TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK, CARGO; 1-1/4 TON, 4X4

M880 (2320-00-579-8942)
M881 (2320-00-579-8943)
M882 (2320-00-579-8957)
M883 (2320-00-579-8959)
M884 (2320-00-579-8985)
M885 (2320-00-579-8989)

TRUCK, CARGO; 1-1/4 TON, 4X2

M890 (2320-00-579-8991)
M891 (2320-00-579-9046)
M892 (2320-00-579-9052)

TRUCK, AMBULANCE; 1-1/4 TON, 4X4*

M886 (2310-00-579-9078)

TRUCK, AMBULANCE; 1-1/4 TON, 4X2

M893 (2310-00-579-5679)

TRUCK, TELEPHONE MAINTENANCE: 1-1/4 TON, 4X4

M888 (2320-01-044-0333)

This copy is a reprint which includes current pages from Changes 1 through 8.

HEADQUARTERS, DEPARTMENT OF THE ARMY

JANUARY 1976

CHANGE

NO. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *28 May 1991*

Organizational Maintenance Manual

TRUCK, CARGO; 1-1/4 TON, 4X4

M880 (2320-00-579-8942), M881 (2320-00-579-8943)
M882 (2320-00-579-8957), M883 (2320-00-579-8959)
M884 (2320-00-579-8985), M885 (2320-00-579-8989)
TRUCK, CARGO; 1-1/4 TON, 4X2
M890 (2320-00-579-8991), M891 (2320-00-579-9046)
M892 (2320-00-579-9052)
TRUCK, AMBULANCE; 1-1/4 TON, 4X4
M886 (2310-00-579-9078)
TRUCK, AMBULANCE; 1-1/4 TON, 4X2
M893 (2310-00-579-5679)
TRUCK, TELEPHONE MAINTENANCE; 1-1/4 TON, 4X4
M888 (2320-01-044-0333)

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a and b	a and b
2-3 and 2-4	2-3 and 2-4
2-13 and 2-14	2-13 and 2-14

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By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Arm
Chief of Staff

Official:

PATRICIA P. HICKERSON
Colonel, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12–38–E, block 0170, Unit maintenance requirements for TM 9–2350–266–20..

CHANGE
NO. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *28 Mar 86*

Organizational Maintenance Manual
TRUCK CARGO: 1 1/4 TON, 4X4
M880 (NSN 2320-00-579-8942), M881 (NSN 2320-00-579-8943)
M882 (NSN 2320-00-579-8957), M883 (NSN 2320-00-579-8959)
M884 (NSN 2320-00-579-8985), M885 (NSN 2320-00-579-8989)
TRUCK, CARGO: 1 1/4 TON, 4X2
M890 (NSN 2320-00-579-8991), M891 (NSN 2320-00-579-9046)
M892 (NSN 2320-00-579-9052)
TRUCK, AMBULANCE: 1 1/4 TON, 4X4
M886 (NSN 2310-00-579-9078)
TRUCK, AMBULANCE: 1 1/4 TON, 4X2
M893 (NSN 2310-00-125-5679)
TRUCK, TELEPHONE MAINTENANCE: 1 1/4 TON, 4X4
M888 (NSN 2320-01-044-0333)

TM 9-2320-266-20, 5 January 1976, is changed as follows:

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Remove Pages	*Insert Pages*
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
1-5 and 1-6	1-5 and 1-6
2-3 thru 2-6	2-3 thru 2-6
2-11 thru 2-14.2(Blank)	2-11 thru 2-14.2 (Blank)
2-17 thru 2-20	2-17 thru 2-20
2-27 thru 2-30	2-27 thru 2-30
2-35 thru 2-46.2 (Blank)	2-35 thru 2-46.2 (Blank)
2-53 thru 2-56	2-53 thru 2-56
2-61 and 2-62	2-61 and 2-62
2-63 and 2-64	2-63 and 2-64
2-67 thru 2-70.2 (Blank)	2-67 thru 2-70.2 (Blank)
2-73 thru 2-76	2-73 thru 2-76
2-79 thru 2-84.2 (Blank)	2-79 thru 2-84.2 (Blank)
3-13 and 3-14	3-13 and 3-14
A-1 and A-2	A-1 and A-2
B-1 thru B-4	B-1 thru B-4
B-7 thru B-16(Blank)	B-7 thru B-16 (Blank)
Index 1 thru Index 6	Index 1 thru Index 6
Sample Da Form 2028-2 & Mailing	Sample DA Form 2028-2 & Mailing
DA Forms 2028-2	DA Forms 2028-2
Metric and Back Cover	Metric and Back Cover

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Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38, Organizational Maintenance requirements for Cargo: 1 1/4 Ton, 4x4, M880; M881; M882; M883; M884; M885; M890; M891; M892.

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *14 May 1982*

Organizational Maintenance Manual
TRUCK CARGO: 1¼ TON, 4X4
M880 (NSN 2320-00-579-8942), M881 (NSN 2320-00-579-8943)
M882 (NSN 2320-00-579-8957), M883 (NSN 2320-00-579-8959)
M884 (NSN 2320-00-579-8985), M885 (NSN 2320-00-579-8989)
TRUCK, CARGO: 1¼ TON, 4X2
M890 (NSN 2320-00-579-8991), M891 (NSN 2320-00-579-9046)
M892 (NSN 2320-00-579-9052)
TRUCK, AMBULANCE: 1¼ TON, 4X4
M886 (NSN 2310-00-579-9078)
TRUCK, AMBULANCE: 1¼ TON, 4X2
M893 (NSN 2310-00-125-5679)
TRUCK, TELEPHONE MAINTENANCE: 1¼ TON, 4X4
M888 (NSN 2320-01-044-0333)

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a and b	a and b
i and ii	i and ii
1-1 through 1-4	1-1 through 1-4
None	1-4.1/(1-4.2 blank)
1-5 and 1-6	1-5 and 1-6
2-1 through 2-6	2-1 through 2-6
2-11 through 2-14	2-11 through 2-14
2-14.1 and 2-14.2	2-14.1/(2-14.2 blank)
2-15 through 2-20	2-15 through 2-20
2-20.1 and 2-20.2	2-20.1 and 2-20.2
2-32.1 and 2-32.2	2-32.1 and 2-32.2
2-35 and 2-36	2-35 and 2-36
2-36.1 and 2-36.2	2-36.1 and 2-36.2
2-37 and 2-38	2-37 and 2-38
None	2-38.1/(2-38.2 blank)
2-39 and 2-40	2-39 and 2-40
2-40.1 and 2-40.2	2-40.1 and 2-40.2
None	2-40.3 through 2-40.5/(2-40.6 blank)
2-41 and 2-42	2-41 and 2-42
2-46.1 and 2-46.2	2-46.1/(2-46.2 blank)
2-47 and 2-48	2-47 and 2-48
2-55 and 2-56	2-55 and 2-56
2-60.1 and 2-60.2	2-60.1 and 2-60.2
2-65 through 2-70	2-65 through 2-70
2-77 and 2-78	2-77 and 2-78
2-78.1 and 2-78.2	None
3-3 through 3-6	3-3 through 3-6
3-11 and 3-12	3-11 and 3-12
None	3-13 through 3-16
None	4-2.1/(4-2.2 blank)
4-3 and 4-4	4-3 and 4-4
A-1 and A-2	A-1 and A-2
B-5 through B-14	B-5 through B-14
None	B-15/(B-16 blank)
Index 1 and Index 2	Index 1 and Index 2
Index 2.1 and Index 2.2	Index 2.1/(Index 2.2 blank)
Index 3 through Index 6	Index 3 through Index 6
None	DA Form 2028-2

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TM 9-2320-266-20
C 6

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

Official:
ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-38, Organizational Maintenance requirements for Cargo: 1¼ Ton, 4x4, M880; M881; M882; M883; M884; M885; M890; M891; M892.

CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D C, *20 August 1980*

Organizational Maintenance Manual

TRUCK, CARGO: 1-1/4 TON, 4X4
M880 (2320-00-579-8942), M881 (2320-00-579-8943)
M882 (2320-00-579-8957), M883 (2320-00-579-8959)
M884 (2320-00-579-8985), M885 (2320-00-579-8989)
TRUCK, CARGO: 1-1/4 TON, 4X2
M890 (2320-00-579-8991), M891 (2320-00-579-9046)
M892 (2320-00-579-9052)
TRUCK, AMBULANCE: 1-1/4 TON, 4X4
M886 (2320-00-579-9078)
TRUCK, AMBULANCE: 1-1/4 TON, 4X2
M893 (2310-00-579-5679)
TRUCK, TELEPHONE MAINTENANCE: 1-1/4 TON, 4X4
M888 (2320-01-044-0333)

TM 9-2320-266-20, 5 January 1976, is changed as follows:

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Remove pages	*Insert pages*
1-5/1-6	1-5/1-6
2-5/2-6	2-5/2-6
2-17 thru 2-20	2-17 thru 2-20
2-31/2-32	2-31 thru 2-32.2
2-36.1/2-36.2	2-36.1/2-36.2
2-37/2-38	2-37/2-38
2-49/2-50	2-49 thru 2-50.1/2-50.2 (blank)
3-5/3-6	3-5 thru 3-11/3-12 (blank)
B-3/B-4	B-3/B-4
B-13/B-14 (blank)	B-13/B-14
Index 1/Index 2	Index 1 thru Index 2.1/Index 2.2 (blank)

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General, United States Army
Chief of Staff

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J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38, Organizational maintenance requirements for Cargo: 1 1/4 Ton, 4x4, M880; M881; M883; M884; M885; M890; M891, Ambulance M886; M893.

CHANGE
NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *25 September 1978*

Organizational Maintenance Manual
TRUCK, CARGO: 1-1/4 TON, 4X4
M880 (2320-00-579-8942), M881 (2320-00-579-8943)
M882 (2320-00-579-8957), M883 (2320-00-579-8959)
M884 (2320-00-579-8985), M885 (2320-00-579-8989)
TRUCK, CARGO: 1-1/4 TON, 4X2
M890 (2320-00-579-8991), M891 (2320-00-579-9046)
M892 (2320-00-579-9052)
TRUCK, AMBULANCE: 1-1/4 TON, 4X4
M886 (2320-00-579-9078)
TRUCK, AMBULANCE: 1-1/4 TON, 4X2
M893 (2310-00-579-5679)
TRUCK, TELEPHONE MAINTENANCE: 1-1/4 TON, 4X4
M888 (2320-01-044-0333)

TM 9-2320-266-20, 5 January 1976, is changed as follows:

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Remove pages	*Insert pages*
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
1-5 and 1-6	1-5 and 1-6
2-17 and 2-18	2-17 and 2-18
2-27 and 2-28	2-27 and 2-28
2-35 and 2-36	2-35 and 2-36
2-39 and 2-40	2-39 and 2-40
2-43 and 2-44	2-43 and 2-44
2-46.1/(2-46.2 blank)	2-46.1/(2-46.2 blank)
2-73 through 2-76	2-73 through 2-76
None	2-89/(2-90 blank)
Index 3 and Index 4	Index 3 and Index 4

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Chief of Staff

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The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-38, organizational maintenance requirements for 1¼-Ton Truck, XM861, Ambulance, XM863 and XM864.

CHANGE

No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 December 1977

Organizational Maintenance Manual

TRUCK, CARGO: 1-1/4 TON, 4X4
M880 (2320-00-579-8942), M881 (2320-00-579-8943)
M882 (2320-00-579-8957), M883 (2320-00-579-8959)
M884 (2320-00-579-8985), M885 (2320-00-579-8989)
TRUCK, CARGO: 1-1/4 TON, 4X2
M890 (2320-00-579-8991), M891 (2320-00-579-9046)
M892 (2320-00-579-9052)
TRUCK, AMBULANCE: 1-1/4 TON, 4X4
M886 (2320-00-579-9078)
TRUCK, AMBULANCE: 1-1/4 TON, 4X2
M893 (2310-00-579-5679)
TRUCK, TELEPHONE MAINTENANCE: 1-1/4 TON, 4X4
M888 (2320-01-044-0333)

TM 9-2320-266-20, 5 January 1976, is changed as follows:

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Remove pages	*Insert pages*
i/ii	i/ii
1-1 thru 1-2.2	1-1 thru 1-2.2
1-7/1-8	1-7/1-8
3-3/3-4	3-3/3-4
None	5-1 thru 5-2
B-11/B-12	B-11/B-12

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General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-38, Organizational maintenance requirements for 1¼ Ton Truck, M861, Ambulance, XM863 and XM864.

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *15 July 1977*

Organizational Maintenance Manual

TRUCK, CARGO: 1-¼ TON, 4X4
M880 (2320-00-579-8942), M881 (2320-00-579-8943)
M882 (2320-00-579-8957), M883 (2320-00-579-8959)
M884 (2320-00-579-8985), M885 (2320-00-579-8989)
TRUCK, CARGO: 1-¼ TON,4X2
M890 (2320-00-579-8991), M891 (2320-00-579-9046)
M892 (2320-00-579-9052)
TRUCK, AMBULANCE: 1-¼ TON, 4X4
M886 (2320-00-579-9078)
TRUCK, AMBULANCE: 1-¼ TON, 4X2
M893 (2310-00-579-5679)

TM 9-2320-266-20, 5 January 1976, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

Remove pages	*Insert pages*
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
None	1-2.1/1-2.2(blank)
1-5 through 1-8	1-5 through 1-8
2-3 through 2-6	2-3 through 2-6
2-11 through 2-14	2-11 through 2-14
2-15 and 2-16	2-15 and 2-16
2-19 and 2-20	2-19 and 2-20
None	2-20.1 and 2-20.2
2-31 and 2-32	2-31 and 2-32
2-35 and 2-36	2-35 and 2-36
None	2-36.1/2-36.2(blank)
2-37 and 2-38	2-37 and 2-38
2-45 and 2-46	2-45 and 2-46
2-46.1/2-46.2	2-46.1/2-46.2(blank)
2-51 and 2-52	2-51 and 2-52
None	2-52.1/2-52.2(blank)
2-55 and 2-56	2-55 and 2-56
None	2-56.1/2-56.2(blank)
2-61 and 2-62	2-61 and 2-62
None	2-62.1/2-62.2(blank)
2-63 and 2-64	2-63 and 2-64
2-67 through 2-70	2-67 through 2-70
None	2-70.1/2-70.2(blank)
2-77 and 2-78	2-77 and 2-78
None	2-78.1/2-78.2(blank)
3-1 through 3-4	3-1 through 3-6
A-1 and A-2	A-1 and A-2
B-1 and B-2	B-1 and B-2
B-11 and B-12	B-11 and B-12
Index 1 through Index 4	Index 1 through Index 4

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38, organizational maintenance requirements for 1¼ Ton Truck, XM861, Ambulance, XM863 and XM864.

WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, or coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel whenever the personnel heater and main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

1. DO NOT operate the heater or engine of the vehicle in an enclosed area unless it is ADEQUATELY VENTILATED.

2. DO NOT idle the engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.

3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

4. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel from the vehicle and treat as follows: Expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, administer artificial respiration.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

FOR ARTIFICIAL RESPIRATION, REFER TO FM 21-11.

WARNING

Allow the engine to cool before touching the exhaust manifolds, as serious burns may result.

WARNING

When removing the radiator pressure cap, turn it counterclockwise until it stops, without pressing down on the cap. This permits pressure to escape and prevents hot water from spraying out of the radiator filler opening.

WARNING

To take off the cap, press down and turn counterclockwise.

WARNING

Never bend or straighten the fan. If it's damaged in any way, replace it.

WARNING

Always disconnect the battery ground cable at the negative terminal before removing and replacing fuel or electrical system components.

WARNING

Never use unauthorized brake fluid in the hydraulic brake system. The brakes may fail.

WARNING

Stop the engine and allow it to cool before touching the electronic control unit or the ballast resistor. High voltages and high temperatures in these units can cause serious injury.

WARNING

Do not open the hood of the truck if you see steam escaping, as serious burns may result.

WARNING

Prior to removal of the fuel tank, disconnect ground battery cable. Keep a CO2 fire extinguisher nearby.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

TECHNICAL MANUAL

No. 9-2320-266-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. *5 January 1976*

ORGANIZATIONAL MAINTENANCE MANUAL
TRUCK, CARGO; 1-1/4 TON, 4X4, M880 SERIES
TRUCK, CARGO; 1-1/4 TON, 4X2, M890 SERIES
TRUCK, AMBULANCE; 1-1/4 TON, 4X4, M886
TRUCK, AMBULANCE; 1-1/4 TON, 4X2, M893
TRUCK, TELEPHONE MAINTENANCE; 1-1/4 TON, 4X4, M888

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual contains instructions for personnel at the organizational maintenance level for the maintenance of M880 series vehicles. Any manual referenced in this TM should be considered a part of this manual.

1-2. Maintenance Forms and Records.

DA Pam 738-750 (The Army Maintenance Management System) explains maintenance forms, records, and procedures required for use with these trucks.

Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you discover before, during, and after operation unless you can fix them yourself. You do not need to record faults that you fix yourself unless they involve replacing parts. When you replace a part tell organizational maintenance so they can enter the repair work in their record system.

1-2.1 Equipment Improvement Report and Maintenance Digest (EIR MD)

The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicle(s) covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWO's), warranties (if applicable), actions taken on some of your DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. The information will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA Pam 310-1, Consolidated Index of Army Publications and Blank Forms, and appendix A, of this manual.

1-3. Destruction of Army Materiel to Prevent Enemy Use.

Procedures outlined in TM 750-244-3 (Procedures for Destruction of Equipment to Prevent Enemy Use) are applicable to these trucks.

1-4. Administrative Storage.

Procedures outlined in TM 740-90-1 (Administrative Storage of Equipment) are applicable to these trucks.

1-5. Reporting Errors and Recommending Improvements.

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

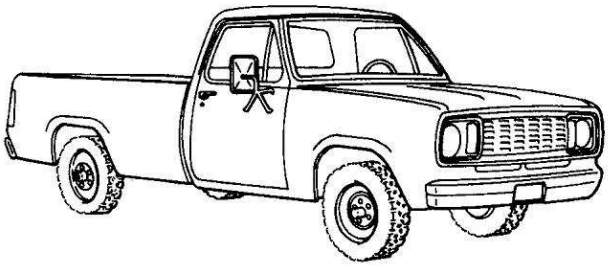
1-6. Warranty Information.

The M880-series trucks are covered by a manufacturer's warranty for 12 months or 12,000 miles, whichever comes first. For detailed information about the warranty and the processing of claims, refer to TB 9-2300-295-15/14.

Section II. DESCRIPTION AND DATA

1-7. Description.

a. The 1-1/4 ton trucks shown in figures 1-1 through 1-4.2 are commercial vehicles suitable for use on all types of roads and highways in all types of weather. In addition, the 4X4 models are designed for cross-country use and will ford hard-bottom streams to a depth of 16 inches. All of the trucks have an automatic transmission with three forward and one reverse speeds. All trucks use a 318 cubic-inch displacement engine which operates on regular, leaded gasoline. However, unleaded may be used. The braking system uses hydraulically-activated, power-assisted front disc and rear drum service brakes. A more detailed description of the trucks and the differences between models in this series is covered in TM 9-2320-266-10. The maintenance paragraphs of this manual contain detailed descriptions of the trucks' components.



TA180888

Figure 1-1. M880/M890 Cargo Truck, Right Front View.

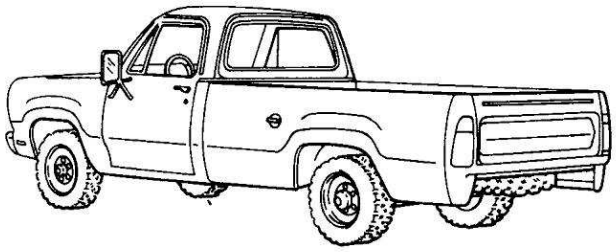


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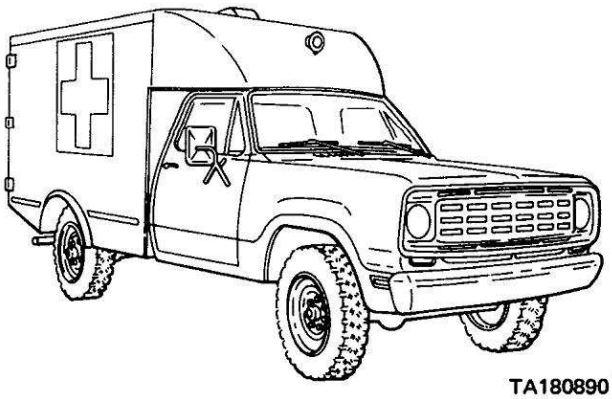
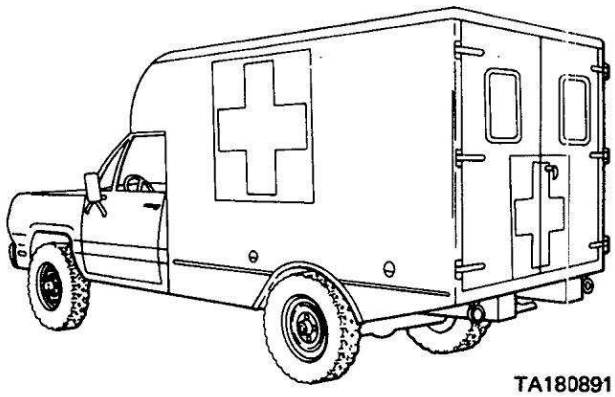
Figure 1-2. M880/M890 Cargo Truck, Left Rear View.



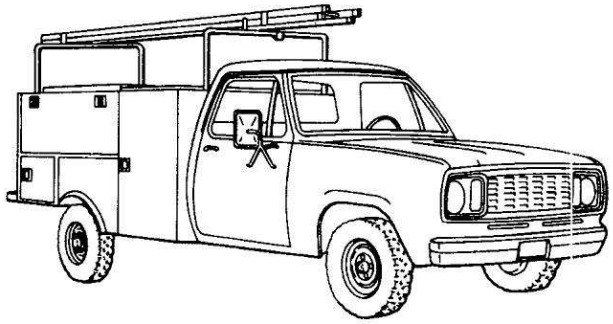
TA180890

Figure 1-3. M886/M893 Ambulance, Right Front View.



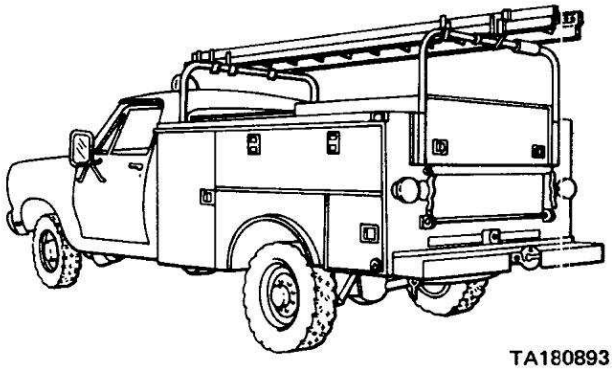
TA180891

Figure 1-4. M886/M893 Ambulance, Left Rear View.



TA180892

Figure 1-4.1. M888 Telephone Maintenance Truck, Right Front View.



TA180893

Figure 1-4.2 M888 Telephone Maintenance Truck, Left Rear View.

b. Models with a part number effectivity date before August 15, 1976, have a different grille and front turn signals than those manufactured after that date (figure 1-5).

Table 1-1. Tabulated Data

Data	Model				
	4X4 Cargo Truck	4X2 Cargo Truck	4X4 Ambulance	4X2 Ambulance	4X4 Telephone Maintenance Truck
Vehicle:					
Make	Dodge	Dodge	Dodge	Dodge	Dodge
Model	W200	W200	W200	D200	D200
Weights:					
Curb	4648 lbs (2108 kg)	4217 lbs (1913 kg)	6116 lbs (2774 kg)	5684 lbs (2578 kg)	5014 lbs (2274 kg)
Payload	2500 lbs (1134 kg)	2500 lbs (1134 kg)	1200 lbs (544 kg) (5 litter patients)	1200 lbs (544 kg) (5 litter patients)	2000 lbs (907 kg)
GVW	7748 lbs (3515 kg)	7317 lbs (3319 kg)	7716 lbs (3500 kg)	7284 lbs (3304 kg)	8000 lbs (3639 kg)
GAWR (front)	3190 lbs (1447 kg)	2826 lbs (1282 kg)	3310 lbs (1502 kg)	2945 lbs (1336 kg)	2000 lbs (907 kg)
GAWR (rear)	4558 lbs (2068 kg)	4491 lbs (2037 kg)	4406 lbs (1999 kg)	4339 lbs (1968 kg)	5000 lbs (2270 kg)
Wheelbase	131.00 in (332.74 cm)	131.00 in (332.74 cm)	131.00 in (332.74 cm)	131.00 in (332.74 cm)	131.00 in (332.74 cm)
Track (front)	65.26 in (165.76 cm)	64.98 in (165.05 cm)	65.26 in (165.76 cm)	64.98 in (165.05 cm)	65.26 in (165.76 cm)
Track (rear)	64.00 in (162.56 cm)	64.00 in (162.56 cm)	64.00 in (162.56 cm)	64.00 in (162.56 cm)	64.00 in (162.56 cm)
Ground clearance	8.50 in (unloaded, 55 psi in rear) 8.0 in (loaded)	8.50 in (unloaded, 55 psi in rear) 8.0 in (loaded)	8.50 in (unloaded, 55 psi in rear) 8.0 in (loaded)	8.50 in (unloaded 55 psi in rear) 8.0 in (loaded)	8.50 in (unloaded, 55 psi in rear) 8.0 in (loaded)
Height (overall)	73.85 in (187.58 cm)	70.77 in (179.76 cm)	101.00 in (256.54 cm)	98.00 in (248.92 cm)	85.00 in (215.90 cm)
Length (overall)	218.74 in (555.6 cm)	218.74 in (555.6 cm)	215.42 in (547.17 cm)	215.42 in (547.17 cm)	214.00 in (543.56 cm)
Width (overall)	79.50 in (201.93 cm)	79.50 in (201.93 cm)	79.50 in (201.93 cm)	79.50 in (201.93 cm)	87.50 in (222.25 cm)
Engine:					
Type	v-type, overhead valve	v-type, overhead valve	v-type, overhead valve	v-type, overhead valve	v-type, overhead valve
Number of cylinders	8	8	8	8	8
Bore	3.91 in (9.93 cm)	3.91 in (9.93 cm)	3.91 in (9.93 cm)	3.91 in (9.93 cm)	3.91 in (9.93 cm)
Stroke	3.31 in (8.41 cm)	3.31 in (8.41 cm)	3.31 in (8.41 cm)	3.31 in (8.41 cm)	3.31 in (8.41 cm)
Piston displacement	318.3 cu in, (5.217 liters)	318.3 cu in (5.217 liters)	318.3 cu in (5.217 liters)	318.3 cu in (5.217 liters)	318.3 cu in (5.217 liters)
Compression ratio	8.6:1	8.6:1	8.6:1	8.6:1	8.6:1
Compression pressure	140 psi	140 psi	140 psi	140 psi	140 psi

Table 1-1. Tabulated Data – Continued

Data	Model				
	4X4 Cargo Truck	4X2 Cargo Truck	4X4 Ambulance	4X2 Ambulance	4X4 Telephone Maintenance Truck
Horsepower	150 bhp at 4000 rpm	150 bhp at 4000 rpm	150 bhp at 4000 rpm	150 bhp at 4000 rpm	150 bhp at 4000 rpm
Torque	230 ft-lbs at 2400 rpm	230 ft-lbs at 2400 rpm	230 ft-lbs at 2400 rpm	230 ft-lbs at 2400 rpm	230 ft-lbs at 2400 rpm
Ignition timing	2° before 0	2° before 0	2° before 0	2° before 0	2° before 0
Recommended fuel 1/	Regular, leaded gasoline	Regular, leaded gasoline	Regular, leaded gasoline	Regular, leaded gasoline	Regular, leaded gasoline
Carburetor:					
Choke unloader	0.310 in	0.310 in	0.310 in	0.310 in	0.310 in
Vacuum kick	0.110 in	0.110 in	0.110 in	0.110 in	0.110 in
Fast idle speed (rpm after 500 miles; engine warm)	1500	1500	1500	1500	1500
Axle ratios	4.10:1	4.10:1	4.10:1	4.10:1	4.10:1
Allowable speeds:					
First gear	25 mph (40 kph) 2	25 mph (40 kph)	25 mph (40 kph) 2	25 mph (40 kph)	25 mph 2 (40 kph)
Second gear	45 mph (72 kph) 2	45 mph (72 kph)	45 mph (72 kph) 2	45 mph (72 kph)	45 mph (72 kph)
Reverse	9 mph (14.5 kph) 2	9 mph (14.5 kph)	9 mph (14.5 kph) 2	9 mph (14.5 kph)	9 mph 2
Drive	2/	–	2/	–	2/
Capacities:					
Fuel tank	20 gals (75.7 liters)	20 gals (75.7 liters)	20 gals (75.7 liters)	20 gals (75.7 liters)	20 gals (75.7 liters)
Crankcase:					
Without filter	5.0 qts (4.73 liters)	5.0 qts (4.73 liters)	5.0 qts (4.73 liters)	5.0 qts (4.73 liters)	5.0 qts (4.73 liters)
With filter	6.0 qts (5.68 liters)	6.0 qts (5.68 liters)	6.0 qts (5.68 liters)	6.0 qts (5.68 liters)	6.0 qts (5.68 liters)
Cooling system	18 qts (17 liters)	18 qts (17 liters)	18 qts (17 liters)	18 qts (17 liters)	18 qts (17 liters)
Differential:					
Rear	6 pts (2.84 liters)	6 pts (2.84 liters)	6 pts (2.84 liters)	6 pts (2.84 liters)	6 pts (2.84 liters)
Front (4X4 models only)	4 pts (1.89 liters)	–	4 pts (1.89 liters)	–	4 pts (1.89 liters)
Transmission	19 pts (8.99 liters)	19 pts (8.99 liters)	19 pts (8.99 liters)	19 pts (8.99 liters)	19 pts (8.99 liters)
Transfer case (4X4 models only)	9 pts (4.26 liters)	–	9 pts (4.26 liters)	–	9 pts (4.26 liters)

Table 1-1. Tabulated Data – Continued

Data	Model				
	4X4 Cargo Truck	4X2 Cargo Truck	4X4 Ambulance	4X2 Ambulance	4X4 Telephone Maintenance Truck
Tires:					
Size 3/	9.50R16.5D	9.50R16.5D	9.50R16.5D	9.50R16.5D	9.50R16.5D
Inflation pressures:					
Front	45 psi (3.16 kg/ cm^2) (309 kPa)	45 psi (3.16 kg/ cm^2) (309 kPa)	45 psi (3.16 kg/ cm^2) (309 kPa)	45 psi (3.16 kg/ cm^2) (309 kPa)	45 psi (3.16 kg/ cm^2) (300 kPa)
Rear	55 psi (3.87 kg/ cm^2) (380 kPa)	55 psi (3.87 kg/ cm^2) (380 kPa)	55 psi (3.87 kg/ cm^2) (380 kPa)	55 psi (3.87 kg/ cm^2) (380 kPa)	55 psi (3.87 kg/ cm^2) (380 kPa)
Maximum load capacity:					
Front	2030 lbs (920.8 kg)	2030 lbs (920.8 kg)	2030 lbs (920.8 kg)	2030 lbs (920.8 kg)	2030 lbs (920.8 kg)
Rear	2650 lbs (1202 kg)	2650 lbs (1202 kg)	2650 lbs (1202 kg)	2650 lbs (1202 kg)	2650 lbs (1202 kg)

1/ Type of gasoline: Designed for use with regular, leaded gas, but unleaded may be used.

2/ Maximum speeds: With the 4X4 transfer shift lever in LO and transmission in "1," the maximum allowable speed is 10 mph (16 kph). With the transfer in LO and the transmission in "2" or "D," the maximum allowable speed is 19 mph (31 kph). Higher speeds will over-rev the engine and can damage the transfer assembly.

3/ Tire size: The tire size number includes the letters "R" and "D." The "R" indicates that it is a radial tire. The "D" stands for the tire load range, which is a set of minimum test standards that has replaced the old ply-rating system. Load range "D" is a rating for a heavy-duty tire capable of carrying the maximum rated payload of the truck.

Table 1-2. Torque Specifications

Location	Ft-lbs
AXLES	
Center bearing bracket to frame bolt (7/16-14)	50
Center bearing support to bracket bolt (7/16-14)	50
Hub yoke (axle) (7/8-14)	300
Hub yoke (transmission) (3/4-16)	175
Roller bushing clamp bolt (1/4-28)	15
Roller bushing clamp bolt (5/16-24)	25
Parking brake to flange yoke nut (3/8-24)	35
Front axle shaft nut	100
Axle shaft flange nut	65
Brake support to axle nut	70
Companion flange nut (pinion nut)	260
Differential bearing cap bolt	90
Differential case half bolt	70
Housing cover capscrews	25
Ring gear capscrews	110
Front spring "U" bolt nuts	110
Rear spring "U" bolt nuts	180
Universal joint clamp capscrews	18
Wheel mounting nuts	105
BRAKES	
Wheel cylinder	
Rear wheel brake support axle housing bolt nut	35
Wheel cylinder hose	25
Rear wheel cylinder mounting bolt	15
Front wheel brake mounting bolt	55
Wheel cylinder to support plate	25
Power brake	
Power brake assembly to dash	18
Brake support plate	
Front (to steering knuckle) top attaching bolts	55
Master brake cylinder	
Master cylinder piston push rod end nut	30
Pedal bracket nut	20
Pedal shaft nut	20

Table 1-2. Torque Specifications–Continued

Location	Ft-lbs
BRAKES (CONTINUED)	
Master cylinder to dash panel or booster front cover	18
Master cylinder pedal link bolt	30
Hydraulic brake lines	
Brake line tube nuts	8
Disc brake	
Adapter mounting bolts	100
Retainer and anti-rattle spring	17
ENGINE	
Spark plugs (14mm, 3/4" reach, 0.035" gap, with gasket)	30
Exhaust pipe to manifold nuts	24
Exhaust manifold to cylinder head nuts and bolts	25
Intake manifold to cylinder head screws/nuts	35
Water pump bolts (3/8-16)	30
Fan attaching bolts (5/16-18)	18
Thermostat housing bolts (3/8-16)	30
Radiator mounting screws (3/8-16)	30
Draincock on radiator tank (1/4-NPTF)	13
SPRINGS AND SHOCK ABSORBERS	
Springs (front) (4X4)	
Shackle nut	80
Front eye bolt nut	80
Spring plate stud	105
Spring plate stud nut	110
"U" bolt nut	110
Front eye bolt	170
Springs (rear)	
Shackle bolt nut and front eye bolt	93
Shackle bolt nut and front eye bolt	160
Shackle bolt nut and front eye bolt	200
"U" bolt nut	180
Shock absorbers (front)	
Upper-bushing retainer nut (4X2)	25
Lower mounting bolt (4X2)	18
Lower shock absorber mounting nut (4X4)	55
Upper shock absorber mounting nut stud (4X4)	55

Table 1-2. Torque Specifications—Continued

Location	Ft-lbs
SPRINGS AND SHOCK ABSORBERS (CONTINUED)	
Shock absorbers (rear)	
Lower mounting nut	85
Upper mounting nut	85
Jounce bumpers	
Front jounce bumper retaining nut (4X4)	30
Rear jounce bumper to frame bolt nut	18
Rear jounce bumper bracket to frame bolt nut	18
Sway bar (4X2)	
"U" shaped bracket retaining bolt nut	23
Link bracket retaining bolt nut	18
Link bushing to spring plate bolt nut	75
STEERING GEAR	
Worm bearing preload adjuster locknut	85
Side-cover bolts	30
Sector-shaft adjusting screw locknut	25
Coupling-flange bolts	30
Coupling-flange nuts	25
Wormshaft clamp bolt	30
Steering-gear arm nut	180
Gear-to-frame bolts	50

Table 1-2. Torque Specifications—Continued

Location	Ft-lbs
SUSPENSION	
Axle housing cover	20
Ball joint nuts (4X2)	
Lower	135
Upper	135
Brake support to steering knuckle	
4X2	215
4X4	35
Companion flange nut (4X4)	210
Differential carrier cap (4X4)	80
Propeller-shaft clamping screws	15
Shock absorber lower mounting	
4X2	18
4X4	55
Steering links (4X4)	47
Strut front mounting (4X2)	50
Strut rear mounting (4X2)	85
Tie rod clamping bolt (4X2)	13
Tie rod end nuts	
4X2	40
4X4	60
Upper-control arm mounting (4X2)	70
Lower-control arm mounting (4X2)	210

1-10. Radio Interference.

NOTE

The M880, M886, M890, and M893 are not equipped with military standard electromagnetic interference components, although they do contain commercial standard SAE suppression componentry. They should not be operated within 50 feet of a vehicle with communications equipment or any ground receiver/transmitter. The unsuppressed vehicles may interfere with operation of the communications equipment.

a. Some M880-series vehicles have military radio suppression componentry (table 1-3). The parts that are affected by this are:

- Starter relay capacitor
- Distributor cap
- Distributor rotor
- Spark plug shields
- Ignition coil shield
- Spark plug and ignition coil cables
- Voltage limiter
- Fender shields
- Ground strap
- Windshield wiper motor
- Heater motor

b. When replacing these parts, make sure you use the proper replacement parts listed in TM 9-2320-266-20P.

1-11. Standard Torque Values.

Table 1-4 provides standard torque values for specific size and grade of bolts and screws used as attaching hardware for components and parts. If specific torque values are not specified in the appropriate component paragraphs, tighten the attaching hardware to the torque values of table 1-4.

Table 1-3. Radio Interference Suppression.

Vehicle	Standard SAE Commercial Suppression Componentry Only	Military Suppression Componentry Also
M880	X	
M881		X
M882		X
M883		X
M884		X
M885		X
M886	X	
M888	X	
M890	X	
M891		X
M892		X
M893	X	

Table 1-4. Standard Torque Values

Bolt or Screw Size	Threads per inch	Diameter (inch)	SAE grade 2* Torque		SAE grade 5** Torque		SAE grade 7+ Torque		SAE grade 8++ Torque	
			Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
			pounds-inch							
4	40	0.1120	5	4	8	6	11	8	12	8
4	48	0.1120	6	5	9	7	12	9	13	10
6	32	0.1380	10	8	16	12	20	15	23	17
6	40	0.1380	12	9	18	13	22	17	29	19
8	32	0.1640	19	14	30	22	36	27	41	31
8	36	0.1640	20	15	31	23	38	29	43	32
10	24	0.1900	27	21	43	32	52	39	60	45
10	32	0.1900	31	23	49	36	60	45	68	51
1/4	20	0.2500	66	49	96	75	120	96	144	108
1/4	28	0.2500	76	56	120	86	144	108	168	120
			pounds-feet							
5/16	18	0.3125	11	8	17	13	21	16	25	18
5/16	24	0.3125	12	9	19	14	24	18	25	20
3/8	16	0.3750	20	15	30	23	40	30	45	35
3/8	24	0.3750	23	17	35	25	45	30	50	35
7/16	14	0.4375	30	24	50	35	60	45	70	55
7/16	20	0.4375	35	25	55	40	70	50	80	60
1/2	13	0.500	50	35	75	55	95	70	110	80
1/2	20	0.500	55	40	90	65	100	80	120	90
9/16	12	0.5625	65	50	110	80	135	100	150	110
9/16	18	0.5625	75	55	120	90	150	110	170	130
5/8	11	0.6250	90	70	150	110	190	140	220	170
5/8	18	0.6250	100	80	180	130	210	160	240	180
3/4	10	0.7500	160	120	260	200	320	240	380	280
3/4	16	0.7500	180	140	300	220	360	280	420	320
7/8	9	0.8750	140	110	400	300	520	400	600	460
7/8	14	0.8750	155	120	440	320	580	440	660	500
1	8	1.0000	220	160	580	440	800	600	900	680
1	12	1.0000	240	170	640	480	860	660	1000	740
1-1/8	7	1.1250	300	220	800	600	1120	840	1280	960
1-1/8	12	1.1250	340	260	880	660	1260	940	1440	1080
1-1/4	7	1.2500	420	320	1120	840	1580	1100	1820	1360
1-1/4	12	1.2500	460	360	1240	920	1760	1320	2000	1500
1-3/8	6	1.3750	560	420	1460	1100	2080	1560	2380	1780
1-3/8	12	1.3750	640	460	1680	1260	2380	1780	2720	2040
1-1/2	6	1.50000	740	560	1940	1460	2780	2080	3160	2360
1-1/2	12	1.5000	840	620	2200	1640	3100	2320	3560	2660

*Head marking-none **Head marking +Head marking ++Head marking

CHAPTER 2
MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. Inspecting the Equipment.

a. Remove all materials used to protect the vehicle during shipment.

b. Make a complete visual inspection of the vehicle to see that the required publications, tools, and accessories are there.

c. Inspect the vehicle for missing parts or damage which may have occured during loading, shipment, or unloading. Inspect the engine, tires, glass panels, and instruments for damage.

d. Inspect all separately packaged kits for damage.

e. Test vehicle brakes and be sure the brake shoes don't stick to the brake drums.

f. Remove all tape and wrappings from the engine crankcase breathers, intake and exhaust openings, transmission, alternator, and brakes.

g. Check the tension on the water pump and alternator drive belt and adjust, if necessary.

h. Check the fluid level in the cooling system, fuel system, transmission, transfer, and differentials.

i. Remove wrappings from all machined surfaces and clean the surfaces to remove preservative coatings.

j. Check to see that all electrical switches are in the OFF position, and then connect the battery cables.

2-2. Servicing the Equipment.

a. Replace any missing parts if authorized by the maintenance allocation chart (MAC).

b. If necessary, drain the engine crankcase, replace the oil filter, and refill to the operating level with oil of the type specified in the lubrication order (LO).

c. Lubricate the entire vehicle in accordance with LO 9-2320-266-12.

d. Make a final, complete inspection of the entire vehicle. Look for leaks, loose or broken hoses and lines, or any other damage or unsafe condition.

Section II. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

2-3. Special Tools and Equipment.

a. Tools and equipment issued with the vehicle are listed in the basic issue items list. Refer to TM 9-2320-266-10.

b. Special tools are listed and illustrated in TM 9-2320-266-20P.

c. For maintenance and repair parts for the M887 refer to TM 9-4940-421-14 and TM 9-4940-421-24P.

2-4. Maintenance Repair Parts.

Repair parts and equipment are listed and illustrated in TM-9-2320-266-20P.

Section III. LUBRICATION INSTRUCTIONS

2-5. General.

LO 9-2320-266-12 specifies locations, intervals, and lubricants for cleaning and lubricating procedures. Whenever necessary, the operator or crew should assist in performing organizational lubrication services for the vehicle.

2-6. Special.

a. Extreme Temperatures. The LO specifies temperature ranges for the different lubricants.

b. After Fording Lubrication. The 4X4 models are designed to ford hard-bottom streams up to a depth of 16 inches. After a truck has completed a fording operation it requires a complete lubrication.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-7. General.

a. The best way to maintain vehicles covered by this manual is to inspect them on a regular basis so minor faults can be discovered and corrected before they result in serious damage, failure, or injury. This section contains systematic instructions for inspection, adjustment and correction of vehicle components to avoid costly repairs or major breakdowns. This is Preventive Maintenance Checks and Services (PMCS).

b. All vehicle shortcomings will be reported on DA 2404, Equipment Inspection and Maintenance Worksheet, immediately after the PMCS and before taking corrective action. They will also be reported in the equipment log.

2-8. Procedures.

a. Perform the PMCS at the intervals shown in Table 2-1.

Do your (S) PREVENTIVE MAINTENANCE once each 6 months.

Do your (A) PREVENTIVE MAINTENANCE once each year.

Do your (B) PREVENTIVE MAINTENANCE once each two years. (See LO 9-2320-266-12.)

b. If something doesn't work, troubleshoot it with the instructions in your manual or notify your supervisor.

c. Always do your PREVENTIVE MAINTENANCE in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

d. If anything looks wrong and you can't fix it, write it on your DA Form 2404. If you find something seriously wrong, report it to direct support maintenance RIGHT NOW.

e. Welds. Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to direct support maintenance.

f. Electric wires and connectors. Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

g. Hoses and fluid lines. Look for wear, damage and leaks and make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to direct support maintenance.

h. It is necessary for you to know how fluid leakage affects the status of your vehicle. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your vehicle. Learn, then be familiar with them and REMEMBER – WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR!

Leakage Definitions for PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consideration must be given to the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor!

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

Class III leaks should be reported to your supervisor or direct support.

2-9. Special Instructions.

a. When you do your PREVENTIVE MAINTENANCE, take along the tools you will need to make all the checks. Take along a rag, you'll always need at least one.

WARNING

Dry cleaning solvent, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of this solvent is 138°F., 59°C.

b. Keep it clean. Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (SD-2) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

c. Bolts, nuts, and screws. Check them all for obvious looseness, missing, bent or broken condition. You can't try them all with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it, or report it to direct support maintenance if you cannot tighten it.

MEMORY JOGGER

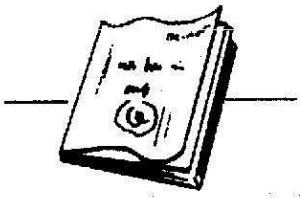
BEFORE STARTING YOUR PMCS

MAKE SURE

YOU HAVE EVERYTHING YOU NEED.

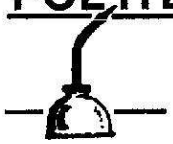
Here are some things you might need

PUBLICATIONS



TM 9–2320–266–10
TM 9–2320–266–20
TM 9–2320–266–20P
LO 9–2320–266–12
LOG BOOK

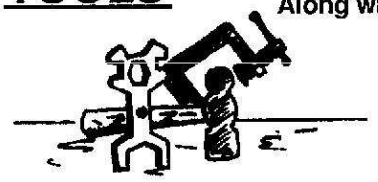
POL ITEMS



Check your lube order and make sure you have all lubricants you'll need.

TOOLS

Along with your Automotive Mechanics Tool Set, you may also need:



Tire depth gage	Tachometer
Tire pressure gage	Fuel pump pressure gage
Clean rags	Timing Light
Drain pan	Compression gage
Antifreeze tester	Torque wrench
Grease gun	Multimeter

Table 2-1. Preventive Maintenance Checks and Services (PMCS)

S – 6 months or 6,000 miles A – 12 months or 12,000 miles

Item no.	Interval S	Interval A	Item to be inspected Procedure
1	*	*	Cooling System Inspect radiator core, hoses, cap, and gaskets. Check core for clogging or bent fins. Observe coolant level. If required, drain radiator and cylinder block, and flush and refill cooling system. Add rust inhibitor unless antifreeze containing a rust inhibitor is used.
2	*	*	Windshield Washer Reservoir Check operation of windshield washer. Nozzles should be adjusted so that the impact of washer solution is within the wiper pattern area.
3	*	*	Battery Check the charge indicator on top of the battery. Test battery only after the engine has been stopped for 5 minutes or more. Inspect cables and clamps for tightness and condition.
4	*	*	Fan and Alternator Inspect pulleys for alinement. Check belt for proper tension (1/2 to 3/4 inch deflection when you press down firmly). Inspect the water pump for leaks.
5	*	*	Alternator and Wiring Check for loose wiring connections or worn insulation. Check security of alternator mounting.
6	*	*	Air Intake System WARNING If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instruction. Check to see that the air cleaner and hose are secure. Inspect hose for damage. Check air cleaner element for contamination, and clean or replace as necessary.
7	*	*	Fuel System Inspect engine compartment and underside of vehicle for leaks. Check lines and connections for damage. Replace in-line fuel filter every 12,000 miles or 12 months, which ever comes first.
8	*	*	Starter and Switch Listen to starter for any unusual noise. Notice if starting motor engages smoothly and turns engine at normal cranking speed.
9	*	*	Linkage and Lines Inspect carburetor and throttle linkage and lines. Observe if throttle valves open fully. Make an engine vacuum test and adjust carburetor mixture (paragraph 2-16., b., c.). Test fuel pump pressure (paragraph 2-17). Examine fuel lines and connections for evidence of leaks. Examine ventilation lines for loose connections.
10	*	*	Exhaust System Listen for loud or unusual noises and look for exhaust leaks. Tighten exhaust manifold mountings if you observe leakage. Inspect muffler and exhaust pipe for damage.
11	*	*	Oil Filter Check condition of oil. If necessary, change oil and replace oil filter.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) – Continued

Item no.	Interval S	Interval A	Item to be inspected Procedure
12	*	*	Ignition System If engine performance is satisfactory and shows no loss of power, misfire, or excessive exhaust smoke, only a visual inspection of the ignition system must be made. If loss of power, misfire, or excessive exhaust smoke is noted, isolate the difficulty by troubleshooting. **NOTE** Spark plugs must be changed after 18,000 miles of service. Normal periodic maintenance is not required on the electronic ignition system distributor. However, ignition system tests should be made when spark plugs are changed.
13	*	*	Engine Performance In starting and warming the engine, observe if it starts easily and if the action of the throttle is satisfactory. Notice if idling speed is correct. Listen for any unusual noises at idle and higher speeds. When operating vehicle, notice if it has normal power and acceleration in each speed range. Listen for any unusual noises when engine is loaded down.
14		*	Compression Test Compression test the engine (paragraph 2-12c). The readings should all be over 100 psi, and there should be no more than 40 pounds difference between the highest and lowest cylinder.
15	*	*	Instruments Check fuel gage, alternator indicator, speedometer, oil pressure gage, and temperature gage for normal readings. Notice if ignition switch operates freely. Check other controls for normal operation.
16	*	*	Safety Devices Depress horn button to sound horn and determine if signal is normal (if tactical situation permits). Test windshield wipers for satisfactory operation. Examine rear view mirror and reflectors. Examine doors for secureness. Check seat belts; if worn or frayed, replace. Try on the seat belt, test the buckle, make sure it doesn't pop open with a little pressure. Seat belt must be firmly anchored. Check fire extinguisher (if so equipped).
17	*	*	Service Brake System Check the fluid level at the master cylinder. Check the condition of the front brake pads and rear brake shoes; replace if necessary. Check pad clearance (0.005 inch or less from rotor) at 12,000 miles. Check disk brake adapter mounting bolts for proper torque specification (Table 1-2).
18	*	*	Parking Brake Check to determine if the parking brake foot lever holds. The lever should require no more than three-quarters travel for full application. Stop vehicle on an incline and apply parking brake to see if it holds the vehicle.
19	*	*	Steering System Check for binding. Examine steering column and wheel. Inspect for damage seals. Check steering box for leaks. Check the rod ends for looseness. Inspect to determine if steering stops are damaged or missing. If damaged or missing notify direct support maintenance.
20	*	*	Tire Rotation Inspect tires for uneven tire wear. If worn unevenly, rotate tires (paragraph 2-76.a).
21		*	Wheel Alinement Schedule a full wheel alinement with Direct Support.

Table 2-1. Preventive Maintenance Checks and Service (PMCS) - Continued

Item no.	Interval S	Interval A	Item to be inspected Procedure
22		*	Transmission Note operation through all drive selections. Pay particular attention to the ease of shifting. Listen for unusual noises, and inspect for signs of malfunction or lubricant leakage.
23		*	Transfer (4X4) models only) Check operation of transfer in all output combinations. Check ease of shifting. Listen for unusual noises, and inspect for signs of malfunction or lubricant leakage. **NOTE** Transfer case lubricant is drained by removing the lowest bolt at the bottom of the rear cover of the front output. This bolt is on the same side of the cover as the fill plug.
23.1	*	*	Transfer (4x4 models only) Check transfer case oil level semiannually. Maintain oil level at the bottom of the filler hole. Drain and refill every 24,000 miles or biennially which ever occurs first. See LO 9-2320-266-12.
24	*	*	Suspension Make certain the axles are installed correctly. Inspect seals for damage. If damaged, inspect wheel bearing grease for contamination. Inspect for worn rubber bushings. Check upper and lower ball joints for wear. Make certain suspension arms are not damaged. Inspect for damaged springs. Check shock absorbers and brackets for damage. Check for leaks. Inspect rubber insulators for excessive wear.
25	*	*	Propeller Shafts and "U" Joints Inspect for loose bearings, damaged seals, and damaged lubricant fittings. Inspect for looseness of bolts and tighten as required.
26		*	Body with Frame Accessories Make general inspection of body including glass, doors, panels, top, fenders, brackets, and fasteners. Inspect seat frames and upholstery. Examine condition of paint and markings. Check caution, identification, and name plates for legibility.
	*	*	Thoroughly inspect for evidence of corrosion damage, surface color change, surface separation, seam separation, blistered paint, rust-through, or other evidence of damage. Refer to TB 43-0213.
27	*	*	Towing Pintle Check operation of pintle hook. Check mounting bolt for tightness.
28		*	Bumpers Inspect front and rear bumpers for looseness or damage.
29	*	*	Lights and Reflectors Check operation of lights and light switches. Check for damaged reflectors.
30	*	*	Lubrication Lubricate in accordance with the intervals in LO 9-2320-266-12.
31	*	*	Final Road Check Perform final road test. Pay special attention to items which have been repaired or adjusted.

Section V. TROUBLESHOOTING

2-10. Scope.

This section contains information for locating and correcting many of the troubles which may develop in the truck. Testing procedures for most systems and components are included in the maintenance paragraphs for the system or component affected. The "trouble trees" (figures 2-1 through 2-5) in this section are designed as a quick-reference diagnostic guide.

2-11. Troubleshooting Procedures.

a. Isolating the Defect. When troubleshooting the truck, the first thing to do is to identify the system or component where the malfunction is most likely to be located. If you are not sure what the malfunction is, or if the malfunctioning system is not known, question the driver to obtain as much information as possible about malfunctions he has observed. The greater number of problems you can identify, the easier it will be to identify and correct the defect. After you have isolated the defect, refer to the trouble trees.

b. Organization of the Trouble Trees. The trouble trees are organized, as far as possible, into the sequence which is most likely to locate and correct malfunctions with a minimum of testing.

c. Using the Trouble Trees. To use the trees, first locate the tree for the malfunctioning system (engine, charging system, suspension, etc.). Then find the trouble symptom (engine will not crank, etc.). Finally, check the test/malfunction listed for that trouble symptom (Test compression, etc.) until you find the solution to the problem. Always perform all applicable tests before replacing a component.

d. Malfunctions Not Listed. This manual cannot list all malfunction that may occur, nor all tests or inspections, and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor.

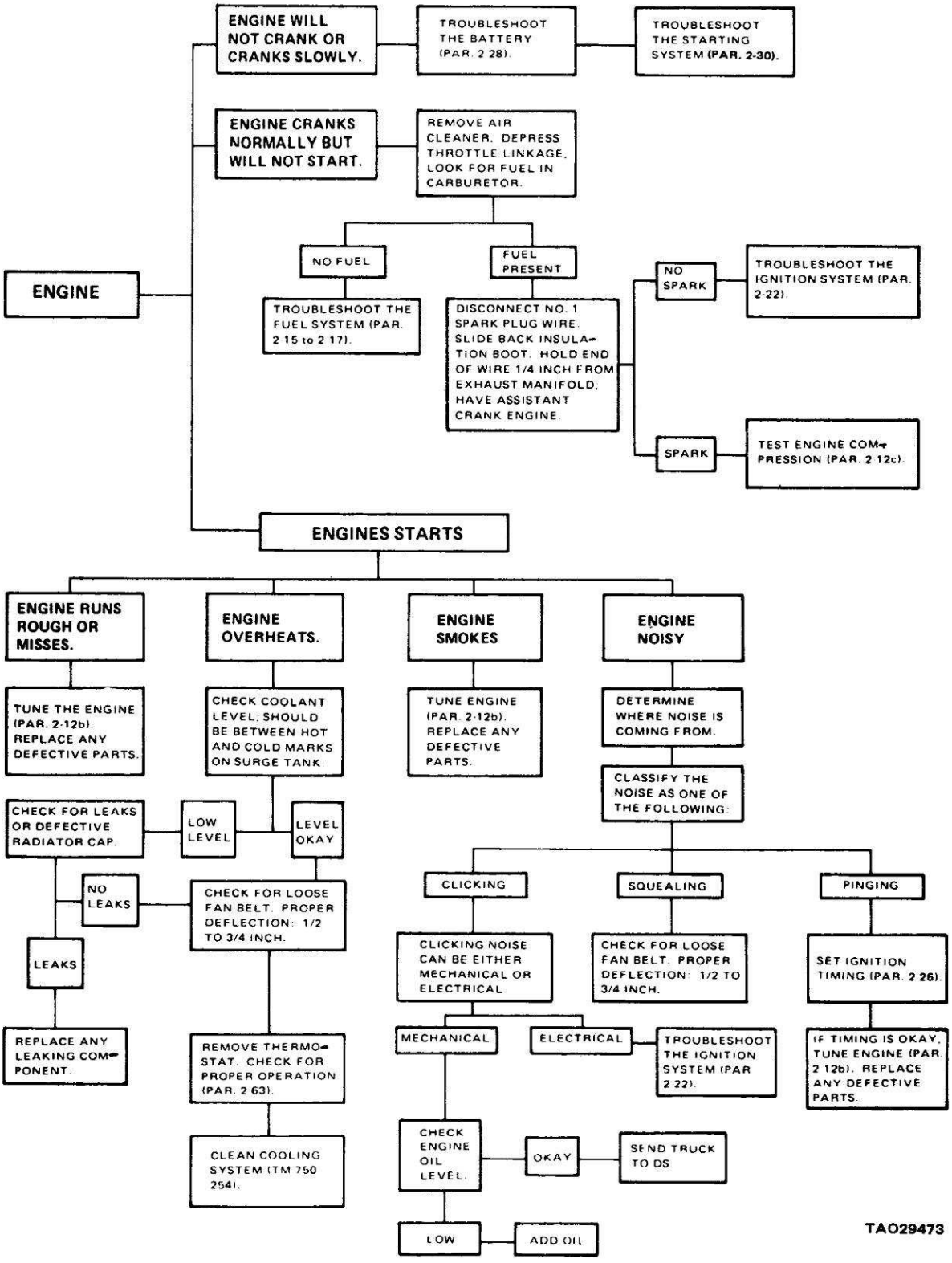


Figure 2-1. Troubleshooting the Engine.

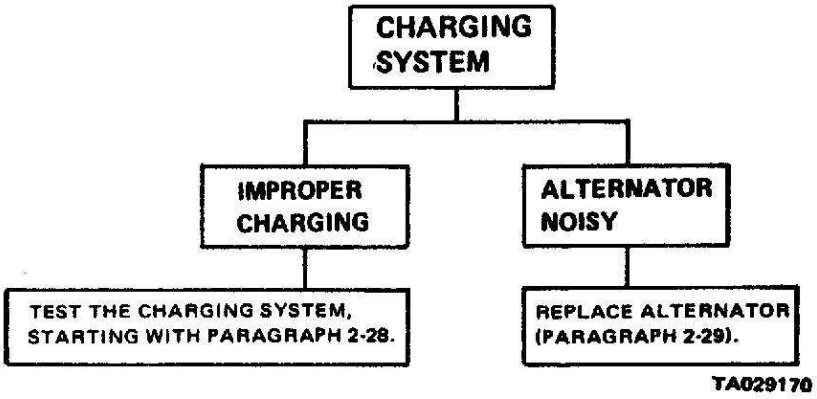


Figure 2-2. Troubleshooting the Charging System.

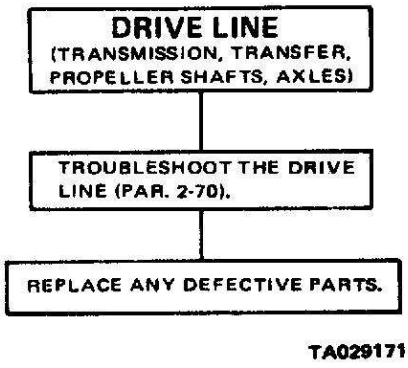


Figure 2-3. Troubleshooting the Driveline.

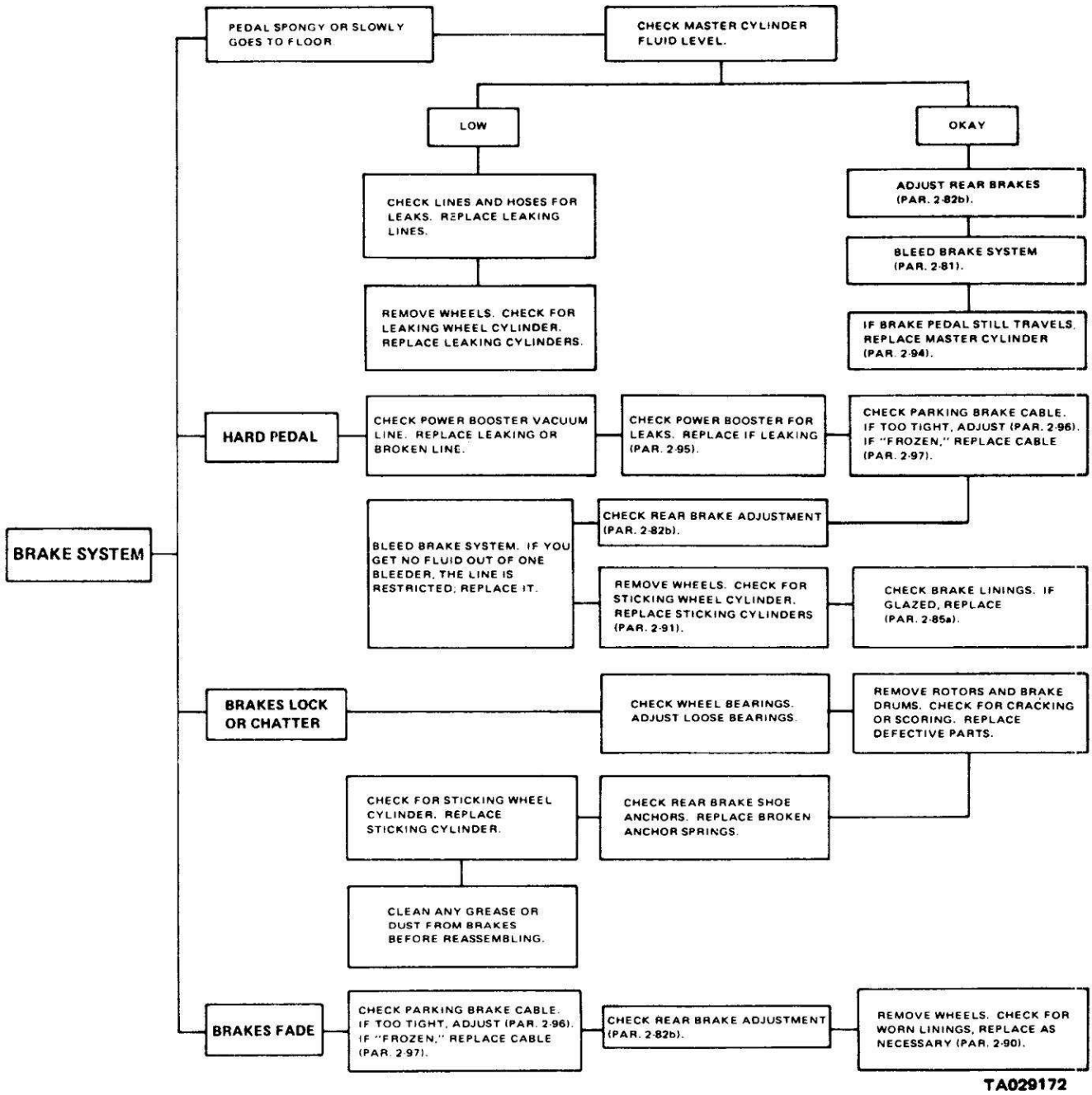


Figure 2-4. Troubleshooting the Brake System.

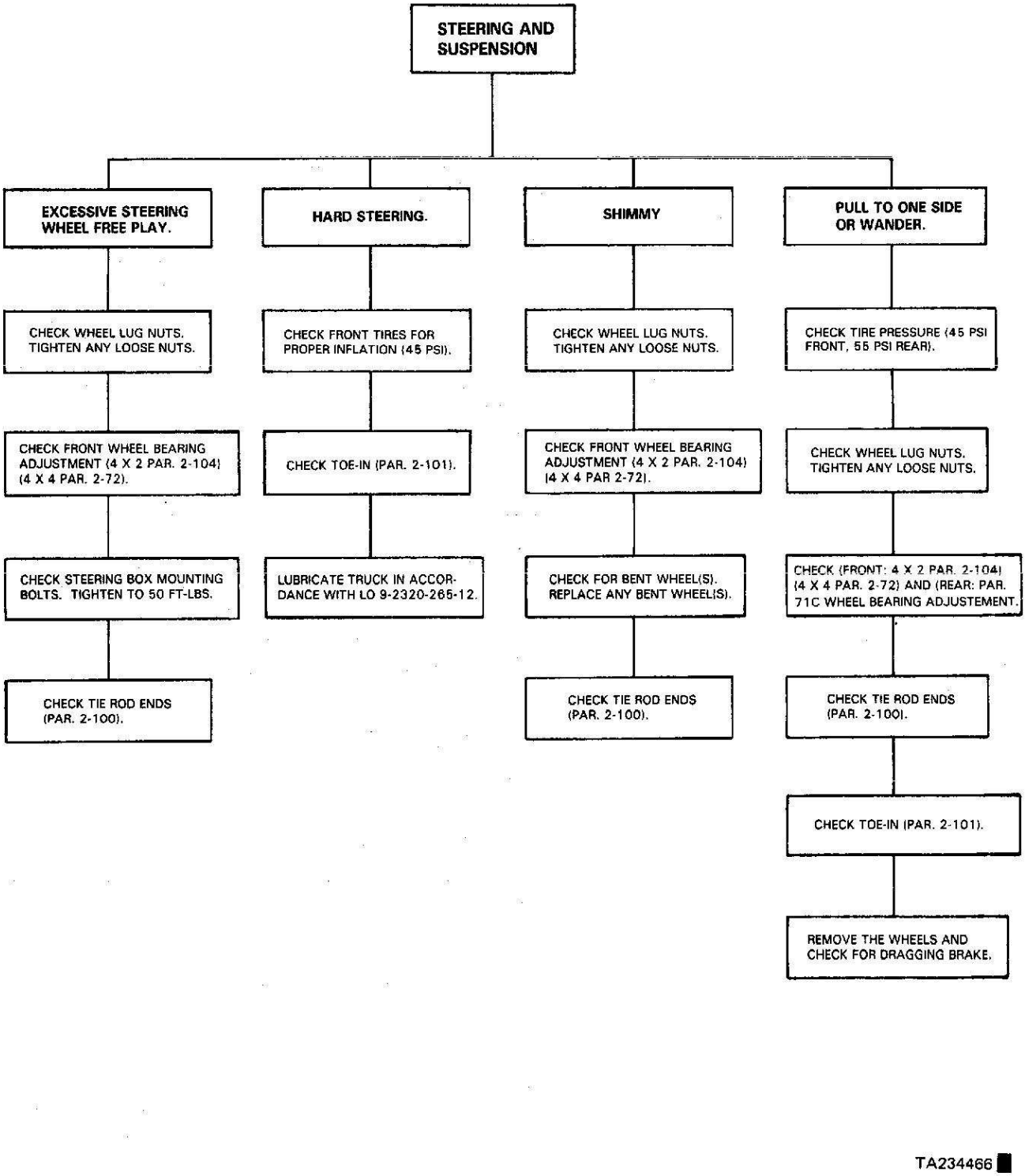


Figure 2-5. Troubleshooting the Steering and Suspension Systems.

Section VI. MAINTENANCE OF ENGINE

2-12. Tune-Up Procedures.

a. General. The V-8 engine in this truck is equipped with an electronic ignition system that has no breaker points or condenser. A dwell meter cannot be used to test the ignition system. A tachometer may be used in the normal manner to measure engine rpm. The following tune-up and inspection procedures will keep the engine operating at peak performance.

b. Engine Tune-Up.

(1) Test the compression at each cylinder (c, below).

(2) Check the distributor cap for corrosion and cracks. Replace the cap, if necessary.

(3) Inspect all wiring for poor insulation, loose connections, or broken wires.

(4) Check the timing with a timing light (paragraph 2-26).

(5) Clean the carburetor and oil breather air cleaners.

(6) Check the PCV valve (LO 9-2320-266-12). Replace the valve, if necessary.

(7) Test the vacuum at the intake manifold (paragraph 2-16).

(8) Adjust the carburetor (paragraph 2-16).

(9) Set the accelerator pump linkage as follows:

- Hot weather: short stroke hole
- Normal weather: center hole
- Cold weather: long stroke hole

c. Compression Test. If any cylinders read less than 100 psi, or if there is more than 40 psi difference between the highest and the lowest reading, discontinue the tune-up. Low readings in adjacent cylinders may indicate a blown head gasket. Low compression readings in all cylinders generally mean that the valves, pistons, or piston rings need repair. In either case, the truck needs Direct Support servicing. Compression test procedure is as follows:

(1) Make sure the battery is fully charged (green dot visible in the charge indicator on top of the battery).

