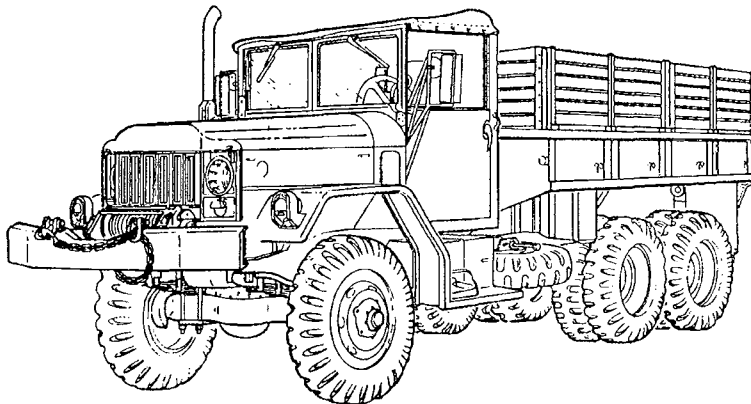


# TECHNICAL MANUAL

## FIELD AND SUSTAINMENT MAINTENANCE

### FOR

#### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)



TRUCK, CARGO, M35A2 (2320-00-077-1616) (EIC: BMA)  
(2320-00-077-1617) (EIC: BMB)

TRUCK, CARGO, XLWB, M36A2 (2320-00-077-1618) (EIC: BMC)  
(2320-00-077-1619) (EIC: BMD)

TRUCK, CARGO, DROPSIDE, M35A2C (2320-00-926-0873) (EIC: BMR)  
(2320-00-926-0875) (EIC: BMS)

TRUCK, TANK, FUEL SERVICING, M49A2C (2320-00-077-1631) (EIC: BME)  
(2320-00-077-1632) (EIC: BMF)

TRUCK, TANK, WATER, M50A3 (2320-00-937-4036) (EIC: BMT)  
(2320-00-937-5264) (EIC: BMU)

TRUCK, VAN, SHOP, M109A3 (2320-00-077-1636) (EIC: BMJ)  
(2320-00-077-1637) (EIC: BMK)

TRUCK, VAN, REPAIR, M185A3 (4940-00-077-1638) (EIC: BMW)

HOW TO USE THIS MANUAL

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CHAPTER 3  
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INSTRUCTIONS

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DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENTS OF THE ARMY  
AND THE AIR FORCE

AUGUST 2006



**WARNING**

**EXHAUST GASES CAN KILL**

1. DO NOT operate vehicle engine in enclosed area.
  2. DO NOT idle vehicle engine with vehicle windows closed.
  3. DO NOT drive vehicle with inspection plates or cover plates removed.
  4. BE ALERT at all times for exhaust odors.
  5. BE ALERT for exhaust poisoning symptoms. They are:
    - Headache
    - Dizziness
    - Sleepiness
    - Loss of muscular control
  6. If YOU SEE another person with exhaust poisoning symptoms:
    - Remove person from area
    - Expose to open air
    - Keep person warm
    - Do not permit person to move
    - Administer artificial respiration \* or CPR if necessary
- \* For artificial respiration, refer to FM 4-25.11.
7. BE AWARE, the field protective mask for Nuclear-Biological-Chemical (NBC) protection will not protect you from carbon monoxide poisoning. **THE BEST DEFENSE AGAINST EXHAUST POISONING IS ADEQUATE VENTILATION.**

## WARNING SUMMARY

- Hearing protection is required for the driver and co-driver. Hearing protection is also required for all personnel working in and around this vehicle while the engine is running (reference AR 40-5 and DA PAM 40-501).
- If required to remain inside the vehicle during extreme heat, occupants should follow the water intake, work/rest cycle, and other heat stress preventive medicines measures contained in FM 21-10, Field Hygiene and Sanitation.
- Vehicle will become charged with electricity if A-frame contacts or breaks high voltage line. Do not attempt to leave vehicle while voltage line is in contact with A-frame or vehicle. Leaving the vehicle may result in injury to personnel.
- Air compressor becomes hot during operation. Allow air compressor to cool before handling, or injury to personnel may result.
- Do not disconnect air couplings before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.
- Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.
- Alternator must be supported during removal. Failure to support alternator may cause injury to personnel or damage to equipment.
- Do not use a dry brush or compressed air to clean brakeshoes. There may be asbestos dust on brakeshoes, which can be dangerous to your health if you breathe it. (Brakeshoes must be wet and a soft bristle brush must be used).
- Leaves and plates of assembled spring are under tension. Restrain all leaves and plates while removing center bolt. Release tension slowly. Failure to comply may result in injury to personnel.
- When assembling plates and leaves with C-clamp, the plates and leaves will be under tension. Use care not to disturb the assembly until center bolt and nut are tightened. Failure to do so may result in injury to personnel.
- Axle is heavy. Ensure axle is balanced and personnel are clear before lowering axle. Failure to do so may result in injury to personnel.
- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin.
- Do not smoke, have open flame, or make sparks when performing battery maintenance. Batteries may explode causing severe injury to personnel.
- Remove all jewelry such as rings, identification tags, and bracelets. If jewelry or disconnected battery ground cable contacts battery post, a direct short can result, causing damage to equipment or severe injury to personnel.
- When disconnecting battery cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage, or battery explosion, and severe injury to personnel.
- Ensure new longer front brake hoses, currently used on 5-ton trucks, are installed on all 2 1/2 ton trucks. Old shorter front brake hoses are subject to failure during full steering travel and must be replaced with new longer front brake hoses. Failure to do this may result in injury or death to personnel.
- Never stand between test vehicles. Assistant must remain in secondary vehicle to engage service brake if cable snaps or automatic brake fails. Failure to do so may result in injury to personnel.
- All personnel must stand clear during removal of cargo body dropside. Cargo body dropside will swing free when pins are removed and injury to personnel may result.
- Eye protection is required when using wire brush for cleaning. Failure to do so may result in injury to personnel.

## WARNING SUMMARY (Contd)

- Compressed air used for cleaning must not exceed 30 psi (207 kPa). Wear goggles/face shield and gloves when cleaning with compressed air. Failure to do so may result in injury to personnel.
- Do not remove inlet hose and outlet hose when engine is hot. Failure to comply may result in injury to personnel.
- All personnel must stand away from engine during crank test. Wear eye protection during crank test. Failure to stand clear and wear eye protection may cause injury or death to personnel.
- Discharge valve internal spring is compressed in cap. Eye protection must be worn when removing screws and cap from valve housing. Failure to do this may cause injury to personnel.
- Eye protection must be worn during spring and cap installation. Failure to do this may result in injury to personnel.
- Stay clear of drive gear area during inspection of input drive shaft seal when engine is operating. Failure to stay clear of drive gear area may result in injury to personnel.
- Ensure engine compartment is free of all tools and working materials before starting engine. Failure to do so may result in damage to equipment and injury to personnel.
- Do not perform engine coolant heater testing while smoking or within 50 feet of sparks or open flames. Fuel is flammable and can explode easily causing injury or death to personnel and damage to equipment.
- Allow time for heater to cool before removing from test equipment. Failure to do so may result in injury to personnel or damage to equipment.
- Keep hands clear of supported engine during placement of engine mounts. Failure to do so may result in injury to personnel.
- Hand protection must be worn during nut retightening. Engine surface is hot and can cause injury to personnel.
- Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.
- Before performing fuel system procedures, allow engine to cool. Failure to do so may result in injury or death to personnel.
- Flywheel is heavy. Use care when removing flywheel. Failure to do so may result in injury to personnel.
- Do not put fingers between frame and engine support. Jack failure may result in injury to personnel.
- Do not perform fuel burning personnel heater testing while smoking or within 50 feet of sparks or open flame. Fuel is flammable and can explode, causing injury or death to personnel and damage to equipment.
- Eye protection is required during inspection of fuel injection pump and drive gear input shaft seal with engine operating. Oil may spray or splash from gear area. Failure to wear eye protection may result in injury to personnel.
- There is enough fuel pressure to penetrate skin when removing injector tubes. Wear hand protection at all times when removing injector tubes. Failure to do so may result in injury to personnel.
- Ensure fuel shutoff valve is OFF and remove throttle cable before cranking engine. Failure to do so may result in injury to personnel.
- Eye protection is required when performing fuel system troubleshooting checks. Failure to wear eye protection may result in injury to personnel.

## WARNING SUMMARY (Contd)

- Ignition switch must remain OFF during fuel system troubleshooting checks. Failure to verify that ignition system is turned off may result in injury to personnel.
- Keep fingers clear of hood and cowling when replacing hinge. Failure to do so may result in injury to personnel.
- Hot coolant is under pressure. Care should be used when removing coolant filler cap or inspecting hot engine coolant leaks. Steam or hot coolant under pressure may cause severe injury to personnel.
- Do not touch hot exhaust system components with bare hands. Severe injury to personnel may result.
- Short front flexible hydraulic brake lines are subject to failure during full steering travel and must be replaced with new, longer flexible hydraulic brake lines P/N 7409330. Failure to comply may cause injury or death to personnel.
- Weight of vehicles must be supported on jack stands at all times. Do not attempt to support weight of vehicle on hydraulic jack. Failure to comply may result in injury or death to personnel.
- Ensure lifting capacity is greater than weight of cargo body. Failure to do so may result in injury to personnel or damage to equipment.
- Ensure lifting capacity is greater than 5,535 lb (2513 kg). Failure to do so may result in injury to personnel or damage to equipment.
- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.
- Lifting device must have a weight capacity greater than the weight of the engine and transmission to prevent damage to equipment and injury to personnel.
- Stay clear of moving parts. Failure to do so may result in injury or death to personnel.
- Exhaust gases can kill. Do not operate personnel heater in enclosed areas. Ensure work area is well ventilated and exhaust fumes are directed away from the test area.
- Failure to perform preliminary inspection on a deadlined vehicle may result in injury to personnel and/or damage to equipment.
- Pressure plate is heavy. Support pressure plate during removal. Failure to do so may result in injury to personnel.
- Use prybar to free engine during lifting operations. Failure to do so may result in injury to personnel.
- Turn vehicle engine off before installing pulse tachometer. Failure to do so may result in injury to personnel.
- Do not remove radiator cap when engine is hot. Wait until engine cools. Failure to wait may cause injury to personnel.
- Do not place fingers between frame and crossmember while replacing mount. Doing so may result in injury to personnel.
- Support cab body while in raised position for mount replacement. Failure to do so may result in injury to personnel.
- If rod clevis is not positioned tightly against cover window bearing screw, fuel shutoff rod may be binding. Verify fuel shutoff rod travels freely before adjusting clearance between rod clevis and bearing screw. Failure to verify fuel shutoff rod condition may result in governor sticking under acceleration and injury to personnel.
- Gloves, eyeshields, and dust mask must be worn during panel removal and installation. Failure to do so may result in injury to personnel.

## WARNING SUMMARY (Contd)

- Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

- Do not remove slave receptacle before disconnecting battery ground cables. If energized battery cables contact cab, a direct short will result and may cause injury to personnel.
- Wear leather gloves when handling cable. Do not let cable run through hands. Broken or rusty wires can cause injury to personnel.
- Ensure vehicle is firmly supported while spring seat is removed. Failure to comply may result in injury to personnel.
- Eye protection must be worn when removing or installing springs under tension. Failure to do so may result in injury to personnel.
- When using steam cleaning equipment, do not come in direct contact of spray. Burns or severe injury to personnel may result.
- All sunshields must be rolled up and properly secured prior to vehicle operation. Failure to do so may result in injury or death to personnel.
- Support capacity must be greater than weight of van body. Ensure that support capacity is not less than 5,535 lb (2,513 kg). Failure to comply may result in injury to personnel and damage to equipment.
- Place support under radiator before removing support plate. Failure to do so may result in injury to personnel and damage to equipment.
- Tandem axle is heavy. Support tandem axle during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.
- Ensure lifting capacity is greater than weight of tank body. Failure to do so may result in injury to personnel.
- Be careful when working under tank body placed on supports. Tank body may fall causing injury to personnel.
- Use caution when testing thermostat, hot water may cause injury to personnel.
- Never inflate a tire without a tire inflation cage. Injury or death to personnel may result from exploding wheel components.
- Always use tire inflation equipment specified in TM 9-2610-200-14. Warn personnel to stand 10 ft (3.1 m) clear of tire inflation cage while inflating tire. Injury or death may result from exploding wheel components.
- Never rest or lean against tire inflation cage while tire is being inflated or injury or death to personnel may result.
- Never remove tire lock ring without first deflating tire. Lock ring may explode off, causing injury or death to personnel.
- Lock ring must be properly seated around wheel when installed. If lock ring is not correctly installed, it may explode off when tire is inflated, causing injury or death to personnel.

## WARNING SUMMARY (Contd)

- Never attempt to correct seating of lock ring by hammering, striking, or forcing while tire is inflated. Lock ring may explode off, causing injury or death to personnel.
- Ensure transfer case is securely mounted to jack with safety chain or strap. Failure to do so may result in injury to personnel.
- Transfer case is heavy and bulky. Allow adequate clearance to remove transfer case from vehicle. Failure to do so may result in injury to personnel.
- Hand protection must be worn at all times when handling heated vibration damper and pulley. Failure to do so may cause injury to personnel.
- Completely deflate tires before removing from axles if there is obvious damage to wheel components. Injury or death to personnel may result from exploding wheel components.
- Always use hand throttle to control engine speed when operating winch. Avoid sudden change in engine speed. Rough or jerky operations may cause broken shearpins and snapped cables. Injury to personnel or damage to equipment may result.
- Ensure rear closure assembly is supported when removing screws. Failure to do so may allow rear closure assembly to drop unexpectedly causing injury to personnel.
- If NBC exposure is suspected, all air filter media must be handled by personnel wearing protective equipment. Consult your NBC officer or NBC noncommission officer for appropriate handling and disposal instructions.

NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel. Failure to do so may result in injury to personnel.

- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.
- Eye protection must be worn during fuel tank replacement. Failure to do so may result in injury to personnel.
- Steering gear is heavy. Support steering gear during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.
- Windshield glass may be sharp. Wear gloves and protective clothing during windshield glass removal and installation. Failure to do so may result in injury to personnel.



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TECHNICAL MANUAL  
VOLUME 1 OF 2  
FIELD AND SUSTAINMENT MAINTENANCE MANUAL  
FOR  
2-1/2-TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

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Truck, Van, Repair, M185A3	4940-00-077-1638	

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## HOW TO USE THIS MANUAL

### ABOUT YOUR MANUAL

Prior to performing vehicle maintenance, you must be familiar with the structure and content of this Technical Manual (TM). Knowing how to use this manual allows you to quickly find information and decrease the time required to perform a procedure.

This TM has the following key features:

- **Work Package Format**—This TM is modular and is organized into Work Packages (WP). Each WP is a stand-alone information package. Each WP has a two-character plus six-digit number (e.g., WP 0001 00). The first four digits identify the sequential WP number (i.e., 0001, 0002, 0003, etc.), and the last two digits indicate the revision level (i.e., 00 is the initial release; 01 is revision 1; 02 is revision 2, etc.).
- **Cover**—Chapter numbers and titles are listed on the front cover for quick reference.
- **Table of Contents**—WP titles and numbers are listed in the Table of Contents of this TM.
- **Acronyms and Abbreviations**—A list of acronyms and abbreviations that are used throughout this manual is provided in WP 0001 00.
- **Illustrations**—The illustrations contain numerical callouts to identify parts, components, etc., mentioned in the text. Numerical callouts generally appear in clockwise order, beginning at the 11 o'clock position.
- **Index**—The alphabetical index is located immediately following the last WP. The index lists maintenance procedures and the WP and page number for each entry.

### HOW TO USE YOUR MANUAL

You must familiarize yourself with the entire maintenance procedure before beginning a maintenance task. Here's an example of how to use your manual:

**PROBLEM:** The unit maintenance mechanic receives a report that the starter motor needs to be replaced.

**SOLUTION:** Follow these steps:

1. Locate the WP for Starter Motor Replacement (WP 0088 00) in the Table of Contents or Index.
2. Turn to Starter Motor Replacement (WP 0088 00).
3. Review the Initial Setup section, which contains information you need before starting the maintenance procedure. Included are:

- **Applicable Models:** Vehicle(s) covered in the maintenance task.
- **Tools and Special Tools:** Tools needed to perform the maintenance task.
- **Materials/Parts:** All mandatory replacement parts and materials needed to perform the task.
- **Personnel Required:** The number of personnel required for a task if task requires more than one.
- **References:** Manuals needed to complete the task.
- **Equipment Condition:** Conditions that must exist before starting the task.

This manual was designed so that text and corresponding illustrations appear together. This makes part identification and procedure sequence easier to follow. Illustrations include diagrams of the component, removed from the vehicle, showing part locations, attachments, and spatial relationships.

Your manual is easier to use once you understand its design. We hope it will encourage you to use it more often.



## CHAPTER 1

### GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

#### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

	<u>WP Sequence No.</u>
General Information.....	WP 0001 00
Equipment Description and Data.....	WP 0002 00
Theory of Operation.....	WP 0003 00



## GENERAL INFORMATION

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

## GENERAL INFORMATION

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### SCOPE

This Technical Manual (TM) contains field and sustainment level maintenance instructions for the 2-1/2 ton, 6x6, M44A2 series vehicle (Multifuel).

Field Maintenance is on-system maintenance and is mainly replacement of defective parts and preventative maintenance. Field maintenance returns repaired equipment to operation. It covers crew, unit, and selected DS maintenance tasks. Some "off-system" maintenance can be done at field level, if based on task analysis, it is simple to complete or it is critical to mission readiness.

Sustainment level is off-system maintenance and is mainly repair of defective or worn out equipment/parts. Sustainment maintenance returns repaired equipment/parts to the supply system.

**Type of Manual:** Field and sustainment maintenance.

Vehicle Model Numbers and Equipment Names:

- (1) M35A2 Cargo Truck, WO/W and W/W
- (2) M35A2C Cargo Truck, Dropsides, WO/W and W/W
- (3) M36A2 Cargo Truck, Long Bed, WO/W and W/W
- (4) M49A2C Fuel Tank Truck, WO/W and W/W
- (5) M50A3 Water Tank Truck, WO/W and W/W
- (6) M109A3 Shop Van, WO/W and W/W
- (7) M185A3 Repair Van, WO/W

**Purpose of Equipment:** The M44A2 series vehicle is a logistic support vehicle designed to enable field commanders to maintain combat force readiness by quickly deploying troops.

**Special Inclusions:** None

### 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, Functional Users Manual for The Army Maintenance Management System (TAMMS).

### RECORDING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your vehicle needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. The preferred method for submitting a Quality Deficiency Report (QDR) is through the Army Electronic Deficiency Reporting System (EDRS). The web address is: <https://aeps.ria.army.mil>. This is a secure site requiring a password which can be applied for on the front page of the website. If the above method is not available to you, put it on an SF 368, Product Quality Deficiency Report (PQDR), and mail it to us at: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/PQDR MS 267, 6501 E. 11 Mile Road, Warren, MI 48397-5000. We'll send you a reply.

## **GENERAL INFORMATION (Contd)**

### **EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD)**

The EIR MD, TB 43-0001-62, is a bulletin published quarterly to provide instructions for corrective action to be taken regarding equipment faults reported through EIRs. In addition to EIR information, it contains information on proposed MWOs, Warranty/Recall information, publication actions, some resulting from DA Form 2028 (Recommended Changes to Publications and Blank Forms), engineering tests, design activities, depot operations, and support maintenance activities such as improvement of maintenance program planning and activities. To use this bulletin to your advantage, scan subject matter of each issue for topics concerning M44A2 series trucks. Familiarize yourself with present or projected actions that will affect your vehicle and this publication.

### **HAND RECEIPT**

There is not a separate hand receipt for M44A2 series vehicles. For a complete list of end-item-related equipment (i.e., COEI, BII, and AAL), refer to TM 9-2320-361-10.

### **CORROSION PREVENTION AND CONTROL (CPC)**

Corrosion Prevention and Control (CPC) of Army material is a continuing concern. It is important that any corrosion problems be reported so corrections and/or improvements can be made to future items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation to metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is rusting iron. Corrosion damage in metals can be seen, depending on the metal, in the form of tarnish, surface residue or oxidation, pitting, and perforation.

Plastics, composites, and rubbers will also degrade. Their deterioration is caused by exposure to heat, oxygen, solvents, or light (typically ultraviolet). An example is deteriorated rubber weather stripping. Degradation from excessive exposure of these elements can be seen in the form of shrinkage, hardening, cracks, and breaks.

If a corrosion or degradation problem is identified, it should be reported using SF 368, Product Quality Deficiency Report. Use of key words such as corrosion, rust deterioration, and cracking will ensure that the information is identified as CPC problem.

SF 368 should be submitted to the address specified in DA PAM 750-8, Functional Users Manual for The Army Maintenance Management System (TAMMS).

### **OZONE DEPLETING SUBSTANCES (ODS)**

The continued use of ODS has been prohibited by Executive Order 12856 of 3 August 1993. The use of ODS in Army equipment is prohibited.

## **GENERAL INFORMATION (Contd)**

### **ARMY PETROLEUM, OIL, AND LUBRICANTS (POL)**

Proper disposal of hazardous waste material is vital to protecting the environment and providing a safe work environment. Materials such as batteries, oils, and antifreeze must be disposed of in a safe and efficient manner.

The following references are provided as a means to ensure that proper disposal methods are followed:

- Waste Disposal Instructions (MEIS/MIDI CD ROM)
- National Environmental Policy Act of 1969 (NEPA)
- Clean Air Act (CCA)
- Resource Conservation and Recovery Act (RCRA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Emergency Planning and Community Right to Know Act (EPCRA)
- Toxic Substances Control Act (TSCA)
- Occupational Safety and Health Act (OSHA)

The disposal of Army Petroleum, Oil, and Lubricants (POL) products are affected by some of the above regulations. State regulations also may apply to POL. If you are unsure of which legislation affects you, contact state and local agencies for regulations regarding proper disposal of Army POL.

### **DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE**

Procedures for destruction of Army material to prevent enemy use can be found in TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.

### **QUALITY OF MATERIAL**

Material used for replacement, repair, or modification must meet the requirements of this manual. If quality of material requirements are not stated in this manual, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

### **SAFETY, CARE, AND HANDLING**

Observe all warnings, cautions, and notes prior to operating and servicing equipment. If uncertain how to perform any maintenance procedure, ask your supervisor for assistance.

**GENERAL INFORMATION (Contd)**

**ABBREVIATIONS AND ACRONYMS**

The following list provides the abbreviations and acronyms, and their definitions used in this manual.

<b>Abbreviation/Acronym</b>	<b>Definition</b>
°	Degrees
-	Minus, Subtraction, or Negative
X or x	Multiplication
+	Plus, Addition
±	Plus or Minus
°C	Degrees Celsius
°F	Degrees Fahrenheit
A	Ampere, Annual
AAL	Additional Authorization List
AC	Alternating Current
A/h	Ampere Per Hour
alt.	Alternator
amp	Ampere
AR	Army Regulation
ASTM	American Society for Testing Materiel
ATTN	Attention
B	Biennially
BII	Basic Issue Item
C	Celsius
cc, CC	Cubic Centimeter
cfm	Cubic Feet Per Minute
CI	Compression Ignited
cm	Centimeter
cm/m	Cubic Meters Per Minute
Co.	Company
Contd	Continued
Contd	Continued
Corp.	Corporation
CTA	Common Table of Allowance
CV	Constant Velocity
DA	Department of the Army
dc, DC	Direct Current
DCA	Diagnostic Connector Assembly
DD	Defense Department
dia., DIA	Diameter
dr.	Drive
EA	Each
EIR	Equipment Improvement Recommendation
etc.	etcetera
F	Fahrenheit
FM	Field Manual
FPT	Female Pipe Thread
ft, Ft, FT	Foot, Feet
GAA	Grease, Automotive and Artillery
gal.	Gallon(s)
gen.	Generator
GL	Gallon
GO	Gear Oil



**GENERAL INFORMATION (Contd)****ABBREVIATION AND ACRONYMS (Contd)**

<b>Abbreviation/Acronym</b>	<b>Definition</b>
GR.....	Gross
HDO .....	Heavy Duty Oil
Hg.....	Mercury
hp, HP .....	Horsepower
hr .....	Hour
hrs .....	Hours
ID .....	Identification
I.D. ....	Inside Diameter
in., IN.....	Inch
Inc. ....	Incorporated
Ind.....	Industries
Int.....	International [check]
k .....	Kilo, Thousand
kg .....	Kilogram
km/h .....	Kilometers Per Hour
km/L.....	Kilometers Per Liter
kPa .....	Kilopascal
KT .....	Kit
kW.....	Kilowatt
l or L .....	Liter(s)
lb, Lb, LB.....	Pound(s)
lb-ft.....	Pound-Feet
lb-in. ....	Pound-Inch
m, M .....	Meter
mi .....	Mile(s)
ml .....	Milliliter
MAC.....	Maintenance Allocation Chart
MD .....	Maintenance Digest
MIL.....	Military
min.....	Minimum, Minute
mm.....	Millimeter
mpg.....	Miles Per Gallon
mph.....	Miles Per Hour
MPT.....	Male Pipe Thread
MS .....	Materiel Specification
MTOE.....	Modified Table of Organization and Equipment
MWO .....	Modification Work Order
NBC.....	Nuclear, Biological, and Chemical
neg.....	Negative
N·m.....	Newton-Meter
NO., No., no. ....	Number
NSN .....	National Stock Number
OE .....	Oil, Engine
OEM.....	On Equipment Materiel [AR 310-50]
ORD .....	Operational Requirements Document
oz., OZ.....	Ounce
PAM, Pam, or pam .....	Pamphlet
para. ....	Paragraph
paras. ....	Paragraphs
PC .....	Piece

**GENERAL INFORMATION (Contd)****ABBREVIATION AND ACRONYMS (Contd)**

<b>Abbreviation/Acronym</b>	<b>Definition</b>
P-D	Petroleum-Distillate
PMCS	Preventive Maintenance Checks and Services
P/N	Part Number
pos	Positive
PR	Pair
psi	Pounds Per Square Inch
psig	Pounds per Square Inch Gauge
pt, PT	Pint or Point
PTF	Poly Tube Fitting(s)
PTO	Power Takeoff
qt, QT	Quart
REF	Reference(s)
rpm, RPM	Revolutions Per Minute
RTV	Room Temperature Vulcanizing
S	Semiannual
SAE	Society of Automotive Engineers
SF	Standard Form
SH	Sheet
SI	Spark Ignited
SMR	Source, Maintenance, and Recoverability
Sq	Square
STE/ICE	Simplified Test Equipment for Internal Combustion Engines
TACOM	Tank-automotive and Armaments Command
TAMMS	The Army Maintenance Management System
TB	Technical Bulletin
TC	Technical Circular
Thd	Thread
TK	Transducer Kit
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TU	Tube
U-joint	Universal-Joint
U/M	Unit of Measure
UNF	Unified Fine Thread
V	Volt(s)
Vdc, VDC	Volts Direct Current
VID	Vehicle Identification (number)
VTM	Vehicle Test Meter
w/, W/	With/
W/W	With/Winch
WO/	Without/
WO/W	Without/Winch
XLWB	Extra Long Wheelbase
yd, YD	Yard

## GENERAL INFORMATION (Contd)

### GENERAL PREPARATION OF VEHICLES FOR SHIPMENT

This Work Package (WP) provides instructions on preserving and protecting M44A2 series vehicles in preparation for shipment. Protection for vehicles and accompanying equipment must be sufficient to protect the material against deterioration and physical damage.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

#### **CAUTION**

Cleaning materials or paints containing chlorinated hydrocarbon class solvents are not to be used on composite taillights and parking lights. Damage to taillight and parking light lenses may result.

Prior to application of preservatives, surface must be cleaned to ensure removal of corrosion, soil, grease, or vehicle acid and alkali residues.

**Interior of vehicle.** Remove all dirt and other foreign matter from all painted metal surfaces of the vehicle by scrubbing with cloths soaked in Skysol 100 (item 13, WP 0468 00). Use alcohol (item 6, WP 0468 00) to clean electrical parts and electrical contact points. Use warm water for cleaning rubber parts. Apply preservative compounds to rubber parts as required.

**Exterior of vehicle.** Clean exterior surfaces of vehicle to ensure removal of all dirt and foreign matter. After cleaning, immediately dry parts to remove excess cleaning solutions or residual moisture. Allow parts to air dry or wipe clean with clean, dry, lint-free rag (item 27, WP 0468 00).

## GENERAL INFORMATION (Contd)

### GENERAL PREPARATION OF VEHICLE FOR SHIPMENT (Contd)

#### LUBRICATION

##### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

After cleaning has been accomplished, wipe all grease fittings with Skysol 100 and lubricate vehicle in accordance with WP 0020 00. Remove excess grease after lubrication and before processing.

#### PRESERVATION

All critical unpainted metal surfaces must be protected during shipment. Use procedures and materials listed below. If the preservatives listed below are not available, oil or grease covered in WP 0020 00 may be used for this purpose, but are effective for only a few days; therefore, equipment protected must be closely watched for signs of corrosion. When selecting preservatives, use only those that will not damage the surface to which they are applied.

**Battery Leads.** Disconnect both batteries (WP 0126 00). Each battery lead terminal, including the jumper lead ends, must be wrapped with tape (item 43, WP 0468 00).

**Miscellaneous Preservation.** Coat all unpainted, exposed, or machined metal surfaces on the exterior of the vehicle with corrosion-preventative compound (item 15, WP 0468 00).

#### PACKAGING

**Electrical Openings.** Cover all electrical receptacles with tape (item 43, WP 0468 00) or with plastic caps which will afford the same degree of protection.

#### PACKING

Pack all Basic Issue Items (BII) and Additional Authorization List (AAL) items to prevent mechanical damage.

#### SHIPMENT OF ARMY DOCUMENTS

Prepare all army shipping documents accompanying vehicle in accordance with DA Pam 738-750.

## GENERAL INFORMATION (Contd)

### LOADING AND MOVEMENT OF VEHICLE

For transportability guidance handling and movement of M44A2 series vehicles, refer to TM 55-2320-209-15-1.

### LIMITED STORAGE

Commanders are responsible for ensuring that all vehicles issued or assigned to their command are maintained in a serviceable condition and properly cared for, and that personnel under their command comply with technical instructions. Lack of time, trained personnel, or proper tools may result in a unit being incapable of performing maintenance for which it is responsible. In such cases, unit commanders may, with the approval of major commanders, place a vehicle that is beyond the maintenance capability of the unit in administrative storage. For detailed information, refer to AR 750-1.

### LIMITED STORAGE INSTRUCTIONS

**Time Limitations.** Administrative storage is restricted to a period of 365 days and must not be extended unless the vehicle is reprocessed in accordance with the storage procedure.

**Storage Procedure.** Perform disassembly only as required to clean and preserve exposed surfaces. Except as otherwise noted, and to the maximum extent consistent with safe storage, place the vehicle in administrative storage in as nearly a completely assembled condition as practicable. Install and adjust equipment so that the vehicle may be placed in service and operated with minimum delay.

1. The vehicle should be stored on level ground in the most favorable location available, preferably one which affords protection from exposure to the elements and from pilferage.
2. Perform semiannual Preventative Maintenance Checks and Services (PMCS) (WP 0022 00) on vehicle intended for administrative storage. This maintenance consists of inspecting, cleaning, servicing, preserving, lubricating, adjusting, and replacing minor repair parts as required.
3. Remove both batteries (WP 0127 00), place in covered storage and maintain a charged condition.
4. Provide access to the vehicle to permit inspection, servicing, and subsequent removal from storage.

### INSPECTION IN LIMITED STORAGE

Conduct visual inspection of vehicles in limited storage at least once a month and immediately following hard rains, heavy snowstorms, windstorms, or other severe weather conditions. Perform disassembly as required to fully ascertain the extent of any discovered deterioration or damage. Maintain a record of these inspections for each vehicle. Attach record to vehicle so it is protected from the weather.

Perform necessary reprocessing for limited storage when rust or deterioration is found on any unpainted area. Immediately repair damage caused to vehicle by severe weather conditions. Repair damage to On-Equipment Material (OEM) as necessary. Thoroughly clean, dry, and repaint painted surfaces showing evidence of wear.

### REMOVAL FROM LIMITED STORAGE

Equipment removed from administrative storage will be:

1. Restored to normal operating conditions.
2. Have all MWOs applied.
3. Returned to normal PMCS schedule using last type service completed as a starting point.
4. Calibrate equipment as required (TB 43-180).



## FIELD MAINTENANCE INSTRUCTIONS

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

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#### EQUIPMENT DESCRIPTION AND DATA

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##### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The 2-1/2 ton, 6x6, M44A2 series vehicles (Multifuel) are highly mobile tactical vehicles capable of traveling over most terrain types under severe weather conditions. All vehicles in this series have a multifuel engine that is capable of running on a variety of fuels, including gasoline, diesel, and JP-8. They utilize a common drivetrain, brake system, chassis components, cab body, and electrical system to accommodate a variety of configurations to accomplish multiple combat support and service roles. They can ford hard-bottom water crossings up to 30 in. (76.2 cm) without a deepwater fording kit, and up to 72 in. (182.9 cm) with the kit. The five-speed manual transmission and two speed transfer case provide 10 speed ranges. All vehicles, except the M185A3, may be equipped with a front winch, making them more versatile under difficult field conditions. All M44A2 series vehicles have a pintle hook for towing, and tie-downs and lifting shackles for vehicle transport by road, rail, sea, or air.

Vehicles covered in this manual are designated 2-1/2 ton, 6x6, M44A2 Series vehicle (Multifuel). Designations are as follows:

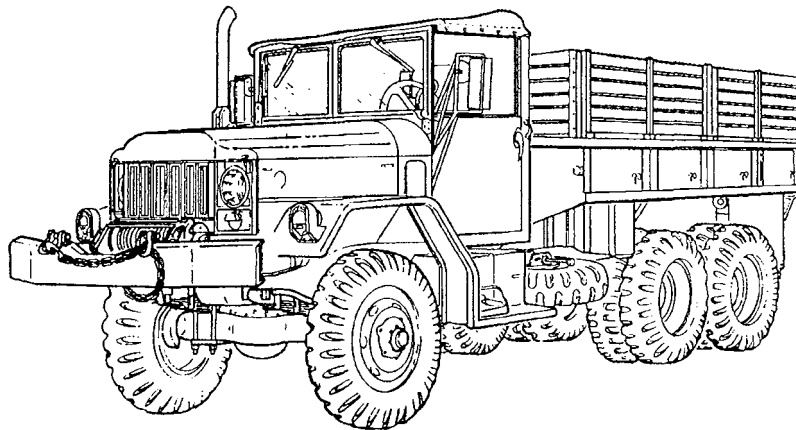
- The 2-1/2 ton refers to the maximum payload these vehicles can carry.
- The 6x6 means all vehicles have six wheel ends and all six are capable of driving power to the ground.
- The M44A2 is the code number assigned to identify this series of vehicles.
- The multifuel means all vehicles are powered by this type of engine.

## EQUIPMENT DESCRIPTION AND DATA (Contd)

### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (Contd)

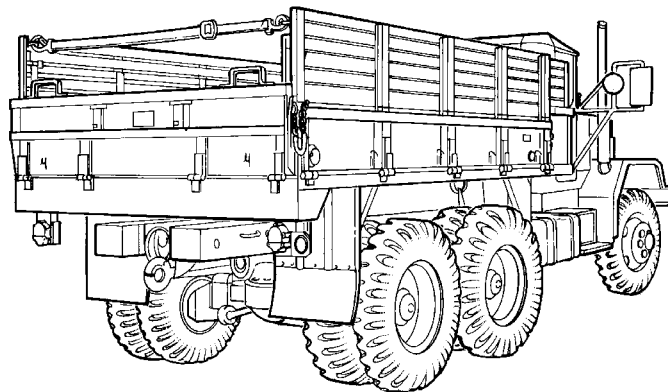
Below is a list of each model in the M44A2 series of vehicles and a brief description of the purpose of each model including characteristics, capabilities, and features.

**M35A2 Cargo Truck, WO/W and W/W** – The M35A2 has a cargo body used for transporting materials, equipment, and/ or personnel. The cargo body has fixed steel welded sides making it the preferred vehicle for use in transporting bulky payloads that may shift during transit. The cargo bed has 270 cu ft (7.7 cu m) of cargo space, removable side racks with built-in fold-down troop seats, and a fold-down tailgate. A bow and tarpaulin kit is available.



**M35A2 CARGO TRUCK W/W**

**M35A2C Cargo Truck With Dropsides, WO/W and W/W** – The M35A2C has a cargo body with dropsides used for transporting materials, equipment, and/or personnel. The cargo body has hinged steel sides that can be folded down or removed for easy loading/off-loading with ground-to-truck forklift operations. The cargo bed has 270 cu ft (7.7 cu m) of cargo space, removable side racks with built-in fold-down troop seats, and a fold-down tailgate. A bow and tarpaulin kit is available.



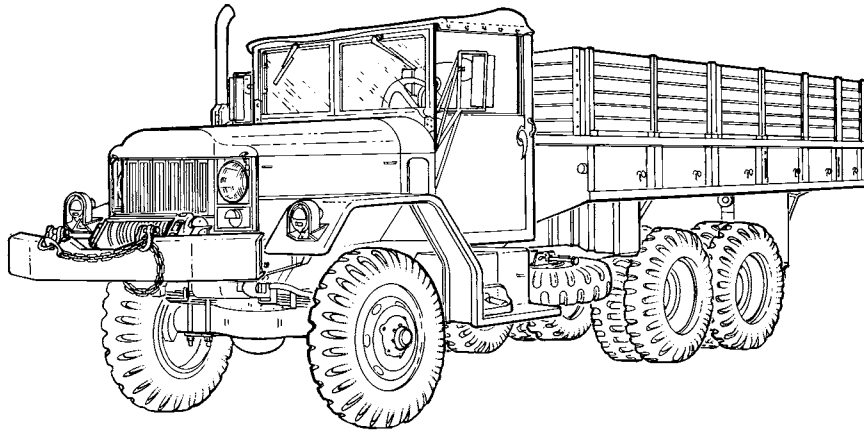
**M35A2C CARGO TRUCK WITH DROPSIDES**



## EQUIPMENT DESCRIPTION AND DATA (Contd)

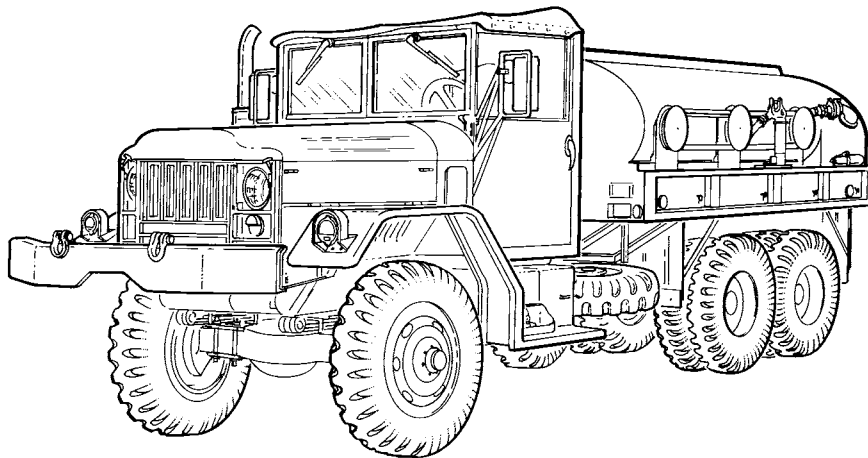
### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (Contd)

**M36A2 Cargo Truck With Long Bed, WO/W and W/W** – The M36A2 has an extra long cargo body with one dropside used for transporting materials and equipment. No troop seats are available for this model. The M36A2 has a 3 ft (0.9 m) longer wheelbase and a cargo body that's 63 in. (160 cm) longer than the cargo body of the M35A2 and M35A2C. The longer bed provides an additional 140 cu ft (3.9 cu m) of cargo space. Only the right side can be folded down or removed for easy loading/off-loading with ground-to-truck forklift operations. A bow and tarpaulin kit is available.



**M36A2 LONG BED CARGO TRUCK W/W**

**M49A2C Fuel Tank Truck, WO/W and W/W** – The M49A2C has a 1,200 gal. (4,542 l) capacity tank body used exclusively to transport and discharge fuel. Each 600 gal. (2271 l) stainless steel tank uses a delivery pump and metering system. The tanks can be filled with or without the use of the delivery pump. The delivery pump, located in the compartment at the rear of the body, can also be used to transfer fuel from one container to another. When transporting fuel cross-country, only the rear tank located over the rear axles may be filled.

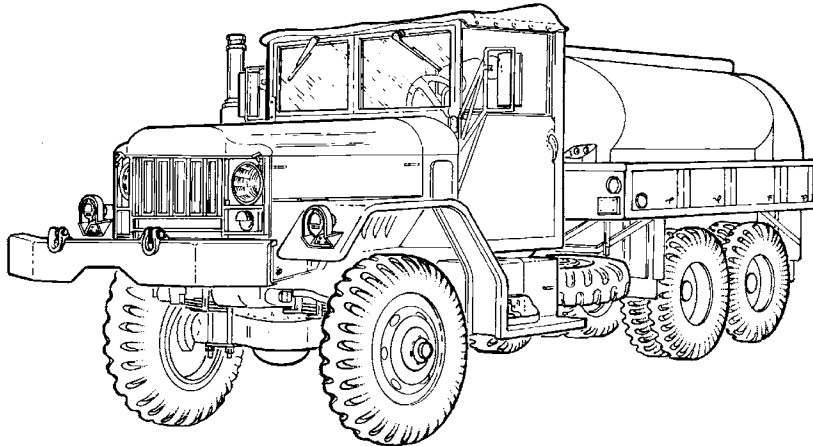


**M49A2C FUEL TANK TRUCK WO/W**

## EQUIPMENT DESCRIPTION AND DATA (Contd)

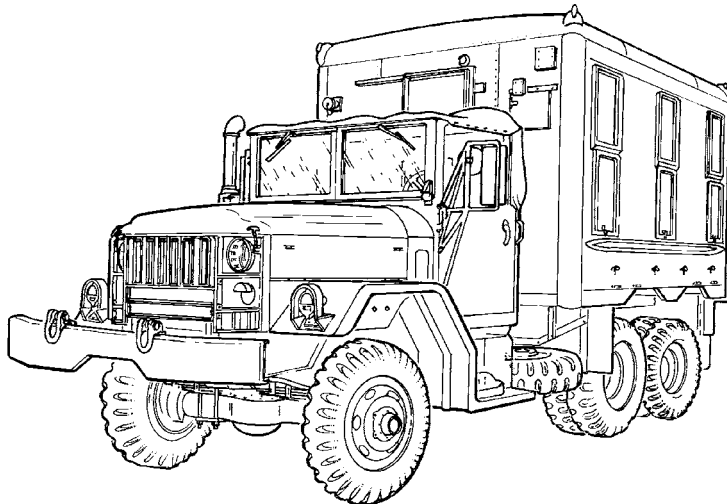
### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (Contd)

**M50A3 Water Tank Truck, WO/W and W/W** – The M50A3 has a 1,000 gal. (3785 l) capacity tank body used exclusively to transport and discharge water. Each 500 gal. (1893 l) stainless steel tank uses a delivery pump. The tanks can be filled or emptied with or without the use of the delivery pump. The delivery pump, located in the compartment at the rear of the body, can also be used to transfer water from one container to another. When transporting water cross-country, only the rear tank located over the rear axles may be filled.



**M50A3 WATER TANK TRUCK WO/W**

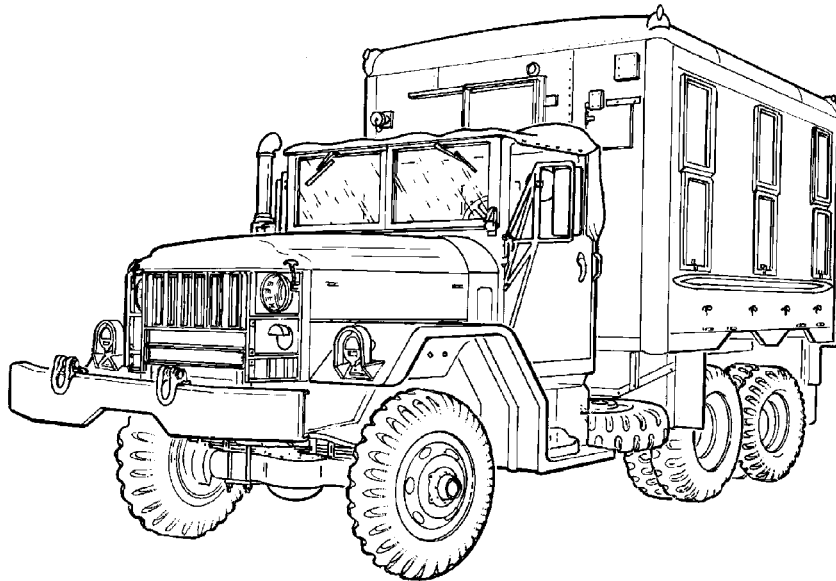
**M109A3 Shop Van, WO/W and W/W** – The M109A3 has an enclosed metal body used as a mobile work shop and for transporting materials and equipment that must be kept dry and free of dust. This vehicle is 10 ft 8 in. (3.3 m) high and is not reducible in height.



**M109A3 SHOP VAN WO/W**

## EQUIPMENT DESCRIPTION AND DATA (Contd)

**M185A3 Repair Van** – The M185A3 has an enclosed metal body used as a mobile repair shop, and contains built-in benches, cabinets, vise, and bench grinder to allow for more extensive field repairs. This vehicle is 10 ft 8 in. (3.3 m) high and is not reducible in height.



## EQUIPMENT DESCRIPTION AND DATA (Contd)

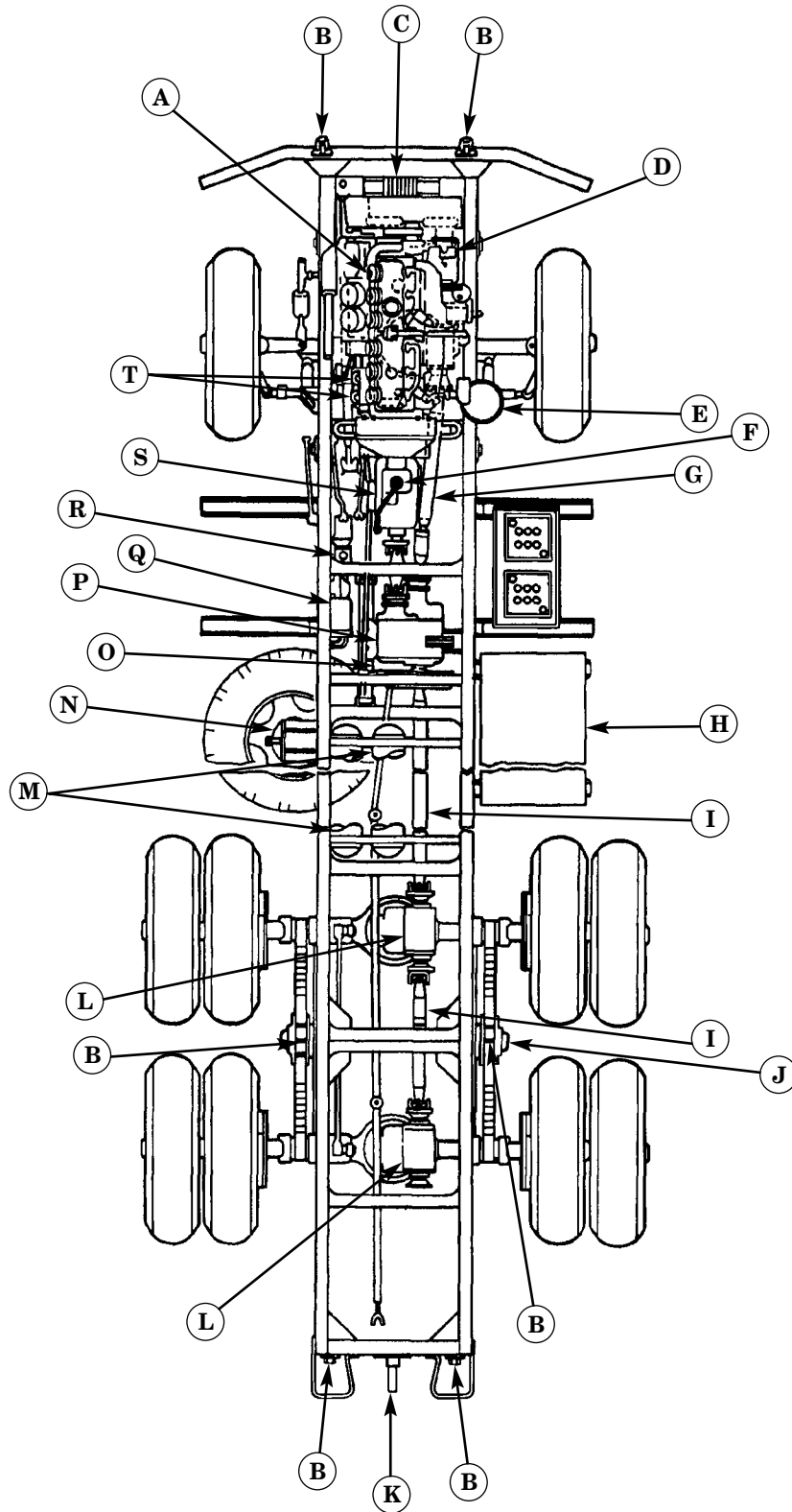
### EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (Contd)

#### LOCATION AND DESCRIPTION OF MAJOR EXTERNAL COMPONENTS

The major chassis components external to the cab and body of M44A2 series vehicles are located and described below. For information on differences between models refer to Table 1, in this Work Package (WP).

- Ⓐ **ENGINE** - Provides power for the vehicle.
- Ⓑ **LIFTING TIEDOWN SHACKLES** - Used for lifting the vehicle in ship-to-shore operations and for tiedown attachments when transporting vehicle.
- Ⓒ **FRONT WINCH** - Used for recovery operations, powered by a propeller shaft extending from transmission power takeoff.
- Ⓓ **PRIMARY FUEL FILTER** - Filters contaminants from fuel.
- Ⓔ **AIR CLEANER** - Filters air before it enters the intake manifold.
- Ⓕ **TRANSMISSION** - Transmits engine power to transfer case.
- Ⓖ **FRONT PROPELLER SHAFT** - Transmits engine power from transfer case to front differential.
- Ⓗ **FUEL TANK** - Stores fuel.
- Ⓘ **REAR PROPELLER SHAFT(S)** - Transmits engine power from transmission to transfer case and then to rear differentials.
- Ⓙ **REAR BOGIE** - Suspension system that supports rear vehicle weight.
- Ⓚ **TOWING PINTLE HOOK** - Permits towing of vehicles or equipment.
- Ⓛ **REAR DIFFERENTIALS** - Transmits power from propeller shaft to axles.
- Ⓜ **AIR RESERVOIRS** - Storage tank(s) for compressed air.
- Ⓝ **SPARE TIRE CARRIER** - Stores spare tire.
- Ⓞ **TRANSFER POWER TAKEOFF** - Supplies power to drive pump for water and fuel tank vehicles.
- Ⓟ **TRANSFER CASE** - The two-speed transfer case along with five forward speed transmission provides 10 speed ranges to front and rear differentials.
- Ⓠ **AIR-HYDRAULIC CYLINDER** - Air-hydraulic cylinder increases fluid pressure to the wheel cylinders. The wheel cylinders expand and press the brakeshoes against the drum to slow or stop the vehicle.
- Ⓡ **MASTER CYLINDER** - Stores brake fluid in reservoir and supplies hydraulic pressure to displace fluid into the brake system. The master cylinder also compensates for seepage from the system.
- Ⓢ **TRANSMISSION POWER TAKEOFF** - Supplies power to drive front winch on all vehicles.
- Ⓣ **SECONDARY AND FINAL FUEL FILTERS** - Filters fuel from primary fuel filter before fuel enters fuel injection pump.

EQUIPMENT DESCRIPTION AND DATA (Contd)



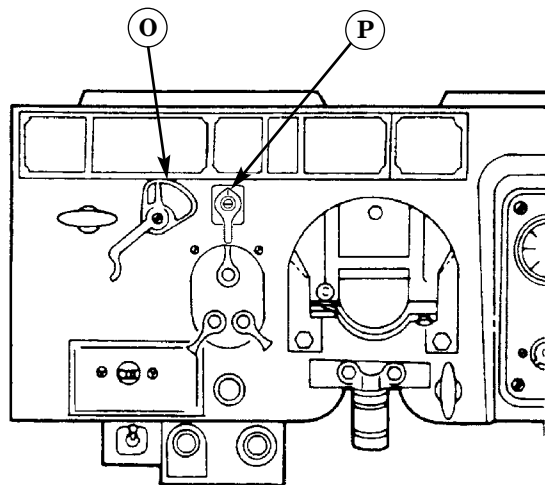
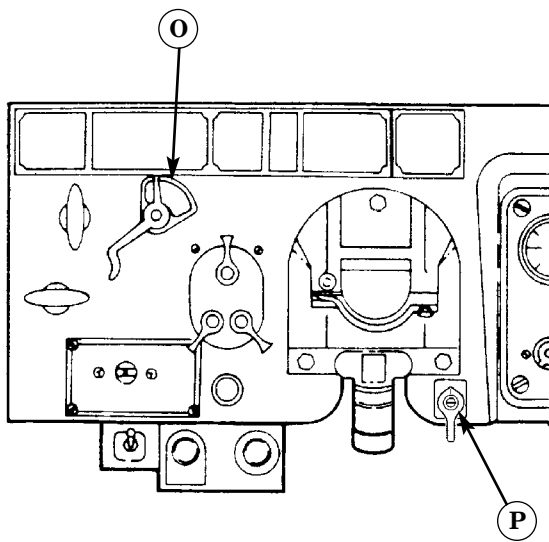
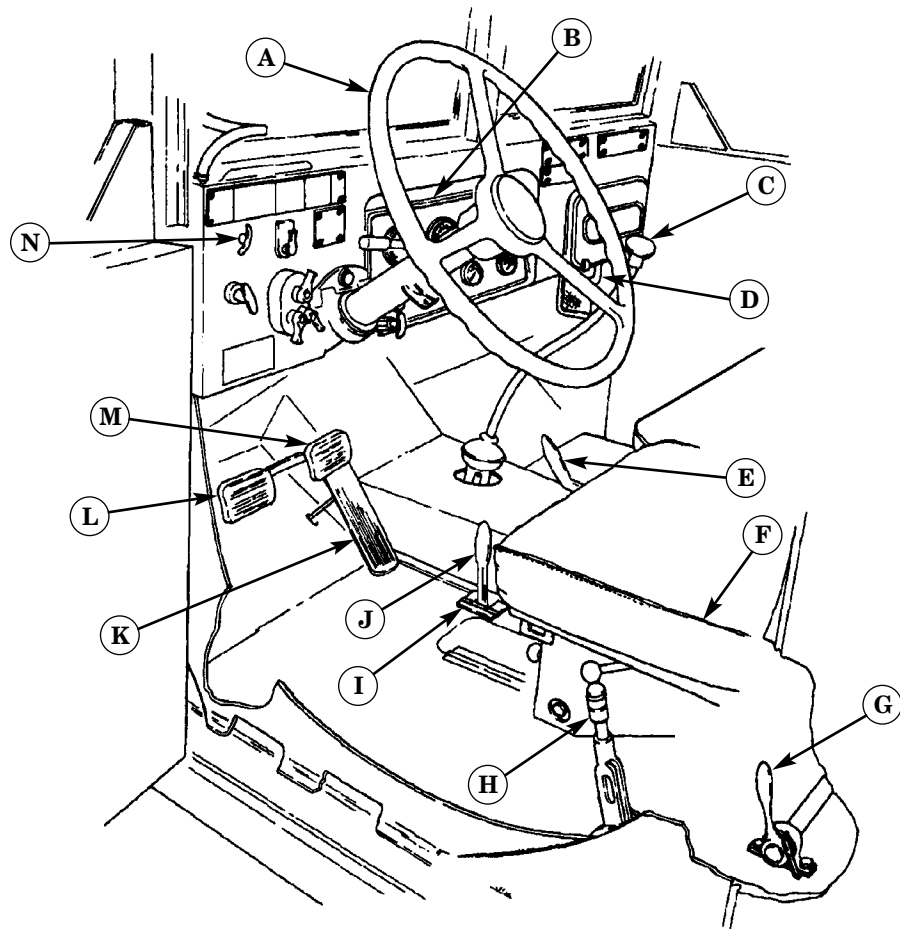
## EQUIPMENT DESCRIPTION AND DATA (Contd)

### LOCATION AND DESCRIPTION OF MAJOR INTERNAL COMPONENTS

The major controls and indicators found in the cab interior of M44A2 series vehicles are located and described below. Internal components not covered here may be found in TM 9-2320-361-10 or in the applicable maintenance procedure WP within this manual.

- Ⓐ **STEERING WHEEL** – The wheel on the steering column by which the truck's direction of motion is controlled.
- Ⓑ **INSTRUMENT CLUSTER** – Contains gauges and indicators for monitoring engine performance.
- Ⓒ **TRANSMISSION GEARSHIFT LEVER** – Located at center of floor tunnel, it enables the operator to shift the manual transmission in and out of gear.
- Ⓓ **COWL VENT** - Located on each side of cowl near floor, it enables outside air to enter cab for ventilation purposes.
- Ⓔ **TRANSFER CASE SHIFT LEVER** – Located on the floor tunnel, the lever enables the transfer case to be placed in high range, low range, or neutral.
- Ⓕ **DRIVER'S SEAT** – The adjustable single seat located on left side of vehicle. Safety belts are provided for both driver and passenger seats.
- Ⓖ **TRANSFER POWER TAKEOFF LEVER** – Located on cab floor at left side of driver's seat, it engages the power takeoff (PTO) on the transfer case for operation of delivery pump on water and fuel tank trucks.
- Ⓗ **PARKING BRAKE LEVER** – Located on floor adjacent to driver's seat, it is used to apply or release vehicle parking brake. The knob at end of lever is turned clockwise to increase brake cable tension.
- Ⓘ **PTO LEVER HINGE LOCK** – Mounted on cab floor adjacent to transmission power takeoff (PTO) lever, it holds transmission PTO lever in neutral (N) position to prevent accidental engagement.
- Ⓙ **TRANSMISSION POWER TAKEOFF LEVER** – Located on driver's side cab floor, it is used to operate the winch to pay-out and pay-in winch cable.
- Ⓚ **ACCELERATOR PEDAL** – Located on driver's side floor adjacent to tunnel, it is used to control engine speed when driving vehicle.
- Ⓛ **CLUTCH PEDAL** – Located to the left of service brake pedal, it controls the clutch to allow shifting of gears by disengage the transmission with the engine.
- Ⓜ **SERVICE BRAKE PEDAL** – Located to the right of clutch pedal, it controls the wheel brakes for slowing and stopping vehicle.
- Ⓝ **ENGINE STOP CONTROL** – The T-handle, located on instrument panel to the left of steering column, used to shut down engine.
- Ⓞ **ACCESSORY POWER SWITCH** – Routes power to starter system, instrument panel gauges, fuel pump, and low pressure warning buzzer.
- Ⓟ **ENGINE START SWITCH** – Located on instrument panel either to the right of steering column or above light switch, it operates engine starter motor to crank engine.

EQUIPMENT DESCRIPTION AND DATA (Contd)



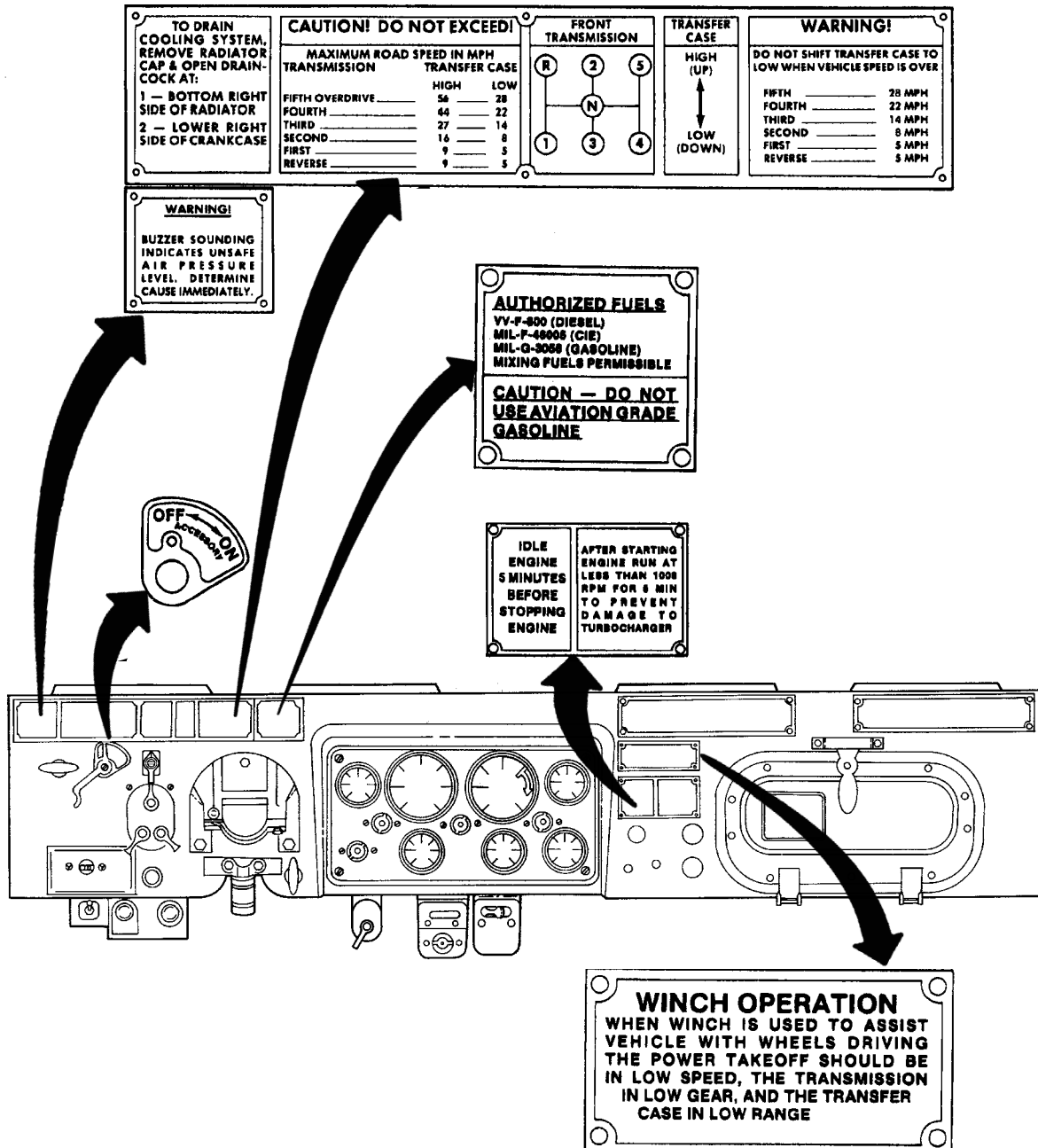
**EQUIPMENT DESCRIPTION AND DATA (Contd)**

**LOCATION AND DESCRIPTION OF DECALS AND DATA PLATES**

Warning, caution, and instruction decals and data plates for M44A2 series vehicles are located and identified below. If any decal or data plate is found to be missing or is not legible, it must be promptly replaced. Refer to TM 9-2320-361-24P for replacement decals and data plates.

Illustrated below and on the next two pages are data plates located inside the cab. These plates are common to one or more models covered in this manual.

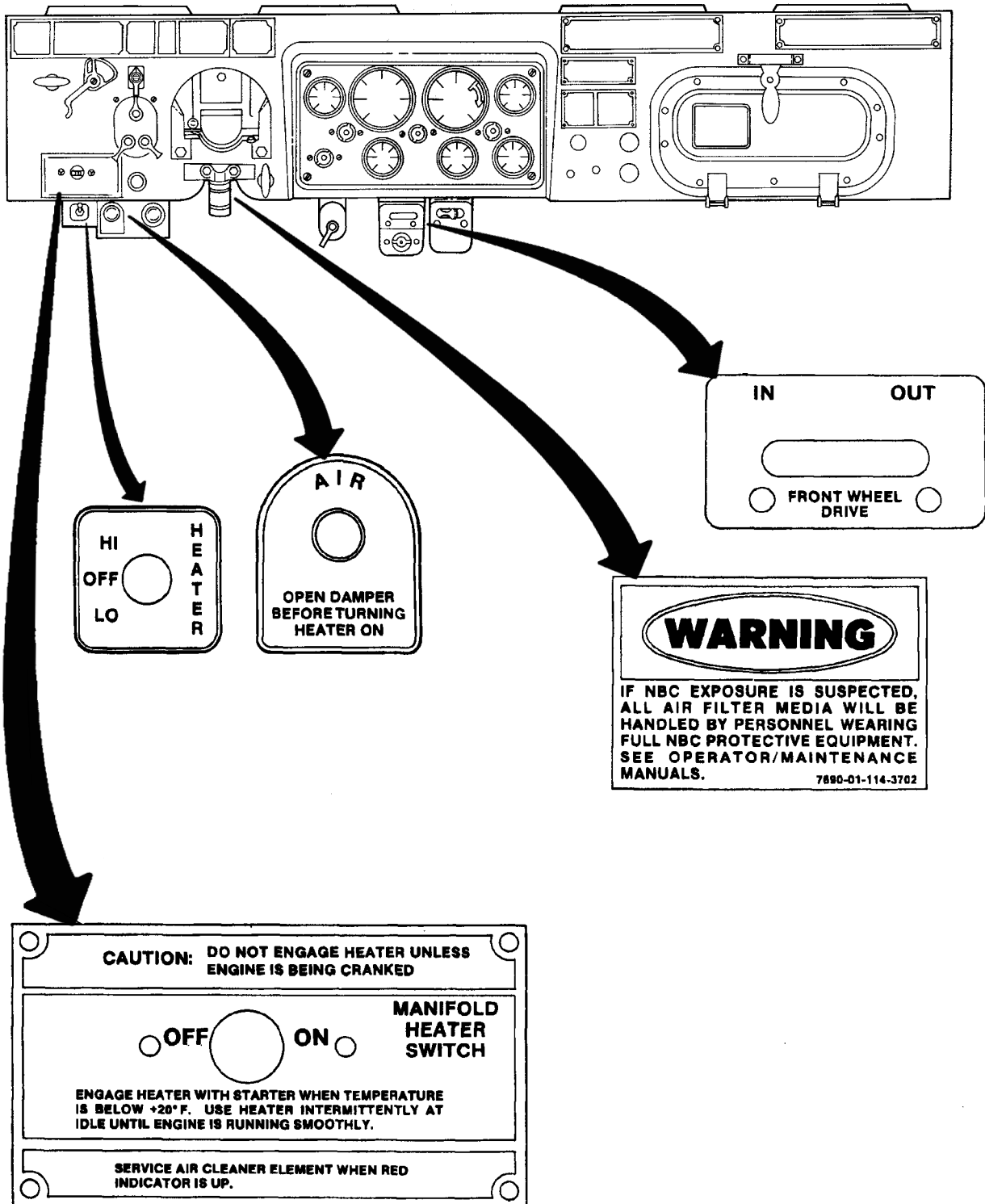
**WARNING AND DATA PLATES FOUND ON ALL VEHICLES**





### EQUIPMENT DESCRIPTION AND DATA (Contd)

### WARNING AND DATA PLATES FOUND ON ALL VEHICLES (Contd)



EQUIPMENT DESCRIPTION AND DATA (Contd)

WARNING AND DATA PLATES FOUND ON ALL VEHICLES (Contd)

<b>TRUCK, CARGO, DROP SIDE: 2-1/2 TON, 6X6, M35A2C W/W</b>				<b>IDENTIFICATION DATA</b>																													
<b>WEIGHT &amp; DIMENSION DATA</b>				STOCK NO. 2320-926-0875																													
C.G. LOCATION BASED ON 5,000 LBS. PAYLOAD W/O CREW				IDENTIFICATION NO.																													
				MFD. BY																													
<table border="1"> <tr> <th>WEIGHTS W/O CREW</th> <th>EMPTY</th> <th>CROSS CTRY</th> <th>HIGHWAY</th> </tr> <tr> <td>PAYLOAD</td> <td></td> <td>5,000</td> <td>10,000</td> </tr> <tr> <td>FRONT AXLE</td> <td>6,450</td> <td>6,646</td> <td>6,842</td> </tr> <tr> <td>INTER AXLE</td> <td>3,540</td> <td>5,942</td> <td>8,344</td> </tr> <tr> <td>REAR AXLE</td> <td>3,540</td> <td>5,942</td> <td>8,344</td> </tr> <tr> <td>TOTAL LBS</td> <td>13,530</td> <td>18,530</td> <td>23,530</td> </tr> <tr> <td>MAX TOWED LOAD LBS</td> <td></td> <td>6,000</td> <td>10,000</td> </tr> </table>				WEIGHTS W/O CREW	EMPTY	CROSS CTRY	HIGHWAY	PAYLOAD		5,000	10,000	FRONT AXLE	6,450	6,646	6,842	INTER AXLE	3,540	5,942	8,344	REAR AXLE	3,540	5,942	8,344	TOTAL LBS	13,530	18,530	23,530	MAX TOWED LOAD LBS		6,000	10,000	CONTRACT NO.	
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SHIPPING CUBAGE 1,252 CU. FT.				U.S. PROPERTY																													
LOADED CG BASED ON LOAD OF UNIFORM DENSITY COMPLETELY FILLING BODY																																	

**FORDING**

IN                      OUT

○                      ○

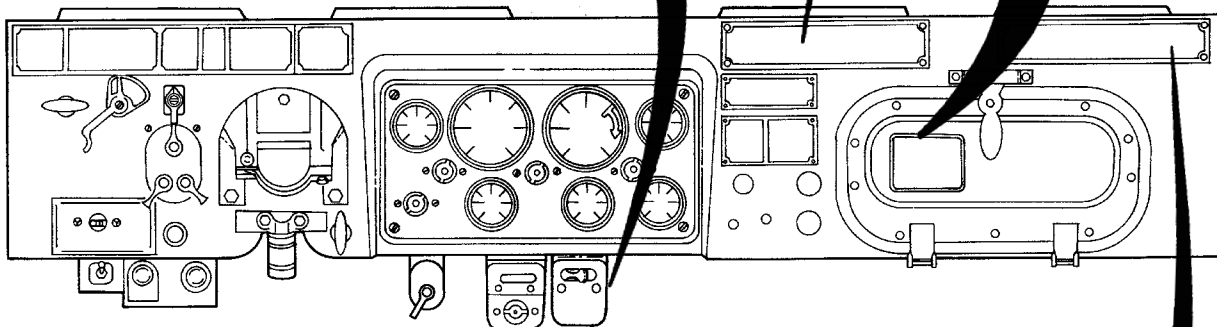
**WARNING**

BEFORE ENTERING WATER PLACE  
FORDING VALVE TO IN POSITION.

AFTER LEAVING WATER PLACE  
FORDING VALVE TO OUT POSITION.

**CAUTION**

HEARING PROTECTION  
IS REQUIRED FOR  
DRIVER AND CO-DRIVER  
(REF. MIL-STD-1474)



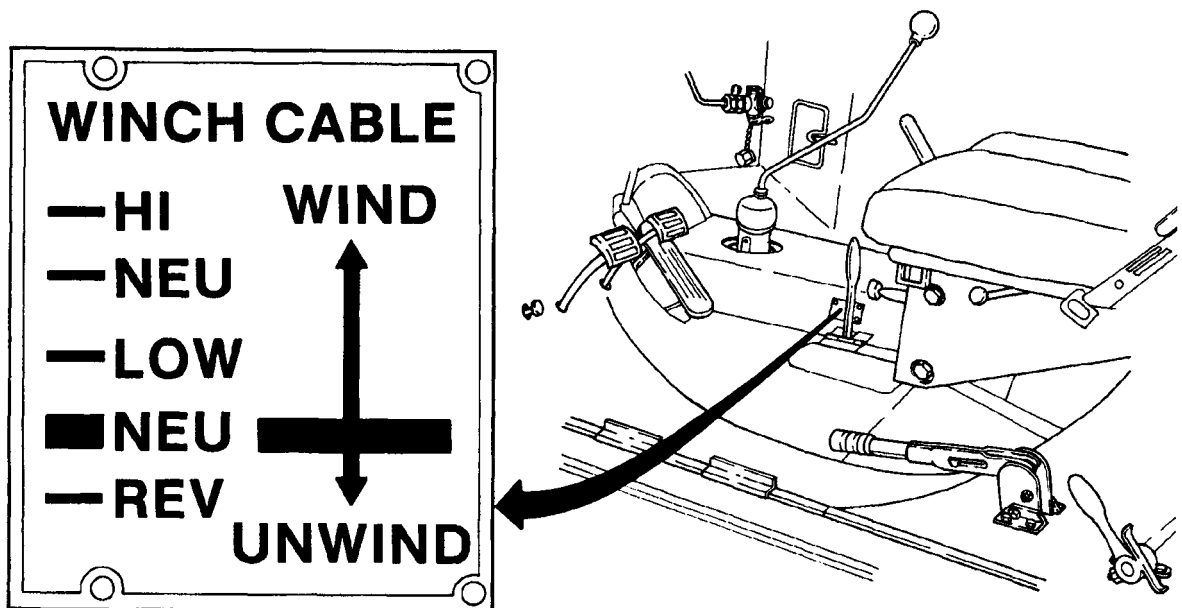
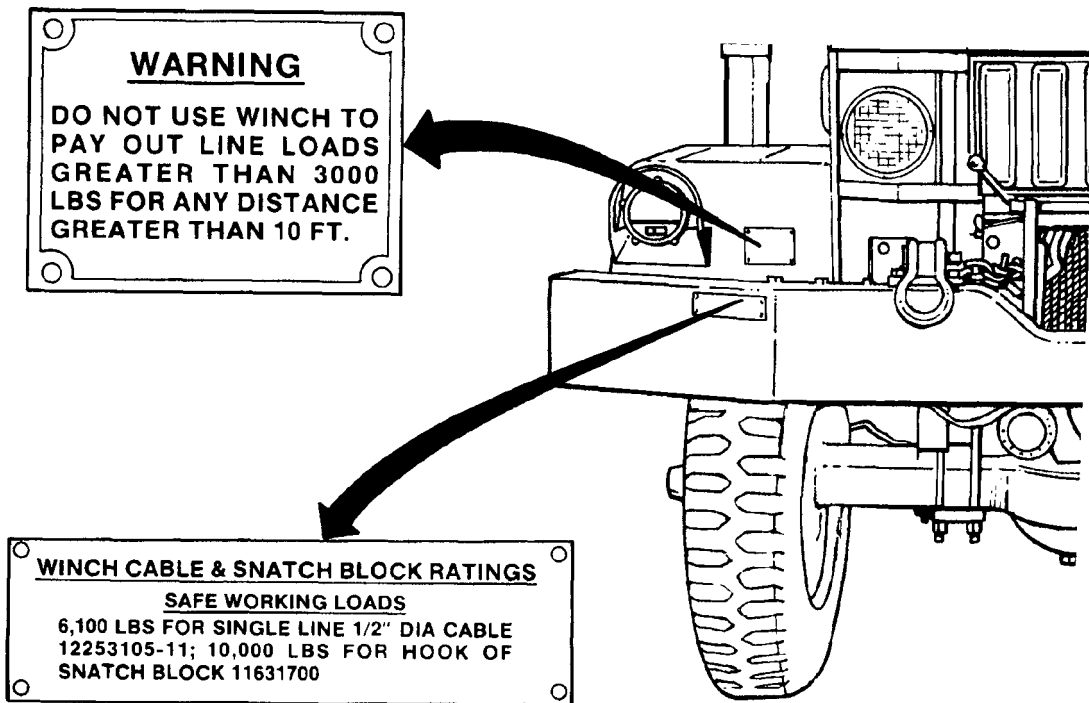
**NOTE**

TM 9-2320-209 publications, listed on data plate, apply only to M44 and M44A1 vehicles. TM 9-2320-361 publications supersede TM 9-2320-209 publications for M44A2 vehicles only.

<b>SERVICING DATA</b>		<b>TRUCK, 2-1/2 TON 6 X 6</b>		<b>PUBLICATIONS APPLYING TO THIS VEHICLE</b>										
<b>ELECTRICAL SYSTEM 24V</b>		<b>TIRE INFLATION PRESSURES</b>												
CRANKCASE CAPACITY 22 QTS. COOLING SYSTEM CAPACITY 32 QTS. FUEL TANK CAPACITY 50 GAL.		<table border="1"> <tr> <th colspan="2">11:00 SINGLE — TIRES — 9:00 DUALS</th> </tr> <tr> <th>2-1/2 TON—5-TON</th> <th>PAYLOAD</th> </tr> <tr> <td>HIGHWAY 50 LBS. 50 LBS.</td> <td>50 LBS. 50 LBS.</td> </tr> <tr> <td>CROSS COUNTRY 35 LBS.</td> <td>35 LBS.</td> </tr> <tr> <td>MUD, SAND, SNOW 15 LBS.</td> <td>15 LBS.</td> </tr> </table>			11:00 SINGLE — TIRES — 9:00 DUALS		2-1/2 TON—5-TON	PAYLOAD	HIGHWAY 50 LBS. 50 LBS.	50 LBS. 50 LBS.	CROSS COUNTRY 35 LBS.	35 LBS.	MUD, SAND, SNOW 15 LBS.	15 LBS.
11:00 SINGLE — TIRES — 9:00 DUALS														
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HIGHWAY 50 LBS. 50 LBS.	50 LBS. 50 LBS.													
CROSS COUNTRY 35 LBS.	35 LBS.													
MUD, SAND, SNOW 15 LBS.	15 LBS.													
TEMPERATURE ABOVE 32°F 40°F TO -10°F 0°F TO -65°F	ENGINE OIL OE GRADE S.A.E. 30 OE GRADE S.A.E. 10 SEE LUBRICATION ORDER NO. LO 9-2320-209-12	GEAR OIL GO GRADE 90 GO GRADE 90	GREASE SEE LUBRICATION ORDER NO. LO 9-2320-209-12											
OPERATOR'S MANUAL — TM 9-2320-209-10 LUBRICATION ORDER — LO 9-2320-209-12 MAINTENANCE MANUAL — TM 9-2320-209-20 PARTS LIST — TM 9-2320-209-20P														

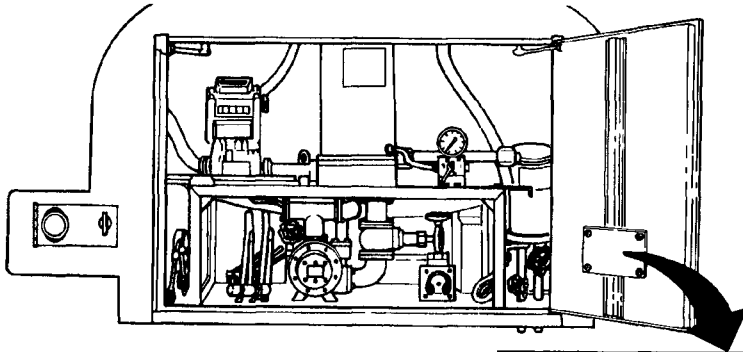
EQUIPMENT DESCRIPTION AND DATA (Contd)

WARNING AND DATA PLATES FOUND ON VEHICLES EQUIPPED WITH A WINCH



EQUIPMENT DESCRIPTION AND DATA (Contd)

OPERATING DECAL FOUND ON THE M49A2C FUEL CARRYING VEHICLE



**FOR PARTS REQUISITION IDENTIFICATION**

MFG'S. SERIAL NO. \_\_\_\_\_  
GOV. CONTRACT NO. \_\_\_\_\_

NORMAL TANK LENGTH 152" WIDTH 96"

**OPERATING INSTRUCTIONS**  
EACH OPERATION BEGINS WITH ALL VALVES CLOSED

**CAUTION** PRIOR TO FUEL TRANSFER

(1) **STATIC DISCHARGE**

(A) CLIP WIRE FROM STATIC DISCHARGE REEL ON SERVICING TRUCK TO GROUND ROD (TRUCK TO GROUND)  
(B) ENSURE UNIT REQUIRING SERVICE IS GROUNDED (UNIT OR AIRCRAFT TO GROUND)  
(C) GROUND SERVICING TRUCK TO UNIT OR AIRCRAFT REQUIRING SERVICE.  
(D) GROUND REFUELING NOZZLE TO UNIT OR AIRCRAFT

STEPS (A) THROUGH (D) ABOVE MUST BE ACCOMPLISHED BEFORE REMOVAL OF FILLER CAPS ON UNIT OR AIRCRAFT TO BE SERVICED.

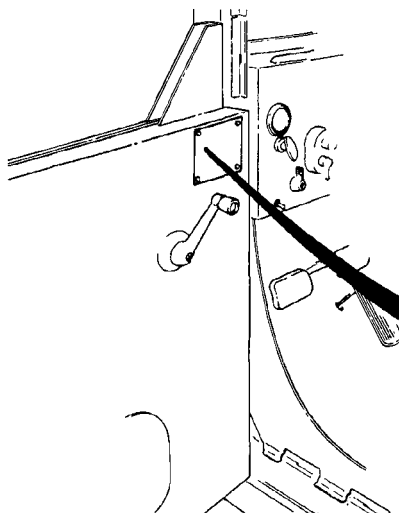
(2) **DO NOT CARRY MORE THAN ONE TYPE OF FUEL AT ONE TIME**  
SEE APPLICABLE TECHNICAL ORDER FOR CHANGING FROM ONE TYPE OF FUEL TO ANOTHER TYPE FOR SERVICING PURPOSES.

(3) **TO DISCHARGE FROM TANK THRU PUMP**  
(SEE GROUNDING PROCEDURE ABOVE)  
(A) START ENGINE. POSITION TRANSMISSION IN SECOND GEAR. PLACE TRANSFER IN NEUTRAL. ENGINE POWER TAKEOFF. PULL OUT THROTTLE CONTROL SLOWLY TO EXTREME POSITION. SPEED CONTROL UNIT WILL CONTROL ENGINE AT 1150 RPM.  
(B) OPEN DESIRED TANK COMPARTMENT DISCHARGE VALVE BY MOVING CORRESPONDING CONTROL LEVER TO OPEN POSITION.  
(C) TURN DELIVERY LINE GATE VALVE TO OPEN POSITION.  
(D) DISCHARGE THRU HOSE BY OPENING NOZZLE.

(4) **TO FILL TANK OR TRANSFER LIQUID FROM ONE SOURCE TO ANOTHER THRU PUMP**  
(SEE GROUNDING PROCEDURE ABOVE)  
(A) ATTACH SUCTION HOSE (ONE OR BOTH 10 FOOT SECTIONS) TO ADAPTER AT SUCTION LINE GATE VALVE.  
(B) REPEAT (2)(A) ABOVE.  
(C) PLACE END OF SUCTION HOSE INTO SOURCE.  
(D) TURN SUCTION AND DELIVERY LINE GATE VALVES TO OPEN POSITION.  
(E) DISCHARGE THRU HOSE INTO TANK TO BE FILLED BY OPENING NOZZLE.

NOTE PERFORM DIFFERENTIAL PRESSURE CHECK DURING FUELING OPERATION.

CAUTION DECAL FOUND ON THE M50A3 WATER CARRYING VEHICLE



**CAUTION**

TO DIRECT HEAT TO WATER TANK

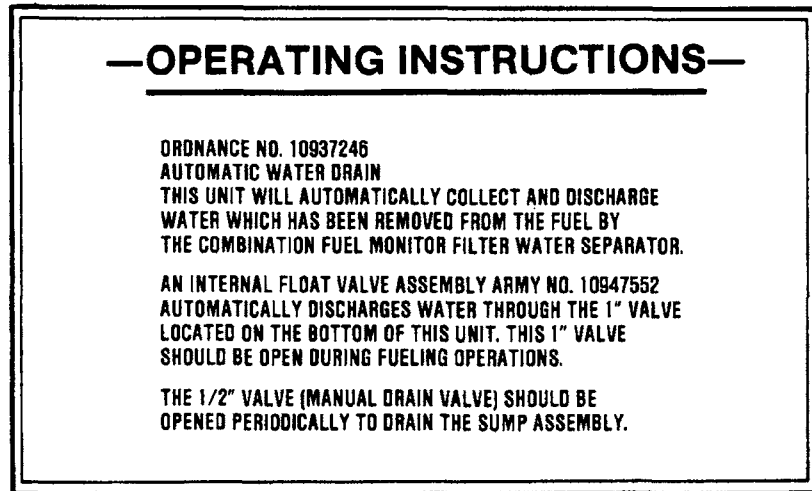
1. CLOSE FRONT EXHAUST STACK SHUTOFF CAP.
2. OPEN WATER TANK EXHAUST SHUTOFF (TURN HANDLE COUNTERCLOCKWISE TO OPEN).

TANK EXHAUST HEATER MUST NOT BE OPERATED WITH LESS THAN 10 INCHES OF WATER IN EITHER TANK COMPARTMENT AND VEHICLE MUST NOT BE OPERATED WITH BOTH EXHAUST SHUTOFFS CLOSED.

SERIOUS DAMAGE MAY RESULT IF THESE WARNINGS ARE NOT OBSERVED.

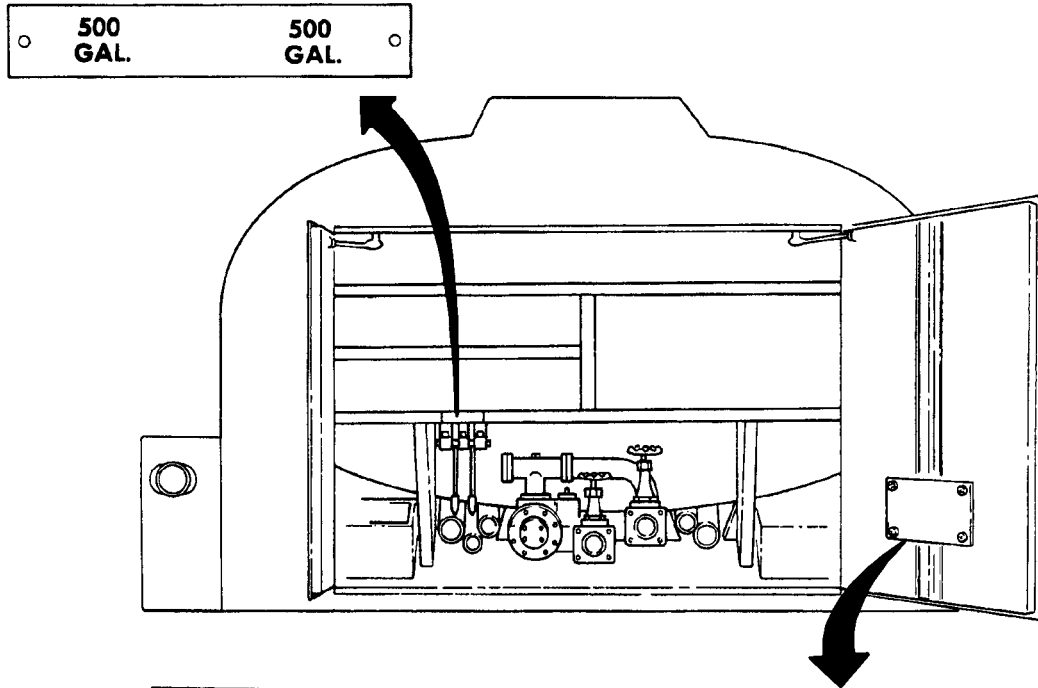
**EQUIPMENT DESCRIPTION AND DATA (Contd)**

OPERATING DECAL FOUND ON THE M49A2C FUEL CARRYING VEHICLE



EQUIPMENT DESCRIPTION AND DATA (Contd)

OPERATING DECAL FOUND ON THE M50A3 WATER CARRYING VEHICLE



**FOR PARTS REQUISITION IDENTIFICATION**

MFG'S. SERIAL NO.

GOV. CONTRACT NO.

NOMINAL TANK LENGTH 148" WIDTH 98"

Labels in diagram: EMG Y VALVE TANK OUTLET (1), EMG Y VALVE TANK OUTLET (2), STRAINER, PUMP, SUCTION VALVE, SUCTION STUB, PROTECTOR CAP, DISCHARGE VALVE, DISCHARGE STUB, PROTECTOR CAP, 500 GAL COMP T VALVE LEVER (3), 500 GAL COMP T VALVE LEVER (4).

**OPERATING INSTRUCTIONS**

**EACH OPERATION BEGINS WITH ALL VALVES CLOSED**

(1) **TO DISCHARGE FROM TANK BY GRAVITY**

(A) ATTACH 2 X 1-1/2 BUSHING TO SUCTION STUB  
 (B) ATTACH 1-1/2 DISCHARGE HOSE W. OR W. O NOZZLE AS DESIRED  
 (C) OPEN TANK OUTLET VALVE LEVER AND SUCTION VALVE  
 (D) DISCHARGE THROUGH HOSE BY OPENING NOZZLE IF ATTACHED.

(2) **TO DISCHARGE FROM TANK THROUGH PUMP**

(A) ATTACH 2 X 1-1/2 BUSHING TO DISCHARGE STUB  
 (B) ATTACH 1-1/2 DISCHARGE HOSE W. OR W. O NOZZLE AS DESIRED  
 (C) OPEN TANK OUTLET LEVER AND DISCHARGE VALVE  
 (D) START ENGINE. POSITION TRANSMISSION IN FOURTH GEAR. POSITION TRANSFER IN NEUTRAL. ENGAGE POWER TAKEOFF. PULL OUT THROTTLE CONTROL SLOWLY TO EXTREME POSITION. SPEED CONTROL UNIT WILL CONTROL ENGINE AT 1100 RPM.

(3) **TO FILL TANK FROM OUTSIDE SOURCE OR TRANSFER LIQUID FROM ONE SOURCE TO ANOTHER**

(A) ATTACH 2 SOCKET HOSE TO SUCTION STUB  
 (B) PLACE END OF SUCTION HOSE W. STRAINER ATTACHED INTO SOURCE  
 (C) ATTACH 2 X 1-1/2 BUSHING TO DISCHARGE STUB  
 (D) ATTACH 1-1/2 DISCHARGE HOSE W. OR W. O NOZZLE AS DESIRED.  
 (E) PLACE END OF DISCHARGE HOSE INTO TANK TO BE FILLED  
 (F) OPEN SUCTION AND DISCHARGE VALVES  
 (G) REPEAT PROCEDURE (2D)

(4) **TO FILL TANK FROM HYDRANT**

(A) ATTACH 2-1/2 X 1-1/2 BUSHING TO HYDRANT  
 (B) ATTACH 1-1/2 DISCHARGE HOSE W. OR W. O NOZZLE AS DESIRED  
 (C) PLACE END OF DISCHARGE HOSE INTO TANK  
 (D) OPEN HYDRANT VALVE WITH WRENCH PROVIDED  
 (E) DISCHARGE THROUGH HOSE BY OPENING NOZZLE IF ATTACHED

(5) **TO OPERATE TWO DISCHARGE LINES**

(A) ATTACH SIAMESE FITTING OR ONE END OF LENGTH OF HOSE WITH SIAMESE FITTING ON OTHER END TO DISCHARGE STUB AND COUPLE ADDITIONAL LENGTH OF HOSE TO SIAMESE FITTING

**CAUTION**

(6) **PARKING TANK DURING FREEZING**

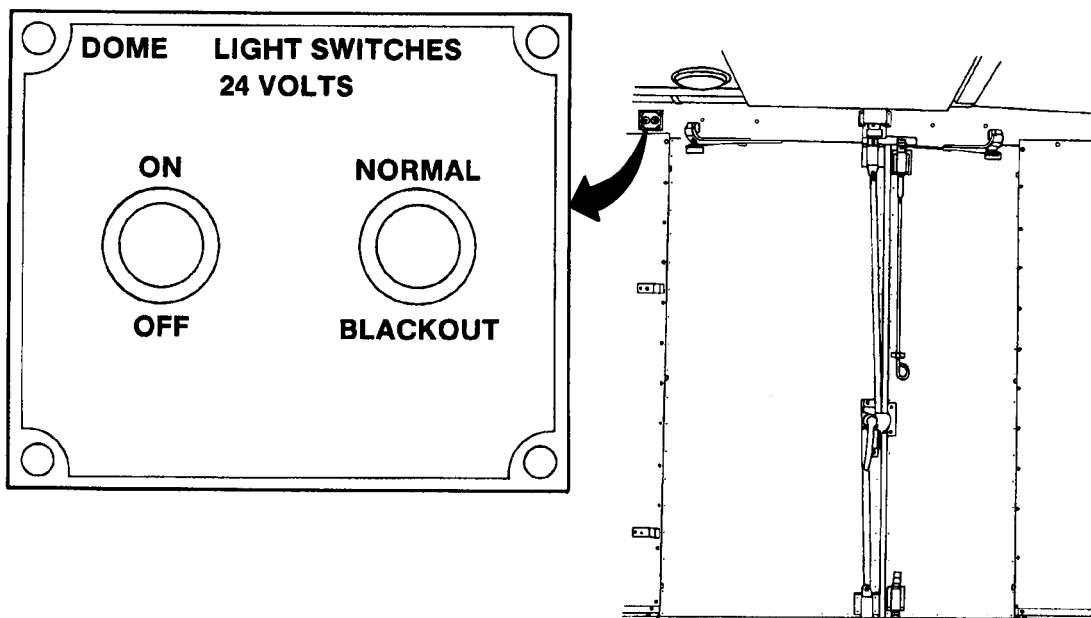
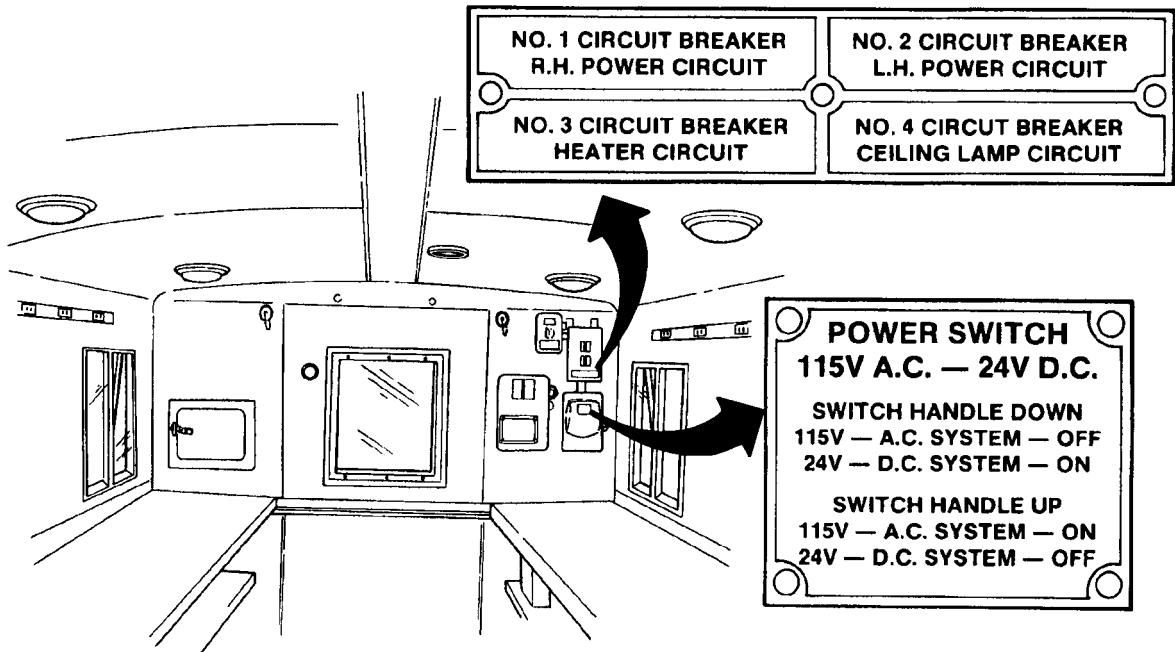
(A) CLOSE TANK VALVE LEVERS. OPEN SUCTION AND DISCHARGE VALVES. PROTECTOR CAPS TO BE LEFT OFF  
 (B) RUN PUMP 90 SECONDS TO DRAIN PIPES DRY

(7) **CHECK WATER LEVEL BEFORE LIGHTING HEATER**

(A) WHEN IMMERSION HEATER IS REQUIRED AS PART OF OPERATION CHECK WATER LEVEL WITH GAGE STICK  
 (B) IF WATER LEVEL IS BELOW CAUTION MARK ON GAGE STICK OR LESS THAN 9-3/16" FROM BOTTOM DO NOT LIGHT HTR

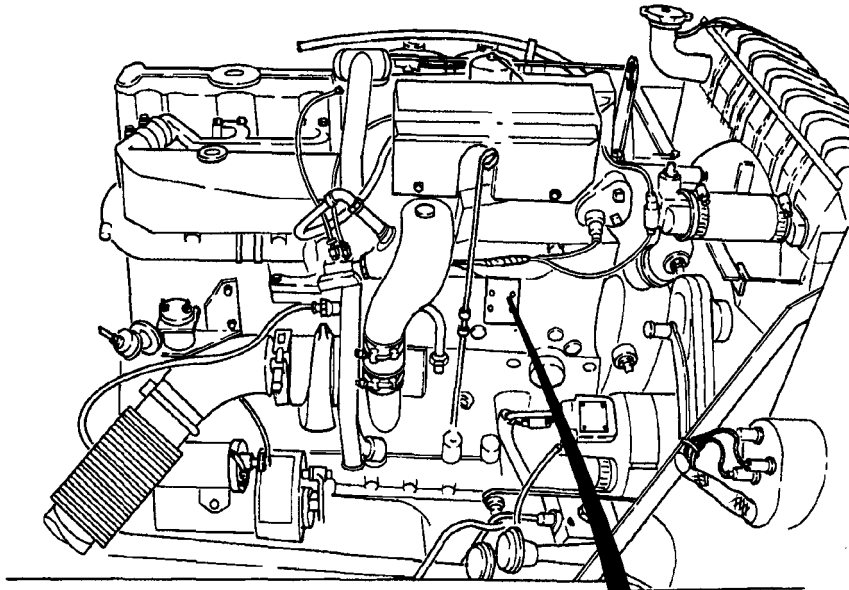
EQUIPMENT DESCRIPTION AND DATA (Contd)

DATA PLATES LOCATED INSIDE VAN BODY OF M109A3 AND M185A3 VEHICLES



**EQUIPMENT DESCRIPTION AND DATA (Contd)**

**ENGINE IDENTIFICATION DATA PLATE**



<b>ENGINE EXHAUST EMISSION CONTROL INFORMATION</b>	
<b>MULTIFUEL</b>	
<input type="radio"/> MODEL LDT465	<input type="text"/> DATE OF ENGINE MFG MO & YR <input type="text"/>
<b>ENGINE SPECIFICATIONS</b>	
ADVERTISED H.P. <input type="text"/> AT <input type="text"/> R.P.M.	
FUEL RATE AT ADVERTISED H.P. <input type="text"/> MM <sup>3</sup> /STROKE	
VALVE LASH INT. <input type="text"/> IN. EXH. <input type="text"/> IN.	
INJECTION TIMING <input type="text"/>	
THIS ENGINE CONFORMS TO U.S. ENVIRONMENTAL PROTECTION AGENCY REGULATIONS APPLICABLE TO <input type="text"/> MODEL YEAR HEAVY-DUTY DIESEL ENGINES	
<b>CONTRACT NO.</b>	
<input type="text"/>	<input type="text"/>
<b>PART NO.</b>	<b>SERIAL NO.</b>
<input type="text"/>	<input type="text"/>
<b>M.A.N. LICENSE</b>	<b>ACCEPTED</b>



**EQUIPMENT DESCRIPTION AND DATA (Contd)****DIFFERENCES BETWEEN MODELS**

Table 1 lists the major differences between models for M44A2 series vehicles.

*Table 1. Difference Between Models.*

<b>EQUIPMENT FUNCTION</b>	<b>M35A2</b>	<b>M35A2C</b>	<b>M36A2</b>	<b>M49A2C</b>	<b>M50A3</b>	<b>M109A3</b>	<b>M185A3</b>
Cargo Transport	X	X	X				
Personnel Transport	X	X					
Removable Dropsides		X	X				
Permanent Sides	X		X				
Reducible Height	X	X	X				
Fuel Servicing				X			
Water Servicing					X		
Transfer Case Power Takeoff				X	X		
Shop Van						X	
Repair Van							X
Built-in Benches, Cabinets, Vise, and Bench Grinder							X
Front Winch	X	X	X	X	X	X	
Transmission Power Takeoff	X	X	X	X	X	X	X
154 in. (392 cm) Wheelbase	X	X		X	X	X	X
190 in. (483 cm) Wheelbase			X				

**EQUIPMENT DESCRIPTION AND DATA (Contd)**

**EQUIPMENT DATA**

Equipment performance data for M44A2 series vehicles is listed in table 2 below. This information includes data applicable to field level maintenance only. For additional equipment data covering vehicle dimensions, weights, performance, and permissible fuels, refer to TM 9-2320-361-10.

*Table 2. Equipment Data.*

	STANDARD	METRIC
<b>1. MAXIMUM PAYLOAD PER VEHICLE</b>		
M35A2, M35A2C, M36A2, M109A3, M185A3 .....	5,000 lb	2,268 kg
M49A2C .....	1,200 gal	4,542 L
M50A3 .....	1,000 gal	3,785 L
<b>2. CAPACITIES</b>		
Cooling system .....	32 qt	30.3 L
Engine:		
Crankcase only .....	20 qt	18.9 L
Crankcase and filter .....	22 qt	20.8 L
Differential (front or rear axles).....	6 qt	5.7 L
Fuel Tank (all vehicles) .....	50 gal	189.3 L
Transmission:		
Without PTO .....	4.25 qt	4.0 L
With PTO.....	5.25 qt	4.9 L
Transfer Case (with or without PTO).....	7 qt	6.6 L
Front Winch:		
Housing, clutch end.....	1 pt	0.47 L
Worm gear housing.....	1.50 pt	0.71 L
<b>3. ENGINE</b>		
Manufacturer: .....	Hercules Engines, Inc. or Continental Motors, Inc.	
Model .....	LDT-465-1D	
Type .....	Turbocharged, six cylinder, in-line, liquid-cooled, multifuel	
Weight.....	1,650 lb	748 kg
Idle speed (stamped on fuel pump ID plate).....	800–850 rpm	
Operating speed (all models):		
Full load (governed) .....	1,200–2,650 rpm	
No load (governed) .....	1,200–2,900 rpm	
Brake horsepower:		
Gross (fan belts removed) .....	140 hp @ 2,600 rpm	104 kW @ 2,600 rpm
Net (fan belts installed) .....	130 hp @ 2,600 rpm	96.98 kW @ 2,600 rpm
Torque:		
Gross .....	305 lb-ft @ 1,500 rpm	414 N•m @ 1,500 rpm
Net .....	297 lb-ft@ 1,500 rpm	403 N•m @ 1,500 rpm

**EQUIPMENT DESCRIPTION AND DATA (Contd)**

*Table 2. Equipment Data (Contd).*

	STANDARD	METRIC
<b>3. ENGINE (Contd)</b>		
Oil Pressure:		
Idle (with OE/HDO @ 200 F).....	10 psi min	68.95 kPa
Full load @ 2,600 rpm) .....	40 psi min	275.75 kPa
	75 psi max	517.11 kPa
Intake:		
Air cleaner:		
Type .....	Dry element	
Air flow @ 2,600 rpm.....	405 cfm max	11.60 cm/m
Compression ratio .....	22:1	
Firing order .....	1, 5, 3, 6, 2, 4	
Fuel consumption (approx.) .....	5-6 mpg	2.13-2.55 km/L
Manifold heater (for cold weather starting):		
Type .....	Flame type, spark ignition	
Spark ignition gap .....	0.088-0.093 in.	2.24-2.36 mm
Fuel pump .....	Electric	
Fuel .....	Multifuel (same as engine)	
<b>4. FUEL SYSTEM</b>		
Fuel pumps location:		
Electric .....	In tank	
Mechanical.....	On fuel injection	
Mechanical .....	Fuel injection pump	
Fuel filters (primary, secondary, and final)		
Manufacturer .....	Bendix or Purolator	
<b>5. COOLING SYSTEM</b>		
Radiator Fill Cap Pressure .....	6.5-8 psi	
Thermostat:		
Start open .....	180° F	82° C
Full open .....	200° F	93° C
Radiator .....	Vertical flow type	
<b>6. ELECTRICAL SYSTEM</b>		
Battery:		
Model .....	6TMF	
Voltage .....	12 Volts	
Plates per cell .....	23	
Number of batteries per vehicle .....	2	
Temperature at time of full charged .....	80° F	27° C
Rating .....	100 A/h	
Alternator:		
Manufacturer .....	Prestolite Co.	
Model .....	AMA 5102 UT	
Voltage output .....	28 V max	
Current output .....	60 A max	
Voltage regulator .....	Mounted internally	

**EQUIPMENT DESCRIPTION AND DATA (Contd)**

*Table 2. Equipment Data (Contd).*

	STANDARD	METRIC
<b>6. ELECTRICAL SYSTEM (Contd)</b>		
	Starter:	
Voltage .....	24 Volts	
Specification .....	MS53011-2	
Mounting plate and pinion housing rotation .....	285 degrees	
Capacity (peak) .....	9.5 hp	
<b>7. CLUTCH</b>		
Type.....	Single dry disc	
Diameter .....	13 in.	33 cm
Torque rating .....	480 lb-ft	651 N•m
<b>8. TRANSMISSION</b>		
Manufacturer .....	Spicer Division, Dana Corp.	
Model .....	3053A	
Type .....	Manual, synchromesh	
Oil type.....	GO 80/90	
Speeds .....	5 forward, 1 reverse	
Gear ratios:		
1st (not synchronized) .....	5.02:1	
2nd .....	2.78:1	
3rd .....	1.62:1	
4th .....	1:1	
5th (overdrive).....	0.79:1	
Reverse (not synchronized).....	4.90:1	
<b>9. TRANSFER CASE</b>		
Manufacturer .....	Rockwell International	
Model.....	T-136-27	
Type .....	Two-speed, Synchromesh	
Oil type . .....	GO 80/90	
Front axle engagement .....	Air actuated	
Drive ratio - Input shaft to output shaft for rear axles:		
Low range .....	1.980:1	
High range .....	1.010:1	
Drive ratio - Input shaft to output shaft for front axle:		
Low range .....	2.137:1	
High range .....	1.078:1	
<b>10. AXLES (FRONT AND TANDEM REARS)</b>		
Type .....	Double reduction	
Ratio .....	6.72:1	
Torque rating .....	1,100 lb-ft	

**EQUIPMENT DESCRIPTION AND DATA (Contd)**

*Table 2. Equipment Data (Contd).*

	STANDARD	METRIC
<b>11. TRANSMISSION POWER TAKEOFF</b>		
Manufacturer	Spicer Division, Dana Corp.	
Model	WN-7-28	
Type	Heavy-duty	
Oil type	GO 80/90 (lubricated from transmission)	
Speeds	2 forward, 1 reverse	
Location	Left side of transmission	
Input gear	Helical gear (in constant mesh with and driven by transmission)	
Output shaft	1-1/4 in. dia., 5/16 in keyway (drives propeller shaft)	
Horsepower delivered:		
100 rpm	13	
1000 rpm	27	
Use	Drives winch on vehicles equipped with winch	
<b>12. TRANSFER CASE POWER TAKEOFF</b>		
Manufacturer	Rockwell International	
Model	P-136-C	
Oil type	GO 80/90 (lubricated from transfer case)	
Speeds	Direct drive	
Location	Top rear of transfer case	
Input drive	Transfer	
Output shaft	Tapered 1-1/2 in. to 1 in. dia.	
Use	Drives delivery pump for M49A2C and M50A3	
<b>13. FRONT WINCH</b>		
Specification	MS51352	
Manufacturer	Spicer or Beekin	
Type	Worm gear, PTO driven	
Load capacity (aluminum sheer pin protected)	10,000 lb max	4,536 kg
Cable load capacity (1/2 in. (13 mm) dia., 200 ft (61 m) long)	10,432 lb max	4,732 kg
Operating Capacity (maximum line load)	6,100 lb	2,767 kg
Operating Capacity (maximum line load with snatch)	10,000 lb	4,536 kg
<b>14. FRAME</b>		
Type	Rail channel	
Number of crossmembers	8	
<b>15. STEERING</b>		
Type	Cam & twin lever	
Ratio (lock-to-lock at steering wheel)	4-1/2 turns	

**EQUIPMENT DESCRIPTION AND DATA (Contd)**

*Table 2. Equipment Data (Contd).*

	STANDARD	METRIC
<b>16. BRAKES</b>		
Type	Internal expanding	
Actuation.....	Air over hydraulic	
Parking brake type .....	Internal/external, drum on transfer	
<b>17. SUSPENSION</b>		
Leaf spring size (front and rear) .....	48 x 2.5 in.	121.9 x 6.4 cm
Front axle type .....	Semi-elliptical	
Rear axles type .....	Semi-elliptical inverted	
<b>18. TIRES</b>		
Type .....	Non-directional cross country tread, 8 ply	
Size .....	9.00 x 20	

## GENERAL INFORMATION

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### THEORY OF OPERATION

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#### GENERAL

The information in this Work Package (WP) is provided to give maintenance technicians the necessary background information to support and perform maintenance, troubleshooting, and repair tasks. Theory of Operation is written as an overview of the major components making up the M44A2 series vehicle and does not include basic theory. Component operation is divided into four systems: mechanical systems, electrical systems, hydraulic systems, and pneumatic systems. A functional description of the major components and their related parts for each system is provided. Knowledge of what components are present, what they look like as a system, and how they function together is essential for the technician when performing maintenance and when attempting to isolate correct malfunctions.

## THEORY OF OPERATION (Contd)

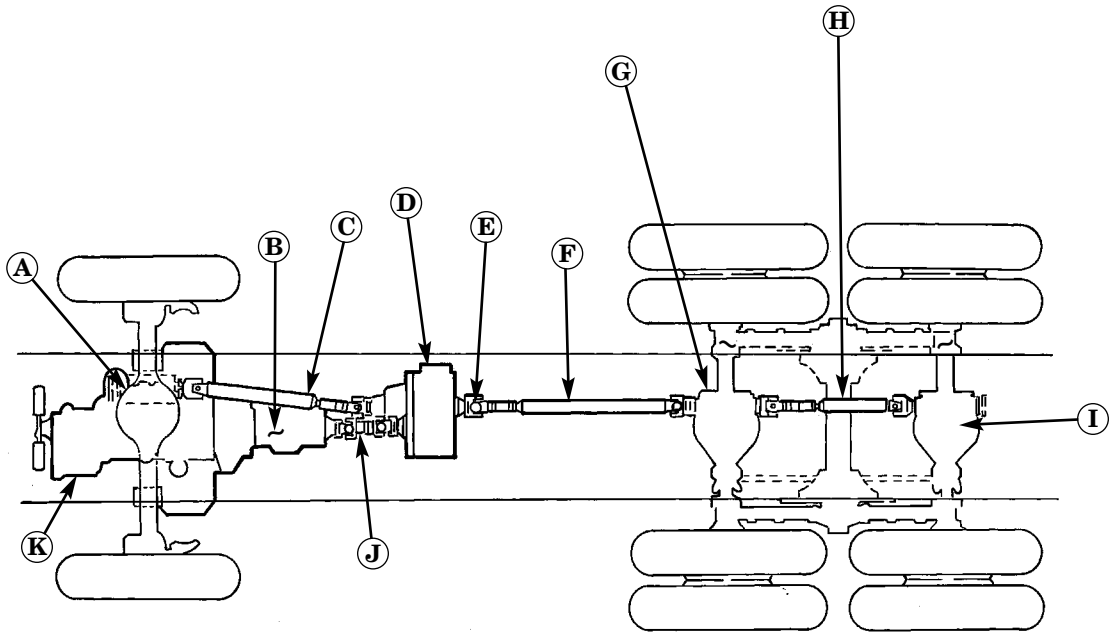
### POWERTRAIN

**Power Train System Operation:** The powertrain components are the same on all models with exception of turbocharged and non-turbocharged engines and an additional propeller shaft and center bearing on the M36A2. The major powertrain components of the M44A2 series are as follows:

- Ⓐ **FRONT AXLE** – Transmits power from front differential to front wheels.
- Ⓑ **TRANSMISSION** – Transfers engine power to meet different speeds and power requirements.
- Ⓒ **TRANSFER CASE TO FRONT DIFFERENTIAL PROPELLER SHAFT** – Transmits power from the transfer case to the front differential.
- Ⓓ **TRANSFER CASE** – Distributes power to front and rear axles.
- Ⓔ **UNIVERSAL JOINTS** – Permit power to be transmitted at slight angles between transmission and transfer case and between transfer case and differentials.
- Ⓕ **TRANSFER CASE TO FORWARD-REAR AXLE PROPELLER SHAFT** – Transmits power from the transfer case to the forward-rear differential.
- Ⓖ **FORWARD-REAR AXLE** – Transmits power from forward rear differential to forward-rear wheels.
- Ⓗ **FORWARD-REAR AXLE TO REAR-REAR AXLE PROPELLER SHAFT** – Transmits power from the forward-rear axle to the rear-rear axle.
- Ⓘ **REAR-REAR AXLE** – Transmits power from rear-rear differential to rear-rear wheels.
- Ⓙ **TRANSMISSION TO TRANSFER CASE PROPELLER SHAFT** – Transmits power from the transmission to the transfer case.
- Ⓚ **ENGINE** – Transmits power from the transmission to the transfer case.



THEORY OF OPERATION (Contd)



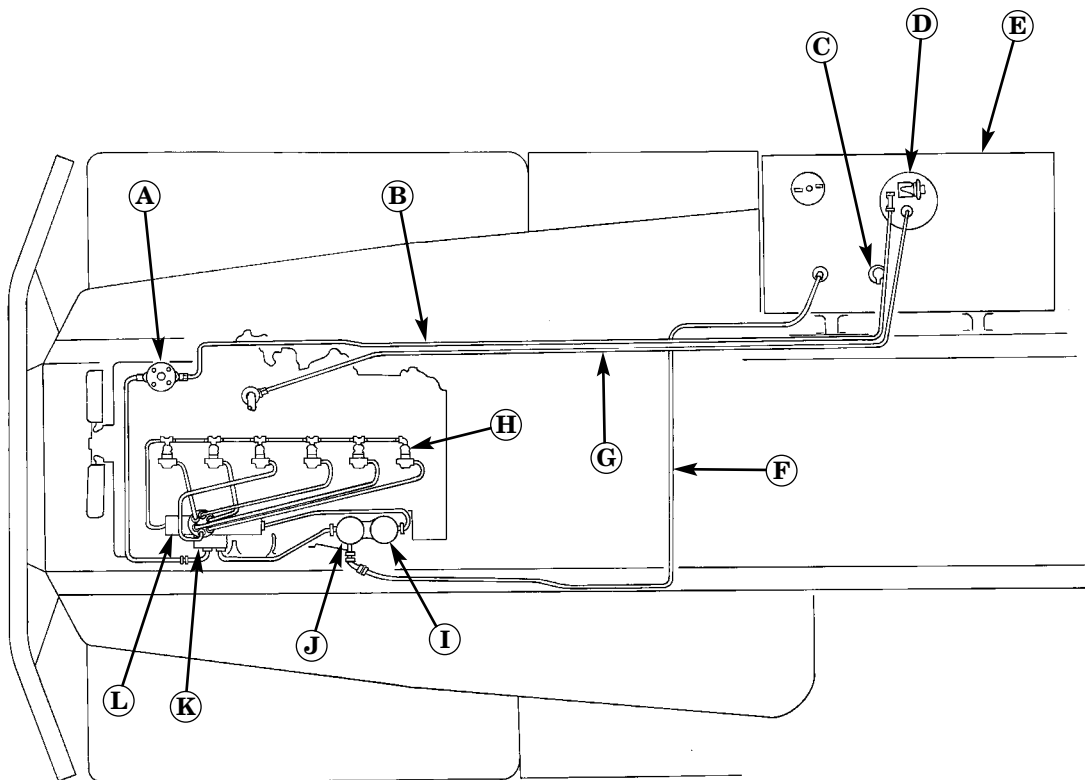
## THEORY OF OPERATION (Contd)

### FUEL SYSTEM

**Fuel System Operation:** The fuel system is the same on all models. It consists of one fuel injector per cylinder, an injector pump, which pressurizes and distributes fuel to each fuel injector, a fuel transfer pump, which forces fuel through the secondary and final fuel filters, and an in-tank electric fuel pump which draws fuel from the fuel tank and pumps it through the primary fuel filter and on to the fuel transfer pump. The major components of the fuel system are as follows:

- Ⓐ **PRIMARY FUEL FILTER** – First filter to remove water and dirt from fuel.
- Ⓑ **FUEL SUPPLY LINE** – Directs fuel from fuel pump in fuel tank to primary fuel filter, to fuel transfer pump, to secondary and final fuel filters, to fuel injector pump, and then to fuel injectors.
- Ⓒ **FUEL LEVEL SENDING UNIT** – Detects fuel level in fuel tank and sends an electrical signal to fuel gauge on instrument panel.
- Ⓓ **FUEL TANK PUMP** – Draws fuel from fuel tank and pumps it through fuel supply line.
- Ⓔ **FUEL TANK** – Stores fuel for vehicle use.
- Ⓕ **FUEL RETURN LINE** – Directs unused fuel back to fuel tank.
- Ⓖ **VENT LINE** – Allows clean air to enter fuel tank as fuel supply is used up.
- Ⓗ **FUEL INJECTORS** – Spray a fine mist of fuel into combustion chambers.
- Ⓘ **FINAL FUEL FILTER** – Removes additional dirt from fuel.
- Ⓙ **SECONDARY FUEL FILTER** – Removes additional dirt from fuel.
- Ⓚ **FUEL TRANSFER PUMP** – Forces flow of fuel through secondary and final fuel filters to the fuel injector pump.
- Ⓛ **FUEL INJECTOR PUMP** – Furnishes pressurized fuel to the fuel injectors.

THEORY OF OPERATION (Contd)

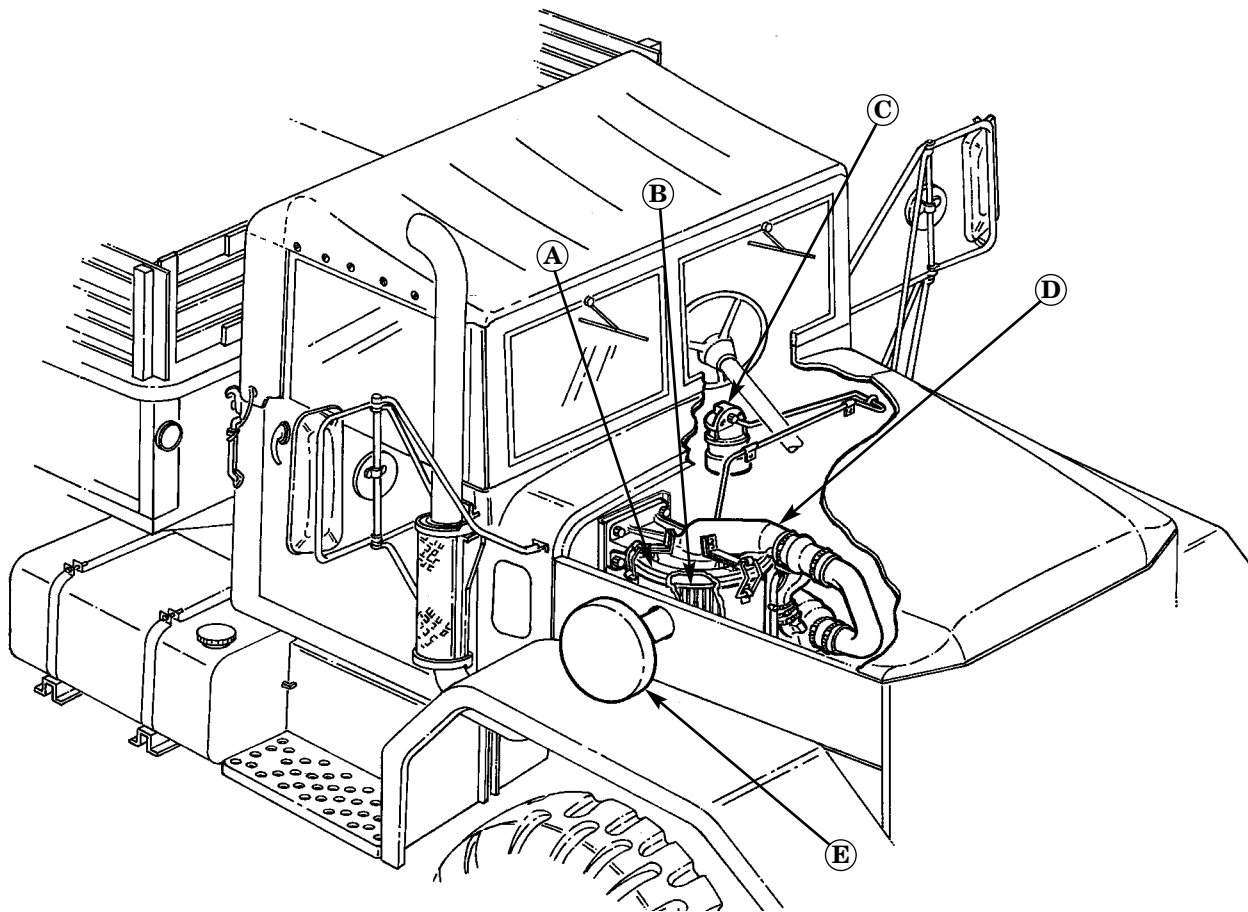


## THEORY OF OPERATION (Contd)

### AIR INTAKE SYSTEM

**Air Intake System Operation:** The air intake system is the same for turbocharged and normally aspirated engine models. It traps dust and debris from air draw through a filter element before it reaches the engine intake manifold. The major components of the air intake system are as follows:

- Ⓐ **AIR CLEANER** – Directs outside air through filter element.
- Ⓑ **FILTER ELEMENT** – Removes dirt and dust from the air.
- Ⓒ **AIR CLEANER INDICATOR** – Shows red when filter element needs servicing.
- Ⓓ **AIR CLEANER OUTLET** – Directs air from air cleaner to turbocharger.
- Ⓔ **AIR CLEANER HOOD** – Prevents rain and large objects from entering air intake system.

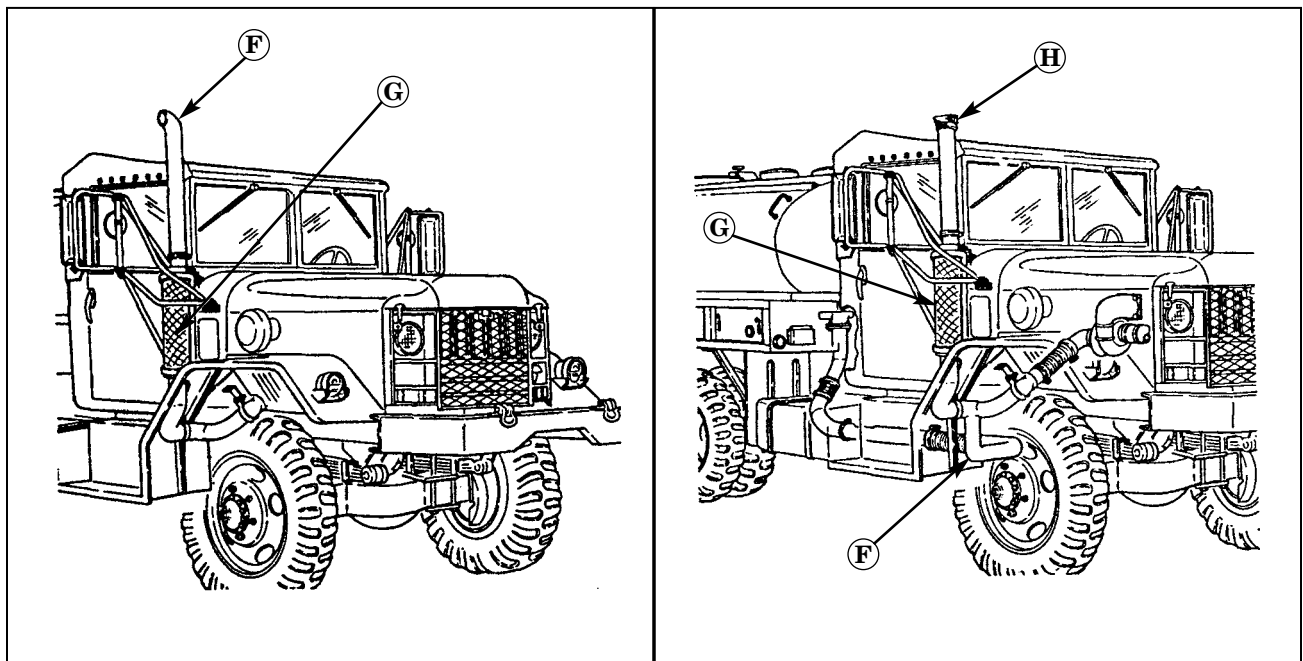


## THEORY OF OPERATION (Contd)

### EXHAUST SYSTEM

**Exhaust System Operation:** The exhaust system has several configurations depending on vehicle and engine models. The major exhaust system components are as follows:

- Ⓕ **EXHAUST PIPES** – Direct exhaust gases away from vehicle and crew compartment.
- Ⓖ **EXHAUST PIPE SHIELD** – Protects personnel from hot exhaust pipes.
- Ⓗ **EXHAUST PIPE CAP** – Used in cold weather to prevent exhaust gases from escaping from exhaust pipe. This forces gases through the exhaust pipes beneath the water tank keeping the water from freezing. Gases then exit through rear of vehicle.



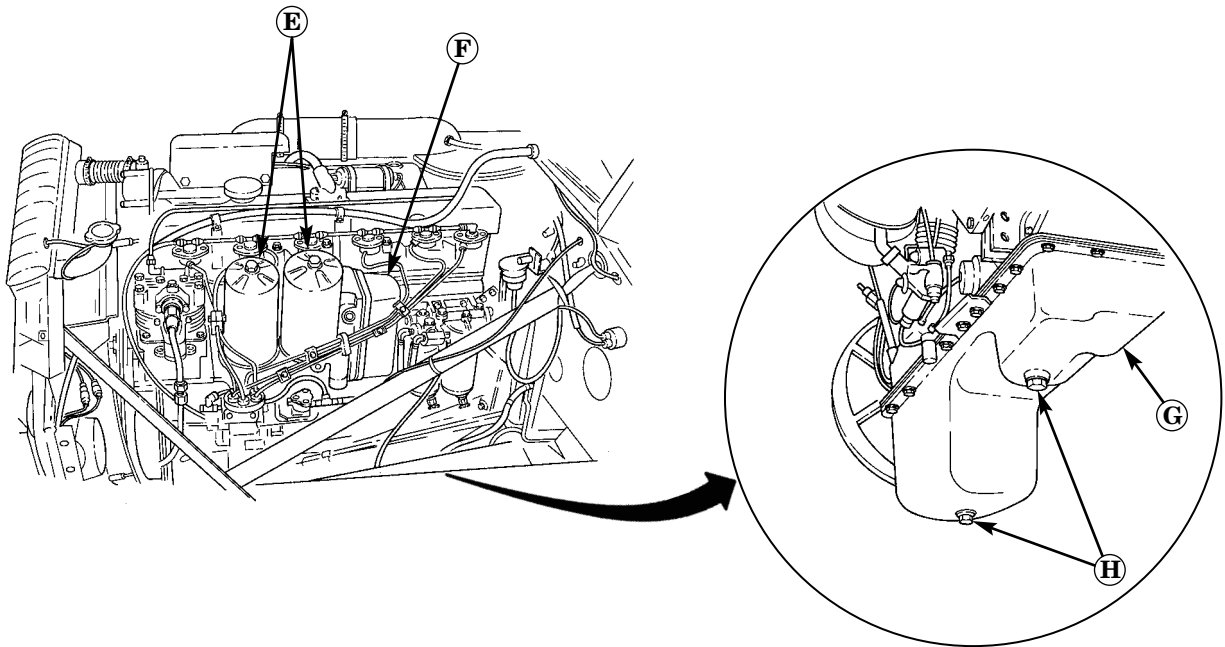
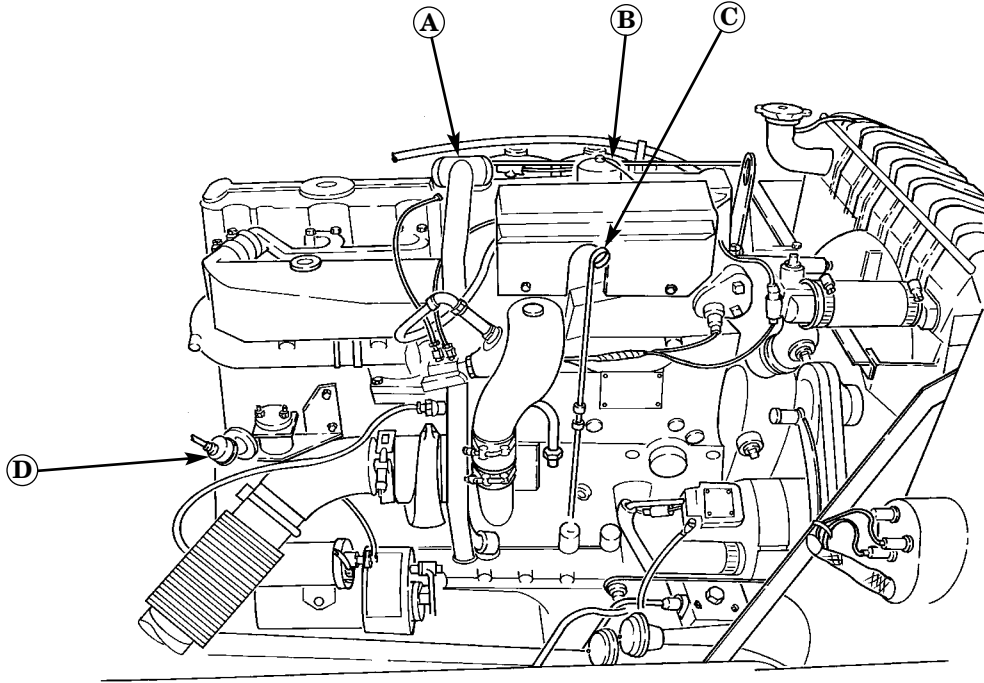
## THEORY OF OPERATION (Contd)

### OIL SYSTEM

**Oil System Operation:** The oil system provides lubrication for internal engine parts. The major components of the engine oil system are as follows:

- Ⓐ **CRANKCASE BREATHER** – Vents engine crankcase.
- Ⓑ **OIL FILLER CAP** – Covers engine oil fill opening.
- Ⓒ **OIL DIPSTICK** – Used to indicate engine oil level.
- Ⓓ **OIL PRESSURE TRANSMITTER** – Sends an electrical signal indicating engine oil pressure to the oil pressure gauge on instrument panel.
- Ⓔ **OIL FILTERS** – Filters oil of dirt and other foreign material to help ensure flow of uncontaminated oil to engine.
- Ⓕ **OIL COOLER** – Removes excess heat from engine oil as coolant circulates through internal tubes of oil cooler.
- Ⓖ **OIL PAN** – Reservoir for engine oil.
- Ⓗ **ENGINE OIL PAN DRAINPLUGS** – When removed, allows oil to be drained from engine.

THEORY OF OPERATION (Contd)



## THEORY OF OPERATION (Contd)

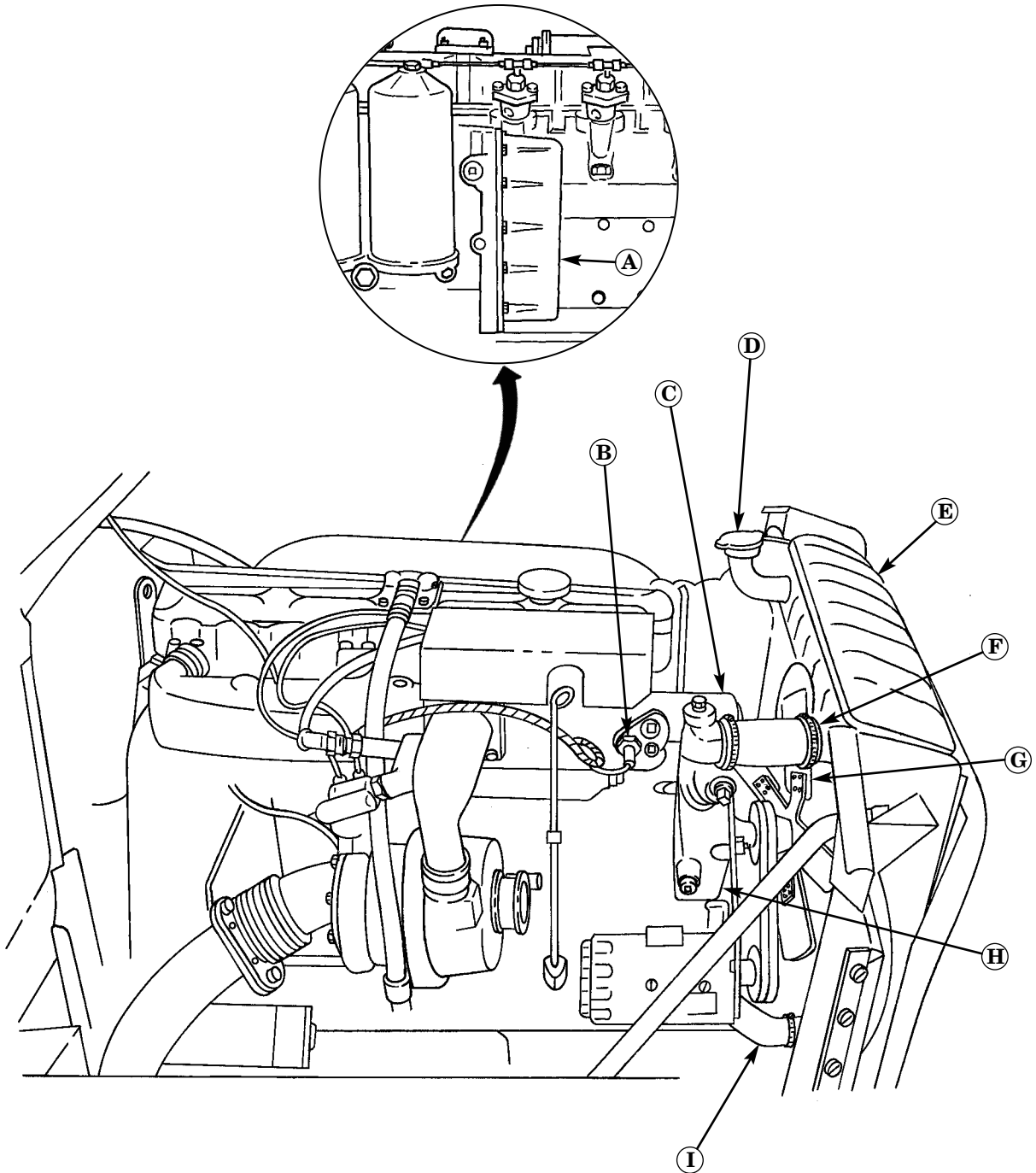
### COOLING SYSTEM

**Cooling System Operation:** The engine cooling system is a pressurized, thermostatically controlled system consisting of a radiator, thermostat, water pump, fan, and hoses. The major components of the cooling system are as follows:

- Ⓐ **ENGINE OIL COOLER** – Removes excess heat from engine oil.
- Ⓑ **ENGINE TEMPERATURE SENDING UNIT** – Detects temperature of engine coolant and sends an electrical signal to temperature gauge on instrument panel.
- Ⓒ **THERMOSTAT** – Shuts off coolant flow to radiator until temperature reaches 180°F (82°C). Coolant is then allowed to flow to the radiator through the upper radiator hose.
- Ⓓ **RADIATOR FILLER CAP** – When removed, filler neck serves as filling point for cooling system. When installed, cap allows cooling system to be pressurized.
- Ⓔ **RADIATOR** – Directs coolant through a series of fins or baffles so outside air can remove excess heat from coolant.
- Ⓕ **UPPER RADIATOR HOSE** – Directs coolant from engine block to radiator when thermostat opens.
- Ⓖ **FAN** – Pulls outside air through radiator to remove excess heat from coolant.
- Ⓗ **WATER PUMP** – Circulates coolant through cooling system.
- Ⓖ **LOWER RADIATOR HOSE** – Directs coolant from radiator back to engine block.



THEORY OF OPERATION (Contd)

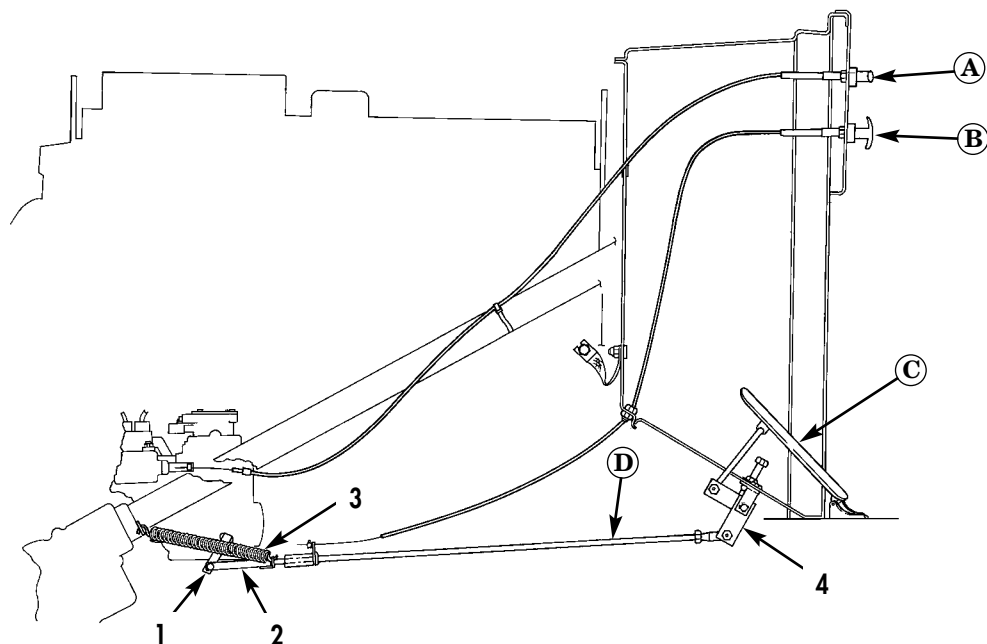
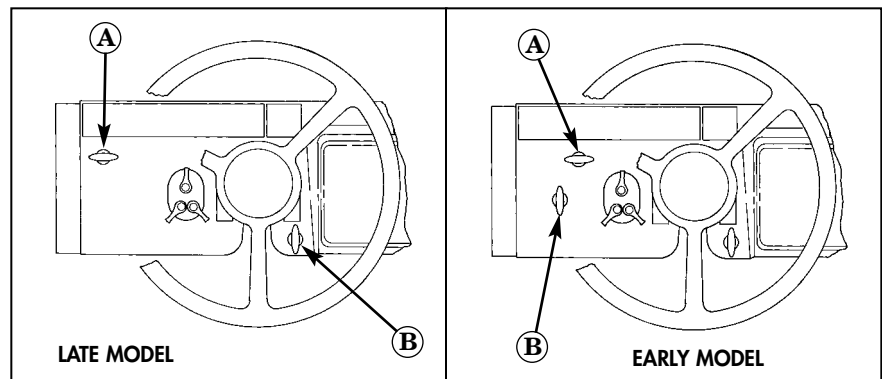


## THEORY OF OPERATION (Contd)

### ENGINE CONTROL SYSTEM

**Engine Control System Operation:** The engine control system consists of mechanical linkage connecting driver's controls to the fuel injector pump. The major components of the engine control system are as follows:

- Ⓐ **ENGINE STOP CONTROL** – Cuts off fuel supply to engine when pulled.
- Ⓑ **HAND THROTTLE CONTROL** – Sets engine speed at desired RPM without operator maintaining pressure on accelerator pedal.
- Ⓒ **ACCELERATOR PEDAL** – Controls engine speed.
- Ⓓ **ACCELERATOR LINKAGE** – Links accelerator pedal and throttle control to fuel pump. The components of the accelerator linkage are:
  1. Injection Pump Lever
  2. Accelerator Rod
  3. Return Spring
  4. Pivot Lever

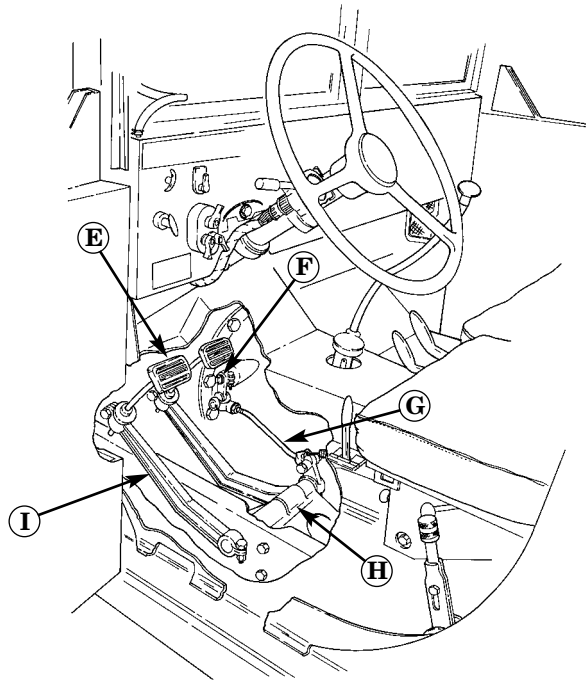


## THEORY OF OPERATION (Contd)

### CLUTCH CONTROL SYSTEM

**Clutch Control System Operation:** Power from the engine flywheel is transmitted to the transmission through a single plate, mechanically operated disk clutch. The drive plate of the clutch is splined to the transmission input shaft. The clutch is controlled by mechanical linkage mounted on the chassis frame and transmission clutch housing. The major components of the clutch control system are as follows:

- Ⓔ **CLUTCH PEDAL** – When pressed down, it disengages transmission from engine. When released, engine and transmission are engaged.
- Ⓕ **PEDAL REMOTE CONTROL LEVER** – Transmits movement of clutch rod to actuate clutch.
- Ⓖ **CLUTCH ROD** – Transmits movement from clutch pivot assembly to remote control lever and shaft, and is used to adjust clutch pedal free travel.
- Ⓗ **CLUTCH PIVOT ASSEMBLY** – Transfers torque from clutch lever to clutch rod.
- Ⓘ **CLUTCH REMOTE CONTROL LEVER** – Transmits movement from clutch pedal to clutch pivot assembly.



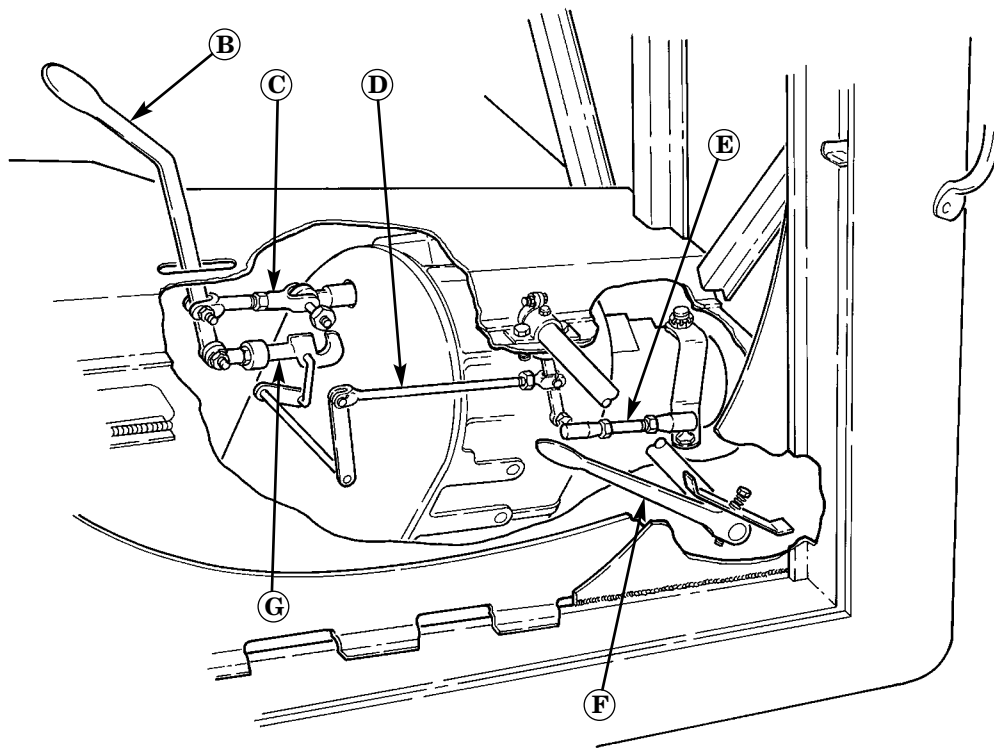
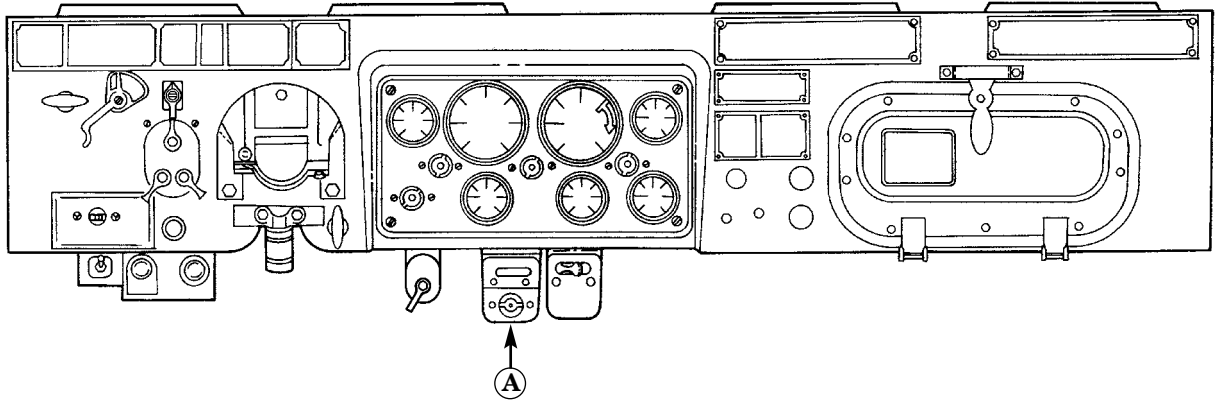
## THEORY OF OPERATION (Contd)

### TRANSFER CASE CONTROL SYSTEM

**Transfer Case Control System Operation:** The transfer case and PTO are mechanically controlled by separate connected to shift linkage consisting of a series of links and rods. The major components of the transfer case control system are as follows:

- Ⓐ **TRANSFER AIR ACTUATED LOCKUP** – Engages transfer case output shaft to the front axle.
- Ⓑ **TRANSFER CASE SHIFT LEVER** – Is pulled up to HIGH for light load operations or pushed down to LOW for heavy load operations.
- Ⓒ **TRANSFER CASE SHIFT LEVER LINK** – Transmits movement of transfer case shift lever to shift shaft.
- Ⓓ **TRANSFER CASE LOCKOUT ROD** – Actuates and adjusts the movement of transfer case lockout.
- Ⓔ **TRANSFER CASE PTO CONTROL LEVER LINK** – Transmits movement of transfer case PTO control lever assembly to transfer case PTO lever.
- Ⓕ **TRANSFER CASE PTO CONTROL LEVER ASSEMBLY** – Manual control for engaging power takeoff.
- Ⓖ **TRANSFER CASE LOCKOUT** – Locks transfer case in NEUTRAL position to prevent vehicle movement when transfer case PTO is engaged.

THEORY OF OPERATION (Contd)

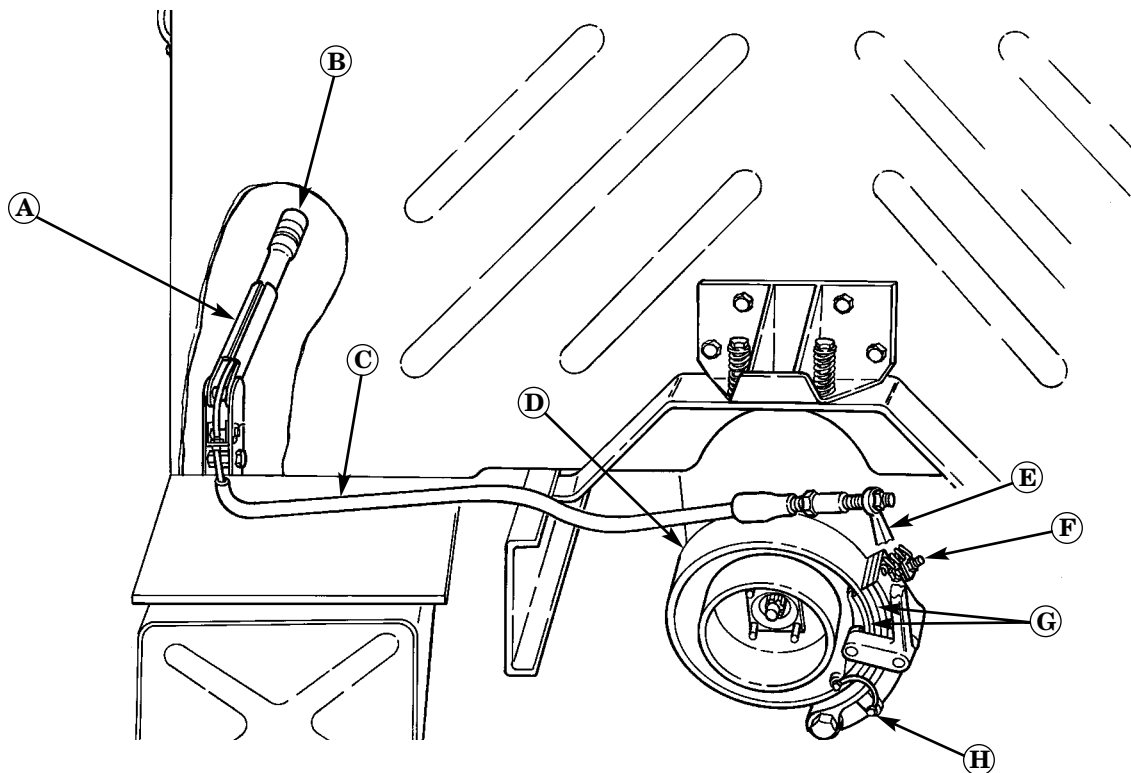


## THEORY OF OPERATION (Contd)

### PARKING BRAKE SYSTEM

**Parking Brake System Operation:** The parking brake system consists of a brake drum and an inner and outer brake shoe assembly, mounted on the transfer case. It is manually controlled by a cable and control lever mounted on the cab floor. The major components of the parking brake system are as follows:

- Ⓐ **PARKING BRAKE CONTROL LEVER** – Applies parking brake when pulled to raised position. When lowered, parking brake is released.
- Ⓑ **ADJUSTING KNOB** – Permits operator to make minor tension adjustment in parking brake cable.
- Ⓒ **PARKING BRAKE CABLE** – Links parking brake lever to actuating lever.
- Ⓓ **BRAKEDRUM** – Provides surface for brakeshoes to press against when parking brake is applied.
- Ⓔ **ACTUATING LEVER** – Forces inner and outer brakeshoes against brakedrum when parking brake control lever is raised.
- Ⓕ **PARKING BRAKE ADJUSTING SCREW** – Used to ensure full contact of brakeshoes with brakedrum.
- Ⓖ **BRAKESHOES** – Both apply friction to brakedrum when parking brake control lever is raised.
- Ⓗ **ECCENTRIC PIN** – Equalizes distance between brakeshoes and brakedrum.

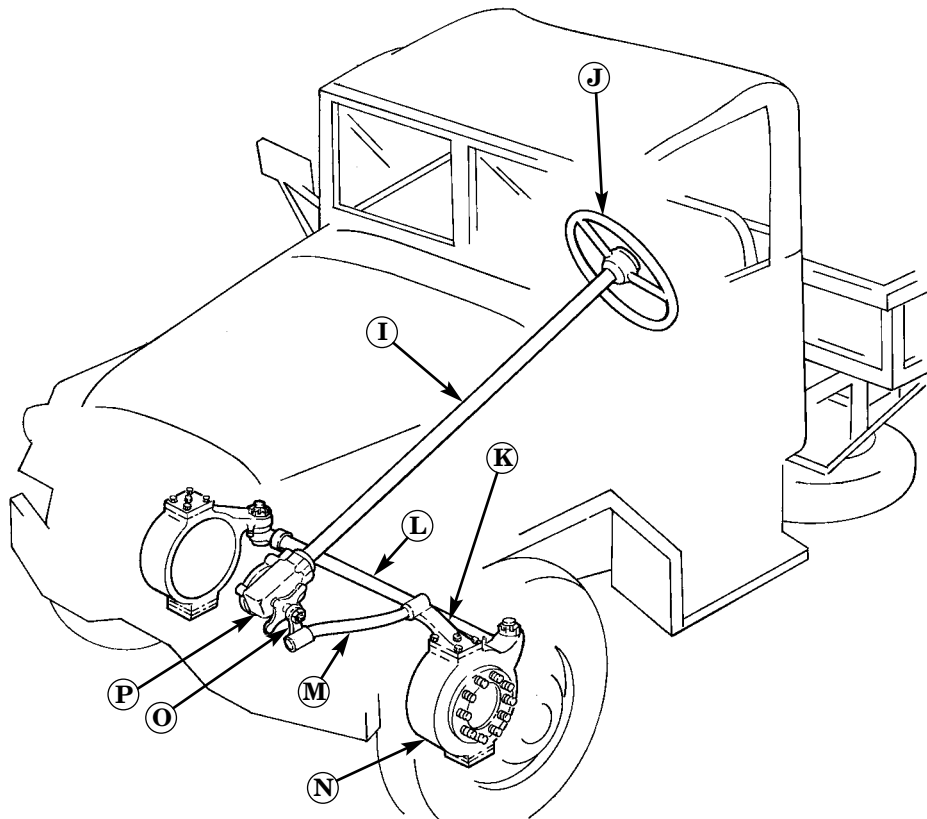


## THEORY OF OPERATION (Contd)

### STEERING SYSTEM

**Steering System Operation:** The major components of the steering system are as follows:

- ① **STEERING COLUMN** – Supports steering shaft through instrument panel and firewall to steering gear.
- ② **STEERING WHEEL** – Used by operator to control direction of vehicle travel.
- ③ **STEERING ARM** – Connects drag link to steering knuckle.
- ④ **TIE ROD** – Connects steering knuckle so both front wheels will pivot when steering is returned.
- ⑤ **DRAG LINK** – Transmits movement from pitman arm to the steering arm.
- ⑥ **STEERING KNUCKLE** – Serves as a pivot point and link for the front wheel from the tie rod.
- ⑦ **PITMAN ARM** – Transmits steering torque from steering gear to drag link.
- ⑧ **STEERING GEAR** – Transmits mechanical power from the steering wheel to the pitman arm.



## THEORY OF OPERATION (Contd)

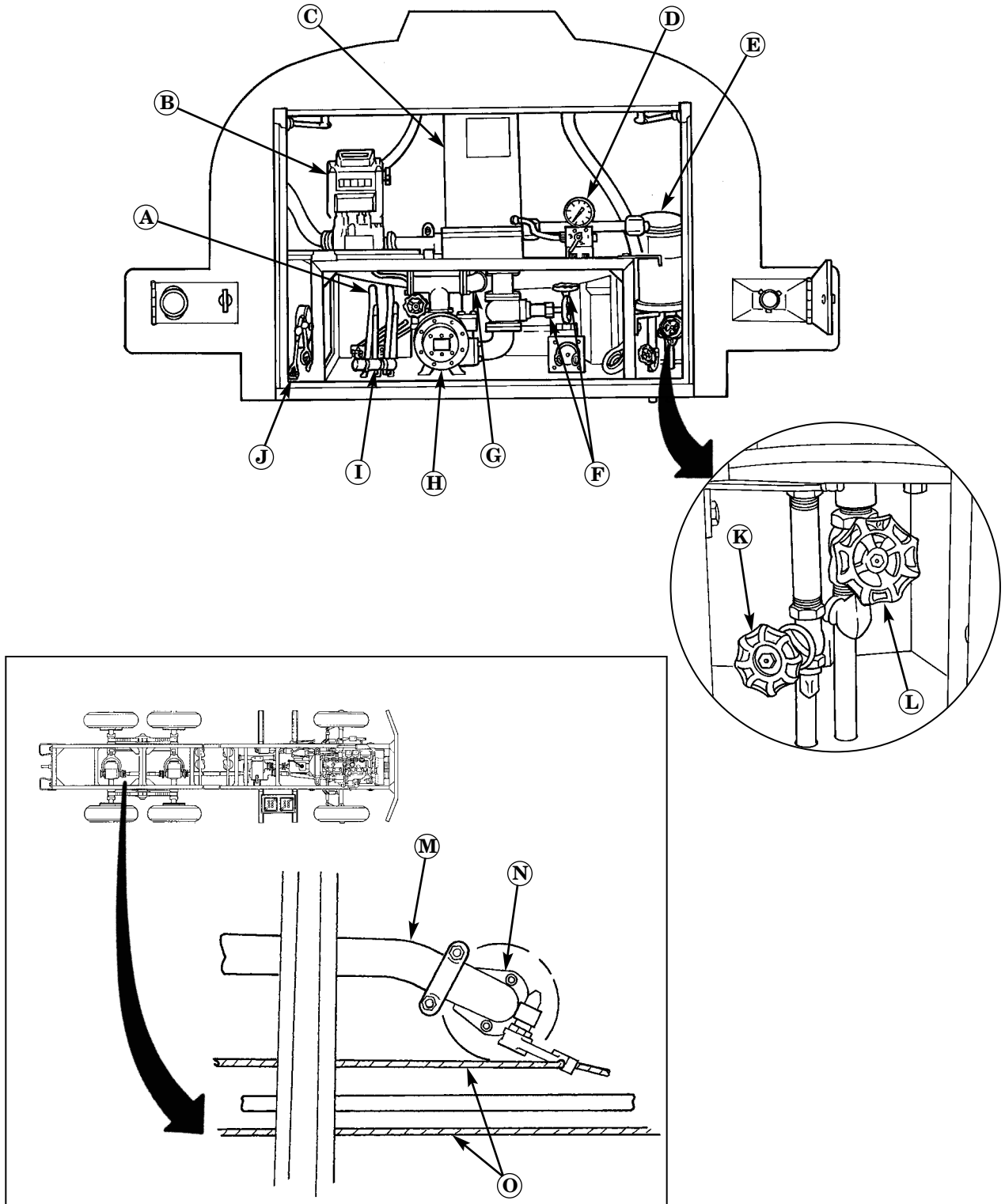
### SPECIAL PURPOSE BODIES

**M49A2C Fuel Tank System Operation:** Fuel is dispensed under pressure by operating a delivery pump driven off the transfer case PTO. As with all fuel dispensing equipment, static discharge from equipment must be grounded to a ground rod.

- Ⓐ **DISCHARGE VALVE CONTROL LEVERS** – Two manual control levers that allow fuel to be discharged from either front or rear compartment of tank body.
- Ⓑ **METER** – Indicates quantity of fuel dispensed.
- Ⓒ **FUEL FILTER/WATER SEPARATOR** – Separates water from fuel and removes contaminants from fuel before distribution.
- Ⓓ **PRESSURE GAUGE** – Checks condition of filter elements by indicating difference in pressure between inlet and outlet side of filter.
- Ⓔ **SUMP** – Collects water from separator and drains through the manual drain valve.
- Ⓕ **GATE VALVES** – Provide a means of turning on or shutting off flow of fuel.
- Ⓖ **MANIFOLD DRAIN** – Accepts fuel from discharge pipes and transfers it to pump.
- Ⓗ **PUMP** – Draws fuel from tank and discharges it under pressure.
- Ⓘ **EMERGENCY CONTROL LEVER RELEASE** – When actuated, it allows discharge valve control levers to return to OFF position which stops flow of fuel.
- Ⓙ **STATIC REAR AND GROUNDING WIRES** – Transmits any static electricity produced by fuel flowing through the piping harmlessly to the ground. The grounding wires are pulled out from static reel and attached to ground and vehicle to be fueled.
- Ⓚ **MANUAL DRAIN VALVE** – Provides a means to periodically drain water from sump.
- Ⓛ **DUMP VALVE** – When opened, water collected by fuel filter/water separator is automatically allowed to drain out.
- Ⓜ **FUEL DISCHARGE PIPE** – Receives fuel from tank body compartments and directs it to fuel filter/water separator.
- Ⓝ **DISCHARGE VALVE** – Operates by cables and is used to drain front and rear tank compartments.
- Ⓞ **FRONT AND REAR DISCHARGE VALVE CABLES** – Connect discharge valve control levers to the two discharge valves.



THEORY OF OPERATION (Contd)



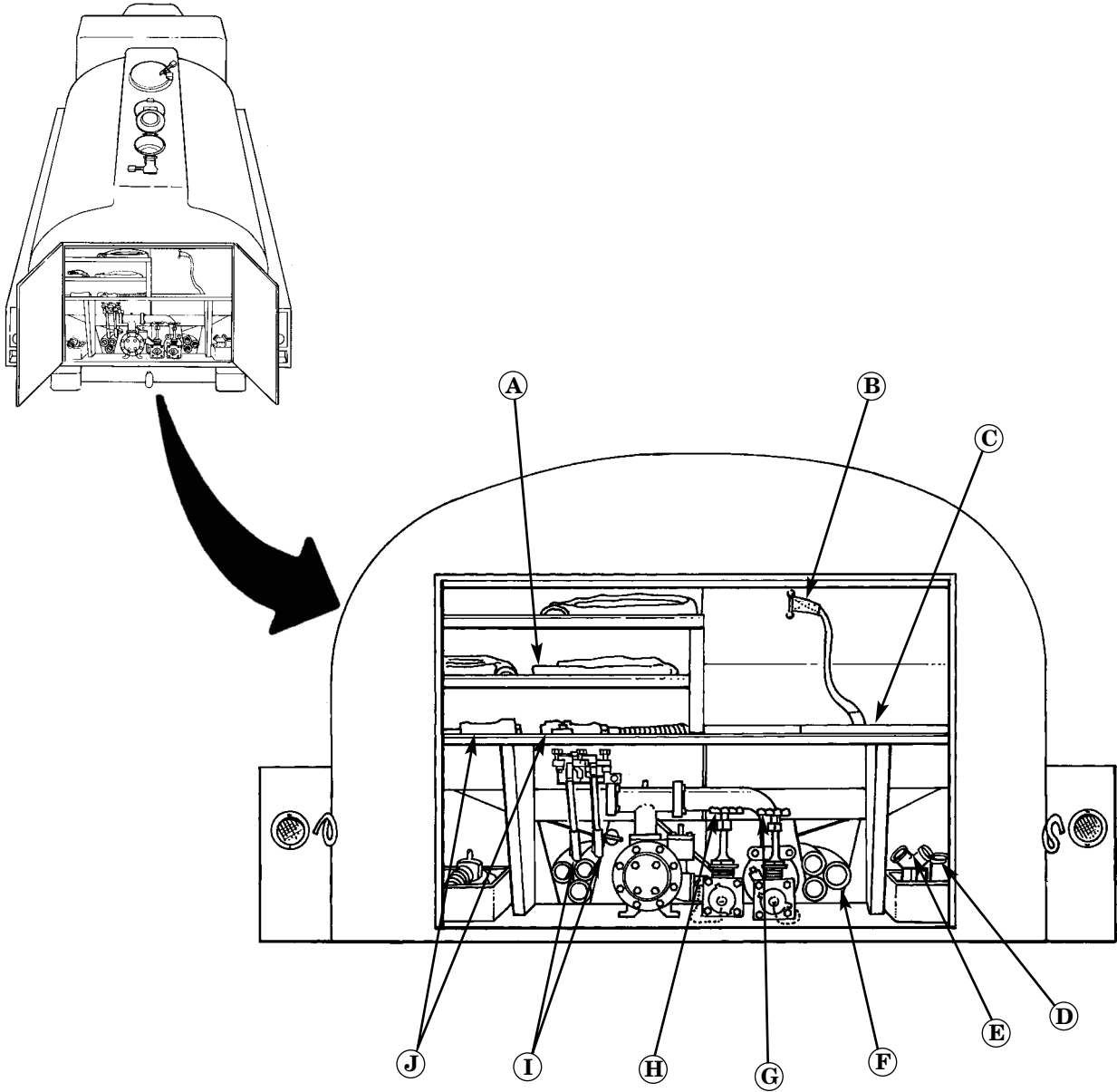
## THEORY OF OPERATION (Contd)

### SPECIAL PURPOSE BODIES (Contd)

**M50A3 Water Tank System Operation:** Water can be dispensed either by gravity or under pressure by operating a delivery pump driven off the transfer case PTO. When operating in temperatures below 32° F (0° C), engine exhaust heat is diverted under water tanks to prevent water from freezing.

- Ⓐ **WATER DISCHARGE HOSES** – Used to deliver water from tank compartments.
- Ⓑ **STRAP** – Used to secure manhole cover during arctic operation when heaters are installed in tank openings.
- Ⓒ **WATER LEVEL GAUGE** – Dipped into tank compartments to measure water levels.
- Ⓓ **WATER SUCTION STRAINER** – Attached to water suction hose to prevent foreign matter from entering tank.
- Ⓔ **Y-COUPLING** – Attached to the line discharge/suction valve to facilitate delivery of two streams of water at the same time.
- Ⓕ **WATER SUCTION HOSES** – Used to fill tank compartments when gravity fill cannot be used.
- Ⓖ **GRAVITY DELIVERY LINE SUCTION VALVE** – Turning handle to the left allows water flow through gravity delivery line.
- Ⓗ **PUMP DELIVERY LINE SUCTION VALVE** – Turning handle to the left allows water flow through pump delivery line.
- Ⓘ **COMPARTMENT VALVE LEVERS** – When pulled back, opens discharge valves which control flow of water from tank compartments.
- Ⓙ **WATER DISPENSER NOZZLE** – Controls flow of water at the point of delivery.

THEORY OF OPERATION (Contd)



## THEORY OF OPERATION (Contd)

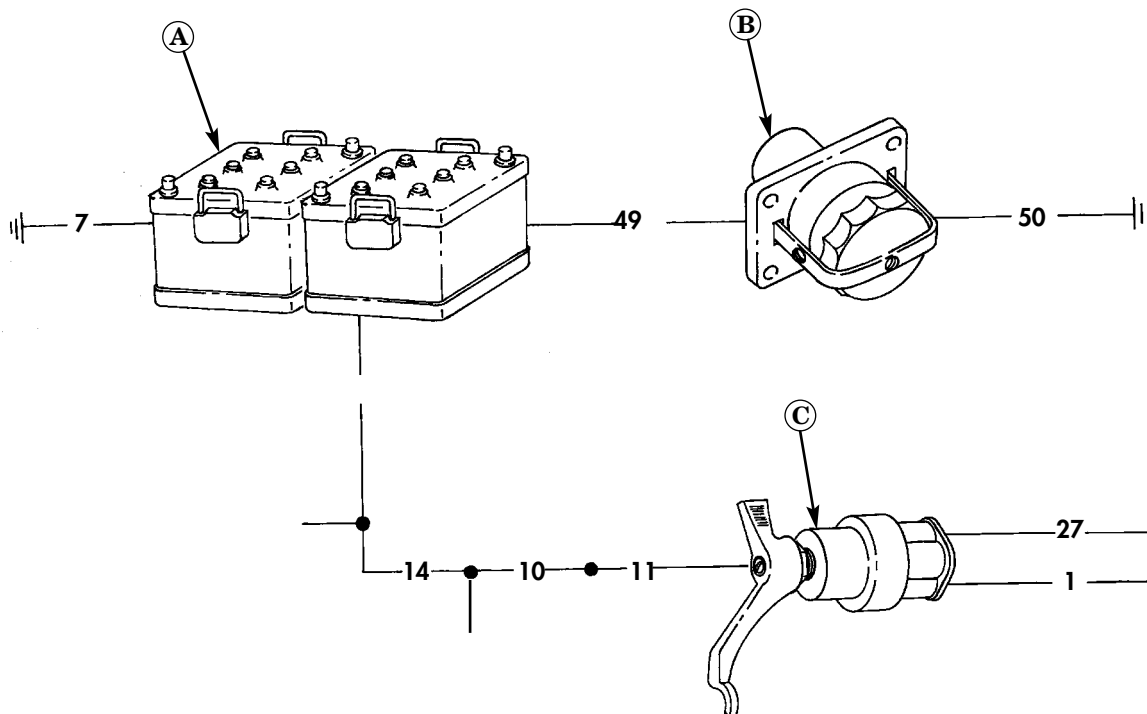
### ELECTRICAL SYSTEMS OPERATION

Wires with circuit numbers are shown here for reference only and are not to be used for troubleshooting.

### BATTERY AND WIRING SYSTEM

**Battery System Operation:** The batteries are wired in series thereby utilizing two 12V batteries to create a 24V system. The batteries are positive grounded directly to the chassis frame. The negative battery cable is connected to the starter motor solenoid terminal, and voltage is supplied to the main wiring harnesses from the solenoid terminal. The major components are as follows:

- Ⓐ **BATTERY** – Two type 6TMF batteries store and supply electrical energy. They provide 24 volts DC for the starting system and electrical accessories.
- Ⓑ **SLAVE RECEPTACLE** – Provides a convenient place to plug in an external power source to assist in cranking the engine. Used when vehicle batteries are not sufficiently charged.
- Ⓒ **ACCESSORY POWER SWITCH** – Connects or disconnects the batteries from the vehicle electrical components.

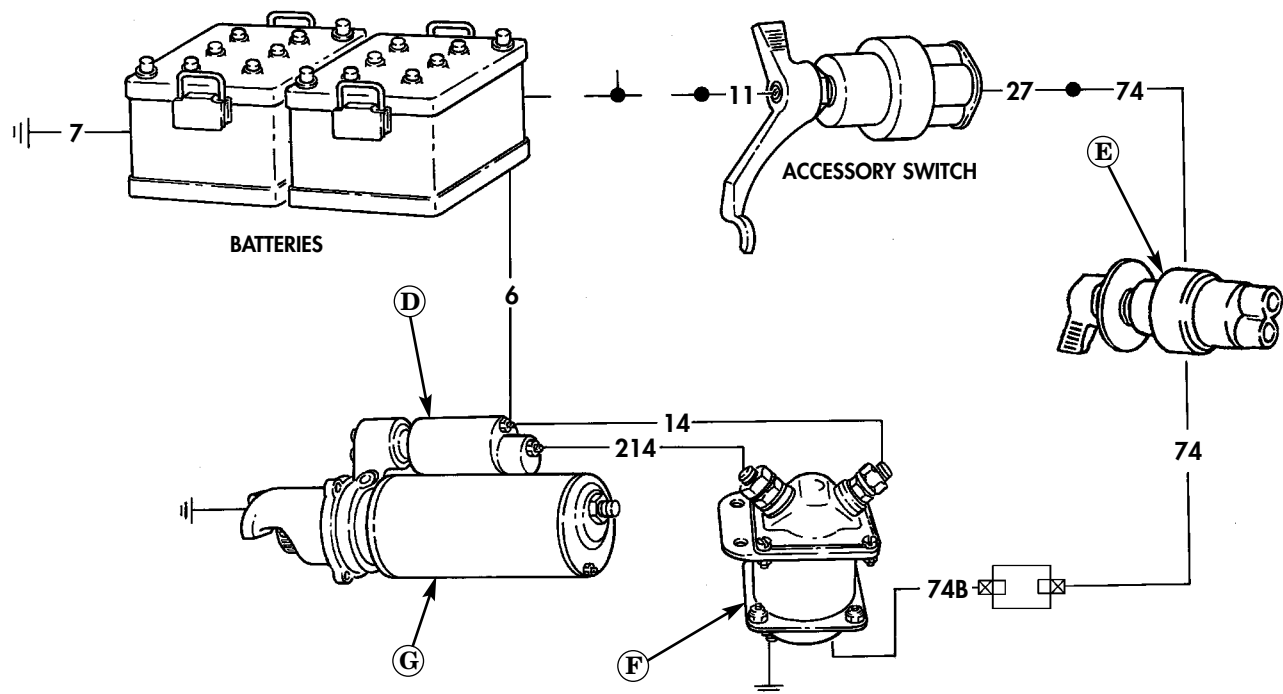


## THEORY OF OPERATION (Contd)

### STARTING CONTROL SYSTEM

**Starting System Operation:** The starter motor on all LD and LDT multifuel engines is energized electrically, and operates mechanically by engaging the starter gear with the engine flywheel via an electric solenoid. To crank the engine, a number of switches are activated to send power to the starter solenoid and starter motor. The major components of the starting system are as follows:

- Ⓓ **STARTER SOLENOID** – Actuates starter motor gear to crank vehicle engine.
- Ⓔ **STARTER SWITCH** – Connects 24-volt battery power to starter motor when pressed.
- Ⓕ **STARTER RELAY** – A magnetic switch, actuated by starter switch that allows 24-volt battery power to flow to starter motor.
- Ⓖ **STARTER MOTOR** – Cranks vehicle engine for starting when supplied with 24-volt battery power.

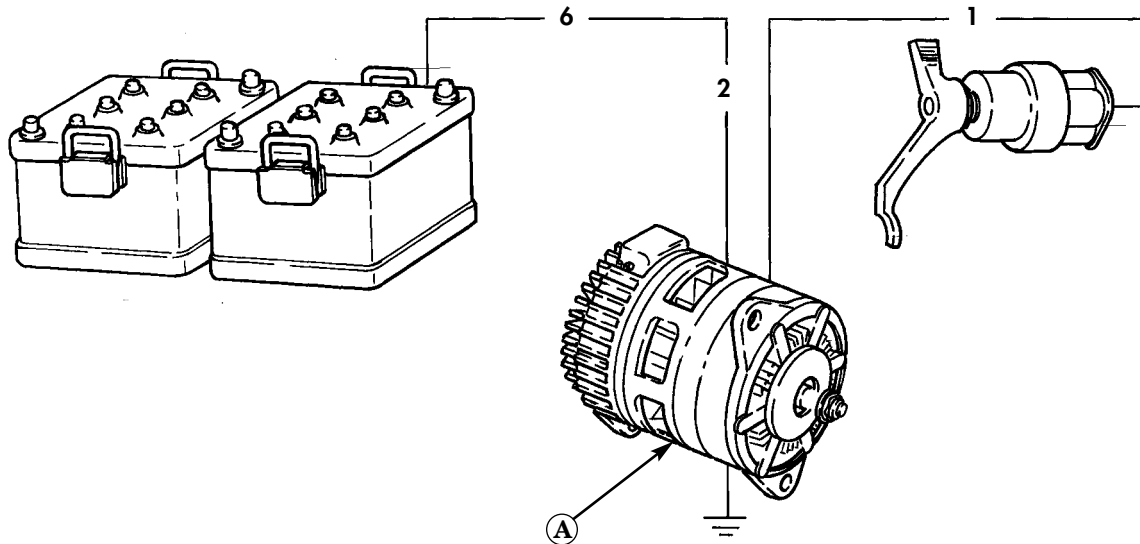


## THEORY OF OPERATION (Contd)

### CHARGING SYSTEM

**Generating System Operation:** The generating system used is 24V direct current (DC), and utilizes a V-belt driven 60A alternator. The major components of the generating system are as follows:

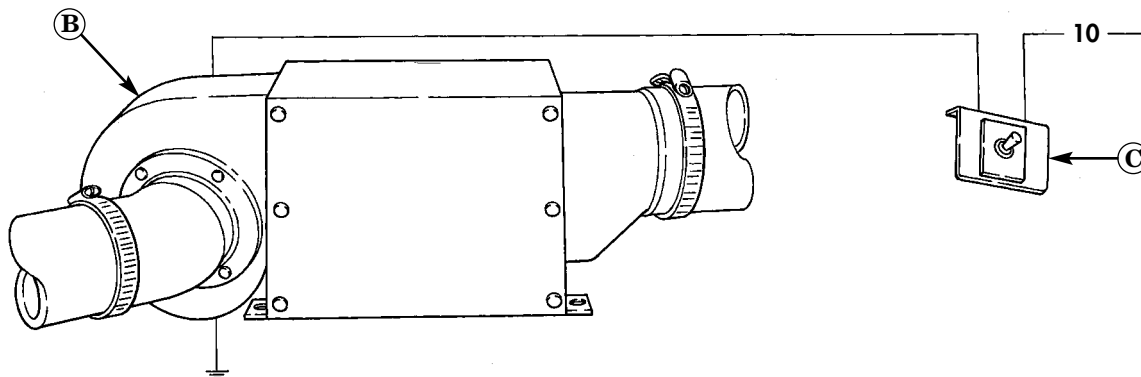
- Ⓐ **ALTERNATOR** – Supplies electrical power to operate all electrical accessories and keeps batteries charged when vehicle engine is operating.



### HEATING SYSTEM OPERATION

The following components make up the heating system:

- Ⓑ **HOT WATER PERSONNEL HEATER** – Warms interior of vehicle cab in cold weather. Hot engine coolant circulating through heater is utilized to warm air flowing through heater core. An electric motor, with two speeds, powers a fan to force outside air through heater and into cab.
- Ⓒ **HEATER SWITCH** – Allows heater fan to be operated at two speeds.

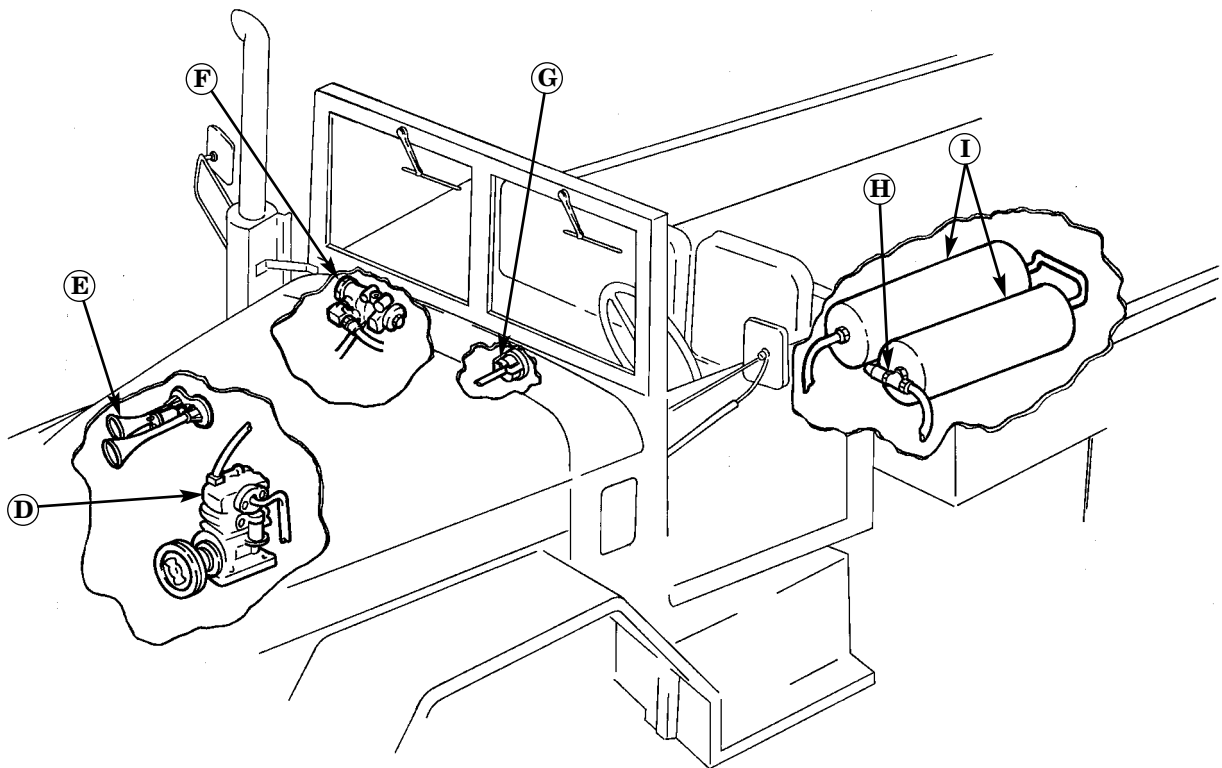


## THEORY OF OPERATION (Contd)

### COMPRESSED AIR SYSTEM

The compressed air system takes filtered air, compresses it, and supplies it to various components within the vehicle. The components of the air system and air actuated accessories are as follows:

- Ⓓ **AIR COMPRESSOR** – Draws in air, filters it, pressurizes it, and forces it into air reservoirs for storage.
- Ⓔ **AIR HORN** – Receives air from the compressed air system in order to operate.
- Ⓕ **GOVERNOR** – Automatically opens or closes a valve inside air compressor to ensure a sufficient quantity of compressed air is available for air system.
- Ⓖ **PRESSURE GAUGE** – Indicates amount of pressurized air available in air system. Normal pressure is 85–120 psi (586–827 kPa).
- Ⓗ **SAFETY VALVE** – Prevents excessive pressure to build up in air system by releasing air when necessary.
- Ⓘ **AIR RESERVOIRS** – Store pressurized air for use in air system and traps water to protect air-operated accessories from corrosion and freezing.

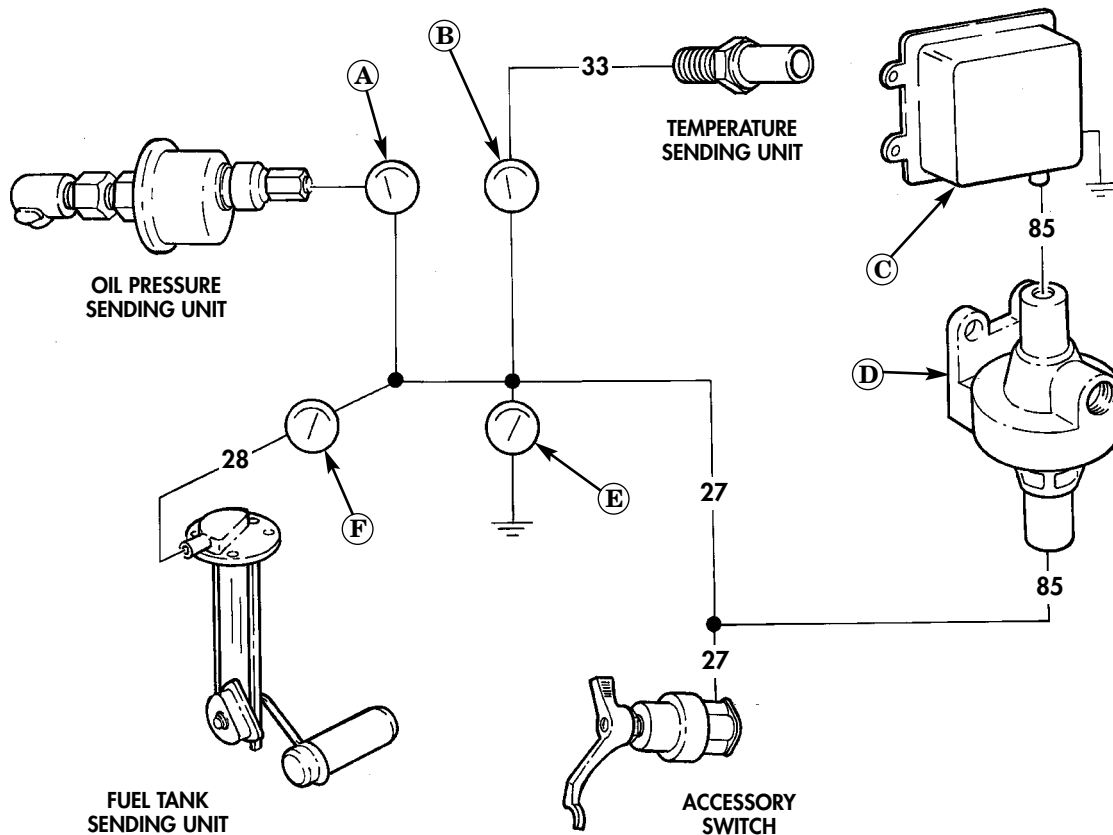


## THEORY OF OPERATION (Contd)

### GAUGE AND WARNING SYSTEM

**Gauge and Warning System Operation:** The major components of the gauge and sending unit system are as follows:

- A. OIL PRESSURE GAUGE** – Indicates pressure of oil circulating through vehicle engine. Receives electrical current from oil pressure sending unit located on engine block.
- B. ENGINE TEMPERATURE GAUGE** – Indicates temperature of engine coolant circulating through engine. Receives electrical current from engine temperature sending unit located on engine block.
- C. WARNING BUZZER (LOW AIR)** – Produces a loud sound to warn vehicle operator that the air pressure is below 60 psi (413 kPa).
- D. LOW AIR PRESSURE SWITCH** – Activates warning buzzer to sound when pressure in compressed air system is below 60 psi (413 kPa).
- E. BATTERY/GENERATOR GAUGE** – Indicates amount of voltage in electrical system provided by batteries and alternator.
- F. FUEL GAUGE** – Indicates amount of fuel in fuel tank. Receives electrical current from fuel tank sending unit located in fuel tank.





## CHAPTER 2

### FIELD TROUBLESHOOTING

#### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

	<u>WP Sequence No.</u>
Introduction to Troubleshooting . . . . .	WP 0004 00
Mechanical Systems Troubleshooting Index — Unit . . . . .	WP 0005 00
Mechanical Systems Troubleshooting — Unit. . . . .	WP 0006 00
Mechanical Systems Troubleshooting Index — Direct Support. . . . .	WP 0007 00
Mechanical Systems Troubleshooting — Direct Support . . . . .	WP 0008 00
Compressed Air and Brake System Troubleshooting Index. . . . .	WP 0009 00
Compressed Air and Brake System Troubleshooting . . . . .	WP 0010 00
Electrical Troubleshooting Symptom Index. . . . .	WP 0011 00
Battery and Charging System Troubleshooting . . . . .	WP 0012 00
Lighting and Wiper System Troubleshooting . . . . .	WP 0013 00
Indicators, Gauges, and Warning System Troubleshooting . . . . .	WP 0014 00
Heating Systems Troubleshooting . . . . .	WP 0015 00
Introduction to Simplified Test Equipment for Internal Combustion Engine — . . . . .	WP 0016 00
Reprogrammable (STE/ICE-R) Troubleshooting	
Simplified Test Equipment for Internal Combustion Engine — . . . . .	WP 0017 00
Reprogrammable (STE/ICE-R) Go Chain Troubleshooting	
Simplified Test Equipment for Internal Combustion Engine — . . . . .	WP 0018 00
Reprogrammable (STE/ICE-R) No-Go Chain Troubleshooting	



## FIELD TROUBLESHOOTING

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

#### INTRODUCTION TO TROUBLESHOOTING

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##### **WARNING**

Failure to perform a preliminary inspection on a deadlined vehicle may cause injury to personnel and/or damage to equipment.

##### **NOTE**

If corrective action provided does not correct malfunction, notify your supervisor.

This chapter provides troubleshooting procedures necessary to diagnose mechanical, compressed air and brake system, electrical, and Simplified Test Equipment for Internal Combustion Engines Reprogrammable (STE/ICE-R) malfunctions for M44A2 series vehicles. The troubleshooting procedures may not correct all vehicle malfunctions encountered. However, the procedures provide a step-by-step approach that directs tests and inspections toward the source of a problem.

The troubleshooting indexes have their own WP numbers and are used to identify malfunctions and locate the troubleshooting procedure needed to diagnose the problem.

Each troubleshooting procedure lists a description of the malfunction followed by a step or sequence of steps to check the operation of a component. Then, in the order of probability, substeps instruct the user to perform a check, inspection, or test to determine if a condition exists. Each substep includes the corrective action required to correct the malfunction.

Prior to performing any troubleshooting procedure, observe the following recommendations:

1. Check the Equipment Inspection and Maintenance Worksheet, DA Form 2404, and Maintenance Request Form, DA Form 2407, to find out why the equipment has been deadlined. Note the operator's written description of the problem and, whenever possible, discuss the problem with the operator. This can save time and effort in diagnosing the problem.
2. Do not assume the operator's diagnosis is correct, even if it sounds accurate. Always perform the appropriate troubleshooting procedure(s) to verify the cause of the problem. Performing a corrective action without proof of a fault wastes time and increases maintenance of the equipment.
3. First isolate the system where the malfunction occurs, then locate the component and perform the corrective action in the ordered listed.
4. Use approved mechanical, electrical, and pneumatic system repair practices provided in the technical manuals, field manuals, and technical bulletins listed in WP 0465 00 of this manual.
5. Use approved special tools and test equipment to determine the known parameters for isolating a fault.
6. Fill out an Exchange Tag, DA Form 2402, and attach it to component that will be exchanged as a core and turned in for repair or rebuilding at the field or sustainment maintenance level.

This manual lists the most common malfunctions that may occur. If a malfunction occurs that is not listed in the Mechanical Systems Troubleshooting Index, WP 0005 00, the Compressed Air and Brake System Troubleshooting Index, WP 0009 00, or the Electrical System Troubleshooting Index, WP 0011 00, notify your supervisor.



## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - UNIT

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>ENGINE</b>		
1.	Engine will not crank . . . . .	0006-00-1
2.	Engine cranks but will not start . . . . .	0006-00-2
3.	Starter cranks engine slowly . . . . .	0006-00-3
4.	Engine stops during normal operation . . . . .	0006-00-3
5.	Engine stops when accelerator is returned to idle position . . . . .	0006-00-4
6.	Engine misfires during operation . . . . .	0006-00-4
7.	Poor acceleration and/or lack of power . . . . .	0006-00-4
8.	Engine surges . . . . .	0006-00-5
9.	Excessive engine oil loss or consumption during normal operation . . . . .	0006-00-5
10.	Engine oil pressure too low or too high at normal operation temperature . . . . .	0006-00-6
11.	Excessive vibration or clunking . . . . .	0006-00-6
12.	Excessive fuel consumption; exhaust color blue and/or excessive smoke . . . . .	0006-00-7
<b>EXHAUST SYSTEM</b>		
1.	Exhaust color blue during normal operation . . . . .	0006-00-7
2.	Exhaust color white during normal operation and idle . . . . .	0006-00-8
3.	Excessive exhaust noise . . . . .	0006-00-8
4.	Exhaust fumes in cab . . . . .	0006-00-8
<b>MANIFOLD HEATER SYSTEM</b>		
	Engine cranks but will not start in cold weather (fuel system operating properly) . . . . .	0006-00-8
<b>COOLING SYSTEM</b>		
1.	Engine temperature gauge above 230 °F (110 °C) . . . . .	0006-00-9
2.	Engine does not reach normal operating temperature . . . . .	0006-00-10
3.	Coolant loss during normal operation . . . . .	0006-00-10
<b>FUEL SYSTEM</b>		
	No fuel at fuel injectors . . . . .	0006-00-11
<b>PERSONNEL HOT WATER HEATER</b>		
	Personnel hot water heater does not heat cab . . . . .	0006-00-11

**MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - UNIT (Contd)**

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>TRANSMISSION</b>		
1.	Transmission noisy .....	0006-00-12
2.	Transmission leaks oil .....	0006-00-12
3.	Clutch pedal will not travel or depress .....	0006-00-12
<b>CLUTCH</b>		
1.	Vehicle creeps with clutch depressed .....	0006-00-12
2.	Clutch drags, slips, or does not engage .....	0006-00-13
<b>TRANSFER CASE</b>		
1.	Burning odor evident with clutch engaged .....	0006-00-13
2.	Transfer case difficult to shift .....	0006-00-13
3.	Transfer case grinds or pops out of gear during normal vehicle operation .....	0006-00-13
4.	Transfer case noisy .....	0006-00-13
<b>PROPELLER SHAFTS</b>		
	Propeller shaft vibration .....	0006-00-14
<b>DIFFERENTIALS</b>		
1.	Differential noisy .....	0006-00-14
2.	Differential clunks during turns or initial takeoff .....	0006-00-15
3.	Differential vibrates .....	0006-00-15
4.	Differential leaks oil .....	0006-00-15
<b>WHEELS AND TIRES</b>		
1.	Uneven tire wear .....	0006-00-16
2.	Vehicle shimmy, wobble, or vibration .....	0006-00-17
<b>STEERING</b>		
1.	Excessive play in steering wheel .....	0006-00-17
2.	Steering wheel hard to turn .....	0006-00-17
3.	Vehicle wanders or pulls to one side .....	0006-00-18
<b>FRAME AND BRACKETS</b>		
1.	Towing pintle does not latch or lock .....	0006-00-19
2.	Pintle hook does not turn .....	0006-00-19
3.	Excessively loose lifting shackle .....	0006-00-19
4.	Loose spare tire carrier .....	0006-00-19
<b>SUSPENSION</b>		
1.	Noisy suspension .....	0006-00-19
2.	Continuous wandering or swaying (poor control) .....	0006-00-19
3.	Vehicle sags .....	0006-00-19

**MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - UNIT (Contd)**

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>WINCH</b>		
1.	Winch inoperative	0006-00-20
2.	Winch operates in one direction only	0006-00-20
3.	Winch operates at one speed only	0006-00-20
4.	Drag brake does not operate	0006-00-20
5.	Winch does not hold load when power released	0006-00-20
6.	Automatic brake overheats	0006-00-20
7.	Vehicle rolls while operating winch	0006-00-20
<b>POWER TAKEOFF (PTO)</b>		
1.	PTO noisy	0006-00-20
2.	PTO difficult to shift	0006-00-20
3.	PTO inoperative (transmission-driven)	0006-00-21
4.	PTO inoperative (transfer-driven)	0006-00-21
<b>NON-ELECTRICAL GAUGES</b>		
1.	Speedometer or tachometer bounces, noisy, or inoperative	0006-00-21
2.	Air pressure gauge inoperative	0006-00-21
<b>FUEL TANK (M49A2C)</b>		
1.	Fuel does not pump from compartments, or pumps slowly	0006-00-22
2.	Delivery pump dispenses fuel slowly from both tanks	0006-00-22
3.	Fuel does not pump or pumps slowly from selected tank, and fuel drains slowly from selected tank using gravity procedures	0006-00-23
4.	Fuel tank compartments cannot be suction filled	0006-00-23
<b>WATER TANK (M50A3)</b>		
1.	Water cannot be pumped from both tanks	0006-00-24
2.	Water cannot be pumped or pumps slowly from selected tank, and water drains slowly from selected tank using gravity procedures	0006-00-24
3.	Water pumps out of both tanks more slowly than normal	0006-00-24
4.	Water tank compartments cannot be suction filled	0006-00-25
<b>PERSONNEL FUEL BURNING HEATER/POWER PLANT HEATER KIT</b>		
1.	Heater will not operate in HIGH or LOW switch position	0006-00-26
2.	Heater will not operate	0006-00-28

END OF WORK PACKAGE

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## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT

**NOTE**

Refer to the general troubleshooting instructions in Introduction to Troubleshooting (WP 0004 00) prior to performing any mechanical troubleshooting.

*Table 1. Engine Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE WILL NOT CRANK</b></p>	<p>1. Verify proper voltage is present at starter (WP 0012 00, table 2, malfunction 2, test 3).</p> <p>2. Remove starter (WP 0088 00) and visually check starter drive, ring gear, and flywheel for broken or missing teeth.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Ensure fuel shutoff valve is off and remove throttle cable before cranking engine. Failure to do so may result in injury to personnel.</p> <p>3. Check for seized engine or fluid-locked pistons. Remove radiator and rotate engine at vibration damper bolt two full revolutions with starter removed.</p> <p>4. Check water pump, and belt-driven accessories. Remove all belts (WP 0084 00 and WP 0182 00). Manually turn drive pulley of each accessory and water pump.</p> <p>5. Check air induction system for presence of water or restrictions. Remove air cleaner cover (WP 0052 00).</p>	<p>If voltage is not present, refer to WP 0012 00, table 2, malfunction 1.</p> <p>1. If starter teeth are damaged, replace starter (WP 0088 00).</p> <p>2. If ring gear is damaged, replace flywheel (WP 0029 00).</p> <p>If engine is seized, replace engine (WP 0046 00).</p> <p>1. If water pump drive pulley will not turn, replace water pump (WP 0082 00).</p> <p>2. If any drive pulley accessory will not turn, replace accessory (WP 0085 00, and WP 0180 00).</p> <p>If air cleaner cover is restricted or contaminated with water, replace element (WP 0052 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE WILL NOT CRANK (Contd)</b></p>	<p>6. Check vertical exhaust system and turbocharger for presence of water. Remove exhaust elbow from turbocharger (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00).</p>	<p>1. If water is present in exhaust elbow, disassemble and drain exhaust system (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00).</p> <p>2. If water is present in turbocharger housing, identified by water on turbocharger fins or hub, replace turbocharger (WP 0057 00).</p>
<p><b>2. ENGINE CRANKS BUT WILL NOT START</b></p>	<p>1. Check air cleaner indicator (TM 9-2320-361-10).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Diesel fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.</li> <li>• Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.</li> </ul> <p>2. Turn accessory switch to ON position and drain 1/2 pint (0.25 liter) of fuel from primary fuel filter, secondary fuel filter, and final fuel filter. Check for contaminated fuel.</p> <p>3. Check for white exhaust smoke during cranking.</p>	<p>1. If red appears at indicator window, inspect air intake head for restrictions. If restrictions are not present, replace air cleaner element (WP 0052 00).</p> <p>2. Reset air cleaner indicator (TM 9-2320-361-10).</p> <p>1. If water or contamination are present, remove fuel tank (WP 0060 00).</p> <p>2. Clean and flush entire fuel system. Dry system with compressed air.</p> <p>1. If white smoke can be seen, air may be in fuel system. Bleed fuel system (WP 0064 00).</p> <p>2. If white smoke can be seen, coolant may be inside combustion chambers. If coolant is present on dipstick, check cylinder heads and gaskets for defects (WP 0027 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. ENGINE CRANKS BUT WILL NOT START (Contd)</b></p>	<p>4. Check in-tank pump pressure (WP 0061 00).</p> <p>5. Turn accessory switch to ON position and check pressure at secondary and final fuel filters (WP 0064 00).</p> <p>6. Check fuel tank pickup tube for restrictions (WP 0061 00).</p> <p>7. Check fuel pump for proper fuel pressure (WP 0061 00).</p> <p>8. Check fuel shutoff for proper adjustment (WP 0071 00).</p>	<p>If pressure is below 4 psi (27.58 kPa) replace in-tank fuel pump (WP 0061 00).</p> <p>1. If pressure is below 2 psi (14.0 kPa), remove and replace primary fuel filter (WP 0063 00), and recheck pressure at secondary and final fuel filters. If pressure is still below 2 psi (14.0 kPa), replace secondary and final fuel filters (WP 0064 00).</p> <p>2. If filters are clean and pressure is still below 2 psi (14.0 kPa) at secondary and final fuel filter, inspect fuel lines for kinks, bends, breaks, loose connections, restrictions, and leaks. Repair fuel lines if damaged.</p> <p>Remove restrictions from fuel tank pickup tube (WP 0061 00).</p> <p>1. If fuel pressure gauge reads no pressure, inspect electrical connections.</p> <p>2. If electrical connections are properly connected, replace fuel pump (WP 0061 00).</p> <p>Adjust fuel shutoff for proper operating conditions (WP 0071 00).</p>
<p><b>3. STARTER CRANKS ENGINE SLOWLY</b></p>	<p>1. Check starting system circuits (WP 0012 00, table 2, malfunction 2).</p> <p>2. In cold weather, make sure proper engine oil is being used and/or replace oil (WP 0020 00).</p> <p>3. Check water pump and belt-driven accessories. Remove all belts (WP 0084 00 and WP 0182 00). Manually turn drive pulley of each accessory and water pump</p>	<p>If starting system circuits are damaged, repair or replace.</p> <p>Use proper engine oil for climate conditions.</p> <p>1. If water pump drive pulley will not turn, replace water pump (WP 0082 00).</p> <p>2. If any drive pulley accessory will not turn, replace accessory (WP 0085 00, and WP 0180 00).</p>
<p><b>4. ENGINE STOPS DURING NORMAL OPERATION</b></p>	<p>1. Check air cleaner for restrictions (WP 0006 00, table 1, malfunction 1).</p> <p>2. Check fuel system for contamination and restrictions (WP 0006 00, table 1, malfunction 2).</p> <p>3. Check for restrictions in exhaust system. Ensure exhaust system is not bent, restricted, or damaged.</p>	<p>Remove restrictions from air cleaner.</p> <p>If water or contamination is present, remove fuel tank (WP 0060 00).</p> <p>If exhaust system is damaged or restricted, replace damaged parts (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 1. Engine Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>4. ENGINE STOPS DURING NORMAL OPERATION (Contd)</b>	<ol style="list-style-type: none"> <li>4. Check air induction system for major restrictions.</li> <li>5. Check idle speed (WP 0070 00).</li> </ol>	<p>If air induction system is restricted, clean or replace defective components (WP 0051 00–WP 0054 00).</p> <p>If idle speed is set below specifications, adjust (WP 0070 00).</p>
<b>5. ENGINE STOPS WHEN ACCELERATOR IS RETURNED TO IDLE POSITION</b>	<ol style="list-style-type: none"> <li>1. Check air induction system for restrictions.</li> <li>2. Check idle speed (WP 0070 00).</li> </ol>	<p>If air induction system is restricted, clean or replace defective components (WP 0051 00–WP 0054 00).</p> <p>If idle speed is set below specifications, adjust (WP 0070 00).</p>
<b>6. ENGINE MISFIRES DURING OPERATION</b>	<ol style="list-style-type: none"> <li>1. Check air cleaner indicator (TM 9-2320-361-10).</li> <li>2. Check for air or water in fuel system.</li> </ol>	<p>If red appears at indicator window, inspect air intake head for restrictions. If restrictions are not present, replace air cleaner element (WP 0052 00).</p> <p>Perform WP 0006 00, table 1, malfunction 2, step 2. Repair or replace as required.</p>
<b>7. POOR ACCELERATION AND/OR LACK OF POWER</b>	<ol style="list-style-type: none"> <li>1. Check air cleaner indicator (TM 9-2320-361-10).</li> <li>2. Check air induction system for restrictions.</li> <li>3. Check fuel system for restrictions.</li> <li>4. Check exhaust system for restrictions.</li> <li>5. Inspect accelerator pedal and throttle lever for full travel.</li> <li>6. Check throttle linkage for binding and sticking.</li> <li>7. Check vehicle for dragging brakes, low tire inflation, or cargo load over limit (TM 9-2320-361-10).</li> </ol>	<p>If red appears at indicator window, inspect air intake head for restrictions. If restrictions are not present, replace air cleaner element (WP 0052 00).</p> <p>If air induction system is restricted, clean or replace defective components (WP 0051 00 – WP 0054 00).</p> <p>Replace restricted or damaged parts (WP 0060 00).</p> <p>If defects are evident during check, adjust or replace components (WP 0073 00) (For M50A3 series vehicles, refer to WP 0074 00).</p> <p>Adjust travel on throttle lever (WP 0070 00).</p> <p>If linkage is binding or sticking, replace throttle linkage (WP 0070 00).</p> <ol style="list-style-type: none"> <li>1. Adjust brakes, tire pressure, and cargo to proper limits.</li> <li>2. Correct overload condition (TM 9-2320-361-10).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>7. POOR ACCELERATION AND/OR LACK OF POWER (Contd)</b></p>	<p>8. Check turbocharger hoses and intake manifold elbow for leaks.</p> <p>9. Inspect around cylinder head for evidence of a blown head gasket (e.g., air bubbles, oil, coolant, etc.).</p> <p>10. Inspect radiator cap for milky film.</p> <p>11. Inspect fuel shutoff for proper adjustment (WP 0071 00).</p>	<p>1. Tighten base screws and clamps. Replace any missing screws or clamps (WP 0051 00).</p> <p>2. If there is no improvement during test run, turbocharger malfunction is indicated; replace turbocharger (WP 0057 00).</p> <p>Replace head gasket (WP 0027 00).</p> <p>If radiator cap has milky film on or around it, check cylinder heads and gaskets for defects (WP 0027 00).</p> <p>Adjust fuel shutoff to proper position (WP 0071 00).</p>
<p><b>8. ENGINE SURGES</b></p>	<p>1. Check fuel system for contamination and restrictions.</p> <p>2. Inspect throttle linkage for proper operation and adjustment</p> <p>3. Check in-tank fuel pump operation (WP 0061 00).</p>	<p>Refer to WP 0006 00, table 1, malfunction 2, step 2.</p> <p>If linkage does not operate properly, adjust or replace as necessary (WP 0070 00).</p> <p>If fuel pressure is uneven or below specifications, replace in-tank fuel pump (WP 0061 00).</p>
<p><b>9. EXCESSIVE OIL LOSS OR CONSUMPTION DURING NORMAL OPERATION</b></p>	<p>1. Check oil level for overfilling (TM 9-2320-361-10).</p> <p>2. Check for external oil leaks at oil pan, drainplug, oil filter, oil filter housing, oil cooler, oil dipstick tube, rocker arm cover, oil feed lines, and turbocharger.</p> <p>3. Inspect radiator cap for milky film.</p> <p>4. Verify engine idle speed is set within specifications (WP 0070 00).</p> <p>5. Check oil pressure gauge for proper operation (WP 0014 00, table 1, malfunction 4).</p>	<p>If oil level is too high, drain the crankcase to safe operating level (WP 0020 00).</p> <p>Tighten any loose connections or loose screws that may cause leaks.</p> <p>If radiator cap has milky film on or around it, check cylinder heads and gaskets for defects (WP 0027 00).</p> <p>If engine idle speed is incorrect, adjust (WP 0070 00).</p> <p>1. Replace inoperative oil pressure gauge (WP 0095 00).</p> <p>2. If oil pressure gauge has maximum reading of 60 psi (413kPa) and needle peaks at 60 psi (413kPa), replace with new oil pressure gauge (range 0–120</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)

Table 1. Engine Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. EXCESSIVE OIL LOSS OR CONSUMPTION DURING NORMAL OPERATION (Contd)	6. Check oil pressure. Oil pressure should be 40–75 psi (275–517 kPa) at 2,600 RPM.	If oil pressure is still too high or too low, replace engine (WP 0046 00).
10. ENGINE OIL PRESSURE TOO LOW OR TOO HIGH AT NORMAL OPERATION TEMPERATURE	<p style="text-align: center;"><b>CAUTION</b></p> <p>Do not operate engine except during testing. Continued operation without proper oil pressure may damage engine internally.</p> <ol style="list-style-type: none"> <li>1. Check engine oil level (WP 0020 00).</li> <li>2. Check engine for excessive engine operating temperature (TM 9-2320-361-10).</li> <li>3. Check that engine oil grade is correct for vehicle use and climate conditions.</li> <li>4. Check operation of oil pressure gauge (WP 0014 00, table 1, malfunction 4).</li> <li>5. Check all external oil and fuel lines for leaks or restrictions.</li> <li>6. Check oil pressure. Oil pressure should be 40–75 psi (275–517 kPa) at 2,600 RPM.</li> </ol>	<p>If oil level is low, check for external oil leaks at oil pan, drainplug, oil filter, oil filter housing, oil cooler, oil dipstick tube, rocker arm cover, and turbocharger.</p> <p>If engine temperature is above correct operating temperature, see WP 0006 00, table 4, malfunction 1.</p> <p>If engine oil grade is incorrect, replace oil (WP 0020 00).</p> <ol style="list-style-type: none"> <li>1. Replace inoperative oil pressure gauge (WP 0095 00).</li> <li>2. If oil pressure gauge has maximum reading of 60 psi (413 kPa) and needle peaks at 60 psi (413 kPa), replace with new oil pressure gauge (range 0–120 psi) (WP 0095 00).</li> </ol> <p>Repair leaks or clear restrictions.</p> <p>If oil pressure is still too high or too low, replace engine (WP 0046 00).</p>
11. EXCESSIVE VIBRATION OR CLUNKING	<ol style="list-style-type: none"> <li>1. Check engine mounts and pads for looseness or damage.</li> <li>2. Check mounting of transmission to engine.</li> <li>3. Check jackshaft for loose or missing hardware.</li> <li>4. Check torsional damper for loose hardware or damage.</li> </ol>	<p>If engine mounts or pads are damaged, replace (WP 0024 00 and WP 0025 00).</p> <p>Replace missing screws or tighten loose screws (WP 0132 00).</p> <p>Replace missing hardware and tighten loose hardware.</p> <p>Tighten loose torsional hardware and/or replace damaged components.</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>12. EXCESSIVE FUEL CONSUMPTION; EXHAUST COLOR BLUE AND/OR EXCESSIVE SMOKE</b></p>	<ol style="list-style-type: none"> <li>1. Check for air cleaner restrictions and air cleaner indicator.</li> <li>2. Inspect fuel lines, hoses, and connections for leaks and damage.</li> <li>3. Inspect engine oil for presence of fuel.</li> </ol>	<ol style="list-style-type: none"> <li>1. If red appears at indicator window, inspect air intake for restrictions. If restrictions are not present, replace air cleaner element (WP 0052 00).</li> <li>2. Reset air cleaner indicator (TM 9-2320-361-10).</li> </ol> <ol style="list-style-type: none"> <li>1. Tighten any loose connections.</li> <li>2. Repair or replace damaged components.</li> </ol> <p>If fuel is present in oil, remove fuel pump, drain system, and replace fuel pump (WP 0061 00).</p>

*Table 2. Exhaust System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. EXHAUST COLOR BLUE DURING NORMAL OPERATION</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>Blue exhaust indicates excess engine oil in cylinder combustion space.</p> <ol style="list-style-type: none"> <li>1. Check that engine oil grade is correct for vehicle use and climatic conditions (WP 0020 00).</li> <li>2. Check that engine fuel grade is correct for vehicle use and climatic conditions (TM 9-2320-361-10).</li> <li>3. Inspect turbocharger for oil leaks into engine air intake or exhaust system.</li> <li>4. Perform compression test (WP 0008 00, table 1, malfunction 11).</li> </ol>	<p>If oil grade is incorrect, replace oil (WP 0020 00) and oil filters (WP 0044 00).</p> <p>If fuel grade is incorrect, drain complete fuel system and replace with correct grade of fuel (TM 9-2320-361-10).</p> <p>If oil leaks are found, replace turbocharger (WP 0057 00).</p> <p>Replace defective components identified by compression test.</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 2. Exhaust System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. EXHAUST COLOR WHITE DURING NORMAL OPERATION AND IDLE</b></p>	<p style="text-align: center;"><b>CAUTION</b></p> <p>Thick white smoke indicates coolant in engine combustion chambers. When this condition is evident, shut the engine down immediately and determine cause. Continued engine operation may result in permanent engine damage.</p> <p>Check engine temperature. Ensure engine temperature is at specified level (TM 9-2320-361-10).</p>	<p>If engine temperature is above correct operating level. See (WP 0006 00, table 4, malfunction 1).</p>
<p><b>3. EXCESSIVE EXHAUST NOISE</b></p>	<ol style="list-style-type: none"> <li>1. Inspect turbocharger for secure mounting and exhaust leaks.</li> <li>2. Inspect exhaust pipes for secure connections, cracks, breaks, and excessive rust.</li> <li>3. Inspect exhaust stack for secure connections, cracks, and breaks.</li> <li>4. Inspect exhaust manifold for damage or loose bolts (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00).</li> </ol>	<p>If turbocharger mountings are loose, tighten 23–27 lb-ft (31–37 N•m).</p> <p>Replace damaged parts (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00.)</p> <p>Replace damaged parts (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00.) If excessive exhaust noise still exists, it may be necessary to install an exhaust insulator kit 12300664.</p> <p>Repair or replace exhaust system (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00)..</p>
<p><b>4. EXHAUST FUMES IN CAB</b></p>	<ol style="list-style-type: none"> <li>1. Inspect exhaust manifold, turbocharger, exhaust pipes, and connections for leaks.</li> </ol>	<p>Replace damaged parts (WP 0073 00). (For M50A3 series vehicles, refer to WP 0074 00.)</p>

*Table 3. Manifold Heater System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>ENGINE CRANKS BUT WILL NOT START IN COLD WEATHER (FUEL SYSTEM OPERATING PROPERLY)</b></p>	<ol style="list-style-type: none"> <li>1. Check manifold heater system electrical circuit (WP 0015 00, table 1, malfunction 1).</li> <li>2. Check fuel pump, supply lines, and filter for leaks, bends, kinks, and restrictions. If vehicle is equipped with alcohol evaporator, check for proper operation as required (TM 9-2320-361-10).</li> </ol>	<p>Repair or replace electrical circuit.</p> <p>Repair or replace damaged fuel components.</p>



**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 3. Manifold Heater System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>ENGINE CRANKS BUT WILL NOT START IN COLD WEATHER (FUEL SYSTEM OPERATING PROPERLY) (Contd)</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Diesel fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.</p> <p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Have a drainage container ready to catch fuel.</li> <li>• During steps 3 and 4, do not confuse in-tank fuel pump pressure with manifold heater pump pressure.</li> </ul> <p>3. Disconnect fuel line at fuel nozzle, energize manifold heater circuit, and check to see if fuel is discharged.</p> <p>4. Check fuel nozzle for proper operation.</p>	<p>1. If fuel is not discharged, replace manifold heater fuel pump (WP 0065 00 or WP 0066 00).</p> <p>2. Remove fuel return lines (WP 0062 00). Energize circuit and check to see if fuel is discharged. If fuel is not discharged, replace manifold heater (WP 0065 00 or WP 0066 00).</p> <p>Replace damaged fuel nozzle. (WP 0067 00).</p>

*Table 4. Cooling System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE TEMPERATURE GAUGE ABOVE 230 °F (110 °C)</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Use caution when removing radiator filler cap. Steam or hot coolant under pressure may cause injury to personnel.</p> <p>1. Ensure engine fuel supply grade is correct for vehicle use and climatic conditions (TM 9-2320-361-10).</p> <p>2. Check coolant protection level with antifreeze tester.</p> <p>3. Check engine temperature gauge and engine temperature sending unit (WP 0014 00, table 1, malfunction 2).</p>	<p>If fuel grade is incorrect, completely drain fuel system and replace fuel with correct grade (TM 9-2320-361-10).</p> <p>If coolant is not within a safe range, service cooling system (WP 0076 00).</p> <p>1. If engine temperature gauge is defective, replace (WP 0095 00).</p> <p>2. If engine temperature sending unit is defective, replace (WP 0107 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 4. Cooling System Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. ENGINE TEMPERATURE GAUGE ABOVE 230 °F (110 °C) (Contd)</b>	<p>4. Inspect drivebelts for damage and check belt tension.</p> <p>5. Inspect fan for broken or missing blades.</p> <p>6. Inspect radiator for bent fins.</p> <p>7. Start engine. Remove radiator cap and visually check coolant for proper circulation and milky film.</p> <p>8. Check for clogged or broken radiator (TM 750-254).</p> <p>9. Check operation of temperature gauge (WP 0014 00, table 1, malfunction 2).</p>	<p>Replace any damaged parts and adjust drivebelts (WP 0084 00).</p> <p>If blades are broken or missing, replace fan (WP 0075 00).</p> <p>Straighten bent fins, or replace radiator (WP 0077 00).</p> <p>1. If coolant is not circulating properly, stop engine, remove thermostat, and test or replace (WP 0081 00).</p> <p>2. If milky film is present, check cylinder head and gaskets for defects (WP 0027 00).</p> <p>For cleaning and flushing instructions, refer to TB 750-651</p> <p>Replace damaged temperature gauge (WP 0095 00).</p>
<b>2. ENGINE DOES NOT REACH NORMAL OPERATING TEMPERATURE</b>	<p>1. Start engine. Remove radiator cap and visually check coolant for proper circulation. Stop engine.</p> <p>2. Test coolant temperature gauge, sending unit, and electrical circuits (WP 0014 00, table 1, malfunction 2).</p>	<p>If coolant is circulating below 100 °F, remove and test thermostat. Replace if defective (WP 0081 00).</p> <p>Replace damaged components.</p>
<b>3. COOLANT LOSS DURING NORMAL OPERATION</b>	<p>1. Pressurize cooling system and check for leaks.</p> <p>2. Check radiator cap for proper relief pressure (TM 750-254).</p> <p>3. Check for coolant in oil.</p>	<p>1. Tighten loose clamps, fasteners, or fittings.</p> <p>2. Replace leaking hoses and/or water pump (WP 0078 00 or WP 0082 00).</p> <p>Relief pressure should be 15 psi (103 kPa). Replace radiator cap if defective.</p> <p>If coolant is found in oil, check cylinder head and gaskets for defects (WP 0027 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 5. Fuel System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>NO FUEL AT FUEL INJECTORS</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Diesel fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.</li> <li>• Eye protection is required when performing fuel system troubleshooting checks. Failure to wear eye protection may result in injury to personnel.</li> <li>• Ignition switch must remain off during fuel system troubleshooting checks. Failure to verify that ignition system is turned off may result in injury or death to personnel.</li> </ul> <ol style="list-style-type: none"> <li>1. Check fuel shutoff for proper operation.</li> <li>2. Inspect fuel pump pickup tube for restrictions (WP 0061 00).</li> <li>3. Check final fuel filters for restrictions (WP 0064 00).</li> </ol>	<p>Adjust fuel shutoff for proper operating conditions (WP 0071 00). Clear restrictions from fuel pump pickup tube (WP 0061 00).</p> <ol style="list-style-type: none"> <li>1. If final fuel filters are restricted or defective, replace (WP 0064 00).</li> <li>2. If final fuel filters are not restricted and problem persists, refer to WP 0008 00, table 2, malfunction 1.</li> </ol>

*Table 6. Personnel Hot Water Heater Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>PERSONNEL HOT WATER HEATER DOES NOT HEAT CAB</b></p>	<ol style="list-style-type: none"> <li>1. Check to ensure engine reaches normal operating temperature.</li> <li>2. Check personnel hot water heater for clogged, broken, or leaking inlet/outlet hoses.</li> <li>3. Check for proper personnel hot water heater control cable and operation of heater, defroster, and heater diverter vents and doors.</li> <li>4. Check heater blower motor and fan for proper operation (TM 9-2320-361-10).</li> </ol>	<p>If engine does not reach normal operating temperature, refer to WP 0006 00, table 4, malfunction 2.</p> <p>If personnel hot water heater hoses are leaking or collapsed, replace (WP 0079 00).</p> <p>If control cables are bent or broken, replace (WP 0249 00).</p> <p>If damaged, replace personnel hot water heater (WP 0250 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)****Table 7. Transmission Troubleshooting Procedures.**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. TRANSMISSION NOISY</b>	<ol style="list-style-type: none"> <li>1. Ensure Power Takeoff (PTO) is not engaged, if applicable.</li> <li>2. Check propeller shafts condition. Remove propeller shafts and inspect (WP 0139 00).</li> <li>3. Check clutch for proper adjustment.</li> <li>4. Check transmission fluid level (WP 0020 00).</li> <li>5. Drain transmission fluid and check for signs of broken gears, metal shavings, and contamination (WP 0020 00).</li> <li>6. Check mounting of transmission to engine (WP 0132 00).</li> </ol>	<p>If PTO is engaged, disengage.</p> <p>If propeller shaft assemblies are worn or defective, repair or replace (WP 0139 00).</p> <p>Adjust clutch linkage as necessary (WP 0047 00).</p> <p>Fill transmission fluid to proper level (WP 0020 00).</p> <p>If broken gears or metal shavings are found, replace transmission (WP 0131 00 and WP 0132 00).</p> <p>Tighten loose components or replace damaged components (WP 0132 00).</p>
<b>2. TRANSMISSION LEAKS OIL</b>	<ol style="list-style-type: none"> <li>1. Check transmission fluid level (WP 0020 00).</li> <li>2. Check drainplug for leaks.</li> <li>3. Check breather for restrictions.</li> <li>4. Check transmission output seal for leaks.</li> </ol>	<p>If fluid level is too high, drain to proper level (WP 0020 00).</p> <p>If drainplug is leaking, tighten.</p> <p>If breather is restricted, refer to WP 0128 00.</p> <p>Replace seals (WP 0450 00).</p>
<b>3. CLUTCH PEDAL WILL NOT TRAVEL OR DEPRESS</b>	<ol style="list-style-type: none"> <li>1. Check transmission fluid level (WP 0020 00).</li> <li>2. Check clutch linkage to ensure it is connected and properly adjusted (WP 0047 00).</li> </ol>	<p>If fluid level is low, add fluid (WP 0020 00).</p> <p>Adjust clutch linkage as necessary (WP 0047 00).</p>

**Table 8. Clutch Troubleshooting Procedures.**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. VEHICLE CREEPS WITH CLUTCH DEPRESSED</b>	<p>Check clutch pedal free travel. Clutch pedal should have 1.5–2 in. (3.8–5 cm) free travel.</p>	<ol style="list-style-type: none"> <li>1. If clutch requires adjustment, refer to WP 0047 00.</li> <li>2. If free travel will not adjust, check for bent or broken parts. Replace damaged parts (WP 0047 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)****Table 8. Clutch Troubleshooting Procedures (Contd).**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>2. CLUTCH DRAGS, SLIPS, OR DOES NOT ENGAGE</b>	<ol style="list-style-type: none"> <li>1. Check clutch linkage for binding.</li> <li>2. Check linkage for proper lubrication (WP 0020 00).</li> <li>3. Check clutch linkage and adjustment (WP 0047 00).</li> </ol>	<p>If linkage binds, check for bent or broken parts. Replace damaged parts (WP 0047 00).</p> <p>Lubricate linkage if necessary (WP 0020 00).</p> <p>Adjust clutch linkage (WP 0047 00).</p>

**Table 9. Transfer Case Troubleshooting Procedures.**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. BURNING ODOR EVIDENT WITH CLUTCH ENGAGED</b>	Check clutch linkage and adjustment (WP 0047 00).	<ol style="list-style-type: none"> <li>1. Adjust clutch linkage (WP 0047 00).</li> <li>2. If problem persists, replace clutch (WP 0050 00).</li> </ol>
<b>2. TRANSFER CASE DIFFICULT TO SHIFT</b>	<ol style="list-style-type: none"> <li>1. Check transfer case fluid level (WP 0020 00).</li> <li>2. Inspect shift linkage for bends, breaks, or missing parts.</li> <li>3. Check for internal problems in transfer case.</li> </ol>	<p>Fill or drain to proper level (WP 0020 00).</p> <p>Replace any broken, bent, or missing parts (WP 0133 00 or WP 0134 00).</p> <p>If internal problems exist, replace transfer case (WP 0138 00).</p>
<b>3. TRANSFER CASE GRINDS OR POPS OUT OF GEAR DURING NORMAL VEHICLE OPERATION</b>	<ol style="list-style-type: none"> <li>1. Check condition and adjustment of external transfer case linkage.</li> <li>2. Check for internal problems in transfer case.</li> </ol>	<p>If linkage is damaged, repair, replace, or adjust (WP 0133 00 or WP 0134 00).</p> <p>If internal problems exist, replace transfer case (WP 0138 00).</p>
<b>4. TRANSFER CASE NOISY</b>	<ol style="list-style-type: none"> <li>1. Check transfer case fluid level (WP 0020 00).</li> <li>2. Drain transfer case fluid (WP 0020 00) and check for signs of broken gears, metal shavings, and contamination.</li> </ol>	<p>If fluid level is low, fill to proper level (WP 0020 00).</p> <p>If broken gears, metal shavings, or contamination are found, replace transfer case (WP 0138 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 10. Propeller Shaft Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>PROPELLER SHAFT VIBRATION</b>	<ol style="list-style-type: none"> <li>1. Inspect propeller shaft for foreign material or damage.</li> <li>2. Inspect propeller shaft for loose screws.</li> <li>3. Check universal joints for play or looseness. If rust is visible around U-joint, disassemble and inspect (WP 0141 00).</li> <li>4. Remove U-joint, disassemble, and inspect (WP 0141 00).</li> </ol>	<p>Clean foreign material from propeller shaft, or replace if damaged (WP 0139 00).</p> <p>If any screws are loose, tighten (WP 0139 00).</p> <p>Repair or replace U-joint (WP 0141 00).</p> <p>Replace U-joint if damaged (WP 0141 00).</p>

*Table 11. Differential Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. DIFFERENTIAL NOISY</b>	<ol style="list-style-type: none"> <li>1. Check to see if front wheel drive is engaged.</li> <li>2. Check lubrication level in axle housing differential (WP 0020 00).</li> <li>3. Check for loose inner wheel adapter nuts or loose lugnuts.</li> <li>4. Check for loose or damaged wheel bearings. Raise wheel off ground. Use prybar to check for excessive play.</li> <li>5. Check differential operation. Remove differential propeller shaft(s) (WP 0139 00). Raise wheels (TM 9-2320-361-10), manually turn wheels, and observe differential operation.</li> </ol>	<p>Disengage front wheel drive when traveling on hard, flat surfaces.</p> <p>If low, fill to proper oil level (WP 0020 00).</p> <ol style="list-style-type: none"> <li>1. If inner wheel adapter nuts are loose, tighten 400–425 lb-ft (542–576 N•m).</li> <li>2. If lugnuts are loose, tighten 325–355 lb-ft (441–481 N•m).</li> </ol> <ol style="list-style-type: none"> <li>1. Adjust wheel bearings if loose (WP 0189 00).</li> <li>2. If damaged, replace wheel bearings (WP 0187 00 or WP 0188 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If tires will not rotate, check brakeshoe condition and operation (WP 0167 00).</li> <li>2. Remove brake drums (WP 0187 00 and WP 0188 00). If brake system components are defective, repair or replace as necessary (WP 0167 00 –WP 0176 00).</li> <li>3. If tires still will not rotate, replace differential (WP 0454 00).</li> <li>4. If tire rotation drags at some points during full rotation, remove and inspect axle shafts (WP 0142 00 or WP 0147 00).</li> <li>5. If axle shafts are defective, replace (WP 0142 00 or WP 0147 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 11. Differential Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. DIFFERENTIAL CLUNKS DURING TURNS OR INITIAL TAKEOFF</b></p>	<ol style="list-style-type: none"> <li>1. Check for loose or damaged wheel bearings. Raise wheel off ground. Use prybar to check for excessive play.</li> <li>2. Check torque rod for damage (WP 0162 00).</li> <li>3. Check differential propeller shaft(s) and universal joint(s) condition (WP 0139 00 or WP 0141 00).</li> <li>4. Check front axle shafts and universal joints for defects (WP 0142 00).</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust wheel bearings if loose (WP 0189 00).</li> <li>2. If damaged, replace wheel bearings (WP 0187 00 or WP 0188 00).</li> </ol> <p>Repair or replace torque rods (WP 0162 00).</p> <p>Repair or replace defective components (WP 0139 00 or WP 0141 00).</p> <ol style="list-style-type: none"> <li>1. Repair or replace defective components (WP 0142 00).</li> <li>2. If problem still exists, replace differential (WP 0454 00).</li> </ol>
<p><b>3. DIFFERENTIAL VIBRATES</b></p>	<ol style="list-style-type: none"> <li>1. Check tires and rims condition.</li> <li>2. Check front axle shafts and universal joints for defects (WP 0142 00).</li> </ol>	<p>Repair or replace defective components (WP 0186 00).</p> <ol style="list-style-type: none"> <li>1. Repair or replace defective components (WP 0142 00).</li> <li>2. If problem still exists, replace differential (WP 0454 00).</li> </ol>
<p><b>4. DIFFERENTIAL LEAKS OIL</b></p>	<ol style="list-style-type: none"> <li>1. Check axle seals condition.</li> <li>2. Inspect drum for presence of gear oil.</li> <li>3. Check housing for loose hardware.</li> </ol>	<p>Replace seals, if defective (WP 0143 00).</p> <p>If gear oil is present in or around drums, replace axle seals (WP 0143 00).</p> <p>Tighten all loose hardware.</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 12. Wheels and Tires Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. UNEVEN TIRE WEAR</b>	<ol style="list-style-type: none"> <li>1. Check vehicle for overload condition (TM 9-2320-361-10).</li> <li>2. Check for loose inner wheel adapter nuts or loose lugnuts (WP 0006 00, table 11, malfunction 1, step 3).</li> <li>3. Check for correct tire pressure (TM 9-2320-361-10).</li> <li>4. Check shock absorbers for class II or class III leaks.</li> <li>5. Check for improper toe-in adjustment.</li> <li>6. Check wheel bearings for proper adjustment and damage. Raise wheel off ground. Use prybar to check for excessive play.</li> <li>7. Check drag link for defects (WP 0195 00).</li> <li>8. Check to make sure tires have been properly rotated (TM 9-2610-200-14).</li> <li>9. Check for broken front-end components.</li> <li>10. Check for bent or damaged wheels.</li> </ol>	<p>If vehicle load is excessive, adjust to capacity limit.</p> <ol style="list-style-type: none"> <li>1. If inner wheel adapter nuts are loose, tighten 400–425 lb-ft (542–576 N•m).</li> <li>2. If lugnuts are loose, tighten 325–355 lb-ft (441–481 N•m).</li> </ol> <p>Adjust tire pressure if necessary (TM 9-2320-361-10).</p> <p>Replace any defective shocks (WP 0160 00).</p> <p>Adjust toe-in (WP 0190 00).</p> <ol style="list-style-type: none"> <li>1. Adjust wheel bearings if necessary (WP 0189 00).</li> <li>2. If damaged, replace wheel bearings (WP 0187 00 or WP 0188 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If linkage parts are defective, replace (WP 0195 00).</li> <li>2. Perform steering gear adjustment (WP 0193 00).</li> </ol> <p>Rotate tires (TM 9-2610-200-14).</p> <p>Replace broken components.</p> <p>If bent or damaged, replace wheel (WP 0186 00).</p>



**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 12. Wheels and Tires Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. VEHICLE SHIMMY, WOBBLE, OR VIBRATION</b></p>	<ol style="list-style-type: none"> <li>1. Check for loose inner wheel adapter nuts or loose lugnuts (WP 0006 00, table 11, malfunction 1, step 3).</li> <li>2. Check for dirt or mud buildup on wheel.</li> <li>3. Check for bent or damaged wheel.</li> <li>4. Check wheel bearings for proper adjustment and damage. Raise wheel off ground. Use prybar to check for excessive play.</li> <li>5. Inspect steering knuckles for loose conditions.</li> <li>6. Check drag link for defects (WP 0195 00).</li> </ol>	<ol style="list-style-type: none"> <li>1. If inner wheel adapter nuts are loose, tighten 400–425 lb-ft (542–576 N•m).</li> <li>2. If lugnuts are loose, tighten 325–355 lb-ft (441–481 N•m).</li> </ol> <p>Clean dirt and mud from wheel.</p> <p>If bent or damaged, replace wheel (WP 0186 00).</p> <ol style="list-style-type: none"> <li>1. Adjust wheel bearings (WP 0189 00).</li> <li>2. If damaged, replace wheel bearings (WP 0187 00 or WP 0188 00).</li> </ol> <p>If damaged, replace steering knuckles (WP 0150 00).</p> <ol style="list-style-type: none"> <li>1. If linkage parts are defective, replace (WP 0195 00).</li> <li>2. Perform steering gear adjustment (WP 0193 00).</li> </ol>

*Table 13. Steering Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. EXCESSIVE PLAY IN STEERING</b></p>	<ol style="list-style-type: none"> <li>1. Check for correct tire pressure (TM 9-2320-361-10).</li> <li>2. Check steering gear for secure mounting.</li> <li>3. Inspect pitman arm, drag link, steering arm, steering knuckles, and tie-rod ends for looseness or damage.</li> <li>4. Check wheel bearings for proper adjustment and damage. Raise wheel off ground. Use prybar to check for excessive play.</li> <li>5. Adjust steering gear, refer to WP 0193 00.</li> </ol>	<p>Adjust tire pressure, if necessary.</p> <p>If loose, tighten mounting screws 62–68 lb-ft (84–92 N•m).</p> <ol style="list-style-type: none"> <li>1. Replace loose or damaged parts (WP 0191 00 – WP 0195 00). If steering arm or knuckle is damaged, replace (WP 0150 00).</li> <li>2. Reset correct toe-in (WP 0190 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Adjust wheel bearings if necessary (WP 0189 00).</li> <li>2. If damaged, replace wheel bearings (WP 0187 00).</li> </ol> <p>If play in steering continues, replace steering gear (WP 0192 00).</p>
<p><b>2. STEERING WHEEL HARD TO TURN</b></p>	<ol style="list-style-type: none"> <li>1. Inspect pitman arm, drag link, steering arm, steering knuckles, and tie-rod ends for binding, damage, or lack of lubrication.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace damaged parts (WP 0191 00 – WP 0195 00). If steering arm or knuckle is damaged, replace (WP 0150 00).</li> <li>2. If binding, lubricate (WP 0020 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 13. Steering Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. STEERING WHEEL HARD TO TURN (Contd)</b>	2. Inspect steering knuckles for binding. Raise front wheels off ground. Disconnect drag link at pitman arm (WP 0191 00 and WP 0195 00). Turn wheels to determine binding. 3. Inspect springs for looseness. 4. Check front tires for proper inflation. 5. Check for improper toe-in adjustment.	If binding, replace steering knuckles (WP 0150 00).  If loose, tighten U-bolts 190–230 lb-ft (258–312 N•m). Adjust tire pressure as necessary (TM 9-2320-361-10). Adjust toe-in if necessary (WP 0190 00).
<b>3. VEHICLE WANDERS OR PULLS TO ONE SIDE</b>	1. Check front tires for proper inflation. 2. Check front tires for uneven tire wear. If tire wear is evident, check toe-in. 3. Check for dragging brakes. Raise front wheels off ground. Spin wheels by hand. Wheels should turn with slight drag when properly adjusted. 4. Check wheel bearings for proper adjustment and damage. Raise wheel off ground. Use prybar to check for excessive play. 5. Check steering gear for loose mounting screws. 6. Inspect pitman arm, drag link, steering arm, and tie-rod ends for looseness or damage.  7. Inspect steering knuckles for binding. Raise front wheels off ground. Disconnect drag link at pitman arm (WP 0191 00 and WP 0195 00). Turn wheels to determine binding. 8. Inspect front springs and shackles for looseness.	Adjust tire pressure as necessary (TM 9-2320-361-10). Adjust toe-in if necessary (WP 0190 00).  If brakes require adjustment, refer to WP 0168 00.  1. Adjust wheel bearings (WP 0189 00). 2. If damaged, replace wheel bearings (WP 0187 00 or WP 0188 00).  If mounting screws are loose, tighten 62–68 lb-ft (84–92 N•m). 1. Replace loose or damaged parts and reset correct toe-in (WP 0190 00, WP 0191 00, WP 0194 00, and WP 0195 00). 2. If steering arm is damaged, replace steering arm (WP 0150 00).  If binding or looseness is found, replace steering knuckles (WP 0150 00).  Replace worn shackles (WP 0154 00) or tighten loose spring U-bolts 190–230 lb-ft (258–312 N•m).

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 14. Towing Pintle Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. TOWING PINTLE DOES NOT LATCH OR LOCK</b>	<ol style="list-style-type: none"> <li>1. Inspect pintle hook for lubrication.</li> <li>2. Check pintle hook for proper operation.</li> </ol>	<p>Lubricate pintle hook as required (WP 0020 00).</p> <p>If pintle hook is broken, bent, or missing parts, disassemble and repair or replace (WP 0199 00).</p>
<b>2. PINTLE HOOK DOES NOT TURN</b>	<ol style="list-style-type: none"> <li>1. Inspect pintle hook for lubrication.</li> <li>2. Inspect pintle hook for bends.</li> </ol>	<p>Lubricate pintle hook as required (WP 0020 00).</p> <p>If pintle hook is bent, replace (WP 0199 00).</p>
<b>3. EXCESSIVELY LOOSE LIFTING SHACKLE</b>	<p>Inspect shackle pin for breaks, cracks, and bends.</p>	<p>If shackle pin is broken, cracked, or bent, replace (WP 0197 00, WP 0198 00, or WP 0200 00).</p>
<b>4. LOOSE SPARE TIRE CARRIER</b>	<ol style="list-style-type: none"> <li>1. Check for missing or broken mounting screws.</li> <li>2. Check spare tire carrier for bent, broken, or missing crank, crank gear, shaft, or bracket.</li> </ol>	<p>If mounting screws are broken or missing, replace (WP 0202 00).</p> <p>If any spare tire carrier part is damaged, replace (WP 0202 00).</p>

*Table 15. Suspension Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. NOISY SUSPENSION</b>	<ol style="list-style-type: none"> <li>1. Inspect leaf springs for damage.</li> <li>2. Check front spring shackles and steering linkage for lack of lubrication.</li> <li>3. Check rear spring seat pads for wear.</li> </ol>	<p>If damaged, replace (WP 0153 00 or WP 0157 00).</p> <p>If lubrication is required, refer to WP 0020 00.</p> <p>If springs are rubbing against spring seat bracket, replace spring seat pads (WP 0161 00).</p>
<b>2. CONTINUOUS WANDERING OR SWAYING (POOR CONTROL)</b>	<ol style="list-style-type: none"> <li>1. Inspect front leaf springs for breaks.</li> <li>2. Inspect shock absorbers for class II or class III leaks and damage.</li> <li>3. Inspect spring U-bolts for looseness or damage.</li> <li>4. Check steering system.</li> </ol>	<p>Replace any broken leaf springs (WP 0153 00).</p> <p>Replace broken or leaking shocks (WP 0160 00).</p> <ol style="list-style-type: none"> <li>1. If U-bolts are loose, tighten 190–230 lb-ft (260–312 N•m).</li> <li>2. If U-bolts are damaged, replace (WP 0153 00 through WP 0162 00).</li> </ol> <p>Refer to WP 0006 00, table 13, malfunction 1.</p>
<b>3. VEHICLE SAGS</b>	<ol style="list-style-type: none"> <li>1. Inspect leaf springs for breaks or damage.</li> <li>2. Inspect leaf spring shackles for breaks or worn bushings.</li> </ol>	<p>Replace any leaf springs that may cause vehicle to sag (WP 0153 00 or WP 0157 00).</p> <p>Replace any broken or worn shackles (WP 0154 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)****Table 16. Winch Troubleshooting Procedures.**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. WINCH INOPERATIVE</b>	<ol style="list-style-type: none"> <li>1. Check transmission PTO linkage for bends, breaks, or improper adjustment.</li> <li>2. Check front winch drive shaft for broken or missing shearpin.</li> <li>3. Check front winch propeller shaft for breaks.</li> <li>4. Check front winch cable for bends and kinks.</li> </ol>	<p>If PTO linkage is bent, broken, or out of adjustment, replace or adjust (WP 0347 00).</p> <p>If shearpin is broken or missing, refer to TM 9-2320-361-10.</p> <p>If propeller shaft is broken, replace (WP 0346 00).</p> <p>If winch cable is broken or kinked, replace (WP 0343 00).</p>
<b>2. WINCH OPERATES IN ONE DIRECTION ONLY</b>	Check transmission PTO linkage for bends or improper adjustment (WP 0347 00).	If PTO linkage is bent or out of adjustment, replace or adjust (WP 0347 00).
<b>3. WINCH OPERATES AT ONE SPEED ONLY</b>	Check throttle control linkage for damage.	If throttle control linkage is damaged, replace (WP 0072 00).
<b>4. DRAG BRAKE DOES NOT OPERATE</b>	Check drag brake adjustment.	<ol style="list-style-type: none"> <li>1. Adjust drag brake as necessary (WP 0342 00).</li> <li>2. If adjustment will not correct drag brake operation, replace winch (WP 0345 00).</li> </ol>
<b>5. WINCH DOES NOT HOLD LOAD WHEN POWER RELEASED</b>	Check automatic brake adjustment.	Adjust automatic brake as necessary (WP 0344 00).
<b>6. AUTOMATIC BRAKE OVERHEATS</b>	<ol style="list-style-type: none"> <li>1. Check weight limits for winch.</li> <li>2. Check automatic brake adjustment.</li> </ol>	<p>Adjust size of load if overloaded, or use a snatch block.</p> <p>Adjust if necessary (WP 0344 00).</p>
<b>7. VEHICLE ROLLS WHILE OPERATING WINCH</b>	Check parking brake for proper adjustment.	Adjust parking brake (WP 0164 00).

**Table 17. Power Takeoff (PTO) Troubleshooting Procedures.**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. PTO NOISY</b>	<ol style="list-style-type: none"> <li>1. Inspect PTO propeller shaft for proper lubrication.</li> <li>2. Inspect PTO propeller shaft for bends.</li> </ol>	<p>Lubricate propeller shaft if necessary (WP 0020 00).</p> <p>If propeller shaft is bent, replace (WP 0346 00).</p>
<b>2. PTO DIFFICULT TO SHIFT</b>	<ol style="list-style-type: none"> <li>1. Inspect PTO shift linkage for proper lubrication.</li> <li>2. Inspect PTO shift linkage for bends and cracks.</li> </ol>	<p>Lubricate PTO shift linkage if necessary (WP 0020 00).</p> <p>If PTO shift linkage is bent or cracked, replace (WP 0347 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 17. Power Takeoff (PTO) Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>3. PTO INOPERATIVE (TRANSMISSION-DRIVEN)</b>	Check PTO. Engage power takeoff and visually confirm output propeller shaft rotation.	<ol style="list-style-type: none"> <li>1. If propeller shaft is noisy, inspect propeller shaft and universal joints. If propeller shaft is bent or universal joints have play, repair or replace (WP 0346 00).</li> <li>2. If propeller shaft is not rotating, inspect control linkage. Adjust control linkage and replace defective parts (WP 0347 00).</li> <li>3. If problem still exists, replace PTO (WP 0349 00).</li> </ol>
<b>4. PTO INOPERATIVE (TRANSFER-DRIVEN)</b>	Check PTO. Engage and visually confirm output propeller shaft rotation.	<ol style="list-style-type: none"> <li>1. If propeller shaft is noisy, inspect propeller shaft and universal joints. If propeller shaft is bent or universal joints have play, repair or replace (WP 0139 00).</li> <li>2. If propeller shaft is not rotating, inspect control linkage. Adjust control linkage and replace defective parts (WP 0133 00).</li> <li>3. If problem still exists, replace PTO (WP 0348 00).</li> </ol>

*Table 18. Non-Electrical Gauges Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. SPEEDOMETER OR TACHOMETER BOUNCES, NOISY, OR INOPERATIVE</b>	<ol style="list-style-type: none"> <li>1. Inspect speedometer or tachometer drive shaft for binding and kinks.</li> <li>2. Remove speedometer or tachometer (WP 0096 00) and check speedometer or tachometer cable operation.</li> <li>3. Check drive unit on transfer case.</li> </ol>	<p>If drive shaft is bent or kinked, replace (WP 0097 00, WP 0098 00, or WP 0099 00.)</p> <p>If cable is operating properly, replace speedometer or tachometer (WP 0096 00).</p> <p>If drive unit is damaged, replace (WP 0097 00, WP 0099 00).</p>
<b>2. AIR PRESSURE GAUGE INOPERATIVE</b>	Check air pressure with a known working air pressure gauge.	If test gauge works properly, replace inoperative air pressure gauge (WP 0094 00).

## MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)

**WARNING**

Diesel fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.

*Table 19. Fuel Tank (M49A2C) Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. FUEL DOES NOT PUMP FROM COMPARTMENTS, OR PUMPS SLOWLY</b>	<ol style="list-style-type: none"> <li>1. Inspect transfer PTO for proper operation.</li> <li>2. Check discharge valve operation (WP 0264 00).</li> <li>3. Check delivery pump propeller shaft for breaks and damaged universal joints.</li> <li>4. Perform fuel filter separator check (TM 9-2320-361-10).</li> <li>5. Check delivery pump strainer for restrictions.</li> </ol>	<p>If transfer PTO is inoperative, check PTO linkage for proper adjustment (WP 0133 00).</p> <p>Replace discharge valve (WP 0263 00).</p> <p>If propeller shaft is broken or universal joints need replacement, replace (WP 0292 00).</p> <p>If fuel filter separator is restricted, replace filter (WP 0286 00).</p> <ol style="list-style-type: none"> <li>1. If restricted, clean or replace delivery pump strainer (WP 0284 00).</li> <li>2. If fuel filter separator is not restricted and fuel pressure is low, replace delivery pump (WP 0280 00).</li> </ol>
<b>2. DELIVERY PUMP DISPENSES FUEL SLOWLY FROM BOTH TANKS</b>	<ol style="list-style-type: none"> <li>1. Perform fuel filter separator check (TM 9-2320-361-10).</li> <li>2. Check delivery pump strainer for restrictions.</li> <li>3. Check PTO speed control linkage for proper operation and adjustment (WP 0347 00).</li> </ol>	<p>If fuel filter separator is restricted, replace filter (WP 0286 00).</p> <p><b>NOTE</b></p> <p>If No. 2 diesel fuel is being used and ambient air temperature is 32 °F (0 °C), the outlet pressure could be as low as 5 psi (34.5 kPa). (See TM 9-2320-361-10 for fuel filter separator inlet and outlet pressure differences.)</p> <ol style="list-style-type: none"> <li>1. If restricted, clean or replace delivery pump strainer (WP 0284 00).</li> <li>2. If fuel system is clean and pressure is low, replace delivery pump (WP 0280 00).</li> </ol> <p>If control linkage is damaged, repair or replace (WP 0347 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 19. Fuel Tank (M49A2C) Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. DELIVERY PUMP DISPENSES FUEL SLOWLY FROM BOTH TANKS (Contd)</b></p>	<p>4. Check operation of discharge valve control levers.</p> <p>5. Check transfer case PTO operation.</p>	<p>1. If control levers are not operating properly, remove and inspect (WP 0264 00).</p> <p>2. If control lever assembly components are defective, replace (WP 0264 00).</p> <p>If transfer case PTO is not operating, refer to WP 0006 00, table 17, malfunction 4.</p>
<p><b>3. FUEL DOES NOT PUMP OR PUMPS SLOWLY FROM SELECTED TANK, AND FUEL DRAINS SLOWLY FROM SELECTED TANK USING GRAVITY PROCEDURES</b></p>	<p>1. Check discharge control cables for proper lubrication (WP 0020 00).</p> <p>2. Check discharge control cable for breaks or kinks.</p> <p>3. Check discharge control cable for proper adjustment.</p> <p>4. Inspect discharge valve tubes for bent, crushed, broken, or leaking tubes.</p> <p>5. Inspect discharge valves for proper operation.</p>	<p>Lubricate discharge control cable if necessary (WP 0020 00).</p> <p>If discharge control cable is broken or kinked, replace (WP 0264 00).</p> <p>If control cable needs adjustment, remove slack in cable (WP 0264 00).</p> <p>If discharge valve tubes are bent, crushed, broken, or leaking, replace (WP 0266 00).</p> <p>If discharge valves are broken or inoperative, replace (WP 0263 00).</p>
<p><b>4. FUEL TANK COMPARTMENTS CANNOT BE SUCTION FILLED</b></p>	<p>1. Check delivery pump propeller shaft for broken universal joints or broken shaft.</p> <p>2. Perform fuel filter separator check (TM 9-2320-361-10).</p> <p>3. Check delivery pump strainer for restrictions.</p>	<p>1. If shaft is broken, replace (WP 0292 00 or WP 0293 00).</p> <p>2. If universal joints are broken, replace (WP 0141 00).</p> <p>If fuel filter separator is restricted, replace (WP 0286 00).</p> <p>1. If strainer is restricted, clean or replace (WP 0284 00).</p> <p><b>NOTE</b></p> <p>If No. 2 diesel fuel is being used and ambient air temperature is 32 °F (0 °C), the outlet pressure may fall as low as 5 psi (34.5 kPa). This could cause slow or no delivery of fuel to delivery pump. Refer to TM 9-2320-361-10 for fuel separator inlet and outlet pressure differences.</p> <p>2. If fuel system is clean and pressure is low, replace delivery pump (WP 0280 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)***Table 20. Water Tank (M50A3) Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. WATER CANNOT BE PUMPED FROM BOTH TANKS</b>	<ol style="list-style-type: none"> <li>1. Check delivery pump drive shaft and universal joints for breaks.</li> <li>2. Check transfer PTO for proper operation.</li> <li>3. Check delivery pump strainer for contamination or restrictions.</li> </ol>	<ol style="list-style-type: none"> <li>1. If drive shaft is broken, replace (WP 0292 00 or WP 0293 00).</li> <li>2. If universal joints are broken, replace (WP 0141 00).</li> <li>1. If transfer PTO is inoperative, check PTO linkage for proper operation and adjustment (WP 0133 00).</li> <li>2. If transfer PTO linkage is operating properly and transfer PTO is defective, replace PTO (WP 0348 00).</li> <li>1. If delivery pump strainer is restricted, clean or replace strainer (WP 0284 00).</li> <li>2. If water system is clean and delivery pump propeller is operating at correct speed, replace delivery pump (WP 0280 00).</li> </ol>
<b>2. WATER CANNOT BE PUMPED OR PUMPS SLOWLY FROM SELECTED TANK, AND WATER DRAINS SLOWLY FROM SELECTED TANK USING GRAVITY PROCEDURES</b>	<ol style="list-style-type: none"> <li>1. Check discharge control cables for proper lubrication (WP 0020 00).</li> <li>2. Check discharge control cables for breaks, bends, or kinks.</li> <li>3. Check discharge control cables for improper adjustment.</li> <li>4. Inspect discharge valve tubes for bent, crushed, broken, or leaking tubes.</li> <li>5. Inspect discharge valves for proper operation.</li> </ol>	<p>Lubricate control cables if necessary.</p> <p>If discharge control cables are broken, bent, or kinked, replace (WP 0290 00).</p> <p>If cable requires adjustment, remove slack in cable (WP 0290 00).</p> <p>If discharge valve tubes are bent, crushed, broken, or leaking, replace (WP 0289 00).</p> <p>If discharge valves are broken or inoperative, replace (WP 0289 00).</p>
<b>3. WATER PUMPS OUT OF BOTH TANKS MORE SLOWLY THAN NORMAL</b>	<ol style="list-style-type: none"> <li>1. Check transfer PTO speed control linkage for proper operation and adjustment (WP 0294 00).</li> <li>2. Remove delivery pump strainer and check for restrictions (WP 0284 00).</li> </ol>	<p>Adjust transfer PTO speed control linkage (WP 0294 00).</p> <ol style="list-style-type: none"> <li>1. If delivery pump strainer is restricted, clean or replace (WP 0284 00).</li> <li>2. If water system is clean and water still pumps slowly, replace delivery pump (WP 0280 00).</li> </ol>



**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 20. Water Tank (M50A3) Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>4. WATER TANK COMPARTMENTS CANNOT BE SUCTION FILLED</b></p>	<ol style="list-style-type: none"> <li>1. Check delivery pump propeller shafts for broken universal joints or broken shaft.</li> <li>2. Check transfer PTO for proper operation.</li> <li>3. Check delivery pump strainer for restrictions.</li> </ol>	<ol style="list-style-type: none"> <li>1. If shaft is broken, replace (WP 0292 00 or WP 0293 00).</li> <li>2. If universal joints are broken, replace (WP 0141 00).</li> <li>1. If transfer PTO is inoperative, check transfer PTO linkage for proper operation and adjustment (WP 0133 00).</li> <li>2. If transfer PTO linkage is operating properly and transfer PTO is inoperative, replace PTO (WP 0348 00).</li> <li>1. If delivery pump strainer is restricted, clean or replace (WP 0284 00).</li> <li>2. If water system is clean and delivery pump drive shaft is operating at correct speed, replace delivery pump (WP 0280 00).</li> </ol>

## MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)

Table 21. Personnel Fuel Burning Heater Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. HEATER WILL NOT OPERATE IN HIGH OR LOW SWITCH POSITION</b>	<p>Test 1. Check horn operation. Push horn button.</p> <p>Test 2. Test lead 10 for power input to heater control box.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to range that will measure 24 VDC.</li> <li>2. Disconnect lead 10 from heater control box.</li> <li>3. Touch multimeter positive lead to contact end of lead 10.</li> <li>4. Touch negative lead of multimeter to frame ground. Voltage should be present.</li> </ol> <p>Test 3. Check heater control box for power output.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to range that will measure 24 VDC.</li> <li>2. Disconnect harness connector from rear of control box.</li> <li>3. Set heater control switch to START and hold.</li> <li>4. Set heater control heat switch to HIGH.</li> <li>5. Touch positive lead of multimeter to pin A.</li> <li>6. Touch negative lead of multimeter to frame ground.</li> <li>7. Repeat steps 5 and 6 for pins B, C, and D. Voltage should be present.</li> </ol>	<ol style="list-style-type: none"> <li>1. If horn is operational, voltage is present at input of personnel heater circuit breaker. Go to test 2.</li> <li>2. If horn fails to operate, go to WP 0014 00, table 1, malfunction 10.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test 3.</li> <li>2. If voltage is not present, repair or replace lead 10 (WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present at all pins tested, go to test 4.</li> <li>2. If voltage is not present at one or more pins, replace heater control box (WP 0352 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 21. Personnel Fuel Burning Heater Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. HEATER WILL NOT OPERATE IN HIGH OR LOW POSITION (Contd)</b></p>	<p>Test 4. Check for input power at fuel pump.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to range that will measure 24 VDC.</li> <li>2. Disconnect lead 25 at fuel pump.</li> <li>3. Touch multimeter positive lead to contact end of lead 25.</li> <li>4. Touch multimeter negative lead to frame ground. Voltage should be present.</li> </ol> <p>Test 5. Check fuel pump for proper operation.</p> <p>Test 6. Check for power input at personnel heater.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage that will measure 24 VDC.</li> <li>2. Disconnect harness connector at personnel heater.</li> <li>3. Set heater control switch.</li> <li>4. Touch multimeter positive lead to pin A of harness connector.</li> <li>5. Touch multimeter negative lead to frame ground.</li> <li>6. Repeat steps 4 and 5 for pins B, C, and D. Voltage should be present at all pins tested.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is present, replace personnel fuel burning heater (WP 0351 00).</li> <li>2. If voltage is not present, repair or replace lead 25 (WP 0090 00).</li> </ol> <p>Refer to WP 0006 00, table 21, malfunction 2.</p> <ol style="list-style-type: none"> <li>1. If voltage is present, replace personnel heater (WP 0351 00).</li> <li>2. If voltage is not present at one or more pins, repair or replace</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - UNIT (Contd)**

*Table 21. Personnel Fuel Burning Heating Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. HEATER WILL NOT OPERATE</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Diesel fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.</li> <li>• Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.</li> </ul> <ol style="list-style-type: none"> <li>1. Refer to Heating System Troubleshooting Procedures in WP 0015 00, malfunction 3.</li> <li>2. Make sure fuel shutoff valve is in full ON position.</li> <li>3. Check heater fuel filter for contamination (WP 0354 00).</li> <li>4. Check fuel lines for breaks, bends, kinks, or leaking joints.</li> <li>5. Check fuel pump discharge.</li> <li>6. Inspect exhaust system for restrictions.</li> <li>7. Check for proper operation of defroster and heat diverter control cables (TM 9-2320-361-10).</li> </ol>	<p>If fuel shutoff valve is damaged (or stuck in OFF or partial ON position), replace fuel shutoff valve (WP 0377 00).</p> <p>If water or contamination is present, clean and flush entire fuel system. Dry with compressed air.</p> <p>If broken, kinked, or leaky joints are found in fuel lines, replace (WP 0376 00 and WP 0383 00).</p> <ol style="list-style-type: none"> <li>1. Remove fuel line from fuel pump output (WP 0353 00).</li> <li>2. Use a clean container for fuel discharge recovery.</li> <li>3. Position heater control box to RUN position.</li> <li>4. If fuel pump fails to pump an adequate amount of fuel, 1/2 pint (0.24 liter) in 30 seconds, replace (WP 0353 00).</li> </ol> <p>If exhaust pipe is restricted or damaged, repair or replace (WP 0355 00).</p> <ol style="list-style-type: none"> <li>1. If vent or control cables are broken, replace (WP 0248 00 and WP 0249 00).</li> <li>2. If fuel burning heater still fails to operate, replace fuel burning heater (WP 0351 00).</li> </ol>

# FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

## MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - DIRECT SUPPORT

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
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2.	Starter cranks engine slowly . . . . .	0008 00-3
3.	Engine cranks but will not start . . . . .	0008 00-3
4.	Engine starts but stops when accelerator is operated . . . . .	0008 00-4
5.	Engine stops when accelerator is returned to idle position . . . . .	0008 00-4
6.	Poor acceleration and/or lack of power . . . . .	0008 00-4
7.	Engine delivers excessive black smoke . . . . .	0008 00-5
8.	Engine surges . . . . .	0008 00-5
9.	Engine misfires during operation . . . . .	0008 00-5
10.	Engine stops during normal operation . . . . .	0008 00-5
11.	Exhaust color blue during normal operation . . . . .	0008 00-5
12.	Exhaust color white during normal operation and idle . . . . .	0008 00-8
13.	Engine oil pressure low or zero at normal operating temperature . . . . .	0008 00-9
14.	Engine oil pressure extremely high at normal operating temperature . . . . .	0008 00-11
15.	Engine oil loss during normal operation . . . . .	0008 00-11
16.	Engine noise abnormal . . . . .	0008 00-12
17.	Engine vibration abnormal . . . . .	0008 00-13
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2.	Low fuel supply at injector nozzles . . . . .	0008 00-16
3.	Fuel injectors inoperative . . . . .	0008 00-16
4.	Fuel injectors deliver excess fuel into engine . . . . .	0008 00-17
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2.	Coolant temperature excessive . . . . .	0008 00-17
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1.	Vehicle will not move or engine stalls with clutch engaged . . . . .	0008 00-17
2.	Burning odor evident with clutch engaged . . . . .	0008 00-18
3.	Clutch noisy during engagement and disengagement . . . . .	0008 00-19
4.	Vibration during clutch engagement . . . . .	0008 00-19
5.	Clutch pedal will not travel or depress . . . . .	0008 00-20

**MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - DIRECT SUPPORT (Contd)**

<b>MALFUNCTION NO.</b>	<b>MALFUNCTION</b>	<b>TROUBLESHOOTING WORK PACKAGE/PAGE</b>
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2.	Transmission leaks oil	0008 00-20
3.	Transmission grinds and/or pops out of gear during shifting	0008 00-20
<b>TRANSFER CASE</b>		
1.	Transfer case will not operate front differential	0008 00-21
2.	Transfer case will not operate rear differential	0008 00-21
3.	Transfer case leaks oil	0008 00-21
4.	Transfer case noisy	0008 00-22
5.	Transfer case grinds or pops out of gear during normal vehicle operation	0008 00-22
<b>DIFFERENTIAL</b>		
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2.	Differential clunks during turns or initial takeoff	0008 00-23
3.	Differential leaks oil	0008 00-23
4.	Abnormal tire wear (front axle)	0008 00-23
5.	Abnormal tire wear (rear axle)	0008 00-23
<b>STEERING GEAR</b>		
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2.	Steering gear leaking oil	0008 00-24
3.	Steering wheel hard to turn	0008 00-24
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1.	Inoperative power takeoff (transmission-driven)	0008 00-24
2.	Inoperative power takeoff (transfer-driven)	0008 00-24
3.	Transmission power takeoff leaks oil	0008 00-25
4.	Transfer power takeoff leaks oil	0008 00-25
<b>FUEL TANK (M49A2C)</b>		
1.	Fuel will not pump from compartments or pumps slowly	0008 00-26
2.	Fuel will not gravity drain from selected compartments	0008 00-26
3.	Fuel tank compartment cannot be suction filled	0008 00-26
4.	Fuel mixed with water when dispensed	0008 00-27
<b>WATER TANK (M50A3)</b>		
1.	Water will not pump from compartments or pumps slowly	0008 00-27
2.	Water will not gravity drain from selected compartments	0008 00-27
3.	Water tank compartments cannot be suction filled	0008 00-27

**MECHANICAL SYSTEMS TROUBLESHOOTING INDEX - DIRECT SUPPORT (Contd)**

<b>MALFUNCTION NO.</b>	<b>MALFUNCTION</b>	<b>TROUBLESHOOTING WORK PACKAGE/PAGE</b>
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**WINCHES**

1.	Clutch will not engage drum .....	0008 00-28
2.	Winch noisy when under load .....	0008 00-28
3.	Drum overruns cable or cable coils loosen when paying out cable .....	0008 00-28
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**WINTERIZATION KITS**

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2.	Heater overheats, overheat switch is good .....	0008 00-28
3.	Heater overheats, continues to run .....	0008 00-29
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5.	Heater smokes and bangs when starting .....	0008 00-29
6.	Blower will not stop after turnoff .....	0008 00-29
7.	Odor of fuel in ventilating air .....	0008 00-29
8.	Blower runs but heater fails to ignite .....	0008 00-29
9.	Heater smokes during normal operation .....	0008 00-29







**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE WILL NOT CRANK (Contd)</b></p>	<p>5. Install fuel injector nozzle (WP 0067 00).</p> <p>6. Check oil pump for seizure. Remove oil pump (WP 0036 00) and manually turn oil pump drive gear.</p> <p>7. Check air intake manifold for presence of water.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Starting engine after correcting piston fluid-locked condition must be done with care. When pistons have been fluid-locked within cylinders, connecting rods may have been damaged and can be identified during test run by abnormal vibration or noise. Do not operate engine when these conditions exist. Permanent engine damage may result.</p> <p>8. Remove water from air induction system, if present and perform an engine test run.</p> <p>9. Check turbocharger housing for presence of water, identified by water on turbocharger fins or hubs.</p> <p>10. Test run engine.</p> <p>11. Remove intake manifold and gasket. Inspect for defects (WP 0041 00).</p>	<p>3. If engine crankshaft will not turn or turns hard, check internal components for seizure. Remove oil pan (WP 0035 00) and inspect crankshaft for nicks, burns, grooves, scuffs, or discoloration due to overheating. If nicked, burned, grooved, scuffed, or discolored replace engine (WP 0046 00).</p> <p>If drive gear will not turn, replace oil pump (WP 0036 00).</p> <p>If water is present within air cleaner, disassemble and drain air intake manifold (WP 0041 00).</p> <p>If engine operates with unusual sounds or vibration, refer to WP 0008 00, table 1, malfunction 16 or 17.</p> <p>If water is present, replace turbocharger (WP 0057 00).</p> <p>If engine operates with unusual sounds or vibration, refer to WP 0008 00, table 1, malfunction 16 or 17.</p> <p>If intake manifold is defective, replace (WP 0041 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. ENGINE WILL NOT CRANK (Contd)</b>	<p>12. Test run engine.</p> <p>13. Test run engine.</p>	<p>1. If engine operates with unusual sounds or vibration, refer to WP 0008 00, table 1, malfunction 16 and 17.</p> <p>2. If engine exhaust color remains white during test run, remove cylinder heads and gaskets and inspect for damage. Replace defective parts (WP 0027 00).</p> <p>If engine exhaust color remains white during test run, replace engine (WP 0046 00).</p>
<b>2. STARTER CRANKS ENGINE SLOWLY</b>	<p>1. Check electrical system for proper voltages (WP 0012 00, table 2, malfunction 2).</p> <p>2. Check fuel injection pump for seizure (WP 0008 00, table 1, malfunction 1, step 1).</p> <p>3. Check internal engine components for seizure (WP 0008 00 malfunction 1, step 4).</p>	<p>Replace defective components as necessary.</p> <p>Replace fuel injection pump if necessary (WP 0069 00).</p> <p>Replace engine if necessary (WP 0046 00).</p>
<b>3. ENGINE CRANKS BUT WILL NOT START</b>	<p>1. Check fuel delivery system (WP 0008 00, table 2, malfunctions 1 through 3).</p> <p>2. Visually check valve train operation and that valve lash is within specifications (WP 0031 00).</p> <p>3. Check engine cylinders for low compression readings (WP 0008 00, table 1, malfunction 11).</p>	<p>Replace defective components as necessary.</p> <p>1. If valve train is not operating properly, check camshaft and crankshaft gears for damaged or missing teeth. Remove timing cover (WP 0032 00) and replace both gears (TM 9-2815-210-34-2-1) if either gear is damaged.</p> <p>2. If valve lash is not within specifications adjust valve lash (WP 0031 00).</p> <p>3. If valve lash cannot be adjusted within specifications, check valve train components for wear or defects (WP 0031 00). Replace worn or defective components.</p> <p>1. If compression readings are low or zero, perform wet compression test (WP 0008 00, table 1, malfunction 11).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. ENGINE CRANKS BUT WILL NOT START (Contd)</b>		2. If wet compression readings increase 50 psi (345 kPa) or more, piston rings or cylinder bores may be worn. Replace engine (WP 0046 00).
<b>4. ENGINE STARTS BUT STOPS WHEN ACCELERATOR IS OPERATED</b>	1. Check fuel leakage at inlet side of fuel supply pump (mounted on fuel injection pump).  2. Check fuel delivery system for defective components.	Refer to WP 0008 00, table 2, malfunction 1, step 4. Replace defective components.  Refer to WP 0008 00, table 2, malfunction 1. Replace defective components.
<b>5. ENGINE STOPS WHEN ACCELERATOR IS RETURNED TO IDLE POSITION</b>	Check fuel delivery system.	Refer to WP 0008 00, table 2, malfunction 1. Replace defective components.
<b>6. POOR ACCELERATION AND/OR LACK OF POWER</b>	1. Check vehicle clutch system for slippage.  2. Check fuel delivery system for defective parts.  3. Check fuel injection pump timing is set within specifications (WP 0069 00).  4. Check turbocharger operation. Remove plug from top of inlet manifold. Install low pressure gauge with adapter into plug opening. Start engine and accelerate engine to full throttle and immediately decelerate. Observe pressure gauge readings.  5. Check turbocharger outlet, hose, intake manifold elbow and gasket for leaks (WP 0057 00).	Refer to WP 0008 00, table 4, malfunction 2. Replace defective components.  Refer to WP 0008 00, table 2, malfunction 1, steps 1–5. Replace defective parts.  If fuel injection pump timing is incorrect, adjust (WP 0069 00).  If no gauge movement or only a small pressure increase by gauge is evident, replace turbocharger (WP 0057 00).  1. Tighten base screw and clamps. Replace missing components.  2. If no improvement during test run, remove and inspect turbocharger hose, intake manifold elbow, and gaskets for defects. Replace defective components (WP 0057 00).

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 1. Engine Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>6. POOR ACCELERATION AND/OR LACK OF POWER (Contd)</b>	6. Check engine valve train operation and valve lash adjustment (WP 0031 00). 7. Check engine cylinder compression.	Refer to WP 0008 00, table 1, malfunction 3, step 2. Adjust as necessary (WP 0031 00). Refer to WP 0008 00, table 1, malfunction 11, tests 1 and 2.
<b>7. ENGINE DELIVERS EXCESSIVE BLACK SMOKE</b>	Refer to WP 0008 00, table 2, malfunction 4.	Replace malfunctioning components.
<b>8. ENGINE SURGES</b>	Perform WP 0008 00, table 2, malfunction 1.	Replace malfunctioning components.
<b>9. ENGINE MISFIRES DURING OPERATION</b>	1. Verify fuel injector nozzle feed lines are correctly installed in fuel injector pump hydraulic head (WP 0068 00). 2. Check fuel injector nozzle operation. 3. Check fuel injection pump operation. 4. Check engine valve train operation and valve lash adjustment (WP 0031 00). 5. Check engine cylinders compression readings.	If fuel injector nozzle feed lines are incorrectly installed, remove and install in correct location (WP 0068 00). Refer to WP 0008 00, table 2, malfunction 1, step 2. Refer to WP 0008 00, table 2, malfunction 3, step 2. Refer to WP 0008 00, table 1, malfunction 3, step 2. Adjust if necessary (WP 0031 00). Refer to WP 0008 00, table 1, malfunction 11, tests 1 and 2.
<b>10. ENGINE STOPS DURING NORMAL OPERATION</b>	Perform Engine Troubleshooting Procedures, WP 0008 00, table 1, malfunction 1.	Replace defective components as necessary.
<b>11. EXHAUST COLOR BLUE DURING NORMAL OPERATION</b>	<b>NOTE</b> Blue exhaust indicates presence of excessive engine oil in cylinder combustion chamber. Test 1. Perform an engine cylinder compression test. 1. Check for proper valve and rocker arms movement and ensure they are adjusted to specifications (WP 0031 00). 2. Cutoff fuel supply at fuel pump by removing fuse (WP 0059 00). 3. Ensure fuel batteries are fully charged and starter operates normal. 4. Remove all injectors in cylinder head. 5. Connect compression gauge and necessary adapter to injector port of number 1 cylinder.	

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>11. EXHAUST COLOR BLUE DURING NORMAL OPERATION (Contd)</b></p>	<p>6. Crank engine through at least five compression strokes or until gauge stops rising.</p> <p>7. Record cylinder number and maximum gauge reading.</p> <p>8. Remove gauge from number 1 cylinder and repeat steps 1 through 7 for remaining cylinders. This is known as a dry test.</p> <p>9. Add 1 to 1 ½ oz (29–44 ml) of clean engine oil through plug port for each cylinder before connecting compression gauge. Repeat steps 5 through 7. This is known as a wet test.</p> <p>10. Record gauge readings for wet test next to dry recorded test results for each cylinder.</p> <p>Test 2. Analyze compression test results.</p> <p>Compute compression loss for dry test for each cylinder compared to cylinder with highest reading using the following formula:</p> <p style="text-align: center;"><b>NOTE</b></p> <p>The sample cylinder reading is the reading from any cylinder other than the highest compression cylinder.</p> $\frac{\text{Highest Cylinder Reading} - \text{Sample Cylinder Reading}}{\text{Highest Cylinder Reading}} \times 100 = \% \text{ Compression Loss}$ <p>1. If one or more cylinders has an 8–10% or greater compression loss in dry test, but improved to acceptable (less than 8%) loss in wet test, then pistons, piston rings, or cylinder liners problem is indicated.</p> <p>2. Remove heads and inspect pistons, piston rings, and cylinder liners for breaks, wear and scoring.</p>	<p>If pistons, piston rings, or cylinder liners are damaged, replace engine (WP 0046 00).</p> <p>If damaged, replace engine (WP 0046 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>11. EXHAUST COLOR BLUE DURING NORMAL OPERATION (Contd)</b></p>	<p>3. If one or more cylinders have an 8–10% or greater loss in both wet and dry tests then compression loss is on top of engine. Remove head(s) and inspect valves, valve seats and guides, and cylinder head gasket(s).</p> <p>4. If steps 2 and/or 3 do not sufficiently restore engine to normal operation, remove rocker arm covers (WP 0030 00), inspect for camshaft, tappets, and pushrod defects.</p> <p>5. If compression test readings are within limits for all cylinders and engine develops normal power but still shows blue exhaust.</p> <p>Test 3. Perform engine oil consumption test.</p> <p>1. Operate vehicle and closely check engine oil level unit until oil level reaches one quart low. Stop vehicle operation.</p> <p>2. Record vehicle mileage. Calculate engine oil consumption by subtracting mileage when engine oil level was topped off from current mileage recorded when engine oil level is one quart low. The difference is the mileage using one quart of oil.</p> <p>3. Repeat steps 1 and 2 of engine oil consumption test. If oil consumption is not acceptable.</p>	<p>Repair or replace defective components (WP 0027 00 and TM 9-2815-210-34-2-2).</p> <p>Repair or replace defective parts (WP 0031 00, and WP 0034 00 or TM 9-2815-210-34-2-2).</p> <p>Remove cylinder head (WP 0027 00) and replace valve seals and guides (WP 0443 00).</p> <p>1. If engine oil consumption remains less than 60 mi. (96 km) for one quart of oil, check all seals.</p> <p>2. If there are no leaks, proceed to step 3 of test 3.</p> <p>1. If engine oil consumption remains less than 60 mi (96 km) for one quart of oil, check all seals.</p> <p>2. If engine oil consumption is greater than or equal to 60 mi (96 km) for one quart of oil, oil consumption is acceptable. No further action required.</p> <p>1. If engine oil consumption remains less than 60 mi (96 km) for one quart of oil, check all seals.</p> <p>2. If engine oil consumption is greater than or equal to 60 mi (96 km) for one quart of oil, oil consumption is acceptable. No</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>11. EXHAUST COLOR BLUE DURING NORMAL OPERATION (Contd)</b></p>	<p>4. Check valve seats, valve guides, or cylinder head gaskets for defects. Remove cylinder heads (WP 0027 00) and disassemble (WP 0438 00).</p> <p>5. Repeat steps 1 and 2 of engine oil consumption test. If valve seats, valve guides or cylinder heads are defective, replace (WP 0443 00 or WP 0027 00).</p>	<p>If oil consumption remains more than one quart for every 60 mi (96 km), piston rings or cylinder bores may be worn or defective. Replace defective components.</p> <p>Perform compression test. If the wet compression test raises compression readings more than 50 psi (345 kPa), a piston ring or cylinder bore problem is indicated. Replace engine (WP 0046 00).</p>
<p><b>12. EXHAUST COLOR WHITE DURING NORMAL OPERATION AND IDLE</b></p>	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Thick white smoke indicates coolant is present in engine combustion chambers during operation. When this condition is evident, shut engine down immediately and determine cause. Continued engine operation may result in permanent engine damage.</p> <p>1. Check engine temperature. Ensure engine temperature is within operating temperature (TM 9-2320-361-10).</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Hot coolant is under pressure. Care should be used when removing coolant filler cap or inspecting hot engine coolant leaks. Steam or hot coolant under pressure may cause severe injury to personnel.</p> <p>2. Pressure test warm engine cooling system (TM 750-254). Observe pressure tester reading.</p>	<p>1. If pressure test reading declines and there is no indication of external leaks, coolant is leaking internally into engine or combustion chambers. Remove oil dipstick and check engine oil for presence of coolant.</p>



**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>12. EXHAUST COLOR WHITE DURING NORMAL OPERATION AND IDLE (Contd)</b></p>	<p>3. Test run vehicle after replacing cylinder heads and gaskets. If exhaust color remains white, internal engine block cooling jacket failure is indicated.</p>	<p>2. If coolant is present on oil dipstick, check intake manifold and gaskets for defects. See WP 0008 00, table 1, malfunction 1, step 11.</p> <p>3. If coolant is present on dipstick, check cylinder heads and gaskets for defects. (WP 0027 00).</p> <p>Replace engine (WP 0046 00).</p>
<p><b>13. ENGINE OIL PRESSURE LOW OR ZERO AT NORMAL OPERATING TEMPERATURE</b></p>	<p style="text-align: center;"><b>CAUTION</b></p> <p>Do not operate engine except during testing when condition of no oil pressure is evident. Continued operation may damage engine internally.</p> <p>1. Check oil pressure regulator for leaks or defective operation. Remove oil pressure regulator and inspect for defects (WP 0037 00).</p> <p style="text-align: center;"><b>NOTE</b></p> <p>When oil pump operation or condition becomes defective, usually there is a lack of oil supply or restriction from oil sludge.</p> <p>2. Remove oil pan and oil pump and inspect for defects (WP 0035 00 and WP 0036 00).</p> <p>3. Check oil pick up for restrictions.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Lack of oil supply due to oil pick up restrictions reducing or cutting off oil supply may cause damage to main and rod bearings, crankshaft, and rods.</p> <p>4. Inspect crankshaft for nicks, burns, scuffs, or discoloration due to overheating.</p>	<p>If oil pressure regulator is defective, replace (WP 0037 00).</p> <p>If oil pump is defective, repair or replace (WP 0036 00). Do not install oil pick up or oil pan when reinstalling oil pump.</p> <p>If oil pick up is restricted, clean or replace (WP 0036 00). Do not install oil pan when reinstalling oil pickup.</p> <p>Replace engine if crankshaft is damaged (WP 0046 00).</p>



## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 1. Engine Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>14. ENGINE OIL PRESSURE EXTREMELY HIGH AT NORMAL OPERATING TEMPERATURE</b>	1. Check oil pressure regulator for leaks or defective operation. <p style="text-align: center;"><b>NOTE</b></p> Continued high oil pressure may indicate engine bearings are spun, the engine block oil feed is restricted, or the return passages are restricted.  2. Disassemble engine and check for spun bearings or restricted oil passages.	Remove oil pressure regulator and inspect for defects. If oil pressure regulator is defective, replace (WP 0037 00).  If evidence of spun engine bearings or restricted oil passage is found, replace engine (WP 0046 00).
<b>15. ENGINE OIL LOSS DURING NORMAL OPERATION</b>	<p style="text-align: center;"><b>CAUTION</b></p> Do not operate engine except during testing when condition of no oil pressure is evident. Continued operation may damage engine internally.  1. Check oil pressure regulator for leaks or defective operation. Remove oil pressure regulator and inspect for defects (WP 0037 00). 2. Remove and inspect oil cooler for leaks, restrictions, or defects.  3. Remove and inspect turbocharger for internal and external oil leaks. (WP 0057 00).  4. Check fuel injection pump for external oil leaks.  5. Complete troubleshooting. See WP 0008 00, table 1, malfunction 11, test 1.	1. If oil cooler is restricted, clean. 2. If oil cooler gasket is defective, replace (WP 0038 00).  If oil is present inside turbocharger housing, on hub fins, or externally on housing, but not in area of oil inlet or outlet parts, replace turbocharger (WP 0057 00).  If fuel injection pump is leaking oil, replace (WP 0069 00).  Replace defective components as necessary.

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 1. Engine Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>16. ENGINE NOISE ABNORMAL</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>When abnormal engine noise is evident, engine should be checked and location of noise determined to ensure engine will not be permanently damaged.</p> <ol style="list-style-type: none"> <li>1. When a knocking noise is located at front of engine, check camshaft gear, crankshaft gear, or fuel injection pump gear for damage, excessive backlash, or loose fit. Check excessive camshaft end play. Remove timing gear cover (WP 0032 00).</li> <li>2. When a knocking noise is located at top of engine, remove rocker arm covers (WP 0030 00) and check valve train components mounted on cylinder heads for wear, defects, or incorrect adjustment (WP 0031 00).</li> <li>3. When knocking noise is located at side of engine, remove side tappet chamber covers, valve covers, valve train components and tappets. Check for defects.</li> <li>4. When a knocking noise is located at bottom or rear of engine, check flywheel screws for loose conditions. Position in neutral, start engine, and press and release clutch a number of times.</li> <li>5. When a knocking noise is located at bottom of engine, remove oil pan, (WP 0035 00) and check condition of bearings, crankshaft and rods for wear and defects.</li> <li>6. Disassemble engine and check connecting rod wrist pins and pistons for wear and defects.</li> </ol>	<ol style="list-style-type: none"> <li>1. If gears are loose on shafts, tighten or replace gears (TM 9-2815-210-34-2-1).</li> <li>2. If gears are worn, defective, or have excessive backlash, replace engine (WP 0046 00).</li> <li>3. If camshaft end play is excessive, replace engine (WP 0046 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If valve train components are worn or are defective, replace (WP 0031 00, and WP 0034 00).</li> <li>2. If valve train components are out of adjustment, adjust (WP 0031 00).</li> </ol> <p>If valve train components are excessively worn or defective, replace (WP 0031 00, and WP 0034 00).</p> <p>If noise changes, remove transmission (WP 0131 00) and clutch (WP 0050 00) and check flywheel screws for loose condition. Tighten loose screws or replace damaged or defective flywheel components (WP 0029 00).</p> <ol style="list-style-type: none"> <li>1. If bearings are worn or defective, replace engine (WP 0046 00).</li> <li>2. If crankshaft or connecting rods are defective or damaged, replace engine (WP 0046 00).</li> <li>3. If worn or defective, replace engine (WP 0046 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 1. Engine Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>17. ENGINE VIBRATION ABNORMAL</b>	<p>1. Inspect vibration damper for loose or vibrating components (WP 0028 00).</p> <p>2. Check for crossed fuel injector lines (WP 0068 00).</p> <p style="text-align: center;"><b>NOTE</b></p> <p>If, after correctly installing crossed fuel injector lines, the engine continues to vibrate excessively, pistons may be burned within engine combustion chambers. This condition cannot be corrected unless affected piston(s) are replaced.</p> <p>3. Check engine cylinders compression readings (WP 0008 00, table 1, malfunction 11, test 1).</p>	<p>1. If vibration damper is loose, check woodruff, key and crankshaft/vibration damper mating surfaces for damage. Replace damaged components (WP 0028 00).</p> <p>2. If vibration damper is defective, replace (WP 0028 00).</p> <p>If fuel injector lines are crossed, remove lines and install in correct locations (WP 0068 00).</p> <p>If one or more cylinders has an 8-10% or greater compression loss, replace engine (WP 0046 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 2. Fuel System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Fuel is flammable. Do not perform troubleshooting checks near open flame, sparks, or electricity. Injury or death to personnel may result.</li> <li>• Eye protection is required when performing fuel system troubleshooting procedures. Failure to wear eye protection may result in injury to personnel.</li> <li>• Ignition switch must remain off during fuel system troubleshooting procedures. Failure to verify that ignition system is turned off may result in injury to personnel.</li> </ul>		
<p><b>1. NO FUEL AT FUEL INJECTORS</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>If rod clevis is not positioned tightly against cover window bearing screw, fuel shutoff rod may be binding. Verify fuel shutoff rod travels freely before adjusting clearance between rod clevis and bearing screw. Failure to verify fuel shutoff rod condition may result in governor sticking, under acceleration, and injury to personnel.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Shutoff rod cover installation will require fuel shutoff rod clevis operating cable to be placed in the RUN position and governor linkage in the LOW IDLE position. Incorrect positioning of linkage and/or fuel shutoff cable may result in jamming of linkage in FULL FUEL load position. Engine will run wide open when started and may cause damage to engine.</p> <p>1. Check fuel injection pump fuel shutoff operation and adjustment (WP 0071 00 and WP 0446 00). Place fuel shutoff cable control on instrument panel to RUN position. Remove timing cover on fuel injection pump (WP 0069 00).</p>	<p>1. If clearance between rod clevis and screw exist, check fuel shutoff rod condition (WP 0446 00).</p> <p>2. If clearance between rod clevis and screw exists, adjust operating cable (WP 0071 00).</p> <p>3. If fuel shutoff is damaged or defective, replace fuel shutoff assembly (WP 0446 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 2. Fuel System Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. NO FUEL AT FUEL INJECTORS (Contd)</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>Air entering fuel delivery lines may block fuel flow. Air can enter lines when fittings are loose or lines or fittings are defective. This is indicated by leaking fuel.</p> <p>2. Check operation of fuel injector nozzle. Remove fuel injector (WP 0067 00) and bench test fuel injector nozzle (TM 9-2815-210-34-1 and -2).</p> <p>3. Check fuel delivery lines mounted on, and from, fuel injection pump (WP 0068 00).</p> <p>4. Check fuel supply pump operation (TM 9-2910-226-34).</p> <p style="margin-left: 20px;">a. Clean dirt, grease, and paint from fuel delivery line fitting at the final fuel filters, which are mounted in fuel supply pump.</p> <p style="margin-left: 20px;">b. Operate in-tank fuel pump and crank engine.</p> <p style="margin-left: 20px;">c. Observe the green port of fuel supply pump.</p> <p>5. Check fuel injection pump delivery operation.</p> <p style="margin-left: 20px;">a. Loosen one injector line nut in hydraulic head.</p> <p style="margin-left: 20px;">b. Operate in-tank fuel pump and crank engine.</p> <p style="margin-left: 20px;">c. Observe location of loose injector line nut in hydraulic head.</p>	<p>1. If fuel injector nozzle operation is incorrect, clean, adjust, and retest (TM 9-2815-210-34-1 and -2).</p> <p>2. If fuel injector nozzles are internally defective, replace (WP 0067 00).</p> <p>If fuel delivery lines are leaking or restricted, tighten lines or fittings, repair fuel delivery lines, or replace fittings (WP 0068 00). Bleed air from fuel injection system (WP 0064 00).</p> <p>If no fuel flows from outlet port of fuel supply pump, replace fuel supply pump (TM 9-2910-226-34).</p> <p>If some traces of fuel, or no fuel pressure is evident, replace fuel injection pump (WP 0069 00).</p>





**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)****Table 2. Fuel System Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>4. FUEL INJECTORS DELIVER EXCESS FUEL INTO ENGINE</b>	<ol style="list-style-type: none"> <li>1. Check fuel injection pump return line.</li> <li>2. Check fuel injection pump timing to engine (WP 0069 00).</li> <li>3. Check fuel injection internal timing (WP 0008 00, table 2, malfunction 2, step 3.</li> <li>4. Check fuel injector nozzle operation (WP 0008 00, table 2, malfunction 1, step 2.)</li> <li>5. See WP 0008 00, table 1, malfunction 3, step 3.</li> </ol>	<p>If fuel return line is bent, kinked, or restricted, replace fuel return line (WP 0062 00).</p> <p>If fuel injection timing to engine is incorrect, adjust to specifications (WP 0069 00).</p> <p>Replace defective components as needed.</p> <p>Replace fuel injection pump if necessary (WP 0069 00).</p>

**Table 3. Cooling System Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>WARNING</b>		
<ul style="list-style-type: none"> <li>• Hot coolant is under pressure. Care should be used when removing radiator filler cap or inspecting hot engine coolant leaks. Steam or hot coolant under pressure may cause severe injury to personnel.</li> <li>• Wear hand protection at all times when working with heated parts. Failure to do so may result in injury to personnel.</li> </ul>		
<b>1. COOLANT LOSS DURING NORMAL OPERATION</b>	Flow test warm engine cooling system (TM 750-254). Observe flow test reading.	<ol style="list-style-type: none"> <li>1. If flow test reading declines and there are no indications of external leaks, coolant is leaking internally into engine or combustion chambers. Remove oil dipstick and check engine oil for presence of coolant.</li> <li>2. If coolant is present on oil dipstick, replace engine (WP 0046 00).</li> </ol>
<b>2. COOLANT TEMPERATURE EXCESSIVE</b>	Refer to WP 0006 00, table 4, malfunction 1.	

**Table 4. Clutch System Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. VEHICLE WILL NOT MOVE OR ENGINE STALLS WITH CLUTCH ENGAGED</b>	<ol style="list-style-type: none"> <li>1. Check transmission condition. Place transfer case in neutral and transmission in first gear. Engage clutch and observe transmission to transfer propeller shaft for evidence of rotation.</li> </ol>	<ol style="list-style-type: none"> <li>1. If engine stalls, disconnect transmission to transfer case propeller shaft for evidence of rotation.</li> <li>2. Place transmission in neutral. If transmission will not turn, replace (WP 0131 00 and WP 0132 00) or repair transmission (WP 0450 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)**

*Table 4. Clutch System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. VEHICLE WILL NOT MOVE OR ENGINE STALLS WITH CLUTCH ENGAGED (Contd)</b></p>	<p>2. Check flywheel condition (WP 0029 00).</p>	<p>3. If transmission to transfer case propeller shaft will not spin, remove transmission (WP 0131 00). Remove pressure plate and clutch disc for defects. Verify flywheel condition (WP 0029 00).</p> <p>4. If pressure plate and clutch disc are defective, replace (WP 0050 00).</p> <p>5. If flywheel is burned or damaged, repair and replace flywheel (WP 0441 00 or WP 0029 00).</p>
<p><b>2. BURNING ODOR EVIDENT WITH CLUTCH ENGAGED</b></p>	<p style="text-align: center;"><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>• Clutch engagement followed by a burning odor indicates clutch improperly engaged and slipping. When this condition is evident, inspection of vehicle clutch operation is required immediately. Prolonged operation of vehicle under these conditions may result in damaged clutch disc, pressure plate and flywheel.</li> <li>• Clutch slippage due to improper clutch disc operation may result in damage to pressure plate, clutch disc, and flywheel contact at surface.</li> </ul> <p style="text-align: center;"><b>NOTE</b></p> <p>Light surface discoloration of pressure plate and flywheel contact surfaces may be removed with crocus cloth. Deeper discoloration and hard spots on flywheel may require replacement of part.</p> <p>1. Check clutch assembly condition. Remove transmission (WP 0131 00).</p> <p>2. Remove pressure plate and clutch disc for inspection (WP 0050 00).</p> <p>3. Remove release bearing for inspection (WP 0049 00).</p>	<p>1. If flywheel or pressure plate surface is only slightly discolored or damaged, clean with crocus cloth. If damage is greater, replace (WP 0050 00 and WP 0029 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 4. Clutch System Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. BURNING ODOR EVIDENT WITH CLUTCH ENGAGED (Contd)</b>		2. If evidence of burned or hard spots on flywheel exist, replace (WP 0029 00). 3. Clutch disc and release bearing defects require replacement of parts (WP 0050 00 and WP 0049 00).
<b>3. CLUTCH NOISY DURING ENGAGEMENT AND DISENGAGEMENT</b>	1. Check clutch noise. Place transmission in neutral. Start engine and push clutch pedal to floor and release. If noise increases when pedal is depressed and released, remove transmission (WP 0131 00). 2. Place transmission in first gear, start engine, and engage clutch.	1. Check release bearing for defects (WP 0049 00). 2. Check clutch pressure plate levers and adjust if necessary (WP 0050 00). 1. If clutch noise increased when engaged, remove transmission (WP 0131 00). 2. Remove and inspect pressure plate and clutch disc for defects. If pressure plate or clutch disc is defective, replace (WP 0050 00). 3. Check flywheel condition. If flywheel is burned or damaged, repair and replace (WP 0029 00).
<b>4. VIBRATION DURING CLUTCH ENGAGEMENT</b>	<p style="text-align: center;"><b>CAUTION</b></p> Vibration during clutch engagement indicates a warped and/or burned pressure plate and flywheel. When this condition is evident, immediate vehicle clutch inspection is required. Prolonged vehicle operation may result in permanent damage to flywheel and unnecessary damage to transmission. 1. Remove transmission (WP 0131 00). 2. Remove and inspect pressure plate, flywheel, and clutch disc (WP 0029 00 and WP 0050 00).	1. If pressure plate and clutch disc are defective, replace (WP 0050 00). 2. Check flywheel conditions (WP 0029 00). If flywheel is burned or damaged, repair (WP 0441 00) or replace (WP 0029 00). 3. Check clutch pressure plate levers (WP 0050 00) and adjust if necessary. 4. Check pilot bushing condition (WP 0050 00). If pilot bushing is damaged, replace.

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 4. Clutch System Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>5. CLUTCH PEDAL WILL NOT TRAVEL OR DEPRESS</b>	Check clutch release bearing and yoke condition. Remove release bearing and inspect bearing and yoke (WP 0131 00 and WP 0049 00).	<ol style="list-style-type: none"> <li>1. If transmission housing pivot is damaged, repair (WP 0450 00) or replace (WP 0131 00 and WP 0132 00).</li> <li>2. If release bearing is defective, replace (WP 0049 00).</li> <li>3. If transmission yoke is defective, replace (WP 0131 00 and WP 0132 00).</li> </ol>

*Table 5. Transmission Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. TRANSMISSION NOISY</b>	<ol style="list-style-type: none"> <li>1. Check clutch condition WP 0008 00, table 4, malfunction 2, step 1.</li> <li>2. Remove transmission and inspect (WP 0131 00).</li> <li>3. Check transfer case condition.</li> </ol>	<p>Replace defective parts.</p> <p>If transmission is defective, repair (WP 0450 00) or replace (WP 0131 00 and WP 0132 00).</p> <p>See WP 0008 00, table 6, malfunctions 4 and 5.</p>
<b>2. TRANSMISSION LEAKS OIL</b>	Check and verify approximate location of oil leak(s).	<ol style="list-style-type: none"> <li>1. If transmission top cover gasket is leaking, replace gasket (WP 0450 00).</li> <li>2. If transmission PTO gasket is leaking, replace gasket in vehicle (WP 0349 00).</li> <li>3. If transmission countershaft rear bearing cover gasket is leaking, replace transmission (WP 0131 00 and WP 0132 00).</li> <li>4. If transmission rear companion flange oil seal is leaking, replace transmission (WP 0131 00 and WP 0132 00).</li> <li>5. If transmission bearing cap gasket is leaking, replace transmission (WP 0131 00 and WP 0132 00).</li> </ol>
<b>3. TRANSMISSION GRINDS AND/OR POPS OUT OF GEAR DURING SHIFTING</b>	Remove transmission top cover (WP 0450 00) exposing shift forks and synchronizers.	<ol style="list-style-type: none"> <li>1. If any shift fork position is incorrect, adjust (WP 0450 00).</li> <li>2. If synchronizers are damaged or defective, replace transmission (WP 0131 00 and WP 0132 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 6. Transfer Case Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. TRANSFER CASE WILL NOT OPERATE FRONT DIFFERENTIAL</b>	<ol style="list-style-type: none"> <li>1. Check sprag air cylinder operation (TM 9-2520-246-34-1) and test using outside air source with engine stopped.</li> <li>2. With air tanks full and engine off, loosen airlines at sprag air cylinder and listen for sprag clutch engagement in transfer sprag unit.</li> </ol>	<p>If sprag air cylinder operation is defective, replace sprag cylinder (WP 0136 00).</p> <ol style="list-style-type: none"> <li>1. If forward and reverse sprag engagements are not heard, replace transfer sprag air cylinder (WP 0136 00).</li> <li>2. If sprag engagement is heard, repair sprag unit in transfer case (WP 0451 00).</li> </ol>
<b>2. TRANSFER CASE WILL NOT OPERATE REAR DIFFERENTIAL</b>	<ol style="list-style-type: none"> <li>1. Confirm transmission to transfer propeller shaft turns.</li> <li>2. Place transmission to transfer propeller shaft in neutral. Try to turn propeller shaft. If propeller shaft moves, then it is damaged.</li> <li>3. Confirm transfer to forward rear axle propeller shaft can be turned. Place transfer shifter into neutral and raise both rear wheels on one side of vehicle.</li> </ol>	<p>If transmission to transfer propeller shaft will not turn with transmission and transfer assembly in neutral. Repair or replace transfer case (WP 0451 00 or WP 0138 00)</p> <p>Remove and repair propeller shaft (WP 0139 00).</p> <p>If rear axle propeller shaft will not turn, see WP 0006 00, table 11, malfunction 1, step 5. If propeller and axles turn freely, replace transfer case (WP 0138 00).</p>
<b>3. TRANSFER CASE LEAKS OIL</b>	Check and verify approximate location of oil leak(s).	<ol style="list-style-type: none"> <li>1. If transfer case front output shaft cover gasket is leaking, remove transfer case (WP 0138 00) and replace gasket (WP 0451 00).</li> <li>2. If transfer case housing gasket is leaking, remove transfer case (WP 0138 00) and replace gasket (WP 0451 00).</li> <li>3. If transfer case input flange oil seal is leaking, replace seal (WP 0451 00).</li> <li>4. If transfer case front output flange oil seal is leaking, replace seal (WP 0451 00).</li> <li>5. If transfer case input shaft bearing cover gasket is leaking, replace gasket</li> </ol>

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 6. Transfer Case Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. TRANSFER CASE LEAKS OIL (Contd)</b>		<p>6. If transfer case rear output bearing cover gasket is leaking replace gasket (WP 0451 00).</p> <p>7. If countershaft rear bearing cover gasket is leaking, remove transfer case and replace gasket (WP 0138 00 and WP 0451 00).</p> <p>8. If rear output shaft oil seal is leaking remove transfer case (WP 0138 00) and replace seal (WP 0451 00).</p> <p>9. If rear output shaft bearing retainer gasket is leaking, remove transfer case (WP 0138 00) and replace gasket (WP 0451 00).</p> <p>10. If top cover gasket is leaking, replace (WP 0451 00).</p> <p>11. If PTO is leaking oil, replace (WP 0348 00).</p> <p>12. If transfer case oil leaks continue, remove transfer case (WP 0138 00) and disassemble (WP 0451 00). Check transfer housing halves for defects. Replace defective components.</p>
<b>4. TRANSFER CASE NOISY</b>	<p>1. Drain transfer case fluid (WP 0020 00) and check for signs of broken gears, metal shavings, and contamination.</p> <p>2. Check transfer case operation in high and low range and in neutral.</p>	<p>If broken gears, metal shavings, or contamination are found in transfer case or on magnetic drain plug, replace transfer case (WP 0138 00).</p> <p>If transfer case is defective, replace (WP 0138 00).</p>
<b>5. TRANSFER CASE GRINDS OR POPS OUT OF GEAR DURING NORMAL VEHICLE OPERATION</b>	<p>Drain transfer case fluid (WP 0020 00) and check for signs of broken gears, metal shavings, and contamination.</p>	<p>If broken gears, metal shavings, or contamination are found in transfer case or on magnetic drain plug, replace transfer case (WP 0138 00).</p> <p>Replace transfer case (WP 0138 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 7. Differential Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. DIFFERENTIAL NOISY</b>	<ol style="list-style-type: none"> <li>1. Check transfer case operation and noise. (Refer to WP 0008 00, table 6, malfunction 4.)</li> <li>2. Check differential operation. Remove differential drive propeller shafts (WP 0139 00). Raise wheels and manually turn wheels and observe differential operation.</li> </ol>	If tires still do not rotate, replace differential assembly (WP 0454 00).
<b>2. DIFFERENTIAL CLUNKS DURING TURNS OR INITIAL TAKEOFF</b>	Check differential internal operation.	Remove differential and disassemble. Repair or replace as necessary (WP 0454 00 and WP 0455 00).
<b>3. DIFFERENTIAL LEAKS OIL</b>	<ol style="list-style-type: none"> <li>1. Check differential shaft seals condition. Inspect for presence of gear oil at gaskets and companion flange areas.</li> <li>2. Check axle housing condition. Inspect axle housing for external evidence of gear oil.</li> </ol>	<ol style="list-style-type: none"> <li>1. If oil is present, replace seals and gaskets (WP 0149 00).</li> <li>2. If seals replacement does not correct problem and leak continues, remove differential and repair (WP 0454 00 and WP 0455 00).</li> <li>1. If axle housing has pinhole leaks, repair or replace axle housing (WP 0148 00 and WP 0151 00).</li> <li>2. If axle housing is cracked or damaged, replace (WP 0148 00 and WP 0151 00).</li> </ol>
<b>4. ABNORMAL TIRE WEAR (FRONT AXLE)</b>	Check steering knuckle sleeve bushings condition and end play.	<ol style="list-style-type: none"> <li>1. If steering knuckle sleeve bushings are defective, replace (WP 0150 00).</li> <li>2. If steering knuckle end play is excessive, adjust (replace with correct shim) (WP 0150 00).</li> <li>3. If steering knuckle end play remains excessive, replace sleeves or axle housing (WP 0148 00 and WP 0150 00).</li> </ol>
<b>5. ABNORMAL TIRE WEAR (REAR AXLE)</b>	Check rear end frame and suspension alignment (WP 0206 00).	If alignment is incorrect, adjust (WP 0206 00).

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 8. Steering Gear Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. EXCESSIVE PLAY IN STEERING</b>	<ol style="list-style-type: none"> <li>1. Check steering gear knuckle condition for defects.</li> <li>2. Check steering gear condition for defects. Inspect for excessive play (WP 0193 00).</li> </ol>	<p>See WP 0008 00, table 7, malfunction 4.</p> <ol style="list-style-type: none"> <li>1. If steering gear play is excessive, adjust (WP 0193 00).</li> <li>2. If steering gear play remains excessive, repair or replace (WP 0192 00 and WP 0458 00).</li> </ol>
<b>2. STEERING GEAR LEAKING OIL</b>	Check oil and verify location.	<ol style="list-style-type: none"> <li>1. If oil leak is at cover gasket, replace gasket (WP 0458 00).</li> <li>2. If oil leak is at pitman shaft oil seal, disassemble steering gear and inspect pitman shaft and bushing (WP 0458 00). Replace defective components.</li> </ol>
<b>3. STEERING WHEEL HARD TO TURN</b>	Check front axle for defective steering knuckle bushings (WP 0150 00).	Replace defective steering knuckle bushings if defective (WP 0150 00).

*Table 9. Power Takeoff (PTO) Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. INOPERATIVE POWER TAKEOFF (TRANSMISSION DRIVEN)</b>	<ol style="list-style-type: none"> <li>1. Check power takeoff. Engage power takeoff and visually confirm output propeller shaft rotation.</li> <li>2. Visually inspect transmission power takeoff drive gear for damage.</li> </ol>	<p>If propeller shaft is not rotating, but PTO is in engaged position, remove transmission (WP 0131 00) with PTO. Remove and inspect PTO. Repair (WP 0464 00) or replace (WP 0349 00).</p> <p>If drive gear is damaged, repair (WP 0464 00).</p>
<b>2. INOPERATIVE POWER TAKEOFF (TRANSFER DRIVEN)</b>	If power takeoff is inoperable, replace (WP 0348 00) or repair (TM 9-2520-246-34-1). Engage and visually confirm output propeller shaft rotation.	<ol style="list-style-type: none"> <li>1. If transfer case half is defective, replace (WP 0138 00) or repair (TM 9-2520-246-34-1).</li> <li>2. If PTO is defective, replace (WP 0348 00) or repair (TM 9-2520-246-34-1).</li> </ol>



## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 9. Power Takeoff (PTO) Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. TRANSMISSION POWER TAKEOFF LEAKS OIL</b>	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>• When replacing gaskets between power takeoff and transmission housing, replace with exact number of gaskets removed. Failure to use the correct number of new gaskets will affect power takeoff to transmission gears spacing and gear backlash. With incorrect gear backlash, equipment may be damaged.</li> <li>• When power takeoff requires bearing or gear replacement, transmission must be removed in order to adjust power takeoff gear and transmission gear backlash. Failure to adjust backlash may result in damage to equipment.</li> </ul> <p>Determine oil leak location.</p>	<ol style="list-style-type: none"> <li>1. If power takeoff cover gasket is leaking, replace gasket (WP 0349 00).</li> <li>2. If power takeoff shifter shaft seal, rear output shaft seal, input shaft seal, rear output shaft housing gasket, or input shaft bearing cover gasket is leaking oil, remove power takeoff from transmission and replace defective parts (WP 0349 00).</li> <li>3. If power takeoff gears or bearings require replacement, remove transmission (WP 0131 00). Remove power takeoff from transmission and replace (WP 0349 00) or repair (WP 0464 00).</li> </ol>
<b>4. TRANSFER POWER TAKEOFF LEAKS OIL</b>	<p>Check oil feed line between transfer case and power takeoff for loose fittings or damaged line (WP 0348 00).</p>	<ol style="list-style-type: none"> <li>1. If oil line fittings are loose, tighten. If damaged, replace (WP 0138 00 and WP 0348 00).</li> <li>2. If gaskets or seals on power takeoff are leaking, replace gaskets or seals (WP 0348 00).</li> </ol>

## MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)

Table 10. Fuel Tank Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b><u>WARNING</u></b>            Diesel fuel is flammable. Do not perform fuel system troubleshooting procedures near open flame, sparks, or electricity. Injury or death to personnel may result.</p>		
<p><b>1. FUEL WILL NOT PUMP FROM COMPARTMENTS OR PUMPS SLOWLY</b></p>	<p>1. Check transfer case power takeoff operation.</p> <p>2. Check discharge valve operation for selected compartment.</p> <p>3. Check delivery pump operation.</p>	<p>If transfer case power takeoff operation is not operating properly, perform WP 0008 00, table 9 malfunction 2.</p> <p>1. If discharge valve operation is defective, remove and inspect discharge valve internal components (WP 0265 00).</p> <p>2. If discharge valve components are defective, replace components (WP 0265 00).</p> <p>1. If delivery pump screen and filter separator are not restricted, remove and inspect delivery pump internal components (WP 0280 00).</p> <p>2. If delivery pump internal components are defective, replace components (WP 0280 00).</p>
<p><b>2. FUEL WILL NOT GRAVITY DRAIN FROM SELECTED COMPARTMENTS</b></p>	<p>Check discharge valve operation for selected compartment.</p>	<p>1. If discharge valve operation is defective, remove and inspect discharge valve internal components (WP 0265 00).</p> <p>2. If discharge valve components are defective, replace components (WP 0265 00).</p>
<p><b>3. FUEL TANK COMPARTMENT CANNOT BE SUCTION FILLED</b></p>	<p>1. Check transfer case power takeoff operation.</p> <p>2. Check delivery pump operation.</p>	<p>If transfer case power takeoff operation is not operating, refer to WP 0008 00, table 9, malfunction 2.</p> <p>1. If delivery pump screen and filter separator are not restricted, remove and inspect delivery pump internal components (WP 0280 00).</p> <p>2. If delivery pump internal components are defective, replace components (WP 0280 00).</p>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 10. Fuel Tank Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>4. FUEL MIXED WITH WATER WHEN DISPENSED</b>	Check dump drain valve for proper operation.	<ol style="list-style-type: none"> <li>1. If dump drain valve operation is defective, remove sump assembly and replace dump drain valves (WP 0267 00).</li> <li>2. If dump drain valve operation is not defective, disassemble sump valve assembly and inspect internal components (WP 0267 00).</li> <li>3. If sump valve components are defective, replace components (WP 0267 00).</li> </ol>

*Table 11. Water Tank Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. WATER WILL NOT PUMP FROM COMPARTMENTS OR PUMPS SLOWLY</b>	<ol style="list-style-type: none"> <li>1. Check transfer case power operations.</li> <li>2. Check discharge valve operation for selected compartment.</li> <li>3. Check delivery pump operation.</li> </ol>	<p>If PTO is not operating, refer to WP 0008 00, table 9, malfunction 2.</p> <ol style="list-style-type: none"> <li>1. If discharge valve operation is defective, remove and inspect discharge valve internal components (WP 0265 00).</li> <li>2. If discharge valve internal components are defective, replace components (WP 0265 00).</li> <li>1. If delivery pump screen and filter separator are not restricted, remove and inspect delivery pump internal components (WP 0461 00).</li> <li>2. If delivery pump internal components are defective, replace components (WP 0461 00).</li> </ol>
<b>2. WATER WILL NOT GRAVITY DRAIN FROM SELECTED COMPARTMENTS</b>	Check discharge valve operation for selected compartments.	<ol style="list-style-type: none"> <li>1. If discharge valve operation is defective, remove and inspect discharge valve internal components (WP 0265 00).</li> <li>2. If discharge valve internal components are defective, replace components (WP 0265 00).</li> </ol>
<b>3. WATER TANK COMPARTMENTS CANNOT BE SUCTION FILLED</b>	<ol style="list-style-type: none"> <li>1. Check transfer case power takeoff operations.</li> <li>2. Check delivery pump operation.</li> </ol>	<p>If transfer case PTO is not operating, refer to WP 0008, table 9, malfunction 2.</p> <ol style="list-style-type: none"> <li>1. If delivery pump screen and filter separator are not restricted, remove and inspect delivery pump internal components (WP 0461 00).</li> <li>2. If delivery pump internal components are defective, replace components (WP 0461 00).</li> </ol>

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 12. Winch Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. CLUTCH WILL NOT ENGAGE DRUM</b>	1. Check shifter shaft and clutch.	Replace winch if defective (WP 0345 00).
	2. Check for mechanical obstructions if clutch handle moves short distance then clatters.	Inspect clutch and drum jaws for burrs, breaks, and misalignment. Replace winch if defective (WP 0345 00).
<b>2. WINCH NOISY WHEN UNDER LOAD</b>	1. Check drum for radial free play.	Replace winch if radial free play is present (WP 0345 00).
	2. Check wormshaft radial free play.	Replace winch if radial freeplay is present (WP 0345 00).
<b>3. DRUM OVERRUNS CABLE OR CABLE COILS LOOSEN WHEN PAYING OUT CABLE</b>	Check drag brake adjustment (WP 0342 00).	Replace winch if no adjustment remains (WP 0345 00).
<b>4. WINCH DOES NOT HOLD LOAD WHEN POWER RELEASED</b>	1. Check for presence of burned odor.	Inspect automatic brakeshoes, replace winch if defective (WP 0345 00).
	2. Automatic brake does not hold load after adjustment.	Replace winch if defective (WP 0345 00).
<b>5. WINCH LEAKS OIL</b>	1. Check for defective oil seals and gaskets.	Replace winch if defective (WP 0345 00).
	2. Check for cracked covers and housing.	Replace winch if cracked. (WP 0345 00).

