

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

**TRUCK, LIFT, FORK, GASOLINE, SOLID
RUBBER TIRED WHEELS, 4000 LBS CAPACITY
100 AND 180 INCH LIFT ARMY MODEL
MHE-231 ALLIS-CHALMERS MODELS
ACC40-24PS100 AND ACC40-24PS180
NSN 3930-00-590-7814 (100 IN.)
NSN 3930-00-556-4955 (180 IN.)**

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1976

WARNING

When servicing the battery, do not smoke or use a flame in the vicinity. Batteries generate hydrogen, a highly explosive gas.

Always correct or report any faulty conditions that may result in further damage to the truck or cause injury to personnel.

Check the operating area to be sure that it is clear of personnel and obstructions.

Do not shift the forward and reverse control lever while the truck is in motion.

Do not operate the truck with the load in a highly elevated position.

When operating the truck, the mast should be tilted backwards slightly to prevent the load from falling off.

Make sure that the forks are lowered to the ground when the truck is parked. Check parking brake for proper operation and engagement.

If the truck is parked on an incline, block at least two wheels to prevent the truck from moving in the event of a parking brake failure.

Report or correct any faulty conditions that may result in damage to the truck or cause injury to personnel if operation of the truck is continued.

Cleaning compound, solvent (Fed. Spec. P-D-680) is a potentially DANGEROUS chemical. Do not use near open flame.

TECHNICAL MANUAL

No. 103930-630-12

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DEPARTMENT OF THE ARMY
WASHINGTON, DC, 13 September 1976

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
TRUCK, LIFT, FORK, GED, SOLID RUBBER TIRED WHEELS,
4000 LBS CAPACITY, 100 AND 180 IN LIFT
ARMY MODEL MHE-231
ALLIS CHALMERS MODELS ACC40-24PS100 AND ACC40-24PS180
(NSN 3930-0-590-7814 (100 IN.))
(NSN 393000-556-4955 (180 IN.))

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Test) located in the back of the manual and mail the form direct to Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MSP, Warren, MI 48090. A reply will be furnished direct to you.

	Paragraphs	Pages
CHAPTER 1. INTRODUCTION		
Section I. General	1-1	1-1
II. Description and Data	1-7	1-1
CHAPTER 2. OPERATING INSTRUCTIONS		
Section I. Operating Procedures	2-1	2-1
II. Operation under Unusual Conditions	2-10	2-8
CHAPTER 3. OPERATOR/CREWMAN MAINTENANCE INSTRUCTIONS		
Section I. Lubrication	3-1	3-1
II. Operator's preventive Maintenance	3-3	3-1
III. Operator's Troubleshooting	3-5	3-2
IV. Operator's Maintenance of Truck	3-7	3-5
CHAPTER 4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section I. Service Upon Receipt of Material	4-1	4-1
II. Movement to a New Work Site	4-3	4-4
III. Repair Parts, Special Tools and Equipment	4-5	4-4
IV. Lubrication Instructions	4-8	4-4
V. Organizational Preventive Maintenance checks and Service	4-15	4-5
VI. Organizational Maintenance Troubleshooting	4-17	4-7
VII. Radio Interference Suppression	4-19	4-10
VIII. Overhead Guard	4-22	4-10
IX. Panels, Cows and Plates	4-24	4-11
X. Seat assembly	4-29	4-14
XI. Instrument Panel	4-31	4-15
XII. Hydraulic Lift Components	4-33	4-18
XIII. Electrical System	4-45	4-38
XIV. Fuel System	4-56	4-53
XV. Cooling System	4-66	4-61
XVI. Exhaust System	4-71	4-65
XVII. Steering System	4-73	4-66
XVIII. Engine	4-79	4-70
Section XIX. Wheels	4-84	4-76
XX. Brakes	4-86	4-78
XXI. Drive Axle	4-93	4-87
XXII. Transmission	4-97	4-89
APPENDIX A. REFERENCES		A-1
B. MAINTENANCE ALLOCATION CHART		B-1
C. BASIC ISSUE ITEMS LIST, TROOP INSTALLED OR AUTHORIZED LIST		C-1
INDEX		I-1

LIST OF ILLUSTRATIONS

<i>Figure number</i>	<i>Title</i>	<i>Page</i>
1-1	Fork lift truck with shipping dimensions, right side view	1-2
1-2	Fork lift truck, left side view.	1-3
1-3	Wiring diagram	1-4
2-1	Controls and instruments (Sheet 1 of 2)	2-2
2-1	Controls and instruments (Sheet 2 of 2)	2-3
2-2	Seat adjustment	2-3
2-3	Engine starting instructions	2-4
2-4	Truck stopping instructions	2-5
2-5	Lifting operation	2-6
2-6	Lowering operation.	2-7
3-1	Air cleaner and indicator	3-5
3-2	Radiator filler cap.	3-6
3-3	Oil filler cap and level gage	3-7
3-4	Transmission filler cap and level gage.	3-8
3-5	Hydraulic filter element indicator.	3-9
3-6	Hydraulic reservoir.	3-10
4-1	Removing, installing or adjusting carriage fork	4-1
4-2	Overhead guard, removal and installation	4-11
4-3	Cowls and floor plates, exploded view.	4-12
4-4	Counterweight and side panels, exploded view.	4-13
4-5	Seat assembly, exploded view.	4-15
4-6	Instrument panel components, exploded view.	4-16
4-7	Instrument panel, exploded view.	4-17
4-8	Hydraulic system diagram	4-19
4-9	Lift chains and anchors, installed view.	4-20
4-10	Lift chains and carriage.	4-21
4-11	Backrest, removal and installation	4-22
4-12	Carriage, removal and installation.	4-23
4-13	Spanning mast channels	4-24
4-14	Setting outside spanning tool	4-24
4-15	Checking bearing alinement.	4-24
4-16	Tilt cylinder, removal and installation.	4-25
4-17	Tilt cylinder yoke, installed view.	4-26
4-18	Checking degrees of mast tilt.	4-27
4-19	Mast assembly (model ACC40-24PS180), exploded view.	4-28
4-20	Mast assembly (model A(XA0-24PS100), exploded view.	4-29
4-21	Mast mounting, exploded view.	4-31
4-22	Control valve levers, installed view.	4-32
4-23	Hydraulic filter element indicator, installed view.	4-33
4-24	Hydraulic filter, installed view.	4-34
4-25	Hydraulic reservoir breather and oil level gage.	4-35
4-26	Hydraulic reservoir drain plug.	4-36
4-27	Hydraulic reservoir, exploded view.	4-37
4-28	Battery, installed view.	4-38
4-29	Headlight, installed view.	4-39
4-30	Combination rear light, exploded view.	4-40
4-31	Brake master cylinder, installed view.	4-41
4-32	Horn and relay, installed view.	4-42
4-33	Oil pressure and hourmeter actuator sending units installed view.	4-43
4-34	Fan belt adjustment.	4-44
4-35	Alternator, installed view.	4-45
4-36	Alternator connections	4-46
4-37	Checking alternator output.	4-46
4-38	Starter, removal and installation	4-47
4-39	Distributor, installed view.	4-47
4-40	Adjusting distributor breaker point gap,	4-48
4-41	Spark plugs and coil, exploded view.	4-49
4-42	Distributor, exploded view.	4-50
4-43	Flywheel timing marks	4-51
4-44	Ignition coil test wiring	4-52
4-45	Fuel system, exploded view.	4-54
4-46	Air cleaner, exploded view.	4-55

<i>Figure Number</i>	<i>Title</i>	<i>Page</i>
4-47	Carburetor adjustment.	4-56
4-48	Governor adjustment.	4-57
4-49	Manifold, exploded view.	4-58
4-50	Accelerator linkage exploded view.	4-59
4-51	Engine coolant drain valve.	4-61
4-52	Water pump and fan, installed view.	4-62
4-53	Radiator and hose, removal and installation	4-63
4-54	Thermostat, removal and installation.	4-64
4-55	Exhaust system, exploded view .	4-65
4-56	Tie rod, exploded view.	4-66
4-57	Spindle stop screw adjustment.	4-67
4-58	Drag link and steering cylinder, removal and installation.	4-68
4-59	Steering wheel and horn button, exploded view.	4-70
4-60	Cylinder head, exploded view.	4-72
4-61	Checking cylinder head for flatness lengthwise.	4-73
4-62	Checking cylinder head for flatness crosswise.	4-73
4-63	Cylinder head torquing sequence.	4-73
4-64	Valve chamber cover, removal and .installation.	4-74
4-65	Checking valve tappet clearance.	4-75
4-66	Adjusting valve tappet clearance.	4-75
4-67	Drive wheel, removal and installation.	4-76
4-68	Rear wheel removal and installation.	4-77
4-69	Service brake pedal adjustment	4-78
4-70	Brake pedal and linkage, exploded view.	4-79
4-71	Service brake dust shield, installed view.	4-80
4-72	Service brake shoes, installed view.	4-80
4-73	Brake adjuster, disassembly and assembly.	4-81
4-74	Brake system bleeder screw.	4-82
4-75	Service brake master cylinder, removal and installation.	4-83
4-76	Parking brake lever, installed view.	4-84
4-77	Parking brake cable, installed view.	4-85
4-78	Parking brake, exploded view.	4-86
4-79	Drive shaft, exploded view.	4-87
4-80	Ring or bull gear lubrication	4-88
4-81	Removing axle shaft.	4-89
4-82	Removing spindle.	4-89
4-83	Transmission oil filter and hose, exploded view.	4-90
4-84	Transmission control adjustment	4-84

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual is for your use in operating and maintaining Allis Chalmers fork lift trucks ACC40-24PS100 and ACC40-24PS180 (Army model MHE-231). The manual provides information on operation and organizational maintenance of the equipment. Included in the manual are descriptions of the main units and their functions in relation to other components.

1-2. Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

1-3. Destruction to Prevent Enemy Use

Procedures to be used for destruction of equipment

to prevent enemy use are defined in TM 750-244-3.

1-4. Equipment Serviceability Criteria

This equipment is not covered by an Equipment Serviceability Criteria

1-5. Administrative Storage

Refer to TM 740-90-1 for instructions pertaining to administrative storage of the fork lift truck.

1-6. Orientation

Throughout this manual the terms "right," "left," "front" and "rear," with respect to the truck, are determined from the viewpoint of the operator sitting on the seat of the truck.

Section II. DESCRIPTION AND DATA

1-7. Description

a. The Allis Chalmers fork lift trucks are nontactical trucks (fig.s 741-1 and 1-2) designed for warehouse operation. The trucks can be used to load, transport, unload and stack loads of as much as 4,000 pounds (1812 kg) at a 24-inch (609.6 mm) load center. (The load center is measured from the heel of the fork.)

b. Loads weighing up to 4,000 pounds (1812 kg) as described above can be lifted to a height of 100 inches (2540 mm) (ACC40-24PS100 truck) or 180 inches (4572 mm) (ACC40-24PS180 Truck).

c. The trucks are powered by a four-cylinder, four-stroke cycle, flat head, liquid cooled, gasoline engine. Coupled to the engine is a single speed, powershift transmission. A short propeller shaft connects the transmission to the forward drive axle.

d. Hydraulic oil pressure for the steering gear and cylinder, lift cylinders, and tilt cylinders is supplied by a hydraulic pump driven by the engine crankshaft. Speed of lift is controlled by positioning control lever and increasing or decreasing engine speed.

1-8. Tabulated Data

a. Lift Truck.

MakeAllis Chalmers

Models:

100 inch
(2540 mm) liftACC40-24PS100
100 inch
(4572 mm) liftACC40-24PS180

Army Models:

100 inch
(2540 mm) lift MHE-231
180 inch
(4572 mm) lift MHE-231

b. Dimensions and Weight.

Ground clearance at
mast center 5 in. (127 mm)

Height

With uprights extended:

ACC40-24PS100 168.3 in. (4281.5 mm)
ACC40-24PS180 259.3 in. (6586.2 mm)

With uprights

retracted 83.0 in. (2108.1 mm)

Length:

Overall

ACC40-24PS100 12187 in (30937 mm)
ACC40-24PS180 122.5 in. (3111.5 mm)

Forks 40.0 in. (1016.0 mm)

Fork spread (maximum) 38.0 in. (965.2 mm)

Width (maximum) 38.0 (965.2 mm)

Weight (gross):

Weight 390.0 (2894.6 kg)

ACC40-24PS100 6390.0 lbs. (2894.6 kg)

ACC40-24PS180 7315.0 lbs. (3313.7 kg)

c. Performance

Axle width (minimum):

Intersecting 44.0 in. (1879.6 mm)

Right angle stacking:

ACC40-24PS100 135.6 in (34406 mm)

ACC40-24PS180 136.2 in. (3459.5 mm)

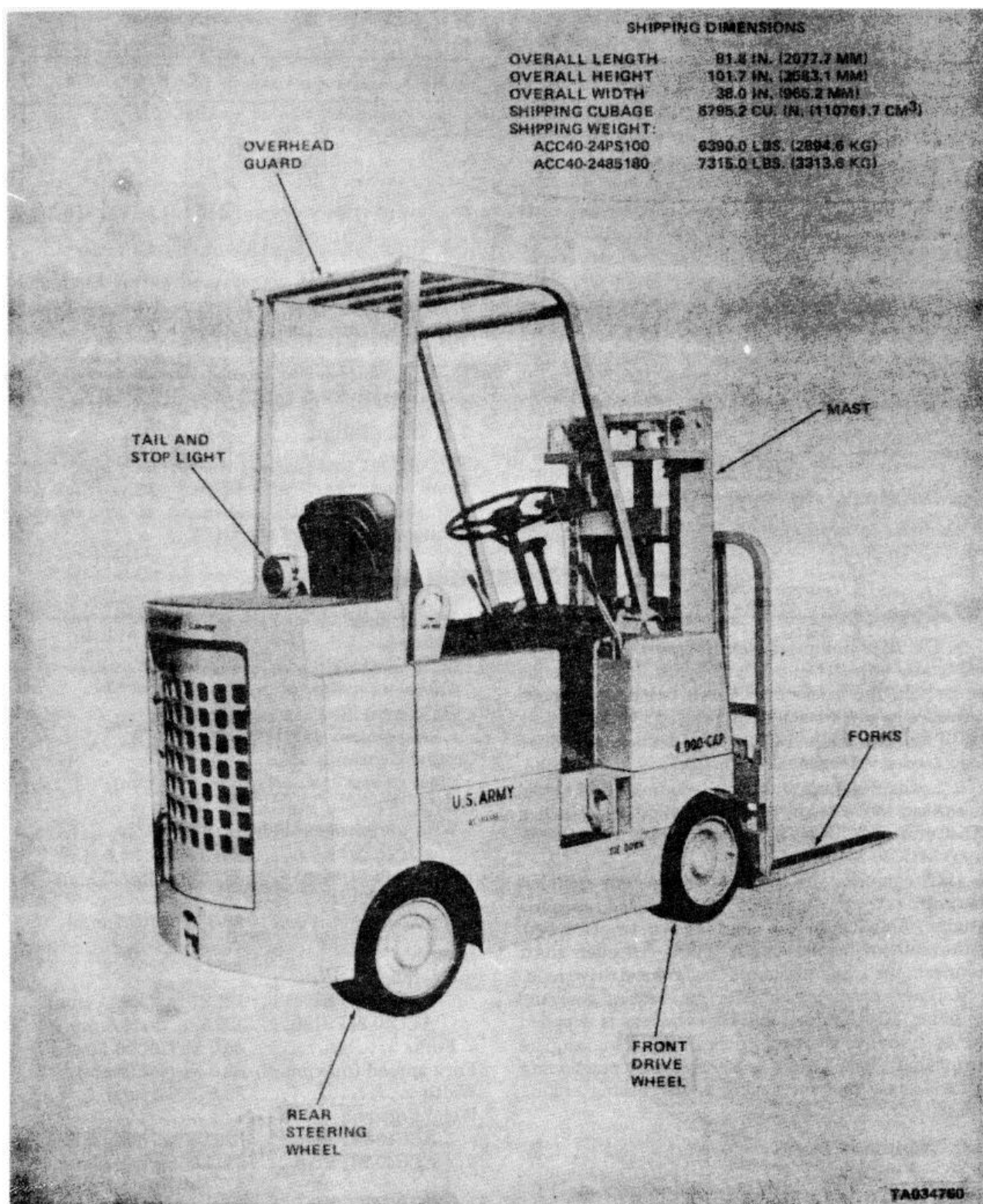


Figure 1-1. Fork lift truck with shipping dimensions, right side view.

Lift height (maximum):

ACC40-24PS100.....	100.0 in. (2540.0 mm)
ACC40-24PS180.....	180.0 in. (4572.0 mm)

Maximum speed (loaded):

Forward	8 mph (12.8 km/h)
Reverse	8 mph (12.8 km/h)

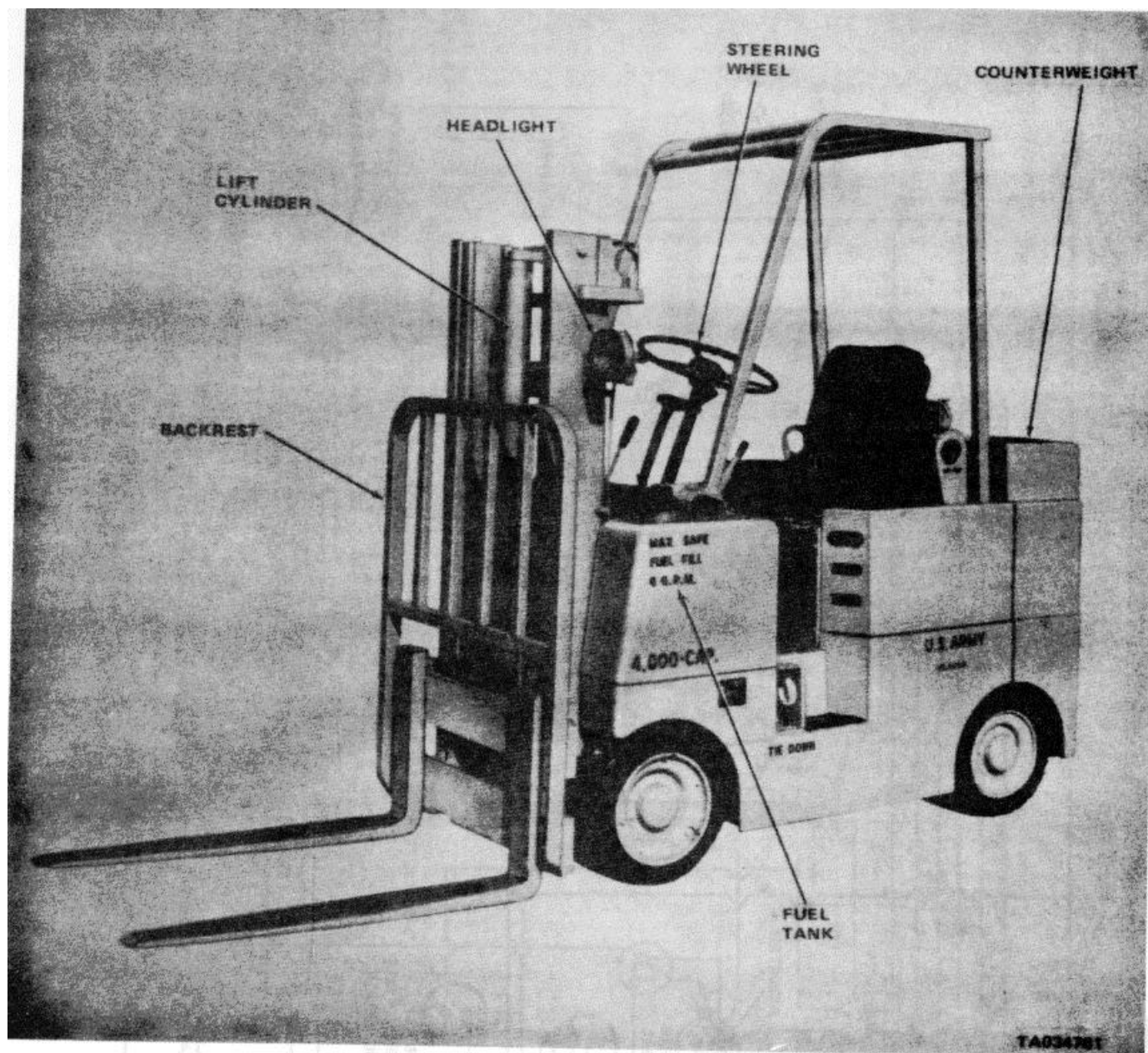


Figure 1-2. Fork lift truck, left side view

Tilt limitations:

ACC40-24PS100:

Backward 10°

Forward; 3°

ACC40-24PS180:

Backward 5.5°

Forward 3°

Turning radius 74.0 in. (1879.5 mm)

d. Tires

Type Solid

Number 4

Size:

ACC40-24PS100:

Drive.....8 x 7 x 12.13

Steer.....1625 x 5 x 11.25

ACC40-24PS180:

Drive.....18 x 8 x 12.25

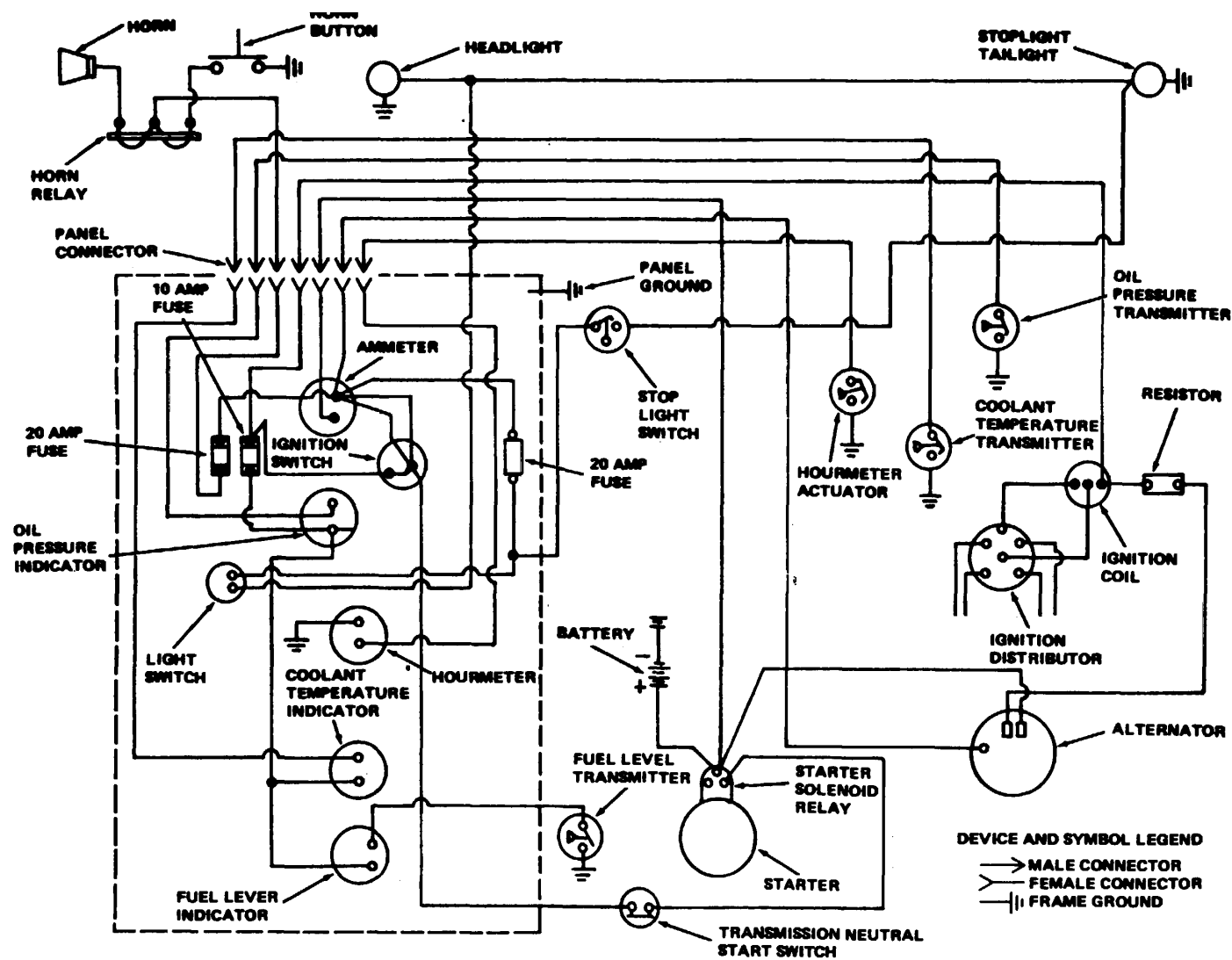
Steer.....16.25 x 5 x 11.25

e. Engine.

Make.....Continental Motor

Model.....F13508019

Cylinders.....4



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Figure 1-3. Wiring diagram

Firing order 134-2

Governed speed:

- Under load.....2000 rpm
- Without load2700 rpm
- Idle speed.....600 rpm

f. Battery

Voltage 12

Ground Negative

g. Hydraulic System.

Pressure setting:

- Engine speed
- 2000 rpm..... 1950 psi

h. Wiring Diagram. Refer to figure 1-3 for wiring diagram of the fork lift truck.

i. Data Plates. The truck identification plate and shipping plate are mounted on the inside of the right cowl of the truck.

(1) The identification plate includes type of truck, type of tires and model number. Also included are the contract, serial and registration numbers, federal stock number and capacity.

(2) The shipping plate includes capacity of lift, shipping weight and wheel loading weight. It also shows the center of gravity and applicable heights and distances for the important parts of the truck.

1-9 Differences in Models

Two models of the fork lift truck are covered in this manual Allis Chalmers models AOCA-24PS100 and ACCA-24PS180. The only difference between the two is the mast and lift cylinders The AOCC40 24PS100 can lift 4,000 pounds (1812.0 kg) to a height of 100 inches (2540.0 mm), employs a single cluster cylinder, and can be tilted 10° to the rear and 3° forward. The AOC-24PS180 can lift 4,000 pounds (1812.9 kg) to a height of 180 inches (4572.0 mm), employs a cluster cylinder and a single lift cylinder, and can be tilted 5.5° to the rear and 3° forward. All differences affecting maintenance of the trucks or components will be covered in the applicable paragraphs.

1-10. Abbreviation

The following metric abbreviations appear in this manual The list below will enable the user to understand their meaning.

c	centigrade
cm	centimeter
kg	kilogram
m	meter
mm	millimeter
N.m	Non Newton meter

CHAPTER 2 OPERATING INSTRUCTIONS

Section I. OPERATING PROCEDURES

CAUTION

If equipment fails to operate refer to troubleshooting procedures in chapter 3.

2-1. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information to insure proper operation of the fork lift truck.

2-2. Controls and Instruments

Refer to figures 2-1 and 2-2 for the purpose, normal readings, and location of all controls and instruments.

2-3. Operation

a. The instructions in this paragraph are published for the information and guidance of personnel responsible for operation of the fork lift truck.

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

2-4. Starting

a. Preparation for Starting. Perform the before operation services (para 3-4).

b. Starting. Refer to figure 2-3 and start the truck.

2-5. Stopping

a. Refer to figure 2-4 to stop the truck.

b. When stopping and parking the truck, set the parking brake (fig. 2-1).

c. If truck is to be parked after completion of work, perform after-operation services (para 3-4).

2-6. Operation of Equipment

The following paragraphs and illustrations describe truck operation under usual conditions.

2-7. Moving the Truck

a. Refer to paragraph 2-4 and start the truck

b. Allow engine to reach operating temperature (fig. 2-1).

c. Raise forks slightly to clear ground by pulling lift control lever (fig. 2-1) to rear.

d. With engine at idle speed, release parking brake (fig. 2-1).

e. Place transmission shift lever (fig. 2-1) in F position for forward movement or R for reverse movement.

f. Depress accelerator (fig. 2-1) to increase engine speed and move truck. Control speed of movement with pressure on accelerator.

WARNING

Use caution when approaching doorways, aisles, intersections or other workers.

g. Control direction of movement by turning steering wheel (fig. 2-1) to guide truck.

CAUTION

Avoid sudden stopping and starting. Reduce speed on turns.

h. To change direction of travel, release accelerator and depress brake pedal (fig. 2-3) to halt movement. Use inching pedal (fig. 2-1), where required, to prevent engine from stalling. After truck comes to a complete stop, move transmission shift lever to direction desired (F for forward; R for reverse). Depress accelerator to increase engine speed and move truck.

i. The inching control pedal (fig. 2-1) is provided to aid the operator in moving into a load or placing a load. Depressing the pedal will slow truck travel while allowing the operator to maintain engine speed at the rate required.

j. After completing movement and with truck parked, refer to paragraph 2-5 to stop truck engine. Park truck on a level surface if possible. If necessary to park truck on an incline, set parking brake and block at least two wheels in event of parking brake failure.

CAUTION

Lower forks to ground and set parking brake firmly.

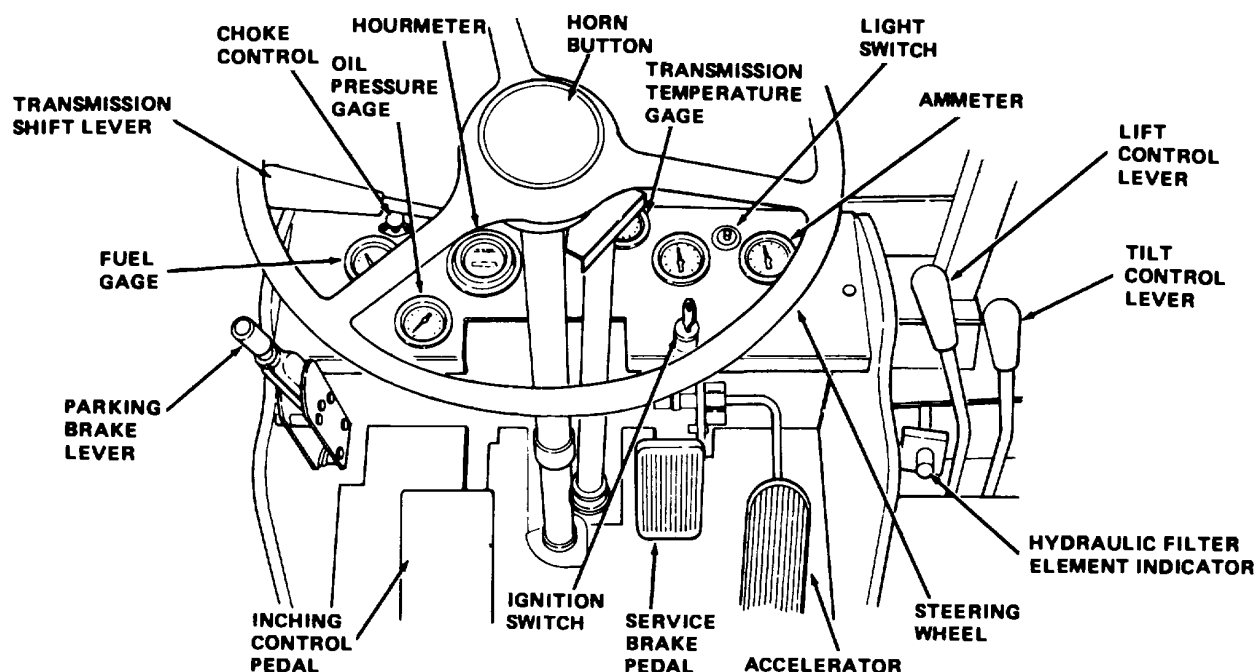


Figure 2-1. Controls and instruments (sheet 1 of 2).

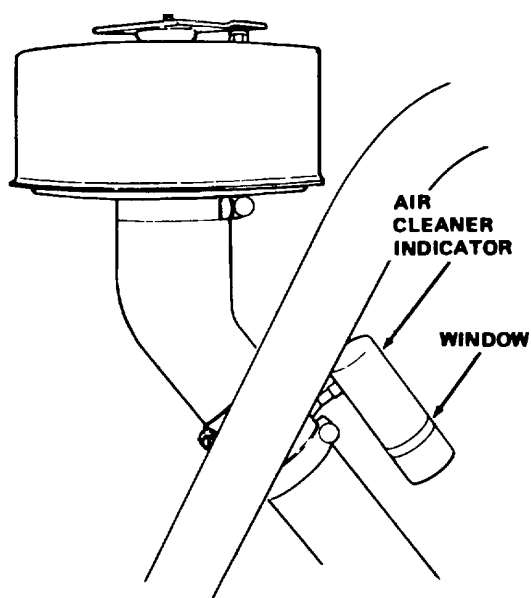
CONTROLS

1. PARKING BRAKE LEVER - PULL BACK ON LEVER TO APPLY PARKING BRAKE. MOVE LEVER FORWARD TO RELEASE BRAKE.
2. HORN BUTTON - DEPRESS BUTTON TO SOUND HORN.
3. TRANSMISSION SHIFT LEVER - MOVE LEVER TO "F" POSITION TO MOVE TRUCK FORWARD. MOVE LEVER TO "R" POSITION TO MOVE TRUCK TO REAR. POSITION LEVER IN "N" (NEUTRAL) WHEN PARKING OR STARTING TRUCK.
4. LIFT CONTROL LEVER - MOVE LEVER TO REAR TO LIFT FORKS. MOVE LEVER FORWARD TO LOWER FORKS
5. TILT CONTROL LEVER - MOVE LEVER FORWARD TO TILT MAST FORWARD. MOVE LEVER TO REAR TO TILT MAST BACKWARD.
6. STEERING WHEEL - ROTATE WHEEL IN DIRECTION DESIRED TO TURN TRUCK.
7. ACCELERATOR - DEPRESS PEDAL TO INCREASE ENGINE SPEED. RELEASE PEDAL TO DECREASE ENGINE SPEED.
8. IGNITION SWITCH - ROTATE SWITCH TO RIGHT TO ACTUATE STARTER. RELEASE KEY TO ALLOW TO RETURN TO RUN POSITION. ROTATE KEY TO LEFT TO HALT ENGINE OPERATION.
9. SERVICE BRAKE PEDAL - DEPRESS PEDAL TO APPLY BRAKES AND STOP TRUCK.
10. INCHING CONTROL PEDAL - DEPRESS PEDAL TO SLOW TRANSMISSION SPEED AND ALLOW HIGH ENGINE SPEED. GIVES OPERATOR PRECISE CONTROL FOR INCHING LOADS.
11. CHOKE CONTROL - PULL OUT TO CLOSE CHOKE VALVE DURING ENGINE START. PUSH ALL THE WAY IN TO OPEN CHOKE FOR NORMAL OPERATION.
12. LIGHTS SWITCH - PULL OUT TO TURN ON LIGHTS

INSTRUMENTS

1. FUEL GAGE - INDICATES AMOUNT OF FUEL IN FUEL TANK.
2. COOLANT TEMPERATURE GAGE - INDICATES OPERATING TEMPERATURE. NORMAL READING SHOULD BE 160° TO 180°F (71° TO 82°C).
3. AMMETER - INDICATES AMOUNT OF CURRENT FLOWING TO OR FROM BATTERY. SHOULD SHOW HIGH RATE OF CHARGE AFTER STARTING AND TAPER DOWN TO NEAR CENTER OF DIAL AFTER OPERATING A SHORT TIME.
4. OIL PRESSURE GAGE - INDICATES WORKING OIL PRESSURE IN ENGINE. NORMAL OPERATION SHOULD INDICATE IN RUNNING RANGE AT NORMAL OPERATING SPEED
5. HOURMETER - OPERATES WHEN ENGINE IS RUNNING. RECORDS HOURS OF OPERATIONS.
6. TRANSMISSION TEMPERATURE GAGE - INDICATES TEMPERATURE OF TRANSMISSION OIL. NORMAL OPERATING TEMPERATURE SHOULD BE IN GREEN AREA.
7. HYDRAULIC FILTER ELEMENT INDICATOR - INDICATES CONDITION OF FILTER ELEMENT. IF INDICATING LINE REACHES RED ZONE, REPLACE ELEMENT.

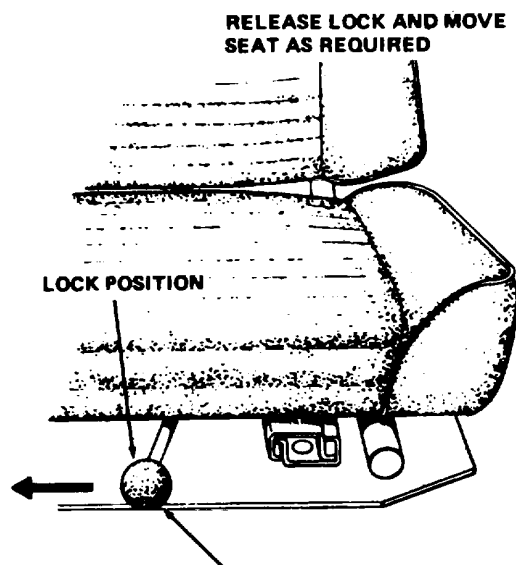
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AIR CLEANER INDICATOR
 WITH; ENGINE RUNNING, WINDOW SHOULD BE CLEAR. IF RED SIGNAL IS LOCKED IN FULL VIEW IN WINDOW, AIR CLEANER MUST BE SERVICED.

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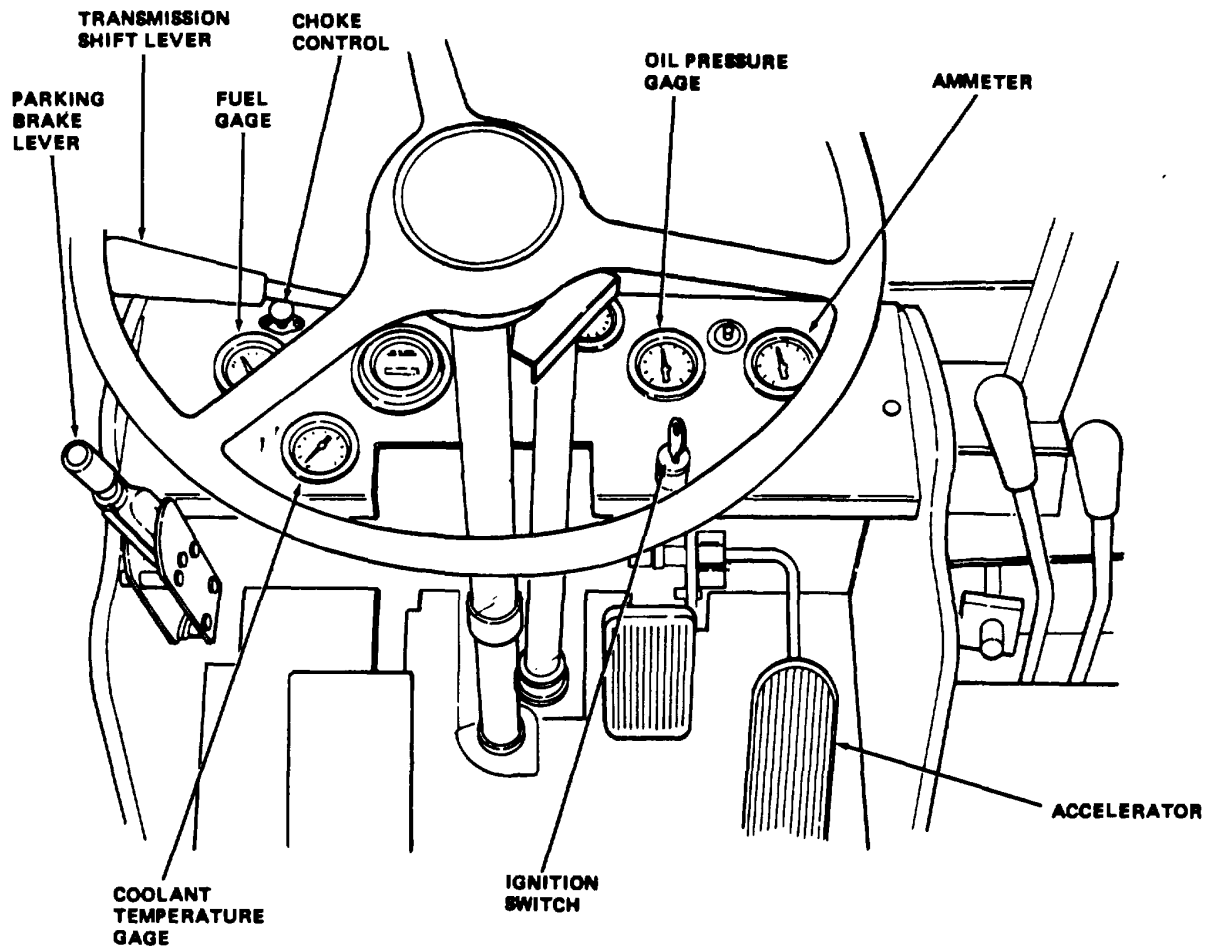
Figure 2-1. Control and instruments (sheet 2 of 2)



MOVE TO RIGHT TO RELEASE SEAT LOCK

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Figure 2-2. Seat adjustment.