(2) Check the engine oil level and add oil, if necessary.

(3) Put the transmission in Neutral and apply the parking brake.

(4) Start the engine and bring it up to normal operating temperature.

(5) Turn the engine off, remove both connectors from the ballast resistor.

(6) Remove all spark plugs.

(7) Install the compression gage in the number one cylinder. Relieve all pressure on the gage.

(8) While holding the throttle open, crank the engine for eight revolutions. Record the gage reading.

(9) Repeat steps 7 and 8 for the remaining seven cylinders.

(10) Clean and reset the spark plugs (0.035 inch). Install new spark plugs, as necessary.

2-13. Crankcase Ventilation System.

The truck's engine has a fully closed crankcase ventilation system. Air is drawn in from the air cleaner through a hose, and is then circulated throughout the engine. It passes through the cylinder head cover and the positive crankcase ventilation (PCV) valve into the combustion chamber by engine vacuum. It is burned in the combustion chamber and then scattered with the exhaust gases (see figure 2-6).

NOTE

Never clean the PCV valve. If it is not operating properly, replace it.

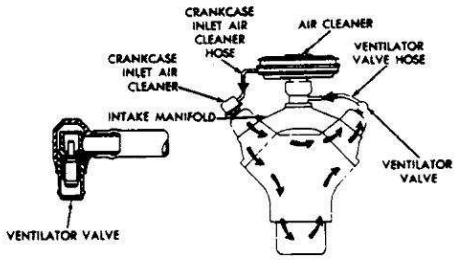


Figure 2-6. Crankcase Ventilation System.

2-13.1. Cylinder Head Covers (Valve Covers).

a. Disconnect the PCV valve.

b. Disconnect the oil breather.

c. Remove the attaching bolts from the valve covers.

d. Remove valve covers.

e. Clean the gasket surfaces of the valve covers and the cylinder head.

f. Using a new gasket, reverse the above procedure to reinstall the valve covers.

Section VII. MAINTENANCE OF FUEL SYSTEM

2-14. General.

The fuel system consists of the fuel tank assembly, a fuel pump, two fuel filters, a carburetor, and fuel and vacuum lines. The fuel tank assembly consists of the fuel tank, a filler tube, a fuel gage sensor assembly, and a pressure-vacuum filler cap.

WARNING

Always disconnect the battery ground cable at the negative terminal of the battery before removing and replacing fuel system components.

2-15. Fuel Tank Replacement.

WARNING

Prior to removal of the fuel tank, disconnect ground battery cable. Keep a CO_2 fire extinguisher nearby.

a. Removal.

(1) Disconnect battery cable.

(2) Remove fuel tank filler cap (tank could be under pressure).

(3) Pump all fuel from fuel tank into an approved holding tank.

(4) Raise vehicle or hoist and disconnect all vent hoses and filler hose. Remove the vent hoses from hose routing bracket attached to the top of the frame rail.

(5) Remove the nut from the outboard end of center retaining strap and allow strap to hang free.

(6) Place a transmission jack, centrally, under the fuel tank and apply slight pressure to hold position.

(7) Remove the nuts from the outboard ends of the two remaining straps and lower tank far enough to allow the gauge wire and fuel line to be disconnected from the gauge unit on top of the tank. Then lower tank further and remove from under vehicle.

b. Installation.

(1) Place fuel tank on top of transmission jack and raise high enough to connect the fuel tank line and gauge wire to the gauge unit on top of the tank.

(2) Raise fuel tank into position in cross-members and connect the two end retaining straps. Remove transmission jack and connect the center strap. Tighten all three straps firmly. Do not over tighten retaining strap nuts.

(3) Install vent hoses in hose routing bracket attached to top of frame rail.

(4) Connect vent hoses.

(5) Connect filler hose to adapter at back of cab.

(6) Connect fuel line if it was disconnected to drain fuel tank.

(7) Refill fuel tank and replace fuel tank filler cap. Inspect all hoses and lines for leaks.

(8) Connect battery cable.

2-15.1. Fuel Filters and Lines.

a. Filters. One of the fuel filters is part of the fuel gage sensor assembly inside the fuel tank on the end of the fuel suction tube. This filter does not normally need servicing, but can be replaced, if necessary. The other filter is a sealed, disposable paper unit located inside the engine compartment just after the fuel pump.

b. Lines. The fuel lines consist of a formed metal line from the rubber connector at the fuel tank to the right frame rail just after the muffler; a flexible coupling around the outside of the frame; a metal tube that runs forward to the engine compartment; and a flexible tube from the engine compartment to the fuel pump. Formed metal tubes carry the fuel from the fuel pump to a flexible filter connector hose and from the filter outlet connector hose to the carburetor. When servicing fuel lines, check all fittings for signs of leakage. Also, check all of the hoses. If leakage is found at a metal-to-metal fitting, tighten the fitting and wipe it dry. Then run the engine for several minutes and check for continued leakage. If the fitting still leaks, replace the metal line. If you find leakage at a flexible hose connection, replace the hose.

2-16. Servicing the Carburetor and Intake Manifold.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

a. Checking or Replacing the Air Filter. Remove the top of the carburetor air cleaner. Take out the filter element and hold a drop light inside it. If you cannot see light through at least 50 percent of the filter, replace it. If you can see light through more than 50 percent of the filter, clean the filter by blowing air from an air hose through the filter. Direct the air from the inside toward the outside of the filter. Be sure to leave at least 2 inches between the air hose nozzle and the filter element.

b. Checking the Intake Manifold for Leaks. Remove the threaded plug to the brake booster from the top of the intake manifold. Screw in the vacuum gage adapter. Attach the vacuum gage to the adapter and start the engine (figure 2-7). With the engine at idle (750 rpm), the vacuum should be at least 17 inches. If not, tighten carburetor nuts alternately, a little at a time, to compress gasket evenly. Do not overtighten. Tighten intake manifold attaching screws to 25 ft-lbs., using tightening sequence shown in figure 2-6.1. Then tighten screws in same sequence to 35 ft-lbs. If leaks still exists, tighten carburetor nuts one-half turn more.

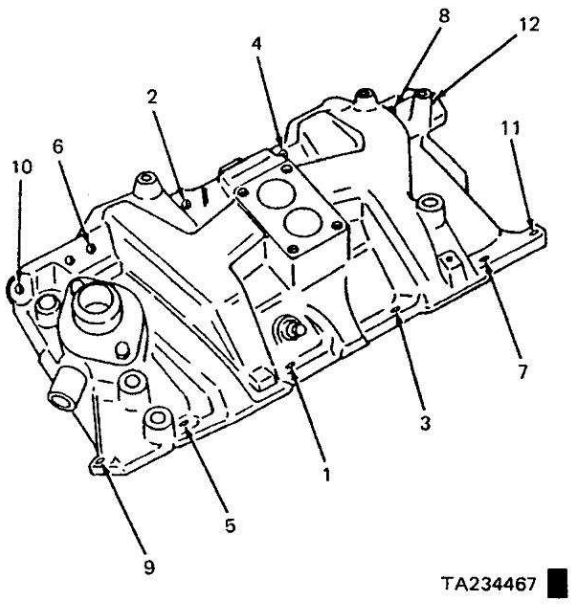


Figure 2-6.1. Intake Manifold Tightening Sequence.

c. *Adjusting Idle Speed and Fuel Mixture.* Refer to figure 2-8.

NOTE

Many problems that seem to stem from the fuel system can actually be the result of other, simpler problems. Look for loose, maladjusted, or deficient engine and electrical components. A disconnected or leaking vacuum hose can also produce symptoms that seem like carburetor malfunctions.

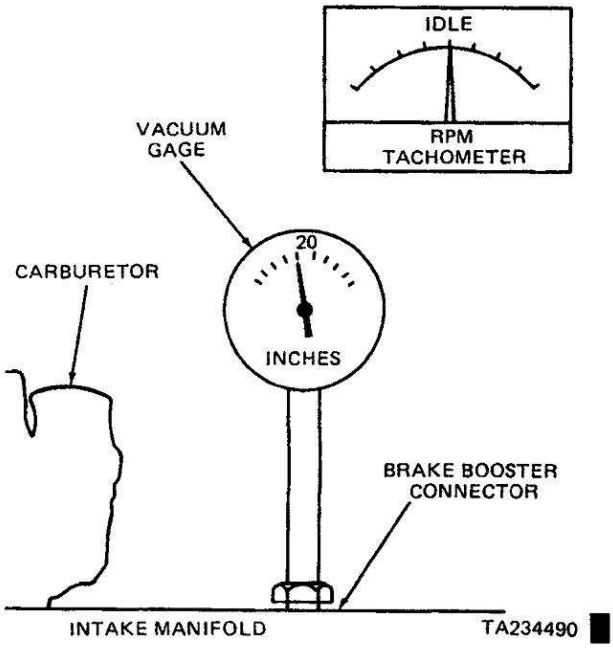


Figure 2-7. Engine Vacuum Test.

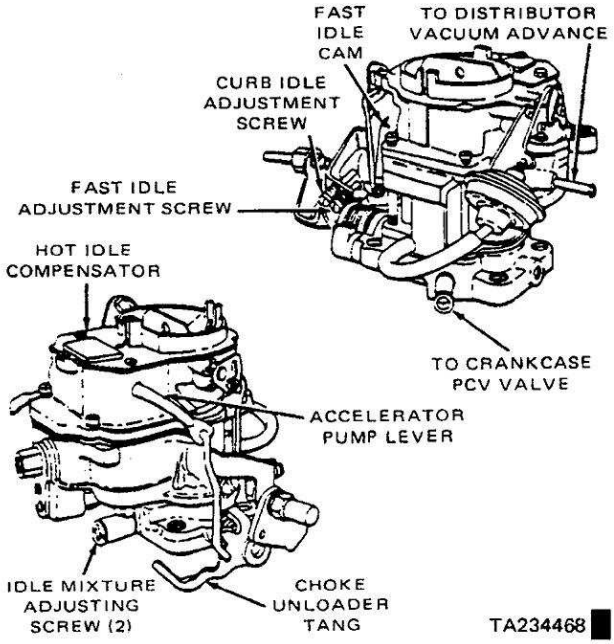


Figure 2-8. Elements of the Carburetor.

(1) Thoroughly warm up the engine. Then stop the engine.

(2) Remove the plastic caps from the two idle mixture screws at the base of the carburetor.

(3) Install the tachometer by using the following procedure. Refer to figure 2-9.

(a) Construct an adapter as described in figure 2-9.

(b) Disconnect the spark plug wire from the No. 1 spark plug on the left front cylinder.

(c) Slip the push-on terminal of the adapter on the No. 1 spark plug.

(d) Slip the end of the adapter with the metal band or cap into the end of the No. 1 spark plug wire.

(e) If you are using a split sleeve tachometer, clamp the inductive pick-up lead around the insulated part of the adapter. If you are using a military tach-dwell with a non-inductive alligator pick-up lead, clamp the lead directly to the bare metal terminal of the adapter.

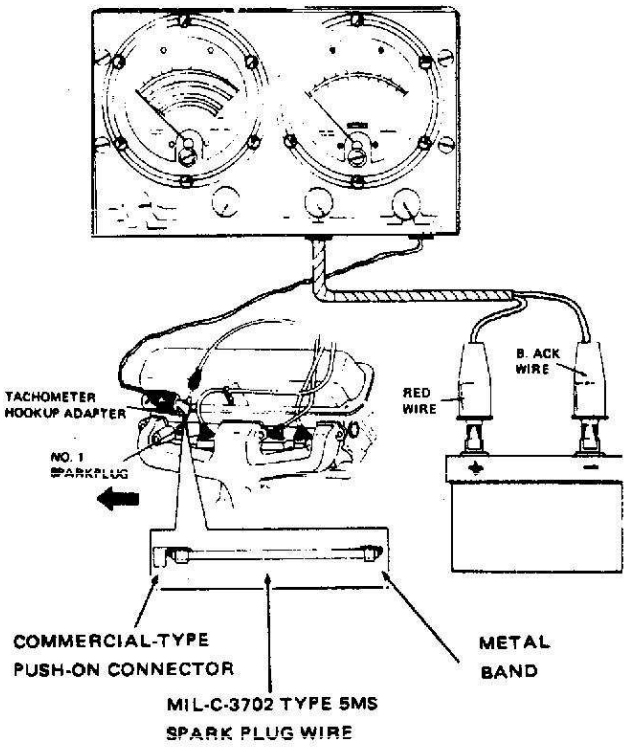
(f) Clamp the timing light pick-up lead directly to the bare metal of the push-on terminal on the adapter.

(4) Turn the two idle mixture screws clockwise with a screwdriver until they are both seated.

NOTE

DON'T over tighten the mixture screws as damage could result to the seat or needle valve.

(5) Turn both idle mixture screws exactly 1-1/2 turns



Construction Details:

1. Strip 1/2 inch of insulation from each end of a 6 inch length of MIL-C-3702 type 5MS spark plug wire.

2. Bend the exposed wires back over the insulation.

3. On one end, crimp a commercial-type, push-on spark plug wire terminal. On the other end, crimp a metal band or cap which will slip snugly into a push-on type spark plug wire terminal.

TA029420

Figure 2-9. Tachometer Hook-Up.

counterclockwise as a starting point.

(6) Start the engine and set the idle speed at 750 rpm, using the curb idle adjusting screw.

(7) Using the idle enrichment screws, adjust the fuel mixture as follows:

NOTE

Both of the idle enrichment screws must be turned in identical, small amounts (about 1/16 of a turn). More than 1/16 of a turn at a time can cause drastic changes in the fuel mixture, and not turning the idle enrichment screws the same number of turns will cause unbalance between the two barrels of the carburetor.

(a) Turn the idle enrichment screws in (clockwise) until the engine rpm drops to 700 rpm.

(b) Turn the idle enrichment screws out (counterclockwise) until the engine rpm increases. Continue turning them out until you pass the maximum attainable rpm, then turn them back to the maximum rpm.

NOTE

If engine speed goes above 875 rpm during step 7, turn it back down to 750 rpm, using the curb idle adjusting screw, before completing the step.

(c) Using the curb idle adjusting screw, set the engine idle speed back to 750 rpm.

(c.1) Check fast idle setting. Adjust by closing choke valve until fast idle screw can be positioned on second step of fast idle cam. Engine should be at 1500 rpm. Adjust fast idle screw in or out to obtain 1500 rpm.

(d) Stop the engine, disconnect the tachometer, and road test the truck.

d. Removing the Carburetor. Remove the carburetor in accordance with the following procedure:

WARNING

Allow the engine to cool until the exhaust manifold is cool to the touch before you remove the carburetor. Fuel spilling on to a hot manifold can ignite and cause serious injury.

(1) Disconnect the battery ground cable at the negative terminal of the battery.

(2) Remove the air cleaner.

(3) Remove the fuel tank filler cap to release any pressure.

(4) Put a small container under the carburetor inlet fitting to catch any fuel that may be trapped in the fuel line.

(5) Disconnect the fuel inlet line. Use two wrenches to avoid twisting the line.

(6) Disconnect the throttle linkage, choke linkage, and distributor vacuum advance hose from the carburetor body.

(7) Remove the carburetor mounting bolts or nuts and carefully remove the carburetor from the engine compartment. Hold the carburetor level to avoid spilling fuel from the fuel bowl.

e. Installing the Carburetor. Make sure the mating surfaces of the carburetor and the intake manifold are clean and free of nicks, burrs, or other damage. Then follow this procedure:

(1) Match up the holes on a new flange gasket to the holes on the bottom of the carburetor. Place the new gasket on the manifold surface. Matching the holes prevents installing the gasket upside down or backwards.

(2) Carefully place the carburetor on the manifold. Be sure not to trap the choke rod under the carburetor linkage.

(3) Install the carburetor mounting nuts and tighten them alternately, a little at a time, to compress the flange gasket evenly. Do not overtighten.

(4) If vacuum leak is found, tighten nuts one-half turn more.

(5) Connect the throttle and choke linkages, and the fuel inlet line. Look carefully for worn or loose connections.

(6) Install the distributor vacuum advance hose.

(7) Operate the choke plate to make sure it opens and closes fully. Also, make sure you can get full throttle travel.

(8) Clean or replace the air filter in accordance with *a*, above. Install the air cleaner.

(9) Reconnect the battery cable. Set the idle speed and fuel mixture in accordance with c, above.

(10) Test for leakage between the carburetor and the intake manifold in accordance with *b*, above.

2-17. Servicing the Fuel Pump and Fuel Filter.

a. Pressure Test.

(1) Connect a tachometer and start the engine. Make sure it is idling at 750 rpm, then stop the engine and disconnect the tachometer.

(2) Remove the fuel line at the carburetor.

(3) Connect a pressure gage to the disconnected fuel line (figure 2-10).

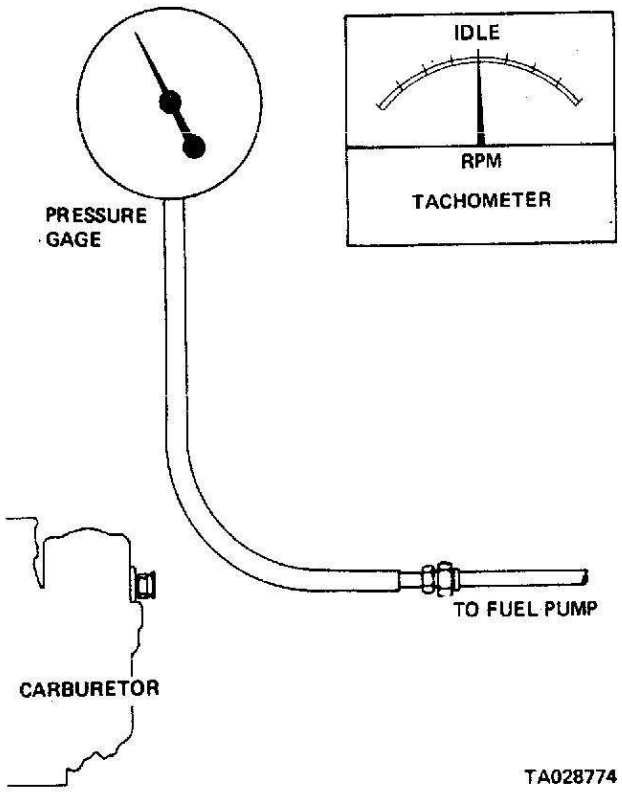


Figure 2-10. Pressure Testing the Fuel Pump.

(4) Start the engine and let it idle for a few seconds, or until the pressure reading settles out. The gage should read 5 pounds. If it reads lower than 3 pounds or higher than 7 pounds, replace the pump.

NOTE

If the engine will not start, just crank it.

(5) Stop the engine. The reading should remain constant or return to zero slowly. If it drops to zero rapidly or instantaneously, replace the pump.

b. Volume Test.

(1) Disconnect the fuel line at the carburetor and insert it into a rubber hose. Insert the other end of the rubber hose into a container. The container should hold at least 1½ quarts and should be marked at the 1 pint level.

CAUTION

Make sure the container is away from the engine fan.

(2) Start the engine and allow it to idle. The fuel pump should take 30 seconds or less to pump 1 pint of fuel into the container.

(3) If it takes longer, disconnect the fuel line before the fuel filter, and repeat the test.

(4) If the fuel pump still does not pump at least 1 pint within 30 seconds, replace it. If it does pump at that rate, replace the fuel filter (*e*, below).

c. Removing the Fuel Pump.

(1) Disconnect the battery ground cable at the negative terminal of the battery.

(2) Disconnect the inlet and outlet fuel lines from the fuel pump (see figure 2-11).

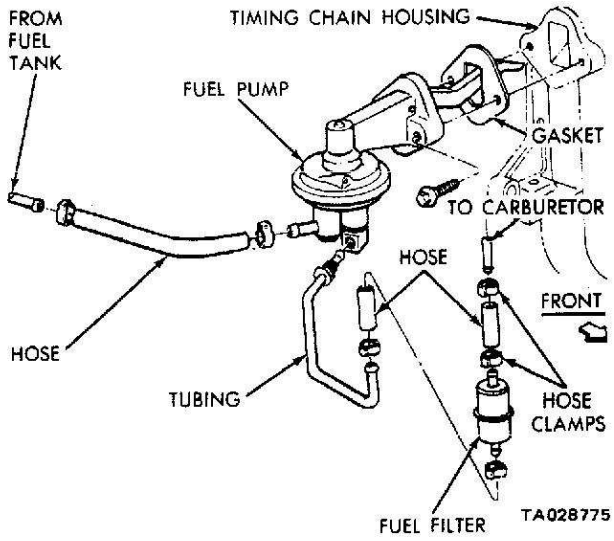


Figure 2-11. Fuel Pump Connections.

(3) Remove the fuel pump mounting bolts.

(4) Remove the fuel pump.

d. Installing the Fuel Pump.

(1) Make sure the mating surfaces of the fuel pump and the engine are free of dirt, old gasket material, burrs, or scratches.

(2) Place the fuel pump and gasket in position against the block and attach them by tightening the mounting bolts alternately.

(3) Reconnect the fuel lines.

(4) Reconnect the battery ground cable at the negative terminal of the battery and start the engine. Check for fuel or oil leakage while the engine idles.

e. Replacing the Fuel Filter.

(1) Disconnect the ground cable at the negative terminal of the battery.

(2) Remove the engine compartment fuel filter, including both flexible hose couplings, and discard it.

(3) Install a new filter with new flexible hose couplings and tighten the clamps.

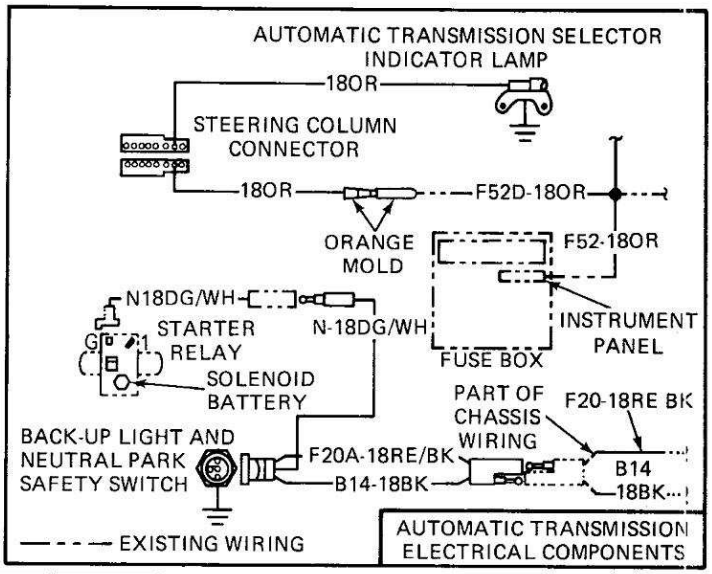
(4) Reconnect the negative battery cable and run the engine for a few minutes to check for fuel leakage.

Section VIII. TESTING ELECTRICAL SYSTEMS

2-18. General Information.

Use the wiring diagrams in figures 2-12, 2-12.1, 2-12.2 and 2-12.3 for general troubleshooting procedures on the truck.

COLOR CODE			
BK	BLACK	OR	ORANGE
BN	BROWN	PK	PINK
DB	DARK BLUE	RE	RED
LB	LIGHT BLUE	TN	TAN
BL	BLUE	PU	PURPLE
DG	DARK GREEN	GR	GRAY
LG	LIGHT GREEN	WH	WHITE
GN	GREEN	YE	YELLOW
WIRES WITH TRACERS TYPICAL EXAMPLES			
BK/WH	BLACK WIRE WITH WHITE TRACER	YE/BK	YELLOW WIRE WITH BLACK TRACER



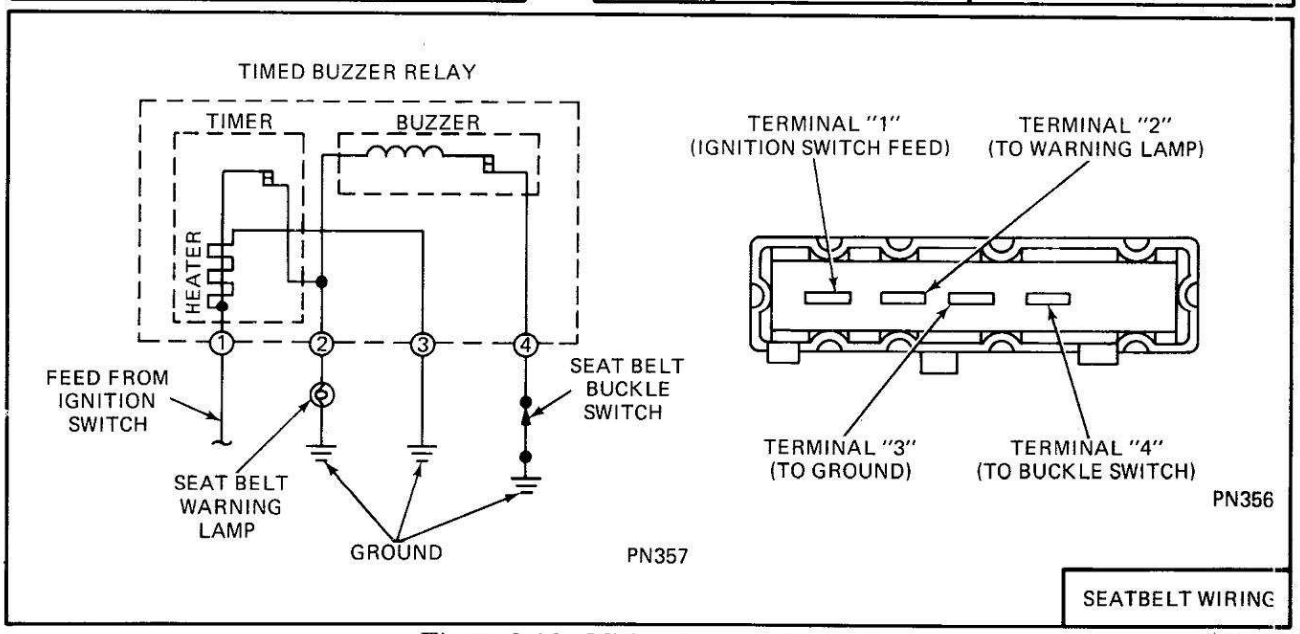


Figure 2-12. Wiring Diagram (1 of 5)

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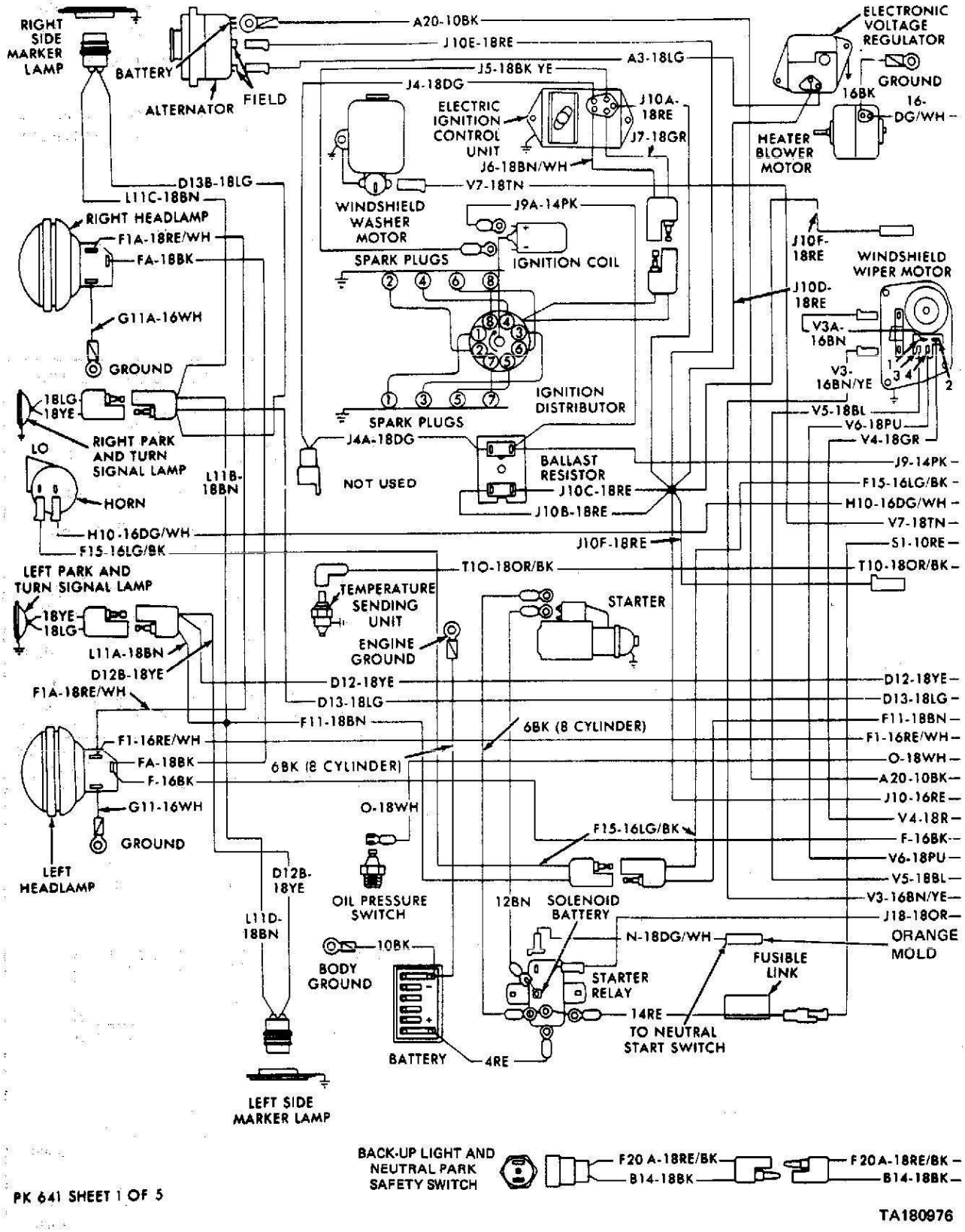

Figure 2-12. Wiring Diagram (2 of 5)

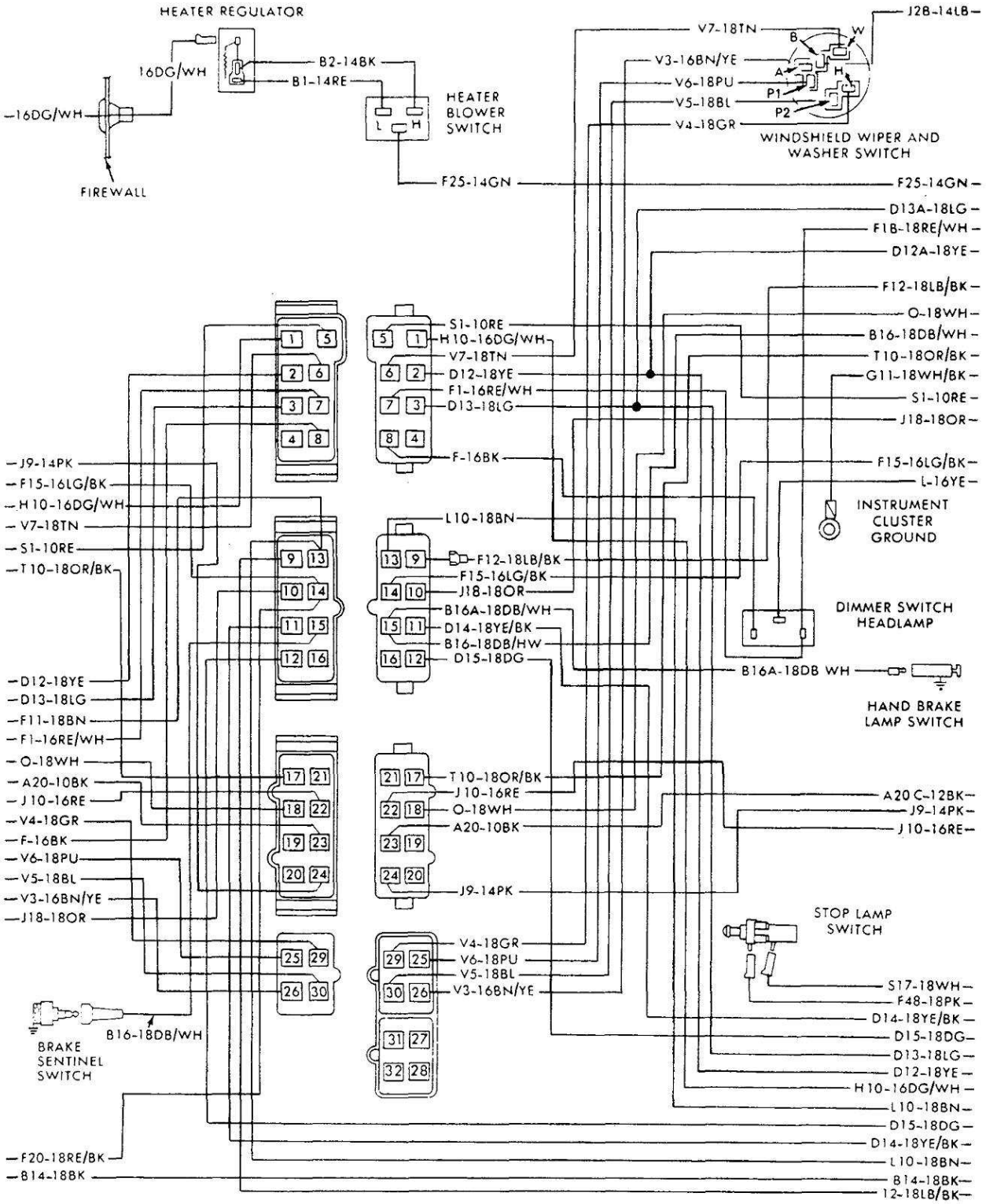

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Figure 2-12. Wiring Diagram (3 of 5)

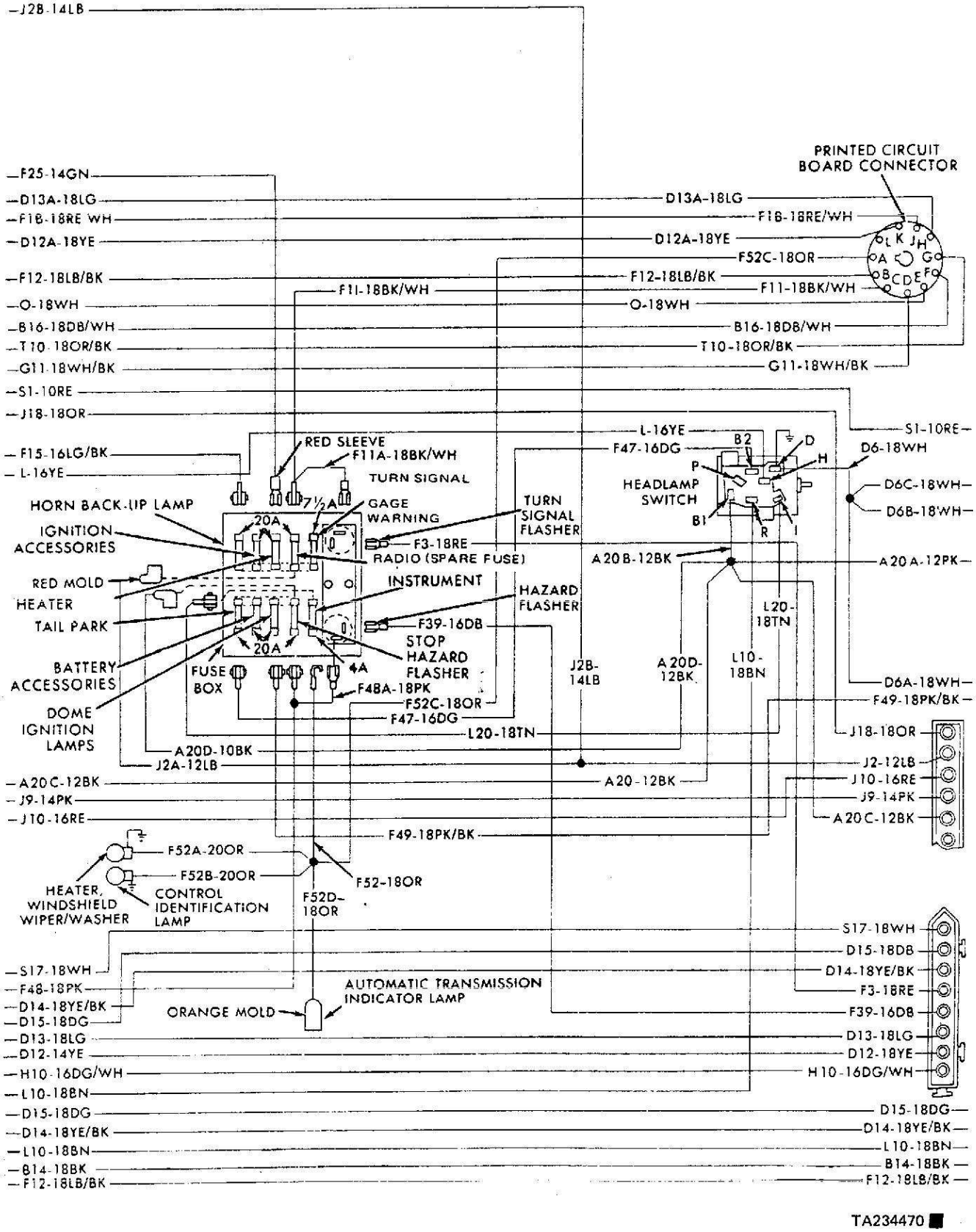


Figure 2-12. Wiring Diagram (4 of 5)

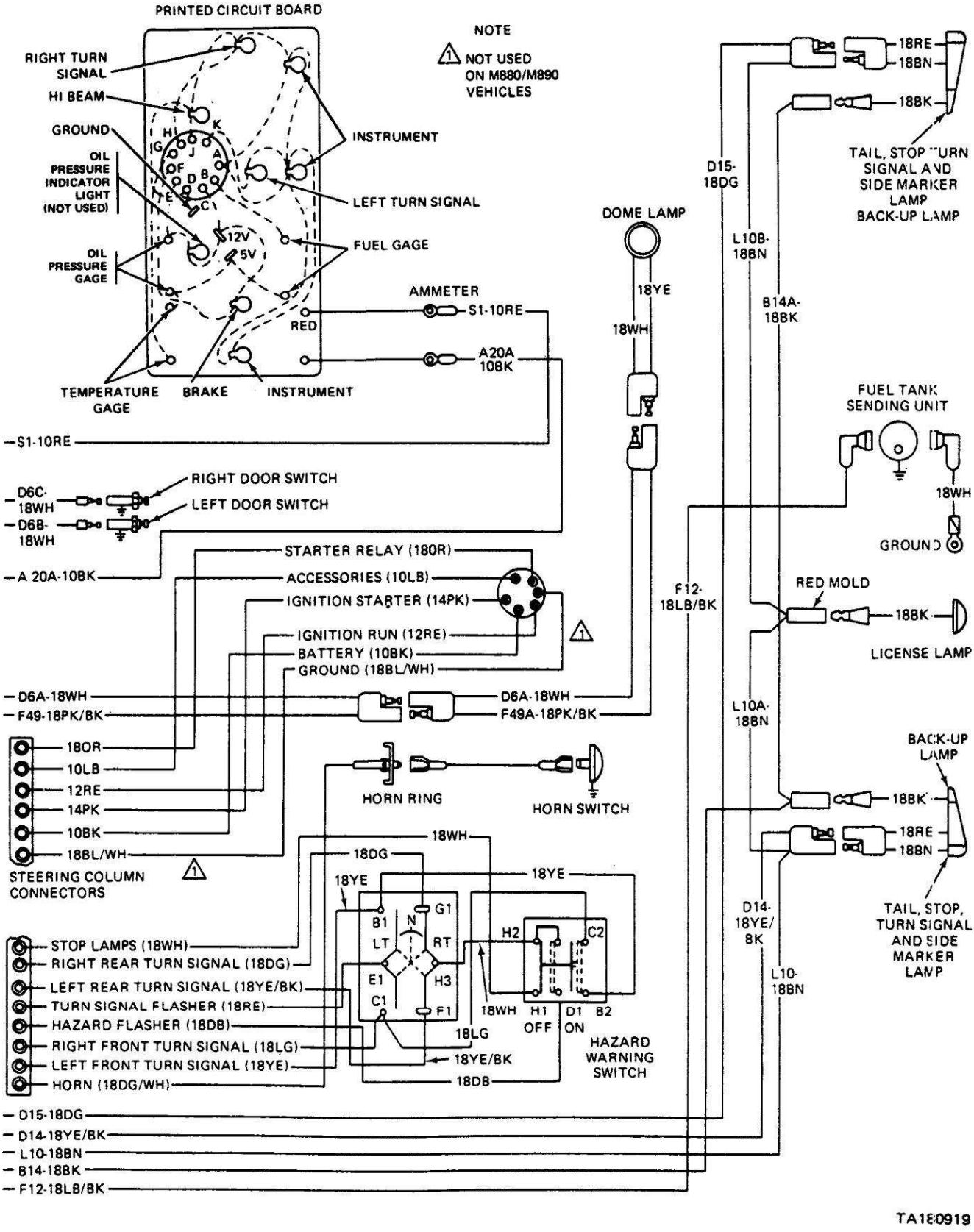


Figure 2-12. Wiring Diagram (5 of 5)

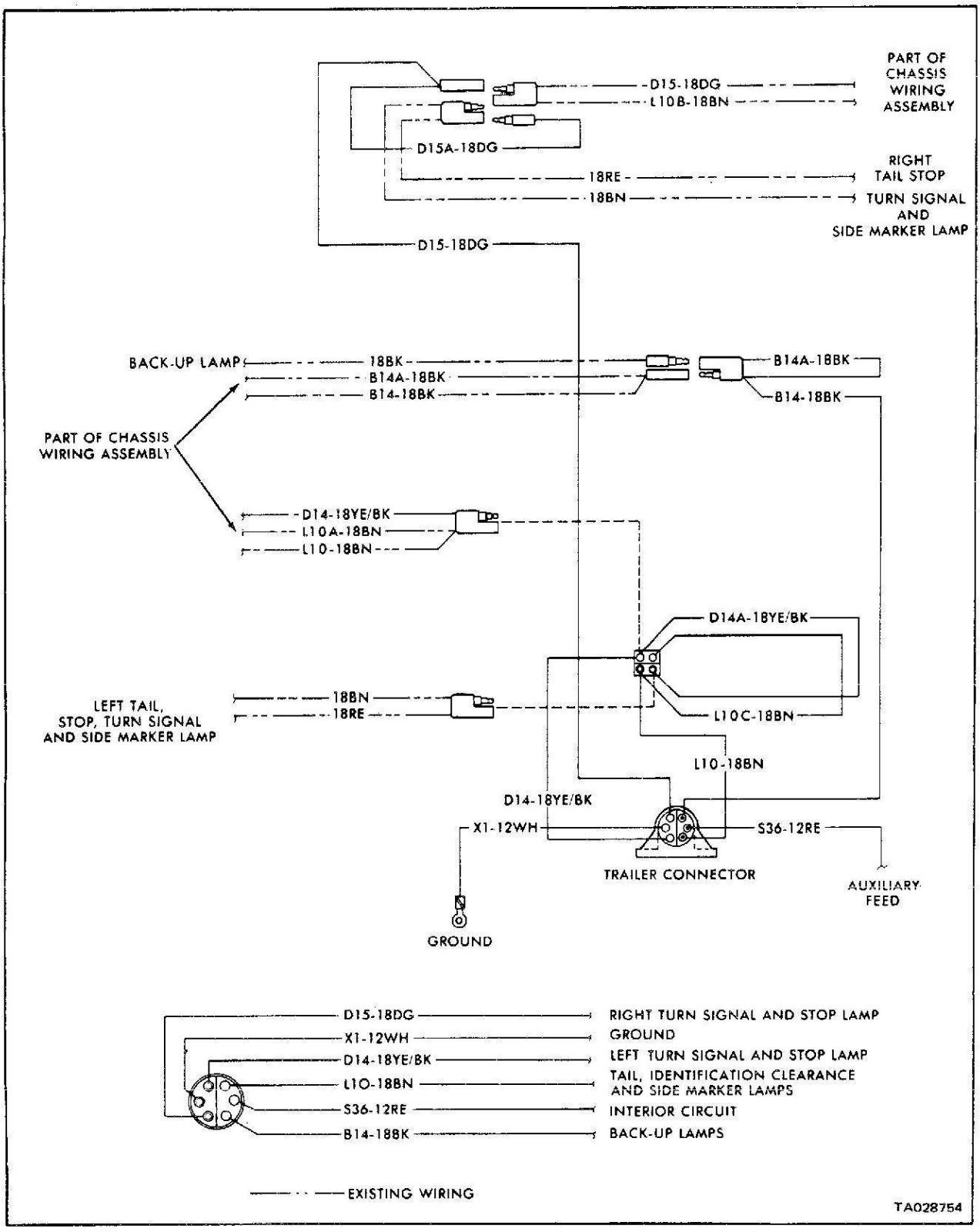


Figure 2-12.1. Trailer Electrical Receptacle.

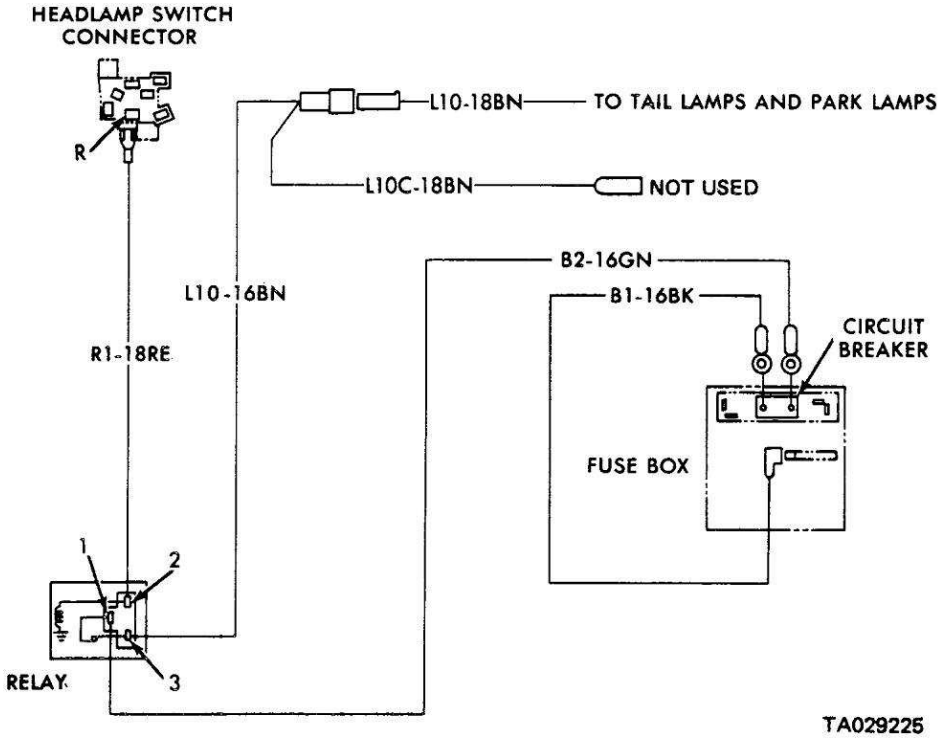


Figure 2-12.2. Parking Light Circuit.

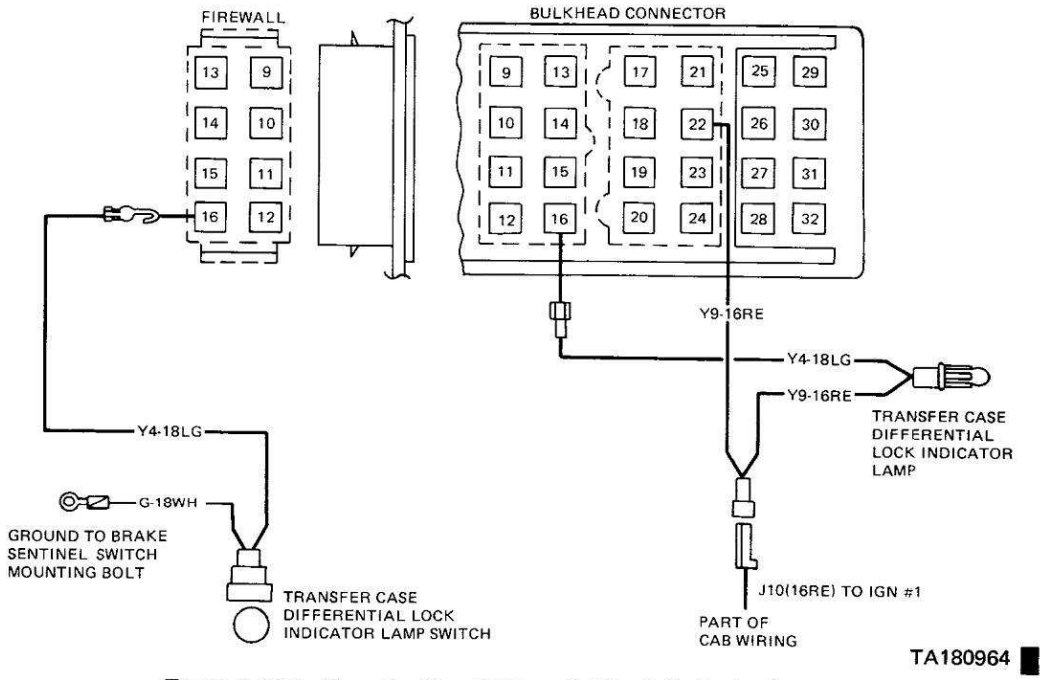


Figure 2-12.3. Transfer Case Differential Lock Indicator Lamp.

a. Any one of three multimeters may be found in the Common No. 1 and No. 2 Organizational Maintenance Automotive Shop Sets. The three meters, shown in figure 2-13, are the Simpson 160, the TS-352 B/U, and the AN/URM-105. These meters all do the same job, and any one of the three can be used to troubleshoot the truck.

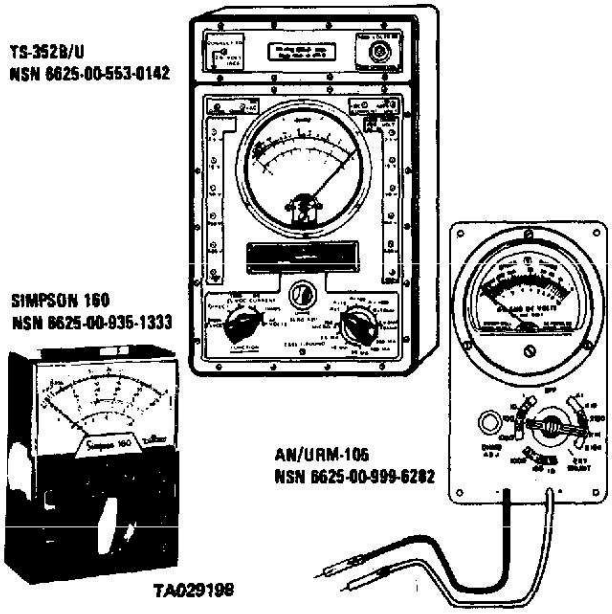


Figure 2-13. Shop Set Multimeters.

b. The ohms scale is used to test for continuity, shorts, and resistance. The voltmeter scale is used to test voltage levels at any point in the electrical system.

2-19. Using the Ohms Scale.

a. Zero the Meter. To obtain an accurate reading you must first adjust the meter so that when there is zero resistance the needle gives a reading of zero. Use the appropriate procedure, below, for the type of meter in your shop set.

NOTE

If the needle will not zero properly, replace the batteries and try the zeroing procedure again. If the needle will not zero after you have replaced the batteries, turn the meter in for repair.

(1) AN/URM-105. Use the procedure shown in figure 2-14.

(2) TS-352 B/U. Use the procedure shown in figure 2-15.

(3) Simpson 160. Refer to figure 2-16.

(a) Set the selector switch to "RX1".

(b) Put the black probe in the "COM-" jack.

(c) Put the red probe in the "+" jack.

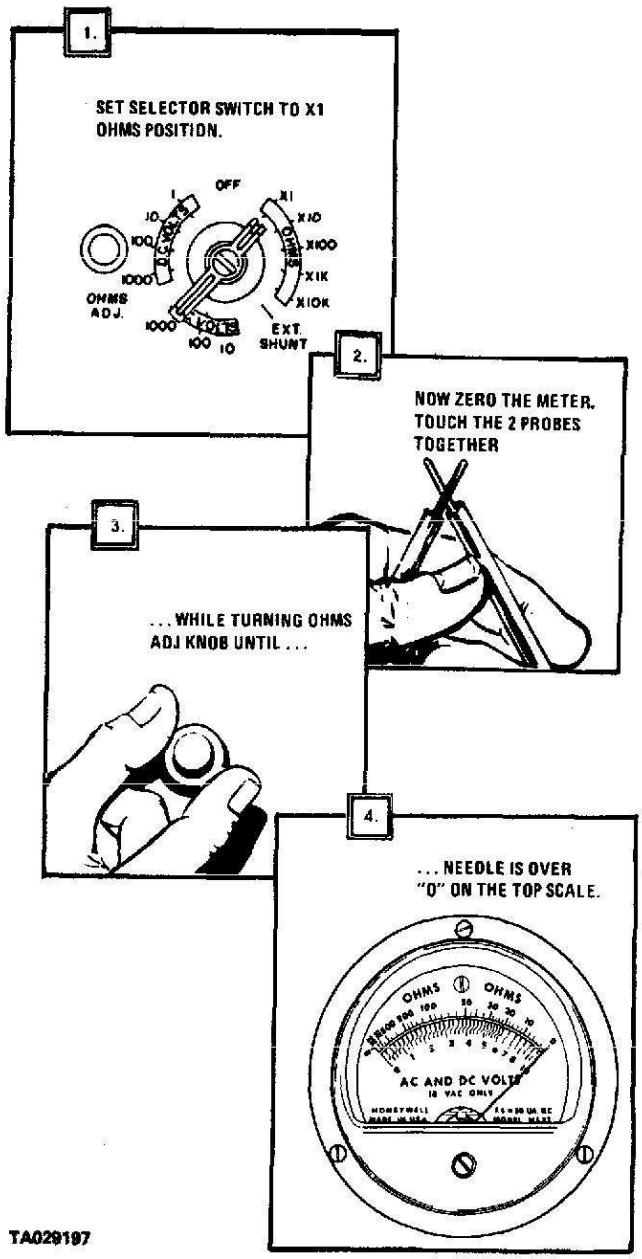


Figure 2-14. Zeroing the AN/URM-105.

(d) Now zero the meter by touching the probes together and turning the "ADJ" knob until the needle is over the "0" on the top scale.

b. Continuity Tests. Continuity tests are made to check for breaks in a circuit (such as the switch, light bulb, or electrical cable). Make a continuity check as follows:

(1) Zero the meter (*a*, above).

(2) Disconnect the battery ground cable at the battery. Then disconnect the circuit you are going to test.

CAUTION

Failure to disconnect the battery ground cable can damage the meter.

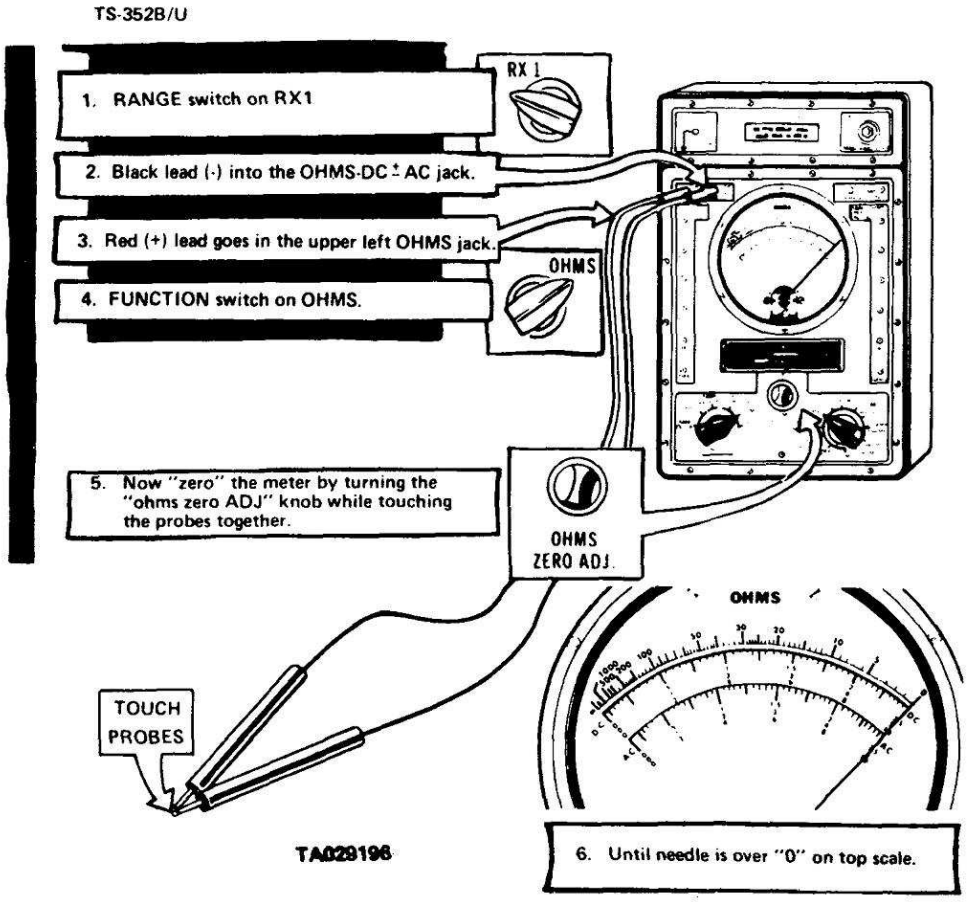


Figure 2-15. Zeroing the TS-352 B/U.

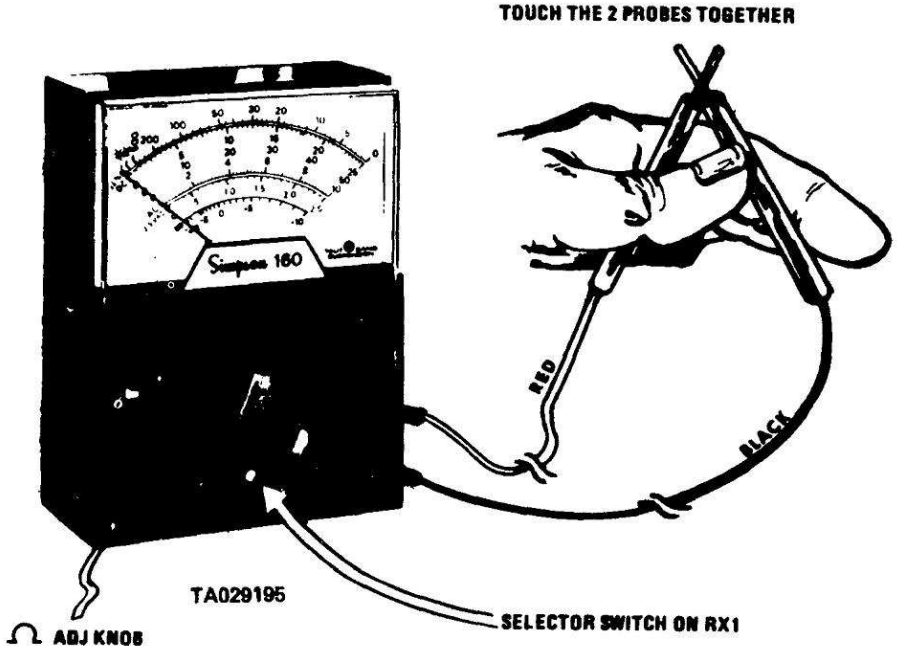


Figure 2-16. Zeroing the Simpson 160.

(3) Connect the meter probes to both terminals of the circuit you are testing (figure 2-17).

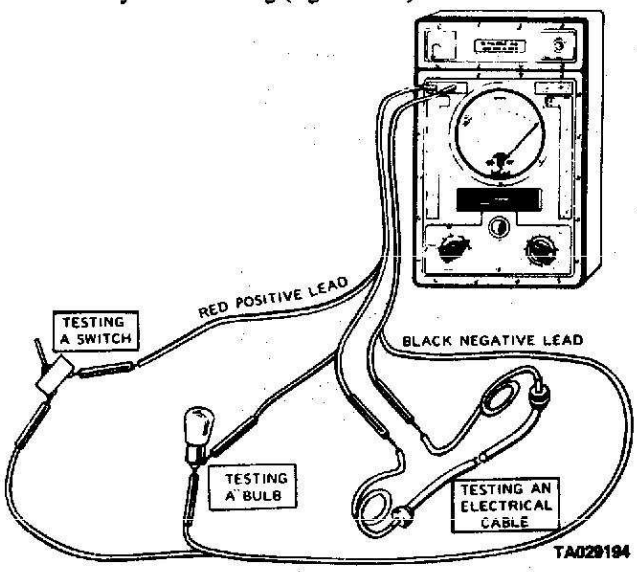


Figure 2-17. Using Meter to Test Continuity.

(4) Read the meter. Interpret the results as follows:

(a) If the needle swings over the "0" on the top scale, the circuit has continuity.

(b) If the needle doesn't move, the circuit is open (the wire is broken). The wire must be replaced.

(c) If the needle jumps or flickers, there is a loose connection somewhere in the circuit being tested. Make sure the meter leads are pressed firmly against the test points. If the meter lead connections are firm, tighten all connections in the circuit. If the needle still jumps, there may be an intermittent open in the wiring; the wire should be replaced.

c. Testing for Shorts. A short (or short circuit) occurs when two circuits that should not be connected have metal-to-metal contact with each other. A short also occurs when a circuit that should not touch ground has metal-to-metal contact with ground. To check for shorts, do as follows:

(1) Zero the multimeter (*a*, above).

(2) Disconnect the battery ground cable at the battery. Then disconnect the circuit being tested.

CAUTION

Failure to disconnect the battery ground cable can damage the meter.

(3) Connect one probe to one circuit and the other probe to the other circuit or to ground (figure 2-18). The figure shows how to test for a short between wires "A" and "B".

(4) Read the meter. Interpret the results as follows:

(a) If the needle swings towards the "0" on the top scale, the circuits are shorted (or the circuit is grounded, if testing to ground).

(b) If the needle doesn't move, the circuits are okay.

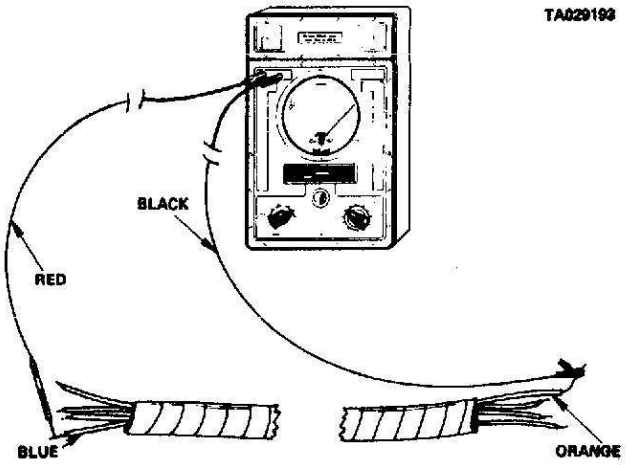


Figure 2-18. Using the Meter to Test for Shorts or Grounds.

(c) If the needle jumps or flickers, the circuits are shorted (or grounded) intermittently.

d. Testing Resistance. Allowable resistance readings depend on the circuit being tested. For most direct wiring circuits (lighting, etc.), a maximum of 3 ohms within the wiring is satisfactory. Where other ohms readings are allowable (10,000 ohms in the coil, etc.), they are specified in the particular section dealing with that circuit or component. Test resistance as follows:

(1) Zero the meter (*a*, above).

(2) Disconnect the battery ground cable at the battery. Then disconnect the circuit being tested.

CAUTION

Failure to disconnect the battery ground cable can damage the meter.

(3) Select the correct ohms switch setting (see table 2-2). For normal circuits where 3 ohms is the maximum allowable reading, use the X1 or RX1 scale (see figure 2-19).

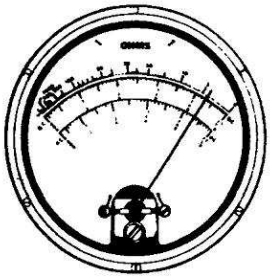
NOTE

Whenever you change switch settings, zero the meter again.

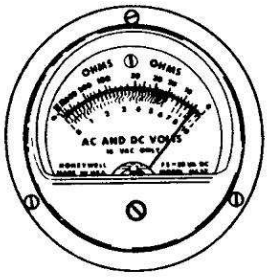
Table 2-2. Ohms Range Switch Setting

Switch Setting	How to Read Scale
X1 or RX1	Read the number on the scale
X10 or RX10	Multiply scale reading by 10
X100 or RX100	Multiply reading by 100
X1K or RX1K	Multiply reading by 1,000
X10K or RX10K	Multiply reading by 10,000

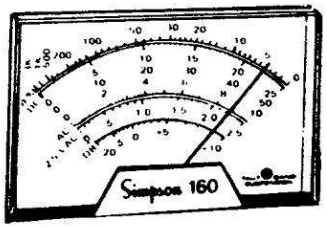
METER READS	OHMS SWITCH SETTING	READING MEANS
4	X1 or RX1	4 ohms
4	X10 or RX10	40 ohms
4	X100 or RX100	400 ohms



TS-352 B/U



AN/URM-105



SIMPSON 160

TA029192

Figure 2-19. Interpreting Meter Readings.

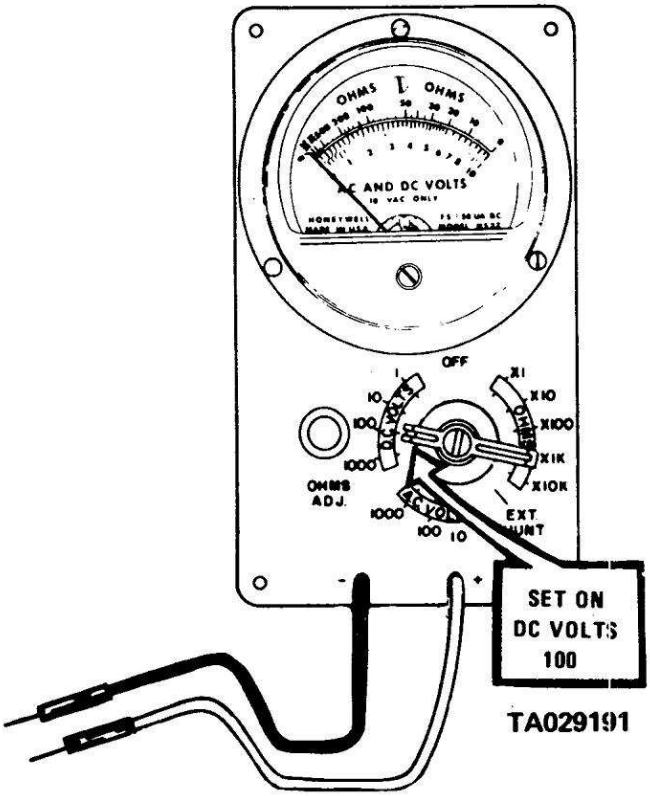


Figure 2-20. Using AN/URM-105 to Measure D.C. Volts.

2-20. Using the D.C. Volts Scale.

Use the d.c. volts scale to measure all voltages; the a.c. volts scale is never used on M880 series trucks.

a. Set Up the Meter. Before using the meter, set it up using the procedure that matches the multimeter in your shop set:

(1) AN/URM-105. Set the meter switch to the d.c. volts range set forth in the testing paragraph for the component or circuit you are testing. (For most circuits on the truck, the right range is the one marked 100 DC VOLTS.) See figure 2-20.

(2) TS-352 B/U Refer to figure 2-21.

(a) Set the Function switch to Direct.

(b) Put black lead in "DC ± AC/OHMS" jack.

(c) To measure 12 volts d.c., plug the red lead into the "50V" jack on the left side of the meter.

NOTE

If measuring less than 10 volts d.c., use the "10V" jack. If measuring less than 2.5 volts d.c., use the "2.5V" jack.

(3) Simpson 160. Refer to figure 2-22.

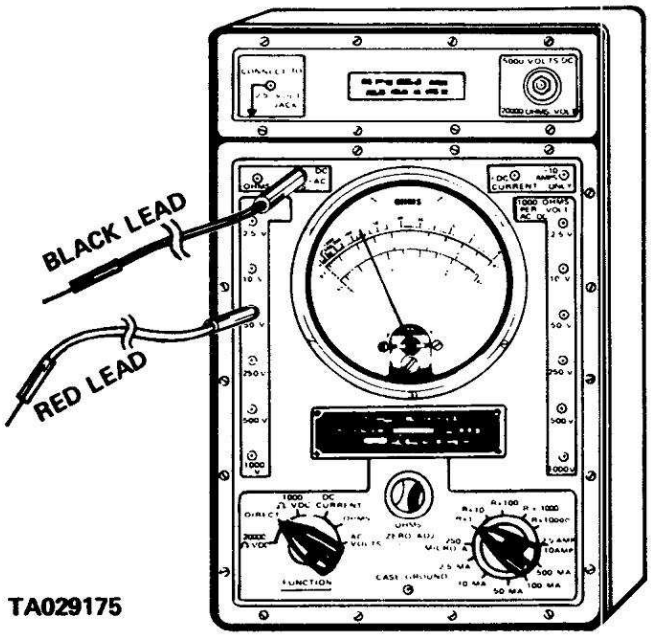


Figure 2-21. Using TS-352 B/U to Measure D.C. Volts.

