

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATORS AND ORGANIZATIONAL  
MAINTENANCE MANUAL

TRACTOR, WHEELED, WAREHOUSE: GASOLINE  
ENGINE DRIVEN; 4 WHEEL PNEUMATIC TIRED,  
4000 LB DRAWBAR PULL, ARMY MODEL MHE-201  
NORTHWEST MOTOR CO. MODEL JG-40PT4  
FSN 3930-926-1066

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This copy is a reprint which includes current  
pages from Change 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY

## **SAFETY PRECAUTIONS**

### **BEFORE OPERATION**

Do not smoke or use an open flame when servicing batteries. Batteries generate hydrogen, a highly explosive gas.

When filling fuel tank, always provide a metal-to-metal contact between container and fuel tank. This will prevent a static spark from being generated as fuel is replenished.

Exercise care at all times while handling electrolyte. Avoid breathing fumes and do not let electrolyte come in contact with skin; if electrolyte contacts skin, wash affected area immediately with a baking soda solution or with a liberal quantity of water. Obtain medical aid as soon as possible.

When using fire extinguisher, avoid breathing fumes or smoke.

### **DURING OPERATION**

Do not fill fuel tank while engine is running. Fuel spilled on hot engine may explode and cause injury to personnel.

If tractor is operated in a closed area, be sure adequate ventilation is provided. Continued breathing of exhaust fumes is dangerous and can be fatal.

Do not attempt to perform any lubrication or maintenance when engine is running.

### **OPERATION**

Use only approved cleaning solvent to prevent possibility of fire.

Stop engine when lubrication or adjustments are being performed. Always set parking brake when parking tractor.

Change }  
No. 3 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 16 April, 1974

**Operator and Organizational Maintenance Manual  
TRACTOR, WHEELED, WAREHOUSE: GASOLNE  
ENGINE DRIVEN; 4-WHEEL, PNEUMATIC TIRED;  
4000 LB. DRAWBAR PULL (ARMY MODEL MHE-201,  
NORTHWEST MOTOR CO. MODEL JF-40PT4)  
FSN 3930-926-1066**

TM 10-3930-603-12, September 1967, is changed as follows:

*Inside Front Cover.* Add the following warning to the list of safety precautions:

**WARNING**

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

**WARNING**

Dry cleaning solvent, P-D-680 used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F.

*Page 1-1.* Section I is superseded as follows:

**Section I. GENERAL**

**1-1. Scope.** This manual is for your use in operating and maintaining the warehouse tractor.

**1-2. Maintenance Forms and Records.** Maintenance forms and records that you are required to use are explained in TM 38-750.

**1-2.1. Recommendations for Maintenance Publications Improvements.** You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

**1-2.2. Destruction of Army Material to Prevent Enemy Use.** Refer to TM 750-244-3 for instructions for demolition of the tractor to prevent enemy use.

**1-2.3. Administrative Storage.** Refer to TM 740-90-1 for administrative storage instructions.

*Page 2-1, paragraph 2-3b.* Subparagraph (5) is added as follows:

(5) Maintenance and operating supplies required for initial 8 hours of operation are listed in Table 2-2.

*Page 2-2.* Table 2-2 is added as follows:

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\*This change supersedes C2, 23 March 1973.



Page 2-4. Immediately after Section III title, add the following warning

**WARNING**

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

Page 3-1. Immediately after Chapter 3 title, the following warning:

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100F.-138 F.

Page 4-1. Chapter 4 is rescinded.

Page A-1, paragraph A-2b. "C9100SL" is changed to read "C9100IL".

Add the following reference:

TB 70B-1 Specification List of Standard Liquid Fuels, Lubricants, Preservatives and Related Products  
Authorized for Use by U.S Army

Paragraph A-2c is superseded as follows:

*c. Painting.*

AR 740-1 Storage-and Supply Activity Operations  
AR 746-1 Color, Marking and Preparation of Equipment for Shipment  
TB 740-97-1 U.S. Army Mobility Equipment Command: Unboxed Mobile  
Equipment Prepared for Shipment (Profile Drawings)

Paragraph A-2d is superseded as follows:

*d. Maintenance.*

TM 9-6140-200-14 Operator, Organizational, Direct Support and General Support  
Maintenance Manual: Storage Batteries: Lead-Acid Type  
TM 9-2610-200-20 Organizational Care, Maintenance and Repair of Pneumatic  
Tires and Inner Tubes  
TB 750-651 Use of Anti-Freeze Solutions and Cleaning Compounds in  
Engine Cooling Systems  
TM 38-750 The Army Maintenance Management System (TAMMS)  
TB MED 251 Noise and Conservation of Hearing

Paragraph A-3 is superseded as follows:

A3. Shipment and Storage  
TB 740-97-2 Preservation of USAMECOM Mechanical Equipment for Ship-  
ment and Storage  
TM 740-90-1 Administrative Storage of Equipment

Paragraph A4 is added as follows:

A4. Demolition  
TM 750-244-3 Procedure for Destruction of Equipment to Prevent Enemy Use  
(Mobility Equipment Command)

Page B-1. Appendix B is superseded as follows:

**APPENDIX B  
BASIC ISSUE ITEMS LISTS AND ITEMS  
TROOP INSTALLED OR AUTHORIZED LIST**

**Section I. INTRODUCTION**

**1. Scope.** This appendix lists items required by the operator for operation of the warehouse tractor.

**2. General.** This list is divided into the following sections:

*a. Basic Issue Items List-Section II.* Not Applicable.

*b. Items Troop installed or Authorized List-Section III.* A list of items in alphabetical sequence, which at the discretion of the unit commander may accompany the warehouse tractor. The items are NOT SUBJECT TO TURN-IN with the tractor when evaluated.

**3. Explanation of Columns.** The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop installed or Authorized, Section III.

*a. Source, Maintenance, and Recoverability Code(s) (SMR).* Not applicable.

*b. Federal Stock Number.* This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

*c. Description.* This column indicates the Federal item name and additional description of the item required.

*d. Unit of Measure (U/M).* A two character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

*e. Quantity Furnished with Equipment (BILL).* Not applicable.

*f. Quantity Authorized (Items Troop installed or Authorized).* This column indicates the quantity of the item authorized to be used with the equipment.

**Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST**

Federal stock number	Description	U/M	Qty auth
7520-559-9618	CASE, Maintenance and Operation Manuals	EA	1
4210-889-2221	EXTINGUISHER, Fire	EA	1

*Page I-1.* Index is changed as follows:

Delete the following:

	<i>Paragraph</i>	<i>Page</i>
Demolition to prevent enemy use	4-7	4-3
Demolition by mechanical means	4-6	4-2
Demolition by other methods	4-8	4-3
Demolition to prevent enemy use	4-5, 4-8	4-2, 4-3
Demolition training	4-9	4-3
Add the following		
Destruction of Material to Prevent Enemy Use	1-2.1	1-1
<i>Page 1-2.</i> Delete the following:		
Loading equipment for shipment	4-2	4-2
<i>Page 1-3.</i> Delete the following:		
Preparation for Shipment	4-1	4-1
Shipment, preparation for	4-1	4-1
Add the following.		
Administrative Storage	1-2.3	1-1

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS

*Major General, United States Army*

*The Adjutant General*

CREIGHTON W. ABRAMS

*General, United States Army*

*Chief of Staff*

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 894) organizational maintenance requirements for Warehouse Equipment.

**Operators and Organizational Maintenance Manual  
 TRACTOR, WHEELED, WAREHOUSE: GASOLINE  
 ENGINE DRIVEN; 4 WHEEL, PNEUMATIC TIRED,  
 4000 LB DRAWBAR PULL, ARMY MODEL MHE-201,  
 NORTHWEST MOTOR CO. MODEL JG-4OPT4  
 FSN 3930-9261066**

		Paragraph	Page
CHAPTER	1. INTRODUCTION		
Section	I. General .....	1-1 - 1-2	1-1
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CHAPTER	3. OPERATORS AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
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	VI. Field expedient repairs .....	3-12 - 3-15	3-14
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CHAPTER	4. SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE		
Section	I. Shipment and limited storage .....	4-1 - 4-4	4-1 - 4-2
	II. Demolition to prevent enemy use .....	4-5 - 4-9	4-2 - 4-3
APPENDIX	A. References .....		A-1
	B. Basic issue items list .....		B-1
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INDEX .....			I-1



## CHAPTER 1 INTRODUCTION

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### Section I. GENERAL

#### 1-1. Scope

a. These instructions are published for use by personnel to whom the wheeled tractor is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains a list of basic issue items authorized the operator of this equipment and the list of maintenance and operating supplies required for initial operation. Appendix C contains the Maintenance Allocation Chart.

c. Numbers in parentheses following nomenclature callouts on illustrations indicate quantity; numbers preceding nomenclature callouts indicate preferred maintenance sequence.

d. Reporting of errors, omissions, and recommendations for improving this publication. By the individual user is encouraged reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSMEMPP, 4300 Goodfellow Blvd. St. Louis, Missouri 63120.

e. Report all equipment improvement recommendations as prescribed by TM 38-750.

#### 1-2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide for Vehicles and Equipment).

b. For other record and report forms applicable to operator, crew, and organizational maintenance, refer to TM 38-750.

*Note.* Applicable forms excluding Standard Form 46 (United States Government Motor Vehicles Operator's Identification Card) which is carried by the operator, will be kept in a canvas bag mounted on equipment.

### Section II. DESCRIPTION AND TABULATED DATA

#### 1-3. Description

a. The Army Model MHE-201 wheeled warehouse tractor is a conventional automotive type vehicle (figs. 1-1 and 1-2). The tractor is powered by a six cylinder internal combustion gasoline engine. Power is transmitted to the dual rear wheels through a three speed, automatic transmission with torque converter, a propeller shaft, drop gear case, and rear axle assembly. Hydraulic breaks are provided on rear wheels and are actuated by a foot pedal.

b. Steering is accomplished at the front wheels through a conventional manual steering gear without power. The steering gear operates through a single tie rod actuating the front wheels. The front axle is spring mounted.

c. The tractor employs a conventional 12-volt electrical system which is radio suppressed in accordance with military requirements as a nontactical vehicle.

d. The tractor frame is a welded steel one piece unit braced to prevent misalignment.

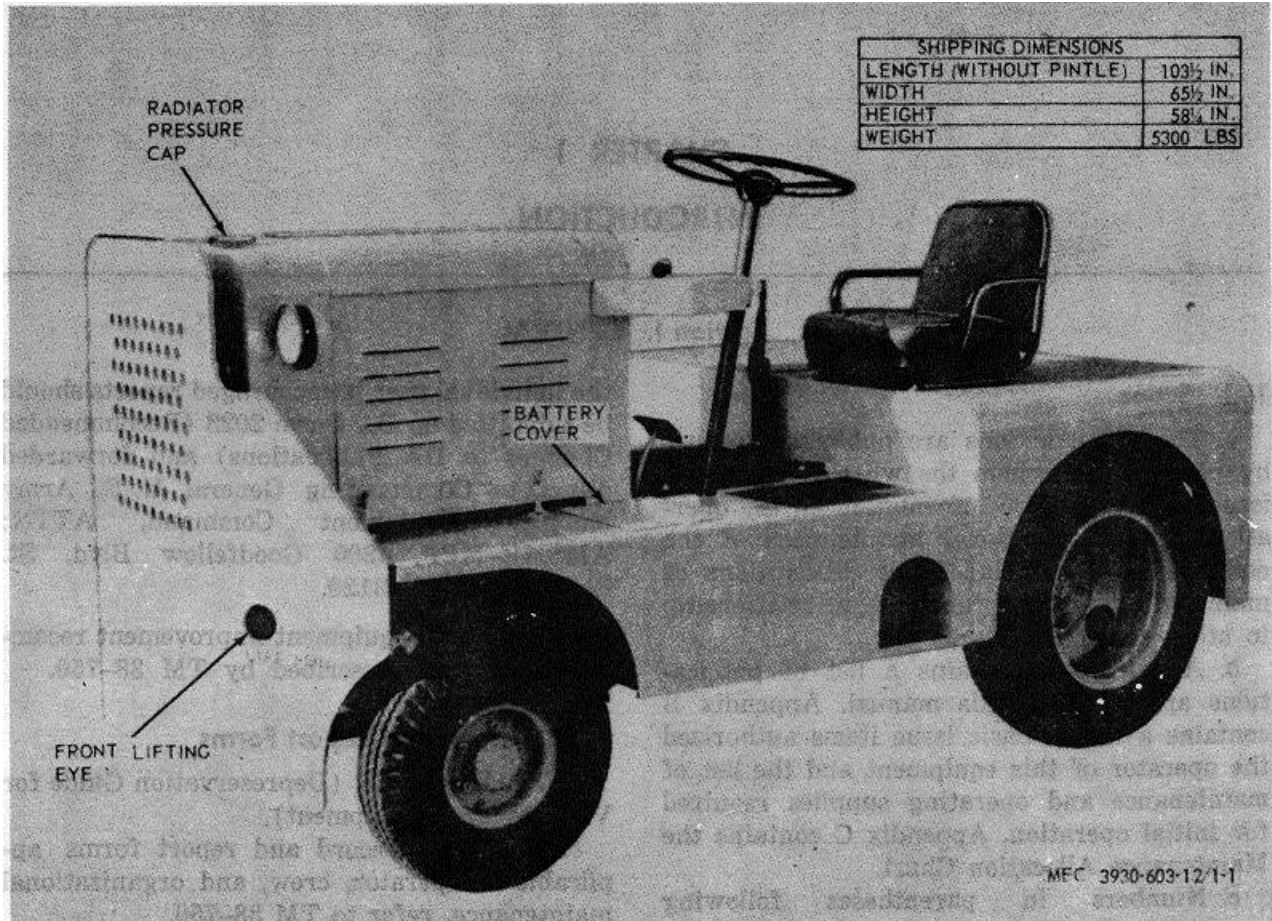


Figure 1-1. Warehouse tractor, left front three-quarter view.

Ballast weights are installed on the frame over the rear axle just under the rear wheel enclosure.

**1-4. Identification and Tabulated Data**

a. *Identification Plates.* The tractor has two identification plates.

(1) *Engine plate.* Located on the right hand side of the engine. It specifies manufacturer, model, type, serial number, bore, stroke, displacement, governor setting, military specification number and brake horsepower.

(2) *End item plate.* Located just below the instrument panel. It specifies the manufacturer's nomenclature, manufacturer, serial number, model number, Federal stock number, registration number, delivery date, warranty expiration date, contract number, service weight, wheel loading, center of gravity, and identification of maintenance manual.

b. *End Item Nomenclature.*

Manufacturer ..... Northwestern Motor Co.  
 Model ..... JG-OPT4  
 Army Model ..... MHE-201  
 Type ..... Rear wheel drive

c. *Engine.*

Manufacturer ..... Chrysler Corporation  
 Type ..... 4 cycle  
 Model ..... IND-931-11  
 Number of cylinders..... 6  
 Firing order..... 1-5-3-6-2-4

d. *Engine Accessories.*

(1) *Generator.*

Manufacturer ..... Prestolite  
 Part number..... GJC7401BT

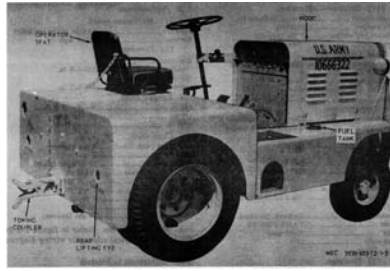


Figure 1-2. Warehouse tractor, right rear three-quarter view.

Rated output.....	30 amps (amperes)
Number poles.....	2
Number brushes.....	2
Brush spring tension.....	18 36 oz (ounces)
<i>(2) Voltage regulator.</i>	
Manufacturer .....	Prestolite
Part number .....	9W-V304202C
Air gaps	
Cutout relay.....	0.025 to 0.027 in.
Current Regulator.....	0.048 to 0.052 in.
Voltage regulator.....	0.048 to 0.052 in.
<i>(3) Distributor.</i>	
Manufacturer .....	Chrysler Corporation
Part number .....	28841
Cam angle.....	38 to 40 degrees
Contact point gap.....	0.018 to 0.020 in.
Contact spring tension.....	17 to 20 oz.
Capacitor.....	0.18 to 0.28 MFD (Manufactured Micro- farad)
Start advance .....	0° at 350 rpm
Maximum advance.....	10° at 1130 rpm
<i>(4) Ignition coil.</i>	
Manufacturer .....	Electric Autolite
Part number .....	200578
<i>(5) Starting motor.</i>	
Manufacturer .....	Chrysler Corporation
Part number .....	2095159
Number of brushes.....	4
Brush spring tension.....	32-36 oz.
Drive type .....	Overrunning clutch
<i>(6) Spark plugs.</i>	
Manufacturer .....	Electric Autolite
Size.....	14 mm (millimeter)
Part number .....	AR80
Gap.....	0.035 in.
<i>(7) Battery.</i>	
Part Number.....	MS35002
Voltage.....	12 volt
<i>(8) Carburetor.</i>	
Manufacturer .....	Carter Carburetor
Model .....	Ball and Ball, E7T
Type.....	Downdraft
<i>(9) Fuel pump.</i>	
Manufacturer .....	Carter Carburetor
Model .....	857SA
Pressure.....	3-1/2 – 4 1/2 psi (pounds per square inch)
<i>(10) Governor.</i>	
Manufacturer .....	King-Seely
Setting.....	2,000 rpm
<i>(11) Oil filter.</i>	
Manufacturer .....	Purolator
Type.....	Military Standard

**TM 10-3930-603-12**

(12) *Radiator-oil cooler*

Manufacturer .....	Young Radiator Co.
Part number .....	D217475
Pressure cap setting.....	7 lbs (pounds)
Type.....	Tube in fin

(13) *Cooling fan.*

Manufacturer .....	Chrysler Corporation
Number blades .....	6
Blade diameter .....	18 in.

(14) *Oil pressure relief valve.*

Setting.....	45-55 lbs
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*e. Transmission.*

Manufacturer .....	Chrysler Corporation
Type.....	Automatic with torque converter
Model .....	A-727

Gear Ratio

Low .....	2.45 to 1
Second.....	1.45 to 1
Drive.....	1. to 1
Reverse .....	2.20 to 1

Fluid type.....	AQ ATF, Suffix A
-----------------	------------------

*f. Rear Axle.*

Manufacturer .....	Rockwell Standard
Model .....	TA267-FSH-X8
Type.....	Bevel gear
Gear ratio .....	17:1

*g. Tires.*

(1) *Tire size.*

Front .....	600x9, 6 ply
Rear .....	650x16, 6 ply

(2) *Tire pressure.*

Front .....	65 psi
Rear .....	40 psi

*h. Performance.*

(1) *Maximum speed.*

Forward.....	18 mph (miles per bow)
Reverse .....	6-½ mph

(2) *Turning.*

Minimum turning radius .....	115-5/8 in.
Minimum turning clearance.....	244- ½ in

*i. Torque Data.*

¼ in.....	10-8-10 ft lb
½ in.....	10-14 ft lb
5/16 in .....	15-18 ft lb

*j. Capacities.*

Crankcase (with filter).....	6 qts (quarts)
Oil filter.....	1 qt
Transmission.....	19-½ pts (pints)
Reduction gear case.....	1-½ pt
Differential.....	9-½ pts
Steering gear.....	1-½ pt
Air cleaner.....	1 pt
Cooling system.....	16 qts
Fuel tank .....	14 gal (gallons)

*k. Wiring Diagram.* Refer to figure 1-3 for the tractor electrical schematic wiring diagram.

**1-5. Difference in Models**

This manual covers only the Northwestern Motor Co. Model JG-4OPT4 Warehouse Tractor. No known unit differences exist for the model covered by this manual.

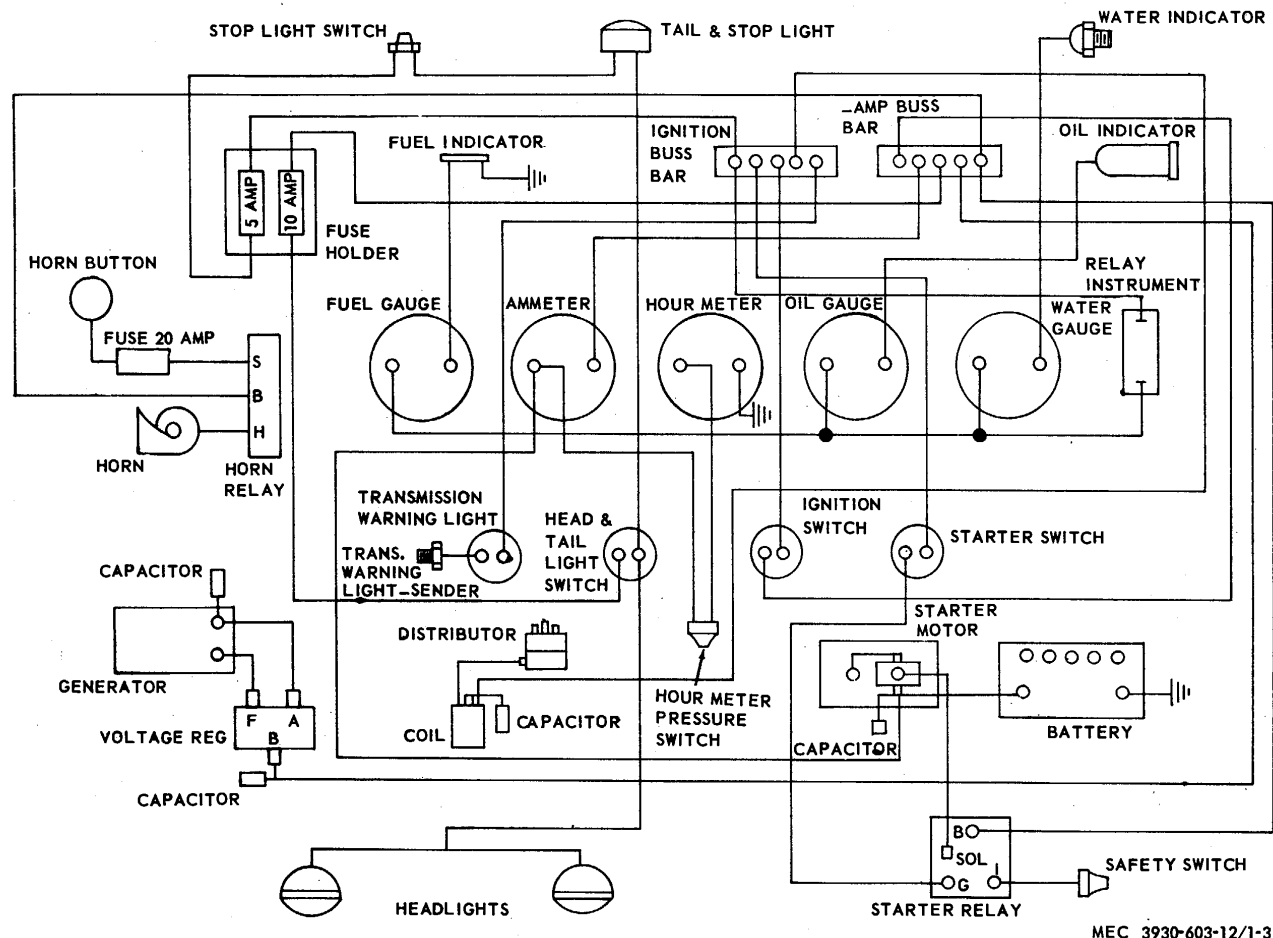


Figure 1-3. Schematic wiring diagram, Model Jg-40PT4 Tractor

**CHAPTER 2  
INSTALLATION AND OPERATING INSTRUCTIONS**

**Section I. SERVICE UPON RECEIPT OF EQUIPMENT**

**2-1. Unloading Equipment**

a. If the tractor is received on a flat bed carrier, remove all blocking and tie down straps. Use a suitable lifting device with a capacity of 6,000 lbs or more. Attach a sling hoist to the front and rear lifting eyes (figs. 1-1 and 1-2) and lift the tractor from the carrier bed.

b. If a lifting device is not available, construct a suitable ramp, service the equipment (para 23) and drive it off the carrier bed.

**2-2. Unpacking of Equipment**

a. Remove all tape, paper or other packing or protective material.

b. Use an approved cleaning solvent and remove preservative compound which has been sprayed on exposed metal surfaces.

c. If the engine, transmission, or gear boxes have been filled with a preservative oil, drain the oil and refill with proper lubricant (para 3 4).

**2-3. Inspection and Servicing Equipment**

a. *Inspection.* Perform a complete systematic inspection of the tractor for damages that may have occurred during shipment. A thorough general visual examination will generally show any shipping damages. Repair or report any noted damages to the proper authority.

b. *Servicing.*

(1) Refer to paragraph S4 and lubricate the tractor.

(2) Refer to paragraphs 3-5 and 36 and perform preventive maintenance services.

(3) If the battery is received separately packed, install battery as illustrated in figure 2-1. Refer to TM 96140-20015 for servicing and testing battery.

(4) Cooling system. If equipment is to be used for cold weather operation, refer to Table 2-1 and make sure the antifreeze solution in cooling system is checked and corrected to lowest possible temperature expected.

*Table 2-1. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials*

Lowest expected ambient temp. °F	Pints of inhibited glycol per Gal. of coolant <sup>1</sup>	Compound, Antifreeze Arctic <sup>2</sup>	Ethylene glycol coolant solution specific gravity at 68°F <sup>3</sup>
+20	1-1/2	Issued full strength and ready mixed for 0 to 65°F temperatures for both initial installation and replenishment of losses.  DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE	1.022
+10	2		1.06
0	2/3/4		1.047
-10	3-¼		1.065
-20	3-½		1.062
-30	4		1.067
40	4-¼		1.073

Table 2-1. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials-Continued

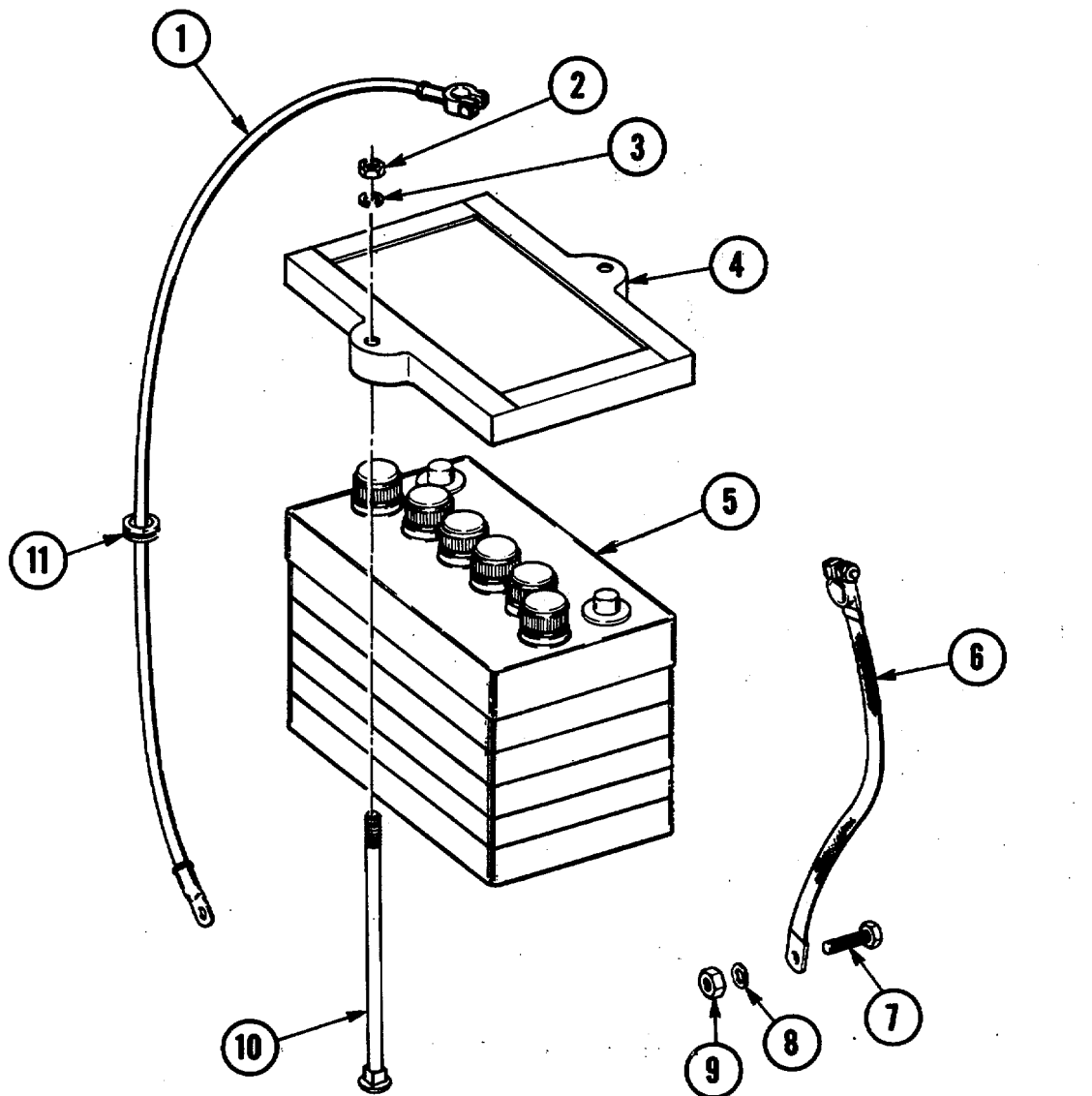
Lowest expected ambient temp. °F	Pints of inhibited glycol per Gal. of coolant <sup>1</sup>	Compound, Antifreeze Arctic <sup>2</sup>	Ethylene glycol coolant solution specific gravity at 68°F <sup>3</sup>
-50 -60 -75	Arctic Anti-freeze preferred		

1. Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution).
2. Military Specifications MIL-C-11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods close to -40°F or drops below, to as low as -90°F.
3. use and accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0°F.

*Note.* Fasten a tag near the radiator filler cap indicating the type antifreeze.

**2-4. Installation of Separately Packed Components**

The tractor has no separately packed components. All accessories are shipped installed in the unit.



MSC 3930-409-20/35

- |                     |                |            |
|---------------------|----------------|------------|
| 1 Starter cable     | 5 Battery      | 9 Nut      |
| 2 Nut               | 6 Ground cable | 10 Bolt    |
| 3 Lockwasher        | 7 Screw        | 11 Grommet |
| 4 Battery hold down | 8 Lockwasher   |            |

Figure 2-1. Battery and cables, removal and installation.

## Section II. CONTROLS AND INSTRUMENTS

### 2-5. General

This section describes, illustrates, and furnishes operator, crew or organizational maintenance personnel sufficient information about various controls and instruments for proper operation of the wheeled tractor.

### 2-6. Controls and Instruments

The purpose of controls and instruments and their normal and maximum reading are illustrated in figure 2-2.



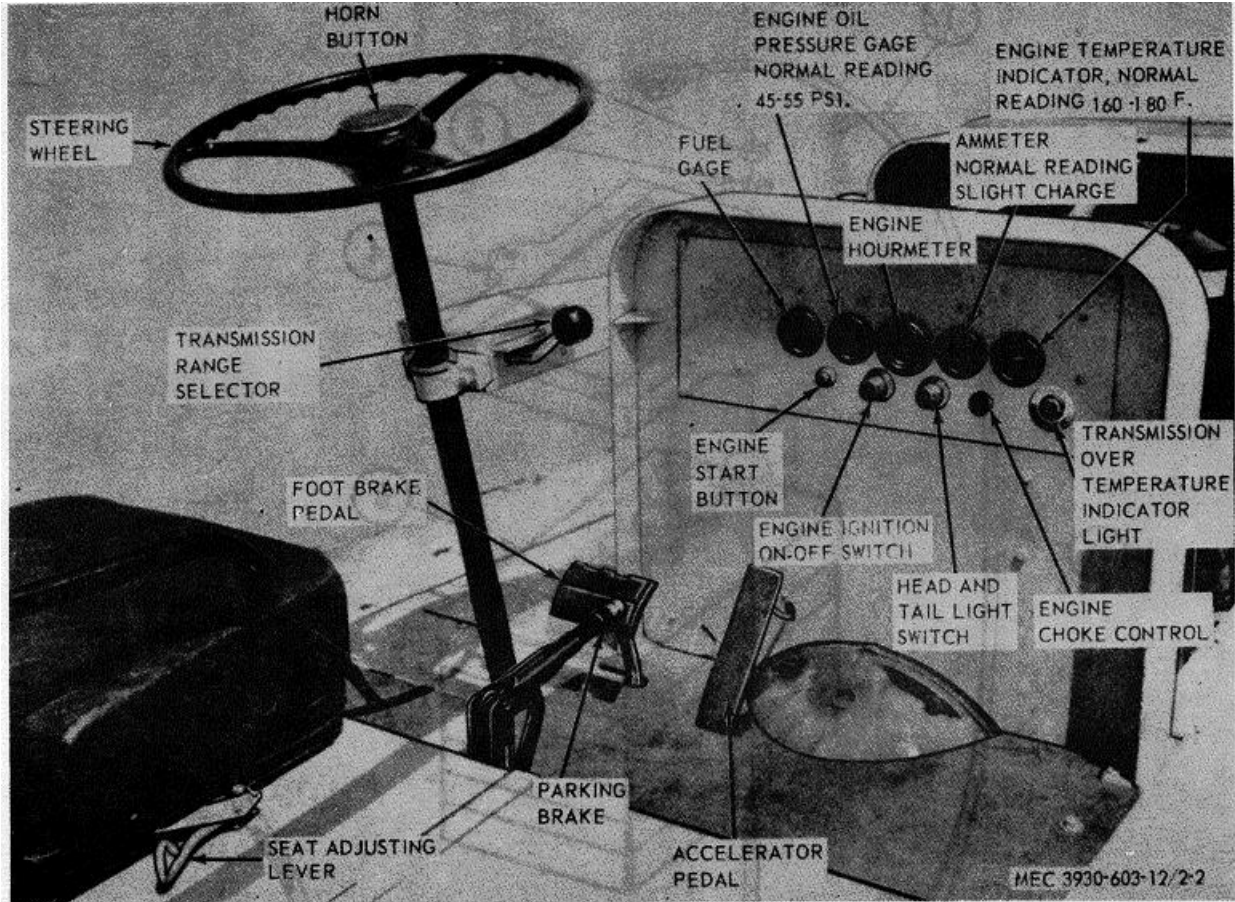


Figure 2-2. Controls and instruments

### Section III. OPERATION UNDER USUAL CONDITIONS

#### 2-7. General

a. Instructions in this section are published for information and guidance of personnel responsible for operation of the wheeled tractor.

b. The operator must know how to perform every operation of which the tractor is capable. This section gives instructions on starting and stopping of the tractor, basic motions of the tractor, and on coordinating basic motions to perform specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

#### 28. Starting Tractor

- a. Refer to paragraph 3-6 and perform the daily preventive maintenance services.
- b. Start tractor as illustrated in figure 2-8.

#### 2-9. Driving the Tractor

Drive tractor as illustrated in figure 2-4.

*Note.* The low or second gear range must be used when towing heavy loads, especially on up or down inclines, or over rough roads. The drive range is used for driving with no load or small loads.

#### 2-10. Stopping the Tractor

Stop tractor as illustrated in figure 2-5.

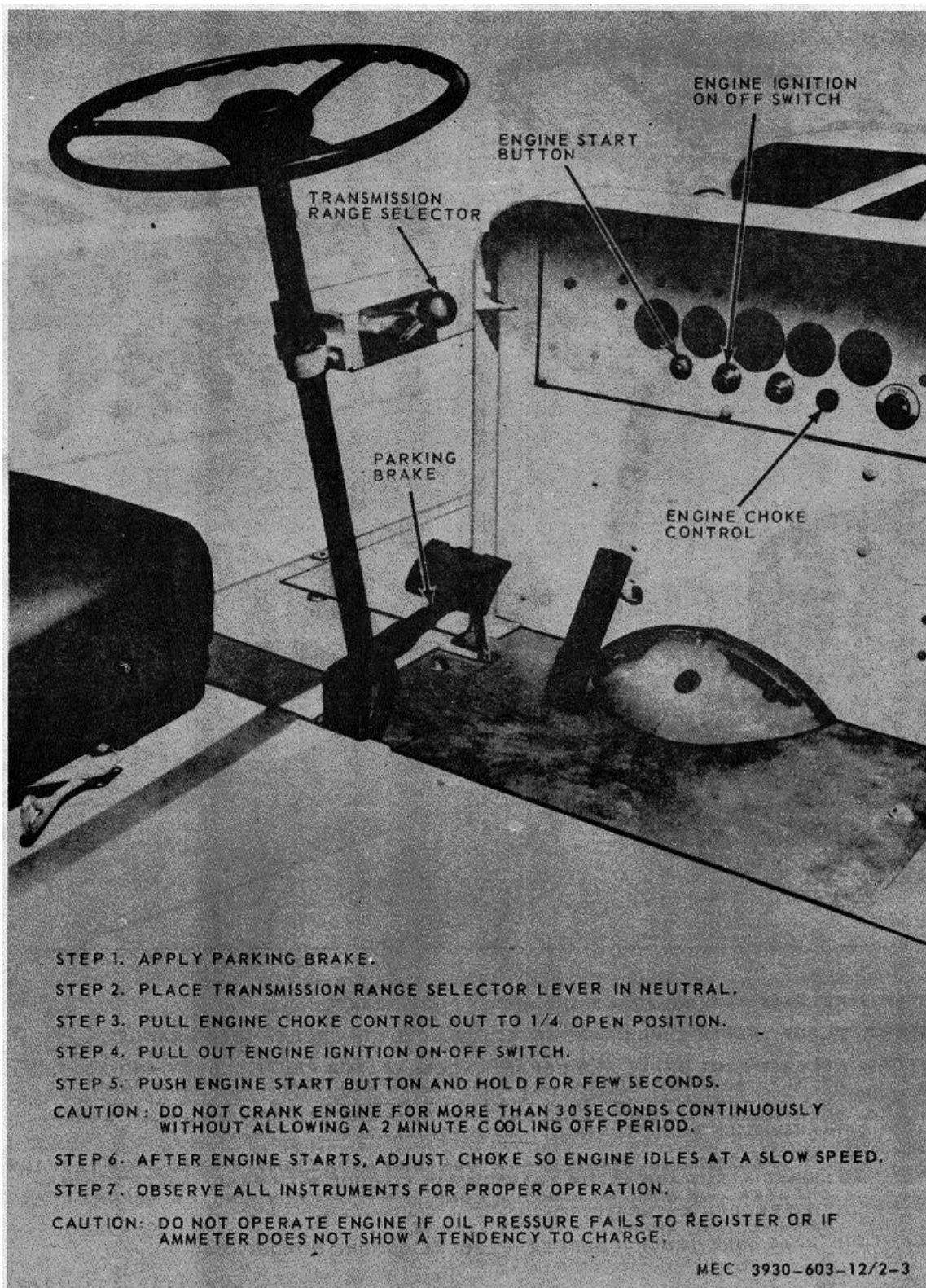


Figure 2-3. Starting the tractor.