*Table 13. Winterization Kits Troubleshooting Procedures.*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>NOTE</b>		
Mechanical troubleshooting procedures for fuel burning personnel and engine coolant heaters are the same. The following are for fuel burning personnel heaters.		
<b>1. HEATER FAILS TO TURN ON</b>	Bench test for defective control parts (WP 0426 00 and WP 0435 00).	If defective replace control parts (WP 0421 00 through WP 0429 00).
<b>2. HEATER OVERHEATS, OVERHEAT SWITCH IS GOOD</b>	1. Check for obstructed airflow.	If obstructed, clear obstructions from fuel supply air and ventilation air passages (WP 0246 00 and WP 0248 00).
	2. Check fuel control valve (WP 0421 00 or WP 0428 00).	Replace fuel control valve if defective (WP 0421 00 or WP 0428 00).

**MECHANICAL SYSTEMS TROUBLESHOOTING - DIRECT SUPPORT (Contd)***Table 13. Winterization Kits Troubleshooting Procedures (Contd).*

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>3. HEATER OVERHEATS, CONTINUES TO RUN</b>	Test overheat switch (WP 0426 00 and WP 0435 00).	Replace overheat switch if defective (WP 0422 00 and WP 0433 00).
<b>4. HEATER OUTPUT TOO LOW</b>	1. Check for obstructed fuel lines or contaminated fuel supply. 2. Check fuel control valve (WP 0421 00 and WP 0428 00).	Clear obstructions from fuel lines and drain contaminated fuel supply. Replace fuel control valve if defective (WP 0421 00 and WP 0428 00).
<b>5. HEATER SMOKES AND BANGS WHEN STARTING</b>	Check fuel control valve (WP 0421 00 and WP 0428 00).	Replace fuel control valve if defective (WP 0421 00 and WP 0428 00).
<b>6. BLOWER WILL NOT STOP AFTER TURNOFF</b>	Check flame detector switch condition (WP 0421 00 and WP 0428 00).	Replace fuel detector switch if defective (WP 0417 00 and WP 0431 00).
<b>7. ODOR OF FUEL IN VENTILATING AIR</b>	1. Check for leaking fuel connections at stand pipe and fuel valve. 2. Check burner preformed packing and gasket (WP 0424 00 and WP 0432 00).	Tighten connections if loose (WP 0421 00 and WP 0428 00). Replace preformed packing and gasket if defective (WP 0424 00 and WP 0432 00).
<b>8. BLOWER RUNS BUT HEATER FAILS TO IGNITE</b>	1. Test igniter (WP 0426 00 and WP 0435 00). 2. Check fuel control valve (WP 0421 00 and WP 0428 00). 3. Check for obstructed ignition air passages.	Replace igniter if defective (WP 0422 00 and WP 0429 00). Replace fuel control valve if defective (WP 0421 00 and WP 0428 00). Clear ignition air passages of obstructions.
<b>9. HEATER SMOKES DURING NORMAL OPERATION</b>	1. Check for blower motor operation (WP 0418 00 and WP 0427 00). 2. Test fuel control valve (WP 0426 00 and WP 0435 00).	Replace blower motor if defective (WP 0418 00 and WP 0427 00). Replace fuel control valve if defective (WP 0421 00 and WP 0428 00).

END OF WORK PACKAGE



## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING INDEX

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>PARKING BRAKE</b>		
1.	Parking brake will not hold vehicle .....	0010 00-2
2.	Parking brake drags .....	0010 00-2
<b>SERVICE BRAKES</b>		
1.	Brake pedal low, soft, or goes to floorboard (weak or no braking) .....	0010 00-4
2.	Excessive pedal pressure required to stop vehicle (brake pedal stops two inches or more above floorboard); no apparent air system failure .....	0010 00-6
3.	Vehicle pulls to right or left when applying brakes .....	0010 00-8
4.	Brakes drag .....	0010 00-10
5.	Brakes squeal .....	0010 00-11
<b>COMPRESSED AIR</b>		
1.	No air pressure, or compressed air reads below 60 psi (low air pressure warning buzzer sounding, indicating air pressure not building up to normal operating range as indicated by gauge) .....	0010 00-12
2.	Air pressure does not build up to normal operating pressure (above 85 psi) according to gauge .....	0010 00-14
3.	Air pressure exceeds maximum (gauge reads over 120 psi) and safety valve opens to release pressure .....	0010 00-14
4.	Low or no reading on air pressure gauge, and warning buzzer shuts off .....	0010 00-16
5.	Warning buzzer fails to sound on low pressure (below 60 psi) .....	0010 00-16
<b>AIR OPERATED ACCESSORIES</b>		
1.	Windshield wipers inoperative or operate slowly (gauge at normal operating pressure) .....	0010 00-18
2.	Front wheel drive does not engage (front wheel drive lock-in switch engaged) .....	0010 00-20
3.	Air horn does not work .....	0010 00-22

END OF WORK PACKAGE

0009 00-1/2 blank





## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING

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#### **WARNING**

Do not use a dry brush or compressed air to clean brakeshoes. Brakeshoes may be coated with asbestos dust, which can be dangerous to your health if breathed. Ensure that brakeshoes are wet and use only a soft bristle brush for cleaning.

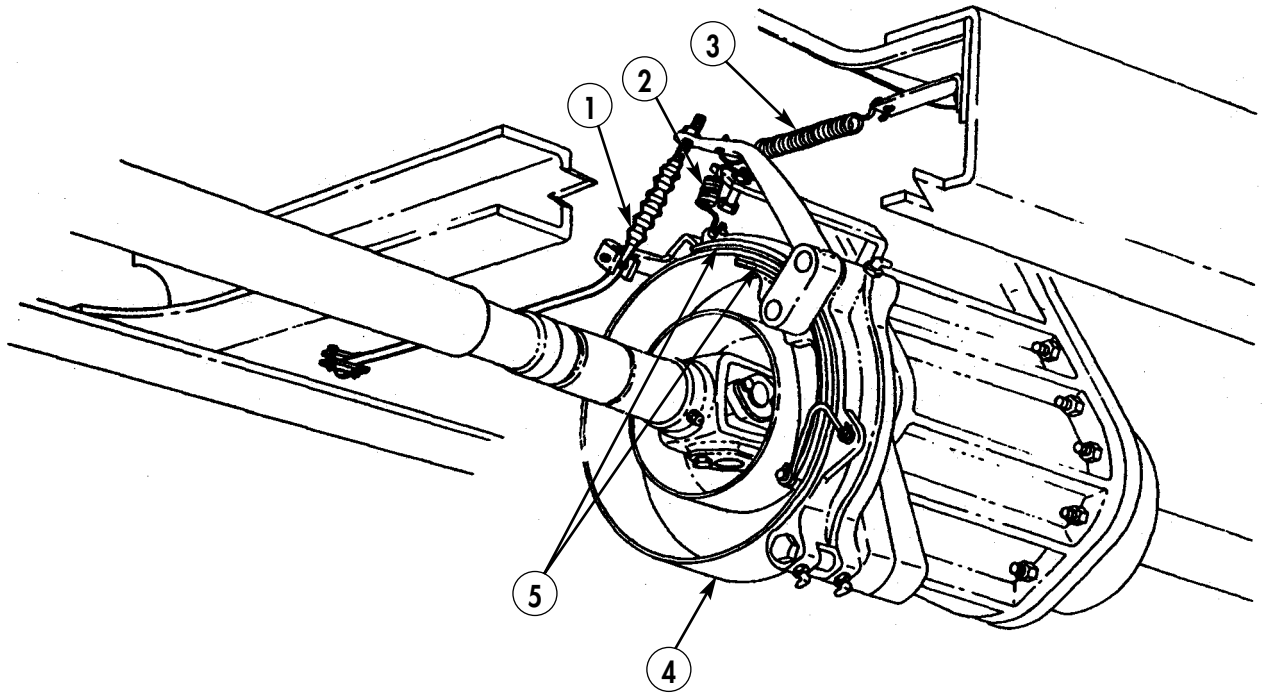
#### **NOTE**

- Refer to the general troubleshooting instructions in Introduction to Troubleshooting, WP 0004 00, prior to performing any compressed air and brake system troubleshooting.
- The air and brake system schematic and wiring diagram for the M44A2 series truck can be found in WP 0473 00.

**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)***Table 1. Parking Brake Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. PARKING BRAKE WILL NOT HOLD VEHICLE</b>	<ol style="list-style-type: none"> <li>1. Check parking brake cable (1) for breaks, bends, or improper adjustment.</li> <li>2. Inspect parking brakeshoes (5) for wear.</li> <li>3. Inspect parking brakeshoe linings (5) and drum (4) for dirt and oil.</li> <li>4. Check parking brakeshoe (5) clearance adjustment (WP 0164 00).</li> <li>5. Check to see if all parts are in place and serviceable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace parking brake cable (1) if broken (WP 0165 00).</li> <li>2. Adjust parking brake cable (1) if out of adjustment (TM 9-2320-361-10).</li> </ol> <p>If parking brakeshoe (5) linings are worn more than 0.188 in. (4.78 mm), replace (WP 0164 00).</p> <p>Replace parking brake shoes and linings, and clean drum (WP 0164 00).</p> <p>If parking brakeshoe (5) clearance is out of adjustment, adjust (WP 0164 00).</p> <p>Repair or replace unserviceable components (WP 0164 00).</p>
<b>2. PARKING BRAKE DRAGS</b>	<ol style="list-style-type: none"> <li>1. Check brakeshoe retracting spring (2) and lever retracting spring (3) for breaks, bends, missing parts, disconnected conditions, or damaged parts on shoe.</li> <li>2. Check parking brake cable (1) for binding or improper adjustment.</li> <li>3. Check parking brake shoe (5) clearance adjustment (WP 0164 00).</li> </ol>	<ol style="list-style-type: none"> <li>1. Reconnect brakeshoe retracting spring (2) or lever retracting spring (3) if disconnected.</li> <li>2. If brakeshoe retracting spring (2) or lever retracting spring (3) is broken, bent, or missing, replace (WP 0164 00).</li> </ol> <p>If parking brake cable (1) is binding or out of adjustment, replace (WP 0165 00) or adjust (TM 9-2320-361-10).</p> <p>If parking brake shoe (5) clearance is out of adjustment, adjust (WP 0164 00).</p>

COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

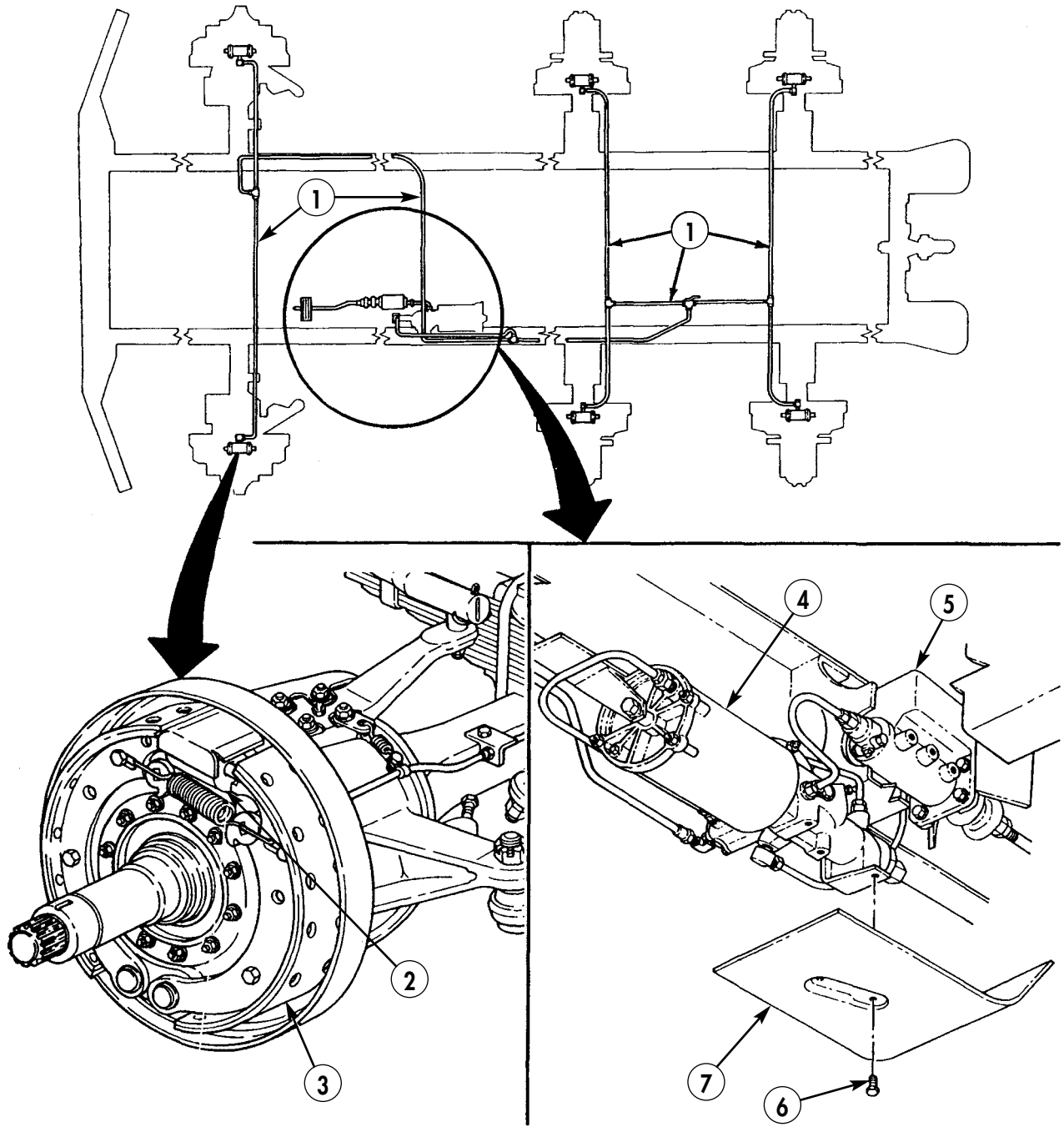


## COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

Table 2. Service Brakes Troubleshooting Procedures.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. BRAKE PEDAL LOW, SOFT, OR GOES TO FLOORBOARD (WEAK OR NO BRAKING)</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Ensure new, longer front brake hoses, currently used on 5 ton trucks, are installed on all 2-1/2 ton trucks. Old, shorter front brake hoses are subject to failure during full steering travel and must be replaced with new, longer front brake hoses. Failure to do this may result in injury or death to personnel.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Old, shorter front brake hoses should be replaced with new longer front brake hoses (WP 0176 00).</p> <ol style="list-style-type: none"> <li>1. Check master cylinder fluid level.</li> <li>2. Check wheel cylinders (2), hydraulic brake lines (1), and hoses for leaks, cracks, breaks, or loose connections.</li> <li>3. Check for air in service brake system.</li> <li>4. Check service brake hydraulic fluid for contamination.</li> <li>5. Check service brakeshoes (3) for proper adjustment and check service brakeshoe (3) linings for wear.</li> <li>6. Remove two screws (6) and shield (7) from air-hydraulic cylinder (4). Inspect master cylinder (5) for leaks.</li> <li>7. Inspect air-hydraulic cylinder (4) for brake fluid leaks.</li> <li>8. Perform master cylinder (5) internal leakage test (WP 0170 00).</li> </ol>	<p>If fluid level is low, fill to proper level (WP 0020 00).</p> <ol style="list-style-type: none"> <li>1. If hydraulic brake lines (1) or hoses are loose, tighten.</li> <li>2. If hydraulic brake lines (1) or hoses are broken, cracked, or leaking, replace (WP 0175 00, WP 0176 00, or TM 9-243).</li> <li>3. If wheel cylinders (2) are leaking, replace (WP 0169 00).</li> </ol> <p>Bleed service brake system (WP 0172 00).</p> <p>If fluid is contaminated, flush entire brake system (WP 0172 00).</p> <ol style="list-style-type: none"> <li>1. Adjust service brakeshoes (3) if necessary (WP 0168 00).</li> <li>2. If service brakeshoe (3) linings are worn more than 0.328 in. (8.33 mm), replace (WP 0167 00).</li> </ol> <p>If master cylinder (5) is leaking, replace (WP 0170 00).</p> <p>If air-hydraulic cylinder (4) is leaking brake fluid, replace (WP 0171 00).</p> <ol style="list-style-type: none"> <li>1. If master cylinder (5) is leaking internally, replace (WP 0170 00).</li> <li>2. If master cylinder (5) is good and malfunction still exists, replace air-hydraulic cylinder (4) (WP 0171 00).</li> </ol>

COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

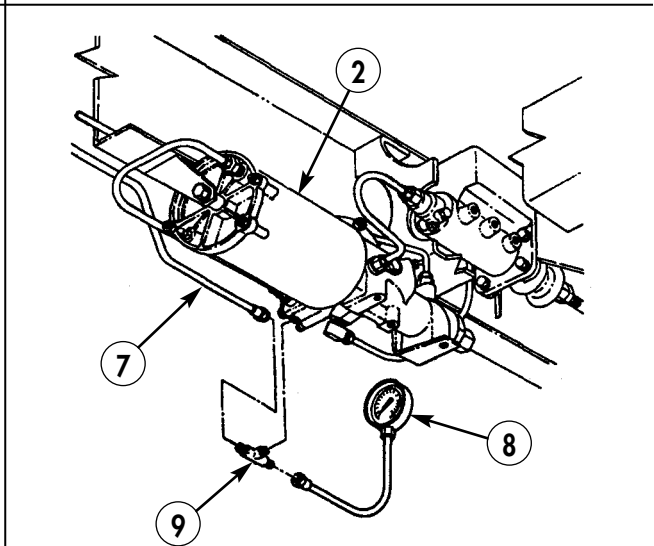
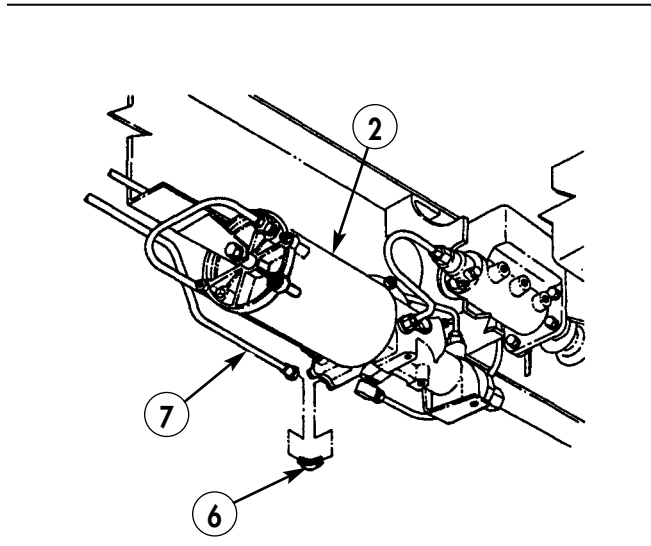
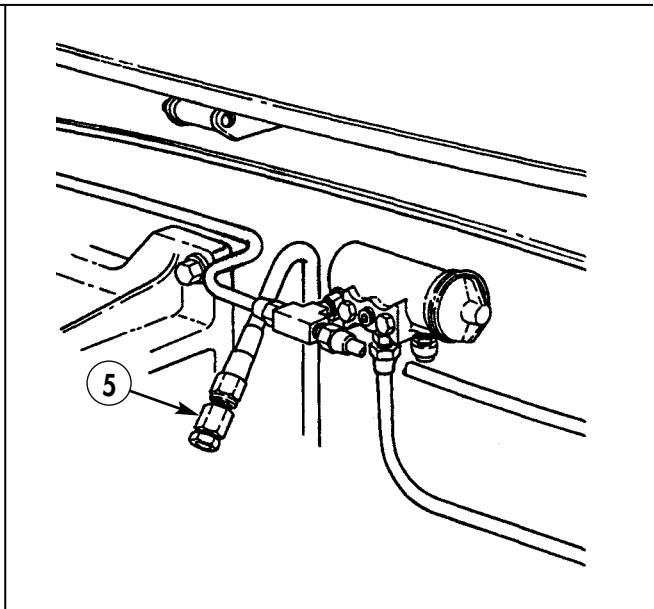
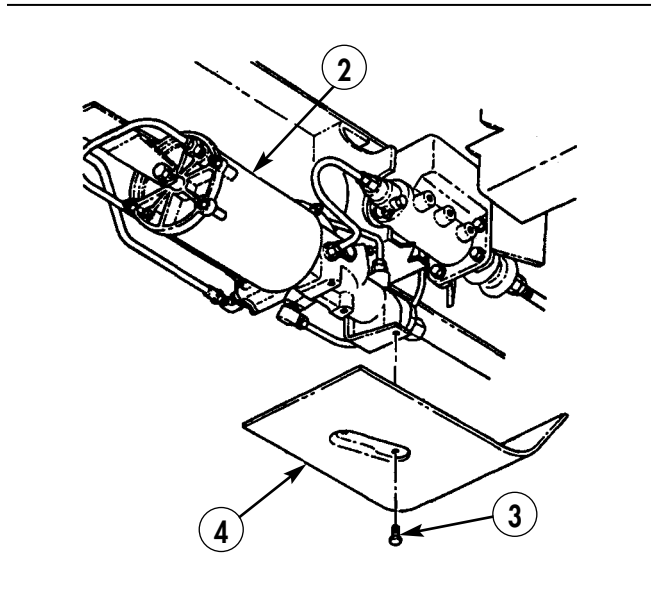
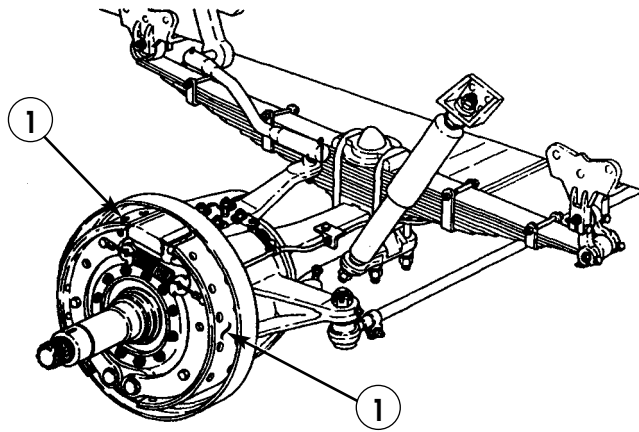


**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Service Brakes Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. EXCESSIVE PEDAL PRESSURE REQUIRED TO STOP VEHICLE (BRAKE PEDAL STOPS TWO INCHES OR MORE ABOVE FLOORBOARD); NO APPARENT AIR SYSTEM FAILURE</b></p>	<p>1. Check service brakeshoe (1) linings for oil or grease contamination.</p> <p>2. Direct assistant to apply service brakes and listen for evidence of air escaping at air hydraulic cylinder (2) and at vent (5).</p> <p>Test 1. Check air-hydraulic cylinder (2) for proper delivery line (7) supply pressure.</p> <ol style="list-style-type: none"> <li>1. Stop engine and open all drain valves (TM 9-2320-361-10) until brake system air pressure is completely drained.</li> <li>2. Remove two screws (3) and shield (4) from air-hydraulic cylinder (2).</li> <li>3. Disconnect delivery line (7) from elbow (6).</li> <li>4. Remove elbow (6) from air-hydraulic cylinder (2).</li> <li>5. Install tee (9) on air-hydraulic cylinder (2).</li> <li>6. Connect test gauge (8) and delivery line (7) to tee (9).</li> <li>7. Direct assistant to start engine (TM 9-2320-361-10) and allow air pressure to build to normal operating pressure.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Air pressure gauge in instrument panel has a maximum pressure reading of 120 psi. If old governor has been replaced with new governor, air pressure may exceed maximum pressure reading on instrument panel gauge.</p> <ol style="list-style-type: none"> <li>8. Check test gauge (8) reading and compare with reading on instrument panel air pressure gauge.</li> </ol>	<p>If service brakeshoe (1) linings are saturated with oil or grease, repair oil or grease leak and replace brakeshoes (WP 0167 00).</p> <ol style="list-style-type: none"> <li>1. If escaping air is present, replace air-hydraulic cylinder (WP 0171 00).</li> <li>2. If no air is escaping, proceed to test 1.</li> </ol> <ol style="list-style-type: none"> <li>1. If reading on test gauge (8) is same as instrument panel air pressure gauge, replace air hydraulic cylinder (2) (WP 0171 00).</li> <li>2. If reading on test gauge (8) is less than instrument panel air pressure gauge, check delivery line (7) for restrictions. If delivery line (7) is damaged or restricted, replace (TM 9-243).</li> </ol>

COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

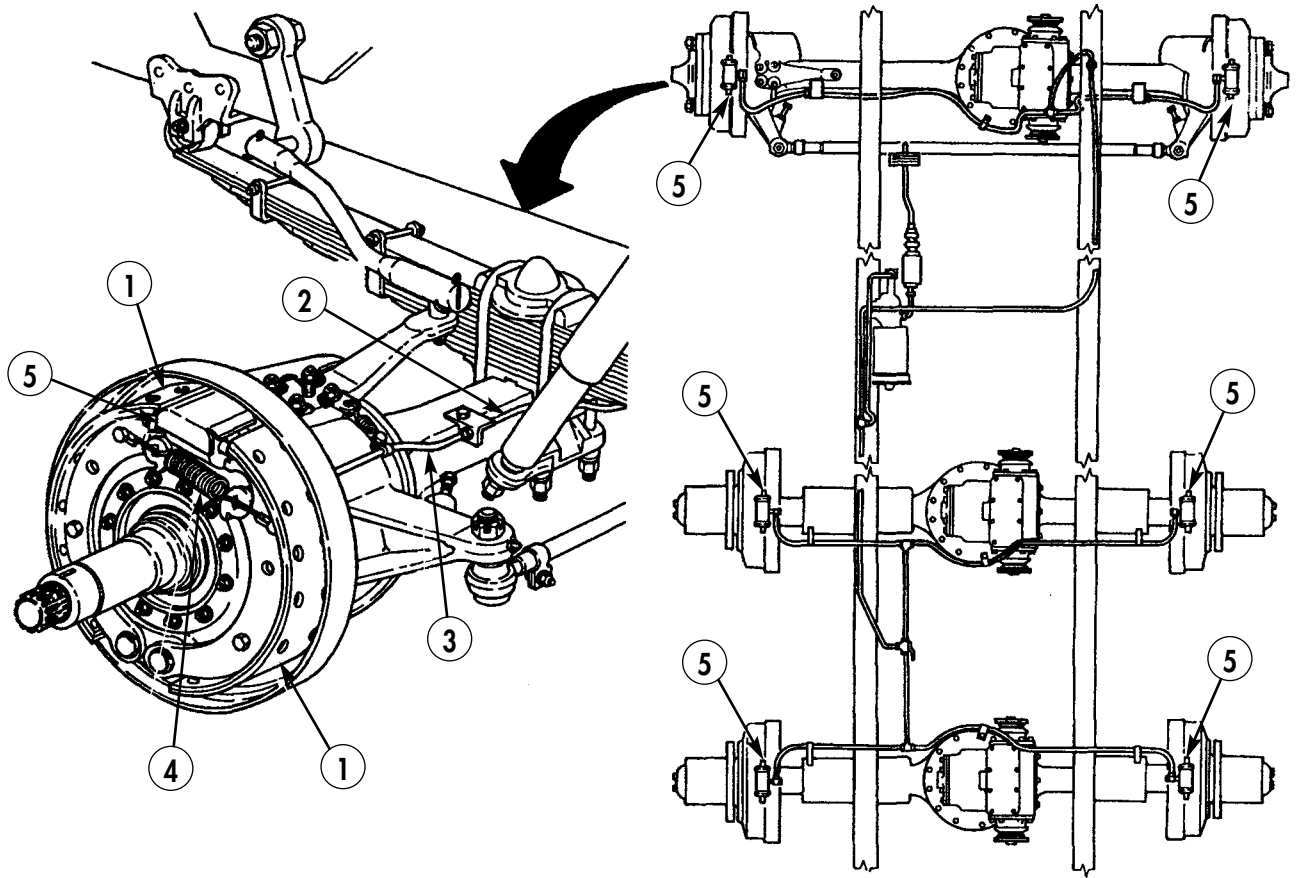


**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)***Table 2. Service Brakes Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. VEHICLE PULLS TO RIGHT OR LEFT WHEN APPLYING BRAKES</b>	<ol style="list-style-type: none"> <li>1. Check clearance on each set of service brakeshoes (1).</li> <li>2. Check service brakeshoe (1) linings for wear.</li> <li>3. Check hydraulic brake lines (2) for bent or crushed conditions.</li> <li>4. Check hydraulic hoses (3) for pinches or cracks.</li> <li>5. Check brakeshoe return springs (4) for damage.</li> <li>6. Check wheel cylinders (5) to make sure wheel cylinder pistons move freely and are not frozen.</li> </ol>	<p>If service brakeshoes (1) are out of adjustment, adjust clearance (WP 0168 00).</p> <p>If service brakeshoe linings (1) are worn more than 0.328 in. (8.33 mm), replace service brakeshoes (1) (WP 0167 00).</p> <p>If hydraulic brake lines are damaged, replace (WP 0175 00).</p> <p>If hydraulic hoses are damaged, replace (WP 0176 00).</p> <p>If brakeshoe return spring (4) is broken or stretched, replace (WP 0167 00).</p> <p>If wheel cylinder pistons are frozen, replace wheel cylinders (5) (WP 0169 00).</p>



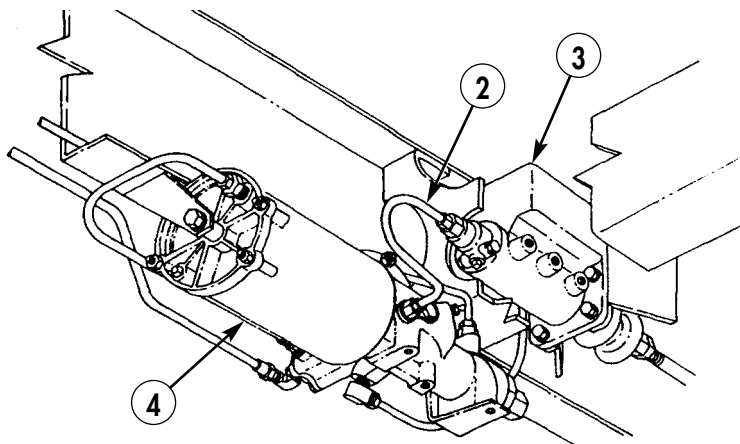
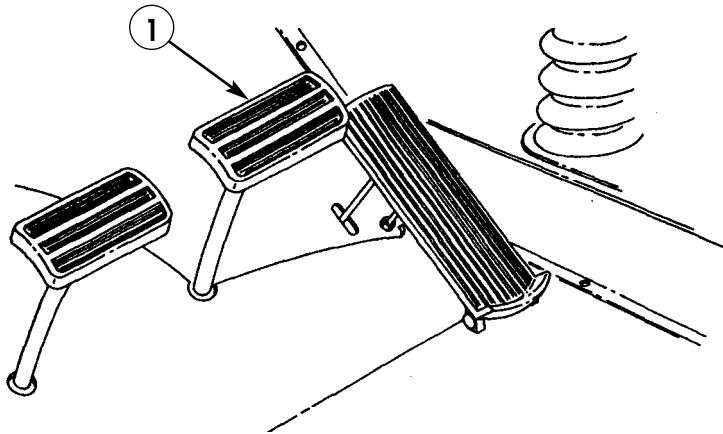
COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)



**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Service Brakes Troubleshooting Procedures (Contd).*

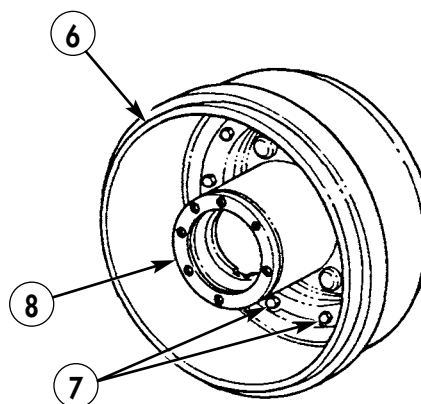
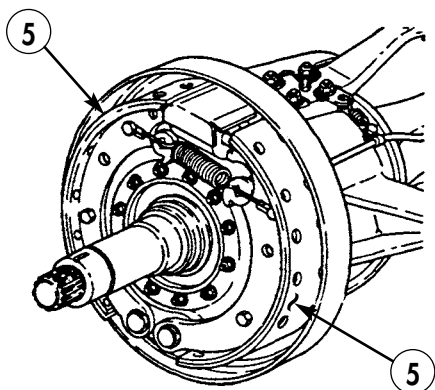
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>4. BRAKES DRAG</b></p>	<ol style="list-style-type: none"> <li>1. Check brake pedal (1) for free travel. Free travel should be 0.25–0.5 in. (6.35–12.7 mm).</li> <li>2. Check hydraulic brake lines (2) for bends, kinks, or restrictions.</li> <li>3. Check service brakeshoes for proper adjustments (WP 0168 00).</li> <li>4. Check service brake hydraulic fluid for contamination.</li> <li>5. Perform master cylinder (3) internal leakage test (WP 0170 00).</li> </ol>	<p>Adjust brake pedal (1) free travel (WP 0174 00).</p> <p>If hydraulic brake lines (2) are bent, kinked, or restricted, replace (WP 0175 00).</p> <p>If brakeshoes are not properly adjusted, adjust (WP 0168 00).</p> <p>If fluid is contaminated, flush entire brake system (WP 0172 00).</p> <ol style="list-style-type: none"> <li>1. If master cylinder (3) is leaking internally, replace (WP 0170 00).</li> <li>2. If master cylinder (3) is good and malfunction still exists, replace air-hydraulic cylinder (4) (WP 0171 00).</li> </ol>



**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Service Brakes Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>5. BRAKES SQUEAL</b></p>	<p>1. Check service brake shoes (5) for proper installation, glazing, distortion, or excessive wear.</p> <p>2. Check brake drums (6) for heat spotting or heavy scoring.</p> <p>3. Check brake drum (6) and hub (8) for proper assembly.</p>	<p>1. If service brake shoes (5) are improperly installed, replace (WP 0167 00).</p> <p>2. If service brake shoes (5) are glazed, distorted, or worn more than 0.328 in. (8.33 mm), replace (WP 0167 00).</p> <p>If brake drums (6) are heat spotted or scored more than 0.03 in. (0.76 mm), replace (WP 0187 00 and WP 0188 00).</p> <p>If brake drum (6) and hub (8) are not properly assembled, or if any screws (7) are missing, replace (WP 0187 00 and WP 0188 00).</p>



**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)**

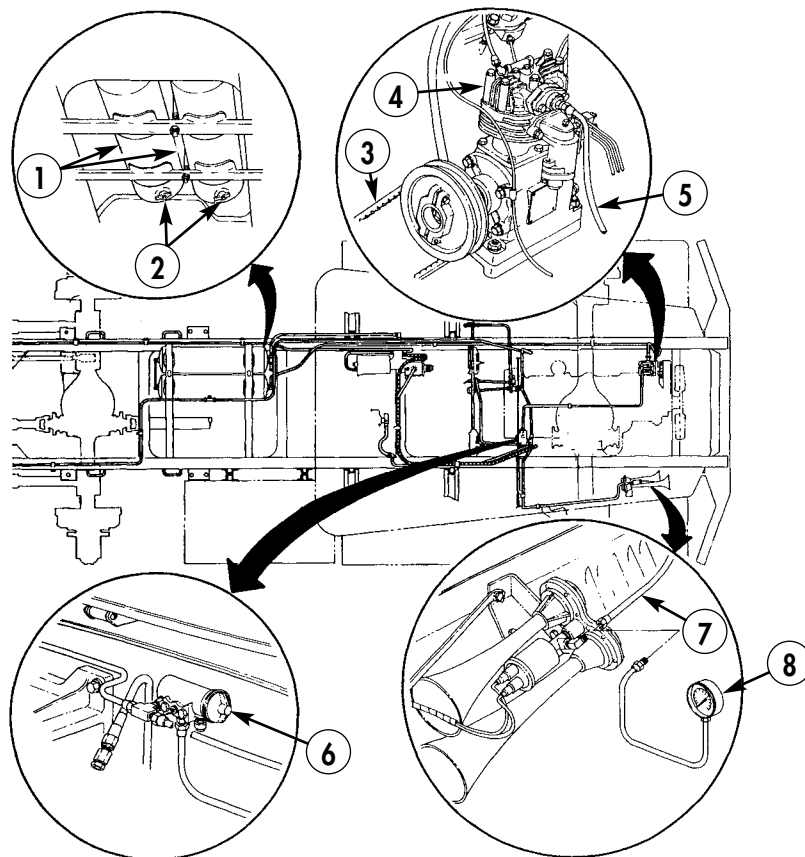
*Table 3. Compressed Air Troubleshooting Procedures (Contd).*

<b><u>WARNING</u></b>		
<ul style="list-style-type: none"> <li>• Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.</li> <li>• Wear eyeshields when working with compressed air system. Failure to wear eyeshields may result in injury to personnel.</li> </ul>		
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. NO AIR PRESSURE, OR COMPRESSED AIR READS BELOW 60 PSI (LOW AIR PRESSURE WARNING BUZZER SOUNDING, INDICATING AIR PRESSURE NOT BUILDING UP TO NORMAL OPERATING RANGE AS INDICATED BY GAUGE)</b></p>	<ol style="list-style-type: none"> <li>1. Check for missing or loose air compressor drivebelt (3).</li> <li>2. Check for leaking compressed air lines and fittings.</li> <li>3. Start engine (TM 9-2320-361-10) and feel compressor outlet line (5).</li> </ol> <p>Test 1. Check air reservoirs (1) for air pressure.</p> <ol style="list-style-type: none"> <li>1. Start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating pressure.</li> <li>2. Loosen air reservoirs drain valves (2).</li> <li>3. Check compressor outlet line (5) for restrictions.</li> </ol> <p>Test 2. Check for air pressure at air horn supply line (7).</p> <ol style="list-style-type: none"> <li>1. Stop engine and open all drain valves (2) (TM 9-2320-361-10) until brake system air pressure is completely drained.</li> <li>2. Disconnect air horn supply line (7).</li> <li>3. Connect air horn supply line (7) to test gauge (8).</li> <li>4. Direct assistant to start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating pressure.</li> </ol>	<p>If air compressor drivebelt (3) is missing or loose, replace or adjust drivebelt (3) (WP 0182 00).</p> <p>If leaking, repair or replace compressed air lines or fittings (TM 9-243).</p> <ol style="list-style-type: none"> <li>1. If compressor outlet line (5) is hot, proceed to test 1.</li> <li>2. If compressor outlet line (5) is cool or warm, proceed to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If low amount of air pressure is released, perform step 3.</li> <li>2. If high amount of air pressure is released, proceed to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If compressor outlet line (5) is restricted, repair or replace (TM 9-243).</li> <li>2. If compressor outlet line (5) is not restricted, proceed to test 2.</li> </ol>

COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

Table 3. Compressed Air Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>1. NO AIR PRESSURE OR COMPRESSED AIR READS BELOW 60 PSI (LOW AIR PRESSURE WARNING BUZZER SOUNDING, INDICATING AIR PRESSURE NOT BUILDING UP TO NORMAL OPERATING RANGE AS INDICATED BY GAUGE) (Contd)</p>	<p><b>NOTE</b> Air pressure gauge on instrument panel has a maximum pressure reading of 120 psi. If old governor has been replaced with new governor, air pressure may exceed maximum pressure reading on instrument panel gauge.</p> <p>5. Compare test gauge (8) reading with gauge on instrument panel.</p>	<ol style="list-style-type: none"> <li>1. If low or no air pressure is indicated on test gauge (8), check air horn supply line (7) for restrictions or leaks. Repair or replace damaged compressed air lines (TM 9-243).</li> <li>2. If air compressor (4) is continuously unloading, not allowing air compressor (4) to build air pressure, adjust air governor (6) (WP 0183 00).</li> <li>3. If air governor adjustment (6) will not increase pressure and/or compressor outlet line (5) is warm or cool, replace air compressor (4) (WP 0181 00).</li> </ol>

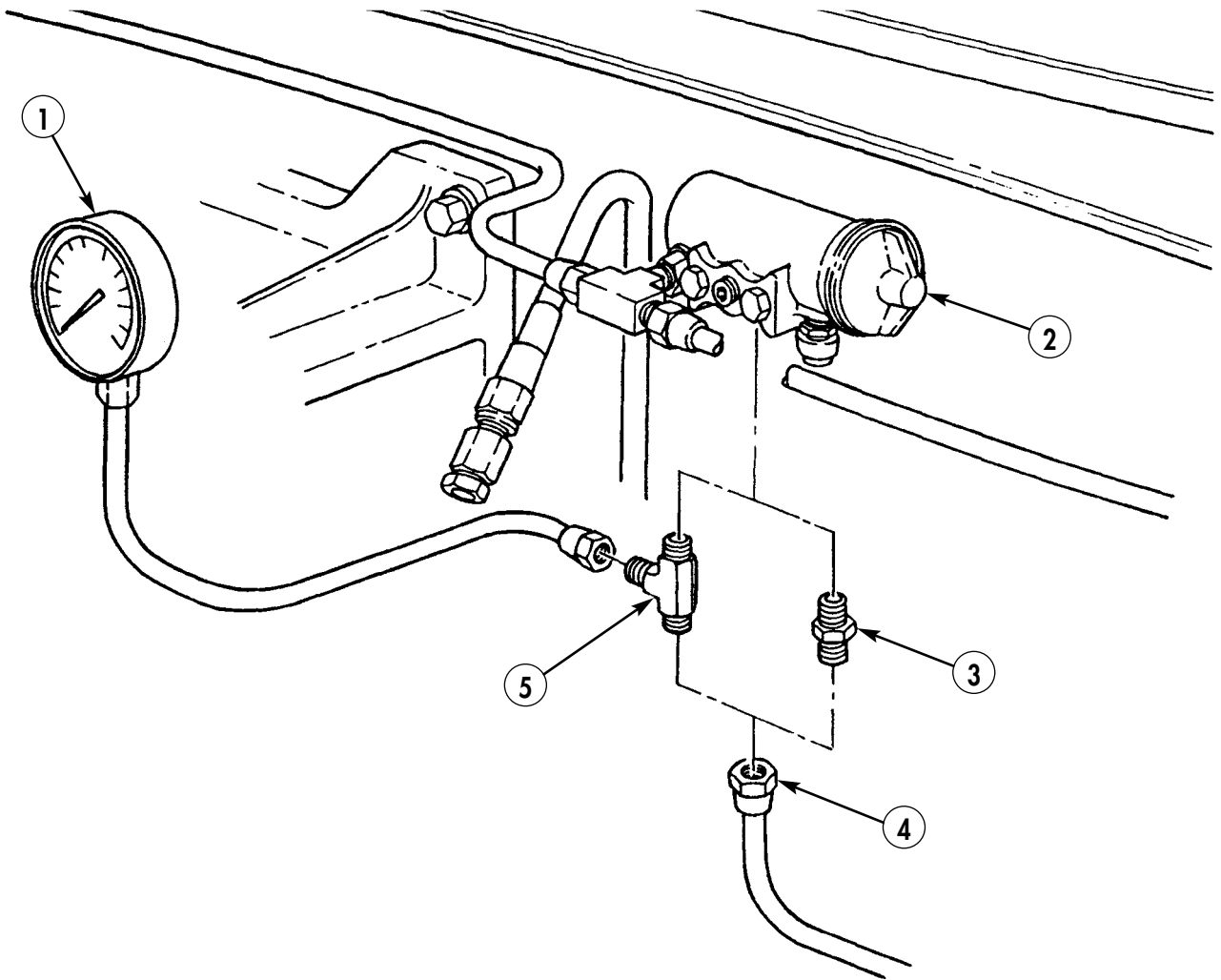


**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Compressed Air Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. AIR PRESSURE DOES NOT BUILD UP TO NORMAL OPERATING PRESSURE (ABOVE 85 PSI) ACCORDING TO GAUGE</b></p>	<ol style="list-style-type: none"> <li>1. Check for compressed air leaks.</li> <li>2. Adjust air governor (WP 0183 00).</li> <li>3. Perform WP 0010, table 3, malfunction 1, test 2.</li> </ol>	<p>If leak is found, repair or replace compressed air lines or fittings (TM 9-243).</p>
<p><b>3. AIR PRESSURE EXCEEDS MAXIMUM (GAUGE READS OVER 120 PSI) AND SAFETY VALVE OPENS TO RELEASE AIR PRESSURE</b></p>	<ol style="list-style-type: none"> <li>1. Check for air loss through accessories. (Refer to WP 0010 00, table 4, malfunctions 1, 2, and 3).</li> <li>2. Check governor signal line (4) for bends, or leaks.</li> </ol> <p>Test 1. Check governor signal line (4) pressure.</p> <ol style="list-style-type: none"> <li>1. Stop engine and open all drain valves (TM 9-2320-361-10) until all air pressure is released from brake system.</li> <li>2. Disconnect governor signal line (4) from adapter (3).</li> <li>3. Remove adapter (3) from air governor (2).</li> <li>4. Install tee (5) on air governor (2).</li> <li>5. Connect test gauge (1) and governor signal line (4) to tee (5).</li> <li>6. Direct assistant to start engine (TM 9-2320-361-10) and allow air supply to build up to normal operating pressure.</li> <li>7. Compare air pressure reading indicated on test gauge (1) to air pressure indicated on instrument panel gauge.</li> </ol>	<ol style="list-style-type: none"> <li>1. If governor signal line (4) is crimped, bent, or leaking, repair or replace governor signal line (4) (TM 9-243).</li> <li>2. If no restrictions are apparent, proceed to test 1.</li> </ol> <ol style="list-style-type: none"> <li>1. If test gauge (1) reading is below 85 psi (586 kPa), adjust governor (WP 0183 00).</li> <li>2. If governor adjustment does not increase governor signal line (4) pressure above 85 psi (586 kPa) on test gauge (1), replace air governor (WP 0183 00).</li> </ol>

COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)



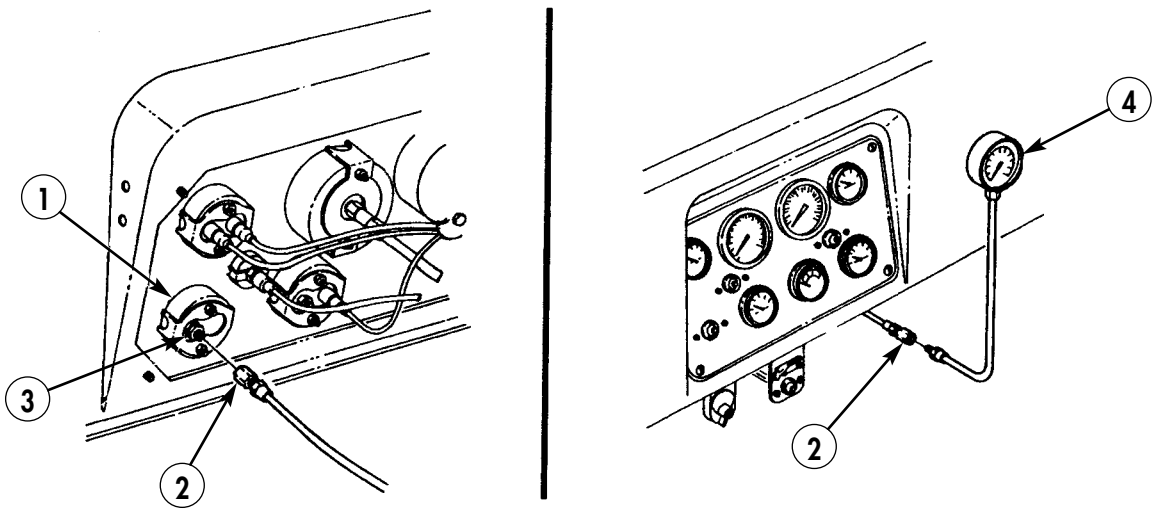
## COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

Table 3. Compressed Air Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>4. LOW OR NO READING ON AIR PRESSURE GAUGE, AND WARNING BUZZER SHUTS OFF</b>	<p>Test 1. Check air supply pressure to air pressure gauge (1).</p> <ol style="list-style-type: none"> <li>1. Stop engine and open all drain valves (TM 9-2320-361-10) until brake system is completely drained of air.</li> <li>2. Disconnect air supply line (2) from air pressure gauge adapter (3).</li> <li>3. Connect air supply line (2) to test gauge (4).</li> <li>4. Start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating pressure.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Air pressure gauge on instrument panel has a maximum pressure reading of 120 psi. If old governor has been replaced with new governor, air pressure may exceed maximum pressure reading on instrument panel gauge.</p> <ol style="list-style-type: none"> <li>5. Check test gauge (4) reading.</li> </ol>	<ol style="list-style-type: none"> <li>1. If reading is low or zero, check air supply line (2) for bends, kinks, or leaks. Repair or replace air supply line if bent, kinked, or leaking (TM 9-243).</li> <li>2. If reading is above 85 psi (586 kPa) on test gauge (4), replace air pressure gauge (1) (WP 0094 00).</li> </ol>
<b>5. WARNING BUZZER FAILS TO SOUND ON LOW AIR PRESSURE (BELOW 60 PSI)</b>	<ol style="list-style-type: none"> <li>1. Refer to WP 0014 00, table 1, malfunction 8.</li> </ol>	



COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

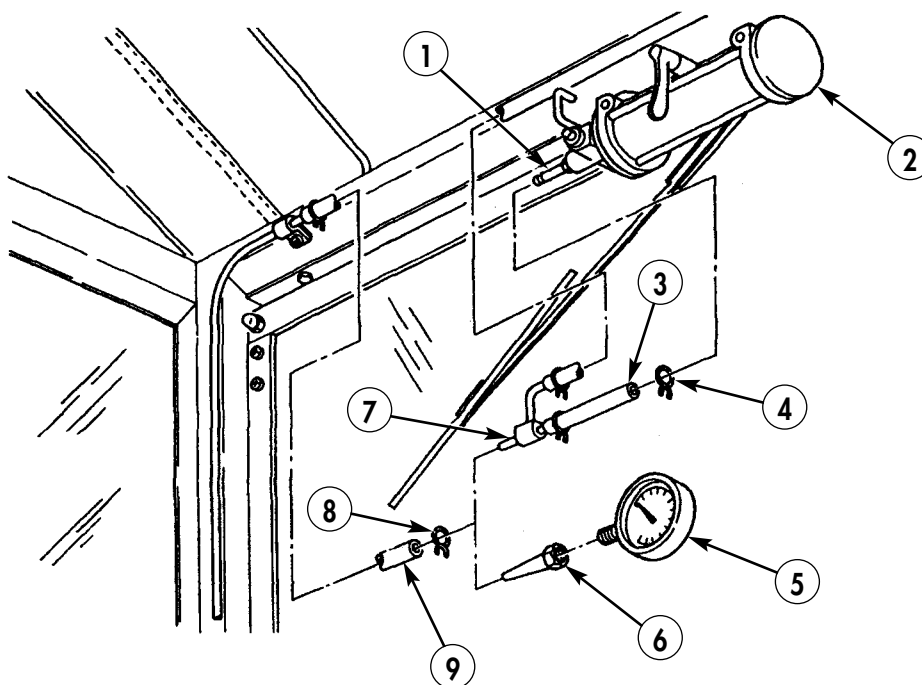




COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)

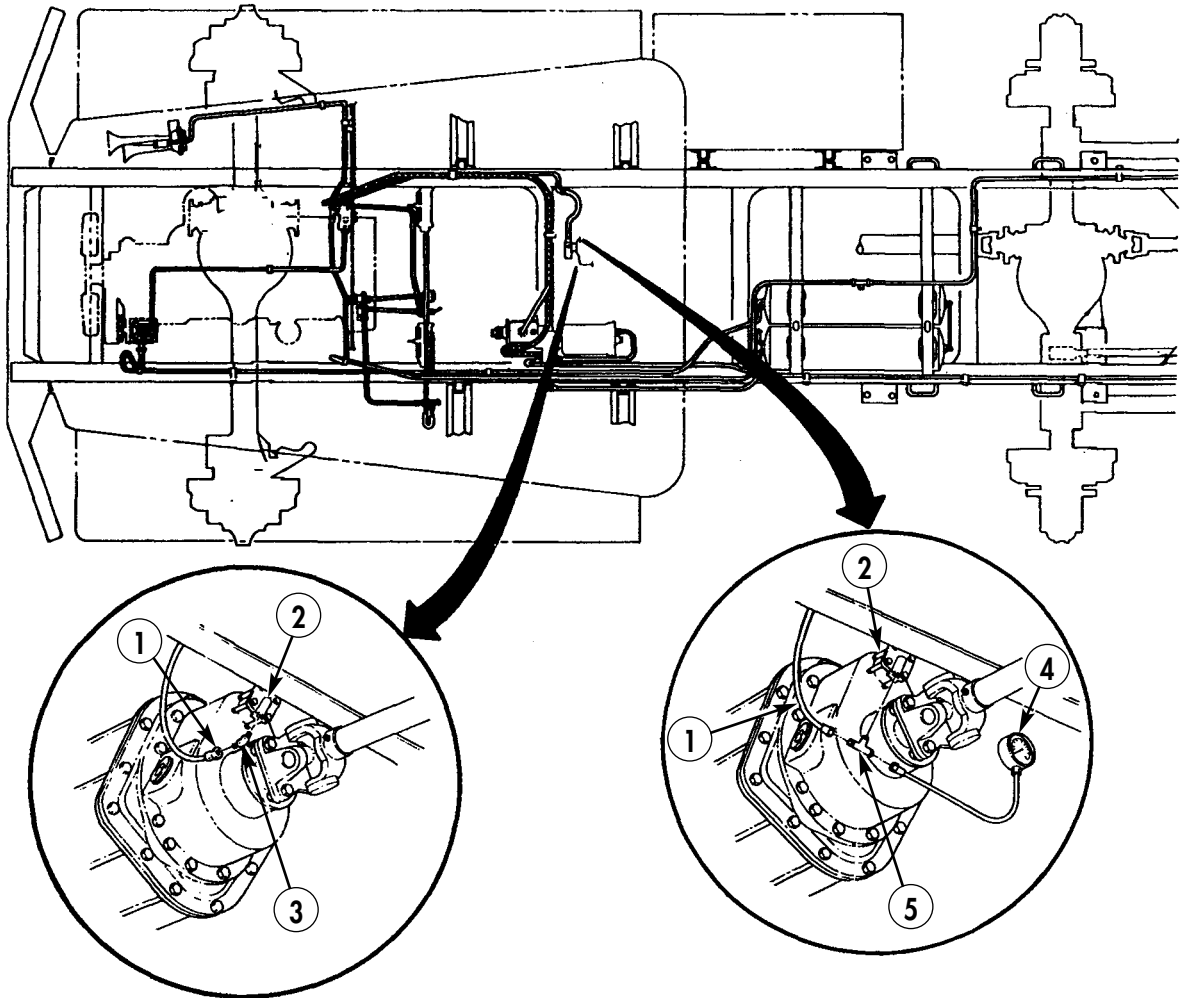
Table 4. Air-Operated Accessories Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. WINDSHIELD WIPERS INOPERATIVE OR OPERATE SLOWLY (GAUGE AT NORMAL OPERATING PRESSURE)(Contd)</b></p>	<p>Test 2. Check windshield wiper motor (2) for clogs.</p> <ol style="list-style-type: none"> <li>1. Remove clamp (4) and hose (3) from windshield wiper motor (2).</li> <li>2. Using wire, clean orifice (1) on windshield wiper motor (2).</li> <li>3. Install hose (3) and clamp (4) on windshield wiper motor (2).</li> <li>4. Start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating pressure.</li> <li>5. Operate windshield wipers (TM 9-2320-361-10).</li> </ol>	<p>If windshield wipers are still inoperative, replace pneumatic windshield wiper assembly with electrical windshield wiper assembly (WP 0240 00).</p>





COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)



**COMPRESSED AIR AND BRAKE SYSTEM TROUBLESHOOTING (Contd)***Table 4. Air-Operated Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. AIR HORN DOES NOT WORK</b>	1. Refer to WP 0014 00, table 1, malfunction 10. 2. If malfunction still exists, refer to WP 0010, table 3, malfunction 1.	If air pressure reading of WP 0010 00, malfunction 1, test 2 is not within $\pm 2$ psi of air pressure gauge on instrument panel, replace air horn (WP 0114 00).

## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ELECTRICAL SYSTEM TROUBLESHOOTING INDEX

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>BATTERY SYSTEM</b>		
	All vehicle electrical systems inoperative .....	0012 00 2
<b>STARTING SYSTEM</b>		
1.	Starter will not crank .....	0012 00 6
2.	Starter motor operates, but engine cranks slowly .....	0012 00 14
<b>CHARGING SYSTEM (60 AMP)</b>		
1.	No alternator output .....	0012 00 19
2.	Batteries not charging properly .....	0012 00 24
3.	Batteries hot or boiling, corrected specific gravity of all cells is 1.280 .....	0012 00 24
4.	Batteries use excessive water .....	0012 00 24
5.	Batteries run down in operation .....	0012 00 24
<b>CHARGING SYSTEM (100 AMP)</b>		
1.	No alternator output .....	0012 00 25
2.	Batteries not charging properly .....	0012 00 27
3.	Batteries hot or boiling, corrected specific gravity of all cells is 1.280 .....	0012 00 27
4.	Batteries use excessive water .....	0012 00 27
5.	Batteries run down in operation .....	0012 00 28
<b>LIGHTING AND WIPER SYSTEM</b>		
1.	Headlight does not operate on low or high or both headlights inoperative .....	0013 00 1
2.	Park lamp does not light .....	0013 00 5
3.	Taillight or clearance lamp does not light .....	0013 00 6
4.	Stoplight lamp does not light .....	0013 00 6
<b>BLACKOUT LIGHTS (B. O.)</b>		
1.	B. O. headlamp does not light .....	0013 00 8
2.	B. O. light marker lamp does not light .....	0013 00 9
3.	B. O. taillight lamp does not light .....	0013 00 10
4.	B. O. stoplight lamp does not light .....	0013 00 11
<b>DIRECTIONAL SIGNAL SYSTEM</b>		
1.	Direction signal inoperative .....	0013 00 12
2.	All stoplights are inoperative .....	0013 00 18
3.	Both direction signals inoperative .....	0013 00 20
4.	Turn signals operate incorrectly with turn signal control lever in one or more positions .....	0013 00 21

**ELECTRICAL SYSTEM TROUBLESHOOTING INDEX (Contd)**

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WORK PACKAGE/PAGE
<b>TRAILER CONNECTION SYSTEM</b>		
	One or more trailer lights inoperative .....	0013 00 22
<b>ELECTRICAL WIPER SYSTEM</b>		
	Windshield wipers fail to work on high or low setting .....	0013 00 23
<b>INDICATORS, GAUGES, AND WARNING SYSTEM</b>		
1.	All gauges inoperative .....	0014 00 2
2.	Engine temperature gauge inoperative .....	0014 00 4
3.	Fuel gauge inoperative .....	0014 00 6
4.	Oil pressure gauge inoperative .....	0014 00 8
5.	Voltmeter inoperative .....	0014 00 10
6.	In-tank fuel pump inoperative .....	0014 00 11
7.	Front wheel drive indicator light inoperative .....	0014 00 14
8.	Low air pressure warning system does not come on below 60 psi and does not go off above 66 psi .....	0014 00 15
9.	Low air pressure warning system inoperative .....	0014 00 16
10.	Horn does not operate .....	0014 00 18
<b>HEATING SYSTEMS</b>		
1.	Engine manifold heater does not work .....	0015 00 1
2.	Hot water personnel heater does not operate or does not operate in low position .....	0015 00 7
3.	Personnel fuel burning heater inoperative .....	0015 00 10
4.	Heater control box light inoperative, but heater operative .....	0015 00 14



## FIELD TROUBLESHOOTING

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

#### BATTERY AND CHARGING SYSTEM TROUBLESHOOTING

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##### **WARNING**

- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin.
- Do not smoke, use open flame, or make sparks when performing battery maintenance. Batteries may explode, causing severe injury to personnel.
- Remove all jewelry, such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result, causing damage to equipment or severe injury to personnel.
- When removing cables, disconnect the ground cable first. Do not allow tools to come into contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

##### **CAUTION**

- During installation of battery terminals, ensure positive clamps are installed on positive (+) posts and negative clamps are installed on negative (-) posts. Failure to connect clamps to correct posts will reverse polarity of circuitry and may cause damage to rectifier diodes in alternator, vehicle wiring, and radios (if equipped).
- Do not use a hammer during installation of battery terminal. Doing so may cause damage to equipment.

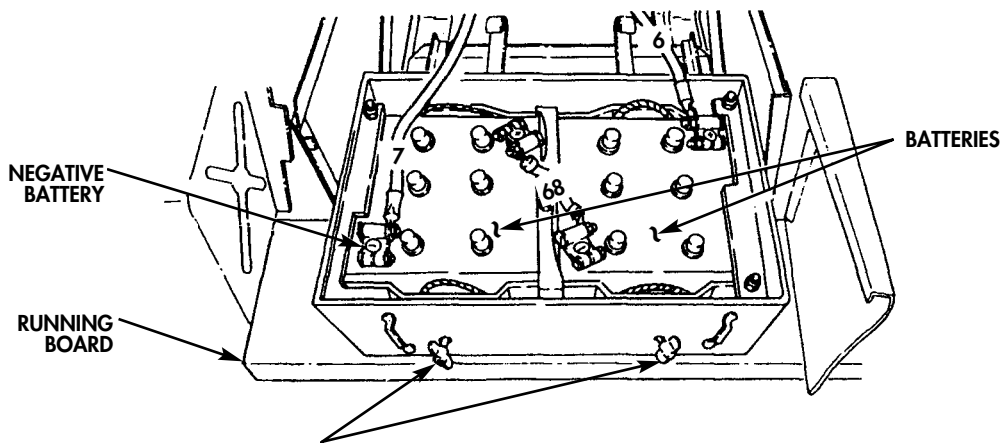
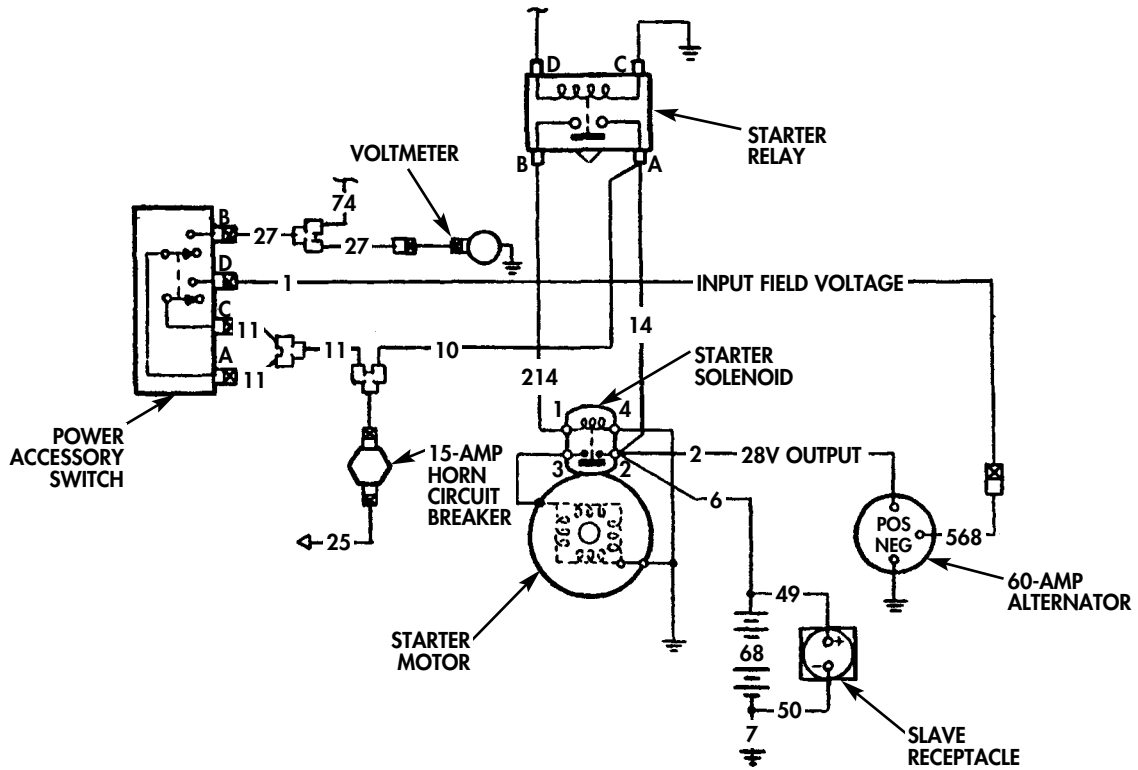
##### **NOTE**

- Refer to general troubleshooting instructions in the Introduction to Troubleshooting Work Package (WP 0004 00) prior to performing any battery and charging system troubleshooting.
- The electrical systems troubleshooting procedures use multimeters in resistance or continuity tests and voltage or low ampere current tests. Multimeters may be found in the Common no. 1 and no. 2 Unit Maintenance Automotive Shop Sets.
- The electrical wiring schematic for the M44A2 series truck can be found in WP 0473 00.

**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)***Table 1. Battery System Troubleshooting Procedure.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>ALL VEHICLE ELECTRICAL SYSTEMS INOPERATIVE</b>	<ol style="list-style-type: none"> <li>1. Open door of battery compartment. Loosen two thumbscrews and slide batteries onto running board. Visually check connections of battery cables (WP 0127 00).</li> <li>2. Visually check batteries for cracks and leaks. Check terminal posts for corrosion and breaks (TM 9-6140-200-14).</li> </ol> <p>Test 1. Check specific gravity of each cell before adding distilled water.</p> <ol style="list-style-type: none"> <li>1. Using optical battery tester, which requires no temperature compensation, check specific gravity of electrolyte in each cell.</li> <li>2. Check specific gravity of cells after battery has been charged (TM 9-6140-200-14).</li> </ol>	<p>Ensure battery cables are correctly connected to battery (WP 0126 00).</p> <ol style="list-style-type: none"> <li>1. If any battery is cracked, leaking, or has broken terminal posts, replace battery (WP 0127 00).</li> <li>2. If terminal posts or cables are corroded, use soda-and-water solution to neutralize battery acid.</li> <li>3. Remove battery ground cable no. 7 from negative post first. Remove cable clamps from battery posts. Clean posts and mating surfaces to bright metal (WP 0126 00).</li> <li>4. If battery terminals are clean and malfunction still exists, go to test 1.</li> </ol> <p>If specific gravity of any cell is below 1.225, battery must be replaced or recharged. Add distilled water as necessary after checking battery. Charge battery as necessary. (TM 9-6140-200-14).</p> <ol style="list-style-type: none"> <li>1. If specific gravity of any cell does not increase to 1.280 (full charge) in 8 hours of charging, replace battery (WP 0127 00).</li> <li>2. All cells in a battery must test within 0.025 point of one another. If specific gravity of any cell is lower than 1.225 (corrected to 80 °F [27 °C] if necessary) after 8 hours of charging, replace battery (WP 0127 00).</li> </ol>

BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)

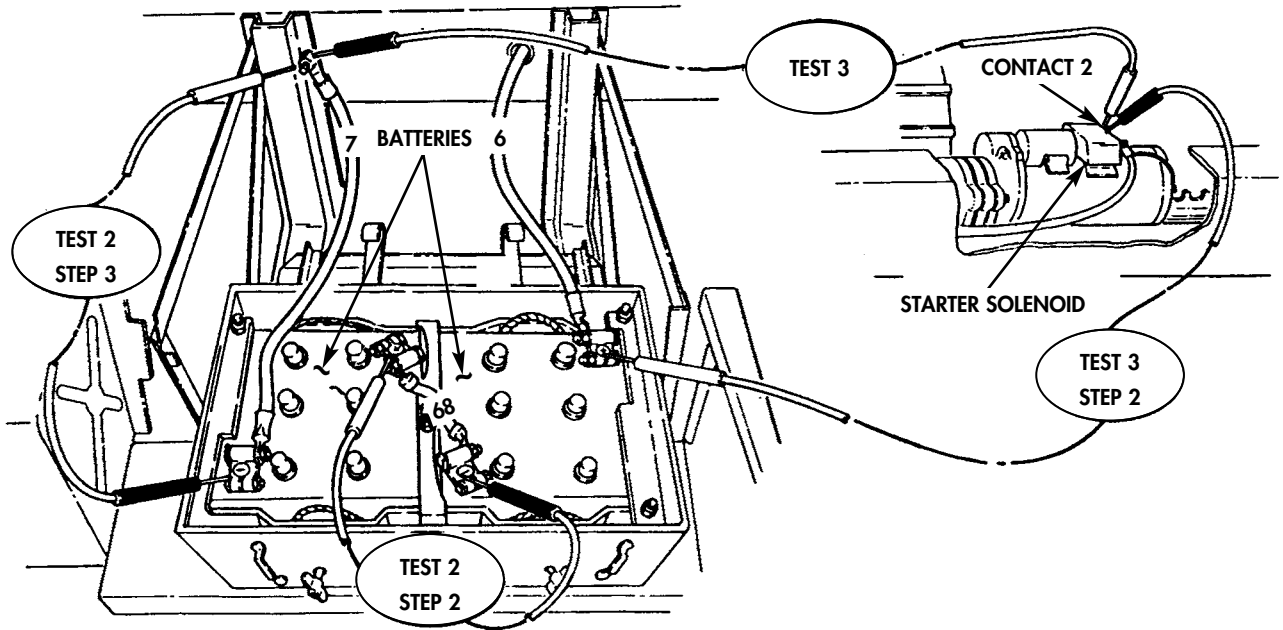


**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Battery System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>ALL VEHICLE ELECTRICAL SYSTEMS INOPERATIVE (Contd)</b></p>	<p>Test 2. Disconnect battery ground cable (WP 0126 00) and test battery cables as follows:</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1 scale.</li> <li>2. Check for continuity of battery cables no. 6 and 68 and for worn or frayed insulation.</li> <li>3. Check continuity of battery cable no. 7 to frame ground.</li> <li>4. Connect battery ground cable (WP 0126 00) and proceed to test 3.</li> </ol> <p>Test 3. Check for battery voltage at starter solenoid.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>2. Check lead no. 6 at contact 2 of starter solenoid for battery voltage.</li> </ol>	<ol style="list-style-type: none"> <li>1. If resistance is greater than 1 ohm, repair or replace battery cables (WP 0126 00 and WP 0090 00).</li> <li>2. If insulation is worn or frayed, repair or replace battery cables (WP 0126 00 and WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If resistance measure greater than 1 ohm, clean cable no. 7 connection at right-hand frame rail.</li> <li>2. If continuity is still greater than 1 ohm, repair or replace battery cable (WP 0126 00 and WP 0090 00).</li> </ol> <p>If battery voltage is not present, clean connections of lead no. 6 at contact no. 2 of starter solenoid (WP 0088 00).</p>

BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)



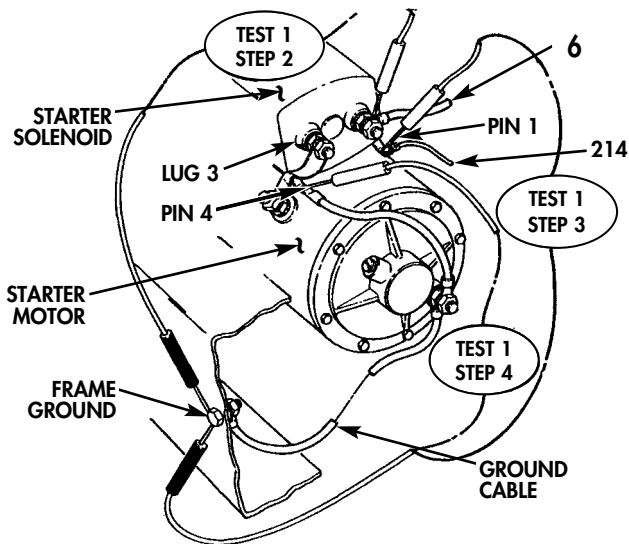
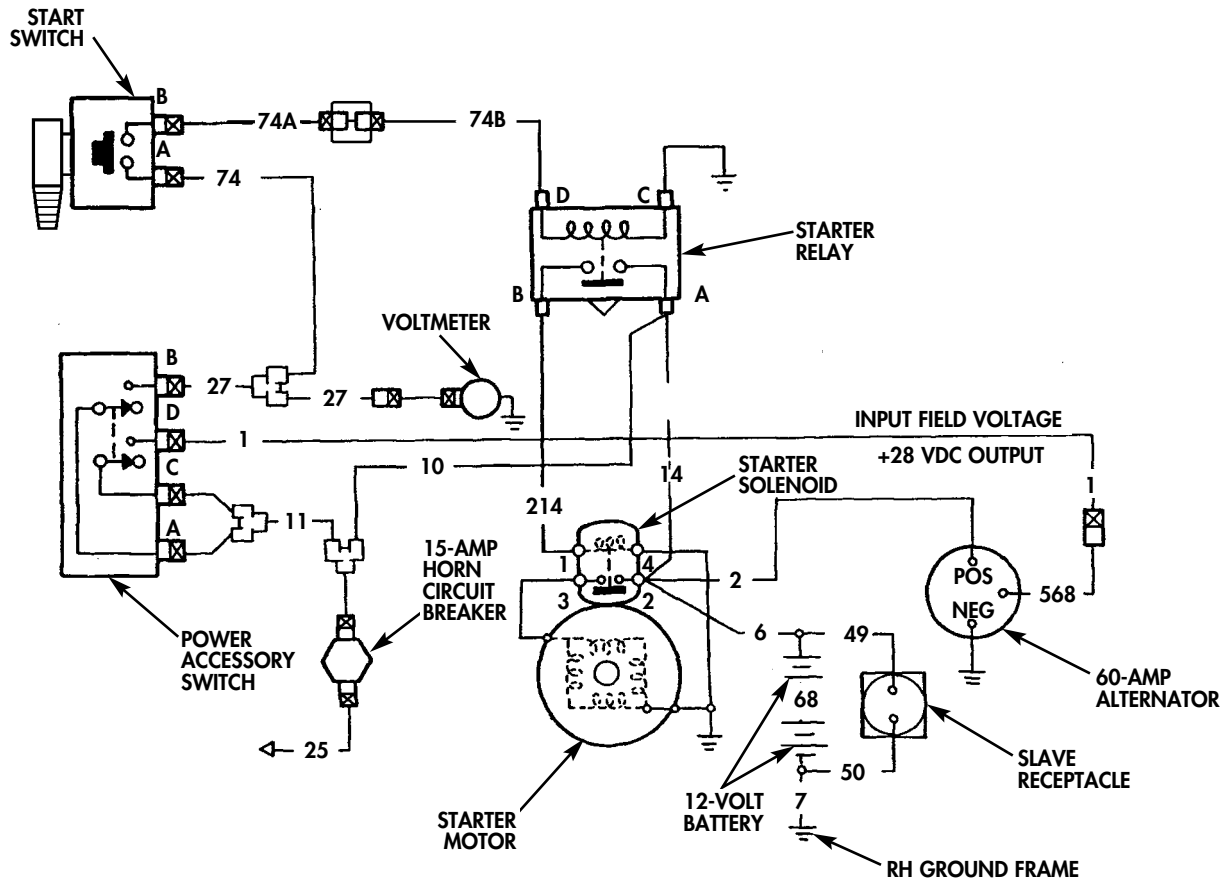
## BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)

Table 2. Starting System Troubleshooting Procedure.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. STARTER WILL NOT CRANK</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Ensure transmission is in neutral.</li> <li>• Check batteries and cables. (See WP 0012 00, table 1, malfunction 1, step 1.)</li> </ul> <p>Test 1. Test for battery voltage at pin 1 of starter solenoid with power accessory switch turned to ON position.</p> <ol style="list-style-type: none"> <li>1. Turn start switch and listen for starter solenoid with power accessory switch turned to ON position.</li> <li>2. Check lead 6 at starter solenoid for battery voltage.</li> <li>3. Check lead 214 for battery voltage at pin 1 of starter solenoid.</li> <li>4. Set multimeter to RX 1 scale. Check continuity between pin 4 of starter solenoid and frame ground.</li> <li>5. Check battery cables for voltage drop (WP 0012 00, table 2, malfunction 2, tests 4 through 7).</li> </ol>	<ol style="list-style-type: none"> <li>1. If a thump sound is heard, go to step 2.</li> <li>2. If thump sound is not heard, go to step 3.</li> <li>3. Check for seized engine. Refer to WP 0006 00, table 1, malfunction 1, step 3.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present but less than 19 VDC, check for corrosion and/or loose connections.</li> <li>2. If no voltage is present and engine still fails to start, go to step 3.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is not present, go to test 2.</li> <li>2. If voltage is present and solenoid does not engage starter motor, proceed to step 4.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is greater than 1 ohm, remove starter solenoid and starter motor ground cables (WP 0088 00). Repair or replace cables (WP 0126 00 and WP 0090 00) that have resistance greater than 1 ohm. Clean cable ends. Clean connections on starter motor and frame ground. Reconnect ground cables and ensure all connections are tight. Repeat test 1, step 1.</li> <li>2. If continuity is greater than 1 ohm, starter solenoid is defective. Replace starter motor (WP 0088 00).</li> </ol> <p>If voltage is not present, clean and tighten cable connections (WP 0126 00).</p>

BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)

STARTING SYSTEM

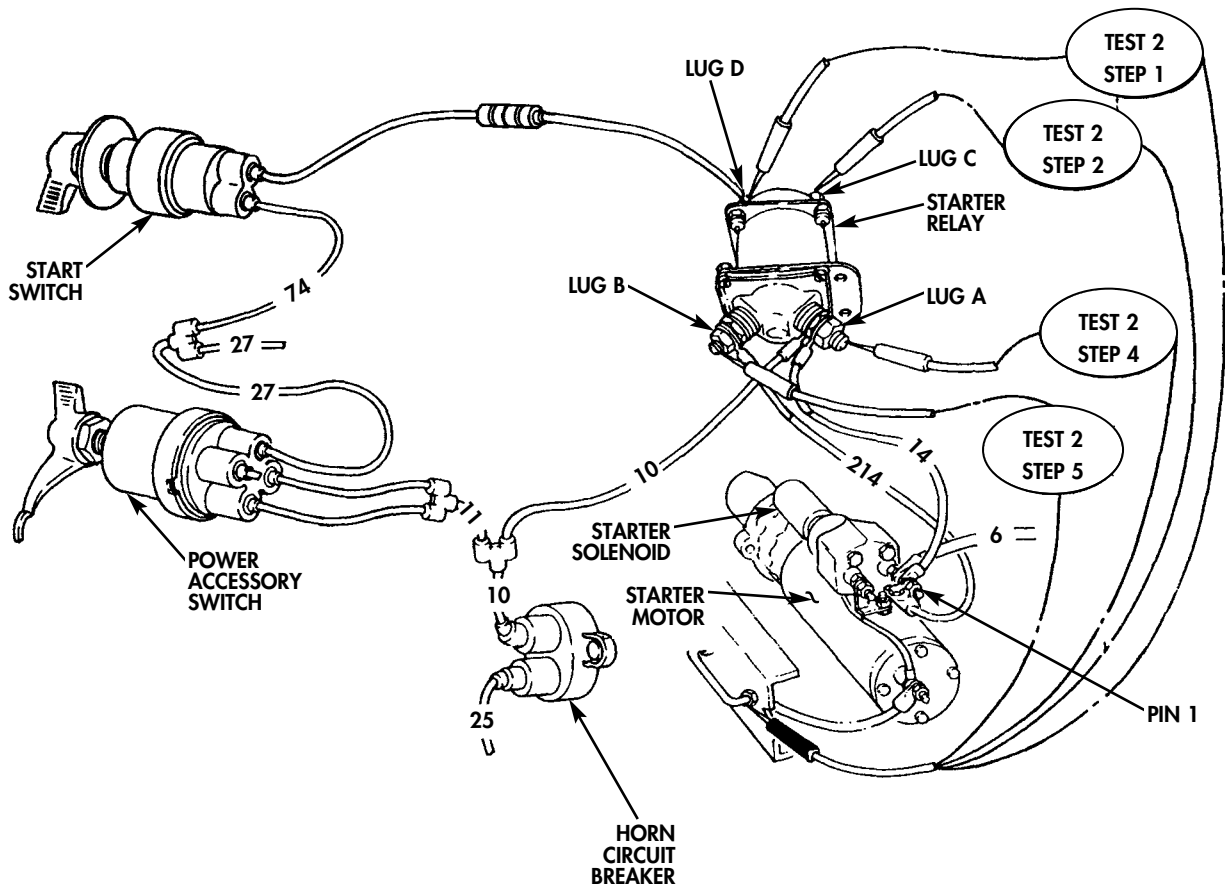


**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)***Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. STARTER WILL NOT CRANK (Contd)</b>	<p>Test 2. Test for battery voltage at lug D of magnetic starter relay.</p> <ol style="list-style-type: none"> <li>1. With power accessory switch ON, turn start switch and at same time, check for battery voltage at lug D on starter relay.</li> <li>2. Set multimeter to RX 1 scale. Check for continuity between lug C on starter relay and ground.</li> <li>3. Check for battery voltage at lug B of starter relay with start switch turned.</li> <li>4. Check for battery voltage at lug A on starter relay. Voltage should always be present.</li> <li>5. Check continuity of lead 214 between lug B on starter relay and pin 1 on starter solenoid.</li> </ol>	<ol style="list-style-type: none"> <li>1. If 19 VDC are not present, go to test 4.</li> <li>2. If voltage is present, go to test step 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is 1 ohm or less, go to test step 3.</li> <li>2. If continuity is greater than 1 ohm, disconnect ground lead at lug C. Repair or replace ground lead (WP 0090 00). Go to WP 0012 00, table 1, malfunction 1, test 1, step 1 and retest.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test step 5.</li> <li>2. If voltage is not present, go to test step 4.</li> </ol> <p>If voltage is not present, repair or replace lead 14 (WP 0090 00). Go to WP 0012 00, table 1, malfunction 1, test 1, step 1 and retest.</p> <p>If continuity is not present, repair or replace lead 214 (WP 0090 00). Clean connections before reinstalling lead. Ensure all connections are tight. Go to WP 0012 00, table 1, malfunction 1, test 1, step 1 and retest.</p>



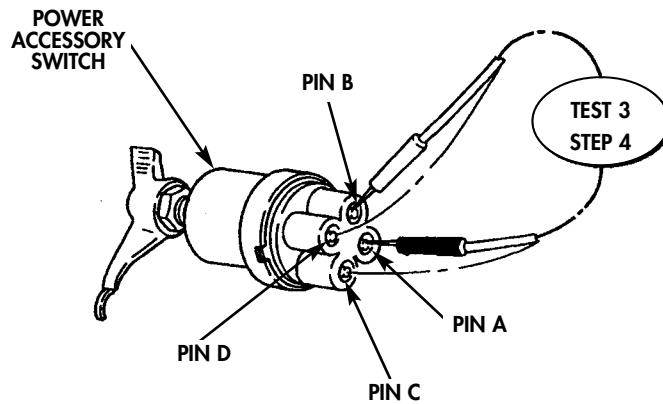
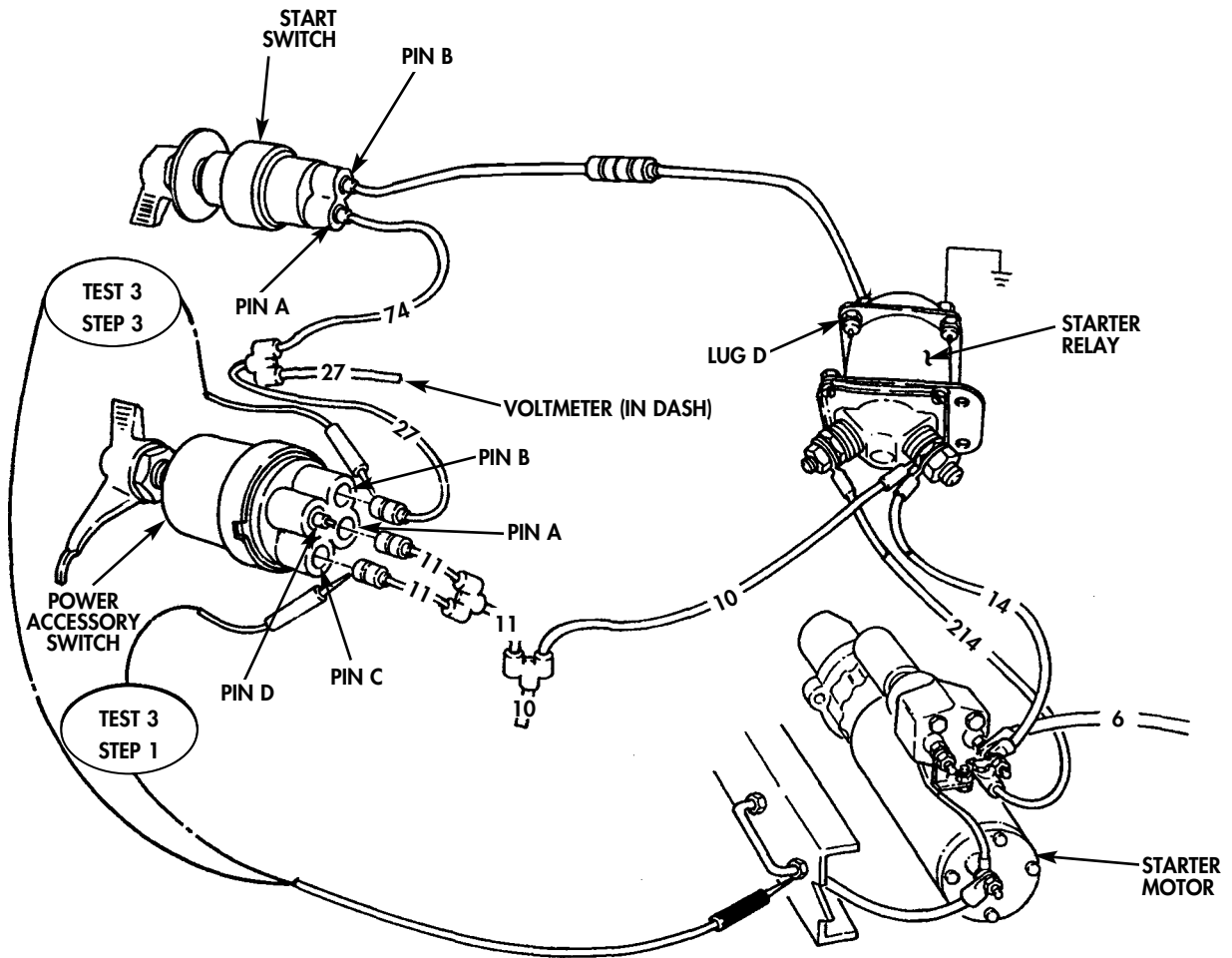
BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)***Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. STARTER WILL NOT CRANK (Contd)</b>	<p>Test 3. Test for battery voltage into power accessory switch pins A and C.</p> <ol style="list-style-type: none"> <li>1. Remove two leads 11 from power accessory switch pins A and C. Using multimeter, check for battery voltage on contact ends of leads 11.</li> <li>2. Observe voltmeter in dash for proper operation.</li> <li>3. Remove leads 27 from pin B of power accessory switch. With power accessory switch turned on, check for battery voltage at pin B.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is not present, go to test 5.</li> <li>2. If voltage is present, install both leads 11 into pins A and C and go to test step 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltmeter works, go to test step 5.</li> <li>2. If voltmeter does not work, go to test step 3.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test step 5.</li> <li>2. If voltage is not present, go to step 4.</li> </ol>

BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

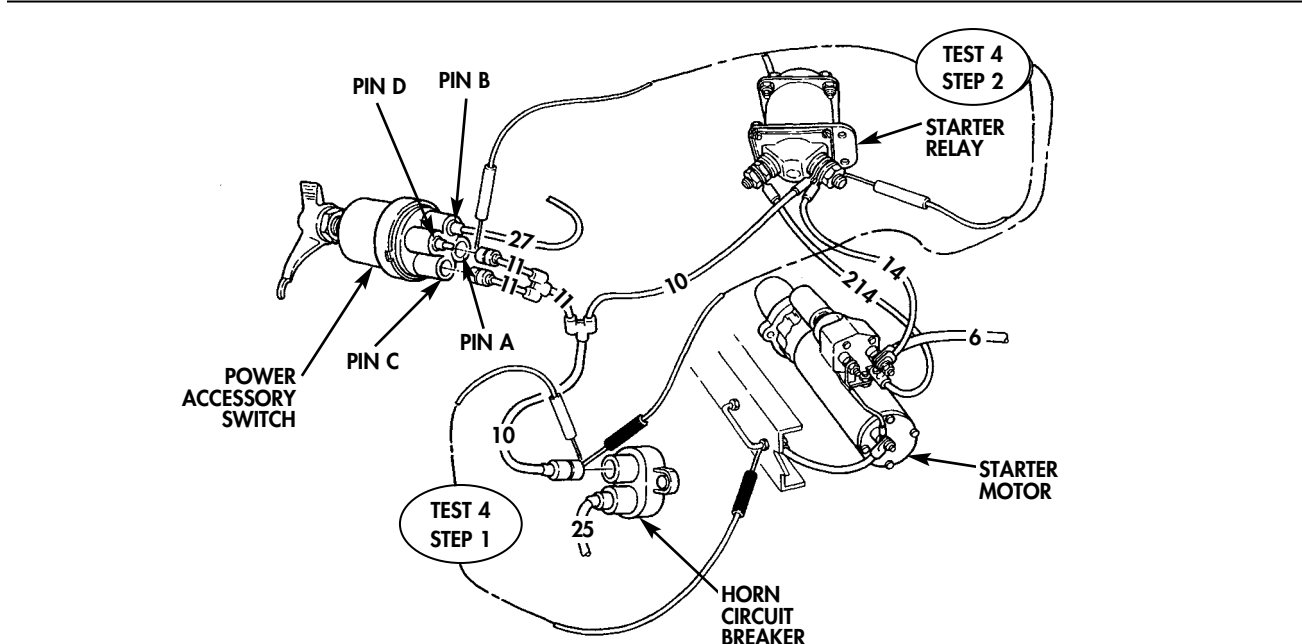
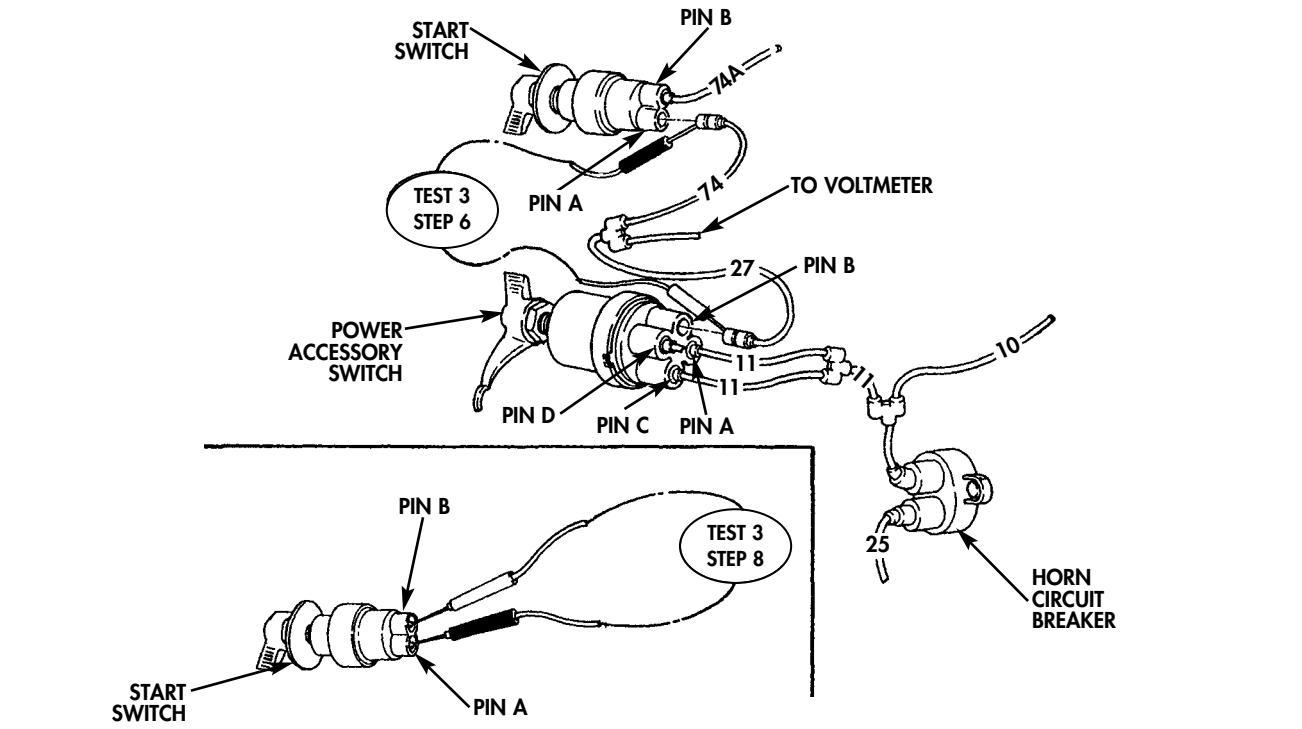
*Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. STARTER WILL NOT CRANK (Contd)</b></p>	<p>4. Remove leads 11 from pins A and C and lead 1 from pin D. With power accessory switch in ON position, check continuity between pins A and B and between pins C and D.</p> <p>5. Remove lead 74A from pin B of start switch. With power accessory switch in ON position, turn start switch and check for battery voltage at pin B.</p> <p>6. Remove lead 74 from pin A of start switch, turn power accessory switch to ON position, and check for battery voltage at pin B.</p> <p>7. Attempt to start engine (TM 9-2320-361-10).</p> <p>8. Remove lead 74 from pin A and lead 74A from pin B of start switch. Turn start switch and perform continuity check between pins A and B.</p> <p>Test 4. Check for battery voltage at horn circuit breaker.</p> <p>1. Remove lead 10 from horn circuit breaker and check battery voltage on contact end.</p> <p>2. Disconnect battery ground cable (WP 0126 00). Disconnect leads 11 from power accessory switch and check continuity of two leads 10 and lead 11.</p>	<p>1. If continuity is not found, replace power accessory switch (WP 0104 00). Check continuity of new power accessory switch before installation. Reinstall leads 11 in pins A and C. Reinstall lead 27 in pin B and lead 1 in pin D. Attempt to start engine (TM 9-2320-361-10).</p> <p>2. If starter does not crank engine, go to test step 5.</p> <p>1. If voltage is not present, go to step 6.</p> <p>2. If voltage is present, perform continuity check on lead 74A</p> <p>3. If continuity is present, repair or replace lead (WP 0090 00).</p> <p>1. If voltage is not present, disconnect lead 27 from power accessory switch and check continuity between lead 27 and its connection to lead 74.</p> <p>2. If continuity is not found, repair or replace lead. Reinstall lead 74 into pin A.</p> <p>If starter does not engage engine, go to test step 8.</p> <p>1. If continuity is not found, replace start switch (WP 0089 00).</p> <p>2. Check continuity of new switch before installation.</p> <p>3. Reinstall lead 74A in pin B and lead 74 in pin A.</p> <p>4. Turn start switch. Starter should turn engine.</p> <p>1. If battery voltage is not present, go to test step 2.</p> <p>2. If battery voltage is present, go to test step 3.</p> <p>1. If continuity is not present, repair or replace leads 10 and 11 (WP 0090 00).</p> <p>2. If continuity is present, reconnect leads 10 and 11, and battery ground cable (WP 0126 00). Go to test step 3.</p>

**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. STARTER WILL NOT CRANK (Contd)</b>	3. With power accessory switch in the ON position, turn start switch. Starter should engage flywheel and crank engine.	If starter does not engage flywheel and crank engine, return to test 4, step 2.

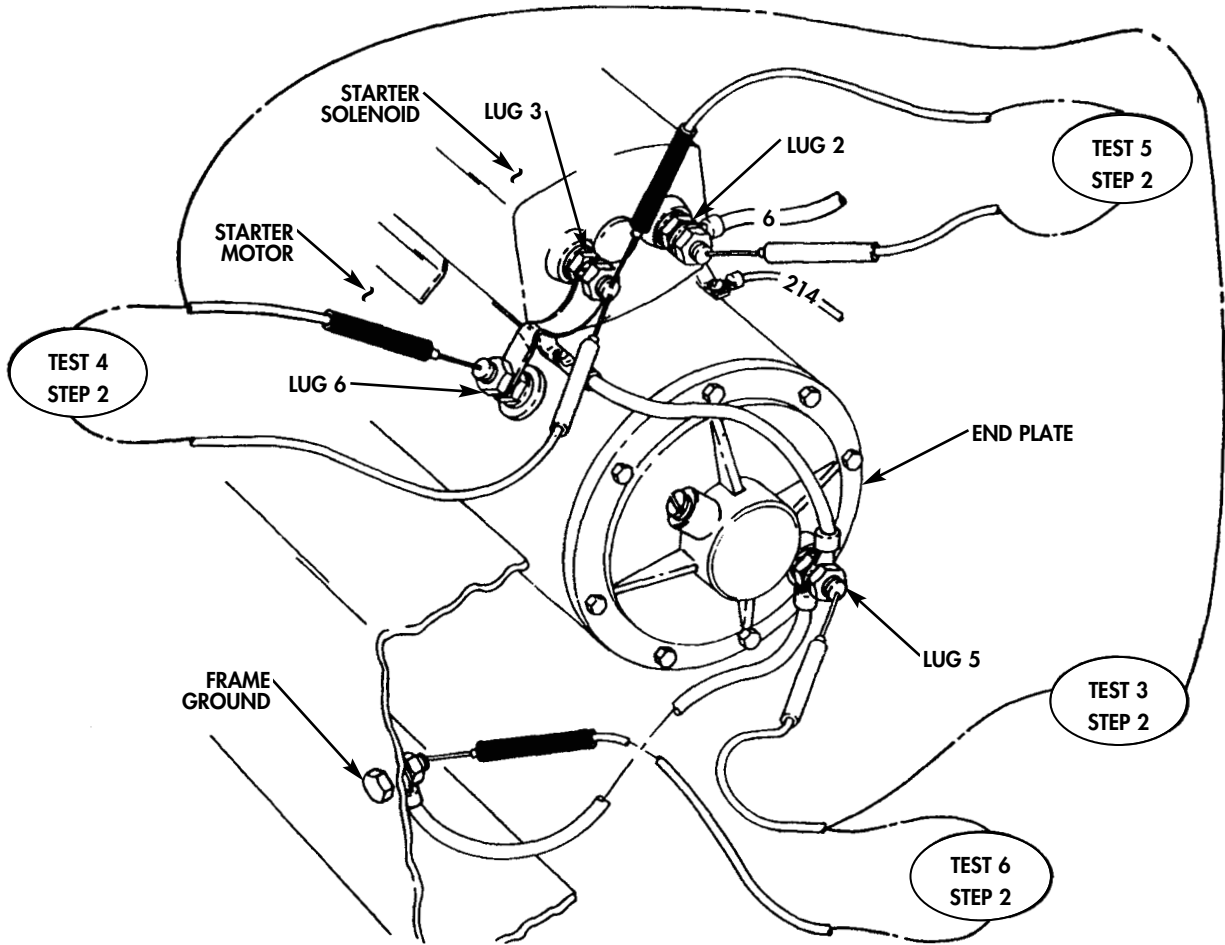


**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. STARTER MOTOR OPERATES, BUT ENGINE CRANKS SLOWLY</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If Simplified Test Equipment for Internal Combustible Engine—Reprogrammable (STE/ICE-R) is available, perform NG Starter Circuit Tests. (WP 0018 00).</li> <li>• Hot battery terminal indicates loose or corroded connection.</li> </ul> <p>Test 1. Check batteries for overheating by cranking engine for 15 seconds and feeling battery terminal connections.</p> <p>Test 2. Test specific gravity for each battery.</p> <p>Perform a specific gravity test (TM 9-6140-200-14). Batteries must test 1.225 or greater, temperature corrected, and all cells in battery must test within 0.025 points of one another.</p> <p>Test 3. Test starter motor voltage.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage range that will measure 24 VDC.</li> <li>2. Connect multimeter positive lead to positive terminal lug 6 of starter motor, and connect negative lead to terminal lug 5 on end plate of starter motor.</li> <li>3. Crank engine (TM 9-2320-361-10) and observe cranking voltage on multimeter. Voltage should exceed 19 VDC.</li> </ol> <p>Test 4. Test motor-to-solenoid strap voltage drop.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage range that will measure tenths of a volt.</li> <li>2. Connect multimeter negative lead to positive terminal lug 6 of starter motor, and connect multimeter positive lead to starter motor solenoid terminal lug 3.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean corroded connection to bright metal.</li> <li>2. Tighten all loose connections at batteries, ground, and starter (WP 0087 00, WP 0088 00 and WP 0126 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Charge all batteries not meeting requirements (TM 9-6140-200-14) and check specific gravity again.</li> <li>2. If more than 0.025 point variation still exists between cells in any battery, battery is defective and must be replaced (WP 0127 00).</li> </ol> <p>If voltage is less than 19 VDC, clean and tighten starter motor connections (WP 0088 00).</p>

BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Starting System Troubleshooting Procedure (Contd).*

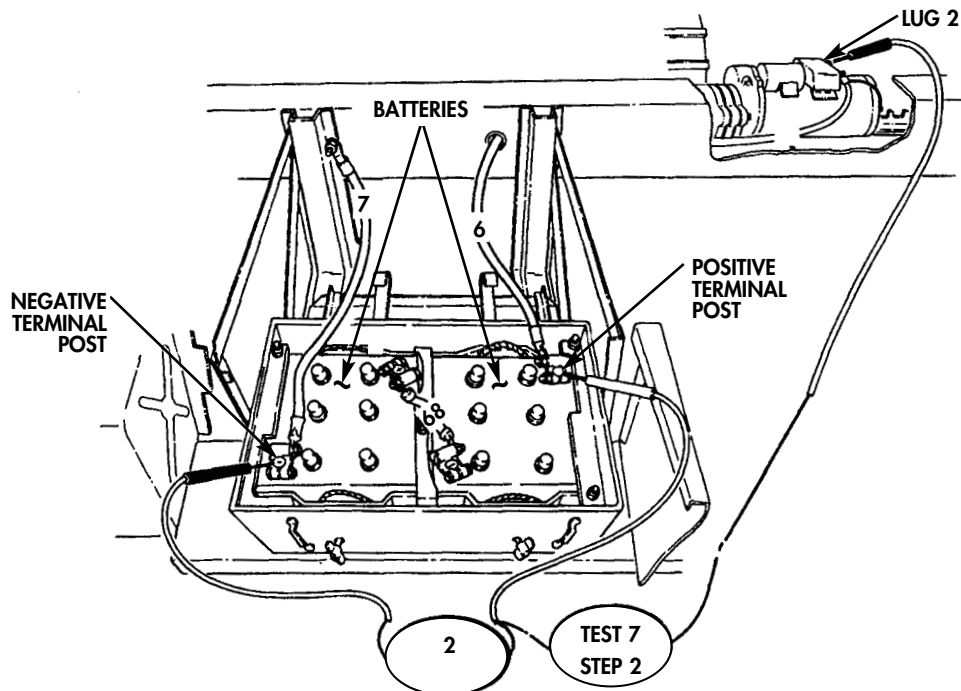
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. STARTER MOTOR OPERATES, BUT ENGINE CRANKS SLOWLY (Contd)</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>A voltage reading exceeding 0.2 volts indicates bad connection at starter motor terminal lug 3 and terminal 6 of solenoid lug.</p> <p style="padding-left: 40px;">3. Crank engine (TM 9-2320-361-10) and observe multimeter.</p> <p>Test 5. Test starter motor solenoid contact voltage drop.</p> <p style="padding-left: 40px;">1. Set multimeter to voltage range that will measure tenths of a volt.</p> <p style="padding-left: 40px;">2. Connect multimeter between starter motor solenoid terminal lugs 2 and 3.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A voltage reading exceeding 0.4 volts indicates defective starter motor solenoid.</p> <p style="padding-left: 40px;">3. Crank engine (TM 9-2320-361-10) and observe multimeter.</p> <p>Test 6. Test negative cable 7 voltage drop from batteries to starter motor.</p> <p style="padding-left: 40px;">1. Set multimeter to voltage range that will measure tenths of a volt.</p> <p style="padding-left: 40px;">2. Connect multimeter positive lead to terminal stud on end plate of starter motor and negative lead to frame ground.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A voltage reading exceeding 0.4 volts indicates defective starter motor solenoid.</p> <p style="padding-left: 40px;">3. Crank engine (TM 9-2320-361-10) and observe multimeter.</p>	<p>Clean and tighten connections WP 0088 00).</p> <p>1. Replace starter motor and solenoid assembly (WP 0088 00).</p> <p>2. If malfunction still exists, go to tests 6, 7, and 8.</p> <p>1. Replace starter motor and solenoid assembly (WP 0088 00).</p> <p>2. If malfunction still exists, go to tests 7 and 8.</p>



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. STARTER MOTOR OPERATES, BUT ENGINE CRANKS SLOWLY (Contd)</b></p>	<p>Test 7. Test positive cable 6 voltage drop from batteries to starter motor solenoid.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage range that will measure tenths of a volt.</li> <li>2. Connect multimeter positive lead to positive terminal post on batteries and negative lead to lug 2 on starter motor solenoid.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>A voltage reading exceeding 0.4 volts indicates loose or corroded connection.</p> <ol style="list-style-type: none"> <li>3. Crank engine (TM 9-2320-361-10) and observe multimeter.</li> </ol> <p>Test 8. Test battery voltage while cranking engine.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage range that will measure 24 VDC.</li> <li>2. Connect multimeter directly across battery terminal posts, and connect negative lead against negative post.</li> </ol>	<p>Clean and tighten cable connections at batteries, starter, and chassis (WP 0126 00 and WP 0088 00).</p>

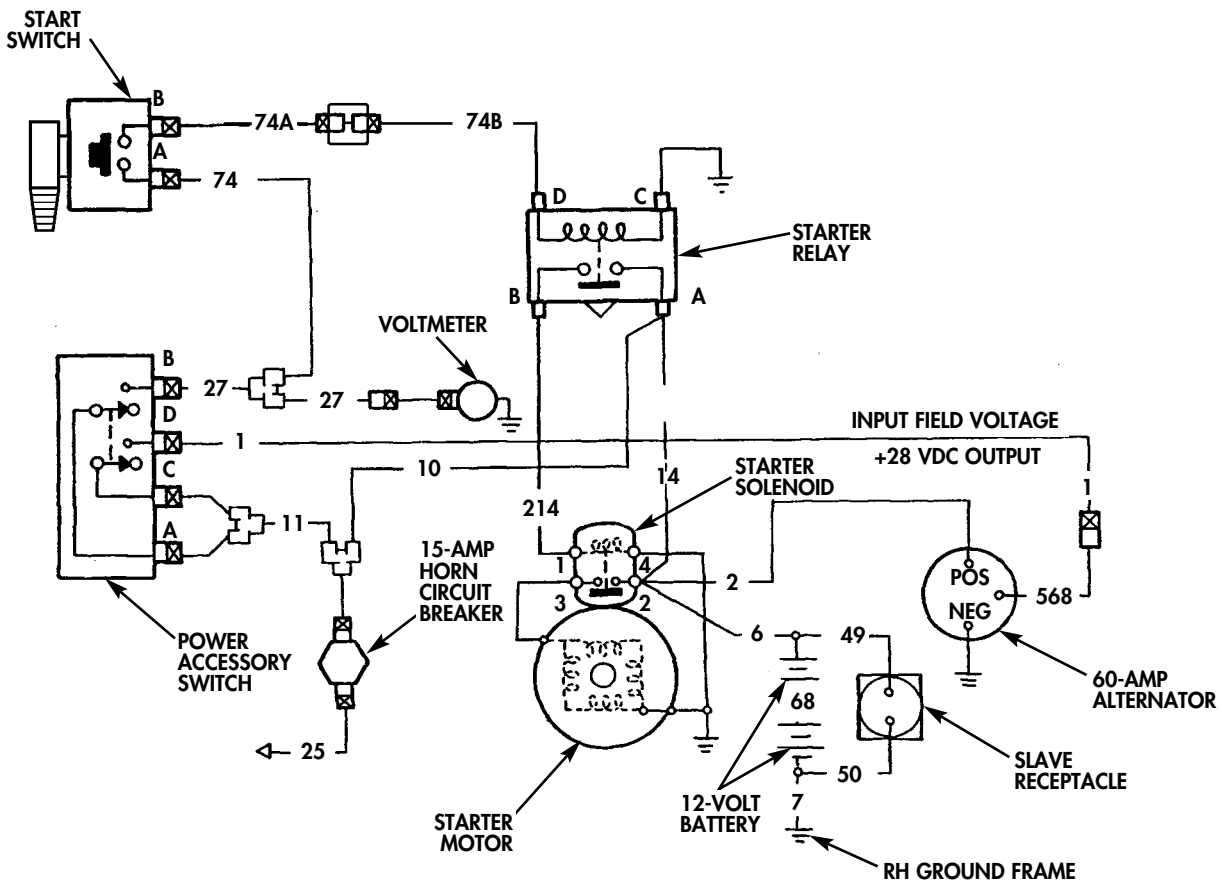


**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Starting System Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. STARTER MOTOR OPERATES, BUT ENGINE CRANKS SLOWLY (Contd)</b>	<p>3. With engine stop control handle pulled out, crank engine for 30 seconds (TM 9-2320-361-10). Voltage reading should be 19 VDC or more during cranking.</p> <p>4. Disengage engine stop control handle (TM 9-2320-361-10).</p>	<p>1. If battery voltage is not satisfactory, go to WP 0012 00, table 1, malfunction 1, test 1.</p> <p>2. If battery voltage is satisfactory, replace starter motor and solenoid assembly (WP 0088 00).</p> <p>If engine still cranks slowly, replace batteries (WP 0127 00).</p>

**CHARGING SYSTEM (60 AMP)**



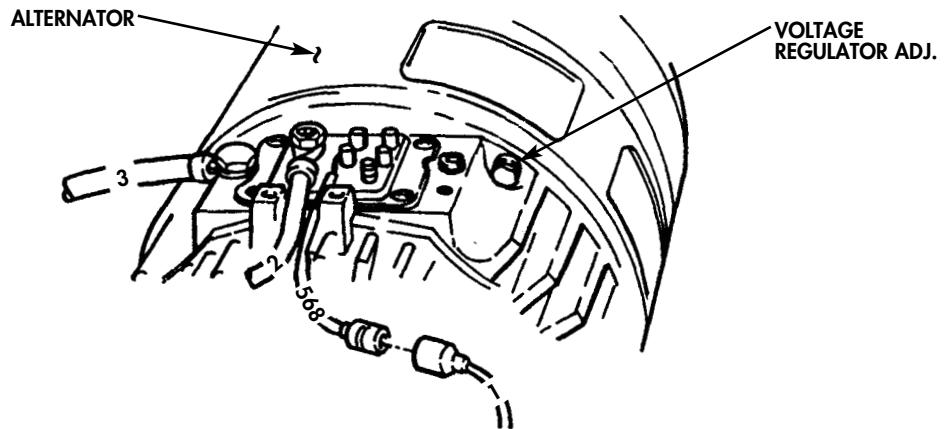
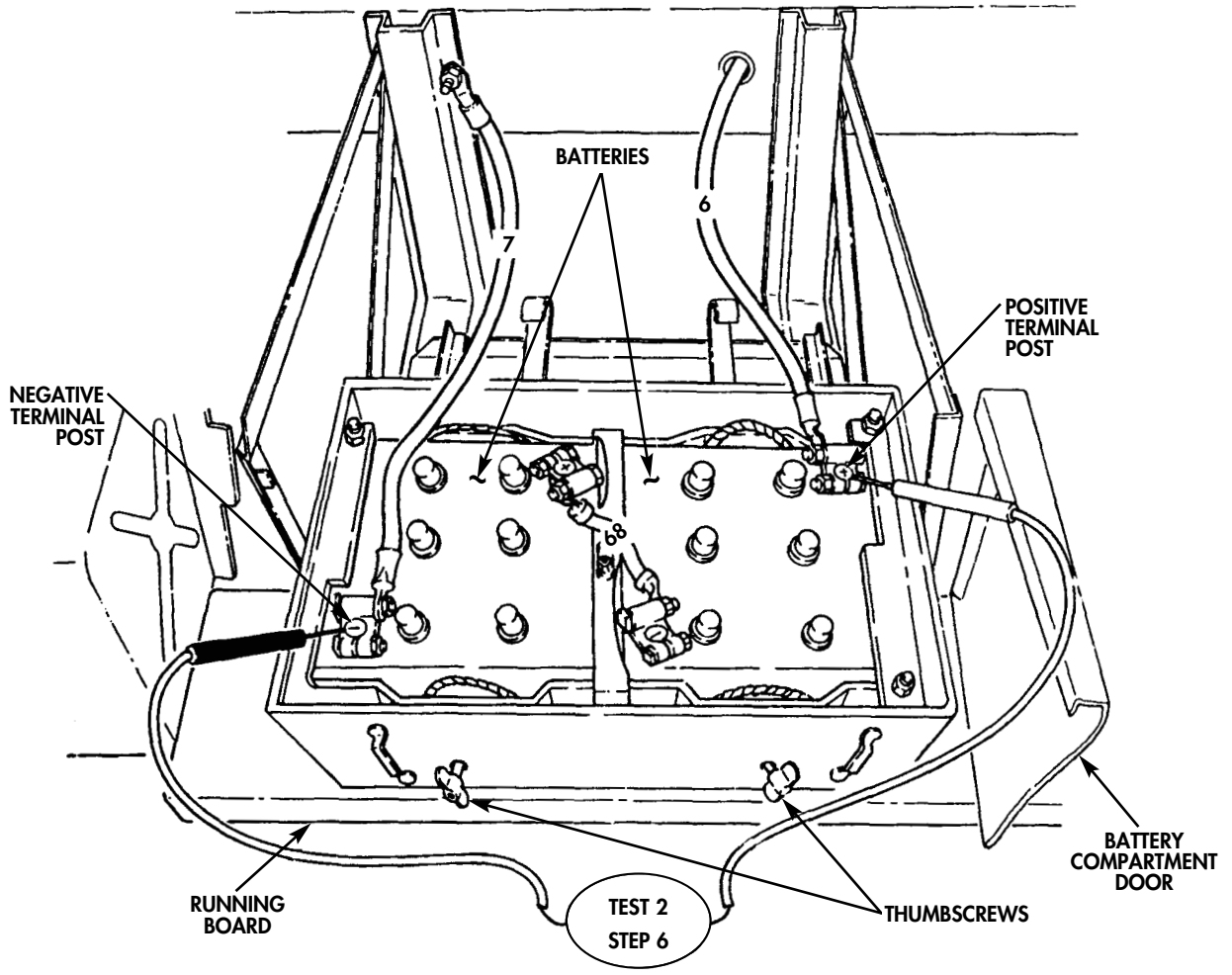
**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Charging System (60 Amp) Troubleshooting Procedure.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. NO ALTERNATOR OUTPUT</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Voltage regulator is built into alternator.</li> <li>• If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</li> </ul> <p>Test 1. Check for loose or missing belts.</p> <p>Test 2. Test charging system output voltage.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>If vehicle is equipped with a slave receptacle, check voltage at receptacle.</p> <ol style="list-style-type: none"> <li>1. Open door of battery compartment. Loosen two thumbscrews and slide batteries onto running board (WP 0127 00).</li> <li>2. Start engine (TM 9-2320-361-10).</li> <li>3. Set engine speed at 1200 RPM.</li> <li>4. Turn vehicle headlights and accessories to ON position.</li> <li>5. Use multimeter to check battery voltage. Charging voltage on batteries should be <math>28.0 \pm 0.2</math> VDC.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust loose belts (WP 0084 00).</li> <li>2. Replace missing belts (WP 0084 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If battery voltage measures 24.0 VDC, alternator has no output. Go to test 3 and check input voltage.</li> <li>2. If battery voltage is between 24.0 and 26.0 VDC, alternator output is weak. Go to test 3 and check input voltage.</li> <li>3. If battery voltage measures <math>28.0 \pm 0.2</math> VDC and voltmeter on instrument panel shows no voltage, an electrical problem exists between alternator and power accessory switch. Go to WP 0012 00, table 2, malfunction 1, test 4, step 3.</li> <li>4. If battery voltage measures between 26.0 and 30.0 VDC, adjust voltage regulator (WP 0085 00) in alternator until voltage across batteries is <math>28.0 \pm 0.2</math> VDC. Go to test step 6 and check regulator stability.</li> </ol>



BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)



## BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)

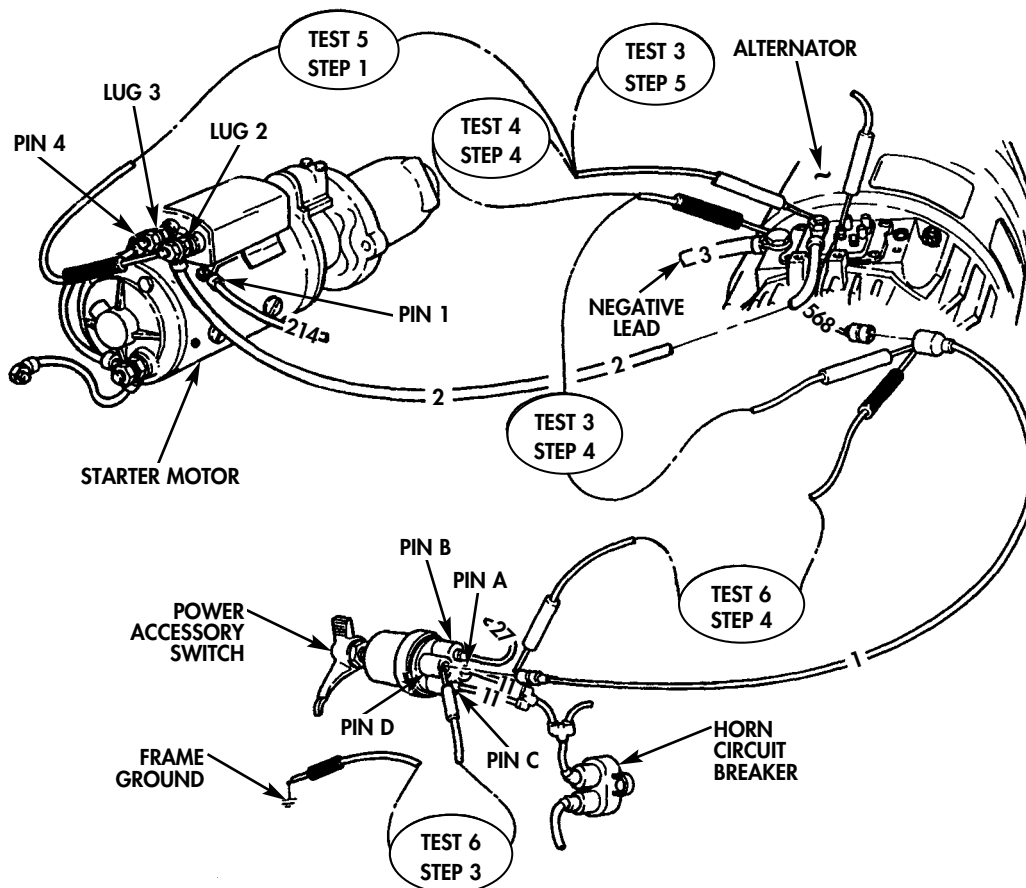
Table 3. Charging System (60 Amp) Troubleshooting Procedure (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. NO ALTERNATOR OUTPUT</b></p>	<p>5. Measure voltage at terminal end of lead 568.</p> <p>Test 4. Test positive output of alternator.</p> <p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Access cover was removed in test 3.</li> <li>• Input amps decrease in input voltage normally causes an increase in alternator output voltage.</li> </ul> <ol style="list-style-type: none"> <li>1. Start engine (TM 9-2320-361-10).</li> <li>2. Set engine speed at 1200 RPM.</li> <li>3. Turn headlights and accessories to ON position.</li> <li>4. Use multimeter to measure alternator output voltage at positive terminal (lead 2).</li> </ol> <p>Test 5. Test voltage drop on lead 2. Place multimeter positive lead on alternator positive output. Place multimeter negative lead on starter solenoid lug 2.</p> <p>Test 6. Test battery voltage into power accessory switch (WP 0012 00, table 3, malfunction 1, test 4).</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 1 from pin D of power accessory switch.</li> <li>2. Turn power accessory switch to ON position.</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is present (normal), the alternator is defective. Go to test 4 and check positive output of alternator.</li> <li>2. If voltage is not present, an open lead or bad connection exists in lead 568. Repair or replace lead (WP 0090 00). Return to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If output voltage is between 24.0 and 26.0 VDC, replace alternator (WP 0085 00).</li> <li>2. If output voltage is more than 28.5 VDC, go to test 5 and check voltage drop on lead 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage drop on lead 2 is greater than 0.4 volts, repair or replace lead (WP 0090 00). Go to test 2.</li> <li>2. If voltage drop on lead 2 is less than 0.4 volts (normal), voltage regulator output is too high. Replace alternator (WP 0085 00).</li> </ol>

**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Charging System (60 Amp) Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. NO ALTERNATOR OUTPUT</b>	3. Check voltage at pin D of power accessory switch. Battery voltage should be present.	1. If battery voltage is present, go to WP 0012 00, table 3, malfunction 1, test 6, step 4 and check continuity of lead 1. 2. If voltage is not present, go to WP 0012 00, table 2, malfunction 1, test 4, step 8, to test continuity of power accessory switch. 3. If continuity is present in power accessory switch, go to next step.
	4. With both ends of lead 1 disconnected, check continuity.	1. If continuity is present, reconnect lead 1 to pin D of power accessory switch. With power accessory switch in ON position, battery voltage should be present at lead 1. 2. If continuity is not present, repair or replace lead 1 (WP 0090 00).

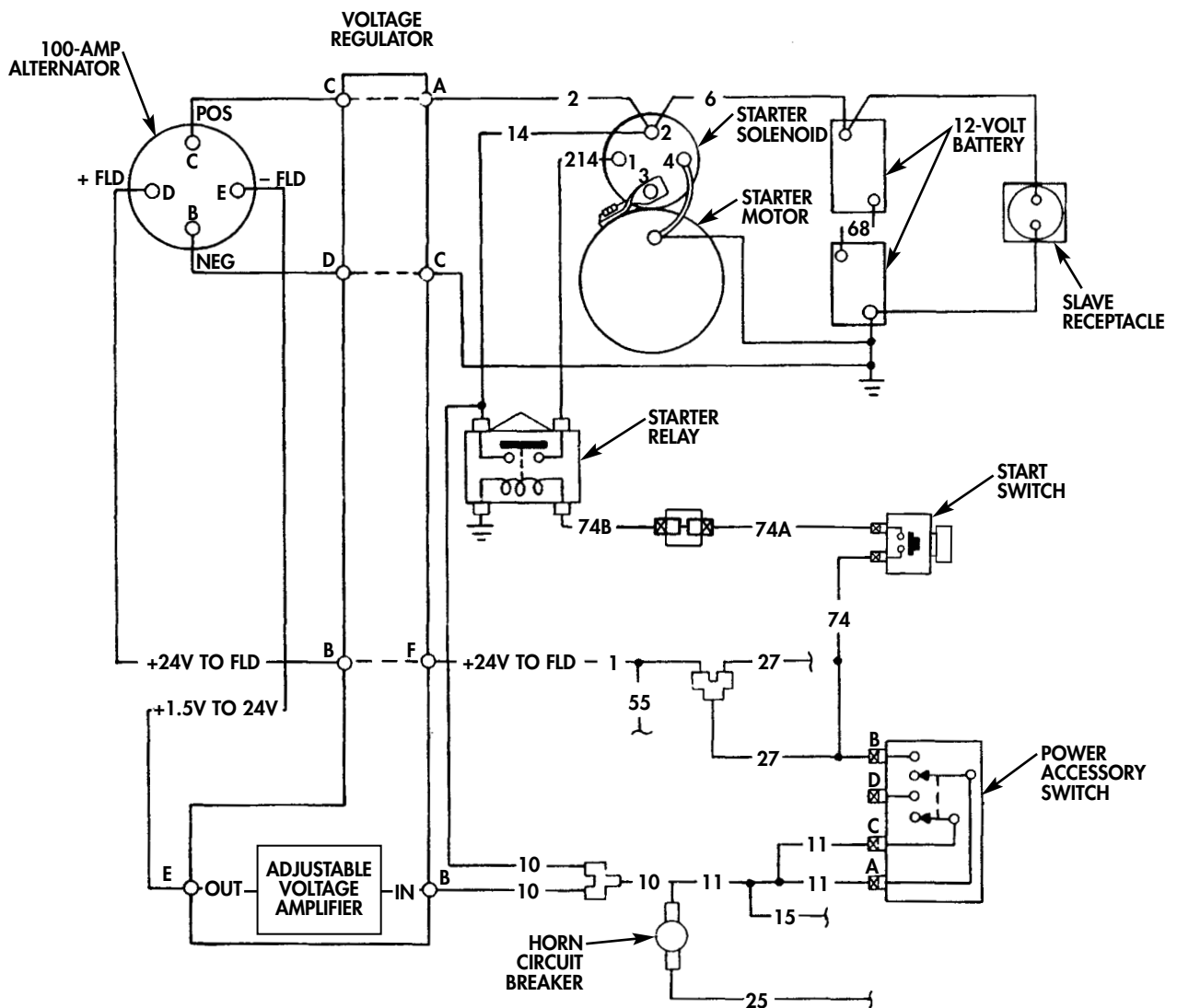


**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)***Table 3. Charging System (60 Amp) Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. BATTERIES NOT CHARGING PROPERLY</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test 1. Check for loose or missing alternator belts (WP 0084 00).</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Battery voltmeter located on instrument panel is not always accurate and should not be used to adjust voltage. Indicator needle in voltmeter located on instrument panel should cover the white dot at edge of green area when battery voltage is 28.0.</p> <p>Test 2. Test battery voltage.</p>	<p>1. Adjust loose belts (WP 0084 00).</p> <p>2. Replace broken or missing belts (WP 0084 00).</p> <p>If voltage across batteries cannot be adjusted to <math>28.0 \pm 0.2</math> VDC, go to WP 0012 00, table 3, malfunction 1, test 2.</p>
<b>3. BATTERIES HOT OR BOILING, CORRECTED SPECIFIC GRAVITY OF ALL CELLS IS 1.280</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test charging voltage of batteries (WP 0012 00, table 2, malfunction 2, test 2).</p>	<p>Replace defective batteries as necessary (WP 0127 00).</p>
<b>4. BATTERIES USE EXCESSIVE WATER</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test charging voltage of batteries (WP 0012 00, table 2, malfunction 2, test 2).</p>	<p>Replace defective batteries as necessary (WP 0127 00).</p>
<b>5. BATTERIES RUN DOWN IN OPERATION</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test 1. Check for loose or missing alternator belts.</p> <p>Test 2. Test charging voltage (WP 0012 00, table 2, malfunction 2, test 2).</p>	<p>1. Adjust loose belts (WP 0084 00).</p> <p>2. Replace missing belts (WP 0084 00).</p> <p>If proper voltage is indicated, problem is not in charging system. Refer to WP 0012 00, table 1, malfunction 1, step 1.</p>



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**



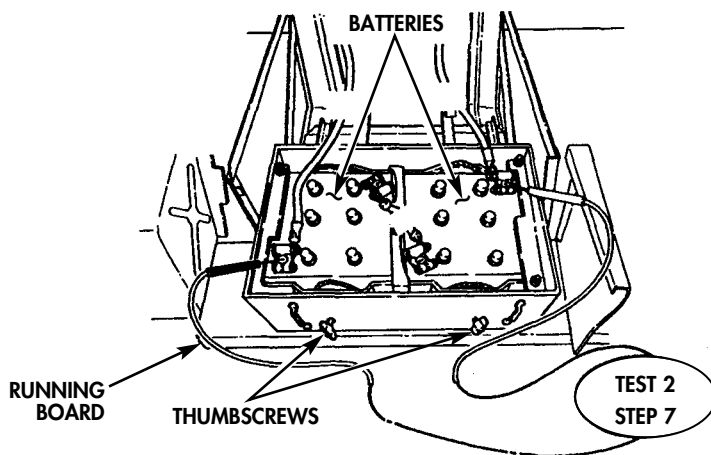
**Table 4. Charging System (100 Amp) Troubleshooting Procedure.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. NO ALTERNATOR OUTPUT</b>	If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00). Test 1. Check for loose or missing belts.	1. Adjust loose belts (WP 0084 00). 2. Replace missing belts (WP 0084 00).

**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)**

*Table 4. Charging System (100 Amp) Troubleshooting Procedure (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. NO ALTERNATOR OUTPUT</b></p>	<p>Test 2. Test charging system output voltage.</p> <p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Voltage regulators in both the 100 amp and 60 amp charging systems regulate battery voltage to <math>28.0 \pm 0.2</math> VDC.</li> <li>• The 100 amp voltage regulator is separate from the 100 amp alternator.</li> <li>• Battery voltage fluctuations are not to go above 28.5 VDC or below 27.5 VDC as headlights are turned on, off, and on with engine running at 1200 RPM.</li> <li>• For test purposes only, charging voltage across batteries can be varied between 26.0 and 30.0 VDC with engine running at 1200 RPM and headlights off.</li> </ul> <ol style="list-style-type: none"> <li>1. Turn off engine.</li> <li>2. Open door of battery compartment. Loosen two thumbscrews and slide batteries onto running board (WP 0127 00).</li> <li>3. Use multimeter to check battery for voltage.</li> <li>4. Start engine (TM 9-2320-361-10).</li> <li>5. Set engine speed at 1200 RPM.</li> <li>6. Turn on vehicle headlights and accessories.</li> </ol>	



**BATTERY AND CHARGING SYSTEM TROUBLESHOOTING (Contd)***Table 4. Charging System (100 Amp) Troubleshooting Procedure (Contd).*

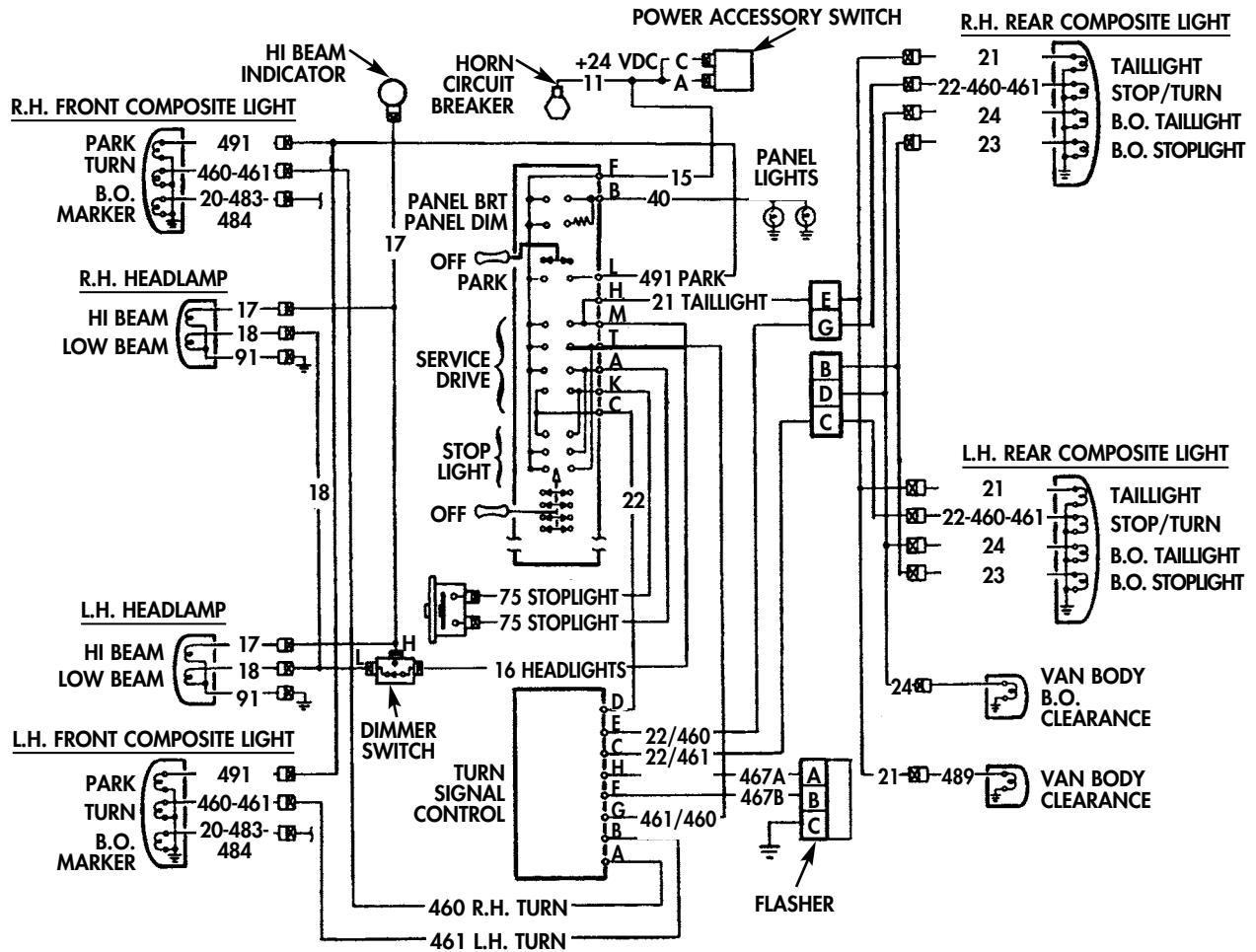
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. NO ALTERNATOR OUTPUT</b>	<p style="text-align: center;"><b>CAUTION</b></p> <p>Do not puncture waterproof cover on cable between alternator and voltage regulator to perform voltage checks. The cable will be unserviceable.</p> <p>7. Use multimeter to check battery voltage. Normal charging on batteries is <math>28.0 \pm 0.2</math> VDC.</p> <p>8. Check voltage regulator stability.</p>	<p>1. If battery voltage measures between 24.0 and 26.0 VDC and alternator has very weak or no output, replace alternator (WP 0085 00).</p> <p>2. If battery voltage measures between 26.0 and 30.0 VDC, adjust voltage regulator (if equipped with adjustment screw). If charging voltage across batteries cannot be adjusted to <math>28.0 \pm 0.2</math> VDC, replace voltage regulator (WP 0448 00).</p> <p>3. If charging voltage across batteries can be adjusted to <math>28.0 \pm 0.2</math> VDC., go to test step 8.</p> <p>Go to WP 0012 00, table 2, malfunction 1, test 2, step 7.</p>
<b>2. BATTERIES NOT CHARGING PROPERLY</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test 1. Check for loose or missing alternator belts.</p> <p>Test 2. Test battery voltage.</p>	<p>1. Adjust loose belts (WP 0084 00).</p> <p>2. Replace broken or missing belts (WP 0084 00).</p> <p>Go to WP 0012 00, table 1, malfunction 1, test 1.</p>
<b>3. BATTERIES HOT OR BOILING, CORRECTED SPECIFIC GRAVITY OF ALL CELLS IS 1.280</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test charging voltage (WP 0012 00, table 4, malfunction 1, test 2).</p>	<p>Replace defective batteries as necessary (WP 0127 00).</p>
<b>4. BATTERIES USE EXCESSIVE WATER</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test charging voltage (WP 0012 00, table 4, malfunction 1, test 2).</p>	<p>Replace defective batteries as necessary (WP 0127 00).</p>
<b>5. BATTERIES RUN DOWN IN OPERATION</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 50 Charging Circuit Tests (WP 0018 00).</p> <p>Test 1. Check for loose or missing alternator belts.</p> <p>Test 2. Test charging voltage (WP 0012 00, table 4, malfunction 1, test 2).</p>	<p>1. Adjust loose belts (WP 0084 00).</p> <p>2. Replace broken or missing belts (WP 0084 00).</p>



## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### LIGHTING AND WIPER SYSTEM TROUBLESHOOTING



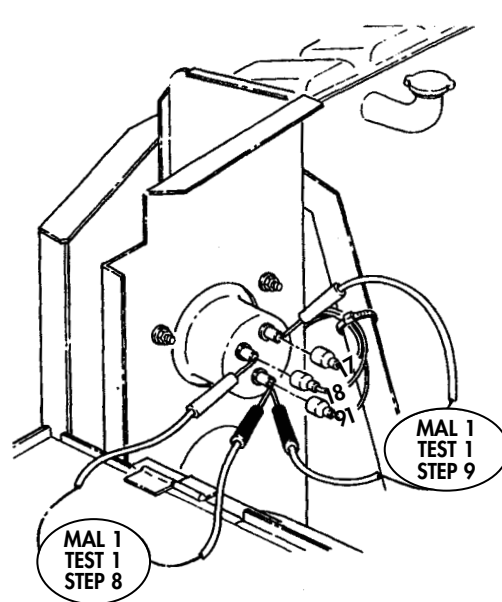
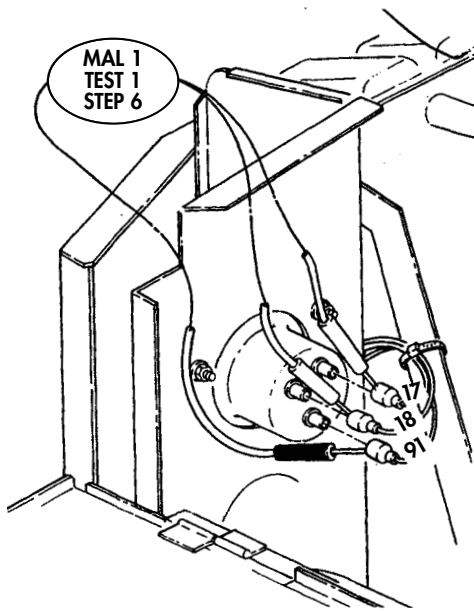
*Table 1. Lighting System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. HEADLIGHT DOES NOT OPERATE ON LOW OR HIGH BEAM, OR BOTH HEADLIGHTS INOPERATIVE</b></p>	<p>Test 1. Test headlamp connection voltage.</p> <ol style="list-style-type: none"> <li>1. Check for loose connection at headlamp and wiring harness and for broken headlamp.</li> <li>2. Ensure body ground straps are secure and clean.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove corrosion or dirt buildup from ground lead connection.</li> <li>2. Tighten screws connecting ground strap to frame.</li> </ol>

**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Lighting System Troubleshooting Procedures (Contd).*

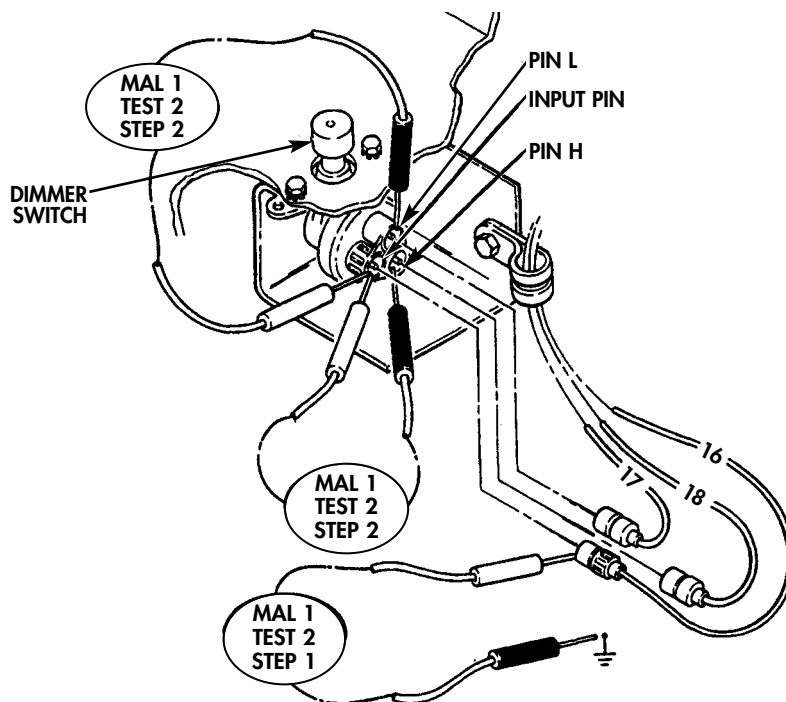
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. HEADLIGHT DOES NOT OPERATE ON LOW OR HIGH BEAM, OR BOTH HEADLIGHTS INOPERATIVE (Contd)</b></p>	<ol style="list-style-type: none"> <li>3. Turn main light switch to OFF position.</li> <li>4. Disconnect leads 17 (high beam), 18 (low beam), and 91 (ground) behind headlamp.</li> <li>5. Place main light switch lever in SERVICE DRIVE position.</li> <li>6. Check low beam and high beam voltage. Push dimmer switch to LOW position. Check for battery voltage between lead 18 and lead 91.</li> <li>7. Push dimmer switch to HIGH position. Check for battery voltage between lead 17 and lead 91.</li> <li>8. Check continuity of low beam filament. Place multimeter leads between headlamp connectors 18 and 91 at rear of lamp.</li> <li>9. Check continuity of high beam filament. Place multimeter leads between headlamp connectors 17 and 91 at rear of headlamp.</li> </ol>	<p>If voltage is present, go to step 7. If voltage is not present, go to test 2.</p> <p>If voltage is present, go to step 8.</p> <p>If continuity is not present, replace sealed beam headlamp (WP 0120 00).</p> <p>If continuity is not present, replace sealed beam headlamp (WP 0120 00).</p>



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Lighting System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. HEADLIGHT DOES NOT OPERATE ON LOW OR HIGH BEAM, OR BOTH HEADLIGHTS INOPERATIVE (Contd)</b></p>	<p>Test 2. Test dimmer switch.</p> <ol style="list-style-type: none"> <li>1. Ensure body ground straps are secure and clean.</li> <li>2. Check dimmer switch input voltage. Remove lead 16 from dimmer switch.</li> <li>3. Check lead 16 contact end for battery voltage. Check dimmer switch continuity.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove corrosion and dirt buildup from ground lead connection.</li> <li>2. Tighten screws connecting ground strap to frame.</li> <li>1. If voltage is present, go to step 3.</li> <li>2. If voltage is not present, go to test 3.</li> <li>1. Remove lead 17 from dimmer switch to pin L. Remove lead 18 from dimmer switch to pin L.</li> <li>2. Set multimeter to RX 1 scale. Check continuity between input pin and pin L.</li> <li>3. If continuity is not found, push dimmer switch to change from HIGH to LOW. Recheck continuity.</li> <li>4. If no continuity is present, replace dimmer switch (WP 0111 00).</li> <li>5. If continuity is present, check continuity between pin H and input pin.</li> <li>6. If continuity is present, push dimmer switch to ON position to change from LOW to HIGH.</li> <li>7. If continuity is not present, replace dimmer switch (WP 0111 00).</li> </ol>

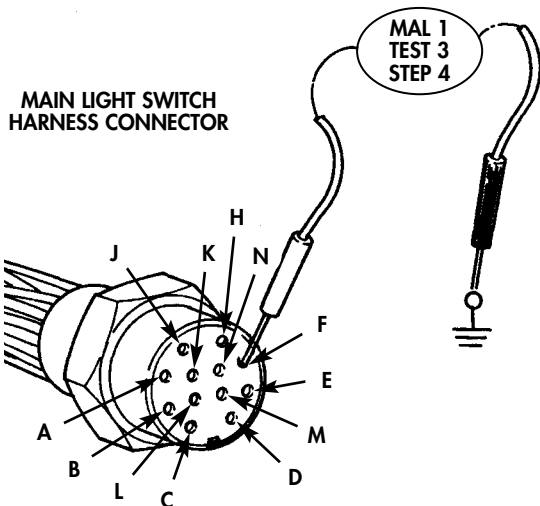


**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Lighting System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. HEADLIGHT DOES NOT OPERATE ON LOW OR HIGH BEAM, OR BOTH HEADLIGHTS INOPERATIVE (Contd)</b></p>	<p>Test 3. Test lighting system harness connector to voltage.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch lever to OFF position.</li> <li>2. Remove light switch assembly from instrument panel (WP 0101 00).</li> <li>3. Disconnect harness connector from light assembly (WP 0101 00).</li> </ol> <p style="text-align: center;"><b>CAUTION</b></p> <p>Voltage at pin F is tied directly to battery without fuse protection. Insert jumper wire in pin of faulty circuit being tested first to prevent energized jumper wire from touching ground and damaging wire harness.</p> <ol style="list-style-type: none"> <li>4. Check for battery voltage at harness connector at pin F.</li> <li>5. Check circuit 15 for loose connections or broken wire.</li> <li>6. Reconnect front wiring harness connector to light switch and reinstall light switch (WP 0101 00).</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is indicated at pin F, connect a jumper wire from pin F to socket pin of faulty circuit.</li> <li>2. If lamps light with jumper wire connected, replace main light switch (WP 0101 00).</li> <li>3. If battery voltage is not indicated, go to step 5.</li> </ol> <p>Repair broken wire.</p>

**Legend**



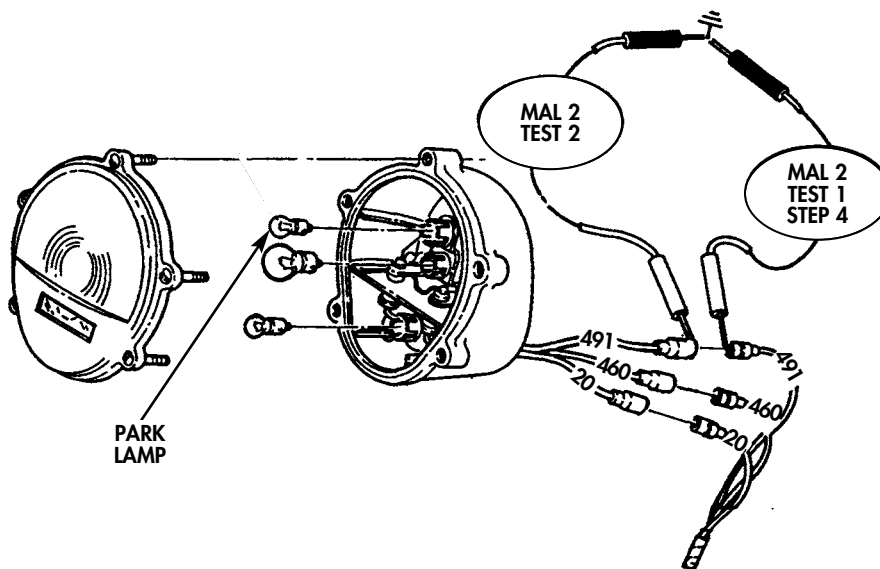
SOCKET	WIRE NO.	CIRCUIT
A	75	STOPLIGHT SWITCH
B	40	PANEL LIGHTS
C	22	DIRECTIONAL CONTROL
D	19	BLACKOUT (B.O.) DRIVING LIGHT
E	20-24	B.O. MARKER LIGHTS
F	15	BATTERY POSITIVE CABLE 24 VOLTS
H	21	SERVICE REAR LIGHTS
J	460-461	DIRECTIONAL INDICATOR
K	75	STOPLIGHT SWITCH
L	491	SERVICE PARKING LIGHTS
M	16	SERVICE HEADLIGHTS
N	23	B.O. STOPLIGHT



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Lighting System Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. PARK LAMP DOES NOT LIGHT</b></p>	<p>Test 1. Test battery voltage at front composite light.</p> <ol style="list-style-type: none"> <li>1. Place auxiliary light switch lever in OFF position.</li> <li>2. Disconnect lead 491 at rear of front composite light.</li> <li>3. Turn auxiliary light switch to PARK position.</li> <li>4. Check for battery voltage on contact end of lead 491.</li> </ol> <p>Test 2. Test continuity of filament in park lamp.</p> <p>Set multimeter to RX 1 scale. Check continuity between frame ground and lead 491 connected to front composite light.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2.</li> <li>2. If battery voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and test lighting system harness connector, pin L.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, replace park lamp (WP 0122 00).</li> <li>2. If continuity is present, check for corroded contacts at lamp and lead 491 connections to front wiring harness. Reconnect lead 491.</li> </ol>

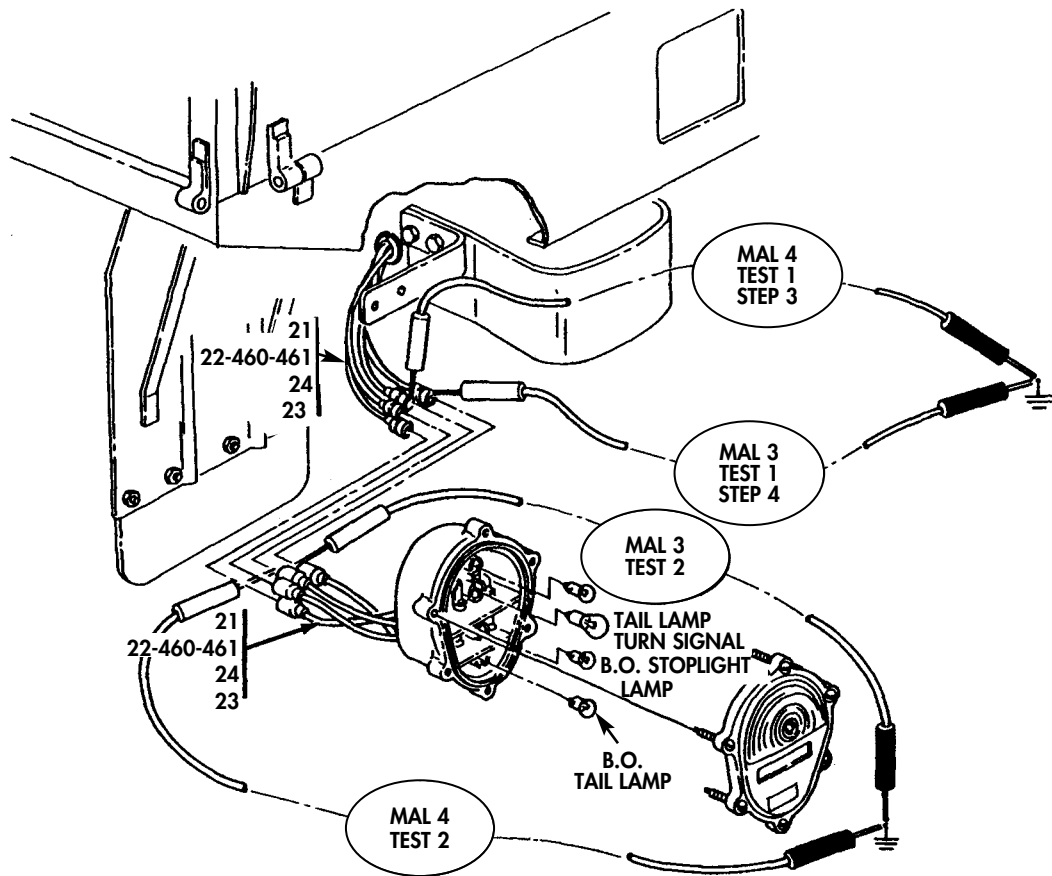


## LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)

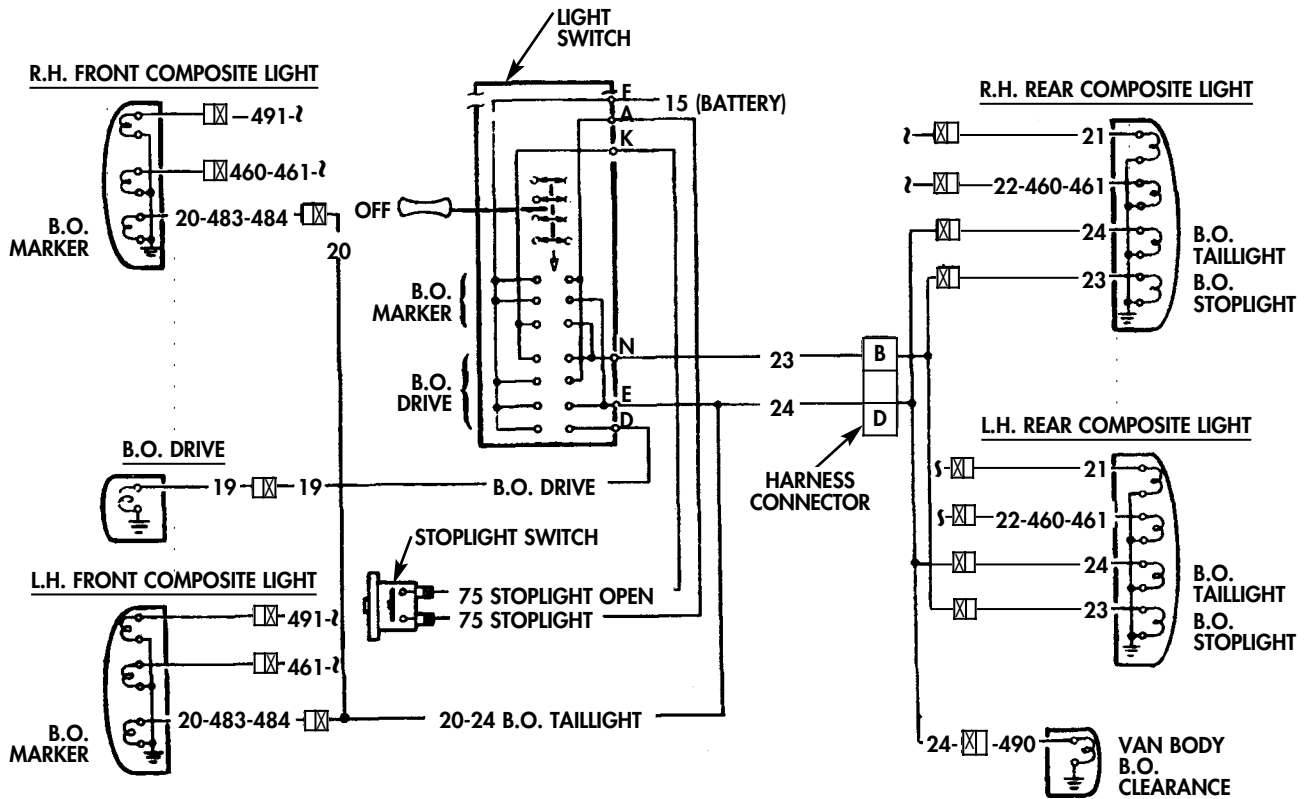
Table 1. Lighting System Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. TAILLIGHT OR CLEARANCE LAMP DOES NOT LIGHT</b>	<p>Test 1. Test battery voltage at rear composite light.</p> <ol style="list-style-type: none"> <li>1. Place main light switch lever in OFF position.</li> <li>2. Disconnect lead 21 from rear composite light</li> <li>3. Turn main light switch lever to SERVICE DRIVE position.</li> <li>4. Check for battery voltage on contact end of lead 21.</li> </ol> <p>Test 2. Test continuity of filament in taillight lamp.</p> <p>Set multimeter to RX 1 scale. Check for continuity between lead 21 connected to rear composite light and frame ground.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2 and check lamp filaments (WP 0125 00).</li> <li>2. If voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and check front wiring harness pin H.</li> <li>1. If continuity is not present, replace taillight lamp (WP 0125 00).</li> <li>2. If continuity is present, check for corroded contacts at lamp and lead 21 connection to rear wiring harness. Reconnect lead 21.</li> </ol>
<b>4. STOPLIGHT LAMP DOES NOT LIGHT</b>	<p>Test 1. Test battery voltage at rear composite light.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to OFF position.</li> <li>2. Disconnect lead 22-460-461 from rear composite light on side of vehicle where stoplight has failed.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Ensure turn indicator is in neutral position.</p> <ol style="list-style-type: none"> <li>3. Check for battery voltage on contact end of lead 22-460-461.</li> </ol> <p>Test 2. Test continuity of filament in stoplight lamp.</p> <p>Check continuity between frame grounds and lead 22-460-461 connected to rear composite light.</p>	<ol style="list-style-type: none"> <li>1. Depress brake pedal to activate stoplight switch.</li> <li>2. If voltage is present, go to step 2.</li> <li>3. If battery voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and test lighting system harness connector pin C.</li> </ol> <p>If continuity is present, check for corroded contact at lamp and lead 22-460-461 connection to rear wiring harness. Reconnect lead 22-460-461.</p>

LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**



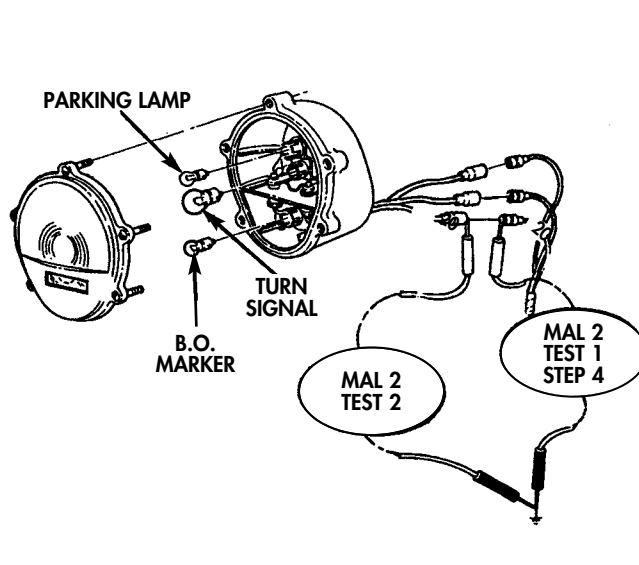
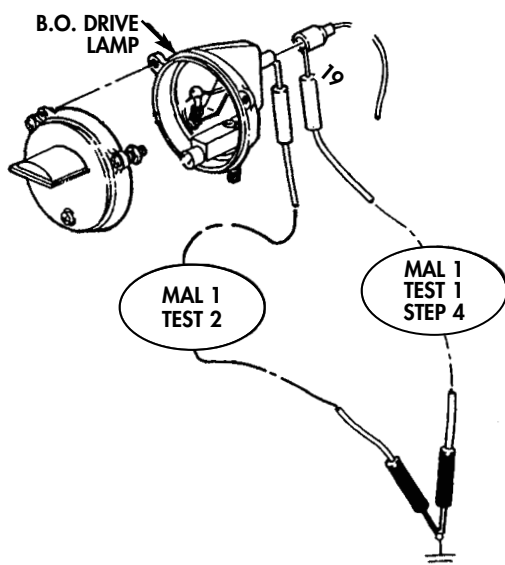
**Table 2. Blackout Lights (B.O.) Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. B.O. HEADLAMP DOES NOT LIGHT</b>	<p>Test 1. Test battery voltage at B.O. drive light.</p> <ol style="list-style-type: none"> <li>Place main light switch lever in OFF position.</li> <li>Disconnect lead 19 from B.O. drive light.</li> <li>Turn main light switch to B.O. DRIVE position.</li> <li>Check for battery voltage on contact end of lead 19.</li> </ol> <p>Test 2. Test continuity of filament in B.O. drive light.</p> <p>Set multimeter to RX 1 scale. Check continuity between frame ground and lead 19 attached to rear of B.O. drive light.</p>	<ol style="list-style-type: none"> <li>If battery voltage is present, go to test 2.</li> <li>If battery voltage is not present go to WP 0013 00, table 1, malfunction 1, test 3.</li> <li>If continuity is not present, replace B.O. drive lamp (WP 0123 00).</li> <li>If continuity is present, check for corroded contacts at lamp and at lead 19 connection to front wiring harness. Reconnect lead 19.</li> </ol>

**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Blackout Lights (B.O.) Troubleshooting Procedures (Contd).*

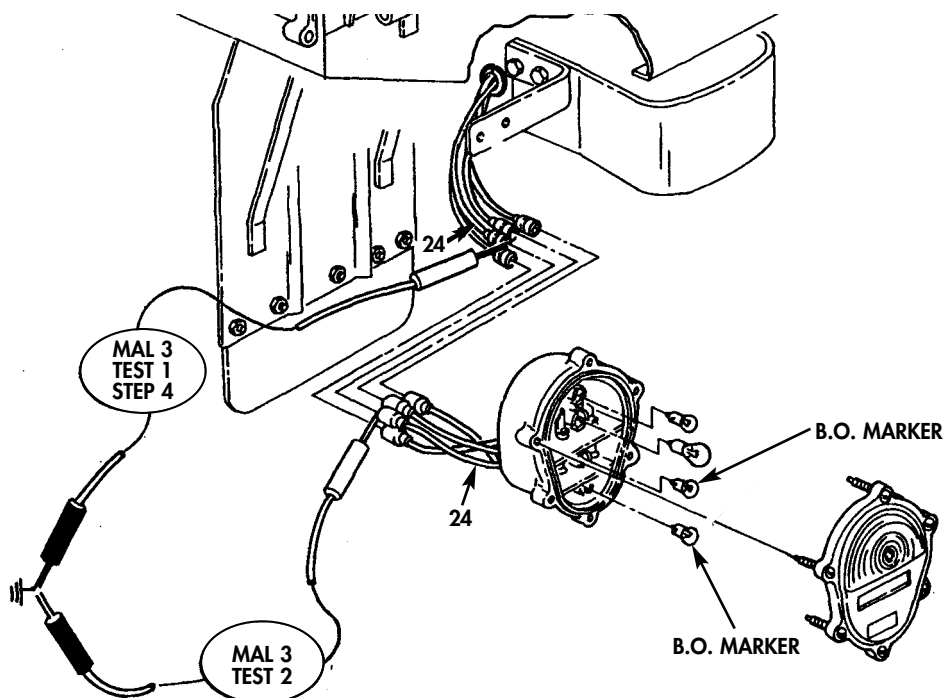
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. B.O. LIGHT MARKER LAMP DOES NOT LIGHT</b></p>	<p>Test 1. Test battery voltage at front marker light.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to OFF position.</li> <li>2. Disconnect lead 20 at rear of front composite light on side of vehicle where light is malfunctioning.</li> <li>3. Place main light switch lever in B.O. MARKER or B.O. DRIVE position.</li> <li>4. Check for battery voltage at contact end of lead 20.</li> </ol> <p>Test 2. Test continuity of filament in B.O. marker lamp.</p> <p>Set multimeter to RX 1 scale. Check continuity between frame ground and lead 20 attached to rear of B.O. marker lamp.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2.</li> <li>2. If battery voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and check front wiring harness pin E.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, replace B.O. marker lamp (WP 0122 00).</li> <li>2. If continuity is still not present, check for corroded contacts at lamp and at lead 20 connection to front wiring harness. Reconnect lead 20.</li> </ol>



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Blackout Lights (B.O.) Troubleshooting Procedures (Contd).*

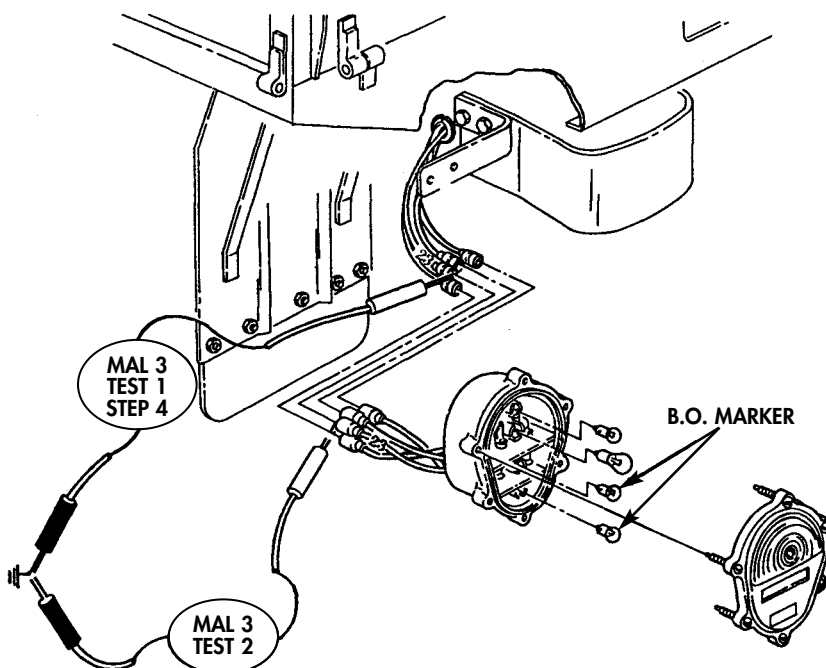
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>3. B.O. TAILLIGHT LAMP DOES NOT LIGHT</b></p>	<p>Test 1. Test battery voltage at rear composite light.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to OFF position.</li> <li>2. Disconnect lead 24 at rear composite light on side of vehicle where B.O. light has failed.</li> <li>3. Turn main light switch to B.O. MARKER or B.O. DRIVE positions.</li> <li>4. Check for battery voltage at contact end of lead 24.</li> </ol> <p>Test 2. Test continuity of filament in B.O. taillight lamp.</p> <p>Check continuity between lead 24 attached to rear composite light and frame ground.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2.</li> <li>2. If battery voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and check front wiring harness, pin E.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, replace B.O. light lamp (WP 0125 00).</li> <li>2. If continuity is present, check for corroded contacts at lamp and on lead 24 connection to rear wiring harness. Reconnect lead 24.</li> </ol>



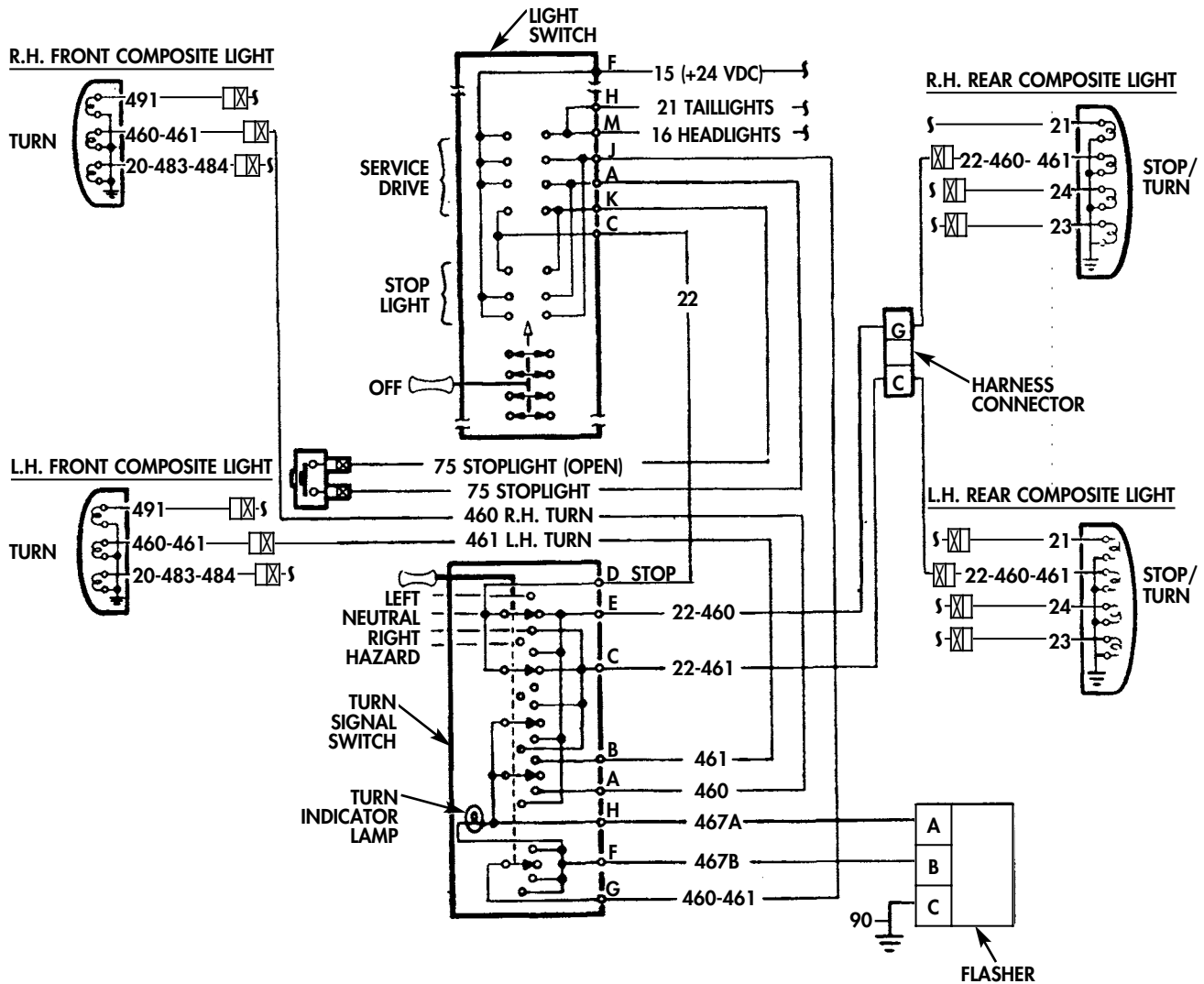
**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 2. Blackout Lights (B.O.) Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>4. B.O. STOPLIGHT LAMP DOES NOT LIGHT</b></p>	<p>Test 1. Test for battery voltage at rear composite light.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to OFF position.</li> <li>2. Disconnect lead 23 at rear composite light on side of vehicle where B.O. stoplight is malfunctioning.</li> <li>3. Turn main light switch to B.O. MARKER or B.O. DRIVE positions.</li> <li>4. Depress brake pedal and check for battery voltage on contact end of lead 23.</li> </ol> <p>Test 2. Test continuity of filament in B.O. stoplight lamp.</p> <p>Check for continuity between lead 23 attached to rear composite light and frame ground.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2.</li> <li>2. If battery voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3, and check front wiring harness pin N.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, replace B.O. taillight lamp (WP 0125 00).</li> <li>2. If continuity is present, check for corroded contacts at lamp and on lead 23 connection to rear wiring harness. Reconnect lead 23.</li> </ol>



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**



*Table 3. Directional Signal Systems Troubleshooting Procedures.*

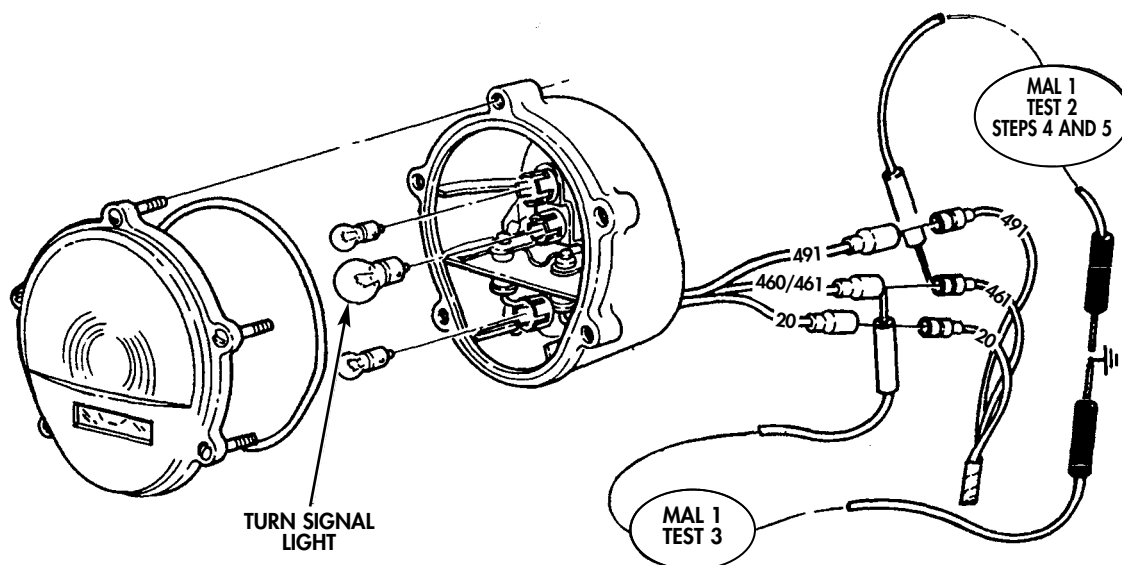
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. DIRECTIONAL SIGNAL INOPERATIVE</b>	<p><b>NOTE</b></p> <p>Testing procedures for left and right turn signal leads 461 and 460 are performed the same, using tests 2 through 8. This test covers left side 461 turn signal circuit.</p> <p>Test 1. Test turn signal lamps.</p> <ol style="list-style-type: none"> <li>1. Turn main switch to SERVICE DRIVE.</li> <li>2. Place turn signal in left or right position. Turn signal should flash on each side.</li> </ol>	<ol style="list-style-type: none"> <li>1. If turn signal on left or right operates properly, go to test 2.</li> <li>2. If turn signal on left or right illuminates but does not flash, go to test 3.</li> </ol>



LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)

Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. DIRECTIONAL SIGNAL INOPERATIVE (Contd)</b></p>	<p>Test 2. Test for voltage at front composite light.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 461 at left front composite light.</li> <li>2. Place turn signal lever in left position.</li> <li>3. Set multimeter to range that will measure 24 volts.</li> <li>4. Touch multimeter negative lead to frame ground.</li> <li>5. Touch multimeter positive lead to contact end of lead 461. Voltage should fluctuate at rate of 1 or 2 cycles per second.</li> </ol> <p>Test 3. Test continuity of filament and socket for turn signal lamp. Check continuity between lead 460-461 attached to front composite light and frame ground.</p>	<ol style="list-style-type: none"> <li>1. If voltage does fluctuate, go to test 3.</li> <li>2. If voltage does not fluctuate, go to test 4.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is present, reconnect leads 460-461 and check turn signal operation. If turn signal operates but does not flash, go to tests 6 and 7.</li> <li>2. If continuity is not present, replace turn signal lamp (WP 0122 00).</li> </ol>

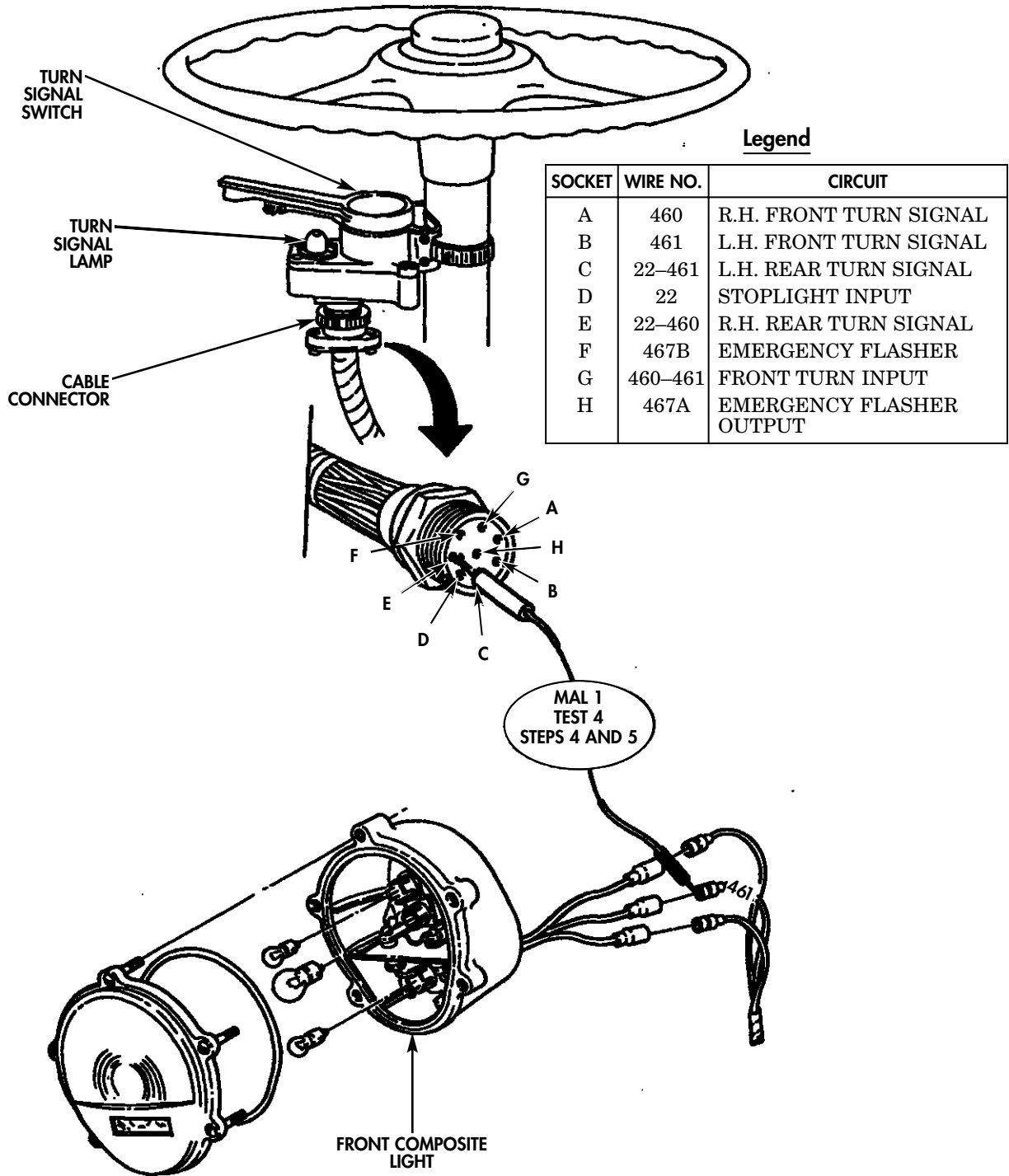


**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. DIRECTIONAL SIGNAL INOPERATIVE (Contd)</b></p>	<p>Test 4. Test continuity of front composite light wiring harness.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 461 from front composite light.</li> <li>2. Disconnect cable connector at turn signal switch.</li> <li>3. Set multimeter to RX 1 scale.</li> <li>4. Touch multimeter negative lead to pin B at cable connector.</li> <li>5. Touch multimeter positive lead to contact end of 461 at front composite light.</li> </ol> <p>Test 5. Test continuity of turn signal switch.</p> <ol style="list-style-type: none"> <li>1. Disconnect cable connector at turn signal switch.</li> <li>2. Place turn signal switch in left position.</li> <li>3. Touch multimeter negative lead to pin G of turn signal switch.</li> <li>4. Touch multimeter positive lead to pin B 461 (front left) and pin C 22-461 (left rear) of turn signal switch.</li> <li>5. Place turn signal lever in right position.</li> <li>6. Touch multimeter positive lead to pin A 460 (right front) and pin E (right rear) at turn signal switch.</li> <li>7. Touch multimeter positive lead to pin F at turn signal switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. If continuity is not present, repair or replace lead 461 (WP 0090 00).</li> <li>2. Perform test 4 again. If lamp fails to flash, go to test 5.</li> </ol> <p>If continuity is not present, replace turn signal switch (WP 0102 00).</p> <p>If continuity is not present, replace turn signal switch (WP 0102 00).</p> <p>If continuity is not present, replace turn signal switch (WP 0102 00).</p>

LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)

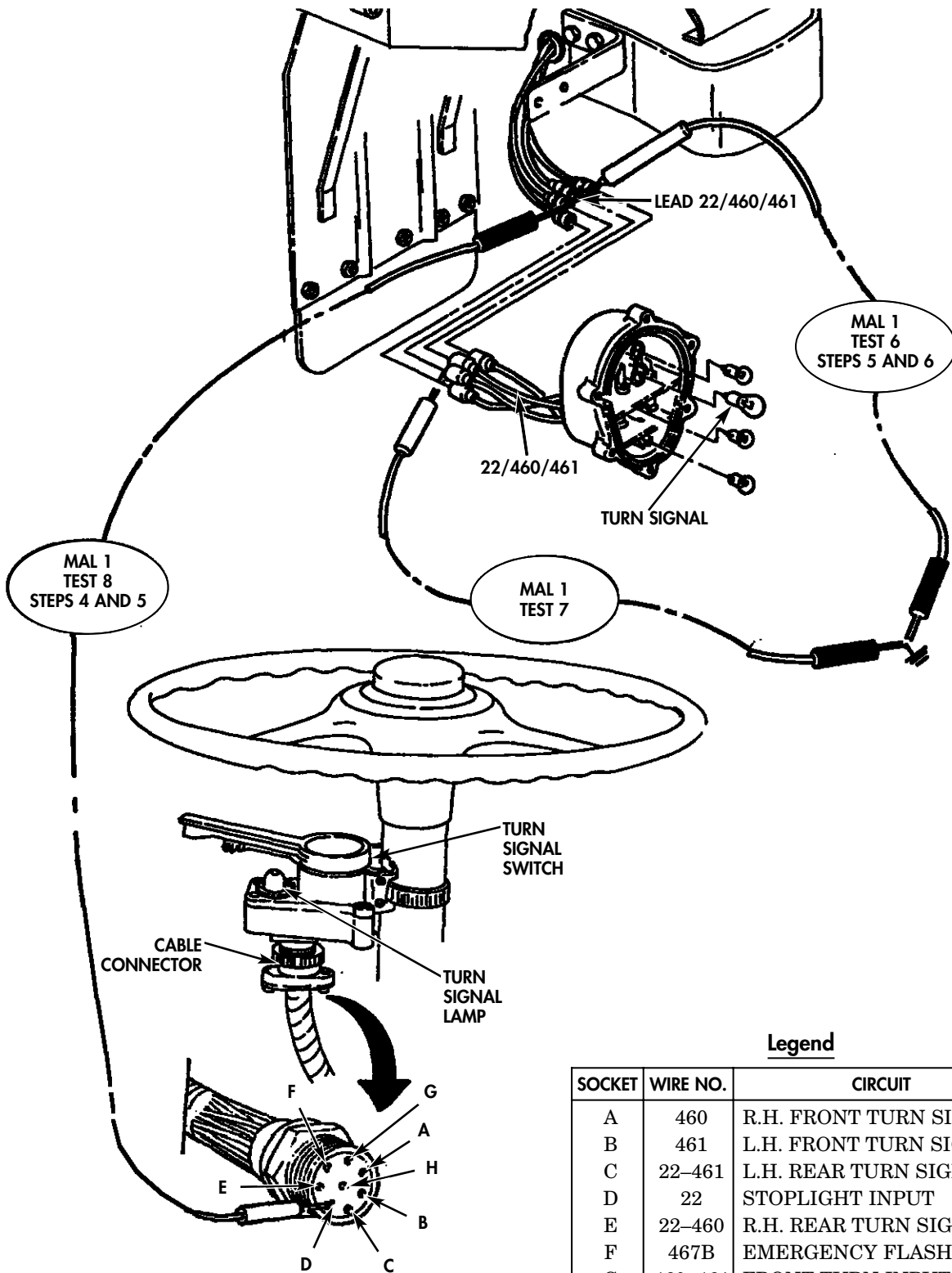


**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. DIRECTIONAL SIGNAL INOPERATIVE (Contd)</b></p>	<p>Test 6. Test for voltage at rear composite light.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 22-461 at left rear composite light</li> <li>2. Turn main light switch to SERVICE DRIVE position.</li> <li>3. Place turn signal switch in left position.</li> <li>4. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>5. Touch multimeter negative lead to frame ground.</li> <li>6. Touch multimeter positive lead to contact end of lead 22-461. Voltage should fluctuate at a rate of 1 or 2 cycles per second.</li> </ol> <p>Test 7. Test continuity of filament and socket for turn signal lamp.</p> <p>Check continuity between lead 22-460-461 attached to rear composite light and frame ground.</p> <p>Test 8. Test continuity of lead 22-461 from turn signal switch to rear harness connector.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1 scale.</li> <li>2. Disconnect cable connector at turn signal switch.</li> <li>3. Disconnect lead 22-461 from rear composite light.</li> <li>4. Touch multimeter negative lead to contact end of lead 22-461.</li> <li>5. Touch multimeter positive lead to contact end of lead 22-461 at turn signal cable connector (pin C).</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage does fluctuate, go to test 7.</li> <li>2. If voltage does not fluctuate, go to test 8.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is present, reconnect lead 22-460-461 and check turn signal operation.</li> <li>2. If continuity is not present, replace turn signal lamp (WP 0102 00).</li> </ol> <p>If continuity is not present, repair or replace lead 22-461 (WP 0090 00).</p>

LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)

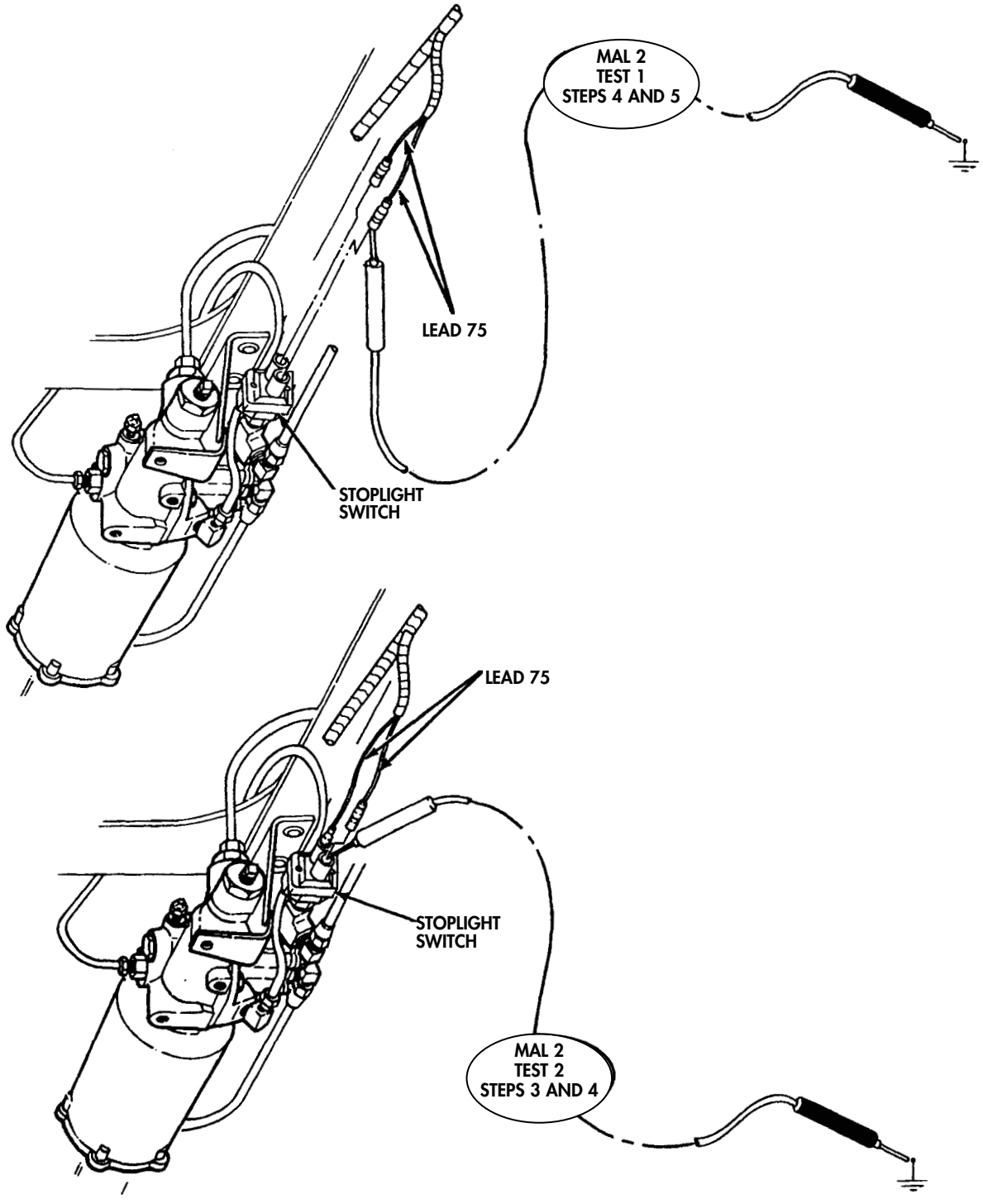


**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. ALL STOPLIGHTS ARE INOPERATIVE</b></p>	<p>Test 1. Check stoplight switch for input voltage.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to SERVICE DRIVE position.</li> <li>2. Set multimeter to voltage range that will measure 24 VDC.</li> <li>3. Disconnect lead 75 input voltage from stoplight switch.</li> <li>4. Touch positive lead of multimeter to contact end of lead 75.</li> <li>5. Touch negative lead of multimeter to frame ground.</li> </ol> <p>Test 2. Check stoplight switch for output voltage.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to voltage range that will measure 24 VDC.</li> <li>2. Disconnect output lead 75 from stoplight switch.</li> <li>3. Touch positive lead of multimeter to contact end of stoplight switch.</li> <li>4. Touch negative lead of multimeter to frame ground.</li> <li>5. Depress brake pedal.</li> <li>6. Place main light switch in OFF position.</li> <li>7. Set multimeter to RX 1 scale.</li> <li>8. Place positive lead of multimeter in pin A of wiring harness.</li> <li>9. Place negative lead on input lead 75 at stoplight switch.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>If vehicle is equipped with hydraulic stoplight switch and switch is defective, replace air-activated stoplight switch conversion kit, part number 12255668.</p>	<ol style="list-style-type: none"> <li>1. If voltage is present, go to test 2.</li> <li>2. If voltage is not present, go to WP 0013 00, table 1, malfunction 1, test 3. Depress brake pedal and check lead 75.</li> </ol> <p>If voltage is not present, and stoplights are still inoperative, go to step 6.</p> <ol style="list-style-type: none"> <li>1. If continuity is present, replace stoplight switch (WP 0112 00).</li> <li>2. If continuity is not present, repair or replace wire or wiring harness.</li> </ol>

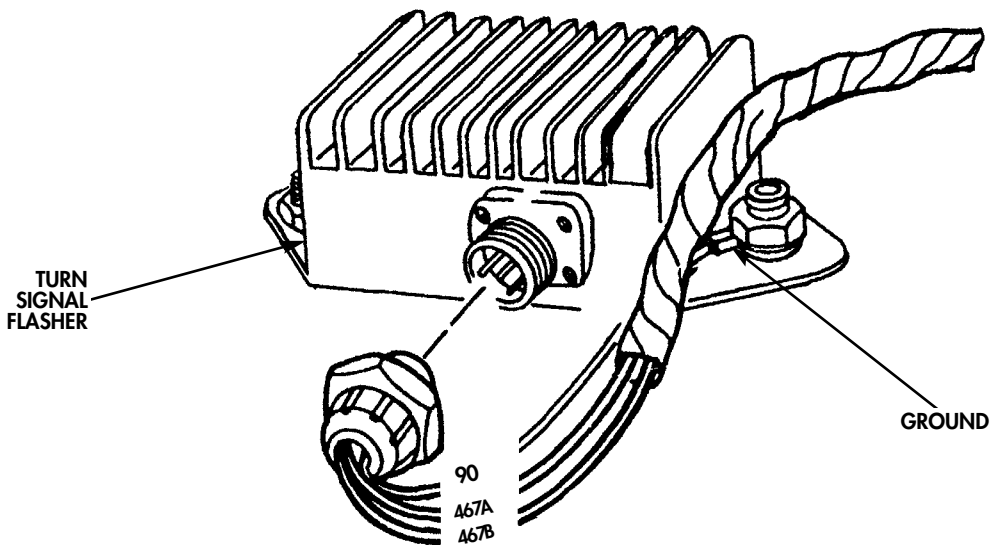
LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>3. BOTH DIRECTION SIGNALS INOPERATIVE</b></p>	<p>Test 1. Test left and right flashers.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to SERVICE DRIVE position.</li> <li>2. Place turn signal lever in left position.</li> <li>3. Place turn signal lever in right position. Both left and right turn signals should flash.</li> </ol> <p>Test 2. Test turn signal flasher.</p> <ol style="list-style-type: none"> <li>1. Disconnect cable connect 467 A and 467 B from solid state flasher pins A and B.</li> <li>2. Connect jumper wire from cable connector 467 A and 467 B.</li> <li>3. Place turn signal lever in left position.</li> <li>4. Place turn signal lever in right position.</li> </ol>	<p>If turn signals fail to flash, go to test 2.</p> <ol style="list-style-type: none"> <li>1. Left and right turn signals should work but not flash. If turn signals work, replace turn signal flasher (WP 0103 00).</li> <li>2. If voltage is not present, go to WP 0013 00, malfunction 1, tests 1 through 8.</li> </ol>

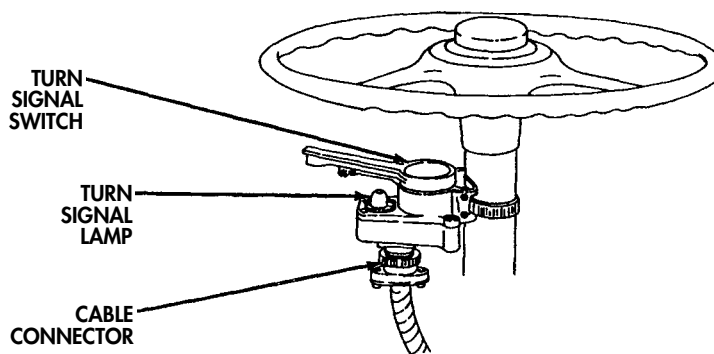




**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 3. Directional Signal Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>4. TURN SIGNALS OPERATE INCORRECTLY WITH TURN SIGNAL CONTROL LEVER IN ONE OR MORE POSITIONS</b>	Test turn signal control unit continuity. 1. Place battery switch in OFF position. 2. Remove cable connector from turn signal switch. 3. Remove indicator lamp from turn signal switch (WP 0102 00). 4. Set multimeter to RX 1 scale. 5. Check circuits according to Control Unit Test Chart, below.	If any circuit does not test as shown in the Control Unit Test Chart, replace turn signal switch (WP 0102 00).



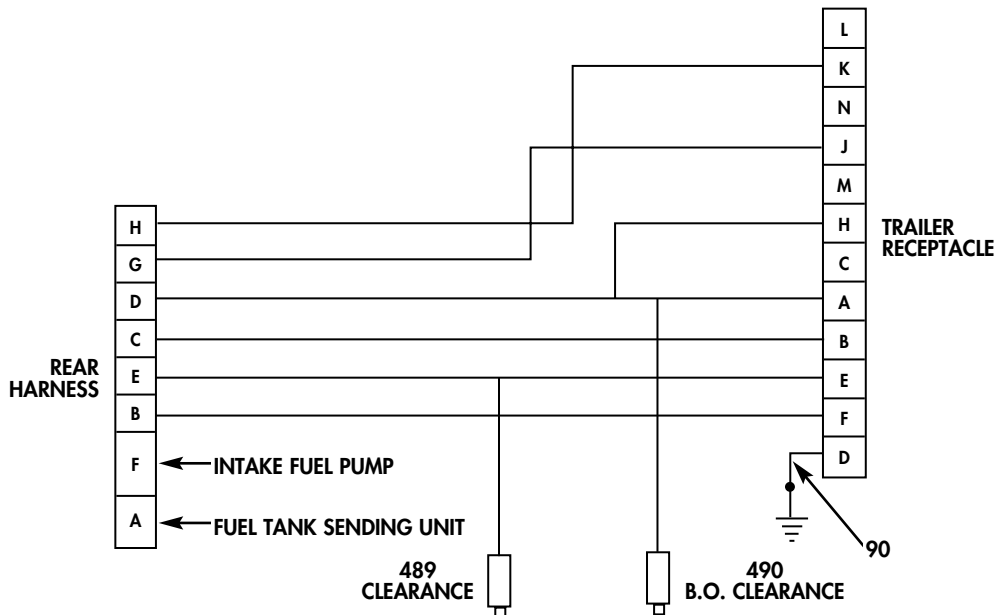
**CONTROL UNIT TEST CHART**

<p>A. Directional signal control lever in NEUTRAL position</p> <table border="1"> <thead> <tr> <th>FROM PIN</th> <th>TO PIN</th> <th>CONTINUITY INDICATION</th> </tr> </thead> <tbody> <tr><td>H</td><td>A</td><td>OPEN</td></tr> <tr><td>H</td><td>B</td><td>OPEN</td></tr> <tr><td>H</td><td>C</td><td>OPEN</td></tr> <tr><td>H</td><td>E</td><td>OPEN</td></tr> <tr><td>D</td><td>C</td><td>SHORTED</td></tr> <tr><td>D</td><td>E</td><td>SHORTED</td></tr> <tr><td>F</td><td>G</td><td>OPEN</td></tr> </tbody> </table>	FROM PIN	TO PIN	CONTINUITY INDICATION	H	A	OPEN	H	B	OPEN	H	C	OPEN	H	E	OPEN	D	C	SHORTED	D	E	SHORTED	F	G	OPEN	<p>C. Directional signal control lever in RIGHT TURN position</p> <table border="1"> <thead> <tr> <th>FROM PIN</th> <th>TO PIN</th> <th>CONTINUITY INDICATION</th> </tr> </thead> <tbody> <tr><td>F</td><td>G</td><td>SHORTED</td></tr> <tr><td>H</td><td>A</td><td>SHORTED</td></tr> <tr><td>H</td><td>E</td><td>SHORTED</td></tr> <tr><td>H</td><td>B</td><td>OPEN</td></tr> <tr><td>H</td><td>C</td><td>OPEN</td></tr> <tr><td>D</td><td>C</td><td>SHORTED</td></tr> <tr><td>D</td><td>E</td><td>OPEN</td></tr> </tbody> </table>	FROM PIN	TO PIN	CONTINUITY INDICATION	F	G	SHORTED	H	A	SHORTED	H	E	SHORTED	H	B	OPEN	H	C	OPEN	D	C	SHORTED	D	E	OPEN
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<p>B. Directional signal control lever in LEFT TURN position</p> <table border="1"> <thead> <tr> <th>FROM PIN</th> <th>TO PIN</th> <th>CONTINUITY INDICATION</th> </tr> </thead> <tbody> <tr><td>H</td><td>B</td><td>SHORTED</td></tr> <tr><td>H</td><td>C</td><td>SHORTED</td></tr> <tr><td>H</td><td>A</td><td>OPEN</td></tr> <tr><td>H</td><td>E</td><td>OPEN</td></tr> <tr><td>F</td><td>G</td><td>SHORTED</td></tr> <tr><td>D</td><td>E</td><td>SHORTED</td></tr> <tr><td>D</td><td>C</td><td>OPEN</td></tr> </tbody> </table>	FROM PIN	TO PIN	CONTINUITY INDICATION	H	B	SHORTED	H	C	SHORTED	H	A	OPEN	H	E	OPEN	F	G	SHORTED	D	E	SHORTED	D	C	OPEN	<p>D. Directional signal control lever in HAZARD WARNING position</p> <table border="1"> <thead> <tr> <th>FROM PIN</th> <th>TO PIN</th> <th>CONTINUITY INDICATION</th> </tr> </thead> <tbody> <tr><td>H</td><td>A</td><td>SHORTED</td></tr> <tr><td>H</td><td>B</td><td>SHORTED</td></tr> <tr><td>H</td><td>C</td><td>SHORTED</td></tr> <tr><td>H</td><td>E</td><td>SHORTED</td></tr> <tr><td>D</td><td>E</td><td>OPEN</td></tr> <tr><td>D</td><td>C</td><td>OPEN</td></tr> <tr><td>F</td><td>G</td><td>SHORTED</td></tr> </tbody> </table>	FROM PIN	TO PIN	CONTINUITY INDICATION	H	A	SHORTED	H	B	SHORTED	H	C	SHORTED	H	E	SHORTED	D	E	OPEN	D	C	OPEN	F	G	SHORTED
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**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 4. Trailer Connection System Troubleshooting Procedures.*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>ONE OR MORE TRAILER LIGHTS INOPERATIVE</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>For stoplight circuit test, brake pedal must be depressed and air pressure maintained.</p> <p>Test 1. Test trailer receptacle voltage.</p> <ol style="list-style-type: none"> <li>1. Place main light switch lever in position corresponding to inoperative lamp.</li> <li>2. Set multimeter to voltage range that will measure 24 VDC.</li> <li>3. Connect negative lead of multimeter to trailer receptacle pin D. Touch positive lead to appropriate trailer receptacle pin of circuit being tested. Light switch must be in corresponding position.</li> </ol> <p>Test 2. Test trailer receptacle ground.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1 scale.</li> <li>2. Connect negative lead of multimeter to frame ground. Touch positive lead to pin D of trailer receptacle.</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, disconnect and reconnect male connector to ensure positive connection. If trailer lamps still do not light, check trailer lighting system.</li> <li>2. If battery voltage is not present at one or more of the pins being tested, continue with test 2.</li> </ol> <p>If continuity is not present, repair or replace lead 90 (WP 0090 00).</p>



**LIGHTING AND WIPER SYSTEM TROUBLESHOOTING (Contd)**

*Table 5. Electrical Wiper System Troubleshooting Procedures.*

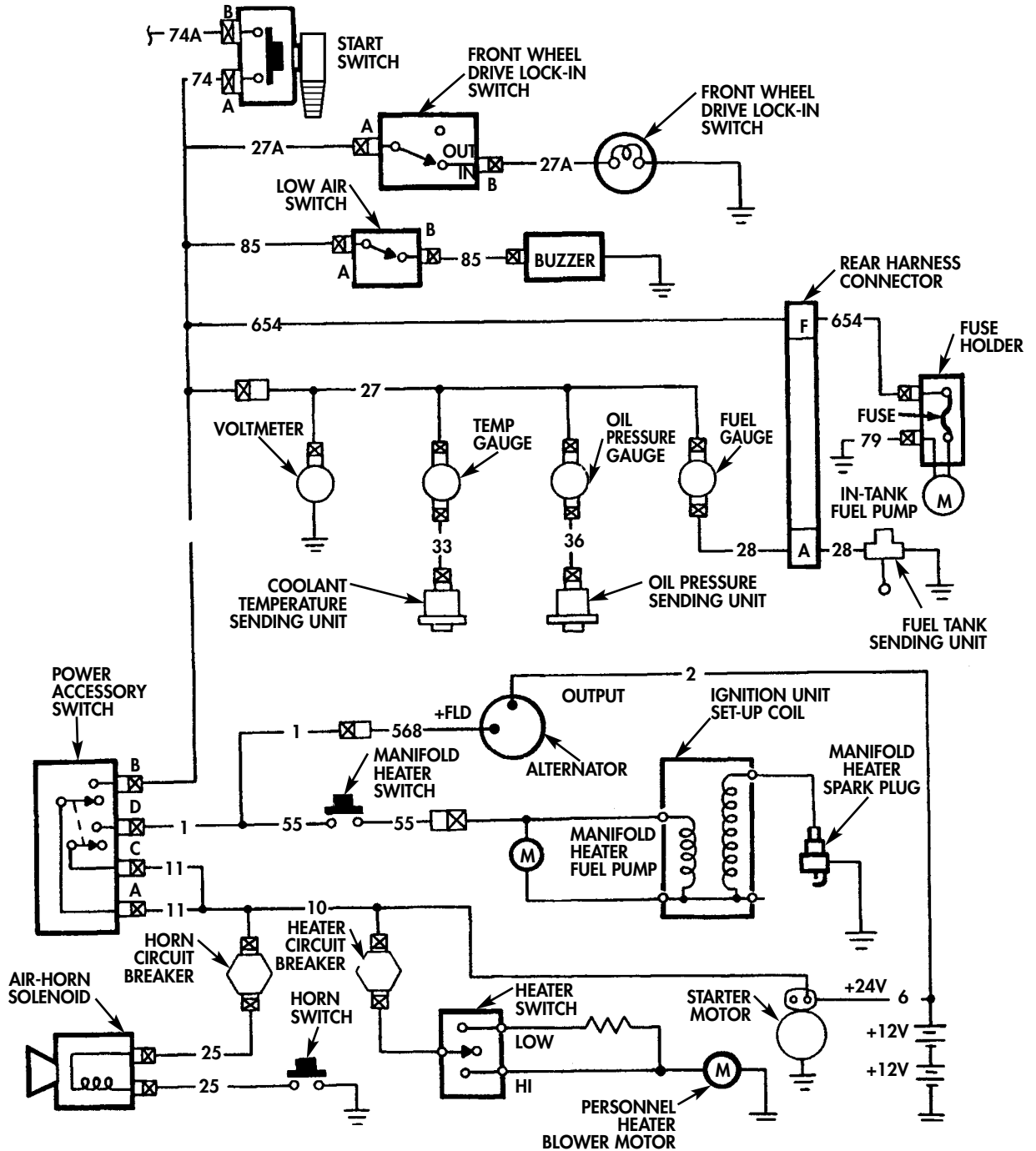
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>WINDSHIELD WIPERS FAIL TO WORK ON HIGH OR LOW SETTING</b></p>	<p>Test 1. Check mechanical linkage for binding or interference.</p> <p>Test 2. Test for voltage at wiper switch.</p> <ol style="list-style-type: none"> <li>1. Ensure wiper switch is properly grounded.</li> <li>2. Disconnect harness from wiper switch.</li> <li>3. Set multimeter to voltage range that will measure 24 VDC.</li> <li>4. Turn power accessory switch to ON position.</li> <li>5. Touch negative lead of multimeter to ground and positive lead to lead 27 of harness receptacle.</li> </ol> <p>Test 3. Test for voltage at wiper motor.</p> <ol style="list-style-type: none"> <li>1. Ensure wiper motor is properly grounded.</li> <li>2. Disconnect harness from wiper motor.</li> <li>3. Turn wiper switch to LOW position.</li> <li>4. Touch negative lead of multimeter to ground and positive lead to pin 2 of harness receptacle.</li> <li>5. Turn wiper switch to HIGH position.</li> <li>6. Touch negative lead of multimeter to ground and positive lead to pin 1 of harness receptacle.</li> </ol>	<p>Replace damaged links (WP 0240 00).</p> <ol style="list-style-type: none"> <li>1. If voltage is present, perform test 3.</li> <li>2. If voltage is not present, go to WP 0012 00, table 2, malfunction 1, test 3, to check operation of power accessory switch.</li> <li>1. If properly grounded, go to step 2.</li> <li>2. If wiper motor is not properly grounded, clean dirt or corrosion from contact end and recheck continuity.</li> <li>1. If voltage is present, go to step 5.</li> <li>2. If voltage is not present, replace wiper switch (WP 0240 00).</li> <li>1. If voltage is present, replace wiper motor (WP 0240 00).</li> <li>2. If voltage is not present, replace wiper switch (WP 0240 00).</li> </ol>



# FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

## INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING

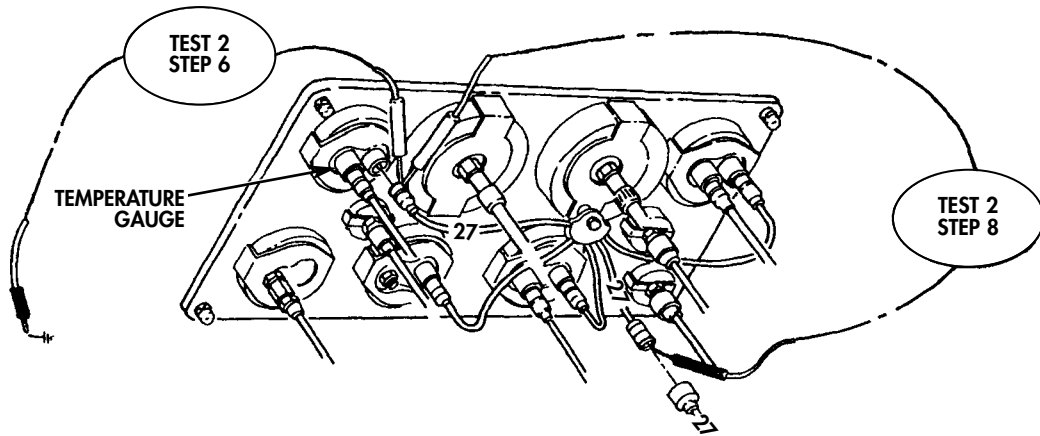


## INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)

Table 1. Indicator, Gauges, and Warning System Troubleshooting.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. ALL GAUGES INOPERATIVE</b>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG31 gauge test (WP 0018 00).</p> <p>Test 1. Test starter for proper operation.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to ON position.</li> <li>2. Turn start button.</li> </ol> <p>Test 2. If problem is still present, test instrument cluster voltage.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Remove instrument cluster panel (WP 0093 00).</li> <li>3. Verify battery ground cable is connected (WP 0126 00).</li> <li>4. Connect jumper wire from instrument panel to good frame ground.</li> <li>5. Disconnect lead 27 from temperature gauge.</li> <li>6. Use multimeter or 24 volt test lamp to check voltage on contact end of lead 27 at gauge.</li> <li>7. Place positive lead on contact end of lead 27.</li> <li>8. Place negative lead on frame ground.</li> <li>9. If battery voltage is present, go to WP 0014 00, table 1, malfunction 2.</li> <li>10. Set multimeter to RX 1 scale.</li> <li>11. Check continuity of lead 27.</li> <li>12. Disconnect lead 27 from front wiring harness.</li> </ol>	<p>Verify that proper voltage is present.</p> <ol style="list-style-type: none"> <li>1. If starter cranks engine, go to test 2.</li> <li>2. If starter does not crank engine go to WP 0012 00, table 2, malfunction 1 and troubleshoot starter circuit.</li> </ol> <p>If continuity is not present, repair or replace lead 27 (WP 0090 00).</p>

INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)



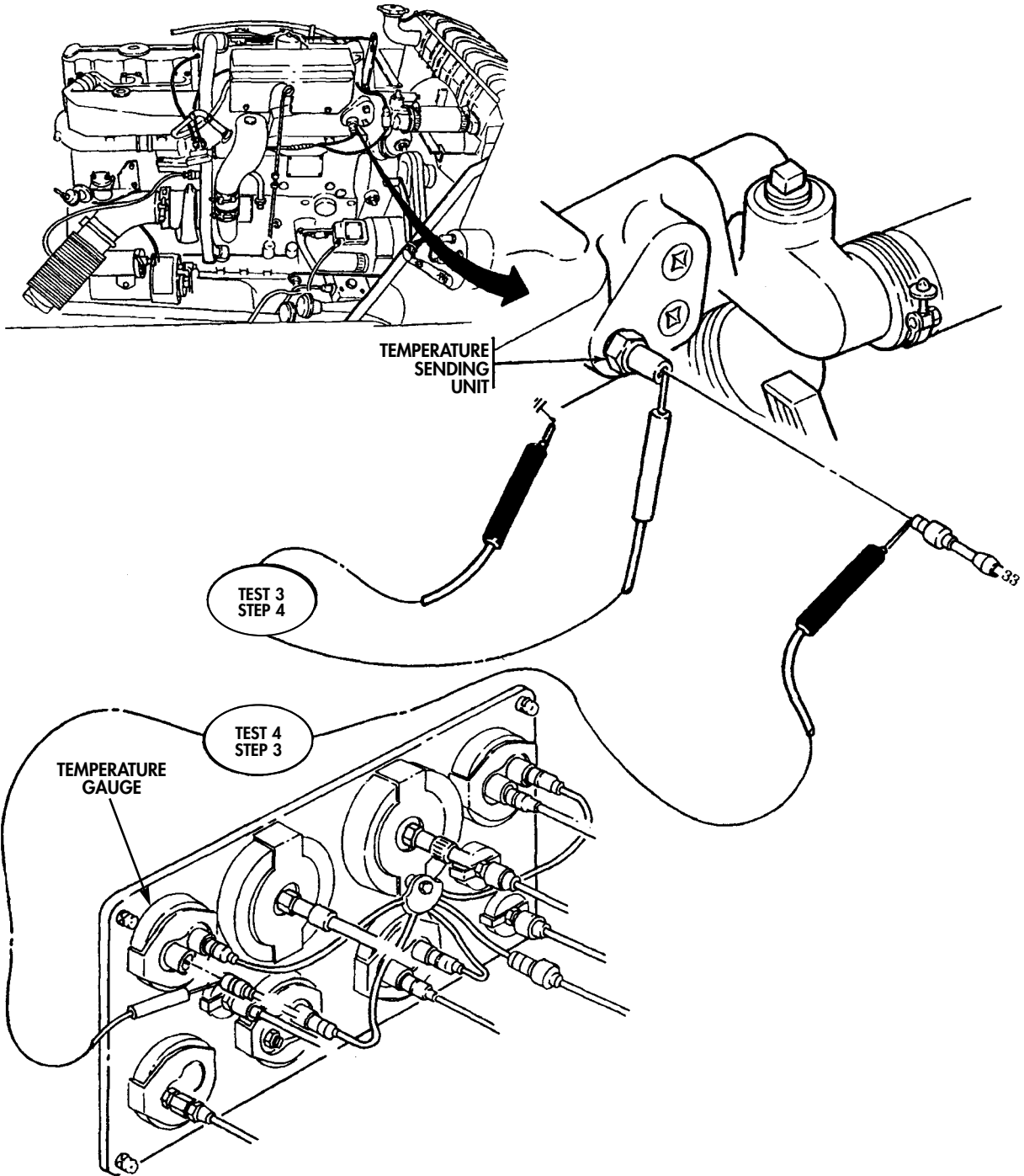
**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. ENGINE TEMPERATURE GAUGE INOPERATIVE</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG31 gauge test (WP 0018 00).</p> <p>Test 1. Test coolant temperature gauge operation.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 33 from coolant temperature sending unit.</li> <li>2. Turn power accessory switch to ON position.</li> <li>3. Coolant temperature gauge should read minimum temperature.</li> <li>4. Touch contact end of lead 33 to frame ground. Coolant temperature gauge should read maximum temperature.</li> </ol> <p>Test 2. Test battery voltage into temperature gauge. Go to WP 0014 00, table 1, malfunction 1, test 2.</p> <p>Test 3. Test temperature-sending unit.</p> <ol style="list-style-type: none"> <li>1. Allow coolant to cool.</li> <li>2. Set multimeter to RX 1 scale.</li> <li>3. Start engine (TM 9-2320-361-10).</li> <li>4. Connect multimeter negative lead to engine ground and positive lead to sending unit. Resistance reading should decrease as engine coolant temperature increases.</li> </ol> <p>Test 4. Check continuity of lead 33.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 33 from temperature gauge.</li> <li>2. Set multimeter to RX 1 scale.</li> <li>3. Touch negative lead of multimeter to contact end of lead 33 at sending unit.</li> <li>4. Touch positive lead of multimeter to other end of lead 33.</li> </ol>	<ol style="list-style-type: none"> <li>1. If coolant temperature gauge operates properly, go to test 3 and check sending unit.</li> <li>2. If coolant temperature gauge does not operate properly, go to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If resistance does not show an decrease as temperature increases, replace temperature sending unit (WP 0107 00).</li> <li>2. If resistance does show a decrease as temperature increases, go to test 4.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, repair or replace lead 33 (WP 0090 00).</li> <li>2. If continuity is present, replace temperature gauge (WP 0095 00).</li> </ol>



INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)



**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

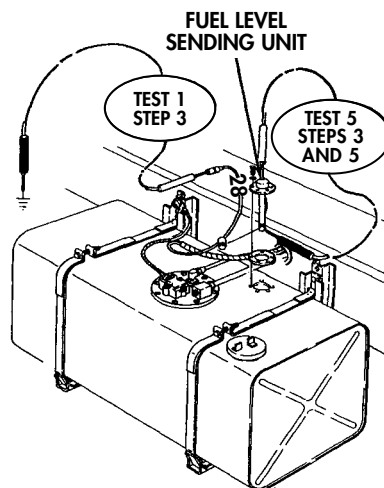
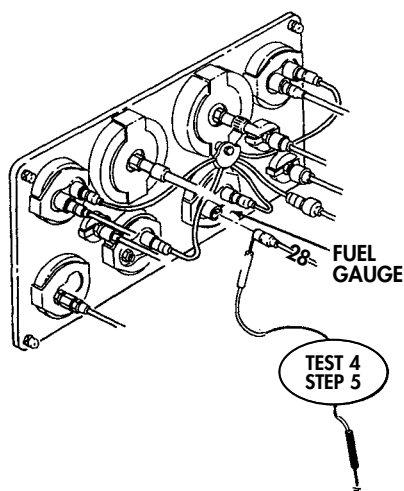
*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>3. FUEL GAUGE INOPERATIVE</b></p>	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Do not perform testing near fuel tank with fill cap or sending unit removed. Fuel may ignite causing injury to personnel.</p> <p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Before performing test, ensure fuel tank is full.</li> <li>• IF STE/ICE-R is available, perform NG 31 gauge test (WP 0018 00).</li> </ul> <p>Test 1. Test for battery voltage to fuel level sending unit.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 28 from fuel level sending unit.</li> <li>2. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>3. Connect negative lead to frame ground and touch positive lead to contact end of lead 28.</li> </ol> <p>Test 2. Test fuel gauge operation.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. With lead 28 already disconnected from sending unit, touch contact end to frame ground.</li> <li>3. Turn power accessory switch to ON position.</li> <li>4. Fuel gauge should read empty.</li> <li>5. Lift lead 28 from frame ground. Fuel gauge should now read full.</li> </ol> <p>Test 3. Test fuel gauge voltage.</p> <p>Go to WP 0014 00, table 1, malfunction 1, test 2, and check battery voltage into fuel gauge.</p>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 2.</li> <li>2. If battery voltage is not present, go to test 3.</li> </ol> <ol style="list-style-type: none"> <li>1. If fuel gauge shows empty, go to step 5.</li> <li>2. If fuel gauge does not show empty, replace fuel gauge (WP 0095 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If fuel gauge shows full, it is operational. Remove fuel level sending unit (WP 0109 00) and go to test 5.</li> <li>2. If fuel gauge does not show full, replace fuel gauge (WP 0095 00).</li> </ol>

**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>3. FUEL GAUGE INOPERATIVE (Contd)</b></p>	<p>Test 4. Test continuity of lead 28.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Disconnect lead 28 from fuel gauge and from fuel level sending unit.</li> <li>3. Connect jumper wire from fuel level sending unit end of lead 28 to frame ground.</li> <li>4. Set multimeter to RX 1 scale.</li> <li>5. Connect negative lead of multimeter to frame ground and touch positive lead of multimeter to contact of lead 28.</li> </ol> <p>Test 5. Test continuity of fuel level sending unit.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1 scale.</li> <li>2. Connect multimeter leads to fuel sending unit.</li> <li>3. Position float in empty position.</li> <li>4. Set multimeter to RX 10 scale.</li> </ol> <p>5. Position float in full position.</p>	<ol style="list-style-type: none"> <li>1. If continuity is present, reconnect lead 28 and recheck fuel gauge operation.</li> <li>2. If continuity is not present, repair or replace wiring (WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If resistance is 0.00–0.50 ohms, go to step 4.</li> <li>2. If resistance is not 0.00–0.50 ohms, replace fuel sending unit (WP 0109 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If resistance is 29.50–31.50 ohms, reinstall fuel level sending unit (WP 0109 00) and recheck gauge operation.</li> <li>2. If resistance is not 29.50–31.50 ohms, replace fuel level sending unit. (WP 0109 00).</li> </ol>

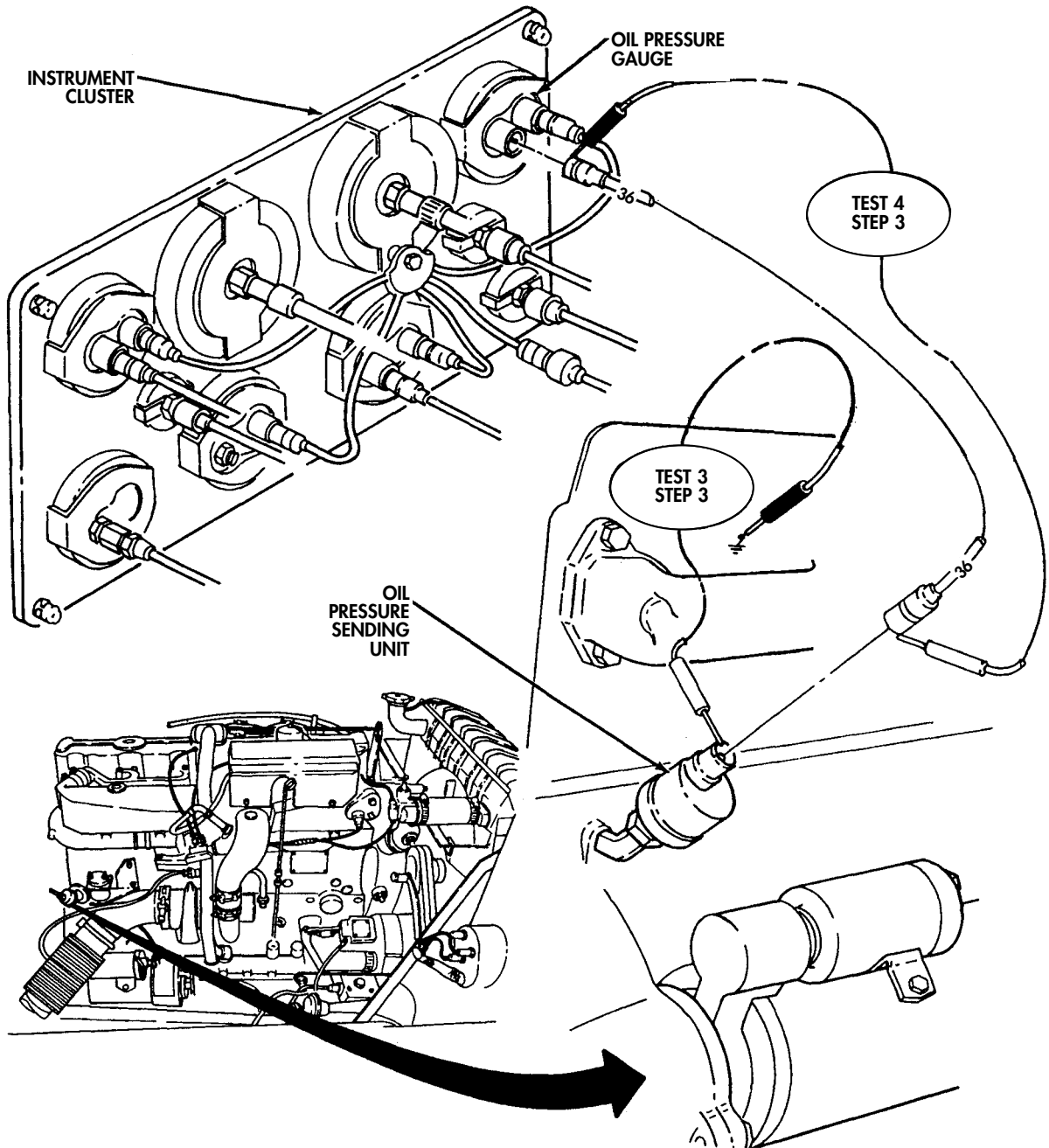


**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>4. OIL PRESSURE GAUGE INOPERATIVE</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>If STE/ICE-R is available, perform NG 31 gauge test (WP 0018 00).</p> <p>Test 1. Test oil gauge operation.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 36 at oil pressure sending unit.</li> <li>2. Turn power accessory switch to ON position.</li> <li>3. Oil pressure gauge should show minimum pressure.</li> <li>4. Touch contact end of lead 36 to frame ground. Oil pressure gauge should show maximum pressure.</li> </ol> <p>Test 2. Test battery voltage to oil pressure gauge. Go to WP 0014 00, table 1, malfunction 1, test 2.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1 scale.</li> <li>2. Connect negative lead to frame ground on engine.</li> <li>3. Touch positive lead to contact of oil pressure sending unit. Resistance should measure less than 1 ohm with engine off (no oil pressure).</li> <li>4. Remove oil pressure sending unit. (WP 0106 00).</li> <li>5. Install mechanical gauge.</li> <li>6. Start engine and check oil pressure on mechanical gauge.</li> </ol> <p>Test 4. Test continuity of lead 36.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 36 from oil pressure gauge.</li> <li>2. Set multimeter to RX 1 scale.</li> <li>3. Touch positive lead of multimeter to one end of lead 36 and negative lead of multimeter to other end of lead 36.</li> </ol>	<ol style="list-style-type: none"> <li>1. If oil pressure gauge operates properly, go to test 3.</li> <li>2. If oil pressure gauge does not operate properly, go to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If resistance is 1 ohm or more, replace oil pressure sending unit (WP 0106 00).</li> <li>2. If resistance is less than 1 ohm, continue with step 4.</li> </ol> <ol style="list-style-type: none"> <li>1. If oil pressure is 10 psi or above at idle, replace oil pressure sending unit (WP 0106 00).</li> <li>2. If oil pressure is less than 10 psi at idle, gauge is accurate. Go to WP 0008 00, table 1, malfunction 13, to diagnose engine.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, repair or replace lead 36 (WP 0090 00).</li> <li>2. If continuity is present, replace oil pressure gauge (WP 0095 00).</li> </ol>

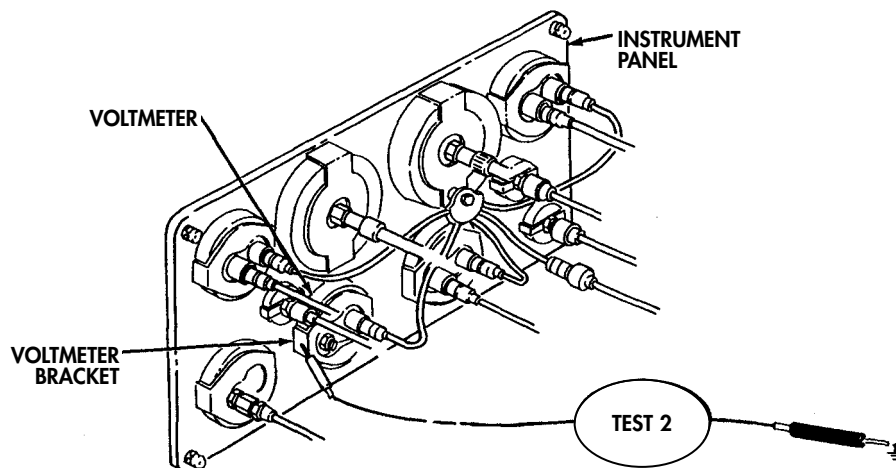
INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)



INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)

Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).

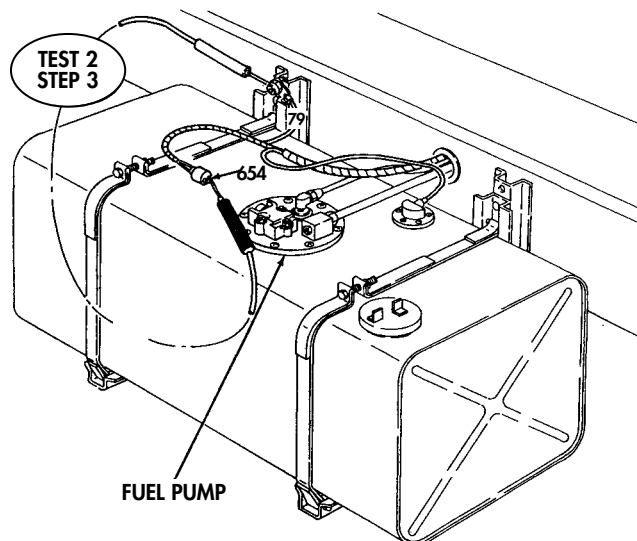
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>5. VOLTMETER INOPERATIVE</b></p>	<p><b>NOTE</b> If STE/ICE-R is available, perform NG 31 gauge test (WP 0018 00). Test 1. Test voltmeter. 1. Turn power accessory switch to ON position. Do not start engine. 2. Voltmeter should rest between lower edge of green area and upper edge of yellow area on gauge (24 volts). 3. Start engine (TM 9-2320-361-10) and observe voltmeter on instrument cluster. 4. Voltmeter should rise as engine speeds up and stop over white dot in green area (approximately 28 VDC). Test 2. Test battery voltage to alternator. Go to WP 0012 00, table 3, malfunction 1, test 3. Check frame ground to multimeter. 1. Set multimeter to RX 1 scale. 2. Connect negative lead to panel ground on instrument panel. 3. Touch positive lead to voltmeter bracket. Continuity should be present. Ensure instrument panel is grounded.</p>	<p>If voltmeter does not perform as specified in steps 2 and 4, stop engine and go to test 2.</p> <p>1. If continuity is present, reinstall instrument panel cluster (WP 0093 00) and recheck instrument panel cluster. 2. If continuity is not present, remove alternator (WP 0085 00) and check for corrosion around alternator body.</p>



INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)

Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>6. IN-TANK FUEL PUMP INOPERATIVE</b></p>	<p>Test 1. Check fuel pump operation.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to ON position.</li> <li>2. Listen or feel for fuel pump humming or vibration at top of pump.</li> <li>3. If vibration can be felt or heard, go to test 4.</li> <li>4. If no vibration can be felt or heard, go to test 2.</li> </ol> <p>Test 2. Test input voltage and ground to fuel pump.</p> <ol style="list-style-type: none"> <li>1. Remove lead 654 from fuel pump.</li> <li>2. Set multimeter to a voltage scale that will measure 24 VDC.</li> <li>3. Connect positive lead of multimeter to lead 654 and negative lead of multimeter to ground lead 79.</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is not present, go to test 5.</li> <li>2. If battery voltage is present, go to test 3.</li> </ol>



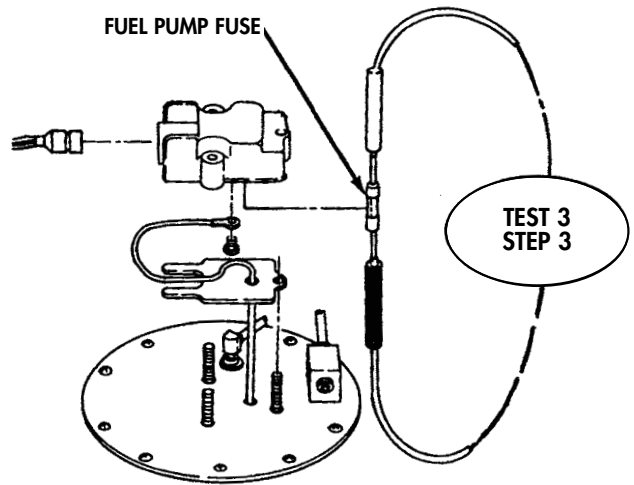
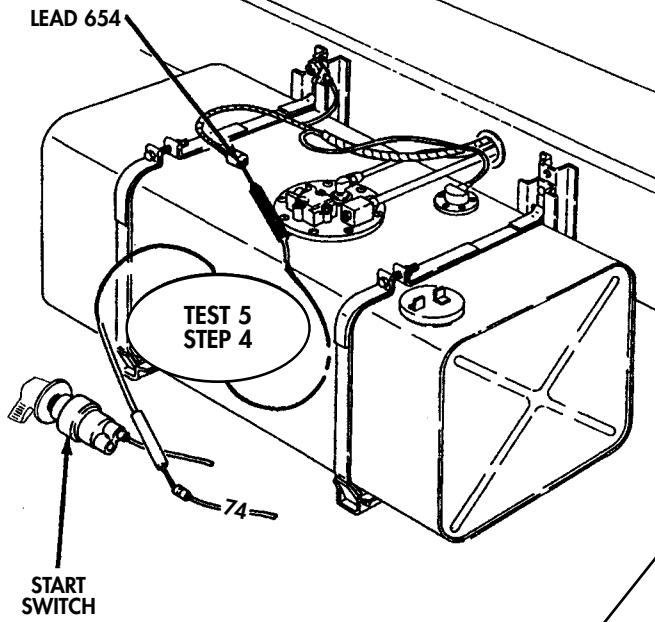
**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>6. IN-TANK FUEL PUMP INOPERATIVE (Contd)</b></p>	<p>Test 3. Test in-tank fuel pump fuse.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Remove fuse holder (WP 0059 00).</li> <li>3. With multimeter set to RX 1 scale, check continuity of fuse. Attach negative lead to one side of fuse. Touch positive lead to other side of fuse.</li> </ol> <p>Test 4. Test fuel pressure delivered by in-tank fuel pump with engine stopped. Go to WP 0006 00, Table 1, malfunction 2, step 5.</p> <p>Test 5. Test continuity of lead 654.</p> <ol style="list-style-type: none"> <li>1. Disconnect negative battery cable (WP 0126 00).</li> <li>2. Disconnect lead 74 from start switch and disconnect lead 654 from fuel pump.</li> <li>3. Set multimeter to RX 1 scale.</li> <li>4. Connect negative and positive leads of multimeter between lead 74 and lead 654.</li> </ol>	<ol style="list-style-type: none"> <li>1. If continuity is not found, replace fuse (WP 0059 00).</li> <li>2. If continuity is present in fuse, go to test 4.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, repair or replace leads 74 and 654.</li> <li>2. If continuity is present, reconnect leads 74 and 654 and recheck fuel pump for proper operation.</li> </ol>



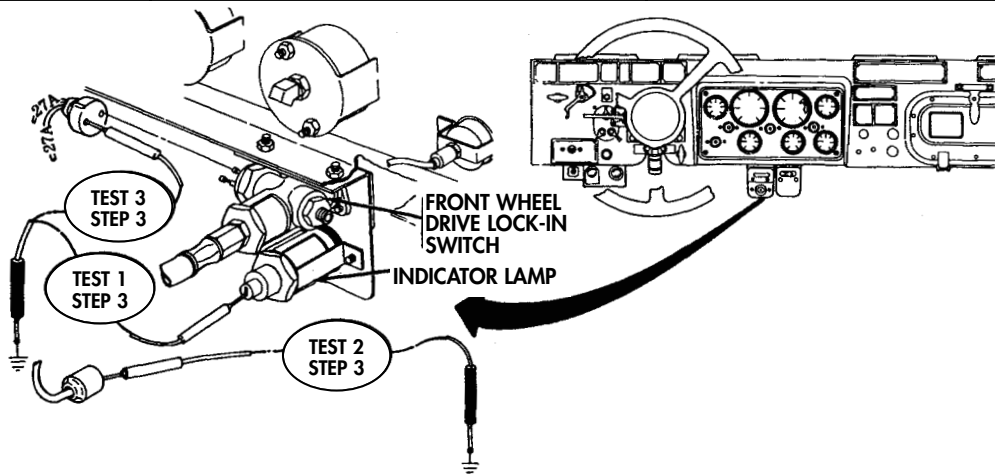
INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)



**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>7. FRONT WHEEL DRIVE INDICATOR LIGHT INOPERATIVE</b></p>	<p>Test 1. Test lamp.</p> <ol style="list-style-type: none"> <li>Place power accessory switch to ON position and service light switch to ON position.</li> <li>Disconnect lead 27A from indicator lamp.</li> <li>Set multimeter to RX 1 scale.</li> <li>Touch positive lead of multimeter to input of indicator lamp and negative lead to frame ground.</li> </ol> <p>Test 2. Test front wheel drive indicator lamp input voltage.</p> <ol style="list-style-type: none"> <li>Disconnect lead 27A from indicator lamp.</li> <li>Set multimeter to a voltage range that measures 24 VDC.</li> <li>Connect multimeter positive lead to 27A and negative lead to frame ground.</li> </ol> <p>Test 3. Test input voltage to front wheel drive lock-in switch.</p> <ol style="list-style-type: none"> <li>Remove lead 27A from pin A of lock-in switch.</li> <li>Connect negative lead of multimeter to frame ground.</li> <li>Touch positive lead of multimeter to lead 27A. Voltage of 24 VDC should be present.</li> </ol>	<ol style="list-style-type: none"> <li>If continuity is present, go to test 2.</li> <li>If continuity is not present, replace indicator lamp (WP 0118 00).</li> </ol> <ol style="list-style-type: none"> <li>If voltage is present, reconnect and go to test 4.</li> <li>If voltage is not present, go to test 3.</li> </ol> <ol style="list-style-type: none"> <li>If voltage is present, replace lock-in switch (WP 0118 00).</li> <li>If voltage is not present, repair or replace lead 27A (WP 0090 00).</li> </ol>



**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

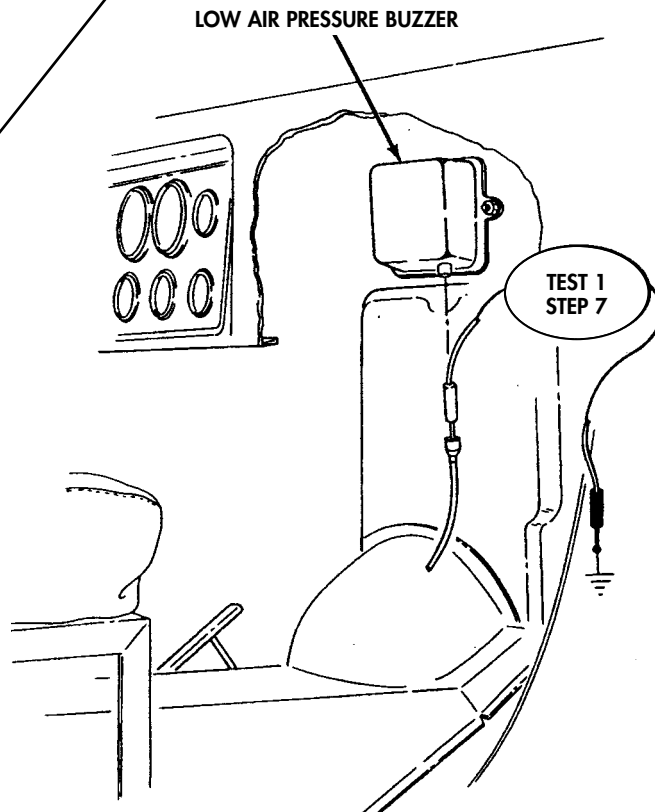
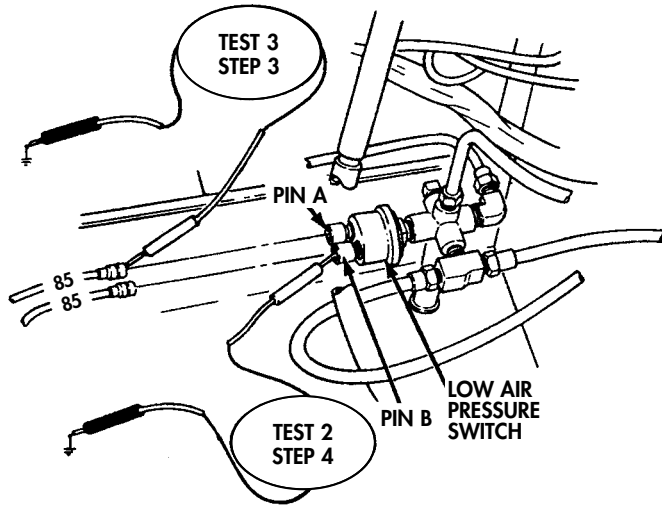
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>8. LOW AIR PRESSURE WARNING SYSTEM DOES NOT COME ON BELOW 60 PSI AND DOES NOT GO OFF ABOVE 66 PSI</b></p>	<p>Test low air pressure switch operation. Air pressure switch should open and close between 54 and 66 psi.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Turn air reservoir drain valve counterclockwise and drain reservoir (TM 9-2320-361-10) to less than 54 psi. Close drain valve.</li> <li>3. Turn power accessory switch to ON position. Buzzer should operate. Warning buzzer should turn off at 66 psi and above.</li> <li>4. Start engine (TM-9-2320-361-10) and allow air pressure to build up in air reservoir.</li> </ol>	<p>If air pressure switch fails either test in step 3 or 4, replace air pressure switch (WP 0108 00).</p>

## INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)

Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>9. LOW AIR PRESSURE WARNING SYSTEM INOPERATIVE</b>	<p>Test 1. Test input voltage to buzzer.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Disconnect lead 85 from buzzer.</li> <li>3. Drain air pressure from air tanks to less than 54 psi (TM 9-2320-361-10). Close drain valve.</li> <li>4. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>5. Turn power accessory switch to ON position.</li> <li>6. Connect negative lead to frame ground.</li> <li>7. Touch positive lead to contact ends of lead 85.</li> </ol> <p>Test 2. Test continuity of low air pressure switch.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Disconnect lead 85 from pin B of low air pressure switch.</li> <li>3. Turn power accessory switch to ON position.</li> <li>4. Connect negative lead of multimeter to frame ground. Connect positive lead of multimeter to pin B of low air pressure switch. Battery voltage should be present.</li> </ol> <p>Test 3. Test voltage into low air switch.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 85 at pin A of low air switch.</li> <li>2. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>3. Connect negative lead to frame ground and touch positive lead to contact end lead 85.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is present, replace low air pressure buzzer (WP 0110 00).</li> <li>2. If voltage is not present, go to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is not present, go to test 3.</li> <li>2. If voltage is present, check continuity of lead 85 connected between pin B of low air switch and buzzer.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is not present, repair or replace lead 85.</li> <li>2. If voltage is present, replace low air buzzer (WP 0110 00).</li> </ol>

INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)



**INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)**

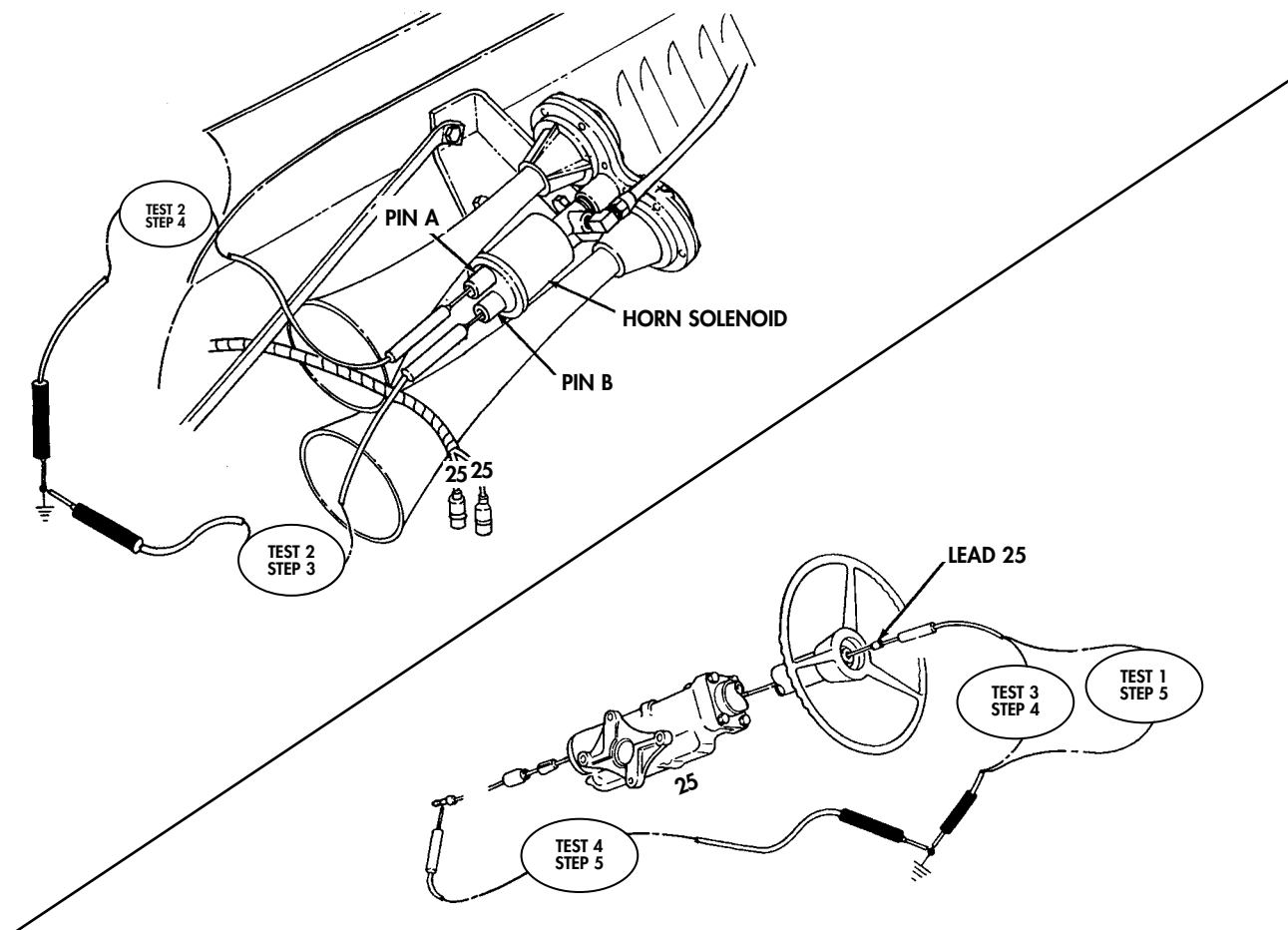
*Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>10. HORN DOES NOT OPERATE</b></p>	<p style="text-align: center;"><b>NOTE</b></p> <p>Troubleshooting of the electrical horn and air horn are the same.</p> <p>Test 1. Test input voltage to horn circuit breaker.</p> <ol style="list-style-type: none"> <li>1. Turn main light switch to SERVICE DRIVE position.</li> <li>2. Remove lead 25 from circuit horn breaker.</li> <li>3. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>4. Connect negative lead to frame ground.</li> <li>5. Touch positive lead to horn circuit breaker contact.</li> </ol> <p>Test 2. Test air horn solenoid.</p> <ol style="list-style-type: none"> <li>1. Remove lead 25 from pin B of air horn solenoid.</li> <li>2. Connect negative lead of multimeter to frame ground.</li> <li>3. Touch positive lead to pin B of solenoid.</li> <li>4. Remove lead 25 connected to pin A of air horn solenoid. Connect negative lead to frame ground. Touch positive lead to contact end of lead 25.</li> </ol> <p>Test 3. Test horn switch input voltage.</p> <ol style="list-style-type: none"> <li>1. Remove horn button (WP 0113 00) until lead 25 can be seen.</li> <li>2. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>3. Connect negative lead to frame ground.</li> <li>4. Touch positive lead to lead 25 contact end.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is not present, replace horn circuit breaker.</li> <li>2. If voltage is present, go to test 2.</li> <li>1. If voltage is present, go to test 3.</li> <li>2. If voltage is not present, go to step 4.</li> <li>1. If voltage is present, replace air horn solenoid (WP 0114 00).</li> <li>2. If voltage is not present, repair or replace lead 25.</li> <li>1. If voltage is not present, repair or replace lead 25 (WP 0090 00).</li> <li>2. If voltage is present, go to test 4.</li> </ol>

INDICATORS, GAUGES, AND WARNING SYSTEM TROUBLESHOOTING (Contd)

Table 1. Indicator, Gauges, and Warning System Troubleshooting (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>10. HORN DOES NOT OPERATE (Contd)</b></p>	<p>Test 4. Test horn switch continuity.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 25 from air horn solenoid to protect multimeter.</li> <li>2. Reinstall horn button cap, spring, and contact (WP 0113 00).</li> <li>3. Set multimeter to RX 1 scale.</li> <li>4. Connect negative lead to a good frame ground.</li> <li>5. Touch positive lead to lead 25 and press down until contact touches base plate.</li> </ol>	<ol style="list-style-type: none"> <li>1. If continuity is present, reconnect lead 25 and recheck horn operation.</li> <li>2. If continuity is not present, remove horn button and clean or replace horn button (WP 0113 00).</li> </ol>



END OF WORK PACKAGE





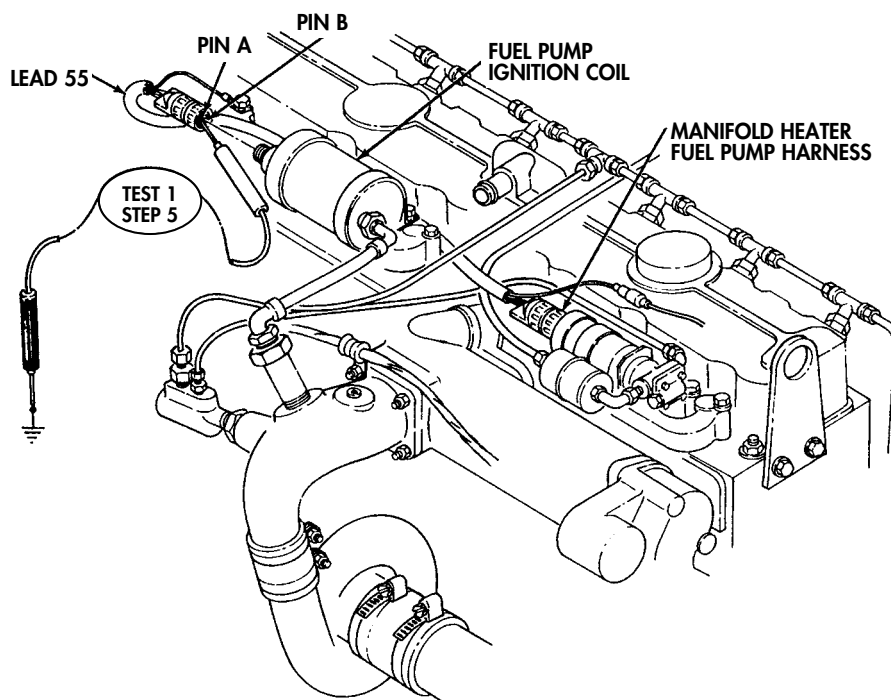
## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HEATING SYSTEMS TROUBLESHOOTING

*Table 1. Heating Systems Troubleshooting Procedures.*

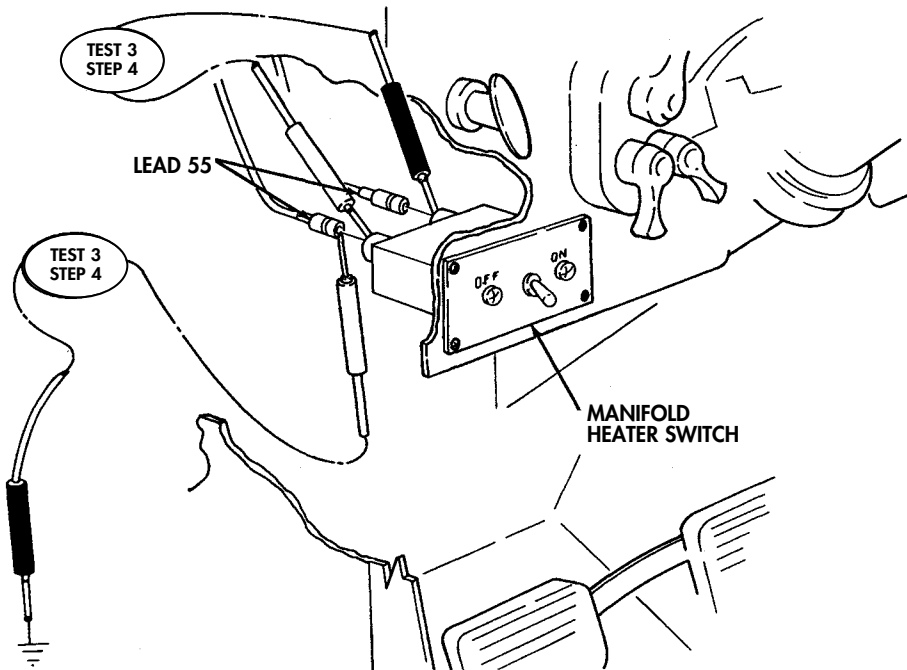
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK</b></p>	<p>Test 1. Test engine manifold heater ignition circuit for battery voltage.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 55 from engine manifold heater ignition unit. Manifold heater fuel pump is now disabled.</li> <li>2. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>3. Turn power accessory switch to ON position.</li> <li>4. Push manifold heater switch and hold.</li> <li>5. Touch positive lead of multimeter to contact end of lead 55 and negative lead to frame ground.</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 4.</li> <li>2. If battery voltage is not present, go to test 2.</li> </ol>



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

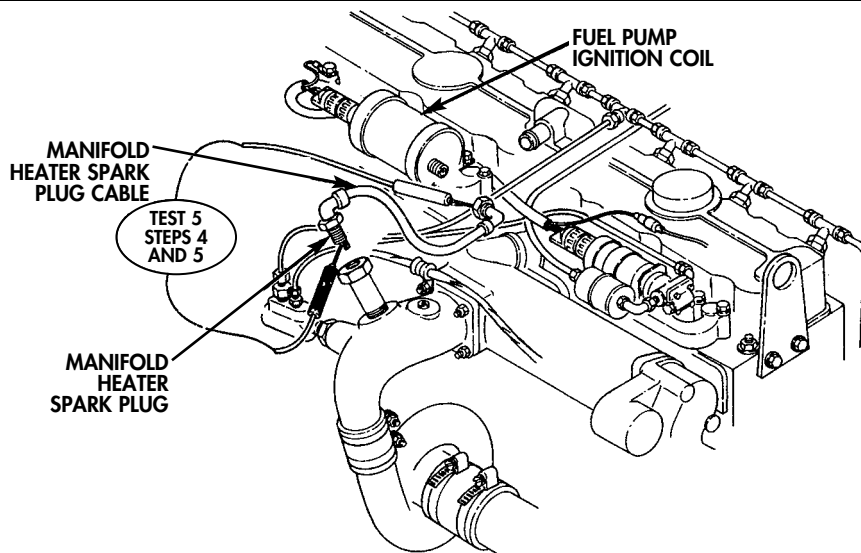
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK (Contd)</b></p>	<p>Test 2. Test input voltage to manifold heater switch.</p> <ol style="list-style-type: none"> <li>1. Disconnect lead 55 at switch input.</li> <li>2. Turn power accessory switch to ON position.</li> <li>3. Connect negative lead of multimeter to frame ground.</li> <li>4. Touch positive lead of multimeter to contact end of lead 55.</li> </ol> <p>Test 3. Test continuity of manifold heater switch.</p> <ol style="list-style-type: none"> <li>1. Turn power accessory switch to OFF position.</li> <li>2. Disconnect lead 55 to manifold heater switch output.</li> <li>3. Set multimeter to RX 1 scale.</li> <li>4. Connect negative lead to one side of switch and touch positive lead to other side. Push manifold heater switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. If battery voltage is present, go to test 3.</li> <li>2. If battery voltage is not present, go to WP 0018 00, table 2, NG81.</li> </ol> <ol style="list-style-type: none"> <li>1. If continuity is not present, replace manifold heater switch (WP 0105 00).</li> <li>2. If continuity is present, reconnect lead 55 to manifold heater switch output and go to test 4.</li> </ol>



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

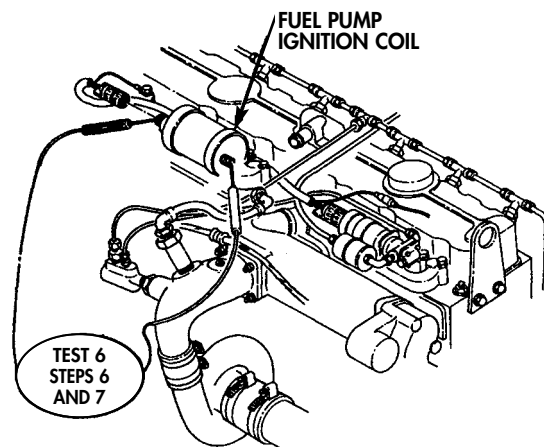
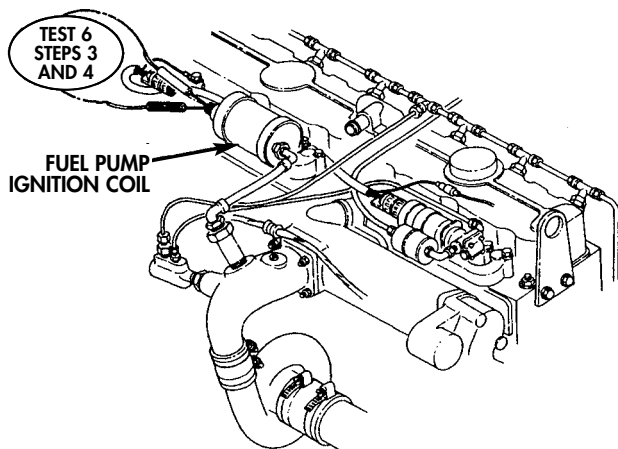
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK (Contd)</b></p>	<p>Test 4. Test manifold heater spark plug.</p> <ol style="list-style-type: none"> <li>1. Remove manifold heater spark plug (WP 0065 00 or WP 0066 00).</li> <li>2. Connect jumper wire from spark plug to engine ground.</li> <li>3. Disconnect wiring harness from manifold heater fuel pump.</li> <li>4. Turn power accessory switch to ON position.</li> <li>5. Position manifold heater switch to START.</li> </ol> <p>Test 5. Test manifold spark plug cable.</p> <ol style="list-style-type: none"> <li>1. Remove cable from manifold heater spark plug (WP 0065 00 or WP 0066 00).</li> <li>2. Remove spark plug cable at ignition coil.</li> <li>3. Set multimeter to RX 1000 scale.</li> <li>4. Touch multimeter negative lead to contact end of spark plug cable at the plug.</li> </ol>	<ol style="list-style-type: none"> <li>1. If spark plug does arc, go to test 9.</li> <li>2. If spark plug does not arc, replace spark plug. (WP 0065 00 or WP 0066 00) and repeat test 4.</li> <li>3. If retest of test 4 fails to produce an arc to engine, go to test 5.</li> </ol>



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

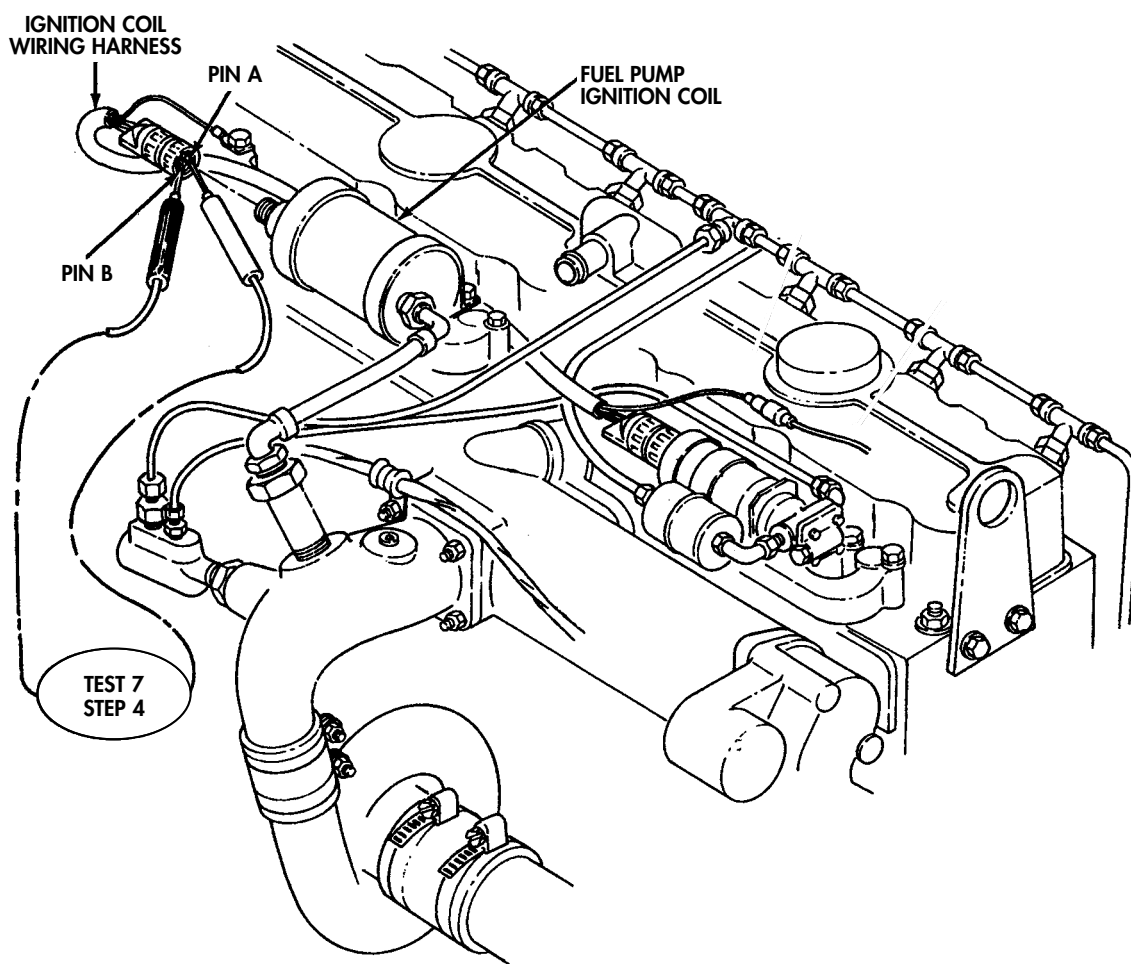
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK (Contd)</b></p>	<p>5. Touch multimeter positive lead to opposite end of spark plug cable.</p> <p>Test 6. Test continuity of ignition coil.</p> <p>1. Disconnect both input and output leads of ignition coil.</p> <p>2. Set multimeter to RX 1000 scale.</p> <p>3. Touch multimeter negative lead to pin B (negative) of ignition coil.</p> <p>4. Touch multimeter positive lead to pin A (positive) of ignition coil.</p> <p>5. Test continuity of ignition coil output.</p> <p>6. Touch multimeter negative lead to pin B (negative) of ignition coil.</p> <p>7. Touch multimeter positive lead to contact end at ignition coil output.</p>	<p>1. If continuity is present go to test 6.</p> <p>2. If continuity is not present, repair or replace spark plug cable (WP 0065 00 or WP 0066 00).</p> <p>1. If continuity is present, go to step 5.</p> <p>2. If continuity is not present, replace ignition coil (WP 0065 00 or WP 0066 00).</p> <p>1. If continuity is present, go to test 7.</p> <p>2. If continuity is not present, replace ignition coil (WP 0065 00 or WP 0066 00).</p>



HEATING SYSTEMS TROUBLESHOOTING (Contd)

Table 1. Heating Systems Troubleshooting Procedures (Contd).

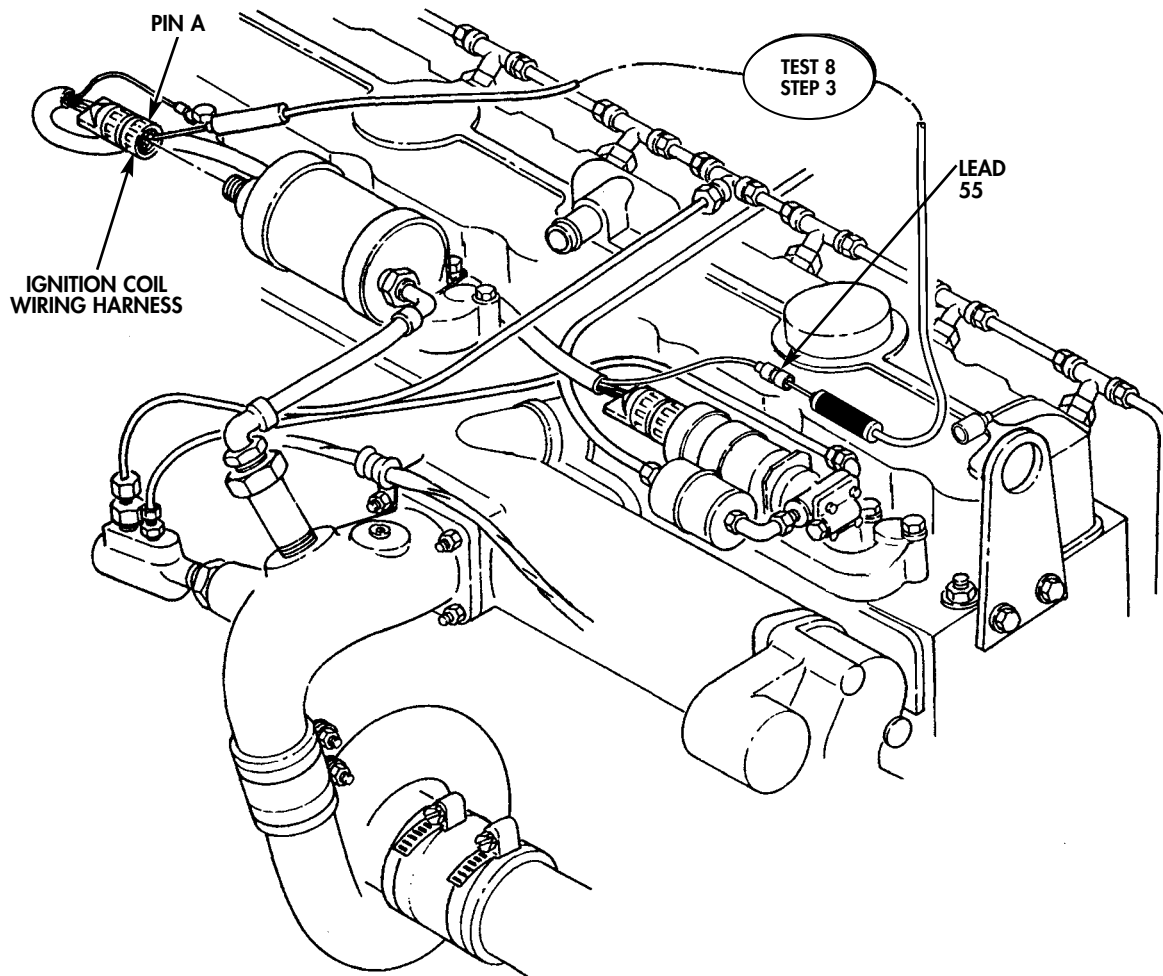
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK (Contd)</b></p>	<p>Test 7. Test fuel pump-to-ignition coil wiring harness.</p> <ol style="list-style-type: none"> <li>1. Disconnect wiring harness input to ignition coil.</li> <li>2. Set multimeter to 24 VDC scale.</li> <li>3. Turn power accessory switch to the ON position and touch multimeter negative lead to pin B (negative) of wiring harness at ignition coil.</li> <li>4. Touch multimeter positive lead to pin A (positive) of wiring harness at ignition coil.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is present, go to test 9.</li> <li>2. If voltage is not present, go to test 8.</li> </ol>



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

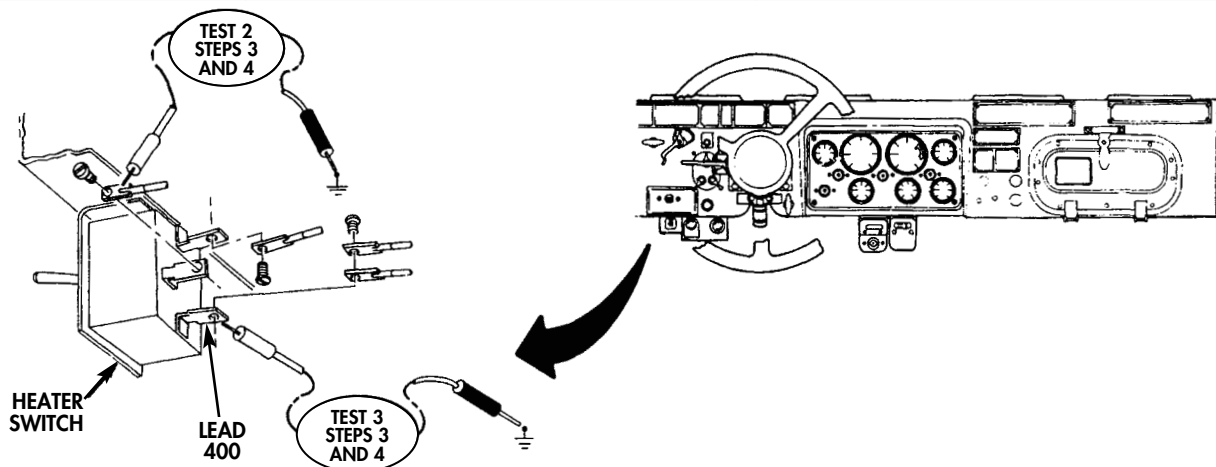
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>1. ENGINE MANIFOLD HEATER DOES NOT WORK (Contd)</b></p>	<p>Test 8. Check continuity of ignition coil harness.</p> <ol style="list-style-type: none"> <li>1. Disconnect ignition coil harness from fuel pump and ignition coil.</li> <li>2. Set multimeter to RX 1.</li> <li>3. Connect multimeter negative lead to lead 55 and multimeter positive lead to pin A.</li> </ol> <p>Test 9. Test manifold heater fuel system.</p>	<ol style="list-style-type: none"> <li>1. If continuity is not present, repair harness (WP 0090 00).</li> <li>2. If continuity is present, go to test 9.</li> </ol> <p>Refer to WP 0006 00, table 3, malfunction 1, steps 2 through 4.</p>



HEATING SYSTEMS TROUBLESHOOTING (Contd)

Table 1. Heating Systems Troubleshooting Procedures (Contd).

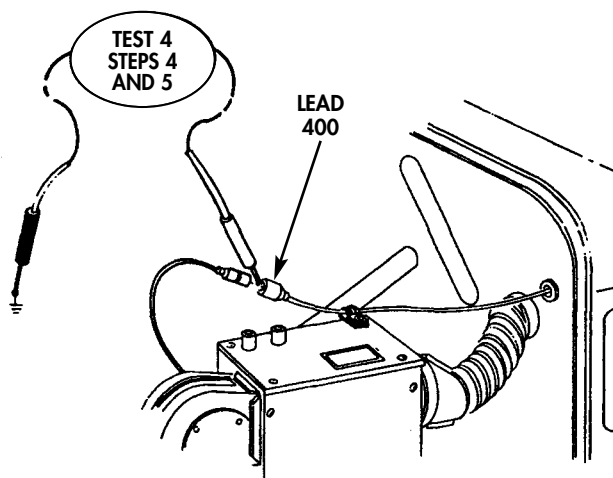
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. HOT WATER PERSONNEL HEATER DOES NOT OPERATE OR DOES NOT OPERATE IN LOW POSITION</b></p>	<p>Test 1. Check horn operation. Place power accessory switch to the ON position. Push horn button.</p> <p>Test 2. Check heater high/low switch for power input.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a range that will measure 24 VDC.</li> <li>2. Disconnect lead 10 at rear of heater switch.</li> <li>3. Touch multimeter positive lead to contact end of lead 10 at heater switch.</li> <li>4. Touch multimeter negative lead to frame ground. Voltage should be present.</li> </ol> <p>Test 3. Test for power output at heater high/low switch.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a range that will measure 24 VDC.</li> <li>2. Reconnect lead 10 and disconnect lead 400 at rear of heater switch at the high switch side. Place switch in the high position.</li> <li>3. Touch positive lead of multimeter to contact end of power output at the heater switch.</li> <li>4. Touch multimeter negative lead to frame ground. Voltage should be present.</li> </ol>	<ol style="list-style-type: none"> <li>1. If horn fails to operate, go to WP 0014 00, table 1, malfunction 10.</li> <li>2. If horn is operational, voltage is present at input of heater circuit breaker. Go to test 2.</li> <li>3. If heater high/low switch operates in high but fails to operate in low, go to test 5.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test 3.</li> <li>2. If voltage is not present, repair or replace lead 10 (WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test 4.</li> <li>2. If voltage is not present, replace heater switch (WP 0116 00).</li> </ol>



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

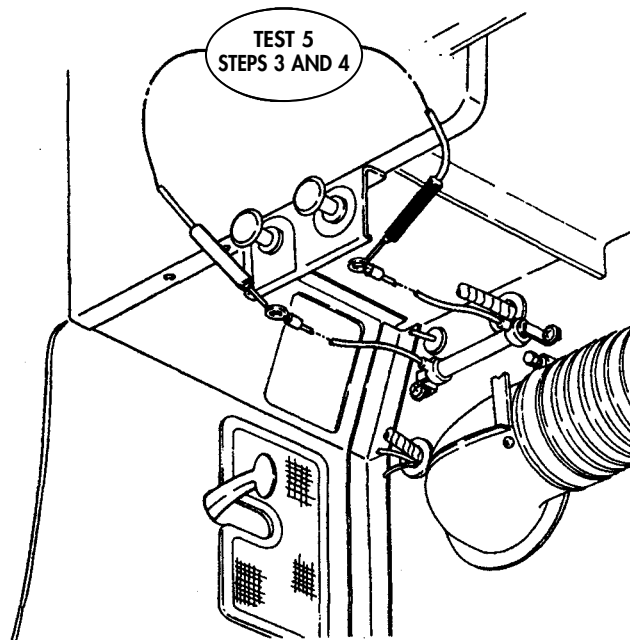
*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>2. HOT WATER PERSONNEL HEATER DOES NOT OPERATE OR DOES NOT OPERATE IN LOW POSITION (Contd)</b></p>	<p>Test 4. Test personnel heater for power input.</p> <ol style="list-style-type: none"> <li>1. Ensure heater switch is in high position.</li> <li>2. Set multimeter to a range that will measure 24 VDC.</li> <li>3. Disconnect lead 400 from personnel heater.</li> <li>4. Touch multimeter positive lead to contact end of lead 400.</li> <li>5. Touch multimeter negative lead to frame ground. Voltage should be present.</li> </ol> <p>Test 5. Test blower motor resistor.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to RX 1.</li> <li>2. Ensure heater switch is set to low position.</li> <li>3. Touch positive lead of multimeter to one lead on resistor.</li> <li>4. Touch negative lead of multimeter to the other end of resistor.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is not present, repair or replace lead 400 (WP 0090 00).</li> <li>2. If voltage is present, and personnel heater fails to operate, replace personnel heater (WP 0250 00).</li> </ol> <p>If resistance is not within tolerance of 4.5 ohms and 5.5 ohms, replace resistor (WP 0117 00).</p>





HEATING SYSTEMS TROUBLESHOOTING (Contd)

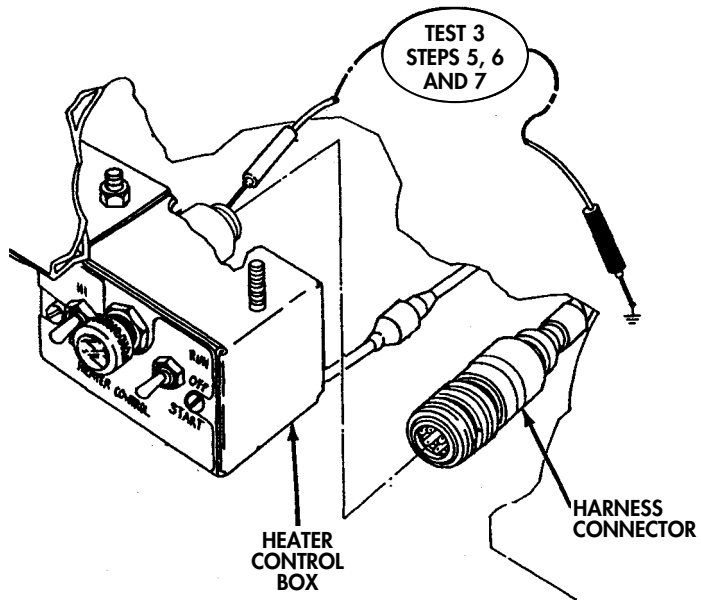
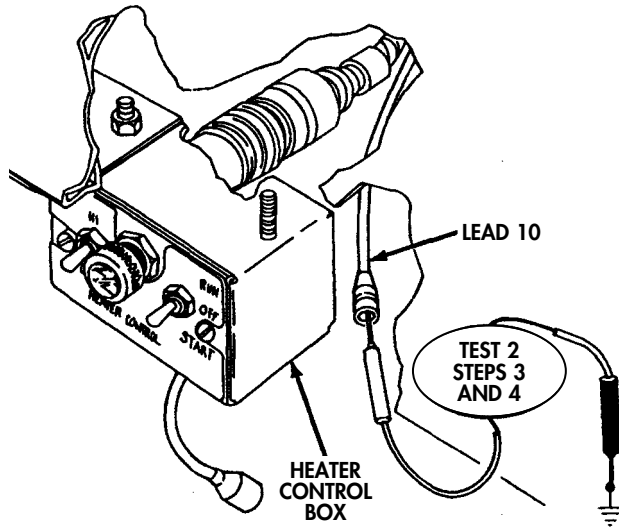


## HEATING SYSTEMS TROUBLESHOOTING (Contd)

Table 1. Heating Systems Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. PERSONNEL FUEL BURNING HEATER INOPERATIVE</b>	<p>Test 1. Check horn operation. Push horn button.</p> <p>Test 2. Test lead 10 for power input to heater control box.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a range that will measure 24 VDC.</li> <li>2. Disconnect lead 10 from heater control box.</li> <li>3. Touch multimeter positive lead to contact end of lead 10.</li> <li>4. Touch negative lead of multimeter to frame ground. Voltage should be present.</li> </ol> <p>Test 3. Check heater control box for power output.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a range that will measure 24 VDC.</li> <li>2. Disconnect harness connector from rear of control box.</li> <li>3. Set heater control switch to start and hold.</li> <li>4. Set heater control heat switch to high.</li> <li>5. Touch positive lead of multimeter to pin A on rear of control box.</li> <li>6. Touch negative lead of multimeter to frame ground.</li> <li>7. Repeat steps 4 and 5 for pins B, C, and D. Voltage should be present.</li> </ol>	<ol style="list-style-type: none"> <li>1. If horn is operational, voltage is present at input of personnel heater circuit breaker, go to test 2.</li> <li>2. If horn fails to operate, go to WP 0014 00, table 1, malfunction 10.</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, go to test 3.</li> <li>2. If voltage is not present, repair or replace lead 10 (WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present at all pins tested, go to test 4.</li> <li>2. If voltage is not present at one or more pins, replace heater control box (WP 0352 00).</li> </ol>

HEATING SYSTEMS TROUBLESHOOTING (Contd)

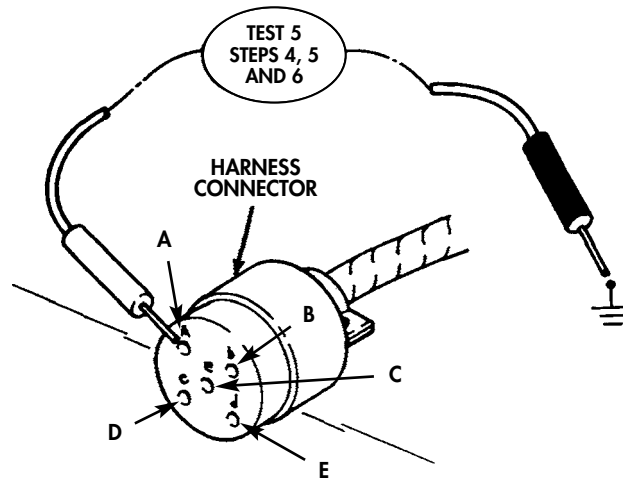
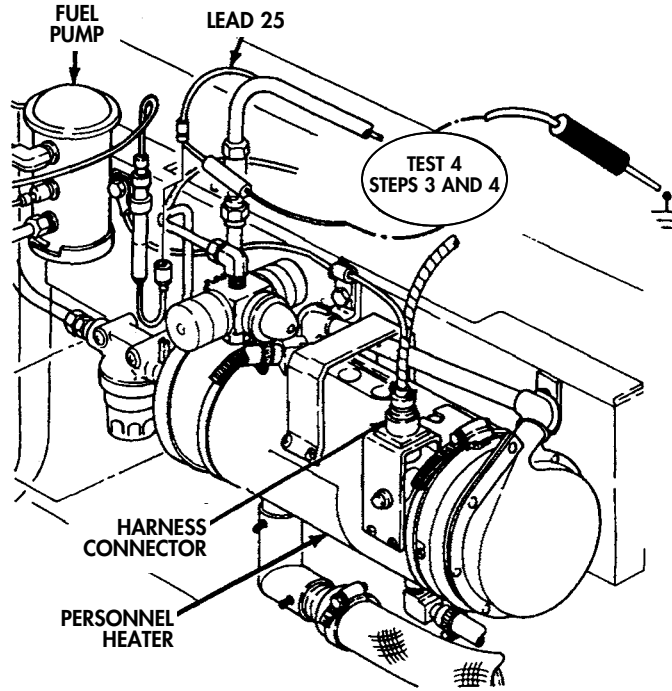


## HEATING SYSTEMS TROUBLESHOOTING (Contd)

Table 1. Heating Systems Troubleshooting Procedures (Contd).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>3. PERSONNEL FUEL BURNING HEATER INOPERATIVE (Contd)</b>	<p>Test 4. Check for input power at fuel pump.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a range that will measure 24 VDC.</li> <li>2. Disconnect lead 25 at fuel pump.</li> <li>3. Touch multimeter positive lead to contact end of lead 25.</li> <li>4. Touch multimeter negative lead to frame ground. Voltage should be present.</li> </ol> <p>Test 5. Check for power input at personnel heater.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a voltage that will measure 24 VDC.</li> <li>2. Disconnect harness connector at personnel heater.</li> <li>3. Set heater control switch to the run position.</li> <li>4. Touch multimeter positive lead to pin A of harness connector.</li> <li>5. Touch multimeter negative lead to frame ground.</li> <li>6. Repeat steps 4 and 5 for pins B, C, and D. Voltage should be present at all pins tested.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is present, check fuel pump for proper operation. Refer to WP 0006 00, table 21, malfunction 2, step 5.</li> <li>2. If fuel pump is operating properly. Go to test 5.</li> <li>3. If voltage is not present, repair or replace lead 25 (WP 0090 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If voltage is present, replace personnel heater (WP 0351 00).</li> <li>2. If voltage is not present at one or more pins, repair or replace harness connector (WP 0090 00).</li> </ol>

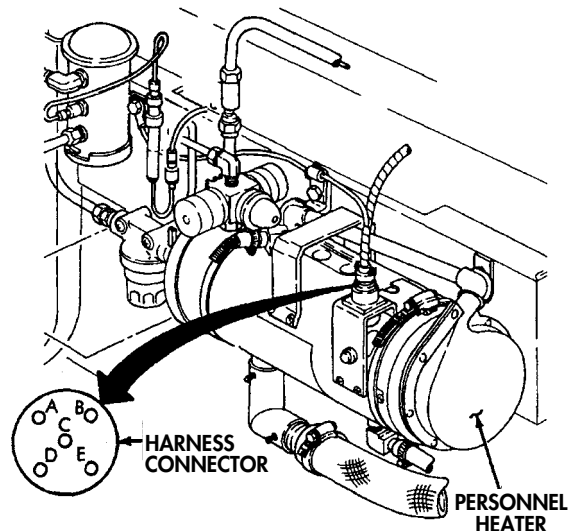
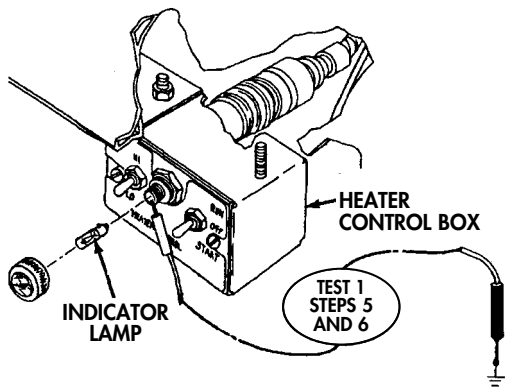
HEATING SYSTEMS TROUBLESHOOTING (Contd)



**HEATING SYSTEMS TROUBLESHOOTING (Contd)**

*Table 1. Heating Systems Troubleshooting Procedures (Contd).*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p><b>4. HEATER CONTROL BOX LIGHT INOPERATIVE, BUT HEATER OPERATIVE</b></p>	<p>Test 1. Check for voltage at heater control box indicator lamp.</p> <ol style="list-style-type: none"> <li>1. Set multimeter to a voltage range that will measure 24 VDC.</li> <li>2. Position heater control switch to RUN.</li> <li>3. Position heater switch to HIGH.</li> <li>4. Remove heater control box indicator lamp.</li> <li>5. Touch positive lead of multimeter to indicator lamp socket.</li> <li>6. Touch negative lead of multimeter to frame ground.</li> </ol> <p>Test 2. Check for voltage between personnel heater and heater control box.</p> <ol style="list-style-type: none"> <li>1. Disconnect wiring harness behind personnel heater control box.</li> <li>2. Connect jumper wire from pin D to pin E at personnel heater.</li> </ol>	<ol style="list-style-type: none"> <li>1. If voltage is present, replace indicator lamp.</li> <li>2. If voltage is not present, go to test 2.</li> </ol> <ol style="list-style-type: none"> <li>1. If heater control box indicator lamp is lit, replace personnel heater (WP 0351 00).</li> <li>2. If indicator lamp fails to light, repair or replace wiring harness (WP 0090 00).</li> </ol>



## FIELD TROUBLESHOOTING

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

#### INTRODUCTION TO SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING

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This work package (WP) contains information that may be used with the STE/ICE-R to locate malfunctions that may occur in M44A2 series trucks.

The STE/ICE-R test set is a tool to help the mechanic troubleshoot and diagnose malfunctions and quickly repair an inoperative system. The STE/ICE-R is used primarily with the vehicle electrical system. The STE/ICE-R is portable and operates on either a 12-volt or 24-volt vehicle battery or equivalent power source.

The STE/ICE-R measures standard voltage, current, resistance, pressure, temperature, and speed. Special tests, such as compression balance tests and starter system evaluations, can be performed by the STE/ICE-R.

The diagnostic tests performed by the STE/ICE-R are used during troubleshooting, during Preventive Maintenance Checks and Services (PMCS), or after replacing parts to isolate malfunctions, anticipate failures, and ensure proper repairs have been made. STE/ICE-R setup and internal checks must be performed prior to testing. Specific setup procedures are listed in WP 0017 00, Engine Go Chain Troubleshooting.

TM 9-4910-571-12&P, Simplified Test Equipment for Internal Combustion Engines, describes the operation and organizational maintenance of the STE/ICE-R system. The manual contains detailed operating procedures for general and specific measurements and lists the diagnostic tests that can be performed.

WP 0017 00, STE/ICE-R Go Chain Troubleshooting, and WP 0018 00, STE/ICE-R No-Go Chain Troubleshooting, also list the diagnostic tests that can be performed. These WPs contain flowcharts that systematically guide the mechanic through the diagnostic tests.

The PMCS charts (WP 0023 00) contain a list of various problems that may occur during operation or inspection of the vehicle. When one of the malfunctions listed occurs, the mechanic proceeds to the associated STE/ICE-R chain index.

The diagnostic tests listed in the TM and WPs cited above cannot cover all possible problems. If a particular malfunction is not covered, refer to the Electrical Troubleshooting System Index (WP 0011 00), and locate the troubleshooting procedure for the malfunctions observed. To obtain the maximum number of observed symptoms, ask the operator.

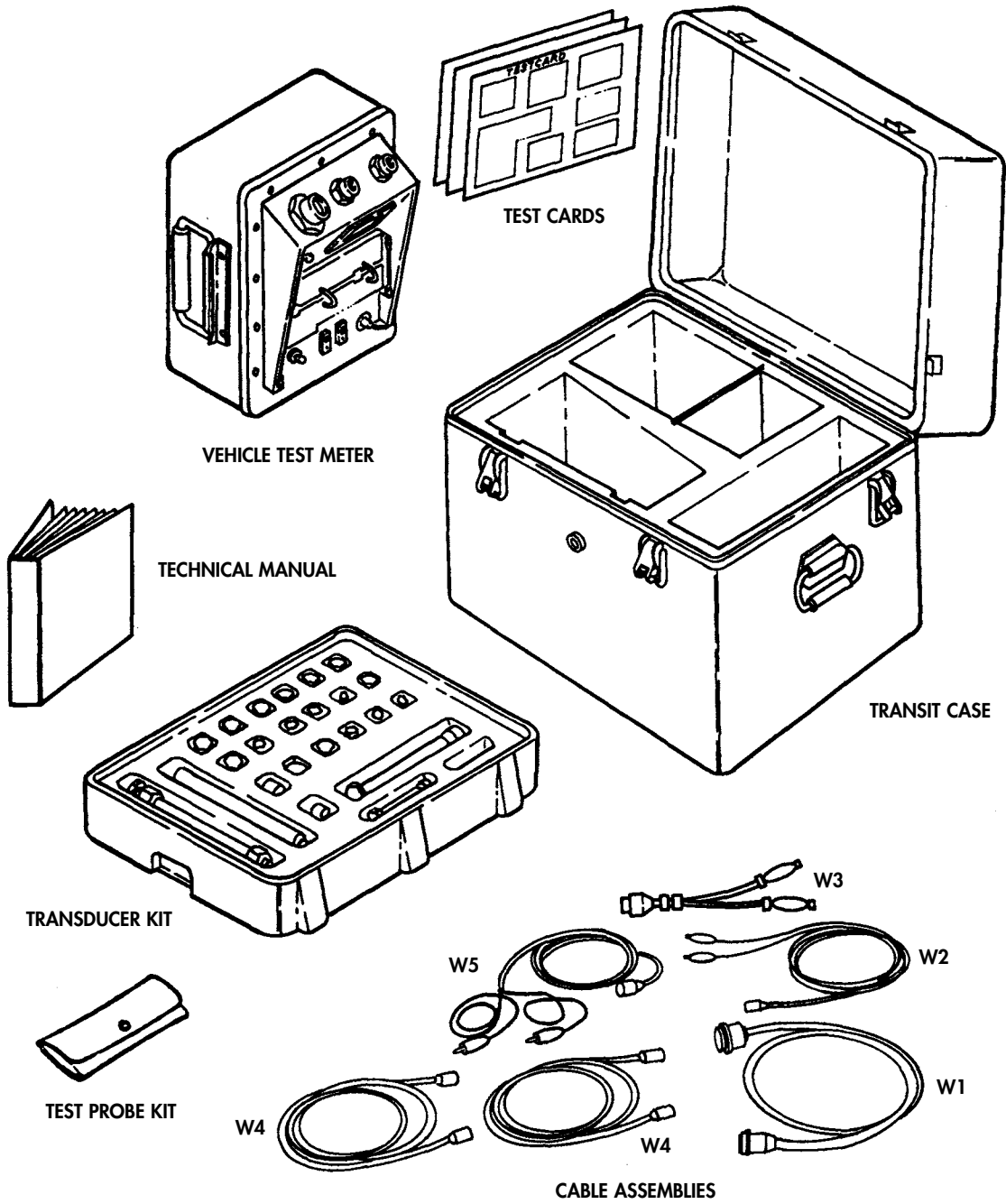
## **SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)**

The STE/ICE-R includes the following equipment:

1. The Vehicle Test Meter (VTM) is a tool for testing electrical and mechanical components.
2. Test Cards are attached to the front of the VTM to provide a quick but limited reference for the mechanic. Test cards list test numbers, messages, and some test procedures.
3. The Transit Case is a portable, protective case that houses the STE/ICE-R equipment and all necessary accessories. A pressure relief valve located on the front of the case allows the operator to release any pressure or vacuum resulting from changes in climate during transit.
4. Cable assemblies are included for power supply and testing. Cables assemblies are referred to by a name that describes how the cable is used. If necessary, two transducer cables (W4) can be joined with the adapter supplied in the transducer kit to make one long cable. When cables are connected, the large key on the cable connector mates with a keyway on the transducer connector or VTM connector for proper installation. If a cable is suspected to be damaged, refer to TM 9-4910-571-12&P for checking cable continuity.
5. The Test Probe Kit contains a variety of clips and probes, which can be attached to the test probe cable W2. These clips and probes allow the user to take different types of measurements (e.g., cable continuity tests, battery tests) with greater ease.
6. The Transducer Kit (TK) is a covered tray inside the transit case that contains necessary equipment to perform various electrical and diagnostic testing.
7. TM 9-4910-571-12&P describes the operation and organizational maintenance of the STE/ICE-R system.



# SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)



## STE/ICE-R EQUIPMENT

## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)

### VTM

The VTM provides a method for technicians to test vehicle electrical and mechanical components. Readings are either pass/fail indications or digital display in units familiar to the technician (psi, rpm, volts, ohms, amps, etc.).

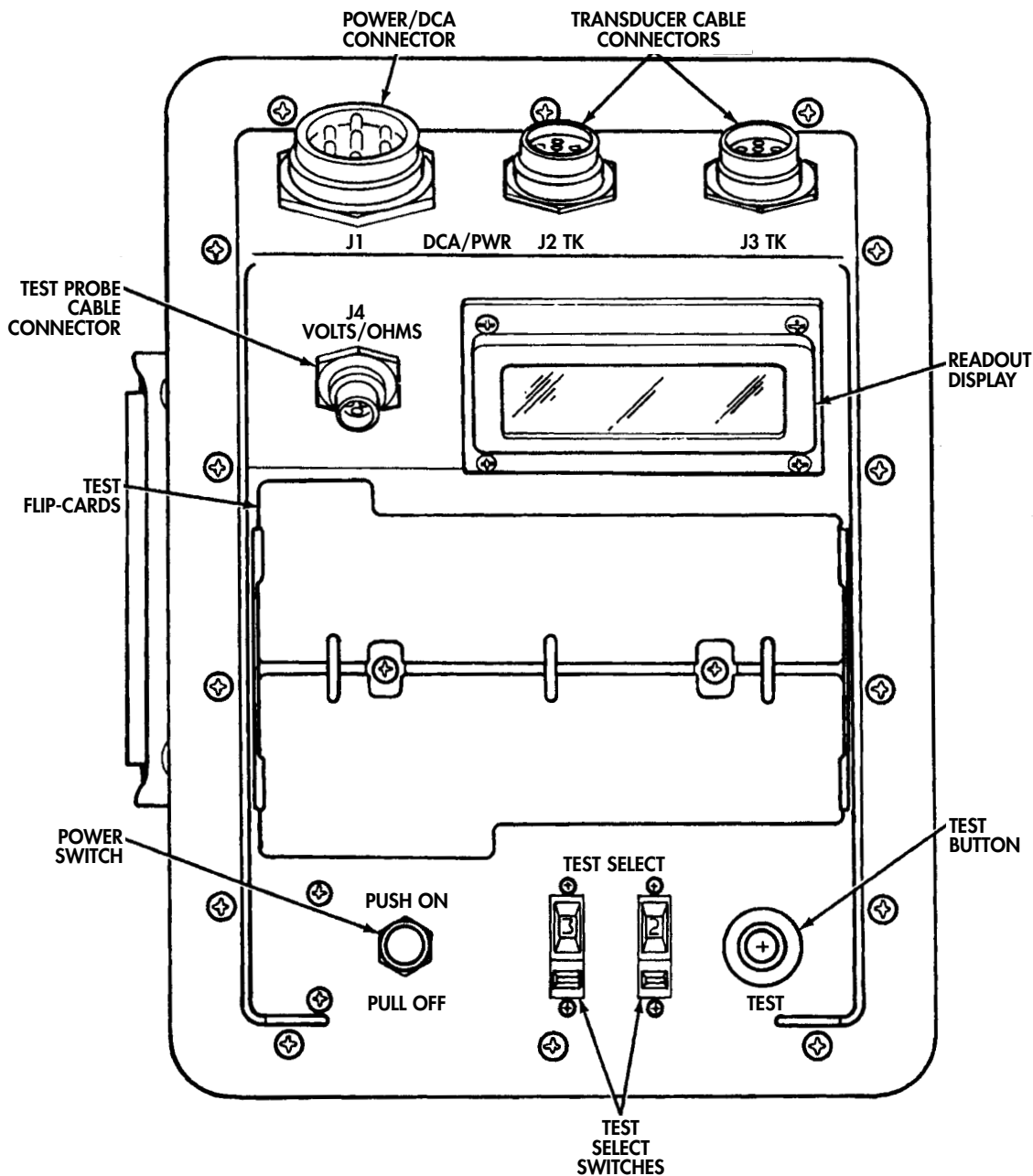
The VTM interfaces with the vehicle directly with a transducer or a set of transducers from the transducer kit. Additional tests can also be done that involve manually probing and/or connecting transducers to appropriate test points. The VTM can be operated on 12 volts or 24 volts drawn from the vehicle batteries or from an alternative power source.

The controls and readout display on the VTM are described below and illustrated on the following page.

1. **POWER/DIAGNOSTIC CONNECTOR ASSEMBLY (DCA) CONNECTOR (J1):** Connector J1 connects to the battery or the DCA by cable W5 to supply power to the VTM.
2. **TRANSDUCER CABLE CONNECTORS (J2 AND J3):** Connectors J2 and J3 connect the VTM to any transducer in the transducer kit. Operating power is supplied to the transducer, and signals from the transducer are supplied to the VTM by cable. Connectors J2 and J3 are identical and can be interchanged with each other or used in combination.
3. **READOUT DISPLAY:** The readout display shows different types of readouts during testing procedures. The readout display has the capability of displaying up to 4 characters (for example .8.8.8.8).
4. **TEST BUTTON:** Pressing and releasing the TEST button causes test measurements to begin. Observe measured values on the readout display. The reading will be in units normally used in a particular vehicle measurement. These units are displayed on the test flip-cards. The TEST button must be pressed and immediately released. Pressing and holding the TEST button initiates an offset test. Offset tests are described in TM 9-4910-571-12&P.
5. **TEST SELECT SWITCHES:** The TEST SELECT switches are used to select the test being performed. There are ten positions on each switch, numbered 0 through 9. The numbers dialed into these switches are read by the VTM when the TEST button is pressed. Changing the position of the switches has no effect until the TEST button is pressed again.
6. **POWER SWITCH (PUSH ON/PULL OFF):** The power switch controls DC power to the VTM. The VTM can operate from either a 12-volt or 24-volt battery system. When the power switch is pushed in (PUSH ON), VTM power is on. To shut off power to the VTM, pull out the power switch (PULL OFF). The power switch contains a 4-amp circuit breaker. If a fault occurs and the VTM uses more power than it should, the power switch will pop out automatically. Check the connection carefully and try again before returning the VTM to support maintenance.
7. **TEST CARDS:** The test cards list the 2-digit test number system for selecting various tests. The cards also summarize test and operating procedures.
8. **TEST PROBE CABLE CONNECTOR (J4):** Connector J4 connects test leads to the VTM when performing manual voltage and resistance tests.

VTM troubleshooting procedures can be found in STE/ICE-R Go Chain Troubleshooting (WP 0017 00). Additional VTM troubleshooting can be found in TM 9-4910-571-12&P, Simplified Test Equipment for Internal Combustion Engines.

### SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)



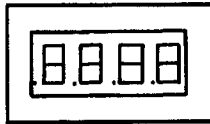
VTM CONTROLS AND READOUT DISPLAY

## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)

### Readout Display

During testing, the Readout Display will show different types of messages to inform the user of the status and results of the test being performed. The messages can be up to four characters long. Described below are the different types of messages that the VTM will display.

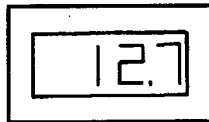
**STATUS READOUT:** A status readout keeps the technician informed of what is happening. For example, .8.8.8.8 is displayed each time the power switch is pushed on. It means that power is applied, and that all elements of the display are operative. It changes to four dashes 1.5 seconds later, indicating that the VTM is ready to be used for testing. The status readout displays are described in table 1.



**PROMPTING MESSAGE:** A prompting message is a technician action message. It is a signal for the operator to do something, such as crank the engine. For example, UEH tells the operator to enter the vehicle identification number into the VTM. After technical action is performed, the test will automatically continue. Prompting messages are listed in table 2.



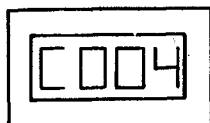
**NUMERICAL READOUT:** A numerical readout is the measured value in units of measurement being made. For example, if 0 to 45 volts DC are being measured and the display shows 12.7, then there are 12.7 VDC present. Units for each test are listed on the test cards.



**ERROR READOUT:** There are 26 different error readouts. All error readouts start with an E. E001 is a typical error readout. An error readout is a warning that the technician omitted a necessary step or otherwise made an error, such as forgot to connect the transducer, selected a wrong test number, failed to start the engine, etc. All error messages must be corrected prior to continuing the test procedures. Error messages are described in table 3. If an error message does not disappear after corrective action, refer to TM 9-4910-571-12&P.



**CONFIDENCE ERROR READOUTS:** Confidence test messages are displayed either as PASS or as a C followed by three numbers. A confidence error is an error message used by VTM repair personnel as an aid in troubleshooting. If a confidence error message appears, refer to TM 9-4910-571-12&P for troubleshooting procedures.



## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)

*Table 1. Status Readouts.*

VTM READOUT	INTERPRETATION
.8.8.8.8	A readout of .8.8.8.8 appears for 1 to 2 seconds each time power is applied to the VTM. It means that there is power to the VTM and all elements of the readout display are operative.
- - - -	A readout of four dashes indicates the following: <ol style="list-style-type: none"> <li>1. After power is turned on, it signifies that the VTM is ready for testing.</li> <li>2. During a compression unbalance test, it signifies testing is in progress.</li> <li>3. During battery condition test, it signifies battery may be in discharged state.</li> </ol>
.9.9.9.9	A readout of .9.9.9.9 indicates that the VTM is reading a test value beyond the range of its measurement. Either the wrong test number is selected for parameters being measured or there is a fault in the vehicle. During a battery condition test, it signifies a bad connection condition or discharged or bad batteries.
PASS/FAIL	Pass or Fail readout is the outcome of a test that checks the condition of a component being measured. A Pass/Fail readout means the component either passes or fails the test.