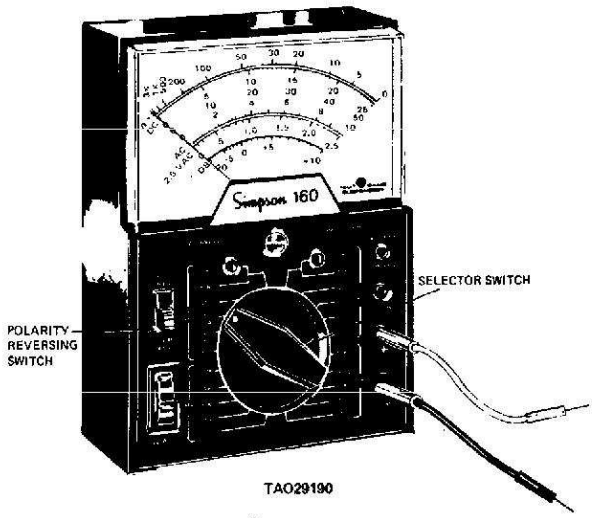


Figure 2-22. Using the Simpson 160 to Measure D.C. Volts.

NOTE

If measuring less than 10 volts d.c., set the switch to the "V/DC 10" position. If measuring less than 2.5 volts d.c., set the switch to the "V/DC 2.5" position.

(d) Set the Polarity Reversing switch to the "+DC" position.

b. Measuring D.C. Voltage. First, set up the meter (*a*, above).

CAUTION

If you are not sure of the voltage you will be measuring, ALWAYS start the 50V range (100V range on AN/URM 105).

c. Connect the red probe to the positive (+) side of the circuit and the black probe to the negative (–) side. See figure 2-23.

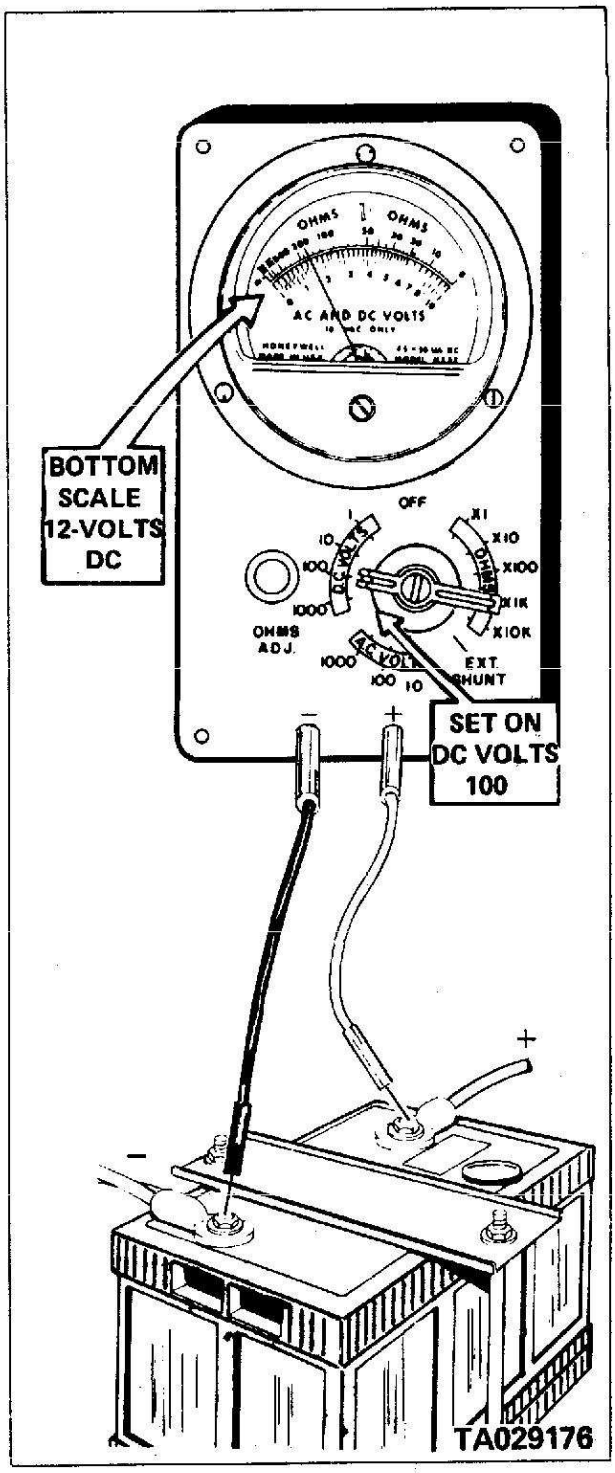


Figure 2-23. Measuring Battery Voltage.

Section IX. MAINTENANCE OF IGNITION SYSTEM

2-21. General.

These trucks are equipped with an electronic ignition system (figure 2-24). The system consists of a dual ballast resistor (figure 2-25), and a control unit (figure 2-26), both mounted on the left fender, an ignition switch, a coil, a distributor, spark plugs, and spark plug wires.

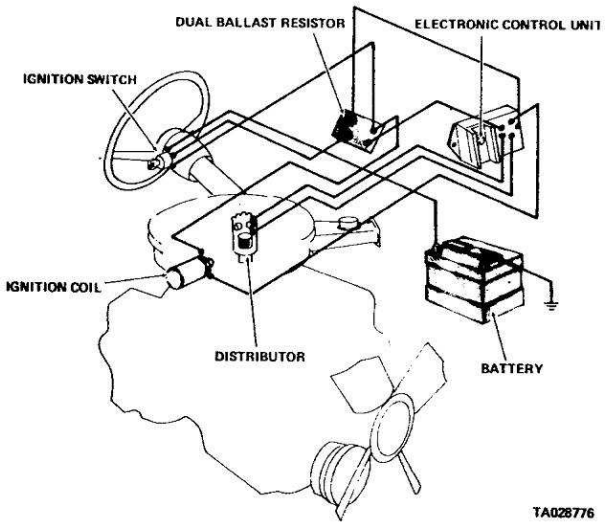


Figure 2-24. Electronic Ignition System.

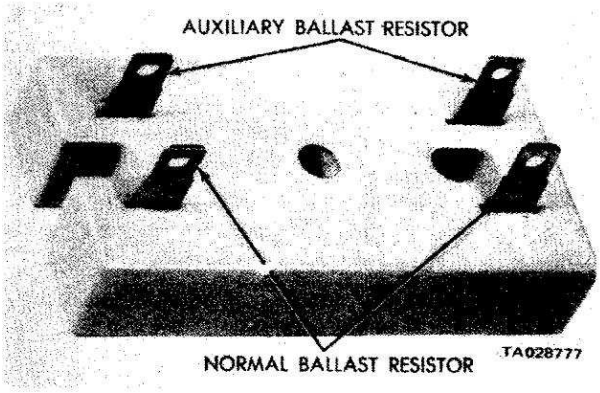


Figure 2-25. Dual Ballast Resistor.

a. The primary (low voltage) circuit consists of the battery, the ignition switch, the compensating (0.5 ohm) side of the ballast resistor, the primary windings of the ignition coil, the power switching transistor of the control unit, and the vehicle frame.

b. The secondary (high voltage) circuit consists of the secondary windings of the coil, the distributor cap and rotor, spark plug wires, spark plugs, and the vehicle frame.

2-22. Electronic Ignition Tests.

a. Electronic ignition differs considerably from typical military ignition systems. The "points" have been replaced

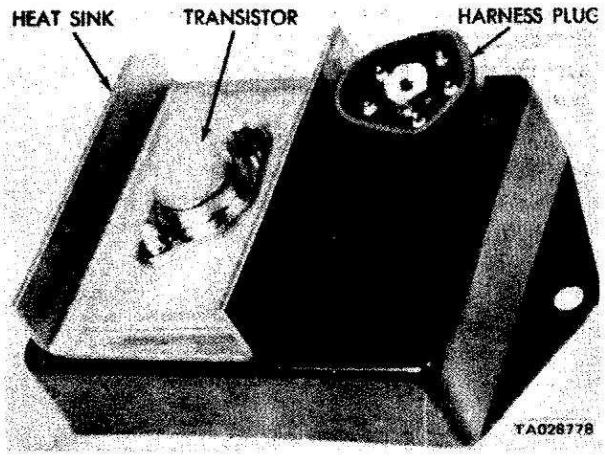


Figure 2-26. Electronic Control Unit.

by an electronic means of breaking the primary circuit and inducing a high voltage to fire the spark plugs. Dwell, the length of time of flow of current in the primary circuit, cannot be measured.

b. Ignition system maintenance is generally reduced to inspection of the distributor cap, rotor, and wiring; and to cleaning and changing the spark plugs, as needed. When other ignition system problems are suspected, remove the air cleaner assembly and follow the procedure below.

(1) Remove the high voltage cable from the center tower of the distributor. Using insulated pliers, hold the cable approximately 3/16 inch from the engine while an assistant cranks the engine.

(a) If arcing does not occur, go to step 2.

(b) If arcing occurs, visually inspect all secondary cables at the coil, distributor, and spark plugs for cracks and tightness. If this does not determine the problem, go to paragraphs 2-23 through 2-26, as necessary.

NOTE

The following steps cover several ignition problems. Follow the steps in order; the pertinent steps for a single problem will be pointed out for you.

(2) Set the multimeter to read at least 15 volts d.c. Check and note the battery voltage between the battery terminals. If battery voltage is not at least 12V, charge and test the battery (paragraph 2-28) before proceeding to step 3.

(3) Remove the cross-head screw which holds the multi-wiring connector to the electronic ignition control unit. Remove the multi-wiring connector.

CAUTION

Whenever removing or installing the wiring harness connector to the control unit, be sure the ignition switch is in the OFF position.

(4) Turn the ignition switch to the ON position. With the meter still set to read battery voltage, check for voltage between wiring-harness connector terminal one and ground (figure 2-27).

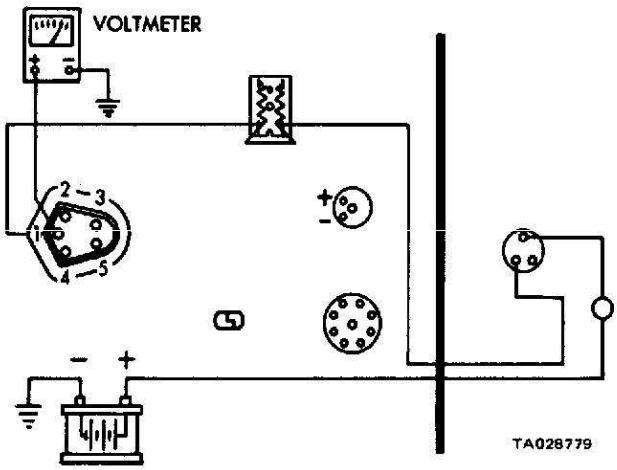


Figure 2-27. Testing Terminal Number One.

(a) If the meter reads within 1 volt of battery voltage, go to step 5.

(b) If the meter does not read within 1 volt of battery voltage, go to step 20.

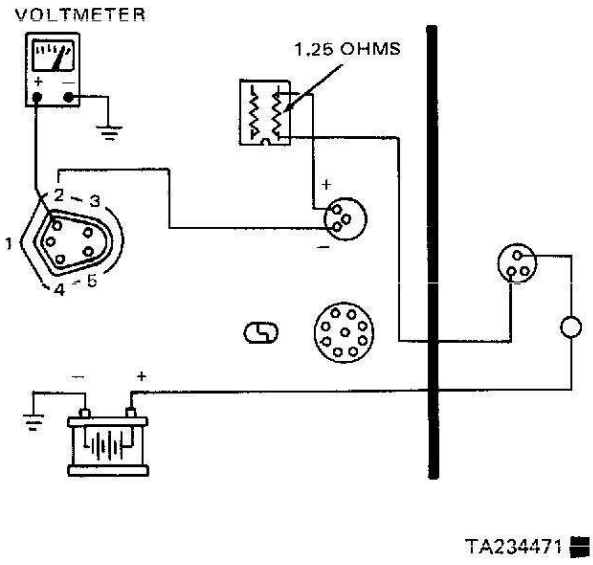


Figure 2-28. Testing Terminal Number Two.

(5) With the ignition switch ON, test for voltage between wiring-harness connector terminal two and ground (figure 2-28).

(a) If the meter reads within 1 volt of battery voltage, go to step 6.

(b) If the meter does not read within 1 volt of battery voltage, go to step 17.

(6) With the ignition switch ON, test for voltage between wiring-harness connector terminal three and ground (figure 2-29).

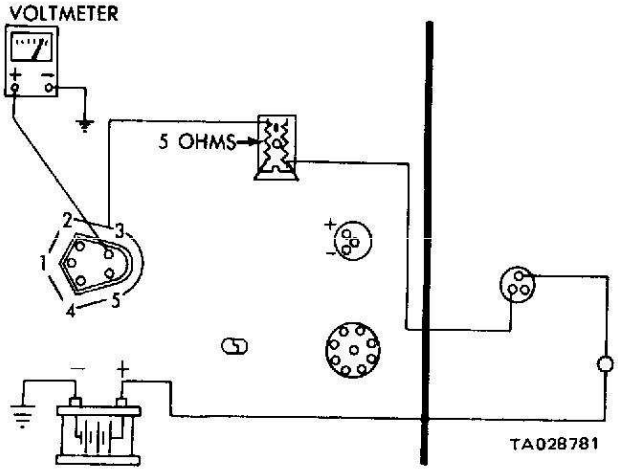


Figure 2-29. Testing Terminal Number Three.

(a) If the meter still reads within 1 volt of battery voltage, go to step 7.

(b) If the meter does not read within 1 volt of battery voltage, go to step 19.

(7) Set the multimeter on the lowest ohms scale (X1 or RX1) and zero it. Connect the leads to wiring-harness connector terminals number four and five (figure 2-30).

(a) If the meter reads between 150 and 900 ohms, go to step 8.

(b) If the meter reads above or below this range, go to step 14.

(8) Check the electronic control unit ground circuit as follows:

(a) Connect one ohmmeter lead to a good ground and the other lead to control unit connector pin number five (figure 2-31).

(b) The ohmmeter should show 0 ohms resistance (continuity) between the ground and the connector pin. If the meter reads 0 ohms, go to step 9. If continuity does not exist, tighten the bolts holding the control unit to the fender, then recheck. If continuity still does not exist, the control unit must be replaced.

(9) Reset the multimeter to measure battery voltage. With the harness still disconnected from the control unit, check for voltage between ground and the positive primary

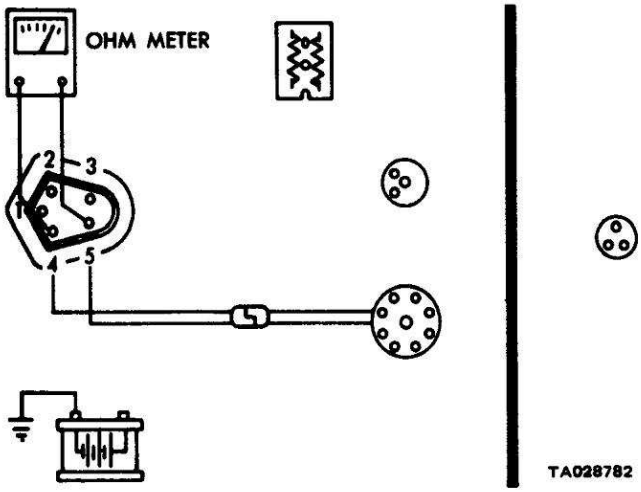


Figure 2-30. Testing Pickup Coil at Wiring-Harness Connector.

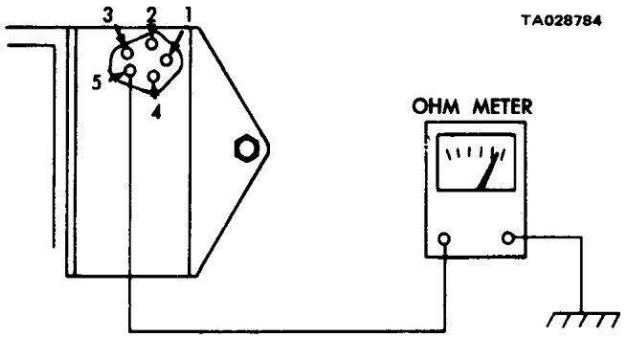


Figure 2-31. Testing Ground Circuit.

terminal on the coil (pink wire), while an assistant cranks the engine.

(a) If the meter reads more than 10V, and you did not get a spark in step 1, replace the coil

(b) If the meter reads less than 10V go to paragraph 2-28 (load test).

(c) If the meter reads 0V go to step 10.

(10) Check for voltage where the two pink wires attach to the ballast resistor, while an assistant cranks the engine.

(a) If the meter reads more than 10V, notify Direct Support to repair the harness between the coil and ballast resistor.

(b) If the meter shows no reading, go to step 11.

(11) While an assistant cranks the engine, check for voltage where the pink wire comes out of the firewall bulkhead connector (figure 2-32). This can be done without disconnecting the connector by pushing the red test lead in from the back of the connector.

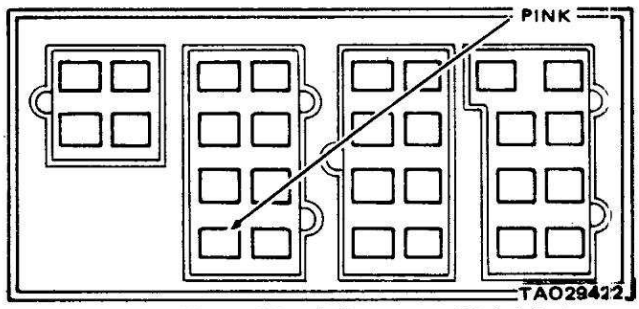


Figure 2-32. Bulkhead Connector (Pink Wire).

(a) If the meter reads more than 10V, notify Direct Support to repair the pink wire between the bulkhead connector and the ballast resistor.

(b) If the meter shows no reading, press in on the bulkhead connector and wires and move them from side to side. If voltage is still not present while cranking the engine, go to step 12.

(12) Pull apart the ignition switch steering column connector under the dashboard. Set the multimeter on the lowest ohms scale and zero the meter. With the ignition switch in the START position, check for continuity between the pink and black wires coming from the steering column.

(a) If the meter reads 0 to 3 ohms, go to step 13.

(b) If the meter reads more than 3 ohms, notify Direct Support to repair the circuit through the ignition switch.

(13) Reset the multimeter to read battery voltage. Check for battery voltage at the steering column connector between ground and the black wire coming from the firewall.

(a) If the meter reads battery voltage, clean and tighten the steering column connector.

(b) If the meter shows no reading, go to paragraph 2-31.

(14) Disconnect the dual lead connector coming from the distributor. With the meter still set on the lowest ohms scale, check the resistance at the dual lead connector, going to the distributor (figure 2-33). If the reading still is not between 150 and 900 ohms, replace the pickup coil assembly in the distributor (paragraph 2-23). If the meter now reads 150 to 900 ohms, go to step 15.

(15) Check for continuity between terminal 4 of the control unit wiring connector and the gray wire at the dual connector. Then, check for continuity between terminal 5 and the brown and white wire at the dual connector. If continuity exists, check for an open circuit between terminals 4 and 5. If continuity doesn't exist, or you don't have an open between terminals 4 and 5, notify Direct Support to repair the wiring harness between the distributor and control unit. If all three conditions are okay, reconnect the wiring harness at the control unit and distributor, and go on to step 16.

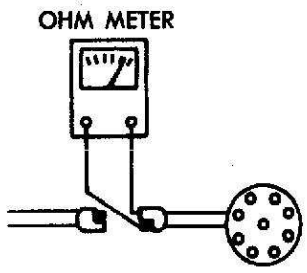


Figure 2-33. Testing Pickup Coil at Distributor Lead Connector

NOTE

Whenever removing or installing the wiring-harness connector to the control unit, the ignition switch must be in the OFF position.

(16) Check the air gap between the reluctor tooth and the pickup coil (paragraph 2-23). Then check the ignition secondary circuit as follows:

(a) Remove the high voltage cable from the center tower of the distributor. Using insulated pliers, hold the cable approximately 3/16 inch from the engine. Have an assistant crank tne engine.

(b) If arcing does not occur, plug in a known good control unit.

(c) Crank the engine again. If arcing still does not occur, reinstall old control unit and test the ignition coil (step 17).

(17) With the ignition switch ON, test for voltage between the negative primary terminal on the coil (black and yellow wire) and ground.

(a) If the meter reads within 1 voltof battery voltage, notify Direct Support to replace the black and yellow wire between the coil and control unit harness connector.

(b) If the meter does not read within 1 volt of battery voltage, check for voltage on the other small coil terminal with the ignition switch ON. If the meter now reads within 1 volt of battery voltage, replace the coil. If voltage is still not present, go to step 18.

(18) With the ignition switch ON, check for voltage where the pink wires attach to the ballast resistor.

(a) If the meter reads within 1 volt of battery voltage, notify Direct Support to repair the pink wire between the ballast resistor and the coil.

(b) If the meter does not read within 1 volt of battery voltage, check for voltage where the red wires go into the ballast resistor. If the meter now reads within 1 volt of battery voltage, replace the ballast resistor. If the meter still does not read within 1 volt of battery voltage, go on to step 20.

(19) With the ignition switch ON, check for voltage where the dark green wire goes into the ballast resistor.

(a) If the meter reads within 1 volt of battery voltage, notify Direct Support to repair the dark green wire between the ballast resistor and the electronic ignition control unit.

(b) If the meter does not read within 1 volt of battery voltage, check for voltage where the red wires go into the ballast resistor. If the meter now reads within 1 volt of battery voltage, replace the ballast resistor. If the meter still does not read within 1 volt of battery voltage, go to step 20.

(20) With the ignition switch ON, check for battery voltage where the red wire comes out of the bulkhead connector on the firewall (figure 2-34). Push the red test lead in from the back of the connector and connect the black lead to a good ground.

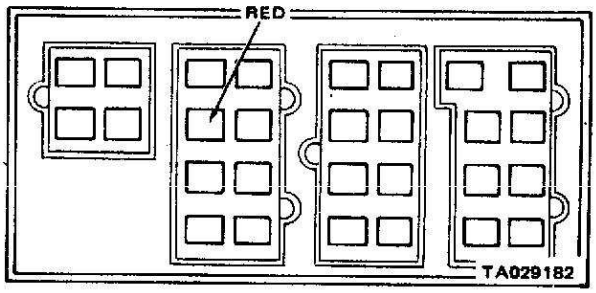


Figure 2-34. Bulkhead Connector (Red Wire).

(a) If the meter reads battery voltage, notify Direct Support to repair the red wire coming from the bulkhead connector.

(b) If the meter does not read battery voltage, move the wires back and forth and press in on the bulkhead connector and wires. If battery voltage still is not present, go to step 21.

(21) Pull apart the ignition switch steering column connector under the dashboard. Set the multimeter on the lowest ohms scale and zero the meter. With the ignition switch ON, check for continuity between the red and black (figure 2-35) or blue and black wires coming from the switch (figures 2-35 and 2-44.6).

NOTE

There are two wiring configurations for the ignition switch connector (see figure 2-44.6).

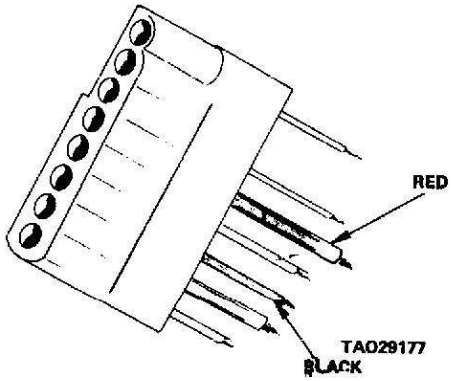


Figure 2-35. Ignition Switch Connector (Black and Red Wires).

(a) If the meter reads over 3 ohms, notify Direct Support to repair the circuit through the ignition switch to the steering column connector.

(b) If the meter reads 0 to 3 ohms, go back to step 13.

2-23. Distributor.

a. Cap.

(1) Remove the ignition wires, one at a time, from the distributor cap. Inspect the wire end and cap receptacle for cracks, corrosion, burning, or flashover. If any of these conditions exist replace both the wires and the cap. Be sure to reinstall each wire in the cap before going on to the next one.

NOTE

When installing wires into the towers, make sure that the terminals are fully seated and that the rubber boots are fully seated around the towers. Replace any boot that does not make a good seal.

(2) Remove the cap and inspect the inside for flashover, cracking of carbon button, cracking of cap, and burned, worn, or grooved terminals. If any of these conditions are present, replace the distributor cap and rotor.

(3) Use a sharp knife to clean light scaling caused by arcing between the rotor and the terminals. If heavy scaling is present, replace the cap and rotor.

(4) If the distributor cap is greasy, dirty, or has a powdered-like substance on the inside, clean it with a solution of warm water and mild detergent. Scrub the distributor cap with a soft brush and let it dry.

b. Rotor.

(1) Inspect the rotor for cracks, excessive burning of the tip, or discoloring of the material (a blueish color) under the spring terminal. If any of these conditions exist, replace both the rotor and the cap.

(2) Use a sharp knife to clean light scaling of the tip. If heavy scaling is present, replace the cap and rotor.

(3) If the rotor has a powdered-like substance on it, clean it with a solution of warm water and mild detergent and let it dry.

c. Removing the Distributor.

(1) Disconnect the vacuum hose at the distributor.

(2) Disconnect the distributor pickup lead wire at the wiring-harness connector.

(3) Unfasten the distributor cap retaining clips and lift off the distributor cap.

(4) Remove the distributor hold-down clamp screw and clamp.

(5) Carefully lift the distributor from the engine.

d. Installing the Distributor.

(1) Position the distributor in the engine. Make sure the rubber "O" ring seal is in the groove of the distributor housing. Clean the top of the cylinder block to insure a good seal between the distributor base and the block.

(2) Engage the tongue of the distributor shaft with the slot in the distributor oil-pump drive gear. Establish the proper relationship between the distributor shaft and the number one piston position as follows:

(a) Remove the number one spark plug. While holding your finger over the spark plug hole, rotate the crankshaft. When pressure is felt, continue to rotate the crankshaft until the vibration damper is in line with the "O" mark on the timing-chain case cover.

(b) Rotate the rotor to the position of the number one distributor cap terminal.

(c) Lower the distributor into the opening. Connect the pickup coil leads and install the distributor cap. Make sure the spark plug wires are firmly seated in the cap towers. Install the distributor hold-down clamp screw. Tighten the screw finger-tight.

(3) Connect the distributor pickup lead wire at the wiring-harness connector.

(4) Adjust the engine timing (paragraph 2-26).

e. Removing the Pickup Coil.

(1) Remove the distributor.

(2) Remove the reluctor by prying it up from the bottom.

CAUTION

Be careful not to damage the reluctor teeth.

(3) Remove the two screws attaching the vacuum control unit to the distributor housing.

(4) Disconnect the vacuum control arm from the upper plate and remove the control unit.

(5) Remove the pickup coil leads from the distributor housing.

(6) Remove the two screws attaching the lower plate to the distributor housing.

(7) Lift out the lower plate, upper plate, and pickup coil as an assembly from the housing.

(8) Remove the upper plate and the pickup coil assembly from the lower plate by depressing the retainer clip on the underside of the lower plate. Move them away from the attaching stud.

f. Installing the Pickup Coil.

(1) Place a small amount of lubricant on the upper plate support pins located on the lower plate.

(2) Position the upper plate on the lower plate. Install the retainer clip and depress it, locking it into place.

(3) Position the lower plate, upper plate, and pickup coil assembly in the distributor housing. Install the mounting screws and tighten them securely.

(4) Attach the vacuum control arm to the upper plate. Position the control arm into place on the distributor housing. Install the mounting screws and tighten them securely.

(5) Install the pickup coil leads to the distributor housing.

(6) Install the reluctor.

(7) Install the distributor.

g. Adjusting the Air Gap.

(1) Aline one reluctor tooth with the pickup coil tooth.

(2) Loosen the pickup coil hold-down screw.

(3) Insert a 0.008 non-magnetic feeler gage (C-4229) between the reluctor tooth and the pickup coil tooth (figure 2-36).

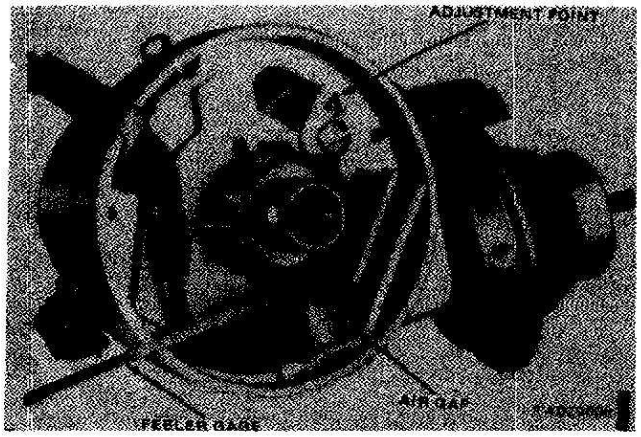


Figure 2-36. Air Gap Adjustment.

(4) Adjust the air gap so that contact is made between the reluctor tooth, the feeler gage, and the pickup coil tooth.

(5) Tighten the hold-down screw.

(6) Remove the feeler gage.

NOTE

No force should be required in removing the feeler gage.

(7) Check the air gap with a 0.010 non-magnetic feeler gage (C-4229). The feeler gage should not fit into the air gap. *DO NOT FORCE THE FEELER GAGE INTO THE AIR GAP.*

2-24. Spark Plug Wires.

a. Cleaning. Clean the wires with a cloth moistened with solvent and wipe them dry. Visually inspect them for cracks or signs of aging. Check the connections for good contact at the coil, distributor, and spark plugs. Terminals should be fully seated. The boots and spark plug covers should be in good condition and fit tightly.

b. Testing.

(1) To test the secondary cables for cracks or punctures, use the following procedure:

(a) With the engine off, connect one end of an insulated wire to a good ground, keeping the other end free for probing.

(b) Disconnect the spark plug wire from the number one cylinder.

(c) Insulate the disconnected spark plug wire from grounding.

(d) Start the engine.

(e) With the engine running, move the free end of the insulated wire along the entire length of the spark plug wire. If punctures or cracks are present there will be a noticeable spark jump from the faulty area to the probe.

(f) Turn the engine off and reconnect the wire.

(g) Repeat this test on all spark plug wires.

(h) Check the secondary coil wire in the same manner, but without disconnecting either end. Instead, disconnect one of the spark plug wires.

(i) Replace any faulty wires.

(2) To test ignition wires for high resistance use a multimeter set on the ohms X1000 (X1K) scale and use the following procedure:

(a) With the engine off, remove the wire from the number one cylinder.

(b) Remove the distributor cap keeping the ignition wires intact.

(c) Connect the ohmmeter to the disconnected end of the spark plug wire and the corresponding electrode inside the distributor cap. Make sure that the ohmmeter probes make good contact.

(d) If resistance is more than 30,000 ohms, remove the cable at the cap tower and check the cable resistance between the two free ends of the wire. Replace the cable if the resistance is still over 30,000 ohms. Replace the cap if the resistance is now less than 30,000 ohms.

(e) Reconnect the spark plug wire.

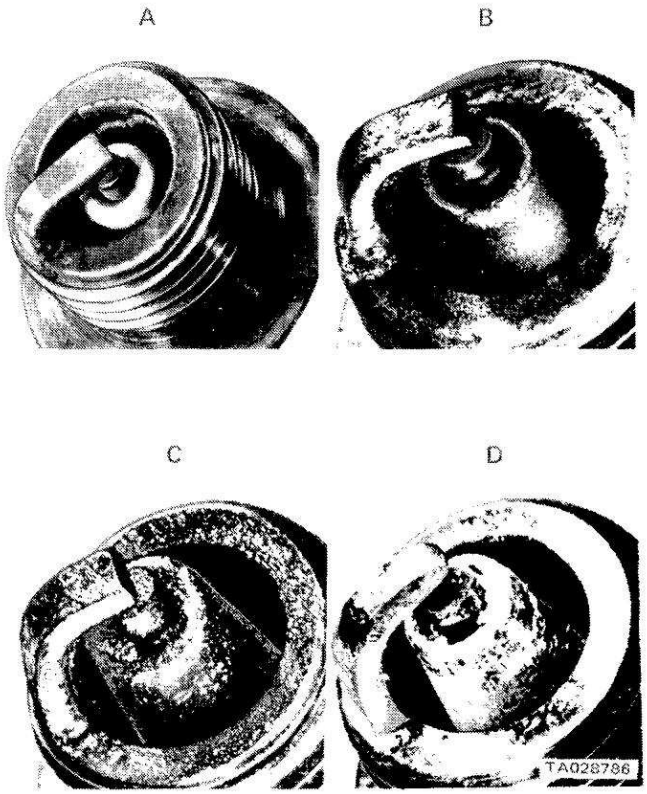
(f) Repeat the above steps on the remaining seven spark plug wires.

(g) To test the coil wire, connect the ohmmeter between the center contact in the distributor cap and either of the primary leads at the coil. The resistance should be between 15,000 and 25,000 ohms.

(h) If the resistance is greater than 25,000 ohms, disconnect the coil wire at the coil and check the resistance between the center contact of the distributor cap and the disconnected end of the wire. If the resistance is now over 15,000 ohms, replace the coil wire. If the resistance is less, you have a faulty coil; replace it.

2-25. Spark Plugs.

a. The appearance or condition of the spark plugs can reflect a wide variety of engine conditions (see figure 2-37).



LEGEND for Figure 2-37:

A. Normal condition.
B. Cold fouling.
C. Wet fouling.
D. Overheating.

Figure 2-37. Diagnosing Spark Plug Condition.

b. To clean and gap the spark plugs use the following procedure:

(1) Remove the spark plugs from the engine.

(2) Carefully clean the spark plugs.

(3) Using a wire-type feeler gage, reset the gap to 0.035 inch.

(4) Reinstall the spark plugs, tightening them to 30 ft-lbs.

NOTE

If spark plugs are being replaced on vehicles with 28-volt 60 ampere or 28-volt 100 ampere generating systems, remove electromagnetic interference shield from old plugs and reinstall them on the new plugs (see paragraph 1-10*a*).

2-26. Ignition Timing.

a. To obtain proper engine performance, the distributor must be properly positioned to give the correct ignition timing. The ignition timing test will indicate the timing of the spark at the number one cylinder.

b. The test procedure is as follows:

(1) With the engine off, install the timing light/tachometer adapter (figure 2-9) between the number one spark plug and the wire.

(2) Connect the timing light to the spark plug wire adapter.

(3) Connect the positive lead of the timing light to the positive battery terminal; the negative lead to the negative battery terminal.

(4) Install a tachometer (figure 2-9).

(5) Start the engine and idle it until it reaches the normal warmed-up condition.

(6) Set the engine idle at 750 rpm.

(7) Disconnect the vacuum advance hose at the distributor and plug the hose.

(8) Using the flex socket TU-16, loosen the distributor hold-down arm screw just enough so that the distributor can be turned.

(9) Aim the timing light at the timing plate on the timing-chain cover housing. If the mark is not alined with the 2° before "O" mark on the plate, turn the distributor until the marks are alined.

NOTE

The specification decal on the engine may list a different timing setting. Regardless of what the decal lists for the timing setting. set it at 2° BTC (before top dead-center). The engine decal gives the necessary timing setting for the engine to meet EPA (Environmental Protection Agency) standards in all situations. The M880-series vehicles meet these standards, even with the ignition timing advanced to the 2° BTC setting. This setting will give the vehicle improved throttle response, increased fuel mileage, and help it run and start better.

(10) Tighten the distributor. Recheck the timing with the timing light to make sure it is still properly set.

(11) Reconnect the vacuum advance hose to the distributor.

(12) Accelerate the engine. The timing mark should move.

(13) If the engine idle speed has changed, readjust it to the proper rpm.

(14) Turn off the engine, and disconnect the timing light.

2-26.1. Suppressed Ignition Component Installation M880 1-¼ Ton Truck.

NOTE

Read complete instructions before beginning.

a. Test. Road test truck to establish operating condition prior to installation of suppressed ignition components.

b. Battery Cable. Disconnect negative battery ground cable at the battery.

c. Spark plugs.

(1) Remove spark plugs from engine. Maintain position of spark plug wire to spark plugs or tag wires.

(2) Inspect, clean, gap (0.035) or renew as necessary. (Refer to paragraph 2-25 and figure 2-37.)

(3) Install spark plug suppression shields and shield nuts on spark plugs. Torque to 30 ft lbs. Recheck spark plug gap (0.035).

(4) Install shielded spark plugs in engine.

d. Coil and Bracket. Remove coil and bracket to provide for ease in installing new distributor cap and wires. Tag bat (+) and dist (-) wires for reinstallation on new coil.

e. Distributor Cap, Ignition Wires and Rotor.

(1) Note position of No. 1 cylinder spark plug cable. Sitting in drivers seat, cylinder numbering is: left side front to rear 1-3-5-7, right side front to rear 2-4-6-8. Without removing unsuppressed ignition wires from the unsuppressed distributor cap remove cap from distributor and move forward. (Refer to paragraph 2-23 and 2-24)

(2) Remove nonsuppressed distributor rotor. Check air gap (refer to paragraph 2-23g. (1) through (7)).

(3) Install suppressed rotor.

(4) Install suppressed distributor cap with attached ground cable facing coil mounting bracket.

(5) Install suppressed distributor to coil cable in suppressed distributor cap.

(6) Using unsuppressed distributor cap and wires as a guide, install one at a time the suppressed ignition cables into the suppressed cap and connect to spark plugs maintaining sequence of cables noted in paragraph C.1 above. Note: firing order is 1-8-4-3-6-5-7-2.

(7) Remove unsuppressed distributor cap with cables from truck.

(8) Remove nonsuppressed ignition cable separators and install suppressed cable separators. Install suppressed ignition cables in separators.

f. Coil.

(1) Install suppressed ignition coil into suppressed ignition coil shield. Note: maintain positive (+) to positive and negative (-) to negative connection between shield connections and coil. (Refer to paragraph 2-24)

(2) Remove nonsuppressed ignition coil from coil bracket. Install suppressed ignition coil with shield in coil bracket, primary wire connections should be aligned in vertical position. Connect distributor to coil secondary suppressed cable tagged primary wires to suppressed ignition coil. Install coil and bracket connecting distributor cap ground strap to coil bracket mount screw.

g. Capacitor, and Starter Relay. Remove one starter relay mounting screw, clean ground, install capacitor on screw and reinstall. Install lead wire to starter relay battery cable connection. (Refer to paragraph 2-31.)

h. Windshield wiper (W/S) motor and harness.

(1) Remove windshield wiper motor harness and replace with suppressed harness. Use unsuppressed wiper motor harness on truck as guide. (Refer to paragraphs 2-55 and 2-56.)

(2) Remove nonsuppressed motor mounting screws, lower motor down far enough to gain access to the crank arm and the drive link retainer bushing.

(3) Remove the crank arm from the drive link by prying the retainer bushing from the crank arm pin with a screwdriver and remove motor and harness.

(4) Remove nut attaching crank arm to the motor drive shaft and remove crank arm.

(5) Using suppressed motor and harness, connect harness ground cable (white) to W/S wiper motor metal ground strap screw.

(6) Install crank arm to suppressed motor drive shaft and secure with nut.

(7) Assemble crank arm pin, retainer bushing, drive link and crank arm.

(8) Install suppressed motor and secure with mounting screws.

i. Heater motor.

(1) Remove screw securing ground wire to fire wall. (Refer to paragraph 2-131).

(2) Disconnect wire connector.

(3) Remove cooling tube from heater motor.

(4) Remove three retaining nuts and remove heater motor and fan assembly.

(5) Separate fan and motor.

(6) Remove spring clamp.

(7) Slide fan off motor shaft.

(8) Remove mounting gasket.

(9) Slide suppressed fan onto motor shaft and install spring clamp and mounting gasket.

(10) Position motor and fan assembly and secure with retaining nuts.

(11) Install cooling tube.

(12) Connect wire.

(13) Secure ground wire to fire wall with screw.

j. Fender Shields.

(1) Remove right and left front fender nonsuppressed splash shield extensions. (Refer to TM 9-2320-266-20P, figure 81).

(2) Reuse clips or use new clips; install right and left front fender RF suppressed splash shield extensions.

k. Ground Straps.

(1) Install engine to body ground strap, from coil mounting bracket screw to right voltage regulator mounting screw on cab fire wall.

(2) Install cab to cargo box ground strap. From front lower edge of right cargo box fender panel to right rear lower corner of cab rear panel. Use 3/8" bolt, nut, and washer through existing hole in fender panel and 3/16" metal screw through existing hole in cab rear panel.

l. Voltage Limiter. Behind instrument panel locate and remove voltage limiter. Remove by pulling it out of the printed circuit board. Replace with suppressed limiter. (Refer to paragraph 2-44).

m. Reconnect battery ground cable at battery.

n. Start engine and test truck.

Section X. MAINTENANCE OF CHARGING SYSTEM

2-27. General.

a. Maintenance-Free Battery. The maintenance-free battery (figure 2-38) has no vent caps on the cover and water never has to be added. Except for a small vent hole on the side, the battery is completely sealed. The vent hole allows small amounts of gases produced during charging to escape. However, a special chemical inside the battery keeps gas production very low at normal charging voltages. The battery is very resistant to damage from overcharging and the terminals are tightly sealed to retard leakage. A charge indicator in the cover indicates the state of charge.

NOTE

Before running any test on charging system components, the battery must be fully charged. See paragraph 2-28.

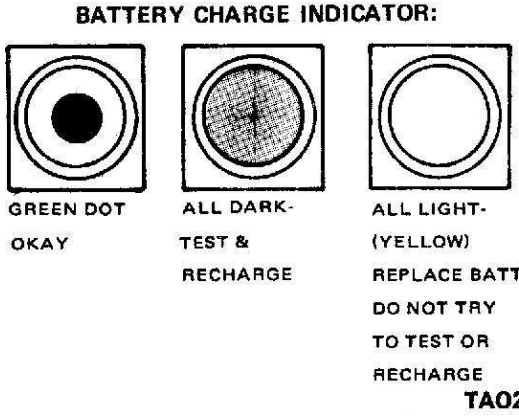


Figure 2-38. Battery Charge Indicator.

b. Alternator. The alternator (figure 2-39) rectifies its a.c. output into d.c. through six built-in silicon rectifiers. The alternator's main components are the rotor (field) stator, rectifiers, end shields, and drive pulley.

c. Electronic Voltage Regulator. The electronic voltage regulator (figure 2-40) controls the electrical system voltage by limiting the alternator's output voltage. It does this by controlling the amount of current that passes through the alternator's field winding. The regulator is set during manufacture and requires no further adjustment. It is a solid-state, electronic device with no moving parts. One important feature of the electronic voltage regulator is that it varies system voltage up or down, depending on the temperature. This provides the best possible charging conditions for the battery in all kinds of weather and in all seasons.

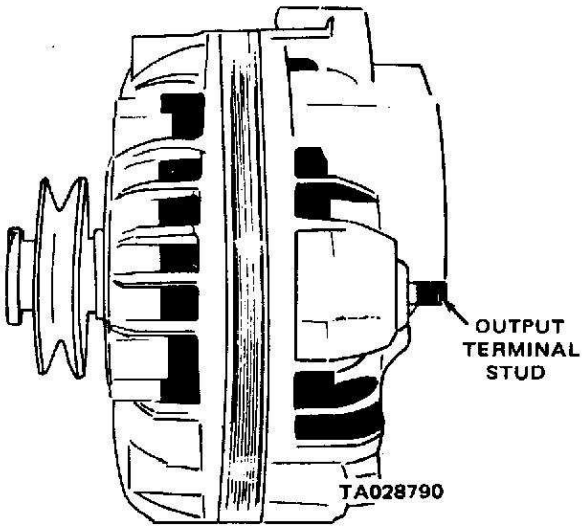


Figure 2-39. Alternator.

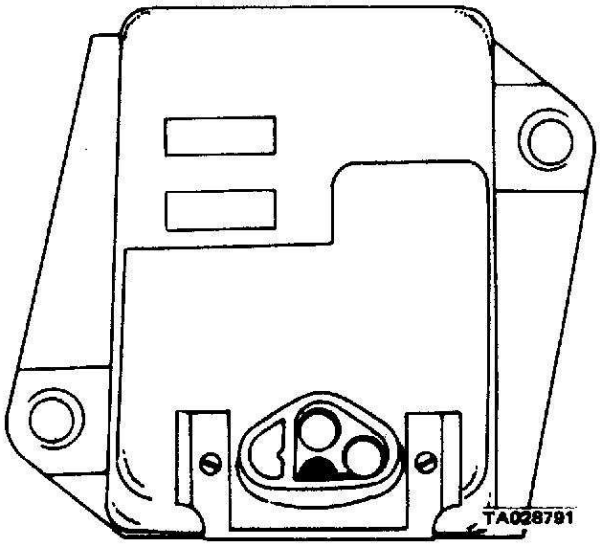


Figure 2-40. Electronic Voltage Regulator.

2-28. Battery Service.

a. Charge Indicator. The charge indicator, located in the cover of the battery, shows the state of charge of the battery.

b. Charge Indications. The different charge indications are interpreted as follows:

(1) Green dot visible. When the charge indicator is dark and has a green dot in the center, the battery is charged enough to be tested. Proceed to *c*, below.

(2) Indicator dark – no green dot visible. If no green dot is visible but the indicator is dark in color, charge the battery until the green dot appears. DO NOT charge for more than 60 amp-hours (for example 15 amps for 4 hours). Then do checks *c* through *e*, below.

NOTE

If your charger is the constant voltage type, you may have to tip the battery slightly from side to side in order to get the green dot to appear.

(3) Indicator light-colored. A light-colored charge indicator (yellow) means the battery has failed. Replace the battery.

c. Visual Inspection. Look for obvious damage, such as a cracked or broken case, that could cause loss of electrolyte. Replace the battery if it is cracked or broken.

d. Testing for Drains on the Battery. If your battery continually goes dead when the truck is parked overnight or for longer periods of time, and you are sure someone didn't leave the lights on, make the following test:

(1) Disconnect the battery ground cable at the battery.

(2) Set a multimeter to read at least 15 volts d.c.

(3) With all electrical systems turned off, connect the red test lead to the disconnected ground cable and the black lead to the negative battery terminal. If the meter reads from 0 to 4 volts, drain on the system is acceptable. If the meter reads from 4 volts up to battery voltage, something in the vehicle is either on or is shorted to ground.

NOTE

If the cab door is open while making this test, the meter will read battery voltage because the cab light switch is on. The reason the light itself is not burning is that the circuit is broken by the disconnected battery ground strap.

(4) In order to isolate the short to ground, disconnect various electrical connectors until the meter needle drops into the acceptable 0 to 4 volt range. The procedure is as follows:

(a) Disconnect each fuse in the fuse box, one at a time. When the meter drops into the acceptable range, reinstall the fuse that made it drop. Then, using the wiring diagram (figure 2-40), disconnect one at a time, those items feeding off that fuse. When the meter again drops into the acceptable range (0 to 4 volts), you have isolated the short to ground.

(b) If the removal of all of the fuses did not drop the meter into the acceptable range, use the wiring diagram and the same technique to disconnect individual items such as the alternator, voltage regulator, light switches, etc.

(c) If the tracing of the short to ground or the subsequent repair is beyond your level of maintenance, notify Direct Support.

e. Load Test. Load test the battery using the following procedure:

(1) Disconnect the coil (high tension) wire from the ignition coil.

(2) Crank the engine for 15 seconds to remove any surface charge from the battery.

(3) Set the multimeter to read at least 15 volts d.c. and connect the leads to the battery terminals.

(4) Have an assistant crank the engine for 15 seconds as you observe the voltmeter. If the reading doesn't drop below 10V while cranking, the battery is okay. If the reading drops below 10V, proceed as follows:

(a) Look for arcing or smoke anywhere along the main supply cable between the battery and the starter motor. If you see any, replace the defective cable.

(b) Pull a second vehicle (with a known good battery) up next to the truck.

(c) Disconnect the leads from the batteries in both vehicles.

(d) Connect jumper cables between the known good battery in the second vehicle and the disconnected cables of the truck.

CAUTION

If the second vehicle has a 24V electrical system, only use one of the 12V batteries. Also, make sure that you connect the positive post to the positive cable, and the negative cable to the negative post of the jump battery.

(e) Repeat steps (2) through (4) above, measuring the voltage drop on the jump battery. If the voltage doesn't drop below 10V on the jump battery, the first battery is defective and must be replaced (*f*, below). If the reading drops below 10V, the battery is okay. The starter motor may be defective; do the test in paragraph 2-31.

NOTE

Battery failure can occur due to overcharging. If you had to replace the battery in the steps above, proceed to the charging system tests in paragraph 2-29.

f. Removing and Installing a Maintenance-Free Battery. Use the following procedure:

(1) Disconnect the negative battery cable.

(2) Disconnect the positive battery cable.

(3) Remove the two nuts from the battery hold-down.

(4) Remove the battery holddown plate and rods.

(5) Lift the battery out of the truck using the lifting indentations located in the casing at each end of the battery. It is not necessary to use any type of battery-lifting device.

NOTE

If the battery fails and a new maintenance-free battery is not available to replace it, use a standard (6 TN) military battery instead. Replacement procedures are in *g*, below.

(6) To install a battery, reverse the above procedure. Make sure the terminals and posts are clean. Make sure that you connect the positive cable to the positive battery post, and the negative cable to the negative post. Use a torque wrench to tighten the terminal connections to 10-15 ft-lbs.

g. Replacing a Maintenance-Free Battery With a Military Battery (6 TN). Use the following procedure:

(1) Remove maintenance-free battery (*f*, above).

(2) Install cable end adapters on both the positive and negative battery cables.

(3) Position the 6 TN battery in the vehicle (figure 2-40.1).

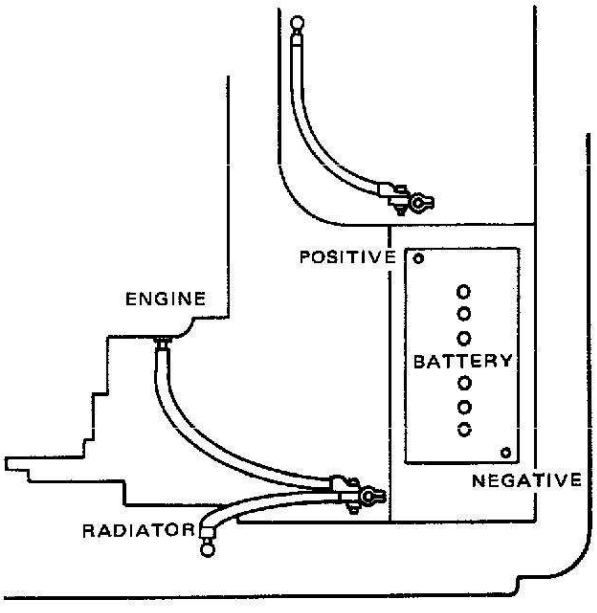


Figure 2-40.1. 6 TN Battery Installation.

(4) Position two blocks of wood on top of the battery.

NOTE

The blocks of wood will protect the battery caps and allow you to secure the battery with the original battery hold-down plate and rods.

(5) Install the battery hold-down rods, plate, and nuts.

(6) Connect the positive battery cable.

(7) Connect the negative battery cable.

h. Jump Starting the Truck. The procedure for jump starting the truck is shown in figure 2-41.

CAUTION

These trucks have a 12V electrical system. Since most tactical vehicles have 24V systems, you must use the jumper connections shown in figure 2-41 for jump starting. Direct jumping from the 24V systems will damage the charging system; *always disconnect one battery of a 24V system* before attempting to jump start this truck.

2-29. Alternator and Voltage Regulator.

a. Initial Tests. When a charging system problem is suspected, perform the following steps to determine which part of the charging system is defective:

(1) Make sure the charge indicator on the battery has a green dot in the center. If not, refer to paragraph 2-28 before proceeding.

(2) Set the multimeter to read at least 15 volts d.c. and connect the leads between the battery terminals. Note the battery voltage.

(3) If the green dot is visible, start the engine and run it at a fast idle (1,250 rpm) with all lights and accessories turned OFF until the ammeter on the dashboard stops indicating a charge and returns to the center position. The amount of time this requires depends upon cranking time when you start the engine.

(4) With the multimeter still set to read at least 15 volts d.c., reconnect the leads between the battery terminals. The meter should now read in the 13.5 to 14.5 volt range.

NOTE

If the engine compartment temperature is subzero, voltage should be in the 14.5 to 16 volt range. If the temperature is exceptionally high (over 140° F), reading should be 13 to 14 volts.

(5) If voltage is above or fluctuating above limits, replace the voltage regulator (*c*, below). If voltage is below or fluctuating below limits, go to step *b*, below. If voltage is within limits, the charging system is okay.

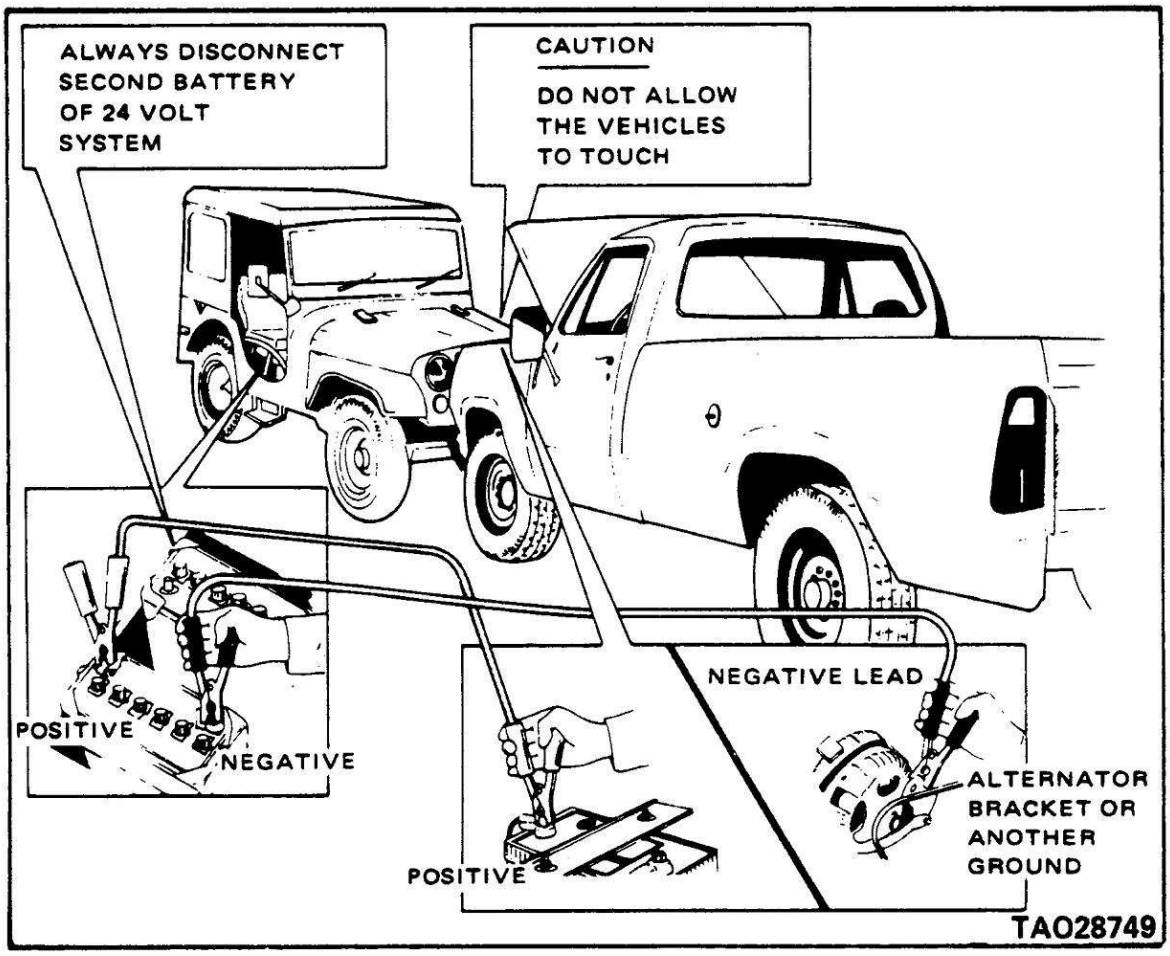


Figure 2-41. Jump Starting the Truck.

b. Under- or No-Charging Condition. If an under- or no-charging condition is suspected from the tests in *a*, above, take the following steps.

NOTE

This paragraph has many steps; you may not need all of them for any one charging system problem. Each step will tell you if you need to go on to another step. *Only* do those steps that you are told to do.

(1) Check the fan belt for proper tension (1/2 to 3/4 inch deflection). Tighten the belt if it is loose. If the belt is okay, go to step 2.

(2) With the multimeter set to read at least 15 volts d.c., connect the red lead to the alternator output terminal stud (figure 2-39) and the black lead to a good ground.

(a) If the meter does not read battery voltage, go to step 3.

(b) If the meter reads battery voltage go to step 4.

(3) Check for battery voltage where the black wire comes out of the bulkhead connector on the firewall (figure 2-42). Push the red test lead in from the back of the connector and connect the black lead to a good ground.

(a) If the meter reads battery voltage, notify Direct Support to repair the wiring harness between the bulkhead connector and the alternator.

(b) If the meter does not read battery voltage, press in on the bulkhead connector and wires and move them back and forth. If battery voltage is still not present, notify Direct Support to repair the wiring harness between the ammeter and the bulkhead connector.

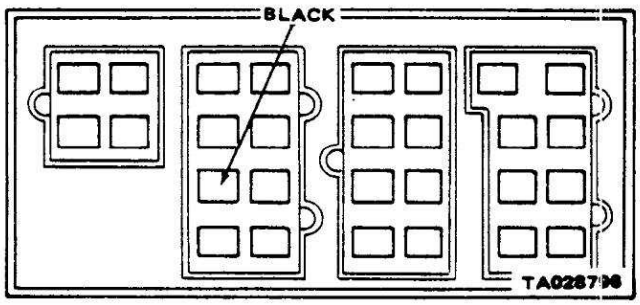


Figure 2-42. Bulkhead Connector (Black Wire).

(4) Disconnect the red field wire from the alternator. Turn the ignition switch ON.

Section XI. MAINTENANCE OF STARTING SYSTEM

2-30. General.

The starting system consists of an ignition switch, starter, battery, and battery cables. The starter is a 12V motor housed in an aluminum die casting. It is bolted to the converter housing on the lower left side of the engine.

WARNING

Before performing any tests on the starter, disconnect the coil wire to prevent the engine from starting.

2-31. Troubleshooting the Starting System.

When you suspect a starting system problem, perform the following steps:

NOTE

The following steps cover several starting system problems. Follow the steps in order; the pertinent steps for a single problem will be pointed out for you.

a. Make sure the charge indicator on the battery has a green dot in the center. If not, charge it (paragraph 2-28) before proceeding to *b*, below.

b. Set the multimeter to read at least 15 volts d.c. and connect the leads between the battery terminals. Note the voltage and then have a helper try to crank the engine while you read the meter.

(1) If the meter reading does not drop, or does not drop more than one volt while your helper is trying to crank the engine, go to *e*, below.

(2) If the meter reading drops by more than one volt while your helper is trying to crank the engine, clean any dirty battery posts and tighten any loose connections at the battery terminals, starter relay, starter, and engine end of battery ground strap.

(3) If the engine now cranks normally, no further maintenance is necessary. If the engine still will not crank normally, go to step *c*.

c. High resistance in the starter supply circuit wiring connections can cause slow or no cranking Check for resistance in these connections as follows:

(1) Disconnect the coil wire.

(2) Set the multimeter on the lowest d.c. volts scale and connect the test leads as shown in table 2-3.

(3) For each connection shown, try to crank the engine briefly while reading the meter. If any reading is higher than the limits shown in table 2-3, clean and tighten that connection. Then repeat the test at that connection.

(4) If the engine still will not crank normally, go to *d*, below.

d. Try to manually crank the engine clockwise with a wrench attached to the nut on the crankshaft pulley.

Table 2-3. Circuit Voltage Drop Chart

CONNECTION	VOLTAGE LEAD CONNECTION		VOLTMETER READING
	POSITIVE	NEGATIVE	
Positive post on battery to cable clamp	To post	To clamp	0
Negative post on battery to cable clamp	To clamp	To post	0
Battery ground cable to engine block	To bolt	To cable connector	Not to exceed 0.2V
Battery cable to starter	To battery positive post	To battery terminal on starter	Not to exceed 0.2V
Starter housing to ground	To starter housing	To negative post on battery	Not to exceed 0.2V

(1) If you can turn the engine, load test the battery (paragraph 2-28).

(2) If you cannot manually turn the engine, notify Direct Support that you have a locked engine.

e. With the multimeter still set to read at least 15 volts d.c., connect the red lead to the battery cable stud on the starter relay and the black lead to ground.

(1) If the meter does not read battery voltage, repair or replace the positive battery cable.

(2) If the meter reads battery voltage, go to *f*, below.

f. With the ignition switch in the START position, check for battery voltage at the starter relay between the terminal with the orange wire and ground.

(1) If battery voltage is present, go to *g*, below.

(2) If battery voltage is not present, go to *k*, below.

g. Place the transmission gear selector in Neutral or Park. Set the multimeter on the lowest ohms scale and zero the meter. Disconnect the green and white wire from the starter relay and connect the test leads between the green and white wire and ground.

(1) If the meter reads 5 ohms or less, go on to *h*, below.

(2) If the meter reads more than 5 ohms, have a helper move the transmission gear selector up and down while you read the meter.

(a) If the meter drops to 5 ohms or less, even momentarily, have Direct Support adjust the transmission linkage.

(b) If you cannot get the meter to drop to 5 ohms or less, jump the disconnected green and white wire to ground. Disconnect the wire harness from the neutral safety switch on the transmission. Connect one test lead to ground and the other test lead to the green and white wire (middle terminal) on the harness connector at the neutral safety switch.

(c) If the meter now reads 5 ohms or less, replace the neutral safety switch. If the meter still reads more than 5 ohms, notify Direct Support to repair the green and white wire between the neutral safety switch and the starter relay.

h. Reset the multimeter to read battery voltage. Reconnect the green and white wire to the starter relay. (Also reconnect the orange wire if you disconnected it in *f*, above). With the transmission in Neutral or Park, and the ignition switch in the START position, check for battery voltage between the light brown wire on the starter relay and ground.

(1) If battery voltage is not present, replace the starter relay.

(2) If battery voltage is present, go on to *i*, below.

i. Check for battery voltage between the large stud on the starter solenoid and ground.

(1) If battery voltage is not present, repair or replace the large wire between the starter relay and starter solenoid.

(2) If battery voltage is present, go to *j*, below.

j. With the ignition switch in the START position and the transmission in Neutral or Park, check for battery voltage between the small stud on the starter solenoid and ground.

(1) If battery voltage is present, replace the starter (paragraph 2-32).

(2) If battery voltage is not present, notify Direct Support to repair the small wire between the starter relay and the starter solenoid

k. Check for battery voltage at the fusible link connector on the red wire coming from the starter relay. (This can be done by pushing the red test lead in from the back at the connector and touching the black lead to ground.)

(1) If battery voltage is present, go on to *l*, below.

(2) If battery voltage is not present, replace the fusible link.

l. Check for battery voltage where the red wire goes into the bulkhead connector on the firewall (figure 2-43). Push the red test lead in from the back of the connector.

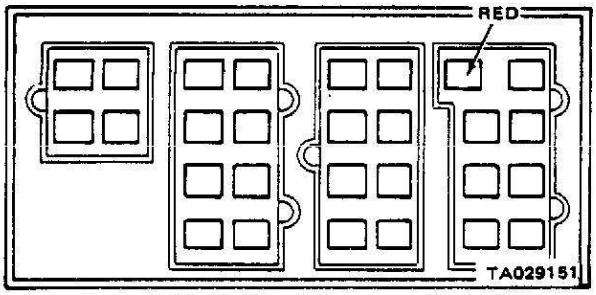


Figure 2-43. Bulkhead Connector (Red Wire).

(1) If the meter reads battery voltage, go on to *m*, below.

(2) If the meter does not read battery voltage, notify Direct Support to repair the wire between the connector and the fusible link.

m. Check for battery voltage at both terminals on the ammeter.

(1) If battery voltage is present at both, go to *n*, below.

(2) If battery voltage is not present on either, notify Direct Support to repair the red wire between the bulkhead connector and the ammeter. If battery voltage is present on only one terminal, replace the ammeter.

n. Pull apart the ignition switch steering column connector under the dashboard. Check for battery voltage on the black wire coming into the connector from the ammeter (not from the steering column).

(1) If battery voltage is present, go to *o*, below.

(2) If battery voltage is not present, notify Direct Support to repair the black wire between the ammeter and the steering column connector.

o. Set the multimeter on the lowest ohms scale and zero the meter. With the ignition switch in the START position, connect the test leads to the orange and black wires coming from the steering column.

(1) If the meter reads 0 to 3 ohms, go on to *p*, below.

(2) If the meter reads more than 3 ohms, notify Direct Support to repair the starter relay circuit through the ignition switch.

p. Reconnect the steering column connector. Reset the multimeter to read battery voltage. Turn the ignition switch to the START position. In the engine compartment, check for battery voltage by pushing the red test lead in from the back where the orange wire comes out of the firewall bulkhead connector (figure 2-44).

(1) If the meter does not read battery voltage, press in on the bulkhead connector and wires and move them back and forth.

(2) If battery voltage is still not present, notify Direct Support to repair the orange wire between the steering column and the bulkhead connectors.

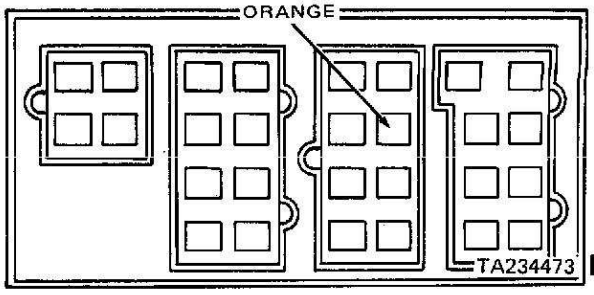


Figure 2-44. Bulkhead Connector (Orange Wire).

(3) If battery voltage is present, notify Direct Support to repair the orange wire between the bulkhead connector and the starter relay.

2-32. Replacing the Starter.

a. Removal.

(1) Disconnect the negative (ground) cable at the battery.

(2) Disconnect the positive battery cable from the starter.

(3) Disconnect the solenoid lead wires at the solenoid terminals.

(4) Remove the stud nut and bolt holding the starter motor to the converter housing.

(5) Slide the starter out of the housing, being careful not to damage the housing seal.

b. Preparation for Installation. Before installing a new starter, make sure that all mounting surfaces on the starter and on the converter are free of dirt and oil. The motor is grounded through the mounting bolts, and cleaning the surfaces will help insure good electrical connections.

c. Installation.

(1) If the rubber mounting seal came off when the previous starter was removed, reposition the seal in the housing.

(2) Place the starter in position and install the washer and nut on the lower stud. Install and tighten the top bolt, then tighten the nut on the lower stud.

(3) Attach the solenoid wires and starter battery cable.

(4) Reconnect the battery ground cable at the negative battery terminal and test the starter for proper operation.

2-32.1 Replacing the Starter Relay

a. Removal.

(1) Disconnect negative cable from the battery.

(2) Tag and disconnect all wires from the starter relay (figure 2-44.1).

(3) Remove two screws and washers holding starter relay to wheelwell.

b. Installation.

(1) Secure starter relay to wheelwell using two screws and washers.

(2) Connect wires to starter relay (figure 2-44.1).

(3) Connect negative cable to battery. Make sure that battery and terminal connection is clean and tight.

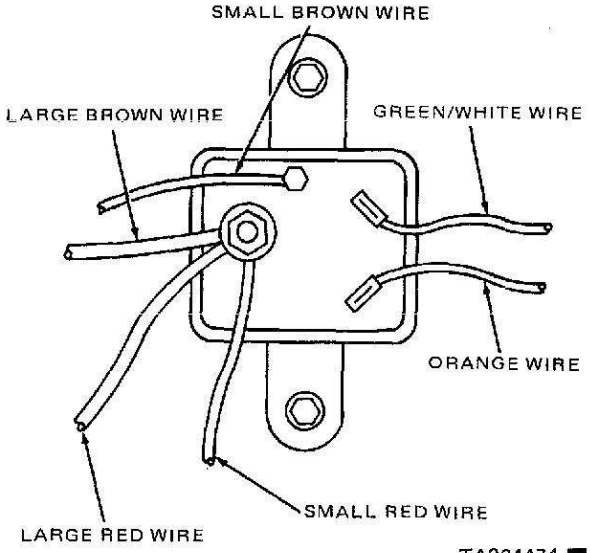


Figure 2-44.1 Starter Relay.