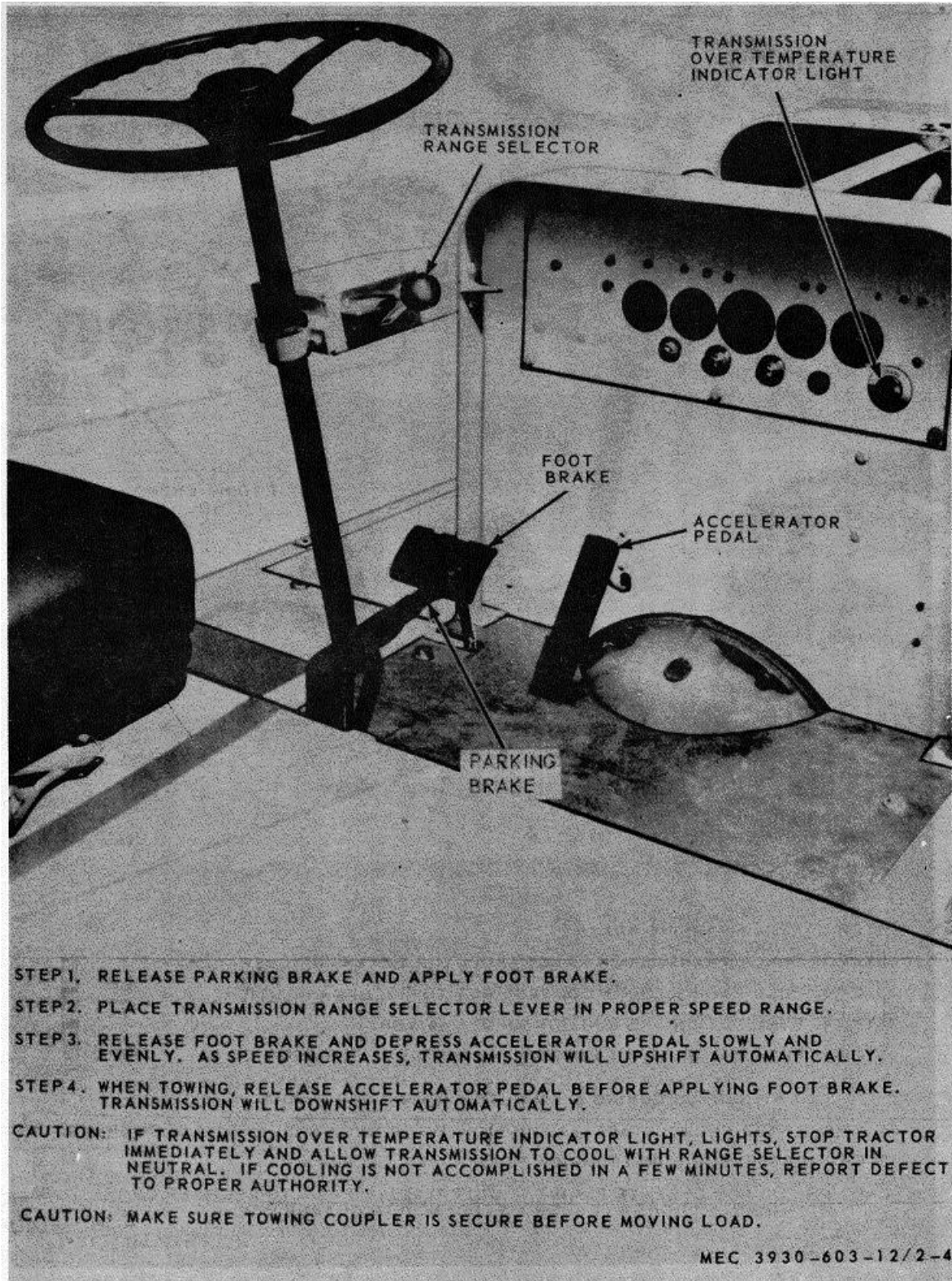


Figure 2-4. Driving the Tractor



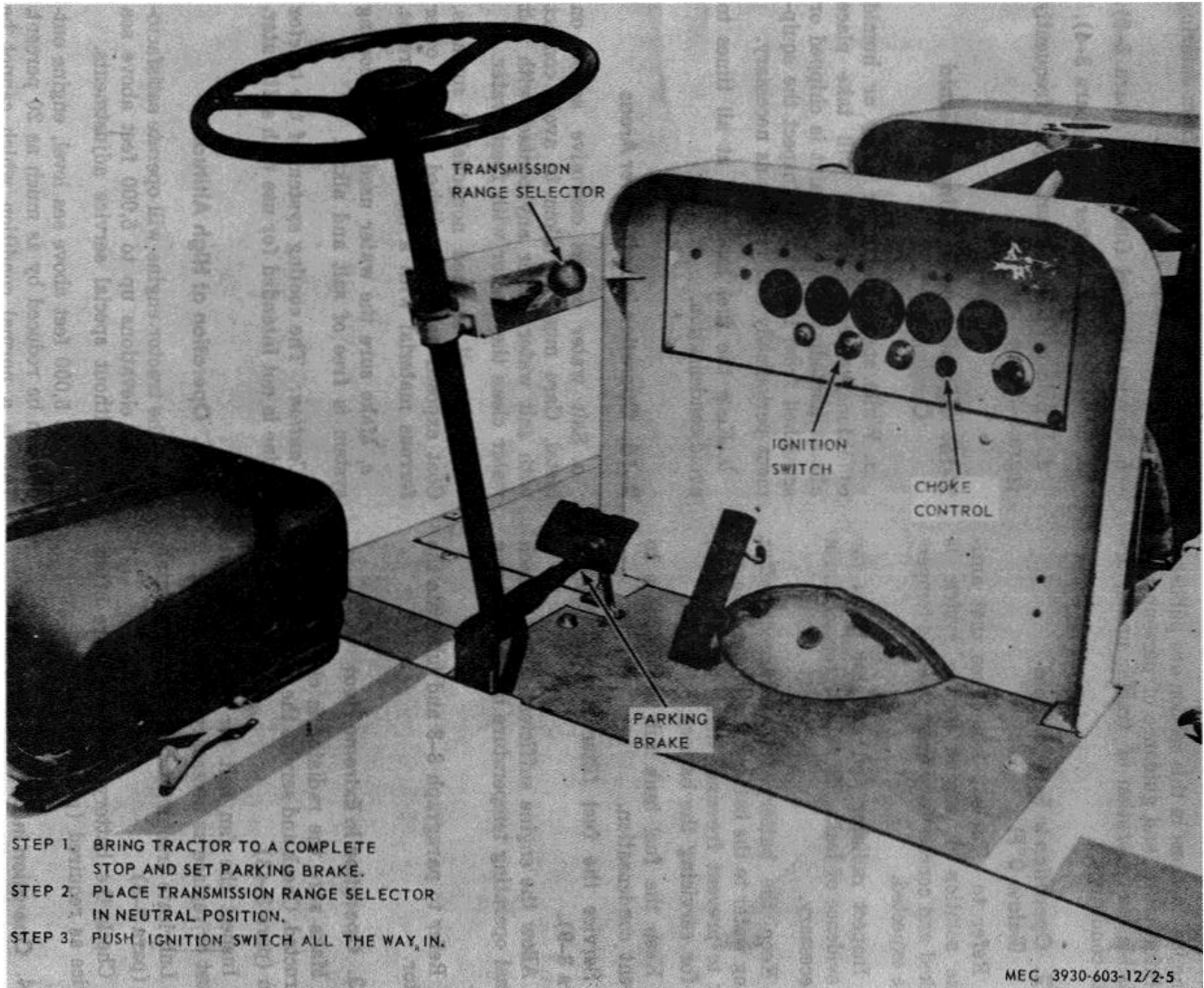


Figure 2-5. Stopping the Tractor.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 2-11. General

The instructions in this section are published for information and guidance of personnel responsible for operation of tractor under unusual conditions.

### 2-12. Operation in Extreme Cold (Below 0°F)

- a. Refer to Table 2-1 and see that antifreeze solution in engine cooling system is checked and correct for lowest possible temperature expected.
- b. Inspect radiator and radiator hoses for any evidence of leaks. Repair or re-ace parts as necessary.
- c. Keep the battery fully charged. After adding water to the battery, run the engine one hour to prevent freezing. Refer to paragraph 2-3 for servicing the battery.
- d. Keep the fuel tank full at all times to prevent condensation.
- e. Service the fuel filter more frequently (para p9). follow the engine sufficient time to reach normal operating temperature before applying load.
- g. Refer to paragraph S3S and lubricate the tractor. \*

### 2-13. Operation in Extreme Heat

- a. Make sure the radiator is clean and unobstructed. Check and service the radiator more often (para 348).
- b. Inspect the fan belt for proper tension. Adjust or replace as necessary (para 845).
- c. Lubricate tractor at more-frequent intervals (para 3S).
- d. Check the battery electrode more often. Service as required (para 2-8).

### 2-14. Operation in Dusty or Sandy Areas

- a. Take precautions to prevent sand or dust from entering the fuel system. Strain all fuel before adding it to the fuel tank. Use precautions to prevent sand or dust from entering the fuel tank while being filled.
- b. Service the fuel filter daily (para p9).
- c. Service the air cleaner daily (para 3-4).
- d. Lubricate the tractor more frequently (para 3-3).

### 2-15. Operation under Rainy or Humid Conditions

- a. While operating under rainy or humid conditions, corrosive action will take place, almost immediately where paint is chipped or scratched from the tractor. Inspect the equipment periodically and repaint as necessary.
- b. Keep the fuel tank full at all times to avoid condensation.

### 2-16. Operation in Salt Water Areas

- a. Salt water causes corrosive action on metal. Care must -be taken to avoid contact with salt water. After any contact with salt water clean the tractor with fresh water.
- b. Paint all exposed nonpolished surfaces. Coat exposed parts of polished steel or other ferrous material with a light coat of grease.
- c. Make sure the water used in the cooling system is free of salt and alkali.

**Caution:** The cooling system of the tractor engine is not intended for use with salt water.

### 2-17. Operation at High Altitudes

- a. The tractor engine will operate satisfactorily at elevations up to 5,000 feet above sea level without special service adjustments.
- b. At 5,000 feet above sea level, engine output can be reduced by as much as 20 percent. This is a normal condition which cannot be prevented, but maximum performance can be obtained by following all service instructions.

## Section V. OPERATION OF AUXILIARY MATERIAL USED IN CONJUNCTION WITH EQUIPMENT

### 2-18. General

This section contains instructions for operation and maintenance for the portable fire extinguisher supplied with the tractor.

### 2-19. Fire Extinguisher (Monobromotrifluoromethane Type)

a. *Description.* The monobromotrifluoromethane type fire extinguisher is generally suitable for all types of fires, except fires involved with lox (liquid oxygen) generating equipment. The fire extinguisher is furnished with a disposable type cylinder.

b. *Operation.* To operate the extinguisher, perform the following:

- (1) Remove the fire extinguisher from its holder at the right hand side of the operator's seat.
- (2) Break the seal by pulling the safety pin from the handle.
- (3) Point the fire extinguisher horn at the base of the flame.
- (4) Press the trigger to discharge and direct the stream at base of flame.
- (5) Replace cylinder immediately after using (c. below).

c. *Replacement of Cylinder.*

- (1) Press lever to release pressure from used cylinder.
- (2) Loosen swivel valve coupling nut and remove valve assembly from used cylinder.
- (3) Remove instruction band from use cylinder.
- (4) Place new cylinder through instruction band.
- (5) Replace safety pin in valve and seal pin with sealing wire.
- (6) Attach valve assembly and tighten swivel coupling nut on new cylinder and place fire extinguisher in mounting bracket.

d. *Maintenance.* Weigh fire extinguisher every three months and replace cylinder if gross weight has decreased four ounces or more. Lubricate cylinder neck threads with one drop of OE 30 oil before reassembly.

**CHAPTER 3**  
**OPERATORS AND ORGANIZATIONAL MAINTENANCE**  
**INSTRUCTIONS**

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**Section I. OPERATORS AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT**

**3-1. Special Tools and Equipment**

No special tools and equipment are required by operator or organizational maintenance personnel for maintenance of the tractor.

**3-2. Basic Issue Tools and Equipment**

Tools and repair parts issued with or authorized for use with the tractor are listed in the Basic Issue Items List, Appendix B of this manual.

**Section II. LUBRICATION**

**3-3. General Lubrication Information**

a. This section contains a reproduction of the Lubrication Order and lubrication instructions which are supplemental to, and not specifically covered in the Lubrication Order.

b. The Lubrication Order shown in figure 31 is an exact reproduction of the approved Lubrication Order for the wheeled tractor.

**3-4. Detailed Lubrication Information**

a. *General.* Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

b. *Cleaning.* Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

c. *Points of Lubrication.* Service the lubrication points at proper intervals as illustrated in figure 31.

d. *Engine Oil Filter Service.* Service engine oil filter as illustrated in figure 32.

e. *Engine air cleaner service.* Service engine air cleaner as illustrated in figure 34.

**LUBRICATION  
ORDER**

**LO 10-3930-603-12**

**TRACTOR, WHEELED, WAREHOUSE: GASOLINE, 4 WHEEL,  
PNEUMATIC TIRED, 4,000-LB DBP ARMY MODEL  
MHE-201 (NORTHWESTERN MOTOR CO. MODEL  
JG-40PT4) W/CHRYSLER ENGINE MODEL 931**

Reference: C91001L

Intervals are based on normal hours of operation. Adjust to compensate for abnormal operation and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

A dotted circle indicates a drain below.

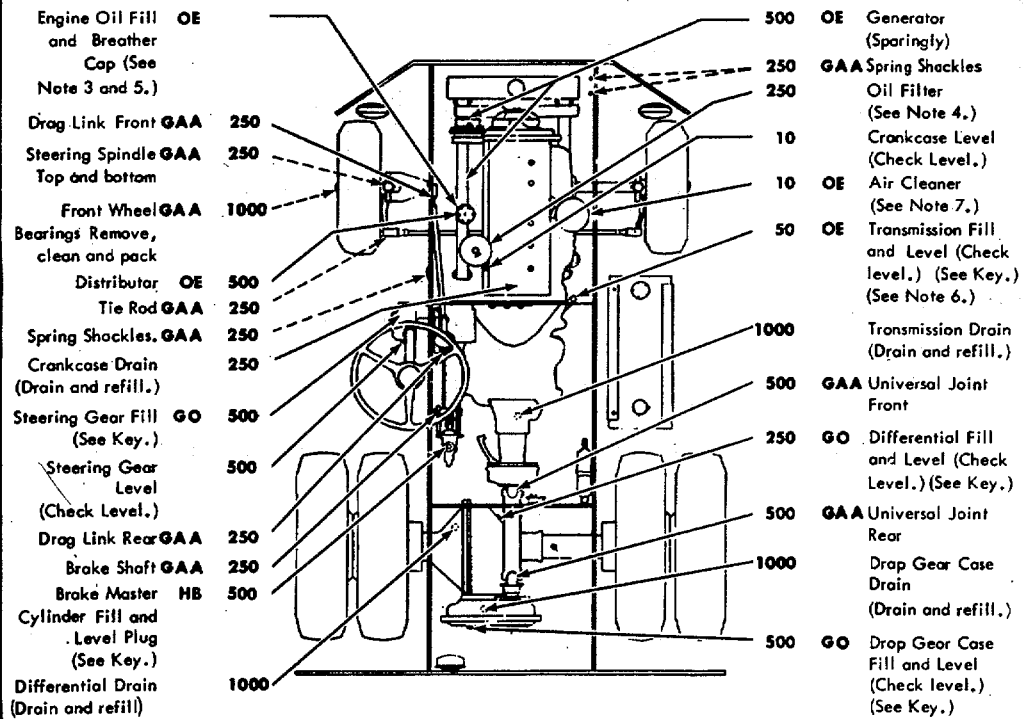
Drain crankcase when hot. Fill and check level.

**LUBRICANT • INTERVAL**

**INTERVAL • LUBRICANT**

FOLD

FOLD



MEC 3930-603-12/3-1 1

Figure 3-1 (1). Lubrication order.



— KEY —					
LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to -10°F	0°F to -65°F	
<b>OE- OIL, Engine, Heavy Duty</b>		OE 30	OE 10	OES	Intervals given are in hours of normal operation.
Crankcase	6 qt				
Air Cleaner	1 qt				
Oil Can Points					
Transmission	5 qt				
<b>OES- OIL, Engine, Subzero</b>		OE 10	OE 10		
<b>HB- HYDRAULIC FLUID, Nonpetroleum</b>		HB	HB	HB	
Brake cylinder					
<b>GO- LUBRICATING OIL, Gear</b>		GO 90	GO 90	GOS	
Steering Gear Box	3/4 qt				
Differential	4 3/4 qt				
Drop Gear Case	3/4 qt				
<b>GOS- LUBRICATING OIL, Gear, Sub-zero</b>					
<b>GAA- Grease, Automotive &amp; Artillery</b>		All Temperatures			

NOTES:

- FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Re-lubricate with lubricants specified in the key for temperatures below -10°F.
- OIL CAN POINTS. Every 50 hours, lubricate linkage pins, clevises and all exposed threads with OE.
- CRANKCASE BREATHER. Remove, clean, re-oil and reinstall.
- ENGINE OIL FILTER. After installing new element, fill crankcase, operate engine 5 minutes, check filter housing for leaks, check crankcase oil level and fill to proper level.
- OES OIL. When OES Oil is used the level will be checked more often.
- TRANSMISSION FILL AND LEVEL. Set handbrake, start and operate engine at idling speed for 5 minutes until engine and transmission reach operating temperature. Move shift lever through all positions to distribute fluid throughout transmission. Check level with engine running and bring to full mark.
- AIR CLEANER. Refill oil reservoir to full mark. Every 250 hours, disassemble entire unit, clean, re-oil and reassemble.
- LUBRICANTS. The following is a list of lubricants with the Military Symbols and applicable Specification numbers.  

OE-MIL-L-2104	GO-MIL-L-2105
OES-MIL-L-10259	GOS-MIL-L-10324
HB-VV-B-680	GAA-MIL-G-10924

FOLD

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

HAROLD K. JOHNSON,  
General, United States Army,  
Chief of Staff.

OFFICIAL:

KENNETH G. WICKHAM,  
Major General, United States Army,  
The Adjutant General.

MEC 3930-603-12/3-1 2.

Figure 3-1 (2). Lubrication order (continued).

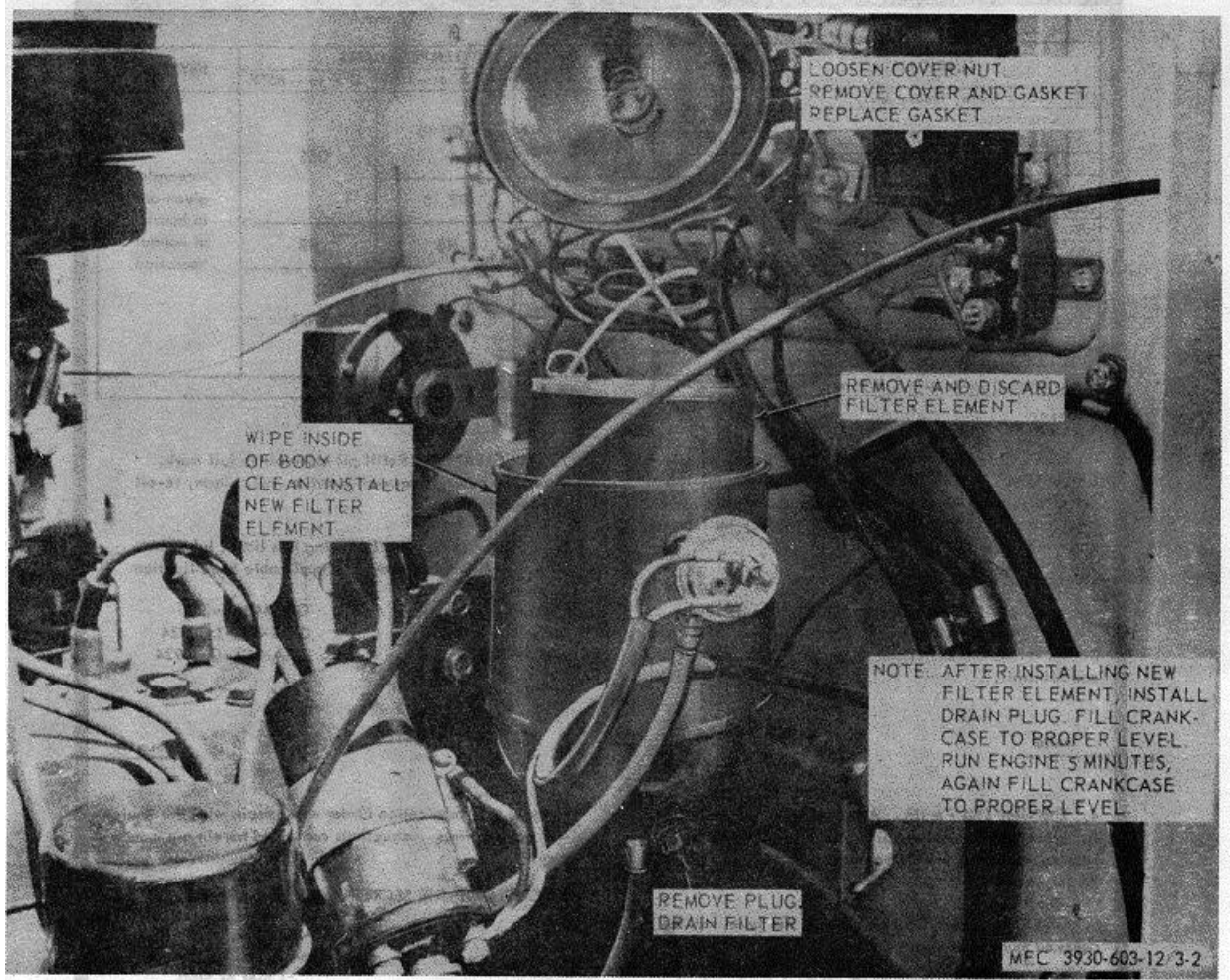


Figure 3-2. Engine oil filter service.

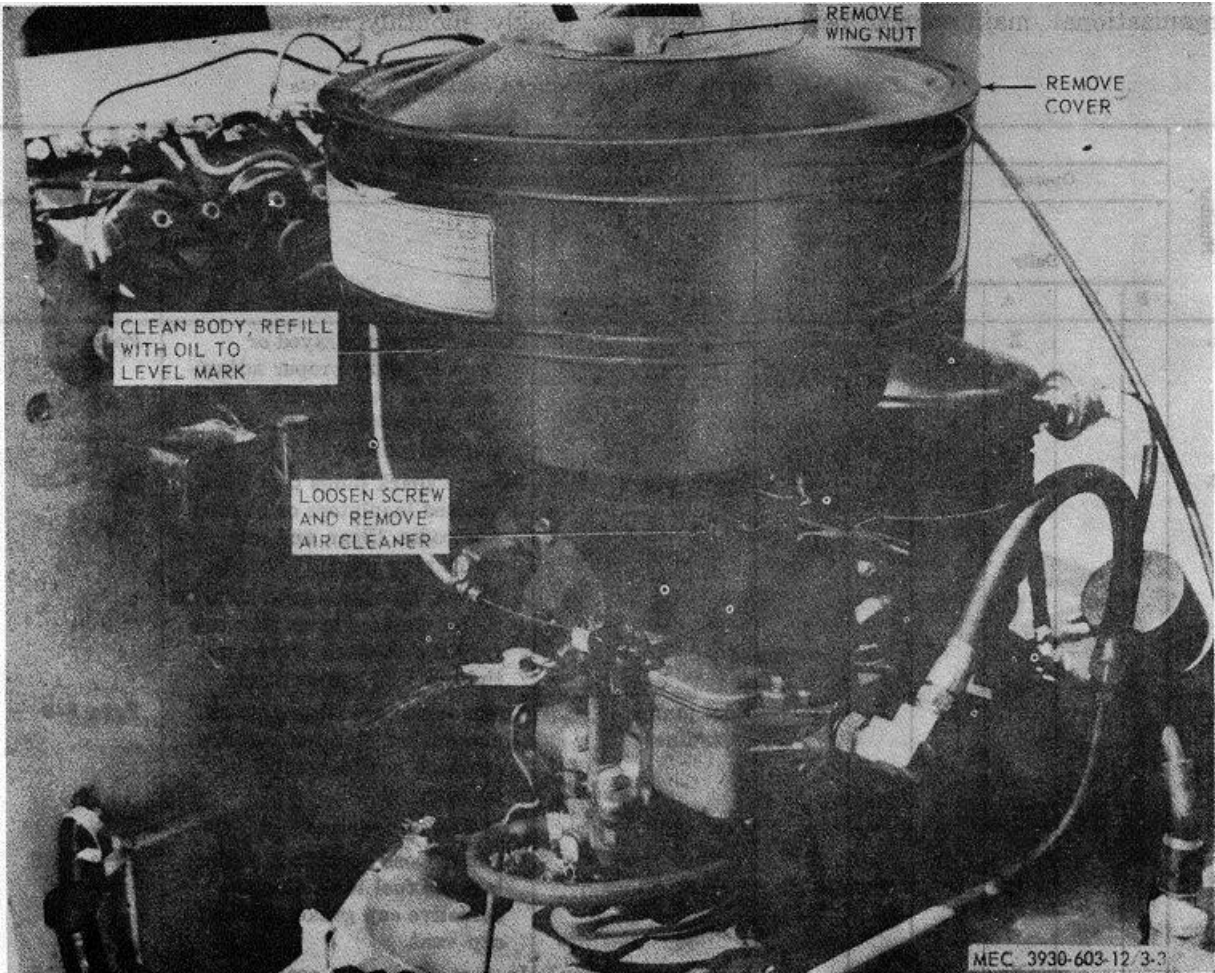


Figure 3-3. Engine air cleaner service.

### Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

#### 3-5. General

To insure that the tractor is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before they result in serious damage or failure. The necessary preventative maintenance checks and services to be performed are listed and described in Table 3-1. Item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on SA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

#### 3-6. Preventive Maintenance Services

Table 3-1 contains a tabulated listing of preventive maintenance checks and service

which must be performed by the operator and organizational maintenance personnel before operation, during operation, after operation, weekly, monthly and quarterly.

Table 3-1. Preventive Maintenance Checks and Services

Item Number	Interval					B—Before Operation D—During Operation	A—After Operation W—Weekly	M—Monthly Q—Quarterly	Item to be Inspected	Procedure	Reference
	Operator				Org.						
	Daily				M	Q					
	B	D	A	W							
1.			X	X	X	X			Belts	Check for worn, frayed or cracked belts; proper adjustment is a deflection of 1/2 in. midway between generator and fan pulley.	Para 3-8
2.					X	X			Spark plugs	Replace spark plugs that have cracked insulators or burned electrodes. Clean and set spark plug gaps to 0.035 in. Torque spark plugs to 25 to 30 ft-lbs. Replace leads that are frayed or broken. Clean and tighten lead connections.	Para 3-35
3.				X	X	X			Fuel pump strainer	Clean or replace filter element and gasket. Tighten ball nut securing bowl if gasket is leaking.	Para 3-9
4.			X		X	X			Fuel tank	Add fuel as required. Tighten loose mounting, replace leaking fuel tank. Replace defective cap gasket. Clean cap vent.	Para 3-28
5.			X						Fire extinguisher	Inspect for broken seal.  Weight dry chemical type. If weight has decreased to less than 4-1/2 pounds or pressure is below 125 psi, cylinder must be replaced.	Para 2-18 and 2-19
6.		X							Hand brake	Inspect for improper operation. Adjust as necessary.	Para 3-63
7.		X							Service brakes	Check for strong pressure when brakes are applied.	Para 3-64
8.		X							Brake pedal	Check for strong pressure when pedal is applied. Proper pedal travel is 3/8 to 5/8 in.	Para 3-64
										Adjust or bleed brakes as necessary. Inspect brakes hoses and connections. Remove wheels and inspect lining.	Para 3-64
9.						X			Master cylinder	Add fluid as required. Inspect cylinder and lines for leaks. Refer to LO 10-3930-603-12. Clean vent plug. Replace defective cylinder or lines.	Para 3-66

Table 3-1. Preventive Maintenance Checks and Services-Continued

Item Number	Interval				M	Q	Item to be Inspected	Procedure	Reference
	Operator		Org.						
	B	D	A	W					
					B—Before Operation	D—During Operation			
10.				X	X	Battery	Tighten loose cables and mounting. Remove corrosion. Inspect for cracks or breaks. Fill to 1/2 inch above plates. Clean vent hole in filler cap before installing. Run engine one hour after adding water in freezing weather.	Para 3-36	
11.		X				Horn	Check operation.		
12.				X		Drive axle and gear reduction case	Check for leaks.		
13.	X		X			Transmission	Check for leaks		
14.			X			Radiator	Add coolant as necessary. Proper level is one inch below filler neck.		
15.	X					Lights	Check for defective lamp or lamp units. Replace units as necessary.	Para 3-38 and 3-39	
16.				X		Tires	Check for cuts. Remove foreign material from tires.		
17.		X				Controls and instruments	Inspect for damage or loose mountings. With unit operating, check for proper operation.	Para 3-37	
		X				Ammeter	Slight positive charge.	Para 2-6	
		X				Engine oil pressure	45-55 psi	Para 2-6	
		X				Engine temperature indicator	160-180° F.	Para 2-6	
		X				Hourmeter	Check for proper operation.	Para 2-6	
		X				Fuel indicator	Check for proper operation and adequate fuel supply.	Para 2-6	
		X				Transmission oil over temperature indicator	Check to make sure indicator light is not burning.	Para 2-6	
18.			X			Engine oil level gage	Check engine oil level. Refer to LO 10-3930-603-12 and add oil as necessary.		
19.					X	Distributor	Replace pitted or burned contact points if necessary. Proper gap adjustment is 0.018 to 0.022 in.	Para 3-34	
20.	X					Radiator	Check coolant. Proper coolant level is one in. below filler neck.		

Table 3-1. Preventive Maintenance Checks and Services-Continued

Item Number	Interval				Operator		Org.		B—Before Operation D—During Operation	A—After Operation W—Weekly	M—Monthly Q—Quarterly	Item to be Inspected	Procedure	Reference
	Daily				M	Q								
	B	D	A	W										
21.						X					Exhaust system	Replace cracked or frayed hoses. Replace defective radiator. Remove obstruction in air passages. Tighten all connections.	Para 3-43	
						X						Tighten clamps and hanger bolts. Inspect muffler, exhaust and tail pipe.	Para 3-48	
22.						X					Starting motor and generator	Tighten electrical connections. Clean exterior and check mounting hardware. Inspect brushes for wear.	Para 3-31 and 3-33	

**Section IV. OPERATORS MAINTENANCE**

**3-7. General**

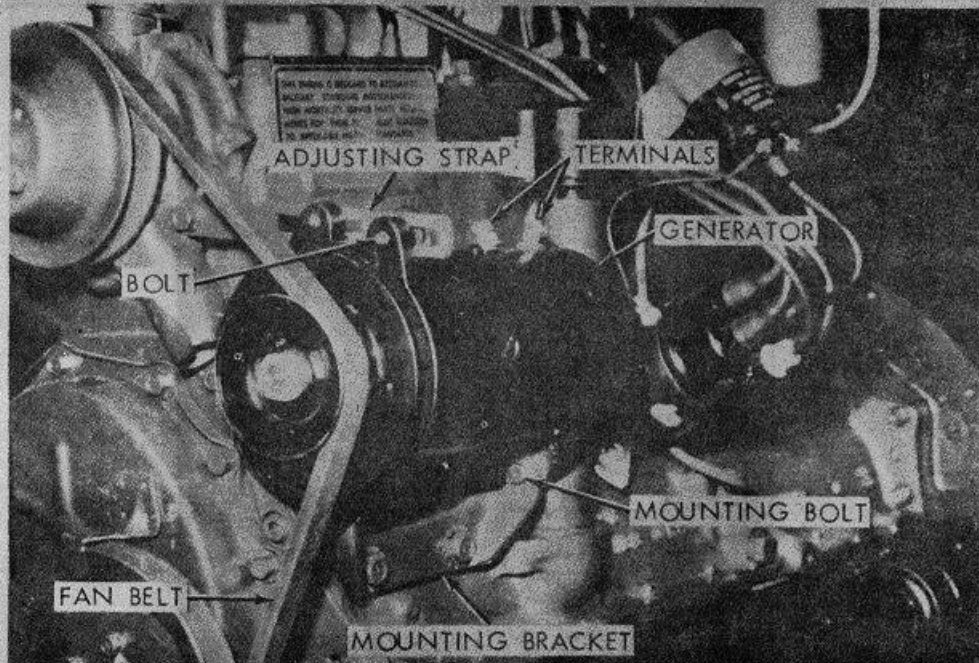
Instructions in this section are published for information and guidance of operator and crew to maintain the tractor.

**3-8. Fan Belt Adjustment**

Adjust fan belt as illustrated in figure 3-4.

**3-9. Fuel Filter Service**

Service fuel filter as illustrated in figure 3-5.



- STEP 1. LOOSEN GENERATOR ADJUSTING STRAP BOLT.
- STEP 2. PIVOT GENERATOR SO BELT HAS DEFLECTION OF  $\frac{1}{2}$  IN. MIDWAY BETWEEN PULLEYS. TIGHTEN ADJUSTING STRAP AND MOUNTING BOLTS.

MEC 3930-603-12/3-4

Figure 3-4. Fan belt adjustment.

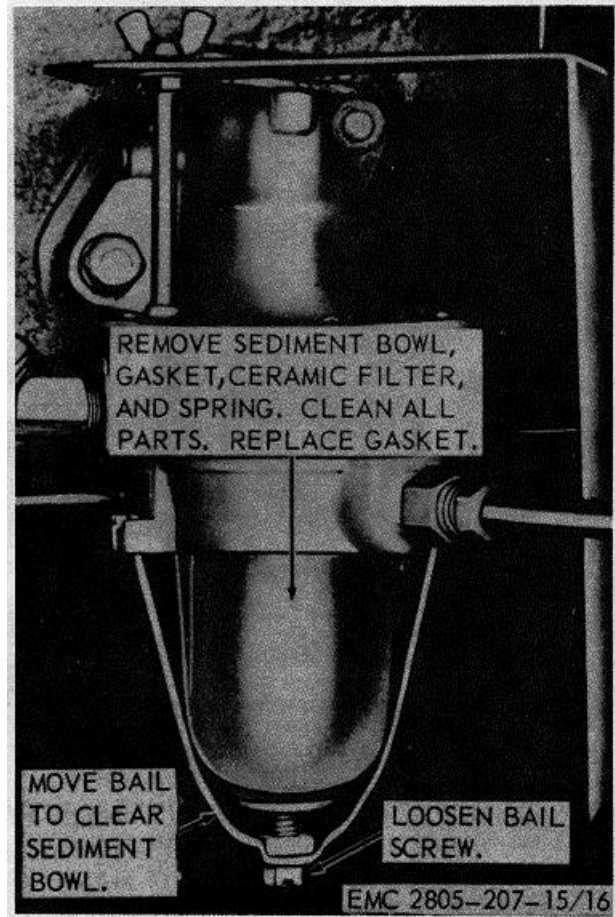


Figure 3-5. Fuel filter service.

**Section V. TROUBLESHOOTING**

**3-10. General**

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the tractor and its components. Malfunctions which may occur are listed in Table 32. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

**3-11. Troubleshooting**

Table 3-2 lists operator and organization malfunctions. Items listed as other causes are the responsibility of, and covered, in the direct and general support maintenance manual.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective Action
1. Engine fails to start	a. Clogged fuel sediment bowl. b. Clogged or bent fuel lines.  c. Defective fuel pump	a. Service fuel filter (para 89). b. Clean or replace fuel lines (para 3-28). c. Replace fuel pump (para 3-27).