*Table 2. Prompting Messages.*

VTM READOUT	INTERPRETATION
UEH	Signal to technician to enter Vehicle Identification (VID) numbers on the Test Select switches. VID numbers are found under test data on the flip-cards, on vehicle test cards, and in the appendix of TM 9-4910-571-12&P.
GO	Signal to technician to crank the engine in compression balance or first peak tests. During the battery condition test, indicates a weak battery in series pair of batteries being tested.
CIP	Signal to technician to apply full throttle in a C1 power test.
OFF	Signal to technician to stop cranking in compression balance test.
CAL	Signal to technician to release the TEST button during an offset test.
66	Numbers are used for prompting messages. For example, in the confidence test, 66 signals the technician to dial in 99. In C1 acceleration/deceleration power test No. 12, the first numerical readout signals the technician to shut off fuel.

## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)

### NOTE

If any error message not listed below is displayed, return STE/ICE-R set to field maintenance for repair.

*Table 3. Error Messages.*

VTM READOUT	INTERPRETATION
E000	Technician has requested information that the VTM it does not have; for example, if the technician requests the VID number and it has not yet been entered.
E001	Nonexistent test number has been dialed into TEST SELECT switches.
E002	Required transducer is not connected.
E004	VID number or number of cylinders has not been entered.
E005	Transducer offset test was not performed.
E007*	Conflict between VID number dialed in and the number of cylinders dialed in.
E008	VTM is not receiving required voltage signal for test selected. This error code is related only to starter and compression balance tests.
E009	Engine is not running at start of test.
E010*	Wrong VID number has been entered.
E011	Throttle control was operated incorrectly during power test, taking too much time to accelerate or decelerate.
E012	CI pulse tachometer is missing.
E013	Bad data has been taken for the test in progress. Repeat test one time.
E014*	Wrong number of cylinders has been dialed into VTM.
E015*	No longer used. If E015 appears, turn in VTM for update.
E017	Engine is not running, or ignition adapter is broken or not properly connected.
E018	Engine RPM or AC frequency test was terminated automatically to protect VTM. Termination is only after several minutes of no-signal operation. Most likely, VTM was left on vehicle and engine stalled.
E020	No first peak was detected by VTM during peak-to-peak voltage test.
E021	VTM cannot calculate results. Current is over current probe's range and VTM did not sample correct portion of data.
E022	External voltage was detected in circuit tested while measuring resistance.
E023	VTM's constant voltage source is not working.

## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)

*Table 3. Error Messages (Contd).*

VTM READOUT	INTERPRETATION
E024	Test is not valid for VID entered.
E027	Error in entry of compression unbalance constants.
E028	Test just entered cannot be used with control function 06.
E030	VID entered conflicts with speed transducer attached.
E032	Vehicle's cranking speed is varying too much for a compression unbalance measurement.
E033	Error in entry of power test constants.

\*Different STE/ICE vehicle connectors have different DCA numbers. You can find out what DCA connector is connected by entering test 62. These error messages have a special meaning if connected to DCA number 13 and message is displayed in response to a cylinder (CYL) or UEH (refer to table 2) entry. In these cases, testing may continue, but the message is a warning that tests using CYL and UEH information are normally performed with the VTM connected to a different connector in the vehicle.

## **SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)**

### **Transducer Kit**

The transducer kit contains a pulse tachometer transducer, a pressure and vacuum transducer, and necessary adapters (bushings, plugs, tees, etc.). Also included in the transducer kit are a current probe for measuring current and a test probe cable for measuring voltage and resistance.

Many of the fittings in the transducer kit do not have a part number marked on them and are referred to by the TK item number and name. In table 4, each fitting is identified by an item number, TK item number, part number, and item name.

Before installing any transducer kit item on the vehicle, be sure to clean the mounting surfaces. This is particularly important if you are going to open fuel lines or tap into the manifolds. Dirt particles entering the engine may cause damage to both the engine and transducer kit items. The transducer should be kept clean and free of dirt and grease, and should be handled with reasonable care.

There are two pressure transducers in the transducer kit.

1. TK item number 17 of the transducer kit is a pressure transducer used to measure cylinder compression, oil, fuel, and other pressures in excess of 25 psi. This transducer is marked with a blue stripe around the connector.
2. TK item number 22 of the transducer kit is also a pressure transducer. This transducer is used to measure manifold vacuum pressure, air box pressures, and fuel pressure. This transducer is marked with a red stripe around the connector.

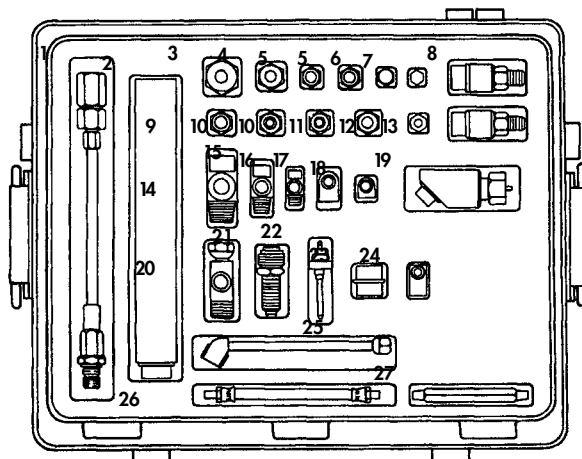
The pressure transducers have a small breather hole on the side of the housing, which should be kept clean and unplugged. Do not use high-pressure shop air to clean the pressure transducers.

The pulse tachometer, TK item number 28 of the transducer kit, is used to sense the speed of combustion engines. Before installing the pulse tachometer, ensure that the slotted hole in the engine tachometer drive shaft is clear and not hard packed with lubricant.

All measuring devices in the transducer kit have an identification resistor within the electrical circuitry. The VTM uses this identification resistor to verify that the correct transducer is connected for the measurement being made. If the correct transducer is not connected for the test being performed, error code E002 will be displayed on the VTM.



## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) TROUBLESHOOTING INTRODUCTION (Contd)



*Table 4. Transducer Kit Parts List.*

ITEM NO.	TK NO.	PART NO.	QTY	ITEM
1	10	11669927	1	Hose and fitting assembly (spark plug adapter)
2	11	12258878	1	Current probe
3	12	12258853-1	1	Pipe thread reducer, 3/4 MPT to 1/4 FPT
4	13	12258853-3	1	Pipe thread reducer, 1/2 MPT to 1/4 FPT
5	14	12258863-2	2	Pipe thread reducer, 3/8 MPT to 1/4 FPT
6	15	444620	1	Hex head plug, 1/4 MPT
7	16	5327970	1	Hex head plug, 1/8 MPT
8	17	12258876	1	Pressure transducer, 0-1000 psig
9	18	12258881	1	Snubber
10	19	3204X2	2	Adapter, 1/8 MPT to 1/4 FPT
11	20	3304X2	1	Coupling reducer, 1/8 FPT to 1/4 FPT
12	21	234X5	1	Male connector, 5/16 tube to 1/4 MPT
13	22	12258877	1	Pressure transducer, 30 in. Hg to 25 psig
14	23	444152	1	Street tee, 1/2 pipe thread
15	24	3750X4	1	Street tee, 1/4 pipe thread
16	25	547002	1	Street tee, 1/8 pipe thread
17	26	12258879-2	1	Street elbow, 1/4 pipe thread
18	27	12258879-1	1	Street elbow, 1/8 pipe thread
19	28	12258875	1	Pulse tachometer
20	29	12258880	1	Fuel line adapter
21	30	MS53099-2	1	Tachometer drive adapter
22	31	7540877	1	Ignition adapter
23	32	MS3119E14-19	1	Adapter (connector to connector)
24	33	12258762	1	Tee, inverted flare
25	34	8840543	1	Air chuck
26	35	11669236	1	Hose assembly, 1/8 MPT
27	36	12258852	1	Pipe nipple, 1/8 MPT

END OF WORK PACKAGE

0016 00-11/12 blank



## FIELD TROUBLESHOOTING

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING

#### INTRODUCTION, TEST DESCRIPTIONS, AND GO CHAIN FLOWCHARTS

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#### INTRODUCTION

To troubleshoot a vehicle problem, the technician uses the Vehicle Test Meter (VTM), transducers, test leads, and vehicle test cards. The VTM performs tests based upon the numbers the technician places in TEST SELECT switches. When the technician dials in the numbers and presses the TEST button, on the VTM, the test is initiated.

For some tests, an offset test is required before the test can be performed. To initiate an offset test, the technician dials in a set of assigned numbers for the required test, presses and holds in the TEST button for several seconds.

#### TEST DESCRIPTIONS

##### Offset Test

The offset test voids characteristic differences between the VTM, test leads, and transducers and also zeros the meters. Once the offset test is performed, the VTM automatically corrects for offsets before displaying measured values. Displayed offset values should be compared to limits on the vehicle test card for the test being performed. If the displayed value is not within limits that are listed on the test card then either the transducer or cable needs to be replaced.

The offset test is performed with a test probe, cable, or transducer connected to the VTM. Care should be taken to see that no stimulus is applied to the transducer. To perform an offset test, dial test number into the TEST SELECT switches. Press and hold the TEST button until prompting message CAL appears on the display. In a few seconds after release of the TEST button, a number will appear. This is a measured offset value associated with the test probe cable or transducer and cable.

##### Control Tests Introduction

Control tests are used to change (or control) the way a vehicle test is displayed, or the way it is run. There are five (5) control tests:

- |  |  |
|--|--|
| 01 Interleave (displays RPM with next test). | 04 Display peak-to-peak value for next test. |
| 02 Display minimum value for next test.      | 05 Initiate full power simulation.           |
| 03 Display maximum value for next test.      |  |

Control tests 01, 02, 03, and 04 specify action to be taken by the next test only. A subsequent test will reset the control.

##### Control Test 1

Interleave test (Test 01) alternately measures engine speed and a second parameter such as fuel pressure or alternator voltage. To initiate interleave, dial 01 into TEST SELECT switches and press and release the TEST button. The prompting message PASS will signal the technician to dial in a second test number and again press and release TEST button.

##### Control Test 2

Minimum Value Test, (Test 02), displays minimum value measured during a test. To initiate a minimum value display, dial 02 into TEST SELECT switches and press and release TEST button. The prompting message PASS will signal the technician to dial in desired test number and again press and release TEST button. The minimum value is displayed and updated whenever a lower minimum value is measured. Entering 02 and test number again will reset process and a new minimum value will be displayed.

## SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)

### TEST DESCRIPTIONS (Contd)

#### Control Test 3

Maximum Value, (Test 03), displays maximum value measured during a test. To initiate a maximum value display, dial 03 into TEST SELECT switches and press and release TEST button. The prompting message PASS will signal the technician to dial in the desired test number and again press and release TEST button. The maximum value is displayed and updated whenever a higher maximum value is measured. Entering 03 and test number again will reset process and new maximum value will be displayed.

#### Control Test 4

Peak-to-Peak Value, (Test 04), displays peak-to-peak value of dwell (test 16), alternator output volts (test 82), 45-volts DC (test 89), 1500 amps DC (test 90), and battery volts (test 67). Electrical peak-to-peak is for measuring dwell variation. To start peak-to-peak measurement, dial 04 into TEST SELECT switches and press TEST button. The prompting message PASS will signal the operator to dial in one of five test numbers (16, 82, 89, 90, 67) and again press TEST button.

#### Control Test 5

Test 05 differs from the previous four control tests in several ways. First, it must be preceded by a number-of-cylinders entry (test 58) or Vehicle Identification Number (VID) entry (test 60). After the number of cylinders or VID has been entered, and engine is warm and idling, 05 is dialed into the TEST SELECT switches, and the TEST button is pressed. The prompting message SIP will signal the operator to press accelerator to the floor. The VTM will monitor engine speed during acceleration, and at approximately 3500 RPM, the VTM will begin full power simulation. Simulation will continue until the operator releases accelerator. PASS message is displayed when simulation starts. A measurement can now be made during power simulation by dialing desired test number and pressing TEST button. New test and control functions can be selected until accelerator is released. The 05 control feature provides a more accurate indication of engine performance than does testing under unloaded conditions.

### GO CHAIN FLOWCHARTS

#### NOTE

Test GO1, VTM connections and checkout, must be performed before running any other STE/ICE-R test.

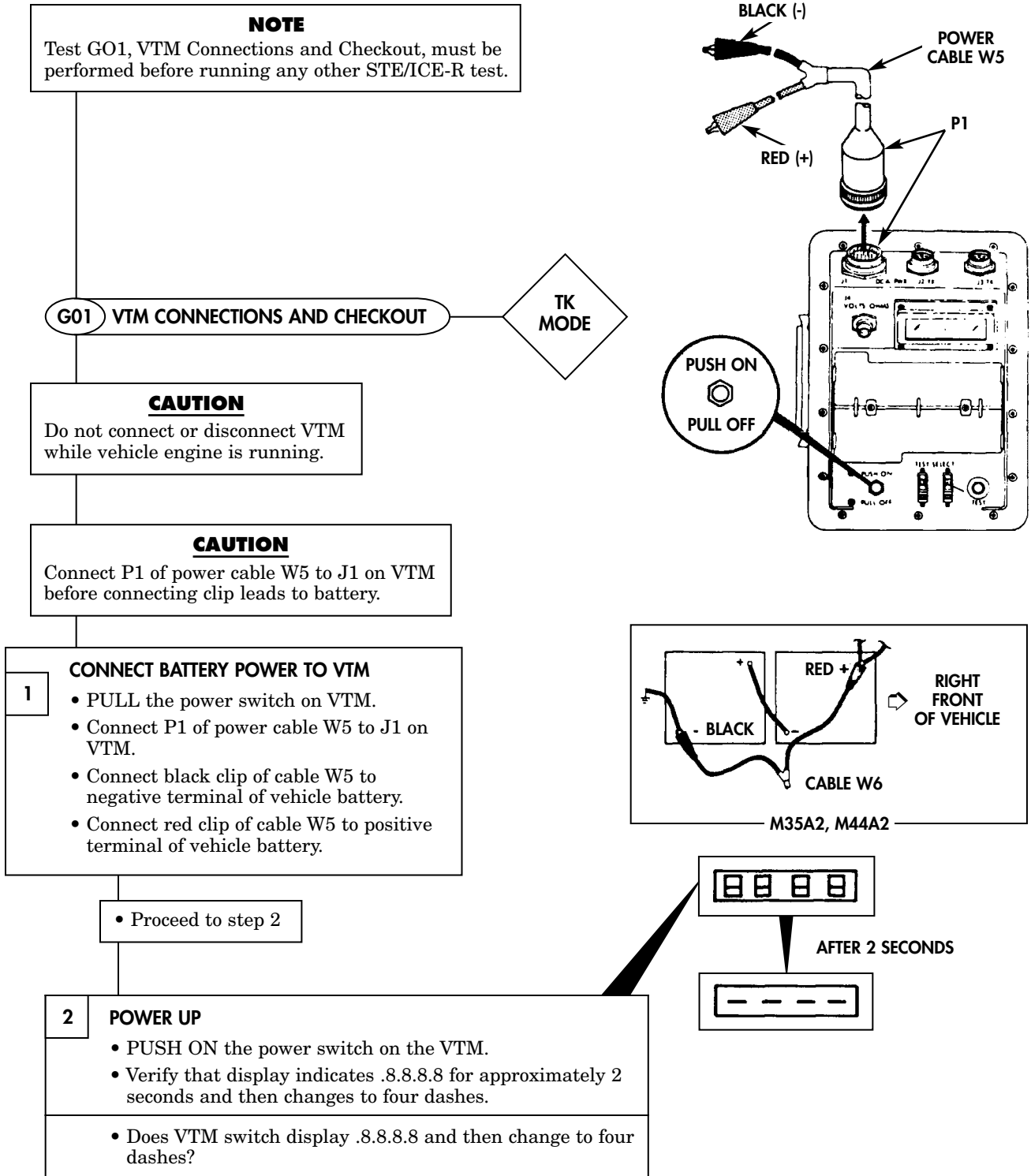
The next section of this Work Package (WP) contains Go Chain flowcharts, which will assist the technician in diagnosing problems with STE/ICE-R. Table 1, lists the Go Chain along with the page the flowchart can be found.

*Table 1. Go Chain Index, TK Mode.*

GO TEST NUMBER	TEST TITLE	WORK PACKAGE-PAGE NUMBER
GO1	VTM connections and checkout	0017 00-3
GO2	First peak test	0017 00-8
GO3	Pulse tachometer installation	0017 00-10
GO4	Engine start-lubrication check	0017 00-11
GO5	Charging circuit and battery voltage test	0017 00-14
GO6	Engine warm up/coolant check	0017 00-16
GO7	Governor check/power test	0017 00-18
GO8	Idle speed/governor check	0017 00-20
GO9	Compression unbalance test	0017 00-21

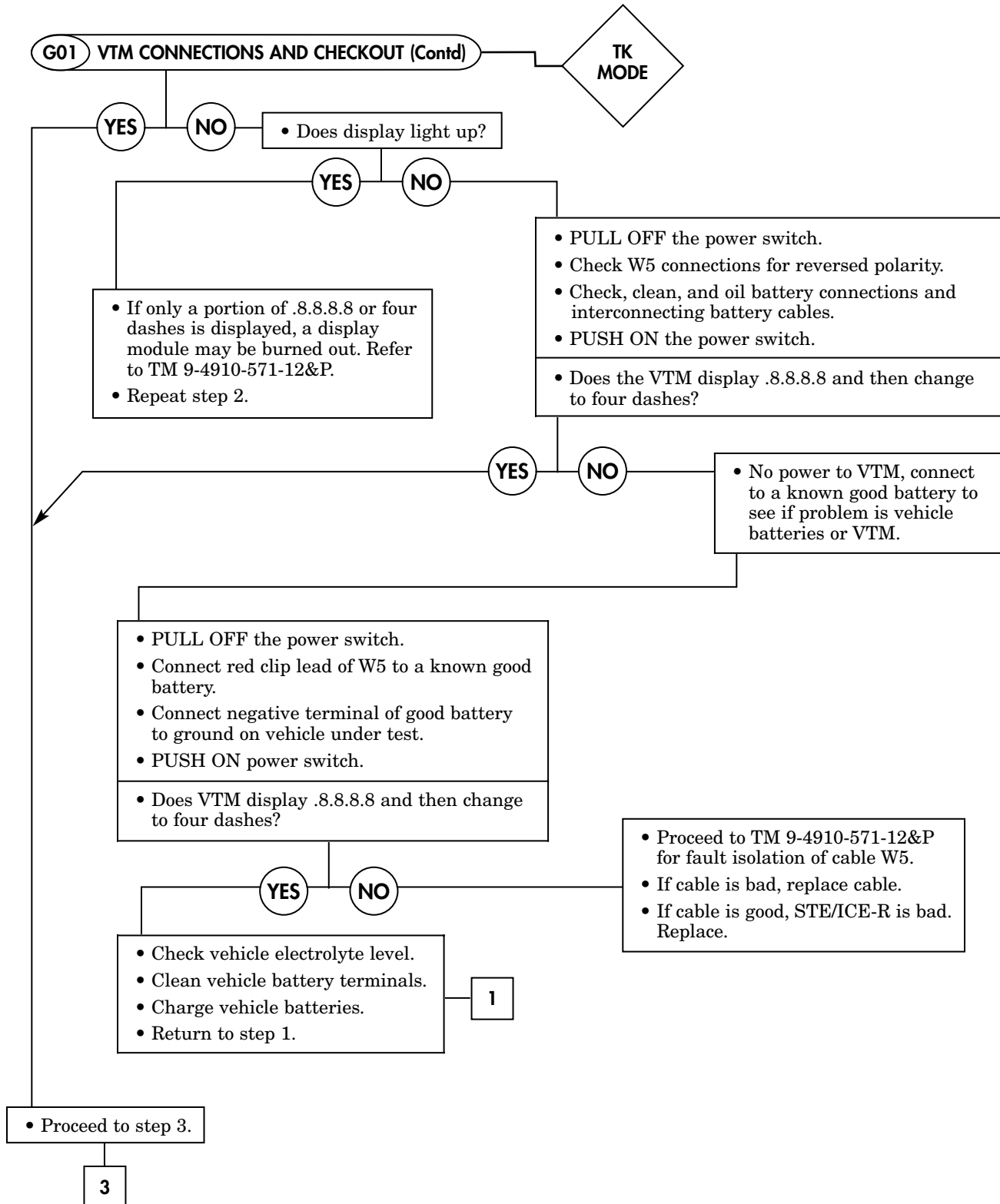
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test.*



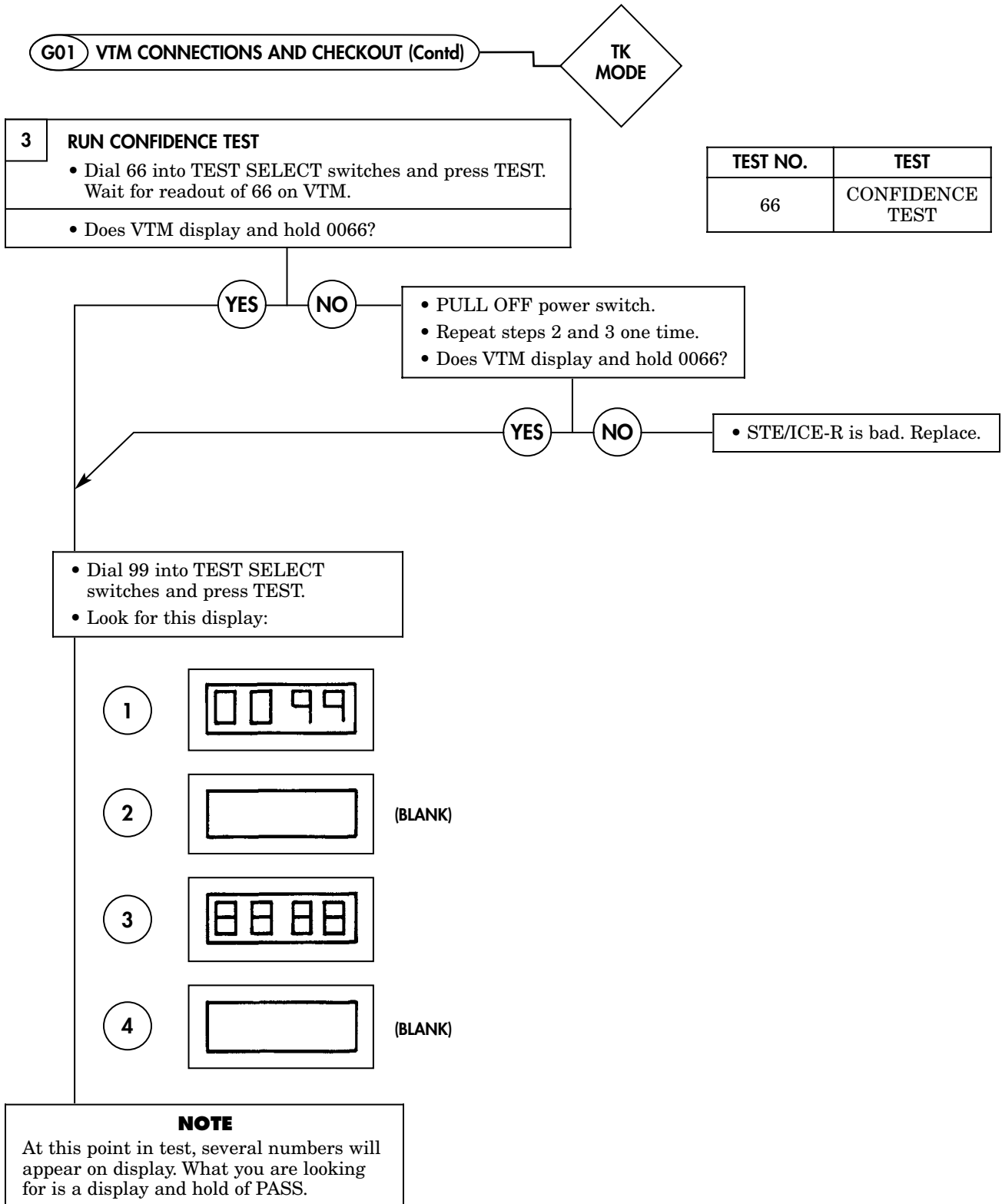
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



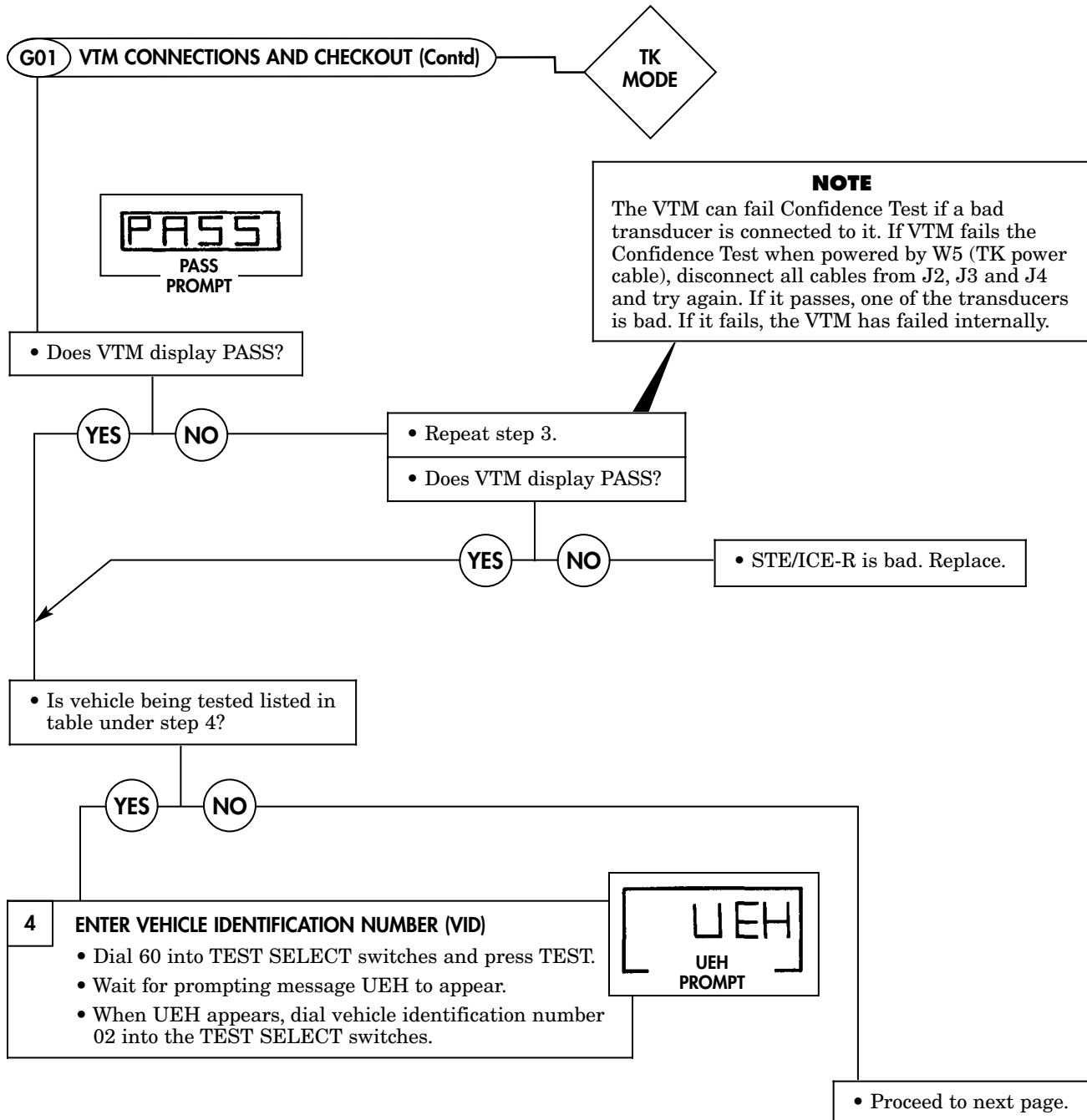
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

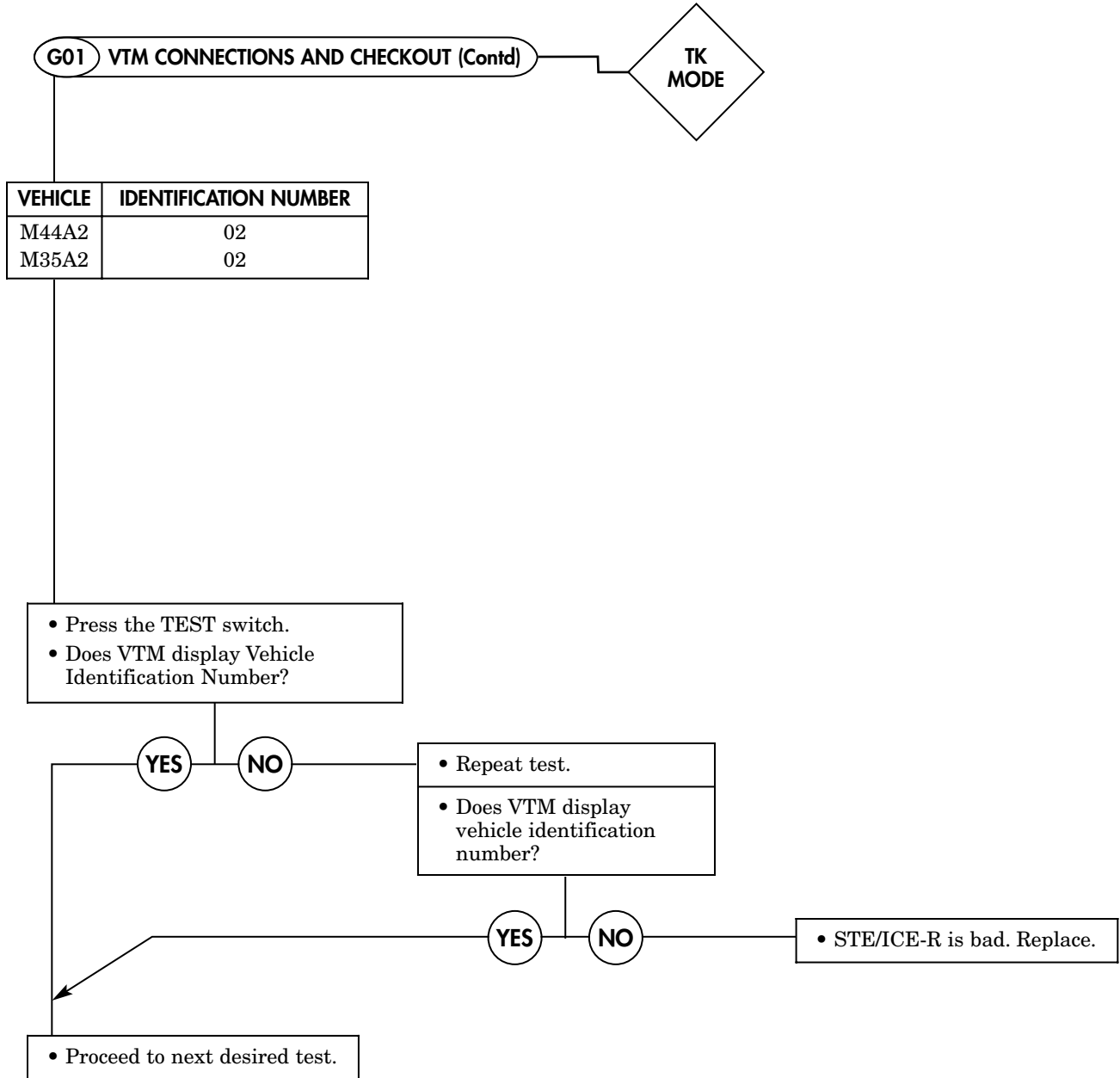
*Table 2. STE/ICE-R Go Chain Test (Contd).*





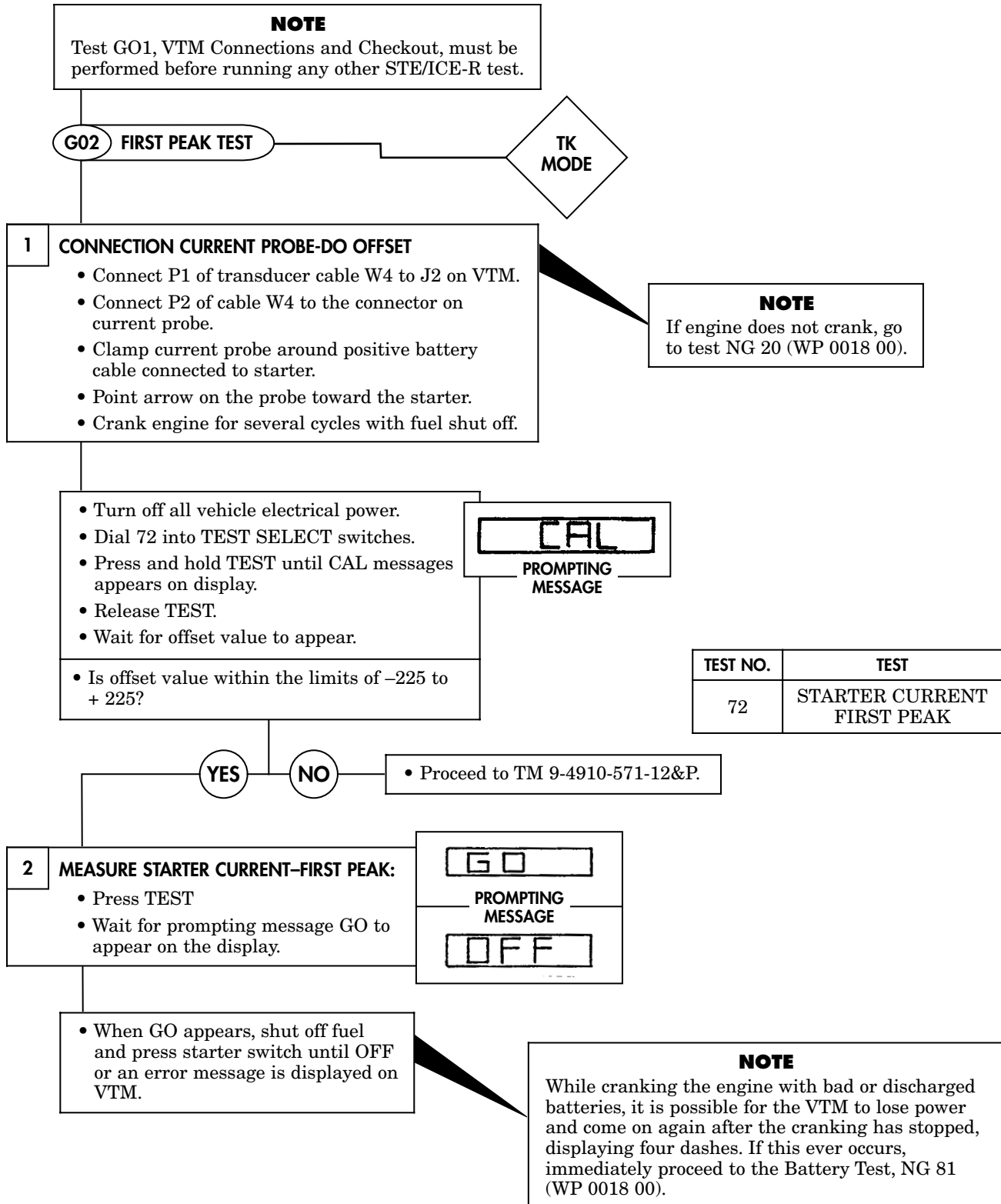
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



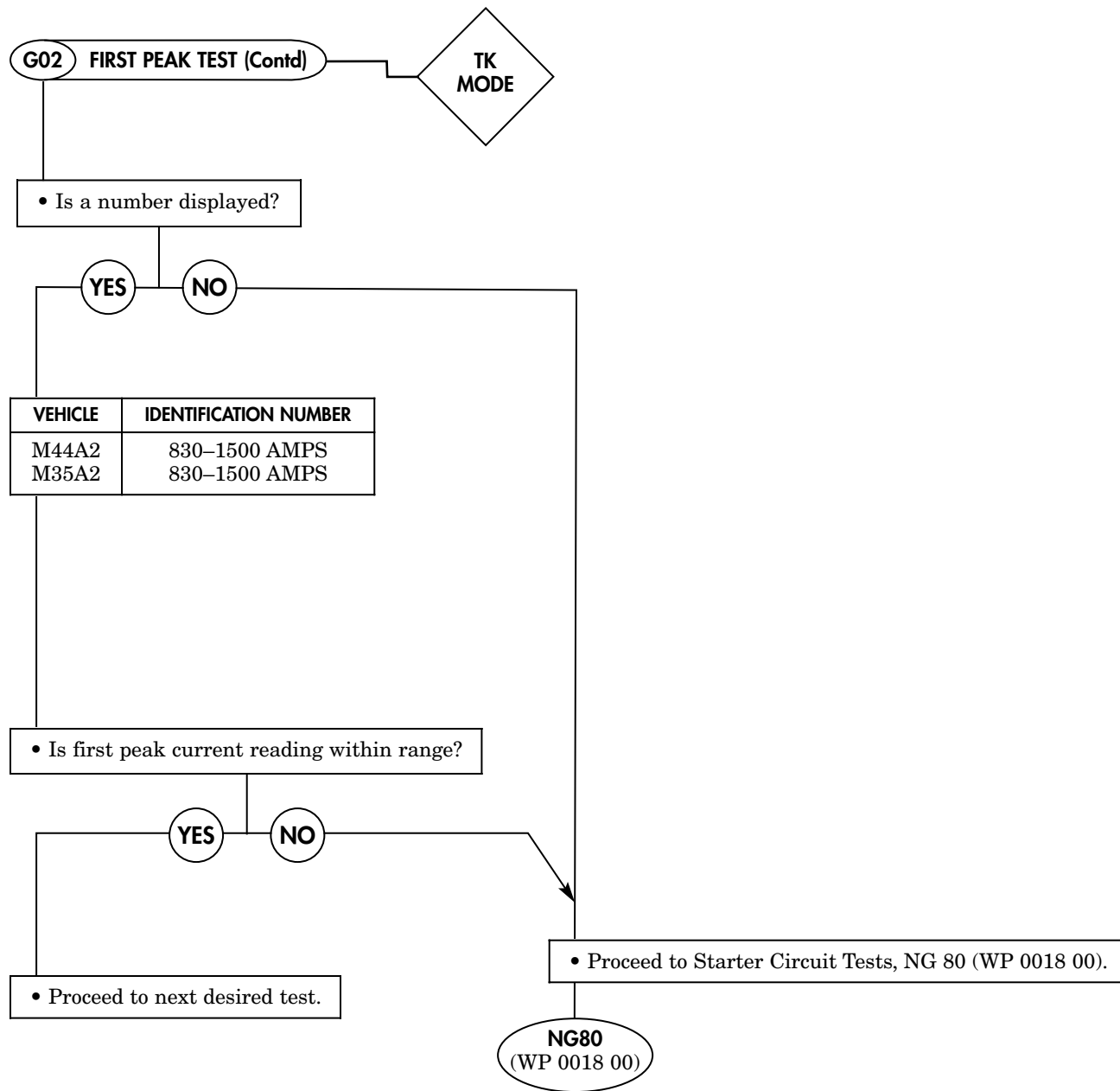
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

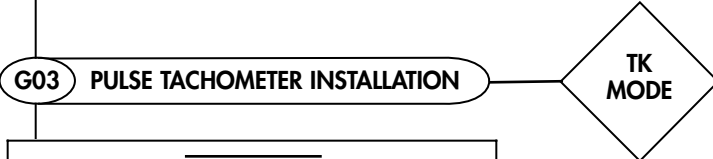
*Table 2. STE/ICE-R Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*

**NOTE**  
Test GO1, VTM Connections and Checkout, must be performed before running any other STE/ICE-R test.

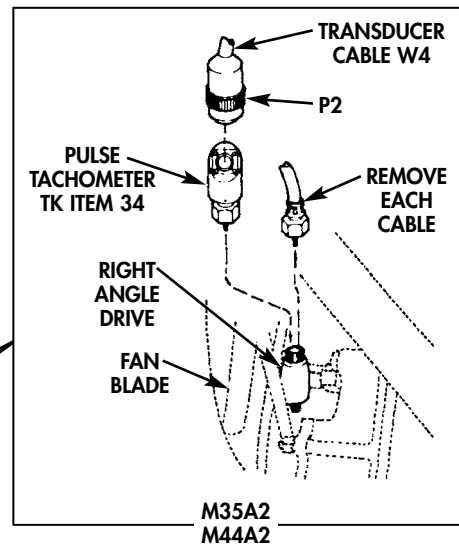


**WARNING**  
Turn vehicle engine off before installing pulse tachometer.

**CAUTION**  
Clean all mounting surfaces before installing transducer to prevent entry of foreign substances that may damage engine or transducer.

**1 INSTALL PULSE TACHOMETER**

- Disconnect tachometer cable in vehicle (WP 0096 00).
- Install pulse tachometer, TK Item 34, in place of removed tachometer cable.



**2 MAKE CABLE CONNECTIONS:**

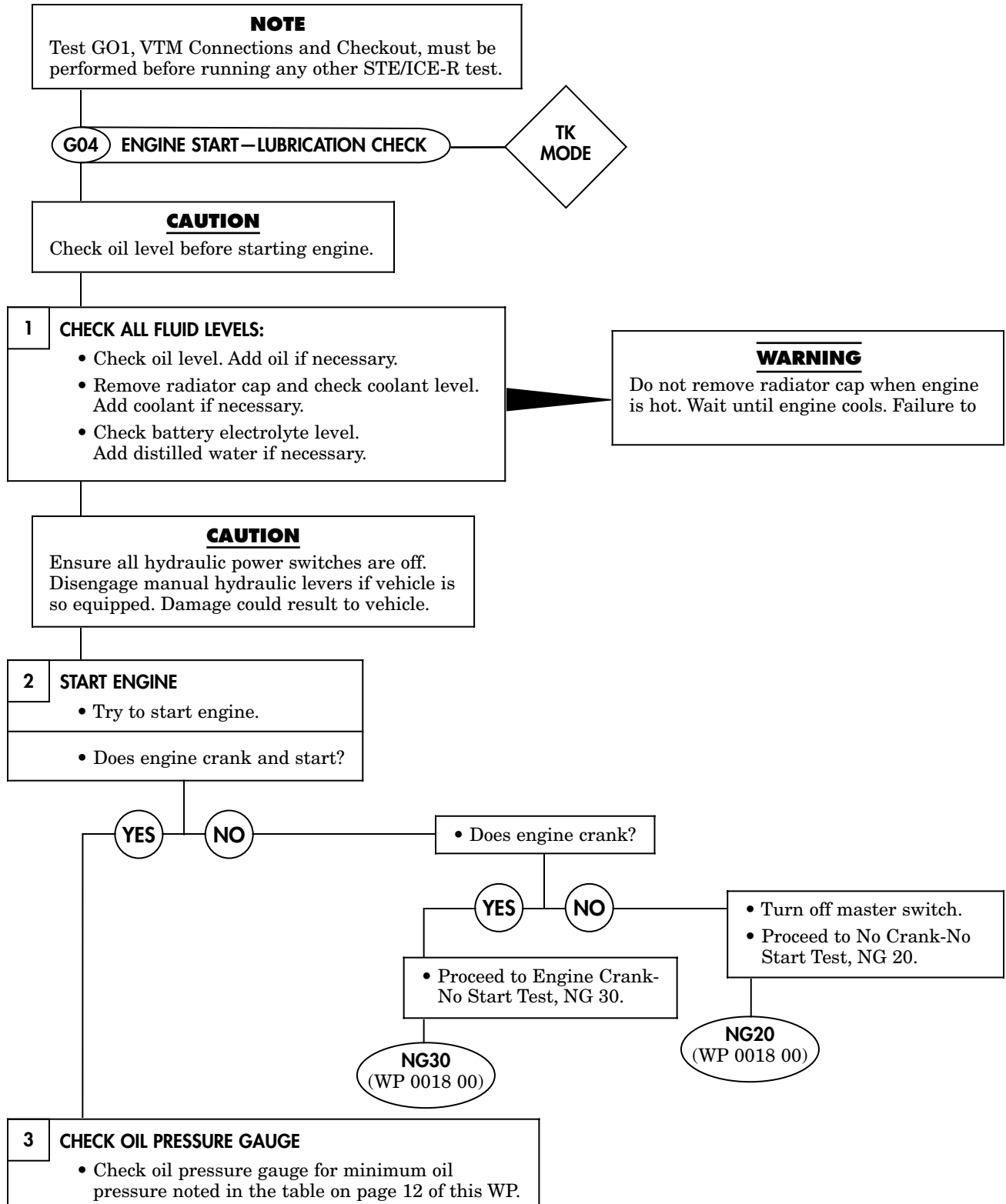
- Connect P1 of transducer cable W4 to J2 on the VTM.
- Connect P2 of transducer cable to connector on pulse tachometer.

**CAUTION**  
Be sure cable W4 is clear of belts and fan blade.

- Proceed to next desired test.

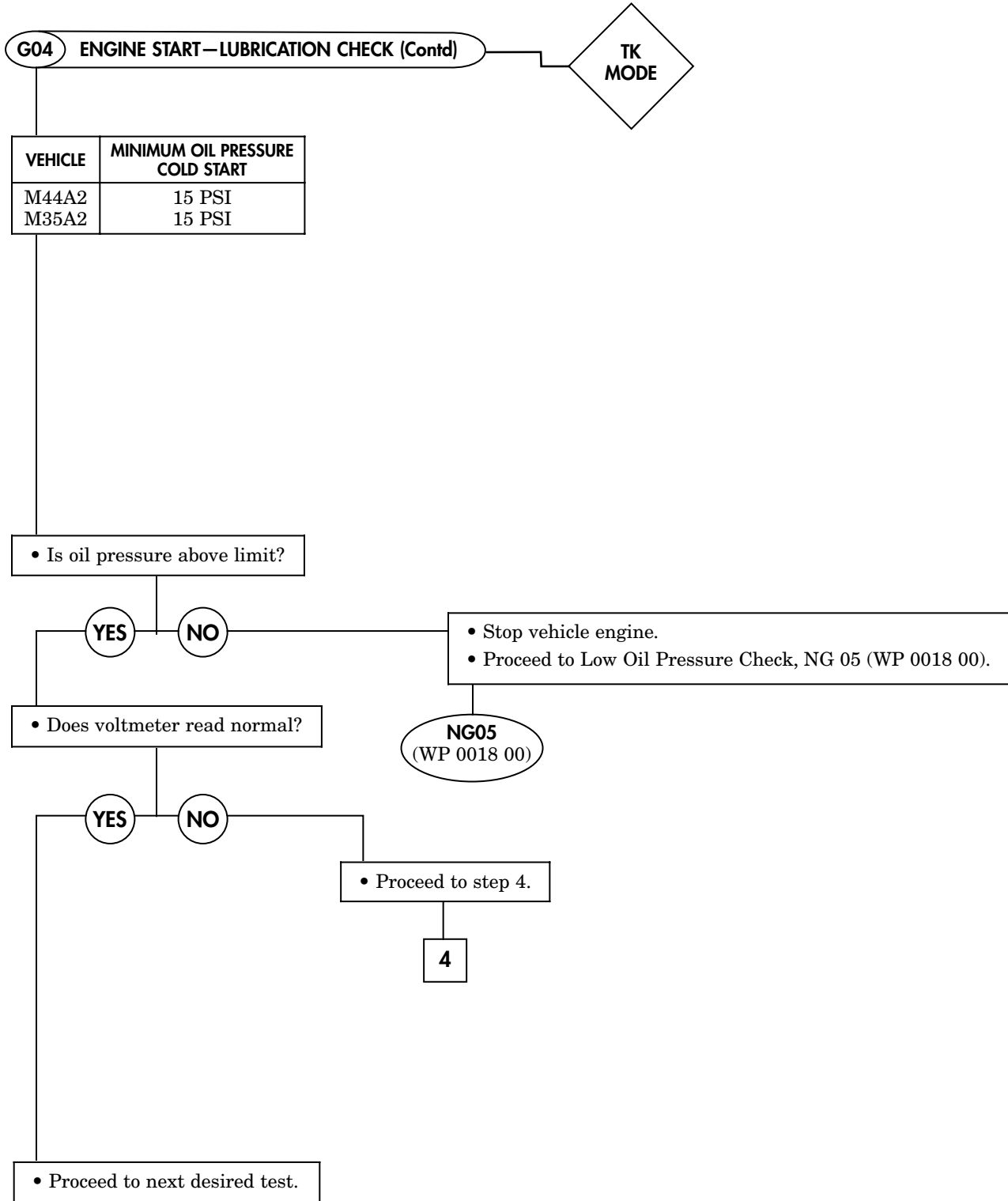
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



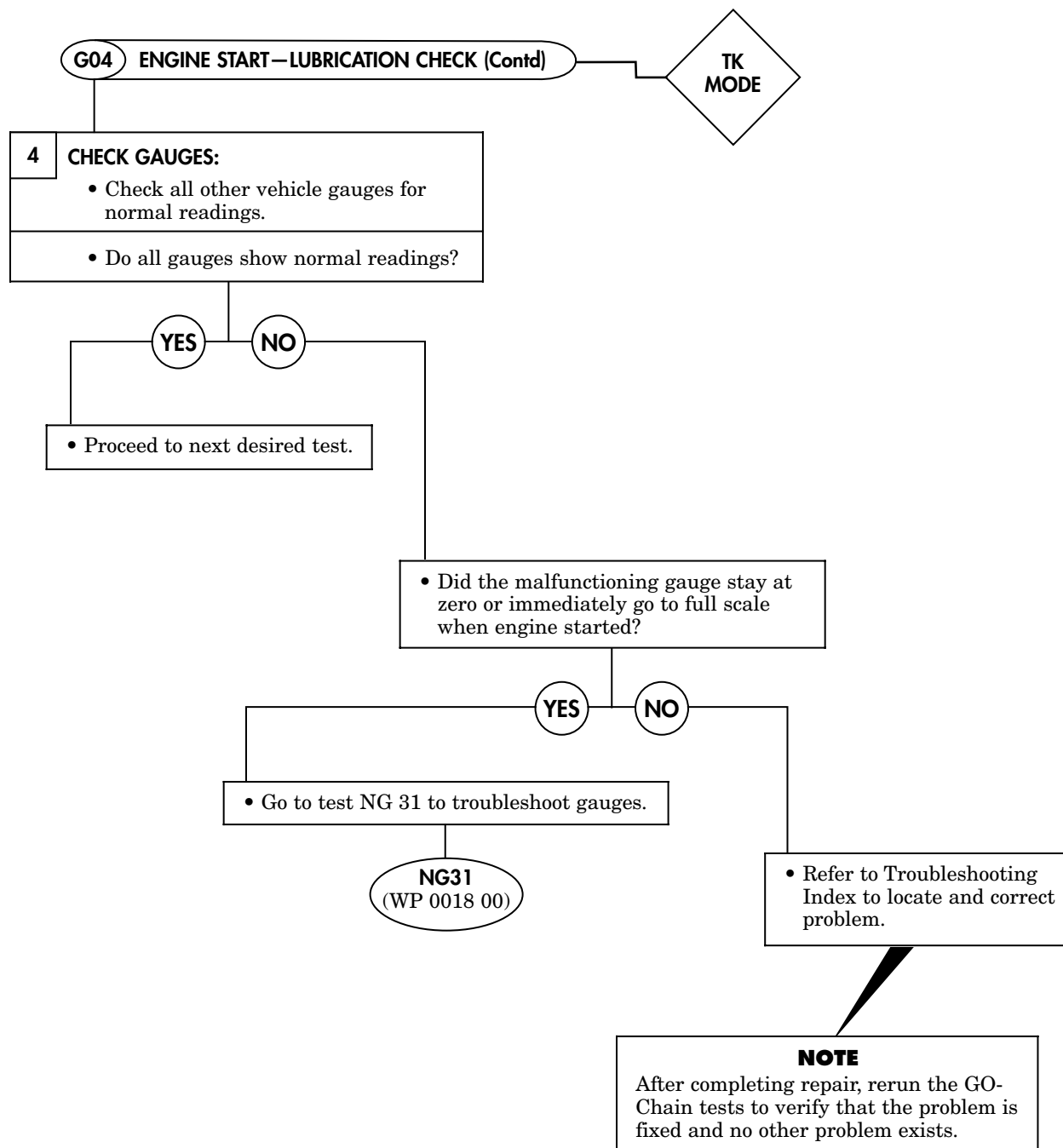
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



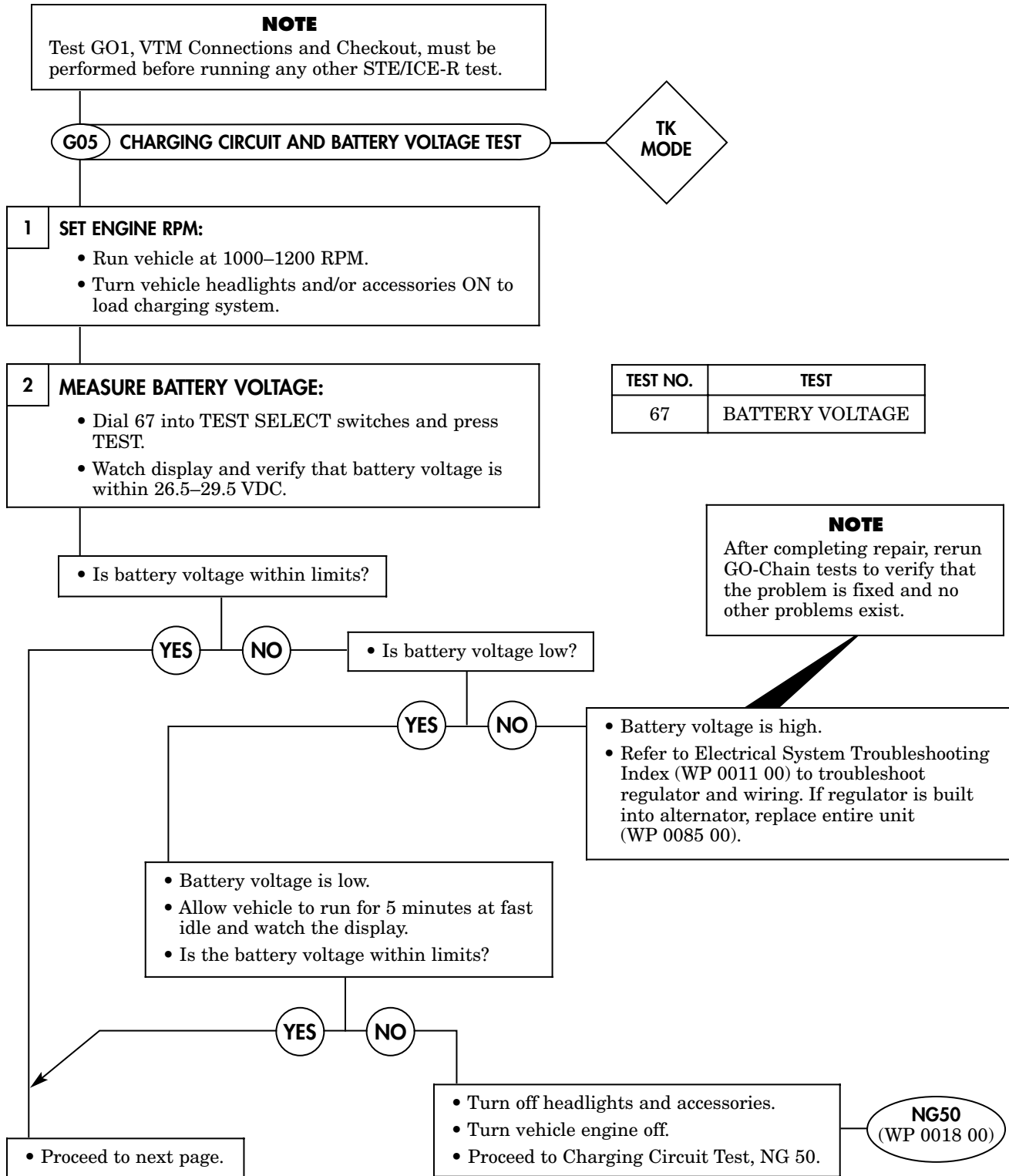
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

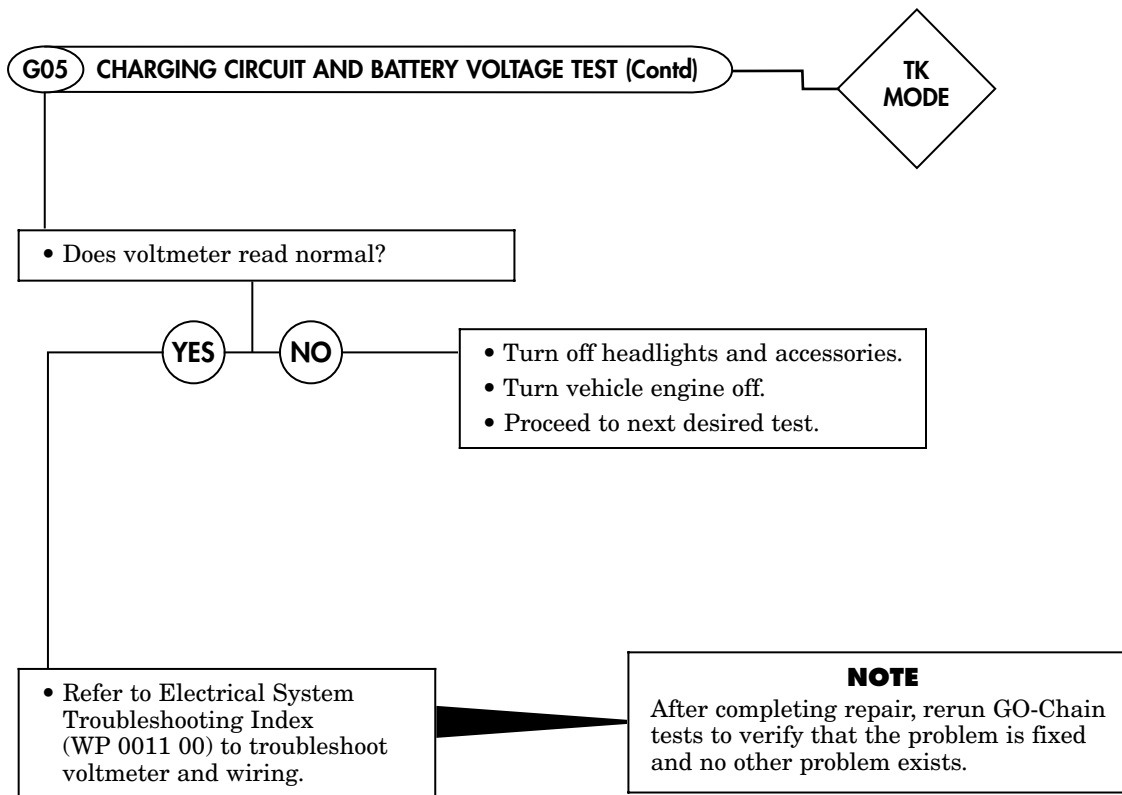
*Table 2. STE/ICE-R Go Chain Test (Contd).*





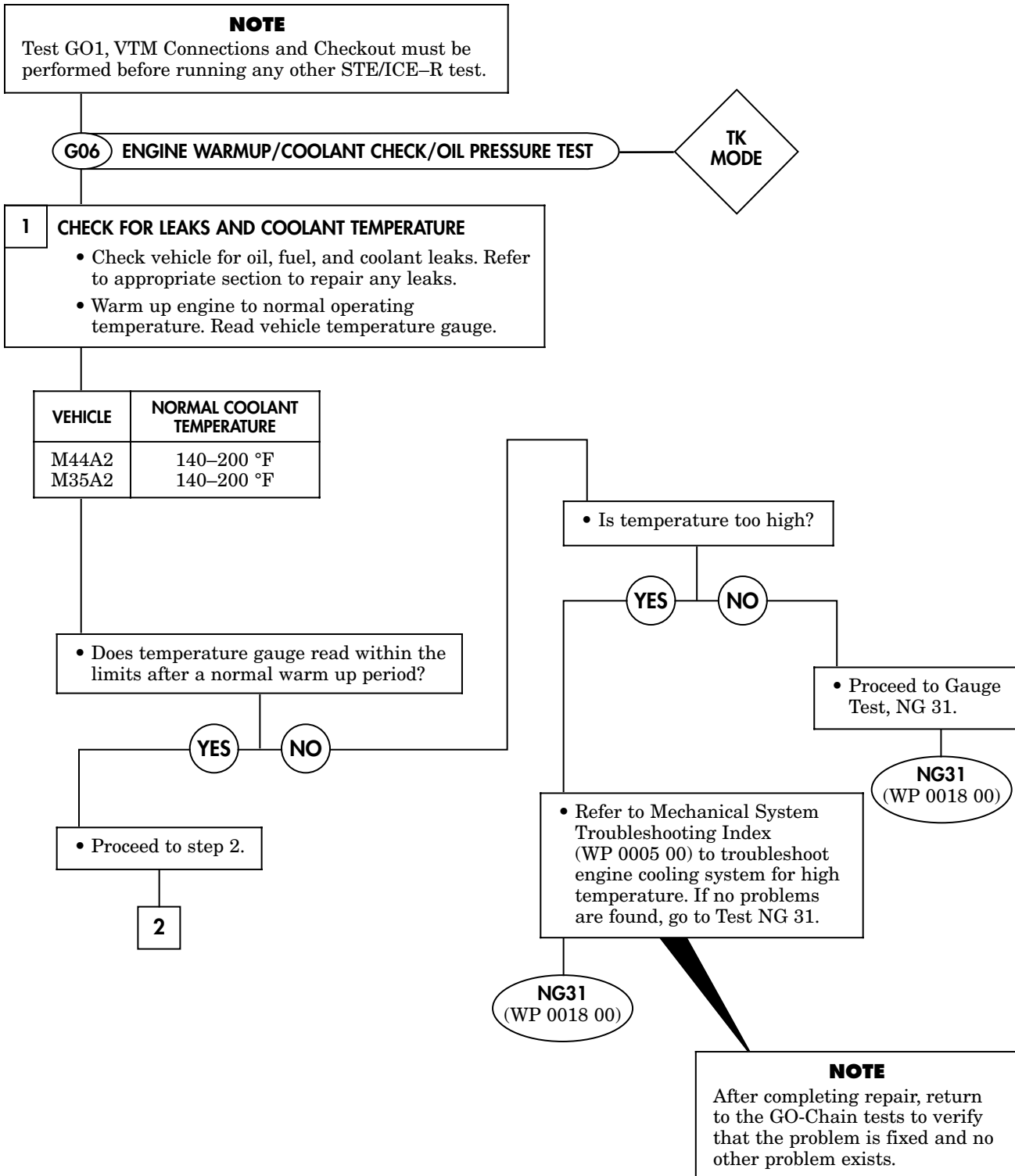
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



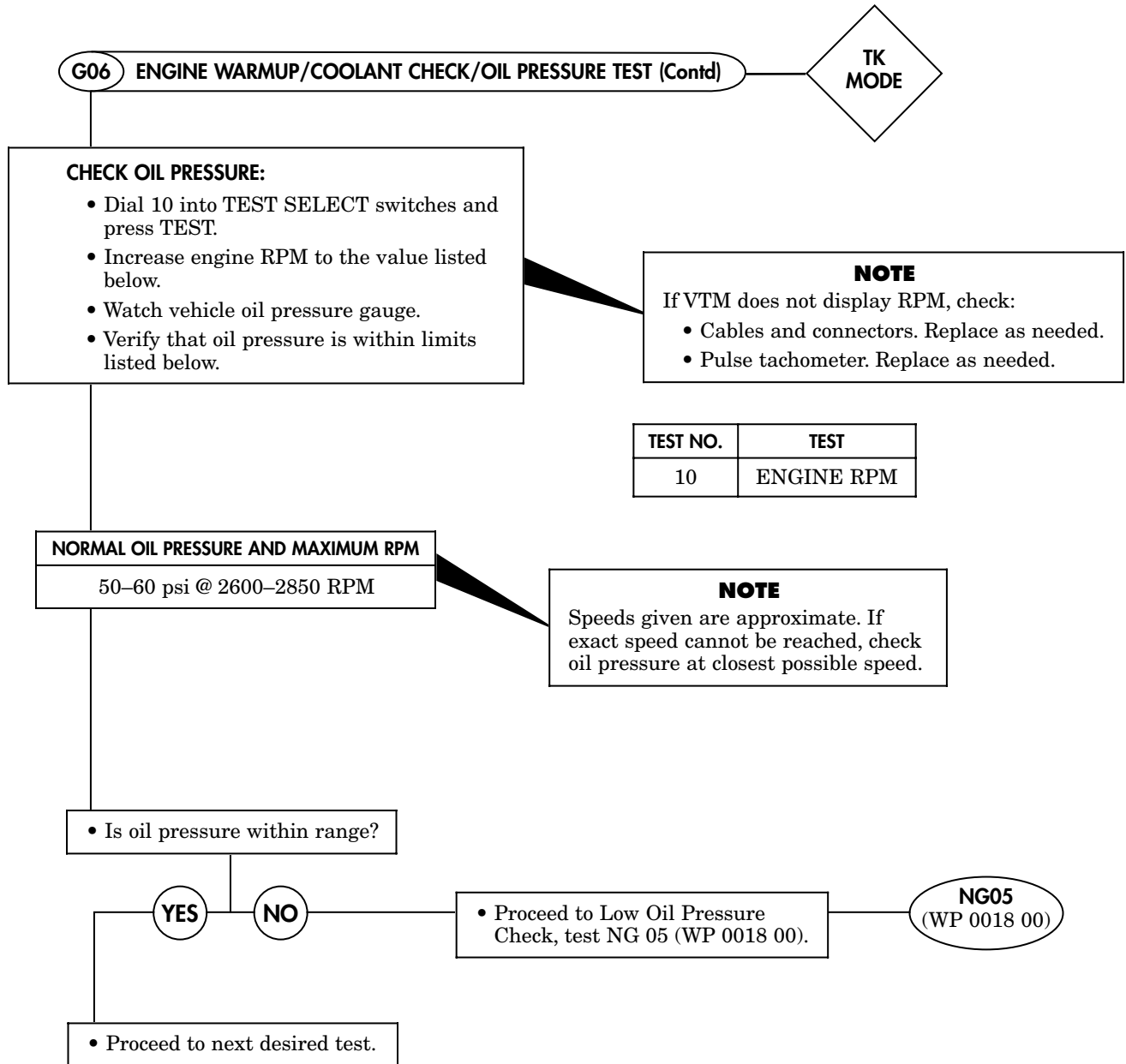
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



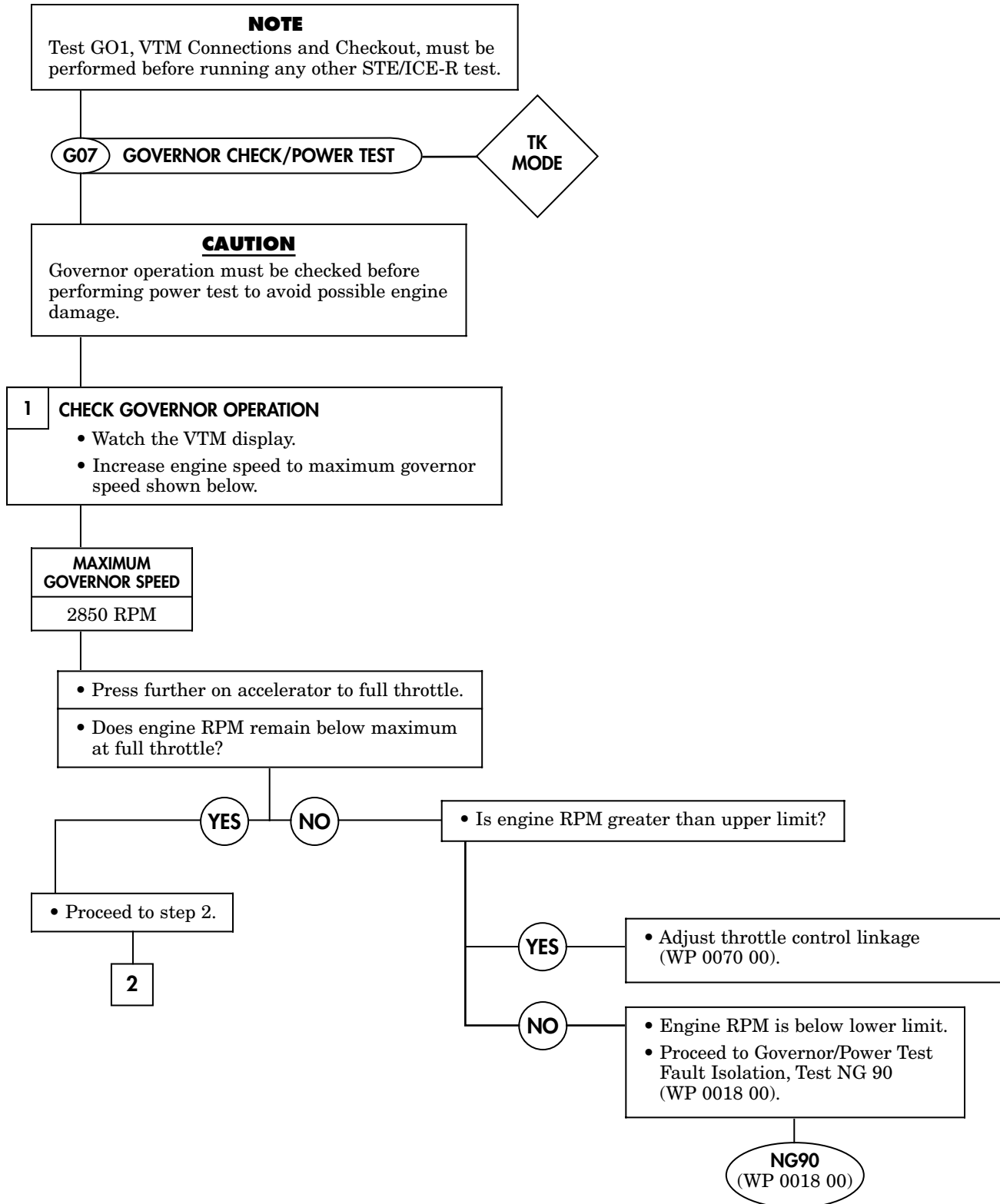
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



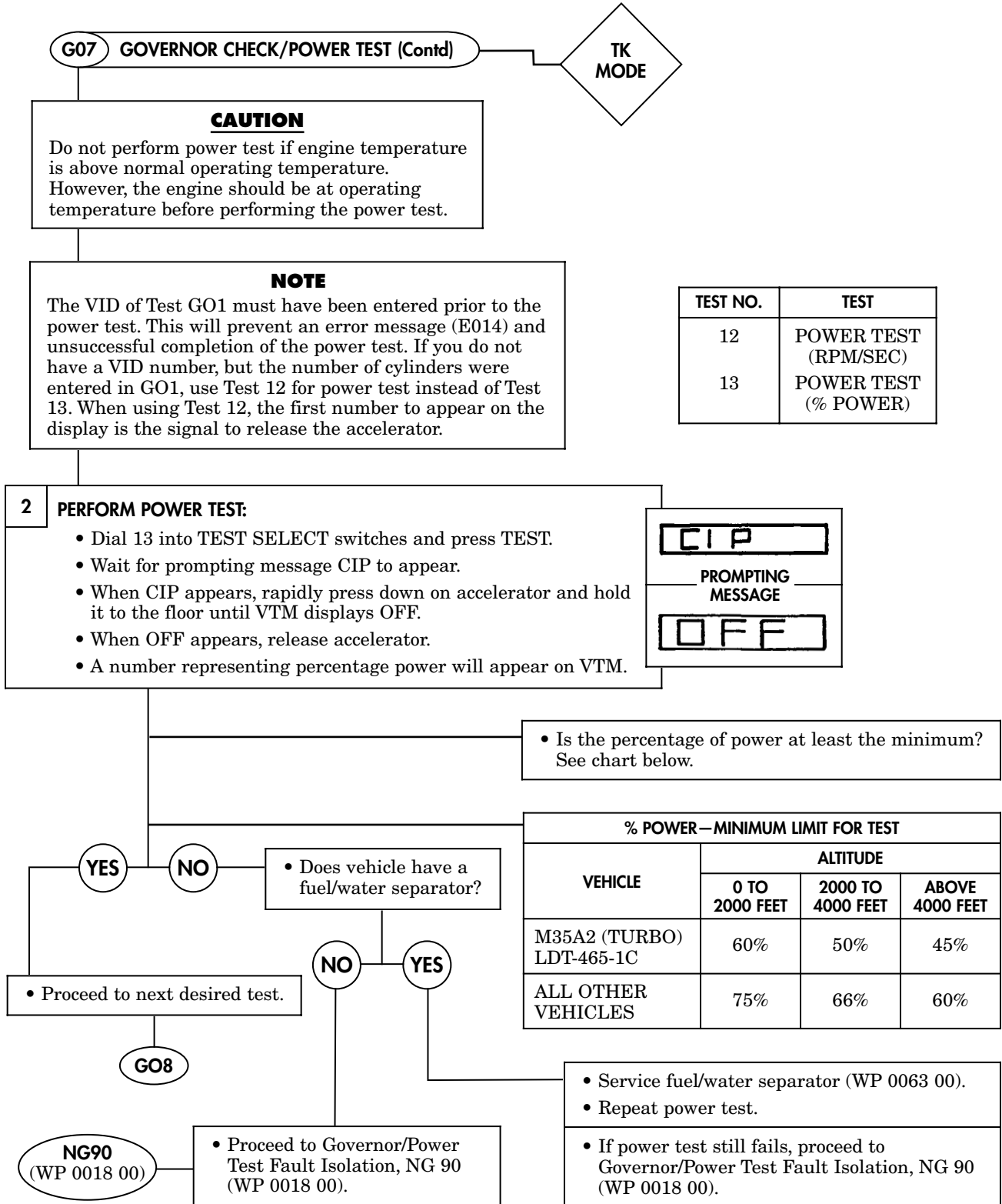
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



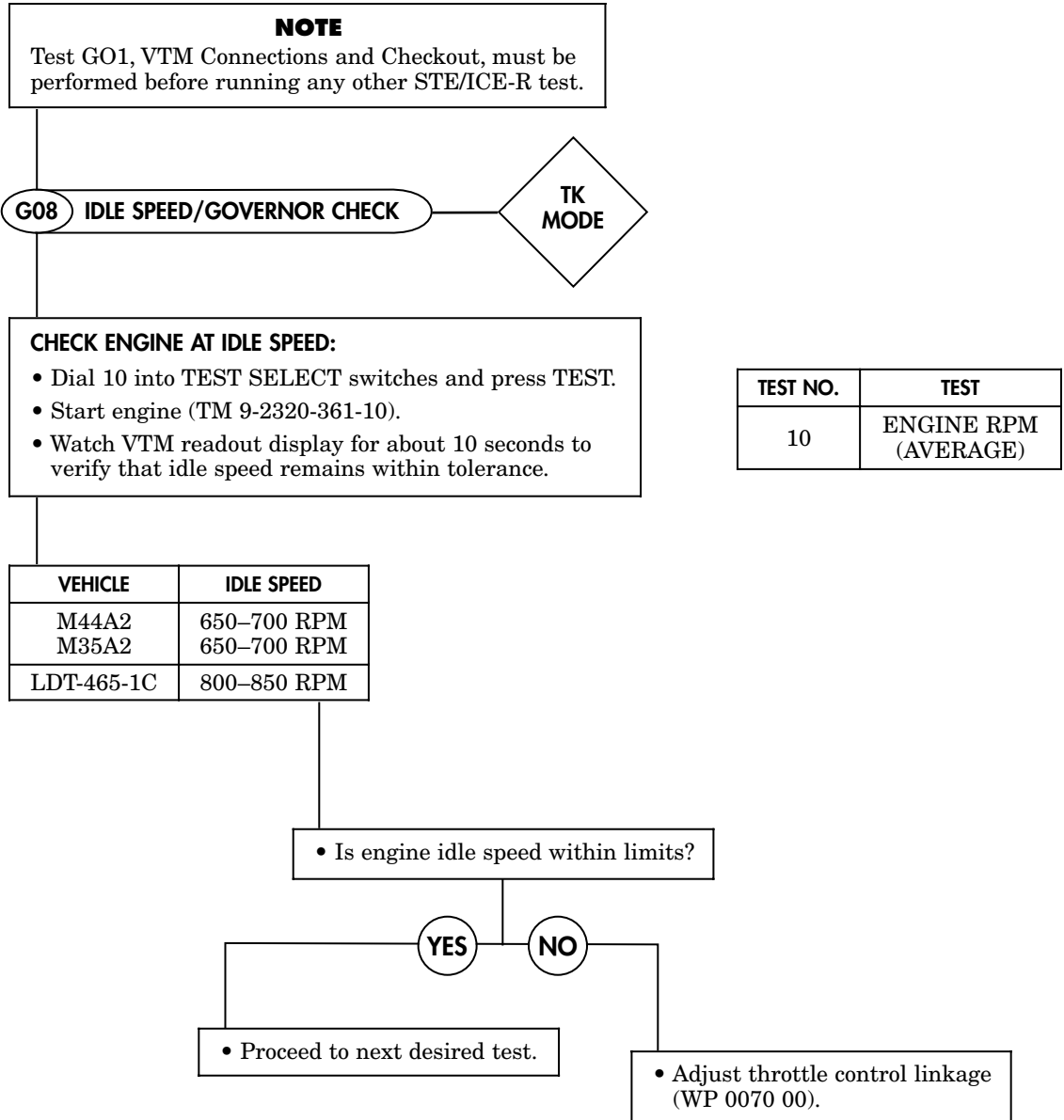
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



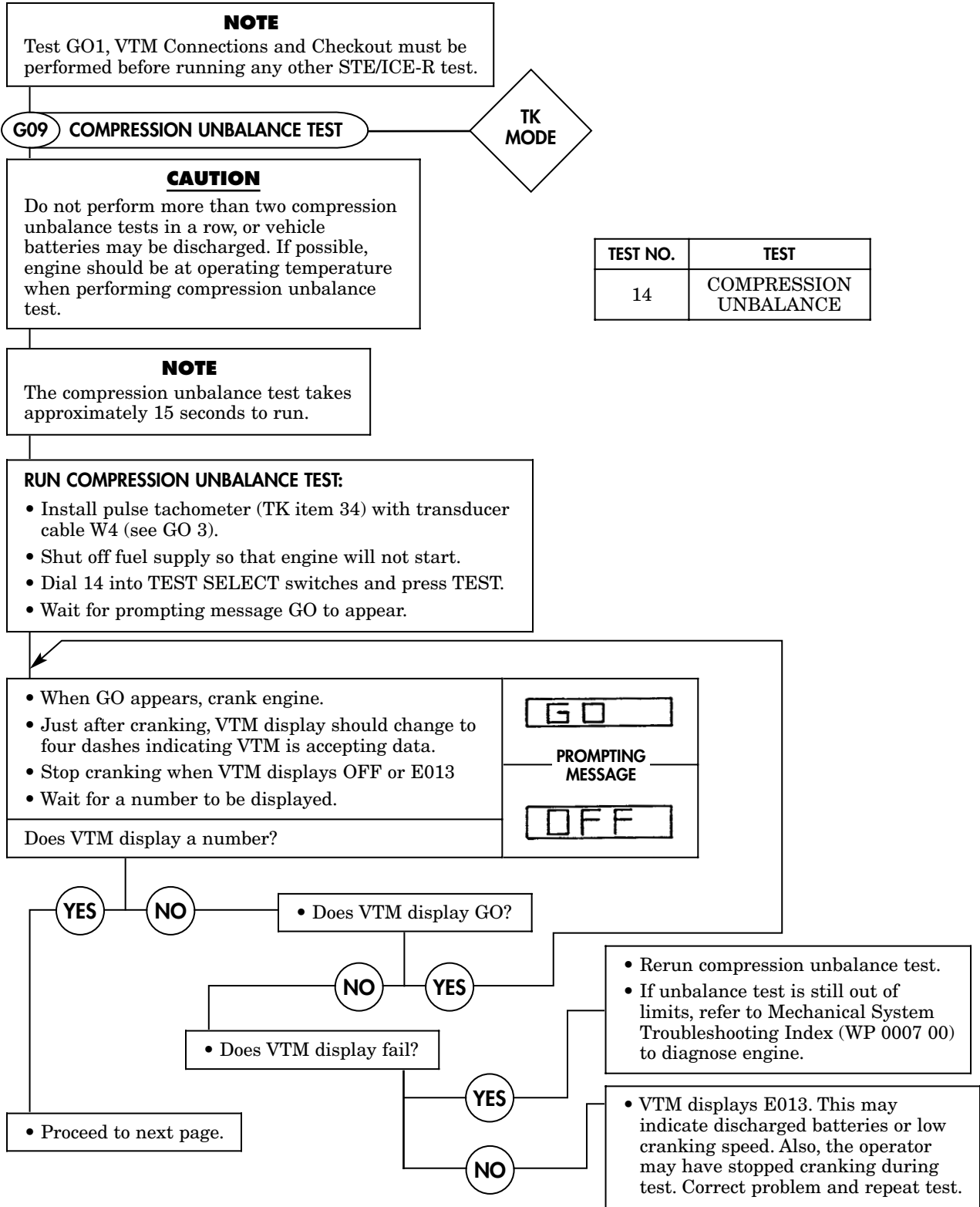
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*



Does VTM display a number?

**YES**

**NO**

- Does VTM display GO?

**NO**

**YES**

- Does VTM display fail?

**YES**

**NO**

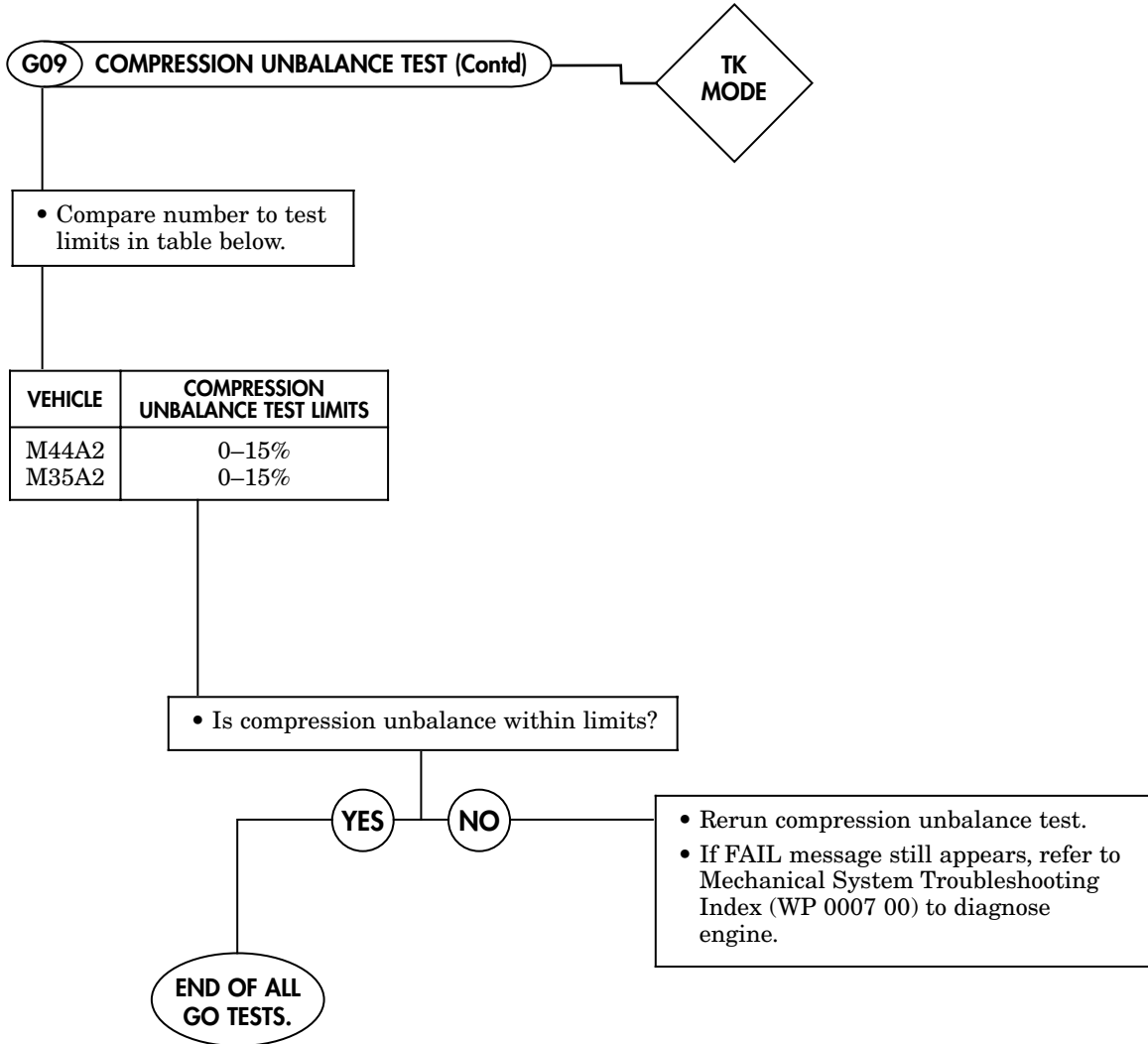
- Proceed to next page.

- Rerun compression unbalance test.
- If unbalance test is still out of limits, refer to Mechanical System Troubleshooting Index (WP 0007 00) to diagnose engine.

- VTM displays E013. This may indicate discharged batteries or low cranking speed. Also, the operator may have stopped cranking during test. Correct problem and repeat test.

**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—REPROGRAMMABLE (STE/ICE-R) GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R Go Chain Test (Contd).*





## FIELD TROUBLESHOOTING

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE— REPROGRAMMABLE (STE/ICE-R) NO-GO CHAIN TROUBLESHOOTING

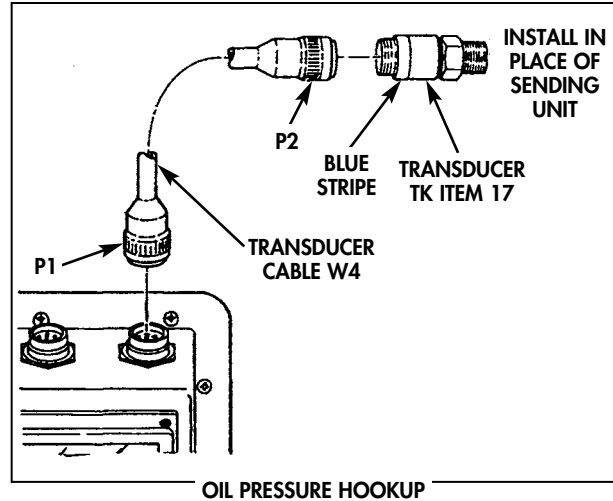
*Table 1. No-Go Chain Index, TK Mode.*

Refer to WP 0017 00 for introduction and test descriptions.

NO-GO TEST NUMBER	TEST TITLE	PAGE NUMBER
NG 05	Low Oil Pressure Check	0018 00-2
NG 20	No Crank—No Start	0018 00-4
NG 30	Engine Crank—No Start	0018 00-5
NG 31	Gauge Test	0018 00-10
NG 50	Charging Circuit Tests	0018 00-12
NG 80	Starter Circuit Tests	0018 00-21
NG 81	Battery Tests	0018 00-27
NG 90	Governor/Power Test Fault Isolation	0018 00-31
NG 120	Battery Compartment—Positive Side Voltage Drop Checks	0018 00-37
NG 121	Battery Compartment—Negative Side Voltage Drop Checks	0018 00-38
NG 130	Engine Tightness Test	0018 00-39

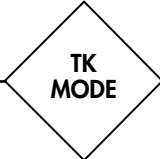
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test.*



**NOTE**  
Test GO 1 (WP 0017 00) Connections and Checkout must be performed before running any other STE/ICE-R test.

**NG05 LOW OIL PRESSURE CHECK**

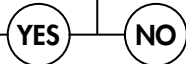
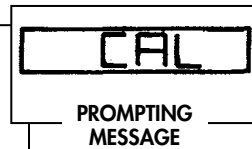


**1 INSTALL TRANSDUCER-DO OFF SET**

- Stop vehicle engine.
- Remove oil pressure sending unit (WP 0106 00).
- Install pressure transducer, TK Item 17 (blue stripe), in place of sending unit on engine.
- Connect P1 of transducer cable W4 to J2 on Vehicle Test Meter (VTM).
- Connect P2 of transducer cable to connector on pressure transducer.
- Install pulse tachometer.
- Connect P2 of W4 to VTM J3.
- Connect P1 of W4 cable to pulse tachometer.

TEST NO.	TEST
01	INTERLEAVE
50	0-1000 PSIG PRESSURE

- Dial 50 into TEST SELECT switches.
- Press and hold TEST until CAL message appears on display.
- Release TEST
- Wait for offset value to appear on display.
- Release TEST.
- Is offset value within limits of -150 to +150?

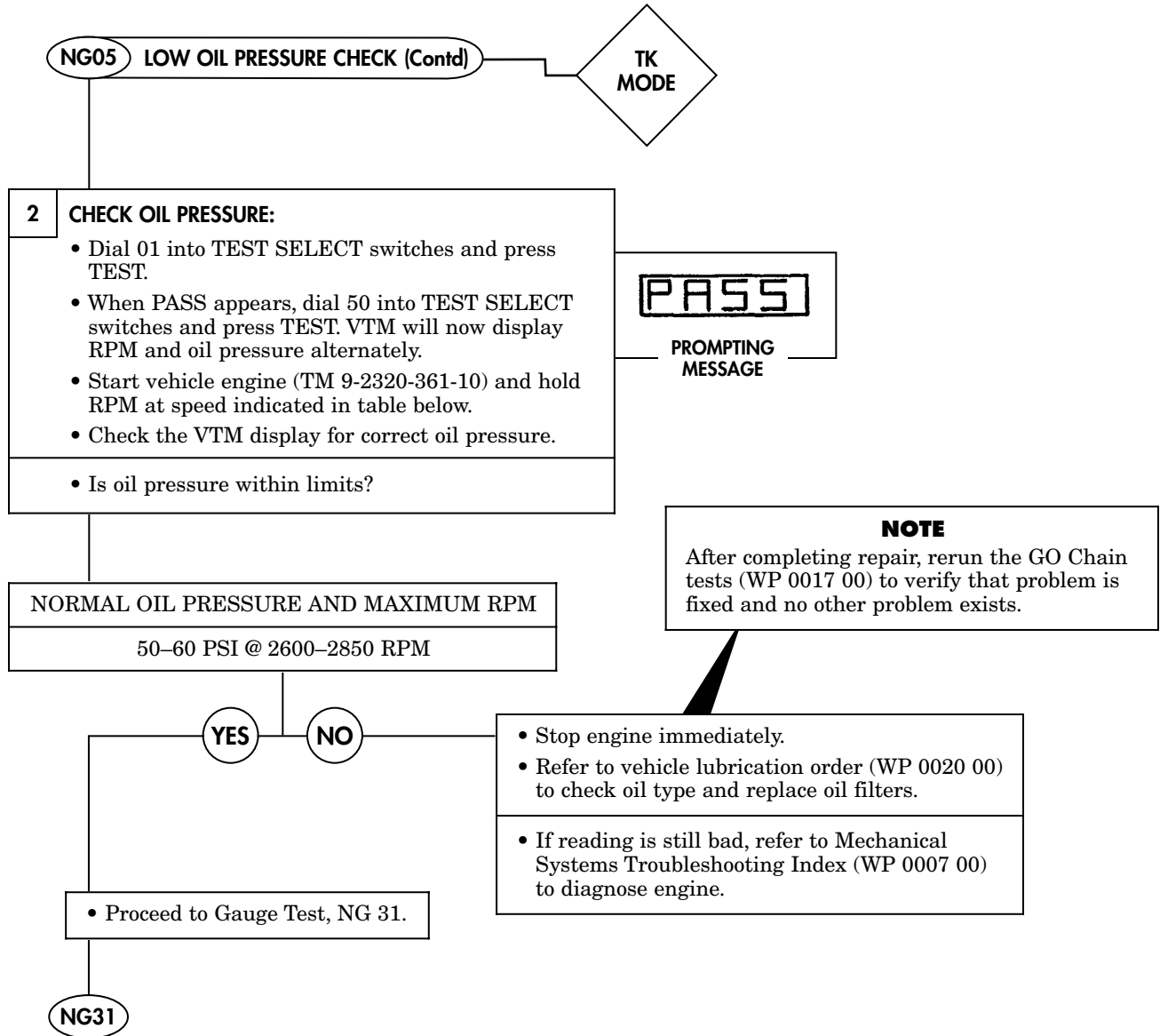


• Proceed to TM 9-4910-571-12&P for offset fault isolation.

• Proceed to step 2. **2**

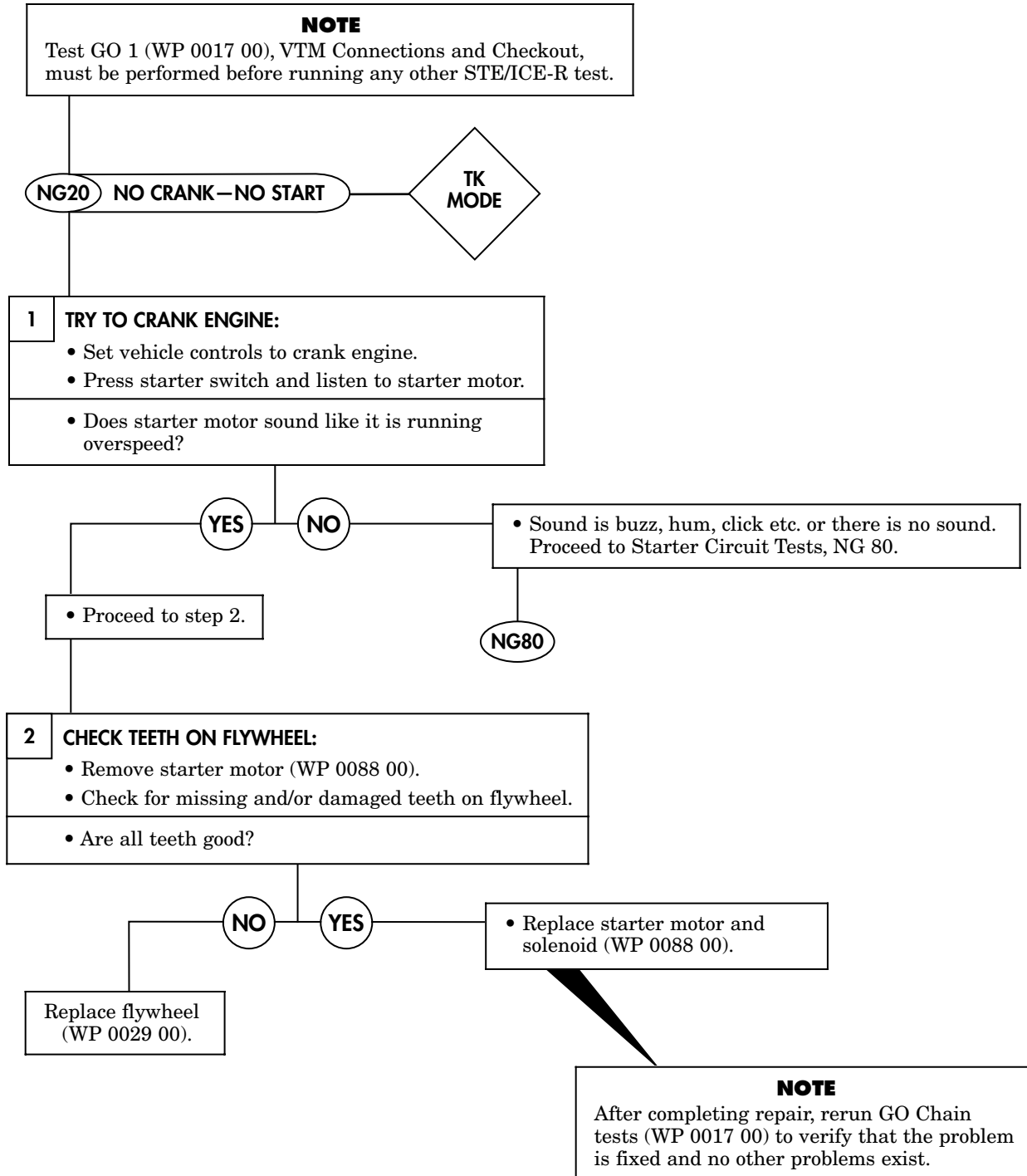
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



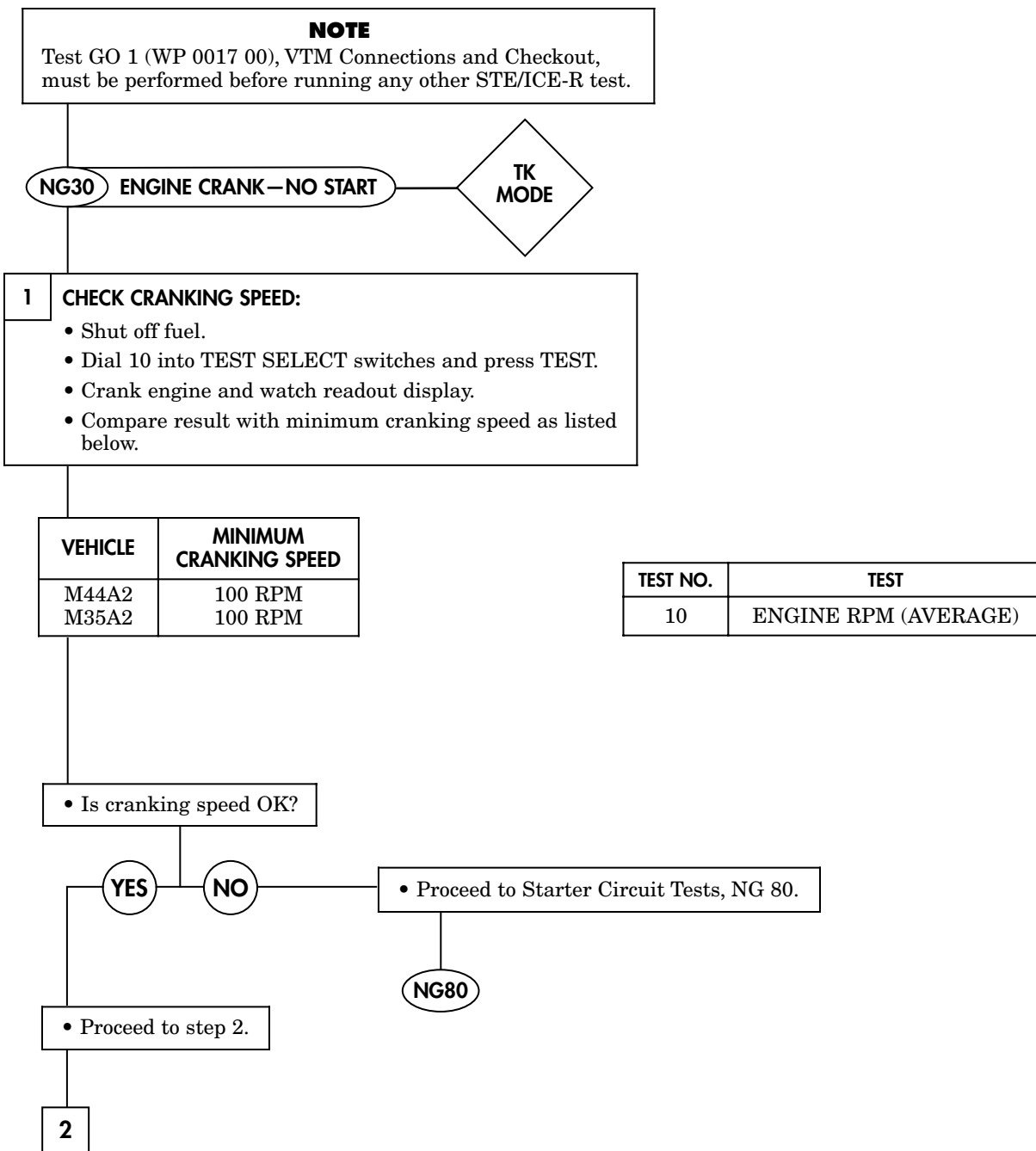
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



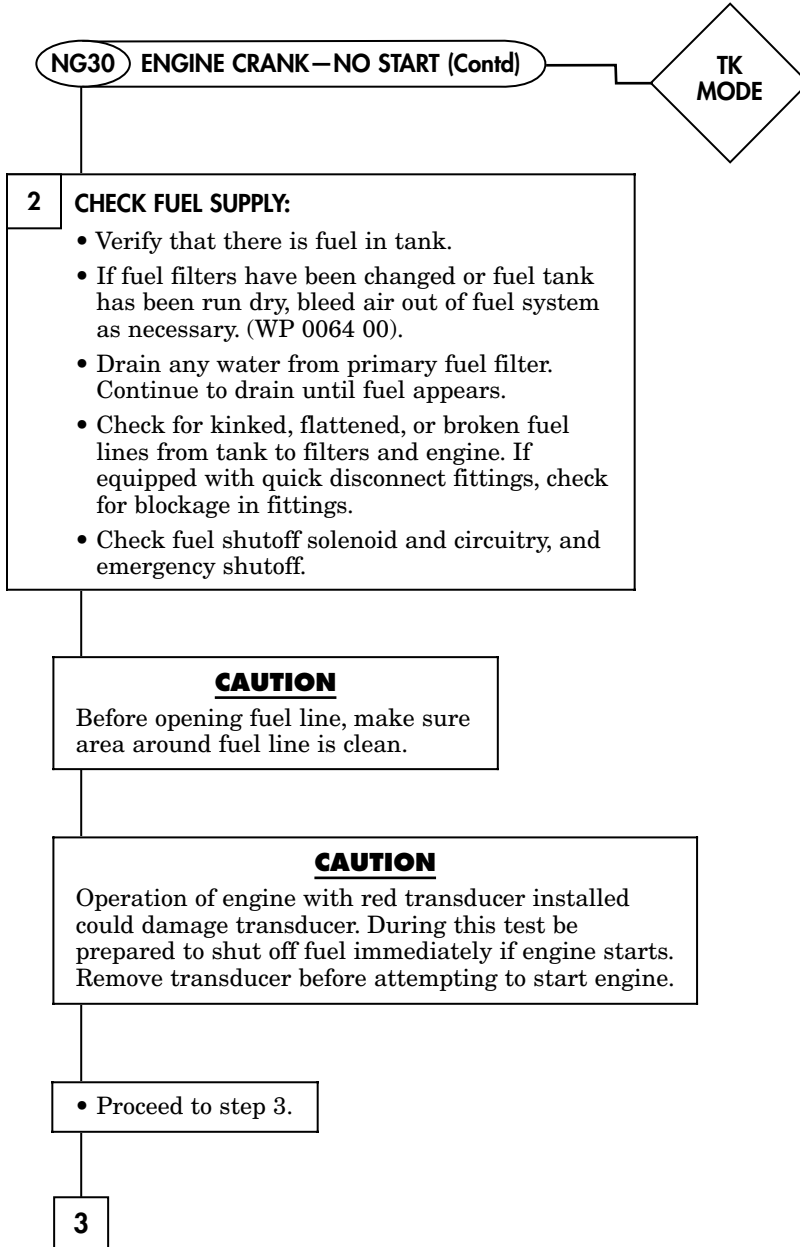
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



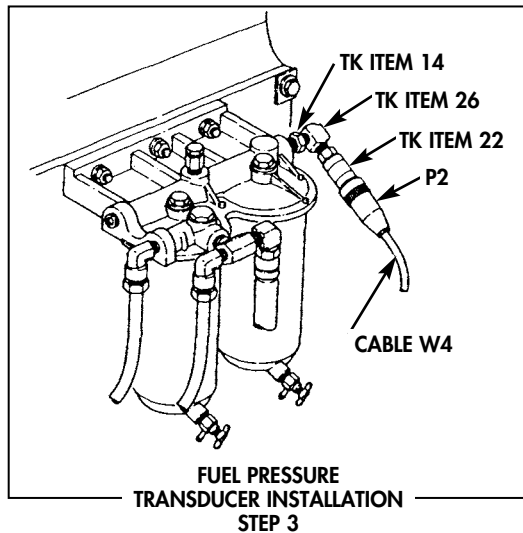
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



NG30 ENGINE CRANK—NO START (Contd)

TK  
MODE

**3 INSTALL TRANSDUCER:**

- Install pressure transducer (red stripe) in outlet side of secondary fuel filter.
- Connect P1 of transducer cable W4 to J2 on VTM.
- Connect P2 of transducer cable to connector on transducer.

TEST NO.	TEST
49	0–25 PSIG PRESSURE

- Dial 49 into TEST SELECT switches and press TEST.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on display.
- Is offset value within range of -4 to +4?



PROMPTING  
MESSAGE

YES

NO

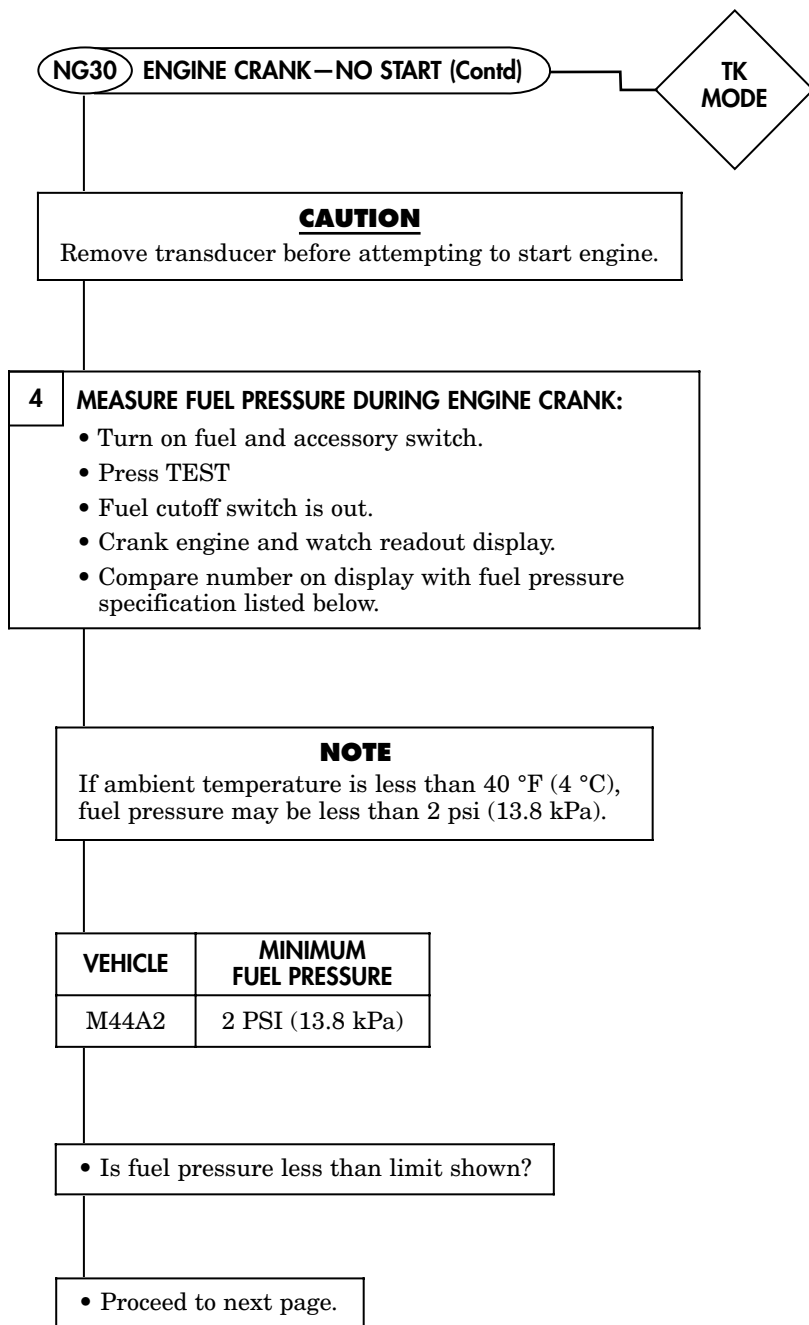
- Proceed to TM 9-4910-571-12&P for offset fault isolation.

- Proceed to step 4.

**4**

**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

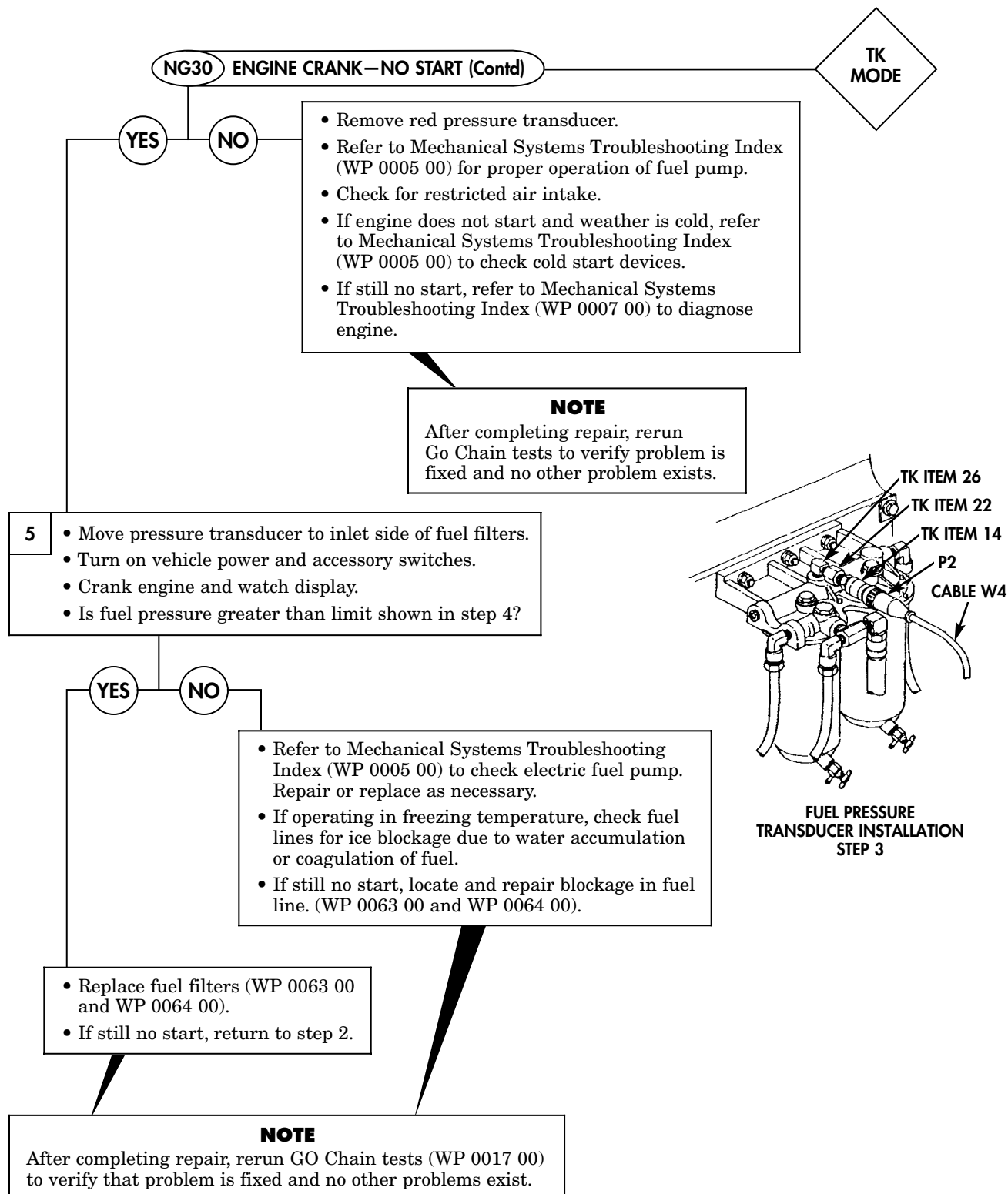
*Table 2. STE/ICE-R No-Go Chain Test (Contd).*





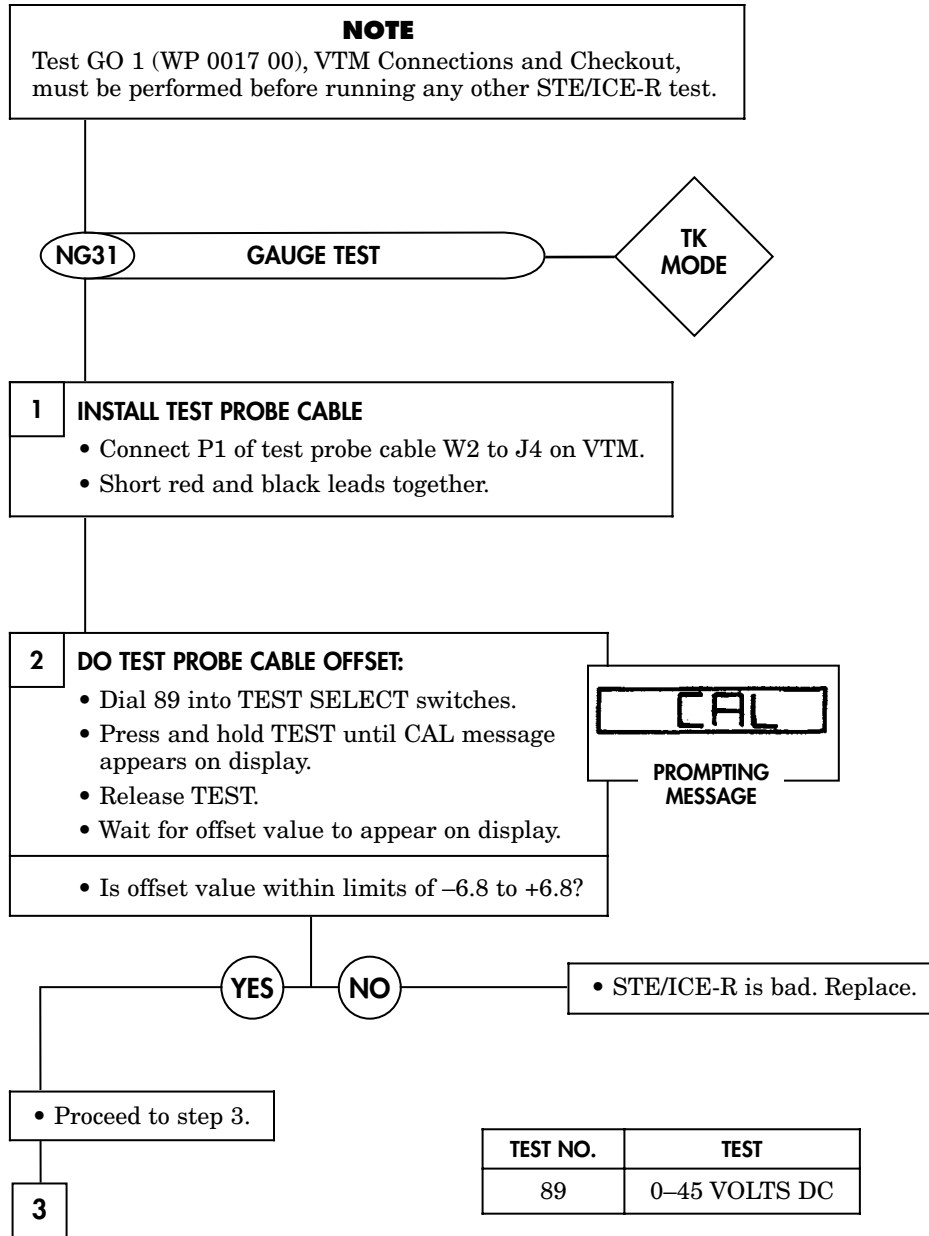
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



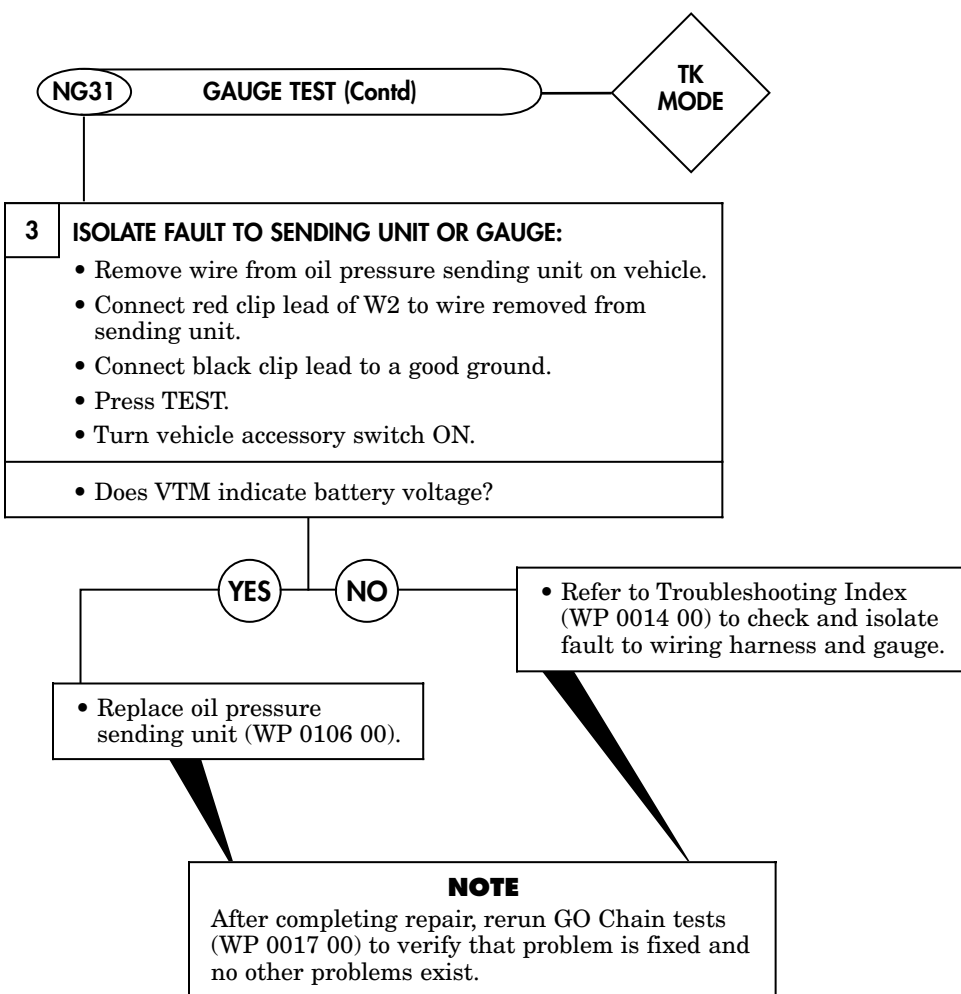
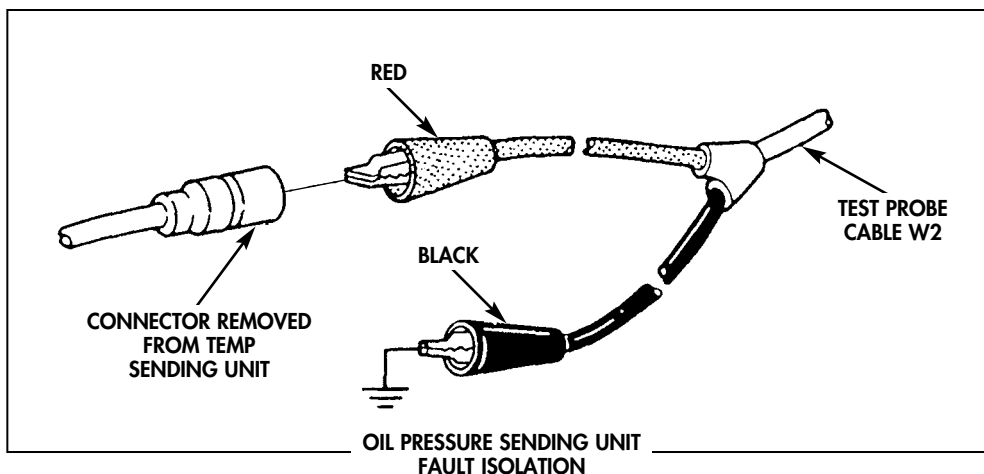
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



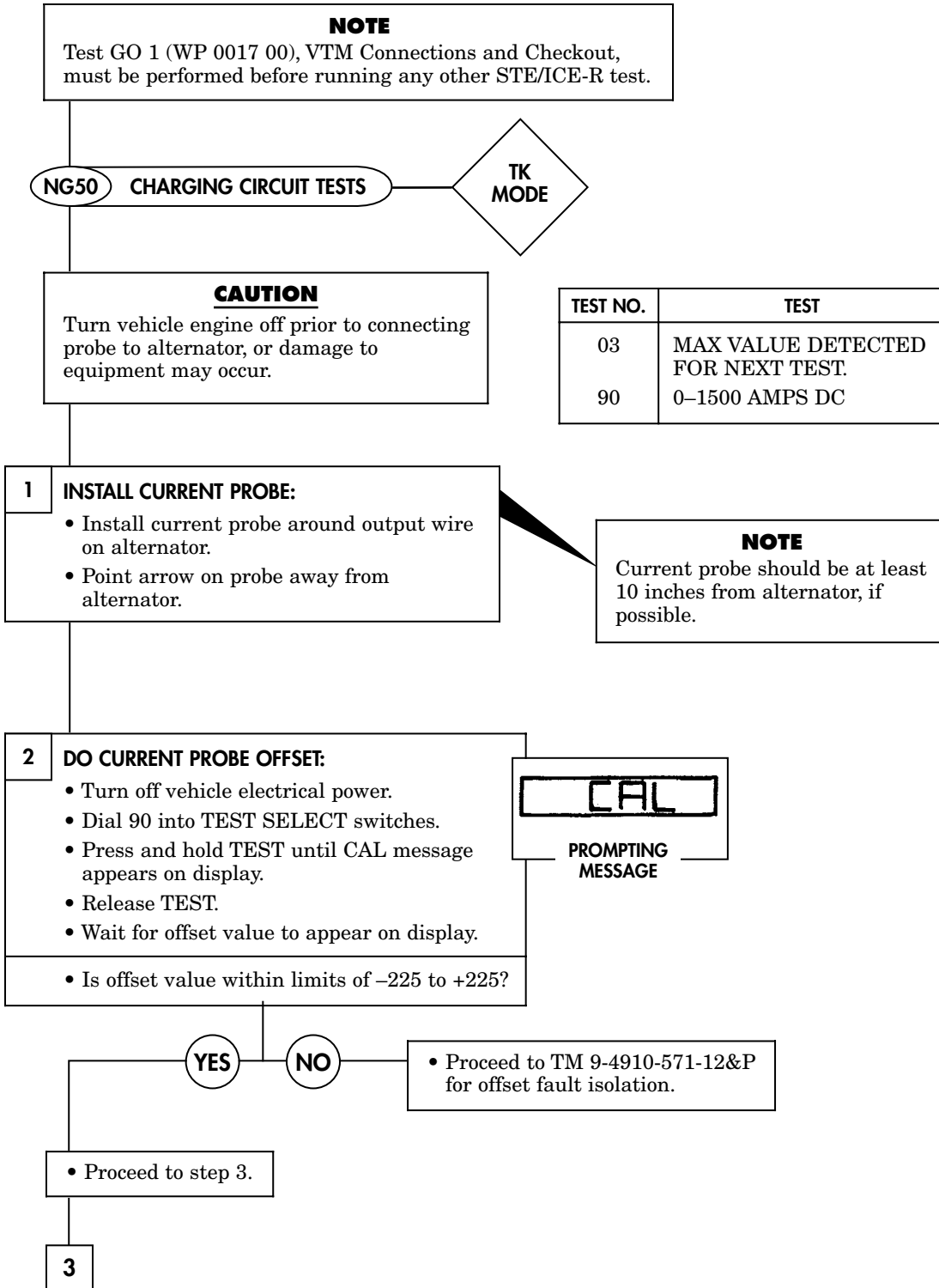
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



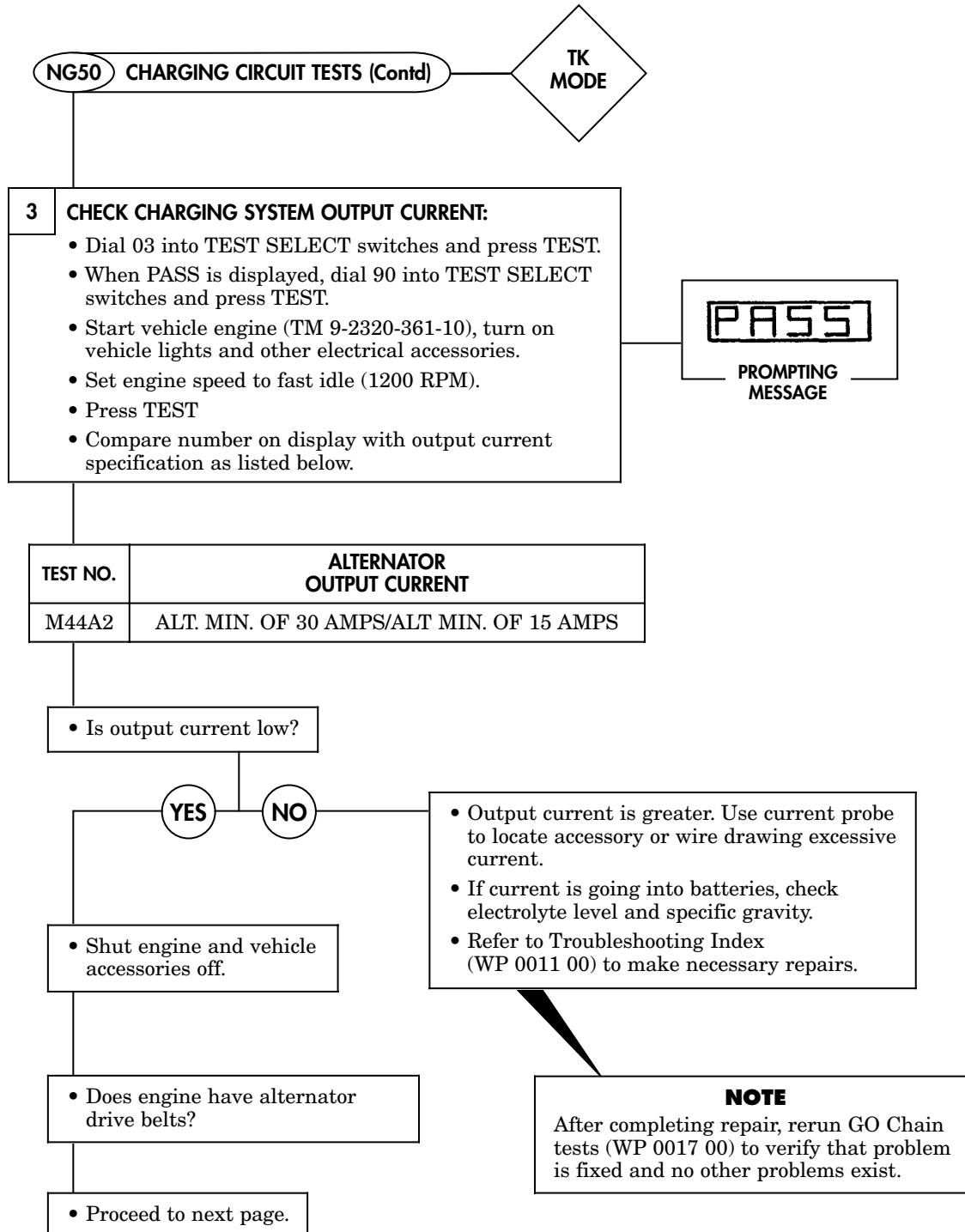
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



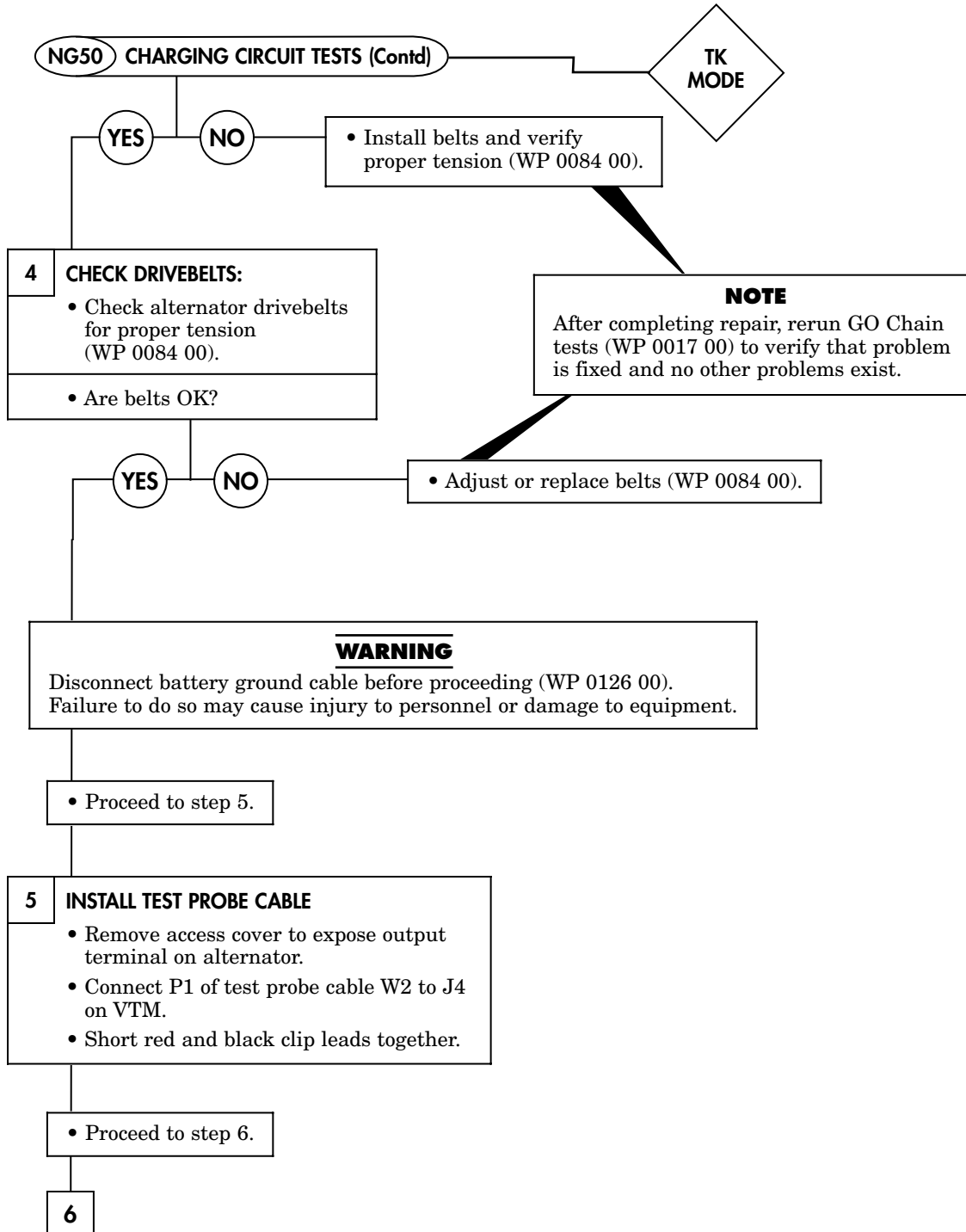
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



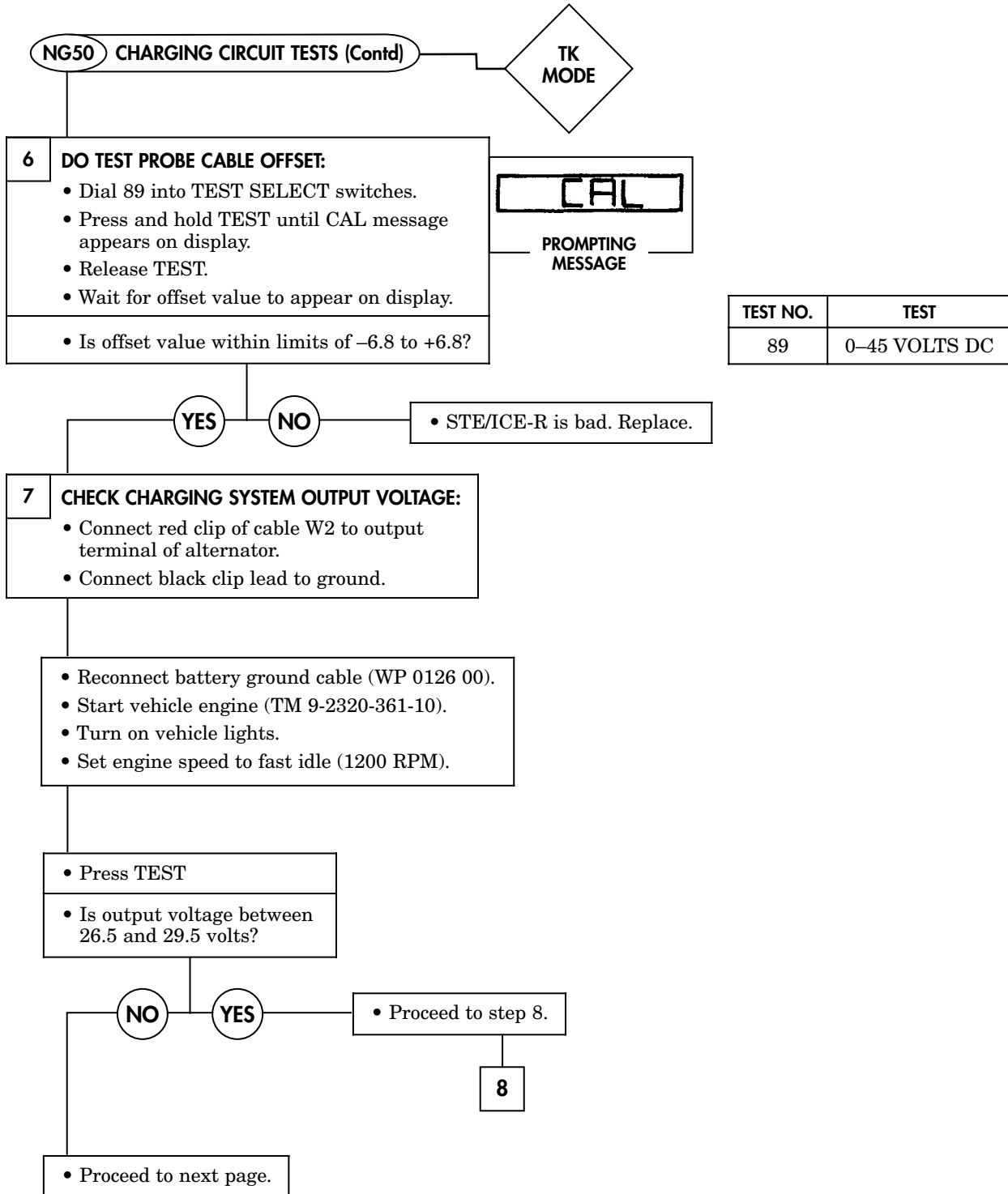
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



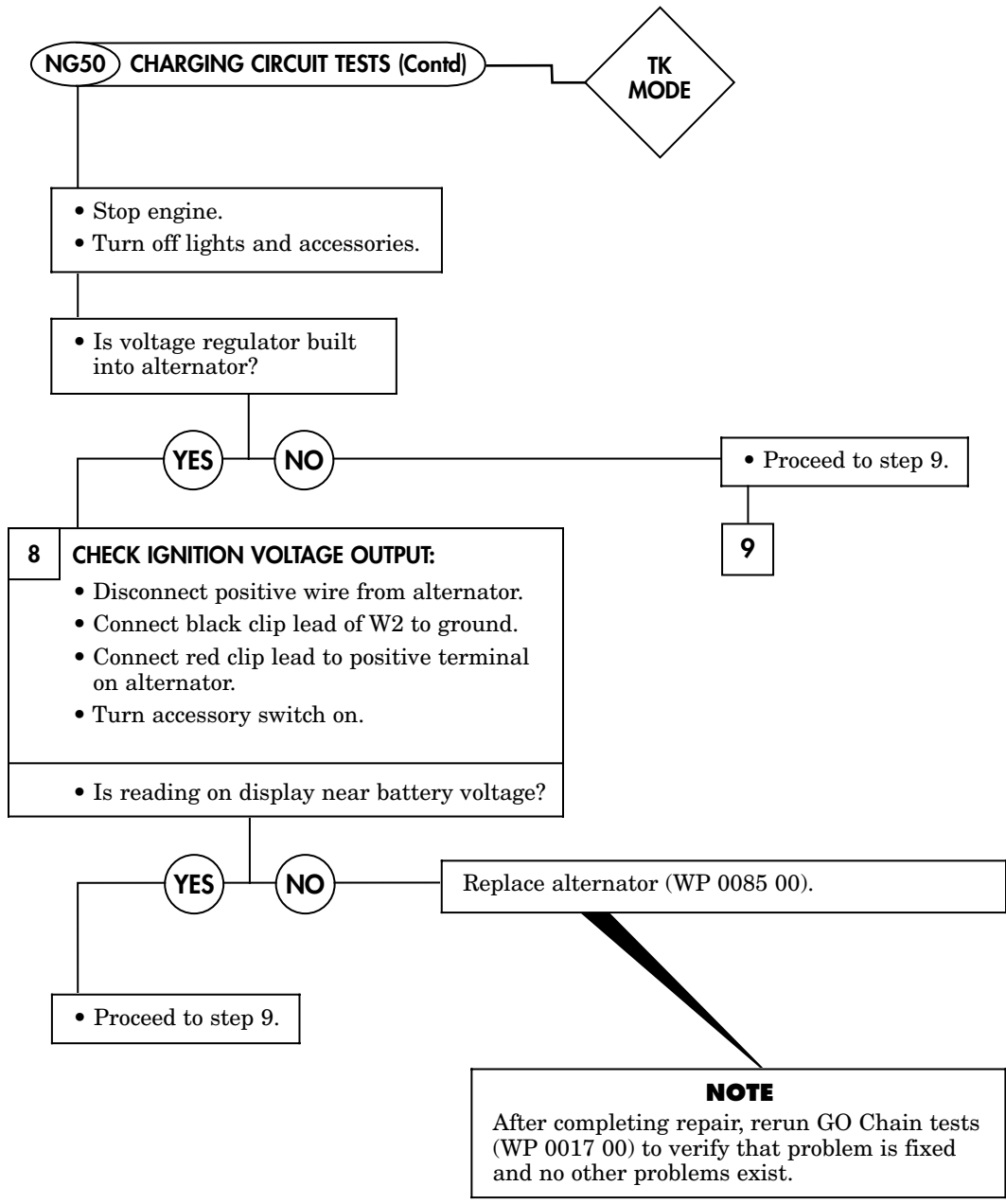
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

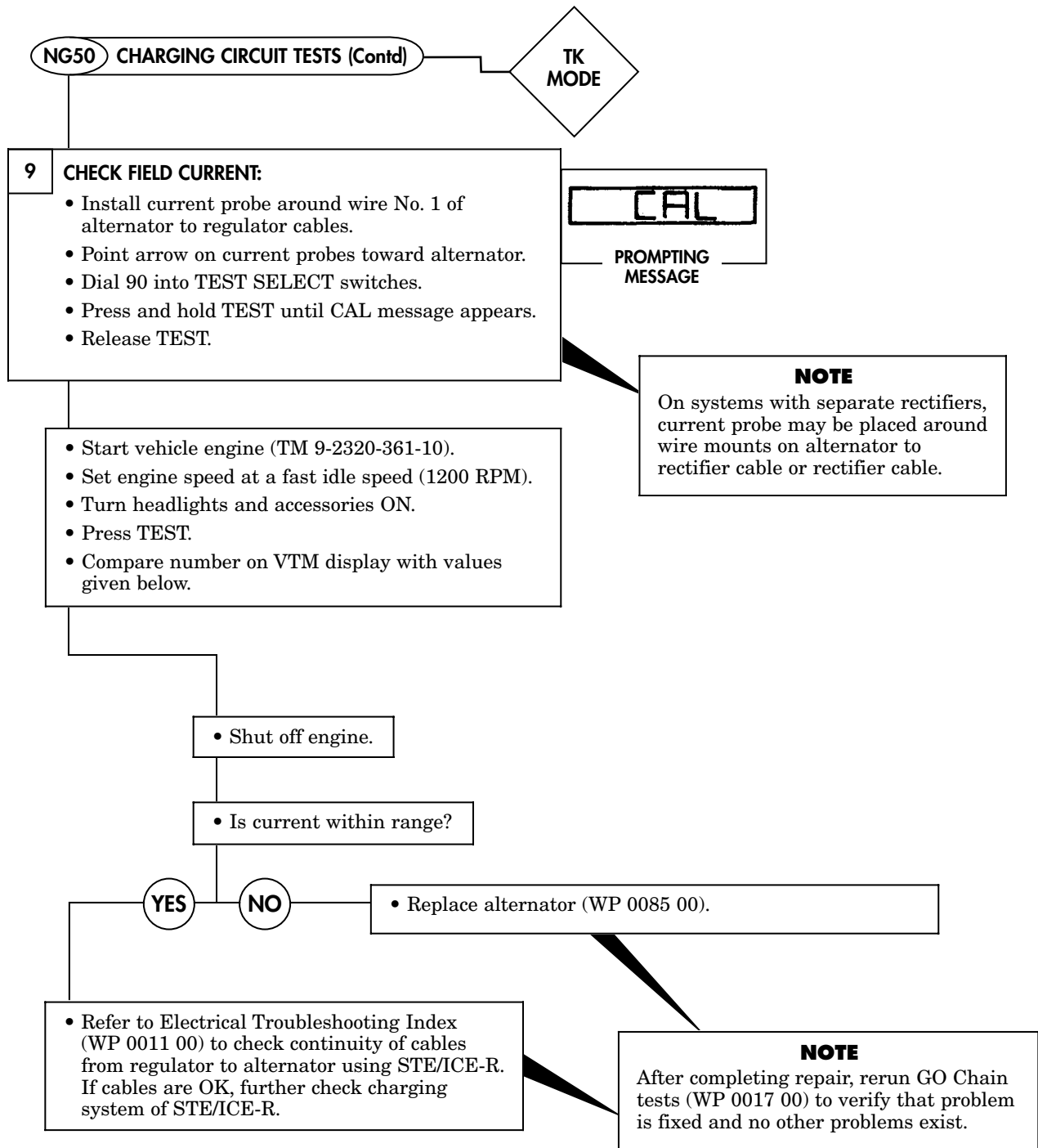
*Table 2. STE/ICE-R No-Go Chain Test (Contd).*





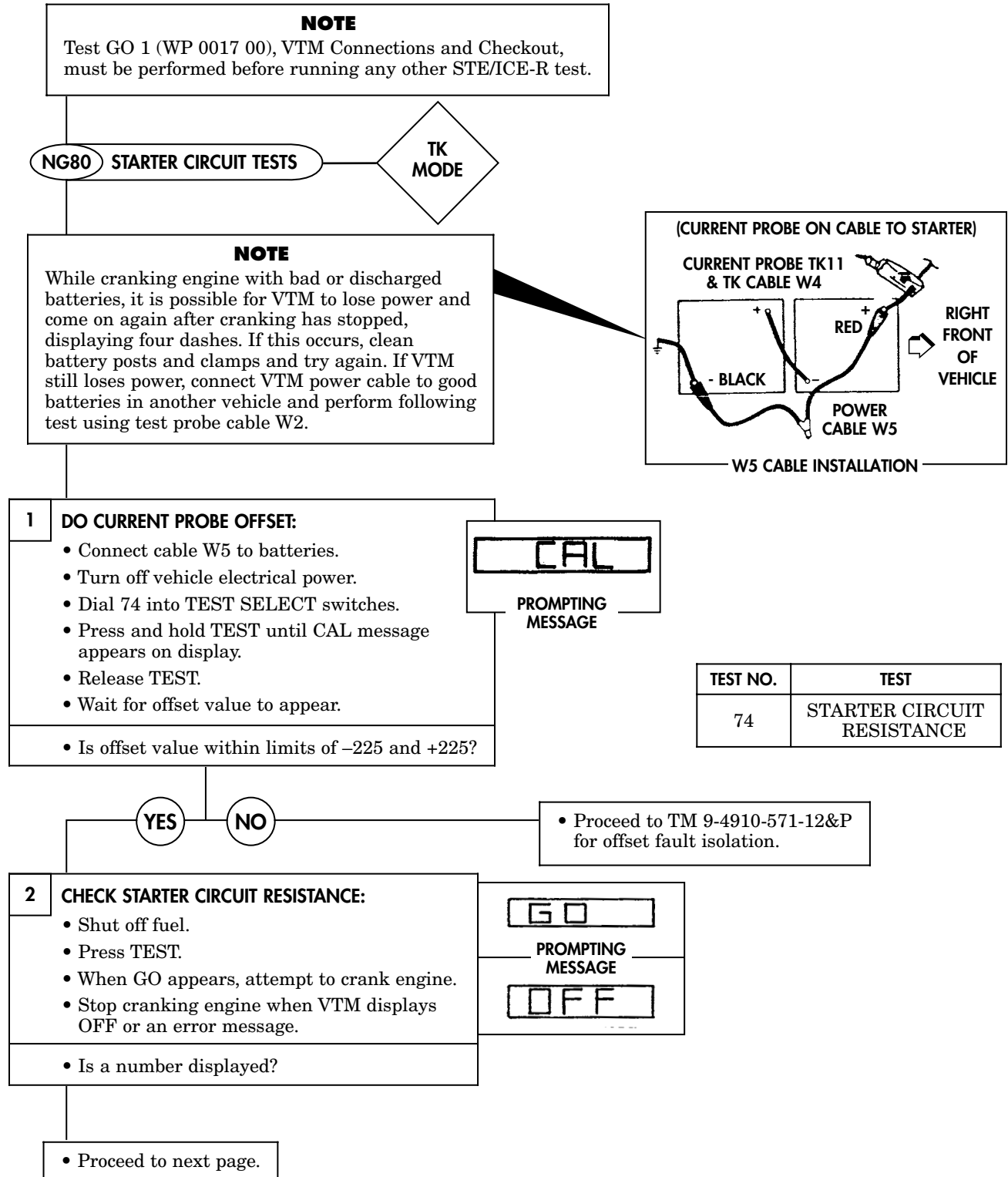
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



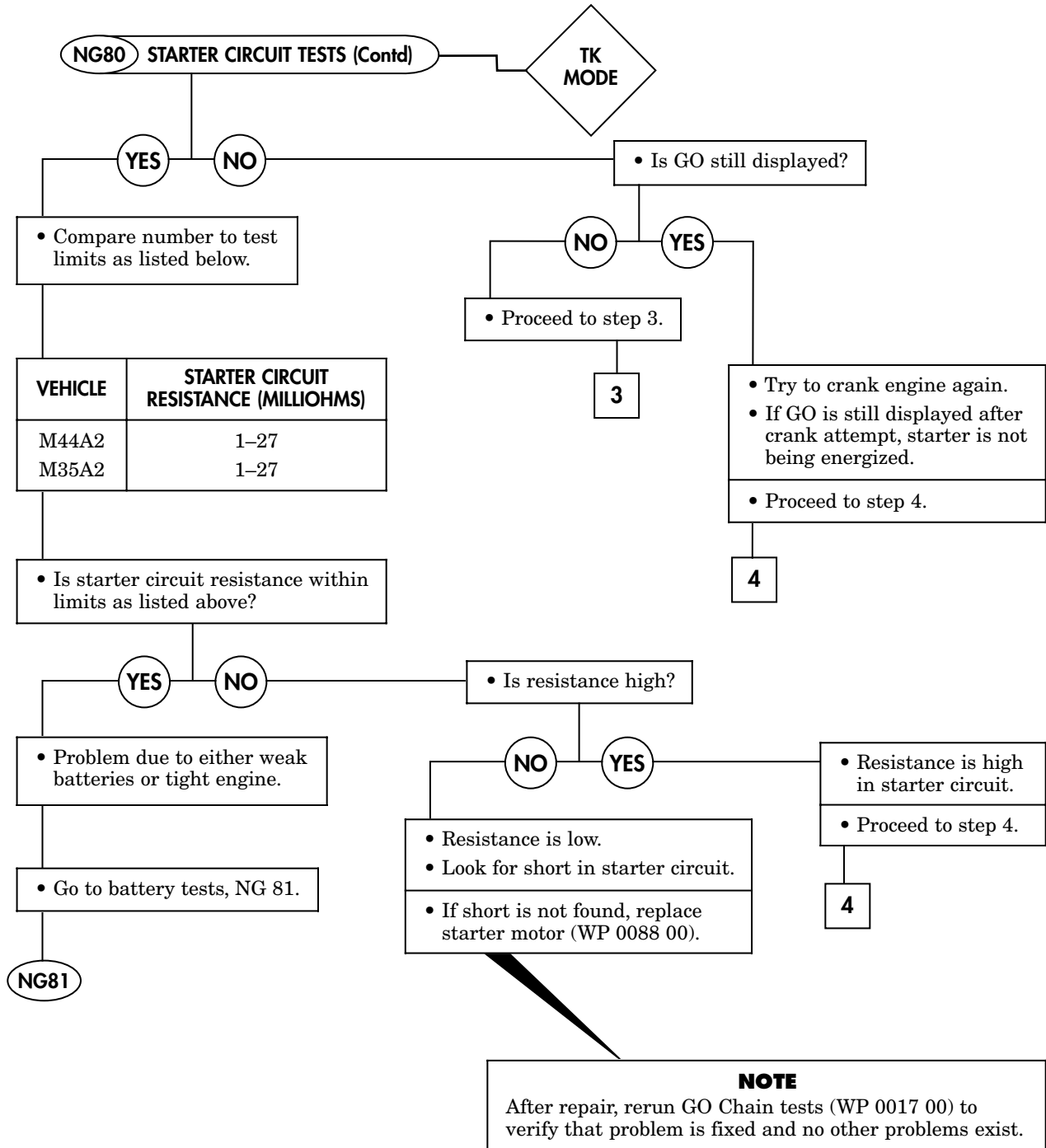
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



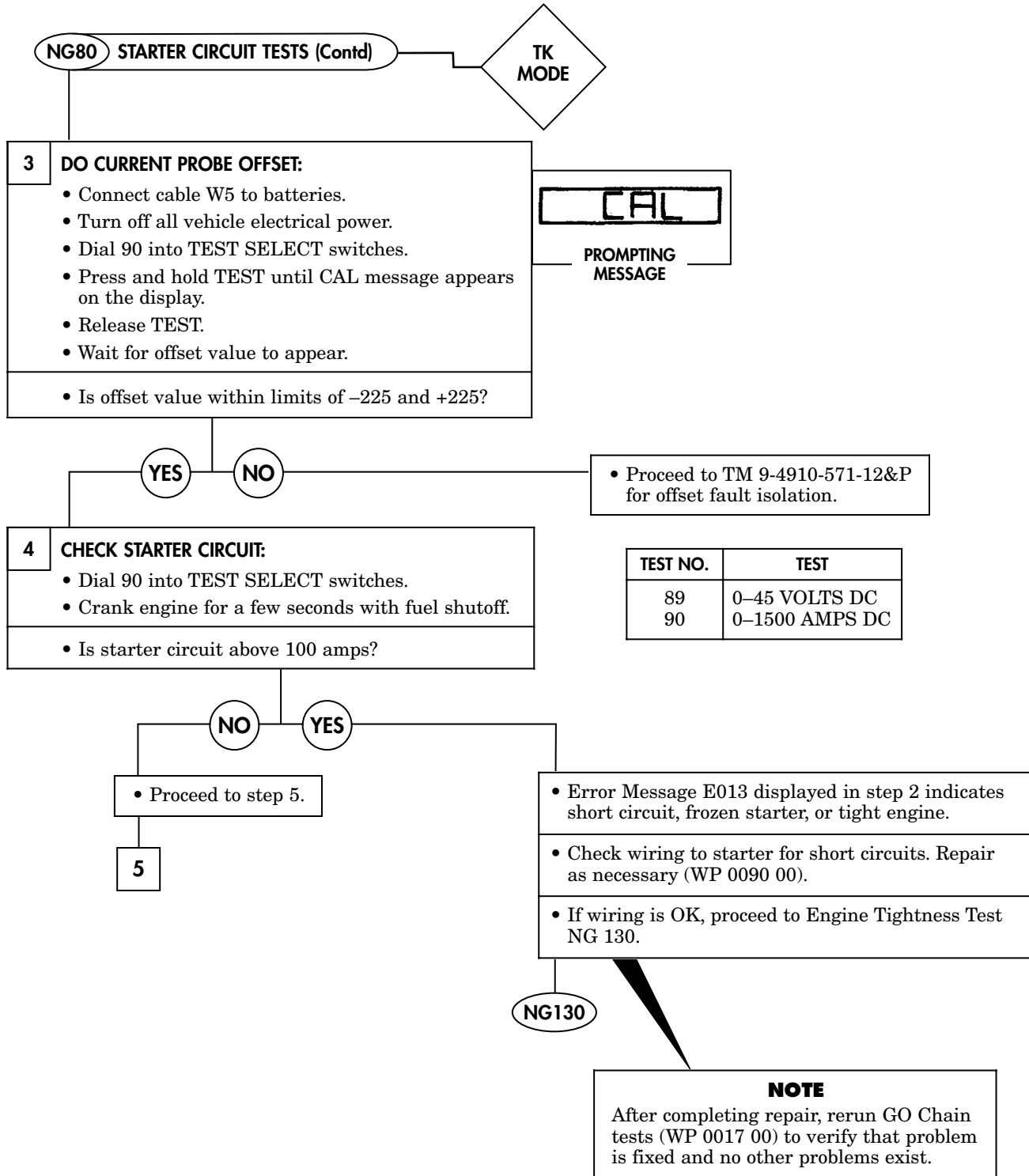
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



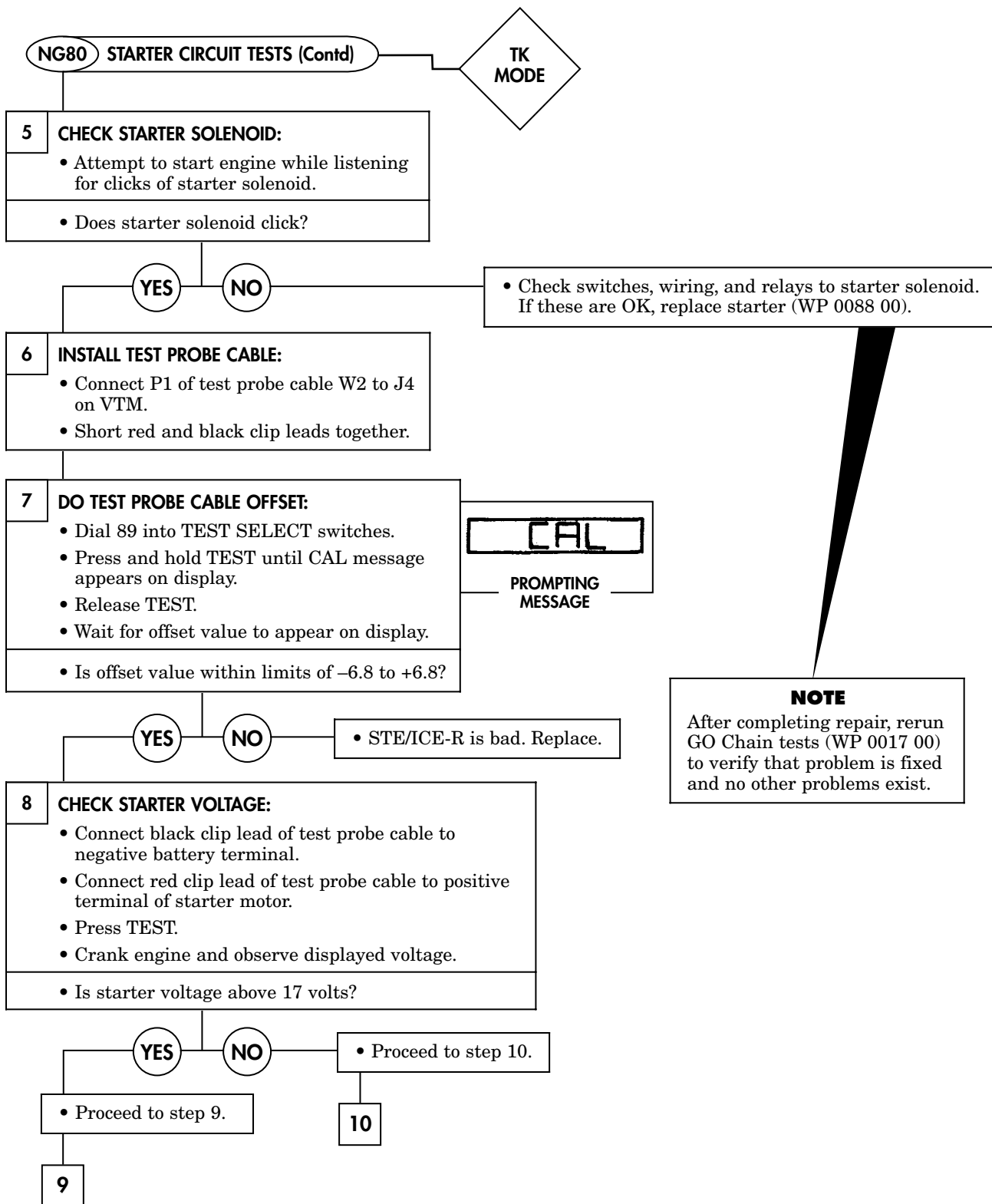
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



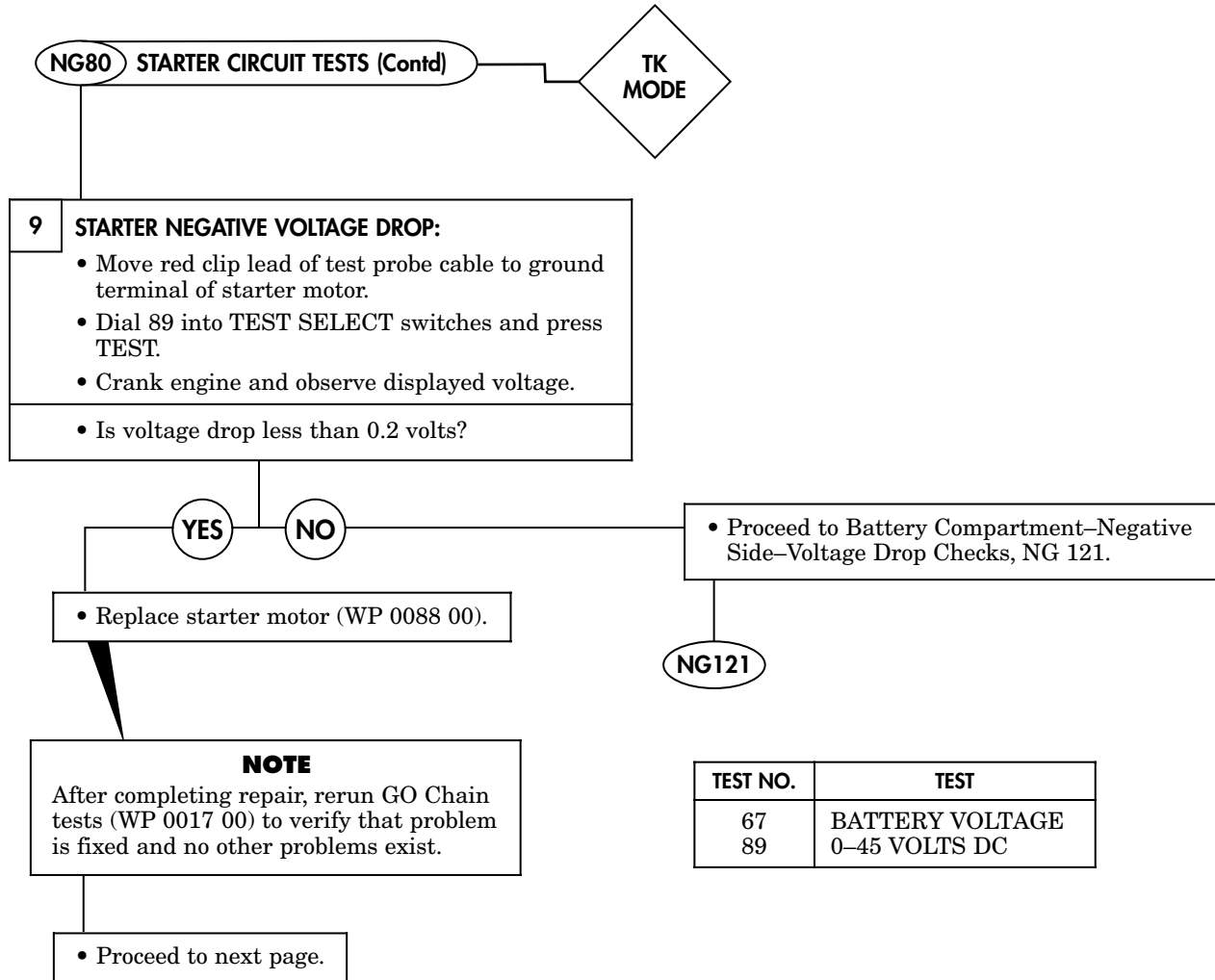
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



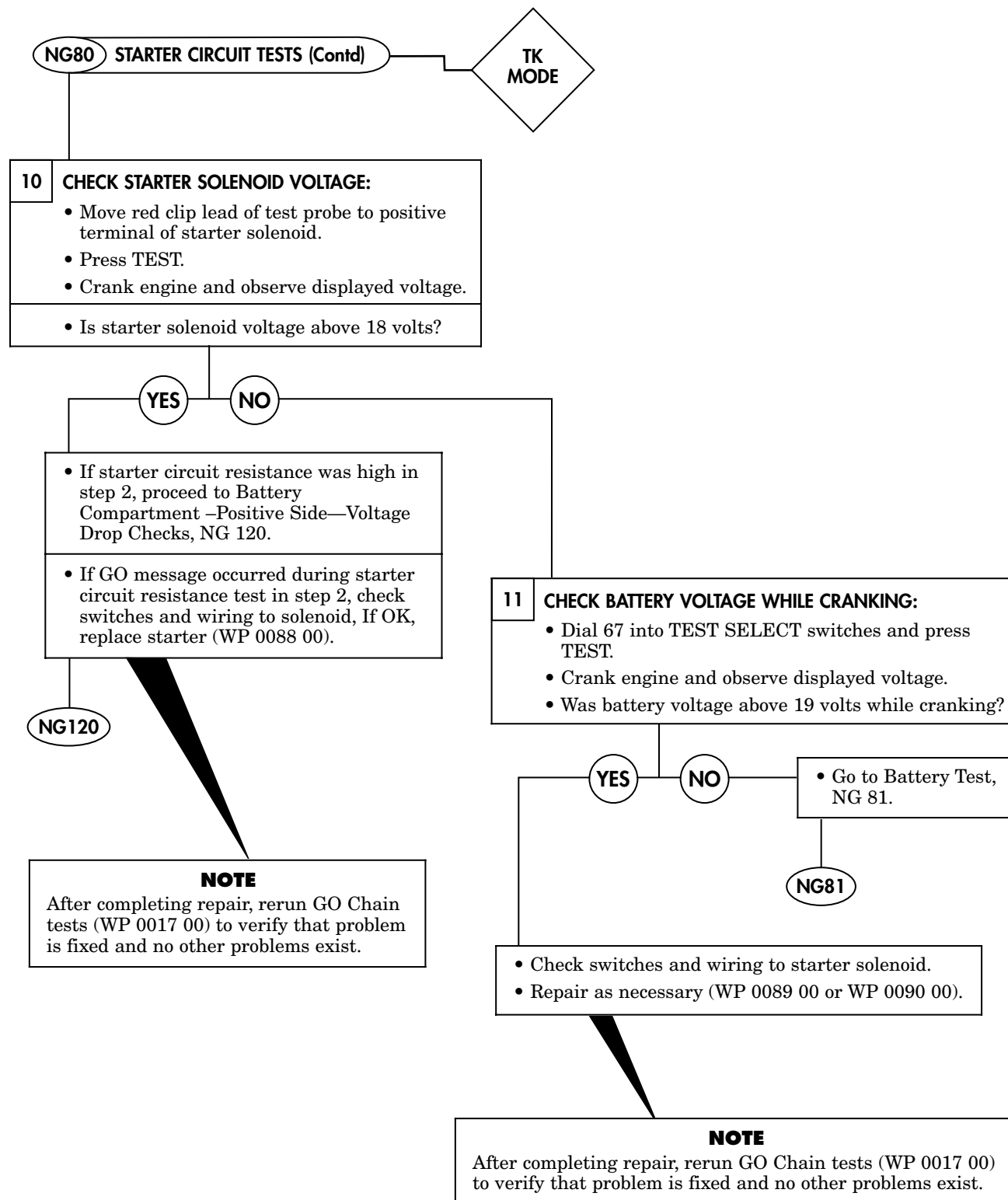
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



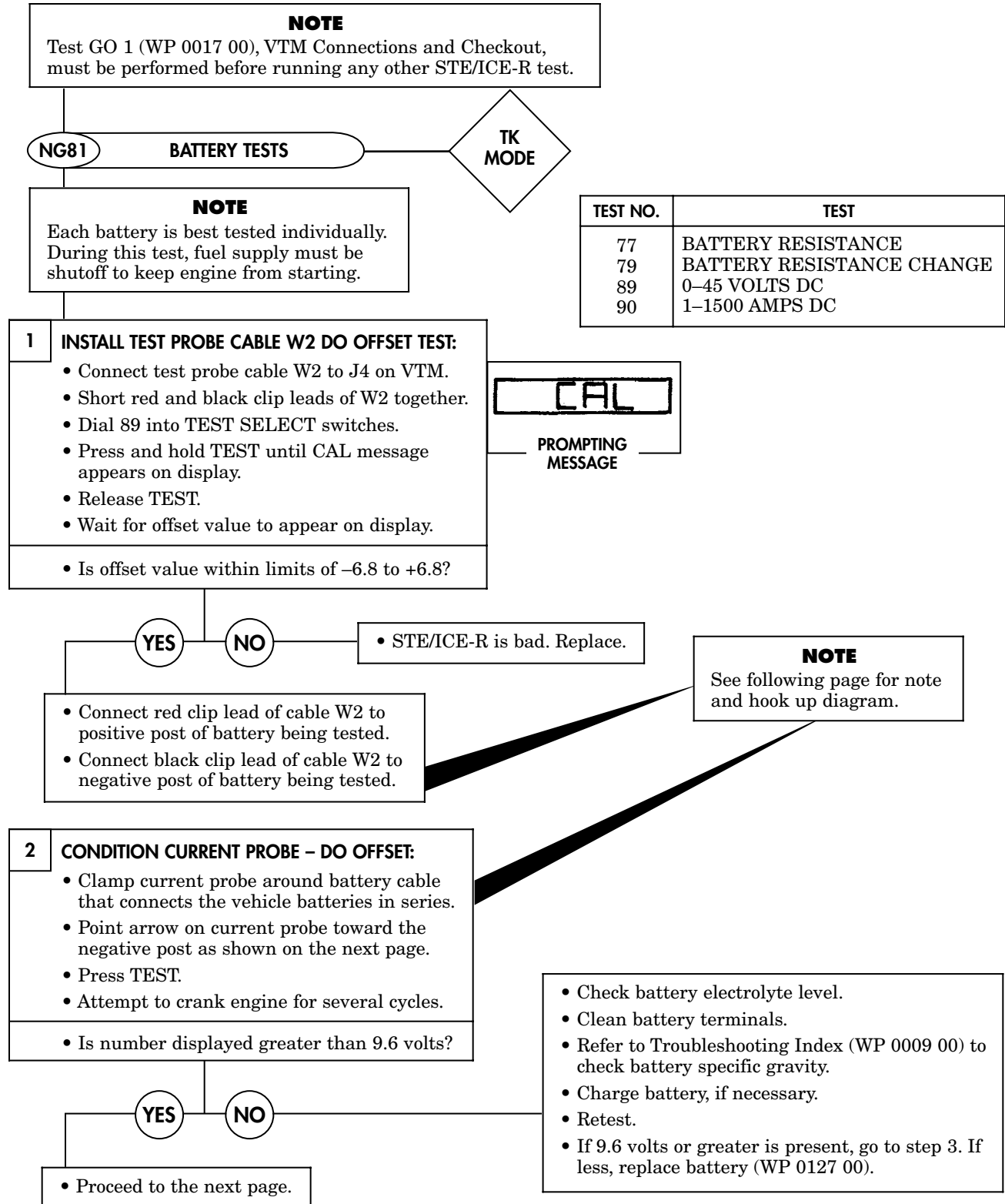
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

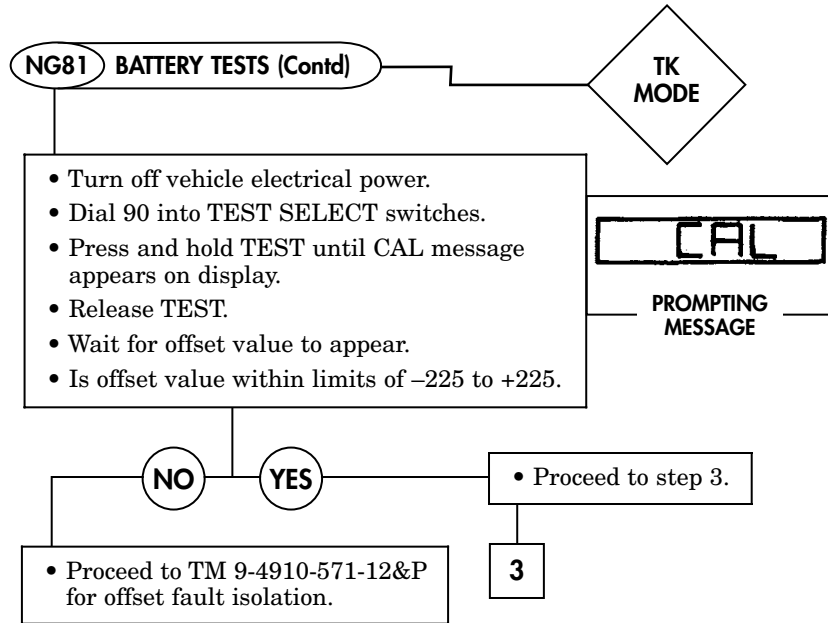
*Table 2. STE/ICE-R No-Go Chain Test (Contd).*





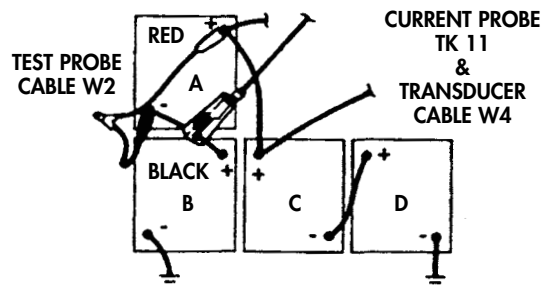
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



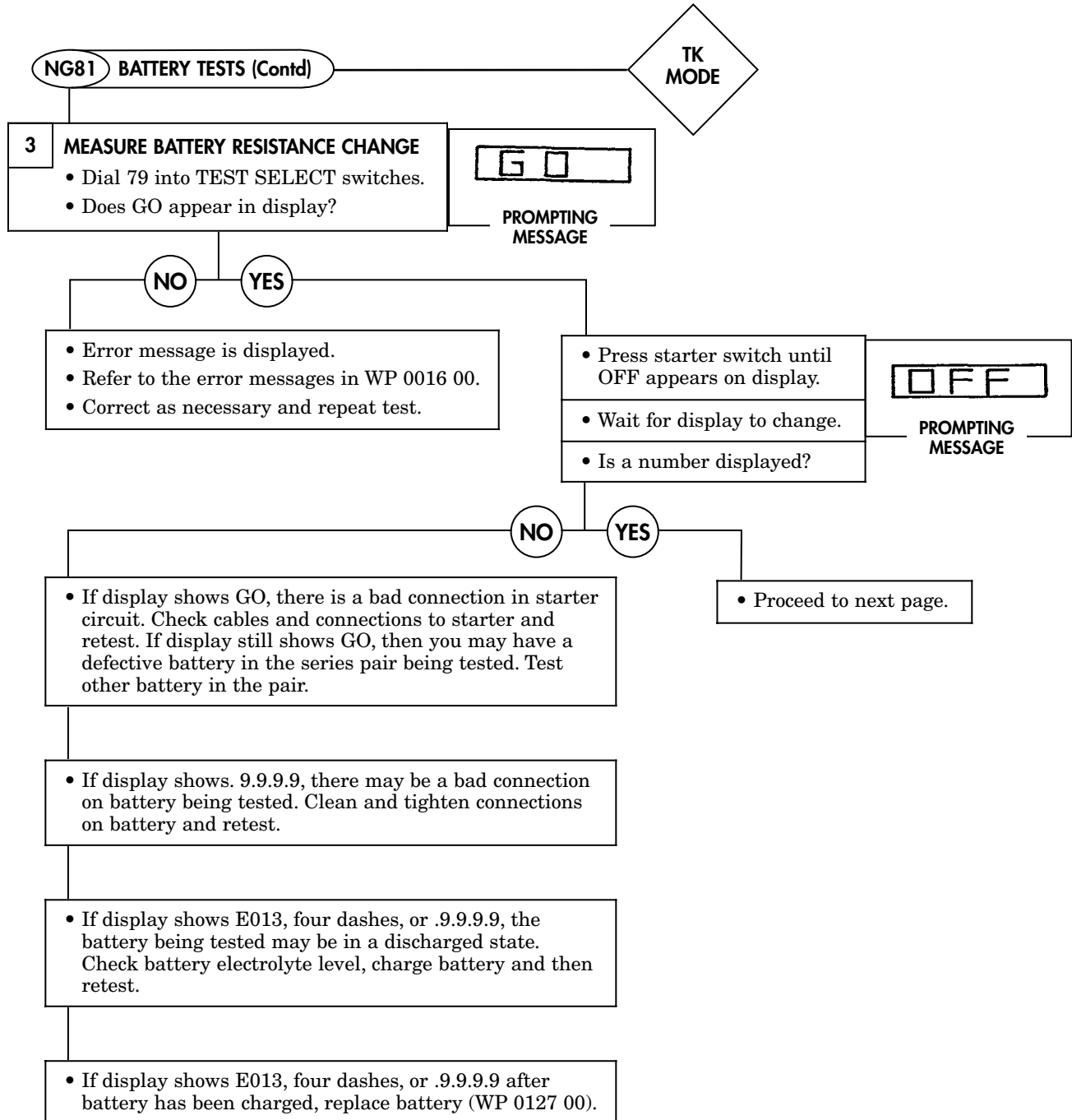
**TEST PROCEDURE**

1. Test each battery of a series pair, then proceed to batteries of next series pair.
2. To find series pair of batteries, find pairs for which the negative terminal of one battery is connected by a cable to the positive terminal of another battery. This makes the two batteries a series pair. For example, in figure below, batteries A and B are a series pair, and batteries C and D are also a series pair.
3. To test battery A or B, clamp current probe around cable connecting battery A and battery B. Point arrow on current probe in direction of negative post connected to the cable.
4. The test probe cable W2 is first connected to battery A for testing battery A.
5. The test probe cable W2 is then connected to battery B for testing battery B. (Current probe in same place as for testing battery A).
6. To test battery C or D, clamp current probe around cable connecting battery C and battery D. Point arrow on current probe in direction of negative post connected to cable.
7. Connect test probe cable W2 to battery C to test battery C.
8. Connect test probe cable W2 to battery D to test battery D.



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

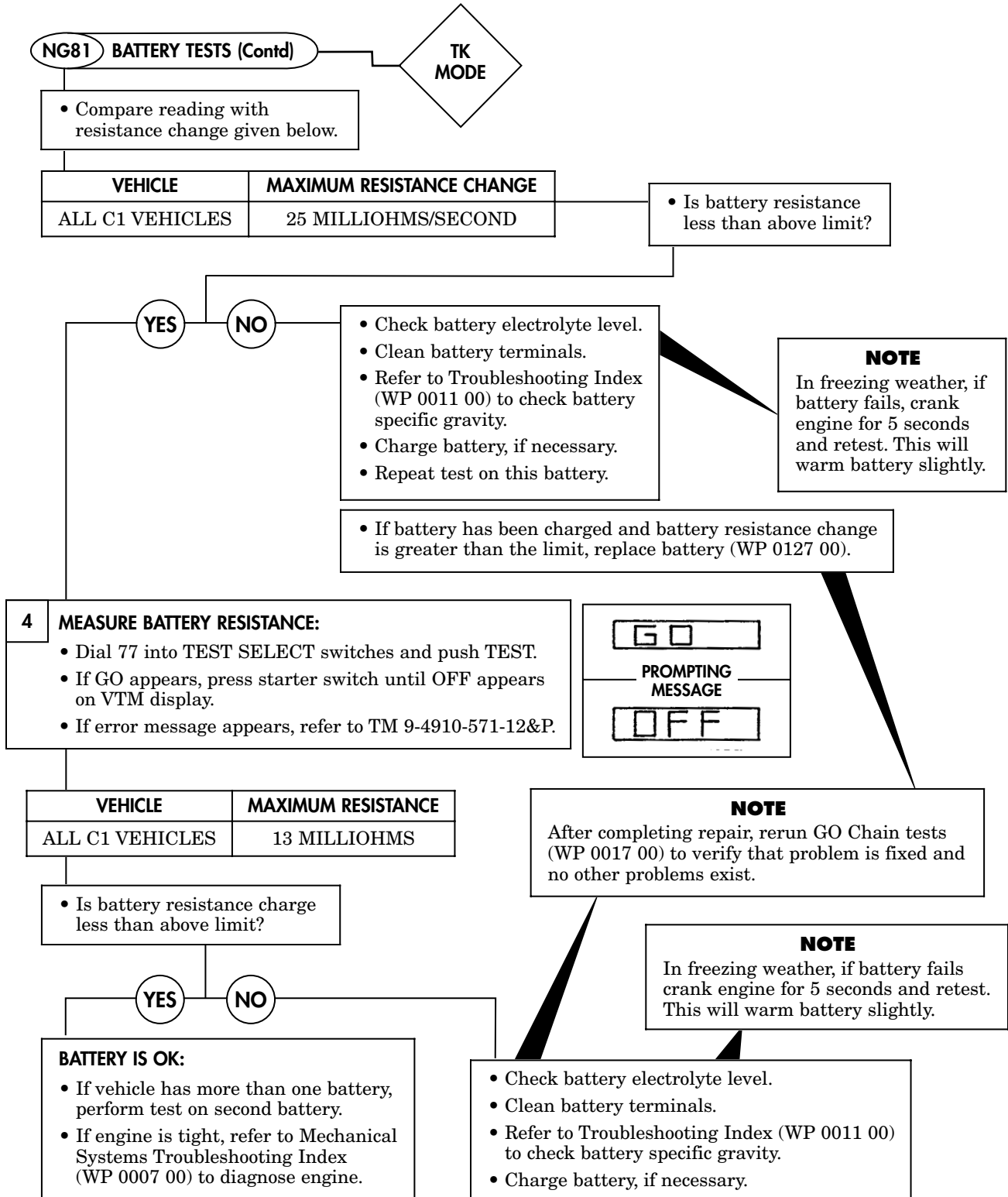
*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**NOTE**  
After completing repair, rerun GO Chain tests (WP 0017 00) to verify that problem is fixed and no other problems exist.

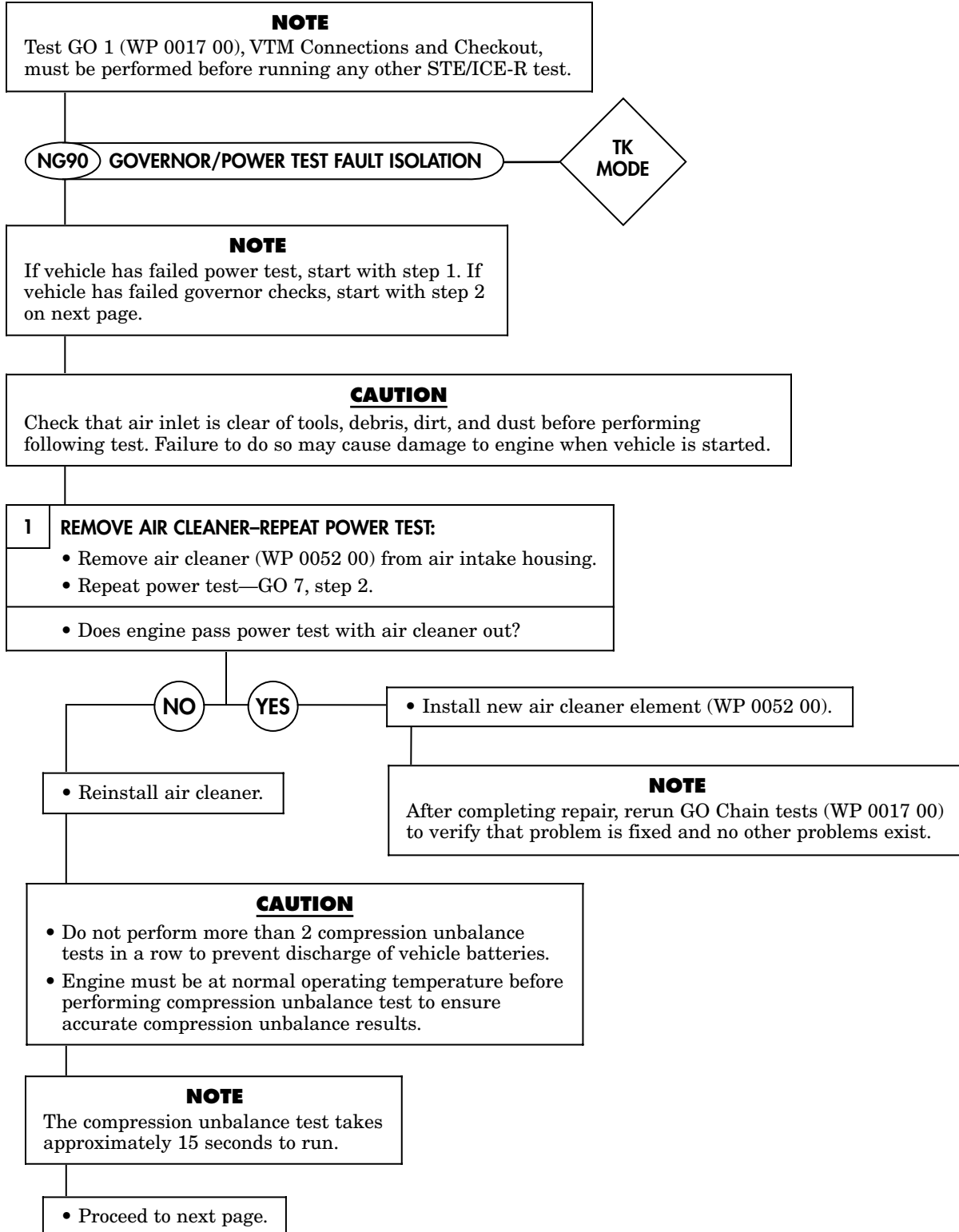
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



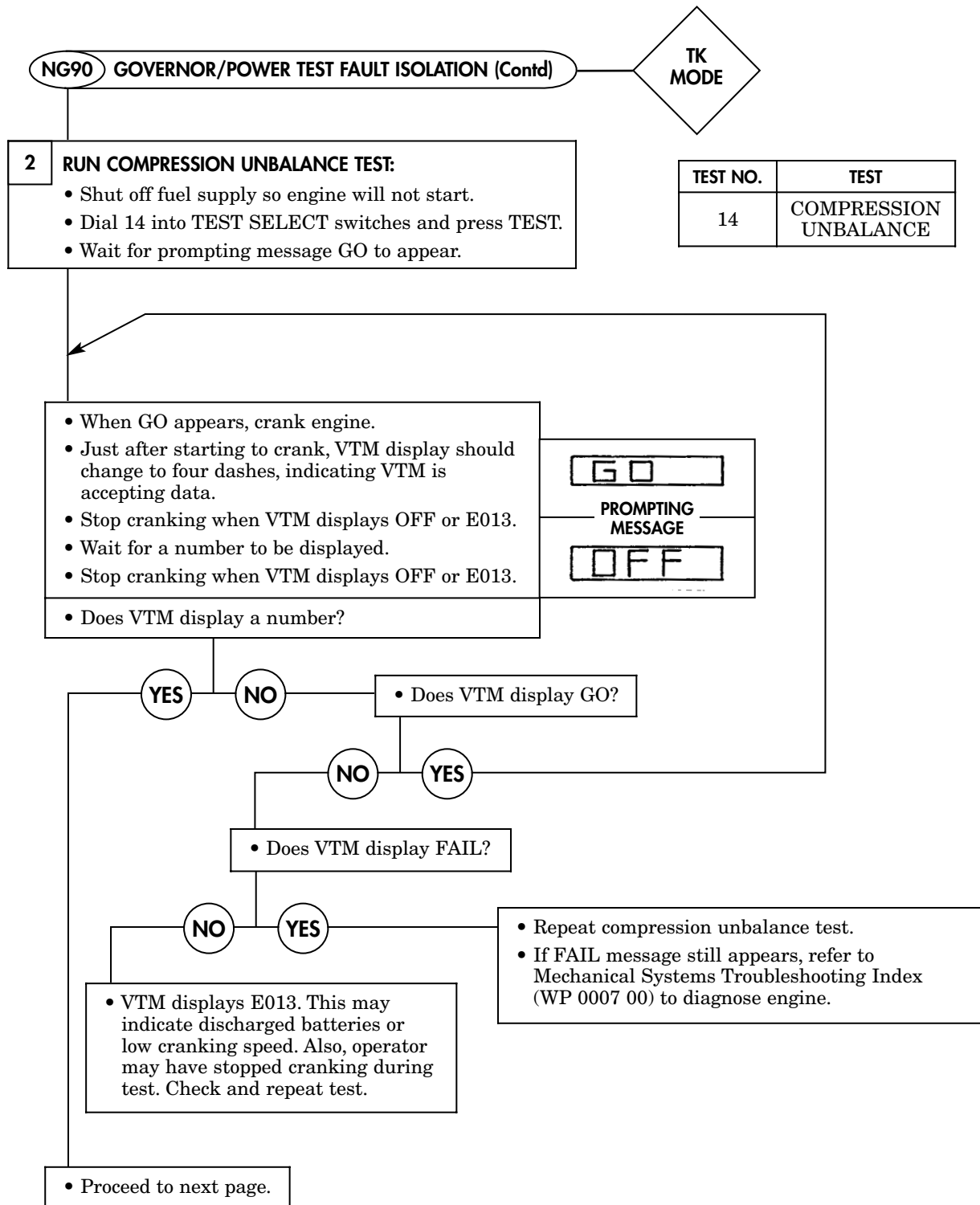
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



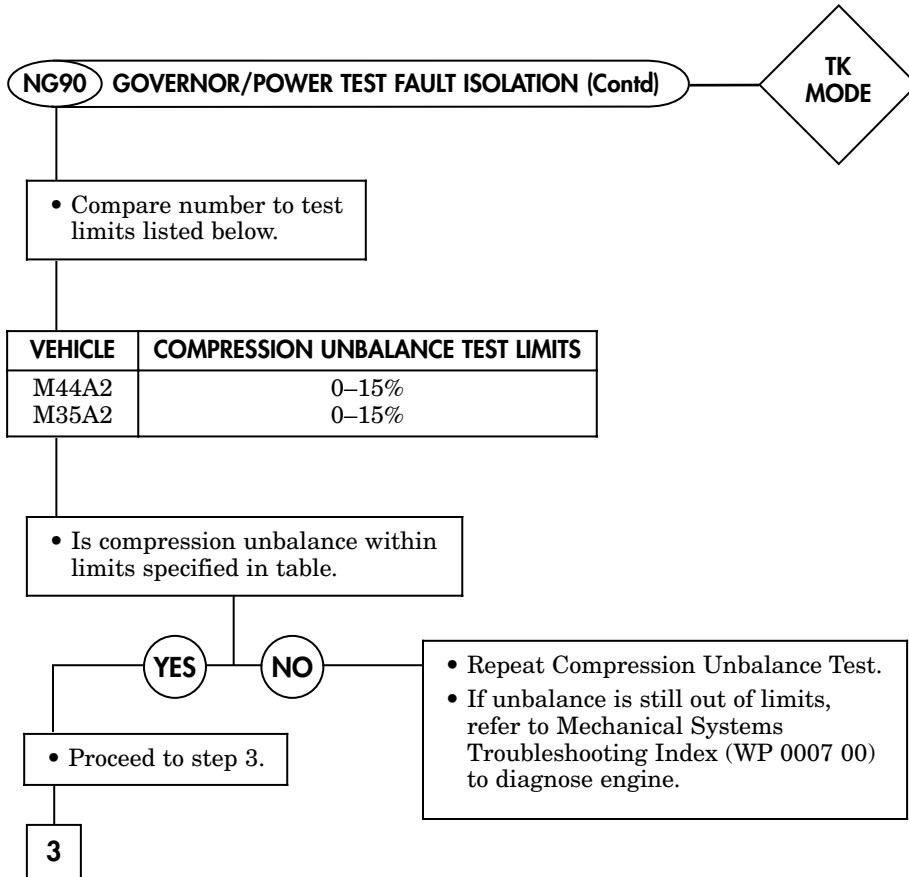
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



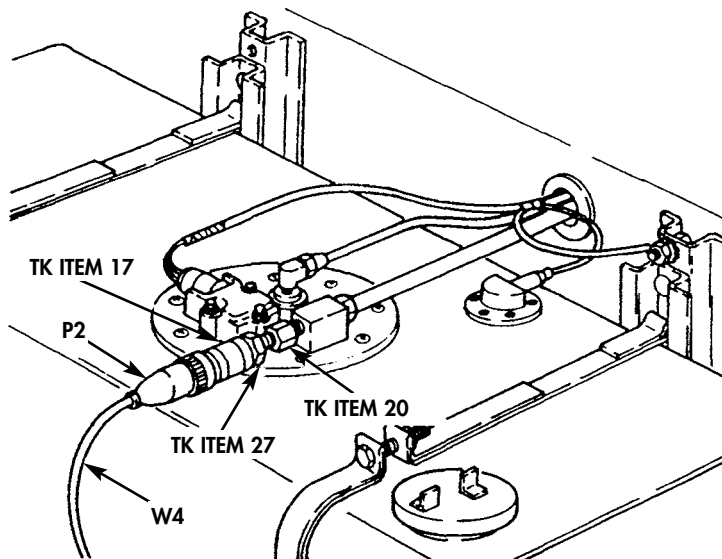
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**FUEL PRESSURE TRANSDUCER INSTALLATION**

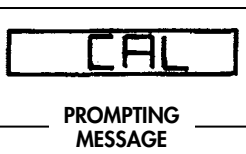
**NG90 GOVERNOR/POWER TEST FAULT ISOLATION (Contd)**

**TK  
MODE**

**3 INSTALL TRANSDUCER**

- Install pressure transducer, TK Item 17 (Blue Stripe) in outlet side of secondary fuel filter.
- Connect P1 of transducer cable W4 to J2 on VTM.
- Connect P2 of transducer cable to connector on transducer.

- Dial 50 into TEST SELECT switches and press TEST.
- Press and hold TEST until CAL message appears on display.
- Release TEST.
- Wait for offset value to appear on display.

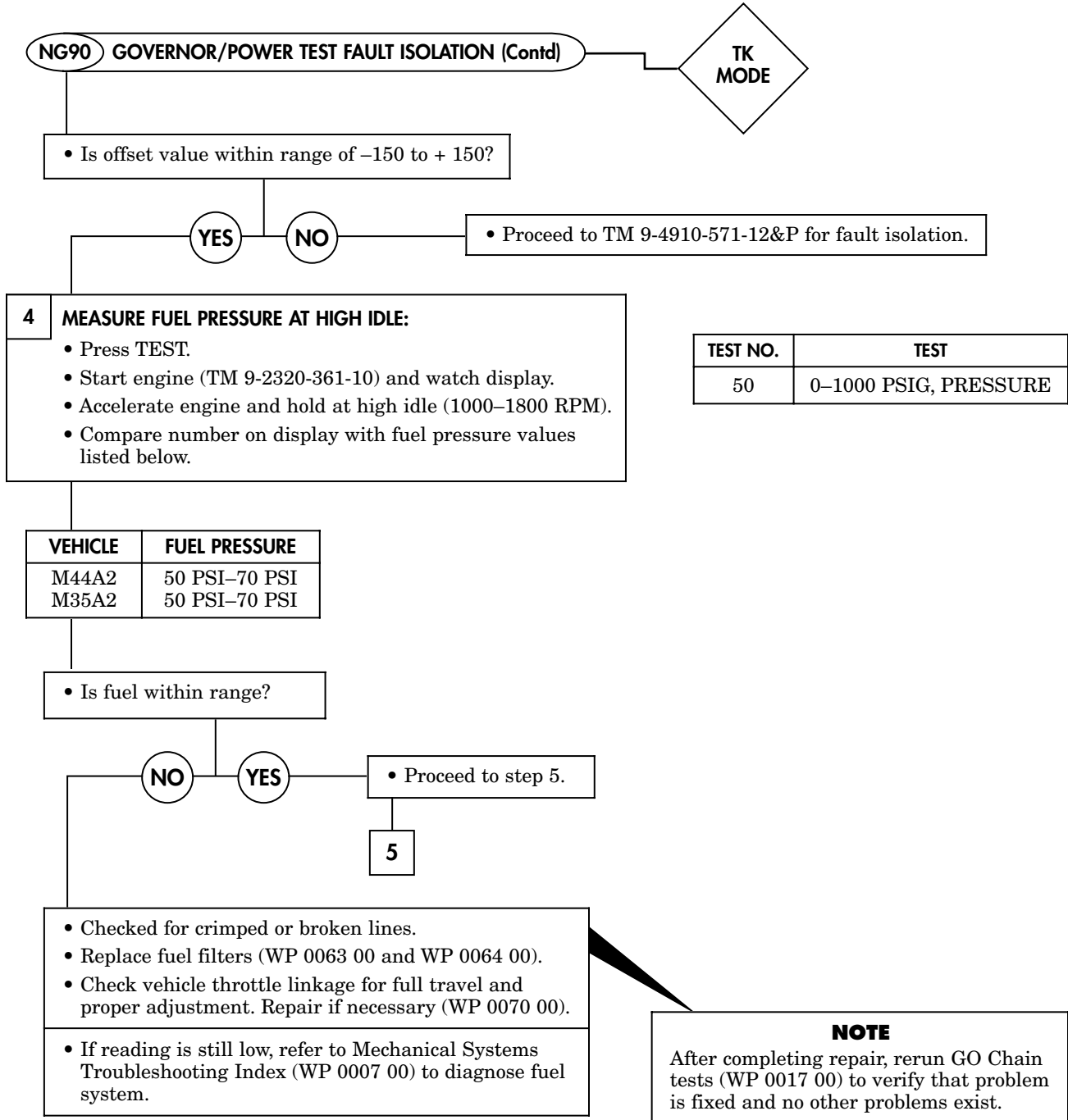


TEST NO.	TEST
50	0-1000 PSIG, PRESSURE

- Proceed to next page.

**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

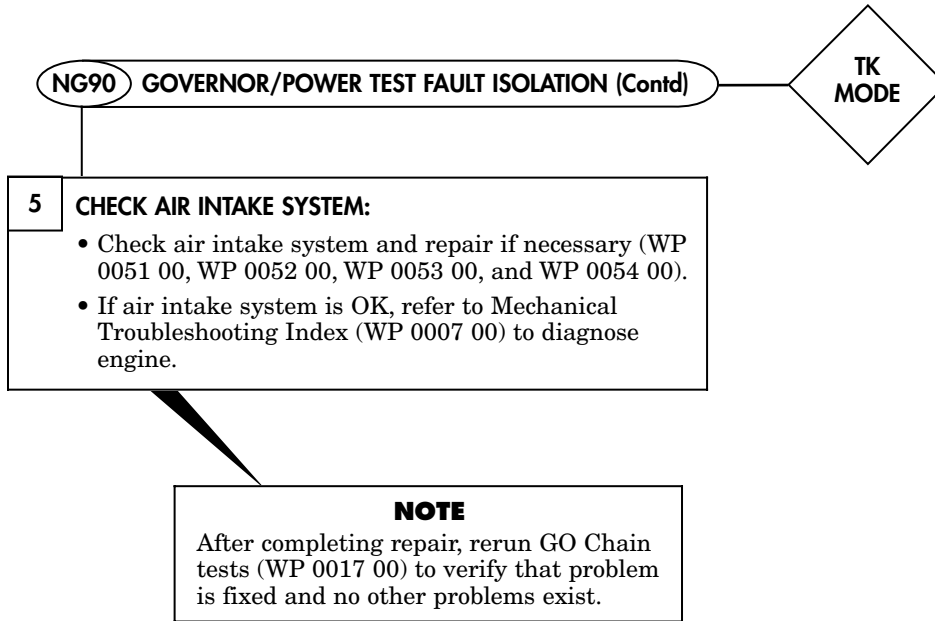
*Table 2. STE/ICE-R No-Go Chain Test (Contd).*





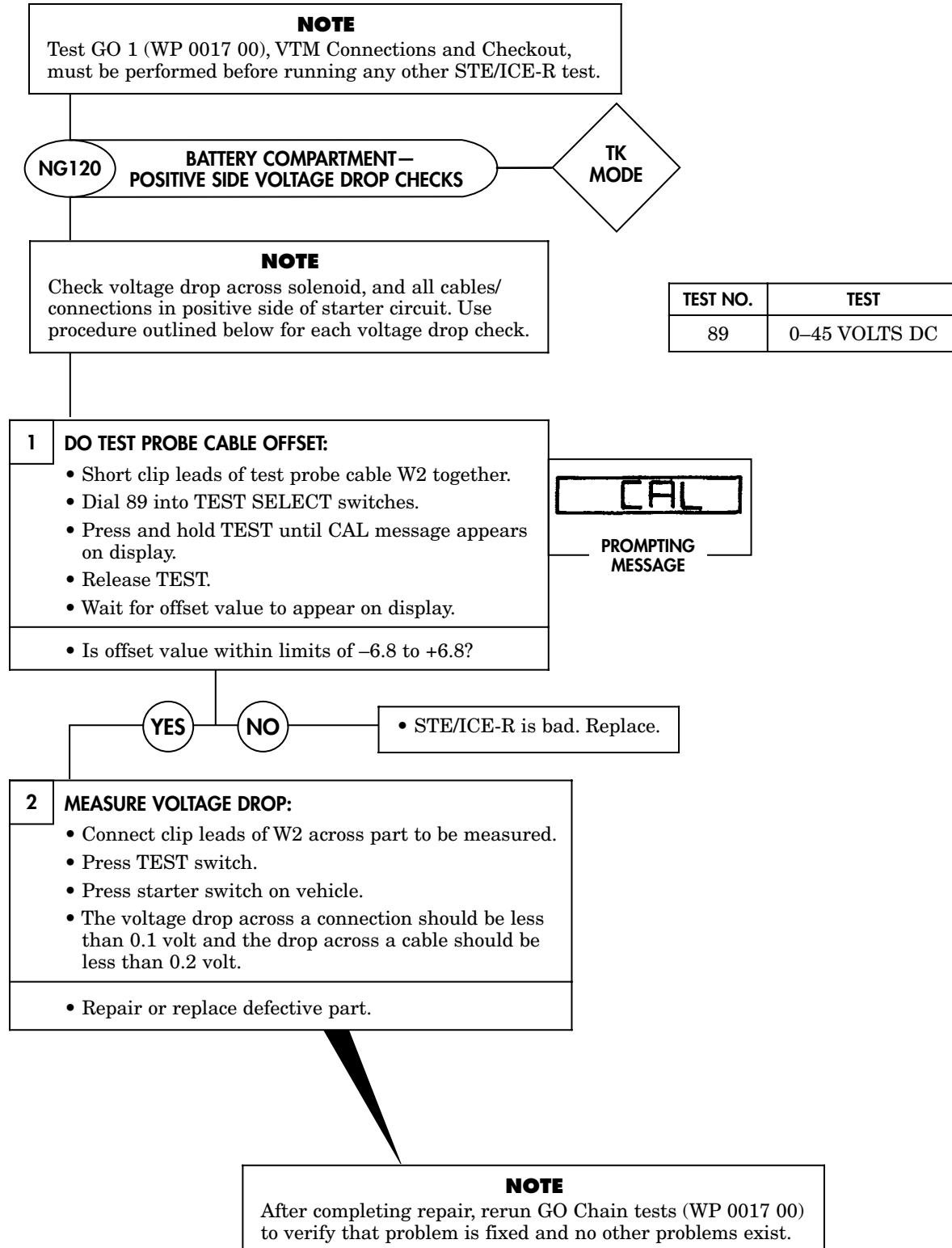
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



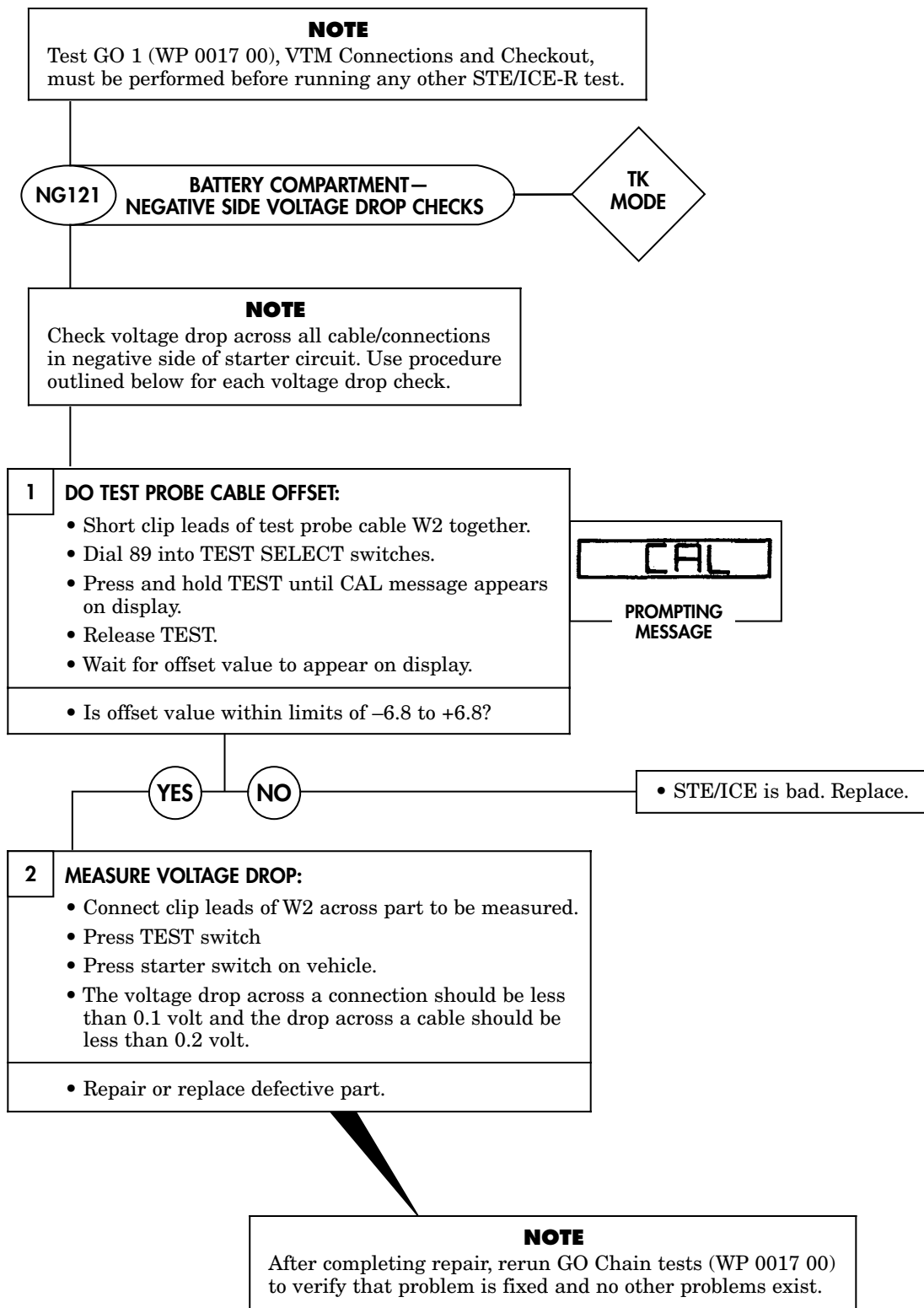
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



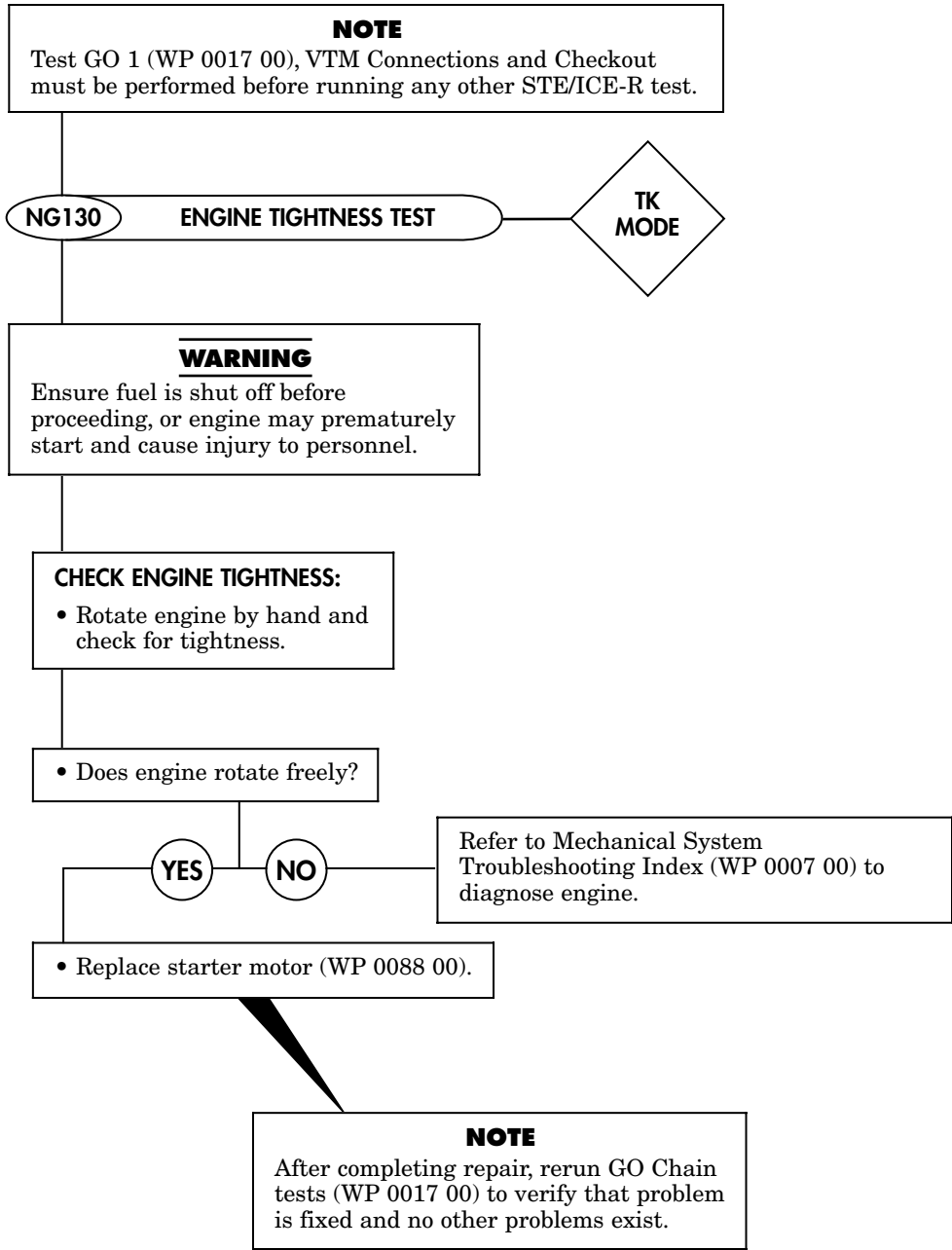
**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



**SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINE—  
REPROGRAMMABLE STE/ICE-R NO-GO CHAIN TROUBLESHOOTING (Contd)**

*Table 2. STE/ICE-R No-Go Chain Test (Contd).*



## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS

#### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

	<u>WP Sequence No.</u>
Service Upon Receipt . . . . .	WP 0019 00
Lubrication Instructions . . . . .	WP 0020 00
General Maintenance Procedures . . . . .	WP 0021 00
Preventive Maintenance Checks and Services (PMCS) Introduction . . . . .	WP 0022 00
Preventive Maintenance Checks and Services (PMCS) . . . . .	WP 0023 00
<b>ENGINE</b>	
Engine Front Mount Pad Replacement . . . . .	WP 0024 00
Engine Rear Mount Pad Replacement . . . . .	WP 0025 00
Engine Front and Rear Mounting Brackets Replacement . . . . .	WP 0026 00
Cylinder Head Maintenance . . . . .	WP 0027 00
Vibration Damper and Seal Maintenance . . . . .	WP 0028 00
Flywheel and Transmission Adapter Plate Maintenance . . . . .	WP 0029 00
Rocker Arm Covers Replacement . . . . .	WP 0030 00
Rocker Arms and Pushrods Maintenance . . . . .	WP 0031 00
Timing Gears Cover and Gasket Replacement . . . . .	WP 0032 00
Tappet Chamber Cover and Gasket Replacement . . . . .	WP 0033 00
Valve Tappets Maintenance . . . . .	WP 0034 00
Oil Pan Replacement . . . . .	WP 0035 00
Oil Pump Maintenance . . . . .	WP 0036 00
Oil Pressure Regulator Housing Maintenance . . . . .	WP 0037 00
Engine Oil Cooler Replacement . . . . .	WP 0038 00
Engine Oil Filter Housing Maintenance . . . . .	WP 0039 00
Air Compressor Support and Gasket Replacement . . . . .	WP 0040 00
Intake and Exhaust Manifolds Maintenance . . . . .	WP 0041 00
Oil Dipstick Tube Replacement . . . . .	WP 0042 00
Crankcase Breather Tube Maintenance . . . . .	WP 0043 00
Engine Oil Filter and Body Maintenance . . . . .	WP 0044 00
Crankcase Breather Tube Adapter Replacement . . . . .	WP 0045 00
Engine Replacement . . . . .	WP 0046 00
<b>CLUTCH SYSTEM</b>	
Clutch Control Linkage Maintenance . . . . .	WP 0047 00
Pedal Shaft Support Replacement . . . . .	WP 0048 00
Clutch Release Bearing, Shaft, and Fork Maintenance . . . . .	WP 0049 00
Clutch Maintenance . . . . .	WP 0050 00
<b>AIR INTAKE SYSTEM</b>	
Air Intake Tube and Cap Replacement . . . . .	WP 0051 00
Air Cleaner Cap and Filter Element Replacement . . . . .	WP 0052 00
Air Cleaner Assembly Maintenance . . . . .	WP 0053 00
Air Cleaner Indicator and Tube Maintenance . . . . .	WP 0054 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>TURBOCHARGER</b>	
Turbocharger Oil Inlet Tube and Adapter Replacement . . . . .	WP 0055 00
Turbocharger Oil Drain Tube, Hose, and Adapter Replacement . . . . .	WP 0056 00
Turbocharger Replacement . . . . .	WP 0057 00
<b>FUEL SYSTEM</b>	
Fuel Tank Filler Cap and Sleeve Replacement . . . . .	WP 0058 00
Fuel Pump (In-Tank) Fuse Replacement . . . . .	WP 0059 00
Fuel Tank Replacement . . . . .	WP 0060 00
Fuel Pump (In-Tank) Maintenance . . . . .	WP 0061 00
Fuel Return Tees and Tubes Replacement . . . . .	WP 0062 00
Primary Fuel Filter Maintenance . . . . .	WP 0063 00
Secondary and Final Fuel Filters Testing and Maintenance . . . . .	WP 0064 00
Manifold Heater (Covered) Replacement . . . . .	WP 0065 00
Manifold Heater (Uncovered) Replacement . . . . .	WP 0066 00
Fuel Injector Nozzle and Holder Maintenance . . . . .	WP 0067 00
Fuel Injector Tubes Maintenance . . . . .	WP 0068 00
Fuel Injection Pump Replacement . . . . .	WP 0069 00
<b>ACCELERATOR PEDAL, BRACKETS, AND ROD</b>	
Accelerator Pedal, Brackets, and Rod Maintenance . . . . .	WP 0070 00
Engine Stop Control Cable Maintenance . . . . .	WP 0071 00
Hand Throttle Control Cable Maintenance . . . . .	WP 0072 00
<b>EXHAUST SYSTEM</b>	
Exhaust System Replacement (All Except M50A3) . . . . .	WP 0073 00
Exhaust System Replacement (M50A3) . . . . .	WP 0074 00
<b>COOLING SYSTEM</b>	
Fan Replacement . . . . .	WP 0075 00
Cooling System Servicing . . . . .	WP 0076 00
Radiator and Brackets Maintenance . . . . .	WP 0077 00
Upper and Lower Radiator Hose Replacement . . . . .	WP 0078 00
Personnel Heater Inlet and Outlet Hose Replacement . . . . .	WP 0079 00
Water Manifold and Hose Replacement . . . . .	WP 0080 00
Thermostat, Housing, and Hose Replacement . . . . .	WP 0081 00
Water Pump Housing and Water Pump Replacement . . . . .	WP 0082 00
Oil Cooler Tube and Hoses Replacement . . . . .	WP 0083 00
<b>ELECTRICAL SYSTEM</b>	
Alternator Belts Maintenance . . . . .	WP 0084 00
Alternator (60 Ampere) and Mounting Bracket Maintenance . . . . .	WP 0085 00
Alternator Pulley Replacement . . . . .	WP 0086 00
Magnetic Starter Relay and Mounting Bracket Replacement . . . . .	WP 0087 00
Starter Motor Replacement . . . . .	WP 0088 00
Starter Switch Replacement . . . . .	WP 0089 00
Wiring Harness Connector Repair . . . . .	WP 0090 00
Front Wiring Harness Replacement . . . . .	WP 0091 00
Rear Wiring Harness Replacement . . . . .	WP 0092 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>INSTRUMENTS, SENDING UNITS, SWITCHES, AND HORN</b>	
Instrument Cluster Replacement . . . . .	WP 0093 00
Air Pressure Gauge Replacement . . . . .	WP 0094 00
Oil Pressure Gauge, Battery and Alternator Gauge, Fuel Gauge, and Engine Temperature Gauge Replacement . . . . .	WP 0095 00
Speedometer and Tachometer Replacement . . . . .	WP 0096 00
Tachometer Drive Shaft and Drive Core Maintenance . . . . .	WP 0097 00
Tachometer Adapter Replacement . . . . .	WP 0098 00
Speedometer Drive Shaft and Adapter Replacement . . . . .	WP 0099 00
Headlight High Beam Indicator and Lamp Replacement . . . . .	WP 0100 00
Light Switch Replacement . . . . .	WP 0101 00
Turn Signal Control and Indicator Lamp Replacement . . . . .	WP 0102 00
Turn Signal Flasher Replacement . . . . .	WP 0103 00
Accessory Power Switch Replacement . . . . .	WP 0104 00
Manifold Heater Switch Replacement . . . . .	WP 0105 00
Oil Pressure Sending Unit Replacement . . . . .	WP 0106 00
Engine Temperature Sending Unit Replacement . . . . .	WP 0107 00
Low Air Pressure Switch Replacement . . . . .	WP 0108 00
Fuel Level Sending Unit Replacement . . . . .	WP 0109 00
Low Air Buzzer Replacement . . . . .	WP 0110 00
Headlight Beam Selection Switch Replacement . . . . .	WP 0111 00
Stoplight Switch Replacement . . . . .	WP 0112 00
Horn Button Replacement . . . . .	WP 0113 00
Air Horn, Solenoid, and Bracket Replacement . . . . .	WP 0114 00
Circuit Breaker Replacement . . . . .	WP 0115 00
Hot Water Personnel Heater Control Switch Replacement . . . . .	WP 0116 00
Hot Water Personnel Heater Blower Motor Resistor Replacement . . . . .	WP 0117 00
Front Wheel Drive Lock-In Switch Indicator and Air Pressure Switch Replacement . .	WP 0118 00
<b>LIGHTING SYSTEM</b>	
Sealed Beam and Headlamp Housing Replacement . . . . .	WP 0119 00
Sealed Beam and Headlamp Housing Adjustment . . . . .	WP 0120 00
Intermediate Turn Signal Replacement . . . . .	WP 0121 00
Front Composite Lamps, Housing, and Bracket Replacement . . . . .	WP 0122 00
Blackout Drive Lamp and Housing Replacement . . . . .	WP 0123 00
Side Marker and Clearance Lamps Replacement . . . . .	WP 0124 00
Rear Composite Lamps and Housing Replacement . . . . .	WP 0125 00
<b>BATTERY AND BATTERY BOX</b>	
Battery Cables and Clamps Maintenance . . . . .	WP 0126 00
Battery and Battery Box Replacement and Servicing . . . . .	WP 0127 00
<b>TRANSMISSION</b>	
Transmission Breather Maintenance . . . . .	WP 0128 00
Transmission Gearshift Lever Knob and Boot Replacement . . . . .	WP 0129 00
Transmission Gearshift Lever Replacement . . . . .	WP 0130 00
Transmission Removal . . . . .	WP 0131 00
Transmission Installation . . . . .	WP 0132 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>TRANSFER CASE</b>	
Transfer Case Controls and Linkage Maintenance (W/ PTO) . . . . .	WP 0133 00
Transfer Case Controls and Linkage Maintenance (W/O PTO) . . . . .	WP 0134 00
Front Wheel Drive Lock-In Switch Maintenance . . . . .	WP 0135 00
Front Axle Engagement Air Cylinder Maintenance . . . . .	WP 0136 00
Transfer Case Breather Maintenance . . . . .	WP 0137 00
Transfer Case Replacement . . . . .	WP 0138 00
<b>PROPELLER SHAFT</b>	
Propeller Shaft Maintenance . . . . .	WP 0139 00
Intermediate Propeller Shaft Maintenance (M36A2) . . . . .	WP 0140 00
Universal Joint Maintenance . . . . .	WP 0141 00
<b>FRONT AND REAR AXLE</b>	
Front Axle Shaft and Universal Joint Maintenance . . . . .	WP 0142 00
Front Axle Oil Seal Assembly Replacement. . . . .	WP 0143 00
Front and Rear Axle Breather Maintenance . . . . .	WP 0144 00
Steering Knuckle Boot Replacement . . . . .	WP 0145 00
Front Axle Shaft Flange Maintenance . . . . .	WP 0146 00
Rear Axle Shaft Maintenance . . . . .	WP 0147 00
Front Axle Replacement . . . . .	WP 0148 00
Front and Rear Differential Oil Seal Replacement. . . . .	WP 0149 00
Steering Knuckle and Steering Arm Maintenance . . . . .	WP 0150 00
Forward-Rear and Rear-Rear Axle Assembly Replacement . . . . .	WP 0151 00
Tandem Axle Replacement . . . . .	WP 0152 00
<b>FRONT AND REAR SUSPENSION</b>	
Front Spring Replacement . . . . .	WP 0153 00
Front Spring Shackle Replacement . . . . .	WP 0154 00
Front Spring Bumper Replacement . . . . .	WP 0155 00
Front Spring Maintenance . . . . .	WP 0156 00
Rear Spring Replacement . . . . .	WP 0157 00
Rear Spring Maintenance . . . . .	WP 0158 00
Rear Spring Seat Replacement. . . . .	WP 0159 00
Shock Absorber Replacement . . . . .	WP 0160 00
Rear Spring Wear Pad Replacement . . . . .	WP 0161 00
Torque Rods Replacement. . . . .	WP 0162 00
<b>PARKING BRAKE</b>	
Parking Brakedrum Replacement . . . . .	WP 0163 00
Parking Brakeshoe Maintenance . . . . .	WP 0164 00
Parking Brake Cable Replacement. . . . .	WP 0165 00
Parking Brake Lever Replacement. . . . .	WP 0166 00
<b>SERVICE BRAKE AND HYDRAULIC SYSTEMS</b>	
Service Brakeshoes Maintenance . . . . .	WP 0167 00
Service Brake Adjustment. . . . .	WP 0168 00
Hydraulic Wheel Cylinder Replacement . . . . .	WP 0169 00
Hydraulic Master Cylinder Maintenance. . . . .	WP 0170 00



## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>SERVICE BRAKE AND HYDRAULIC SYSTEMS (Contd)</b>	
Air-Hydraulic Cylinder Replacement . . . . .	WP 0171 00
Service Brake Bleeding . . . . .	WP 0172 00
Brake Pedal Lever Replacement . . . . .	WP 0173 00
Brake Pedal Adjustment . . . . .	WP 0174 00
Hydraulic Brake Line Replacement . . . . .	WP 0175 00
Flexible Hydraulic Brake Line Modification . . . . .	WP 0176 00
<b>COMPRESSED AIR SYSTEM</b>	
Air System Safety Valve Replacement . . . . .	WP 0177 00
Airbrake Hand Control Valve Replacement . . . . .	WP 0178 00
Air Reservoirs Replacement . . . . .	WP 0179 00
Air Compressor and Pulley Maintenance . . . . .	WP 0180 00
Air Compressor Maintenance . . . . .	WP 0181 00
Air Compressor Drivebelt Maintenance . . . . .	WP 0182 00
Air Compressor Governor Maintenance . . . . .	WP 0183 00
Quick-Disconnect Coupling Half Maintenance . . . . .	WP 0184 00
Airbrake Cutoff Valves and Couplings Replacement . . . . .	WP 0185 00
<b>WHEEL, TIRE, AND DRUM</b>	
Wheel, Tire, and Tube Maintenance . . . . .	WP 0186 00
Front Hub and Drum Maintenance . . . . .	WP 0187 00
Rear Hub and Drum Maintenance . . . . .	WP 0188 00
Wheel Bearing Adjustment . . . . .	WP 0189 00
<b>STEERING SYSTEM</b>	
Toe-In Check and Adjustment . . . . .	WP 0190 00
Pitman Arm Replacement . . . . .	WP 0191 00
Steering Gear Replacement . . . . .	WP 0192 00
Steering Gear Adjustment . . . . .	WP 0193 00
Tie Rod and Tie Rod End Replacement . . . . .	WP 0194 00
Drag Link Replacement . . . . .	WP 0195 00
Steering Wheel Replacement . . . . .	WP 0196 00
<b>FRAME</b>	
Front Shackle (W/O Winch) Replacement . . . . .	WP 0197 00
Front Shackle (W/ Winch) Replacement . . . . .	WP 0198 00
Pintle Hook Maintenance . . . . .	WP 0199 00
Rear Shackle Replacement . . . . .	WP 0200 00
Rear Bumperette Replacement . . . . .	WP 0201 00
Spare Tire Carrier Maintenance . . . . .	WP 0202 00
Brush Guard, Stone Shield, and Headlight Guard Replacement . . . . .	WP 0203 00
Front Bumper Replacement . . . . .	WP 0204 00
Front Winch Extension Replacement . . . . .	WP 0205 00
Frame Alignment Inspection . . . . .	WP 0206 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>BODY, CAB, AND ACCESSORIES</b>	
Cab Door Inspection Hole Cover Replacement . . . . .	WP 0207 00
Cab Door Dovetail Wedge Replacement . . . . .	WP 0208 00
Cab Door and Hinges Replacement . . . . .	WP 0209 00
Cab Door Glass Assembly and Weatherseal Replacement . . . . .	WP 0210 00
Door Glass Replacement . . . . .	WP 0211 00
Door Glass Channel Replacement . . . . .	WP 0212 00
Cab Door Window Regulator and Handle Replacement . . . . .	WP 0213 00
Outside Door Handle, Inside Door Handle, and Cab Door Lock Replacement . . . . .	WP 0214 00
Cab Door Check Rod Replacement . . . . .	WP 0215 00
Cab Door Catch Replacement . . . . .	WP 0216 00
Cab Door Weatherseals Replacement . . . . .	WP 0217 00
Side Panel Replacement . . . . .	WP 0218 00
Headlight Bracket Replacement . . . . .	WP 0219 00
Hood Fasteners and Rubber Radiator Shield Replacement . . . . .	WP 0220 00
Hood Maintenance . . . . .	WP 0221 00
Hood Hinges Replacement . . . . .	WP 0222 00
Cab Handle Replacement . . . . .	WP 0223 00
Cab Cowl Vent Replacement . . . . .	WP 0224 00
Glove Compartment Replacement . . . . .	WP 0225 00
Toolbox (Under Cab) Replacement . . . . .	WP 0226 00
Windshield Glass Replacement . . . . .	WP 0227 00
Windshield Assembly Maintenance . . . . .	WP 0228 00
Windshield Arm, Glass Assembly, and Handle Replacement . . . . .	WP 0229 00
Cab Tunnel, Rear Tunnel, and Toeboard Replacement . . . . .	WP 0230 00
Rear Cab Mount and Bracket Replacement . . . . .	WP 0231 00
Water Can Bracket and Running Board Replacement . . . . .	WP 0232 00
Cab Soft Top Turnbuttons and Lashing Hooks Replacement . . . . .	WP 0233 00
Companion Seat Maintenance . . . . .	WP 0234 00
Driver's Seat Base Maintenance . . . . .	WP 0235 00
Driver's Seat Replacement . . . . .	WP 0236 00
Driver's Seat Cushion, Backrest, Frame, and Seat Adjuster Replacement . . . . .	WP 0237 00
Front Fenders Maintenance . . . . .	WP 0238 00
<b>ACCESSORIES</b>	
Windshield Washer Reservoir, Tubing, Jet, and Pump Replacement . . . . .	WP 0239 00
Windshield Wiper Switch, Motor, and Conlink Covers Replacement . . . . .	WP 0240 00
Left and Right Conlinks Maintenance . . . . .	WP 0241 00
Windshield Wiper Idler Shaft and Housing Replacement . . . . .	WP 0242 00
Windshield Wiper Blade and Arm Replacement . . . . .	WP 0243 00
Mirror and Brackets Replacement . . . . .	WP 0244 00
Data Plate Replacement . . . . .	WP 0245 00
Personnel Heater Supply Hose Replacement . . . . .	WP 0246 00
Personnel Heater Diverter Replacement . . . . .	WP 0247 00
Personnel Heater Air Vent Replacement . . . . .	WP 0248 00
Personnel Heater Control Cables Maintenance . . . . .	WP 0249 00
Personnel Hot Water Heater Replacement . . . . .	WP 0250 00
Personnel Heater Defroster Hoses Replacement . . . . .	WP 0251 00
Reflector Replacement . . . . .	WP 0252 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>CARGO BODIES</b>	
Cargo Body Rack and Troop Seat Maintenance . . . . .	WP 0253 00
Cargo Body Tailgate Replacement . . . . .	WP 0254 00
Cargo Body Tailgate Replacement (M35A2C) . . . . .	WP 0255 00
Cargo Body Upper and Lower Rear Splash Guard Replacement. . . . .	WP 0256 00
Front Splash Guard Replacement . . . . .	WP 0257 00
Cargo Body Front Rack Maintenance (M35A2C) . . . . .	WP 0258 00
Cargo Body Dropside Replacement (M35A2C) . . . . .	WP 0259 00
Cargo Body Front Rack Maintenance (M35A2 and M36A2). . . . .	WP 0260 00
Cargo Bodies Tailgate Maintenance. . . . .	WP 0261 00
Cargo Bodies Maintenance . . . . .	WP 0262 00
<b>TANK BODIES</b>	
Discharge Valve Replacement (M49A2C) . . . . .	WP 0263 00
Discharge Valve Control Levers Maintenance (M49A2C) . . . . .	WP 0264 00
Discharge Valve Repair . . . . .	WP 0265 00
Front and Rear Fuel Tank Discharge Tubes Replacement (M49A2C) . . . . .	WP 0266 00
Automatic Dump Valve and Sump Assembly Maintenance (M49A2C) . . . . .	WP 0267 00
Fuel Tank Manhole Cover Maintenance (M49A2C) . . . . .	WP 0268 00
Fuel Hose and Nozzle Replacement (M49A2C) . . . . .	WP 0269 00
Water Tank Nozzle Holder Replacement . . . . .	WP 0270 00
Overturn Tubes Replacement (M49A2C) . . . . .	WP 0271 00
Globe Valve Replacement (M49A2C) . . . . .	WP 0272 00
Filter Separator-to-Sump Pipe Replacement (M49A2C) . . . . .	WP 0273 00
Cable Retractor Replacement (M49A2C) . . . . .	WP 0274 00
Meter-to-Filter Tube Replacement (M49A2C) . . . . .	WP 0275 00
Gallon Meter Replacement (M49A2C) . . . . .	WP 0276 00
Delivery Pump Outlet Tube Replacement (M49A2C) . . . . .	WP 0277 00
Delivery Pump Inlet Tube Replacement (M49A2C) . . . . .	WP 0278 00
Water Pump Manifold Replacement (M50A3) . . . . .	WP 0279 00
Delivery Pump Replacement . . . . .	WP 0280 00
Delivery Pump Drain Valve Replacement . . . . .	WP 0281 00
Meter Outlet Tube Replacement (M49A2C) . . . . .	WP 0282 00
Gate Valve Replacement . . . . .	WP 0283 00
Delivery Pump Strainer Replacement . . . . .	WP 0284 00
Separator Element Test Valve, Gauge, and Lines Maintenance (M49A2C) . . . . .	WP 0285 00
Filter Separator Maintenance (M49A2C) . . . . .	WP 0286 00
Water Tank Filler Cover Replacement (M50A3) . . . . .	WP 0287 00
Rear Compartment Door Maintenance . . . . .	WP 0288 00
Water Tank Discharge Tube, Cover, and Valve Replacement (M50A3) . . . . .	WP 0289 00
Water Tank Discharge Valve Control Levers Maintenance (M50A3) . . . . .	WP 0290 00
Water Tank Manhole Cover Replacement (M50A3) . . . . .	WP 0291 00
Delivery Pump Front Propeller Shaft Maintenance . . . . .	WP 0292 00
Delivery Pump Rear Propeller Shaft Maintenance. . . . .	WP 0293 00
Speed Control Cable Maintenance . . . . .	WP 0294 00
Tank Bodies Front Splash Guard Replacement. . . . .	WP 0295 00
Tank Bodies Upper and Lower Rear Splash Guard Replacement . . . . .	WP 0296 00
Tank Bodies Frame Sill Maintenance . . . . .	WP 0297 00
Fuel and Water Tank Bodies Maintenance . . . . .	WP 0298 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>VAN BODY</b>	
Rear Splash Guard Replacement . . . . .	WP 0299 00
Safety Switch Fuse Replacement . . . . .	WP 0300 00
Exhaust Blower Motor and Bracket Replacement . . . . .	WP 0301 00
Dome Lamp and Housing Replacement . . . . .	WP 0302 00
Van Door Replacement . . . . .	WP 0303 00
Van Door Seals Replacement . . . . .	WP 0304 00
Van Door Maintenance . . . . .	WP 0305 00
Van Body Cabinet and Work Bench Table Replacement . . . . .	WP 0306 00
Van Body Ceiling Panel Replacement . . . . .	WP 0307 00
Van Body Side Panel Replacement . . . . .	WP 0308 00
115-Volt AC Receptacle Replacement . . . . .	WP 0309 00
24-Volt DC Receptacle Replacement (M185A3) . . . . .	WP 0310 00
115-Volt Receptacle Replacement . . . . .	WP 0311 00
115-Volt Receptacle Strip Replacement . . . . .	WP 0312 00
115-Volt Wiring Harness Replacement . . . . .	WP 0313 00
Wire Plug Wiring Harness Replacement (M109A3) . . . . .	WP 0314 00
115- and 24-Volt Wiring Harness Replacement . . . . .	WP 0315 00
Blackout Master Switch Replacement (M109A3) . . . . .	WP 0316 00
Multibreaker Box Replacement . . . . .	WP 0317 00
Safety Switch Box Replacement . . . . .	WP 0318 00
Circuit Breaker Harness Replacement . . . . .	WP 0319 00
Front Window Sash Maintenance . . . . .	WP 0320 00
Side Window Sash Maintenance . . . . .	WP 0321 00
Van Body Access Door Replacement . . . . .	WP 0322 00
Van Body Access Plate, Access Cover, and Retainer Assembly Replacement . . . . .	WP 0323 00
24-Volt Circuit Breaker Replacement . . . . .	WP 0324 00
Vehicle Boarding Ladder Replacement . . . . .	WP 0325 00
Converter Selector Switch Replacement . . . . .	WP 0326 00
Exhaust Blower Switch Replacement . . . . .	WP 0327 00
Converter Replacement . . . . .	WP 0328 00
Van Bodies Front Splash Guard Replacement . . . . .	WP 0329 00
Van Body Tool Replacement (M185A3) . . . . .	WP 0330 00
Converter Receptacle Replacement . . . . .	WP 0331 00
Floodlight Bracket Replacement . . . . .	WP 0332 00
Access Door Molding and Access Plate Replacement . . . . .	WP 0333 00
Power Switch Maintenance . . . . .	WP 0334 00
Door Holder Assembly and Bracket Replacement . . . . .	WP 0335 00
Door Check Replacement . . . . .	WP 0336 00
Exhaust Blower Duct Assembly Replacement . . . . .	WP 0337 00
Blower Motor Receptacle Replacement . . . . .	WP 0338 00
Blackout Switch Replacement . . . . .	WP 0339 00
Fuel Line Adapter Replacement . . . . .	WP 0340 00
Side Rail Maintenance . . . . .	WP 0341 00

## CHAPTER 3

### FIELD MAINTENANCE INSTRUCTIONS (Contd)

	<u>WP Sequence No.</u>
<b>WINCH AND POWER TAKEOFF</b>	
Front Winch Drag Brake Test and Adjustment.....	WP 0342 00
Front Winch Cable Replacement .....	WP 0343 00
Automatic Brake Test and Adjustment .....	WP 0344 00
Front Winch Replacement.....	WP 0345 00
Front Winch Propeller Shaft Replacement .....	WP 0346 00
Transmission Power Takeoff (PTO) Shift Linkage Maintenance.....	WP 0347 00
Transfer Case Power Takeoff (PTO) Maintenance .....	WP 0348 00
Transmission Power Takeoff (PTO), Cover, and Gasket Maintenance .....	WP 0349 00



## FIELD MAINTENANCE INSTRUCTIONS

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

#### SERVICE UPON RECEIPT

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##### GENERAL

Upon receipt of a new, used, or reconditioned vehicle, refer to TM 9-2320-361-10 and perform the following steps to determine if the vehicle has been properly prepared for service.

##### **NOTE**

The operator will assist when performing service-upon-receipt inspections.

1. Inspect all assemblies, subassemblies, and accessories to ensure they are in proper working order.
2. Secure, clean, lubricate, or adjust equipment as indicated in the Preventive Maintenance Checks and Services (PMCS) (WP 0023 00).
3. Check all Basic Issue Items (BII) to ensure every item is present, in good condition, and properly mounted or stowed.

##### GENERAL INSPECTION AND SERVICING INSTRUCTIONS

Refer to TM 9-2320-361-10 and other WPs in this manual when servicing, inspecting, and lubricating equipment.

##### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use. Failure to do so may result in injury to personnel.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to do so may result in injury to personnel.

##### **NOTE**

If the vehicle was driven to the using organization, the following steps should have been completed.

1. Use Skysol 100 to clean all exterior surfaces coated with rust-preventive compounds.
2. Read Processing and Deprocessing Record of Shipping, Storage, and Issue of Vehicles and Spare Engines tag (DD Form 1397), and follow all precautions listed. This tag should be attached to steering wheel, shift column, or battery switch.

**SERVICE UPON RECEIPT (Contd)****SPECIFIC INSPECTION AND SERVICING INSTRUCTIONS**

1. Perform annually (A) or 6,000 mi (9,656 km) PMCS listed in WP 0023 00.

**NOTE**

Do not lubricate gearcases or engine unless processing tag states that the oil is unsuitable for 500 mi (805 km) of operation. If oil is suitable, check oil level (TM 9-2320-361-10).

2. Lubricate the vehicle according to the instructions found in WP 0020 00.
3. Schedule semiannual service on DD Form 314 (Preventive Maintenance Schedule and Record Card).
4. If vehicle is delivered with dry-charged battery, activate battery according to TM 9-6140-200-14.
5. Check vehicle coolant level and determine if solution is proper for climate. (Refer to TB 750-651 for preparation of antifreeze solutions.)



## FIELD MAINTENANCE INSTRUCTIONS

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

## LUBRICATION INSTRUCTIONS

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### GENERAL

The lubrication instructions include table 1, Fluid Capacities and Lubricant Requirements, and table 2, Lubrication Intervals and Locations. Table 2 is used for lubricating vehicles under normal operating conditions.

### SERVICE INTERVALS

Service intervals are for normal operation of the vehicle in moderate temperatures, humidity, and atmospheric conditions. The intervals are hard-time intervals performed in accordance with the vehicle's age, calendar, or usage such as operating time or mileage. The hard-time intervals in table 2 are based on mileage and calendar times. An example of mileage and calendar intervals is: 6/A; 6 stands for 6,000 miles (9,656 km) and A stands for annually (every twelve months). The lubrication for the vehicle is to be performed at whichever interval occurs first.

Hard-time oil service intervals must be followed for equipment under manufacturer's warranty. Hard-time intervals may be shortened if lubricants are used under adverse conditions, including longer than usual operating hours. Hard-time intervals may be extended during periods of low activity, although adequate preservation precautions must be taken.

Service intervals under abnormal conditions will increase the frequency of lubricating service, such as high or low temperatures, prolonged high-speed driving, or extended cross-country operations. These conditions can diminish a lubricant's protective quality.

### ARCTIC CONDITIONS

Refer to FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather 0 to -65 °F (-18 to -54 °C), or table 1, Fluid Capacities and Lubricant Requirements.

### CORROSION PREVENTION AND CONTROL (CPC)

Corrosion prevention and control (CPC) of Army material is a continuing concern. It is important that corrosion problems are reported so that corrections and improvements can be made to prevent future problems.

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 key words such as corrosion, rust, deterioration, or cracking will ensure that the information is identified as a CPC problem. This form should be submitted to the address specified in DA Pam 738-750.

## LUBRICATION INSTRUCTIONS (Contd)

### CLEANING

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to do so may result in injury to personnel.

#### **CAUTION**

Keep container covers clean and free of dust, dirt, or other foreign material. Keep all lubrication equipment clean and ready to use.

External parts not requiring lubrication should be kept clean and free of lubricants.

Clean fittings before lubricating equipment. Use biodegradable Skysol 100 to clean dirt and grease from all lubrication points. Dry lubrication points before lubricating. After servicing lubrication points, clean excess lubricants to prevent accumulation of foreign matter.

## LUBRICATION INSTRUCTIONS (Contd)

### MILITARY SYMBOLS FOR LUBRICANTS AND INTERVALS

The following symbols are used within this WP:

#### Lubricant Symbols

OE/HDO – Lube Oil, ICE, MIL-PRF-2104

OEA – Lube Oil, ICE, Arctic, MIL-PRF-46167

GO – Lube Oil, Gear, Multipurpose, MIL-PRF-2105

GAA – Grease, Automotive and Artillery, MIL-PRF-10924

BFS – Fluid, Hydraulic Brake, MIL-PRF-46176

CW – Lube Oil, Chain, Exposed Gear and Wire Rope, VV-L-751

#### Lubrication Interval Symbols

OC On-Condition

C/MR Change gear lubricant only when required by maintenance repair action or if contaminated

W Weekly

M Monthly

A Annually (12 months)

B Biennially (24 months)

1 1,000 mi (1,609 km)

3 3,000 mi (4,828 km)

6 6,000 mi (9,656 km)

12 12,000 mi (19,312 km)

24 24,000 mi (38,624 km)

## LUBRICATION INSTRUCTIONS (Contd)

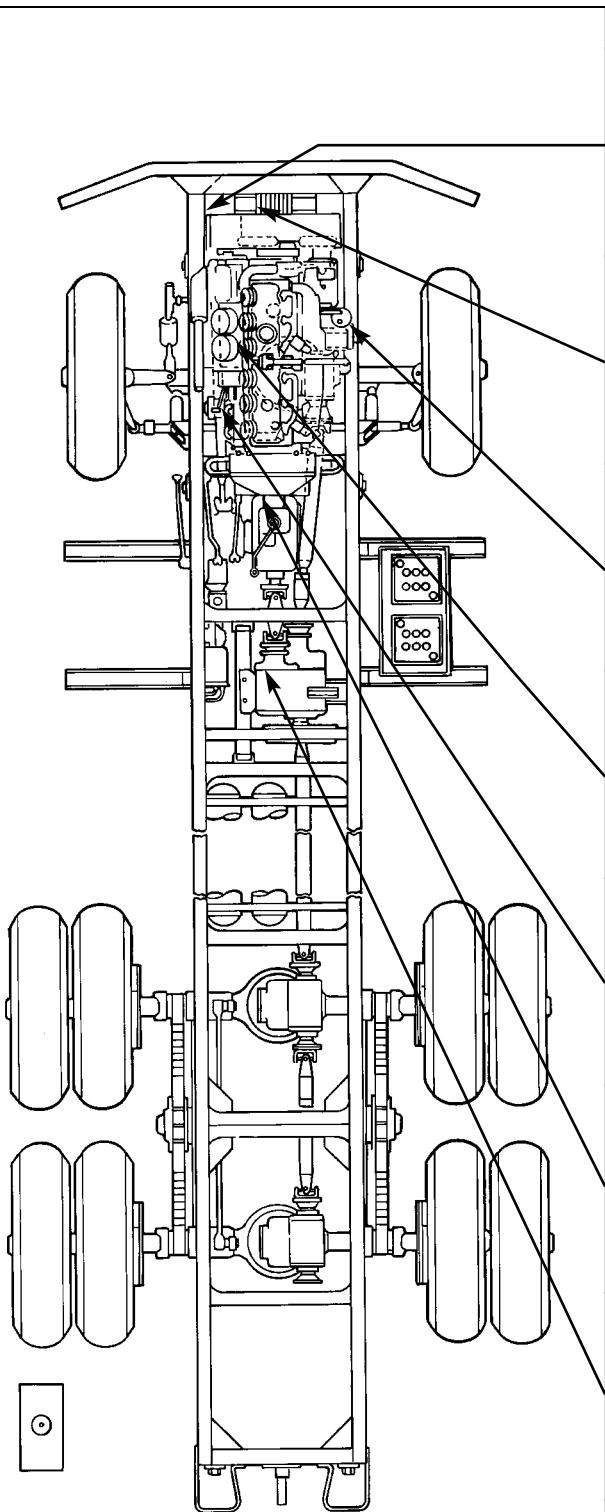
Table 1. Fluid Capacities and Lubrication Requirements.

COMPONENT	CAPACITIES	EXPECTED TEMPERATURES		LUBRICATION MIL. SYMBOL (NATO CODE) SPECIFICATION
		F	C	
Engine	Crankcase Only 20 qt (18.9 L) Crankcase and Filter 22 qt (20.8 L)	-4 to +122	-20 to +50	OE/HDO 15W40 (O-1236) MIL-PRF-2104  OEA (O-183) MIL-PRF-46167
		-50 to -4	-46 to -20	
Transmission	Without PTO 4.25 qt (4.0L) With PTO 5.25 qt (4.9 L)	-4 to +122	-20 to +50	GO 80W90 (O-226) MIL-PRF-2105  OEA (O-183) MIL-PRF-46167
		-50 to -4	-46 to -20	
Winch Gear Case	1.5 pt (0.71 L)	-4 to +122	-20 to +50	GO 80/90 (O-226) MIL-PRF-2105
Winch End Frame Housing	2.6 pt (1.2 L)	-50 to -4	-46 to -20	GO 75 (O-186) MIL-PRF-2105
Master Cylinder Reservoir	2 qt (1.9 L)	All Temperatures		BFS (H-547) MIL-PRF-46176
Front and Rear Axle Differentials	6 qt (5.7 L)	-4 to +122	-20 to +50	GO 80/90 (O-226) MIL-PRF-2105 GO 75 (O-186) MIL-PRF-2105
		-50 to -4	-46 to -20	
Transfer Case	7 qt (6.6 L)	-4 to +122	-20 to +50	GO 80/90 (O-226) MIL-PRF-2105 GO 75 (O-186) MIL-PRF-2105
		-50 to -4	-46 to -20	
Steering Gear	3.13 pt (1.48 L)	-4 to +122	-20 to +50	GO 80/90 (O-226) MIL-PRF-2105

**LUBRICATION INSTRUCTIONS (Contd)***Table 2. Lubrication Intervals.*

<b>COMPONENT</b>	<b>INTERVAL</b>
Engine Crankcase	Change oil and oil filter element every 12 months or 6,000 mi (9,656 km).
Engine Oil Filter	Replace at each engine oil change.
Fuel Filter	Replace fuel filter every 12 months or 6,000 mi (9,656 km).
Winch	Change lubricant only when required by maintenance repair action, or if contaminated. Check oil level annually or 6,000 mi (9,656 km).
Master Cylinder Reservoir	Service every 12 months or 1,000 mi (1,609 km).
Front and Rear Axles	Check oil level annually or every 6,000 mi (9,656 km). Change oil only when required by maintenance repair action, or if contaminated.
Transfer Case	Check fluid level annually or every 6,000 mi (9,656 km). Change oil only when required by maintenance repair action, or if contaminated.
Steering Gear	Check fluid level every 1,000 mi (1,609 km). Change lubricant only when required by maintenance repair action, or if contaminated.
Accessory Drive Pulley	Lubricate fitting every 6,000 mi (9,656 km).

LUBRICATION INSTRUCTIONS (Contd)

	INTERVAL	LUBRICANT	
	C/MR		Winch Worm Housing Drain (Drain and refill) (Cap. – 1-1/4 pts [0.59 l]) (See note 5)[F]
	A/6	GO	Winch Worm Housing (Check level) (See note 5) [D]
	A/6	OE/HDO	Crankcase Fill (Cap. – 22 qts 21 l) including filter) (See note 4) [H]
	A/6	OE/HDO	Oil Filters (2) and Oil Filter Drain Plug (See note 3) [K] [L]
	A/6		Engine Fuel Filter (Replace Element) (See note 2)
	A/6	GAA	Hand Lever Cross Shaft (2 fittings) (Tanker trucks only) (Located back of driver's seat) [CC]
	A/6	GO	Transfer Case (Check level) (See note 5)
<p style="text-align: center;"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>			

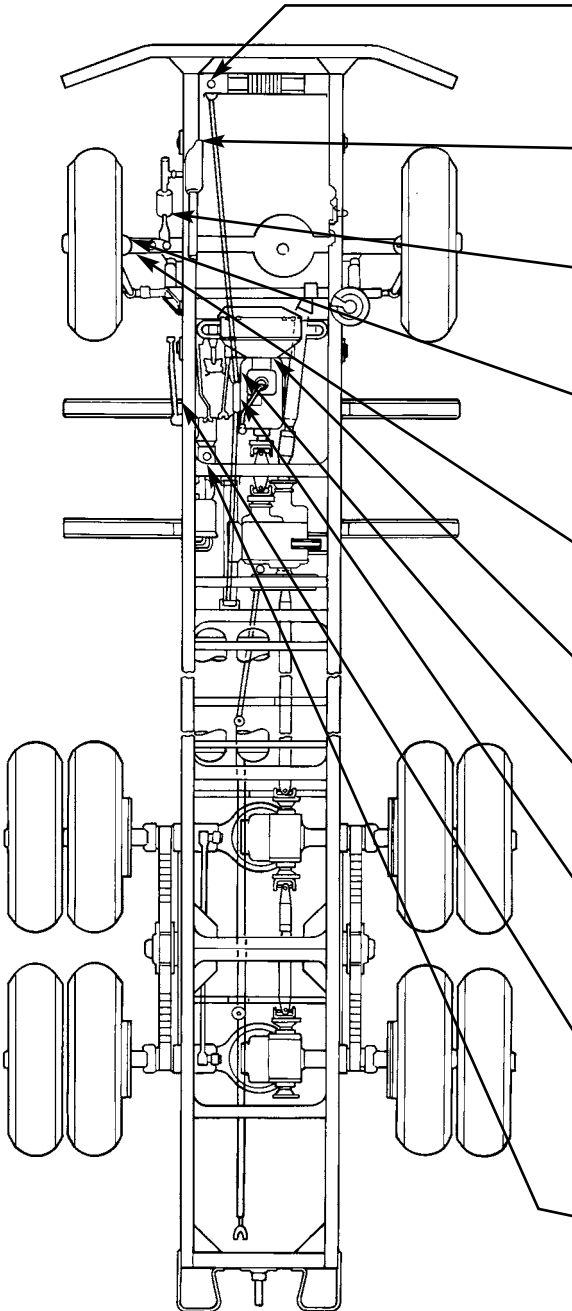
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LUBRICATION INSTRUCTIONS (Contd)

	INTERVAL	LUBRICANT	
	C/MR		Winch Worm Housing Drain (Drain and refill) (Cap. – 1-1/4 pts [0.59 l]) (See note 5)[F]
	A/6	GO	Winch End Boring Frame Housing (Check level) (See note 5) [D]
	A/6		Engine Crankcase Drain (Change Oil) (See note 4)
	A/6	GO	Transmission Fill and Level (check level) (Remove plug to check level, and reinstall plug) (See note 5)
	C/MR		Transmission Drain (Drain and refill) (Cap. – 8-1/2 pts [4.0 l] w/PTO) (See note 5)
	C/MR		Transfer Case Drain (Drain and refill) (Cap. – 7 pts [6.6 l]) (See note 5)
	A/6	GAA	Parking Brake Lever and Shoe Anchor Pins (4 fittings sparingly)
	<p align="center"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>		

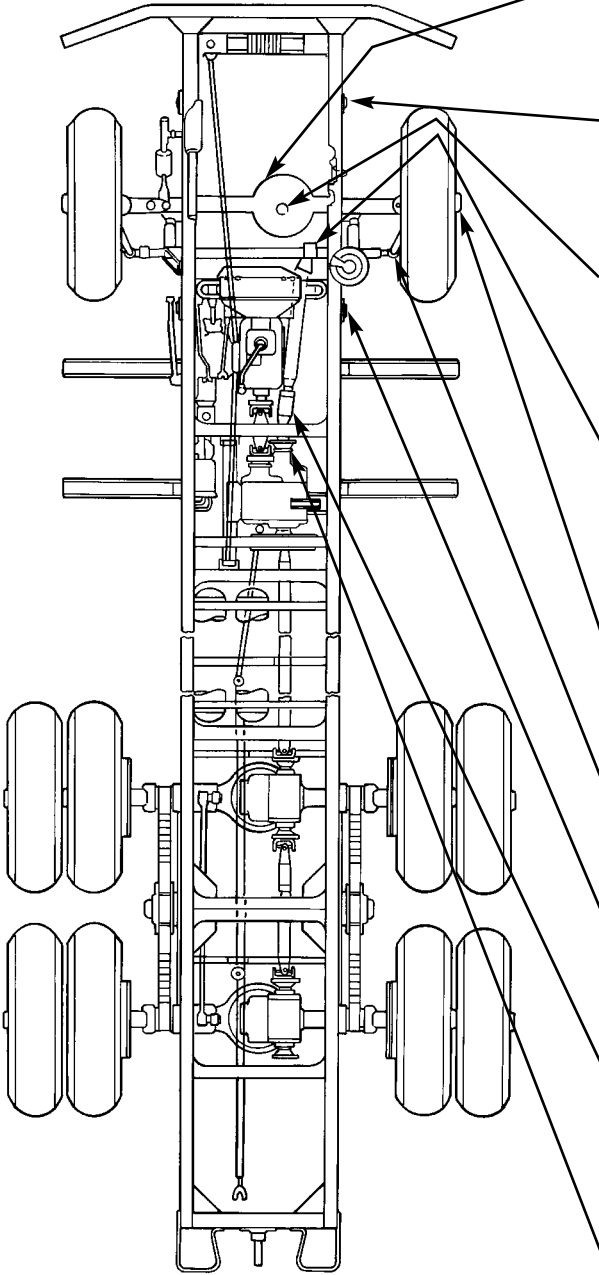
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LUBRICATION INSTRUCTIONS (Contd)

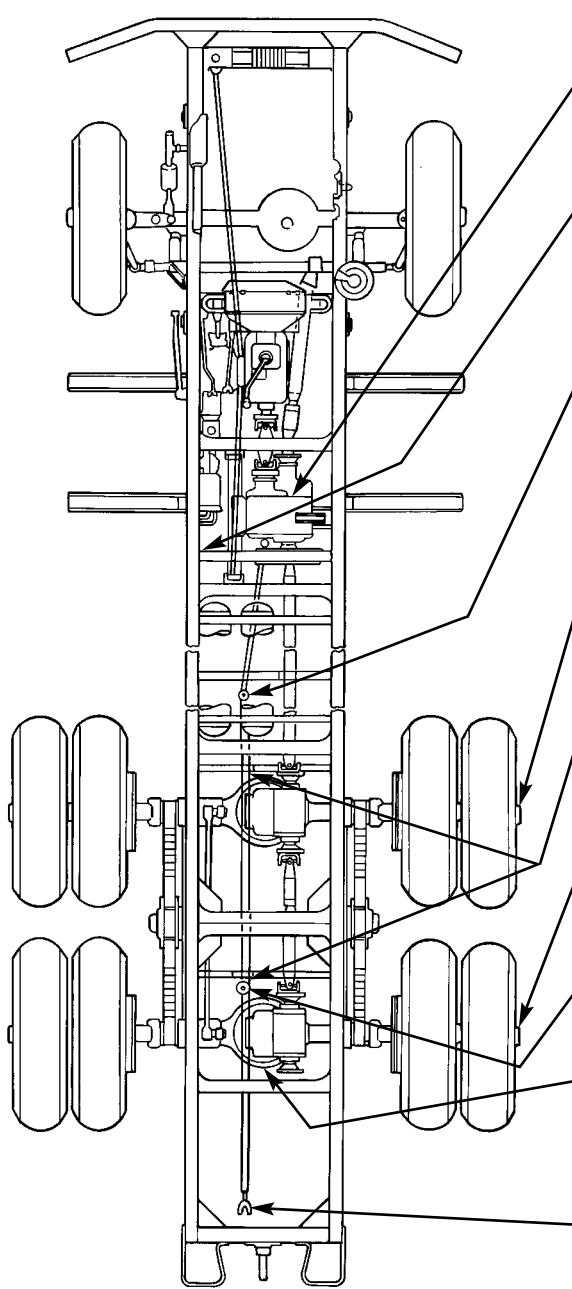
	INTERVAL	LUBRICANT	
	A/6	GAA	Winch Drive Shaft Universal Joint Fitting (Some models)
	C/MR	GO	Steering Gear Drain (Drain and refill) (Cap – 3-1/8 pts [1.48 l]) (See note 5) [Q]
	A/6	GAA	Steering Draglink (2 fittings) [R]
	A/6	GAA	Steering Knuckle Bearings (Top and bottom 2 fittings) (See note 7) [N]
	A/6	GAA	Front Wheel Universal Joint [N] [P] (See note 7 )
	A/6	GAA	Clutch Throw-Out Bearing Carrier Fitting (Springly)
	A/6	GAA	Clutch Throw-Out Shaft (2 fittings) [V]
	A/6	GAA	Winch Drive Shaft Universal and Slip Joints (2 fittings) (Some models)
	A/6	GAA	Brake Pedal and Pedal Shaft Bracket (3 fittings) [A] [B]
	1	BFS	Brake Master Cylinder (Check level) (See note 8) [M]
<p>CHASSIS – M44A2</p>	<b>NOTE</b>		
	Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.		



LUBRICATION INSTRUCTIONS (Contd)

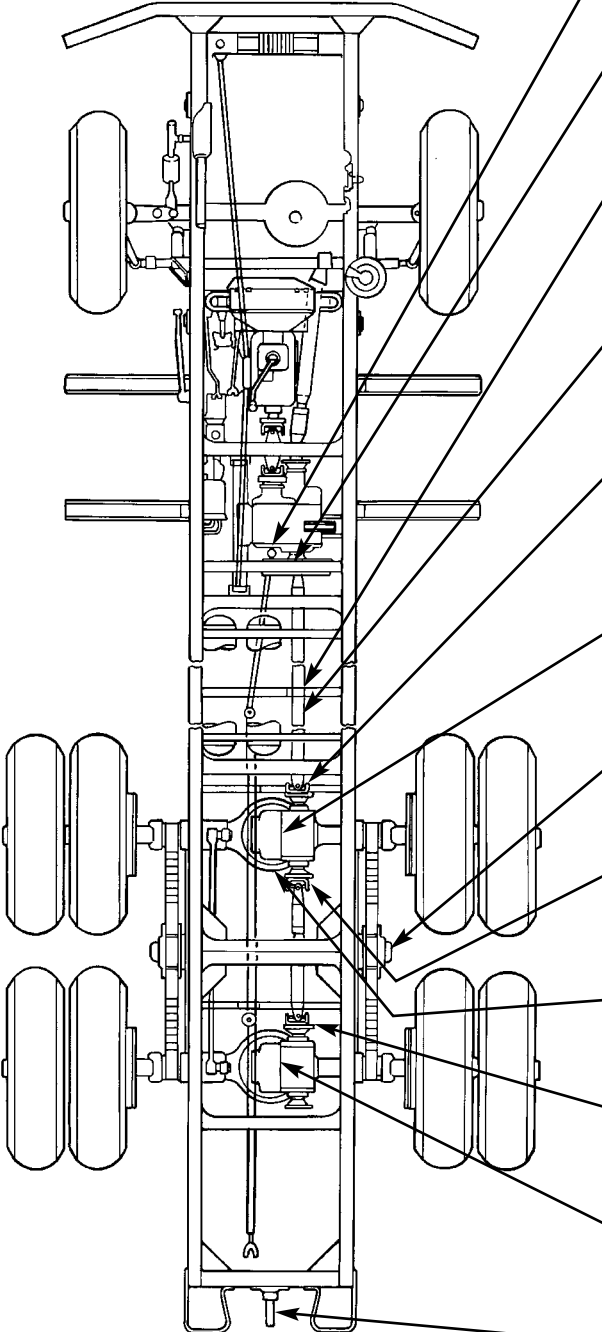
	INTERVAL	LUBRICANT	
	A/6	GO	Front Axle Differential Fill and level (Check level) (See note 5)
	A/6	GAA	Spring Bolt Fitting [S]
	C/MR		Front Axle Differential Drain (Drain and refill) (Cap – 6 qts [5.7 l]) (See note 5)
	A/6	GAA	Front Axle Drive Shaft Universal Joint Fitting [U]
	A/6	GAA	Front Wheel Bearings (Remove, clean, dry, and repack) (See note 10)
	A/6	GAA	Tie Rod Fitting [T]
	A/6	GAA	Spring Shackles (2 fittings) [S]
	A/6	GAA	Front Axle Drive Shaft Universal and Slip Joints (2 fittings) [U]
	A/6	GAA	Transmission to Transfer Case Drive Shaft Universal and Slip Joints (3 fittings)
<p align="center"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>			
<p align="center"><b>CHASSIS - M44A2</b></p>			

LUBRICATION INSTRUCTIONS (Contd)

	INTERVAL	LUBRICANT	
	A/6	GAA	Speedometer Adapter Fitting [Y]
	1	GAA	Parking Brake Cable Fitting (Some models) [W]
	A/6	GAA	Pump Drive Shaft Universal and Slip Joints (2 fittings)
	A/6	GAA	Rear Wheel Bearing (Remove, clean, dry, and repack) (See note 10)
	A/6	GAA	Pump Drive Shaft Support Bearing Fitting (Fuel and water tankers) [Z]
	A/6	GAA	Rear Wheel Bearing (Remove, clean, dry, and repack) (See note 10)
	A/6	GAA	Pump Drive Shaft Universal Joint Fitting (Fuel and water tankers)
	A/6	GO	Rear Axle Differential (Check level) (See note 5)
	A/6	GAA	Pump Drive Shaft Universal and Slip Joints (2 fittings) (Fuel and water tankers)
<p style="text-align: center;"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>			

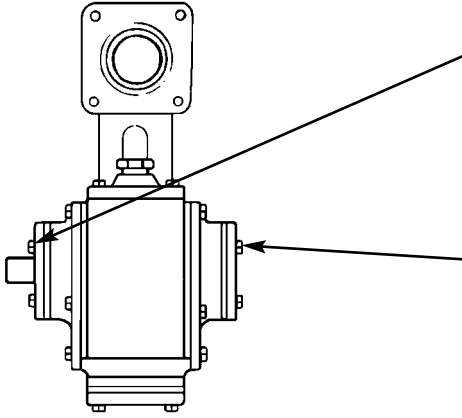
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LUBRICATION INSTRUCTIONS (Contd)

	INTERVAL	LUBRICANT	
	A/6	GAA	Pump Forward Drive Shaft Universal Joint Fitting (Fuel and water tankers)
A/6	GAA	Forward Rear Axle Drive Shaft Universal and Slip Joints (2 fittings) [U]	
A/6	GAA	Drive Shaft Center Bearing Fitting (Lubricate until new lubricant appears at pressure relief valve) (M36A2) [X]	
A/6	GAA	Forward Rear Axle Drive Shaft Universal and Slip Joints (2 fittings) (M36A2)	
A/6	GAA	Forward Rear Axle Drive Shaft Universal Joint Fitting	
C/MR		Intermediate Rear Axle Differential Drain (Drain and refill) (Capacity 6 qts [5.7 l]) (See note 5)	
A/6	GAA	Rear Spring Seat Bushing or Bearing (See note 6)	
A/6	GAA	Rear Axle Drive Shaft Universal and Slip Joints (2 fittings)	
A/6	GO	Intermediate Rear Axle Differential (Check level) (See note 5)	
A/6	GM	Rear Axle Drive Shaft Universal Joint Fitting	
C/MR		Rear Axle Differential Drain (Drain and refill) (Capacity 6 qts [5.7 l]) (See note 5)	
A/6	GAA	Pintle (4 fittings) (See note 9) [G]	
<p style="text-align: center;"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>			

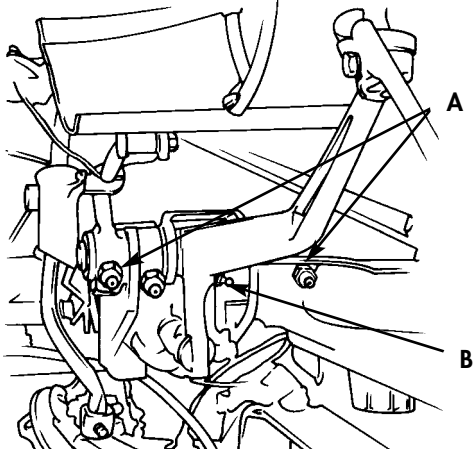
CHASSIS - M44A2

**LUBRICATION INSTRUCTIONS (Contd)**

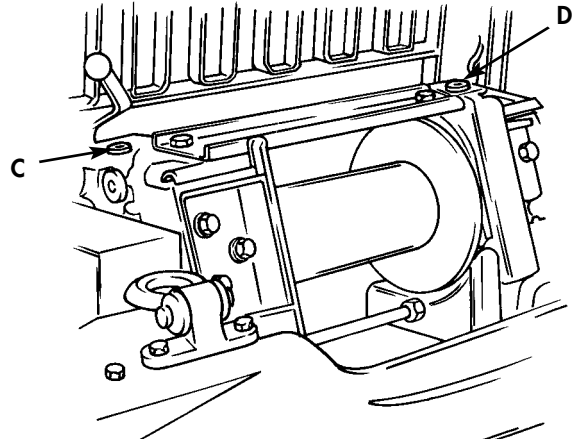
	INTERVAL	LUBRICANT	
	D	GAA	Pump Drive (When in use) (C)
	D	GAA	Pump Bearing (Lubricate until lubricant appears at relief valve when in use) [BB]
<p align="center"><b>NOTE</b></p> <p>Letters in brackets after lubrication entries refer to localized views. See pages 13 through 16.</p>			
<p><b>PUMP, GASOLINE SERVICE, PUMP WATER SERVICE</b></p>			

LUBRICATION INSTRUCTIONS (Contd)

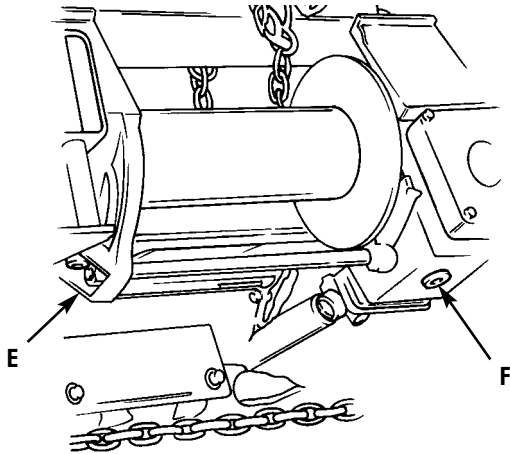
LOCALIZED LUBRICATION POINTS A THROUGH L



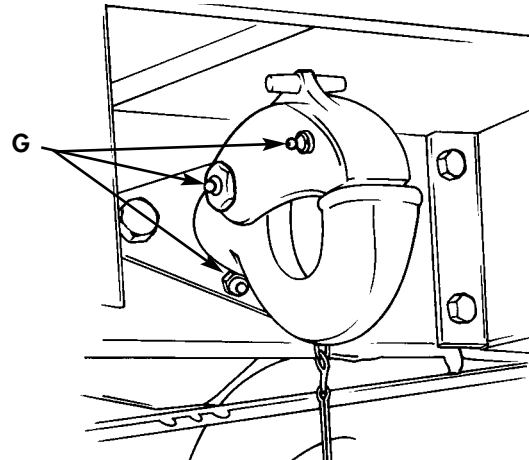
BRAKE PEDAL AND PEDAL SHAFT BRACKET



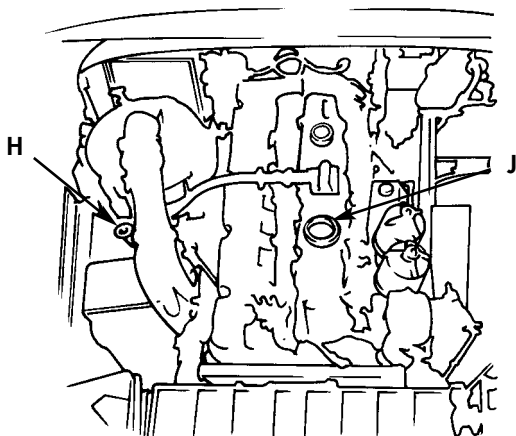
FRONT WINCH



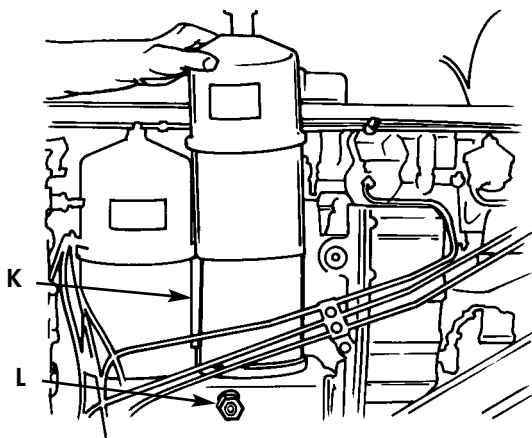
FRONT WINCH



PINTLE



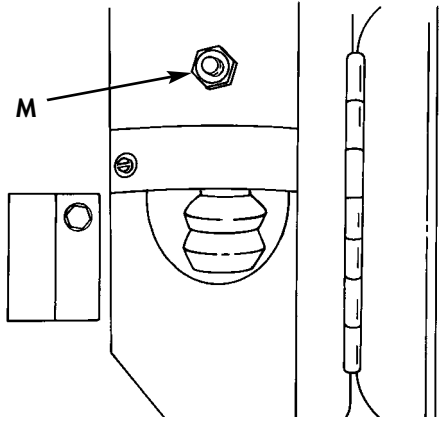
ENGINE CRANKCASE



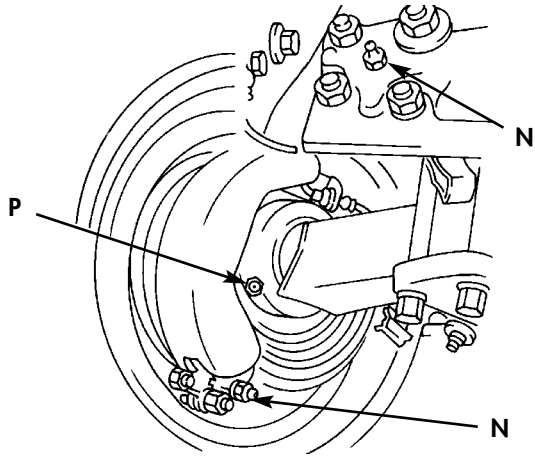
OIL FILTERS AND DRAIN PLUG

# LUBRICATION INSTRUCTIONS (Contd)

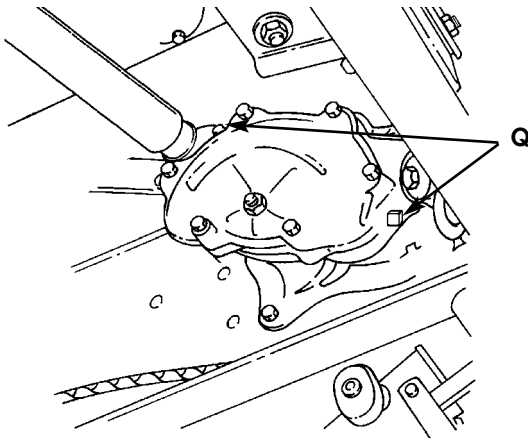
## LOCALIZED LUBRICATION POINTS M THROUGH S



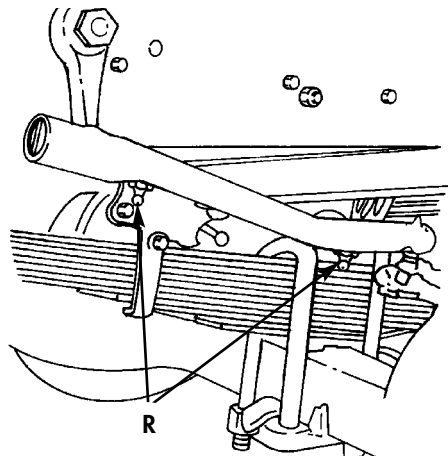
**BRAKE MASTER CYLINDER**



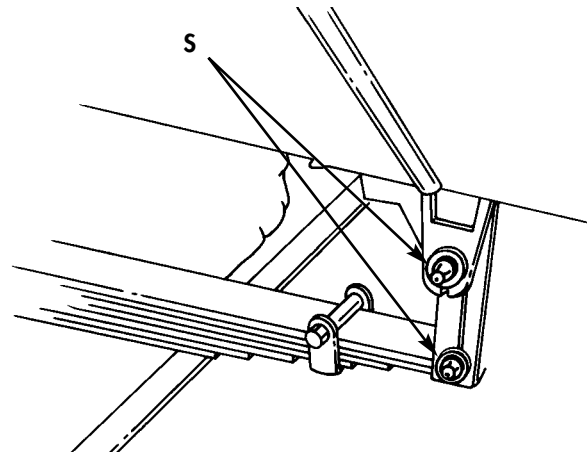
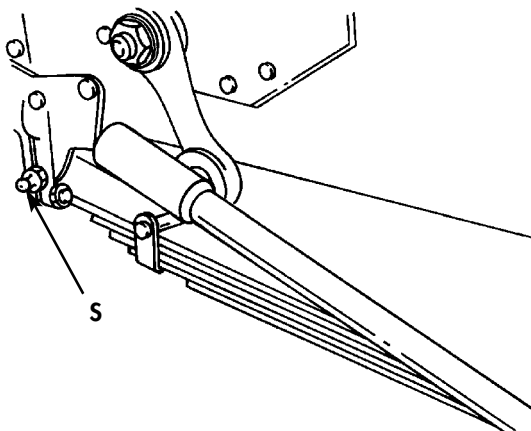
**FRONT WHEEL**



**STEERING GEAR**



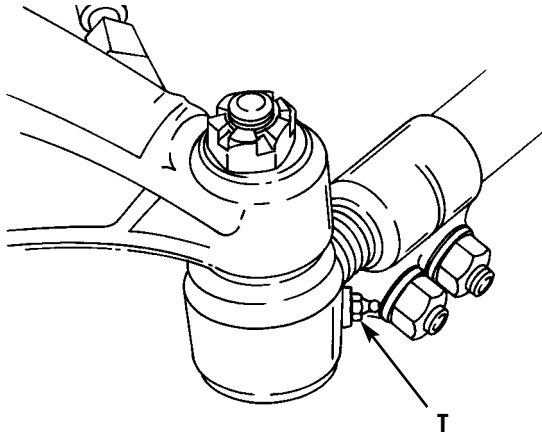
**STEERING DRAG LINK**



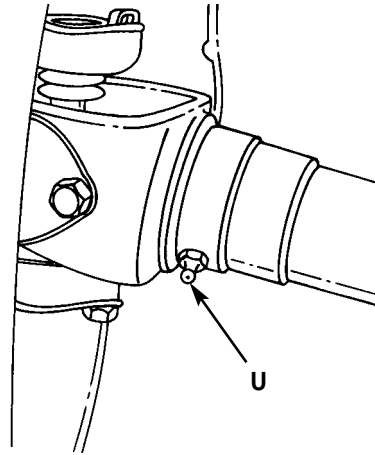
**SPRING BOLT FITTINGS**

LUBRICATION INSTRUCTIONS (Contd)

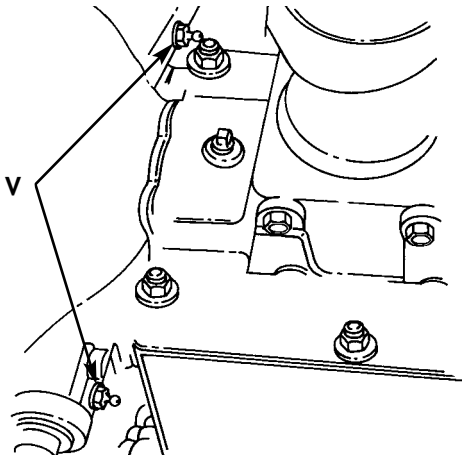
LOCALIZED LUBRICATION POINTS T THROUGH X



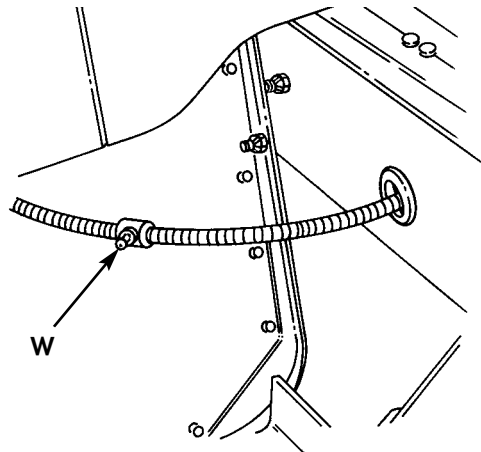
TIE ROD



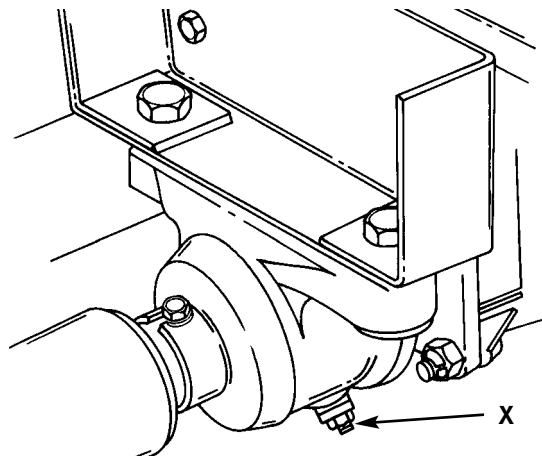
FRONT AXLE DRIVE SHAFT



CLUTCH THROW-OUT SHAFT



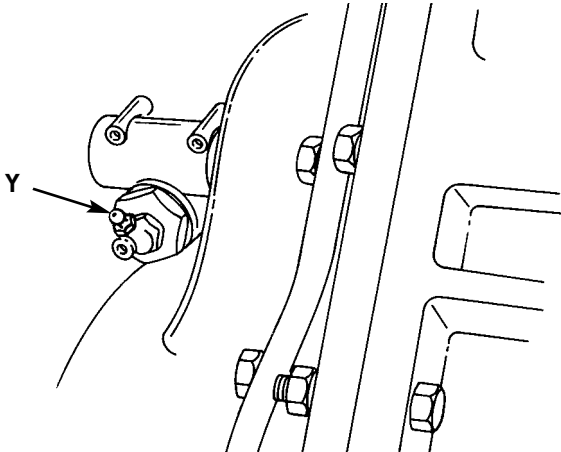
HANDBRAKE CABLE



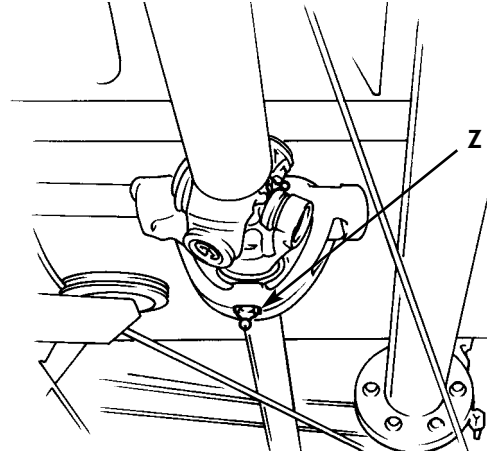
DRIVE SHAFT CENTER BEARING

# LUBRICATION INSTRUCTIONS (Contd)

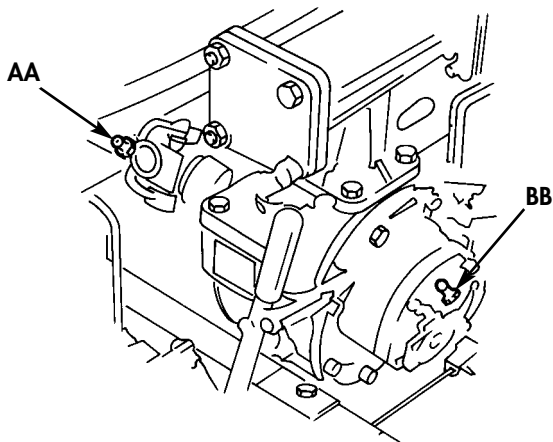
## LOCALIZED LUBRICATION POINTS EE THROUGH QQ



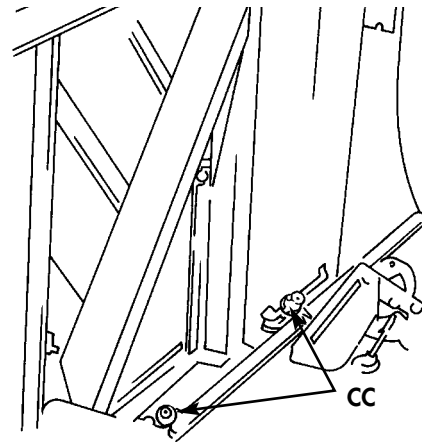
SPEEDOMETER ADAPTER



PUMP DRIVE SHAFT UNIVERSAL JOINT



SERVICE PUMP



CONTROL LEVER



## LUBRICATION INSTRUCTIONS (Contd)

### NOTES

#### 1. Fuel Filters

Drain primary fuel filter. If fuel filter contains dirt or water, drain secondary and final filters. If dirt or water is found in final filter, notify organizational maintenance. Replace primary and secondary filter elements and gaskets every 6,000 mi (9,656 km), 12 months, or whichever occurs first, or at the discretion of the Maintenance Officer, as local conditions warrant. Change final fuel filter during engine overhaul/rebuild or during troubleshooting. Do not drain filters completely.

#### 2. Fuel Filter

Replace fuel filter every 6,000 mi (9,656 km) or 12 months, whichever occurs first.

#### 3. Oil Filter

Remove filter drain plug and elements; clean inside of filter case and reinstall drain plug, new elements, and gaskets.

Oil filters must be serviced, changed, or cleaned when:

1. They are clogged or known to be contaminated.
2. Prescribed hard-time intervals are reached.

#### 4. Crankcase

To check engine oil level, wait at least one minute after shutting down engine to allow oil to drain into crankcase. Safe operating level is between ADD and FULL on the dipstick. Adjust oil level accordingly.

When vehicle or engine is placed in storage other than administrative storage, service the crankcase with grade 30 engine oil conforming to specification MIL-PRF-21260, Lubricating Oil, Internal Combustion Engine, Preservative and Break-In. MIL-PRF-21260 engine oil is an operational lubricant and may be used until the initial scheduled oil change after reactivation of the vehicle or engine. For administrative storage, engine oil conforming to the specification and grade established should be used.

#### 5. Gear Cases

Change gear lubricant only when required by maintenance repair action, or if contaminated by water or other foreign material. Check lubricant for proper level and for contamination annually. Drain only when unit is hot after operation. At axle differentials, transfer case and transmission; check fluid level within 1/2-in. (12.70 mm) of level plug opening. The level in the winch end bearing frame housing on the right side is 6-7/8 inches (174.62 mm) below filter plug. Use the full level plug located on the left side of the winch worm housing to check lubrication level.

At the time of a scheduled lubrication, a gear housing lubricant retaining seal that indicates questionable leakage may be considered functional if a safe level of lubricant is present in the gear housing. Questionable leaks that may indicate a potential problem area may be subject to frequent observation. When seepage or leakage of lubricant adversely affects the proper function of parts within the area (e.g. brakes), the retaining seal is non-functional regardless of lubricant level.

## LUBRICATION INSTRUCTIONS (Contd)

### NOTES (Contd)

#### 6. Rear Spring Seat Bushings or Bearings

Remove bearing cap and tighten bearing adjusting nut in accordance with TM 9-2320-361-24 every 6,000 mi (9,656 km) or annually, whichever occurs first. Install cap loosely, and lubricate bearings by removing pipe plug in bottom of spring seat and installing fitting. Lubricate with GAA grease through fitting until lubricant appears around cap. Remove fitting, and reinstall pipe plug.

Remove, clean, and inspect bearings every 6,000 mi (9,656 km), or annually, whichever occurs first. Reinstall bearings, tighten adjusting nuts and locknuts, and lubricate bearings as described above.

#### 7. Front Wheel Universal Joints and Steering Knuckle Bearings

Remove plug from universal joint housing, fill to level of plug opening, and reinstall plug every 12,000 mi (19,312 km) or annually, whichever occurs first. Remove plugs on each side of steering knuckle and fill to level of plug opening through upper and lower steering knuckle bearings. Do not disassemble.

#### 8. Master Cylinder Assembly

Service every 1,000 miles (1,609 km) or 12 months, whichever comes first. Use BFS (MIL-PRF-46176)

#### 9. Pintle

Vehicles received with a tow pintle that does not have grease fittings is equipped with production improvement TOW pintle. This pintle is equipped with bushings, and does not require lubrication.

#### 10. Wheel Bearings

Remove, clean, dry, repack, and install wheel bearings every 6,000 mi (9,65678 km) or 12 months, whichever occurs first.

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### GENERAL MAINTENANCE PROCEDURES

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#### GENERAL CLEANING PROCEDURES

Cleaning procedures are the same for most parts and components that make up the vehicle subassemblies. Great care and effort are required in all cleaning operations. Dirt and foreign material can jeopardize satisfactory vehicle operation and maintenance.

The following guidelines apply to all cleaning operations:

1. Clean all parts before inspection, after repair, and before assembly.
2. Keep hands free of large amounts grease, which can collect dust and grit.
3. After cleaning, wrap or cover all parts with plastic or paper to protect them from dust and/or dirt.

#### **NOTE**

All electrical equipment and other parts that can be damaged by steam cleaning or moisture must be removed and all openings must be covered before cleaning. Dry parts with compressed air.

4. Place disassembled parts in wire baskets for cleaning. Dry and cover all cleaned parts and inspect or repair as necessary. All parts subject to rusting must be oiled and wrapped in paper or plastic to avoid dirt and/or dust settling on them. Keep all subassembly parts together and avoid mixing parts.

#### **WARNING**

- Improper cleaning methods and use of unauthorized cleaning solvents may cause damage to equipment or injury to personnel.
  - Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.
5. Clean inner and outer surfaces of castings and all areas likely to collect grease and oil with cleaning solvents. Use a stiff brush to remove sludge and gum deposits. Use compressed air to blow out all tapped screw holes and to dry castings after cleaning.
  6. Particular attention must be given to all oil passages in castings and machined parts. Oil passages must be kept clean and free of obstructions. Clean passages with wire probes to break up any sludge or gum deposits. Wash passages by flushing with cleaning solvents. Dry passages with compressed air.
  7. Clean electrical cables and flexible hoses with soap and water. Allow to air dry.

## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL CLEANING PROCEDURES (Contd)

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to do so may result in injury to personnel.

8. Clean machined-tooled parts with Skysol 100 solvent and dry with compressed air.
9. Clean machined surfaces with Skysol 100 solvent and dry with lint-free cloth.
10. Use compressed air to blow out all tapped screw holes where gasket material covers mating surfaces. This will clear holes from any deteriorating gasket material.

### GENERAL INSPECTION PROCEDURES

Procedures for inspections are the same for many parts and components that make up vehicle subassemblies. Dimensional standards for parts have been fixed at extremely close tolerances, so use specification tables located throughout this manual. Use specified inspection equipment for inspections where cracks and other damage cannot be seen. Exercise extreme care in all phases of inspection and adhere to the following guidelines:

1. When inspecting castings perform the following inspections:
  - a. Inspect all ferrous and non-ferrous castings for cracks using a magnifying glass and a strong light.
  - b. Check areas around studs, pipe plugs, threaded inserts, and sharp corners. Replace all cracked castings.
  - c. Inspect machined surfaces for nicks, burrs, or raised metals. Mark damaged areas for repair or replacement.
  - d. Inspect all pipe plugs, pipe plug openings, screws, and screw openings for damaged or stripped threads.
  - e. Using a straightedge or surface plate, check all gasket mating surfaces, flanges on housings, and supports for warpage. Visually inspect mating flanges for discolorations. This may indicate persistent oil leakage.
  - f. Check all castings for conformance to applicable repair standards.
2. Refer to TM 9-214 for inspection of bearings. Check all bearings for conformance to applicable repair standards.
3. Replace studs, bolts, and screws if threads are damaged, bent, loose, or stretched.

## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL INSPECTION PROCEDURES (Contd)

4. Inspect all gears for cracks, using a magnifying glass and strong light. No cracks are allowed. Inspect gear teeth for wear, sharp fins, burrs, and galled or pitted surfaces. Check keyway slots for wear and/or damage.
5. Check all bushings and bushing-type bearings for secure fit, evidence of overheating, wear, burrs, nicks, and out-of-round condition. Check for dirt in lubrication holes or grooves. Holes and grooves must be clean and free from damage.
6. All seals must be replaced with new seals.
7. Inspect core hole expansion plugs for leakage. Replace plugs when leakage is present.
8. Inspect machined-tooled parts for cracks, breaks, elongated holes, wear, and chips.
9. Inspect machined surfaces for cracks, evidence of wear, burrs, nicks, pitted surfaces, and scratches.
10. Inspect mated surfaces for remains of old gaskets or seals, evidence of leakage, pitting, and secure fit.
11. Inspect surfaces for rust, pitting, holes, and severe damage.
12. Inspect oil bathed internal parts for cracks, nicks, burrs, evidence of overheating, and wear.
13. Inspect air actuated internal parts for cracks, nicks, burrs, evidence of overheating, and wear.
14. Inspect externally exposed parts for breaks, cracks, rust damage, and wear.
15. Inspect springs for broken, collapsed, and twisted coils.

### GENERAL REPAIR PROCEDURES

Use the appropriate Work Package within this manual for the part or component being repaired and the guidelines listed below.

#### **CAUTION**

Repaired items must be thoroughly cleaned to remove metal chips and abrasives. Metal chips and abrasives can enter working parts of vehicles and cause damage to equipment.

1. All cracked castings must be replaced. Only minor repairs to machined surfaces, flanges, and gasket mating surfaces are permitted. Use the following methods to remove minor nicks, burrs, and/or scratches:
  - a. File with a fine mill file.
  - b. Wipe surface with a crocus cloth dipped in cleaning solvent.
  - c. Smooth rough surfaces using a surface plate.
2. Remachining of machined surfaces to repair damage, warpage, or uneven surfaces is not permitted. Replace castings.
3. Repair damaged threaded pipe plugs and/or screw threads with a screw tapper. Repair oversized holes with threaded inserts.
4. Refer to TM 9-214 for repair of bearings.

## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL REPAIR PROCEDURES (Contd)

5. Replace all bent and stretched studs. Repair minor thread damage with a thread die. Use the following methods to replace studs having stripped or damaged threads:
  - a. Use a stud remover to remove studs. Back studs out slowly to avoid heat buildup and seizure, which can cause stud to break off.
  - b. If studs break off too short to use a stud remover, use a stud extractor to remove studs, or use welding method.
  - c. Broken studs can be removed by welding a nut or bar stock to stud and removing with wrench.

#### **NOTE**

- Standard studs may have a coarse thread on one end and a fine thread on the other end. The coarse thread end is installed in the aluminum casting. The short threaded end goes into the casting. Studs having coarse threads on both ends are used in some applications Refer to TM 9-2320-361-24P for correct part numbers.
  - Replacement studs have a special coating and must have a small amount of antiseize compound applied on threads before stud is installed. Install replacement stud slowly to prevent heat build up and snapping off.
6. Use puller to remove gears. Remove minor nicks, burrs, or scratches on gear teeth. If keyways are worn or enlarged, replace gear.
  7. Replace bushings when bushing and bushing-type bearings seize to a shaft and spin in the bore, also replace the associated part.

#### **CAUTION**

Be careful not to damage casting or adapter bore when removing oil seals.

8. Remove oil seals by pressing or prying out. Use proper seal replacement tool to install new seal in bore.

### GENERAL ASSEMBLY PROCEDURES

When assembling components, follow these rules to ensure proper operation of vehicle:

1. Cleanliness is essential in all component assembly operations. Dirt and dust, even in small quantities, are abrasive. Parts must be cleaned as specified and kept clean. Wrap or cover parts and components when assembly procedures are not immediately completed.
2. Coat all bearings and contact surfaces with operating oil (axle oil for axle parts, transmission oil for transmission parts, etc.) to ensure lubrication of parts during initial operation after repair.
3. Use new gaskets and preformed packing during assembly of all components.

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## FIELD MAINTENANCE INSTRUCTIONS

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

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#### PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

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##### GENERAL PMCS

The best way to maintain vehicles covered by this manual is to inspect them on a regular basis so minor faults can be discovered and corrected. This will help prevent serious damage or failure of the vehicle and equipment, or injury to personnel. WP 0023 00 contains systematic instructions for inspection, adjustment, and correction of vehicle components to avoid costly repairs or major breakdowns. This is referred to as PMCS.

##### REPORTING REPAIRS

Uncorrected defects will be recorded on the Equipment Inspection and Maintenance Worksheet, DA Form 2404, in accordance with DA Pam 738-750.

##### GENERAL SERVICE AND INSPECTION PROCEDURES

Definitions of class I, II, and III leaks and their effect on vehicle operation are listed in TM 9-2320-361-10.

While performing specific PMCS procedures, verify items are correctly assembled, secure, serviceable, not worn, not leaking, and adequately lubricated as defined below:

1. An item is **CORRECTLY ASSEMBLED** when all parts are present and in proper position.
2. When wires, nuts, washers, hoses, or attaching hardware cannot be moved by hand, wrench, or prybar, they are **SECURE**.
3. An item is **UNSERVICEABLE** if worn beyond established wear limits or likely to fail before the next scheduled inspection.
4. An item is **WORN** if there is play between joining parts, or warning and caution plates are not readable.
5. An item is **ADEQUATELY LUBRICATED** if it meets the requirements specified by the Lubrication Instructions, WP 0020 00.
6. When the instruction "tighten" appears in a procedure, you must tighten with a torque wrench to the given torque value even when the item appears to be secure.

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION (Contd)

### GENERAL SERVICE AND INSPECTION PROCEDURES (Contd)

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

7. Use Skysol 100 to clean grease or oil from metal parts. After the item is cleaned, rinsed, and dried, apply a light grade of oil to unprotected surfaces to prevent rusting. Use soap and water to clean rubber and plastic materials.



## FIELD MAINTENANCE INSTRUCTIONS

### 2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

#### PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

---

The Preventive Maintenance Checks and Services (PMCS) is performed at scheduled intervals under normal operating conditions. Perform more frequently when operating under abnormal conditions.

At an annual inspection interval, a semiannual and annual inspection must be performed. At a biennial inspection interval, a semiannual, annual, and biennial inspection must be performed. The PMCS is provided in table 1. It is arranged in logical order.

On the PMCS schedule, the following columns are left to right:

**Item Number:** Provides logical order for PMCS performance and is used as a source number for DA Form 2404, on which your PMCS results will be recorded.

**Interval:** Indicates when check or service is to be performed. Intervals are:

1. **Semiannually:** every 6 months or 6,000 miles (9,656 kilometers), whichever comes first.
2. **Annually:** every 12 months or 12,000 miles (19,312 kilometers), whichever comes first.
3. **Biennially:** every 24 months or 24,000 miles (38,624 kilometers), whichever comes first.

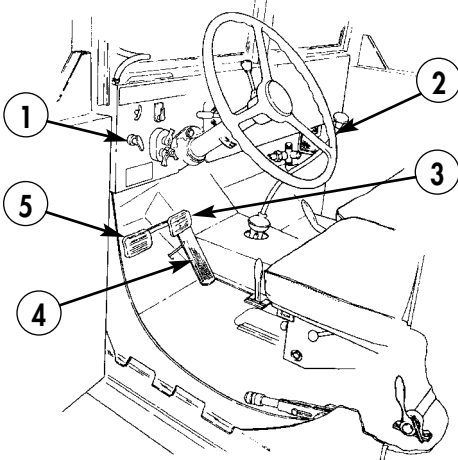
**Item To Check/Service:** Lists the system, common name, or location of the item to be inspected. The letters RPL in this column indicate replacement parts that are required to complete the task or procedure. Refer to mandatory replacement parts WP 0470 00.

**Procedure:** Provides instructions for servicing, inspection, replacement, or adjustment, and in some cases, having an item repaired at a higher level. If a defect is found, repair, fill, replace, or adjust as needed.

**Equipment Not Ready/Available If:** Provides information for deadlining a vehicle when checks or services reveal a defect or deficiency with a component(s) of the vehicle.

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
1	Semiannually	Starter	<p><b>PRIOR TO ROAD TEST</b></p> <p>Perform all Before Operation checks listed in the TM 9-2320-361-10, "Preventive Maintenance Checks and Services".</p> <p>Start engine (TM 9-2320-361-10). While starting engine, listen for unusual noises and difficult cranking. Ensure mounting bolts are present and tight.</p>	
2	Semiannually	Engine and engine compartment	<p><b>a.</b> Observe response to accelerator pedal (4). Listen for unusual noises. Observe for hesitation, varying idle speed, and sticking or binding of accelerator pedal.</p> <p><b>b.</b> Be alert for excessive vibration and the smell of fuel, oil, coolant, and exhaust.</p>	<p><b>a.</b> Accelerator pedal is sticking or binding.</p>
3	Semiannually	Throttle control	<p>Check travel and free movement of throttle control (1) by watching accelerator pedal (4). When throttle control (1) is pulled out all the way, accelerator pedal (4) will be down against stop screw. Check that throttle control (1) does not bind or stick in any position.</p>	<p>Throttle is sticking or binding.</p>
				
<p><b>ROAD TEST</b></p> <p>Perform all During Operation checks listed in TM 9-2320-361-10 in addition to those that follow. Drive the vehicle for at least 5 miles (8 kilometers) over varied terrain both on and off road. This will provide ample time to check reported malfunctions and to locate unreported malfunctions.</p>				

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
4	Semiannually	Clutch	Check clutch pedal (5) for 1.5–2.0 in. (3.8–5.0 cm) free travel. If not within limits, adjust clutch pedal (WP 0047 00).	
5	Semiannually  Semiannually  Semiannually  Semiannually  Semiannually	Brakes	<p><b>a.</b> Reach a desired speed and lightly depress brake pedal (3) with a steady force. Vehicle should slow down immediately and stop smoothly, without noticeable side-pull or chatter.</p> <p><b>b.</b> Check brake pedal (3) to make sure it stops no less than 2.0 in. (5.0 cm) above floor. If brake pedal (3) stops less than 2 in. (5.0 cm) above floor, check brakeshoe adjustment (WP 0168 00).</p> <p><b>c.</b> Check brake pedal (3) for 0.2–0.5 in. (.06–1.25 cm) free travel. If brake pedal adjustment is required (WP 0174 00).</p> <p><b>d.</b> After stopping the vehicle, and with transmission in drive, release brake pedal (3). The brakes should release immediately and without difficulty.</p> <p><b>e.</b> Inspect master cylinder for leaks, damage, and security. Tighten if loose, or replace if leaking or damaged (WP 0170 00).</p>	<p><b>a.</b> Service brakes do not operate properly, hydraulic or air leaks are evident.</p> <p><b>b.</b> Pedal goes within 2 in. (5 cm) of floor.</p> <p><b>c.</b> Brake pedal has too much free travel.</p> <p><b>d.</b> Brakes do not release.</p> <p><b>e.</b> Master cylinder is leaking or damaged.</p>
6	Semiannually  Semiannually	Steering System	<p><b>a.</b> Check steering wheel (2) and make sure it does not exceed more than 1 in. (2.5 cm) free play.</p> <p><b>b.</b> Turn steering wheel (2) through full range and check for binding or excessive steering. If binding or excessive steering is noticed, refer to WP 0193 00.</p>	<p><b>a.</b> Steering wheel has too much free travel.</p> <p><b>b.</b> Steering is excessive or wheel is binding</p>

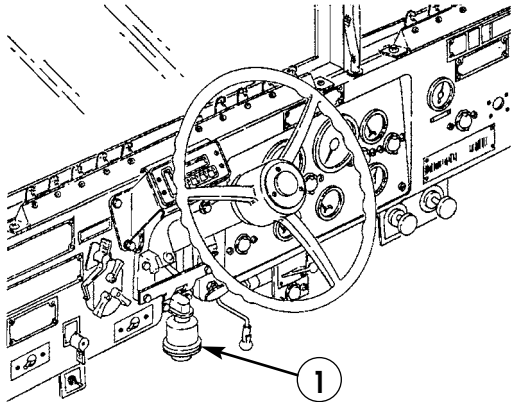
## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
7	Semiannually	Engine stop control	<p>Stop engine (TM 9-2320-361-10).</p> <p style="text-align: center;"><b>AFTER ROAD TEST</b></p> <p>Perform all after-operation weekly and monthly checks in TM 9-2320-361-10 PMCS. Make the following inspections in the order given, including kit items on vehicles so equipped.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <ul style="list-style-type: none"> <li>• Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin. Failure to do so may result in injury to personnel.</li> <li>• Do not smoke, have open flame, or make sparks when performing battery maintenance. Batteries may explode causing severe injury to personnel.</li> <li>• Remove all jewelry such as rings, dog tags, and bracelets. If jewelry or disconnected battery ground cable contacts battery post, a direct short can result, causing damage to equipment or severe injury to personnel.</li> </ul>	
8	Semiannually	Batteries	<p><b>a.</b> Check specific gravity of each cell before adding distilled water. Using optical battery tester, which requires no temperature compensation, check specific gravity of electrolyte in each cell (TM 9-6140-200-14).</p>	
	Semiannually	RPL	<p><b>b.</b> Clean and inspect battery cables (WP 0126 00).</p>	
	Semiannually		<p><b>c.</b> If specific gravity of any cell is below 1.255, battery must be replaced or recharged. Add distilled water as necessary after checking battery. Charge batteries as necessary (TM 9-6140-200-14).</p>	
9	Semiannually	Air cleaner indicator	<p>Test air cleaner indicator (1) for proper operation:</p> <p><b>a.</b> Remove clamp and cap from air cleaner.</p> <p><b>b.</b> Start engine (TM 9-2320-386-10) and run at 1200 RPM.</p>	Air cleaner indicator inoperative or yellow band is not showing.
	Semiannually			
	Semiannually			

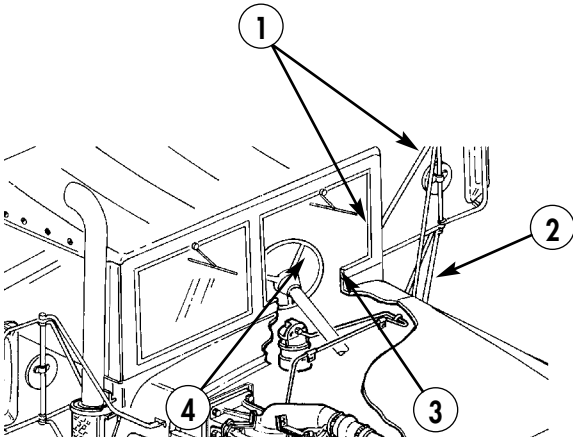
**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
	<p>Semiannually</p> <p>Semiannually</p> <p>Semiannually</p>	<p>Air cleaner indicator (Contd)</p>	<p>c. Using a piece of wood, cover approximately 90 percent of air cleaner opening.</p> <p>d. Observe the air cleaner indicator (1) to see if yellow band is visible. If yellow band is visible, air cleaner indicator (1) is working properly. If not, air cleaner indicator (1) is defective or indicator tube is obstructed. Stop engine (TM 9-2320-361-10).</p> <p>e. Remove wood and install cap on air cleaner with clamp.</p> 	
10	Biennially	Data, caution, and warning plates	<p>Inspect for completeness, security, and readability. Replace if necessary.</p> <p style="text-align: center;"><b>ENGINE COMPARTMENT</b></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>If NBC exposure is suspected, all air filter media must be handled by personnel wearing protective equipment. Consult your unit NBC officer or NBC noncommission officer for appropriate handling and disposal instructions. Failure to do so may result in injury to personnel.</p> <p>NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel. Failure to do so may result in injury to personnel.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Open hood and secure with retaining latch (TM 9-2320-361-10).</p>	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

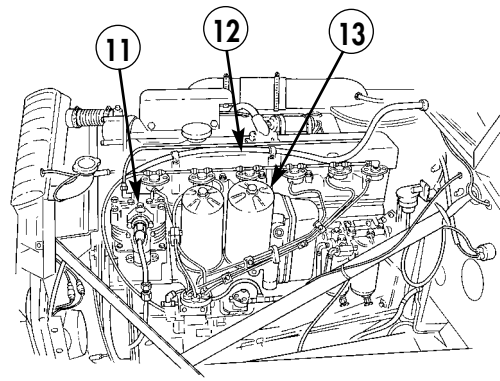
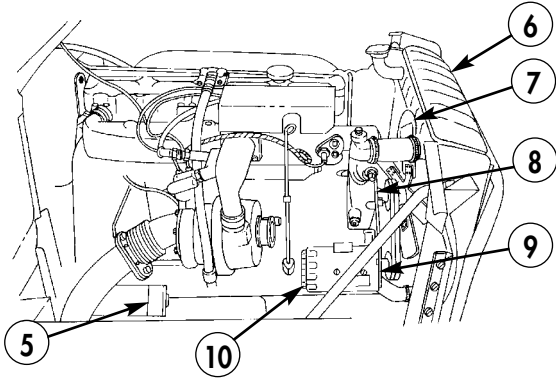
Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
11	Semiannually Semiannually Semiannually	Air intake system	<p><b>a.</b> Inspect air cleaner (4) and air intake tubes (2) for security or damage.</p> <p><b>b.</b> Check air cleaner indicator tube (1) for kinks or bends.</p> <p><b>c.</b> Inspect air cleaner element (3) for tears or presence of dirt and oil. Clean or replace as necessary (WP 0052 00).</p> 	<b>c.</b> Air cleaner element is torn, dirty, or contaminated.
12	Annually Semiannually	Starter and starter wiring	<p><b>a.</b> Inspect starter (5) mounting nuts for security. If loose, tighten nuts to 70–80 lb-ft (95–108 N•m).</p> <p><b>b.</b> Inspect starter (5) wiring for loose and corroded connections. Clean connections if corrosion is present. If loose, tighten.</p>	<b>b.</b> Wiring connections are loose or corroded.
13	Semiannually Semiannually Semiannually Semiannually	Alternator, alternator wiring, and mounting bracket	<p><b>a.</b> Inspect alternator (9) for secure mounting.</p> <p><b>b.</b> Inspect alternator (9) wiring for burned or frayed wires and loose or broken terminal connections. If loose, tighten. If burned, frayed, or broken, replace or repair wiring (WP 0090 00).</p> <p><b>c.</b> Check alternator belts for wear and tension.</p> <p><b>d.</b> Inspect alternator mounting bracket (10). If loose, tighten. If broken, replace (WP 0085 00).</p>	<b>b.</b> Wiring insulation is missing, frayed, or split; or poor connections are evident.
14	Semiannually Semiannually	Cooling system	<p><b>a.</b> Inspect radiator (6) for clogged or bent fins and protruding objects. Clean radiator and straighten bent fins.</p> <p><b>b.</b> Test coolant freeze point.</p>	<b>a.</b> Radiator is clogged, bent, or damaged.