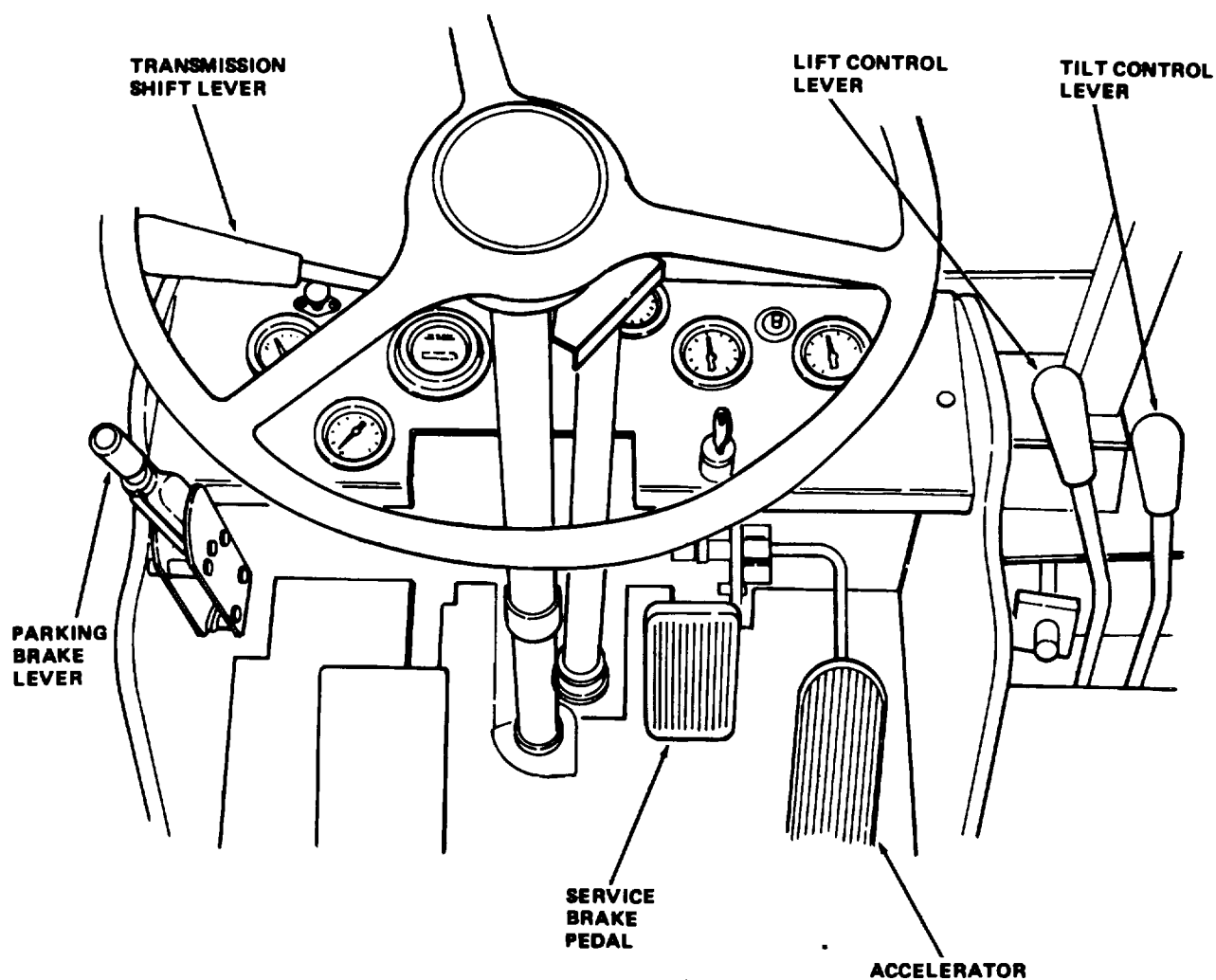
1. PULL PARKING BRAKE LEVER TO REAR TO SET PARKING BRAKE.
2. PLACE TRANSMISSION SHIFT LEVER IN "N" (NEUTRAL) POSITION.
3. IF ENGINE IS COLD PULL CHOKE CONTROL ALL THE WAY OUT.
4. DEPRESS ACCELERATOR APPROXIMATELY ONE-THIRD OF THE WAY.
5. TURN IGNITION SWITCH ALL THE WAY TO THE RIGHT TO ACTUATE STARTER. RELEASE KEY WHEN ENGINE

CAUTION: DO NOT OPERATE STARTER CONTINUOUSLY FOR LONGER THAN 30 SECONDS. IF ENGINE FAILS TO START AFTER 30 SECONDS, ALLOW STARTER TO COOL OFF FOR TWO MINUTES BEFORE ATTEMPTING TO START ENGINE AGAIN

6. HOLD ACCELERATOR STEADY AND ALLOW ENGINE TO WARM UP AT FAST IDLING SPEED.
7. CHECK OIL PRESSURE GAGE AND AMMETER FOR NORMAL READINGS. AS ENGINE WARMS UP, PUSH IN ON CHOKE CONTROL. WHEN ENGINE IS WARM, PUSH CONTROL ALL THE WAY IN.
8. WITH ENGINE AT OPERATING TEMPERATURE, CHECK FOR PROPER READINGS ON AMMETER, OIL PRESSURE GAGE, AND COOLANT TEMPERATURE GAGE. CHECK FUEL GAGE AND HOURMETER FOR PROPER OPERATION.
9. REPORT ANY MALFUNCTIONS TO PROPER AUTHORITY.

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Figure 2-3. Engine starting instructions



1. RELEASE FOOT FROM ACCELERATOR.
2. DEPRESS SERVICE BRAKE GRADUALLY TO BRING TRUCK TO SAFE SMOOTH STOP.
3. PULL PARKING BRAKE LEVER TO REAR TO APPLY PARKING BRAKE.
4. MOVE TILT CONTROL LEVER FORWARD TO PLACE MAST IN VERTICAL POSITION.
5. MOVE LIFT CONTROL LEVER FORWARD AND LOWER FORKS TO GROUND.
6. TURN IGNITION SWITCH TO THE LEFT TO "OFF" POSITION TO STOP ENGINE.

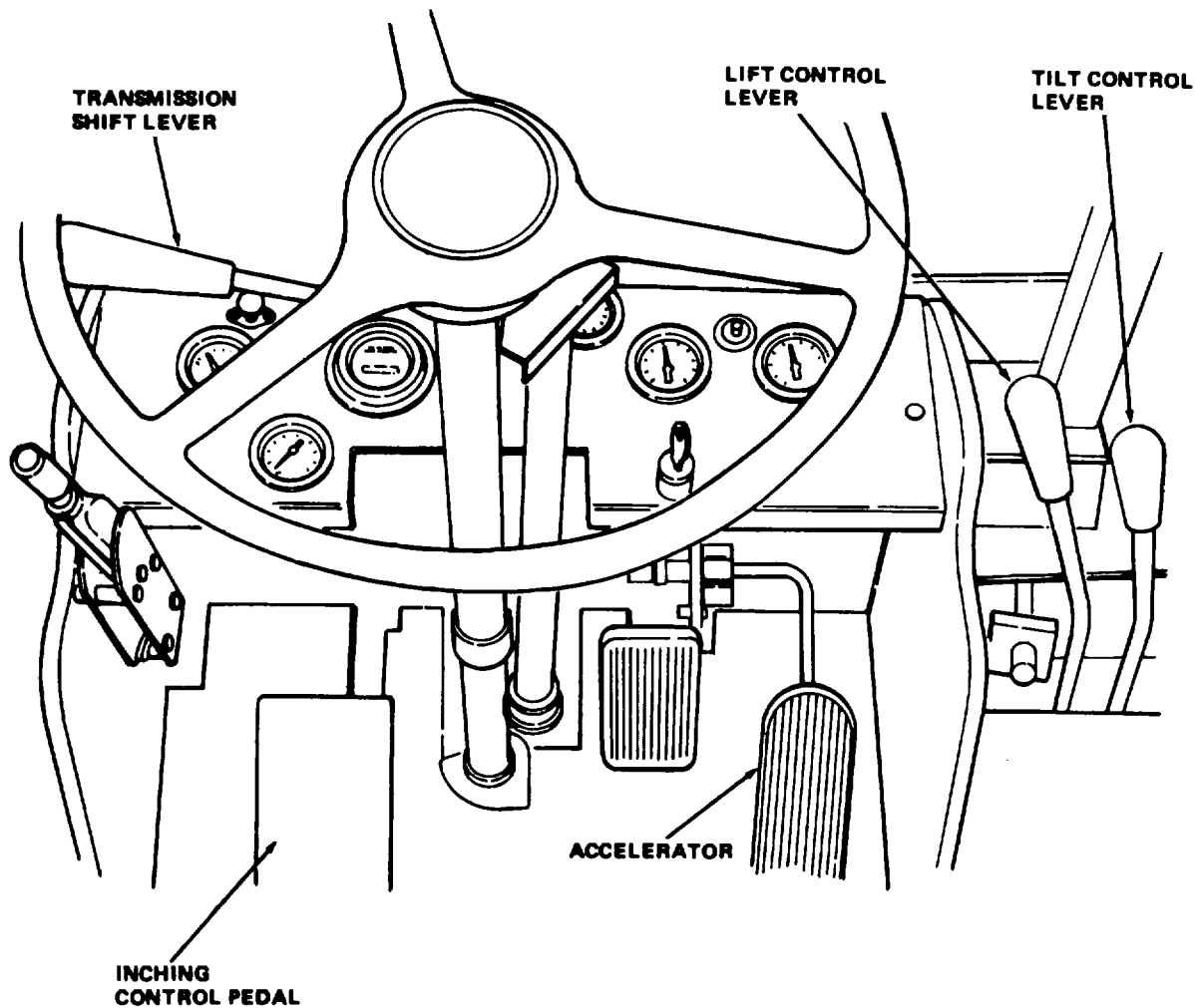
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Figure 2-4. Truck stopping instructions

2-8. Lifting and Transporting a Load

a. Refer to paragraph 2-7 and move truck to the vicinity of the load

b. As truck nears the load, bring truck to a halt and raise or lower forks to position them under a load. Refer to figure 2-5 for lifting operations.



1. BRING TRUCK TO A HALT.
2. RAISE OR LOWER FORKS, USING LIFT CONTROL LEVER, TO BRING FORKS IN LINE WITH LOAD.
3. MOVE TRUCK FORWARD, USING INCHING CONTROL AND ACCELERATOR, TO BRING FORKS UNDER LOAD.
4. PULL LIFT CONTROL LEVER TO REAR TO RAISE FORKS AND LOAD TO CLEAR GROUND OR STACK. MOVE TRUCK IN REVERSE TO CLEAR STACK.
5. TILT MAST TO THE REAR BY PULLING TILT CONTROL LEVER TO REAR, TO SAFELY TRANSPORT LOAD.
6. RAISE OR LOWER LOAD AS NECESSARY, USING LIFT CONTROL LEVER.

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Figure 2-5. Lifting operation.

CAUTION

Never pick up a load until certain it can be carried safely. The load must be steady on the forks before lifting. Keep the load against the carriage backrest

c. If load is on pallet, center forks between upper and lower members of pallet. With mast in vertical position, move truck forward (para 2-7) using accelerator and inching control until load rests against rear of forks and backrest.

d. Raise forks (fig. 25) enough to clear stack or floor below the load. Tilt load back by pulling tilt control

lever (fig. 2-5) to rear. Mast must be tilted far enough back to travel safely with load. To increase speed of lift or tilt movement, increase engine speed.

CAUTION

When transporting bulky loads, travel in reverse. Always descend ramps in reverse when transporting a load.

e. Place transmission shift lever in reverse and move truck and load to rear to clear stack or other obstacle. Turn truck to face in direction of travel required. If load is raised, lower load to assure clear vision forward. If load is bulky and obstructs vision it may be required to travel in reverse to enable the operator to see

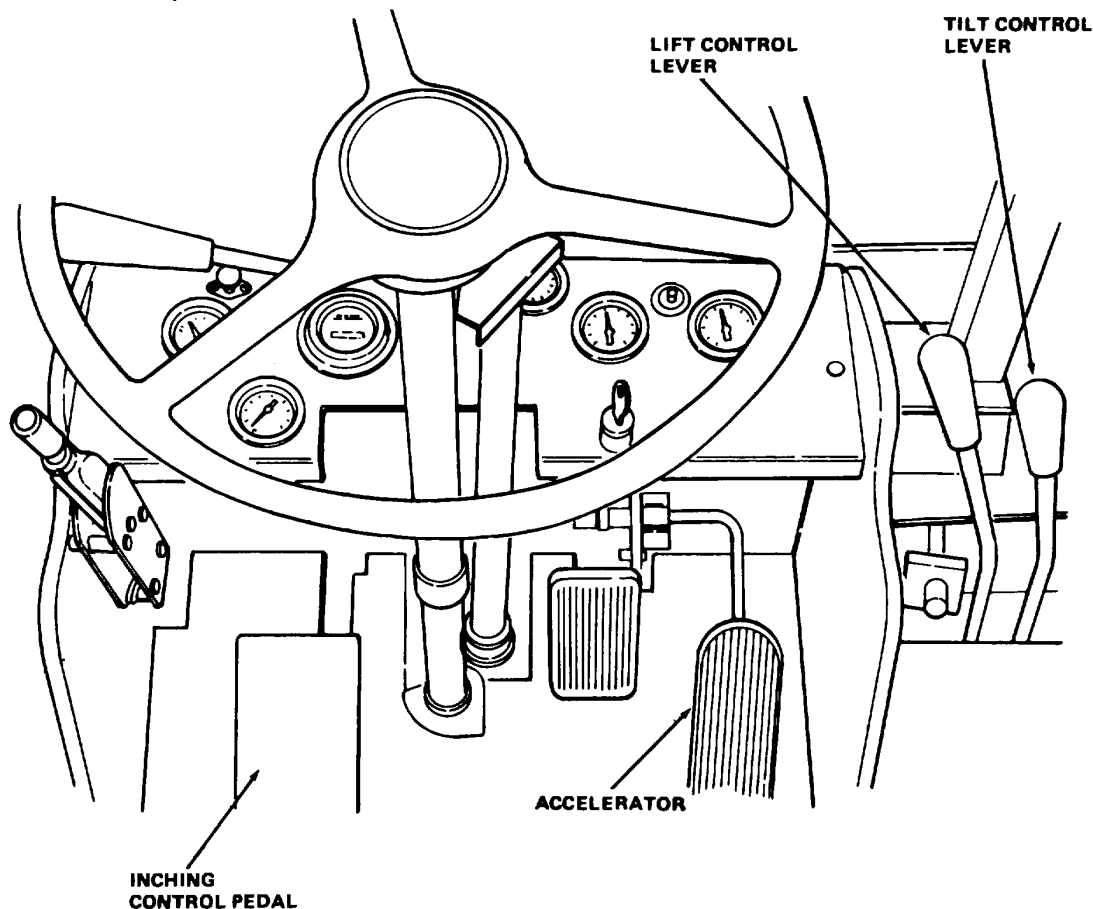
WARNING

Always travel with load tilted back and forks raised just high enough to clear any uneven floor conditions.

f. Obey speed limits and drive carefully. Avoid sharp turns at too high of a speed, which could cause load to slip off or tip truck.

2-9. Depositing a Load

a. Move truck with load to place where load is to be deposited. Refer to figure 2-5 to raise or figure 2-6 to lower load and move truck as necessary to bring it in line with top of stack or ground.



1. MOVE TRUCK INTO POSITION WITH INCHING CONTROL PEDAL AND ACCELERATOR TO BRING FORKS AND LOAD OVER PLACE TO DEPOSIT LOAD.
2. HALT TRUCK USING SERVICE BRAKE PEDAL. SHIFT TRANSMISSION TO NEUTRAL.
3. PUSH LIFT CONTROL LEVER FORWARD TO GRADUALLY LOWER LOAD. MOVE TILT CONTROL LEVER FORWARD TO BRING MAST TO VERTICAL POSITION.
4. LOWER LOAD INTO POSITION.
5. PLACE TRANSMISSION SHIFT LEVER IN "R" (REVERSE) POSITION AND, USING INCHING CONTROL PEDAL AND ACCELERATOR. MOVE TRUCK AWAY FROM LOAD.

Figure 2-6. Lowering operation.

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- b. Move tilt control lever forward to align forks horizontally with stack or ground.
- c. Refer to figure 2-6 and lower load into desired position.

- d. Refer to paragraph 2-7 and move truck away from load and return for further loading operations or to a parking place.

Section II. OPERATING UNDER UNUSUAL CONDITIONS

2-10. General

Although the truck is designed primarily for warehouse operations, the truck could be operated under unusual conditions as described in the following paragraphs. When operating under these conditions, extra care must be provided to maintain the truck in good operating condition. To operate under these conditions, certain additional services must be performed and certain regular maintenance procedures may be required more often.

2-11. Operating in Extreme Heat

a. Cooling System.

(1) Check adjustment of fan drive belt more often to see that the deflection is correct. Belt should deflect three-eighths of an inch when pressure is applied midway between pulleys.

(2) Check coolant level more often and maintain level to bottom of filler neck on radiator. Check radiator cap to be certain it is secure (para 3-12).

(3) Keep grille and radiator free of dirt and debris to insure good air circulation.

(4) Flush and clean cooling system frequently.

b. Electrical System.

(1) Check battery electrolyte level more often. Maintain level three-eighths of an inch above plates.

(2) Check specific gravity of battery (para 4-46 more often.

(3) Clean battery cables frequently.

2-12. Operation in Extreme Cold

a. Protection. The truck should be stored in a heated building or shelter if possible. If a shelter is not available, park the truck with the front end facing the wind and cover with a tarpaulin. Fasten tarpaulin securely to prevent it from blowing away.

b. Cooling System. Service the cooling system with antifreeze as follows. For temperatures from 32°F (0°C) to 10°F (-18°C), add one part of glycol antifreeze to four parts of water. For temperature from

(-18°C) to a -10°F (-23°C), add two parts of glycol antifreeze to five parts of water. For temperatures from a -10°F (-23°C) to a -30°F (-35°C), add one part of glycol antifreeze to one part of water. Refer to TB ORD 651 for the use of antifreeze solutions and cleaning compounds in engine cooling system.

c. Electrical System.

(1) Check specific gravity of battery more often.

(2) Do not add water to the battery unless the engine is going to be operated immediately.

(3) Keep battery charged as much as possible to insure starting and prevent freezing at low temperatures.

(4) Remove and store battery (on wooden base) in a warm place if truck is not going to be parked in a shelter.

2-13. Operation in Sandy or Dusty Areas

a. Protect fuel hydraulic and lubrication systems from entrance of sand. Use a bag of single layer cloth and loosely tie bag over entire air cleaner during sand storms.

b. Clean fuel filter bowl, air cleaner, drive axle breather, hydraulic reservoir breather, and oil filler breather daily.

c. Remove all sand from axles, wheels, spindles, radiator, and brake assemblies periodically. Check all parts often to prevent undue wear caused by sand.

d. Protect lift, tilt and steering mechanisms from entrance of sand. Cover exposed parts of lift, tilt and steering cylinder rods, lift chains, bearings, and reservoir during sand storms.

2-14. Operation in Damp Tropical Areas

a. Check all paint for shipping and scratching. Corrosive action from dampness will take place almost immediately if bare metal is exposed.

b. Touch up all spots where paint is chipped or scratched.

CHAPTER 3 OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION

3-1. General Lubrication Information

a. These paragraphs contain general lubrication instructions and lubrication instructions which are supplemental to, and not specifically covered in the lubrication order.

b. Refer to DA PAM 310-4 for the current lubrication order.

3-2. Detailed Lubrication Information

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

b. Cleaning. Keep all external parts not requiring.

lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

c. Points of Lubrication. Service the points of lubrication at the proper intervals as illustrated on current lubrication order.

d. Operation Immediately After Lubrication Operate the truck through all movements for 5 minutes immediately after lubrication. Inspect filters and lines for evidence of leakage. If crankcase oil was changed, operate engine for 5 minutes and again check oil level. Open right side panel to gain access to engine oil gage.

Section II. OPERATOR'S PREVENTIVE MAINTENANCE

3-3. General

To insure that the fork life truck is ready to operate at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed by the operator are listed and described in paragraph 3-4. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings

will be recorded in accordance with TM 38750.

3-4. Operator's Preventive Maintenance Checks and Services

a. This paragraph contains a tabular listing of preventive maintenance services which must be performed by the operator at the indicated intervals

b. Table 3-1 list preventive maintenance services in item numbers listed consecutively and indicate the sequence of minimum requirements. The intervals are listed under services to be performed by the operator. Columns indicate the item to be inspected, the procedure, and the paragraph reference in this manual where the procedure is described. When operational checks are to be made, operator must be seated on seat.

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

B - Before Operation Time required: 15			D - During Operation Time required: 0.9			A - After Operation Time required: 12		
interval and sequence No.			Item to be inspected Procedure					Work time (M/H)
B	D	A						
1			NOTE Visually inspect for evidence of lubricant and hydraulic leak concurrent with daily service check INSTRUMENT PANEL					0.2
2			Inspect gages and instruments for broken glass and other damage. FUEL LINES					0.2.
3			Inspect for leaks and damage and secure mounting. RADIATOR					0.2
			Check for leaks and for correct fluid level (para 12).					