Table 3-2. Troubleshooting-Continued

Malfunction	Probable cause	Corrective action
<p>2. Engine overheats.</p>	<p>d. Carburetor out of adjustment or defective.                      e. Engine out of time.                      f. Defective distributor.</p> <p>g. Defective spark plugs.</p> <p>h. Defective ignition coil.</p> <p>i. Defective cylinder head gasket.</p> <p>j. Other causes.</p> <p>a. Fan belt slipping.</p> <p>b. Low oil level in crankcase.                      c. Defective thermostat.</p> <p>d. Defective water pump.</p> <p>e. Engine out of time.                      f. Dirty or clogged radiator.</p> <p>g. Other causes.</p>	<p>d. Adjust or replace carburetor (para 3-25).                      e. Time engine (para 3-34).                      f. Replace distributor (para 3-34) or points and capacitor (para 3-34).                      g. Clean and adjust gap or replace spark plugs (para 3-35).                      h. Replace ignition coil (para 3-35).                      i. Replace cylinder head gasket (para 3-53).                      j. Refer malfunction to direct and general support maintenance personnel.</p> <p>a. Adjust fan belt or replace fan belt (para 3-45).                      b. Add or change oil (fig. 3-1).                      c. Replace thermostat (para 3-44).                      d. Replace water pump (para 3-45).                      e. Time engine (para 3-34).                      f. Flush radiator. Replace radiator (para 3-43).                      g. Refer other causes to direct and general support maintenance personnel.</p>
<p>3. Engine misfires.</p>	<p>a. Defective spark plugs.</p> <p>b. Defective carburetor.</p> <p>c. Defective distributor.</p> <p>d. Defective spark plug wires.</p> <p>e. Defective intake manifold gasket.                      f. Defective cylinder head gasket.</p> <p>g. Valves out of adjustment.                      h. Other causes.</p>	<p>a. Clean, adjust and replace spark plugs (para 3-35).                      b. Adjust carburetor (para 3-25). Replace carburetor (para 3-25).                      c. Adjust or replace points, replace capacitor, cap or rotor (para 3-34). Replace distributor (para 3-34).                      d. Repair or replace wiring (para 3-35).                      e. Replace intake manifold or gasket (para 3-47).                      f. Replace cylinder head gasket (para 3-53).                      g. Adjust valves (para 3-54).                      h. Refer other causes to direct and general support maintenance personnel.</p>
<p>4. Excessive smoke from engine exhaust.</p>	<p>a. Defective carburetor.</p> <p>b. Low grade of fuel.                      c. Choke linkage out of adjustment.                      d. Other cause.</p>	<p>a. Adjust carburetor (para 3-25). Replace carburetor (para 3-25).                      b. Use proper fuel.                      c. Adjust choke linkage (para 3-29).                      d. Refer other causes to direct and general support maintenance personnel.</p>

Table 3-2. Troubleshooting-Continued

Malfunction	Probable cause	Corrective action
5. Engine will not crank.	<ul style="list-style-type: none"> <li>a. Defective battery.</li> <li>b. Loose or corroded battery cables.</li> <li>c. Defective starting motor.</li> <li>d. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Service battery (para 3-36). Replace battery (para 3-36).</li> <li>b. Clean, tighten or replace battery cables (para 3-36).</li> <li>c. Replace starting motor (para 3-33).</li> <li>d. Refer other causes to direct and general support maintenance personnel.</li> </ul>
6. Engine backfires but will not start.	<ul style="list-style-type: none"> <li>a. Defective spark plugs.</li> <li>b. Incorrect engine timing.</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Clean and adjust spark plug gap, or replace spark plugs (para 3-35).</li> <li>b. Time engine (para 3-34).</li> <li>c. Refer other causes to direct and general support maintenance personnel.</li> </ul>
7. Engine lacks power under load.	<ul style="list-style-type: none"> <li>a. Low grade of fuel.</li> <li>b. Incorrect engine timing.</li> <li>c. Defective distributor.</li> <li>d. Defective spark plugs.</li> <li>e. Defective cylinder head gasket.</li> <li>f. Defective governor.</li> <li>g. Defective fuel pump.</li> <li>h. Defective carburetor.</li> <li>i. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Use proper grade of fuel.</li> <li>b. Time engine (para 3-34).</li> <li>c. Replace points, cap, capacitor, and rotor, and adjust points para 3-34).</li> <li>d. Clean and adjust spark plug gap or replace spark plugs (para 3-35).</li> <li>e. Replace cylinder head gasket (para 3-53).</li> <li>f. Adjust governor (para 3-26).</li> <li>g. Service fuel pump strainer (para 3-9). Replace fuel pump (para 3-27).</li> <li>h. Adjust carburetor (para 3-25).</li> <li>i. Refer other causes to direct and general support maintenance personnel.</li> </ul>
8. Excessive fuel consumption.	<ul style="list-style-type: none"> <li>a. Defective carburetor.</li> <li>b. Defective fuel pump.</li> <li>c. Clogged or overfilled air cleaner.</li> <li>d. Choke linkage out of adjustment.</li> <li>e. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust or replace carburetor (para 3-25).</li> <li>b. Replace fuel pump (para 3-27).</li> <li>c. Service air cleaner (para 3-4).</li> <li>d. Adjust choke linkage (para 3-29).</li> <li>e. Refer other causes to direct and general support maintenance personnel.</li> </ul>
9. Good battery chronically discharges.	<ul style="list-style-type: none"> <li>a. Low voltage regulator setting.</li> <li>b. Defective generator.</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust voltage regulator (para 3-32). Replace voltage regulator (para 3-32).</li> <li>b. Replace generator (para 3-31).</li> <li>c. Refer other causes to direct and general support maintenance personnel.</li> </ul>
10. Propeller shaft vibrates.	<ul style="list-style-type: none"> <li>a. Worn or loose universal joints.</li> <li>b. Lack of lubricant.</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten mounting hardware (para 3-60).</li> <li>b. Lubricate propeller shafts (para 3-8).</li> </ul>

Table 3-2. Troubleshooting-Continued

Malfunction	Probable cause	Corrective action
11. Excessive play or loose steer-	c. Other causes. a. Defective tie rod ends. b. Loose or defective wheel bearings. c. Other causes.	c. Refer other causes to direct and general support maintenance personnel. a. Replace tie rods or ends (para 3-68). b. Replace wheel bearings (para 3-56). c. Refer other causes to direct and general support maintenance personnel.
12. Tractor steers hard.	a. Low tire pressure. b. Defective steering linkage. c. Other causes.	a. Inflate tires to proper pressure (para 3-57). b. Lubricate steering linkage (para 3-3). Replace tie rods (para 3-68). c. Refer other causes to direct and general support maintenance personnel.
13. Brakes grab or lock.	a. Restricted port in master cylinder. b. Brakes out of adjustment. c. Other causes.	a. Replace master cylinder (para 3-66). b. Adjust brakes (para 3-64). c. Refer other causes to direct and general support maintenance personnel.
14. Brakes will not hold.	a. Defective wheel cylinder. b. Defective master cylinder. c. Defective brake lining. d. Brakes out of adjustment. e. Broken brake line. f. Other causes.	a. Replace wheel cylinder (para 3-65). b. Replace master cylinder (para 3-66). c. Replace brake lining (para 3-64). d. Adjust brakes (para 3-64). e. Repair or replace line (para 3-66). f. Refer other causes to direct and general support maintenance personnel.
15. Brakes drag.	a. Defective master cylinder. b. Improper brake adjustment. c. Defective wheel cylinder. d. Other causes.	a. Replace master cylinder (para 3-66). b. Adjust brakes (para 3-64). c. Replace wheel cylinder (para 3-65). d. Refer other causes to direct and general support maintenance personnel.
16. Excessive brake pedal travel.	a. Improper brake adjustment. b. Defective brake lining. c. Other causes.	a. Adjust brakes (para 3-64). b. Replace brake shoes (para 3-64). c. Refer other causes to direct and general support maintenance personnel.
17. Brakes spongy.	a. Air in hydraulic system. b. Defective brake lining or hose. c. Other causes.	a. Bleed brakes (para 3-64). b. Replace brake shoes (para 3-64). Replace hose (para 3-64). c. Refer other causes to direct and general support maintenance personnel.

**Section VI. FIELD EXPEDIENT REPAIRS**

**3-12. General**

Operator and organizational maintenance level troubles may occur while the tractor is operating in the field where supplies and repair parts are not available and, normal corrective action cannot be performed. When this condition exists, the following expedient repairs may be used in emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

**3-13. Engine Heats Up**

<p>Trouble</p> <p>Defective thermostat</p>	<p>Expedient Remedy</p> <p>Remove defective thermostat (para 3-44) and operate engine without a thermostat.</p>
--	---

**3-14. Oil Filter Leak**

<p>Trouble</p> <p>Broken oil filter tube (para 3-51) and install a 1/2-14 pipe plug</p>	<p>Expedient Remedy</p> <p>Remove oil filter tubes or broken oil filter. and a 1/4-18 pipe plug in the engine crankcase where the oil filter tubes were removed. Operate the engine by passing the oil filter.</p>
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**3-15. Excessive Fan Vibration**

<p>Trouble</p> <p>Broken fan blade causing excess vibration from fan blade opposite</p>	<p>Expedient Remedy</p> <p>Cut the same amount broken blade so fan blades will be balanced.</p>
---	---

**Section VII. RADIO INTERFERENCE SUPPRESSION**

**3-16. General Methods Used to Attain Proper Suppression**

Essentially, suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

**3-17. Interference Suppression Components**

*a. Primary Suppression Components.* The primary suppression components are those whose primary function is to suppress radio interference. These components are described and located in figure 3-6.

*b. Secondary Suppression Components.* These components have radio interference suppression functions which are incidental and/or secondary to their primary function.

**3-18. Replacement of Suppression Components**

Refer to figure 3-6 to replace the radio interference suppression components.

**3-19. Testing Radio Interference Suppression Components**

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trial-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

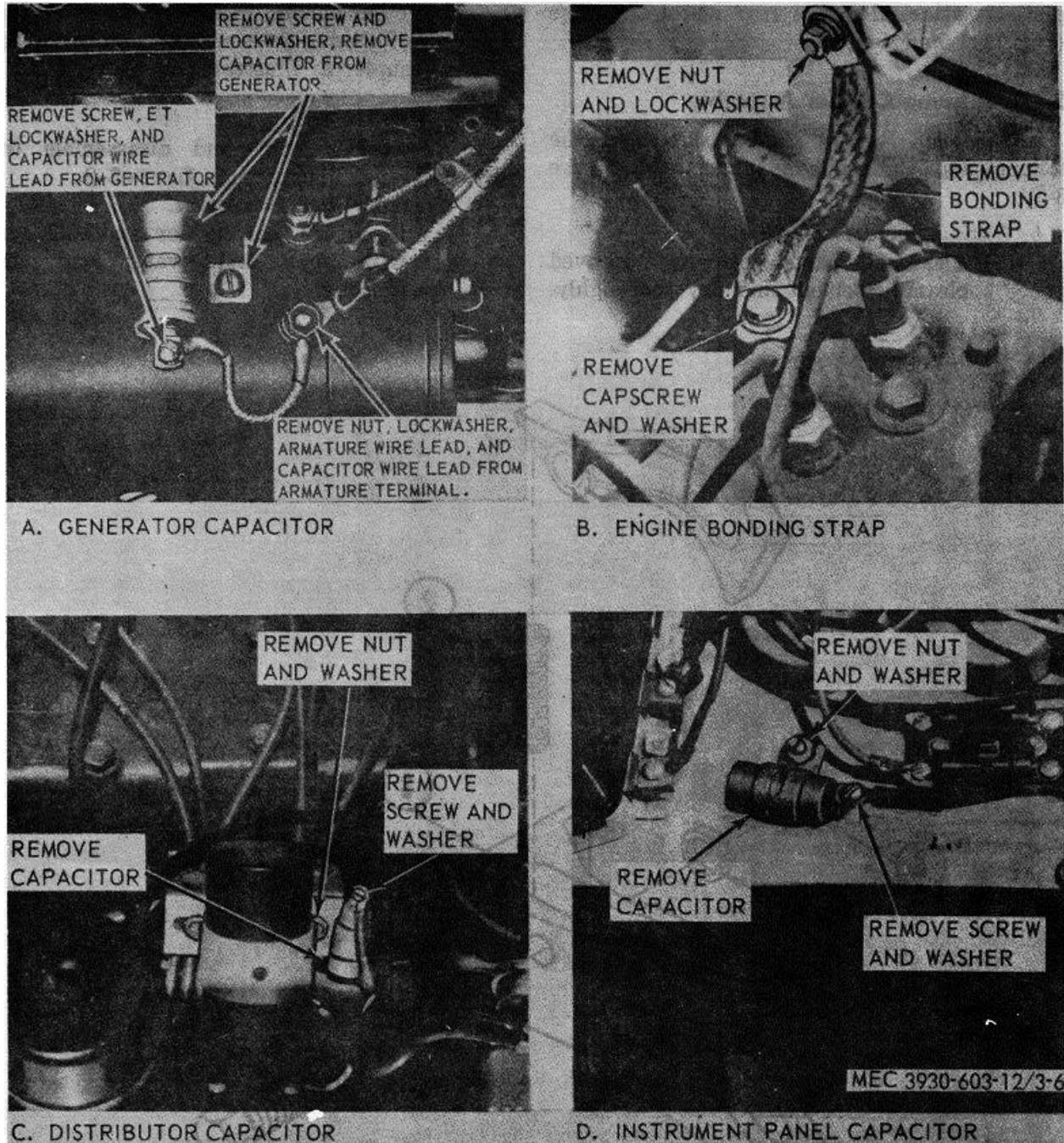


Figure 3-6. Interference suppression components, removal and installation.

### Section VIII. BODY GROUP

#### 3-20. General

The tractor frame and engine is enclosed in a sheet metal and steel plate body. Sheet metal panels and the hood complete the engine housing assembly. An adjustable operators seat is mounted on the rear deck. Two holes are provided in the front bumper and rear wheel

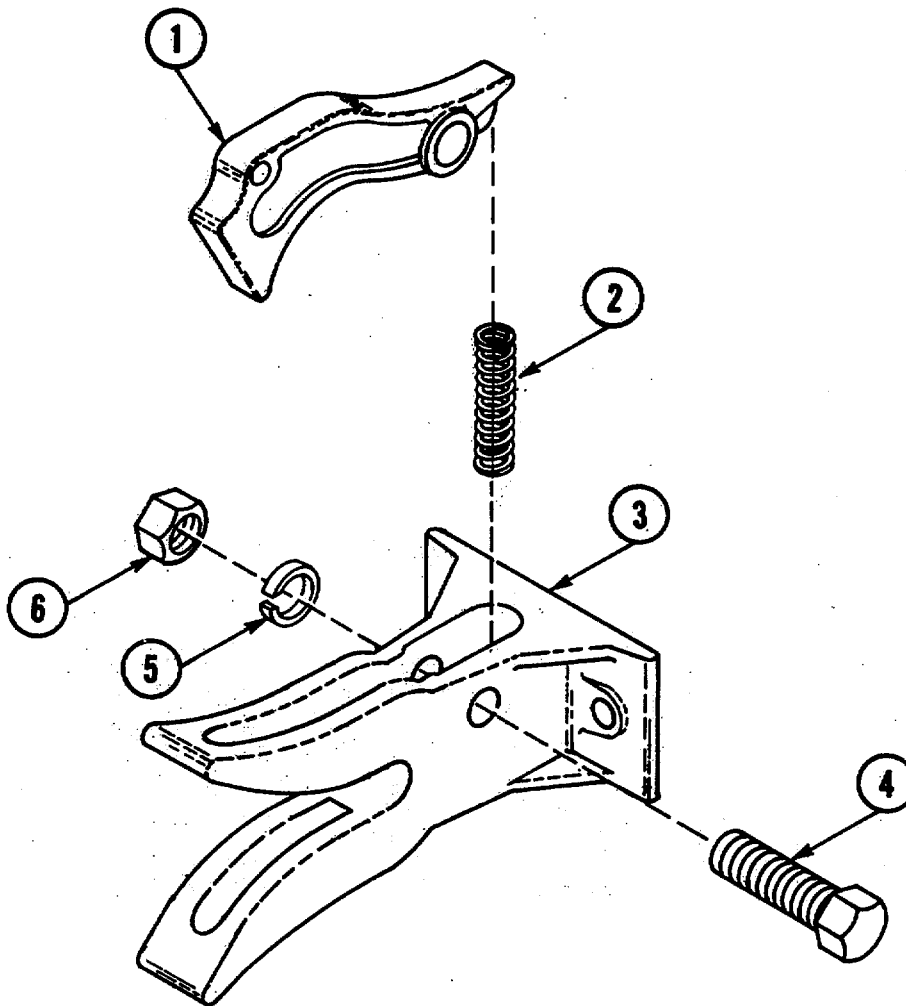
enclosure for lifting the tractor. A towing pintle is attached to the rear wheel enclosure (figs. 1-1 and 1-2).

**3-21. Towing Coupler Assembly**

- a. *Removal.* Remove and disassemble the towing coupler assembly as illustrated in figure 37.
- b. *Cleaning and Inspection.*
  - (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
  - (2) Inspect all parts for cracks, breaks or other damage. Replace defective parts.
- c. *Installation.* Reassemble and install the towing coupler as illustrated in figure 37.

**3-22. Drivers Seat**

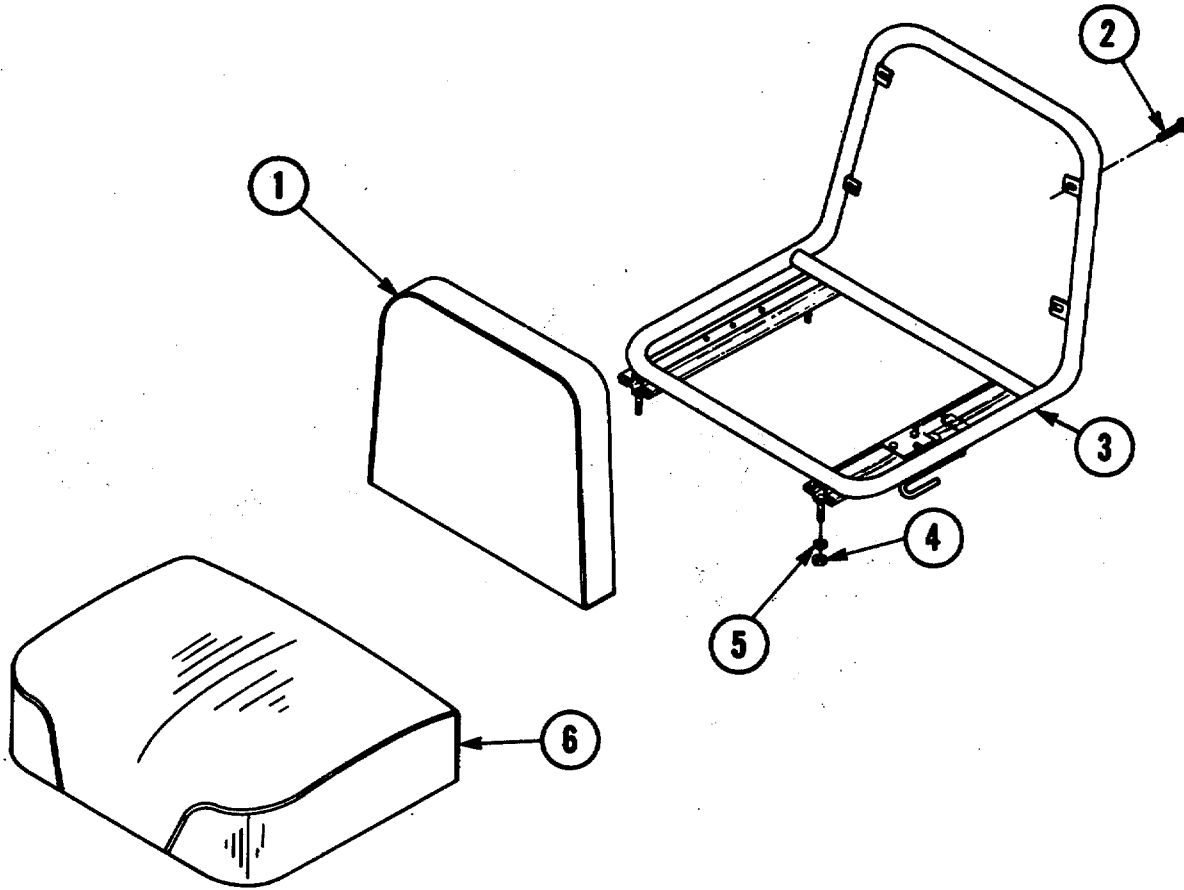
- a. *Removal.* Remove and disassemble the drivers seat as illustrated in figure 8-8.
- b. *Cleaning and Inspection.*
  - (1) Clean the seat cushion and back rest with soap and water and dry thoroughly.



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- |   |        |   |            |
|---|--------|---|------------|
| 1 | Hook   | 4 | Bolt       |
| 2 | Spring | 5 | Lockwasher |
| 3 | Body   | 6 | Nut        |

Figure 3-7. Towing coupler assembly, removal, disassembly reassembly and installation.



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- |   |          |   |              |
|---|----------|---|--------------|
| 1 | Backrest | 4 | Nut          |
| 2 | Screw    | 5 | Lockwasher   |
| 3 | Frame    | 6 | Seat cushion |

Figure 3-8. Drivers seat, removal, disassembly, reassembly and installation.

(2) Inspect all parts for cracks, breaks, or other damage. Replace defective parts.

c. *Installation.* Reassemble and install the drivers seat as illustrated in figure 3-8.

**3-23. Hood Assembly**

a. *Removal.* Remove the hood assembly as illustrated in figure 3-9.

b. *Cleaning and Inspection.*

(1) Wash all parts. in an approved cleaning solvent and dry thoroughly.

(2) Inspect the hood for cracks, breaks, or other damage. Replace defective parts.

c. *Installation.* Install the hood assembly as illustrated in figure 3-9.

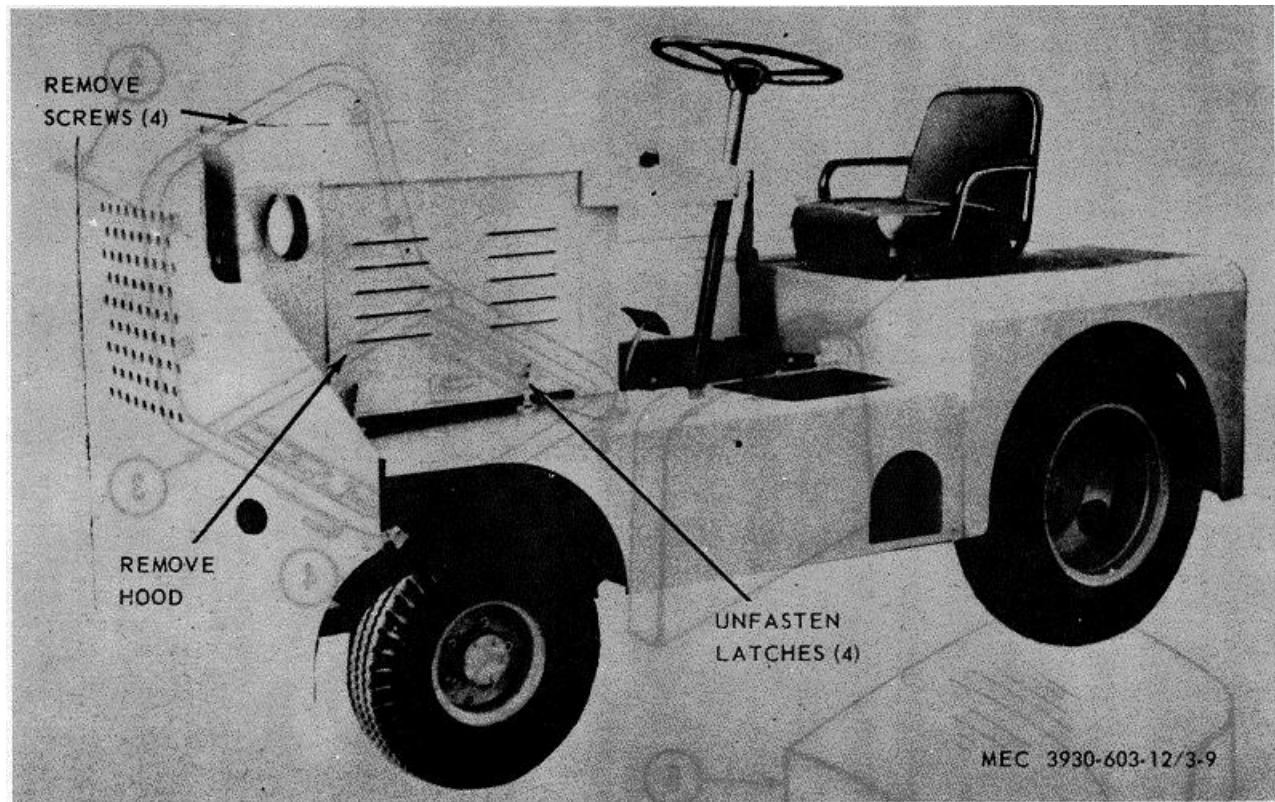


Figure 3-9. Hood assembly, removal and installation

## Section IX. FUEL SYSTEM

### 3-24. General

The fuel system consists of fuel pump, carburetor, maximum speed governor, choke control, intake manifold, and fuel tank. The fuel pump supplies fuel under pressure to carburetor from fuel tank. The carburetor supplies proper fuel-air mixture and maximum speed governor limits flow of fuel-air mixture to intake manifold. The intake manifold distributes fuel-air mixture to cylinders.

### 3-25. Carburetor

*a. Removal.* Remove carburetor as illustrated in figure 3-10.

*b. Cleaning and Inspection.* Clean all parts in an approved cleaning solvent and dry thoroughly. Inspect external portions of carburetor for damage. Discard and replace mounting gaskets. Replace all defective parts.

*c. Installation.*

(1) Install carburetor as illustrated in figure 3-10.

(2) Adjust carburetor (*d* below).

*d. Carburetor Adjustment.* Adjust carburetor as illustrated in figure 3-11.

### 3-26. Governor

*a. Removal.* Remove carburetor and governor assemblies as illustrated in figure 3-10.

*b. Cleaning and Inspection.* Clean all parts with an approved cleaning solvent and dry thoroughly. Discard and replace mounting gasket. Inspect exterior of governor for damage. Replace a defective governor.

*c. Installation.*

(1) Refer to figure 3-10 for installation of governor and carburetor assemblies.

(2) Adjust carburetor (para 3-25).



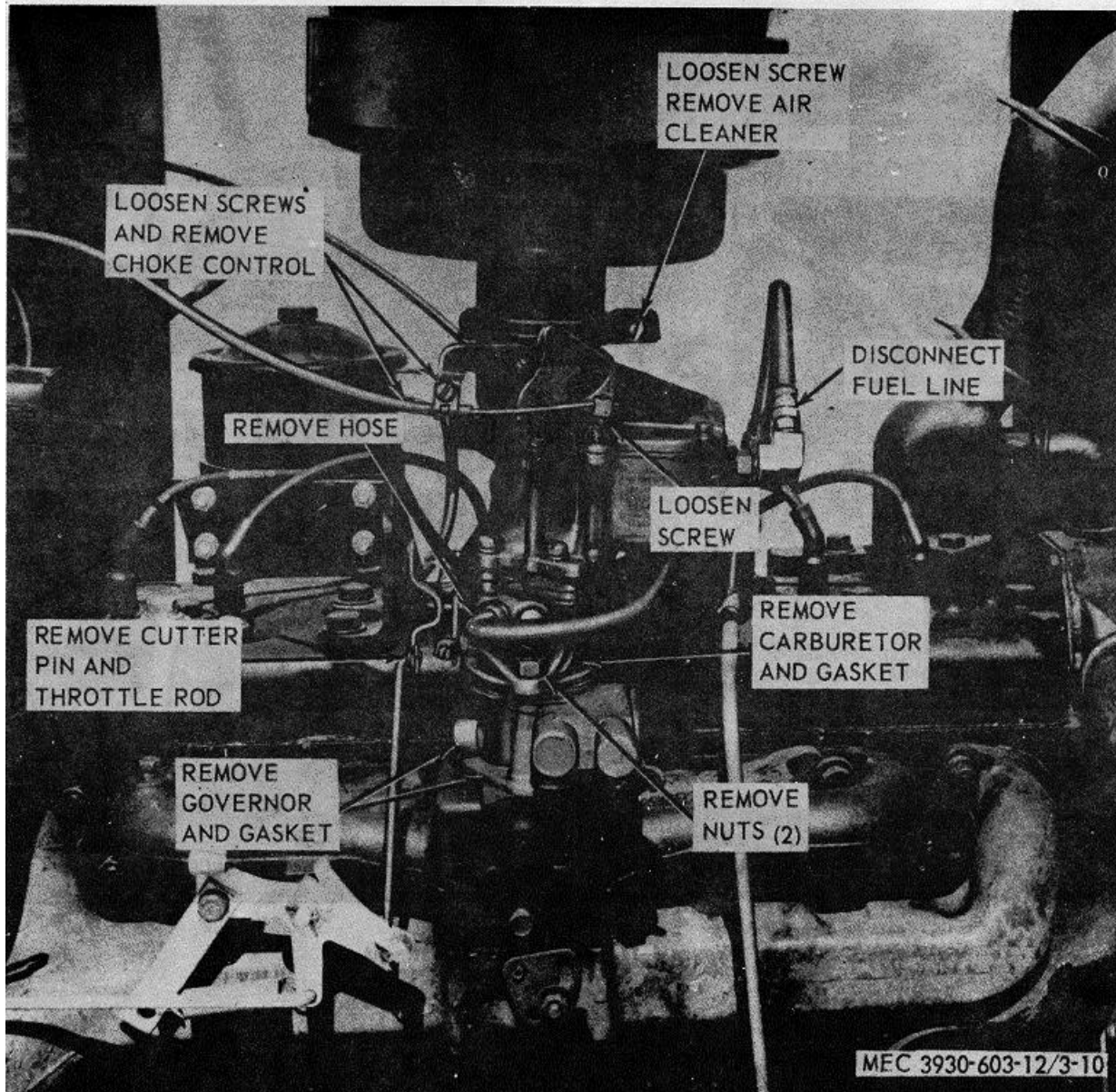


Figure 3-10 Carburetor and governor, removal and installation.

(3) Adjust governor (d. below).

d. Adjustment.

(1) General.

(a) Make sure all linkage -at manifold and carburetor is secure and that carburetor has been adjusted (para 3-25).

(b) Start engine (para 28) and run until normal operating temperature is reached.

(2) Speed adjustment.

(a) Attach a tachometer to engine. Run engine at full throttle. Tachometer should read 2000 rpm.

(b) To adjust for higher speed remove seal and wire from adjusting screw cap (fig. 3-12) and turn cap counterclockwise. To adjust for lower speed, turn adjusting screw cap clockwise. One complete turn of adjusting screw cap will change engine speed approximately 300 rpm.

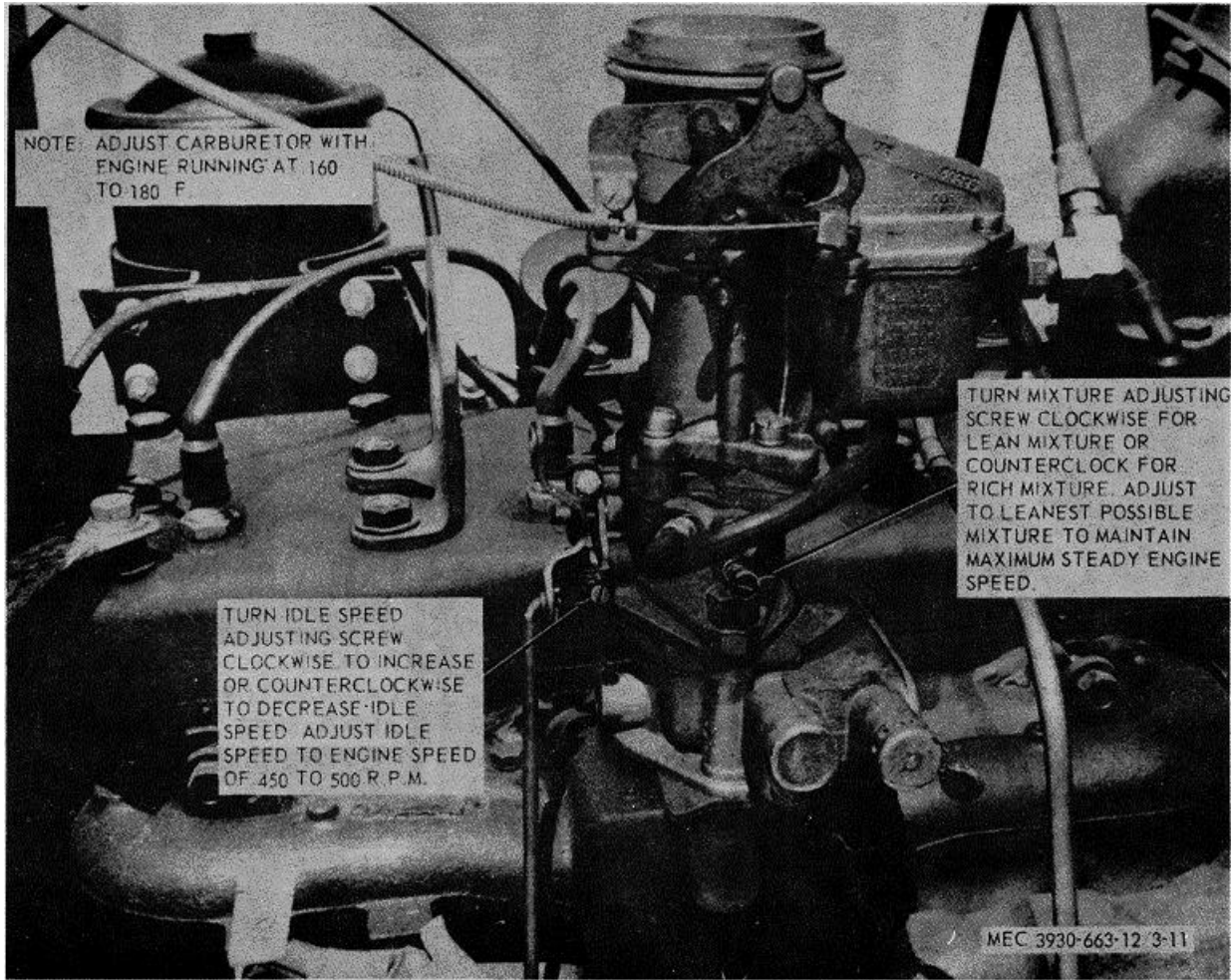


Figure 3-11. Carburetor adjustment.

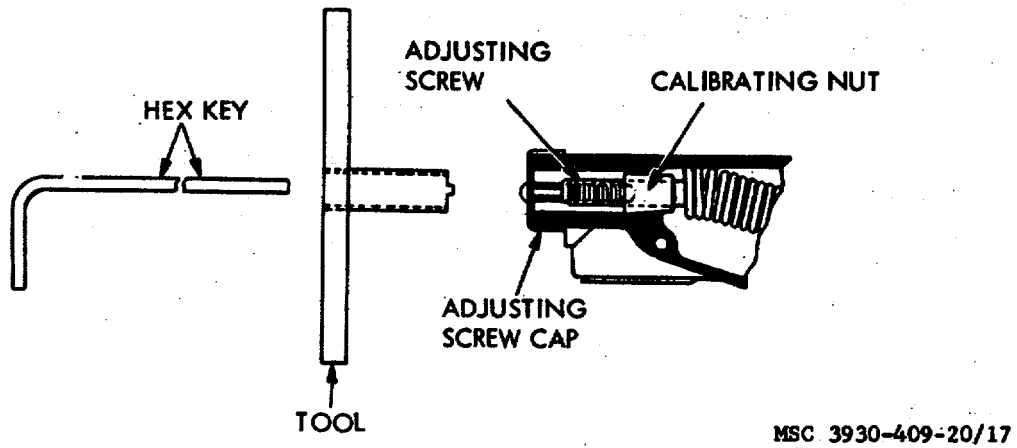


Figure 3-12. Governor adjustment..

(3) *Surge adjustment.*

- (a) Attach tachometer to engine.
- (b) Start engine (para 2-8), run engine until it reaches normal operating temperature.
- (c) Remove seal and wire from governor adjusting screw cap (fig. 3-12) and remove cap.
- (d) Fabricate a tool from a short piece of tubing. Tube inside diameter must not exceed screw outside diameter. Cut end of tube to engage slots in calibration nut and use handle as shown in figure 3-12.
- (e) Engage slot in calibration nut with tool and engage adjustment screw with appropriate Allen wrench (fig. 3-12).
- (f) Hold adjustment screw stationary with Allen wrench and turn calibration nut clockwise .one-quarter turn at a time until surge is minimized or eliminated.
- (g) Readjust as necessary and install adjusting screw cap and seal.

(4) *Slow action, adjustment.* If governor does not cut in promptly at maximum speed or does not cut out promptly at governed speed when load is applied, adjust surge ((3) above) except turn calibration nut counterclockwise.

**3-27. Fuel Pump**

- a. *Removal.* Remove the fuel-pump assembly as illustrated in figure 3-13.
- b. *Cleaning and Inspection.* Clean all parts thoroughly with an approved cleaning solvent and dry thoroughly. Discard and replace mounting gasket. Inspect fuel pump for damage.
- c. *Installation.* Install fuel pump assembly as illustrated in figure 3-13.