2-33. Removing and Replacing the Battery Cables.

To remove and replace the battery cables, disconnect the negative cable from the battery before you disconnect it from the block. Then disconnect the positive cable, including the segment between the solenoid and the relay. Make sure the battery posts and new cable clamps are clean. Then reinstall by reversing the removal procedure.

Section XII. MAINTENANCE OF ELECTRICAL SWITCHES

2-34. General Information.

This section contains installation and removal procedure for the following switches: headlight, dimmer, brake light, horn, heater fan, turn signal/hazard warning light, and windshield wiper/washer.

2-35. Replacing the Headlight Switch.

a. Removal.

(1) Disconnect the negative (ground) cable at the battery.

(2) Reach under the instrument panel and depress the knob-and-stem release button on the bottom of the switch housing. At the same time, pull the knob-and-stem assembly out of the switch housing from the front of the panel.

(3) Remove the spanner nut attaching the switch to the front of the panel.

(4) Reach under the panel and lower the switch far enough to remove the electrical leads. Disconnect the leads.

(5) Remove the switch.

b. Installation.

(1) Reconnect the electrical leads.

(2) Position the switch in the panel and install the spanner nut. Tighten it securely.

(3) Insert the knob-and-stem assembly into the switch. Make sure the spring catch operated by the knob-and-stem release button holds the stem securely.

(4) Reconnect the battery ground cable and check switch operation.

2-36. Testing and Replacing the Windshield Wiper/Washer Switch.

a. Testing. Disconnect the wiring-harness connectors to the switch. Working behind the dashboard, use an ohmmeter to test for continuity (no resistance) between the switch contact terminals as shown in table 2-4. For test purposes, the first position is the OFF position. The LOW position is the first detent past the OFF position. The HIGH position is the second detent of the switch. Use the case of the switch for ground. Replace the switch, if it is defective.

Table 2-4. Switch Continuity Chart

OFF	LOW	HIGH
B to B/U	B to B/U	B to B/U
B to P1	B to P1	B to P1
A to P2	B to A	B to H
H-open	P-2 open	P-2 open
	H-open	A-open

b. Removal.

(1) Disconnect the negative (ground) cable at the battery.

(2) Loosen the set screw on the wiper control knob Remove the knob from the shaft.

(3) From the front of the panel, remove the spanner nut that mounts the switch to the panel.

(4) Working under the dash, lower the switch far enough and disconnect the electrical leads. Remove the lighting bracket.

(5) Remove the switch.

c. Installation.

(1) Working under the dash, connect the electrical leads and install the lighting bracket to the switch.

(2) Position the switch in the panel. Install the spanner nut and tighten it securely.

(3) Install the knob on the shaft. Tighten the set screw securely.

(4) Reconnect the battery ground cable and check switch operation.

2-37. Replacing the Heater Fan Control Switch.

a. Removal.

(1) Disconnect the negative (ground) cable at the battery.

2-39. Replacing the Horn Switch.

a. Removal.

(1) Remove the horn button by pulling it off the center of the steering wheel (see figure 2-45).

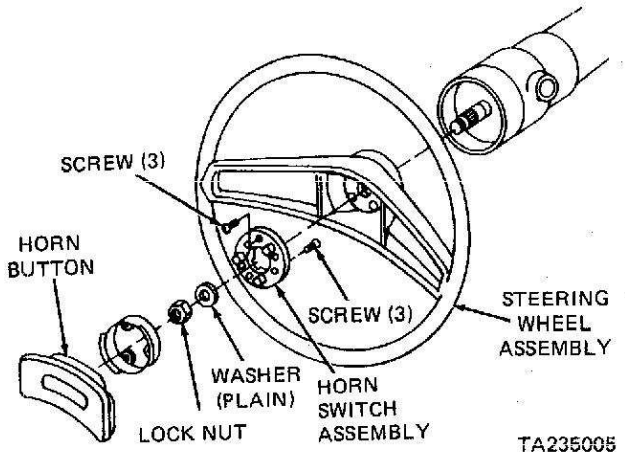


Figure 2-45. Horn Switch Removal.

(2) Pull the horn wire from the horn switch terminal.

(3) Remove the three screws. Lift out the horn switch.

b. Installation. Position the horn switch in the steering wheel and install the three retaining screws. Tighten them securely. Connect the horn switch wire to the switch terminal and reinstall the horn button.

2-40. Replacing the Brake Light Switch.

Refer to figure 2-46.

a. Removal.

(1) Disconnect the two wires from the switch.

(2) Remove the bracket attaching screw, and remove the switch and bracket as an assembly.

(3) Slide the switch out of the bracket.

b. Installation. To install a new brake light switch, reverse *a*, above.

2-41. Replacing the Headlight Dimmer Switch.

a. Removal.

(1) Disconnect the negative (ground) cable at the battery.

(2) Disconnect the connector between the switch and the wiring harness.

(3) Remove the top mounting screw and ground wire.

(4) Remove the bottom mounting screw and remove the switch.

b. Installation. To install a new dimmer switch, reverse *a*, above.

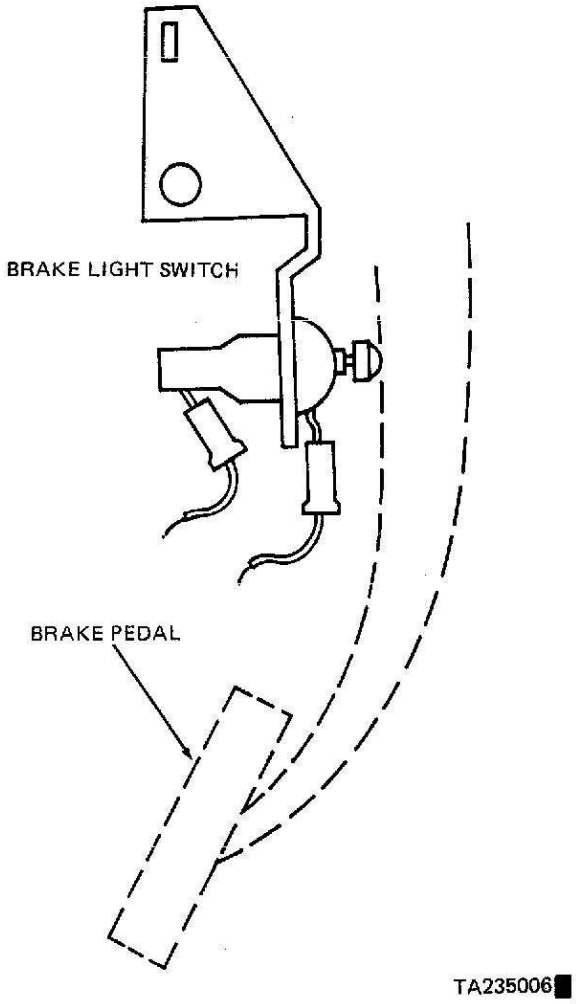


Figure 2-46. Brake Light Switch.

Section XIII. MAINTENANCE OF SPEEDOMETER AND INSTRUMENT PANEL GAGE ASSEMBLY

2-42. General Information.

The instrument panel gage assembly consists of the fuel, temperature, and oil pressure gages, and the alternator indicating system. The speedometer system is included in this section because it is part of the instrument panel gage assembly. These components are described more fully below.

2-43. Component Descriptions.

a. Fuel, Temperature, and Oil Pressure Gages. The fuel, temperature, and oil pressure gages are of the constant-voltage, variable-resistance type. The gages are powered through a common voltage limiter which pulses to provide intermittent current to the gage system. An electrical damping circuit keeps the gage needles steady, despite any brief fluctuations in current flow to the meters.

(1) Fuel level indicating system. The fuel level sensor is a hinged float-arm that floats on the surface of the fuel, rising and dropping with the fuel level. The end of the arm contacts a variable resistor in a sending unit mounted in the top of the fuel tank. The circuit resistance caused by the variable resistor increases as the fuel level drops. This decreases the current flow through the meter and causes the gage needle to move down toward the empty mark. When the tank is full, resistance decreases to a minimum. This increases the amount of current in the circuit and causes the fuel gage needle to move up toward the full mark.

(2) Temperature and oil indicating systems. The temperature and oil indicating systems vary the circuit resistance differently than the fuel level indicating system. In all other respects however, these systems operate identically. In the temperature indicating system, a metal disc in the temperature sensor decreases in electrical resistance as the coolant temperature increases. This increases current flow through the temperature gage, causing the needle to rise. In the oil pressure indicating system, increased oil pressure causes a diaphragm in the pressure sensor to move outward. This decreases circuit resistance, thus increasing current flow through the meter, and causing the gage needle to rise.

b. Alternator Indicating System. The alternator gage shows whether the battery is being charged or discharged.

c. Speedometer. The speedometer system consists of the speedometer, the cable assembly, and the drive pinion gear in the transmission. The rear tires must be properly inflated to 55 psi for the system to remain accurate. The speedometer cable assembly has a silencing sleeve to reduce noise where the cable core connects with the speedometer unit.

d. Brake System Warning Light. The brake warning light illuminates when the parking brake is applied with the ignition key turned ON. If one of the two service brake systems has failed, the light will also illuminate when the service brake pedal is applied.

2-44. Testing Instrument Panel System Components.

a. Alternator Gage Test (All Electrical Functions Lost). The alternator gage is connected directly in series with every electrical service circuit in the truck (lights, gages, starting solenoid, etc.). The following test procedure is designed for a situation where all electrical functions fail. If the alternator gage is simply functioning improperly, but not all electrical functions are lost, use the test procedure in *b*, below.

(1) Using a multimeter, set to read at least 15 volts d.c., check the battery voltage.

(2) With the ignition key in the OFF position, check for voltage at both alternator gage terminal connections. Both terminals should read battery voltage when measured to ground.

(a) Both terminals energized. If both terminals are energized, the problem is not in the alternator gage. Check and repair the wiring harness after the alternator gage.

(b) One terminal energized. If only one terminal has voltage, disconnect the negative (ground) cable at the battery. Then, working up behind the panel, tighten the connection at the dead terminal. Reconnect the battery ground cable and check for voltage at both alternator gage connection terminals. If one terminal still has no voltage, remove the instrument panel gage assembly and replace the alternator gage (paragraph 2-45). Then go to step *3* of this procedure.

(c) Neither terminal energized. If you get no sign of voltage at either terminal, disconnect the negative (ground) cable at the battery. Tighten any loose connections at the terminals. Reconnect the ground cable and check for voltage again. If you still have no voltage, check the wiring harness before the alternator gage.

(3) With the ignition switch in the OFF position, turn on the headlights. The gage needle should move toward the "D" or discharge scale. If it moves toward the "C" or charge scale, the terminal connection wires are reversed. If the alternator gage still does not function properly, check and repair the wiring harness.

b. Alternator Gage Test (Electrical Functions Not Lost). This procedure is designed for use when the gage works improperly but not all electrical functions are lost.

(1) Disconnect the negative (ground) cable at the battery. Then see if both alternator gage connection terminals are tight. Tighten any loose connections, reconnect the battery ground cable, and check for voltage at both gage terminals. Both terminals shoud have battery voltage; if they do not, or if tightening the connections did not correct the problem, remove the instrument panel gage assembly and replace the alternator gage (paragraph 2-45).

(2) To test a newly installed alternator gage, reconnect the battery ground cable. With the ignition switch turned to OFF, turn the headlights ON. If the gage needle does not move, check and repair the wiring harness between the gage and the battery. If the needle moves toward "C" (charge), the gage terminal connection wires are reversed.

c. Oil Pressure, Fuel Level, and Temperature Gage Tests. Before testing the gages, check them for normal operation (TM 9-2320-266-10). If all three gages operate abnormally but the alternator gage keeps working, test the voltage limiter (*e*, below). If only a single gage has stopped working, use the gage testing procedure below. See figure 2-47.

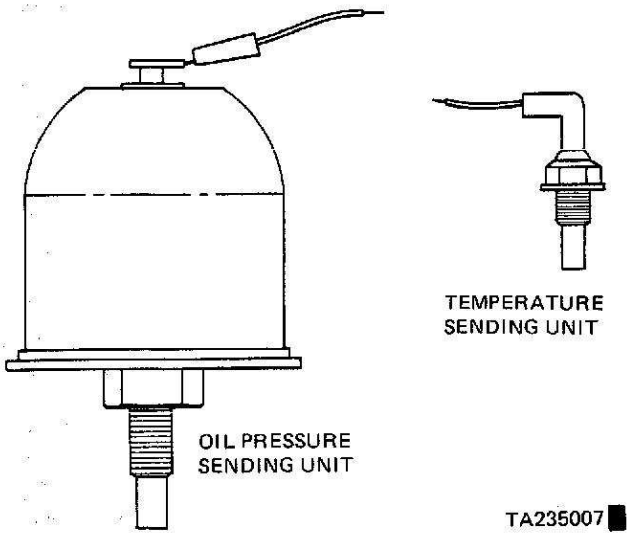


Figure 2-47. Oil Pressure and Temperature Gage Sending Units.

(1) Disconnect the wire from the gage sending unit.

(2) Turn the key to ON and wait for 30-60 sec. The gage needle should remain pegged at the low end.

(3) If the needle moves, turn the key to OFF and check to see if the sending unit wire is grounded, using an ohmmeter. Repair any ground in the wiring harness.

(4) If the needle does not move, turn the key to OFF and attach one end of a jumper wire to the gage wire at the sending unit. Have someone watch the gage for you, and connect the other end of the jumper to a good ground. Have your assistant turn the ignition to ON. The needle should move toward the high peg. Turn off the ignition switch as soon as the needle reaches the highest gage mark, before it pegs. If the needle stops before the high mark, replace the gage (paragraph 2-45).

NOTE

The fuel-gage sending unit has two wires attached to it. Use the "hot" lead for this test. Also, make certain that the sending unit ground wire is properly attached.

(5) If the needle moves properly when the sending unit wire is jumped to ground, but does not move when the wire is attached to the sending unit, the sending unit is defective. Remove and replace it.

(6) If the needle does not move when the sending unit wire is attached to ground, disconnect the negative (ground) cable at the battery. Then, working up behind the instrument panel, tighten any loose gage connections. Reconnect the battery ground cable and try the wire-grounding test again.

(7) If the needle still does not work properly, turn the ignition switch to ON. Check for voltage at both of the gage terminals, using a multimeter.

NOTE

The voltage will not be the same as battery voltage.

(8) If you have voltage on only one terminal, remove the instrumet-panel gage assembly and replace the gage (paragraph 2-45).

(9) If you have power on both terminals, check for voltage at the disconnected sending unit wire.

(a) If there is voltage at the sending unit wire, remove and replace the gage.

(b) If there is no voltage at the sending unit wire, check and repair the wiring harness between the gage and the sending unit.

(10) If neither terminal has voltage, test the voltage limiter and replace it if necessary (*e*, below). Also look for broken connections on the printed circuit board; remove and replace it if necessary.

d. Brake-Failure Warning Light Test. To test whether the brake-failure warning light is burned out, apply the parking brake and turn the ignition switch to ON. The light should illuminate. If it does not, replace the bulb (paragraph 2-46). If it still does not light, look for a broken or disconnected wire at the switch located on the parking brake foot-pedal lever. Once the light works properly, test the service brake-failure warning circuit as follows:

(1) Have an assistant turn the ignition switch to the ON position and depress the service brake pedal while he watches the warning light. Then open the left front wheel cylinder bleeder. The warning light should light up.

(2) If the light fails to illuminate, disconnect the sending wire from the switch located in the brake line "T" fitting (figure 2-48).

(3) Press the disconnected sending wire against a good ground. If the warning light now illuminates, replace the brake warning switch. If it does not light, check and repair the wiring harness between the switch and the light.

(4) Once the brake warning light is working, refill the brake master cylinder if required, and bleed the brakes (paragraph 2-81).

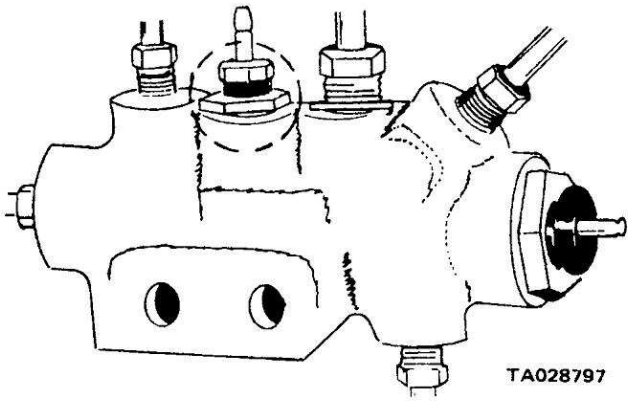


Figure 2-48. Brake-Failure Warning Light Switch.

e. Voltage Limiter Test. The voltage limiter is a rectangular, metallic box mounted on the printed circuit board (figure 2-49). It limits power to the oil, temperature, and fuel gages, and to the brake-failure warning light. You can test it in the vehicle as follows:

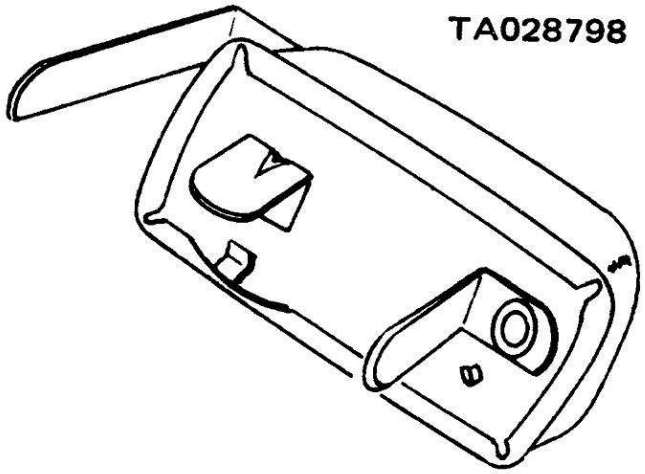


Figure 2-49. Voltage Limiter.

(1) Press one lead of a voltmeter to the temperature sending unit. Leave the sending unit lead wire attached to the sending unit.

(2) Press the other voltmeter lead to a good ground.

(3) Turn the ignition switch to the ON position. A fluctuating voltmeter reading indicates that the voltage limiter is working properly.

(4) If the reading does not fluctuate, remove the negative (ground) cable at the battery. Then reach behind the instrument panel and locate the voltage limiter. Remove it by pulling it out of the printed circuit board. Replace it with a new limiter and reconnect the battery ground cable at the negative battery terminal. Repeat the voltmeter test.

NOTE

Check for blown fuse before replacing voltage limiter.

2-45. Removal and Installation Procedures - Gage Assembly and Components.

a. Removing the Instrument Panel Gage Assembly.

(1) Disconnect the negative (ground) cable at the battery.

(2) Remove the mounting screws along the lower edge of the panel cover (figure 2-50).

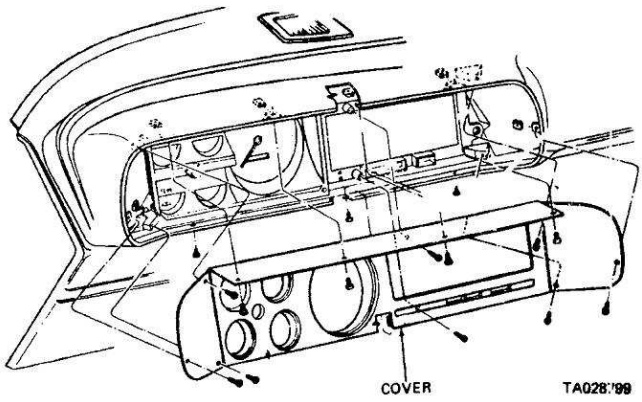


Figure 2-50. Removing the Panel Cover.

(3) Remove the four mounting screws along the upper edge of the cover.

(4) Remove the eight mounting screws from the face of the cover.

(5) Remove the cover from the instrument panel gage assembly.

(6) Cover the steering column to prevent damage to the paint.

(7) Working under the instrument panel, disconnect the speedometer cable by pulling on the plastic sound-deadening sleeve where it joins the speedometer.

(8) Remove the five gage assembly mounting screws from the front of the panel.

(9) Maneuver the assembly far enough out of the panel to gain access to the rear. Then disconnect all electrical leads.

(10) Remove the assembly from the panel.

b. Installing the Instrument Panel Gage Assembly.

(1) Position the gage assembly on the lower edge of the panel opening.

(2) Reach behind the assembly and reconnect all electrical leads. Make sure you connect the red alternator gage wire to the terminal marked RED or the alternator gage will work backwards.

(3) Position the assembly in the panel opening. Be careful not to pinch any wires. Then install and tighten the mounting screws.

(4) Working from under the panel, connect the speedometer cable.

(5) Install the panel cover, tightening all screws securely.

(6) Reconnect the battery ground cable.

(7) Check all gages for proper operation.

c. Removing the Gages. This procedure covers all five instrument panel gages.

(1) Remove the instrument panel gage assembly (*a*, above).

(2) Place the assembly on a padded work bench.

(3) Remove the transparent plastic gage cover, using needlenose pliers to compress the spring clamps that hold the cover to the housing.

(4) Remove any gage in the assembly by removing either mounting screws or nuts located at the rear of the assembly housing. With mounting screws or nuts removed, pull the gage from the front of the housing.

d. Installing the Gages.

(1) Position the gage in the housing and install the mounting screws or nuts.

(2) Reinstall the plastic gage cover.

(3) Reinstall the entire gage assembly (*b*, above).

e. Removing the Printed Circuit Board.

(1) Remove the instrument panel gage assembly (*a*, above.)

(2) Remove all gages except the speedometer.

(3) Remove the voltage limiter.

(4) Remove all lamp sockets by rotating counterclockwise and pulling outward.

(5) Remove the circuit board mounting screws and lift off the board.

f. Installing the Printed Circuit Board.

(1) Position the board on the assembly housing and install mounting screws.

CAUTION

Do not over-tighten the mounting screws or the printed circuit board will be damaged.

(2) Install the lamp sockets by inserting them into the receiving holes and rotating clockwise.

NOTE

The lamp receiving hole over the oil gage is designed for a low oil pressure indicating light, and is not used.

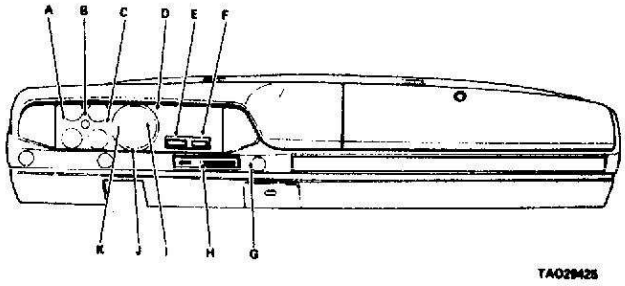
(3) Install all the gages.

(4) Install the voltage limiter.

(5) Reinstall the entire gage assembly in the dash (*b*, above).

2-46. Removal and Installation of the Instrument Panel Illumination Lamps.

The following procedure applies to the instrument panel gage assembly illumination lamps, the brake warning lamp, the turn signal indicator lamps, and the high beam indicator lamps. See figure 2-51 for locations.



LEGEND for Figure 2-51:

A. Cluster illumination.
B. Brake warning indicator.
C. Cluster illumination.
D. Cluster illumination.
E. Transfer warning light.
F. Seat belt reminder light.
G. Wiper/washer switch illumination.
H. Heater controls and switch illumination.
I. Right turn signal indicator.
J. High beam indicator.
K. Left turn signal indicator.

Figure 2-51. Instrument Panel Lights.

a. Reach up behind the instrument panel and remove the socket assembly from the printed circuit board by turning it counterclockwise.

b. Replace the bulb in the socket.

c. Reposition the socket assembly into the opening in the printer circuit board and turn it clockwise to lock it into place.

Section XIV. MAINTENANCE OF EXTERIOR LIGHTS

2-47. General Information.

The exterior lights include the turn signals, brake lights, side marker lights, hazard lights, headlights, and all associated wiring and connections.

a. Turn Signals. The turn signals are activated when the ignition switch is in the ON position. Move the turn signal lever up to light the right side or down to light the left side. The turn signal flasher is located in the fuse box next to the glove box.

b. Hazard Warning System. The hazard warning system is energized by a knob on the right side of the steering column just below the steering wheel. When the knob is pulled out, all turn signal lights and both dashboard indi-

cators will flash simultaneously. The hazard flasher unit is located in the fuse box to the left of the glove box opening. When actuating the hazard warning lights, the turn signal switch should be in the OFF position. This will prevent feedback through the accessory circuit which can cause intermittent operation of any accessories with switches turned ON. The hazard lights override the brake lights.

c. Brake Lights. The brake lights are located on the cargo box at the rear corners of the truck. They are activated by depressing the brake pedal in the cab.

d. Side Marker Lights. The side marker lights are located on the front side fenders of the cab. They are activated when the headlights are turned on.

e. Headlight System. The truck's headlight system uses two sealed-beam bulbs with two filaments each, one for low beam and one for high beam. The correct replacement bulb will have the number "2" molded in the lens. The headlight switch on the instrument panel turns the lights on and off. A foot-operated dimmer switch controls the use of high or low beams.

f. Seat Belt Reminder Light. This light is on for no more than 8 seconds when the ignition switch is turned to the ON position. If the driver's seat belt is not fastened, a buzzer will sound while the light is on.

g. Transfer Case Warning Light. (4X4 trucks built after March 1, 1976, only.) This light alerts you that the transfer is in the HI-LOC, LO, or LO-LOC position.

2-48. Turn Signal/Hazard Warning System Test.

The following procedure is written as a turn signal system test. If you are checking a hazard flasher malfunction, follow the same procedure using the hazard switch instead of the turn signal switch, since the two systems share much common wiring.

a. Turn the key to run and activate the left, then the right turn signals. Both sides should flash strongly and evenly. A steady or continuous indicator light, a dim or rapidly flashing light, or no light at all indicates a malfunction.

b. If you get no light, check the fuse box for other trouble signs, check the bulbs on the malfunctioning side. If they are burned out, replace them.

c. If the exterior light bulbs operate correctly but the turn signal indicator light on the dashboard does not flash on and off, remove and replace the indicator light bulb (paragraph 2-46).

d. If the turn signals still do not work, remove the turn signal flasher from the fuse box and check for voltage with a multimeter. One of the two receptacle openings should be energized when the key is in the ON position. If one of the receptacle openings has voltage, install a new flasher unit.

e. If neither receptacle opening is energized, disconnect the switch wiring connector at the base of the steering column and plug in a known good switch. If the good switch corrects the problem, replace the switch (paragraph 2-38). If the switch is not the problem, use the wiring diagram to locate the problem in the wiring harness (see section VIII for test procedures).

2-48.1. Replacing the Rear Taillight Lamp and Brake Light Lamp.

The rear taillights and turn signals share common wiring, and are found in the same bulb. To replace the bulb, use the following procedure.

a. Remove the four mounting screws attaching the lamp assembly to the cargo box.

b. Pull the taillight assembly out of the cargo box.

c. Remove the two screws from the back of the assembly, and remove the lens.

d. Remove the bulb.

e. Reverse the above steps to reassemble.

2-48.2. Replacing the Front Turn Signal and Parking Light Lamp.

a. Remove lens attaching screws.

b. Remove the lens.

c. Remove the bulb.

NOTE

On models manufactured after August 15, 1976, you will have to remove the bulb and socket as an assembly before you can remove the bulb.

d. Install the bulb.

e. Position the lens.

f. Install the lens attaching screws.

2-49. Removing and Installing Side Marker Lights.

To change the side marker lights, reach behind the fender and turn the lamp socket counterclockwise.

2-50. Maintenance of the Headlight System.

a. Adjustments. See figure 2-52 for an illustration of the headlight adjustment points.

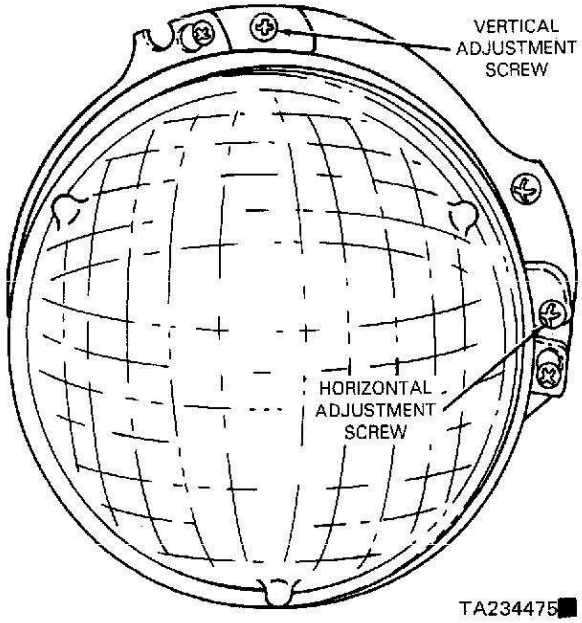


Figure 2-52. Headlight Adjustment Points.

(1) Position the truck so that the headlights are 25 feet from a smooth, vertical surface. The floor must be level and the truck must be unloaded.

(2) Make sure the tires are inflated to 45 psi in front and 55 psi in the rear. Remove both headlight trim doors.

(3) Measure the centerline of the headlights from the floor and draw a horizontal line 3 inches below that height on the flat verticle surface.

(4) Sight down the centerline of the truck to the wall. Draw a vertical line intersecting the first two lines at the projected centerline of the truck.

(5) Measure the distance between the centers of the two headlights. Divide that distance equally on both sides of the centerline. Draw vertical lines at these points, intersecting the first two lines.

(6) Turn on the headlights and select the high beam. Adjust one headlight at a time, covering the other.

(7) Turn the adjusting screws in or out until the beam is adjusted to a pattern as near as possible to that shown in figure 2-53. Center the beams on the intersections of the horizontal and vertical lines.

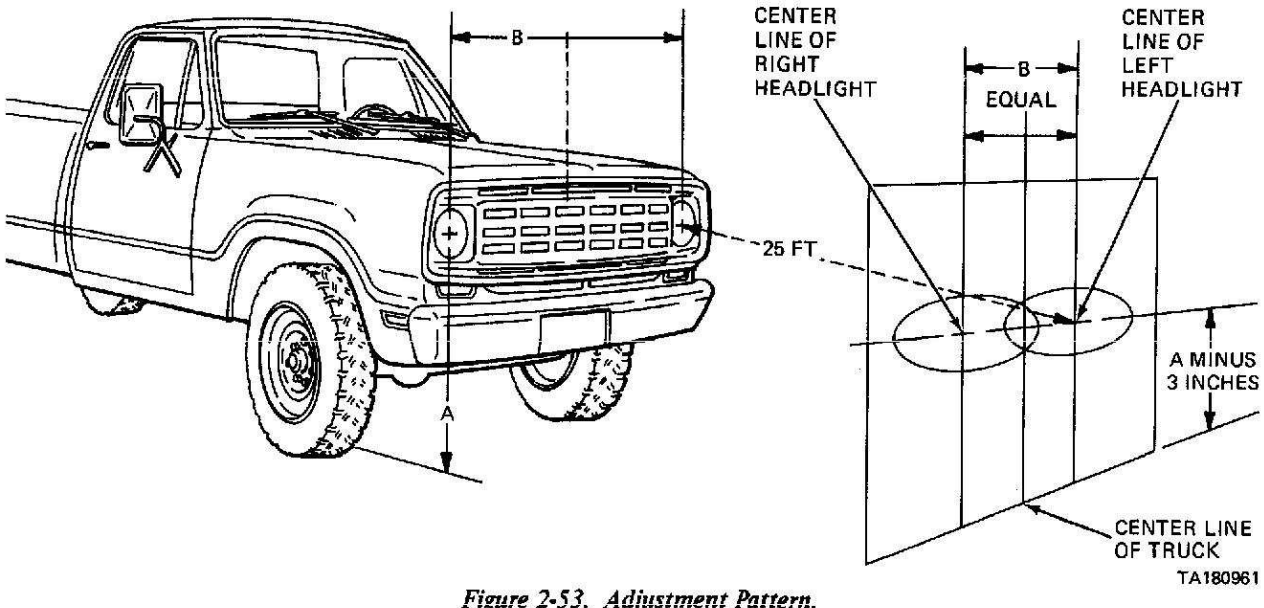


Figure 2-53. Adjustment Pattern.

(8) Adjust the other headlight in the same manner.

b. Replacement.

(1) Remove the screws from the headlight trim door. Remove the door.

(2) Remove the screws from the interior retaining ring and remove the ring. Do not disturb the headlight aimer screws.

(3) Pull out the sealed beam unit. Unplug the connector by pulling it straight off.

(4) Install a new sealed beam unit. Reinstall the retaining ring. Make sure the new headlight is aimed correctly, and reinstall the trim door.

Section XV. MAINTENANCE OF MISCELLANEOUS ELECTRICAL SERVICE CIRCUITS

2-51. General Information.

The miscellaneous electrical service circuits consist of the windshield wipers, washer pump, horn, and heater fan.

a. Horn. The horn circuit consists of a horn switch on the steering wheel, a horn, and all wiring and connections. The circuit is fed from the fuse box through the horn and is grounded in the horn switch.

b. Windshield Wipers/Washer. The windshield wipers are activated by a switch on the dashboard to the right of the steering column. The two-speed wiper motor has permanent-magnet fields; wiper speed is controlled by feeding power to different brushes for low and high speed. There is a torque-limiting resistor in the low-speed brush circuit. The wiper system completes the wipe cycle and parks in the lowest part of the wipe pattern when the switch is turned OFF. A cricuit breaker built into the wiper switch protects the wiper motor if the switch is turned ON when the wipers are unable to move. The windshield washer sprays water or solvent onto the windshield when you push the wiper/washer switch in.

c. Heater Fan. The heater fan is operated by a two-speed blower motor switch located in the heater control panel.

2-52. Testing the Horn.

If the horn blows continually, pull off the horn button and disconnect the horn wire at the steering wheel. If disconnecting the horn wire does not stop the horn from blowing, disconnect the negative (ground) wire at the battery and troubleshoot the wiring harness (figure 2-12). If the horn does not blow at all, troubleshoot the horn circuit as follows:

a. Check the horn fuse. Replace it if it is blown. If it is good, continue to *b*, below.

b. Connect one end of a jumper wire to a good ground. Touch the other end to the negative (ground) terminal on the horn. If the horn now blows, test the steering column shaft with a multimeter for continuity to ground. If the multimeter reading is more than zero ohms, remove and clean the connections at the coupling and flange assembly, located on the lower end of the steering column shaft, to insure a good ground. If the multimeter reading is zero ohms, replace the horn switch (paragraph 2-39).

c. If the horn does not blow when you jump it to ground, remove the ground jumper. Then connect the jumper between the battery positive post and the positive terminal on the horn.

d. With the ignition switch ON, depress the horn switch button. If the horn blows, check and repair the wiring harness. If the horn does not blow, remove and replace the horn.

2-53. Removing and Installing the Heater Control and Wiper/Washer Switch Illumination Lamps.

Both lamps are located on the illumination bracket mounted on the wiper/washer switch. To remove, first remove the wiper/washer switch (paragraph 2-36). Then remove and replace the light bulb and reinstall the wiper/washer switch.

2-54. Maintenance of the Wiper/Washer System.

a. Changing the Wiper Blades.

(1) Turn the wiper switch ON and position the blades in a convenient place by turning the ignition switch ON and OFF.

(2) Depress the release lever on the center bridge. Remove the blade from the wiper arm.

(3) Depress the release button on the end of the center bridge and withdraw the rubber wiping element from the end bridges.

(4) Replace the wiping element. Make sure that all four of the bridge claws are engaged and properly positioned on the filler assembly.

(5) Replace the blade assembly, checking each release point for positive locking.

b. Removing and Replacing the Wiper Arms. To remove wiper arms, use a screwdriver as shown in figure 2-54. Install new wiper arms by snapping them into place.

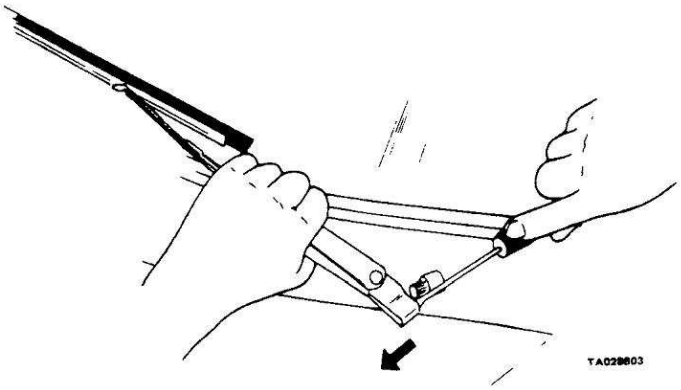


Figure 2-54. Wiper Arm Removal.

2-55. Troubleshooting the Wiper/Washer System.

Wiper system mechanical connections are shown in figure 2-55, and wiper motor terminals are identified in figure 2-56. Before troubleshooting the system, make sure the fuses are okay. To gain access to the wiper linkage, remove the cowl grille (paragraph 2-112).

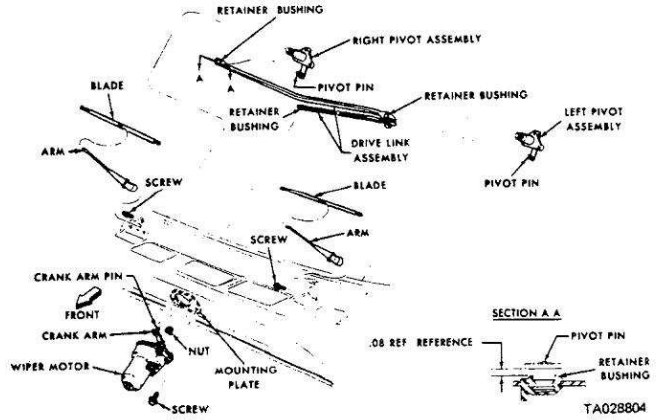


Figure 2-55. Wiper Linkage.

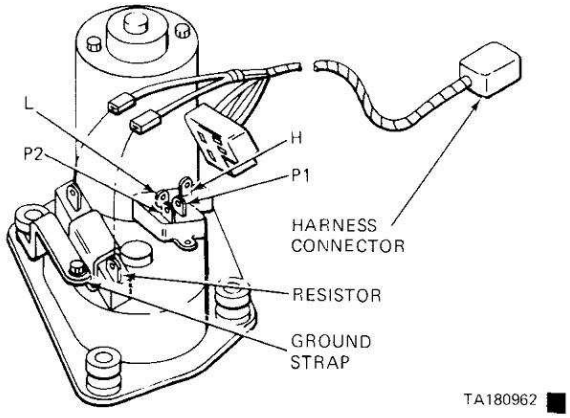


Figure 2-56. Wiper Motor Terminal Identification.

a. Motor Will Not Run in Any Switch Position.

(1) Turn the ignition switch to ACC and turn the wiper switch to the slow speed position.

(2) If you can hear the motor running, check the motor output shaft. If the shaft is not turning, replace the wiper motor (paragraph 2-56). If it is turning, either the drive link to the output shaft or the linkage itself is not connected properly; reconnect it.

(3) If the motor is not running, connect a voltmeter between motor terminal L and ground (figure 2-56). If you have about 12V at terminal L and the panel switch circuit breaker is not cycling, the problem is one of the following:

(a) There is an open ground circuit. The motor is grounded with a ground strap; make sure it is making good contact.

(b) If the motor still does not run, it is defective; replace it (paragraph 2-56).

(4) If the circuit breaker is cycling so that you get 12V at terminal L only part of the time, the problem is faulty wiring, motor, panel switch, or circuit breaker.

(a) To check the wiring and switch, disconnect the wiring-harness connector at the motor. Remove the wiper arms and blades. Connect an ammeter between the battery and terminal L on the motor. If the motor now runs and the average ammeter reading is less than 6 amps, the motor is okay and the problem is in the panel switch or wiring (paragraph 2-36).

(b) If the motor still does not run or it runs and draws more than 6 amps, check to see if the wiper linkage or pivots are binding or caught. Disconnect the drive link from the motor. Reconnect the jumper wire. If the motor now runs and draws less than 3 amps, repair the linkage system.

(c) If the motor still does not run, replace it (paragraph 2-56).

(5) If, after several minutes, no voltage has appeared at terminal L to indicate a cycling circuit breaker, disconnect the wiring harness and connect a jumper from the battery to terminal L. If the motor now runs, the wiring or panel switch is faulty (paragraph 2-36).

b. Motor Will Run at Low Speed, But Not at High Speed.

(1) If the motor will not run at high speed, put the panel switch in high position and connect a voltmeter between motor terminal H and ground (figure 2-56).

(2) If there is no voltage at the motor terminal, there is an open in the wiring or switch. If there is voltage at the motor terminal, replace the motor.

c. Motor Will Run at High Speed, But Not at Low Speed.

(1) If the motor will not run at low speed, put the panel switch in the low position and connect a voltmeter between motor terminal L and ground (figure 2-56).

(2) If there is no voltage at the motor terminal, there is an open in the wiring, switch, or resistor. To check the resistor, move the voltmeter from terminal L on the motor to the terminal on the resistor that has the brown and yellow tracer wire. If there is voltage, replace the resistor.

(3) If there is voltage at the motor terminal, replace the motor.

d. Motor Will Keep Running with Panel Switch in OFF Position.

(1) Remove the wiring harness. Connect a jumper from terminal P_2 to terminal L (figure 2-56).

(2) Connect a second jumper from terminal P_1 to the battery. If the motor now runs to the park position and and stops, the panel switch is faulty (paragraph 2-36). If the motor keeps running and does not park, replace the motor (paragraph 2-56).

e. Motor Stops Before Wipers Park.

(1) Remove the motor wiring connector and clean the terminals. Reconnect the connector and test the motor. If the problem persists, proceed to step 2.

(2) Put the panel switch in the OFF position with the wiper blade pointing upward.

(3) Connect a voltmeter between terminal P_1 and ground. If the voltage is zero, there is a panel switch or wiring problem (paragraph 2-36).

(4) If you read 12V at terminal P_1, check the voltage at terminal P_2. If the voltage at terminal P_2 is zero, replace the motor. If you get 12V at terminal P_2, trouble-shoot the panel switch (paragraph 2-36).

2-56. Replacing the Wiper Motor and Linkages.

a. Removing the Wiper Motor.

(1) Disconnect the negative (ground) cable at the battery.

(2) Disconnect the wires from the wiper motor.

(3) Remove the motor mounting screws.

(4) Lower the motor down far enough to gain access to the crank arm and the drive link retainer bushing.

(5) Remove the crank arm from the drive link by prying the retainer bushing from the crank arm pin with a screwdriver.

(6) Remove the motor.

(7) Remove the nut attaching the crank arm to the motor drive shaft.

(8) Remove the crank arm.

b. Installing the Wiper Motor.

(1) Position the crank arm on the motor drive shaft, making sure the slot is indexed properly. Install the mounting nut and tighten it.

(2) Install the crank arm pin in the drive link retainer bushing by snapping it together with channel lock pliers.

(3) Position the motor and install the mounting screws.

(4) Connect the wires to the wiper motor.

(5) Reconnect the negative battery cable.

c. Removing the Crank Arm.

(1) Remove the wiper motor (*a*, above).

(2) Remove the nut attaching the crank arm to the motor drive shaft.

(3) Remove the crank arm (figure 2-55).

d. Installing the Crank Arm.

(1) Position the crank arm on the motor drive shaft, making sure the slot is indexed properly. Install the mounting nut and tighten it.

(2) Install the wiper motor (*b*, above).

e. Removing the Drive Link and Left Pivot Assemblies.

(1) Remove the wiper arms (paragraph 2-54).

(2) Remove the screws attaching the louvered cowl cover to the firewall.

(3) Remove the cowl cover by pulling forward with a slight upward movement.

(4) Reach through the access hole and remove the drive link from the right pivot by prying the retainer bushing from the pivot pin with a screwdriver.

(5) Remove the crank arm from the drive link by prying the retainer bushing from the crank arm pin with a screwdriver.

(6) Remove the left pivot mounting screws and let the pivot hang loose.

(7) Working through access holes, remove the drive links and the left pivot as an assembly.

(8) Remove the drive link from the left pivot by prying the retainer bushing from the pivot pin with a screwdriver.

(9) Remove the retainer bushings from the drive link assembly.

f. Installing the Drive Link and Left Pivot Assemblies.

(1) Install the retainer bushings in the drive link assembly.

(2) Install the left pivot pin in the drive link retainer bushing by snapping them together with channel lock pliers.

(3) Maneuver the drive links and the pivot assembly through the access hole and position them into place.

(4) Position the left pivot into place. Install the mounting screws and tighten them.

(5) Install the crank arm pin in the drive link retainer bushing by snapping them together with channel lock pliers.

(6) Install the right pivot pin in the drive link retainer bushing by snapping them together with channel lock pliers.

(7) Position the cowl into place, install the mounting screws, and tighten them securely.

(8) Install the wiper arms (paragraph 2-54).

g. Removing the Right Pivot Assembly.

(1) Remove the wiper arms.

(2) Remove the screws attaching the louvered cowl cover to the firewall.

(3) Remove the cowl cover by pulling forward with a slight upward movement.

(4) Reach through the access hole and remove the drive link from the right pivot by prying the retainer bushing from the pivot pin with a screwdriver.

(5) Remove the right pivot mounting screws.

(6) Remove the pivot through the access hole.

h. Installing the Right Pivot Assembly.

(1) Position the pivot into place. Install the mounting screws, and tighten them.

(2) Install the right pivot pin in the drive link retainer bushing by snapping them together with channel lock pliers.

(3) Position the cowl cover into place. Install the mounting screws and tighten securely.

(4) Install the wiper arm.

2-57. Servicing the Washer System.

a. Troubleshooting. If the washer pump is not operating, check to make sure the fuse is okay and the washer reservoir has washing solution in it. If neither of these is the problem, turn the ignition switch to ACC and depress the wiper/washer switch. If you can hear the pump operating, the hose from the reservoir to the washer nozzles or the nozzles themselves may be plugged. If the pump is not operating, do as follows:

(1) Connect a jumper wire between the positive post of the battery and the positive terminal on the washer pump. If the pump still does not operate, make sure it is properly grounded by checking for resistance between the pump's ground terminal and a good ground. If the pump is well grounded the motor is defective. Replace the motor (*c*, below).

(2) If the pump does operate now, turn off the ignition switch. Working behind the instrument panel, disconnect the four-wire connector to the wiper/washer switch. Put a jumper wire between the light brown wire and the light blue wire. Turn the key to ACC.

(3) If the pump now operates, remove and replace the wiper/washer switch.

(4) If the pump still does not operate, check and repair the wiring harness.

b. Adjusting the Nozzles. To adjust a washer nozzle, loosen the mounting screw under the hood. For lateral adjustment, move the nozzle and bracket assembly until the nozzle is centered between the grille louvers. For vertical adjustment, bend the nozzle mounting bracket up or down, using the tab provided. Adjust the nozzles so that both streams of washer solution hit the glass inside the wiper pattern. If the nozzle is defective, replace it.

c. Replacing the Washer Pump.

(1) Remove all liquid from the reservoir.

(2) Disconnect the pump ground wire by removing the mounting screw.

(3) Remove the reservoir mounting screws, and remove the reservoir/pump assembly.

(4) Disconnect the electrical lead and rubber hose from the bottom of the pump.

(5) Reach through the reservoir filler neck with an extension and deep-well socket to remove the pump mounting nut and plastic washer.

(6) Remove the pump. Remove the rubber grommet from the reservoir and discard it.

(7) To put a new pump in, install a new rubber grommet in the reservoir.

(8) Position the pump into place, installing a plastic washer and mounting nut. Tighten securely.

(9) Connect the electrical lead and rubber hose to the pump.

(10) Connect the ground wire. Fill the reservoir and check pump operation.

Section XVI. MAINTENANCE OF COOLING SYSTEM

2-58. Description and Data.

a. General. The cooling system consists of a tube-and-spacer type radiator, a surge tank, a centrifugal water pump, a fan, and a chock-type thermostat.

b. Cleaning and Maintenance. For cleaning and maintenance of the cooling system refer to TM 750-254.

2-58.1. Water Pump.

a. General. The water pump is serviced only as an assembly.

b. Removal

(1) Drain the cooling system (partial).

(2) Remove fan shroud attaching screws, separate shroud from radiator, and position shroud rearward on engine.

(3) Loosen alternator adjusting strap bolts and pivot bolt which will allow the removal of the drive belt.

(4) Remove alternator bracket attaching bolts from water pump; swing alternator out-of-way; maintain the alternator in out-of-way position by tightening the pivot bolt.

(5) Remove fan blade, spacer, and pulley as an assembly by removing the four screws attaching the fan.

(6) Disconnect heater, thermostat by-pass, and water pump inlet hoses.

(7) Remove water pump retaining bolts, and remove water pump assembly. Discard gasket.

c. Installation.

(1) Clean face of engine block of any gasket residue.

(2) Position a new thermostat by-pass hose if necessary, with clamp positioned in the center of the hose.

(3) Install water pump using a new gasket. Tighten pump retainer bolts in accordance with table 1-2. Rotate pump shaft by hand to insure free impeller and shaft rotation.

(4) Install heater, thermostat by-pass, and water pump inlet hoses and position hose clamps.

(5) Install alternator front bracket. Torque bolts to 30 foot-pounds.

(6) Install fan blade, spacer, pulley, and bolts as an assembly.

(7) Install drive belt, and adjust tension as directed in paragraph 2-64.

(8) Install shroud.

(9) Fill cooling system as directed in paragraph 2-63.

2-59. Fan.

a. General. There are no repairs that can be made on

the fan. If the fan is bent, cracked, or damaged in any way, it must be replaced.

b. Removal and Installation.

(1) Remove the four screws holding the fan shroud in position.

(2) Slide the fan shroud back over the fan, and rest it on the engine.

(3) Remove the four attaching bolts from the fan and remove the fan.

(4) To reinstall the fan, reverse the above steps.

2-60. Radiator and Transmission Oil Cooler.

a. Removal.

(1) Remove the radiator cap and drain the cooling system by opening the draincock at the bottom of the radiator.

(2) Remove the four attaching screws from the radiator shroud and slide the shroud over the fan, resting it on the engine.

(3) Disconnect the upper and lower radiator hoses.

(4) Use two wrenches to disconnect the transmission oil cooler lines at the bottom of the radiator. Cover the openings to prevent the entrance of dirt and the loss of transmission oil.

(5) Disconnect the hose between the radiator and the surge tank.

(6) Remove the surge tank attaching bolts and remove the tank.

(7) Remove the four radiator attaching bolts and remove the radiator. Take care not to damage the cooling fins or water tubes.

b. Installation. To install the radiator, reverse the procedures above. After installation, run the engine for a few minutes to make sure that the coolant is circulating properly and that there are no leaks.

2-61. Thermostat.

a. General. The thermostat (figure 2-57) is activated by a pellet containing a wax mixed with copper. As the temperature of the pellet increases, the wax expands and opens the valve. The standard thermostat opens at 185° F.

b. Removal and Installation.

(1) Drain the cooling system.

(2) Remove the upper radiator hose from the thermostat housing.

(3) Remove the thermostat housing bolts.

(4) Remove the thermostat and housing.

(5) Clean the old gasket off the housing and intake manifold.

(6) For thermostat installation, reverse the above procedures, using a new gasket.

Figure 2-57. Thermostat.

c. Testing.

(1) Examine the thermostat to make sure the valve is closed tightly.

(2) If the valve will not close completely, carefully clean the sealing edge, making sure you don't damage it.

(3) If the valve still won't close, install a new thermostat.

(4) Put the thermostat in a container of 50 percent antifreeze and 50 percent water, making sure the pellet is completely covered by the solution. The pellet must not touch the sides or bottom of the container.

(5) Heat the solution to a temperature between 182° F and 189° F, continuously stirring it.

(6) Insert a 0.001 feeler gage into the valve opening. The feeler gage should pass freely into the valve opening when the solution is between these temperatures. If it doesn't, replace the thermostat.

(7) Continue heating the solution to about 205° F. If the thermostat valve is not completely open, replace the thermostat.

2-62. Radiator Hoses.

a. Replace any cracked, swollen, or restricted hose.

b. The reinforcement spring inside the lower hose prevents collapsing of the hose due to suction at medium or high engine speeds. If this spring is misplaced in the hose, reposition it. If the hose is deformed, replace it.

2-63. Coolant Reserve System.

a. Radiator Cap. The radiator cap is a 16 psi vented cap that has a pressure relief valve and a vent valve. If the pressure in the radiator rises above 16 psi, the valve opens to vent excess pressure and coolant to the surge tank. The radiator cap need not be removed unless you are:

(1) Adding antifreeze to lower the freeze point.

(2) Refilling the system with new antifreeze.

WARNING

Never remove the cap when the engine is hot. This is a high-pressure cooling system, and escaping steam or hot water can cause serious scalds.

b. Removing the Radiator Cap. To take off the cap, press down and turn counterclockwise until the cap stops at the detent. After the pressure has been released, press down on the cap again and turn it the rest of the way off.

c. Installing the Radiator Cap. To install the radiator cap, position it on the radiator and turn it clockwise. It is important that the radiator cap be tightly installed to prevent the loss of coolant and possible engine damage.

d. Checking the Coolant Level. Make sure the amount of coolant in the surge tank does not fall below the "Cool" mark on the tank. Add coolant by putting it in the surge tank only.

e. Testing the Coolant Reserve System.

(1) Make sure the coolant is at the proper level in the surge tank and the radiator cap is on before beginning the test.

(2) With the engine at normal operating temperature, draw coolant from the surge tank into the radiator by cracking open the draincock at the bottom of the radiator and starting the engine.

(3) If water is not drawn into the radiator, turn off the engine and close the draincock. Check for leaks at the radiator filler neck, overflow nipple, radiator cap, and surge tank tube. Repair or replace, as necessary.

(4) Replace any coolant that was lost during the test.

(5) If you find that you must frequently add coolant to the system, check for leaks inside and outside the system. Also, see if the engine is operating at too high a temperature.

2-64. Adjusting Fan Belt Tension.

Good performance of belt-driven accessories depends on how well the proper belt tension is maintained. Use the following method to adjust the belt.

a. Loosen the alternator attaching bolts.

b. Cup one hand under the alternator and lift upward with firm pressure.

c. Tighten the adjusting bolt while maintaining constant pressure.

d. Check tension by measuring belt deflection halfway between the alternator and the fan pulleys. Deflection with firm pressure should be 1/2 to 3/4 inch.

e. If belt tension is incorrect, readjust, as necessary, to obtain proper deflection.

f. After proper tension is obtained, tighten the mounting bolts.

Section XVII. MAINTENANCE OF EXHAUST SYSTEM

2-65. Description and Data.

The exhaust system consists of the two exhaust manifolds, the exhaust pipe, the muffler, the tailpipe, and the heat control valve.

2-65.1 Testing for Exhaust Restriction.

a. General. A restricted or blocked exhaust system can give you a loss of power or cause the engine to backfire through the carburetor.

b. Inspection. Before testing for exhaust restriction, visually inspect the pipes and muffler for obvious damage. This will help you to identify the problem if you find that the system is restricted.

c. Test. Use the following procedure to test for restriction:

(1) Remove the threaded plug to the brake booster from the top of the intake manifold. Screw in the vacuum gage adapter, and attach the gage.

(2) Connect a tachometer (paragraph 2-16*c*).

(3) With the transmission in neutral and the parking brake on, start the engine. With the engine at an idle (750 rpm), the vacuum gage should show 16 to 21 inches of vacuum (fig. 2-57.1). If it doesn't, torque the carburetor and intake manifold bolts to 24 ft lbs. If the vacuum still is not in the proper range, notify direct support.

(4) If the gage indicates 16 to 21 inches at idle (750 rpm), increase the engine speed to 2,000 rpm. Vacuum will drop as the speed is being increased, but should settle between 16 to 21 inches and remain steady when you reach 2,000 rpm.

(a) If the vacuum settles below 16 inches, the exhaust system is restricted. Continue this procedure to isolate the problem.

(b) If the vacuum is in the 16 to 21-inch range, disconnect the tachometer and vacuum gage, and reconnect the brake booster line.

(5) Disconnect the exhaust pipe from the exhaust manifolds.

(6) Start engine and increase speed to 2,000 rpm. Observe the vacuum gage.

(a) If vacuum drops below 16 inches with exhaust pipe disconnected, one of the exhaust manifolds is restricted. Proceed to step 7, below.

(b) If vacuum settles at 16 to 21 inches, restriction or blockage is in the exhaust pipe, muffler, or tailpipe. Replace the defective part (paragraph 2-68).

(7) Check the heat riser valve for freedom of operation.

(a) If the valve operates freely, remove the exhaust manifolds and check for blocked passageways. If blockage is found, remove the obstruction or replace the manifold.

(b) If the valve does not move freely, apply solvent to both ends of the valve shaft at the bushings. Work

the valve open and closed as you apply the solvent. Repeat step *6*, above, after the valve is working freely.

(8) Stop the engine, and remove the tachometer and vacuum gage. Reconnect the brake booster hose.

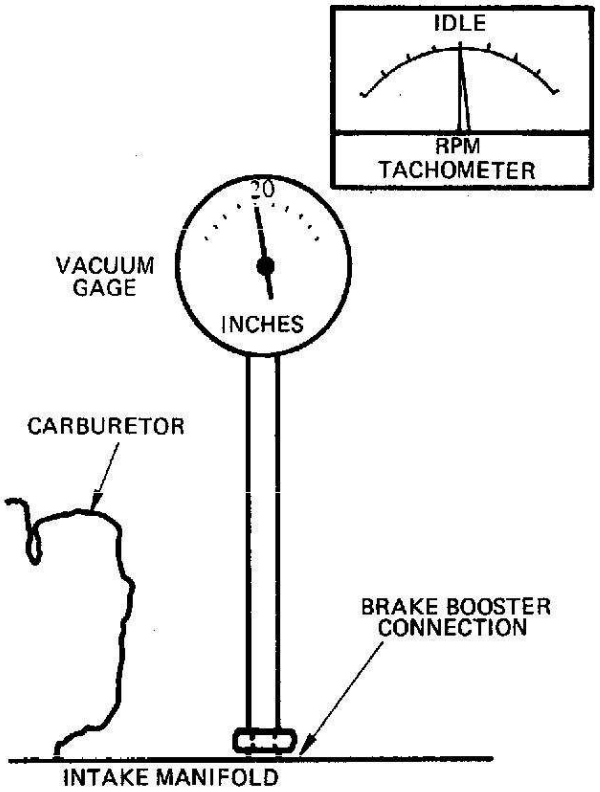


Figure 2-57.1. Exhaust Restriction Test.

2-66. Servicing the Manifold Heat Control Valve.

Let the engine idle for a few minutes. Then quickly accelerate the engine. The valve counterweight should move CLOCKWISE. If the valve does not move clockwise, let the manifold cool. After the manifold is cool to the touch, apply solvent to both ends of the valve shaft at the bushings, working the valve as you apply the solvent.

2-67. Servicing the Exhaust Manifolds.

a. Removal.

WARNING

Be sure the manifold is cool before you work on it, or serious burns may result.

(1) Remove the bolts and nuts attaching the exhaust pipe to the manifold.

(2) Remove the bolts, nuts, and washers attaching the manifold to the cylinder head.

(3) Remove the manifold from the cylinder head.

b. Cleaning and Inspection.

(1) Clean the mating surfaces of the cylinder head and the manifold.

(2) Inspect the manifold for cracks.

(3) Use a straightedge to inspect the mating surfaces for flatness. All surfaces must be flat to within 0.008 inch.

(4) Check the right side manifold to see if the manifold heat control valve turns freely. If it doesn't, apply manifold heat control valve solvent to both ends of the valve shaft. Let the solvent soak in to dissolve deposits. Work the valve back and forth until it operates freely.

c. Installation.

(1) Place the manifold on the two studs on the cylinder head.

(2) Put the conical washers and nuts on the studs (figure 2-58).

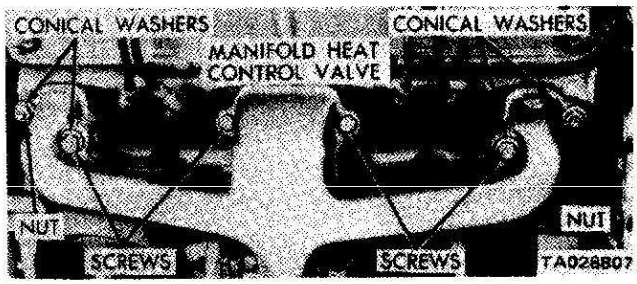


Figure 2-58. Installation of Exhaust Manifold.

(3) Put two screws with conical washers inside the ends of the outer arms of the manifold.

(4) Tighten all screws and nuts to 25 ft-lbs starting at the center arm and working outward.

(5) Attach the exhaust pipe to the manifold with bolts, nuts, and washers.

2-68. Servicing the Exhaust Pipe, Muffler, and Tailpipe.

See figure 2-59 for the following procedures.

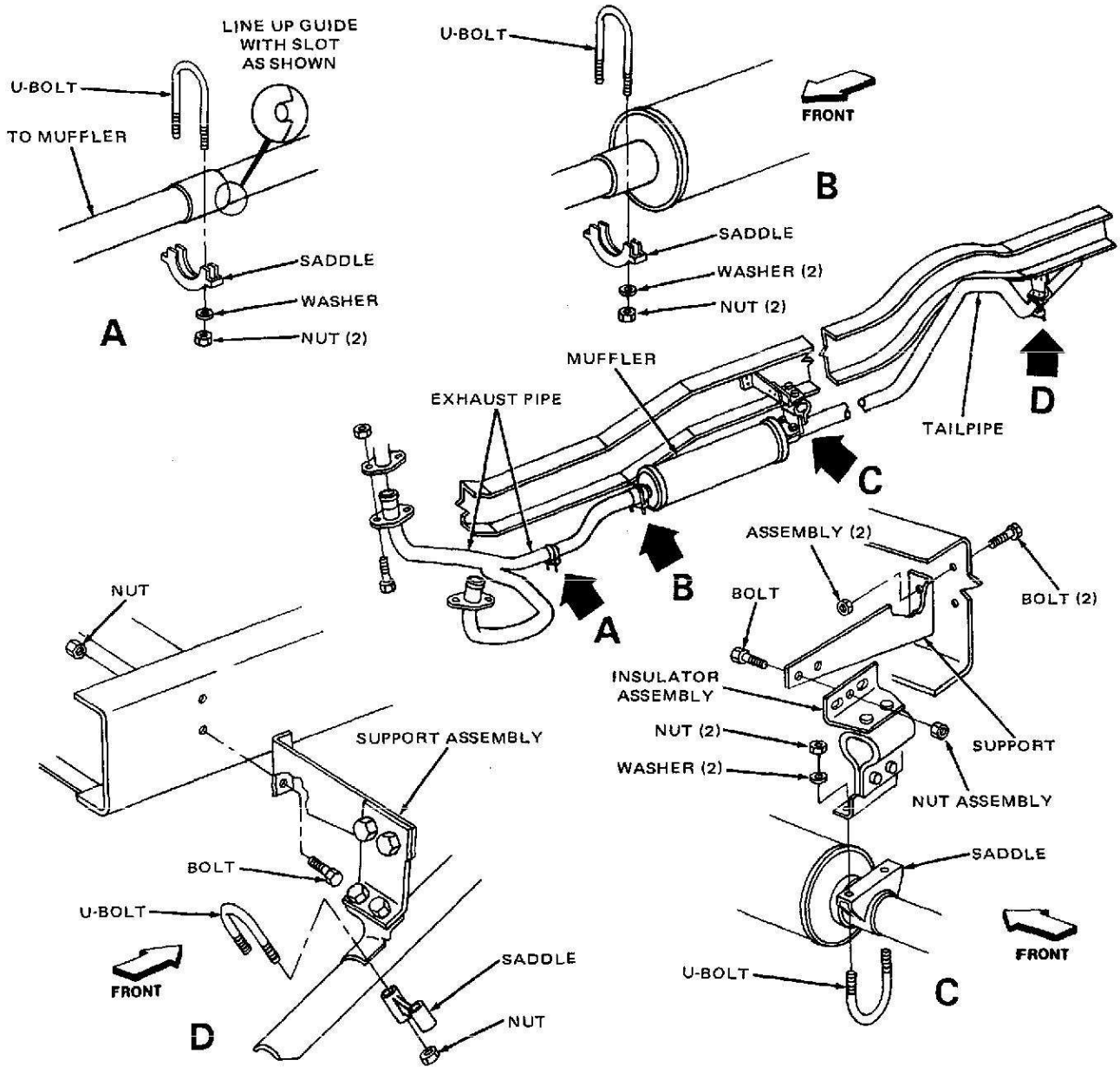


Figure 2-59. Exhaust System. TA234476

a. Inspection.

(1) Start the engine and let it idle.

NOTE

The muffler has a small hole at the rear end to allow moisture to escape. This drainage hole does NOT constitute a leak unless it is rusted out to a diameter of more than one-eighth inch.

(2) Stop the engine and let the exhaust system cool. Then replace any defective part.

(3) Look at all exhaust system hangers. Replace any broken hangers.

b. Removal.

(1) Raise the truck on jack stands and apply oil to all clamp bolts and nuts. This will loosen any rust and corrosion.

(2) Remove the clamps and supports from the tailpipe, muffler, and exhaust pipe.

(3) Disconnect the exhaust pipe at the exhaust manifolds.

(4) Remove the exhaust pipe. Clean mating surfaces.

NOTE

It may be necessary to raise the rear end of the truck to relieve weight from the rear springs so that the tailpipe can be removed.

(5) Remove the muffler and the extension pipe assembly.

c. Installation.

(1) Put the front exhaust pipe on the exhaust manifold. Do not fully tighten the flange.

(2) Loosely assemble the rear exhaust pipe, muffler, and tailpipe. Line up the guide with the slot, if a guide is provided.

(3) Aline the exhaust system, making sure that everything is in its proper place.

(4) Tighten nuts and bolts in accordance with figure 2-59.

Section XVIII. MAINTENANCE OF AXLES AND PROPELLER SHAFTS

2-69. General.

a. The driveline system consists of a tubular yoke propeller shaft with sliding spline yokes and cross-type universal joints. The rear axle and front axle on 4X4 models is of the carrier-housing, hypoid-gear type, with outer drive assemblies, a differential carrier and tube assembly, and a differential case and drive pinion assembly.

b. Parts like the axle shaft, outer drive assembly, wheel bearings, oil seals, universal joints, or brake parts can be replaced without complete removal of the axle assembly.

2-70. Axle Noise.

a. General. All axles are noisy to a certain degree, and some noise must be considered normal. If the noise is loud or is present at all speeds, isolate the noise and try to determine its source. Most axle noise can be traced to either gear noise or bearing noise, but diagnosis can be difficult.

b. Diagnostic Road Test. A thorough road test is necessary in order to make a good diagnosis. Road test the truck before attempting any disassembly or tear-down of axle components. Test as follows:

(1) Select a level, smooth, blacktop or asphalt road. Drive far enough to warm up the axle to normal operating temperatures.

(2) Note the speed at which the noise is more pronounced. Also note the pitch and loudness of the noise. Then stop.

(3) With the transmission in "N", run the engine slowly up and down through the engine speeds at which the noise was loudest. If the noise persists, it is due to exhaust roar or other engine conditions rather than to an axle noise.

(4) If step 3 does not isolate the noise, proceed as follows:

(a) 4X4 Models. Remove both drive shafts. Put the transfer in HI or LO and the transmission in "D". Run the engine slowly up and down through the engine speeds where the noise was the loudest. If the noise is present now, but was not in step 3, the problem is in the transmission or transfer.

(b) 4X2 Models. Remove the drive shaft. Put the transmission in "D" and run the engine slowly up and down through the engine speeds where the noise was the loudest. If the noise is present now, but was not in step 3, the problem is in the transmission.

(5) If step 4 does not isolate the noise, the problem is in the driveline or axle assembly. Diagnose the noise in accordance with *c*, below.

c. Diagnose the Type of Noise. Several kinds of driveline noises can be confused with axle noise. Try to diagnose the probable cause as follows:

(1) If the noise varies at different speeds and is low-pitched or grumbling in tone, it is probably tire noise.

(2) If the noise is a high-pitched whine and increases in loudness when you decelerate, especially if the noise peaks in a narrow range of speed, the problem most likely is in the differential. Send the truck to Direct Support for servicing.

(3) If the noise and vibration increases when you accelerate, it may be caused by propeller shaft unbalance, which is not sensitive to torque. If the noise peaks between

two speeds and is not evident above that speed range, or if it is a snapping noise, it is not the propeller shaft. It could be bad universal joints.