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services - Continued

B - Before Operation Time required: 1.5			D - During Operation Time required: 0.9	A - After Operation Time required 1-2
Interval and sequence No.				Work time (M/H)
B	D	A	Items to be inspected Procedures	
4			ENGINE Check oil level and add oil if necessary (para 3-14).	02
5			TIRES Check for imbedded material, check for gouges and other damage (para 3-15).	02
6			TRANSMISSION Check oil level and add oil if necessary (para 3-16).	02
7			LIGHTS Check lights for proper operation (para 2-2	0.1
8			HORN Check horn for proper operation (para 2.2	0.1
9			FIRE EXTINGUISHER Inspect for broken seal and correct pressure.	0.1
	10		INSTRUMENTS Check that all instruments indicate within required ranges (para 3-9	0.1
	11		CONTROLS Check that controls perform as required (para 2-2).	02
	12		BRAKES Check parking brake and service brake to assure safe operation (para 2-2).	02
	13		AIR CLEANER Check air cleaner indicator. Indicator should show green in window. If indicator shows red locked in up position, check air filter element and reset indicator (para 3-10).	0.1
	14		HYDRAULIC SYSTEM Check hydraulic filter indicator. Indicator should show green band in line with indicating line (para 3-17).	
	15		UNUSUAL NOISES AND VIBRATION Listen for unusual noises and check for excessive vibration. If present, shut off truck and report to organizational maintenance	02
		16	FUEL LEVEL Fill fuel tank.	02
		17	TRANSMISSION Check oil level Add oil as necessary (para 3.16).	02
		18	HYDRAULIC RESERVOIR Check oil level Add oil as necessary (para 3-18).	
		19	FAN BELT Check for proper adjustment, three-eighths of an inch between pulleys If belt is worn or frayed, notify organizational maintenance.	02
		20	TIRES Remove imbedded material. Check for gouge and other damage.	0.4

Section III. OPERATOR'S TROUBLESHOOTING

3-5. General

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

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not correctly listed by corrective actions, notify organizational maintenance personnel

3-6. Operator's Troubleshooting

Malfunctions which may occur are listed in table 32. Each malfunction stated is followed by a list of tests and inspections within the recommended corrective action.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE FAILS TO TURN OVER

Step 1. Check to see if transmission shift lever is in neutral (N) position.

Place lever in neutral (N) position.

Step 2. Check for weak or defective battery.

Notify organizational maintenance.

Step 3. Check for defective or shorted wiring.

Notify organizational maintenance.

2. ENGINE FAILS TO START

Step 1. Check cranking speed.

If cranking speed is too slow, check battery connections. If battery is defective, notify organizational maintenance.

Step 2. Check choke and carburetor controls (para 2-2).

If controls are defective, notify organizational maintenance.

Step 3. Check fuel shutoff valve, fuel tank and fuel filter (para 3-11).

Fill tank if necessary. Notify organizational maintenance if filter requires service.

Step 4. Check distributor, coil, spark plugs and wires (para 3-14).

If distributor, coil plugs or wires are defective, notify organizational maintenance.

3. ENGINE HARD TO START.

Step 1. Check choke and carburetor controls (para 2-2).

If controls require adjustment or are defective notify organizational maintenance.

Step 2. Check distributor, coil, spark plugs and wires.

If parts are not operating properly or are defective notify organizational maintenance.

Step 3. Check air supply to engine (para 4-7).

If air cleaner indicator indicates the air cleaner is dirty or clogged, clean or replace element.

4. ENGINE STALLS AND STOPS FREQUENTLY.

Step 1. Check fuel shutoff valve (para 3-11).

Open valve completely.

Step 2. Check idle speed (para 24).

If idle speed requires adjusting, notify organizational maintenance.

Step 3. Check governor operation (para 24).

If governor requires adjustment or replacement, notify organizational maintenance.

Step 4. Check carburetor and linkage operation (para 2-4).

If carburetor or linkage requires adjustment or service notify organizational maintenance.

5. ENGINE OVERHEATS.

Step 1. Check coolant level (para 3-12).

Replenish engine coolant if necessary.

Step 2. Check radiator air passages (para 3-12).

Clean air passages if necessary.

Step 3. Check radiator and hoses for leakage (para 3-12).

If leakage is present, notify organizational maintenance.

Step 4. Check thermostat operation (para 4-70)

If thermostat does not operate properly, notify organizational maintenance.

6. ENGINE EMITS BLACK SMOKE FROM EXHAUST.

Step 1. Check air supply to engine (para 3-10).

If indicator indicates air supply is restricted, notify organizational maintenance.

Step 2. Check carburetor operation.

If carburetor requires adjustment or service, notify organizational maintenance.

MALFUNCTION		
TEST OR INSPECTION		
CORRECTIVE ACTION		

7. ENGINE OIL PRESSURE LOW.
 - Step 1. Check crankcase oil level (para 4-14).
Refill crankcase with proper grade of oil. Refer to current Lubrication Order.
 - Step 2. Check oil lines for leakage (para 4-13).
If oil lines are leaking, notify organizational maintenance.
 - Step 3. Check oil filter (para 4-13).
If oil filter is dirty, refer to organizational maintenance.
 - Step 4. Check oil pressure gage (para 2-2).
If oil pressure gage is defective, notify organizational maintenance.
8. STARTER WILL NOT CRANK ENGINE.
 - Step 1. Check transmission shift lever.
Place transmission shift lever in neutral (N) position (para 2-4).
 - Step 2. Check battery and cables.
Tighten cables or notify organizational maintenance if battery or cables are defective.
 - Step 3. Check neutral start switch.
Notify organizational maintenance if switch is defective.
 - Step 4. Check starter connections and operation.
Tighten connections. Notify organizational maintenance if starter is defective.
9. TRUCK DOES NOT MOVE WHEN ACCELERATOR IS DEPRESSED.
 - Step. 1. Check transmission shift lever (para 2-6).
Place transmission shift in forward (F) or reverse (R) to move truck.
 - Step 2. Check parking brake (para 2-5).
Disengage parking brake if necessary.
 - Step 3. Check oil level in transmission (para 3-16).
Replenish transmission oil if necessary.
10. TILT AND LIFT MECHANISMS DO NOT OPERATE WHEN LEVERS ARE ACTUATED.
 - Step 1. Check hydraulic filter indicator (para 3-17).
If indicator is in red zone, notify organizational maintenance to service filter.
 - Step 2. Check hydraulic reservoir oil level (para 3-18).
Replenish hydraulic oil if necessary. Refer to current Lubrication Order. Check hydraulic system for leaks. Notify organizational maintenance if service is required.
11. SERVICE BRAKES DO NOT STOP TRUCK PROPERLY.
 - Step 1. Check brake pedal and linkage (para 2-5).
If linkage and pedal require adjustment, refer to organizational maintenance.
 - Step 2. Check fluid level in master cylinder (para 4-11).
If fluid level is low, notify organizational maintenance.
12. PARKING BRAKE DOES NOT HOLD TRUCK ON SLOPE.
 - Step 1. Adjust parking brake lever.
Loosen setscrew and turn knurled top of lever clockwise to adjust parking brake. Tighten setscrew.
 - Step 2. Check parking brake (para 2-5).
Notify organizational maintenance if parking brake requires service.
13. TRUCK DOES NOT STEER PROPERLY.
 - Step 1. Check connections to steering valve and cylinder.
Tighten connections or notify organizational maintenance if valve or cylinder are defective.
 - Step 2. Check hydraulic system for leaks (para 3-18).
Tighten connections or notify organizational maintenance if components need replacement.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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Step 3. Check drag link and tie rods.

Notify organizational maintenance if components require adjustment or replacement.

Step 4. Check steering axle mounting.

Notify organizational maintenance if steering axle requires adjustment.

14. HEAD AND TAIL LIGHTS DO NOT OPERATE WHEN SWITCH IS ACTUATED.

Step 1. Check connections to switch and lights (para 3-9).

Tighten connections if necessary.

Step 2. Check headlight and taillight.

If lights are defective, notify organizational maintenance.

Step 3. Check stoplight switch.

If stoplight switch is defective, notify organizational maintenance.

15. HORN DOES NOT SOUND.

Step 1. Check horn wiring and connections

Tighten connections if necessary.

Step 2. Check battery.

If battery is low and requires service, notify organizational maintenance.

Section IV. OPERATOR MAINTENANCE OF TRUCK

3-7. General

Operator's maintenance of the truck is limited to the following items described in paragraphs 3-8 through 3-18 below.

3-8. Lubrication

a. Lubricate truck in accordance with the current lubrication order.

b. Refer to paragraph 3-2 for detailed lubrication information.

3-9. Instrument Panel

a. *General* The instrument panel is mounted across the front of the truck. Refer to paragraph 2-2 for a description of instruments and their operation.

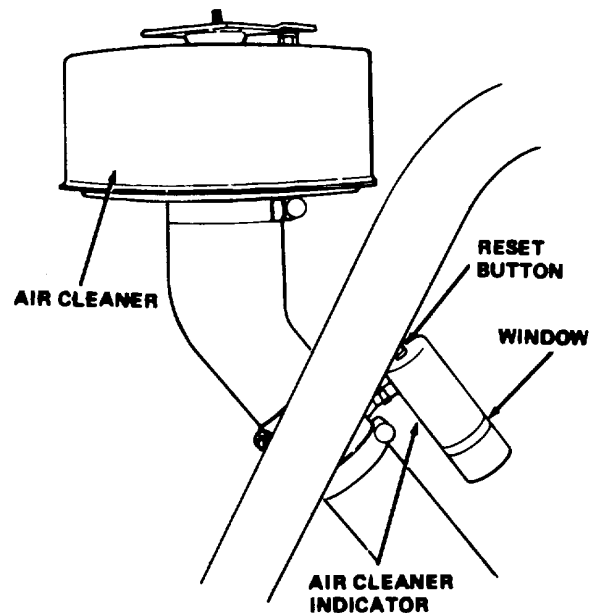
b. *Inspection:*

(1) Before operating truck, inspect the instruments (fig. 2-1) for broken glass and other damage.

(2) During operation monitor the instruments for proper readings. If the instruments indicate a malfunction, notify organizational maintenance.

3-10. Air Cleaner and Indicator

a. *General* The air cleaner is mounted on the left side of the truck. Open the left side panel to gain access to the air cleaner (fig. 3-1).



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Figure 3-1. Air cleaner and indicator

b. Inspection.

(1) With the engine running, inspect the air cleaner indicator. If the red signal is locked in full view in the window, press reset button on top of the indicator (fig. 3-1).

(2) If the red signal is locked in full view, notify organizational maintenance to service the air cleaner.

(3) Check hose clamps for tightness and hose for leaks and damage.

3-11. Fuel Lines

a. General Fuel lines connect the fuel pump and filter to the fuel tank and carburetor. Shut off valves are located at the fuel tank outlet and at the fuel filter.

b. Inspection.

(1) Inspect fuel lines at tank, fuel filter and

carburetor for leaks, dents, bends and other damage.

(2) If lines are leaking, close shut off valve to prevent loss of fuel and notify organizational maintenance.

3-12. Radiator

a. General. The radiator is enclosed by the counterweight at the rear of the truck. An opening at the top of the counterweight allows access to the radiator cap.

CAUTION

Remove cap slowly. Coolant could be under pressure.

b. Service. Stop the engine and allow radiator to cool before attempting to remove radiator cap. Pressure in cooling system is 7 psi.

(1) Remove radiator cap (fig. 3-2) and check coolant level.

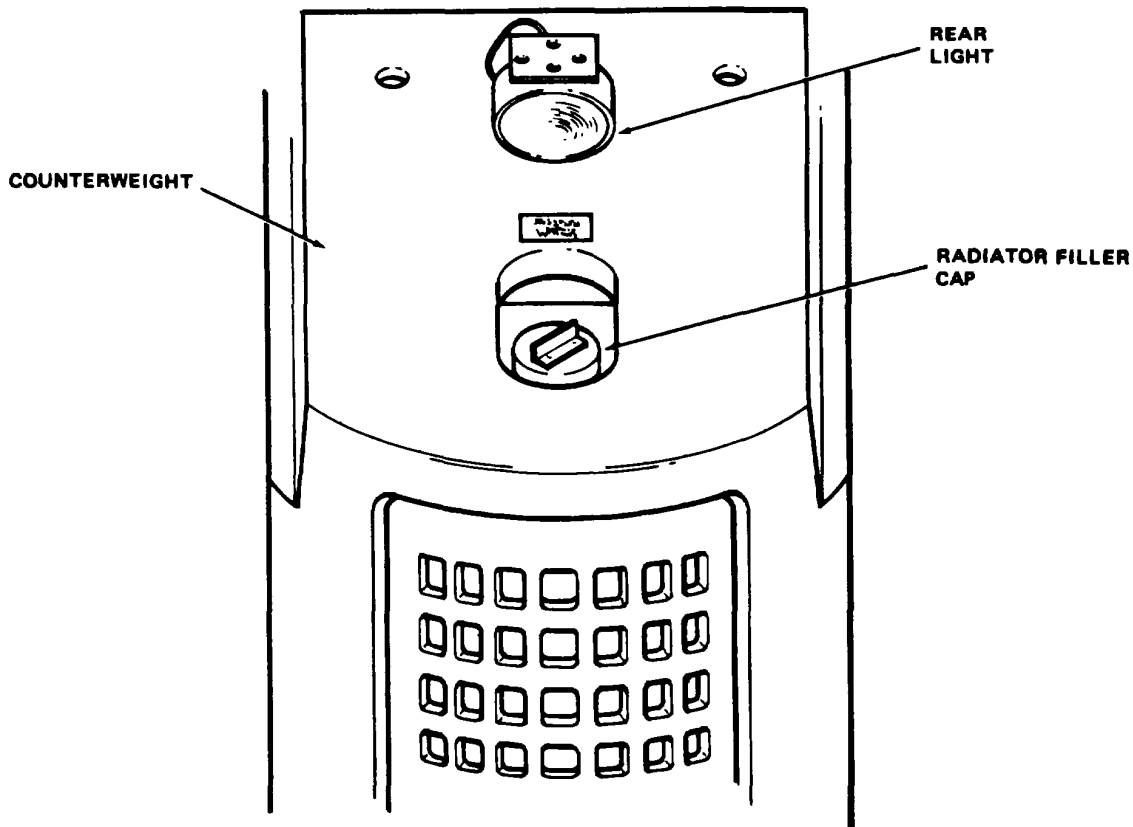


Figure 3-2. Radiator filler cap.

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(2) Coolant level should be one-half to one inch above plates.

(3) If coolant level is low, add coolant as necessary to bring to proper level

(4) Install radiator cap.

3-13. Muffler and Pipes

a. General The muffler is mounted on the lower left side of the frame. An exhaust pipe connects the muffler to the exhaust manifold. Open left side panel

to gain access to the muffler.

b. Inspections. Inspect muffler and exhaust pipe for evidence of holes and leakage. Check clamps for security.

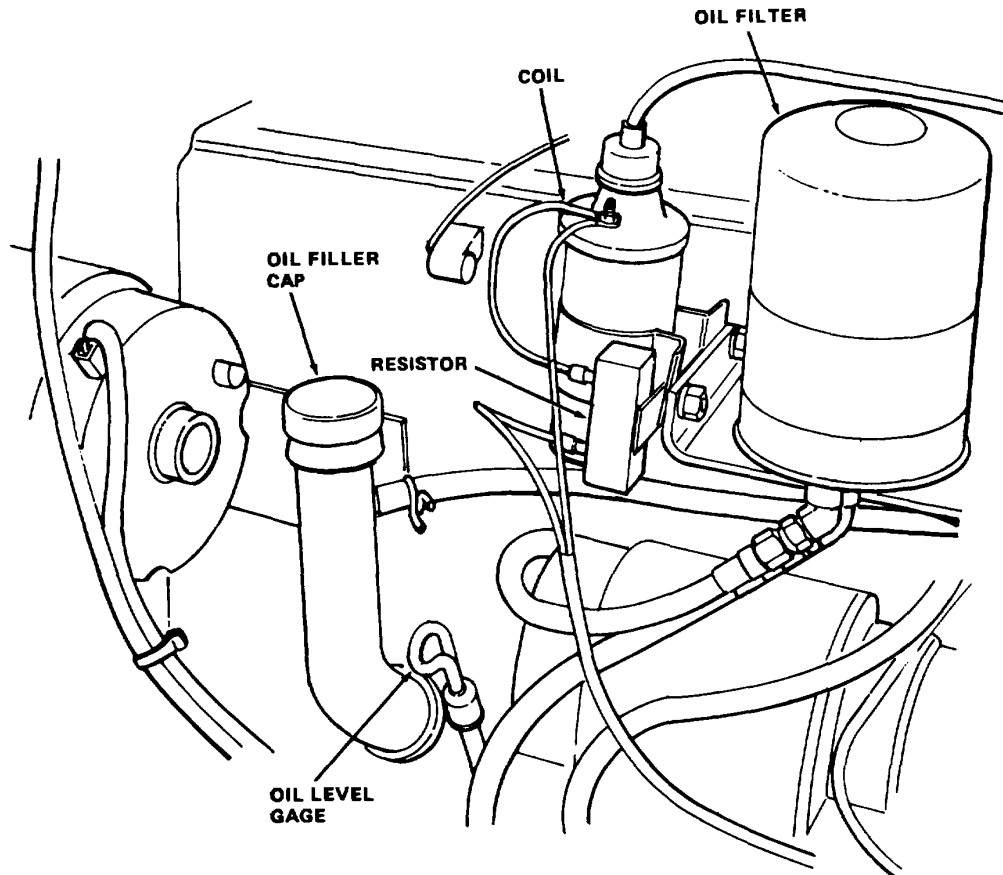
3-14. Engine Assembly

a. General The engine is mounted in a compartment below the operator's seat. Open side panels and tilt seat forward to gain access to the engine.

b. Service. Operator service for the engine is limited to checking the oil level in the crankcase and adding oil to bring to operating level

(1) With engine off, open right side panel to gain access to oil level gage.

(2) Remove engine oil level gage (fig. 33) and check oil level Oil level should be between the ADD and F marks on the gage.



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Figure 3-3. Oil filler cap and level gage.

(3) To add oil remove filler cap (fig. 3-3) and add oil Refer to current lubrication order for correct grade of oil

3-15. Wheels and Tires

a. General The front wheels of the truck are the drive wheels. A propeller shaft connects the transmission to the drive axle. Rear wheels are mounted on the steering axle. A hydraulic cylinder, actuated by turning the steering wheel, rotates the steering

axle to turn the truck. The tires are the solid rubber-cushion type.

b. Inspection.

(1) Inspect the tires for cuts, gouges and other damage.

(2) Check the wheels for secure mounting.

(3) When operating truck listen for unusual noises that could come from loose wheel mounting or worn wheel bearings.

3-16. Transmission

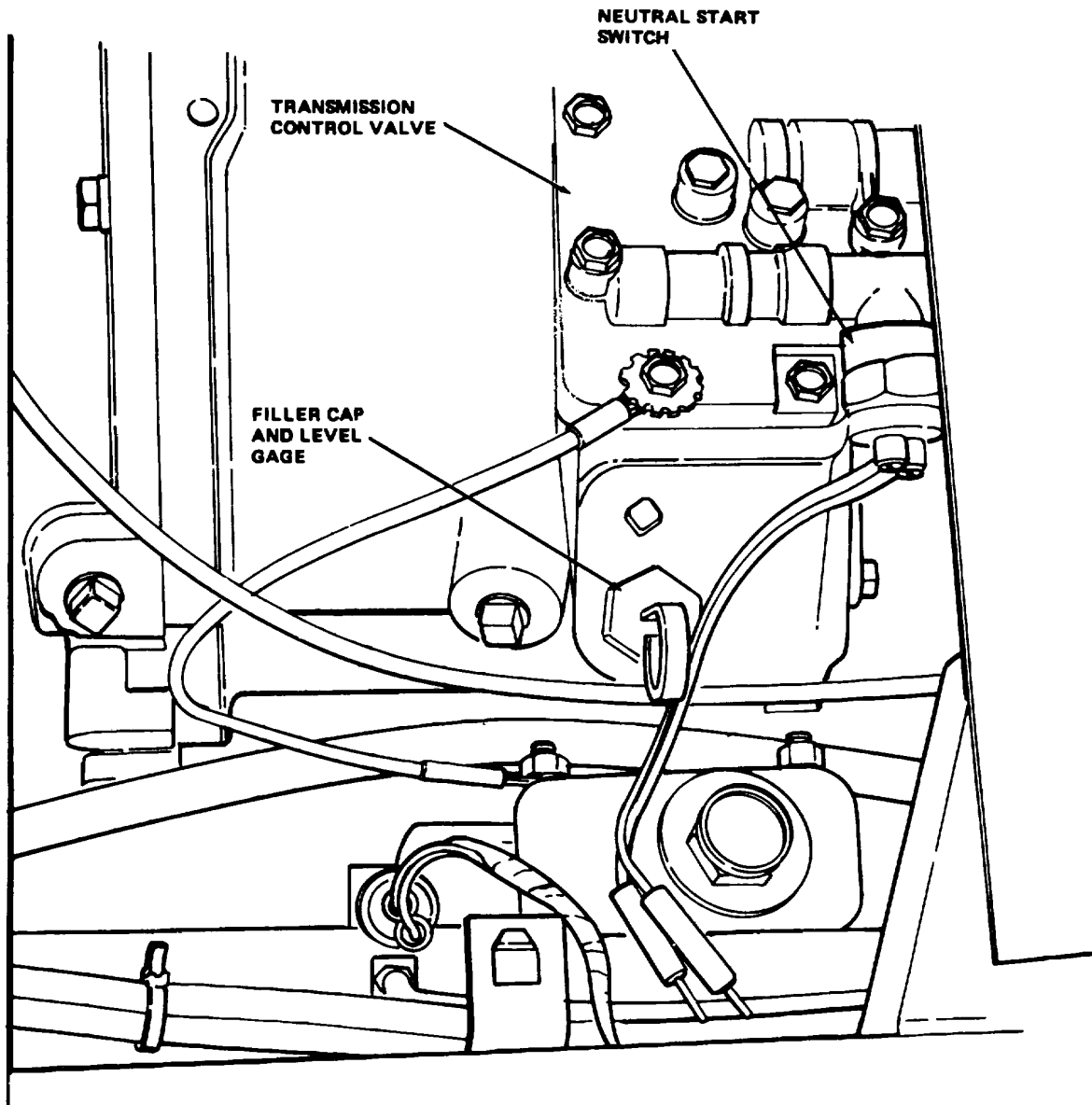
a. *General.* The transmission is mounted forward at the engine and the torque converter is directly coupled to the flywheel with flex plates.

b. *Service.* Operator service of the transmission is limited to checking the oil level and adding oil to

bring to operating level

(1) Lift hinged door on right end of floor plate.