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
	Semiannually	Cooling system (Contd)	<b>c.</b> Inspect radiator (6) for corrosion. If excessive corrosion is found, flush radiator. Flush radiator and cylinder block every four years (WP 0076 00).	
Semiannually	<b>d.</b> Inspect fan (7) for cracks and missing or loose rivets and screws. Replace fan (7) if defective (WP 0075 00).		<b>d.</b> Fan is cracked, broken, or loose.	
Semiannually	<b>e.</b> Inspect radiator mounts for cracks, breaks, and security. If loose, tighten. If broken or cracked, replace (WP 0077 00).		<b>e.</b> Radiator mount is cracked, broken, or loose.	
Semiannually	<b>f.</b> Inspect water pump (8) for cracks, leaks, and security. If loose, tighten. If broken or cracked, replace (WP 0082 00).		<b>f.</b> Water pump is broken, cracked, leaking, or loose.	
15	Semiannually	Air compressor	<b>a.</b> Inspect air compressor (11) for secure mounting.	
	Semiannually		<b>b.</b> Check air compressor belts for wear and tension.	
16	Semiannually	Engine lubrication	<b>a.</b> Check the end of the oil dipstick for metal particles. If metal particles are present, notify your supervisor.	
Semiannually	<b>b.</b> Check rocker arm cover (12) and oil pan areas for leaks. If leaking, replace rocker arm cover gaskets (WP 0030 00) or oil pan gasket (WP 0035 00).			
Semiannually	<b>c.</b> Inspect oil filter (13) for leaks. If leaking, tighten center bolt to 60 lb-ft (81 N•m).			



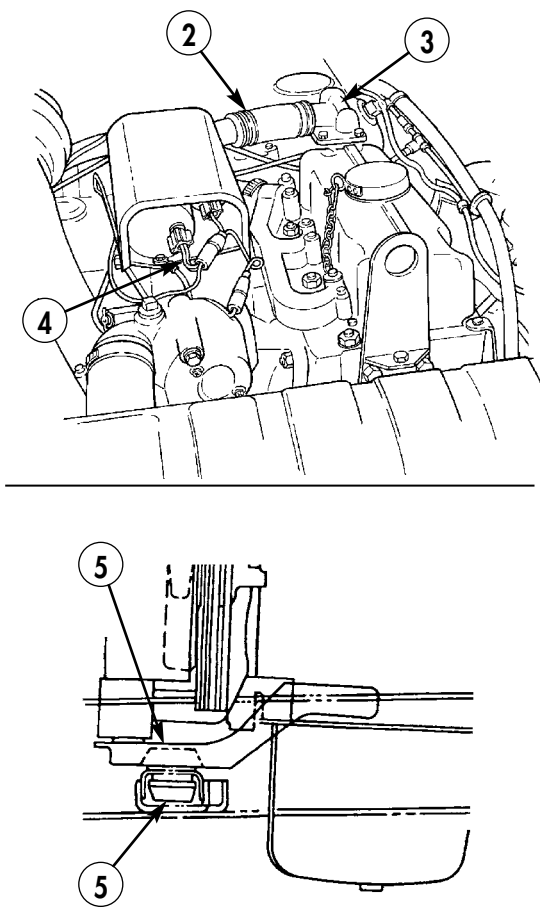




**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

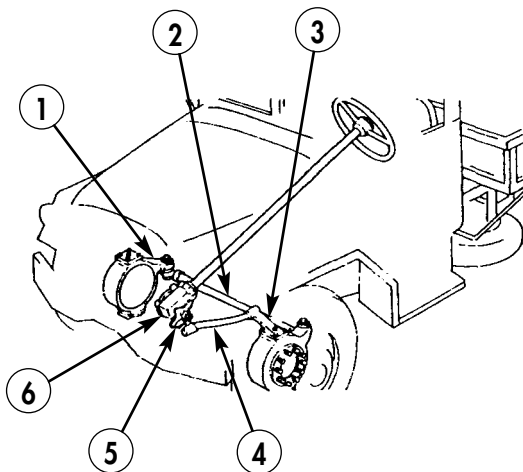
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
19	Semiannually	Manifold heater	Inspect tubing (2) and wiring (4) for loose connections and leaks. If leaking or loose, tighten.	
20	Semiannually  Semiannually	Fuel system	<p><b>a.</b> Inspect fuel filter assembly for dents or cracks that could cause fuel leaks.</p> <p><b>b.</b> Replace filter elements (WP 0063 00) every 6,000 mi (9,656 km) or annually, whichever occurs first.</p>	
21	Semiannually	Engine pads and mounts	Inspect front engine mounts for loose screws, broken, split, or missing rubber pads (5). If loose, tighten to 65–70 lb-ft (88–95 N•m). If pads are defective, replace (WP 0024 00).	Engine mounts are damaged or loose.



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

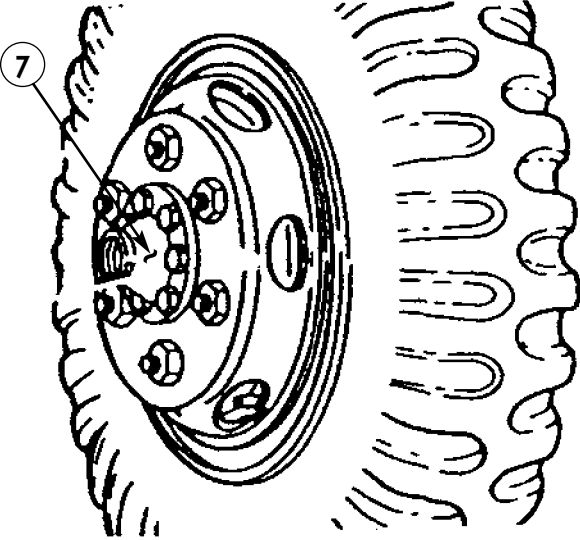
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
22	Annually	Steering gear	Inspect steering gear (6) for security. If loose, tighten mounting screws to 62 lb-ft (84 N•m)	
23	Semiannually  Semiannually  Semiannually  Semiannually	Steering system	<p style="text-align: center;"><b>UNDERSIDE OF VEHICLE</b></p> <p><b>a.</b> Inspect steering knuckles (1), tie rod (2), steering arm (3), drag link (4), and pitman arm (5) for breaks, cracks, and loose conditions. If loose, tighten. If broken or cracked, replace parts as necessary (WP 0150 00, WP 0194 00, WP 0195 00, and WP 0191 00).</p> <p><b>b.</b> Inspect wheel bearing for loose conditions. If loose, adjust (WP 0189 00).</p> <p><b>c.</b> Inspect steering stops for bends and breaks. If bent or broken, notify your supervisor.</p> <p><b>d.</b> Check steering wheel and ensure it does not exceed more than 2.5 in. (6.35 cm) free play.</p> <p><b>e.</b> Turn steering wheel through full tange to check for any hard steering or binding.</p>	<p><b>a.</b> Steering linkage is broken or loose.</p> <p><b>d.</b> Steering wheel exceeds 2.5 in. (6.35 cm) free play.</p> <p><b>e.</b> Steering wheel is hard to turn or binding.</p>



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

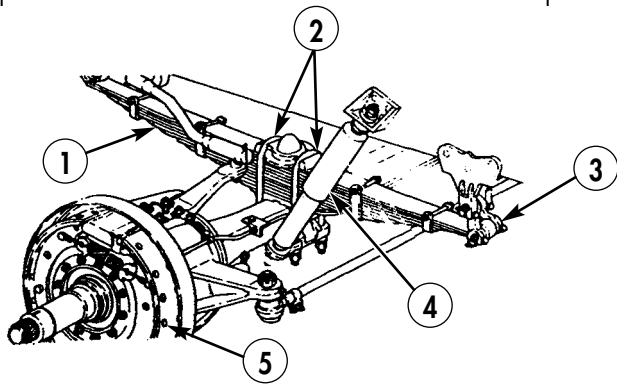
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
24	Semiannually	Front end alignment	Check front end alignment. Correct toe-in is $.13 \pm .06$ in. ( $3.2 \pm 1.6$ mm). Adjust toe-in if incorrect (WP 0190 00).	
25	Biennially  Semiannually  Annually  Semiannually  Annually	Front axle	<p><b>a.</b> Inspect axle housings for cracks that may cause leaks. If axle housing is cracked, replace axle (WP 0148 00).</p> <p><b>b.</b> Check fittings and plugs for leaks. If loose, tighten (WP 0020 00).</p> <p><b>c.</b> Remove breather valves and clean (WP 0144 00).</p> <p><b>d.</b> Inspect axle housings for leaks at differential housing and pinion seal. If leaking, replace seal (WP 0149 00).</p> <p><b>e.</b> Inspect axle flange (7) for leaks. If leaking, tighten loose screws 60–80 lb-ft (81–108 N•m).</p>	<b>d.</b> Axle flange is leaking.
				

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

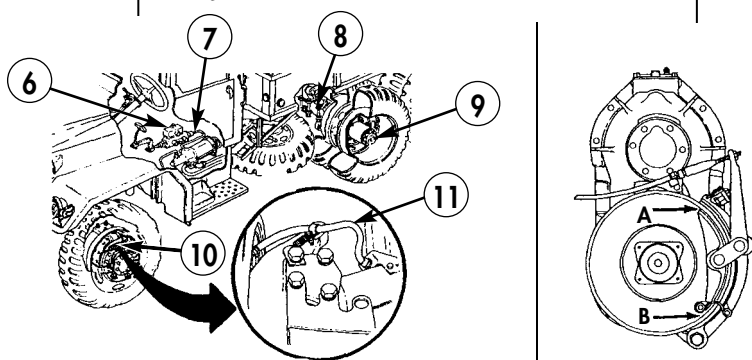
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
26	Semiannually  Annually	Front suspension	<p><b>a.</b> Inspect springs (1) and shackles (3) for cracks, breaks, and security. If spring U-bolts (2) are loose, tighten 190–230 lb-ft (258–312 N•m). If cracked or broken, replace (WP 0153 00).</p> <p><b>b.</b> Inspect shock absorbers (4) and mounting brackets for wear, cracks, leaks, and security. Replace leaking shock absorbers (4) if more than class I leak is found. If worn or cracked, replace (WP 0160 00).</p>	<p><b>a.</b> Front springs are broken or loose.</p> <p><b>b.</b> Shock absorbers are broken, leaking, or loose.</p>
27	Annually  Semiannually  Semiannually	Brake system	<p><b>a.</b> Check brakeshoe (5) condition. If brakeshoes (5) are worn beyond .328 in. (8.33 mm), replace (WP 0167 00).</p> <p><b>b.</b> Inspect master cylinder (6) and wheel cylinders (10) to make sure they are not loose, leaking, or damaged. If loose, tighten. If damaged, replace (WP 0169 00 and WP 0170 00).</p> <p><b>c.</b> Inspect air-hydraulic cylinder (7) to make sure it is not loose, leaking, or damaged. If loose, tighten. If damaged, replace (WP 0171 00).</p>	<p><b>b.</b> Master cylinder and/or wheel cylinders are leaking, damaged, or loose.</p> <p><b>c.</b> Air-hydraulic cylinder is leaking, damaged, or loose.</p>



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

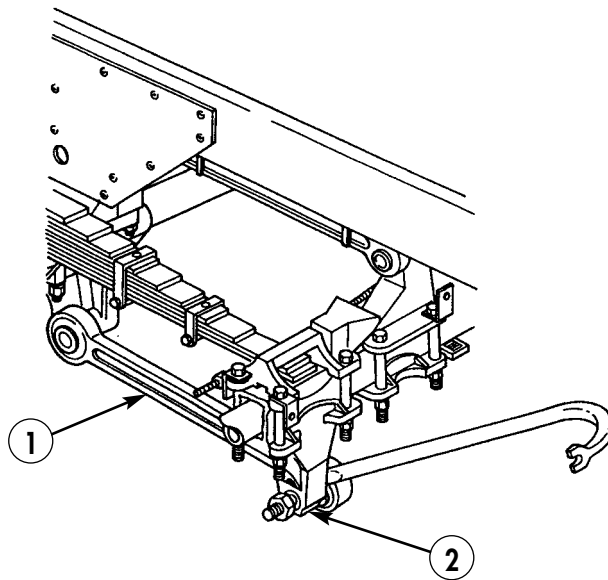
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
	Semiannually	Brake system (Contd)	<p><b>d.</b> Inspect all flexible hydraulic brake hoses for bulges, pinches, cracks, crimping, chafing, abrasions, or leaks. If any of these conditions exist, replace or reposition to prevent failure. Check front brake hoses (11) for loose or missing fittings, and ensure they are long enough to allow full steering travel. If brake hose (11) is too short, it must be replaced with new longer hoses (WP 0175 00 and WP 0176 00).</p> <p><b>e.</b> Inspect parking brakeshoes for wear. Replace both brakeshoes if lining thickness is 0.188 in. (4.76 mm) or less (WP 0164 00).</p> <p><b>f.</b> Inspect parking brake cable, lever, and brakeshoe assembly for binding and loose or missing components. Tighten components if loose or replace if missing or damaged (WP 0163 00–WP 0166 00).</p> <p><b>g.</b> Check parking brakeshoe clearance to parking brakedrum (A and B). If clearance is not 0.015 in. (0.381 mm), adjust (WP 0164 00).</p>	<p><b>d.</b> Flexible hydraulic brake hoses are damaged or leaking.</p>
	Semiannually			
	Semiannually			
	Semiannually			
28	Biennially	Forward-rear axle and rear-rear axle	<p><b>a.</b> Inspect axle housings (8) for cracks that may cause leaks. If axle housing is cracked, replace axle (WP 0151 00).</p>	
Semiannually	<p><b>b.</b> Check fittings and plugs for leaks. If loose, tighten (WP 0020 00).</p>			
Annually	<p><b>c.</b> Remove breather valves and clean (WP 0144 00).</p>			
Semiannually	<p><b>d.</b> Inspect axle housings (8) for leaks at differential housing and pinion seal. If leaking, replace seal (WP 0149 00).</p>		<p><b>d.</b> Axle flange is leaking.</p>	
Annually	<p><b>e.</b> Inspect axle flange (9) for leaks. If leaking, tighten loose screws 60–80 lb-ft (81–108 N•m).</p>			



PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
29	Semiannually	Rear suspension	<p><b>a.</b> Inspect torque rods (1) for damage and security. Tighten if loose or replace if damaged (WP 0162 00).</p> <ol style="list-style-type: none"> <li>1. Place flat end of crowbar or pinch bar between torque rod (1) and mounting bracket (2).</li> <li>2. Push on end of bar until hook end moves 4–6 in. (101.6–152.4 mm).</li> <li>3. Release pressure on bar. If torque rod (1) does not return to original position, replace (WP 0162 00).</li> </ol>	<p><b>a.</b> Torque rod is damaged or loose.</p>
	Semiannually		<p><b>b.</b> Inspect rear springs (3) for cracks, breaks, and security. If spring U-bolts (4) are loose, tighten 190–220 lb-ft (258–298 N•m). If cracked or broken, replace (WP 0157 00).</p>	<p><b>b.</b> Rear springs are broken or loose.</p>
	Semiannually		<p><b>c.</b> Inspect front and rear spring wear pads (8) for wear. Replace wear pads (8) if spring (3) is rubbing against spring bracket (7) (WP 0161 00).</p>	





## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

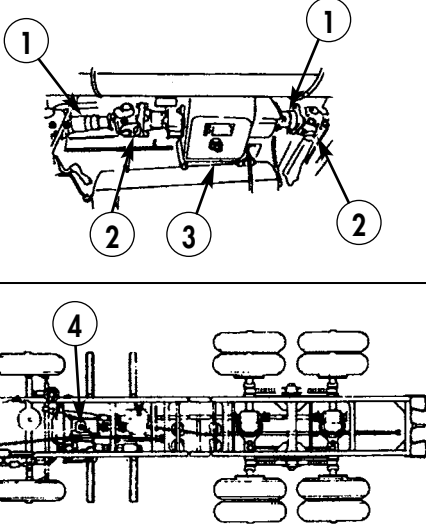
Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
31	Semiannually	Frame and crossmembers (Contd)	<b>b.</b> Thoroughly clean rivet and riveted connection of all dirt, grease, and oil. Using an oil can, apply oil on suspected loose rivet(s). Allow 10–20 seconds for oil to penetrate. Clean excess oil and tap rivet with hammer. A loose rivet will squirt oil when tapped. If loose or broken rivets are found, notify your supervisor.	<b>d.</b> Welds are cracked or broken.  <b>a.</b> Propeller shaft is bent, cracked, or loose.
	Semiannually		<b>c.</b> Check bolted frame connections for loose bolts and nuts, security, and proper mating with frame surfaces.	
	Semiannually		<b>d.</b> Check welded frame connections for integrity and deterioration. Notify your supervisor for repair or replacement of welded frame connections.	
	Semiannually	Propeller shafts	<b>a.</b> Check all propeller shafts (1) for bends, cracks, missing counterweights, and security. If loose, tighten mounting screws 90–120 lb-ft (122–163 N•m). If cracked or broken, replace (WP 0139 00).	
32	Semiannually		<b>b.</b> Inspect universal joints (2) to make sure there is no play, broken retaining clips and bearing cups, or missing lubrication fittings (WP 0141 00).	<b>b.</b> Transmission mounting screws are loose or missing.  <b>d.</b> Shifting is stiff, binding, or slipping
	Semiannually	Transmission	<b>a.</b> Inspect transmission (4) for loose screws and plugs that may cause leaks. If loose, tighten.	
	Semiannually		<b>b.</b> Inspect transmission (4) for missing or loose mounting screws. If loose, tighten 23–26 lb-ft (31–35 N•m). If missing, notify your supervisor.	
	Semiannually		<b>c.</b> Remove transmission breather valve and clean (WP 0128 00).	
33	Semiannually		<b>d.</b> Be alert for unusual noises and difficulty in shifting in any gear range.	
	Semiannually	Transfer case	<b>a.</b> Inspect transfer case (3) for oil leaks, cracks, and loose screws that may cause leaks.	



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

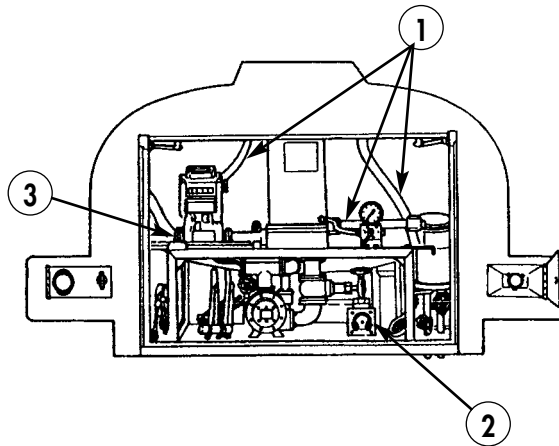
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
	Semiannually  Semiannually  Semiannually	Transfer case (Contd)	<p><b>b.</b> Inspect transfer case (3) for loose mounting screws and nuts. If transfer case stud nuts are loose, tighten 125–135 lb-ft (169–183 N•m). If transfer case support bracket screws and nuts are loose, tighten 65–70 lb-ft (88–95 N•m).</p> <p><b>c.</b> Remove transfer case breather valve and clean (WP 0137 00).</p> <p><b>d.</b> Check for response to shifting and smoothness of operation in all gear ranges.</p> <div style="text-align: center;">  </div>	<p><b>b.</b> Transfer case is loose.</p> <p><b>d.</b> Transfer case is inoperative or jumps out of gear.</p>
34	Semiannually  Semiannually	Wheel and tire assemblies	<p><b>a.</b> Check each tire for wear using tire tread depth gauge. Tread depth should not be less than 0.13 in. (3.18 mm) as indicated on the tire depth gauge (TM 9-2610-201-14). Refer to TM 9-2610-200-14 and TM 9-2610-201-14 for specific instructions for matching tires and tire rotation.</p> <p><b>b.</b> Inspect wheels for cracks in welds, surface defects, and/or malformed parts. If damaged, replace (WP 0186 00)</p>	<p><b>a.</b> Tire has cuts, gouges, cracks, or leaks that would cause tire failure. Tires have cupping which cause erratic steering, or worn to within 4/32 in. (3 mm).</p> <p><b>b.</b> Wheels are cracked or damaged.</p>

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

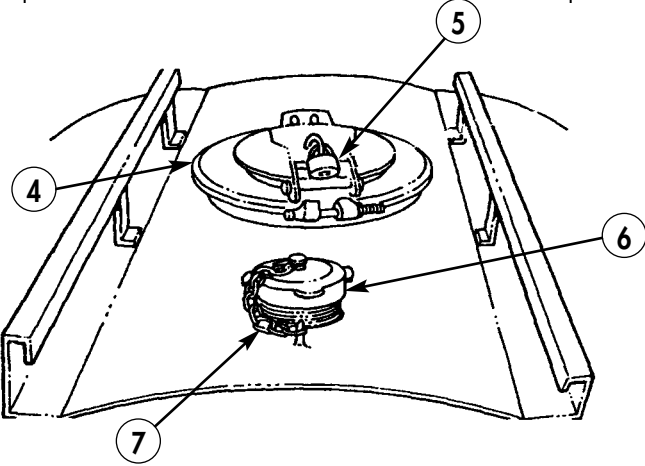
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
35	Annually  Annually  Annually	Front winch	<p><b>SPECIAL PURPOSE BODIES AND EQUIPMENT</b></p> <p><b>a.</b> Inspect front winch for secure mounting and broken or missing parts. If loose, tighten (WP 0345 00).</p> <p><b>b.</b> Test drag brake for proper operation (WP 0342 00).</p> <p><b>c.</b> Test automatic brake for proper operation (WP 0344 00).</p>	<p><b>a.</b> Front winch is loose.</p> <p><b>b.</b> Drag brake inoperative.</p> <p><b>c.</b> Automatic brake inoperative.</p>
36	Semiannually    Semiannually    Semiannually	Fuel pump system and gravity discharge system	<p><b>M49A2C FUEL TANK TRUCK</b></p> <p><b>a.</b> Check all pipes (1), caps (2), and couplings (3) to make sure they are not loose or leaking.</p> <p><b>NOTE</b> Refer to TM 9-2320-361-10 for operating procedures when doing the following checks:</p> <p><b>b.</b> Pump enough fuel from one compartment to another to make sure fuel system works properly and there are no unusual noises, vibrations, or leaks.</p> <p><b>c.</b> Gravity discharge fuel from one compartment to a clean container. Empty enough fuel to make sure gravity discharge system works properly and does not leak.</p>	



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

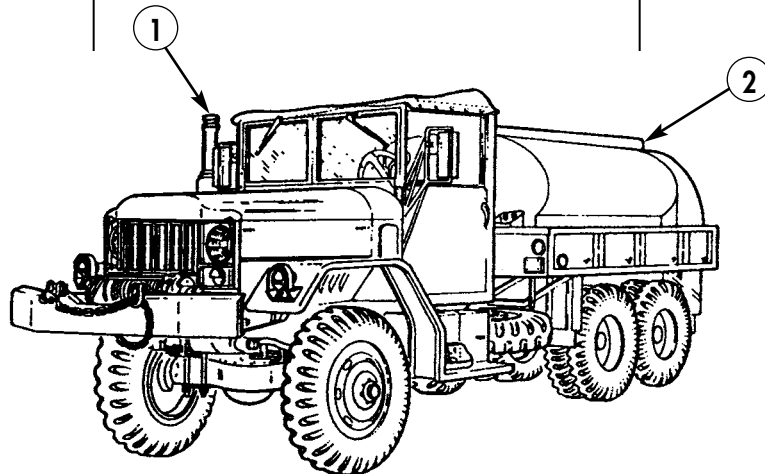
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
37	Semiannually  Semiannually	Tank body	<p>a. Inspect manhole covers (4) and filler caps (6) to make sure they seal properly and are not damaged.</p> <p>b. Inspect chains (7) and locks (5) to make sure they are not missing or damaged.</p> 	
38	Semiannually	Water separator filter	<p>Replace fuel filter elements (WP 0286 00).</p> <p><b>M50A3 WATER TANK TRUCKS</b></p> <p><b>NOTE</b></p> <p>Refer to TM 9-2320-361-10 for operating procedures when performing the following checks:</p>	
39	Semiannually  Semiannually	Water pump system and gravity discharge system	<p>a. Pump enough water from one compartment to another to make sure water pump system works properly and there are no unusual noises, vibrations, or leaks.</p> <p>b. Gravity discharge water from one compartment to a clean container. Empty enough water to ensure gravity discharge system works properly and does not leak.</p>	
40	Semiannually	Tank body	<p>Inspect manhole covers (4) and filler caps (6) to ensure they seal properly and are not damaged.</p>	

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

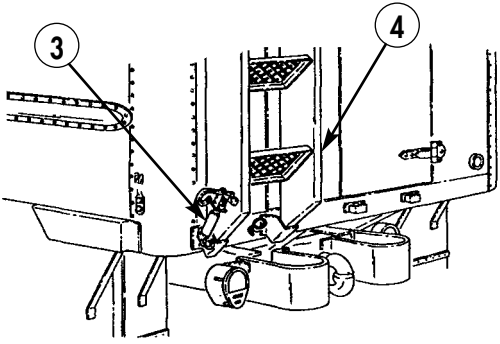
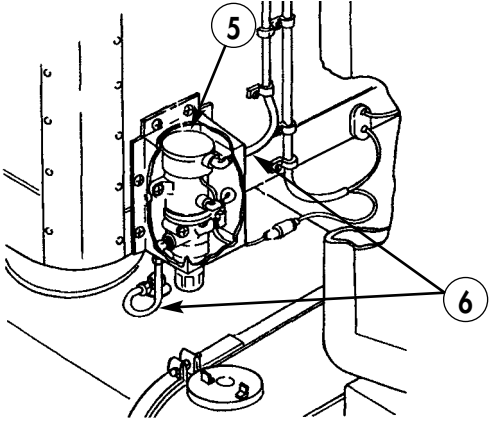
*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
41	Semiannually	Exhaust bypass system	<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Exhaust bypass system will overheat tank body if there is less than 10 in. (25.0 cm) of water in either compartment. Make sure level is above 10 in. (25 cm) before checking exhaust bypass system.</p> <p>Check exhaust bypass system for proper operation as follows:</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Do not touch hot exhaust system components with bare hands. Injury to personnel may result.</p> <ol style="list-style-type: none"> <li>a. Close and latch front exhaust shutoff valve (1).</li> <li>b. Open rear exhaust shutoff valve (2).</li> <li>c. Start engine (TM 9-2320-361-10).</li> <li>d. Check to make sure exhaust gases are coming out of rear exhaust.</li> <li>e. Stop engine (TM 9-2320-361-10).</li> <li>f. Open front exhaust shutoff valve (1).</li> <li>g. Close rear exhaust shutoff valve (2).</li> </ol>	Exhaust bypass system is malfunctioning.



**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)**

*Table 1. Preventive Maintenance Checks and Services (PMCS) (Contd).*

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
42	Semiannually  Semiannually	Van body hardware	<p><b>M109A3 AND M185A3 SHOP VAN TRUCKS</b></p> <p><b>a.</b> Inspect access ladder (4) and mounting hardware (3) for breaks, bends, or damage.</p> <p><b>b.</b> Inspect heater fuel pump (5) and fuel lines (6) for leaks or damage.</p>   <p><b>FINAL ROAD TEST</b></p> <p>After all services and inspections have been completed, take vehicle on a short road test to ensure all corrections have been implemented. Correct any defects or malfunctions that may occur during this test.</p>	



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE FRONT MOUNT PAD REPLACEMENT

FRONT MOUNT PAD REMOVAL, SUPPORT PLATE REMOVAL, SUPPORT PLATE INSTALLATION,  
AND FRONT MOUNT PAD INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Four locknuts (item 161, WP 0470 00)

Lockwasher (item 212, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Brush guard removed (WP 0203 00).

Front bumper removed (WP 0204 00).

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## ENGINE FRONT MOUNT PAD REPLACEMENT (Contd)

### FRONT MOUNT PAD REMOVAL

1. Remove two locknuts (13), washers (12), springs (11), and washers (10) from studs (2). Discard locknuts (13).
2. Remove two locknuts (16) and washers (15) from screws (8). Discard locknuts (16).
3. Remove nut (20), screw (17), lockwasher (19), washer (18), and ground strap (23) from front crossmember (6). Discard lockwasher (19).
4. Remove two nuts (4), screws (14), clamps (5), and fuel line (7) from front crossmember (6).
5. Push two screws (8) up through front crossmember (6), lower front pads (24), and upper front pads (25) as far as possible.

#### **WARNING**

Do not put fingers between frame and engine support. Jack failure may result in injury to personnel.

6. Carefully lift engine and radiator (3), and remove two upper front pads (25) and lower front pads (24) from front crossmember (6).

### SUPPORT PLATE REMOVAL

#### **WARNING**

Do not put fingers between frame and engine support. Jack failure may result in injury to personnel.

Place support under radiator before removing support plate. Failure to do so may result in injury to personnel and damage to equipment.

1. Place support under radiator (3).
2. Remove six screws (21), washers (22), and support plate (9) from two engine supports (1) and studs (2).
3. Remove two screws (8) from support plate (9).

### SUPPORT PLATE INSTALLATION

#### **WARNING**

Do not put fingers between frame and engine support. Jack failure may result in injury to personnel.

1. Install two screws (8) on support plate (9).
2. Install support plate (9) on two studs (2) and engine supports (1) with six washers (22) and screws (21). Tighten screws (21) 25–27 lb-ft (34–37 N•m) and remove support from radiator (3).



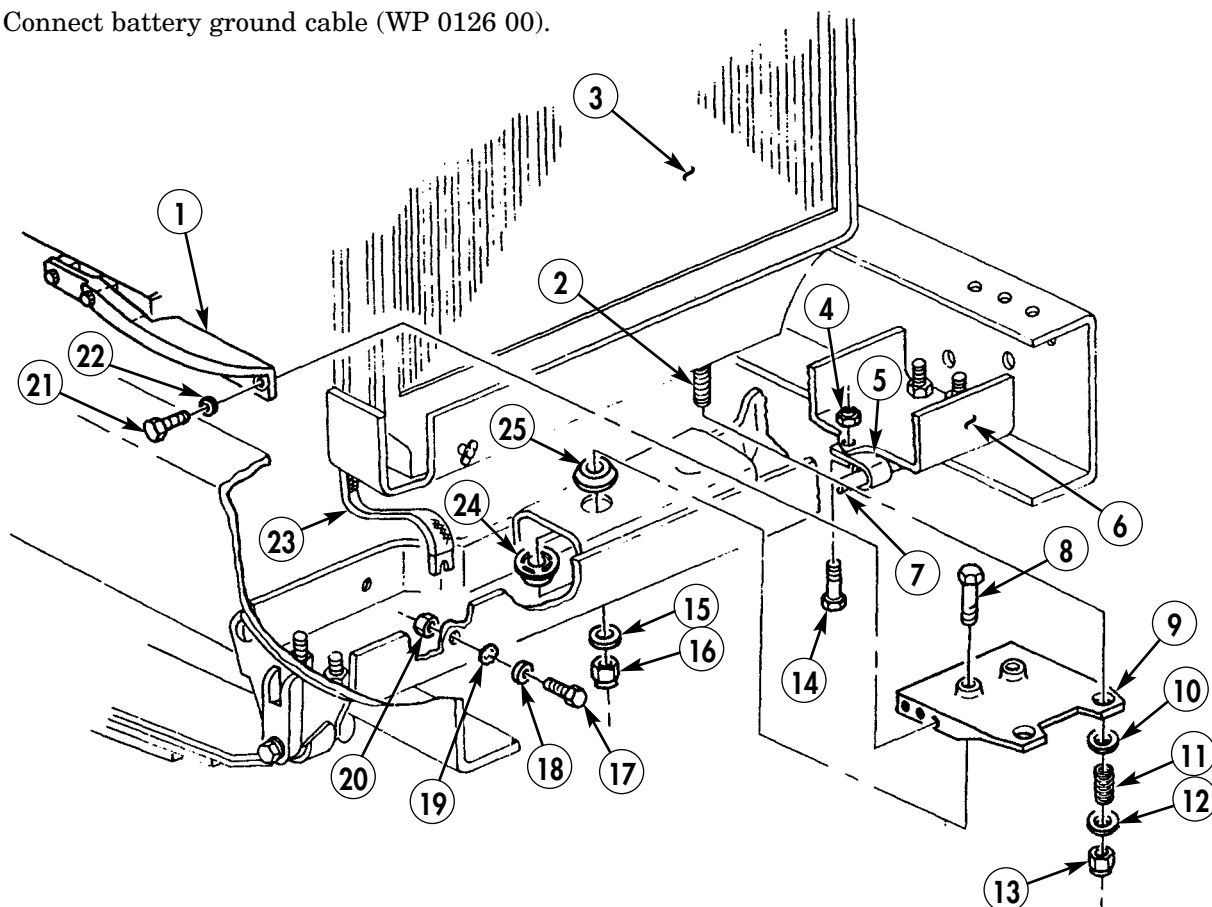
## ENGINE FRONT MOUNT PAD REPLACEMENT (Contd)

### FRONT MOUNT PAD INSTALLATION

#### **WARNING**

Do not put fingers between frame and engine support. Jack failure may result in injury to personnel.

1. Install two lower front pads (24) and upper front pads (25) on front crossmember (6),
2. Carefully lower engine and radiator (3) guiding two screws (8) through upper and lower front pads (25) and (24) and front crossmember (6).
3. Install fuel line (7) on front crossmember (6) with two clamps (5), screws (14), and nuts (4).
4. Install ground strap (23) on front crossmember (6) with screw (17), washer (18), new lockwasher (19), and nut (20).
5. Install two washers (15) and new locknuts (16) on screws (8). Tighten locknuts (16) 65–70 lb-ft (88–95 N•m).
6. Install two washers (10), springs (11), washers (12), and new locknuts (13) on studs (2). Do not fully compress springs (11).
7. Install front bumper (WP 0204 00).
8. Install brush guard (WP 0203 00).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
11. Connect battery ground cable (WP 0126 00).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE REAR MOUNT PAD REPLACEMENT REMOVAL AND INSTALLATION

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**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Locknut (item 161, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## ENGINE REAR MOUNT PAD REPLACEMENT (Contd)

### REMOVAL

#### **NOTE**

Perform step 1 for engine left rear mount.

1. Remove nut (1) and accelerator linkage (3) from throttle control lever (2).

#### **NOTE**

Right and left engine rear mounts are removed the same way.

This procedure covers the right engine rear mount.

2. Remove locknut (10), washer (9), and lower rear engine pad (8) from frame (7). Discard locknut (10).
3. Position hydraulic jack (13) and wood blocks (14) under transmission (12) lifting point. Raise transmission (12) just enough to take weight off upper rear engine pad (11).

#### **WARNING**

Do not put fingers between frame and engine support. Jack failure may cause injury to personnel.

4. Remove screw (4), washer (5), and upper rear engine pad (11) from frame (7) and engine support (6).

### INSTALLATION

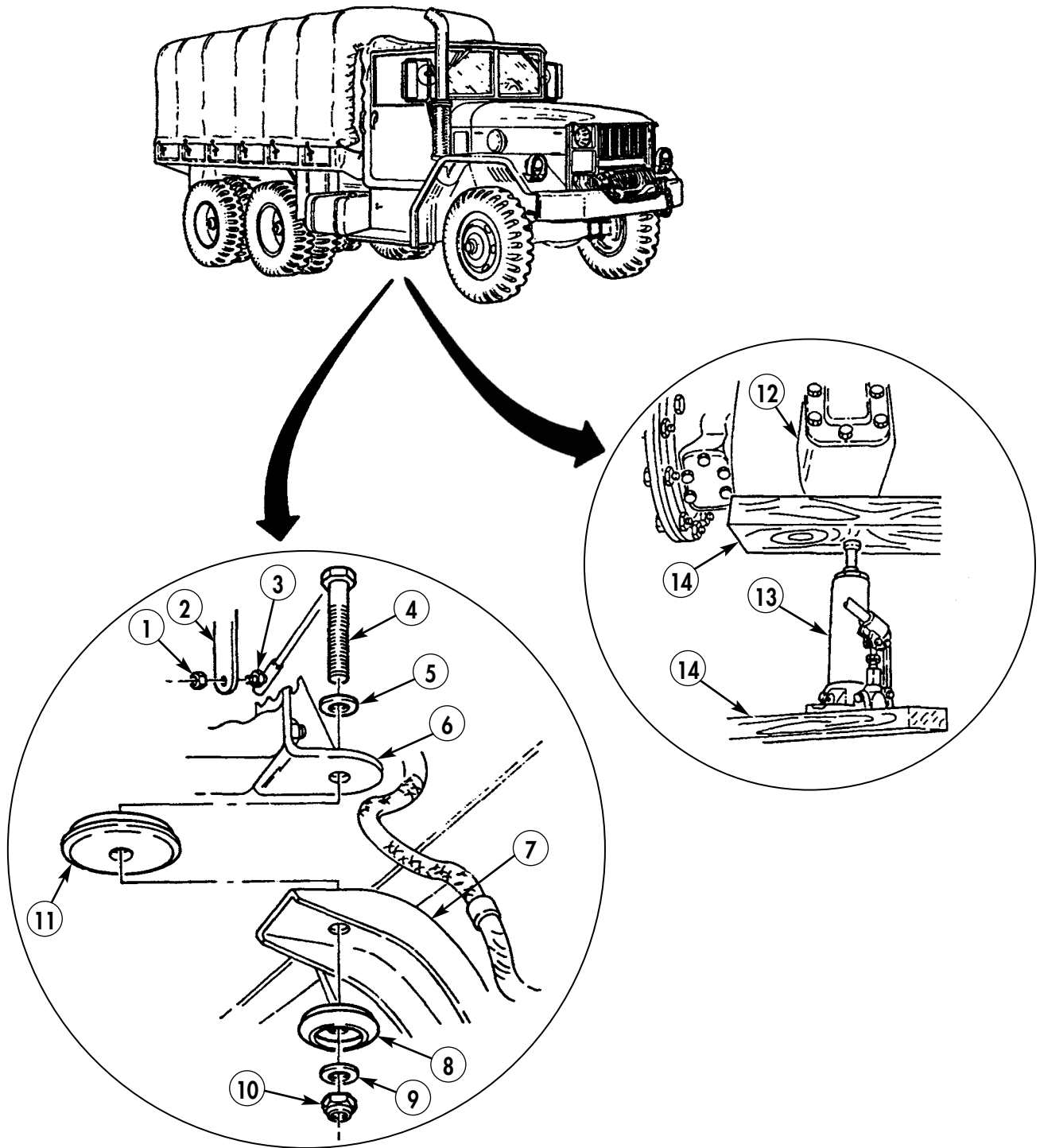
1. Install upper rear engine pad (11) on frame (7) with washer (5) and screw (4).
2. Lower hydraulic jack (13) and remove jack (13) and wood blocks (14) from transmission (12).
3. Install lower rear engine pad (8) on frame (7) with washer (9) and new locknut (10). Tighten locknut (10) 65–70 lb-ft (88–95 N•m).

#### **NOTE**

Perform step 4 for engine left rear mount.

4. Install accelerator linkage (3) on throttle control lever (2) with nut (1).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
7. Connect battery ground cable (WP 0126 00).

ENGINE REAR MOUNT PAD REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE FRONT AND REAR MOUNTING BRACKETS REPLACEMENT

FRONT MOUNTING BRACKET REMOVAL, FRONT MOUNTING BRACKET INSTALLATION,  
REAR MOUNTING BRACKET REMOVAL, AND REAR MOUNTING BRACKET INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

Lifting device

Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)

1-1/8-in socket, 3/4-in. drive  
(item 99, WP 0469 00)

1-1/4-in. socket, 3/4-in. drive  
(item 97, WP 0469 00)

Breaker bar 3/4-in. drive (item 8, WP 0469 00)

##### References

WP 0025 00

##### Equipment Condition

Hood raised and secured (TM 9-2320-361-10).

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Primary fuel filter removed (if removing right  
front mount only) (WP 0063 00).

Steering gear removed (if removing left front  
mount only) (WP 0192 00).

##### Materials/Parts

Four locknuts (item 127, WP 0470 00)

Three lockscrews (item 182, WP 0470 00)

Lockscrew (item 183, WP 0470 00)

Lockscrew (item 184, WP 0470 00)

## ENGINE FRONT AND REAR MOUNTING BRACKETS REPLACEMENT (Contd)

### **WARNING**

- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.
- Lifting device must have a weight capacity greater than the weight of the engine and transmission to prevent damage to equipment and injury to personnel.

### **CAUTION**

Closely observe all engine and transmission attachments during removal to prevent damage to equipment.

### **NOTE**

Assistant will help with lifting operations.

### **FRONT MOUNTING BRACKET REMOVAL**

1. Attach lifting device to front engine lifting bracket (10). Raise lifting device enough to remove slack.
2. Remove three lockscrews (7) and washers (8) from front bracket (5) and mounting plate (9). Discard lockscrews (7).
3. Remove lock screw (4), washer (2), lock screw (3), washer (2), and front bracket (5) from engine block (6). Discard lockscrews (3) and (4).

### **FRONT MOUNTING BRACKET INSTALLATION**

1. Install front bracket (5) on engine block (6) with washer (2), new lock screw (3), washer (2), and new lock screw (4). Tighten lock screws (4) and (3) 200–250 lb-ft (271–339 N•m).
2. Install front bracket (5) on mounting plate (9) with three washers (8) and new lock screws (7). Tighten three lock screws (7) 25–27 lb-ft (34–37 N•m).
3. Lower lifting device and remove from front engine lifting bracket (10).
4. Install steering gear, if removed (WP 0192 00).
5. Install primary fuel filter (WP 0063 00).

### **REAR MOUNTING BRACKET REMOVAL**

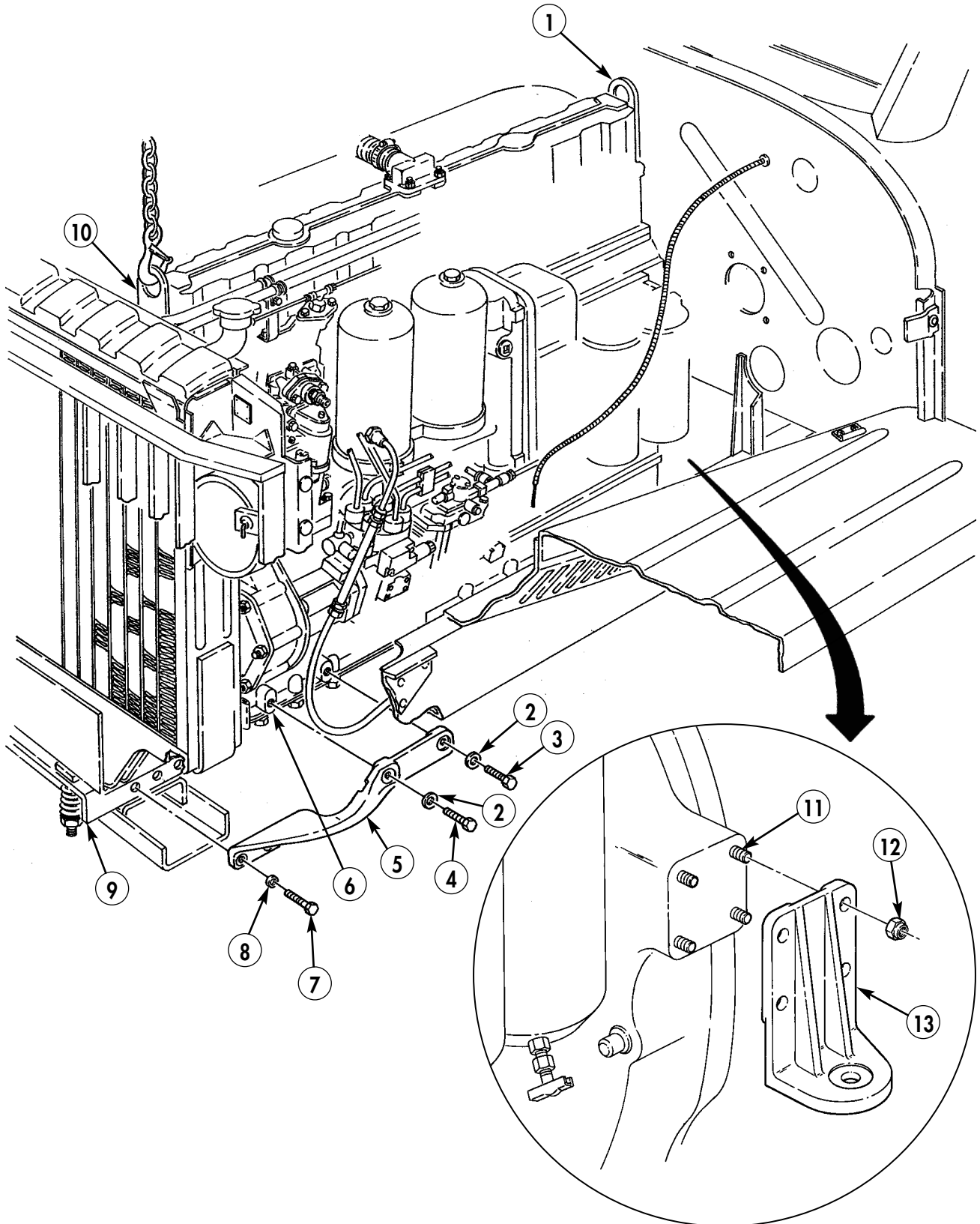
1. Attach lifting device to rear engine lifting bracket (1). Raise lifting device enough to remove slack.
2. Remove rear engine mount pad (WP 0025 00).
3. Remove four locknuts (12) and rear bracket (13) from flywheel housing studs (11). Discard locknuts (12).

### **REAR MOUNTING BRACKET INSTALLATION**

1. Install rear bracket (13) on flywheel housing studs (11) with four new locknuts (12). Tighten locknuts (12) 45–55 lb-ft (61–75 N•m).
2. Install rear engine mount pad (WP 0025 00).
3. Lower lifting device and remove lifting device from rear engine lifting bracket (1).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



ENGINE FRONT AND REAR MOUNTING BRACKETS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CYLINDER HEAD MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

Torque wrench 1/2-in. drive  
(item 136, WP 0469 00)

Wrench, adjustable, cylinder  
(item 128, WP 0469 00)

##### Materials/Parts

Gasket (item 104, WP 0470 00).

Two lockwashers (item 201, WP 0470 00)

Lubricating oil (item 24, WP 0468 00)

Sealing compound (item 29, WP 0468 00)

##### References

TM 9-2815-210-34-2-2

TM 9-2320-361-10

WP 0021 00

WP 0068 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 0-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air intake tube and cap removed (WP 0051 00).

Rocker arm cover and gasket removed  
(WP 0030 00).

Rocker arms and pushrods removed  
(WP 0031 00).

Fuel injector nozzles and holders removed  
(WP 0067 00).

Intake and exhaust manifolds removed  
(WP 0041 00).

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## CYLINDER HEAD MAINTENANCE (Contd)

### REMOVAL

1. Remove two screws (8), lockwashers (7), bracket (6), and lifting bracket (9) from cylinder head (2). Discard lockwashers (7).
2. Using cylinder head wrench, remove fourteen nuts (1) and washers (10) from studs (5).

#### **CAUTION**

Uneven lifting and binding of cylinder head may damage studs and cause misalignment of cylinder head during installation.

#### **NOTE**

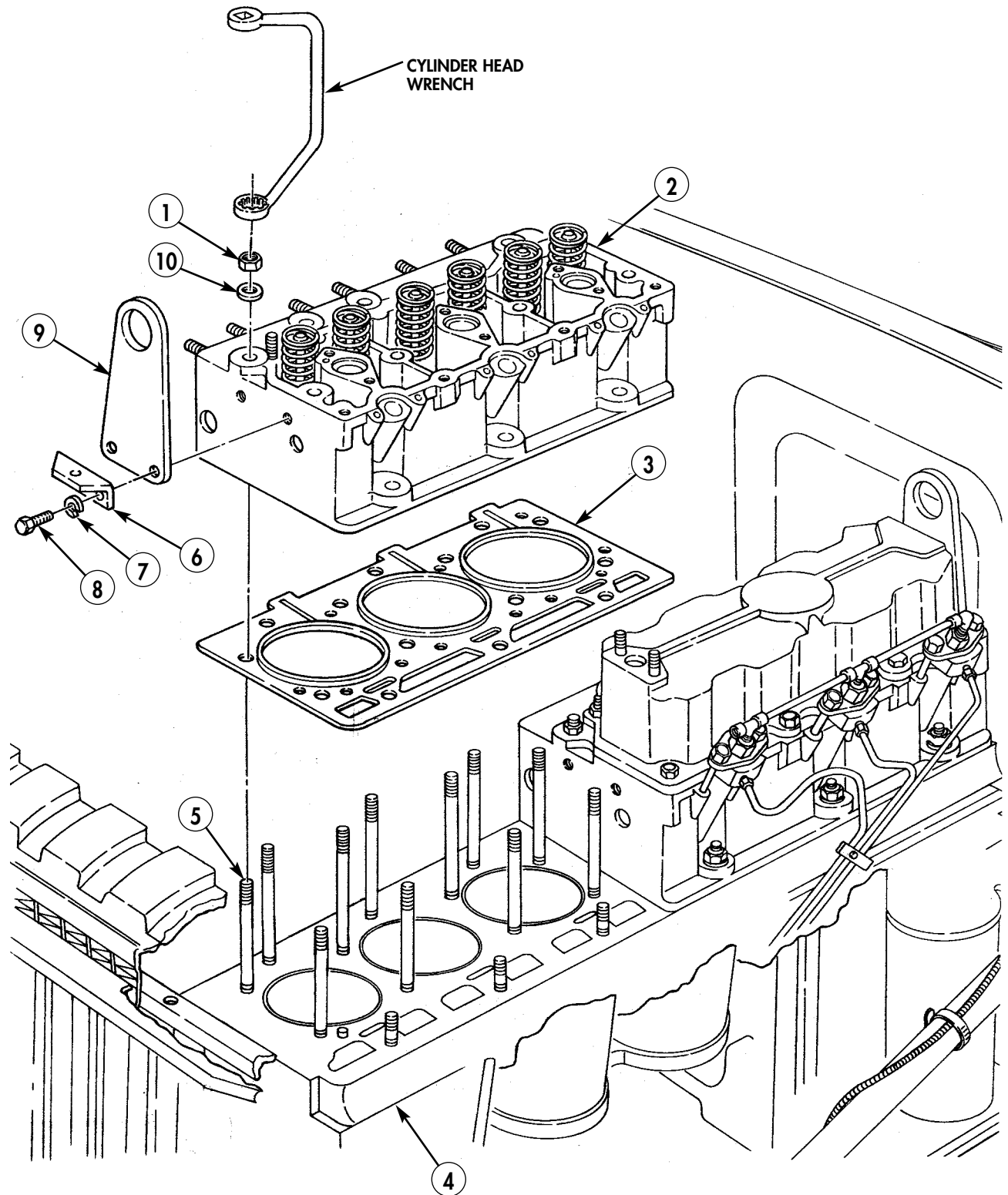
Cylinder head is heavy and may require the use of a lifting device during removal.

3. Remove cylinder head (2) and gasket (3) from engine block (4). Discard gasket (3).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0021 00.
2. Remove all excess gasket material from engine block (4) and cylinder head (2).
3. For stud removal and care, refer to WP 0021 00.

### CYLINDER HEAD MAINTENANCE (Contd)



## CYLINDER HEAD MAINTENANCE (Contd)

### INSTALLATION

#### **CAUTION**

Do not allow lubricating oil to contact the surface on engine block where cylinder head gasket bonds. Cylinder head gasket may become contaminated with oil and fail to seal on engine block and cylinder head. Failure to comply may cause damage to equipment.

1. Apply thin coat of clean lubricating oil on threads of fourteen studs (5) and nut (1) facings.

#### **CAUTION**

Ensure cylinder head does not bind on studs during installation. Bending of studs may cause cylinder head to guide pin misalignment. Cylinder head cannot be installed on engine block if misaligned. Failure to comply may cause damage to equipment.

2. Install new gasket (3) and cylinder head (2) on fourteen studs (5) and engine block (4) with fourteen washers (10) and nuts (1).

#### **NOTE**

If studs rotate when torquing nuts, remove cylinder head and repair or replace studs.

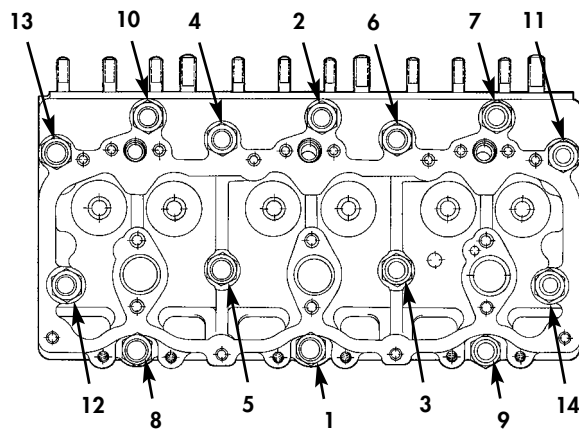
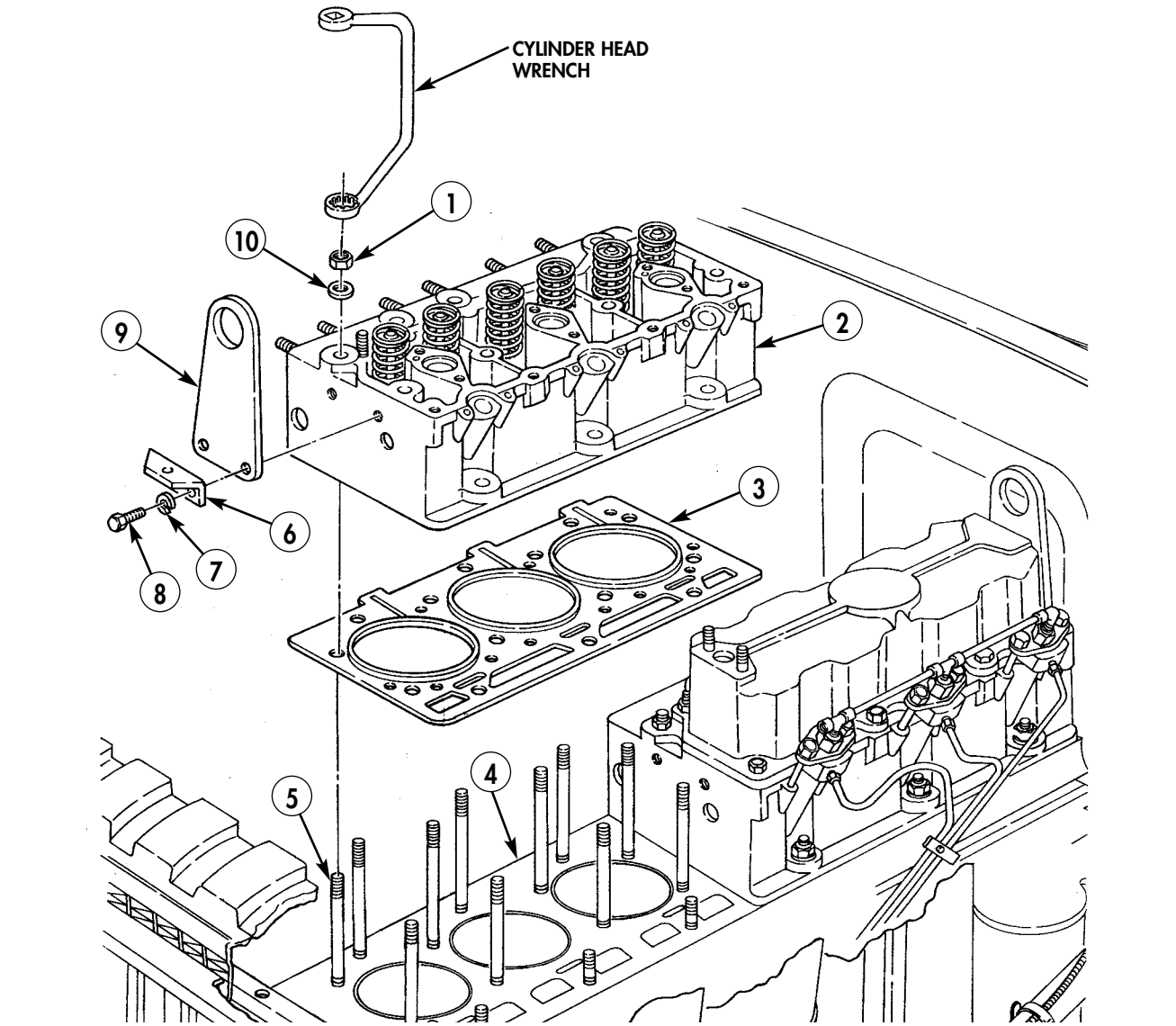
3. Tighten fourteen nuts (1) to 40 lb-ft (54 N•m) in torque sequence shown.
  - a. Using torque sequence, tighten nuts (1) to 110 lb-ft (149 N•m).
  - b. Using torque sequence, tighten nuts (1) to 130 lb-ft (176 N•m).
  - c. Using torque sequence, tighten nuts (1) to 157 lb-ft (204 N•m).
  - d. Using torque sequence, tighten nuts (1) to 157 lb-ft (204 N•m).
4. Install lifting bracket (9) and bracket (6) on cylinder head (2) with two new lockwashers (7) and screws (8).
5. Install intake and exhaust manifolds (WP 0041 00).
6. Install and adjust rocker arms and pushrods (WP 0031 00).

#### **NOTE**

Do not apply sealing compound on rocker arm cover gasket at this time.

7. Install rocker arm cover and gasket (WP 0030 00).
8. Install fuel injector nozzles and holders (WP 0067 00).
9. Install air intake tube and cap (WP 0051 00).
10. Connect battery ground cable (WP 0126 00).

### CYLINDER HEAD MAINTENANCE (Contd)



TORQUE SEQUENCE

## CYLINDER HEAD MAINTENANCE (Contd)

### INSTALLATION (Contd)

#### **WARNING**

Ensure engine compartment is free of all tools and working materials before starting engine. Failure to do this may result in damage to equipment and injury to personnel.

11. Start engine (TM 9-2320-361-10). Idle engine until coolant temperature reaches a minimum of 175 °F (79 °C) before engine shutdown.

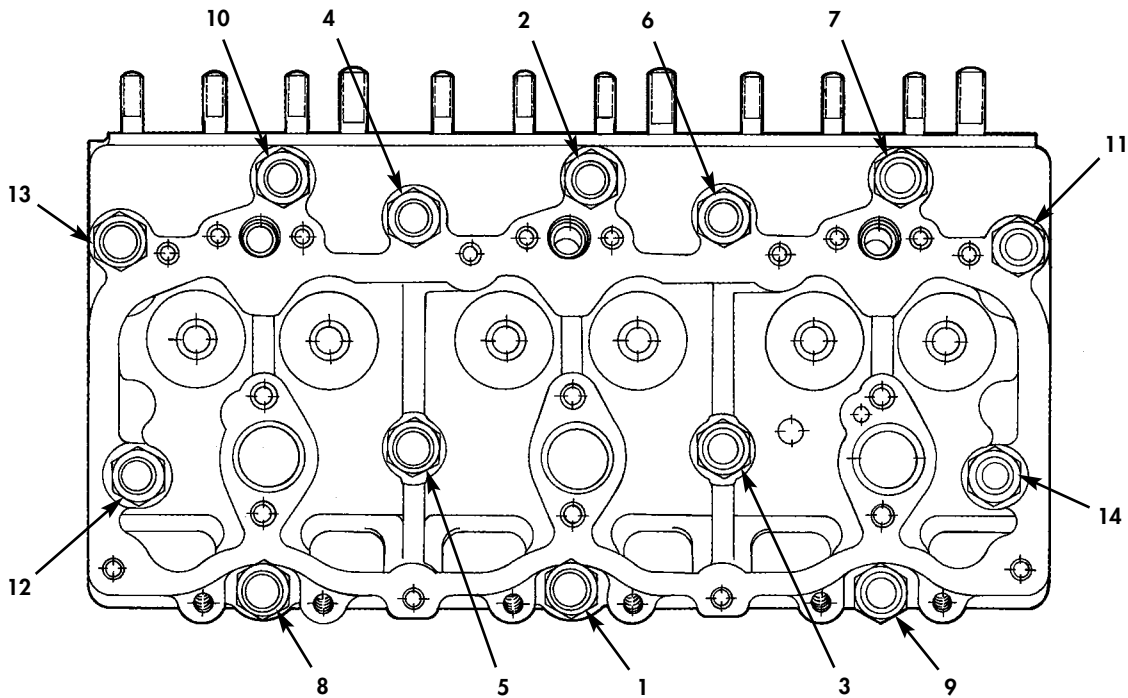
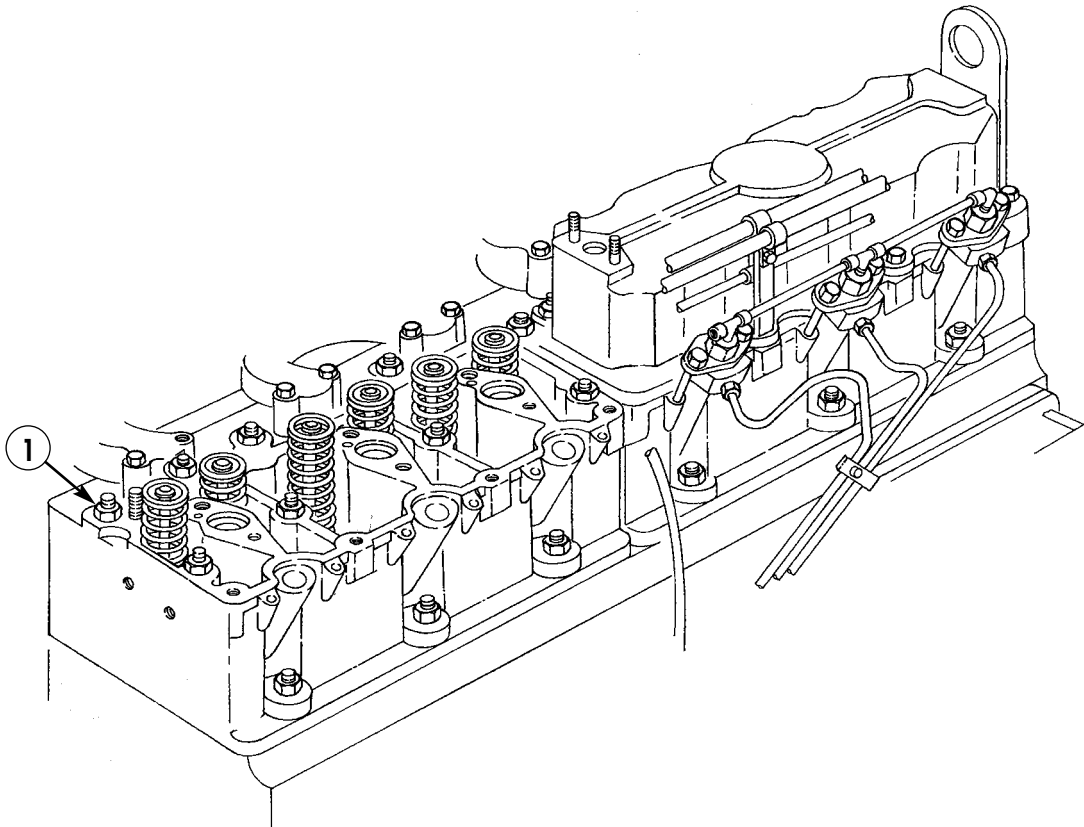
#### **NOTE**

It is not recommended to hot re-torque this gasket. If any seepage or leaks occur, a re-torque is required. It must be done on a cold engine. Re-torque using torque sequence shown, tighten nuts (12) to 157 lb-ft (204 N•m).

12. Remove no. 1 through no. 3 injector tubes (WP 0068 00).
13. Remove rocker arm cover and gasket (WP 0030 00).
14. Remove rocker arm assembly (WP 0031 00).
15. Install pushrods and rocker arm assembly, and adjust valve clearance (WP 0031 00).
16. Install rocker arm cover and gasket (WP 0030 00).
17. Install injector tubes (WP 0068 00).
18. Install fuel injector nozzles and holders (WP 0067 00).
19. Install air intake tube and cap (WP 0051 00).
20. Connect battery ground cable (WP 0126 00).
21. Lower and secure hood (TM 902320-361-10).
22. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



CYLINDER HEAD MAINTENANCE (Contd)



TORQUE SEQUENCE

END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### VIBRATION DAMPER AND SEAL MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)  
1-5/8-in. socket, 3/4-in. drive  
(item 102, WP 0469 00)  
Handle, socket wrench, 3/4-in. drive  
(item 42, WP 0469 00)  
Mechanical puller (item 64, WP 0469 00)  
Crankshaft driver (item 24, WP 0469 00)  
Oil seal inserter (item 70, WP 0469 00)

##### Materials/Parts

Two lockwashers (item 195, WP 0470 00)  
Oil seal (item 331, WP 0470 00)  
Lubricating oil OE/HDO (item 24, WP 0468 00)

##### References

WP 0046 00  
WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Vehicle in fifth gear (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Radiator removed (WP 0077 00).  
Drivebelts removed (WP 0182 00).

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## VIBRATION DAMPER AND SEAL MAINTENANCE (Contd)

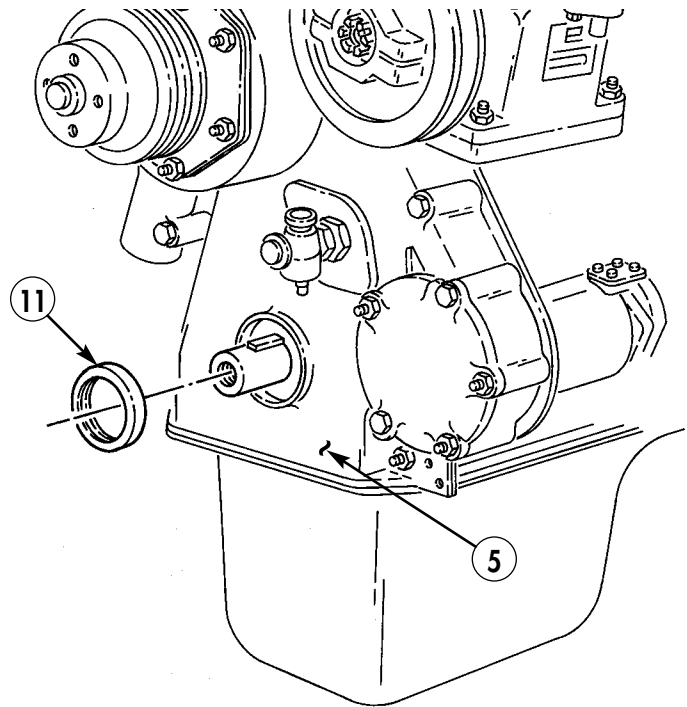
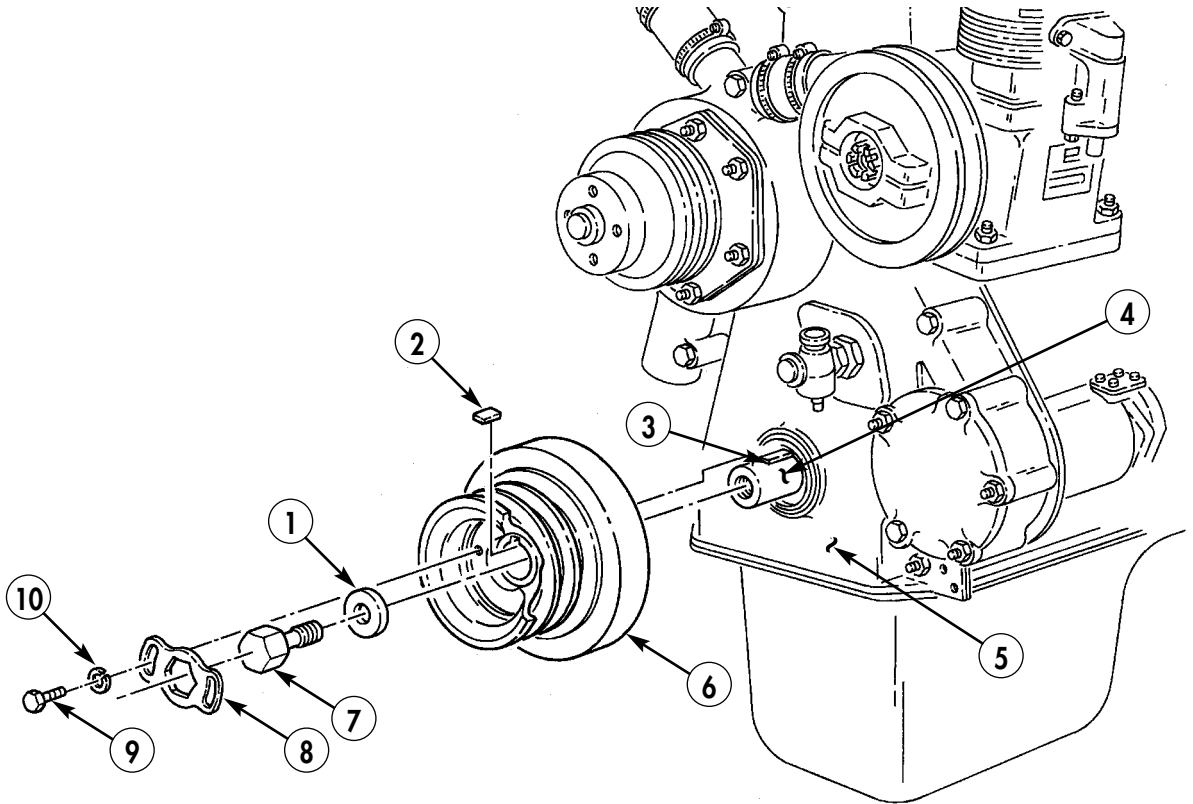
### REMOVAL

1. Remove two screws (9), lockwashers (10), and lockplate (8) from vibration damper and pulley (6). Discard lockwashers (10).
2. Remove retainer bolt (7) and washer (1) from crankshaft (4) and vibration damper and pulley (6).
3. Remove vibration damper and pulley (6) from crankshaft (4) and timing cover (5).
4. Remove plug (2) from keyway (3) of crankshaft (4).
5. Install retainer bolt (7) in end of crankshaft (4) and turn until key (3) position is approximately 12 o'clock. Remove retainer bolt (7).
6. Using mechanical puller, remove oil seal (11) from timing cover (5). Discard oil seal (11).

### CLEANING AND INSPECTION

1. For general cleaning instructions, refer to WP 0021 00.
2. Visually inspect vibration damper and pulley (6) for nicks, cracks, or damage. Replace vibration damper and pulley (6) if damaged.
3. Inspect exposed section of key (3) on crankshaft (4) for looseness or damage. Remove engine (WP 0046 00) and replace crankshaft (4) if defective.
4. Hold rear half of vibration damper (6) on floor with your feet. Try to turn vibration damper and pulley (6). Replace vibration damper and pulley (6) if loose.
5. Inspect threads of two puller screw holes for damage. Fix minor thread damage with tap. Replace vibration damper and pulley (6) if damaged beyond repair.
6. Inspect lockplate (8) for cracks or damage. Replace lockplate (8) if cracked or damaged.
7. Inspect rubber insert in vibration damper and pulley (6) for cracks. Replace vibration damper and pulley (6) if cracked.
8. Ensure rubber insert in vibration damper and pulley (6) has not pulled away from vibration damper and pulley (6). Replace vibration damper and pulley (6) if damaged.

VIBRATION DAMPER AND SEAL MAINTENANCE (Contd)



## VIBRATION DAMPER AND SEAL MAINTENANCE (Contd)

### INSTALLATION

1. Assemble vibration damper pulley bolt (10), washer (6), and adapter to form oil seal inserter.

#### **CAUTION**

Oil seal must be installed with lip of oil seal facing out and extended steel body towards vibration damper. Open side of oil seal must be positioned towards timing cover. Failure to install oil seal correctly may result in oil leak.

2. Lightly coat lip surface of new oil seal (1) with clean lubricating oil.
3. Install new oil seal (1) in timing cover (2) with oil seal inserter on crankshaft (3). Tighten vibration damper pulley bolt (10) until adapter contacts timing cover (2).
4. Remove vibration damper pulley bolt (10), washer (6), and adapter from timing cover (2) and crankshaft (3).

#### **CAUTION**

Vibration damper and pulley must be installed slowly on crankshaft and into new oil seal. Do not crimp oil seal lip with end of vibration damper and pulley assembly. Crimping of oil seal lip may permanently damage oil seal and result in oil leak.

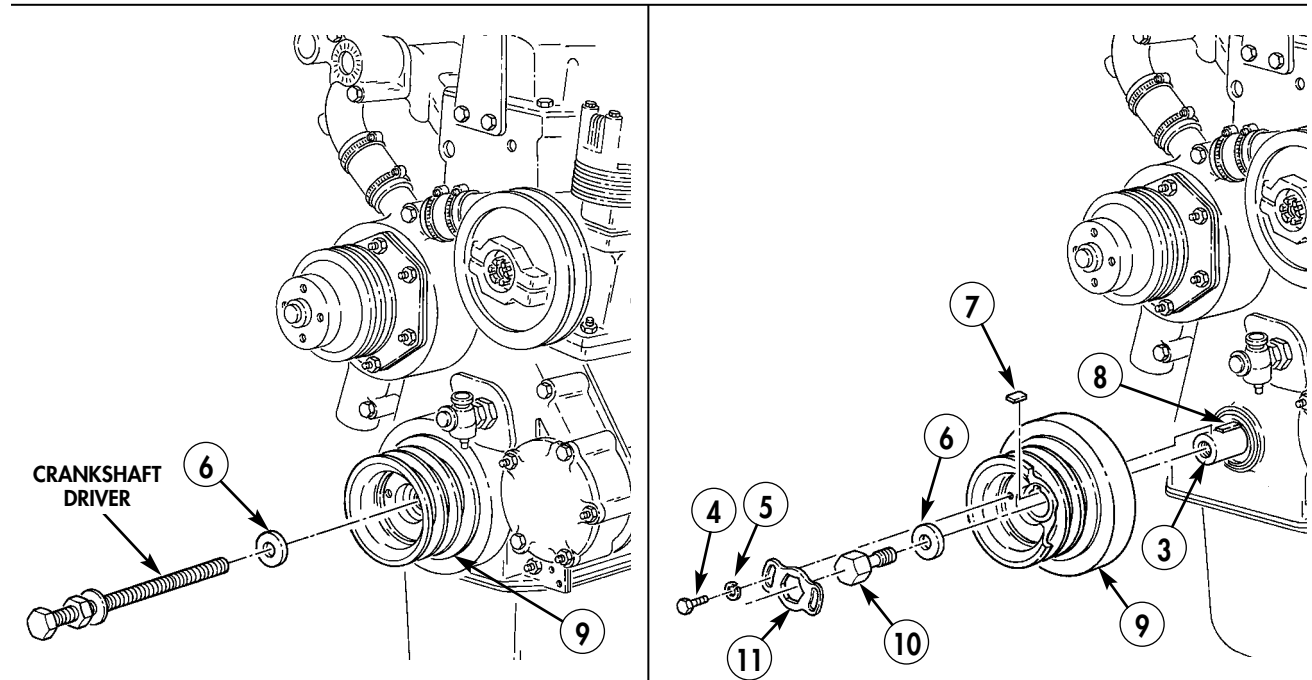
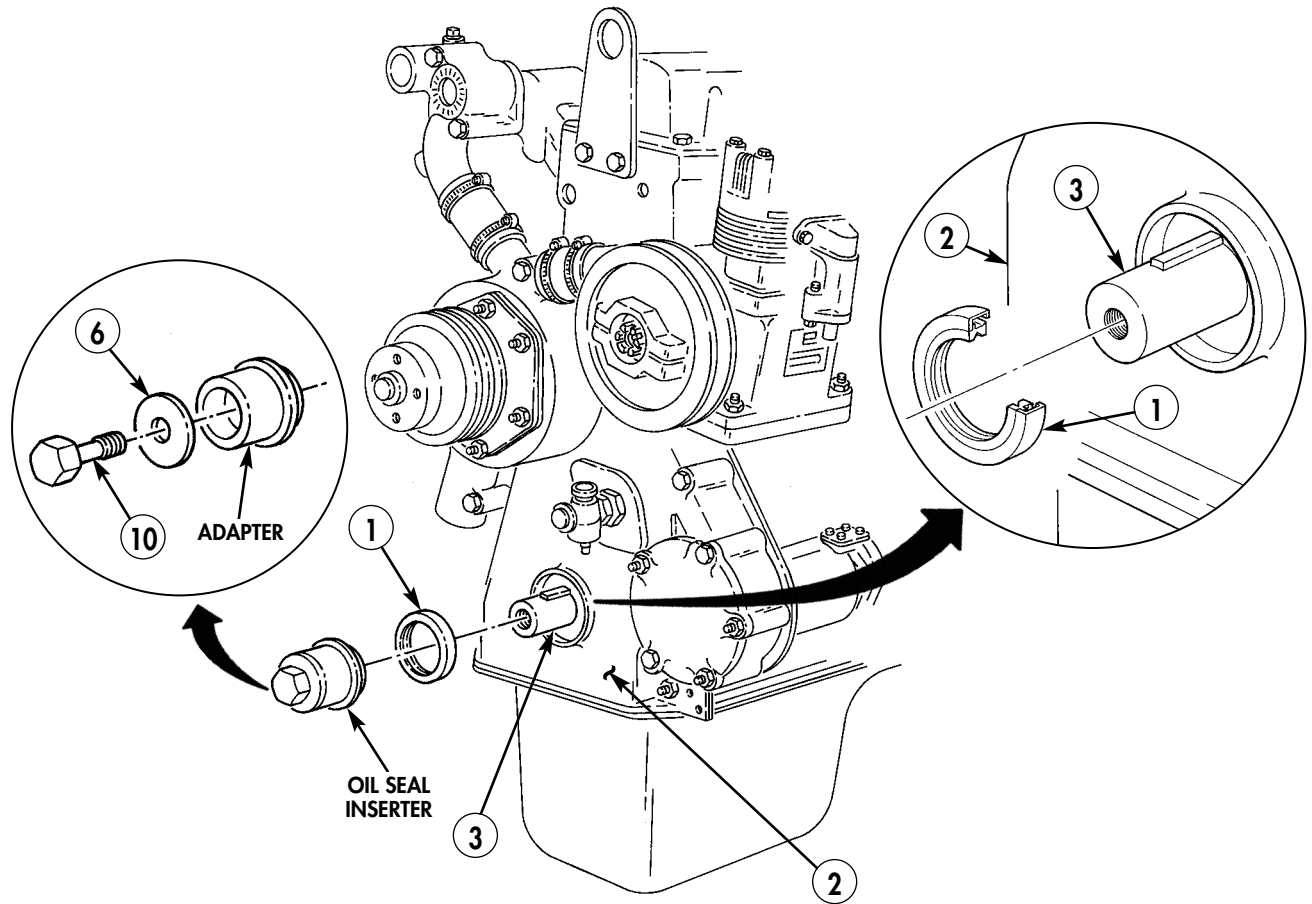
5. Install plug (7) in keyway (8) of crankshaft (3).
6. Heat vibration damper and pulley (9) for 30 minutes at 200 °F (93.3 °C).

#### **WARNING**

Hand protection must be worn at all times when handling heated vibration damper and pulley. Failure to do so may cause injury to personnel.

7. Align plug (7) and keyway (8) in vibration damper and pulley (9), and install vibration damper and pulley (9) on crankshaft (3) until seated.
8. Assemble crankshaft driver as shown.
9. Install washer (6) against vibration damper and pulley (9) with crankshaft driver tool threaded into end of crankshaft (3).
10. Hold bolt and turn nut on crankshaft driver clockwise until vibration damper and pulley (9) is seated on crankshaft (3).
11. Loosen nut and remove crankshaft driver and washer (6) from crankshaft (3) and vibration damper and pulley (9).
12. Install washer (6) and vibration damper pulley bolt (10) against vibration damper and pulley (9) and crankshaft (3). Tighten vibration damper pulley bolt (10) 225–250 lb-ft (305–339 N•m).
13. Install lockplate (11) on vibration damper pulley bolt (10) on vibration damper and pulley (9) with two new lockwashers (5) and screws (4).
14. Install drivebelts (WP 0182 00).
15. Install radiator (WP 0077 00).
16. Connect battery ground cable (WP 0126 00).
17. Lower and secure hood (TM 9-2320-361-10).
18. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

VIBRATION DAMPER AND SEAL MAINTENANCE (Contd)



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FLYWHEEL AND TRANSMISSION ADAPTER PLATE MAINTENANCE ADAPTER PLATE REMOVAL, FLYWHEEL REMOVAL, CLEANING AND INSPECTION, FLYWHEEL INSTALLATION, AND ADAPTER PLATE INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench (item 136, WP 0469 00)  
Flywheel drive screw (item 28, WP 0469 00)

##### Materials/Parts

Gasket (item 73, WP 0470 00)  
Six lockscrews (item 138, WP 0470 00)  
Thirteen lockwashers (item 192, WP 0470 00)

##### References

TM 9-2815-210-34-2-2  
WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Pressure plate and clutch disc removed  
(WP 0050 00).

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## FLYWHEEL AND TRANSMISSION ADAPTER PLATE REPLACEMENT (Contd)

### ADAPTER PLATE REMOVAL

1. Remove thirteen nuts (6) and lockwashers (5) from adapter plate (7) and flywheel housing studs (2). Discard lockwashers (5).
2. Remove adapter plate (7) and gasket (4) from flywheel housing (1). Discard gasket (4).

### FLYWHEEL REMOVAL

#### **WARNING**

Flywheel is heavy. Use care when removing flywheel. Failure to do so may result in injury to personnel.

1. Remove one of six lockscrews (8) from approximately six o'clock position on flywheel (10). Discard lockscrew (8).
2. Install guide screw at six o'clock position through flywheel (10) in crankshaft (3).
3. Remove five remaining lockscrews (8) from flywheel (10). Discard lockscrews (8).
4. Remove flywheel (10) from crankshaft (3) and guide screw.
5. Remove guide screw from crankshaft (3).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0021 00.

### FLYWHEEL INSTALLATION

1. Locate the X (11) marked on crankshaft (3) above one of six screw holes, and install guide screw in marked hole.

#### **CAUTION**

Alignment mark on flywheel must be matched with X marked on crankshaft during installation. Incorrect positioning of flywheel on crankshaft will not allow installation of all six screws in flywheel and crankshaft. Do not attempt to install screws if screws will not turn easily when starting in threaded holes in crankshaft. Serious damage to equipment may result when engine is operated.

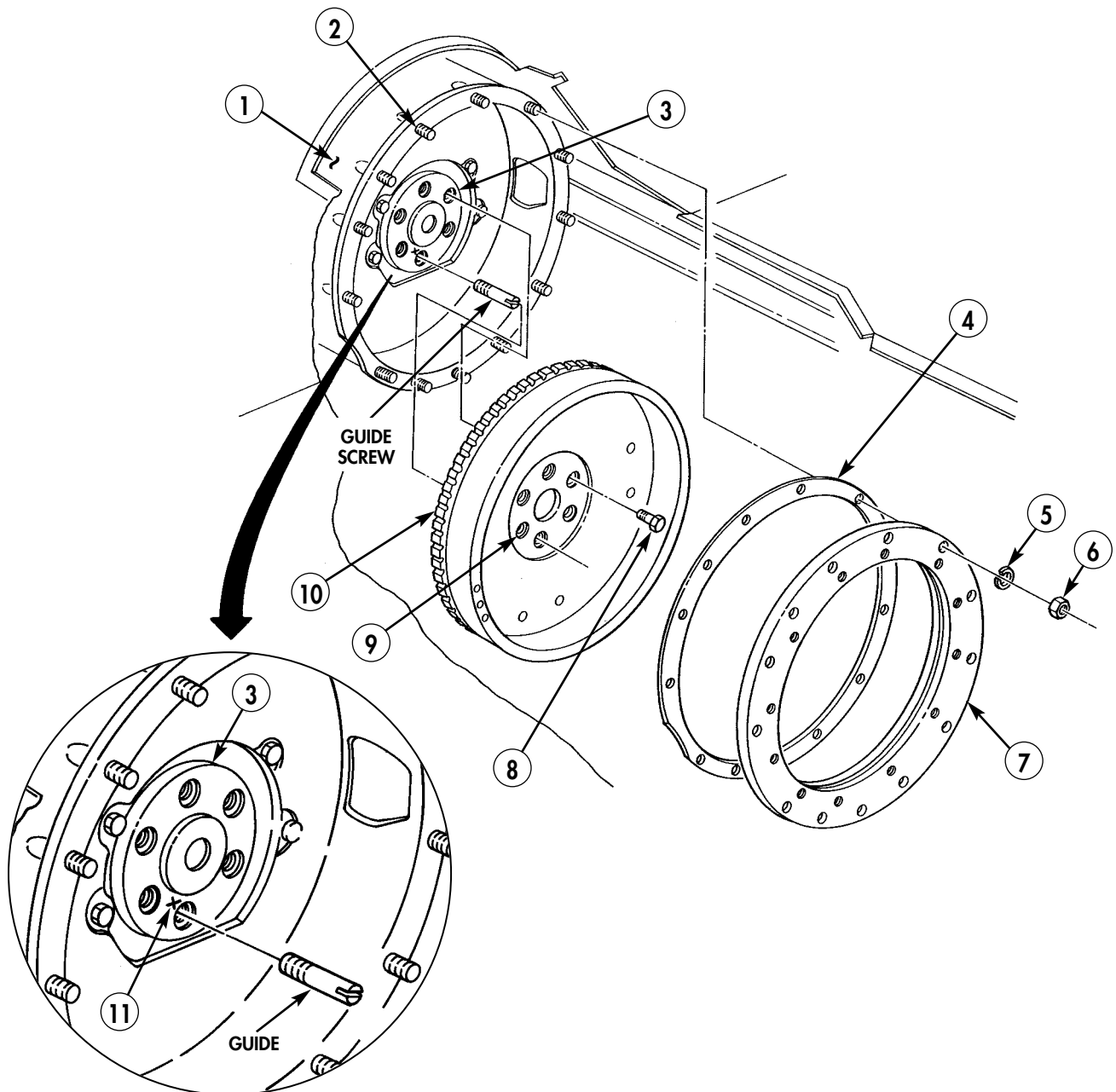
#### **NOTE**

An alignment drill point or punch mark can be located on the backside of flywheel, approximately 2-1/2 in. out from one of six screw holes.

2. Locate alignment mark on back of flywheel (10). Use an erasable marking device and mark corresponding hole (9) at clutch disc side of flywheel (10).
3. Align marked hole (9) with guide screw and seat flywheel (10) against crankshaft (3).
4. Install five of six new lockscrews (8) in flywheel (10) and crankshaft (3).
5. Remove guide screw from crankshaft (3) and flywheel (10).
6. Install new lockscrew (8) in flywheel (10) and crankshaft (3).
7. Tighten six lockscrews (8) 80–90 lb-ft (109–122 N•m). Repeat tightening until 115–120 lb-ft (156–163 N•m) is achieved.

**FLYWHEEL AND TRANSMISSION ADAPTER PLATE REPLACEMENT (Contd)****ADAPTER PLATE INSTALLATION**

1. Position new gasket (4) on flywheel housing studs (2).
2. Install adapter plate (7) on flywheel housing (1) with thirteen new lockwashers (5) and nuts (6).
3. Install clutch disc and pressure plate (WP 0050 00).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 0-2320-361-10).

**END OF WORK PACKAGE**

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ROCKER ARM COVERS REPLACEMENT

FRONT ROCKER ARM COVER REMOVAL, REAR ROCKER ARM COVER REMOVAL,  
FRONT ROCKER ARM COVER INSTALLATION, AND REAR ROCKER ARM COVER INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 3/8-in. drive  
(item 138, WP 0469 00)

##### Materials/Parts

Two gaskets (item 72, WP 0470 00)  
Sixteen lockscrews (item 390, WP 0470 00)

##### Materials/Parts (Contd)

Locknut (item 145, WP 0470 00)  
Two locknuts (item 139, WP 0470 00)  
Sealing compound, gasket forming  
(item 30, WP 0468 00)  
Sealing compound, thread locking  
(item 34, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Crankcase breather tube adapter removed  
(WP 0043 00).

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## ROCKER ARM COVERS REPLACEMENT (Contd)

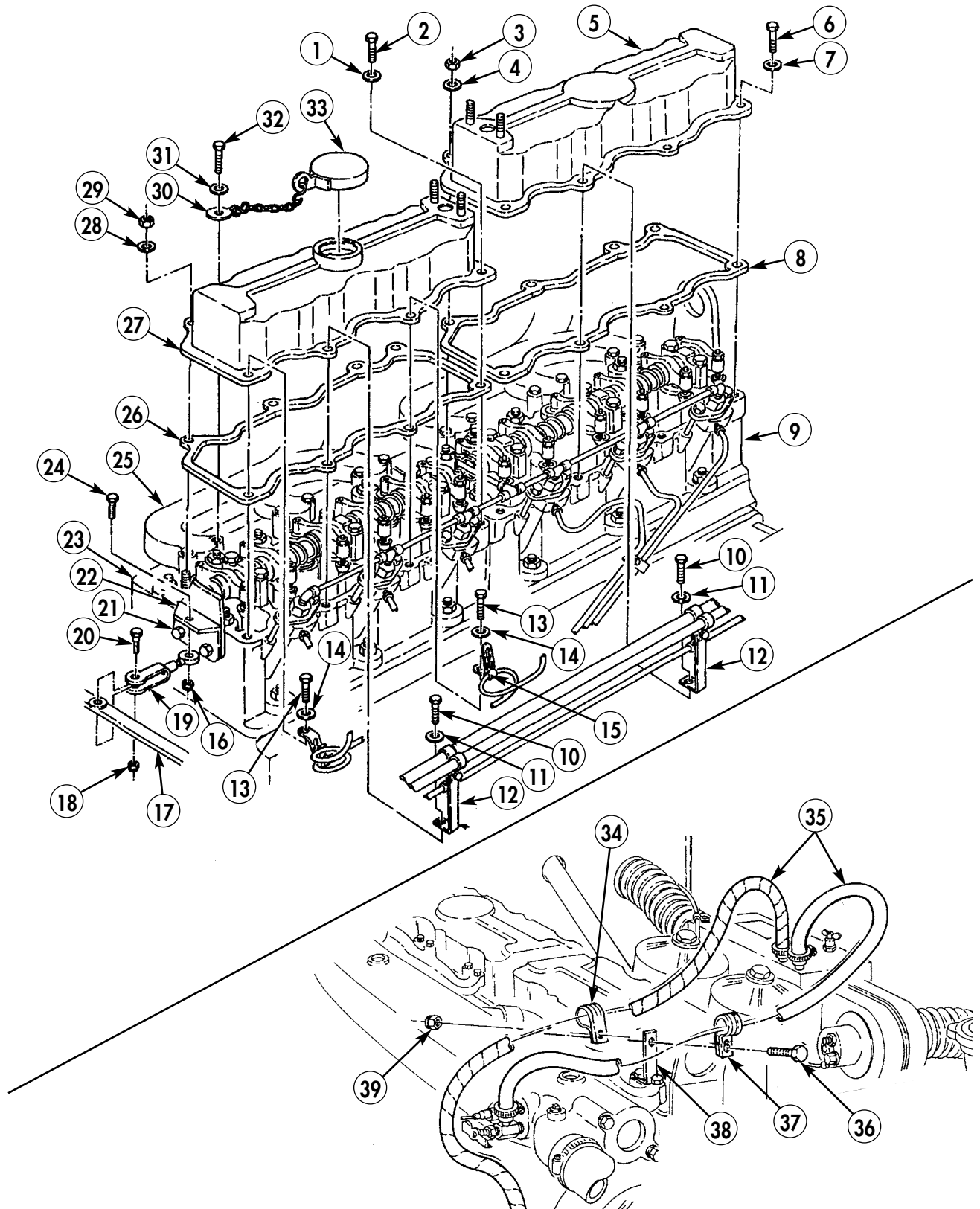
### FRONT ROCKER ARM COVER REMOVAL

1. Remove screw (32), washer (31), and retainer (30) from water outlet manifold (25). Remove oil cap (33) from rocker arm cover (27).
2. Remove locknut (39), clamp (34), screw (36), clamp (37), and personnel heater hoses (35) from bracket (38). Discard locknut (39).
3. Remove two lockscrews (13) and washers (14) from hangers (15). Rotate hangers (15) away from rocker arm cover (27). Discard lockscrews (13).
4. Remove two lockscrews (10) and washers (11) from brackets (12). Discard lockscrews (10). Secure brackets (12) away from rocker arm covers (27) and (5).
5. Remove four lockscrews (2) and washers (1) from rocker arm cover (27). Discard lockscrews (2).
6. Remove locknut (29) and washer (28) from rocker arm cover (27). Discard locknut (29).
7. Remove nuts (16) and (18), screws (20) and (24), and clevis (19) from bracket (17) and front lifting bracket (22).
8. Loosen two screws (21) and front lifting bracket (22).
9. Remove rocker arm cover (27) and gasket (26) from cylinder head (23). Discard gasket (26).
10. Remove all remaining gasket material from cylinder head (23) and rocker arm cover (27).

### REAR ROCKER ARM COVER REMOVAL

1. Remove two lockscrews (10) and washers (11) from brackets (12). Discard lockscrews (10). Secure bracket (12) away from rocker arm cover (5).
2. Remove six lockscrews (6) and washers (7) from rocker arm cover (5). Discard lockscrews (6).
3. Remove locknut (3) and washer (4) from rocker arm cover (5). Discard locknut (3).
4. Remove rocker arm cover (5) and gasket (8) from cylinder head (9). Discard gasket (8).
5. Remove all remaining gasket material from cylinder head (9) and rocker arm cover (5).

ROCKER ARM COVERS REPLACEMENT (Contd)



## ROCKER ARM COVERS REPLACEMENT (Contd)

### FRONT ROCKER ARM COVER INSTALLATION

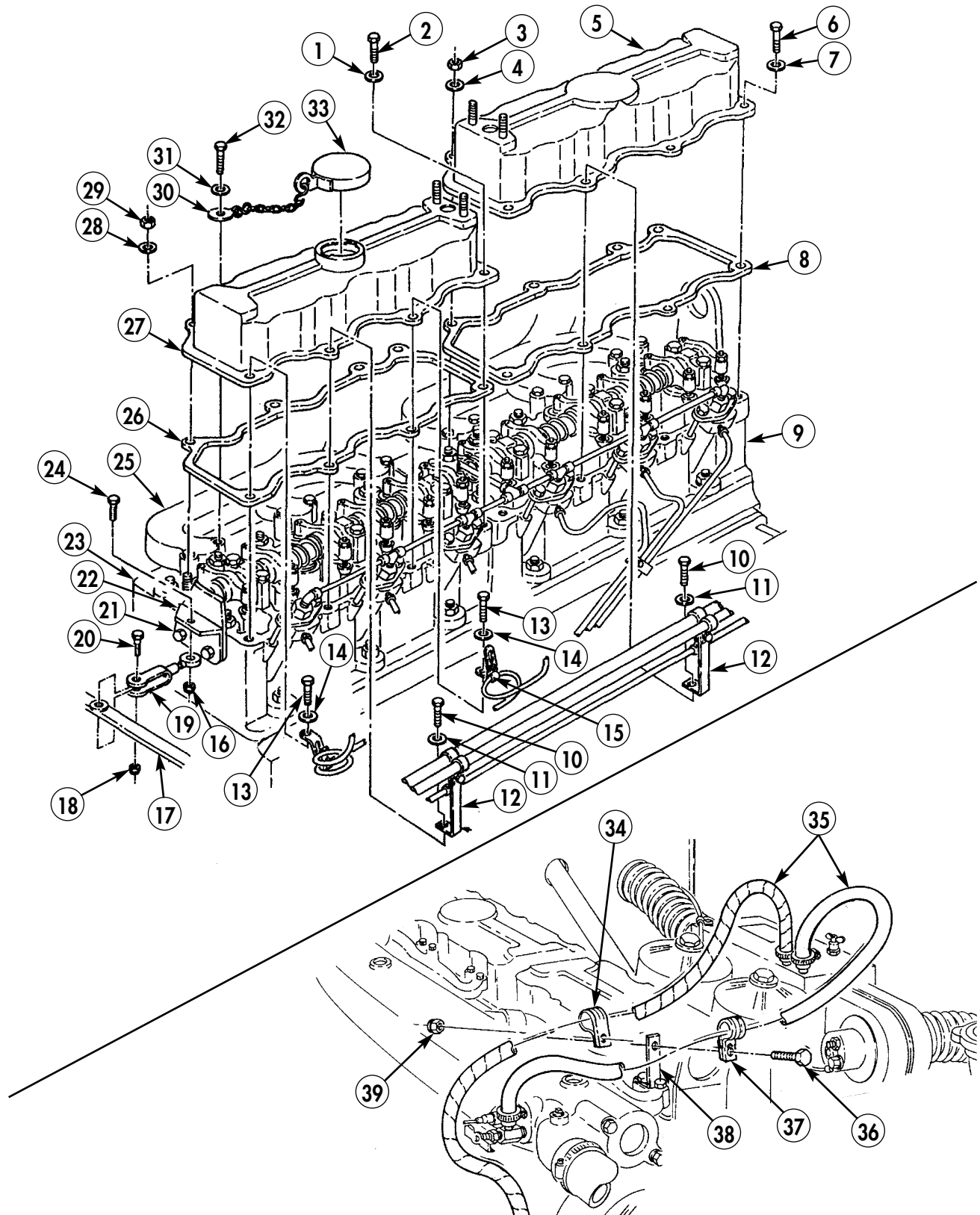
1. Apply thin coat of sealing compound on both sides of new gasket (26).
2. Apply thin coat of sealing compound on threads of new lockscrews (2), (13), and (10).
3. Install new gasket (26) and rocker arm cover (27) on cylinder head (23) with washer (28) and new locknut (29). Do not tighten locknut (29).
4. Install four washers (1) and lockscrews (2) on rocker arm cover (27). Do not tighten lockscrews (2).
5. Install two brackets (12) on rocker arm covers (27) and (5) with washers (11) and lockscrews (10). Do not tighten lockscrews (10).
6. Install two hangers (15) on rocker arm cover (27) with washers (14) and lockscrews (13).
7. Install retainer (30) on water outlet manifold (25) with washer (31) and screw (32). Install oil cap (33) on rocker arm cover (27).
8. Tighten lockscrews (2), (13), and (10) and locknut (29) 30 lb-in. (3 N•m). Repeat tightening until 50–60 lb-in. (6–7 N•m) is achieved.
9. Tighten two screws (21) on front lifting bracket (22).
10. Install clevis (19) on bracket (17) and front lifting bracket (22) with screws (24) and (21) and nuts (16) and (18).
11. Install personnel heater hoses (35) on bracket (38) with clamp (37), screw (36), clamp (34), and new locknut (39).

### REAR ROCKER ARM COVER INSTALLATION

1. Apply thin coat of sealing compound on both sides of new gasket (8).
2. Apply thin coat of sealing compound on threads of new lockscrews (6) and (10).
3. Install new gasket (8) and rocker arm cover (5) on cylinder head (9) with washer (4) and new locknut (3). Do not tighten locknut (3).
4. Install rocker arm cover (5) on cylinder head (9) with six washers (7) and lockscrews (6). Do not tighten lockscrews (6).
5. Install two brackets (12) on rocker arm covers (5) and (27) with washers (11) and lockscrews (10). Do not tighten lockscrews (10).
6. Tighten lockscrews (6) and (10) and locknut (3) 30 lb-in. (3 N•m). Repeat tightening until 50–60 lb-in. (6–7 N•m) is achieved.
7. Install crankcase breather tube adapter (WP 0043 00).
8. Connect battery ground cable (WP 0126 00).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



ROCKER ARM COVERS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ROCKER ARMS AND PUSHRODS MAINTENANCE

REMOVAL, ROCKER ARM DISASSEMBLY, CLEANING AND INSPECTION, ROCKER ARM ASSEMBLY,  
INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116 WP 0469 00)

Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)

Micrometer, inside (item 49, WP 0469 00)

Micrometer, outside (item 50, WP 0469 00)

1 5/8-in. socket, 3/4-in. drive  
(item 102, WP 0469 00)

Handle, socket wrench 3/4-in. drive  
(item 42, WP 0469 00)

##### Materials/Parts (Contd)

Six lockwashers (item 192, WP 0470 00)

Two retainers (item 389, WP 0470 00)

##### References

WP 0021 00

WP 0077 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Rocker arm covers removed (WP 0030 00).

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## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### **NOTE**

- Front and rear rocker arm assemblies are identical and are repaired and replaced the same. This procedure covers the front rocker arm assembly.
- Prior to removal, tag all components for installation.

### **REMOVAL**

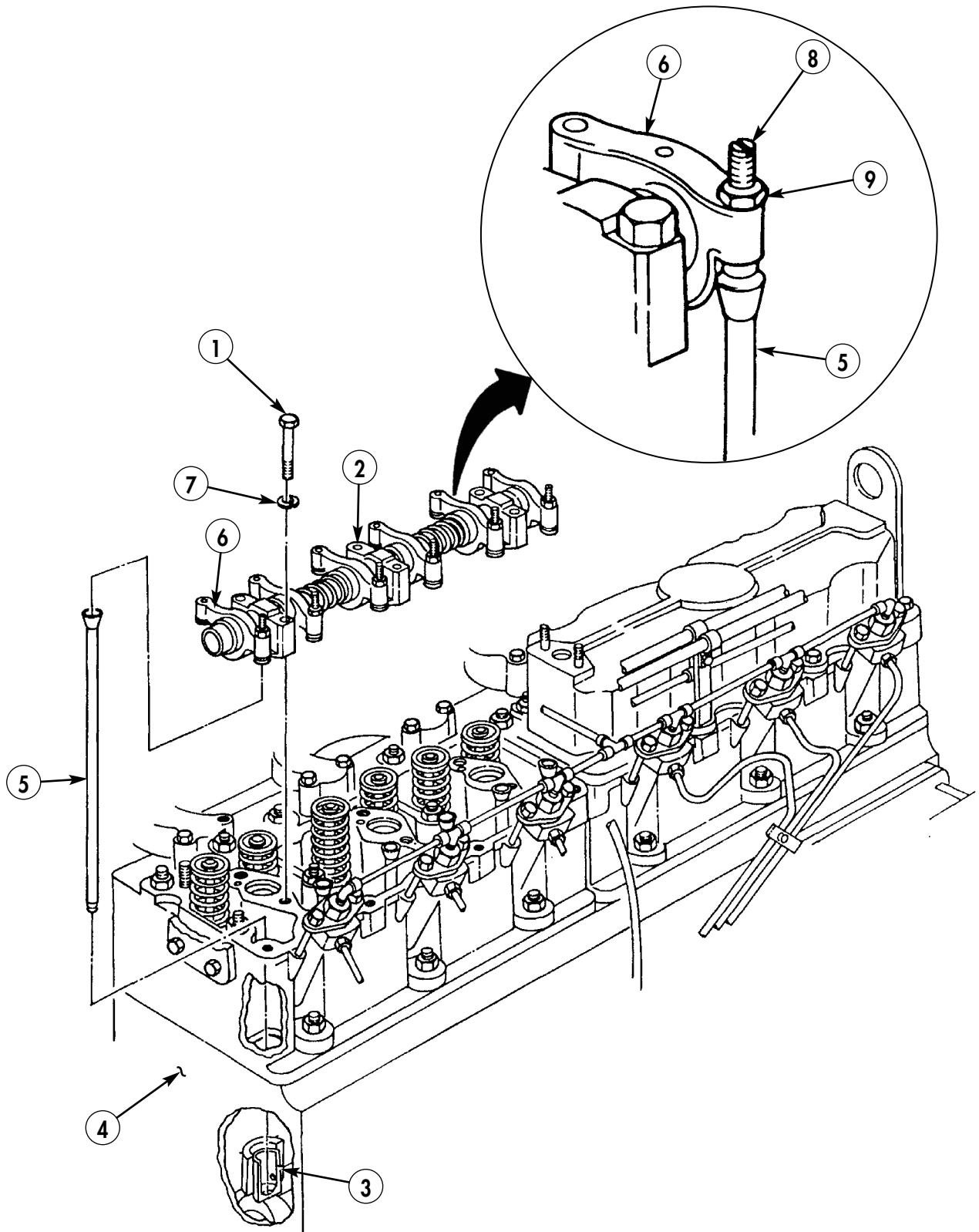
1. Loosen six nuts (9) while holding adjustment screws (8).
2. Turn adjustment screw (8) counterclockwise until rocker arm (6) is loose against pushrod (5) end. Repeat for remaining five screws (8).
3. Remove six screws (1), lockwashers (7), and three supports (2) with six rocker arms (6) from cylinder head (4) and six pushrods (5). Discard lockwashers (7).

### **CAUTION**

Engine oil may cause suction between pushrods and tappets. Pushrods must be removed from tappets using a sharp upward snap motion. Failure to do this may result in tappets becoming dislodged from bores in engine block.

4. Remove six pushrods (5) from tappets (3) and cylinder head (4).

ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)



## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### ROCKER ARM DISASSEMBLY

#### NOTE

Prior to removal, tag all components for assembly.

1. Remove retainer (18) and thrust washer (17) from shaft (14). Discard retainer (18).
2. Remove rocker arm (16) from support (8) and shaft (14).
3. Remove retainer (1) and thrust washer (2) from shaft (14). Discard retainer (1).
4. Remove rocker arm (3), support (4), rocker arm (5), spring (6), rocker arm (7), support (12), rocker arm (11), spring (10), rocker arm (9), and support (8) from shaft (14).
5. Remove nut (19) from adjustment screw (20).
6. Remove adjustment screw (20) from rocker arm (16).
7. Repeat steps 5 and 6 for each rocker arm (3), (5), (7), (11), and (9), as necessary.

### CLEANING AND INSPECTION

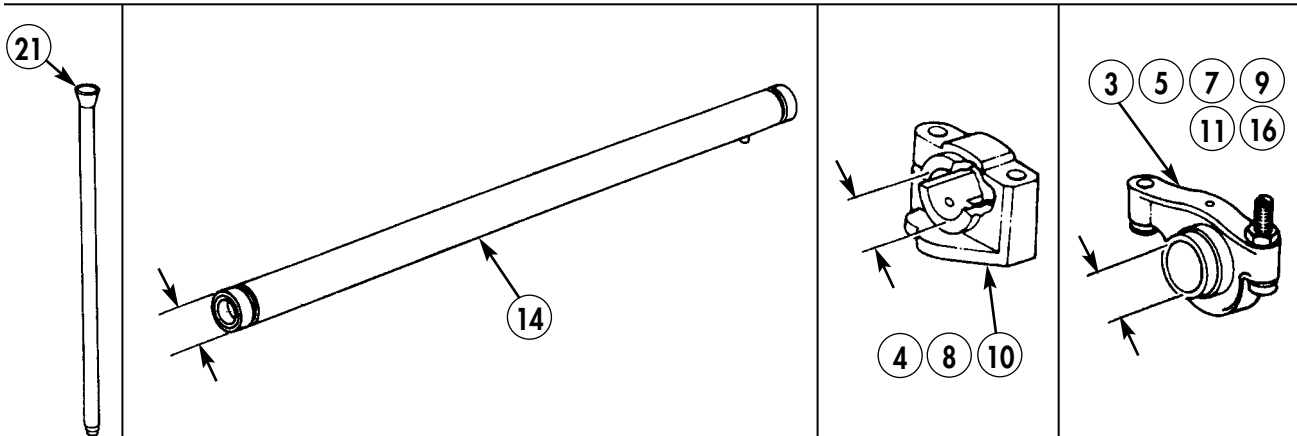
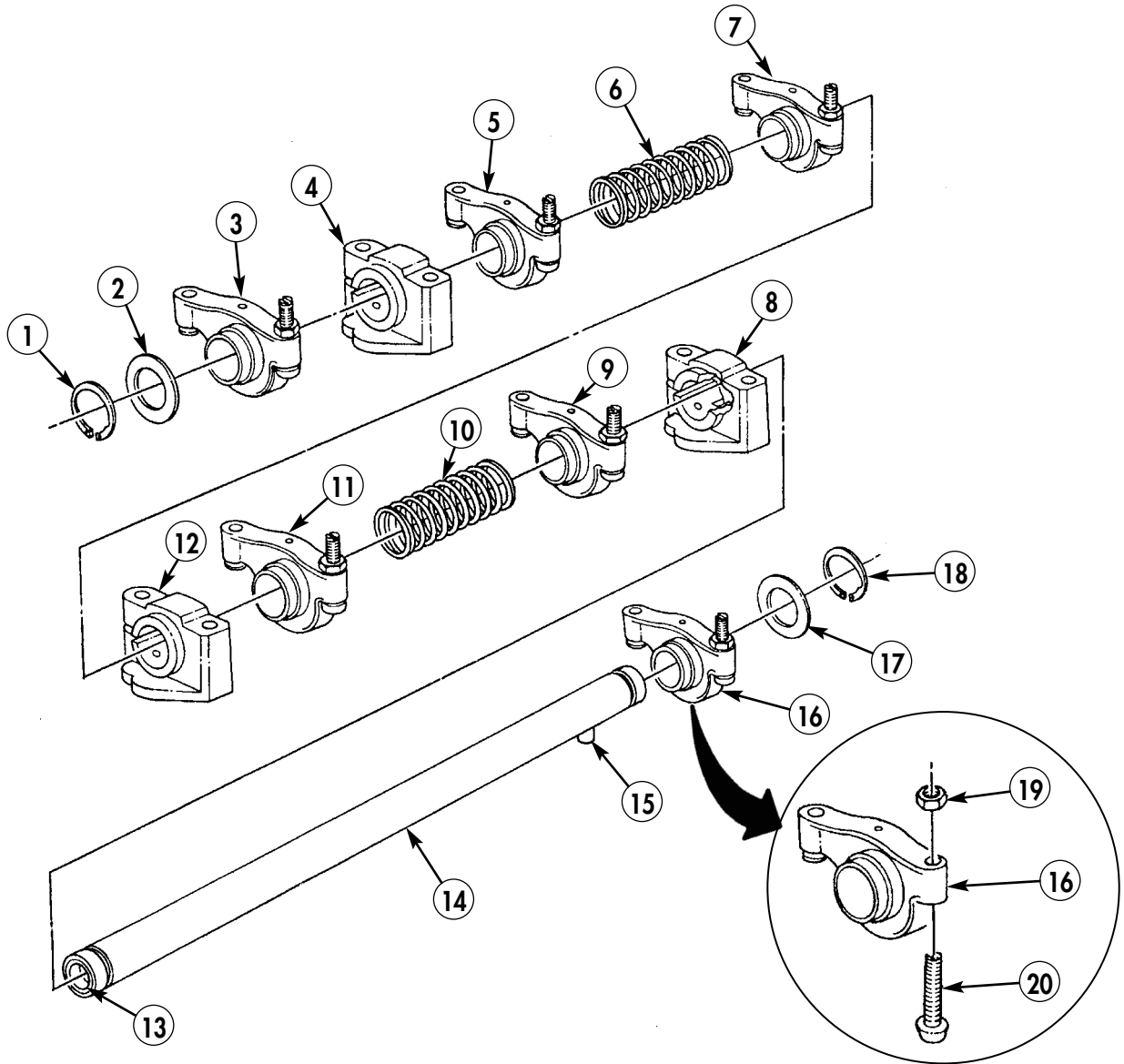
1. For general cleaning and inspection instructions, refer to WP 0021 00.
2. Remove oil deposits from oil passages inside components.
3. Inspect dowel pin (15) in shaft (14) for looseness. Replace if loose.
4. Inspect two plugs (13) in shaft (14) ends for evidence of oil leakage. Replace if oil leakage is present.

*Table 1. Rocker Arm Assembly Wear Limits.*

ITEM NO.	ITEM/POINT OF MEASUREMENT	WEAR LIMIT/TOLERANCE	
		INCHES	MILLIMETERS
3, 5, 7, 9, 11, 16	Rocker arms (inside diameter)	0.98–1.02	24.89–25.90
4, 8, 12	Supports (inside diameter)	0.99–1.01	25.14–25.65
14	Shaft (outside diameter)	0.97–1.01	24.63–25.65

5. Inspect shaft (14) for scoring or wear. Refer to table 1, Rocker Arm Assembly Wear Limits, for measurements. Replace if damaged or worn past limits.
6. Inspect supports (4), (12), and (8) for surface scoring or wear on shaft and rocker arm riding surfaces. Refer to table 1, Rocker Arm Assembly Wear Limits, for measurements. Replace if damaged or worn past limits.
7. Inspect rocker arms (3), (5), (7), (11), (9), and (16) for surface scoring or wear on shaft and support riding surfaces. Refer to table 1, Rocker Arm Assembly Wear Limits, for measurements. Replace if damaged or worn past limits.
8. Inspect rocker arms (3), (5), (7), (11), (9), and (16) for thread or valve stem riding surface damage. Replace if damaged.
9. Inspect thrust washers (2) and (17) for cracks or grooving. Replace if damaged.
10. Inspect springs (6) and (10) for distortion. Replace if damaged.
11. Inspect six pushrods (21) for scored or grooved ends and sides, cracks, and straightness. Replace if damaged.
12. Inspect six adjustment screws (20) for head damage, grooving, or scoring. Replace if damaged.

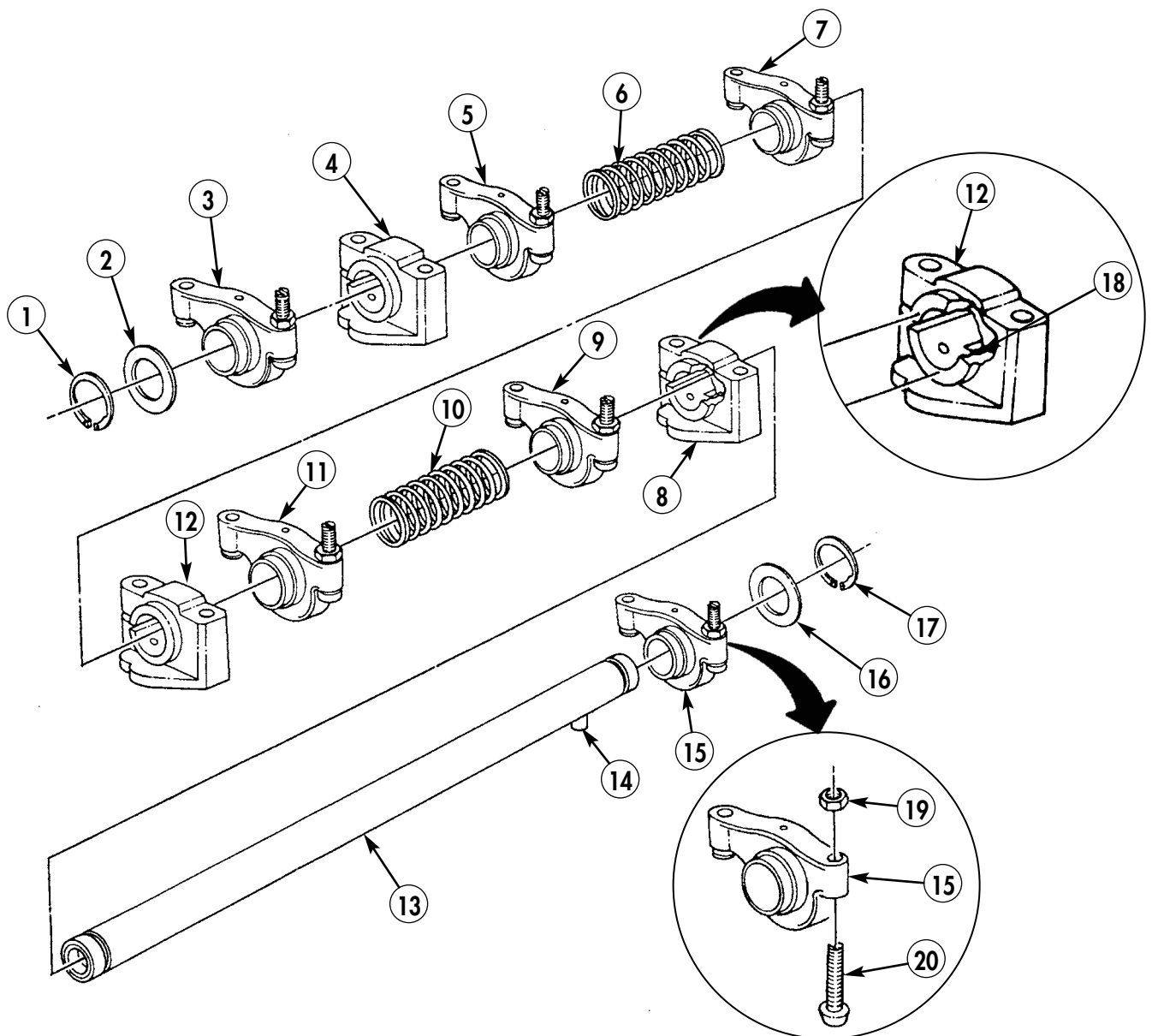
ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)



## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### ROCKER ARM ASSEMBLY

1. Install adjustment screw (20) in rocker arm (15) until seated.
2. Install nut (19) on adjustment screw (20). Do not tighten nut (19).
3. Repeat steps 1 and 2 for each rocker arm (3), (5), (7), (11), and (9), as necessary.
4. Position support (8) on shaft (13) with dowel slot (18) over dowel pin (14).
5. Install rocker arm (9), spring (10), rocker arm (11), support (12), rocker arm (7), spring (6), rocker arm (5), support (4), rocker arm (3), and thrust washer (2) on shaft (13) with new retainer (1).
6. Install rocker arm (15) on shaft (13) against support (8) with thrust washer (16) and new retainer (17).





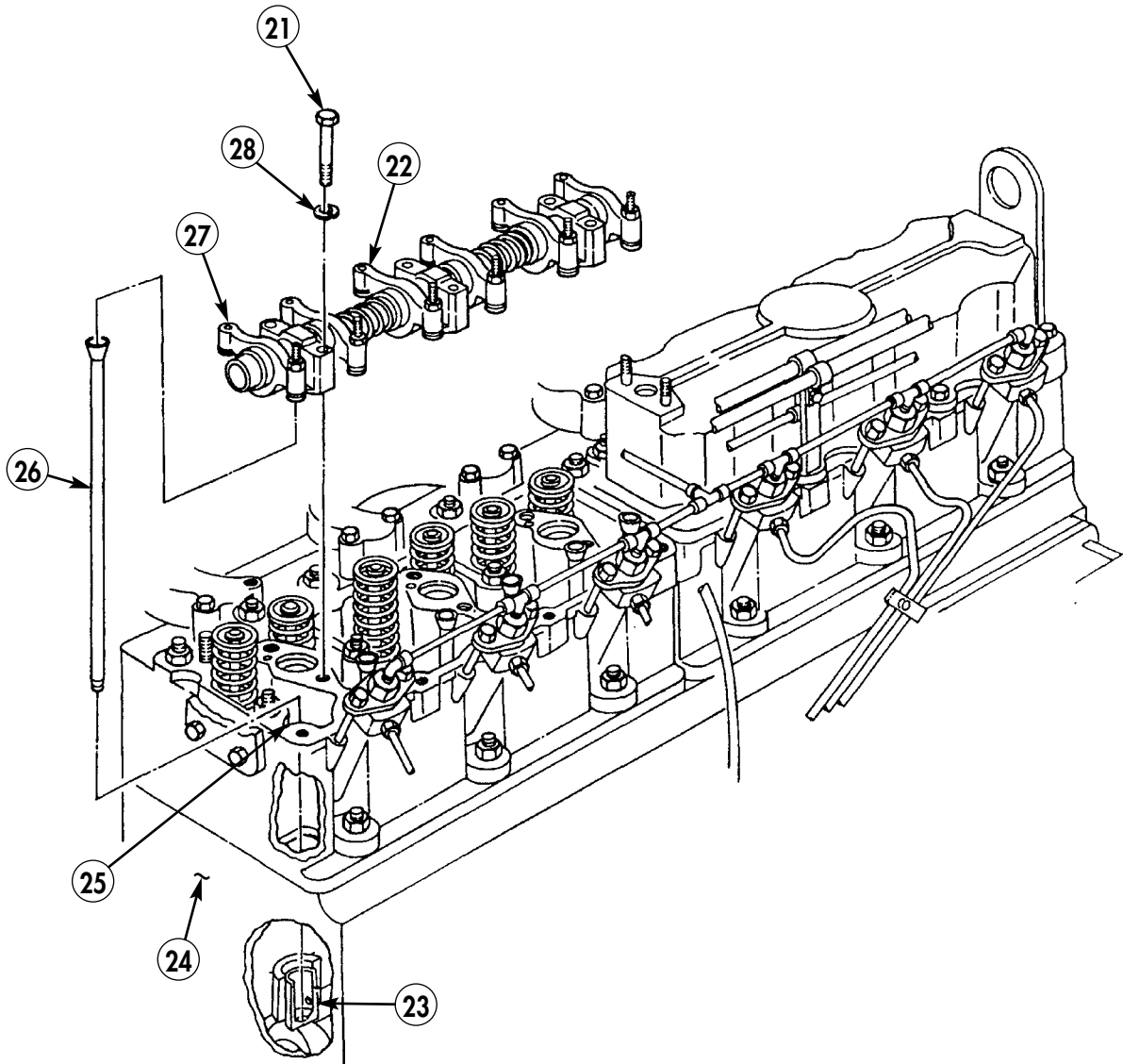
## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### INSTALLATION

#### **CAUTION**

All rocker arm adjusting screws must be backed off flush with rocker arm body before installation on cylinder head. Failure to do so may bend pushrods and damage rocker arms.

1. Position six pushrods (26) in channels (25) through cylinder head (24) and seat in six tappets (23).
2. Position six rocker arms (27) on pushrods (26) and three supports (22) on cylinder head (24).
3. Install three supports (22) on cylinder head (24) with six new lockwashers (28) and screws (21).
4. Tighten six screws (21) 44 lb-ft (60 N•m).
5. Connect battery ground cable (WP 0126 00).



## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### ADJUSTMENT

#### **WARNING**

Disconnect battery ground cable prior to performing valve adjustment procedure. Failure to do so may cause injury to personnel.

1. Disconnect battery ground cable (WP 0126 00).

#### **NOTE**

- The intake valve is the front valve and the exhaust valve is the rear valve in each cylinder.
  - Cylinders are numbered from the front of the truck to the rear.
  - Assistant will help with this procedure.
2. Rotate crankshaft bolt (1) clockwise until rocker arm (2), No. 1 cylinder intake valve, is fully open.

*Table 2. Valve Clearance Limits.*

CYLINDER NUMBER	VALVES ADJUSTED IN STEP 4	VALVES ADJUSTED IN STEP 11
1	E	I
2	I and E	
3	I	E
4	E	I
5		I and E
6	I	E
<b>VALVE CLEARANCE SETTING</b>		
I=Intake valve gap 0.010 in. (0.254 mm) E= Exhaust valve gap 0.025 in. (0.635 mm)		

3. Adjust valves to proper clearance. Refer to table 2, Valve Clearance Limits, for measurements. Perform steps 5 through 8.

#### **NOTE**

All rocker levers are adjusted the same way.

4. Loosen nut (6) and turn adjustment screw (5) two full turns counterclockwise.
5. Place feeler gauge between rocker arm head (4) and valve stem (7).
6. Tighten or loosen adjustment screw (5) until a slight drag is felt on feeler gauge.
7. Hold adjustment screw (5) stationary and tighten nut (6).
8. When all valves in step 4 are adjusted, perform steps 10 and 11.
9. Rotate crankshaft bolt (1) 360° clockwise until rocker arm (3), No. 6 cylinder intake valve, is fully open.
10. Adjust remaining valves to proper clearance. Refer to table 2, Valve Clearance Limits, for measurements. Repeat steps 5 through 8 to adjust remaining valves.
11. Connect battery ground cable (WP 0126 00).
12. Install rocker arm cover(s) (WP 0030 00).

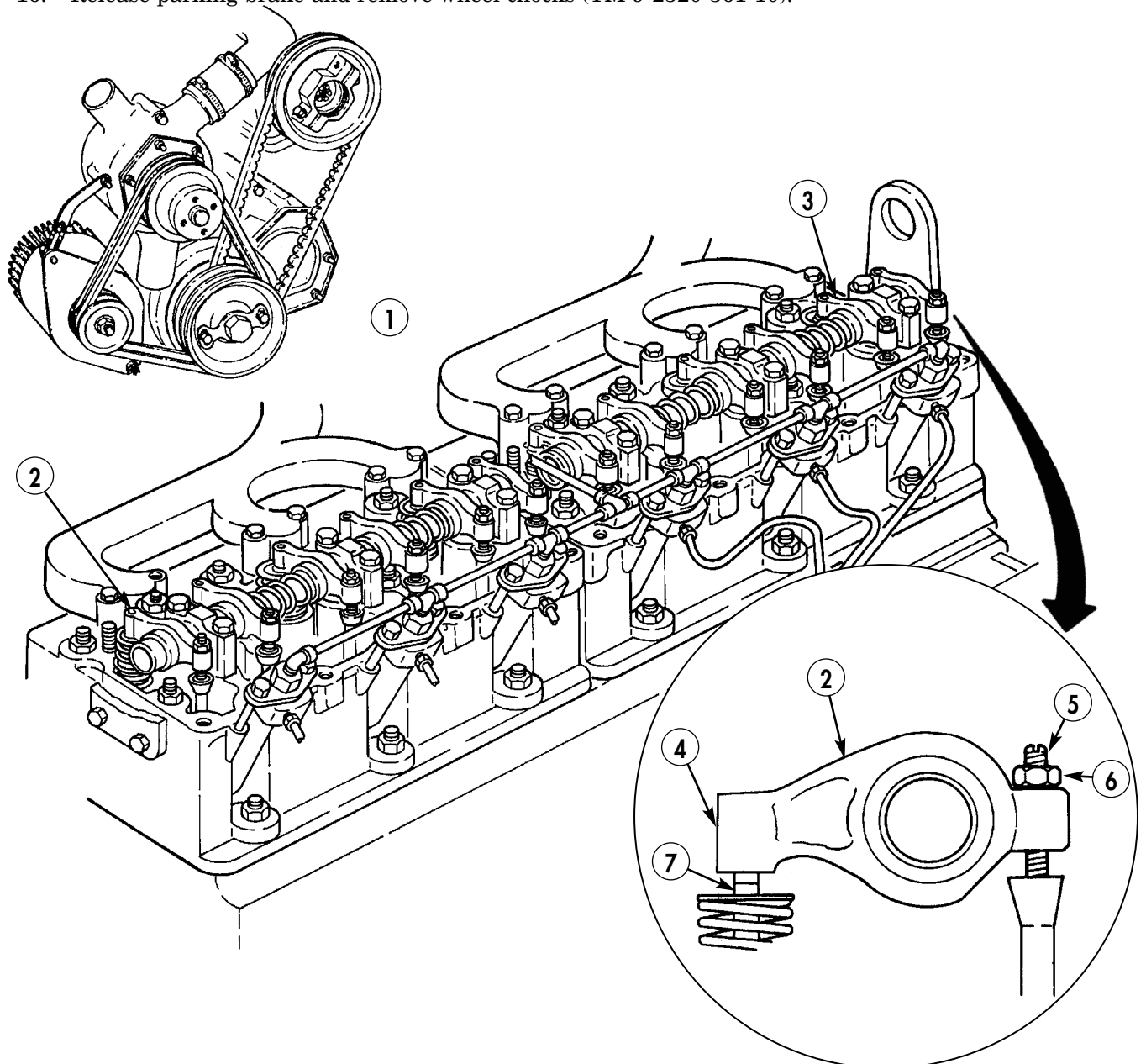
## ROCKER ARMS AND PUSHRODS MAINTENANCE (Contd)

### ADJUSTMENT (Contd)

#### **CAUTION**

When engine is started, if any unusual noises are heard, stop engine immediately and check valve clearances. Failure to do so may result in damage to equipment.

13. Start engine and allow engine to reach normal operating temperature (TM 9-2320-361-10). Stop engine.
14. Connect battery ground cable (WP 0126 00).
15. Lower and secure hood (TM 9-2320-361-10).
16. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TIMING GEARS COVER AND GASKET REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

##### Materials/Parts

Sealing compound (item 34, WP 0468 00)  
Sealing compound (item 30, WP 0468 00)  
Gasket (item 80, WP 0470 00)

##### Materials/Parts (Contd)

Gasket (item 56, WP 0470 00)  
Seventeen lockwashers (item 192, WP 0470 00)  
Lockwasher (item 411, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Vibration damper removed (WP 0028 00).  
Tachometer cable adapter removed  
(WP 0098 00).

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## TIMING GEARS COVER AND GASKET REPLACEMENT (Contd)

Water pump and housing removed (WP 0082 00).

### REMOVAL

1. Remove nut (21) and lockwasher (20) from timing cover stud (23). Discard lockwasher (20).
2. Remove four nuts (12), lockwashers (11), screws (22), access cover (19), and gasket (18). Discard lockwashers (11) and gasket (18).
3. Remove seven screws (25) and lockwashers (24) from adapter plate (13) and timing cover (4). Discard lockwashers (24).
4. Remove nut (8), lockwasher (7), nut (10), lockwasher (9), and screws (1) and (26) from adapter plate (13) and timing cover (4). Discard lockwashers (7) and (9).
5. Remove nut (2) and lockwasher (3) from timing cover (4) and stud (6). Discard lockwasher (3).
6. Remove four screws (16) and lockwashers (17) from timing cover (4) and oil pan (14). Discard lockwashers (17).

### **CAUTION**

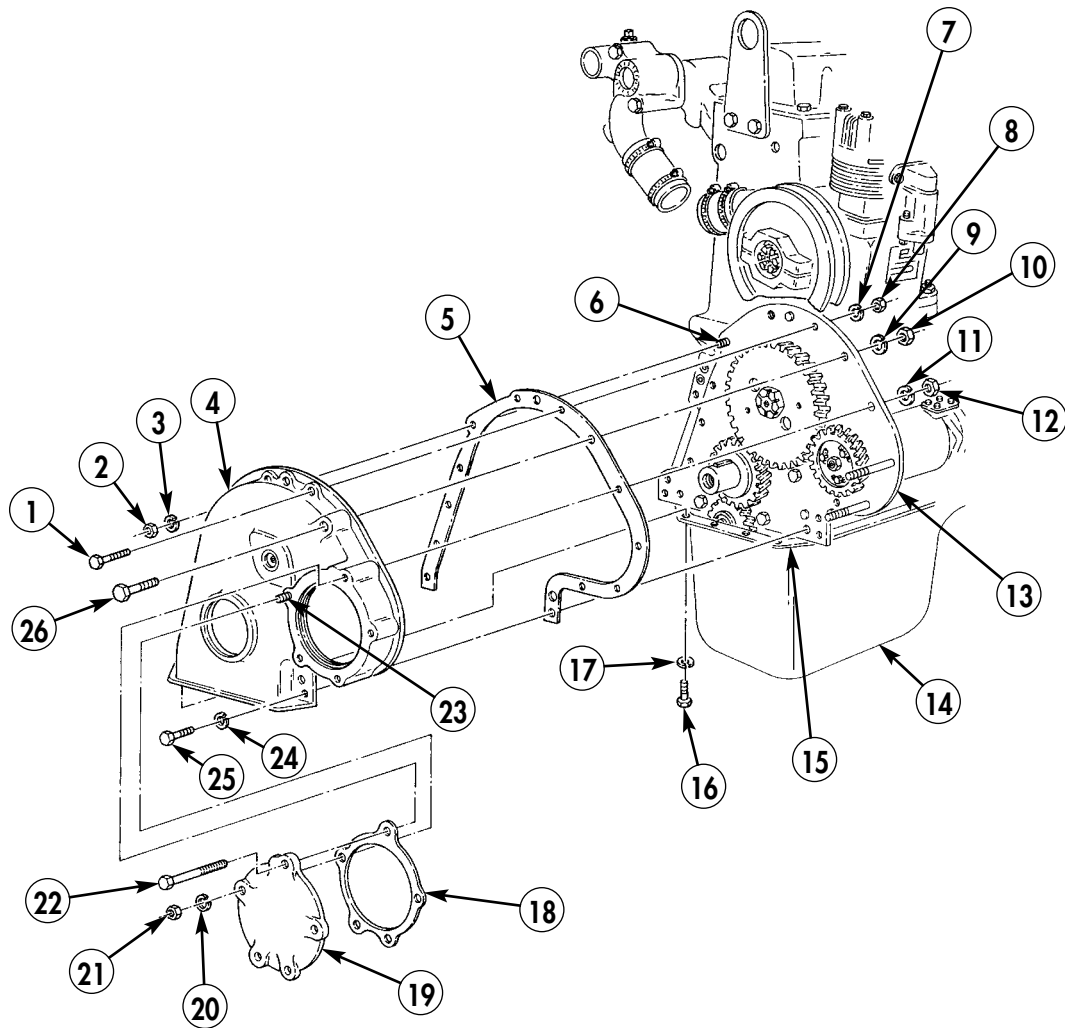
Oil pan gasket may stick to timing cover. Use care when removing timing cover from oil pan. Failure to do this may damage oil pan gasket.

7. Remove timing cover (4) and gasket (5) from adapter plate (13) and oil pan gasket (15). Discard gasket (5).
8. Remove all remaining gasket (5) material from timing cover (4) and adapter plate (13).

### INSTALLATION

1. With new gasket (5) laying flat on timing cover (4), trim bottom edges of gasket (5) even with bottom edge of timing cover (4).
2. Apply a thin, even coat of gasket sealing compound on both sides of timing cover gasket (5) and exposed surface of oil pan gasket (15).
3. Apply a thin coat of thread locking sealing compound on threads of seven screws (25).
4. Install gasket (5) and timing cover (4) on adapter plate (13) with seven new lockwashers (24) and screws (25).
5. Install screws (1) and (26) through timing cover (4) and adapter plate (13) with new lockwashers (7) and (9) and nuts (8) and (10).
6. Install new lockwasher (3) and nut (2) on stud (6) and timing cover (4).
7. Install timing cover (4) on oil pan (14) with four new lockwashers (17) and screws (16).
8. Install new gasket (18) and access cover (19) on timing cover (4) with new lockwasher (20), nut (21), four screws (22), new lockwashers (11), and nuts (12).
9. Install water pump and housing (WP 0082 00).
10. Install tachometer cable adapter (WP 0098 00).
11. Install vibration damper (WP 0028 00).
12. Connect battery ground cable (WP 0126 00).
13. Lower and secure hood (TM 9-2320-361-10).

TIMING GEARS COVER AND GASKET REPLACEMENT (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TAPPET CHAMBER COVER AND GASKET REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

General mechanic's tool kit  
(item 116, WP 0469 00)

**Materials/Parts**

Gasket (item 44, WP 0470 00)  
Sealing compound, thread locking  
(item 34, WP 0468 00)

**Materials/Parts (Contd)**

Sealing compound, gasket forming  
(item 30, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Engine oil cooler removed (WP 0038 00).

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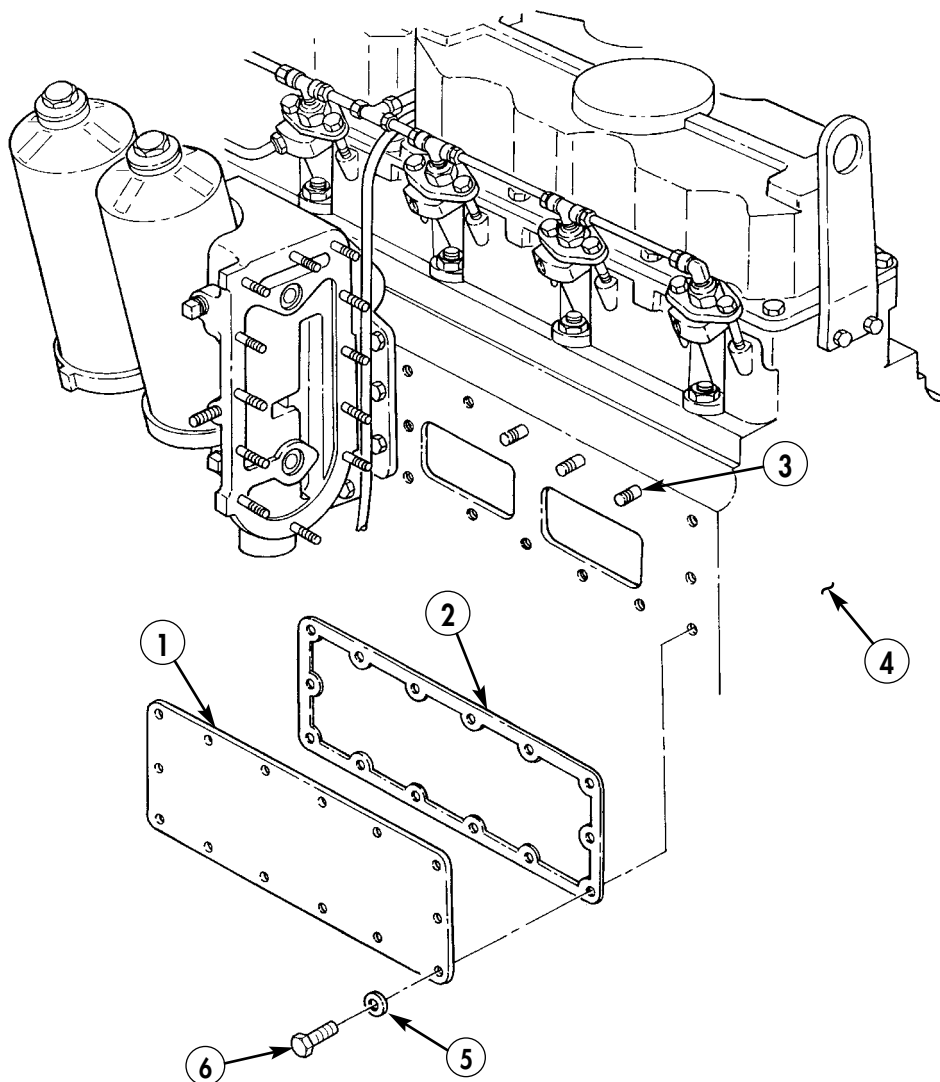
## TAPPET CHAMBER COVER AND GASKET REPLACEMENT (Contd)

### REMOVAL

1. Remove eleven screws (6), washers (5), cover (1), and gasket (2) from three studs (3) and engine block (4). Discard gasket (2).
2. Remove all remaining gasket (2) material from cover (1) and engine block (4).

### INSTALLATION

1. Apply a light, even coat of sealing compound on both sides of new gasket (2).
2. Apply a light coat of thread locking sealing compound on threads of eleven screws (6).
3. Install new gasket (2) and cover (1) on three studs (3) and engine block (4) with eleven washers (5) and screws (6).
4. Install engine oil cooler (WP 0038 00).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### VALVE TAPPETS MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

General mechanic's tool kit  
(item 116, WP 0469 00)

**Materials/Parts**

Lubricating oil, OE/HDO 30,  
(item 24, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Reference**

TM 9-2815-210-34-2-2  
WP 0021 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air compressor support removed (WP 0040 00).  
Oil filter housing removed (WP 0039 00).  
Tappet chamber cover removed (WP 0033 00).  
Rocker arms and pushrods removed  
(WP 0031 00).

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## VALVE TAPPETS MAINTENANCE (Contd)

### REMOVAL

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

#### **CAUTION**

Camshaft and tappets are a matched set. All tappets removed must be tagged for installation. Failure to do this may result in damage to tappets or camshaft.

#### **NOTE**

Sludge from engine oil may build upon external surfaces of tappets. When this condition exists, Skysol 100 solvent maybe applied to tappets while working tappets up and down to loosen sludge and aid removal.

Remove and tag twelve tappets (2) from tappet bores (1) in engine block (3).

### CLEANING AND INSPECTION

1. For general cleaning instructions, refer to WP 0021 00.

#### **NOTE**

Normal tappet and camshaft lobe wear is indicated by a slight inward coning or dishing effect of the cam contact surface on tappets.

2. Inspect tappets (2) for coned, scored, or grooved cam contact. Minor surface coning is acceptable when cam contact surface is free of grooving and scoring, otherwise replace.
3. Inspect machined sides of twelve tappets (2) for grooving or scoring. Replace if defective.
4. If tappets (2) need replacement, inspect twelve tappet bores (1) and lobe surfaces of camshaft. Refer to TM 9-2815-210-34-2-2 for inspection.

### INSTALLATION

#### **CAUTION**

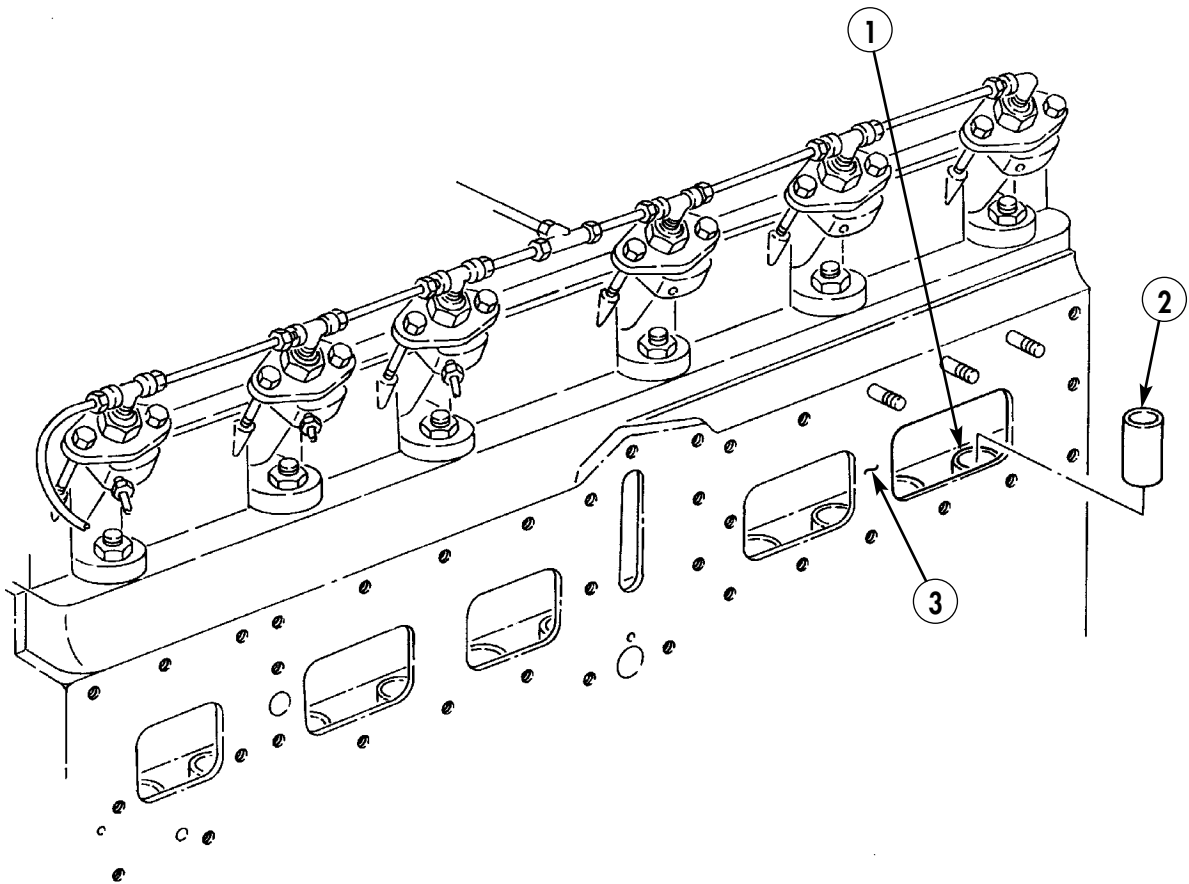
Tappets exterior must be coated with new engine oil prior to installation. This provides for initial lubrication when engine is started. Failure to oil tappets may result in damage to tappet bores, tappets, or camshaft lobes.

1. Coat twelve tappets (2) with new engine oil.
2. Install and seat twelve tappets (2) in tappet bores (1) of engine block (3).
3. Install rocker arms and pushrods (WP 0031 00).
4. Install tappet chamber cover (WP 0033 00).

## VALVE TAPPETS MAINTENANCE (Contd)

### INSTALLATION (Contd)

5. Install oil cooler and oil cooler filter housing (WP 0039 00).
6. Install air compressor support (WP 0040 00).
7. Connect battery ground cable (WP 0126 00).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL PAN REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Applicable Models

All

###### Tools and Special Tools

General mechanic's tool kit

(item 116, WP 0469 00)

Hydraulic jack (item 47, WP 0469 00)

Jack stands

###### Materials/Parts

Gasket (item 81, WP 0470 00)

Thirty lockwashers (item 192, WP 0470 00)

Sealing compound, gasket forming

(item 30, WP 0468 00)

###### Equipment Condition

Parking brake set and wheels chocked

(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected

(WP 0126 00).

Engine oil drained (WP 0044 00).

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## OIL PAN REPLACEMENT (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **REMOVAL**

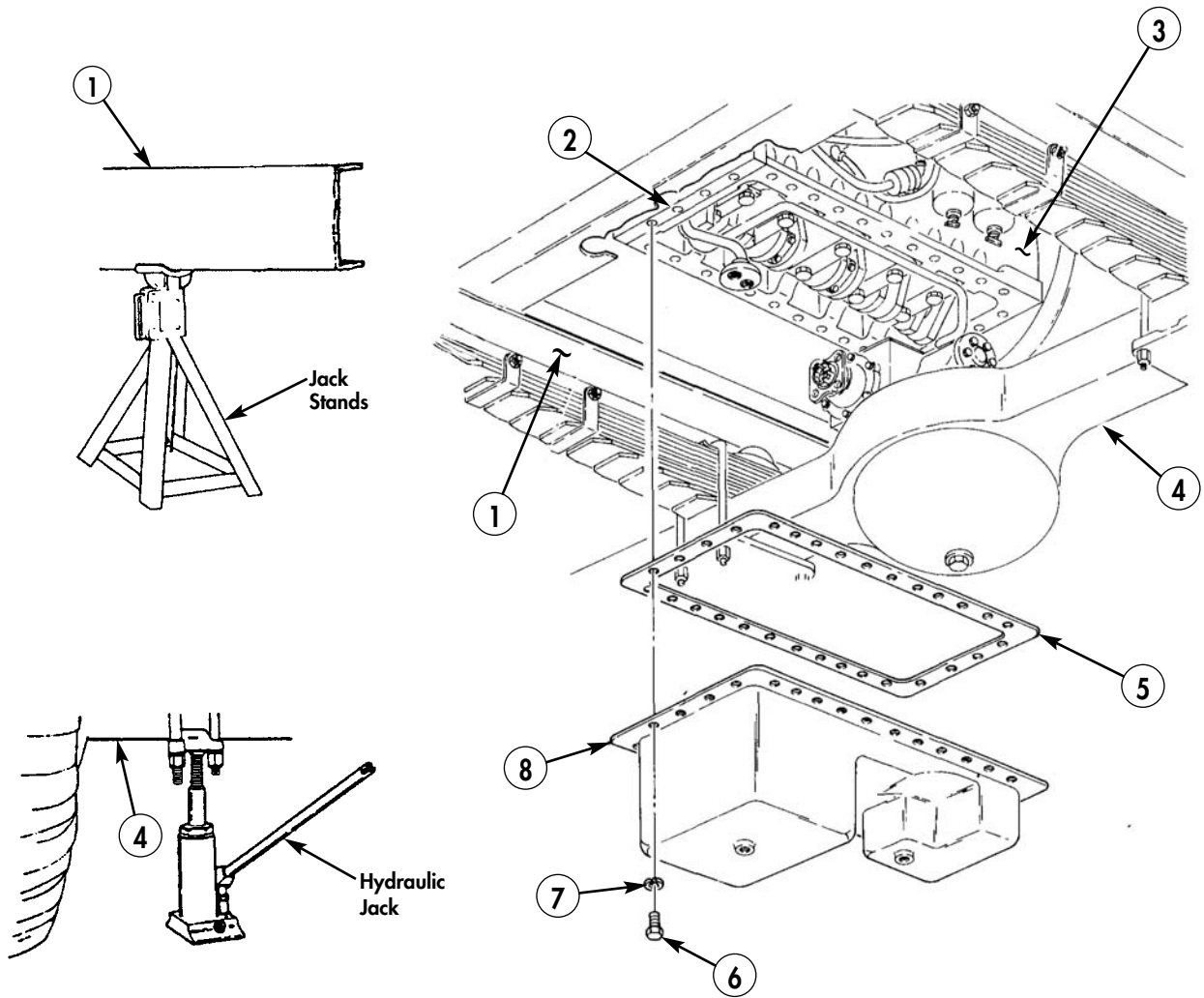
1. Place hydraulic jack under driver's side front axle (4) and raise vehicle.
2. Place jack stand under driver's side frame (1) and lower hydraulic jack.
3. Remove thirty screws (6), lockwashers (7), oil pan (8), and gasket (5) from engine block (3) and timing cover (2). Discard lockwashers (7) and gasket (5).
4. Remove gasket remains from oil pan (8), engine block (3), and timing cover (2).

### **INSTALLATION**

1. Apply light coat of sealing compound to new gasket (5).
2. Install new gasket (5) and oil pan (8) on engine block (3) and timing cover (2) with thirty new lockwashers (7) and screws (6).
3. Place hydraulic jack under driver's (left) side front axle (4) and raise vehicle.
4. Remove jack stand from under frame (1).
5. Lower vehicle and remove hydraulic jack.
6. Fill engine with oil (WP 0020 00).
7. Connect battery ground cable (WP 0126 00).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



### OIL PAN REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL PUMP MAINTENANCE

#### REMOVAL, INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Applicable Models

All

###### Tools and Special Tools

General mechanic's tool kit

(item 116, WP 0469 00)

Mechanical puller kit (item 64, WP 0469 00)

12-in. Extension, 3/8-in. drive

(item 26, WP 0469 00)

Universal joint, 3/8-in. (item 141, WP 0469 00)

Adapter, 1/2-in. male, 3/8-in. female

(item 1, WP 0469 00)

5/8-in. crowfoot adapter (item 92, WP 0469 00)

###### Materials/Parts

Cotter pin (item 391, WP 0470 00)

Gasket (item 392, WP 0470 00)

Gasket (item 393, WP 0470 00)

Gasket (item 394, WP 0470 00)

Three lockscrews (item 395, WP 0470 00)

Two lockwashers (item 193, WP 0470 00)

Eleven lockwashers (item 396, WP 0470 00)

O-ring (item 280 WP 0470 00)

Safety wire (item 49, WP 0468 00)

###### Equipment Condition

Parking brake set and wheels chocked

(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected

(WP 0126 00).

Oil pan removed (WP 0035 00).

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## OIL PUMP MAINTENANCE (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **REMOVAL**

1. Remove safety wire (8) from two screws (9). Discard safety wire (8).
2. Remove two screws (9), outlet tube (7), and gasket (6) from engine block (2) and flange (12). Discard gasket (6).
3. Remove two screws (10), lockwashers (11), flange (12), and O-ring (13) from oil pump (14). Discard lockwashers (11) and O-ring (13).
4. Remove nut (18), lockwasher (17), and screw (22) from pickup tube clamp (21) and brace (16). Discard lockwasher (17).
5. Remove two screws (24), lockwashers (25), pickup tube (23), and gasket (26) from oil pump (14). Discard lockwashers (25) and gasket (26).
6. Remove two screws (30) and lockwashers (29) from scavenger tube (28) and engine block (2). Discard lockwashers (29).
7. Remove two screws (34), lockwashers (35), scavenger tube (28), and gasket (27) from oil pump (14). Discard lockwashers (35) and gasket (27).
8. Remove two screws (20), lockwashers (19), and brace (16) from oil pump (14). Discard lockwashers (19).
9. Remove three lockscrews (15) and oil pump (14) from two bearing caps (1). Discard lockscrews (15).
10. Remove cotter pin (5), nut (4), and gear (3) from pump (14). Discard cotter pin (5).
11. Remove gear (3) from pump (14) with mechanical puller.
12. Remove two nuts (31), lockwashers (32), and screws (33) from scavenger tube (28). Discard lockwashers (32).

### **INSPECTION**

1. Inspect gear (3) for damaged teeth or scored bearing surfaces. Remove minor burrs with fine mill file. If gear (3) is damaged beyond repair, replace.
2. Inspect all tubes (7), (23), and (28) for dents, cracks, bent flanges, flattened areas, and cracked, torn, or loose screen. If tubes (7), (23), and (28), are damaged, replace.

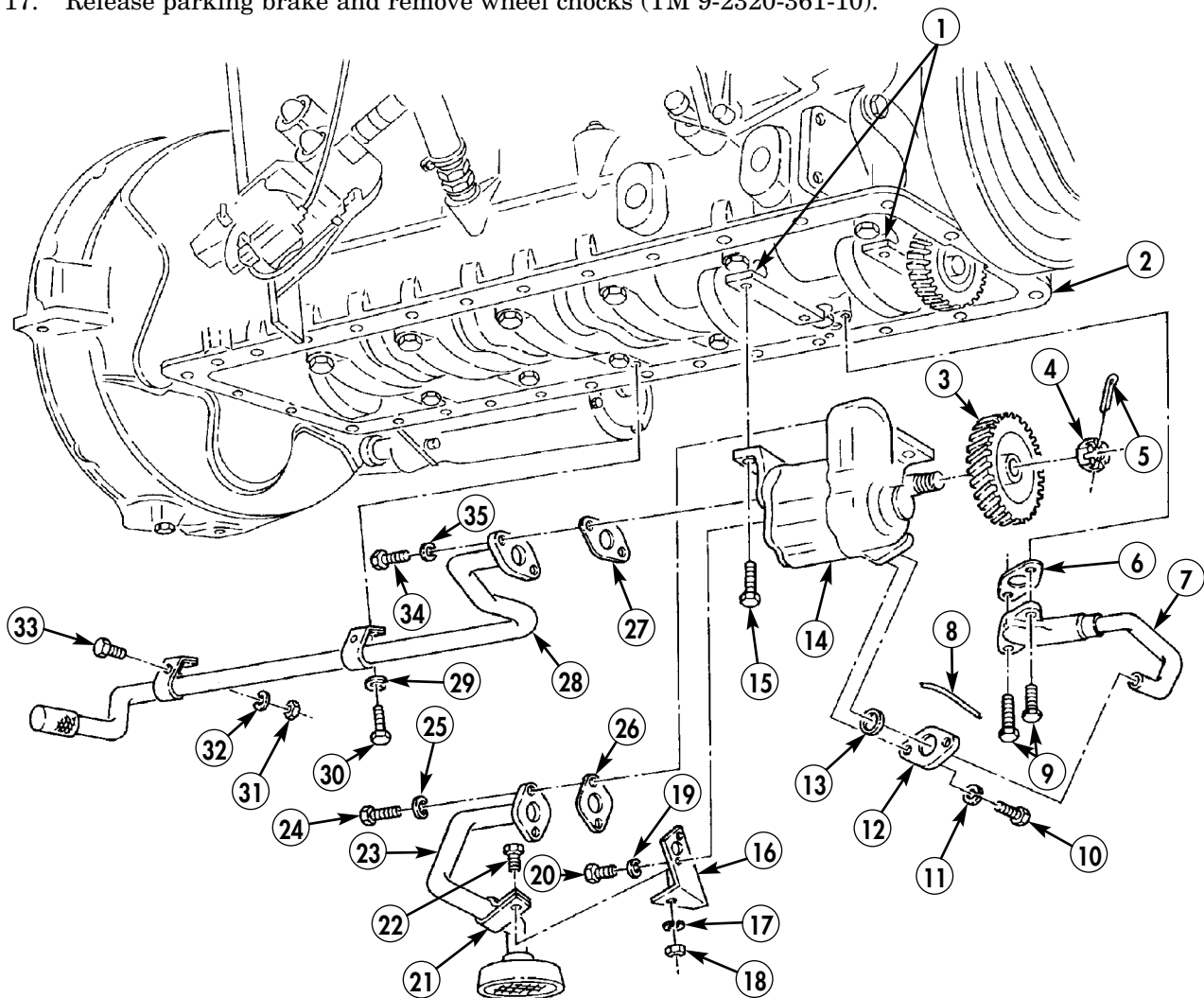
### **INSTALLATION**

1. Install gear (3) on oil pump (14) with nut (4).
2. Prime oil pump (14) with oil.
3. Install oil pump (14) on two bearing caps (1) with three new lockscrews (15). Tighten lockscrews (15) 53–58 lb-ft (72–79 N•m).
4. Tighten nut (4) 44–46 lb-ft (60–62 N•m) and install new cotter pin (5).
5. Install new gasket (27) and scavenger tube (28) on oil pump (14) with two new lockwashers (35) and screws (34). Tighten screws (34) 75–100 lb-in (8–11 N•m).
6. Install scavenger tube (28) on engine block (2) with two new lockwashers (29) and screws (30). Tighten screws (30) 150–175 lb-in (17–20 N•m).
7. Install two screws (33) on scavenger tube (28) with two new lockwashers (32) and nuts (31). Tighten nuts (31) 75–100 lb-in (8–11 N•m).

## OIL PUMP MAINTENANCE (Contd)

### INSTALLATION (Contd)

8. Install brace (16) on oil pump (14) with two new lockwashers (19) and screws (20). Tighten screws (20) 75–100 lb-in (8–11 N•m).
9. Install new gasket (26) and pickup tube (23) on oil pump (14) with two new lockwashers (25) and screws (24). Tighten screws (24) 75–100 lb-in (8–11 N•m).
10. Install screw (22) through pickup tube clamp (21) and brace (16) with new lockwasher (17) and nut (18). Tighten nut (18) 75–100 lb-in (8–11 N•m).
11. Install new O-ring (13) and flange (12) on outlet tube (7) and oil pump (14) with two new lockwashers (11) and screws (10). Tighten screws (10) 75–100 lb-in (8–11 N•m).
12. Install new gasket (6) and outlet tube (7) on engine block (2) with two screws (9). Tighten screws (9) 150–175 lb-in (17–20 N•m).
13. Install new safety wire (8) on screws (9).
14. Install oil pan (WP 0035 00).
15. Connect battery ground cable (WP 0126 00).
16. Lower and secure hood (TM 9-2320-361-10).
17. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL PRESSURE REGULATOR HOUSING MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Spring tester (item 110, WP 0469 00)  
Inside micrometer (item 49, WP 0469 00)  
Outside micrometer item 50, WP 0469 00)  
Torque wrench, 1/2-in. drive  
(item 136, WP 0469 00)

##### Materials/Parts

Gasket (item 397, WP 0470 00)  
Two gaskets (item 90, WP 0470 00)  
Four lockwashers (item 218, WP 0470 00)  
Crocus cloth (item 14, WP 0468 00)  
Sealant (item 28, WP 0468 00)

##### References

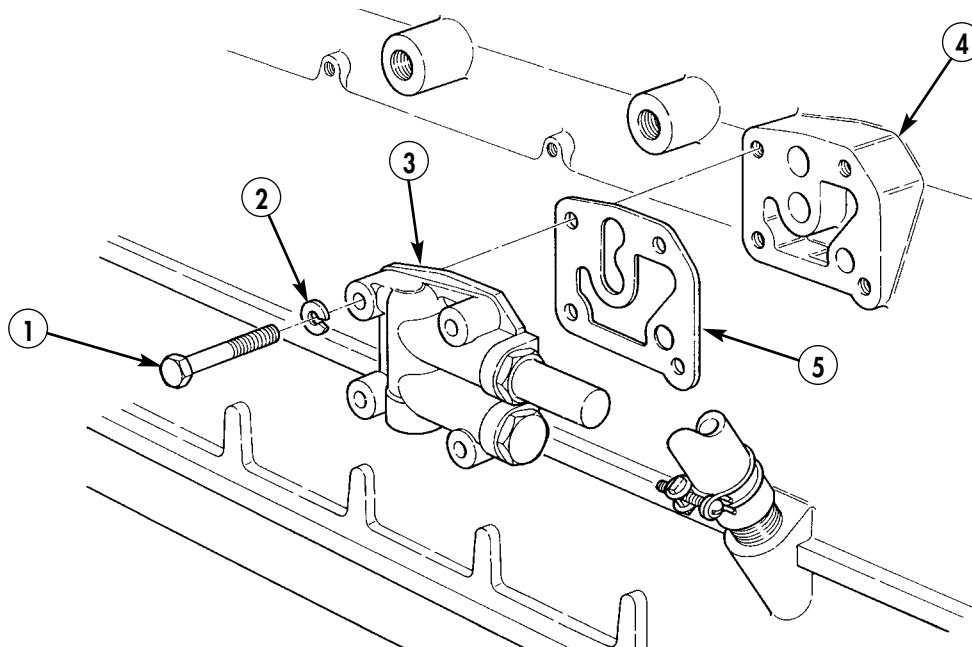
WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

#### REMOVAL

1. Remove four screws (1), lockwashers (2), regulator valve housing (3) and gasket (5) from engine (4). Discard gasket (5) and lockwashers (2).



## OIL PRESSURE REGULATOR HOUSING MAINTENANCE (Contd)

### DISASSEMBLY

1. Remove oil pressure regulator valve plug (6) and gasket (5) from regulator valve housing (1). Discard gasket (5).
2. Remove oil pressure regulator spring (4) and plunger (3) from regulator valve housing (1).
3. Remove piston oil cooling control valve plug (7) and gasket (8) from regulator valve housing (1). Discard gasket (8).
4. Remove piston oil cooling relief valve spring (9) and plunger (3) from regulator valve housing (1).
5. Remove plug (10) from regulator valve housing (1).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0021 00.

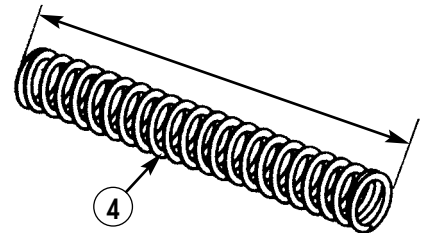
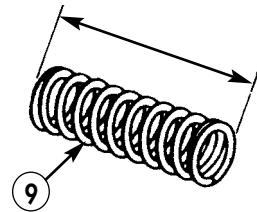
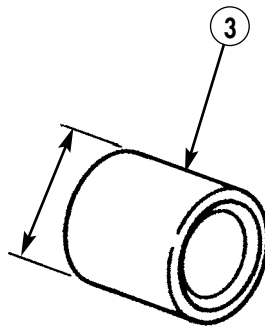
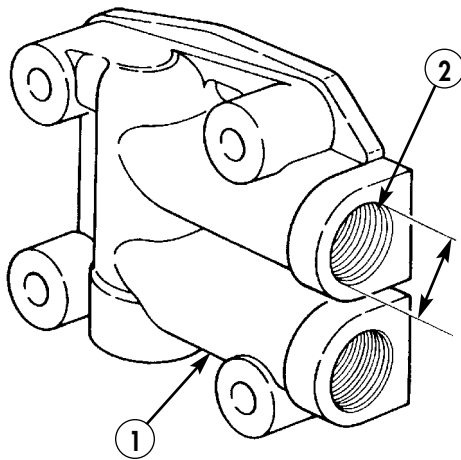
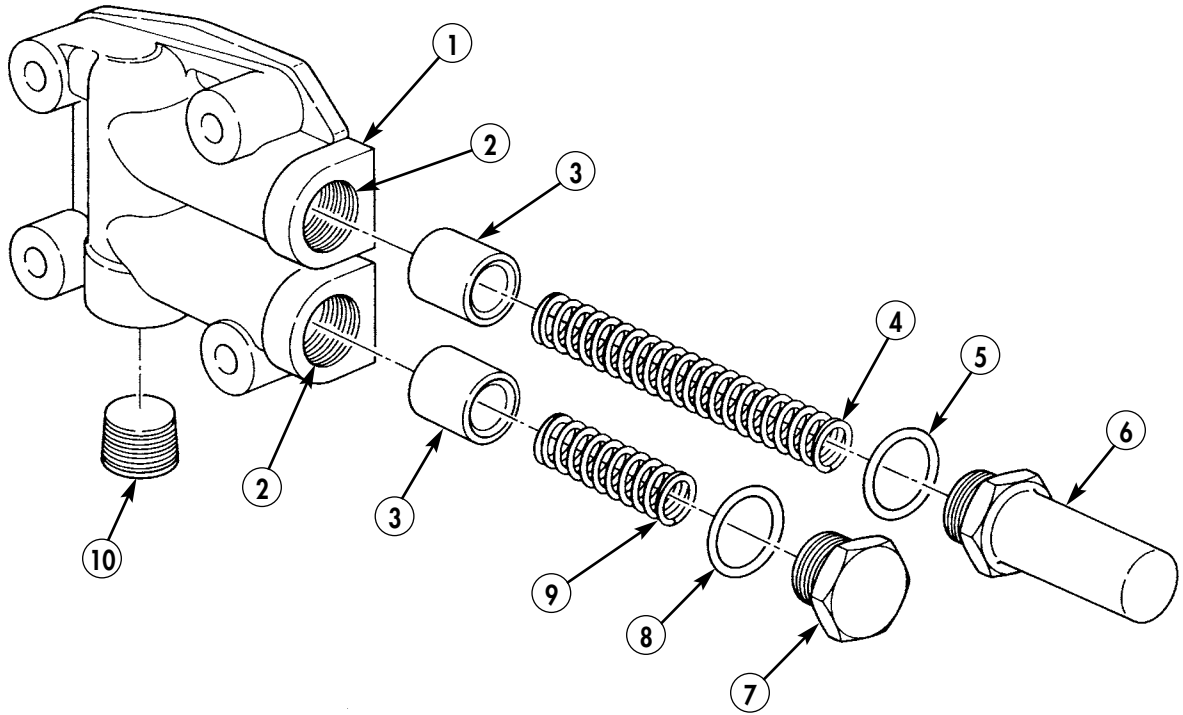
*Table 1. Oil Pressure Regulator Wear Limits.*

ITEM NO	ITEM/POINT OF INTEREST		
2	Inside Diameter of Plunger Bores in Housing	0.803–0.804	20.396–20.422
3, 10	Outside Diameter of Plunger	0.800–0.801	20.320–20.345
9	Piston Cooling Relief Valve Spring Free Length	1.620	41.148
4	Oil Pressure Regulator Spring Free Length	4.650	118.110

2. Inspect bores (2) for burrs, scratches, or wear. Refer to table 1, Oil Pressure Regulator Wear Limits, for measurements. Remove burrs and scratches with crocus cloth. Replace if excessively burred, scratched, or worn.
3. Inspect oil pressure regulator spring (4) for distortion, cracks, and collapsed coils. Refer to table 1, Oil Pressure Regulator Wear Limits, for measurements. Replace oil pressure regulator spring (4) if distorted, cracked, coils are collapsed, or worn.
4. Using spring tester, compress oil pressure regulator spring (4) to 3.44 in. (87.38 mm). Load measured should be 24.6–28.6 lb (11.17–13.0 kg). Replace oil pressure regulator spring (4) if not within limits.
5. Inspect piston cooling relief valve spring (9) for distortion, cracks, collapsed coils, or wear. Refer to table 1, Oil Pressure Regulator Wear Limits, for measurements. Replace piston cooling relief valve spring (9) if distorted, cracked, coils are collapsed, or worn.
6. Using spring tester, compress piston cooling relief valve spring (9) to 1.38 in. (35.05 mm). Load measured should be 6.95–8.35 lb (3.16–3.79 kg). Replace piston cooling relief valve spring (9) if not within limits.
7. Inspect two plungers (3) for nicks, burrs, or scratches. Refer to table 1, Oil Pressure Regulator Wear Limits, for measurements. Replace plungers (3) if nicked, burred, scratched, or worn.



OIL PRESSURE REGULATOR HOUSING MAINTENANCE (Contd)



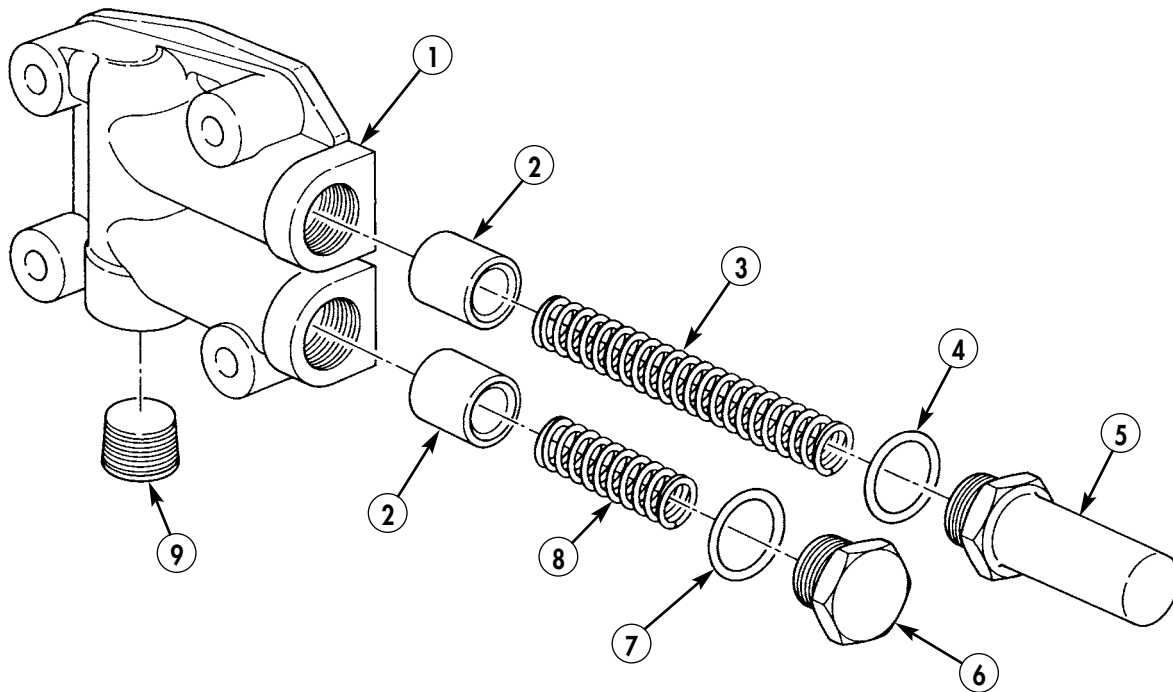
**OIL PRESSURE REGULATOR HOUSING MAINTENANCE (Contd)****ASSEMBLY**

1. Install plunger (2) and piston oil cooling control valve spring (8) in regulator valve housing (1).
2. Install new gasket (7) and piston oil cooling control valve plug (6) in regulator valve housing (1).
3. Install plunger (2) and oil pressure regulator spring (3) in regulator valve housing (1).
4. Install new gasket (4) and oil pressure regulator valve plug (5) in regulator valve housing (1).

**NOTE**

Prior to installation, apply sealant to plug.

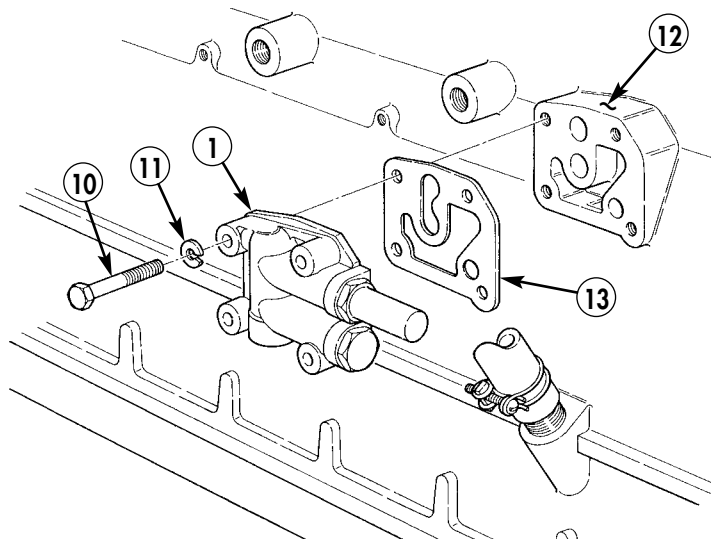
5. Install plug (9) in regulator valve housing (1).



## OIL PRESSURE REGULATOR HOUSING MAINTENANCE (Contd)

### INSTALLATION

1. Install new gasket (13) and oil pressure regulator valve housing (1) on engine (12) with four new lockwashers (11) and screws (10).
2. Lower and secure hood (TM 9-2320-361-10).
3. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
4. Connect battery ground cable (WP 0126 00).





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE OIL COOLER REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
11/16-in. flare wrench (item 131, WP 0469 00)

##### Materials/Parts

Gasket (item 399, WP 0470 00)  
Gasket (item 400, WP 0470 00)

##### Materials/Parts (Contd)

Two locknuts (item 165, WP 0470 00)  
Thirteen lockwashers (item 412, WP 0470 00)  
Two O-rings (item 398, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)  
Sealing compound (item 31, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Engine coolant drained (WP 0076 00).  
Secondary fuel filter head removed  
(WP 0064 00).

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## ENGINE OIL COOLER REPLACEMENT (Contd)

### REMOVAL

1. Remove nut (3) and lockwasher (4) from stud (20). Discard lockwasher (4).
2. Remove four dust covers (1) from injector ports (22) and slide up injector line (23) and three lines (2).
3. Remove two locknuts (27), screws (26), washers (25), and clamps (24) from injector line (23). Discard locknuts (27).

#### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Failure to do so may result in damage to equipment.

#### **NOTE**

Prior to removal, tag injector lines for installation.

4. Remove injector line (23) from injector pump port (22).
5. Remove three injector lines (2) from injector pump ports (22) and injectors (9) and remove injector line retainer clamp (5) and washer (21) from stud (20).
6. Remove nut (14), lockwasher (13), and clamp (12) from stud (8). Discard lockwasher (13).

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

7. Remove eleven nuts (16), lockwashers (15), cover (17), gasket (11), oil cooler (10), gasket (18), and two O-rings (19) from oil cooler housing (6), and studs (7) and (8). Discard gaskets (11) and (18), O-rings (19), and lockwashers (15).
8. Remove gasket remains from cover (17), oil cooler (10), and oil cooler housing (6).

### INSTALLATION

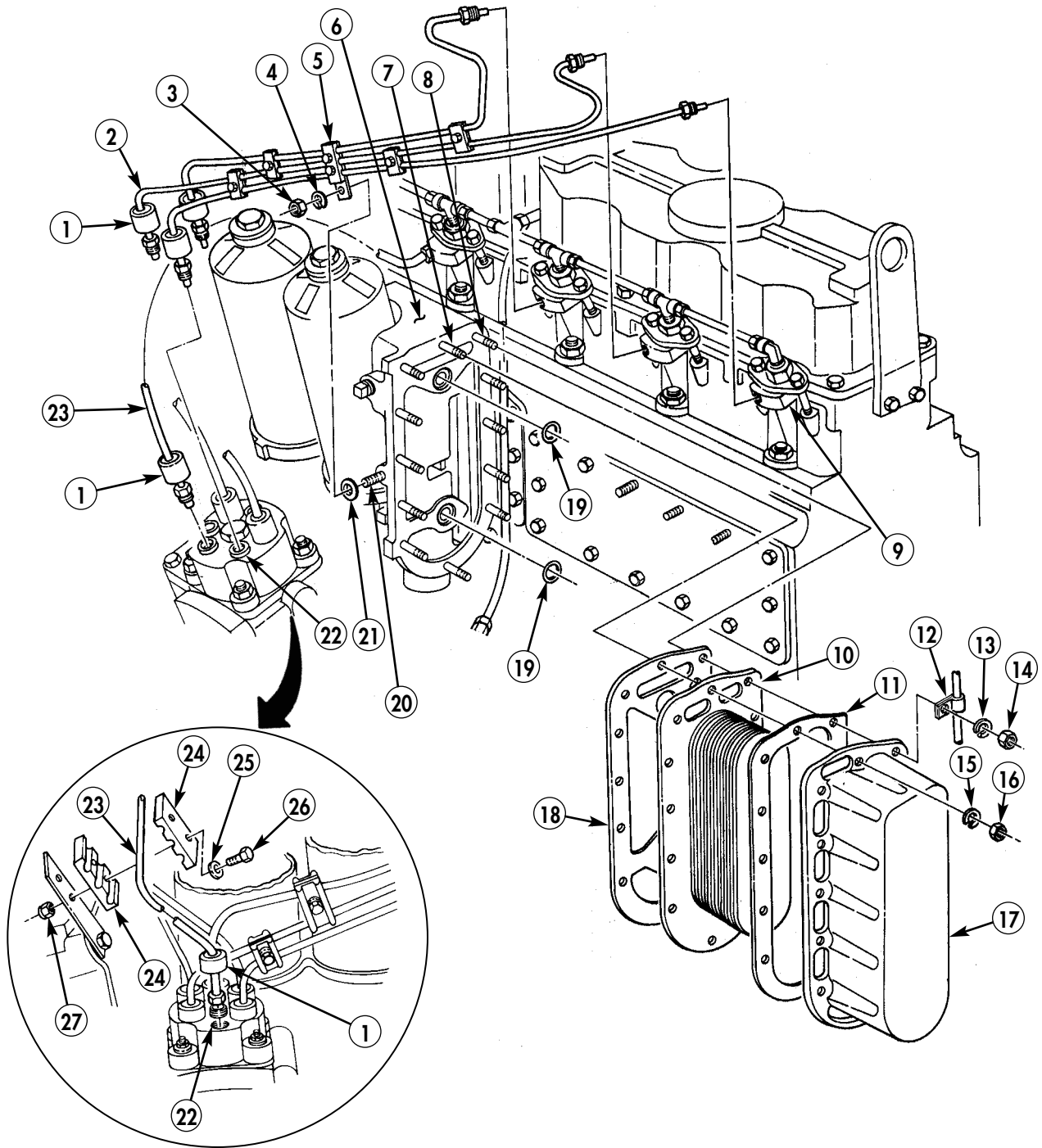
1. Apply light coat of sealing compound to new gasket (18) and new gasket (11).
2. Install two new O-rings (19), new gasket (18), oil cooler (10), new gasket (11), and cover (17) on oil cooler housing (6), eleven studs (7), and stud (8) with eleven new lockwashers (15) and nuts (16).
3. Install clamp (12) on stud (8) and cover (17) with new lockwasher (13) and nut (14).
4. Install washer (21) and injector line retainer clamp (5) on stud (20) with new lockwasher (4) and nut (3).

#### **CAUTION**

Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment

5. Install three injector lines (2) on three injector pump ports (22) and injectors (9).
6. Install injector line (23) and dust cover (1) on injector pump port (22).
7. Install two clamps (24), washers (25), screws (26), and new locknuts (27) on injector line (23).
8. Install three dust covers (1) over three injector pump ports (22).
9. Install secondary fuel filter head (WP 0064 00).
10. Fill engine coolant to required level (WP 0076 00).
11. Connect battery ground cable (WP 0126 00).
12. Lower and secure hood (TM 9-2320-361-10).
13. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

ENGINE OIL COOLER REPLACEMENT (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE OIL FILTER HOUSING MAINTENANCE

REMOVAL, DISASSEMBLY, INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit

(item 116, WP 0469 00)

1/2-in. allen wrench (item 129, WP 0469 00)

1-1/4-in. open end wrench

(item 127, WP 0469 00)

##### Materials/Parts

Gasket (item 401, WP 0470 00)

Two gaskets (item 90, WP 0470 00)

Hose (item 402, WP 0470 00)

Sealing compound, thread locking

(item 34, WP 0468 00)

##### Materials/Parts (Contd)

Sealing compound, gasket forming

(item 30, WP 0468 00)

Sealant (item 28, WP 0468 00)

##### References

WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked

(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected

(WP 0126 00).

Engine oil filters removed (WP 0044 00).

Engine oil cooler removed (WP 0038 00).

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## ENGINE OIL FILTER HOUSING MAINTENANCE (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **REMOVAL**

1. Remove plug (17). Allow coolant to drain.
2. Loosen two clamps (2).
3. Remove seventeen screws (12) and washers (11) from engine block (4) and housing (6).
4. Remove housing (6) and gasket (19) from hose (3) and engine block (4). Discard gasket (19).
5. Remove two clamps (2) and hose (3) from coolant tube (1). Discard hose (3).

### **DISASSEMBLY**

1. Remove two oil pressure plugs (14), gaskets (13), springs (15), and valves (16) from housing (6). Discard gaskets (13).
2. Remove two adapter bushings (5) from housing (6).
3. Remove plug (18) from housing (6).
4. Remove drain valve (9) and adapter (8) from housing (6).

### **INSPECTION**

1. Refer to WP 0021 00 for inspection instructions.
2. Inspect twelve studs (7) and stud (10) for damage. If stud(s) is damaged, replace.
3. Inspect housing (6) for cracks. If housing (6) is damaged, replace.

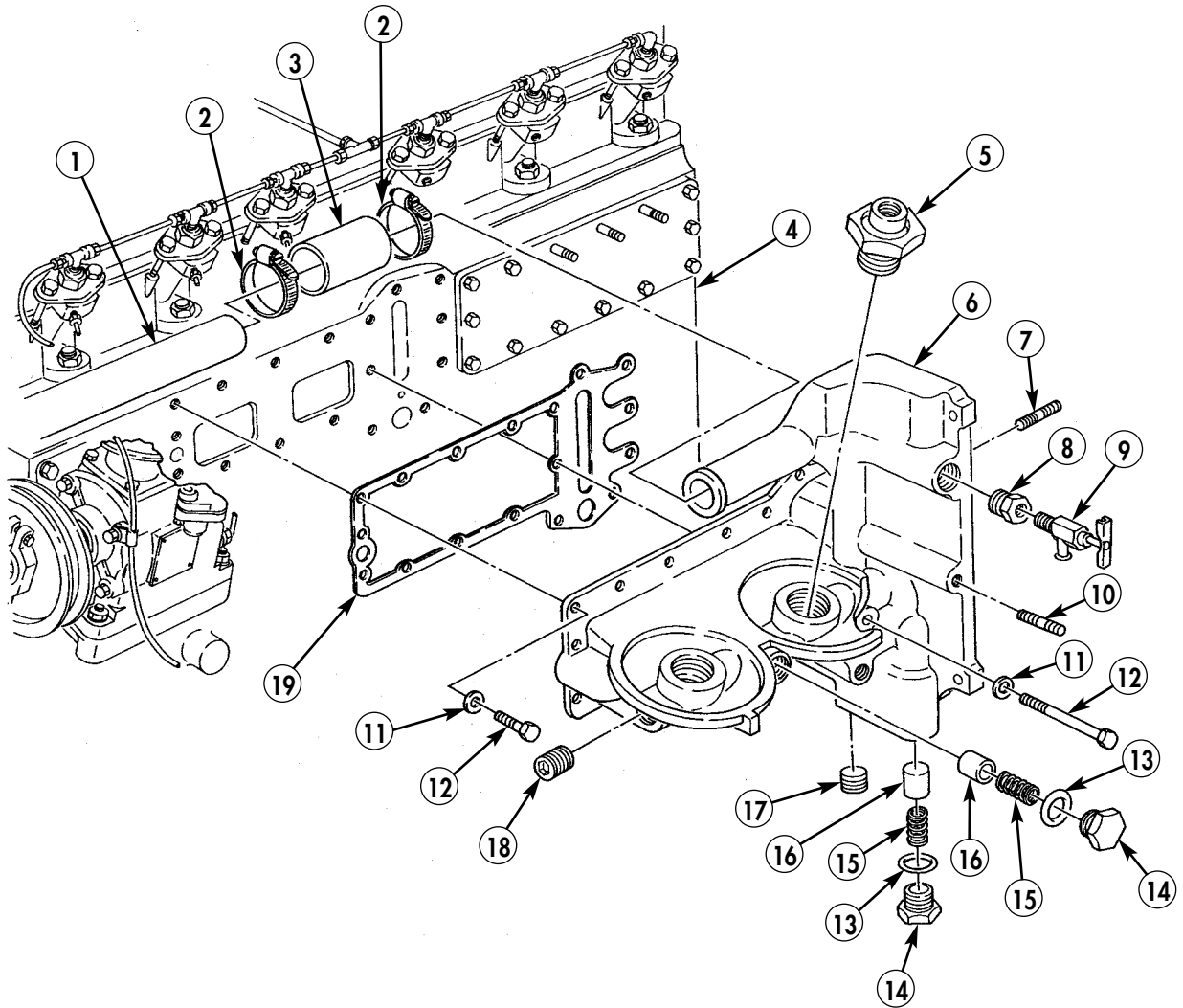
### **ASSEMBLY**

1. Apply light coat of sealant to threads of adapter (8), drain valve (9), and plugs (18) and (17).
2. Install adapter (8) and drain valve (9) in housing (6).
3. Install plugs (18) and (17) in housing (6).
4. Coat outer threads of two bushings (5) with sealing compound.
5. Install two adapter bushings (5) in housing (6).
6. Install two valves (16), springs (15), new gaskets (13), and oil pressure plugs (14) in housing (6).

### **INSTALLATION**

1. Install new hose (3) and two clamps (2) on coolant tube (1). Do not tighten clamps (2).
2. Apply light coat of sealing compound to threads of seventeen screws (12).
3. Apply light coat of sealing compound to new gasket (19).
4. Install new gasket (19) and housing (6) on engine block (4) with seventeen washers (11) and screws (12).
5. Install hose (3) on housing (6) and tighten two hose clamps (2).
6. Install engine oil cooler (WP 0038 00).
7. Install engine oil filters (WP 0044 00).
8. Connect battery ground cable (WP 0126 00).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

ENGINE OIL FILTER HOUSING MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR COMPRESSOR SUPPORT AND GASKET REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

##### Materials/Parts

Gasket (item 403, WP 0470 00)  
Sealant compound, thread locking  
(item 34, WP 0468 00)

##### Materials/Parts (Contd)

Sealant compound, gasket forming  
(item 30, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air compressor removed (WP 0180 00).

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## AIR COMPRESSOR SUPPORT AND GASKET REPLACEMENT (Contd)

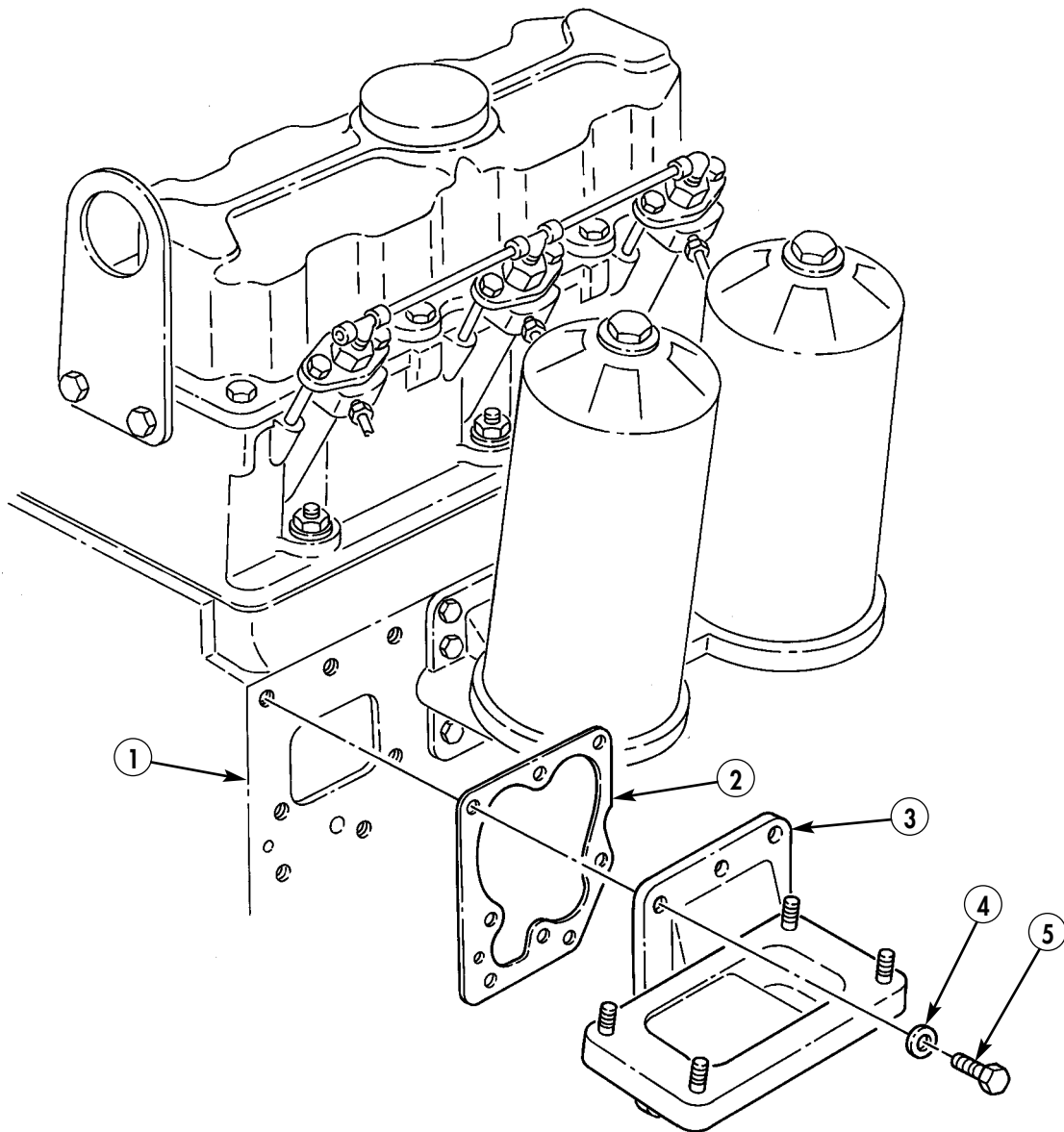
### REMOVAL

1. Remove seven screws (5), washers (4), support (3), and gasket (2) from engine block (1). Discard gasket (2).
2. Remove all excess gasket (2) material from engine block (1) and support (3).
3. Remove sealer from threads of seven screws (5).

### INSTALLATION

1. Apply a thin coat of sealing compound on threads of seven screws (5).
2. Apply a thin, even coat of sealing compound on both sides of gasket (2).
3. Install new gasket (2) and support (3) on engine block (1) with seven washers (4) and screws (5).
4. Install air compressor (WP 0180 00).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**AIR COMPRESSOR SUPPORT AND GASKET REPLACEMENT (Contd)**



**END OF WORK PACKAGE**

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### INTAKE AND EXHAUST MANIFOLDS MAINTENANCE

INTAKE AND EXHAUST MANIFOLDS REMOVAL, EXHAUST MANIFOLD DISASSEMBLY, CLEANING AND INSPECTION, EXHAUST MANIFOLD ASSEMBLY, AND INTAKE AND EXHAUST MANIFOLDS INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

##### Materials/Parts

Gaskets (item 404, WP 0470 00)  
Six seal rings (item 405, WP 0470 00)  
Twelve locknuts (item 406, WP 0470 00)

##### Personnel Required

Two

##### References

WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Thermostat and housing removed  
(WP 0081 00).  
Personnel heater defroster hoses removed  
(WP 0251 00).  
Oil dipstick tube removed (WP 0042 00).  
Turbocharger removed (WP 0057 00).  
Uncovered manifold heater removed  
(If installed) (WP 0066 00).  
Covered manifold heater removed. If installed  
(WP 0065 00).  
Water outlet manifold removed (WP 0080 00).  
Engine temperature sending unit removed  
(WP 0107 00).  
Air cleaner assembly removed (WP 0053 00).

## INTAKE AND EXHAUST MANIFOLDS MAINTENANCE (Contd)

### INTAKE AND EXHAUST MANIFOLDS REMOVAL

1. Remove drain valve (7) and plug (8) from intake manifold (4).
2. Remove sixteen nuts (6) and washers (5) from intake manifold (4).
3. Remove twelve locknuts (11) and washers (10) from exhaust manifold (9). Discard locknuts (11).
4. Loosen two screws (17) on starter solenoid bracket (18).

#### **NOTE**

Assistant will help with steps 5 and 6.

5. Remove intake manifold (4), exhaust manifold (9), and two gaskets (3) from cylinder heads (1) and (2). Discard gaskets (3).
6. Remove excess gasket (3) material from cylinder heads (1) and (2), intake manifold (4), and exhaust manifold (9).

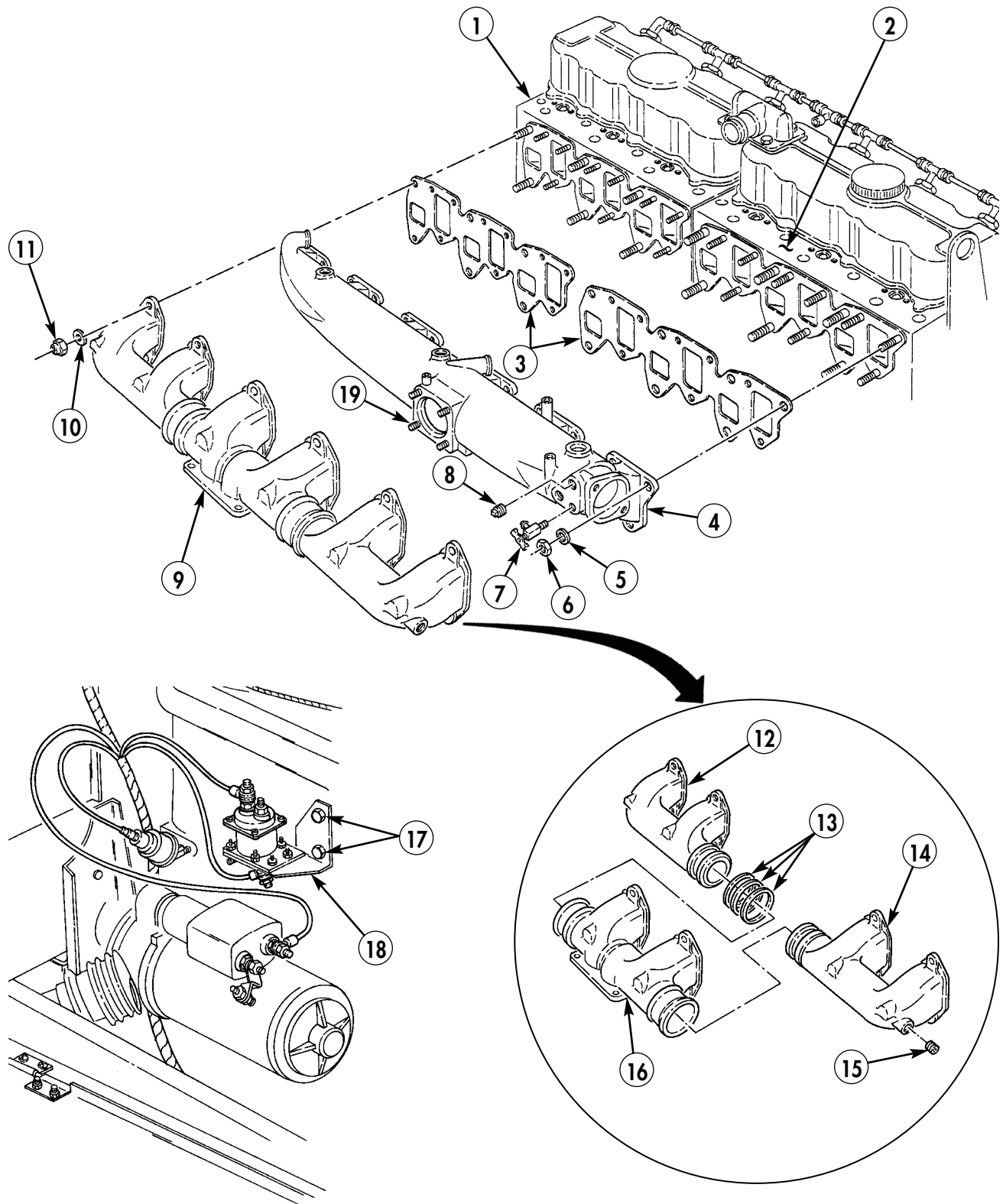
### EXHAUST MANIFOLD DISASSEMBLY

1. Remove manifold sections (12) and (14) from manifold section (16).
2. Remove six flange seal rings (13) from manifold sections (12) and (14). Discard seal rings (13).
3. Remove two plugs (15) from exhaust manifold sections (12) and (14).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0021 00.
2. Inspect three plugs (8) and (15) for looseness, leaking, or damage. If loose or damaged, replace.
3. Inspect four studs (19) for looseness, stripped, cross-threaded, or other damage. Repair thread damage. If more repair is required, replace intake manifolds (4).
4. Inspect gasket surfaces on intake manifold (4) and exhaust manifold (9) for nicks, burrs, or scratches. Repair with fine mill file or crocus cloth.
5. Inspect intake manifold (4) and exhaust manifold (9) for cracks or bends. If damaged, replace.

### INTAKE AND EXHAUST MANIFOLDS MAINTENANCE (Contd)



## INTAKE AND EXHAUST MANIFOLDS MAINTENANCE (Contd)

### EXHAUST MANIFOLD ASSEMBLY

1. Install six new flange seal rings (14) on manifold sections (13) and (15).
2. Install manifold sections (13) and (15) in manifold section (17).
3. Install two plugs (16) in exhaust manifold sections (13) and (15).

### INTAKE AND EXHAUST MANIFOLDS INSTALLATION

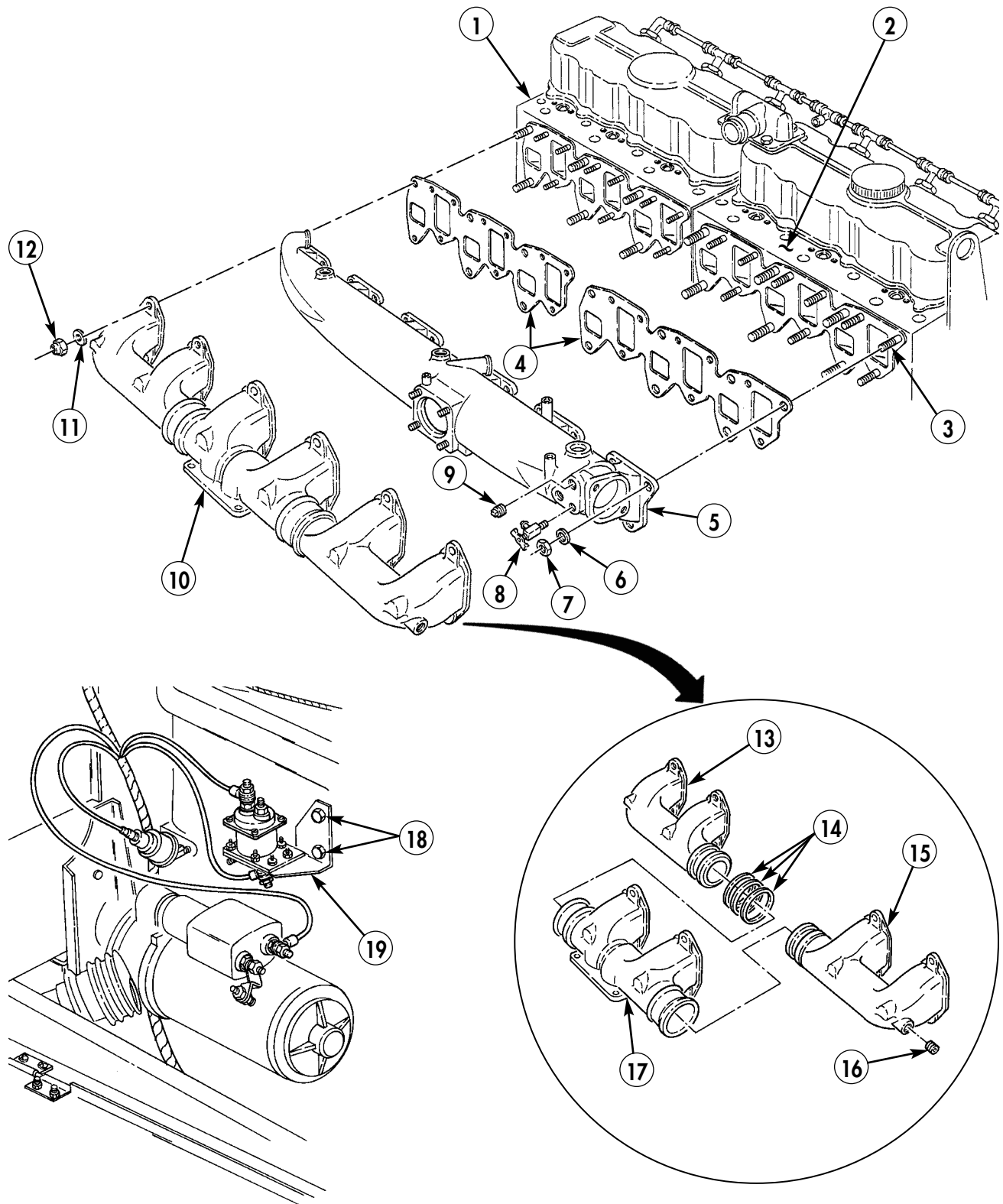
1. Position two new gaskets (4) on thirty studs (3).

#### **NOTE**

Assistant will help with steps 2 and 3.

2. Install exhaust manifold (10) on twelve studs (3) and cylinder head (1) with twelve washers (11) and new locknuts (12). Do not tighten locknuts (12).
3. Hold exhaust manifold (10). Install intake manifold (5) on cylinder head (2) with sixteen washers (6) and nuts (7).
4. Tighten twelve locknuts (12).
5. Install plug (9) and drain valve (8) on intake manifold (5).
6. Tighten two screws (18) on starter solenoid bracket (19).
7. Install air cleaner assembly (WP 0053 00).
8. Install engine temperature sending unit (WP 0107 00).
9. Install water outlet manifolds (WP 0080 00).
10. Install covered manifold heater, if removed (WP 0065 00).
11. Install uncovered manifold heater, if removed (WP 0066 00).
12. Install turbocharger (WP 0057 00).
13. Install oil dipstick tube (WP 0042 00).
14. Install personnel heater defroster hoses (WP 0251 00).
15. Install thermostat and housing (WP 0081 00).
16. Connect battery ground cable (WP 0126 00).
17. Lower and secure hood (TM 9-2320-361-10).
18. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### INTAKE AND EXHAUST MANIFOLDS MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL DIPSTICK TUBE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Applicable Models

All

###### Materials/Parts

Lockwasher (item 187, WP 0470 00)

Antiseize tape (item 42, WP 0468 00)

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Dipstick removed (TM 9-2320-361-10).

---

## OIL DIPSTICK TUBE REPLACEMENT (Contd)

### REMOVAL

1. Remove nut (1), lockwasher (7), and screw (3) from bracket (6). Discard lockwasher (7).
2. Remove dipstick tube (5) from engine (4) and bracket (6).

#### NOTE

Perform step 3 only if oil dipstick tube bracket needs replacement.

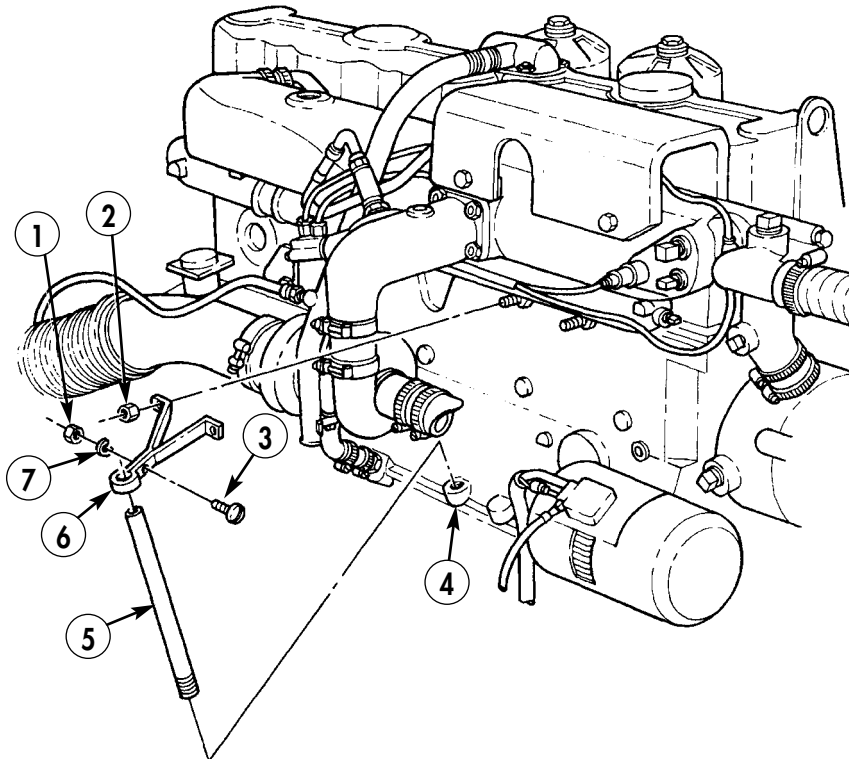
3. Remove two nuts (2) and bracket (6) from engine (4).

### INSTALLATION

#### NOTE

- Male pipe threads must be wrapped with antiseize tape before installation.
- Perform step 1 only if oil dipstick tube bracket was removed.

1. Install bracket (6) on engine (4) with two nuts (2).
2. Insert dipstick tube (5) through bracket (6), and install dipstick tube (5) on engine (4).
3. Install screw (3), new lockwasher (7), and nut (1) on dipstick tube bracket (6).
4. Install dipstick (TM 9-2320-361-10).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CRANKCASE BREATHER TUBE MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 193, WP 0470 00)

Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## CRANKCASE BREATHER TUBE MAINTENANCE (Contd)

### REMOVAL

1. Disconnect tube (5) and remove adapter (6) from crankcase breather tube (4).
2. Remove screw (8) and lockwasher (7) from crankcase breather tube (4) and turbocharger (9). Discard lockwasher (7).
3. Loosen two clamps (2) and remove crankcase breather tube (4), hose (3), and two clamps (2) from breather tube adapter (1) and turbocharger (9).

### CLEANING AND INSPECTION

#### **WARNING**

- Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

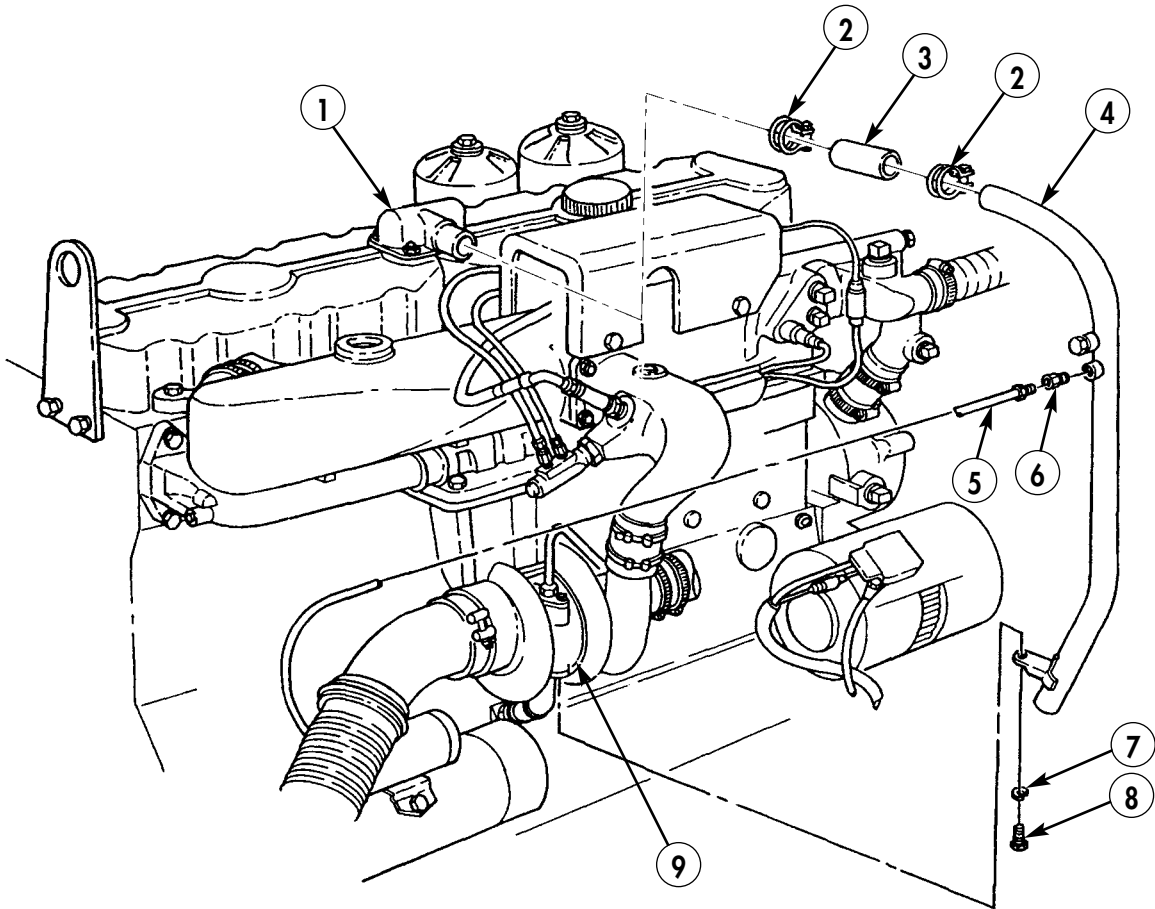
- Compressed air source must not exceed 30 psi (207 Kpa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

Clean crankcase breather tube (4) and hose (3) with Skysol 100 and dry with compressed air. Remove obstructions. Replace if bent.

### INSTALLATION

1. Install hose (3) and crankcase breather tube (4) on breather tube adapter (1) with two clamps (2).
2. Install crankcase breather tube (4) on turbocharger (9) with new lockwasher (7) and screw (8).
3. Install adapter (6) on crankcase breather tube (4), and connect tube (5) to adapter (6).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

CRANKCASE BREATHER TUBE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE OIL FILTER AND BODY MAINTENANCE

DRAINING OIL, OIL FILTER REMOVAL, BODY DISASSEMBLY, CLEANING AND INSPECTION, BODY ASSEMBLY,  
AND OIL FILTER INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Two oil filter kits (item 298, WP 0470 00)  
Two seals (item 329, WP 0470 00)  
Skysol 100 (item 13, WP 0468 00)  
Lubricating oil, OE/HDO 30  
(item 24, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

---

## ENGINE OIL FILTER AND BODY MAINTENANCE (Contd)

### **WARNING**

- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.
- Do not drain oil when engine is hot. Hot oil may cause injury to personnel.

### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **DRAINING OIL**

1. Remove two drainplugs (3) and seals (2) from engine oil pan (1), and allow oil to completely drain. Discard seals (2).
2. Install two new seals (2) and drainplugs (3) to engine oil pan (1).

### **OIL FILTER REMOVAL**

1. Remove pipe plug (6) from filter housing (7) and allow oil to drain.

### **NOTE**

Both engine oil filter bodies are removed the same way.

2. Loosen center post (4) and remove body (5) and gasket (8) from filter housing (7). Discard gasket (8).
3. Install pipe plug (6) on filter housing (7).

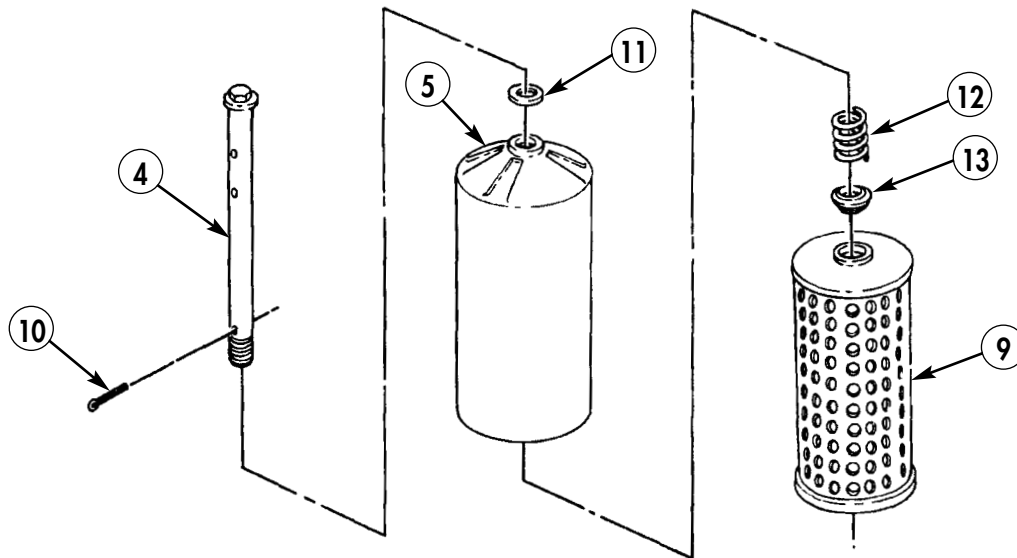
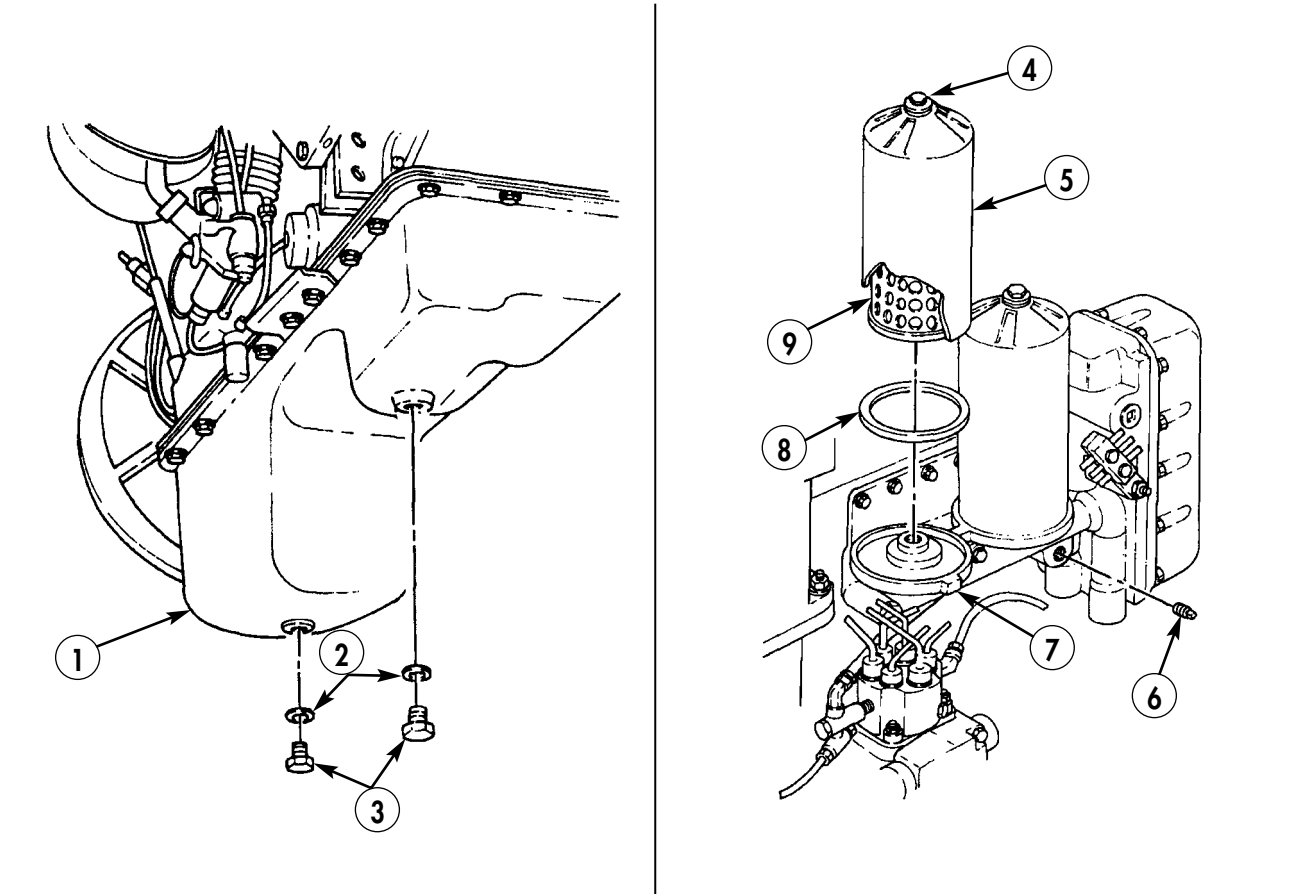
### **BODY DISASSEMBLY**

### **NOTE**

Both engine oil filter bodies are disassembled the same.

1. Remove cotter pin (10), filter element (9), cup (13), and spring (12) from center post (4) and body (5). Discard cotter pin (10) and filter element (9).
2. Remove center post (4) and gasket (11) from body (5). Discard gasket (11).

ENGINE OIL FILTER AND BODY MAINTENANCE (Contd)



## ENGINE OIL FILTER AND BODY MAINTENANCE (Contd)

### CLEANING AND INSPECTION

#### **WARNING**

- Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

- Compressed air source must not exceed 30 psi (207 Kpa). When cleaning with compressed air, eyeshields must be worn. Failure to wear eyeshields may result in injury to personnel.

1. Clean center post (1) and body (2) with Skysol 100 and dry with compressed air.
2. Inspect body (2) for cracks. Replace body (2) if cracked.
3. Inspect center post (1) for stripped threads. Replace center post (1) if threads are stripped.
4. Inspect filter housing (3) for cracks, nicks, and stripped threads. Notify your supervisor if filter housing (3) is cracked, nicked, or threads are stripped.
5. Inspect cup (8) for cracks and grooves. Replace cup (8) if cracked or grooved.
6. Inspect spring (7) for cracks and breaks. Replace spring (7) if cracked or broken.

### BODY ASSEMBLY

#### **NOTE**

Both engine oil filter bodies are assembled the same.

1. Place new gasket (6) on center post (1) and install center post (1) on body (2).
2. Install spring (7), cup (8), new filter element (9), and new cotter pin (5) on center post (1) and body (2).

### OIL FILTER INSTALLATION

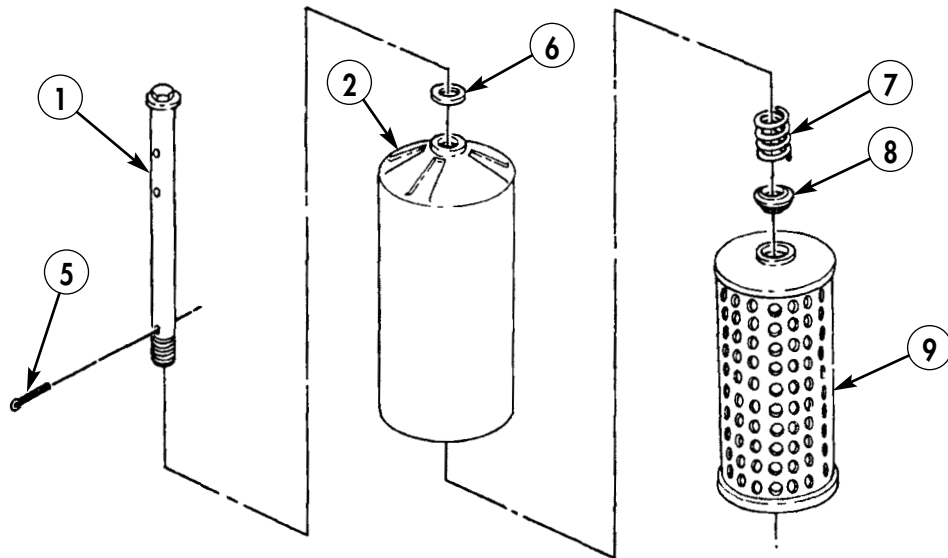
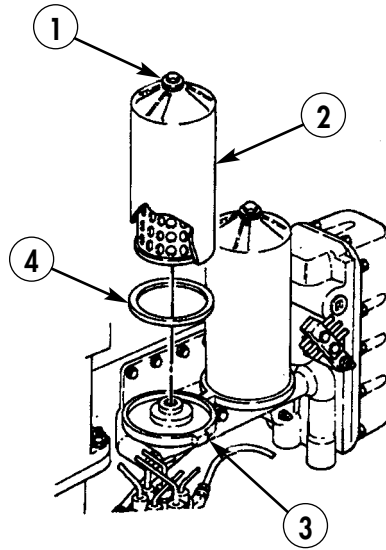
#### **NOTE**

Both engine oil filter bodies are installed the same.

1. Coat new gasket (4) with light film of engine oil.
2. Install new gasket (4) and body (2) on filter housing (3). Tighten center post (1) to 60 lb-ft (81 N•m).
3. Fill engine crankcase to proper fluid level (TM 9-2320-361-10).
4. Connect battery ground cable (WP 0126 00).
5. Start engine and check for leaks (TM 9-2320-361-10).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



ENGINE OIL FILTER AND BODY MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CRANKCASE BREATHER TUBE ADAPTER REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four locknuts (item 126, WP 0470 00)

Two gaskets (item 83, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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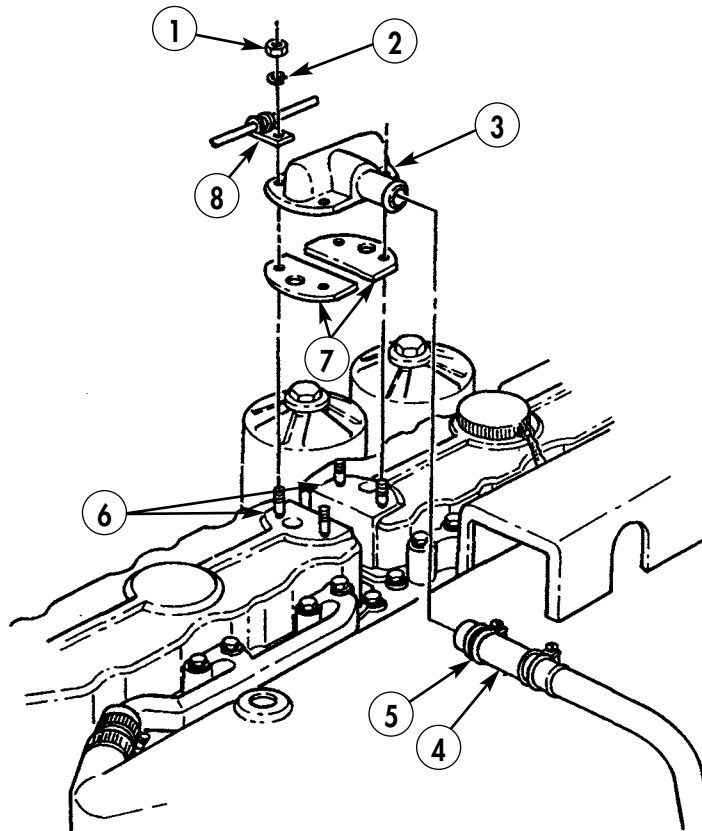
## CRANKCASE BREATHER TUBE ADAPTER REPLACEMENT (Contd)

### REMOVAL

1. Loosen clamp (5) and disconnect hose (4) from crankcase breather tube adapter (3).
2. Remove four locknuts (1), washers (2), and clamp (8) from crankcase breather tube adapter (3). Discard locknuts (1).
3. Remove crankcase breather tube adapter (3) and two gaskets (7) from two rocker arm covers (6). Discard gaskets (7).

### INSTALLATION

1. Install two new gaskets (7) and crankcase breather tube adapter (3) on two rocker arm covers (6) with clamp (8), four washers (2), and new locknuts (1). Tighten locknuts (1) 55–60 lb-in. (6–7 N•m).
2. Connect hose (4) to adapter (3) and tighten clamp (5).
3. Connect battery ground cable (WP 0126 00).
4. Lower and secure hood (TM 9-2320-361-10).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE REPLACEMENT REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)  
Torque wrench, 3/8-in. drive  
(item 138, WP 0469 00)  
Sling (item 91, WP 00469 00)  
1-1/8-in. socket, 3/4-in. drive  
(item 99, WP 0469 00)  
Bar, breaking, 3/4-in. drive  
(item 8, WP 0469 00)  
1-1/4-in. box wrench (item 130, WP 0469 00)  
Lifting device  
Transmission jack  
Engine supports

##### Materials/Parts

Twelve screw-assembled lockwashers  
(item 252, WP 0470 00)  
Eight locknuts (item 127, WP 0470 00)  
Four locknuts (item 161, WP 0470 00)  
Four locknuts (item 145, WP 0470 00)  
Six lockwashers (item 233, WP 0470 00)  
Two lockwashers (item 203, WP 0470 00)  
Two lockwashers (item 223, WP 0470 00)  
Cotter pin (item 29, WP 0470 00)  
Gasket (item 117, WP 0470 00)

##### Materials/Parts (Contd)

Gasket (item 63, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)  
Adhesive sealant (item 4, WP 0468 00)  
Antiseize tape (item 42, WP 0468 00)

##### References

WP 0047 00  
WP 0070 00  
WP 0071 00  
WP 0072 00  
WP 0050 00

##### Personnel Required

Two

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air reservoir drained (TM 9-2320-361-10).  
Engine oil drained (WP 0044 00).  
Propeller shaft removed (WP 0139 00).  
Air cleaner assembly removed (WP 0053 00).  
Cab tunnel panel removed (WP 0230 00).  
Transmission gearshift lever removed  
(WP 0130 00).  
Radiator and brackets removed (WP 0077 00).  
Front winch propeller shaft removed, if  
equipped (WP 0346 00).

## ENGINE REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury to personnel may result.

### **CAUTION**

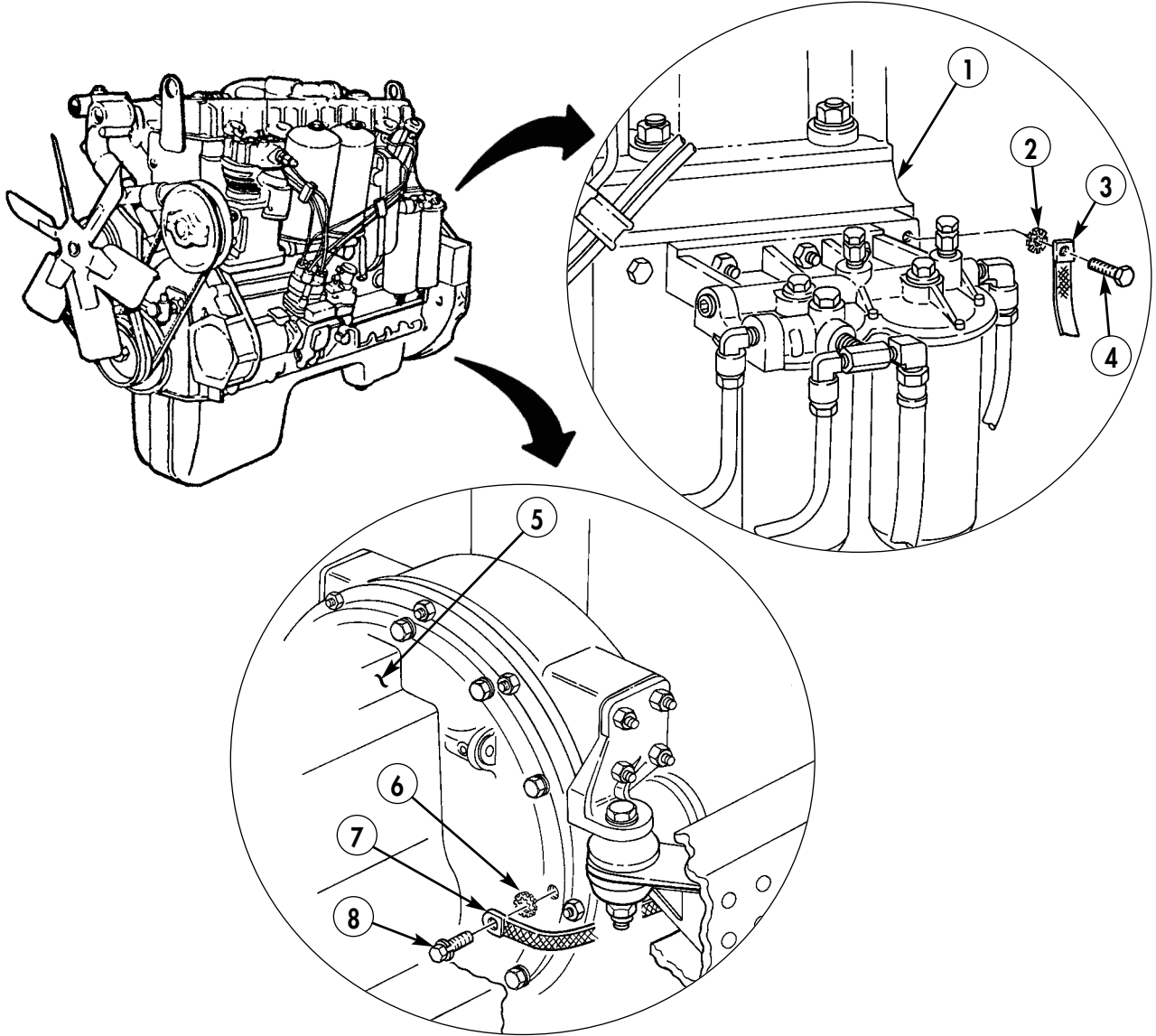
Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

## REMOVAL

### **NOTE**

- Prior to removal, tag lead wires, hoses, and tubes for installation.
  - Secure wires, hoses, and tubes away from engine after removal or disconnection.
1. Remove screw (4), ground strap (3), and lockwasher (2) from rear of engine (1). Discard lockwasher (2). Install screw (4) in rear of engine (1).
  2. Remove screw (8), ground strap (7), and lockwasher (6) from transmission (5). Discard lockwasher (6). Install screw (8) in transmission (5).

ENGINE REPLACEMENT (Contd)



**ENGINE REPLACEMENT (Contd)****REMOVAL (Contd)**

3. Remove screw (1), lockwasher (2), and clamp (3) from fuel injector pump (5). Discard lockwasher (2).
4. Loosen screw (7) and remove engine stop control cable (4) from swivel (6).
5. Remove throttle return spring (15) from swivel (14) and throttle return clip (17).
6. Remove cotter pin (9), pin (16), and swivel (14) from pump lever (8). Discard cotter pin (9).
7. Remove screw (10), connector (11), and throttle control cable (12) from accelerator rod (13).

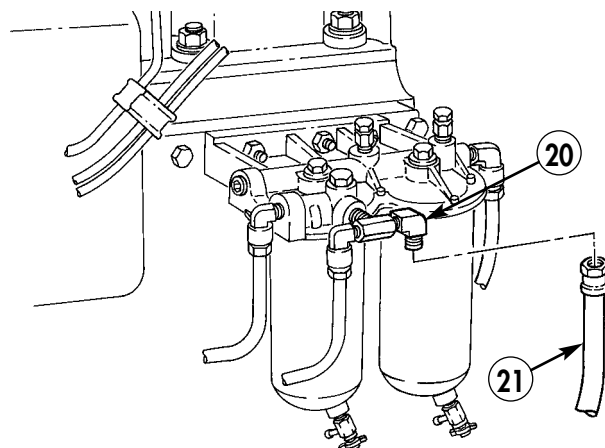
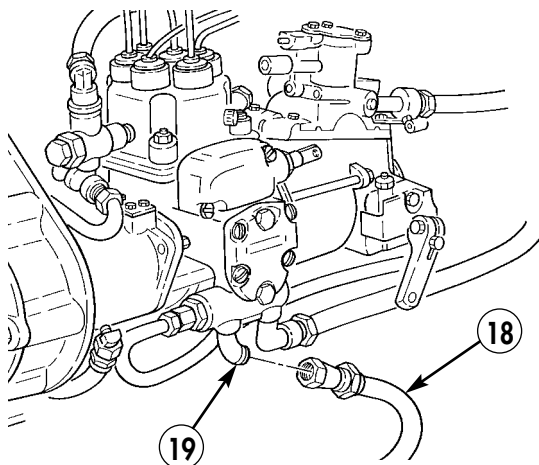
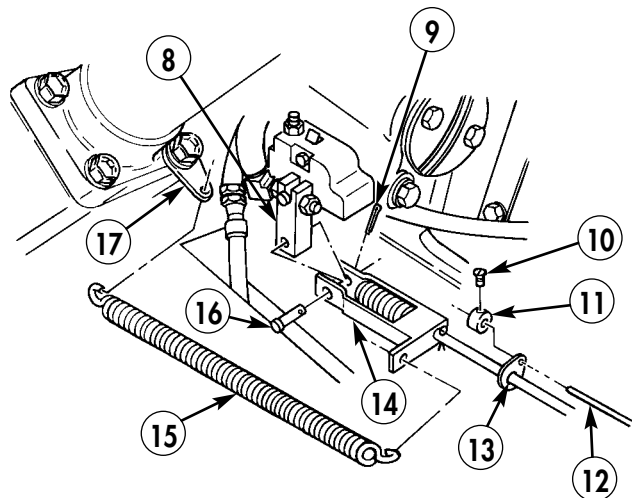
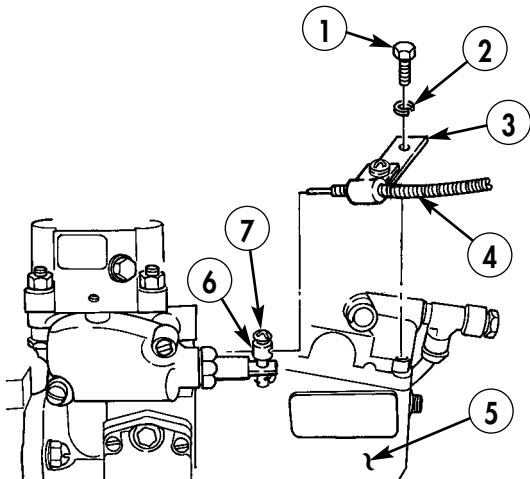
**WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury to personnel may result.

**NOTE**

Have fuel drainage container ready to catch excess fuel.

8. Disconnect fuel line (18) from fuel pump elbow (19).
9. Disconnect fuel line (21) from fuel filter elbow (20).

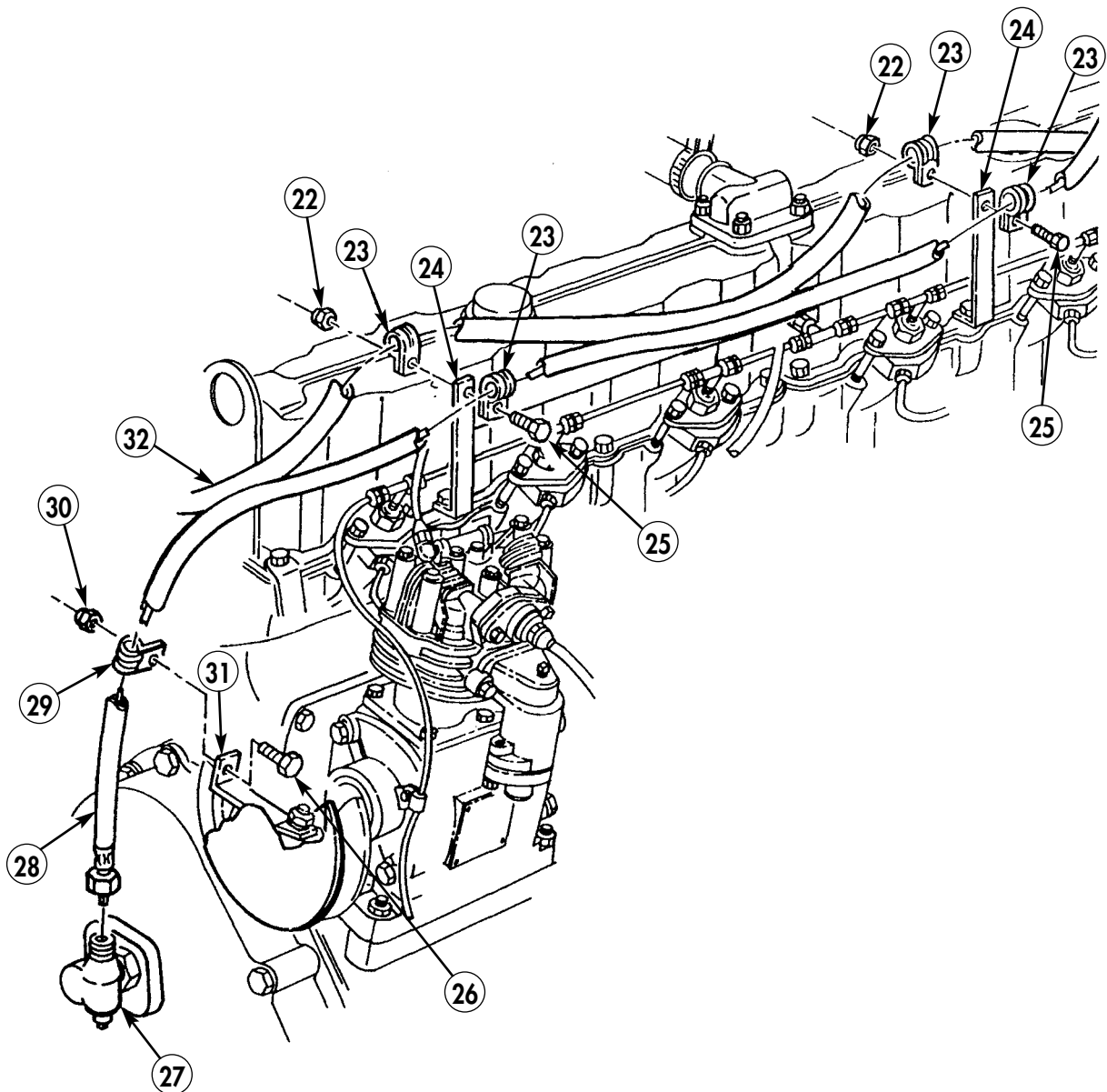




## ENGINE REPLACEMENT (Contd)

### REMOVAL (Contd)

10. Disconnect tachometer driveshaft (28) from tachometer drive unit (27).
11. Remove locknut (30), screw (26), clamp (29), and tachometer driveshaft (28) from bracket (31). Discard locknut (30).
12. Remove two locknuts (22), screws (25), four clamps (23), tachometer driveshaft (28), and wiring harness (32) from two brackets (24). Discard locknuts (22).



## ENGINE REPLACEMENT (Contd)

### REMOVAL (Contd)

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

13. Disconnect air line (2) from air governor (1).
14. Disconnect air line (4) from air compressor (3).

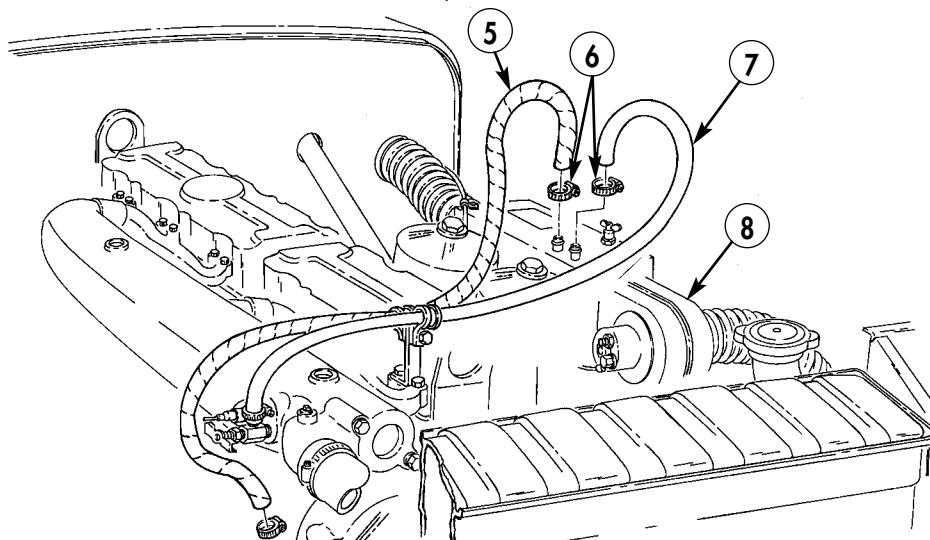
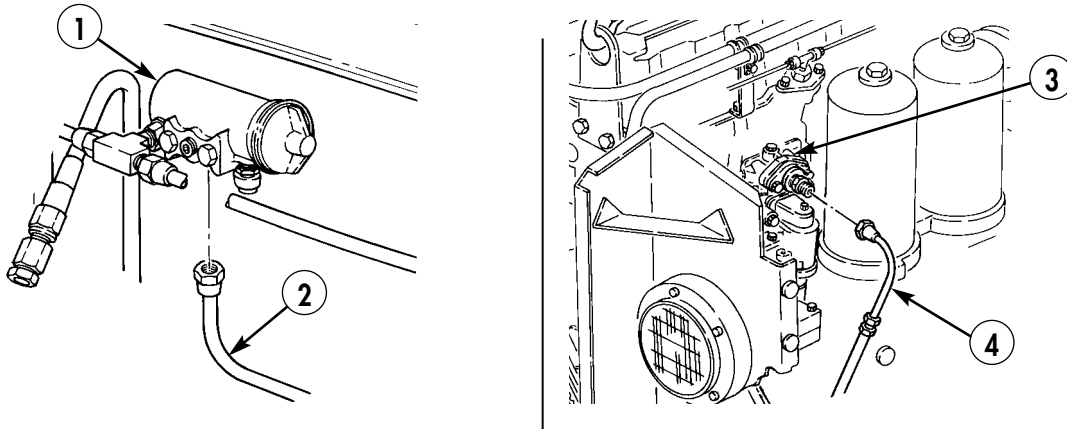
#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining water. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

15. Remove two clamps (6), inlet hose (5), and outlet hose (7) from hot water personnel heater (8).



## ENGINE REPLACEMENT (Contd)

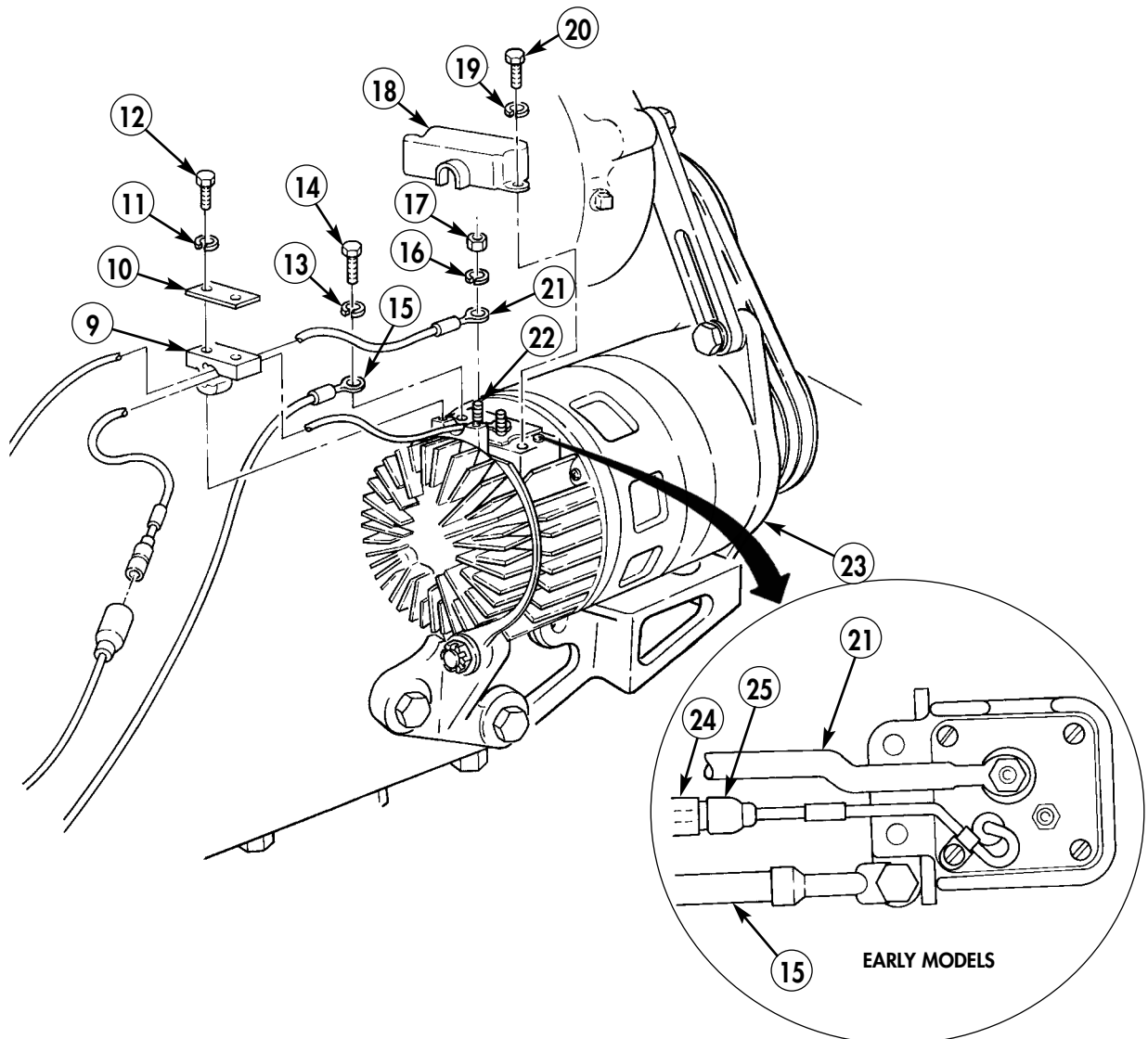
### REMOVAL (Contd)

16. Remove two screws (20) and lockwashers (19) from terminal cover (18). Discard lockwashers (19).
17. Remove terminal cover (18) and water proofing sealant from alternator (23).
18. Remove two screws (12), lockwashers (11), wire retaining strap (10), and spacer (9) from alternator (23). Discard lockwashers (11).

#### NOTE

Alternator has an AC terminal not used on M35A2 series trucks.

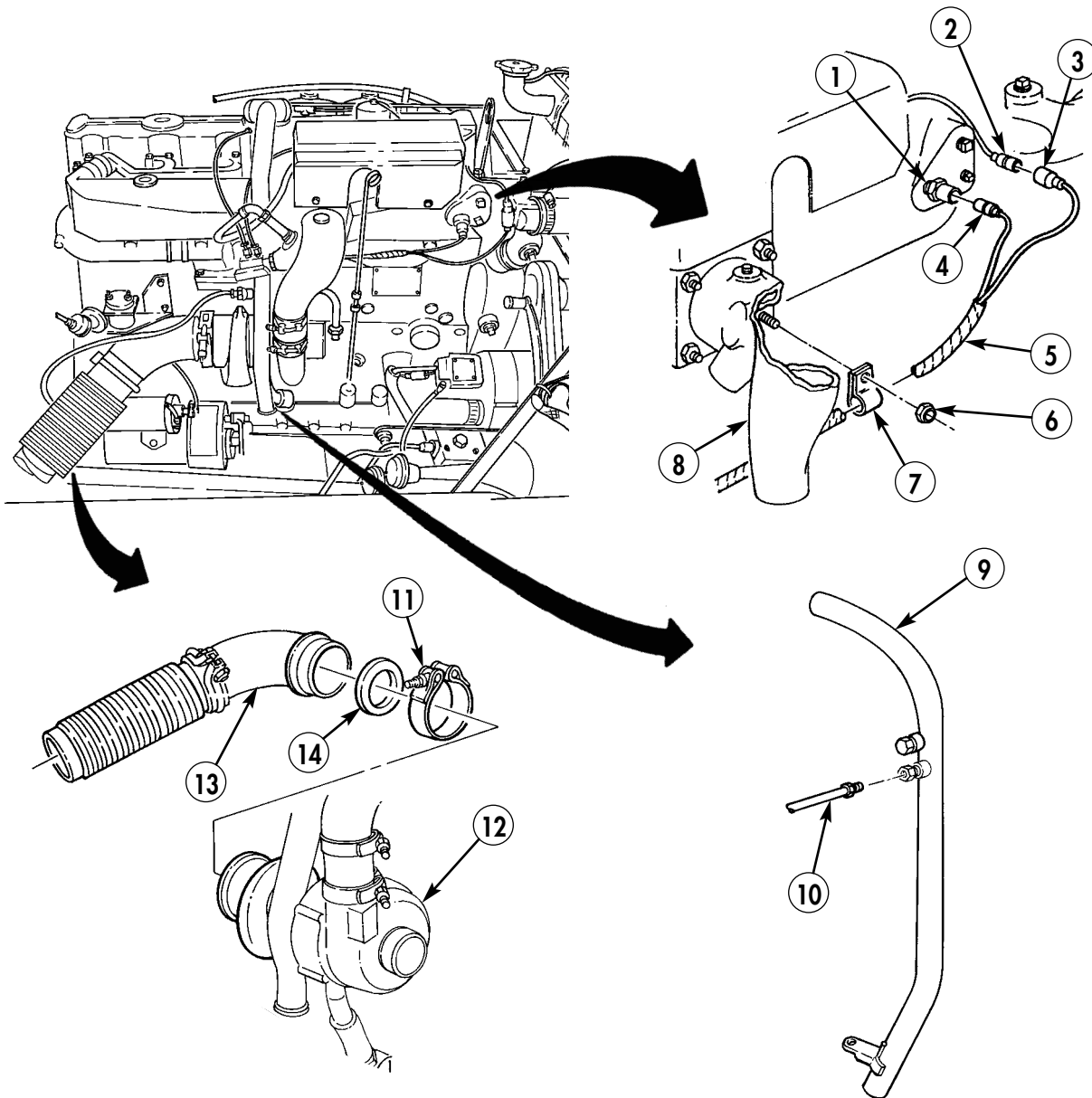
19. Remove screw (14), lockwasher (13), and ground wire (15) from alternator (23). Discard lockwasher (13).
20. Remove nut (17), lockwasher (16), and positive wire (21) from alternator stud (22). Discard lockwasher (16).
21. Disconnect wire (24) from accessory wire (25).



## ENGINE REPLACEMENT (Contd)

### REMOVAL (Contd)

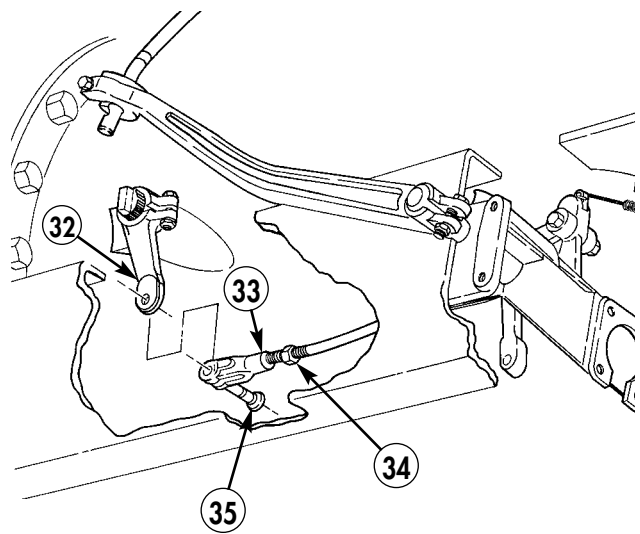
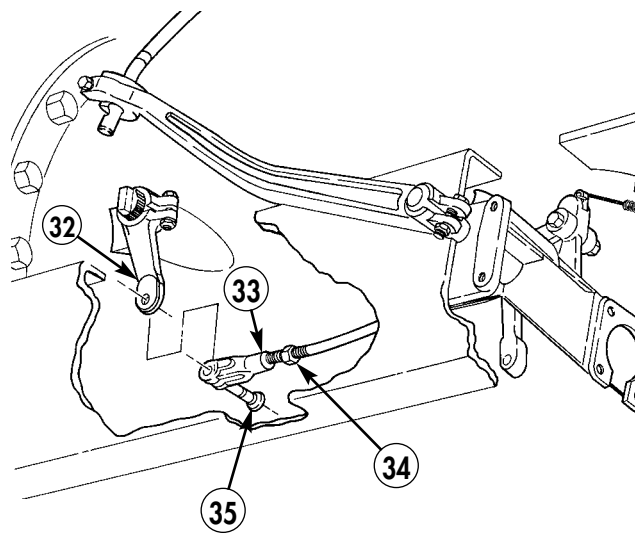
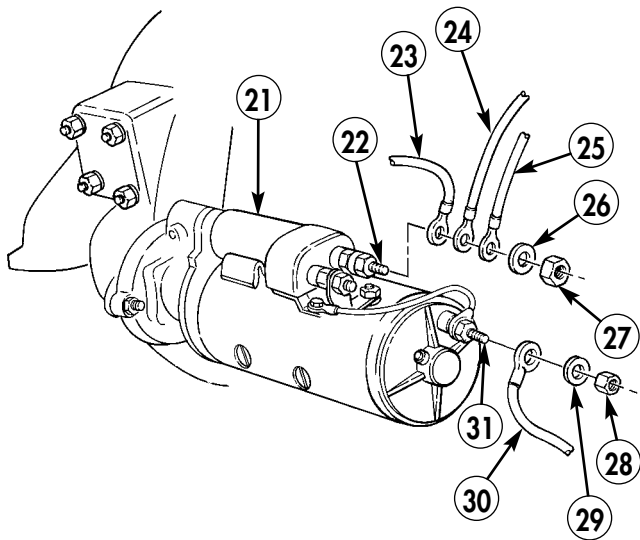
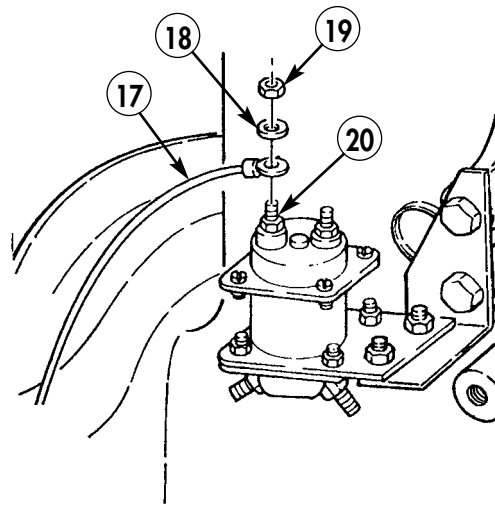
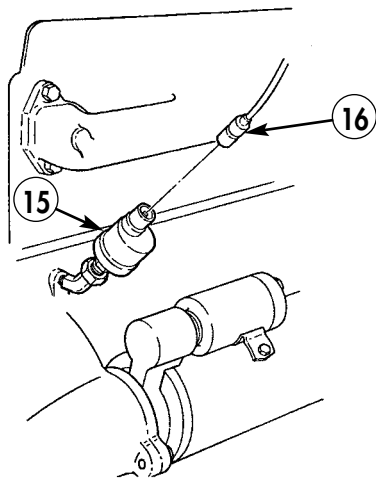
22. Disconnect wire (4) from engine temperature sending unit (1).
23. Disconnect wire (3) from manifold heater harness (2).
24. Remove locknut (6), clamp (7), and front wiring harness (5) from intake manifold (8). Discard locknut (6).
25. Disconnect vent tube (10) from crankcase breather tube (9).
26. Loosen clamp (11) and remove elbow (13), clamp (11), and gasket (14) from turbocharger (12). Discard gasket (14).



## ENGINE REPLACEMENT (Contd)

### REMOVAL (Contd)

27. Disconnect wire (16) from oil pressure sending unit (15).
28. Remove nut (19), washer (18), and wire (17) from starter relay stud (20).
29. Remove nut (27), lockwasher (26), wires (25) and (24), and cable (23) from solenoid stud (22). Discard lockwasher (26).
30. Remove nut (28), lockwasher (29), and ground cable (30) from ground stud (31) on starter motor (21). Discard lockwasher (29).
31. Loosen nut (34), pull pin (35) to side of clevis (33), and disconnect clevis (33) from remote control lever (32).



## ENGINE REPLACEMENT (Contd)

### REMOVAL (Contd)

#### **NOTE**

- Do not remove spring-loaded pin from clevis. Bearing will fall free from clevis if pin is removed.
- Step 32 applies to vehicles equipped with transmission power takeoff.

32. Pull pin (10) to one side of clevis (11) and remove clevis (11) from Power Takeoff (PTO) arm (8).
33. Install chain to rear lifting bracket (5) with two washers (3), screw (2), and nut (4).
34. Connect lifting device to sling.
35. Connect sling to front lifting bracket (1) and chain.
36. Remove two locknuts (15), washers (14), lower mounting pads (13), screws (6), and washers (7) from frame (12). Discard locknuts (15).
37. Remove two locknuts (16), washers (17), lower mounting pads (18), screws (23), and washers (22) from support plate (21) and crossmember (19). Discard locknuts (16).

#### **WARNING**

- Lifting device must have a weight capacity greater than the weight of the engine and transmission to prevent damage to equipment and injury to personnel.
- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Use prybar to free engine during lifting operations. Failure to do so may cause injury to personnel.
- Do not detach chain from engine until engine is supported on engine stand. An improperly supported engine may cause injury to personnel.

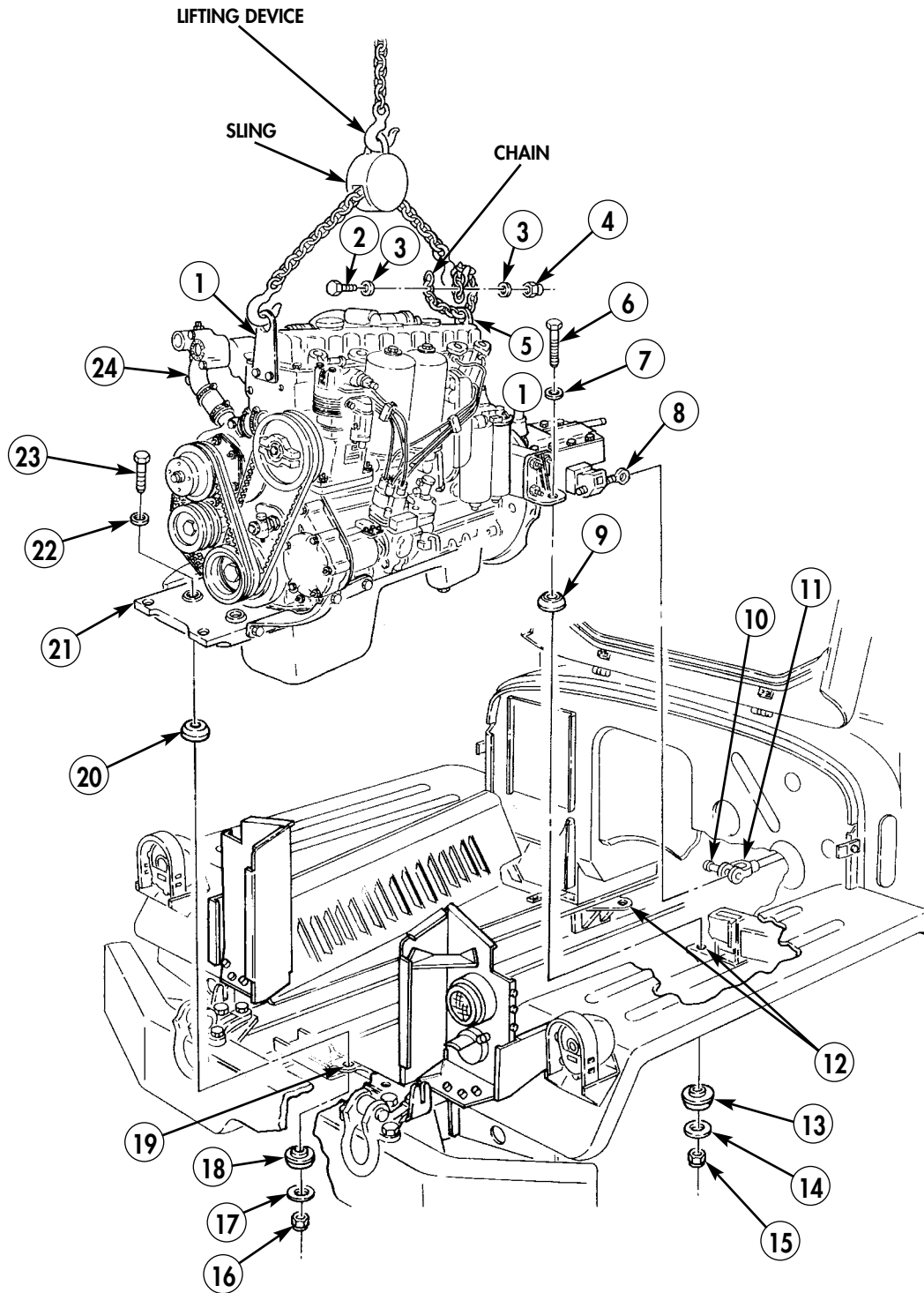
#### **CAUTION**

Closely observe all engine and transmission attachments during removal to prevent damage to equipment.

#### **NOTE**

- Assistant will help with step 38.
  - Engine angle must be adjusted constantly during engine removal.
38. Raise engine (24) from engine compartment.
  39. Lower engine (24) and position on supports.
  40. Remove lifting device and sling from chain and front lifting bracket (1).
  41. Remove nut (4), screw (2), two washers (3), and chain from rear lifting bracket (5).
  42. Remove two mounting pads (9) and (20) from frame (12) and crossmember (19).

# ENGINE REPLACEMENT (Contd)



**ENGINE REPLACEMENT (Contd)****REMOVAL (Contd)**

43. Remove six screws (7), washers (8), and support plate (10) from two front engine supports (9).
44. Remove two screws (5), screws (6), washers (4), and two front engine supports (9) from engine (1).
45. Remove eight locknuts (3) and two rear engine supports (2) from engine (1). Discard locknuts (3).

**CAUTION**

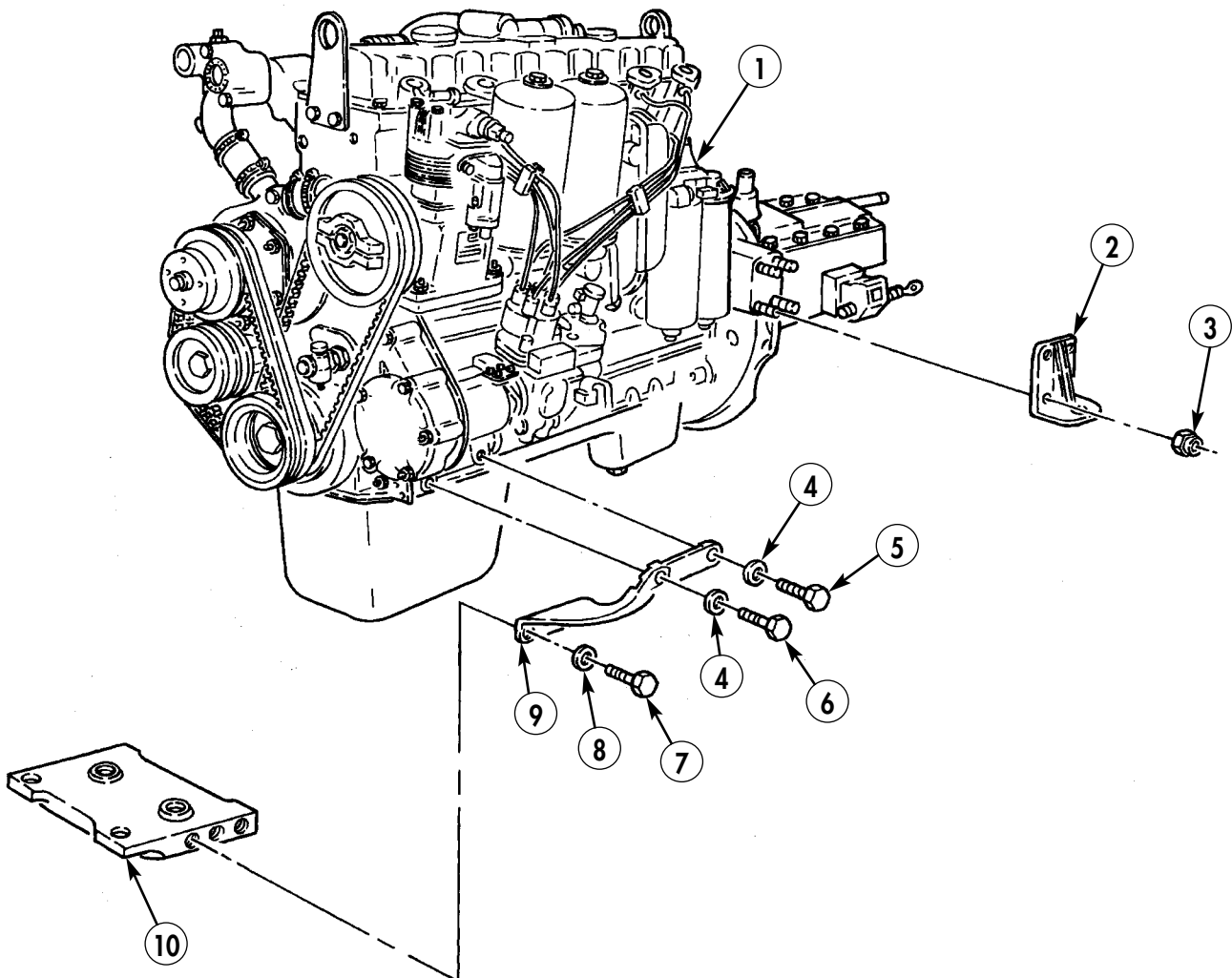
Before removing transmission, ensure transmission is properly supported. Failure to do so may result in damage to equipment.

46. Position transmission jack or wooden supports under transmission (13).
47. Remove twelve screw-assembled lockwashers (12) from transmission (13) and flywheel housing (11). Discard screw-assembled lockwashers (12).
48. Remove transmission (13) and gasket (14) from flywheel housing (11). Discard gasket (14).

**NOTE**

If clutch replacement is required, perform step 49.

49. Remove pressure plate and clutch (WP 0050 00).





## ENGINE REPLACEMENT (Contd)

### INSTALLATION

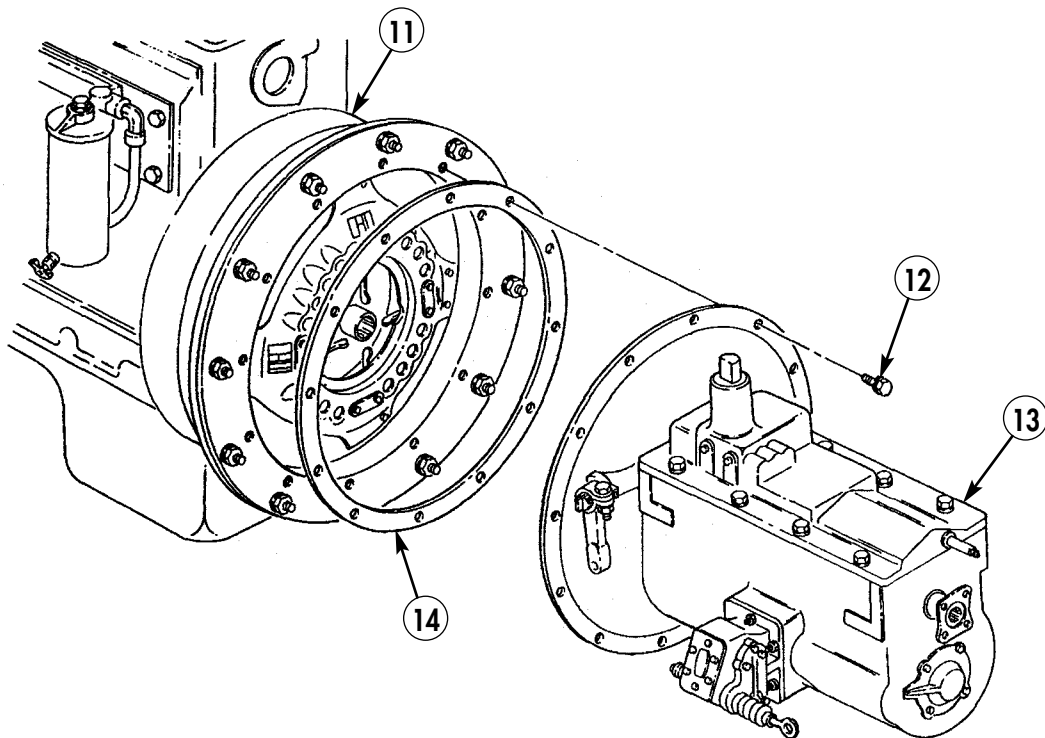
#### **CAUTION**

Remove all plugs or caps prior to installation. Failure to do so may result in damage to equipment.

#### **NOTE**

Perform step 1 if clutch and pressure plate were removed.

1. Install pressure plate and clutch (WP 0050 00).
2. Position transmission (13) to flywheel housing (11) with transmission jack.
3. Install new gasket (14) and transmission (13) on flywheel housing (11) with twelve new screw assembled lockwashers (12). Tighten screw-assembled lockwashers (12) 23–26 lb-ft (31–35 N•m).
4. Remove transmission jack from transmission (13).



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

5. Install two rear engine supports (2) on engine (1) with eight new locknuts (3). Tighten locknuts (3) 45–55 lb-ft (61–75 N•m).
6. Install two front engine supports (9) on engine (1) with four washers (4), two screws (5), and screws (6). Tighten screws (5) and (6) 200–250 lb-ft (271–339 N•m).
7. Install support plate (10) on two front engine supports (9) with six washers (8) and screws (7). Tighten screws (7) 24–27 lb-ft (33–37 N•m).
8. Install chain on rear lifting bracket (16) with washers (14) and (13), screw (16), and nut (15).
9. Connect lifting device to sling.
10. Connect sling to front lifting bracket (11) and chain.

#### **WARNING**

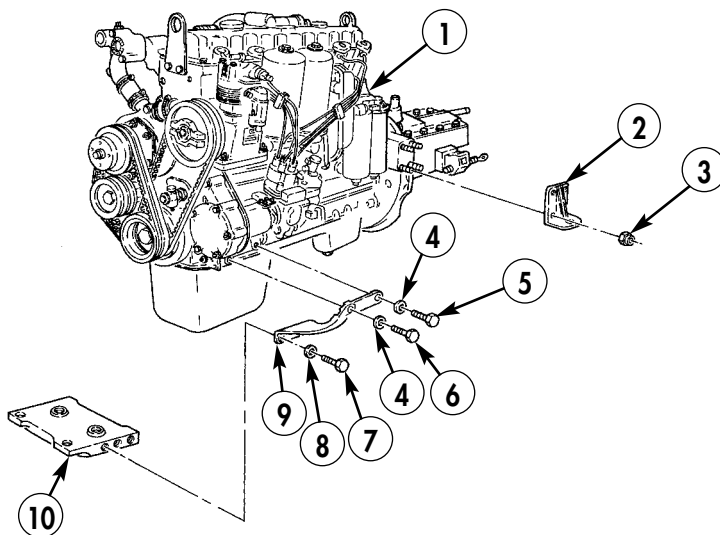
- Lifting device must have a weight capacity greater than the weight of the engine and transmission to prevent damage to equipment and injury to personnel.
- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Use prybar to free engine during lifting operations. Failure to do so may cause injury to personnel.
- Do not detach chain from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.

11. Raise engine (1) from supports.

#### **NOTE**

- Two assistants will help with step 12.
- Engine angle must be adjusted constantly during engine installation.

12. Lower engine (1) into engine compartment. Do not lower completely.



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### **WARNING**

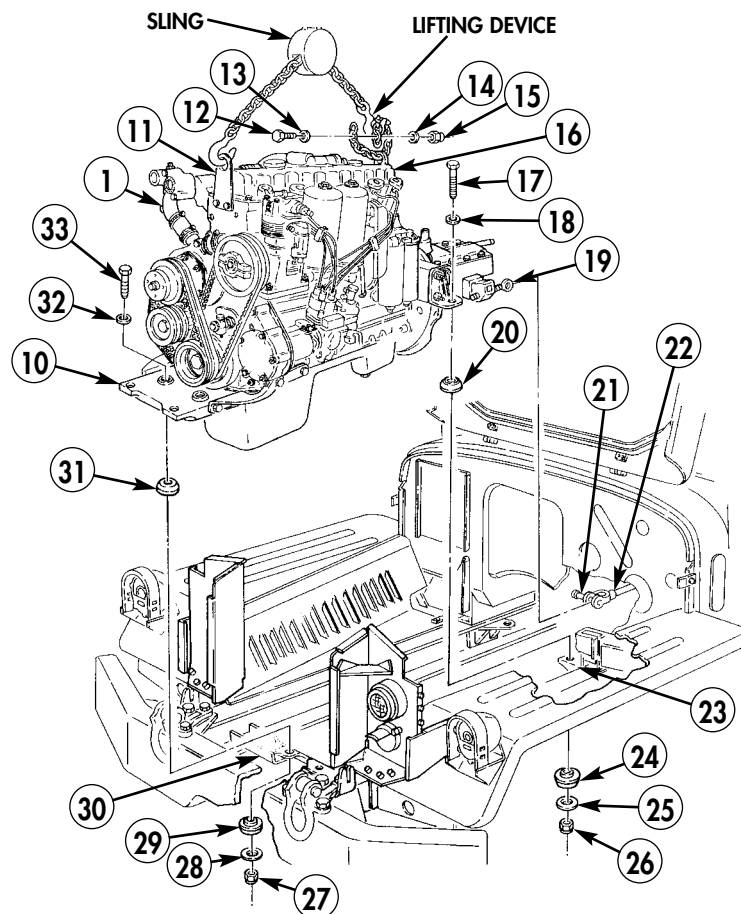
Keep hands clear of supported engine during placement of engine mounts. Failure to do so may result in injury to personnel.

13. Position two mounting pads (20) and (31) on frame (23) and crossmember (30).
14. Lower engine (1) until it rests on frame (23) and crossmember (30). Ensure mounting holes are aligned.
15. Install two washers (32), screws (33), lower mounting pads (29), washers (28), and new locknuts (27) on support plate (10) and crossmember (30). Tighten locknuts (27) 65–70 lb-ft (88–95 N•m).
16. Install two washers (18), screws (17), lower mounting pads (24), washers (25), and new locknuts (26) on frame (23). Finger-tighten locknuts (26).
17. Tighten locknuts (26) 65–70 lb-ft (88–95 N•m).
18. Remove lifting device and sling from chain and front lifting bracket (11).
19. Remove nut (15), screw (12), washers (14) and (13), and chain from rear mounting bracket (16).

#### **NOTE**

Perform step 20 if vehicle is equipped with transmission PTO.

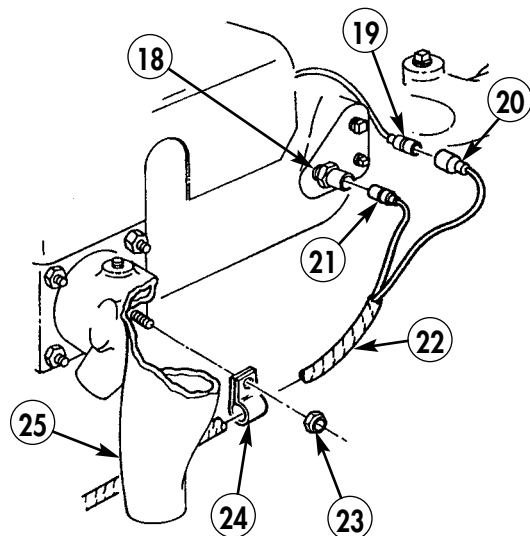
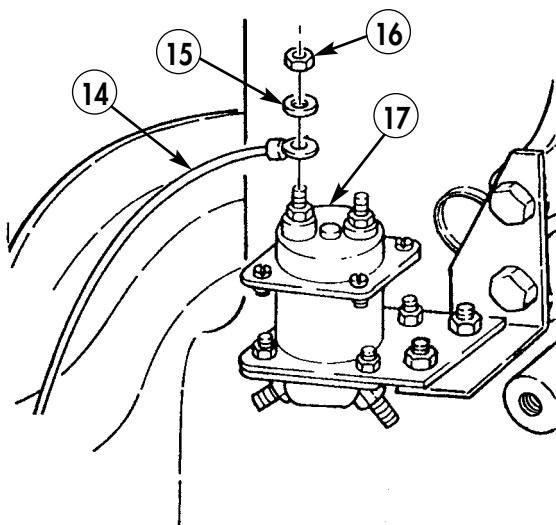
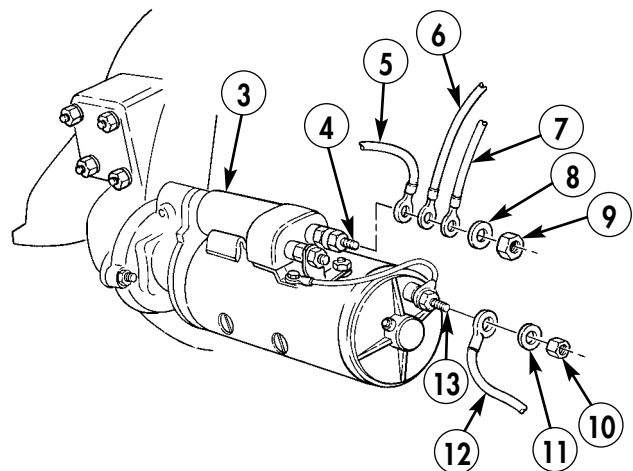
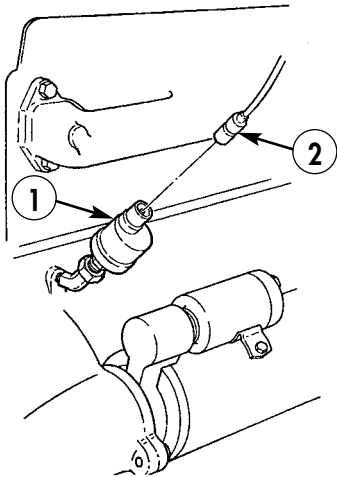
20. Position clevis (22) on PTO arm (19) and push pin (21) in clevis (22) until head of pin (21) seats against clevis (22).



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

21. Connect wire (2) to oil pressure sending unit (1).
22. Install ground wire (12) on ground stud (13) and starter motor (3) with new lockwasher (11) and nut (10).
23. Install cable (5) and wires (6) and (7) on solenoid stud (4) with new lockwasher (8) and nut (9).
24. Install wire (14) on starter relay (17) with washer (15) and nut (16).
25. Connect wire (17) to engine temperature sending unit (18).
26. Connect wire (20) to manifold heater harness (19).
27. Install front wiring harness (18) and clamp (24) on intake manifold (25) with new locknut (23).



## ENGINE REPLACEMENT (Contd)

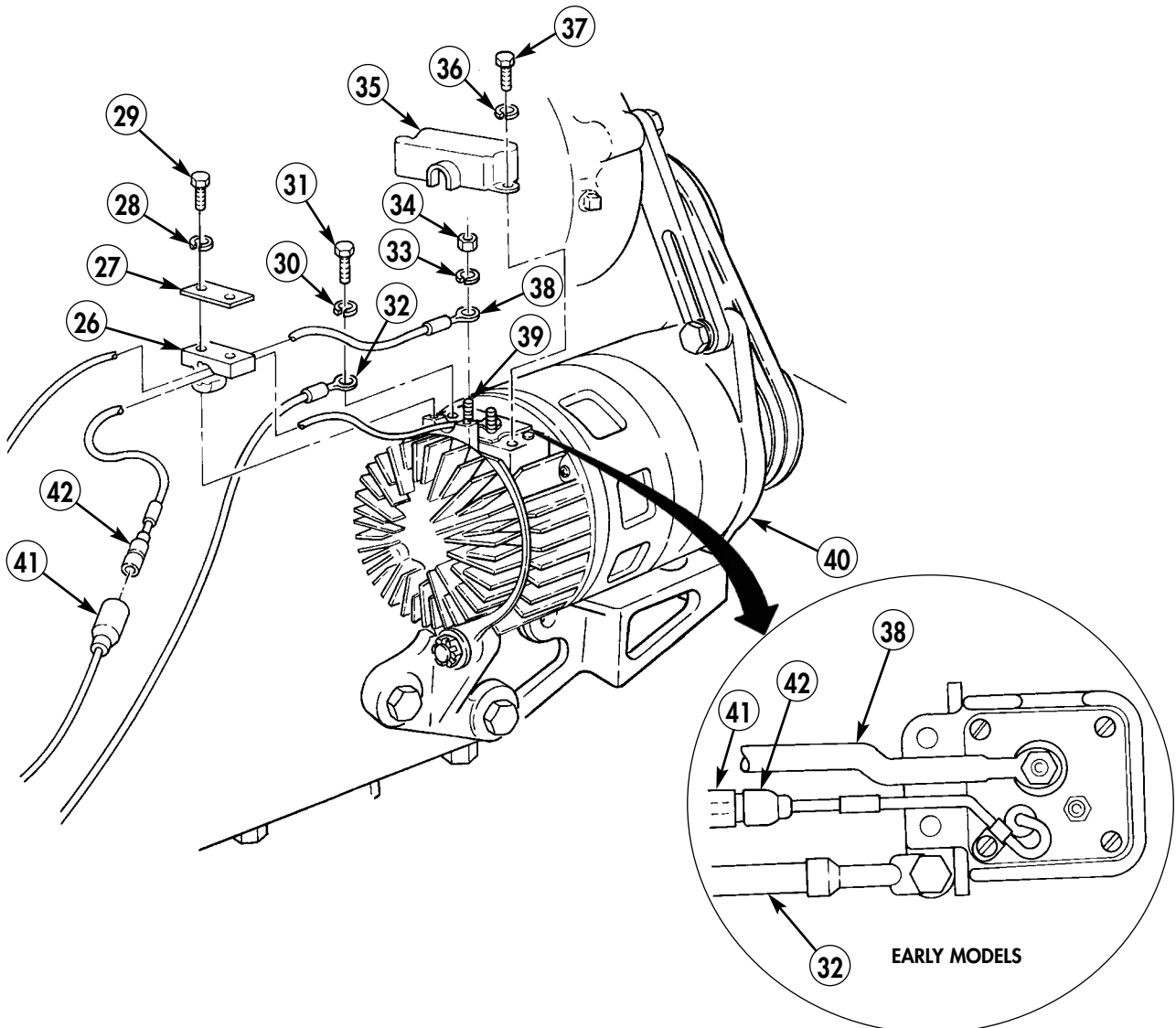
### INSTALLATION (Contd)

28. Connect wire (41) to accessory wire (42).

#### NOTE

Ensure terminals are clean before connections are made.

29. Install positive wire (38) on alternator (40) with new lockwasher (33) and nut (34). Tighten nut (34) 45–55 lb-in (5–6 N•m).
30. Install ground wire (32) on alternator (40) with new lockwasher (30) and screw (31). Tighten screw (31) 82–102 lb-in (9–12 N•m).
31. Install spacer (26) on alternator (40) and wire retaining strap (27) on terminal (39) with two new lockwashers (28) and screws (29). Tighten screws (29) 30–35 lb-in (3–4 N•m).
32. Seal terminal (39) and terminal cover (35) completely with adhesive sealant.
33. Install terminal cover (35) on alternator (40) with two new lockwashers (36) and screws (37).



## ENGINE REPLACEMENT (Contd)

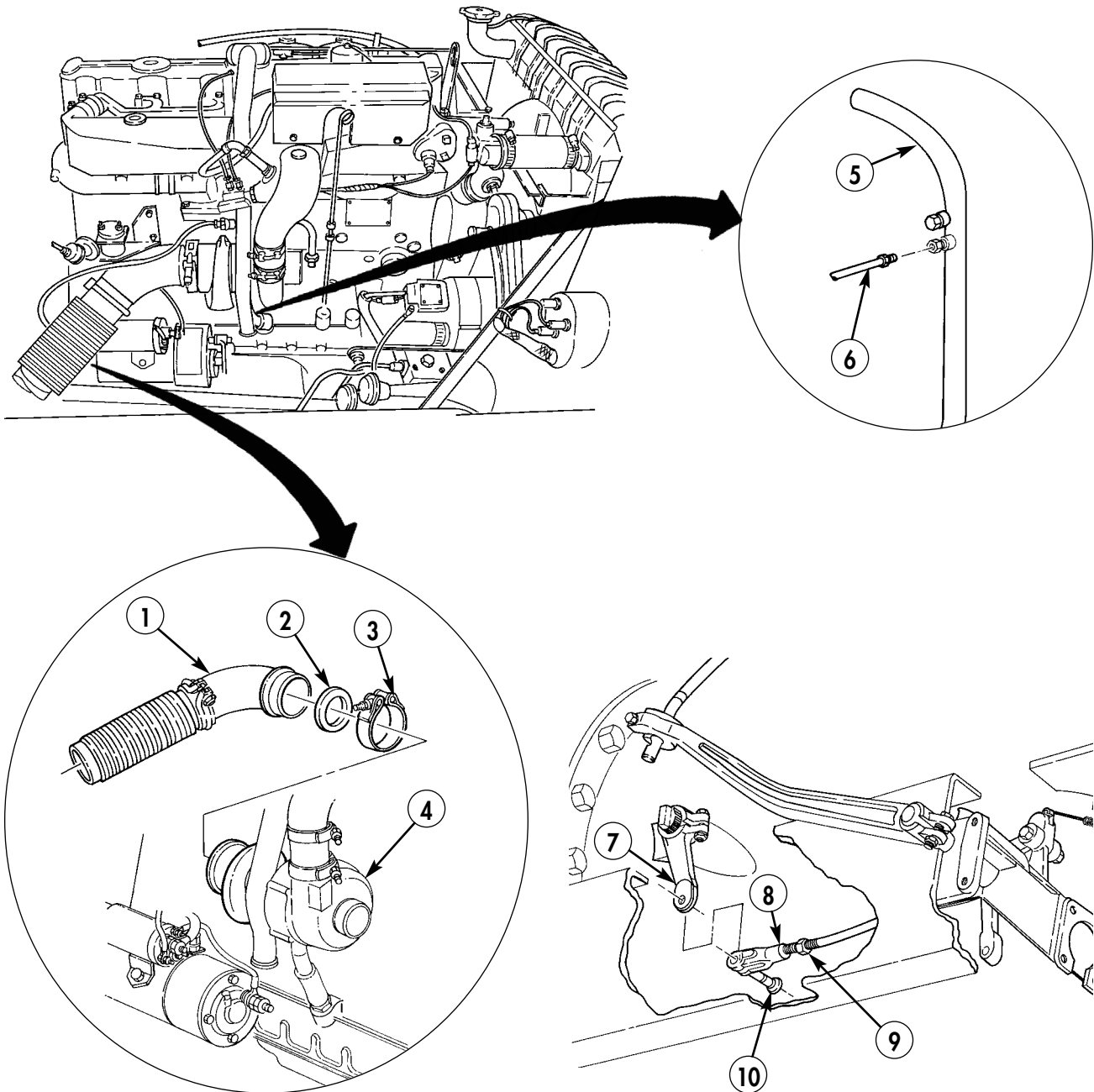
### INSTALLATION (Contd)

34. Install new gasket (2) and elbow (1) on turbocharger (4) with clamp (3).

**NOTE**

Vent line threads must be wrapped with antiseize tape prior to installation.

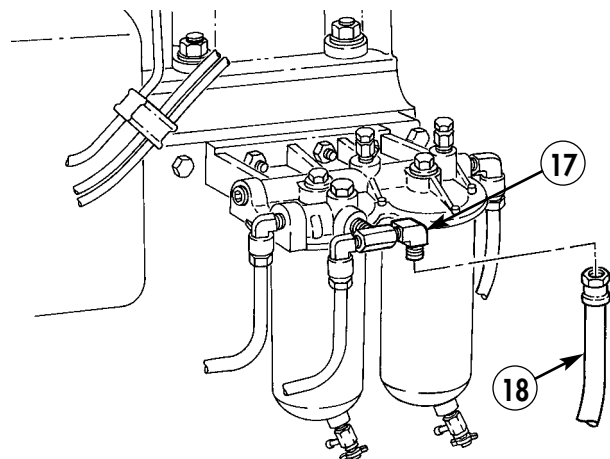
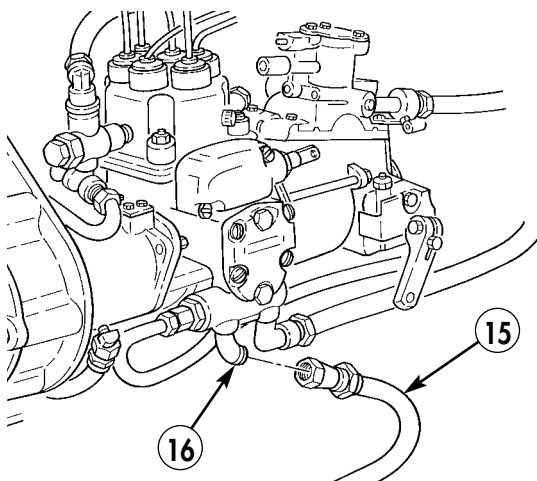
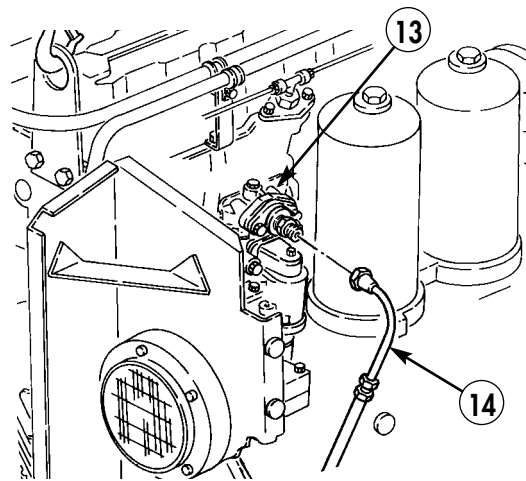
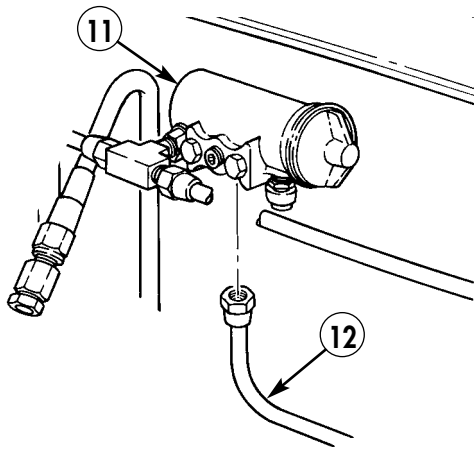
35. Connect vent tube (6) on crankcase breather tube (5).  
 36. Position clevis (8) on remote control lever (7). push pin (10) in clevis (8) until head of pin (10) seats against clevis (8). Tighten nut (9).



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

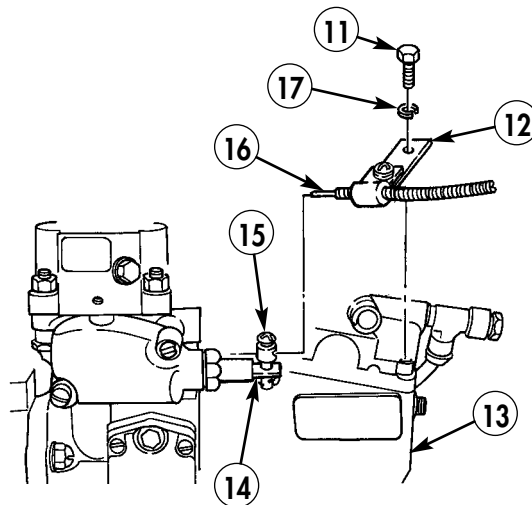
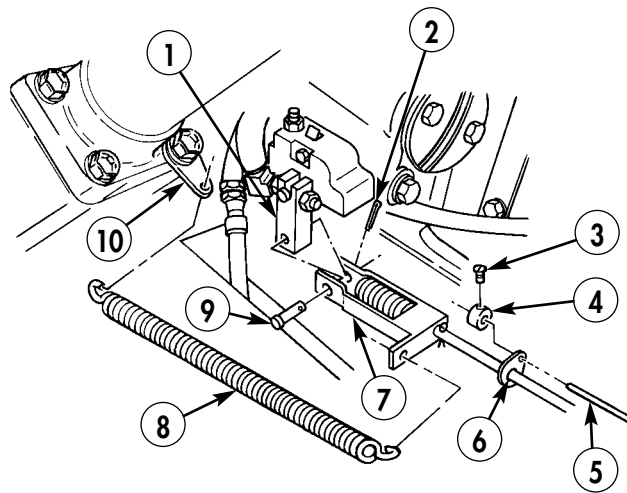
37. Connect air line (12) to air governor (11).
38. Connect air line (14) to air compressor (13).
39. Connect fuel line (15) to fuel pump elbow (16).
40. Connect fuel line (18) to fuel filter elbow (17).



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

41. Install swivel (7) on pump lever (1) with pin (9) and new cotter pin (2).
42. Insert throttle control cable (5) through flange on accelerator rod (6) and install with connector (4) and screw (3). Do not tighten screw (3). Position connector (4) 1/8 in. (3 mm) from flange on accelerator rod (6) and tighten screw (3).
43. Install throttle return spring (8) on swivel (7) and throttle return clip (10).
44. Insert cable control wire (16) through swivel (14). Do not tighten screw (15).
45. Install clamp (12) on fuel injector pump (13) with new lockwasher (17) and screw (11).

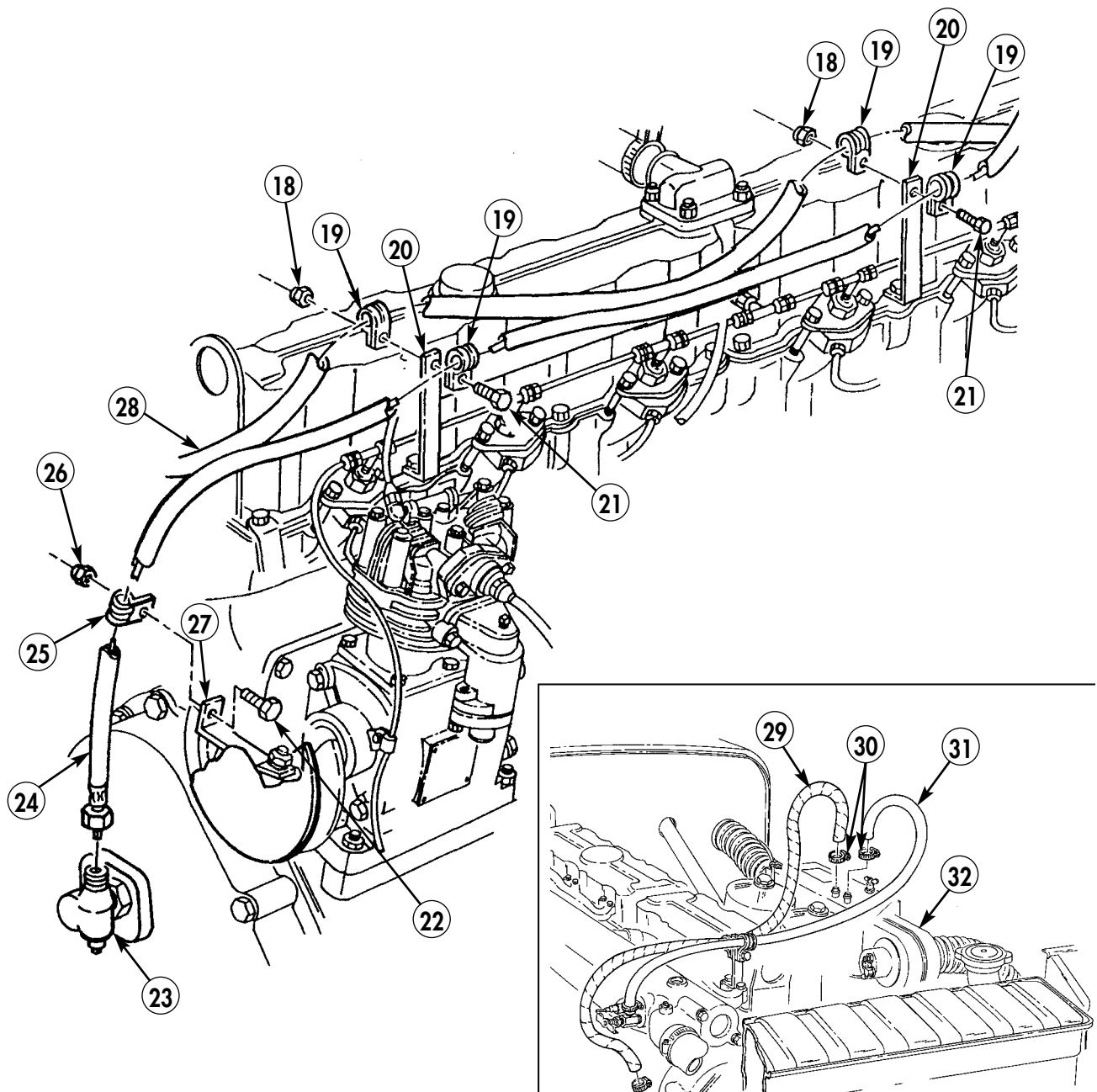




## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

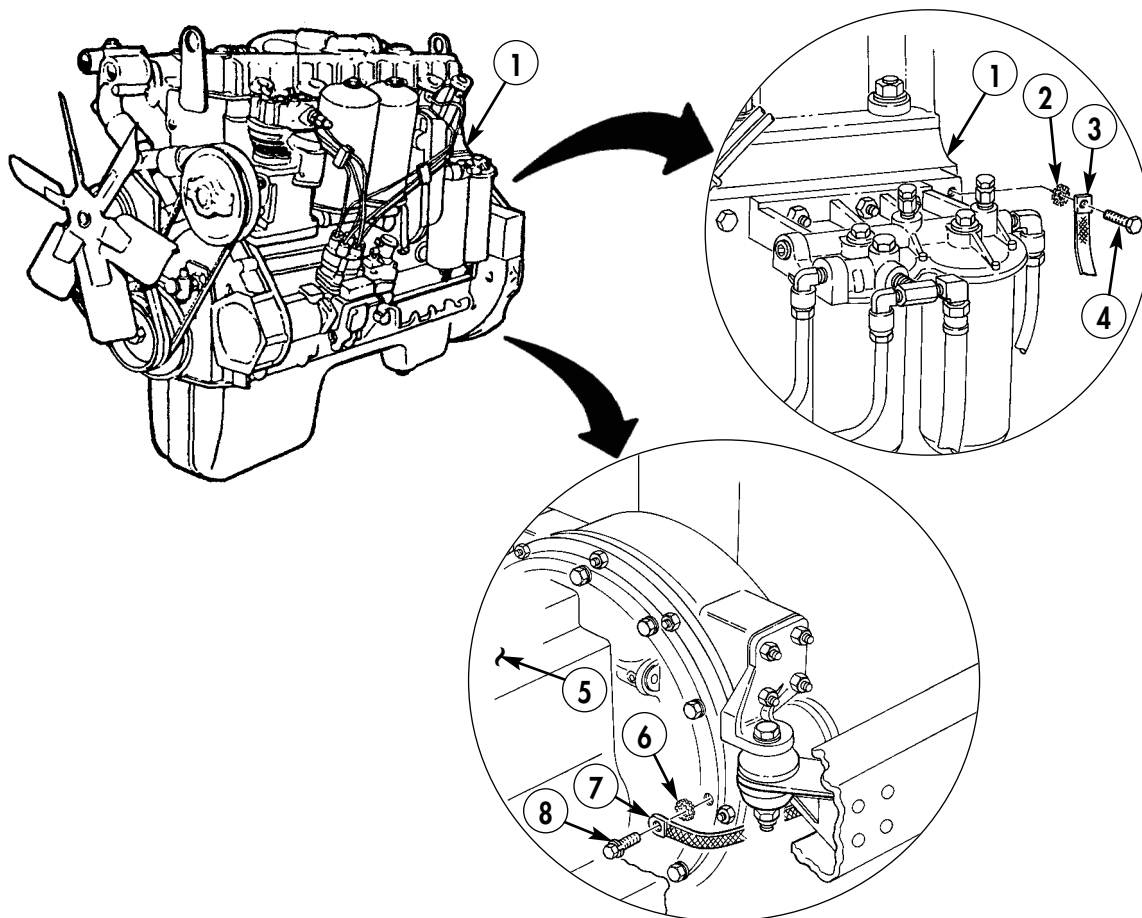
46. Connect tachometer driveshaft (24) to tachometer drive unit (23).
47. Install tachometer driveshaft (24) and clamp (25) on bracket (27) with screw (22) and new locknut (26).
48. Install wiring harness (28), tachometer driveshaft (24), and four clamps (19) on two brackets (20) with two screws (21) and new locknuts (18).
49. Install inlet hose (29) and outlet hose (31) on hot water personnel heater (32) with two clamps (30).



## ENGINE REPLACEMENT (Contd)

### INSTALLATION (Contd)

50. Remove screw (8) and lockwasher (6) from transmission (5) and install new lockwasher (6) and ground strap (7) on transmission (5) with screw (8). Tighten screw (8) 23–26 lb-ft (31–35 N•m).
51. Remove screw (4) from engine (1) and install new lockwasher (2) and ground strap (3) on engine (1) with screw (4).
52. Install air cleaner assembly (WP 0053 00).
53. Install transmission gearshift lever (WP 0130 00).
54. Install radiator and brackets (WP 0077 00).
55. Install cab tunnel panel (WP 0230 00).
56. Install front winch propeller shaft, if equipped (WP 0346 00).
57. Install propeller shaft (WP 0139 00).
58. Fill engine crankcase to proper oil level (TM 9-2320-361-10).
59. Adjust hand throttle control cable (WP 0072 00).
60. Adjust engine stop control cable (WP 0071 00).
61. Adjust accelerator linkage (WP 0070 00).
62. Adjust clutch control linkage (WP 0047 00).
63. Connect battery ground cable (WP 0126 00).
64. Lower and secure hood (TM 9-2320-361-10).
65. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CLUTCH CONTROL LINKAGE MAINTENANCE REMOVAL, INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Locknut (item 147, WP 0470 00)  
Three locknuts (item 129, WP 0470 00)  
Two woodruff keys (item 388, WP 0470 00)  
Chalk (item 11, WP 0468 00)

##### References

WP 0020 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Transmission power takeoff shift linkage  
removed (vehicles with transmission  
PTO only) (WP 0347 00).