(4) If the noise is a lower pitched rumbling, it may be bearing noise. Take the truck out on a smooth surface without any other traffic. Swerve the truck sharply right and left. Bearing noise will increase on the loaded side when you swerve. You can also brake lightly while holding the truck to a steady speed with the accelerator. Wheel bearing noise should diminish, since you are taking some of the load off the bearings by using the brakes. If it is wheel bearing noise, remove and replace the bearings (paragraphs 2-71, 2-72, and 2-104).

(5) If the noise is a low-speed knock, it usually indicates a worn out universal joint or excessive counterbore clearance in the differential side gear hub. If the universal joint is loose, remove and replace it (paragraph 2-74). If this isn't the problem, send the truck to Direct Support for servicing.

2-71. Servicing the Rear Axle.

a. Axle Shaft Replacement. If it is necessary to replace the rear axle shaft, use the following procedure:

(1) Vehicles manufactured before April 15, 1976.

(a) Remove the axle shaft flange nuts and lockwashers. Rap the axle shafts sharply in the center of the flange with a hammer to free the dowels. Remove the tapered dowels and the axle shaft.

(b) To install an axle shaft, clean the gasket contact area with a suitable solvent. Install a new flange gasket and slide the axle shaft into the axle housing. Install the tapered dowels, lockwashers, and nuts. Tighten the nuts to 65 ft-lbs.

(2) Vehicles manufactured after April 15, 1976.

(a) Remove the axle shaft flange screws.

(b) Remove the axle shaft.

(c) Clean the gasket surface area.

(d) Install the replacement axle shaft with a new gasket.

(e) Install the flange screws and tighten to 70 ft-lbs.

b. Rear Wheel Bearing Replacement.

(1) Raise the truck and remove the brake drum (paragraph 2-89).

(2) Using a punch, knock out the bearing cup.

NOTE

Whenever installing a new bearing you must also install a new cup.

(3) Using a brass drift, drive the new cup into the drum until it seats.

(4) Reinstall the brake drum, axle, and wheel (paragraph 2-93).

c. Adjusting the Wheel Bearings.

(1) Raise the truck off the floor and install jack stands.

(2) Remove the axle shaft.

(3) Bend the lockring back, and using tool DD-1245-A, remove the outer nut.

(4) While rotating the wheel and tire assembly, tighten the adjusting nut with tool DD-1245-A until a slight bind is evident. Back off the adjusting nut one-sixth turn so that the wheel will rotate freely without excessive end play.

NOTE

Use tool DD-1241-JD in place of tool DD-1245-A on 4X2 models with a part number effectivity date after August 15, 1976, or after September 15, 1976, on 4X4 models.

(5) Install the lockring, bend two tabs over the adjusting nut, install jam nut and bend two tabs over the jam nut.

CAUTION

When drawing up jam nut, avoid forcing adjusting nut forward on its threads. This will affect bearing adjustment, and also shear lock tab that fits into slot on axle shaft.

(6) Install the new gasket and axle shaft.

(7) Remove the stands and lower the vehicle.

2-72. Servicing the Front Axle (4X4 Models Only).

NOTE

See paragraph 2-104 for 4X2 models front wheel bearings.

a. Disassembly.

(1) Remove the cotter key from the outer axle shaft castle nut, and loosen the outer axle shaft nut.

(2) Raise the truck and install jackstands.

(3) Remove axle shaft nut.

(4) Remove the wheel and tire.

(5) Remove the brake caliper assembly and brake pads (paragraph 2-87).

NOTE

Do not let the caliper hang or be supported by the hydraulic brake line.

(6) Pull the hub and rotor assembly, using a puller (figure 2-60).

(7) Pull the outer bearing from the hub and rotor, using bearing press C-293-PA and adapters C-293-49 and C-293-3 (figure 2-61).

(8) Remove the six retainer bolts (figure 2-61.1).

(9) Place a pry bar behind the inner axle shaft yoke, and push the bearings out of the knuckle (figure 2-61.2).

(10) Remove the O-ring from the knuckle and discard it.

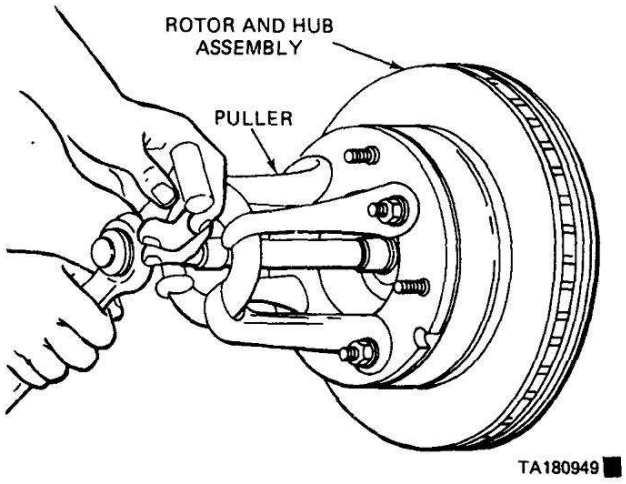


Figure 2-60. Removing Hub Assembly.

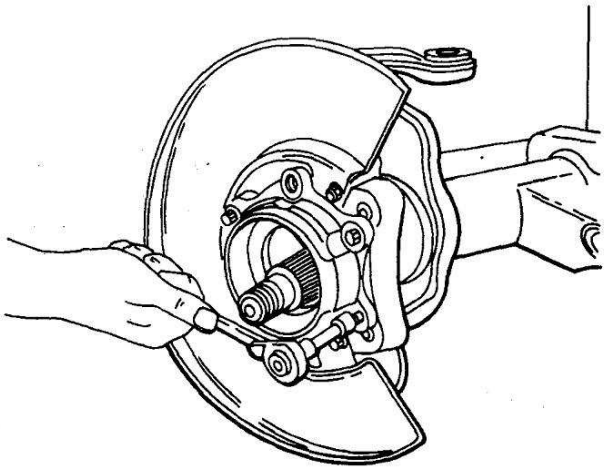


Figure 2-61.1. Removing Retainer.

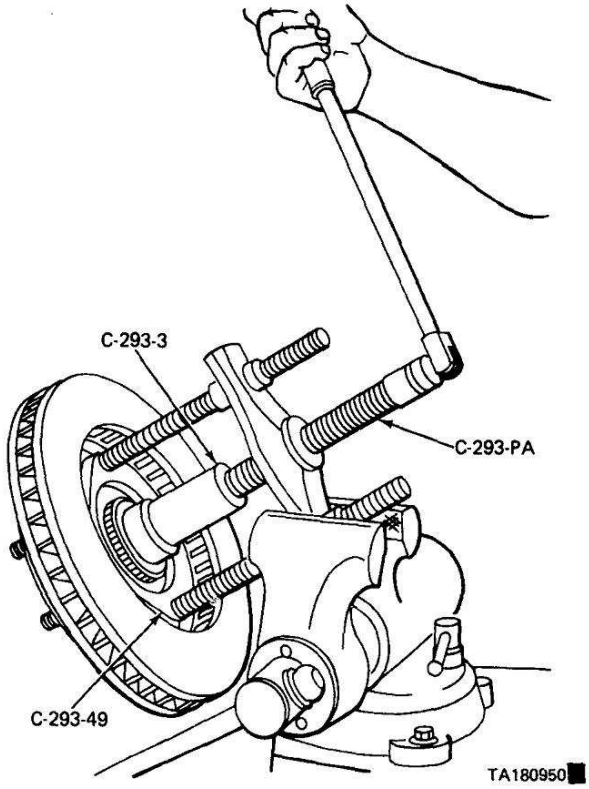


Figure 2-61. Pulling Outer Bearing.

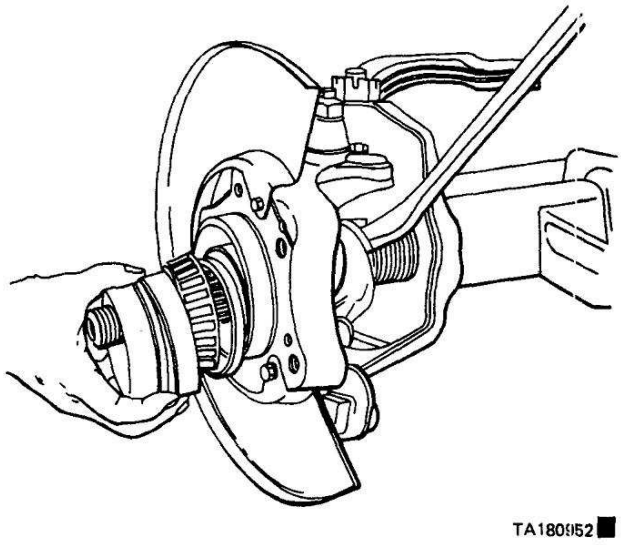


Figure 2-61.2. Removing Bearing from Knuckle

(11) Remove the inner oil seal from the rear of the steering knuckle using a punch and hammer (figure 2-61.3).

(12) Remove the axle shaft (assembly) from the axle housing.

b. Inspection.

(1) Inspect the knuckle bore and inner seal surface for signs of serious wear or damage. Notify direct support maintenance.

(2) Check the outer axle shaft seal surface for grooving. Repair a grooved surface as follows:

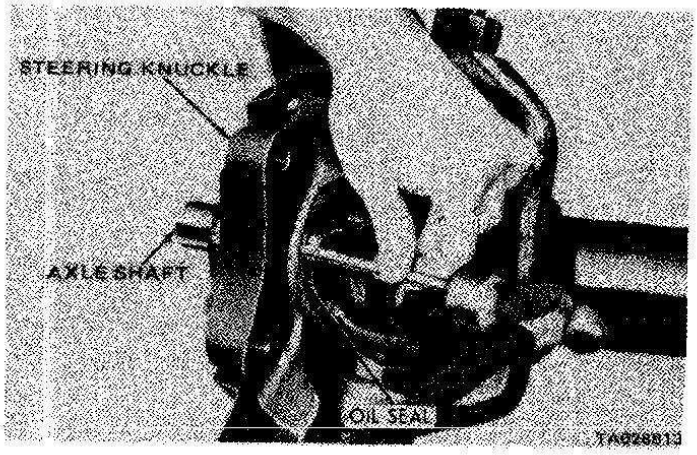


Figure 2-61.3. Removing Inner Oil Seal from Steering Knuckle.

(a) Measure in three-eighths inch from the yoke shoulder of the axle shaft.

(b) Stake the yoke shoulder at 1/4-inch intervals with a center punch, as shown in figure 2-61.4.

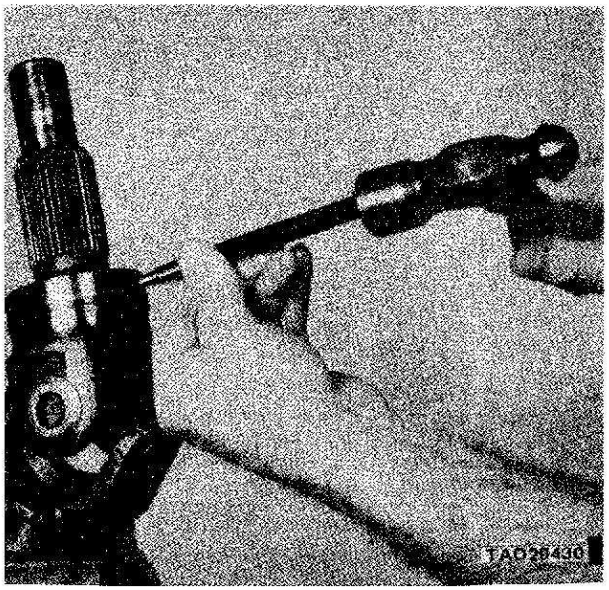


Figure 2-61.4. Staking Axle Shaft.

(3) Use the following procedure to check for proper bearing clearance:

(a) Install the bearing cups and spacer into the knuckle bore (figure 2-61.5).

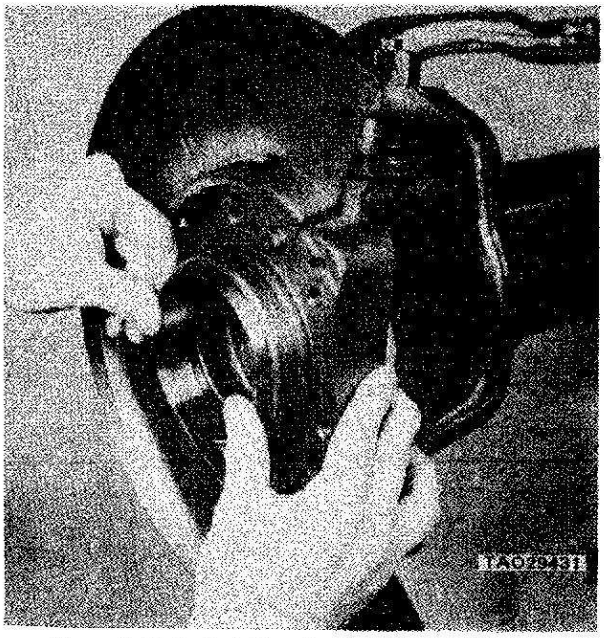


Figure 2-61.5. Installing Bearing Cups and Spacer.

(b) Install the bearing retainer, and tighten to 30 ft-lbs (figure 2-62).

NOTE

Remove the brake dust shield, if necessary, to complete this check.

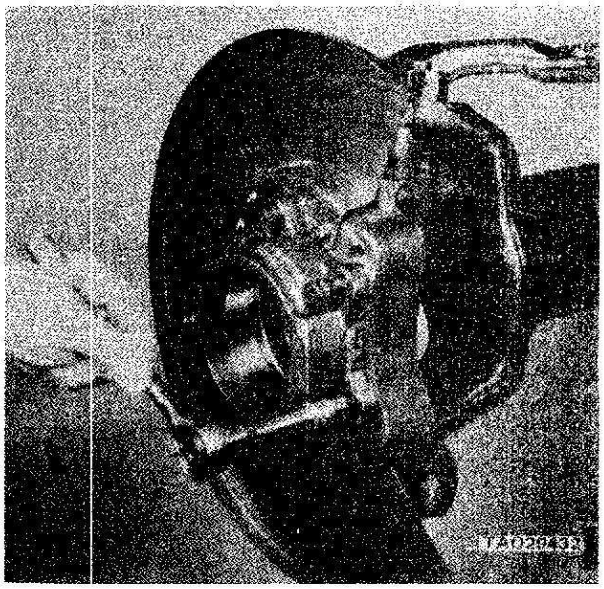


Figure 2-62. Installing Retainer.

(c) Insert a 0.004 feeler gage between the retainer and the knuckle, as shown in figure 2-62.1. Check for clearance at the six points midway between the retainer mounting ears.

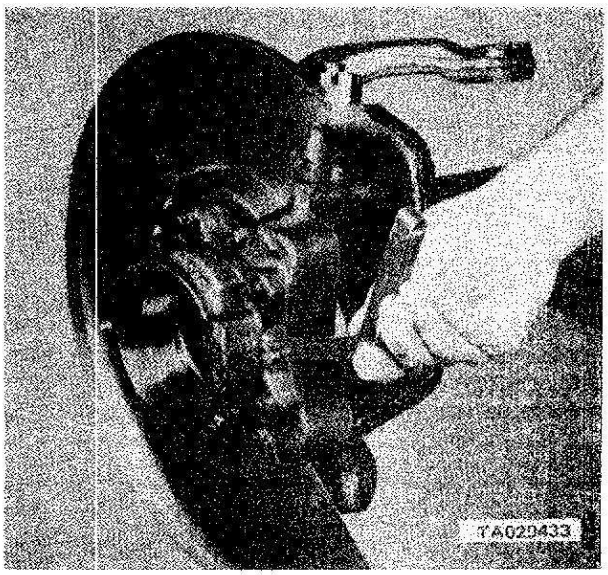


Figure 2-62.1. Checking Knuckle-to-Retainer Clearance.

(d) If you don't get a clearance of 0.004 at each measuring point, replace the knuckle.

(e) After proper clearance is attained, remove the retainer, bearing, and spacer.

c. Assembly.

(1) Apply RTV (silicone) sealer to the seal surface of the axle shaft.

(2) Install the seal slinger on the outer axle shaft using tool C-4398-1, as shown in figure 2-62.2.

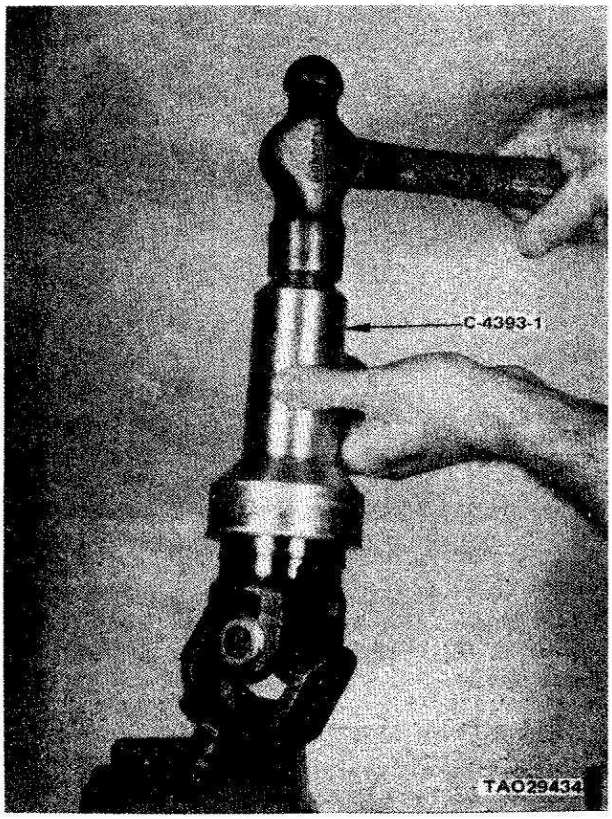


Figure 2-62.2. Slinger Installation.

(3) Install the lip seal on the slinger with the lip toward the axle shaft spline (figure 2-62.3).

(4) Insert the axle shaft into the axle housing.

CAUTION

Be careful not to damage the differential seal at the side gears when you insert the axle shaft into the housing.

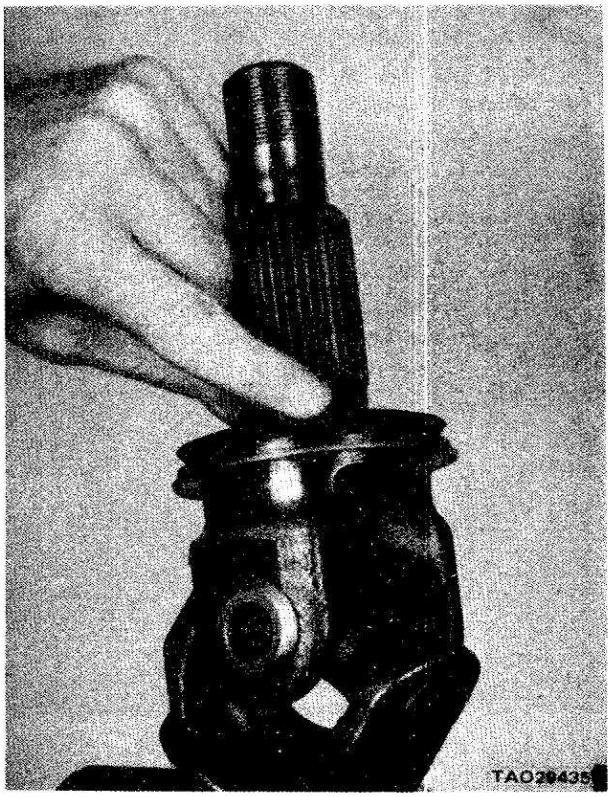


Figure 2-62.3. Seal Installation.

(5) Place a pry bar through the axle shaft U-joint, and wedge it so the shaft is in all the way, as shown in figure 2-62.4.

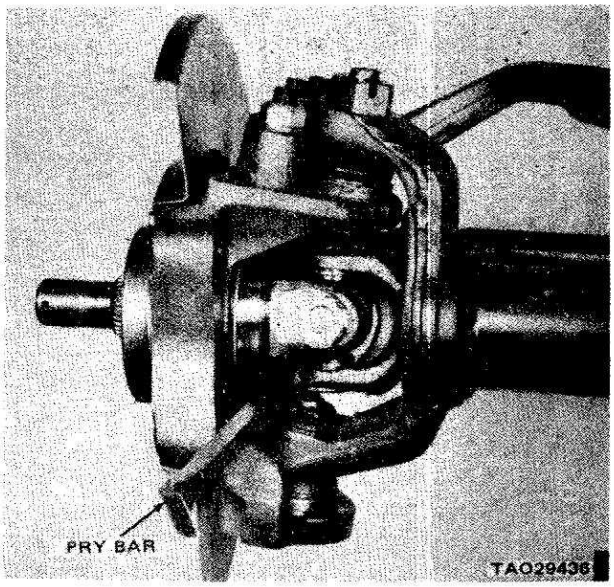


Figure 2-62.4. Insert Pry Bar.

(6) Using adapter C-4398-2 and driver C-4398-1, bottom the seal cup in the knuckle. Refer to figure 2-62.5.

NOTE

Hold the cup in position by placing a small amount of grease on the adapter face. Do not remove the installing tool at this time.

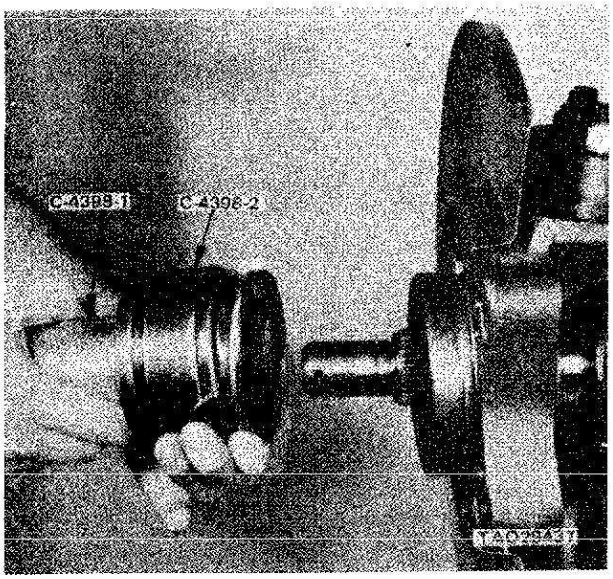


Figure 2-62.5. Cup Installation.

(7) Using tool C-4398-1, install the seal in the retainer (figure 2-62.6).

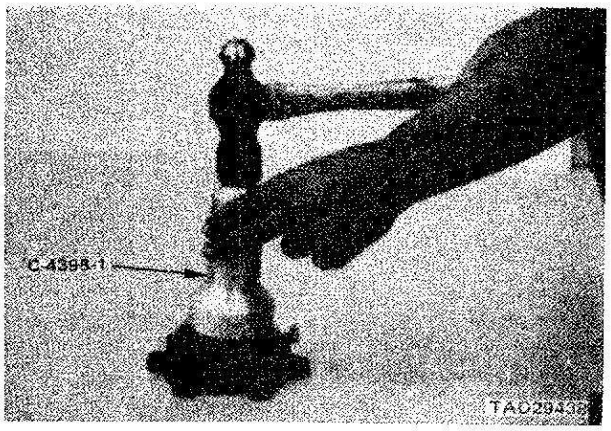


Figure 2-62.6. Installing the Seal in the Retainer.

(8) Install the retainer on the hub and rotor assembly spindle, and pack the wheel bearings with GAA grease.

(9) Position the outer bearing cone on the hub spindle, and drive it into place using tools C-4246-8 and C-4398-1. Install the outer bearing cup, spacer, and inner bearing cup.

(10) Position the inner bearing cone on the hub spindle, and drive it into place using tools C-4246-8 and C-4398-1.

(11) Apply a 1/4-inch bead of silicone sealer to the retainer face near the chamfer, as shown in figure 2-63.

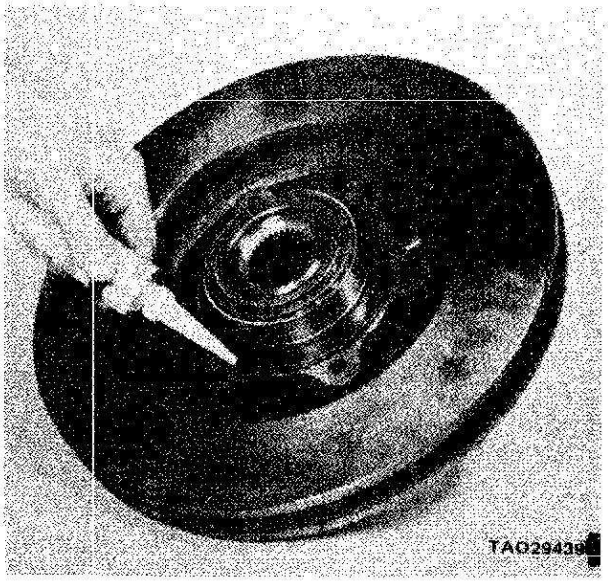


Figure 2-63. Applying Sealer.

(12) Remove the seal installing tool from the knuckle bore, making sure the outer axle shaft remains centered.

NOTE

If the shaft is not centered, make sure the lip seal is still inside the cup. Correct if necessary.

(13) Position the bearing retainer in the hub assembly so that the lube fitting is forward and alines with the tie rod (figure 2-64).

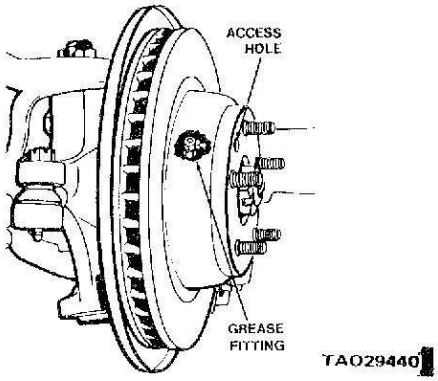


Figure 2-64. Alining the Lube Fitting.

(14) Install the hub and rotor on the knuckle. Torque the retainer bolts to 30 ft-lbs, and remove the pry bar from the U-joint.

(15) Install the washer, and nut. Torque the nut to 100 ft-lbs. Then, continue to tighten it to the next cotter pin position. Install the cotter pin.

(16) Insert a grease gun through the hole in the hub assembly onto the lube fitting. Fill it until the grease flows through the inner seal. Check the area around the U-joint for grease flow.

(17) Remove the lube gun and turn the hub and rotor several times.

(18) Reinstall the lube gun, and lubricate allowing the grease to flow from 50 percent of the seal diameter.

(19) Install the brake caliper, wheel, and tire. Remove the jackstands, and lower the vehicle.

2-72.1. Axle Shaft and Joint Assembly.

a. Removal. Refer to paragraph 2-72*a*.

b. Disassembly.

(1) Remove the snap rings from the two ears in each yoke.

(2) Position the joint assembly in an open vise with one yoke horizontal and resting on top of the vise jaws (figure 2-65). Do not tighten the vise.

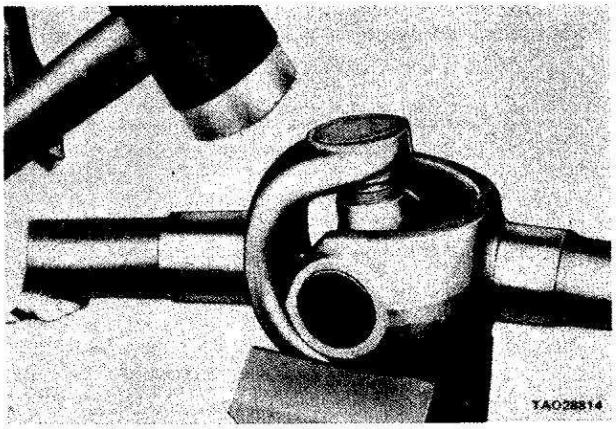


Figure 2-65. Removing Bearing Cups.

(3) With a mallet, tap the upper ear of the vertical yoke several times, driving the vertical yoke down and pushing out the upper needle bearing and cup.

(4) Reverse the yoke and remove the opposite needle bearing and cup.

(5) Work the yoke off of the arms of the cross.

c. Assembly.

(1) Insert the needle bearing and cup assembly in one ear of the yoke.

(2) Place the yoke in the vise (figure 2-66), and press the needle bearing into the proper position. Install the snap ring.

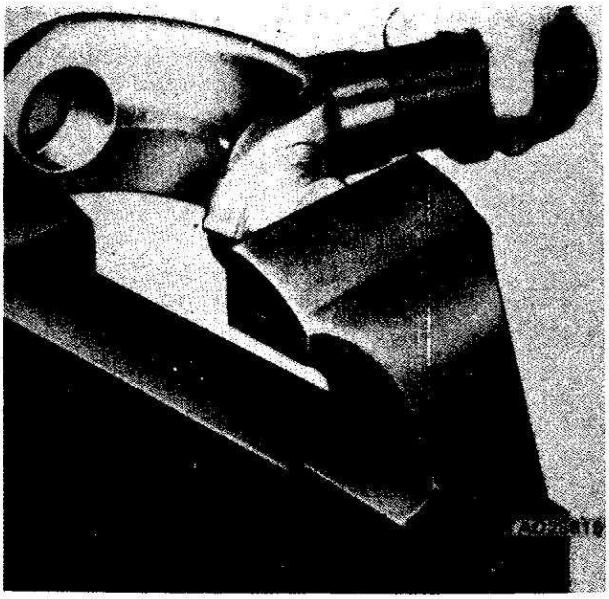


Figure 2-66. Replacing Bearing Cups.

(3) Remove the yoke from the vise and work one arm of the cross into it. Insert the opposite bearing cup by hand and line it up with the cross.

(4) Replace the yoke in the vise, and press the cup into the yoke and on to the arm of the cross (figure 2-67).

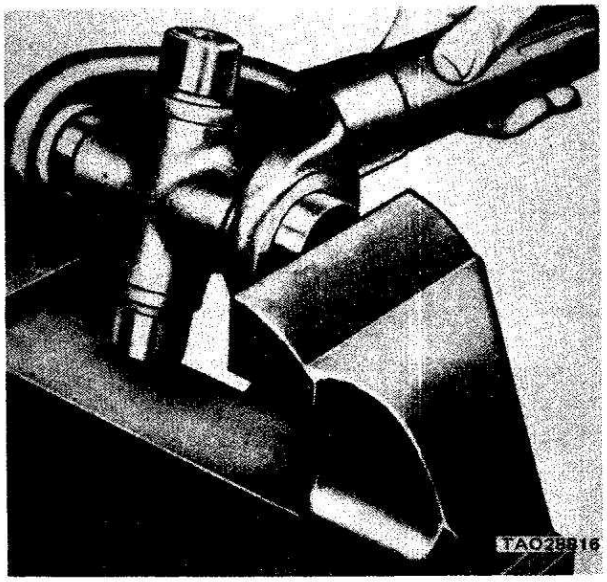


Figure 2-67. Pressing Cross and Cups into Yoke.

(5) With the aid of a short plug or socket, press the bearing cup into the proper position. Install the snap ring.

(6) Repeat the procedure as outlined in *(1)* through *(5)* for installing the remaining cups.

d. Installation. Refer to paragraph 2-72*c*.

2-72.2. Transfer Oil Level and Draining Transfer Case.

a. Refer to LO 9-2320-266-12.

b. The proper oil level ranges from the bottom of the check-fill hole to ½ inch below the check fill hole. Check oil level when cold (figure 2-69).

c. When draining to refill, remove the check-fill hole plug and the drain hole plug. Drain completely. (figure 2-69). Clean the drain hole plug threads after draining and coat with solvent, MIL-S-22473 or equivalent.

2-73. Propeller Shaft.

The trucks are equipped with single-piece propeller shafts. The 4X2 models use an outside slip-type and the 4X4 models use an inside slip-type. Maintenance of the propeller shaft is separated into front and rear service. Refer to figures 2-68 and 2-69 for operations listed below.

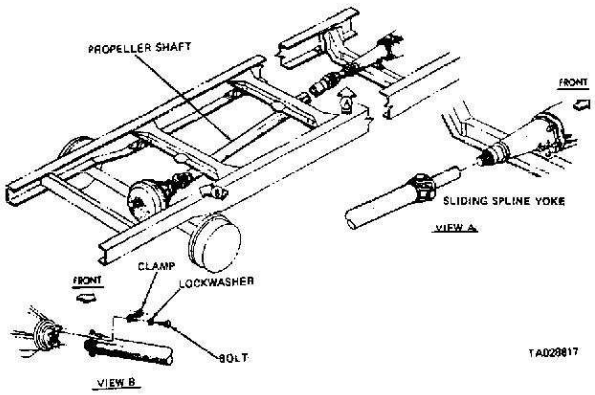


Figure 2-68. 4X2 Vehicle Driveline Components.

a. Removing the Rear Shaft (4X2 Models).

(1) Mark the shaft and the pinion hub yoke in order to reinstall them in the same position.

(2) Remove both the rear universal joint roller and the bushing assembly clamps from the rear axle drive pinion hub yoke. If so equipped, do not disturb the retaining strap used to hold the cup assemblies on the universal joint cross.

(3) Do not allow the propeller shaft to drop or hang loose from either joint during removal. Wire up or otherwise support the loose end of the shaft to prevent damage to the joint.

NOTE

Before removing the propeller shaft with the sliding yoke from the transmission, lower the truck front end slightly to prevent loss of transmission fluid.

(4) Slide the propeller shaft from the transmission output shaft. Do not damage the splines on the output shaft or yoke. Examine the sliding yoke seal for evidence of leakage and if no leakage is evident, do not disturb the seal.

b. Installing the Rear Shaft (4X2 Models).

(1) Before installing the propeller shaft, wipe the sliding yoke clean and inspect the machined surface for scratches, nicks, or burrs.

(2) Engage the yoke splines on the end of the output shaft and slide the yoke into the transmission.

(3) Install the rear universal joint cross and roller bushings in the seats of the drive pinion hub yoke, alining the marks made during removal. Install the bushing clamps and attaching screws.

(4) Tighten the clamp screws to 20 ft-lbs.

c. Removing and Installing the Rear Shaft (4X4 Models). Use the same procedure as on the 4X2 models, except that both the front and rear U-joints are held in position with clamps.

d. Removing and Installing the Front Shaft (4X4 Models).

(1) Remove the four bolts from the constant velocity U-joint flange at the transfer case.

NOTE

Use a pry bar to prevent the constant velocity universal joint from turning when removing the bolts.

(2) Mark the shaft and the pinion hub yoke in order to reinstall them in the same position.

(3) Remove the U-joint roller and the bushing assembly clamps from the axle drive pinion hub yoke. Be sure to support the shaft to prevent damage during removal. If so equipped, do not disturb the retaining strap holding the cup assemblies on the U-joint cross.

(4) To install the front shaft, aline the yoke and pinion hub marks made during removal. Install the bushing clamps and attaching screws. Position the constant velocity U-joint flange on the transfer case flange, and secure the four attaching bolts and lockwashers.

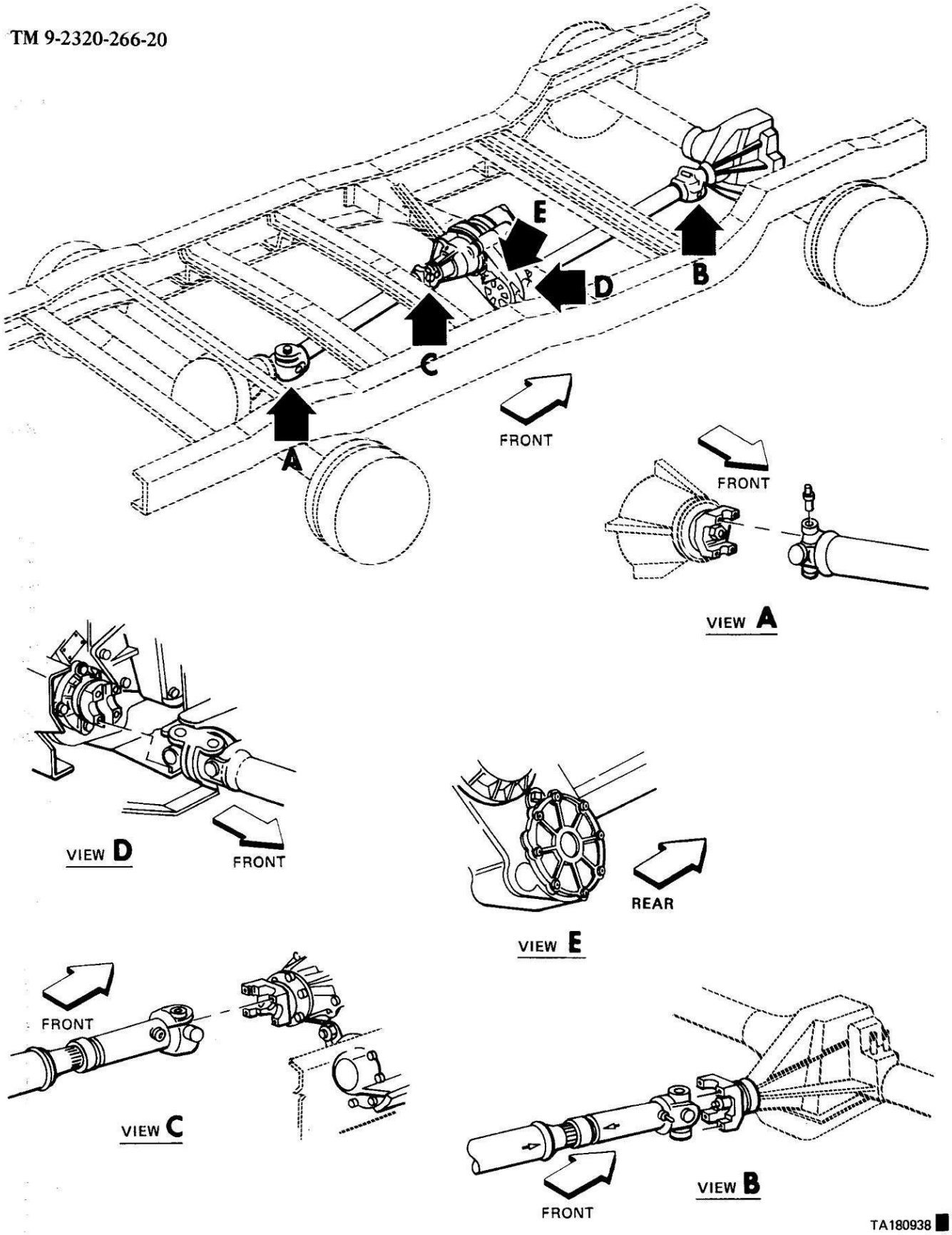


Figure 2-69. 4X4 Vehicle Driveline Components.

2-74. Universal Joint Cross and Roller.

a. Disassembly.

(1) Hammer the bushings slightly inward to relieve pressure from the snap rings. Remove the snap rings.

(2) Position the yoke in the press or vise with a socket large enough to receive the bushing on one side and a socket slightly smaller than the bushing on the other side.

(3) With pressure applied, one roller will move into the yoke and the opposite roller will move into the receiving socket.

(4) After one roller is out, press on the cross end to move the opposite roller into the receiving socket. Discard the cross and rollers.

b. Assembly.

(1) Position the yoke in the vise or press with the new bushing assemblies and the new cross assembly.

(2) As pressure is applied, guide the cross ends into the bushing and roller assemblies.

(3) Press the bushing just far enough in to expose the snap ring grooves, and install the new snap rings.

Section XIX. MAINTENANCE OF WHEELS AND TIRES

2-75. Tire Wear Indicators.

a. General. Abnormal wear on the tires can result from operating the truck on rough terrain, or from mechanical faults. If you find abnormal wear on the tires, correct the cause as soon as possible. Figure 2-70 shows various types of abnormal tire wear, their causes, and their corrections. Repair of these tires is covered in TM 9-2610-200-20.

b. Underinflation. Don't let the tire pressure drop below 45 psi in front and 55 psi in the rear and spare. Underinflation results in fast wear at the shoulders of the tire.

c. Overinflation. Overinflation causes faster wear at the center of the tread. This increases the possibility of cuts and punctures. Always check inflation when the tires are cold.

d. Excessive Camber Wear. Excessive positive or negative camber causes the tire to run at an angle to the road. One side of the tread will wear more than the other. Send the truck to Direct Support for a wheel alinement.

e. Toe-In or Toe-Out Tread Wear. Incorrect toe-in or toe-out causes wear on the edges of the front tires. It also makes the tire drag instead of letting it roll. This condition produces a tapered or feathered edge on the tread ribs. Send the truck to Direct Support for a complete wheel alinement.

f. Thin Spots, Cupped, or Scalloped Tire Tread Wear. These problems usually occur when a truck has been driven mostly at highway speeds, without the recommended tire rotation, and without balanced tires. Once a front tire gets flat or cupped spots, it will continue to wear at a fast rate. Rotate the tires (figure 2-71) and balance the wheels to correct this condition. Then keep a fairly close watch on the damaged tire, as it will need to be replaced sooner than the other tires.

g. Runout. A wheel and tire may have radial or lateral runout, or both. Runout is caused by an irregularity of the tire, a bent wheel, or both. To check runout, raise the wheel, spin it, and observe the tire. If you have a runout problem, you will see the wheel or tire wobble. Replace the wheel, tire, or, if both wobble, the entire assembly.

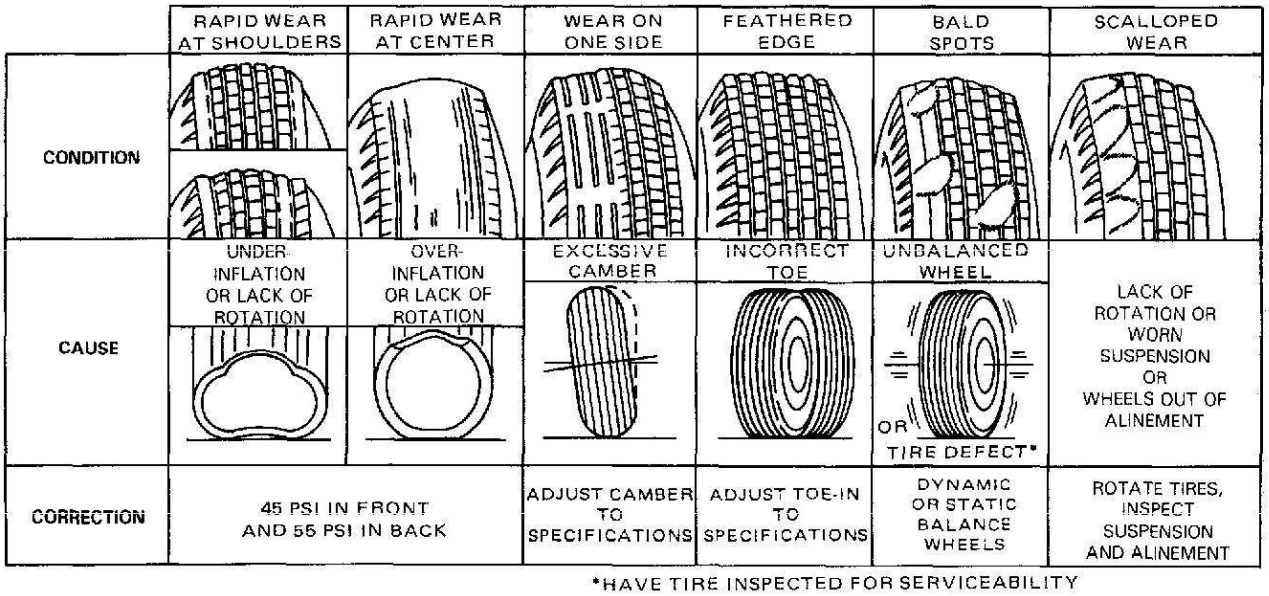


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Figure 2-70. Causes and Corrections of Abnormal Tire Wear.

2-76. Service Procedures.

a. Rotating or Replacing Tires.

(1) General. Inspect the tires during every regularly scheduled maintenance check. It's a good idea to break in new tires on the front wheels; it will increase the overall tire life. These trucks use radial ply tires (9.50R16-5D). They give improved tread life, better road hazard resistance and a smoother high-speed ride.

(2) Rotating. Use either the four-wheel or the five-wheel pattern shown in figure 2-71.

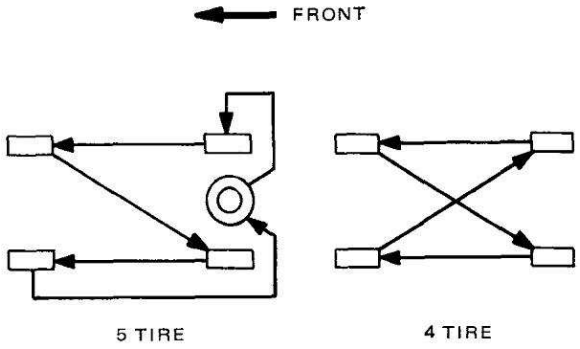

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Figure 2-71. Rotation of Radial Tires.

(3) Replacing. When replacing tires, always use the spare tire as one of the new tires. This will minimize unnecessary aging of the spare. If an operator has changed a tire during a mission, check to see if the one that went flat is reparable. If it is, mark which side of the truck it was used on and save it for later use. Always replace a spare tire that has been used on the truck.

b. Balancing. If the steering wheel vibrates heavily when driving at or above 40 mph, the tires and wheels need balancing. Notify Direct Support.

c. Inflation Pressure. The front tires require 45 psi for even wear. The rear and spare tires should be inflated to 55 psi.

d. Installing the Tire on the Rim.

(1) To install a tire on a rim, use the procedures in TM 9-2610-200-24.

(2) To seat the tire on the rim, use the following procedure:

(a) Lubricate the entire bead of the tire and rim with tire mounting lubricant.

(b) Install the bead expander (tool TC-50) by slipping it over the rim so that it forms a seal between the rim and the bead area of the tire (figure 2-71.1).

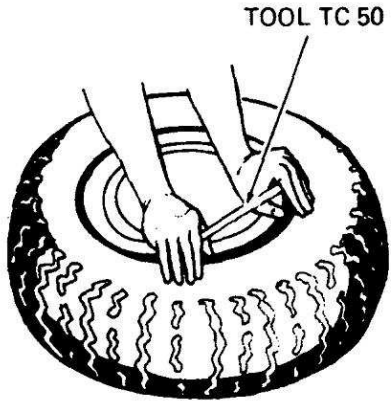

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Figure 2-71.1. Installing the Bead Expander (Tool TC-50).

(c) Inflate the tire.

NOTE

As you inflate the tire, the bead expander (tool TC-50) will slide off the rim. If the expander sticks, apply lubricant to the expander and repeat this procedure.

Section XX. MAINTENANCE OF BRAKE SYSTEM

2-77. Description and Data.

a. General. The trucks have independent front and rear hydraulic brake systems using drums on the rear and discs on the front. Depressing the brake pedal activates the master cylinder, which forces fluid through the master cylinder outlet into the brake lines. The fluid pressure pushes out the pistons on the wheel cylinders. This forces the brake shoes or pads against the drums or discs. The friction created when the lining and pads are forced against the drums creates the braking action which slows down or stops the truck. A spring-loaded brake warning system detector between the two systems grounds against the detector housing if one system loses hydraulic pressure. When this occurs, the brake warning light in the instrument cluster lights up.

b. Principles of Brake Maintenance. Check the master cylinder fluid level at each lubrication and add brake fluid if the level is more than one-quarter inch below the top of the cylinder opening. Check for equalization and free travel of linkages.

2-78. Servicing the Hydraulic System.

a. General. Servicing the hydraulic system is basically a matter of making adjustments, replacing worn or

damaged parts, and correcting any damage caused by dirt or contaminated fluid.

(1) Never use a brake fluid container that has been used for any other liquid. Contaminated brake fluid will cause the piston cups and the valve in the master cylinder to swell or deteriorate.

(2) Adjust the rear brakes after installing new or relined brake shoes. Also, if you must hit the brake pedal a few times to start the braking action, bleed or adjust the brakes as required.

b. Low Pedal. Low pedal reserve is caused by normal brake lining wear or by lack of brake fluid in the master cylinder. Adjust the brakes (paragraph 2-82) if you find this condition. Also check the fluid in the master cylinder.

c. Fluid Loss. Some drop in fluid level is normal with disc brakes because of wear to the pads. If the drop is abnormal, or if you must constantly add fluid to the system, fluid might be leaking past the piston cups in the master cylinder or the brake cylinders. The hydraulic lines or hoses may be leaking or a connection may be loose or broken. Tighten any loose connections and replace damaged parts. After any repairs you should bleed the system (paragraph 2-81).

2-79. Master Cylinder Internal Leak Check.

a. The following test will help you determine if a brake master cylinder is faulty. Perform this test BEFORE replacing any item in the brake system.

b. Apply and hold the brake with strong pressure for 1 minute. If pedal travel occurs without fluid loss during this check, the master cylinder is defective and must be replaced.

2-80. Bleeding the Master Cylinder.

a. Check the brake master cylinder to be sure the boot is in place; make necessary corrections if it is not.

b. Bleed the master cylinder before you install it on the vehicle. Connect tool C-4029 to the outlet ports and immerse the other ends in the master cylinder reservoirs (figure 2-72). Then apply the master cylinder push rod full stroke until all air bubbles have ceased (this may take 20-30 applications). Until this step has been taken, manual or pressure bleeding is unlikely to dislodge air bubbles from the system.

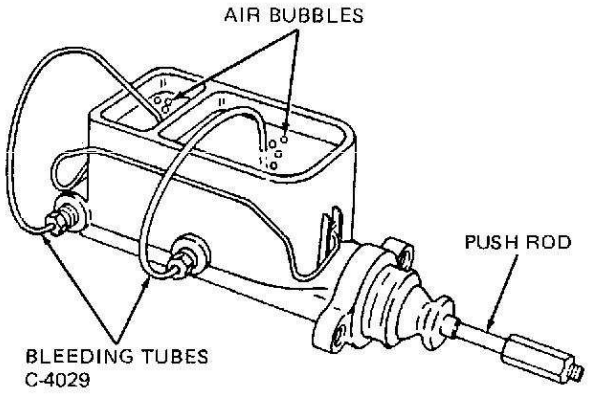


Figure 2-72. Bleeding the Master Cylinder.

2-81. Bleeding the Brake System.

a. Pressure bleed the metering valve (figure 2-73). Hold the metering valve open manually by using tool C-4121 to pull the valve stem out. The pressure release valve stem is in its innermost position when there is no pressure present.

CAUTION

Don't use a rigid clamp, wedge, or block to depress the valve stem. This can cause internal failure in the valve, resulting in complete loss of front brakes.

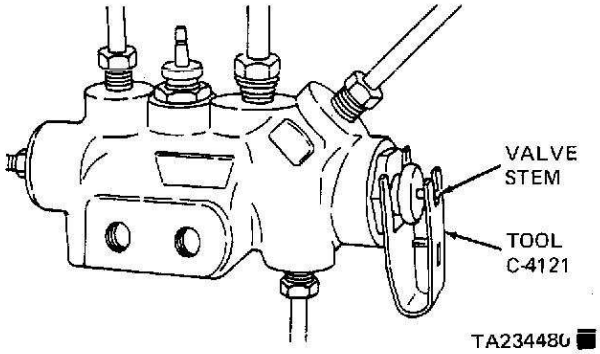


Figure 2-73. Bleeding the Metering Valve.

b. Bleed the remainder of the system by using one of the following methods:

(1) Attach a bleeder hose to the bleeder valve of the right rear wheel cylinder. Insert the other end of the bleeder hose in a clear jar half filled with brake fluid, in order to make any air bubbles visible. Open the bleeder screws one full turn and bleed the fluid from the hose until a solid steam of fluid without any bubbles is expelled. Refill the master cylinder after bleeding the wheel cylinder. Follow the same procedure on the left rear, right front, and left front wheels in that order.

(2) Have an assistant pump the brake pedal and hold it down while the bleed screw is held open. Do this until the entrapped air is removed. Follow the same bleeding sequence as above.

c. Check for correct master cylinder compensation. This is done by pumping the brake pedal several times and stopping with the pedal depressed. Observe each reservoir chamber carefully while slowly releasing the pedal. If the compensating port is open, you will see the geyser. Repeat several times and adjust the push rod length to insure the master cylinder is compensating correctly.

2-82. Brake Adjustment - Rear Brakes.

a. General. Drum brakes are used on the rear of the truck. They don't normally need manual adjustment, but if the brakes are relined, do the initial adjustment manually to speed up adjusting time.

b. Procedure.

(1) Jack up the vehicle so rear wheels are free to turn.

(2) Remove the adjusting hole cover from both rear wheel backing plates.

(3) Be sure the parking brake lever is fully released. Then back off the parking brake cable adjustment so there is slack in the cable.

(4) Insert a brake adjusting tool into the star wheel of the adjusting screw. Move the handle of the tool upward until you feel a heavy drag when the rear wheel is rotated. See figure 2-74.

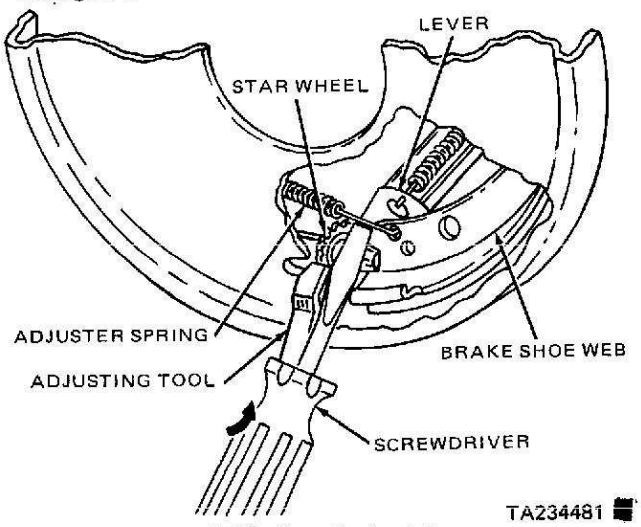


Figure 2-74. Rear Brake Adjustment.

(5) Insert a thin screwdriver into the brake adjusting hole and disengage the adjusting lever from the star wheel. Be careful not to bend the adjusting lever. While holding the adjusting lever out of engagement, back off the star wheel until you feel only a slight drag.

(6) Repeat the above adjustment on the other rear wheel. The adjustment must be equal on both wheels. Install the adjusting hole covers in the brake supports.

(7) Lower the vehicle and road test it.

2-83. Brake Hoses and Tubing.

a. Install the flexible hydraulic brake hose by first tightening the male end of the hose in the rear axle "T"

b. Install the female end to the tube fitting in such a manner that you have a minimum of twist in the hose.

c. Inspect the hoses and tubing in all brake service operations for the following.

(1) Severe surface cracking, pulling, scuffing, or worn spots. If a hose's cotton fabric casing is exposed to weather by cracks or abrasions in the rubber hose cover, the hose may eventually deteriorate or burst.

(2) Faulty installation which can cause a hose or tube to twist or touch a wheel, tire, or chassis.

d. Make sure the tube and hose mating surfaces are clean and free from nicks and burrs.

e. Use new copper seal washers and see that the tube connections are properly made and the nuts tightened.

f. Attach all tubes with retaining clips.

2-84. Disc Brakes.

a. General. The single-piston,sliding-caliper disc brakes consist of a one-piece nut and disc assembly, the caliper, the pads and linings, the splash shield, and the adapter as shown in figure 2-75. The cast-iron braking disc has cooling fins between the two machined braking surfaces.

b. Operation. When the brake pedal is pressed down, hydraulic pressure is put on the piston. This force is transmitted to the inside pad and the inside braking surface of the disc. This makes the caliper and outside pad move in, sliding on the machined adapter ways, to give a clamping force on the disc. These brakes automatically compensate for wear.

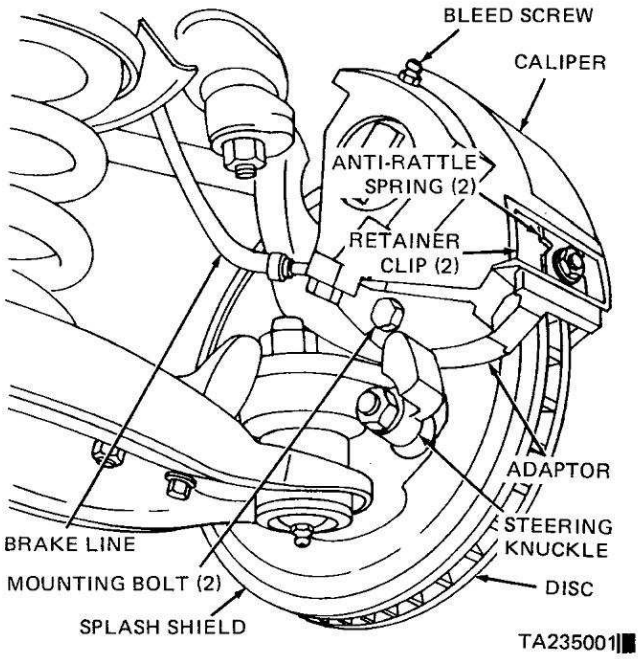


Figure 2-75. Disc Brakes.

c. Services.

(1) Linings should have light contact with the disc or have nor more than 0.005 inch clearance. If the pads are more than 0.005 inch from the disc, apply the brakes several times and recheck the clearance. If you still have more than 0.005 inch clearance, clean the ways. If the problem persists, send the truck to Direct Support.

(2) Knock-back of the linings can be caused by the normal deflection of front suspension components during a hard turn. In effect, the disc is tilted and knocks the linings and pistons back. Excessive running clearance results and the driver will notice increased pedal travel on the next brake application. Loose or worn suspension parts, especially front wheel bearings, can increase the problem and make it necessary for the driver to pump the pedal several times to get braking action. Check, and adjust or replace loose, worn or broken suspension parts.

(3) Lack of parallelism between the two faces of the disc (variations in the disc thickness) may cause excessive pedal travel, a throbbing sound (front end vibration) or a pumping (up-and-down movement) of the brake pedal when braking. Check for even wear on both pads. If you find excessive uneven wear, replace the disc.

(4) Disc lateral runout is a side-to-side wobble. This can cause pads and pistons to be knocked-back, causing increased pedal travel. If the disc wobbles slightly when rotated, even though the wheel bearings are in good condition and properly adjusted, the wobble will usually not affect braking efficiency.

d. Corrosion. Trucks that stand unused for a long time in high humidity or salt air areas may get rust on the disc. This will cause a temporary brake surge and roughness. However, this will correct itself after a short time. Replace the rotor if the condition doesn't clear.

2-85. Routine Maintenance of Disc Brakes.

Refer to figure 2-76.

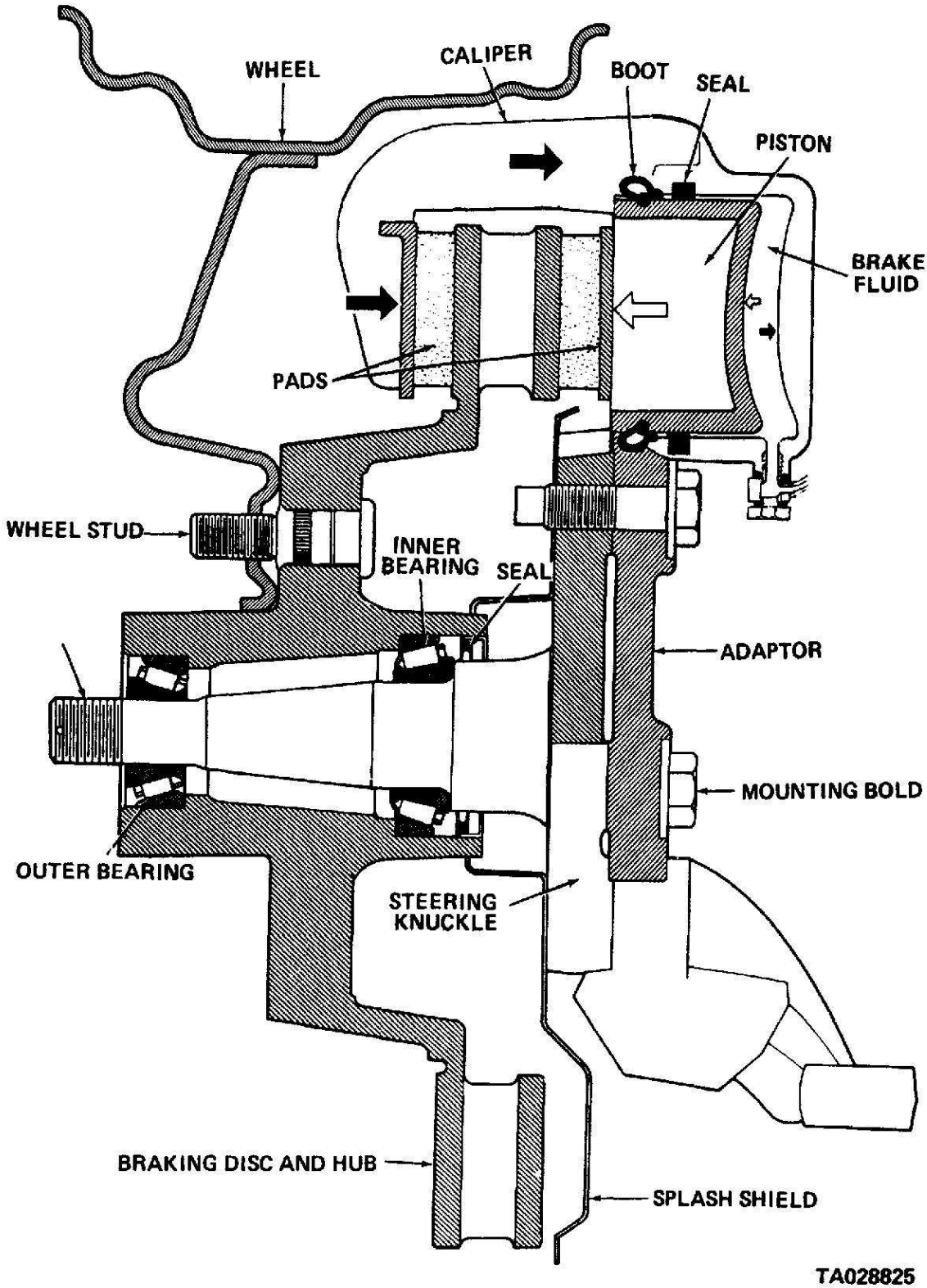


Figure 2-76. Disc Brake Assembly (Sectional).

a. Check Brake Lines, Hoses, and Linings.

(1) Raise the front wheels.

(2) Remove the wheels.

(3) Inspect the disc, the pads, and the caliper.

(4) Inspect the brake hoses and tubing as described in paragraph 2-83.

b. Check Disc Brakes.

(1) Replace both sets of pads (inside and outside) if *either* lining is worn to within 1/16 inch of the rivet (paragraph 2-87). Don't get oil or grease on the disc or pads when handling them.

(2) If you replace the pads on one side, replace them on the other side also.

(3) Check all brake tube connections for leaks.

(4) Check the adapter plate mounting bolts to see that they are tight (100 ft-lbs).

2-86. Combination Brake Warning/Metering Valve.

a. Metering Valve Unit. The metering valve holds off hydraulic pressure to the front disc brakes in the 35 to 135 psi range. This allows the rear drum brake shoes to overcome the return springs and begin to contact the drums. This feature helps prevent locking the front brakes on icy surfaces under light braking conditions. The metering valve has no effect on front brake pressure during hard stops.

(1) Checking Operation.

(a) Check for a slight bump (you should feel it with your foot as the brake pedal is depressed about 1 inch).

(b) Visually check to see that the valve stem extends slightly when the brakes are applied and retracts when the brakes are released.

(c) In case of a metering valve malfunction, remove the valve and install a new combination valve assembly.

(2) Removal.

(a) Disconnect the electrical wire at the brake warning switch.

(b) Disconnect the hydraulic brake tube lines on the valve.

(c) Remove the two mounting nuts and screws.

(d) Install the metering valve by reversing the above procedure.

(e) Bleed the brake system.

b. Brake Warning Switch Unit. The brake warning switch used in this combination valve is a latching type. If a pressure loss occurs in one side of the dual brake system, the piston in the valve will move toward the faulty side and latch in that position. This will cause the brake system warning light to come on and stay on until the brake system is repaired. After repairing and bleeding the brake system, apply the brakes to recenter the piston and automatically turn off the warning light.

(1) Electrical test. See paragraph 2-44d.

(2) Replacing the warning switch sending unit. The component parts of the switch body are not serviced. However, the sending unit can be removed if a malfunction occurs, and a new sending unit installed as follows:

(a) Disconnect the electrical wire connected to the brake warning switch.

(b) Remove the sending unit.

(c) Install a new unit using a new seal.

(d) Reconnect the wire.

2-87. Brake Pads.

a. Removing the Brake Pads.

(1) Place the truck on jack stands.

(2) Remove the wheel.

(3) Remove the caliper retaining clips and anti-rattle springs (figure 2-77).

(4) Remove the caliper from the disc by slowly sliding the caliper assembly out and away from the disc (figure 2-78).

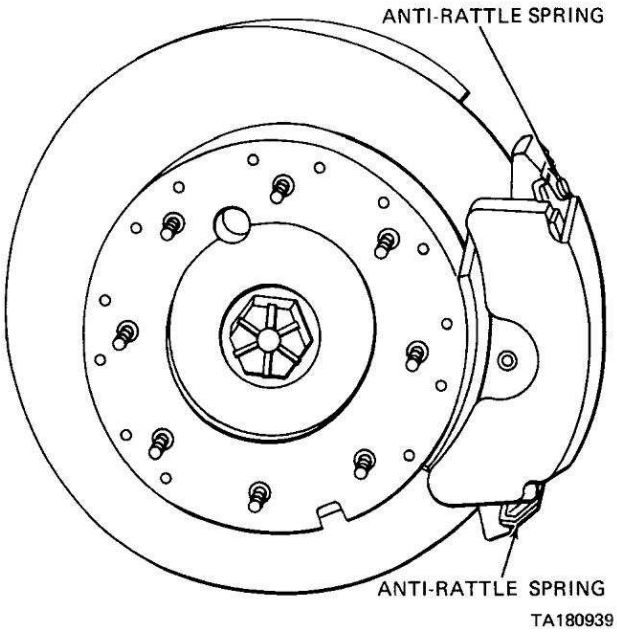


Figure 2-77. Caliper Retaining Clips Location.

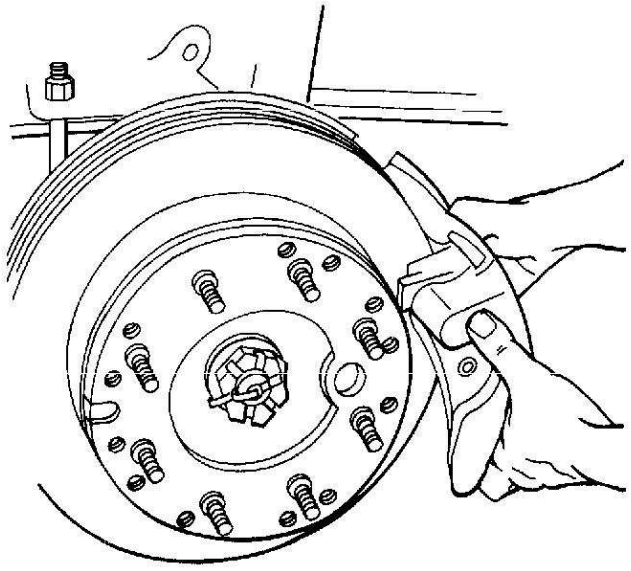


Figure 2-78. Caliper Removal.

(5) Flanges on the outside pad will retain the pad to the caliper fingers. Support the caliper so it doesn't damage the flexible brake hose. Remove the inside pad (figure 2-79).

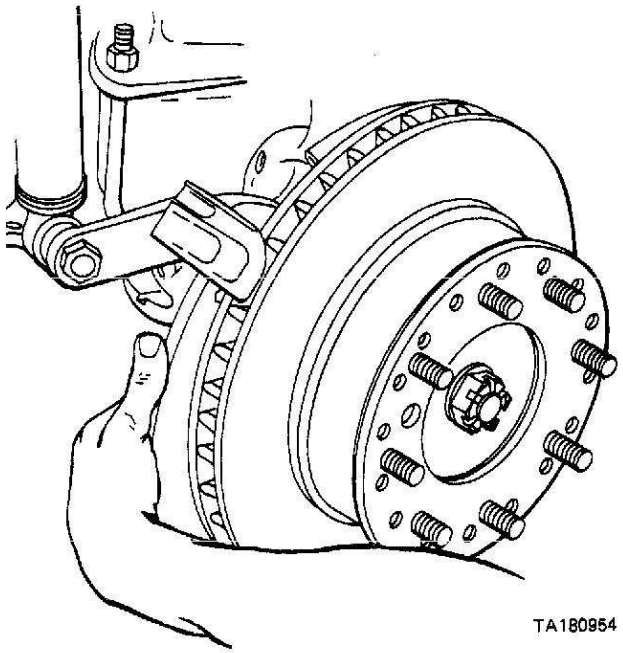


Figure 2-79. Inside Pad Removal.

b. Inspecting Brake Components.

(1) Check for piston leaks if you find brake fluid in and around the boot area and the inside lining.