(2) With engine operating at idle speed remove transmission oil level gage (fig. 3-4), and check oil level. Level should be to full mark on gage.



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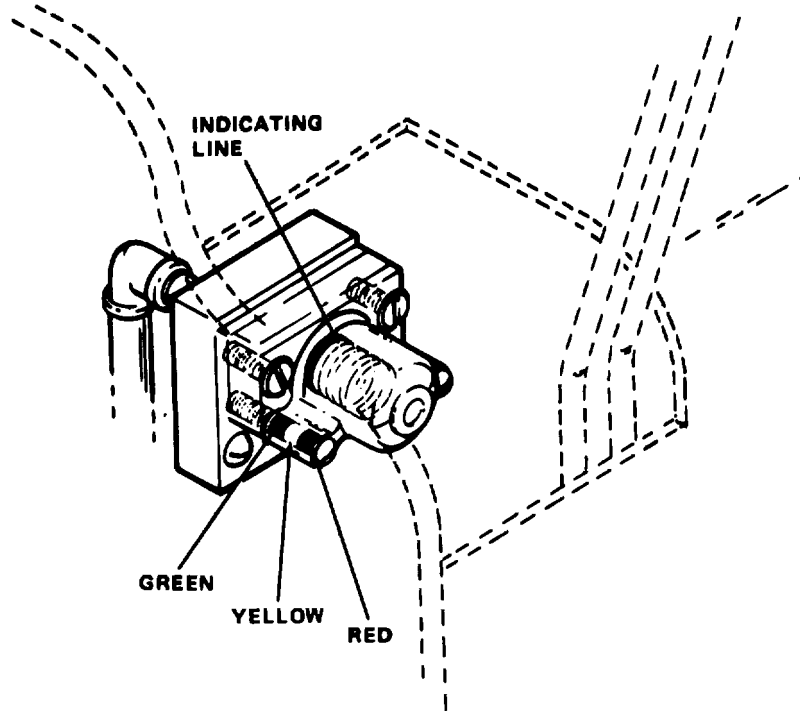
Figure 3-4. Transmission filler cap and level gage.

(3) To add oil, remove filler cap and fill to full mark on gage. Refer to current lubrication order for proper grade of oil.

3-17. Hydraulic Filter Element Indicator

a. *General.* A hydraulic filter element indicator (fig. 3-5) is mounted below the hydraulic control valve

levers at the right front of the truck. The indicator shows the condition of the element in the hydraulic filter.



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Figure 3-5. Hydraulic filter element indicator.

b. Inspection. With the engine operating, move the hydraulic control valve levers to actuate the hydraulic system. Check the filter indicator as oil is flowing in the system.

(1) If the green band is in line with white indicating line, the element and system is operating properly.

(2) When the white indicating line is in line with any portion of the yellow band, the filter element is becoming contaminated.

(3) When the white indicating line reaches any portion of the red band, notify organizational maintenance to change the element. Do not operate truck when indicator is in this position.

3-18. Hydraulic Reservoir

a. General The hydraulic reservoir stores oil to be

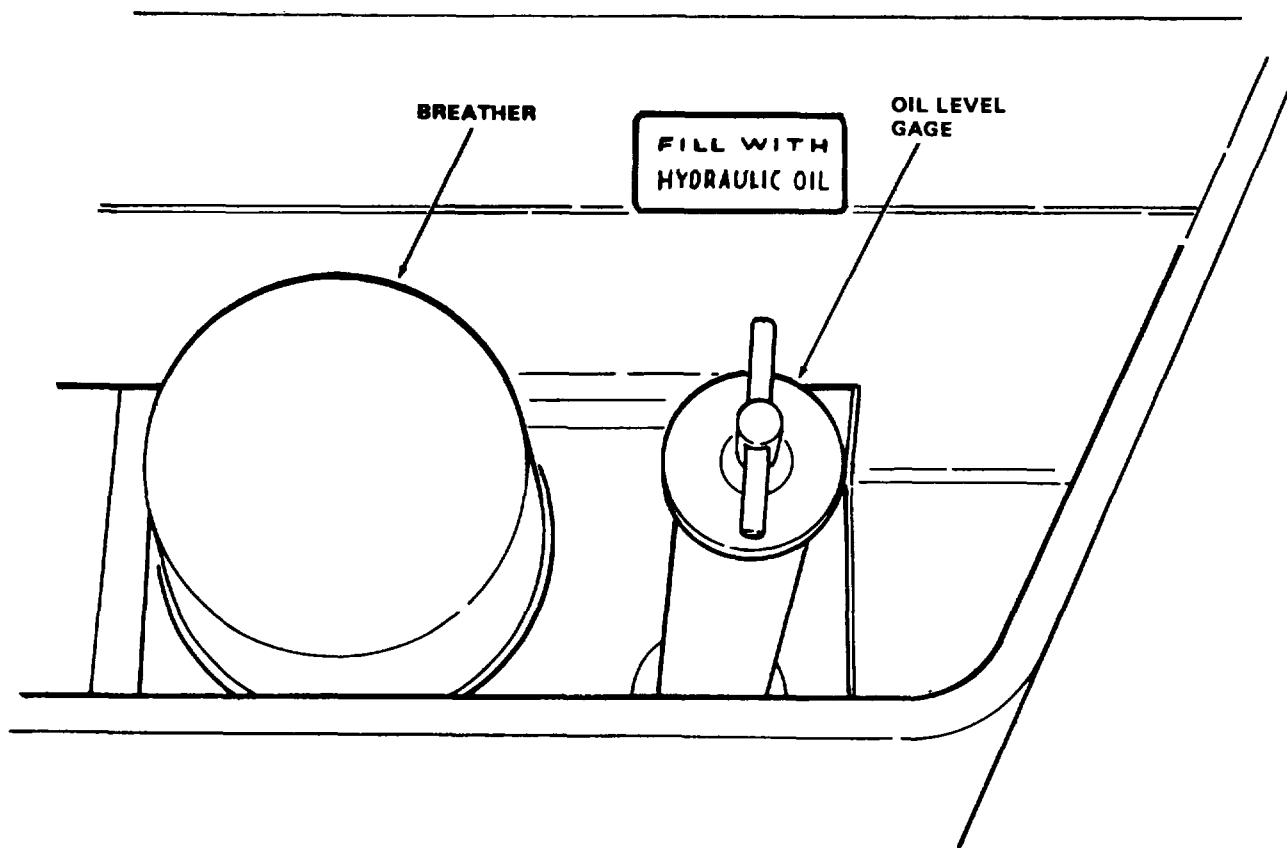
used in the hydraulic system. The reservoir is mounted on the frame at the lower right side of the engine compartment.

b. Service. Open right side panel to gain access to hydraulic reservoir.

(1) Remove level gage (fig. 3-6) and check oil level in reservoir. Level should be at full mark with oil temperature at approximately 70°F (21°C).

(2) If oil level is low, add oil to bring it to proper level. Refer to current lubrication order for proper grade of oil. Fill reservoir through oil gage opening.

(3) To remove hydraulic reservoir breather from reservoir, unscrew breather from reservoir. If breather is dirty or contaminated, replace breather.



TO REMOVE BREATHER, TURN COUNTERCLOCKWISE

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Figure 3-6. Hydraulic reservoir

CHAPTER 4 ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF TRUCK

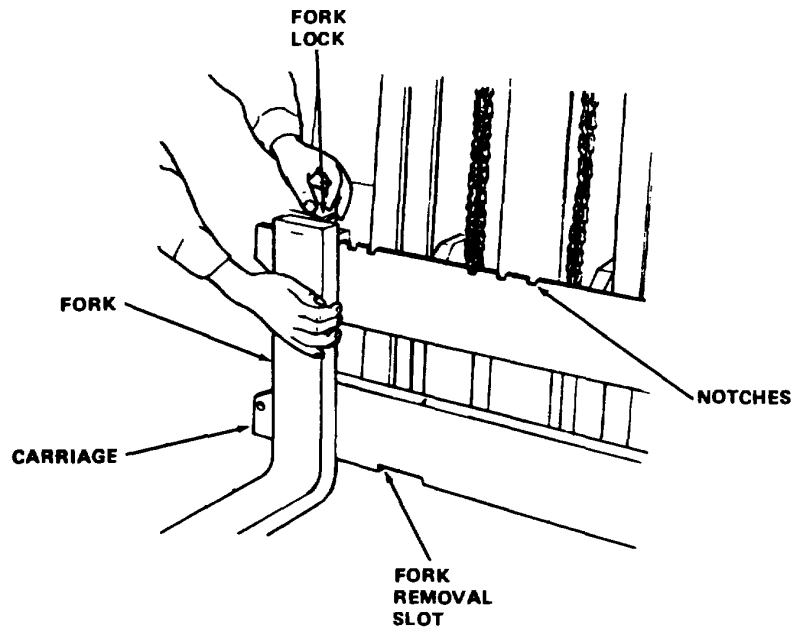
4-1. Inspecting and Servicing the Equipment

a. When a truck is received by the using organization, it must be serviced to prepare it for operation. The services required are described below.

b. Carefully inspect truck for any signs of dents or

damage that may have occurred in shipment.

c. Remove tape, paper and other packing materials. Remove forks from truck by removing strapping and tie downs. Install forks on carriage as shown in figure 4-1.



INSTALLATION

1. RELEASE FORK LOCK BY TURNING POINT UP.
2. SLIDE FORK IN LINE WITH SLOT ON CARRIAGE. LIFT FRONT OF FORK UP AND SLIDE INTO POSITION.
3. TURN POINT OF FORK LOCK DOWN TO LOCK FORK IN NOTCH ON CARRIAGE.

REMOVAL

1. TURN POINT UP TO RELEASE FORK LOCK.
2. SLIDE FORK IN LINE WITH SLOT ON CARRIAGE. LIFT FRONT OF FORK UP AND REMOVE FROM CARRIAGE.

ADJUSTMENT

1. RELEASE LOCK.
2. SLIDE FORK IN LINE WITH NOTCH AND LOCK IN POSITION.

Figure 4-1. Removing, installing or adjusting carriage forks.

TA034776

d. Remove any preservative compound that has been sprayed on metal surfaces with cleaning compound, solvent (Fed Spec. P-D-680), and dry thoroughly

WARNING

Dry cleaning solvent, P-D480 used for cleaning is potentially dangerous to personnel and property. Do not use near an open flame. Flash point of solvent is 100° F (880C) to 188°F (5C).

e. Preservative compound is not a lubricant. Take special care to completely remove the compound from all wearing surfaces.

WARNING

When servicing battery, do not smoke or

use flame in the vicinity. Batteries generate hydrogen, a highly explosive gas.

f. Fill the battery with electrolyte to three-eighths of an inch above the plates. Check specific gravity of electrolyte as prescribed in TM 96140-200-12.

g. Lubricate the truck in accordance with the current lubrication order.

h. See that the cooling system contains the prescribed amount of anti-freeze in accordance with table 4-1, if necessary.

i. Check drive belts and adjust for proper deflection.

j. Refer to table 4-2 for a list of maintenance and operating supplies required for initial operation of the fork lift truck.

Table 4-1. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temperature °F	Pints of inhibited glycol per al. Of coolant	Compound, antifreeze Arctic ³	Ethylene glycol coolant specific gravity at 68°F
+2	1%	Issue full strength	1.022
+10	2	and ready mixed for	1.036
0	2 ^{3/4}	01 to 66F temperatures	1.047
-10	3 ^{1/4}	for both	1.066
-20	4	initial installation	1.062
-30	4 ^{1/4}	and replenishment of	1.067
-40	Arctic	losses	1.073
-50	anti-	DO NOT DILUTE WITH	
-60	freeze	WATER OR ANY OTHER	
-75	Preferred	SUBSTANCE	

¹Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution)

² Military Specification MIL-C-11755 Arctic type, nonvolatile anti-freeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions, where the ambient temperature remains for extended period close to -40°F or drops below, to as low as -90°F.

³ Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol to 2 parts water. This should produce a hydrometer reading of 0°F.

NOTE

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

4-2. Installation of Separately Packed Components

a. Components. The only components not already installed are the forks, electrolyte and the fire extinguisher.

b. Fire Extinguisher. Remove separately packed

fire extinguisher and install in bracket in operator's compartment. Be certain clamp locks securely to hold fire extinguisher in position.

c. Forks and Electrolyte. Refer to paragraph 4-1 and install forks and electrolyte.

Table 4-2. Maintenance and Operating Supplies

(1) Component application	(2) National stock number	(3) description	(4) Quantity f/initial operation	(5) Quantity f/8 hrs. operation	(6) Notes
CRANKCASE (1)	----- 9150-00-265-9364(2) 9150-00-265-2429(2) 9150-00-242-7604(2) 9130-00-264-6218	OIL, LUBRICATING: 55 gal. drums as follows: OE/HDO-30 OE/HD-10 OES GASOLINE: bulk as follows: Regular grade	5 qt. 5 qr. 5 qt. 4 ½ (4)	(3) (3) (3) 8 gal. (5)	(1) Includes quantity to fill out system as follows: 1 qt. oil filter 4 qt crankcase
RADIATOR	6850-00-243-1992 6580-00-243-1990	WATER ANTIFREEZE: ethylene glycol 1 gal. can. ANTIFREEZE: ethylene glycol 55 gal. drum grade application and	10 qt.		(2) See C 100L for additional data and requisitioning procedure
TRANSMISSION		OIL, LUBRICATING: (6) OE/HDO-10 OES	11 qt. (7) 11 qt. (7)	(3) (3)	(3) See current LO for grade application and replenishment intervals.
HYDRAULIC BRAKE		OIL HYDRAULIC: 1 gal can as follows: HBA-non-petroleum base, automotive, arctic-type HBA-non-petroleum base, automotive, arctic-type	½ pt. ½ pt.	(3) (3)	(4) Tank capacity. (5) Average fuel con- sumptim is 10 gal. per hour of continuous operation.
DIFFERENTIAL	91504)0577-5845(3) 9150-00;240-2244(3) 915040-257-5442(3)	OIL, LUBRICATING, GEAR: 55 gal. drum as follows: GO90 GO-75 GOS	6 pt. 6 pt. 6 pt.	(3) (3) (3)	(6) Use oil as (7) Includes quantity to fill transmission system as follows: 10 qt. transmission 1 qt. filter
HYDRAULIC SYSTEM	9150-00-265-9429(3) 9150-00-242-7604(3)	OIL, LUBRICATING: 55 gal. drum as follows: OE/HDO-10 OES	14 ¼. (8) 14 ¼ 8 qt.	(3) (3) (3)	(8) Includes quantity to fill hydraulic system as follows: 1 qt. filter 2½ qy. lines 3¾ gal. reservoir
LUBRICATION FITTINGS	9150-00-1 90-07(3)	GREASE, AUTOMOTIVE AND ARTILLERY: 35 lb can as follows: GAA	As required	(3)	

Section II. MOVEMENT TO A NEW WORKSITE

4-3. Dismantling for Movement

The only components that may require dismantling for movement are the forks. If necessary to conserve space when transporting the lift truck by means of another carrier, refer to figure 4-1 and remove the forks.

4-4. Reinstallation after Movement If forks were removed to transport the lift truck, refer to figure 4-1 and install the forks on the carriage.

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-5. Tools and Equipment

Tools, equipment, and repair parts, with or authorized for the fork lift truck, are listed in the basic issue items list and items troop installed or authorized, appendix C.

4-7. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list (TM 10-39304630-20P, to be published), for the fork lift truck.

4-6. Special Tools and Equipment

No special tools or equipment are required to perform organizational maintenance on the fork lift truck.

Section IV. LUBRICATION INSTRUCTIONS

4-8. General

These paragraphs contain lubrication instructions which are supplemental to and not specifically covered in the lubrication order.

4-9. Hydraulic Filter and Reservoir

a. Replacement of the filter is required at specified intervals.

b. A hydraulic filter element indicator (fig. 3-5) is located at the right side of the instrument panel. The indicating line (fig. 3-5) should be in line with the green band. This indicates filter element is operating properly. If indicating line is in line with the yellow band, element is becoming contaminated and should be changed at earliest convenience. When white indicating line reaches any portion of the red band, change element immediately.

c. Refer to paragraph 4-43 and service the hydraulic filter.

d. The hydraulic reservoir and breathers must be serviced at regular intervals.

e. Refer to paragraph 4-44 and service the reservoir and breather.

f. To drain reservoir, place a suitable container under reservoir. Remove drain plug and drain reservoir.

g. Install drain plug and fill reservoir through level gage hole.

4-10. Brake Master Cylinder

a. The brake system must be checked and serviced at regular intervals.

b. Refer to paragraph 4-90 and service the master cylinder.

4-11. Drive Axle

a. The drive axle requires addition of lubricant and draining and filling at regular intervals.

b. The axle breather requires service at regular intervals.

c. To drain axle differential, remove drain plug at bottom of housing. Fill axle differential through level plug located on cover side of the housing.

d. Refer to paragraph 4-95 to service axle and breather.

4-12. Transmission

a. The transmission requires service at regular intervals. A daily check of the oil level is required.

b. To drain transmission, place a suitable container under the drain plug, remove drain plug and drain transmission.

c. A filter screen is mounted in the transmission sump. The screen should be serviced every time the transmission oil is change

d. Refer to paragraph 4-101 to service transmission and screen.

4-13. Engine Oil Filter

a. The engine oil filter must be changed at regular intervals; the filter is replaceable and requires no servicing.

b. Refer to paragraph 4-80 and replace the engine oil filter when necessary.

4-14. Engine Crankcase

a. The oil level in the engine crankcase should be inspected daily. Add oil as necessary to maintain proper operating level

b. A breather, mounted in the filler cap, should be cleaned periodically.

c. To drain engine crankcase, place a suitable container below engine and remove drain plug at left side of oil pan. Install drain plug and fill crankcase to proper level through filler cap hole.

d. Refer to paragraph 4-80 to service the engine crankcase.

Section V. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-15. General

To insure that the fork lift truck is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed by the operator are listed and described in paragraph 3-4. Organizational maintenance checks and services are listed and described in paragraph 4-16. The item numbers indicate the sequence of minimum inspection requirements. All deficiencies and shortcomings will be recorded, together with the corrective action taken, in accordance with TM 38-750.

4-16. Organizational Preventive Maintenance Services

a. This paragraph contains a tabular listing of preventive maintenance services which must be performed by organizational maintenance personnel at the indicated intervals.

b. Table 4-3 lists preventive maintenance services in item numbers listed consecutively and indicates the sequence of minimum requirements. The intervals are listed under services to be performed by organizational maintenance personnel Columns indicate the interval and sequence number, the item to be inspected, the procedure, and the paragraph reference in this manual where the procedure is described. When operational checks are to be made, an operator must be seated on seat.