**3-28. Fuel Tank**

- a. *Removal.*
  - (1) Remove fuel tank cap, use a suitable container and drain fuel tank.
  - (2) Remove and disassemble fuel tank assembly as illustrated in figure 3-14.
- b. *Cleaning and Inspection.*
  - (1) Use compressed air and blow out fuel lines.
  - (2) Clean all parts with an approved cleaning solvent and dry thoroughly.
  - (3) Inspect all fuel lines and threaded fittings for damage. Replace defective parts.
- c. *Installation.*
  - (1) Install drain plug and filler cap (fig. 3-14).
  - (2) Reassemble and install fuel tank assembly as illustrated in figure 3-14.
  - (3) Fill fuel tank with proper grade of fuel.

**3-29. Throttle and Choke Control Linkage**

- a. *Removal.* Remove and disassemble throttle and choke control linkage as illustrated in figure 3-15.
- b. *Cleaning and Inspection.*
  - (1) Wash all parts with an approved cleaning solvent and dry thoroughly.
  - (2) Inspect all parts for damage and wear. Replace defective parts.
- c. *Installation.* Reassemble and install throttle and choke control linkage as illustrated in figure 3-15.

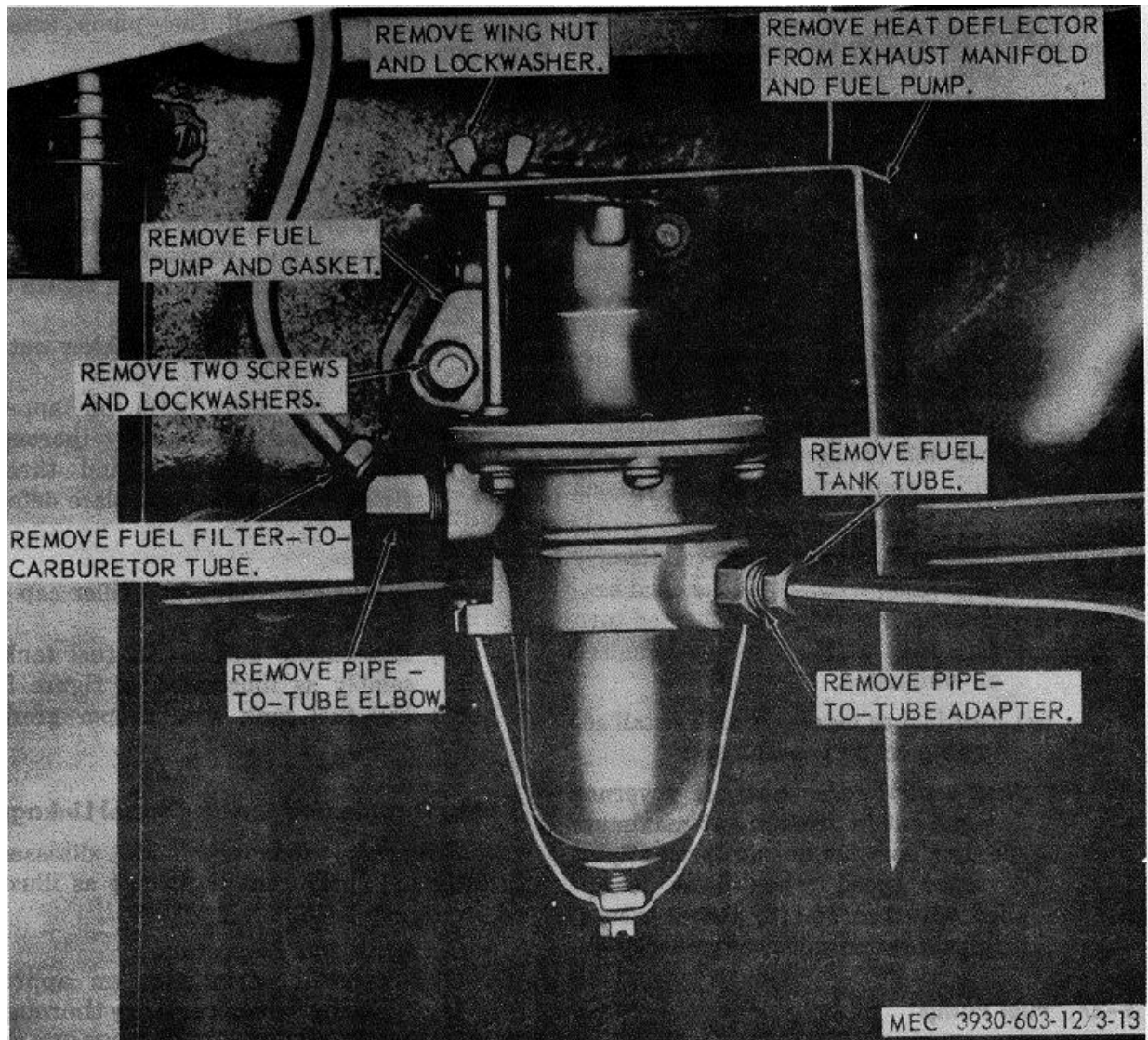
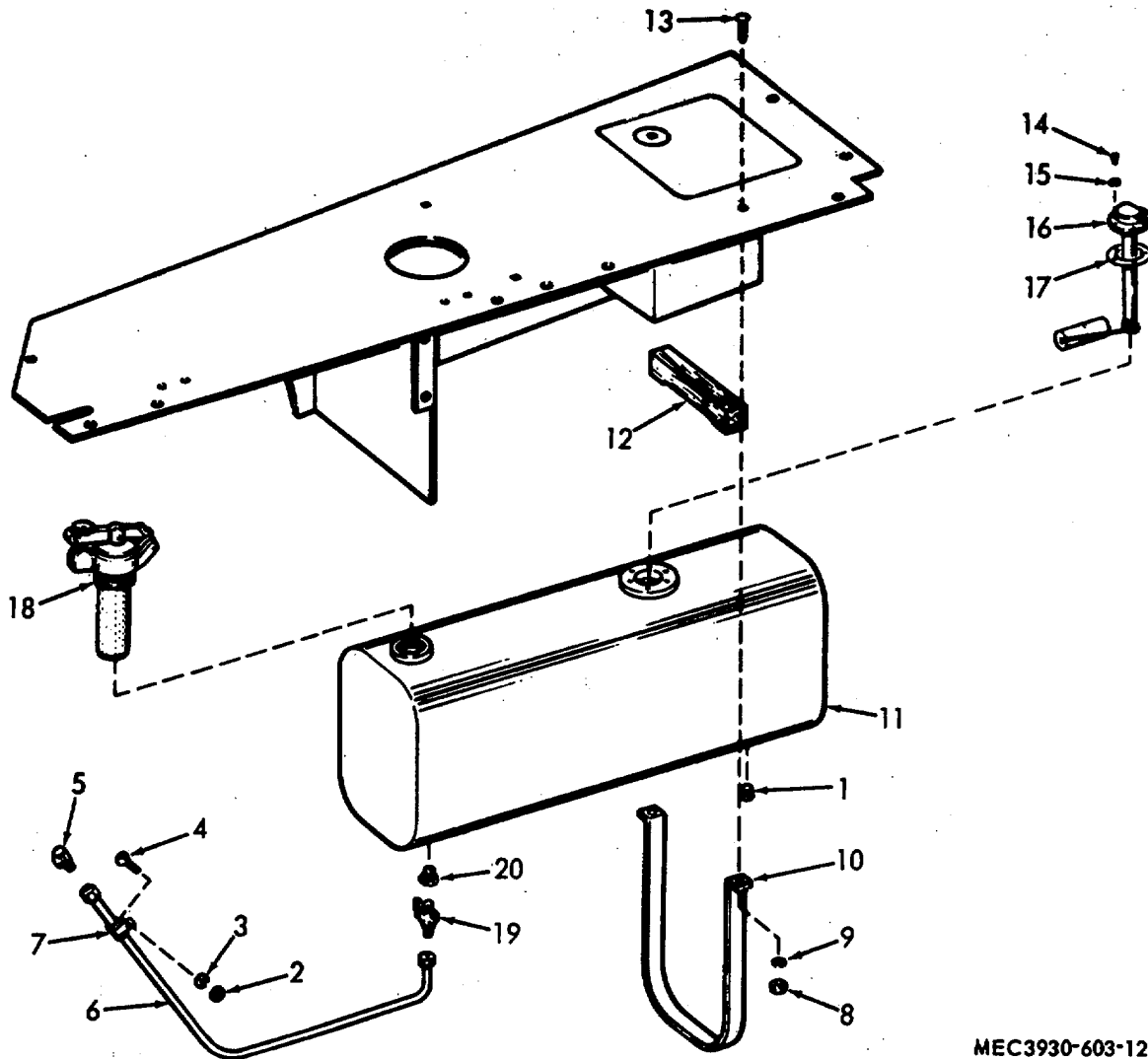


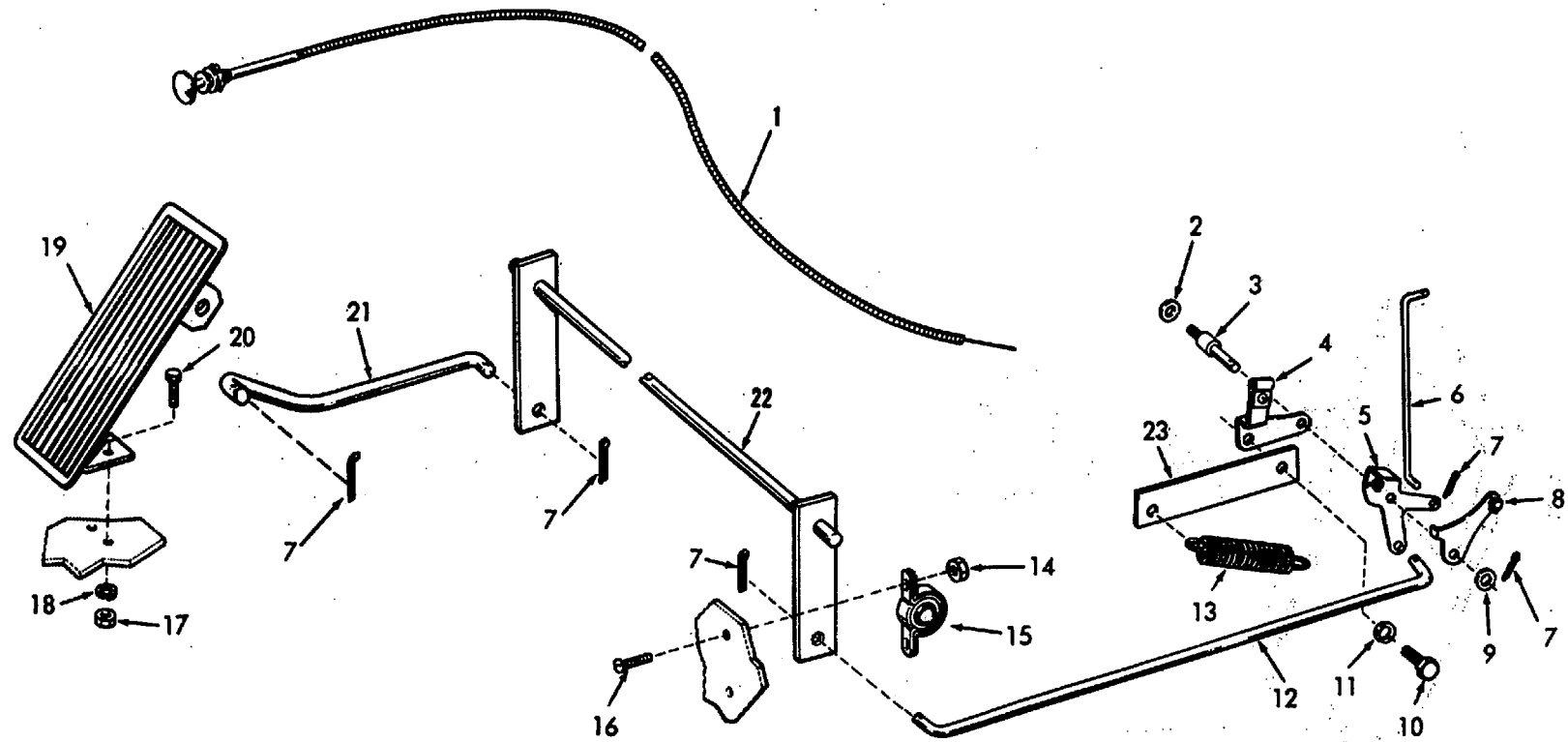
Figure 3-13. Fuel pump assembly, removal and installation.



MEC3930-603-12/3-14

- |    |                  |    |                               |
|----|------------------|----|-------------------------------|
| 1  | pipe plug        | 11 | Fuel tank                     |
| 2  | Hex nut          | 12 | Fuel tank block               |
| 3  | Lockwashers      | 13 | Carriage bolt                 |
| 4  | Round head screw | 14 | Round head screw              |
| 5  | Elbow            | 15 | Lockwashers                   |
| 6  | Fuel tube        | 16 | Fuel gage sending unit        |
| 7  | Fuel tube clip   | 17 | Fuel gage sending unit gasket |
| 8  | Hex nut          | 18 | Fuel tank cap                 |
| 9  | Lockwashers      | 19 | Shutoff cock                  |
| 10 | Fuel tank trap   | 20 | Reducer bushing               |

Figure 3-14. Fuel tank assembly, removal and installation



MEC 3930-603-12/3-15

- |   |                             |    |                         |    |                    |
|---|-----------------------------|----|-------------------------|----|--------------------|
| 1 | Choke control cable         | 9  | Flat washer             | 17 | Hex nut            |
| 2 | Flat washer                 | 10 | Hex head cap screw      | 18 | Lockwashers        |
| 3 | Stud                        | 11 | Lockwasher              | 19 | Accelerator pedal  |
| 4 | Throttle cable bracket      | 12 | Control rod             | 20 | Hex head cap screw |
| 5 | Bellcrank                   | 13 | Spring                  | 21 | Pedal shaft        |
| 6 | Carburetor to bellcrank rod | 14 | Self locking nut        | 22 | Accelerator rod    |
| 7 | Cotter pin                  | 15 | Accelerator rod bearing |    |                    |
| 8 | Throttle control lever      | 16 | Round head screw        |    |                    |

Figure 3-15. Throttle and choke control linkage, removal and installation.

**Section X . ELECTRICAL SYSTEM**

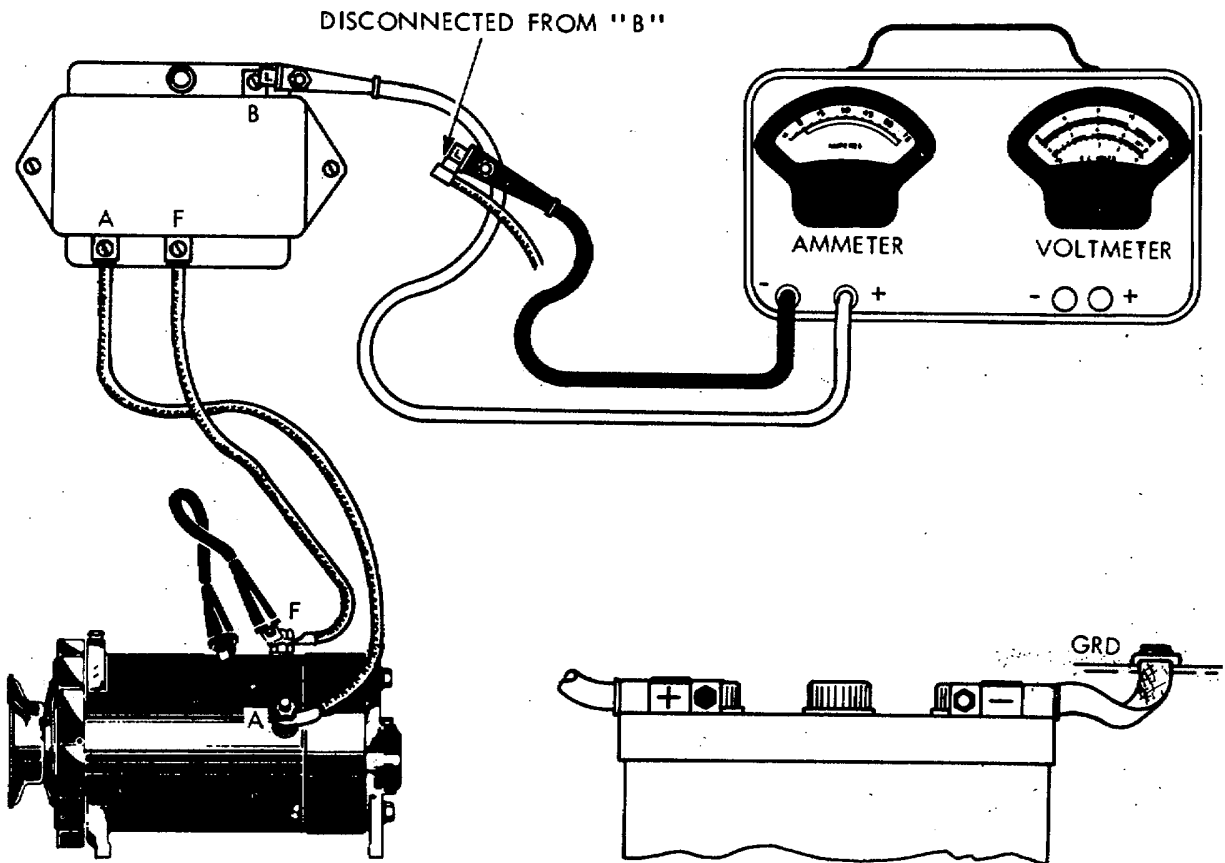
**3-30. General**

The electrical system consists of six basic circuits; starting, charging, ignition, horn, instruments and lighting. The units of various circuits are connected to a 12 volt negative ground, single wire system. When repairing or replacing electrical components refer to wiring diagram (fig. 14).

**3-31, Generator**

*a. Generator Output Test.*

- (1) Disconnect lead from battery terminal of voltage regulator, and connect ammeter in circuit as shown in figure 3-16.
- (2) With engine idling connect a jumper lead from generator "F" (Field) terminal to ground on generator. This prevents regulator from controlling (or interfering with) generator out- put. A regulator defect will not present operation of generator.
- (3) Slowly increase engine speed, while watching ammeter. If generator charging rate increases proportionately with engine speed to its rated out- put, generator is capable of satisfactory performance. Do not force generator to exceed its normal output rat- ing capacity of 30 amperes during this test.



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Figure -16 . Hoop for generator output test .



- (4) If output rises steadily to a rate less than rated output then levels off or back, check for slipping fan belt. If generator does not pass test, replace generator.

*b. Removal.*

- (1) Open left side of engine hood.
- (2) Remove generator assembly as illustrated in figure p17.

*c. Cleaning and Inspection.*

- (1) Clean exterior of generator with a cloth dampened with an approved cleaning solvent and dry thoroughly. Do not submerge generator in cleaning solvent
- (2) Inspect bearings for excessive wear or unusual noises.
- (3) Replace a defective generator.

*d. Installation.*

- (1) Install generator assembly as illustrated in figure 317.
- (2) Polarize generator after electrical connections have been made, by briefly shorting together bat and arm terminals of generator regulator with a jumper wire or a screw driver just long enough to cause a spark.

**3-32. Voltage Regulator**

*a. General.*

- (1) Mechanical checks and adjustments such as air gaps and points openings

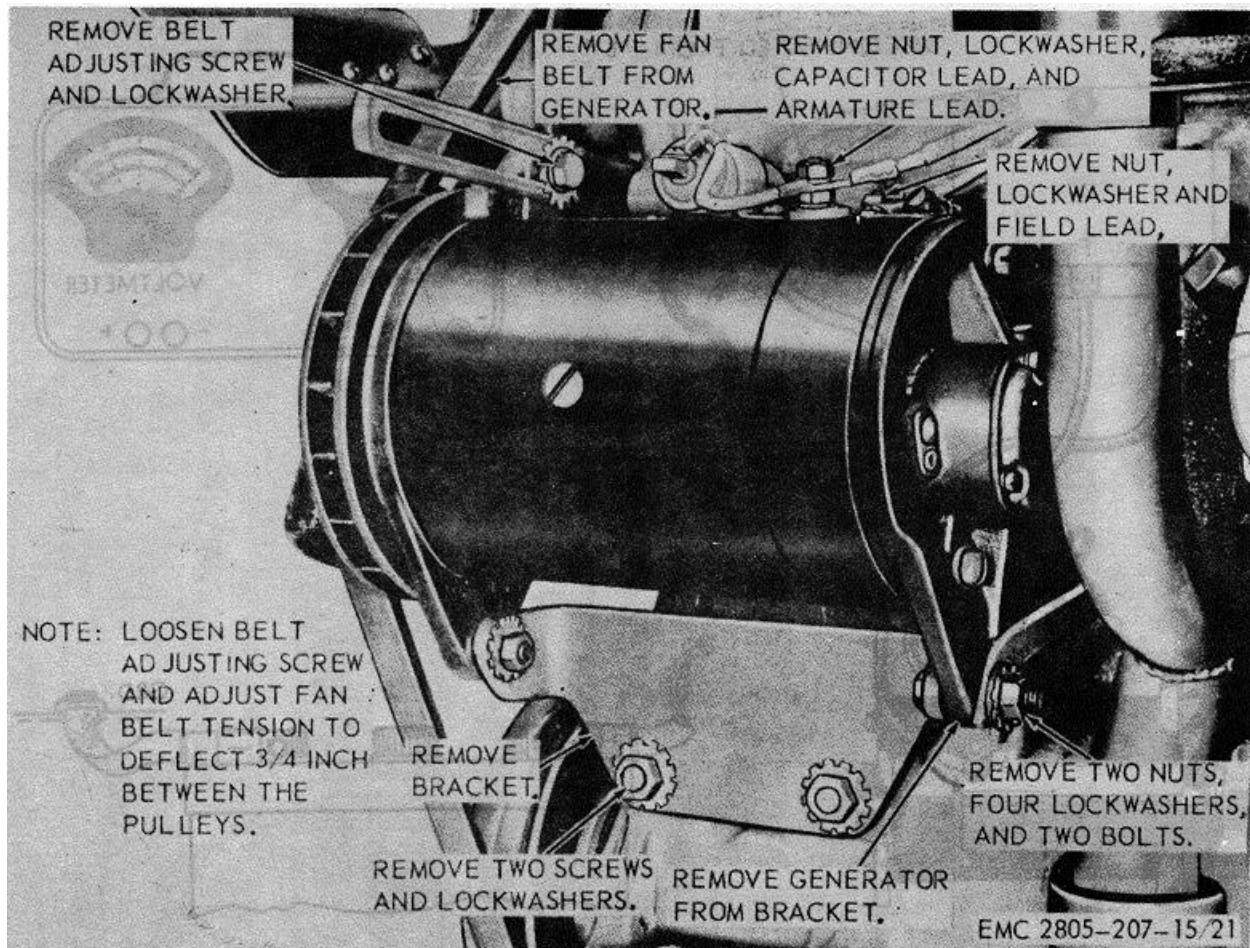


Figure 8-17 . Generator assembly, removal and installation



must be made with battery disconnected and preferably with regulator removed from tractor.

**Caution:** Cutout relay contact points must never be closed by hand with battery connected to regulator. This will cause a high current to flow through units which would cause serious damage.

- (2) Electrical checks and adjustments can be made either on or off tractor if a test bench is available. Regulator must always be operated with generator for which it is designed.
- (3) A regulator must be mounted in operating position when electrical settings are checked and adjusted and it must be at operating temperature. Operating temperature for regulator checking and adjusting is reached after 15 minutes of continuous operation.
- (4) Specified generator speeds for testing and adjusting regulator are as follows:
  - (a) *Voltage regulator.* Operate engine at governed speed.
  - (b) *Current regulator.* Generator must be operated at sufficient speed to produce current in excess of specified setting. Voltage of generator must be kept high enough to insure sufficient current output, but below operating voltage of voltage regulator unit.
- (5) After any tests or adjustments, generator on vehicle must be polarized after leads are connected, but before engine is started (para 3-31). This allows a momentary surge of current to flow through generator which correctly polarizes it. Failure to do this may result in severe damage since reversed polarity causes vibration, arcing and burning of relay contact points.

*b. Removal.*

- (1) Open battery compartment door and disconnect battery ground lead (fig. 2-1).
- (2) Remove voltage regulator as illustrated in figure 3-18.

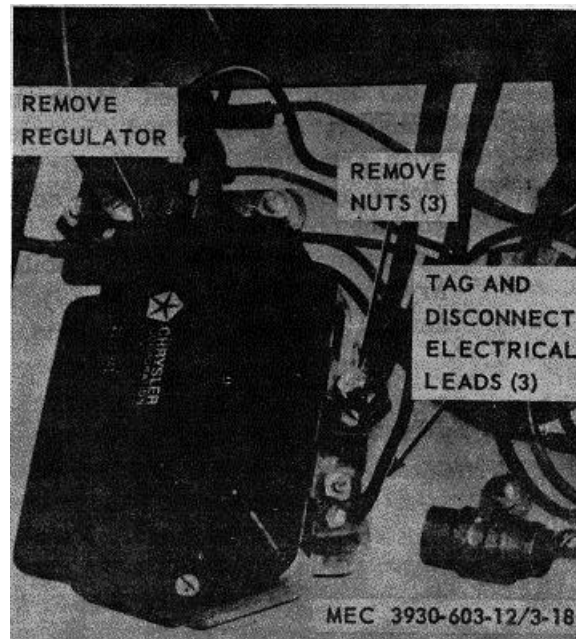


Figure 8-18 . Voltage regulator, removal and installation .

*c. Installation.*

- (1) Install voltage regulator as illustrated in figure 3-18.
- (2) Install battery ground cable (para 2 3) and close battery cover.

*d. Testing and Adjusting.* Prior to electrical testing generator regulator, cutout relay air gap and contact point openings ((1) (a) and (1) (b) below), the voltage regulator contact point opening ((2) (a) below) and current regulator contact point opening ((3) (a) below) must be checked and adjusted. The cutout relay is electrically tested and adjusted before testing is performed on voltage and current regulator portions of generator regulator. With cutout relay operating properly, voltage regulator portion is electrically tested and adjusted, and finally, current regulator portion is electrically tested and adjusted.

- (1) *Cutout relay.* The cutout relay requires three checks and adjustments as follows:
  - (a) *Air gap.* With battery disconnected, measure air gap between armature and center of core (fig. 3-19).

If adjustment is required, bend armature stop (fig. 3-20) up or down until air gap clearance of 0.025 to 0.027 inch is obtained. Make sure armature stop does not interfere with armature alinement.

- (b) *Point opening.* Check and adjust contact point opening to 0.015 inch by expanding or contracting stationary contact bridge (fig. 3-20). Be certain to keep contact points in

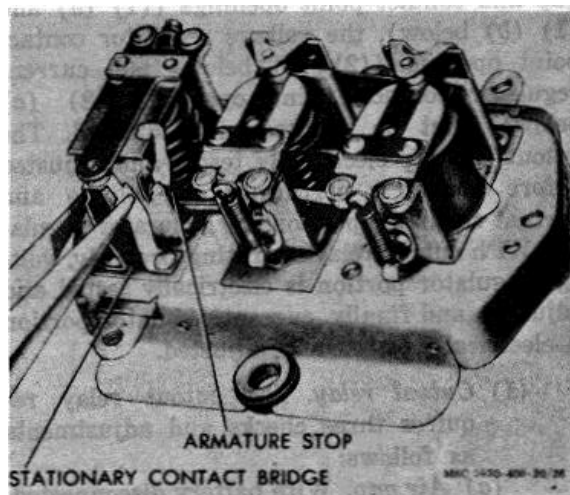
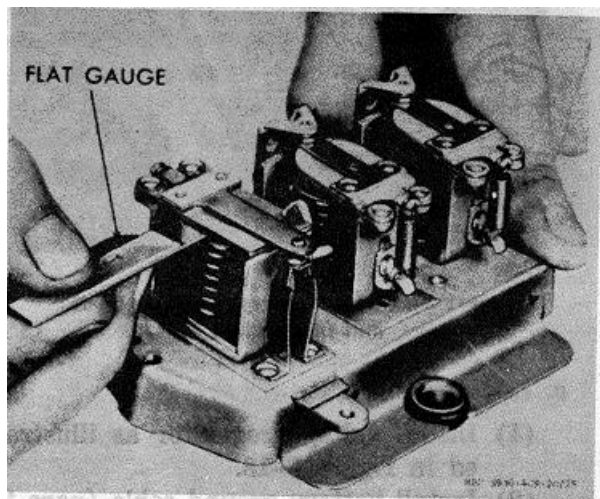


Figure 3-19. Checking voltage regulator cutout relay armature air gap.

Figure 3-20. Voltage regulator cutout relay contact point gap and armature air gap adjustment.

alinement when adjusting contact .gap.

(c) *Electrical test.*

1. Connect test equipment as illustrated in figure 3-21.
2. With engine running, regulator warmed up and battery fully charged, decrease engine speed until voltmeter reads less than battery voltage and ammeter reads steady on zero. Cutout relay points are now open.
3. Very slowly increase engine speed by turning carburetor adjustment screw (fig. 3-11) so that voltmeter reading builds up a fraction at a time. Keep glancing at ammeter after each increase in voltage.

**Note.** Closing voltage of cutout relay is highest voltmeter reading obtained just before ammeter pointer moves off zero. Closing voltage will be 12.6 to 13.6 volts.

4. Continue to increase engine speed until ammeter reads 8 to 10 amperes, then slowly decrease speed while watching ammeter. Ammeter pointer will move to left of zero, then suddenly return to zero as speed is decreased.

**Note.** Opening amperage of cutout relay is greatest discharge reading obtained before pointer returns to zero. Opening amperage must be 3.0 to 6.0 amperes

5. Repeat steps S. and a. above several times to assure an accurate test.
6. If closing voltage is not within limits, bend lower armature spring hanger (fig. 3 22). If opening amperage is not within limits, recheck point opening ((h) above).

(2) *Voltage regulator.* The voltage regulator requires two checks and adjustments as follows:

- (a) *Air gap.* With battery disconnected, check air gap (fig. 8-23). Insert gage on contact point side of air .

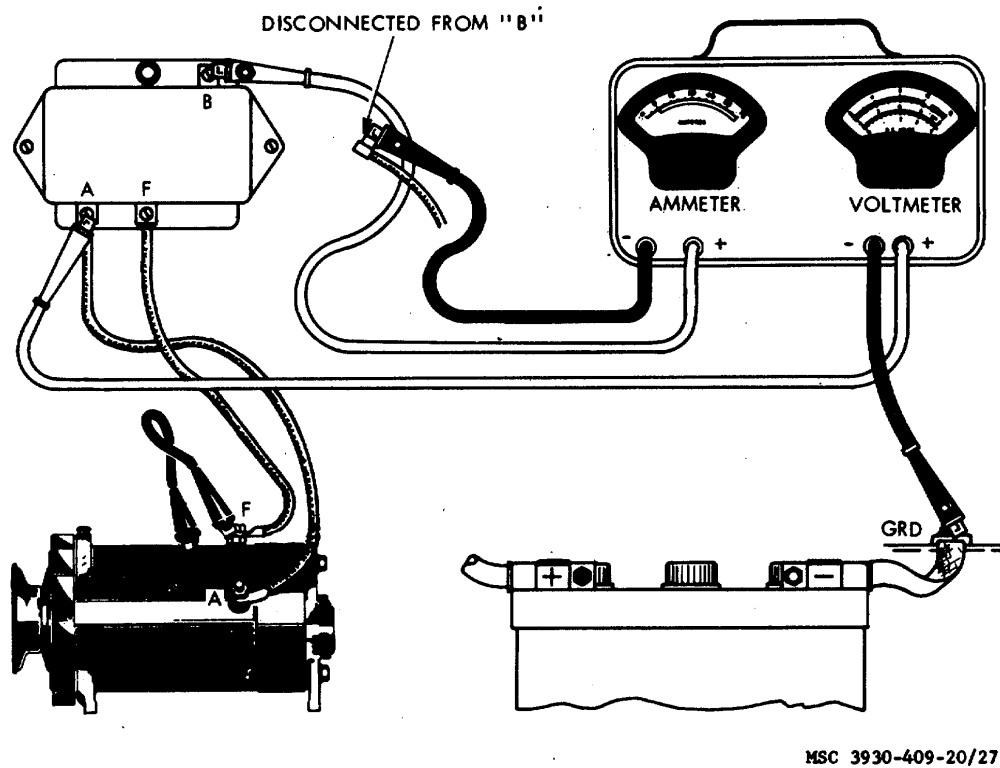


Figure 3-21. Voltage regulator cutout relay test setup.

gap next to armature stop pin. If adjustment is needed, loosen bracket adjustment screw and raise or lower contact point bracket until a gap of 0.048 to 0.052 in. is obtained. Tighten bracket adjustment screw securely after making adjustment. When armature is held down so that stop rivet rests on magnet core, the point should be a minimum of 0.012 inch.

(b) Electrical test.

1. Refer to figure 824 and connect test equipment.
2. Start tractor (para 2-) and operate at 1500 rpm.
3. Turn on tractor headlights and if necessary apply load across battery until test ammeter reads approximately 15 amperes.

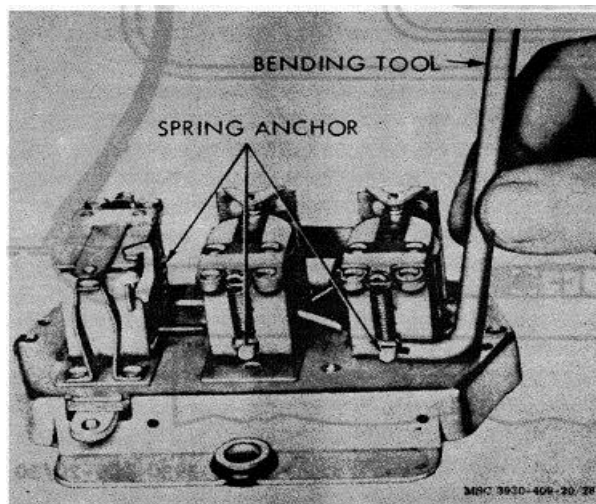


Figure 3-22. Voltage regulator spring anchor adjustment

4. Cycle regulator by reducing speed until cutout relay points open, then slowly increase speed again to 1500 rpm.
5. Voltmeter reading indicates setting of voltage regulator unit. Reading must be 14.2 to 14.8 volts.

Note. Erratic voltmeter reading indicates burned, dirty or pitted contact points.

6. When adjusting voltage regulator, repeat steps 4. and 5. above after taking final reading. Final test reading must be made with cover in place at normal operating temperature.

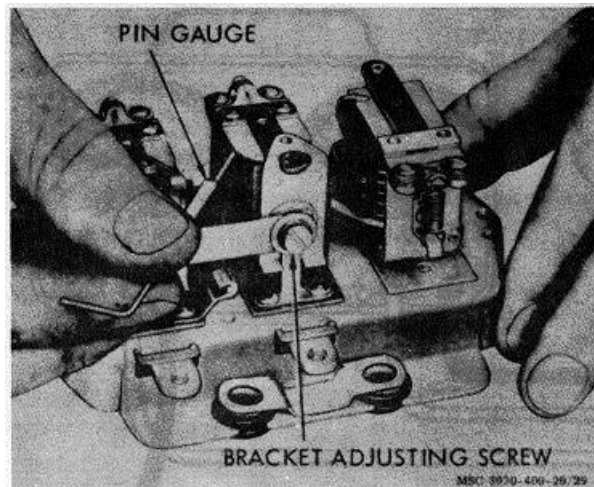
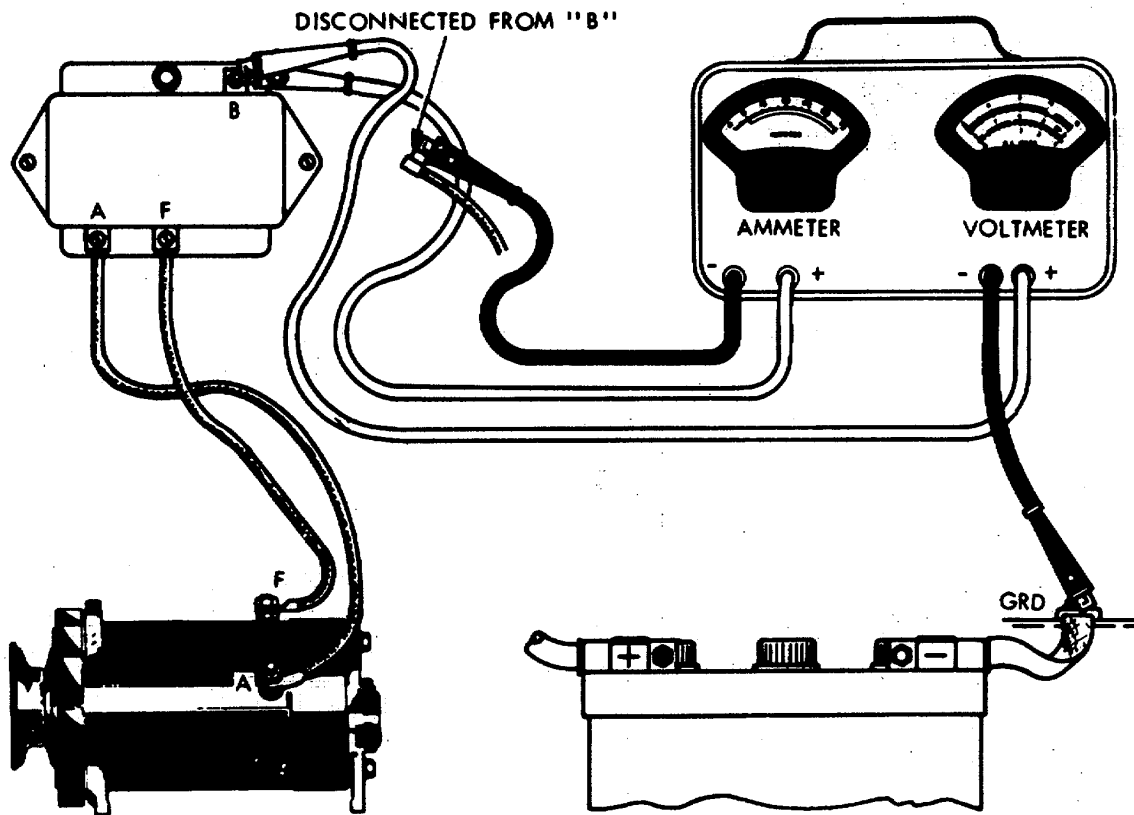


Figure 3-23. Checking voltage and current regulator air gap.