(2) Check for any ruptures in the piston dust boot.

(3) Inspect the braking surfaces of the disc for scoring, ridges, or cracks.

(4) If you find damage, replace the rotor or caliper assembly.

c. Installing the Brake Pads.

(1) Open the bleeder slightly and carefully push the piston back into the bore until it bottoms. Close the bleeder.

(2) Slide the new outside pad into the recess of the caliper.

NOTE

Be sure to clean the adapter ways before installing the caliper.

(3) Put the inside pad in position on the adapter with the flanges in the adapter ways.

(4) Slowly slide the caliper assembly into position in the adapter and over the disc. Aline the caliper on the machined ways of adapter.

NOTE

Be careful not to pull the dust boot from its groove as the piston and boot slide over the inside pad.

(5) Install anti-rattle springs and retaining clips on top of the retainer spring plate. Torque the retaining bolts to 18 ft-lbs.

(6) Check for proper brake pad to disc clearance. Brake pads should have light contact or not more than .005 inch clearance. If the pad linings are more than .005 inch from the disc, pump the pedal several times until you get a firm pedal, recheck the clearance. If you still have more than .005 inch clearance and the problem persists notify Direct Support Maintenance.

(7) Check and refill the master cylinder reservoirs, as required. If you can't get a firm pedal, bleed the brake system (paragraph 2-81).

(8) Install the wheels.

(9) Remove the jack stands and test vehicle operation.

2-88. Brake Rotor (Disc).

Inspect the rotor; if it doesn't work properly, check for pulsating brake pedal,cracks, rust, scoring, or heat spots. Replace it if you find any of these conditions.

2-89. Removing the Rear Brake Drum.

a. Raise the truck and install jack stands.

b. Remove the wheels.

c. Remove the axle shaft nuts, washers, and cones. Tap the axle shaft sharply in the center to release the cones. Remove the axle shaft.

d. Using tool DD-1245, remove the outer hub nut.

Straighten the lock washer and remove it. Remove the inner nut and the bearing. Carefully remove the drum. If the drum cannot be removed, back off the brake adjustment (figure 2-74).

NOTE

Use tool DD-1241-JD in place of tool DD-1245-A on 4X2 models with a part number effectivity date after August 8, 1976, or after September 15, 1976, on 4X4 models.

2-90. Brake Shoes.

a. Inspection.

(1) Brush the dust off the metal parts of the brake shoes.

(2) Examine the lining contact pattern to see if the shoes are bent. The whole width of the lining should show contact. If the shoes only show contact on one side, replace them.

b. Removal.

NOTE

The pivot screw and adjusting nut have left hand threads on the left brake assemblies and right hand threads on the right hand assemblies.

(1) Unhook the adjusting lever return spring from the lever (figure 2-80). Remove the lever and return spring from the lever pivot pin. Unhook the adjuster lever from the adjuster cable assembly.

(2) Using brake spring pliers, unhook the upper shoe-to-shoe spring. Unhook and remove the shoe holddown springs.

(3) Disconnect the parking brake cable from the parking brake lever.

(4) Remove the shoes with the lower shoe-to-shoe spring and the star wheel as an assembly.

(5) Clean the backing plate.

(6) Clean the threads of the adjusting screws, then inspect them for pulled or stripped threads.

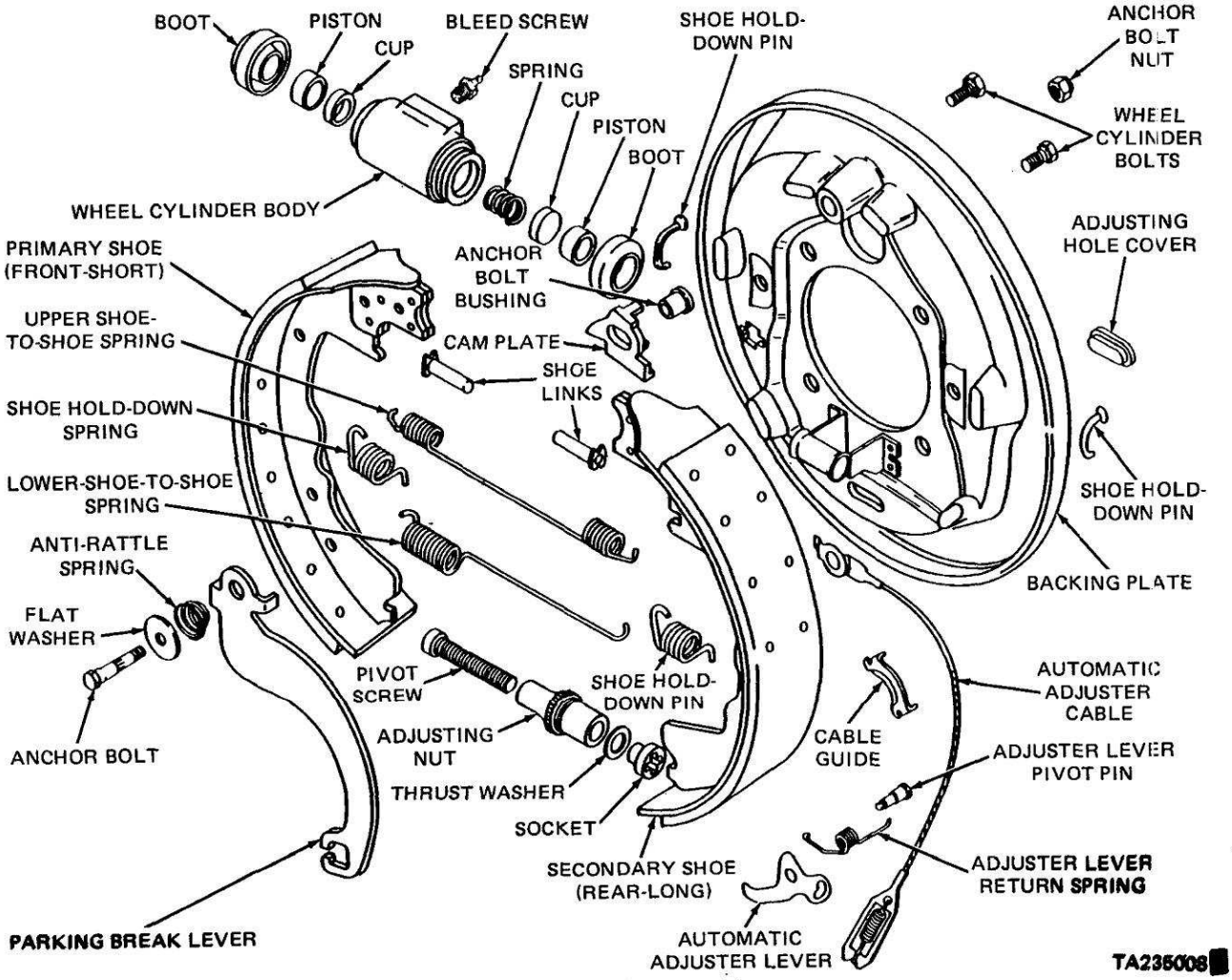


Figure 2-80. Rear Brake Assembly.

2-91. Rear Wheel Cylinder.

a. Removal.

(1) Disconnect the brakeline from the wheel cylinder.

(2) Remove the wheel cylinder attaching bolts, then slide the wheel cylinder out of the support.

b. Installation.

(1) Slide the wheel cylinder into position on the backing plate. Install the attaching bolts and tighten them securely.

(2) Connect the brakeline to the wheel cylinder and tighten.

2-92. Installing the Rear Brake.

a. Lubricate and assemble the star wheel assembly. Lubricate the guide pads on the backing plates (figure 2-81) with GAA or equivalent.

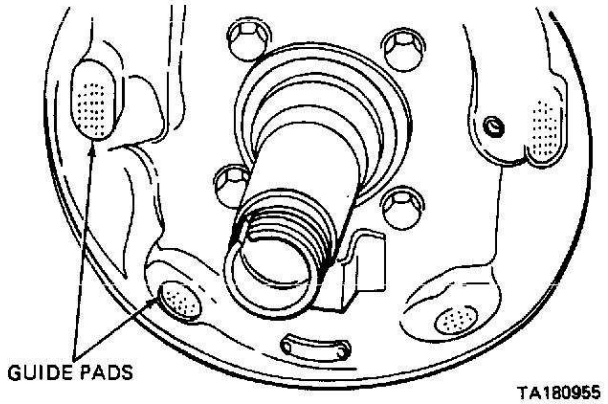


Figure 2-81. Backing Plate and Guide Pads.

b. Assemble the star wheel, the lower shoe-to-shoe spring, and the primary and secondary shoe (primary to the front, secondary to the rear), and position them on the backing plate (figure 2-82).

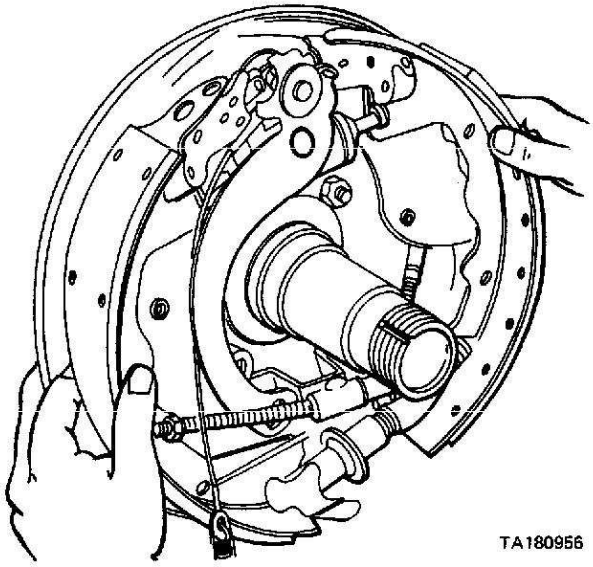


Figure 2-82. Installing Shoe Assembly, Rightside.

c Connect the parking brake cable to the parking brake lever.

d. Install and hook the holddown springs (figures 2-83 and 2-84). Using brake spring pliers, replace the upper shoe-to-shoe spring.

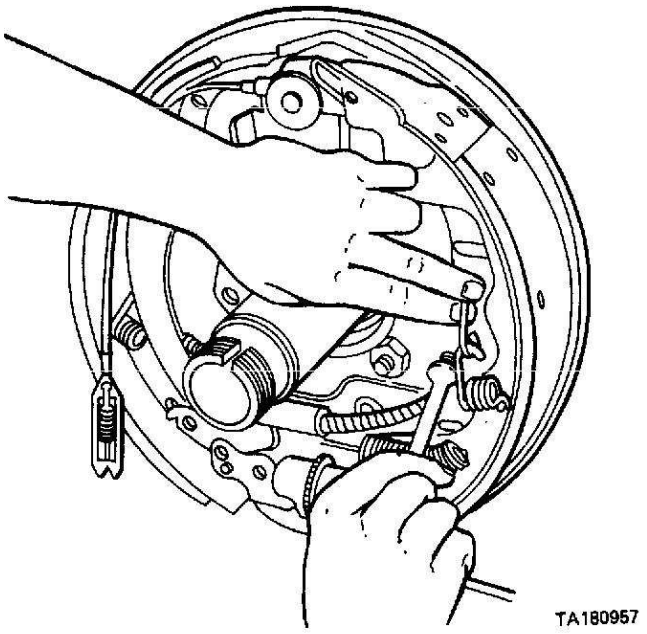


Figure 2-83. Installing Shoe Holddown Springs, Rightside.

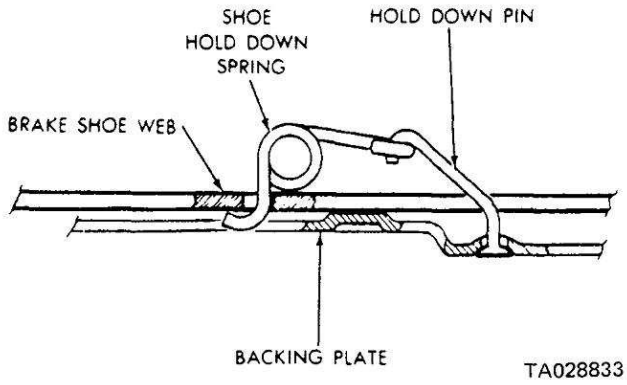


Figure 2-84. Installed Shoe Holddown Spring.

e. Position the adjuster lever return spring on the pivot (green springs on the left brakes and red springs on the right).

f. Install the adjuster lever. Route the adjuster cable and connect it to the adjuster.

g. Carefully double-check all components.

2-93. Installing the Rear Brake Drum.

a. Position the drum on the axle housing.

b. Install the bearing and inner nut.

c. While turning the hub and drum, tighten the inner (adjusting) nut until a slight bind is evident. Back off the adjusting nut 1/6 turn, so that the wheel will rotate freely without excessive end play.

d. Install lockring, bend two tabs over adjusting nut. Install jam nut, and bend two tabs over jam nut.

CAUTION

When drawing up jam nut, avoid forcing adjusting nut forward on its threads. This will affect bearing adjustment and also shear lock tab that fits into slot on axle shaft.

e. Place new gaskets on the hubs and install the axle shaft, the cones, and the lockwashers and nuts.

f. Install the wheel.

g. Adjust the brake (paragraph 2-82).

h. Remove the jack stands.

2-94. Dual Master Cylinder.

a. Removal.

(1) Disconnect the front and rear brake tubing from the master cylinder.

(2) Remove the nuts securing the master cylinder.

(3) Slide the cylinder from the truck (figure 2-85).

b. Installation.

(1) Position the master cylinder.

(2) Install the attaching nuts and tighten them to 17 ft-lbs. Connect the push rod to the brake pedal linkage.

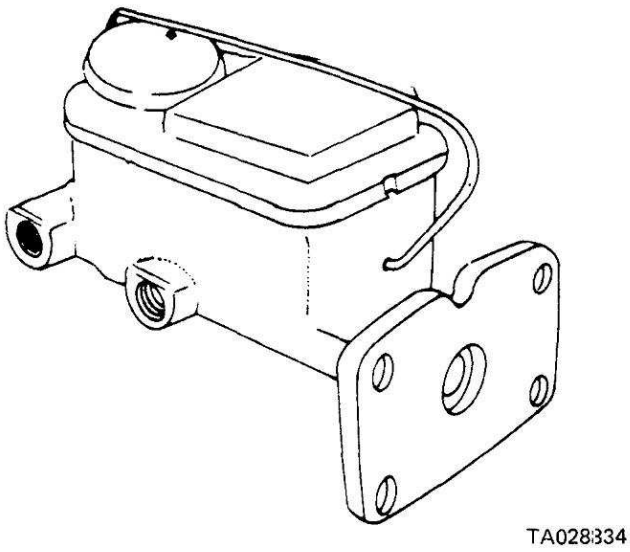


Figure 2-85. Dual Master Cylinder Assembly.

(3) Connect the front and rear brake tubing and tighten securely.

(4) Bleed the entire brake system (paragraph 2-81).

2-95. Power Booster.

a. Test and Inspection.

(1) Inspect the pedal linkage to make sure it is not binding.

(2) Start the engine, and run it until the normal warmed-up temperature is reached.

(3) Stop the engine.

(4) Disconnect the vacuum hose from the power booster.

(5) Connect a vacuum gage to the hose.

(6) Start the engine, and operate at an idle (750 rpm). The vacuum reading should be between 17 and 21 inches.

(a) If the vacuum reading is in the proper range, go on to step 7.

(b) If the vacuum reading is not in the proper range, disconnect the hose from the intake manifold, connect the gage to the manifold, and repeat this step. If the reading is now in the proper range, replace the hose. If the reading is still not in the proper range, torque the carburetor and intake manifold attaching nuts to 24 ft-lbs. If the reading is still not in the proper range, notify Direct Support.

(7) Stop the engine.

(8) Disconnect the vacuum gage and reconnect the power booster hose.

(9) Pump brake pedal three times, hold down. Start engine, vacuum created by engine should apply power booster and pull pedal down approximately one-inch. If pedal is not pulled down approximately one-inch replace power booster.

(10) Stop the engine and wait 5 minutes, then apply the brakes once.

(a) If the pedal feels the same as it did in step *9*, above, go to step *11*, below.

(b) If the pedal requires more effort than in step *9*, above, replace the booster.

(11) Apply the brakes six times to bleed the vaccum from the booster. Then apply the brakes again. There should be a significant difference between the feel of the pedal this time and the feel of the pedal in step *9*, above. If there is no difference, replace the booster.

b. Removal.

(1) Disconnect the brakelines from the master cylinder.

(2) Remove the master cylinder.

(3) Disconnect the vacuum hose from the power booster.

(4) Remove the power booster attaching bolts and remove the power booster assembly.

c. Installation.

(1) Install the power booster and tighten the attaching bolts.

(2) Reconnect the vacuum hose.

(3) Install the master cylinder and tighten the attaching bolts.

(4) Connect the brakelines to the master cylinder and bleed the brake system (paragraph 2-81).

2-96. Parking Brakes.

a. General Information. The rear wheel brakes also act as the parking brake. The rear brake shoes are operated by levers and struts that are connected to a flexible steel cable The wheel brake cables are joined together by an equalizer and a front cable which extends to the parking brake pedal (figure 2-86).

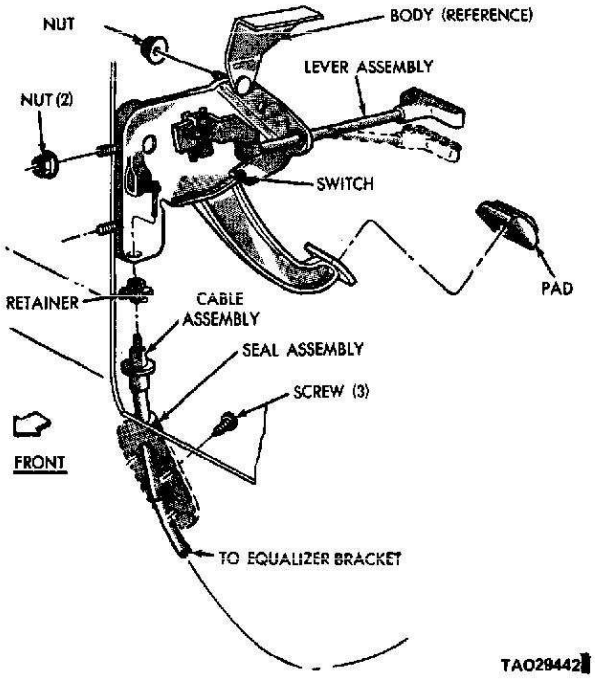


Figure 2-86. Front Cable and Parking Brake Assembly.

b. Adjustments. The service brakes must be properly adjusted before you can properly adjust the parking brake. See figure 2-87.

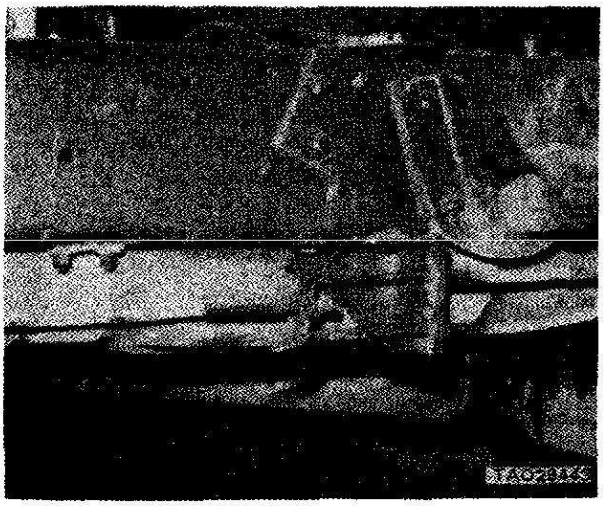


Figure 2-87. Rear Cable Routing.

(1) Release the parking brake pedal and loosen the cable adjusting nut to insure that the cable is slack.

(2) Tighten the cable adjusting nut until a slight drag is felt while turning the wheel. Loosen the cable adjusting nut until both rear wheels can be turned freely, then back off the cable adjusting nut two full turns.

(3) Apply the parking brake several times, then release it and test to see that the rear wheels turn freely without dragging.

2-97. Rear Cable.

a. Removal.

(1) Place the truck on jack stands and remove the rear wheels.

(2) Remove the brake drum from the rear axle (paragraph 2-89).

(3) Remove the brake shoe return springs.

(4) Remove the brake shoe retaining springs.

(5) Remove the brake shoes, the strut, and the spring from the brake backing plate. Disconnect the brake cable from the operating arm.

(6) Compress the retainers on the end of the brake cable housing and remove the cable from the brake plate.

(7) Move the retaining clip out at the crossmember.

(8) Disconnect the brake cable from the equalizer.

b. Installation. When installing a new brake cable, lubricate the cable at the contact points.

(1) Insert the brake cable and housing into the crossmember. Install a retaining clip.

(2) Insert the brake cable and housing into the brake backing plate. Make sure the housing retainers lock the housing firmly into place.

(3) Holding the brake shoes in place on the backing plate, engage the brake cable into the brake shoe operating lever.

(4) Install the brake shoe retaining springs and the brake shoe return springs.

(5) Insert the front of the brake cable into the equalizer.

(6) Install the brake drum and wheel (paragraph 2-93).

(7) Adjust the service brakes and the parking brake cable. Make sure the rear wheels rotate freely.

(8) Remove the jack stands and test operation.

2-98. Front Cable.

Refer to figure 2-86.

a. Removal.

(1) Remove the adjusting nut at the equalizer.

(2) Disengage the cable housing at the lower anchor point. Remove the cable and housing from the bracket.

(3) Remove the cable housing anchor clip at the parking brake lever.

(4) Remove the anchor clip from the lever.

(5) Remove the housing grommet from the floorboard.

b. Installation.

(1) Insert the cable and housing through the floorboard and install the housing grommet.

(2) Install the anchor clip at the upper end of the cable housing.

(3) Engage the cable housing at the lower anchor bracket.

(4) Connect the cable at the equalizer by installing the adjusting nut.

(5) Adjust the parking brake cable.

(6) Apply the brakes several times and test for free wheel rotation with the parking brake off.

Section XXI. MAINTENANCE OF STEERING AND SUSPENSION SYSTEMS

2-99. Steering System Description.

a. General. The steering gear provides steering with minimum friction. A ball nut travels up and down on the wormshaft, riding on recirculating balls which act as a screw thread. The steering box is a sealed unit and cannot be lubricated.

b. Wormshaft Assembly. The wormshaft and ball nut assembly is supported in the gear housing by ball thrust-type upper and lower bearings.

c. Sector Assembly. The sector shaft is a part of the sector gear. This gear meshes with the rack teeth on the recirculating ball nut.

2-100. Servicing the Steering System

a. General. Most steering system repairs must be accomplished at the Direct Support lever or higher. You are authorized to remove and replace the steering wheel (but not the steering column) and the tie rods.

b. Steering Inspection. With the wheels on a hard surface, have an assistant move the steering wheel back and forth. Observe all linkage connections. There should be no obvious looseness at the connecting points.

c. Removing and Installing the Steering Wheel. Refer to figure 2-88.

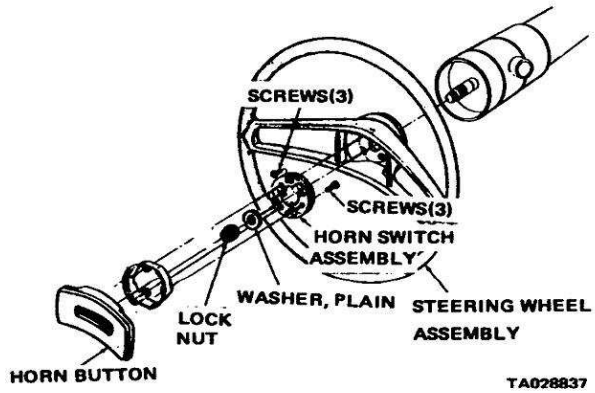


Figure 2-88. Steering Wheel Assembly.

(1) Disconnect the negative (ground) cable at the battery.

(2) Pull off the horn button.

(3) Remove the nut and washer in the center of the steering wheel.

(4) Disconnect the horn wire.

(5) Remove the three attaching screws. Remove the horn switch.

(6) Mark the steering wheel and shaft for reassembly in the same position.

(7) Remove the steering wheel with a wheel puller.

(8) To install a steering wheel, reverse the above procedure.

d. Removing the Tie Rod Ends.

(1) Place the truck on jack stands.

(2) Remove the cotter key and nut from the tie rod end.

(3) Install a tie rod end puller, tool C-3894-A (figure 2-89). Apply enough pressure to free the tie rod end from the knuckle arm or center link.

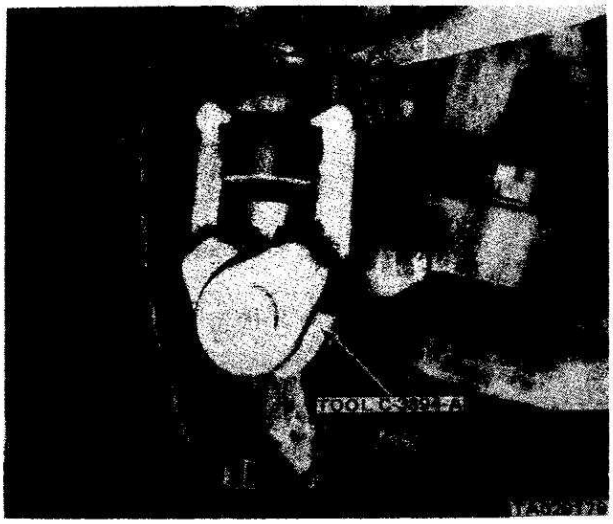


Figure 2-89. Tie Rod and Puller Installed.

NOTE

Count and record the number of turns it takes to unscrew the tie rod end. For reinstallation you will have to turn it back the same number of turns.

(4) Loosen the tie rod sleeve clamping bolt and unscrew the tie rod end.

(5) Inspect the seals closely for wear or damage.

(6) Remove any damaged seals and inspect the tie rod end assembly at the throat opening.

e. Installing the Tie Rod Ends.

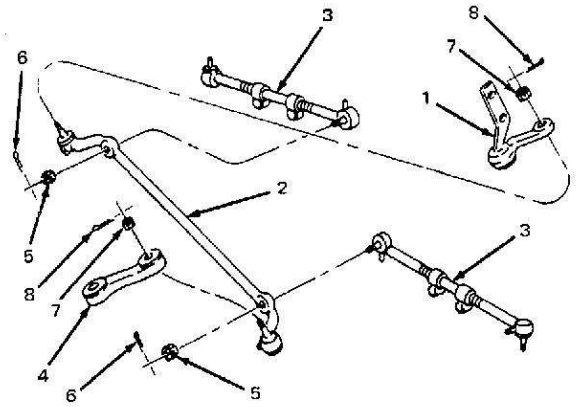
(1) Screw a new tie rod end into the tie rod sleeve the same number of turns as it took to take the old one out.

(2) Connect the tie rod end to the knuckle arm or center link. Install the nut and tighten it to 40 ft-lbs. Install the cotter key.

(3) Position the clamp on the sleeve so that the bolt and clamp openings are in line with the slot in the sleeve. Tighten the clamp nut to between 12 and 15 ft-lbs.

(4) Lubricate the tie rod end assembly in accordance with LO 9-2320-266-12.

f. Removing and Installing the Tie Rods. Refer to figure 2-90.



1. IDLER ARM AND BRACKET.
2. CENTER LINK ASSEMBLY.
3. TIE ROD ASSEMBLY.
4. STEERING GEAR ARM.
5. NUT.
6. COTTER KEY.
7. NUT.
8. COTTER KEY.

TA234482

Figure 2-90. Steering Linkage Assembly.

(1) Remove the tie rod end (*d*, above).

(2) Remove the inner tie rod ends from the center link.

(3) Remove the center link from the idler arm.

(4) Remove the center link from the steering gear arm.

(5) Remove the idler arm bracket from the frame.

(6) Remove the steering arm from the gear.

(7) To replace the rod, position the idler arm bracket on the frame and install the mounting bolts. Install the idler arm and tighten the nut to 40 ft-lbs. Install the cotter key.

(8) Position the steering gear arm on the gear. Install the washer and nut and tighten to 180 ft-lbs.

CAUTION

Be careful when installing the center links. It is possible to install them backwards, which will interfere with steering. Viewed from the front of the truck, the center link ends must bend UP. Viewed from the side, the ends should bend toward the FRONT of the truck. Tie rod ball studs enter the center link from the REAR.

(9) Install the center link to the idler arm and the steering arm gear. Install the nuts and tighten them to 40 ft-lbs. Install the cotter keys.

(10) Connect the tie rod ends (*e*, above).

(11) Adjust the toe-in (paragraph 2-101).

2-101. Toe-In.

The leading edges of the front tires are closer together than the trailing edges. The differences between these distances, measured in fractions of an inch, is called toe-in. Incorrect toe-in causes slipping between the tire and the road, and is a frequent cause of excessive tire wear.

a. Pre-Toe-In Check. Before adjusting toe-in, do the following inspection and make any necessary corrections:

(1) Check and inflate the tires to 45 psi in front and 55 psi in back. Look at the tread wear to see if it helps diagnose alinement problems.

(2) Check and adjust the front wheel bearings (paragraph 2-72).

(3) Inspect the ball joints and all steering linkage pivot points for excessive looseness. Replace, if necessary.

(4) Check all parts of the front suspension system. Replace or have Direct Support replace any loose or damaged parts.

CAUTION

Do not attempt to straighten any bent part by bending or heating it. Always replace it.

b. Measuring Toe-In. Use the following procedure. Refer to figure 2-91.

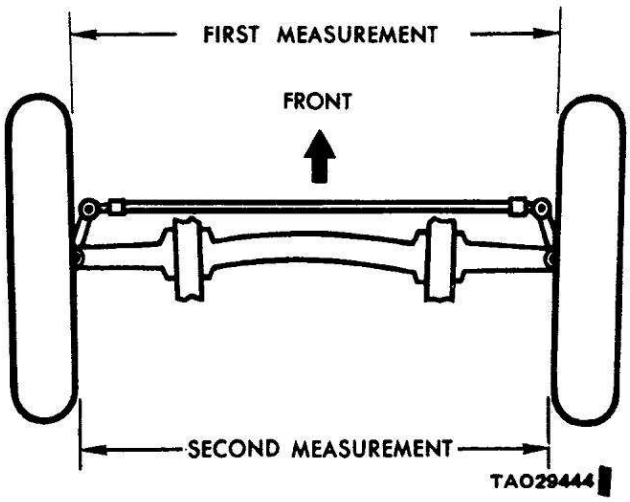


Figure 2-91. Front Wheel Toe-In.

(1) Turn the front wheels to the exact straight-ahead position.

(2) Roll the truck ahead one full revolution of the wheels, with the full weight of the truck on the wheels.

(3) Using a toe-in gage (bar), check the distance between the inside edges of the front tires at hub height. Note the reading.

(4) With the bar still in place, roll the truck ahead until the two measurement points are in the rear at the same (hub) height.

(5) Check the distance between the tires and note the reading. Toe-in is the amount that the second (rear) reading is ***greater*** than the first (front) reading. Acceptable toe-in readings are:

(a) 4X4 models. Toe-in should be ±1/8 inch.

(b) 4X2 models. Toe-in should be 1/16 to 1/8 inch.

c. Adjusting Toe-In. Adjust toe-in as follows:

(1) Loosen the clamping bolts on both ends of the tie rod sleeve.

(2) Turn the tie rod sleeve in the direction required to bring toe-in within limits.

NOTE

On 4X2 models, turn each side equally to maintain a centered steering wheel.

(3) Tighten the clamping bolts on the tie rod ends.

(4) Check the toe-in again (*b*, above) to make sure it is correct.

2-102. Drag Link Service Procedures (4X4 Models Only).

a. General. Inspect the drag link seals and ball joints for damage. Move the steering wheel and check for movement of the ball joint. If you find either condition, replace the drag link assembly.

b. Removing and Installing.

(1) Raise the truck and install jack stands. Remove the wheel.

(2) Turn the wheels in the direction necessary to give the best possible access to the drag link. Remove the cotter keys and nuts.

(3) Install puller tool C-3894-A. Apply enough pressure to free the drag link from the steering knuckle arm and steering gear arm. Lower the drag link from the truck.

(4) To reinstall, position the drag link to the steering knuckle arm as shown in figure 2-92.

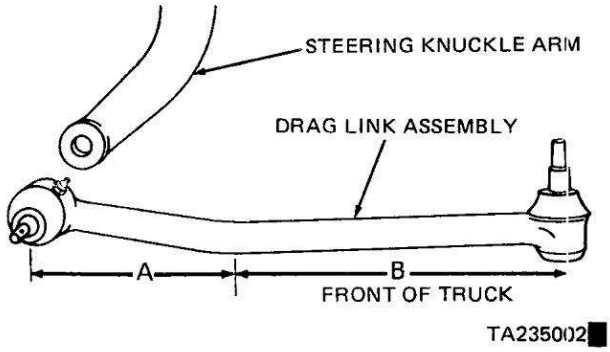


Figure 2-92. Position the Drag Link.

(5) Install and tighten the nuts to 60 ft-lbs. Install the cotter keys.

(6) Install the wheel. Remove the jack stands and lower the truck.

2-103. Shock Absorber Service Procedures.

a. Removal.

(1) Place the truck on jack stands, positioning the jack stands on the frame.

(2) Turn the front wheels in the direction needed to give best possible access to the upper shock absorber unit.

(3) Remove the upper nut and retainer.

(4) Remove the two lower mounting bolts and the shock absorber.

b. Installation.

(1) Check new shocks for proper operation. Use new bushings.

(2) Extend the shock absorber fully and install the top mounting retainer.

(3) Aline the lower end and install the mounting bolts.

(4) Remove the jack stands and lower the truck.

2-104. Front Wheel Bearings (4X2 Models)

a. Removal.

(1) Chock the rear wheels and raise the front of the truck.

(2) Remove the wheel.

(3) Remove the brake caliper assembly from the rotor (disc).

NOTE

Do not allow the caliper to hang on the brakeline. Secure it out of the way.

(4) Remove the grease cap and cotter key.

(5) Loosen the retaining nut until it is flush with the end of the spindle.

(6) Pull the rotor (disc) out, then push it back into position.

(7) Remove the nut and slide the washer and outer bearing off the spindle.

(8) Remove the rotor.

(9) Remove the inner bearing and grease seal.

(10) If you are replacing a bearing you must also replace the cup. Use the following procedure:

(a) Place the rotor on a work bench.

(b) Using a punch, and working from the opposite side, work the cup out by driving it on alternating sides.

(c) To install a new cup, use a brass drift to drive it in until it seats.

b. Installation.

(1) Wipe both the inner and outer cup clean.

(2) Pack the wheel bearings with grease.

(3) Position the inner wheel bearing in the hub, and install a new grease seal.

(4) Position the rotor on the spindle and install the outer bearing, washer, and the retaining nut.

(5) Turn brake rotor assembly while tightening bearing adjusting nut until you feel a slight bind. Back off bearing adjusting nut until brake rotor rotates freely, without end play.

(6) Install a new cotter key and the grease cap.

(7) Reinstall the caliper assembly.

(8) Reinstall the wheel, lower the truck, and remove the chocks from the rear wheels.

Section XXII. BODY COMPONENTS AND SHEET METAL

2-105. General.

General automotive body repair procedures are covered in FM 43-2.

2-106. Bumpers.

a. Removing the Front Bumper. Refer to figure 2-93.

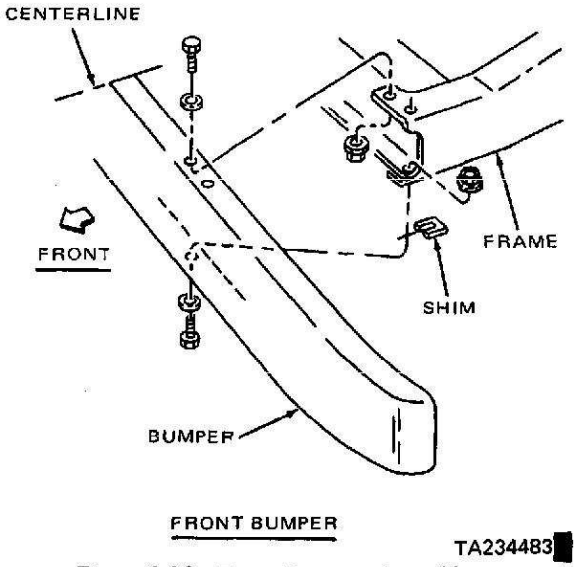


Figure 2-93. Front Bumper Assembly.

(1) Loosen the bolts that mount the bumper brackets to the frame.

(2) Support the bumper and remove the mounting bolts. Remove the bumper.

(3) Remove the nuts holding the mounting brackets to the bumper. Remove the brackets.

b. Installing the Front Bumper.

(1) Replace the brackets to the bumper bolts using a plain washer, a lock washer, and nuts.

(2) Tighten the nuts.

(3) Line up the bumper brackets and tighten the bolts.

c. Removing the Rear Bumper. Remove the electrical receptacle. Then follow the procedure for removing the front bumper (*a*, above).

d. Installing the Rear Bumper. Follow the procedure for installing the front bumper (*b*, above). Reinstall the electrical receptacle.

2-107. Pintle Hook.

Refer to figure 2-94.

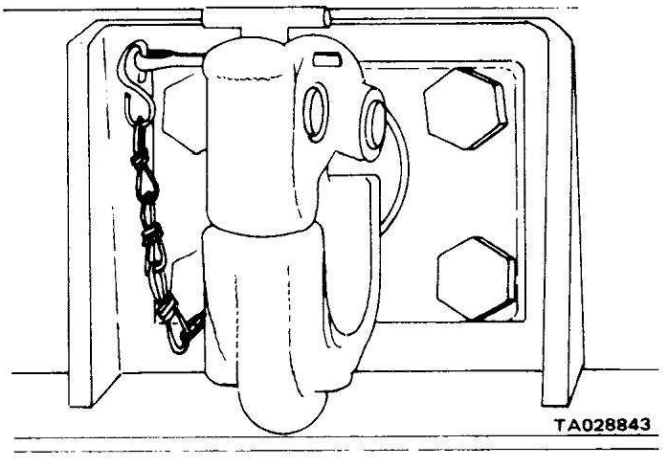


Figure 2-94. Pintle Assembly.

a. Removal.

(1) Remove the cotter key, slotted nut, and plain washer from the front end of the pintle. Remove the pintle hook.

(2) Inspect the lubrication fitting. If the fitting is damaged, replace it.

b. Installation. Install the pintle hook through the mounting plates. Install the washer and slotted nut. Tighten the nut securely and install the cotter key.

2-108. Hood.

a. Adjustments.

(1) To adjust the hood in the forward or backward direction, use the oversized and elongated screw holes shown in figure 2-95.

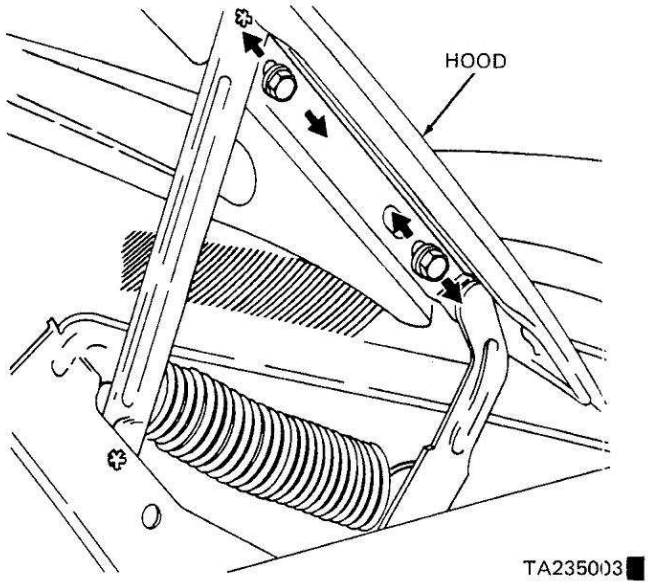


Figure 2-95. Forward and Backward Adjustment Points.

(2) Use the hinge mounting at the fender panel to provide up and down hood adjustment (figure 2-96).

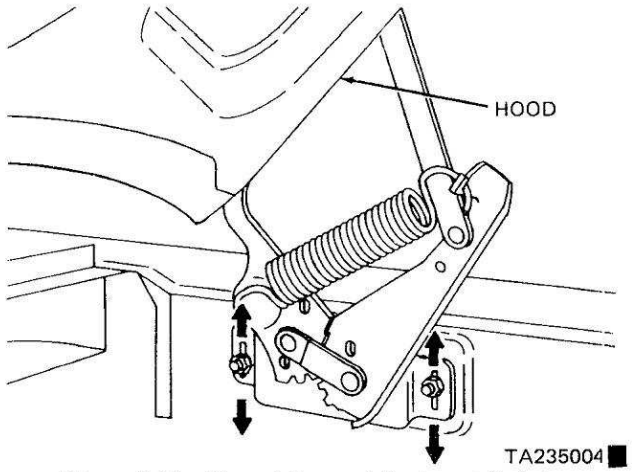


Figure 2-96. Up and Down Adjustment Points.

b. Hood Alinement. When alining the hood, use the following sequence. Note that it includes a lock-and-striker adjustment to keep the hood from opening to the safety catch while the truck is moving.

(1) Loosen both hinge mounting bolts at the hood mounting.

(2) Loosen the hood lock from the grille support.

(3) Close the hood and then move it u ıtil you have about 3/16-inch clearance between the back of the hood and the cowl.

(4) Raise the hood to approximately 30 degrees. Tighten the hinge-to-hood mounting bolts.

(5) Tighten the lock and lower the hood. Check alinement with the fenders.

(6) Make sure the hood latches securely. If it doesn't, readjust the hood lock until it does (figure 2-97).

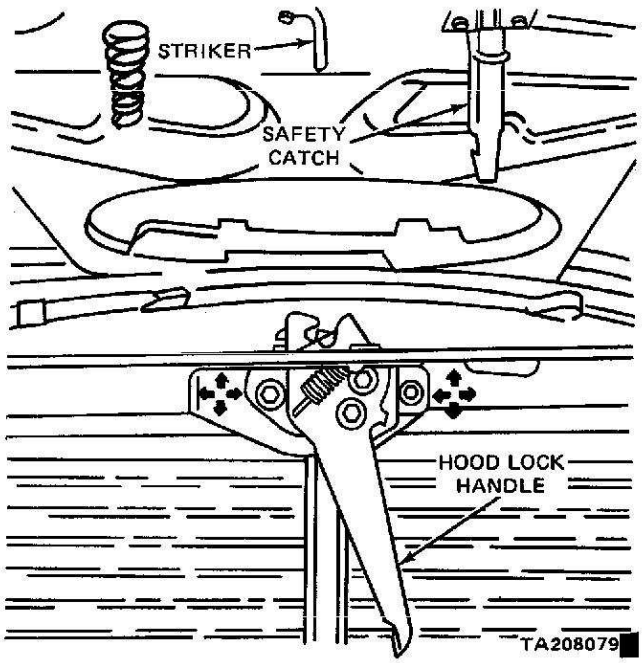


Figure 2-97. Hood Lock Striker Adjustment.

c. Removing the Hood.

(1) Raise the hood to its fully open position.

(2) With an assistant helping you, remove the attaching bolts. Lift the hood from the truck.

(3) If you are installing a new hood, remove all serviceable components from the old one.

(4) Inspect the hinges for proper operation. If they are okay, wipe them clean with solvent and lubricate them.

d. Installing the Hood.

(1) Install all usable parts from the old hood. Install new parts as necessary.

(2) With an assistant helping you, position the hood on the vehicle and aline the mounting holes to the hinge. Install the bolts snugly, but do not tighten them.

(3) When the hood is mounted, aline it (*b*, above).

e. Installing New Hinges. When replacing both hinges, remove the hood (*c*, above) and install the new hinges. When replacing only one hinge, proceed as follows:

(1) Raise the hood to its fully open position. Loosen the hood hinge bolts.

(2) Support the hood on the side where you plan to replace the hinge. Then remove the old hinge.

(3) Position a new hinge against the fender shield. Install the mounting bolts and tighten them securely.

(4) Aline the hood to the hinge. Install the mounting bolts snugly, but do not tighten them.

(5) Aline the hood and lock and striker (*b*, above).

f. Removing the Lock and Striker. Position the lock and striker, raise the hood and remove the striker attaching bolts. Then remove the striker. Loosen and remove the lock assembly attaching bolts and remove the lock from the grille support.

g. Installing the Lock and Striker. Position the lock assembly and install the mounting bolts. Then position the striker assembly and install the mounting bolts. Adjust the newly installed lock and striker (*b*, above).

NOTE

The mounting holes are elongated to allow side-ways and up-and-down adjustment. The "T" plate floats laterally.

2-109. Grille (Models Manufactured Before August 15, 1976).

a. Removal. Refer to figure 2-98.

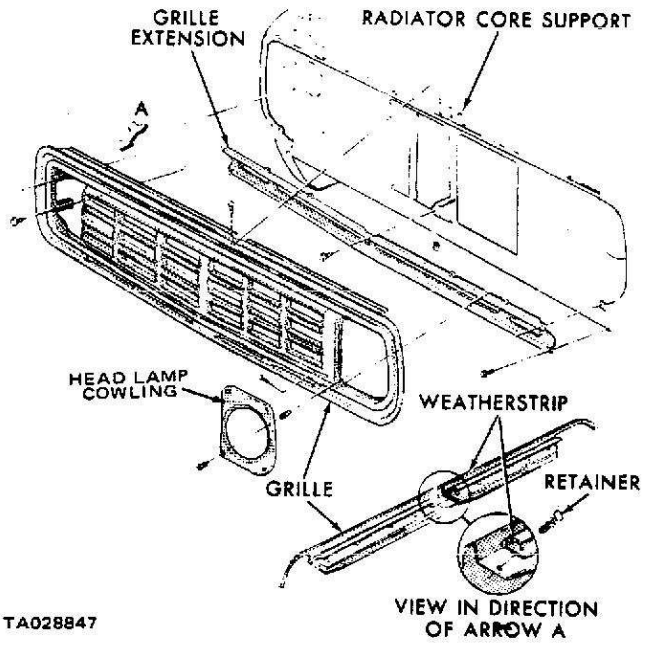


Figure 2-98. Grille Assembly (Models Manufactured Before August 15, 1976).

(1) Remove both headlight cowlings.

(2) Remove the upper and lower grille attaching screws.

(3) Remove the attaching screws at each end of the grille.

(4) Remove the lower grille-to-extension attaching screws.

(5) Remove the attaching screws at each end of the grille extension and lift out the grille.

b. Installation.

(1) Place the grille extension in the-opening. Install the sheet metal screws loosely.

(2) Center the grille extension and tighten the screws.

(3) Place the grille in the opening and center it. Install the mounting screws.

(4) Install the headlight cowlings.

2-109.1. Grille (Models Manufactured After August 15, 1976).

a. Removal. Refer to figure 2-98.1.

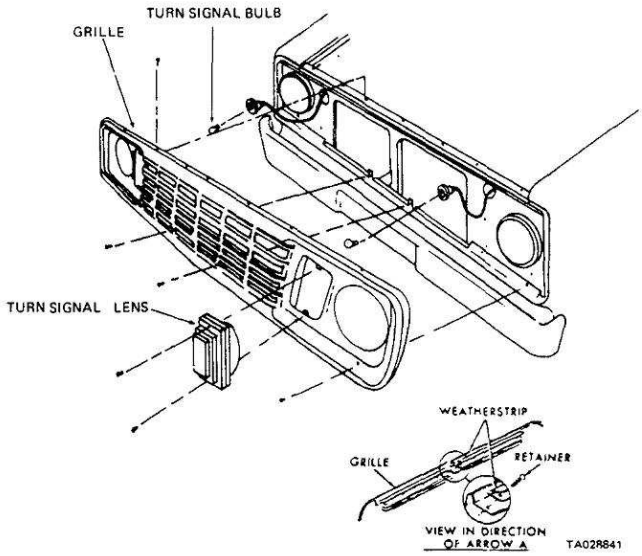


Figure 2-98.1. Grille Assembly (Models Manufactured After August 15, 1976).

(1) Remove the turn signal lens assembly attaching screws and lens assemblies on both sides.

(2) Remove the bulb and socket assemblies from both lens assemblies.

(3) Remove the seven upper and six lower grille attaching screws.

(4) Remove the grille.

b. Installation.

(1) Position the grille.

(2) Install the seven upper and six lower grille attaching screws. Tighten all screws.

(3) Install the bulb and socket assemblies in both turn signal lens assemblies.

(4) Position the lens assemblies, and secure with attaching screws.

NOTE

Make sure the U-nut clips are in place. Otherwise you will not be able to secure the turn signal assemblies.

Paragraph 2-110 deleted.

Figure 2-99 deleted.

b. Installation.

(1) Install six "U" nuts on the lower flange of the radiator core support. Install the support.

(2) Secure the right fender to the wheelhouse and the radiator core support. Tighten the screws.

(3) Install the horn.

(4) Install and refill the radiator.

(5) Attach the battery tray to the radiator core support.

(6) Install and aim the headlights (paragraph 2-50).

(7) Install the grille and both headlight cowlings.

(8) Install and reconnect the battery.

2-111. Battery Tray and Brace.

Refer to figure 2-100.

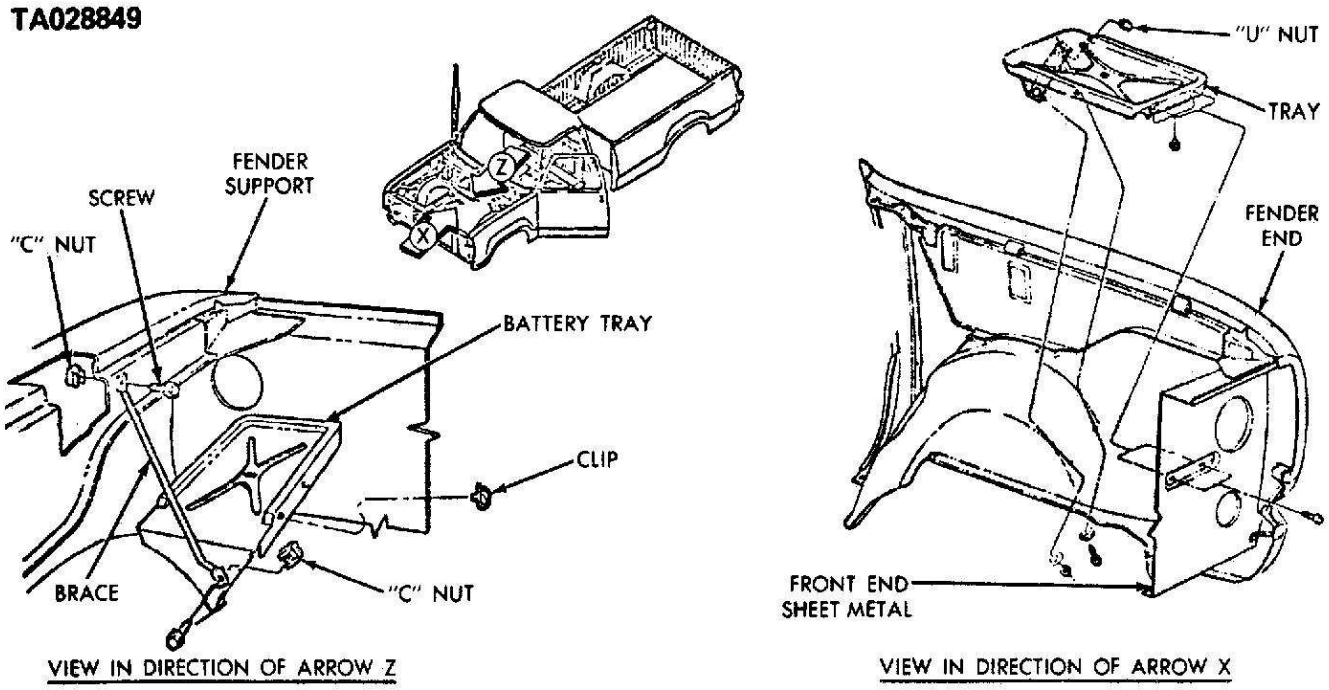


Figure 2-100. Battery Tray and Brace.

a. Removal.

(1) Disconnect the battery cables and remove the battery.

(2) Remove the clinch nut ("C" nut) and screw that attach the lower brace to the tray.

(3) Remove the brace from the fender housing support.

(4) Remove the tray from the front end sheet metal.

b. Installation.

(1) Place the "U" nuts on the tray assembly and aline them to the holes.

(2) Position the tray on the front end sheet metal. Attach it with screws, washers, and nuts.

(3) Position the brace on the fender housing support and attach it with the "C" nut, screw, and washer.

(4) Position the lower end of the brace to the battery tray and attach it with the "C" nut, screw, and washer.

(5) Reinstall the battery and hold downs and reconnect the battery cables.

2-112. Cowl Grille Attachment.

Eight screws attach the cowl grille to the cowl at the front of the windshield. Remove the windshield wiper arms and blades prior to removing the cowl grille. See figure 2-101 for removal and installation attachments.

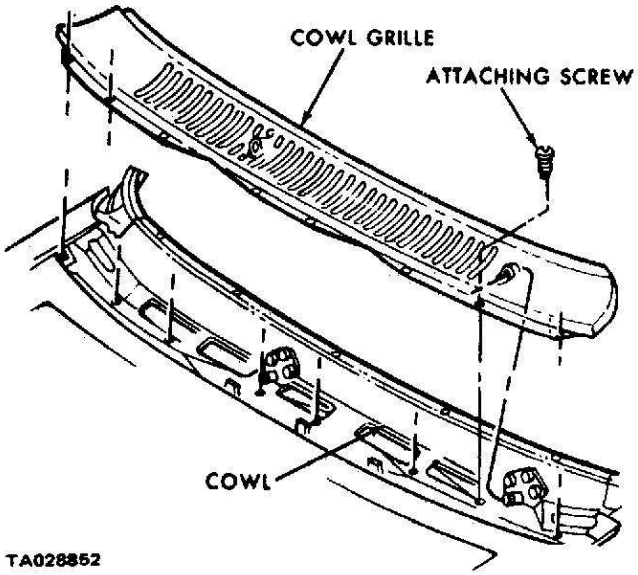


Figure 2-101. Cowl Grille Cover Attachment.

2-113. Front End and Cab Hold-Down Mountings.

Front end and cab hold-down locations, torque settings, and correct hardware are shown in figure 2-102. Be careful not to over- or under-torque the hold-down nuts.

2-114. Front Door Assembly.

Refer to figure 2-103 as an index to the components of the front door assembly. Service procedures for individual components are detailed in the following paragraphs.

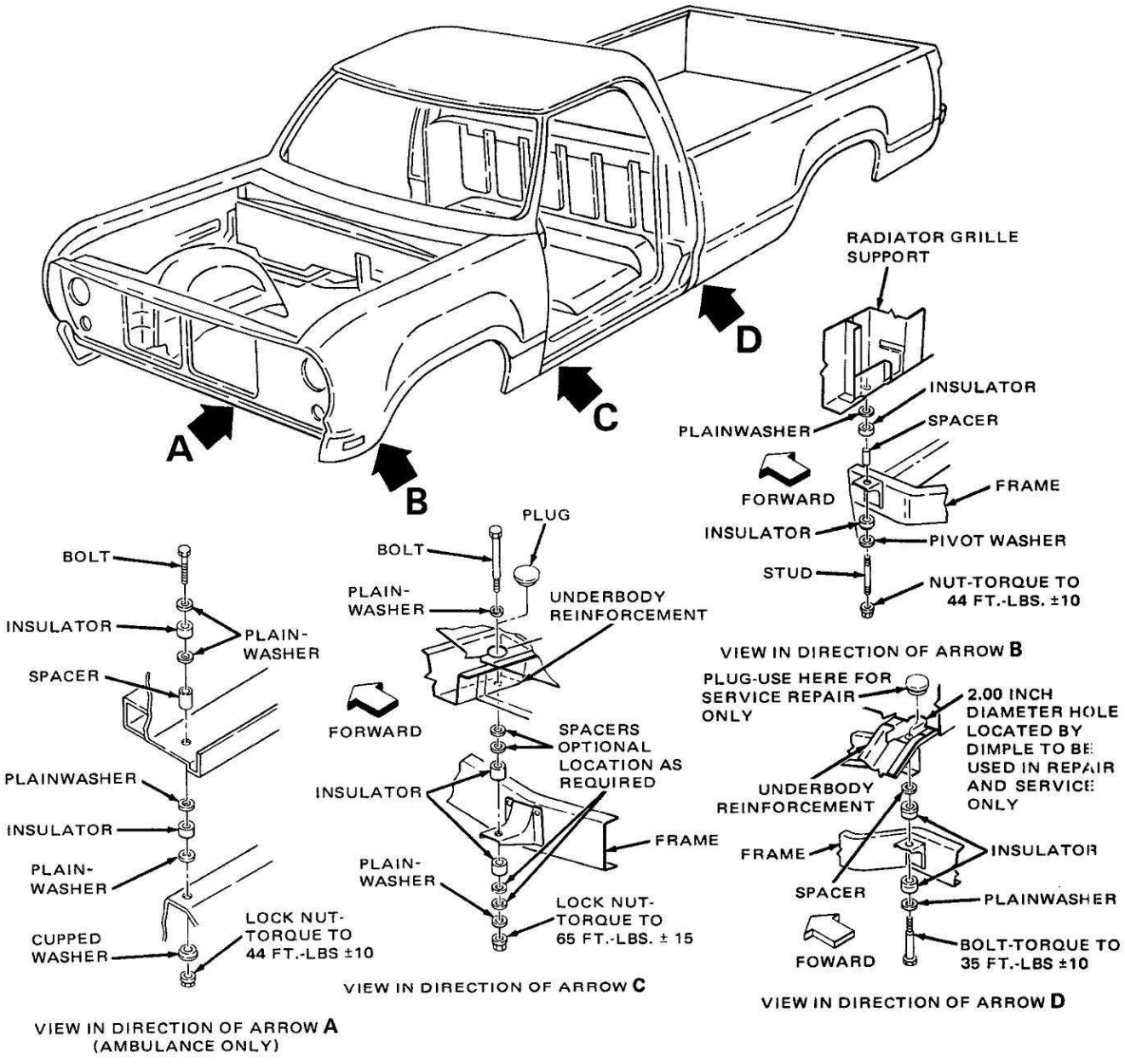


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Figure 2-102. Front End and Cab Hold-Down Mountings.

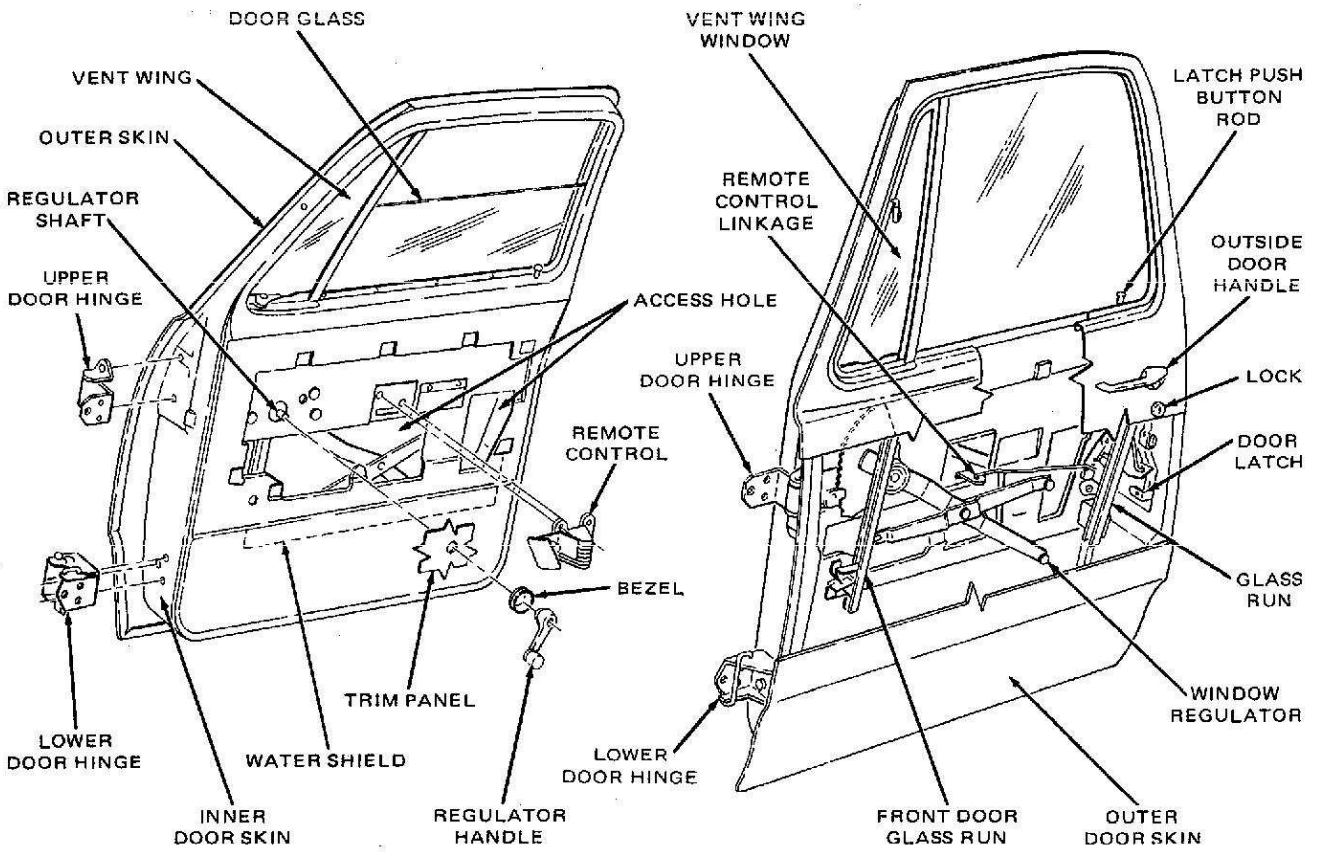


Figure 2-103. Front Door Assembly.

a. Removal.

(1) Lower the glass and remove the inner weatherstrip.

(2) Free the clip on the inner section of the weatherstrip, using a wire hook or similar tool (see upper right-hand corner of figure 2-105).

(3) Pull back the upper glass run 8 to 10 inches.

(4) Remove the upper and lower vent wing attaching screws.

(5) Remove the vent wing. Make sure the lower pivot adjusting screws do not damage the paint.

b. Installation.

(1) Install the plastic nut and "U" nut on the vent wing assembly.

(2) Install the vent wing assembly into the door. Make sure the lower pivot adjusting screw does not damage the paint.

(3) Install the upper and lower vent wing attachment screws loosely.

(4) Move the glass run back to the vent wing as follows:

(a) Place the run next to the door channel.

(b) Press it into the channel using a wide-bladed screwdriver or similar tool.

(c) Press at both inside corners to make sure the hidden lip engages in the channel.

(5) Install the weatherstrip by alining the clips to the holes in the door and pressing it in.

(6) Raise or lower the vent to maintain a 0.06 inch front-to-back glass freeplay. Then, with the glass up, tighten the upper screws.

(7) Hold the vent against the glass with the glass down. Then tighten the lower screws.

2-116. Assembling the Glass, Door, and Weatherstripping.

a. Glass and Glass Weatherstrip. Refer to figure 2-105

(1) Insert the glass into the everseal.

(2) Place the channel assembly onto the everseal.

(3) Press the seal onto the channel securely and lubricate the channel.

(4) Lower the window regulator to the down position.

(5) Place the glass and channel assembly into the slot opening in the door. Lower it to the bottom of the door.

(6) Reach through the access hole in the door and install the regulator to the lower and upper channels on the glass.

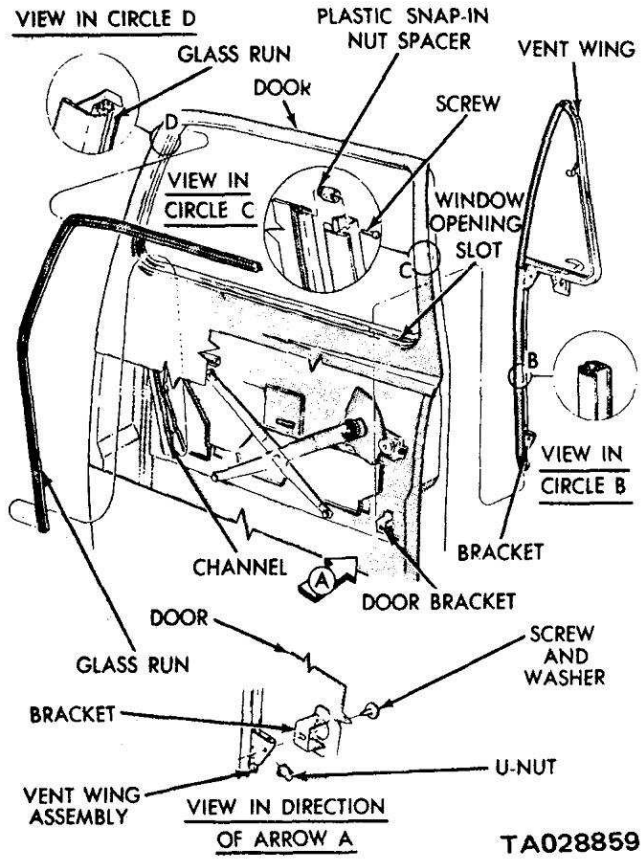


Figure 2-104. Vent Wing and Glass Run Assembly.

(7) Install the vent wing (paragraph 2-115).

(8) Run the window up and down several times to check for proper movement.

(9) If you have excessive front-to-back freeplay, adjust the vent.

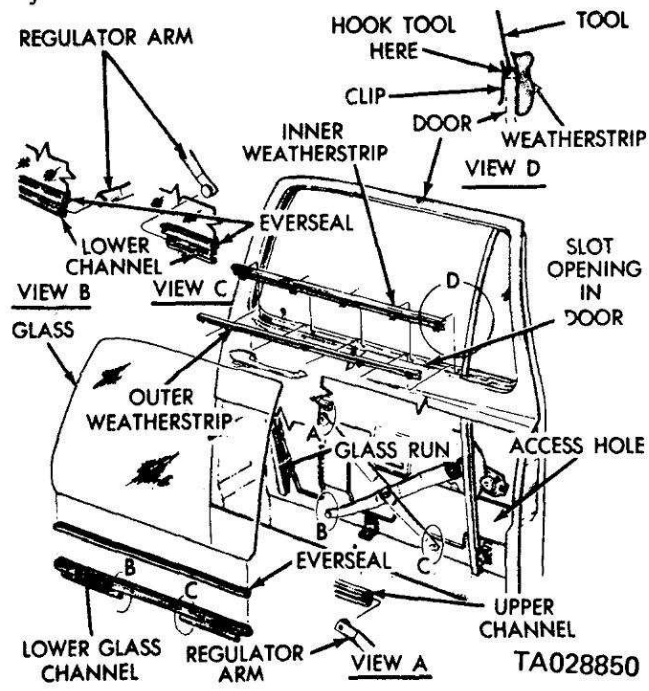


Figure 2-105. Door Glass and Weatherstrip.

(10) Install the front and rear weatherstrip assembly, as shown in figure 2-106.

b. Door Weatherstrip.

(1) Apply an adhesive to the door opening. Allow it to dry until it's tacky.

(2) Apply adhesive to the weatherstrip and press it against the door opening as shown in figure 2-106.

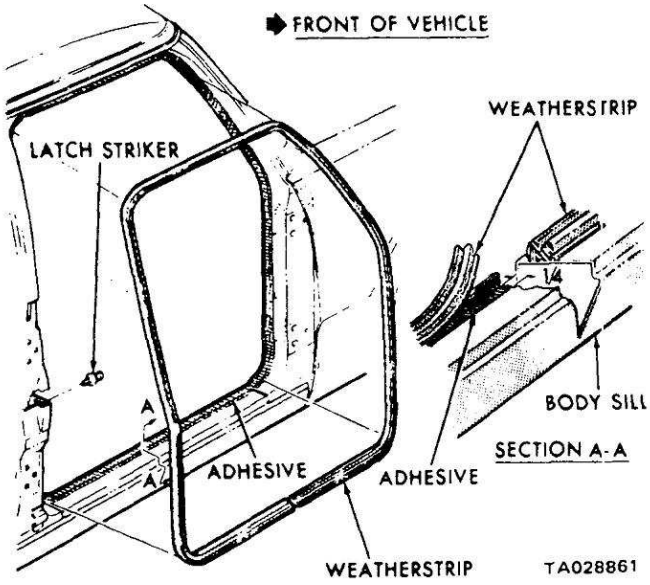


Figure 2-106. Door Weatherstrip.

NOTE

Do NOT close the door after you install the weatherstrip. Let it dry. Also, make sure the weatherstrip is sealing properly to the door.

2-117. Replacing the Window Regulator.

a. Removal. Refer to figure 2-107.

(1) Remove the remote control and regulator handles, the arm rests, and the trim panel.