Table 4-3. Organizational Preventive Maintenance Checks and Services

Q—Quarterly
Total man-hours required: 3.0

Sequence No. . procedure	Item to be inspected	Work Time (M/H)
1	OVERHEAD GUARD Check for cracked welds and other damage (para 4-22)	0.1
	OPERATOR'S SEAT Check for secure mounting; damage to cushions and adjustment operation (para 4-29)	0.1
3	BODY, PANELS AND COWLS Check for dents, cracks and secure mounting.(para 4- 24).	0.1
4	INSTRUMENT PANEL Check for cracked and damaged instrument Inspect electrical and tubing connections and tighten if necessary	
5	MAST ASSEMBLY Check for smooth operation Adjust bed if necessary. Check operation of carriage Inspect for cracked or damage welds. (para 4-40).	0.2
6	HYDRAULIC LINES AND FITTINGS Inspect lines for leaks, deterioration, secure connection and any evidence of damage (para 4-34).	0.1
7	LIFT CHAINS Check chains for smooth operation. Inspect chain mounting. Check cir head bearings for good condition. Lubricate chain if necessary (para 4-.3	0.1
8	LIFT CYLINDERS Operate lift mechanism and observe cylinder operation (4-38)	0.1
9	TILT CYLINDERS Operate tilt mechanism and observe cylinder operation. Check tilt limits if necessary. Check tilt cylinder mounting and hoses (para 43).	02
10	HYDRAULIC RESERVOIR Check breather for contamination Inspect reservoir for leaks and damage (para 4.44).	0.1
11	ELECTRICAL SYSTEM Check all wiring and harness for a secure connections. Check wire for fraying and other damage (para 4-45)	02

Table 4-3. Organizational Preventive Maintenance Checks and Services - Continued

Q—Quarterly

Total man-hours required: 3.0

Sequence No. procedure	Item to be inspected	Work Time (M/H)
12	BATTERY Check battery for loose cables Remove corrosion Fill battery to 3; inch above plates Clean vent holes in	0.1
18	LIGHTS Check lights for proper operation Inspect lights for broken lens and other damage (para 4-47).	0.1
14	ALTERNATOR Operate engine and check ammeter. Alternator should be charging and taper down to a minimum charging rate. Inspect wires and connections to alternator and tighten if necessary (par 4-51).	0.1
15	STARTER Operate starter to start engine and check operation. Check wires connected to starter and tighten if necessary (para 4-2)	0.1
16	STARTER Check engine operation Adjust distributor points if necessary (para 453).	
17	SPARK PLUGS AND COIL Check engine operation If engine runs erratically or seems to lack power, check spark plugs and coil (para 4-45).	0.1
18	AIR CLEANER Check air cleaner indicator. If indicator is locked with red in the up position, clean or replace element. Reset indicator (para 4-57).	0.1
19	CARBURETOR Reset indicator (para 4-5). Operate engine and check carburetor operation. Test and adjust if necessary (para 4-58).	0.1
20	FUEL PUMP Check fuel pump pressure (para 4-60).	02
21	CRANKCASE VENT VALVE Remove vent valve and check valve (para 4-62).	0.1
22	GOVERNOR Operate engine and check governor operation (par 4-59	0.1
28	ACCELERATOR Operate pedal and linkage Check operation (para 4658	0.1
24	FUEL TANK FILLER CAP AND SCREEN Remove filler cap and check screen Clean screen if necessary (para 4-61).	0.1
26	FUEL LINES Check fuel lines for leakage and damage. Tighten connections (para 4-68).	02
2a	DRIVE BELT Check belt for stretching and wear. Adjust belt to obtain 3/4-inch deflection between pulleys (para 4-1).	02
27	FAN AND WATER PUMP Check fan for bent or dented blades If engine is overheating check water pump operation (para 4/8).	0.1
28	RADIATOR Check radiator for leaks and damage. Test radiator and cap for correct pressure (par 469).	02
29	HOSES AND THERMOSTAT Check hoses for leaks and good condition Tighten hose clamps if necessary. Check thermostat operation (para 670).	0.1
80	MUFFLER AND PIPES Check muffler and pipes for leaks and damage. Tighten clamps if necessary (para 4-75	02
31	DRAGLINK AND TIE RODS Operate steering and check drag link and tie rods (para 4-74)	0.1
32	ENGINE Check engine operation Inspect engine for leaks and damage. Change engine oil if necessary (para 4-80).	02
33	ENGINE OIL FILTER Check engine oil filter. Replace filter according to interval specified in current Lubrication Order.	02
34	MANIFOLDS Check manifolds for cracks or leakage (pars 4-81	02
35	CYLINDER HEAD Check cylinder head for leakage and damage (para 4-82).	0.1
36	VALVE Check engine and valve operation (para 4-8-3)	0.1
37	WHEELS AND BEARINGS Check drive and steer wheels for proper operation Adjust steering stops if necessary (pars 485).	0.1
38	TIRES Check tires for wear, cuts and damage. Notify direct and general support maintenance if tires require replacing (para 3-15	02

Table 4-3. Organizational Preventive Maintenance Checks and Services - Continued

Q—Quarterly

Total man-hours required: 6.9

Sequence No. procedure	Item to be inspected Time	Work (M/H)
39	SERVICE BRAKE SHOES Inspect shoes for wear (para 4-88)	0.2
40	WHEEL CYLINDERS Check wheel cylinder operation Bleed brake system if necessary (para 489).	0.1
41	MASTER CYLINDER Check master cylinder operation. Brakes should stop truck smoothly and evenly. Check master cylinder for leaks (para 4-90)	0.1
	BRAKE PEDAL AND LINKAGE Check brake operation (para 4-87).	
43	PARKING BRAKE Check lever and brake operation (para 4-91 and 4-92)	0.1
44	DRIVE AXLE Check axle shafts and drive gears for good condition and proper operation. Lubricate axle according to current Lubrication Order (para 4-93)	0.4
45	STEERING AXLE Check steering axle mounting. Tighten screws if necessary. Check stop and alignment adjustment Adjust if necessary (para 4-73)	0.2
46	TRANSMISSION OIL FILTER Check hoses for leaks Tighten connections or replace hoses if necessary. Change filter element in accordance with current Lubrication Order (para 4-73)	0.2
47	CONTROL LEVER AND LINKAGE Operate truck and check transmission operational Operate inching pedal and check operation (par 4-99)	0.2

Section VI. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

4-17. General

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

b. This manual cannot list all malfunctions that

may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify direct support maintenance.

4-18. Organizational Maintenance Troubleshooting

The following table, Table 4-4, lists the malfunctions, tests and inspections, and corrective actions as applicable to organizational maintenance.

Table 4-4. Organizational Maintenance Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ENGINE FAILS TO TURN OVER		
	Step 1.	Check for weak or defective battery. Charge battery or replace battery (para 4-46).
	Step 2.	Check for defective or shorted wiring. Repair or replace wiring as necessary.
	Step 3.	Check for defective starter. Replace defective starter (para 4-52).
2. ENGINE FAILS TO START		
	Step 1.	Check cranking speed. If speed is low check battery connections and battery. If battery is dead, charge or replace battery (para 4-52).
	Step 2.	Check choke and carburetor controls. Adjust controls if necessary (para 4-58).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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- | | | |
|---------|---|--|
| Step 3. | Check fuel filter.
Service fuel filter if necessary (para 4-61). | |
| Step 4. | Check distributor, coil and spark plugs.
Adjust distributor points or replace points if defective. Check coil and spark plugs and replace if defective. Replace defective distributor, coil and spark plug wires (para 444). | |
| 3. | ENGINE HARD TO START | |
| Step 1. | Check choke and carburetor controls.
Adjust choke and carburetor and controls if necessary (para 4-58). | |
| Step 2. | Check distributor, coil, spark plugs and wires.
Adjust distributor, coil, spark plugs and wires.
Adjust distributor points or replace points. Replace defective coil, spark plugs and wires (para 4-54). | |
| Step 3. | Check air supply to engine.
If air cleaner indicator indicates cleaner is clogged, clean or replace air cleaner element (para 4-57). Reset indicator. | |
| 4. | ENGINE STALLS AND STOPS FREQUENTLY | |
| Step 1. | Check idle speed.
Adjust idle speed if necessary (para 4-58). | |
| Step 2. | Check governor operation.
Adjust or replace governor if necessary (para 4-59). | |
| Step 3. | Check carburetor and linkage operation.
Adjust linkage or replace carburetor if necessary (para 458). | |
| 5. | ENGINE OVERHEATS | |
| Step 1. | Check fan belt for wear, stretching and proper adjustment.
Replace worn or stretched belt. Adjust belt to 1/2 inch deflection between pulleys (para 451). | |
| Step 2. | Check radiator and hoses for leakage.
Tighten hose clamps or replace hoses if necessary. Repair leaks if possible (para 4-69). | |
| Step 3. | Check thermostat operation.
Replace defective thermostat (para 4-70). | |
| 6. | ENGINE EMITS BLACK SMOKE FROM EXHAUST | |
| Step 1. | Check air supply to engine.
If indicator shows air cleaner is restricted, clean or replace element and reset indicator (para 457). | |
| Step 2. | Check carburetor settings and adjustments.
Adjust carburetor, carburetor linkage or replace defective carburetor (para 4-58). | |
| 7. | ENGINE OIL PRESSURE LOW | |
| Step 1. | Check oil lines for leakage
Repair or replace oil lines. | |
| Step 2. | Check oil pressure regulator valve.
Adjust regulator valve. | |
| Step 3. | Check oil pressure gage.
Replace defective oil pressure gage (para 432). | |
| 8. | STARTER WILL NOT CRANK ENGINE | |
| Step 1. | Check battery and cables.
Tighten, clean or replace battery and/or cables (para 4.46). | |
| Step 2. | Check neutral start switch.
Replace defective neutral start switch (para 4-100). | |
| Step 3. | Check starter operation.
Tighten connections or replace defective starter (para 4-52) | |

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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- | | | |
|-----|--|---|
| 9. | TRUCK DOES NOT MOVE WHEN ACCELERATOR IS DEPRESSED | |
| | Step 1. | Check accelerator linkage.
Adjust or replace carburetor linkage. |
| | Step 2. | Check transmission linkage.
Adjust transmission lever and linkage (para 4-58). |
| | Step 3. | Check drive axle.
Adjust drive axle bearings (para 486) or notify direct and general support maintenance if drive axle is defective. |
| 10. | TILT AND LIFT MECHANISMS DO NOT OPERATE WHEN LEVERS ARE ACTUATED | |
| | Step 1. | Check hydraulic filter element indicator.
If indicator shows element is restricting flow, replace element (para 4-43). |
| | Step 2. | Check hydraulic reservoir and lines for leaks.
Tighten connections or replace lines and/or reservoir (para 444). |
| | Step 3. | Check control lever operation.
Adjust or replace defective levers (para 4-41). Notify direct and general support maintenance if control valve is defective |
| 11. | SERVICE BRAKES DO NOT STOP TRUCK PROPERLY | |
| | Step 1. | Check brake pedal and linkage.
Adjust or replace pedal and linkage (para 4-87). |
| | Step 2. | Check master cylinder.
Fill master cylinder or replace defective master cylinder (para 4-90) |
| | Step 3. | Check wheel cylinders.
Bleed brake system or replace defective wheel cylinder (para 4-89) |
| | Step 4. | Check service brake shoes.
Replace unserviceable springs or brake shoes (para 4-88). |
| 12. | PARKING BRAKE DOES NOT HOLD TRUCK ON SLOPE | |
| | Step 1. | Check parking brake linkage.
Adjust or replace defective parking brake linkage or lever (para 4-91) |
| | Step 2. | Check parking brake.
Repair or replace parking brake (para 4-92) |
| 13. | TRUCK DOES NOT STEER PROPERLY | |
| | Step 1. | Check drag link and tie rod.
Adjust, repair or replace defective drag link and/or tie rods (para 4-7). |
| | Step 2. | Check steering axle mounting.
Adjust mounting or adjust steering axle (para 4-78). |
| | Step 3. | Check steering valve and cylinder.
Notify direct and general support maintenance if valve is defective. Replace defective steering cylinder (para 4-76). |
| 14. | HEAD AND TAILLIGHTS DO NOT OPERATE WHEN SWITCH IS ACTUATED | |
| | Step 1. | Check headlight and taillight.
Repair or replace defective lights (para 4-47). |
| | Step 2. | Check light switch.
Repair or replace defective light switch (para 4-31). |
| | Step 3. | Check stoplight switch.
Replace defective switch (para 4-90). |
| 16. | HORN DOES NOT SOUND | |
| | Step 1. | Check horn button.
Replace defective horn button (para 4-77). |
| | Step 2. | Check battery.
Charge or replace defective battery (para 446). 4-48 |
| | Step . | Check horn and relay.
Replace defective horn and/or relay (para 448). |

Section VII. RADIO INTERFERENCE SUPPRESSION

4-19. General Methods to Obtain Proper Suppression

Essentially, suppression is obtained by providing a low resistance path to ground for stray currents. The methods used include grounding the frame with ground straps and installing internal or external teeth lockwashers in critical mounting areas.

4-20. Interference Suppression Components

a. A ground strap is connected between the instrument panel and frame.

b. The following ground and mounting parts utilize internal-external teeth lockwashers to provide positive grounding.

(1) Leads to instrument panel

(2) Battery ground wire.

c. Spark plugs are the resistor type.

d. Spark plug and ignition coil leads and cable are nonmetallic conductor type.

4-21. Replacement of Suppression Components

Since no major components such as capacitors or resistors are installed to provide radio suppression, removal of the components is not required. In normal removal and disassembly procedures the lockwashers will be removed and be labeled as suppression components at that time.

Section VIII. OVERHEAD GUARD

4-22. General

The overhead guard is incorporated in the truck to provide protection for the operator. The guard is mounted to the frame at the four corners.

4-23. Overhead Guard

a. Removal

(1) Attach a suitable hoist to the overhead guard and raise hoist to relieve tension on mounting screws.

(2) Remove screws (1 and 2, fig. 4-2), nuts, lockwashers (3), washers (4) and nuts (5).

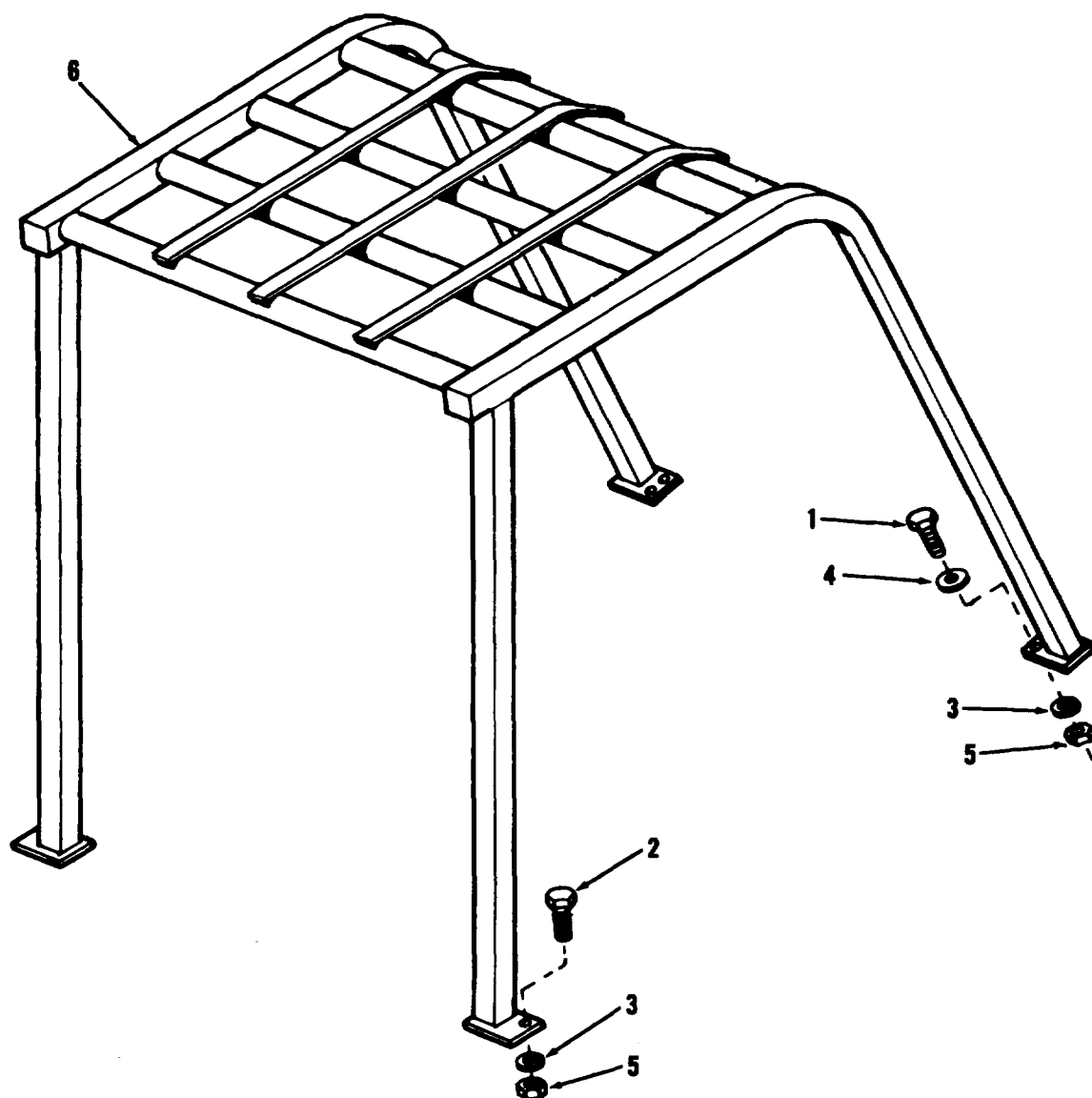
(3) Carefully lift overhead guard (6) from truck, using hoist.

b. Installation.

(1) Lift overhead guard (6, fig. 4-2) into position on truck.

(2) Secure overhead guard to truck with screws (1 and 2), lockwashers (3), washers (4) and nuts (5).

(3) Detach hoist from guard.



1 Screw
2 Screw
3 Lock Washer

4 Washer
5 Nut
6 Overhead guard

TA034777

Figure 4-2. Overhead guard, removal and installation.

Section IX. PANELS. COWLS AND PLATES

4-24. General

a. Panels and Cowls. The major portions of the truck are enclosed with sheet metal panels and cowls. Two side panels are hinged and can be swung out and to the rear to gain access to the engine

compartment. Two cowls, one on each side of the front of the frame, enclose the fuel tank on the left and the hydraulic oil filter control valve and horn on the right.

b. Floor and Toe Plates. The floor and toe plates

provide the base for the operator's compartment. They provide protection for the transmission, shifting, inching pedal and accelerator linkages. A hinged cover welded to right side of the floor plate beneath the seat allows access to the transmission level gage and master cylinder.

c. *Grilles.* A large grille is mounted at the rear of the counterweight to protect the radiator. Below the front of the operator seat is an engine screen to protect the engine compartment and allow air to enter for engine operation.

d *Seat Support and Deck.* The seat is mounted on a support hinged at the front to allow the seat to be tipped forward. A prop is provided to hold the seat in the open position. Attached to the rear of the support is a deck which protects the upper rear of the engine compartment.

4-25. Cowls

a. *Removal.* Removal screws (1 and 3, fig. 4-3), washers (2) and nuts (4 and 7) and remove cowls (5 and 6) from the front corners of the frame.