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Figure a 84. Voltage regulator test setup.

7. If voltage regulator is not within limits, bend lower armature spring anchor (fig. p22) to obtain proper voltage.

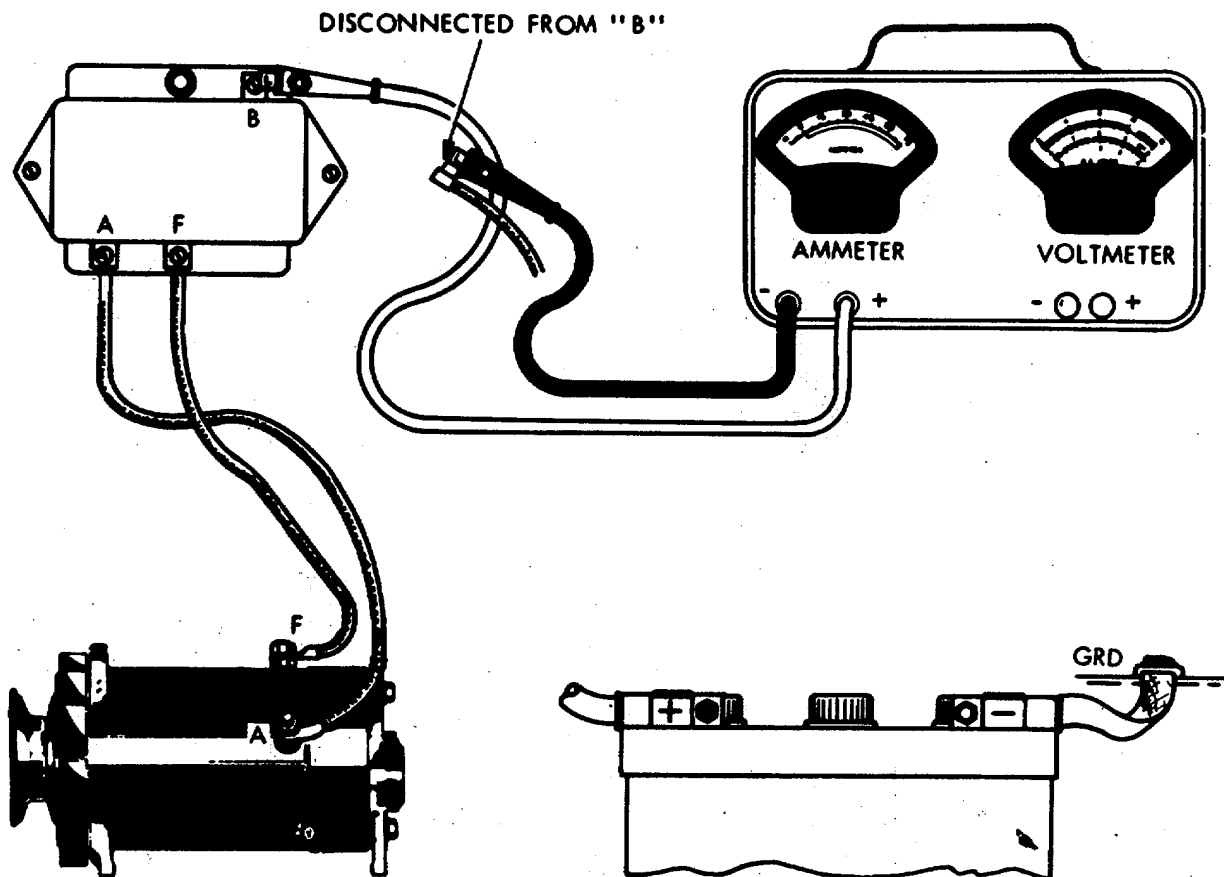
(3) *Current regulator.* The current regulator requires two checks and adjustments as follows:

(a) *Air gap.* With battery disconnected, check air gap (fig. 823). Insert gage on contact point side of air gap next to armature stop pin. If adjustment is needed, loosen bracket adjusting screw and raise or lower contact point bracket until gap of 0.048 to 0.052 inch is obtained. Tighten bracket adjusting screw securely after making adjustment. When armature is held down so that stop rivet rests on magnet core, point gap must be a minimum of 0.012 inch.

(b) *Electrical test.*

1. Refer to figure 3-25 and connect test equipment.
2. Start engine (para 2-8) and operate at 2000 rpm.
3. Apply variable load across battery until ammeter load is maximum.
4. Maximum ammeter reading indicates setting of current regulator unit. Reading must be 30 amperes.

Note. Erratic ammeter reading indicates dirty, burned or pitted contact points.



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Figure 3-25. Current regulator test setup

5. If current regulator is not within limits, bend lower armature spring anchor (fig. p22) to obtain proper amperage.

### 3-33. Starting Motor

#### a. Removal

- (1) Open battery compartment cover (fig. 1-1) and disconnect positive cable from storage battery (fig. 2-1).
- (2) Jack up tractor to a suitable working height and block securely so starter can be removed from under vehicle.
- (3) Remove starting motor as illustrated in figure p26.

#### b. Cleaning and Inspection.

- (1) Clean exterior of starter with a cloth dampened with an approved cleaning solvent and dry thoroughly. Do not submerge starter in cleaning solvent.
- (2) Visually inspect starter for obvious defects such as cracks, breaks, mutilation or excessive wear of drive gear teeth or damaged threads.
- (3) Replace a defective starter.

#### c. Installation.

- (1) Install starting motor as illustrated in figure 3-26.
- (2) Connect positive cable on battery (fig. 21) and close battery compartment door (fig. 1-1).
- (3) Remove jack and blocks and set tractor on floor.

### 3-34. Distributor Assembly

a. Removal. Remove distributor assembly as illustrated in figure p27.

#### b. Cleaning and Inspection.

- (1) Clean exterior of distributor and inside of distributor cap with a cloth dampened in approved cleaning solvent and dry thoroughly.

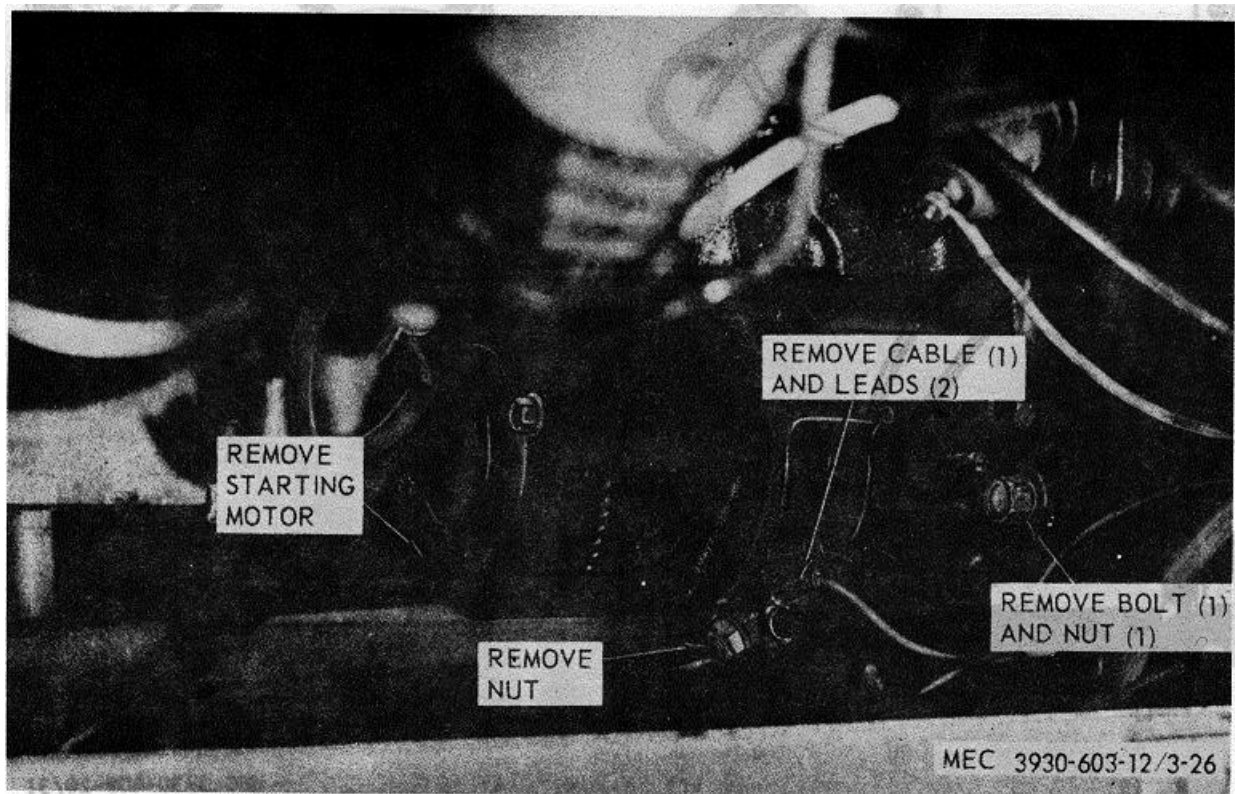


Figure 3-26. Starting motor, removal and installation.

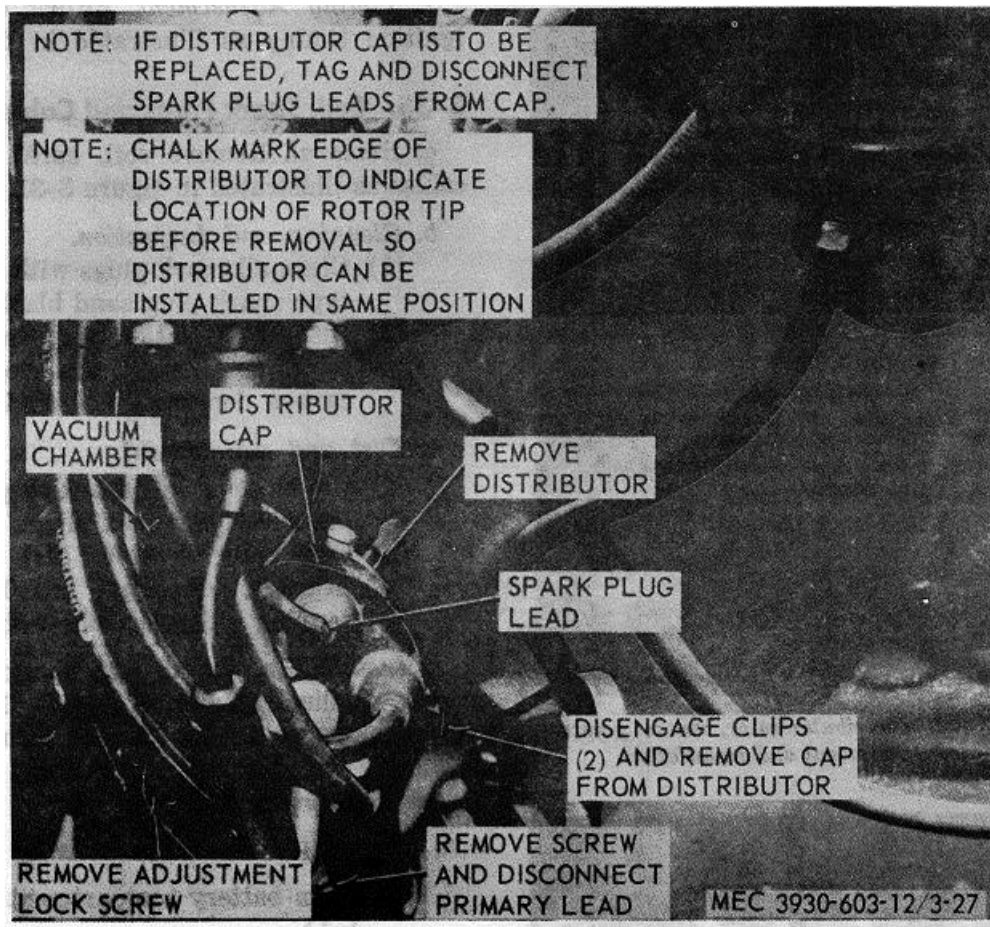


Figure 3-27. Distributor assembly, removal and installation.

(2) Inspect cap and rotor for cracks, carbon runners, and corroded terminals. If vertical face of insert in cap is slightly burned, clean burned area with crocus cloth dampened in cleaning solvent. Do not use a file. If burned area is deep, replace cap.

(3) Wipe breaker contacts with a cloth dampened with approved cleaning solvent and dry thoroughly. Examine points for pitted or worn condition. Replace pitted or worn contact points (c below).

*c. Repair.*

(1) Remove and install rotor, contact points, and capacitor as illustrated in figure 828.

(2) Test vacuum chamber (fig. 327) by twisting distributor cam (fig. 828) clockwise. It will turn against spring tension, and return by spring tension to its original position if in good working condition.

*d. Installation.*

(1) Position distributor rotor so its tip points to chalk mark made before removal.

(2) Install distributor assembly as illustrated in figure S27.

*e. Engine Ignition Timing Check.*

(1) Remove spark plug cable from No. 1 plug and connect timing light as illustrated in figure 329.

(2) Start engine (para 2-8) and, at 450 rpm idle speed direct flashing beam of timing light at top of crankshaft pulley. If ignition timing is correct, light flash will show scribed mark on

crankshaft pulley aligned with pointer on timing gear cover as No. 1 plug fires.

f. *Timing Adjustment.* Adjust engine and ignition timing as illustrated in figure 3 0.

**3-35. Coil, Spark Plugs and Cable**

a. *Removal.* Remove coil, spark plugs and cables as illustrated in figure 3-31.

b. *Cleaning and Inspection.*

- (1) Clean all spark plugs with an abrasive type spark plug sand blaster.
- (2) Inspect insulation for breaks, cracks or chips. Inspect the electrodes for carbon deposits or burned electrodes.

c. *Test and Adjustment.*

- (1) Use an approved spark plug tester and pressure test spark plugs.
- (2) File center electrode flat, and after cleaning, adjust gap to 0.035 inch by bending side electrode only.

d. *Installation.* Install coil, spark plugs and cables as illustrated in figure S31. Torque spark plugs to 25 to 30 foot pounds.

**3-36. Battery and Cables**

a. *Removal*

- (1) Open battery compartment door (fig. 1-1).
- (2) Remove battery as illustrated in figure 2-1.

b. *Cleaning, Service and Testing.*

(1) Wash battery by flushing with water. Use brush if necessary to remove crusted deposits. Brush terminal posts and inside of cable terminals to bright finish without removing metal.

- (2) Refer to TM 96140200-15 for servicing and testing battery.

c. *Installation.*

- (1) Install battery as illustrated in figure 2-1.
- (2) Close battery compartment cover (fig. 1-1).

**3-37. Instruments and Gages**

a. *Removal.* Remove instruments, switches and warning lights as illustrated in figure 3-32.



Figure 3-28 (1). Distributor rotor, contact points and capacitor, removal and installation.

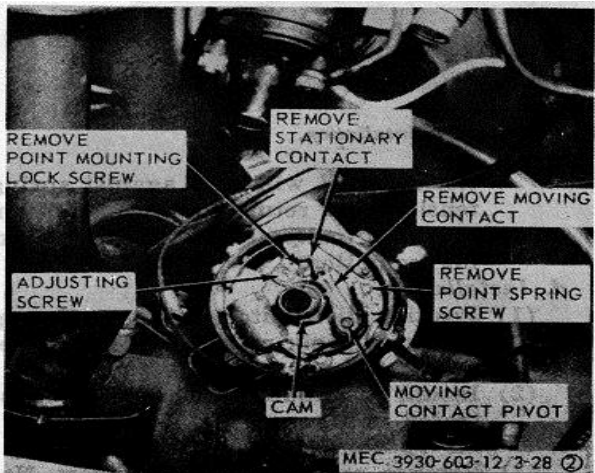
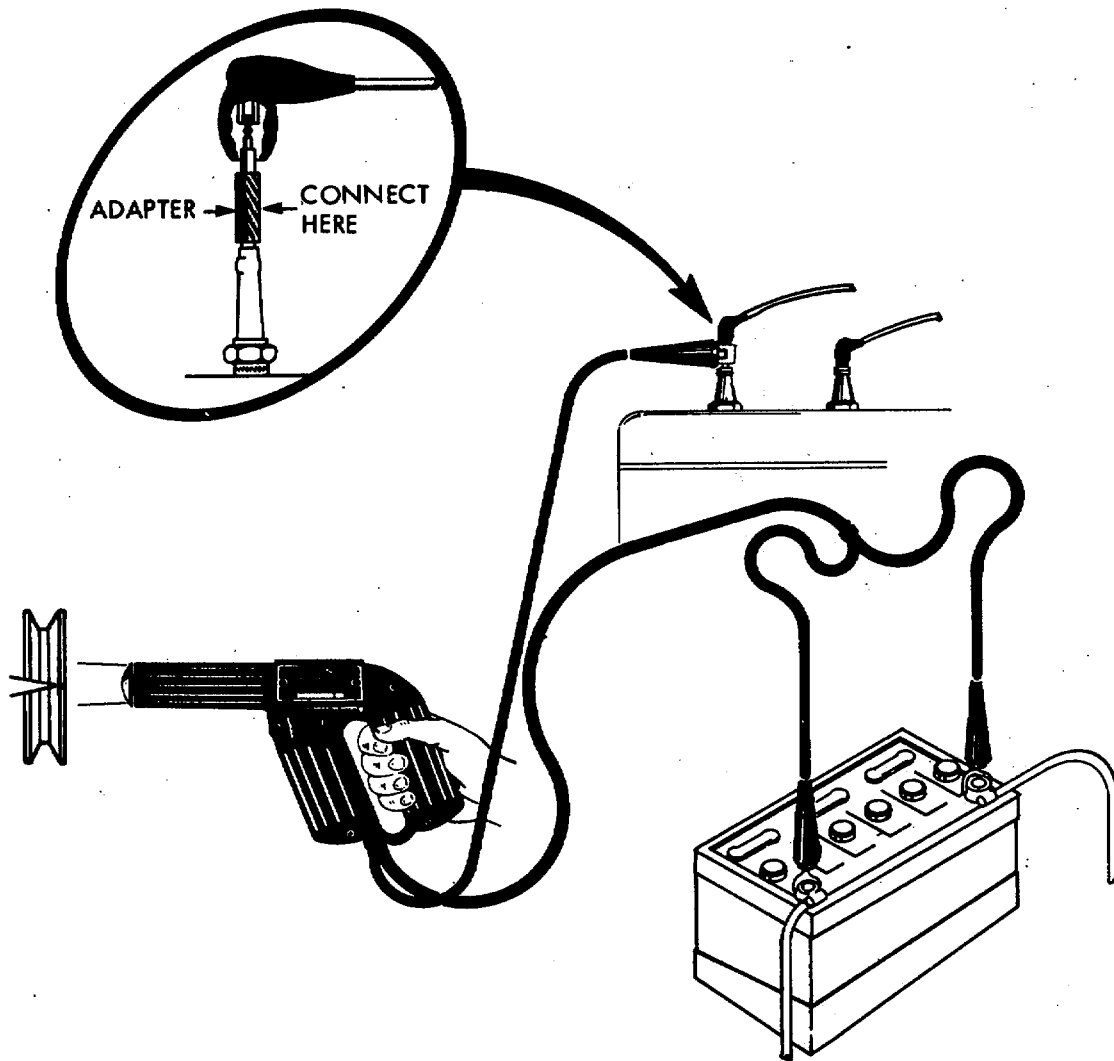


Figure 3-28 (2). Distributor rotor, contact points and capacitor, removal and installation (Continued)





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Figure 3-29. Checking engine ignition timing.

*b. Cleaning and Inspection.*

- (1) Clean all electrical connections and inspect all leads for frayed edges or defective terminals.
- (2) Inspect gages for cracked or broken glass.
- (3) Replace defective instruments, switches or warning lights.

*c. Installation.* Install instruments, switches and warning lights as illustrated in figure 3-32.

**3-38. Headlights**

- a. Removal and Disassembly.* Remove and disassemble headlight assembly as illustrated in figure 3-33.
- b. Reassembly and Installation.* Reassemble and install headlight assembly as illustrated in figure 3-33.

**3-39. Tail and Stop Light Assembly**

- a. Removal and Disassembly.* Remove tail and stoplight assembly as illustrated in figure 3-34.

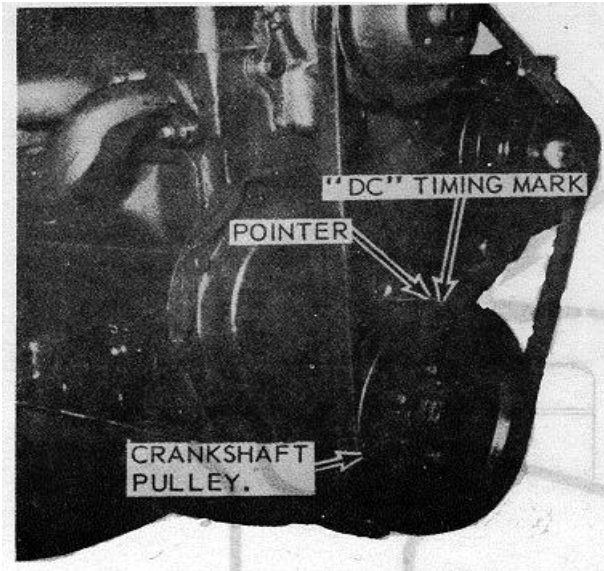


Figure 3-30 (1). Engine and ignition timing.

- STEP 1. REMOVE NO. 1 SPARK PLUG. HOLD THUMB OVER SPARK PLUG HOLE AND TURN CRANKSHAFT UNTIL AIR PRESSURE IS FELT WHICH INDICATES THE COMPRESSION STROKE OF NO. 1 CYLINDER
- STEP 2. WITH NO. 1 CYLINDER ON THE COMPRESSION STROKE, TURN THE CRANKSHAFT UNTIL THE "DC" MARK ON THE CRANKSHAFT PULLEY IS ALINED WITH THE POINTER.
- STEP 3. AFTER DISTRIBUTOR IS INSTALLED MARK THE POINTER AND CRANKSHAFT PULLEY TIMING MARK.
- A. CRANKSHAFT PULLEY TIMING MARK&
- MEC 3930 603- 12/3- 30 1
- STEP 4. REMOVE DISTRIBUTOR CAP (FIG.3-27) AND TURN ROTOR UNTIL IT POINTS TO NO.1 SPARK PLUG CABLE IN DISTRIBUTOR CAP.
- STEP 5. LOOSEN LOCK SCREW AND ROTATE DISTRIBUTOR TO OBTAIN RANGE OF ADJUSTMENT. TIGHTEN SCREW.
- STEP 6 RECHECK ENGINE TIMING
- B. DISTRIBUTOR TIMING
- MEC 3930603-122/3-30Q**

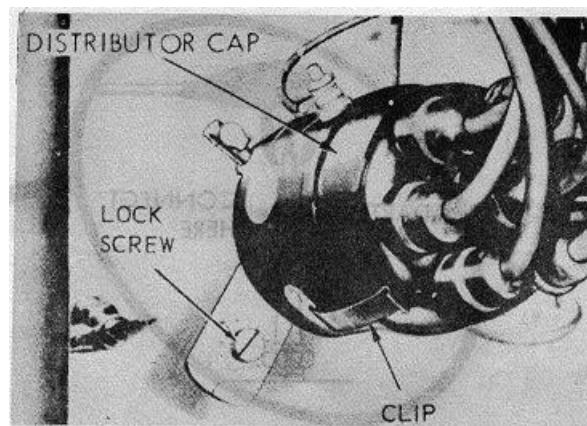


Figure 3030 (2) - Continued.

b. *Reassemble and Installation.* Install tail and stop light assembly as illustrated in figure 3-34.

### 3-40. Horn and Horn Relay

- a. *Removal.* Remove horn and horn relay as illustrated in figure 3-35.
- b. *Installation.* Install horn and horn relay as illustrated in figure 3-35.



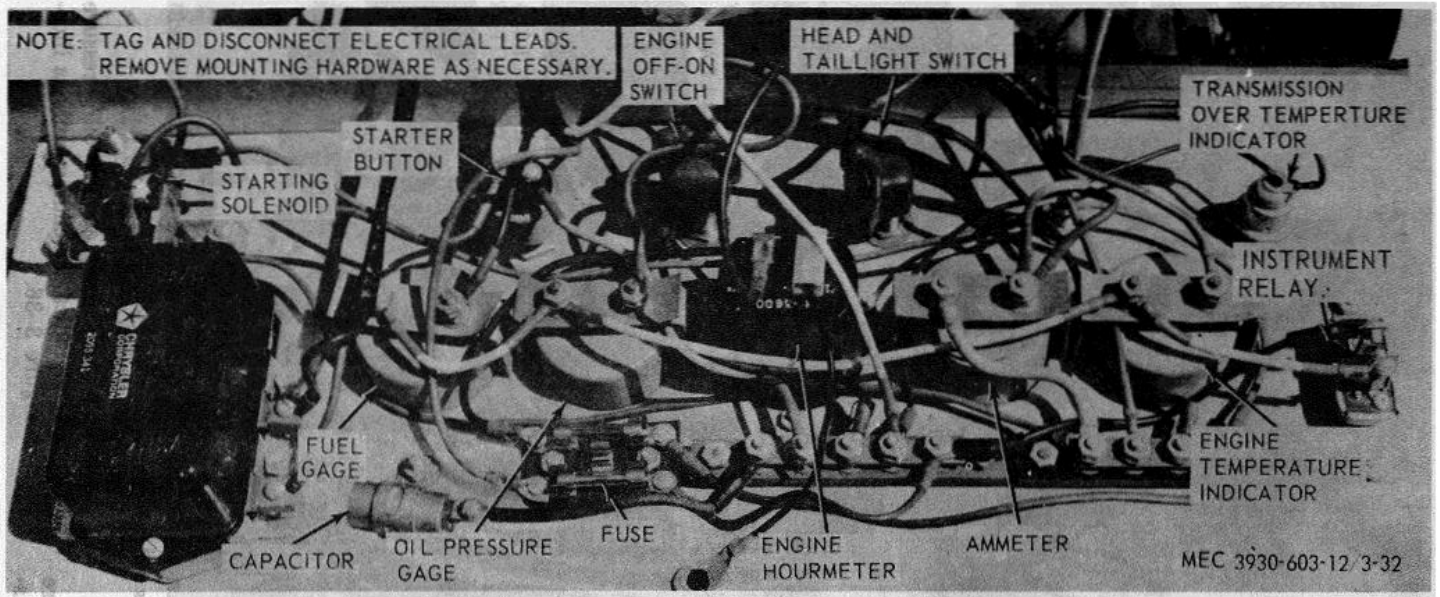
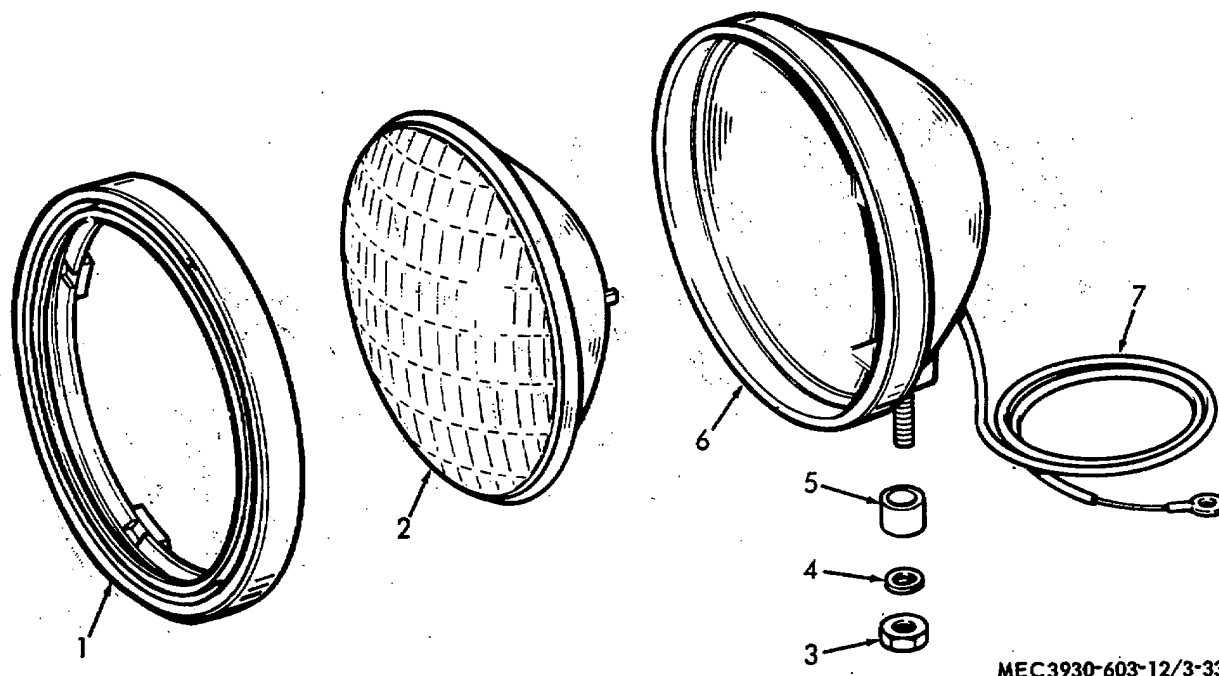


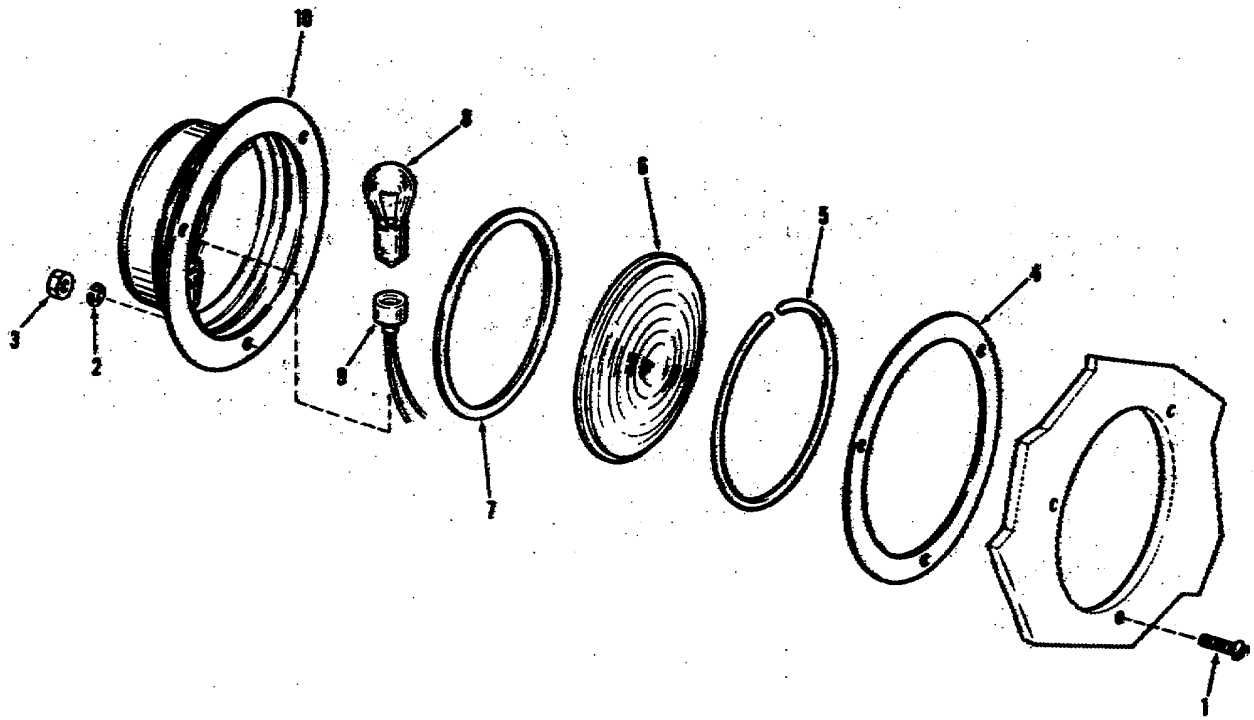
Figure 3-32. Instruments, switches and warning lights, removal and installation.



MEC3930-603-12/3-33

- |   |                  |   |               |
|---|------------------|---|---------------|
| 1 | Retaining ring   | 5 | Nylon sleeve  |
| 2 | Sealed beam unit | 6 | Lamp body     |
| 3 | Hex nut          | 7 | Wire assembly |
| 4 | Lockwasher       |   |               |

Figure 3-33. Headlight Assembly, removal, and installation.



MEC3930-603-12/3-34

- |                    |                     |
|--------------------|---------------------|
| 1 Round head screw | 6 Lens              |
| 2 Lockwasher       | 7 Spacer ring       |
| 3 Hex nut          | 8 Incandescent lamp |
| 4 Gasket           | 9 Contact assembly  |
| 5 Retaining ring   | 10 Holder assembly  |

Figure 3-34. Tail and stop light assembly, removal, and installation.

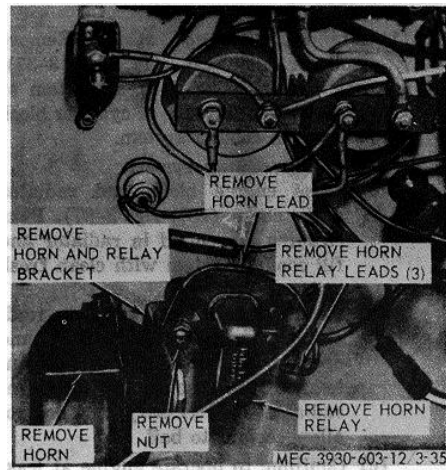


Figure 3-35. Horn and horn relay, removal and installation

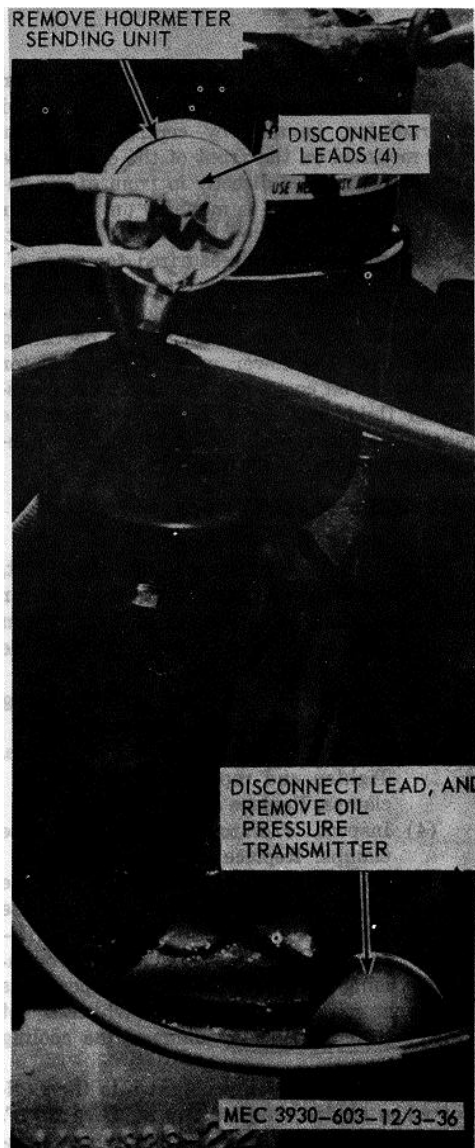


Figure 3-36. Engine oil pressure and hourmeter indicator sending units, removal and installation.

## Section XI. COOLING SYSTEM

### 3-42. General

Engine cooling is accomplished by water circulation through the cylinder block, head and radiator, pumped by centrifugal water pump mounted on the front of the engine. The radiator is mounted directly in front of the engine. The cooling fan is mounted on the water pump and is belt driven from the crankshaft. The cooling system is pressurized for more efficient cooling. A thermostat mounted in a thermostat housing on the cylinder head regulates water flow to maintain proper operating temperature. The lower part of the radiator serves as an oil cooler for the automatic transmission fluid. The fluid is pumped from the transmission to the oil cooler through two interconnecting hydraulic lines

### 3-43. Radiator Assembly

#### a. Inspection and Cleaning.

(1) Raise the engine hood and clean dirt, insects, and trash from the exterior core using compressed air or a stream of water applied carefully from engine side of core.