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## CLUTCH CONTROL LINKAGE MAINTENANCE (Contd)

### REMOVAL

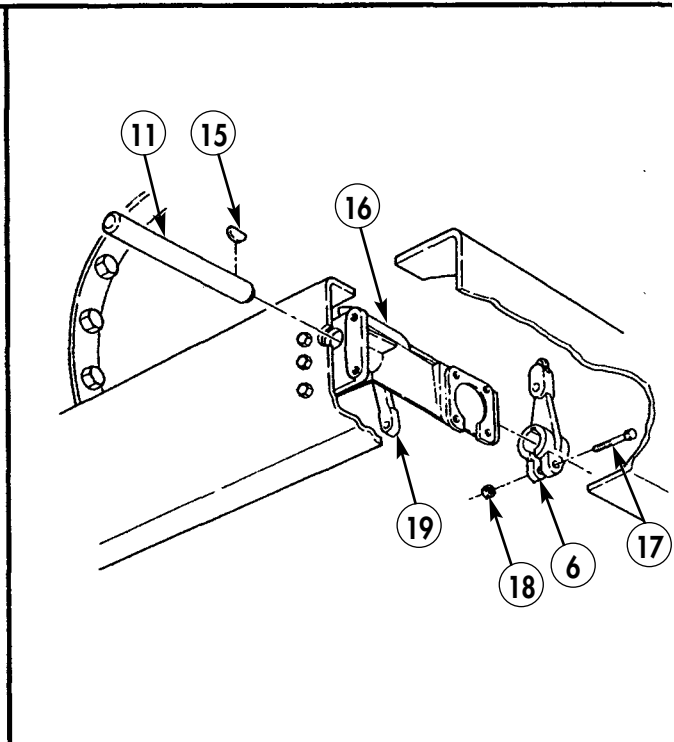
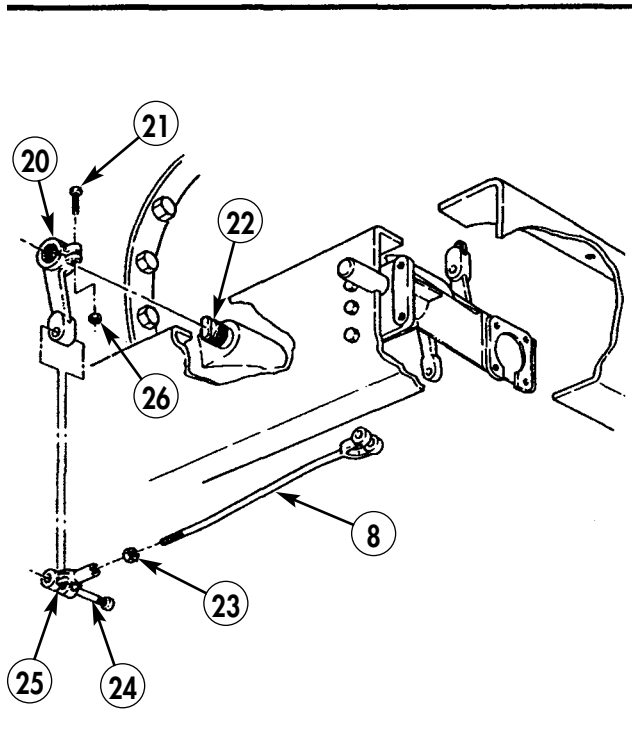
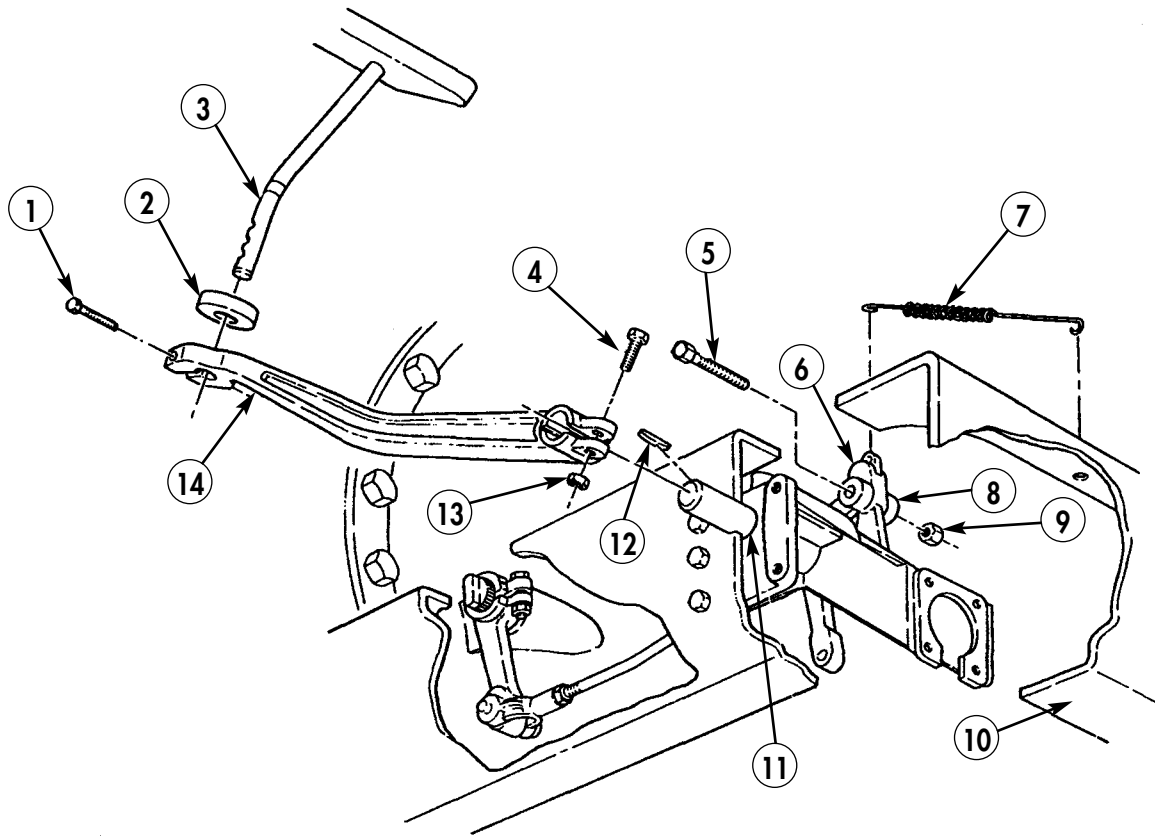
1. Remove clutch return spring (7) from clutch shaft lever (6) and frame (10).
2. Mark shaft of clutch pedal (3) with chalk next to remote control lever (14).
3. Remove screw (1), clutch pedal (3), and rubber bumper (2) from remote control lever (14).
4. Remove locknut (13), screw (4), remote control lever (14), and woodruff key (12) from pedal lever shaft (11). Discard locknut (13) and woodruff key (12).
5. Remove locknut (9), screw (5), and rod (8) from clutch shaft lever (6). Discard locknut (9).
6. Remove locknut (26), screw (21), and remote control lever (20) with rod (8) from shaft (22). Discard locknut (26).

### NOTE

Do not remove spring loaded pin from clevis.

7. Pull pin (24) to one side of clevis (25) and remove remote control lever (20) from clevis (25).
8. Loosen nut (23) and remove clevis (25) and nut (23) from rod (8).
9. Remove locknut (18), screw (17), clutch shaft lever (6), and pedal lever shaft (11) from brake lever (19) and shaft support (16). Discard locknut (18).
10. Remove woodruff key (15) from shaft (11). Discard woodruff key (15).

CLUTCH CONTROL LINKAGE MAINTENANCE (Contd)



## CLUTCH CONTROL LINKAGE MAINTENANCE (Contd)

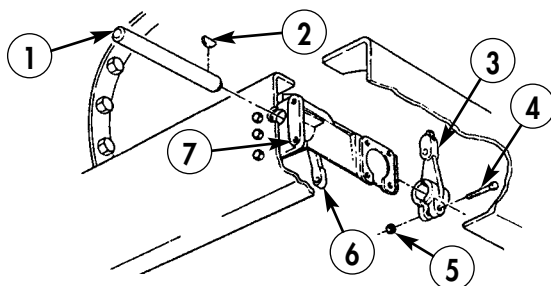
### INSTALLATION

1. Install new woodruff key (2) on pedal lever shaft (1).
2. Install clutch shaft lever (3) on pedal lever shaft (1) with screw (4) and new locknut (5). Do not tighten locknut (5).
3. Install pedal lever shaft (1) through brake lever (6) and shaft support (7).
4. Position clutch shaft lever (3) flush with end of pedal lever shaft (1) and tighten locknut (5).
5. Install remote control lever (15) on clutch shaft (9); position one remote control lever spline to rear of clutch shaft (9) centerline. Install screw (8) and new locknut (14). Do not tighten locknut.

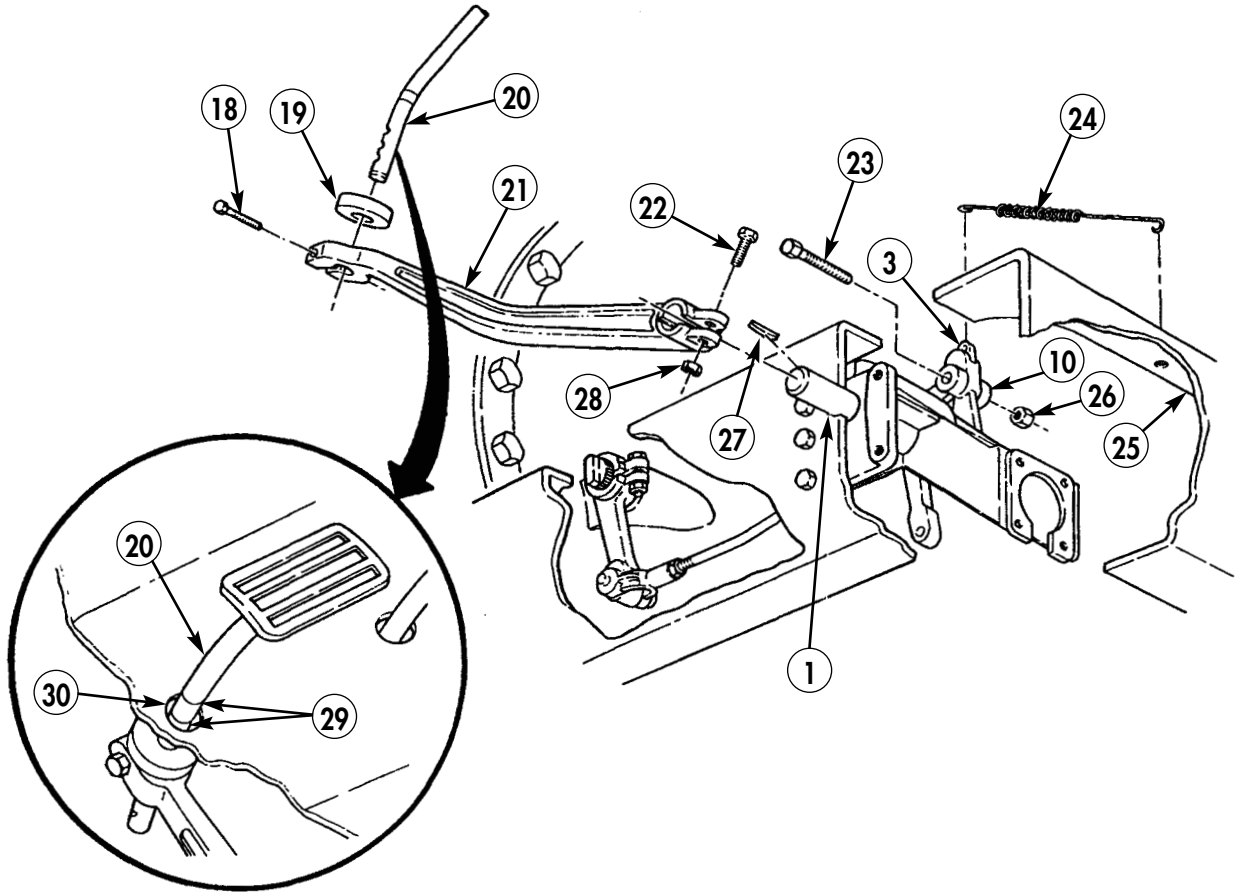
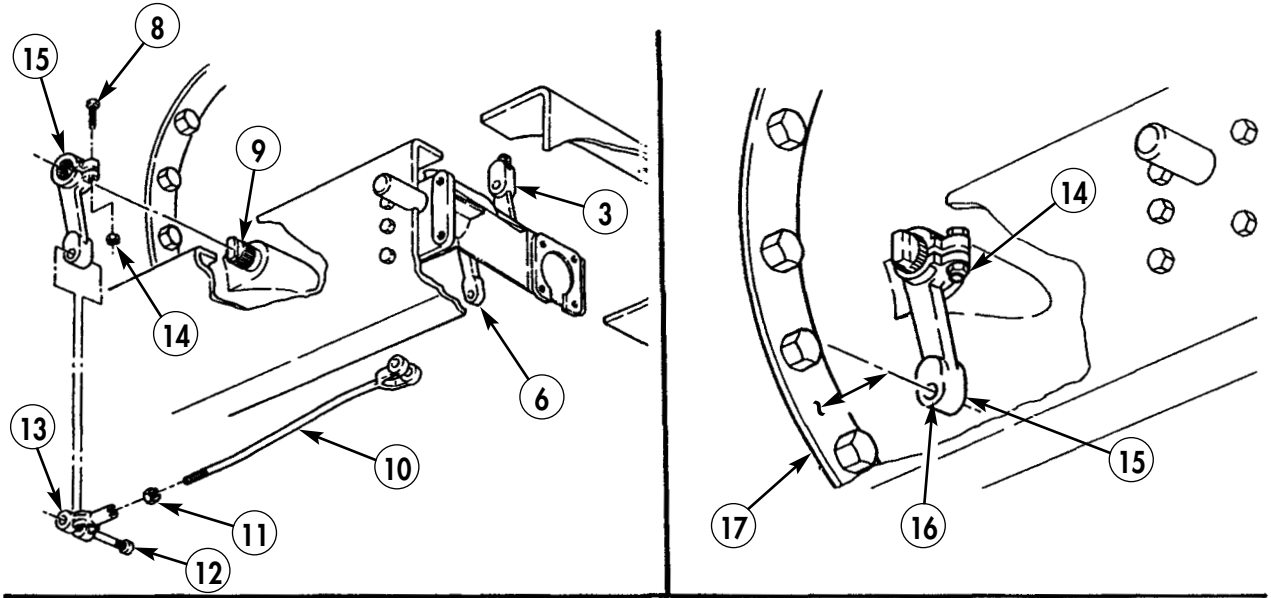
### NOTE

Measurement taken in step 6 should be approximately 3.25 in. (8.26 cm). If measurement is not approximately 3.25 in. (8.26 cm), perform step 7.

6. Push lower end of remote control lever (15) forward until resistance is felt. Measure distance from center of bottom hole (16) to transmission flange (17).
7. Remove remote control lever (15) and rotate it one spline at a time until measurement is correct.
8. Tighten locknut (14).
9. Install nut (11) and clevis (13) on rod (10).
10. Install rod (10) on clutch shaft lever (3) with screw (23) and new locknut (26). Make sure head of pin (12) is facing transmission.
11. Install rod (10) on remote control lever (15) with pin (12). Press pin (12) into clevis (13) until head of pin (12) seats against clevis (13).
- 12.. Install clutch return spring (24) on clutch shaft lever (3) and frame (25).
13. Install new woodruff key (27) on pedal lever shaft (1).
14. Install remote control lever (21) on pedal lever shaft (1) with screw (22) and new locknut (28).
15. Install shaft of clutch pedal (20) and rubber bumper (19) on remote control lever (21) with screw (18). Align chalk mark on shaft of clutch pedal (20) with remote control lever (21) and tighten screw (18).
16. Mark shaft of clutch pedal (20) with chalk where shaft passes through floor (30).
17. Push clutch pedal (20) down until resistance is felt and again mark shaft of clutch pedal (20) with chalk.
18. Release clutch pedal (20) and measure distance between two chalk marks (29). Distance (pedal free travel) should be 1.5–2 in. (3.8–5.1 cm).
19. If pedal free travel is not 1.5–2 in. (3.8–5.1 cm), perform clutch adjustment procedure.
20. Lubricate clutch control linkage (WP 0020 00).
21. Install transmission power takeoff shift linkage (vehicles with transmission PTO only) (WP 0347 00).



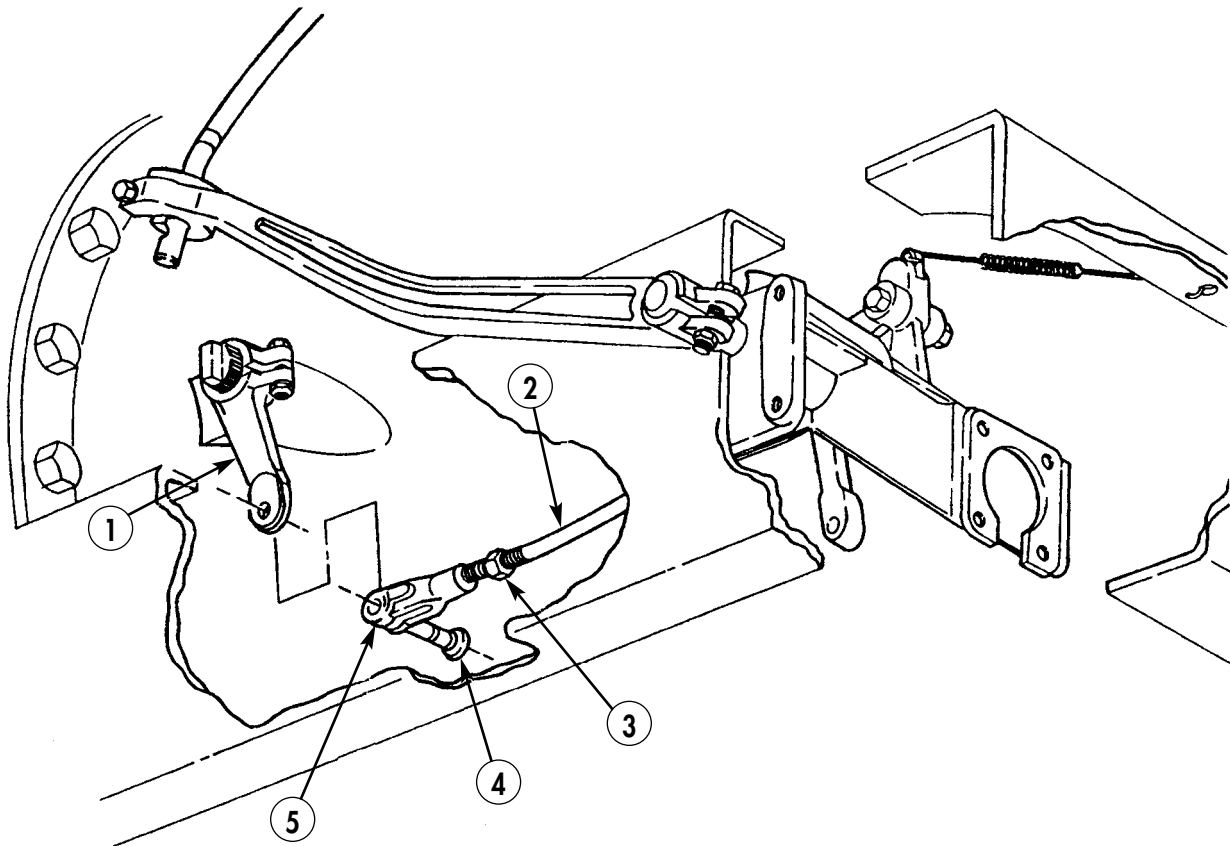
CLUTCH CONTROL LINKAGE MAINTENANCE (Contd)



## CLUTCH CONTROL LINKAGE MAINTENANCE (Contd)

### ADJUSTMENT

1. Loosen nut (3), pull pin (4) to one side of clevis (5) and remove clevis (5) from remote control lever (1).
2. If pedal free travel is less than 1.5 in. (3.8 cm), shorten length of rod (2) by tightening clevis (5) on rod (2).
3. If pedal free travel is more than 2 in. (5.1 cm), lengthen rod (2) by loosening clevis (5) on rod (2).
4. Install clevis (5) on remote control lever (1) with pin (4). Press pin (4) into clevis (5) until head of pin (4) seats against clevis (5).
5. Recheck pedal free travel (steps 17 and 18 in Installation) and tighten nut (3).
6. Connect battery ground cable (WP 0126 00).
7. Lower and secure hood (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PEDAL SHAFT SUPPORT REPLACEMENT

#### REMOVAL AND INSTALLATION

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**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Five locknuts (item 129, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Clutch control linkage removed (WP 0047 00).

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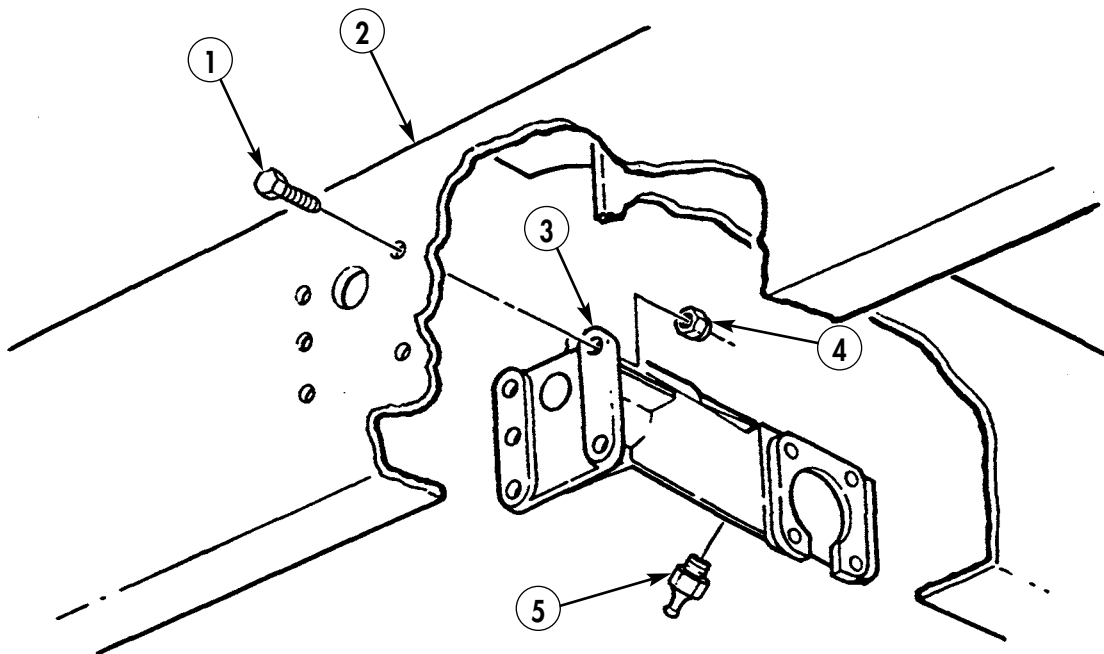
## PEDAL SHAFT SUPPORT REPLACEMENT (Contd)

### REMOVAL

1. Remove five locknuts (4), screws (1), and pedal shaft support (3) from chassis (2). Discard locknuts (4).
2. Remove two grease fittings (5) from pedal shaft support (3).

### INSTALLATION

1. Install two grease fittings (5) in pedal shaft support (3).
2. Install pedal shaft support (3) on chassis (2) with five screws (1) and new locknuts (4).
3. Install clutch control linkage (WP 0047 00).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CLUTCH RELEASE BEARING, SHAFT, AND FORK MAINTENANCE REMOVAL, INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 1/2-in. dr.  
(item 136, WP 0469 00)

##### Materials/Parts

Two lockwashers (item 213, WP 0470 00)  
Seal (item 330, WP 0470 00)

##### References

WP 0020 00  
TM 9-214

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Transmission removed (WP 0132 00).

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## CLUTCH RELEASE BEARING, SHAFT, AND FORK MAINTENANCE (Contd)

### REMOVAL

1. Remove two support springs (9) from clutch release bearing assembly (8) and clutch release fork (7).
2. Remove clutch release bearing assembly (8) from input shaft (10).
3. Remove two screws (6), lockwashers (5), and thrust washers (4) from clutch release fork (7). Discard lockwashers (5).
4. Slide clutch release shaft (3) out of clutch release fork (7).
5. Remove clutch release fork (7) and clutch release shaft (3) from transmission (1).
6. Remove seal (2) from bell housing of transmission (1). Discard seal (2).

#### NOTE

Perform step 7 if bearing requires replacement.

7. Remove grease fitting (13), two buttons (14), and bearing (12) from clutch release bearing housing (11).

### INSPECTION

1. Inspect bearing (12) (TM 9-214). Replace bearing (12) if damaged.
2. Visually inspect shaft (3) and clutch release fork (7) for wear or damage. Replace shaft (3) or fork (7) if damaged.

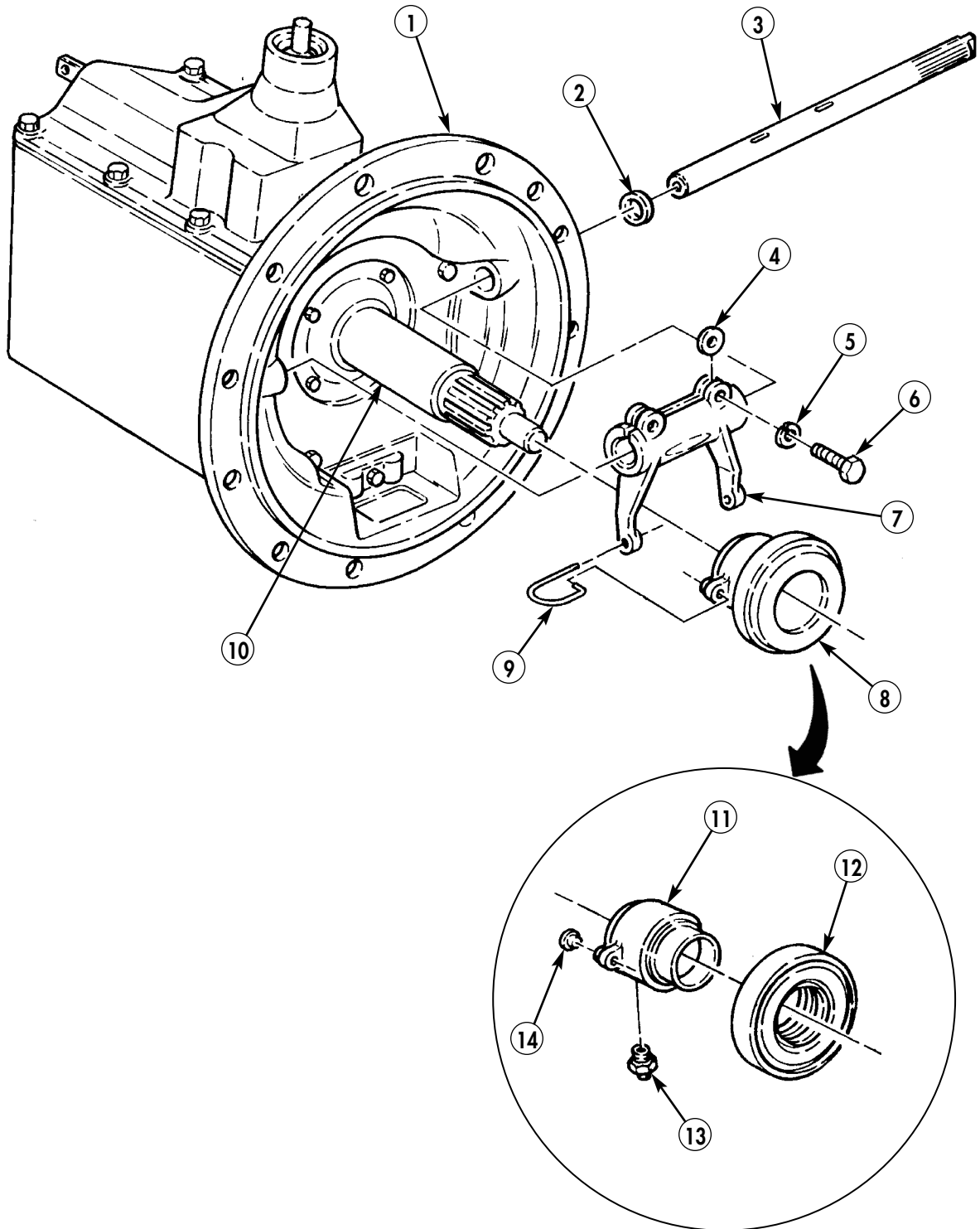
### INSTALLATION

#### NOTE

Perform step 1 if bearing was replaced.

1. Install bearing (12), two buttons (14), and grease fitting (13) on clutch release bearing housing (11).
2. Install new seal (2) on bell housing of transmission (1).
3. Slide clutch release shaft (3) through transmission (1) and clutch release fork (7). Align holes in fork (7) with slots in shaft (3).
4. Install two thrust washers (4) on clutch release fork (7) with two new lockwashers (5) and screws (6). Tighten screws (6) 40–50 lb-ft (54–68 N•m).
5. Position clutch release bearing assembly (8) on input shaft (10) and clutch release fork (7).
6. Install clutch release bearing assembly (8) on clutch release fork (7) with two support springs (9).
7. Lubricate clutch release bearing (WP 0020 00).
8. Lubricate clutch release shaft (WP 0020 00).
9. Install transmission (WP 0132 00).
10. Connect battery ground cable (WP 0126 00).
11. Lower and secure hood (TM 9-2320-361-10).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

CLUTCH RELEASE BEARING, SHAFT, AND FORK MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CLUTCH MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

General mechanic's tool kit  
(item 116, WP 0469 00)

Clutch alignment kit (item 112, WP 0469 00)

Torque wrench, 3/8-in. drive  
(item 138, WP 0469 00)

Mechanical puller (item 61, WP 0469 00)

Universal puller kit (item 59, WP 0469 00)

**Materials/Parts**

Eight lockwashers (item 195, WP 0470 00)

**References**

TM 9-2815-210-34-2-2

WP 0029 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Transmission removed (WP 0132 00).

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## CLUTCH MAINTENANCE (Contd)

### REMOVAL

#### **WARNING**

Pressure plate is heavy. Support pressure plate during removal. Failure to do so may result in injury to personnel.

#### **NOTE**

New and old clutch pressure plates are replaced the same. The difference between the two is that the new clutch plate has three release levers as opposed to four found in the old clutch plates. This procedure covers old clutch pressure plates.

Remove eight screws (7), lockwashers (8), pressure plate (6), and clutch disc (4) from flywheel (1). Discard lockwashers (8).

### CLEANING AND INSPECTION

1. Check clutch face of flywheel (1) for grooves, scuff marks, and overheating discoloration. Replace flywheel (1) if damaged (WP 0029 00).
2. Check clutch pilot bearing (3) from flywheel end of crankshaft (2) for scoring, nicks, or cracks. Replace clutch pilot bearing (3) if damaged.

#### **NOTE**

Perform steps 3 and 4 if pilot bearing is damaged.

3. Using bearing puller, remove clutch pilot bearing (3) from flywheel end of crankshaft (2) and remove any debris from clutch pilot bearing hole in crankshaft (2).
4. Using bearing installer, install new clutch pilot bearing (3) in flywheel end of crankshaft, (2) flush with counter bored area of crankshaft (2).

### INSTALLATION

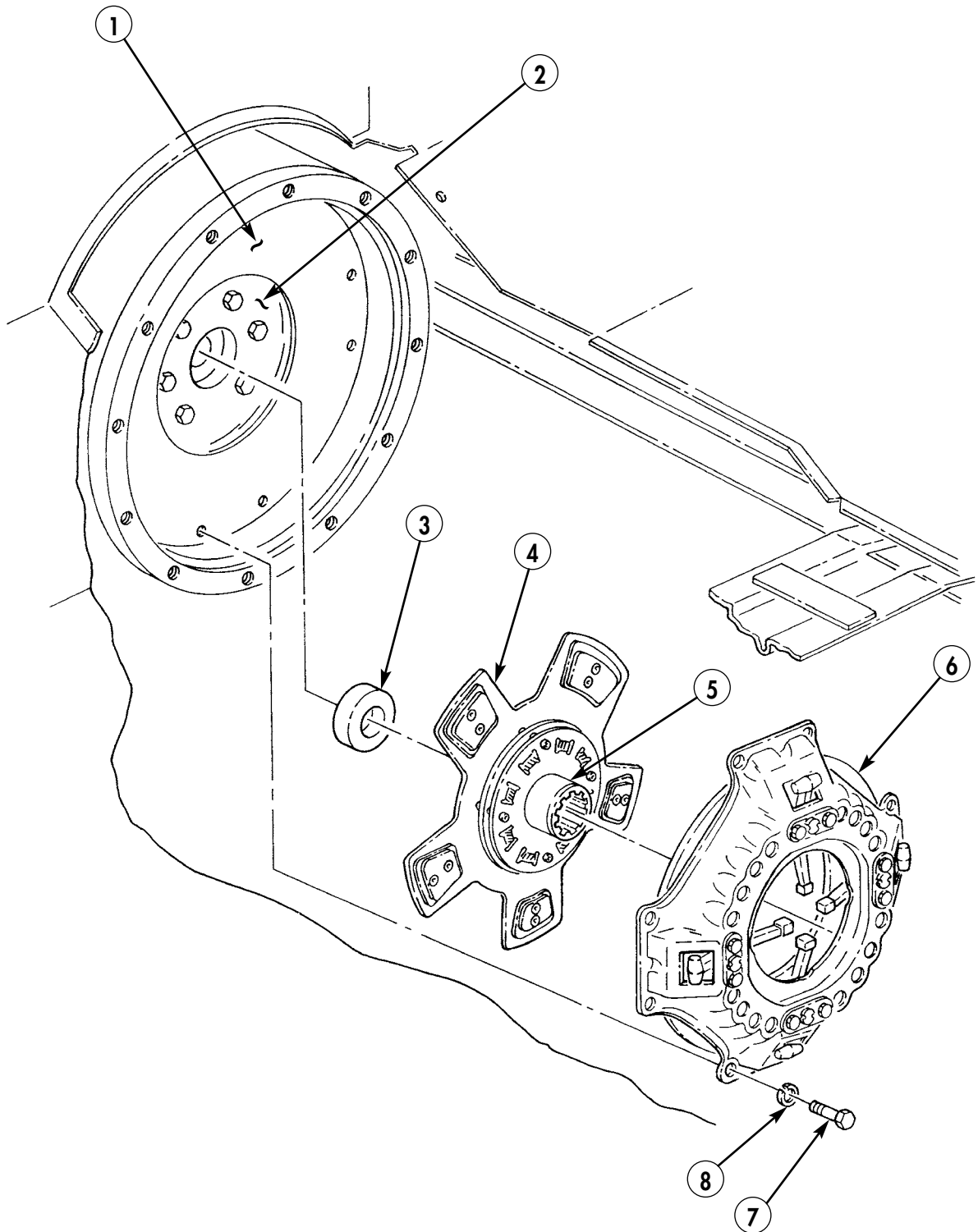
#### **CAUTION**

Clutch disc and clutch pilot bearing must be aligned prior to installation (TM 9-2815-210-34-2-2). Failure to do so may result in damage to equipment.

1. Position clutch disc (4) on flywheel (1) with long end of drive hub (5) facing away from flywheel (1).
2. Insert clutch alignment tool through clutch disc (4) and crankshaft (2).
3. Position pressure plate (6) against flywheel (1) and clutch disc (4) and align holes of pressure plate (6) with holes of clutch disc (4).
4. Install eight new lockwashers (8) and screws (7) on pressure plate (6). Tighten eight screws (7) 23–27 lb-ft (31–37 N•m).
5. Remove clutch alignment tool from clutch disc (4) and crankshaft (1).
6. Install transmission (WP 0132 00).
7. Connect battery ground cable (WP 0126 00).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



CLUTCH MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR INTAKE TUBE AND CAP REPLACEMENT

#### REMOVAL AND INSTALLATION

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**INITIAL SETUP:****Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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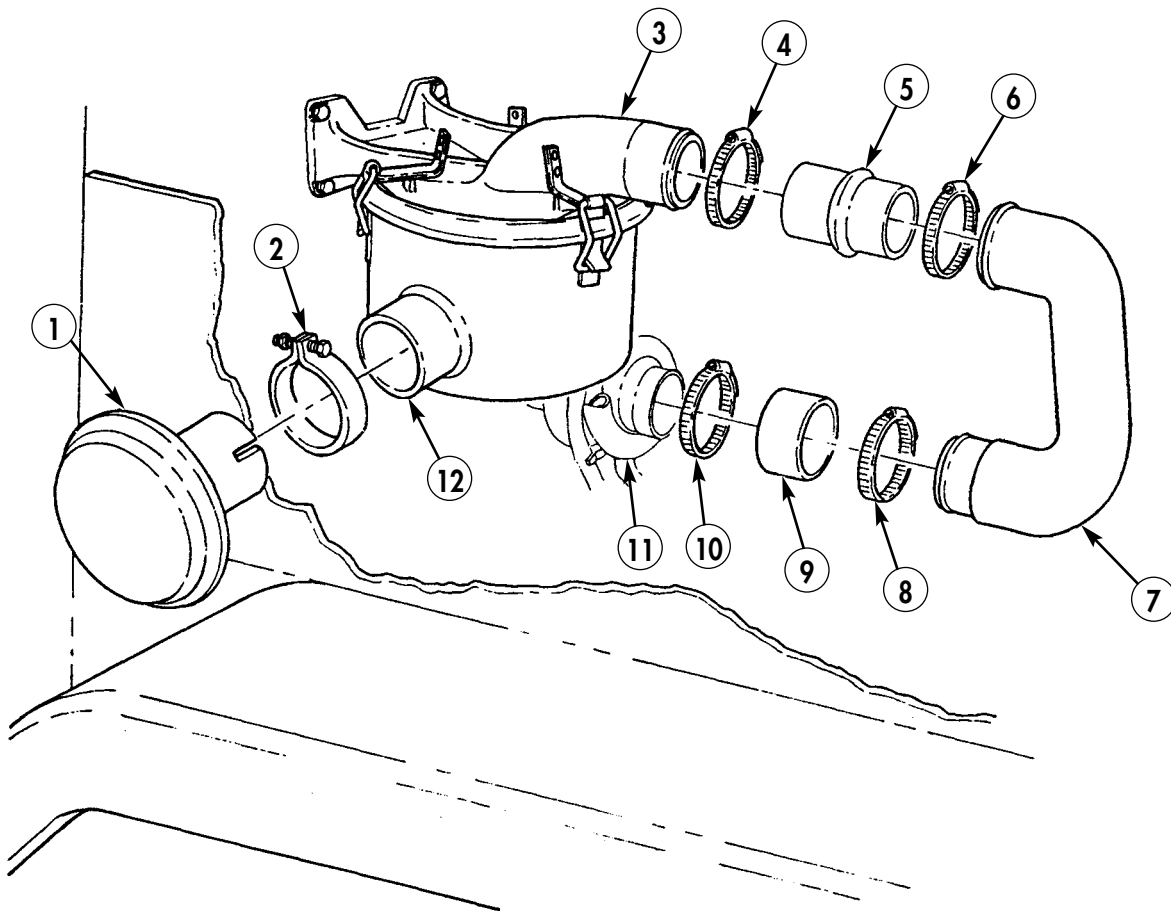
## AIR INTAKE TUBE AND CAP REPLACEMENT (Contd)

### REMOVAL

1. Loosen clamp (2) and remove cap (1) from air cleaner shell (12).
2. Loosen clamps (6) and (8) and remove air intake tube (7) from hoses (5) and (9).
3. Loosen clamp (4) and remove hose (5) from air cleaner head (3).
4. Loosen clamp (10) and remove hose (9) from turbocharger (11).

### INSTALLATION

1. Install hose (9) on turbocharger (11) with clamp (10).
2. Install hose (5) on air cleaner head (3) with clamp (4).
3. Install air intake tube (7) on hoses (5) and (9) with clamps (6) and (8).
4. Install cap (1) on air cleaner shell (12) with clamp (2).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR CLEANER CAP AND FILTER ELEMENT REPLACEMENT

CAP REMOVAL, ELEMENT REMOVAL, ELEMENT INSTALLATION, AND CAP INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## AIR CLEANER CAP AND FILTER ELEMENT REPLACEMENT (Contd)

### **WARNING**

- If Nuclear, Biological, and Chemical (NBC) exposure is suspected, all air filter media must be handled by personnel wearing protective equipment. Consult your unit NBC officer or NBC noncommissioned officer for appropriate handling and disposal instructions. Failure to do so may result in injury to personnel.
- NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel. Failure to do so may result in injury to personnel.

### **CAP REMOVAL**

Loosen clamp (2) and remove cap (1) and clamp (2) from air cleaner shell (3).

### **ELEMENT REMOVAL**

1. Unlatch three clamps (5) and remove air cleaner shell (3) from air cleaner head (4).
2. Remove filter element (7) from air cleaner shell (3).
3. Remove seal (6) from air cleaner head (4).

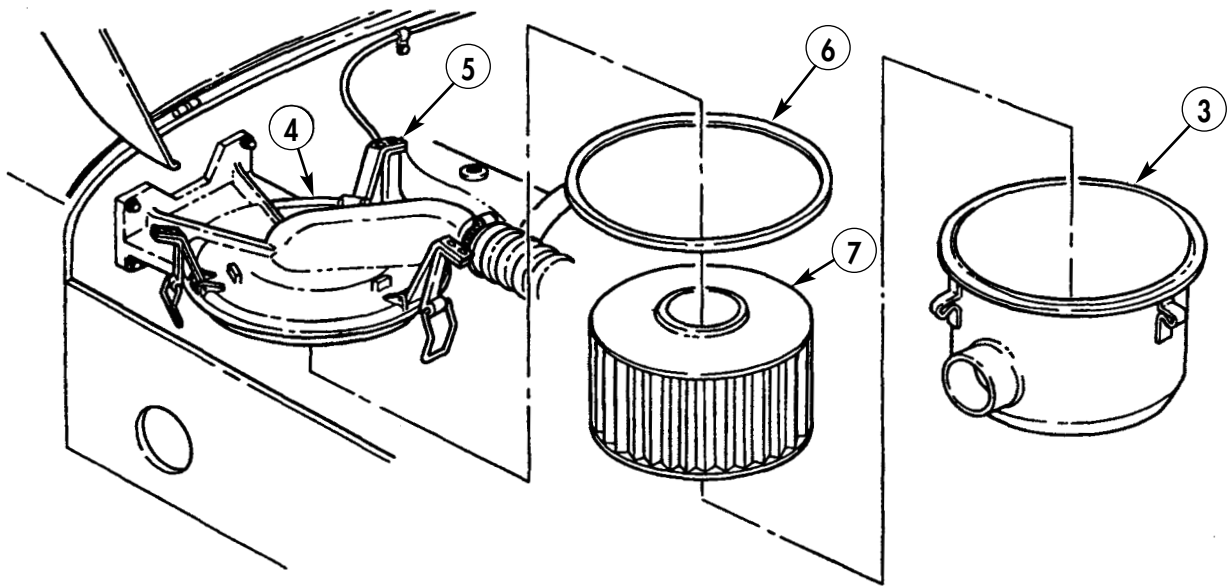
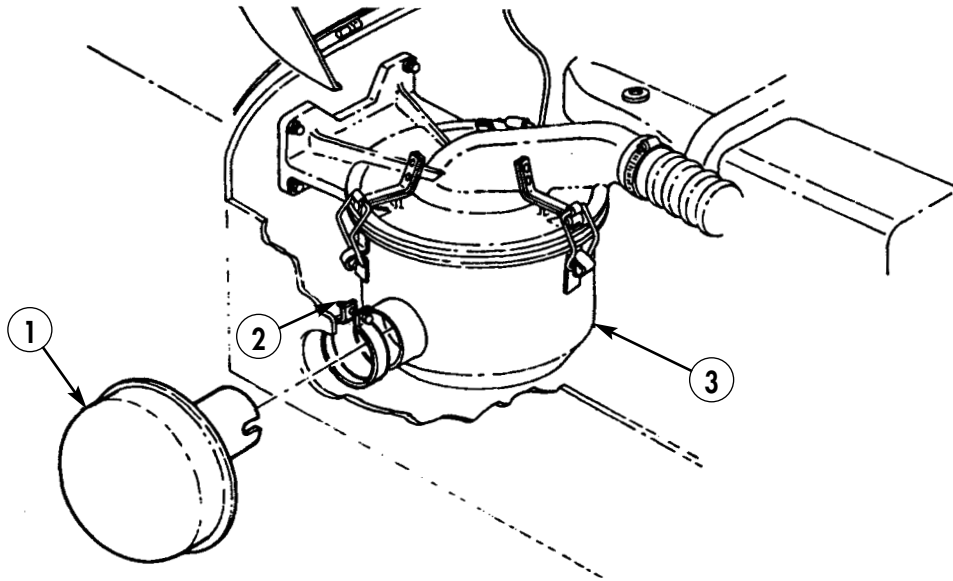
### **ELEMENT INSTALLATION**

1. Install seal (6) in air cleaner head (4).
2. Install filter element (7) in air cleaner shell (3).
3. Align air cleaner shell (3) with air cleaner head (4) and install with three clamps (5).

### **CAP INSTALLATION**

1. Install clamp (2) and cap (1) to air cleaner shell (3) and tighten clamp (2).
2. Connect battery ground cable (WP 0126 00).
3. Lower and secure hood (TM 9-2320-361-10).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
5. Start engine (TM 9-2320-361-10) and make sure air filter indicator in cab indicates green (TM 9-2320-361-10).

**AIR CLEANER CAP AND FILTER ELEMENT REPLACEMENT (Contd)**



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR CLEANER ASSEMBLY MAINTENANCE REMOVAL, INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Four lockwashers (item 195, WP 0470 00)

Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air intake tube and cap removed  
(WP 0051 00).

Air cleaner element removed (WP 0052 00).

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## AIR CLEANER ASSEMBLY MAINTENANCE (Contd)

### REMOVAL

1. Disconnect tube (2) from adapter (3), and remove adapter (3) from air cleaner head (4).

#### NOTE

Step 2 must be performed with two personnel.

2. Remove four nuts (1), screws (6), lockwashers (5), and air cleaner head (4) from firewall (7). Discard lockwashers (5).

### INSPECTION

Inspect air cleaner head (4) for cracks or damage that would allow unfiltered air to enter. Replace air cleaner head (4) if cracked or damaged.

### INSTALLATION

#### NOTE

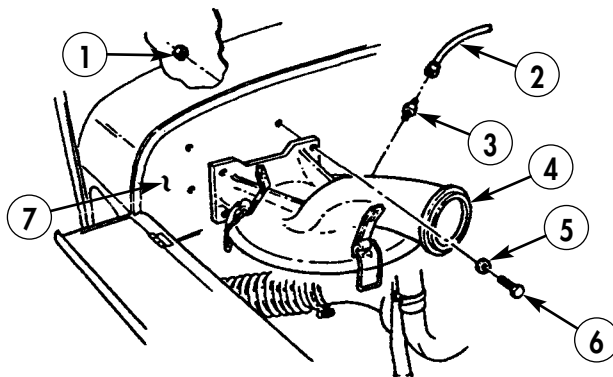
Step 1 must be performed with two personnel.

1. Install air cleaner head (4) on firewall (7) with four screws (6), new lockwashers (5), and nuts (1).

#### NOTE

Male pipe threads must be wrapped with antiseize tape before installation.

2. Install adapter (3) on air cleaner head (4).
3. Connect tube (2) to adapter (3).
4. Install air cleaner element (WP 0052 00).
5. Install air intake tube and cap (WP 0051 00).
6. Connect battery ground cable (WP 0126 00).
7. Lower and secure hood (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR CLEANER INDICATOR AND TUBE MAINTENANCE

#### TESTING, REMOVAL, INSPECTION AND CLEANING, AND INSTALLATION

##### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Materials/Parts

Antiseize tape (item 42, WP 0468 00)

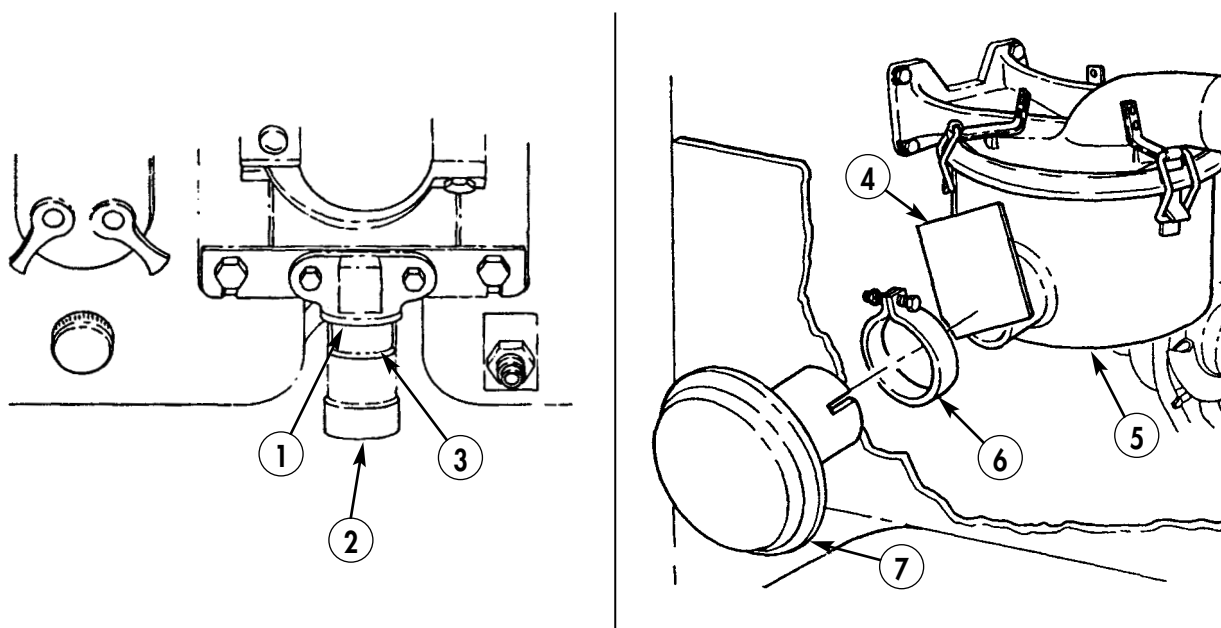
##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

##### TESTING

1. Loosen clamp (6) and remove cap (7) and clamp (6) from air cleaner (5).
2. Start engine (TM 9-2320-361-10) and run at 1200 rpm.
3. Using cardboard (4), cover approximately 90% of air cleaner assembly (5) opening.
4. Observe air cleaner indicator (2) to see if red band (3) is visible.
  - a. If red band (3) is visible, indicator (2) works properly.
  - b. If red band (3) is not visible, refer to Inspection and Cleaning in this WP.
5. Stop engine (TM 9-2320-361-10).
6. Remove cardboard (4) and install cap (7) on air cleaner (5) with clamp (6).



## AIR CLEANER INDICATOR AND TUBE MAINTENANCE (Contd)

### REMOVAL

1. Disconnect tube (6) from connector (7) and remove connector (7) from air cleaner head (8).

#### **NOTE**

Step 2 must be performed with two personnel.

2. Remove two nuts (4), screws (1), and clamps (3) from tube (6) on firewall (5).
3. Remove two nuts (9), screws (13), and washers (12) from air cleaner indicator (11).
4. Disconnect tube (6) from adapter (10) and remove air cleaner indicator (11).
5. Remove adapter (10) from air cleaner indicator (11).
6. Remove tube (6) and grommet (2) from firewall (5),

### INSPECTION AND CLEANING

1. Inspect tube (6) for kinks and obstruction. Replace tube (6) if kinked or obstructed.

#### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

2. Clean tube (6) by blowing through it with compressed air.
3. Inspect connector (7), adapter (10), and fittings on tube (6) for stripped threads. Replace connector (7), adapter (10), or fittings on tube (6) if threads are stripped.

### INSTALLATION

#### **NOTE**

Male pipe threads must be wrapped with antiseize tape before installation.

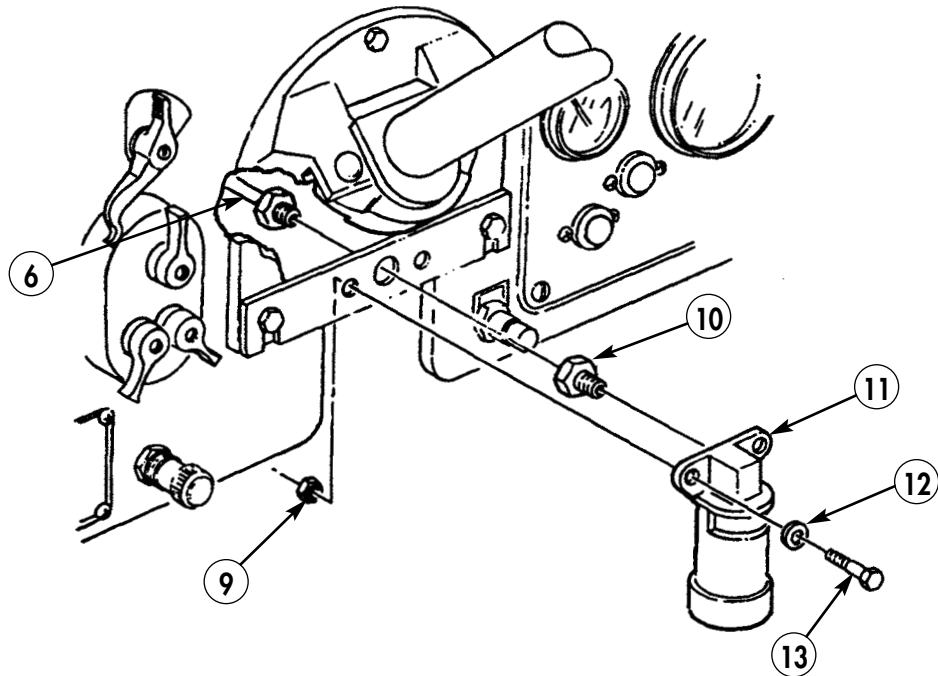
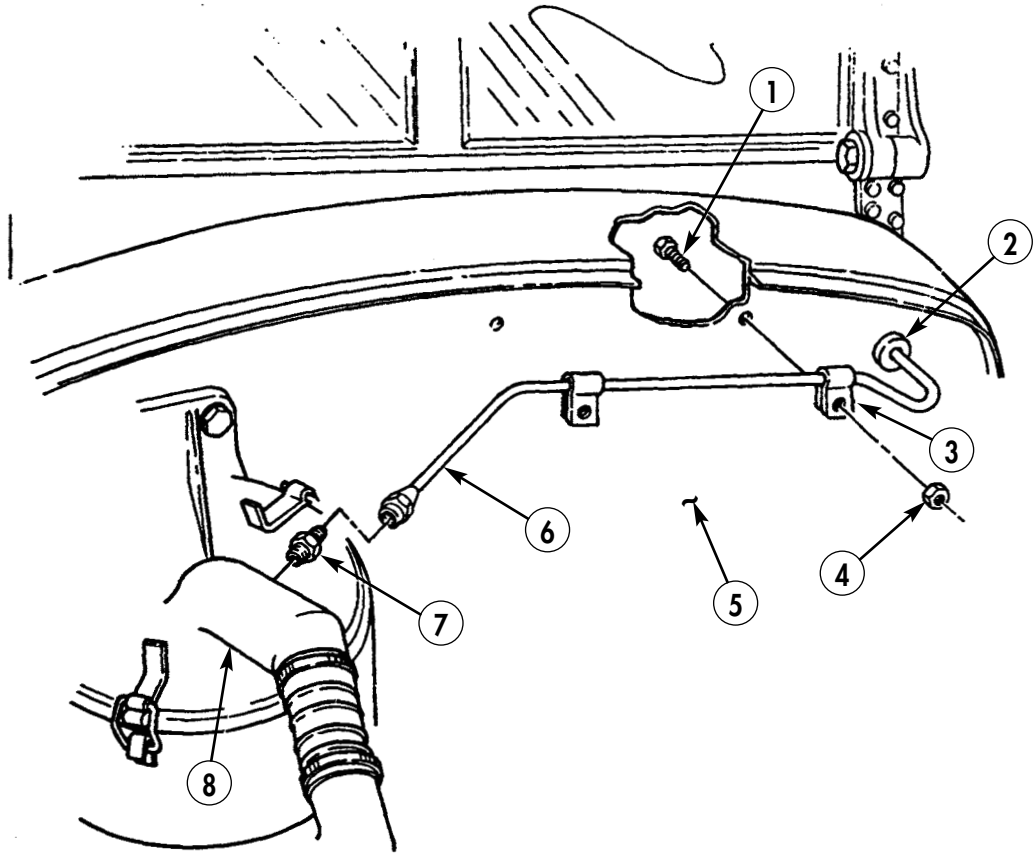
1. Install grommet (2) and tube (6) into firewall (5).
2. Install adapter (10) on air cleaner indicator (11).
3. Connect air cleaner indicator (11) to tube (6).
4. Install two screws (13), washers (12), and nuts (9).

#### **NOTE**

Step 5 must be performed with two personnel.

5. Install tube (6) on firewall (5) with two clamps (3), screws (1), and nuts (4). Do not tighten nuts (4).
6. Install connector (7) on air cleaner head (8), and connect tube (6) to adapter (7). Tighten nuts (4).
7. Lower and secure hood (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

AIR CLEANER INDICATOR AND TUBE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TURBOCHARGER OIL INLET TUBE AND ADAPTER REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Gasket (item 86, WP 0470 00)  
Two lockwashers (item 193, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

##### Material/Parts (Contd)

Antiseize tape (item 42, WP 0468 00)  
Lubricating oil OE/HDO 30  
(item 24, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## TURBOCHARGER OIL INLET TUBE AND ADAPTER REPLACEMENT (Contd)

### **CAUTION**

Cover or plug all hoses, connections, and openings immediately after disconnecting or removing a component to prevent contamination. Remove all plugs prior to component installation.

### **REMOVAL**

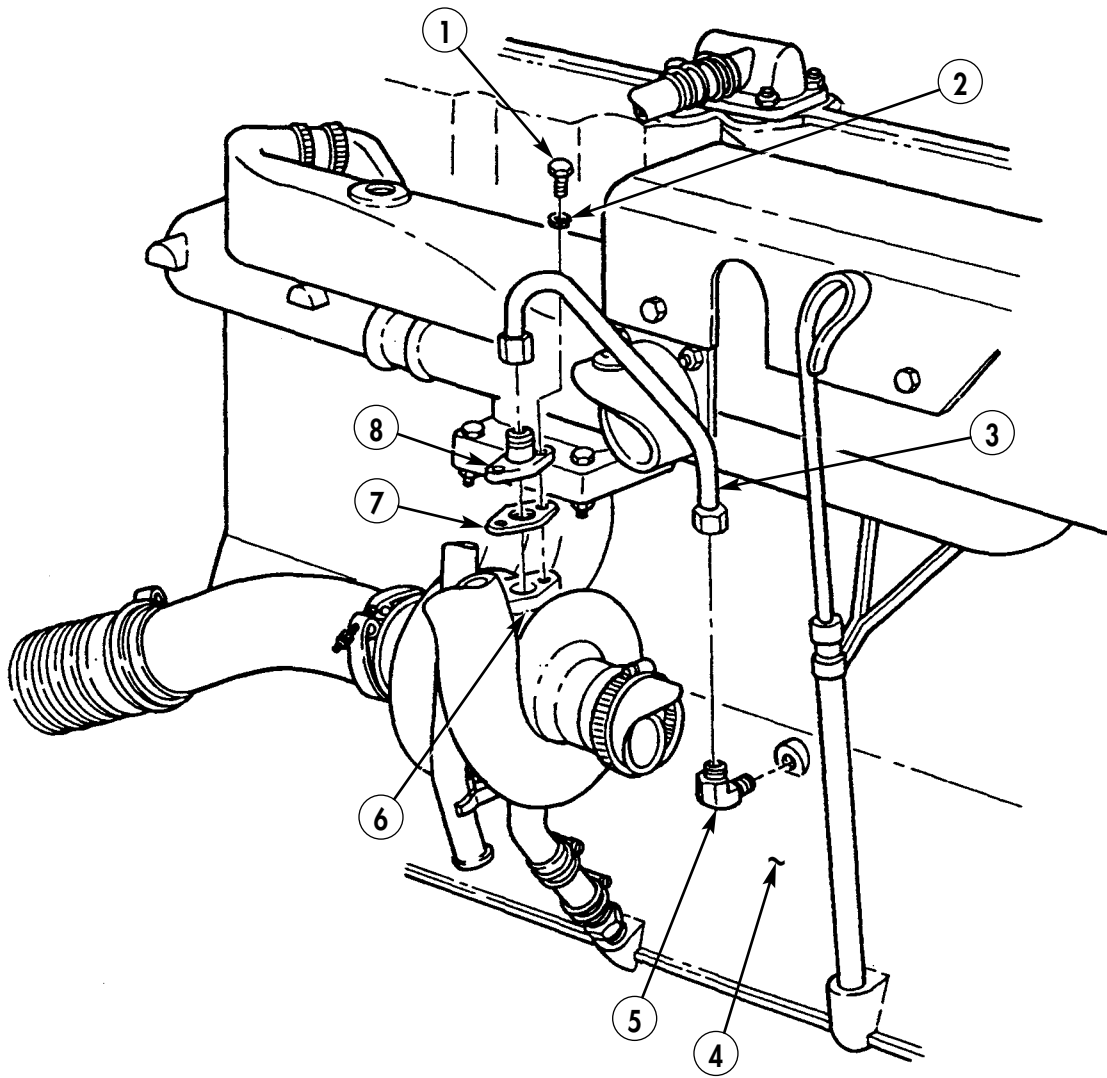
1. Remove oil inlet tube (3) from elbow (5) and oil inlet adapter (8).
2. Remove elbow (5) from engine (4).
3. Remove two screws (1), lockwashers (2), oil inlet adapter (8), and gasket (7) from turbocharger (6). Discard lockwashers (2) and gasket (7).

### **INSTALLATION**

1. Install new gasket (7) and oil inlet adapter (8) on turbocharger (6) with two new lockwashers (2) and screws (1).
2. Add 2 oz (59 ml) of new lubricating oil OE/HDO 30 into oil inlet adapter (8).
3. Install elbow (5) on engine (4).
4. Install oil inlet tube (3) on elbow (5) and oil inlet adapter (8).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



TURBOCHARGER OIL INLET TUBE AND ADAPTER REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TURBOCHARGER OIL DRAIN TUBE, HOSE, AND ADAPTER REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Gasket item (item 87, WP 0470 00)  
Two lockwashers (item 193, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## TURBOCHARGER OIL DRAIN TUBE, HOSE, AND ADAPTER REPLACEMENT (Contd)

### REMOVAL

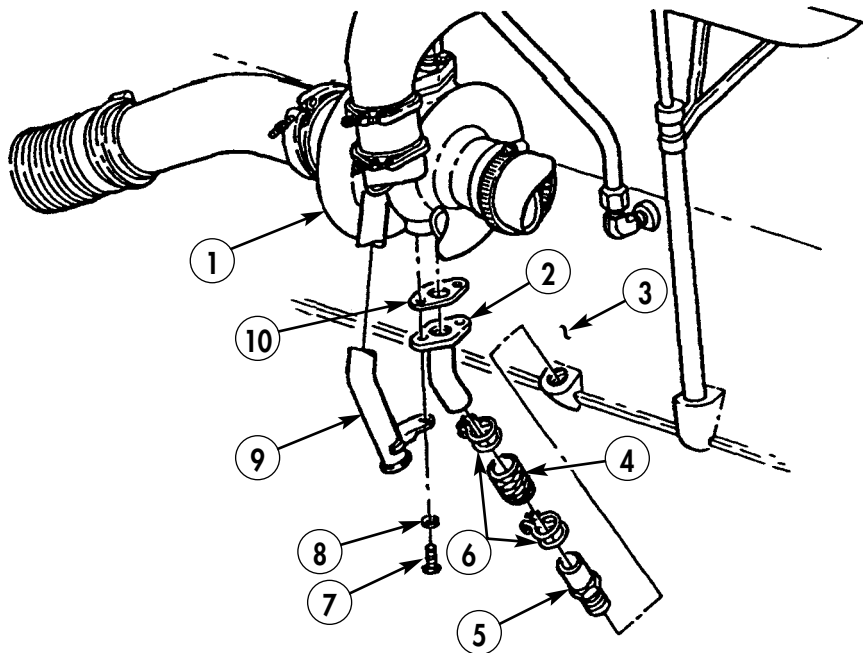
1. Remove two screws (7) and lockwashers (8) from breather tube (9), oil drain tube (2), and turbocharger (1). Discard lockwashers (8).
2. Loosen two clamps (6) and remove oil drain tube (2) and gasket (10) from turbocharger (1) and hose (4). Discard gasket (10).
3. Remove hose (4) and two clamps (6) from oil drain adapter (5).
4. Remove oil drain adapter (5) from engine (3).

### INSTALLATION

#### NOTE

Male pipe threads must be wrapped with antiseize tape before installation.

1. Install oil drain adapter (5) on engine (3).
2. Install hose (4) and two clamps (6) on oil drain adapter (5). Do not tighten clamps (6).
3. Install oil drain tube (2) on hose (4).
4. Install new gasket (10), oil drain tube (2), and breather tube (9) on turbocharger (1) with two new lockwashers (8) and screws (7).
5. Tighten two clamps (6).
6. Connect battery ground cable (WP 0126 00).
7. Lower and secure hood (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TURBOCHARGER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air intake tube removed (WP 0051 00).  
Manifold heater removed (WP 0066 00).  
Crankcase breather tube removed  
(WP 0043 00).  
Turbocharger oil drain tube, hose, and adapter  
removed (WP 0056 00).  
Turbocharger oil inlet tube and adapter  
removed (WP 0055 00).

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##### Materials/Parts

Four locknuts (item 140, WP 0470 00)  
Gasket (item 57, WP 0470 00)  
Gasket (item 63, WP 0470 00)  
Gasket (item 85, WP 0470 00)  
Locknut (item 142, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)  
Lubricating oil, OE/HDO 10  
(item 16, WP 0468 00)

## TURBOCHARGER REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in turbocharger and/or engine damage.

### **REMOVAL**

1. Remove locknut (12) and screw (9) from coupling (11). Discard locknut (12).
2. Remove coupling (11), gasket (13), and elbow (8) from flex tube (10). Discard gasket (13).
3. Loosen clamp (7) and remove elbow (8), clamp (7), and gasket (6) from turbocharger (5). Discard gasket (6).

### **NOTE**

Assistant will help with step 4.

4. Remove four locknuts (3), two screws (2), turbocharger (5), and gasket (14) from exhaust manifold (1). Discard locknuts (3) and gasket (14).

### **INSTALLATION**

### **NOTE**

Assistant will help with step 1.

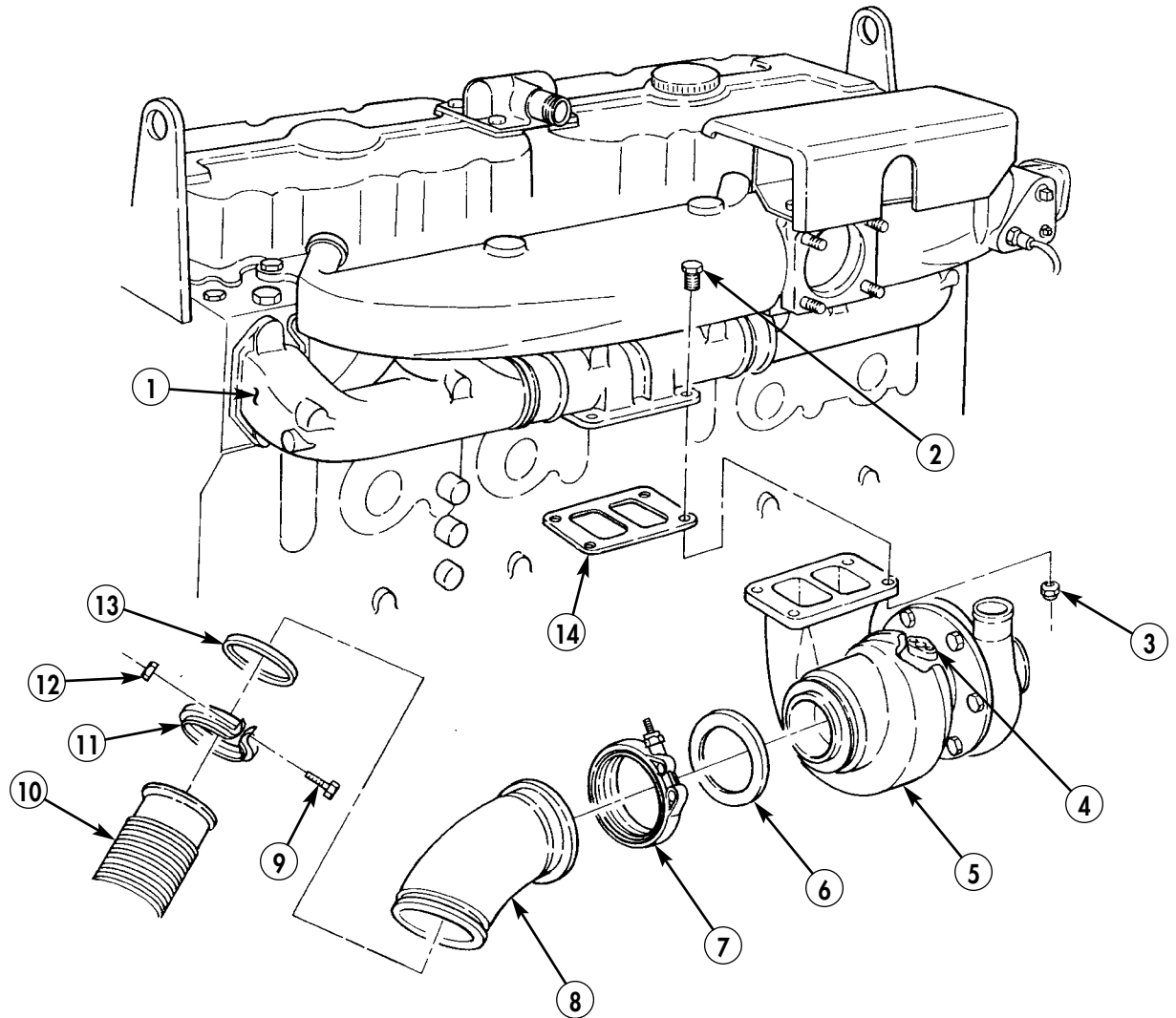
1. Install new gasket (14) and turbocharger (5) on exhaust manifold (1) with two screws (2) and four new locknuts (3).
2. Install new gasket (6), clamp (7), and elbow (8) on turbocharger (5). Do not tighten clamp (7).
3. Install new gasket (13) on elbow (8).
4. Install elbow (8) on flex tube (10) with coupling (11), screw (9), and new locknut (12).
5. Tighten clamp (7).

### **CAUTION**

Ensure oil is added before operating engine. Failure to do so may result in damage to turbocharger bearings.

6. Pour 2 oz (59 ml) of lubricating oil into turbocharger (5) through oil inlet tube port (4).
7. Install turbocharger oil drain tube, hose, and adapter (WP 0056 00).
8. Install turbocharger oil inlet tube and adapter (WP 0055 00).
9. Install crankcase breather tube (WP 0043 00).
10. Install manifold heater (WP 0066 00).
11. Install air intake tube (WP 0051 00).
12. Connect battery ground cable (WP 0126 00).
13. Lower and secure hood (TM 9-2320-361-10).
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**TURBOCHARGER REPLACEMENT (Contd)**



**END OF WORK PACKAGE**

0057 00-3/4 blank





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL TANK FILLER CAP AND SLEEVE REPLACEMENT REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

**Materials/Parts**

Gasket (item 94, WP 00470 00)

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## FUEL TANK FILLER CAP AND SLEEVE REPLACEMENT (Contd)

### REMOVAL

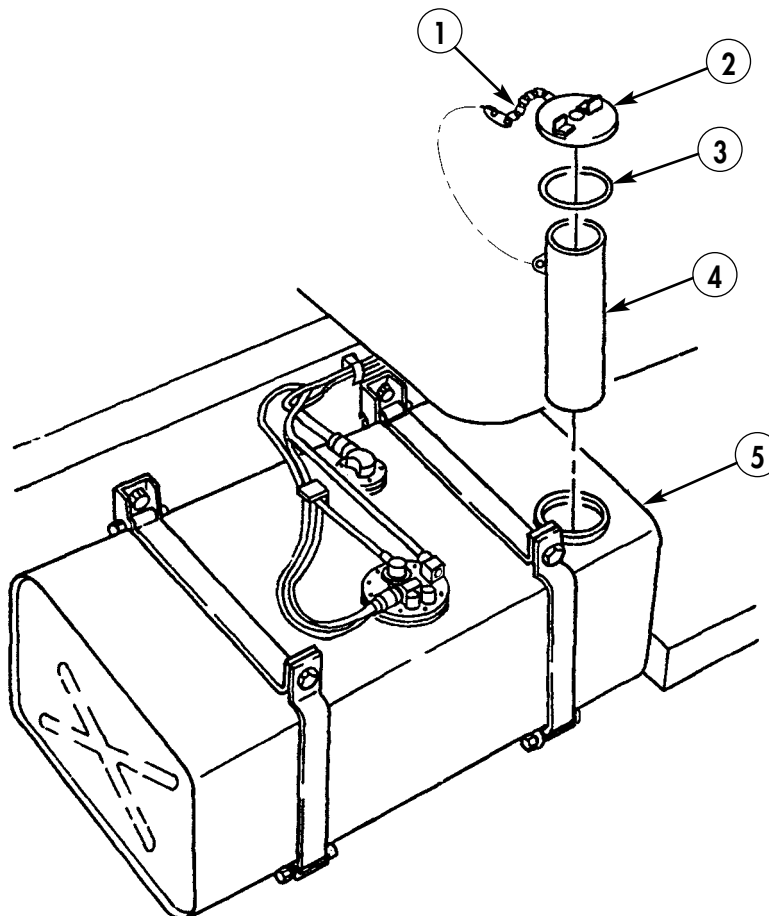
#### **WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.

1. Remove fuel tank filler cap (2) from fuel tank (5) and disconnect chain (1) from sleeve (4).
2. Rotate sleeve (4) counterclockwise and remove sleeve (4) from fuel tank (5).
3. Remove gasket (3) from fuel tank filler cap (2). Discard gasket (3).

### INSTALLATION

1. Install new gasket (3) on fuel tank filler cap (2).
2. Install sleeve (4) on fuel tank (5) by rotating clockwise.
3. Connect chain (1) to sleeve (4), and install fuel tank filler cap (2) on fuel tank (5).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL PUMP (IN-TANK) FUSE REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Gasket (item 53, WP 0470 00)  
Three lockwashers (item 187, WP 0470 00)  
Lead seal wire (item 351, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## FUEL PUMP (IN-TANK) FUSE REPLACEMENT (Contd)

### **WARNING**

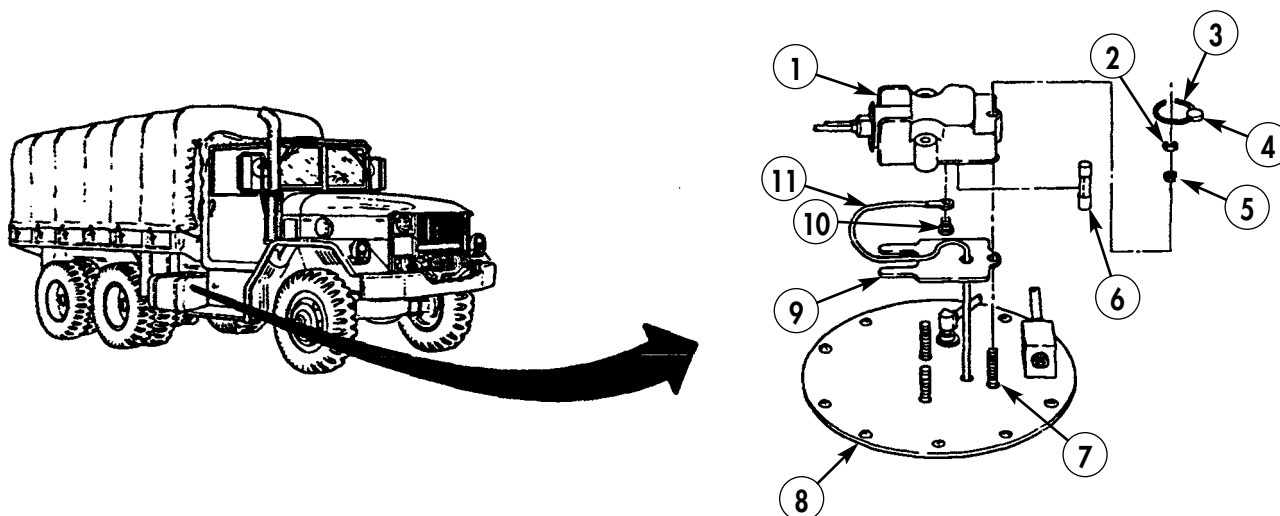
Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.

### REMOVAL

1. Remove lead seal (4) from stud (7) by cutting wire (3). Discard wire (3) and lead seal (4).
2. Remove three nuts (2), lockwashers (5), and terminal cover (1) from fuel pump (8). Discard lockwashers (5).
3. Remove screw (10) and disconnect wire (11) from terminal cover (1).
4. Remove gasket (9) from fuel pump (8). Discard gasket (9).
5. Remove fuse (6) from terminal cover (1).

### INSTALLATION

1. Install 4-amp fuse (6) on terminal cover (1).
2. Install gasket (9) on fuel pump (8) and connect wire (11) to terminal cover (1) with screw (10).
3. Install terminal cover (1) on fuel pump (8) with three new lockwashers (5) and nuts (2).
4. Install new lead seal wire (3) through one stud (7). Thread end of seal wire (3) back through lead seal and fasten using an adequate crimping tool.
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10) and check fuel pump connections for leaks.
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL TANK REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two locknuts (item 129, WP 0470 00)  
Two locknuts (item 174, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)  
Antiseize tape (item 42, WP 0468 00)

**Personnel Required**

Two

**References**

TM 9-2320-361-10  
WP 0061 00  
WP 0109 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Fuel tank filler cap and sleeve removed  
(WP 0058 00).

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## FUEL TANK REPLACEMENT (Contd)

### **WARNING**

- Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury or death to personnel may result.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.
- Eye protection must be worn during fuel tank replacement. Failure to do so may result in injury to personnel.

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

### **NOTE**

Use a drain pan to capture any draining fuel. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

## REMOVAL

1. Drain fuel from fuel tank (4) by removing drainplug (8) from fuel tank (4).

### **NOTE**

Male pipe threads must be wrapped with antiseize tape before installation.

2. Install drainplug (8) on fuel tank (4).
3. Disconnect fuel return tube (6) from elbow (5) and remove elbow (5) from fuel tank (4).

### **WARNING**

Some vehicles have two separate wires and connectors. Mark location of wires for installation. Connecting wires on wrong terminals may cause fuel to ignite, resulting in injury to personnel and/or damage to equipment.

### **CAUTION**

Perform steps 4 through 7 only if removing fuel tank from M109A3 and M185A3 series trucks.

4. Disconnect connector (16) from fuel pump (15).
5. Disconnect vent tube (18) from elbow (17) and remove elbow (17) from fuel pump (15).
6. Disconnect fuel supply tube (14) from fuel pump (15).
7. Disconnect connector (12) from sending unit (13).
8. Remove two locknuts (2) and screws (1) from retaining straps (3) and (10). Discard locknuts (2).
9. Remove two locknuts (9), screws (11), and two retaining straps (10) from fuel tank hangers (7) and retaining straps (3). Discard locknuts (9).

### **NOTE**

Assistant will help with step 10.

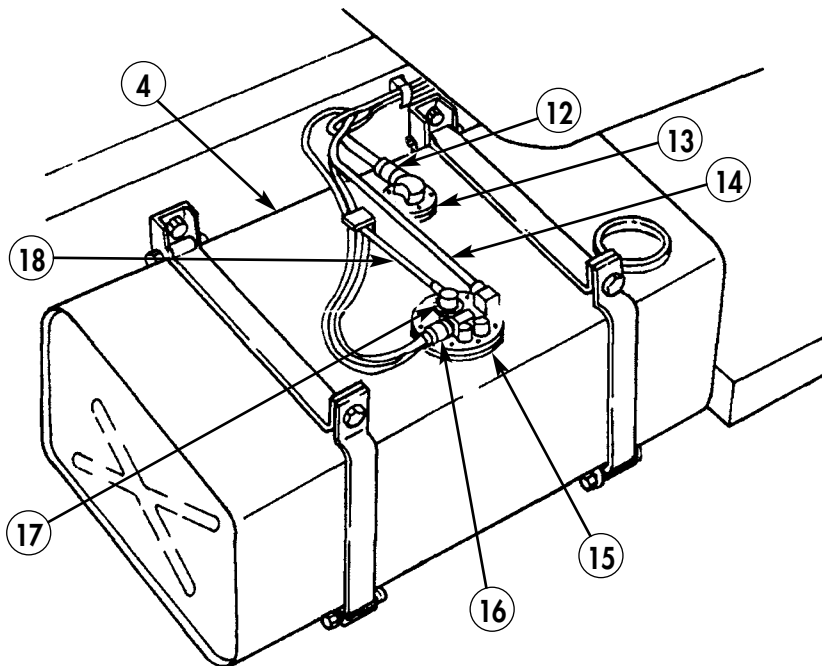
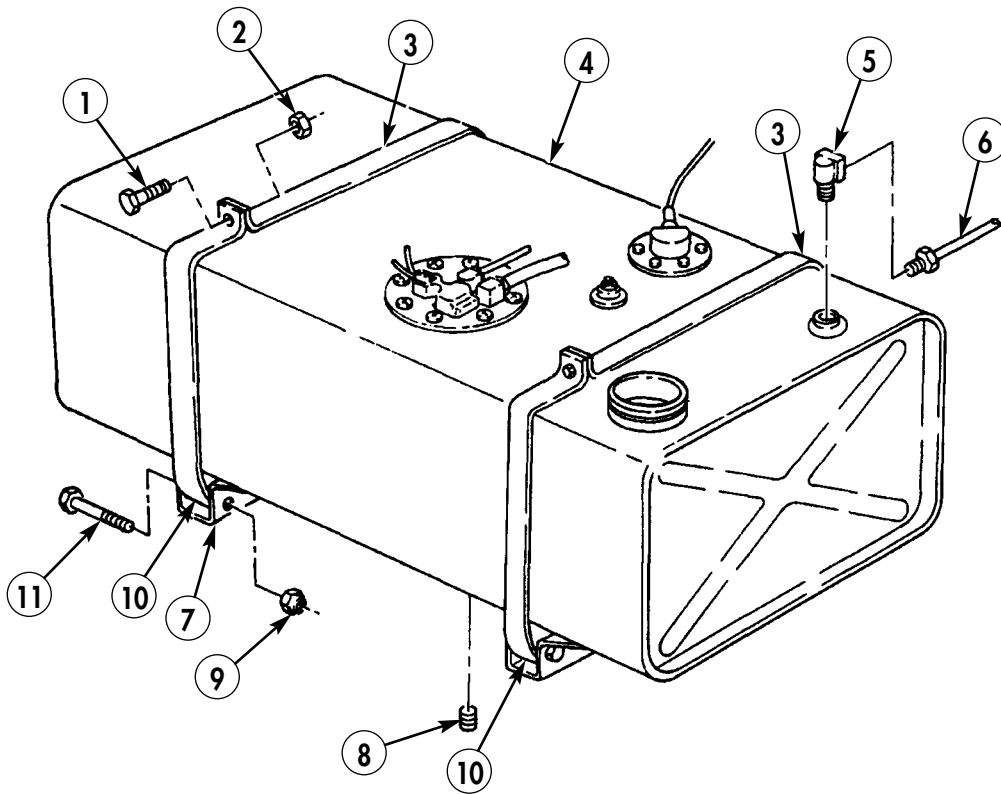
10. Remove fuel tank (4) from two fuel tank hangers (7).

### **NOTE**

Perform steps 11 and 12 only if removing fuel tank from M109A3 and M185A3 series trucks.

11. Remove fuel pump (15) from fuel tank (4) (WP 0061 00).
12. Remove sending unit (13) from fuel tank (4) (WP 0109 00).

FUEL TANK REPLACEMENT (Contd)



## FUEL TANK REPLACEMENT (Contd)

### INSTALLATION

#### NOTE

Perform steps 1 and 2 prior to installing fuel tank on M109A3 and M185A3 series trucks only.

1. Install sending unit (12) on fuel tank (4) (WP 0109 00).
2. Install fuel pump (14) on fuel tank (4) (WP 0061 00).

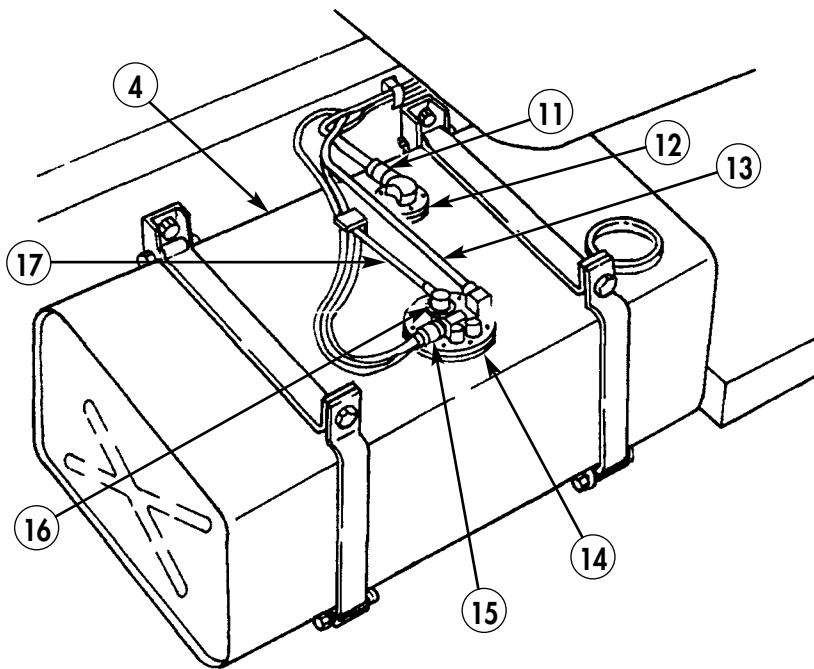
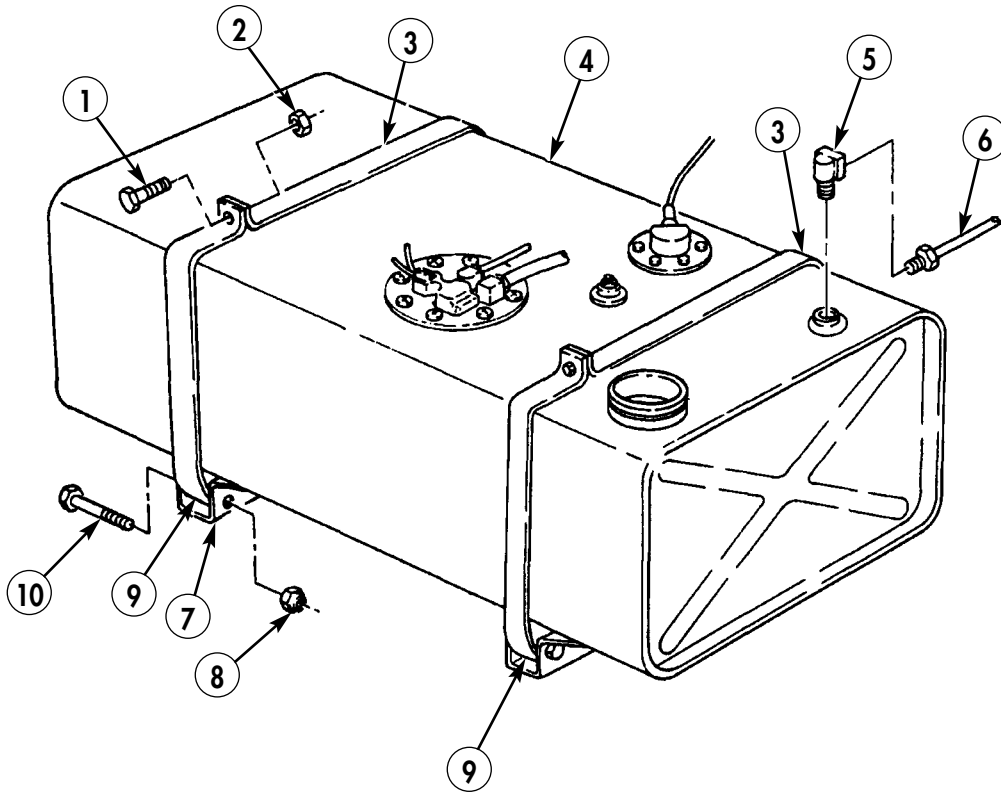
#### NOTE

Assistant will help with step 3.

3. Install fuel tank (4) on two fuel tank hangers (7).
4. Install two retaining straps (9) on fuel tank hangers (7) with two screws (10) and new locknuts (8).
5. Connect two retaining straps (3) to retaining straps (9) with screws (1) and new locknuts (2).
6. Install elbow (5) on fuel tank (4).
7. Connect fuel return tube (6) to elbow (5).
8. Connect connector (11) to sending unit (12).
9. Connect fuel supply (13) to fuel pump (14).
10. Install elbow (16) on fuel pump (13).
11. Connect vent tube (17) to elbow (16).
12. Connect connector (15) to fuel pump (14).
13. Install fuel tank filler cap and sleeve (WP 0058 00).
14. Connect battery ground cable (WP 0126 00).
15. Fill fuel tank (TM 9-2320-361-10).
16. Start engine (TM 9-2320-361-10) and check for fuel leaks.
17. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



FUEL TANK REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL PUMP (IN-TANK) MAINTENANCE

TESTING FUEL PUMP PRESSURE, REMOVAL, DISASSEMBLY,  
CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

Fuel pressure gauge (item 32, WP 0469 00)

##### Materials/Parts

Gasket (item 55, WP 0470 00)  
Gasket (item 53, WP 0470 00)  
Gasket (item 52, WP 0470 00)  
Lockwasher (item 240, WP 0470 00)  
Lockwasher (item 231, WP 0470 00)  
Three lockwashers (item 149, WP 0470 00)

##### Materials/Parts (Contd)

Four lockwashers (item 198, WP 0470 00)  
O-ring (item 279, WP 0470 00)  
Lead seal (item 351, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

##### References

WP 0060 00  
WP 0126 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

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## FUEL PUMP (IN-TANK) MAINTENANCE (Contd)

### TESTING FUEL PUMP PRESSURE

#### **WARNING**

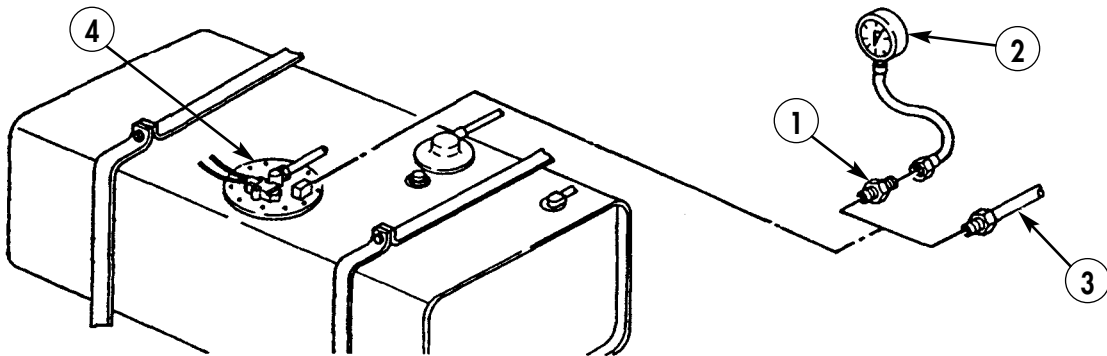
Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.

1. Disconnect fuel supply tube (3) from fuel pump (4).
2. Connect adapter (1) and fuel pressure gauge (2) to fuel pump (4).

#### **CAUTION**

Do not start engine. Starting engine may damage fuel pressure gauge.

3. Turn accessory switch to ON position (TM 9-2320-361-10) to start fuel pump (4).
4. Read pressure on fuel pressure gauge (2). If pressure reads at least 4 psi (27.6 kPa), operation of fuel pump (4) is satisfactory. Turn accessory switch to OFF position (TM 9-2320-361-10) and remove fuel pressure gauge (2) and adapter (1) from fuel pump (4).
5. If fuel pressure gauge (2) reads no pressure, inspect electrical connections and, if necessary, continue with fuel pump replacement (4).



## FUEL PUMP (IN-TANK) MAINTENANCE (Contd)

### REMOVAL

#### NOTE

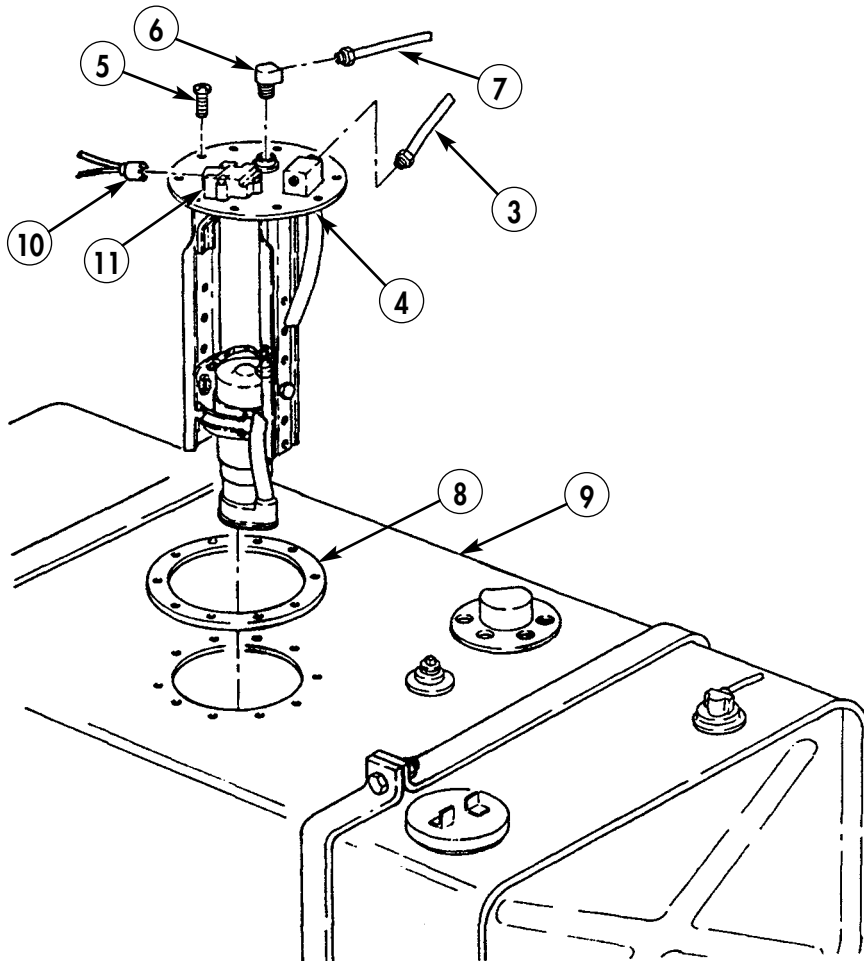
Remove fuel tank from vehicles M109A3 and M185A3 (WP 0060 00).

1. Disconnect battery cable (WP 0126 00).

#### WARNING

Some vehicles have two separate wires and connectors. Mark location of wires for installation. Connecting wires on wrong terminals may cause fuel to ignite, resulting in injury to personnel and/or damage to equipment.

2. Disconnect connector (10) from terminal cover (11).
3. Disconnect vent tube (7) from elbow (6) and remove elbow (6) from fuel pump assembly (4).
4. Disconnect fuel supply tube (3) from fuel pump assembly (4), if not already disconnected.
5. Remove ten screws (5), fuel pump assembly (4), and gasket (8) from fuel tank (9). Discard gasket (8).
6. Cover opening in fuel tank (9) to prevent dirt and dust from entering fuel tank.



## FUEL PUMP (IN-TANK) MAINTENANCE (Contd)

### DISASSEMBLY

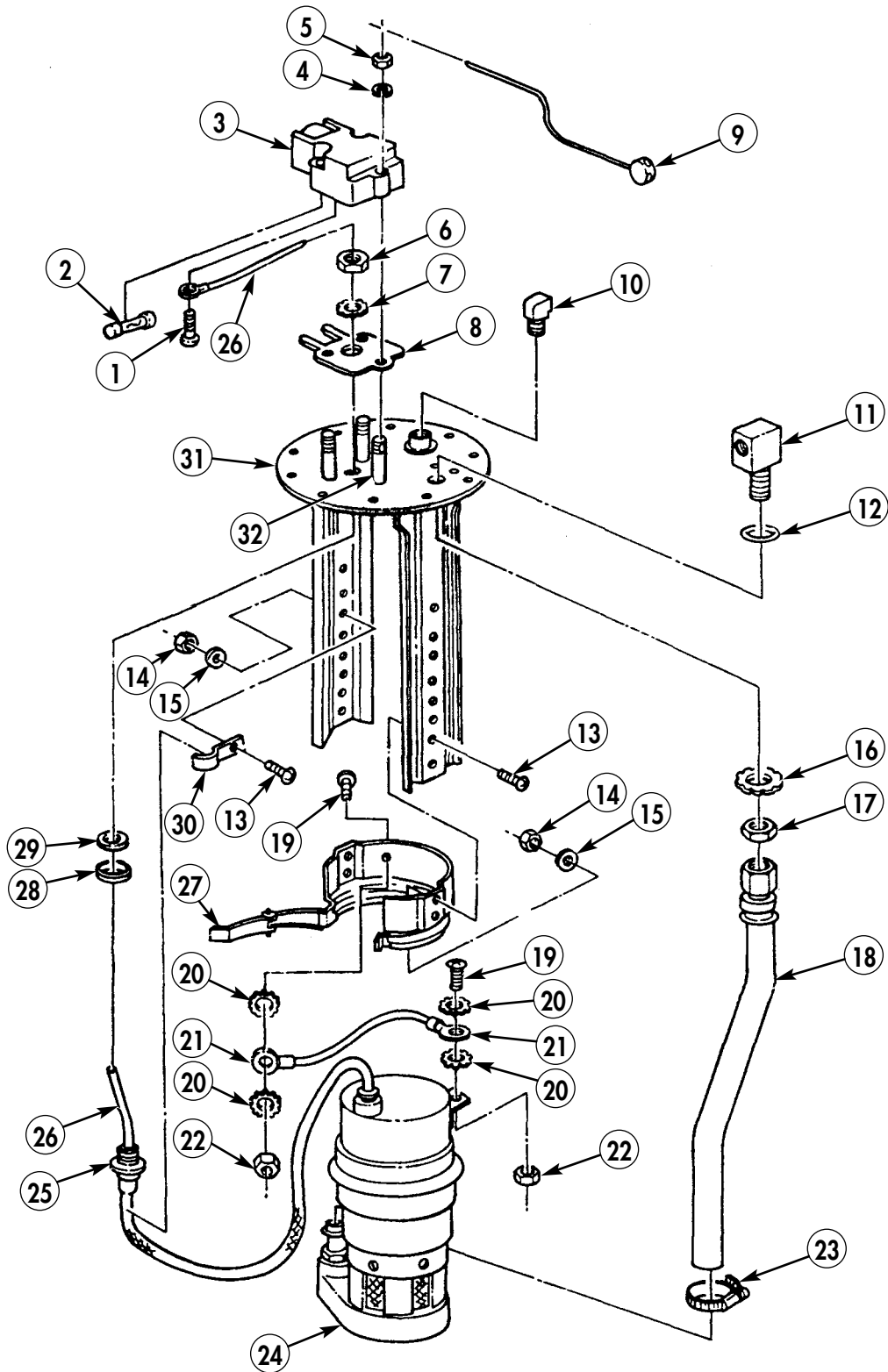
1. Remove lead seal (9) from stud (32) by cutting wire. Discard lead seal (9).
2. Remove three nuts (5), lockwashers (4), and terminal cover (3) from plate and bracket (31).
3. Remove screw (1) and disconnect pump wire (26) from terminal cover (3).
4. Remove fuse (2) from terminal cover (3).
5. Remove nut (6), lockwasher (7), fuel pump wire (26), wire retainer (25), and gasket (8) from plate and bracket (31). Discard lockwasher (7) and gasket (8).
6. Remove gasket (29) and recessed washer (28) from wire retainer (25). Discard gasket (29).

#### **NOTE**

Note location of mounting hardware on plate and bracket for proper installation.

7. Remove nut (14), washer (15), screw (13), and clamp (30) from wire retainer (25) and plate and bracket (31).
8. Remove pump (24) from clamp assembly (27).
9. Remove two nuts (14), washers (15), screws (13), and clamp assembly (27) from plate and bracket (31).
10. Remove two nuts (22), screws (19), four lockwashers (20), and ground strap (21) from pump (24) and clamp assembly (27). Discard lockwashers (20).
11. Remove elbow (10) from plate and bracket (31).
12. Remove hose assembly (18), nut (17), lockwasher (16), O-ring (12), and fitting (11) from plate and bracket (31). Discard lockwasher (16) and O-ring (12).
13. Remove clamp (23) and hose assembly (18) from pump (24).

FUEL PUMP (IN-TANK) MAINTENANCE (Contd)



## FUEL PUMP (IN-TANK) MAINTENANCE (Contd)

### CLEANING AND INSPECTION

Clean and inspect all fuel pump assembly parts for cracks, holes, and stripped threads. Replace damaged parts.

### ASSEMBLY

1. Install ground strap (21) on pump (24) and clamp assembly (27) with four new lockwashers (20), two screws (19), and nuts (22).
2. Install hose assembly (18) on pump (24) with clamp (23).
3. Install new "O" ring (12) and fitting (11) on plate and bracket (31) with new lockwasher (16) and nut (17).

#### NOTE

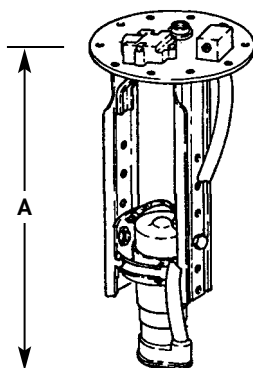
Male pipe threads must be wrapped with antiseize tape before installation.

4. Install hose assembly (18) on fitting (11).
5. Install elbow (10) on plate and bracket (31).

#### NOTE

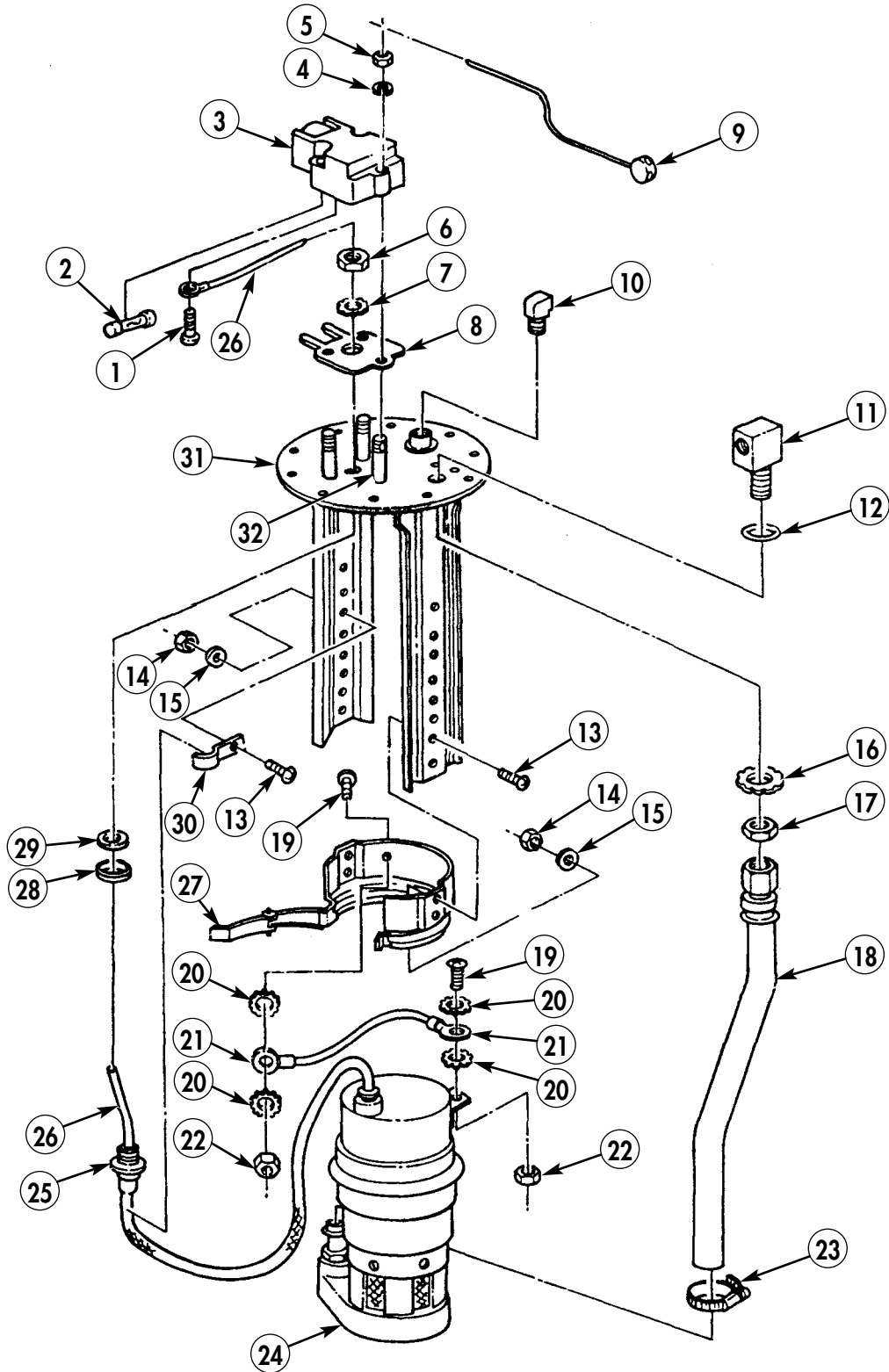
If new fuel pump is installed, measurement "A" must be 15.1 in. (38.4 cm).

6. Install pump (24) on clamp assembly (27) and position pump (24) up or down in plate and bracket (31) to give correct measurement.
7. Remove pump (24) from clamp assembly (27) and install clamp assembly (27) on plate and bracket (31) with two screws (13), washers (15), and nuts (14).
8. Install pump (24) on clamp assembly (27).
9. Install clamp (30) on wire retainer (25) with screw (13), washer (15), and nut (14).
10. Install new gasket (8) on plate and bracket (31) and position fuel pump wire (26) through center hole in plate and bracket (31) and new gasket (8).
11. Install recessed washer (28), new gasket (29), and wire retainer (25) on plate and bracket (31) with new lockwasher (7) and nut (6).
12. Install fuse (2) on terminal cover (3).
13. Install fuel pump wire (26) on terminal cover (3) with screw (1).
14. Install terminal cover (3) on plate and bracket (31) and gasket (8) with three new lockwashers (4) and nuts (5).
15. Install new lead seal (9) on stud (32) with an adequate crimping tool.





FUEL PUMP (IN-TANK) MAINTENANCE (Contd)



## FUEL PUMP (IN-TANK) MAINTENANCE (Contd)

### INSTALLATION

#### NOTE

If new fuel pump is installed, measurement "A" must be 15.1 in. (38.4 cm).

If necessary to adjust fuel pump length, perform steps 1 through 5.

1. Remove pump (8) from clamp (12).
2. Remove two nuts (11), washers (10), and screws (7) from clamp (12) and fuel pump bracket (6).
3. Install pump (8) on clamp (12) and position pump (8) up or down in fuel pump bracket (6) to give correct measurement.
4. Remove pump (8) from clamp (12) and install two screws (7), washers (10), and nuts (11) on fuel pump bracket (6) and clamp (12).
5. Install pump (8) in clamp (12).
6. Install new gasket (9) and fuel pump assembly (5) on fuel tank (13) with ten screws (1).
7. Install fuel tank (WP 0060 00).

#### NOTE

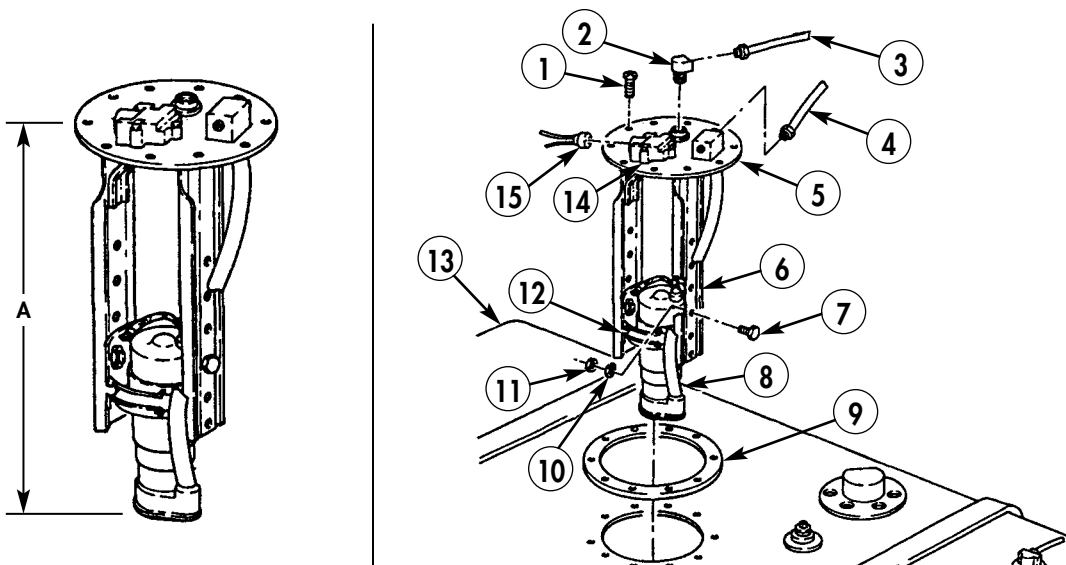
Male pipe threads must be wrapped with antiseize tape before installation.

8. Connect fuel supply tube (4) to fuel pump assembly (5).
9. Install elbow (2) on fuel pump assembly (5) and connect vent tube (3) to elbow (2).

#### WARNING

Some vehicles have two separate wires and connectors. Connecting wires on wrong terminals may cause fuel to ignite, resulting in injury to personnel and/or damage to equipment.

10. Connect connector (15) to terminal cover (14).
11. Connect battery ground cable (WP 0126 00).
12. Start engine (TM 9-2320-361-10), check operation of fuel pump, and check for fuel leaks.
13. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL RETURN TEES AND TUBES REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Cap and plug set (item 10, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## FUEL RETURN TEES AND TUBES REPLACEMENT (Contd)

### REMOVAL

#### **WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel and/or damage to equipment may result.

Before performing fuel system procedures, allow engine to cool. Failure to do so may result in injury or death to personnel.

#### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

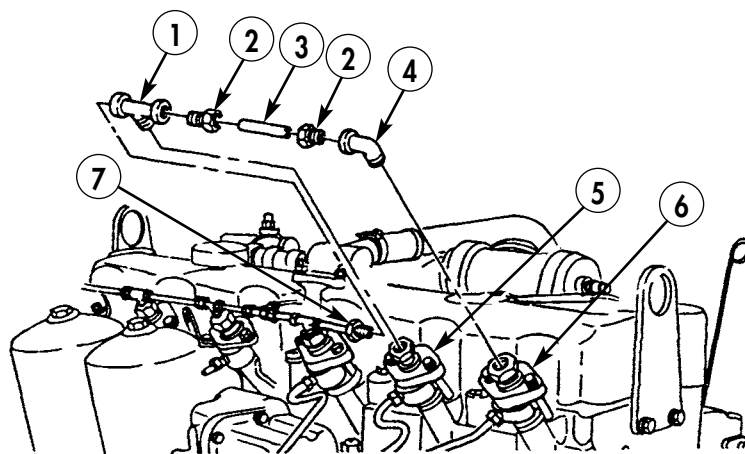
#### **NOTE**

All fuel return tees and tubes are replaced the same way.

1. Loosen two tube nuts (2) on fuel return tube (3), injector nozzle return tee (1), and elbow (4).
2. Remove fuel return tube (3) and two tube nuts (2) from injector nozzle return tee (1) and elbow (4).
3. Remove elbow (4) from injector nozzle (6).
4. Disconnect tube nut (7) from injector nozzle return tee (1) and remove injector nozzle return tee (1) from injector nozzle (5).
5. Cut new tube (3) to same length as old tube (3). Discard old tube (3).

### INSTALLATION

1. Install injector nozzle return tee (1) on injector nozzle (5) and connect tube nut (7) to tee (1).
2. Install elbow (4) on injector nozzle (6).
3. Install new fuel return tube (3) on injector nozzle tee (1) and elbow (4) with two tube nuts (2).
4. Connect battery ground cable (WP 0128 00).
5. Start engine (TM 9-2320-361-10) and check for fuel leaks.
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PRIMARY FUEL FILTER MAINTENANCE

DRAINING, FILTER HOUSING REMOVAL, FILTER REMOVAL,  
CLEANING AND INSPECTION, FILTER INSTALLATION, AND FILTER HOUSING INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### References

WP 0064 00

##### Materials/Parts

Fuel filter kit (item 294, WP 0470 00)  
Two locknuts (item 129, WP 0470 00)  
Two lockwashers (item 198, WP 0470 00)  
Four lockwashers (item 195, WP 0470 00)  
Skysol 100 (item 13, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## PRIMARY FUEL FILTER MAINTENANCE (Contd)

### DRAINING

#### **WARNING**

- Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel and/or damage to equipment may result.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

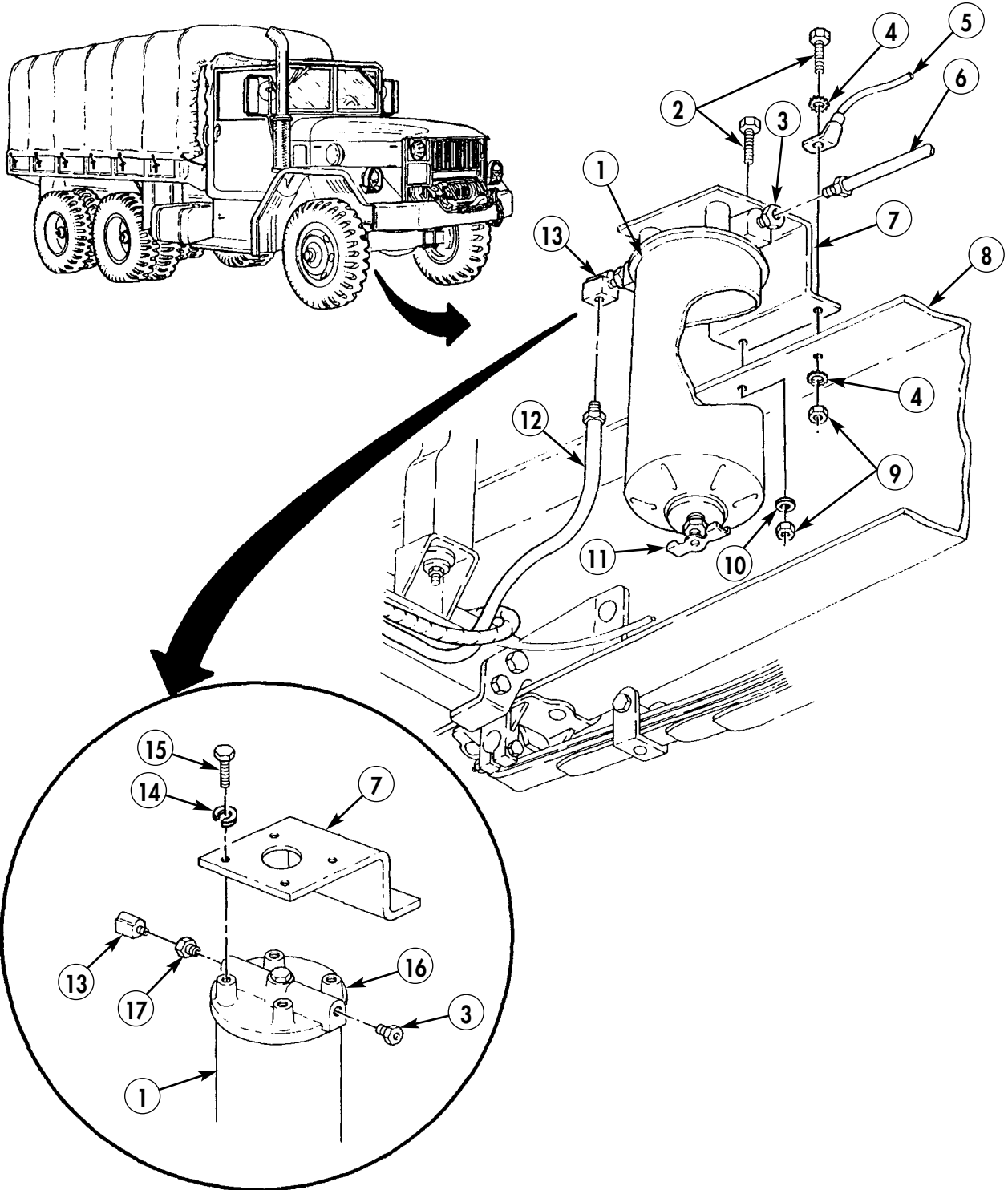
Use a drain pan to capture any draining fuel. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

1. Open drain valve (11) to drain fuel from primary fuel filter (1).
2. Close drain valve (11).

### FILTER HOUSING REMOVAL

1. Disconnect fuel lines (6) and (12) from connector (3) and elbow (13).
2. Remove two locknuts (9), washer (10), lockwasher (4), two screws (2), lockwasher (4), ground wire (5), bracket (7), and primary fuel filter (1) from frame (8) and bracket (7). Discard locknuts (9) and lockwashers (4).
3. Remove four screws (15), lockwashers (14), and bracket (7) from filter head (16). Discard lockwashers (14).
4. Remove elbow (13), connector (17), and connector (3) from filter head (16).

PRIMARY FUEL FILTER MAINTENANCE (Contd)



## PRIMARY FUEL FILTER MAINTENANCE (Contd)

### FILTER REMOVAL

1. Remove sleeve nut (1), gasket (2), filter head (3), and gasket (4) from filter housing (11). Discard gaskets (2) and (4).
2. Remove filter element (5) from filter housing (11). Discard filter element (5).
3. Remove cup (6), gasket (7), washer (8), spring (9), and washer (10) from filter housing (11). Discard gasket (7).

#### **NOTE**

Perform step 4 if drain valve is damaged.

4. Remove drain valve (12) from filter housing (11).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all components with Skysol 100 and dry with lint-free cloth.
2. Inspect components for stripped threads, burrs, and scratches on mating surfaces.

### FILTER INSTALLATION

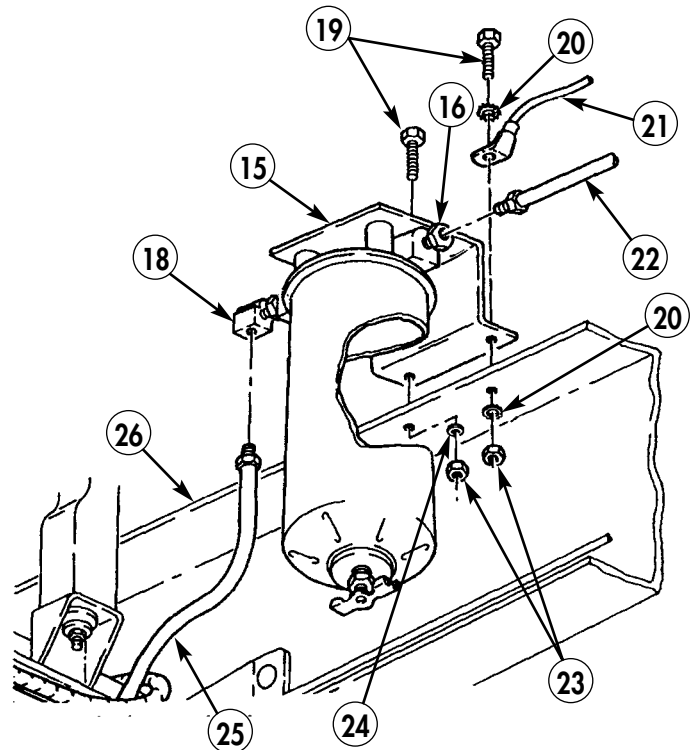
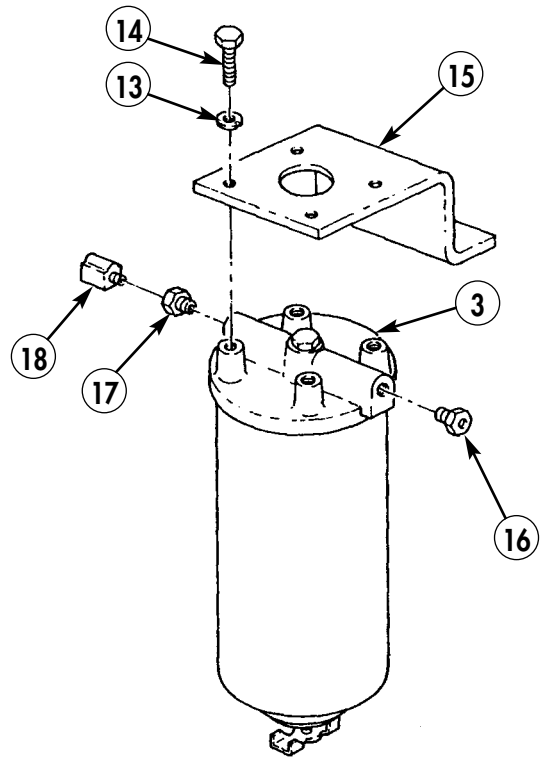
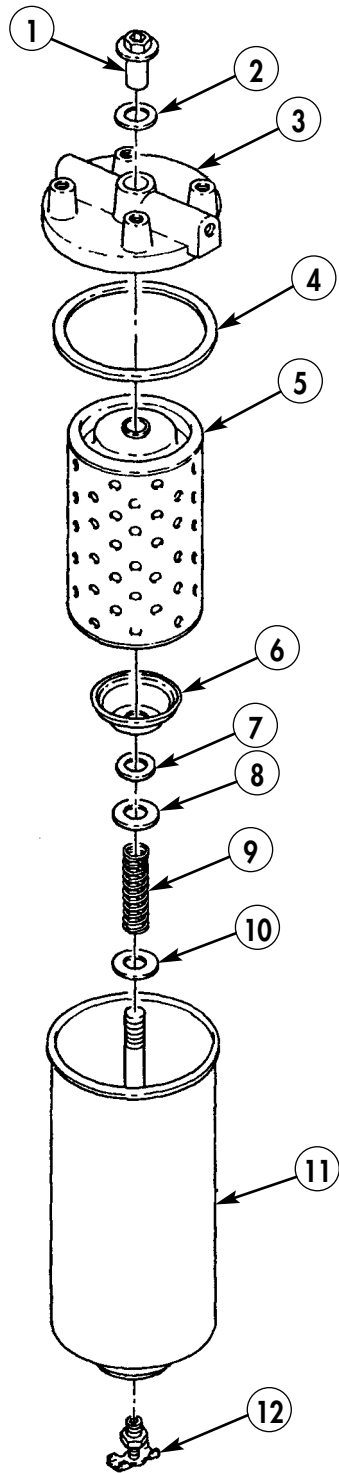
1. Install drain valve (12) on filter housing (11).
2. Install washer (10), spring (9), washer (8), new gasket (7), and cup (6) on filter housing (11).
3. Install new filter element (5), new gasket (4), filter head (3), and new gasket (2) on filter housing (11) with sleeve nut (1). Tighten sleeve nut (1) 15 lb-ft (20 N•m).

### FILTER HOUSING INSTALLATION

1. Install connector (16), connector (17), and elbow (18) on primary fuel filter head (3).
2. Install bracket (15) on primary fuel filter head (3) with four new lockwashers (13) and screws (14).
3. Install bracket (15) and ground strap (21) on frame (26) with two screws (19), washer (24), two new lockwashers (20), and new locknuts (23).
4. Connect fuel lines (22) and (25) to connector (16) and elbow (18).
5. Connect battery ground cable (WP 0126 00).
6. Bleed air from fuel system at secondary and final fuel filter (WP 0064 00).
7. Start engine (TM 9-2320-361-10) and check for fuel leaks.
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



PRIMARY FUEL FILTER MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE

TESTING FUEL PRESSURE, DRAINING, REMOVAL,  
CLEANING AND INSPECTION, INSTALLATION, AND BLEEDING AIR

---

#### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

Fuel pressure gauge (item 32, WP 0469 00)

**Materials/Parts**

Three lockwashers (item 192, WP 0470 00)

Two cotter pins (item 33, WP 0470 00)

Two gaskets (item 95, WP 0470 00)

Two washers (item 372, WP 0470 00)

**Materials/Parts (Contd)**

Two fuel filter kits (item 295, WP 0470 00)

Rag (item 27, WP 0468 00)

Skysol 100 (item 13, WP 0468 00)

**References**

WP 0063 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

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## SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)

### TESTING FUEL PRESSURE

#### **WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.

#### **NOTE**

Fuel filters may have one or two bleeder valves. Remove only one bleeder valve for testing fuel pressure.

1. Remove bleeder valve (1) or (4) from top of fuel filter head (5).
2. Install adapter (3) and fuel pressure gauge (2) on bleeder valve (1) or (4) opening of fuel filter head (5).

#### **CAUTION**

Do not start engine. Starting engine may damage fuel pressure gauge.

3. Turn accessory switch to ON position (TM 9-2320-361-10) to start fuel pump.
4. Read pressure on fuel pressure gauge (2).
  - a. If pressure reads at least 2 psi (13.8 kPa), condition of all fuel filters is satisfactory.
  - b. If pressure reads below 2 psi (13.8 kPa), turn accessory switch to OFF position (TM 9-2320-361-10) and inspect fuel supply tubes (9) for damage. If necessary, replace primary fuel filter (WP 0063 00). If pressure is still not at least 2 psi (13.8 kPa), continue with fuel filter draining and replace secondary and final fuel filter.

### DRAINING

#### **WARNING**

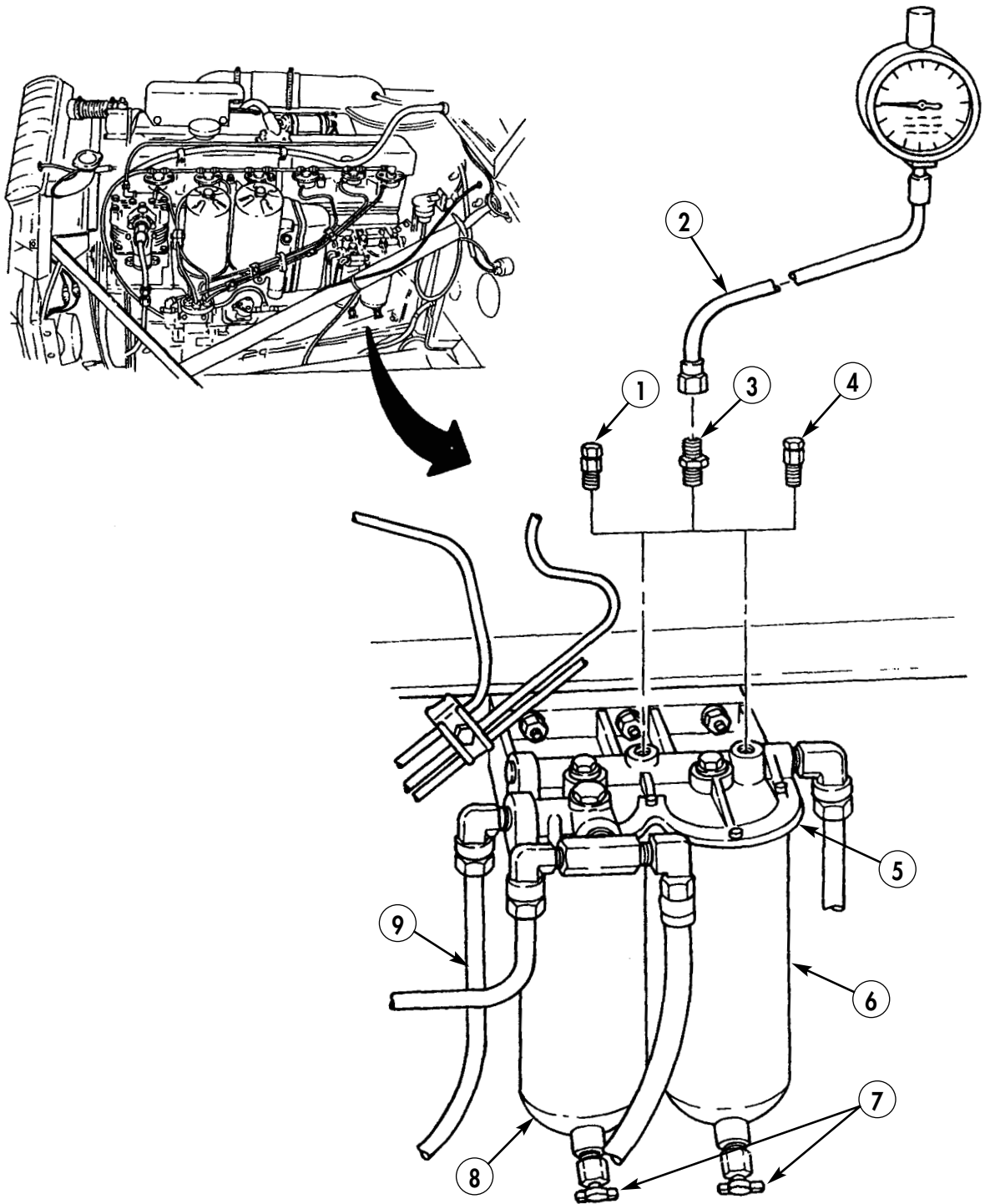
Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining fuel. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

1. Open two drain valves (7) to drain fuel from secondary fuel filter housing (8) and final fuel filter housing (6).
2. Close two drain valves (7).

SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)



## SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)

### REMOVAL

#### Fuel Filter Head

1. Disconnect battery ground cable (WP 0126 00).

#### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

#### **NOTE**

Mark location of the fuel lines for installation.

2. Disconnect three fuel lines (4) and fuel line (7) from three elbows (3) and elbow (8).
3. Remove three elbows (3), elbow (8), and tee (9) from fuel filter head (2).
4. Remove three nuts (6), lockwashers (5), and fuel filter head (2) from engine (1). Discard lockwashers (5).

#### Fuel Filters

#### **NOTE**

- Some fuel filters have two bleeder valves.
- Secondary and final fuel filters are removed the same way.  
This procedure covers the secondary fuel filter.

1. Remove bleeder valve (11) from fuel filter head (2).
2. Remove sleeve nut (10), washer (23), and gasket (22) from fuel filter head (2). Discard gasket (22) and washer (23).
3. Remove secondary fuel filter housing (18) and gasket (21) from filter head (2). Discard gasket (21).
4. Remove filter element (20) from secondary fuel filter housing (18). Discard filter element (20).
5. Remove cotter pin (17) from center post (12). Discard cotter pin (17).
6. Remove cup (13), gasket (14), washer (15), and spring (16) from center post (12). Discard gasket (14) and washer (15).
7. Remove drain valve (19) from secondary fuel filter housing (18).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all components with Skysol 100 and dry with clean rag.
2. Inspect elbows (3) and (8), tee (9), and center post (12) for burrs and stripped threads.
3. Inspect filter head (2) and filter housing (18) for burrs and scratches on mating surfaces.

## SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)

### INSTALLATION

#### Fuel Filters

#### NOTE

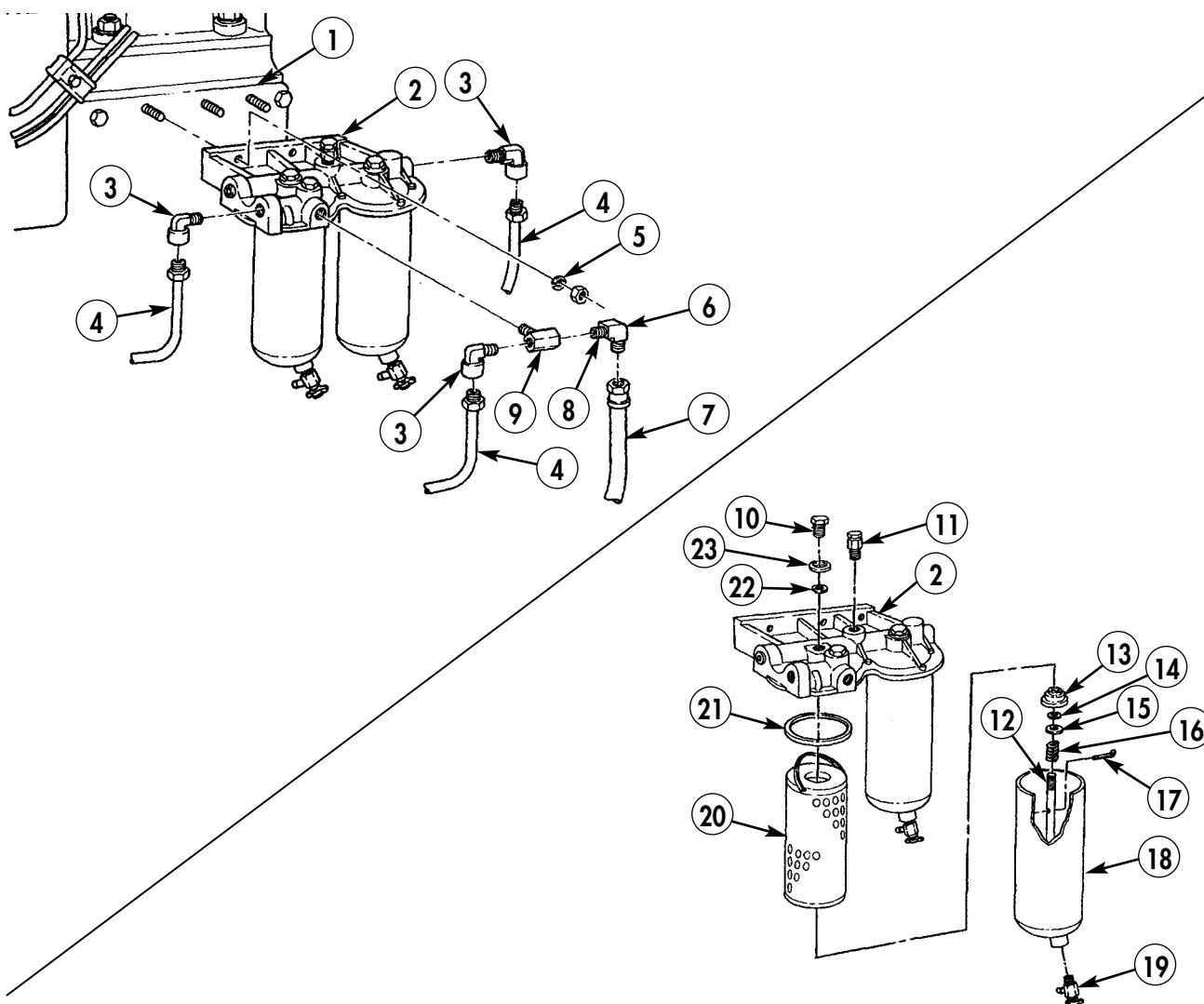
Secondary and final fuel filters are installed the same way. This procedure covers the secondary fuel filter.

1. Install drain valve (19) on secondary fuel filter housing (18).
2. Install spring (16), new washer (15), new gasket (14), and cup (13) on center post (12).
3. Install new cotter pin (17) in center post (12).
4. Install new filter element (20) on secondary fuel filter housing (18).
5. Install secondary fuel filter housing (18) and new gasket (21) on fuel filter head (2) with new gasket (22), new washer (23), and sleeve nut (10). Tighten sleeve nut (10) 15 lb-ft (20.3 N•m).

#### NOTE

Some fuel filters have two bleeder valves.

6. Install bleeder valve (11) on fuel filter head (2).



## SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)

### INSTALLATION (Contd)

#### Fuel Filter Head

1. Install fuel filter head (2) on engine (1) with three new lockwashers (5) and nuts (6).
2. Install tee (9), three elbows (3), and elbow (8) on fuel filter head (2).
3. Connect three fuel lines (4) and fuel line (7) to elbows (3) and (8).
4. Connect battery ground cable (WP 0126 00).

### BLEEDING AIR

1. Place accessory switch on instrument panel in ON position (TM 9-2320-361-10) to operate in-tank fuel pump. Do not start engine at this time.

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining fuel. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

2. Loosen bleeder valve (11). When fuel starts to flow, close bleeder valve (11).

#### **NOTE**

Perform step 3 for secondary and final fuel filters with two bleeder valves.

3. Open and close each bleeder valve (11) until fuel is clear of air bubbles.

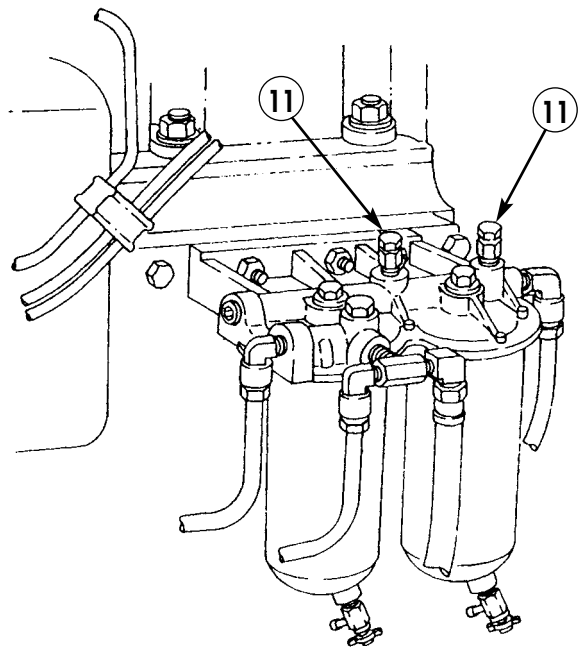
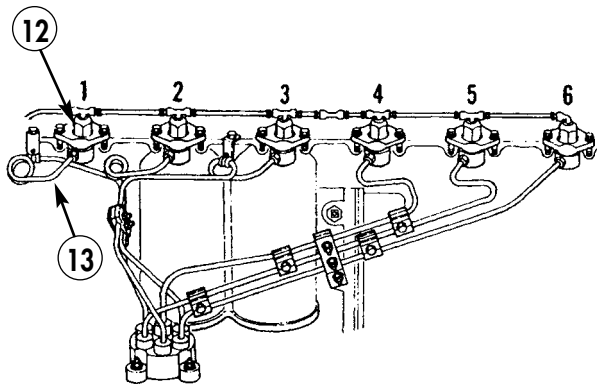
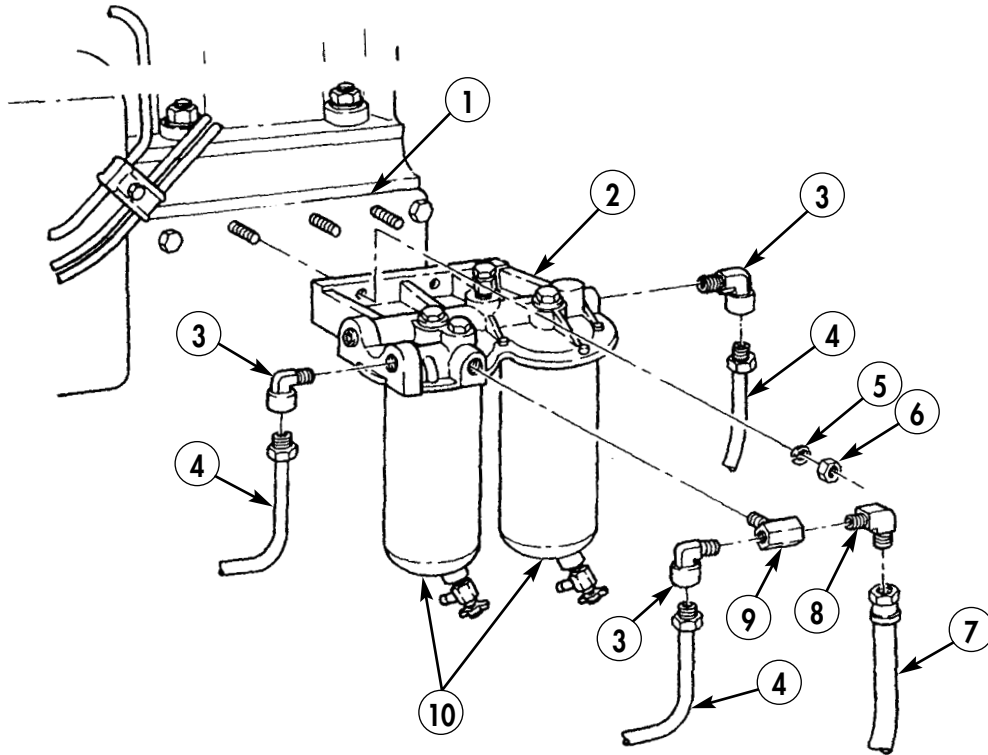
#### **WARNING**

- There is enough fuel pressure to penetrate skin when removing injector tubes. Wear hand protection at all times when removing injector tubes. Failure to do so may result in injury to personnel.
- Stay clear of moving parts. Failure to do so may result in injury or death to personnel.

4. Loosen injector tube (13) from injector (12). Crank engine (TM 9-2320-361-10) until no air bubbles are observed in fuel. Tighten injector tube (13).
5. Repeat step 4 for remaining injectors (13) in sequence shown.
6. Start engine (TM 9-2320-361-10).
7. With engine running, again open and close bleeder valve (11) until fuel is clear of air bubbles. Tighten bleeder valve (11) and stop engine (TM 9-2320-361-10).
8. Using clean rag, wipe fuel from secondary and final fuel filter housings (10) and injectors (13).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



SECONDARY AND FINAL FUEL FILTERS TESTING AND MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MANIFOLD HEATER (COVERED) REPLACEMENT

COVER REMOVAL, IGNITION UNIT REMOVAL, FUEL NOZZLE REMOVAL, FUEL PUMP REMOVAL, ELBOW  
REMOVAL, FUEL FILTER REMOVAL, FUEL FILTER INSTALLATION, ELBOW INSTALLATION, FUEL PUMP  
INSTALLATION, FUEL NOZZLE INSTALLATION, IGNITION UNIT INSTALLATION, AND COVER INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Lockwasher (item 192, WP 0470 00)  
Three lockwashers (item 229, WP 0470 00)  
Four lockwashers (item 193, WP 0470 00)  
Gasket (item 49, WP 0470 00)  
Gasket (item 82, WP 0470 00)  
Fuel filter (item 42, WP 0470 00)

##### Materials/Parts (Contd)

Two filter disks (item 38, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Breather tube removed (WP 0043 00).

---

## MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

### **COVER REMOVAL**

Remove four screws (1), clamp (5), and fuel pump cover (2) from bracket (11).

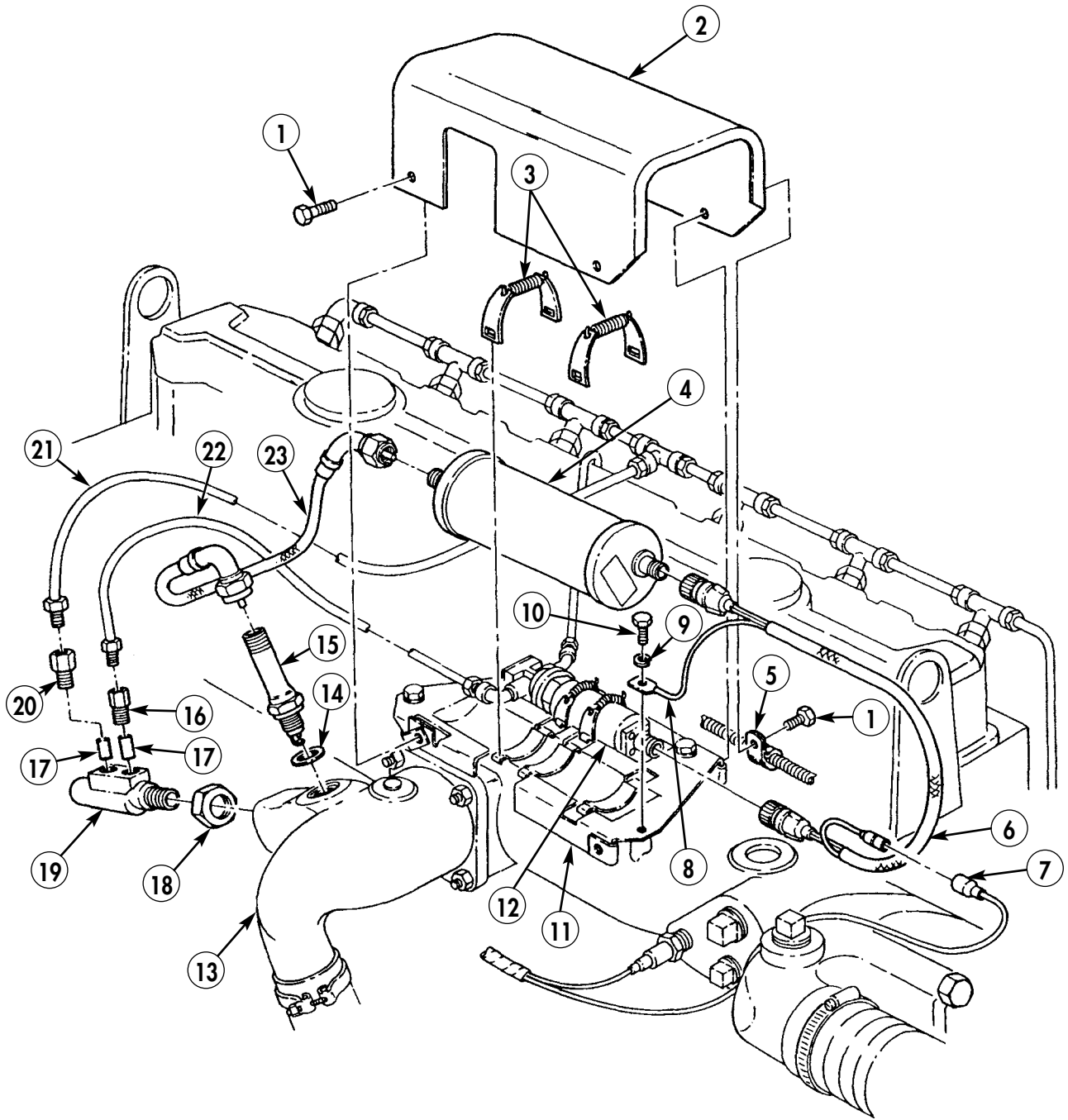
### **IGNITION UNIT REMOVAL**

1. Remove screw (10), lockwasher (9), and wiring harness ground wire (8) from bracket (11). Discard lockwasher (9).
2. Disconnect wire (7) from wiring harness (6).
3. Disconnect wiring harness (6) from ignition unit (4) and fuel pump (12).
4. Disconnect cable assembly (23) from ignition unit (4) and spark plug (15).
5. Remove two clamp assemblies (3) and ignition unit (4) from bracket (11).

### **FUEL NOZZLE REMOVAL**

1. Remove spark plug (15) and gasket (14) from elbow (13). Discard gasket (14).
2. Disconnect fuel return tube (21) and fuel inlet tube (22) from adapters (20) and (16).
3. Remove adapters (20) and (16) from fuel nozzle (19).
4. Loosen nut (18) and remove fuel nozzle (19) and nut (18) from elbow (13).
5. Remove two filter disks (17) from fuel nozzle (19). Discard filter disks (17).

MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)



## MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)

### FUEL PUMP REMOVAL

1. Remove fuel inlet tube (20) from elbow (1).
2. Remove fuel supply tube (5) from elbow (4).
3. Remove two clamps (3) and fuel pump (2) from bracket (10).
4. Remove elbows (1) and (4) from fuel pump (2).
5. Remove two screws (19), lockwashers (18), bracket (10), and four nuts (9) from air intake manifold (8). Discard lockwashers (18).
6. Remove fuel return tube (7) from tee (6).

### ELBOW REMOVAL

1. Loosen clamp (11) on air intake tube (12).
2. Remove four nuts (15), lockwashers (16), clamp (14), elbow (13), and gasket (17) from air intake manifold (8) and air intake tube (12). Discard lockwashers (16) and gasket (17).

### FUEL FILTER REMOVAL

1. Disconnect fuel supply tube (5) from adapter (21).
2. Disconnect fuel supply tube (28) from fuel filter (29).
3. Remove screw (27), lockwasher (26), clamp (25), fuel filter (29), and clamp (24) from side of engine (23). Discard lockwasher (26) and fuel filter (29).
4. Remove adapter (21) and elbow (22) from fuel filter (29).

### FUEL FILTER INSTALLATION

1. Install elbow (22) and adapter (21) on new fuel filter (29).
2. Install fuel filter (29) on engine (23) with clamps (24) and (25), new lockwasher (26) and screw (27).
3. Connect fuel supply tube (28) to fuel filter (29).
4. Connect fuel supply tube (5) to adapter (21).

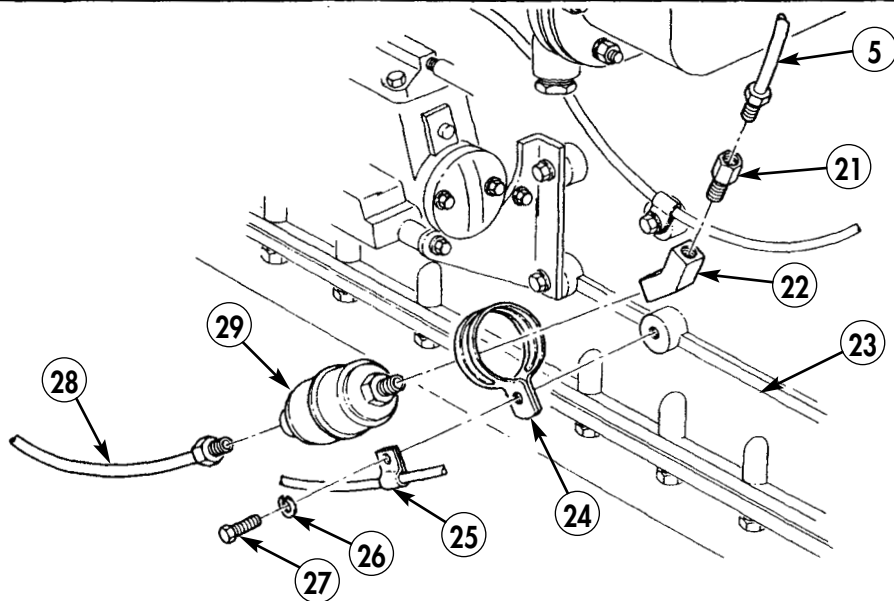
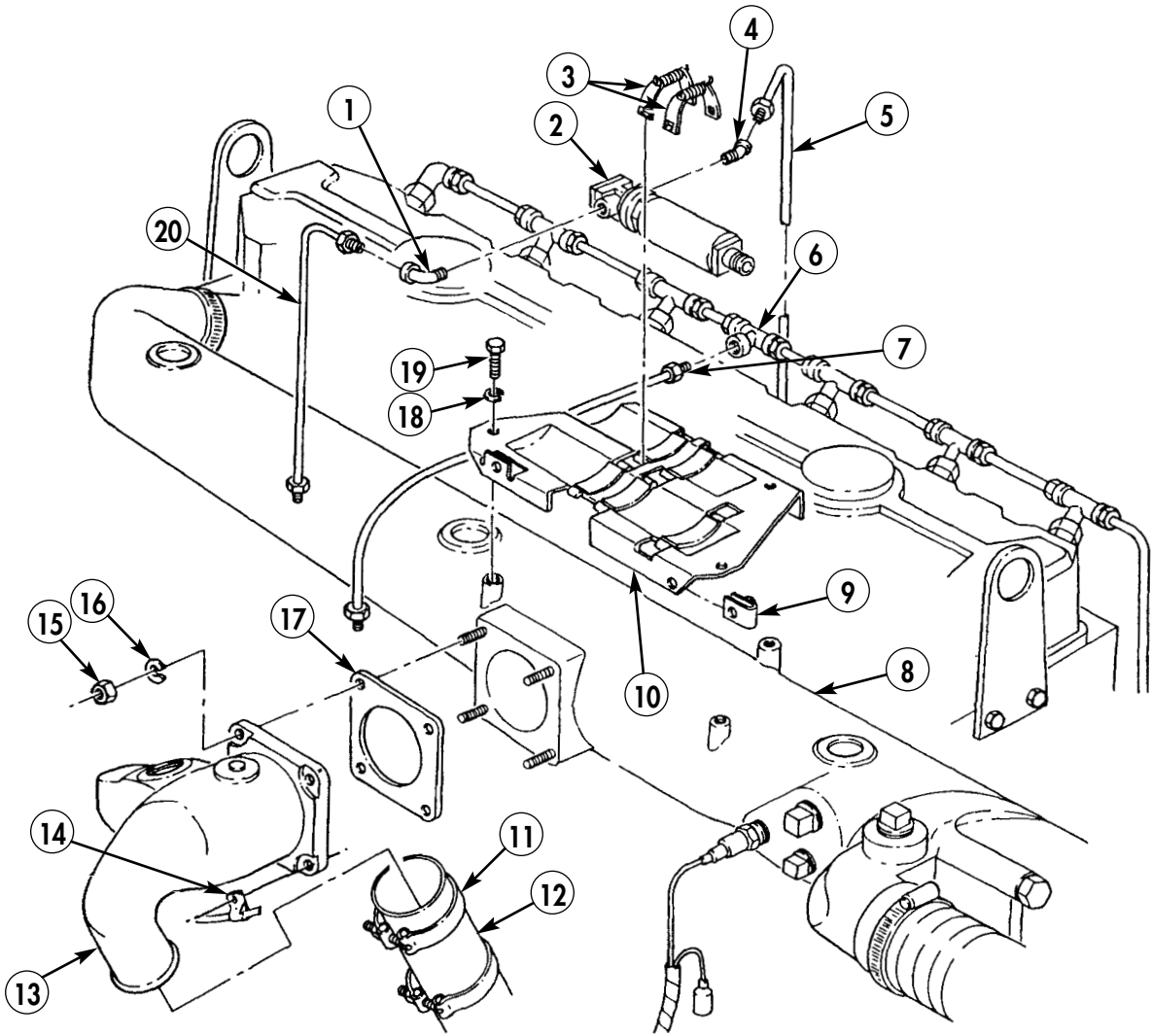
### ELBOW INSTALLATION

1. Install new gasket (17), elbow (13), and clamp (14) on air intake tube (12) and air intake manifold (8) with four new lockwashers (16) and nuts (15).
2. Tighten clamp (11) on air intake tube (12).

### FUEL PUMP INSTALLATION

1. Install fuel return tube (7) on tee (6).
2. Install four nuts (9) on bracket (10) and install bracket (10) on air intake manifold (8) with two screws (19) and new lockwashers (18).
3. Install elbows (1) and (4) on fuel pump (2).
4. Install fuel pump (2) on bracket (10) with two clamps (3).
5. Connect fuel supply tube (5) to elbow (4).
6. Connect fuel inlet tube (20) to elbow (1).

### MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)



## **MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)**

### **FUEL NOZZLE INSTALLATION**

1. Install two new filter disks (17) on fuel nozzle (19).
2. Install fuel nozzle (19) on elbow (13) with nut (18). Tighten nut (18) securely.
3. Install adapters (16) and (20) on fuel nozzle (19).
4. Connect fuel inlet tube (22) and fuel return tube (21) to adapters (16) and (20).
5. Install new gasket (14) and spark plug (15) on elbow (13).

### **IGNITION UNIT INSTALLATION**

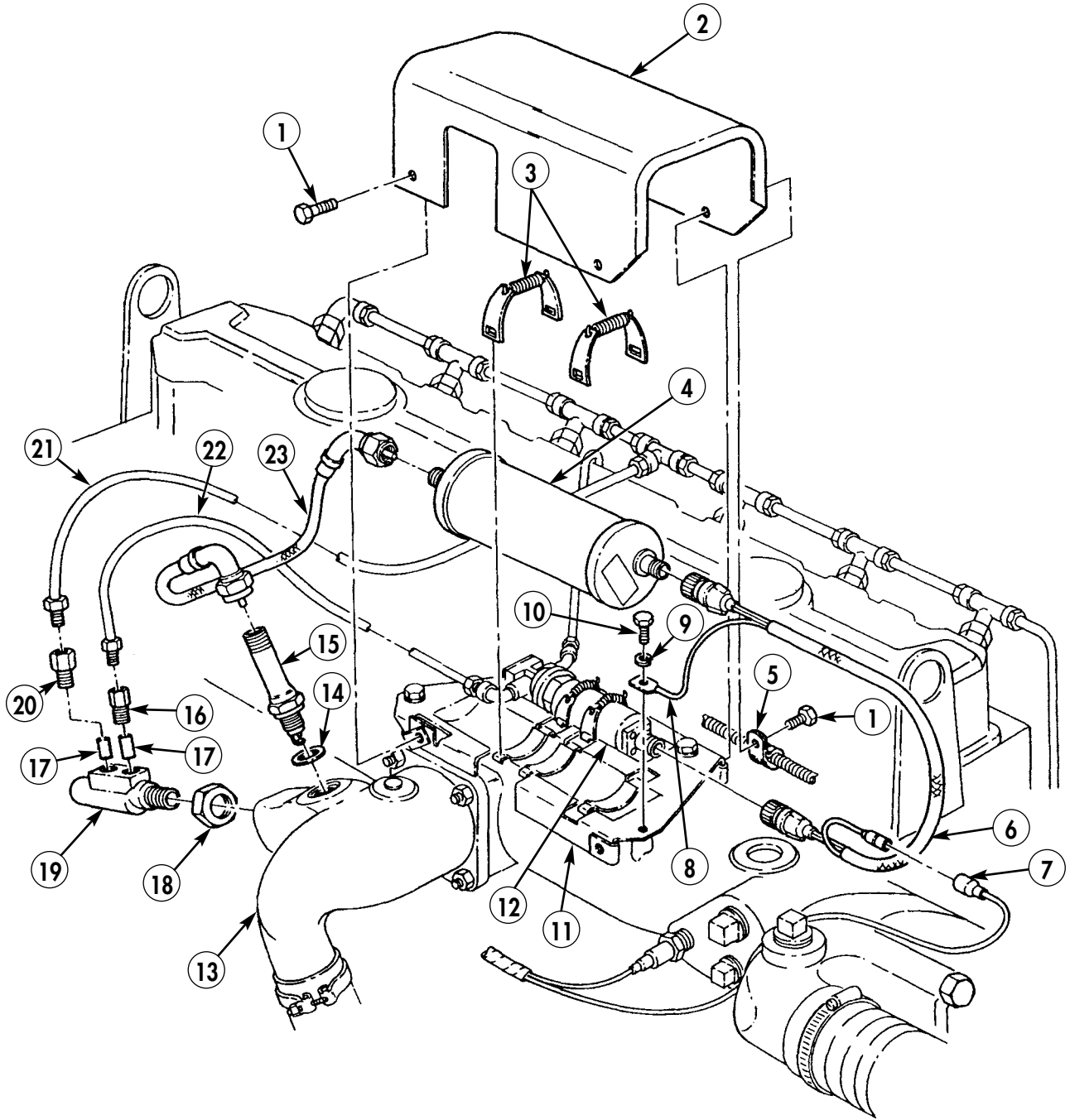
1. Install ignition unit (4) on bracket (11) with two clamp assemblies (3).
2. Connect cable assembly (23) to ignition unit (4) and spark plug (15).
3. Connect wiring harness (6) to fuel pump (12) and ignition unit (4).
4. Connect wiring harness ground wire (8) to bracket (11) with screw (10) and new lockwasher (9).
5. Connect wiring harness (6) to wire (7).

### **COVER INSTALLATION**

1. Install fuel pump cover (2) and clamp (5) on bracket (11) with four screws (1).
2. Install breather tube (WP 0043 00).
3. Connect battery ground cable (WP 0126 00).
4. Lower and secure hood (TM 9-2320-361-10).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



MANIFOLD HEATER (COVERED) REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MANIFOLD HEATER (UNCOVERED) REPLACEMENT

FUEL NOZZLE REMOVAL, IGNITION UNIT REMOVAL, FUEL FILTER REMOVAL,  
FUEL PUMP REMOVAL, ELBOW REMOVAL, ELBOW INSTALLATION, FUEL PUMP INSTALLATION,  
FUEL FILTER INSTALLATION, IGNITION UNIT INSTALLATION, AND FUEL NOZZLE INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Fuel filter (item 42, WP 0470 00)  
Two filter disks (item 38, WP 0470 00)  
Gasket (item 82, WP 0470 00)  
Gasket (item 49, WP 0470 00)  
Lockwasher (item 229, WP 0470 00)

##### Materials/Parts (Contd)

Four lockwashers (item 192, WP 0470 00)  
Four lockwashers (item 193, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## MANIFOLD HEATER (UNCOVERED) REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove cap or plugs prior to installation. Failure to do so may result in damage to equipment.

### **FUEL NOZZLE REMOVAL**

1. Disconnect cable assembly (38) from spark plug (32).
2. Remove spark plug (32) and gasket (31) from elbow (25). Discard gasket (31).
3. Disconnect fuel return tube (7) and fuel inlet tube (10) from adapters (30) and (28).
4. Loosen nut (26) and remove fuel nozzle (27) and nut (26) from elbow (25).
5. Remove two filter disks (29) from fuel nozzle (27). Discard filter disks (29).

### **IGNITION UNIT REMOVAL**

1. Remove cable assembly (38) from ignition unit (4).
2. Remove screw (1), lockwasher (2), and ground wire (41) from engine (40) and disconnect wiring harness (39) from ignition unit (4). Discard lockwasher (2).
3. Remove two screws (3), lockwashers (5), clamps (36), and ignition unit (4) from engine (40). Discard lockwashers (5).

### **FUEL FILTER REMOVAL**

1. Disconnect wire (11) from wire (12).
2. Remove wiring harness (21) from fuel pump (14).
3. Remove fuel return line (7) from tee (9).
4. Disconnect fuel supply line (35) from fuel filter (18).
5. Remove fuel filter (18), elbow (16), and pipe coupling (15) from fuel pump (14). Discard fuel filter (18).

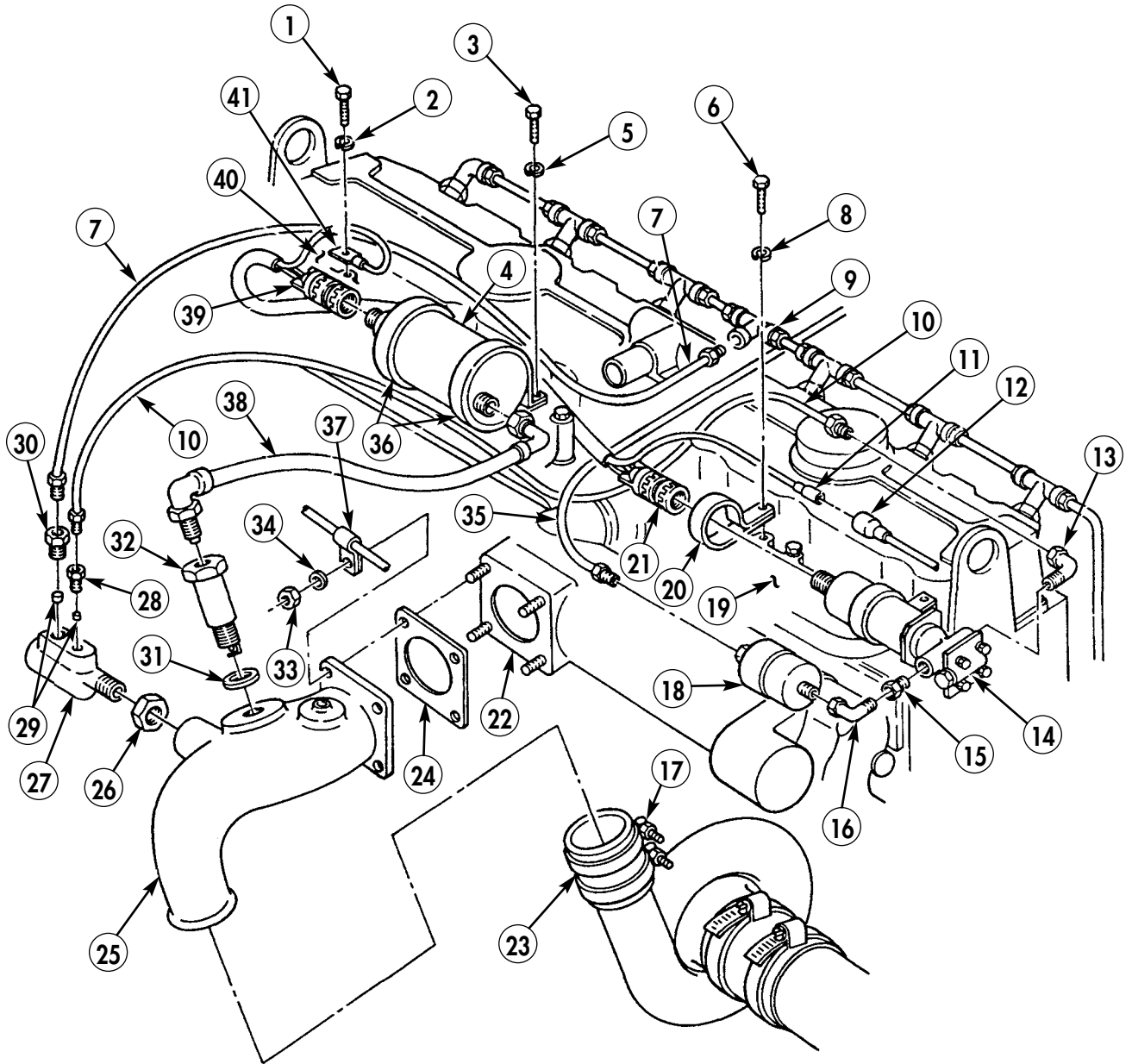
### **FUEL PUMP REMOVAL**

1. Remove fuel inlet tube (10) and elbow (13) from fuel pump (14).
2. Remove two screws (6), lockwashers (8), clamps (20), and fuel pump (14) from water outlet manifold (19). Discard lockwashers (8).

### **ELBOW REMOVAL**

1. Loosen clamp (17) on air intake tube (23).
2. Remove four nuts (33), lockwashers (34), clamp (37), elbow (25), and gasket (24) from air intake manifold (22) and air intake tube (23). Discard lockwashers (34) and gasket (24).

MANIFOLD HEATER (UNCOVERED) REPLACEMENT (Contd)



## MANIFOLD HEATER (UNCOVERED) REPLACEMENT (Contd)

### ELBOW INSTALLATION

1. Install new gasket (24), elbow (25), and clamp (37) on air intake tube (23) and air intake manifold (22) with four new lockwashers (34) and nuts (33).
2. Tighten clamp (17) on air intake tube (23).

### FUEL PUMP INSTALLATION

1. Install fuel pump (14) on water outlet manifold (19) with two clamps (20), new lockwashers (8), and screws (6).
2. Install elbow (13) on fuel pump (14) and connect fuel inlet tube (10) to elbow (13).

### FUEL FILTER INSTALLATION

1. Install pipe coupling (15), elbow (16), and new fuel filter (18) on fuel pump (14).
2. Connect fuel supply line (35) to fuel filter (18).
3. Connect fuel return line (7) to tee (9).
4. Connect wiring harness (21) to fuel pump (14).
5. Connect wire (11) to wire (12).

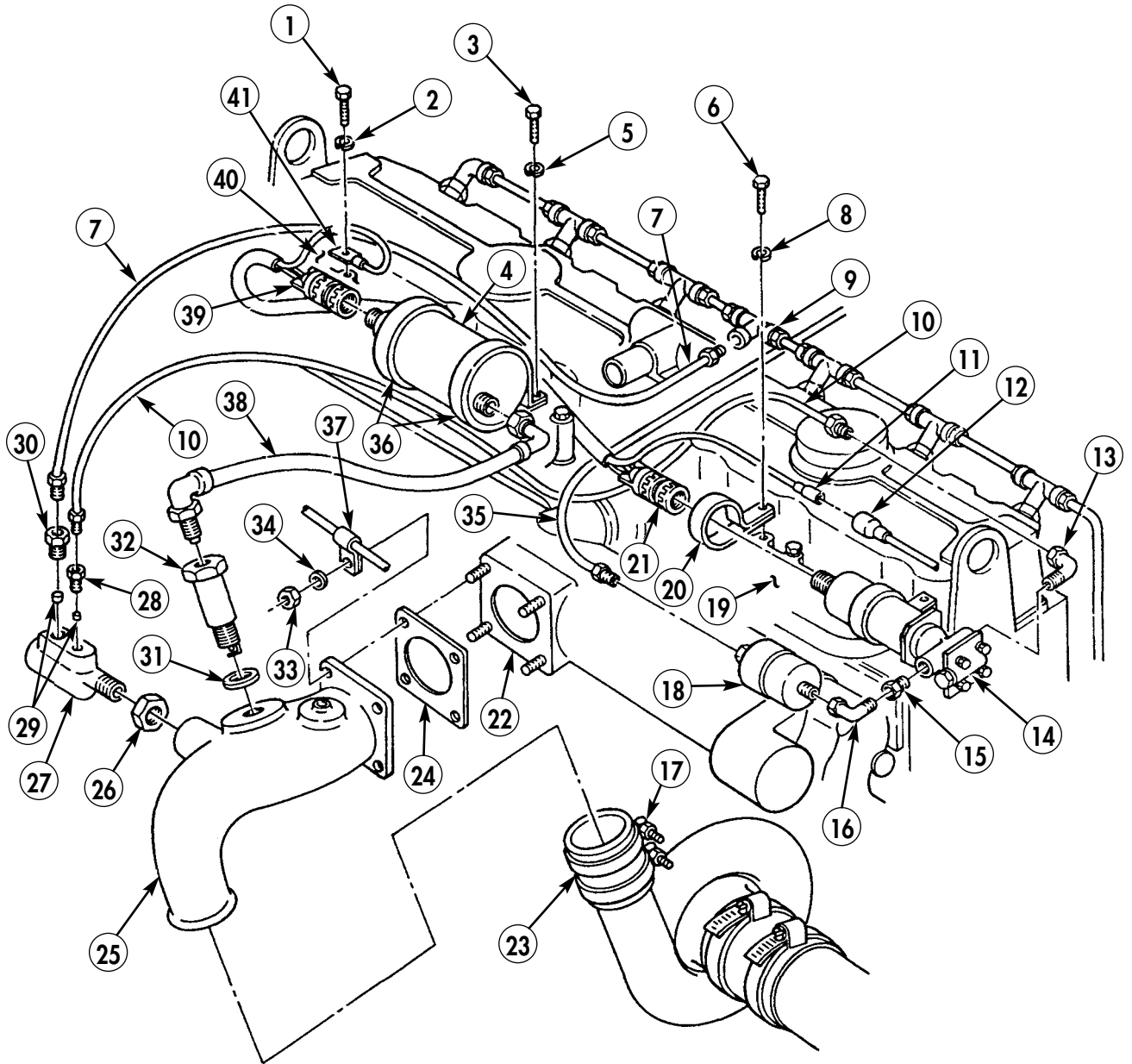
### IGNITION UNIT INSTALLATION

1. Install ignition unit (4) on engine (40) with two clamps (36), new lockwashers (5), and screws (3).
2. Connect cable assembly (38) to ignition unit (4).
3. Connect wiring harness (39) to ignition unit (4).
4. Install ground wire (41) on engine (40) with new lockwasher (2) and screw (1).

### FUEL NOZZLE INSTALLATION

1. Install two new filters (29) on fuel nozzle (27).
2. Install fuel nozzle (27) and nut (26) on elbow (25).
3. Install adapters (28) and (30) on fuel nozzle (27).
4. Connect fuel inlet tube (10) and fuel return tube (7) to adapters (28) and (30).
5. Install new gasket (31) and spark plug (32) on elbow (25).
6. Connect cable assembly (38) to spark plug (32).
7. Connect battery ground cable (WP 0126 00).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

MANIFOLD HEATER (UNCOVERED) REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL INJECTOR NOZZLE AND HOLDER MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 1/2-in. drive  
(item 136, WP 0469 00)

##### Materials/Parts

Two lockwashers (item 193, WP 0470 00)  
Dust seal (item 349, WP 0470 00)  
Locknut (item 159, 0470 00)

##### Materials/Parts (Contd)

Cap and plug set (item 10, WP 0468 00)  
Silicone compound (item 29, 0468 00)

##### References

TM 9-2815-210-34-2-2  
WP 0064 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Fuel injection tubes and tees removed  
(WP 0068 00).

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## FUEL INJECTOR NOZZLE AND HOLDER REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury to personnel may result.

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

### **NOTE**

All fuel injector nozzle and holder assemblies are removed and installed basically the same. This procedure covers no. 4 cylinder injector nozzle.

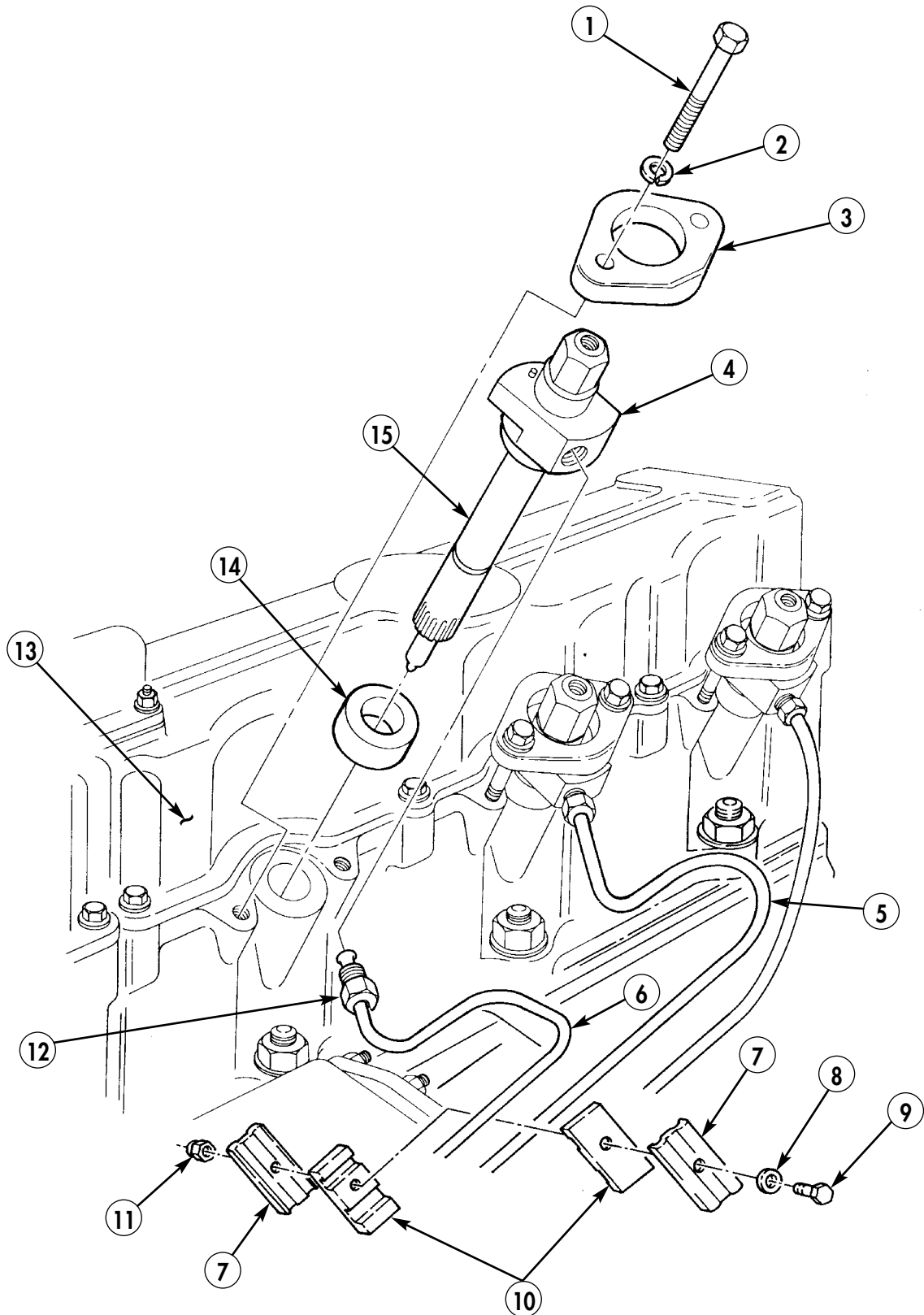
### **REMOVAL**

1. Loosen tube nut (12) on fuel injector tube (6) and disconnect from fuel injector nozzle (4).
2. Remove locknut (11), screw (9), washer (8), two retainers (7), and cushions (10) from injector tubes (5) and (6). Discard locknut (11).
3. Remove two screws (1), lockwashers (2), fuel injector holder (3), and fuel injector nozzle (4) from engine (13). Discard lockwashers (2).
4. Remove dust seal (14) from fuel injector nozzle body (15). Retain dust seal (14) if serviceable. For fuel injector nozzle cleaning, inspection, and repair procedures, refer to TM 9-2815-210-34-2-2.

### **INSTALLATION**

1. Apply a coat of silicone compound to fuel injector nozzle body (15).
2. Install dust seal (14) onto fuel injector nozzle body (15).
3. Install fuel injector nozzle (4) and holder (3) into engine (13) with two new lockwashers (2) and screws (1).
4. Evenly tighten two screws (1) 13–15 lb-ft (17–20 N•m).
5. Connect fuel injector tube (6) to fuel injector nozzle (4) with tube nut (12).
6. Install two cushions (10) and retainers (7) on fuel injector tubes (5) and (6) with washer (8), screw (9), and new locknut (11).
7. Install fuel return tees and tubes (WP 0068 00).
8. Bleed fuel system (WP 0064 00).
9. Start engine (TM 9-2320-361-10) and check for fuel leaks.
10. Connect battery ground cable (WP 0126 00).
11. Lower and secure hood (TM 9-2320-361-10).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FUEL INJECTOR NOZZLE AND HOLDER REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL INJECTOR TUBES MAINTENANCE REMOVAL, INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### References

WP 0064 00

##### Tools and Special Tools

General mechanic's tool kit

(item 116, WP 0469 00)

11/16-in. flare wrench, 12 pt.

(item 131, WP 0469 00)

Fuel line dust cap assembly tool

(WP 0471 00)

##### Equipment Condition

Hood raised and secured (TM 9-2320-361-10).

Parking brake set and wheels chocked

(TM 9-2320-361-10).

Battery ground cable disconnected

(WP 0126 00).

##### Materials/Parts

Eight locknuts (item 159, WP 0470 00)

Two locknuts (item 158, WP 470 00)

Lockwasher (item 192, WP 0470 00)

Cap and plug set (item 10, WP 0468 00)

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## FUEL INJECTOR TUBES MAINTENANCE (Contd)

### **WARNING**

- Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury to personnel may result.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection or component removal to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

## REMOVAL

### **NOTE**

- Perform steps 1 through 5 for fuel injectors 2, 4, and 6.
  - Perform steps 6 through 10 for fuel injectors 1, 3, and 5.
1. Remove two locknuts (18), screws (25), washers (9), and two retainers (17) from fuel injector tubes (21), (22), and (24) and bracket (19). Discard locknuts (18).
  2. Remove two locknuts (2), screws (23), and clamps (20) from brackets (1). Discard locknuts (2).

### **NOTE**

- Prior to removal, tag fuel injector tubes for installation.
  - Use a drain pan to capture any draining fuel . Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.
3. Lift three dust caps (16) for fuel injector tubes (21), (22), and (24).
  4. Loosen three nuts (15) and remove fuel injector tubes (21), (22), and (24) from fuel injector pump (14).
  5. Loosen three nuts (26) and remove three fuel injector tubes (21), (22), and (24) from injector nozzles (3).
  6. Remove nut (11), lockwasher (12), two retainer halves (17), and washer (9) from stud (13). Discard lockwasher (12).
  7. Remove six locknuts (27), ten retainers (8), eight cushion halves (7), six washers (9), and screws (10) from fuel injector tubes (4), (5), and (6). Discard six locknuts (27).
  8. Lift three dust caps (16) for fuel injector tubes (4), (5), and (6).
  9. Loosen three nuts (15) and remove fuel injector tubes (4), (5), and (6) from fuel injector pump (14).
  10. Loosen three nuts (26) and remove three fuel injector tubes (4), (5), and (6) from injector nozzles (3).

## INSPECTION

1. Inspect injector tubes (4), (5), (6), (21), (22), and (24) for cracks, bends, or damaged flaring. Replace if cracked, bent, or damaged.
2. Inspect six dust caps (16) for damage. Using fabricated tool, replace dust caps (16) if damaged.

## INSTALLATION

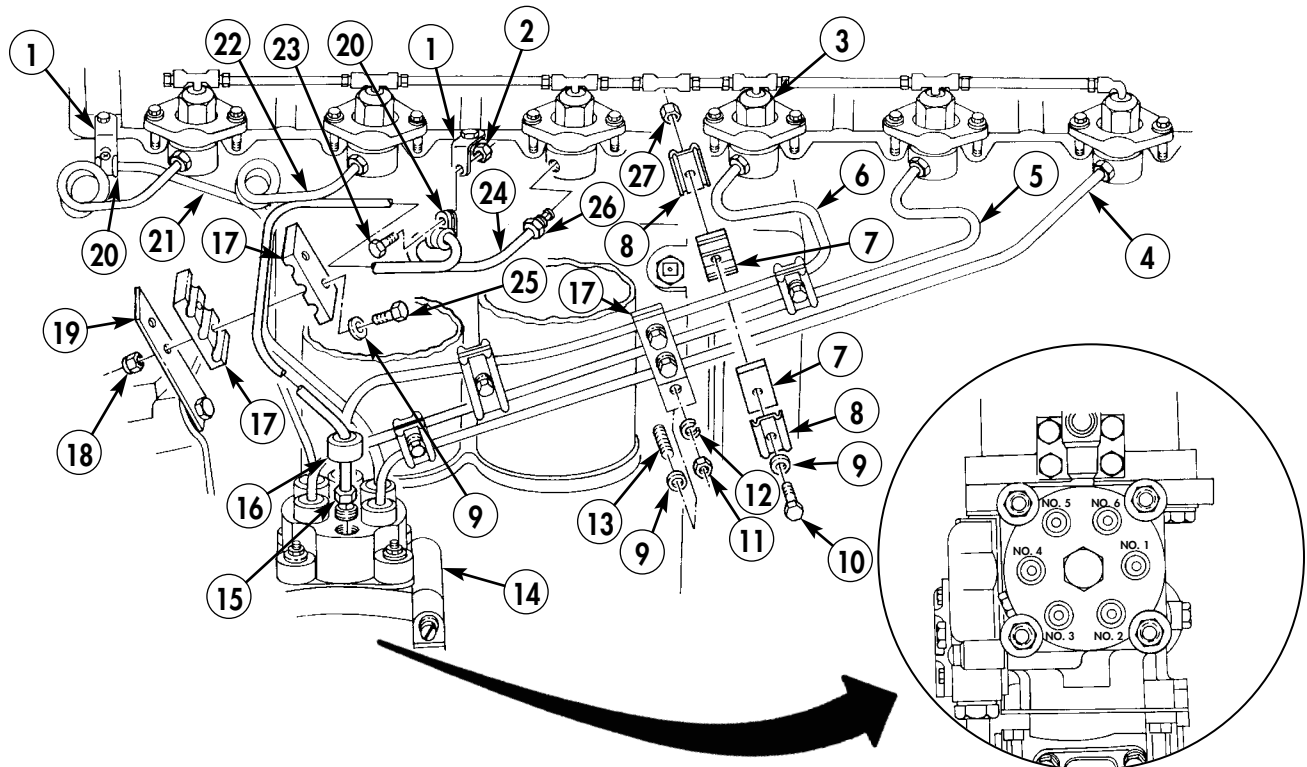
### **NOTE**

- Perform steps 1 through 5 for fuel injectors 2, 4, and 6.
- Perform steps 6 through 11 for fuel injectors 1, 3, and 5.

## FUEL INJECTOR TUBES MAINTENANCE (Contd)

### INSTALLATION (Contd)

1. Install three fuel injector tubes (21), (22), and (24) on fuel injector nozzles (3) with three nuts (26).
2. Install three fuel injector tubes (21), (22), and (24) on fuel injection pump (14) ports no. 2, no. 6, and no. 4 respectively with three nuts (15). Do not tighten nuts (15).
3. Install two retainer halves (17) and three fuel injector tubes (21), (22), and (24) on bracket (19) with two screws (25), washers (9), and new locknuts (18).
4. Install two clamps (20) on brackets (1) with screws (23) and new locknuts (2).
5. Install three fuel injector tubes (21), (22), and (24) on fuel injector nozzles (3) with three nuts (26). Tighten nuts (26) 23–25 lb-ft (31–34 N•m).
6. Tighten nuts (15) 23–25 lb-ft (31–34 N•m) and lower dust caps (16) over nuts (15).
7. Install three fuel injector tubes (4), (5), and (6) on fuel injector pump (14) ports no. 3, no. 5, and no. 1 respectively with three nuts (15). Do not tighten nuts (15).
8. Install three fuel injector tubes on injector nozzles (3) with three nuts (26). Do not tighten nuts (26).
9. Install eight retainer halves (8) and cushion halves (7) on fuel injector tubes (4), (5), and (6) with four screws (10), washers (9), and new locknuts (27).
10. Install washer (9), two retainer halves (17), and fuel injector tubes (4), (5), and (6) on stud (13) with new lockwasher (12) and nut (11).
11. Tighten three nuts (15) and (26) 23–35 lb-ft (31–34 N•m).
12. Lower dust caps (16) over nuts (15).
13. Bleed fuel system (WP 0064 00).
14. Connect battery ground cable (WP 0126 00).
15. Lower and secure hood (TM 9-2320-361-10).
16. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL INJECTION PUMP REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Mechanical puller kit (item 64, WP 0469 00)  
Socket wrench crowfoot attachment  
(item 92, WP 0469 00)  
Fuel injection pump gear hub wrench  
(WP 0471 00)

##### Materials/Parts

Six lockwashers (item 192, WP 0470 00)  
Six lockwashers (item 207, WP 0470 00)  
Six lockwashers (item 193, WP 0470 00)  
Gasket (item 61, WP 0470 00)  
Gasket (item 56, WP 0470 00)  
Gasket (item 68, WP 0470 00)

##### Materials/Parts (Contd)

Gasket (item 71, WP 0470 00)  
Lockplate (item 407, WP 0470 00)  
Lockwasher (item 202, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)  
Adhesive (item 3, WP 0468 00)  
Sealing compound (item 38, WP 0468 00)

##### References

WP 0064 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Engine stop control cable disconnected  
(WP 0071 00).  
Accelerator cable removed (WP 0070 00).  
Fuel injector tubes removed (WP 0068 00).

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## FUEL INJECTION PUMP REPLACEMENT (Contd)

### **WARNING**

- Diesel fuel is flammable. Do not perform fuel system procedures near open flame. Injury to personnel may result.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

- Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.
- Radiator core is easily damaged. Use care when working near or handling radiator.

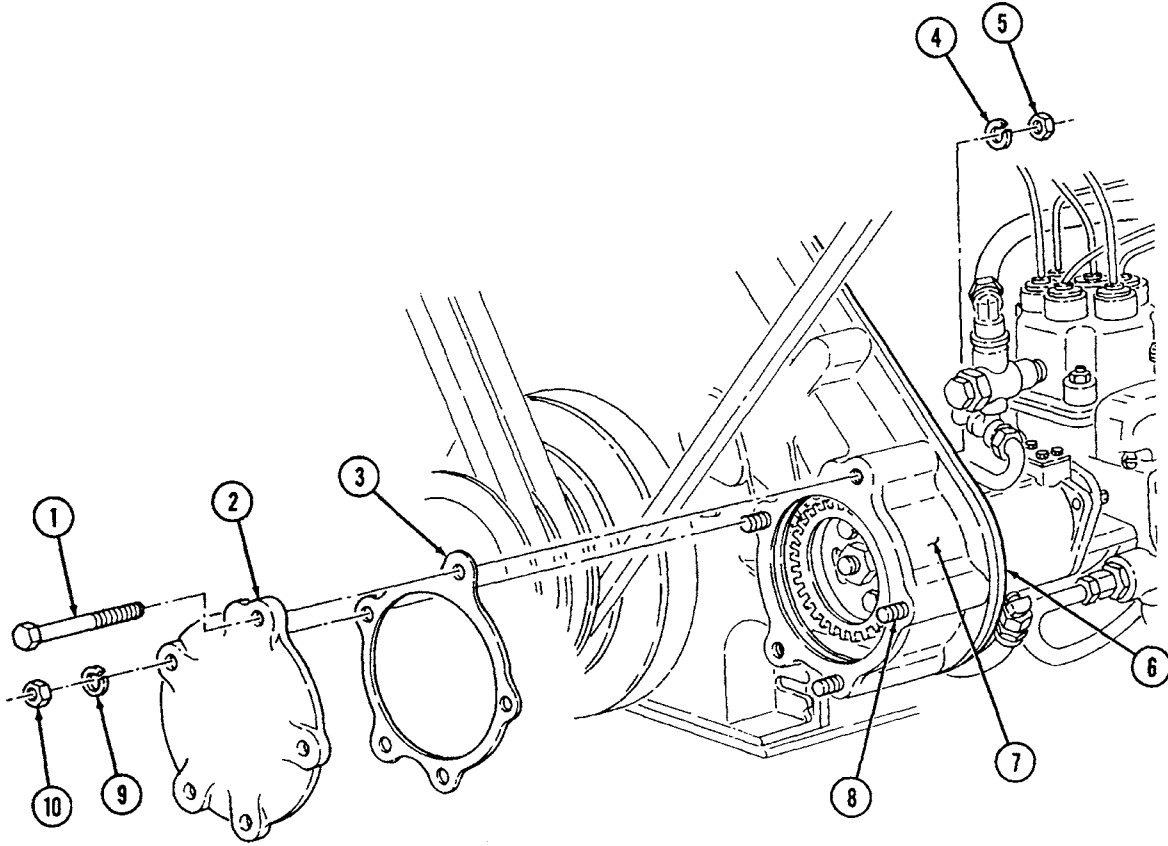
### **NOTE**

- Use a drain pan to capture any draining fuel. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.
- Prior to removal, tag tubes for installation.

## REMOVAL

1. Remove two nuts (5), lockwashers (4), and screws (1) from adapter plate (6), timing cover (7), and access cover (2). Discard lockwashers (4).
2. Remove three nuts (10), lockwashers (9), access cover (2), and gasket (3) from timing studs cover (8). Discard lockwashers (9) and gasket (3).
3. Remove gasket (3) residue from timing cover (7) and access cover (2).

FUEL INJECTION PUMP REPLACEMENT (Contd)

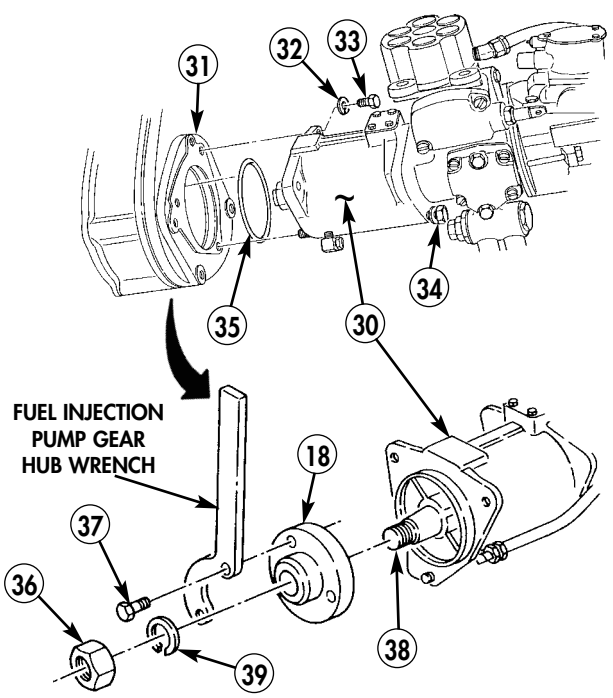
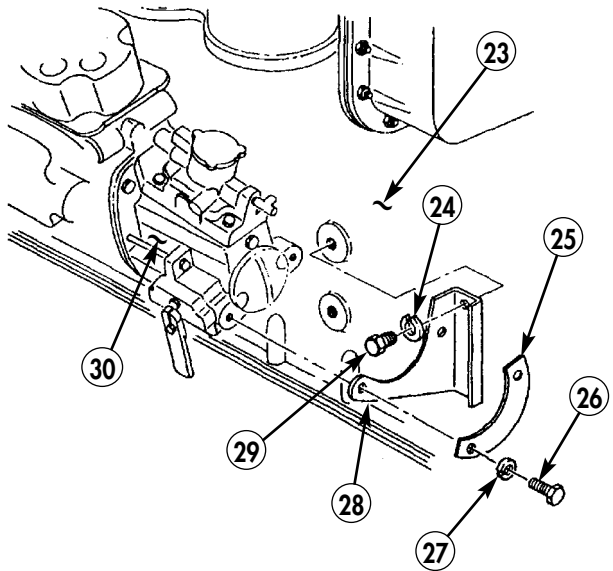
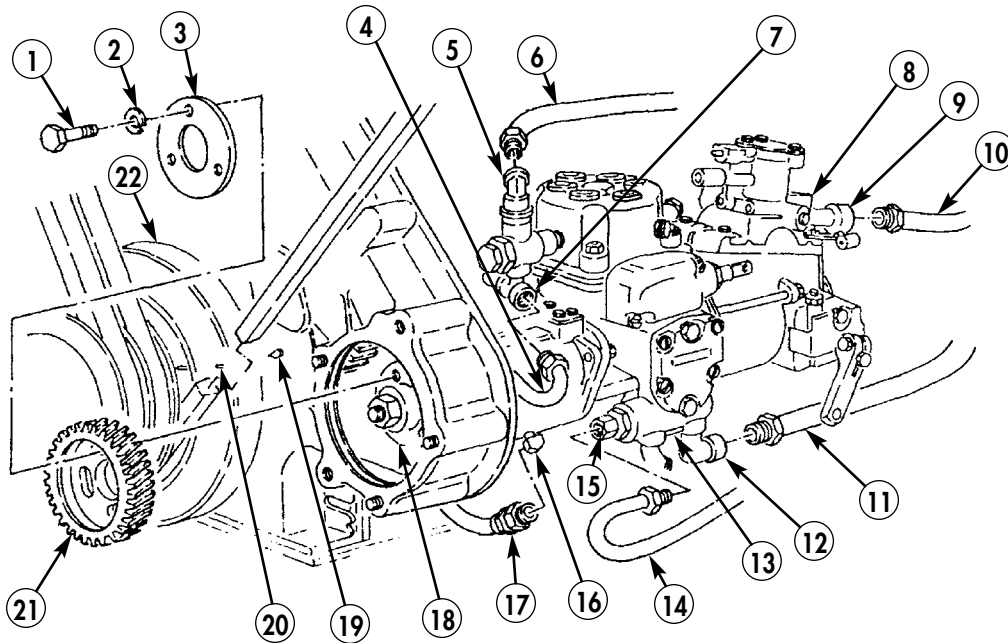


## FUEL INJECTION PUMP REPLACEMENT (Contd)

### REMOVAL (Contd)

4. Disconnect crankcase-to-fuel injection pump pressure oil hose (17) from tee (16) at bottom of fuel injection pump (30).
5. Disconnect fuel return-to-fuel injection pump overflow valve tube (4) from tee (7).
6. Disconnect fuel filter outlet-to-fuel density compensate inlet tube (10) from tee (9) at compensator (8).
7. Disconnect fuel transfer pump-to-fuel filter inlet tube (11) from elbow (12) at transfer pump (13).
8. Disconnect fuel injection pump-to-fuel filter fuel return tube (6) from elbow (5).
9. Disconnect transfer pump-to-flame heater fuel filter tube (14) from adapter (15).
10. Align timing mark (20) on crankshaft damper (22) with timing pointer (19).
11. Remove three screws (1), lockwashers (2), retaining plate (3), and drive gear (21) from drive gear hub (18). Discard lockwashers (2).
12. Straighten lockplate (25) and remove two screws (26), washers (27), and lockplate (25) from bracket (28) and fuel injection pump (30). Discard lockplate (25).
13. Remove two screws (29), lockwashers (24), and bracket (28) from crankcase (23). Discard lockwashers (24).
14. Remove two screws (33), lockwashers (32), screw (34), and fuel injection pump (30) from adapter (31). Discard lockwashers (32).
15. Install fuel injection pump gear hub wrench on hub (18) with two screws (37).
16. Hold hub (18) and remove nut (36) and lockwasher (39) from fuel injection pump (30). Discard lockwasher (39). Remove two screws (37) and fuel injection pump gear hub wrench.
17. Remove drive gear hub (18) from timing device shaft (38).
18. Remove gasket (35) from adapter (31). Discard gasket (35).

### FUEL INJECTION PUMP REPLACEMENT (Contd)



## FUEL INJECTION PUMP REPLACEMENT (Contd)

### **CAUTION**

Remove caps or plugs from hoses, connections, and openings before reconnection. Failure to do so may result in damage to equipment.

### **INSTALLATION**

1. Align timing marks (6) on crankshaft damper (8) with timing pointer (5).
2. Install drive gear hub (4) on timing device shaft (9) with new lockwasher (11) and nut (12).
3. Install fuel injection pump gear hub wrench on drive gear hub (4) with two screws (13). Tighten nut (12) 66–71 lb-ft (90–96 N•m). Remove screws (13) and gear hub wrench.
4. Remove four screws (14), lockwashers (15), timing cover (16), and gasket (17) from fuel injection pump (10). Discard lockwashers (15) and gasket (17).
5. Remove two screws (22), lockwashers (23), timing window cover (21), and gasket (20) from fuel injection pump (10). Discard lockwashers (23) and gasket (20).

### **NOTE**

Ensure drive gear hub timing mark is aligned with the pointer when installing the fuel injection pump drive gear and retaining plate.

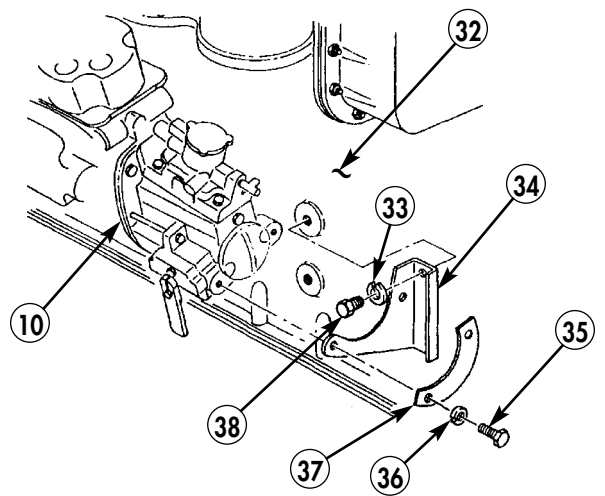
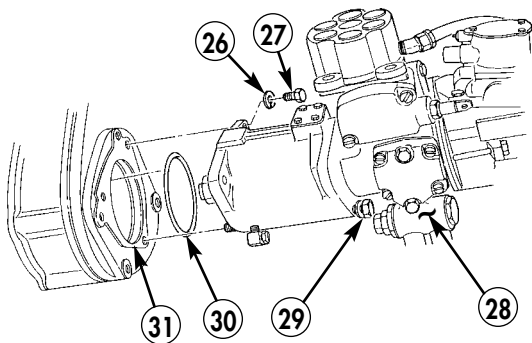
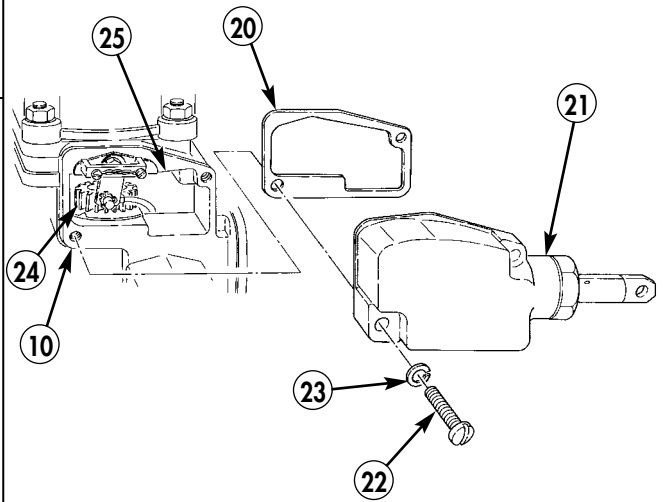
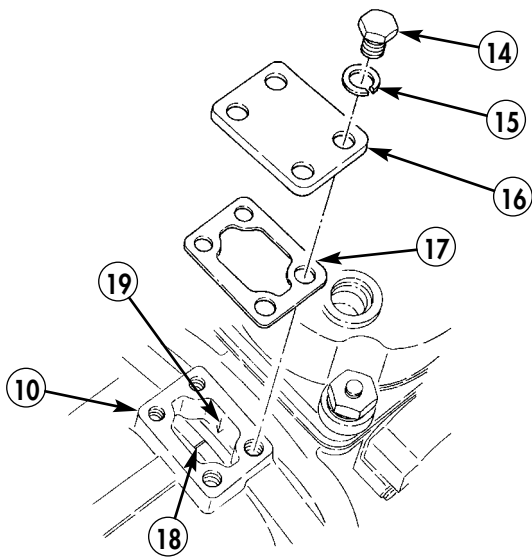
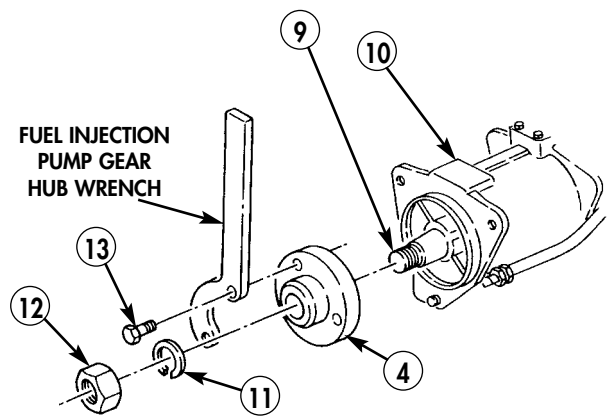
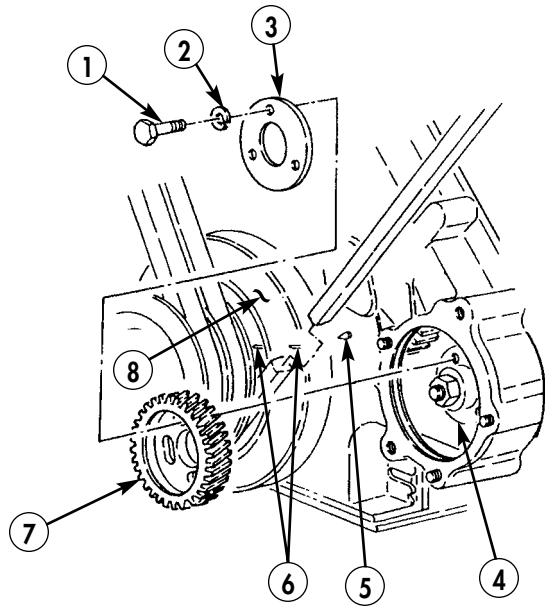
6. Align timing mark (18) on drive gear hub (4) with pointer (19) when marked tooth (24) in timing window (25) is visible.
7. Install new gasket (30) and fuel injection pump (10) on adapter (31) with two new lockwashers (26), screws (27), and screw (29).
8. Install bracket (34) and new lockplate (37) on fuel injection pump (10) and crankcase (32) with two new lockwashers (33), screws (38), washers (36), and screws (35). Bend lockplate (37) ends over screws (35).
9. Install drive gear (7) on drive gear hub (4).

### **NOTE**

The three elongated holes in the fuel injection pump drive gear allow about 20° free rotation around the injection pump drive gear hub. In cases where the alignment mark will not align with pointer, remove drive gear retaining plate and drive gear to reposition the gear on hub.

10. Install retaining plate (3) on drive gear (7) with three new lockwashers (2) and screws (1). Do not tighten screws (1).
11. Rotate timing device shaft (9) clockwise, as necessary, to align timing mark (18) on drive gear hub (4) with pointer (19).
12. Hold shaft (9) in aligned position and tighten three screws (1) 23–27 lb-ft (31–37 N•m).
13. Align timing marks (6) on crankshaft damper (8) with timing pointer (5).
14. Install new gasket (20) and timing window cover (21) with two new lockwashers (23) and screws (22).
15. Install new gasket (17) and timing cover (16) on fuel injection pump (10) with four new lockwashers (15) and screws (14).

FUEL INJECTION PUMP REPLACEMENT (Contd)



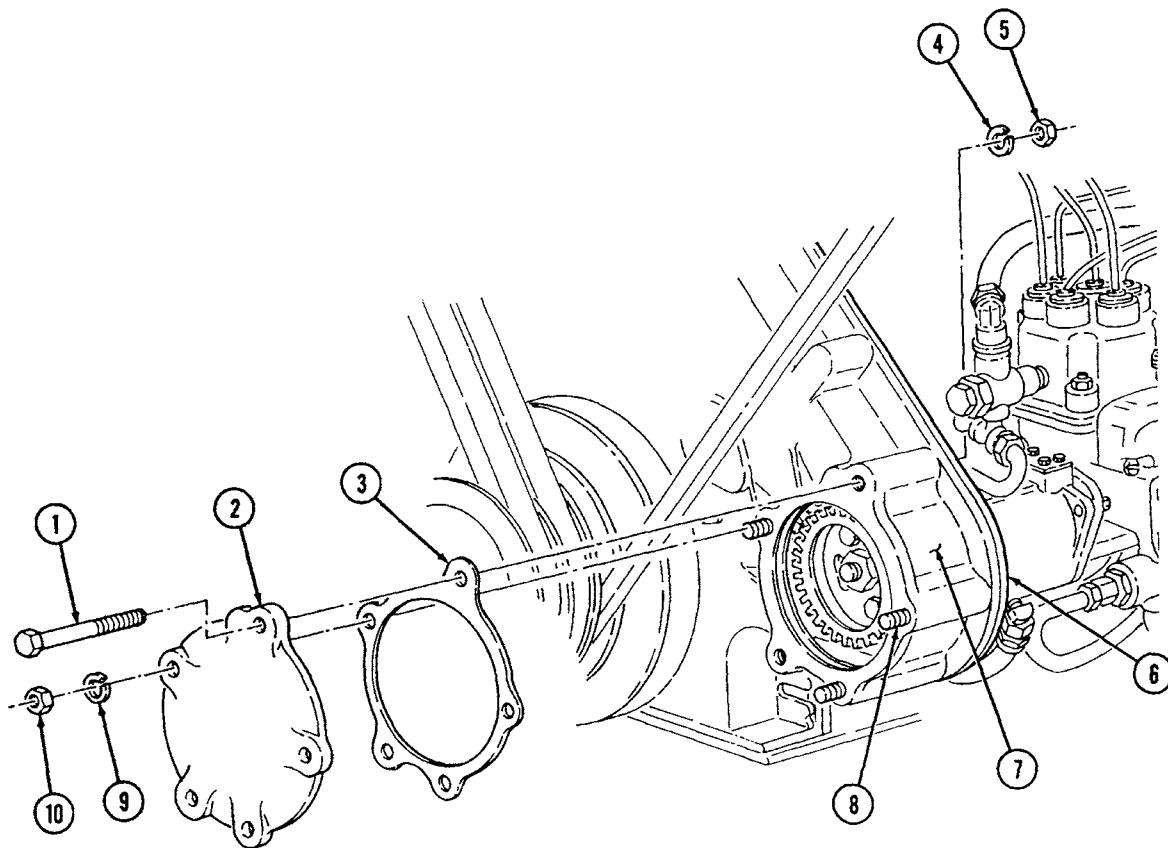
## FUEL INJECTION PUMP REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### **CAUTION**

All gasket(s) must be blotted to remove excess sealing compound. Excess sealing compound can damage engine.

16. Apply light, even coat of adhesive on both sides of new gasket (3).
17. Apply sealing compound on threads of three nuts (10), two screws (1), and two nuts (5).
18. Install new gasket (3) and access cover (2) on timing cover studs (8) with three new lockwashers (9) and nuts (10).
19. Install two screws (1) through access cover (2), new gasket (3), timing cover (7), and adapter plate (6) with two new lockwashers (4) and nuts (5).

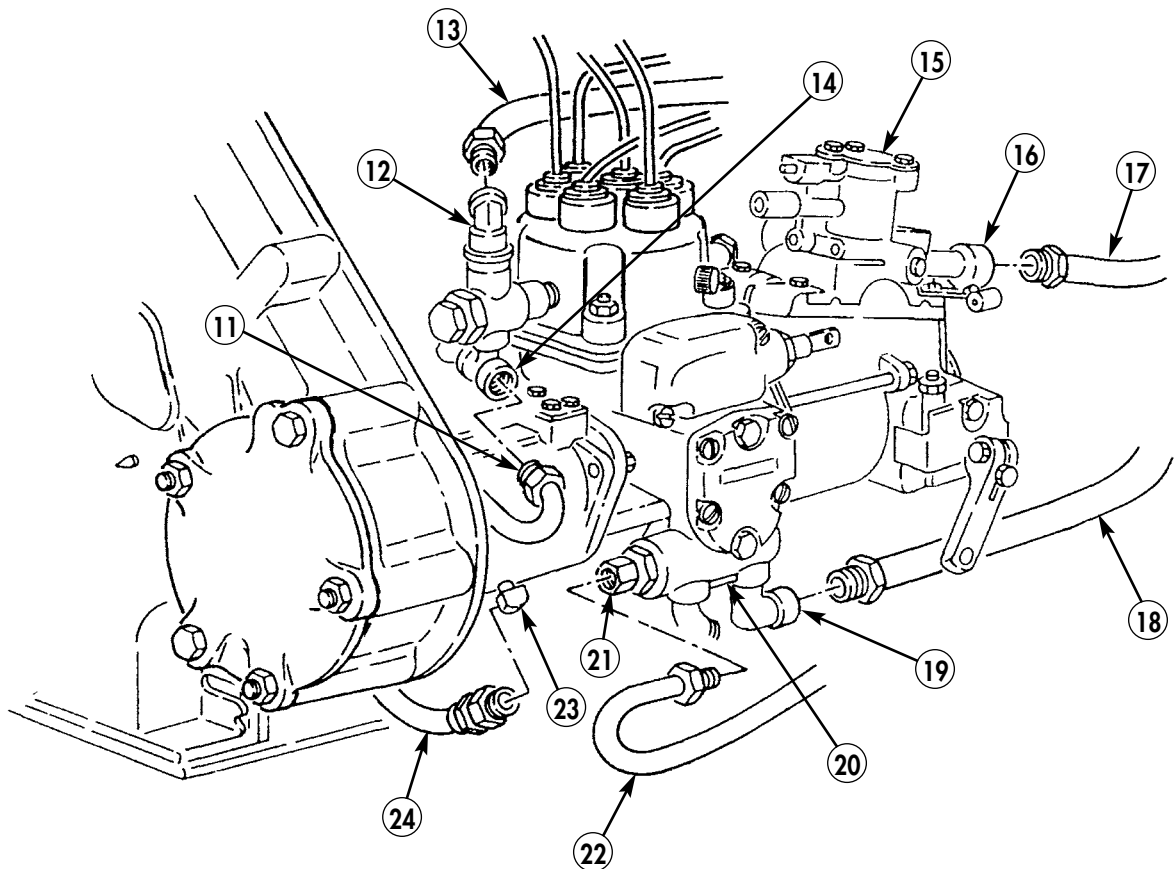




## FUEL INJECTION PUMP REPLACEMENT (Contd)

### INSTALLATION (Contd)

20. Connect fuel injection pump-to-fuel filter fuel return tube (13) to elbow (12).
21. Connect transfer pump-to-flame heater fuel filter tube (22) to adapter (21).
22. Connect fuel transfer pump-to-fuel filter inlet tube (18) to elbow (19) at transfer pump (20).
23. Connect fuel filter outlet-to-fuel density compensator inlet tube (17) to tee (16) at compensator (15).
24. Connect fuel return-to-fuel injection pump overflow valve tube (11) to tee (14).
25. Connect crankcase-to-fuel injection pump pressure oil hose (22) to tee (21).
26. Install accelerator cable (WP 0070 00).
27. Install engine stop control cable (WP 0071 00).
28. Install fuel injector tubes (WP 0068 00).
29. Bleed and fill fuel system (WP 0064 00).
30. Start engine (TM 9-2320-361-10) and check for fuel leaks.
31. Connect battery ground cable (WP 0126 00).
32. Lower and secure hood (TM 9-2320-361-10).
33. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

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##### INITIAL SETUP:

###### Applicable Models

All

###### Materials/Parts

Two cotter pins (item 25, WP 0470 00)  
Two cotter pins (item 16, WP 0470 00)  
Three cotter pins (item 29, WP 0470 00)  
Two locknuts (item 160, WP 0470 00)

###### Materials/Parts (Contd)

Three locknuts (item 155, WP 0470 00)

###### Personnel Required

Two

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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**ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)****REMOVAL**

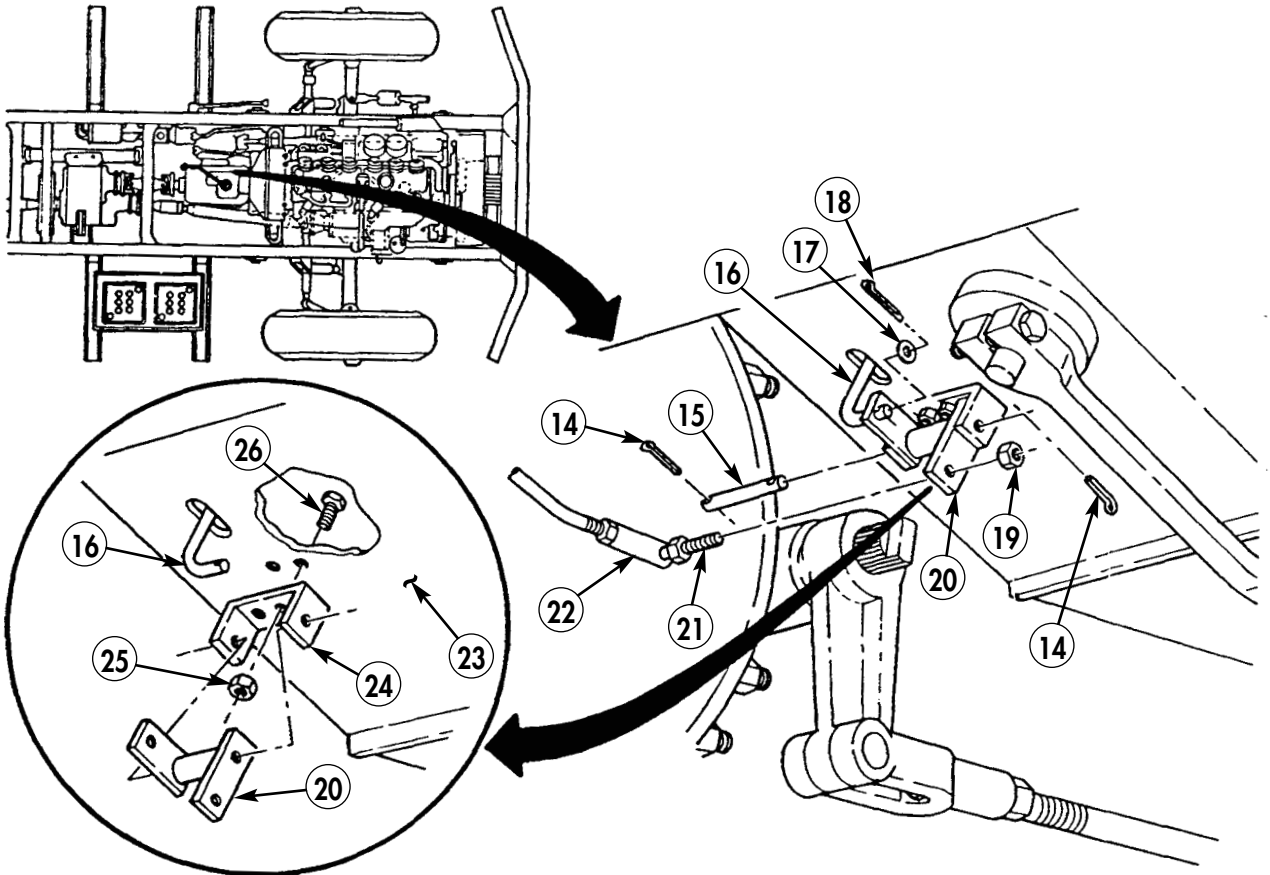
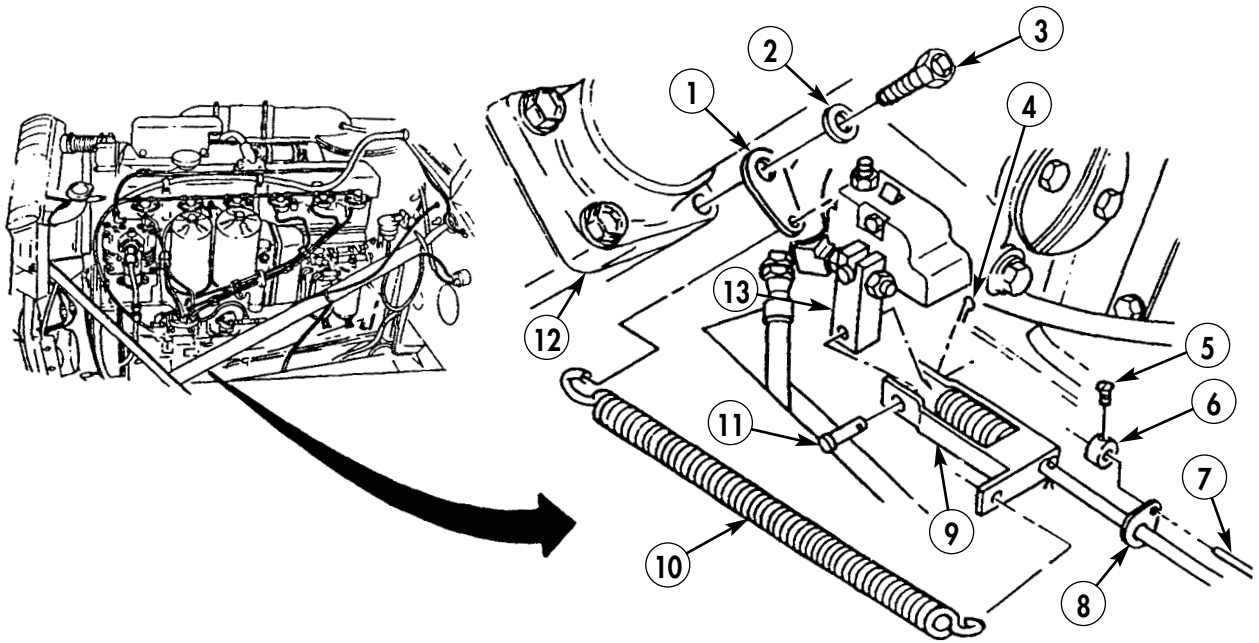
1. Remove throttle return spring (10) from swivel (9) and throttle return clip (1).
2. Remove screw (3), washers (2), and throttle return clip (1) from steering gear housing (12).
3. Remove cotter pin (4) and pin (11) from swivel (9) and disconnect swivel (9) from pump lever (13). Discard cotter pin (4).
4. Loosen screw (5) and remove connector (6), screw (5), and control wire (7) from flange on accelerator rod (8).
5. Remove locknut (19), ball joint (21), and accelerator rod (22) from lever (20). Discard locknut (19).
6. Remove cotter pin (18), washer (17), and connecting link (16) from lever (20). Discard cotter pin (18).
7. Remove two cotter pins (14), pin (15), and lever (20) from bracket (24). Discard cotter pins (14).

**NOTE**

Assistant will help with step 8.

8. Remove two locknuts (25), screws (26), and bracket (24) from cab floor (23). Discard locknuts (25).

ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)



## ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)

### REMOVAL (Contd)

9. Remove cotter pin (3) and connecting link (2) from accelerator pedal (4). Discard cotter pin (3).
10. Remove pin (8) and accelerator pedal (4) from bracket (7).

#### NOTE

Assistant will help with step 11.

11. Remove two locknuts (6), screws (1), and bracket (7) from cab floor (5). Discard locknuts (6).
12. Remove two cotter pins (12), washer (9), spring (10), and swivel (11) from accelerator rod (13). Discard cotter pins (12).
13. Loosen nut (14) and remove ball joint (15) and nut (14) from accelerator rod (13).

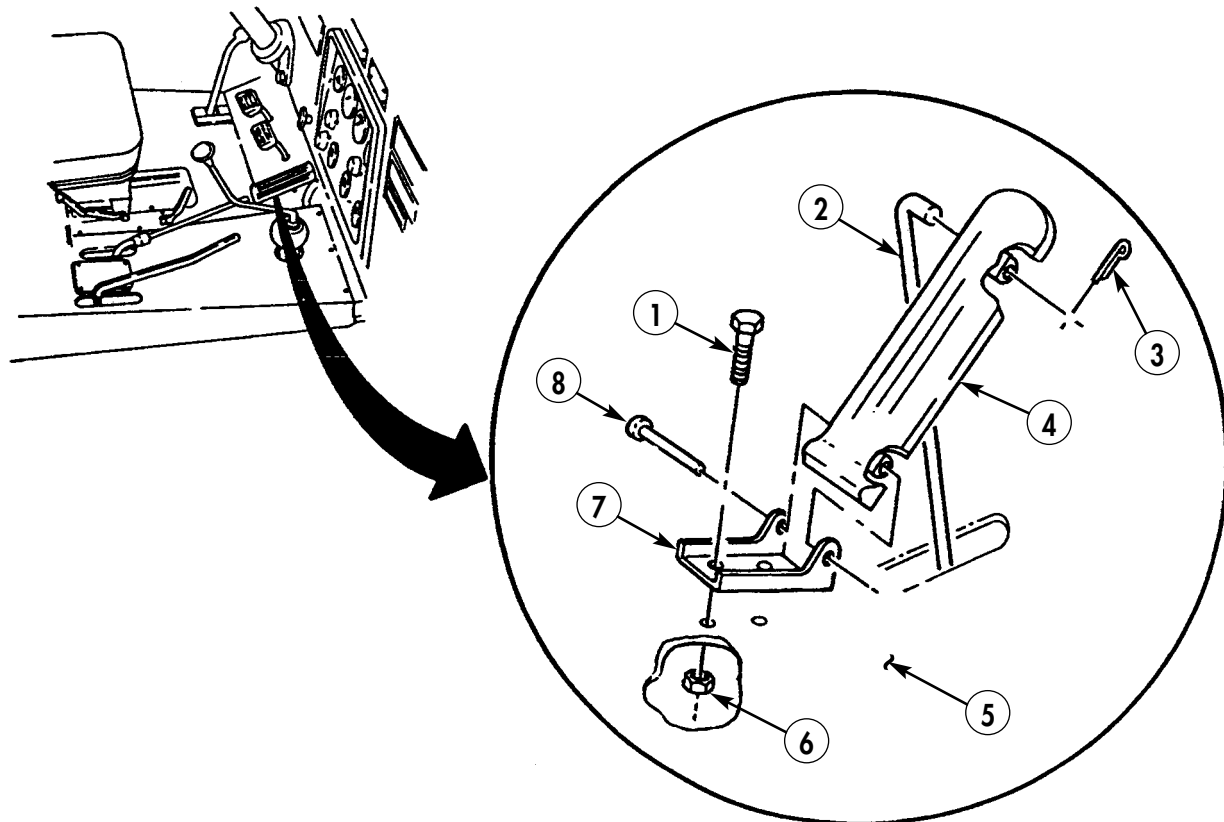
### INSTALLATION

1. Install nut (14) and ball joint (15) on accelerator rod (13). Tighten nut (14).
2. Install swivel (11), spring (10), and washer (9), on accelerator rod (13) with two new cotter pins (12).

#### NOTE

Assistant will help with step 3.

3. Install bracket (7) on cab floor (5) with two screws (1) and new locknuts (6).
4. Install accelerator pedal (4) on bracket (7) with pin (8).
5. Install connecting link (2) on accelerator pedal (4) with new cotter pin (3).



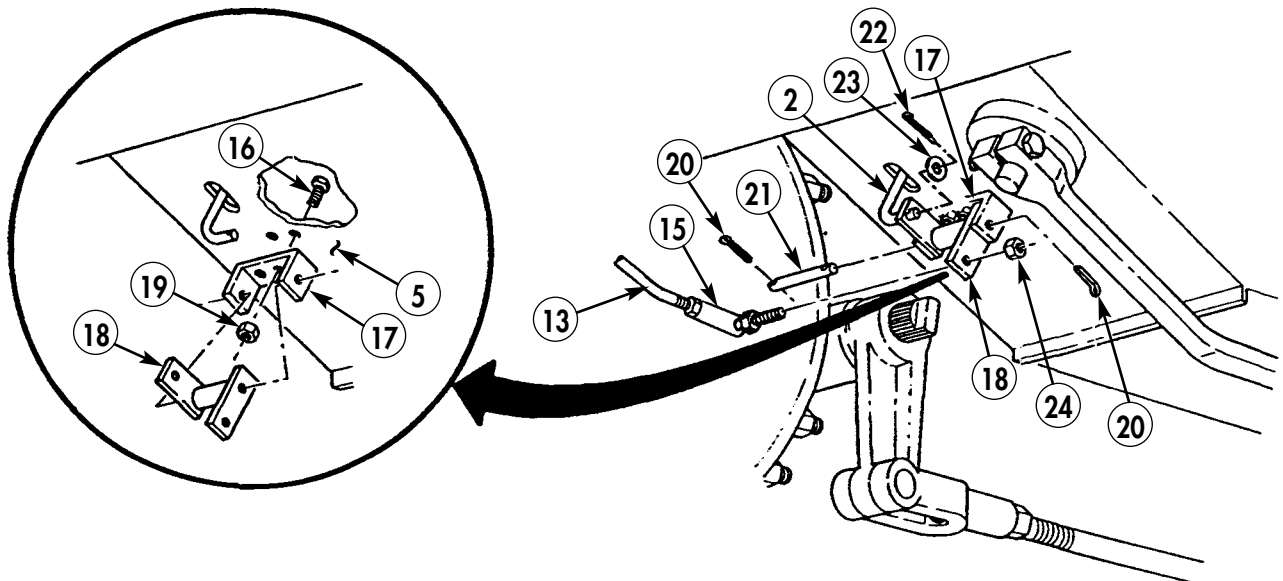
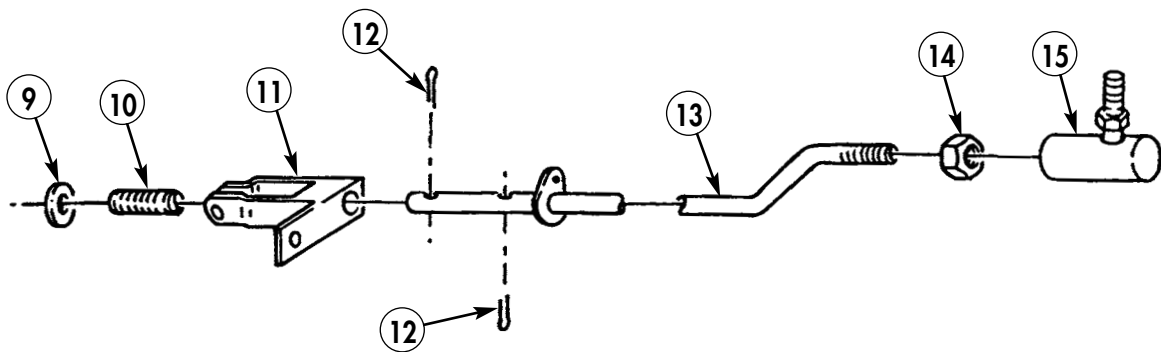
**ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)**

**INSTALLATION (Contd)**

**NOTE**

Assistant will help with step 6.

6. Install bracket (17) on cab floor (5) with two screws (16) and new locknuts (19).
7. Install lever (18) on bracket (17) with pin (21) and two new cotter pins (20).
8. Install connecting link (2) on lever (18) with washer (23) and new cotter pin (22).
9. Install ball joint (15) and accelerator rod (13) on lever (18) with new locknut (24).



## ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)

### INSTALLATION (Contd)

10. Connect swivel (9) to pump lever (12) with pin (11) and new cotter pin (4).
11. Position control wire (7) through flange on accelerator rod (8) and install connector (6) and screw (5) on control wire (7). Do not tighten. Position connector (6) 0.125 in. (0.32 mm) from flange on accelerator rod (8) and tighten screw (5).
12. Install throttle return clip (1) on steering gear housing (13) with washer (2) and screw (3).
13. Install spring (10) on throttle return clip (1) and swivel (9).

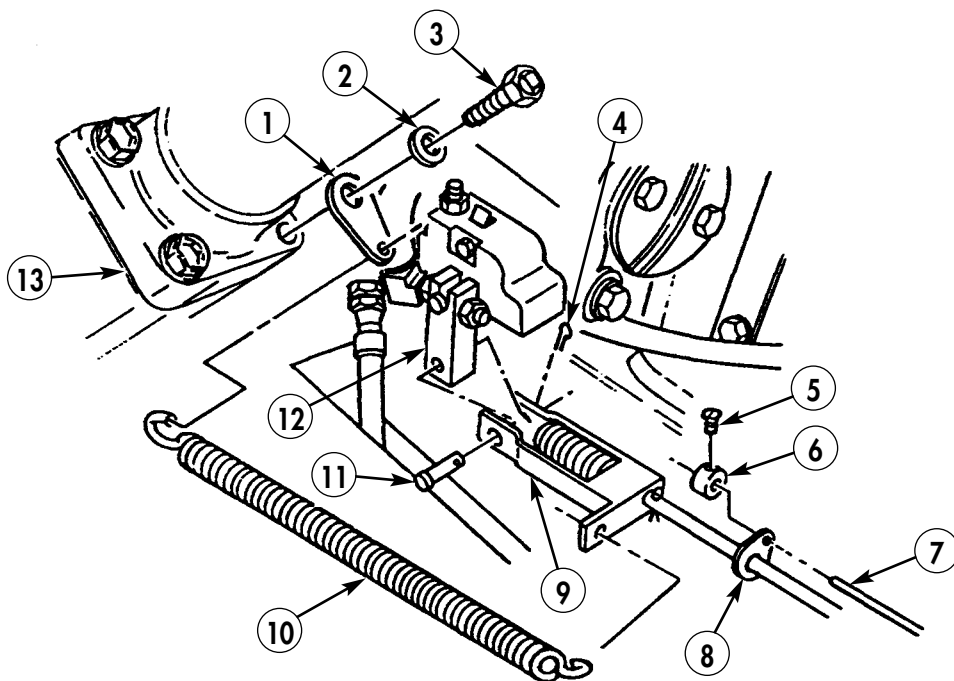
### ADJUSTMENT

1. Remove locknut (15) from threaded stud (16) and remove threaded stud (16) of ball joint (18) from lever (17).
2. Loosen nut (19) on accelerator rod (14).

#### NOTE

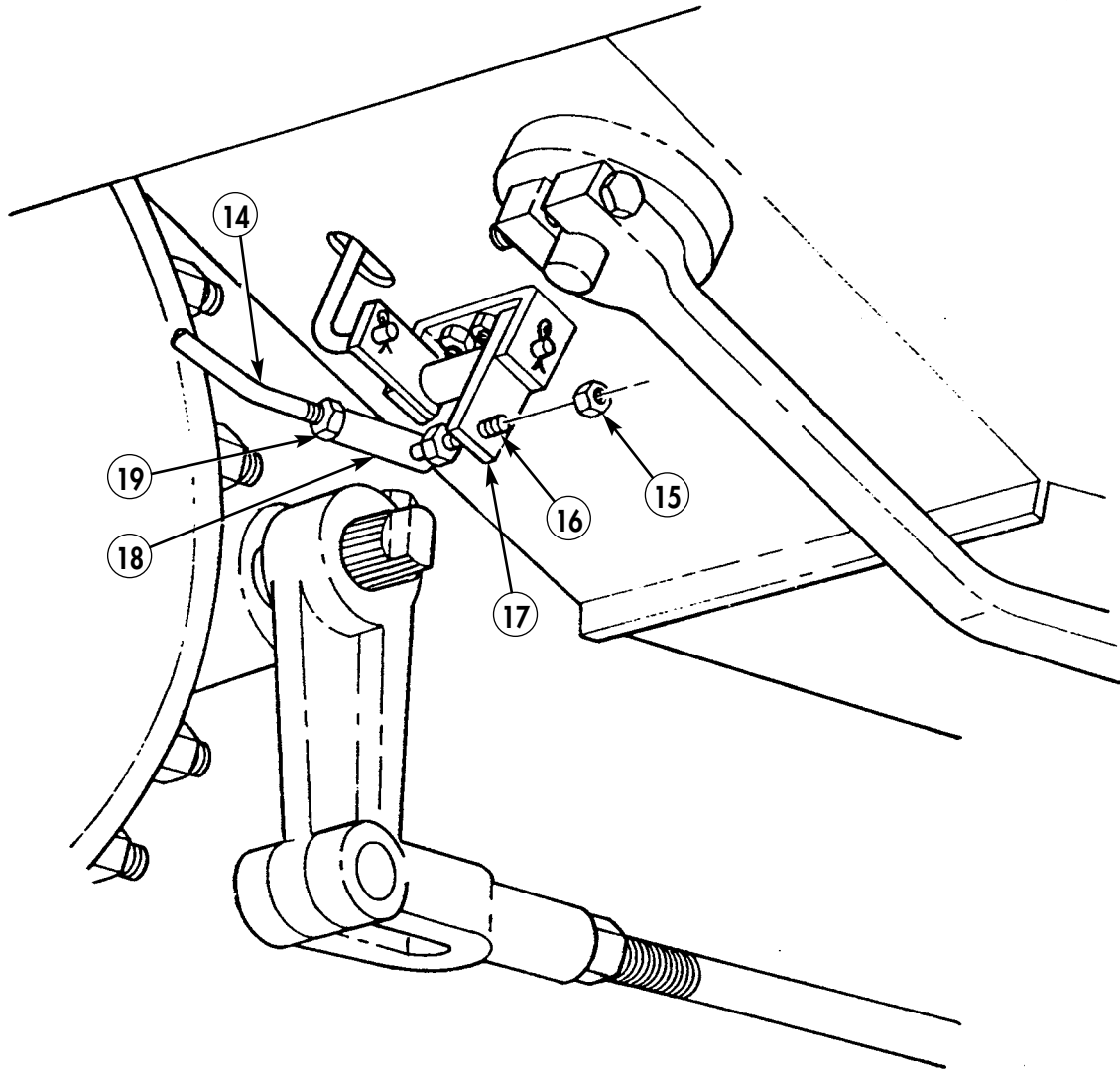
Rod is shortened by turning ball joint clockwise on rod and lengthened by turning ball joint counterclockwise on rod.

3. Shorten or lengthen accelerator rod (14) until threaded stud (16) of ball joint (18) will freely slide into hole of lever (17).
4. Install locknut (15) on threaded stud (16) and tighten locknut (15).
5. Tighten nut (19) on accelerator rod (14).
6. Connect battery ground cable (WP 0126 00).
7. Start engine (TM 9-2320-361-10) and check throttle for proper operation.
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).





ACCELERATOR PEDAL, BRACKETS, AND ROD MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE STOP CONTROL CABLE MAINTENANCE

REMOVAL, INSTALLATION, AND ADJUSTMENT

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Lockwasher (item 195, WP 0470 00)  
Three lockwashers (item 198, WP 0470 00)  
Cotter pin (item 29, WP 0470 00)

##### Materials/Parts (Contd)

Tiedown strap (item 40, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

---

## ENGINE STOP CONTROL CABLE MAINTENANCE (Contd)

### REMOVAL

1. Remove tiedown strap (8) and engine stop control cable (1) from around steering column (9).
2. Remove nut (19), two lockwashers (12), and screw (13) from clamp (16). Discard lockwashers (12).
3. Straighten end of control cable wire (11) and loosen screw (10) on swivel (21).
4. Remove control cable wire (11) and control cable (1) from swivel (21) and clamp (16).
5. Remove cotter pin (18), swivel (21), and screw (10) from fuel shutoff valve (20). Discard cotter pin (18).
6. Remove screw (14), lockwasher (15), and clamp (16) from fuel injection pump (17). Discard lockwasher (15).
7. Loosen nut (6) behind instrument panel (5) and slide nut (6) and lockwasher (3) back on control cable (1).
8. Remove engine stop control (4) from instrument panel (5) and remove nut (6) and lockwasher (3) from cable (1) as end of cable (1) comes through grommet (7) in firewall (2). Discard lockwasher (3).
9. Remove grommet (7) from firewall (2).

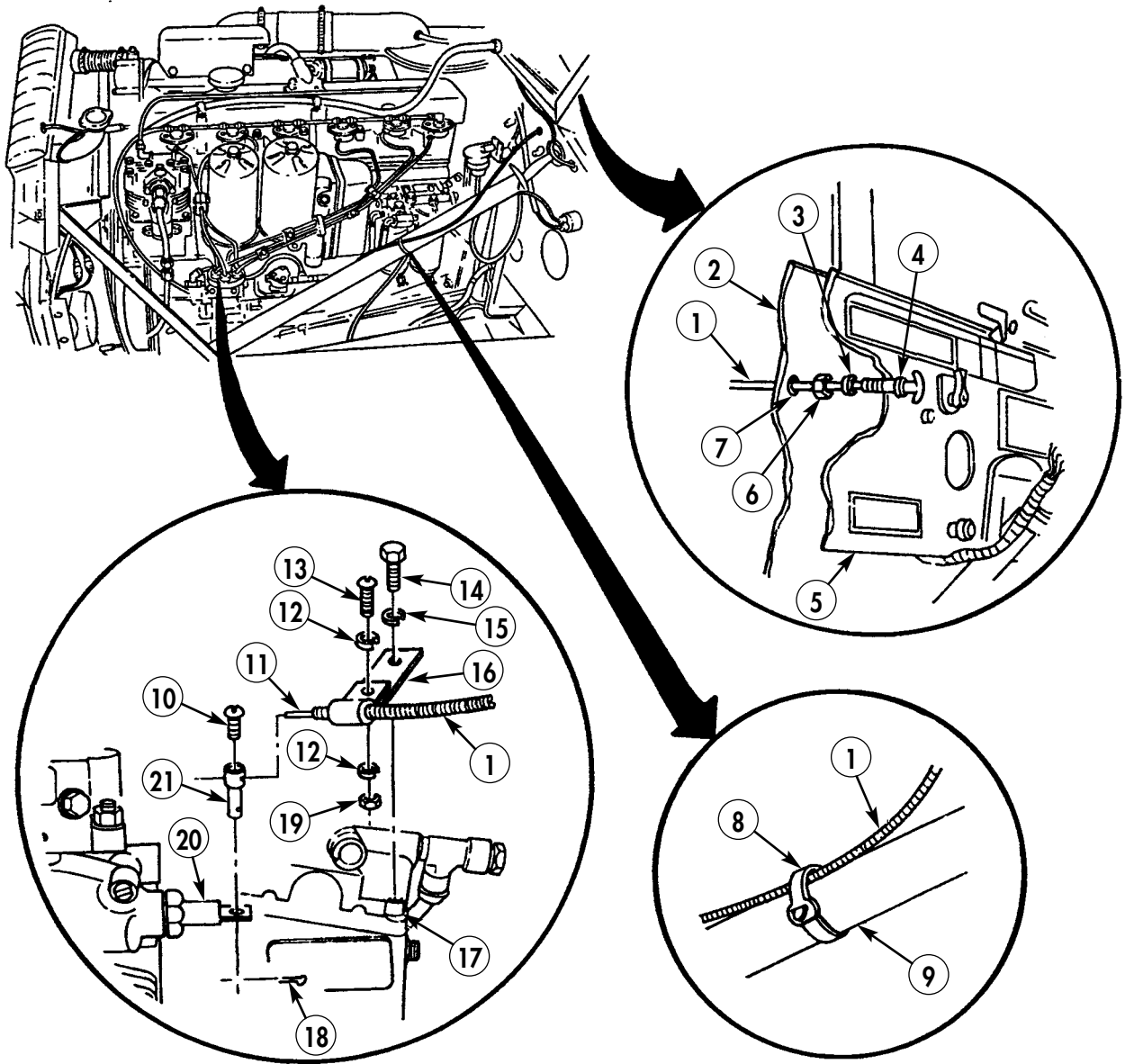
### INSTALLATION

1. Install grommet (7) on firewall (2).
2. Route end of engine stop control (4) through instrument panel (5).
3. Position new lockwasher (3) and nut (6) on end of control cable (1) and insert control cable (1) through grommet (7) and firewall (2).
4. Install engine stop control (4) on instrument panel (5) with lockwasher (3) and nut (6).
5. Install clamp (16) on fuel injection pump (17) with new lockwasher (15) and screw (14).
6. Install swivel (21) on fuel shutoff valve (20) with new cotter pin (18) and install screw (10) on swivel (21). Do not tighten.
7. Slide control cable (1) through clamp (16) and control cable wire (11) through swivel (21).
8. Install two new lockwashers (12), screw (13), and nut (19) on clamp (16). Do not tighten nut (19).
9. Connect battery ground cable (WP 0126 00).

### ADJUSTMENT

1. Push ENGINE STOP control (4) all the way in.
2. Pull fuel shutoff valve (20) out (toward firewall).
3. Position control cable (1) in clamp (16) with end at least 1/2 in. (13 mm) away from fuel shutoff valve (20).
4. Tighten nut (19) on screw (13).
5. Push fuel shutoff valve (20) all the way in and tighten screw (10) on control cable wire (11). Bend end of control cable wire (11) up.
6. Install tiedown strap (8) around steering column (9) and control cable (1).
7. Start and stop engine (TM 9-2320-361-10).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

ENGINE STOP CONTROL CABLE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HAND THROTTLE CONTROL CABLE MAINTENANCE REMOVAL, INSTALLATION, AND ADJUSTMENT

---

#### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Lockwasher (item 195, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## HAND THROTTLE CONTROL CABLE MAINTENANCE (Contd)

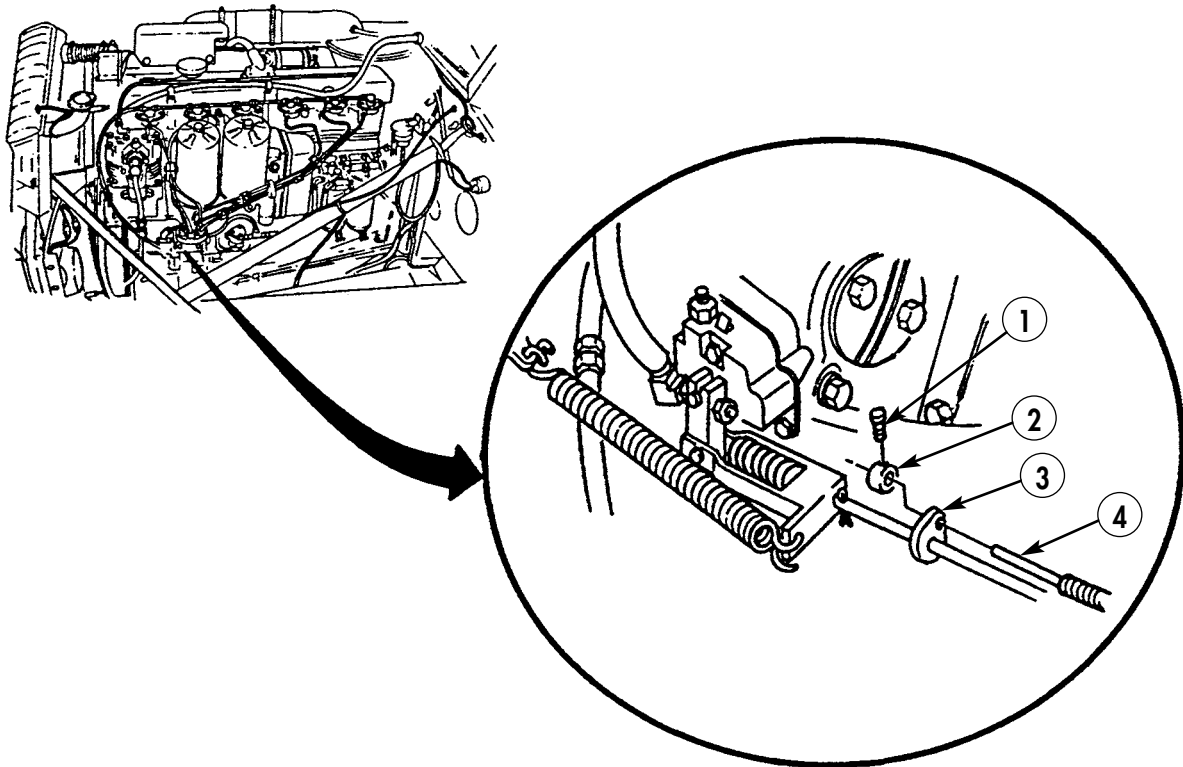
### REMOVAL

1. Straighten end of control wire (4) and remove screw (1), connector (2), and control wire (4) from accelerator rod flange (3).

#### NOTE

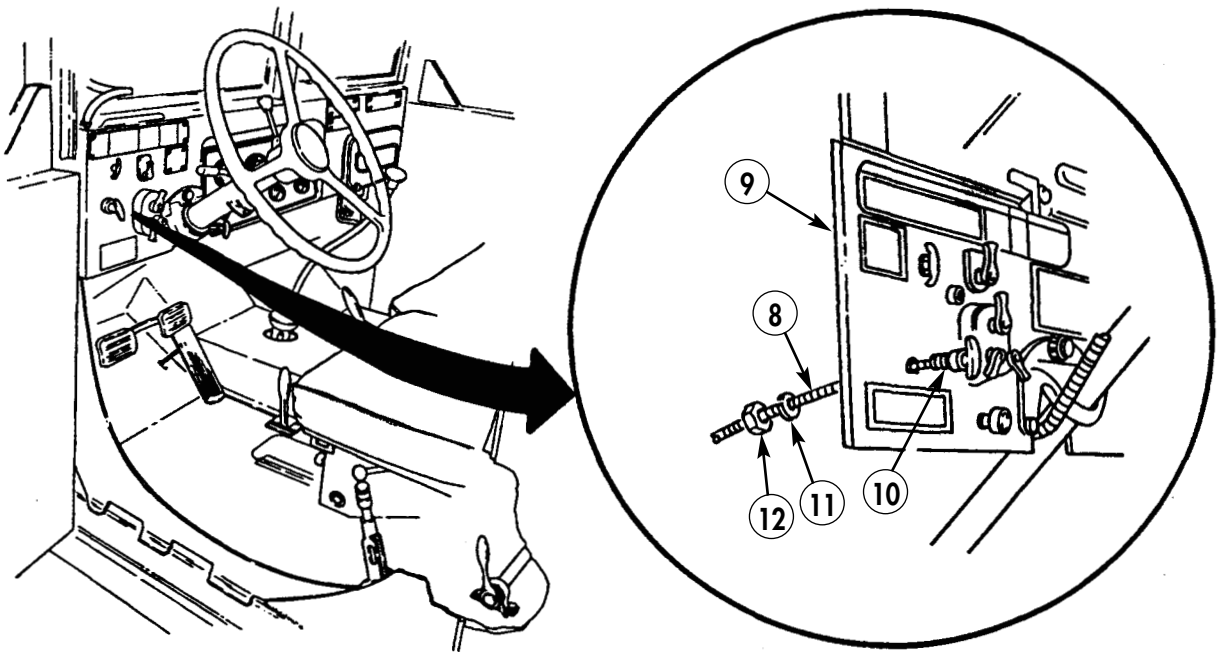
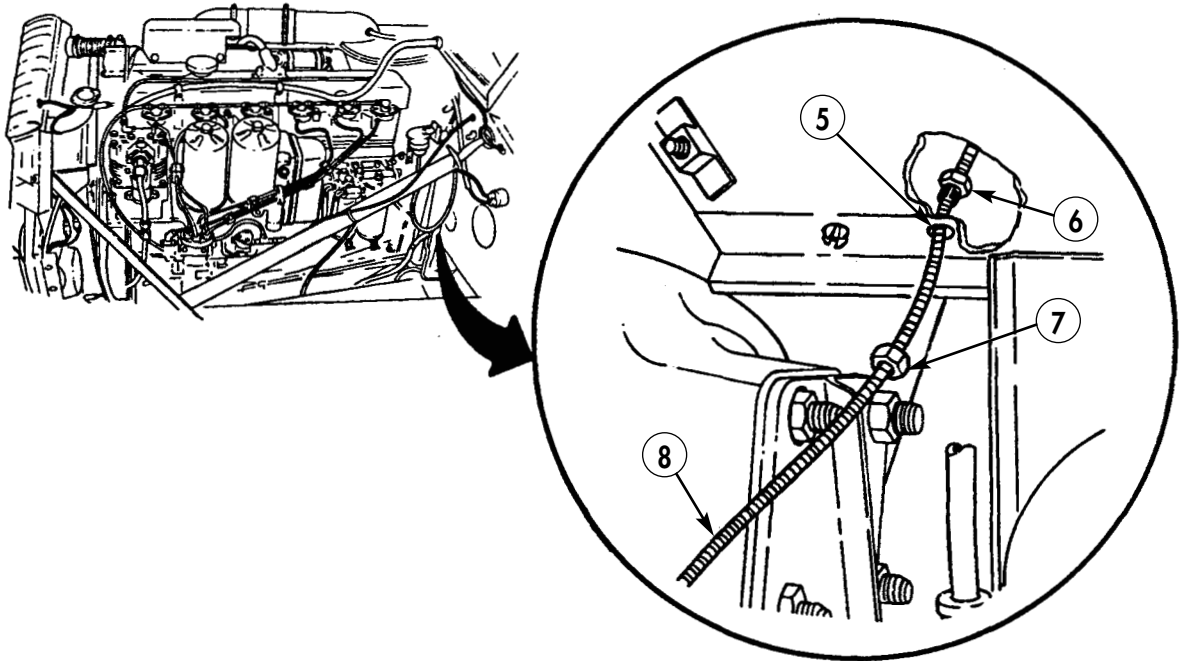
Assistant will help with step 2.

2. Remove nut (7) from screw (6) and slide nut (7) off end of control cable (8).
3. Pull control cable (8) up through hole in cab floor (5) and remove screw (6) from end of control cable (8).
4. Remove nut (12) and lockwasher (11) from control cable (8). Discard lockwasher (11).
5. Pull hand throttle control (10) out from instrument panel (9).





### HAND THROTTLE CONTROL CABLE MAINTENANCE (Contd)



## HAND THROTTLE CONTROL CABLE MAINTENANCE (Contd)

### INSTALLATION

1. Install control cable (3) through instrument panel (2) and install new lockwasher (5) and nut (6) on hand throttle control (4).
2. Position screw (8) on end of cable (3). Push cable (3) through hole in cab floor (7).
3. Position nut (9) on end of cable (3) and install nut (9) on screw (8) and hole in cab floor (7). Do not tighten nut (9).
4. Install control wire (13) through accelerator rod flange (12).
5. Install connector (11) and screw (10) on control wire (13). Do not tighten screw (10).

### ADJUSTMENT

1. Push hand throttle control (4) all the way in.

#### NOTE

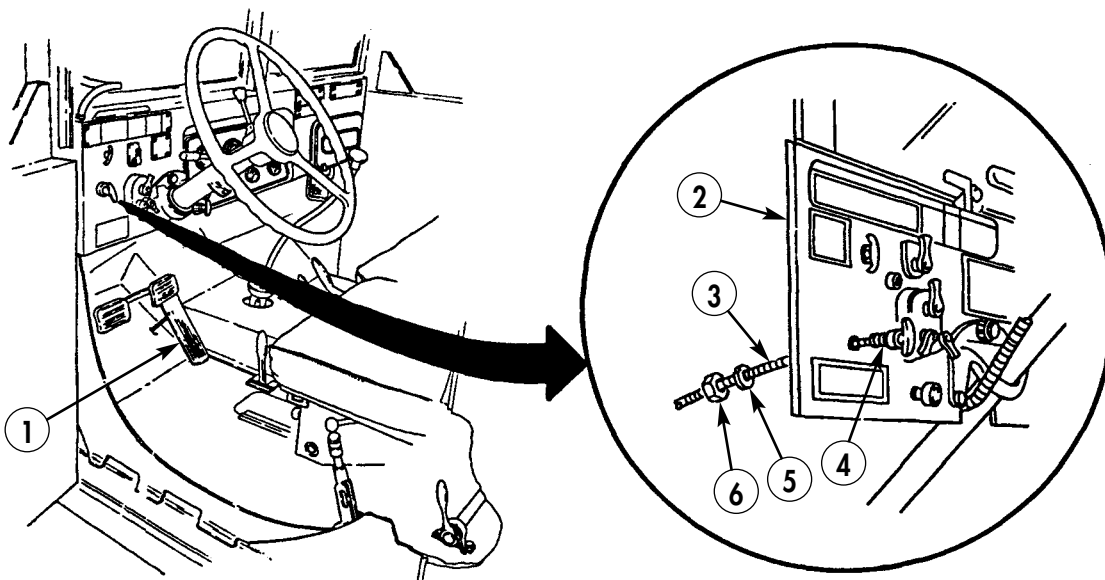
Assistant will help with step 2.

2. Hold accelerator pedal (1) down.
3. Position control cable (3) through hole in cab floor (7) until distance between end of control cable (3) and accelerator rod flange (12) is approximately 0.5 in. (13 mm).
4. Release accelerator pedal (1).

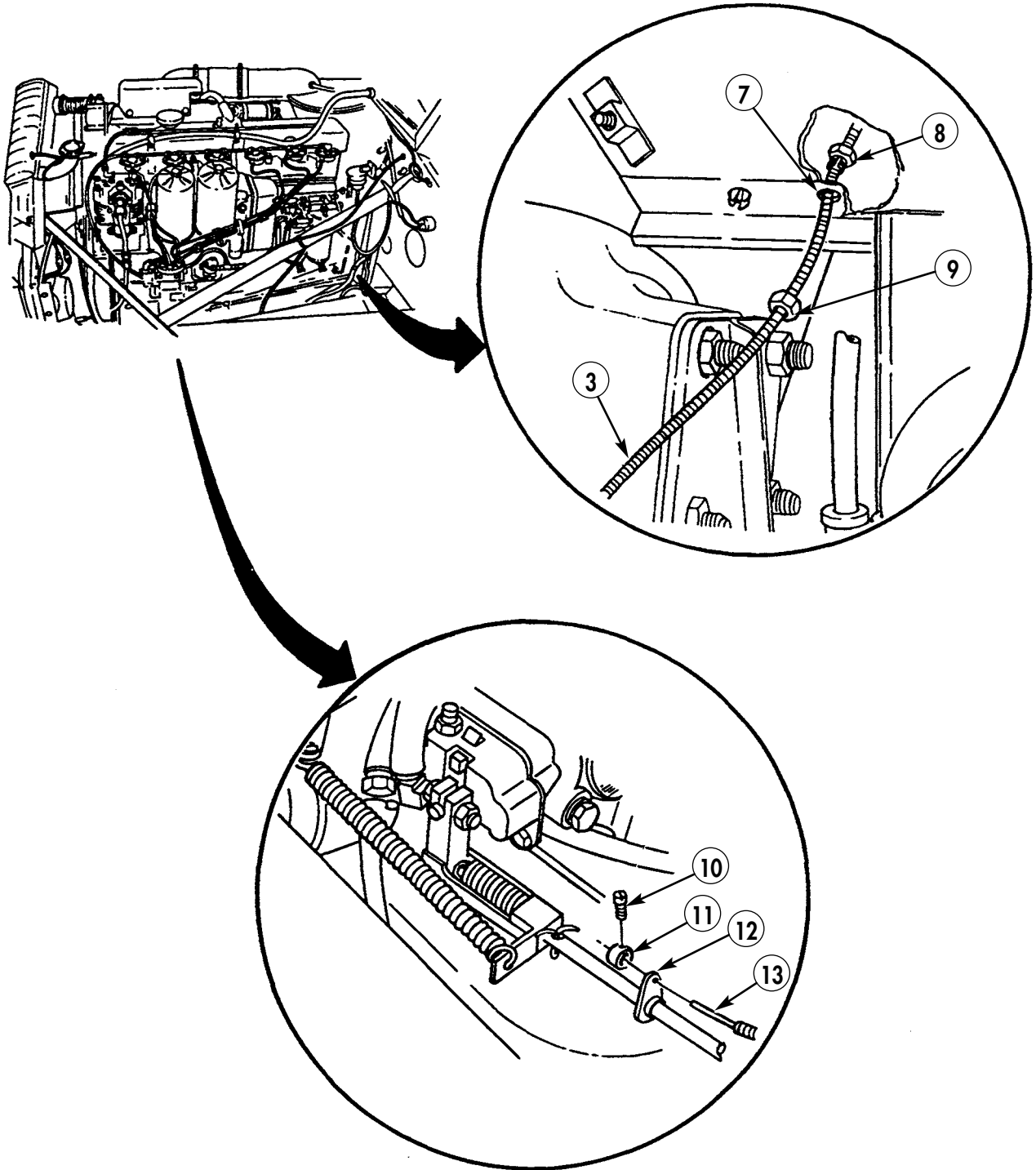
#### NOTE

Assistant will help with step 5.

5. Tighten screw (8) and nut (9).
6. Position connector (11) next to accelerator rod flange (12) and tighten screw (10) on control wire (13).
7. Bend end of control wire (13) up.
8. Connect battery ground cable (WP 0126 00).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



### HAND THROTTLE CONTROL CABLE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### EXHAUST SYSTEM REPLACEMENT (ALL EXCEPT M50A3)

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Applicable Models

All except M50A3

###### Materials/Parts

Gasket (item 63, WP 0470 00)  
Three gaskets (item 57, WP 0470 00)  
Four locknuts (item 142, WP 0470 00)  
Six locknuts (item 141, WP 0470 00)  
Two lockwashers (item 195, WP 0470 00)

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air cleaner assembly removed (WP 0053 00).

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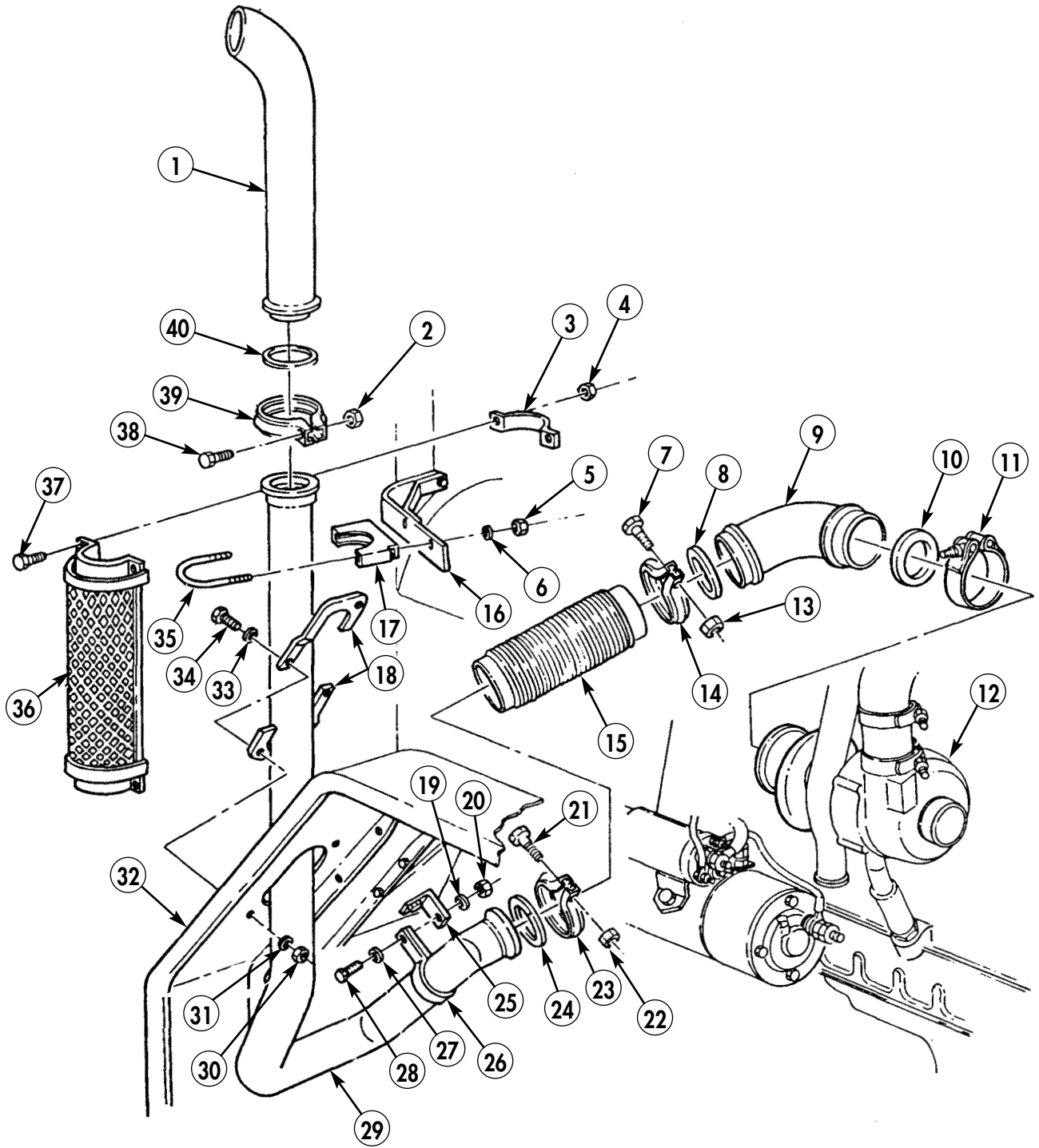
**EXHAUST SYSTEM REPLACEMENT (ALL EXCEPT M50A3) (Contd)****WARNING**

Do not touch hot exhaust system components with bare hands.  
Severe injury to personnel will result.

**REMOVAL**

1. Remove locknut (13) and screw (7) from coupling (14). Discard locknut (13).
2. Disconnect elbow (9) from flex tube (15), and remove coupling (14) and gasket (8) from elbow (9). Discard gasket (8).
3. Loosen clamp (11) and remove elbow (9), clamp (11), and gasket (10) from turbocharger (12). Discard gasket (10).
4. Remove locknut (22) and screw (21) from coupling (23), and remove flex tube (15), coupling (23), and gasket (24) from exhaust pipe (29). Discard gasket (24) and locknut (22).
5. Remove locknut (2) and screw (38) from coupling (39). Discard locknut (2).
6. Remove stack pipe (1), coupling (39), and gasket (40) from exhaust pipe (29). Discard gasket (40).
7. Remove four locknuts (4), screws (37), two clamps (3), and exhaust shield (36) from exhaust pipe (29). Discard locknuts (4).
8. Remove two locknuts (30), washers (31), screws (34), washers (33), and cover plates (18) from fender (32). Discard locknuts (30).
9. Remove two nuts (5), lockwashers (6), U-bolt (35), and clamp (17) from exhaust pipe (29) and bracket (16). Discard lockwashers (6).
10. Remove locknut (20), washer (19), screw (28), washer (27), and clamp (26) from exhaust pipe (29) and bracket (25). Discard locknut (20).
11. Remove exhaust pipe (29) from fender (32).

EXHAUST SYSTEM REPLACEMENT (ALL EXCEPT M50A3) (Contd)

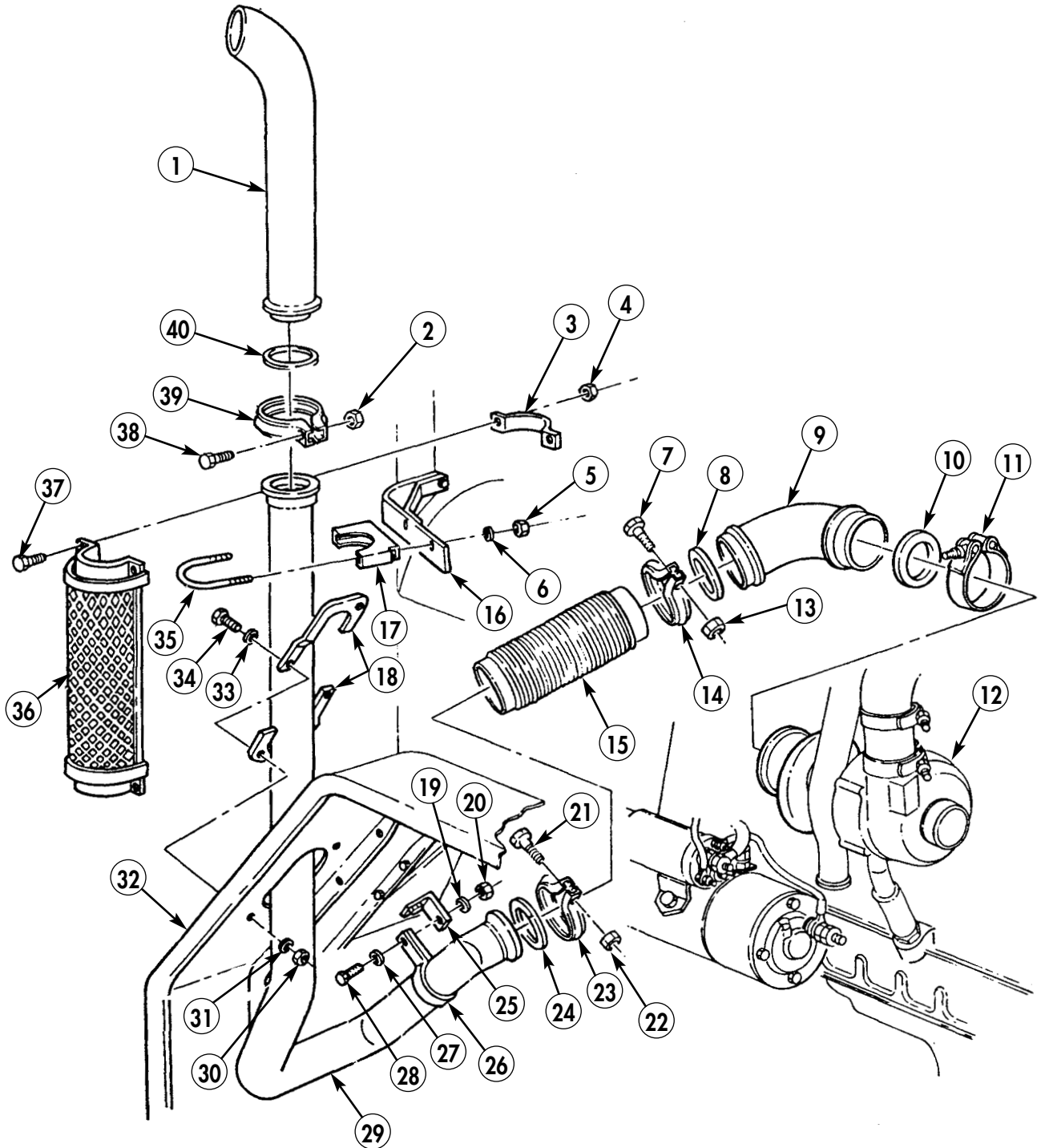


**EXHAUST SYSTEM REPLACEMENT (ALL EXCEPT M50A3) (Contd)****INSTALLATION**

1. Install exhaust pipe (29) on fender (32).
2. Install exhaust pipe (29) on bracket (16) with U-bolt (35), clamp (17), two new lockwashers (6), and nuts (5).
3. Install exhaust pipe (29) on bracket (25) with clamp (26), washer (27), screw (28), washer (19), and new locknut (20).
4. Install cover plates (18) on fender (32) with two washers (33), screws (34), washers (31), and two new locknuts (30).
5. Install exhaust shield (36) on exhaust pipe (29) with two clamps (3), four screws (37), and new locknuts (4).
6. Install new gasket (40) and stack pipe (1) on exhaust pipe (29) with coupling (39), screw (38), and new locknut (2). Do not tighten locknut (2).
7. Position outlet of stack pipe (1) outward and approximately 45° to rear of vehicle. Tighten coupling (39).
8. Install new gasket (24) and flex tube (15) on exhaust pipe (29) with coupling (23), screw (21), and new locknut (22). Do not tighten locknut (22).
9. Install new gasket (10) and elbow (9) on turbocharger (12) with clamp (11). Do not tighten clamp (11).
10. Install new gasket (8) and flex tube (15) on elbow (9) with coupling (14), screw (7), and new locknut (13). Tighten coupling (14).
11. Tighten clamp (11) and coupling (23).
12. Install air cleaner element (WP 0052 00).
13. Connect battery ground cable (WP 0126 00).
14. Start engine (TM 9-2320-361-10).
15. Lower and secure hood (TM 9-2320-361-10).
16. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



EXHAUST SYSTEM REPLACEMENT (ALL EXCEPT M50A3) (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### EXHAUST SYSTEM REPLACEMENT (M50A3)

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Applicable Models

M50A3

###### Materials/Parts

Gasket (item 63, WP 0470 00)  
Gasket (item 72, WP 0470 00)  
Five gaskets (item 57, WP 0470 00)  
Seven locknuts (item 142, WP 0470 00)  
Seven locknuts (item 141, WP 0470 00)  
Two lockwashers (item 195, WP 0470 00)  
Four lockwashers (item 411, WP 0470 00)

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air cleaner assembly removed (WP 0053 00).

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## EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)

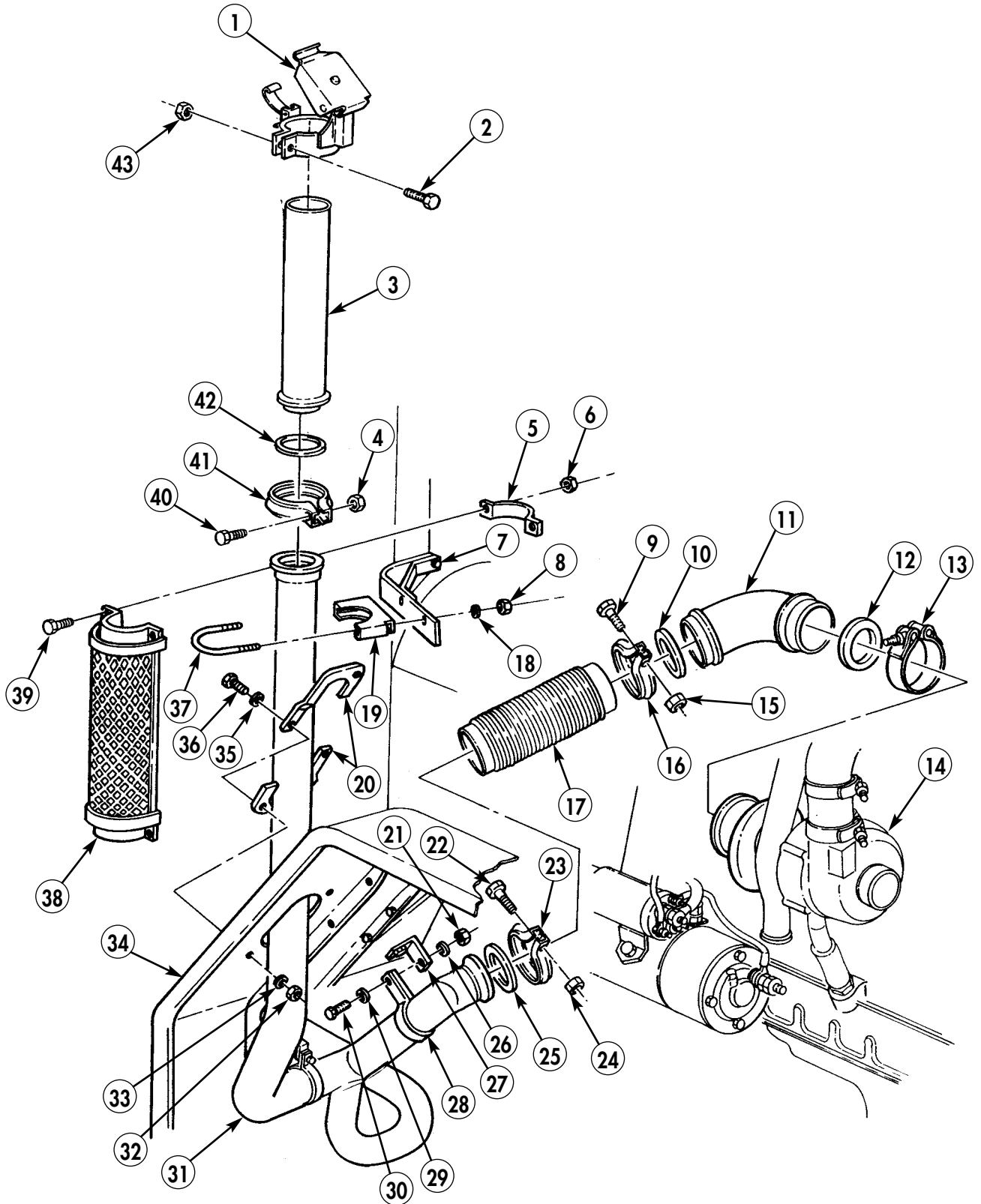
### REMOVAL

#### **WARNING**

Do not touch hot exhaust system components with bare hands.  
Severe injury to personnel will result.

1. Remove locknut (15), screw (9), and coupling (16) from flex tube (17) and elbow (11). Discard locknut (15).
2. Remove locknut (24), screw (22), coupling (23), flex tube (17), and gaskets (10) and (25) from elbow (11) and Y-pipe (31). Discard locknut (24) and gaskets (10) and (25).
3. Loosen clamp (13) and remove elbow (11), clamp (13), and gasket (12) from turbocharger (14). Discard gasket (12).
4. Remove locknut (43), screw (2), and exhaust stack shutoff (1) from exhaust pipe (3). Discard locknut (43).
5. Remove locknut (4), screw (40), clamp (41), exhaust pipe (3), and gasket (42) from Y-pipe (31). Discard locknut (4) and gasket (42).
6. Remove four locknuts (6), screws (39), two clamps (5), and exhaust shield (38) from Y-pipe (31). Discard locknuts (6).
7. Remove two nuts (8), lockwashers (18), U-bolt (37), and clamp (19) from Y-pipe (31) and bracket (7). Discard lockwashers (18).
8. Remove two locknuts (32), washers (33), screws (36), washers (35), and cover plates (20) from fender (34). Discard locknuts (32).
9. Remove locknut (21), washer (26), screw (30), washer (29), clamp (28), and Y-pipe (31) from bracket (27). Discard locknut (21).

EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)



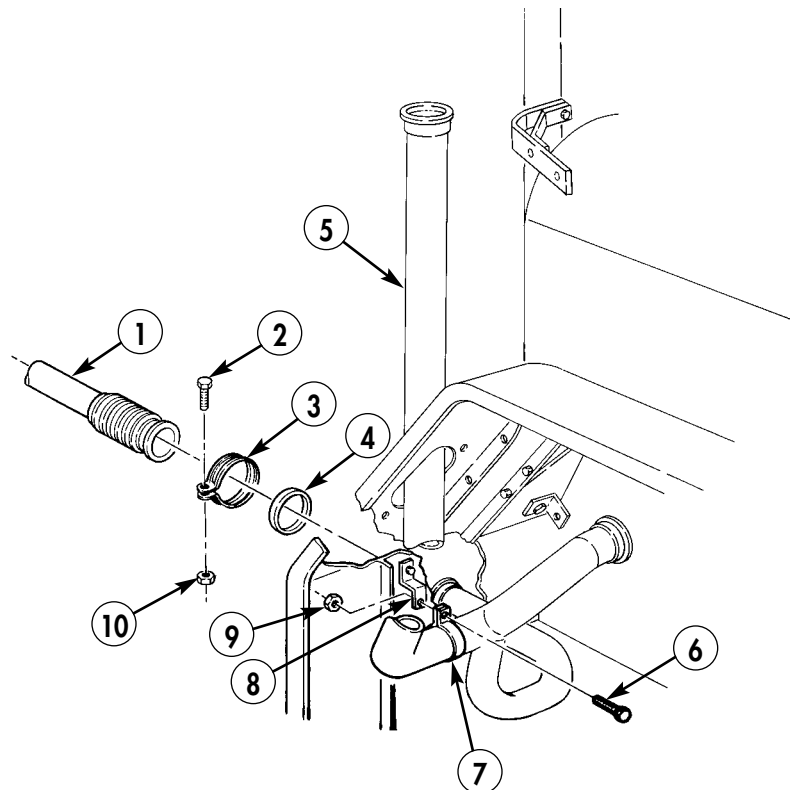
## EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)

### REMOVAL (Contd)

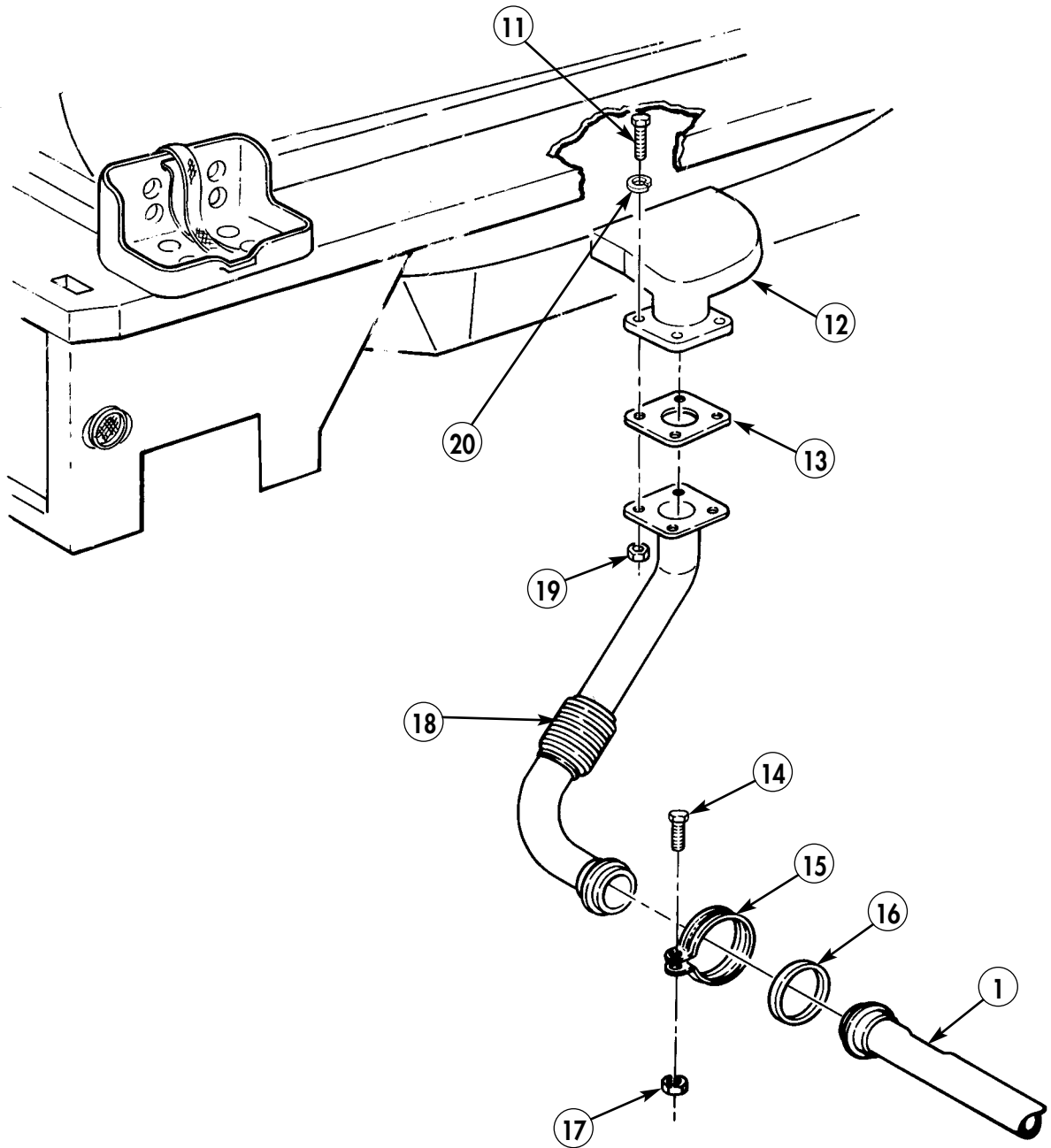
10. Remove locknut (10), screw (2), coupling (3), and gasket (4) from exhaust pipe (1) and Y-pipe (5). Discard locknut (10) and gasket (4),
11. Remove locknut (9), screw (6), clamp (7), and Y-pipe (5) from bracket (8). Discard locknut (9).
12. Remove locknut (17), screw (14), coupling (15), exhaust pipe (1), and gasket (16) from exhaust pipe (18). Discard locknut (17) and gasket (16).
13. Remove four nuts (19), lockwashers (20), screws (11), exhaust pipe (18), and gasket (13) from exhaust manifold (12). Discard lockwashers (20) and gasket (13).

### INSTALLATION

1. Install new gasket (13) and exhaust pipe (18) on exhaust manifold (12) with four screws (11), new lockwashers (20), and nuts (19).
2. Install new gasket (16) and exhaust pipe (1) on exhaust pipe (18) with coupling (15), screw (14), and new locknut (17).
3. Install Y-pipe (5) on bracket (8) with clamp (7), screw (6), and new locknut (9). Do not tighten locknut (9).
4. Install Y-pipe (5) and new gasket (4) on exhaust pipe (1) with coupling (3), screw (2), and new locknut (10).
5. Tighten locknut (9).



EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)



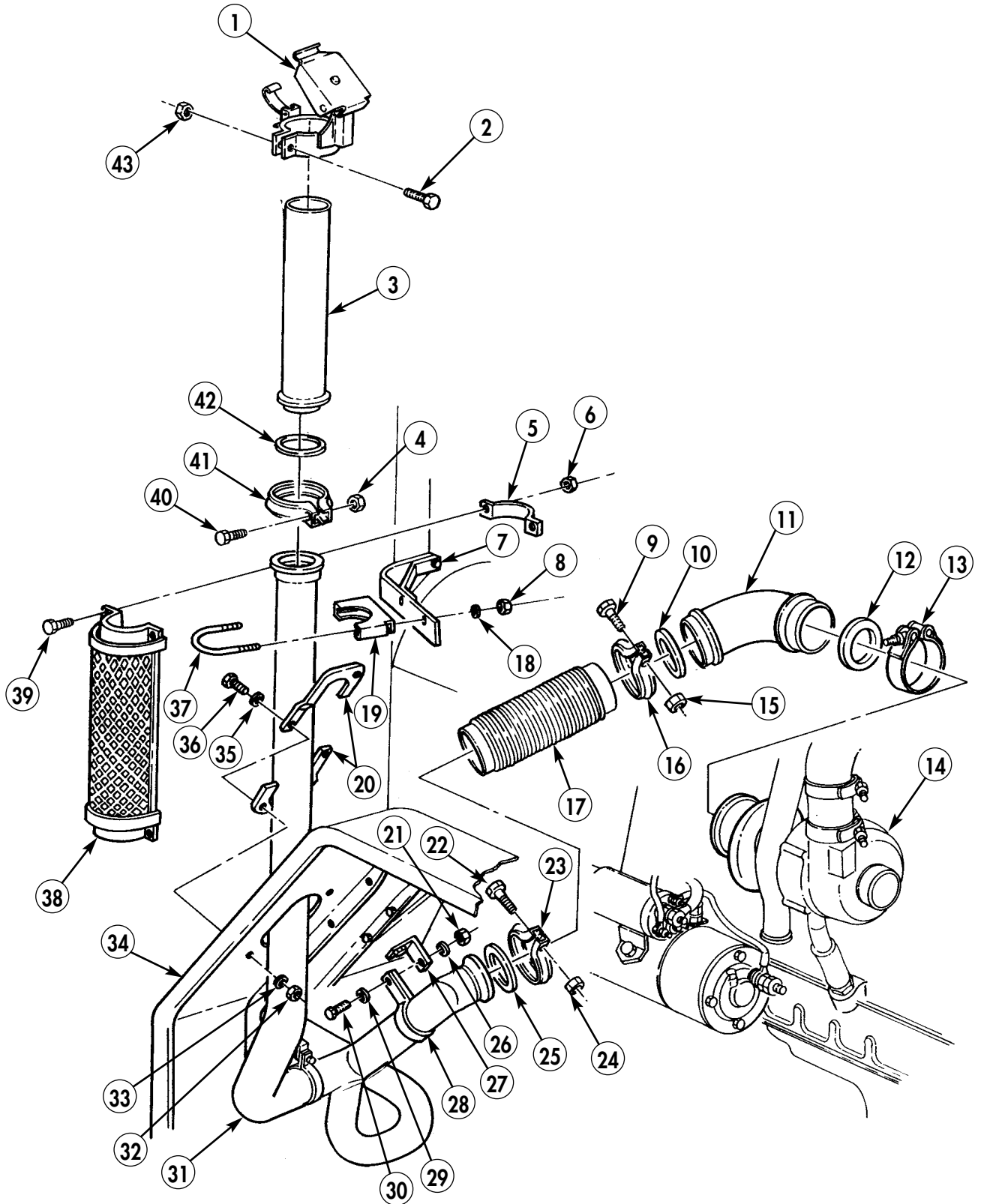
## EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)

### INSTALLATION (Contd)

6. Install new gasket (12) and elbow (11) on turbocharger (14) with clamp (13). Do not tighten clamp (13).
7. Install new gasket (10) and flex tube (17) on elbow (11) with coupling (16), screw (9), and new locknut (15).
8. Install new gasket (25) and Y-pipe (31) on flex tube (17) with coupling (23), screw (22), and new locknut (24).
9. Install clamp (28) and Y-pipe (31) on bracket (27) with washer (29), screw (30), washer (26), and new locknut (21).
10. Install two cover plates (20) on fender (34) with two washers (35), screws (36), washers (33), and new locknuts (32).
11. Tighten clamp (13) on elbow (11).
12. Install U-bolt (37) and clamp (19) on Y-pipe (31) and bracket (7) with two new lockwashers (18) and nuts (8).
13. Install exhaust shield (38) on Y-pipe (31) with two clamps (5), four screws (39), and new locknuts (6).
14. Install new gasket (42) and exhaust pipe (3) on Y-pipe (31) with coupling (41), screw (40), and new locknut (4).
15. Install exhaust stack shutoff (1) on exhaust pipe (3) with screw (2) and new locknut (43). Do not tighten locknut (43).
16. Position exhaust stack shutoff (1) so exhaust gases are directed approximately 45° out from rear of vehicle.
17. Tighten locknut (43) on exhaust stack shutoff (1).
18. Install air cleaner element (WP 0052 00).
19. Connect battery ground cable (WP 0126 00).
20. Lower and secure hood (TM 9-2320-361-10).
21. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
22. Start engine (TM 9-2320-361-10) and check for exhaust leaks.



EXHAUST SYSTEM REPLACEMENT (M50A3) (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FAN REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 193, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Upper radiator hose removed (WP 0078 00).

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## FAN REPLACEMENT (Contd)

### REMOVAL

#### **CAUTION**

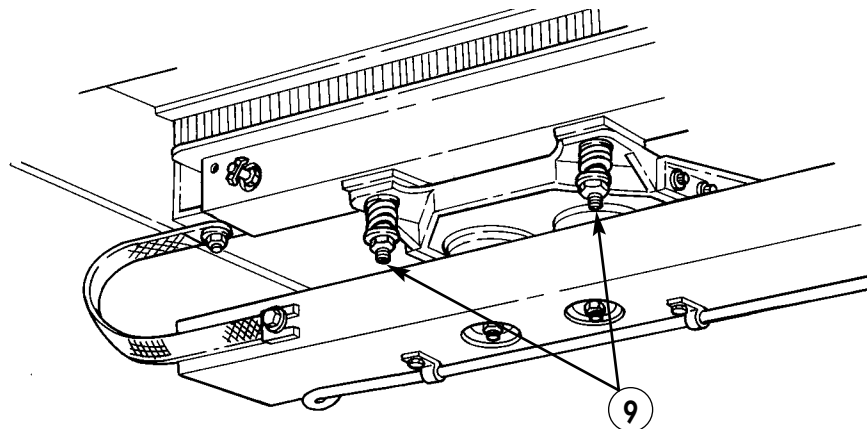
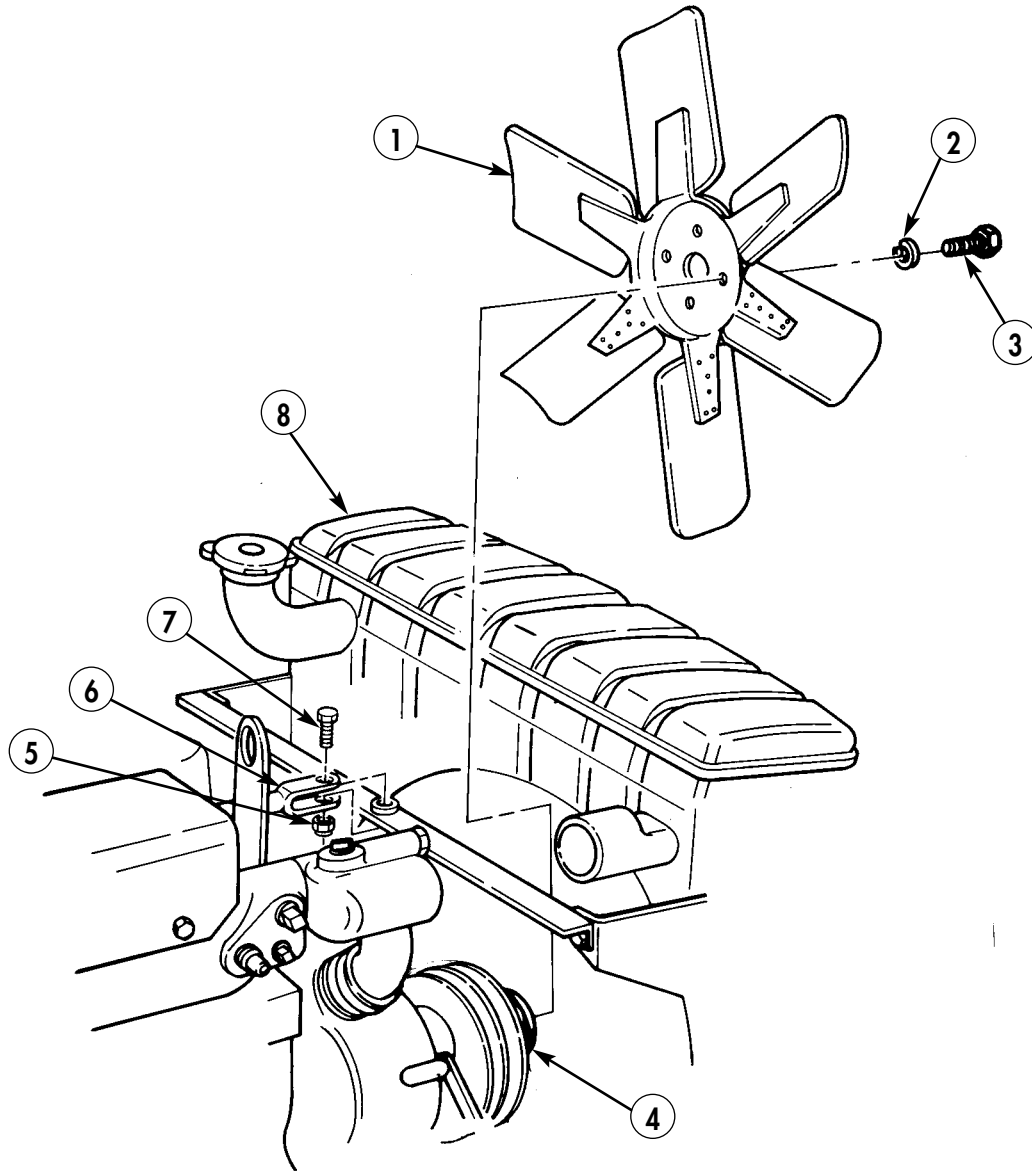
Radiator core is easily damaged. Use care when working near or handling radiator.

1. Remove locknut (5) and screw (7) from rod (6). Discard locknut (5).
2. Loosen two locknuts (9) and tilt radiator (8) away from engine.
3. Remove four screws (3) and lockwashers (2) from fan (1) and water pump pulley (4). Discard lockwashers (2).
4. Carefully remove fan (1) from water pump pulley (4).

### INSTALLATION

1. Install fan (1) on water pump pulley (4) with four new lockwashers (2) and screws (3).
2. Push radiator (8) back in position and tighten locknuts (9).
3. Tilt radiator backward and install screw (7) and new locknut (5) on rod (6).
4. Install upper radiator hose (WP 0078 00).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FAN REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### COOLING SYSTEM SERVICING

DRAINING, CLEANING AND FLUSHING, AND FILLING

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Antifreeze (item 7, WP 0468 00)  
Cleaning compound, engine cooling  
(item 12, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

---

## COOLING SYSTEM SERVICING (Contd)

### DRAINING

#### **WARNING**

Do not remove radiator cap if engine is hot. Steam or hot coolant under pressure may cause injury to personnel.

1. Turn radiator cap (1) to first stop. Allow any pressure to escape.
2. Remove radiator cap (1) by pressing down and turning counterclockwise. Lift off radiator cap (1) from filler neck (2).

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining coolant. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

3. Open engine block draincock (5) and radiator draincock (4) to allow coolant to drain.
4. Close engine block draincock (5) and radiator draincock (4).

### CLEANING AND FLUSHING

Follow cleaning and flushing instructions included in cleaning compound kit to clean and flush radiator (3) and cooling system.

### FILLING

#### **CAUTION**

- Type 1, ethylene glycol (green) and Type 2, propylene glycol (purple), should never be mixed due to their difference in toxic properties. Failure to comply may result in damage to equipment.
- Using antifreeze without mixing it with water can cause high operating temperatures, blockage of cooling system passages, and damage to water pump seals.

#### **NOTE**

- Type 1 antifreeze is an ethylene glycol based coolant, green in color, and is the only authorized antifreeze for military vehicles. Type 1 can be added to factory-filled pink coolant. When it becomes necessary to flush factory coolant, Type 1, ethylene glycol, will be used. When mixing Type 1 antifreeze with water, distilled water is recommended. Tap water should only be used in emergency situations.
  - Capacity of cooling system is 32 quarts (30.3 liters).
1. Fill cooling system with required amount of antifreeze (table 3-1).
  2. Add distilled water to 1 in. (2.45 cm) below top of filler neck (2).
  3. Install radiator cap (1) on filler neck (2).
  4. Start engine (TM 9-2320-361-10), and allow engine to reach normal operating temperature.
  5. Stop engine (TM 9-2320-361-10) and allow engine to cool.



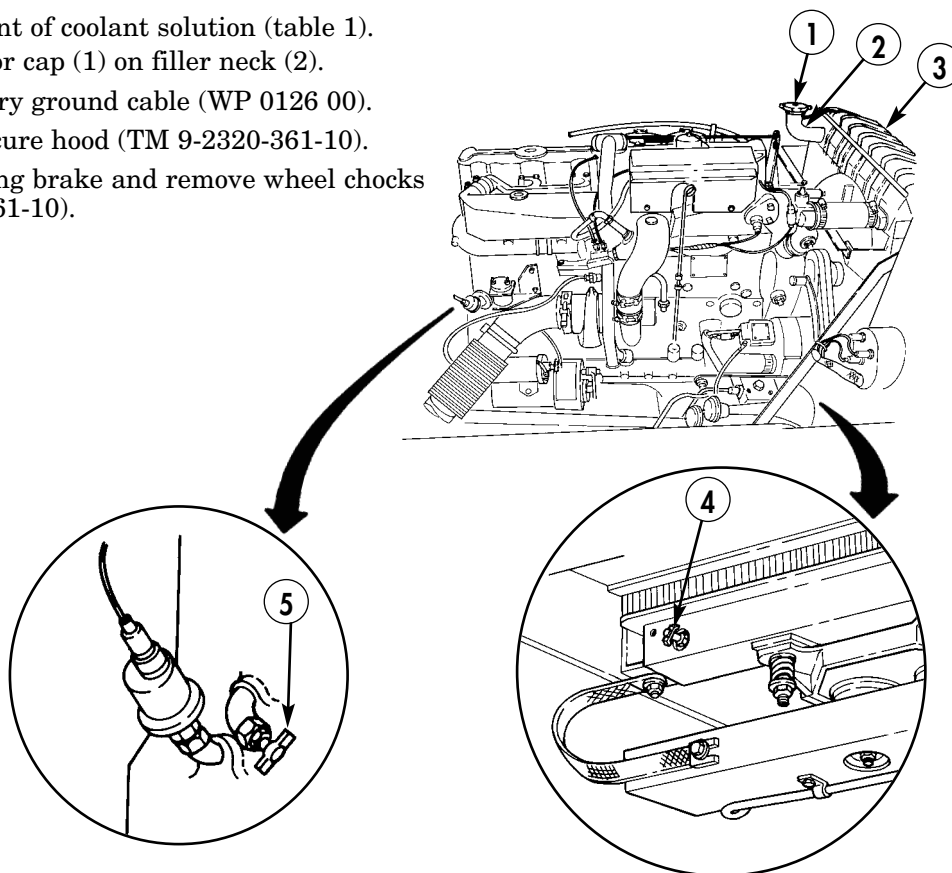
## COOLING SYSTEM SERVICING (Contd)

### FILLING (Contd)

#### **WARNING**

Do not remove radiator cap if engine is hot. Steam or hot coolant under pressure may cause injury to personnel.

6. Remove radiator cap (1) from filler neck (2) and check level of coolant in radiator (3). Add water if necessary.
7. Test freeze point of coolant solution (table 1).
8. Install radiator cap (1) on filler neck (2).
9. Connect battery ground cable (WP 0126 00).
10. Lower and secure hood (TM 9-2320-361-10).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**Table 1. Guide for Antifreeze Solutions.**

ETHYLENE-GLYCOL -60 °F (-51 °C) INHIBITED CID A-A-52624A			
LOWEST EXPECTED AMBIENT TEMPERATURE		QUARTS OF ANTIFREEZE REQUIRED	ARCTIC GRADE ANTIFREEZE -90 °F (-68 °C) CID A-A-52624A
°F	°C		
+20	-7	9	Freezing point of -90 °F (-68 °C); issued ready for use; must not be mixed with any other liquid
+10	-12	11-3/4	
0	-18	16	
-10	-23	19	
-20	-29	20-1/2	
-30	-34	23-1/2	
-40	-40	25	
-50	-46	26-11/2	
-55	-48	28	
Below -60	Below -51	Use arctic grade antifreeze (-90 °F) (-68 °C)	

END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### RADIATOR AND BRACKETS MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Antifreeze (item 7, WP 0468 00)  
Locknut (item 129, WP 0470 00)  
Two locknuts (item 147, WP 0470 00)  
Eight locknuts (item 155, WP 0470 00)  
Lockwasher (item 210, WP 0470 00)

**Personnel Required**

Two

**References**

TM 750-254

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Upper and lower radiator hose removed  
(WP 0078 00).  
Brushguard removed (WP 0203 00).  
Fan removed (WP 0075 00).

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## RADIATOR AND BRACKETS REPLACEMENT (Contd)

### REMOVAL

1. Remove nut (8), washer (9), ground strap (10), lockwasher (11), and screw (1) from radiator (2). Discard lockwasher (11).
2. Remove two locknuts (6), washers (5), springs (7), and washers (4) from radiator mounting studs (3). Discard locknuts (6).

### CAUTION

Radiator core is easily damaged. Use care when working near or handling radiator.

3. Remove locknut (15), screw (12), and rod assembly (14) from bracket (13). Discard locknut (15).

### NOTE

Assistant will help with step 4.

4. Tilt radiator (2) forward and carefully lift out of vehicle.

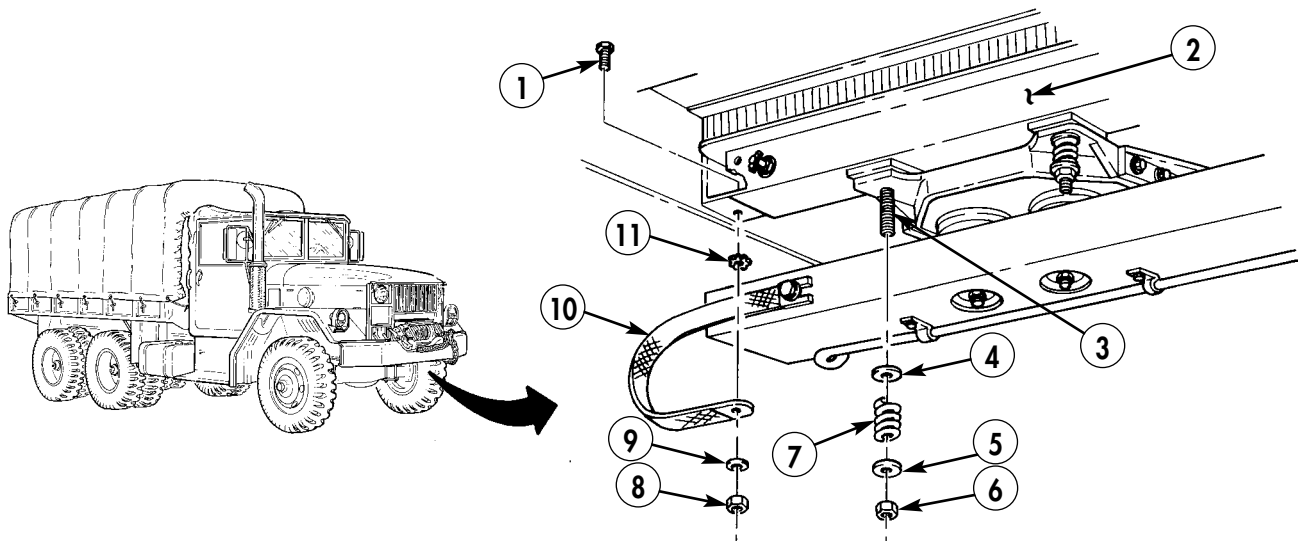
### NOTE

Perform step 5 only if radiator and draincock are damaged or if radiator is being replaced.