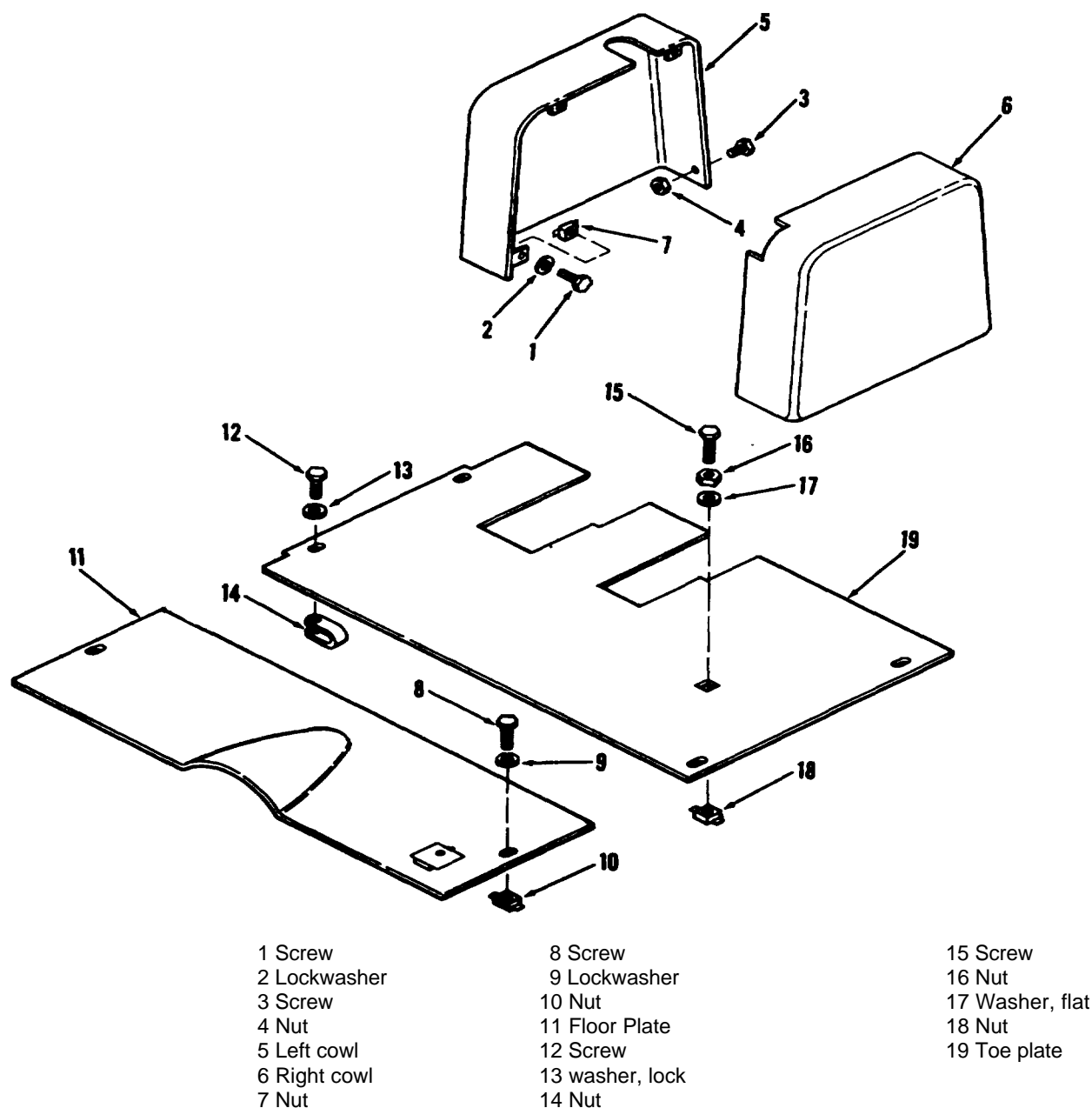


Figure 4-3. Cowls and floor plates, exploded view.

b. *Installation.* Install cowls (5 and 6, fig. 4-3) on frame and secure with screws (1 and 3), lockwashers (2) and nuts (4 and 7).

4-26. Side Panels

a. *Removal.*

- (1) Open side panels and swing them to the rear.
- (2) Lift side panels up and away from hinges (27 and 28, fig. 4-4).

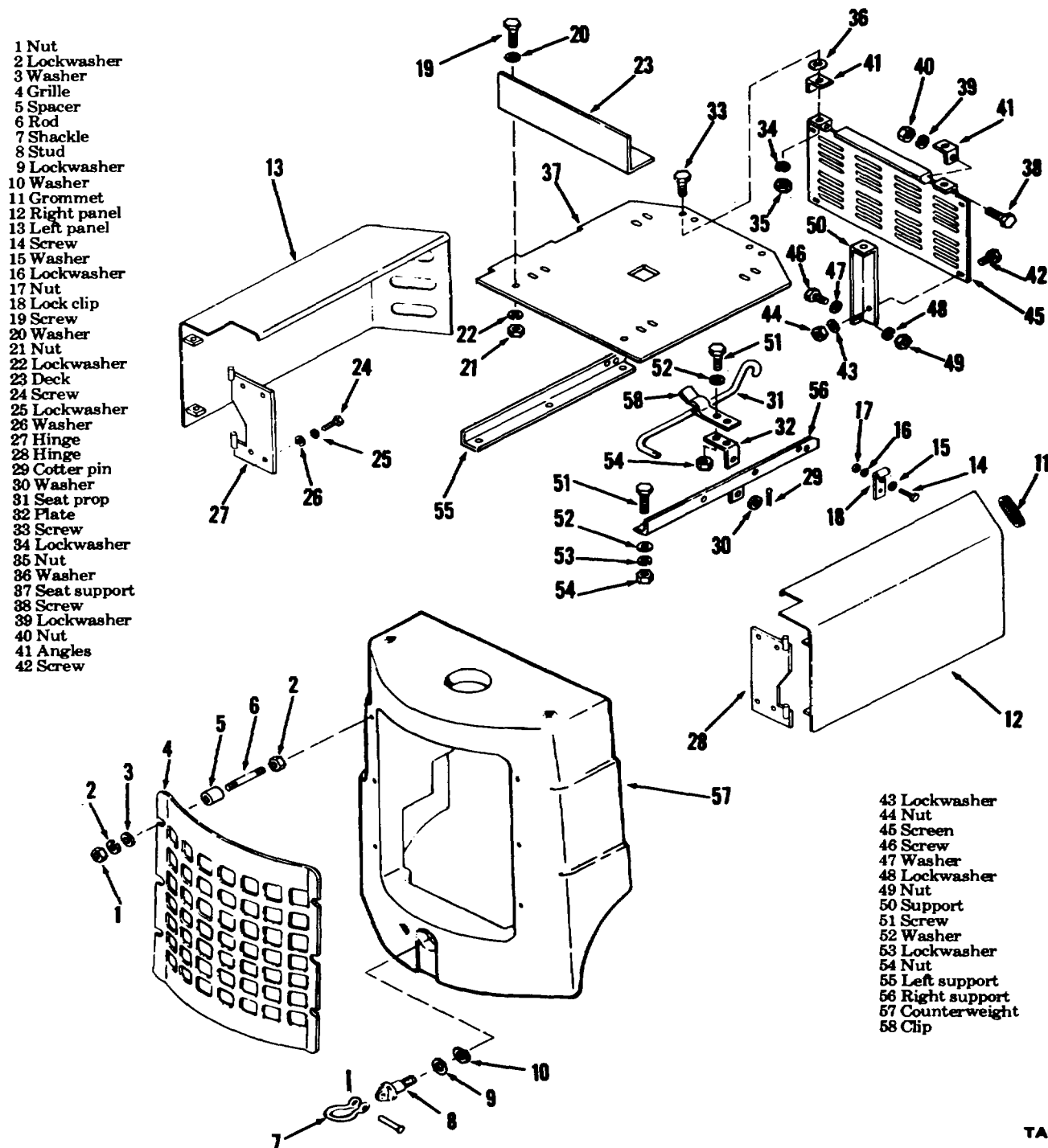


Figure 4-4. Counterweight and side panels, exploded view.

(3) Inspect grommets (11) and replace if damaged or deteriorated.

b. Installation

(1) Install side panels (12 and 13, fig. 4-4) on hinges. Install grommets (11) in panels if they were removed.

(2) Close side panels.

4-27. Floor and Toe Plates

a. Removal

(1) Remove screws (8, fig. 4-3) and washers (9).

(2) Remove floor plate (11) from operator's compartment.

(3) Remove screws (12 and 15), washers (13 and 17) and nuts (16).

(4) Carefully slide toe plate (19) to the rear and lift toe plate away from accelerator, brake and inching pedals.

c. Installation.

(1) Carefully slide toe plate (19, fig. 4-3) into position in truck. Align cutouts in plate with pedals and accelerator.

(2) Secure plate to frame with screws (12 and 15), washers (13 and 17) and nuts (16).

(3) Install floor plate (11) behind toe plate over transmission.

(4) Secure floor plate with screws (8) and washers (9).

4-28. Grille and Screen

a. Removal

(1) Remove nuts (1, fig. 4-4), lockwashers (2) and

washers (3) and remove grille (4). Remove spacers (56)

(2) Refer to paragraph 4-30 and remove seat from truck.

(3) Remove screws (19), washers (20), nuts (21) and lockwashers (22) and remove deck (23) from seat support.

(4) Remove screws (33), lockwashers (34), nuts (35) and washers (36) and remove seat support (37).

(5) Remove long screws (38), lockwashers (39) and nuts (40) and remove angles (41) from screen.

(6) Remove screws (42), lockwashers (43) and nuts (44) and remove engine screen (45) from truck.

(7) Remove remaining parts, if necessary, by removing attaching parts.

b. Installation.

(1) Install engine screen (45, fig. 4-4) on supports and secure with screws (42), lockwashers (43) and nuts (44).

(2) Install angles (41) on screen and install long screws (38), lockwashers (39) and nuts (40).

(3) Install seat support (37) on angles and secure with screws (33), lockwashers (34), nuts (35) and washers (36).

(4) Install deck (23) on rear of seat support and secure with screws (19), washers (20), nuts (21) and lockwashers (22).

(5) Refer to paragraph 4-30 and install seat assembly.

(6) Install spacers (5) and grille (4) on rods (6). Secure grille with nuts (1), lockwashers (2) and washers (3).

Section X. SEAT ASSEMBLY

4-29. General

a The operator's seat is mounted above the engine compartment. Placement of the seat allows easy access to all operating controls. Cushions on the seat and back provide comfort for operator.

b. The seat is adjustable, fore and aft. It is mounted on a hinged support, allowing it to be tilted up and forward to allow access to the top of the engine. A prop, set on a pivot, can be raised and set in place to an open position.

4-30. Seat Assembly

a. Removal

(1) Lift and tilt seat forward and prop into position.

(2) Support seat and remove nuts (1, fig. 4-5) and lift seat assembly from support. hold the seat in an open position.

b. Disassembly.

(1) Remove screws (2, fig. 4-5), washers (3) and nuts (4) and remove backrest (5) from frame. (2) Remove cotter pins (8) and rod (9) and remove seat cushion (10) from frame.

(3) Disconnect spring (14) from slide adjuster. Remove screws (11), lockwashers (12) and nuts (13) and remove slide adjuster (15) and slide (16) from frame (17).

(4) Remove plastic plugs (18) from frame.

c. Assembly.

(1) Install plastic plugs (18, fig. 4-5) in ends of frame.

(2) Position slide (16) and slide adjuster (15) on frame (17) and secure in place with screws (11), lockwashers (12) and nuts (13).

(3) Install spring (14) on slide adjuster.

(4) Place seat cushion (10) on frame and align hooks at rear of cushion with holes in frame. Slide rod

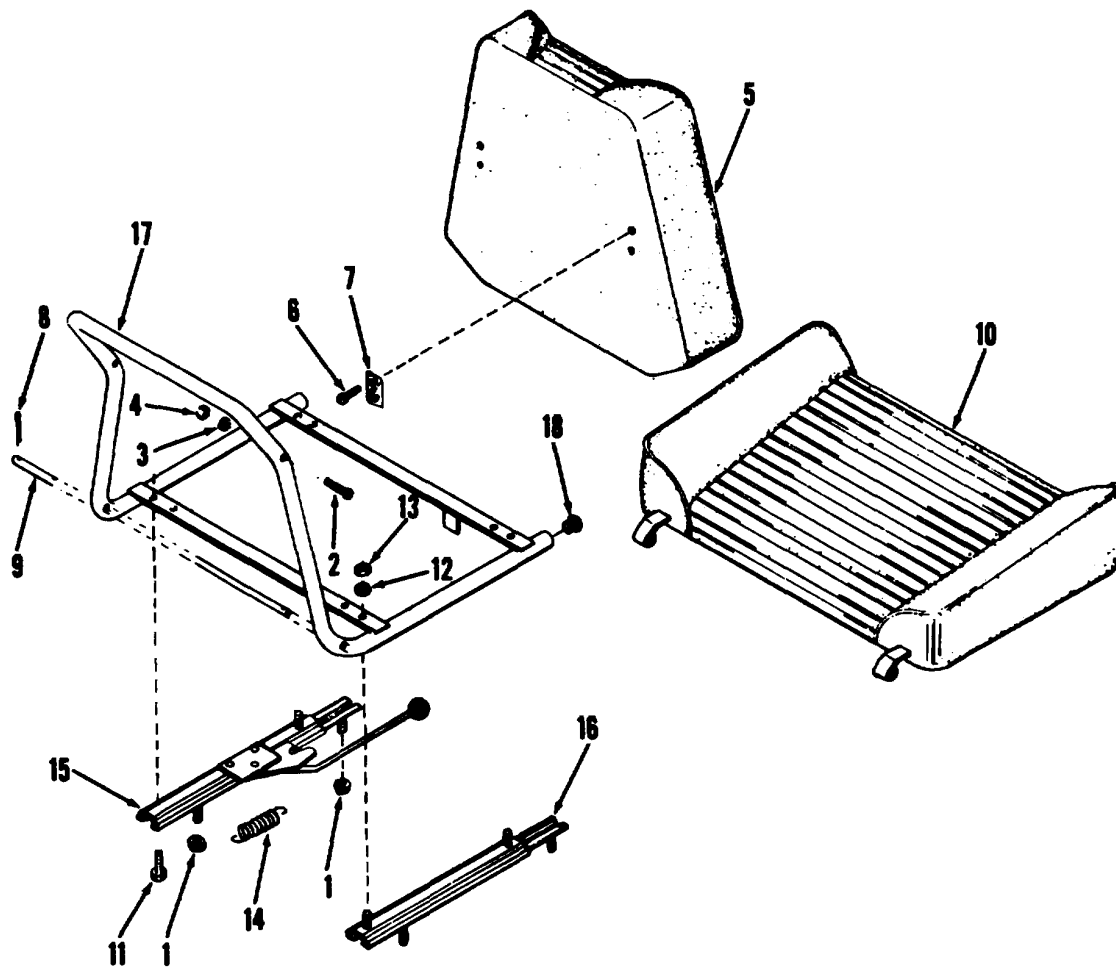
(9) through frame and cushion hooks and secure with cotter pins (8).

d. Installation.

(1) Position seat assembly on seat support (37, fig. 4-4).

(2) Secure seat to support with nuts (1, fig. 4-5).

(3) Remove prop and lower seat and support into position on truck.



TA0M34780

- 1 Nut
- 2 Screw
- 3 Washer
- 4 Nut
- 5 Backrest
- 6 Screw
- 7 Hinge
- 8 Cotter pin
- 9 Rod

- 10 Seat cushion
- 11 Screw
- 12 Lockwasher
- 13 Nut
- 14 Spring
- 15 Slide adjuster
- 16 Slide
- 17 Frame
- 18 Plug

Figure 4-5. Seat assembly, exploded view.

Section XI. INSTRUMENT PANEL

4-31. General

a. The instrument panel is mounted across the front of the truck forward of the steering wheel. All the instruments relative to truck operation are mounted on the panel.

b. Also mounted on the panel are the ignition switch and choke control. The ignition switch serves to start the truck, as a starter switch and the main switch in the electrical system.

4-32. Instrument Panel

a. *Test.* Operate truck engine and truck. Check

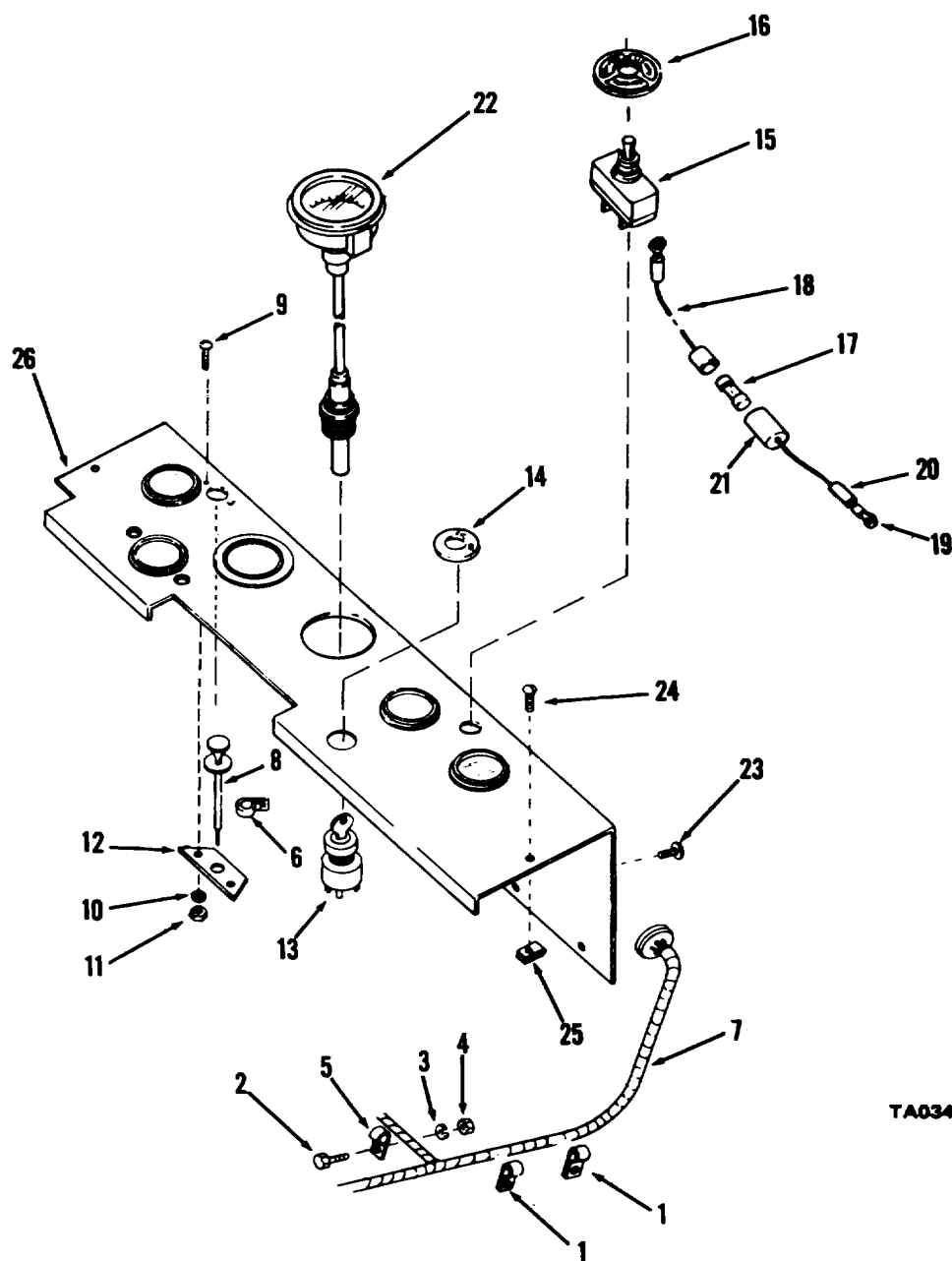
instruments for correct reading (fig. 2-1). Test fuses with an ohmmeter for continuity.

b. Removal

(1) Remove clamps (1, fig. 4-8). Remove screw (2), lockwasher (3) and nut (4) and remove clamp (5).

(2) Disconnect frame wiring harness (7) from instrument panel harness.

(3) Remove clamp (6). Remove screws (9), lockwashers (10) and nuts (11) and remove adapter (12) and choke control (8) from panel. Remove harness (7).



TA034781

- 1 Clamp
- 2 Screw
- 3 Lockwasher
- 4 Nut
- 5 Clamp
- 6 Camp
- 7 Frame wiring harness
- 8 Choke control
- 9 Screw
- 10 Lockwasher
- 11 Nut
- 12 Adapter
- 13 Ignition switch

- 14 Plate
- 15 Light switch
- 16 Plate
- 17 20 amp fuse
- 18 Switch cable
- 19 Terminal
- 20 Sleeve
- 21 Fuseholder
- 22 Transmission pressure gage
- 23 Screw
- 24 Screw
- 26 Nut
- 26 Instrument panel

Figure 4-6. Instrument panel components, exploded view.

(4) Tag and disconnect harness wires and cable (18) from light switch (15). Disconnect fuseholder (21) and remove fuse (17).

(5) Disconnect tube from transmission pressure gage (22) and remove gage from panel.

(6) Tag and disconnect wires from ignition switch (18). Remove ignition switch and plate (14) from instrument panel.

(7) Disconnect panel ground wire (29, Fig. 4-7) from panel and frame. Remove screws (23 and 24, fig. 4-6) and nuts (25) and remove instrument panel (26) from truck.

c. Disassembly.

NOTE

Most of the instruments removed in the following paragraphs can be removed with-out removing the instrument panel from the truck.

(1) Tag and disconnect leads (1, 4 and 5, fig. 4-7) from instruments and fuseholder.

(2) Remove screw (6), lockwasher (7) and nut (8) and remove clamp (9). Tag leads from wiring harness and disconnect leads from instruments and fuseholder. Remove wiring harness (10).