(2) Straighten all bent core and fins being careful not to puncture core tubes.

(3) Inspect radiator mounting hardware. Tighten and replace as necessary. clamps. Replace all defective parts.

(4) Inspect radiator hoses and -hose clamps. Replace all defective parts.

b. *Preventive Cleaning.* To clean engine cooling system of scale, rust, or sludge use cooling system compound and inhibitor (MIL-C-10597B). Be sure to flush radiator thoroughly after using the above cleaning compound as the cleaner contains a strong acid which, if not completely removed, may damage the cooling system.

**Caution: Do not pour coolant into the radiator when engine temperature is-above 200°F. Cold coolant, regardless of engine temperature, will close the thermostat and prevent complete filling of engine water jackets and passages. When filling the cooling system with cold coolant, operate engine until normal operating temperature is reached, then add coolant as required.**

(1) *Draining cooling system.* Remove radiator filler cap (17, fig. 3-37), open drain cocks, (18) at bottom of radiator and left side of ,cylinder block and drain cooling system.

(2) *Cleaning cooling system.*

(a) Close engine block and radiator drain cocks (18), fig. 3-37. Pour cleaning compound in radiator and fill cooling system with clean fresh water.

(b) Install pressure cap (17) on radiator, start engine (para 2-8), and operate at fast idle until coolant temperature. reaches 180°F. Cover radiator if necessary but do not allow coolant to boil.

(c) Continue to operate engine at least 30 minutes. stop engine (para 2-10) and drain cooling system ((b) above).

(3) *Neutralizing cooling system.* Repeat operation (para (2) above) using a rust inhibitor instead of cleaning compound to neutralize cooling system.

(4) *Flushing system.*

(a) Close engine and radiator drain cocks (18, fig. 347) and fill cooling system with water and install radiator pressure cap.

(b) Start engine (para 2-8) and operate until it reaches 180°F. Continue to operate for at least five minutes, stop engine (para 2-10). Remove radiator pressure cap and drain cooling system. If coolant is still discolored to any extent, repeat flushing procedure.

**Caution: Do not flush cooling system by inserting a hose in radiator with engine running and drain cocks open. This procedure will close thermostat and stop circulation of coolant through engine.**

#### c. Corrosion Inhibitor.

(1) The cooling system must be free of rust and scale to maintain cooling



efficiency. The use of corrosion inhibitor compound reduces and prevents corrosion of metal and prevents forming of scale.

(2). This rust inhibitor must be renewed periodically, especially after cooling system has been cleaned or flushed.

*d Pressure Flushing.*

(1) Drain cooling system ((b), above).

(2) Remove thermostat and reinstall housing, gasket and upper radiator hose (para 3-44).

(3) Remove lower clamp (8, fig. 3-37). Securing lower hose (9) to radiator assembly (16), remove hose from radiator and install a leadway hose to dispose of water while flushing.

(4) Install a pressure gun (one using air pressure) and force water into upper radiator hose and through engine block until water runs clean.

(5) Remove pressure gun, connect bottom hose (9, fig. 3-37) to bottom of radiator (16) and disconnect same hose from water pump. Install air pressure gun on this hose.

(6) Install a leadway hose to radiator top inlet hose, install pressure cap (17) and force water through radiator until water runs clean.

(7) Install radiator hoses and thermostat (para 3-44). Fill cooling system with clean fresh water ((b) above).

*e. Removal and Disassembly.*

(1) Drain transmission and torque converter (para 3-3).

(2) Drain cooling system ((b) above).

(3) Remove and disassemble radiator assembly, lines and hoses as illustrated in figure 3-37.

*f. Reassembly and Installation.*

(1) Reassemble and install radiator assembly, lines and hoses as illustrated in figure 3-37.

(2) Fill transmission and torque converter (para 8-3).

(3) Fill cooling system with fresh clean water ((b) above).

### **3-44. Thermostat**

*a. Removal.*

(1) Drain cooling system (para 3-43).

(2) Remove thermostat as illustrated in figure 3-38.

*b. Testing.*

(1) Suspend thermostat in a container of water so that it does not touch bottom of container.

(2) Heat water and check water temperature with a thermometer. The thermostat should start to open at out 157°F and should be fully open at 1830F.

(3) If thermostat opens before water temperature reaches 157°F, or does not open at all until after water temperature reaches 1830F, it must be replaced.

*c. Installation.*

(1) Install thermostat as illustrated in figure 3-38.

(2) Fill cooling system with clean, fresh water (para 3-43).

### **3-45. Water Pump, Fan and Fan Belt**

*a. Removal.*

(1) Drain cooling system (para 3-43).

(2) Remove upper and lower radiator hoses as illustrated in figure O88.

(3) Remove water pump assembly, fan and fan belt as illustrated in figure 3-39.

*b. Inspection.*

(1) Inspect water pump bearing for excessive wear. Inspect impeller for damage.

(2) Inspect belt and hoses for damage.

(3) Replace defective parts.

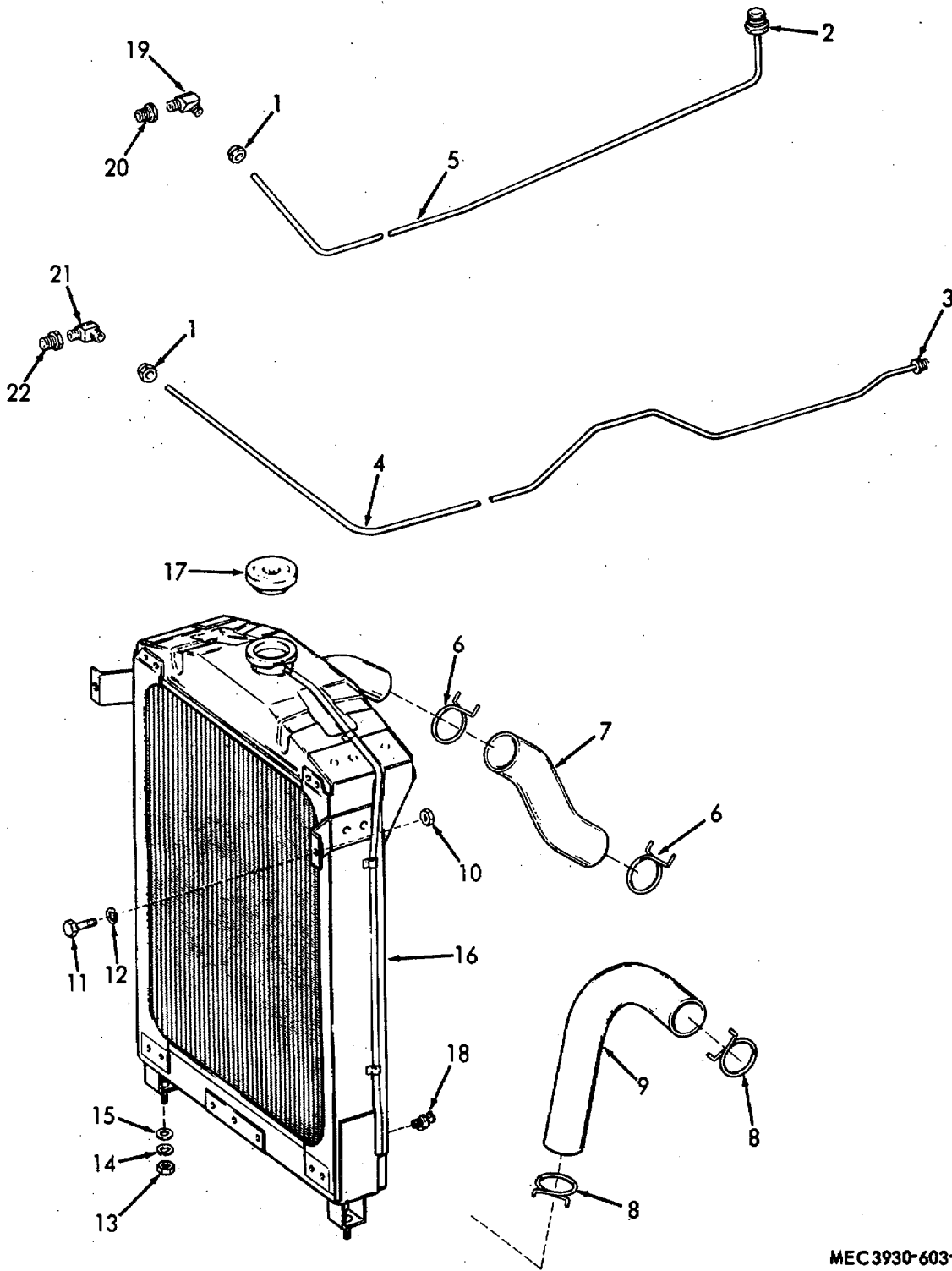
*c. Installation.*

(1) Install water pump fan and fan belt, as illustrated in figure 8 39.

(2) Install upper and lower radiator hoses as illustrated in figure 8-8.

(3) Adjust fan belt (para 838).

(4) Fill cooling system with fresh, clean water (para 848).



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Figure 3-37. Radiator assembly, lines and hoses, removal and installation

- |              |                      |                 |
|--------------|----------------------|-----------------|
| 1 Tube nut   | 9 Lower hose         | 17 Radiator cap |
| 2 Tube nut   | 10 Hex nut           | 18 Drain cock   |
| 3 Tube nut   | 11 Hex head capscrew | 19 Elbow        |
| 4 Tube       | 12 Lockwasher        | 20 Reducer      |
| 5 Tube       | 13 Self locking nut  | 21 Elbow        |
| 6 Hose clamp | 14 Lockwasher        | 22 Reducer      |
| 7 Upper hose | 15 Flat washer       |                 |
| 8 Hose clamp | 16 Radiator assembly |                 |

Figure 3-37-Continued

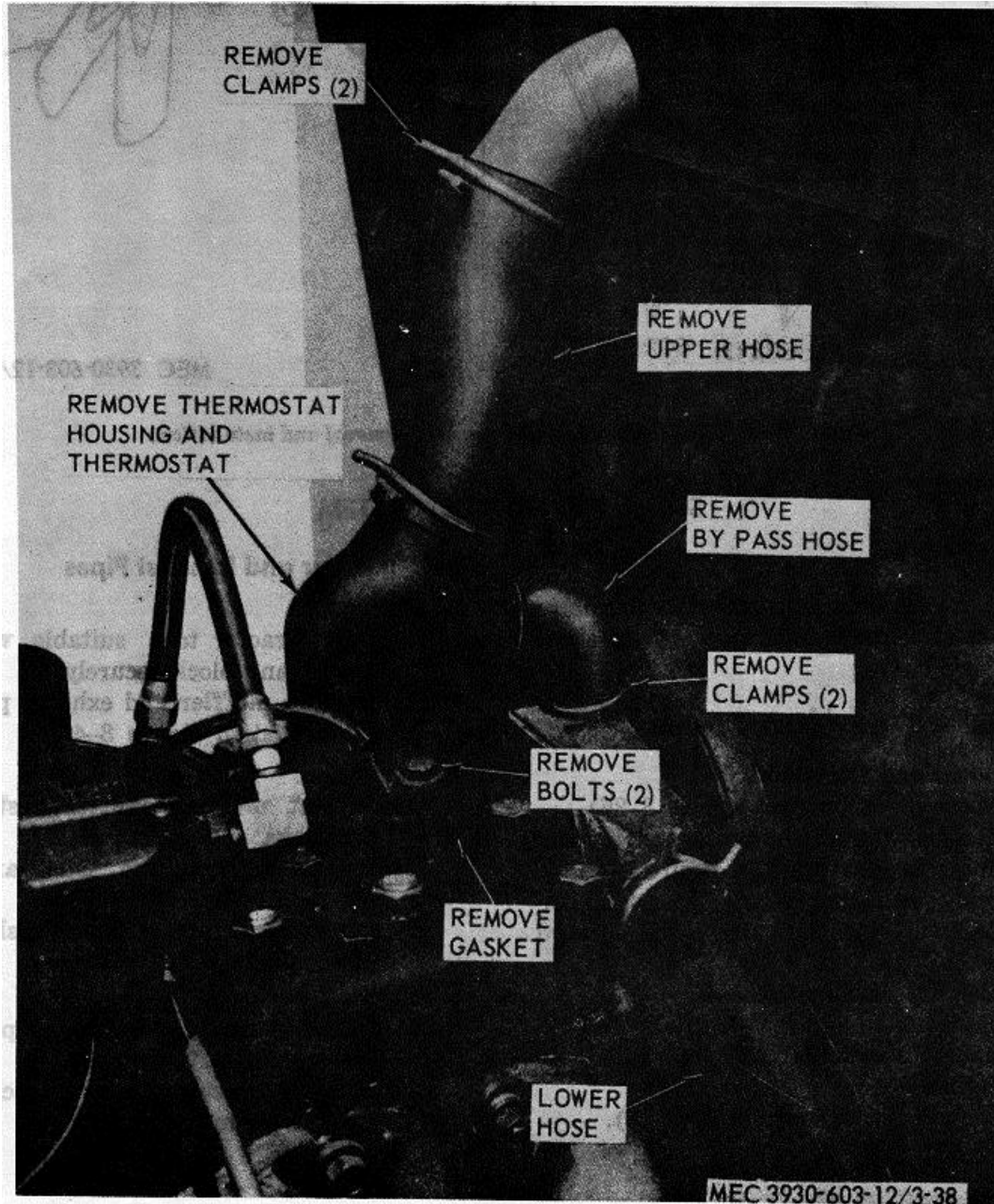


Figure3-38. Thermostat, removal, and installation

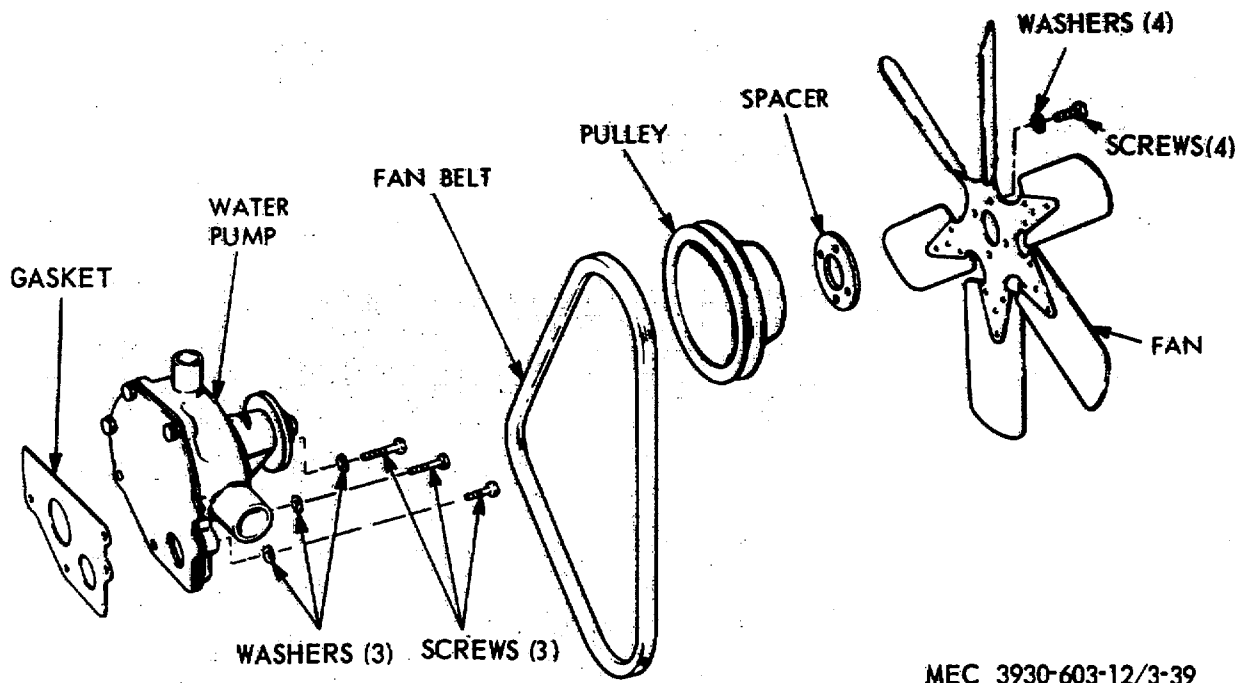


Figure 3-39. Water pump, fan and fan belt, removal and installation

## Section XII. EXHAUST SYSTEM

### 3-46. General

The exhaust system consists of the exhaust manifold; heat control valve, exhaust pipes and muffler.

### 3-47. Engine Manifolds

#### a. Removal and Disassembly.

- (1) Remove carburetor-(para 3-25).
- (2) Remove the intake and exhaust manifolds as illustrated in figure 3-40.

b. *Cleaning and Inspection.* Clean and inspect all parts. Replace defective parts. Discard and replace all gaskets.

#### c. Reassembly and Installation.

- (1) Reassemble and install intake and exhaust manifolds as illustrated in figure 3-40.
- (2) Install carburetor (para 3-25).

### 3-48. Muffler and Exhaust Pipes

#### a. Removal.

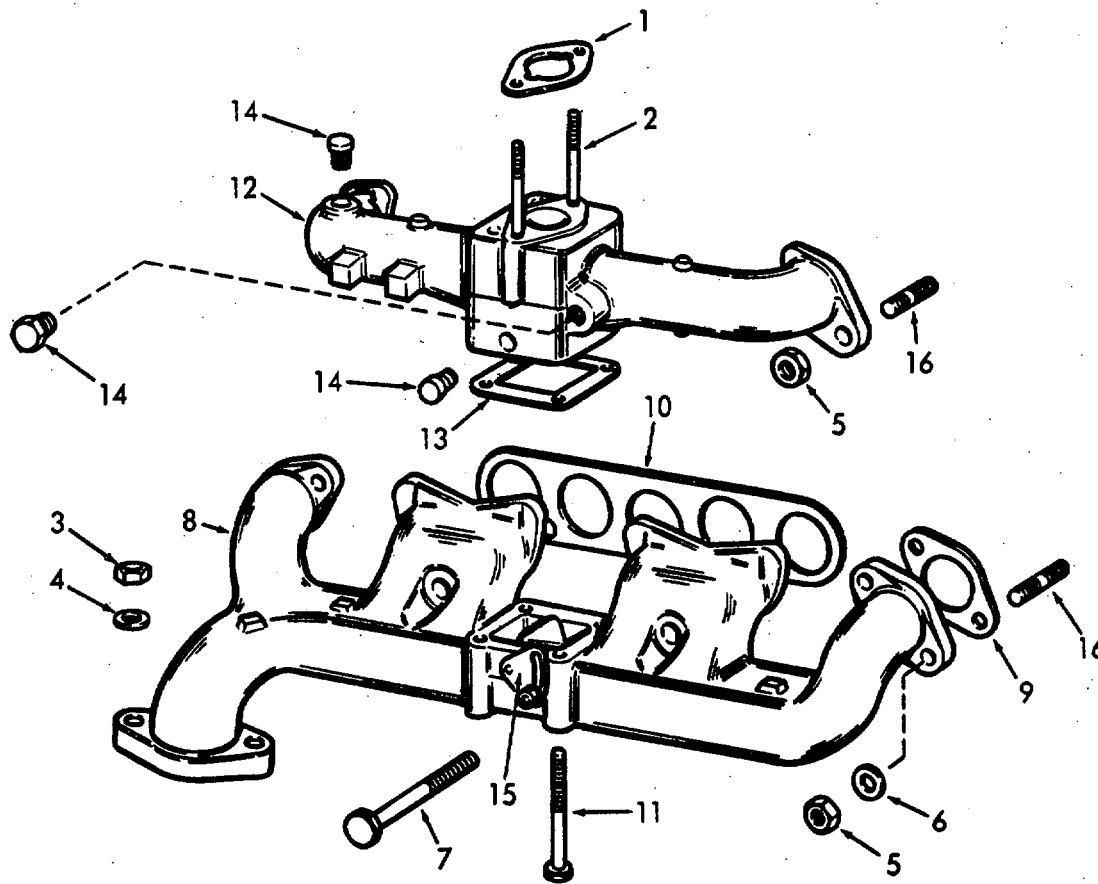
- (1) Raise tractor to a suitable working height and block securely.
- (2) Remove muffler and exhaust pipes as illustrated in figure 3-41.

#### b. Inspection.

- (1) Inspect muffler and exhaust pipes for leaks and corrosion.
- (2) Inspect all mounting hardware and hanger for defects.
- (3) Discard and replace flange gasket. Replace all defective parts.

#### c. Installation.

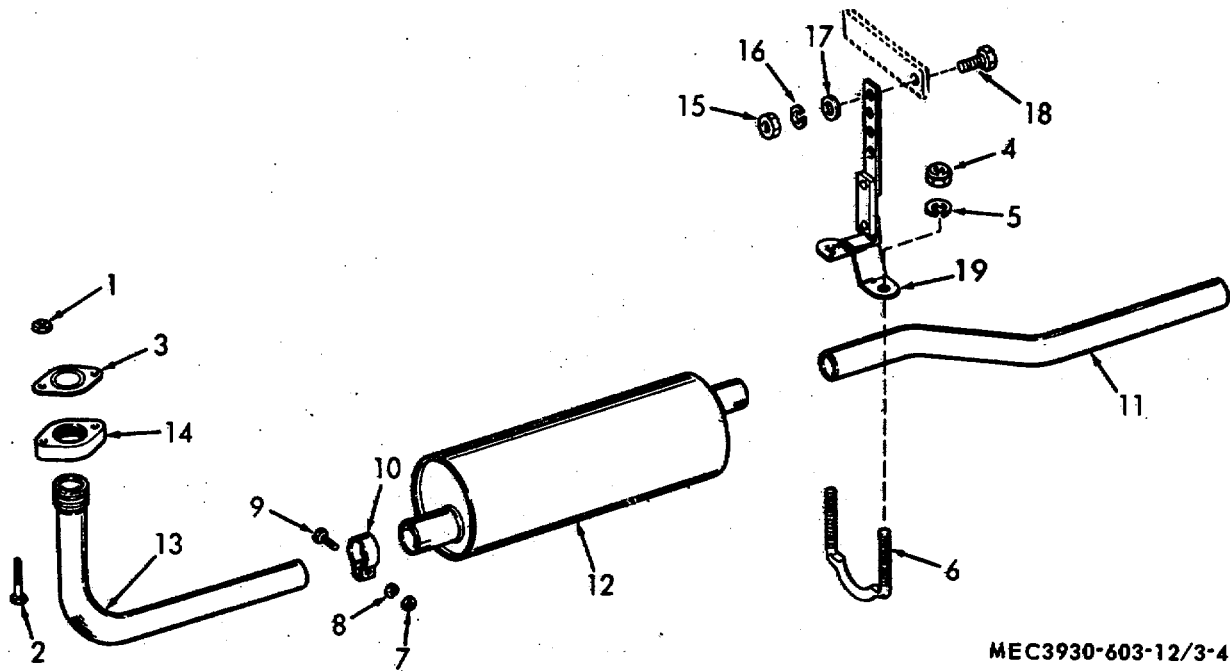
- (1) Install muffler and exhaust pipes as illustrated in figure 841.
- (2) Tack up tractor, remove blocks and lower tractor to floor.



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- |                              |                             |
|------------------------------|-----------------------------|
| 1 Carburetor mounting gasket | 9 Manifold and gasket       |
| 2 Carburetor mounting stud   | 10 Manifold center gasket   |
| 3 Hex nut                    | 11 Hex head capscrew        |
| 4 Lockwasher                 | 12 Intake manifold          |
| 5 Hex nut                    | 13 Intake to exhaust gasket |
| 6 Clamp washer               | 14 Manifold plug            |
| 7 Manifold bolt              | 15 Heat control valve       |
| 8 Exhaust manifold           | 16 Manifold stud            |

Figure 3-40. Intake and exhaust manifolds, removal and installation



MEC3930-603-12/3-41

- |    |                   |    |                     |
|----|-------------------|----|---------------------|
| 1  | Flange nut        | 11 | Tail pipe           |
| 2  | Hex head capscrew | 12 | Muffler             |
| 3  | Flange gasket     | 13 | Front exhaust pipe  |
| 4  | Hex nut           | 14 | Exhaust pipe flange |
| 5  | Lockwasher        | 15 | Hex nut             |
| 6  | U-bolt (2 rqr)    | 16 | Lockwasher          |
| 7  | Hex nut           | 17 | Flat washer         |
| 8  | Lockwasher        | 18 | Hex head capscrew   |
| 9  | Hex head capscrew | 19 | Hanger              |
| 10 | Muffler clamp     |    |                     |

Figure 3-41. Muffler and exhaust pipes, removal, and installation

### Section XIII. BASIC ENGINE

#### 3-49. General

The engine is a six cylinder, four cycle gasoline burning type, liquid cooled and pressure lubricated engine. It features a forged steel balanced crankshaft, forged steel connecting rods, replaceable bearings and splash-lubricated pistons, each with four piston rings.

#### 3-50. Engine Compression Test

A compression test of engine must be made to determine the need of internal repairs before tune-up procedures are undertaken. Test the compression as follows:

- a. Start the engine (para 2-8) and run until it has reached normal operating temperature.
- b. After engine is warmed up, stop engine (para 2-10) and remove plug cables from spark plugs. Blow out all foreign matter from around spark plugs with compressed air.
- c. Remove spark plug leads and spark plugs (para 3-35).
- d. Remove coil high tension lead (para 3-35) from distributor cap and ground lead to engine.
- e. Fully open carburetor throttle and choke and block in this position.
- f. Insert compression tester in spark plug hole (fig. 3-42) using an adapter if necessary.

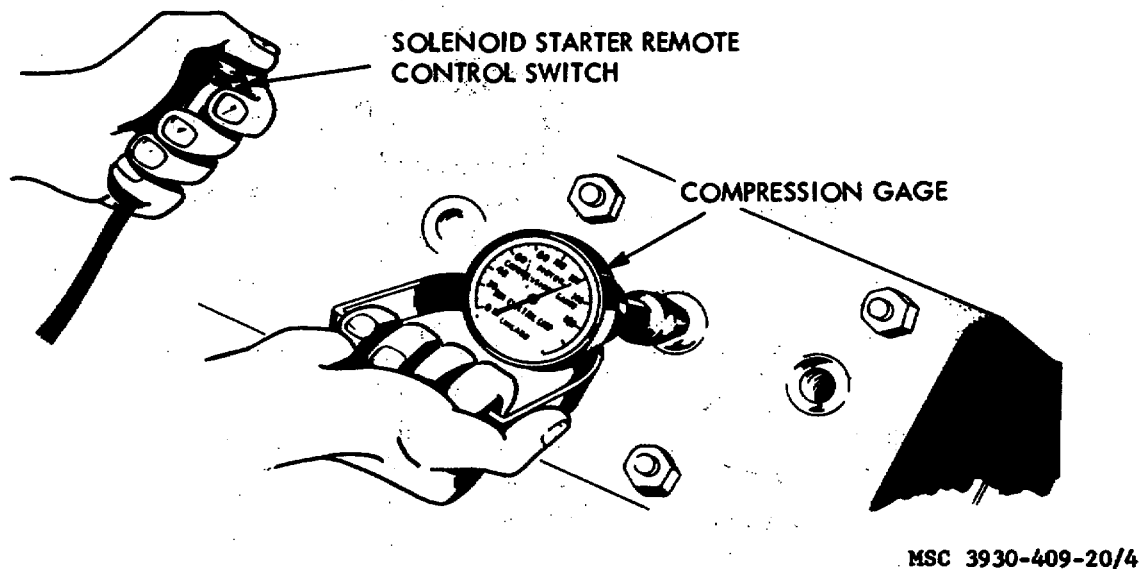


Figure 3-42. Engine compression test.

g. Pull out ignition switch and depress starter switch knob to crank engine at least four compression strokes. A starter remote control cable can be used if available. Note reading on first full stroke as well as on final stroke.

*Note.* All cylinders must be t same number of strokes to assure accurate reading.

h. Proper cranking pressure is 110 to 140 psi. If readings are below normal or uneven, place equivalent of a teaspoon of OE 80 oil in each cylinder and retest compression.

*Note.* Make sure oil is deposited on piston head.

i. Test indications are as follows:

- (1) *Normal.* Compression builds up quickly and evenly to specified compression in each cylinder, varies less than 15 pounds between highest and lowest reading cylinder.
- (2) *Ring trouble.* Compression low on first stroke tends to build up on following strokes but does not reach normal; improves considerably with addition of oil.
- (3) *Valve trouble.* Low or first stroke does not tend to build up on following strokes; doen not improve with addition of oil.
- (4) *Leaking head gasket.* Same reaction as valve trouble on two adjacent cylinders, usually accompanied by indications of water in cylinder.
- (5) *Carbon deposits.* Compression pressure considerably higher than specified.
- (6) Install spark plug leads and coil high tension lead (para 3-35).

### 3-51. Oil Filter and Lines

#### a. Removal

- (1) Remove drain plug (fig. 3-43) and drain oil from filter body.
- (2) Remove and disassemble oil filter assembly as illustrated in figure 3-43.

#### b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect lines and fittings for pinched tubes or stripped threads.
- (3) Discard and replace filter element.

#### c. Installation.

- (1) Reassemble and install oil filter assembly as illustrated in figure 84t.
- (2) Install drain plug in filter body, refer to paragraph S8 and oil as required.

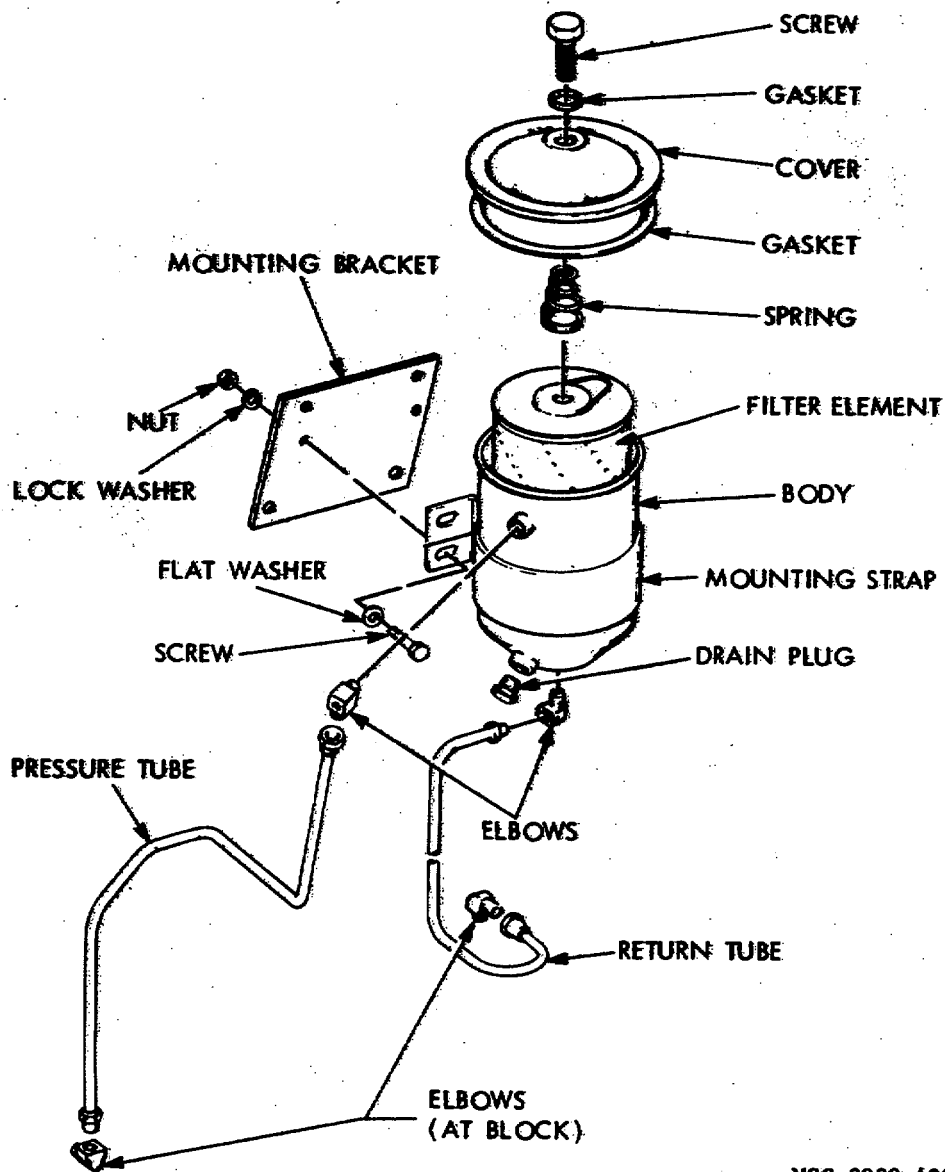


Figure 3-43. Oil filter assembly, removal, disassembly, reassembly, and installation.

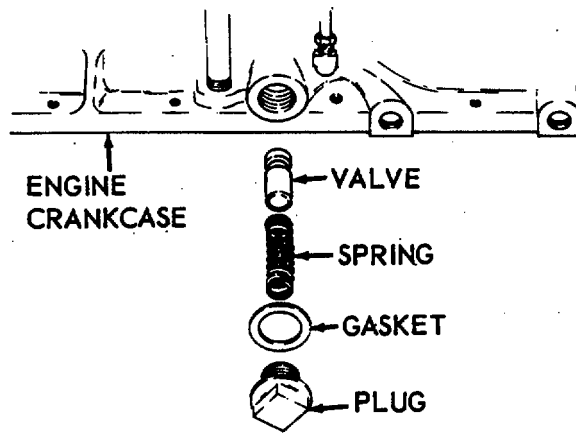
### 3-52. Oil Pressure Regulator Valve

- a. *Removal.* Remove oil pressure regulator valve as illustrated in figure 3-44.
- b. *Cleaning and Inspection.* Wash all parts thoroughly with an approved cleaning solvent and dry thoroughly. Discard and replace gasket. Replace defective parts.
- c. *Installation.* Install oil pressure regulator valve as illustrated in figure 3-44.

### 3-53. Cylinder Head

- a. *Removal.*
  - (1) Remove hood (para 3-28).
  - (2) Remove air cleaner (para p25).
  - (3) Remove thermostat and housing (para 3-44).
  - (4) Remove spark plugs and cables (para 3-38).
  - (5) Remove cylinder head as illustrated in figure 3 45.





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Figure 3-44. Oil pressure regulator valve, removal and installation

*b. Cleaning and Inspection.*

- (1) Scrape carbon from inside of combustion chamber and top of cylinder block and pistons.
- (2) Inspect cylinder head for cracks or warping.
- (3) Discard and replace cylinder head gasket.

*c. Installation.*

- (1) Install cylinder head as illustrated in figure 3-45.
- (2) Install spark plugs and cables (para 3-35).
- (3) Install thermostat and housing (para 3-44).
- (4) Install air cleaner (para 3-25).
- (5) Install hood (para 3-23).
- (6) Tighten cylinder bolts to 65 to 70 foot-pounds torque, following tightening sequence as illustrated in

figure 3-46.

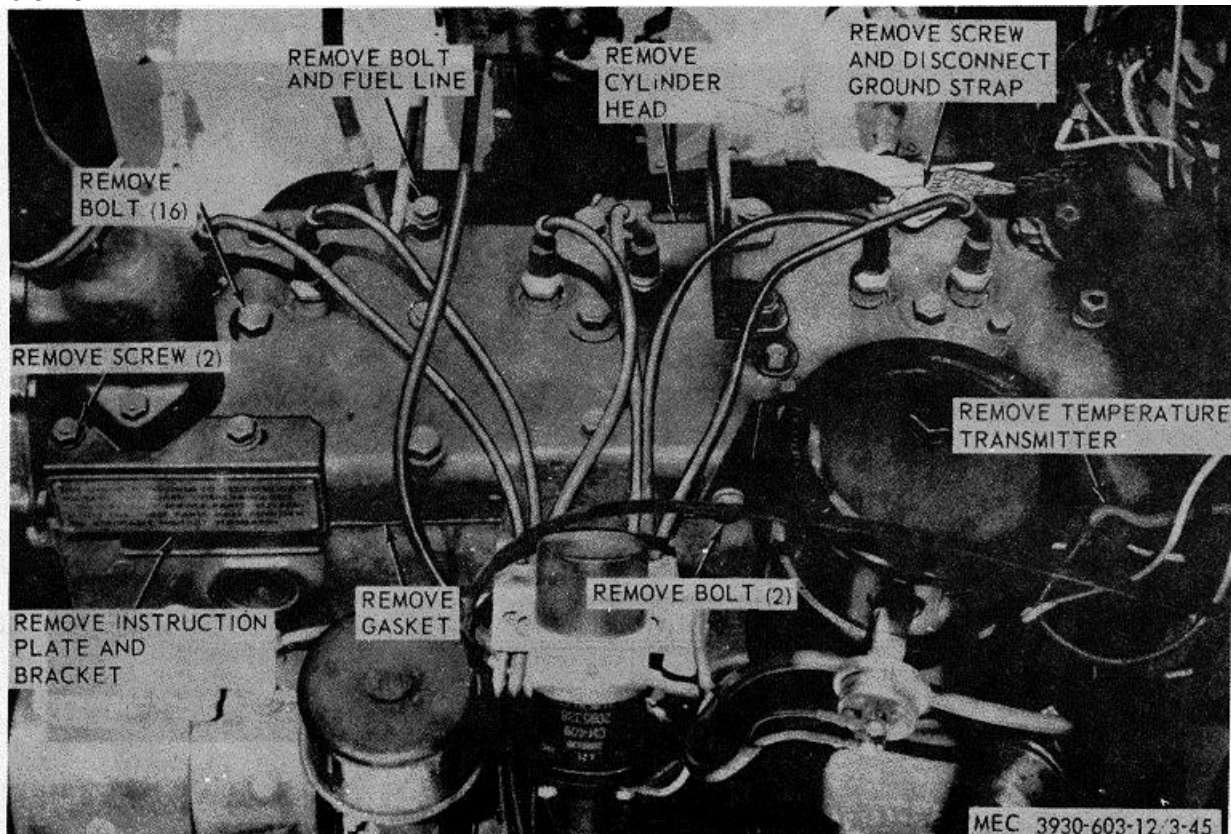


Figure 3-45. Cylinder head, removal and installation.