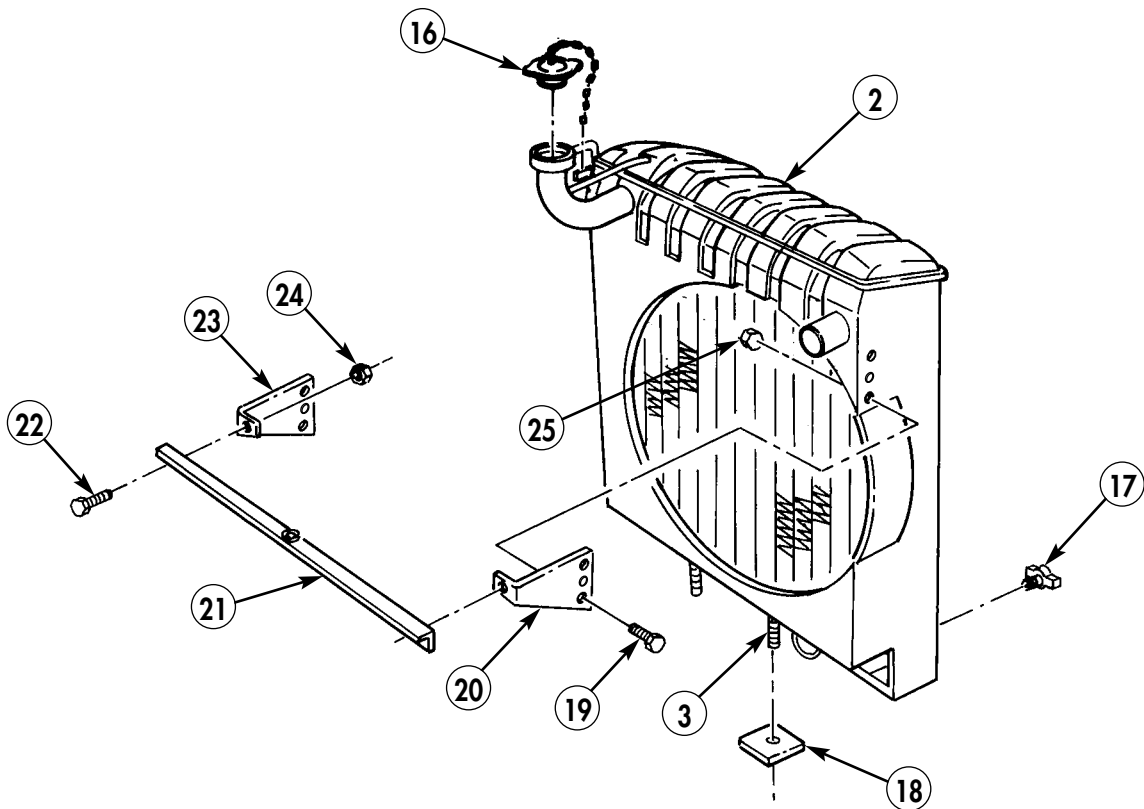
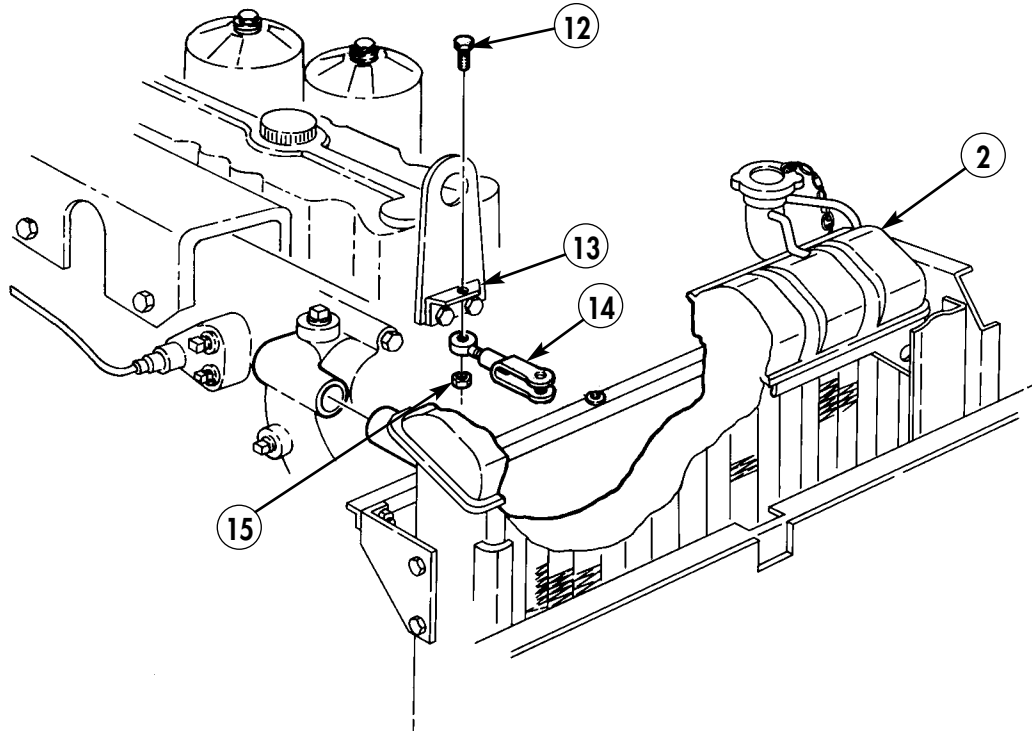
5. Remove radiator cap (16) and draincock (17) from radiator (2).
6. Remove two shims (18) from radiator mounting studs (3).
7. Remove two locknuts (24), screws (22), and support (21) from left bracket (23) and right bracket (20). Discard locknuts (24).
8. Remove six locknuts (25), screws (19), left bracket (23), and right bracket (20) from radiator (2). Discard locknuts (25).

### CLEANING AND INSPECTION

1. Clean radiator (2) (TM 750-254).
2. Inspect radiator (2) for cracked, broken, or damaged components.



RADIATOR AND BRACKETS REPLACEMENT (Contd)



## RADIATOR AND BRACKETS REPLACEMENT (Contd)

### INSTALLATION

#### **NOTE**

Perform step 1 if radiator cap and draincock were removed.

1. Install radiator cap (1) and draincock (3) on radiator (2).
2. Install left bracket (10) and right bracket (7) on radiator (2) with six screws (6) and new locknuts (12).
3. Install support (8) on left bracket (10) and right bracket (7) with two screws (9) and new locknuts (11).
4. Install two shims (4) on radiator mounting studs (5).

#### **CAUTION**

Radiator core is easily damaged. Use care when working near or handling radiator.

#### **NOTE**

Assistant will help with step 5.

5. Carefully install radiator (2) on vehicle.
6. Install rod assembly (15) on bracket (14) with screw (13) and new locknut (16).
7. Install two washers (18), springs (21), washers (19), and new locknuts (20) on radiator mounting studs (5). Do not fully compress springs (21).
8. Install ground strap (24) on radiator (2) with screw (17), new lockwasher (25), washer (23), and nut (22).
9. Install fan (WP 0075 00).
10. Install brushguard (WP 0203 00).
11. Install upper and lower radiator hose (WP 0078 00).

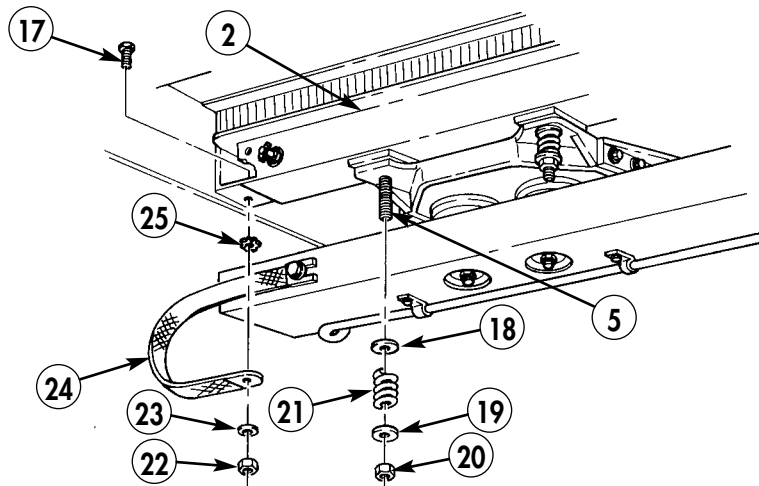
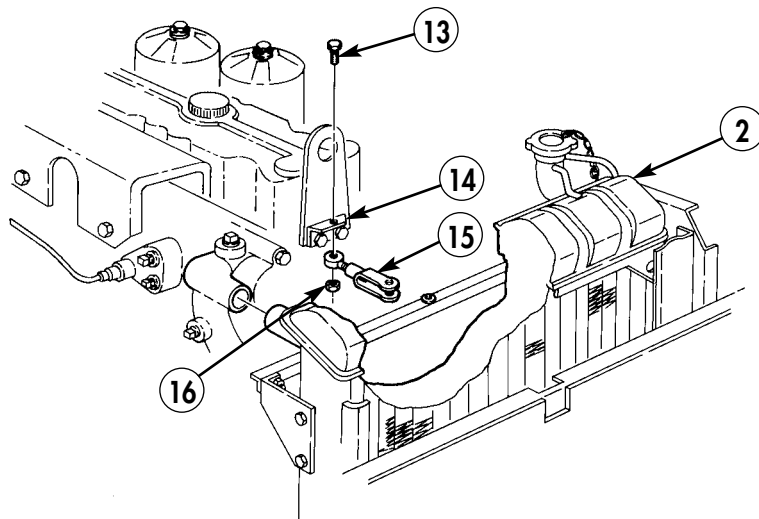
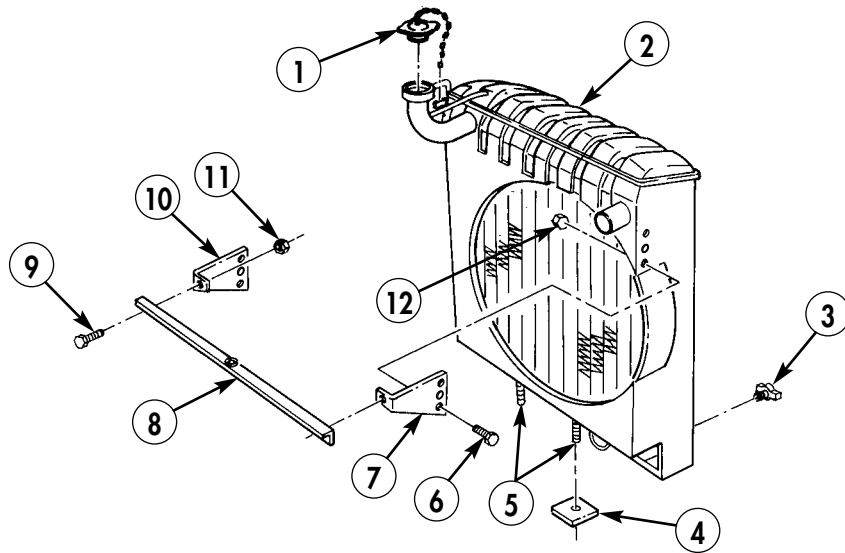
#### **CAUTION**

- Type 1, ethylene glycol (green) and Type 2, propylene glycol (purple), should never be mixed due to their difference in toxic properties. Failure to comply may result in damage to equipment.
- Using antifreeze without mixing it with water can cause high operating temperatures, blockage of cooling system passages, and damage to water pump seals.

#### **NOTE**

- Type 1 antifreeze is an ethylene glycol based coolant, green in color, and is the only authorized antifreeze for military vehicles. Type 1 can be added to factory-filled pink coolant. When it becomes necessary to flush factory coolant, Type 1, ethylene glycol, will be used. When mixing Type 1 antifreeze with water, distilled water is recommended. Tap water should only be used in emergency situations.
  - Capacity of cooling system is 32 quarts (30.3 liters).
12. Fill cooling system (WP 0076 00).
  13. Connect battery ground cable (WP 0126 00).
  14. Lower and secure hood (TM 9-2320-361-10).
  15. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

RADIATOR AND BRACKETS REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### UPPER AND LOWER RADIATOR HOSE REPLACEMENT

UPPER HOSE REMOVAL, LOWER HOSE REMOVAL,  
UPPER HOSE INSTALLATION, AND LOWER HOSE INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Locknut (item 129, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Cooling system drained (WP 0076 00).

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## UPPER AND LOWER RADIATOR HOSE REPLACEMENT (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

Use a drain pan to capture any draining coolant. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **UPPER HOSE REMOVAL**

1. Remove locknut (6) and screw (1) from rod (7) and bracket (8). Discard locknut (6).
2. Loosen two clamps (2) on upper radiator hose (3).
3. Tilt radiator (4) forward and remove upper radiator hose (3) and two clamps (2) from radiator (4) and thermostat housing (5).

### **LOWER HOSE REMOVAL**

1. Loosen two clamps (9) on lower radiator hose (11).
2. Remove lower radiator hose (11) and two clamps (9) from radiator (4) and water pump housing (10).

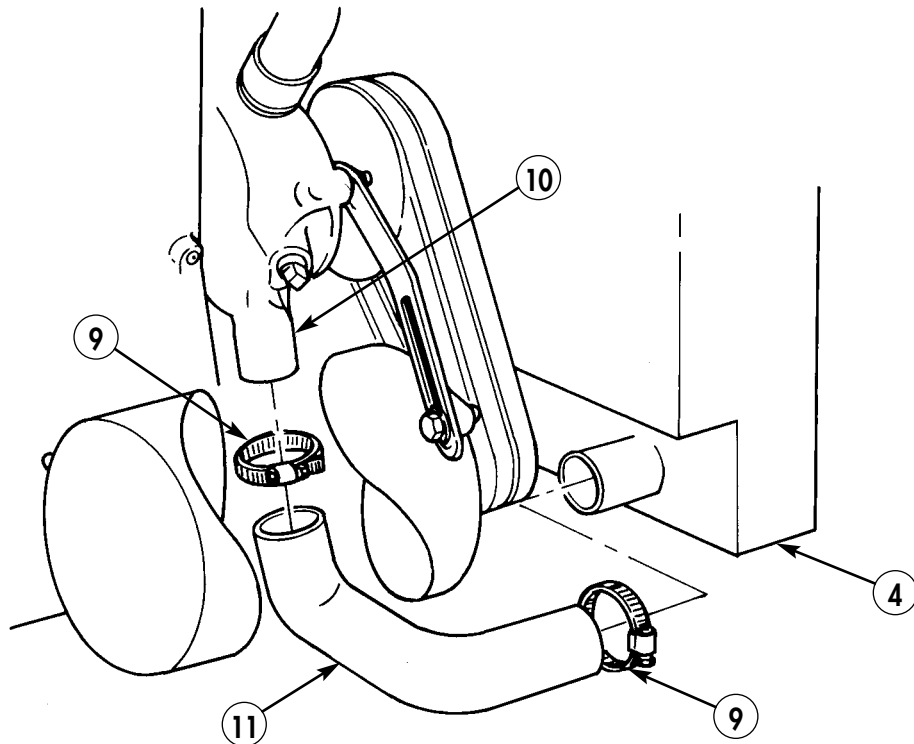
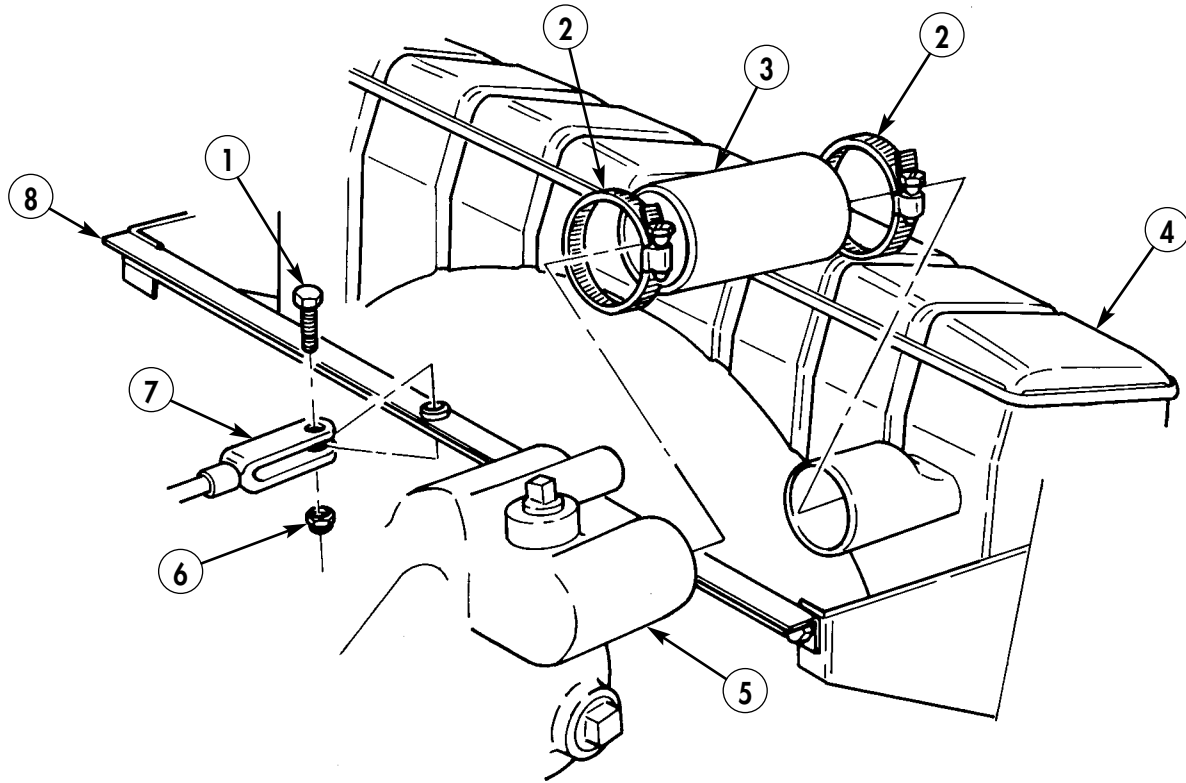
### **UPPER HOSE INSTALLATION**

1. Install upper radiator hose (3) on thermostat housing (5) and radiator (4) with two clamps (2). Do not tighten.
2. Tilt radiator (4) backward and install screw (1) new locknut (6), and rod (7) on bracket (8).
3. Tighten two clamps (2).

### **LOWER HOSE INSTALLATION**

1. Install lower radiator hose (11) on water pump housing (10) and radiator (4) with two clamps (9). Tighten two clamps (9).
2. Fill cooling system (WP 0076 00).
3. Connect battery ground cable (WP 0126 00).
4. Lower and secure hood (TM 9-2320-361-10).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

UPPER AND LOWER RADIATOR HOSE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PERSONNEL HEATER INLET AND OUTLET HOSE REPLACEMENT

#### REMOVAL AND INSTALLATION

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**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Locknut (item 145, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## PERSONNEL HEATER INLET AND OUTLET HOSE REPLACEMENT (Contd)

### REMOVAL

1. Remove locknut (9), screw (7), two clamps (1), inlet hose (3), and outlet hose (5) from bracket (2). Discard locknut (9).

#### **WARNING**

- Do not remove inlet hose or outlet hose when engine is hot. Steam or hot coolant under pressure may cause injury to personnel.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining coolant. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

2. Loosen four clamps (4) and remove inlet hose (3) and outlet hose (5) from heater (6), water pump (8), and intake manifold (10).
3. Remove four clamps (4) and two clamps (1) from inlet hose (3) and outlet hose (5).

### INSTALLATION

1. Install two clamps (1) and four clamps (4) on inlet hose (3) and outlet hose (5). Do not tighten clamps (4).
2. Install inlet hose (3) and outlet hose (5) on heater (6), water pump (8), and intake manifold (10). Tighten four clamps (4).
3. Install two clamps (1), inlet hose (3), and outlet hose (5) on bracket (2) with screw (7), and new locknut (9).

## PERSONNEL HEATER INLET AND OUTLET HOSE REPLACEMENT (Contd)

### INSTALLATION (Contd)

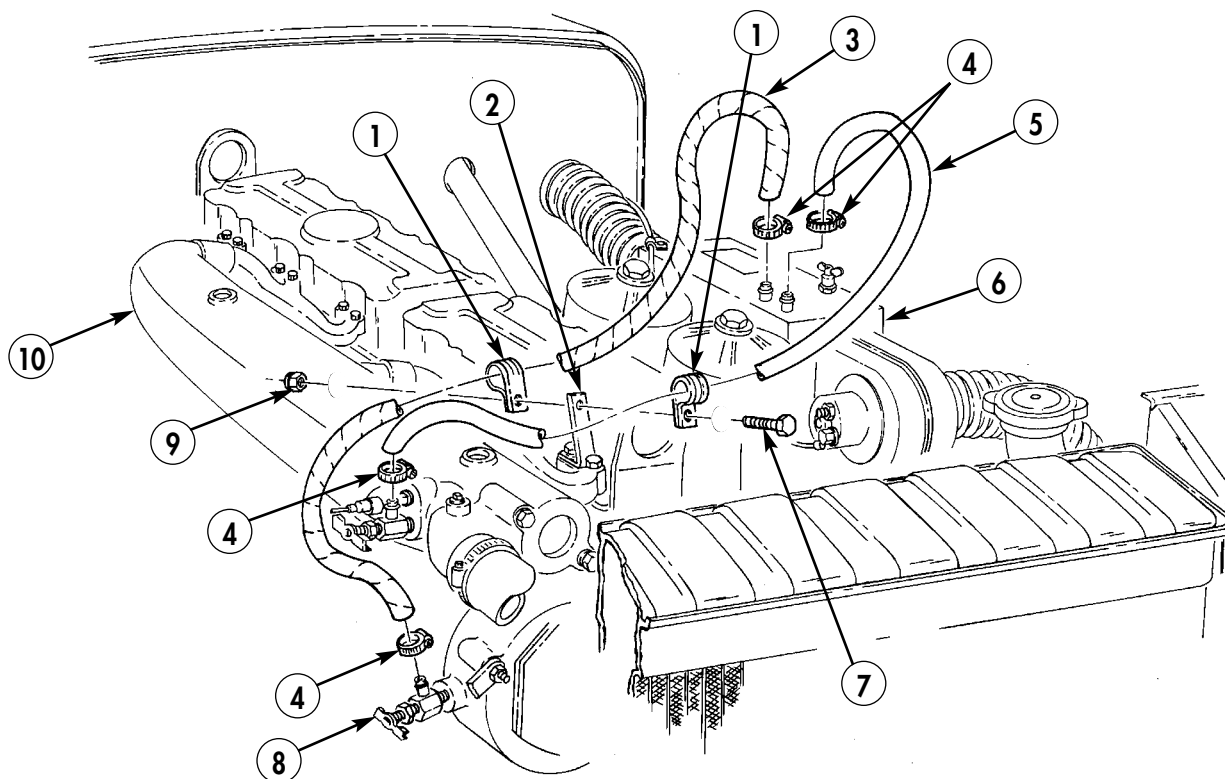
#### **CAUTION**

- Type 1, ethylene glycol (green) and Type 2, propylene glycol (purple), should never be mixed due to their differences in toxic properties. Failure to comply may result in damage to equipment.
- Using antifreeze without mixing it with water can cause high operating temperatures, blockage of cooling system passages, and damage to water pump seals.

#### **NOTE**

Type 1 antifreeze is an ethylene glycol based coolant, green in color, and is the only authorized antifreeze for military vehicles. Type 1 can be added to factory filled pink coolant. When it becomes necessary to flush factory coolant, Type 1, ethylene glycol will be used. When mixing Type 1 antifreeze with water, distilled water is recommended. Tap water should only be used in emergency situations.

4. Check level of antifreeze and add as necessary.
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

0079 00-3/4 blank





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### WATER MANIFOLD AND HOSE REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Three gaskets (item 60, WP 0470 00)

Six lockwashers (item 193, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Manifold heater removed (uncovered)  
(WP 0066 00).

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## WATER MANIFOLD AND HOSE REPLACEMENT (Contd)

### REMOVAL

#### NOTE

There are two water manifolds and hoses. Both are removed the same way.

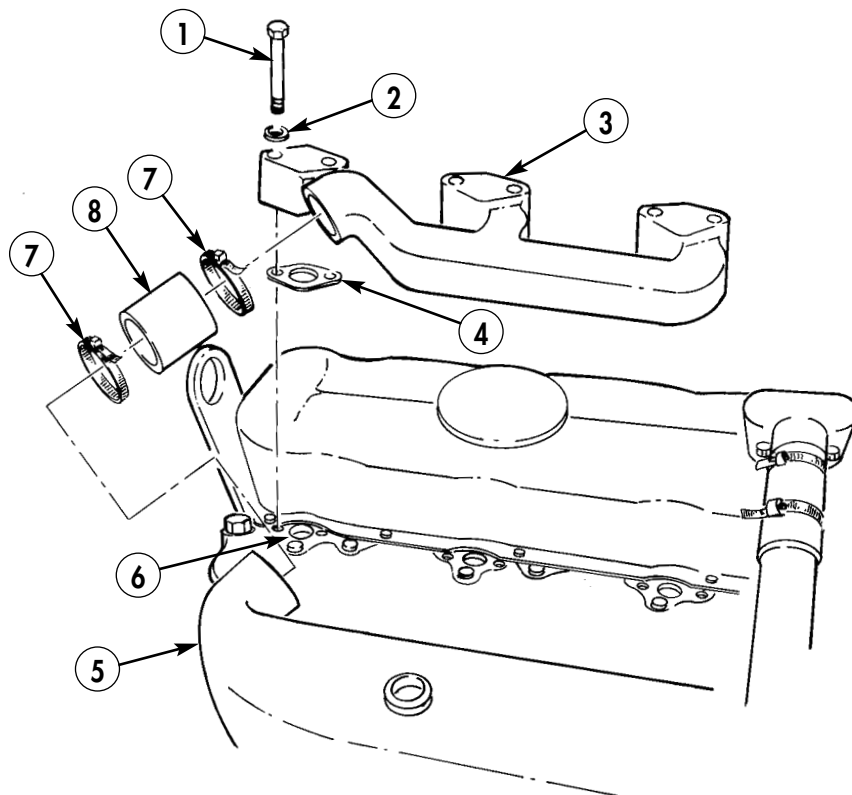
1. Loosen two clamps (7) on hose (8).
2. Remove six screws (1) and lockwashers (2) from water manifold (3). Discard lockwashers (2).
3. Remove water manifold (3), three gaskets (4), hose (8), and two clamps (7) from cylinder head (6) and intake manifold (5). Discard gaskets (4).

### INSTALLATION

#### NOTE

There are two water manifolds and hoses. Both are installed the same way.

1. Install hose (8) and two clamps (7) on water manifold (3). Do not tighten clamps (7).
2. Install three new gaskets (4) and water manifold (3) on cylinder head (6) and intake manifold (5) with six new lockwashers (2) and screws (1).
3. Tighten two clamps (7) on hose (8).
4. Install manifold heater (uncovered) (WP 0066 00).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### THERMOSTAT, HOUSING, AND HOSE REPLACEMENT REMOVAL, TESTING, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Gasket (item 59, WP 0470 00)

Seal (item 355, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Upper radiator hose removed (WP 0078 00).

---

## THERMOSTAT, HOUSING, AND HOSE REPLACEMENT (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

Use a drain pan to capture any draining coolant. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### REMOVAL

1. Loosen two clamps (4) on hose (5).
2. Remove two screws (3), lockwashers (2), housing (1), and gasket (8) from intake manifold (7) and hose (5). Discard lockwashers (2) and gasket (8).

### **NOTE**

Observe position of seal in housing.

3. Remove thermostat (10) and seal (9) from housing (1). Discard seal (9).
4. Remove hose (5) and two clamps (4) from water pump (6).

### TESTING

### **WARNING**

Use caution when testing thermostat. Hot water may cause injury to personnel.

### **NOTE**

Do not let thermostat touch container sides.

1. Place thermostat (10) in container of water heated to 185°F (85°C).
2. Observe thermostat (10). If thermostat (10) fails to open, replace thermostat (10).

### INSTALLATION

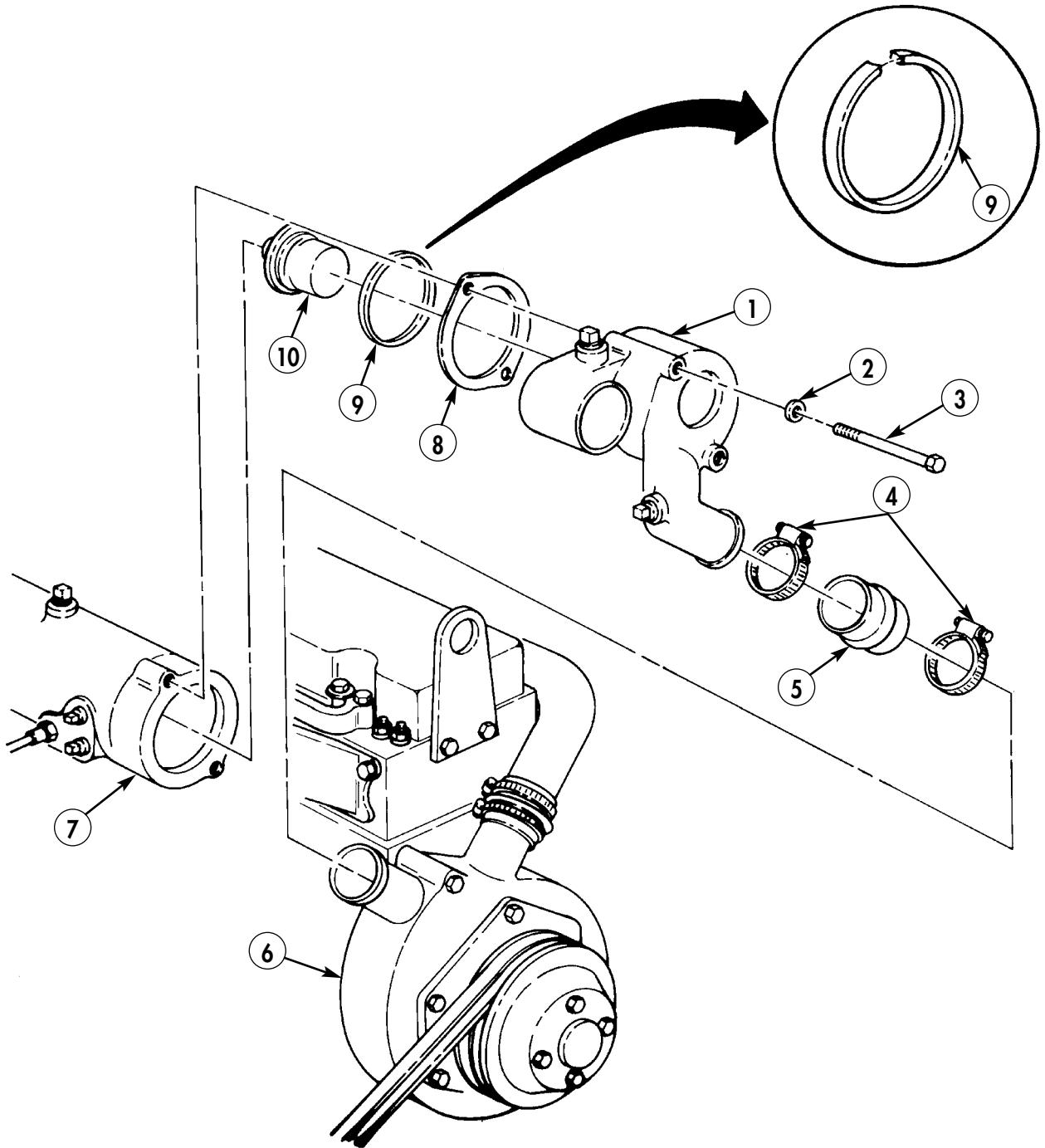
1. Install hose (5) and two clamps (4) on water pump (6). Do not tighten clamps (4).

### **NOTE**

New seal must be pressed into same position as old seal.

2. Install new seal (9) on housing (1) by tapping into place.
3. Install thermostat (10) on housing (1).
4. Install new gasket (8) and housing (1) on hose (5) and intake manifold (7) with two new lockwashers (2) and screws (3).
5. Tighten two clamps (4) on hose (5).
6. Install upper radiator hose (WP 0078 00).
7. Connect battery ground cable (WP 0126 00).
8. Lower and secure hood (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

THERMOSTAT, HOUSING, AND HOSE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### WATER PUMP HOUSING AND WATER PUMP REPLACEMENT

WATER PUMP HOUSING REMOVAL, WATER PUMP REMOVAL,  
WATER PUMP INSTALLATION, AND WATER PUMP HOUSING INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Gasket (item 84, WP 0470 00)  
Four lockwashers (item 192, WP 0470 00)  
Six lockwashers (item 193, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Radiator removed (WP 0077 00).  
Fan removed (WP 0075 00).  
Alternator belts removed (WP 0084 00).

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## WATER PUMP HOUSING AND WATER PUMP REPLACEMENT (Contd)

### WATER PUMP HOUSING REMOVAL

1. Remove nut (10), lockwasher (11), washer (12), and adjusting link (13) from water pump housing (6). Discard lockwasher (11).
2. Loosen two clamps (4) on hoses (5).

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **NOTE**

Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

3. Loosen clamp (2) and disconnect inlet hose (1) from draincock (14).
4. Remove draincock (14) and adapter (3) from water pump housing (6).
5. Remove three screws (8) and lockwashers (7) from water pump housing (6). Discard lockwashers (7).
6. Remove water pump housing (6) from cylinder block (9) and two hoses (5).

### WATER PUMP REMOVAL

1. Remove six nuts (15) and lockwashers (16) from water pump housing (6). Discard lockwashers (16).
2. Remove water pump drive assembly (17) and gasket (18) from water pump housing (6). Discard gasket (18).

#### **NOTE**

Perform step 3 if studs are to be replaced.

3. Remove six studs (19) and one stud (20) from water pump housing (6).

### WATER PUMP INSTALLATION

#### **NOTE**

Perform step 1 if studs were removed.

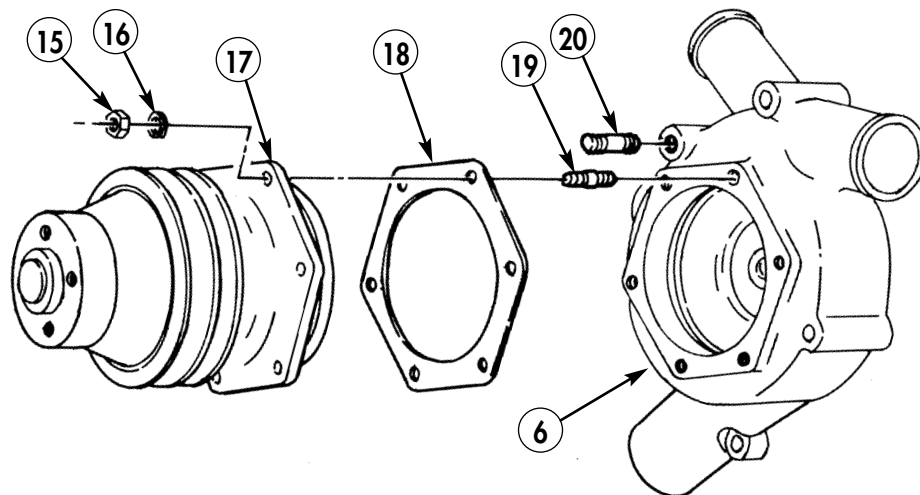
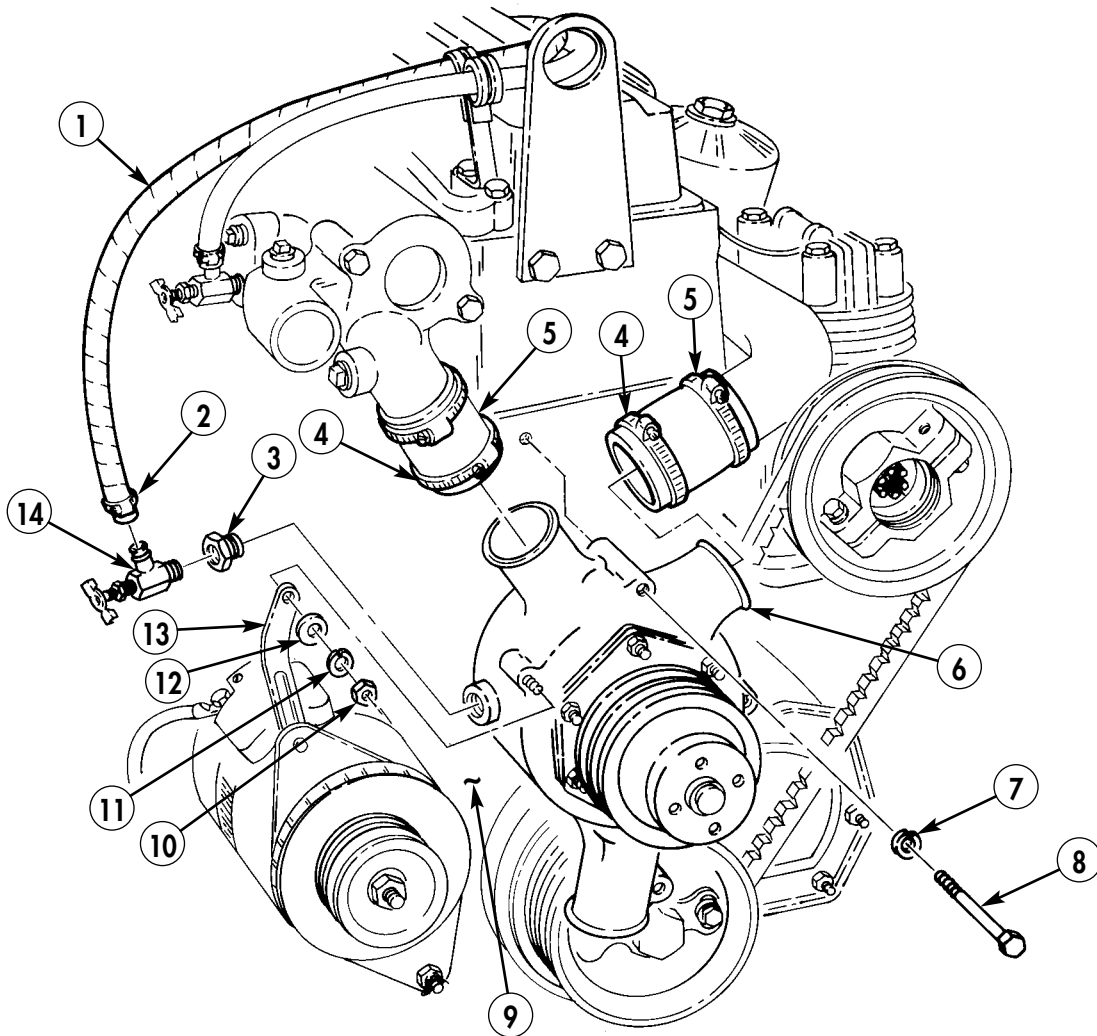
1. Install six studs (19) and one stud (20) on water pump housing (6).
2. Install new gasket (18) and water pump drive assembly (17) on water pump housing (6) with six new lockwashers (16) and nuts (15).

### WATER PUMP HOUSING INSTALLATION

1. Install water pump housing (6) on two hoses (5) and cylinder block (9) with three new lockwashers (7) and screws (8).
2. Tighten two clamps (4) on hoses (5).
3. Install adjusting link (13) on water pump housing (6) with washer (12), new lockwasher (11), and nut (10).
4. Install adapter (3) and draincock (14) on water pump housing (6).
5. Install inlet hose (1) on draincock (14). Tighten clamp (2).
6. Install alternator belts (WP 0084 00).
7. Install fan (WP 0075 00).
8. Install radiator (WP 0077 00).
9. Connect battery ground cable (WP 0126 00).
10. Lower and secure hood (TM 9-2320-361-10).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**WATER PUMP HOUSING AND WATER PUMP REPLACEMENT (Contd)**



**END OF WORK PACKAGE**



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL COOLER TUBE AND HOSES REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Radiator drained (WP 0077 00).

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## OIL COOLER TUBE AND HOSE REPLACEMENT (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **NOTE**

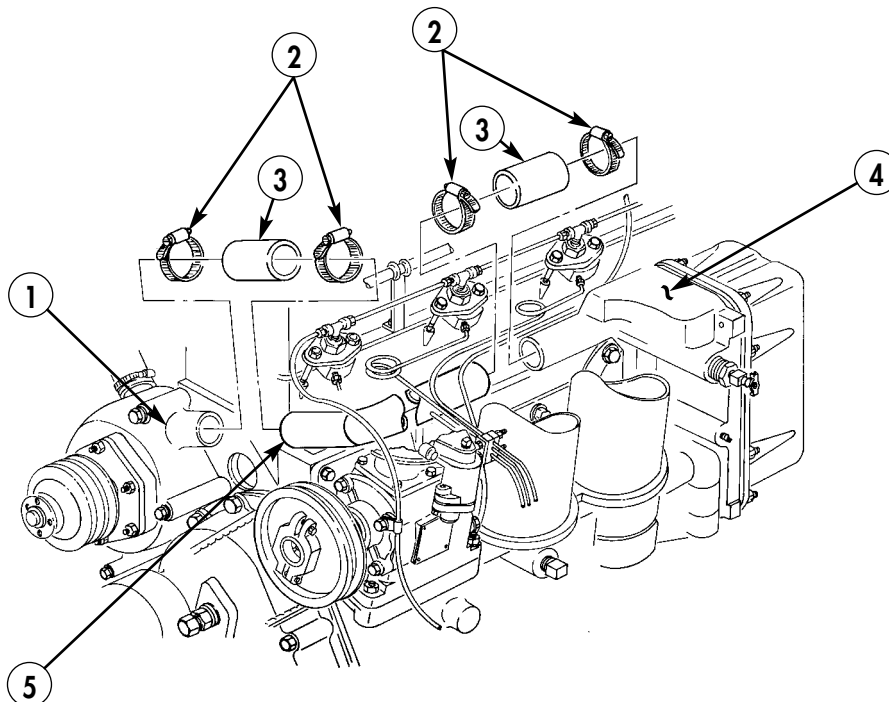
Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

### **REMOVAL**

1. Loosen four clamps (2) on two hoses (3).
2. Remove oil cooler tube (5), two hoses (3), and four clamps (2) from water pump (1) and engine oil cooler (4).

### **INSTALLATION**

1. Install oil cooler tube (5) and two hoses (3) on water pump (1) and engine oil cooler (4) with four clamps (2).
2. Tighten four clamps (2) on two hoses (3).
3. Fill cooling system (WP 0076 00).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ALTERNATOR BELTS MAINTENANCE

REMOVAL, INSPECTION, INSTALLATION AND ADJUSTMENT

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two cotter pins (item 31, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## ALTERNATOR BELTS MAINTENANCE (Contd)

### REMOVAL

1. Loosen screw (9) and nut (2) on alternator adjusting arm (1).
2. Remove two cotter pins (6) and loosen front and rear locknuts (7). Discard cotter pins (6).
3. Rotate alternator (12) toward engine (11) and remove two alternator belts (4) from alternator pulley (8), water pump pulley (3), and vibration damper (5).

### INSPECTION

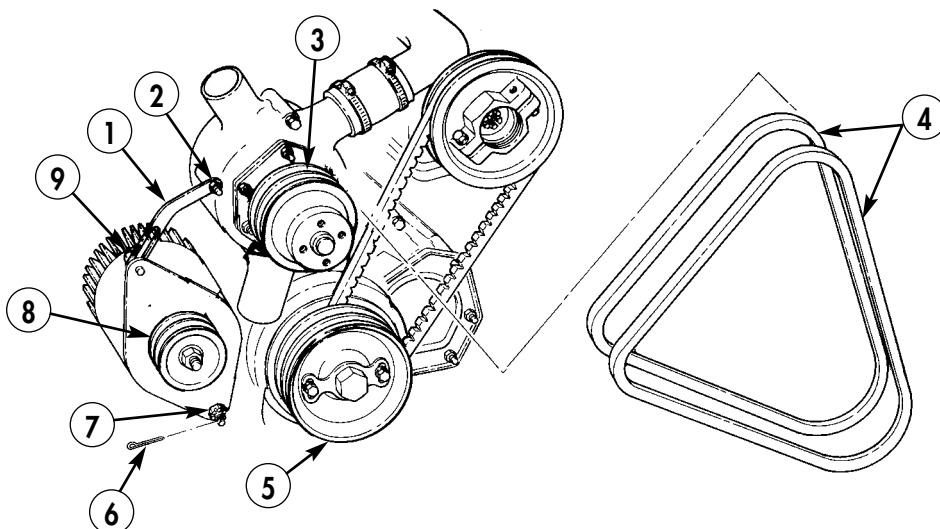
Inspect two alternator belts (4) for cracks, fraying, and splits. Replace if cracked, frayed, or split.

### INSTALLATION AND ADJUSTMENT

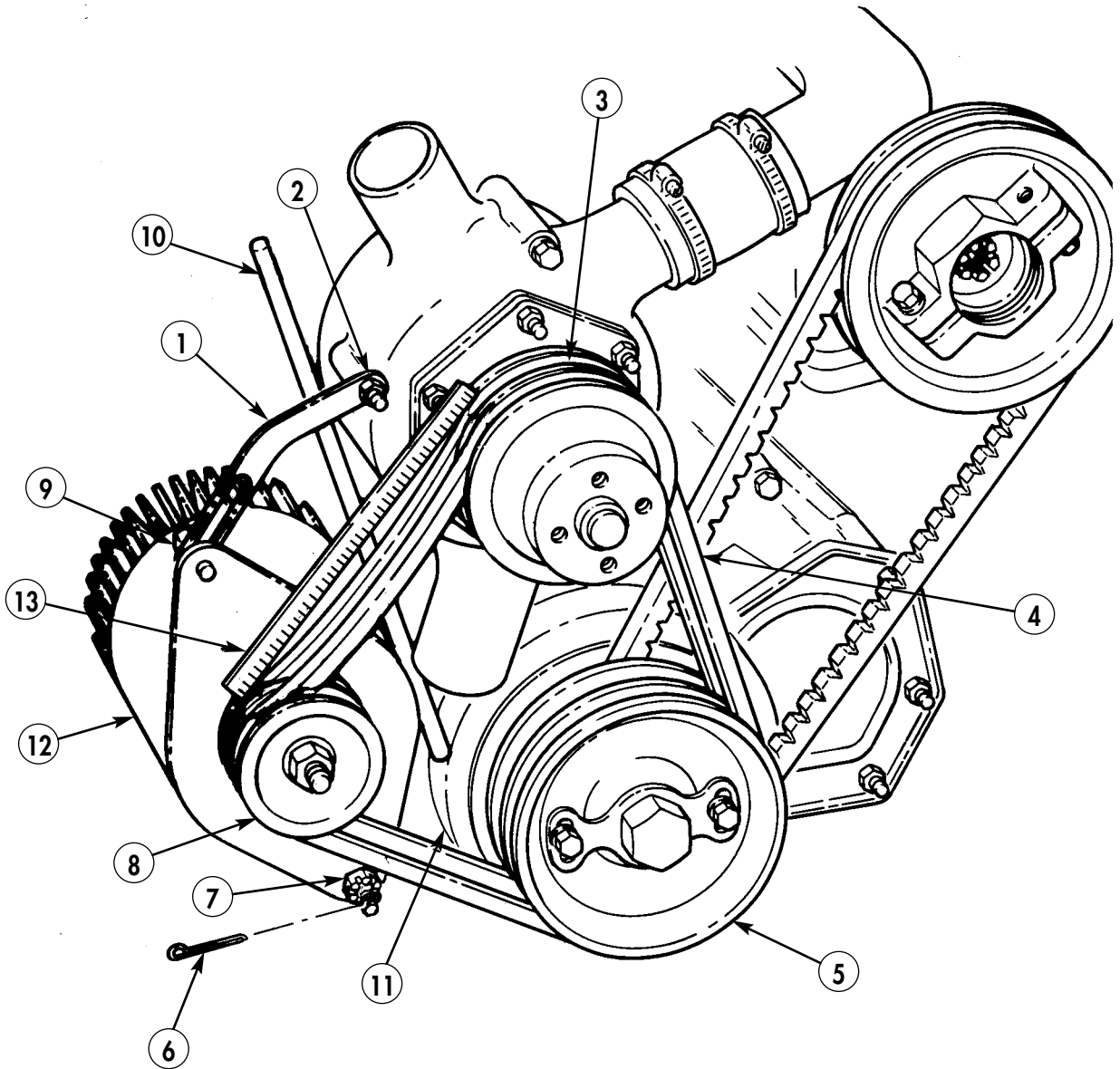
#### NOTE

Alternator belts are a matched set.

1. Install two alternator belts (4) on vibration damper (5), water pump pulley (3), and alternator pulley (8).
2. Position suitable prybar (10) between engine (11) and alternator (12). Pull prybar (10) down until belts (4) appear tight.
3. Place straightedge (13) across alternator pulley (8) and water pump pulley (3) and check for 0.75 in. (19.05 mm) deflection on alternator belts (4).
4. Tighten screw (9) at adjusting arm (1) 15–20 lb-ft (20–27 N•m).
5. Tighten nut (2) at adjusting arm (1) 25–31 lb-ft (34–42 N•m).
6. Tighten two locknuts (7) and install two new cotter pins (6). Tighten locknuts (7) 33–42 lb-ft (45–57 N•m).
7. Connect battery ground cable (WP 0126 00).
8. Start engine (TM 9-2320-361-10) and check if battery-generator indicator is in green area.
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



ALTERNATOR BELTS MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ALTERNATOR (60 AMPERE) AND MOUNTING BRACKET MAINTENANCE REMOVAL, INSTALLATION, AND ADJUSTMENT

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Two lockwashers (item 210, WP 0470 00)  
Two lockwashers (item 192, WP 0470 00)  
Three lockwashers (item 211, WP 0470 00)  
Four lockwashers (item 229, WP 0470 00)  
Two cotter pins (item 31, WP 0470 00)

##### Personnel Required

Two

##### References

WP 0086 00  
WP 0084 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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**ALTERNATOR (60 AMPERE) AND MOUNTING BRACKET MAINTENANCE (Contd)****REMOVAL****CAUTION**

Never operate the alternator with the positive output terminal disconnected. Damage to alternator will result.

**NOTE**

Prior to removal, tag wires for installation.

1. Remove two screws (12) and lockwashers (11) from terminal cover (10). Discard lockwashers (11).
2. Pry cover (10) away from waterproofing sealant and remove cover (10) from alternator (25).
3. Remove two screws (4), lockwashers (3), wire retaining strap (2), and spacer (1) from alternator (25). Discard lockwashers (3).
4. Remove screw (6), lockwasher (5), and ground wire (7) from alternator (25). Discard lockwasher (5).

**NOTE**

- Alternator has an AC terminal not used on M44A2 series trucks.
  - Waterproofing sealant must be removed before removing wire in step 5.
5. Remove nut (9), lockwasher (8), and wire (36) from stud (35). Discard lockwasher (8).
  6. Disconnect wire (33) from wire (34).
  7. Remove screw (18), lockwasher (19), and washer (17) from alternator adjusting arm (16) and alternator (25). Discard lockwasher (19).
  8. Remove nut (15), lockwasher (14), and alternator adjusting arm (16) from engine stud (13). Discard lockwasher (14).
  9. Remove two alternator belts (20) from alternator pulley (21).
  10. Remove two cotter pins (22), two locknuts (23), shims (31), four washers (24) and (26), two screws (27), and alternator (25). Discard two cotter pins (22).

**NOTE**

Perform step 11 only if alternator mounting bracket is damaged.

11. Remove three screws (28), lockwashers (29) and alternator mounting bracket (30) from engine (32). Discard lockwashers (29).
12. Remove alternator pulley (21) (WP 0086 00).



## ALTERNATOR (60 AMPERE) AND MOUNTING BRACKET MAINTENANCE (Contd)

### INSTALLATION

1. Install alternator pulley (21) (WP 0086 00).

#### **NOTE**

Perform step 2 only if mounting bracket has been removed.

2. Install alternator mounting bracket (30) on engine (32) with three new lockwashers (29) and screws (28). Tighten screws (28) 60–71 lb-ft (81–96 N•m).
3. Install alternator adjusting arm (16) to engine stud (13) with new lockwasher (14) and nut (15). Finger-tighten only.

#### **WARNING**

Alternator must be supported during installation. Failure to support alternator may cause injury to personnel or damage to equipment.

4. Install alternator (25) on mounting bracket (30) with two screws (27), four washers (26) and (24), shims (31) as required, and two nuts (23). Finger-tighten only.
5. Install alternator adjusting arm (16) on alternator (25) with washer (17), new lockwasher (19), and screw (18). Finger-tighten only.
6. Install and adjust alternator belts (20) (WP 0084 00). Tighten two screws (27) 33–42 lb-ft (45–57 N•m).
7. Connect wire (33) to wire (34) and install two new cotter pins (22) through locknuts (23).

#### **NOTE**

Ensure terminals are clean before connections are made.

Alternator has an AC terminal not used on M44A2 series trucks.

8. Install wire (36) on stud (35) with new lockwasher (8) and nut (9). Tighten nut (9) 45–55 lb-in. (5–6 N•m).
9. Install ground wire (7) to alternator (25) with new lockwasher (5) and screw (6). Tighten screw (6) 82–102 lb-in. (9–12 N•m).
10. Install spacer (1) and wire retaining strap (2) over wires (7) and (36) on alternator (25) with two new lockwashers (3) and screws (4). Tighten screws (4) 30–35 lb-in. (1–2 N•m).

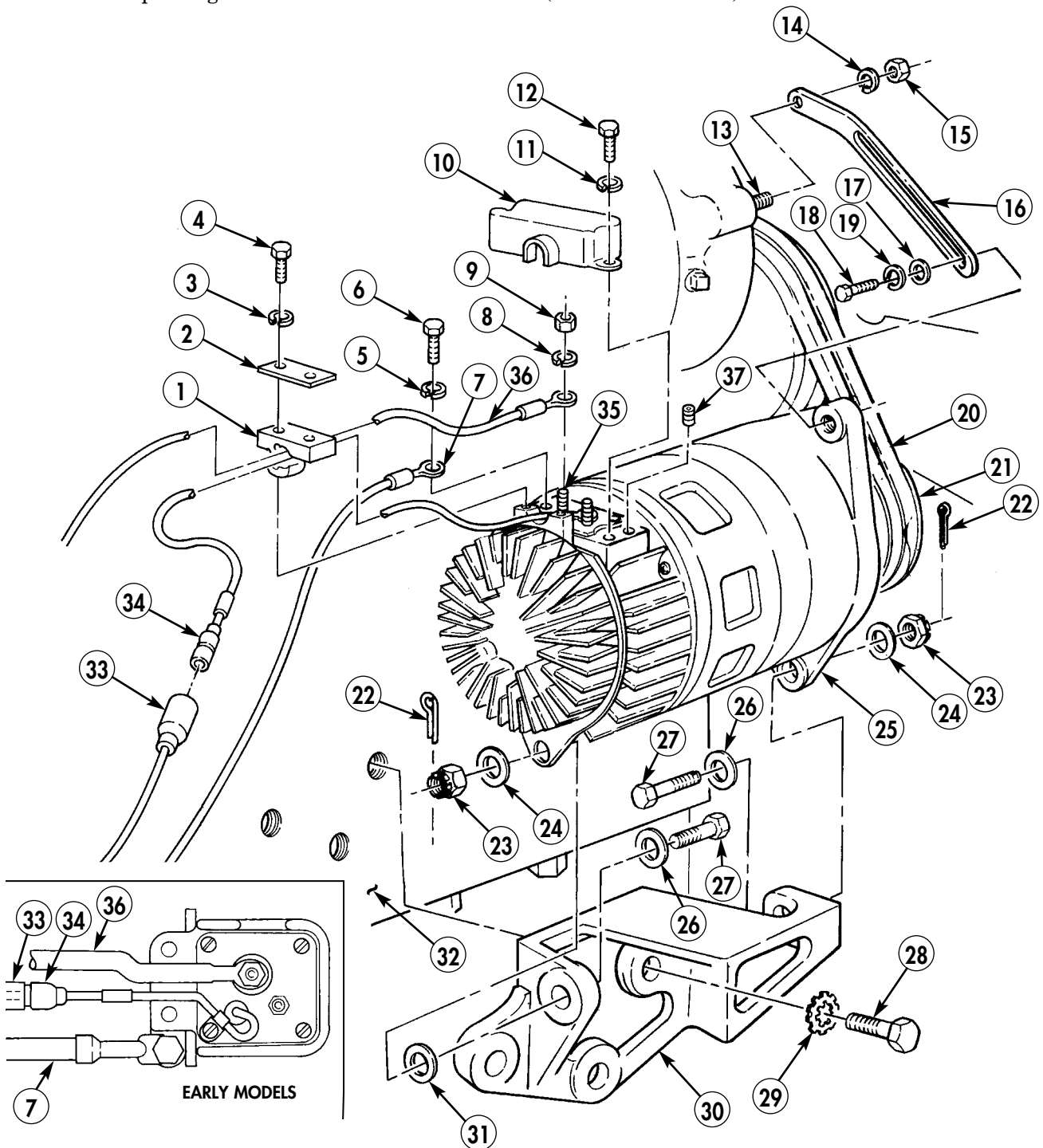
### ADJUSTMENT

1. Connect battery ground cable (WP 0126 00) and start engine (TM 9-2320-361-10).
2. Set engine speed to 1200 rpm (TM 9-2320-361-10).
3. Turn on headlights (TM 9-2320-361-10) to place load on alternator.
4. Using multimeter, check alternator output voltage. Connect black lead to ground cable (7) and touch red lead to wire (33). Output voltage should be  $28.0 \pm 0.2$  VDC. If adjustment is required, continue with next step. If no adjustment is required, go to step 8.
5. Remove pipe plug (37) from alternator (25).
6. Turn adjusting screw counterclockwise to increase or clockwise to decrease voltage until output voltage of  $28.0 \pm 0.2$  VDC is achieved.
7. Apply sealing compound to pipe plug (37) threads. Install pipe plug (37) in alternator (25) and tighten to 24–36 lb-in. (3–4 N•m).
8. Turn off headlights (TM 9-2320-361-10).
9. Stop engine (TM 9-2320-361-10).
10. Seal wires (36), (7), and (34) and connectors and stud (35) completely with adhesive sealant.

**ALTERNATOR (60 AMPERE) AND MOUNTING BRACKET MAINTENANCE (Contd)**

**ADJUSTMENT (Contd)**

11. Install terminal cover (10) on alternator (25) with two new lockwashers (11) and screws (12).
12. Connect battery ground cable (WP 0126 00).
13. Lower and secure hood (TM 9-2320-361-10).
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**END OF WORK PACKAGE**



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ALTERNATOR PULLEY REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

Mechanical puller kit (item 64, WP 0469 00)

**Materials/Parts**

Locknut (item 143, WP 0470 00)

Woodruff key (item 383, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Alternator removed (WP 0085 00).

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## ALTERNATOR PULLEY REPLACEMENT (Contd)

### REMOVAL

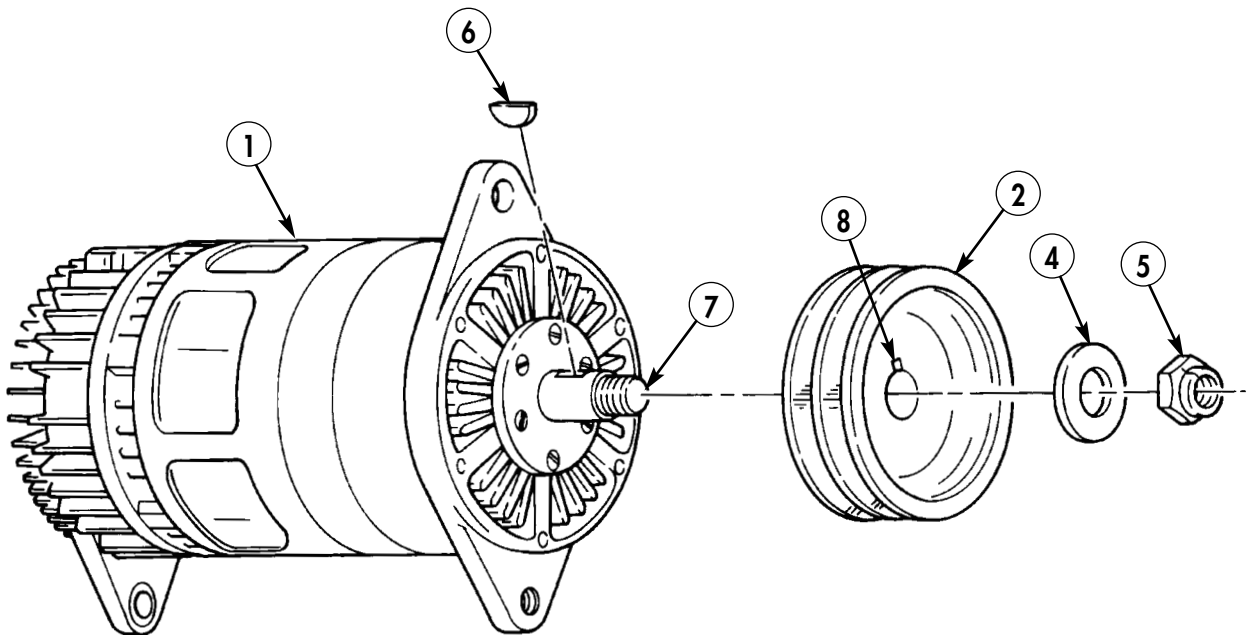
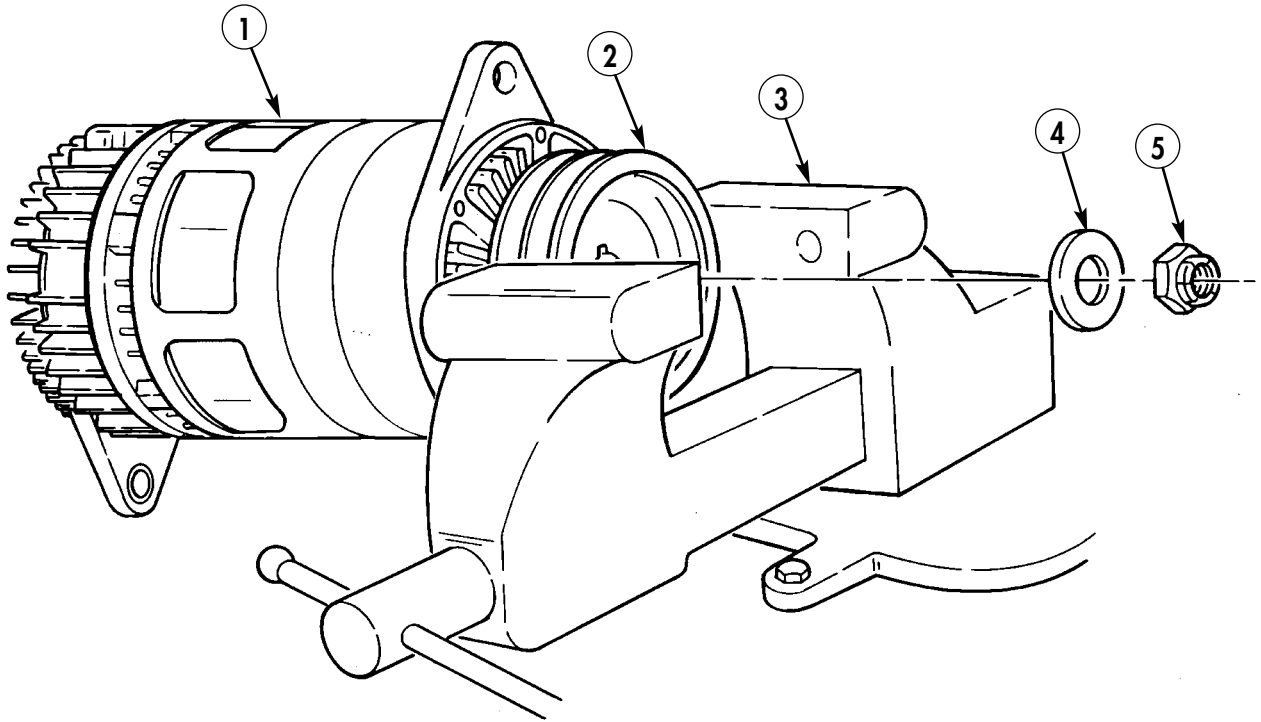
1. Clamp alternator pulley (2) in a soft-jawed vice (3).
2. Remove locknut (5) and washer (4) from alternator shaft (7). Discard locknut (5).
3. Remove alternator (1) and pulley (2) from soft-jawed vise (3).
4. Using puller, remove alternator pulley (2) and woodruff key (6) from alternator shaft (7). Discard woodruff key (6).

### INSTALLATION

1. Position new woodruff key (6) in alternator shaft (7) with flat side up.
2. Align pulley keyway (8) with woodruff key (6) in alternator shaft (7) and tap pulley (2) onto alternator shaft (7).
3. Install washer (4) and new locknut (5) on alternator shaft (7). Tighten locknut (5) finger-tight.
4. Clamp alternator pulley (2) in soft-jawed vise (3).
5. Tighten locknut (5) 90–100 lb-ft (122–135 N•m).
6. Remove alternator pulley (2) from vise (3).
7. Install alternator (WP 0085 00).
8. Connect battery ground cable (WP 0126 00).
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



ALTERNATOR PULLEY REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MAGNETIC STARTER RELAY AND MOUNTING BRACKET REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Applicable Models

All

###### Materials/Parts

Two locknuts (item 145, WP 0470 00)  
Two lockwashers (item 212, WP 0470 00)  
Two lockwashers (item 195, WP 0470 00)  
Two lockwashers (item 210, WP 0470 00)

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air cleaner assembly removed (WP 0053 00).

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## MAGNETIC STARTER RELAY AND MOUNTING BRACKET REPLACEMENT (Contd)

### REMOVAL

#### NOTE

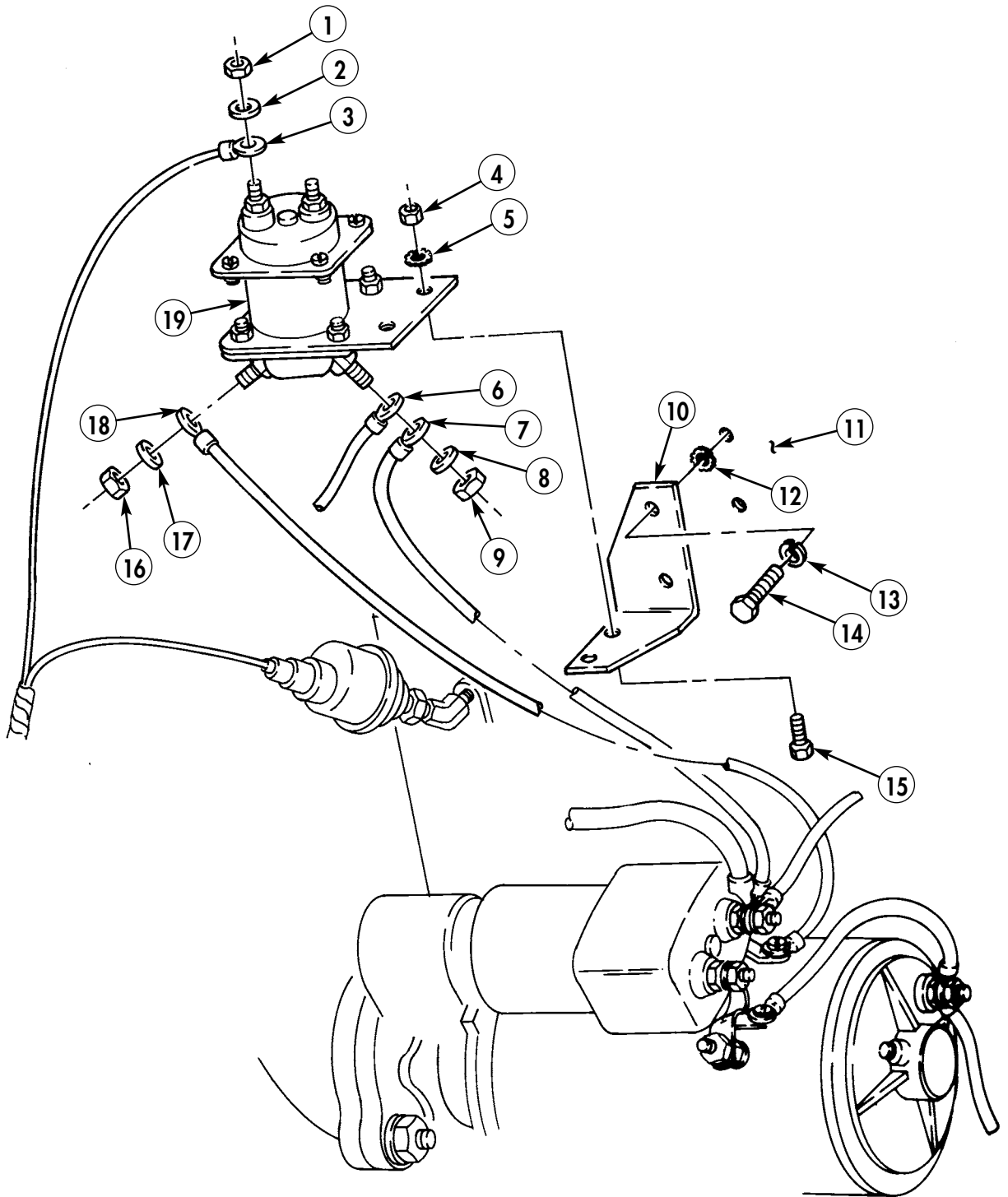
Prior to removal, tag leads for installation.

1. Remove nut (1), washer (2), and cable lead (3) from magnetic starter relay (19).
2. Remove nut (9), washer (8), and cable leads (7) and (6) from magnetic starter relay (19).
3. Remove nut (16), washer (17), and cable lead (18) from magnetic starter relay (19).
4. Remove two locknuts (4), lockwashers (5), screws (15), and magnetic starter relay (19) from mounting bracket (10). Discard two locknuts (4) and lockwashers (5).
5. Remove two screws (14), lockwashers (13) and (12), and mounting bracket (10) from engine block (11). Discard lockwashers (13) and (12).

### INSTALLATION

1. Install mounting bracket (10) on engine block (11) with two screws (14) and new lockwashers (13) and (12).
2. Install magnetic starter relay (19) on mounting bracket (10) with two screws (15), new lockwashers (5), and locknuts (4).
3. Install cable lead (3) on relay (19) with washer (2) and nut (1).
4. Install cable leads (6) and (7) on relay (19) with washer (8) and nut (9).
5. Install cable lead (18) on relay (19) with washer (17) and nut (16).
6. Install air cleaner assembly (WP 0053 00).
7. Connect battery ground cable (WP 0126 00).
8. Start and stop engine (TM 9-2320-361-10).
9. Connect battery ground cable (WP 0126 00).
10. Lower and secure hood (TM 9-2320-361-10).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

MAGNETIC STARTER RELAY AND MOUNTING BRACKET REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### STARTER MOTOR REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Three lockwashers (item 237, WP 0470 00)

Two gaskets (item 75, WP 0470 00)

**Personnel Required**

Two

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air cleaner assembly removed (WP 0053 00).

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## STARTER MOTOR REPLACEMENT (Contd)

### **WARNING**

Starter is heavy. Assistant must help during removal and installation. Failure to do so may result in injury or death to personnel.

### REMOVAL

#### **NOTE**

Prior to removal, tag all lead wires for installation.

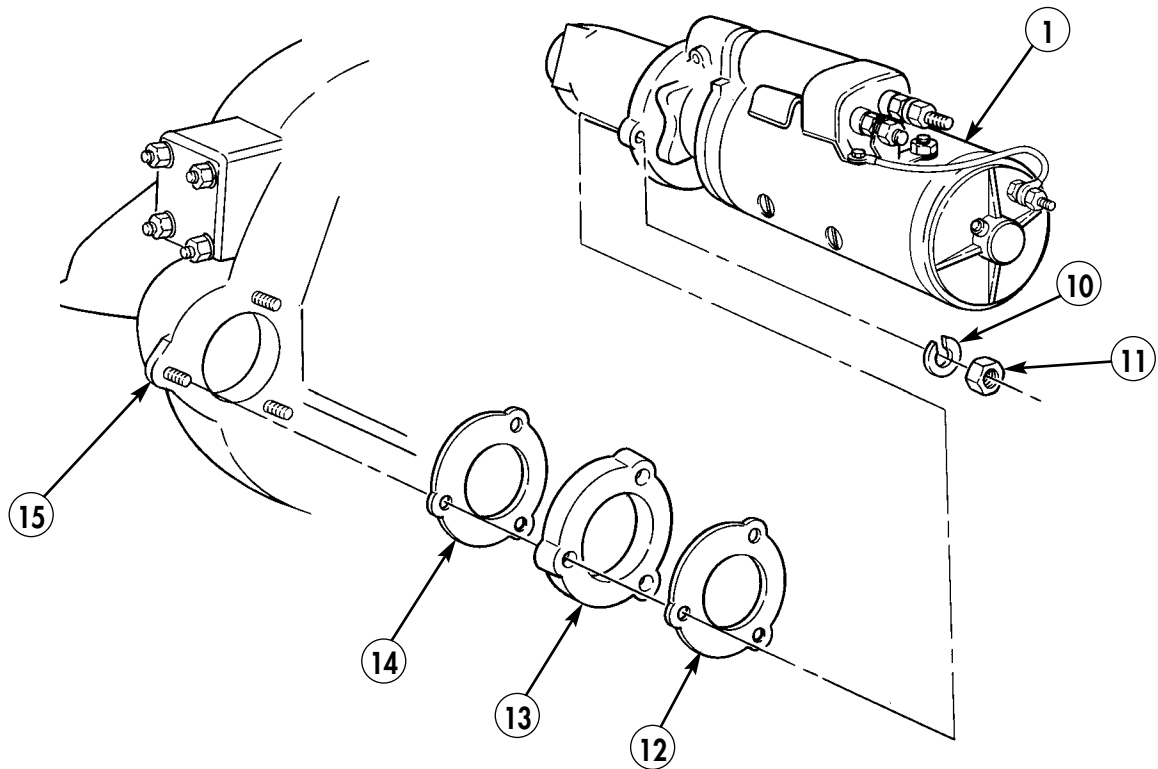
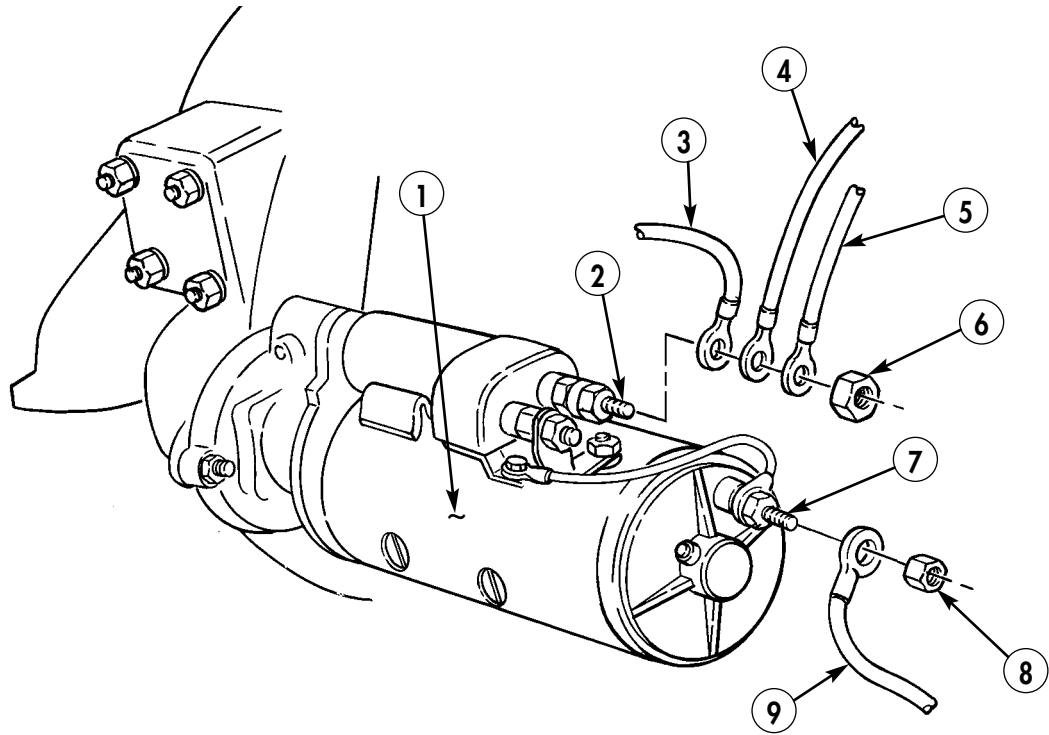
1. Remove nut (6) and leads (5), (4), and (3) from positive solenoid stud (2).
2. Remove nut (8) and lead (9) from starter motor stud (7).
3. Remove three nuts (11), lockwashers (10), starter motor (1), gasket (12), adapter (13), and gasket (14) from flywheel housing (15). Discard gaskets (12) and (14), and lockwashers (10).

### INSTALLATION

1. Install new gasket (14), adapter (13), new gasket (12), and starter motor (1) on flywheel housing (15) with three new lockwashers (10) and nuts (11).
2. Install lead (9) on starter motor stud (7) with nut (8).
3. Install leads (3), (4), and (5) on positive solenoid stud (2) with nut (6).
4. Install air cleaner assembly (WP 0053 00).
5. Connect battery ground cable (WP 0126 00).
6. Lower and secure hood (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



STARTER MOTOR REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### STARTER SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Applicable Models

All

###### Materials/Parts

Lockwasher (item 245, WP 0470 00)

Lockwasher (item 205, WP 0470 00)

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## STARTER SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove screw (9), lockwasher (10), and handle (8) from starter switch (4). Discard lockwasher (10).
2. Remove nut (7), lockwasher (6), and switch plate (1) from starter switch (4). Discard lockwasher (6).
3. Remove starter switch (4) from instrument panel (5).

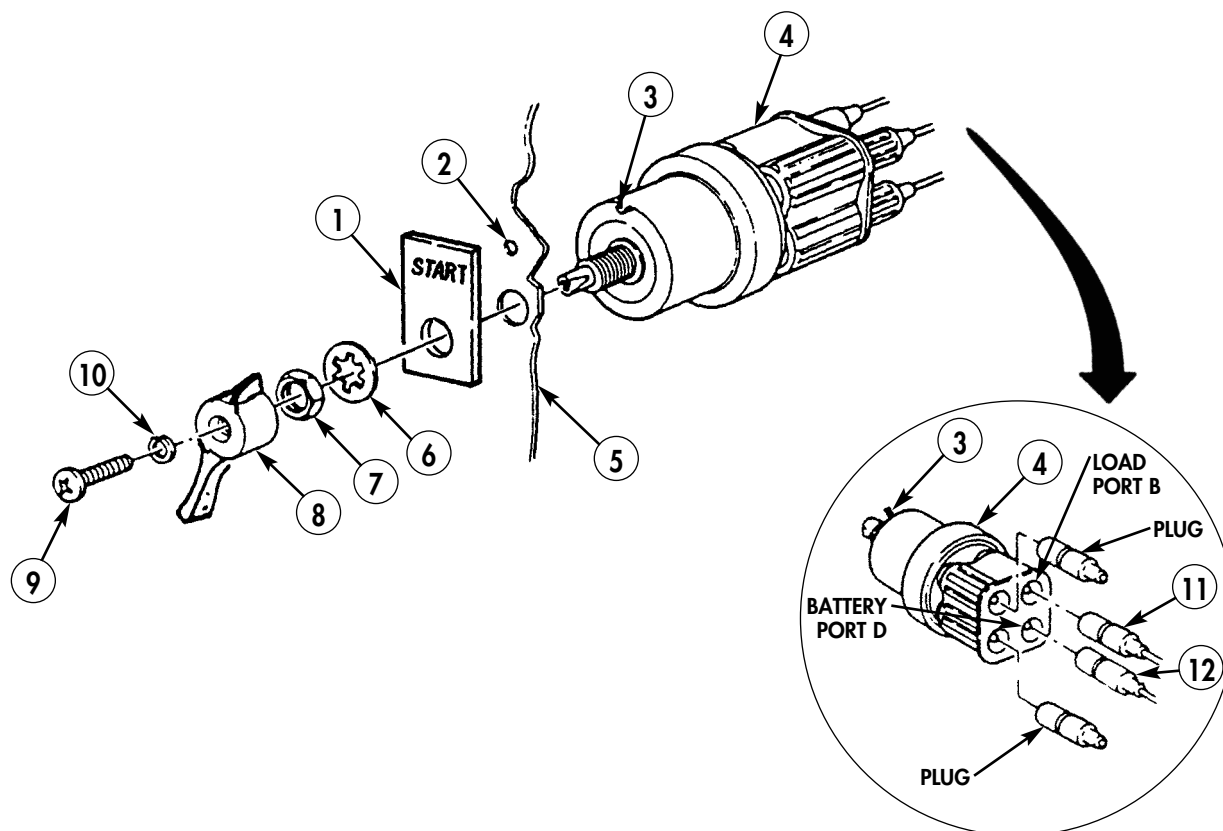
### NOTE

Prior to removal, tag all leads for installation.

4. Disconnect lead wires 74A (11) and 74 (12) from starter switch (4).
5. Remove plugs from starter switch (4).

### INSTALLATION

1. Install plugs in starter switch (4).
2. Connect load lead wire 74A (11) to port B and battery lead wire 74 (12) to port D on starter switch (4).
3. Align pin (3) with hole (2) and install starter switch (4) and switch plate (1) on instrument panel (5) with new lockwasher (6) and nut (7).
4. Install handle (8) on starter switch (4) with new lockwasher (10) and screw (9).
5. Connect battery ground cable (WP 0126 00).
6. Start and stop engine (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### WIRING HARNESS CONNECTOR REPAIR

TERMINAL-TYPE CABLE CONNECTOR REPAIR, MALE CABLE CONNECTOR REPAIR, FEMALE CABLE CONNECTOR REPAIR, CONNECTOR ASSEMBLY REPAIR, AND RECEPTACLE ASSEMBLY REPAIR

#### INITIAL SETUP:

**Applicable Models**

All

**References**

TC 9-237

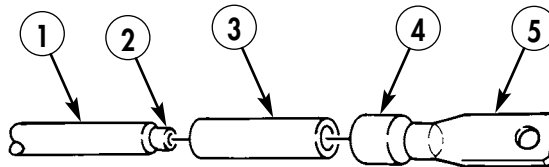
**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

#### TERMINAL-TYPE CABLE CONNECTOR REPAIR

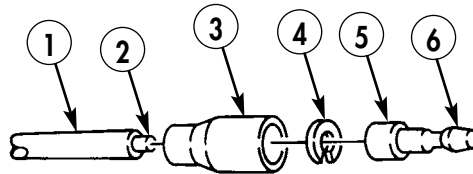
1. Strip cable insulation (1) from cable (2) to equal depth of terminal well (4).
2. Slide insulator (3) over cable insulation (1).
3. Insert cable (2) into terminal well (4) and crimp.
4. Slide insulator (3) over crimped end of terminal (5).



## WIRING HARNESS CONNECTOR REPAIR (Contd)

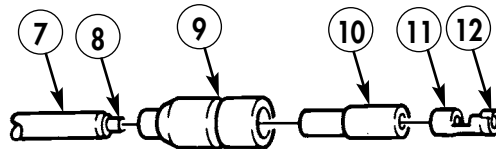
### MALE CABLE CONNECTOR REPAIR

1. Strip cable insulation (1) from cable (2) to equal depth of terminal well (5).
2. Slide shell (3) and slotted washer (4) over cable insulation (1).
3. Insert cable (2) into terminal well (5) and crimp.
4. Place slotted washer (4) over crimped junction at terminal (6).
5. Slide shell (3) over slotted washer (4) and terminal (6).



### FEMALE CABLE CONNECTOR REPAIR

1. Strip cable insulation (7) from cable (8) to equal depth of terminal well (11).
2. Slide shell (9) and sleeve (10) over cable insulation (7).
3. Insert cable (8) into terminal well (11) and crimp.
4. Slide sleeve (10) and shell (9) over terminal (12).



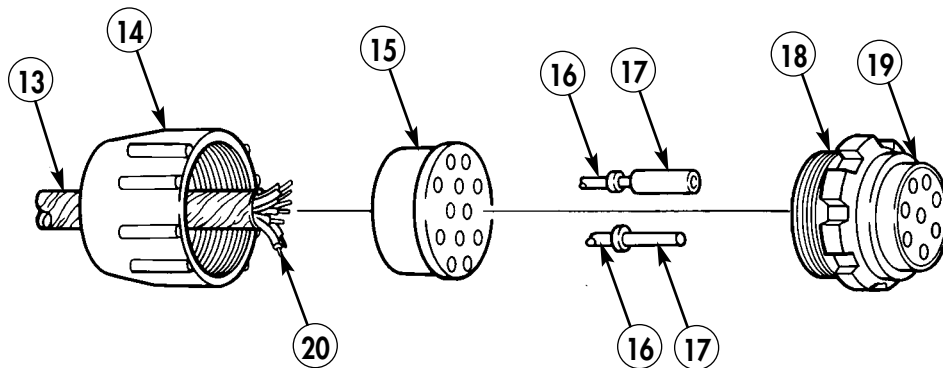
## WIRING HARNESS CONNECTOR REPAIR (Contd)

### CONNECTOR ASSEMBLY REPAIR

#### NOTE

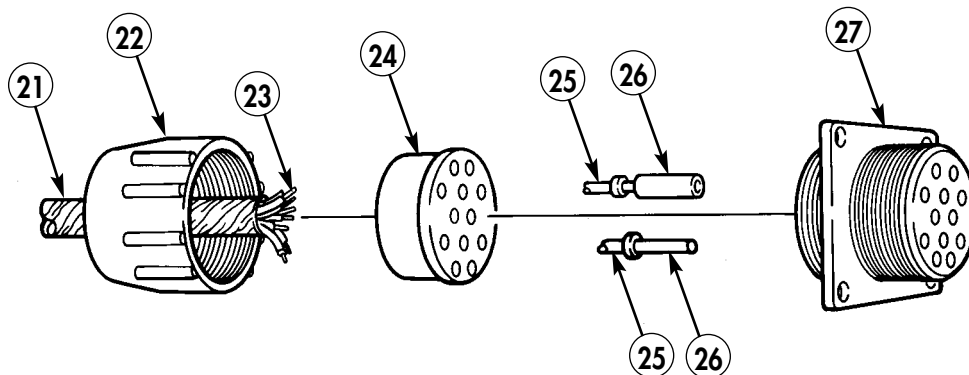
Refer to TC 9-237 for soldering instructions.

1. Strip cable insulation (13) to depth of solder wells (16) on inserts (17).
2. Slide cable ends (20) through grommet retaining nut (14) and grommet (15).
3. Place cable ends (20) into solder wells (16) and solder.
4. Slide grommet (15) over inserts (17) and press into shell assembly (18) until seated.
5. Screw grommet retaining nut (14) on shell assembly (18) and coupling nut (19) until seated.



### RECEPTACLE ASSEMBLY REPAIR

1. Strip cable insulation (21) to depth of solder wells (25) on inserts (26).
2. Slide cable ends (23) through grommet retaining nut (22) and grommet (24).
3. Place cable ends (23) into solder wells (25) and solder.
4. Slide grommet (24) over inserts (26) and press into receptacle (27) until seated.
5. Screw grommet retaining nut (22) onto receptacle (27) until seated.
6. Connect battery ground cable (WP 0126 00).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT WIRING HARNESS REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Multimeter (item 51, WP 0469 00)  
Tool kit, electrical (item 114, WP 0469 00)  
Torque wrench, 3/8-in. drive  
(item 138, WP 0469 00)

##### Materials/Parts

Four lockwashers (item 208, WP 0470 00)  
Two lockwashers (item 210, WP 0470 00)  
Three lockwashers (item 229, WP 0470 00)

##### Materials/Parts (Contd)

Six locknuts (item 145, WP 0470 00)  
Five locknuts (item 129, WP 0470 00)  
Two tiedown straps (item 413, WP 0468 00)  
Adhesive sealant (item 5, WP 0468 00)

##### Reference

WP 0473 00

##### Equipment Condition

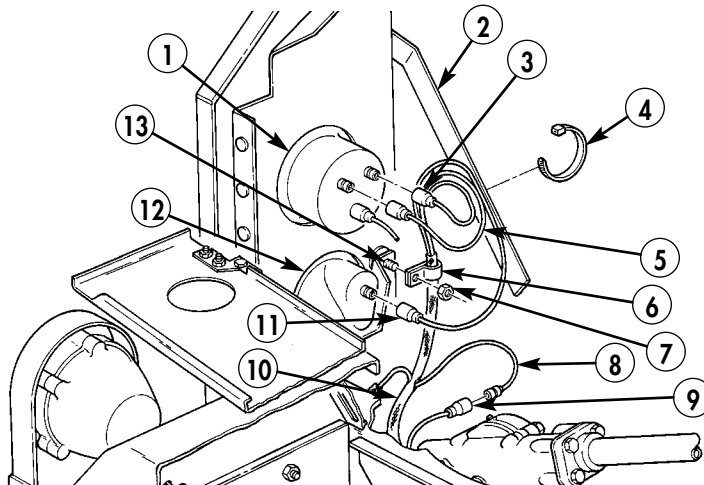
Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Accessory power switch removed (WP 0104 00).

#### NOTE

Prior to removal, tag lead wires for installation.

#### REMOVAL

1. Disconnect wire (9) from horn wire (8).
2. Disconnect wires (3) and (5) from left headlamp (1).
3. Disconnect wire (11) from blackout drive lamp (12).
4. Remove nut (7) and clamp (6) from front wiring harness (10) and stud (13).
5. Remove tiedown strap (4) from front wiring harness (10) and brush guard support (2). Discard tiedown strap (4).



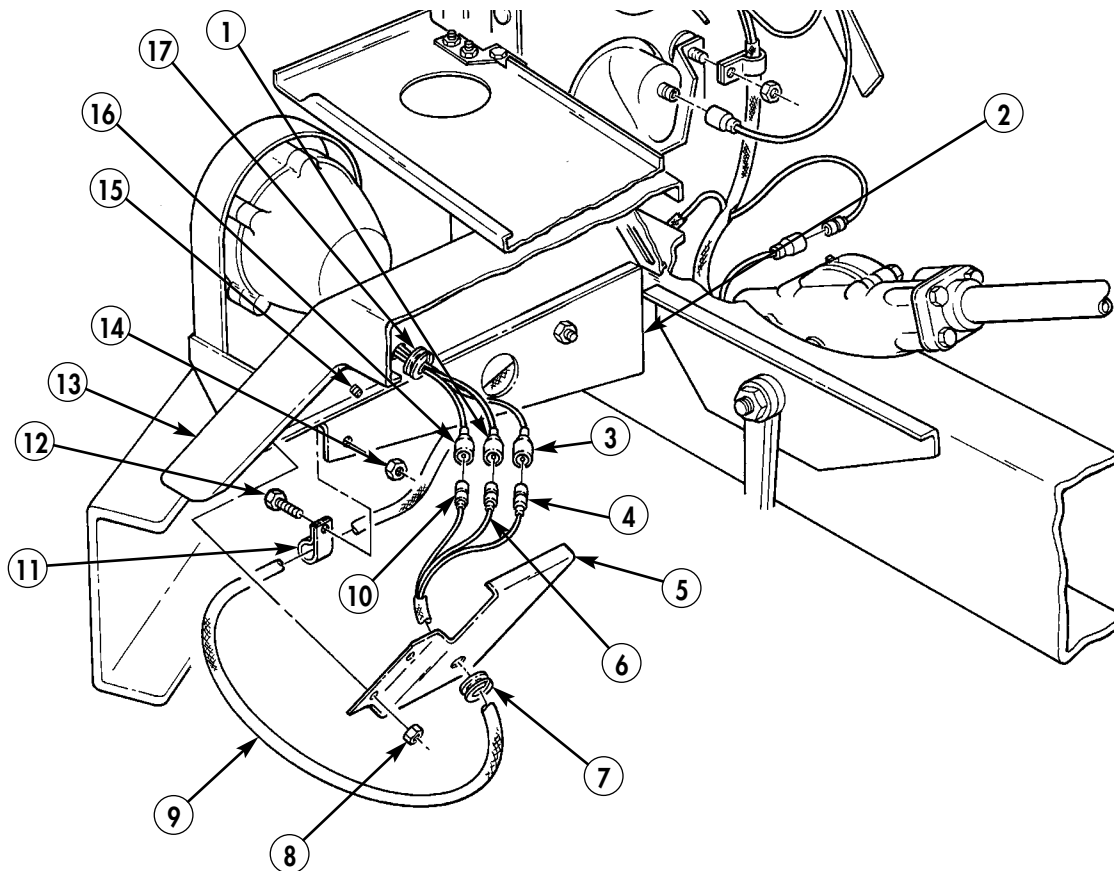
## FRONT WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

#### NOTE

Steps 6 through 9 cover the left side front composite lights.

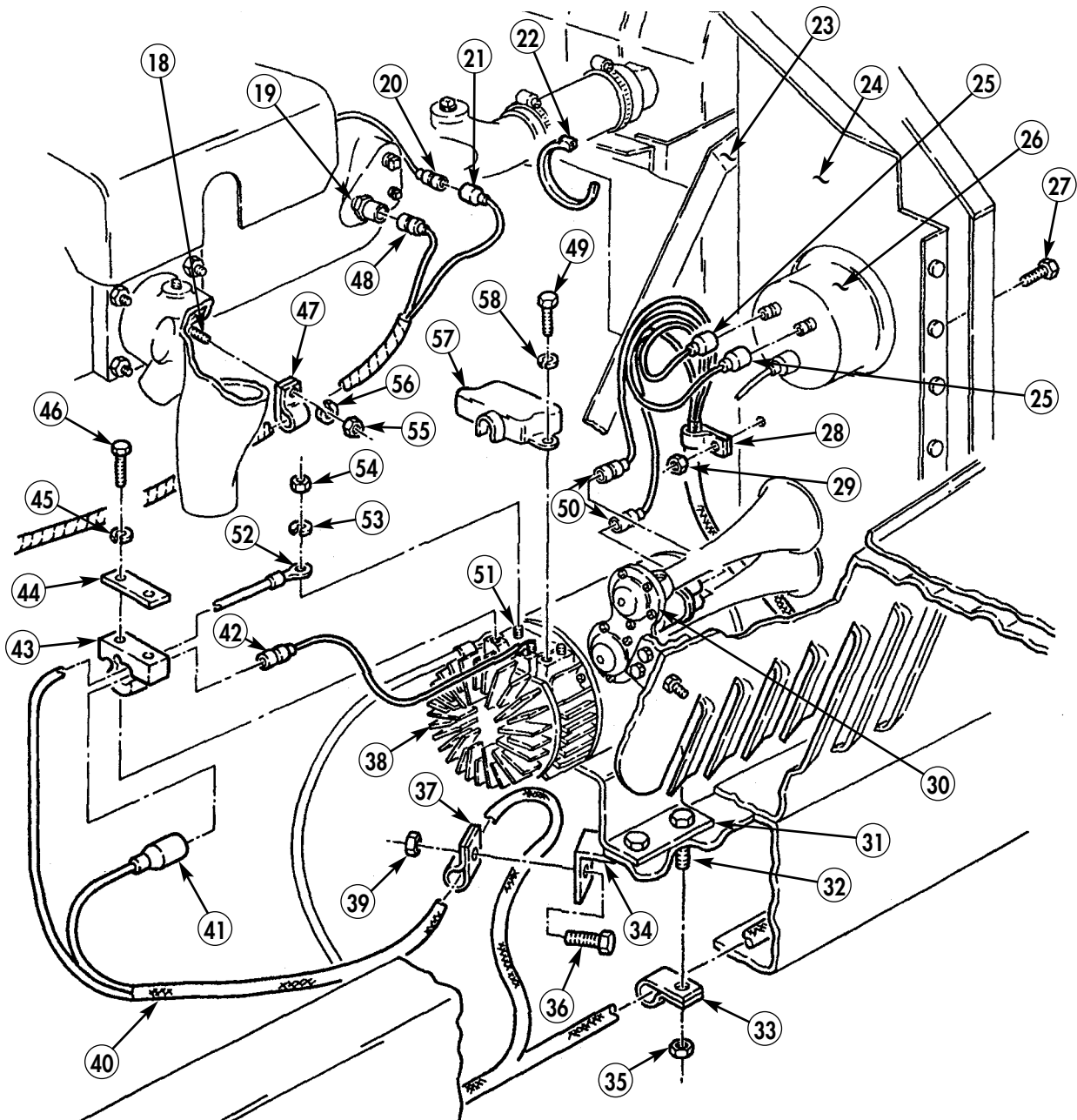
6. Remove four nuts (8) and plate (5) from four screws (15).
7. Disconnect wires (4), (6), and (10) from left composite light wires (3), (1), and (16) and remove plate (5) from wires (4), (6), and (10).
8. Remove grommet (7) from plate (5) and grommet (17) from fender (13).
9. Remove two nuts (14), screws (12), and clamps (11) from fender support (2) and front wiring harness (9).
10. Repeat steps 6 through 9 for right side front composite lights.
11. Remove two screws (49), lockwashers (58), and cover (57) from alternator (38). Discard lockwashers (58).
12. Remove two screws (46), lockwashers (45), plate (44), and spacer (43) from alternator (38). Discard lockwashers (45).
13. Disconnect wire (41) from alternator wire (42).
14. Remove nut (54), lockwasher (53), and wire (52) from terminal (51). Discard lockwasher (53).
15. Disconnect wire (48) from temperature sending unit (19).
16. Disconnect wire (21) from preheater wire (20).
17. Disconnect two wires (50) from horn (30).
18. Disconnect two wires (25) from right headlamp (26).
19. Repeat step 18 for left headlamp.



## FRONT WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

20. Remove tiedown strap (22) from front wiring harness (40) and brush guard support (23). Discard tiedown strap (22).
21. Remove nut (29), screw (27), and clamp (28) from front wiring harness (40) and headlamp panel (24).
22. Remove nut (55), lockwasher (56), and clamp (47) from stud (18) and front wiring harness (40). Discard lockwasher (56).
23. Remove nut (35), clamp (33), and screw (32) from bracket (31) and front wiring harness (40).
24. Remove nut (39), clamp (37), and screw (36) from cable bracket (34) and front wiring harness (40).



## FRONT WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

#### NOTE

Perform step 25 for all vehicles except M50A3 and M49A2C.

25. Remove nut (10) and wire (11) from starter terminal (12).
26. Remove nut (3), washer (4), and wire (5) from relay terminal (6).
27. Remove nut (9), washer (8), and wire (7) from relay terminal (13).
28. Disconnect wire (15) from oil pressure sending unit (14).

#### NOTE

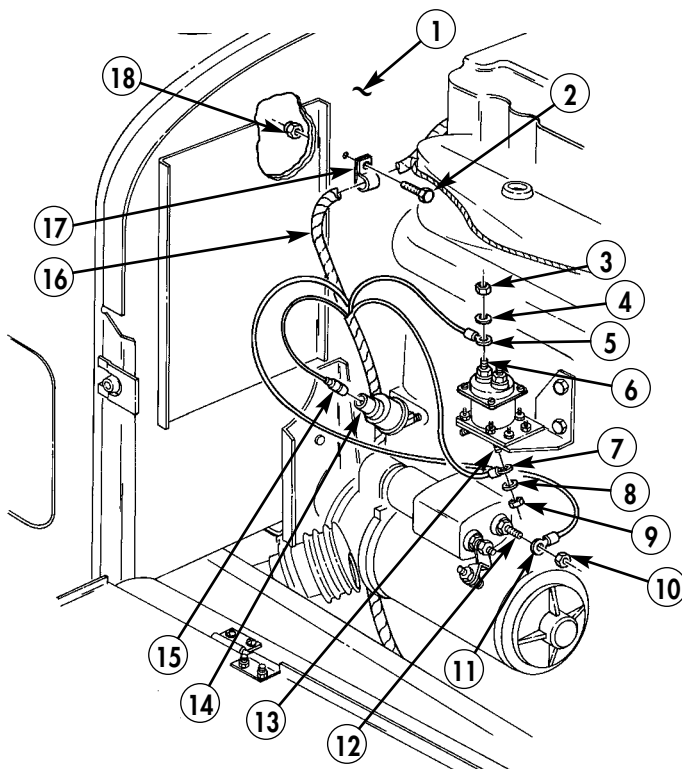
Assistant will help with step 29.

29. Remove locknut (18), screw (2), and clamp (17) from firewall (1) and wiring harness (16). Discard locknut (18).
30. Remove nut (39), lockwasher (38), wire (37), screw (36), and lockwasher (35) from flasher unit (34). Discard lockwashers (38) and (35).
31. Remove plug (33) from flasher unit (34).
32. Disconnect wires (26) and (27) from circuit breaker (25).
33. Disconnect wires (30), (29), and (28) from beam selector switch (31).

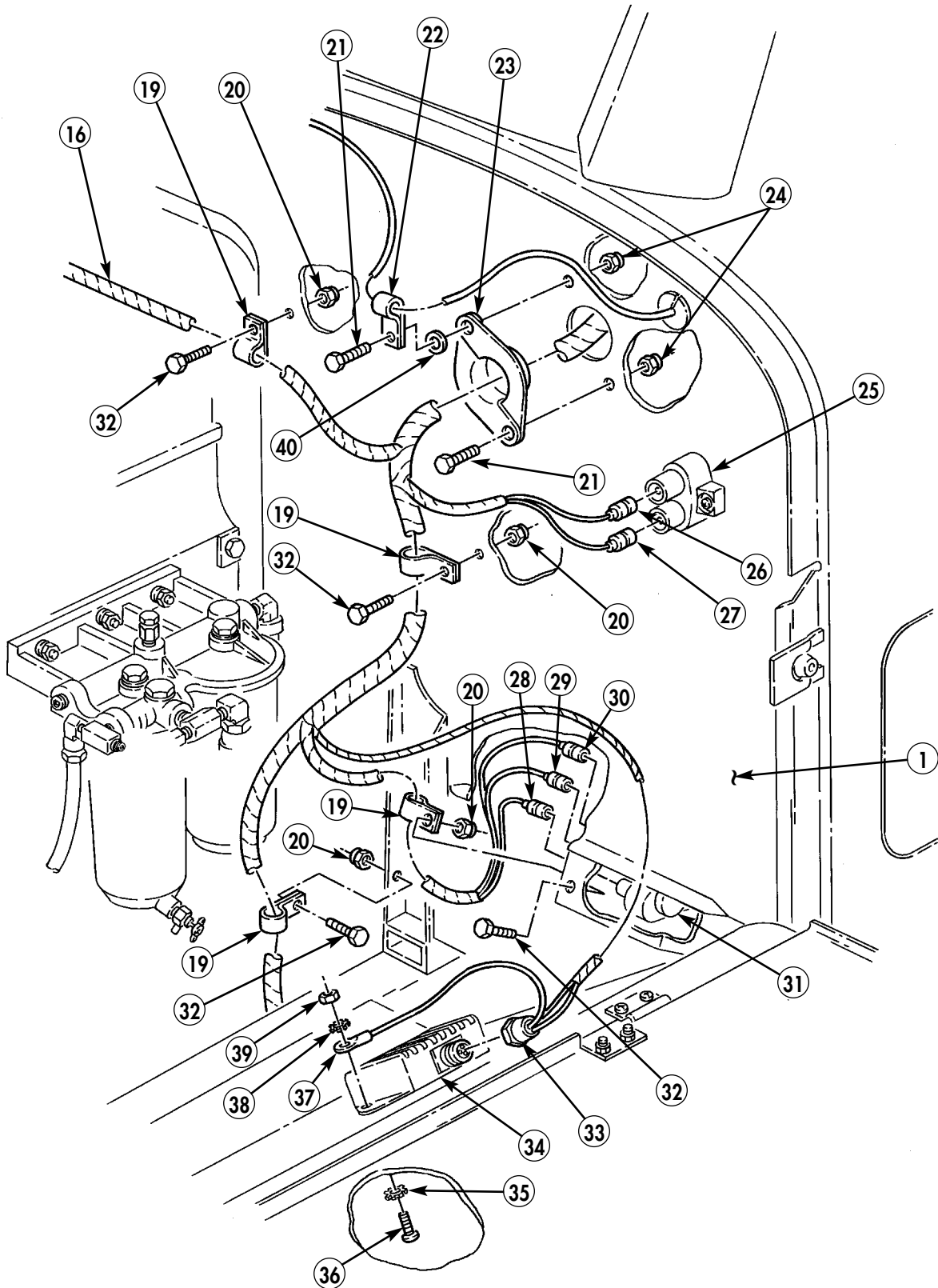
#### NOTE

Assistant will help with steps 34 and 35.

34. Remove four locknuts (20), screws (32), and clamps (19) from front wiring harness (16) and firewall (1). Discard locknuts (20).
35. Remove two locknuts (24), screws (21), washer (40), clamp (22), and two clamp halves (23) from firewall (1). Discard locknuts (24).



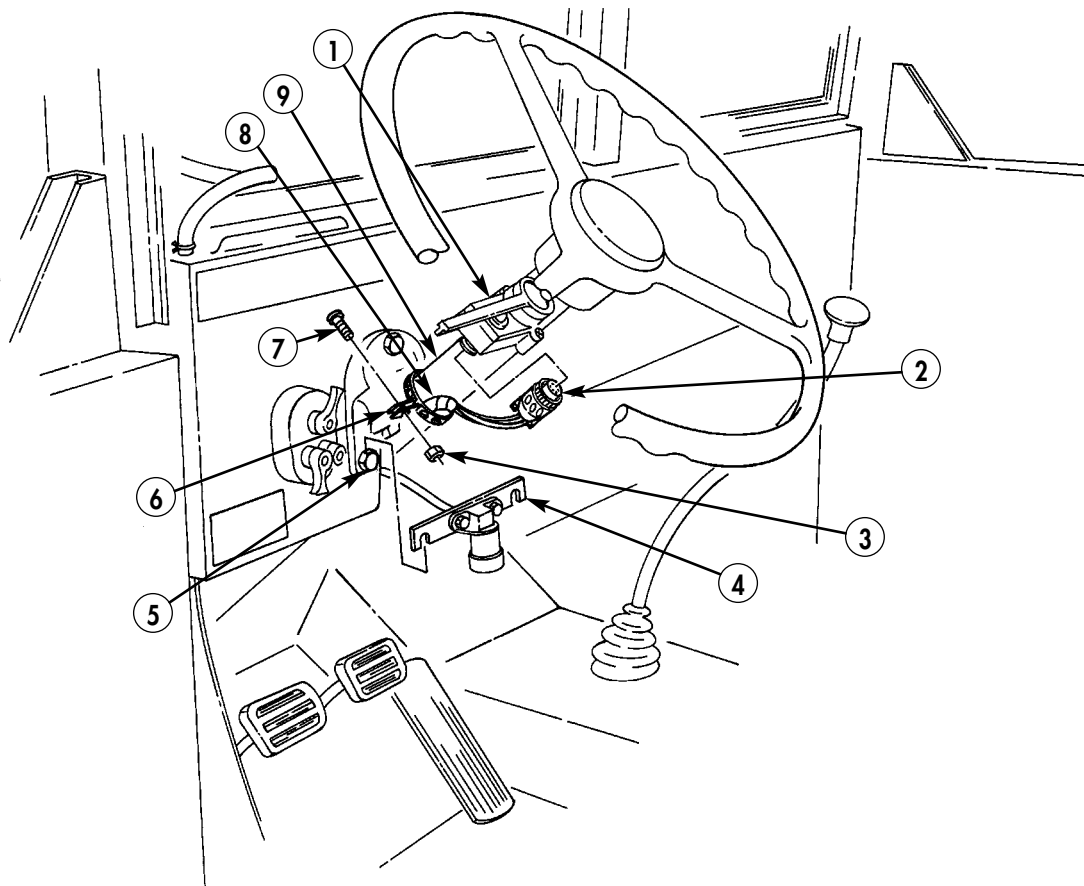
FRONT WIRING HARNESS REPLACEMENT (Contd)



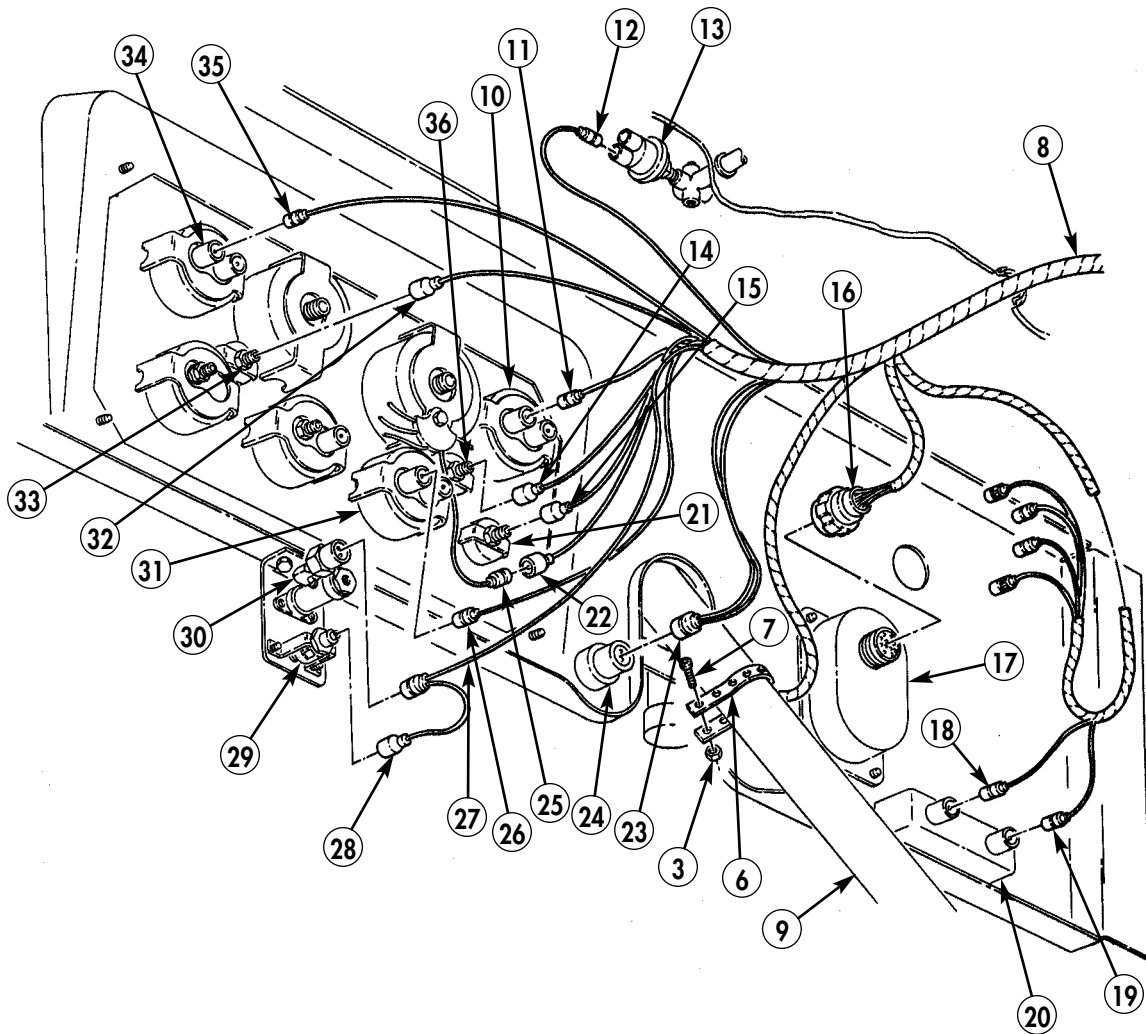
## FRONT WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

36. Loosen two screws (5) and position bracket (4) so that plug (2) can be removed.
37. Disconnect plug (2) from turn signal switch (1).
38. Remove nut (3), screw (7), and clamp (6) from steering column (9) and front wiring harness (8).
39. Disconnect wire (12) from low air buzzer switch (13).
40. Disconnect wires (27) and (28) from transfer switch (30) and lamp (29).
41. Disconnect wire (15) from high beam indicator lamp (21).
42. Disconnect wire (14) from panel lamp (36).
43. Disconnect wire (32) from panel lamp (33).
44. Disconnect wire (22) from wire (25).
45. Disconnect wire (35) from coolant temperature gauge (34).
46. Disconnect wire (11) from fuel gauge (10).
47. Disconnect wire (26) from oil gauge (31).
48. Disconnect plug (23) from starter switch (24).
49. Disconnect wires (18) and (19) from preheater switch (20).
50. Disconnect plug (16) from lamp selector switch (17).



FRONT WIRING HARNESS REPLACEMENT (Contd)



## FRONT WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

51. Disconnect wires (10) and (11) from stoplight switch (12).
52. Remove two locknuts (14), screws (13), front wiring harness (1), and horn rear wiring harness (15), from brace (16). Discard locknuts (14).
53. Remove two locknuts (2), screws (8), and clamps (3) from brace (4), front wiring harness (1), and frame (9). Discard locknuts (2).
54. Remove nut (5) and clamp (7) from front wiring harness (1) and U-bolt (6).

### **CAUTION**

Use care when removing front wiring harness. Snagging and pulling may cause damage to harness.

55. Remove front wiring harness (1) from left side frame (17), right side frame (18), over steering column (19), and through firewall (21).

### INSTALLATION

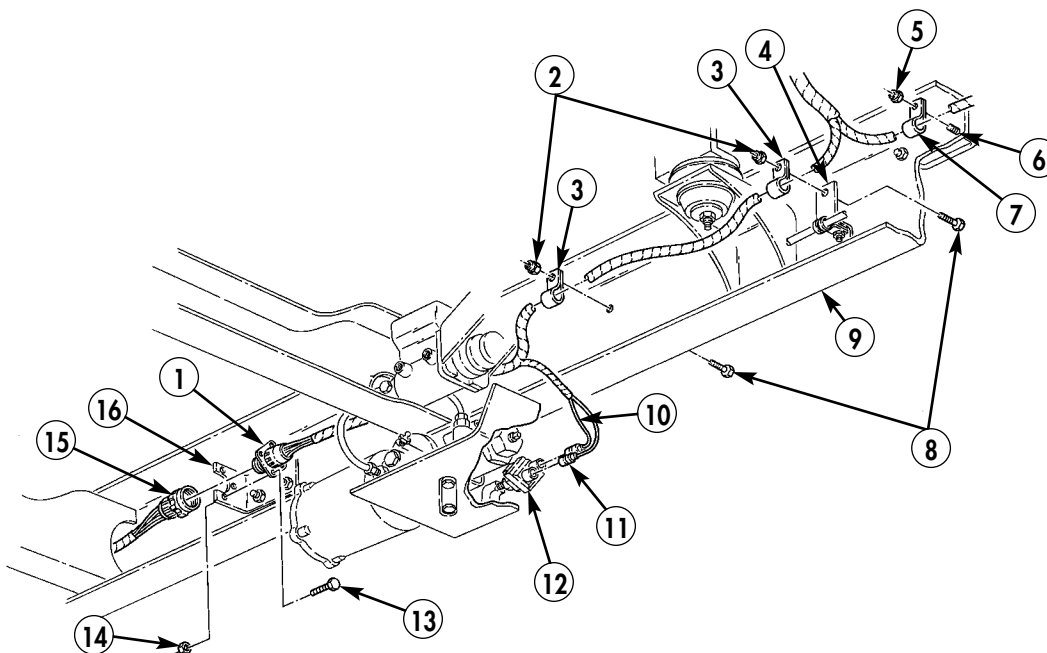
### **CAUTION**

Use care when routing front wiring harness. Snagging and pulling may cause damage to front wiring harness.

### **NOTE**

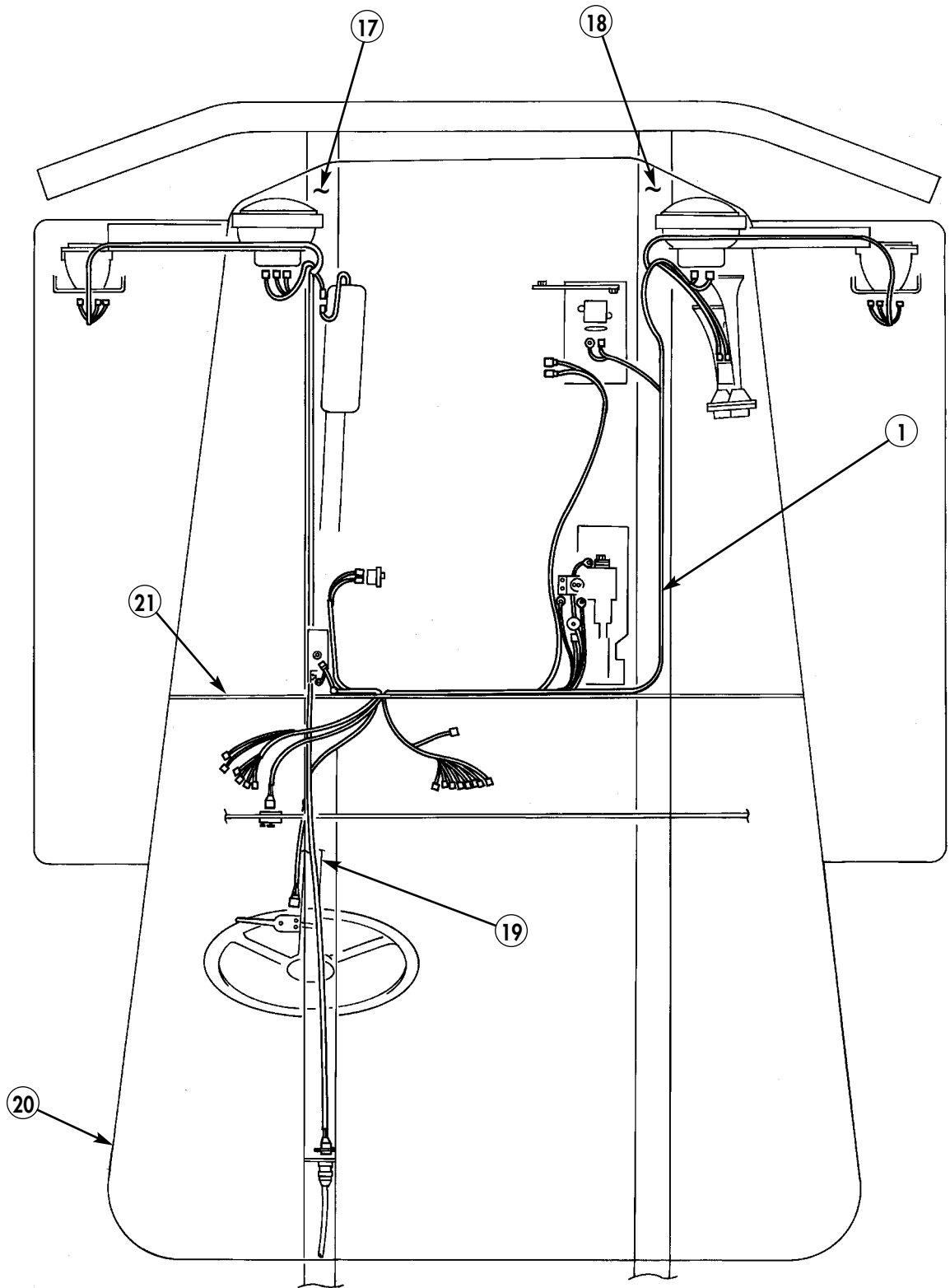
- If new wiring harness is to be installed, remove tags from old harness and install on new harness.
- For additional wiring harness installation information, refer to Electrical System Wiring Diagram (WP 0473 00).

1. Install front wiring harness (1) through firewall (21), over steering column (19), left side frame (17), and right side frame (18), and under cab (20).





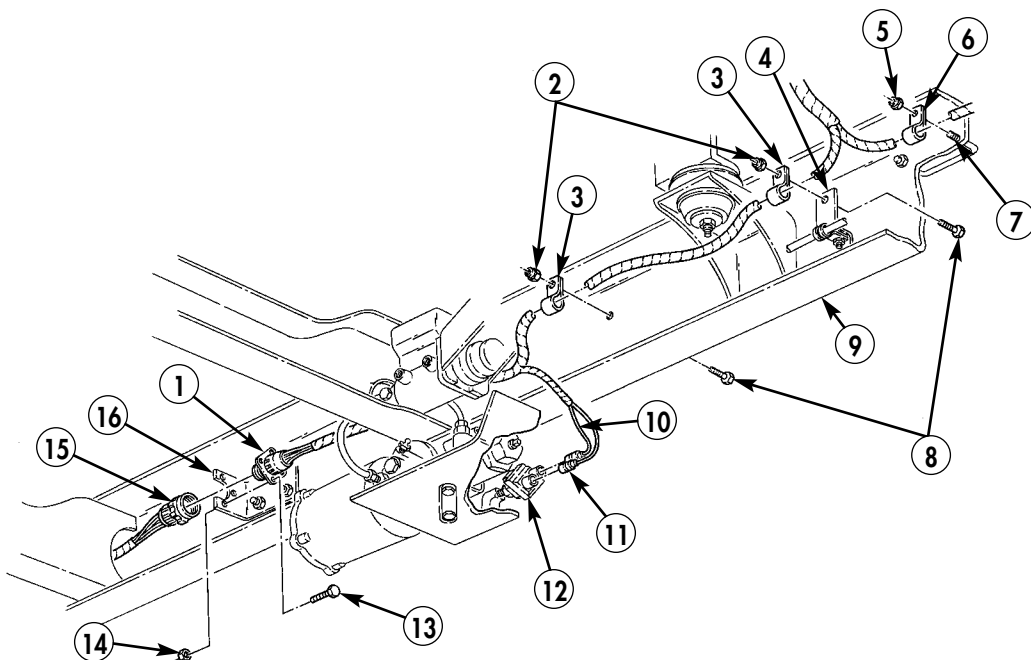
FRONT WIRING HARNESS REPLACEMENT (Contd)



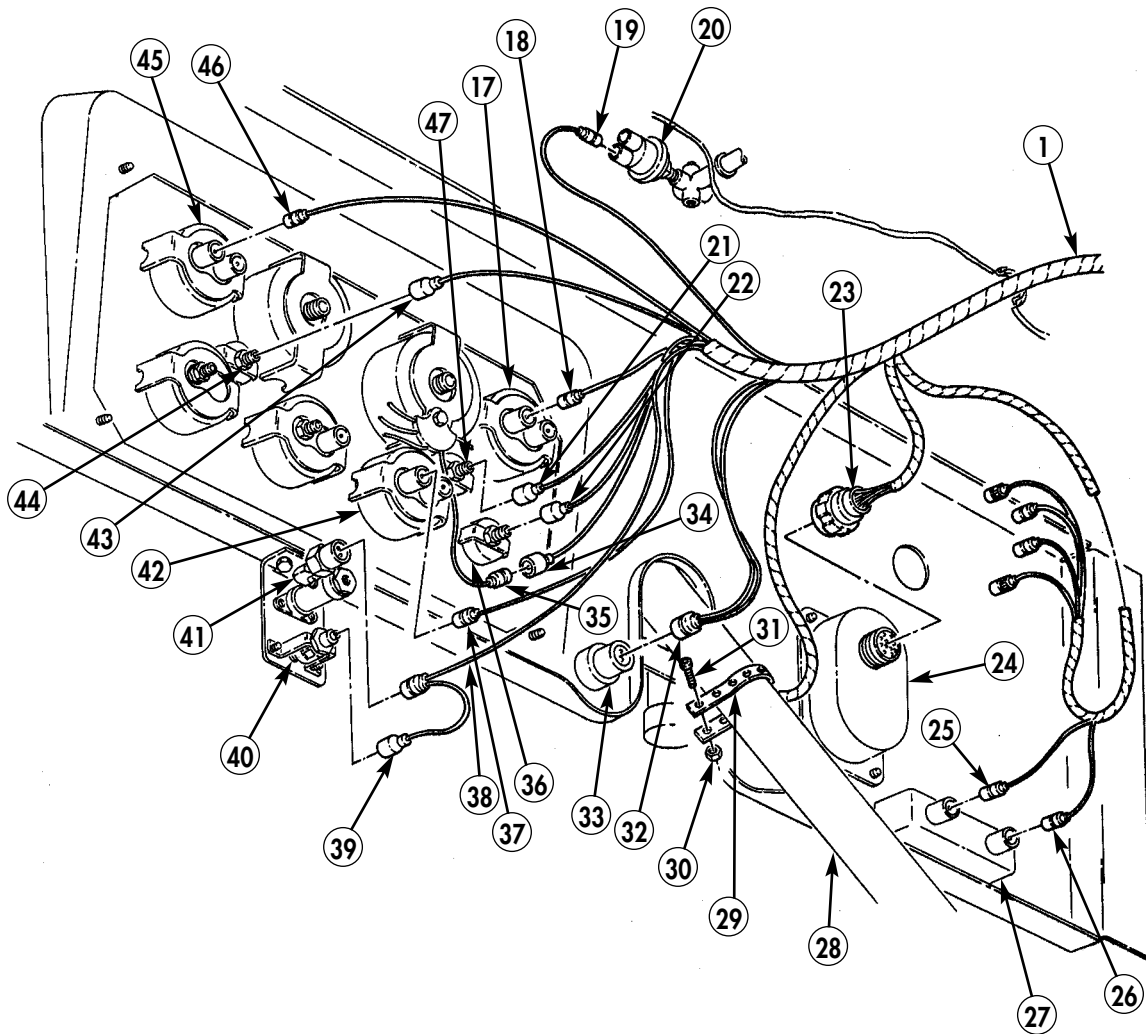
## FRONT WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

2. Connect front wiring harness (1) to rear wiring harness (15).
3. Install front wiring harness (1) on brace (16) with two screws (13) and new locknuts (14).
4. Connect wires (10) and (11) to stoplight switch (12).
5. Remove slack from front wiring harness (1).
6. Install two clamps (3) on front wiring harness (1), brace (4), and frame (9) with two screws (8) and new locknuts (2).
7. Install clamp (6) on front wiring harness (1) and U-bolt (7) with nut (5).
8. Connect wire (19) to low air buzzer switch (20).
9. Connect wires (38) and (39) to transfer switch (41) and lamp (40).
10. Connect wire (22) to high beam indicator lamp (36).
11. Connect wire (43) to panel lamp (44).
12. Connect wire (21) to panel lamp (47).
13. Connect wire (34) to wire (35).
14. Connect wire (46) to coolant temperature gauge (45).
15. Connect wire (18) to fuel gauge (17).
16. Connect wire (37) to oil gauge (42).
17. Connect plug (32) to starter switch (33).
18. Connect wires (25) and (26) to preheater switch (27).
19. Connect plug (23) to lamp selector switch (24).
20. Install clamp (29) on steering column (28) and front wiring harness (1) with screw (31) and nut (30).



FRONT WIRING HARNESS REPLACEMENT (Contd)



## FRONT WIRING HARNESS REPLACEMENT (Contd)

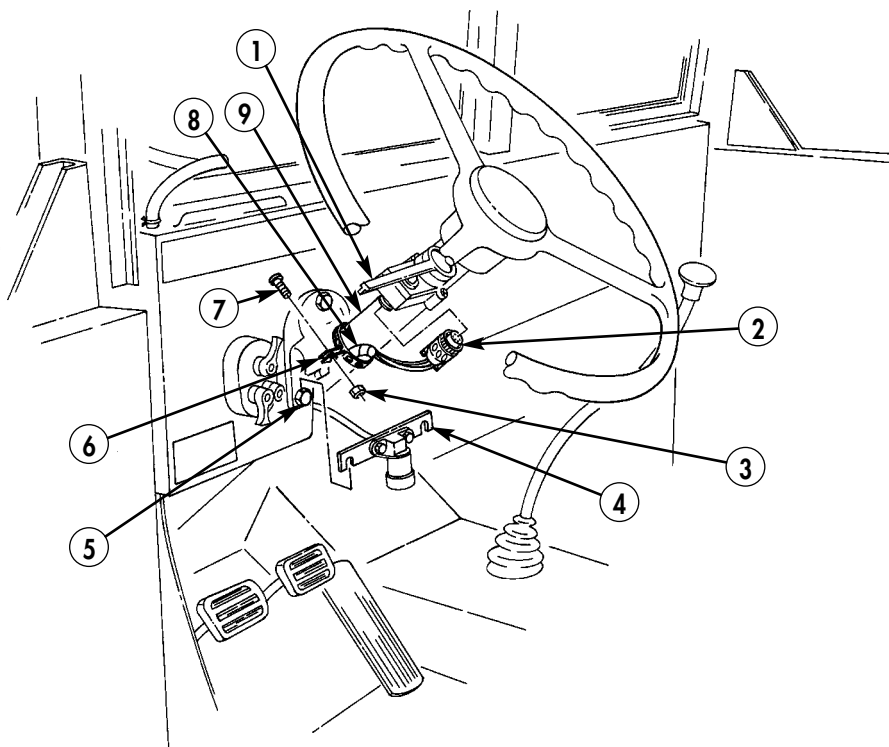
### INSTALLATION (Contd)

21. Position bracket (4) on two screws (5) so that front wiring harness (8) is between bracket (4) and steering column (9). Tighten two screws (5).
22. Connect plug (2) to signal switch (1).
23. Install clamp (6) on steering column (9) and front wiring harness (8) with screw (7) and nut (3).
24. Install wire (28) on flasher unit (25) with new lockwasher (26), screw (27), new lockwasher (29), and nut (30).
25. Connect plug (24) to flasher unit (25).
26. Connect wires (18), (19), and (20) to beam selector switch (22).
27. Connect wires (16) and (17) to circuit breaker (15).

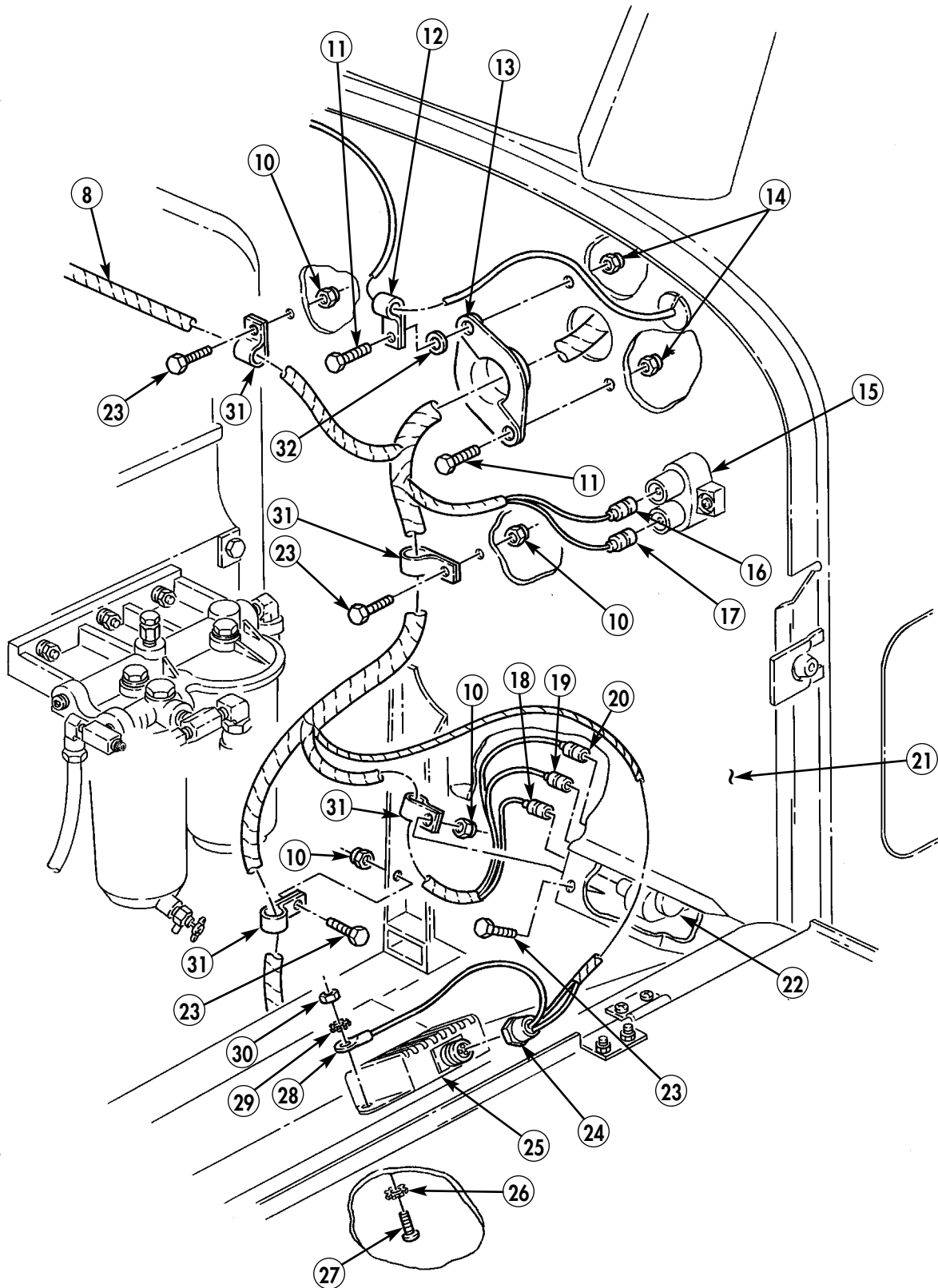
### NOTE

Assistant will help with steps 28 through 30.

28. Install two clamp halves (13) on firewall (21) with washer (32), clamp (12), two screws (11), and new locknuts (14).
29. Remove slack from front wiring harness (8).
30. Install four clamps (31) on front wiring harness (8) and firewall (21) with four screws (23) and new locknuts (10).



FRONT WIRING HARNESS REPLACEMENT (Contd)



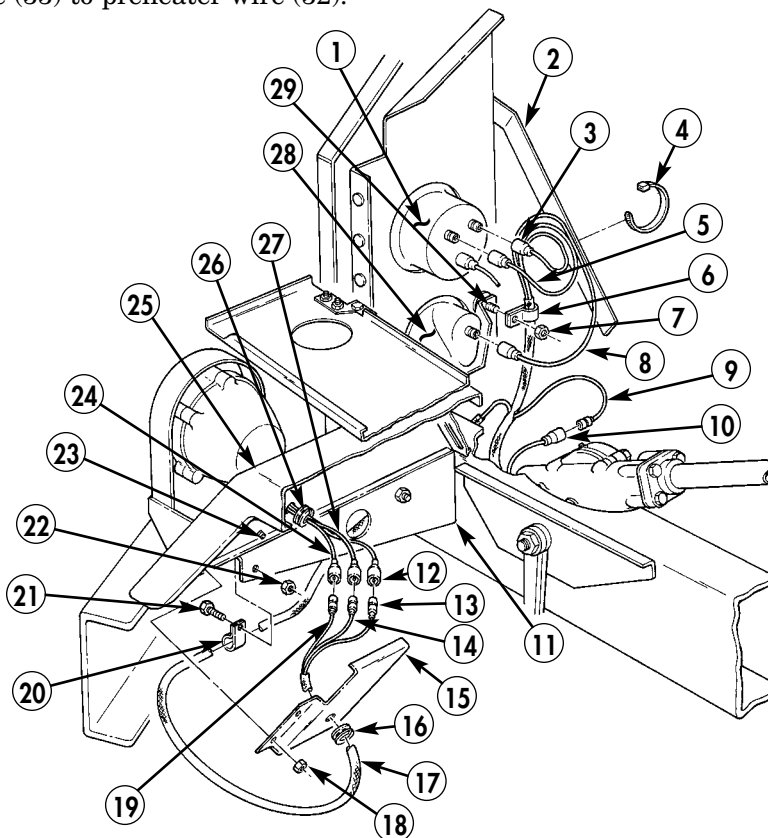
## FRONT WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### NOTE

Steps 32 through 36 cover the left side front composite lights.

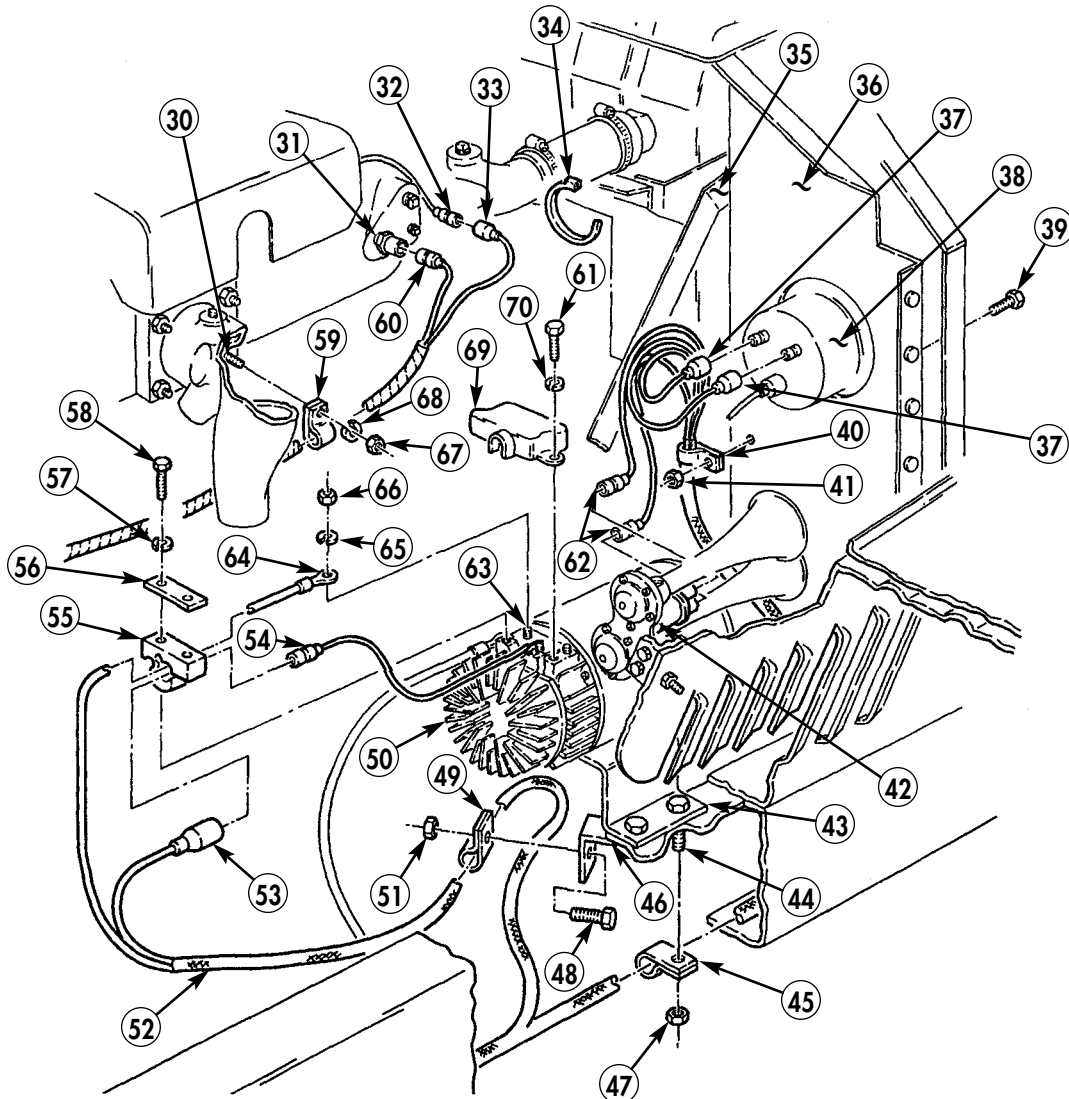
31. Route wires (13), (14), and (19) through plate (15).
32. Install grommet (16) in plate (15) and grommet (26) in fender (25).
33. Connect wires (13), (14), and (19) to wires (12), (27), and (24).
34. Install plate (15) on four screws (23) with four nuts (18).
35. Install two clamps (20) on front wiring harness (17) and fender support (11) with two screws (21) and nuts (22).
36. Repeat steps 32 through 36 for right side front composite lights.
37. Connect wire (9) to horn wire (10).
38. Connect wire (8) to blackout lamp (28).
39. Connect wires (3) and (5) to left headlamp (1).
40. Remove slack from front wiring harness (17).
41. Install clamp (6) on front wiring harness (17) and stud (29) with nut (7).
42. Install wires (3), (5), and (8) on brush guard support (2) with new tiedown strap (4).
43. Connect wires (62) to horn (42).
44. Connect wires (37) to right headlamp (38).
45. Repeat step 45 for left headlamp.
46. Connect wire (60) to temperature sending unit (31).
47. Connect wire (33) to preheater wire (32).



## FRONT WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

48. Install plate (56) and spacer (55) on alternator (50) with two new lockwashers (57) and screws (58).
49. Install wire (64) through spacer (55) and on alternator terminal (63) with new lockwasher (65) and nut (66). Tighten nut (66) 45–55 lb-in (5–6 N•m).
50. Install wire (53) through spacer (55) and on alternator wire (54).
51. Coat wire (64) and bottom of cover (69) with sealant.
52. Install cover (69) on alternator (50) with two new lockwashers (70) and screws (61).
53. Remove slack from front wiring harness (52).
54. Install two wires (62) and (37) on brush guard support (35) with new tiedown strap (34).
55. Install clamp (49) on front wiring harness (52) and cable bracket (46) with screw (48) and nut (51).
56. Install clamp (40) on front wiring harness (52) and headlamp panel (37) with screw (39) and nut (41).
57. Install clamp (59) on front wiring harness (52) and stud (30) with new lockwasher (68) and nut (67).
58. Install clamp (45) on front wiring harness (52) and alternator support plate (43) with screw (44) and nut (47).



## FRONT WIRING HARNESS REPLACEMENT (Contd)

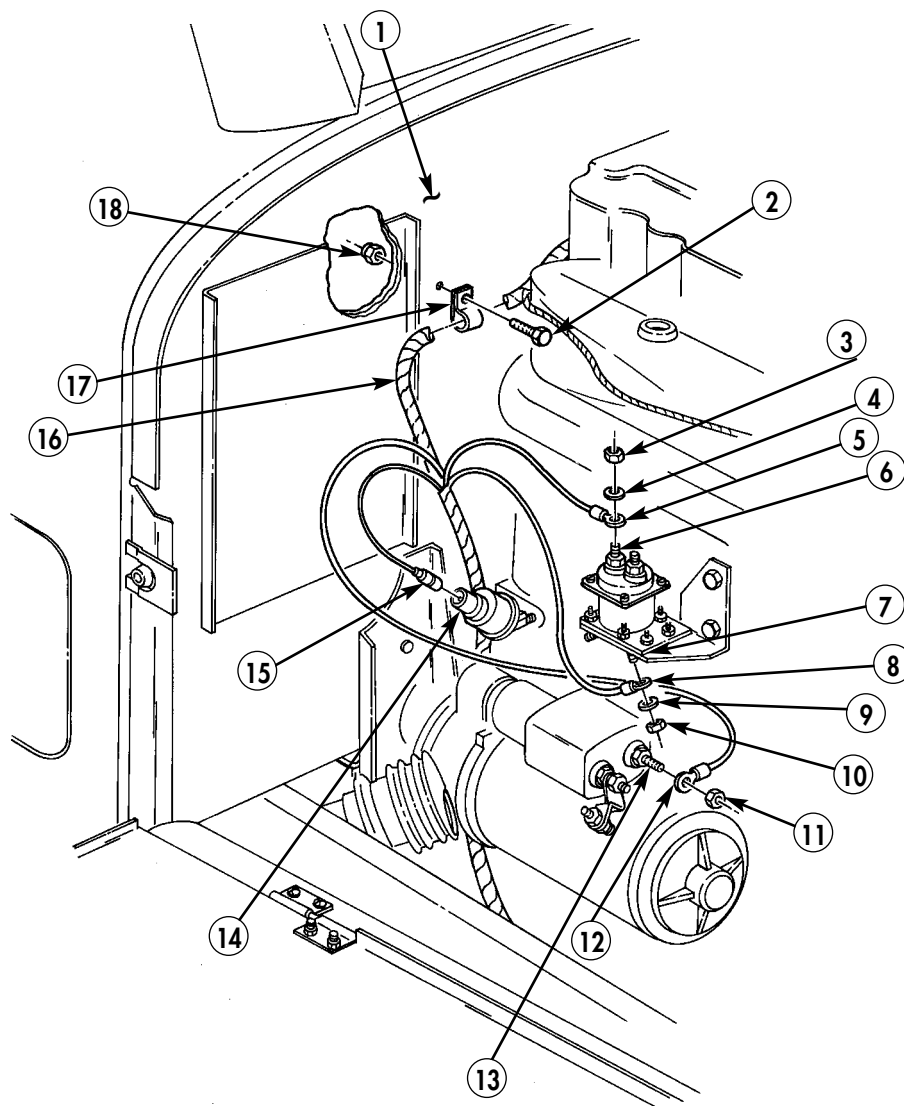
### INSTALLATION (Contd)

59. Install wire (12) on starter terminal (13) with nut (11).
60. Install wire (8) on starter relay terminal (7) with washer (9) and nut (10).
61. Install wire (5) on starter relay terminal (6) with washer (4) and nut (3).
62. Connect wire (15) to oil pressure sending unit (14).
63. Remove slack from front wiring harness (16).

#### NOTE

Assistant will help with step 65.

64. Install clamp (17) on front wiring harness (16) and firewall (1) with screw (2) and new locknut (18).
65. Install accessory switch (WP 0104 00).
66. Connect battery ground cable (WP 0126 00).
67. Lower and secure hood (TM 9-2320-361-10).
68. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR WIRING HARNESS REPLACEMENT

#### REMOVAL AND INSTALLATION

##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Tool kit, electrical (item 114, WP 0469 00)  
Multimeter (item 51, WP 0469 00)

##### Materials/Parts

Thirteen locknuts (item 129, WP 0470 00)  
Five lockwashers (item 210, WP 0470 00)

##### Equipment Condition

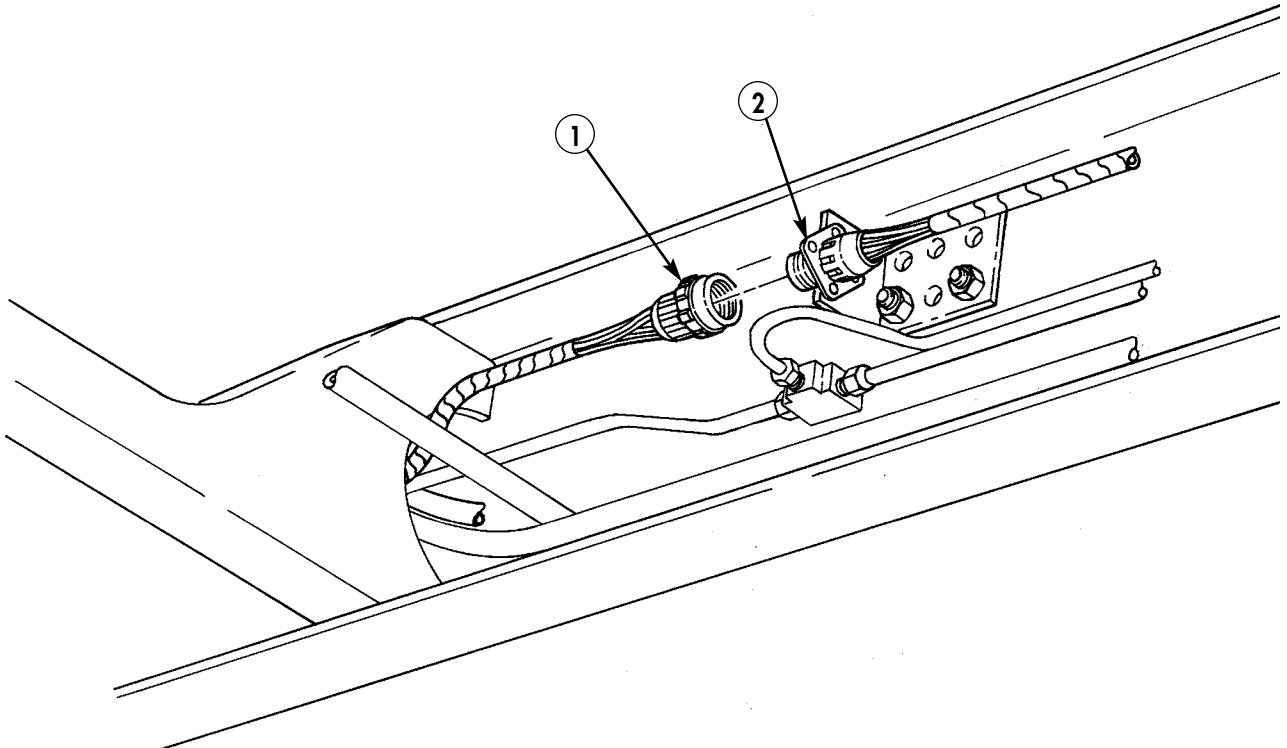
Battery ground cable disconnected  
(WP 0126 00).  
Parking brake set and wheels chocked  
(TM 9-2320-361-10).

##### REMOVAL

##### NOTE

Prior to removal, tag wires for installation.

1. Disconnect rear wiring harness (1) from front wiring harness (2).



## REAR WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

2. Remove locknut (12), lockwasher (13), ground wire (14), and screw (2) from support (1). Discard locknut (12) and lockwasher (13).
3. Disconnect plug (11) from fuel pump (10).
4. Disconnect wire (8) from fuel level sending unit (9).
5. Remove two locknuts (7), screws (4), and clamps (3) from rear wiring harness (5) and crossmember (6). Discard locknuts (7).

#### NOTE

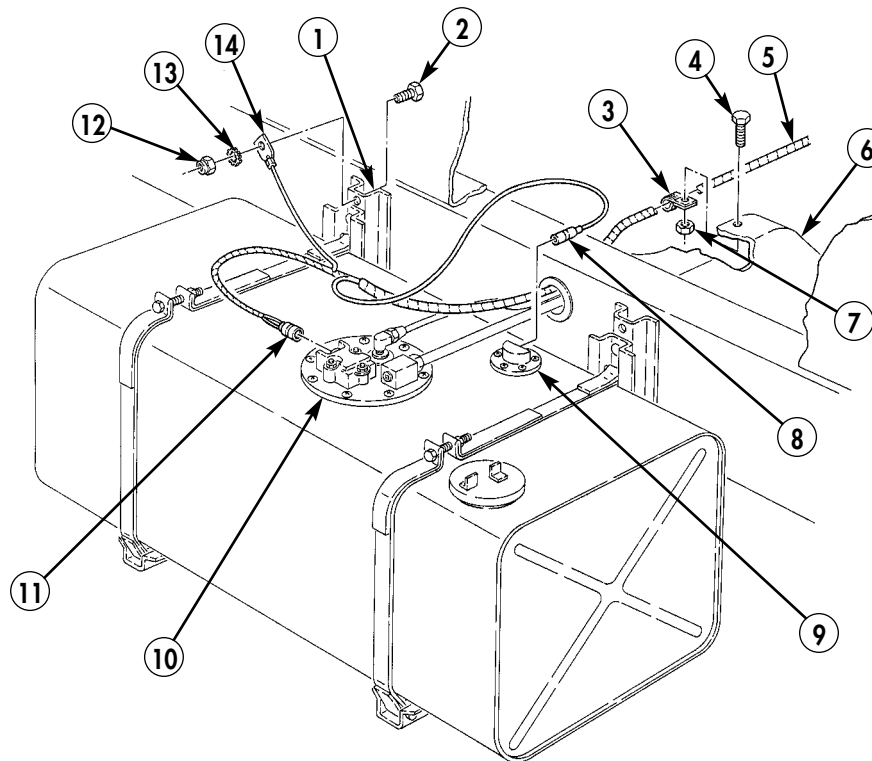
Steps 6 and 7 cover left side composite light.

6. Disconnect wires (22), (23), (24), and (25) from composite light wires (21), (20), (19), and (18).
7. Remove locknut (26), screw (16), and clamp (15) from bracket (17) and rear wiring harness (5). Discard locknut (26).
8. Repeat steps 6 and 7 for right side composite light.

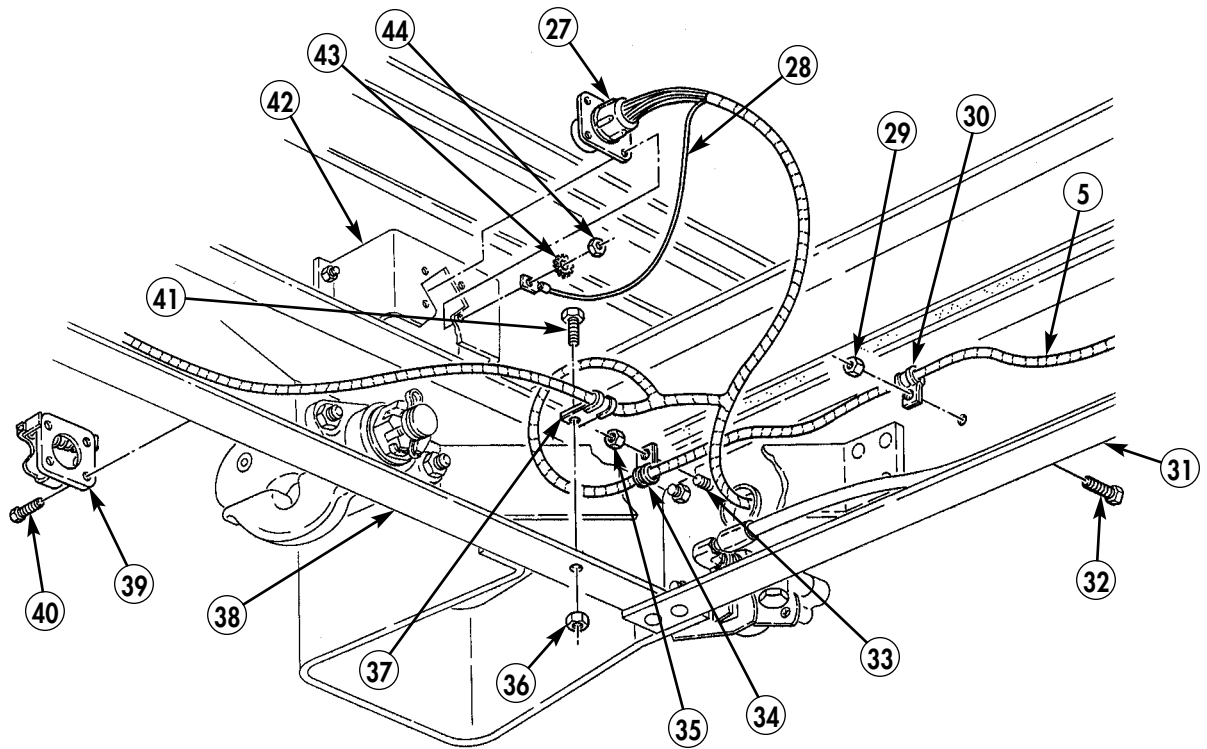
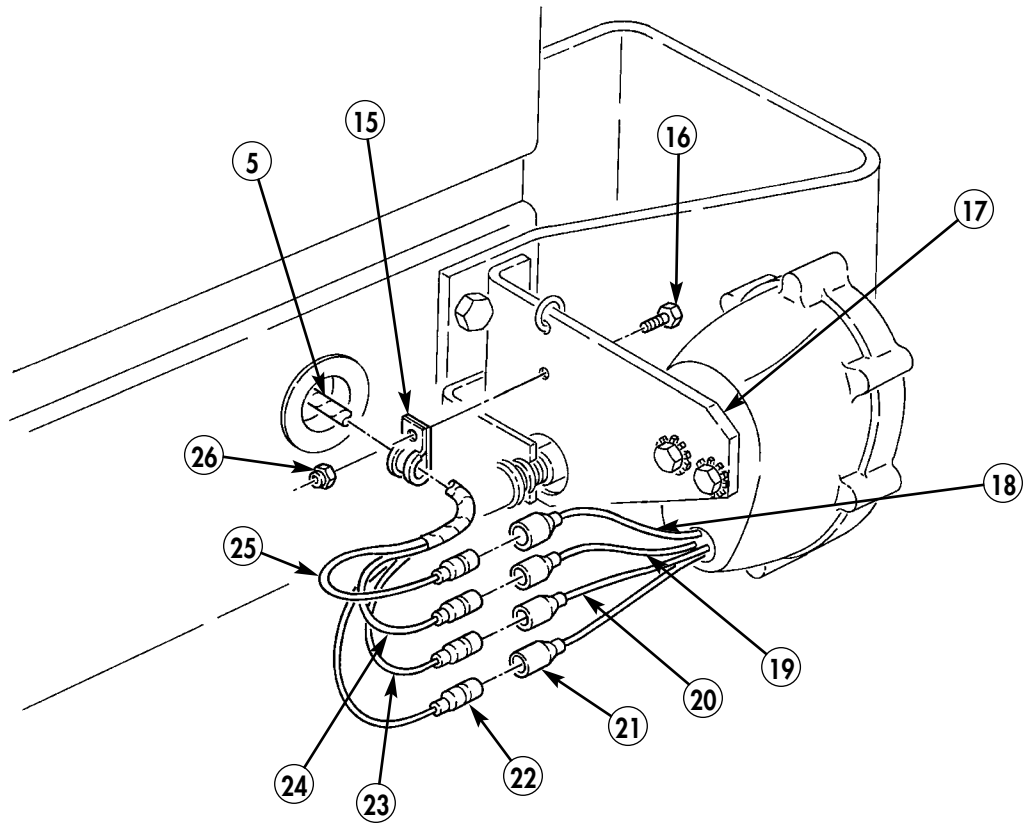
#### NOTE

All trailer receptacles are removed basically the same.

9. Remove four locknuts (44), lockwashers (43), ground wire (28), four screws (40), cap (39), and receptacle (27) from bracket (42). Discard locknuts (44) and lockwashers (43).
10. Remove two locknuts (36), screws (41), and clamps (37) from tail frame (38) and rear wiring harness (5). Discard locknuts (36).
11. Remove four locknuts (29), screws (32), nut (35), and five clamps (30) and (34) from frame (31), stud (33), and rear wiring harness (5). Discard locknuts (29).



REAR WIRING HARNESS REPLACEMENT (Contd)



## REAR WIRING HARNESS REPLACEMENT (Contd)

### REMOVAL (Contd)

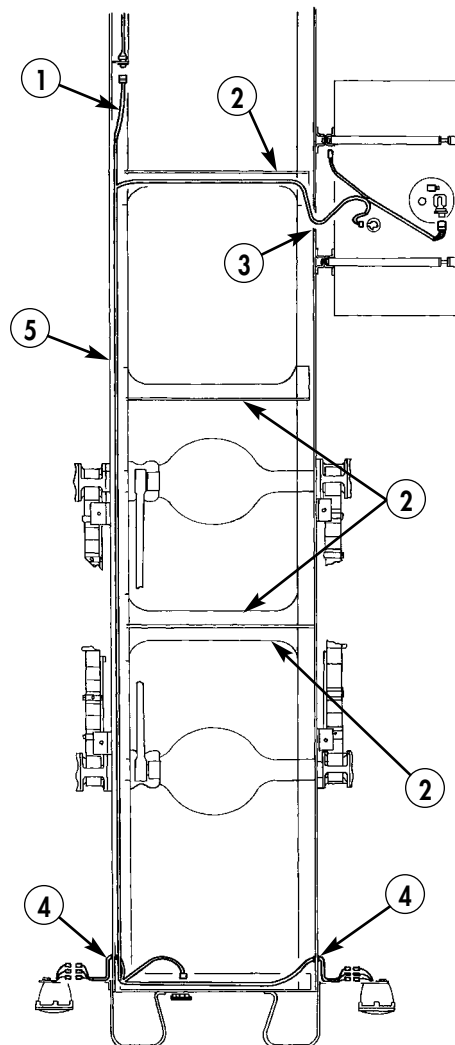
#### **CAUTION**

- Prior to removal of wiring harness, ensure all clamp removals and wire disconnections have been performed. Failure to do so may result in damage to equipment.
- Use care when removing or installing rear wiring harness. Snagging and pulling may cause damage to rear wiring harness.

12. Remove rear wiring harness (1) from left side frame (5), four cross braces (2), through two holes (4), and hole (3).

### INSTALLATION

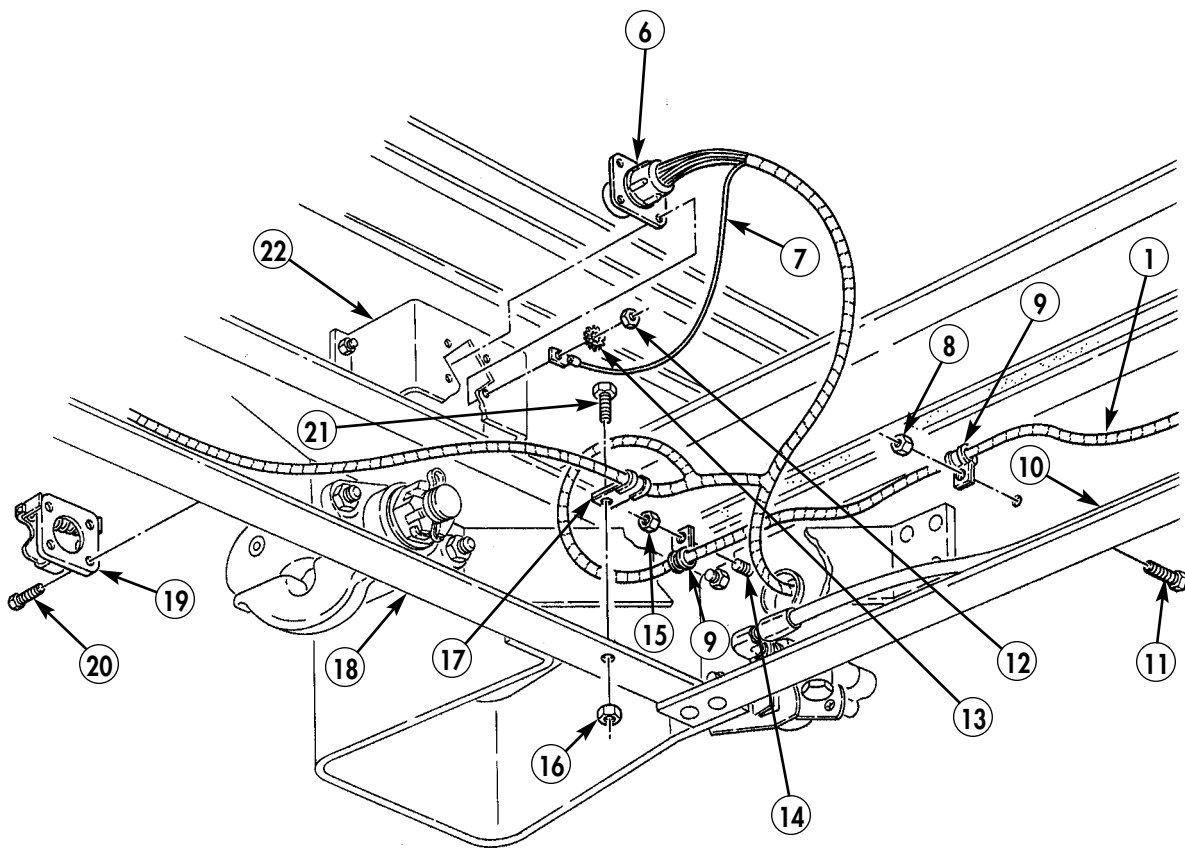
1. Route rear wiring harness (1) between front left side frame (5), four cross braces (2), through two holes (4), and hole (3).



## REAR WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

2. Install receptacle (6) and cap (19) on bracket (22) with four screws (20), ground wire (7), new lockwasher (13), and four new locknuts (12).
3. Remove slack from rear wiring harness (1) and install five clamps (9) on rear wiring harness (1), stud (14), and left side frame (10) with four screws (11), new locknuts (8), and nut (15).
4. Install rear wiring harness (1) on tail frame (18) with two clamps (17), screws (21), and new locknuts (16).



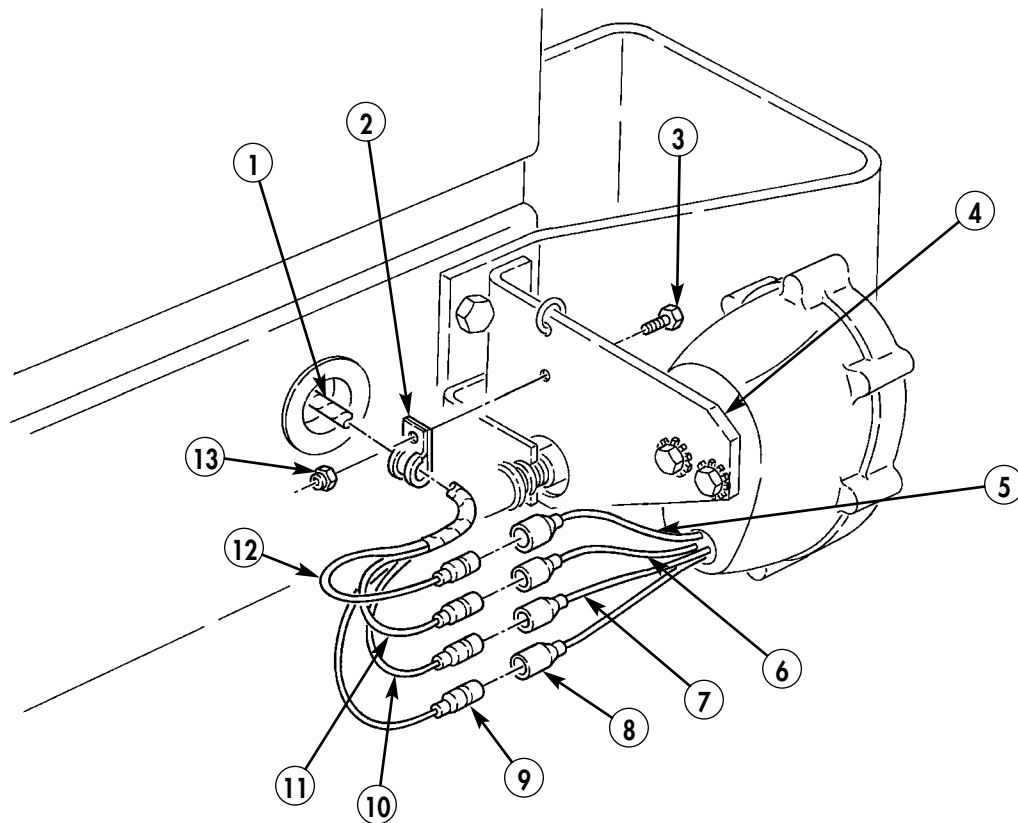
## REAR WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### NOTE

Steps 5 and 6 cover the left side rear composite lights.

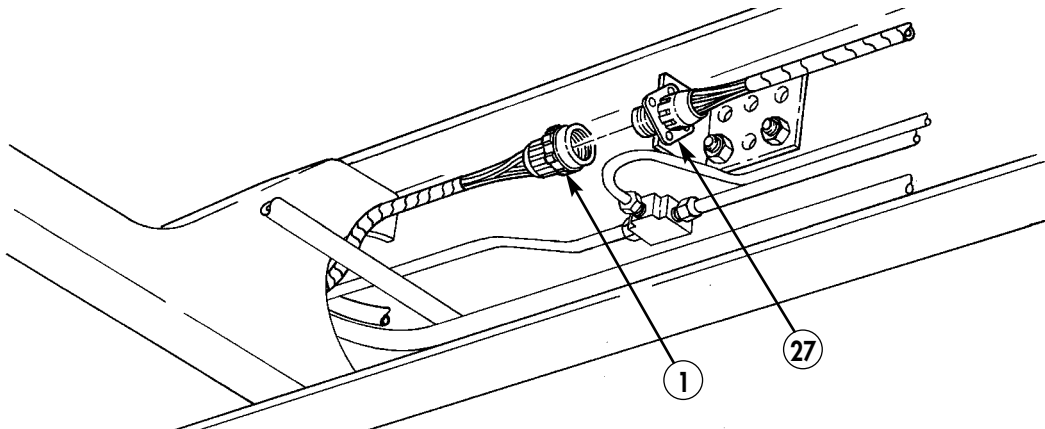
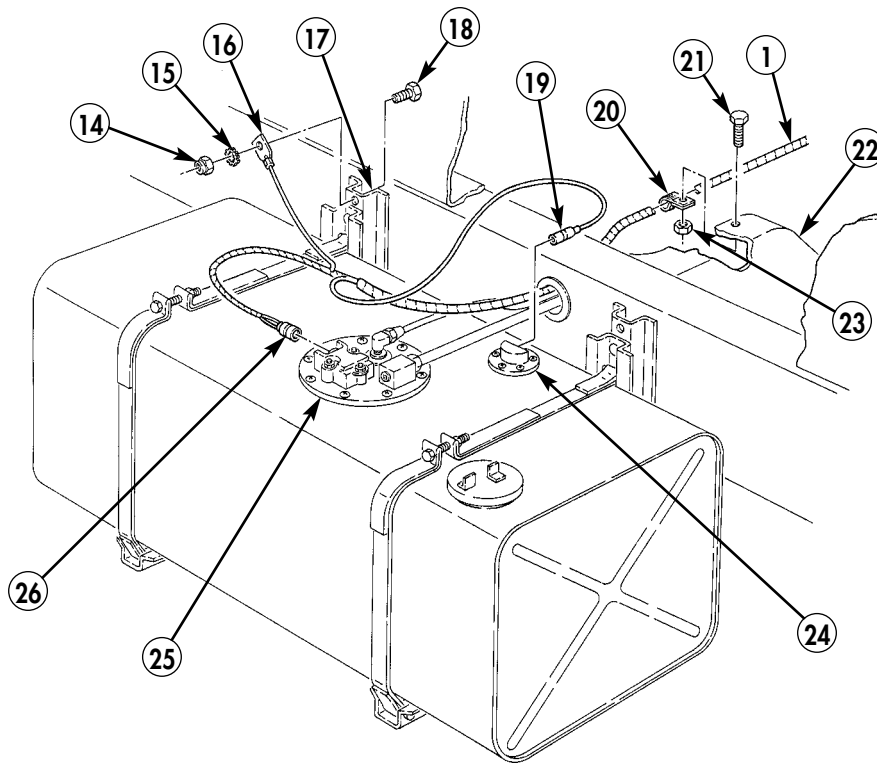
5. Connect wires (9), (10), (11), and (12) to rear composite light wires (8), (7), (6), and (5).
6. Remove slack from rear wiring harness (1) and install clamp (2) and rear wiring harness (1) on bracket (4) with screw (3) and new locknut (13).
7. Repeat steps 5 and 6 for right rear composite lights.



## REAR WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

8. Connect wire (19) to fuel sending unit (24).
9. Connect plug (26) to fuel pump (25).
10. Install ground wire (16) on support (17) with new lockwasher (15), screw (18), and new locknut (14).
11. Remove slack from rear wiring harness (1) and install two clamps (20) on rear wiring harness (1) and crossmember (22) with two screws (21) and new locknuts (23).
12. Connect rear wiring harness (1) to front wiring harness (27).
13. Connect battery ground cable (WP 0126 00).
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

0092 00-7/8 blank





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### INSTRUMENT CLUSTER REPLACEMENT REMOVAL, DISASSEMBLY, ASSEMBLY, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Antiseize tape (item 42, WP 0468 00)

##### References

WP 0094 00  
WP 0095 00

##### References (Contd)

WP 0096 00  
WP 0100 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air reservoirs drained (TM 9-2320-361-10).

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## INSTRUMENT CLUSTER REPLACEMENT (Contd)

### REMOVAL

1. Turn four lockstuds (1)  $\frac{1}{4}$  turn to left and pull instrument cluster (2) away from instrument panel (3).

#### **NOTE**

Prior to removal, tag each lead wire, air tube, and drive shaft for installation.

Location of gauges on instrument cluster may vary for M44A2 series trucks. Install gauges in their original locations.

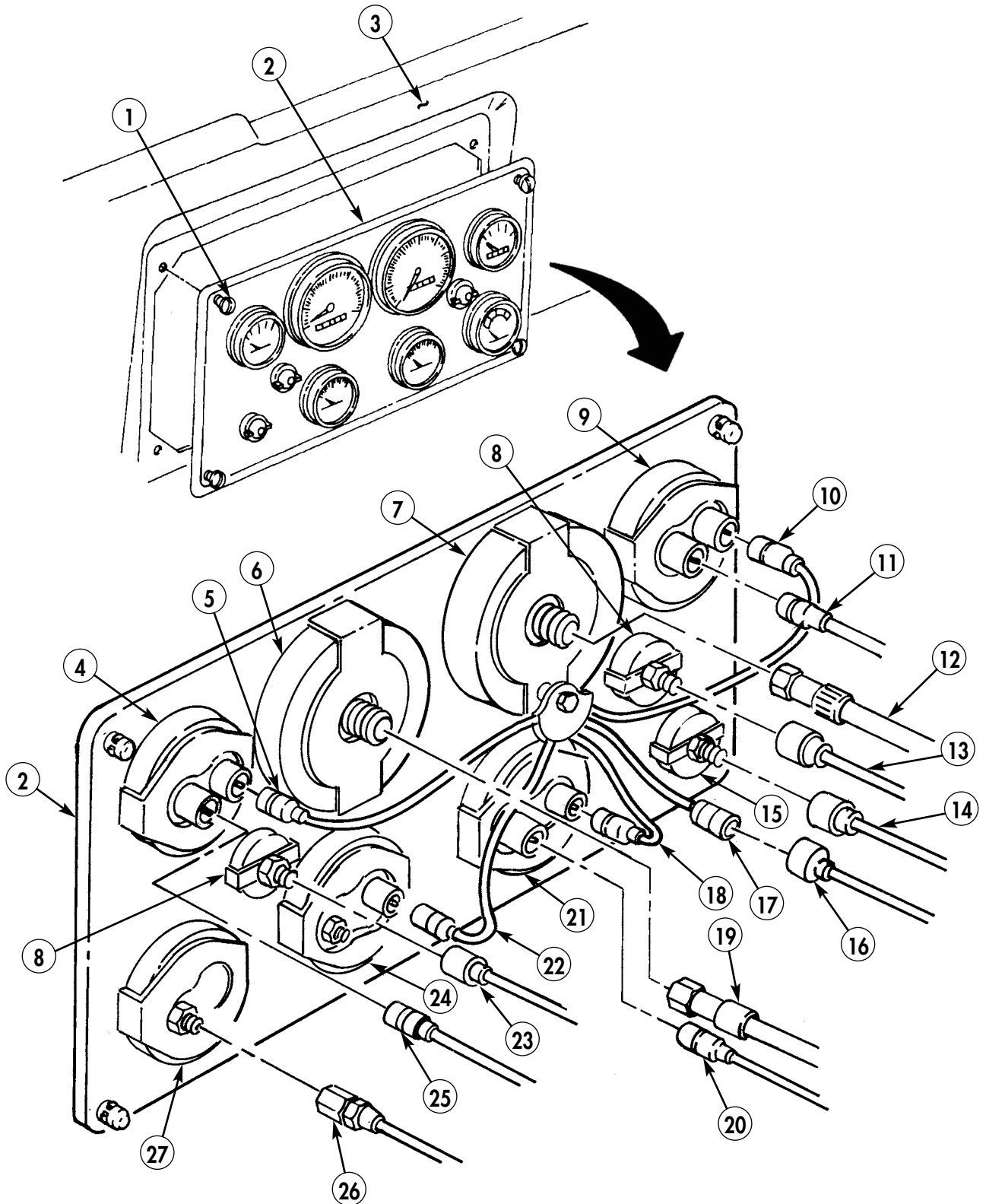
2. Disconnect tachometer drive shaft (19) from tachometer (6).
3. Disconnect speedometer drive shaft (12) from speedometer (7).

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

4. Disconnect air line (26) from air pressure gauge (27).
5. Disconnect lead wire plug (16) from lead wire connector (17).
6. Disconnect lead wire plugs (5) and (25) from engine temperature gauge (4).
7. Disconnect lead wire plugs (10) and (11) from oil pressure gauge (9).
8. Disconnect lead wire plugs (20) and (18) from fuel gauge (21).
9. Disconnect lead wire connector (14) from high beam indicator (15).
10. Disconnect lead wire connectors (13) and (23) from two indicator panel lamps (8).
11. Disconnect lead wire plug (22) from battery and generator gauge (24).
12. Remove instrument cluster (2) from instrument panel (3).

### INSTRUMENT CLUSTER REPLACEMENT (Contd)



## INSTRUMENT CLUSTER REPLACEMENT (Contd)

### DISASSEMBLY

1. Remove two indicator panel lamps (8) (WP 0100 00).
2. Remove high beam indicator (15) (WP 0100 00).
3. Remove tachometer (6) (WP 0096 00).
4. Remove speedometer (7) (WP 0096 00).
5. Remove oil pressure gauge (9), engine temperature gauge (4), battery and generator gauge (24), and fuel gauge (21) (WP 0095 00).
6. Remove air pressure gauge (27) (WP 0094 00).

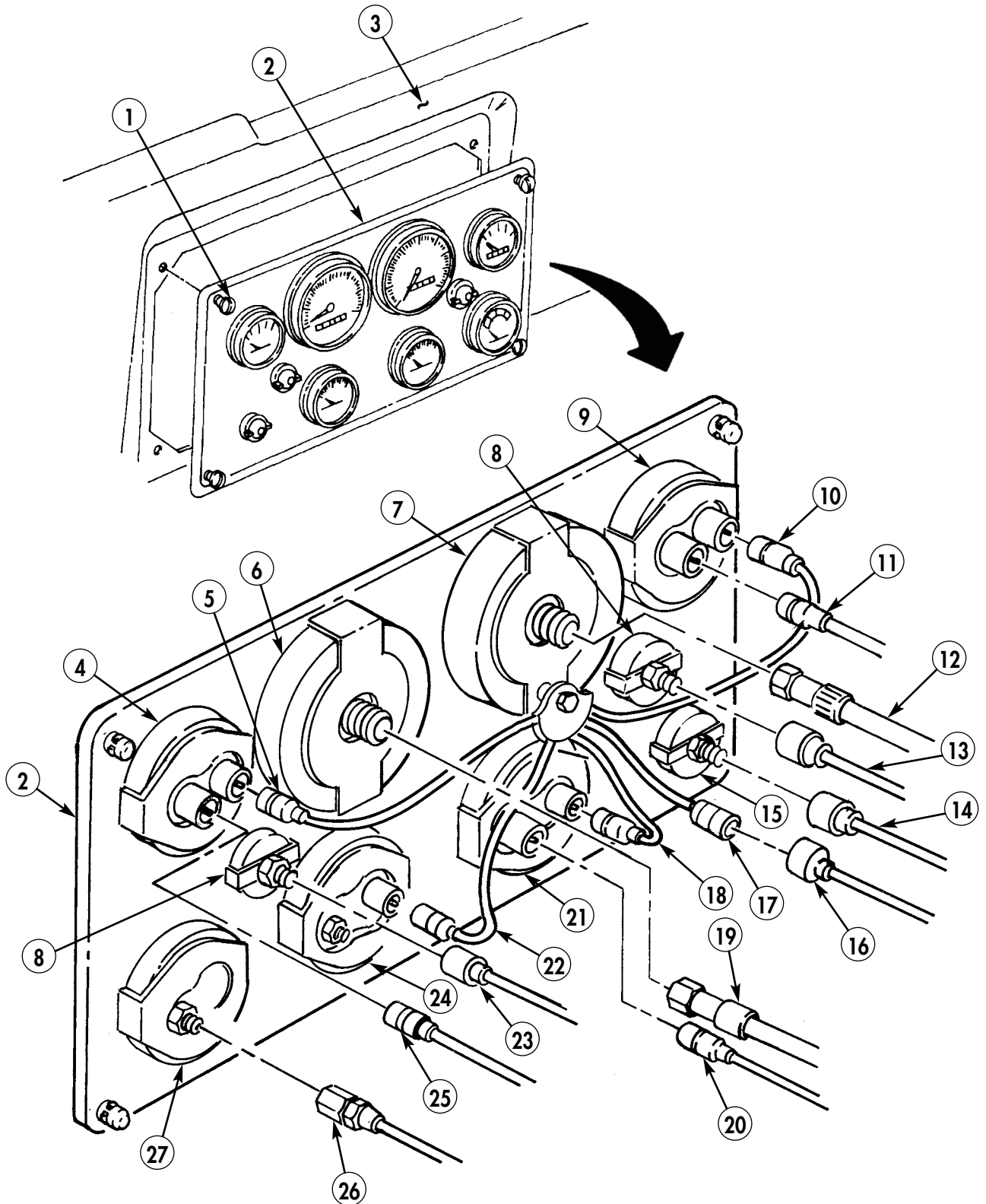
### ASSEMBLY

1. Install air pressure gauge (27) (WP 0094 00).
2. Install fuel gauge (21), battery and generator gauge (24), engine temperature gauge (4), and oil pressure gauge (9) (WP 0095 00).
3. Install speedometer (7) (WP 0096 00).
4. Install tachometer (6) (WP 0096 00).
5. Install high beam indicator (15) (WP 0100 00).
6. Install two indicator panel lamps (8) (WP 0100 00).

### INSTALLATION

1. Connect lead wire plug (22) to battery and generator gauge (24).
2. Connect lead wire connectors (13) and (23) to both indicator panel lamps (8).
3. Connect lead wire connector (14) to high beam indicator (15).
4. Connect lead wire plugs (20) and (18) to fuel gauge (21).
5. Connect lead wire plugs (10) and (11) to oil pressure gauge (9).
6. Connect lead wire plugs (5) and (25) to engine temperature gauge (4).
7. Connect lead wire plug (16) to wire connector (17).
8. Wrap threads of air pressure gauge (27) with antiseize tape and connect air line (26) to air pressure gauge.
9. Connect speedometer drive shaft (12) to speedometer (7).
10. Connect tachometer drive shaft (19) to tachometer (6).
11. Position instrument cluster (2) on instrument panel (3) and install by turning four lockstuds (1) 1/4 turn to right.
12. Connect battery ground cable (WP 0126 00).
13. Start engine (TM 9-2320-361-10) and check if gauges work properly. Allow air pressure to build up to normal operating range.
13. Check for air leaks at air pressure gauge.
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### INSTRUMENT CLUSTER REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR PRESSURE GAUGE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 203, WP 0470 00)

Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Air reservoirs drained (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## AIR PRESSURE GAUGE REPLACEMENT (Contd)

### REMOVAL

1. Turn four lockstuds (8)  $\frac{1}{4}$  turn to left and pull instrument cluster (6) away from instrument panel (5).

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

#### **NOTE**

Location of gauges on instrument cluster may vary for M44A2 series trucks. Install gauges in their original locations.

2. Disconnect air line (1) from air pressure gauge (7).
3. Remove two nuts (2), lockwashers (3), and gauge mounting bracket (4) from air pressure gauge (7). Discard lockwashers (3).
4. Remove air pressure gauge (7) from front of instrument cluster (6).

### INSTALLATION

1. Position air pressure gauge (7) through front of instrument cluster (6).
2. Position gauge mounting bracket (4) on air pressure gauge (7) and install with two new lockwashers (3) and nuts (2).

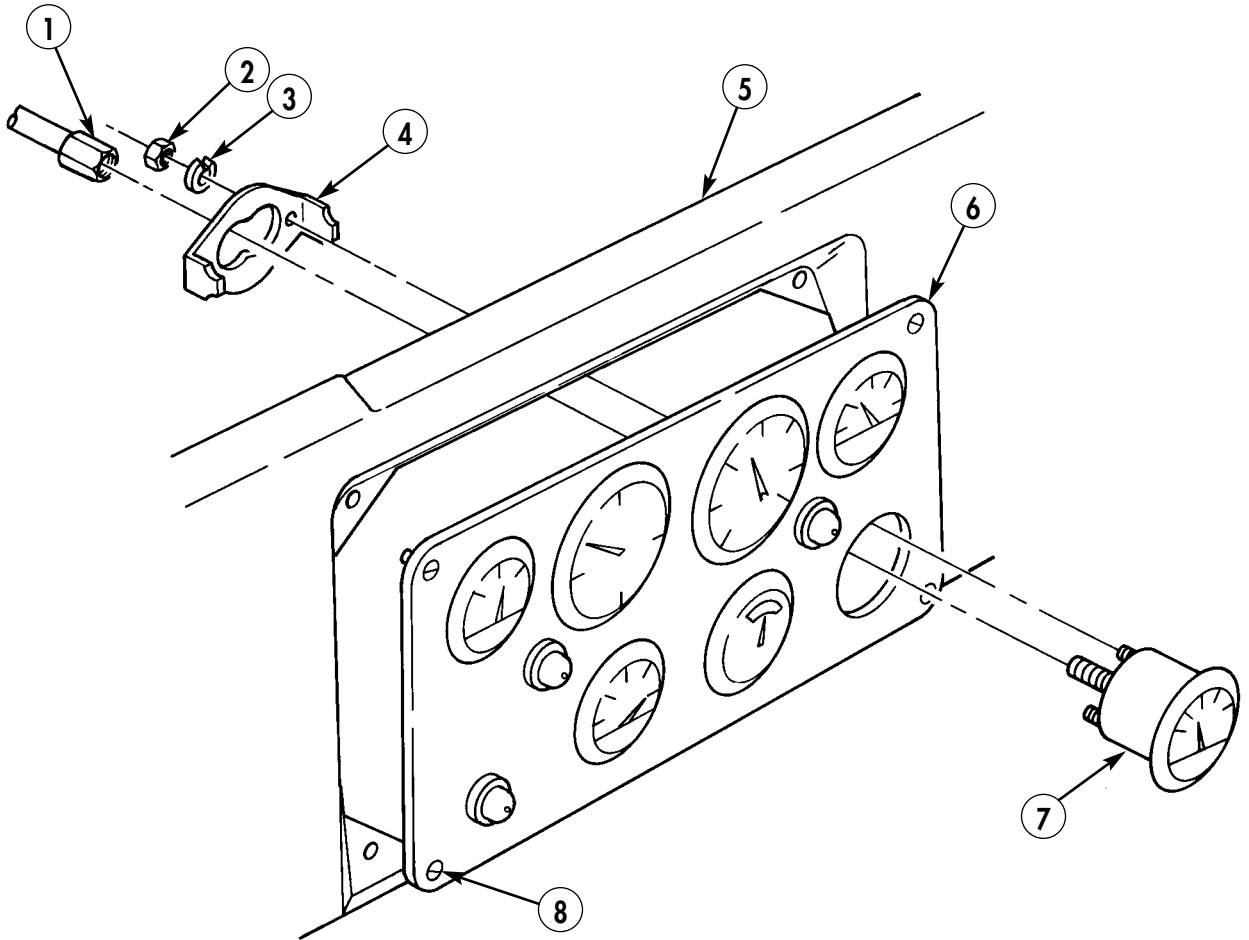
#### **NOTE**

Clean male pipe threads and wrap with antiseize tape before installation.

3. Wrap threads of air pressure gauge (7) with antiseize tape and connect air line (1) to air pressure gauge (7).
4. Position instrument cluster (6) on instrument panel (5) and lock in place by turning four lockstuds (8)  $\frac{1}{4}$  turn to right.
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10). Allow air pressure to build up to normal operating range.
7. Check for air leaks at air pressure gauge.
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



AIR PRESSURE GAUGE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL PRESSURE GAUGE, BATTERY AND ALTERNATOR GAUGE, FUEL GAUGE, AND ENGINE TEMPERATURE GAUGE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 203, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## OIL PRESSURE GAUGE, BATTERY AND ALTERNATOR GAUGE, FUEL GAUGE, AND ENGINE TEMPERATURE GAUGE REPLACEMENT (Contd)

### **CAUTION**

The 60 psi and 120 psi gauges and sending units are not interchangeable. Installation of improper gauge may result in damage to equipment.

### **NOTE**

Engine temperature, oil pressure, battery and alternator, and fuel gauges are removed and installed the same. This procedure covers the engine temperature gauge.

### **REMOVAL**

1. Turn four lockstuds (5)  $\frac{1}{4}$  turn to left and pull instrument cluster (7) away from instrument panel (8).

### **NOTE**

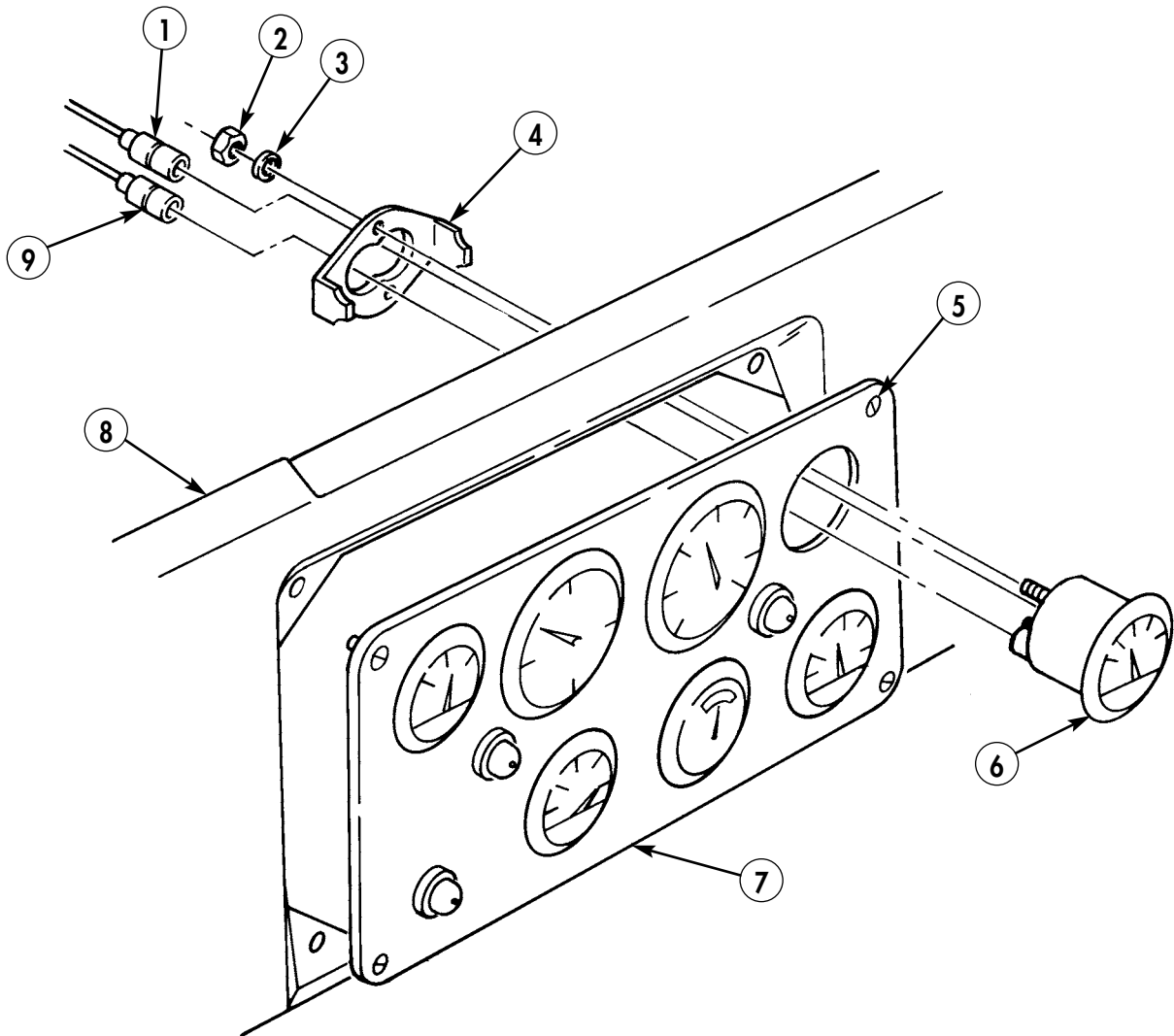
Prior to removal, tag lead wires for installation.

2. Disconnect lead wires (1) and (9) from engine temperature gauge (6).
3. Remove two nuts (2), lockwashers (3), and bracket (4) from temperature gauge (6). Discard lockwashers (3).
4. Remove engine temperature gauge (6) from instrument cluster (7).

### **INSTALLATION**

1. Position engine temperature gauge (6) through front of instrument cluster (7).
2. Install bracket (4) on temperature gauge (6) with two new lockwashers (3) and nuts (2).
3. Connect lead wires (1) and (9) to engine temperature gauge (6).
4. Position instrument cluster (7) on instrument panel (8) and install by turning four lockstuds (5)  $\frac{1}{4}$  turn to right.
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10) and check gauges for proper operation.
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**OIL PRESSURE GAUGE, BATTERY AND ALTERNATOR GAUGE, FUEL GAUGE, AND ENGINE TEMPERATURE GAUGE REPLACEMENT (Contd)**



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SPEEDOMETER AND TACHOMETER REPLACEMENT REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 203, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## SPEEDOMETER AND TACHOMETER REPLACEMENT (Contd)

### NOTE

Speedometer and tachometer are removed and installed the same way with exception of instrument cluster cable and extension stud, which are on speedometer only. This procedure covers the speedometer.

### REMOVAL

1. Turn four lockstuds (9) 1/4 turn to left and pull instrument cluster (7) away from instrument panel (8).

### NOTE

Prior to removal, tag speedometer drive shaft for installation.

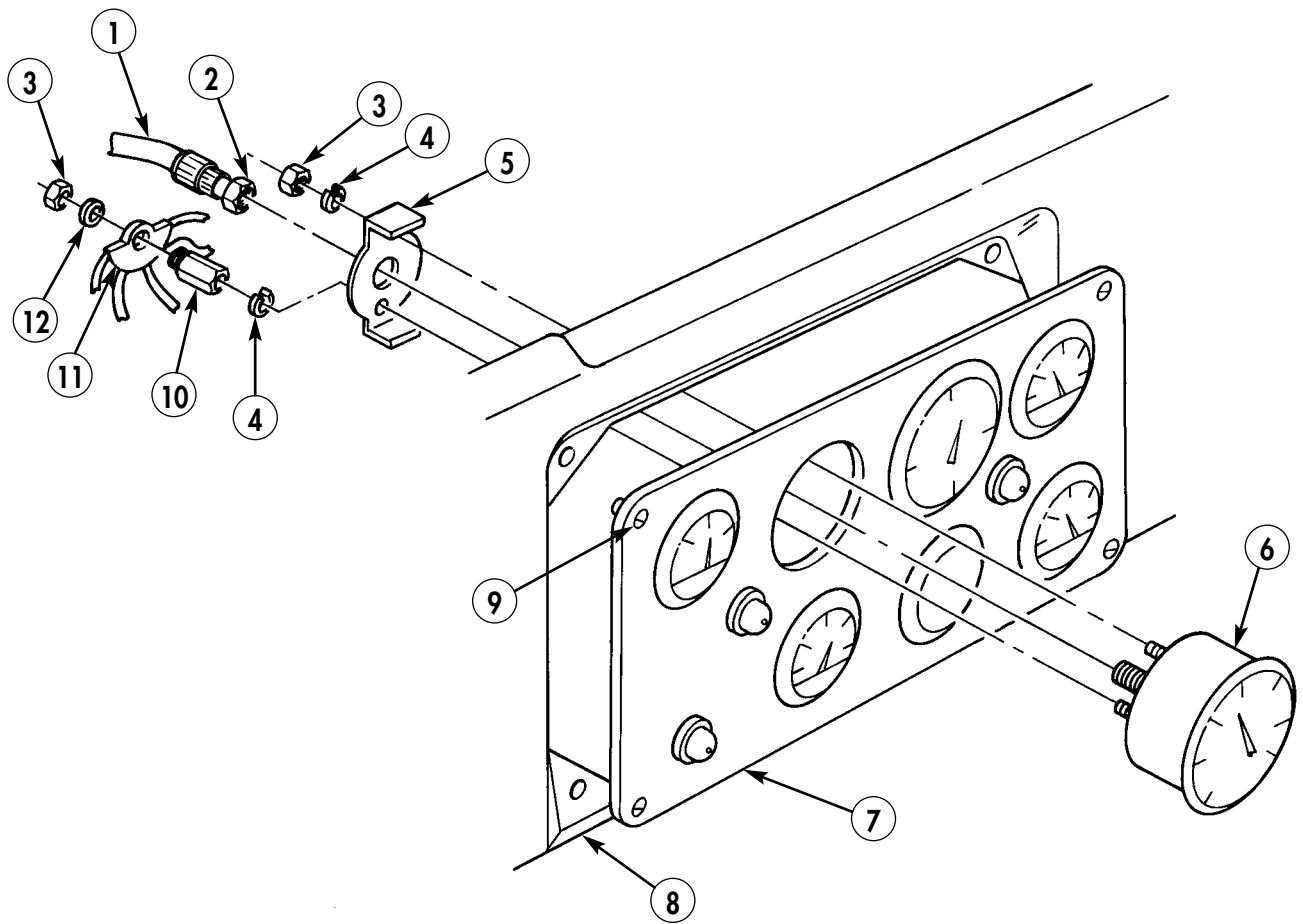
2. Loosen shaft nut (2) and disconnect speedometer drive shaft (1) from speedometer (6).
3. Remove two nuts (3), washer (12), instrument cluster cable assembly (11), extension stud (10), two lockwashers (4), and mounting bracket (5) from speedometer (6). Discard two lockwashers (4).
4. Remove speedometer (6) from instrument cluster (7).

### INSTALLATION

1. Position speedometer (6) through front of instrument cluster (7).
2. Position mounting bracket (5) on speedometer (6) and install with two new lockwashers (4), extension stud (10), and nut (3).
3. Install cable assembly (11) with washer (12) and nut (3).
4. Install speedometer drive shaft (1) on speedometer (6) with shaft nut (2).
5. Position instrument cluster (7) on instrument panel (8) and install by turning four lockstuds (9) 1/4 turn to right.
6. Connect battery ground cable (WP 0126 00).
7. Start engine (TM 9-2320-361-10) and road test to check speedometer and tachometer for proper operation.
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**SPEEDOMETER AND TACHOMETER REPLACEMENT (Contd)**



**END OF WORK PACKAGE**



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TACHOMETER DRIVE SHAFT AND DRIVE CORE MAINTENANCE REMOVAL, INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 201, WP 0470 00)  
Three locknuts (item 145, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## TACHOMETER DRIVE SHAFT AND DRIVE CORE MAINTENANCE (Contd)

### REMOVAL

1. Turn four lockstuds (4) 1/4 turn left and pull instrument cluster (3) away from instrument panel (5).
2. Disconnect tachometer drive shaft (1) from tachometer (2).
3. Disconnect tachometer drive shaft (1) from tachometer drive unit (18).
4. Remove two locknuts (7), screws (13), four clamps (8), tachometer drive shaft (1), and wiring harness (6) from two brackets (15). Discard locknuts (7).
5. Remove locknut (22), screw (20), clamp (21), and tachometer drive shaft (1) from bracket (17). Discard locknut (22).
6. Remove two screws (9), washers (10), and brackets (15) from rocker arm cover (14).
7. Remove nut (24), lockwasher (23), and bracket (17) from air compressor stud (16). Discard lockwasher (23).
8. Remove grommet (11) and tachometer drive shaft (1) from firewall (13).
9. Remove four clamps (8) and clamp (21) from tachometer drive shaft (1).

### INSPECTION

Inspect drive shaft drive core (19) and grommet (11). Replace if defective.

### INSTALLATION

1. Install four clamps (8) and clamp (21) on tachometer drive shaft (1).
2. Install tachometer drive shaft (1) and grommet (11) in firewall (12).
3. Install two brackets (15) on rocker arm cover (14) with two washers (10) and screws (9).
4. Install bracket (17) on air compressor stud (16) with new lockwasher (21) and nut (24).
5. Connect tachometer drive shaft (1) to tachometer drive unit (18).
6. Connect tachometer drive shaft (1) to tachometer (2).
7. Install tachometer drive shaft (1), clamp (21), screw (20), and new locknut (22) on bracket (17).
8. Install tachometer drive shaft (1) and wiring harness (6) on two brackets (15) with four clamps (8), two screws (13), and new locknuts (7).
9. Position instrument cluster (3) on instrument panel (5) and install by turning four lockstuds (4) 1/4 turn to right.
10. Connect battery ground cable (WP 0126 00).
11. Lower and secure hood (TM 9-2320-361-10).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TACHOMETER ADAPTER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Gasket (item 91, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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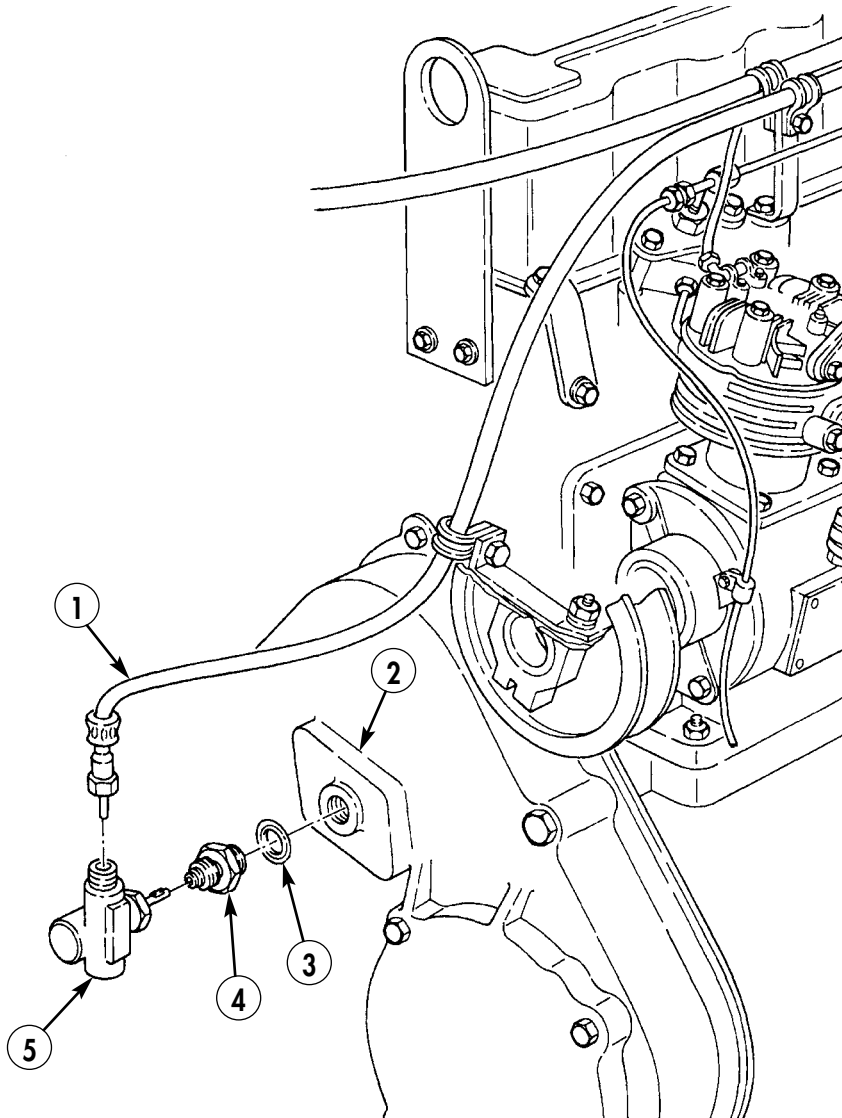
## TACHOMETER ADAPTER REPLACEMENT (Contd)

### REMOVAL

1. Disconnect tachometer drive shaft (1) from tachometer adapter (5).
2. Remove tachometer adapter (5) from adapter (4).
3. Remove adapter (4) and gasket (3) from timing cover (2). Discard gasket (3).

### INSTALLATION

1. Install new gasket (3) and adapter (4) on timing cover (2).
2. Install tachometer adapter (5) on adapter (4).
3. Connect tachometer drive shaft (1) on tachometer adapter (5).
4. Connect battery ground cable (WP 0126 00).
5. Lower and secure hood (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SPEEDOMETER DRIVE SHAFT AND ADAPTER REPLACEMENT

SPEEDOMETER SHAFT REMOVAL, SPEEDOMETER ADAPTER REMOVAL,  
SPEEDOMETER ADAPTER INSTALLATION, AND SPEEDOMETER SHAFT INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**References**

WP 0020 00

**Parts/Materials**

Two locknuts (item 129, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Front and center cab tunnels removed  
(WP 0230 00).

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## **SPEEDOMETER DRIVE SHAFT AND ADAPTER REPLACEMENT (Contd)**

### **SPEEDOMETER SHAFT REMOVAL**

1. Turn four lockstuds (4) 1/4 turn left and pull instrument cluster (5) away from instrument panel (14).
2. Remove speedometer drive shaft (2) from adapter (12).
3. Remove two locknuts (7), clamps (6), screws (1), and speedometer drive shaft (2) from instrument panel (14) and floor (13). Discard locknuts (7).
4. Remove speedometer drive shaft (2) from speedometer (3).

### **SPEEDOMETER ADAPTER REMOVAL**

1. Remove adapter (12) from transfer case (11).
2. Remove adapter shaft (10), sleeve (9), and drive shaft (8) from adapter (12).
3. Remove fitting (15) from adapter (12).

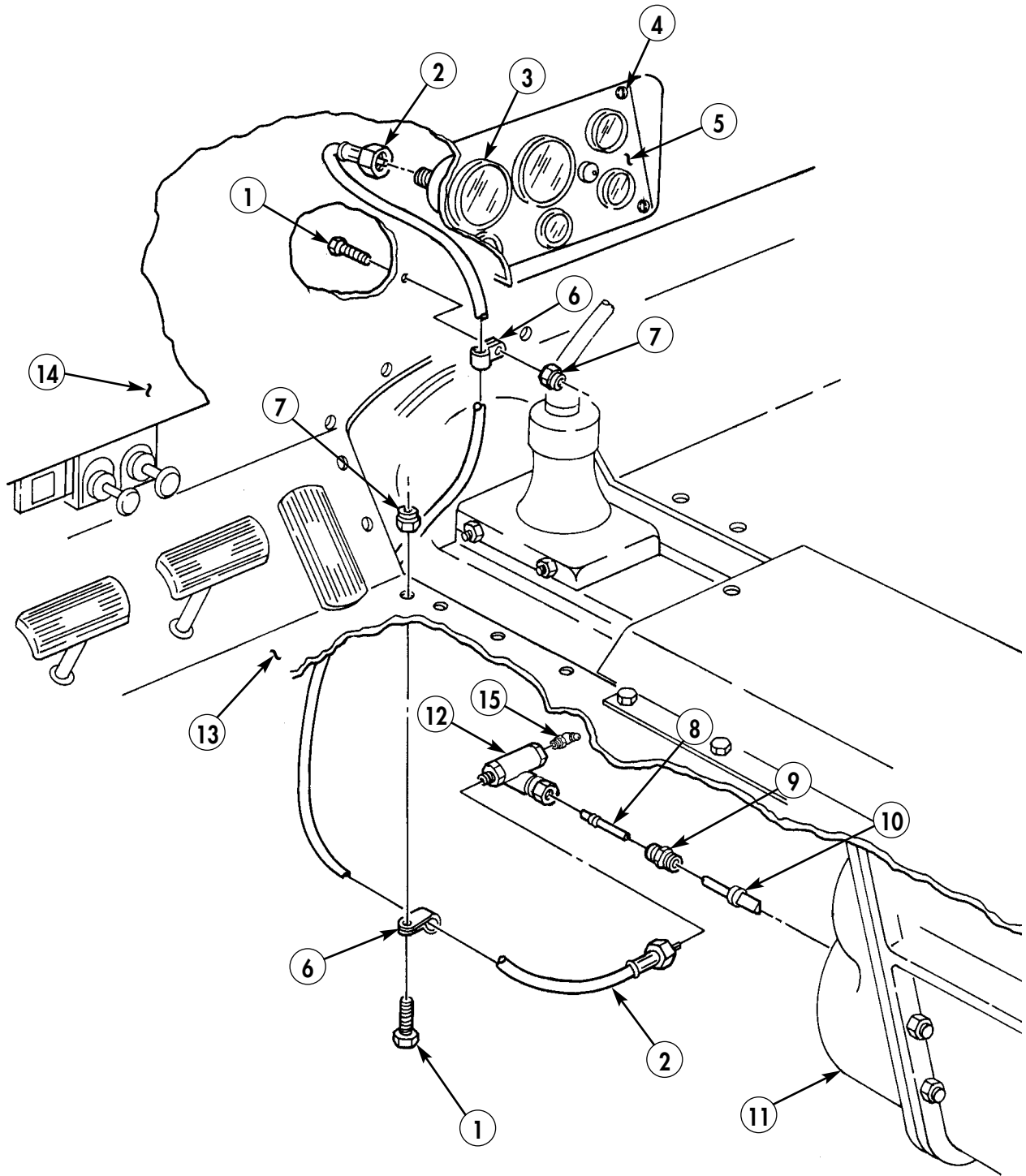
### **SPEEDOMETER ADAPTER INSTALLATION**

1. Install fitting (15) and adapter (12).
2. Install drive shaft (8), sleeve (9), and adapter shaft (10) on adapter (12).
3. Install adapter (12) on transfer case (11).

### **SPEEDOMETER SHAFT INSTALLATION**

1. Install speedometer drive shaft (2) on speedometer (3).
2. Install speedometer drive shaft (2) on instrument panel (14) and floor (13) with two clamps (6), screws (1), and two new locknuts (7).
3. Install speedometer drive shaft (2) on adapter (12).
4. Position instrument cluster (5) on instrument panel (14) and lock in place by turning four lockstuds (4) 1/4 turn to right.
5. Install front and center cab tunnels (WP 0230 00).
6. Install battery ground cable (WP 0126 00).
7. Lubricate adapter (WP 0020 00).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**SPEEDOMETER DRIVE SHAFT AND ADAPTER REPLACEMENT (Contd)**



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HEADLIGHT HIGH BEAM INDICATOR AND LAMP REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

##### Materials/Parts

Two lockwashers (item 245, WP 0470 00)

Battery ground cable disconnected  
(WP 0126 00).

#### NOTE

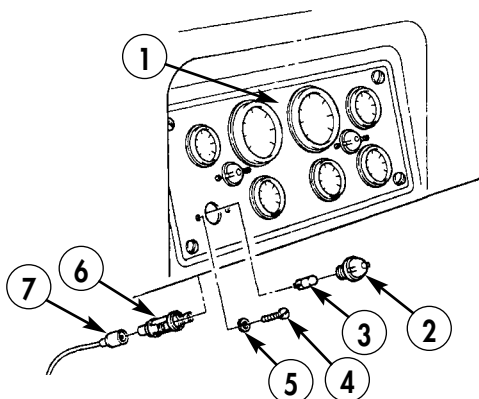
Headlight high beam indicator assembly and the two instrument cluster light assemblies are removed and installed the same. This procedure covers the high beam indicator light.

#### REMOVAL

1. Turn lens (2) to left and remove.
2. Push in and turn lamp (3) to left and remove.
3. Remove two screws (4), lockwashers (5), and headlight high beam indicator (6) from instrument cluster (1). Discard lockwashers (5).
4. Disconnect connector (7) from headlight high beam indicator (6).

#### INSTALLATION

1. Connect connector (7) to headlight high beam indicator (6).
2. Install headlight high beam indicator (6) in instrument cluster (1) with two new lockwashers (5) and screws (4).
3. Install lamp (3) on high beam indicator (6).
4. Install lens (2) over lamp (3).
5. Connect battery ground cable (WP 0126 00).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### LIGHT SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

##### Parts/Materials

Three lockwashers (item 245, WP 0470 00)

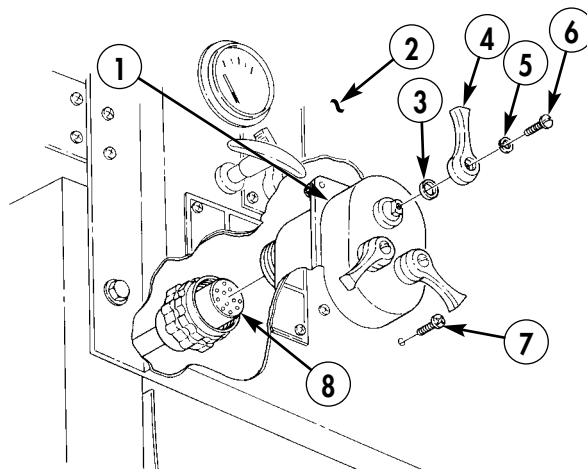
Battery ground cable disconnected  
(WP 0126 00).

#### REMOVAL

1. Remove three screws (6), lockwashers (5), handles (4), and washers (3) from light switch (1). Discard lockwashers (5).
2. Remove four mounting screws (7) from instrument panel (2) and light switch (1). Push light switch (1) through instrument panel (2).
3. Disconnect front wiring harness connector (8) from light switch (1).

#### INSTALLATION

1. Connect front wiring harness connector (8) to light switch (1).
2. Position light switch (1) through instrument panel (2) and install with four mounting screws (7).
3. Install three washers (3) and handles (4) on light switch (1).
4. Install three new lockwashers (5) and screws (6) on light switch (1).
5. Connect battery ground cable (WP 0126 00).
6. Check lights for proper operation (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TURN SIGNAL CONTROL AND INDICATOR LAMP REPLACEMENT

#### REMOVAL AND INSTALLATION

##### INITIAL SETUP:

###### Applicable Models

All

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

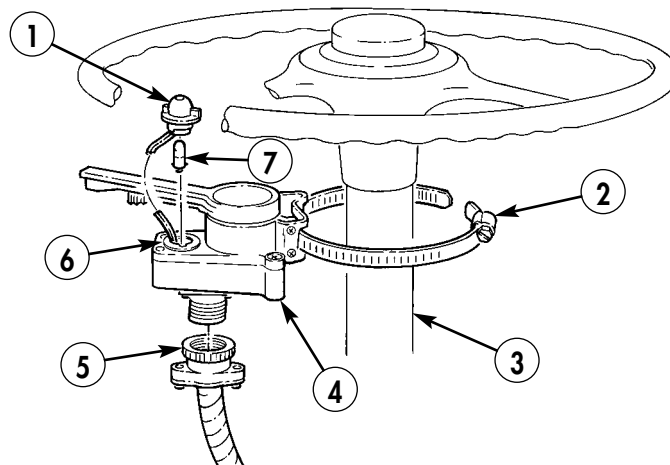
Battery ground cable disconnected  
(WP 0126 00).

##### REMOVAL

1. Remove cable connector (5) from turn signal control (4).
2. Remove clamp (2) and turn signal control (4) from steering column (3).
3. Turn lamp lens (1) 1/2 turn to left and remove from turn signal control (4).
4. Remove lamp (7) from lamp socket (6).

##### INSTALLATION

1. Install lamp (7) in lamp socket (6).
2. Install lamp lens (1) in turn signal control (4) and rotate 1/2 turn to right.
3. Install turn signal control (4) on steering column (3) with clamp (2).
4. Connect cable connector (5) to turn signal control (4).
5. Connect battery ground cable (WP 0126 00).
6. Check turn signal control for proper operation (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TURN SIGNAL FLASHER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 208, WP 0470 00)

**Personnel Required**

Two

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## TURN SIGNAL FLASHER REPLACEMENT (Contd)

### REMOVAL

1. Disconnect cable connector (4) from turn signal flasher (10).

#### NOTE

Assistant will help with steps 2 and 3.

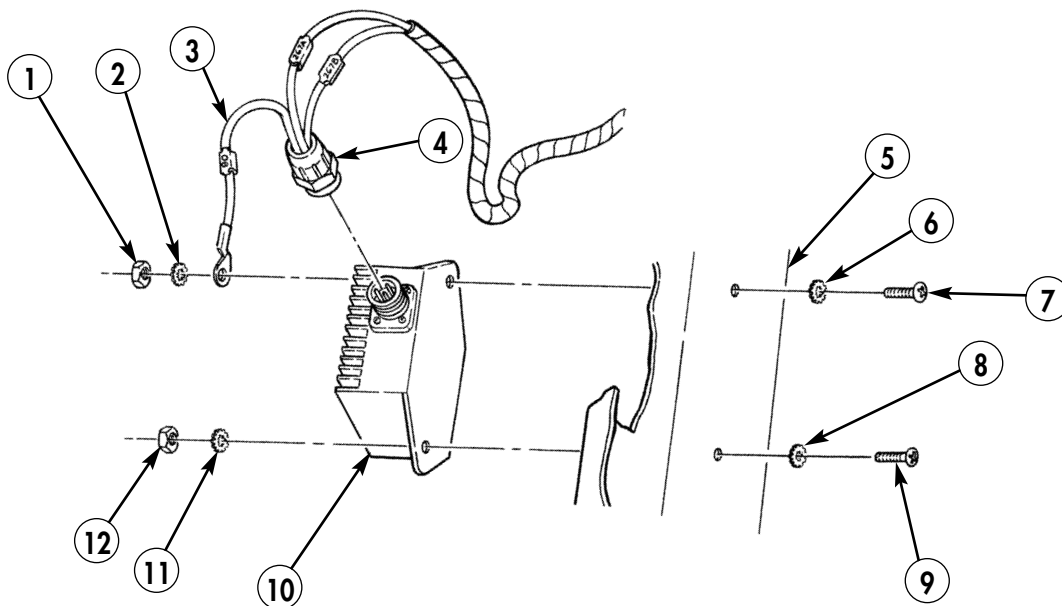
2. Remove nut (1), lockwasher (2), ground lead wire (3), screw (7), and lockwasher (6) from turn signal flasher (10). Discard lockwashers (2) and (6).
3. Remove nut (12), lockwasher (11), screw (9), lockwasher (8), and turn signal flasher (10) from firewall (5). Discard lockwashers (11) and (8).

### INSTALLATION

#### NOTE

Assistant will help with steps 1 and 2.

1. Install turn signal flasher (10) on firewall (5) with screw (9), two new lockwashers (8) and (11), and nut (12).
2. Install ground lead wire (3) on turn signal flasher (10) with screw (7), new lockwashers (6) and (2), and nut (1).
3. Connect cable connector (4) to turn signal flasher (10).
4. Connect battery ground cable (WP 0126 00).
5. Operate turn signal control to check turn signal flasher (TM 9-2320-361-10).
6. Lower hood and secure (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ACCESSORY POWER SWITCH REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 245, WP 0470 00)

Lockwasher (item 205, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## ACCESSORY POWER SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove screw (9), lockwasher (10), and handle (8) from switch (4). Discard lockwasher (10).
2. Remove nut (7), lockwasher (6), and switch plate (1) from switch (4). Discard lockwasher (6).
3. Remove switch (4) from instrument panel (5).

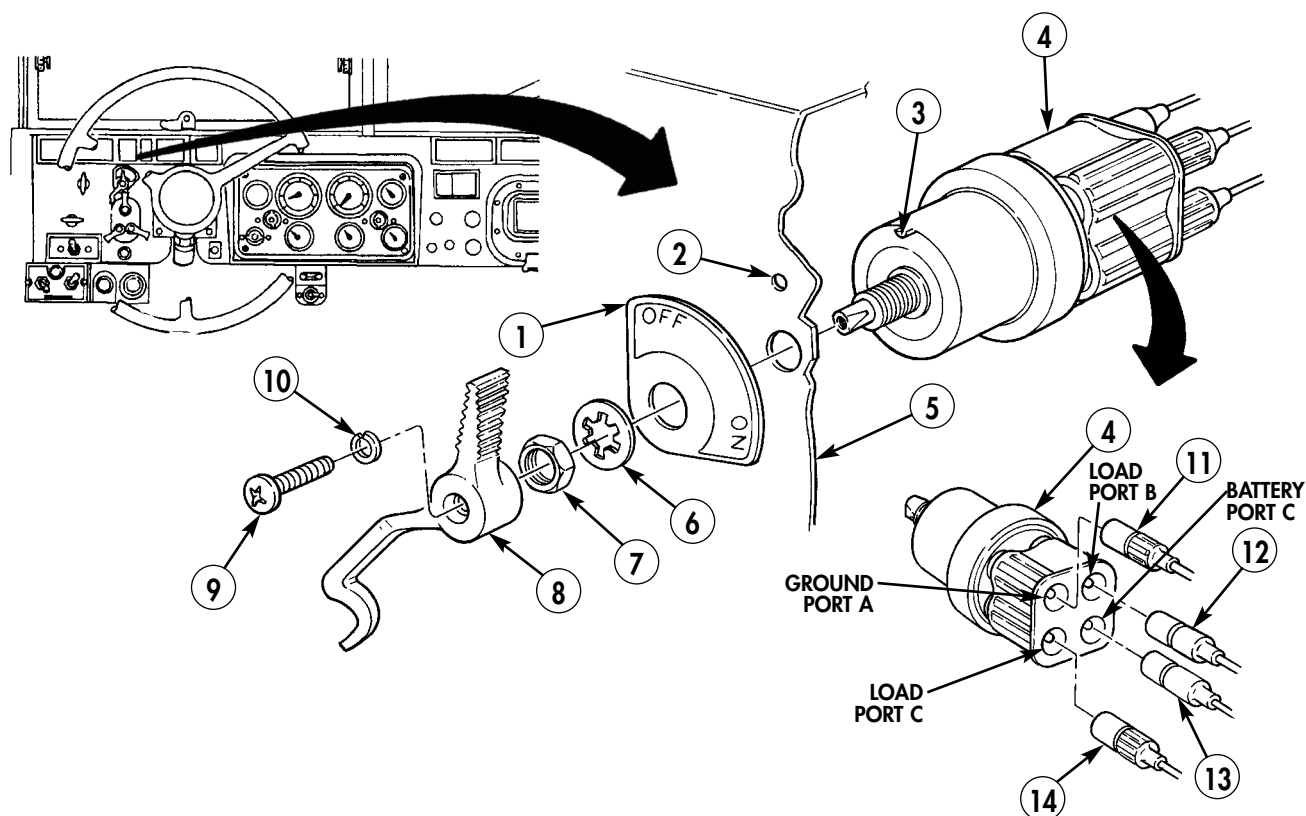
### NOTE

Prior to removal, tag lead wires for installation.

4. Disconnect wires (11), (12), (13), and (14) from switch (4).

### INSTALLATION

1. Connect wires (11), (12), (13), and (14) to switch (4).
2. Install switch (4) and switch plate (1) on instrument panel (5) with new lockwasher (6) and nut (7). Position locator tab (3) in hole (2).
3. Install handle (8) on switch (4) with new lockwasher (10) and screw (9).
4. Connect battery ground cable (WP 0126 00).
5. Check accessory power switch for proper operation (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### MANIFOLD HEATER SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

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**INITIAL SETUP:****Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## MANIFOLD HEATER SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove two screws (3) and manifold heater switch (6) from instrument panel (4).

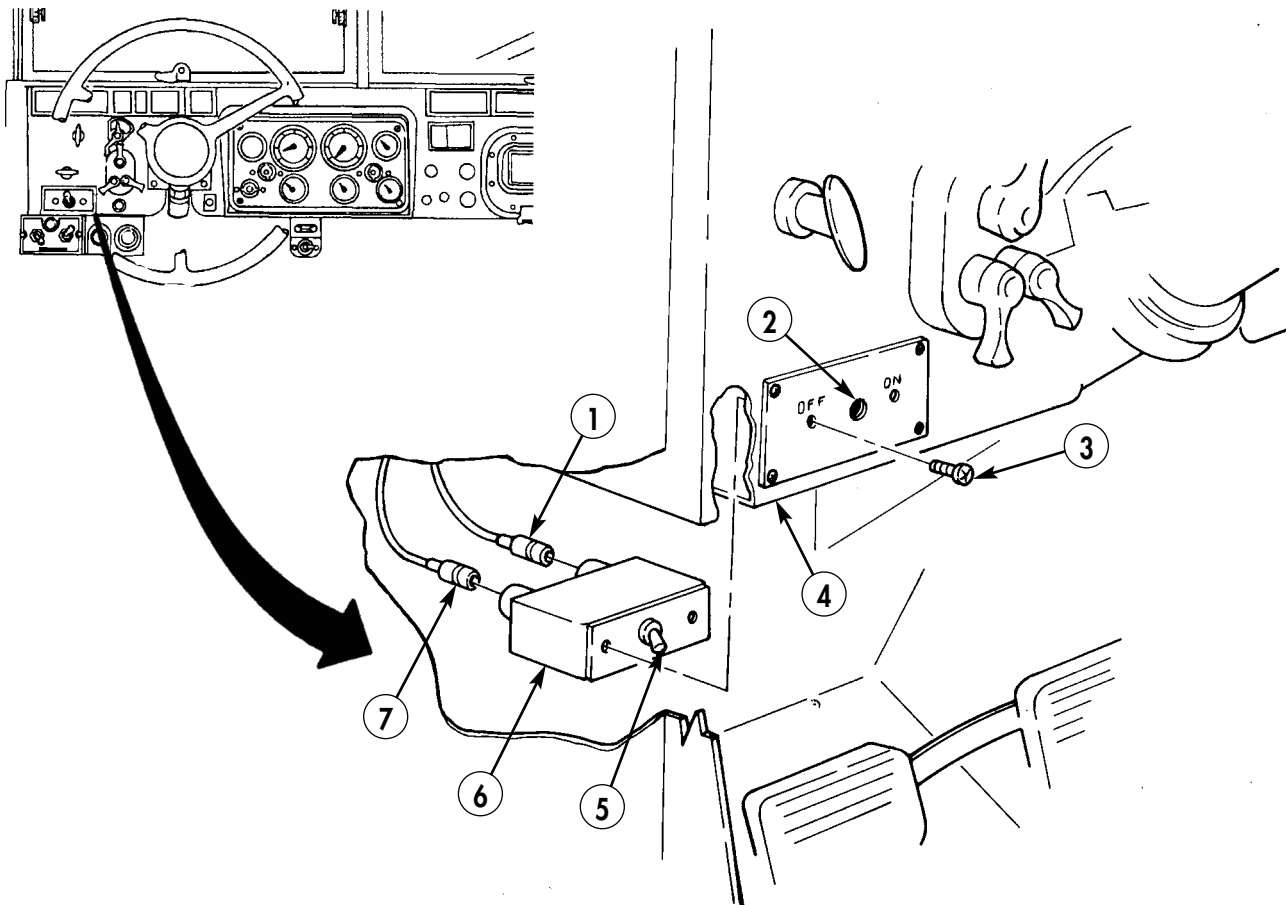
#### NOTE

Prior to removal, tag all lead wires for installation.

2. Disconnect lead wires (1) and (7) from manifold heater switch (6).

### INSTALLATION

1. Connect wires (1) and (7) to manifold heater switch (6).
2. Push switch lever (5) through hole (2) in instrument panel (4). Be sure switch lever (5) is positioned toward OFF marked on data plate.
3. Install manifold heater switch (6) on instrument panel (4) with two screws (3).
4. Connect battery ground cable (WP 0126 00).
5. Start engine (TM 9-2320-361-10) and check operation of manifold heater switch.
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### OIL PRESSURE SENDING UNIT REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air cleaner assembly removed (WP 0053 00).

---

## OIL PRESSURE SENDING UNIT REPLACEMENT (Contd)

### **CAUTION**

The 60 psi and 120 psi gauges and sending units are not interchangeable. Do not interchange the 60 psi gauge or sending unit with a 120 psi gauge or sending unit.

### **NOTE**

Do not remove elbow and adapter unless items require replacement.

### **REMOVAL**

1. Disconnect wire (1) from oil pressure sending unit (2).
2. Remove oil pressure sending unit (2) from adapter fitting (3).
3. Remove adapter fitting (3) and elbow (4) from engine (5).

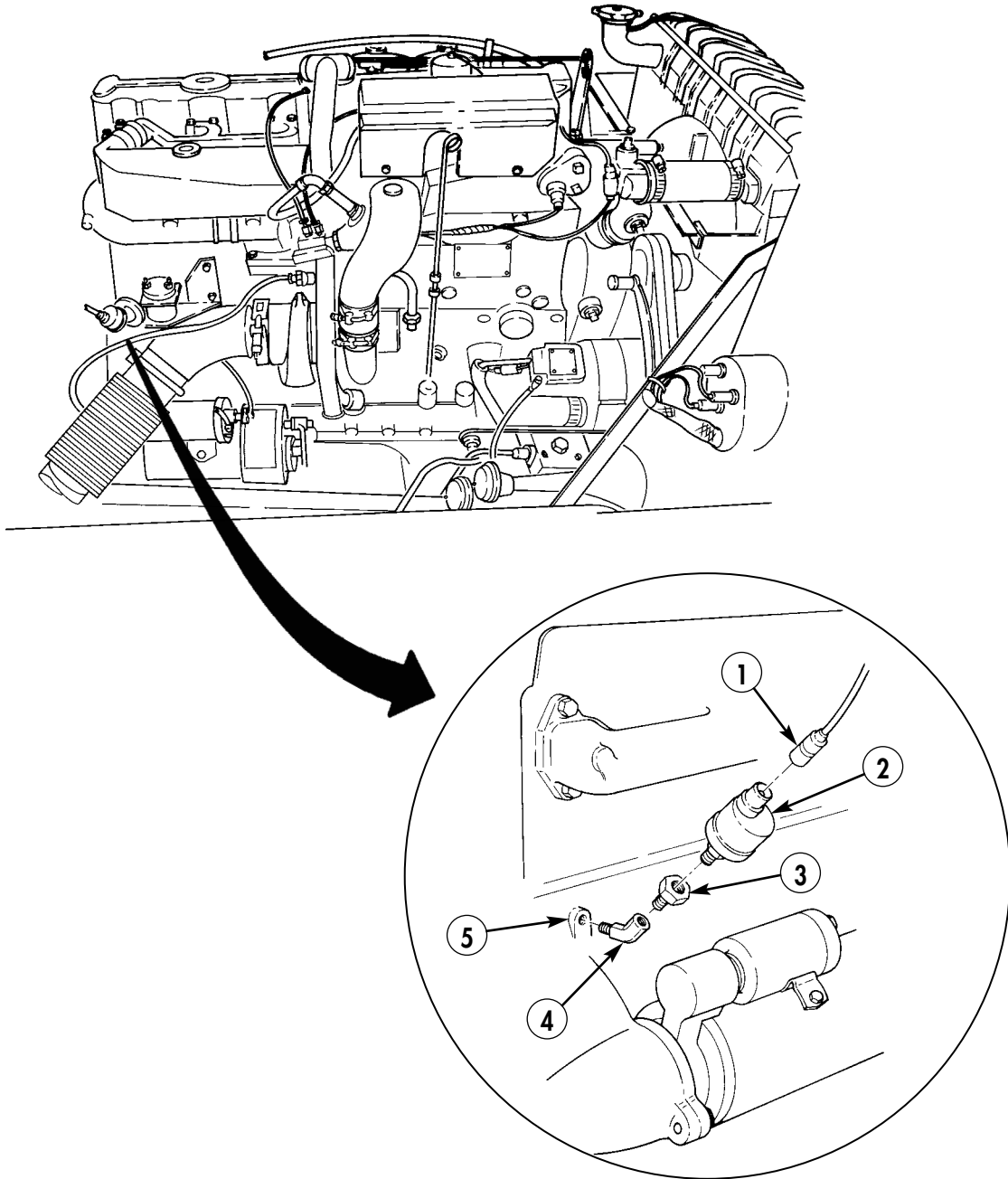
### **INSTALLATION**

### **NOTE**

Clean all male pipe threads and wrap with antiseize tape before installation.

1. Install elbow (4) and adapter fitting (3) on engine (5).
2. Install oil pressure sending unit (2) in adapter (3).
3. Connect lead wire (1) to oil pressure sending unit (2).
4. Install air cleaner assembly (WP 0053 00).
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10) and check for oil leaks around adapter and elbow.
7. Check for proper operation of oil pressure gauge (TM 9-232-361-10).
8. Lower hood and secure (TM 9-2320-361-10).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

OIL PRESSURE SENDING UNIT REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### ENGINE TEMPERATURE SENDING UNIT REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Sealing compound (item 29, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Cooling system drained (WP 0076 00).

---

## ENGINE TEMPERATURE SENDING UNIT REPLACEMENT (Contd)

### REMOVAL

#### NOTE

Prior to removal, tag all lead wires for installation.

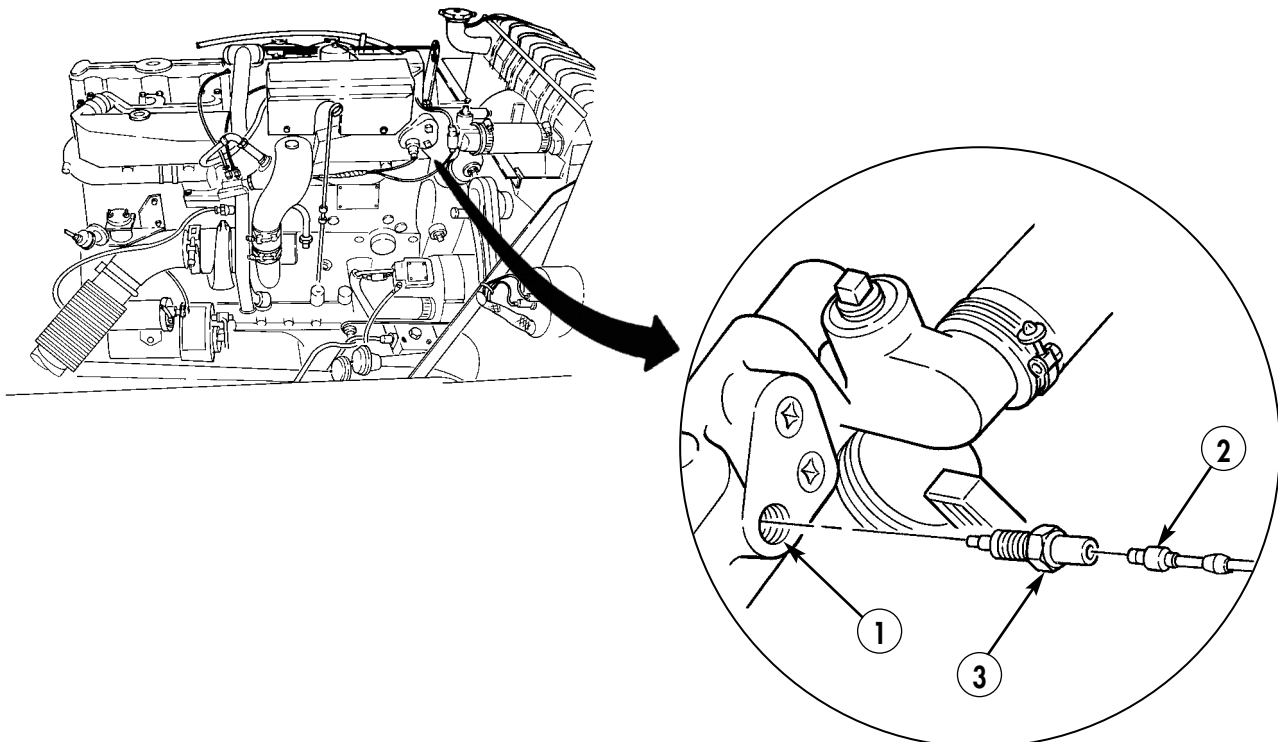
1. Disconnect wire (2) from engine temperature sending unit (3).
2. Remove engine temperature sending unit (3) from intake manifold (1).

### INSTALLATION

#### NOTE

Clean all male pipe threads and coat with sealing compound before installation.

1. Install engine temperature sending unit (3) in intake manifold (1).
2. Connect wire (2) to engine temperature sending unit (3).
3. Connect battery ground cable (WP 0126 00).
4. Fill cooling system (WP 0076 00).
5. Start engine (TM 9-2320-361-10) and check for coolant leaks at water manifold.
6. Check coolant temperature gauge for proper operation.
7. Lower hood and secure (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

---

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### LOW AIR PRESSURE SWITCH REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## LOW AIR PRESSURE SWITCH REPLACEMENT (Contd)

### REMOVAL

#### NOTE

Prior to removal, tag lead wires for installation.

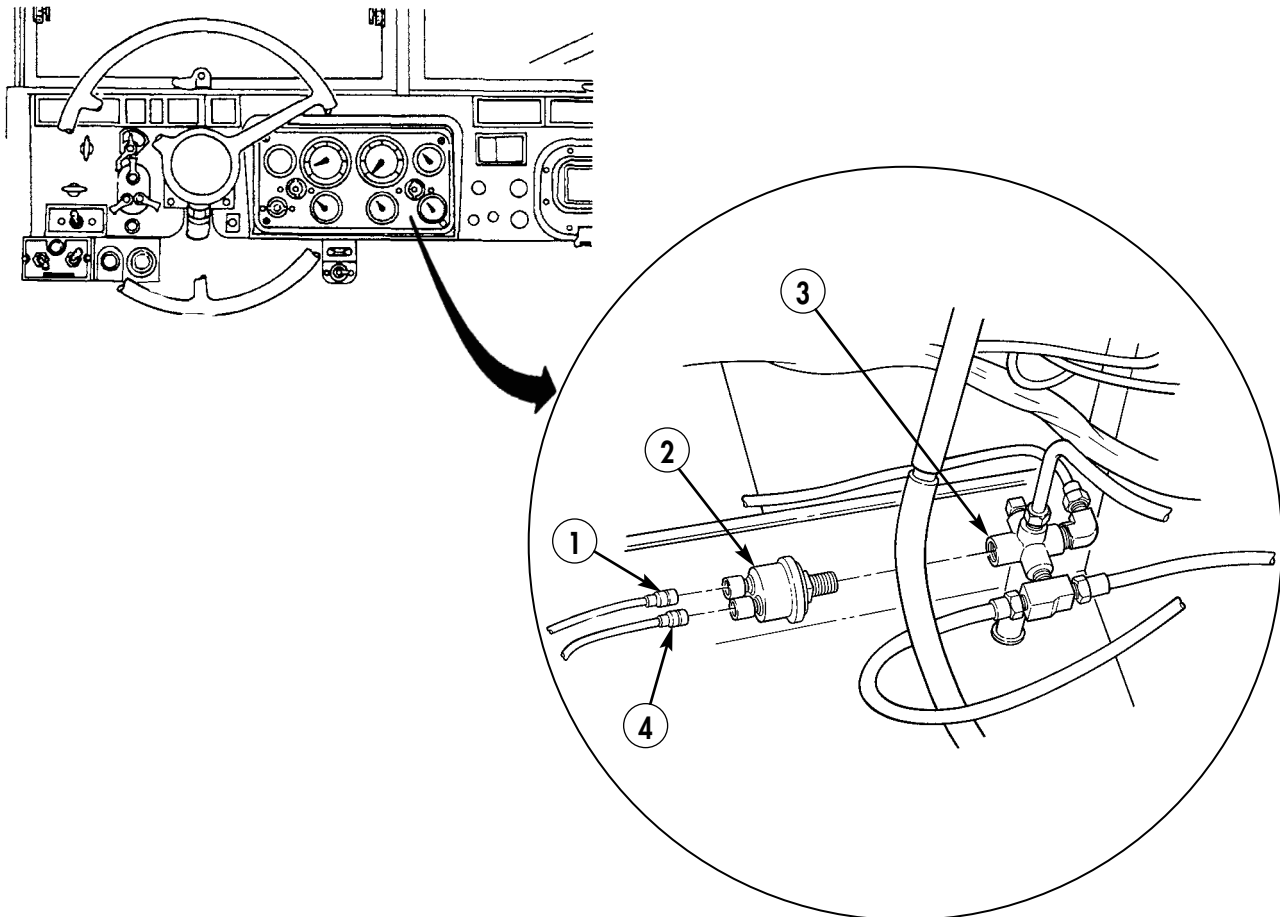
1. Disconnect lead wires (1) and (4) from low air pressure switch (2).
2. Remove low air pressure switch (2) from tube and hose manifold (3).

### INSTALLATION

#### NOTE

Clean all male pipe threads, and wrap with antiseize tape before installation.

1. Install low air pressure switch (2) to tube and hose manifold (3).
2. Connect lead wires (1) and (4) to low air pressure switch (2).
3. Connect battery ground cable (WP 0126 00).
4. Start engine (TM 9-2320-361-10) and check low air pressure switch operation.
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FUEL LEVEL SENDING UNIT REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Gasket (item 106, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Fuel tank removed for M109A3 and M185A3  
vehicles only (WP 0060 00).

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## FUEL LEVEL SENDING UNIT REPLACEMENT (Contd)

### **WARNING**

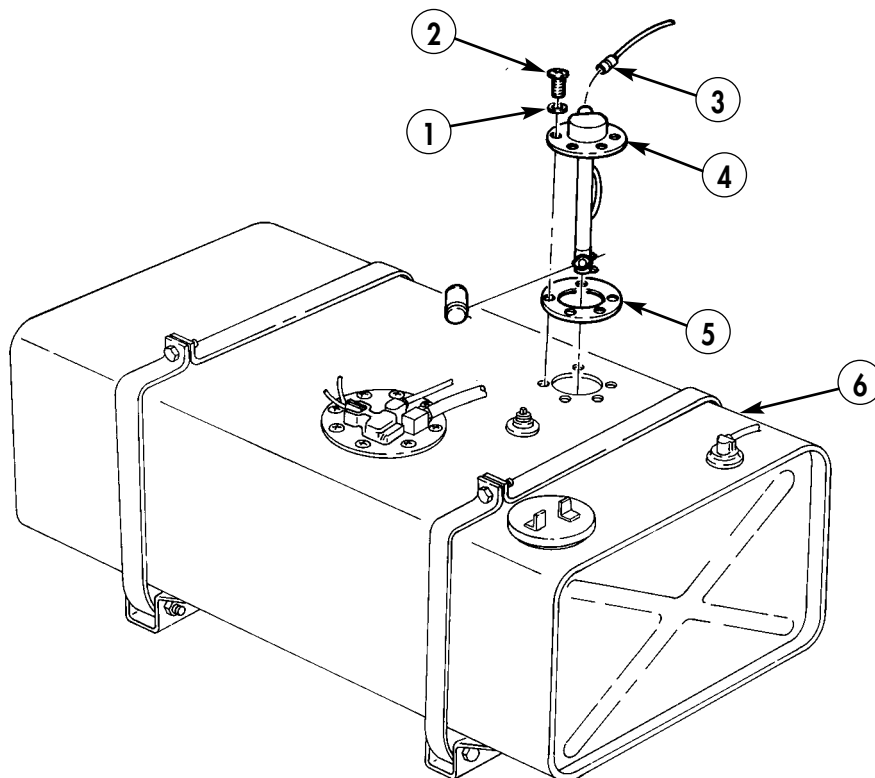
Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result and/or damage to equipment may result.

### REMOVAL

1. Disconnect lead wire (3) from sending unit (4).
2. Remove five screws (2) and copper washers (1) from sending unit (4).
3. Remove sending unit (4) and gasket (5) from fuel tank (6). Discard gasket (5).

### INSTALLATION

1. Install new gasket (5) and sending unit (4) on fuel tank (6) with five copper washers (1) and screws (2).
2. Connect lead wire (3) to sending unit (4).
3. Install fuel tank on M109A3 and M185A3 vehicles (WP 0060 00).
4. Connect battery ground cable (WP 0126 00).
5. Start engine (TM 9-2320-361-10) and check fuel gauge for proper operation.
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### LOW AIR BUZZER REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Five lockwashers (item 207, WP 0470 00)

Two lockwashers (item 212, WP 0470 00)

**Personnel Required**

Two

**References**

TM 9-2320-361-10

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## LOW AIR BUZZER REPLACEMENT (Contd)

### REMOVAL

1. Disconnect lead wire (13) from low air buzzer (3).
2. Remove two nuts (1) and lockwashers (2) from two stud mounts (4). Discard lockwashers (2).
3. Remove nut (15) and lockwasher (14) from stud mount (11). Discard lockwasher (14).
4. Bend ground strap (12) outward and remove low air buzzer (3) from two stud mounts (4) and stud mount (11).

#### NOTE

Assistant will help with steps 5 and 6.

5. Remove two nuts (7), lockwashers (6), and mounting studs (4) from firewall (5). Discard lockwashers (6).
6. Remove nut (9), lockwasher (8), stud mount (11), ground strap (12), and lockwasher (10) from firewall (5). Discard lockwashers (8) and (10).

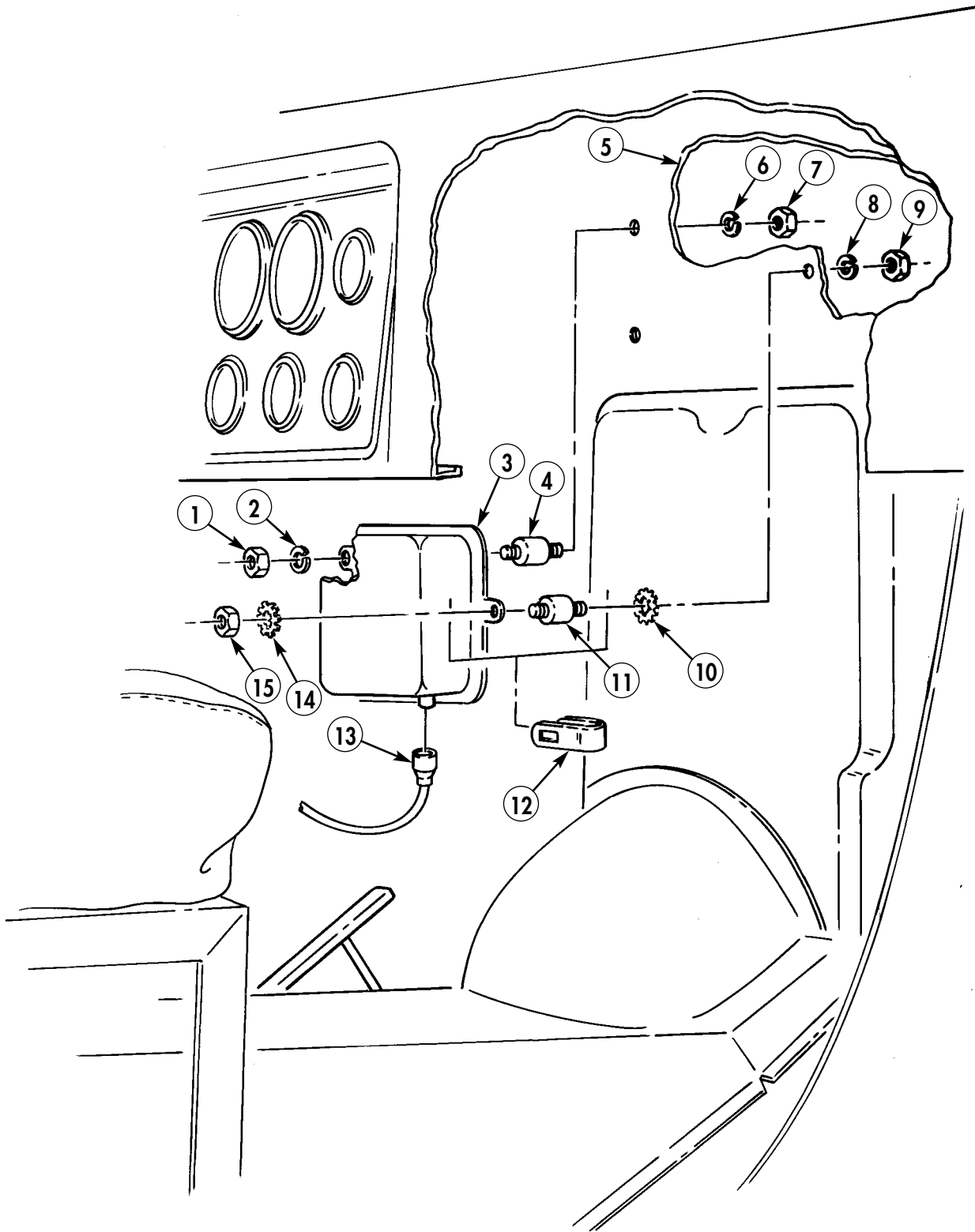
### INSTALLATION

#### NOTE

Assistant will help with steps 1 and 2.

1. Install stud mount (11) and ground strap (12) on firewall (5) with two new lockwashers (10) and (8) and nut (9).
2. Install two stud mounts (4) in firewall (5) with two new lockwashers (6) and nuts (7).
3. Install low air buzzer (3) on two stud mounts (4) and stud mount (11).
4. Lift end of ground strap (12) and secure on stud mount (11) with new lockwasher (14) and nut (15).
5. Install two new lockwashers (2) and nuts (1) on stud mounts (4).
6. Connect wire (13) to low air buzzer (3).
7. Connect battery ground cable (WP 0126 00).
8. Start engine (TM 9-2320-361-10) and check low air buzzer operation.
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

LOW AIR BUZZER REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HEADLIGHT BEAM SELECTION SWITCH REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Two lockwashers (item 216, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

---

## HEADLIGHT BEAM SELECTION SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove two screws (1) and lockwashers (9) from headlight beam selection switch (8). Discard lockwashers (9).
2. Push headlight beam selection switch plunger (4) through floorboard (2) and slide headlight beam selection switch (8) away from protective cover (3).

#### NOTE

Prior to removal, tag lead wires for installation.

3. Disconnect wires (5), (6), and (7) from headlight beam selection switch (8).

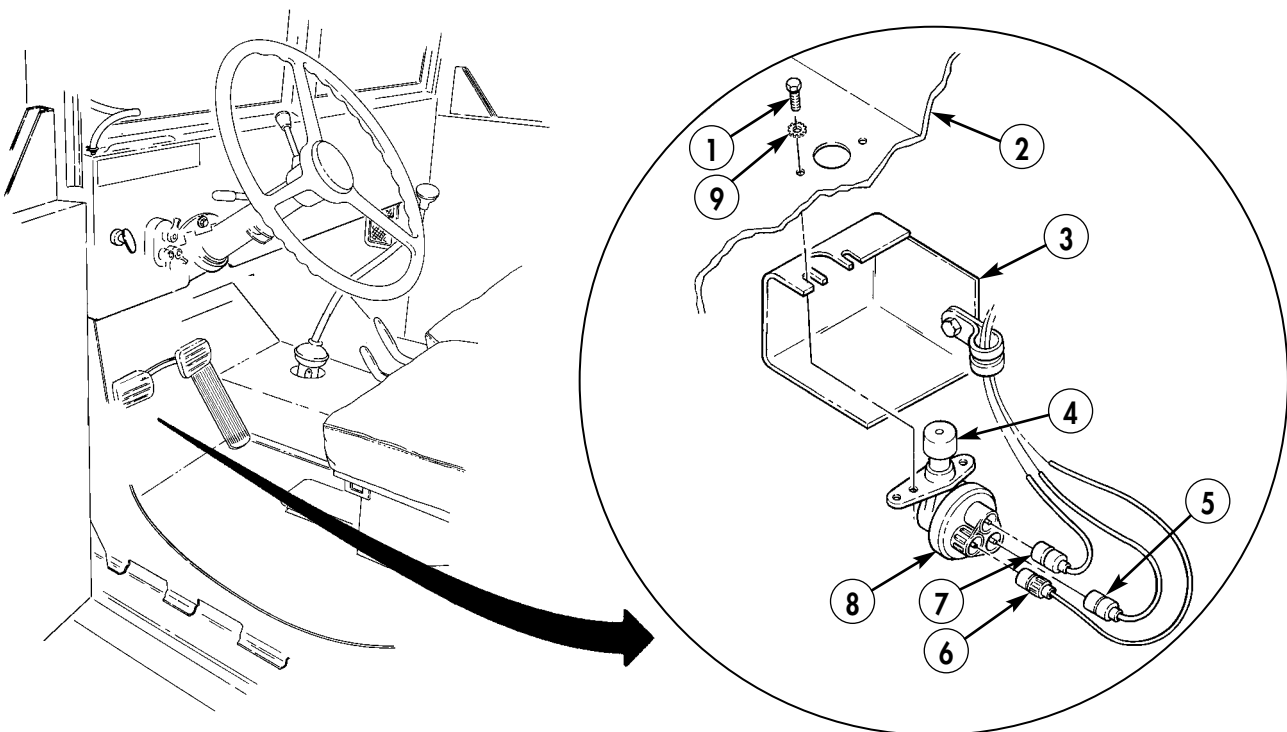
### INSTALLATION

1. Connect three wires (5), (6), and (7) to headlight beam selection switch (8).

#### NOTE

Assistant will help with steps 2 and 3.

2. Position headlight beam selection switch plunger (4) through floorboard (2). Install two new lockwashers (9) and screws (1) to headlight beam selection switch (8). Do not tighten screws (1).
3. Position protective cover (3) over headlight beam selection switch (8). Slide slotted side of cover (3) on headlight beam selection switch (8) and floorboard (2). Tighten screws (1).
4. Connect battery ground cable (WP 0126 00).
5. Check operation of headlight beam selecting switch (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### STOPLIGHT SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

---

**INITIAL SETUP:****Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## STOPLIGHT SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove two screws (7) and shield (6) from mounting bracket (1).

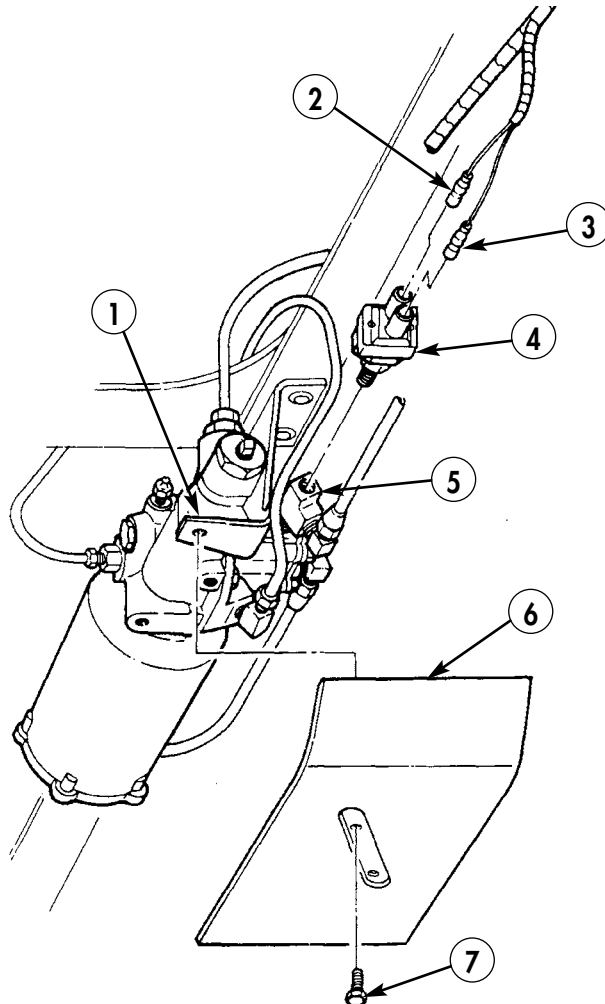
#### NOTE

Prior to removal, tag all lead wires for installation.

2. Disconnect lead wires (2) and (3) from stoplight switch (4).
3. Remove stoplight switch (4) from tee (5).

### INSTALLATION

1. Install stoplight switch (4) on tee (5).
2. Connect wires (2) and (3) to stoplight switch (4).
3. Install shield (6) to mounting bracket (1) with two screws (7).
4. Connect battery ground cable (WP 0126 00).
5. Turn light switch to stoplight position and check stoplight operation by pressing brake pedal several times (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HORN BUTTON REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

O-ring (item 286, WP 0470 00)

Safety wire (item 50, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## HORN BUTTON REPLACEMENT (Contd)

### REMOVAL

1. Remove three screws (4) and lift horn button adapter (3) from center of steering wheel (1). Disconnect horn button connector (7) from wire connector (10).
2. Remove spring (9) and seal (2).
3. Remove retaining ring (6), horn button (5), and O-ring (8) from adapter (3). Discard O-ring (8).

#### NOTE

Perform steps 4 through 8 only if horn wire is damaged.

4. Disconnect plug (16) from connector (15) and slide shell (14) back on horn wire (12).
5. Remove slotted washer (18) from behind connector (15) and slide shell (14) off end of wire (12).
6. Remove rubber bushing (13) from steering gearbox (19) and slide bushing (13) off end of wire (12).

#### NOTE

- If horn wire is damaged, perform steps 7 and 8.
- Safety wire must be long enough to reach from other end of steering column plus two additional feet.

7. Attach safety wire (17) to horn wire (12).

#### NOTE

Safety wire must be left inside steering column. It will be used to pull new horn wire through steering column.

8. Pull horn wire (12) through steering column (11). Leave safety wire (17) in steering column (11).

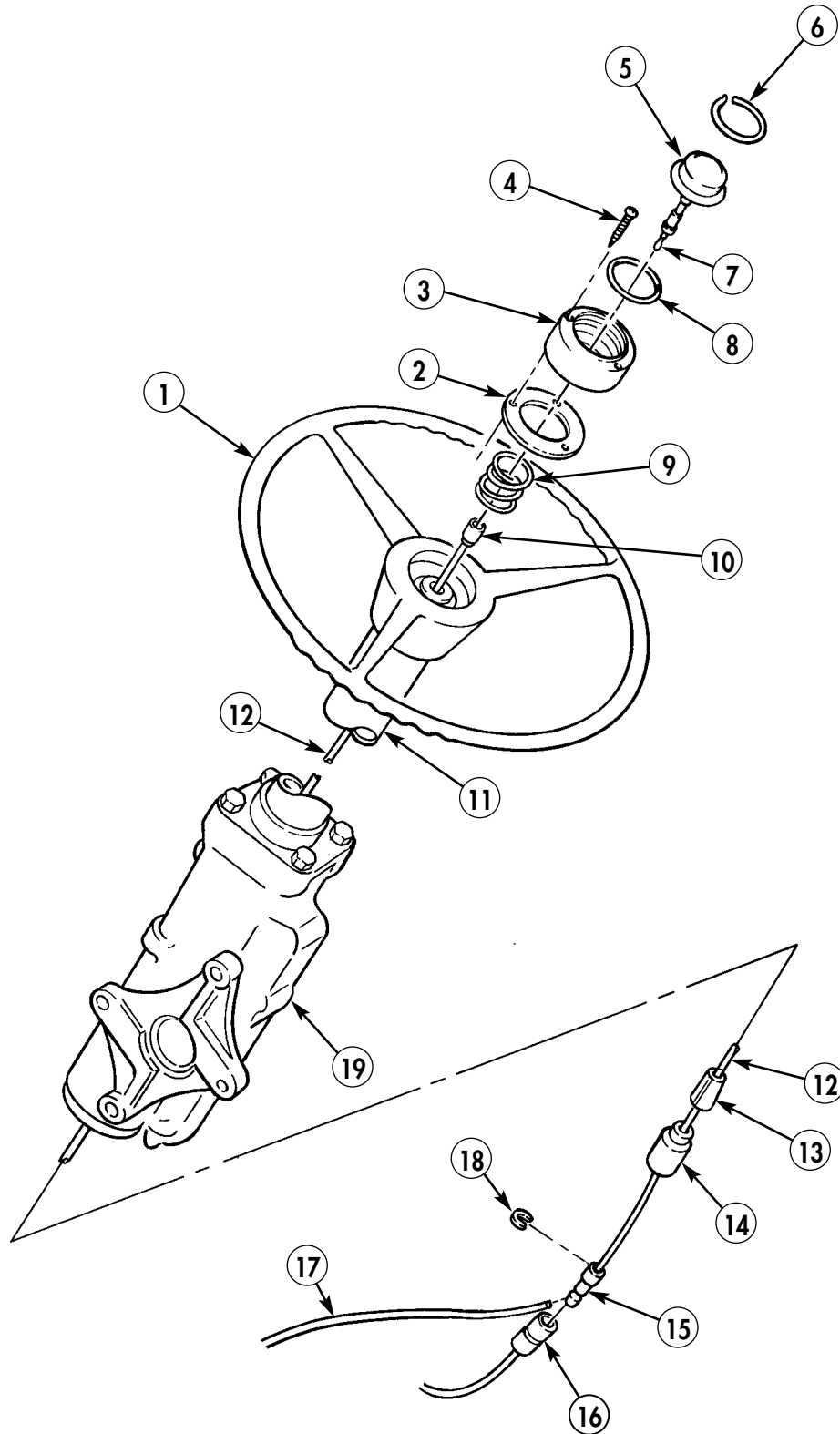
### INSTALLATION

#### NOTE

If horn wire has not been removed, proceed to step 6.

1. Pull horn wire (12) through steering column (11). Make sure horn wire (12) is taut between steering column (11) and connector (15). Discard safety wire (17).
2. Install rubber bushing (13) on horn wire (12) and insert into hole in steering gearbox (19).
3. Move shell (14) upward on wire (12) and install slotted washer (18) behind connector (15). Slide shell (14) over slotted washer (18).
4. Connect plug (16) to connector (15).
5. Install spring (9) and seal (2) in steering column (11).
6. Install retaining ring (6), horn button (5), and new O-ring (8) in adapter (3).
7. Connect wire connector (10) to horn button connector (7).
8. Install horn adapter (3) in steering column (11) and steering wheel (1) with three screws (4).
9. Connect battery ground cable (WP 0126 00).
10. Check horn for proper operation (TM 9-2320-361-10).
11. Connect battery ground cable (WP 0126 00).
12. Lower and secure hood (TM 9-2320-361-10).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### HORN BUTTON REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR HORN, SOLENOID, AND BRACKET REPLACEMENT

SOLENOID REMOVAL, AIR HORN REMOVAL, AIR HORN INSTALLATION, AND SOLENOID INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 195, WP 0470 00)  
Two lockwashers (item 216, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Air reservoir drained (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

---

## AIR HORN, SOLENOID, AND BRACKET REPLACEMENT (Contd)

### SOLENOID REMOVAL

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

1. Disconnect air line (2) from elbow (3).
2. Remove elbow (3) from air solenoid (4).

#### **NOTE**

Prior to removal, tag lead wires for installation.

3. Disconnect wire plugs (5) and (6) from air solenoid (4).
4. Remove air solenoid (4) and nipple (7) from air horn (1).

### AIR HORN REMOVAL

1. Remove two nuts (10), lockwashers (11), screws (16), and air horn (1) from bracket (12). Discard lockwashers (11).
2. Remove two nuts (14), lockwashers (13), screws (9), and bracket (12) from fender (15) and brace (8). Discard lockwashers (13).

### AIR HORN INSTALLATION

1. Install bracket (12) on fender (15) with brace (8), two screws (9), new lockwashers (13), and nuts (14).
2. Install air horn (1) on bracket (12) with two screws (16), new lockwashers (11), and nuts (10).

### SOLENOID INSTALLATION

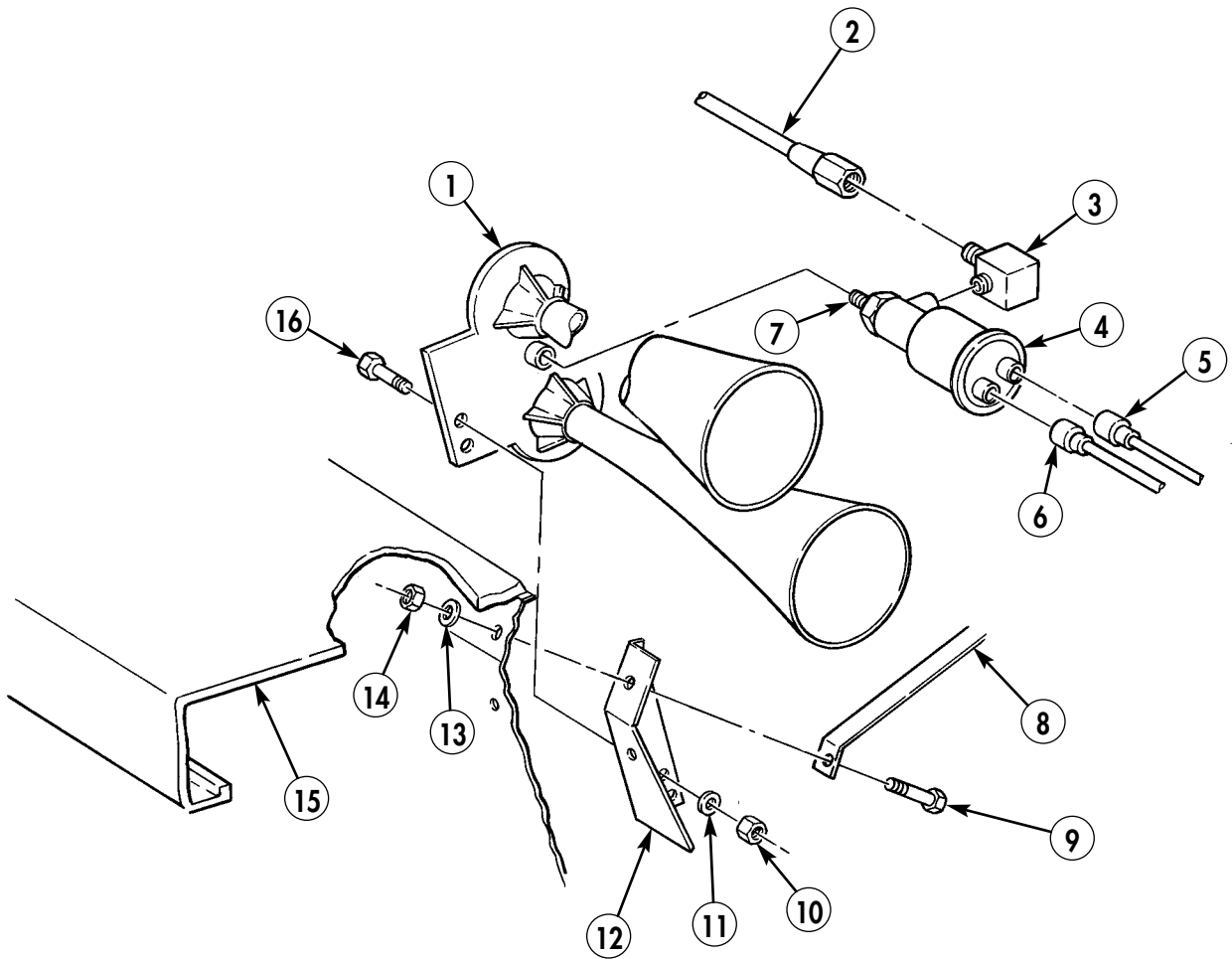
#### **NOTE**

Clean all male pipe threads and wrap with antiseize tape before installation.

1. Install nipple (7) and air solenoid (4) on air horn (1).
2. Install elbow (3) on air solenoid (4).
3. Connect air line (2) to elbow (3).
4. Connect wire plugs (5) and (6) to air solenoid (4).
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating range.
7. Check for air leaks at horn solenoid.
8. Check horn for proper operation (TM 9-2320-361-10).
9. Lower hood and secure (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



AIR HORN, SOLENOID, AND BRACKET REPLACEMENT (Contd)





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### CIRCUIT BREAKER REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

#### REMOVAL

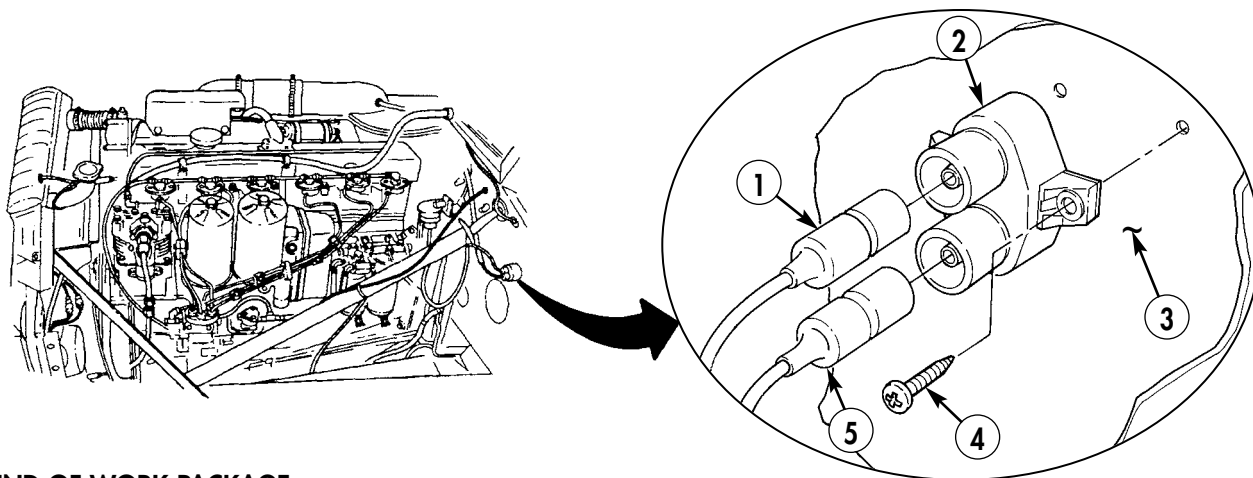
##### NOTE

- Vehicle with auxiliary power outlets and personnel heaters have two additional circuit breakers located next to horn circuit breaker. Replacement procedures are the same for all circuit breakers.
- Prior to removal, tag all lead wires for installation.

1. Disconnect wires (1) and (5) from circuit breaker (2).
2. Remove two screws (4) and circuit breaker (2) from firewall (3).

#### INSTALLATION

1. Install circuit breaker (2) on firewall (3) with two screws (4).
2. Connect wires (1) and (5) to circuit breaker (2).
3. Connect battery ground cable (WP 0126 00).
4. Lower and secure hood (TM 9-2320-361-10).
6. Check operation of horn and personel heater (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HOT WATER PERSONNEL HEATER CONTROL SWITCH REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Three screw-assembled lockwashers

(item 414, WP 0470 00)

Two lockwashers (item 207, WP 0470 00)

Lockwasher (item 196, WP 0470 00).

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## HOT WATER PERSONNEL HEATER CONTROL SWITCH REPLACEMENT (Contd)

### REMOVAL

1. Remove nut (9), lockwasher (8), locking ring (7), and switch (11) from mounting bracket (5). Discard lockwasher (8).

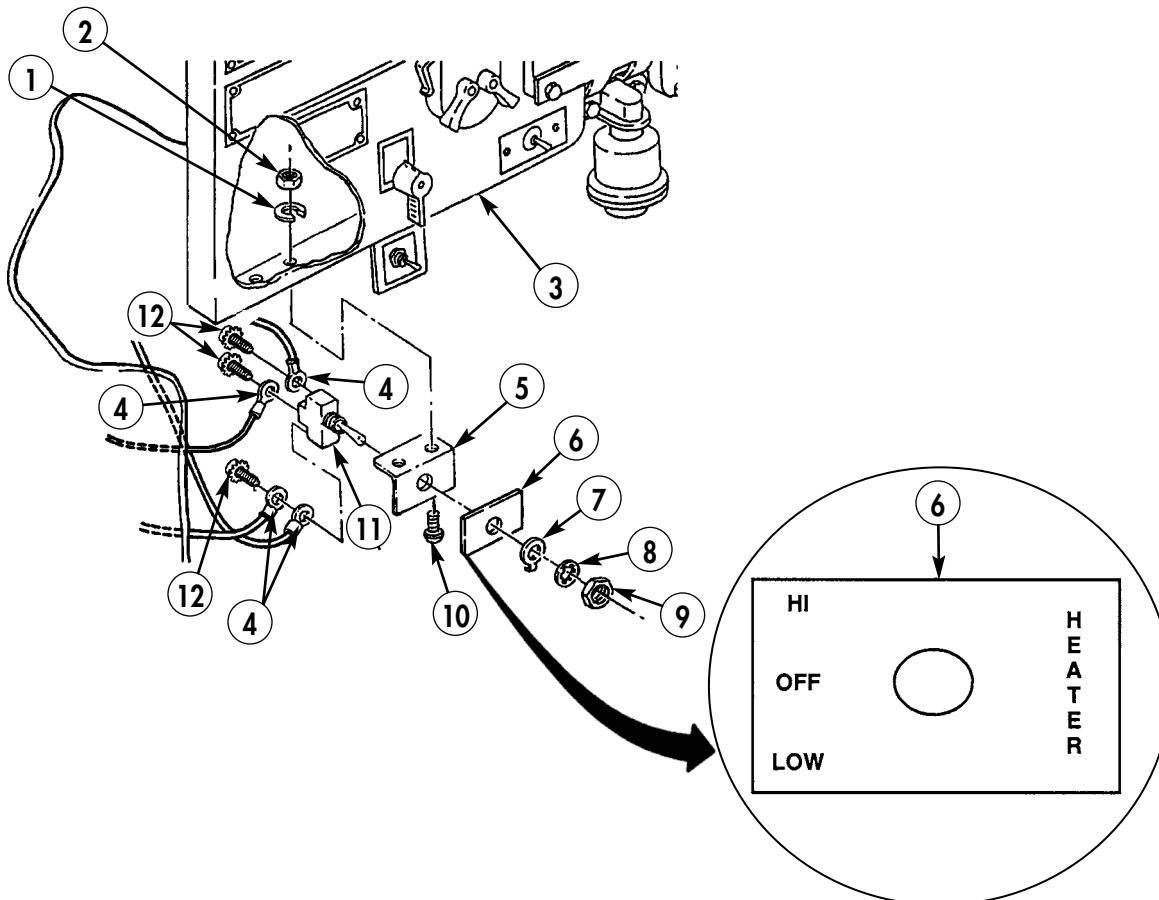
### NOTE

Prior to removal, tag lead wires for installation.

2. Remove three screw-assembled lockwashers (12) and four wires (4) from switch (6). Discard assembled washer screws (8).
3. Remove two nuts (2), lockwashers (1), screws (10), and mounting bracket (5) from instrument panel (3). Discard lockwashers (1).

### INSTALLATION

1. Install mounting bracket (5) on instrument panel (3) with two screws (10), new lockwashers (1), and nuts (2).
2. Install four wires (4) on switch (11) with three new assembled washer screws (12).
3. Position toggle switch in switch (11) down. Install plate (6), locking ring (7), new lockwasher (8), and nut (9) on mounting bracket (5).
4. Connect battery ground cable (WP 0126 00).
5. Check heater switch for proper operation (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HOT WATER PERSONNEL HEATER BLOWER MOTOR RESISTOR REPLACEMENT REMOVAL AND INSTALLATION

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 215, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

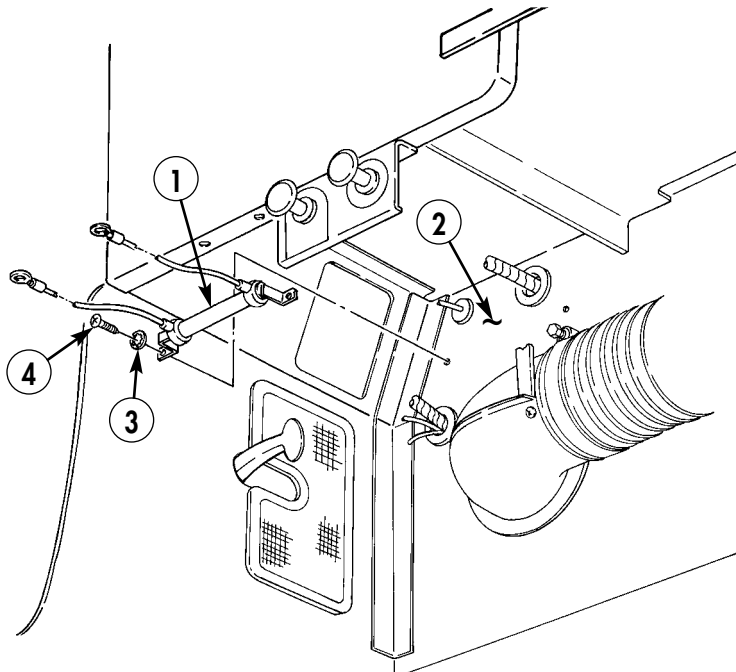
Battery ground cable disconnected  
(WP 0126 00).

#### REMOVAL

Remove two screws (4), lockwashers (3), and resistor (1) from firewall (2). Discard lockwashers (3).

#### INSTALLATION

1. Install resistor (1) on firewall (2) with two new lockwashers (3) and screws (4).
2. Connect battery ground cable (WP 0126 00).
3. Turn on hot water heater switch (TM 9-2320-361-10) and check personnel heater operations.
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT WHEEL DRIVE LOCK-IN SWITCH INDICATOR AND AIR PRESSURE SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Applicable Models

All

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Air reservoirs drained (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## FRONT WHEEL DRIVE LOCK-IN SWITCH INDICATOR AND AIR PRESSURE SWITCH

### NOTE

Prior to removal, tag all lead wires for installation.

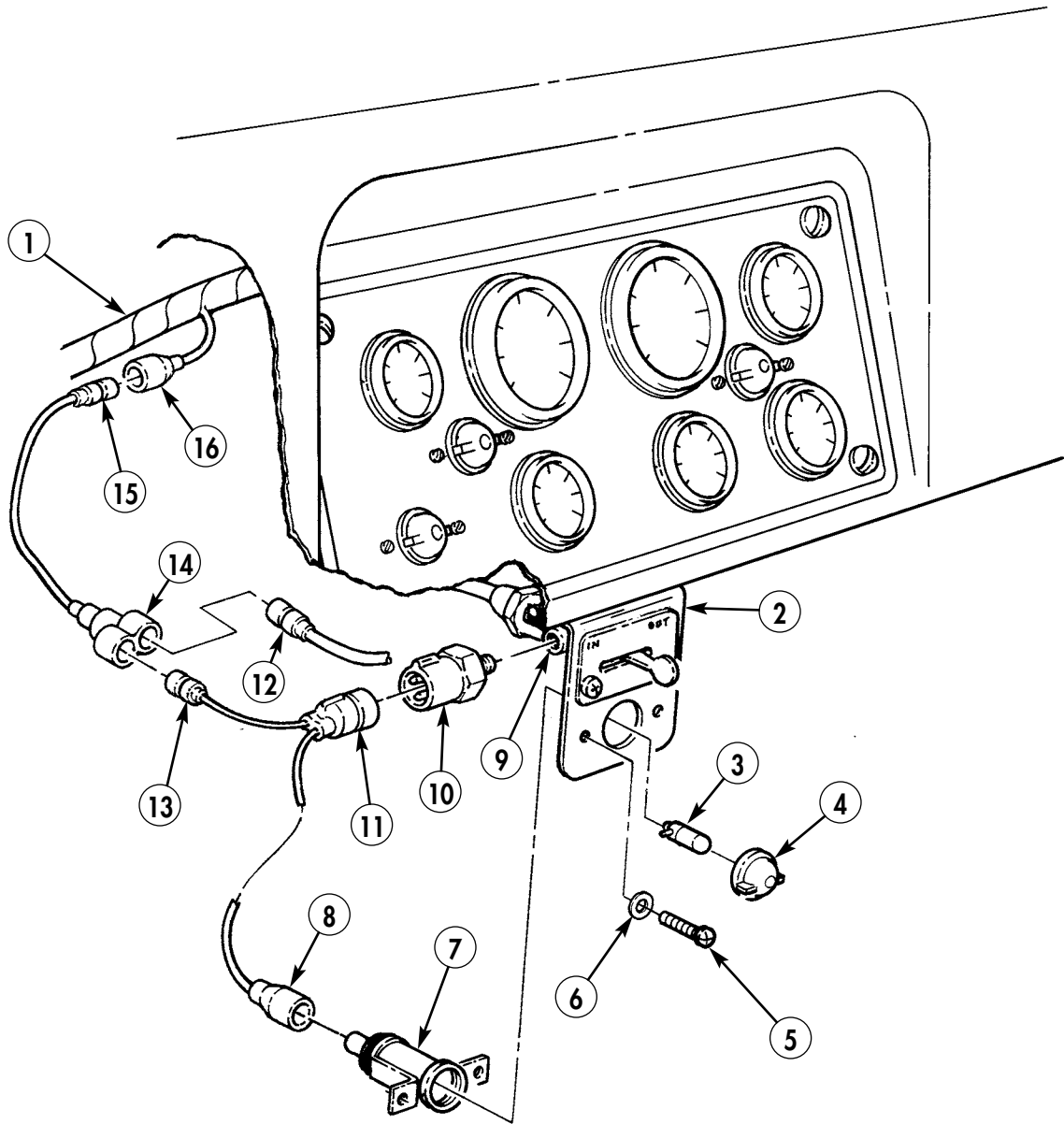
### REMOVAL

1. Remove wire connector (11) from air pressure switch (10).
2. Remove air pressure switch (10) from air valve (9).
3. Disconnect wire (15) from connector (16) at front wiring harness (1).
4. Disconnect wires (12) and (13) from connector (14).
5. Disconnect wire (8) from indicator lamp socket (7).
6. Remove lens cover (4) and lamp (3) from indicator lamp socket (7).
7. Remove two screws (5), washers (6), and indicator lamp socket (7) from bracket (2).

### INSTALLATION

1. Install indicator lamp socket (7) on bracket (2) with two screws (5) and washers (6).
2. Install lamp (3) and lens cover (4) on indicator lamp socket (7).
3. Connect wire (8) to indicator lamp socket (7).
4. Connect wires (12) and (13) to connector (14).
5. Connect wire (15) to connector (16) at front wiring harness (1).
6. Install air pressure switch (10) on air valve (9).
7. Install wire connector (11) on air pressure switch (10).
8. Connect battery ground cable (WP 0126 00).
9. Start engine (TM 9-2320-361-10) and allow air pressure to build up to normal operating pressure. Check for leaks at switch.
10. Engage front wheel drive lever (TM 9-2320-361-10) and check if indicator light is illuminated.
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**FRONT WHEEL DRIVE LOCK-IN SWITCH INDICATOR AND AIR PRESSURE SWITCH  
REPLACEMENT (Contd)**





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SEALED BEAM AND HEADLAMP HOUSING REPLACEMENT

SEALED BEAM REMOVAL, HEADLAMP HOUSING REMOVAL, HEADLAMP HOUSING INSTALLATION,  
AND SEALED BEAM INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Six lockwashers (item 207, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## SEALED BEAM AND HEADLAMP HOUSING REPLACEMENT (Contd)

### SEALED BEAM REMOVAL

1. Remove three screws (1) and retaining ring (2) from headlamp housing (18).

#### **NOTE**

Prior to removal, tag all lead wires for installation.

2. Disconnect three wires (19) from connector plugs (13) and remove sealed beam (3).

### HEADLAMP HOUSING REMOVAL

1. Disconnect three wires (12) from three connector plugs (13) at rear of housing (7).
2. Remove three nuts (10), lockwashers (9), shock mounts (8), and housing (7), from body (11). Discard lockwashers (9).
3. Loosen two adjusting screws (16) and remove spring (17) from headlamp housing (18).
4. Remove headlamp housing (18) from housing (7).
5. Remove two adjusting screws (16) and adjusting nuts (15) from housing (7).
6. Remove three nuts (4), lockwashers (5), washers (6), and shock mounts (8) from housing (7). Discard lockwashers (5).
7. Remove three connector plugs (13) and grommets (14) from housing (7).

### HEADLAMP HOUSING INSTALLATION

1. Install three grommets (14) and connectors plugs (13) in housing (7).
2. Install three shock mounts (8) on housing (7) with three washers (6), new lockwashers (5), and nuts (4).
3. Install two adjusting nuts (15) in housing (7) with adjusting screws (16).

#### **NOTE**

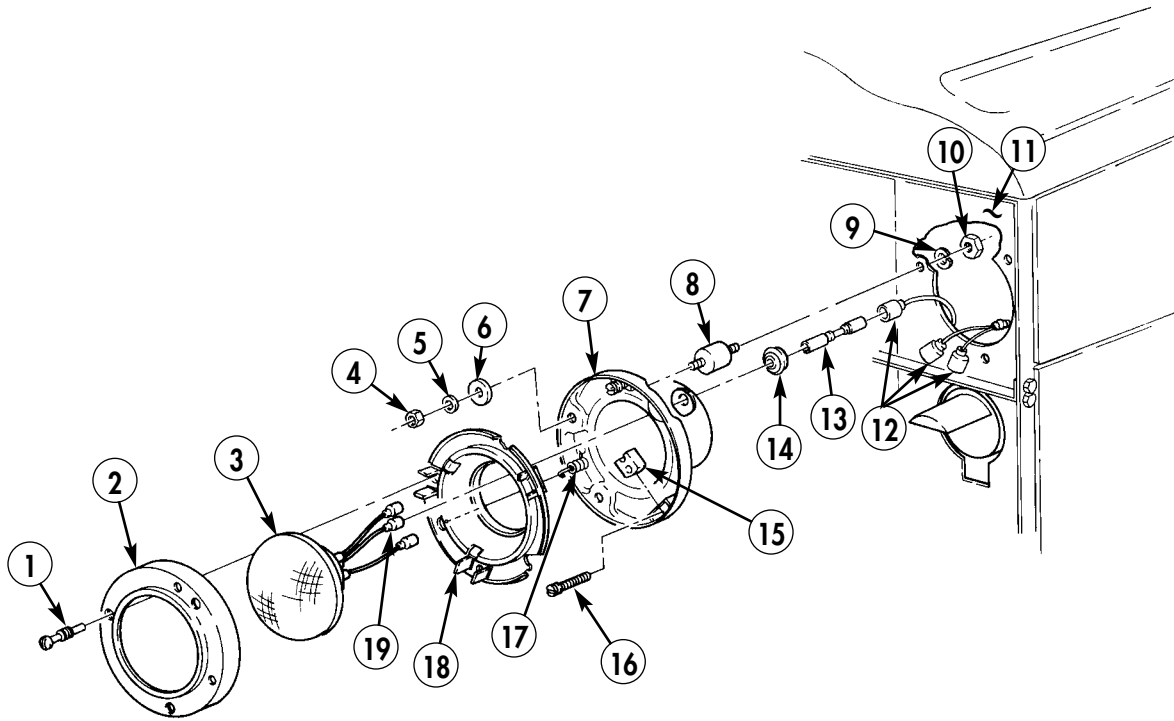
Adjusting nuts must move freely for lamp adjustment. Do not bottom out adjusting screws in step 4.

4. Install headlamp housing (18) on adjusting screws (16) and tighten adjusting screws (16) evenly.
5. Install spring (17) on housing (18) and adjusting screw (16).
6. Install housing (7) on body (11) with three shock mounts (8), new lockwashers (9), and nuts (10).
7. Connect three wires (12) to connector plugs (13).

### SEALED BEAM INSTALLATION

1. Connect three wires (19) to connector plugs (13).
2. Install sealed beam (3) in headlamp housing (18) with retaining ring (2) and three retaining screws (1).
3. Connect battery ground cable (WP 0126 00).
4. Lower hood and secure (TM 9-2320-361-10).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

SEALED BEAM AND HEADLAMP HOUSING REPLACEMENT (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SEALED BEAM AND HEADLAMP HOUSING ADJUSTMENT

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#### INITIAL SETUP:

##### Applicable Models

All

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

##### Materials/Parts

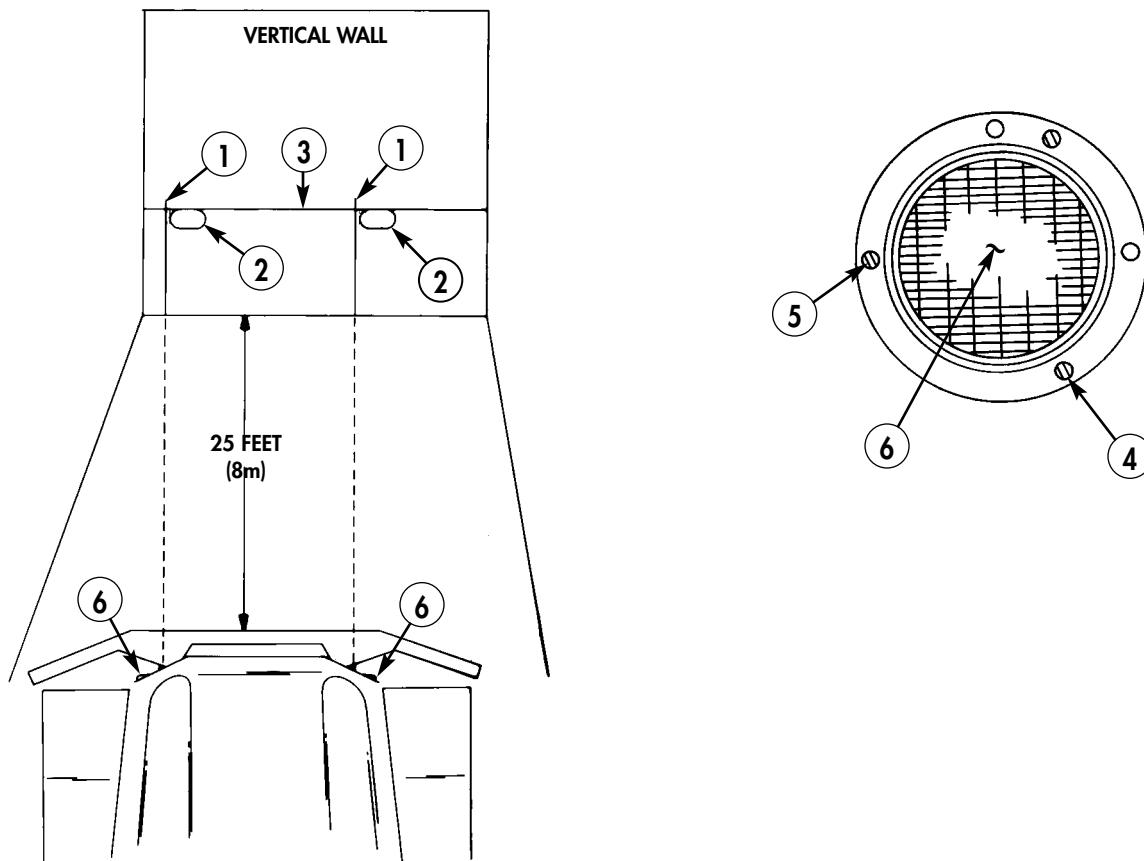
Marking chalk (item 11, WP 0468 00)

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## SEALED BEAM AND HEADLAMP HOUSING ADJUSTMENT (Contd)

### ADJUSTMENT

1. Using chalk, draw a horizontal line (3) on a wall the height of center of headlamp (6).
2. Park truck facing wall so headlamps (6) are 25 ft (7.62 m) from wall.
3. Using chalk, draw a vertical line (1) through horizontal line (3) so it is in line with center of headlamp (6).
4. Turn headlamps (6) on low beam (TM 9-2320-361-10).
5. Adjust headlamp (6) horizontal direction with adjusting screw (5) until left edge of bright light area (2) on wall is 2–6 in. (5.08–15.24 cm) right of vertical line (1).
6. Adjust headlamp (6) vertical direction with adjusting screw (4) until top edge of bright light area (2) on wall is touching lower side of horizontal line (3).
7. Repeat steps 1 through 6 for opposite headlight (6).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### INTERMEDIATE TURN SIGNAL REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Lockwasher (item 220, WP 0470 00)  
Two lockwashers (item 195, WP 0470 00)  
Two O-rings (item 283, WP 0470 00)

##### Equipment Condition

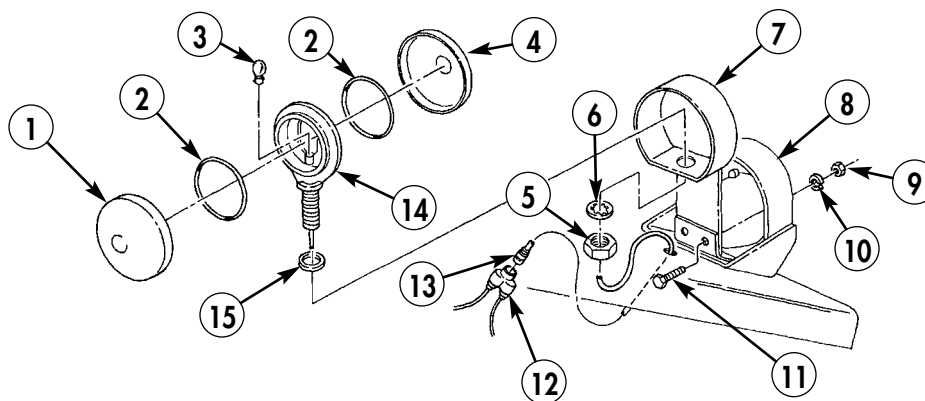
Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

#### REMOVAL

1. Remove amber lens (4), red lens (1), two O-rings (2), and lamp (3) from bracket (14). Discard O-rings (2).
2. Disconnect wire (13) from connector (12).
3. Remove nut (5), lockwasher (6), washer (15), and bracket (14) from brush guard (7). Discard lockwasher (6).
4. Remove two screws (11), lockwashers (10), nuts (9), and brush guard (7) from bracket (8). Discard lockwashers (10).

#### INSTALLATION

1. Install brush guard (7) on bracket (8) with two screws (11), new lockwashers (10), and nuts (9).
2. Install bracket (14), washer (15), new lockwasher (6), and nut (5) on brush guard (7).
3. Connect wire (13) to connector (12).
4. Install lamp (3), two new O-rings (2), red lens (1), and amber lens (4) on bracket (14).
5. Connect battery ground cable (WP 0126 00).
6. Check operation of intermediate turn signal light (TM 9-2320-361-10).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT COMPOSITE LAMPS, HOUSING, AND BRACKET REPLACEMENT

COMPOSITE LAMPS REMOVAL, COMPOSITE LIGHT HOUSING REMOVAL,  
COMPOSITE LIGHT HOUSING INSTALLATION, AND COMPOSITE LAMPS INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 195, WP 0470 00)  
Four locknuts (item 146, WP 0470 00)  
O-ring (item 289, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Intermediate turn signal removed, if equipped  
(WP 0121 00).

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## FRONT COMPOSITE LAMPS, HOUSING, AND BRACKET REPLACEMENT (Contd)

### COMPOSITE LAMPS REMOVAL

1. Loosen five screws (2) and remove lens cover (1) and O-ring (16) from composite light housing (4). Discard gasket (16).
2. Remove lamp(s) (3) from composite light housing (4).

### COMPOSITE LIGHT HOUSING REMOVAL

#### NOTE

Prior to removal, tag all lead wires for installation.

1. Disconnect three wires (6) from wires (5).
2. Remove two screws (7), lockwashers (8), and composite light housing (4) from upper bracket (15). Discard lockwashers (8).
3. Remove four locknuts (13), screws (14), lower bracket (11), and upper bracket (15) from fender (10). Discard locknuts (13).
4. Remove two grommets (9) and (12) from fender (10) and lower bracket (11).

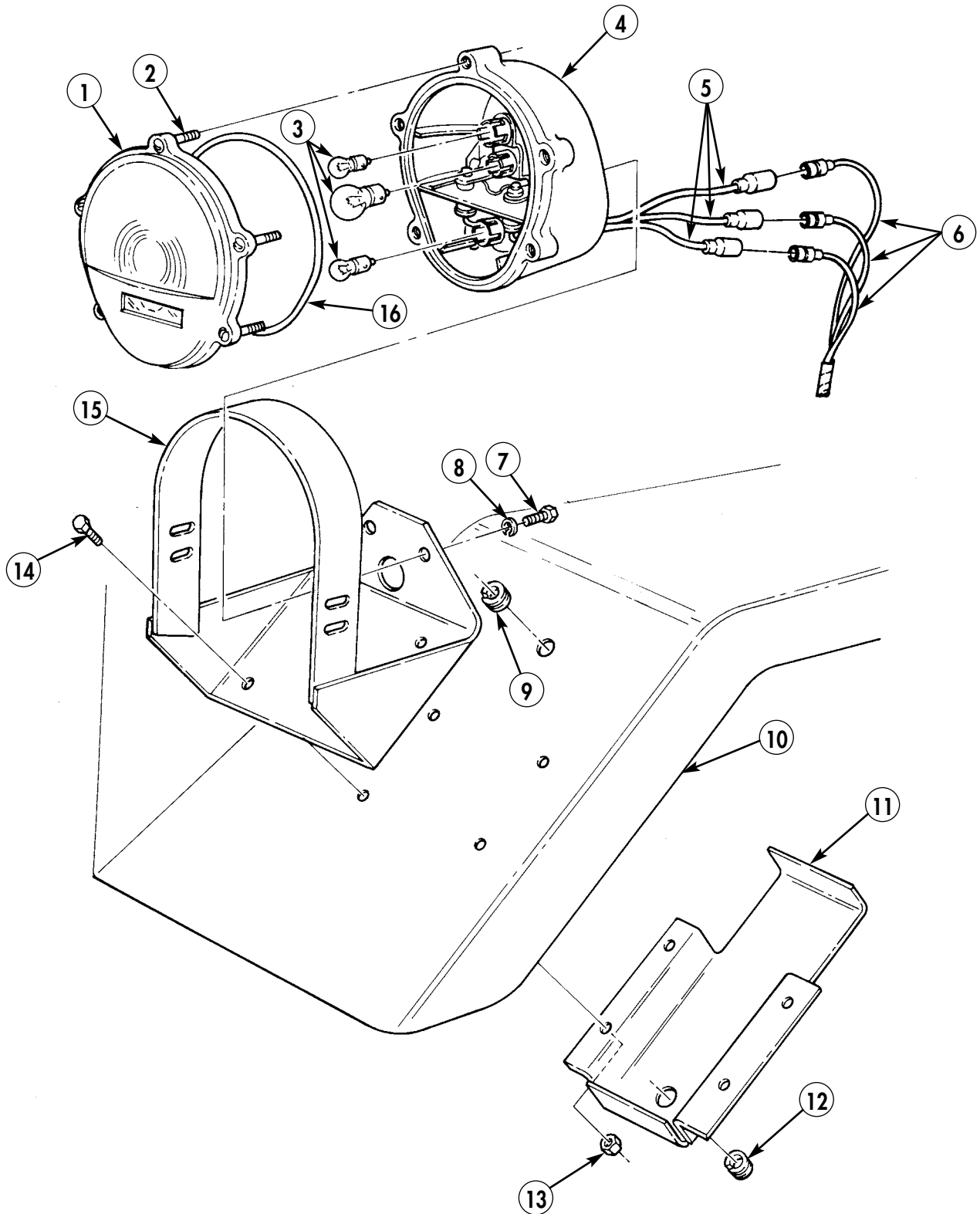
### COMPOSITE LIGHT HOUSING INSTALLATION

1. Install grommets (9) and (12) on fender (10) and lower bracket (11).
2. Install upper bracket (15) and lower bracket (11) on fender (10) with four screws (14) and new locknuts (13).
3. Install composite light housing (4) on upper bracket (15) with two new lockwashers (8) and screws (7).
4. Connect three wires (6) to three wires (5).

### COMPOSITE LAMPS INSTALLATION

1. Install lamp(s) (3) in composite light housing (4).
2. Install new O-ring (16) and lens cover (1) on composite light housing (4) with five screws (2). Tighten screws (2).
3. Install intermediate turn signal, if equipped (WP 0121 00).
4. Connect battery ground cable (WP 0126 00).
5. Check operation of front composite light (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT COMPOSITE LAMPS, HOUSING, AND BRACKET REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### BLACKOUT DRIVE LAMP AND HOUSING REPLACEMENT

BLACKOUT DRIVE LAMP REMOVAL, BLACKOUT DRIVE LAMP HOUSING REMOVAL,  
BLACKOUT DRIVE LAMP HOUSING INSTALLATION, AND BLACKOUT DRIVE LAMP INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Gasket (item 88, WP 0470 00)  
Three gaskets (item 89, WP 0470 00)  
Lockwasher (item 195, WP 0470 00)  
Eight lockwashers (item 207, WP 0470 00)

##### References

TM 9-6140-200-14

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## **BLACKOUT DRIVE LAMP AND HOUSING REPLACEMENT (Contd)**

### **BLACKOUT DRIVE LAMP REMOVAL**

1. Loosen three screws (2) and remove lens cover (1), three gaskets (9), and gasket (8) from blackout drive lamp housing (4). Discard gaskets (9) and gasket (8).
2. Remove lamp (3) from blackout drive lamp housing (4).

### **BLACKOUT DRIVE LAMP HOUSING REMOVAL**

#### **NOTE**

Prior to removal, tag all lead wires for installation.

1. Remove wire (5) from connector plug (6).
2. Remove nut (17), lockwasher (18), ground wire (16), mounting washers (19) and (7), and blackout drive lamp housing (4) from bracket (11). Discard lockwasher (18).
3. Remove eight nuts (14), seven lockwashers (15), lockwasher (13), clamp (12), bracket (11), and four shock mounts (10) from plate (20). Discard lockwashers (15) and (13).

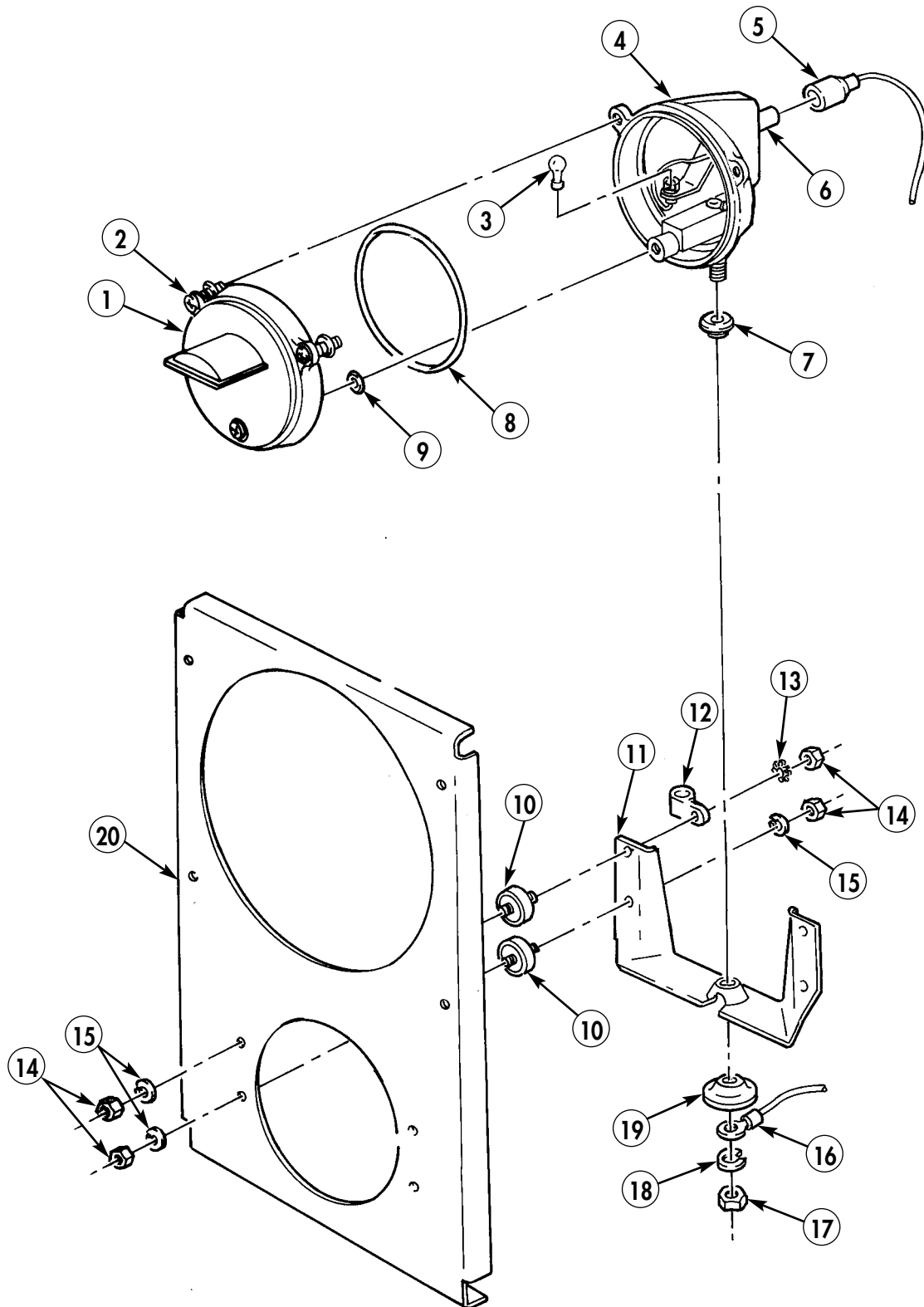
### **BLACKOUT DRIVE LAMP HOUSING INSTALLATION**

1. Install four shock mounts (10) and bracket (11) on plate (20) with seven new lockwashers (15), clamp (12), new lockwasher (13), and eight nuts (14).
2. Install blackout lamp housing (4) on bracket (11) with mounting washers (19) and (7), ground wire (16), new lockwasher (18), and nut (17).
3. Connect wire (5) to connector plug (6).

### **BLACKOUT DRIVE LAMP INSTALLATION**

1. Install lamp (3) in blackout drive lamp housing (4).
2. Install new gasket (8), three new gaskets (9), and lens cover (1) on blackout drive lamp housing (4) with three screws (2).
3. Connect battery ground cable (WP 0126 00).
4. Lower hood and secure (TM 9-2320-361-10).
5. Check operation of blackout drive lamp (TM 9-2320-361-10).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**BLACKOUT DRIVE LAMP AND HOUSING REPLACEMENT (Contd)**



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SIDE MARKER AND CLEARANCE LAMPS REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two locknuts (item 130, WP 0470 00)  
Four lockwashers (item 212, WP 0470 00)  
Four lockwashers (item 241, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## SIDE MARKER CLEARANCE LAMPS REPLACEMENT (Contd)

### REMOVAL

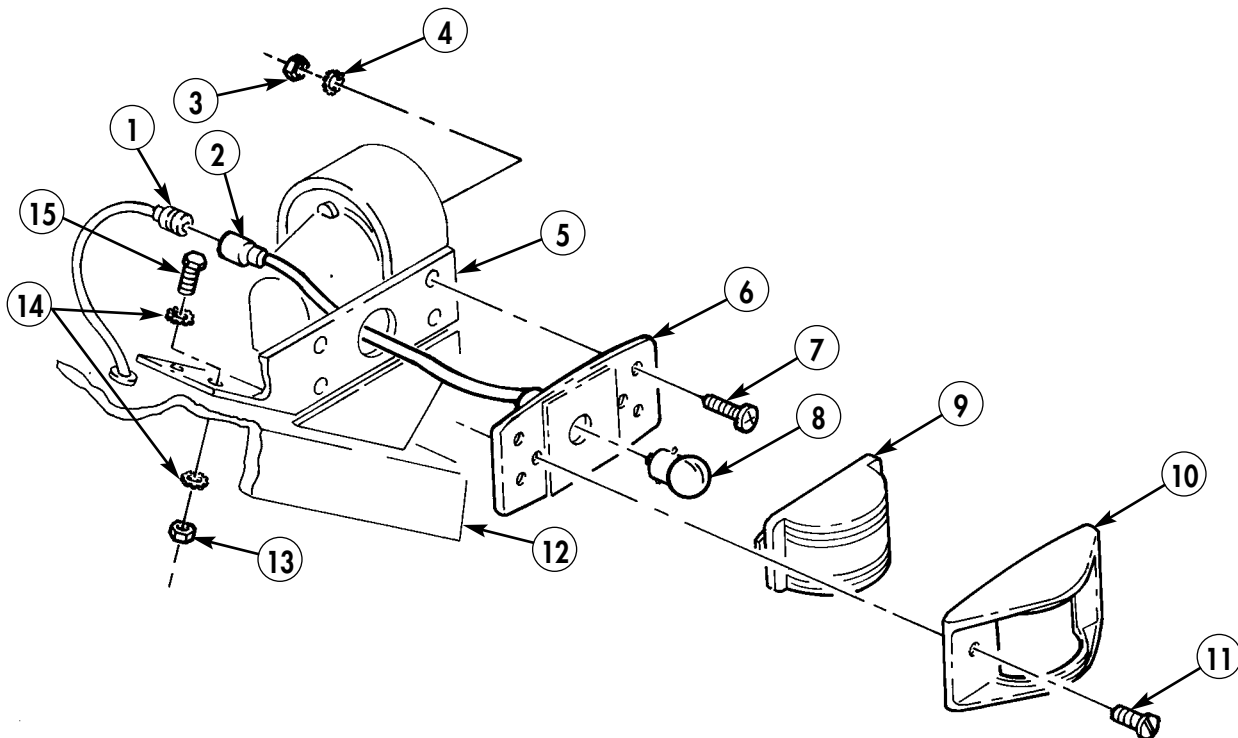
#### NOTE

All side marker lights and clearance lights are replaced the same.