(2) Carefully guide the assembly out of the access hole. Be especially careful not to bend the regulator arms when removing them from the run channels.

b. Installation. Install the regulator through the access hole in the inner door panel and mount it to the inner sheet metal with screws. The regulator arms are inserted into the regulator channel guides.

2-118. Door and Window Mechanical Linkages.

a. Assembling the Latch, Lock, and Window Linkage. Refer to figure 2-108.

(1) Install the latch assembly to the door.

(2) Install the lock to the door.

(3) Connect the linkage between the handle and the latch release lever.

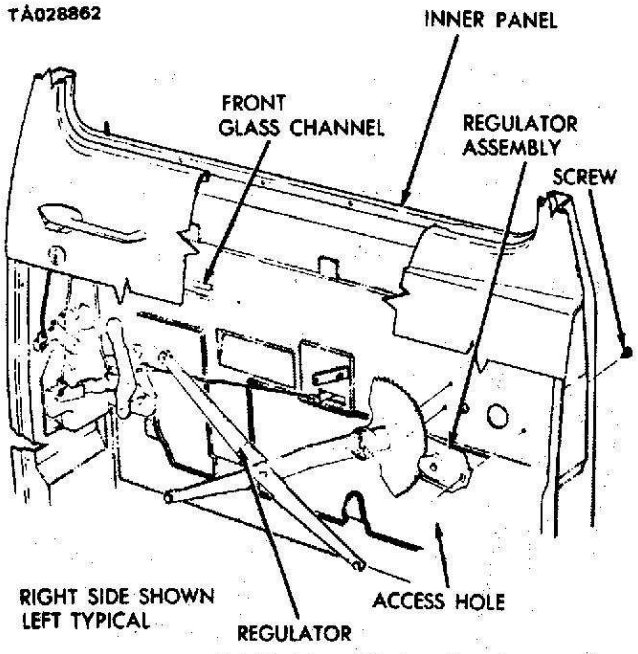


Figure 2-107. Door Window Regulator.

(4) Connect the linkage between the lock cylinder and the latch.

(5) Connect the linkage between the lock knob and the latch.

(6) Install the clip on the remote control and latch linkages.

(7) Going through the 5/16-inch hole in the door latch face, loosen the door latch adjustment screw spring tension. Then cycle the outside handle several times, using the push button.

(8) Tighten the adjusting screw. To identify the left hand parts, look for a green paint mark.

NOTE

The lever is spring-loaded and will self adjust.

(9) Test the door for proper function of all linkages. If the door does not operate properly, look for bent, broken, binding, or improperly installed linkages. Repair or replace, as necessary. If the door operates properly, continue to step 10.

(10) Install the watershield and the trim panel.

(11) Install the remote control and regulator handles.

(12) Install the arm rests.

b. Removing the Remote Control and Regulator Handles.

(1) Remove the door regulator window glass handle (figure 2-109).

(2) Remove the remote control handle and the door trim panel.

(3) Working through the access hole, remove the remote control linkage and mounting plate.

c. Installing the Remote Control and Regulator Handles.

(1) Slide the remote control mounting plate through the access hole into the door.

(2) Connect the linkage and install the screws to the remote control assembly.

(3) Install the remote control handle and adjust it forward to eliminate excess handle travel.

(4) Install the trim panel.

2-119. Upper-Lower Trim and Arm Rests.

a. The upper trim plastic panel is mounted with a reinforcement in the arm rest area. It is then fastened to the door with clips and screws (figure 2-110).

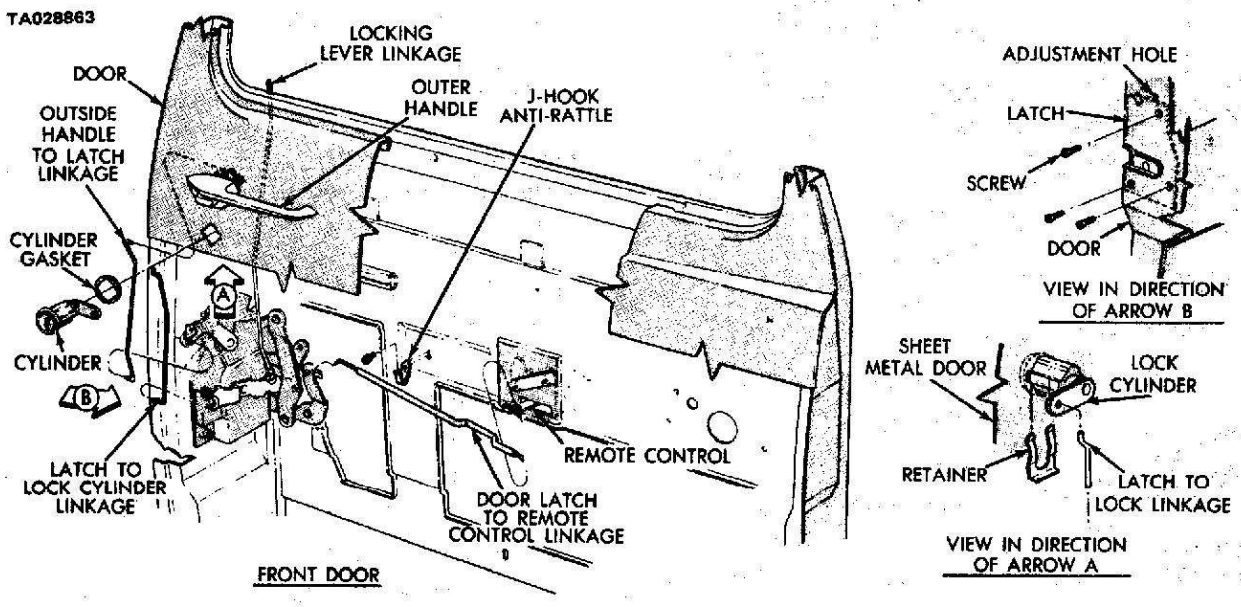


Figure 2-108. Latch, Lock, and Linkage.

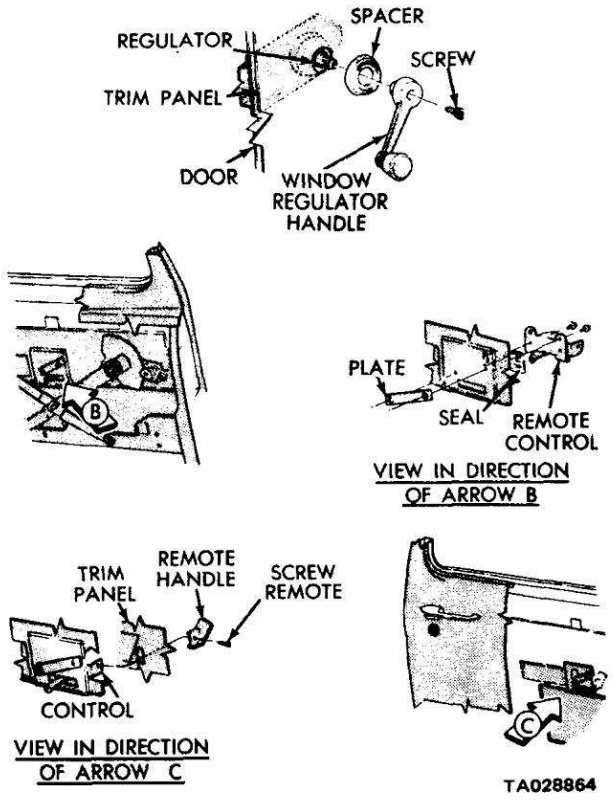


Figure 2-109. Remote Control and Regulator Handles.

b. The lower panel pocket is mounted to the door with clip-type retainers. When removing the lower pocket assembly, use a flat tool to pry it out. Always apply the tool as closely to the clip location as possible.

c. To re-attach the pocket, line up the fasteners with the holes in the door and press firmly. Replace any damaged fasteners.

2-120. Visor and Rearview Mirror.

NOTE

Rear view mirror is not a mandatory item in M880/890 series vehicles.

Refer to figure 2-111. Use screws to attach the visor and rearview mirror to the header assembly. Do not over-tighten the screws.

2-121. Outside Air Vents.

To remove either air vent, remove the mounting screws and remove the vent assembly. To install a vent, position the assembly and secure the mounting screws.

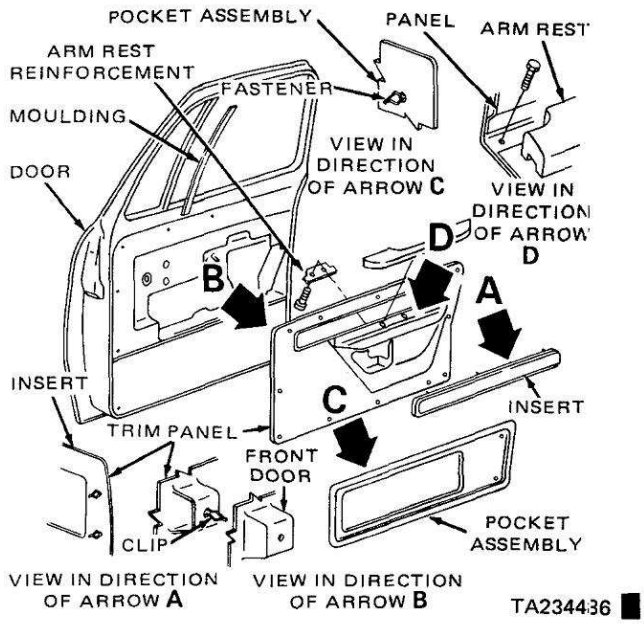


Figure 2-110. Upper-Lower Trim and Arm Rest.

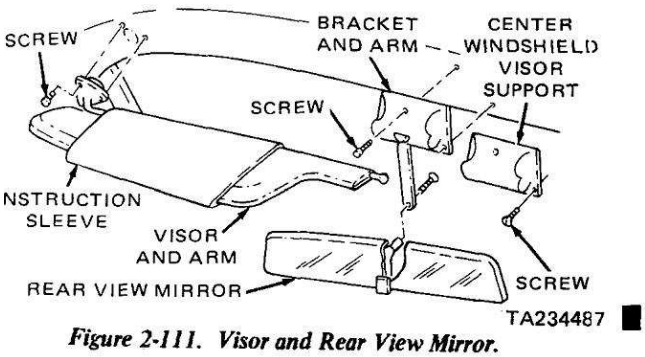


Figure 2-111. Visor and Rear View Mirror.

2-122. Seat Belts and Retractors.

There are two types of seat belt systems used on the M880 series vehicles. One type is the lap belt system, the other type is the Unibelt system (figure 2-112). The seat belt systems are serviced as follows:

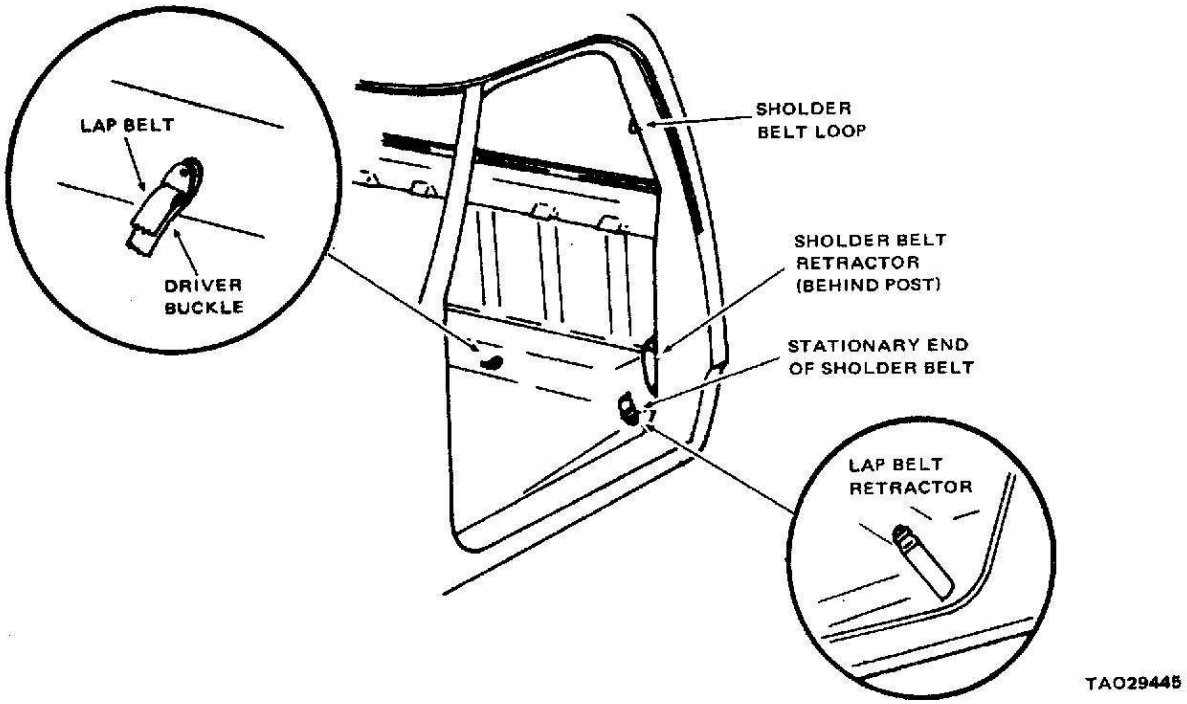


Figure 2-112. Seat Belts and Retractors.

a. Replacing Lap Belts.

(1) Adjust the seat completely forward.

(2) Remove the bolt that secures the side seat belt retractor to the floor. Lift the belt out of the cab.

(3) Remove the bolt securing the other half of the lap belt to the cab floor. Lift out the plastic belt guide and belt.

(4) To replace the lap belt system, properly position the belts and install the mounting bolts. Torque them to 30 ft-lbs.

b. Replacing the Unibelt.

(1) Using a flat tool, pry the plastic covers from the upper Unibelt mounting bracket tip.

(2) Remove the bolts securing the belt tip.

(3) Remove the screw securing the belt retractor assembly plastic cover. Lift off the cover and remove the mounting bolts.

(4) To remove the center seat belt, follow the procedure for the lap belt removal in *a*, above.

(5) To reinstall the Unibelt system, properly position the belts and install the mounting bolts. Torque the bolts to 30 ft-lbs.

2-123. Seat Mountings.

Refer to figure 2-113. The mountings shown in view A are for bench seat models. The mountings shown in view B are for models with separate driver and passenger seats (ambulances).

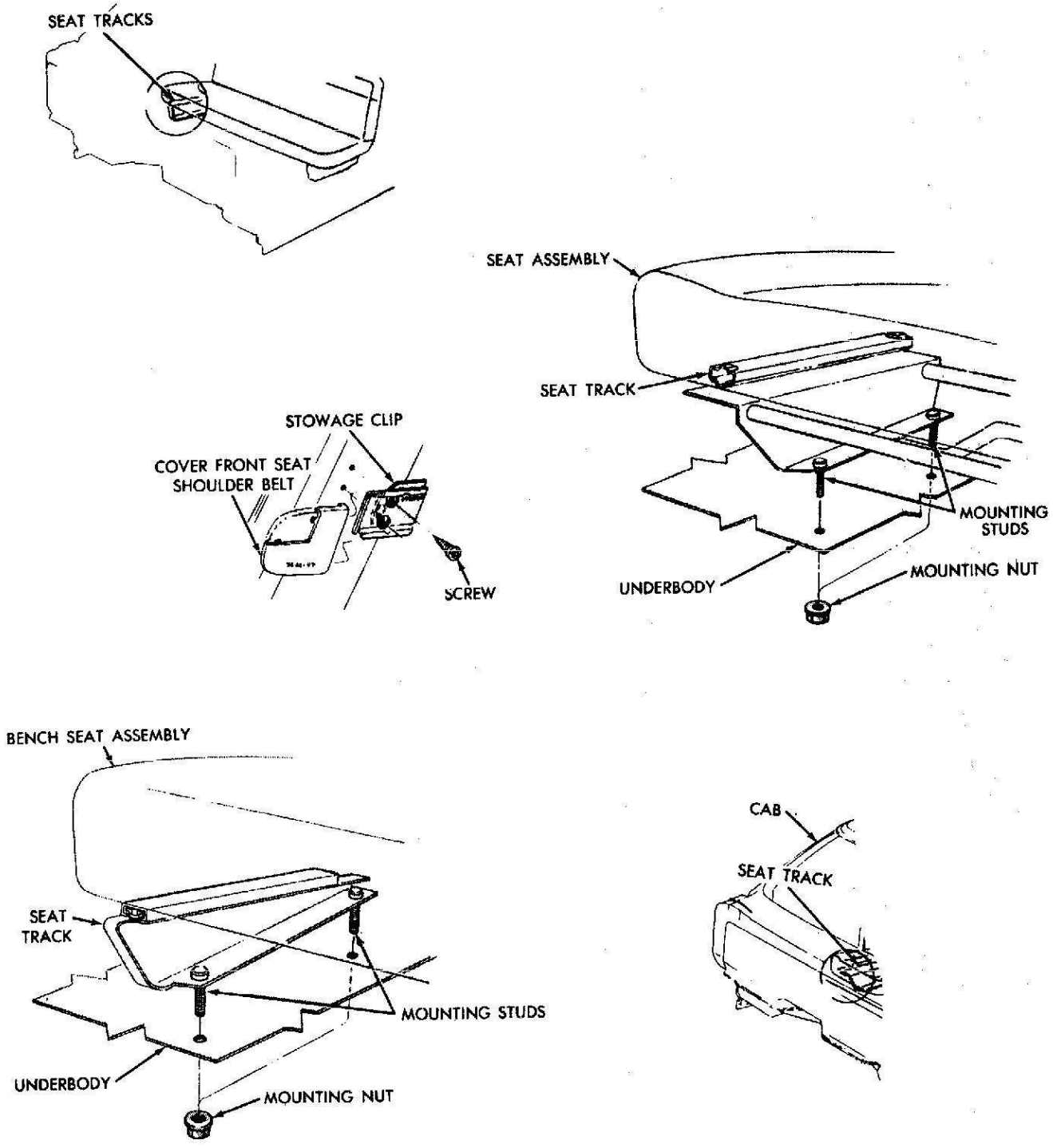


Figure 2-113. Seat Mountings.

2-124. Ash Tray Housing.

Refer to figure 2-114.

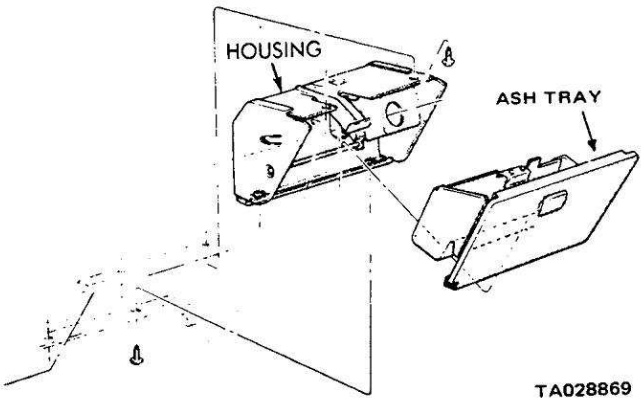


Figure 2-114. Ash Tray Housing.

a. Removal.

(1) Remove the ash tray by opening it, pushing down on the spring tab, and tilting the tray downward.

(2) Remove the housing mounting screws. Remove the housing.

b. Installation. To install the housing, reverse the procedures in *a*, above.

2-125. Glove Box Assembly.

Refer to figures 2-115 and 2-116.

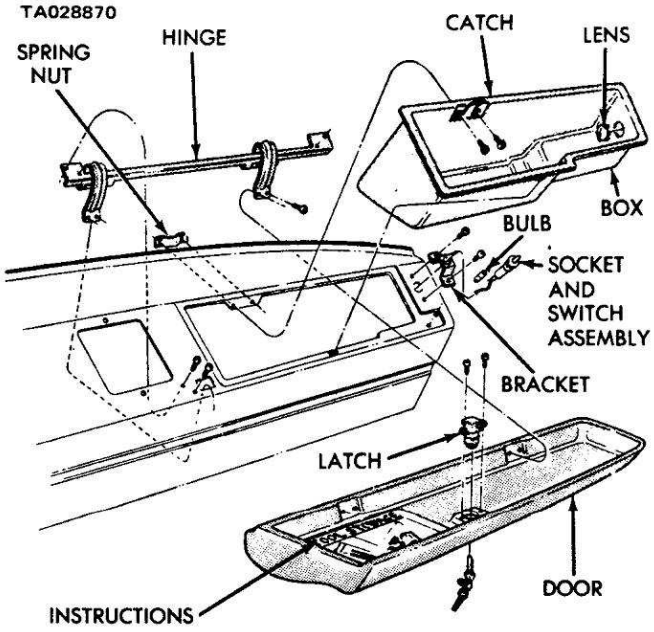


Figure 2-115. Glove Box.

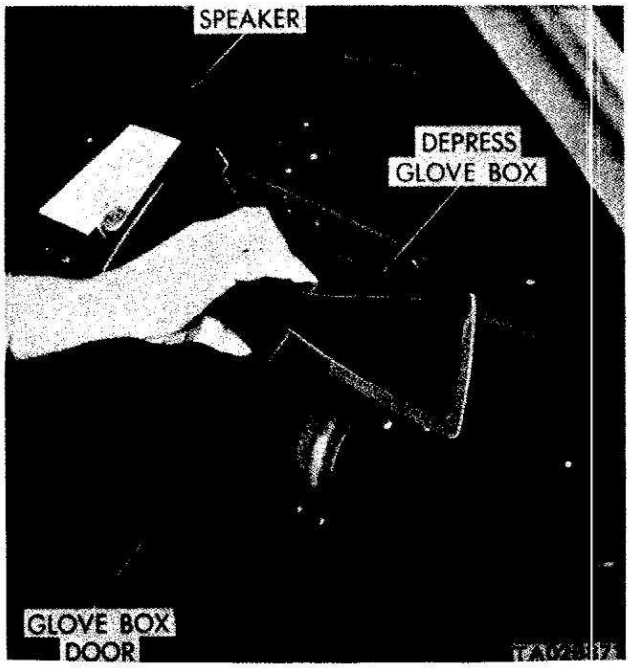


Figure 2-116. Removing the Glove Box.

a. Removing and Installing the Glove Box. To remove the box, depress the top and bottom edges of the box together, lift it upwards, and remove it. To install, insert the box into the panel opening. Make sure the locating tab on the lower edge of the box goes into the slotted opening in the panel.

b. Removing and Installing the Glove Box Door. To remove the door, open it and remove the screws that attach it to the hinge. To install the door, reverse the procedure.

c. Removing and Installing the Glove Box Door Hinge. First remove the glove box and the door. Then remove the hinge mounting screws. You can then remove the hinge by working through the opening in the panel. To install the hinge, reverse the procedure.

d. Removing and Installing the Latch and Catch. The door latch and catch are removed by taking out the mounting screws. To install, reverse the procedure.

2-126. Tailgate.

Refer to figure 2-117.

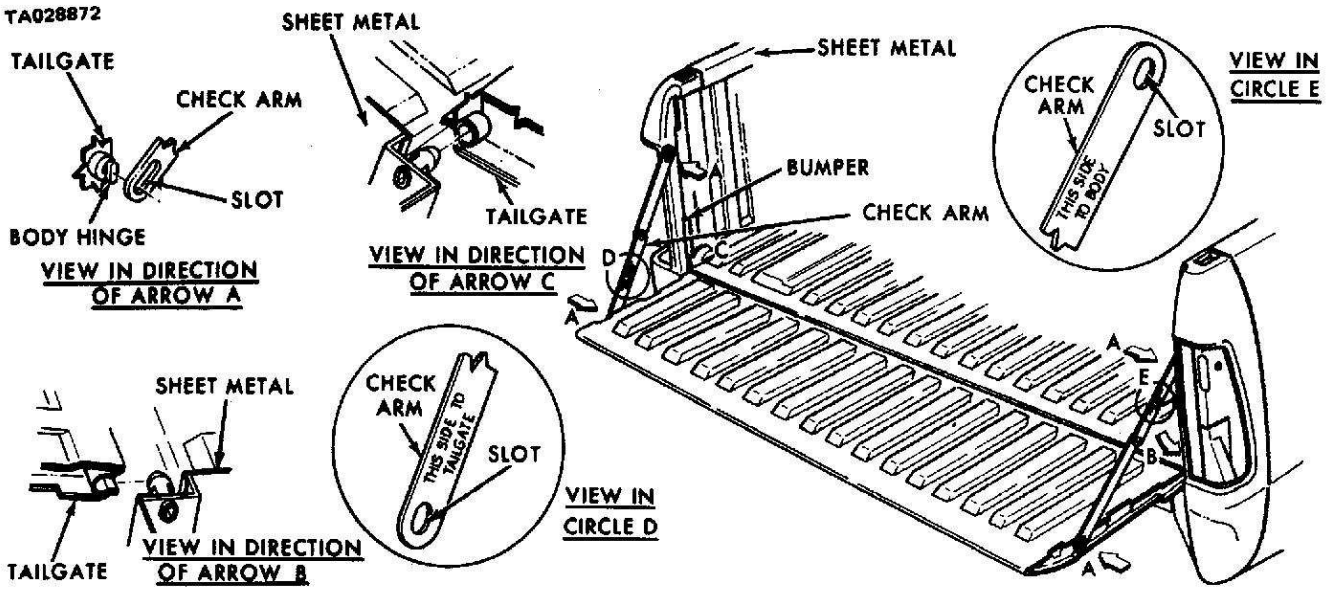


Figure 2-117. Tailgate to Body.

a. Removal.

(1) Open the tailgate.

(2) Angle the gate so the slot in the check arm lines up with the body hinge.

(3) Slip the check arm away from the hinge.

(4) Remove the bottom of the gate from the slot in the lower hinge (right side, facing the gate).

(5) Remove the left side of the gate by sliding it out of the lower hinge.

b. Installation.

(1) Slide the gate into the left lower hinge.

(2) Place the right side into the slotted hinge.

(3) Install the check arm to the gate. Note the markings on the check arm showing the correct position of the arm and body.

(4) Raise the gate until the top of the check arm (slotted section) slips onto the hinge.

2-127. Tailgate Lock and Linkage.

Refer to figure 2-118.

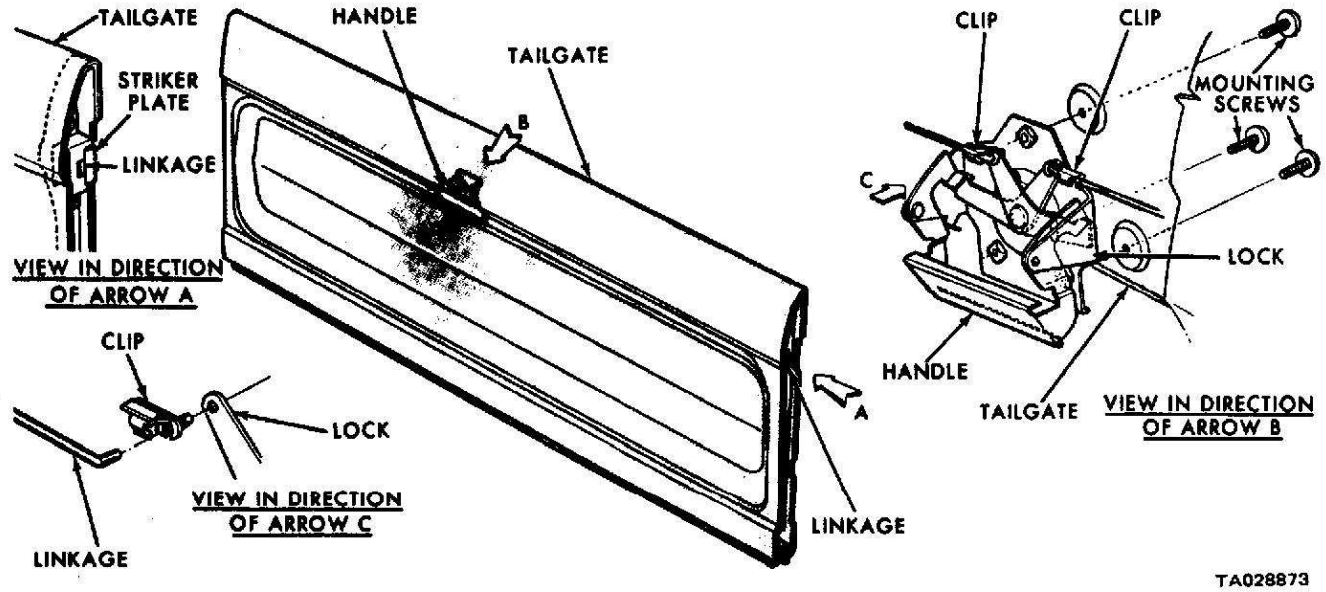


Figure 2-118. Tailgate Lock and Linkage.

a. Removal.

(1) Remove the screws that mount the lock to the inner tailgate sheet metal.

(2) Lower the handle and lock assembly out of the opening in the front tailgate sheet metal.

(3) Disconnect the clip between the lock and the linkage.

(4) Remove the striker plates on the left and right ends of the tailgate.

(5) Remove the linkage through the ends of the tailgate.

b. Installation. Lubricate the locks before installing them.

(1) Insert the lock into the tailgate opening.

(2) Guide the linkage into the ends of the tailgate.

(3) Secure the striker plates to the ends of the gate.

(4) Insert the linkage into the lock assembly and install the clips.

(5) Secure the lock to the tailgate with mounting screws.

(6) Check the lock for proper operation. Adjust it to eliminate tailgate rattles.

Section XXIII. MAINTENANCE OF CAB HEATER

2-128. General Information.

The heater motor draws outside air from the cowl grille in front of the windshield. The air is then pushed through the heater core. The temperature is varied by controlling the amount of engine coolant flowing through the heater core.

2-129. Replacing Heater Assembly.

a. Removal.

(1) Disconnect battery negative cable.

(2) Drain radiator and disconnect heater hose from heater.

(3) Disconnect wiring from resistor.

(4) Disconnect control cables from heater.

(5) Remove defroster ducts.

(6) Disconnect ground wire and cooling tube from blower motor (engine side).

(7) Remove bracket from right end of instrument panel and pull panel toward rear of cab.

(8) Remove seven retaining nuts from engine side of firewall and one from inside cab at right kick pad and roll assembly out.

b. Installation.

(1) Position heater assembly to dash and install retaining nuts and screw.

(2) Connect ground wire and blower cooling tube (engine side).

(3) Connect and adjust control cables.

(4) Install defroster ducts.

(5) Connect wires to resistor.

(6) Install bracket at right end of panel.

(7) Connect heater hose and fill radiator.

(8) Connect battery.

2-130. Replacing Heater Core.

a. Removal.

(1) Remove heater assembly from cab (para 2-129*a*).

(2) Remove screws that hold the front and rear housing together.

NOTE

There are two screws inside the assembly at the right end. These must be removed in order to separate the housing halves.

(3) Remove the screws at each end of the core and the screw between the inlet and outlet hoses. Then, carefully slide the core out of the housing.

b. Installation.

(1) Position core.

(2) Install screws at each end of core.

(3) Install screw between inlet and outlet hoses.

(4) Assemble front and rear hosuing halves and install screws.

(5) Install heater assembly in cab (paragraph 2-129*b*).

2-131. Replacing Heater Motor and Fan Assembly.

a. Removal.

(1) Remove screw securing ground wire to firewall.

(2) Disconnect wire connector.

(3) Remove cooling tube from heater motor.

(4) Remove three retaining nuts and remove heater motor and fan assembly.

(5) Separate fan and motor.

(a) Remove spring clamp.

(b) Slide fan off motor shaft.

b. Installation.

(1) Slide fan onto motor shaft and install spring clamp.

(2) Position motor and fan assembly and secure with retaining nuts.

(3) Install cooling tube.

(4) Connect wire.

(5) Secure ground wire to firewall with screw.

CHAPTER 3

MATERIEL USED IN CONJUNCTION WITH MAJOR ITEM

Section I. CARGO BOX COVER KIT

3-1. General.

The cargo box cover kit (figures 3-1 and 3-2) consists of fabric cover, supporting bows, and angle-iron rails. The outer surface of the fabric does not reflect infrared light.

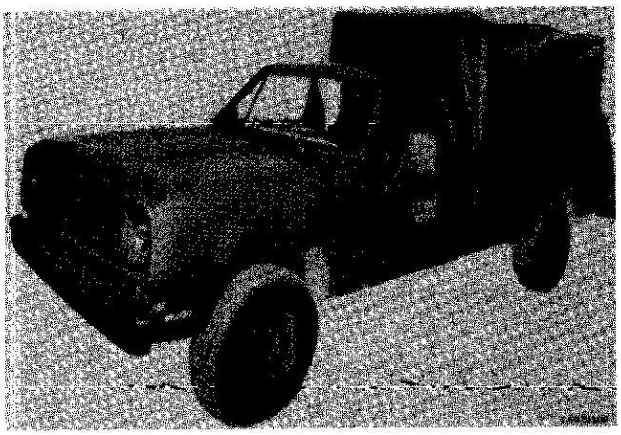


Figure 3-1. Cargo Box Cover (Left Front View).

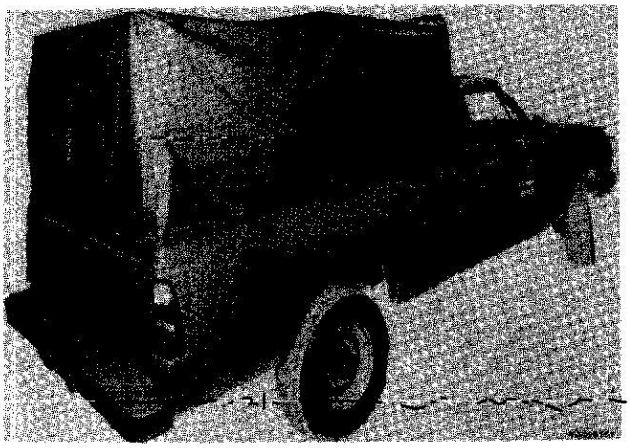
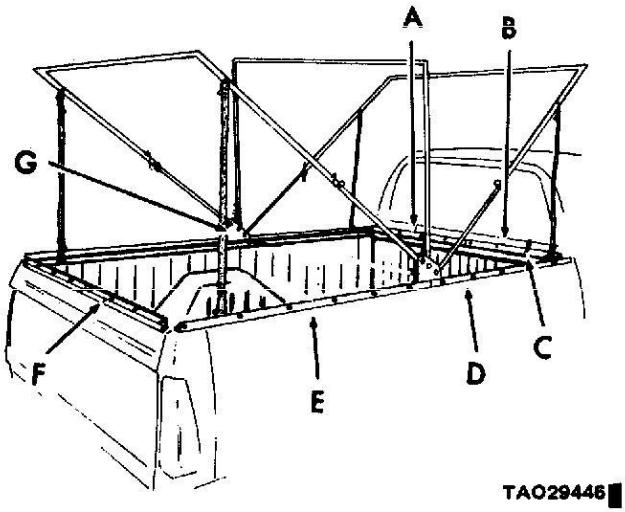


Figure 3-2. Cargo Box Cover (Right Rear View).

3-2. Installation.

a. Drill Mounting Holes.

(1) Identify the two forward angle-iron rails (A and B, figure 3-3).



Legend for Figure 3-3:

A. Left forward rail assembly.
B. Right forward rail assembly.
C. 1/4 turn fasteners.
D. Forward side rail assembly.
E. Rear side rail assembly.
F. Rear (tailgate) rail assembly.
G. Pivot brackets.

Figure 3-3. Installation of Angle-Iron Rails.

(2) Place the two rails on the forward wall of the box, with the 1/4 turn fasteners (C) facing the cargo bed. The rails must be butted together and centered on the forward wall.

(3) Using the rails as templates, mark the locations for the attaching bolts.

(4) Center-punch and drill with a 7/16-inch bit.

(5) Identify the right-side rails (D and E). Position them on the right-side cargo box walls with the 1/4 turn fasteners facing outside the cargo box. Position rail D against rail B, and rail E against rail D.

NOTE

When the side rails are properly positioned, the stake pockets will not be covered. DO NOT cover the stake pockets, or the troop seat kit cannot be installed.

(6) Use the side rails as templates. Mark mounting hole locations, center-punch, and drill with a 3/8-inch bit.

(7) Repeat steps 5 and 6 for the left-side rails.

(8) Identify the rear (tailgate) rail (F).

(9) Center the rail on the tailgate as shown in figure 3-3.

(10) Using the rail as a template, mark locations, center-punch, and drill with a 7/16-inch bit.

b. Install Expansion Nuts. The front and rear rail attaching bolts are held in position with expansion nuts (moly-nuts). Install the expansion nuts as follows:

(1) Insert the appropriate size expansion nut into the drilled hole and hold it in place with pliers.

(2) Screw the attaching bolt into the expansion nut until the nut has expanded and seated firmly against the sheet metal.

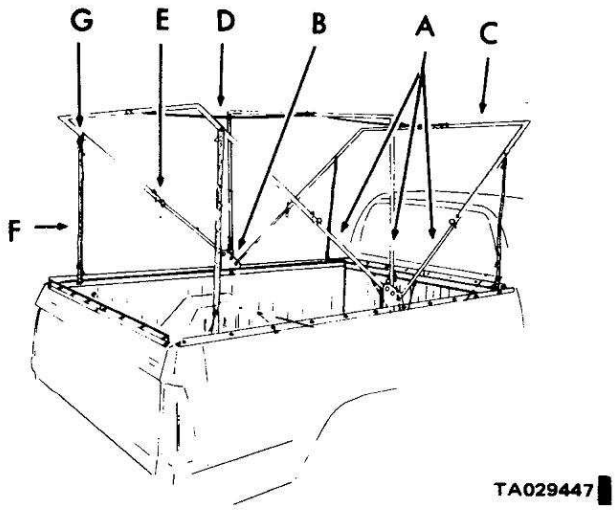
(3) Remove the attaching bolt and repeat the procedure for the remaining front and rear mounting holes.

c. Install Rails. Position the front and rear rails over the drilled holes and attach them firmly by screwing the attaching bolts into the expansion nuts. Install the side rails as follows:

(1) Position the rails over the drilled holes. At the end holes by the cab and tailgate, attach the side rails with bolts, lockwashers, and nuts.

(2) Place the pivot brackets (G) over the center holes with the angled sides facing the front of the truck. Attach them with bolts, lockwashers, and nuts.

d. Install Bows, Tension Straps, and Cover. Refer to figure 3-4.



Legend for Figure 3-4:

A. Lower end bow.
B. Pivot brackets.
C. Upper bow assembly.
D. Tension strap.
E. Lock pins.
F. Corner straps.

Figure 3-4. Extension Members, Bows, and Tension Straps.

(1) Attach the lower end bow (A, figure 3-4) to the pivot brackets (B), using nuts and bolts. Be careful not to cross-thread the bolts. When installed, the lower end bow members should move freely in the pivot brackets.

(2) Identify the upper members of the bow assembly (C) and the tension strap (D).

(3) Run an upper member through each loop of the tension strap.

(4) Insert the upper members into the lower end members, keeping the tension strap attached.

(5) Extend and lock the front and rear bows using the lockpins (E). Then depress and lock the center bow.

NOTE

All bows can be locked in either of two positions: extended or depressed.

(6) Loop the corner straps (F) through the rings provided in the side rails. Then attach them to the strap clips.

(7) Adjust the four corner straps until they are snug and the tension strap is horizontal with the ground. If the tension strap is not horizontal, the cover will not fasten properly to the 1/4 turn fasteners.

(8) Unzip the cover and drape it over the bows, making sure the side marked FRONT faces the cab of the truck.

(9) When the cover is positioned, lock all the 1/4 turn buttons and zip up the sides.

3-3. Alternative Cover Positions.

a. Sides Up. Straps are provided on the inside of the cover to allow the sides to be raised, as shown in figure 3-5.

Figure 3-5. Cargo Box Cover Sides Rolled Up.

b. Stowed Position. When use of the cover is not desired, it may be folded and secured on the truck as shown in figure 3-6.

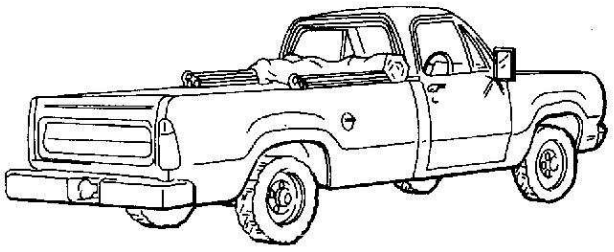


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Figure 3-6. Cargo Box Cover Secured.

Section II. TROOP SEAT KIT

3-4. General.

The troop seat kit (figure 3-7) provides space for eight men in the cargo box of the truck. The seats may be folded up to provide additional cargo space. The kit may be used in conjunction with the cargo box cover kit (section I).

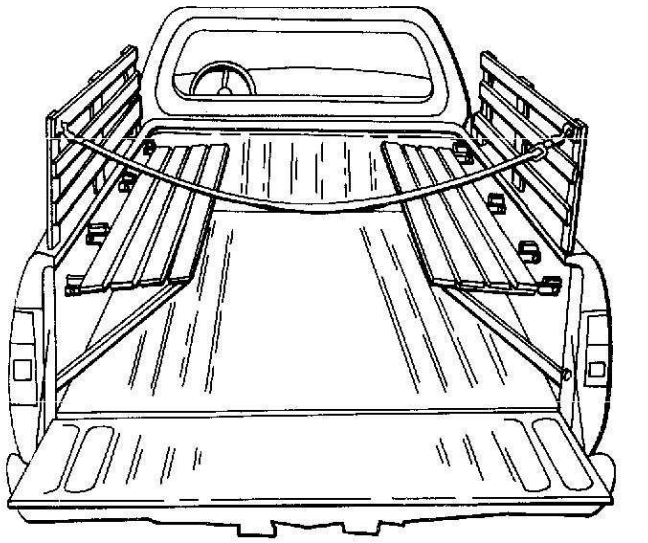

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Figure 3-7. Troop Seat Kit Installed.

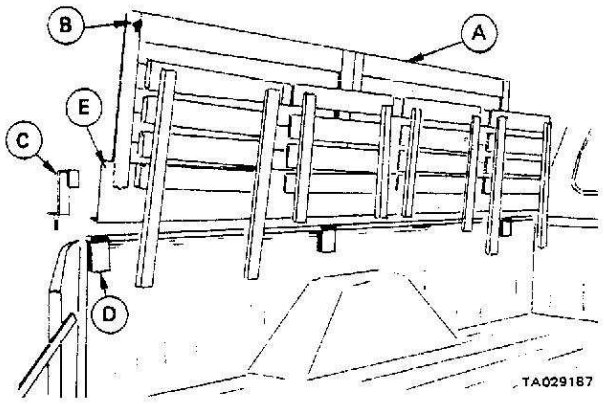
3-5. Installation and Use.

a. Installation.

(1) Position each panel (A, figure 3-8) on the side of the cargo box so that the eye bolt (B) is inside at the rear.

(2) Place the three pocket clamps (C) into the stake pockets (D). The bolt goes through the bottom of the pocket. The upper part clamps over the side rack (E).

(3) Thread nuts onto the bolts under the stake pocket and tighten them securely.



Legend for Figure 3-8:

A. Panel.
B. Eye bolt.
C. Pocket clamp.
D. Stake pocket.
E. Side rack.

Figure 3-8. Installation of Troop Seat Kit.

b. Use. The seats may be lowered individually for use, or may be raised for storage (figure 3-9). A quick-release pin with a T-handle, located by the hinge pin, locks the seats in the up or down position. A safety cable across the back of the truck snaps onto the eye bolts.

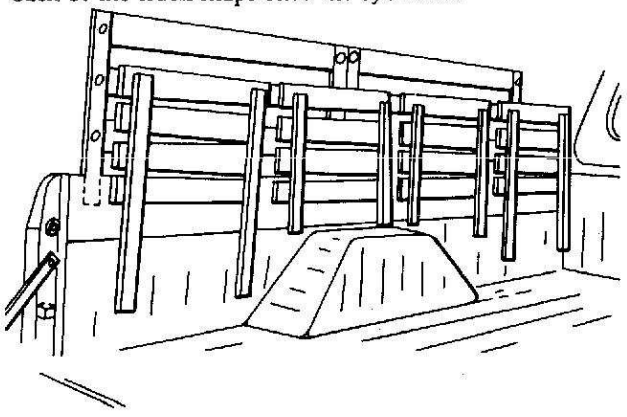


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Figure 3-9. Troop Seats Locked in Up Position.

Section III. 60-AMP, 24-VOLT GENERATING KIT

3-6. General.

All M880-series vehicles are equipped with a 12-volt electrical system. In addition, some models (table 3-1) are equipped with 24-volt systems.

Table 3-1. Charging Systems

Model	12 Volt Only	24 Volt/60 Amp	24 Volt/100 Amp
M880	X		
M881		X	
M882		X	
M883		X	
M884			X
M885	X		
M886	X		
M888	X		
M890	X		
M891		X	
M892		X	
M893	X		

3-7. Repair.

To isolate a problem in the 60-amp, 24-volt charging system, use the wiring diagram in figure 3-10 and paragraph 2-29.1.

3-8. 24-Volt Alternator.

a. General. The procedure for replacement of the 24-volt alternator is the same on both the 60-amp and 100-amp systems.

b. Removal.

(1) Disconnect the negative cables from both batteries in the 24-volt system.

(2) Disconnect the electrical wires from the alternator. Mark them for aid when reinstalling the alternator.

(3) Remove the adjusting screw.

(4) Remove the drive belts.

(5) Remove the attaching nuts and screws, and remove the alternator.

c. Installation.

(1) Position the alternator on the mounting bracket, and install the attaching screws and nuts. Tighten the nuts until they contact the bracket, but don't torque them at this time.

(2) Position the drive belts.

(3) Install the adjusting screw. Adjust the belt until it has a 1/2 to 3/4-inch deflection, and tighten the adjusting screw.

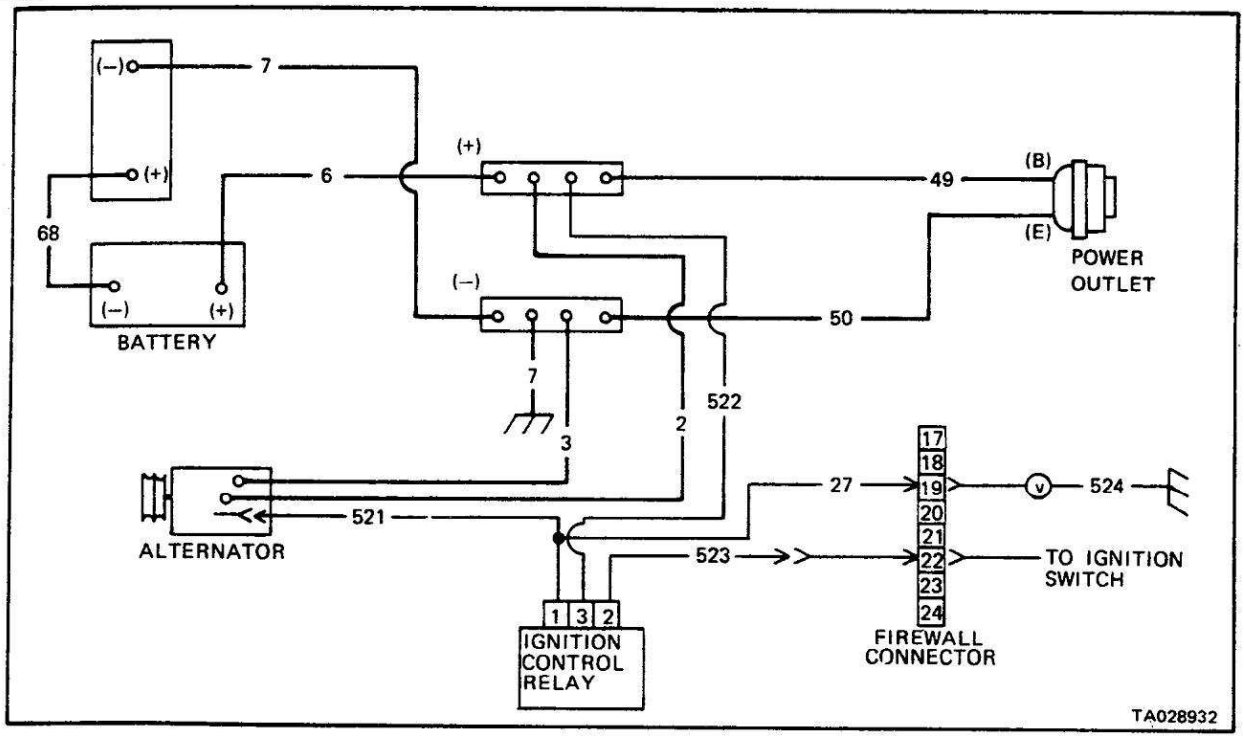

Figure 3-10. 60-Amp Wiring Diagram.

3-9. 24-Volt Voltage Regulator.

a. General. The procedure for replacement of the 24-volt voltage regulator is the same on both the 60-amp and 100-amp systems.

b. Removal.

(1) Disconnect the negative cables from both batteries in the 24-volt system.

(2) Disconnect the electrical connectors from the voltage regulator.

(3) Remove the attaching screws, and remove the voltage regulator.

c. Installation.

(1) Position the voltage regulator, and install the attaching screws.

(2) Connect the electrical connectors.

(3) Reconnect the battery cables.

Section IV. 100-AMP, 24-VOLT GENERATING KIT

3-10. General.

All M880-series vehicles are equipped with a 12-volt electrical system. In addition, some models (table 3-1) are equipped with 24-volt systems.

3-11. Repair.

To isolate a problem in the 100-amp, 24-volt charging system, use the wiring diagram in figure 3-11 and paragraph 2-29.1.

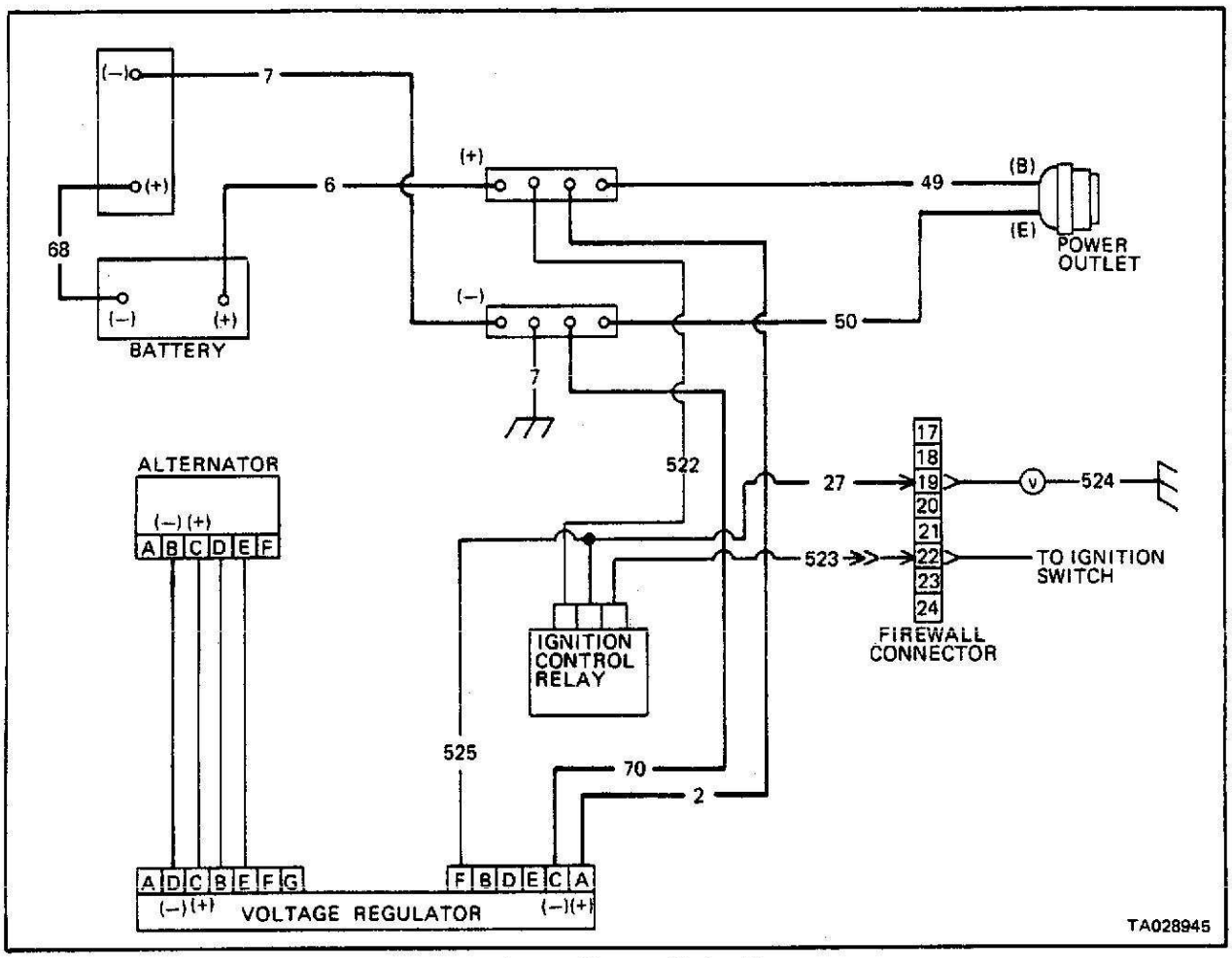

Figure 3-11. 100-Amp Wiring Diagram.

3-12. Alternator Replacement.

To replace the alternator, see paragraph 3-8.

3-13. Voltage Regulator Replacement.

To replace the voltage regulator, see paragraph 3-9.

Section V. COMMUNICATIONS INSTALLATION KIT

3-14. Installation. Refer to TM 11-2300-459 Series for installation.

3-15. Maintenance. Refer to TM 11-2300-459 Series for communications maintenance.

Section VI. SHELTER TIE-DOWN KIT

3-16. Installation. Refer to Supply Bulletin 11-640 for installation and fabrication of donnage.

3-17. Maintenance.
To be furnished at a later date.

Section VII. ARCTIC EQUIPMENT

3-18. General.

Arctic winterization equipment installed on an M880-series truck permits operation of the vehicle in extreme cold weather conditions. Use of the "Swingfire" heater will aid in starting the vehicle, even if cold-soaked, down to a temperature of -50° Farenheit (-46° Centigrade). A heavy-duty heater motor and core replaces the standard units for heating the cab area. An M880 or M882 truck will have the cargo area reworked to accommodate a 24 volt personnel heater with insulated structure installed to protect personnel. The M886 ambulance 12 volt personnel heater will be replaced with a 24 volt personnel heater. All winterized vehicles have wide-tread snow tires and tubes installed.

3-19. Location of Equipment.

The Swingfire heater when not in use is stored in the stowage box positioned on or in the right rear of the M886 and certain M880 trucks. The heater when being used is inserted in the heater water jacket leading into the engine compartment from the grille. The heater jacket vents the Swingfire heater exhaust to the enclosed 12 volt and 24 volt batteries as well as heating the engine coolant. The cab heavy-duty motor and core are installed on the right side of the firewall. The 24 volt personnel heater is installed on the right front corner of the floor of those trucks with an enclosed cargo area. The M886 ambulance 24 volt personnel heater is located under the rear of the left bench.

3-20. Differences Between Models.

Refer to table 3-1 for a listing showing which winterization components are installed on your M880-series trucks.

3-21. Swingfire Heater PMCS.

Preventive-maintenance check and services to be performed on the Swingfire heater (fig. 3-12) are detailed in table 3-2. The interval column indicates frequency of PMCS to be performed during the cold weather season. In addition, these checks and services are to be performed at the beginning of each cold weather season.

Table 3-1. Differences Between Models Matrix

WINTERIZATION COMPONENTS	INSTALLED ON			
	M880	M882	M884	M886
Engine compartment rework	X	X	X	X
Swingfire heater	X	X	X	X
Personnel heater, 24 volt	X	X		X
Cab heavy-duty motor & core	X	X	X	X
Cargo box bowing & insulation	X	X		
Rear panel, door & floor	X	X		
Hood insulation	X	X	X	X
Cab insulation	X	X	X	

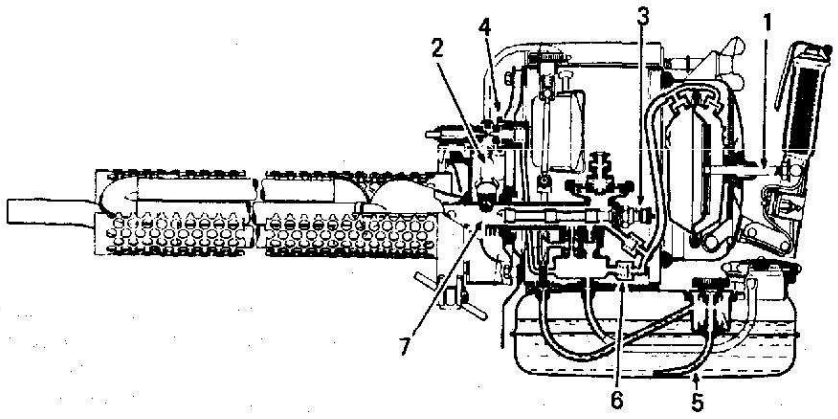

Figure 3-12. Swingfire Heater Cross Section.

Table 3-2. Preventive Maintenance Checks and Services.

KEY (see fig. 3-12)	Item to be inspected Procedure	Interval
1	Pump Pushrod Lubricate with grease suitable for extreme cold use.	Sooner of 10 days or 100 hours operation.
2	Spark Plug Use special tool wrench (fig. 3-13) to remove spark plug. Clean with fine steel brush. Use feeler gage to check gap and adjust to 0.039 inch if necessary. Reconnect plug to cable, ground plug thread at heater housing and apply current. Sparks must develop at gap.	Sooner of 10 days or 100 hours operation.
3	Preheating Plug Remove electrical lead from preheating plug and remove plug, using special tools wrench (fig. 3-13). Clean plug carefully with fine steel brush. Reconnect lead to preheating plug, ground plug thread at heater housing and apply current. Preheating plug will become warm in a few minutes if operating normally.	
4	Control Air Shut-off Valve Remove dirt and other material with clean rag.	Sooner of 10 days or 100 hours operation.
5	Fuel tank Clean with gasoline.	1000 hours of operation.
6	Air Valves and Hose Connections Check for loose connections and tighten where necessary.	Before each operation.
7	Mixing Chamber Screw special tool cleaning rod into position where preheating plug is normally located. Keep turning rod while pushing it forward and backward to scrape off carbon deposits in mixing chamber. You can observe partial results through spark plug hole. Remove cleaning rod, install spark plug and preheating plug and connect to respective leads. Start heater to blow out loose carbon from mixing chamber.	Sooner of 10 days or 100 hours operation.

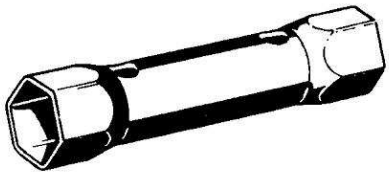

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Figure 3-13. Spark Plug and Preheating Plug Wrench.

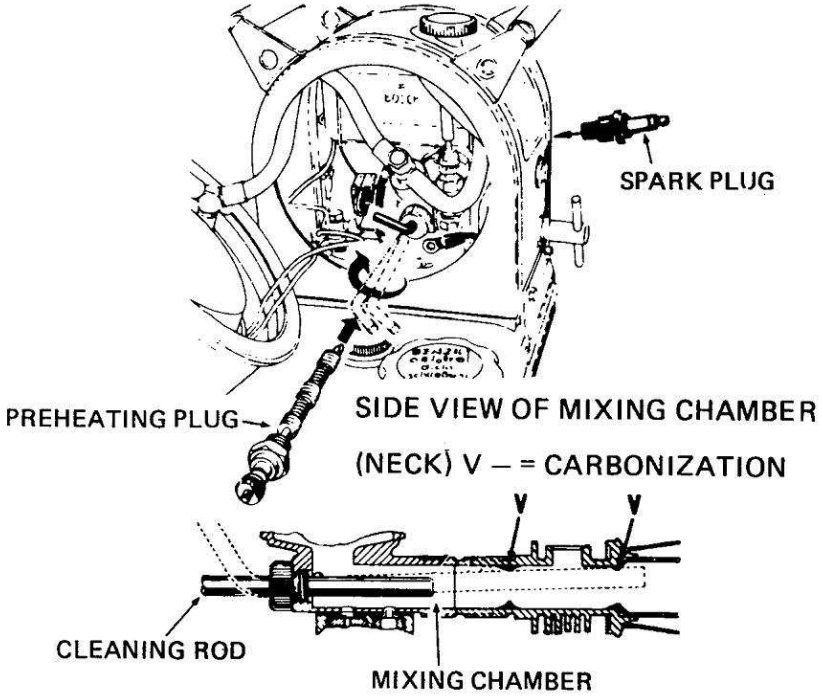

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Figure 3-14. Mixing Chamber.

Table 3-3. Personnel Heater Preventive Maintenance Checks and Services

Item no.	Item to be inspected Procedure
1	Heater Wiring Harness Check connectors, terminals, and shielding for frayed insulation and broken or damage wiring.
2	Heater Control Box Turn heater on, check for proper operation in HI and LO settings; press indicator lamp and check for bright illumination.
3	Fuel Filter Close drain cock. Place suitable container under filter assembly, unscrew filter bowl from head and remove gasket and element. Clean element in approved cleaning solvent. If element is bent or torn, replace element.
4	Heater Inspect personnel heater for loose clamps, leaking fuel lines, damaged electrical connections, and loose attaching hardware. Check operation of heater.

3-22. Personnel Heater PMCS.

Table 3-3 details the preventive maintenance checks and services to be performed on the personnel heater and its related items.

3-23. Personnel Heater Control Box Replacement and Installation.

a. Removal.

(1) Disconnect 24 volt battery system ground cable.

(2) For the M880 or M882 vehicle, gain access to control box by removing attaching hardware from the retaining guard (fig. 3-15). Remove guard. For the M886 ambulance, access is gained in same way as for heater/ventilator in paragraph 4-47.

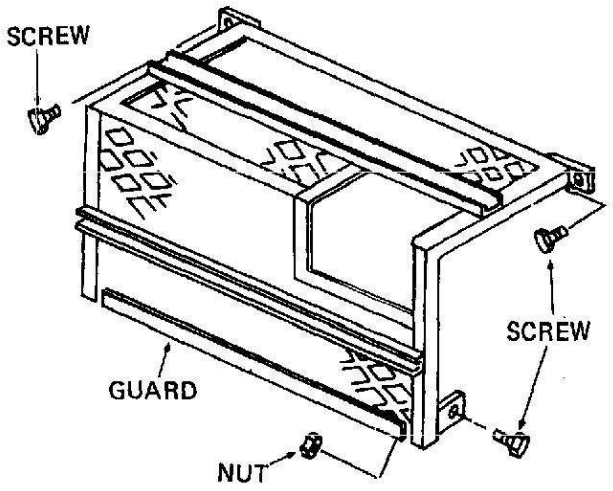

Figure 3-15. Heater Guard

(3) Disconnect electrical connector and harness plug from heater control box assembly (fig. 3-16).

(4) Remove two nuts (fig. 3-16) and washers securing control box assembly to base plate. Remove the control box.

b. Installation.

(1) Secure control box assembly to base plate by installing two nuts on screws on top of control box (fig. 3-16).

(2) Connect electrical connector of power harness and connector of heater harness to control box assembly.

(3) Install guard (fig. 3-15) and retain with three screws and nuts.

(4) Connect 24 volt battery ground cable.

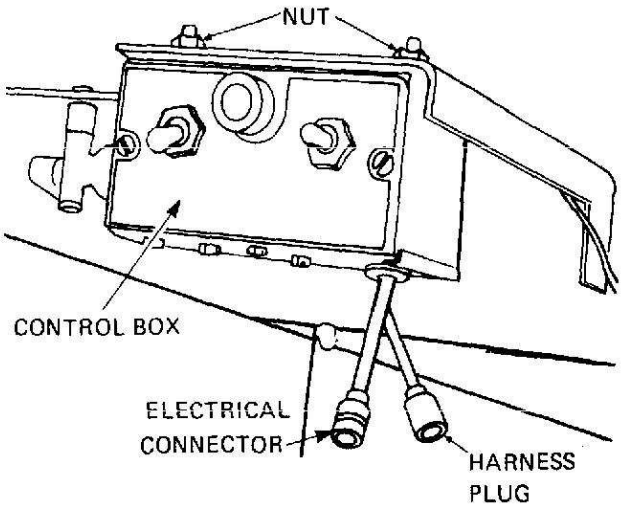

Figure 3-16. Electric Control Box

3-24. Fuel Filter Maintenance.

a. Removal.

(1) Access is gained to fuel filter in same way as for control box; refer to paragraph 3-23.

(2) Disconnect 24 volt battery system ground cable.

(3) Turn off shutoff cock in fuel line to personnel heater.

(4) Place suitable container under heater fuel filter.

WARNING

Do not allow sparks or flame near work area.

(5) Unscrew fuel filter body. Remove filter element.

b. Installation.

(1) Replace filter element in body. Screw body into head.

(2) Attach guard.

(3) Connect battery ground cable.

3-25. Heater Fuel Pump Removal and Installation.

a. Removal.

(1) Access is gained to fuel pump in same way as for control box; refer to paragraph 3-23.

(2) Disconnect 24 volt battery system ground cable.

(3) Place suitable container under heater fuel pump.

WARNING

Do not allow sparks or flame near work area.

(4) Turn off shutoff cock.

(5) Disconnect pump electrical lead and fuel lines.

(6) Remove screws securing pump to mounting bracket and remove fuel pump.

b. Installation.

(1) Position fuel pump at mounting bracket and retain with screws. If replacement screw is used, apply LOCTITE 242 to threads before installing.

(2) Reconnect pump lead to proper connector.

(3) Connect 24 volt battery system ground cable.

3-26. Heater Fuel Lines.

Inspect fuel lines for damage; install new lines in place of damaged lines. Insure that all connections are tight.

3-27. Electrical Wiring.

Check connector, terminals, and shielding for frayed insulation and broken or damaged wiring. If replacement is required, use removed wiring as template to determine length required for new wiring.

3-28. Domelight.

Service is limited to replacement of lamp. If replacement lamp does not work, check circuit breaker. Place red lead of voltmeter at point where harness terminal connects to circuit breaker. Ground black voltmeter lead to bare metal. If you do not get a 24 volt reading, install a new circuit breaker. If you get a 24 volt reading, install a new domelight assembly.

3-29. Rear Panel and Door.

a. Repair. Seal small cracks in the plywood of the floor, near panel, and door with adhesive MMM-A-134.

b. Removal of panel and door.

(1) Remove attaching hardware for door hinges.

(2) Remove door. Use the removed parts as templates to fabricate replacement door.

(3) Fold cover back from panel.

(4) Remove Swingfire heater stowage box.

(5) Remove inside and outside grab handles.

(6) Remove attaching hardware for panel.

(7) Remove rear panel. Use the removed panel as a template to fabricate replacement panel.

c. Installation.

(1) Place the rear panel in position on the truck.

(2) Secure the panel with attaching hardware.

(3) Aline the hinges of the door, and secure with attaching hardware. Insure that the door will close properly.

(4) Reinstall inside and outside grab handles.

(5) Reinstall Swingfire heater stowage box.

(6) Reposition the cover to panel.

3-30. Cargo Box.

a. Repair. Seal small cracks in the plywood with adhesive MMM-A-134.

b. Removal.

(1) Remove attaching hardware securing canvas cover to rear frame. Fold cover back from panel.

(2) Disconnect negative battery cables.

(3) For removal of rear panel, see paragraph 3-29.

(4) Remove troop seat kit, if installed.

(5) Break adhesive securing fuel line grommet to floor.

(6) Remove personnel heater fuel line.

(7) Disconnect wiring harness, and back out harness end through floor.

(8) Remove personnel heater.

(9) Remove attaching hardware.

(10) Lift floor to clear tire wells, and slide floor out through back of truck. Use old floor as a template to fabricate replacement floor.

c. Installation.

(1) Place the floor in position in the truck, and secure with attaching hardware.

(2) Fill small cavities with adhesive MMM-A-134.

(3) Reinstall the personnel heater.

(4) Connect wiring harness and fuel lines to personnel heater.

(5) Reinstall troop seat kit, if removed.

(6) For installation of rear panel, see paragraph 3-29.

(7) Connect battery cables.

(8) Reposition the cover to panel.

3-31. Storage Container, Swingfire Heater.

a. Repair.

(1) Tighten any loose attaching hardware.

(2) Fabricate a replacement for the hinge if it is damaged.

b. Removal. Remove attaching hardware. Remove storage box.

c. Installation. Position storage box against rear panel, and secure with attaching hardware.

3-32. Insulation Covers.

The radiator grille insulation cover, hood insulation cover, and cargo area cover are secured to the vehicles with turnbuttons. The radiator grille insulation cover is additionaly secured by attaching springs under the front of the truck. This facilitates the removal and replacement of the covers.

3-33. Cargo Box Bow.

a. Removal.