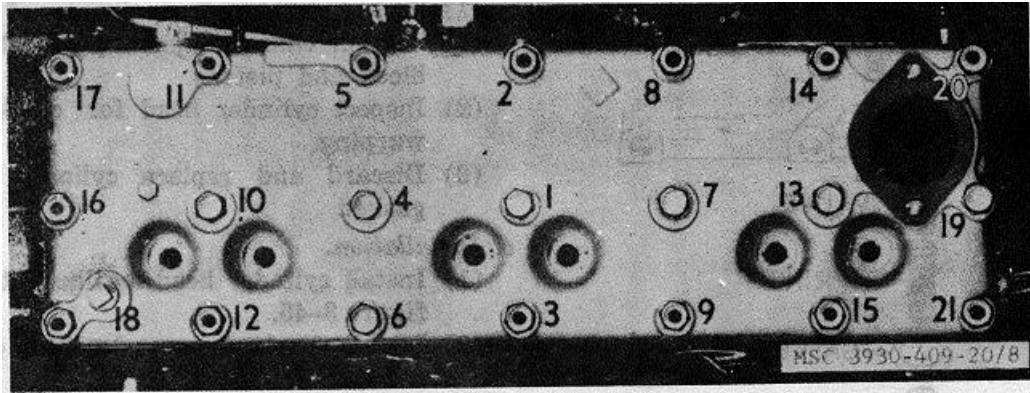


Figure 3-46. Cylinder head bolt tightened sequence.

**3-54. Valves**

*a. Valve Cover Removal.*

- (1) Remove fuel pump heat deflector (para 3-27).
- (2) Remove two valve covers as illustrated in figure 3-47.

*b. Valve Tappet Adjustment.* Adjust valve tappet clearance as illustrated in figure 3-48.

*c. Valve Cover Installation*

- (1) Install two valve covers as illustrated in figure 3-47.
- (2) Install fuel pump heat deflector (para 3-27).

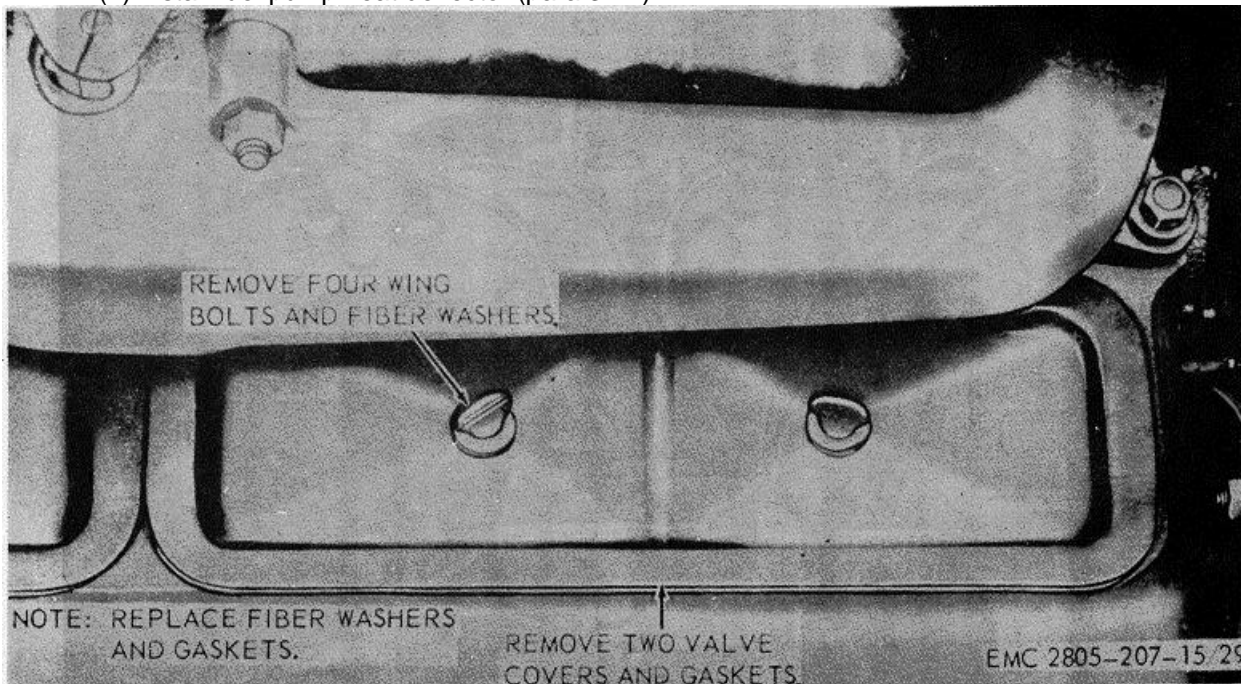


Figure 3-47. Valve cover, removal and installation

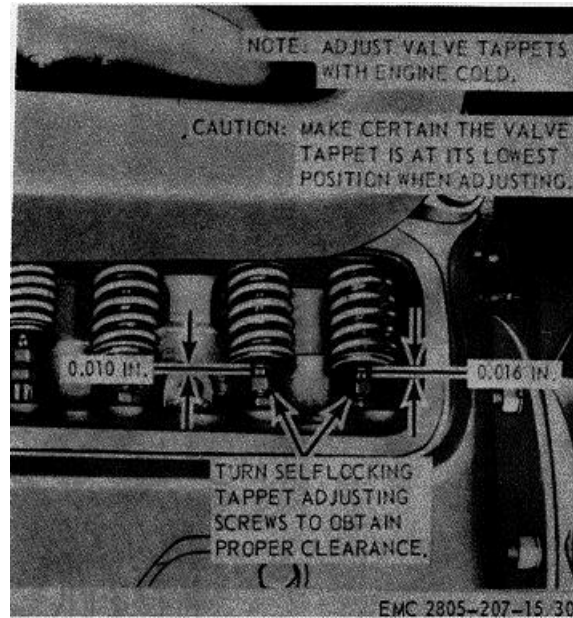


Figure 3-48. Valve tappet adjustment.

#### Section XIV. WHEELS AND TIRES

##### 3-55. General

This section contains instructions for maintenance operations which organizational maintenance personnel are authorized to perform on driving (rear) wheels and steering (front) wheels, tires and tubes.

##### 3-56. Front Wheels

###### a. Removal.

- (1) Use a suitable jack, raise front wheels and block securely.
- (2) Remove front wheels as illustrated in figure 3-49.

###### b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect cups, cones and washers for breaks, cracks, burrs, scoring and wear.
- (3) Replace defective parts.

###### c. Installation.

- (1) Reassemble and install front wheel as illustrated on figure 3-49.
- (2) During installation, tighten inner nut (7) until a slight drag is felt when wheel is turned.
- (3) Back off nut (7), one-quarter turn and install lock (19) and outer nut (7) and bend over sides of lock (19) to secure outer nut (7).
- (4) Remove blocks and jack.

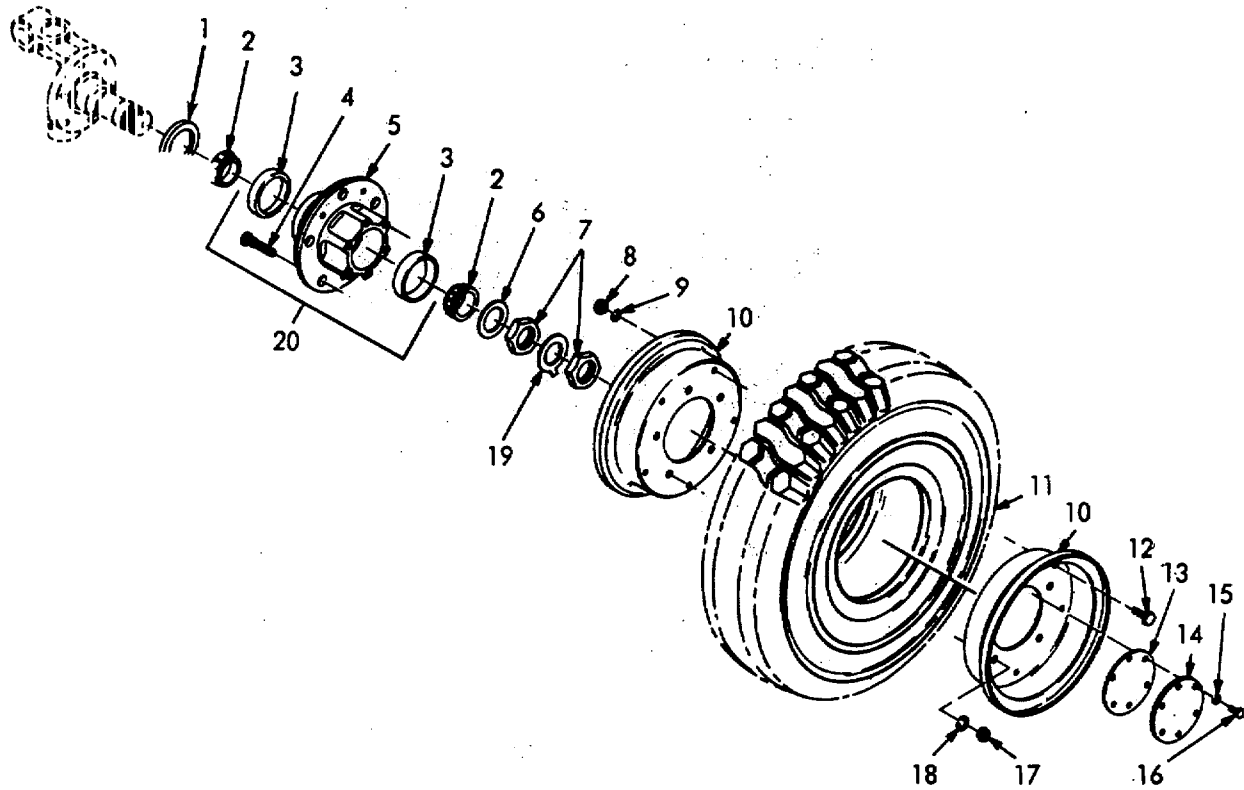
##### 3-57. Tire Service

###### a. Removal.

- (1) Use a suitable jack, raise front wheels and block securely.
- (2) Remove five nuts (17, fig. 3-49), washers (18) and remove wheel and tire assembly.
- (3) Deflate tire (11) and remove five nuts (8), washers (9) and screws (12). Separate wheel halves and remove flap, tube, and tire.

###### b. Inspection and Repair.

- (1) Inspect tires for cuts, excessive wear and imbedded foreign objects.



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1	Oil seal	11	Tire
2	Cone	12	Screw
3	Cup	13	Gasket
4	Bolt	14	Grease cup
5	Hub	15	Washer
e	Key washer	16	Screw
7	Adjusting nut	17	Nut
8	Nut	18	Washer
9	Washer	19	Lock
10	Front wheel	20	Hub assembly

Figure 3-49. Valve tappet adjustment.

- (2) Repair tire or tube as necessary.
- (3) Inflate tire to 65 psi and remove blocks and jack.

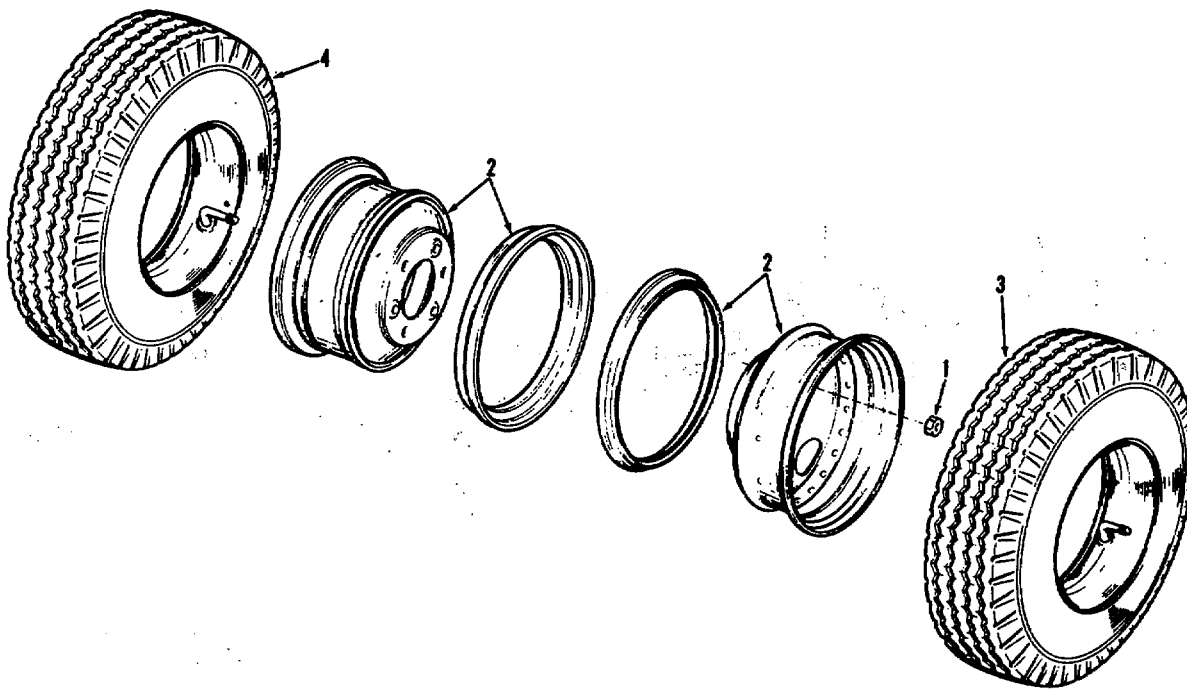
*c. Installation.*

- (1) Install tire, (11, fig. 3 49).tube, and flap on inner portion of wheel (10) and secure with five screws (12), washers (9) and nuts (8).
- (2) Install outer portion of wheel (10) and secure with five washers (18) and nuts (17).

**3-58. Drive Wheel**

*a. Removal.*

- (1) Jack rear of tractor and block securely.
- (2) Remove drive wheel and tire as illustrated in figure 3-50.



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- |   |                       |   |                     |
|---|-----------------------|---|---------------------|
| 1 | Wheel nut             | 3 | Outer tire and tube |
| 2 | Disc and rim assembly | 4 | Inner tire and tube |

Figure 3-50. Drive wheel and tire removal and installation

- b. *Inspection and Repair.* Inspect and repair tire (para 357).  
 c. *Installation.*

- (1) Install drive wheel and tire as illustrated in figure 3-50.
- (2) Inflate tire to 40 psi and remove blocks and jack.

## Section XV PROPELLER SHAFT

### 3-59. General

This section contains instructions for maintenance operations which organizational maintenance personnel are authorized to perform on tractor propeller shaft assembly.

### 3-60. Propeller Shaft and Universal Joint

a. *Removal and Disassembly.*

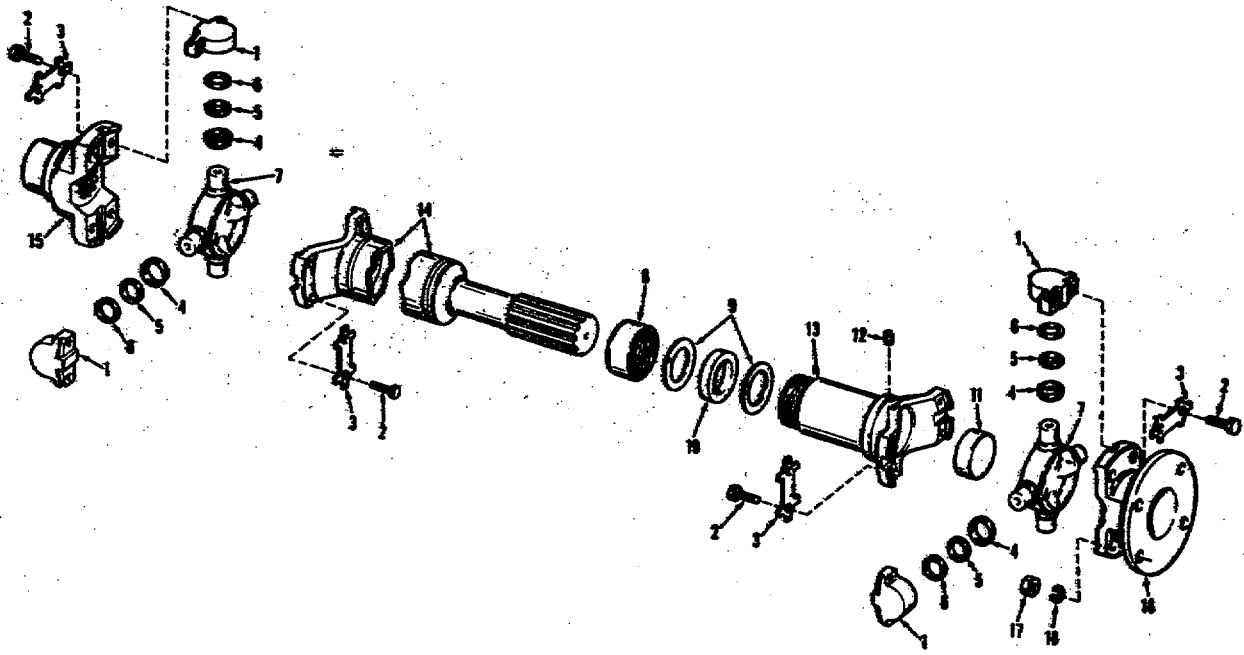
- (1) Jack rear of tractor and block securely.
- (2) Remove and disassemble propeller shaft and universal joints as illustrated in figure 3-51.

b. *Cleaning and Inspection.*

- (1) Wash all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect bearings, rollers, for fit' on spider and excessive wear.
- (3) Replace defective parts

c. *Reassembly and Installation.*

- (1) Reassemble and install propeller shaft and universal joints as illustrated in figure 3-51.
- (2) Lubricate universal joints (para 3-3).
- (3) Remove blocks and jacks and lower tractor to floor.



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- |   |                   |    |                       |
|---|-------------------|----|-----------------------|
| 1 | Bearing           | 10 | Felt                  |
| 2 | Hex bead capscrew | 11 | Dust cap              |
| 3 | Lock plate        | 12 | Pipe plug             |
| 4 | Dust shield       | 13 | Slip yoke             |
| 5 | Felt washer       | 14 | Tube fitting assembly |
| 6 | Roller retainer   | 15 | Splined coupling      |
| 7 | Spider            | 16 | Flanged coupling      |
| 8 | Felt retainer     | 17 | Hex nut               |
| 9 | Retainer washer   | 18 | Lock washer           |

Figure 3-51. Propeller shaft and universal joints, removal, disassembly, reassembly, and installation

## Section XVI. BRAKES

### 3-61. GENERAL

This section contains instructions for maintenance operations which organizational maintenance personnel are authorized to perform on hand brake and linkage service brakes, master cylinder and wheel cylinders.

### 3-62. Hand Brake Lever and Linkage

#### a. Adjustment

(1) For minor adjustment of hand brake linkage, pull up on hand brake lever (fig. 3-52) and test holding power of brake with tractor on an incline. If parking brake does not hold, turn adjusting cap on hand brake lever clockwise until proper adjustment is obtained.

(2) Adjustment to hand brake to compensate for wear on brake shoe lining is made from underneath tractor. With hand brake lever released, remove adjustment cover plate, loosen adjusting nut (2, fig. 3-53) and turn adjusting screw (1) out to take up lining wear. Check operation of hand brake and adjust as necessary. Install adjusting

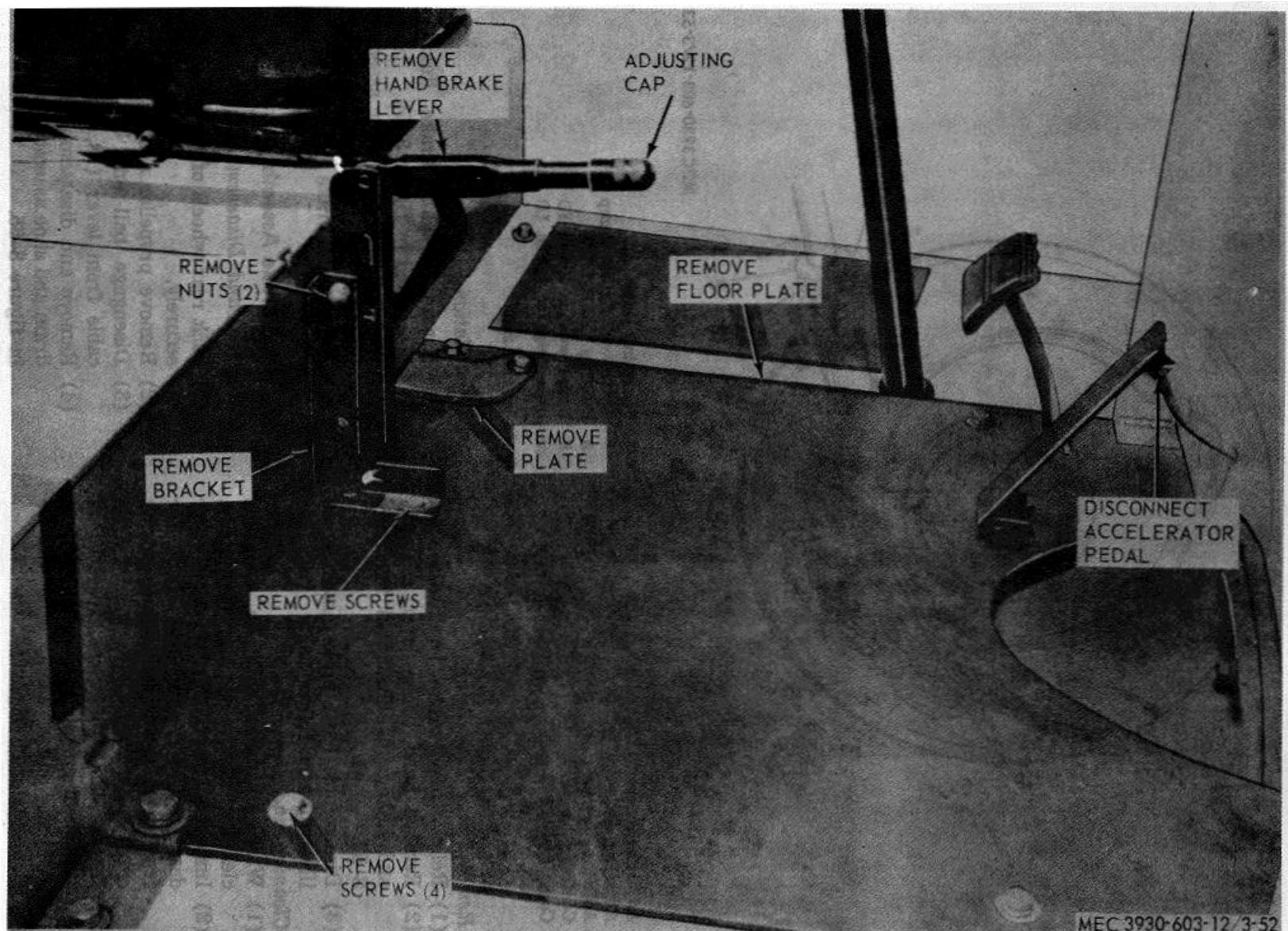
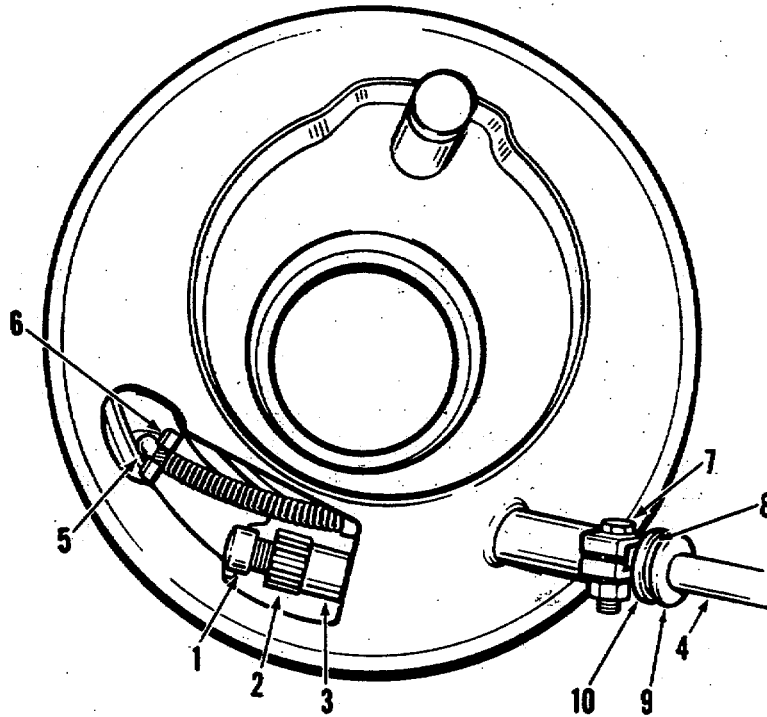


Figure 3-52. Hand brake and floor plate, removal and installation



MEC3930-603-12/3-53

- |   |                        |    |                           |
|---|------------------------|----|---------------------------|
| 1 | Adjusting screw.       | 6  | Operating lever           |
| 2 | Adjusting nut          | 7  | Control cable guide clamp |
| 3 | Adjusting sleeve       | 8  | Bushing                   |
| 4 | Control cable          | 9  | Dished washer, 3/8 in. ID |
| 5 | Control cable ball end | 10 | Dished washer, 1/2 in. ID |

Figure 3-53. Hand brake adjustment

*b. Removal and Disassembly.*

- (1) Release hand brake lever: assembly.
- (2) Remove hand brake lever assembly and linkage as illustrated in figure 3-52.
- (3) Disassemble hand brake assembly as illustrated in figure 3-54.

*c. Cleaning and Inspection.*

- (1) Wash all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect all parts for wear or other damage. Check hand brake lever for free operation and stripped threads on cup.
- (3) Inspect cable for kinks, freedom of movement and security of ball attachment at end of cable.
- (4) Replace defective parts.

*d. Installation.*

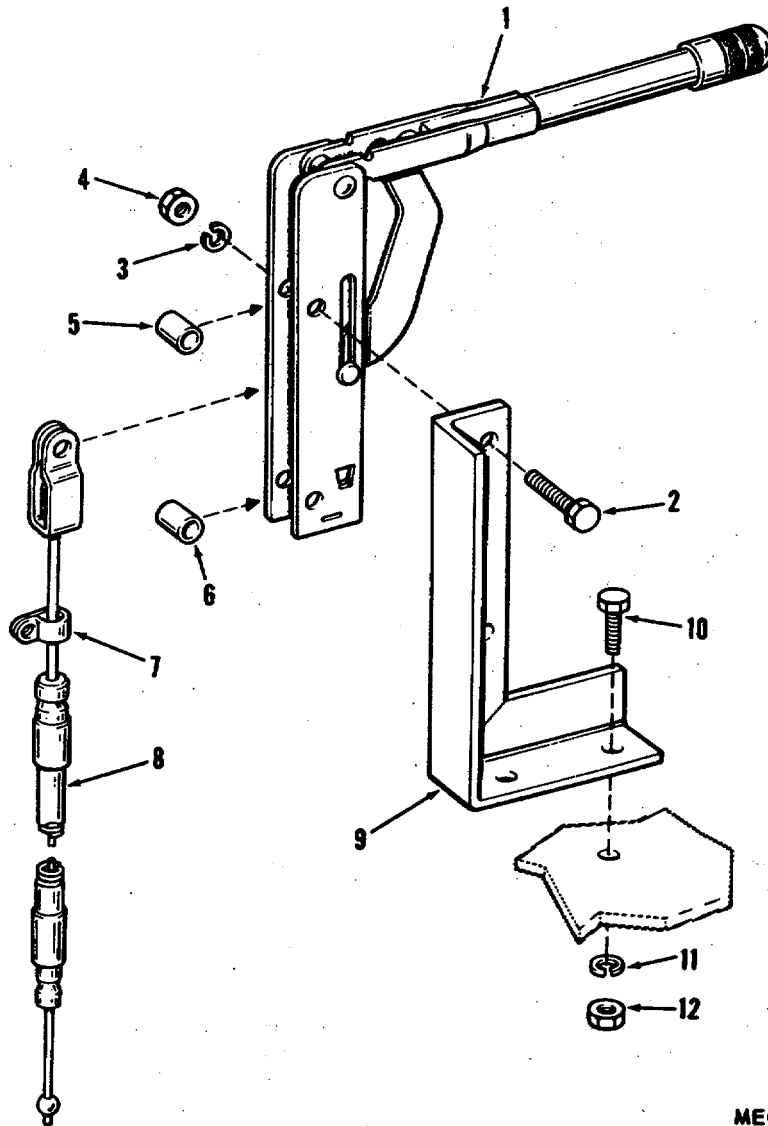
- (1) Reassemble hand brake linkage as illustrated in figure, W4.
- (2) Install hand brake lever assembly as illustrated in figure 3-52.
- (3) Adjust hand brake (a above).

**363. Hand Brake Assembly**

*a. Removal and Disassembly.*

- (1) Jack rear wheels of tractor and block securely.
- (2) Remove propeller shaft (para 3-60).
- (3) Disengage ball end of hand brake cable from lever (18, fig. 3-55).
- (4) Remove and disassemble hand brake, drum and shoe assembly as illustrated in figure 3-45.





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- |   |                           |    |                   |
|---|---------------------------|----|-------------------|
| 1 | Hand brake lever assembly | 7  | Cable clamp       |
| 2 | Hex head capscrew         | 8  | Hand brake cable  |
| 3 | Lockwasher                | 9  | lever bracket     |
| 4 | Hex nut                   | 10 | Hex head capscrew |
| 5 | Upper spacer              | 11 | Lockwasher        |
| 6 | Lower spacer              | 12 | Hex nut           |

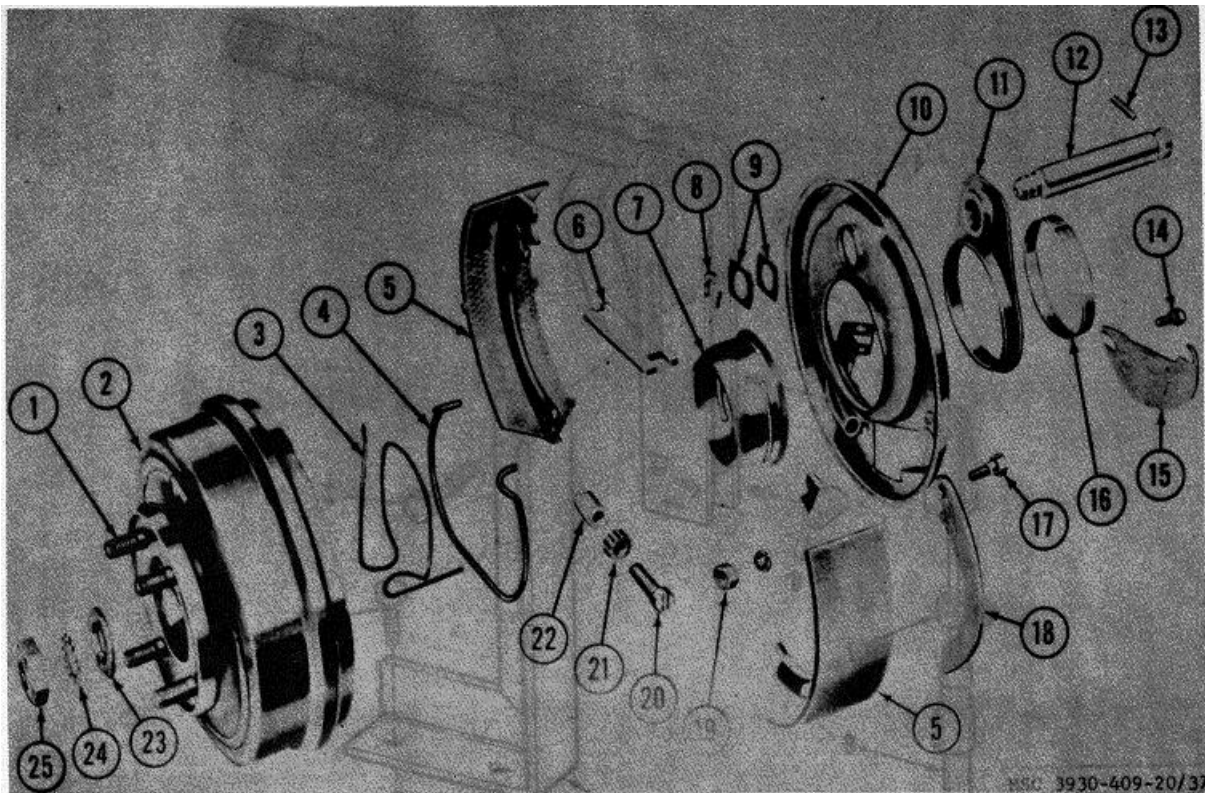
Figure 3-54..Hand brake linkage, removal, disassembly, and reassembly,

b. *Cleaning and Inspection.*

- (1) Wash all parts except brake shoes in an approved cleaning solvent and dry thoroughly.
- (2) Inspect all parts for excessive wear or damage.
- (3) Replace defective parts.

c. *Reassembly and Installation*

- (1) Reassemble and install hand brake drum and shoe assembly as illustrated in figure 3-59.
- (2) Turn adjusting nut (21) until brake shoes are in released position before installing drum (2).



- |    |                       |    |                       |
|----|-----------------------|----|-----------------------|
| 1  | Propeller shaft stud  | 14 | Screw                 |
| 2  | Hand brake drum       | 15 | Adjusting cover plate |
| 3  | Spring retainer       | 16 | Sleeve                |
| 4  | Return spring         | 17 | Screw                 |
| 5  | Brake shoe            | 18 | Lever                 |
| 6  | Operating lever strut | 19 | Nut                   |
| 7  | Shield                | 20 | Adjusting screw       |
| 8  | Guide retainer        | 21 | Adjusting nut         |
| 9  | Guide                 | 22 | Sleeve                |
| 10 | Sort                  | 23 | Washer                |
| 11 | Spacer                | 24 | Washer                |
| 12 | Anchor                | 25 | Nut                   |
| 13 | pin                   |    |                       |

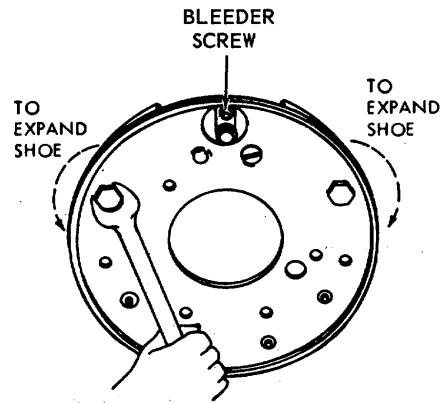
Figure 3-55. Hand brake linkage, removal, disassembly, and reassembly, and installation

- (3) Adjust brake shoes and hand brake linkage (para 3-62).
- (4) Install propeller shaft (para 3-60). Remove jack and blocking.

**3-44. Service Brakes**

*a. Adjustment.*

- (1) Block front wheels of tractor and set transmission range selector in neutral.
- (2) Jack rear wheels of tractor so both sets of wheels are off ground.
- (3) Adjust two studs on each brake plate as illustrated in figure W6.
- (4) Adjust one stud at a time while spinning wheels and turning stud until brake shoe contacts drum, then back off stud slightly to. Permit wheels to turn freely.
- (5) Repeat steps (8) and (4) on opposite wheel.



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Figure 3-56. Service brake adjustment

(6) Lower rear end of tractor and remove blocks.

**b. Removal and Disassembly.**

- (1) Remove drive wheel and tire assemblies (para 3-58).
- (2) Back off brake shoe adjusting bolts (fig. 3-56) and remove rear wheel disc and rim assembly (fig. 3-50).
- (3) Remove Brake Drum and clamp wheel cylinder pistons to prevent loss of fluid.
- (4) Remove and disassemble service brake as illustrated in figure 3-54.

**c. Cleaning and inspection.**

- (1) Wash all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect lining and drums for excessive wear. Replace defective parts.

**d. Reassembly and installation.**

- (1) Reassemble and install service brake as illustrated in figure 3-57.
- (2) Install brake drum, rear wheel disc and rim assembly (fig. 3-50).
- (3) Install drive wheels and tire assembly (para 3-58).
- (4) Adjust service brakes (a. below)
- (5) Bleed service brakes (e. below).