1. Remove two screws (11), lens frame (10), and lens (9) from marker light base (6).
2. Remove lamp (8) from marker light base (6).
3. Remove four nuts (3), lockwashers (4), and screws (7) from marker light base (6) and bracket (5). Discard lockwashers (4).
4. Disconnect wire (2) from wire (1) and remove marker light base (6) from bracket (5).
5. Remove locknut (13), two lockwashers (14), screw (15), and bracket (5) from fender (12). Discard lockwashers (14) and locknut (13).

### INSTALLATION

1. Install bracket (5) on fender (12) with screw (15), two new lockwashers (14), and new locknut (13).
2. Connect wire (2) to wire (1).
3. Install marker light base (6) on bracket (5) with four screws (7), new lockwashers (4), and nuts (3).
4. Install lamp (8) in marker light base (6).
5. Install lens (9) and lens frame (10) on marker light base (6) with two screws (11).
6. Connect battery ground cable (WP 0126 00).
7. Check operation of side marker light (TM 9-2320-361-10).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR COMPOSITE LAMPS AND HOUSING REPLACEMENT

REAR COMPOSITE LAMPS REMOVAL, REAR COMPOSITE LAMPS HOUSING REMOVAL,  
REAR COMPOSITE HOUSING INSTALLATION, AND REAR COMPOSITE LAMPS INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 210, WP 0470 00)

O-ring (item 290, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## REAR COMPOSITE LAMPS AND HOUSING REPLACEMENT (Contd)

### REAR COMPOSITE LAMPS REMOVAL

1. Loosen six screws (8) and remove lens (9) and O-ring (7) from composite lamp housing (5). Discard O-ring (7).
2. Remove lamp(s) (6) from composite lamp housing (5).

### REAR COMPOSITE LAMPS HOUSING REMOVAL

#### **NOTE**

Prior to removal, tag all lead wires for installation.

1. Disconnect four wires (10) from wires (4).
2. Remove two screws (1), lockwashers (2), and composite lamp housing (5) from bracket (3). Discard lockwashers (2).

### REAR COMPOSITE LAMPS HOUSING INSTALLATION

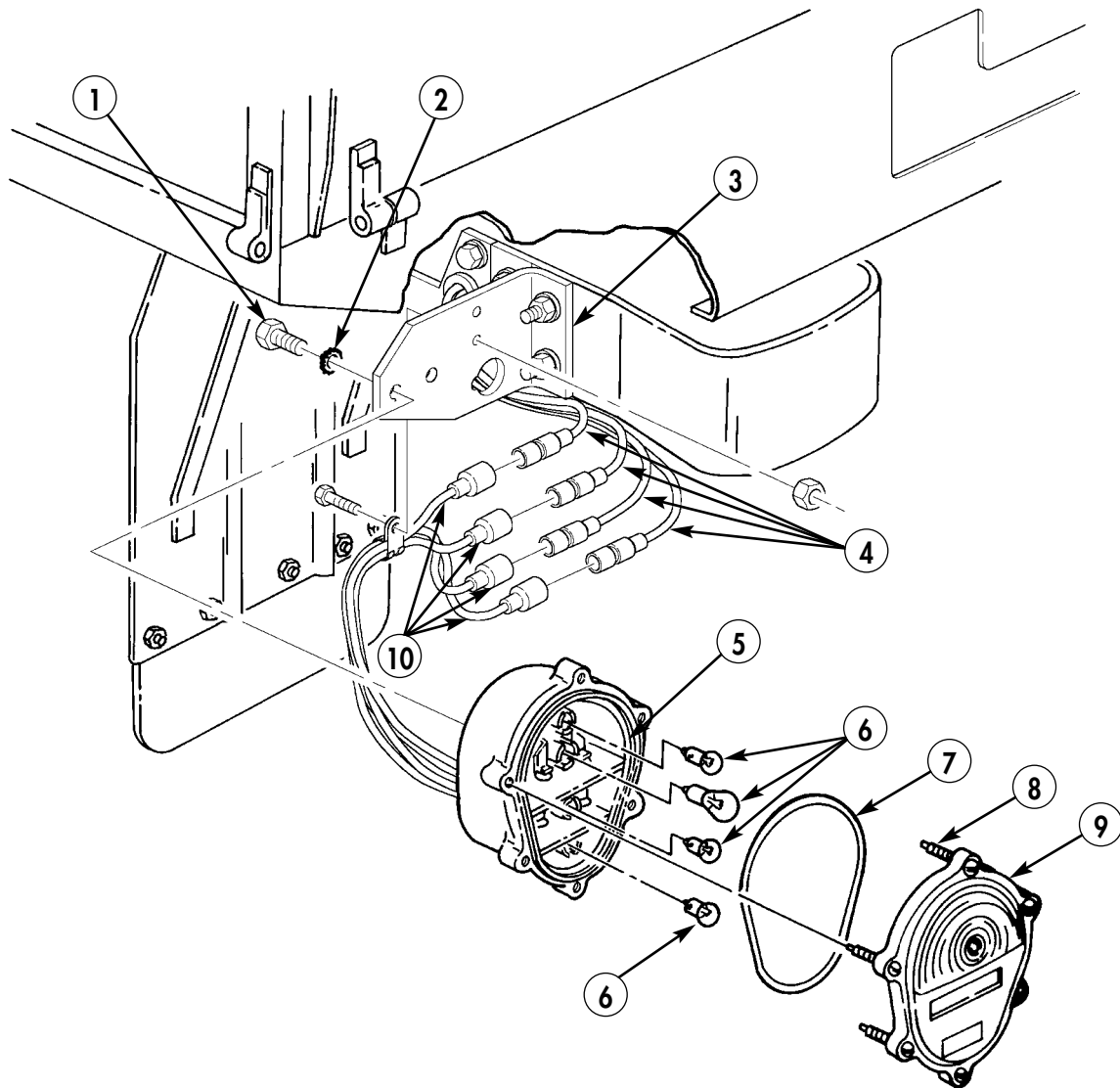
1. Install composite lamp housing (5) on bracket (3) with two new lockwashers (2) and screws (1).
2. Connect four wires (10) to wires (4).

### REAR COMPOSITE LAMPS INSTALLATION

1. Install lamp(s) (6) in composite lamp housing (5).
2. Install new O-ring (7) and lens (9) on composite lamp housing (5) with six screws (8).
3. Connect battery ground cable (WP 0126 00).
4. Check operation of rear composite lamps (TM 9-2320-361-10).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



REAR COMPOSITE LAMPS AND HOUSING REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### BATTERY CABLES AND CLAMPS MAINTENANCE

GROUND CABLE DISCONNECTION, GROUND CABLE CONNECTION,  
REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### References

TM 9-6140-200-14

##### Materials/Parts

Lockwasher (item 195, WP 0470 00)

Lockwasher (item 210, WP 0470 00)

GAA grease (item 17, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

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#### **WARNING**

- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin.
- Do not smoke, have open flame, or make sparks when performing battery maintenance. Batteries may explode, causing severe injury to personnel.
- Remove all jewelry such as rings, identification tags, and bracelets. If jewelry or disconnected battery ground cable contacts battery post, a direct short can result, causing damage to equipment or severe injury to personnel.
- When removing cables, disconnect the ground cable first. Do not allow tools to come into contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage, or battery explosion, and severe injury to personnel.

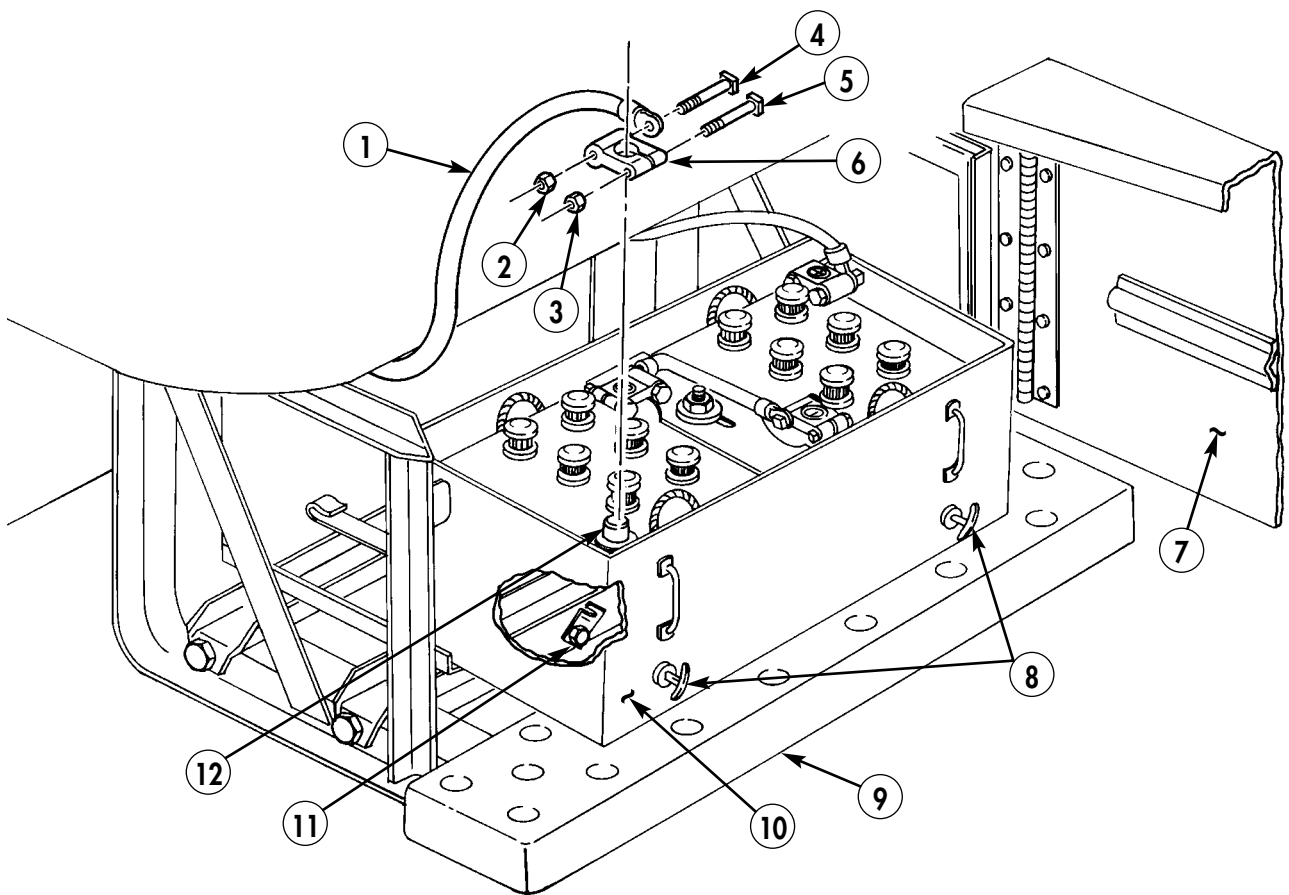
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## **BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)**

### **GROUND CABLE DISCONNECTION**

1. Open battery compartment door (7).
2. Loosen two thumbscrews (8) and clamps (11), and pull battery box (10) onto running board (9).
3. Remove nut (2) and screw (4) and disconnect ground cable (1) from battery clamp (6).
4. Remove nut (3), screw (5), and clamp (6) from negative post (12).

BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)



## **BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)**

### **REMOVAL**

#### **Ground Cable**

1. Remove nut (19) and screw (29) and disconnect ground cable (21) from battery clamp (20).
2. Remove nut (13), lockwasher (14), ground cable (21), lockwasher (17), and screw (16) from frame (15). Discard lockwashers (14) and (17).

#### **Battery-to-Battery Cable**

1. Remove nut (25), screw (2), and cable (1) from negative clamp (4).
2. Remove nut (27), screw (24), and cable (1) from positive clamp (22).

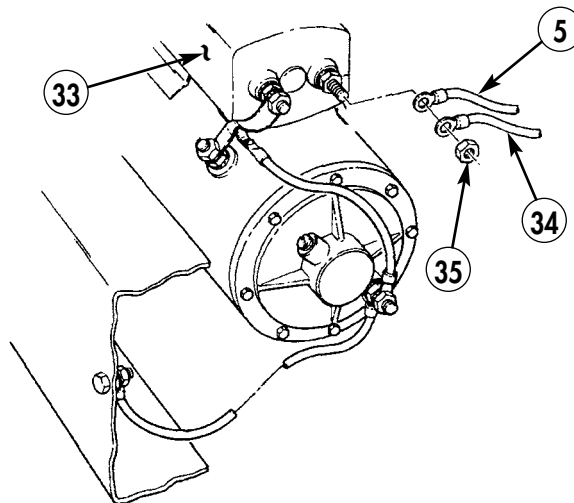
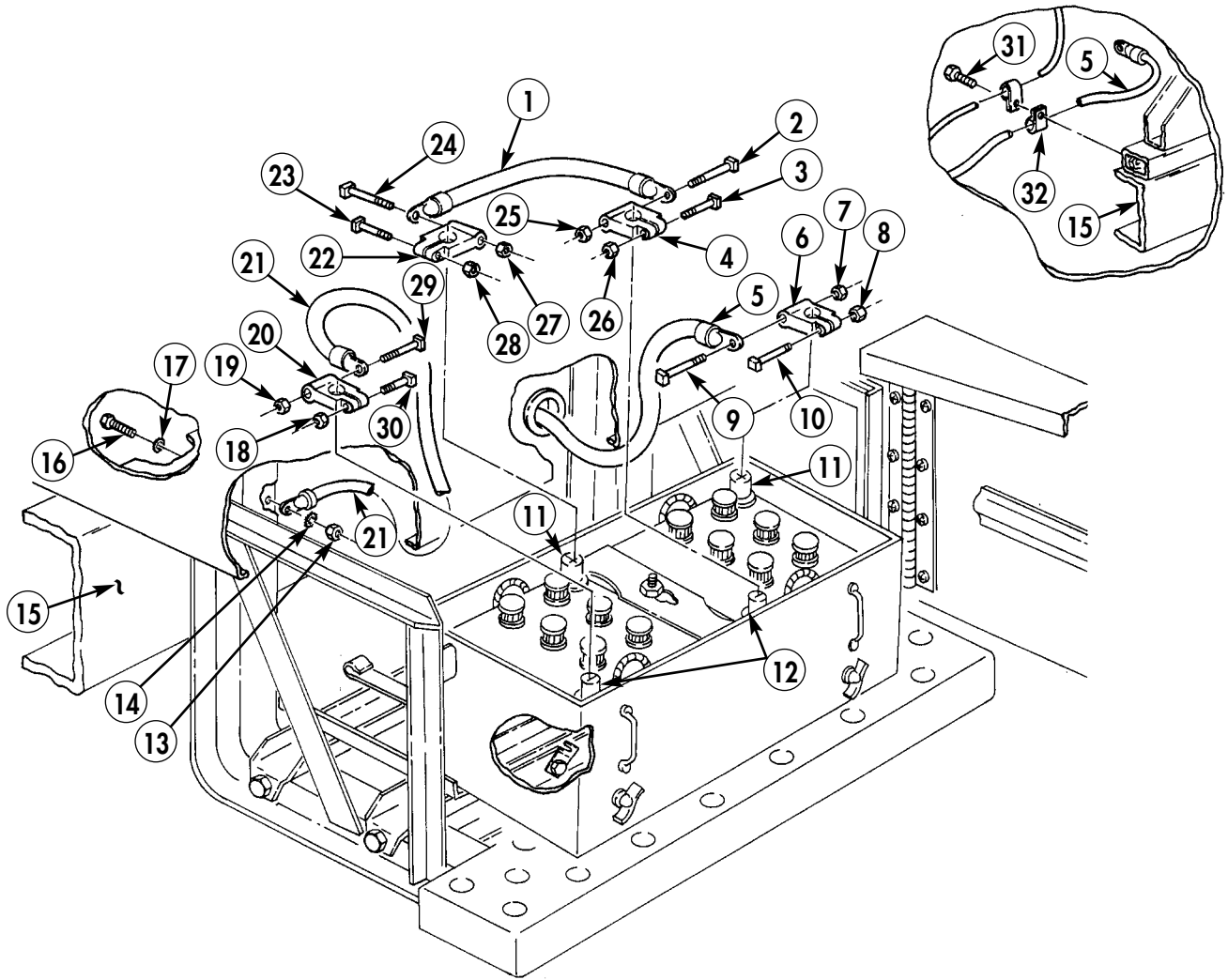
#### **Positive Cable**

1. Remove nut (7) and screw (9) and disconnect positive cable (5) from battery clamp (6).
2. Remove nut (35) and disconnect positive cable (5) and wire (34) from starter solenoid (33).
3. Remove screw (31), clamp (32), and positive cable (5) from frame (15).

#### **Battery Clamps**

1. Remove two nuts (26) and (18), screws (3) and (30), and clamps (4) and (20) from two negative posts (12).
2. Remove two nuts (8) and (28), screws (10) and (23), and clamps (6) and (22) from two positive posts (11).

BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)



## BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)

### CLEANING AND INSPECTION

For general cleaning instructions, maintenance, and servicing of battery cables and clamps, refer to TM 9-6140-200-14.

### INSTALLATION

#### **CAUTION**

- During installation of battery terminals, make sure positive clamps are installed on positive posts (+) and negative clamps are installed on negative posts (-). Failure to connect clamps to correct posts will reverse polarity of circuitry and may cause damage to rectifier diodes in alternator, vehicle wiring, and radios (if equipped).
- Do not use a hammer during installation of battery terminal. Spread battery terminal open, or damage to equipment may result.

#### **NOTE**

Apply a light coat of GAA grease to battery terminals after connection is made. Wipe off excess grease.

#### **Battery Clamps**

1. Install two clamps (6) and (27) on two positive posts (11) with two screws (10) and (28) and nuts (8) and (33).
2. Install two clamps (4) and (25) on two negative posts (13) with two screws (3) and (35) and nuts (23) and (31).

#### **Positive Cable**

1. Install clamp (37) and positive cable (5) on frame (20) with screw (36).
2. Connect wire (39) and positive cable (5) to starter solenoid (38) with nut (40).
3. Connect positive cable (5) to clamp (6) with screw (9) and nut (7).

#### **Battery-to-Battery Cable**

1. Install cable (1) on positive clamp (27) with screw (29) and nut (32).
2. Install cable (1) on negative clamp (4) with screw (2) and nut (30).

#### **Ground Cable**

1. Connect ground cable (26) to frame (20) with new lockwasher (22), screw (21), lockwasher (19), and nut (18).
2. Connect ground cable (26) to battery clamp (25) with screw (34) and nut (24).

#### **Ground Cable Connection**

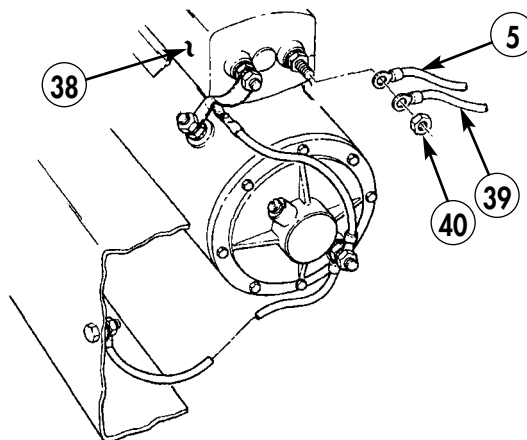
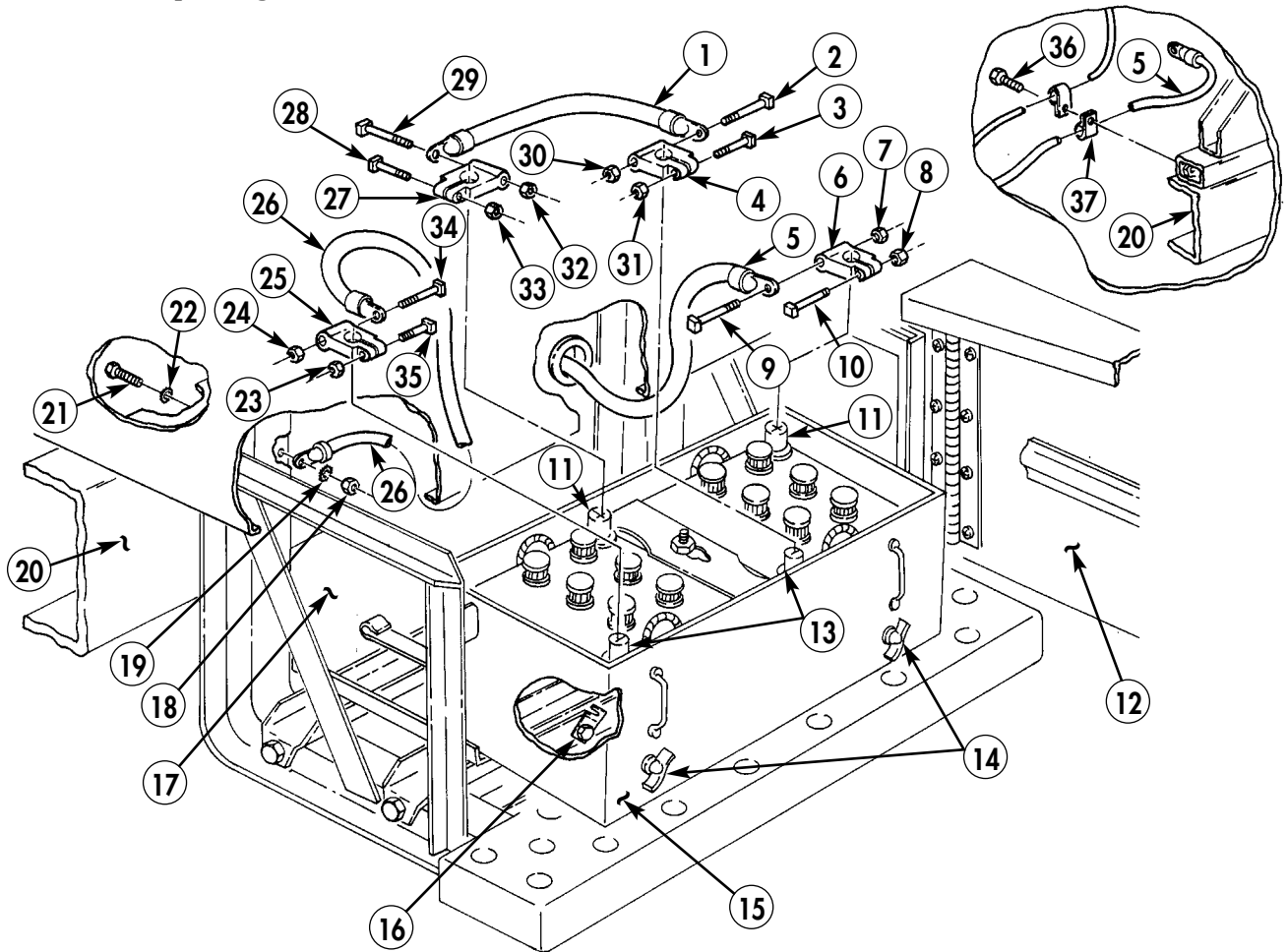
1. Install clamp (25) on negative post (13) with screw (30) and nut (23).
2. Install ground cable (26) on battery clamp (25) with screw (34) and nut (24).
3. Apply a light coat of GAA grease to battery terminals after connection is made. Wipe off excess grease.



**BATTERY CABLES AND CLAMPS MAINTENANCE (Contd)**

**Ground Cable Connection (Contd)**

4. Push battery box (15) into battery compartment (17) and install with two clamps (16) and thumbscrews (14).
5. Close battery compartment door (12).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### BATTERY AND BATTERY BOX REPLACEMENT AND SERVICING

BATTERY AND BATTERY BOX REMOVAL, BATTERY BOX SUPPORT REMOVAL, BATTERY AND BATTERY BOX SERVICING, BATTERY BOX SUPPORT INSTALLATION, AND BATTERY AND BATTERY BOX INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Materials/Parts

Two locknuts (item 155, WP 0470 00)

Four locknuts (item 129, WP 0470 00)

Five locknuts (item 145, WP 0470 00)

##### Materials/Parts (Contd)

Four lockwashers (item 195, WP 0470 00)

Two spring washers (item 366, WP 0470 00)

##### References

TM 9-6140-200-14

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery clamps removed (WP 0126 00).

#### **WARNING**

- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin.
- Do not smoke, have open flame, or make sparks when performing battery maintenance. Batteries may explode causing severe injury to personnel.
- Remove all jewelry such as rings, identification tags, and bracelets. If jewelry or disconnected battery ground cable contacts battery post, a direct short can result, causing damage to equipment or severe injury to personnel.
- When removing cables, disconnect the ground cable first. Do not allow tools to come into contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage, or battery explosion, and severe injury to personnel.

## **BATTERY AND BATTERY BOX REPLACEMENT AND SERVICING (Contd)**

### **BATTERIES AND BATTERY BOX REMOVAL**

1. Remove four nuts (1), lockwashers (2), J-bolts (4), and battery holddown (3) from battery box (6) and two batteries (5). Discard lockwashers (2).

#### **NOTE**

Assistant will help with step 2.

2. Remove two batteries (5) from battery box (6).
3. Remove battery box (6) from battery box support (7).
4. Remove five locknuts (20), screws (18), and shield (19) from battery box (6). Discard locknuts (20).
5. Remove two nuts (8), thumb screws (10), and washers (9) from battery box (6).

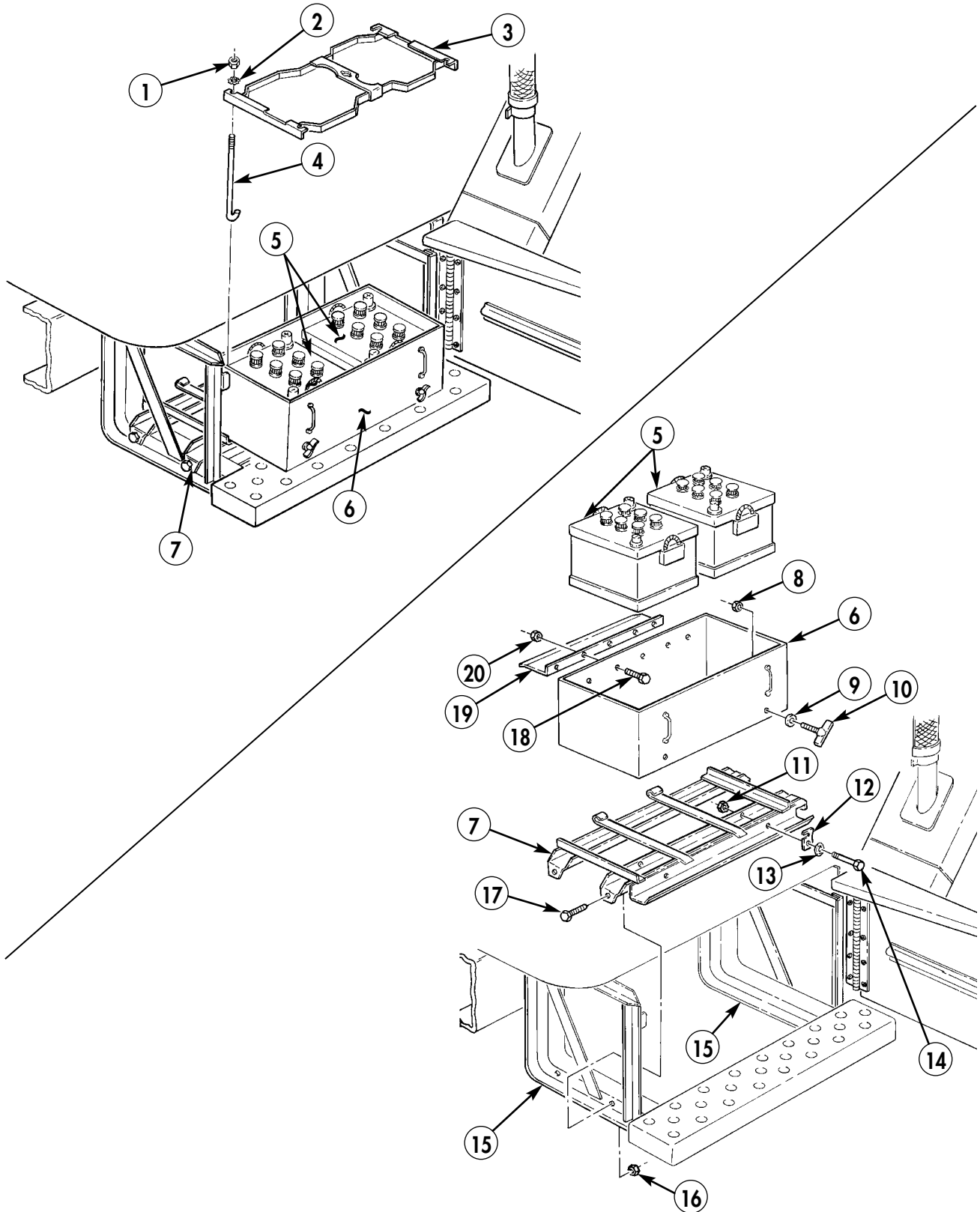
### **BATTERY BOX SUPPORT REMOVAL**

1. Remove four locknuts (16), screws (17), and battery box support (7) from two running board brackets (15). Discard locknuts (16).
2. Remove two locknuts (11), screws (14), spring washers (13), and clamps (12) from battery box support (7). Discard locknuts (11) and spring washers (13).

### **BATTERY AND BATTERY BOX SERVICING**

For battery and battery box servicing instructions, refer to TM 9-6140-200-14.

BATTERY AND BATTERY BOX REPLACEMENT AND SERVICING (Contd)



## BATTERY AND BATTERY BOX REPLACEMENT AND SERVICING (Contd)

### BATTERY BOX SUPPORT INSTALLATION

#### NOTE

Ensure clamps move freely when nuts are installed.

1. Install two clamps (12) on battery box support (7) with two new spring washers (13), screws (14), and new locknuts (11). Tighten locknuts (11) so that clamps (12) can move freely.
2. Install battery box support (7) on two running board brackets (15) with four screws (17) and new locknuts (16).

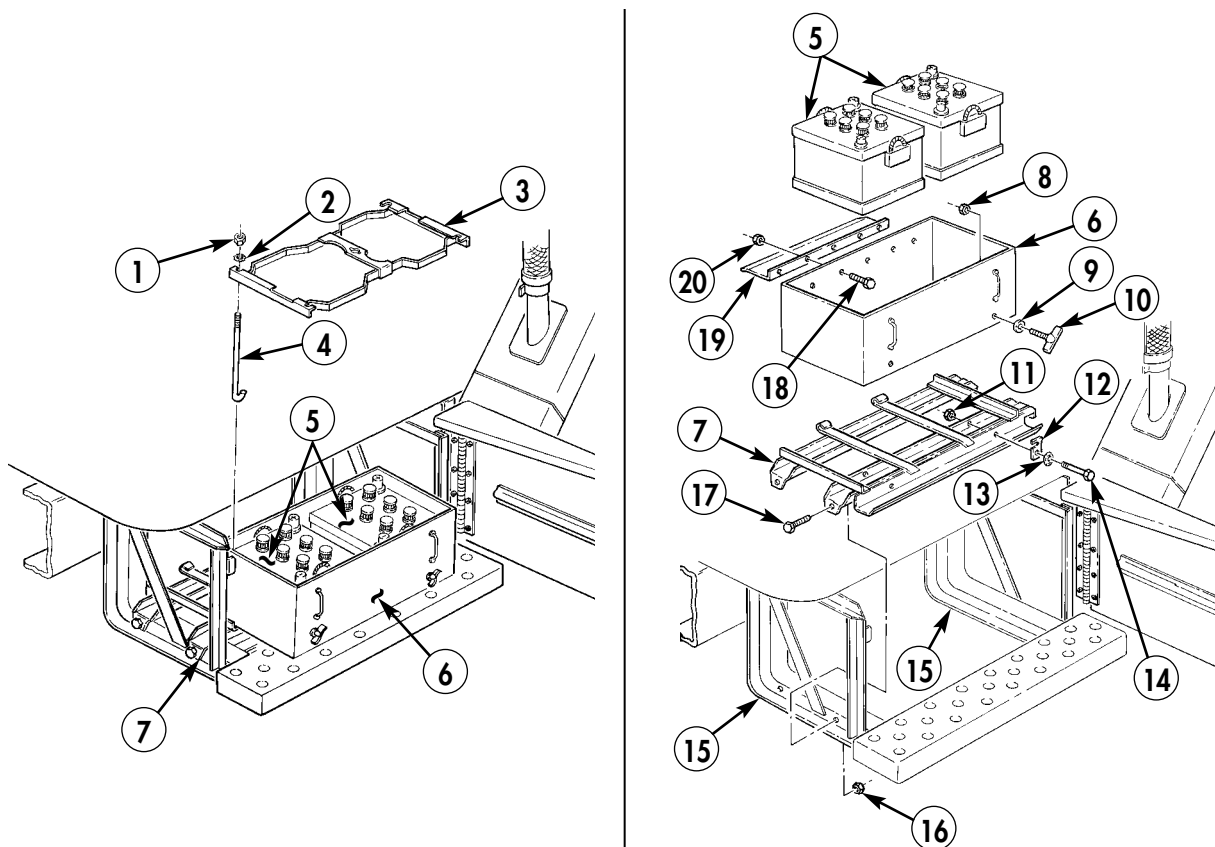
### BATTERIES AND BATTERY BOX INSTALLATION

1. Install shield (19) on battery box (6) with five screws (18) and new locknuts (20).
2. Install two washers (9) and thumbscrews (10) on battery box (6) with two nuts (8).
3. Install battery box (6) on battery box support (7).

#### NOTE

Assistant will help with step 4.

4. Place two batteries (5) in battery box (6). Install battery holddown (3) on battery box (6) and batteries (5) with four J-bolts (4), new lockwashers (2), and nuts (1).
5. Install battery clamps (WP 0126 00).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSMISSION BREATHER MAINTENANCE REMOVAL, CLEANING, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Skysol 100 (item 13, WP 0468 00)

Rag (item 27, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Cab intermediate tunnel removed  
(WP 0230 00).

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## TRANSMISSION BREATHER MAINTENANCE (Contd)

### REMOVAL

1. Wipe area around transmission breather hole (2) with rag.
2. Remove transmission breather (1) from transmission housing (3).

### CLEANING

#### **WARNING**

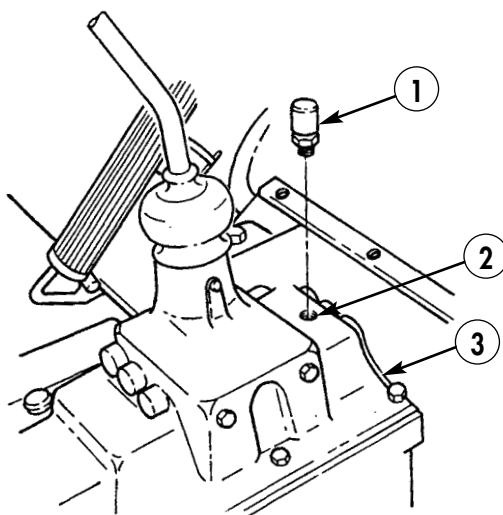
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Clean transmission breather (1) with Skysol 100 solvent.

### INSTALLATION

1. Install transmission breather (1) on transmission housing (3).
2. Install cab intermediate tunnel (WP 0230 00).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSMISSION GEARSHIFT LEVER KNOB AND BOOT REPLACEMENT

#### REMOVAL AND INSTALLATION

##### INITIAL SETUP:

###### Applicable Models

All

###### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

##### REMOVAL

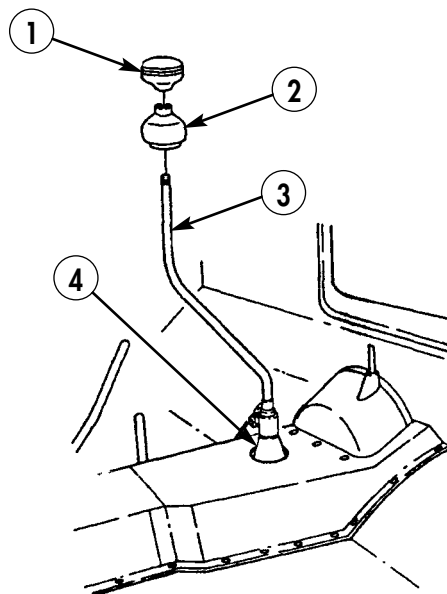
1. Rotate gearshift knob (1) counterclockwise, and remove from gearshift lever (3).
2. Slide boot (2) up and off ball socket pedestal (4) and gearshift lever (3).

##### INSTALLATION

###### **CAUTION**

Use care during installation to prevent sharp edges from cutting boot.

1. Slide boot (2), small end facing up, over gearshift lever (3) and slide down to fit over ball socket pedestal (4) on transmission housing.
2. Rotate gearshift knob (1) clockwise to install on gearshift lever (3).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSMISSION GEARSHIFT LEVER REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Lockwasher (item 213, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

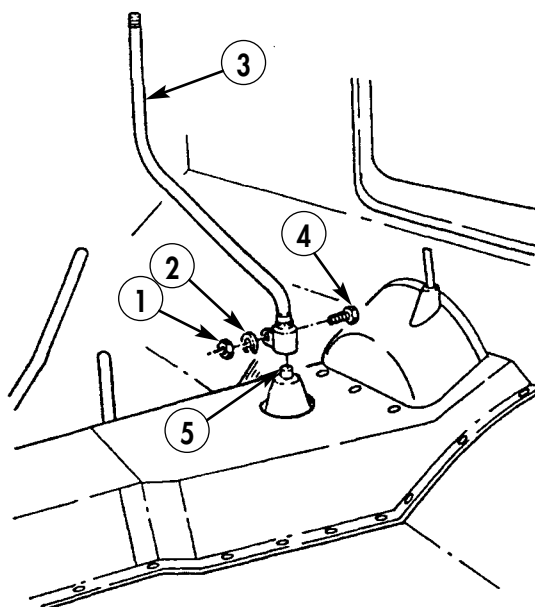
Transmission gearshift lever knob and boot  
removed (WP 0129 00).

#### REMOVAL

1. Position transmission shifter shaft (3) in neutral.
2. Remove nut (1), lockwasher (2), screw (4), and gearshift lever (3) from transmission shifter shaft (5). Discard lockwasher (2).

#### INSTALLATION

1. Install gearshift lever (3) on transmission shifter shaft (5) with screw (4), new lockwasher (2), and nut (1). Tighten nut (1) 40–50 lb-ft (54–68 N•m).
2. Install transmission gearshift lever knob and boot (WP 0129 00).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

0130 00-1/2 blank



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSMISSION REMOVAL

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 1, WP 0469 00)

Sling, engine and transmission  
(item 91, WP 0469 00)

Breaker bar, 1/2-in. drive  
(item 6, WP 0469 00)

Lifting device

Two utility chains

##### Personnel Required

Two

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Cab top removed  
(if overhead lifting device is used)  
(TM 9-2320-361-10).

Transmission gearshift lever removed  
(WP 0130 00).

Cab tunnels removed (WP 0230 00).

Power takeoff propeller shaft removed  
(vehicles w/PTO installed) (WP 0346 00).

Transfer case to transmission propeller shaft  
removed (WP 0139 00).

Intermediate propeller shaft removed  
(WP 0140 00).

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## TRANSMISSION REMOVAL (Contd)

### REMOVAL

1. Remove clutch return spring (2) from clutch shaft lever (1) and frame (3).
2. Remove locknut (4), screw (5), and rod (6) from shaft lever (1). Discard locknut (4).

#### **NOTE**

- Do not remove spring-loaded pin from clevis. Bearing will fall free from clevis if pin is removed.
- Step 3 applies to vehicles with transmission power takeoff installed.

3. Pull pin (16) to one side of clevis (18) on power takeoff shift lever (17) and remove PTO shift lever (17) from PTO arm (19).
4. Pull pin (7) to one side of clevis (8) on rod (6) and remove rod (6) from lever (9).

#### **NOTE**

Mark position of lever and shaft for installation.

5. Remove locknut (22), screw (23), and lever (9) from shaft (21). Discard locknut (22).

#### **NOTE**

Screw-assembled lockwashers must be reinstalled in transmission if transmission requires replacement.

6. Remove four screw-assembled lockwashers (14) from transmission (15). Discard screw-assembled lockwashers (14).
7. Install utility chains on transmission (15) with four washers (13) and screws (12).
8. Attach utility chains to sling. Attach sling to lifting device.

#### **WARNING**

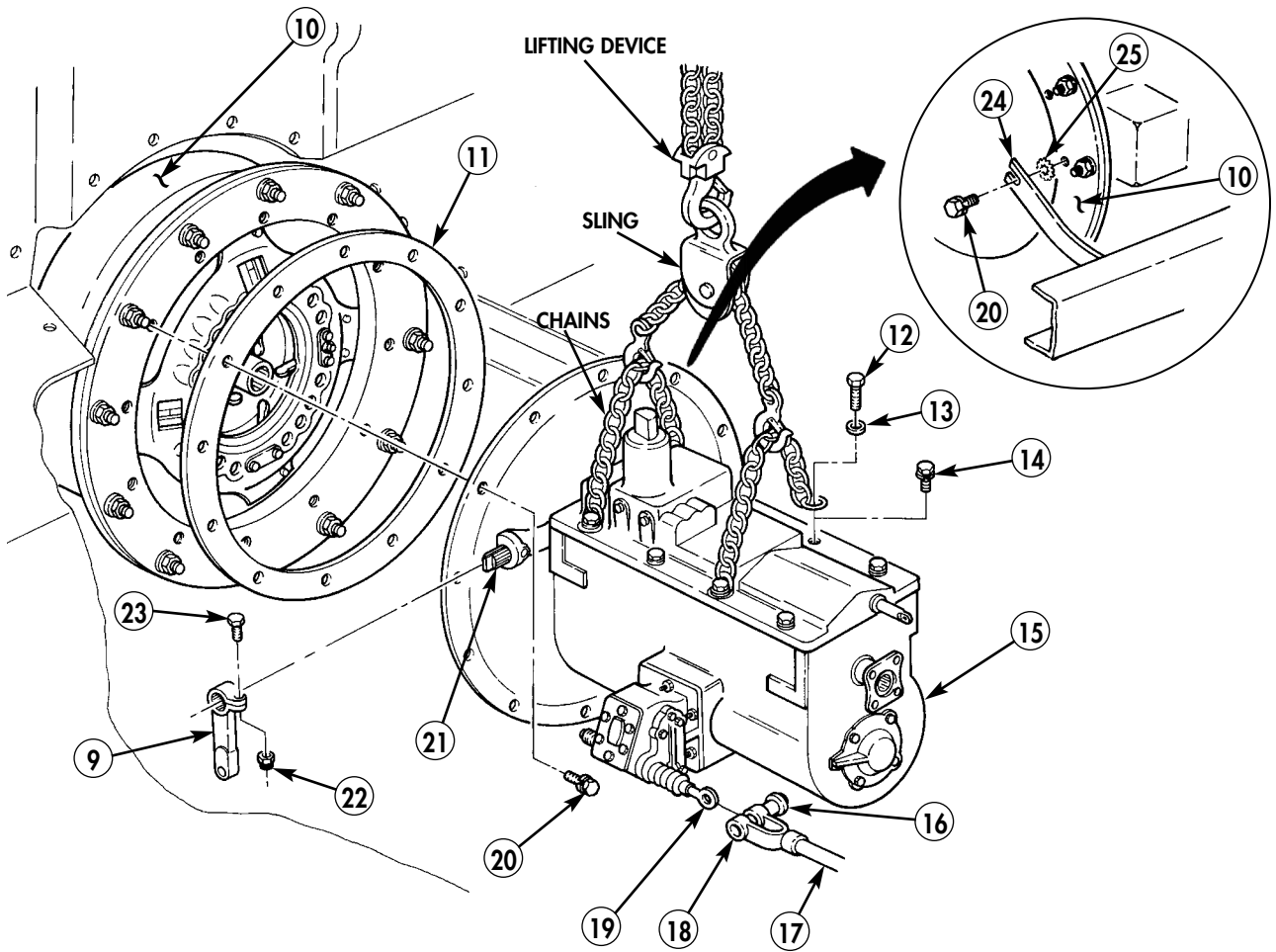
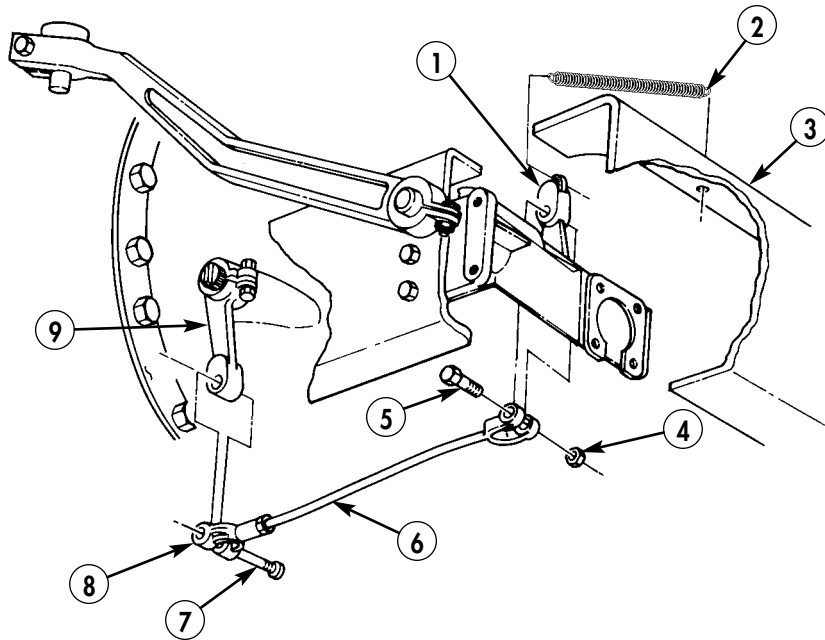
- Use prybar to free transmission during lifting operations. Failure to do so may result in injury to personnel or damage to equipment.
- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Lifting device must have a weight capacity greater than the weight of the transmission to prevent damage to equipment and injury to personnel.

#### **NOTE**

If a new transmission is not being installed, the adapter plate may be removed and installed with the transmission.

9. Remove twelve screw-assembled lockwashers (20), ground strap (24), and lockwasher (25) from flange of transmission (15). Discard screw-assembled lockwashers (20) and lockwasher (25).
10. Remove transmission (15) and gasket (11) from flywheel housing (10) and lower transmission (15). Discard gasket (11).
11. Remove lifting device from sling. Remove sling from utility chains.
12. Remove four screws (12), washers (13), and utility chains from transmission (15).

TRANSMISSION REMOVAL (Contd)



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSMISSION INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 1, WP 0469 00)  
Sling, engine and transmission  
(item 91, WP 0469 00)  
Breaker bar, 1/2-in. drive  
(item 6, WP 0469 00)  
Torque wrench, 1/2-in. drive  
(item 136, WP 0469 00)  
Lifting device  
Two utility chains

##### Materials/Parts

Twelve screw-assembled lockwashers  
(item 252, WP 0470 00)  
Four screw-assembled lockwashers  
(item 254, WP 0470 00)  
Four screws (item 321, WP 0470 00)  
Four washers (item 374, WP 0470 00)  
Two locknuts (item 129, WP 0470 00)  
Gasket (item 73, WP 0470 00)  
Lockwasher (item 192, WP 0470 00)

##### Personnel Required

Two

##### References

WP 0047 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Cab top removed  
(if overhead lifting device is used)  
(TM 9-2320-361-10).  
Transmission gearshift lever removed  
(WP 0130 00).  
Cab tunnels removed (WP 0230 00).  
Power takeoff propeller shaft removed  
(vehicles w/PTO installed) (WP 0346 00).  
Transfer case to transmission propeller shaft  
removed (WP 0139 00).  
Intermediate propeller shaft removed  
(WP 0140 00).

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## TRANSMISSION INSTALLATION (Contd)

### INSTALLATION

1. Install utility chains on transmission (6) with four washers (4) and screws (3).
2. Attach sling to utility chains. Attach lifting device to sling.
3. Position transmission (6) under vehicle and raise transmission (6).

#### **WARNING**

- All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.
- Lifting device must have a weight capacity greater than the weight of the transmission to prevent damage to equipment and injury to personnel.

#### **CAUTION**

Ensure transmission is aligned with clutch and pilot bearing. Failure to do so may result in damage to equipment.

4. Install new gasket (2) and transmission (6) on flywheel housing (1) with eleven new screw assembled lockwashers (11). Tighten screw-assembled lockwashers (11) 23–26 lb-ft (31–35 N•m).
5. Install new lockwasher (17) and ground strap (16) on transmission (6) with new screw-assembled lockwasher (11). Tighten screw-assembled lockwasher (11) 23–26 lb-ft (31–35 N•m).
6. Remove lifting device from sling. Remove sling from utility chains.
7. Remove four screws (3), washers (4), and utility chains from transmission (6).
8. Install four new screw-assembled lockwashers (5) on transmission (6). Tighten screw-assembled lockwashers (5) 25–32 lb-ft (34–43 N•m).
9. Align mark on lever (14) with shaft (12) and install lever (14) on shaft (12) with screw (15) and new locknut (13).

#### **NOTE**

If mark does not exist on shaft or lever, position lever on spline to rear of shaft centerline.

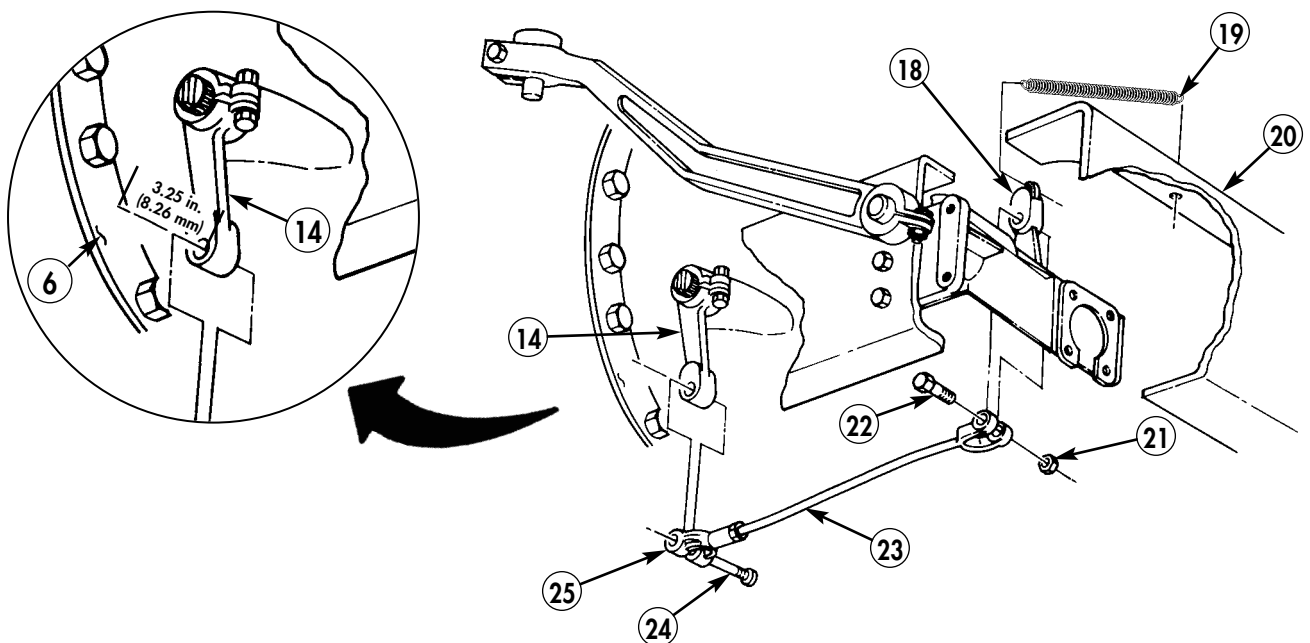
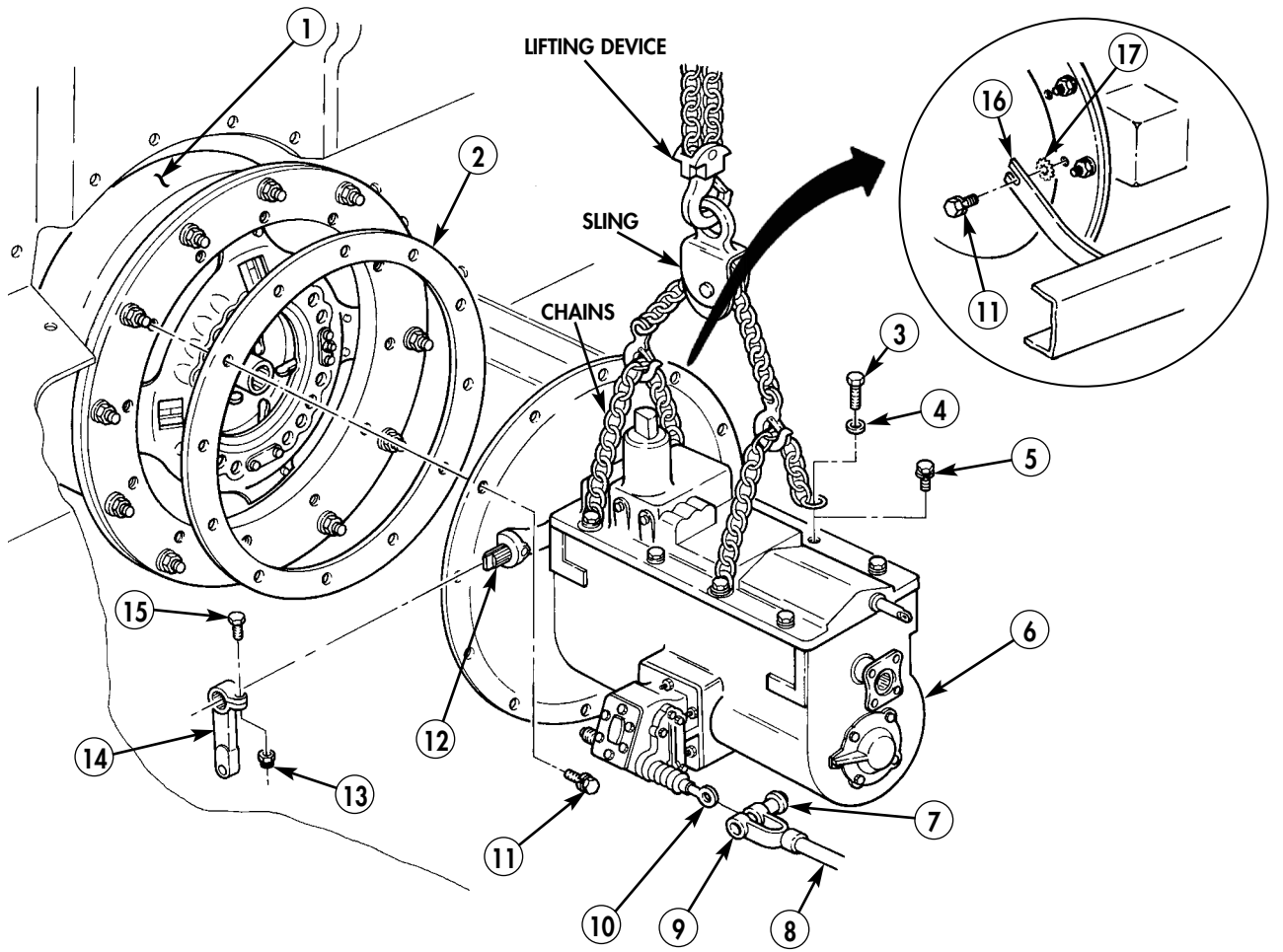
10. Push lower end of lever (14) forward until resistance is felt. Measure distance from center of hole on lever (14) to flange of transmission (6). Measurement should be 3.25 in. (8.26 cm). Rotate lever (14) one spline at a time if necessary to obtain 3.25 in. (8.26 cm) measurement. Tighten locknut (13).

#### **NOTE**

Perform step 11 if PTO is installed.

11. Attach power takeoff shift lever (8) on PTO arm (10) and push pin (7) in clevis (9) until head of pin (7) seats against clevis (9).
12. Install rod (23) on clutch shaft lever (18) with screw (22) and new locknut (21).
13. Install clevis (25) on lever (14).
14. Push pin (24) in clevis (25) until head of pin (24) seats against clevis (25).
15. Install clutch return spring (19) on clutch shaft lever (18) and frame (20).
16. Fill transmission to proper fluid level (WP 0020 00).
17. Install intermediate propeller shaft (WP 0140 00).
18. Install transfer case to transmission propeller shaft (WP 0139 00).
19. Install power takeoff propeller shaft (if removed) (WP 0346 00).
20. Install cab tunnels (WP 0230 00).
21. Install transmission gearshift lever (WP 0130 00).
22. Install cab top (if removed) (TM 9-2320-361-10).
23. Connect battery ground cable (WP 0126 00).
24. Adjust clutch pedal free play (WP 0047 00).
25. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### TRANSMISSION INSTALLATION (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO)

REMOVAL, CLEANING AND INSPECTION, INSTALLATION, AND PTO LOCK ADJUSTMENT

#### INITIAL SETUP:

##### Applicable Models

M49A2C and M50A3

##### Personnel Required

Two

##### Materials/Parts

Locknut (item 155, WP 0470 00)  
Two bushings (item 7, WP 0470 00)  
Four cotter pins (item 25, WP 0470 00)  
Five locknuts (item 129, WP 0470 00)  
Five locknuts (item 147, WP 0470 00)

##### Materials/Parts (Contd)

Woodruff key (item 380, WP 0470 00)  
Skysol 100 (item 13, WP 0468 00)  
Rags (item 27, WP 0468 00)

##### References

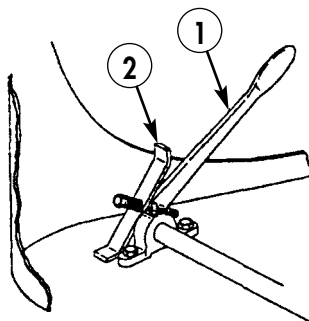
WP 0020 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Driver's seat removed (WP 0236 00).  
Cab tunnel removed (WP 0230 00).

#### REMOVAL

1. Place transfer case PTO shift handle (1) in NEUTRAL position and turn shift lever lock (2) parallel to PTO shift handle (1).



**TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)****REMOVAL (Contd)****NOTE**

Perform step 2 on vehicles with transfer case lockout arms.

2. Remove two cotter pins (18), washers (17), and rod (24) from lock (16) and lever (19). Discard cotter pins (18).

**NOTE**

Some vehicles are equipped with a screw; others use a shoulder screw. This procedure covers a shoulder screw.

3. Remove two locknuts (14), shoulder screw (11), screw (35), clevis (12), and rod (26) from transfer case shaft (13) and transfer case shift handle (27). Discard locknuts (14).
4. Loosen jamnut (25) and remove clevis (12) and jamnut (25) from rod (26).

**NOTE**

Perform steps 5 and 6 on vehicles equipped with transfer case lockout arms.

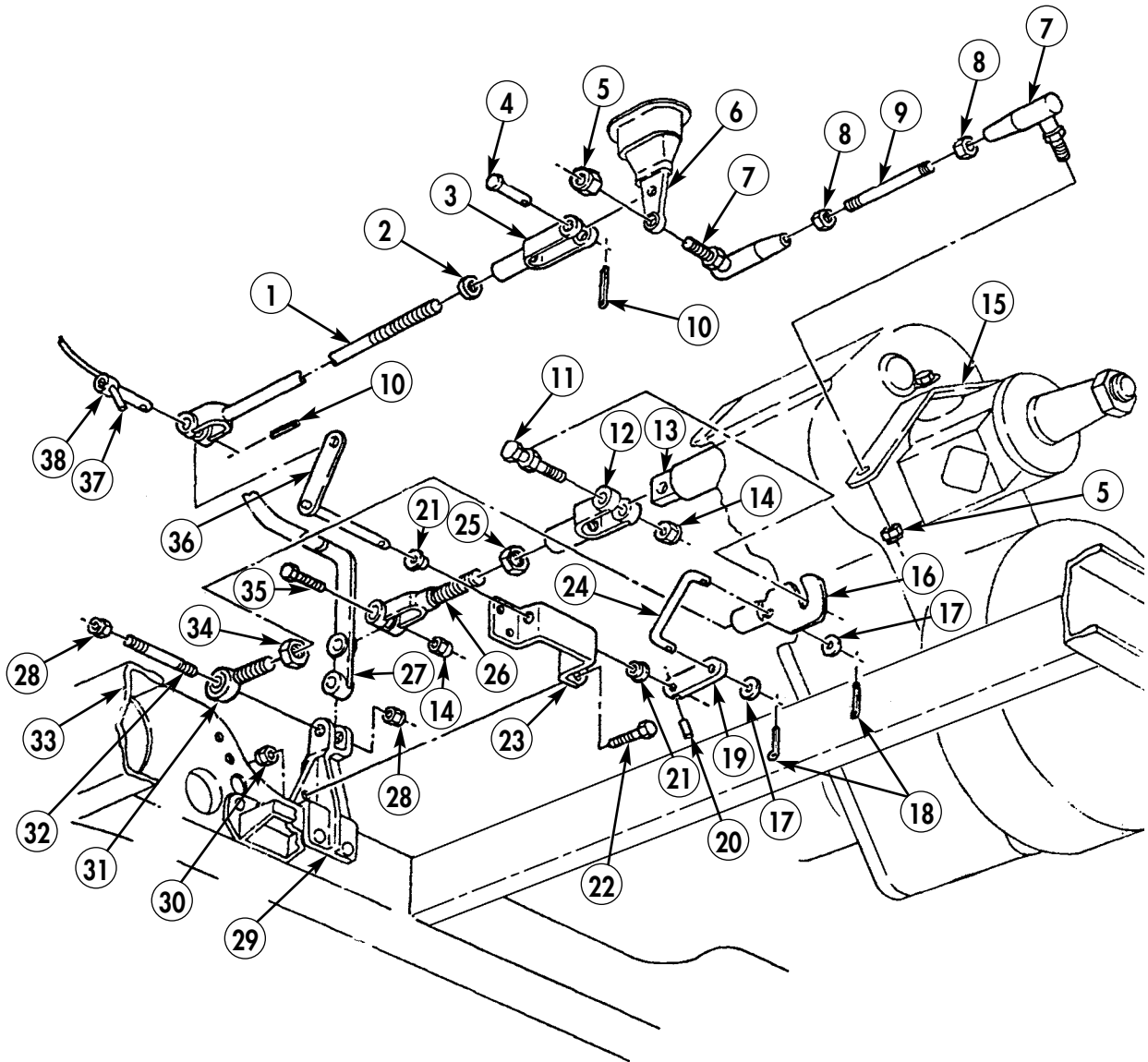
5. Remove two locknuts (28), stud (32), lock (16), connector rod (31), and transfer case shift handle (27) from transfer case shifter bracket (29). Discard locknuts (28).
6. Loosen jamnut (34) and remove lock (16) and jamnut (34) from connector rod (31).
7. Remove two locknuts (5) and ball pivot ends (7) from PTO shift lever (6) and shift arm (15). Discard locknuts (5).
8. Loosen two jamnuts (8) and remove two ball pivot ends (7) and jamnuts (8) from rod (9).

**NOTE**

Perform steps 9 through 12 on vehicles equipped with transfer case lockout arms.

9. Remove two cotter pins (10), clevis pins (4) and (38), clevis (3), and rod (1) from PTO shift lever (6) and lever (36). Discard cotter pins (10). Clevis pin (38) remains attached to speed control cable (37) on vehicles with speed control cables.
10. Loosen jamnut (2) and remove clevis (3) and jamnut (2) from rod (1).
11. Remove three locknuts (30), screws (22), and bracket (23) from frame (33) and transfer case shifter bracket (29). Discard locknuts (30).
12. Remove straight pin (20), levers (19) and (36), and two bushings (21) from bracket (23). Discard bushings (21).

TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)



## TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)

### REMOVAL (Contd)

#### **NOTE**

Assistant will help with step 13.

13. Remove four locknuts (10), screws (3), and two mounting brackets (1) with PTO shift control handle (4) from cab floor (9). Discard locknuts (10).
14. Remove seal (13) from cab floor (9).
15. Remove locknut (14), screw (16), lever (15), and woodruff key (12) from PTO shift control shaft (11). Discard locknut (14) and woodruff key (12).
16. Remove two mounting brackets (1) from PTO shift control shaft (11) and remove two lubrication fittings (2) from two mounting brackets (1).
17. Remove locknut (8), screw (7), spring (6), and control lock (5) from PTO shift control handle (4). Discard locknut (8).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all parts with Skysol 100 and wipe dry with clean rag.
2. Inspect all parts for breaks, bends, and cracks. Replace parts if broken, bent, or cracked.
3. Ball and socket joints are not repairable and must be discarded if there is damage or free play. Ball studs must swivel freely.
4. Inspect threaded parts for stripped or crossed threads. Discard threaded parts if threads are stripped or cross-threaded.
5. Inspect spring (6) for breaks, distortion, or collapsed coils. Discard spring (6) if broken, distorted, or coils are collapsed.



## TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)

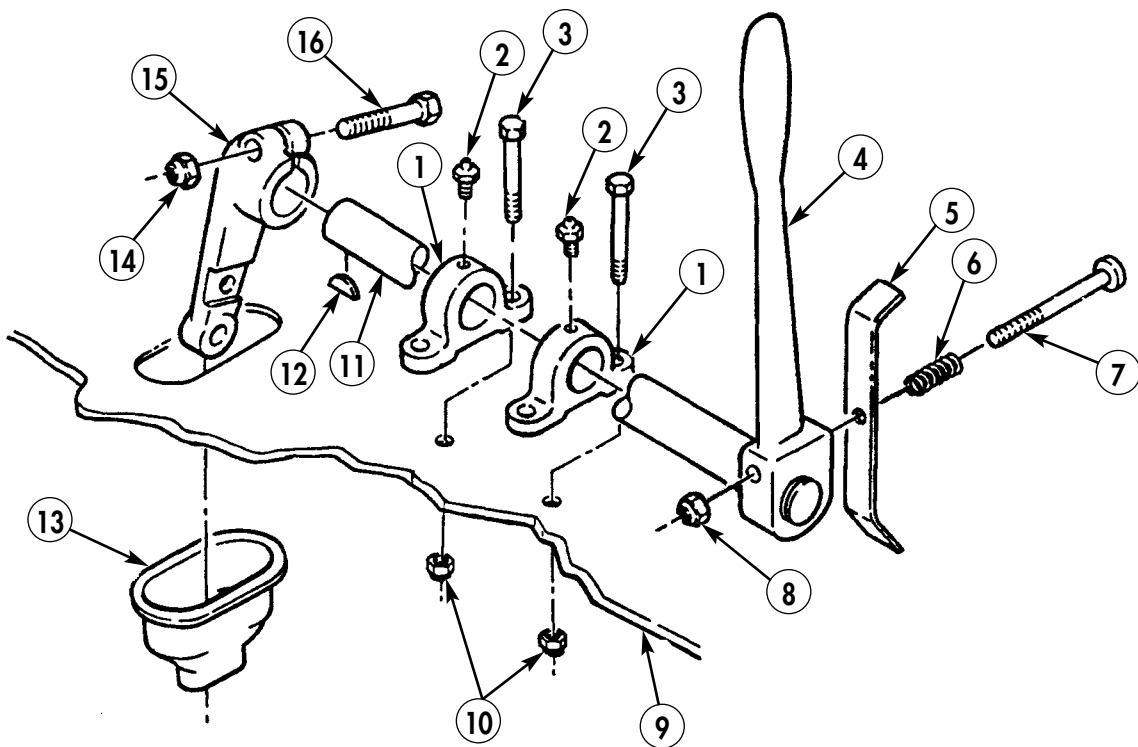
### INSTALLATION

1. Install PTO shift control lock (5) and spring (6) to PTO shift control handle (4) with screw (7) and new locknut (8). Ensure PTO shift control lock (5) turns freely on PTO shift control handle (4).
2. Install two lubrication fittings (2) on two mounting brackets (1) and install mounting brackets (1) on PTO shift control shaft (11).
3. Install new woodruff key (12) and lever (15) on PTO shift control shaft (11) with screw (16) and new locknut (14).
4. Install seal (13) on cab floor (9).

### NOTE

Assistant will help with step 5.

5. Install two mounting brackets (1) with PTO shift control shaft (4) on cab floor (9) with four screws (3) and new locknuts (10).



**TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)****INSTALLATION (Contd)****NOTE**

Perform steps 6 through 9 on vehicles with transfer case  
lockout arms.

6. Install two new bushings (21), levers (36) and (19), and straight pin (20) on bracket (23).
7. Install bracket (23) on frame (33) and transfer case shift bracket (29) with three screws (22) and new locknuts (30).
8. Install jamnut (2) and clevis (3) on rod (1) to measure 13.5 in. (34.3 cm) from center on clevis (3) and rod (1). Tighten jamnut (2).
9. Install clevis (3) and rod (1) on PTO shift lever (6) and lever (36) with clevis pins (4) and (37) and two new cotter pins (10).
10. Install two jamnuts (8) and two ball pivot ends (7) on rod (9) to measure 6.9 in. (17.5 cm) from center of ball pivot ends (7). Tighten two jamnuts (8).
11. Install two ball pivot ends (7) on PTO shift lever (6) and shift arm (15) with two new locknuts (5).

**NOTE**

Perform steps 12 and 13 on vehicles with transfer case lockout  
arms.

12. Install jamnut (34) and lock (16) on connector rod (31) to measure 3.8 in. (9.7 cm) from center of connector rod (31) clevis hole and rod hole in lock (16). Tighten jamnut (34).
13. Install lock (16), connector rod (31), and transfer case shift handle (27) on transfer case shifter bracket (29) with stud (32) and two new locknuts (28). Transfer case shift handle (27) must move freely.
14. Install jamnut (25) and clevis (12) on rod (26) to measure 4.9 in. (12.4 cm) from center of clevis (12) hole and rod (26) hole. Tighten jamnut (25).

**NOTE**

Some vehicles are equipped with a screw; others use a shoulder  
screw. This procedure covers a shoulder screw.

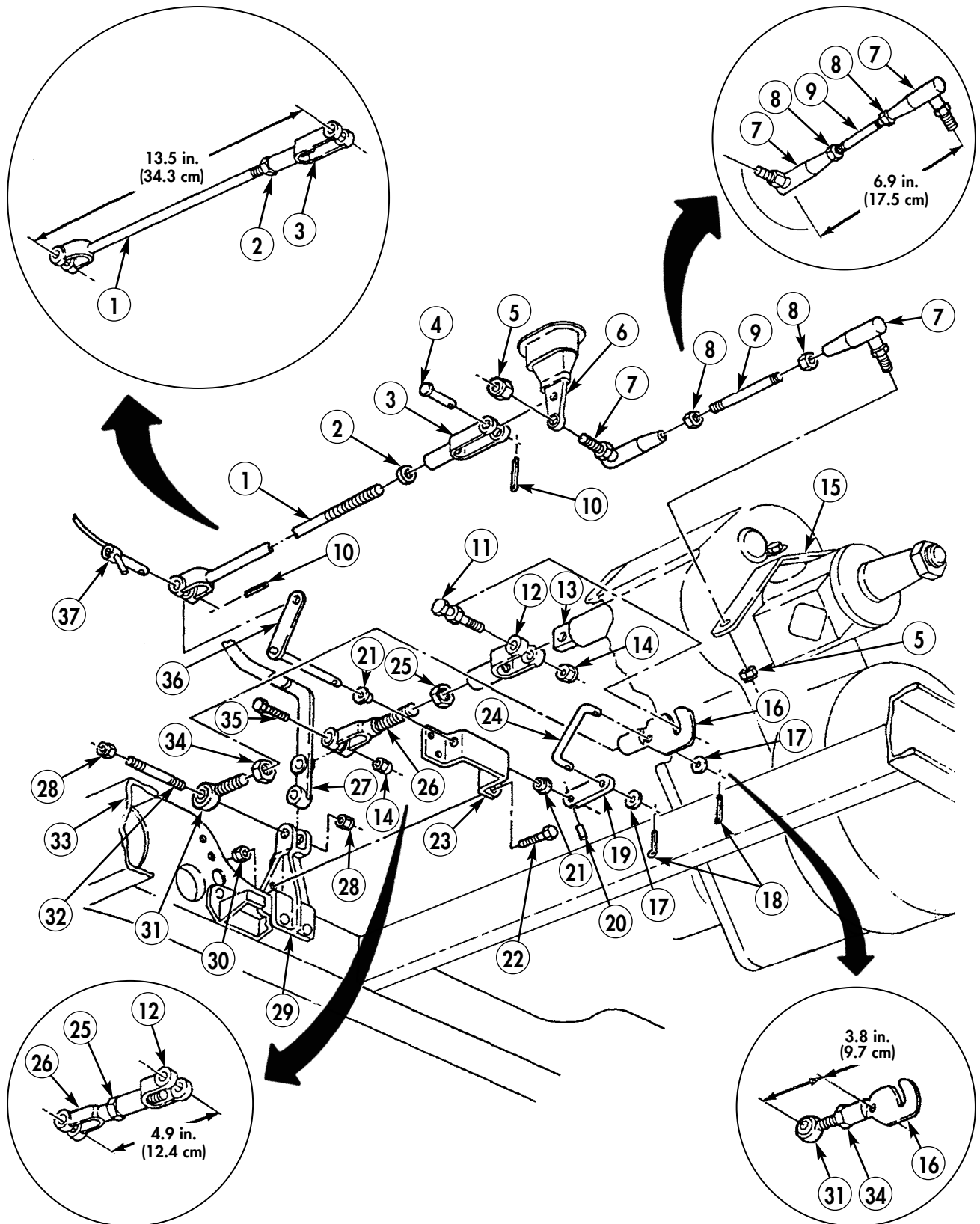
15. Install clevis (12) and rod (26) on transfer case shift handle (27) and transfer case shaft (13) with screw (35), shoulder screw (11), and two new locknuts (14).

**NOTE**

Perform step 16 on vehicles with transfer case lockout arms.

16. Install rod (24) on lock (16) and lever (19) with two washers (17) and new cotter pins (18).

TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)



**TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)****PTO LOCK ADJUSTMENT**

1. Ensure transfer case shift handle (3) is in NEUTRAL.
2. Move PTO shift control handle (1) to disengaged position and ensure PTO control lock (2) can be turned parallel to handle (1) to prevent rearward movement of PTO shift control handle (1).
3. Remove locknut (4) and ball pivot end (12) from PTO shift lever (8). Discard locknut (4).

**NOTE**

Perform step 4 on vehicles with transfer case lockout arms.

4. Remove cotter pin (9), clevis pin (7), and clevis (6) from PTO shift lever (8). Discard cotter pin (9).
5. Ensure PTO shifter lever (5) is in disengaged position (rear detent).

**NOTE**

Assistant will help with steps 6 through 9.

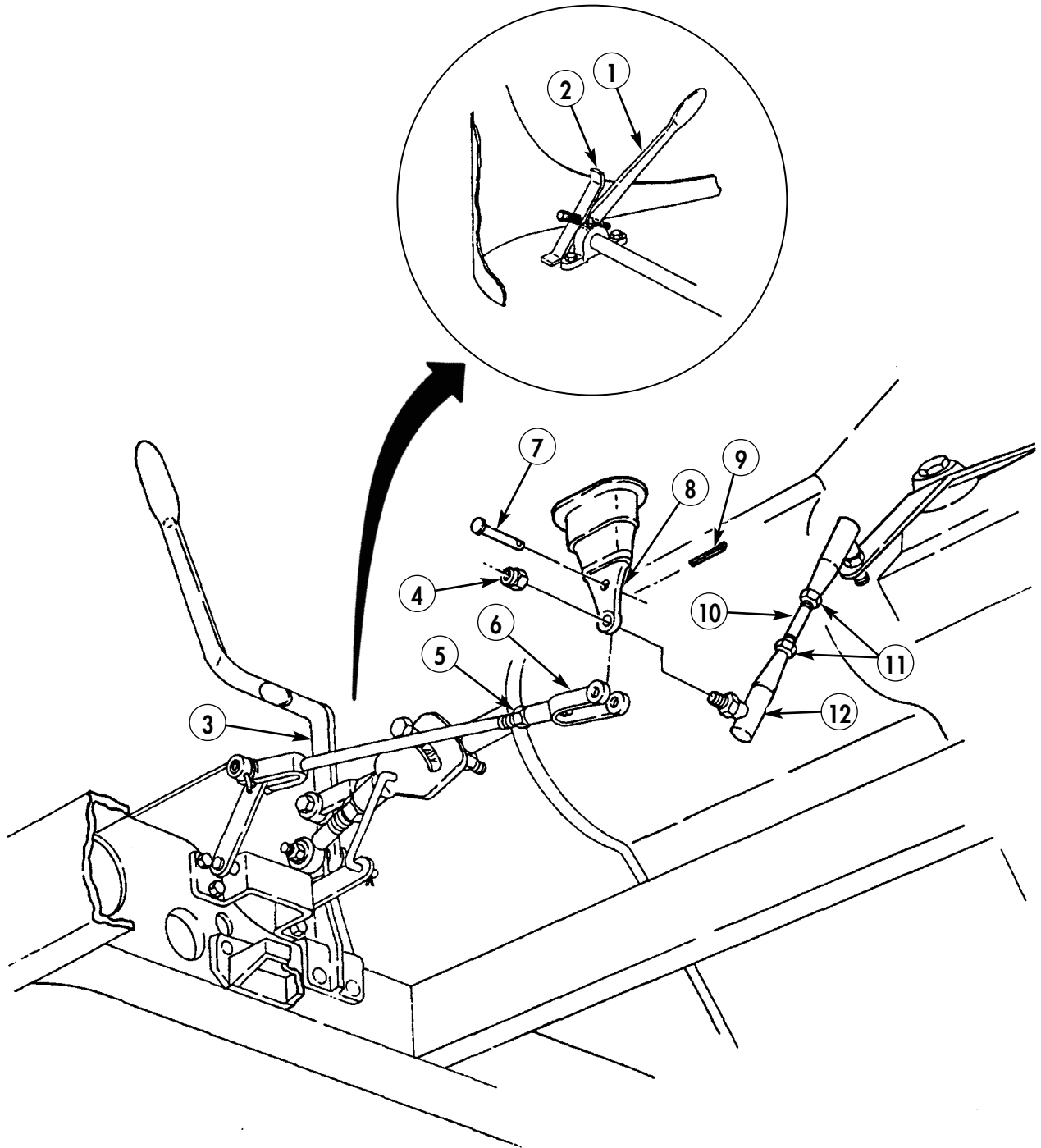
6. Place PTO control lock (2) parallel to handle (1) and hold tight to cab floor.
7. Loosen two jamnuts (11) and adjust (10) to align ball pivot end (12) to fit freely in PTO shift lever (5) hole. Tighten two jamnuts (11).
8. Connect ball pivot end (12) on PTO shift lever (8) with new locknut (4).

**NOTE**

Perform steps 9 and 10 on vehicles with transfer case lockout arms.

9. Loosen jamnut (5) and adjust clevis (6) to align holes in clevis (6) with holes in PTO shift lever (8). Tighten jamnut (5).
10. Connect clevis (6) on PTO shift lever (8) with clevis pin (7) and new cotter pin (9).
11. Install driver's seat (WP 0236 00).
12. Lubricate PTO shift lever (WP 0020 00).
13. Install cab tunnels (WP 0230 00).
14. Connect battery ground cable (WP 0126 00).
15. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/PTO) (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/O PTO)

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All except M49A2C and M50A3

**Materials/Parts**

Three locknuts (item 147, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/O PTO) (Contd)

### REMOVAL

1. Remove two locknuts (6), screws (3), rod (1), and clevis (4) from transfer case shaft (5) and transfer case shift handle (10). Discard locknuts (6).
2. Loosen jamnut (2) and remove clevis (4) and jamnut (2) from rod (1).
3. Remove locknut (7), screw (9), and transfer case shift handle (10) from transfer case shift bracket (8). Discard locknut (7).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

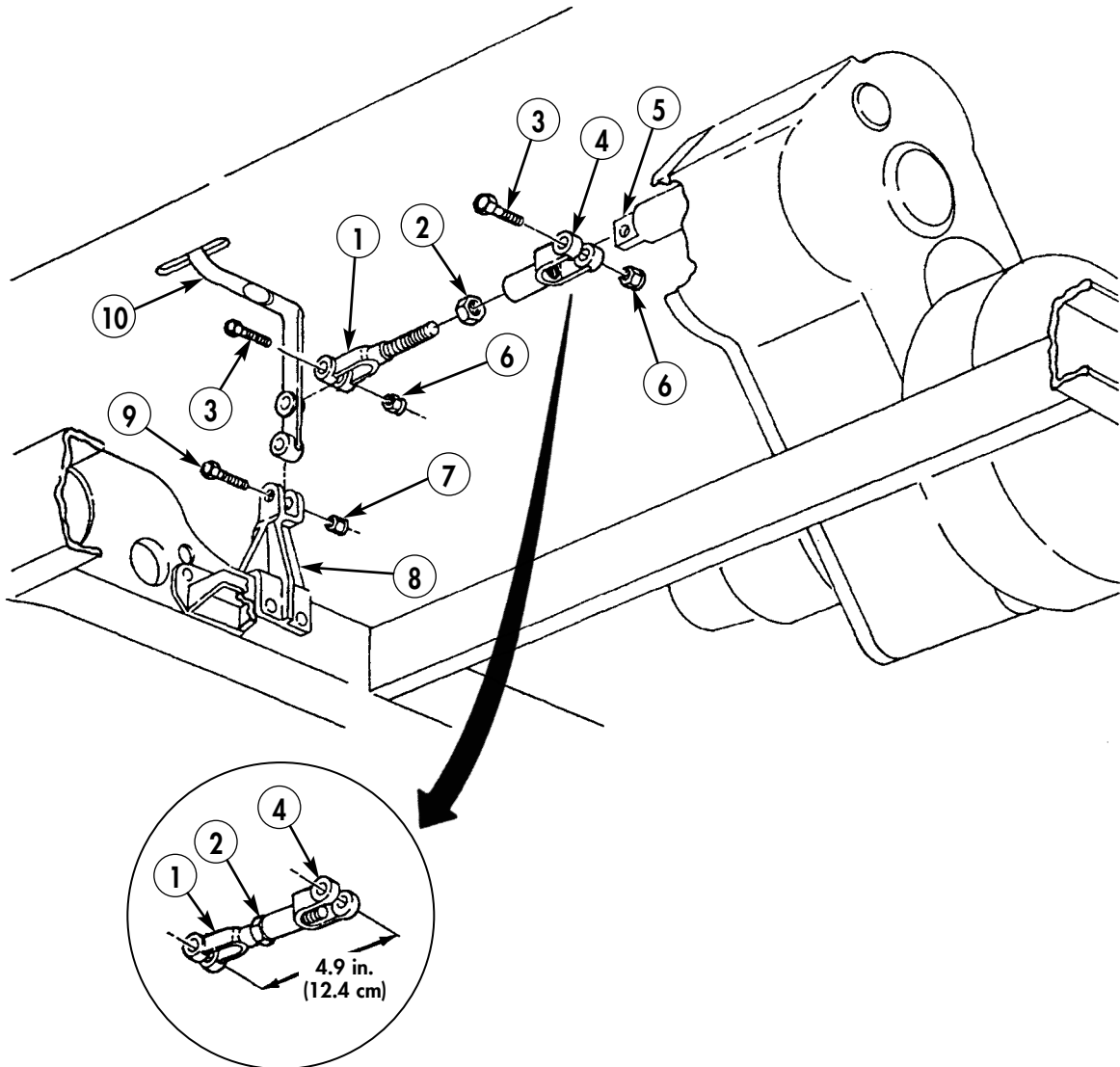
1. Clean all parts with Skysol 100 solvent and dry with clean rag.
2. Inspect all parts for breaks, cracks, and bends. If broken, cracked, or bent, replace part.

### INSTALLATION

1. Install transfer case shift handle (10) on transfer case shift bracket (8) with screw (9) and new locknut (7). Shift handle (10) must move freely.
2. Install jamnut (2) and clevis (4) on rod (1) to measure 4.9 in. (12.4 cm) from center of clevis (4) hole and rod (1) hole. Tighten jamnut (2).
3. Install clevis (4) and rod (1) on transfer case shift handle (10) and transfer case shaft (5) with two screws (3) and new locknuts (6).
4. Move transfer case shift handle (10) through LOW, NEUTRAL, and HIGH positions and verify correct installation of controls.
5. Connect battery ground cable (WP 0126 00).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



TRANSFER CASE CONTROLS AND LINKAGE MAINTENANCE (W/O PTO) (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE

AIR VALVE AND BRACKET REMOVAL, LINE REMOVAL,  
CLEANING AND INSPECTION, LINE INSTALLATION, AND AIR VALVE AND BRACKET INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two locknuts (item 146, WP 047000)  
Four sleeves (item 361, WP 0470 00)  
Two locknuts (item 145, WP 0470 00)  
Locknut (item 129, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

**References**

TM 9-243

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Air reservoirs drained (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front-wheel drive lock-in indicator and air  
pressure switch removed (WP 0118 00).

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## FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)

### AIR VALVE AND BRACKET REMOVAL

#### **WARNING**

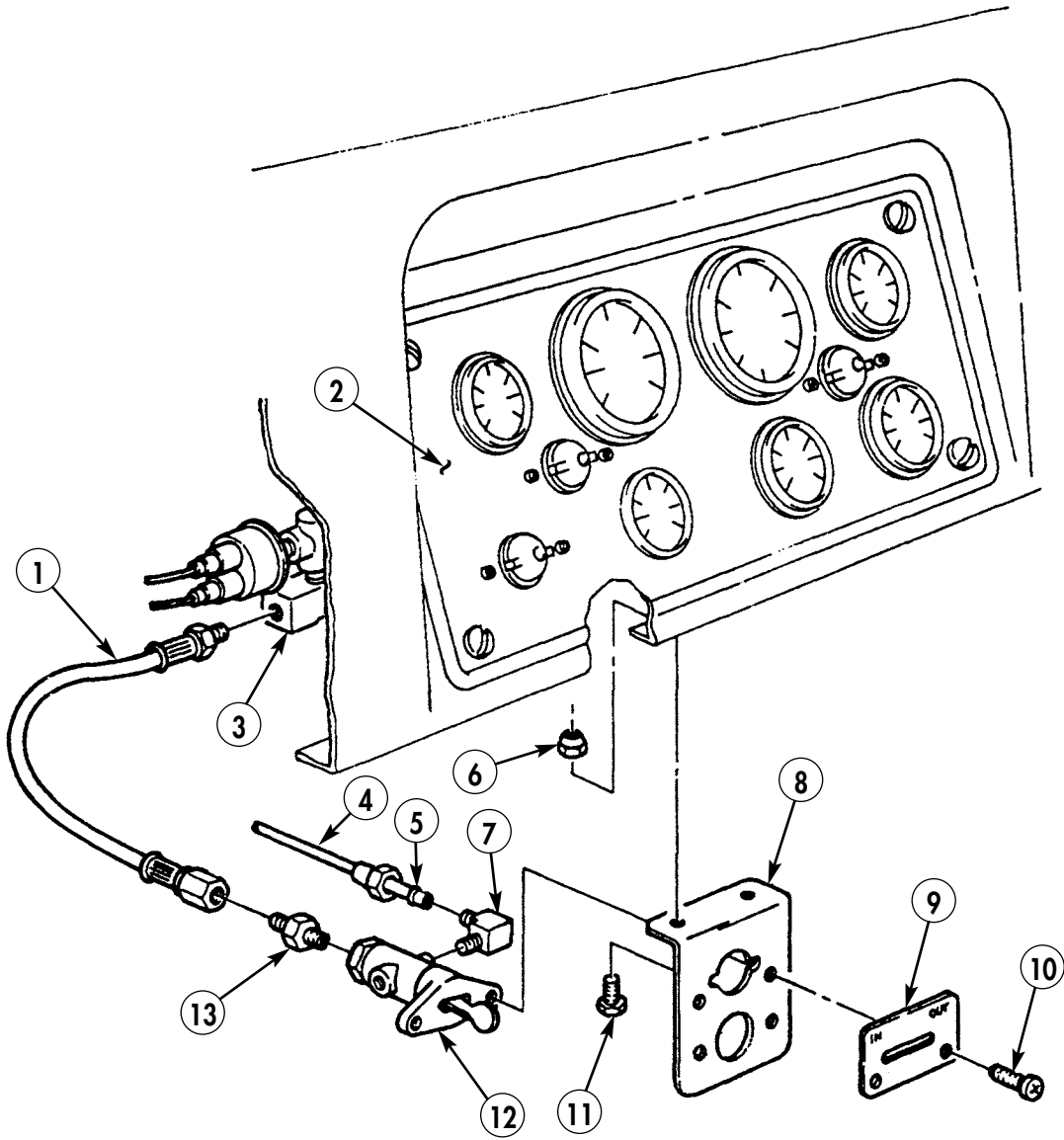
Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

#### **NOTE**

Prior to removal, tag all lines for installation.

1. Remove two screws (10), decal plate (9), and air valve (12) from bracket (8).
2. Remove line (4) and sleeve (5) from elbow (7). Discard sleeve (5).
3. Remove hose (1) from adapter (13) and pipe tee (3).
4. Remove elbow (7) and adapter (13) from air valve (12).
5. Remove two screws (11), locknuts (6), and bracket (8) from dash panel (2). Discard locknuts (6).

FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)



## FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)

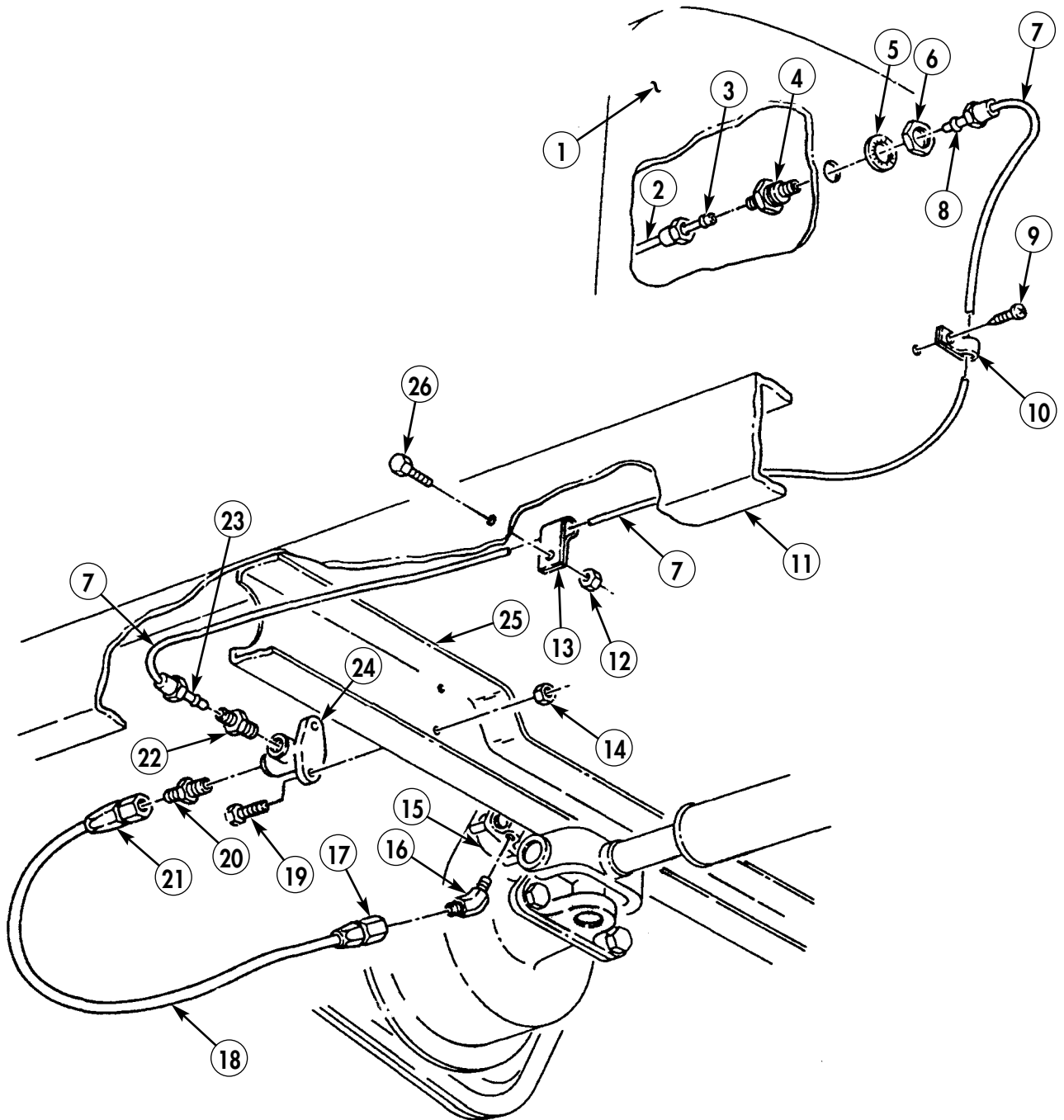
### LINE REMOVAL

1. Remove line (2) and sleeve (3) from adapter (4). Discard sleeve (3).
2. Remove line (7) and sleeve (8) from adapter (4). Discard sleeve (8).
3. Remove nut (6), washer (5), and adapter (4) from firewall (1).
4. Remove screw (9), clamp (10), and line (7) from firewall (1).
5. Remove locknut (12), screw (26), clamp (13), and line (7) from frame (11). Discard locknut (12).
6. Remove line (7) and sleeve (23) from adapter (22). Discard sleeve (23).
7. Remove adapter (22) from elbow (24).
8. Loosen nut (21) and remove hose (18) from adapter (20).
9. Remove adapter (20) from elbow (24).
10. Loosen nut (17) and remove hose (18) from elbow (16).
11. Remove elbow (16) from air cylinder (15).
12. Remove two locknuts (14), screws (19), and elbow (24) from frame crossmember (25). Discard two locknuts (14).

### CLEANING AND INSPECTION

1. Inspect all lines for bends, breaks, and kinks. If bent, broken, or kinked, replace lines.
2. Inspect all hoses for chafing, abrasions, leaks, cracks, bulges, and pinches. If chafed, abraded, leaking, cracked, bulging, or pinched, replace hose.
3. Clean all fittings of dirt and tape sealant.

FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)



## FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)

### LINE INSTALLATION

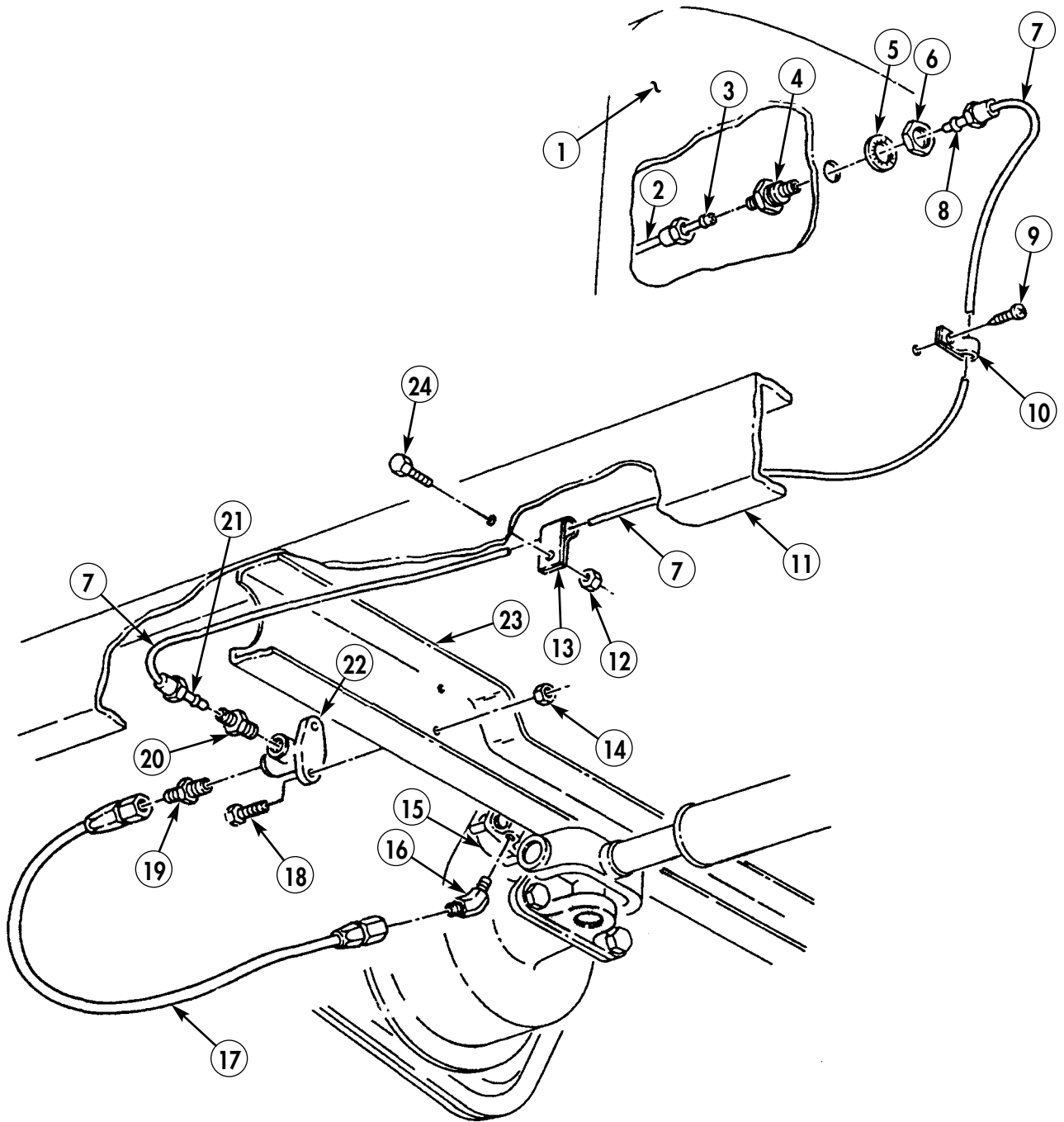
#### **NOTE**

For fabrication of air lines, refer to TM 9-243.

1. Install elbow (22) on frame crossmember (23) with two screws (18) and new locknuts (14).
2. Install elbow (16) on air cylinder (15).
3. Install hose (17) on elbow (16).
4. Install adapter (19) on elbow (22).
5. Install hose (17) on adapter (19).
6. Install adapter (20) on elbow (22).
7. Install new sleeve (21) and line (7) on adapter (20).
8. Install line (7) on frame (11) with clamp (13), screw (24), and new locknut (12).
9. Install line (7) on firewall (1) with clamp (10) and screw (9).
10. Install adapter (4), washer (5), and nut (6) on firewall (1).
11. Install new sleeve (8) and line (7) on adapter (4).
12. Install new sleeve (3) and line (2) on adapter (4).



FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)



## FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)

### AIR VALVE AND BRACKET INSTALLATION

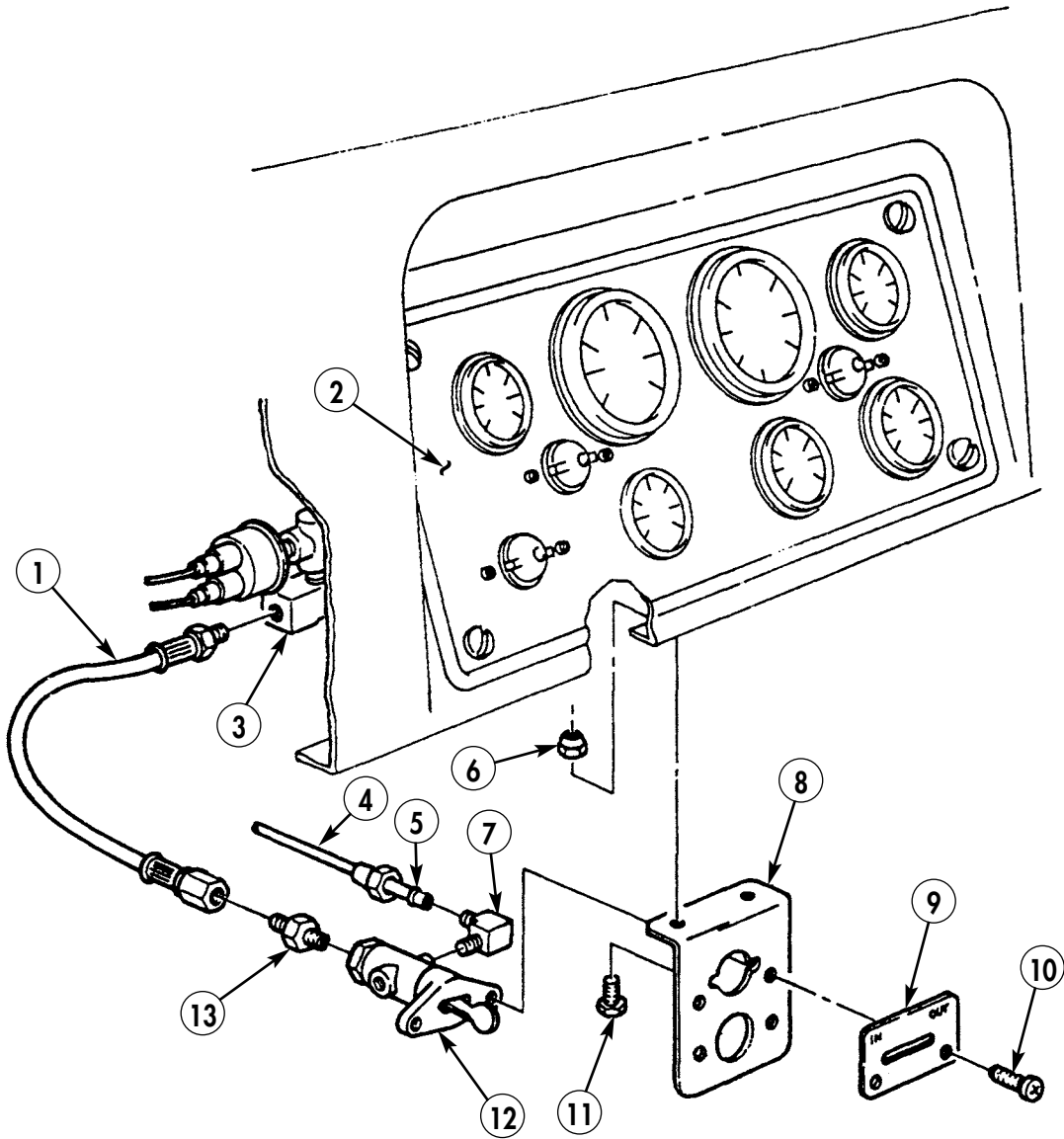
1. Install bracket (8) on dash panel (2) with two screws (11) and new locknuts (6).

**NOTE**

All male connections must be wrapped with antiseize tape before installation.

2. Install elbow (7) and adapter (13) on air valve (12).
3. Install hose (1) on adapter (13) and pipe tee (3).
4. Install new sleeve (5) and line (4) on elbow (7).
5. Install air valve (12) and decal plate (9) on bracket (8) with two screws (10).
6. Install front-wheel drive lock-in indicator and air pressure switch (WP 0118 00).
7. Connect battery ground cable (WP 0126 00).
8. Start engine and allow air reservoirs to fill (TM 9-2320-361-10). Check for air leaks.
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT WHEEL DRIVE LOCK-IN SWITCH MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AXLE ENGAGEMENT AIR CYLINDER MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Reference**

WP 0021 00

**Tools and Special Tools**

General mechanic's tool kit  
(item 116, WP 0469 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Transfer case removed (WP 0138 00).

**Materials/Parts**

Air cylinder parts kit (item 292, WP 0470 00)  
GAA grease (item 17, WP 0468 00)

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## FRONT AXLE ENGAGEMENT AIR CYLINDER MAINTENANCE (Contd)

### REMOVAL

1. Bend four lock tabs (4) down and remove four screws (5), lock tabs (4), air cylinder cover (3), and brass ring (6) from transfer case (2). Discard lock tabs (4) and brass ring (6).
2. Remove air cylinder (11) from transfer case (2).
3. Remove nut (7), washer (8), piston (10), washer (8), and brass ring (6) from shifter shaft (1). Discard washers (8) and brass ring (6).
4. Remove seal (9) from piston (10). Discard seal (9).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to (WP 0021 00).
2. Clean and inspect air cylinder cover (3), air cylinder (11), and piston (10).

### INSTALLATION

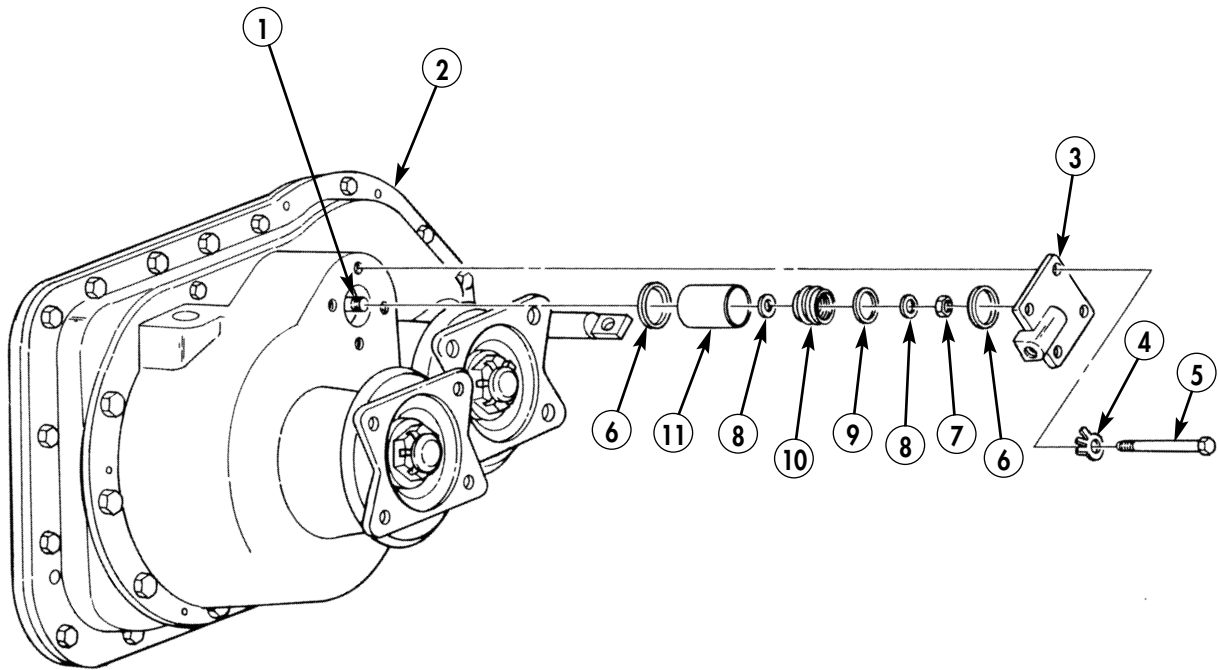
1. Apply a small amount of GAA grease on new seal (9) and install on piston (10).
2. Install piston (10) on shifter shaft (1) with two new washers (8) and nut (7). Tighten nut (7) 48–61 lb-ft (65–83 N•m).

#### NOTE

Ensure air cylinder cover is installed with air line opening positioned toward bottom of transfer case.

3. Install new brass ring (6), air cylinder (11), new brass ring (6), air cylinder cover (3), four new lock tabs (4), and screws (5) on transfer case (2). Tighten screws (5) 5–8 lb-ft (7–11 N•m).
4. Bend lock tabs (4) down on transfer case (2) and bend lock tabs (4) up on air cylinder screws (5).
5. Install transfer case (WP 0138 00).
6. Connect battery ground cable (WP 0126 00).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT AXLE ENGAGEMENT AIR CYLINDER MAINTENANCE (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSFER CASE BREATHER MAINTENANCE REMOVAL, CLEANING, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Rag (item 27, WP 0468 00)

Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Cab tunnels removed (WP 0230 00).

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## TRANSFER CASE BREATHER MAINTENANCE (Contd)

### REMOVAL

1. Wipe area around transfer case breather (2) with rag.
2. Remove transfer case breather (2) from transfer case (1).

### CLEANING

#### **WARNING**

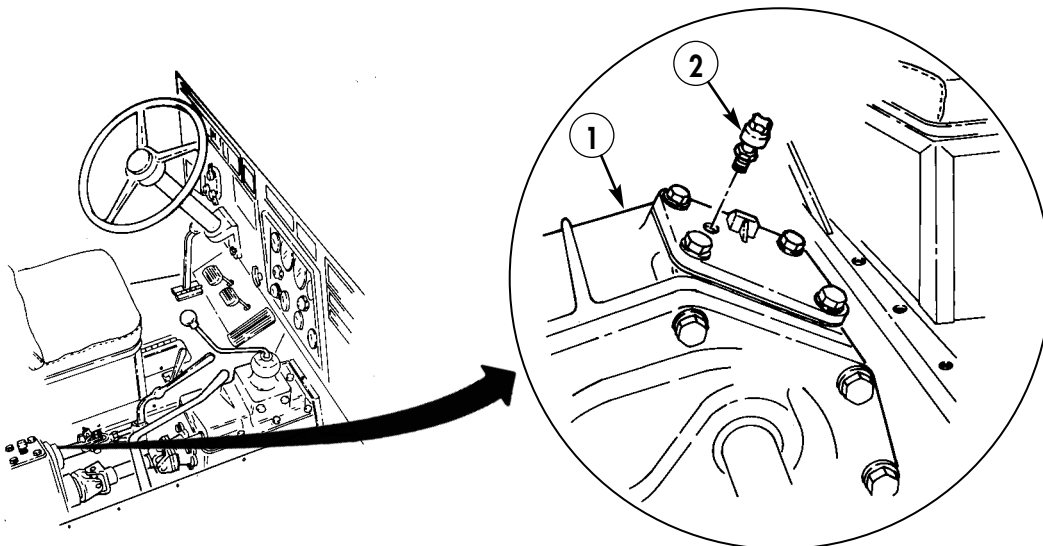
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Clean transfer case breather (2) with Skysol 100.

### INSTALLATION

1. Install transfer case breather (2) into transfer case (1).
2. Install cab tunnels (WP 0230 00).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TRANSFER CASE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 1/2-in. drive  
(item 136, WP 0469 00)  
1-1/8-in. socket, 1/2-in. drive  
(item 98, WP 0469 00)  
1-1/16-in. socket, 1/2-in. drive  
(item 93, WP 0469 00)  
Lift, transmission and differential  
(item 48, WP 0469 00)

##### Materials/Parts

Seven locknuts (item 161, WP 0470 00)  
Six locknuts (item 162, WP 0470 00)  
Two lockwashers (item 213, WP 0470 00)  
Locknut (item 147, WP 0470 00)  
Lockwasher (item 214, WP 0470 00)

##### Personnel Required

Two

##### References

WP 0164 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Transfer case drained (WP 0020 00).  
Spare wheel removed (TM 9-2320-361-10).  
Air reservoir drained (TM 9-2320-361-10).  
Cab tunnels removed (WP 0230 00).  
Front axle propeller shaft removed  
(WP 0142 00).  
Transmission-to-transfer propeller shaft  
removed (WP 0139 00).  
Intermediate propeller shaft removed  
(WP 0140 00).  
Forward rear axle propeller shaft removed  
(WP 0147 00).  
Power takeoff propeller shaft removed  
(vehicles w/PTO installed) (WP 0346 00).

## TRANSFER CASE REPLACEMENT (Contd)

### REMOVAL

1. Remove spring (31) from parking brake lever (30) and bracket (35).

#### **NOTE**

Prior to removal, mark threaded end of parking brake cable nut for installation.

2. Remove nut (32) from threaded end (6) of parking brake cable (9) and slide parking brake cable (9) out of parking brake lever (30).
3. Remove screw (5), lockwasher (4), and parking brake cable (9) from parking brake bracket (3) on transfer case (25). Discard lockwasher (4).
4. Remove air line (16) from air cylinder (24) on front of transfer case (25).
5. Remove speedometer drive shaft (38), adapter (37), and adapter drive shaft (36) from transfer case (25).

#### **NOTE**

Step 6 applies to vehicles with transfer case PTO installed.

6. Remove locknut (10) and ball pivot end (1) from PTO shift arm (2). Discard locknut (10).

#### **WARNING**

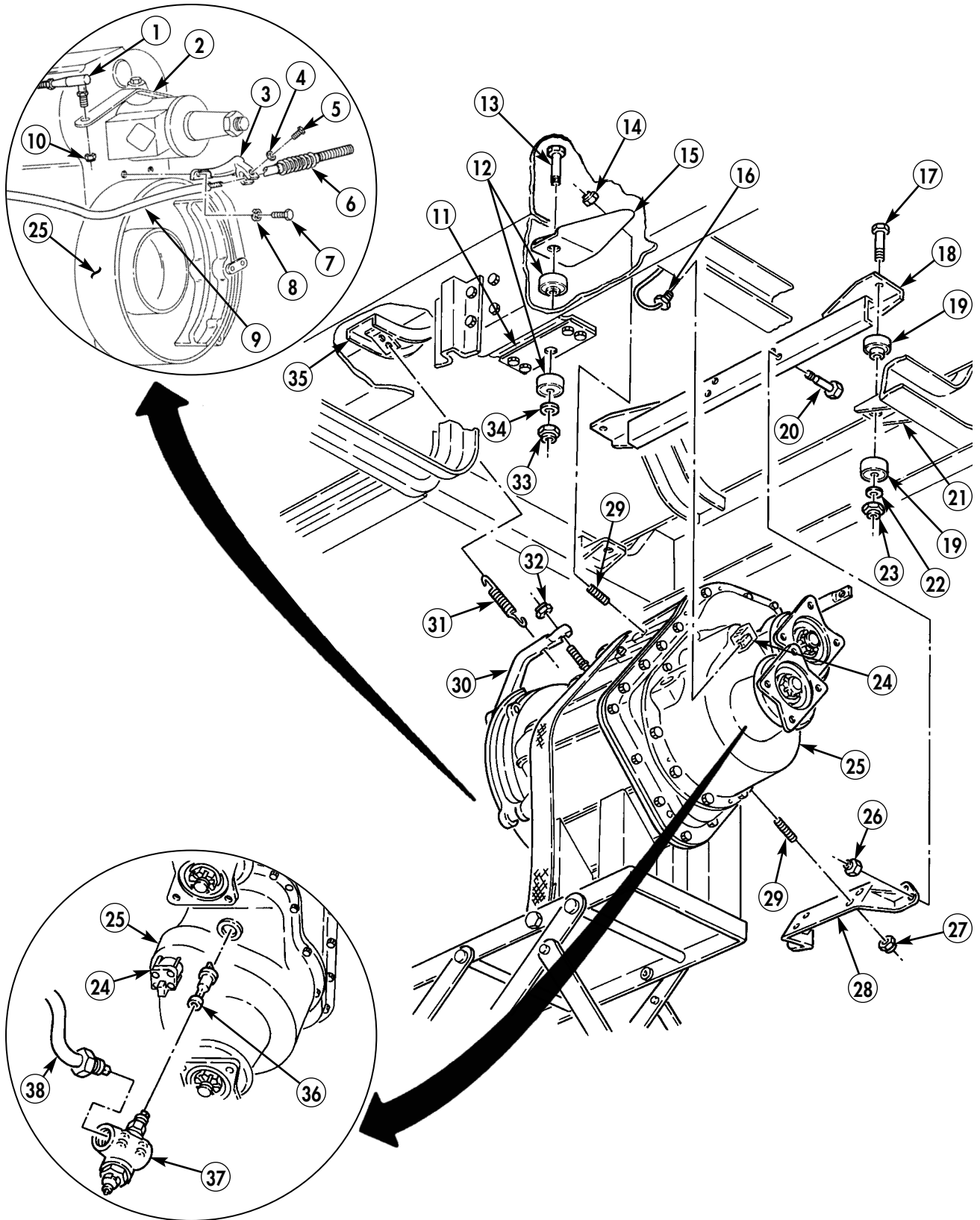
- Use prybar to free transfer case during lifting operations. Failure to do so may result in injury to personnel.
  - Ensure transfer case is securely mounted to jack with safety chain or strap. Failure to do so may result in injury to personnel.
  - Transfer case is heavy and bulky. Allow adequate clearance to remove transfer case from vehicle. Failure to do so may result in injury to personnel.
7. Position transfer case jack stand under transfer case (25) and secure transfer case (25) to jack stand with safety chain or strap.
  8. Remove four locknuts (26) and screws (20) from support (28) and mounting plate (18). Discard locknuts (26).
  9. Remove two locknuts (23), washers (22), four bushings (19), two screws (17), and mounting plate (18) from support brackets (21). Discard locknuts (23).
  10. Remove locknut (33), washer (34), two bushings (12), and screw (13) from support brackets (15) and (11). Lower jack stand and remove transfer case (25) from vehicle. Discard locknut (33).
  11. Remove two screws (7), lockwashers (8), and parking brake bracket (3) from transfer case (25). Discard lockwashers (8).
  12. Remove four locknuts (27) and left transfer case support (28) from four studs (29) on transfer case (25). Discard locknuts (27).
  13. Remove two locknuts (14) and right transfer case support (15) from two studs (29) on transfer case (25). Discard locknuts (14).

#### **NOTE**

Perform step 14 if stud(s) is damaged.

14. Remove threaded stud(s) (29) from transfer case (25).

### TRANSFER CASE REPLACEMENT (Contd)



## TRANSFER CASE REPLACEMENT (Contd)

### INSTALLATION

#### NOTE

Perform step 1 if stud(s) was removed.

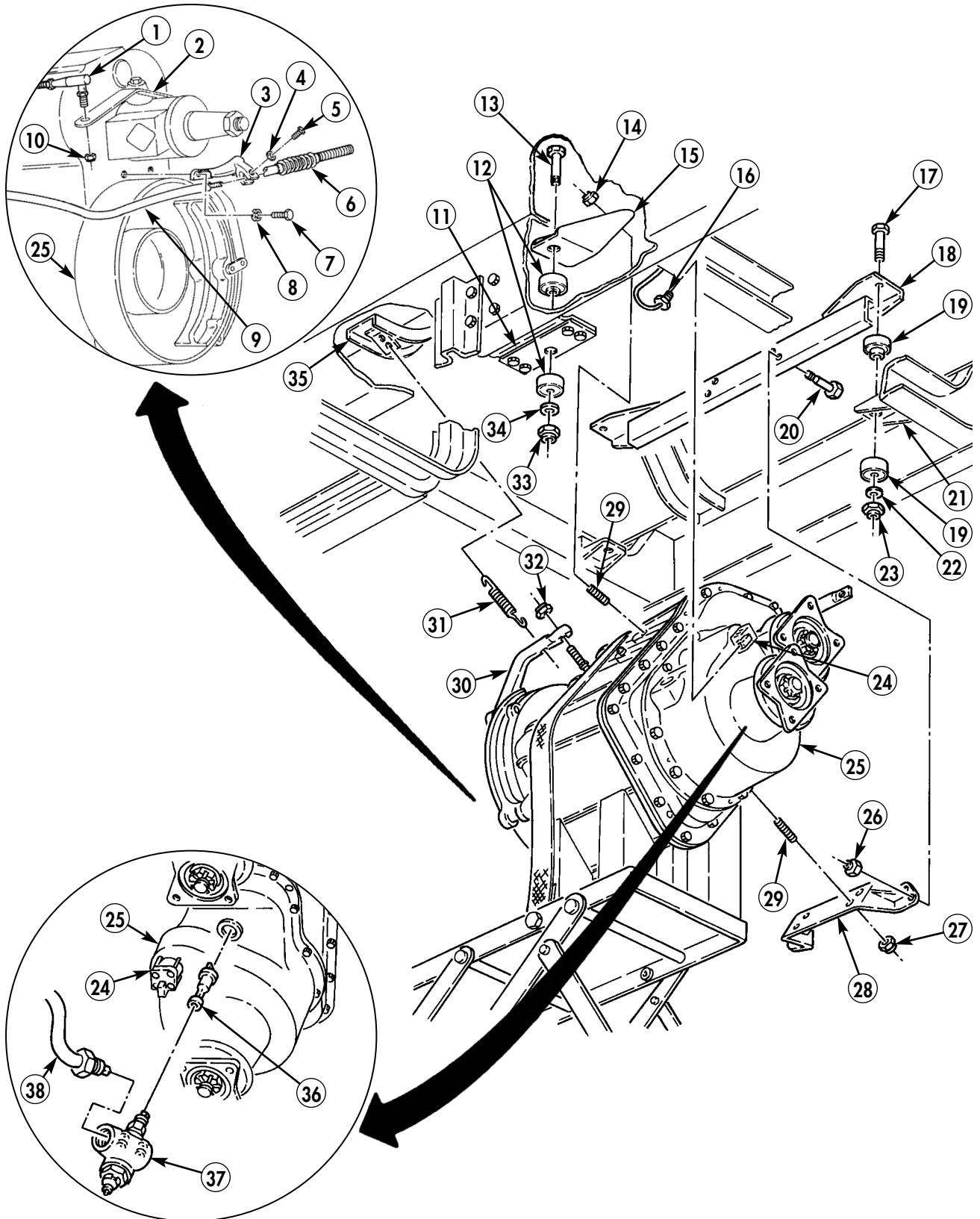
1. Install threaded stud(s) (29) on transfer case (25). Tighten stud(s) (29) 125–135 lb-ft (170–183 N•m).
2. Place transfer case (25) on transfer case jack stand. Secure transfer case (25) with safety chain or strap.
3. Install right transfer case support (15) on transfer case studs (29) with two new locknuts (14). Tighten locknuts (14) 125–135 lb-ft (170–183 N•m).
4. Install left transfer case support (28) on transfer case studs (29) with four new locknuts (27). Tighten locknuts (27) 125–135 lb-ft (170–183 N•m).
5. Install parking brake bracket (3) on transfer case (25) with two new lockwashers (8) and screws (7). Tighten screws (7) 60–77 lb-ft (81–104 N•m).
6. Raise transfer case (25) into mounting position underneath vehicle.
7. Install mounting plate (18) on two support brackets (21) with four bushings (19), two washers (22), screws (17), and new locknuts (23). Tighten locknuts (23) 65–75 lb-ft (88–102 N•m).
8. Install left transfer case support (28) on mounting plate (18) with four screws (20) and new locknuts (26). Tighten locknuts (26) 65–70 lb-ft (88–95 N•m).
9. Install right transfer case support (15) to support bracket (11) with screw (13), two bushings (12), washer (34), and new locknut (33). Tighten locknut (33) 65–70 lb-ft (88–95 N•m).
10. Install adapter drive shaft (36), adapter (37), and speedometer shaft (38) on transfer case (25).
11. Install spring (31) on parking brake lever (30) and bracket (35).
12. Slide parking brake cable (9) in parking brake lever (30) and install nut (32) on threaded end (6) of parking brake cable (9).
13. Install parking brake cable (9) on parking brake bracket (3) with new lockwasher (4) and screw (5).
14. Connect air line (16) to air cylinder (24) on front of transfer case (25).

#### NOTE

Step 15 applies to vehicles with transfer case PTO installed.

15. Install ball pivot end (1) on PTO shift arm (2) with new locknut (10).
16. Install power takeoff propeller shaft (vehicles w/PTO) (WP 0346 00).
17. Install forward rear axle propeller shaft (WP 0147 00).
18. Install transmission to transfer propeller shaft (WP 0139 00).
19. Install front axle propeller shaft (WP 0142 00).
20. Install cab tunnels (WP 0230 00).
21. Install spare wheel (TM 9-2320-361-10).
22. Fill transfer case to proper fluid level (WP 0020 00).
23. Adjust parking brake (WP 0164 00).
24. Connect battery ground cable (WP 0126 00).
25. Start engine and fill air reservoir (TM 9-2320-361-10).
26. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

TRANSFER CASE REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PROPELLER SHAFT MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

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#### INITIAL SETUP:

##### Applicable Models

All (except intermediate propeller shaft  
M36A2)

##### References

WP 0020 00  
WP 0141 00

##### Materials/Parts

Seal (item 352, WP 0470 00)  
Eight locknuts (item 129, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## PROPELLER SHAFT MAINTENANCE (Contd)

### NOTE

Front transfer to transmission and transmission to differential propeller shafts are replaced in the same manner. This procedure covers the transmission to differential propeller shaft.

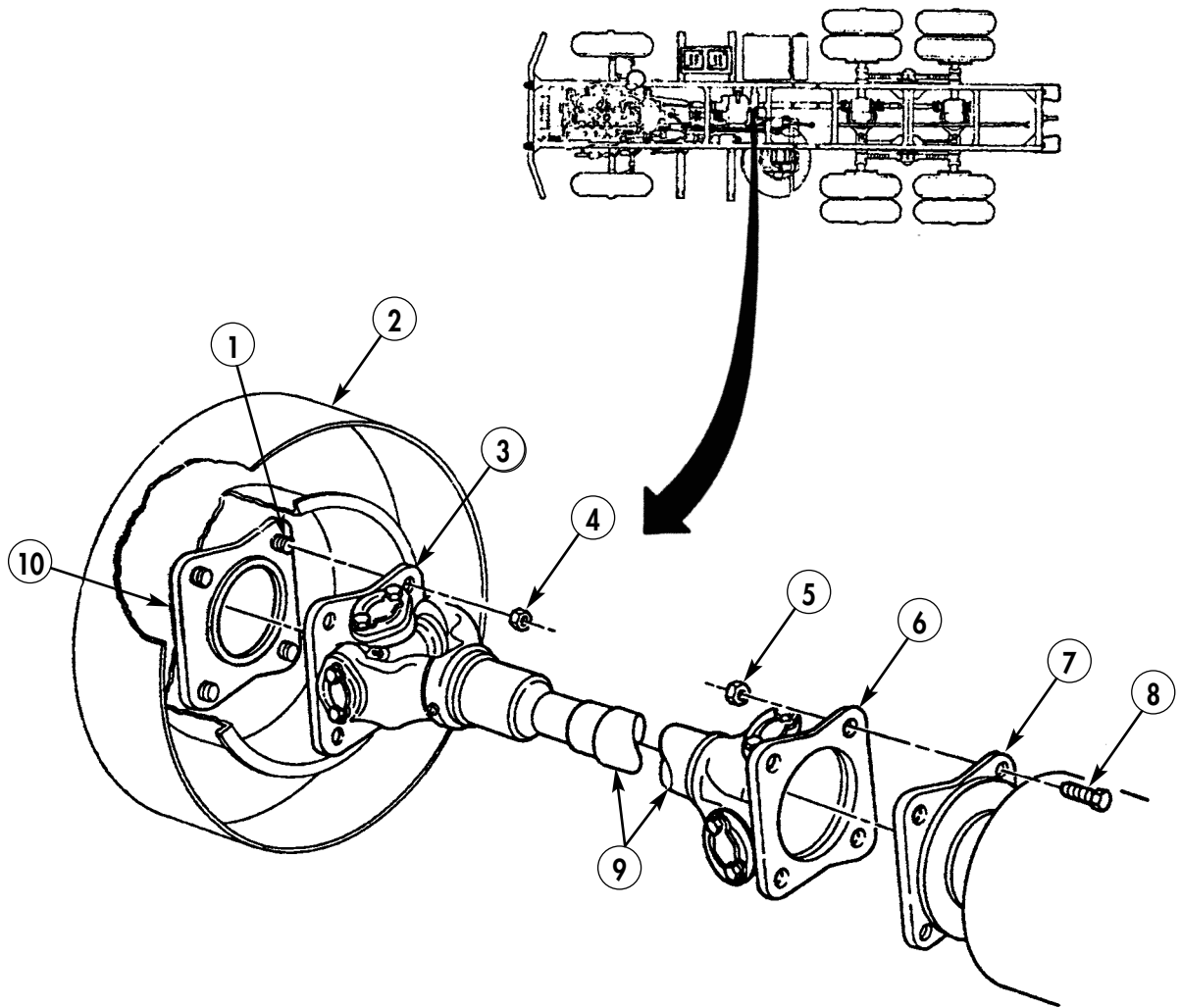
### REMOVAL

1. Chock two wheels of vehicle.
2. Release parking brake (TM 9-2320-361-10).
3. Disengage transfer case (TM 9-2320-361-10).

### NOTE

- Mark propeller shaft flange positions for installation.
  - Rotate propeller shaft in step 4 to gain access to propeller shaft mounting screws and locknuts.
4. Remove four locknuts (4) from studs (1) and separate flange (3) from flange (10) located in parking brakedrum (2). Discard locknuts (4).
  5. Remove four locknuts (5), screws (8), propeller shaft (9), and flange (6) from flange (7). Discard locknuts (5).

PROPELLER SHAFT MAINTENANCE (Contd)



## PROPELLER SHAFT MAINTENANCE (Contd)

### DISASSEMBLY

1. Loosen cap (6) and slide back on shaft (7).
2. Pull shaft (7) out of washer (5), seal (4), and shaft tube (3).
3. Remove washer (5) and seal (4) from shaft tube (3). Discard seal (4).

#### **NOTE**

Perform step 4 if lubrication fitting is damaged.

4. Remove lubrication fitting (10) from shaft tube (3).
5. Remove breather (2) from U-joint end of shaft tube (3).

### CLEANING AND INSPECTION

1. Inspect U-joint for roughness, binding, looseness, and free play. Replace U-joint if there is any roughness, binding, looseness, or free play (WP 0141 00).

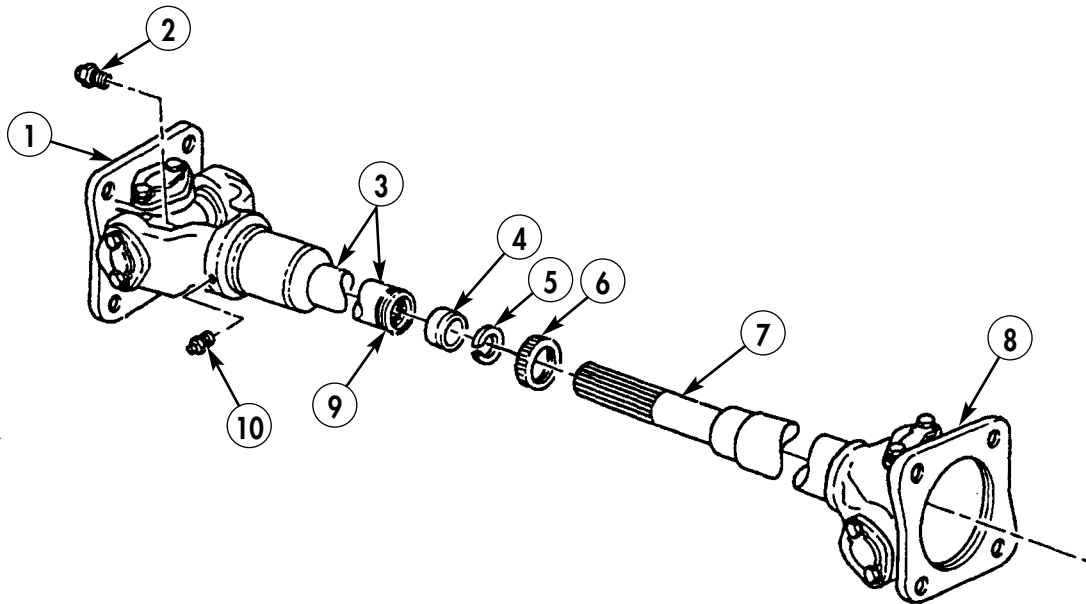
#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean splined end of shaft (7) with rag saturated with Skysol 100 solvent. Dry with clean rag.
3. Clean bore (9) of shaft tube (3) with Skysol 100. Clean outside of shaft tube (3) with rag saturated with Skysol 100.
4. Clean breather (2) and lubrication fitting (10) with Skysol 100 mixture.
5. Inspect shaft tube (3) and shaft (7) for:
  - a. Breaks, cracks, or bends. Replace if damaged.
  - b. Crossed or stripped threads, Replace if threads are crossed or stripped.
6. Inspect flanges (1) and (8) for cracks and breaks. Replace flanges (1) and (8) if cracked or broken.

PROPELLER SHAFT MAINTENANCE (Contd)



## PROPELLER SHAFT MAINTENANCE (Contd)

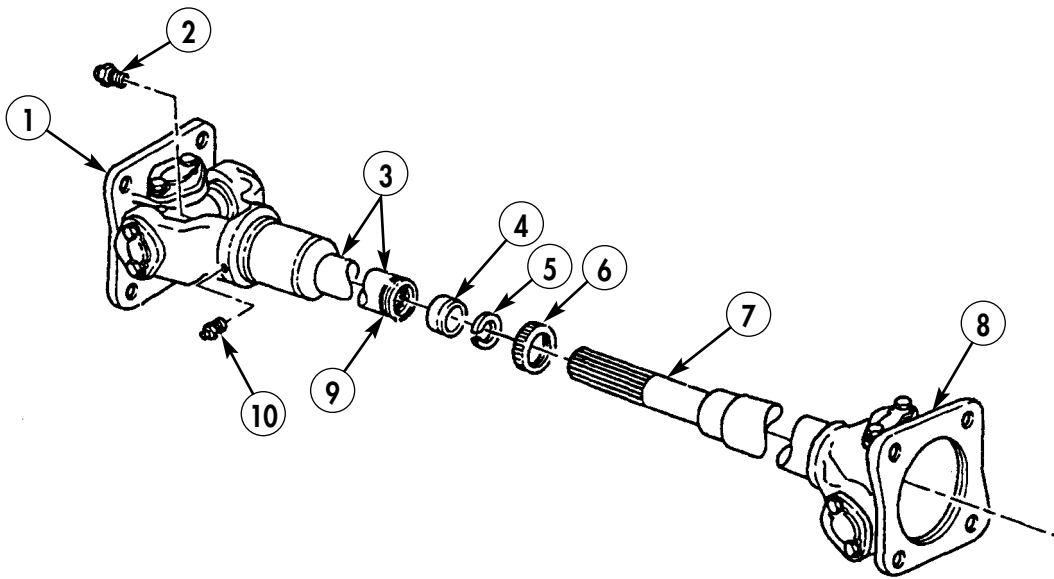
### ASSEMBLY

1. Install breather (2) in end of shaft tube (3).

#### NOTE

Perform step 2 if lubrication fitting was removed.

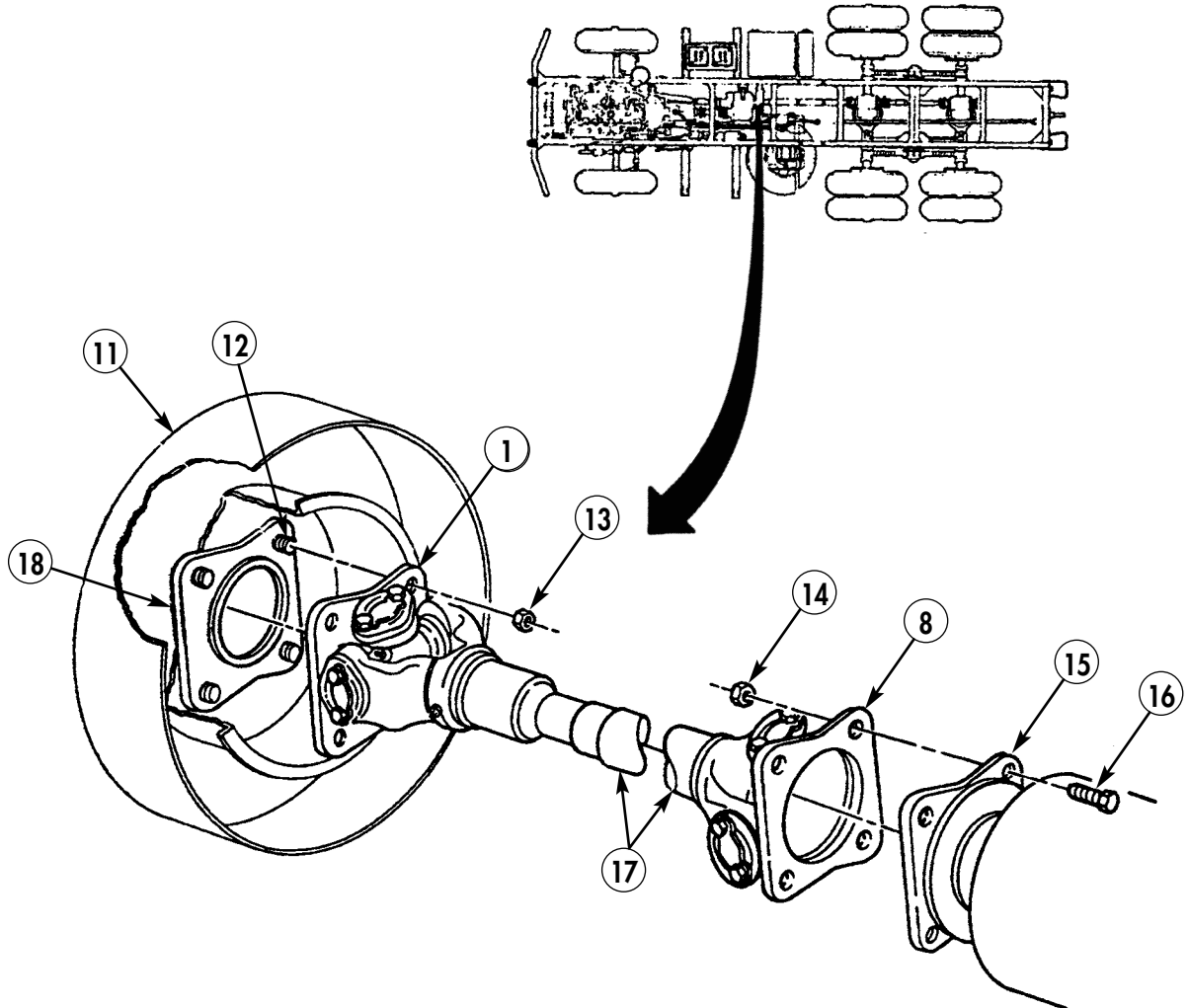
2. Install lubrication fitting (10) in shaft tube (3).
3. Install new seal (4) in bore (9) of shaft tube (3).
4. Install cap (6) on shaft (7) with open side toward shaft end and slide up on shaft (7).
5. Install washer (5) on shaft (7).
6. Apply a thick film of GAA grease on splines of shaft (7).
7. Slide splined end of shaft (7) through seal (4) and into internal splines of shaft tube (3).
8. Position washer (5) against seal (4) and install cap (6) on shaft tube (3).



## PROPELLER SHAFT MAINTENANCE (Contd)

### INSTALLATION

1. Install propeller shaft assembly (17) and flange (1) on flange (18) inside parking brakedrum (11) with four new locknuts (13). Tighten locknuts (13) 90–120 lb-ft (122–163 N•m).
2. Install flange (8) on flange (15) with four screws (16) and new locknuts (14). Tighten locknuts (14) 90–120 lb-ft (122–163 N•m).
3. Check that propeller shaft assembly (17) has no free play in any direction.
4. Engage transfer (TM 9-2320-361-10).
5. Apply parking brake (TM 9-2320-361-10).
6. Remove wheel chocks.
7. Lubricate propeller shaft (WP 0020 00).
8. Connect battery ground cable (WP 0126 00).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

0139 00-7/8 blank





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### INTERMEDIATE PROPELLER SHAFT MAINTENANCE (M36A2)

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

M36A2

##### Materials/Parts

Cotter pin (item 21, WP 0470 00)  
Two locknuts (item 156, WP 0470 00)  
Four locknuts (item 151, WP 0470 00)  
Four locknuts (item 129, WP 0470 00)  
Lockwasher (item 188, WP 0470 00)  
Seal (item 336, WP 0470 00)  
Seal (item 415, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

##### References

TM 9-214  
WP 0020 00  
WP 0141 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Forward-rear axle propeller shaft removed  
(WP 0139 00).

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## INTERMEDIATE PROPELLER SHAFT MAINTENANCE (M36A2) (Contd)

### REMOVAL

1. Remove cotter pin (8), nut (9), washer (10), flange (11), and deflector (12) from shaft (23). Discard cotter pin (8).

#### **NOTE**

Assistant will help with step 2.

2. Remove two locknuts (16), washers (15), screws (7), propeller shaft (23), and bearing housing (18) from frame support (4). Discard locknuts (16).

#### **NOTE**

Mark yoke position for installation.

3. Remove four locknuts (25) and flange yoke (24) from flange (26) and studs (1) located in parking brake drum (2). Discard locknuts (25).
4. Remove four locknuts (3), screws (5), and frame support (4) from crossmember (6). Discard locknuts (3).

### DISASSEMBLY

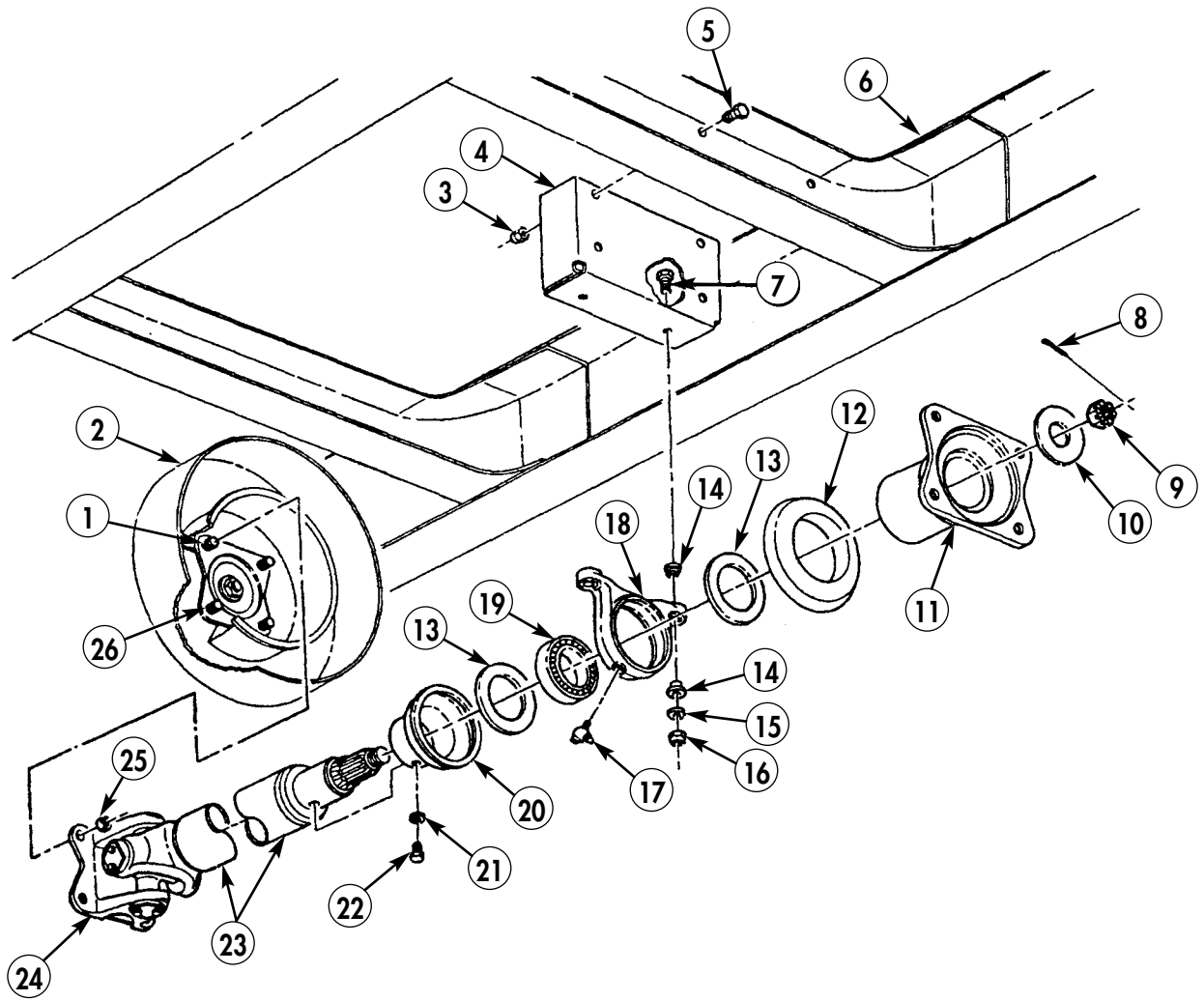
1. Remove bearing housing (18) from propeller shaft (23).
2. Remove screw (22), lockwasher (21), and side shield (20) from propeller shaft (23). Discard lockwasher (21).
3. Remove two seals (13) and bearing (19) from bearing housing (18). Discard seals (13).
4. Remove four rubber insulators (14) from bearing housing (18).

#### **NOTE**

Perform step 5 if lubrication fitting is damaged.

5. Remove lubrication fitting (17) from bearing housing (18).

INTERMEDIATE PROPELLER SHAFT MAINTENANCE (M36A2) (Contd)



## INTERMEDIATE PROPELLER SHAFT MAINTENANCE (M36A2) (Contd)

### CLEANING AND INSPECTION

#### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all parts with Skysol 100 and dry with clean rag.
2. Clean and inspect bearing (19) in accordance with TM 9-214.
3. Inspect universal joint (24) for roughness and free play. Replace universal joint (24) if loose or rough (WP 0141 00).
4. Inspect propeller shaft (23) for:
  - a. Breaks, cracks, or bends. Replace if cracked, bent, or broken.
  - b. Crossed or stripped threads. Replace if threads are crossed or stripped.
  - c. Nicked or burred splines (28). Replace if splines are cracked or chipped.
  - d. Bearing shoulder nicked, burred, or scored. Replace if bearing shoulder is nicked, burred, scored, or bearing (19) is frozen.
5. Inspect shield (20) for cracks, breaks, or bends. Replace shield (20) if cracked, broken, or bent.
6. Inspect flange (11) for cracks, breaks, and bent deflector (12). Replace flange (11) if damaged.
7. Inspect rubber insulators (14) for tears or breaks. Replace rubber insulators (14) if torn or broken.
8. Inspect bearing housing (17) for cracks and breaks. Replace bearing housing (17) if cracked or broken.
9. Inspect frame support (4) for breaks and cracks. Replace frame support (4) if broken or cracked.

### ASSEMBLY

1. Apply a light film of GAA grease to bearing (19) outer race and inner bore of bearing housing (17). Install bearing (19) in bearing housing (17). Ensure bearing (19) is seated square in bearing housing (17).
2. Install two new seals (13) in shaft side of bearing housing (17).
3. Slide shield (20) on shaft (23) as far as it will go.
4. Install shield (20) with screw (22) and new lockwasher (21) on shaft (23).
5. Install four rubber insulators (14) in bearing housing (17).

#### **NOTE**

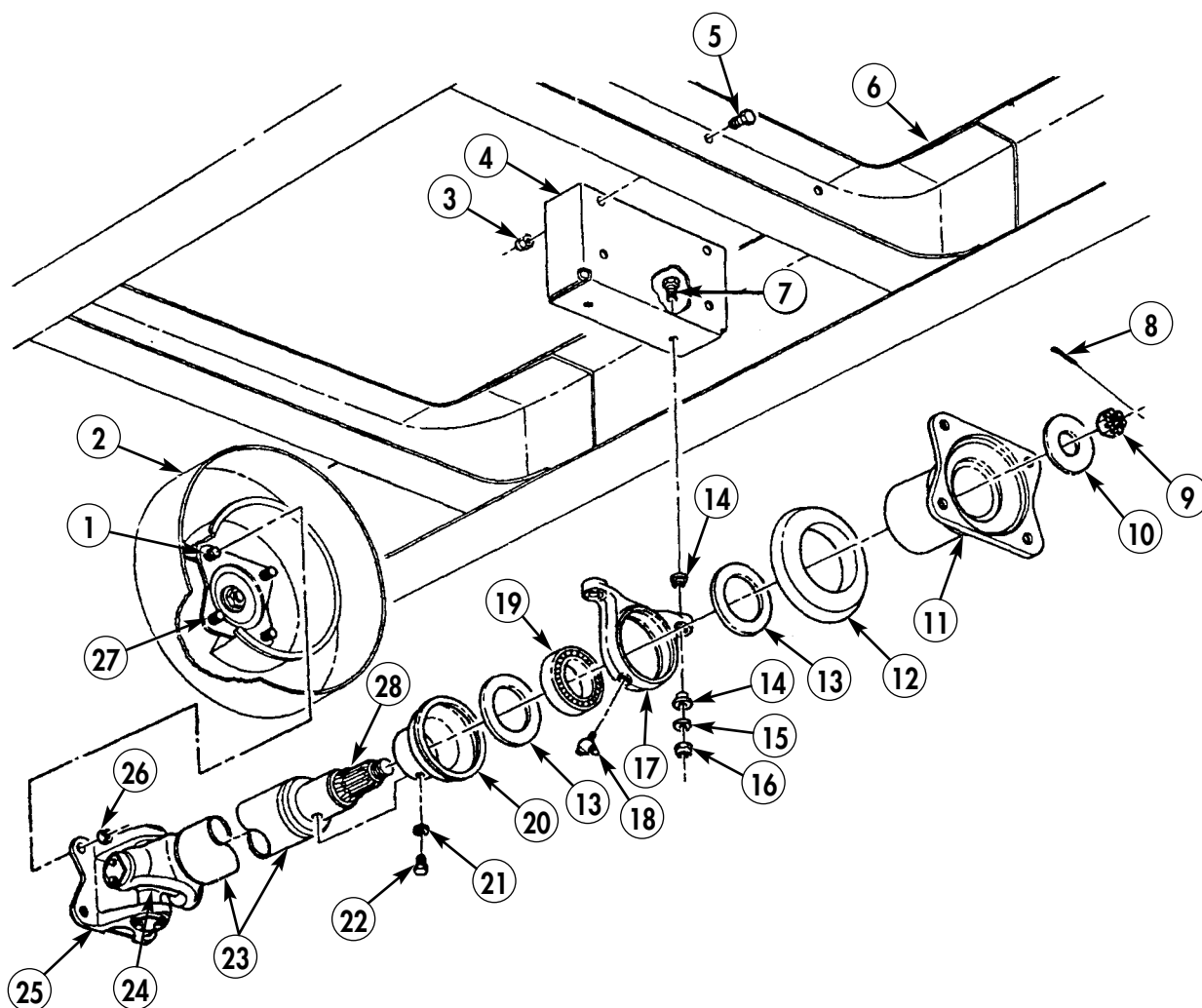
Perform step 6 if lubrication fitting was removed.

6. Install lubrication fitting (18) in bearing housing (17).

## INTERMEDIATE PROPELLER SHAFT MAINTENANCE (M36A2) (Contd)

### INSTALLATION

1. Install frame support (4) to crossmember (6) with four screws (5) and new locknuts (3).
2. Install flange yoke (25) on studs (1) of transfer flange (27) in parking brake drum (2) with four new locknuts (26). Ensure scribed marks align. Tighten locknuts (26) 90–120 lb-ft (122–163 N•m).
3. Install bearing housing (17) to frame support (4) with two screws (7), washers (15), and new locknuts (16).
4. Install deflector (12) and flange (11) on shaft (23) with washer (10) and nut (9).
5. Tighten nut (9) on shaft (23) 260–290 lb-ft (353–393 N•m).
6. Install new cotter pin (8) through nut (9).
7. Ensure shaft (23) turns freely and with no side play at U-joint (24) and support bearing (19).
8. Install forward-rear propeller shaft (WP 0139 00).
9. Lubricate bearing housing (WP 0020 00).
10. Connect battery ground cable (WP 0126 00).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### UNIVERSAL JOINT MAINTENANCE

DISASSEMBLY, CLEANING AND INSPECTION, AND ASSEMBLY

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four retaining rings (item 311, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**References**

TM 9-2320-209-12  
TM 9-214

**Equipment Condition**

Propeller shaft removed (WP 0139 00).  
Intermediate propeller shaft removed (M36A2)  
(WP 0140 00).

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## UNIVERSAL JOINT MAINTENANCE (Contd)

### NOTE

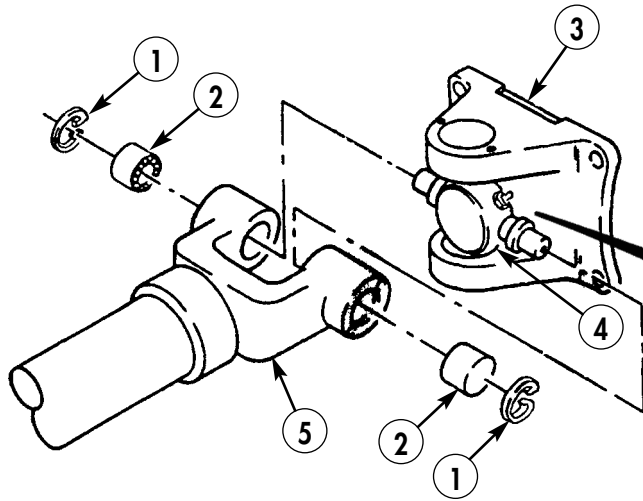
- Do not remove bearings from caps, except when replacing caps.
- Mark mating yoke position for installation.

### REMOVAL

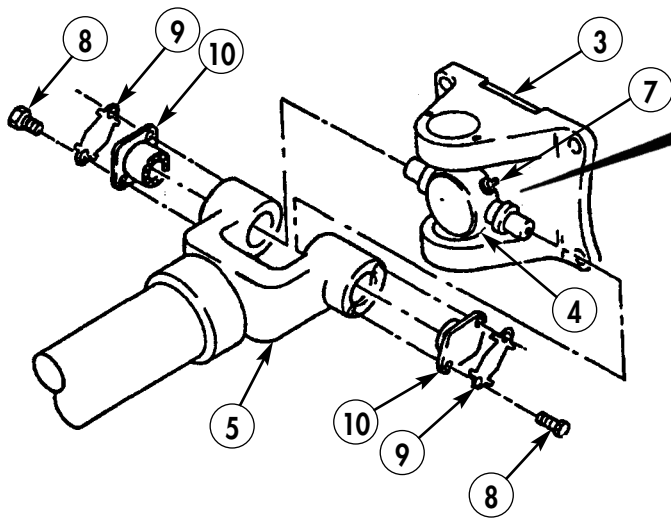
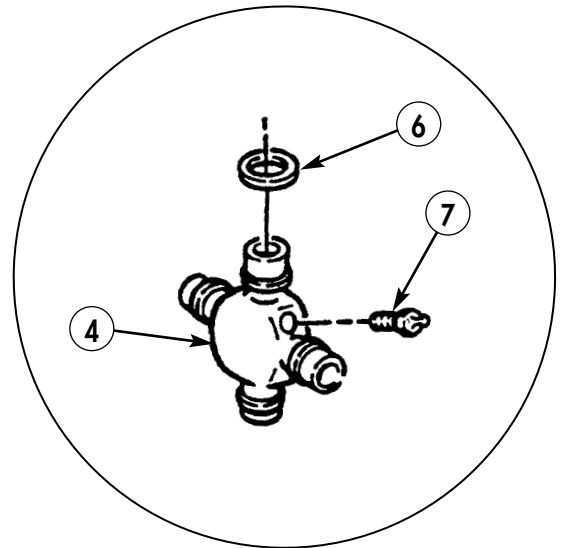
1. C-ring and retaining ring type:
  - a. Remove four retaining rings (1) from yoke (5) and yoke flange (3). Discard retaining rings (1).
  - b. Remove four bearing caps (2), yoke flange (3), and universal joint (4) from yoke (5).
  - c. Remove four seals (6) and lubrication fitting (7) from universal joint (4). Discard seals (6).
2. Cap type:
  - a. Remove eight screws (8), four straps (9), and bearing caps (10) from yoke (5) and yoke flange (3).
  - b. Remove yoke flange (3) and universal joint (4) from yoke (5).
  - c. Remove four seals (6) and lubrication fitting (7) from universal joint (4). Discard seals (6).



UNIVERSAL JOINT MAINTENANCE (Contd)



C-RING AND RETAINING RING TYPE



CAP TYPE

## UNIVERSAL JOINT MAINTENANCE (Contd)

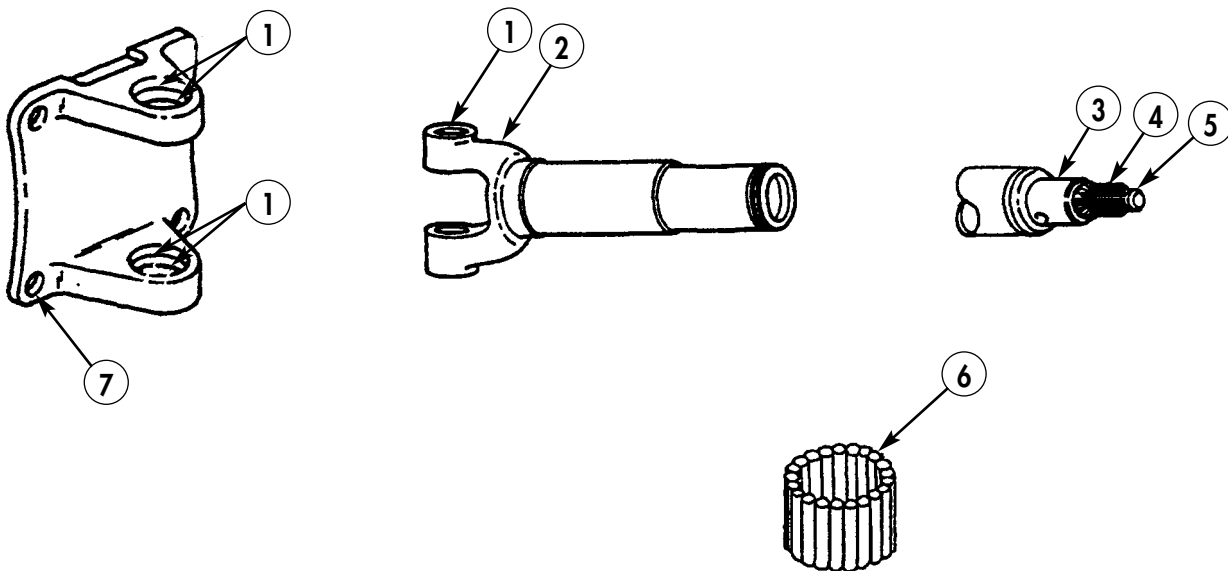
### CLEANING AND INSPECTION

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1. Clean all parts with Skysol 100 and dry with clean rag.
2. Inspect yokes (2) for breaks, cracks, and bends. Replace yokes (2) if damaged.
3. Inspect retaining ring grooves (1) for damage. Replace yoke flange (7) or yoke (2) if retaining ring grooves (1) are damaged.
4. Inspect shaft (3) for bends, cracks, and damaged threads (5) or splines (4). Replace shaft (3) if damaged, bent or cracked.
5. Inspect bearings (6) in bearing cap (2) (TM 9-214). Replace U-joint if damaged.



## UNIVERSAL JOINT MAINTENANCE (Contd)

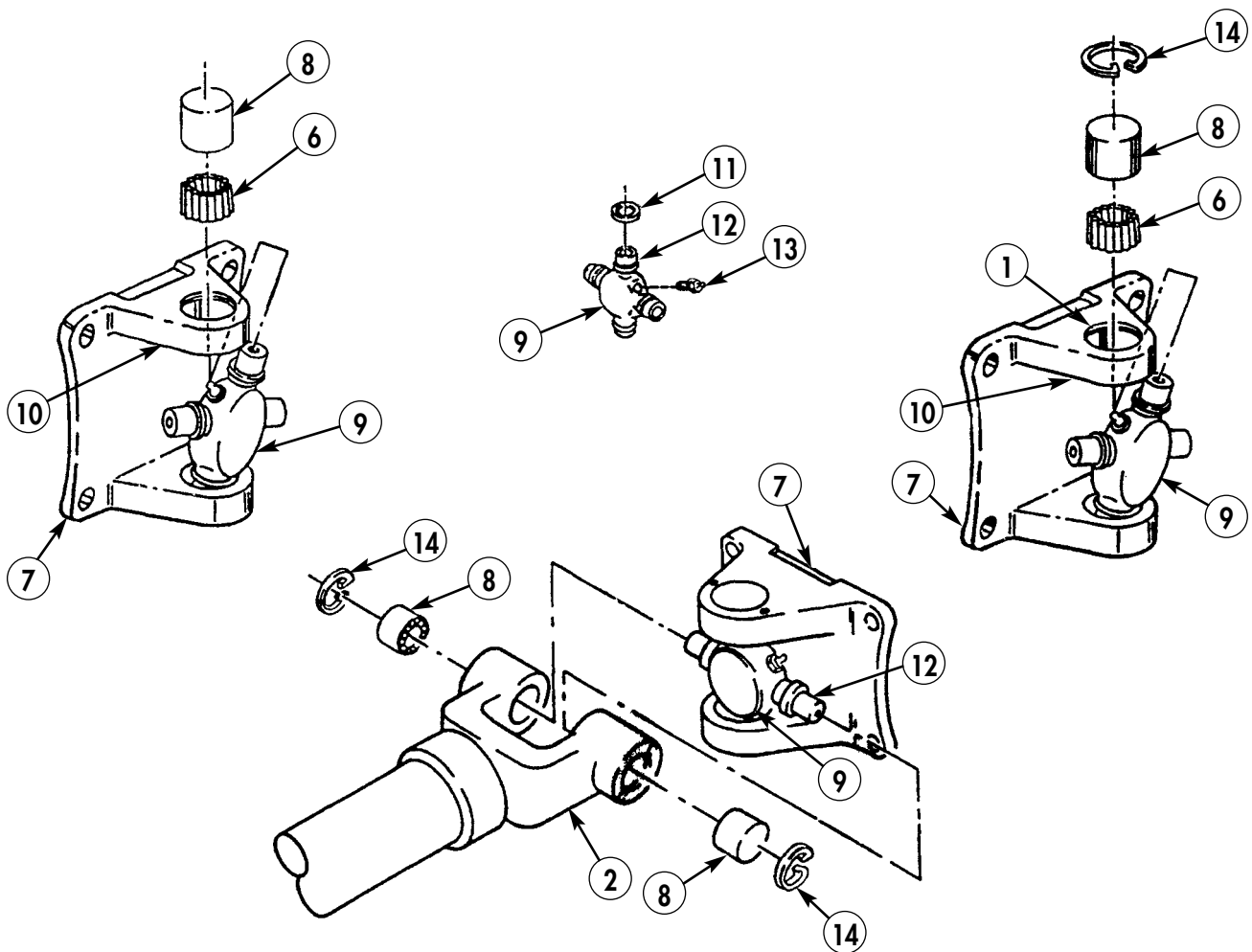
### ASSEMBLY

1. C-ring and retaining ring type:
  - a. Apply thick film of GAA grease to bearing caps (8) to hold bearings (6) in place during assembly.
  - b. Install four new rubber seals (11) on universal joint journals (12).
  - c. Install universal joint journals (12) in yoke flange (7). Press two bearing caps (8) into yoke flange loops (10).
  - d. Ensure retaining ring groove (1) in outside edge of both yoke loops (10) are visible. Install two new retaining rings (14).

#### NOTE

Align marks on yokes before assembling bearing caps in shaft yoke.

- f. Position yoke (2) on universal joint journals (12), and install two bearing caps (8) and new retaining rings (14).
- g. Install lubrication fitting (13) on universal joint (9).



C-RING AND RETAINING RING

## UNIVERSAL JOINT MAINTENANCE (Contd)

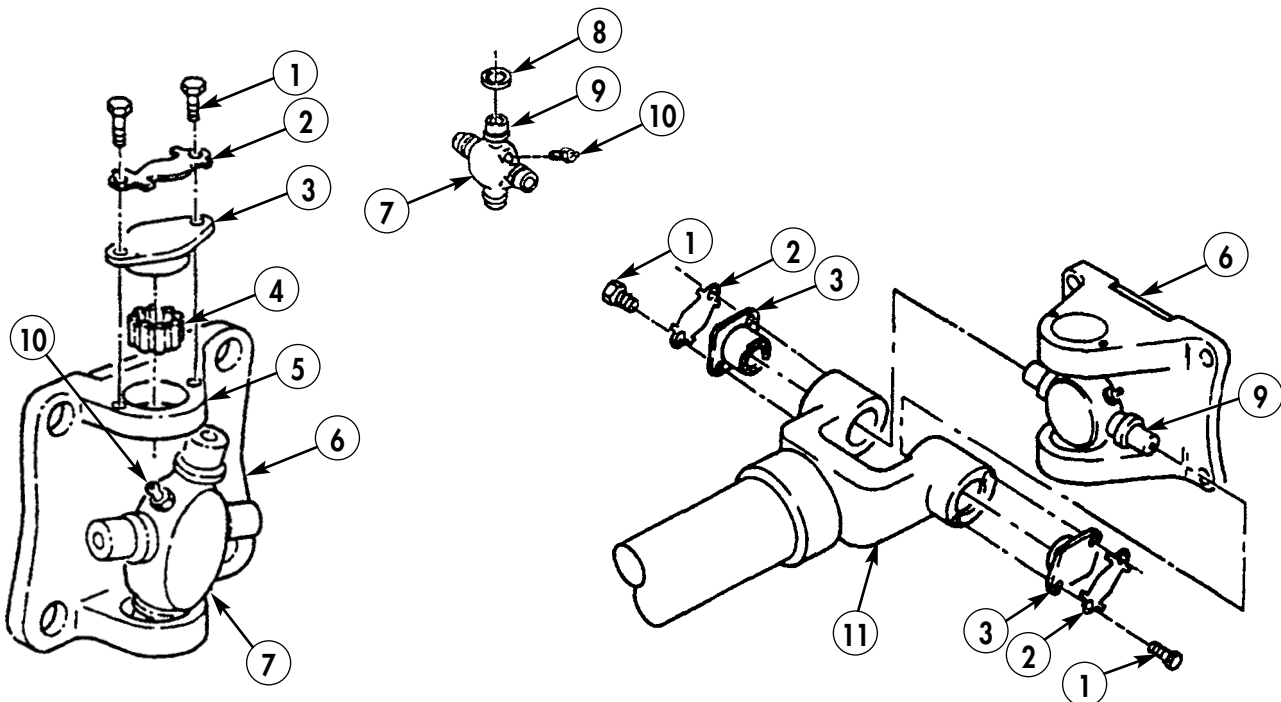
### NOTE

Align marks on yokes before assembling bearing caps in shaft yoke.

2. Cap type:
  - a. Install four new seals (8) on universal joint journals (9).
  - b. Install lubrication fitting (10) on universal joint (7).
  - c. Install universal joint (7) in upper yoke flange loop (5) with lubrication fitting (10) angled away from yoke flange (6).
  - d. Apply GAA grease in bearing caps (3) to hold bearing (4) in place during assembly.
  - e. Install two bearing caps (3) on universal joint journal (9) and upper yoke flange loop (5).
  - f. Position two locking straps (2) on bearing caps (3) and install with four screws (1). Tighten screws (1) 18–25 lb-ft (24–34 N•m). Bend tabs of locking straps (2) up to hold screws (1) in place.

### NOTE

- Align marks on yokes before assembling bearing caps in shaft yoke.
  - Shaft yoke and yoke flange should move smoothly and have no free play.
- g. Position shaft yoke (11) on universal joint journals (9) and install two bearing caps (3) with new locking straps (2) and four screws (1). Tighten screws (1) 18–25 lb-ft (24–34 N•m).
  - h. Bend tabs of locking straps (2) up to hold screws (1) in place.
3. Install propeller shaft (WP 0139 00).
  4. Install intermediate propeller shaft (M36A2) (WP 0140 00).



CAP TYPE

END OF WORK PACKAGE

0141 00-6

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Twelve lockwashers (item 233, WP 0470 00)  
Washer (item 373, WP 0470 00)  
Washer (item 376, WP 0470 00)  
GO 80/90 (item 25, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Sealing compound (item 32, WP 0468 00)  
Cap and plug set (item 10, WP 0468 00)

**References**

WP 0020 00  
WP 0141 00  
WP 0172 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front hubs and drums removed (WP 0187 00).

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## FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)

### REMOVAL

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

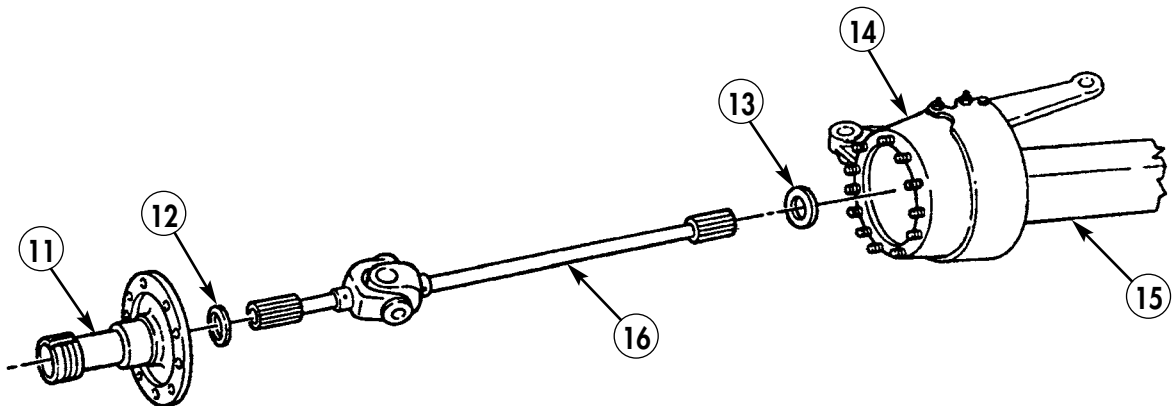
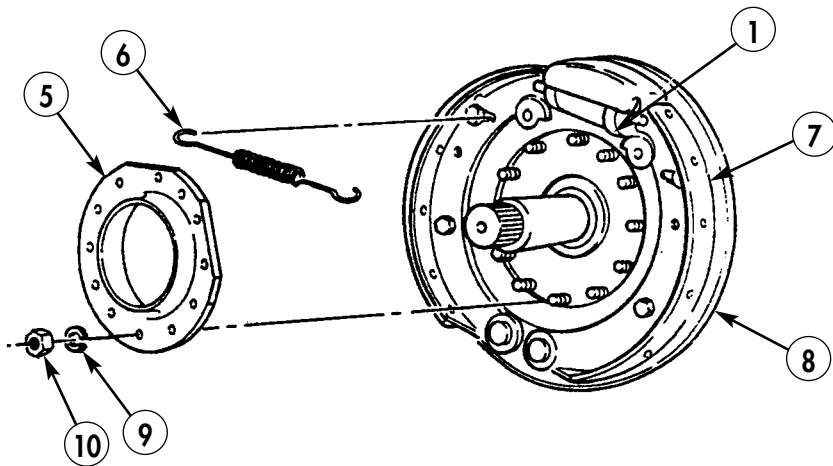
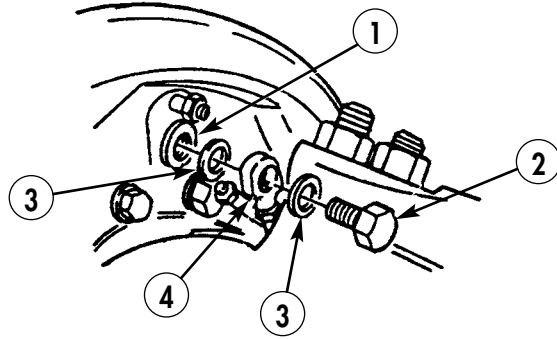
#### **CAUTION**

Plug all openings after disconnection to prevent contamination.

#### **NOTE**

- Left and right side front axle shafts are replaced the same way. This procedure covers the right side front axle shaft.
  - Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.
1. Remove screw (2), two washers (3), and hose connector (4) from wheel cylinder (1). Discard washers (3).
  2. Remove spring (6) from brakeshoes (7).
  3. Remove twelve nuts (10), lockwashers (9), and deflector (5) from brake plate (8). Discard lockwashers (9).
  4. Remove brake plate (8) from spindle (11).
  5. Slide spindle (11) and thin thrust washer (12) off outer shaft of front axle shaft (16).
  6. Carefully pull front axle shaft (16) out of axle housing (15) and steering knuckle (14).
  7. Remove thick thrust washer (13) from front axle shaft (16).

FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)



## FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. Inspect for worn U-joint as follows:
  - a. Place short shaft (3) in vise and twist shaft (1) back and forth checking for free play.
  - b. Push and pull shaft (1) and check for free play.
  - c. Check universal joint (2) for roughness, binding, or free play. Replace universal joint (2) if damaged (WP 0141 00).

#### **WARNING**

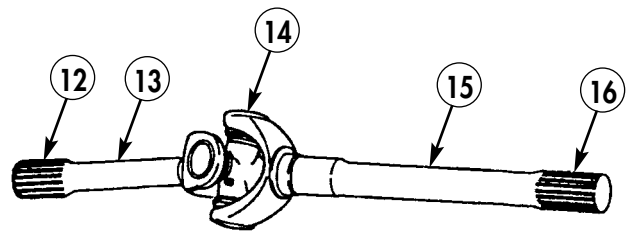
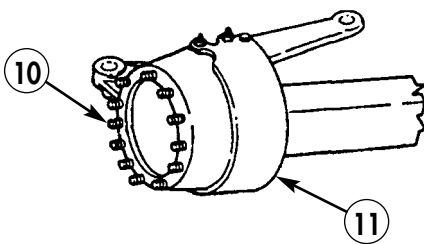
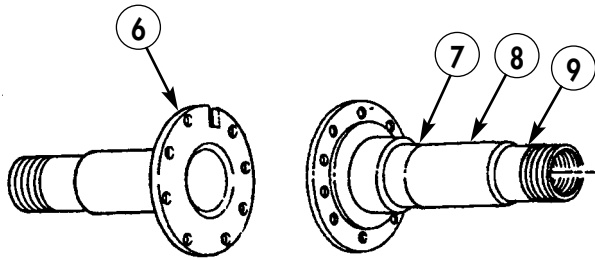
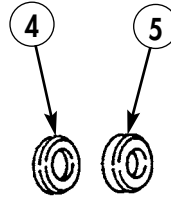
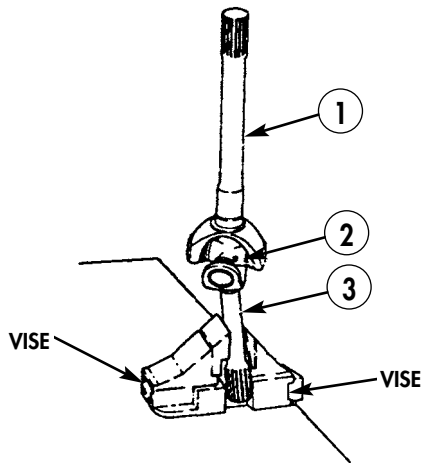
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2. Clean all metal parts with rag saturated with Skysol 100. Do not clean brake lining or any parts of wheel cylinder with Skysol 100. Clean sealer remains from mating surfaces.
3. Inspect shafts (1) and (3), including yokes (14), for breaks, cracks, or bends. Replace shafts (1) or (3) if damaged.
4. Inspect splines (12) and (16) for nicks, burrs, or chipping. Replace shafts (13) or (15) if nicked, burred, or chipped.
5. Inspect thrust washers (4) and (5) for evidence of overheating (discoloration) or scoring. Replace thrust washers (4) and (5) if discolored or scored.
6. Inspect spindle (8), bearing sleeve (6), and bearing surfaces (7) and (9) for scoring. Replace spindle (8) if scored.
7. Inspect studs (10) of steering knuckle (11) for stripped or crossed threads. Replace studs (10) if threads are stripped or crossed.



FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)

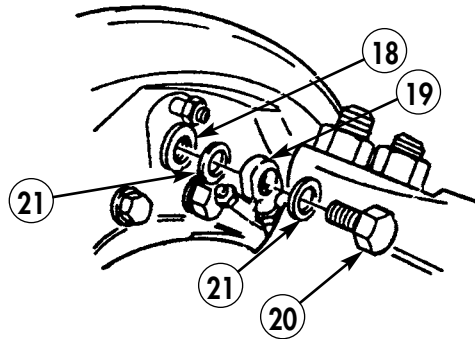
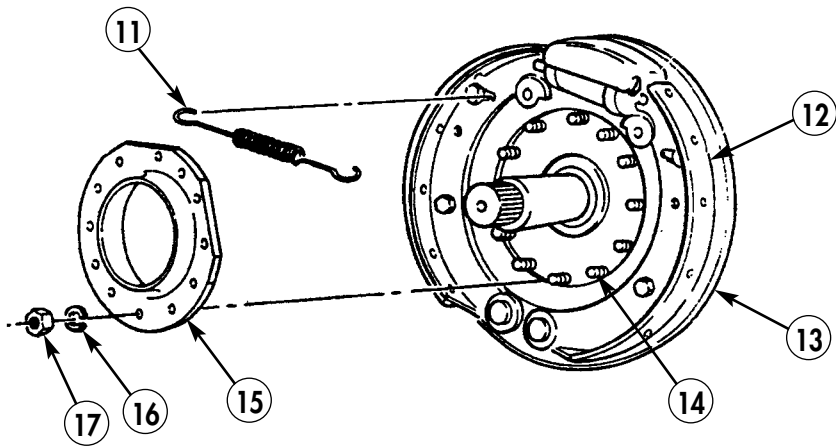
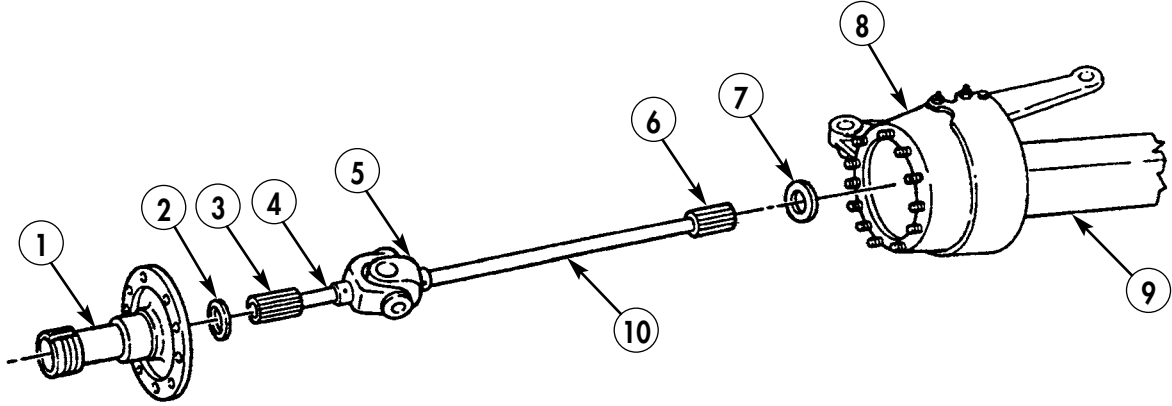


## FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)

### INSTALLATION

1. Lubricate U-joint (5) (WP 0020 00). Coat splines (3) and (6) with GO 80/90 oil.
2. Install thick thrust washer (7) on shaft (10) with tapered side of thrust washer (7) facing U-joint (5).
3. Carefully slide axle shaft (10) into axle housing (9) and seat splines (6) in differential.
4. Install thin thrust washer (2) on shaft (4) with tapered side of thrust washer (2) facing U-joint (5).
5. Run 1/8 in. x 1/8 in. (3.2 mm x 3.2 mm) bead of sealing compound on inside surface of deflector (15) just inside of stud circle.
6. Apply sealing compound on studs (14).
7. Install spindle (1) on shaft (4) and seat on studs (14) of knuckle (8).
8. Install brake plate (13) and deflector (15) on spindle (1) and studs (14) of knuckle (8) with twelve new lockwashers (16) and nuts (17). Tighten nuts (17) 25–35 lb-ft (34–48 N•m).
9. Install spring (11) on brakeshoe (12).
10. Install hose connector (19) on back of wheel cylinder (18) with two new washers (21) and screw (20).
11. Bleed brakes (WP 0172 00).
12. Install front hubs and drums (WP 0187 00).
13. Connect battery ground cable (WP 0126 00).
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT AXLE SHAFT AND UNIVERSAL JOINT MAINTENANCE (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AXLE OIL SEAL ASSEMBLY REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

Puller, mechanical (item 61, WP 0469 00)

Oil seal inserter (item 81, WP 0469 00)

##### Materials/Parts

Oil seal assembly (item 416, WP 0470 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

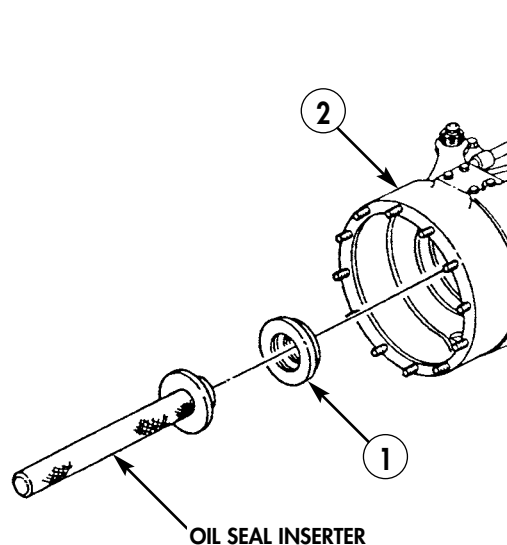
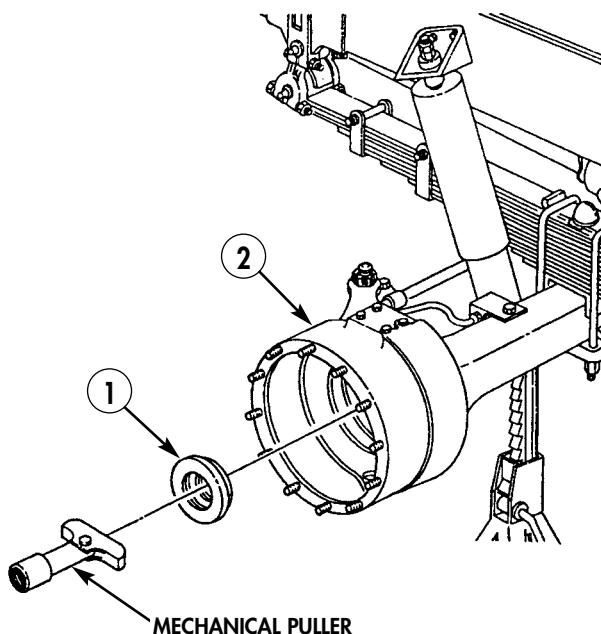
Front axle shaft removed (WP 0142 00).

#### REMOVAL

Using mechanical puller, remove oil seal assembly (1) from axle housing (2). Discard oil seal assembly (1).

#### INSTALLATION

1. Using oil seal inserter, install new oil seal assembly (1) in axle housing (2).
2. Install front axle shaft (WP 0142 00).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AND REAR AXLE BREATHER MAINTENANCE REMOVAL, CLEANING, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Rags (item 27, WP 0468 00)

Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## FRONT AND REAR AXLE BREATHER MAINTENANCE (Contd)

### REMOVAL

#### **NOTE**

This procedure is for all axles.

Remove breather (1) from axle housing (2).

### CLEANING

#### **WARNING**

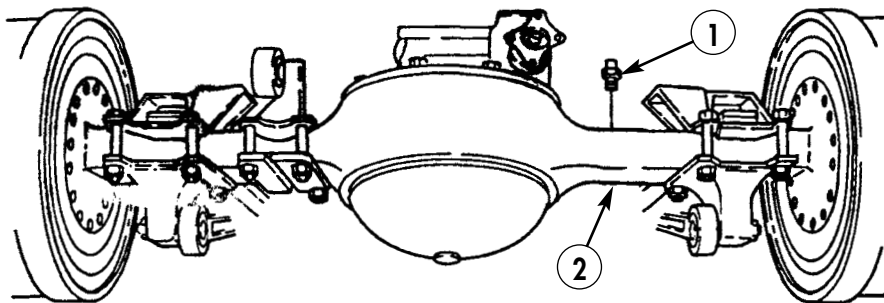
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Clean breather (1) in Skysol 100 and dry with clean rag.

### INSTALLATION

1. Install breather (1) in axle housing (2).
2. Connect battery ground cable (WP 0126 00).
3. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### STEERING KNUCKLE BOOT REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 239, WP 0470 00)

Steering knuckle, dust boot parts kit  
(item 293, WP 0470 00)

Adhesive (item 1, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## STEERING KNUCKLE BOOT REPLACEMENT (Contd)

### REMOVAL

#### NOTE

Left and right steering knuckle boots are replaced the same way. This procedure covers the left side.

1. Remove four screws (1), lockwashers (2), and boot guard (3) from steering arm (5) and knuckle (4). Discard lockwashers (2).
2. Hold nut (8) and loosen screw (6) and washer (7) on outer clamp (9).
3. Remove outer clamp (9) and slide boot (11) off toward center of vehicle.
4. Pull boot (11) off steering knuckle (4).
5. Hold nut (14), loosen screw (12) and washer (13), and slide inner clamp (15) off boot (11) toward center of vehicle.
6. Pull boot (11) away from axle housing (18).

#### NOTE

Cut boot only if necessary for removal. Replacement boots are equipped with zippers.

7. Cut boot (11) from edge (15) to edge (17). Remove and discard boot (11).

### INSTALLATION

#### NOTE

When boot is properly installed, zipper will be toward front on left side and toward rear on right side

1. Place new boot (11) around axle housing (18) so that when zipped up, zipper tab (10) is outside of boot (11).
2. Close zipper (10) all the way.
3. Thoroughly coat zipper (10) with adhesive sealer.

#### NOTE

Ensure word TOP is facing upward when installing boot.

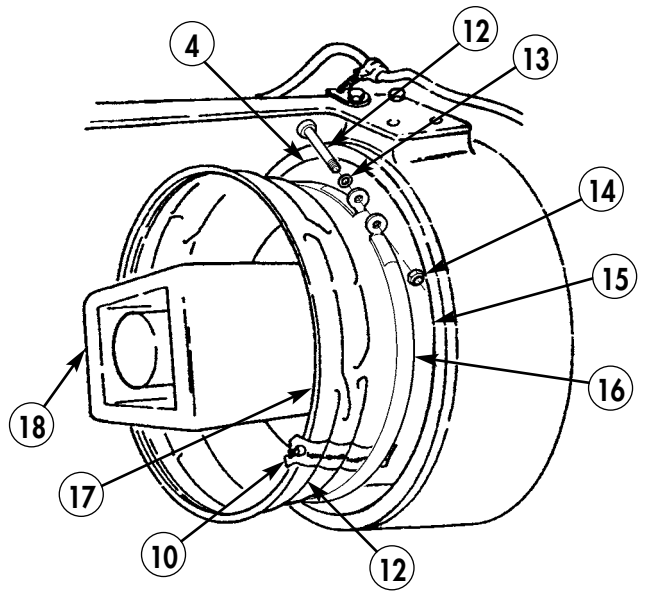
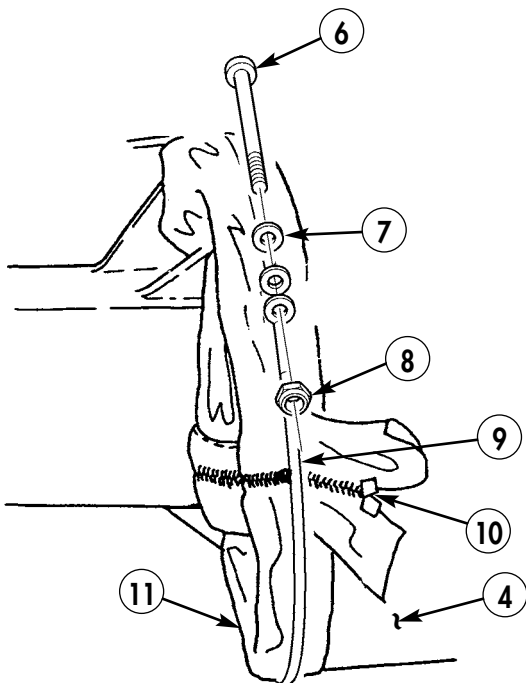
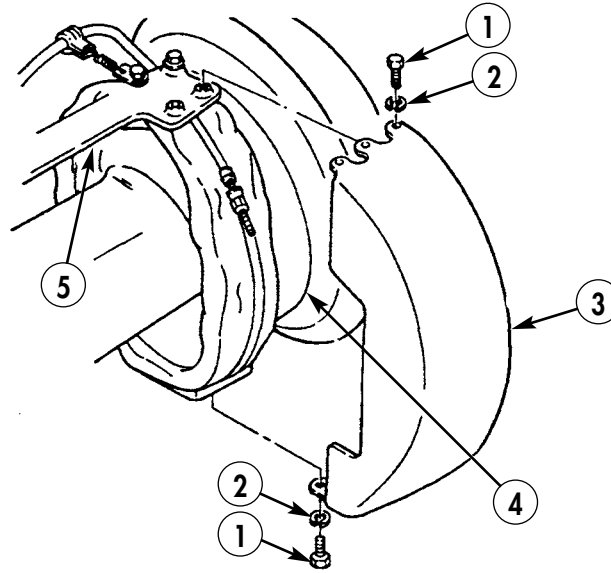
4. Place small end of boot (11) over groove in axle housing (18). Slide small clamp (16) over boot (11) until fully seated in groove of axle housing (18). Screw (12), washer (13), nut (14), and clamp (16) must be positioned on top of axle housing (18), and clamp (16) must be between two beads of boot (11).
5. While holding nut (14), tighten screw (12) and washer (13) of clamp (16). Check that clamp (16) is holding boot (11) in groove of axle housing (18).
6. Fold free inner edge of boot (11) over itself and place over groove in steering knuckle (4). Tab (10) of zipper is now inside of boot (11).

#### NOTE

When steering knuckle boot clamp is installed, ensure screw and nut are located toward front and at top of steering knuckle when tightened.

7. Slide larger clamp (9) over boot (11) and seat clamp (9) in groove of steering knuckle (4). Ensure clamp (9) is seated all the way around steering knuckle (4) and is between two beads of boot (11).
8. While holding nut (8), tighten screw (6) and washer (7) of clamp (9).
9. Using adhesive sealer, seal around both edges of boot (11) to steering knuckle (4) and axle housing tube (18).
10. Install boot guard (3) on steering arm (5) and steering knuckle (4) with four new lockwashers (2) and screws (1).
11. Connect battery ground cable (WP 0126 00).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

STEERING KNUCKLE BOOT REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AXLE SHAFT FLANGE MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

**Applicable Models**

All

**References**

WP 0142 00

**Materials/Parts**

Gasket (item 67, WP 0470 00)  
Eight lockwashers (item 206, WP 0468 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## FRONT AXLE SHAFT FLANGE MAINTENANCE (Contd)

### REMOVAL

1. Remove eight screws (1) and lockwashers (2) from axle flange (3) and hub (5). Discard lockwashers (2).
2. Loosen axle flange (3) from axle shaft (6).
3. Remove axle flange (3) and gasket (4). Discard gasket (4).

### CLEANING AND INSPECTION

1. Clean gasket (4) remains from mating surfaces.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

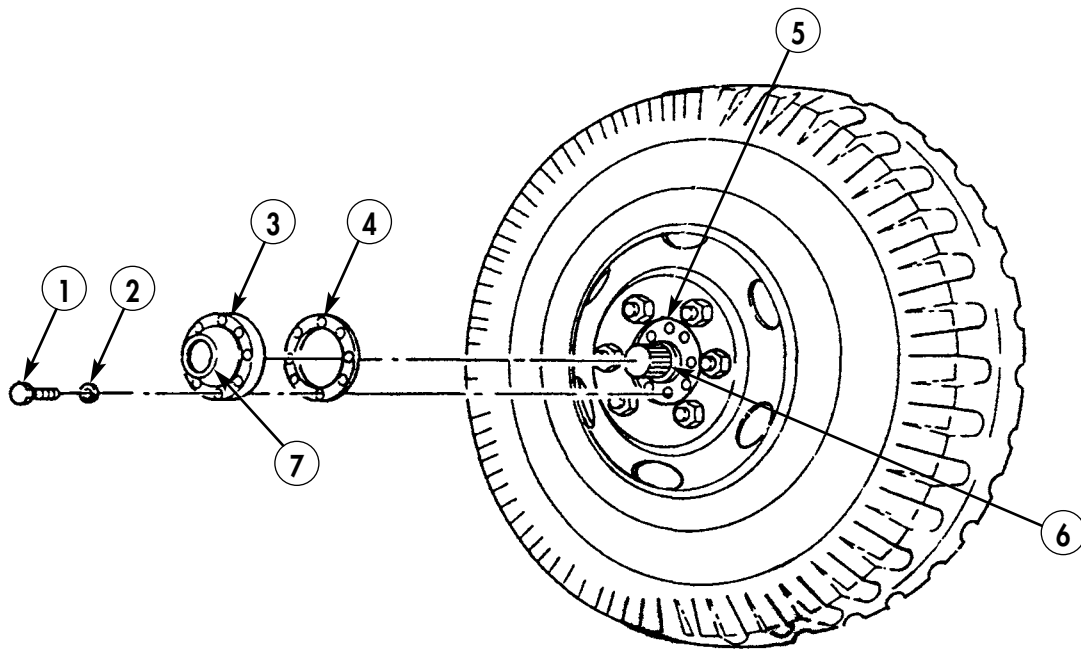
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean axle flange (3) in Skysol 100 and dry with clean rag.
3. Clean gasket (4) surface on hub (5) with rag saturated with Skysol 100, and dry with clean rag.
4. Inspect axle flange (3) for:
  - a. Cracks and breaks. Replace if cracked or broken.
  - b. Nicked, burred, or cracked female splines. Remove minor nicks or burrs with fine-mill file or emery cloth. Replace splines if cracked.
  - c. Inspect plug (7) for tightness. Replace if loose or leaking lubricant.
5. Inspect male splines on axle shaft (6) for nicks, burrs, or cracks. Remove minor nicks or burrs with fine-mill file or emery cloth. Replace axle shaft if splines are cracked (WP 0142 00).

### INSTALLATION

1. Coat one side of new gasket (4) with GAA grease and align over holes in hub (5).
2. Align holes in axle flange (3), gasket (4), and hub (5), and install with eight new lockwashers (2) and screw (1). Tighten 60–80 lb-ft (81–108 N•m).
3. Connect battery ground cable (WP 0126 00).
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT AXLE SHAFT FLANGE MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR AXLE SHAFT MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Gasket (item 67, WP 0470 00)  
Eight lockwashers (item 206, WP 0468 00)  
GAA grease (item 17, WP 0468 00)

**Materials/Parts (Contd)**

Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## REAR AXLE SHAFT MAINTENANCE (Contd)

### REMOVAL

1. Remove eight screws (1) and lockwashers (2) from flange (3) and hub (6). Discard lockwashers (2).
2. Remove flange (3) and axle shaft (4) as an assembly, and gasket (5) from hub (6) and axle housing (7). Discard gasket (5).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

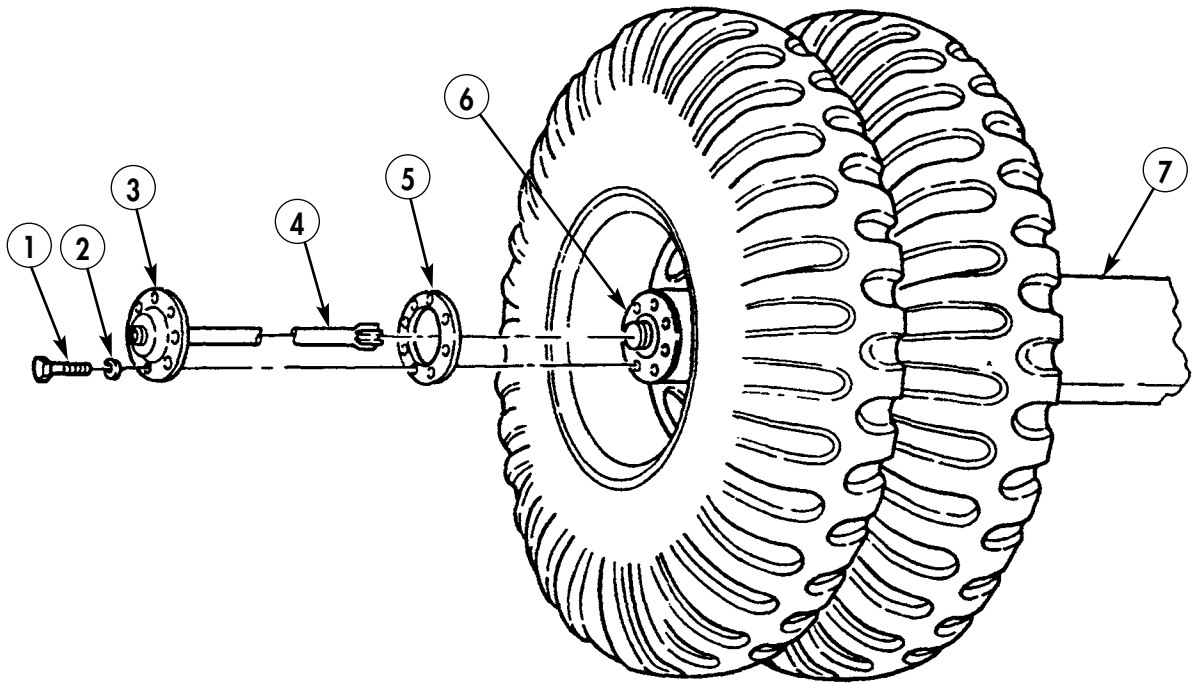
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean gasket (5) residue from mating surfaces.
2. Clean axle shaft (4) with rag saturated in Skysol 100. Dry with clean rag.
3. Inspect axle shaft (4) for cracks, breaks, and bends. Replace axle shaft (4) if cracked, broken, or bent.
4. Inspect axle shaft (4) splines for nicks, burrs, cracks, and breaks. Remove minor nicks and burrs with a fine-mill file or emery cloth. Replace if splines are cracked or broken.

### INSTALLATION

1. Coat one side of new gasket (5) with GAA grease and align over holes in hub (6).
2. Carefully insert axle shaft (4) into hub (6) and axle housing (7). Turn axle shaft (4) until splines of axle shaft (4) seat in differential. Align holes of flange (3) to holes in gasket (5) and hub (6).
3. Install flange (3) with eight new lockwashers (2) and screws (1). Tighten screws (1) 81–104 lb-ft (110–189 N•m).
4. Connect battery ground cable (WP 0126 00).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

REAR AXLE SHAFT MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AXLE REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)

Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)

Hydraulic jack (item 47, WP 0469 00)

Jack stands

##### References

WP 0020 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Front wheels removed (WP 0186 00).

Front propeller shaft removed (WP 0139 00).

Drag link removed (WP 0195 00).

Brake line removed at tee fitting on front axle  
(WP 0175 00).

Front shock absorbers removed (WP 0160 00).

##### Materials/Parts

Eight lockwashers (item 238, WP 0470 00)

Lubricating oil, GO 80/90  
(item 25, WP 0468 00)

## FRONT AXLE REPLACEMENT (Contd)

### **WARNING**

Weight of vehicle must be supported on jack stands at all times.  
Do not attempt to support weight of vehicle on hydraulic jack.  
Failure to comply may result in injury or death to personnel.

### REMOVAL

1. Raise axle (4) with hydraulic jack under differential (3) and place two jack stands under left and right springs (10) between axle (4) and spring (10) hangers.
2. Remove eight nuts (6), lockwashers (7), and two clamp plates (8) from axle (4). Discard lockwashers (7).
3. Remove four U-bolts (1) and two saddle plates (2).

### **WARNING**

Axle is heavy. Ensure axle is balanced and personnel are clear before lowering axle. Failure to comply may result in injury to personnel.

### **NOTE**

Two assistants will help with step 4.

4. Lower axle (4) until it clears vehicle. Remove axle (4) from under vehicle and place on jack stands.

### INSTALLATION

### **WARNING**

Axle is heavy. Ensure axle is balanced and personnel are clear before raising axle. Failure to comply may result in injury to personnel.

### **NOTE**

Two assistants will help with installation.

1. Remove axle (4) from jack stands and place under vehicle.
2. Position spring seats (5) on axle (4) under springs (10).
3. Raise axle (4) until holes in spring seats (5) meet spring centering bolts (9).
4. Install four U-bolts (1) on two saddle plates (2).

### **NOTE**

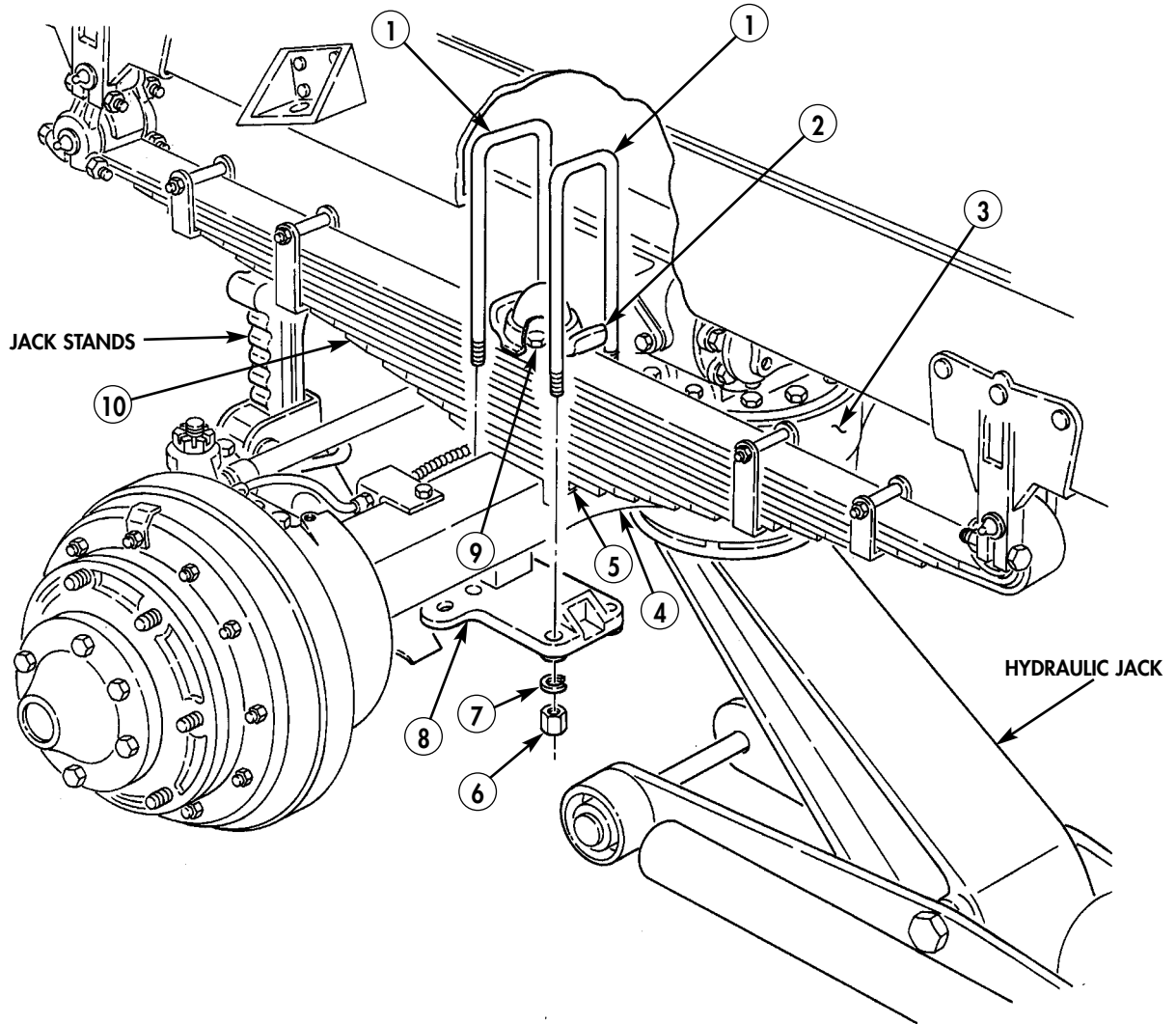
Install clamp plates with shock absorber mounting holes on outside, toward rear of vehicle, and angled down.

5. Install two clamp plates (8) on four U-bolts (1) with eight new lockwashers (7) and nuts (6). Tighten nuts (6) 190–230 lb-ft (258–312 N•m).
6. Install front shock absorbers (WP 0160 00).
7. Install brake line at tee fitting on front axle (WP 0175 00).
8. Install drag link (WP 0195 00).
9. Install front propeller shaft (WP 0139 00).
10. Install front wheels (WP 0186 00).
11. Connect battery ground cable (WP 0126 00).

**FRONT AXLE REPLACEMENT (Contd)**

**INSTALLATION (Contd)**

12. Fill axle housing with GO 80/90 (WP 0018 00).
13. Release parking brake and remove wheel chocks (TM 9-2320-361-10).







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT AND REAR DIFFERENTIAL OIL SEAL REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Applicable Models

All

###### Tools and Special Tools

General mechanic's tool kit

(item 116, WP 0469 00)

Torque wrench, 3/4-in. drive

(item 137, WP 0469 00)

Mechanical puller kit (item 64, WP 0469 00)

Oil seal replacer (item 80, WP 0469 00)

###### Materials/Parts

Cotter pin (item 26, WP 0470 00)

Oil seal (item 356, WP 0470 00)

###### Equipment Condition

Parking brake set and wheels chocked

(TM 9-2320-361-10).

Battery ground cable disconnected

(WP 0126 00).

Propeller shaft removed (WP 0139 00).

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## FRONT AND REAR DIFFERENTIAL OIL SEAL REPLACEMENT (Contd)

### REMOVAL

1. Remove cotter pin (12), nut (1), and washer (2) from shaft (8). Discard cotter pin (12).
2. Remove flange (3) from shaft (8).

#### NOTE

Perform step 3 if replacing dirt deflectors.

3. Remove dirt deflector (4) from flange (3).
4. Remove six screws (11) and washers (10) from retainer (6).

#### NOTE

Count and record number of shims for installation.

5. Remove retainer (6) and shims (7) from carrier (9).
6. Remove oil seal (5) from retainer (6). Discard oil seal (5).

### INSTALLATION

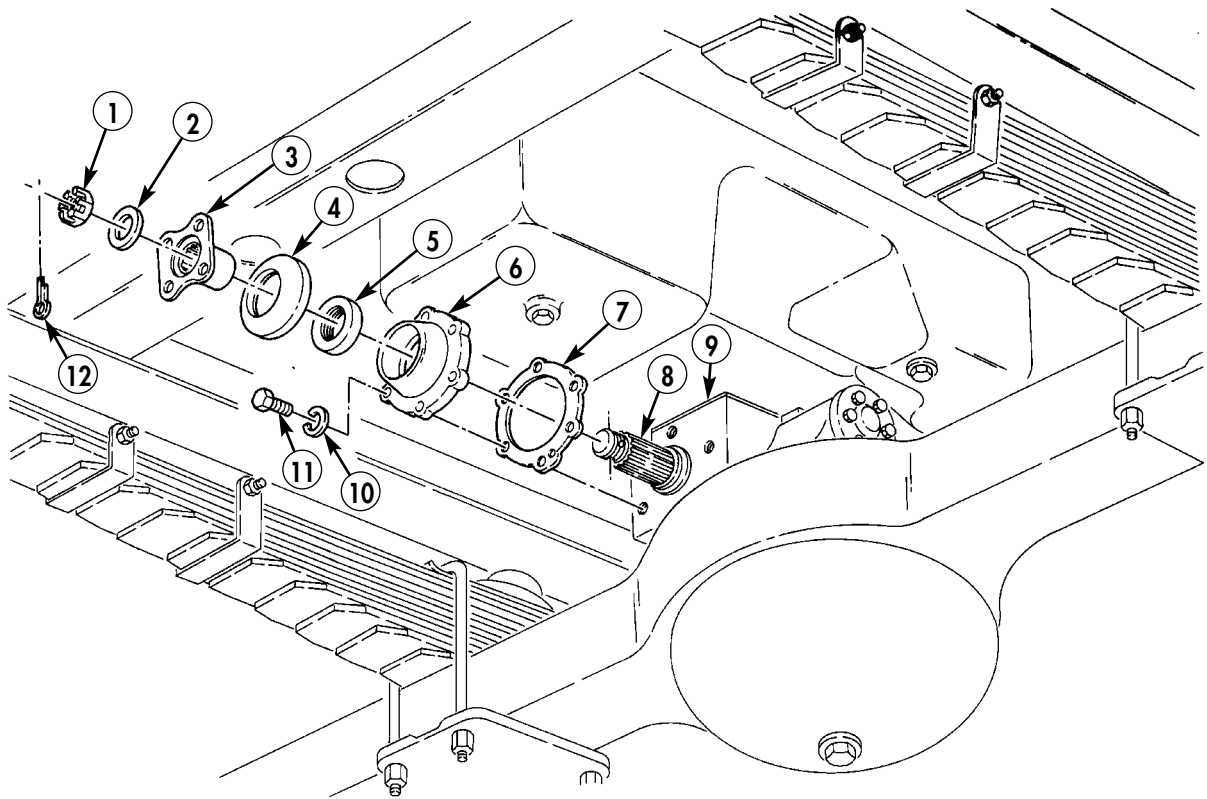
1. Install new oil seal (5) in retainer (6).
2. Install shims (7) and retainer (6) on carrier (9) with six washers (10) and screws (11). Tighten screws (11) 65–85 lb-ft (88–115 N•m).

#### NOTE

Perform step 3 if replacing dirt deflectors.

3. Install dirt deflector (4) on flange (3) and install flange (3) on shaft (8).
4. Install washer (2) and nut (1) on shaft (8). Tighten nut (1) 300–600 lb-ft (407–814 N•m).
5. Install new cotter pin (12) on nut (1) and shaft (8).
6. Install propeller shaft (WP 0139 00).
7. Connect battery ground cable (WP 0126 00).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT AND REAR DIFFERENTIAL OIL SEAL REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### STEERING KNUCKLE AND STEERING ARM MAINTENANCE

STEERING ARM REMOVAL, STEERING KNUCKLE REMOVAL, CLEANING AND INSPECTION, STEERING KNUCKLE INSTALLATION, STEERING ARM INSTALLATION, END PLAY TEST, AND TURN ANGLE SCREW ADJUSTMENT

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)  
Inside micrometer (item 49, WP 0469 00)  
Outside micrometer (item 50, WP 0469 00)  
Dial indicator (item 43, WP 0469 00)  
Mechanical puller kit (item 64, WP 0469 00)  
1-5/16-in. socket, 3/4-in. drive  
(item 101, WP 0469 00)  
Wheel alignment indicator  
(item 44, WP 0469 00)  
Jack stands

##### Materials/Parts

Eight lockwashers (item 239, WP 0470 00)  
Twelve lockwashers (item 202, WP 0470 00)  
Four bushings (item 417, WP 0470 00)  
Lubricating oil, GO 80/90  
(item 25, WP 0468 00)

##### References

TC 9-237  
WP 0021 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front axle shaft removed (WP 0142 00).  
Steering knuckle boot removed (WP 0145 00).  
Tie rod removed (WP 0194 00).  
Drag link removed (WP 0195 00).

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## STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)

### STEERING ARM REMOVAL

1. Remove lubrication fitting (4) from steering arm (5).
2. Remove four nuts (2) and lockwashers (3) from steering arm (5). Discard lockwashers (3).
3. Tap steering arm (5) at point A to loosen four bushings (1).
4. Remove four bushings (1) and steering arm (5) from steering knuckle (8). Discard four bushings (1).
5. Remove four bushings (1) from steering arm (5).

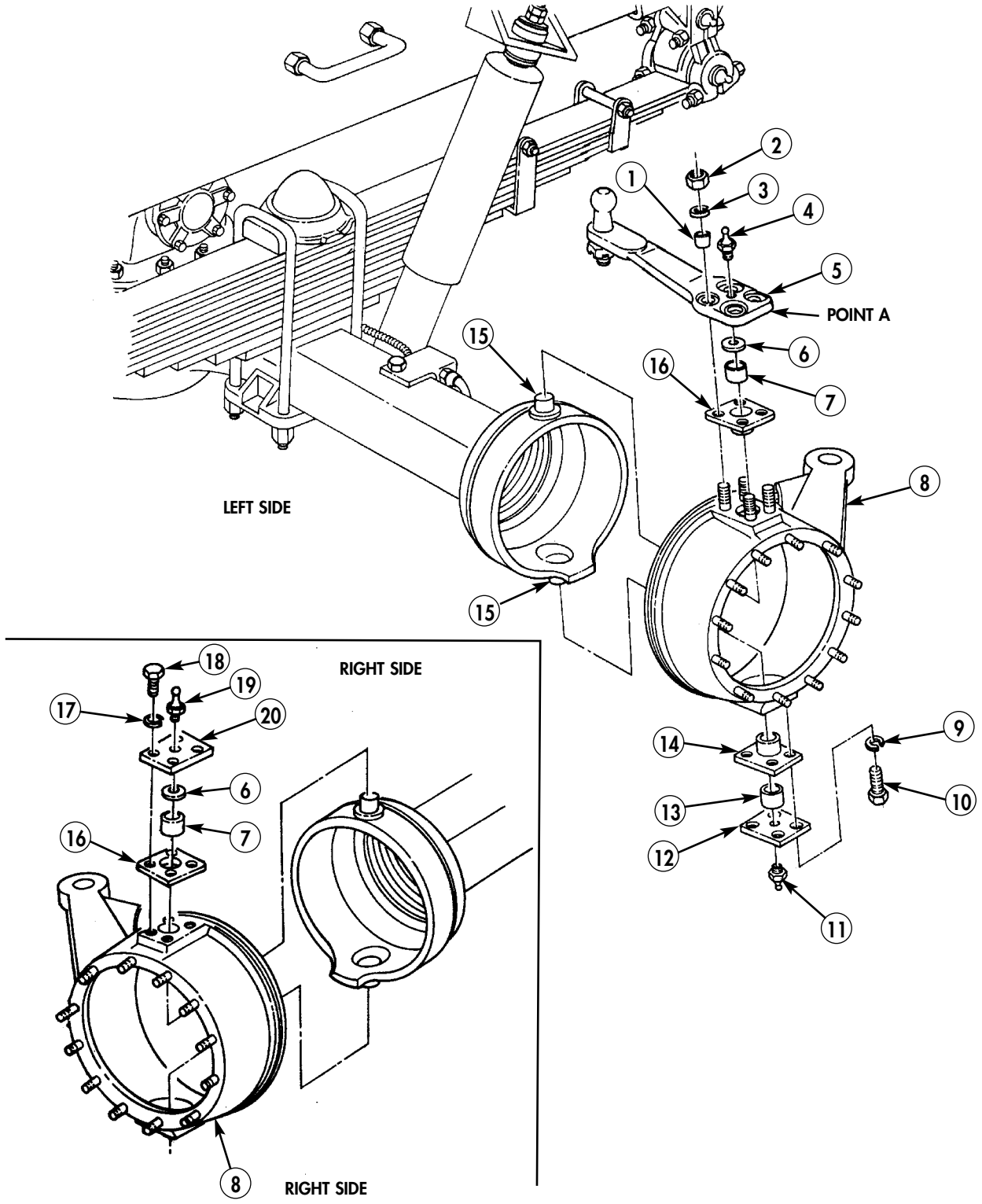
### STEERING KNUCKLE REMOVAL

#### NOTE

Perform step 1 for left steering knuckle. Perform step 2 for right steering knuckle.

1. Remove lubrication fitting (11) from steering knuckle (8).
2. Remove lubrication fitting (19), four screws (18), lockwashers (17), and plate (20) from steering knuckle (8). Discard lockwashers (17).
3. Remove spacer (6), bearing (7), and sleeve (16) from left and right steering knuckles (8).
4. Remove four screws (10), lockwashers (9), plate (12), sleeve (14), and bearing (13) from left and right steering knuckles (8). Discard lockwashers (9).
5. Remove left and right steering knuckles (8) from two pins (15).

STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)



## STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning instructions, refer to WP 0021 00.
2. Measure outside diameter of ball stud (21). Replace ball stud (21) if outside diameter is less than 1.24 in. (3.15 cm).
3. Visually inspect ball stud (21) for nicks, scratches, pits, scores, or scratches. Replace ball stud (21) if damaged.
4. Measure outside diameter of steering knuckle pins (18). Replace front axle if outside diameter of steering knuckle pin is less than 1.123 in. (2.852 cm).
5. Inspect steering knuckle pins (18) for nicks, scratches, pitting, scores, and cracks. Replace front axle if pins (18) are nicked, scratched, pitted, scored, or cracked.
6. Inspect sleeves (17) and (20) for nicks, scratches, scores, cracks, and signs of wear. Replace sleeve (17) or (20) and bearing (16) or (9) if nicked, scratched, scored, cracked, or worn.
7. Measure inside diameter of bearings (9) and (16). Replace bearing (9) or (16) if inside diameter is greater than 1.126 in. (2.860 cm).
8. Inspect bearings (9) and (16) for nicks, scratches, pitting, scores, or cracks. Replace if nicked, scratched, pitted, scored, or cracked.
9. Inspect four studs (19) and twelve studs (11) for bends or stripped threads. Replace stud(s) (19) or (11) if bent or threads are stripped.
10. Inspect turn angle screw (7) and nut (6) for damage. Replace turn angle screw (7) and nut (6) if damaged.

### STEERING KNUCKLE INSTALLATION

1. Install left and right steering knuckles (10) on pins (18) with studs (19) facing up.
2. Install sleeve (17), plate (15), and bearing (16) on left and right steering knuckles (10) with two new lockwashers (12) and screws (13). Tighten screws (13) 116–149 lb-ft (157–202 N•m).
3. Install sleeve (20), bearing (9), and spacer (8) on left and right steering knuckles (10).

#### NOTE

Perform steps 4 and 5 for right steering knuckle. Perform step 6 for left steering knuckle.

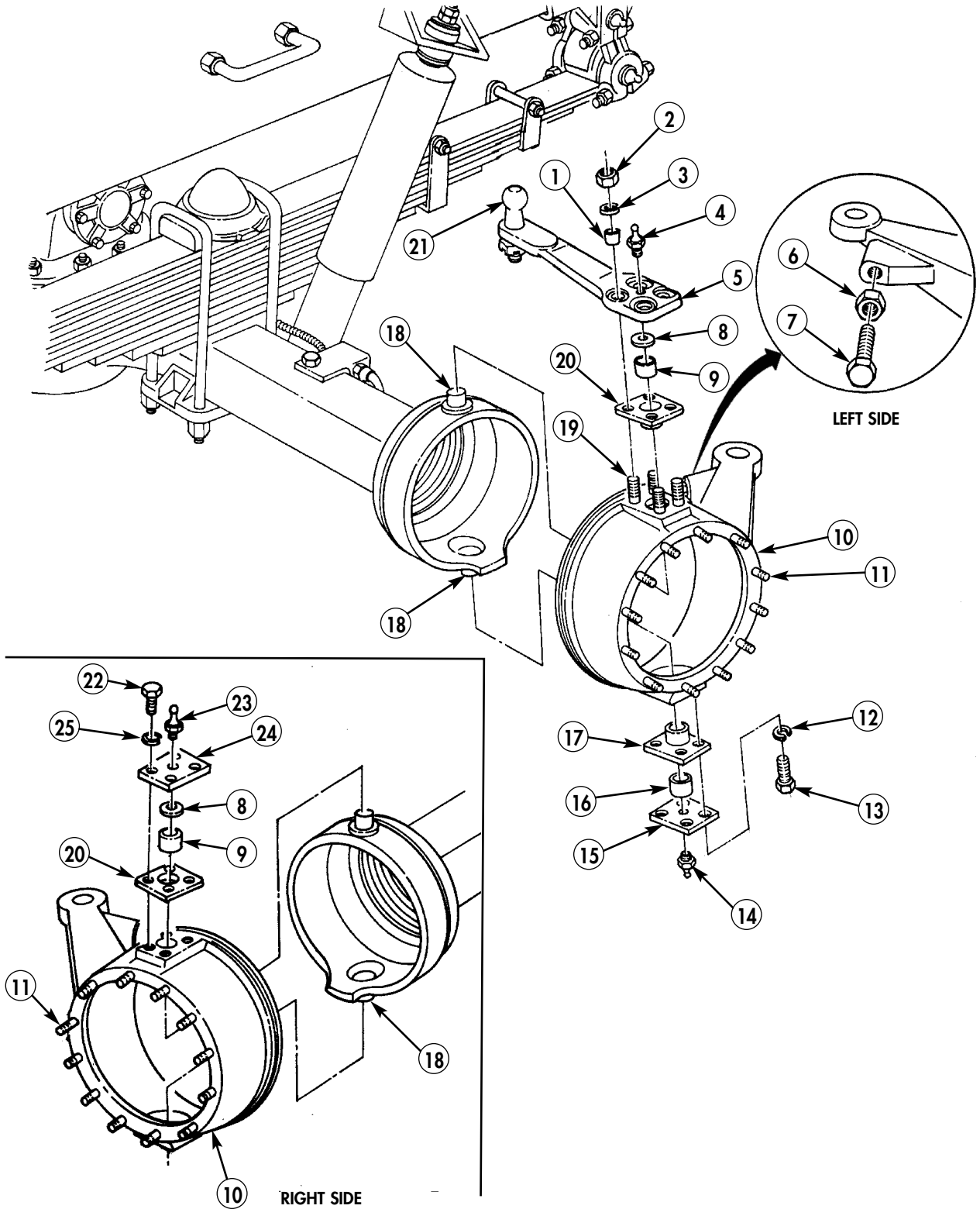
4. Install plate (24) with four new lockwashers (25) and screws (22) on steering knuckle (10). Tighten screws (22) 116–149 lb-ft (157–202 N•m).
5. Install lubrication fitting (23) on plate (24) and lubrication fitting (14) on plate (15).
6. Install lubrication fitting (4) on steering arm (5).

### STEERING ARM INSTALLATION

1. Install four new bushings (1) on steering arm (5).
2. Install steering arm (5) on four studs (19) with four new lockwashers (3) and nuts (2). Tighten nuts (2) 130–167 lb-ft (176–226 N•m).
3. Install lubrication fitting (4) on steering arm (5).



STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)



**STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)****END PLAY TEST**

1. Install dial indicator on front axle housing (3) so measuring point touches steering arm mounting plate (2).
2. Install lever and jack stand under steering knuckle (1).
3. Pry upward with lever and support and observe dial indicator. Correct reading is 0.004–0.014 in. (0.102–0.356 mm).

**NOTE**

- If dial indicator reading is correct, proceed to step 14
- Perform steps 4 through 13 if dial indicator reading is incorrect.
- Steps 4 through 6 apply to left steering knuckle.
- Step 7 applies to right steering knuckle.

4. Remove lubrication fitting (6), four nuts (4), and lockwashers (5) from steering arm (7). Discard lockwashers (5).
5. Tap steering arm (7) at point A to loosen steering arm (7).
6. Remove steering arm (7) from steering knuckle (1).
7. Remove lubrication fitting (11), four screws (10), lockwashers (12), and plate (2) from steering knuckle (1). Discard lockwashers (12).
8. Remove spacer (8) from left and right steering knuckles (1).

**NOTE**

- If dial indicator reading was less than 0.004 in. (0.102 mm), install smaller spacer.
- If dial indicator reading was more than 0.014 in. (0.356 mm), install larger spacer.

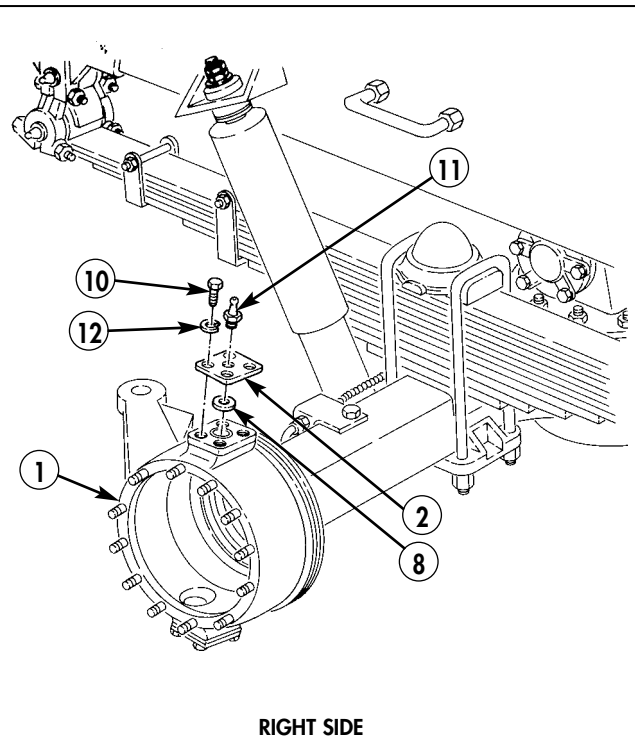
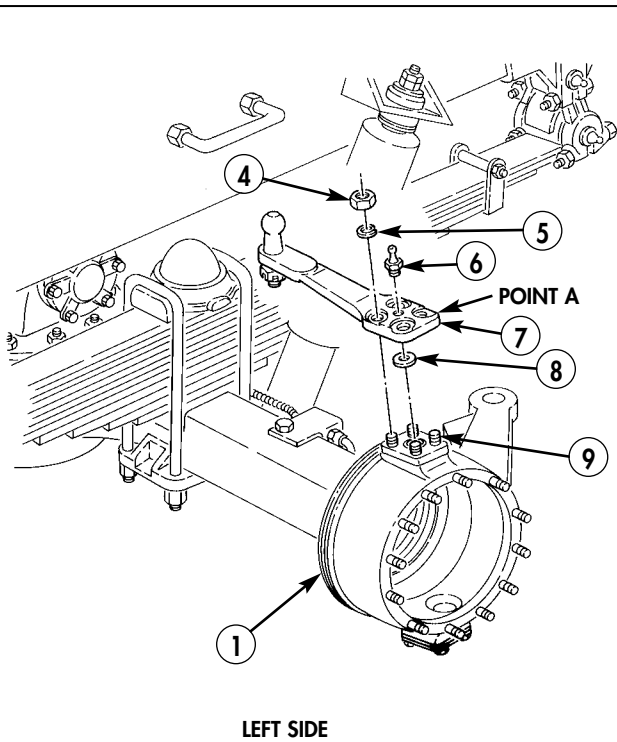
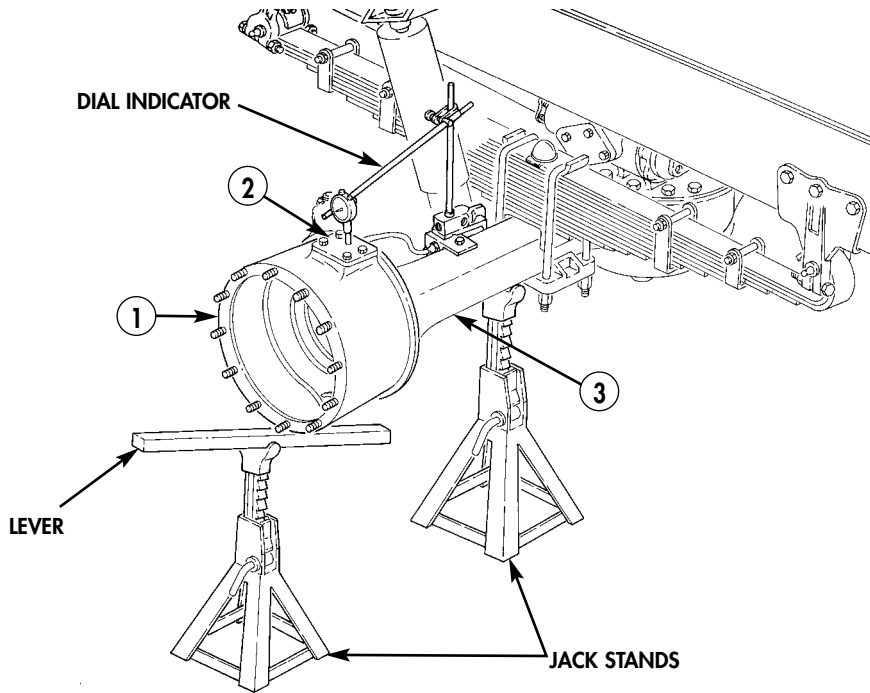
9. Install spacer (8) on left and right steering knuckles (1).

**NOTE**

- Step 10 applies to right steering knuckle.
- Steps 11 and 12 apply to left steering knuckle.

10. Install plate (2), four new lockwashers (12), screws (10), and lubrication fitting (11) on steering knuckle (3). Tighten screws (10) 116–149 lb-ft, (157–202 N•m).
11. Install steering arm (7) on four studs (9) with four new lockwashers (5) and nuts (4). Tighten nuts (4) 130–167 lb-ft (176–226 N•m).
12. Install lubrication fitting (6) on steering arm (7).
13. Check endplay (steps 1 through 3).
14. Install drag link (WP 0195 00).
15. Install tie rod (WP 0194 00).
16. Install steering knuckle boot (WP 0145 00).
17. Install front axle shaft (WP 0142 00).
18. Lubricate all components with lubricating oil, GO 80/90 (WP 0020 00).

### STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)



## STEERING KNUCKLE AND STEERING ARM MAINTENANCE (Contd)

### TURN ANGLE SCREW ADJUSTMENT

1. Count number of threads showing on screw (2) above nut (3) and record.
2. Break welds and remove screw (2) and nut (3) from steering knuckle (4). Discard screw (2) and nut (3).
3. Install new nut (3) and new screw (2) on steering knuckle (4) with same number of threads showing above nut (3) as in step 1.

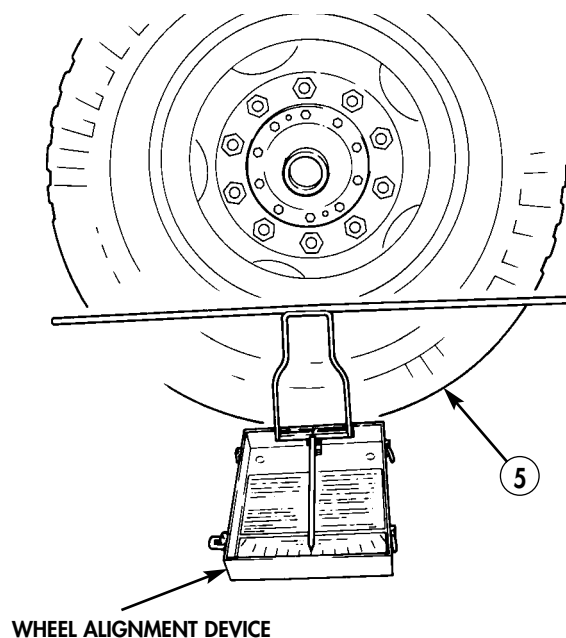
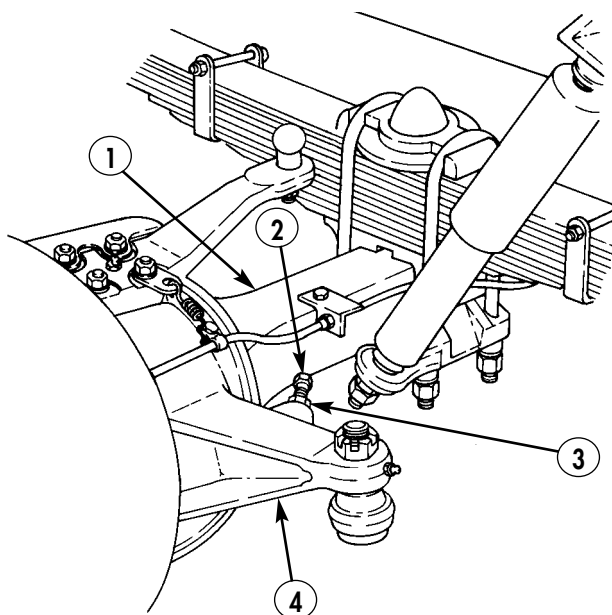
#### **NOTE**

Ensure wheels are in straight position.

4. Place wheel alignment device 3 in. (7.6 cm) from outer tire surface and place turning radius gauge against outer tire surface.
5. Align pointer with center of wheel (5) and zero degree mark on alignment device.
6. Turn wheel (5) outward and read degrees of travel. Correct travel is 27-28 degrees.
7. Adjust screw (2) until head contacts axle housing (1) and tighten nut (3) 94-120 lb-ft (127-163 N•m).

#### **WARNING**

- Wear hand protection at all times when working with heated parts. Failure to do so may result in injury to personnel.
  - Eye protection must be worn during welding procedures. Failure to wear eye protection may result in injury to personnel.
  - Welding procedures may produce poisonous fumes. Perform welding in well-ventilated areas. Failure to do so may result in injury to personnel.
8. Tack weld nut (3) to screw (2) and steering knuckle (4) (TC 9-237).
  9. Connect battery ground cable (WP 0126 00).
  10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FORWARD-REAR AND REAR-REAR AXLE ASSEMBLY REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

General mechanic's tool kit  
(item 116, WP 0469 00)  
Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)  
1-1/8-in. socket, 3/4-in. drive  
(item 99, WP 0469 00)  
Breaker bar (item 8, WP 0469 00)  
Handle, socket wrench, 3/4-in. drive  
(item 41, WP 0469 00)  
Hydraulic jack (item 47, WP 0469 00)  
Jack stands

##### Materials/Parts

Twelve lockwashers (item 238, WP 0470 00)  
Four seal washers (item 376, WP 0470 00)  
Three locknuts (item 129, WP 0470 00)  
Brake fluid (item 9, WP 0468 00)

##### References

WP 0172 00  
WP 0020 00

##### Personnel Required

Two

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Inner and outer wheels removed (as required)  
(WP 0186 00).  
Propeller shafts removed (if installed)  
(WP 0139 00).

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**FORWARD-REAR AND REAR-REAR AXLE ASSEMBLY REPLACEMENT (Contd)****REMOVAL****NOTE**

- The rear-rear and forward-rear axles are replaced basically the same. This procedure covers the rear-rear axle.
- Ensure front wheels are chocked before raising vehicle (TM 9-2320-361-10).

1. Place hydraulic jack under differential housing (8) on axle (7) and raise vehicle enough to move two jack stands from under axle (7) to under tandem axle spring seats (18).
2. Place two jack stands under tandem axle spring seats (18).
3. Lower hydraulic jack enough to relieve tension on springs (19).

**NOTE**

Have drainage container ready to catch coolant.

4. Remove two screws (32), hose connectors (34), and four seal washers (33) from two wheel cylinders (20). Discard seal washers (33).
5. Remove two locknuts (30), screws (31), clamps (22), and brake line (23) from two brackets (1). Discard locknuts (30).
6. Remove nut (29), washer (28), clamp (27), and brake line (23) from differential carrier (8).
7. Disconnect hose (26) from tee (25).
8. Remove locknut (21), screw (24), and tee (25) from bracket (6). Discard locknut (21).

**NOTE**

Step 9 applies to left side.

9. Remove four nuts (9), lockwashers (10), screws (5), two brackets (6), plate (11), and bracket (4) from axle (7). Tie upper torque rod (3) out of the way. Discard lockwashers (10).
10. Remove eight nuts (16), lockwashers (17), screws (2), and two brackets (1) from two brackets (15). Lower two brackets (15). Discard lockwashers (17).
11. Remove two axle spring seats (12) from four guide pins (14) and axle (7).
12. Remove two seats (13) from axle (7).

**WARNING**

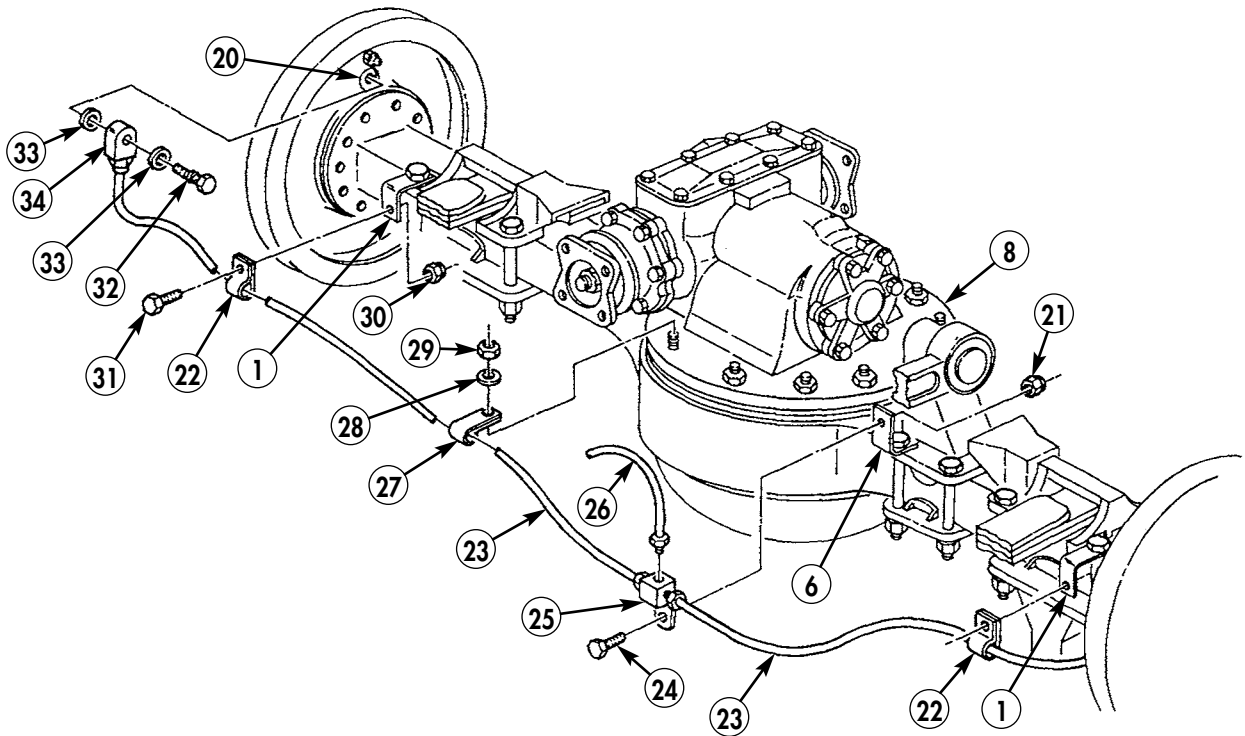
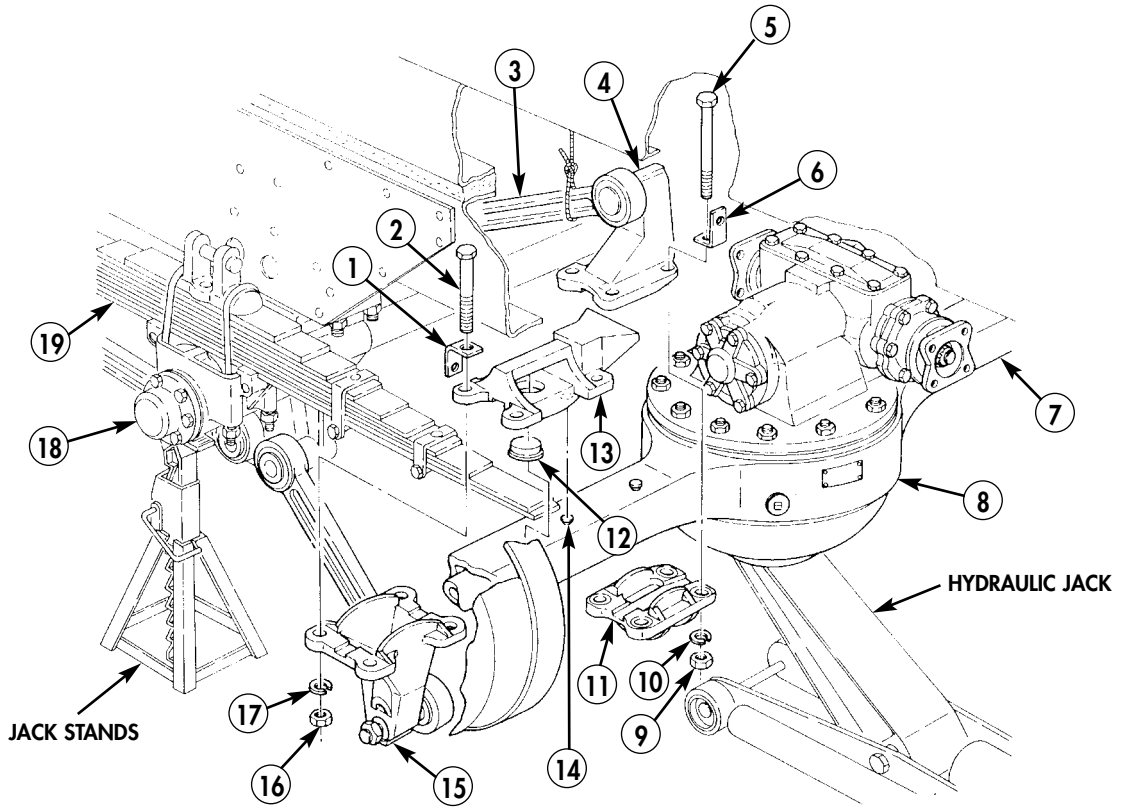
Axle is heavy. Ensure axle is balanced and personnel are clear before lowering axle. Failure to do so may result in injury to personnel.

**NOTE**

Assistant will help with step 13.

13. Lower hydraulic jack and remove axle (7) from vehicle.

**FORWARD-REAR AND REAR-REAR AXLE ASSEMBLY REPLACEMENT (Contd)**



**FORWARD-REAR AND REAR-REAR AXLE ASSEMBLY REPLACEMENT (Contd)****INSTALLATION****WARNING**

Axle is heavy. Ensure axle is balanced and personnel are clear before raising axle. Failure to do so may result in injury to personnel.

**NOTE**

Assistant will help with step 1.

1. Place hydraulic jack and axle under vehicle and position two axle spring seats (8) over ends of spring (14).
2. Raise hydraulic jack until springs (14) meet brackets (11) and align holes in axle spring seats (8) with guide pins (10) on axle.
3. Place two seats (9) in axle.
4. Align two brackets (11) with axle spring seats (8) and install on axle with eight screws (16), two brackets (15), eight new lockwashers (13), and nuts (12). Tighten nuts (12) 200–275 lb-ft (271–373 N•m).

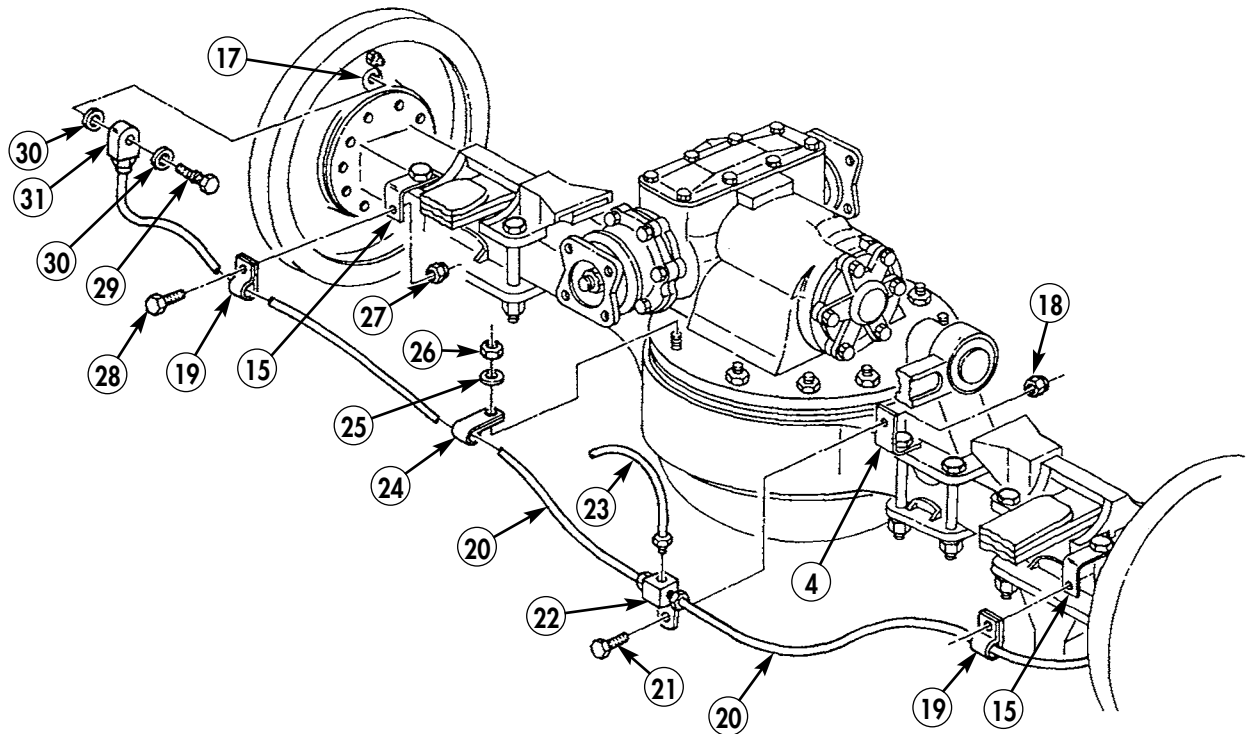
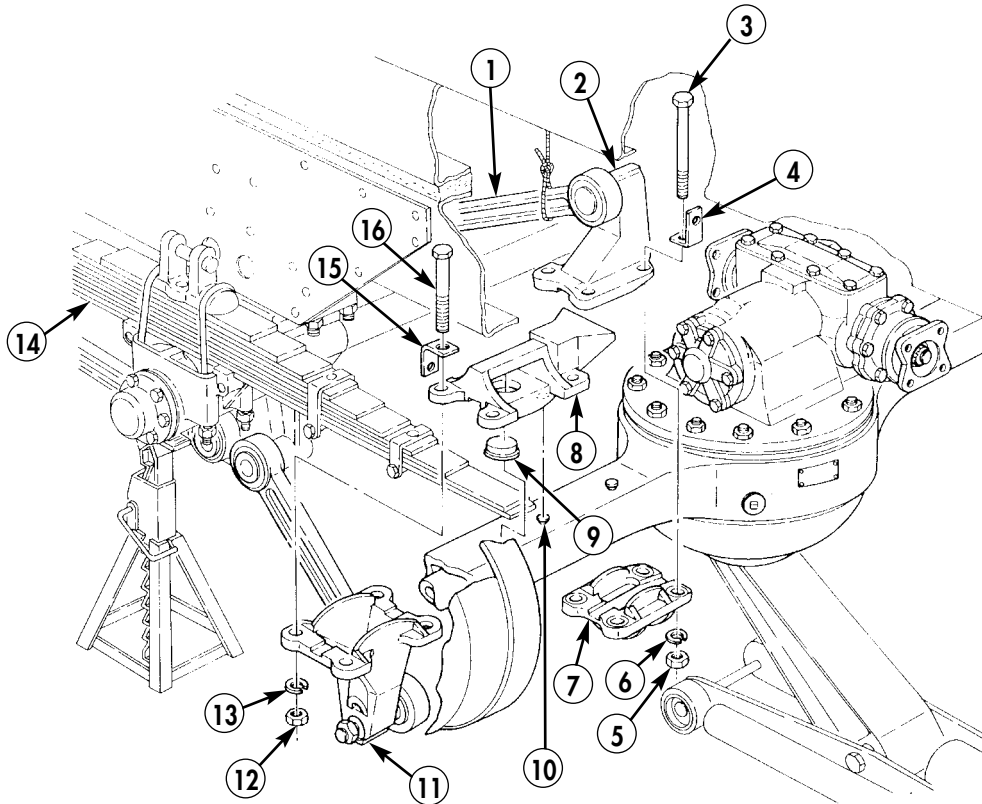
**NOTE**

Step 5 applies to left side.

5. Align upper torque rod (1) and bracket (2) with plate (7) and install on axle with four screws (3), two brackets (4), four new lockwashers (6), and nuts (5). Tighten nuts (5) 200–275 lb-ft (271–373 N•m).
6. Install tee (22) on bracket (4) with screw (21) and new locknut (18).
7. Install hose (23) in tee (22).
8. Install four new seal washers (30) and two hose connectors (31) on two wheel cylinders (17) with two screws (29).
9. Install brake line (20) and two clamps (19) on two brackets (15) with two screws (28) and new locknuts (27).
10. Install brake line (20) and clamp (24) on differential housing with washer (25) and nut (26). Tighten nut (26) 53–76 lb-ft (72–103 N•m).
11. Raise vehicle enough to move two jack stands from under tandem axle spring seats (14) to under axle.
12. Place jack stands under axle.
13. Remove hydraulic jack from under vehicle.
14. Install propeller shaft (as required) (WP 0139 00).
15. Install inner and outer wheels (as required) (WP 0186 00).
16. Bleed service brakes (WP 0172 00).
17. Fill brake fluid to proper level (WP 0020 00).
18. Connect battery ground cable (WP 0126 00).
19. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**FORWARD-REAR AND REAR-REAR AXLE ASSEMBLY REPLACEMENT (Contd)**



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TANDEM AXLE REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

General mechanic's tool kit  
(item 116, WP 0469 00)

Torque wrench, 3/4-in. drive  
(item 137, WP 0469 00)

1-5/16-in. socket, 3/4-in. drive  
(item 101, WP 0469 00)

Handle, socket wrench, 3/4-in. drive  
(item 41, WP 0469 00)

Jack stands

**Materials/Parts**

Twelve locknuts (item 164, WP 0470 00)

**Personnel Required**

Two

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Lower torque rods removed  
(tandem axle end only) (WP 0162 00).

Rear spring seats removed (WP 0157 00).

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## TANDEM AXLE REPLACEMENT (Contd)

### **WARNING**

Weight of vehicle must be supported on jack stands at all times.  
Do not attempt to support weight of vehicle on hydraulic jack.  
Injury or death to personnel may result if jack fails.

### REMOVAL

1. Install jack stands under frame of vehicle behind rear-rear axle (3).
2. Position hydraulic jack under center of tandem axle bracket (5).

### **WARNING**

Tandem axle is heavy. Support tandem axle during removal and installation. Failure to do so may result in injury to personnel or damage to equipment.

3. Remove twelve locknuts (4) and screws (1) from tandem axle bracket (5) and two rear axle bogie supports (2). Discard locknuts (4).

### **NOTE**

Assistant will help with step 4.

4. Lower hydraulic jack and remove tandem axle bracket (5) from vehicle.

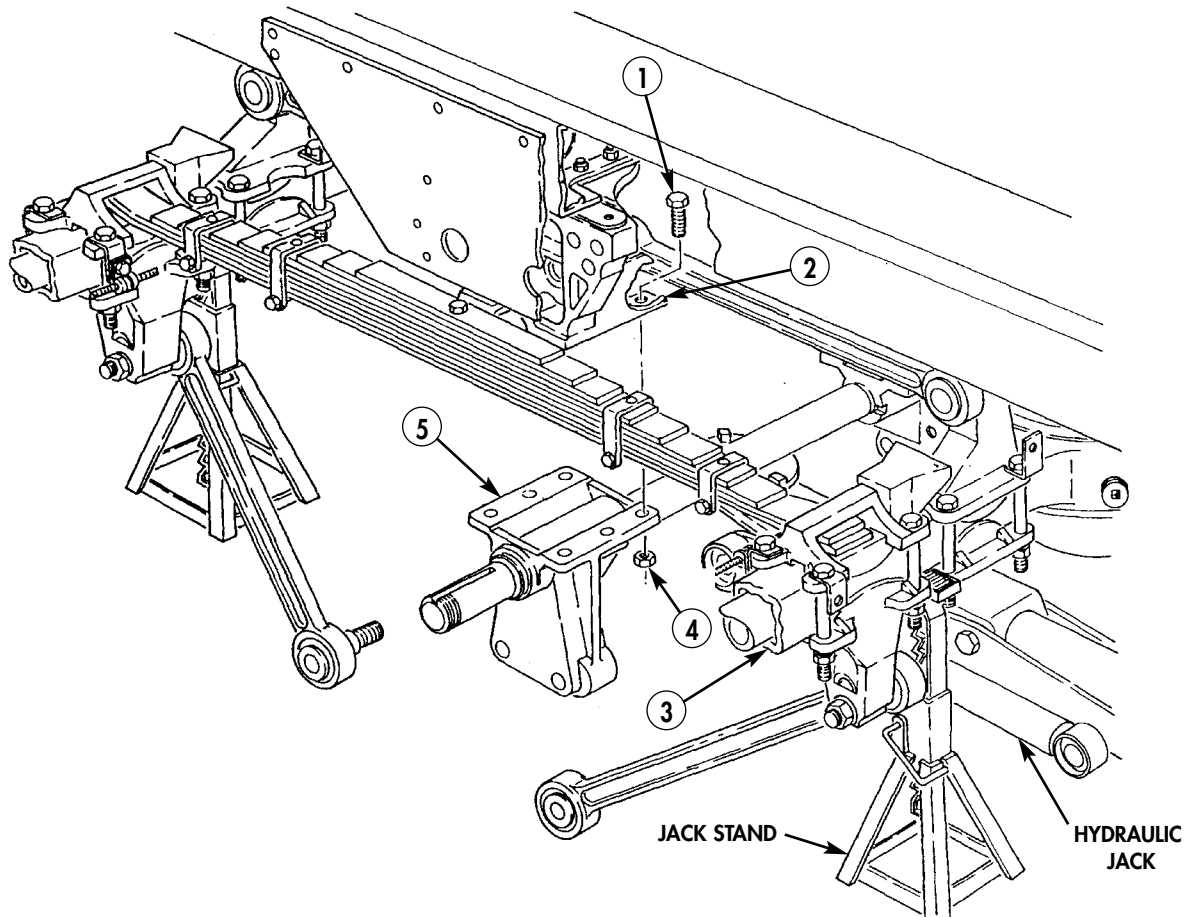
### INSTALLATION

### **NOTE**

Assistant will help with step 1.

1. Using hydraulic jack, lift tandem axle bracket (5) into position under vehicle.
2. Install tandem axle bracket (5) on two rear axle bogie supports (2) with twelve screws (1) and new locknuts (4). Tighten locknuts (4) 180–220 lb-ft (244–298 N•m).
3. Remove hydraulic jack from under vehicle.
4. Install rear spring seats (WP 0157 00).
5. Connect lower torque rods (WP 0162 00).
6. Connect battery ground cable (WP 0126 00).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

TANDEM AXLE REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT SPRING REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four locknuts (item 129, WP 0470 00)  
Four lockwashers (item 238, WP 0470 00)  
Adhesive sealant (item 4, WP 0468 00)

**Personnel Required**

Two

**References**

WP 0020 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front right wheel removed (WP 0186 00).

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## FRONT SPRING REPLACEMENT (Contd)

### REMOVAL

#### NOTE

Left and right front springs are replaced the same way. This procedure covers the right side.

1. Raise front of vehicle and remove two jack stands from under front axle (11).
2. Support vehicle at frame (24) with two jack stands.
3. Place hydraulic jack under front axle (11).
4. Remove jamnut (16), nut (17), retainer (18), and rubber bushing (19) from shock absorber piston rod (23).
5. Push shock absorber piston rod (23) up and out of plate (13).
6. Remove rubber bushing (21) and retainer (22) from piston rod (23).
7. Remove four nuts (15), lockwashers (14), and plate (13) from two U-bolts (8). Discard lockwashers (14).
8. Remove two U-bolts (8), saddle (9), and rubber bumper (10) from spring (2).
9. Remove four locknuts (3) and screws (6) from hanger (7) and shackle (1). Discard locknuts (3).
10. Remove two lubrication fittings (4) from two pins (5).

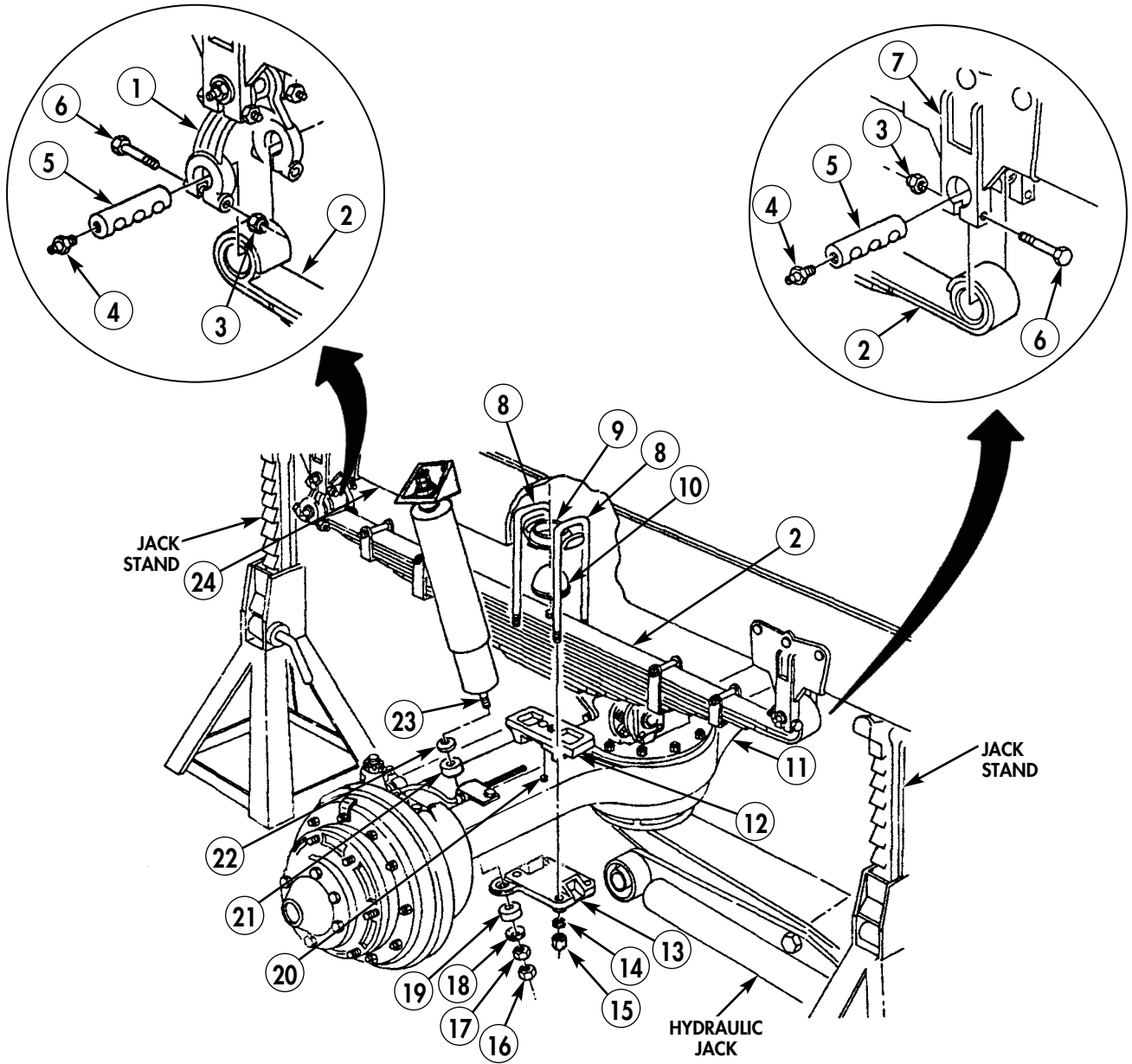
#### NOTE

Assistant will help with steps 11 through 15.

11. Remove two pins (5) from shackle (1), hanger (7), and spring (2).
12. Push shackle (1) toward front of vehicle.
13. Push spring (2) clear of rear hanger (7).
14. Lift spring (2) clear of spring seat (12) and remove from vehicle.
15. Remove spring seat (12) from centering peg (20) and front axle (11).



FRONT SPRING REPLACEMENT (Contd)



## FRONT SPRING REPLACEMENT (Contd)

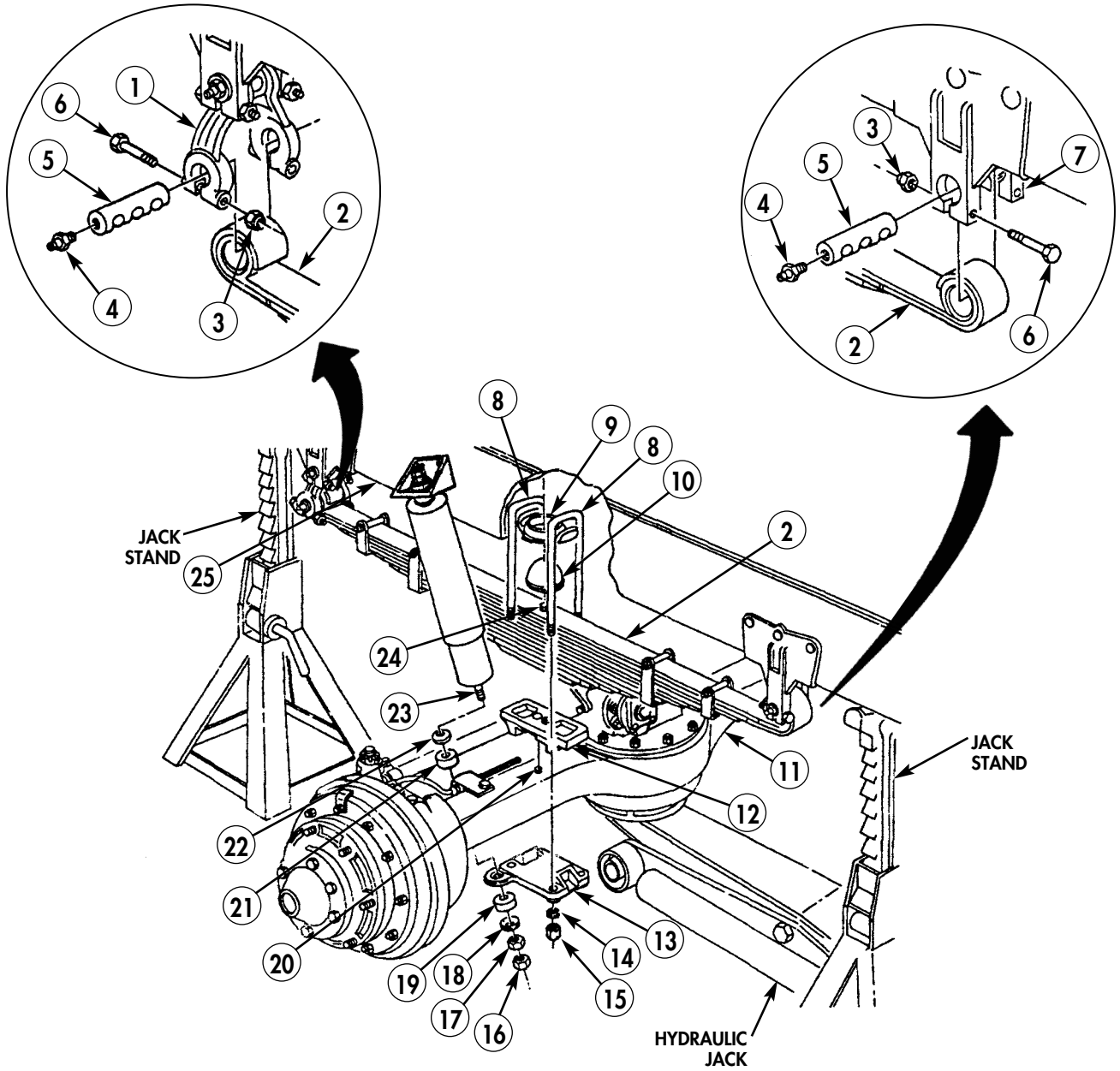
### INSTALLATION

#### NOTE

Assistant will help with steps 1 through 5.

1. Ensure spring seat (12) is properly positioned on centering peg (20) and front axle (11). Place spring (2) on spring seat (12) so nut on bottom of center bolt (24) is in spring seat (12).
2. Using hydraulic jack, raise or lower axle (11) to align holes in spring (2) with holes in shackle (1) and hanger (7).
3. Install spring (2) on shackle (1) and hanger (7) with two pins (5).
4. Turn pins (5) to align pin retaining screw slots with holes in shackle (1) and hanger (7).
5. Install four screws (6) and new locknuts (3) on hanger (7) and shackle (1).
6. Install two lubrication fittings (4) on two pins (5).
7. Ensure center bolt (24) of spring (2) is still seated in spring seat (12). If not seated, realign spring (2) and spring seat (12).
8. Apply sealant around top mating surface of metal base of rubber bumper (10) and saddle (9), and seat bumper (10) base in saddle (9).
9. Install saddle (9) over spring (2) so center bolt (24) is in recess of rubber bumper (10) base.
10. Install two U-bolts (8) over saddle (9) and spring (2).
11. Position plate (13) on U-bolts (8) under axle housing (11) and install four new lockwashers (14) and nuts (15). Plate (13) must have shock absorber hole on wheel side of spring (2) facing rear of front axle housing (11) and angled down. Tighten nuts (15) 190–230 lb-ft (258–312 N•m).
12. Install retainer (22) and rubber bushing (21) on shock absorber piston rod (23) and extend through hole in plate (13). Ensure projecting lip of bushing (21) is seated in plate (13).
13. Install rubber bushing (19), retainer (18), and nut (17) on shock absorber piston rod (23). Tighten nut (17) until bushings (19) and (21) start to bulge.
14. Install jamnut (16) and tighten against nut (17).
15. Raise vehicle, remove two jack stands from frame (25), and place jack stands under front axle (11) to allow front wheel installation.
16. Lubricate shackle and hanger fittings (WP 0020 00).
17. Install right front wheel (WP 0186 00).
18. Connect battery ground cable (WP 0126 00).
19. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT SPRING REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT SPRING SHACKLE REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four locknuts (item 129, WP 0470 00)

**References**

WP 0020 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Front right wheel removed (WP 0186 00).

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## FRONT SPRING SHACKLE REPLACEMENT (Contd)

### REMOVAL

#### NOTE

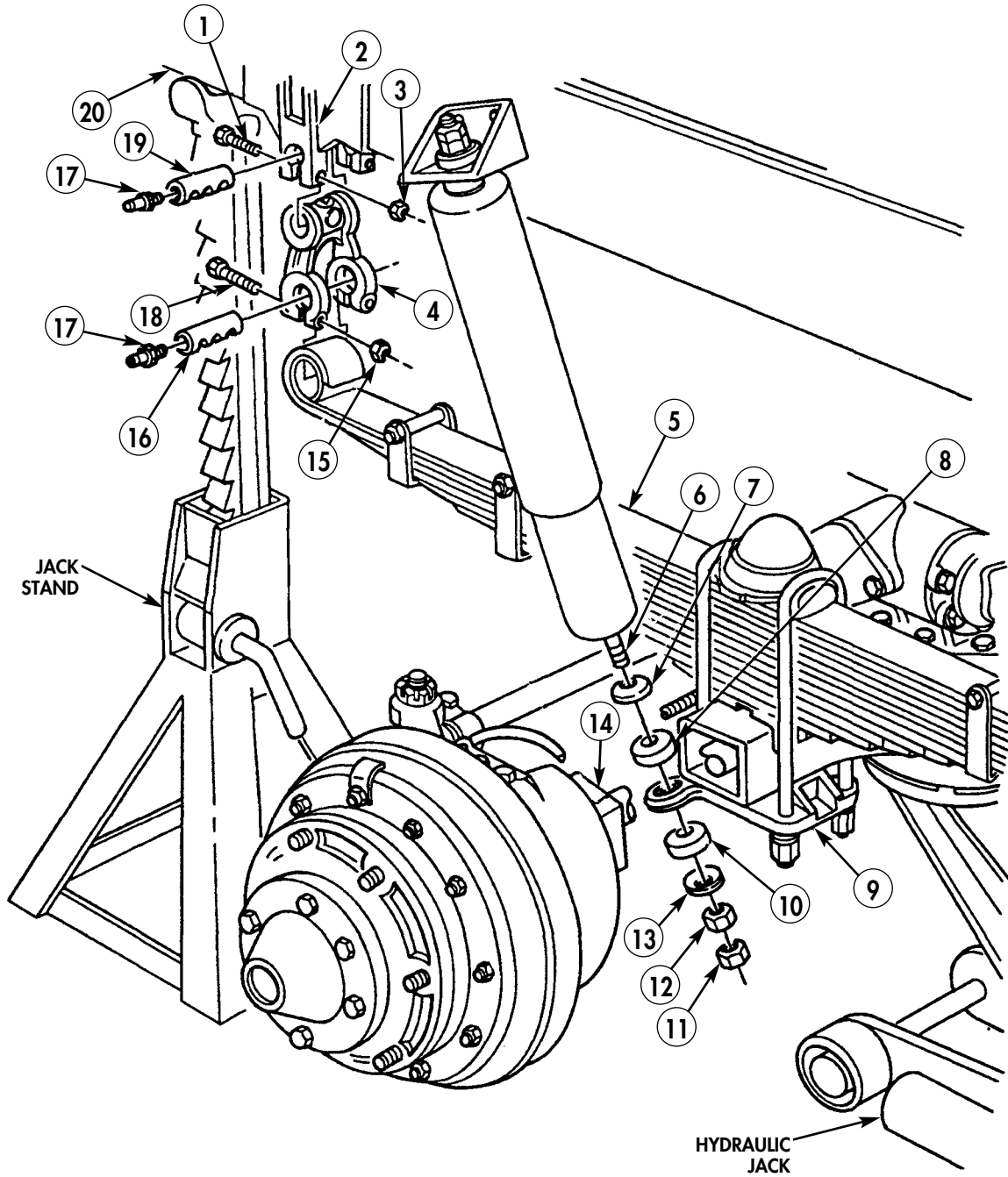
Left and right front spring shackles are replaced the same way.  
This procedure covers the right side.

1. Raise front of vehicle and remove two jack stands from under front axle (14).
2. Support vehicle at frame (20) with two jack stands.
3. Place hydraulic jack under front axle (14).
4. Remove jamnut (11), nut (12), retainer (13), and rubber bushing (10) from shock absorber piston rod (6).
5. Push shock absorber piston rod (6) up and out of plate (9).
6. Remove rubber bushing (8) and retainer (7) from shock absorber piston rod (6).
7. Remove two locknuts (15) and screws (18) from shackle (4). Discard locknuts (15).
8. Remove two lubrication fittings (17) from pins (16) and (19).
9. Remove pin (16) from spring (5).
10. Lower hydraulic jack until spring (5) is free of shackle (4).
11. Remove two locknuts (3) and screws (1) from hanger (2). Discard locknuts (3).
12. Remove pin (19) and shackle (4) from hanger (2).

### INSTALLATION

1. Install shackle (4) in hanger (2) with pin (19). Align grooves in pin (19) with screw (1) holes in shackle (4).
2. Install two screws (1) and new locknuts (3) on hanger (2).
3. Lift front axle (14) and spring (5), align holes in spring (5) and shackle (4), and install pin (16). Align grooves in pin (16) with retaining screw (18) holes in shackle (4).
4. Install two screws (18) and new locknuts (15) on shackle (4).
5. Install two lubrication fittings (17) in pins (16) and (19).
6. Install retainer (7) and rubber bushing (8) on shock absorber piston rod (6). Ensure lip of rubber bushing (8) is facing hole in plate (9).
7. Extend shock absorber piston rod (6) through hole in plate (9), and install rubber bushing (10), retainer (13), and nut (12) on shock absorber piston rod (6). Tighten nut (12) until bushing (8) and (10) start to bulge.
8. Install jamnut (11) on piston rod (6) and tighten against nut (12).
9. Raise vehicle, remove two jack stands from frame (20), and place jack stands under front axle (14) to allow front wheel installation.
10. Install front right wheel (WP 0186 00).
11. Lubricate shackle fittings (WP 0020 00).
12. Connect battery ground cable (WP 0126 00).
13. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

FRONT SPRING SHACKLE REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT SPRING BUMPER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 238, WP 0470 00)

Adhesive sealant (item 4, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## FRONT SPRING BUMPER REPLACEMENT (Contd)

### REMOVAL

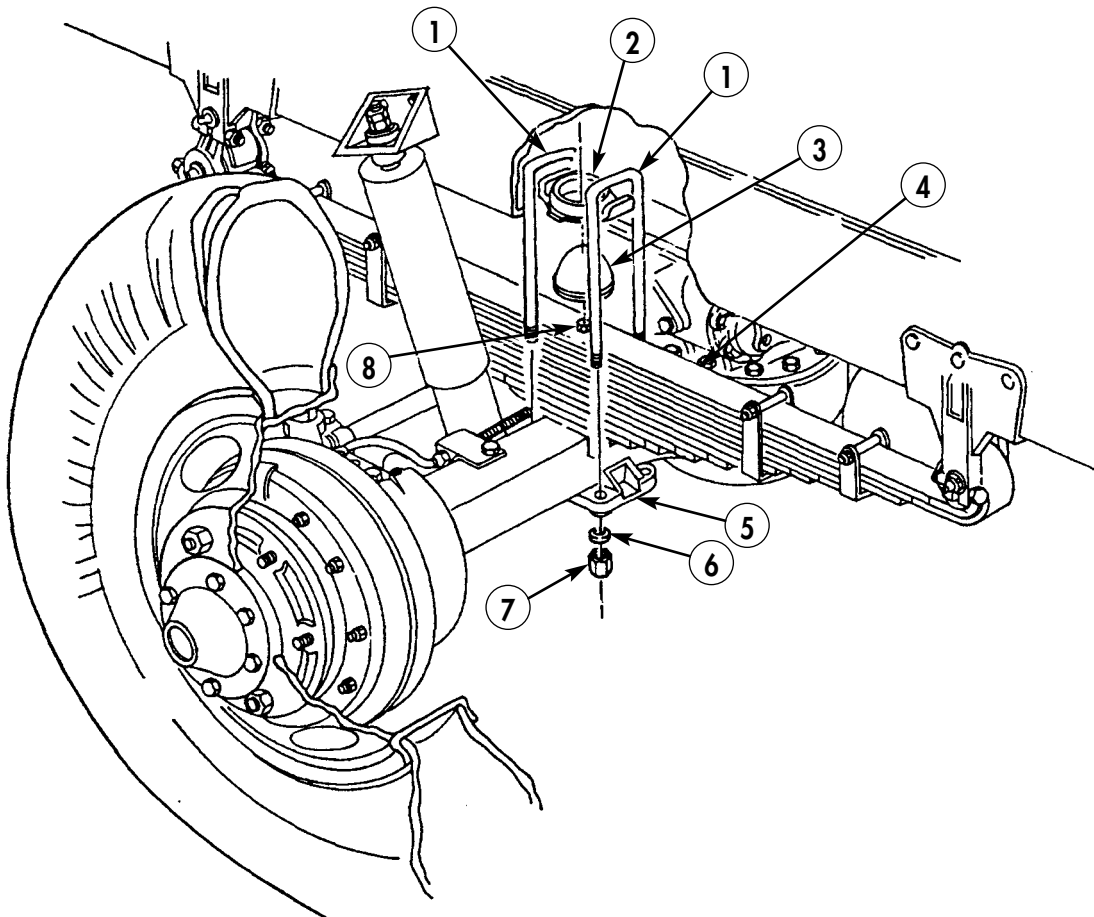
#### NOTE

Left and right spring bumpers and seats are replaced the same way. This procedure covers the right side.

1. Remove four nuts (7), lockwashers (6), two U-bolts (1), bumper (3), and saddle (2) from spring (4) and plate (5). Discard lockwashers (6).
2. Remove saddle (2) from bumper (3).

### INSTALLATION

1. Apply sealant around top mating surface of metal base of bumper (3) and saddle (2).
2. Install bumper (3) in saddle (2) and set saddle (2) over center bolt (8) on spring (4).
3. Install two U-bolts (1) over saddle (2) and plate (5) with four new lockwashers (6) and nuts (7). Tighten nuts (7) 190–230 lb-ft (258–312 N•m).
4. Connect battery ground cable (WP 0126 00).
5. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT SPRING MAINTENANCE

DISASSEMBLY, CLEANING AND INSPECTION, AND ASSEMBLY

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Center bolt (item 4, WP 0470 00)  
Nut (item 276, WP 0470 00)  
Four nuts (item 277, WP 0470 00)  
Four rivets (item 316, WP 0470 00)

##### Materials/Parts (Contd)

Four screws (item 322, WP 0470 00)  
Graphite grease (item 20, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

##### Equipment Condition

Front springs removed (WP 0153 00).

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## FRONT SPRING MAINTENANCE (Contd)

### DISASSEMBLY

#### **NOTE**

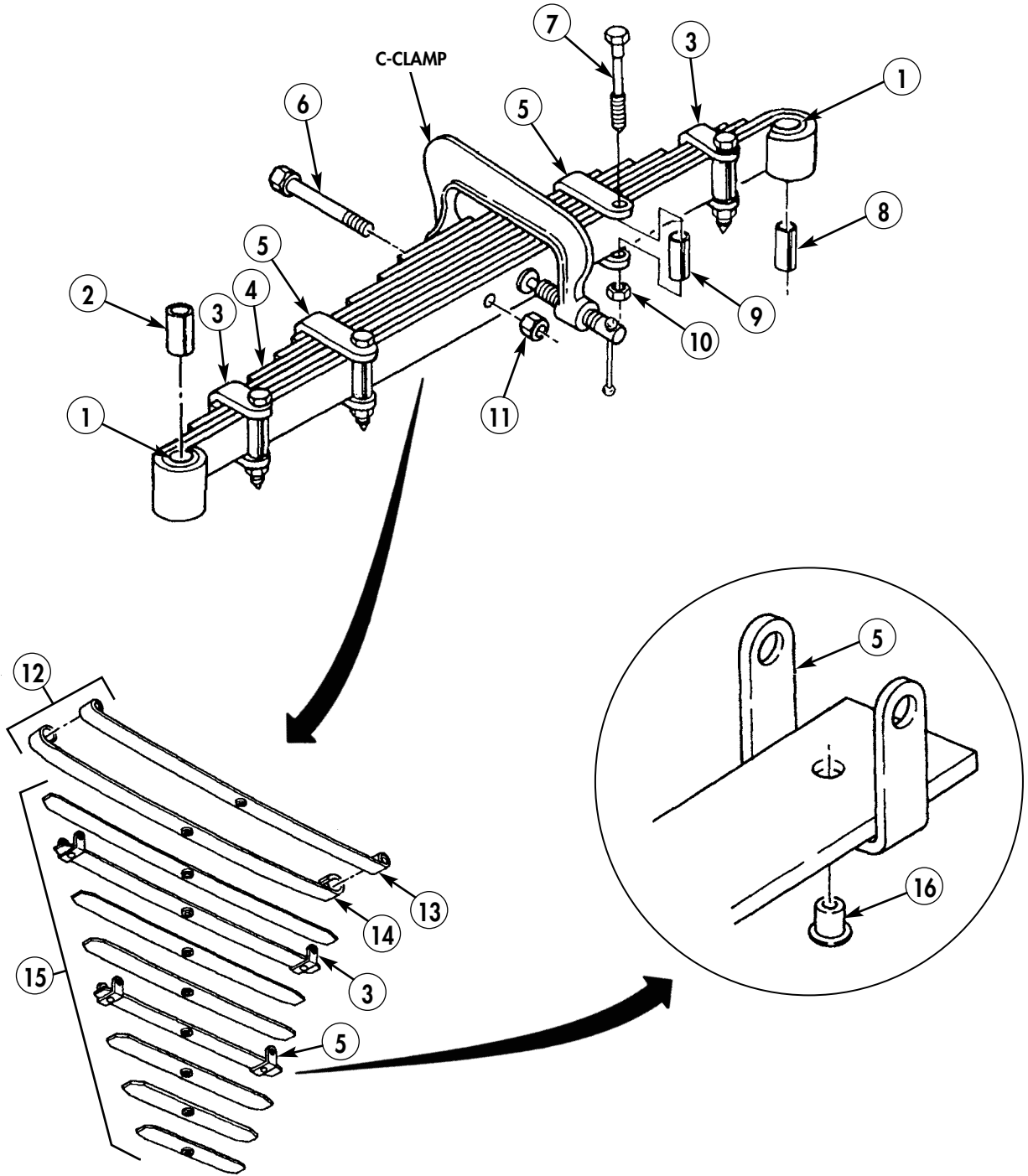
- Some springs have two leaves and eight plates, and others have two leaves and ten plates. Both types are maintained the same way. This procedure covers the springs with eight plates.
  - Only the two leaves of the spring can be replaced. Damaged plates require replacement of whole spring.
1. Position C-clamp on spring (4) near center bolt (6). Ensure C-clamp is vertically centered and square across spring (4).
  2. Remove four nuts (10), screws (7), and spacers (9) from two long leaf clips (5) and short leaf clips (3). Discard nuts (10) and screws (7).

#### **WARNING**

Leaves and plates of assembled spring are under tension. Restrain all leaves and plates while removing center bolt. Release tension slowly. Failure to comply may result in injury to personnel.

3. Remove nut (11) and center bolt (6) from spring (4). Discard center bolt (6) and nut (11).
4. Slowly loosen C-clamp until tension on plates (15) and leaves (12) is released. Remove leaf (13) from leaf (14).
5. Using a center punch and drill, remove rivets (16) from two long leaf clips (5) and short leaf clips (3). Discard rivets (16).
6. Remove bushings (2) and (8) from eyes (1) of leaf (13).

FRONT SPRING MAINTENANCE (Contd)



## FRONT SPRING MAINTENANCE (Contd)

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all parts with Skysol 100. Use wire brush to remove rust and corrosion. Dry with clean rag.
2. Inspect two bushings (6) and (10) for looseness and free play. Replace bushings (6) and (10) if damaged.

#### **NOTE**

Only the two leaves of the spring can be replaced. Damaged plates require replacement of whole spring.

3. Inspect plates (14) through (21) for breaks or cracks. Replace entire spring (11) if any plates (14) through (21) are broken or cracked.
4. Inspect long leaf clips (4), short leaf clips (2), and spacers (7) for cracks or breaks. Replace leaf clips (4) and (2) and spacers (7) if cracked or broken.

### ASSEMBLY

1. Install two long leaf clips (2) on plate (18) with two new rivets (23).
2. Install two short leaf clips (4) on plate (15) with two new rivets (22).
3. Apply graphite grease between all plates and leaves (11) while assembling.
4. Assemble leaf (12) in leaf (13) before placing over new center bolt (1).
5. Assemble plates (21) through (14) and leaves (12) and (13) on new center bolt (1) on a flat surface.

#### **WARNING**

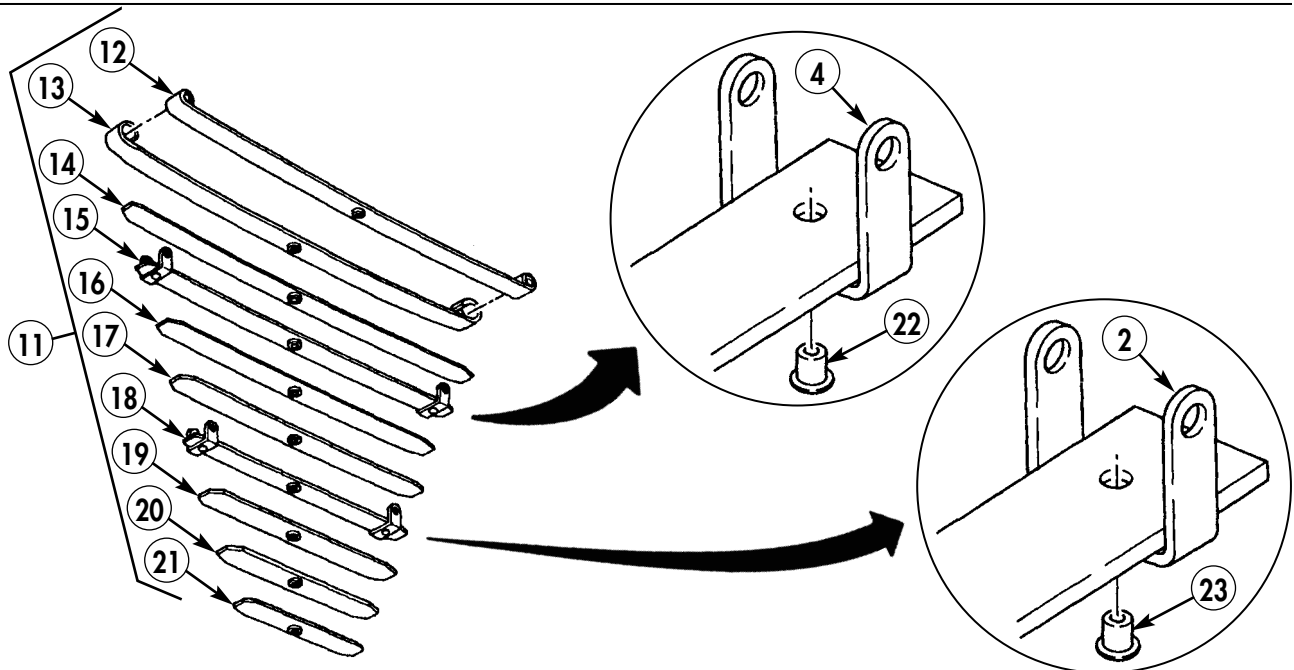
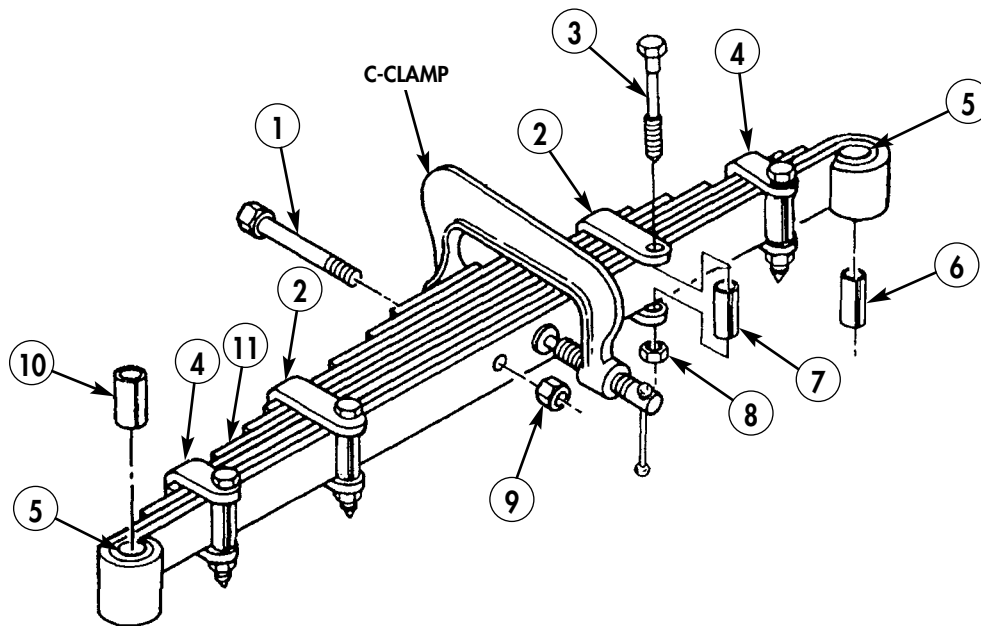
When assembling plates and leaves with C-clamp, the plates and leaves will be under tension. Use care not to disturb the assembly until center bolt and nut are tightened. Failure to comply may result in injury to personnel

6. Install C-clamp over leaves (12) and (13) and plates (14) through (21). Ensure there is clearance for center bolt (1) and nut (9), and C-clamp is squared and vertically centered across spring plate assembly (11).
7. Tighten C-clamp and install new nut (9) on new center bolt (1). Remove C-clamp and peen end of center bolt (6) to nut (9).

## FRONT SPRING MAINTENANCE (Contd)

### ASSEMBLY (Contd)

8. Install four spacers (7) in leaf clips (4) and (2) with four new leaf screws (3) and new nuts (8). Tighten nut (8) if leaf clip (4) or (2) is loose. Ensure leaves and plates (11) are parallel and not binding at sides of leaf clips (4) or (2). Peen screws (3) over nuts (8).
9. Coat outside of bushings (10) and (6) with graphite grease.
10. Install bushings (6) and (10) in leaf eyes (5).
11. Install front springs (WP 0153 00).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR SPRING REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 238, WP 0470 00)

Two lockwashers (item 227, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Rear spring wear pads removed (WP 0161 00).

**Personnel Required**

Two

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## REAR SPRING REPLACEMENT (Contd)

### REMOVAL

#### NOTE

Left and right rear springs are replaced the same way. This procedure covers the left side.

1. Remove four nuts (7), lockwashers (8), two U-bolts (3), and saddle (2) from spring (1). Discard lockwashers (8).
2. Remove two bolts (5) and lockwashers (4) from spring seat (9). Discard lockwashers (4).

#### NOTE

Assistant will help with step 3.

3. Remove spring (1) from spring seat (9) and rear axles (10) and (6).

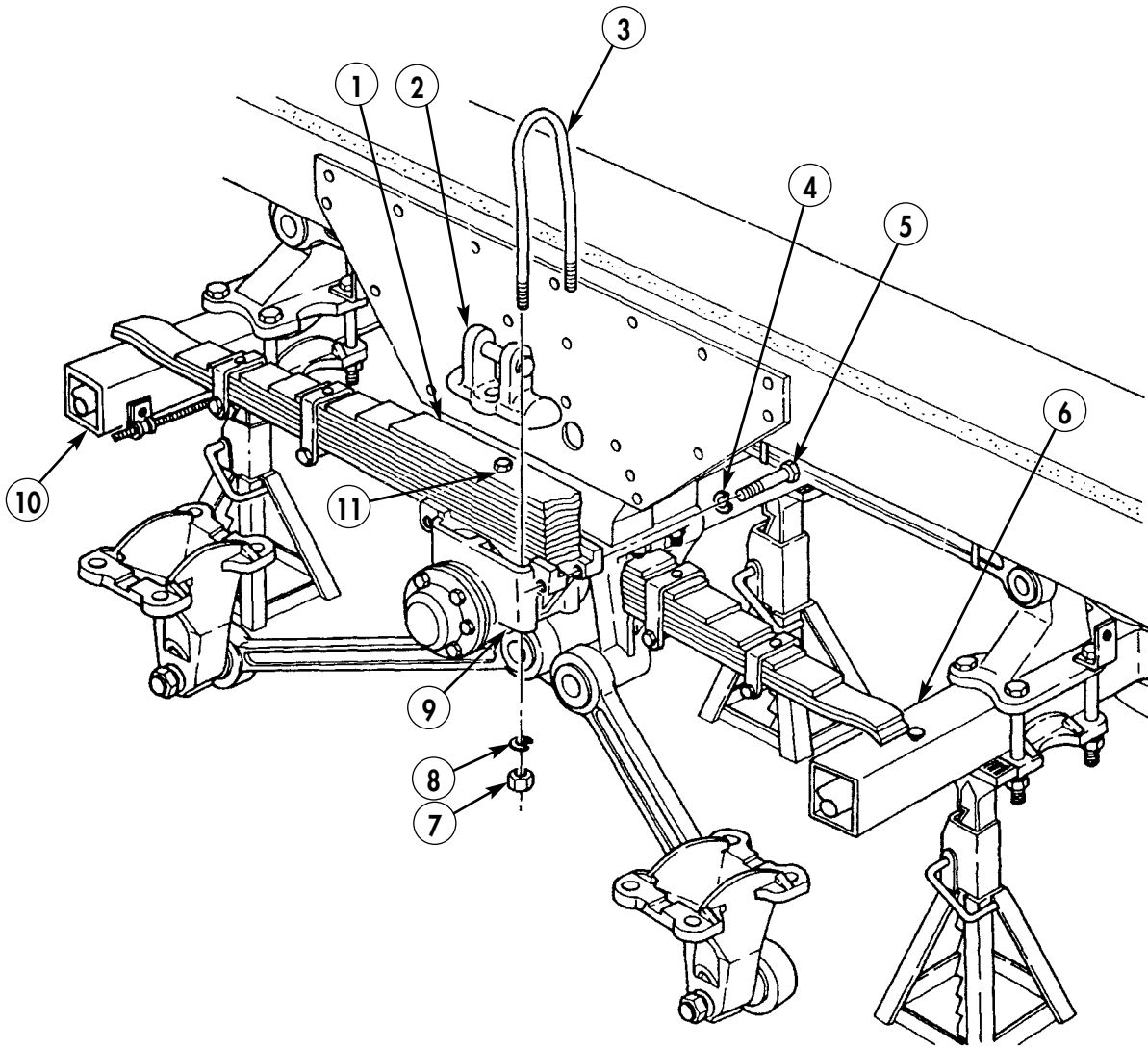
### INSTALLATION

#### NOTE

Assistant will help with step 1.

1. Position and align spring (1) on spring seat (9) and rear axles (6) and (10).
2. Install two new lockwashers (4) and bolts (5) on spring seat (9). Tighten bolts (5) 280–365 lb-ft (380–495 N•m).
3. Position saddle (2) over spring (1) and center bolt (11). Install two U-bolts (3) with four new lockwashers (8) and nuts (7). Tighten nuts (7) 190–220 lb-ft (258–298 N•m).
4. Install rear spring wear pads (WP 0161 00).
5. Connect battery ground cable (WP 0126 00).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

REAR SPRING REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR SPRING MAINTENANCE

DISASSEMBLY, CLEANING AND INSPECTION, AND ASSEMBLY

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Center bolt (item 2, WP 0470 00)  
Nut (item 278, WP 0470 00)  
Four nuts (item 418, WP 0470 00)  
Four rivets (item 317, WP 0470 00)

**Materials/Parts (Contd)**

Four screws (item 323, WP 0470 00)  
Graphite grease (item 20, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Rear spring removed (WP 0157 00).

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## REAR SPRING MAINTENANCE (Contd)

### DISASSEMBLY

#### **NOTE**

- Some springs have two leaves and eight plates, and others have two leaves and ten plates. Both types are maintained the same way. This procedure covers the spring with eight plates.
  - Only the two leaves of the spring can be replaced. Damaged plates require replacement of whole spring.
1. Position C-clamp on spring (2) near center bolt (6). Ensure C-clamp is vertically centered and square across spring (2).
  2. Remove four nuts (1), screws (8), and spacers (7) from two long leaf clips (5) and short leaf clips (4). Discard nuts (1) and screws (8).

#### **WARNING**

Leaves and plates of assembled spring are under tension. Restrain all leaves and plates while removing center bolt. Release tension slowly. Failure to do so may result in injury to personnel.

3. Remove nut (3) and center bolt (6) from spring (2). Discard center bolt (6) and nut (3).
4. Slowly loosen C-clamp until tension on plates (19) and leaves (20) is released. Remove C-clamp from spring (2).
5. Using a center punch and drill, remove rivets (21) from two long leaf clips (5) and short leaf clips (4). Discard rivets (21).

### CLEANING AND INSPECTION

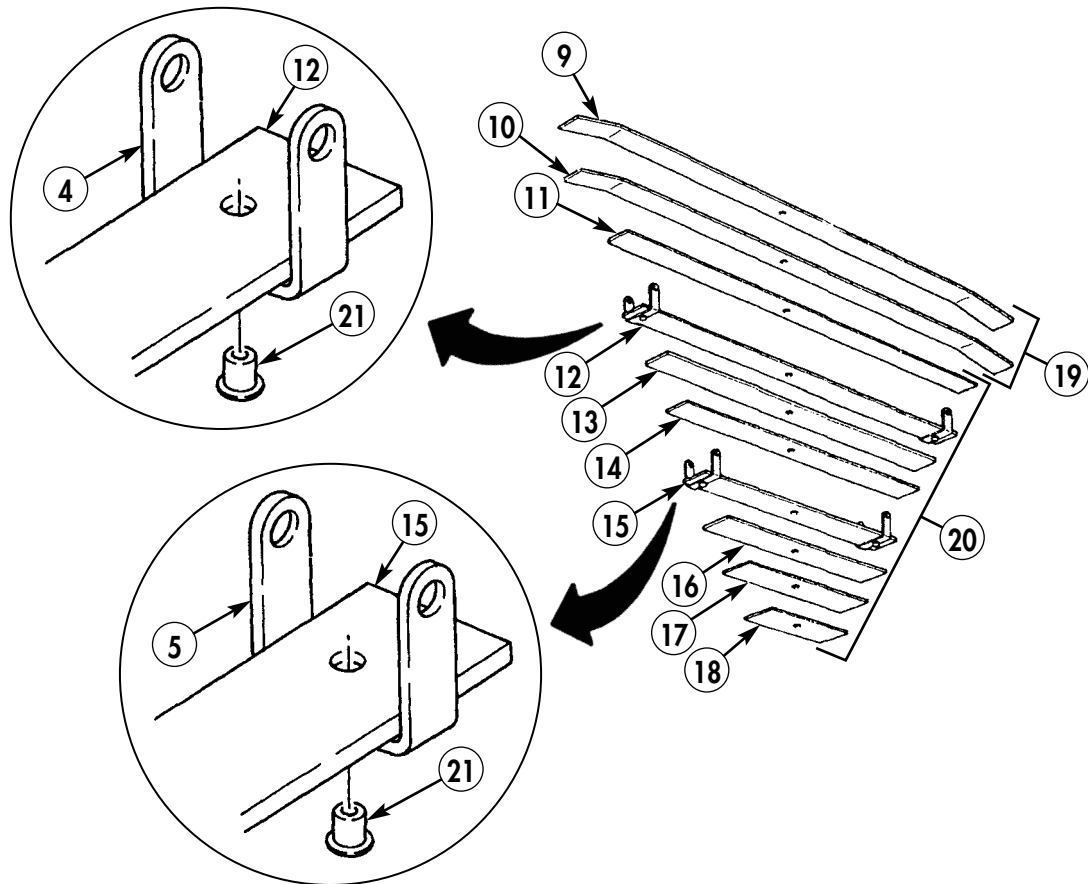
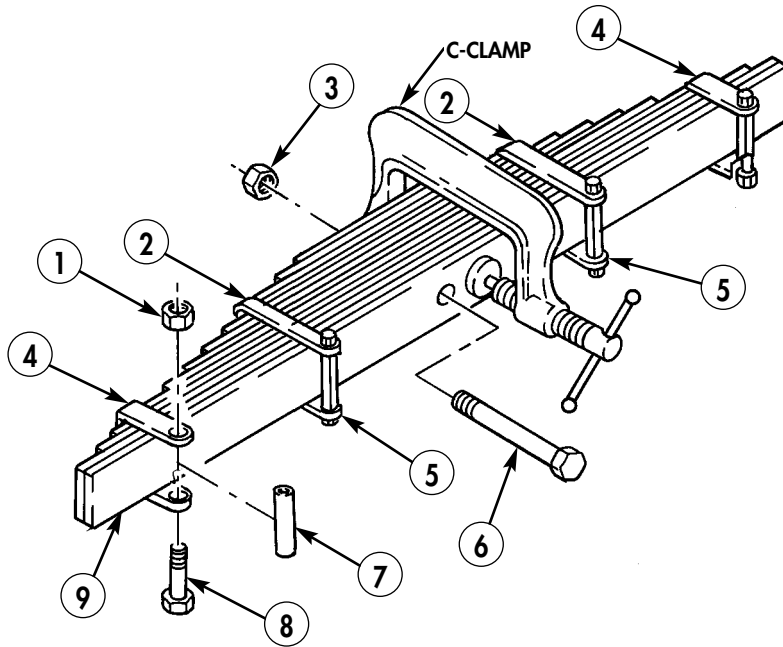
#### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all parts with Skysol 100. Use wire brush to remove rust and corrosion. Dry with clean rag.
2. Inspect plates (11) through (18) and leaves (9) and (10) for breaks and cracks. Replace leaves (9) and (10) if broken or cracked. Broken or cracked plates require replacement of entire spring.
3. Inspect long leaf clips (5), short leaf clips (4), and spacers (7) for cracks or breaks. Replace clips (5) and (4) and spacers (7) if cracked or broken.

REAR SPRING MAINTENANCE (Contd)



## REAR SPRING MAINTENANCE (Contd)

### ASSEMBLY

1. Install two short leaf clips (4) on plate (12) with two new rivets (20).
2. Install two long leaf clips (5) on plate (15) with two new rivets (20).

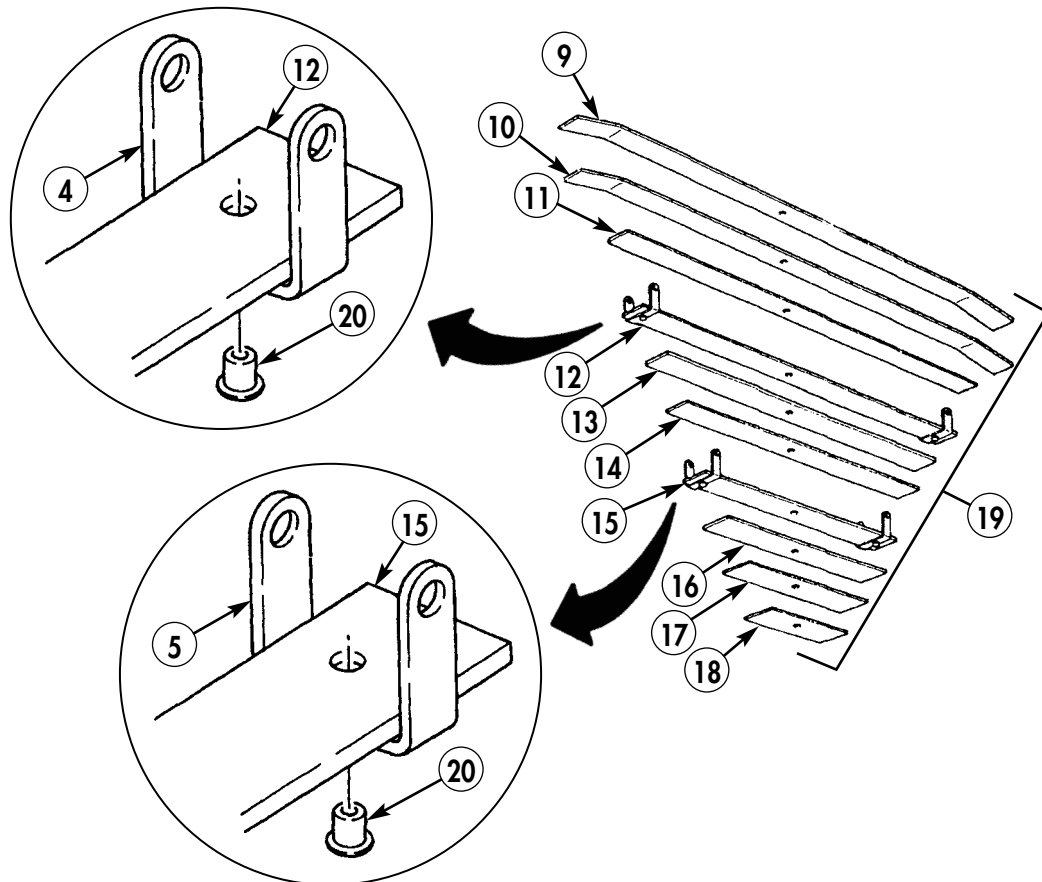
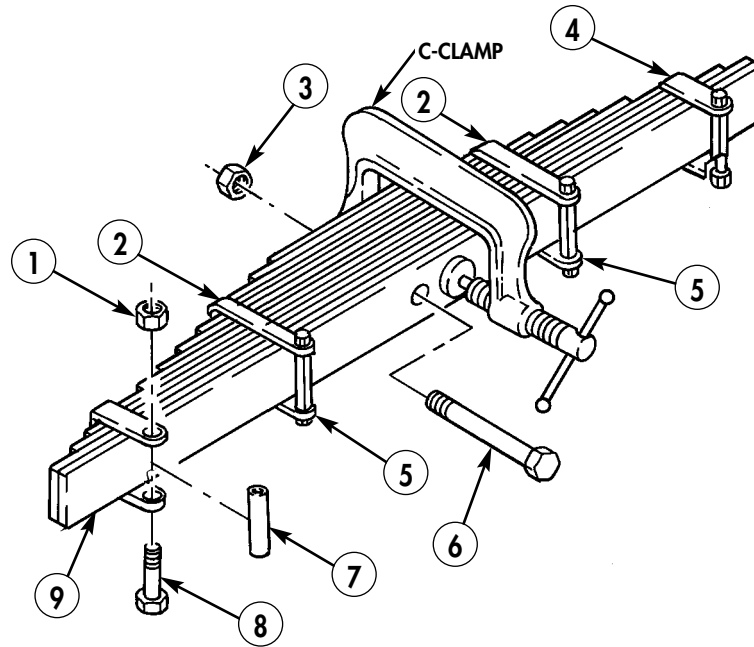
#### **WARNING**

When assembling plates and leaves with C-clamp, the plates and leaves will be under tension. Use care not to disturb the assembly until center bolt and nut are tightened. Failure to comply may result in injury to personnel.