(1) Disconnect personnel heater air intake hood and plate on canvas cover.

(2) Remove the canvas cover.

(3) Remove top panel. If top panel is damaged, use old panel as a template to fabricate the new cover.

(4) Remove top braces.

(5) Remove bow(s).

b. Installation.

(1) Install bow(s).

(2) Install top braces.

(3) Install top panel.

(4) Position canvas cover over bows and install.

(5) Connect personnel heater air intake and plate on canvas cover.

3-34. Tires.

Refer to section XIX.

Section VIII. BLACKOUT LIGHTING KIT

3-35. General.

M880 and M890 series vehicles may be equipped with blackout lighting kits.

3-36. Repair.

The wiring diagram provides the information that is needed to electrically trace the blackout lighting system parts. Refer to figure 3-17 to isolate a blackout lighting problem.

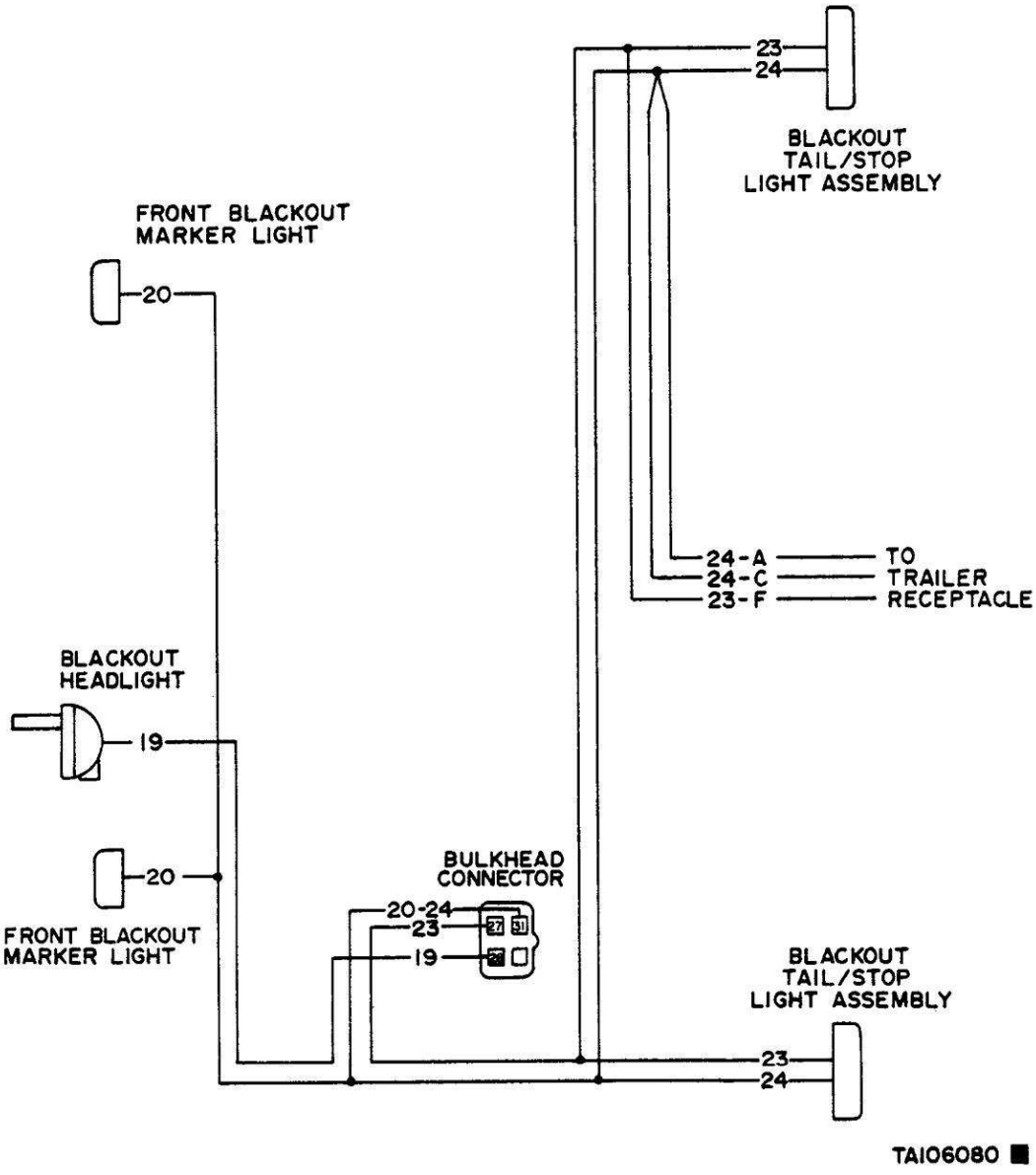

Figure 3-17. Blackout Lighting Kit Wiring Diagram (1 of 3)

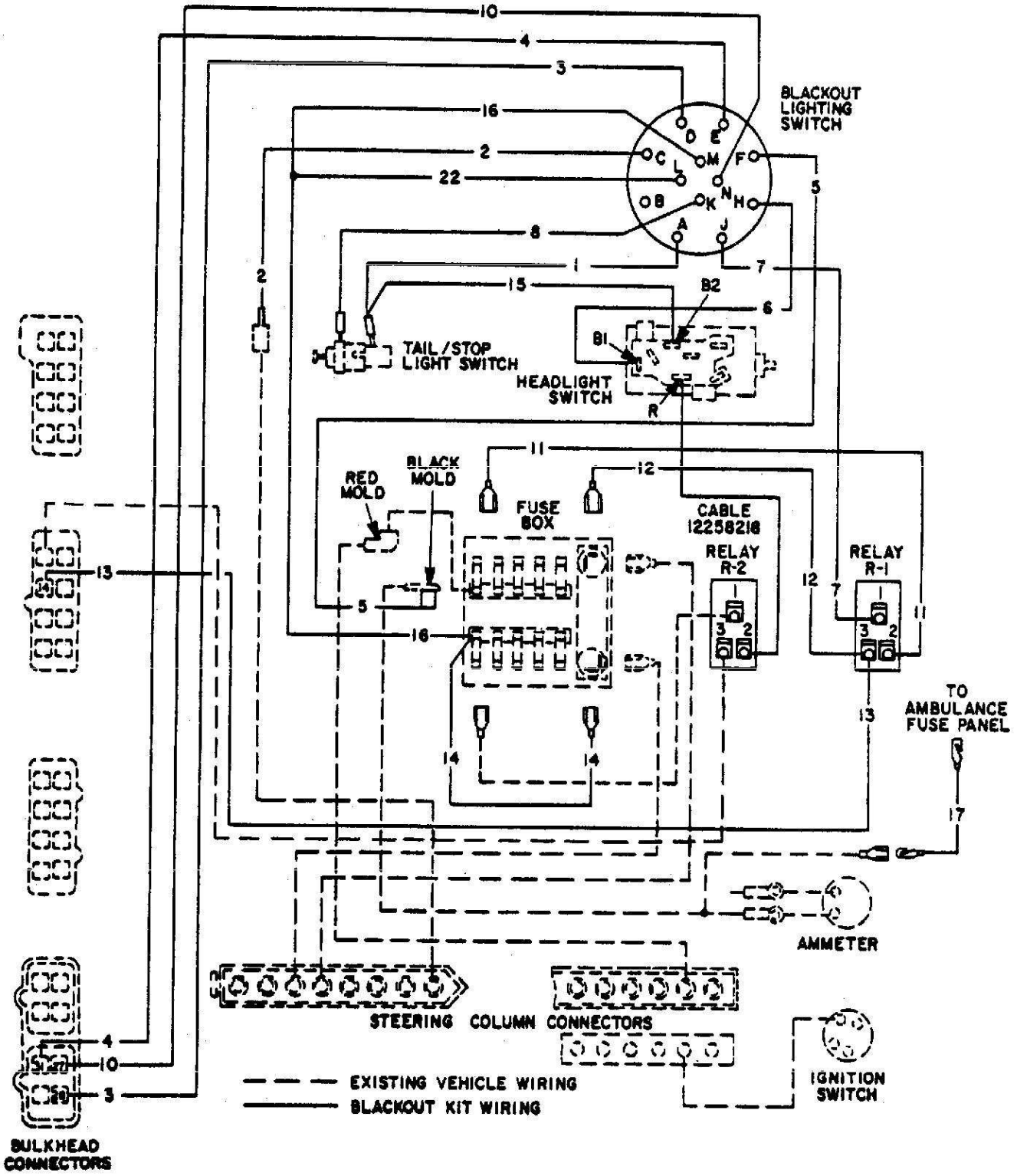

Figure 3-17. Blackout Lighting Kit Wiring Diagram (2 of 3)

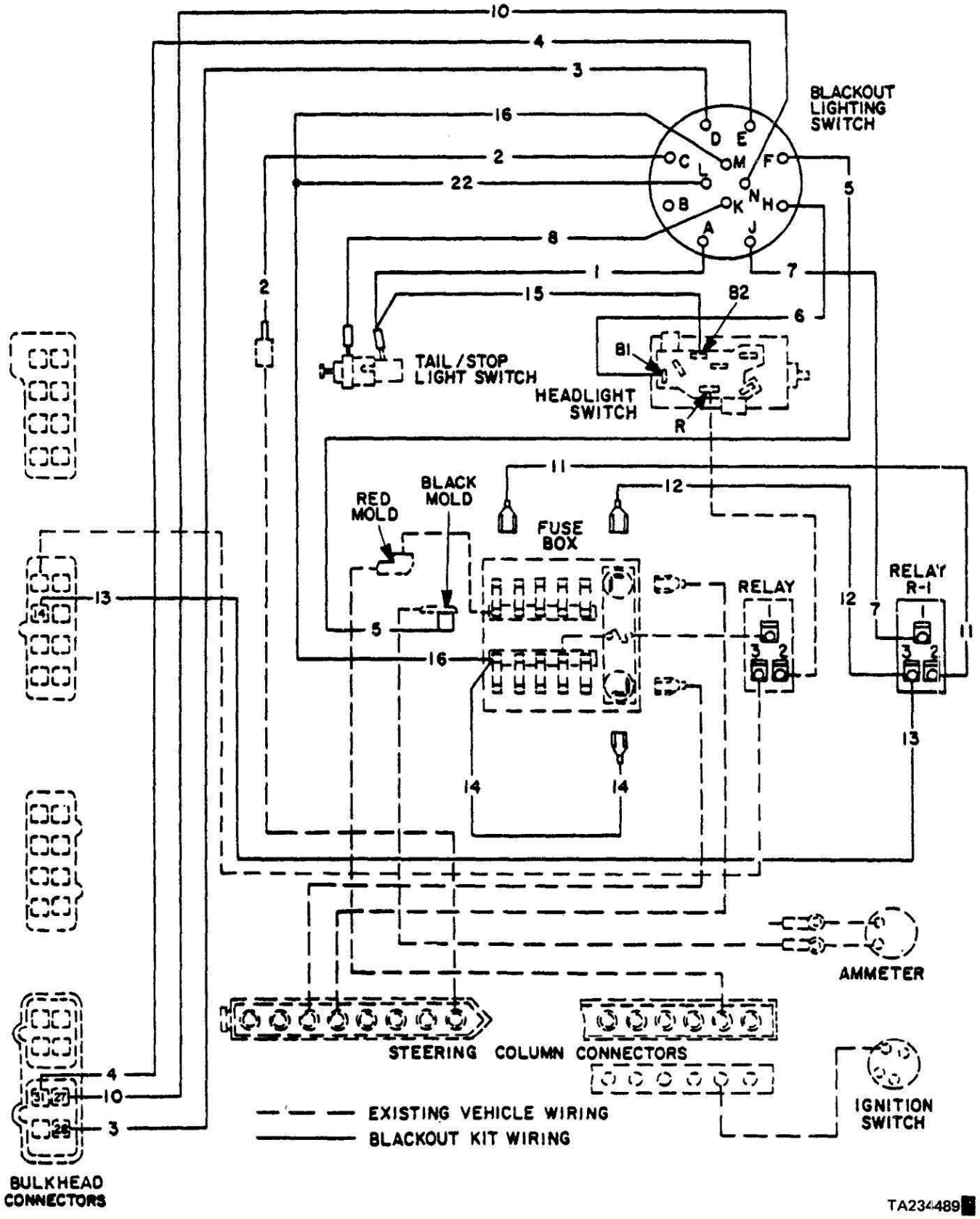

Figure 3-17. Blackout Lighting Kit Wiring Diagram (3 of 3)

3-37. Blackout Headlight Assembly.

a. Repair.

(1) To replace lamp, or for the repair of components, remove the three slotted screws in the door of the blackout headlight.

b. Removal.

(1) To replace the entire blackout headlight assembly, or the mounting bracket, remove the grille by removing 13 screws from the top and bottom of grille.

NOTE

On the 1976 model, the headlight cowling must be removed along with two screws at each end of the grille. On the 1977 model the parking light sockets must be disconnected. Lift grille from the vehicle.

(2) Remove nut and washers from the driving light stud, detach electrical lead and remove blackout headlight assembly.

(3) Remove the mounting bracket by removing the two bolts and nuts which retain the bracket to the radiator core support.

c. Installation.

(1) Attach mounting bracket to the radiator core support.

(2) Place blackout headlight on mounting bracket and install hardware.

(3) Connect the electrical lead.

(4) Place the grille in position on the vehicle.

(5) Install the necessary screws to retain the grille, replace lamp sockets in the 1977 model and, on the 1976 model, attach headlight cowlings.

3-38. Front Blackout Marker Lights.

a. Removal.

(1) On vehicles having headlight cowlings, remove four screws and remove headlight cowlings.

(2) With headlight cowlings removed, disconnect marker light electrical connectors, remove nuts from marker light studs, and remove marker lights.

(3) On vehicles without headlight cowlings, the marker light may be separated from the mounting bracket by removing nuts from marker light studs.

(4) To detach electrical connector of marker lights on models without the cowling, remove the turn signal lens by removing two screws. With lens removed, electrical connection is accessible for disconnection.

(5) If it is necessary to remove marker light mounting brackets, remove the grille in order to remove nuts on the marker light mounting studs.

b. Installation.

(1) 1977 Model Vehicle.

(a) Attach the marker light to the mounting bracket and with the grille removed, mount the bracket and light assembly to the grille.

(b) Reinsert the turn signal sockets into the grille and secure grille with screws.

(2) 1976 Model Vehicle.

(a) Attach the marker lights directly to the grille using lockwashers and hex nuts.

(b) Reinstall headlight cowlings.

3-39. Blackout Lighting Switch.

a. Removal.

(1) Remove the 15 screws which retain the instrument panel cover.

(2) Separate the cover from the dashboard enough so that switch connector is accessible.

(3) Remove four screws which retain cover to the blackout lighting switch.

(4) Remove coupling nut from the connector and separate blackout lighting switch from the connnector.

b. Installation.

(1) Attach instrument panel cover to the blackout lighting switch using four screws.

(2) Attach blackout lighting switch to the harness by inserting blackout lighting switch into the connector and securing with coupling nut.

(3) Install panel cover with 15 screws.

3-40. Blackout Tail/Stop Light Assemblies

a. Removal.

(1) Remove the four screws which retain the original vehicle taillight assembly.

(2) Separate taillight assembly from vehicle far enough so that the two connectors on each blackout tail/stop light assembly are accessible.

(3) Separate the connectors and remove nuts and washers from blackout tail/stop light assembly mounting studs and remove blackout tail/stop light assembly.

b. Installation.

(1) Reinstall blackout tail/stop light assembly and secure with lockwashers and nuts from behind (inside the fender).

(2) Connect to harness by attaching both connectors.

(3) Reinstall original taillight assembly and secure with four screws.

CHAPTER 4

M886/M893 AMBULANCE

Section I. BODY

4-1. General Information.

a. The litter compartment and roof extension (figure 4-1) are mounted directly on the chassis and frame. They are of sheet metal construction, welded and riveted in sections to the chassis. The unit is sealed around the outside of the cab and compartment.

b. When repairing sheet metal or mounting it to aluminum, paint the mounting surfaces with sealer before mounting and assembling them.

c. To make some of the repairs on the ambulance models, you will need a rivet gun.

4-2. Spotlight.

a. Removal.

(1) Remove the clamp bracket and screw from the inner cab roof.

(2) Remove the spotlight assembly and cover exterior of the cab extension.

(3) Remove the handle cover.

(4) Disconnect all electrical leads.

(5) Remove the handle and shaft through the inner cab roof.

b. Installation.

(1) Place the handle and shaft through the inner cab roof.

(2) Connect all electrical leads.

(3) Install the handle cover.

(4) Install the cover and spotlight to the exterior roof extension.

4-3. Rear Side Marker Lights.

To replace the rear side marker lights, remove the plastic lens, replace the light bulb, and reinstall the plastic lens.

4-4. Power Vent Hood.

The power vent hood is located on the roof of the ambulance. To remove it, take out the four attaching screws and lift it off. To reinstall the hood, position it on the frame and install the screws.

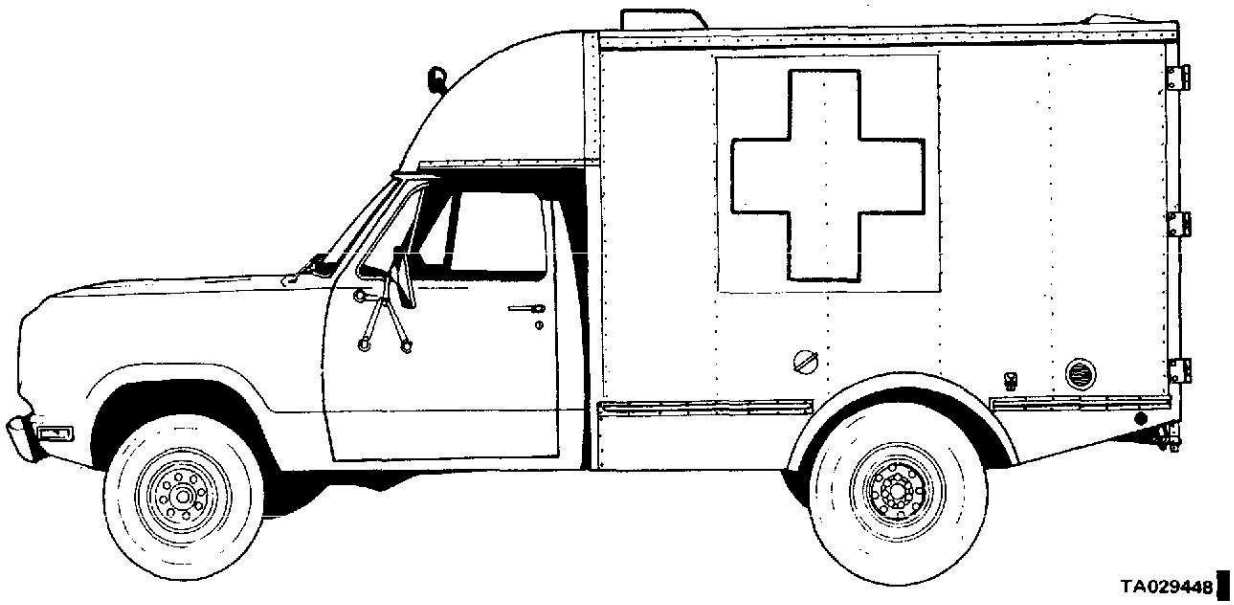

Figure 4-1. Litter Compartment and Roof Extension.

4-5. Power Vent Fan and Motor.

a. Removal.

(1) Remove the power vent hood.

(2) Disconnect the electrical wires at the motor.

(3) Remove the attaching nuts and lift the fan and motor assembly out.

b. Installation.

(1) Position the fan and motor assembly on the mounting bracket and install the mounting nuts.

(2) Connect the electrical wires to the motor.

(3) Reinstall the power vent hood.

4-6. Fixed Glass.

a. Removal.

(1) Insert a fiber stick between the glass weatherstrip retainer and panel.

(2) With an assistant, gently force the glass and weatherstrip retainer away from the frame.

(3) Remove the glass and weatherstrip retainer assembly from the panel.

b. Installation.

(1) Install a cord in the weatherstrip retainer.

(2) Install the glass and weatherstrip assembly to the door glass opening.

(3) Install the assembly to the door frame by using an installation cord.

(4) Clean the glass.

4-7. Rear Door Replacement.

Remove the bolts from the hinges, and remove the door assembly. To reinstall the door assembly, install the hinge bolts, and aline the door so that it will close properly.

4-8. Hinges (Rear Doors).

a. Removal.

(1) Remove the bolts from the door; be sure the door is supported to avoid injury.

(2) Remove the bolts from the back frame.

(3) Remove the hinges from the vehicle.

b. Installation.

(1) Position the hinges to the back of the frame, and secure them with bolts.

(2) Aline the supported door with the hinges, and secure it with bolts.

(3) Test the door for correct fit. There is a slight adjustment allowed for by slotted and elongated holes in the hinges.

4-9. Access Panel.

a. Removal.

(1) Remove the screws securing the access panel to the inner door.

(2) Remove the panel from the door assembly.

b. Installation.

(1) Place the access panel in position on the door assembly.

(2) Install the mounting screws.

4-10. Inside Handle – Left Door.

a. Removal.

(1) Remove the screws from the bezel securing the handle to the inner door panel.

(2) Pull the handle and shaft assembly out of the door and latch.

b. Installation.

(1) Place the handle and shaft into position on the door by inserting the shaft into the latch assembly.

(2) Secure the handle to the door with screws, making sure it is pointing down.

4-11. Inside Handle – Right Door.

a. Removal.

(1) Remove the set screw from the handle.

(2) Remove the handle from the shaft.

b. Installation.

(1) Place the handle on the shaft.

(2) Secure the set screw.

4-12. Draw Bolt Linkage.

The deadlock style linkage is mounted inside the door sections.

a. Removal.

(1) Remove the access panel from the inner door panel.

(2) Move the insulation out of the way.

(3) Remove the mounting nuts from either the upper or lower rod.

(4) Remove the upper or lower rod through the access hole.

b. Installation.

(1) Place the rod into the access hole, guiding it into the retainer on the inner door.

(2) Secure the rod to the latch with nuts.

(3) Replace the insulation.

(4) Replace the access panel to the door.

4-13. Rear Door Key Locking Handle.

a. Removal.

(1) Remove the phillips head screw from the handle.

(2) Remove the inside handle.

(3) Remove the handle from the door.

b. Installation.

(1) Install the inside handle.

(2) Install the outside handle assembly.

(3) Secure the phillips head screws.

4-14. Weatherseal.

The weatherseal is cemented to the outer edge of the complete door assembly. Remove it by peeling it away from the door. Clean the door surface. During installation, peel the paper away from the weatherseal and apply the cemented side to the door. Do not stretch during application.

4-15. Door (Sliding).

a. Removal.

(1) Remove the lower guide and track.

(2) Remove the nuts and bolts from the upper guide only.

(3) Remove the door out of the upper guide to the floor.

(4) Remove the door from the opening.

b. Installation.

(1) Place the door into the opening.

(2) Raise the door into the upper guide assembly.

(3) Install the lower door guide and track.

(4) Lower the door onto the lower track and secure the nuts and bolts to the upper guide.

(5) Adjust the door in the opening and secure all nuts, bolts, rivets, and screws.

4-16. Inside Handle (Sliding Door).

a. Removal.

(1) Remove the screws holding the handle to the door latch assembly.

(2) Remove the handle and shaft out of the latch.

b. Installation.

(1) Insert the shaft and handle assembly into the door latch assembly with the large end of the handle pointing up.

(2) Secure the handle to the latch with screws.

4-17. Outer Two-Way Latch.

a. Removal.

(1) Replace the nuts, bolts, and washers from the cab side of the latch.

(2) Remove the latch from the door assembly.

b. Installation.

(1) Place the latch into position on the door and shaft.

(2) Secure the nuts, bolts, and washers.

4-18. Upper Door Roller Guide and Track.

a. The upper door roller guide is secured to the door with nuts and bolts. The upper track is also mounted with nuts and bolts to the upper door opening.

b. To remove the guide, take the nuts and bolts out of the track and pull it out of the opening into the cab interior toward the stowage compartment. To get enough room to remove the guide, open the stowage door and move the track into the opening to get clearance from the door opening on the right side. Remove the nuts and bolts from the guide and slide it off the door into the cab compartment.

c. When installing the guide and track, place the guide on the door and secure the nuts and bolts. Slide the track on to the rollers and fit it into the door opening. Secure the nuts and bolts. The guide has slotted mounting holes so adjustment can be made for proper door operation.

4-19. Door Holdback.

The holdback is a riveted assembly that is mounted on the outer door sheet metal. The securing bracket is riveted to the side of the ambulance. To replace these items, drill out the rivets, and rivet the new piece in place.

4-19.1 Supplementary Door Hold-Open Kit

a. A supplementary rear door hold open kit has been designed by the Ambulance body manufacturer to augment the current vehicle hold open device. The kit is installed for both right and left doors and is located under present keepers.

b. Installation.

(1) Locate the hook and bracket (1) on the bottom side of the present plunger bracket (2). (See figure 4.1.1).

(2) Use clamp to hold hook and bracket (1) to present plunger bracket (2).

(3) Using a ¼ inch drill, drill through the existing holes (3) in the hook and bracket (1) and through the present plunger bracket (2).

(4) Attach the hook and bracket (1) to the present plunger bracket (2) with bolts (4) lockwashers (5), and nuts (6). Tighten nuts (6) securely.

(5) Locate keeper (6) under present keeper (7) on truck panel (8) (See figure 4.1.1).

(6) Make sure keeper (6) will engage with hook and bracket (1) when door (9) is opened.

(7) Using the keeper (6) for a template, drill 4 No. 10 holes in truck panel (8).

(8) Attach keeper (6) to truck panel (8) with rivets (10).

(9) To install the hook and bracket (1) and keeper (6) on opposite door, repeat steps *(1)* through *(8)*.

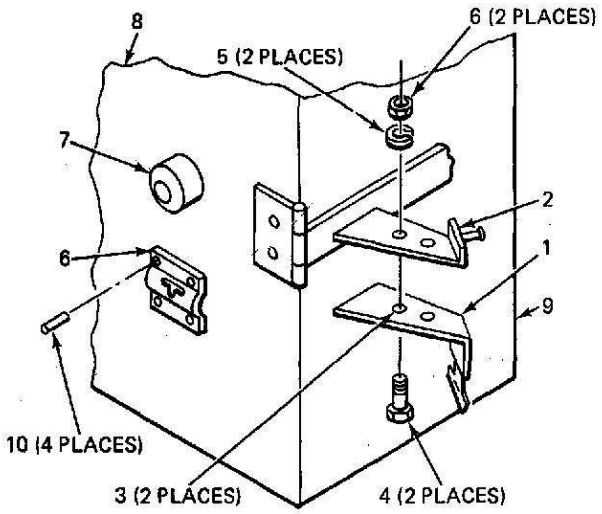

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Figure 4-1.1. Installation of Supplementary Door Hold Open Kit For M866/M893 Ambulance 1 1/4 Ton Truck.

4-20. Rubber Fenders.

The rubber fenders are riveted to the side frame over the wheel openings. To remove them, drill out the rivets. To install, rivet them in place.

Section II. CAB INTERIOR

4-21. Instrument Panel.

Refer to figure 4-2.

a. Blackout Switch and Power Vent Switch.

(1) Removal.

(a) Unscrew the nut holding the switch to the panel sheet metal.

(b) Lower the switch from the rear of the panel.

(c) Disconnect the wiring.

(2) Installation.

(a) Connect the wiring to the switch.

(b) Position the switch up into the sheet metal panel.

(c) Secure the switch to the panel with a nut.

b. Open-Door Warning Light.

(1) Removal.

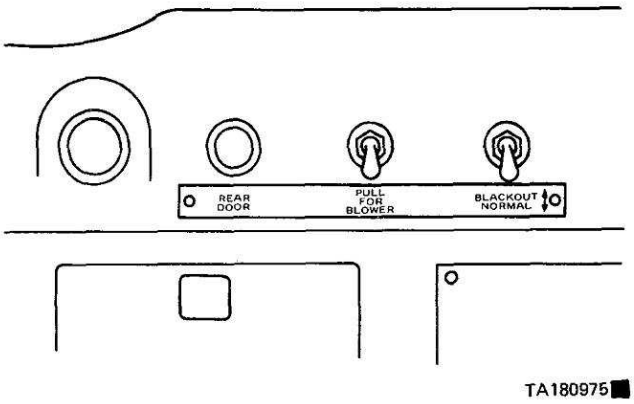

Figure 4-2. Ambulance Dashboard.

(a) Unscrew the lens from the socket on the front of the sheet metal panel.

(b) Remove the bulb from the socket.

(c) Remove the socket by lowering it down through the rear of the panel.

(d) Disconnect all electrical leads.

(2) Installation.

(a) Connect all electrical leads.

(b) Install the socket to the panel.

(c) Install the bulb in the socket.

(d) Screw the lens into the socket on the front of the panel.

4-22. Dome Light.

a. Removal.

(1) Pop the plastic lens out of the housing by pressing the edge in and releasing the plastic tabs.

(2) Remove the bulb from the inner housing socket.

(3) Remove the screws mounting the housing to the roof.

(4) Lower the housing from the roof and disconnect all electrical leads.

b. Installation.

(1) Connect all electrical leads.

(2) Place the housing into position on the roof and secure it with screws.

(3) Put a bulb into the socket.

(4) Place the plastic lens back in the housing.

4-23. Fire Extinguisher.

a. The fire extinguisher is mounted in a holding bracket behind the attendant seat. It is removed by releasing the clamp retainer.

b. The bracket and retainer are riveted to the floor of the cab. To replace the bracket, drill out the rivets and install the new bracket with rivets.

4-24. Overhead Stowage Compartment Door.

a. Removal. Drill out the lower set of rivets and remove the door.

b. Installation. Position the door on the hinge assembly and rivet in place.

Section III. LITTER COMPARTMENT

4-25. Back Rest.

The back rest runs the length of the side frames on the interior. The back rest is held in position by brackets riveted along the top, and snaps along the bottom. To remove the back rests, unsnap bottoms and slip the rests up and off of the brackets.

4-26. Blackout Light.

The blackout light lens is screwed into the roof panel toward the front of the litter compartment. To remove the service light and lens, remove the screws.

4-27. Surgical Light.

The fixture is mounted to the roof of the litter compartment with rivets. Remove screws to service the lens or lighting tubes. See the electrical diagram for wiring service.

4-28. Light Switch.

The light switch is mounted over the sliding door.

a. Removal.

(1) Remove the nut from the switch.

(2) Remove the screws from the small support plate.

(3) Disconnect all electrical wiring.

(4) Remove the switch.

b. Installation.

(1) Connect all wiring.

(2) Install the switch to the small support plate.

(3) Install the screws.

(4) Install the nut to the switch.

4-29. Side Inner Switch.

a. Removal.

(1) Remove the nut securing the switch to the inner rear frame.

(2) Remove the two screws to the switch support brackets.

(3) Slide the bracket out from the inner rear frame.

(4) Pull the switch out enough to reveal the wiring and disconnect it.

b. Installation.

(1) Connect the wiring to the switch.

(2) Insert the switch and plate into position on the rear frame.

(3) Install the nut on to the switch.

(4) Secure the support plate to the inner frame with screws.

4-30. Power Ventilator.

The ventilator is screwed to the roof panel. Remove the grille to service the motor mounted inside the vent assembly. See the electrical wiring diagram for servicing electrical wiring to the motor.

4-31. Static Vents.

The static vents are located on the left and right rear of the litter compartment, and are mounted to the roof with screws. To remove the vent grille and screen, remove all screws.

4-32. Lower Litter Rack and Stowage Compartment.

a. Removal.

(1) Remove the moulding running along the floor.

(2) Remove the screws securing the frame of the stowage rack along inside on floor and side frames.

(3) Remove heater/ventilator grille and controls on left side only.

(4) Slide assembly out of patient compartment through rear.

b. Installation.

(1) Place the assembly into the littter compartment.

(2) Secure it with screws.

(3) Install heater/ventilator grille and controls to stowage frame.

(4) Seal edges along side frames.

4-33. Sliding Stowage Doors.

a. Removal.

(1) To remove the sliding doors from the litter compartment, remove the vertical stowage track first.

(2) Slide the doors out of the horizontal tracks and out of the compartment, on the right side only.

(3) Remove the heater/ventilator grille on the stowage frame mounted on the left side.

(4) Slide the doors out of the stowage frame horizontal tracks and out of the compartment.

b. Installation.

(1) On the left side, install the sliding door into the horizontal tracks and slide the door into the heater/ventilator area.

(2) Install the heater/ventilator grille assembly.

(3) On the right side, insert the sliding doors into horizontal tracks.

4-34. Front Wall Supports.

The wall supports are mounted to the wall with self-tapping screws. Remove the screws to remove the supports. Install the screws to secure the supports to the wall.

4-35. Pivot Wall Brackets.

The pivot wall brackets are mounted with self-tapping screws to the left and right side frames. The brackets pivot to the wall when not in use and pivot into an open locked position for upper litter assembly mounting. To remove the brackets, remove the screws. To install the brackets, screw them into the side frames.

4-36. Upper Hanger Brackets.

a. Hanger arm brackets are used to hold the upper litter racks in position. When not in use they stow into a channel in the roof section, by pivoting up into the channel.

b. The hanger bracket assembly can be removed by removing bolts from the channel and lowering the assembly out of the roof channel. To install the assembly, place it into the channel and secure it with bolts.

4-37. Striker Plates (Rear Door).

a. There are four striker plates on the rear frame assembly: two for the left door, and two for the right door. The upper plates are screwed into position, and the lower plates are riveted into position.

b. Remove the screws and nuts on the upper plates. To replace the upper plates, install the screws and nuts.

4-38. Door Switch and Striker (Sliding Door).

a. The door-open switch and striker is screwed to the door (striker) and door jam (switch).

b. To service the striker, remove the screws and striker from the door. The striker is replaced by screwing it back into the door.

c. The switch mounted in the door jam is secured with screws; remove the screws and remove the switch and plate enough to disconnect all electrical wiring. To replace the switch, connect the wiring, place it into position in the door jam, and secure it with screws.

4-39. Door-Open Sensor Switch.

a. Removal.

(1) Remove the upper rear interior plate by removing the screws.

(2) Lower the switch out of the opening in the frame.

(3) Disconnect all wiring.

b. Installation.

(1) Connect all wiring.

(2) Install the switch into the frame opening.

(3) Install the interior plate to the rear frame opening with screws.

4-40. Rear Step and Seat Assembly.

The padded seat is removed by removing screws on the step side of the unit. The step and seat unit can be removed from the vehicle by removing the bolts from the hinge located on the lower frame assembly. To replace the pad, install the screws through the step into the cushion back. To replace step and seat unit, install bolts into the hinge and torque them into the lower frame assembly.

4-41. Blackout Curtains.

To remove the blackout curtains, drill out the rivets. To install, hold the curtain in place and rivet it.

4-42. Intravenous Bottle Holders (IV Holders).

The holders are riveted in position. To remove, drill out the rivet. To install, hold in position and rivet.

4-43. Outlet (12V).

a. Removal.

(1) Drill out the rivets.

(2) Disconnect the electrical wires.

(3) Remove the outlet from the wall.

b. Installation.

(1) Connect the electrical wires.

(2) Position the outlet in the wall and rivet it.

4-44. Resilient Bumpers.

To replace the bumpers, drill out the rivets and rivet the new bumper in place.

4-45. Sliding Door Stowage Retaining Clips.

To replace the clip, drill out the rivets, and rivet the new clip in place.

4-46. Plastic Skid Strips.

To replace the plastic skid strips, drill out the rivets, and rivet new strips in place.

Section IV. LITTER COMPARTMENT HEATER

4-47. Heater/Ventilator.

a. Removal.

(1) A shut off valve is located under left rear floor of underbody just above the rear spring hanger. Turn the valve off.

(2) Remove the access plate on the top of the stowage compartment.

(3) Remove the screws securing the heater to the floor.

(4) Disconnect all electrical wiring and plumbing from the heater.

(5) Remove side vent and grille assembly from stowage frame.

(6) Remove the heater/ventilator assembly up through the access hole in the stowage frame.

b. Installation.

(1) Position the heater/ventilator into the stowage frame.

(2) Secure the assembly to the floor.

(3) Secure the heater and side vent to the frame assembly.

(4) Connect all electrical wiring and plumbing to the unit.

(5) Replace the access plate.

(6) Turn on the valve to the unit, located under the vehicle.

4-48. Air Intake Vent.

To remove the air intake vent, drill out the rivets, and rivet a new grille in place.

Section V. ELECTRICAL TROUBLESHOOTING: AMBULANCE

4-49. General Information.

The harness, also called a loom, is routed up the front wall behind the driver and into the litter compartment. The loom runs along the left upper corner of the litter compartment.

4-50. Troubleshooting Procedures.

When troubleshooting the ambulance electrical wiring, refer to figure 4-3. Use the general electrical troubleshooting procedures described in chapter 2, section VIII. To replace faulty wires, gain access to the harness by removing the upper left trim cover inside the litter compartment.

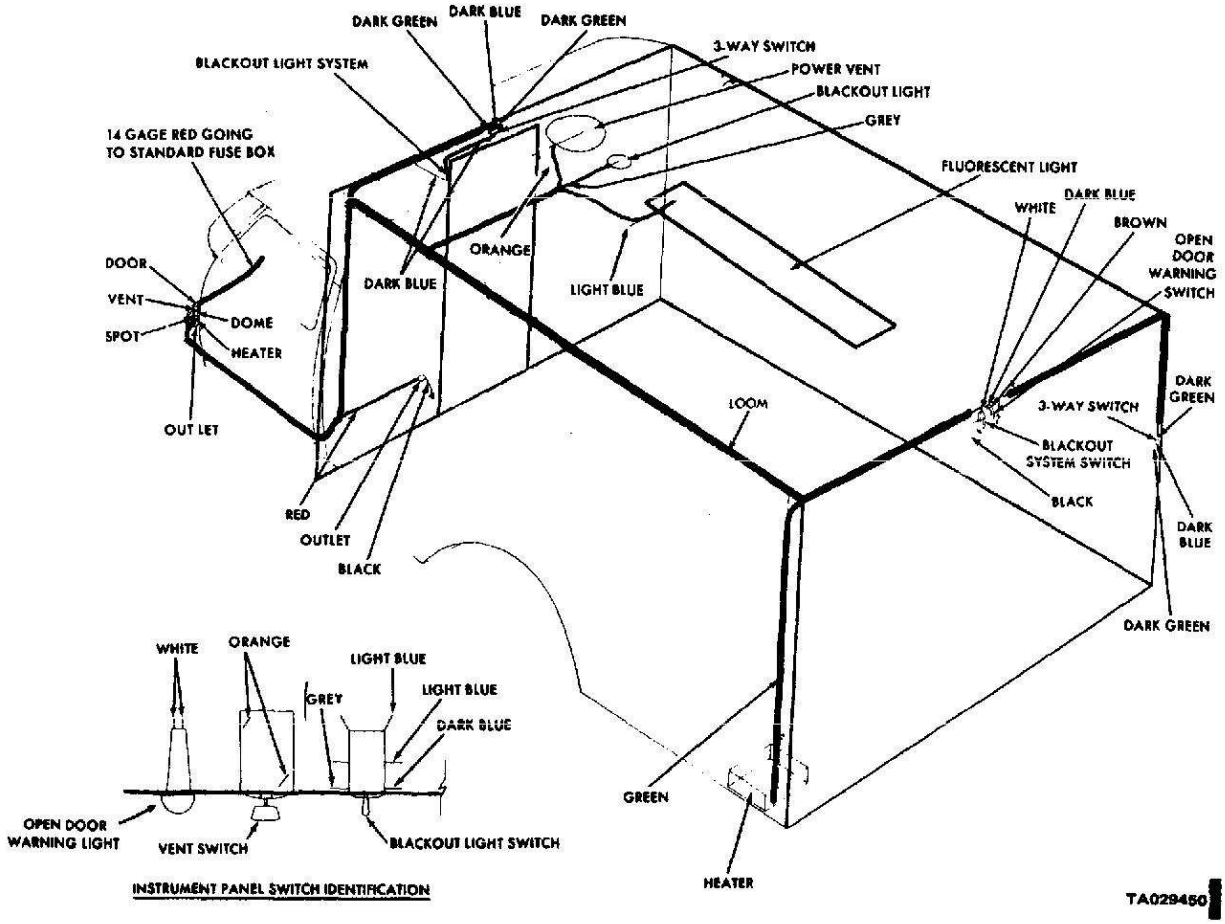

Figure 4-3. Ambulance Wiring Diagram.

CHAPTER 5

M888 TELEPHONE MAINTENANCE TRUCK

5-1. General Information.

The M888 is an M880 series vehicle with a telephone maintenance body in place of the cargo box (figure 5-1).

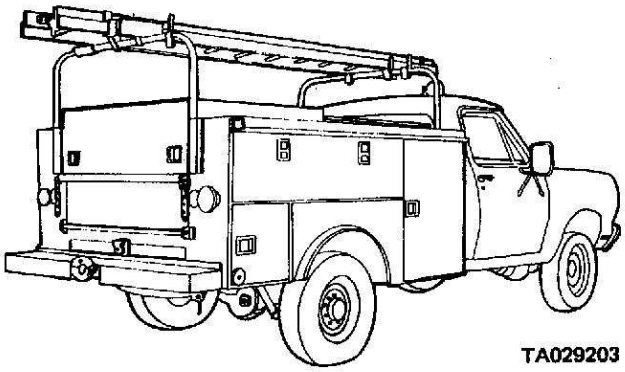

Figure 5-1. M888 Telephone Maintenance Truck.

5-2. Storage Compartment Doors.

a. Chain Replacement.

(1) Open the compartment door.

(2) Remove the chain.

(3) Install a new chain, and bend the end links closed.

b. Door Replacement.

(1) Open door and disconnect chain from door.

NOTE

The front and lower rear storage compartment doors are not equipped with chains.

(2) On front compartment doors, remove the screws, nuts, and washers from the top hinge bracket. On all others, drill out rivets on one of the hinge brackets.

(3) Install a new door.

(4) Position the hinge bracket and secure with screws, nuts, and washers, or pop rivets.

(5) Connect chain to door.

(6) Close door.

5-3. Front and Rear Bows.

a. Removal.

(1) Remove ladder..

(2) With storage compartment door open, remove the screws, nuts, and washers while an assistant holds the bow in position.

(3) Remove bow.

(4) Remove brackets from bow (see *c*, below).

b. Installation.

(1) Position bow.

(2) Install screws, nuts, and washers.

(3) Install brackets (see *c*, below).

(4) Install ladder.

c. Bracket Replacement.

(1) Remove nuts, washers, and screw or U-bolt.

(2) Remove bracket.

(3) Position replacement bracket.

(4) Install screw or U-bolt, and nuts and washers.

5-4. Upper Section of Tailgate.

a. Removal.

(1) Using a drift, knock hinge pin out until you can pull it out with a pliers.

(2) Open latches and remove upper section of tailgate.

b. Installation.

(1) Position upper section of tailgate.

(2) Install hinge pin.

5-5. Rear Bumper.

a. Removal.

(1) Remove pintle hook (paragraph 2-107).

(2) Remove screws, nuts, and washers from electrical receptacle.

(3) Remove screws, nuts, and washers from bumper bracket and remove bumper.

b. Installation.

(1) Position bumper and install attaching screws, nuts, and washers.

(2) Position electrical receptacle and install attaching screws, nuts, and washers.

(3) Install pintle hook (paragraph 2-107).

5-6. Spotlight.

The spotlight wire is held secure by a clip mounted on the mirror base and a clip mounted on the right sun visor base. The wire is connected to the fuse box at the battery accessory fuse. To replace the spotlight, see paragraph 4-2.

5-7. Taillight.

a. Bulb Replacement.

(1) Remove screws from lens.

(2) Remove lens.

(3) Replace bulb.

(4) Position lens.

(5) Install screws.

b. Taillight Assembly Replacement.

(1) Open storage compartment and remove rear shelf divider.

NOTE

On left side, the divider is secured with a screw.

(2) Disconnect wires.

(3) Remove nuts and washers.

(4) Replace taillight assembly.

(5) Install nuts and washers.

(6) Connect wires.

(7) Install shelf divider and close storage compartment.

5-8. Backup Light.

a. Bulb Replacement.

(1) Remove screws from lens.

(2) Remove lens.

(3) Replace bulb.

(4) Position lens.

(5) Install screws.

b. Backup Light Assembly Replacement.

(1) Open storage compartment and remove rear shelf divider.

NOTE

On left side, the divider is secured with a screw.

(2) Disconnect wires.

(3) Remove nuts and washers.

(4) Replace backup light assembly.

(5) Install nuts and washers.

(6) Connect wires.

(7) Install shelf divider and close storage compartment.

5-9. Clearance Light Replacement.

a. Open storage compartment and disconnect wire.

b. Drill out rivets.

c. Replace light assembly and secure with pop rivets.

d. Connect wire.

5-10. Reflector Replacement.

a. Remove screw.

b. Replace reflector.

c. Install screw.

APPENDIX A

REFERENCES

A-1. Publication Indexes and General References.

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

a. Military Publication Indexes.

Index of Administrative Publications	DA Pam 310-1
Index of Blank Forms	DA Pam 310-2
Index of Doctrinal, Training, and Organizational Publications	DA Pam 310-3
Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9) Supply Bulletins, and Lubrication Orders	DA Pam 310-4

b. General References.

Dictionary of United States Army Terms	AR 310-5
Authorized Abbreviations and Brevity Codes	AR 310-50
Military Training	FM 21-5
Techniques of Military Instruction	FM 21-6
Military Symbols	FM 21-30

A-2. Other Publications.

The following publications contain information pertinent to the major item materiel and associated equipment.

a. Vehicle.

Lubrication Order, Truck, Cargo, 1-1/4 Ton, 4X4, M880; Truck, Cargo, 1-1/4 Ton, 4X2, M890; Truck, Ambulance 1-1/4 Ton, 4X4, M886; Truck, Ambulance, 1-1/4 Ton 4X2, M893	LO 9-2320-266-12
Operator's Manual	TM 9-2320-266-10
Organizational Maintenance Repair Parts and Special Tools List	TM 9-2320-266-20P
Warranty	TB 9-2300-295-15/14

b. Camouflage

Camouflage	FM 5-20

c. Decontamination.

Chemical, Biological, and Radiological (CBR) Decontamination	TM 3-220
Chemical, Biological, Radiological, and Nuclear Defense	FM 21-40

d. General.

Accident Reporting and Records	AR 385-40
Basic Cold Weather Manual	FM 31-70
Cooling Systems: Tactical Vehicles	TM 750-254
Manual for Wheeled Vehicle Driver	FM 21-305
Driver Selection and Training (Wheeled Vehicles)	TM 21-300
Mountain Operations	FM 90-6
Northern Operations	FM 31-71
Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to -65°F)	FM 9-207

Principles of Automotive Vehicles	TM 9-8000
Prevention of Motor Vehicle Accidents	AR 385-55
Procedures for Destruction of Equipment to Prevent Enemy Use	TM 750-244-6
Organizational Maintenance Spark Plugs used on Ordnance Materiel	TM 9-8638

e. Maintenance and Repair.

Organizational, Direct Support, and General Support, Care, Maintenance, and Repair of Pneumatic Tires and Inner Tubes	TM 9-2610-200-24
Cleaning of Ordnance Materiel	TM 9-208-1
Description, Use, Bonding Techniques, and Properties of Adhesives	TB ORD 1032
Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Tank-Automotive Gasoline Engines : Lubrication Before Use	TB ORD 392
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materiels Including Chemicals	TM 9-247
Metal Body Repair and Related Operations	FM 43-2
Operation and Organizational, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries	TM 9-6140-200-14
Organization, Policies, and Responsibilities for Maintenance Operation	AR 750-5
Painting Instructions for Field Use	TM 9-213
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling System	TB 750-651
Welding Theory and Application	TM 9-237
Rustproofing Procedures for Truck Utility	TB 43-0213

f. Shipment and Limited Storage.

Administrative Storage of Equipment	TM 740-90-1
Color and Marking of Army Materiel	AR 746-5
Preservation, Packaging and Packing Materials, Supplies, and Equipment Used by the Army	SB 38-100
The Army Maintenance Management Systems (TAMMS)	DA Pam 738-750

APPENDIX B
MAINTENANCE ALLOCATION CHART
for
M880 SERIES TRUCKS

Section I. INTRODUCTION

B-1. General.

The Maintenance Allocation Chart determines at what maintenance echelon a given procedure may be performed.

B-2. Maintenance Functions.

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition. This includes cleaning (decontamination), preserving, draining, painting, and replenishing fuel, lubricants, hydraulic fluids, or compressed air supplies.

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

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

f. Calibrate. To correct or adjust instruments, or test measuring and diagnostic equipment used in precision measurement. This is done by comparing a test instrument with an instrument of certified accuracy.

g. Install. The act of positioning or seating an item, part, or module (component or assembly) in a manner to allow the equipment or system to function properly.

h. Replace. The act of substituting a serviceable part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services[1] or actions[2] to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

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

B-3. Column Entries.

Column entries used in the maintenance allocation chart are explained below:

a. Column 1, Group Number. Column 1 lists group numbers which identify components, assemblies, subassemblies, and modules with the next higher assembly.

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

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of man-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This figure includes time for preparation, troubleshooting, and quality assurance/quality control, in addition to the time required to perform the specific tasks identified for the functions authorized in the chart.

[1] Services—Inspect, test, service, adjust, aline, calibrate, or replace.
[2] Actions—Welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

Section II. MAINTENANCE ALLOCATION CHART

Table B-1. Maintenance Allocation Chart

C - Crew/Operator O - Organizational F - Direct Support H - General Support D - Depot

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category					(5) Tools and equipment
			C	O	F	H	D	
01	ENGINE							
0100	Engine	Inspect		0.4				
		Test		1.5				
		Service		1.0				
		Adjust		3.7				
		Replace			6.0			
		Repair				A		
	Mount, engine	Inspect		0.3				
		Replace			1.5			
0101	Cylinder block	Inspect			6.3			
		Replace				6.3		
		Repair				A		
	Plug, expansion	Inspect		0.1				
		Replace			0.6			
	Cylinder head	Inspect			4.2			
		Replace			3.9			
		Repair			5.7			
0102	Crankshaft	Inspect			2.9			
		Replace				11.4		
	Seals, main	Inspect			0.2			
		Replace			6.0			
	Pulley	Inspect		0.2				
		Replace		1.0				
	Balancer, crankshaft (harmonic balancer)	Inspect			0.2			
		Replace			1.4			
	Bearing, crankshaft	Inspect				4.5		
		Replace				4.5		
0104	Piston and pins	Inspect				12.0		
		Replace				13.3		
	Rings	Inspect				12.0		
		Replace				12.0		
	Rod, connecting	Inspect				12.0		
		Replace				13.3		
	Bearing, connecting	Inspect				6.2		
		Replace				6.2		
0105	Camshaft	Inspect				7.2		
		Replace				7.2		
	Cover, cylinder head (valve cover)	Inspect		0.2				
		Replace		1.1				

A—In this category, no specific times can be established.

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
01	ENGINE–Continued							
	Arm, rocker	Inspect			1.4			
		Replace			2.0			
	Valves, intake and exhaust	Inspect			5.6			
		Replace			10.3			
		Repair			10.3			
	Cover, timing	Inspect			0.2			
		Replace			3.7			
	Sprockets, timing	Inspect			3.7			
		Replace			4.0			
0105	Chain, timing	Inspect			3.7			
		Replace			4.0			
0106	Pump, oil	Inspect			2.3			
		Replace			2.3			
	Pan, oil	Inspect		0.2				
		Replace			2.1			
	Cap, filler	Inspect	0.1					
		Replace		0.1				
	Dipstick	Inspect		0.1				
		Replace		0.1				
0108	Manifold							
	Intake	Inspect		0.2				
		Replace			2.1			
	Exhaust	Inspect		0.2				
		Replace		1.0				
		Repair				2.0		
03	FUEL SYSTEM							
0301	Carburetor	Inspect		0.2				
		Adjust		0.3				
		Replace		0.8				
		Repair			2.2			
0302	Pump, fuel	Inspect		0.2				
		Test		0.4				
		Replace		0.7				
	Lines and fittings	Inspect		0.2				
		Replace		0.4				
0304	Air cleaner	Inspect		0.1				
		Service		0.2				
		Replace		0.2				
0306	Fuel tank	Inspect		0.2				
		Replace		2.5				
0312	Accelerator, throttle, and linkage	Inspect		0.2				
		Service		0.2				
		Adjust			1.0			
		Replace		0.8				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
03	FUEL SYSTEM—Continued							
0313	Emission control							
	Valve, PCV	Inspect		0.1				
		Replace		0.1				
	Breather, oil	Inspect		0.1				
		Service		0.2				
		Replace		0.1				
	Hoses	Inspect		0.1				
		Replace		0.2				
04	EXHAUST SYSTEM							
0401	Muffler, pipes, and brackets	Inspect		0.2				
		Replace		2.7				
		Repair		1.0				
05	COOLING SYSTEM							
0501	Radiator	Inspect		0.1				
		Test			0.6			
		Service		0.2				
		Replace		1.1				
		Repair			2.6			
	Tank, reservoir	Inspect		0.1				
		Replace		0.3				
	Cap, radiator	Inspect		0.1				
		Replace		0.1				
0502	Shroud	Inspect		0.1				
		Replace		1.1				
0503	Thermostat	Inspect		0.8				
		Test		0.7				
		Replace		0.8				
	Housing	Inspect		0.1				
		Replace		0.8				
	Hoses and clamps	Inspect		0.1				
		Replace		0.6				
		Repair		0.1				
0504	Pump, water	Inspect		0.1				
		Replace		1.4				
	Pulley, water pump	Inspect		0.1				
		Replace		0.8				
0505	Fan, cooling	Inspect		0.1				
		Replace		0.8				
06	ELECTRICAL SYSTEM							
0601	Alternator	Inspect		0.1				
		Test		0.6				
		Replace		0.9				
		Repair			1.9			
	Bracket, mounting	Inspect		0.1				
		Replace		0.6				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
06	ELECTRICAL SYSTEM–Continued							
0601	Pulley	Inspect		.1				
		Replace			1.9			
	Belt	Inspect		.1				
		Adjust		.3				
		Replace		.5				
0602	Regulator	Inspect		.1				
		Test		.6				
		Replace		.7				
0603	Starter & Starter Relay	Inspect		.1				
		Test		.3				
		Replace		1.3				
		Repair			2.8			
	Cable	Inspect		.1				
		Test		.6				
		Replace		.7				
0605	Distributor	Inspect		.2				
		Test		.6				
		Service		1.0				
		Adjust		1.0				
		Replace		.8				
		Repair			1.9			
	Coil, ignition	Inspect		.1				
		Test		.5				
		Replace		.6				
	Spark plugs	Inspect		1.0				
		Adjust		1.0				
		Replace		1.0				
	Spark plug cable	Inspect		.2				
		Test		.6				
		Replace		1.0				
0607	Gages	Inspect	.1					
		Test		.6				
		Replace		1.2				
	Lights, indicator	Inspect	.1					
		Replace		.2				
	Lamps, dashboard	Inspect	.1					
		Replace		.2				
	Switch, light	Inspect	.1					
		Test		.7				
		Replace		.7				
	Switch, ignition	Inspect	.1					
		Test		.3				
		Replace		1.6				
	Switch, stop-light	Inspect	.1					
		Test		.2				
		Replace		.5				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
06	ELECTRICAL SYSTEM–Continued							
0607	Directional signal switch	Inspect	.1					
		Test		.6				
		Replace		1.3				
	Switch, dimmer	Inspect	.1					
		Test		.3				
		Replace		.6				
0609	Lights, head	Inspect	.1					
		Adjust		.5				
		Aline		.5				
		Replace		.3				
	Lights, tail and park/ T-signal	Inspect	.1					
		Replace		.2				
	Lights, surgical	Inspect	.1					
		Replace		.6				
		Repair		.6				
	Light, dome	Inspect	.1					
		Replace		.4				
		Repair		.4				
	Lamps	Inspect	.1					
		Replace		.2				
0610	Sending units	Test		.6				
		Replace		.7				
	Neutral start and Back-up light switch	Test			.1			
		Replace			.1			
0611	Horn	Inspect	.1					
		Test		.1				
		Replace		.3				
	Switch, horn	Test		.1				
		Replace		.3				
0612	Battery	Inspect	.1					
		Test		.3				
		Service		.3				
		Replace		.6				
0613	Coupling, trailer	Inspect	.1					
		Test		.2				
		Replace		.9				
		Repair			1.0			
	Wiring, electrical	Inspect		A				
		Test		A				
		Repair		A				
	Harness, wiring	Replace			A			

A—In this category, no specific times can be established.

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
07	TRANSMISSION							
0705	Shift linkage	Inspect			0.2			
		Adjust			0.6			
		Replace			1.2			
0708	Inspection plate	Inspect		0.1				
		Replace			0.3			
	Torque converter	Inspect			5.8			
		Test			0.5			
		Replace			5.8			
		Repair			6.8			
	Seal, front pump	Inspect			5.8			
		Replace				6.3		
	Plate, adapter (flex plate)	Inspect			5.8			
		Replace			6.3			
	Gear, ring (torque converter)	Inspect			5.8			
		Replace				7.0		
	Plate, converter drive	Inspect			5.8			
		Replace			6.3			
	Housing, extension (4X2)	Inspect			0.2			
		Replace			1.8			
		Repair				1.8		
	Drive gear, speedometer	Inspect			1.8			
		Replace			2.0			
	Seal, output shaft	Inspect			0.2			
		Replace			0.8			
0710	Transmission assembly	Inspect		0.2				
		Test			0.9			
		Service			1.8			
		Replace			5.8			
		Repair				13.0		
0714	Band, front and rear	Inspect			1.8			
		Test			0.5			
		Adjust			1.8			
		Replace				2.2		
		Repair				2.2		
08	TRANSFER AND DRIVE ASSEMBLIES							
0801	Transfer assembly	Inspect		0.2				
		Replace			2.3			
		Repair				8.3		
	Seal, oil, input shaft bearing	Inspect			0.6			
		Replace			1.1			
	Bearings, input shaft	Inspect			1.1			
		Adjust			1.1			
		Replace				1.2		
	Drain, plug	Inspect		0.1				
		Replace		0.2				

Table B-1. Maintenance Allocation Chart–Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
08	TRANSFER AND DRIVE ASSEMBLIES–Continued							
	Seals, oil output shaft	Inspect			0.1			
		Replace			1.1			
	Seal, oil rear	Inspect			0.1			
		Replace			1.1			
0803	Shift levers and linkage	Inspect			0.2			
		Adjust			0.8			
		Replace			1.1			
		Repair			1.1			
09	PROPELLER SHAFT							
0900	Shaft, propeller	Inspect		0.2				
		Service		0.2				
		Replace		0.8				
	Joint, universal	Inspect		0.2				
		Service		0.2				
		Replace		1.6				
	Joint, constant velocity (CV)	Inspect		0.2				
		Service		0.2				
		Replace			1.6			
		Repair			2.0			
10	FRONT AXLE							
1000	Axle Assembly (4X4)	Test			1.2			
		Service		0.6				
		Aline			1.0			
		Replace			3.5			
		Repair				8.8		
	Shafts (4X4)	Inspect		2.2				
		Service		2.2				
		Adjust		2.2				
		Replace		2.2				
	Seal, inner	Inspect		0.1				
		Replace		2.2				
	Seal, oil, drive pinion (4X4)	Inspect			0.1			
		Replace			1.0			
	Plug, filler (4X4)	Inspect		0.1				
		Replace		0.1				
1004	Arm, steering	Inspect			0.1			
		Replace			1.4			
	Knuckle	Inspect			0.1			
		Replace			1.4			
	Spindle (4X2)	Inspect			1.0			
		Replace			2.3			
	Bearings and seals (4X2)	Inspect		1.6				
		Service		1.6				
		Adjust		1.6				
		Replace		2.4				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
11	REAR AXLE							
1100	Axle assembly, rear	Inspect		0.1				
		Test			1.2			
		Service		0.6				
		Replace			3.5			
		Repair				8.8		
	Shaft, rear axle	Inspect		1.0				
		Adjust		1.0				
		Replace		1.0				
	Plug, filler	Inspect		0.1				
		Replace		0.2				
	Cover	Inspect		0.1				
		Replace		1.0				
	Seals	Inspect			0.2			
		Replace			1.4			
	Drive gear and pinion	Inspect			1.0			
		Replace			3.5			
		Repair				0.8		
12	BRAKES							
1201	Parking brake, cables, and brackets	Inspect		0.1				
		Service		0.1				
		Adjust		0.3				
		Replace		2.8				
1202	Brake shoes	Inspect		1.0				
		Adjust		0.6				
		Replace		1.9				
	Brake pads	Inspect		1.8				
		Replace		1.8				
	Hose, front or rear	Inspect		0.1				
		Replace		0.9				
1204	Cylinder, master	Inspect		0.1				
		Service		0.1				
		Replace		1.0				
		Repair			1.5			
	Cylinder, wheel (rear)	Inspect		1.0				
		Replace		1.9				
		Repair			2.5			
	Caliper, wheel (front)	Inspect		0.2				
		Replace		1.0				
		Repair			2.0			
	Lines and fittings	Inspect		0.1				
		Replace		0.9				
1205	Power booster	Inspect		0.2				
		Test		x.x				
		Replace		1.1				
1206	Pedal, brake	Inspect	0.1					
		Replace		1.0				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
12	BRAKES–Continued							
1206	Drum brake, rear	Inspect		1.0				
		Replace		1.0				
		Repair			1.5			
	Rotor (disc) brake, front	Inspect		0.2				
		Replace		1.8				
		Repair			1.5			
13	WHEELS AND SUSPENSION							
1301	Suspension assy (4X2)							
	Control arms (upper and lower)	Inspect		0.2				
		Service		0.2				
		Replace			5.4			
		Repair			5.4			
	Bushings, control arm	Inspect		0.2				
		Replace			5.4			
	Ball joints	Inspect		0.2				
		Service		0.2				
		Replace			5.1			
	Sway-Bar	Inspect		0.1				
		Replace		1.0				
1311	Wheel	Inspect	0.1					
		Replace	0.5					
1313	Tire	Inspect	0.1					
		Service	0.1					
		Replace	0.5					
		Repair	0.6					
14	STEERING							
1401	Gear assembly steering	Inspect		0.1				
		Adjust			1.1			
		Replace			1.9			
		Repair				3.0		
	Arm, pitman	Inspect		0.1				
		Replace		0.8				
	Rod and bracket, idler arm	Inspect		0.1				
		Replace		0.6				
	Rod, arm connecting	Inspect		0.1				
		Replace		0.7				
	Tie rod assembly ends with tube	Inspect		0.1				
		Replace		1.0				
	Column	Inspect		0.1				
		Adjust			1.1			
		Replace			3.0			
		Repair			4.0			
	Wheel, steering	Inspect		0.1				
		Replace		0.5				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
15	FRAME, TOWING ATTACHMENT, AND DRAWBAR							
1501	Frame assembly	Inspect		0.2				
		Replace				20.0		
	Bumper, front	Inspect	0.1					
		Replace		0.4				
1503	Pintle	Inspect	0.1					
		Replace		0.4				
		Repair		0.5				
16	SPRINGS AND SHOCK ABSORBERS							
1601	Springs, front (4X2)	Inspect		0.1				
		Replace			5.2			
	Springs, front (4X4)	Inspect		0.1				
		Replace			2.8			
		Repair			3.0			
	Bushings	Inspect		0.1				
		Replace			2.8			
	Springs, rear	Inspect		0.1				
		Replace			3.8			
		Repair			4.0			
	Shackle assembly	Inspect		0.1				
		Replace			0.9			
1604	Shock absorbers, front and rear	Inspect		0.2				
		Test		0.2				
		Replace		1.7				
1605	Torque and stabilizer bars	Inspect		0.2				
		Replace		0.7				
18	BODY, CAB, HOOD, AND HULL							
1801	Body, cab	Inspect	0.2					
		Repair			A			
	Hold downs	Inspect		0.1				
		Replace		0.4				
	Doors	Inspect	0.1					
		Replace		0.5				
		Repair			A			
	Hood	Inspect	0.1					
		Aline		1.1				
		Replace		0.5				
		Repair			A			
	Grille	Inspect	0.1					
		Replace		0.5				
	Radior core support	Inspect		0.2				
		Replace			3.0			
1802	Fenders	Inspect	0.1					
		Replace			0.9			
		Repair			A			

A--In this category, no specific times can be established.

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
18	BODY, CAB, HOOD, AND HULL–Continued							
1802	Door glass	Inspect	0.1					
		Replace		1.1				
	Windshield	Inspect	0.1					
		Replace			1.0			
	Rear window	Inspect	0.1					
		Replace			1.0			
1806	Seats, belts, and visors	Inspect	0.1					
		Replace		0.4				
		Repair			A			
1808	Jack Stowage and Cargo Tiedown	Inspect	0.1					
		Replace		0.4				
1809	Brackets (seats)	Inspect	0.1					
		Replace		0.7				
		Repair			A			
1810	Cargo box	Inspect	0.1					
		Replace			2.0			
		Repair			A			
	Tailgate	Inspect	0.1					
		Replace		0.4				
		Repair			A			
	Racks and seats (ambulance)	Inspect	0.1					
		Replace		1.0				
		Repair			A			
1812	Ambulance and maintenance bodies	Inspect	0.2					
		Repair		A				
	Doors (rear ambulance body)	Inspect	0.1					
		Replace		0.5				
		Repair			A			
22	BODY CHASSIS AND HULL ACCESSORY ITEMS							
2201	Bows	Inspect	0.1					
		Replace		0.4				
	Cover, top	Inspect	0.1					
		Replace		0.4				
		Repair		A				
2202	Windshield wiper blades	Inspect	0.1					
		Replace		0.2				
	Motor, wiper	Inspect		0.1				
		Replace		1.0				
	Mirror assembly	Inspect	0.1					
		Replace		0.4				
2207	Heater, ambulance	Inspect		0.1				
		Replace		1.0				
		Repair			A			
	Blower assembly, exhaust, AMB	Inspect		0.1				
		Replace		1.0				

A--In this category, no specific times can be established.

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
33	SPECIAL PURPOSE KITS							
3303	Winterization hoses and tubes, engine compartment	Inspect	0.1					
		Replace			1.0			
	Battery boxes, arctic	Inspect	0.1					
		Replace			4.0			
	Swingfire heater	Inspect	0.1					
		Service	0.1					
		Adjust	0.1					
		Replace		1.0				
		Repair			2.0			
	Cab heater motor and core, heavy-duty	Inspect		0.1				
		Repair			0.2			
		Replace			1.5			
	Personnel heater, cargo area	Inspect	0.1					
		Repair			4.5			
		Replace		1.0				
		Test			0.5			
	Control box, heater	Inspect	0.1					
		Repair			1.5			
		Replace		0.5				
	Fuel pump, heater	Inspect		0.3				
		Replace		0.4				
	Fuel filter, heater	Inspect		0.1				
		Service		0.2				
		Replace		0.4				
	Fuel lines, heater	Inspect	0.1					
		Replace		0.5				
	Electrical wiring	Inspect		0.2				
		Repair		0.5				
	Domelight	Inspect	0.1					
		Service	0.1					
		Repair		0.1				
		Replace		0.2				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
33	SPECIAL PURPOSE KITS-CONTINUED							
3303	Rest panel and door installation	Inspect	0.1					
		Replace		8.0				
		Repair		4.0				
	Storage container Swingfire heater	Inspect	0.1					
		Replace		0.2				
		Repair		0.2				
	Radiator grille cover	Inspect	0.1					
		Replace		0.2				
		Repair			0.5			
	Engine hood cover	Inspect	0.1					
		Replace		0.2				
		Repair			0.5			
	Cargo box bow installation	Inspect	0.1					
		Service		0.5				
		Replace			2.5			
		Repair			0.5			
	Cargo box cover and insulation	Inspect	0.1					
		Service		0.5				
		Replace			2.0			
		Repair			0.5			
	Cargo box floor	Inspect	0.1					
		Replace		8.0				
		Repair		0.3				
	Snow tires	Inspect	0.1					
		Service	0.1					
		Replace	0.5					
		Repair		0.6				
3307	Alternator, 24 volt kit	Inspect		0.1				
		Test		0.6				
		Replace		0.9				
	Voltage regulator, 24 volt kit	Inspect		0.1				
		Test		0.5				
		Replace		0.5				
	Blackout Lights	Inspect	0.1					
		Test		0.8				
		Install			4.0			
		Replace		0.5				

Table B-1. Maintenance Allocation Chart-Continued

(1) Group number	(2) Component/assembly	(3) Maintenance function	(4) Maintenance category C	O	F	H	D	(5) Tools and equipment
47	GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES							
4701	Speedometer	Inspect		0.1				
		Replace		1.2				
	Cable and housing	Inspect		0.2				
		Replace		0.9				
	Gear, cable	Inspect		0.2				
		Replace		0.3				

A–In this category, no specific times can be established.

INDEX

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