**e. Bleeding Service Brakes.** Bleed hydraulic brake system whenever fluid lines have been disconnected and any amount of fluid is lost. Bleed service brakes as follows:

- (1) Remove filler caps (fig. 3-58) and fill master cylinder with brake fluid as required. Refill as required during brake bleeding.
- (2) Connect a hose between bleeder screw (13, fig. 3-57) of wheel cylinder (10) and a container which will hold a small amount of brake fluid.
- (3) Depress brake pedal slowly and open bleeder screw. Just before pedal is completely depressed, close bleeder screw and release brake pedal.
- (4) Repeat instructions in (3) above as necessary until bubbles cease to appear in container and close bleeder screw.
- (5) Repeat procedures (2) through (4) above on opposite wheel cylinder.

**3-65. Wheel Cylinder**

Remove and install wheel cylinder assemblies (para 3-64).

**3-66. Master Cylinder**

**a. Removal.**

- (1) Loosen and lift up rear floor plate as illustrated in figure 3-52.
- (2) Remove master cylinder assembly as illustrated in figure 3-58.

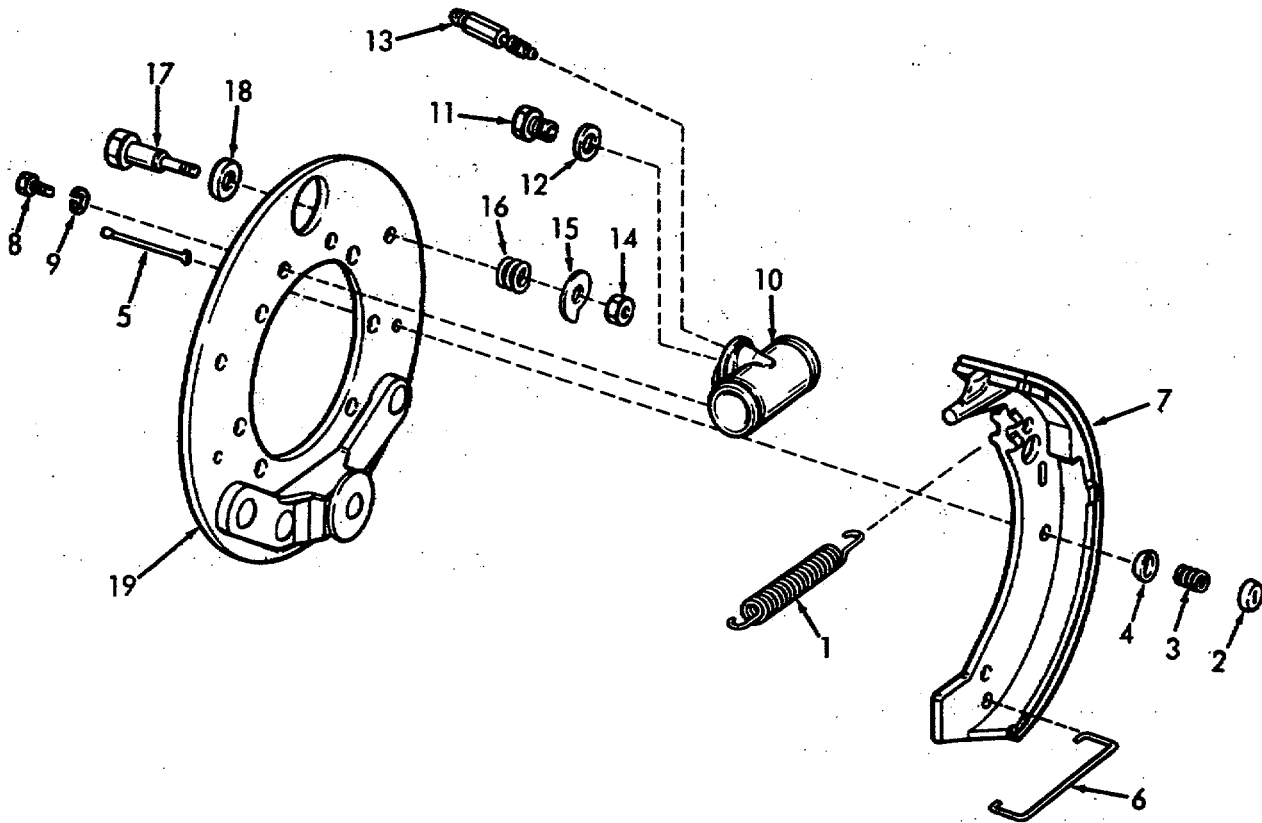
**b. Cleaning and Inspection.**

(1) Clean all parts thoroughly with a cloth dampened with an approved cleaning solvent and dry thoroughly. Do not submerge master cylinder in solvent.

- (2) Inspect all fitting and tubing for cracks, breaks, or damaged threads.
- (3) Discard and replace filler cap gaskets. Replace all defective parts.

**c. Installation.**

- (1) Install master cylinder assembly as illustrated in figure 3-58.
- (2) Bleed hydraulic brake system (para 3-64).
- (3) Install rear floor plate as illustrated in figure 3-52.



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- |    |                         |    |                  |
|----|-------------------------|----|------------------|
| 1  | Shoe return spring      | 11 | Inlet connection |
| 2  | Retainer                | 12 | Inlet gasket-    |
| 3  | Retainer S g            | 13 | Bleeder screw    |
| 4  | Retainer                | 14 | Adjusting nut    |
| 5  | Anti-rattle rod         | 15 | Adjusting        |
| 6  | Retainer spring         | 16 | Cam spring       |
| 7  | Brake shoe              | 17 | Cam bolt         |
| 8  | Hex head capscrew       | 18 | Cam bolt washer  |
| 9  | Lockwasher              | 19 | Brake plate      |
| 10 | Wheel cylinder assembly |    |                  |

Figure 3-57. Service brake removal, disassembly, and reassembly, and installation.

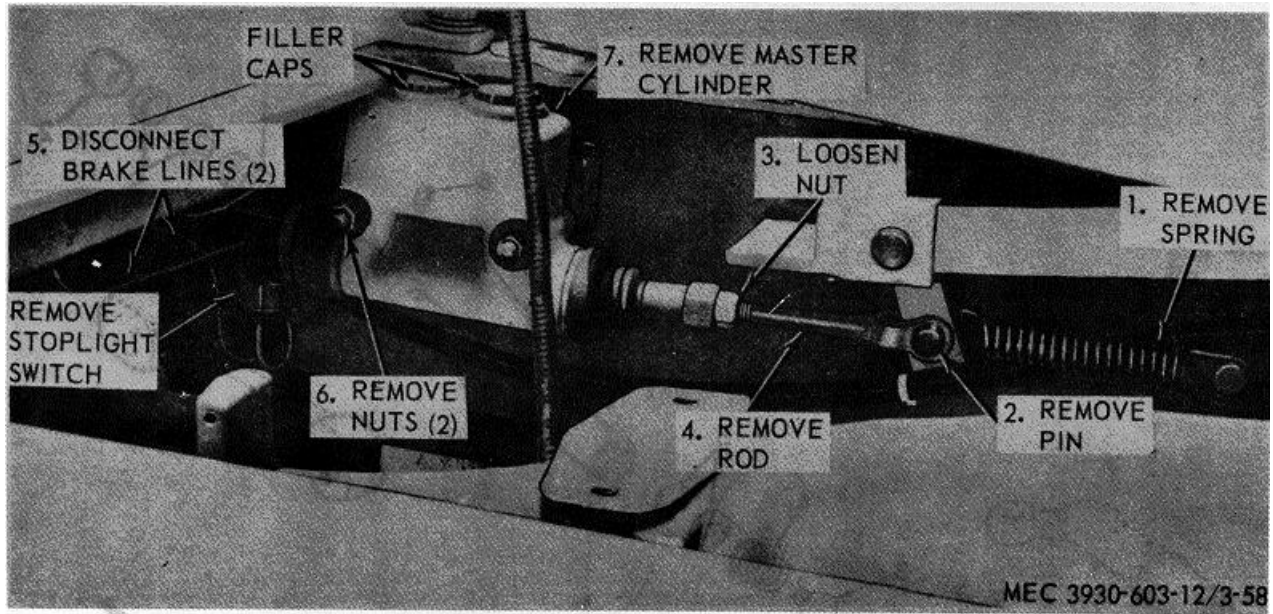


Figure 3-58. Master cylinder, assembly, removal and, and installation

## Section XVII. STEERING

### 3-67. General

This section contains instructions for maintenance operations which organizational maintenance personnel are authorized to perform on steering drag link and tie rods.

### 3-68. Tie Rods

#### a. Removal and Disassembly.

- (1) Remove front wheels and tires (para 3-56).
- (2) Remove and disassemble tie rods and tie rod ends as illustrated in figure 3-59.

#### b. Cleaning and Inspection.

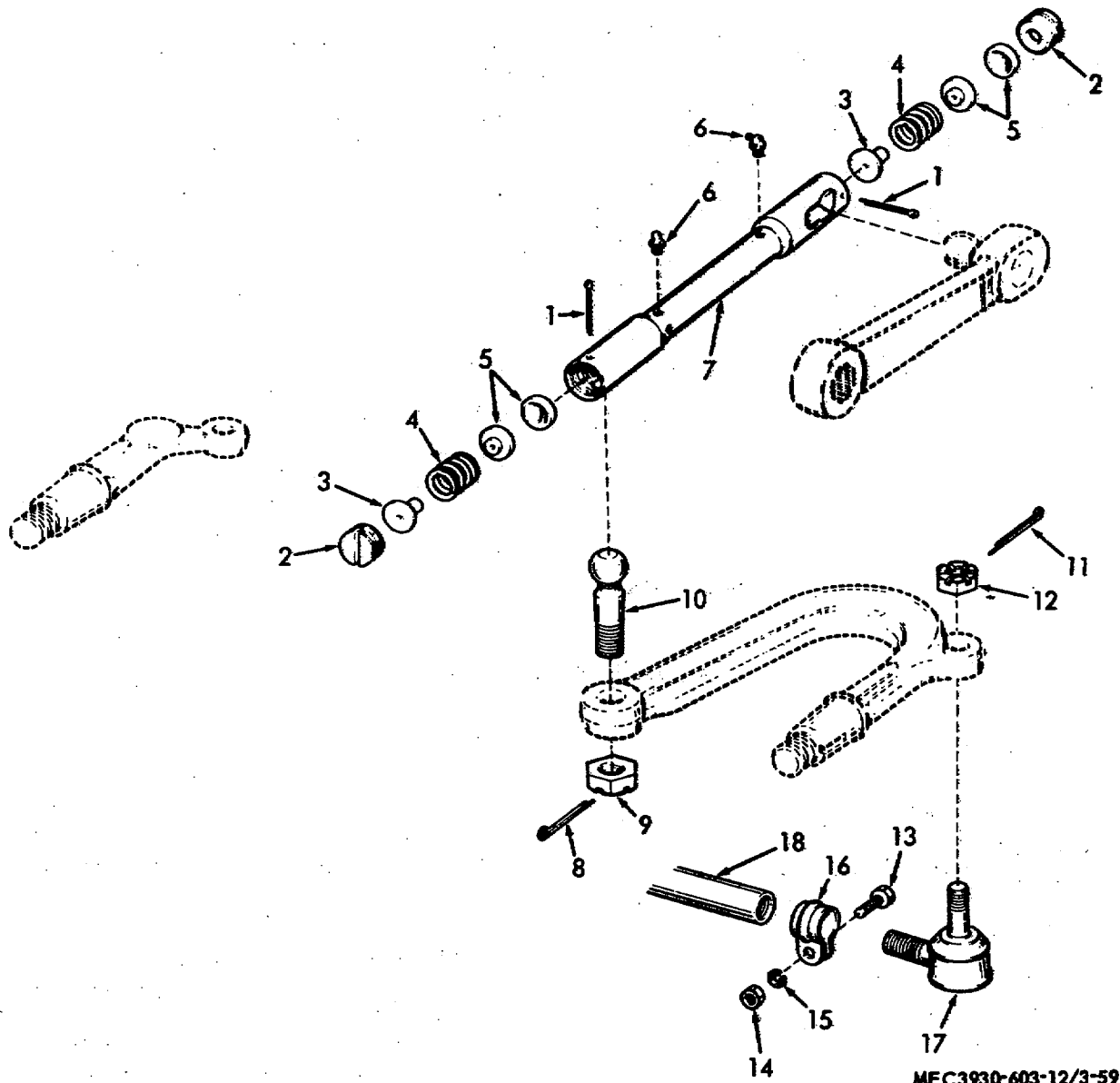
- (1) Wash all parts in an approved cleaning solvent and dry thoroughly.
- (2) Inspect all parts visually for excessive wear or damage.
- (3) Inspect socket springs and ball socket seats for wear or damage.
- (4) Replace all defective parts.

#### c. Reassembly and Installation.

- (1) Reassemble and install tie rods and tie rod ends as illustrated in figure 3-59.
- (2) Install front wheels and tires (para 3-56).
- (3) Align front wheels (*d.* below).

#### d. Front Wheel Alinement..

- (1) With tie rod installed and secured to steering knuckles arms with allotted nuts (9, fig. 3-59) and cotter pin (8), turn steering hand wheel until front wheels are in straight ahead position.
- (2) Measure span between inside of front tires at front and rear hub height. Span measured at rear must be one- sixteenth inch to one-eighth inch greater than span measured in front.
- (3) Turn tie rod (18) until dimension for toe-in (2) above is obtained.
- (4) Secure tie rod ends in] place by tightening nut (14) on clamp (16).



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- |   |                    |    |                   |
|---|--------------------|----|-------------------|
| 1 | Cotter pin         | 10 | Steering arm ball |
| 2 | Plug               | 11 | Cotter pin        |
| 3 | Safety plug        | 12 | Castellated nut   |
| 4 | Spring             | 13 | Hex head capscrew |
| 5 | Ball seat          | 14 | Hex nut           |
| 6 | Lubricator fitting | 15 | Lockwasher        |
| 7 | Drag Link tube     | 16 | End clamp         |
| 8 | Cotter pin         | 17 | Tie rod and ably  |
| 9 | Castellated nut    | 18 | Tie rod           |

Figure 3-59. Tie rod and drag link ,removal and, and installation

## CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION  
TO PREVENT ENEMY USE

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## Section I. SHIPMENT AND LIMITED STORAGE

**4-1. Preparation of Equipment for Shipment**

a. *General.* Detailed instructions for the preparation of the tractor for domestic shipment are outlined within this paragraph. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. *Inspection.* The tractor will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Inspection of the individual components and assemblies will be as outlined on the "Preventive Maintenance Service" in this manual.

c. *Cleaning and Drying.* All contamination shall be removed from the tractor by an approved method. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38-230.

d. *Painting.* Paint all surfaces where the paint has been removed or damaged. Refer to TB 740-93-2 for detailed cleaning and painting instructions.

e. *Depreservation Guide.* DA Form 2258 (Depreservation Guide of Engineer Equipment).

(1) A properly annotated depreservation guide will be completed concurrently with preservation for each item of mechanical equipment. Any peculiar requirements will be outlined in the blank spaces on the form. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide", and fastened in a conspicuous location on or near the operator's controls.

(2) Prior to placing equipment in operation or to the extent necessary for inspection, depreservation of the item shall be performed as outlined on the depreservation guide.

f. *Cooling System, Boxed or Crated.* Completely drain the cooling system including radiator and block, space heater, or other accessories through which the coolant has circulated. Flush with clean water. Leave draincocks open.

g. *Lubrication System (Wet Sump), Boxed or Crated.* Check level of lubricant. Operate the engine at fast idle until lubricant has been circulated throughout the system. The crankcase will then be drained and the drain plugs reinstalled.

h. *Sealing of Openings.* Openings that will permit the direct entry of water into the interior of gasoline engine-driven equipment, starting motor, generator, electrical enclosures and so on, shall be sealed with pressure-sensitive tape conforming to Specification PPP-T-06, Type III, Class I.

i. *Fuel Tank, Boxed or Crated.* Drain fuel tank after engine preservation and fog interior with preservative oil, Type P-10, Grade 2, conforming to Specification MIL-L-21260.

j. *Air Cleaner.* Drain the air cleaner and seal all openings that permit the direct entry of water. Use Type III, Class I, pressure-sensitive tape conforming to Specification PPP-T-60, Type III, Class I.

k. *Exterior Surfaces.* Coat exposed machined ferrous metal surfaces with Type P-6 preservative conforming to Specification MIL-C-11796, Class 3. If preservative is not available, cup grease may be used.

*l. Marking.* Shall conform to MIL-STD-129.

*m. Batteries and Cables.* Batteries shall be filled, fully charged, and secured in the battery compartment. Cables shall be disconnected, vent holes sealed, and all terminals wrapped and secured with Type III, Class I, pressure sensitive tape conforming to Specification PPP-TO.

*n. Disassembly, Disassembled Parts and Basic Issue Items.*

(1) Disassembly shall be limited to the removal of parts and projecting components that tend to increase the overall profile of the tractor and that which is subject to pilferage.

(2) Disassembled items- shall be packed with the publications in the toolbox if possible. Otherwise, items will be packed in a suitable container and secured to the tractor to prevent loss or pilferage.

*Note.* If packing is required to provide adequate protection against damage during shipment, refer to TM 38230 for guidance in crate fabrication.

#### **4-2. Loading Equipment for Shipment**

Use appropriate materials handling equipment of sufficient capacity to lift the tractor onto the carrier. Block and tie the unit to the carrier to assure that it will not move during transit.

#### **4-3. Preparation of Equipment for Storage**

*a.* Detailed instructions for preparation of the tractor for limited storage are provided in paragraph 41. Limited storage is defined as storage not to exceed six (6) months. Refer to AR 748505.

*b.* Every effort should be made to provide covered storage for the tractor. If this is impossible, select a firm, level, well-drained storage location, protected from prevailing winds. Position the tractor on heavy planking. Cover the tractor with a tarpaulin or other suitable waterproof covering and secure in a manner that will provide the tractor maximum protection from the elements.

#### **4-4. Inspection and Maintenance of Equipment in Storage**

Every 90 days, the tractor will be inspected as outlined on the "Preventive Maintenance Services", and operated long enough to assure complete lubrication of bearings. After each inspection period, the tractor shall be represerved as outlined in paragraph 4-3.

### **Section II. DEMOLITION TO PREVENT ENEMY USE**

#### **4-5. General**

When capture or abandonment of the tractor to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all tractors and all corresponding repair parts.

**Caution:** The tractor will not be destroyed, except upon order of proper authority.

#### **4-6. Demolition to Render the Equipment Inoperative**

*a. Mechanical Means.* Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be a valuable to destroy the following:

- (1) All controls and instruments.
- (2) Engine block and manifold.
- (3) Transmission assembly.

**Note.** The above steps are minimum requirements for this method .

- (4) Carburetor, magneto, governor, and water pump.



(5) Radiator, starting motor, and generator.

*b. Misuse.* Perform the following steps to render the equipment inoperative.

(1) Drain the radiator transmission and engine crankcase. Place sand, gravel, nuts, bolts, screws, or broken glass in the oil filler tube.

(2) Disconnect the radiator fan and run the engine at full throttle until it fails.

#### 4-7. Demolition by Explosives or Weapons Fire

*a. Explosives.* Place as many of the following charges as the situation permits and detonate them simultaneously with a detonating cord and a suitable detonator.

(1) One 1/2-pound charge under intake manifold against engine block.

(2) One 1/2-pound charge between engine and transmission.

(3) One 1/2-pound charge behind instrument panel.

*Note.* The above steps are minimum requirements for this method.

(4) One 1/2-pound charge between engine and starting motor.

(5) One 1/2-pound charge between battery charging generator and engine block.

*b. Weapons Fire.* Fire on the tractor with the heaviest practical weapons available.

#### 4-8. Other Demolition Methods

*a. Scattering and Concealment.* Remove all easily accessible parts such as the carburetor, fuel pump, governor, generator, and distributor. Scatter them through dense foliage, bury them in dirt or sand, or throw them in a lake, stream, or other body of water.

*b. Burning.* Pack rags, clothing, or canvas under, around, and inside the tractor. Saturate this packing with gasoline, oil, or diesel fuel and ignite.

*c. Submersion.* Totally submerge the tractor in a body of water to provide water damage and concealment. Salt water will damage metal parts more than fresh water.

#### 4-9. Training

All operators should receive thorough training in the destruction of the tractor. Refer to FM 5-25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

## APPENDIX A REFERENCES

### A-1 Technical Manuals

The following Department of the Army technical manuals pertain to this material:

TM 109O&O-20P	Operators and Organizational Maintenance Repair Parts List; Tractor, Wheeled, Warehouse: Gasoline Engine Driven; 4 Wheel, Pneumatic Tired, 4000 lb, DBP, Army Model MHE201 (North-western Motor Go. Model JG-40PT4) FSN 3930-926-1066
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### A-2. Preventive Maintenance and Service

The following Department of the Army supply catalogs pertain to this material.

*a. Fire Protection.*

TB 54200-200-10	Hand Portable Fire Extinguisher for Army Use
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*b. Lubrication.*

C9100SL	Petroleum, Petroleum-Base Products and Related Materials LO 10-3930-603-12 Lubrication Order, Tractor, Wheeled, Warehouse: Gasoline Engine Driven; 4 Wheel, Pneumatic Tired, 4000 lb. DBP, Army Model MHE 201, (Northwestern Motor Co. Model JG-40PT4) FSN
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*c. Painting*

TM 9-213	Painting Instructions for Field Use.
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*d. Preventive Maintenance.*

TM 9-6140-200-15	Storage Batteries, Lead acid Type
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TM 38-230 3930-926-1066	Preservation, Packing, and Packing Military Supplies and Equipment
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TM 38-750	Army Equipment Record Procedures
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**APPENDIX B  
BASIC ISSUE ITEMS LIST**

**B1. Scope**

This appendix lists items which accompany the tractor or are required for installation, operation, or operator's maintenance.

**B2. General**

This Basic Issue Items List is divided into the following sections:

a. *Basic Issue Items-Section II.* This section is a listing of accessories, repair parts, tools, and publications required for operator's maintenance and operation, initially issued with, or authorized for the tractor.

b. *Maintenance and Operating Supplies-Section III.* This section is a listing of maintenance and operating supplies required for initial operation.

**B3. Explanation of Columns**

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II:

a. *Source, Maintenance, and Recoverability Codes (SMR), Column 1:*

(1) Source Code indicates the selection status and source for the list item.

Source code is:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA Army supply system and authorized for use at indicated maintenance categories.

(2) Maintenance Code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
O	Organization Maintenance Operator/Crew

b. *Federal Stock Number, Column 2.* This column indicates the Federal stock number for the item.

c. *Description, Column 5.* This column indicates the Federal item name and any additional description required. A five-digit manufacturer's or other service code is shown in parentheses followed by the manufacturer's part number. Repair parts quantities included in kits, sets, and assemblies that differ from the actual quantity used in the specific item, are listed in parentheses following the repair part name.

d. *Unit of Issue, Column 4.* This column indicates the unit used as a basis of issue, e.g., ea, pr, ft, yd, etc.

e. *Quantity Incorporated in Unit Pack, Column 5.* This column indicates the actual quantity contained in the unit pack.

f. *Quantity Incorporated in Unit, Column 6.* This column indicates the quantity of the item used in the equipment.

g. *Quantity Authorized, Column 7.* This column indicates the quantity of an item authorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

h. *Illustration, Column 8.* This column is divided as follows:

(1) Figure Number, column 8a, indicates the figure number of the illustration in which the item is shown.

(2) Item Number, column 8b, indicates the callout number used to reference the item in the illustration.

**B-4. Explanation of Columns in The Tabular List of Maintenance and Operating Supplies--Section III**

- a. *Item, Column 1.* This column contains numerical sequence item numbers assigned to each component application to facilitate reference.
- b. *Component Application, Column 2.* This column identifies the component application of each maintenance or operating supply item.
- c. *Federal Stock Number, Column S.* This column indicates the Federal stock number for the item and will be used for requisitioning purposes.
- d. *Description, Column 4.* This column indicates the item and a brief descriptions
- e. *Quantity Required for Initial Operation, Column 5.* This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.
- f. *Quantity Required for 8 Hours Operation, Column 6.* This column indicates the estimated quantities required for an average eight hours of operation.
- g. *Notes, Column 7.* This column indicates informative notes keyed to data appearing in a preceding column.

**B5. Abbreviations**

- gal .....gallon
- pt .....pint
- qt .....quart

Section II. BASIC ISSUE ITEMS LIST

(1) Source maint and recov code			(2)  Federal stock number	(3)  Description	(4)  Unit of issue	(5)  Qty inc in unit pack	(6)  Qty inc in unit	(7)  Qty auth	(8) Illustration	
(A) Source	(B) Maint	(C) Recov							(A) Fig no.	(B) Item or sym no.
P	O		6140-635-5208 7520-559-9618	Group 31—Basic Issue Items Manufacturer installed						
				3100—Basic Issue Items Manufacturer or Depot installed						
				Battery: 12 V (Repair Parts Manual Group 0612)	ea.	1	1			
				Case: Maintenance and Operational Manuals Department of the Army Operators' Manual TM 10-3930-603-12	ea.	1	1			
P	O		7510-889-3494 4210-889-2221	Binder Log Book: With applicable forms required by TM 38-750	ea.	1	1			
				Extinguisher, Fire (Repair Parts Manual Group 7603)	ea.	1	1			
P	O		6810-249-9354	Sulphuric Acid (Repair Parts Manual Group 0612)	gal	1	1			
P	O			Department of the Army Organizational Repair Parts Manual TM 10-3930-603-20P	ea.	1	1			

Item	Component application	Source of Supply	Federal stock number	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	CRANKCASE (1)	--	-----	OIL, LUBRICATING: 5 gal. Drum as follows:			(1) Includes quantity of oil to fill engine oil systems as follows:
		10	9150-231-6653	Grade 9250	6 1/2 qt		
		10	9150-265-9435	OE-30			5 qt--Crankcase
		10	9150-231-9037	Grade 9110	6 1/2 qt		1 qt--Oil Filter
		10	9150-265-9428	OE-10	-----		
		10	9150-242-7603	OES	6 1/2 qt		1/2 qt--Air Cleaner
2	AIR CLEANER (2)			OIL, LUBRICATING (2)			
3	TRANSMISSION (2)	10		OE-10 (2)	8 qt		(2) Use oil as prescribed in item 1.
		10		OES (2)			
4	HYDRAULIC BRAKE SYSTEM			OIL, HYDRAULIC 1 gal. Can as follows:			
		10	9150-231-9071	HB--Nonpetroleum Base, Automotive	3/4 pt--(3)		(3) Represents quantity of oil to fill reservoir to proper level.
		10	9150-252-6375	HBA Nonpetroleum Base, Automotive Arctic-Type			
5	FUEL TANK	10	9130-264-6218	GASOLINE, AUTOMOTIVE Bulk.			
					13 gal (4)	6 gal.	
6	RADIATOR			WATER	14 1/2 qt		
		9	6850-243-1992	ANTIFREEZE: Inhibited glycol, 1 gal. can			(4) Tank Capacity
		9	6850-174-1806	ANTIFREEZE: Compound Arctic, 55 gal. drum			
7	DIFFERENTIAL	--	-----	OIL, LUBRICATING, GEAR:			
				5 gal. Pail as follows:			
		10	9150-577-5844	GO-90	9 1/2 pt		
		10	9150-257-5440	GOS			
8	DROP GEAR CASE	10	9150-577-5844	GO-90	1 1/2 pt		
		10	9150-257-5440	GOS			

## APPENDIX C

## MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

**C-1. General**

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the Identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

**C-2. Explanation of Columns in Section 11**

a. Group Number. Column 1. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1, Functional Grouping Codes) are listed on the Maintenance assignment in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximately to each other.

b. Functional Group. Column 2. This column contains a brief description of the components of each functional group.

c. Maintenance Functions. Column S. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C—Operator or crew

O—Organizational maintenance

F—Direct support maintenance

H—General support maintenance

D—Depot maintenance

The maintenance functions are defined as follows:

A—INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B—TEST. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C—SERVICE. To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.

D—ADJUST. To rectify to the extent necessary to bring into proper operating range.

E—ALINE. To adjust specified variable elements of an item to bring to optimum performance.

F—CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G—INSTALL. To set up for use in an operational environment such as an emplacement, site, or vehicle.

H—REPLACE. To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

I—REPAIR. To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

J—OVERHAUL. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards

using the Inspect and Repair Only as Necessary (IROAN) technique.

K-REBUILD. To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

d. *Tools and Equipment. Column 4.* This column is provided for referencing' by code the special tools and test equipment, (Sec. III) required to perform the maintenance functions (Sec. II).

e. *Remarks. Column 5.* This column is provided for referencing by code the remarks (Sec IV) pertinent to the maintenance functions.

Section II. MAINTENANCE ASSIGNMENT

(1) Group No.	(2) Functional group TRACTOR, WHEELED, WAREHOUSE: GASOLINE ENGINE DRIVEN; 4 WHEEL, PNEUMATIC TIRED, 4000 LB DBP ARMY MODEL MHE 201 (NORTHWESTERN MOTOR CO. MODEL JG-40PT4) FSN 8930-926-1066	(3) Maintenance Functions										(4) Tools and equipment	(5) Remarks	
		A	B	C	D	E	F	G	H	I	J			K
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild
01	ENGINE													
0100	Engine Assembly:													
	Engine Assembly, Gasoline -----	O	O	O	O				F	O	H	D		
	Gasket Set -----								F					
	Insulator, Mounting -----								F					
0101	Crankcase, Block, Cylinder Head:													
	Head Assembly -----								O	H				
	Block Assembly -----								H					
	Tube, Water Distributor -----								F					
0102	Crankshaft:													
	Crankshaft -----								H	D				
	Bearing, Main -----								H					
	Seal, Oil -----								F					
	Sprocket, Timing Gear -----								H					
0103	Flywheel Assembly:													
	Gear, Ring -----								H					
0104	Pistons, Connecting Rods:													
	Bearing, Connecting Rod -----								H					
	Ring, Piston -----								H					
	Bushing, Piston Pin -----								H					
0105	Valves, Camshafts and Timing System:													
	Camshaft and Bearing -----					H			H					
	Chain, Timing -----								H					
	Cover, Chain Case -----								F					
	Cover, Valve -----								O	H				
	Guide, Valve -----								H					
	Screw, Tappet -----								F					
	Tappet -----								F					
	Valve, Engine -----				O				F	F				
0106	Engine Lubrication System:													
	Breather -----			O					O					
	Cartridge, Oil Filter -----								O					
	Filter, Oil -----			O					O					
	Oil Pressure Relief Valve -----								O					



(1) Group No.	(2) Functional group TRACTOR, WHEELED, WAREHOUSE: GASOLINE ENGINE DRIVEN; 4 WHEEL, PNEUMATIC TIRED, 4000 LB DBP ARMY MODEL MHE 201 (NORTHWESTERN MOTOR CO. MODEL JG-40PT4) FSN 9930-926-1066	(3) Maintenance Functions											(4) Tools and equipment	(5) Remarks	
		A	B	C	D	E	F	G	H	I	J	K			
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild			
0108	Gasket Set, Oil Pan -----									F					
	Hose Assembly, Oil (External) -----									O	F				
	Indicator Assembly, Oil -----									O					
	Pump Assembly, Oil -----									F	F				
	Manifolds:														
	Manifolds -----									O					
	Valve, Heat Control -----									O					
	FUEL SYSTEM														
	0301 Carburetor:														
	Carburetor Assembly -----			O	O					O	F				
Repair Kit, Carburetor -----									O	F					
Gasket Set, Carburetor -----									F						
0302 Fuel Pump:															
Pump Assembly, Fuel -----			O						O						
Shield, Heat -----									O						
0304 Air Cleaner -----			O						O						
0306 Tanks, Lines, Fittings:															
Cap, Tank -----			O						O						
Line Assembly, Fuel -----									O	O					
Tank, Fuel -----			C						O	F	O				
0308 Engine Speed Governor and Controls:															
Governor -----				O					O						
0312 Accelerator, Throttle or															
Choke Controls:															
Control, Choke -----									O						
Pad, Pedal -----									O						
Pedal Assembly -----									O						
Link-Rod -----									O						
Spring -----									O						
04 EXHAUST SYSTEM															
0401 Muffler and Pipes -----									O						
05 COOLING SYSTEM															
0501 Radiator:															
Cap, Radiator -----			O						O						
Radiator Assembly -----			O	C					O	F					
0503 Water Manifold, Headers,															
Thermostats and Tousing,															
Gasket:															
Clamp, Hose -----									O						
Thermostat -----			O						O						
0504 Water Pump -----									O						
0505 Fan Assembly:															
Belt "V" -----				O					O						
06 ELECTRICAL SYSTEM															
0601 Generator -----			O						O	F					
Brush Set -----									O	F					
0602 Generator Regulator -----			O	O					O						
0603 Starting Motor -----			O						O	F					
Brush Kit -----									O	F					
Solenoid -----									O	F					
Relay, Starter -----									O						

(1) Group No.	(2) Functional group TRACTOR, WHEELED, WAREHOUSE: GASOLINE ENGINE DRIVEN; 4 WHEEL, PNEUMATIC TIRED, 4000 LB DBP ARMY MODEL MHE 201 (NORTHWESTERN MOTOR CO. MODEL JG-40PT4) FSN 3980-926-1066	(3) Maintenance Functions											(4) Tools and equipment	(5) Remarks				
		A	B	C	D	E	F	G	H	I	J	K						
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild						
0605	Ignition Components:																	
	Cap-Contact-Generator-Rotor -----								O									
	Cable Assembly, Spark Plug -----								O				F					
	Distributor Assembly -----				O								F					
	Spark Plug -----		O	O	O				O									
	Ignition Coil -----								O									
0606	Engine Safety Controls:																	
	Switch, Neutral -----									F								
0607	Instrument or Engine Control Panel:																	
	Gages -----									O								
	Harness, Engine -----									F			F					
	Light, Warning -----									O								
	Bulb, Lamp -----									O								
	Switch, Push-Pull -----									O								
0608	Miscellaneous Items:																	
	Fuse, Light -----									O								
	Switch, Stop Light -----									O								
0609	Lights:																	
	Headlight Assembly -----									O								
	Lamp, Sealed Beam -----									O								
	Lamp, Incandescent -----									O								
	Light, Tail and Stop -----									O			O					
0610	Sending Units:																	
	Sender, Gage -----									O								
0611	Horn:																	
	Horn Assembly -----									O								
	Relay, Horn -----									O								
	Button Assembly, Horn -----									O			F					
	Cover, Horn Button -----									O								
0612	Batteries, Storage:																	
	Battery -----		O	C						O								
	Cable, Battery -----									O								
	Strap, Ground -----									O								
0615	Radio Interference Suppression -----									O								
07	TRANSMISSION																	
0708	Torque Converter -----				O					F								
0710	Transmission Assembly -----		H	O	H					F			H					
	Indicator, Oil Level -----									O								
0713	Intermediate Clutch -----									H			H					
0714	Servo Unit -----									H			H					
0721	Coolers, Pumps, Motors:																	
	Filter Assembly -----				H					H								
	Line Assembly, Oil -----				O					O								
09	PROPELLER AND PROPELLER SHAFTS																	
0900	Propeller Shafts -----									O								
	Joint, Universal -----				O					O								
10	FRONT AXLE																	
1000	Front Axle Assembly -----					F				F			F					
1004	Steering:																	
	End Assembly, Tie Rod -----									O								
	Knuckle Assembly -----									F			F					

(1) Group No.	(2) Functional group TRACTOR, WHEELED, WAREHOUSE: GASOLINE ENGINE DRIVEN; 4 WHEEL, PNEUMATIC TIRED, 4000 LB DBP ARMY MODEL MHE 201 (NORTHWESTERN MOTOR CO. MODEL JG-40PT4) FSN 3930-926-1066	(3) Maintenance Functions											(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J	K					
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild					
11	<b>REAR AXLE</b>																
1100	Rear Axle Assembly -----								F	F							
1101	Housing:																
	Breather Assembly -----								F	H							
	Case, Differential -----								H	H							
	Tube, Axle Housing -----								H	H							
1102	Differential -----								F	H							
12	<b>BRAKES</b>																
1201	Hand Brakes:																
	Brake Assembly -----				O				O	O							
	Lever, Brake -----				O				O	O							
1202	Service Brakes -----				O				O	O							
1204	Hydraulic Brake System:																
	Cylinder Assembly, Master -----								O	F							
	Cylinder Assembly, Wheel -----								O	F							
1206	Mechanical Brake System:																
	Pedal -----				O				F								
13	<b>WHEELS AND TRACKS</b>																
1311	Wheel Assembly:																
	Cup and Cone -----			O	O				O	O							
	Hub, Rear Wheel -----								O	O							
	Drum, Brake -----								O	F							
	Retainer, Axle -----								O	O							
	Seal, Oil Axle -----								O	O							
1318	Tires, Tubes -----			C					O	O							
14	<b>STEERING</b>																
1401	Steering Assembly:																
	Arm, Pitman -----									F	F						
	Shaft Assembly, Lever -----									F	O						
	Rod, Tie, Steering -----				O					F	O						
	Wheel, Steering -----				F					F	F						
1407	Steering Gear Assembly -----									F	F						
15	<b>FRAME, TOWING ATTACHMENTS</b>																
1501	Frame Assembly -----									H	H						
	Bumper, Front -----									H	O						
1502	Counterweights -----									H	O						
1053	Pintles -----									O	O						
16	<b>SPRINGS</b>																
1601	Springs -----									F	F						
18	<b>BODY, CAB, HOOD AND HULL</b>																
1801	Body, Cab:																
	Fender -----									F	O						
	Hood Assembly -----									F	O						
1806	Upholstery Seats:																
	Cushion -----									O	F						

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NG: None.


USAR: None.

For explanation of abbreviations used, see AR 320-50.

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