3. Apply graphite grease between plates and while assembling.
4. Place new center bolt (6) through lower spring leaf (9) and coat upper side of leaf (9) with graphite grease.
5. Install C-clamp over leaves (9) and (10) and plates (11) through (18). Ensure there is clearance for head of center bolt (6) and nut (3). C-clamp must be squared and centered vertically across leaf and plate assembly (19).
6. Tighten C-clamp and install new nut (3) on new center bolt (6). Remove C-clamp and peen center bolt (6) over nut (3).
7. Install four spacers (7) in leaf clips (4) and (5) with four new screws (8) and new nuts (1). Tighten nut (3) if clip is loose. Ensure leaves and plates (19) are parallel and not binding at sides of leaf clips (4) and (5). Peen clip screws (8) over nuts (1).
8. Install rear spring (WP 0157 00).



REAR SPRING MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR SPRING SEAT REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Two bushing assemblies  
(item 8, WP 0470 00)  
Felt seal (item 333, WP 0470 00)  
Gasket (item 50, WP 0470 00)  
Six lockwashers (item 229, WP 0470 00)  
Four lockwashers (item 238, WP 0470 00)  
Two lockwashers (item 227, WP 0470 00)  
Washer (item 375, WP 0470 00)

##### Materials/Parts (Contd)

Woodruff key (item 387, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)

##### References

WP 0020 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Forward-rear and rear-rear axle wheels  
removed (WP 0186 00).

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## REAR SPRING SEAT REPLACEMENT (Contd)

### REMOVAL

#### **WARNING**

Ensure vehicle is firmly supported while spring seat is removed. Failure to comply may cause injury to personnel.

#### **NOTE**

Right and left spring seats are replaced the same way. This procedure covers the left side.

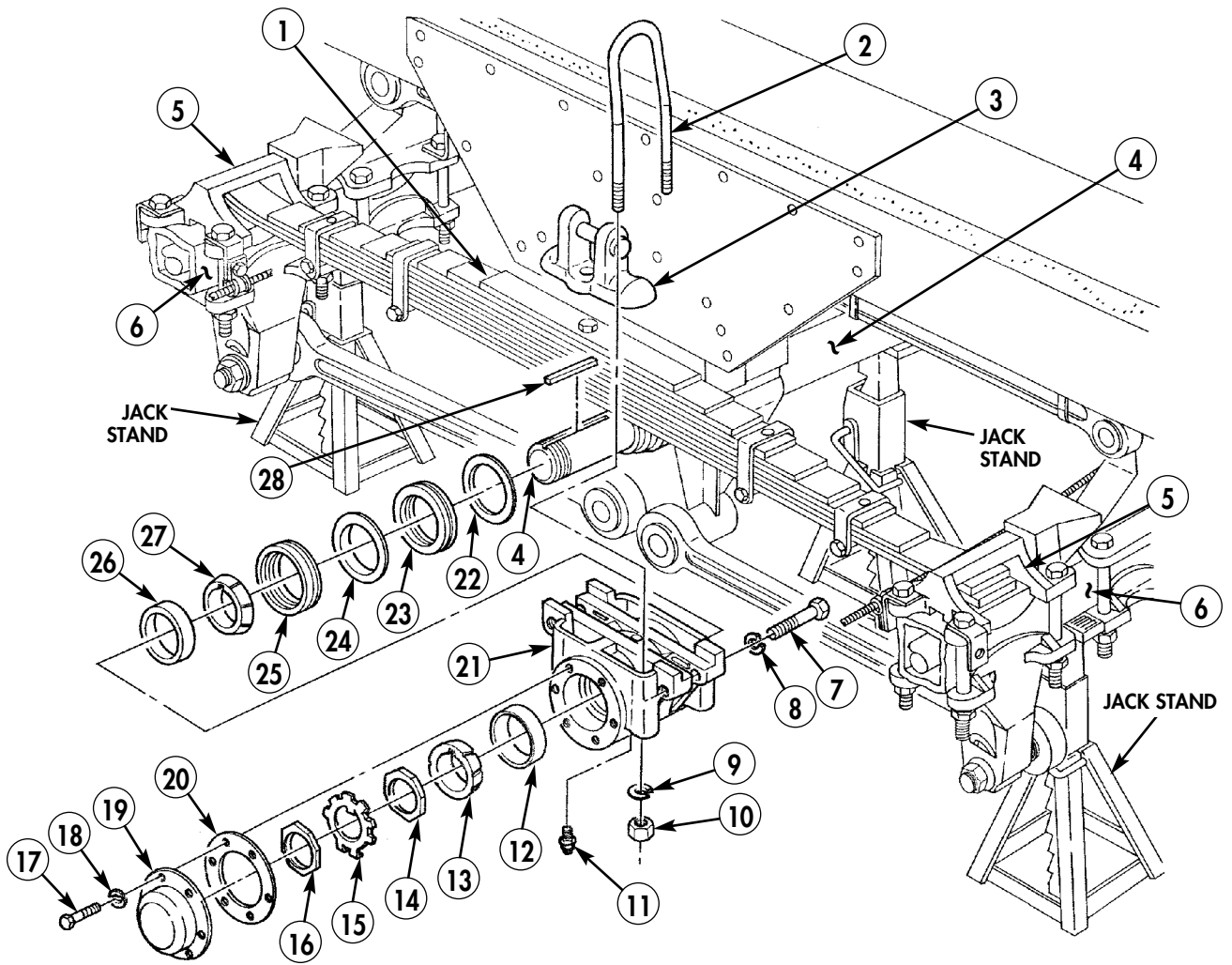
1. Support vehicle with two jack stands at tandem axle bracket (4).
2. Raise axles (6) so that spring (1) is not resting against brackets (5).
3. Remove two screws (7) and lockwashers (8) from spring seat (21). Discard lockwashers (8).
4. Remove four nuts (10), lockwashers (9), two U-bolts (2), and saddle (3) from spring (1). Discard lockwashers (9).
5. Using hydraulic jack, raise and support rear-rear axle (6) until spring (1) is lifted off spring seat (21). Readjust jack stands under axle (6).
6. Remove six screws (17), lockwashers (18), pack cover (19), and gasket (20) from spring seat (21). Discard lockwashers (18) and gasket (20).
7. Straighten washer (15) tabs.
8. Remove nut (16), washer (15), nut (14), outer bushing (13), and spring seat (21) from tandem axle bracket (4) end. Discard washer (15).
9. Remove two bushing cups (12) and (26) from spring seat (21). Discard bushing cups (12) and (26).
10. Remove plug (11) from spring seat (21).

#### **NOTE**

Use care when installing retainer and washer in the following step.

11. Remove inner bushing (27), seal (25), retainer (24), felt seal (23), washer (22), and woodruff key (28) from tandem axle bracket (4) end. Do not bend washer (22) or retainer (24). Discard seal (25), felt seal (23), and woodruff key (28).

REAR SPRING SEAT REPLACEMENT (Contd)

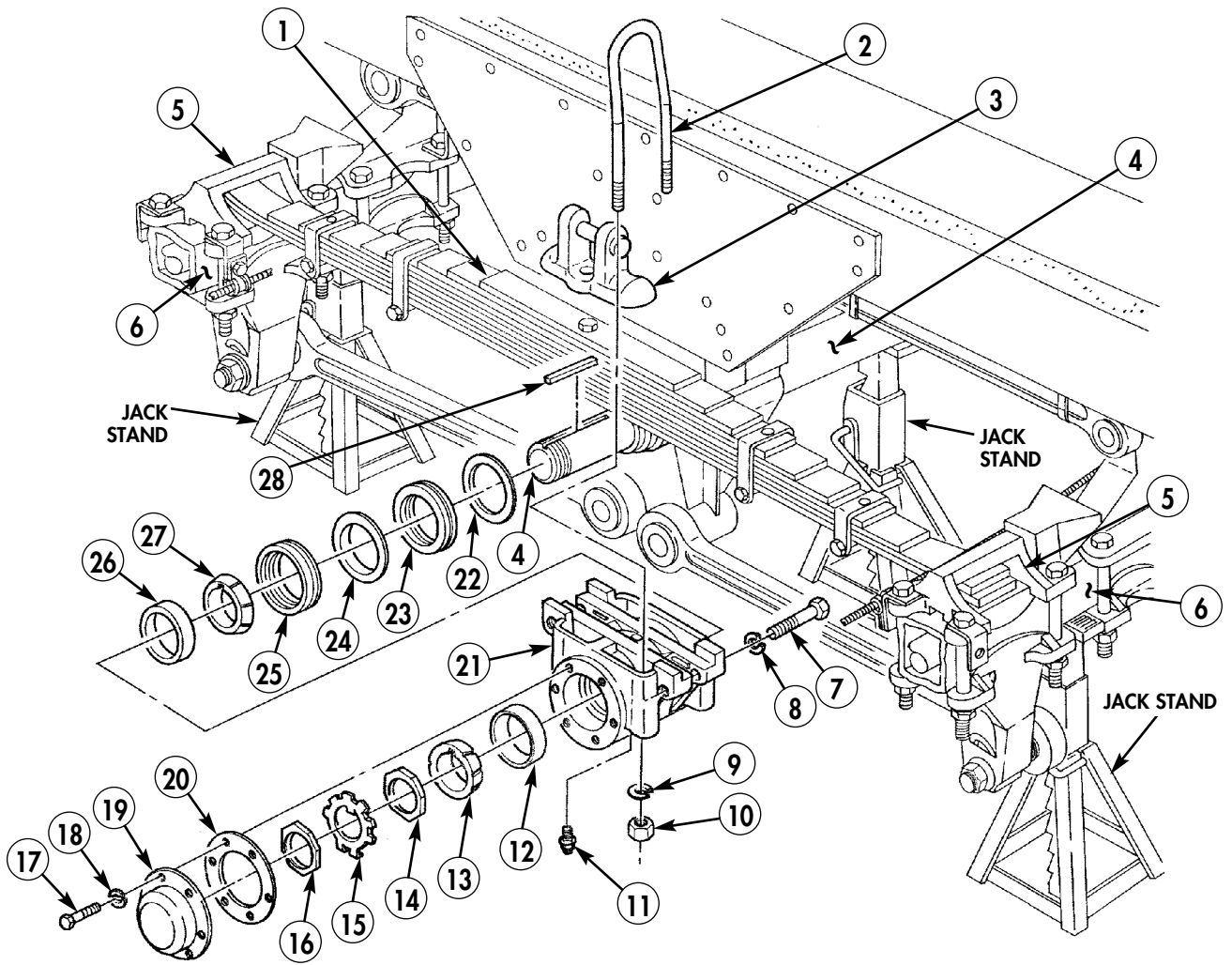


## REAR SPRING SEAT REPLACEMENT (Contd)

### INSTALLATION

1. Position new felt seal (23) on retainer (24).
2. Install two new bushing cups (12) and (26) in spring seat (21).
3. Apply light film of GAA grease to tandem axle bracket (4) end, new seal (25), spring seat (21), and inner bushing (27).
4. Install washer (22), new felt seal (23), retainer (24), new seal (25), inner bushing (27), and new woodruff key (28) over tandem axle bracket (4) end.
5. Place spring seat (21) over inner bushing (27).
6. Apply light film of GAA grease to outer bushing (13) and end of tandem axle bracket (4), and install in spring seat (21) with nut (14). Tighten nut (14) 60 lb-ft (81 N•m). Back off nut (14) about 1/4 turn.
7. Install new washer (15) and nut (16) on tandem axle bracket (4) end. Tighten nut (16) 100–150 lb-ft (136–203 N•m). Bend washer (15) tabs against nut (16).
8. Apply light film of GAA grease to both sides of gasket (20).
9. Install gasket (20) and pack cover (19) on spring seat (21) with six new lockwashers (18) and screws (17). Tighten screws (17) 16–20 lb-ft (22–27 N•m). Wipe away excess grease with rag.
10. Using hydraulic jack, raise rear-rear axle (6), adjust jack stands, and lower axle (6) onto spring seat (21). Position center bolt (29) in recess of spring seat (21).
11. Install plug (11) on spring seat (21).
12. Position saddle (3) over spring center bolt (29) and install saddle (3) with two U-bolts (2), four new lockwashers (9), and nuts (10). Tighten nuts (10) 190–220 lb-ft (258–298 N•m).
13. Install two new lockwashers (8) and screws (7) in spring seat (21). Tighten screws (7) 280–365 lb-ft (380–495 N•m).
14. Using hydraulic jack, raise vehicle and remove two jack stands. Lower vehicle and remove hydraulic jack.
15. Lubricate spring seat (WP 0020 00).
16. Install rear-rear and forward-rear axle wheels (WP 0186 00).
17. Connect battery ground cable (WP 0126 00).
18. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

REAR SPRING SEAT REPLACEMENT (Contd)



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SHOCK ABSORBER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## SHOCK ABSORBER REPLACEMENT (Contd)

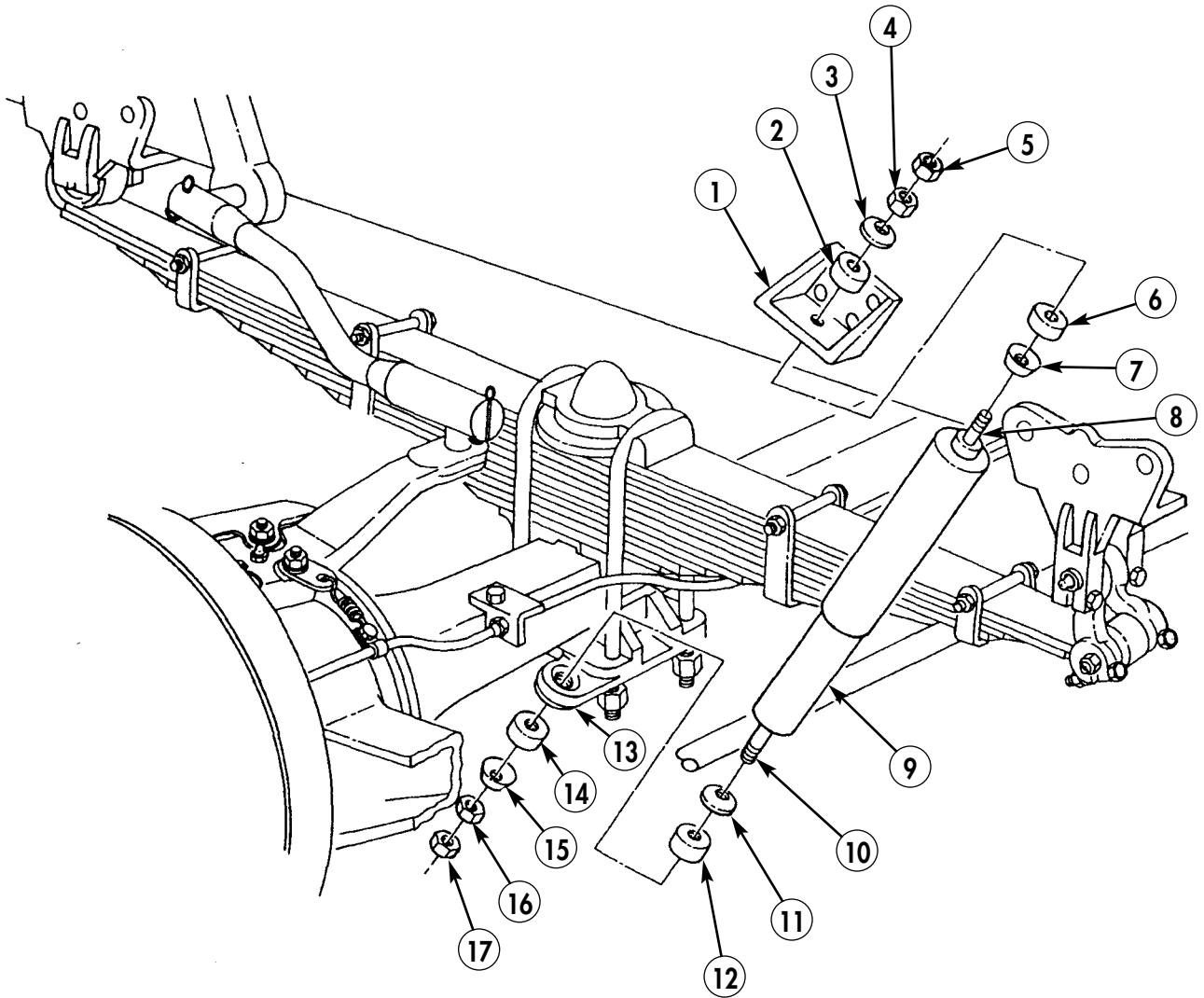
### REMOVAL

1. Remove jamnut (17), nut (16), retainer (15), and rubber bushing (14) from shock absorber piston rod (10).
2. Push shock absorber piston rod (10) up through hole in plate (13) and remove upper rubber bushing (12) and retainer (11).
3. Remove jamnut (5), nut (4), upper retainer (3), and rubber bushing (2) from upper rod (8).
4. Remove shock absorber (9), lower retainer (7), and rubber bushing (6) from frame bracket (1).

### INSTALLATION

1. Position retainer (7) and rubber bushing (6) on upper rod (8) of shock absorber (9). Ensure lip of bushing (6) is facing up.
2. Position upper rod (8) through hole in frame bracket (1) and install rubber bushing (2), retainer (3), and nut (4) on rod (8). Ensure lip of bushing (2) is in hole in frame bracket (1).
3. Tighten nut (4) until two rubber bushings (2) and (6) start to bulge.
4. Install jamnut (5) against nut (4).
5. Install retainer (11) and rubber bushing (12) on piston rod (10). Ensure lip of rubber bushing (12) is facing down.
6. Pull piston rod (10) down through hole in plate (13) and install rubber bushing (14), retainer (15), and nut (16). Ensure lip of bushing (14) is in hole of plate (13).
7. Tighten nut (16) until two rubber bushings (14) and (12) start to bulge.
8. Install jamnut (17) against nut (16).
9. Connect battery ground cable (WP 0126 00).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

SHOCK ABSORBER REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR SPRING WEAR PAD REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Wear pad (item 377, WP 0470 00)

Four lockwashers (item 238, WP 0470 00)

Locknut (item 171, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Rear left wheels removed (WP 0186 00).

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## REAR SPRING WEAR PAD REPLACEMENT (Contd)

### NOTE

This procedure covers the rear spring wear pad replacement on the left side of the vehicle. The right side is replaced the same.

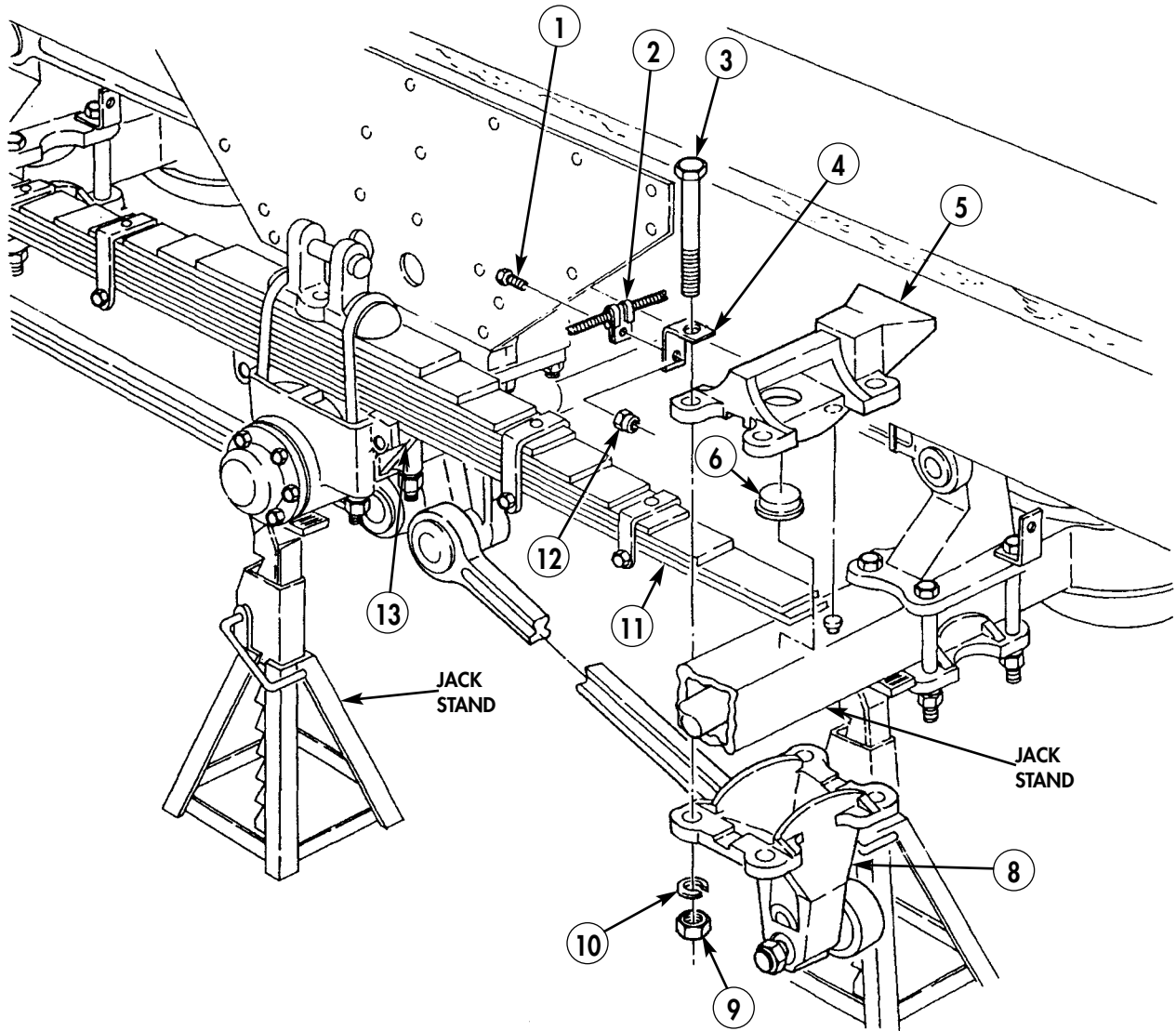
### REMOVAL

1. Raise spring seat (13) until spring (11) is lifted up in axle bracket (5) and support spring seat (13) with jack stand.
2. Remove locknut (12), screw (1), and clamp (2) from bracket (4). Discard locknut (12).
3. Remove four nuts (9), lockwashers (10), screws (3), bracket (4), and axle bracket (5) from axle housing (7) and mounting bracket (8). Discard lockwashers (10).
4. Remove wear pad (6) from axle bracket (5). Discard wear pad (6).

### INSTALLATION

1. Install new wear pad (6) on axle bracket (5).
2. Position axle bracket (5) over spring (11) and install on axle housing (7) and mounting bracket (8) with brackets (4), four screws (3), new lockwashers (10), and nuts (9). Tighten nuts (9) 200–275 lb-ft (271–373 N•m).
3. Install clamp (2) on bracket (4) with screw (1) and new locknut (12).
4. Raise spring seat (13) and remove jack stand from spring seat (13).
5. Install left rear wheels (WP 0186 00).
6. Connect battery ground cable (WP 0126 00).
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

REAR SPRING WEAR PAD REPLACEMENT (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### TORQUE RODS REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Four lockwashers (item 228, WP 0470 00)  
Four lockwashers (item 238, WP 0470 00)  
Two tiedown straps (item 40, WP 0468 00)

**Personnel Required**

Two

**References**

TM 9-2320-361-10

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Rear wheels removed (WP 0186 00).

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## TORQUE RODS REPLACEMENT (Contd)

### REMOVAL

#### NOTE

- The left and right side torque rods are replaced the same. This procedure covers the left-rear side.
- Upper torque rods are on the left side.

1. Loosen nut (2) until even with end of torque rod (6) stud.
2. Using brass drift and sledge, strike stud and nut (2) to loosen stud from bracket (7).
3. Remove nut (2) and lockwasher (1) from torque rod (6) stud. Discard lockwasher (1).

#### NOTE

It maybe necessary to reposition jack stands to gain access to nut and lockwasher.

4. Remove nut (5) and lockwasher (4) from torque rod (6) stud on axle bracket (3). Discard lockwasher (4).

#### NOTE

It maybe necessary to tap bracket with hammer to loosen torque rod stud.

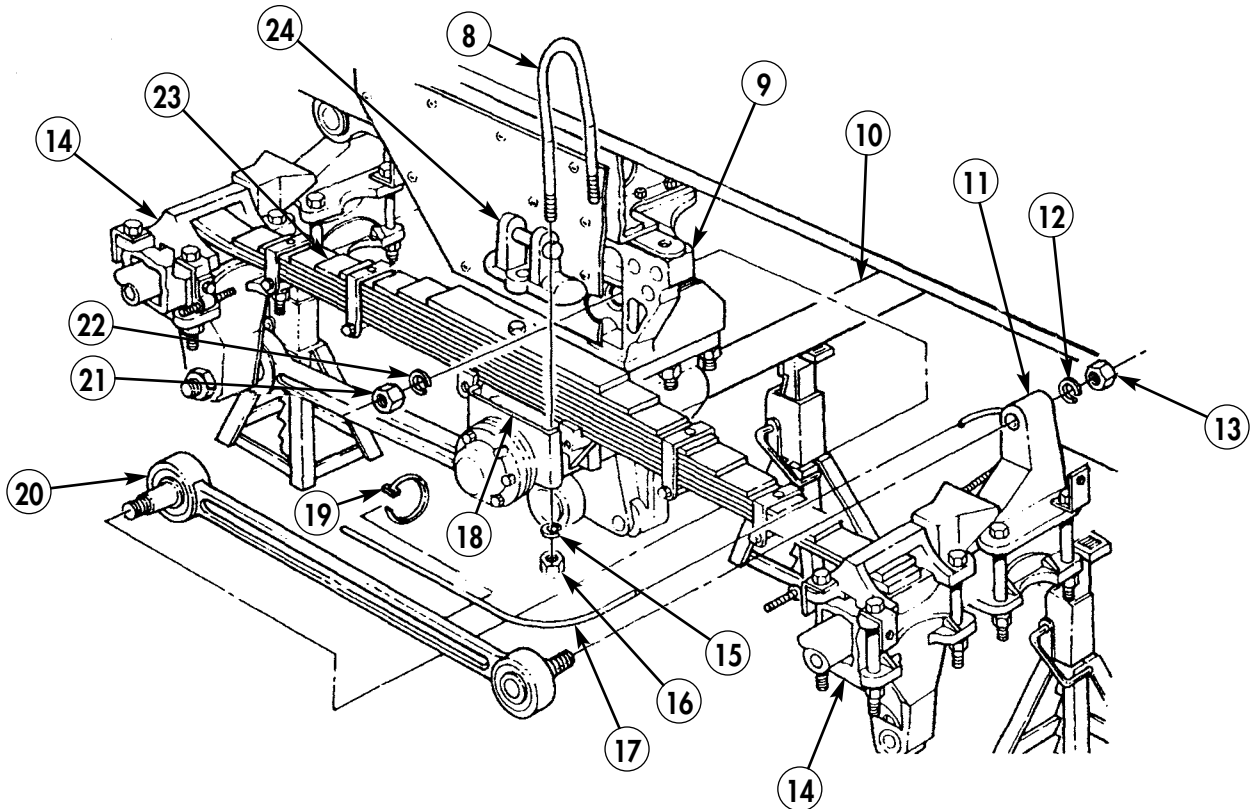
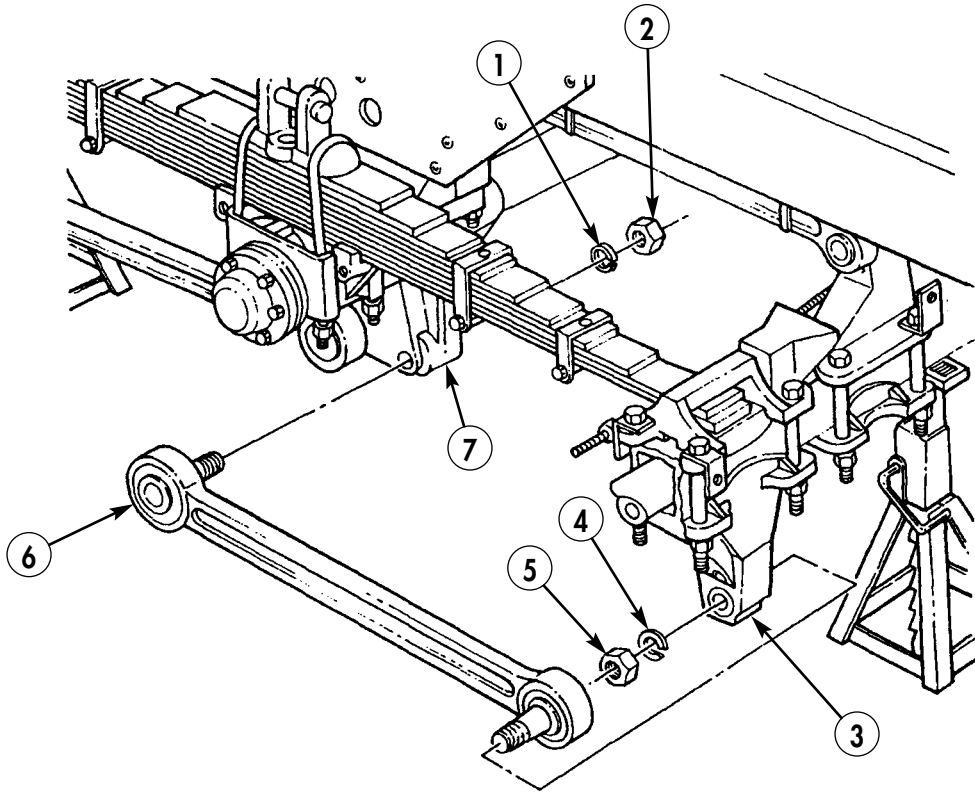
5. Remove torque rod (6) from vehicle.
6. Place jack under tandem axle bracket (10) near spring seat (18) and raise vehicle until spring (23) is lifted off front and rear spring seat brackets (14).
7. Remove four nuts (16) and lockwashers (15) from two U-bolts (8). Discard lockwashers (15).
8. Remove two U-bolts (8) and spring saddle (24) from spring seat (18).
9. Cut two tiedown straps (19) and remove brake line (17) from upper torque rod (20). Discard tiedown straps (19).
10. Loosen nut (21) until even with end of upper torque rod (20) stud.
11. Using brass drift and sledge, strike stud and nut (21) to loosen stud from bracket (9).
12. Remove nut (21) and lockwasher (22) from upper torque rod (20) stud. Discard lockwasher (22).
13. Remove nut (13) and lockwasher (12) from upper torque rod (20) stud on axle bracket (11). Discard lockwasher (12).

#### NOTE

It maybe necessary to tap bracket with hammer to loosen torque rod stud.

14. Remove upper torque rod (20) from vehicle.

TORQUE RODS REPLACEMENT (Contd)

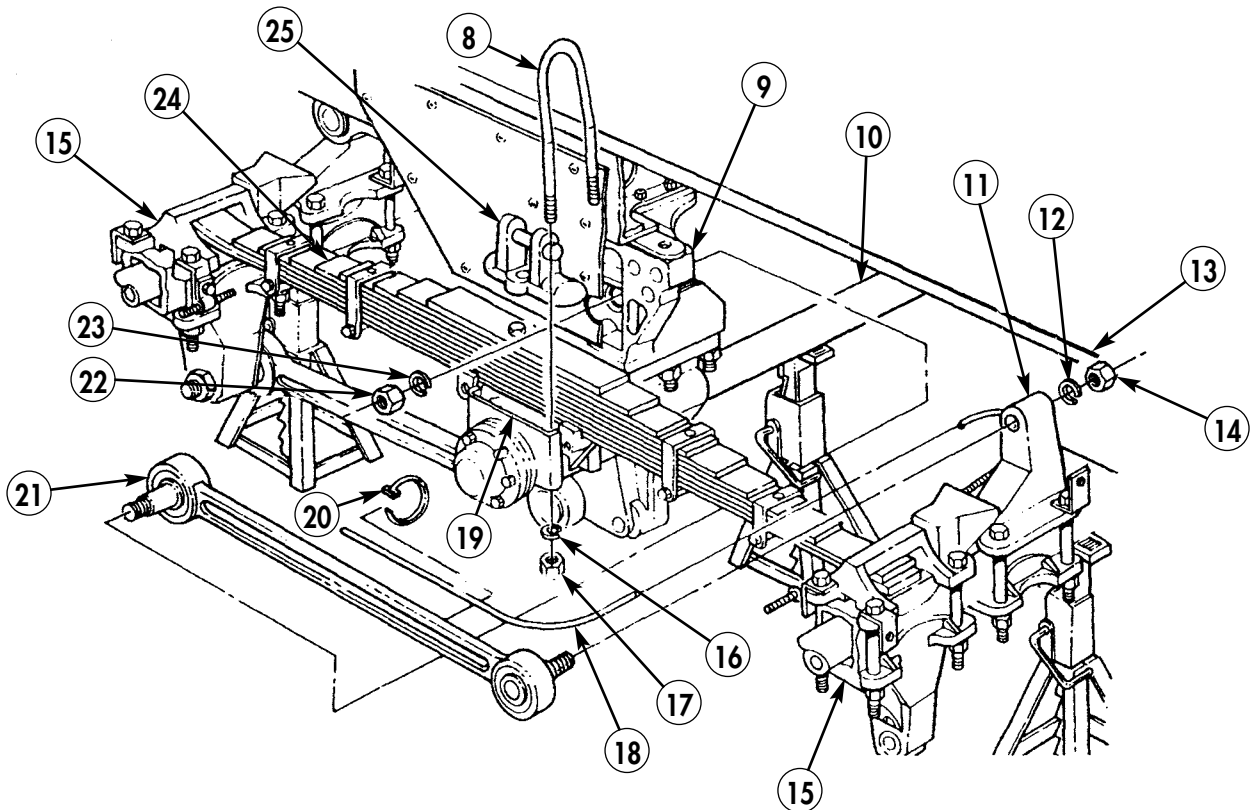
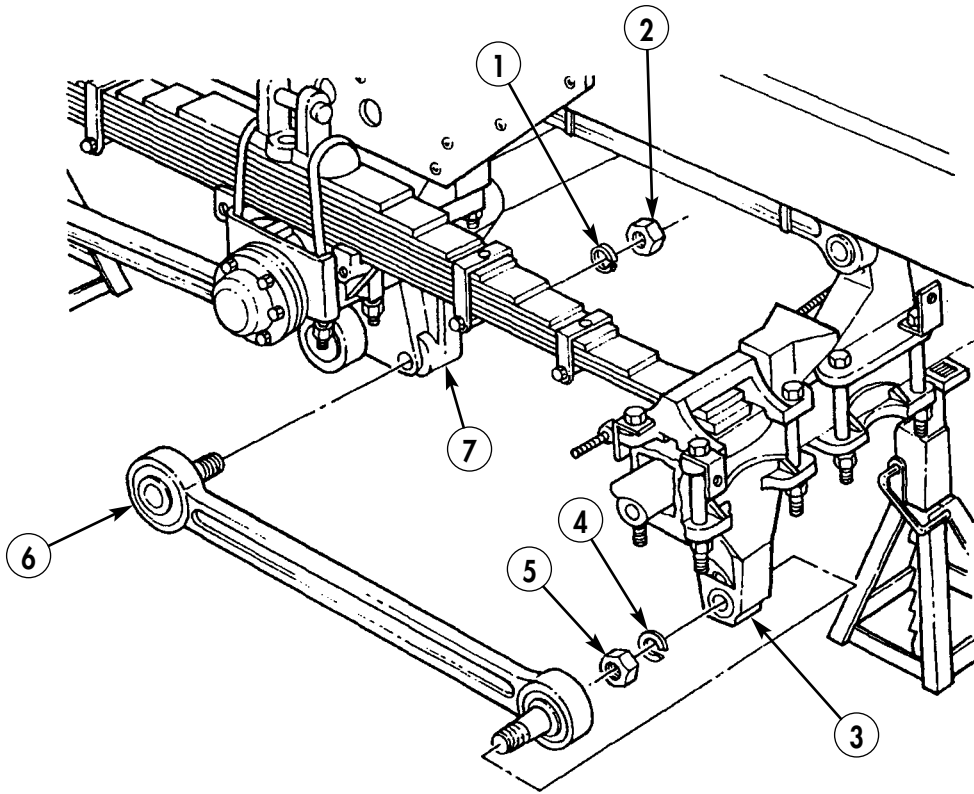


## TORQUE RODS REPLACEMENT (Contd)

### INSTALLATION

1. Adjust jack under tandem axle (10) until center of hole in axle bracket (11) is  $7.00 \pm 0.125$  in. ( $17.78 \pm 0.317$  cm) from lower edge of frame (13).
2. Install one end of upper torque rod (21) on bracket (9) with new lockwasher (23) and nut (22). Finger tighten nut (22).
3. Install other end of upper torque rod (21) on axle bracket (11) with new lockwasher (12) and nut (14). Tighten nuts (14) and (22) 175–200 lb-ft (237–271 N•m).
4. Install brake line (18) on upper torque rod (21) with two new tiedown straps (20).
5. Install spring saddle (25) on spring seat (19) with two U-bolts (8), four new lockwashers (16), and nuts (17). Tighten nuts (17) 190–220 lb-ft (258–298 N•m).
6. Install one end of torque rod (6) on bracket (3) with new lockwasher (4) and nut (5). Finger tighten nut (5).
7. Install other end of torque rod (6) on axle bracket (7) with new lockwasher (1) and nut (2). Tighten nuts (5) and (2) 175–200 lb-ft (237–271 N•m).
8. Install rear wheels (WP 0186 00).
9. Connect battery ground cable (WP 0126 00).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

TORQUE RODS REPLACEMENT (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PARKING BRAKEDRUM REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Cotter pin (item 26, WP 0470 00)

**References**

WP 0164 00

**Equipment Condition**

Wheels chocked (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Transfer-to-forward rear propeller shaft  
removed (all except M36A2) (WP 0139 00).

Intermediate propeller shaft removed (M36A2)  
(WP 0140 00).

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## PARKING BRAKEDRUM REPLACEMENT (Contd)

### REMOVAL

1. Remove spring (3) from lever (6) and bracket (4).

#### NOTE

Prior to removal, mark nut position on threaded end of parking brake cable for installation.

2. Remove nut (2) from threaded end (1) of parking brake cable (11) and slide parking brake cable (11) from eye of lever (6).
3. Loosen jamnut (13) and thread screw (5) several turns into bracket (14).
4. Remove spring (12) from outer brakeshoe (7) and screw (5).
5. Remove jamnut (16), screw (8), spacer(s) (17), lever (6), inner brakeshoe (9), and outer brakeshoe (7) from parking brakedrum (10) and bracket (15).

#### NOTE

Have oil drainage container ready to catch oil.

6. Remove cotter pin (18), nut (19), washer (26), four nuts (25), companion flange (20), grease shield (21), parking brakedrum (10), and deflector (22) from transfer rear output shaft (23). Discard cotter pin (18).
7. Check four studs (24) for cracks, bends, or breaks. If damaged or broken, remove four studs (24) from parking brakedrum (10) and discard studs (24).

### INSTALLATION

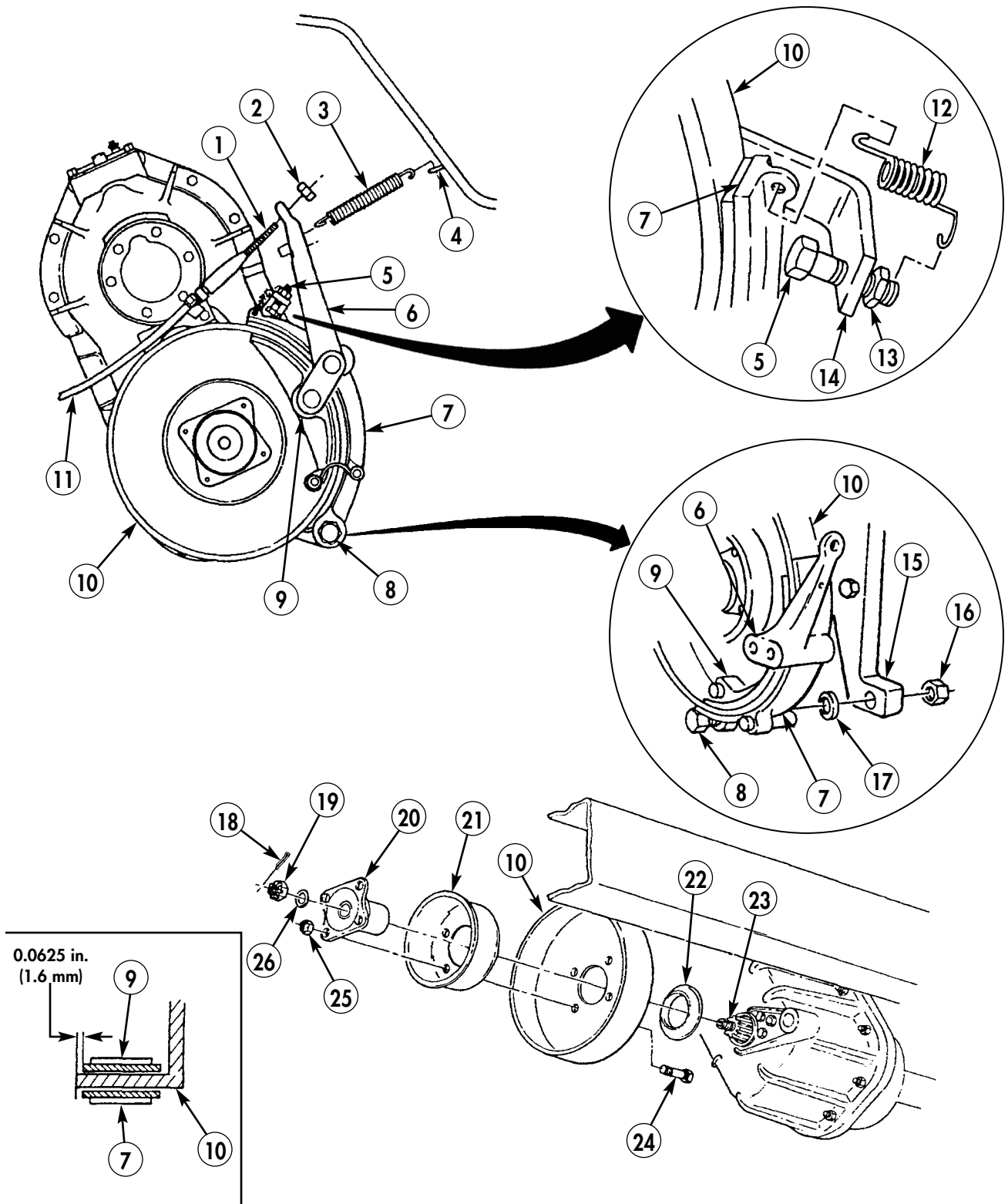
#### NOTE

Perform step 1 only if studs were removed from brakedrum.

1. Install four new studs (24) in parking brakedrum (10).
2. Install deflector (22), brakedrum (10), grease shield (21), and companion flange (20) on transfer rear output shaft (23) with four nuts (25), washer (26), and nut (19). Tighten nut (19) 90–100 lb-ft (122–136 N•m) and install new cotter pin (18).
3. Install inner brakeshoe (9), outer brakeshoe (7), and lever (6) on brakedrum (10).
4. Install spacer(s) (17) and screw (8) on outer brakeshoe (7) and bracket (15) with jamnut (16) until measurement is 0.0625 in. (1.6 mm) between inside edge of brakedrum (10) inner brakeshoe (9).
5. Install spring (12) on adjustment screw (5) and outer brakeshoe (7). Do not tighten jamnut (13).
6. Install threaded end (1) of brake cable (11) through eye of lever (6) and install nut (2) up to marked location on threaded end (1) of brake cable (11).
7. Install spring (3) on lever (6) and bracket (4).
8. Operate parking brake handle in cab several times ending in released position.
9. Make sure outer brakeshoe (7) and lever (6) rotate easily on screw (8) without side-to-side wobble. Tighten screw (5) as necessary to prevent wobble and tighten jamnuts (13) and (16).
10. Install transfer-to-forward rear axle propeller shaft (all except M36A2) (WP 0139 00).
11. Install intermediate propeller shaft (M36A2) (WP 0140 00).
12. Perform a parking brake operation test (TM 9-2320-361-10).
13. Adjust parking brakeshoe clearance (WP 0164 00).
14. Connect battery ground cable (WP 0126 00).
15. Remove wheel chocks (TM 9-2320-361-10).



**PARKING BRAKEDRUM REPLACEMENT (Contd)**



**END OF WORK PACKAGE**



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PARKING BRAKESHOE MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, INSTALLATION, AND CLEARANCE ADJUSTMENT

---

#### INITIAL SETUP:

**Applicable Models**

All

**References**

WP 0020 00

**Materials/Parts**

Two clips (item 13, WP 0470 00)  
Two clips (item 14, WP 0470 00)  
Lockwasher (item 195, WP 0470 00)  
Pin (item 307, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Wheels chocked (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## PARKING BRAKESHOE MAINTENANCE (Contd)

### REMOVAL

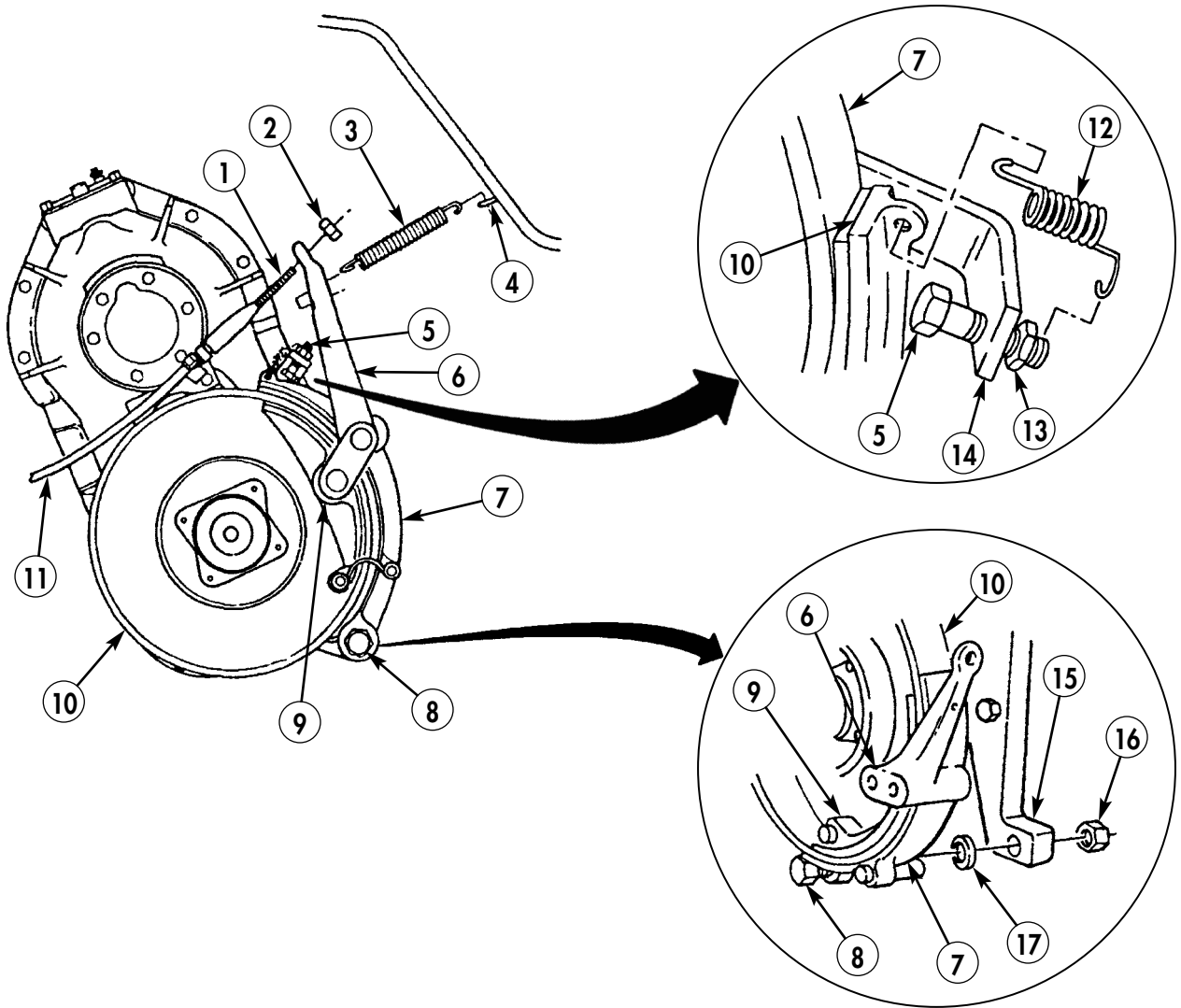
1. Remove spring (3) from lever (6) and bracket (4).

#### **NOTE**

Prior to removal, mark nut position on threaded end of parking brake cable for installation.

2. Remove nut (2) from threaded end (1) of parking brake cable (11) and slide parking brake cable (11) from eye of lever (6).
3. Remove spring (12) from outer brakeshoe (7) and screw (5).
4. Remove jamnut (13) and screw (5) from bracket (14).
5. Remove jamnut (16), screw (8), spacer (17), lever (6), inner brakeshoe (9), and outer brakeshoe (7) from parking brakedrum (10) and bracket (15).

PARKING BRAKESHOE MAINTENANCE (Contd)



## PARKING BRAKESHOE MAINTENANCE (Contd)

### DISASSEMBLY

1. Remove two clips (1), spring (6), and two washers (2) and (3) from pins (4) and (5). Discard clips (1).
2. Remove two clips (7) from pins (8) and (11). Discard clips (7).
3. Remove outer brakeshoe (9) from pin (8) and inner brakeshoe (10) from pin (11).
4. Remove nut (18), lockwasher (19), and cam pin (5) from outer shoe (9). Discard lockwasher (19).

#### **NOTE**

Perform step 5 only if lubrication fittings are damaged.

5. Remove three lubrication fittings (12) from outer shoe (9) and one lubrication fitting (12) and pin (4) from inner shoe (10). Discard pin (4).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

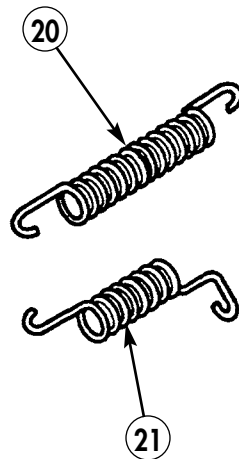
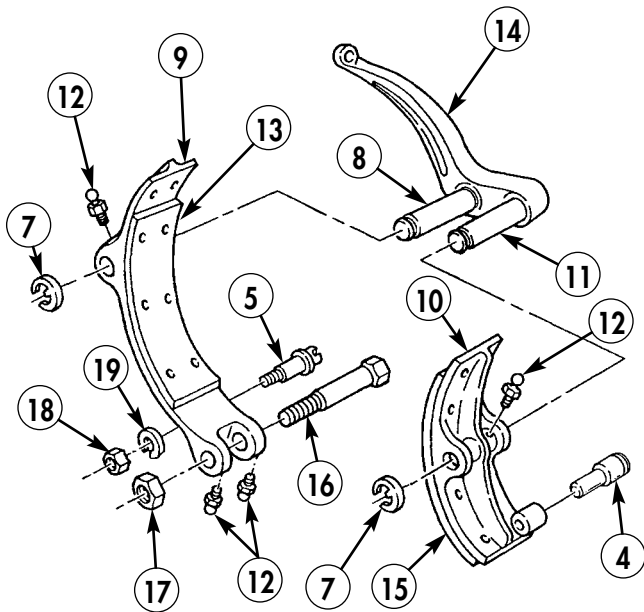
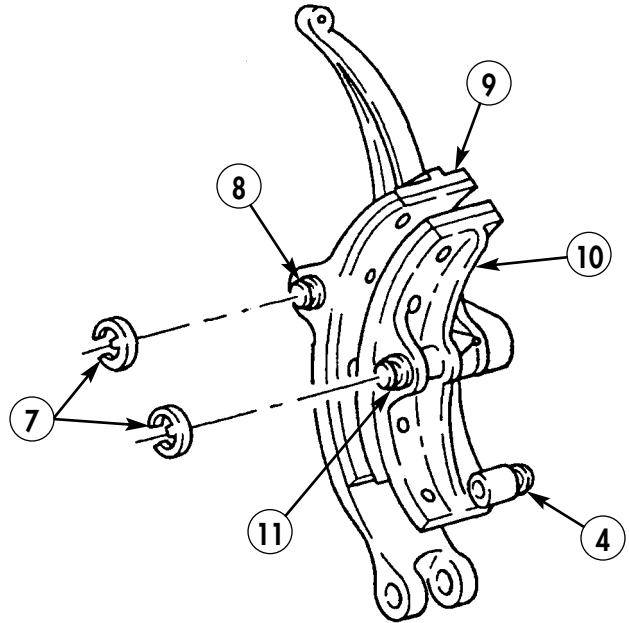
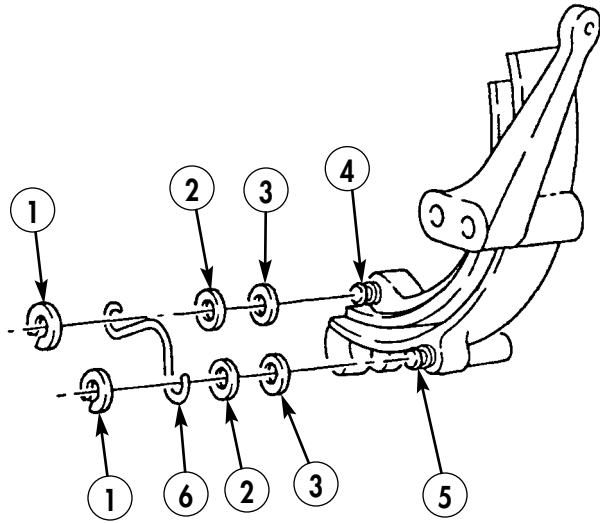
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

#### **CAUTION**

Do not saturate brakeshoe lining or brakedrum with Skysol 100.

1. Clean all parts with rag saturated with Skysol 100. Remove thick dirt and corrosion.
2. Measure the thickness of brake linings (13) and (15) at thinnest point. If thickness is 0.1875 in. (4.76 mm) or less, replace both brakeshoes (9) and (10).
3. Inspect brakeshoes (9) and (10) for broken linings (13) and (15), loose or missing rivets, cracks, or stripped threads. Replace both brakeshoes (9) and (10) if linings (13) and (15) are broken, rivets are loose or missing, brakeshoes (9) and (10) are cracked, or threads are stripped.
4. Inspect lever (14) for cracks, breaks, or loose pins (8) and (11). Replace if cracked, broken, or pins (8) or (11) are loose. Pins (8) and (11) must be perpendicular to lever (14). Clip grooves of pins (11) and (8) must be free of chips and burrs.
5. Slot in cam pin (5) must have square slot. If slot is damaged, replace pin (5).
6. Pin (4) must be tight in brakeshoe (11) and clip groove free of chips and burrs.
7. Inspect springs (20) and (21) for broken or distorted coils. If coils or hook ends are distorted or broken, replace.
8. Inspect jamnuts (17) and (18) for burred flats or stripped threads. Replace if flats are burred or threads are stripped.
9. Inspect screw (16) for breaks, cracks, and crossed or stripped threads. Replace if broken, cracked, or threads are crossed or stripped.
10. Inspect spring (6) for breaks or cracks. Replace if broken or cracked.

PARKING BRAKESHOE MAINTENANCE (Contd)



## PARKING BRAKESHOE MAINTENANCE (Contd)

### ASSEMBLY

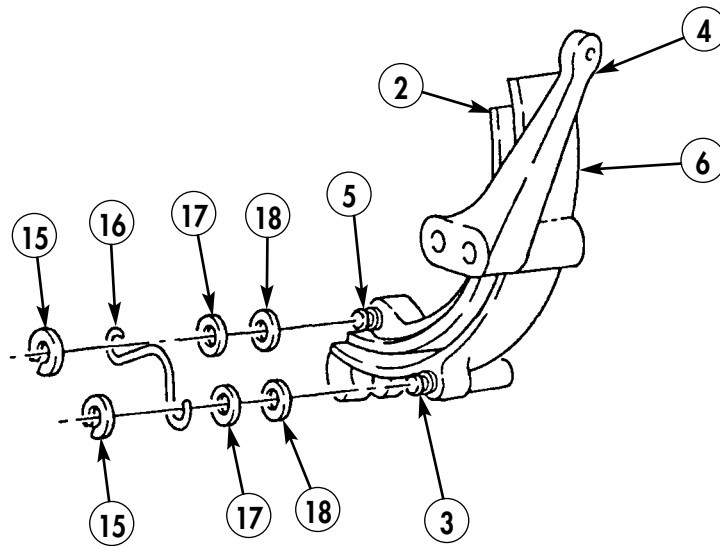
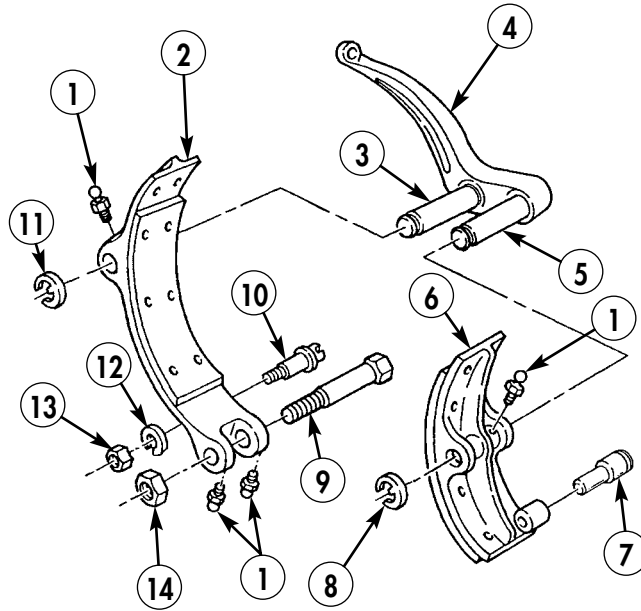
#### NOTE

Perform step 1 only if lubrication fittings were removed.

1. Install three lubrication fittings (1) into outer brakeshoe (2) and one lubrication fitting (1) and new pin (7) into inner brakeshoe (6).
2. Coat pin (5) with light film of GAA grease and install inner brakeshoe (6) on pin (5) with new clip (8).
3. Coat pin (3) with light film of GAA grease and install outer brakeshoe (2) on pin (3) with new clip (11).
4. Coat cam pin (10) with light film of GAA grease and install cam pin (10) in outer brakeshoe (2) with new lockwasher (12) and nut (13).
5. Install two washers (18) and (17) and spring (16) on pins (3) and (5) with two new clips (15). Position V of spring (16) towards lever (4). Turn cam pin (10) for maximum opening between brakeshoes (2) and (6).



PARKING BRAKESHOE MAINTENANCE (Contd)

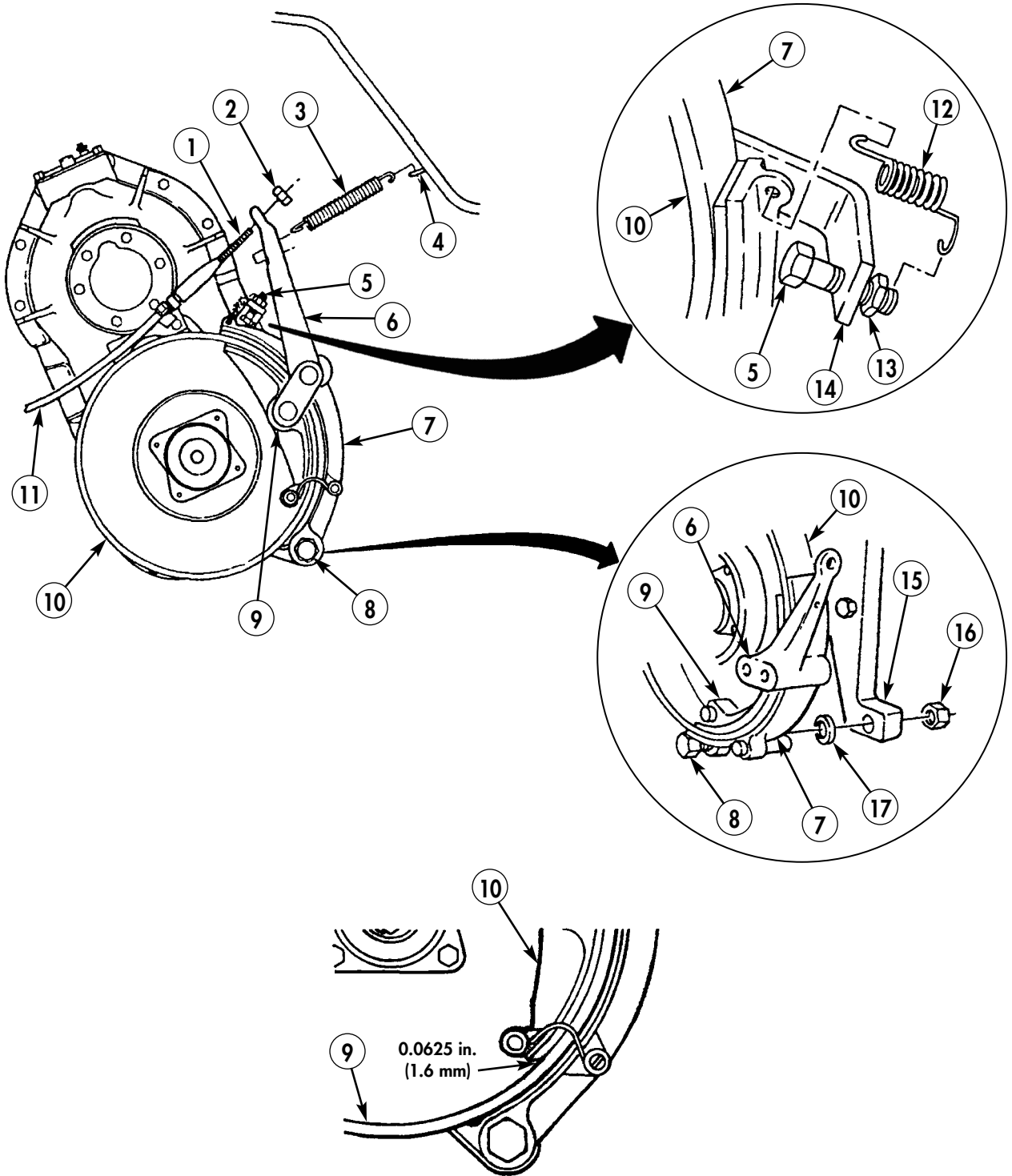


## **PARKING BRAKESHOE MAINTENANCE (Contd)**

### **INSTALLATION**

1. Install inner brakeshoe (9), outer brakeshoe (7), and lever (6) on brakedrum (10).
2. Install spacer(s) (17) and screw (8) on outer brakeshoe (7) and bracket (15) with jamnut (16) until measurement is 0.0625 in. (1.6 mm) between inside edge of brakedrum (10) and inner brakeshoe (9). Do not tighten jamnut (16).
3. Install adjustment screw (5) and jamnut (13) on bracket (14).
4. Install spring (12) on adjustment screw (5) and outer brakeshoe (7). Tighten jamnut (13).
5. Install threaded end (1) of brake cable (11) through eye of lever (6) and install nut (2) up to marked location on threaded end (1).
6. Install spring (3) on lever (6) and bracket (4).
7. Operate parking brake handle in cab several times ending in released position.
8. Make sure outer brakeshoe (7) and lever (6) rotate easily on screw (8) without side-to-side wobble. Tighten screw (8) as necessary to prevent wobble, and tighten jamnut (16).

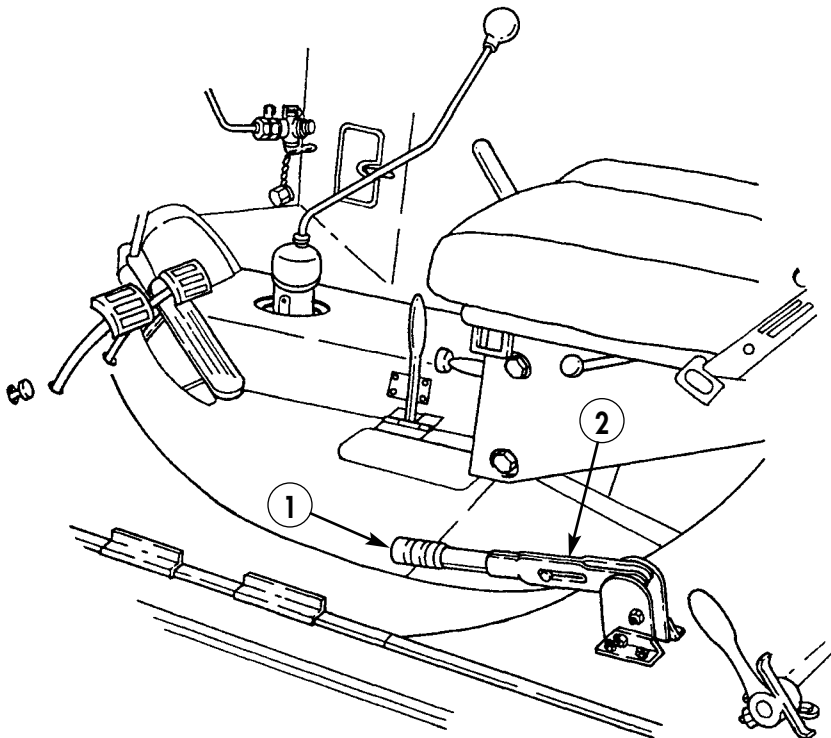
**PARKING BRAKESHOE MAINTENANCE (Contd)**



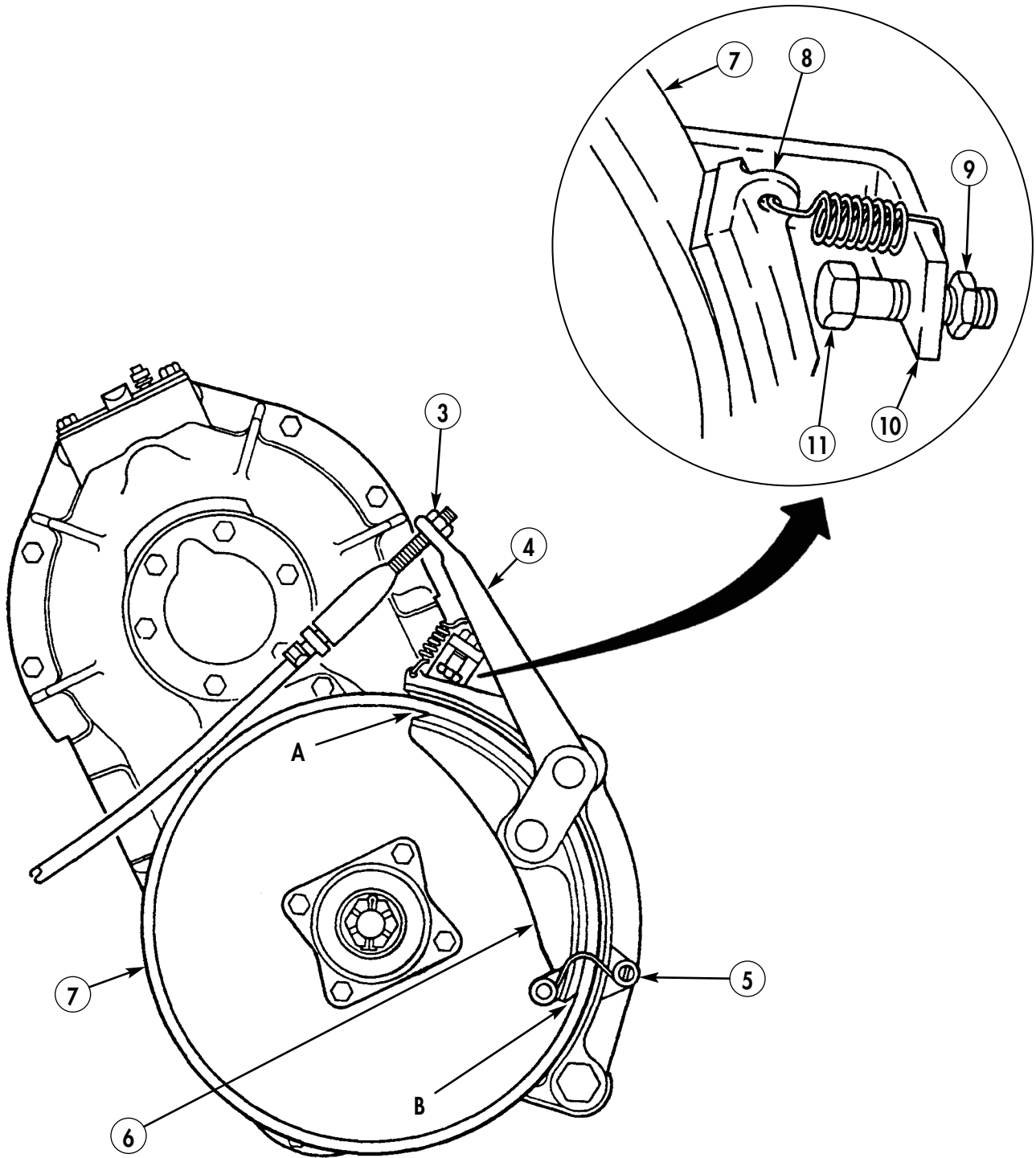
## PARKING BRAKESHOE MAINTENANCE (Contd)

### CLEARANCE ADJUSTMENT

1. Place parking brake lever (2) in release position. Turn adjustment knob (1) on parking brake lever (2) fully counterclockwise until knob (1) stops turning.
2. Turn screw (11) into or out of bracket (10) to set clearance of outer parking brakeshoe (8) 0.015 in. (.381 mm) from parking brakedrum (7). Check both ends of outer parking brakeshoe (8) for proper clearance.
3. Tighten nut (3) until it just contacts lever (4).
4. Hold slotted pin (5) and loosen nut on other end of pin (5).
5. Turn slotted pin (5) until there is 0.015 in. (0.381 mm) clearance between inner parking brakeshoe (6) lining and parking brakedrum (7) at both ends (A and B) at the same time.
6. Apply and release parking brake lever (2) twice. Stop in release position. Recheck clearances.
7. Repeat steps 2 through 6 as necessary to obtain 0.015 in. (0.381 mm) clearances.
8. Hold screw (11) and tighten jamnut (9) against bracket (10).
9. Tighten nut on end of slotted pin (5).
10. Lubricate parking brake (WP 0020 00).
11. Connect battery ground cable (WP 0126 00).
12. Remove wheel chocks (TM 9-2320-361-10).
13. Road test vehicle to test parking brake holding power (TM 9-2320-361-10).



PARKING BRAKESHOE MAINTENANCE (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PARKING BRAKE CABLE REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 214, WP 0470 00)

**Equipment Condition**

Wheels chocked (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Parking brake lever removed (WP 0166 00).

**References**

WP 0164 00

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## PARKING BRAKE CABLE (Contd)

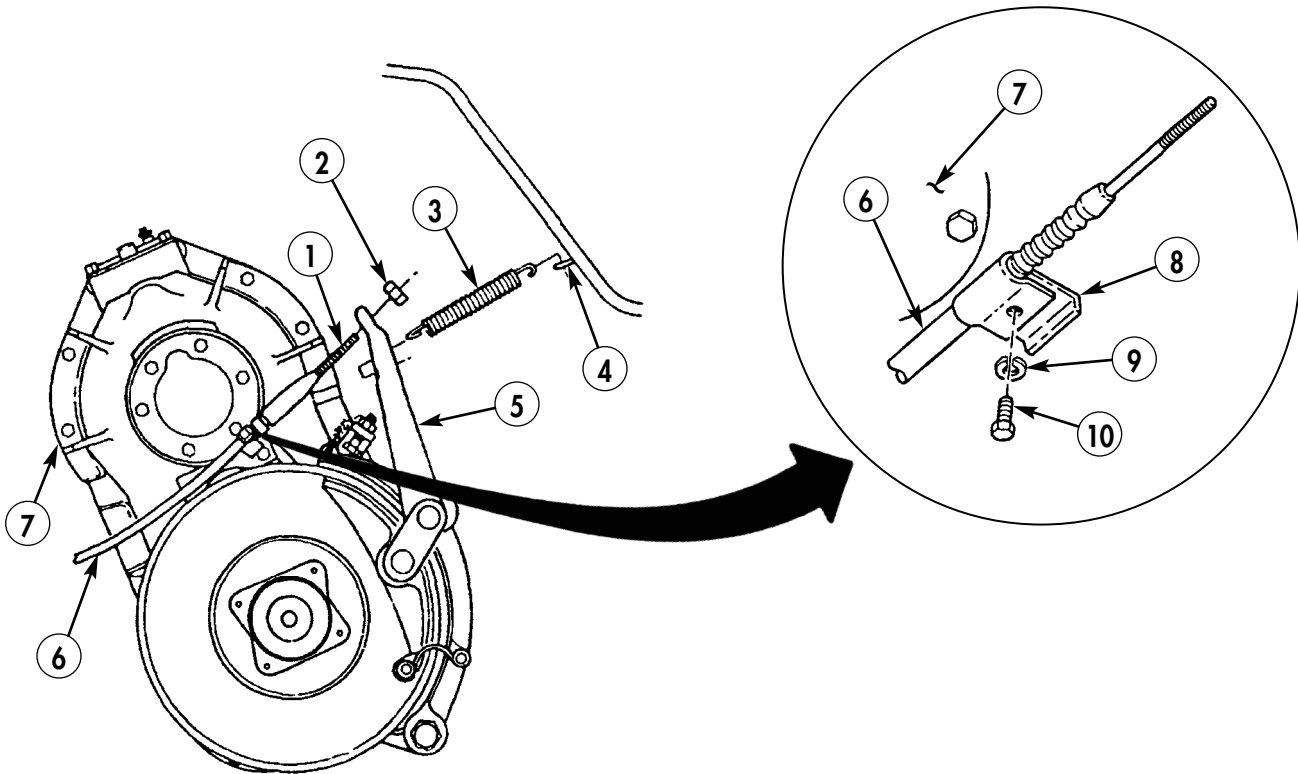
### REMOVAL

1. Remove spring (3) from lever (5) and bracket (4).

#### NOTE

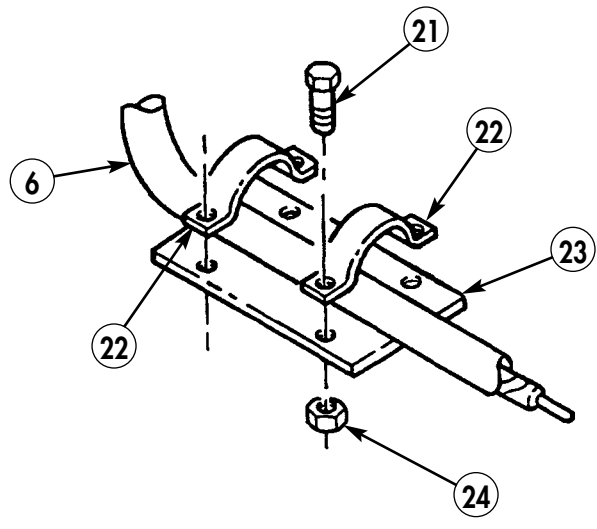
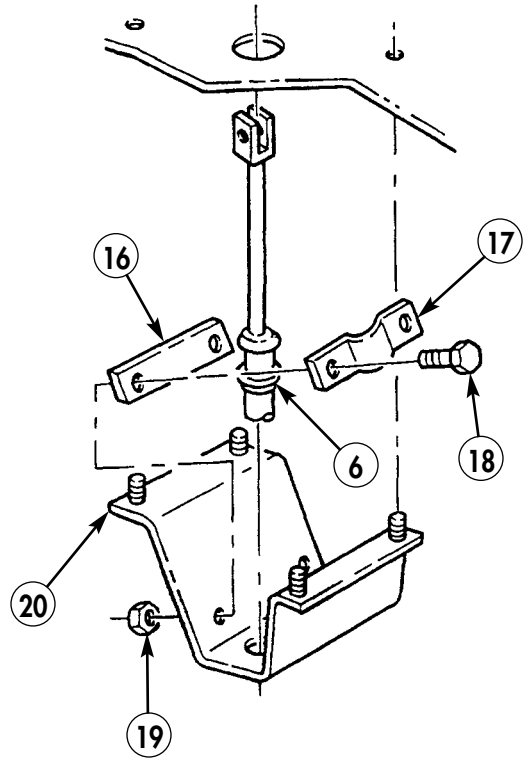
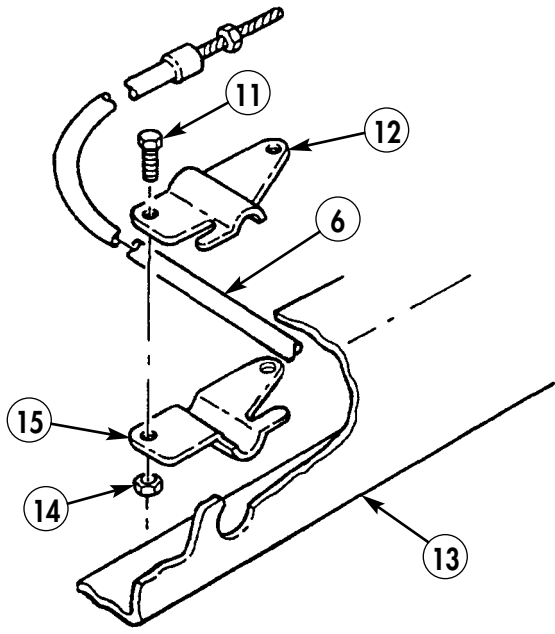
Prior to removal, mark nut position on threaded end of parking brake cable for installation.

2. Remove nut (2) from threaded end (1) of parking brake cable (6) and slide parking brake cable (6) from eye of lever (5).
3. Remove screw (10), lockwasher (9), and clamp (8) from parking brake cable (6) and transfer case (7). Discard lockwasher (9).
4. Remove two nuts (14), screws (11), upper clamp half (12), lower clamp half (15), and parking brake cable (6) from frame (13).
5. Remove two nuts (19), screws (18), clamp (17), spacer (16), and parking brake cable (6) from bracket (20).
6. Remove four nuts (24), screws (21), two clamps (22), and parking brake cable (6) from wear plate (23).





PARKING BRAKE CABLE (Contd)



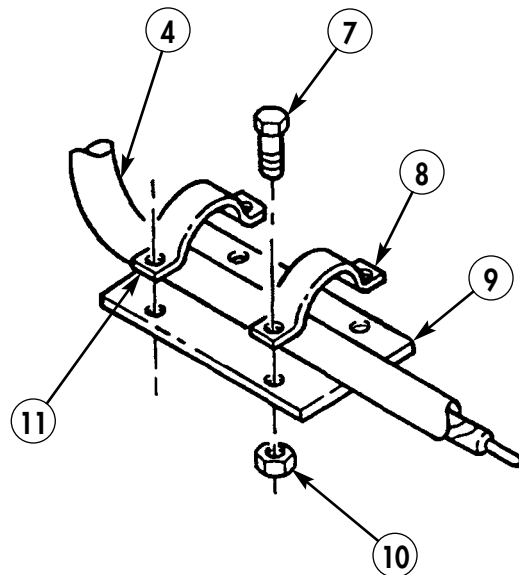
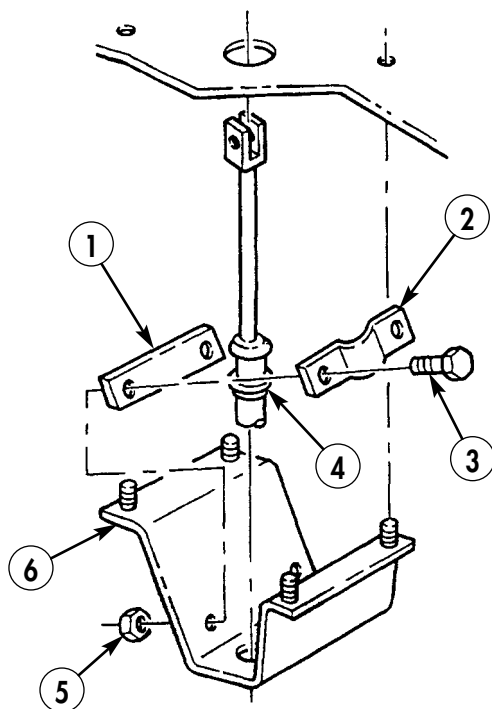
## PARKING BRAKE CABLE (Contd)

### INSTALLATION

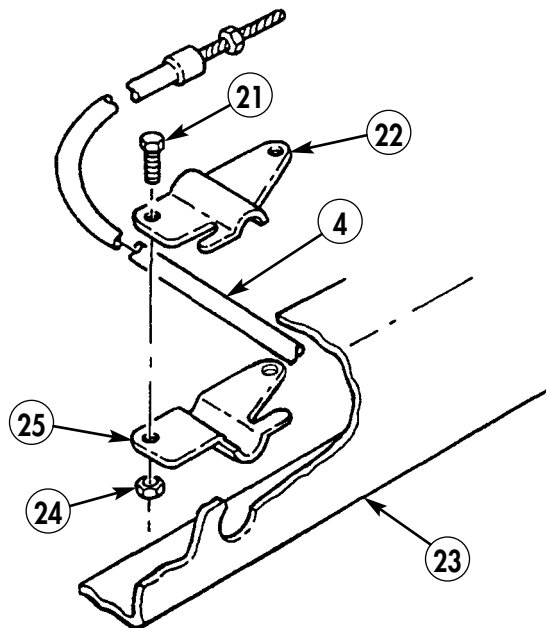
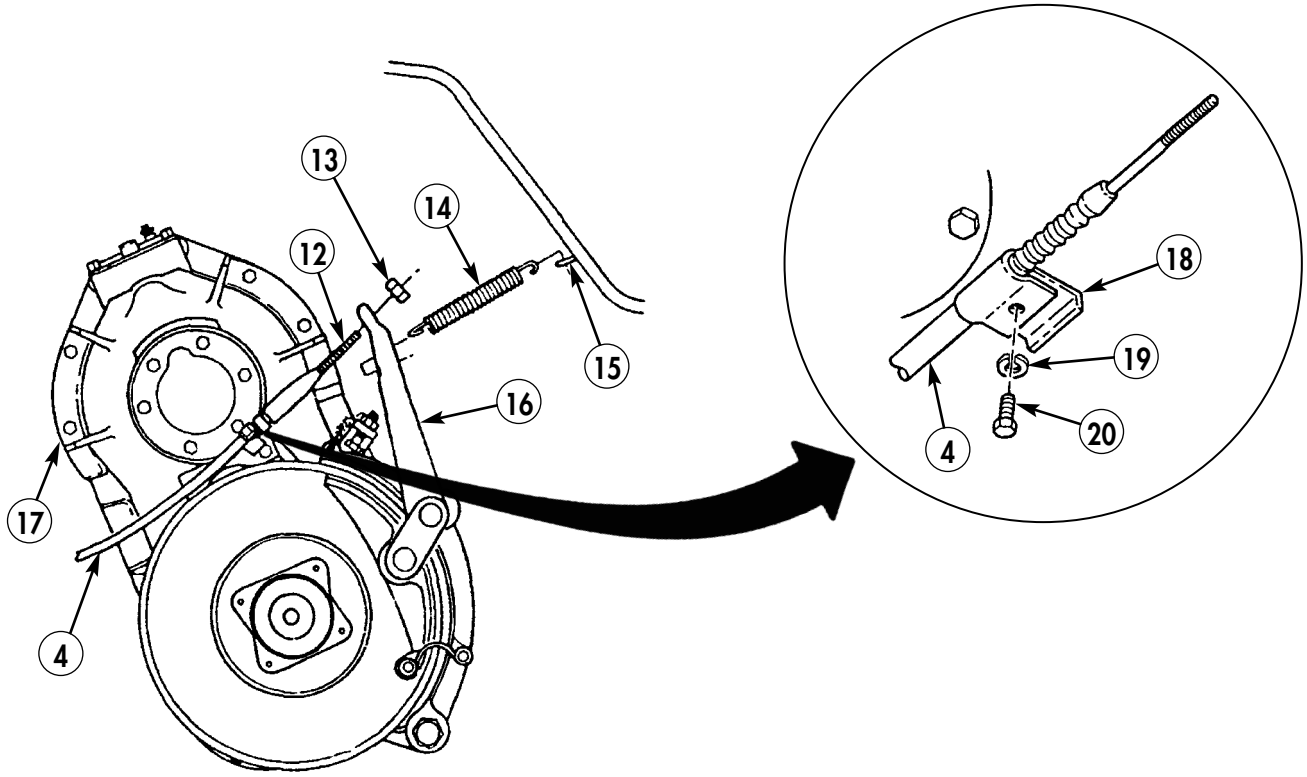
#### **CAUTION**

Be careful when installing parking brake cable to ensure there are no sharp bends or kinks.

1. Install parking brake cable (4) on bracket (6), with spacer (1) and clamp (2) on groove of parking brake cable (4), with two screws (3) and nuts (5).
2. Install wear plate (9) on parking brake cable (4), approximately 12 in. (30.5 cm) from bracket (6), with clamps (8) and (11), four screws (7), and nuts (10). Do not tighten nuts (10).
3. Install threaded end (12) of brake cable (4) through eye of lever (16), and install nut (13) up to marked location on threaded end (12).
4. Place clamp (18) on parking brake cable (4) and install clamp (18) on transfer case (17) with new lockwasher (19) and screw (20).
5. Install spring (14) on lever (16) and bracket (15).
6. Install parking brake cable (4) on frame (23) with upper clamp half (22), lower clamp half (25), two screws (21), and nuts (24).
7. Adjust position of wear plate (9) to protect parking brake cable (4) from rubbing on edge of toolbox. Tighten nuts (10).
8. Install parking brake lever (WP 0166 00).
9. Check brakeshoe clearance (WP 0164 00).
10. Check parking brake lever adjustment (TM 9-2320-361-10).
11. Connect battery ground cable (WP 0126 00).
12. Remove wheel chocks (TM 9-2320-361-10).



PARKING BRAKE CABLE (Contd)



END OF WORK PACKAGE

0165 00-5/6 blank



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### PARKING BRAKE LEVER REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Cotter pin (item 25, WP 0470 00)

**Equipment Condition**

Wheels chocked (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

---

## PARKING BRAKE LEVER REPLACEMENT (Contd)

### REMOVAL

1. Release parking brake if applied (refer to TM 9-2320-361-10).
2. Remove cotter pin (4), washer (3), and clevis pin (15) from cable clevis (12) and parking brake lever (1). Discard cotter pin (4).
3. Remove four nuts (6) and bracket (10) from cab floor (9) and two parking brake lever mounting brackets (7).

#### **NOTE**

Assistant will help with step 4.

4. Remove nut (11), screw (8), and parking lever (1) from cab floor (9).
5. Remove nut (5), screw (13) and spacer (2) from two parking brake lever mounting brackets (7).
6. Remove two nuts (14), screws (16), and parking brake lever mounting brackets (7) from parking lever (1).

### INSTALLATION

#### **NOTE**

Ensure parking brake lever adjusting knob is turned counterclockwise to lower link for installation.

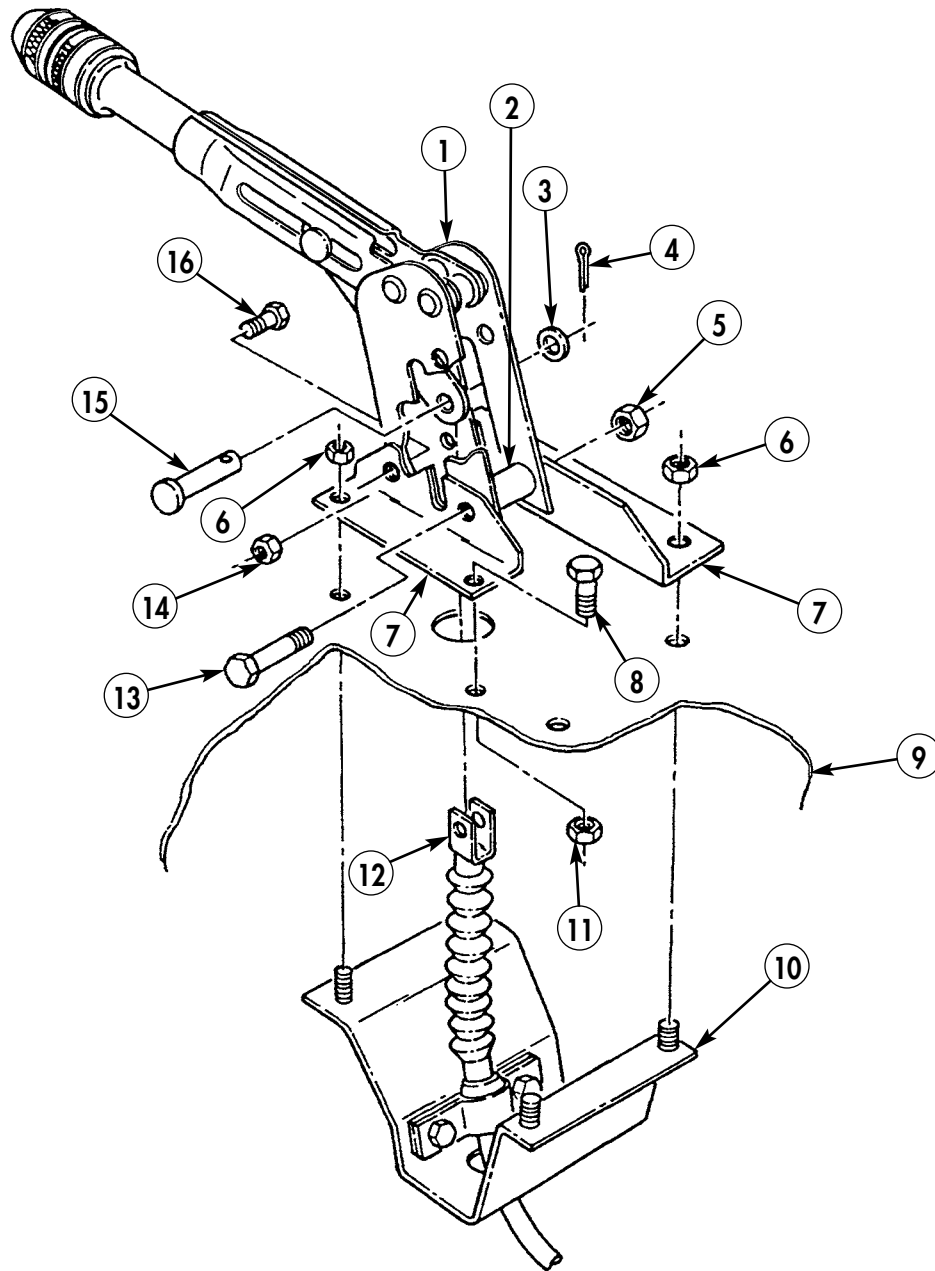
1. Install two parking brake lever mounting brackets (7) on parking brake lever (1) with two screws (16) and nuts (14). Do not tighten nuts (14).
2. Install spacer (2) and screw (13) between two parking brake lever mounting brackets (7) and parking brake lever (1) with nut (5). Tighten nuts (5) and (14) so parking brake lever (1) moves freely.

#### **NOTE**

Assistant will help with step 3.

3. Install parking brake lever (1) on cab floor (9) with screw (8) and nut (11).
4. Install bracket (10) on cab floor (9) and two parking brake lever mounting brackets (7) with four nuts (6).
5. Connect parking brake lever (1) to cable clevis (12) with clevis pin (15), washer (3), and new cotter pin (4).
6. Adjust parking brake lever (TM 9-2320-361-10).
7. Connect battery ground cable (WP 0126 00).
8. Remove wheel chocks (TM 9-2320-361-10).

PARKING BRAKE LEVER REPLACEMENT (Contd)



END OF WORK PACKAGE

0166 00-3/4 blank





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SERVICE BRAKESHOES MAINTENANCE

REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**References**

WP 0168 00

**Materials/Parts**

Service brakeshoe parts kit  
(item 301, WP 0470 00)  
Two slotted retainers (item 312, WP 0470 00)  
Grease (item 17, WP 0468 00)  
Rags (item 27, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front hubs and brakedrums removed  
(WP 0187 00).

**Personnel Required**

Two

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## SERVICE BRAKESHOES MAINTENANCE (Contd)

### **WARNING**

Do not use a dry brush or compressed air to clean brakeshoes. There may be asbestos dust on brakeshoes which can be dangerous to your health if you breathe it. (Brakeshoes must be wet, and soft bristle brush must be used.)

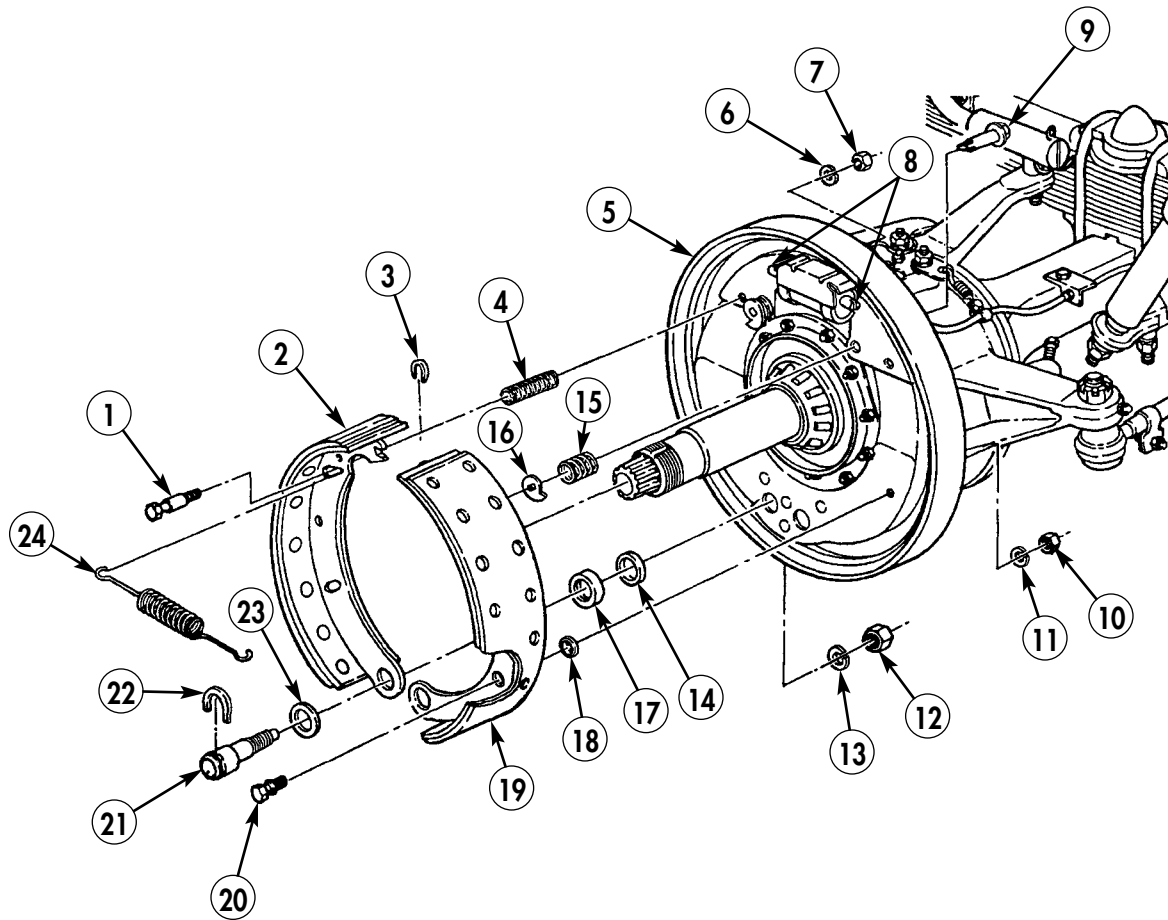
### **NOTE**

- The replacement procedure for front and rear service brakeshoes are done the same way. This procedure covers the front service brakes.
- If any brakeshoes are to be replaced, replace all brakeshoes on both ends of an axle.

## REMOVAL

1. Remove brakeshoe return spring (24) from brakeshoes (2) and (19).
2. Remove two nuts (7), washers (6), anti-rattle springs (4), washers (3), and upper (long) guide pins (1) from backing plate (5). Discard nuts (7), washers (6), and guide pins (1).
3. Remove two nuts (10), washers (11), lower (short) guide pins (20), and retainer washers (18) from backing plate (5). Discard nuts (10), washers (11), and guide pins (20).
4. Remove two slotted retainers (22) and washers (23) from two anchor pins (21). Discard slotted retainers (22).
5. Remove two brakeshoes (2) and (19), retainer washers (17), and felt washers (14) from anchor pins (21), backing plate (5), and wheel cylinder pushrods (8).
6. Remove two cams (16), springs (15), and adjusting pins (9) from backing plate (5).
7. Remove two nuts (12), washers (13), and anchor pins (21) from backing plate (5).

SERVICE BRAKESHOES MAINTENANCE (Contd)



## SERVICE BRAKESHOES MAINTENANCE (Contd)

### CLEANING AND INSPECTION

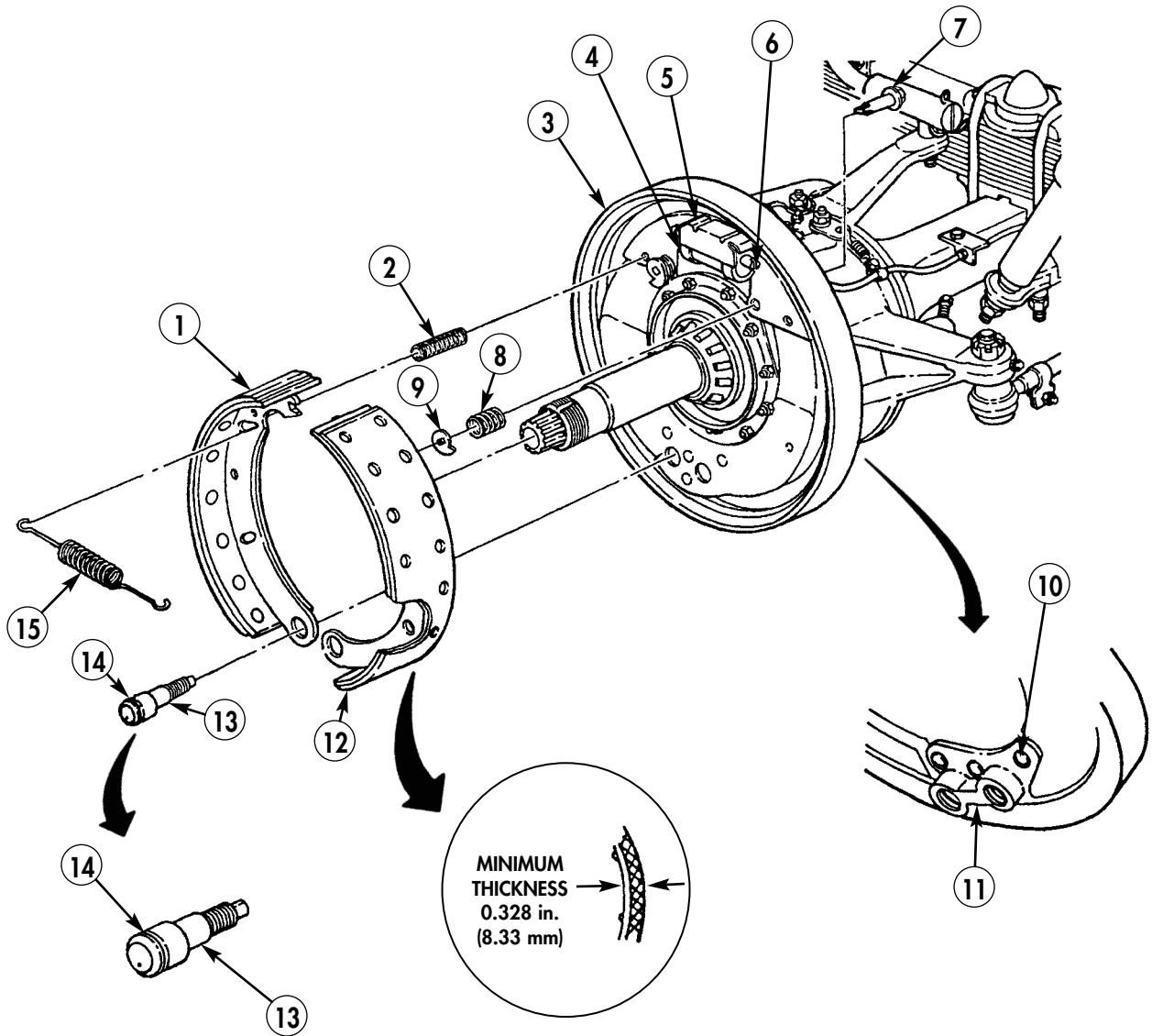
#### **WARNING**

- Eye protection is required when using wire brush for cleaning. Failure to do so may result in injury to personnel.
- Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Wash all parts, except brakeshoes (1) and (12), in Skysol 100 solvent and wipe dry with clean rag. Clean outer brakehoe side of backing plate (3) with rag saturated in Skysol 100 solvent and wipe dry.
2. Measure top, middle, and bottom thickness of brakeshoes (1) and (12). If minimum thickness is 0.328 in. (8.33 mm) or less, replace.
3. Inspect backing plate (3) for cracks, breaks, and elongated holes. If backing plate (3) is broken, cracked, or holes are elongated, replace. If rear axle backing plate (3) is damaged, replace rear axle housing.
4. Inspect anchor plate (11) for loose or missing rivets (10). If any rivets (10) are loose or missing, replace backing plate (3).
5. Inspect anchor pins (13) for cracks, looseness, and chipped or broken retaining clip slots (14). If anchor pins (13) are cracked, loose in backing plate (3), or retaining clip slots (14) are damaged, replace.
6. Inspect wheel cylinder (5) for cracks, leaks, torn boots (4), and bent or broken pushrods (6). If cracked, leaking, boots (4) are torn, or pushrods (6) are bent or broken, replace wheel cylinder (5).
7. Inspect cams (9), springs (8), and adjusting pins (7) for cracks, bends, or breaks. If cracked, bent, or broken, replace.
8. Inspect return spring (15) and anti-rattle springs (2) for breaks, bends, or distorted coils. If broken, bent, or coils are distorted, replace.

SERVICE BRAKESHOES MAINTENANCE (Contd)



## SERVICE BRAKESHOES MAINTENANCE (Contd)

### INSTALLATION

1. Mark ends of new or old anchor pins (23) with center punch indicating highest cam lobe position.
2. Apply light coat of grease on backing plate (5) where brakeshoes (2) and (19) may rub.

#### NOTE

- Perform steps 3 and 4 if anchor pins and cams have been removed.
- Final tightening of cam nuts and anchor pin nuts is done in brakeshoe adjustment.

3. Install felt washers (14), retainer washers (17), and anchor pins (23) on backing plate (5) with two washers (13) and nuts (12). Do not tighten nuts (12).
4. Install two adjusting pins (9), springs (15), and cams (16) on backing plate (5). Peen ends of two adjusting pins (9) securely against cams (16) to hold in place.
5. Turn anchor pins (23) so that center punch marks (21) are close together.
6. Set cam (16) so that tip points down.

#### NOTE

Brakeshoes must be a matched set on both ends of axle.

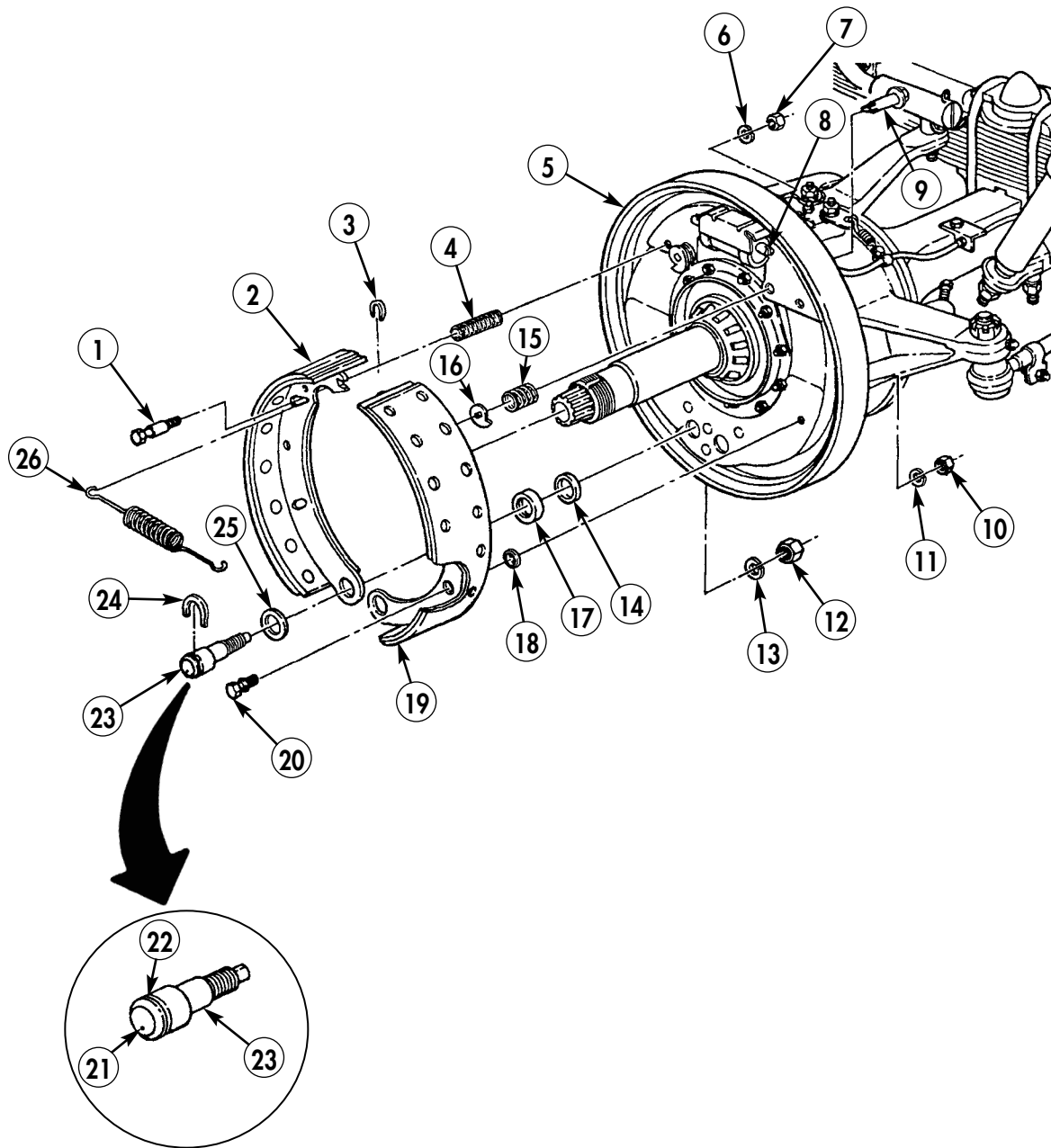
7. Install two brakeshoes (2) and (19) on anchor pins (23) against wheel cylinder pushrods (8) and against backing plate (5) with two retainer washers (18), new lower (short) guide pins (20), washers (11), and nuts (10).
8. Install two anti-rattle springs (4) and washers (3) between two brakeshoes (2) and (19) and backing plate (5) with two upper (long) guide pins (1), washers (6), and nuts (7).
9. Tighten upper guide pin nuts (7) 19–24 lb-ft (26–33 N•m) and lower guide pin nuts (10) 11–16 lb-ft (15–22 N•m).
10. Install two retainer washers (25) and new retaining clips (24) on anchor pins (23). Squeeze retaining clips (24) into slots (22) of anchor pins (23).

#### NOTE

Ensure brakeshoes are still positioned against wheel cylinder pushrods after brakeshoe return spring is installed.

11. Install brakeshoe return spring (26) on two brakeshoes (2) and (19).
12. Replace hub and brakedrums (WP 0187 00).
13. Perform service brake adjustment (WP 0168 00).
14. Connect battery ground cable (WP 0126 00).
15. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

SERVICE BRAKESHOES MAINTENANCE (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SERVICE BRAKE ADJUSTMENT

#### ADJUSTMENT

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 195, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Front or rear wheels removed (WP 0186 00).  
Adjust wheel bearing (WP 0189 00).

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## SERVICE BRAKE ADJUSTMENT (Contd)

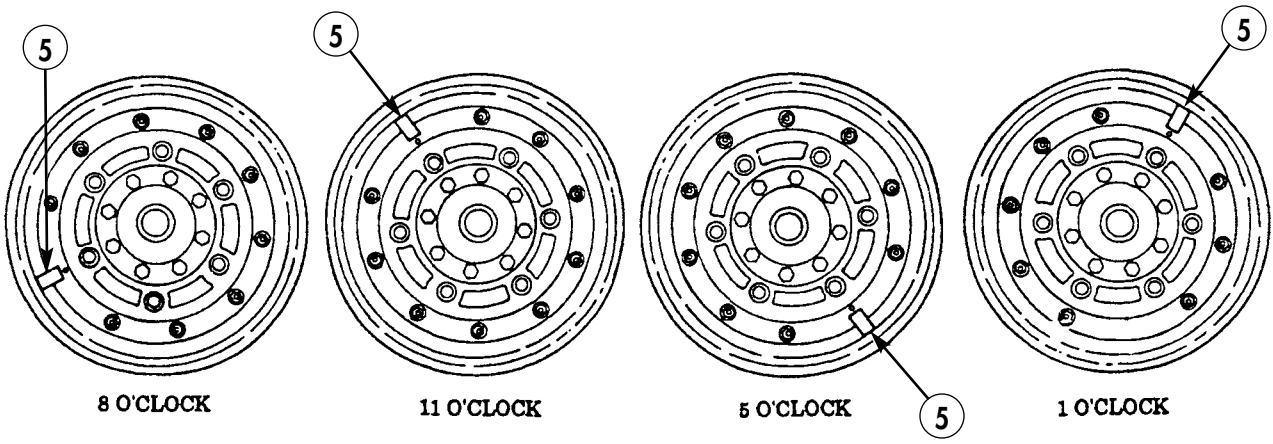
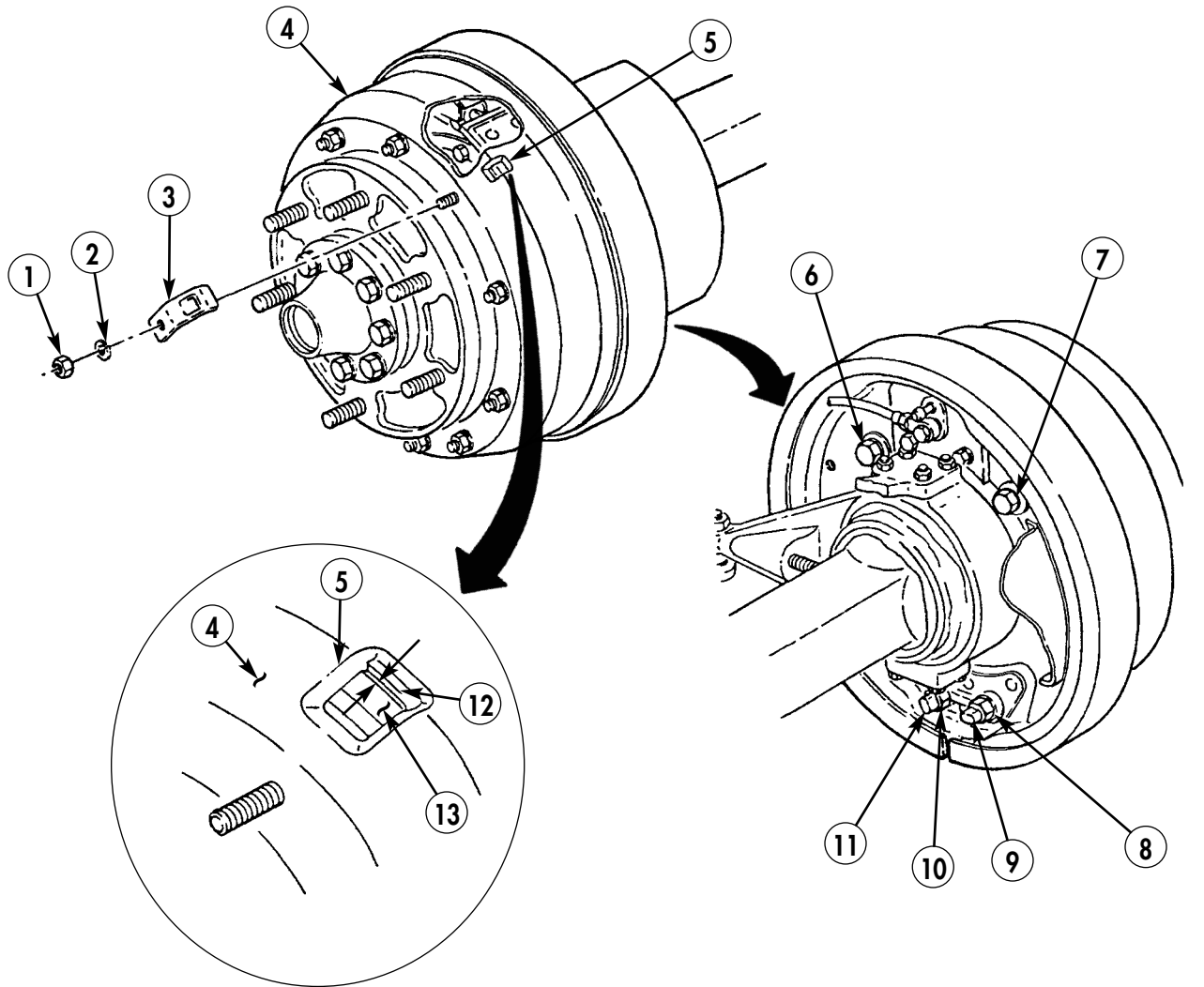
### NOTE

- The adjustment procedure for front and rear brakes is done the same way.
- This procedure covers the front brakes. Allow brakes to cool before adjusting.

### SERVICE BRAKE ADJUSTMENT

1. Remove nut (1), lockwasher (2), and inspection slot cover (3) from brakedrum (4). Discard lockwasher (2).
2. Turn brakedrum (4) to position inspection slot (5) at 8 o'clock location.
3. Loosen jamnut (8) on anchor pin (9) one full turn.
4. Turn anchor pin (9) clockwise or counterclockwise until gap between brakeshoe lining (13) and inner brakedrum surface (12) measures 0.010 in. (0.25 mm). Tighten jamnut (8) on anchor pin (9) 80–110 lb-ft (109–149 N•m).
5. Turn brakedrum (4) to position inspection slot (5) at 11 o'clock location.
6. Turn cam stud (7) clockwise until gap between brakeshoe lining (13) and inner brakedrum surface (12) measures 0.020 in. (0.50 mm).
7. Turn brakedrum (4) to position inspection slot (5) at 5 o'clock location.
8. Loosen jamnut (10) on anchor pin (11) one full turn.
9. Turn anchor pin (11) clockwise or counterclockwise until gap between brakeshoe lining (13) and inner brakedrum surface (12) measures 0.010 in. (.25 mm). Tighten jamnut (10) on anchor pin (11) 80–110 lb-ft (109–149 N•m).
10. Turn brakedrum (4) to position inspection slot (5) at 1 o'clock location.
11. Turn cam stud (6) counterclockwise until gap between brakeshoe lining (13) and inner brakedrum surface (12) measures .020 in. (.50 mm).
12. Install inspection slot cover (3) on brakedrum (4) with new lockwasher (2) and nut (1).
13. Turn brakedrum (4) by hand and turn cam stud (6) counterclockwise until brakedrum (4) drags. Loosen cam stud (6) until brakedrum (4) slightly drags.
14. Turn brakedrum (4) by hand and turn cam stud (7) clockwise until brakedrum (4) drags. Loosen cam stud (7) until brakedrum (4) slightly drags.
15. Perform steps 1 through 14 to do service adjustment of other wheel on axle.
16. Install front or rear wheels (WP 0186 00).
17. Connect battery ground cable (WP 0126 00).
18. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

SERVICE BRAKE ADJUSTMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HYDRAULIC WHEEL CYLINDER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 195, WP 0470 00)  
Washer (item 373, WP 0470 00)  
Washer (item 376, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

**References**

WP 0172 00  
WP 0168 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Front or rear hubs and drums removed  
(WP 0187 00 or WP 0188 00).

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## HYDRAULIC WHEEL CYLINDER REPLACEMENT (Contd)

### REMOVAL

#### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

#### **CAUTION**

Cover or plug all hoses, connections, and openings immediately after disconnecting or removing a component to prevent contamination. Remove all plugs prior to component installation. Failure to comply may result in equipment damage.

#### **NOTE**

Front and rear wheel cylinders are replaced the same way. This procedure covers the left front.

1. Remove brakeshoe return spring (10) from two brakeshoes (8) and (14).

#### **NOTE**

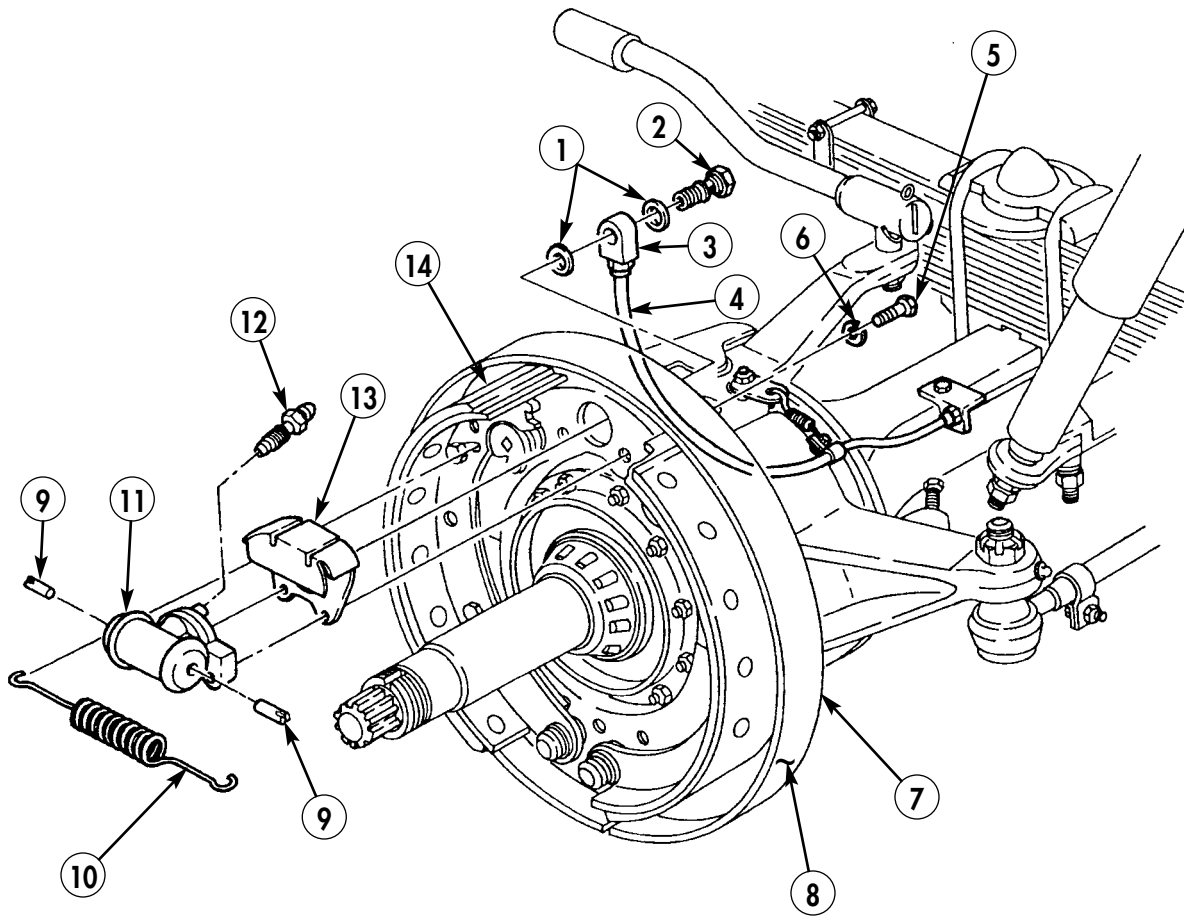
Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

2. Remove brake line screw (2), two washers (1), and hose connector (3) from wheel cylinder (11). Discard two washers (1).
3. Remove hose connector (3) from brake line (4) and discard.
4. Remove two screws (5) and lockwashers (6) from backing plate (7) and wheel cylinder (11). Discard lockwashers (6).
5. Slide brakeshoes (8) and (14) off slotted pushrods (9) and remove wheel cylinder (11) and dust shield (13) from backing plate (7).

### INSTALLATION

1. Install dust shield (13) and wheel cylinder (11) on backing plate (7) with slotted pushrods (9) placed in brakeshoes (8) and (14) slots.
2. Install two new lockwashers (6) and screws (5) into wheel cylinder (11) and backing plate (7). Tighten screws (4) 27–35 lb-ft (37–48 N•m).
3. Install new hose connector (3) to brake line (4) and tighten.
4. Install hose connector (3) to wheel cylinder (11) with two washers (1) and brake line screw (2). Tighten screw (2) 65 lb-ft (88 N•m).
5. Install brakeshoe return spring (10) on two brakeshoes (8) and (14).
6. Install front or rear hubs and drums (WP 0187 00 or WP 0188 00).
7. Bleed service brakes (WP 0172 00).
8. Adjust service brakes (WP 0168 00).
9. Connect battery ground cable (WP 0126 00).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### HYDRAULIC WHEEL CYLINDER REPLACEMENT (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HYDRAULIC MASTER CYLINDER MAINTENANCE INTERNAL LEAKAGE TEST, REMOVAL, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Cotter pin (item 28, WP 0470 00)  
Four bolt-assembled lockwashers  
(item 3, WP 0470 00)  
Screw assembled lockwasher  
(item 256, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)  
Cap and plug set (item 10, WP 0468 00)  
Brake fluid (item 9, WP 0468 00)

**References**

WP 0020 00  
WP 0172 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Adjust brake pedal (WP 0174 00).

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## HYDRAULIC MASTER CYLINDER MAINTENANCE (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage. Remove caps and plugs prior to installation.

### INTERNAL LEAKAGE TEST

1. Remove screw-assembled lockwasher (6) from brace (2) and open access door (1). Discard screw assembled lockwasher (6).
2. Disconnect line (3) from adapter (5).
3. Remove two screws (8) and shield (9) from air-hydraulic cylinder (7).

### **NOTE**

Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

4. Remove line (10) from adapter (11) and adapter (12).

### **NOTE**

Have plug ready to replace adapter before removing adapter.

5. Remove adapter (11) from master cylinder (4) and quickly install plug (13).
6. Make sure master cylinder reservoir (4) is filled with brake fluid 0.5 in. (12.7 mm) from top. Refer to WP 0020 00.

### **NOTE**

Assistant will help with steps 7 and 8.

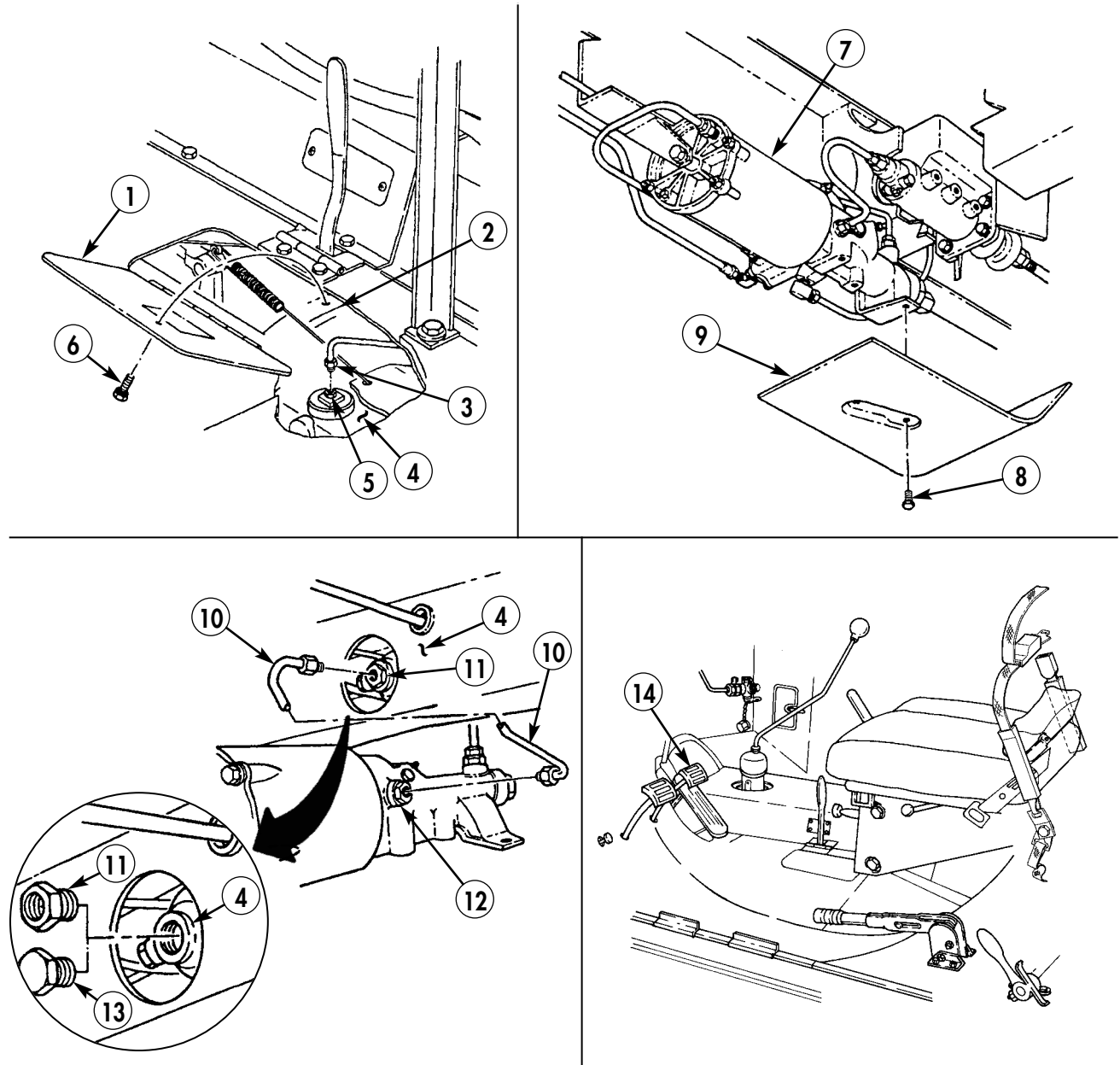
7. Measuring distance alongside of brake pedal (14), step down slowly but firmly on brake pedal (14). Maintain steady firm pressure for 30 seconds.
8. Brake pedal (14) should not move more than 0.125–0.25 in. (3.18–6.35 mm).
9. If brake pedal (14) moves more than 0.125–0.25 in. (3.18–6.35 mm) in 30 seconds, there is an internal leak. Replace master cylinder (4).

### **NOTE**

Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

10. Remove plug (13) and install adapter (11) in master cylinder (4).
11. Install line (10) on adapter (11) and adapter (12).
12. Install shield (9) on air-hydraulic cylinder (7) with two screws (8).
13. Fill master cylinder reservoir (4) 0.5 in. (12.7 mm) from top (WP 0020 00).
14. Connect line (3) on adapter (5).
15. Close access door (1) and secure to brace (2) with new screw-assembled lockwasher (6).

HYDRAULIC MASTER CYLINDER MAINTENANCE (Contd)



## HYDRAULIC MASTER CYLINDER MAINTENANCE (Contd)

### **CAUTION**

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage. Remove plugs prior to installation.

### **REMOVAL**

1. Remove screw-assembled lockwasher (6) from brace (2) and open access door (1).
2. Disconnect line (4) from adapter (5).
3. Remove two screws (8) and shield (9) from air-hydraulic cylinder (7).
4. Remove two screws (10) from bracket (20) and master cylinder (3). Push bracket (20) away from master cylinder (3).
5. Remove spring (14) from clevis pin (11) and bracket (13).
6. Remove cotter pin (15) from clevis pin (11). Discard cotter pin (15).

### **NOTE**

Brake pedal must be supported in full extended position for ease when installing master cylinder.

7. Scribe or measure position of jamnut (17).
8. Loosen jamnut (17) and remove clevis pin (11) and yoke (16) from brake pedal lever (12).
9. Remove pushrod (18) and boot (19) from master cylinder (3).

### **NOTE**

Have drainage container ready to catch brake fluid.

10. Remove line (21) from adapters (22) and (23).
11. Remove four bolt-assembled lockwashers (24) and master cylinder (3) from bracket (26). Discard bolt-assembled lockwashers (24).
12. Remove adapter (22) and adapter (5) from master cylinder (3).

### **INSTALLATION**

### **NOTE**

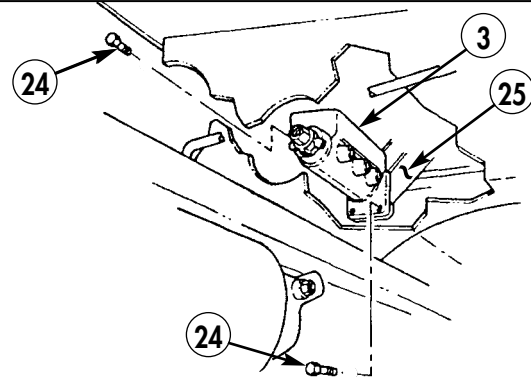
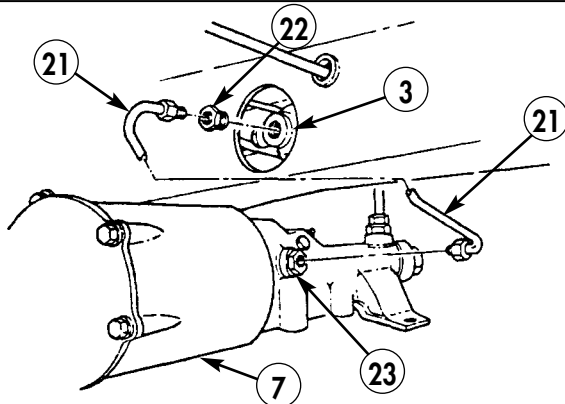
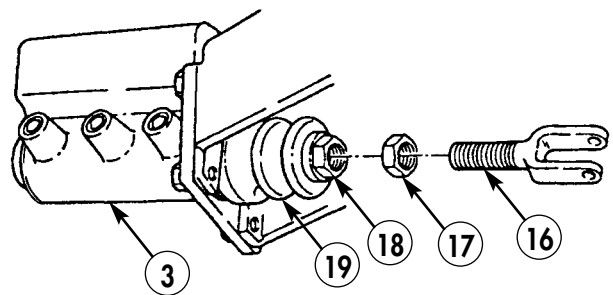
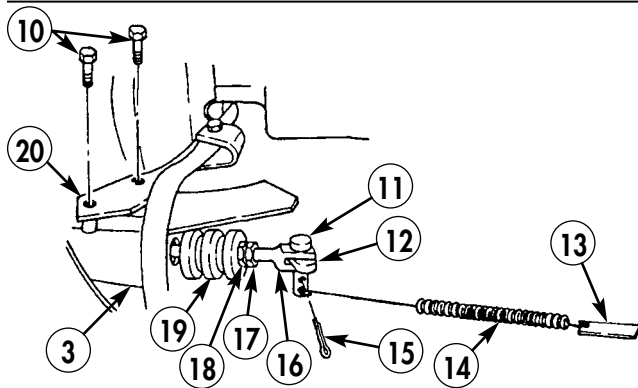
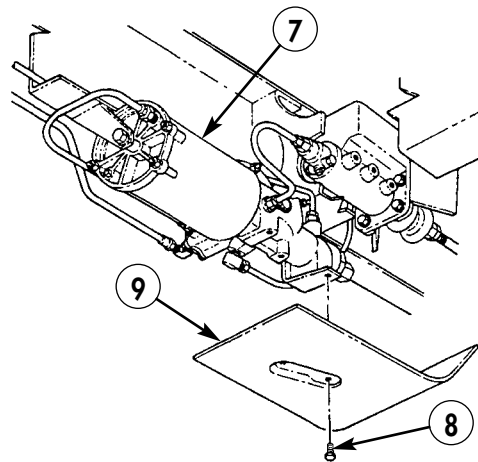
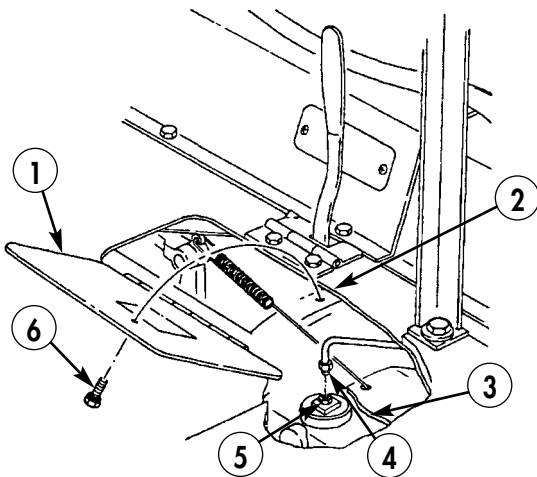
- All male pipe threads must be wrapped with antiseize tape before installation.
- Remove all plugs that were installed during the removal procedure and from the left or right side of the master cylinder, so that the master cylinder will fit through the access hole in the frame cross member.

1. Install adapter (22) and adapter (5) on master cylinder (3).
2. Install master cylinder (3) on bracket (25) with four new lockwashers (25) and bolt assembled lockwashers (24).
3. Install line (21) on adapters (22) and (23).
4. Install boot (19) and pushrod (18) on master cylinder (3).
5. Install yoke (16) on pushrod (18) to measured distance or scribed mark, ensure yoke (16) forked end aligns with brake pedal lever (12).
6. Tighten jamnut (17) on pushrod (18).
7. Align brake pedal lever (12) with yoke (16) holes and install with clevis pin (11) and new cotter pin (15).
8. Install spring (14) on clevis pin (11) and bracket (13).

## HYDRAULIC MASTER CYLINDER MAINTENANCE (Contd)

### INSTALLATION (Contd)

9. Install bracket (20) on master cylinder (3) with two screws (10).
10. Install shield (9) on air-hydraulic cylinder (7) with two screws (8).
11. Fill master cylinder (3) 0.5 in. (12.7 mm) from top (WP 0020 00).
12. Connect line (4) on adapter (5).
13. Close and secure access door (1) on brace (2) with new screw-assembled lockwasher (6).
14. Bleed service brake (WP 0172 00).
15. Connect battery ground cable (WP 0126 00).
16. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR-HYDRAULIC CYLINDER REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two gaskets (item 79, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)  
Cap and plug set (item 10, WP 0468 00)

**References**

WP 0020 00  
WP 0172 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air system drained (TM 9-2320-361-10).

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## AIR-HYDRAULIC CYLINDER REPLACEMENT (Contd)

### **WARNING**

- Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

When disconnecting hydraulic lines and hoses, plug all openings to prevent dirt from entering and causing internal parts damage. Remove plugs prior to installation.

### **NOTE**

Prior to removal, tag all air and hydraulic lines for installation.

## REMOVAL

### **NOTE**

Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

1. Remove two screws (10) and shield (11) from air-hydraulic cylinder (2).
2. Remove master cylinder hydraulic line (5) and gasket (3) from adapter (4). Discard gasket (3).
3. Loosen nut (6) and turn master cylinder hydraulic line (5) out of the way.
4. Disconnect hydraulic pressure line (7) from adapter (8).
5. Remove vent line (12) and gasket (13) from elbow (14). Discard gasket (13).
6. Disconnect trailer air line (21) from elbow (22).
7. Disconnect air supply line (16) from elbow (15).
8. Disconnect connector (20) from stoplight switch (19).
9. Remove screw (1) and air-hydraulic cylinder (2) from brackets (9) and (17).
10. Remove stoplight switch (19) from tee adapter (18).
11. Remove elbows (14), (15), and (22) and adapters (4) and (8) from air-hydraulic cylinder (2).
12. Remove, tag, clean, and inspect all adapters and elbows from air-hydraulic cylinder (2). Inspect for cracks, breaks, or stripped threads. If damaged, discard.

## INSTALLATION

### **NOTE**

All male pipe threads must be wrapped with antiseize tape prior to installation.

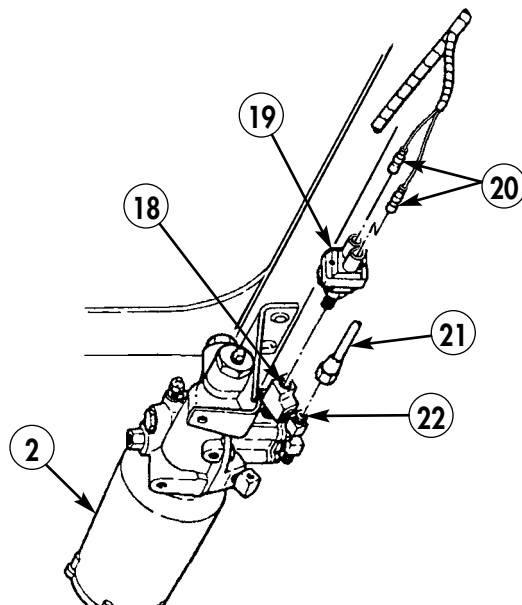
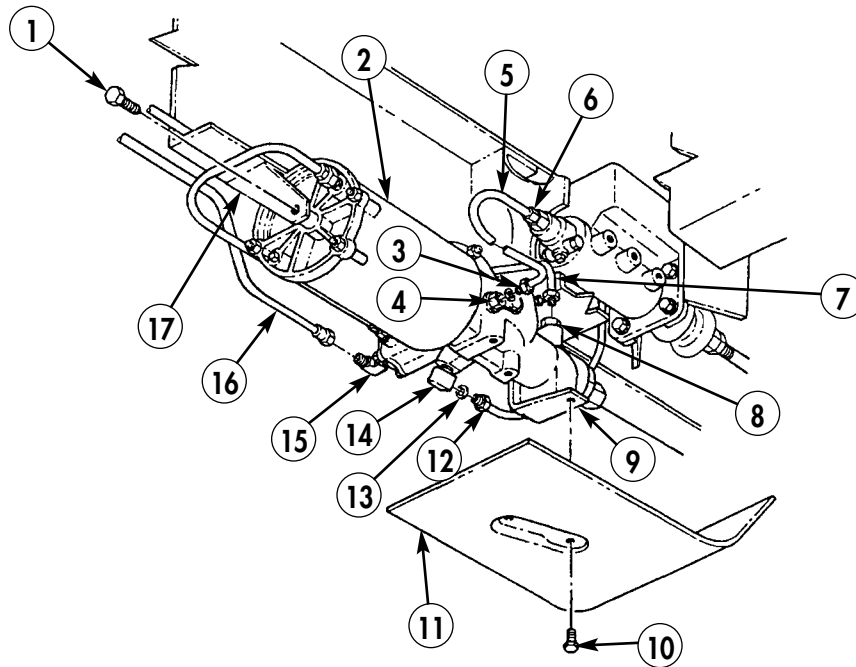
1. Install elbows (14), (15), and (22) and adapters (4) and (8) on air-hydraulic cylinder (2).
2. Install stoplight switch (19) on tee adapter (18).
3. Install air-hydraulic cylinder (2) on brackets (17) and (9) with screw (1).
4. Connect connectors (20) to stoplight switch (19).
5. Connect air supply line (16) to elbow (15).
6. Connect trailer air line (21) to elbow (22).
7. Install new gasket (13) and connect vent line (12) to elbow (14).
8. Connect hydraulic pressure line (7) to adapter (8).



## AIR-HYDRAULIC CYLINDER REPLACEMENT (Contd)

### INSTALLATION (Contd)

9. Install new gasket (3) and master cylinder hydraulic line (5) to adapter (4).
10. Tighten nut (6).
11. Install shield (11) on air-hydraulic cylinder (2) with two screws (10).
12. Fill master cylinder (WP 0020 00).
13. Bleed service brake (WP 0172 00).
14. Connect battery ground cable (WP 0126 00).
15. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### SERVICE BRAKE BLEEDING

#### PRESSURE TANK METHOD AND MANUAL METHOD

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##### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Screw-assembled lockwasher  
(item 256, WP 0470 00)

Brake fluid (item 9, WP 0468 00)

Rags (item 27, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Master cylinder filled (WP 0020 00).

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## SERVICE BRAKE BLEEDING (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

Do not reuse brake fluid. Reusing brake fluid may result in damage to equipment.

### **NOTE**

Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

## PRESSURE TANK METHOD

1. Remove screw-assembled lockwasher (7) from brace (2) and open access door (1) exposing top of master cylinder (6). Discard screw-assembled lockwasher (7).
2. Disconnect vent line (3) from adapter (4).
3. Clean top of master cylinder (6) and remove filler plug (5).
4. Fill master cylinder (6) with fresh brake fluid to 1/2 in. (1.27 cm) from top.
5. Install adapter plug (9) and male quick-disconnect coupling (8) on master cylinder (6).
6. Ensure brake bleeder tank (10) is charged with brake fluid and is pressurized to 20–25 psi (138–172 kPa). Follow manufacturer instructions for purging and preparation before connecting to brake system. Turn flow valve (13) off on tank hose (11), if so equipped.
7. Connect female quick-disconnect coupling (12) to male quick-disconnect coupling (8).
8. Turn flow valve (13) on, if so equipped.
9. Check for leaks and correct as necessary.

### **CAUTION**

Always bleed air-hydraulic cylinder before bleeding downstream hydraulic components. Failure to do so may result in damage to equipment.

10. Clean around bleeder screw (19) located on top front of air-hydraulic cylinder (18).
11. Fill transparent container (17) 1/3 to 1/2 full of brake fluid.
12. Install flexible snug-fitting hose (16) on bleeder screw (19) and immerse other end of hose (15) in transparent container (17). Keep hose (16) end under surface of brake fluid at all times.
13. Loosen bleeder screw (19) 3/4 turn until brake fluid is flowing. Allow brake fluid to flow until no air bubbles are observed.

### **NOTE**

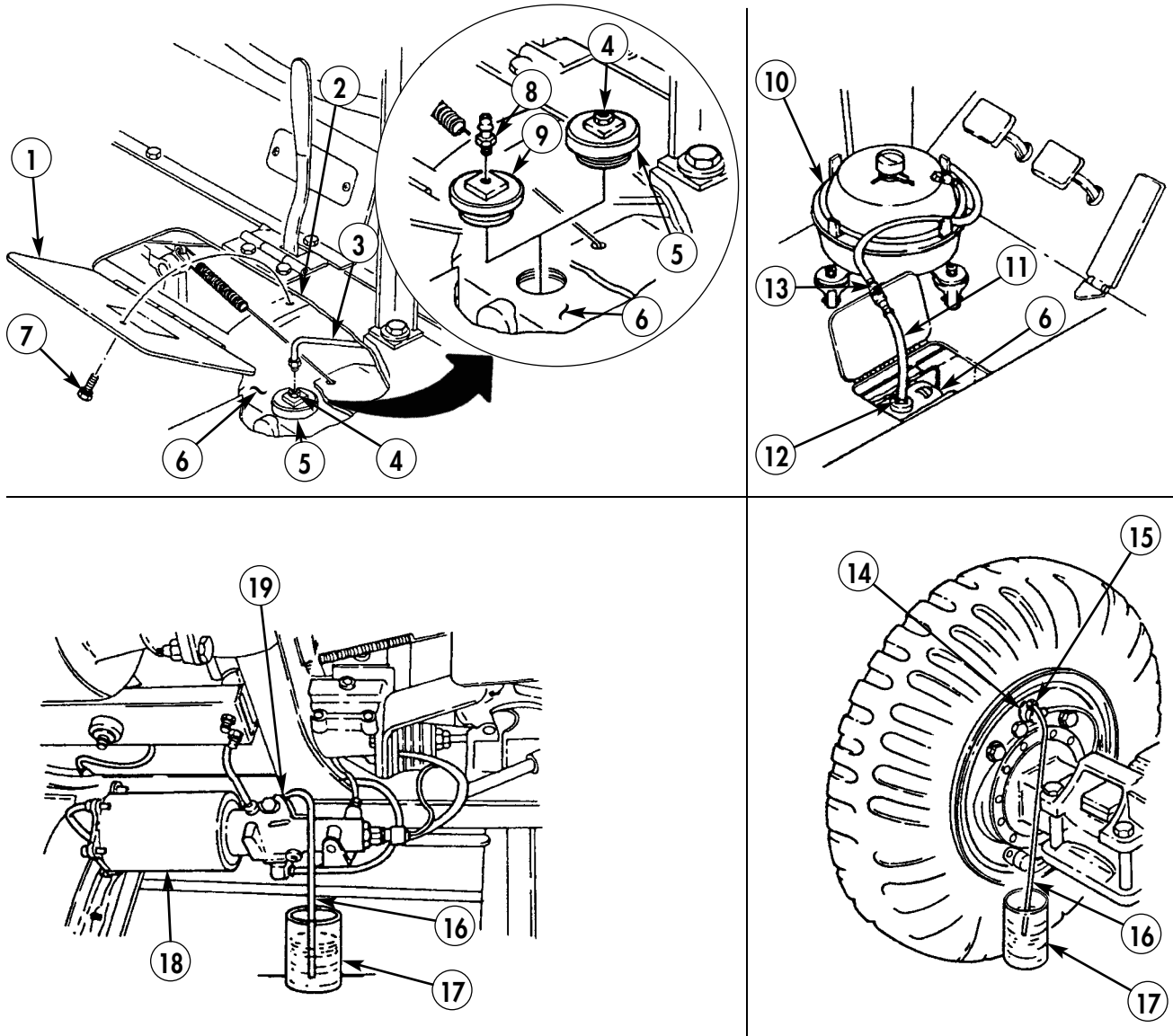
If brake fluid doesn't flow after 3/4 turn, go to step 14; otherwise, go to step 15.

14. Turn valve (13) off and remove female quick-disconnect coupling (12). Remove and clean bleeder screw (19). Install bleeder screw (19) and repeat steps 7 through 13.
15. Close bleeder screw (19) and remove hose (16) from bleeder screw (19). Tighten bleeder screw (19) 10–20 lb-ft (14–27 N•m).
16. If hydraulic components of any one wheel were worked on, go to that wheel, clean around bleeder screw (19), and bleed brake system by performing steps 11 through 15. Install end of hose (16) on bleeder screw (19) and immerse other end of hose (16) in brake fluid in transparent container (17).

**SERVICE BRAKE BLEEDING (Contd)**

**PRESSURE TANK METHOD (Contd)**

17. If all wheel cylinders (14) need to be bled, start with wheel cylinder farthest from air-hydraulic cylinder (18) and progressively go in distance sequence to wheel cylinder (18) nearest to air hydraulic cylinder (18). Tighten wheel cylinder bleeder screws (15) 10–15 lb-ft (14–20 N•m).
18. When finished bleeding hydraulic system, turn valve (13) off and disconnect female quick disconnect coupling (12) on tank hose (11) from male quick-disconnect coupling (8) and adapter plug (9).
19. Remove adapter plug (9) with male quick-disconnect coupling (8) and install filler plug (5) and adapter (4) in master cylinder (6). Tighten filler plug (5) 15–20 lb-ft (2–27 N•m).
20. Connect vent line (3) to adapter (4).
21. Remove bleeder tank (10) from cab. Follow equipment manufacturer instructions for placing bleeder tank (10) in storage.
22. Close access door (1) and install new screw-assembled lockwasher (7).



## SERVICE BRAKE BLEEDING (Contd)

### **WARNING**

Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

Do not reuse brake fluid. Reusing brake fluid may result in damage to equipment.

### **NOTE**

Use a drain pan to capture any draining brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

## MANUAL METHOD

1. Remove screw-assembled lockwasher (7) from brace (2) and open access door (1) exposing top of master cylinder (6). Discard screw-assembled lockwasher (7).
2. Disconnect vent line (3) from adapter (4).
3. Clean top of master cylinder (6) and remove filler plug (5).
4. Fill master cylinder (6) with fresh brake fluid to 1/2 in. (1.27 cm) from top.
5. Install filler plug (5).

### **CAUTION**

Always bleed air-hydraulic cylinder before bleeding downstream hydraulic components. Failure to do so may result in damage to equipment.

6. Clean area around bleeder screw (8) on air-hydraulic cylinder (11).
7. Connect a snug fitting flexible hose (9) on bleeder screw (8) and immerse other end of hose (9) in a transparent container (10) 1/3 to 1/2 filled with brake fluid. Keep end of hose (9) always under surface of brake fluid.

### **NOTE**

Assistant is required for steps 8 through 14.

8. Have assistant slowly apply and release brake pedal (12) twice, then slowly apply and hold down brake pedal (12). Have assistant tell you when holding down brake pedal (12).
9. While assistant holds brake pedal (12) down, open bleeder screw (8) 3/4 turn on air-hydraulic cylinder (11) or bleeder screw (14) on wheel cylinder (13). Observe for air bubbles in container (10) or (16).
10. Close bleeder screw (8) or (14) and inform assistant to release brake pedal (12). Refill master cylinder (6) with brake fluid.
11. Repeat steps 8 through 10 until no air bubbles appear when brake pedal (12) is applied.
12. Remove hose (9) from bleeder screw (8) and tighten bleeder screw (8) 10–20 lb-ft (14–27 N•m).

### **NOTE**

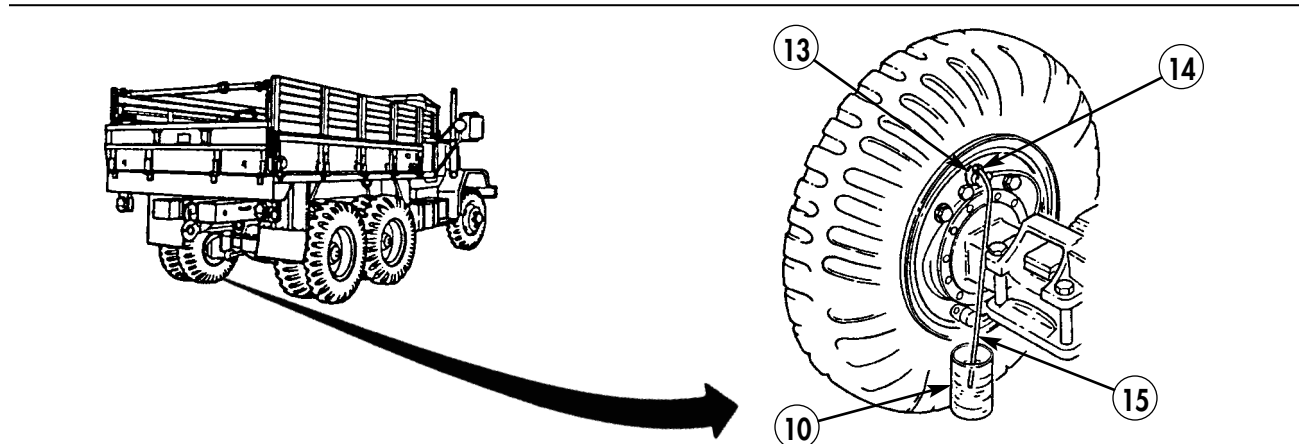
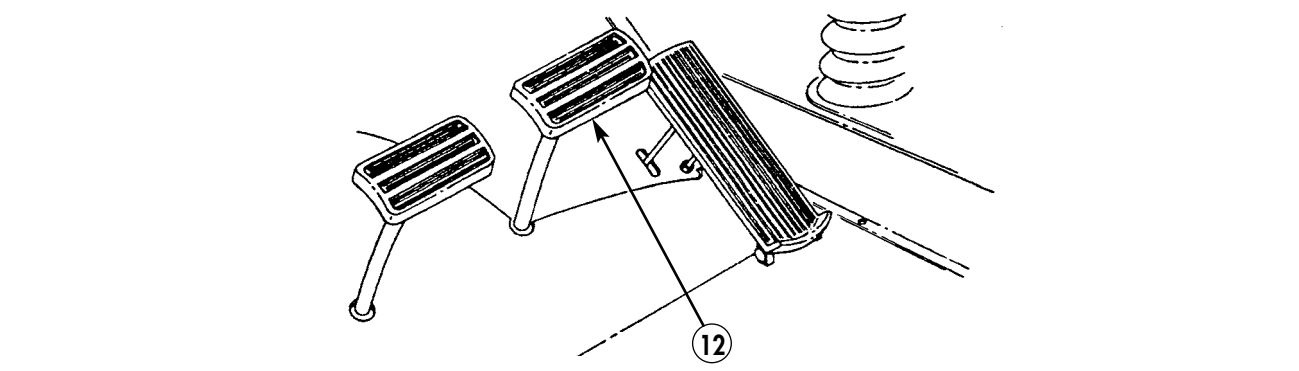
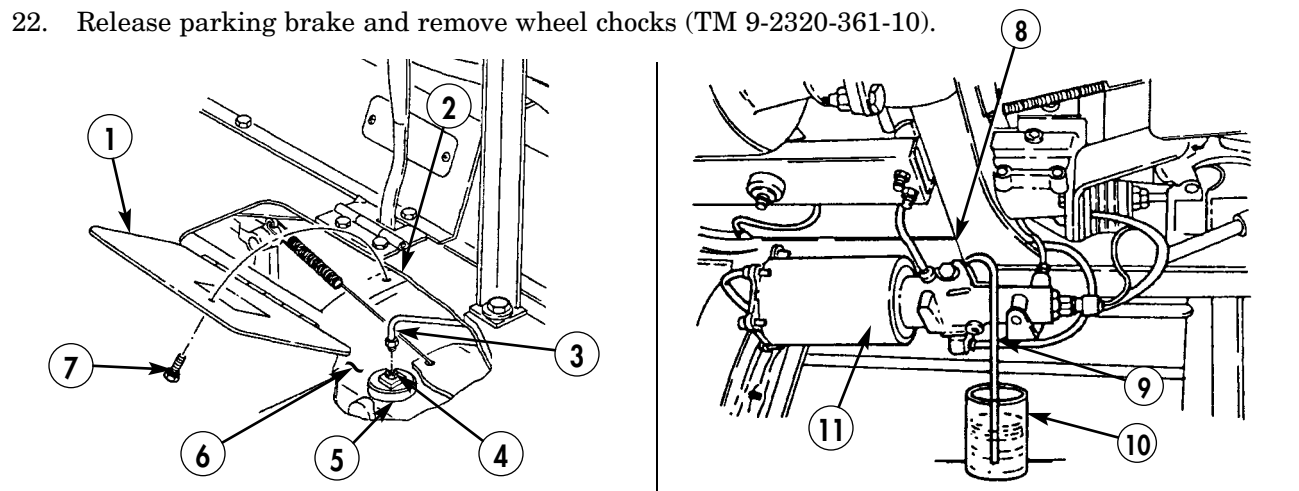
- If wheel cylinders are to be bled, go to step 13. If not, go to step 17.
- If more than one wheel cylinder is to be bled, start with wheel cylinder farthest from master cylinder and progress in sequence to wheel cylinders closest to master cylinder.

13. Clean around bleeder screw (14) on wheel cylinder (13).
14. Connect a snug fitting flexible hose (15) to bleeder screw (14) and immerse end of hose (15) in a transparent container (16) 1/3 to 1/2 filled with brake fluid. Keep end of hose (15) always under surface of brake fluid.

## SERVICE BRAKE BLEEDING (Contd)

### MANUAL METHOD (Contd)

15. Repeat steps 8 through 11.
16. When finished bleeding wheel cylinder (13), remove hose (15) and tighten bleeder screw (14) 10–15 lb-ft (14–20 N•m).
17. Ensure master cylinder (6) is filled with fresh brake fluid to 0.5 in. (1.27 cm) from top.
18. Install filler plug (5) on master cylinder (6) and tighten to 15–20 lb-ft (21–28 N•m).
19. Connect line (3) to adapter (4).
20. Close access door (1) on brace (2) and install with screw-assembled lockwasher (7).
21. Connect battery ground cable (WP 0126 00).
22. Release parking brake and remove wheel chocks (TM 9-2320-361-10).







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### BRAKE PEDAL LEVER REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Cotter pin (item 28, WP 0470 00)  
Two woodruff keys (item 388, WP 0470 00)

**Personnel Required**

Two

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Remove transmission PTO shift linkage  
(if equipped) (WP 0347 00).

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## BRAKE PEDAL LEVER REPLACEMENT (Contd)

### REMOVAL

1. Unhook clutch return spring (1) from relay lever (2).
2. Unhook brake pedal return spring (14) from clevis pin (8).
3. Remove nut (19), washer (20), screw (3), and yoke rod (4) from relay lever (2).
4. Remove screw (5) and nut (21) from relay lever (2).
5. Remove relay lever (2) and woodruff key (18) from shaft (6). Discard woodruff key (18).
6. Remove screw (22), clutch pedal rod (24), and bumper (23) from arm (28).
7. Remove screw (27), clutch pedal arm (28), and woodruff key (26) from shaft (6). Discard woodruff key (26).
8. Remove screw (12), washer (11), brake pedal lever (13), and bumper (10) from brake pedal rod (9). Remove brake pedal rod (9) from cab.
9. Remove cotter pin (15), clevis pin (8), and yoke (16) from brake pedal lever (13). Discard cotter pin (15).

### NOTE

- Assistant will help with steps 10 and 11.
- On vehicles equipped with transmission power takeoff, pull shaft free of inside of bracket and brake pedal lever until lever can be removed.

10. Remove shaft (6) through bracket (17) and brake pedal lever (13) until brake pedal lever (13) can be removed from bracket (17).
11. Remove shaft (6) from frame (25).
12. Remove grease fitting (7) from brake pedal lever (13).

### INSTALLATION

### NOTE

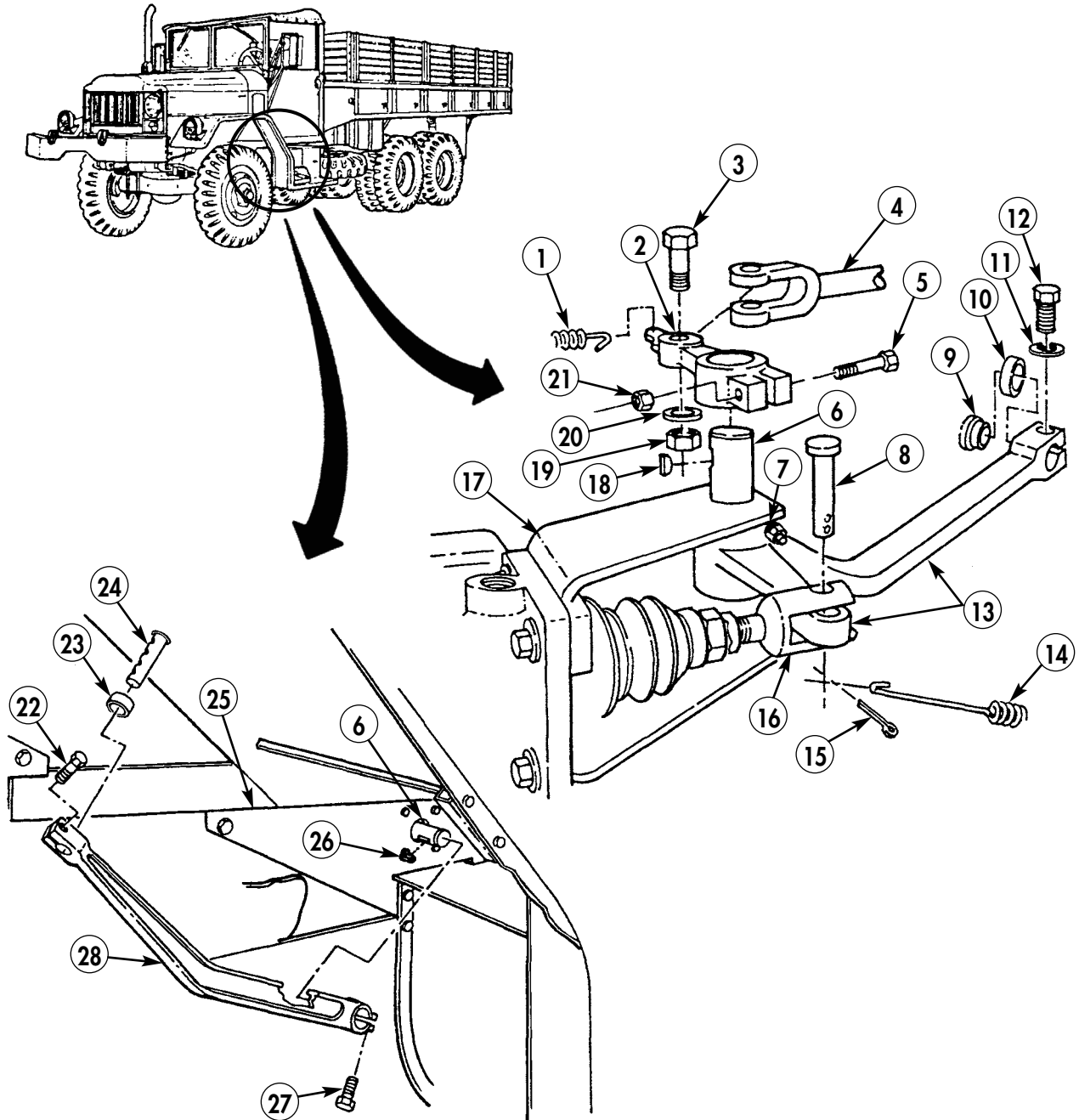
- Assistant will help with step 1.
- When installing shaft make sure enough room is afforded for installation of relay lever and clutch pedal arm.

1. Install grease fitting (7) on brake pedal lever (13).
2. Position brake pedal lever (13) in bracket (17) and yoke (16), and install shaft (6) through frame (25), bracket (17), and brake pedal lever (13).
3. Install clevis pin (8) through yoke (16) and brake pedal lever (13) with new cotter pin (15).
4. Install new woodruff key (18) and relay lever (2) on shaft (6) with screw (5) and nut (21).
5. Connect relay lever (2) to yoke rod (4) with screw (3), washer (20), and nut (19).
6. Install brake pedal rod (9) through cab floor and bumper (10) onto brake pedal lever (13) with washer (11) and screw (12).
7. Install new woodruff key (26) and clutch pedal arm (28) on shaft (6) with screw (27).
8. Install clutch pedal rod (24) through cab floor and bumper (23) and onto clutch pedal arm (28) with screw (22).
9. Connect brake pedal return spring (14) to clevis pin (8).
10. Connect clutch return spring (1) on relay lever (2).

**BRAKE PEDAL LEVER REPLACEMENT (Contd)**

**INSTALLATION (Contd)**

11. Install transmission PTO shift linkage (if so equipped) (WP 0347 00).
12. Connect battery ground cable (WP 0126 00).
13. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### BRAKE PEDAL ADJUSTMENT

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Cotter pin (item 28, WP 0470 00)  
Chalk (item 11, WP 0468 00)

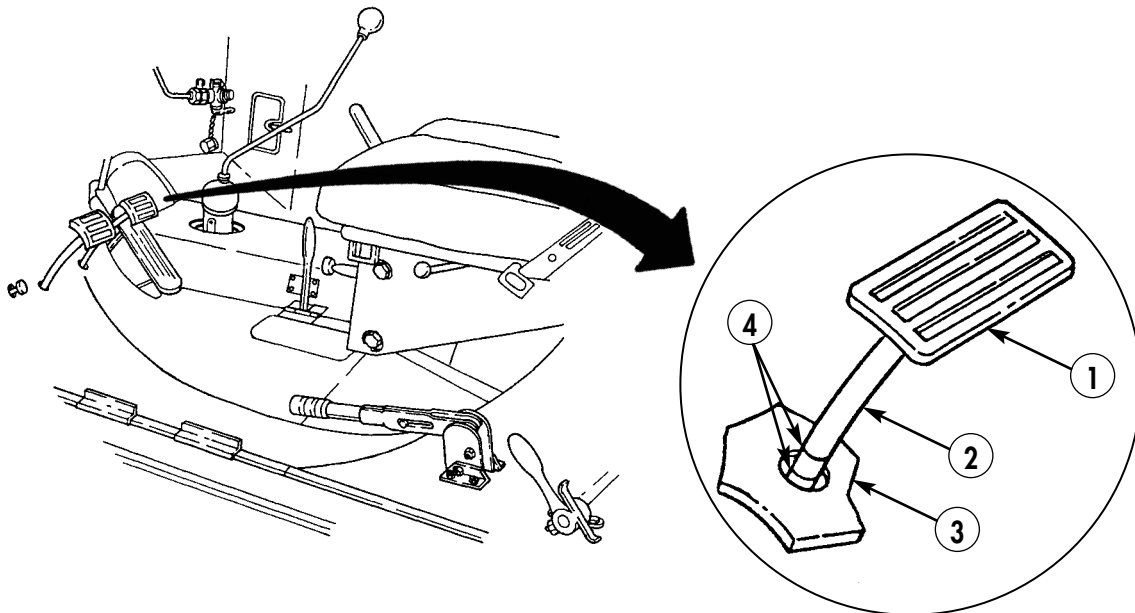
**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

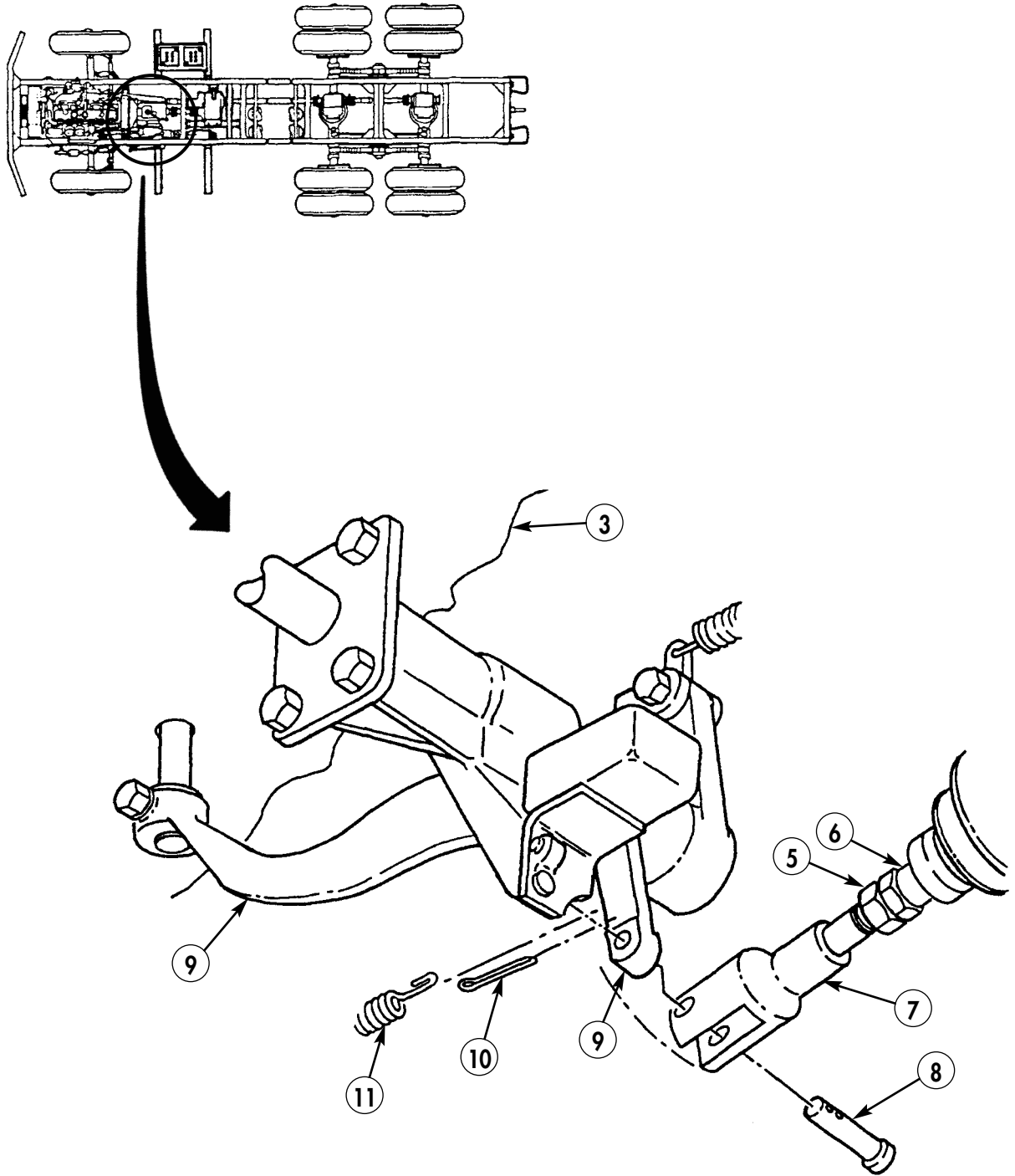
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**BRAKE PEDAL ADJUSTMENT (Contd)**

1. Mark brake pedal rod (2) with chalk, marking it even with cab floor (3).
2. Push brake pedal (1) down until free play is gone.
3. Mark brake pedal rod (2) with chalk, marking it even with cab floor (3), and then release brake pedal (1).
4. Measure distance between two marks (4). If distance is 0.25–0.5 in. (6.35–12.7 mm), adjustment is correct. If out of adjustment, proceed with steps 5 through 7.
5. Unhook spring (11) from clevis pin (8).
6. Remove cotter pin (10), clevis pin (8), and yoke (7) from brake pedal lever (9). Discard cotter pin (10).
7. Loosen jamnut (5) and adjust pushrod (6) until proper adjustment is obtained.
8. Install yoke (7) on brake pedal lever (9) with clevis pin (8).
9. Hook spring (11) to clevis pin (8).
10. Repeat steps 1 through 9 until free play is correct as indicated in step 4.
11. Install new cotter pin (10) through clevis pin (8).
12. Tighten jamnut (5) against pushrod (6).
13. Connect battery ground cable (WP 0126 00).
14. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**BRAKE PEDAL ADJUSTMENT (Contd)**



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### HYDRAULIC BRAKE LINE REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 217, WP 0470 00)  
Locknut (item 152, WP 0470 00)  
Screw-assembled lockwashers  
(item 248, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

**References**

WP 0020 00  
WP 0172 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## HYDRAULIC BRAKE LINE REPLACEMENT (Contd)

### **WARNING**

- Short front flexible hydraulic brake lines are subject to failure during full steering travel and must be replaced with new, longer flexible hydraulic brake lines P/N 7409330. Failure to comply may cause injury or death to personnel.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Failure to do so may result in internal parts damage.

### **NOTE**

All flexible hydraulic brake and compressed air lines are replaced the same. This procedure covers the front flexible hydraulic brake line.

### **REMOVAL**

1. Disconnect spring (7) from spring plate (5).
2. Remove nut (3), lockwasher (4), and spring plate (5) from steering arm (2). Discard lockwasher (4).
3. Remove locknut (14), screw (6), spring (7), and clamp (8) from flexible hydraulic brake line (15). Discard locknut (14).

### **NOTE**

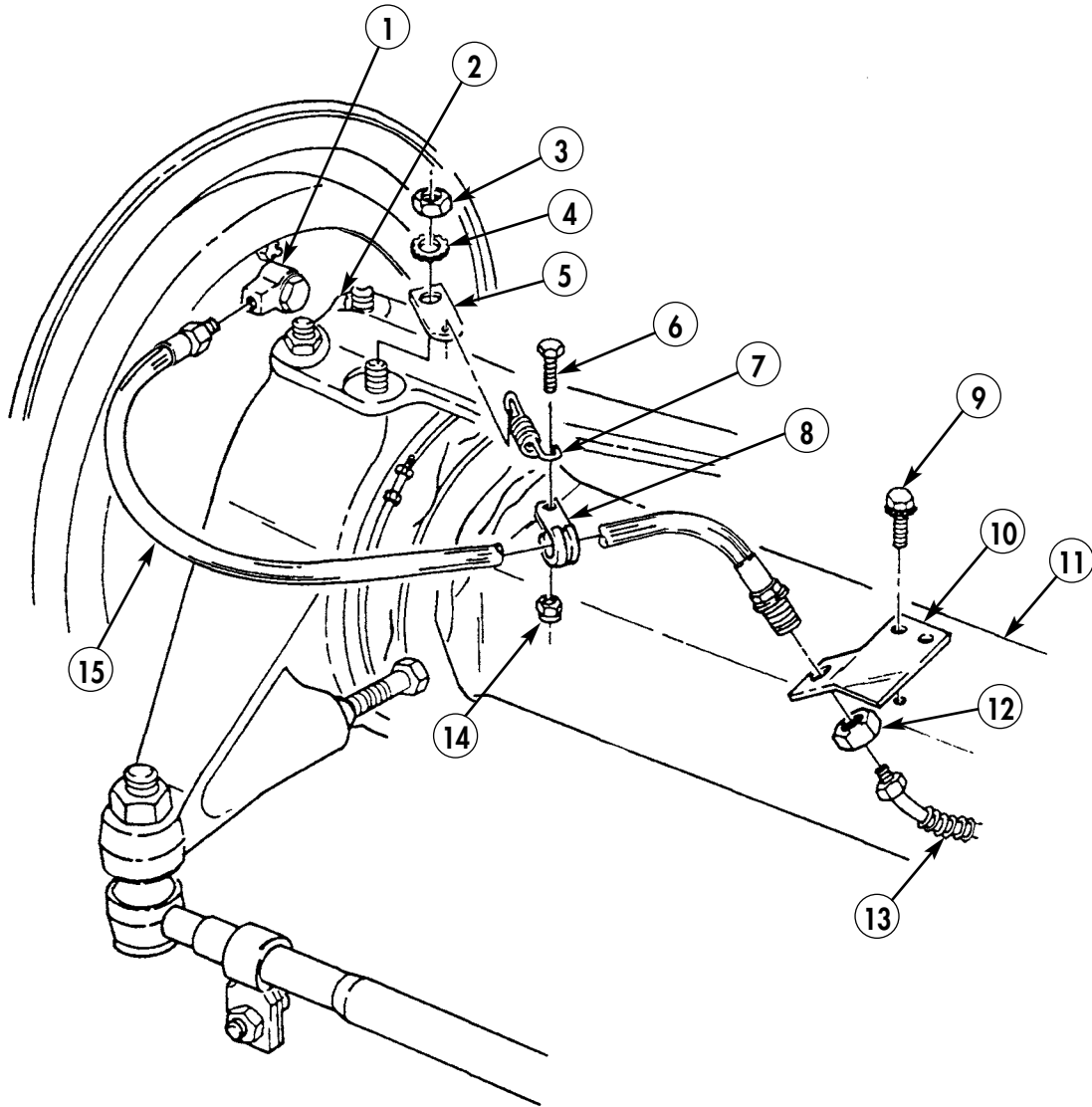
Use a drain pan to capture any draining oil. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

4. Disconnect flexible hydraulic brake line (15) from inlet connector (1).
5. Remove brake line (13) from flexible hydraulic brake line (15).
6. Remove nut (12) and flexible hydraulic brake line (15) from bracket (10).
7. Remove two screw-assembled lockwashers (9) and bracket (10) from axle housing (11) and brake line (13). Discard screw-assembled lockwashers (9).

### **INSTALLATION**

1. Install bracket (10) on axle housing (11) with two new screw-assembled lockwashers (9).
2. Connect flexible hydraulic brake line (15) to inlet connector (1).
3. Install flexible hydraulic brake line (15) on bracket (10) with nut (12).
4. Install brake line (13) on flexible hydraulic brake line (15).
5. Install clamp (8) on flexible hydraulic brake line (15) with spring (7), screw (6), and new locknut (14).
6. Install spring plate (5) on steering arm (2) with new lockwasher (4) and nut (3). Tighten nut (3) to 130–167 lb-ft (176–227 N•m).
7. Connect spring (7) on spring plate (5).
8. Fill master cylinder (WP 0020 00).
9. Bleed service brakes (WP 0172 00).
10. Connect battery ground cable (WP 0126 00).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

HYDRAULIC BRAKE LINE REPLACEMENT (Contd)



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FLEXIBLE HYDRAULIC BRAKE LINE MODIFICATION REMOVAL, MODIFICATION, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 239, WP 0470 00)  
Two screw-assembled lockwashers  
(item 248, WP 0470 00)  
Brakeline (item 6, WP 0470 00)  
Clamp (item 12, WP 0470 00)  
Locknut (item 152, WP 0470 00)  
Screw (item 324, WP 0470 00)  
Spring (item 364, WP 0470 00)

**Materials/Parts (Contd)**

Spring plate (item 365, WP 0470 00)  
Cap and plug set (item 10, WP 0468 00)

**References**

WP 0020 00  
WP 0172 00

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).

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## FLEXIBLE HYDRAULIC BRAKE LINE MODIFICATION (Contd)

### **WARNING**

- Ensure new, longer front hydraulic brake lines, currently used on 5-ton trucks, are installed on all 2-1/2-ton trucks. Old, shorter front hydraulic brake lines are subject to failure during full steering travel and must be replaced with new, longer front brake hoses. Failure to comply will result in injury or death to personnel.
- Accidental or intentional introduction of liquid contaminants into the environment is a violation of state, federal, and military regulations. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to do so may result in damage to environment and health of personnel.

### **CAUTION**

Cap or plug all openings immediately after disconnecting lines and hoses to prevent contamination. Failure to do so may result in internal parts damage.

### **NOTE**

Left and right front flexible hydraulic lines are replaced the same. This procedure covers the left front.

## **REMOVAL**

1. Remove two nuts (2), lockwashers (1), and steering guard (4) from steering arm (7). Discard lockwashers (1).
2. Remove locknut (6), screw (3), and bracket (5) from steering guard (4). Discard screw (3) and locknut (6).

### **NOTE**

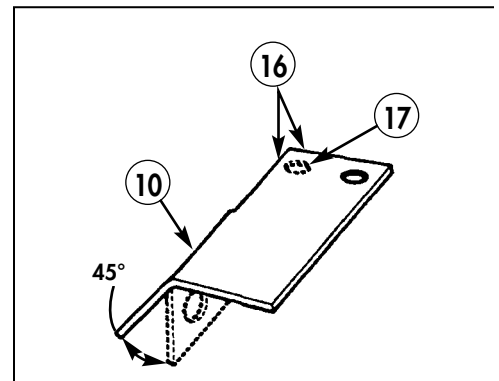
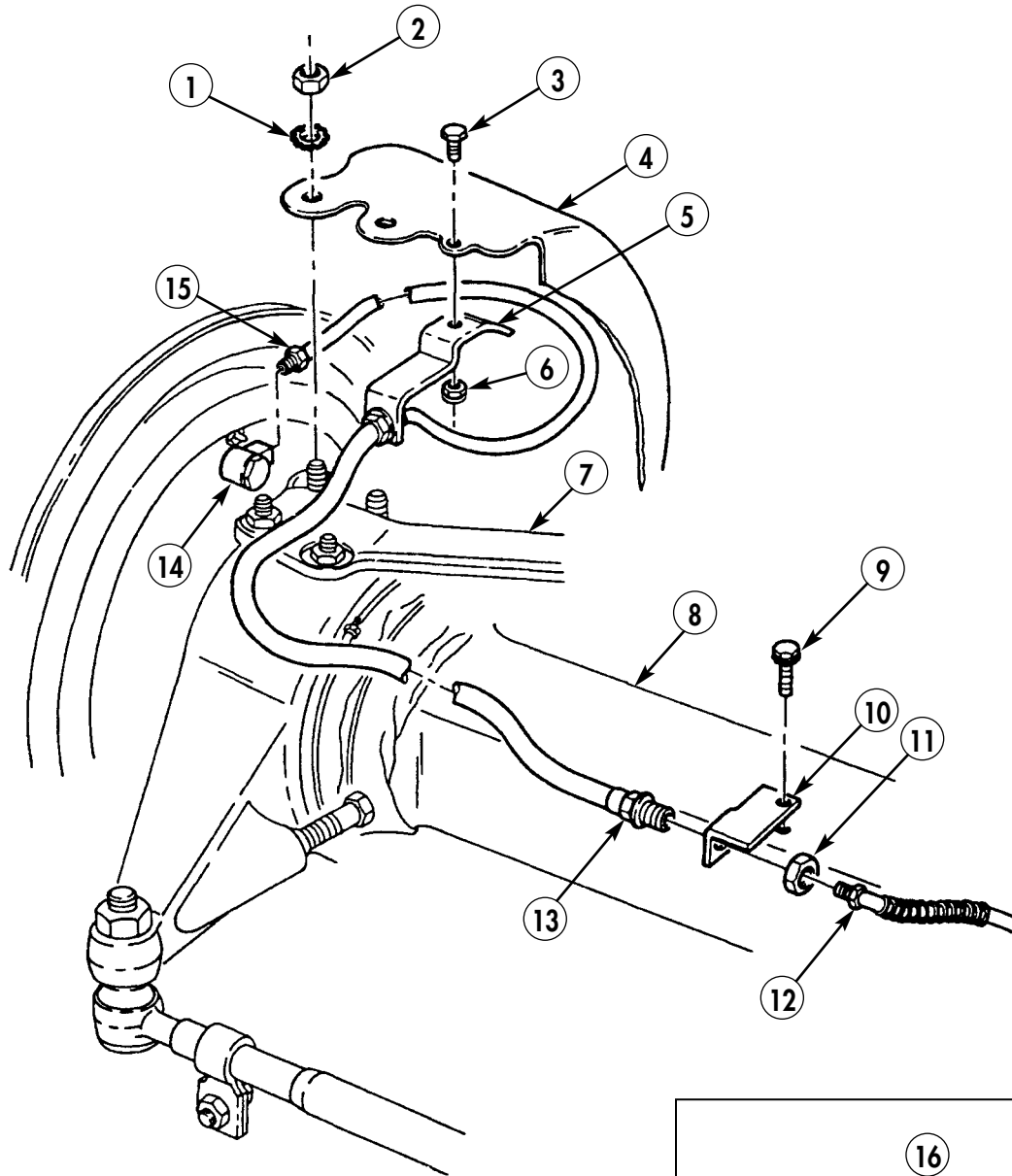
Use a drain pan to capture any brake fluid. Dispose of fluids in accordance with local policy and ordinances. Ensure all spills are cleaned up.

3. Disconnect steel brake line (15) from inlet connector (14).
4. Disconnect brake line (12) from flexible hydraulic brake line (13).
5. Remove nut (11), old flexible hydraulic brake line (13) with steel brake line (15), and bracket (5) from bracket (10). Discard nut (11), old flexible hydraulic brake line (13) with steel brake line (15), and bracket (5).
6. Remove two screw-assembled lockwashers (9) and bracket (10) from axle housing (8). Discard screw assembled lockwashers (9).

## **MODIFICATION**

1. Bend bracket (10) tab to a 45° angle. Check bracket (10) for cracks. If cracked, replace bracket (10) and repeat step.
2. Locate and drill 0.46 in. (10.3 mm) hole (17), 0.5 in. (12.7 mm) from bracket corners (16).

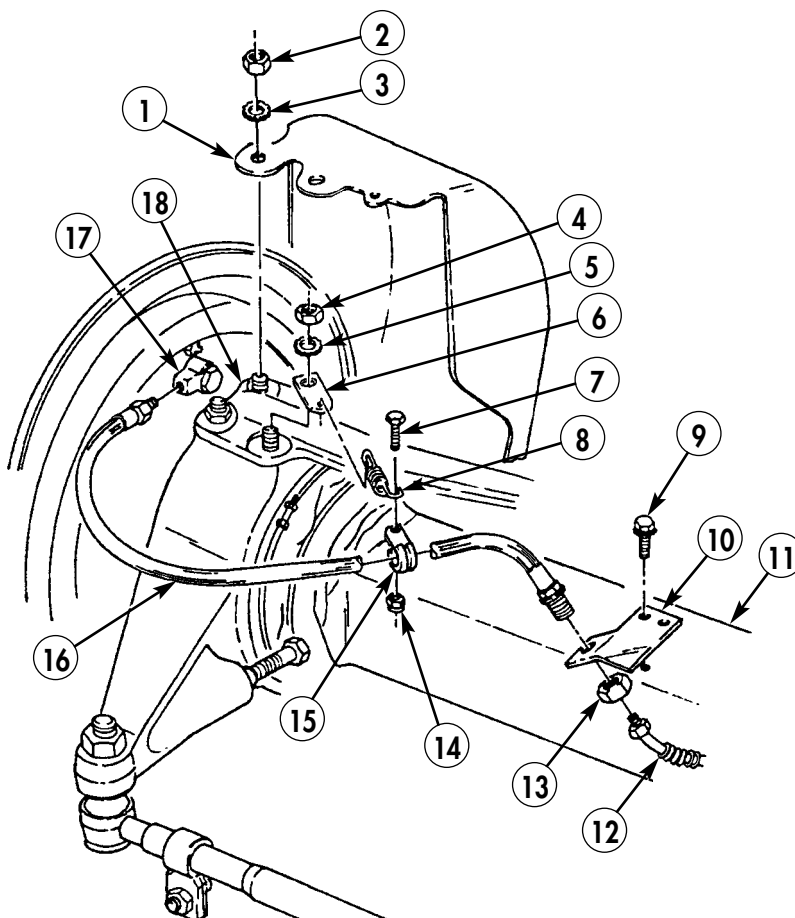
FLEXIBLE HYDRAULIC BRAKE LINE MODIFICATION (Contd)



## FLEXIBLE HYDRAULIC BRAKE LINE MODIFICATION (Contd)

### INSTALLATION

1. Loosen brake cylinder inlet connector (17) and rotate 180° (1/2 turn) so that inlet connector (17) is toward rear of vehicle. Tighten brake cylinder inlet connector (17).
2. Install new, altered bracket (10) on axle housing (11) with two new screw-assembled lockwashers (9).
3. Install new, longer flexible hydraulic brake line (16) to inlet connector (17), and other end to new, altered bracket (10) with new nut (13).
4. Install brake line (12) to brake line (16).
5. Install new spring plate (6) on steering arm (18) with new lockwasher (5) and nut (4). Tighten nut (4) to 130–167 lb-ft (176–227 N•m).
6. Install new clamp (15) and spring (8) on new, long flexible hydraulic brake line (16) with screw (7) and new locknut (14).
7. Connect new spring (8) on spring plate (6).
8. Install steering guard (1) on steering arm (18) with two new lockwashers (3) and nuts (2). Tighten nuts (2) 130–167 lb-ft (176–227 N•m).
9. Fill master cylinder (WP 0020 00).
10. Bleed service brakes (WP 0172 00).
11. Connect battery ground cable (WP 0126 00).
12. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR SYSTEM SAFETY VALVE REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Antiseize tape (item 42, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air reservoirs drained (TM 9-2320-361-10).

#### REMOVAL

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

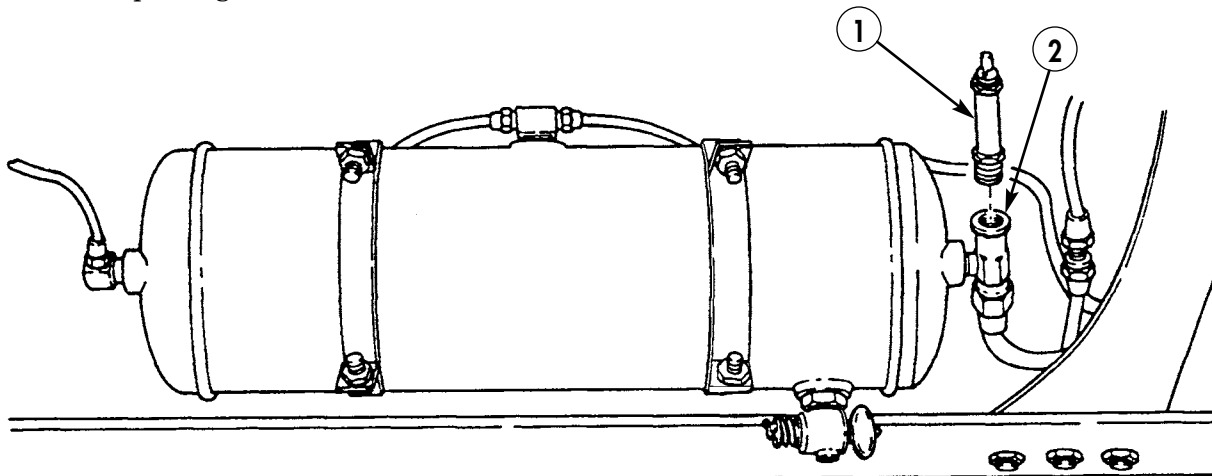
Remove air system safety valve (1) from tee fitting (2).

#### INSTALLATION

#### **NOTE**

All male pipe threads must be wrapped with antiseize tape before installation.

1. Install air system safety valve (1) in tee fitting (2).
2. Connect battery ground cable (WP 0126 00).
3. Start engine (TM 9-2320-361-10), build up air pressure in air reservoirs, and check for leaks.
4. Release parking brake and remove wheel chocks (TM 9-2320-361-10).





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIRBRAKE HAND CONTROL VALVE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 205, WP 0470 00)

Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air reservoirs drained (TM 9-2320-361-10).

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## AIRBRAKE HAND CONTROL VALVE REPLACEMENT (Contd)

### REMOVAL

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

#### **NOTE**

Prior to removal, tag all air lines for installation.

1. Remove valve outlet air line (8) from adapter (9).
2. Remove two air supply lines (7) from two adapters (6).
3. Remove two screws (2), lockwashers (3), clamp (4), and hand control valve (1) from steering column (5). Discard lockwashers (3).
4. Remove two adapters (6) and adapter (9) from hand control valve (1) and inspect for stripped threads, cracks, or breaks. If cracked, broken, or threads are stripped, replace adapters (6) and (9) and hand control valve (1).

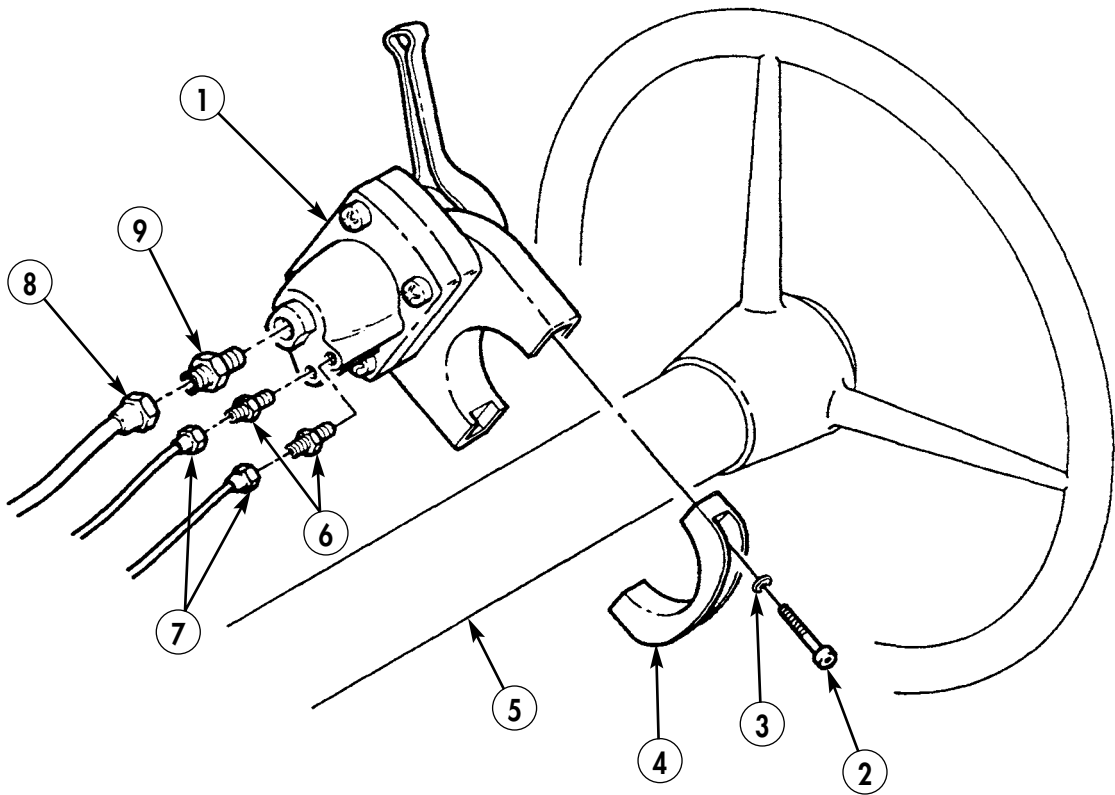
### INSTALLATION

#### **NOTE**

All male pipe threads must be wrapped with antiseize tape before installation.

1. Install two adapters (6) and adapter (9) on hand control valve (1).
2. Install hand control valve (1) on steering column (5) with clamp (4), two new lockwashers (3), and screws (2).
3. Install two air supply lines (7) on two adapters (6).
4. Install outlet air line (8) on adapter (9).
5. Connect battery ground cable (WP 0126 00).
6. Start engine (TM 9-2320-361-10), build up air pressure in air reservoirs and check operation of airbrake hand control valve.
7. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

**AIRBRAKE HAND CONTROL VALVE REPLACEMENT (Contd)**





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR RESERVOIRS REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Lockwasher (item 213, WP 0470 00)  
Two locknuts (item 129, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)  
Sealing compound (item 32, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Spare tire removed (TM 9-2320-361-10).  
Delivery pump front propeller shaft removed  
(M49A2C and M50A3) (WP 0292 00).  
Air system safety valve removed (WP 0177 00).

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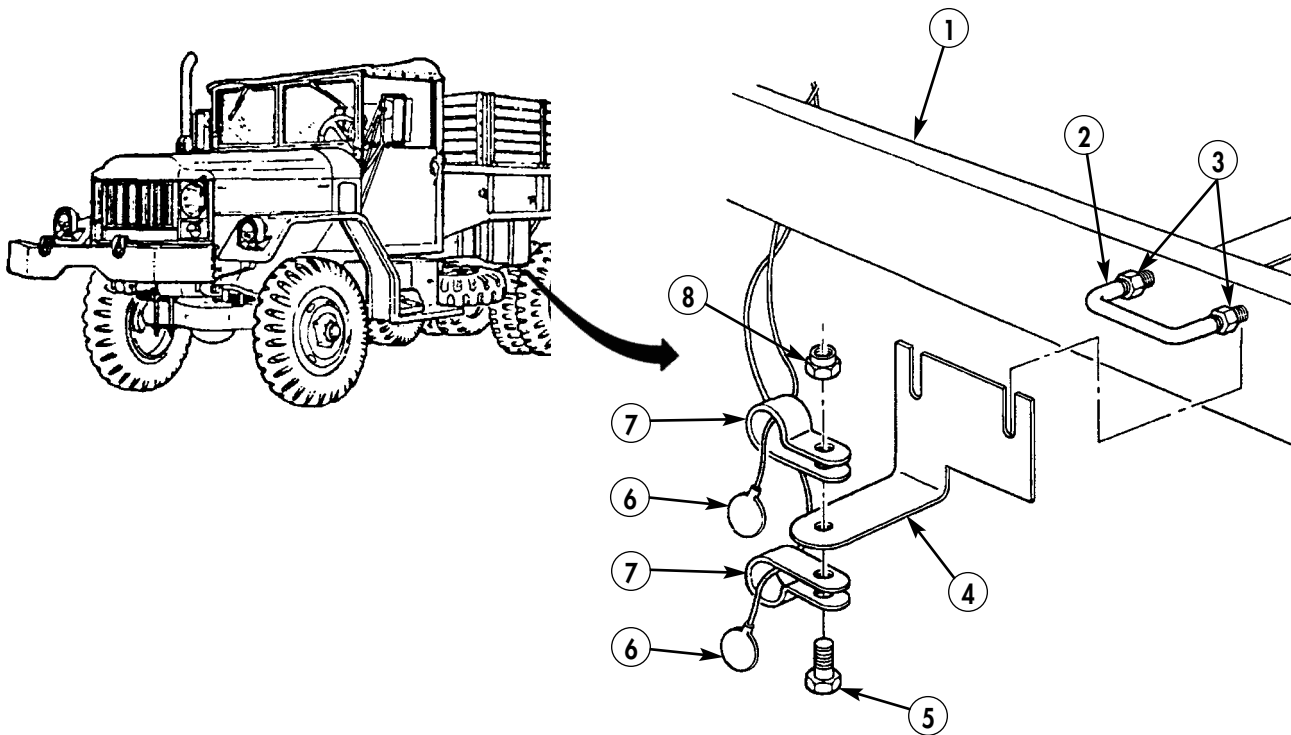
## AIR RESERVOIRS REPLACEMENT (Contd)

### REMOVAL

#### NOTE

- Perform steps 1 through 7 for vehicles equipped with air reservoir drain kit.
- Perform steps 1 and 2 for M50A3, M109A3, M185A3, M35A2C, and M35A2 vehicles.

1. Remove locknut (8), screw (5), two clamps (7), and cables (6) from bracket (4). Discard locknut (8).
2. Loosen two nuts (3) on tiedown bracket (2) and remove bracket (4) from frame (1). Tighten nuts (3).



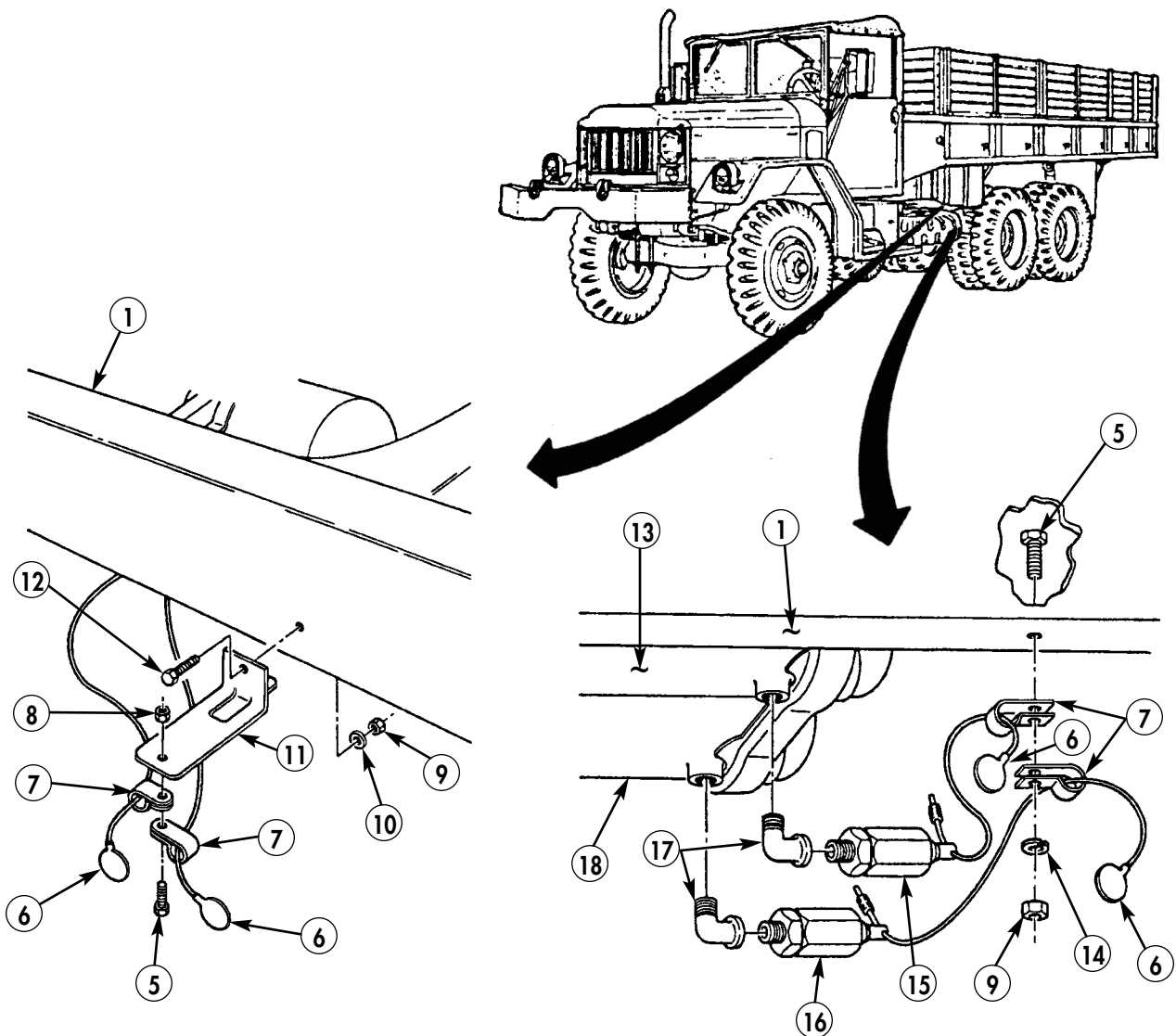


## AIR RESERVOIRS REPLACEMENT (Contd)

### REMOVAL (Contd)

#### NOTE

- Perform steps 3 through 5 for M36A2 vehicle.
  - Perform steps 3 and 4 on vehicles without hole in bottom flange of frame rail.
  - Perform step 5 on vehicles with hole in bottom flange of frame rail.
3. Remove locknut (8), screw (5), two clamps (7), and cables (6) from bracket (11). Discard locknut (8).
  4. Remove nut (9), washer (10), screw (12), and bracket (11) from frame (1).
  5. Remove nut (9), lockwasher (14), screw (5), and two clamps (7) from frame rail (1). Discard lockwasher (14).
  6. Remove two valves (15) and (16) from elbows (17).
  7. Remove elbows (17) from air tanks (13) and (18).



## AIR RESERVOIRS REPLACEMENT (Contd)

### REMOVAL (Contd)

#### NOTE

Prior to removal, tag air lines and hoses for installation.

8. Remove two locknuts (13), bolts (4), and retaining brackets (7) and (21) from two air reservoirs (20) and (12) and two supports (19) and (22). Discard locknuts (13).

#### NOTE

Slide air reservoirs to gain access to air lines and fittings.

9. Remove air line (5) from elbow (6) and valve (8).
10. Remove two air lines (15) and (18) from tee fitting (16) and elbow (17).
11. Remove two air lines (1) and (3) from tee fitting (2).
12. Remove two air reservoirs (12) and (20) from two supports (22) and (19).

#### NOTE

Prior to removal, record location and position of all fittings for installation.

13. Remove two elbows (6) and (17), tee fitting (2), and drain valve (10) from air reservoir (20).
14. Remove valve (8), elbow (9), drain valve (11), plug (14), and tee fitting (16) from air reservoir (12).
15. Inspect all fittings, valves, drain valves, elbows, and plug for stripped threads, cracks, or breaks. If damaged, replace.

### INSTALLATION

#### NOTE

Wrap all male pipe threads with antiseize tape before installation.

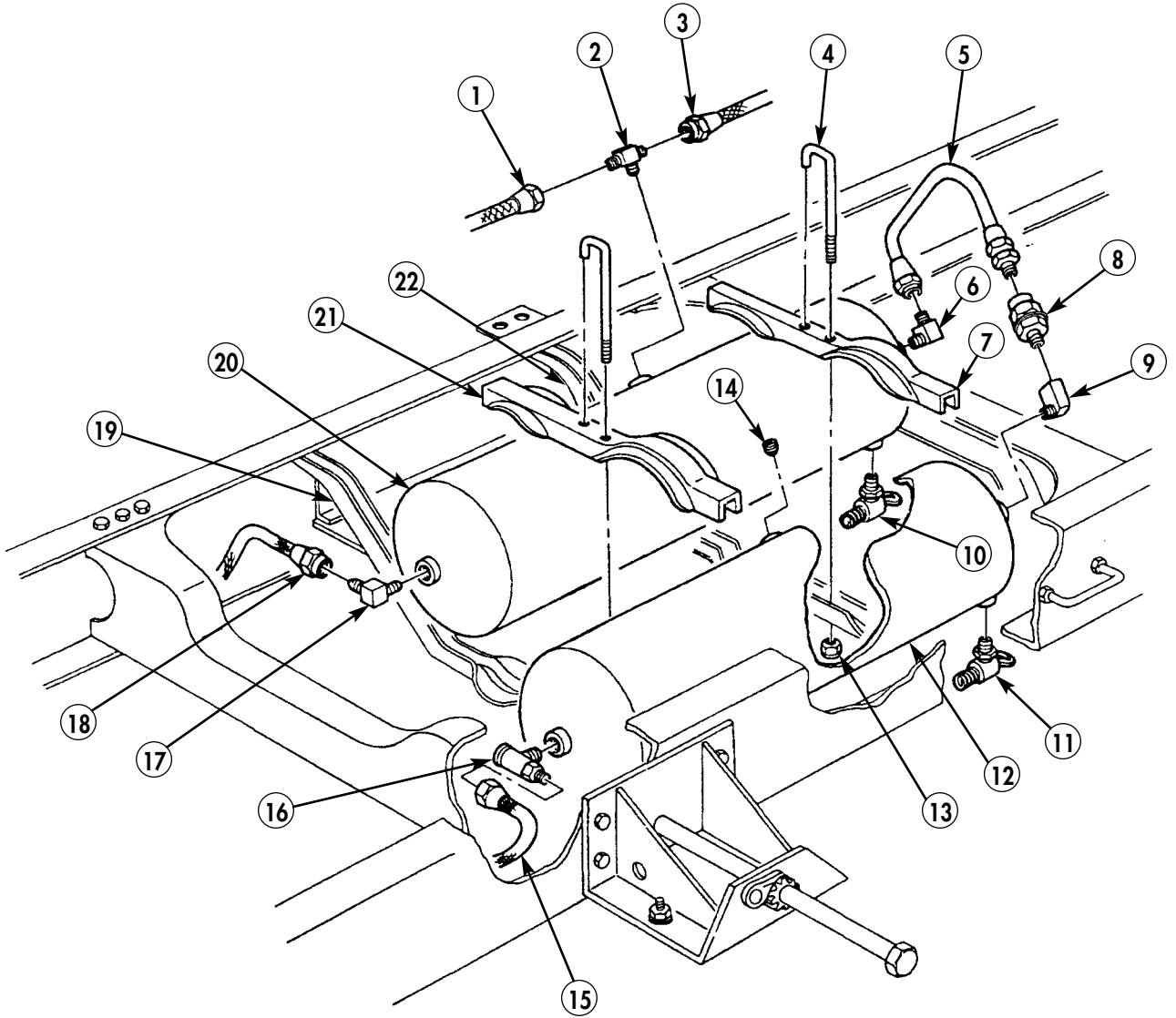
1. Install two elbows (17) and (6), tee fitting (2), and drain valve (10) in air reservoir (20).
2. Install tee fitting (16), plug (14), drain valve (11), elbow (9), and valve (8) on air reservoir (12).
3. Position two air reservoirs (20) and (12) on two supports (22) and (19).

#### NOTE

Slide air reservoirs to gain access to air lines and fittings.

4. Install two air lines (1) and (3) on tee fitting (2).
5. Install two air lines (15) and (18) on tee fitting (16) and elbow (17).
6. Install air line (5) on valve (8) and elbow (6).
7. Secure two air reservoirs (12) and (20) to two supports (19) and (22) with two retaining brackets (21) and (7), bolts (4), and new locknuts (13).

AIR RESERVOIRS REPLACEMENT (Contd)



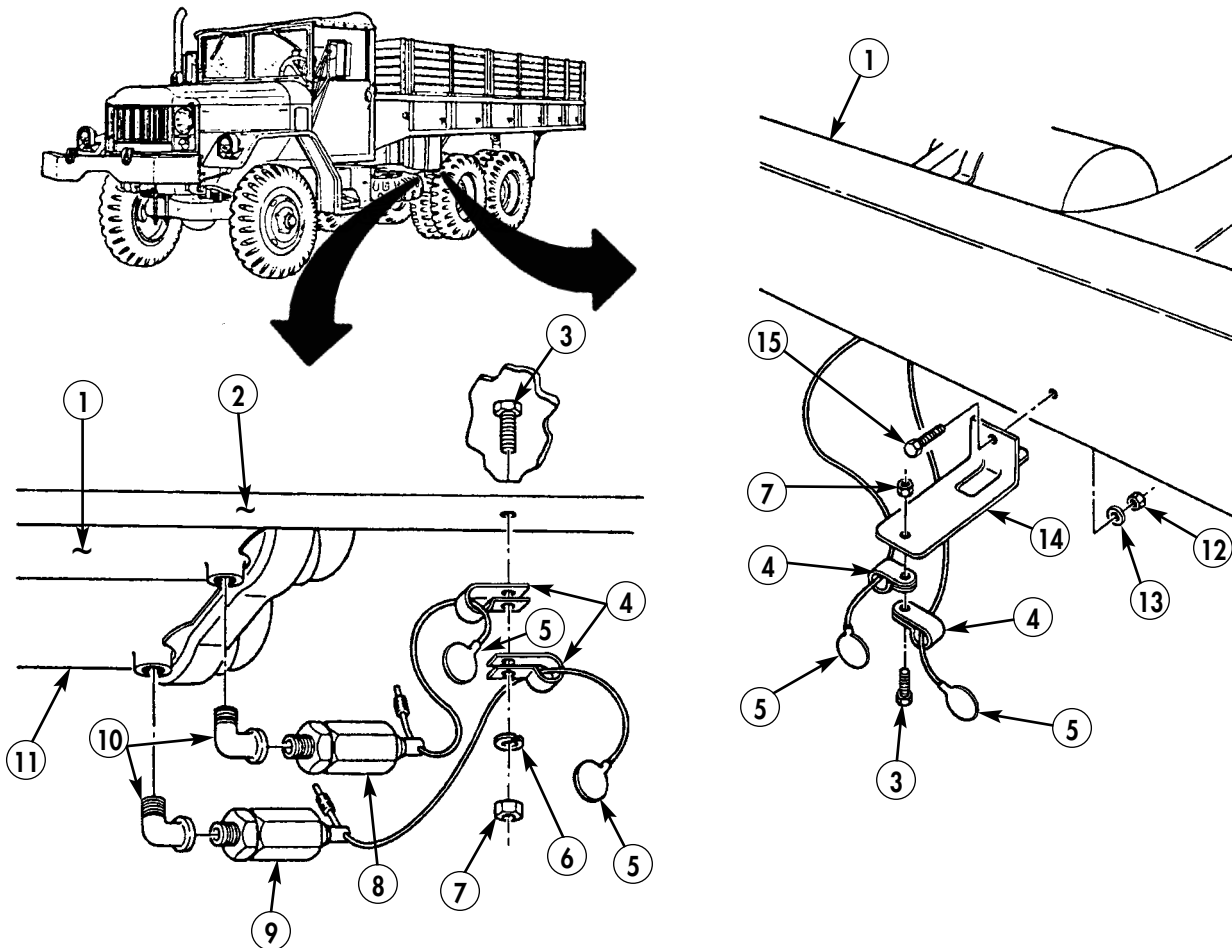
## AIR RESERVOIRS REPLACEMENT (Contd)

### INSTALLATION (Contd)

**NOTE**

- Apply pipe sealant to male pipe threads during assembly and installation.
- Perform steps 13 through 15 for M36A2 vehicle.
- Perform step 13 for vehicles with hole in bottom flange of frame rail.
- Perform steps 14 and 15 for vehicles without hole in bottom flange of frame rail.

8. Install elbow (10) on right tank (11).
9. Install valve (9) on elbow (10).
10. Install elbow (10) on left tank (2).
11. Install valve (8) on elbow (10).
12. Turn valves (8) and (9) so that they are facing rear of vehicle.
13. Install cables (5) on frame (1) with two clamps (4), screw (3), new lockwasher (6), and new locknut (7).
14. Install bracket (14) on frame (1) with screw (15), washer (13), and nut (12).
15. Install cables (5) on bracket (14) with screw (3), two clamps (4), and nut (7).



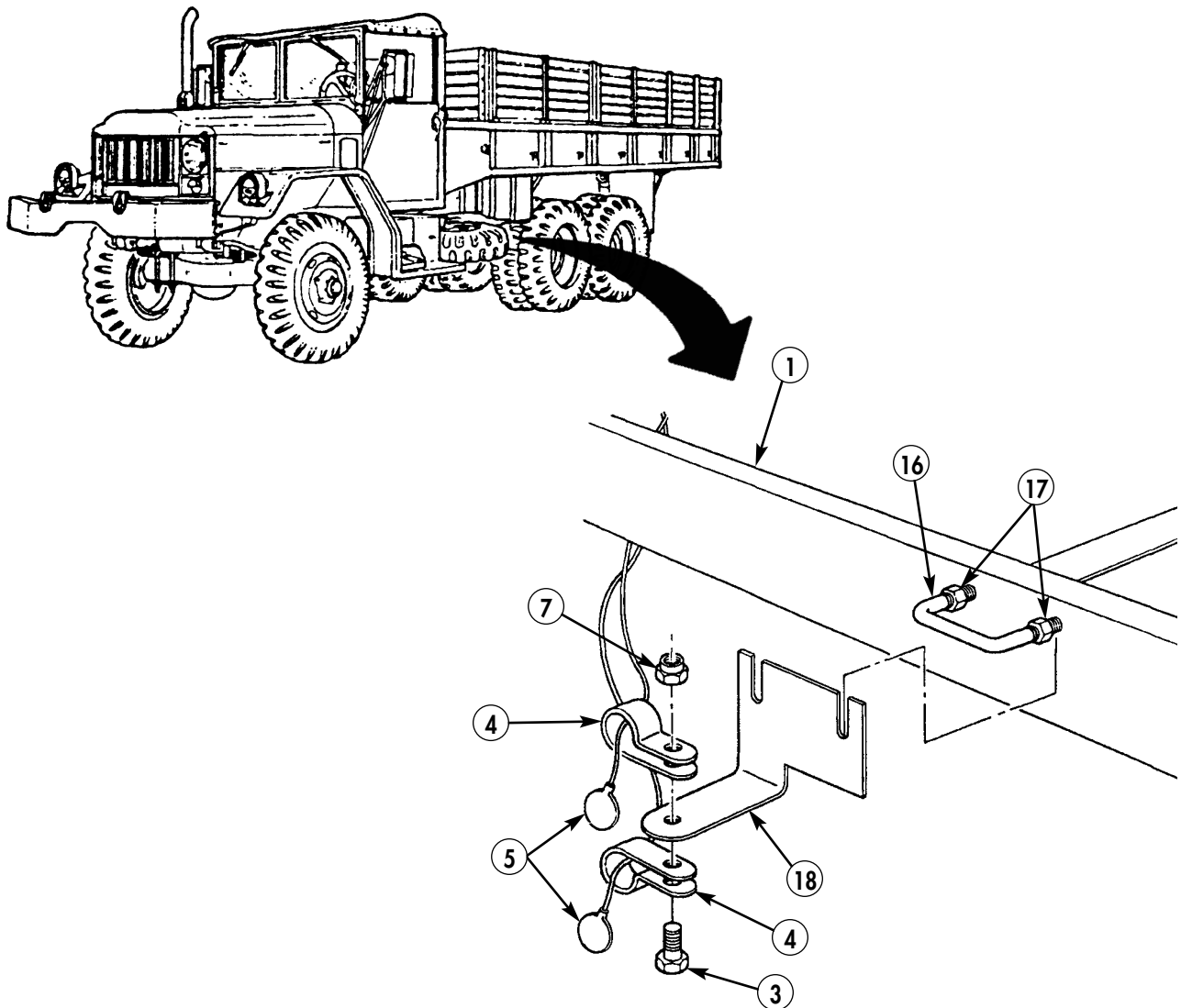
## AIR RESERVOIRS REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### NOTE

Perform steps 16 through 18 for M50A3, M109A3, M185A3, M35A2C, and M35A2 vehicles.

16. Loosen two nuts (17) on tiedown bracket (16) on left side of frame (1).
17. Install bracket (18) between tiedown bracket (16) and frame (1). Tighten two nuts (17) to secure.
18. Install cables (5) on bracket (18) with two clamps (4), screw (3), and new locknut (7).
19. Install air system safety valve (WP 0177 00).
20. Install delivery pump front propeller shaft (M49A2C and M50A3) (WP 0292 00).
21. Install spare tire (TM 9-2320-361-10).
22. Connect battery ground cable (WP 0126 00).
23. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR COMPRESSOR AND PULLEY MAINTENANCE REMOVAL, DISASSEMBLY, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Four lockwashers (item 201, WP 0470 00)  
Two lockwashers (item 193, WP 0470 00)  
Two lockwashers (item 218, WP 0470 00)  
Gasket (item 69, WP 0470 00)  
Gasket (item 70, WP 0470 00)  
Gasket (item 92, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)  
Cap and plug set (item 10, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air reservoir drained (TM 9-2320-361-10).  
Air compressor drivebelt removed  
(WP 0182 00).

---

## AIR COMPRESSOR AND PULLEY MAINTENANCE (Contd)

### REMOVAL

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel. Air compressor becomes hot during operation. Allow compressor to cool before handling, or injury to personnel may result.

#### **NOTE**

- Prior to removal, tag all air lines for installations.
- Plug air lines as they are disconnected.

1. Remove air line (7) from adapter (4).

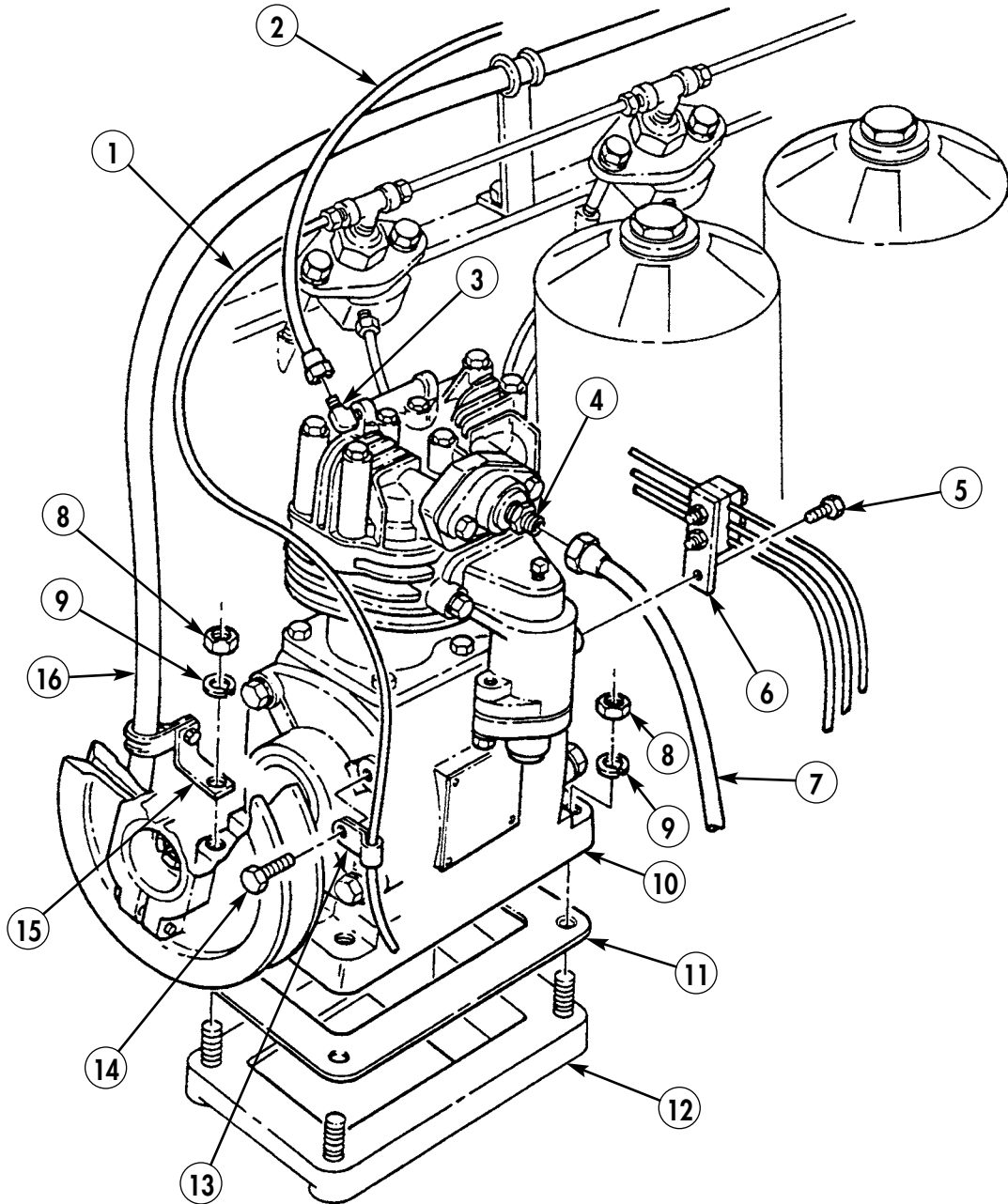
#### **NOTE**

On some air compressors, the air governor air line is on front of compressor near pulley.

2. Remove air governor air line (2) from elbow (3).
3. Remove screw (14), clamp (13), and fuel pump return line (1) from air compressor (10). Tie fuel pump return line (1) out of way.
4. Install screw (14) in air compressor (10).
5. Remove screw (5) and bracket (6) from air compressor (10).
6. Install screw (5) in air compressor (10).
7. Remove four nuts (8), lockwashers (9), and bracket (15) from base of air compressor (10). Discard lockwashers (9).
8. Tie tachometer cable (16) and bracket (15) out of way.
9. Remove air compressor (10) and gasket (11) from air compressor support (12). Discard gasket (11).



AIR COMPRESSOR AND PULLEY MAINTENANCE (Contd)



## AIR COMPRESSOR AND PULLEY MAINTENANCE (Contd)

### DISASSEMBLY

1. Holding pulley flange (15), remove nut (13) from crankshaft (16).
2. Remove adjustable puller flange (14) from pulley flange (15).
3. Remove pulley flange (15) from crankshaft (16).

#### **NOTE**

Some compressors have a key in crankshaft and others use a tapered shaft.

4. Remove key (12), if present, from crankshaft (16).
5. Remove adapter (6) from discharge housing (3).
6. Remove two screws (5), lockwashers (4), discharge housing (3), and gasket (2) from air compressor (11). Discard lockwashers (4) and gasket (2).
7. Remove two screws (7), lockwashers (8), intake air cleaner (9) and gasket (10) from air compressor (11). Discard lockwashers (8) and gasket (10).
8. Remove elbow (1) from air compressor (11).

### ASSEMBLY

#### **CAUTION**

Remove shipping plate and gasket from new air compressor before installation, or damage to equipment may result.

#### **NOTE**

- Clean all fittings and housings before installation.
- Wrap all male pipe threads with antiseize tape before installation.

1. Install elbow (1) on air compressor (11).
2. Install intake air cleaner (9) and new gasket (10) on air compressor (11) with two new lockwashers (8) and screws (7).
3. Install discharge housing (3) and new gasket (2) on air compressor (11) with two new lockwashers (4) and screws (5).
4. Install adapter (6) on discharge housing (3).
5. Install key (12), if used, in crankshaft (16).
6. Install pulley flange (15) on crankshaft (16) aligning keyway in pulley flange (15) to key (12).
7. Holding pulley flange (15), install nut (13) on threaded end of crankshaft (16).
8. Install adjustable pulley flange (14) on pulley flange (15).

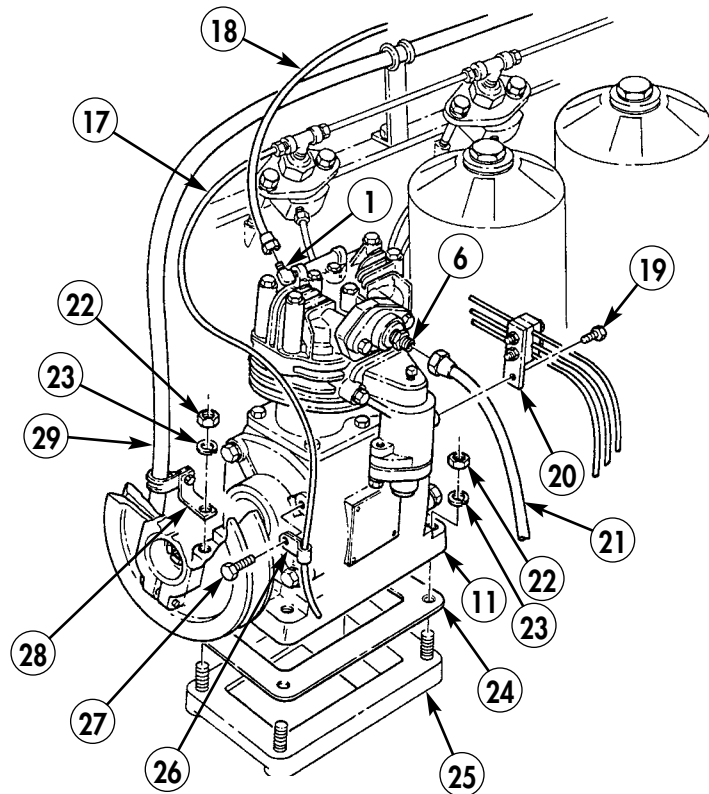
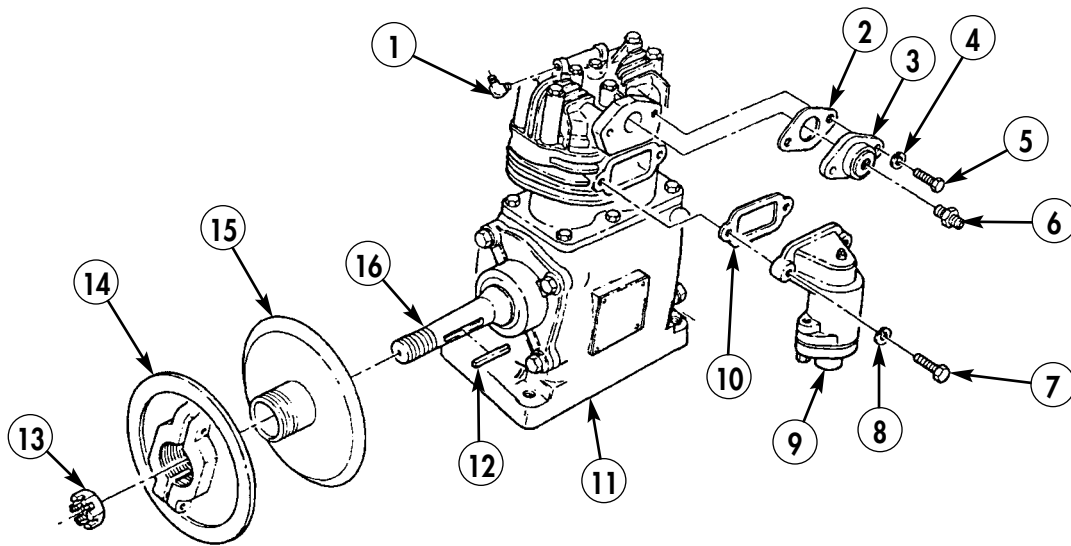
### INSTALLATION

1. Install new gasket (24) over studs on compressor support (25).
2. Install air compressor (11), tachometer cable (29), and bracket clamp (28) on air compressor support (26) with four new lockwashers (23) and nuts (22).
3. Remove screw (19) from air cleaner (9) and install bracket (20) with screw (19).
4. Remove screw (27) from air compressor (11) and install fuel return line (17) and clamp (26) on air compressor (11) with screw (27).
5. Install air line (21) on adapter (6).

## AIR COMPRESSOR AND PULLEY MAINTENANCE (Contd)

### INSTALLATION (Contd)

6. Install governor air line (18) on elbow (1).
7. Install air compressor drivebelt (WP 0182 00).
8. Connect battery ground cable (WP 0126 00).
9. Fill air reservoir (TM 9-2320-361-10).
10. Lower and secure hood (TM 9-2320-361-10).
11. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR COMPRESSOR MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Two lockwashers (item 193, WP 0470 00)

Gasket (item 70, WP 0470 00)

Skysol 100 (item 13, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Hood raised and left side panel down  
(TM 9-2320-361-10).

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## AIR COMPRESSOR MAINTENANCE (Contd)

### REMOVAL

1. Loosen two screws (5) on intake air cleaner (2).
2. Remove two screws (4), lockwashers (3), intake air cleaner (2), and gasket (1) from air compressor (6). Discard lockwashers (3) and gasket (1).

### DISASSEMBLY

1. Remove two screws (5) from intake air cleaner (2).
2. Remove cap (10), spring (9), plate (8), and filter (7) from body of intake air cleaner (2).

### CLEANING

#### **WARNING**

- Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

- Compressed air used for cleaning must not exceed 30 psi (207 kPa). Wear goggles/face shield and gloves when cleaning with compressed air. Failure to do so may result in injury to personnel.

1. Wash filter (7) in Skysol 100 solvent.
2. Using compressed air source, clean and dry filter (7).

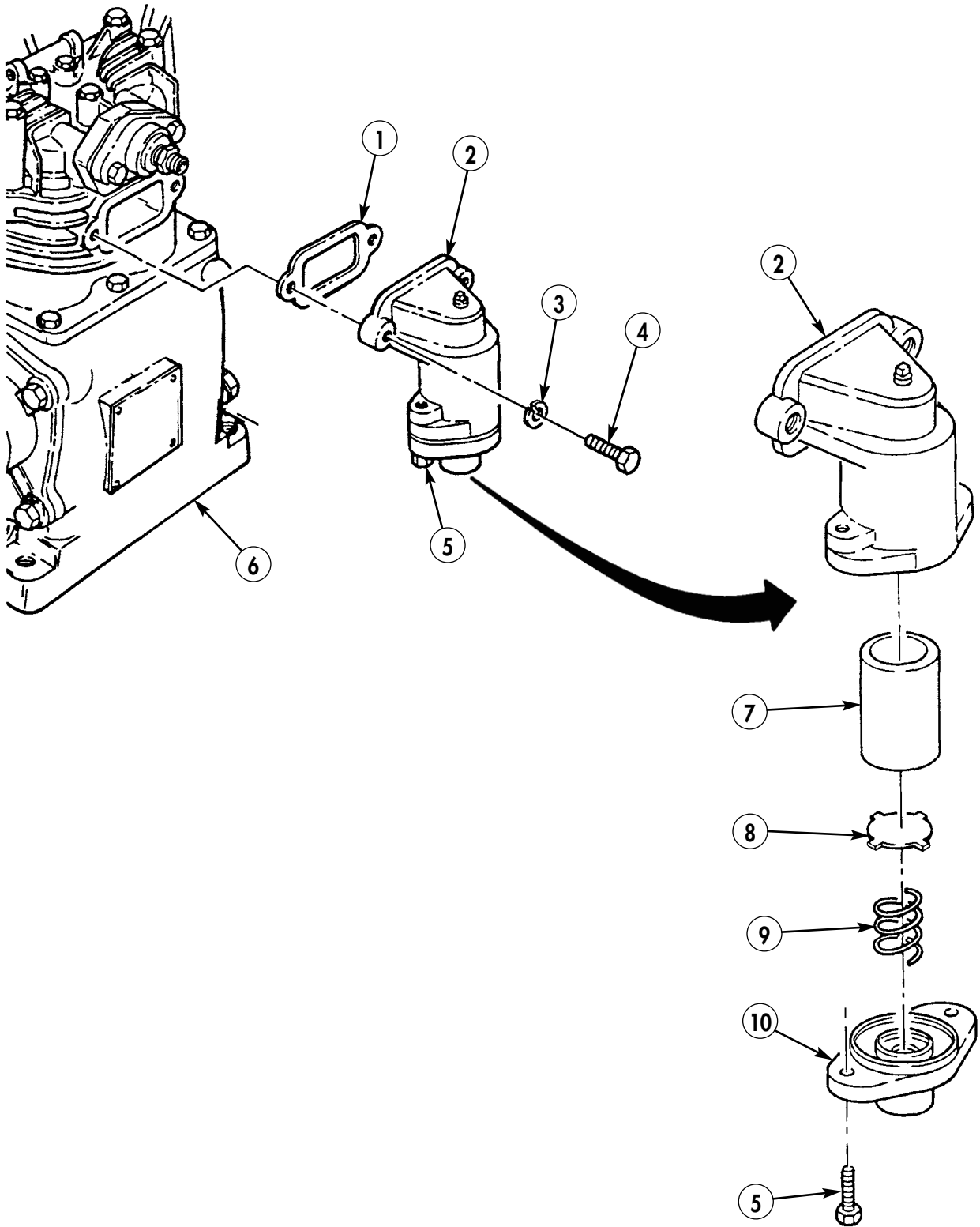
### ASSEMBLY

1. Install filter (7), plate (8), and spring (9) in body of intake air cleaner (2).
2. Install cap (10) on intake air cleaner (2) with two screws (5), Tighten screws (5) finger-tight.

### INSTALLATION

1. Install new gasket (1) and intake air cleaner (2) on air compressor (6) with two new lockwashers (3) and screws (4).
2. Tighten two screws (5).
3. Start engine (TM 9-2320-361-10), buildup air pressure, and check air compressor operation.
4. Raise and lock side panel and lower hood (TM 9-2320-361-10).
5. Connect battery ground cable (WP 0126 00).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

AIR COMPRESSOR MAINTENANCE (Contd)







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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR COMPRESSOR DRIVEBELT MAINTENANCE REMOVAL, INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

Air compressor pulley spanner wrench  
(item 135, WP 0469 00)

**Materials/Parts**

Two lockwashers (item 192, WP 0470 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Hood raised and secured (TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Alternator belts removed (WP 0084 00).

Radiator removed (WP 0077 00).

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## AIR COMPRESSOR DRIVEBELT MAINTENANCE (Contd)

### REMOVAL

1. Remove two screws (2) and lockwashers (1) from adjustable pulley flange (4). Discard lockwashers (1).
2. Using pulley wrench and holding pulley flange (3), turn adjustable pulley flange (4) counterclockwise to loosen drivebelt (5).
3. Remove drivebelt (5) from crankshaft pulley (6), pulley flange (3), and adjustable pulley flange (4).

### INSTALLATION

1. Place drivebelt (5) between pulley flange (3) and adjustable pulley flange (4) and on crankshaft pulley (7).
2. Holding drivebelt (5) up, turn adjustable pulley flange (4) clockwise as far as possible by hand.
3. Turn adjustable pulley flange (4) on pulley flange (3) until there is no slack in drivebelt (5).

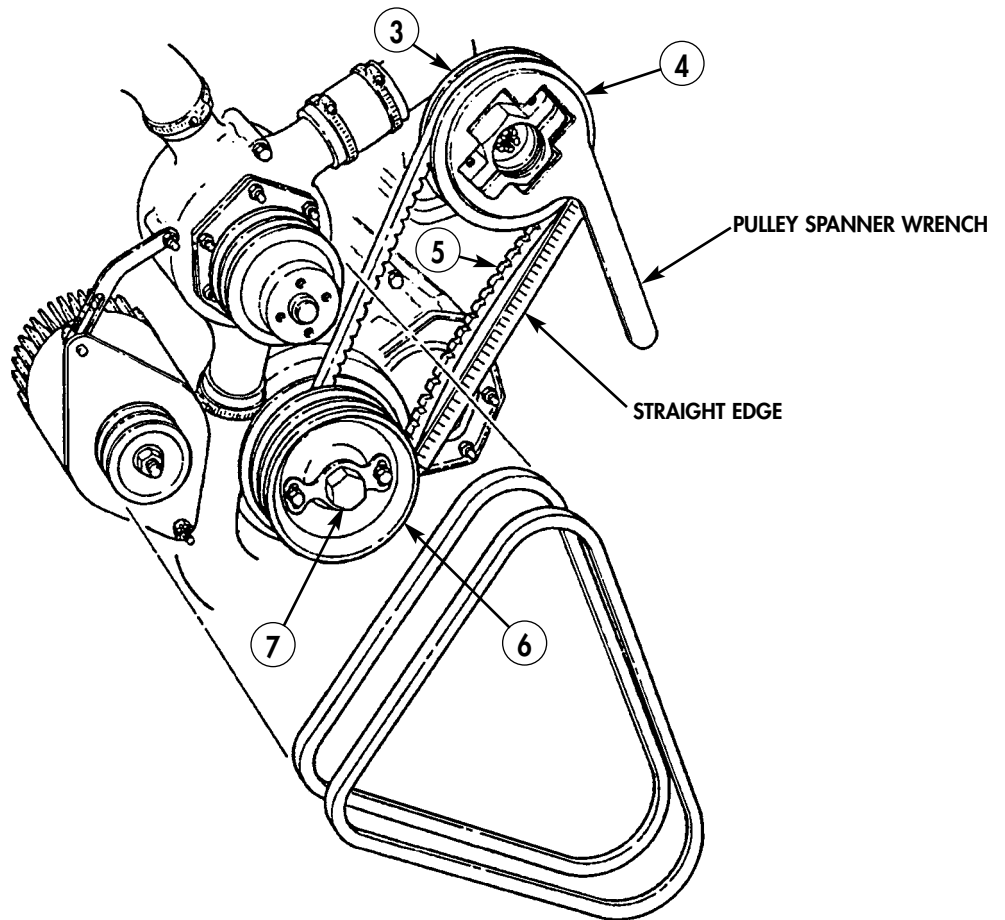
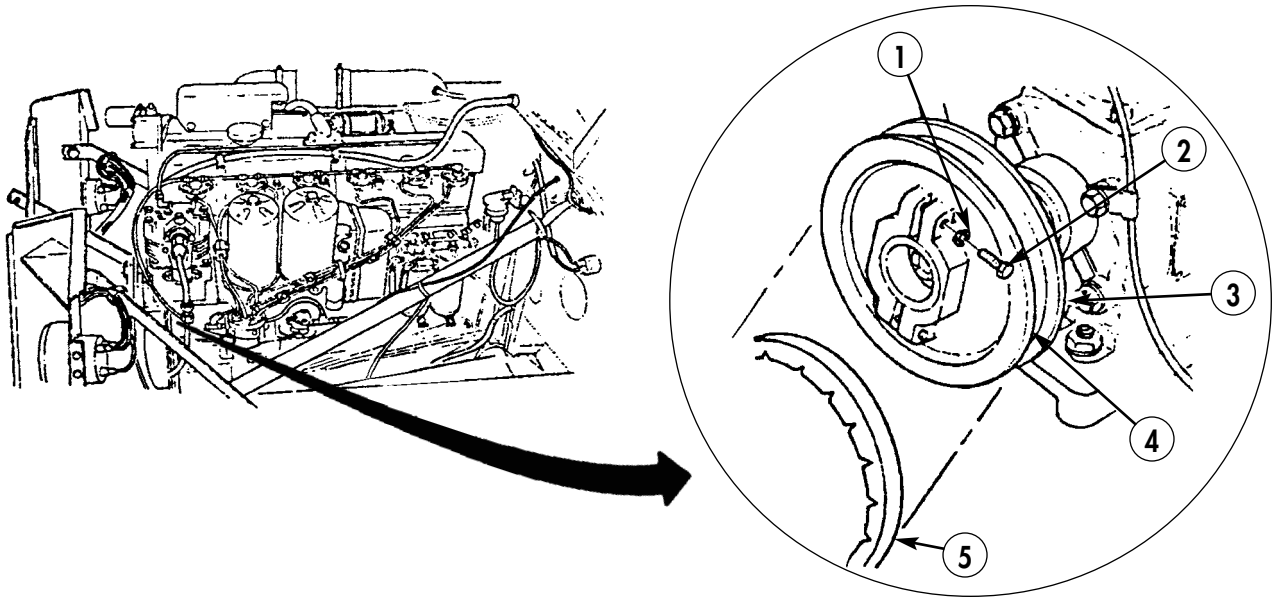
### ADJUSTMENT

#### **WARNING**

Ensure fuel shutoff valve is off before turning over engine.  
Failure to do this may result in injury to personnel.

1. Turn engine several revolutions, by turning crankshaft bolt (7), to equalize tension on both sides of drivebelt (5).
2. Holding straight edge along drivebelt (5), use 6-inch ruler to push in center of drivebelt (5). Correct drivebelt tension is 0.75 in. (1.905 cm) with firm finger grip on 6-inch ruler.
3. Using pulley wrench and holding pulley flange (3), adjust drivebelt (5) tension:
  - a. Turn adjustable pulley flange (4) counterclockwise to loosen tension on drivebelt (5).
  - b. Turn adjustable pulley flange (4) clockwise to increase tension on drivebelt (5).
4. When drivebelt (5) tension is correct, install two new lockwashers (1) and screws (2) in adjustable pulley flange (4).
5. Install radiator (WP 0077 00).
6. Install alternator belts (WP 0084 00).
7. Connect battery ground cable (WP 0126 00).
8. Start engine (TM 9-2320-361-10), build up air pressure, and check air compressor operation.
9. Lower and secure hood (TM 9-2320-361-10).
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

### AIR COMPRESSOR DRIVEBELT MAINTENANCE (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIR COMPRESSOR GOVERNOR MAINTENANCE

REMOVAL, INSTALLATION, AND CHECK AND ADJUSTMENT

---

#### INITIAL SETUP:

##### Applicable Models

All

##### Tools and Special Tools

Gauge, pressure dial indicating  
(item 34, WP 0469 00)

##### Materials/Parts

Two screw-assembled lockwashers  
(item 325, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Hood raised and secured (TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air reservoirs drained (TM 9-2320-361-10).

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## AIR COMPRESSOR GOVERNOR MAINTENANCE (Contd)

### REMOVAL

#### **WARNING**

Do not disconnect air lines before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

#### **NOTE**

Prior to removal, tag all air lines and hoses for installation.

1. Remove two air lines (6) and (8) from tee fitting (7).
2. Remove air line (4) from adapter (3).
3. Remove two screw-assembled lockwashers (5) and air compressor governor (10) from firewall (2). Discard screw-assembled lockwashers (5).
4. Remove tee fitting (7), adapter (9), and adapter (3) from air compressor governor (10).

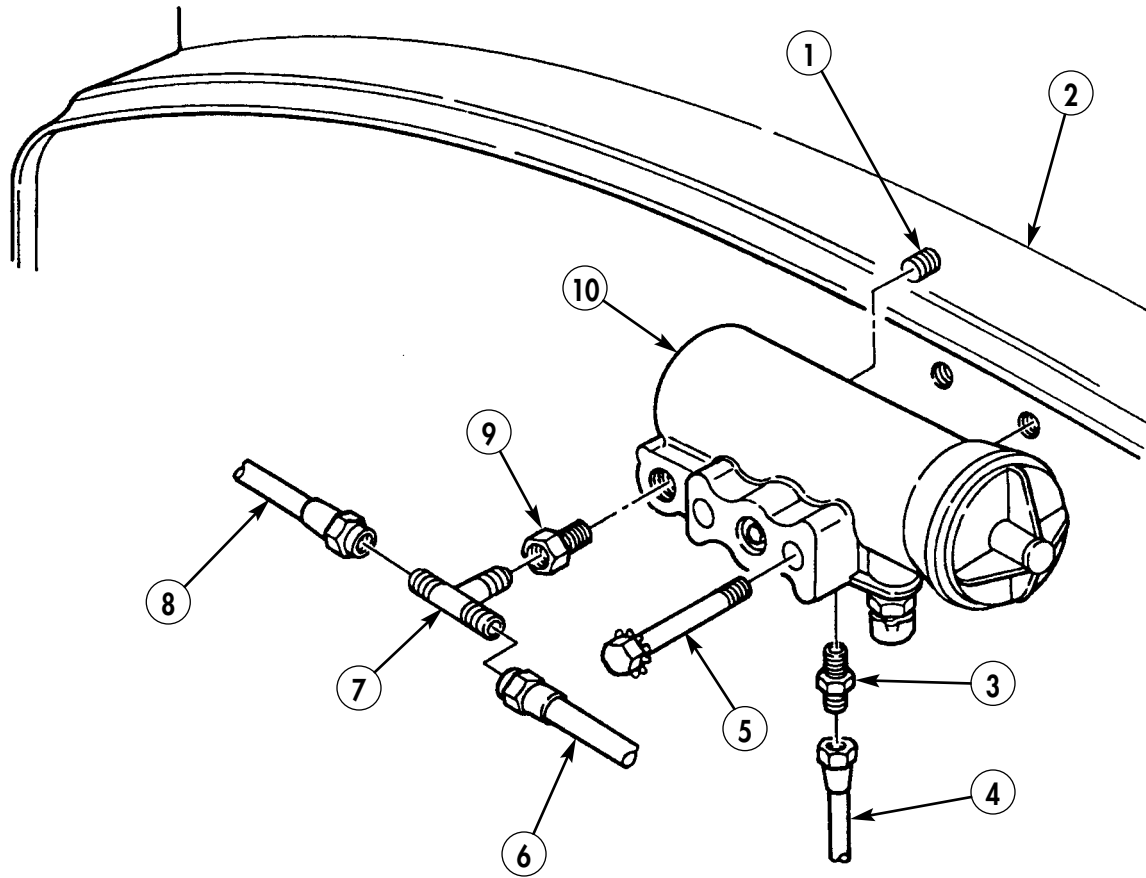
### INSTALLATION

#### **NOTE**

Wrap all male pipe threads with antiseize tape before installation.

1. Install adapter (3) and adapter (9) on air compressor governor (10).
2. Install tee fitting (7) on adapter (9).
3. Install air compressor governor (10) on firewall (2) with two new screw-assembled lockwashers (5).
4. Install air line (4) on adapter (3).
5. Install two air lines (8) and (6) on tee fitting (7).
6. Connect battery ground cable (WP 0126 00).
7. Lower and secure hood (TM 9-2320-361-10).

AIR COMPRESSOR GOVERNOR MAINTENANCE (Contd)



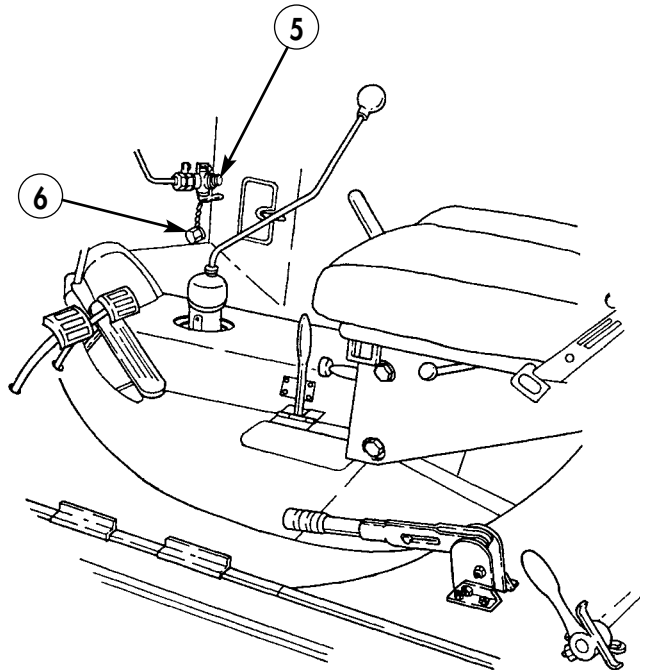
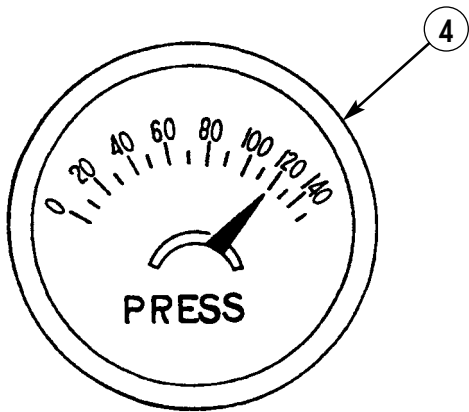
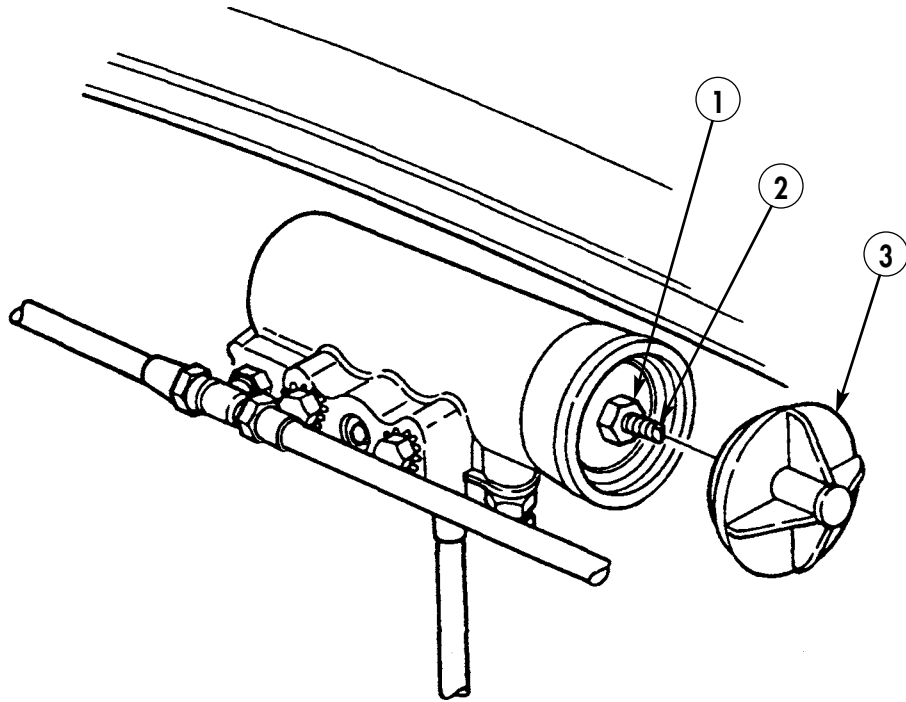
## AIR COMPRESSOR GOVERNOR MAINTENANCE (Contd)

### CHECK AND ADJUSTMENT

1. Start engine and buildup air pressure (TM 9-2320-361-10) until gauge (4) reading is steady.
2. Check air pressure. Gauge (4) should read 85–120 psi.
3. If air pressure gauge (4) reading is correct, stop engine. End of task.
4. If air pressure gauge (4) reading is too low:
  - a. Stop engine.
  - b. Remove cap (3), loosen jamnut (1), and turn screw (2) 1/4 turn counterclockwise.
  - c. Start engine and buildup air pressure (TM 9-2320-361-10). Check air pressure gauge (4) reading.  
If still low, check for air leaks and repeat step b. until air pressure is correct.
  - d. Stop engine, tighten jamnut (1) on screw (2), and install cap (3).
5. If air pressure gauge (4) reading is too high:
  - a. Stop engine.
  - b. Remove cap (6) from air valve (5).
  - c. Turn air valve (5) left and bleed air until gauge (4) reads below 100 psi.
  - d. Close air valve (5) and replace cap (6).
  - e. Remove cap (3), loosen jamnut (1), and turn screw (2) 1/4 turn clockwise.
  - f. Start engine and buildup air pressure. Check air pressure gauge (4) reading. If still high, repeat steps a. through e. until air pressure is correct.
  - g. Stop engine, tighten jamnut (1) on screw (2) and install cap (3).
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**AIR COMPRESSOR GOVERNOR MAINTENANCE (Contd)**





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### QUICK-DISCONNECT COUPLING HALF MAINTENANCE

LEAK TEST, REMOVAL, AND INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Seal (item 419, WP 0470 00)

Antiseize tape (item 42, WP 0468 00)

Detergent (item 16, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Air reservoirs drained (TM 9-2320-361-10).

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## QUICK-DISCONNECT COUPLING HALF MAINTENANCE (Contd)

### LEAK TEST

1. Start engine (TM 9-2320-361-10) and buildup air pressure.
2. With dummy coupling (4) locked to coupling half (5), turn valve handle (1) to open position.
3. Test dummy coupling (4) and coupling seal (3) for leaks by coating with soapy water. Check if coupling seal (3) is leaking by watching for air bubbles. If leaking or damaged, replace coupling seal (3).
4. Turn valve handle (1) to align with coupling half (5).
5. Stop engine (TM 9-2320-361-10).

### REMOVAL

#### **WARNING**

Do not disconnect air couplings before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

1. Remove dummy coupling (4) from coupling half (5).
2. Remove coupling half (5) from nipple (2).

#### **NOTE**

Perform step 3 only if coupling seal is damaged or leaking.

3. Remove coupling seal (3) from coupling half (5). Clean all coupling seal (3) remains from coupling half (5).

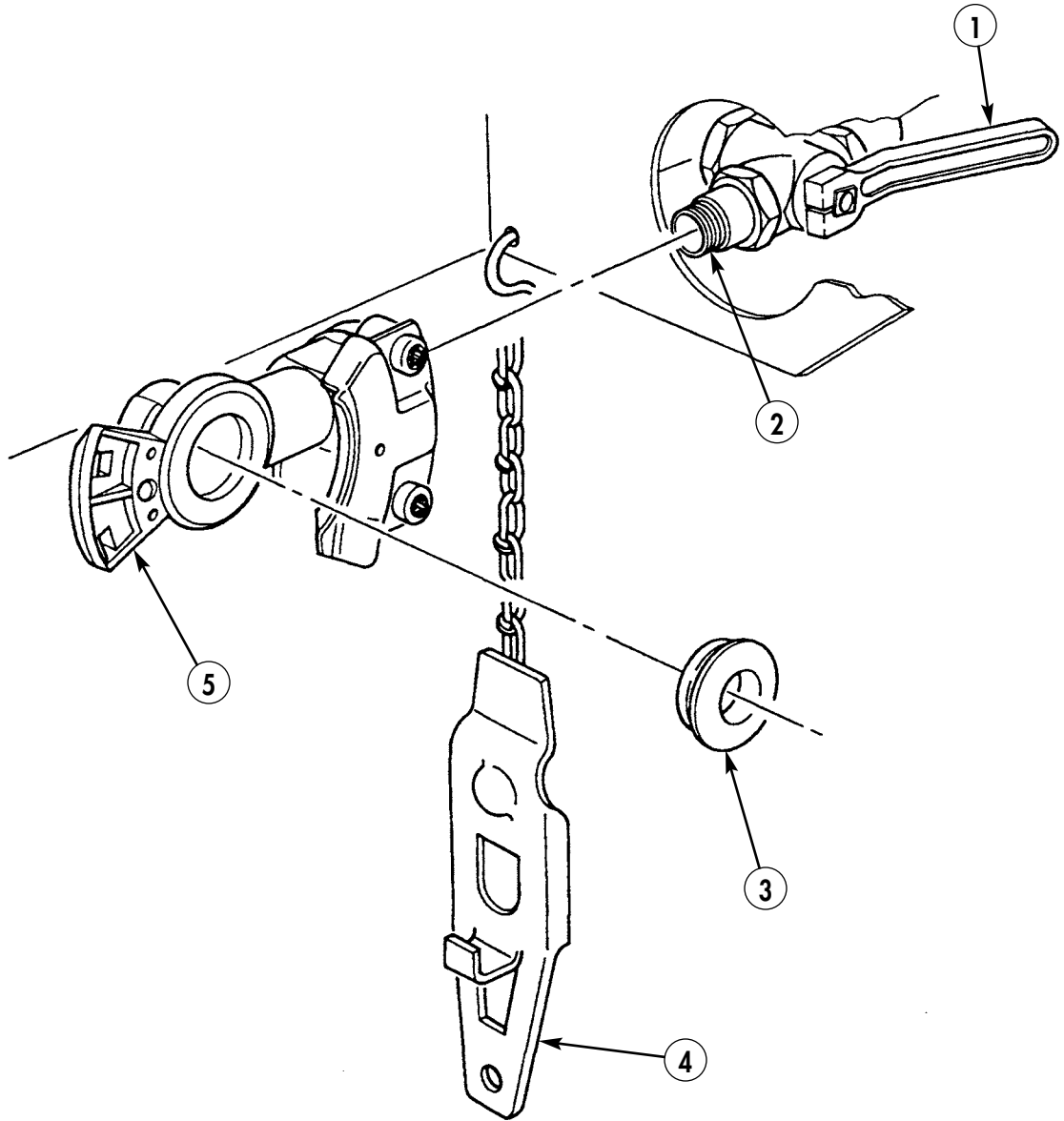
### INSTALLATION

#### **NOTE**

Perform step 1 if coupling was removed. Wrap male pipe threads with antiseize tape before installation.

1. Install new coupling seal (3) in coupling half (5).
2. Install coupling half (5) on nipple (2).
3. Install dummy coupling (4) on coupling half (5).
4. Connect battery ground cable (WP 0126 00).
5. Start engine (TM 9-2320-361-10), build up air pressure, and check for leaks.
6. Release parking brake and remove wheel chocks (TM 9-2320-361-10).

QUICK-DISCONNECT COUPLING HALF MAINTENANCE (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### AIRBRAKE CUTOFF VALVES AND COUPLINGS REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

**Applicable Models**

All

**Materials/Parts**

Lockwasher (item 216, WP 0470 00)  
Antiseize tape (item 42, WP 0468 00)

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).  
Battery ground cable disconnected  
(WP 0126 00).  
Air reservoirs drained (TM 9-2320-361-10).

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## AIRBRAKE CUTOFF VALVES AND COUPLINGS REPLACEMENT (Contd)

### REMOVAL

#### **WARNING**

Do not disconnect air couplings before draining air reservoirs. Small parts under pressure may shoot out with high velocity, causing injury to personnel.

#### **NOTE**

The right emergency and left service couplings and cutoff valves are replaced the same. This procedure covers the right side of emergency brake.

1. Remove dummy coupling (11) from coupling half (12).
2. Remove chain (13) and dummy coupling (11) from bracket (9).
3. Remove coupling half (12), nipple (10), and elbow (8) from cutoff valve (7).
4. Remove airline (2) and elbow (1) from connector (5).
5. Remove nut (3), cutoff valve (7) with connector (5), and lockwasher (4) from frame (14). Discard lockwasher (4).
6. Remove nut (6) and connector (5) from cutoff valve (7).

### INSTALLATION

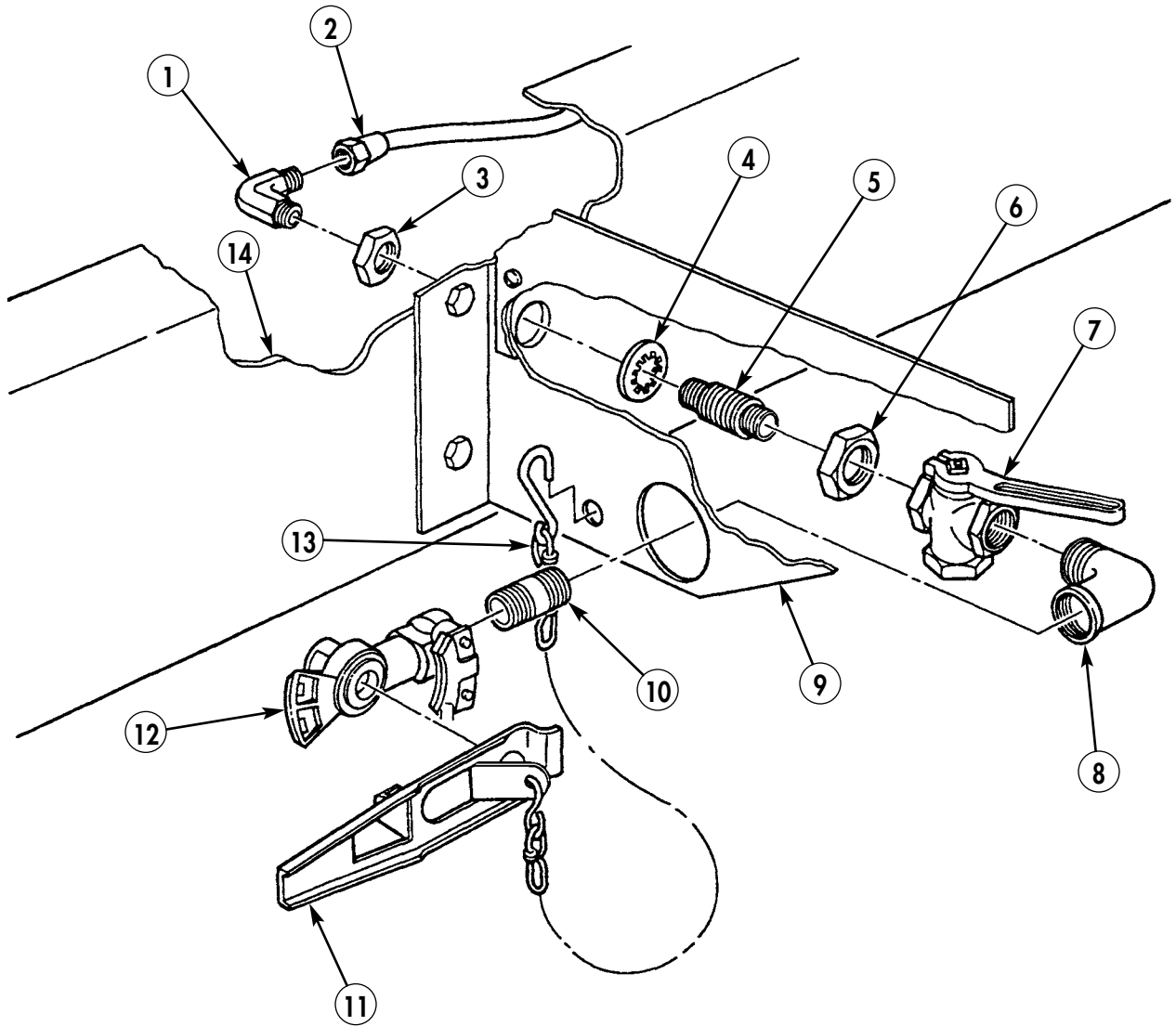
#### **NOTE**

Wrap all male pipe threads with antiseize tape before installation.

1. Install connector (5) and nut (6) on cutoff valve (7).
2. Install new lockwasher (4) and cutoff valve (7) with connector (5) on frame (14) with nut (3).
3. Install elbow (1) and air line (2) on connector (5).
4. Install elbow (8), nipple (10), and coupling half (12) on cutoff valve (7).
5. Install chain (13) and dummy coupling (11) on bracket (9).
6. Install dummy coupling (11) on coupling half (12).
7. Make sure cutoff valve (7) handle is turned to off position.
8. Connect battery ground cable (WP 0126 00).
9. Start engine (TM 9-2320-361-10), build up air pressure, and check for air leaks.
10. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



**AIRBRAKE CUTOFF VALVES AND COUPLINGS REPLACEMENT (Contd)**



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### WHEEL, TIRE, AND TUBE MAINTENANCE

WHEEL REMOVAL, TIRE AND TUBE REMOVAL, INSPECTION,  
TIRE AND TUBE INSTALLATION, AND WHEEL INSTALLATION

---

#### INITIAL SETUP:

**Applicable Models**

All

**Tools and Special Tools**

Wrench, socket (item 134, WP 0469 00)

**Personnel Required**

Two

**References**

TM 9-2610-200-14

**Equipment Condition**

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

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## WHEEL, TIRE, AND TUBE MAINTENANCE (Contd)

### WHEEL REMOVAL

#### **WARNING**

Completely deflate tires before removing from axles if there is obvious damage to wheel components. Injury or death to personnel may result from exploding wheel components.

#### **NOTE**

- Wheel stud nuts on left side have left-hand threads and must be turned to the right to loosen them. Wheel stud nuts on right side have right-hand threads and must be turned to the left to loosen them. Studs and nuts are stamped (L) left and (R) right.
- Rear and front wheels are maintained the same way. This procedure covers rear wheels.

1. Loosen six wheel stud nuts (1) on wheel (2) to be removed.
2. Raise vehicle with hydraulic jack and place jack stand under axle (6) of wheel (2) to be removed.
3. Remove six wheel stud nuts (1) from inner-rear wheel (4).

#### **CAUTION**

Do not slide wheel on threaded studs. Sliding wheel may damage threads.

#### **NOTE**

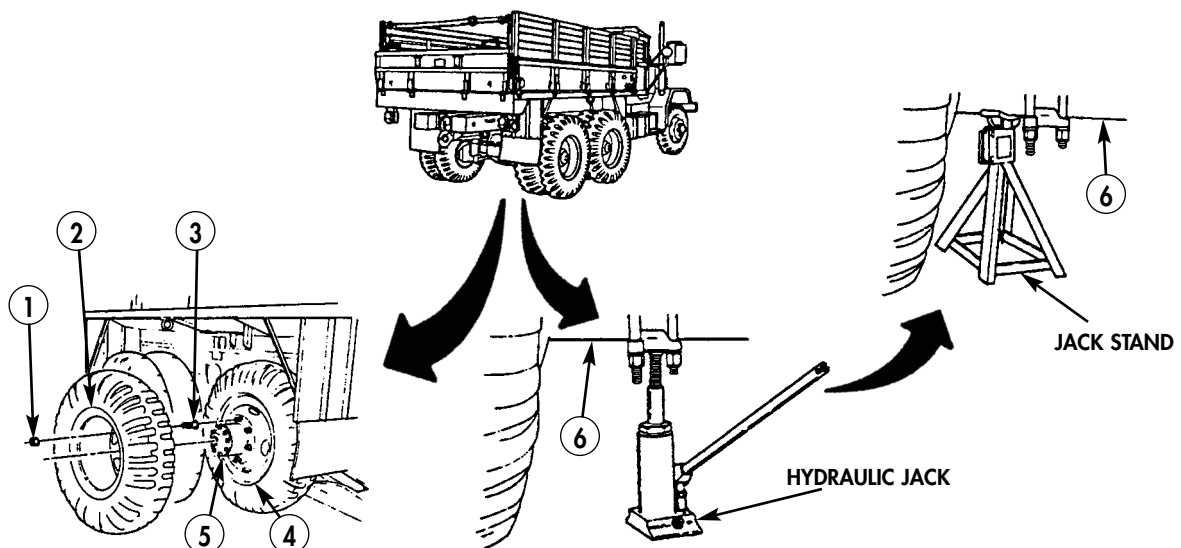
Assistant will help with steps 4 and 5.

4. Remove outer-rear wheel (2) from hub (5).

#### **NOTE**

To remove inner wheel, reverse wheel stud nut wrench, remove handle, and install near large end of wrench.

5. Remove six wheel cap nuts (3) and inner-rear wheel (4) from hub (5).



## WHEEL, TIRE, AND TUBE MAINTENANCE (Contd)

### TIRE AND TUBE REMOVAL

1. Unscrew valve cap (8) from valve stem (7). Use valve cap (8) to remove valve core (9) from valve stem (7) to release air from tire.

#### **WARNING**

Never remove tire lock ring without first deflating tire. Lock ring may explode off, causing injury or death to personnel.

#### **NOTE**

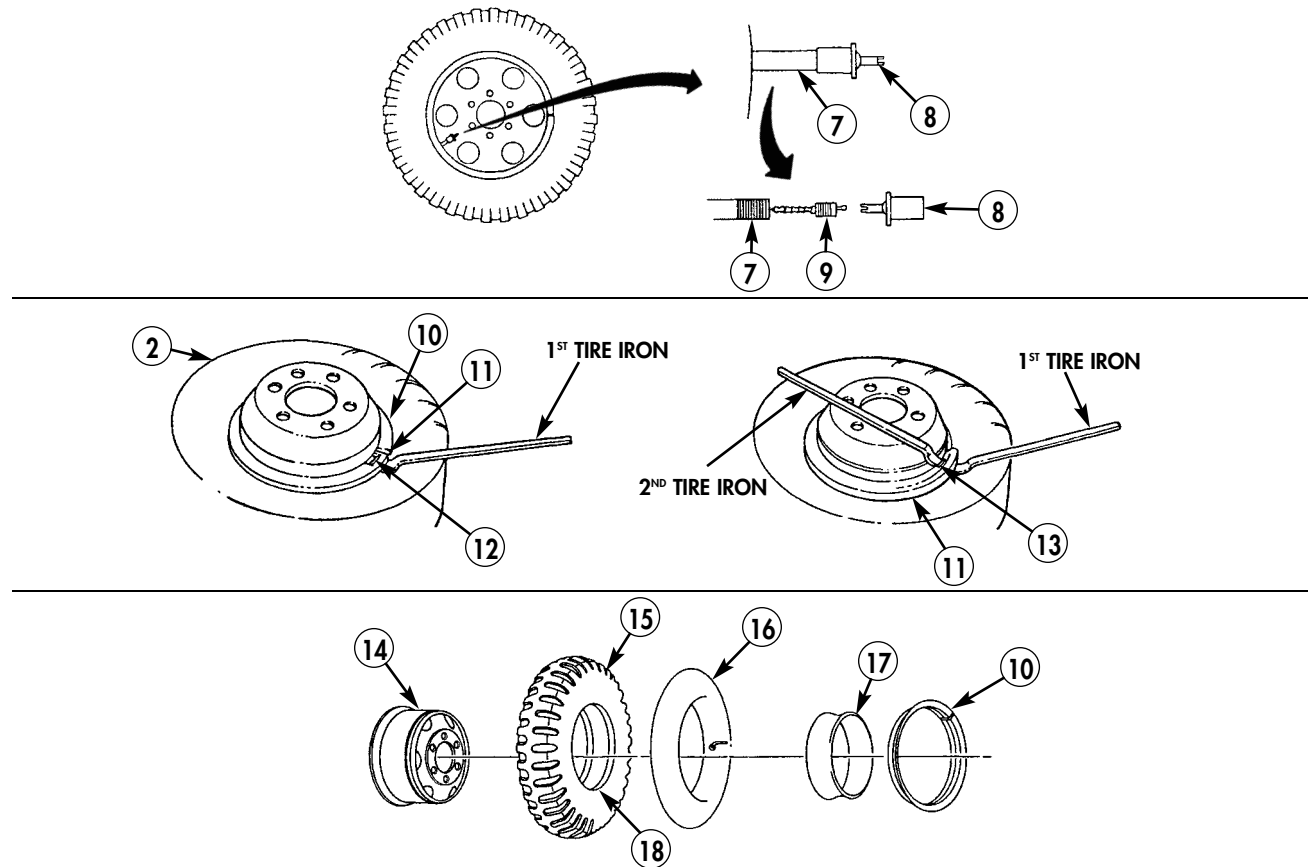
Put a soap and water solution on tire bead to help remove tire from rim.

2. Lay outer-rear wheel (2) flat on side with lock ring (10) facing upwards and break tire bead (18) from lock ring (10).

#### **NOTE**

Assistant will help with step 3.

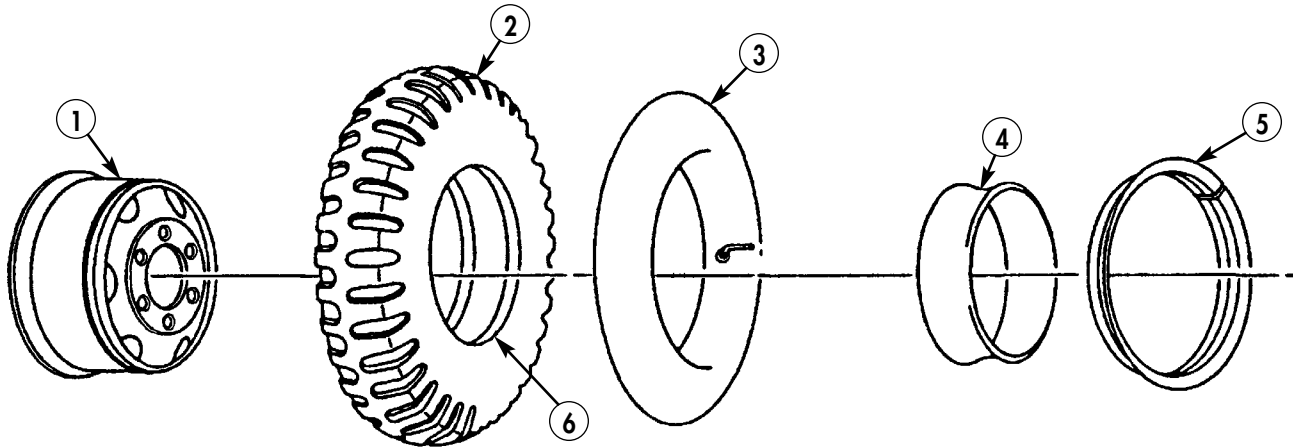
3. Insert first tire iron between lock ring slit (11) and pry upward until lock ring slot (12) is exposed.
4. Insert second tire iron in lock ring slot (12) and pry outward and upward.
5. Run first tire iron completely around and remove lock ring (10).
6. Turn wheel (2) over and break tire bead (18) on opposite side.
7. Remove rim (14), tire liner (17), and tube (16) from tire (15).



## WHEEL, TIRE, AND TUBE MAINTENANCE (Contd)

### INSPECTION

1. Inspect rim (1) and lock ring (5) for bends, cracks, breaks, distortion, or pitting from corrosion. Replace if bent, cracked, broken, distorted, or pitted from corrosion.
2. Inspect tire (2), tube (3), and tire liner (4) for cracks, stud hole damage, and bends. Replace if cracked, stud holes are damaged, or bent.



### TIRE AND TUBE INSTALLATION

1. Use valve cap (8) to screw valve core (9) into valve stem (7), and place tube (3) in tire (2).
2. Inflate tube (3) enough to hold shape (do not exceed 3 psi (21 kPa)), and install tire liner (4) over valve stem (7). Ensure tube (3) and tire liner (4) are straight and not pinched.
3. Install tire (2) and tube (3) on rim (1) and guide valve stem (7) through hole in rim (1), and seat tire (2) firmly.

#### **WARNING**

- Lock ring must be properly seated around wheel when installed. If lock ring is not correctly installed, it may explode off when tire is inflated, causing injury or death to personnel.
  - Never attempt to correct seating of lock ring by hammering, striking, or forcing while tire is inflated. Lock ring may explode off, causing injury or death to personnel.
4. Install lock ring (5) into groove of rim (1).

## WHEEL, TIRE, AND TUBE MAINTENANCE (Contd)

### TIRE AND TUBE INSTALLATION (Contd)

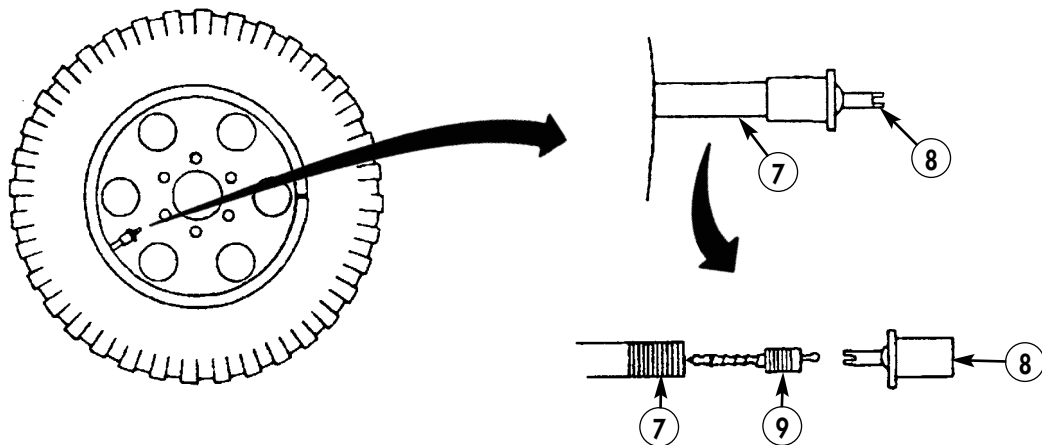
#### **WARNING**

- Never inflate a tire without a tire inflation cage. Injury or death to personnel may result from exploding wheel components.
- Always use tire inflation equipment specified in TM 9-2610-200-14. Warn personnel to stand 10 ft (3.1 m) clear of tire inflation cage while inflating tire. Injury or death may result from exploding wheel components.
- Never rest or lean against tire inflation cage while tire is being inflated or injury or death to personnel may result.

#### **NOTE**

Ensure tire inflation cage does not have cracked welds, cracked or bent components, or pitting from corrosion. If any of these are found, obtain new cage.

5. Inflate tire (2) (TM 9-2320-361-10) and install valve cap (8).
6. Inspect rim (1) and lock ring (5) for proper seating while still in inflation cage. If further adjustment is required, deflate tire (2) completely before adjusting lock ring (5).



## WHEEL, TIRE, AND TUBE MAINTENANCE (Contd)

### WHEEL INSTALLATION

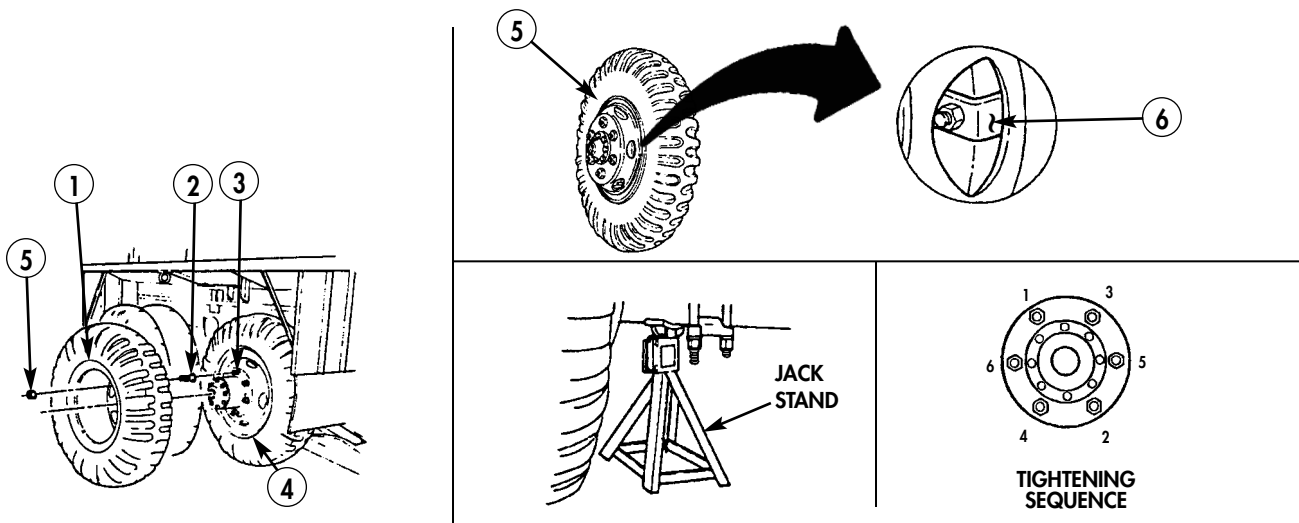
#### **CAUTION**

When installing stud nuts, ensure to put the curved (ball seat) surface of the nut toward the wheel to seat properly. Failure to do this may result in damage to wheel.

#### **NOTE**

- Wear of rear dual tires should be matched as closely as possible. Valves on rear tires must be opposite each other (180° apart).
- Ventilation holes in outer wheel should be directly aligned with ventilation holes in inner wheel.
- Nuts have left-hand threads on left wheel assembly and right and threads on right wheel assembly. Studs and nuts are stamped (L) left and (R) right.
- Assistant will help steps 1 and 3.
- If inner-rear wheel is being replaced, ensure inner stud nuts are properly seated when installed.
- If inner-rear wheel is being installed, perform step 4. If outer-rear wheel or front wheel is being installed, go to step 5.

1. Lift inner wheel (4) and install on wheel studs (3).
2. Install and hand tighten six wheel capnuts (2) on wheel studs (3).
3. Tighten six wheel capnuts (2) in tightening sequence shown 400–425 lb-ft (542–576 N•m).
4. Lift wheel (1) and install on wheel capnuts (2) with six stud nuts (5). On front wheel, ensure brake inspection plate (6) is visible through ventilation hole.
5. Install and hand-tighten six new wheel cap nuts (5).
6. Tighten six stud nuts (5) in sequence shown on front wheel 325–355 lb-ft (441–481 N•m) and six stud nuts (5) on wheel (1) 325–355 lb-ft (441–481 N•m).
7. Raise vehicle with hydraulic jack, remove jack stand, and lower vehicle to ground.
8. Connect battery ground cable (WP 0126 00).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### FRONT HUB AND DRUM MAINTENANCE

DISASSEMBLY, CLEANING AND INSPECTION, LUBRICATION, AND ASSEMBLY

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#### INITIAL SETUP:

**Applicable Models**

All

**Personnel Required**

Two

**Materials/Parts**

Ten lockwashers (item 195, WP 0470 00)  
Eight lockwashers (item 206, WP 0470 00)  
Ten bolts (item 326, WP 0470 00)  
Six wheel studs (item 369, WP 0470 00)  
Key washer (item 375, WP 0470 00)  
Seal (item 357, WP 0470 00)  
Gasket (item 439, WP 0470 00)  
GAA grease (item 17, WP 0468 00)  
Skysol 100 (item 13, WP 0468 00)

**References**

TM 9-214  
WP 0168 00  
WP 0189 00

**Equipment Condition**

Front wheel(s) removed (WP 0186 00).  
Rear wheels chocked (TM 9-2320-361-10).  
Front axle shaft flange removed (WP 0146 00).  
Battery ground cable disconnected  
(WP 0126 00).

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## FRONT HUB AND DRUM MAINTENANCE (Contd)

### DISASSEMBLY

#### **CAUTION**

Differential housing must be thoroughly cleaned before disassembly. Do not allow dirt or other contaminants to enter the differential components. Failure to comply may result in damage to components.

#### **NOTE**

Both hub and drum assemblies are disassembled the same way.

1. Remove eight capscrews (1), lockwashers (2), flange (3) with expansion plug (9), and gasket (4) from hub (15). Discard lockwashers (2) and gasket (4).
2. Straighten tabs on key washer (7) and remove two nuts (6) and (8) and key washer (7) from spindle (11). Discard key washer (7).
3. Remove outer bearing (5) from hub (15) and spindle (11).

#### **CAUTION**

Do not slide hub and drum assembly over threaded end of spindle. Damage to spindle may result.

4. Remove hub (15) and drum (14) from spindle (11).
5. Remove ten nuts (18), lockwashers (19), access cover (20), and drum (14) from adapter (13). Discard lockwashers (19).
6. Remove six wheel studs (12) from adapter (13). Discard wheel studs (12).
7. Remove ten bolts (10) from adapter (13). Discard bolts (10).
8. Remove inner bearing (16) from hub (15).
9. Remove seal (17) from hub (15). Discard seal (17).

### CLEANING AND INSPECTION

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

1. Clean all hub (10) and drum (16) components with Skysol 100 solvent, and allow to air dry. Do not use compressed air to dry bearings (5) or (16).
2. Inspect inner and outer bearings (5) and (16) (TM 9-214). If damaged, replace.
3. Inspect hub (10) for cracks and breaks. Replace if cracked or broken.
4. Inspect drum (16) for cracks. Replace if cracked.
5. Check adapter (17) for cracks or warps. Replace if cracked or warped.

## FRONT HUB AND DRUM MAINTENANCE (Contd)

### LUBRICATION

1. Pack inner and outer bearings (5) and (16) with GAA grease (TM 9-214).
2. Apply light coat of GAA grease to rubber section of new inner bearing seal (12).

### ASSEMBLY

#### NOTE

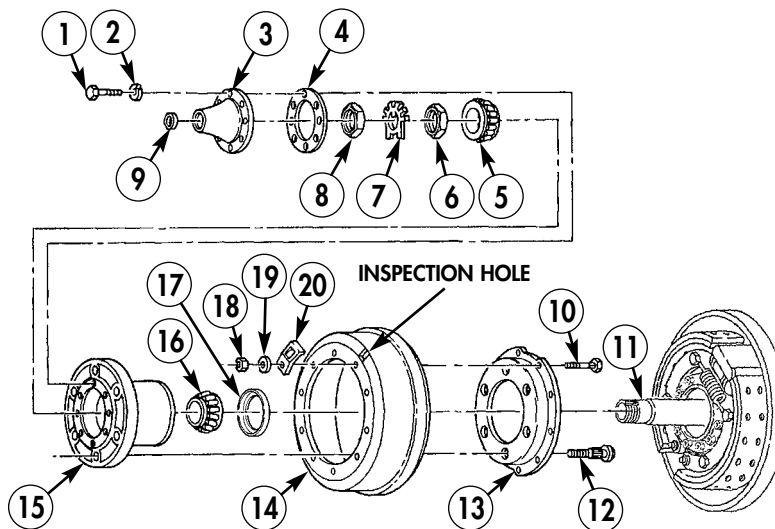
Assembly procedures below refer to one hub and drum. The remaining hub and drum are assembled in the same way.

1. Apply light coat of GAA grease to rubber lips of new seal (17) and lubricate bearings (5) and (16) per TM 9-214.
2. Install bearing (16) and seal (17) on hub (15).
3. Install adapter (13) on drum (14) with ten new bolts (10).
4. Position hub (15) on adapter (13), align inspection holes of hub (15) and drum (14), and install six new wheel studs (12).
5. Install access cover (20) (placed to cover inspection hole), ten new lockwashers (19), and nuts (18) on bolts (10). Tighten nuts (18) 31–39 lb-ft (42–53 N•m).
6. Cover threaded end of spindle (11) with tape and apply grease to spindle (11).

#### CAUTION

Use extreme caution when installing hub and drum on spindle. Any jarring or sliding of hub and drum over threaded end of spindle may cause damage to contact surfaces of spindle and hub.

7. Install hub (15) and drum (14) on spindle (11) and remove tape from threaded end of spindle (11).
8. Install outer bearing (5) on spindle (11) and hub (15).
9. Install inner nut (6) on spindle (11), turn drum (14) and tighten inner nut (6) 50 lb-ft (68 N•m), then back off nut (6) 1/16 to 1/4 turn.
10. Install new key washer (7) and outer nut (8) on spindle (11). Tighten outer nut (8) 100–150 lb-ft (136–203 N•m).
11. Bend tabs on key washer (7) down, over nut (6).
12. Coat one side of new gasket (4) with GAA grease and align over holes in hub (15).
13. Align holes in flange (3), gasket (4), and hub (15). Install flange (3) with expansion plug (9) on hub (15) with eight new lockwashers (2) and screws (1). Tighten screws (1) 60–80 lb-ft (81–108 N•m).
14. Install front axle shaft flange (WP 0146 00).
15. Connect battery ground cable (WP 0126 00).
16. Remove real wheel chocks (TM 9-2320-361-10).
17. Install front wheel(s) (WP 0186 00).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### REAR HUB AND DRUM MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, LUBRICATION, AND INSTALLATION

#### INITIAL SETUP:

##### Applicable Models

All

##### Personnel Required

Two

##### Materials/Parts

Outer bearing seal (item 354, WP 0470 00)  
 Inner bearing seal (item 357, WP 0470 00)  
 Cork gasket (item 114, WP 0470 00)  
 Seal (item 333, WP 0470 00)  
 Seal (item 420, WP 0470 00)  
 Eight lockwashers (item 206, WP 0470 00)  
 Key washer (item 375, WP 0470 00)  
 Ten lockwashers (item 195, WP 0470 00)  
 Ten screws (item 326, WP 0470 00)  
 Six studs-driver side (item 369, WP 0470 00)  
 Six studs-passenger side  
 (item 370, WP 0470 00)  
 GAA grease (item 17, WP 0468 00)  
 Safety wire (item 50, WP 0468 00)  
 Skysol 100 (item 13, WP 0468 00)

##### References

WP 0168 00  
 TM 9-214  
 WP 0151 00  
 WP 0189 00

##### Equipment Condition

Wheels chocked (TM 9-2320-361-10).  
 Battery ground cable disconnected  
 (WP 0126 00).  
 Rear wheel(s) removed (TM 9-2320-361-10).  
 Rear axle shaft removed (WP 0147 00).

## REAR HUB AND DRUM MAINTENANCE (Contd)

### REMOVAL

1. Bend back tabs on key washer (22), and remove outer adjusting nut (23), key washer (22), and inner adjusting nut (21) from spindle (8). Discard key washer (22).

#### **CAUTION**

Do not slide seal over threaded end of spindle, or damage to seal may result.

2. Remove outer seal (20), cork gasket (14), and outer bearing (19) from spindle (8). Discard cork gasket (14) and outer seal (20).

#### **CAUTION**

Do not slide hub and drum assembly over spindle, or damage to equipment may result.

3. Remove hub (13) and drum (18) from spindle (8).

### DISASSEMBLY

1. Remove ten nuts (15), lockwashers (16), and inspection cover (17) from drum (18). Discard lockwashers (16).
2. Remove ten screws (3) and deflector (2) from adapter (1). Discard screws (3).
3. Remove hub (13) from drum (18).
4. Remove safety wire (9), eight screws (10), lockwashers (11), and adapter (1) from hub (13). Discard safety wire (9) and lockwashers (11).
5. Remove six wheel studs (12) from hub (13). Discard studs (12).
6. Remove inner bearing (4) and seal (5) from spindle (8). Discard seal (5).

### CLEANING AND INSPECTION

#### **WARNING**

- Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

- Do not use compressed air to dry bearings. Failure to comply may result in injury to personnel.

1. Clean all hub (13) and drum (18) components with Skysol 100, and allow to air dry.
2. Inspect inner and outer bearings (4) and (19) (TM 9-214). If damaged, replace.

## REAR HUB AND DRUM MAINTENANCE (Contd)

### CLEANING AND INSPECTION (Contd)

3. Inspect inner and outer bearing cups (25) and (24) (TM 9-214). If damaged, replace.
4. Check rivets (7) and backing plate (6) for looseness. If loose, replace axle (WP 0151 00).

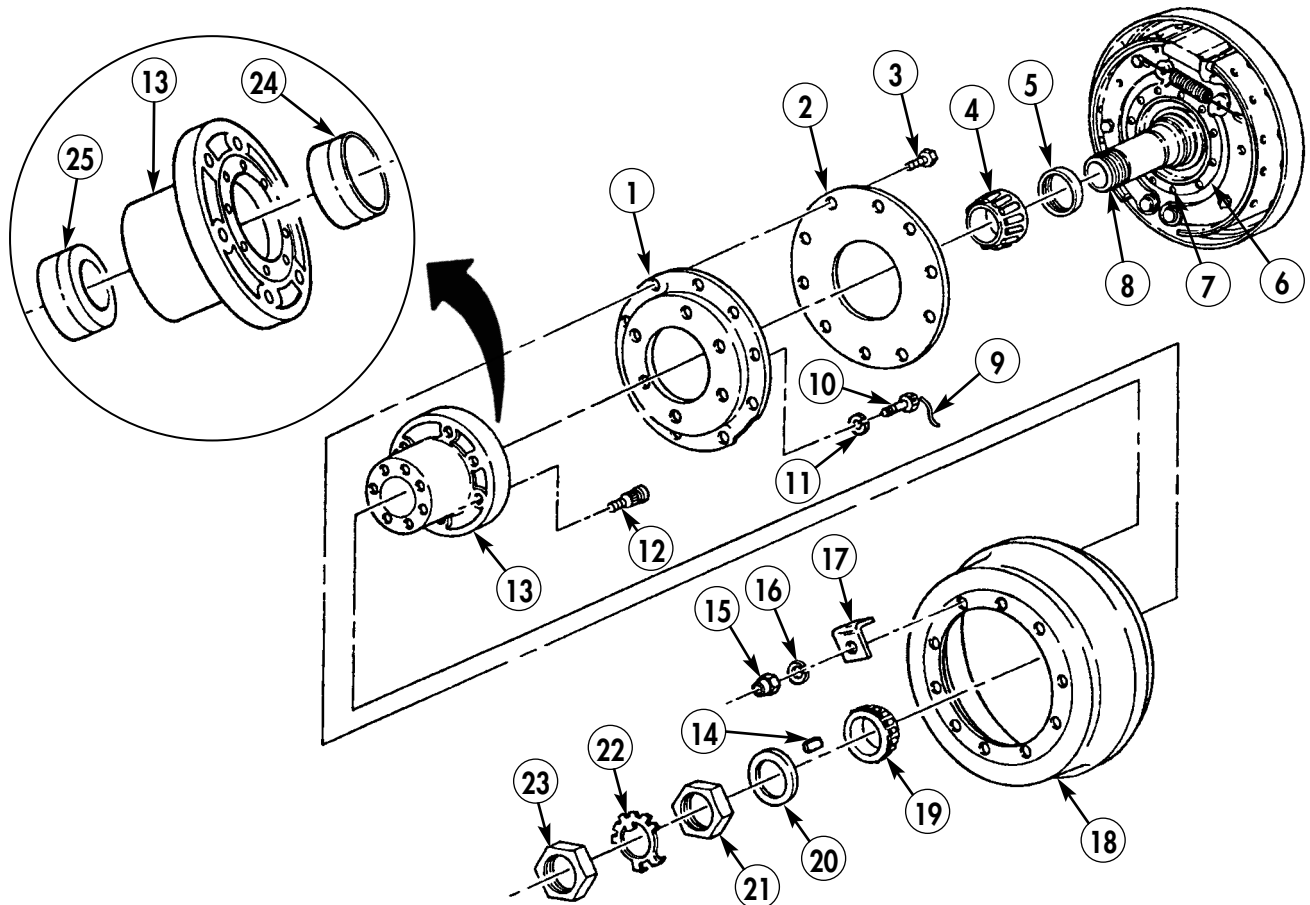
#### NOTE

Perform steps 5 and 6 only if bearings or bearing cups are to be replaced.

5. Remove inner and outer bearing cups (25) and (24) from hub (13) by tapping alternately on outer edge.
6. Inspect hub (13) for cracks or breaks. If cracked or broken, replace.
7. Press new inner and outer bearing cups (25) and (24) into hub (13). Make sure cups (25) and (24) are seated.
8. Inspect hub (13) for cracks or breaks. If cracked or broken, replace.
9. Inspect drum (18) for deep grooves and cracks. If cracked or grooved, replace.
10. Inspect adapter (1) and deflector (2) for cracks or warps. If cracked or warped, replace.

### LUBRICATION

1. Pack inner and outer bearings (4) and (19) with GAA grease (TM 9-214).
2. Apply light coat of GAA grease to rubber section of new inner bearing seal (5).



## REAR HUB AND DRUM MAINTENANCE (Contd)

### ASSEMBLY

1. Install new inner bearing seal (5) and inner bearing (4) on spindle (6).
2. Install six new wheel studs (10) on hub (11).
3. Install adapter (1) on hub (11) with eight new lockwashers (9) and screws (8). Tighten screws (8) 81–104 lb-ft (110–141 N•m) and install new safety wire (7).
4. Install hub (11) in drum (16).
5. Install deflector (2) on adapter (1) with ten new screws (3).
6. Install inspection cover (15), ten new lockwashers (14), and nuts (13). Tighten nuts (13) 31–39 lb-ft (42–53 N•m).

### INSTALLATION

#### **CAUTION**

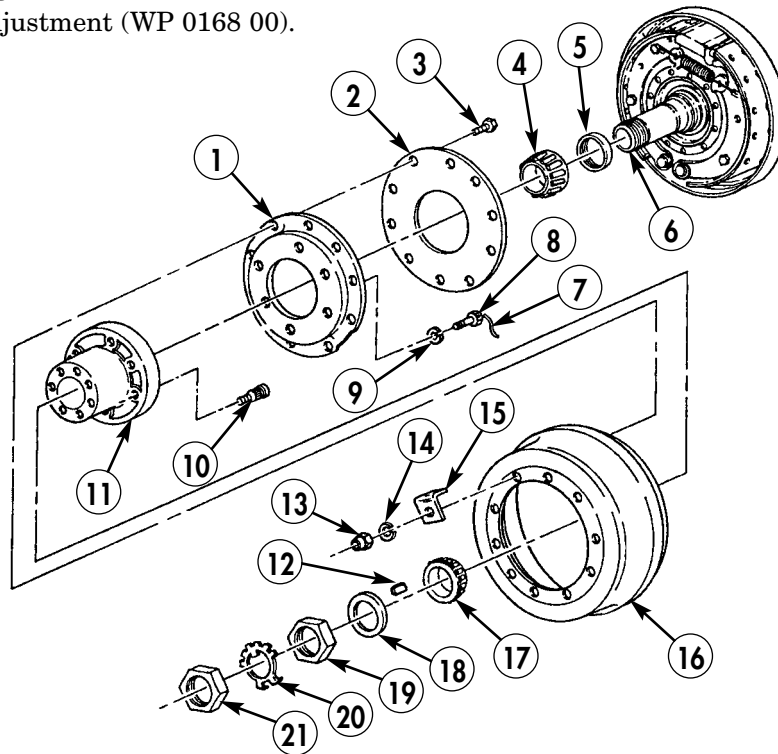
Do not slide hub and drum assembly over threaded end of spindle, or damage to equipment may result.

1. Install hub (11) and drum (16) on spindle (6).

#### **CAUTION**

Do not slide seal over threaded end of spindle, or damage to seal may result.

2. Install outer bearing (17) and new cork gasket (12) in keyway of spindle (6), and install new outer bearing seal (18) on spindle (6).
3. Install inner adjusting nut (19) on spindle (6), and adjust wheel bearings (WP 0189 00).
4. Install new key washer (20) and outer adjusting nut on spindle (6). Bend key washer (20) tabs over on inner adjusting nut (19) and outer adjusting nut (21).
5. Install rear wheels (TM 9-2320-361-10) but do not lower.
6. Install rear axle shaft (WP 0147 00).
7. Connect battery ground cable (WP 0126 00).
8. Release parking brake and remove wheel chocks (TM 9-2320-361-10).
9. Check brake adjustment (WP 0168 00).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

2-1/2 TON, 6X6, M44A2 SERIES TRUCKS (MULTIFUEL)

### WHEEL BEARING ADJUSTMENT

#### INITIAL SETUP:

##### Applicable Models

All

##### Materials/Parts

Key washer (item 375, WP 0470 00)

##### References

WP 0168 00

##### Equipment Condition

Parking brake set and wheels chocked  
(TM 9-2320-361-10).

Battery ground cable disconnected  
(WP 0126 00).

Front axle shaft flange removed (WP 0146 00).

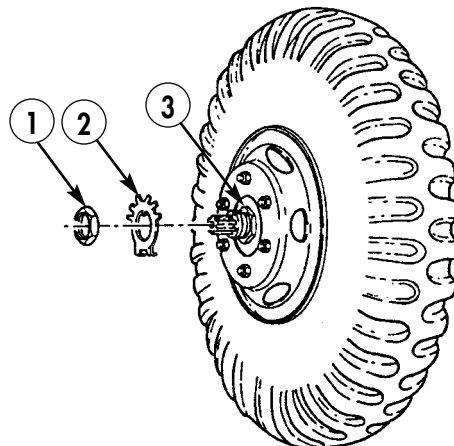
Rear axle shaft removed (WP 0147 00).

#### WHEEL BEARING ADJUSTMENT

##### NOTE

- Wheel must turn freely prior to wheel bearing adjustment.
- Adjustment procedures for front and rear wheel bearings are the same.

1. Bend tabs back on key washer (2) and remove outer adjusting nut (1) and key washer (2). Discard key washer (2).
2. Turn wheel, tighten inner adjusting nut (3) 50 lb-ft (68 N•m), then back off nut (3) 1/16 to 1/4 turn.
3. Install new key washer (2) and outer adjusting nut (1). Tighten nut (1) 100–200 lb-ft (136–272 N•m).
4. Bend tabs on key washer (2) down, over inner and outer adjusting nuts (3) and (1).
5. Install rear axle shaft (WP 0147 00).
6. Install front axle shaft flange (WP 0146 00).
7. Adjust service brake (WP 0168 00).
8. Connect battery ground cable (WP 0126 00).
9. Release parking brake and remove wheel chocks (TM 9-2320-361-10).



END OF WORK PACKAGE

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By Order of the Secretary of the Army:

Official:



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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 380417,  
requirements for TM 9-2320-361-24-1.

<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 (reverse) for Repair Parts and Special Tools Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE: <b>13 July 2006</b>
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TO: <i>(Forward to proponent of publication or form) (include ZIP code)</i> <b>AMSTA-LC-LPIT Tech Pubs, TACOM-RI</b> 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (include ZIP code)</i> <b>Co. B, 1st BN, 2nd Brigade</b> <b>Ft. Hood, TX 76445</b>
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PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER <b>TM 9-2320-361-24-1</b>	DATE <b>12 MAY 2006</b>	TITLE <b>TECHNICAL MANUAL, VOLUME 1 OF 2, FIELD AND SUSTAINMENT MAINTENANCE MANUAL</b>
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible).</i>
	0346 00-2					<b>Removal, Step 2, reference to cotter pins (6) is wrong reference. Reference should be changed to (9).</b>
<h1>SAMPLE</h1>						

*\*Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE, OR TITLE <b>Pat Smith</b>	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION <b>AV272-4162</b>	SIGNATURE <i>Pat Smith</i>
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TO: <i>(Forward direct to addressee listed in publication)</i> AMSTA-LC-LPIT Tech Pubs, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: <i>(Activity and location)</i> <i>(include ZIP code)</i>	DATE:
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PART II - REPAIR PARTS AND SPECIAL TOOLS LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER TM 9-2320-361-24-1	DATE 12 MAY 2006	TITLE TECHNICAL MANUAL, VOLUME 1 OF 2, FIELD AND SUSTAINMENT MAINTENANCE MANUAL
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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
<h1>SAMPLE</h1>								

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.)*

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TYPED NAME, GRADE, OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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<b>PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER TM 9-2320-361-24-1						DATE 18 August 2006	TITLE 2-1/2 Ton, M44A2 Series Trucks (Multi-fuel)
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON ( <i>Provide exact wording of recommended changes, if possible.</i> )	
<i>*Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

TO: <i>(Forward direct to addressee listed in publication)</i> AMSTA-LC-LPIT / TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	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 9-2320-361-24-1	DATE 18 August 2006	TITLE 2-1/2 TON, M44A2 SERIES TRUCKS (MULTI-FUEL)
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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.)*

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 Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
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# THE METRIC SYSTEM AND EQUIVALENTS

## LINEAR MEASURE

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches
- 1 Kilometer = 1,000 Meters = 0.621 Miles

## 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 = 1,000,000 Sq Meters = 0.386 Sq Miles

## CUBIC MEASURE

- 1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
- 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

## LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

## TEMPERATURE

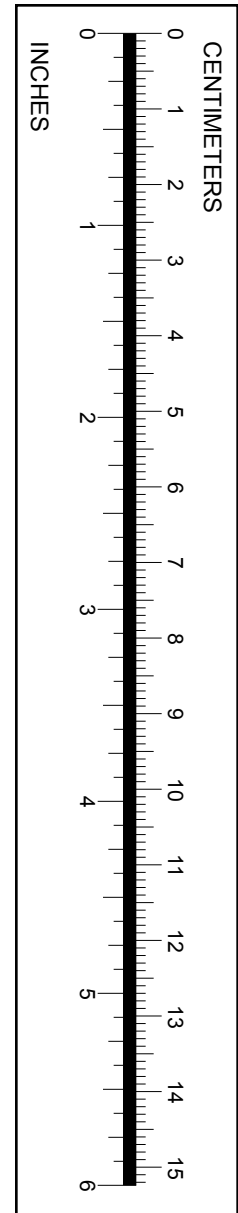
- Degrees Fahrenheit (F) =  $^{\circ}\text{C} \cdot 9 \div 5 + 32$
- Degrees Celsius (C) =  $\text{F}^{\circ} - 32 \cdot 5 \div 9$
- 212° Fahrenheit is equivalent to 100° Celsius
- 90° Fahrenheit is equivalent to 32.2° Celsius
- 32° Fahrenheit is equivalent to 0° Celsius

## WEIGHTS

- 1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1,000 Grams = 2.2 Lb
- 1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

## APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Millimeters	25.4
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	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.4536
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
Millimeters	Inches	0.03937
Centimeters	Inches	0.3937
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	2.2046
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



PIN: 083363-000