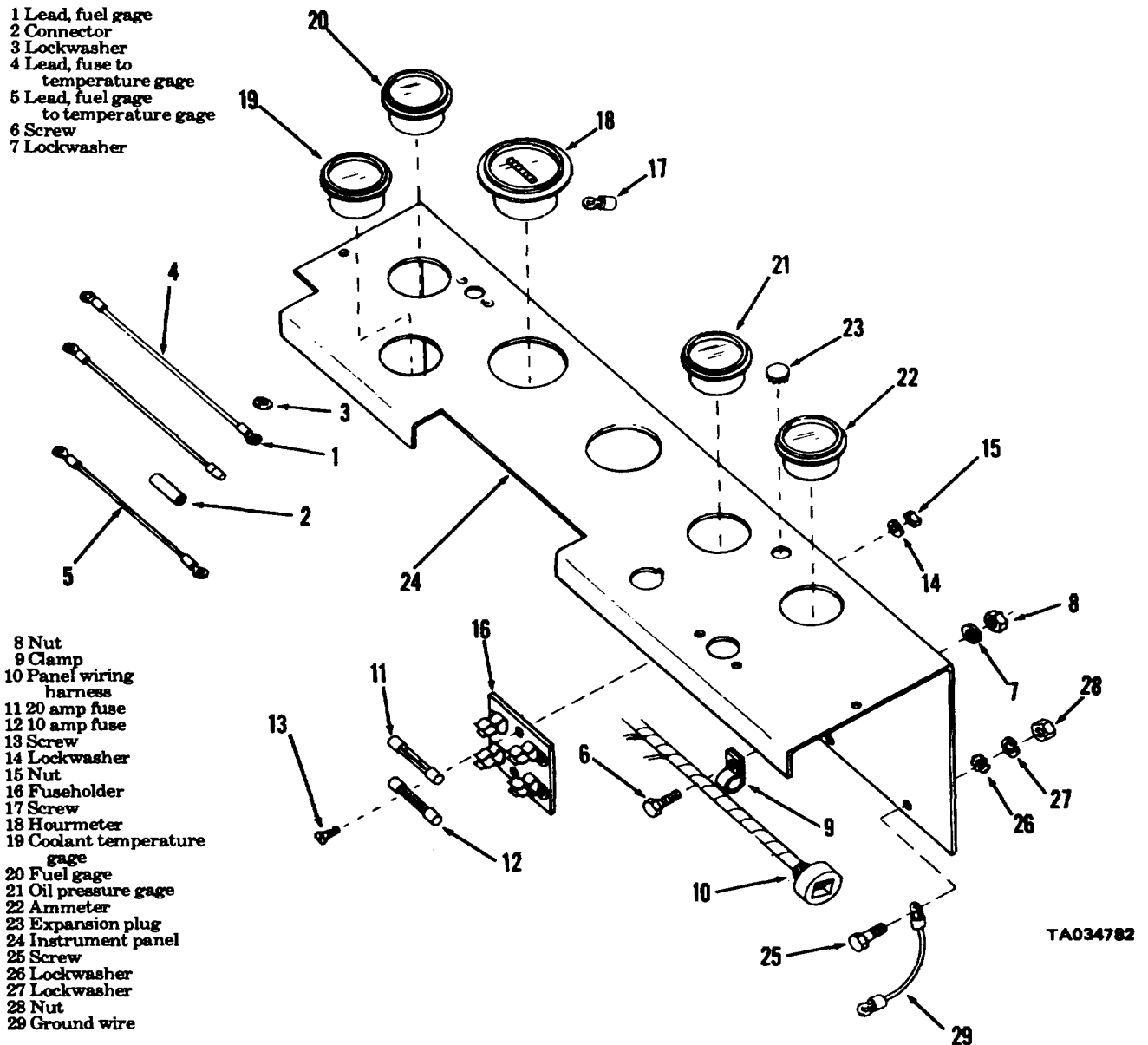


Figure 4-7. Instrument panel, exploded view. 17

(3) Remove fuses (11 and 12) from fuseholder. Remove screws (13), lockwashers (14) and nuts (15) and remove fuseholder (16).

(4) Remove screws (17) and remove hourmeter (18).

(5) Remove remaining gages and ammeter (19, 20, 21 and 22) by removing attaching parts.

d. Assembly.

(1) Install coolant temperature gage (19, fig. 4-7), fuel gage (20), oil pressure gage (21) and ammeter (22) on instrument panel and secure with screws, nuts and lockwashers.

(2) Install hourmeter (18) and secure with screws (17).

(3) Install fuseholder (16) on rear of instrument panel and secure with screws (13), lockwashers (14) and nuts (15). Install fuses (11 and 12) in fuseholder.

NOTE

Refer to figure 13 and check wire locations and connections on wiring diagram.

(4) Check tags on wiring harness (10) and connect leads to instruments and fuseholder. Secure wiring harness to panel with clamp (9) and screw (6), lockwasher (7) and nut (8).

(5) Connect lead (4) to fuseholder and coolant temperature gage. Use lockwashers (3) when connecting lead.

NOTE

Internal-external teeth lockwashers (3) must be installed to provide radio interference suppression.

(6) Connect lead (5) between fuel gage and

coolant temperature gage.

(7) Connect lead (1) to fuel gage and to connector (2). Connector (4) is connected to the wire from the fuel gage transmitter installed in the fuel tank.

e. Installation.

(1) Install instrument panel (26, fig. 4-6) on truck frame and secure panel with screws (23 and 24) and nuts (25).

(2) Connect panel ground wire (29, fig. 4-7) to instrument panel and frame. Use lockwashers (26, fig. 4-7) when connecting ground wire.

NOTE

Internal-external teeth lockwashers (26, fig. 4-7) must be installed to provide radio interference suppression.

(3) Install transmission pressure gage (22, fig. 4-6) and connect tube leading from transmission to pressure gage.

(4) Install ignition switch (13) and plate (14).

(5) Install light switch (15) and plate (16). Connect cable (18) to light switch. Install fuse (17) in fuseholder (21) and connect fuseholder.

(6) Connect frame wiring harness (7) to panel harness (10), fig. 4-6) and install clamps (1 and 5, fig. 4-6). Secure clamp (5) with screw (2), lockwasher (3) and nut (4).

(7) Install choke control (8, fig. 4-6) and adapter (12). Secure adapter with screws (9), lockwashers (10) and nuts (11). Install clamp (6) to secure choke cable.

(8) Start truck and check operation of instruments.

Section XII. HYDRAULIC LIFT COMPONENTS

4-33. General

a. The hydraulic lift components provide the means to elevate the carriage and forks. Hydraulic pressure induced into the lift cylinders extend the cylinder rods in sequence to lift the carriage, and the masts to raise the load.

b. Chains attached to the cluster cylinder (fig. 4-8) lift the carriage to the end of chain travel. The outer cylinders of the cluster cylinder lift the crossheads and the chains roll over the crosshead bearings, lifting the carriage.

c. When the outer cylinders reach the end of their travel, the center or inner cylinder rod is forced down raising the entire cluster cylinder, carriage and inner mast.

NOTE

The above sequence applies to both model ACC4024PS100 and ACC40-24PS180 lift trucks. On the ACC40-24PS100, the mast at this point will have lifted the forks to their 100-inch limit.



d. When the cluster cylinder center cylinder has reached the limit of travel, hydraulic pressure is delivered to the single lift cylinder (fig. 4-8) (model ACC40-24PS180 only). The single lift cylinder is attached to the intermediate mast at the top and to the bottom of the outer mast. The rod extends from the bottom of the cylinder, raising the cylinder and intermediate mast.

e. As the intermediate mast rises, it carries the inner mast, cluster cylinder and carriage forks upward. When the single lift cylinder reaches the limit of travel, the carriage and forks are at their 180-inch elevation.

f. An interlock assembly, mounted on the inner mast serves to keep the masts in the proper sequencing procedures. The masts telescope within each other providing a compact assembly.

g. When the lift control lever is pulled to the rear, or lowering position, the carriage and forks start to drop. The load and/or carriage drop because of their own weight. Speed of the lowering operation is governed by a flow regulator valve (fig. 4-8).

DEVICE AND SYMBOL LEGEND

- DIRECTION OF FLOW
 LINES CROSSING
 REGULATOR
 PC PRESSURE CONTROLLED
 PF FIXED DISPLACEMENT
 NOTE: LIFT CYLINDER IS NOT USED
 ON MODEL ACC40-24PS100.

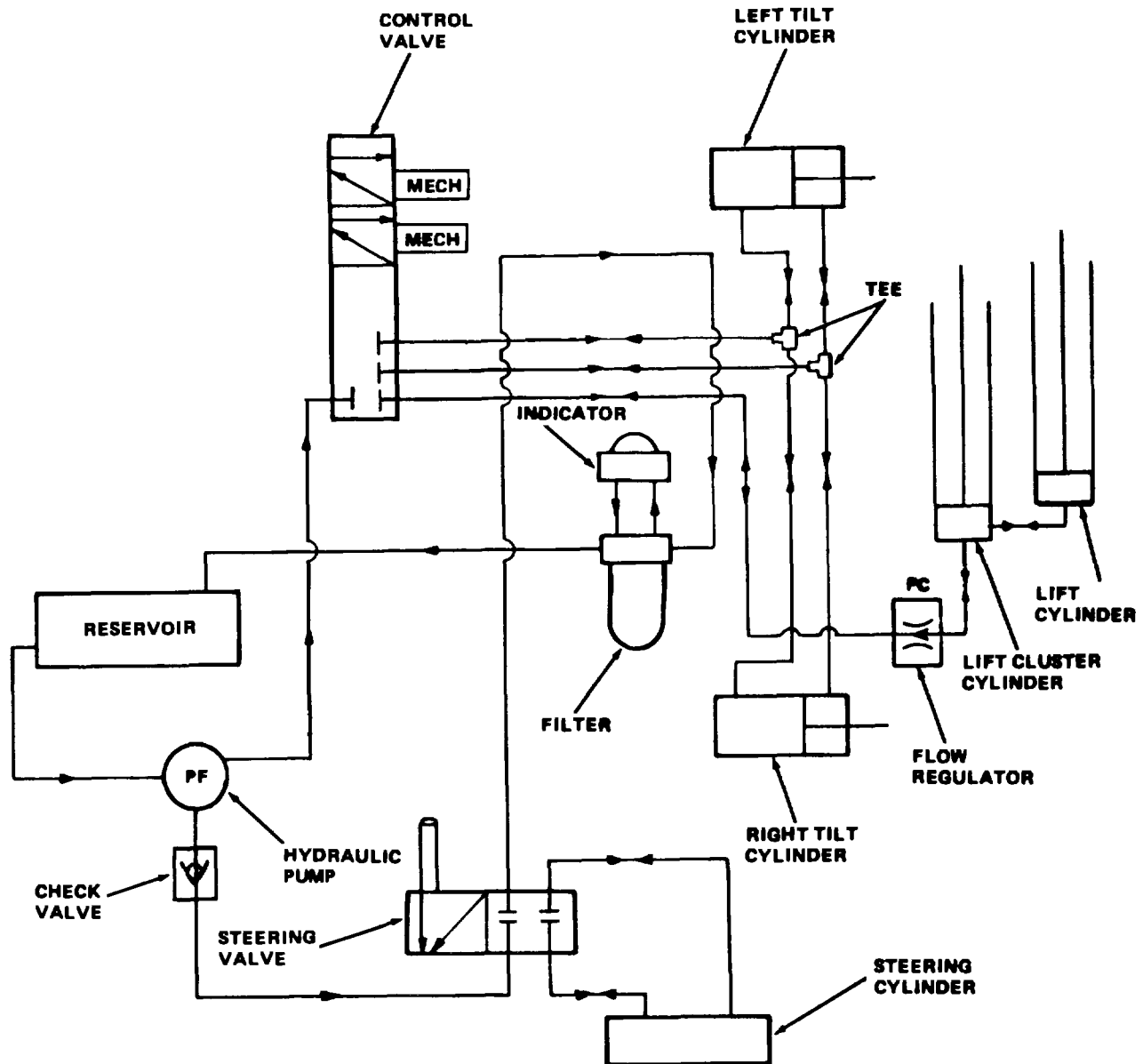


Figure 4-8. Hydraulic system diagram.

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Figure 4-8. Hydraulic system diagram.

Hydraulic oil is forced from the cylinders to maintain a safe lowering speed. Release of the lift control lever, allowing it to reach a neutral position, will hold the

carriage at the height desired

h. To further understand the fork lift hydraulic system, refer to the hydraulic system diagram,

figure 4-8.

i. A hydraulic pump (fig. 48), directly driven by the engine crankshaft, supplies hydraulic oil under pressure to the control valve (fig. 4-8). As the lift and tilt levers are moved, oil flows to the lift cylinders to raise the mast or to the tilt cylinders (fig. 4-8) to tilt the mast.

j. Oil for the system is stored in the hydraulic reservoir (fig. 4-8). As the oil returns to the reservoir, it flows through the hydraulic oil filter (fig. 4-8). A filter element indicator (fig. 4-8) is connected across the inlet and outlet of the filter. If the filter element becomes clogged and contaminated, the indicator will show filter element condition.

k. Tilt cylinders are connected to the outer mast and to the frame below the toe plate. Hydraulic pressure applied on either side of the cylinder rod will extend or retract the rod. As the rod extends, it tilts the mast forward. As the rod is retracted, the mast tilts backward.

4-34. Hydraulic Lines and Fittings

a. Inspection. Inspect hydraulic hoses and tubes frequently. Check for leakage, damage, chafing and wear. Check all fittings for leakage and damage. Replace unserviceable components.

b. Removal Before attempting to remove any hydraulic lines or fittings, refer to paragraph 440 and drain reservoir if necessary. Remove toe and floor plates and front cowls or open side panels to gain access to hydraulic lines.

(1) Disconnect hoses or tubes at valve, cylinders, filter or reservoir by removing hose clamps or disconnecting at fittings.

(2) If necessary, remove any clamps mounting the hose or tube to the truck.

(3) If preformed packings are present when a fitting is removed, mark fitting to insure installing packing when installing new fitting.

(4) Immediately plug ends of hose or tube and

plug cylinder, valve or filter ports to prevent entrance of foreign matter.

c. Installation. Before installing fittings, check to see if packing is required.

(1) Remove plugs from ports and install fittings in cylinders, valves or filter.

(2) Remove plugs from ends of hoses and connect hoses to fittings.

(3) Operate truck and lift and tilt mast and steer truck to actuate hydraulic system.

(4) Stop truck engine and check level of oil in hydraulic reservoir. Add oil as necessary to fill reservoir to proper operating level Refer to current lubrication order for proper grade of oil

(5) Bleed hydraulic system as follows.

(a) Raise mast until forks are approximately three feet off the ground.

(b) Open bleed screws located at the top of the cylinder until hydraulic oil comes out.

(c) Observe oil and check for air bubbles. When stream of oil is free of air bubbles, close bleed screws.

(d) Check level of hydraulic oil in reservoir. Fill reservoir if necessary.

(e) Raise and lower mast and check for leaks and proper operation. Tighten connections if necessary.

4-35. Lift Chains

a. General. Extension of the two outer cylinders of the cylinder cluster raises the chain bearing and crosshead. As the bearing raises the chains which are anchored at the rear of the cylinder cluster, the action raises the carriage.

b. Inspection. Inspect chains for wear, cracks and other damage.

(1) Lower carriage and forks to the floor.

(2) Refer to figure 4-9 and remove other pins and chain links from chain anchors attached to cluster cylinder.

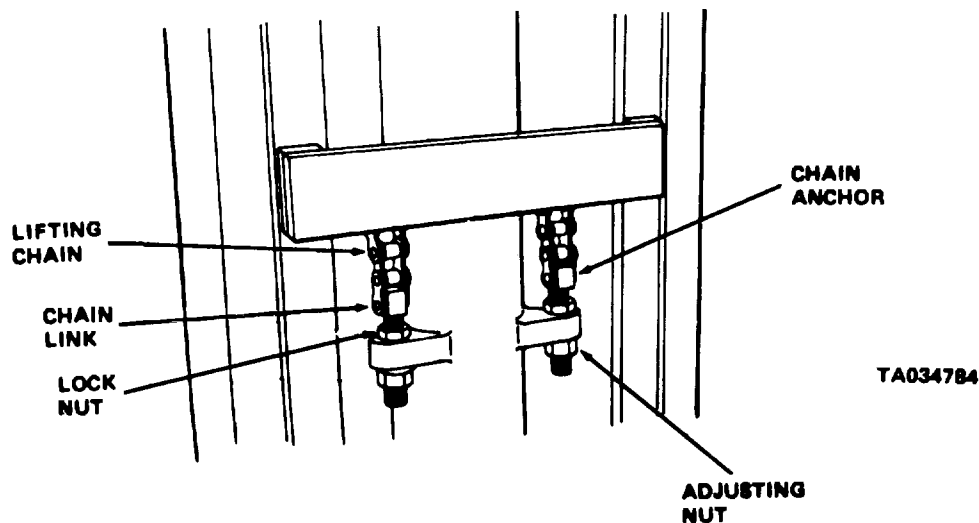


Figure 4-9. Lift chain and anchors, installed view.

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(3) Disconnect lift chains from carriage by removing cotter pins (fig. 4-10) and chain links from both chains.

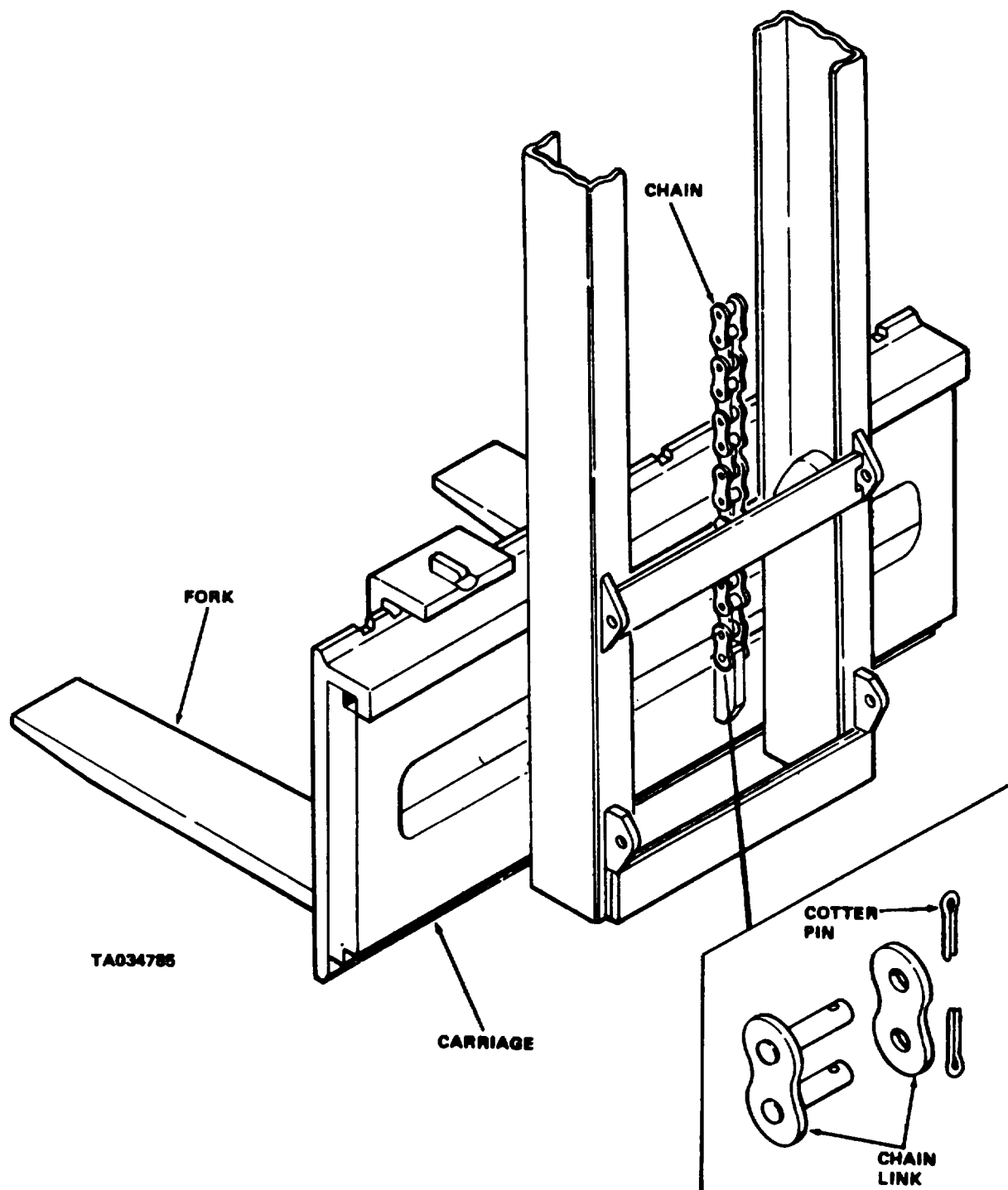


Figure 4-10. Lift chains and carriage.

(4) Lift chains over chain bearings and off of crossheads and remove chains from mast.

d. Cleaning and Inspection.

(1) Clean chains with cleaning compound, solvent (Fed. Spec. P-D-680) and dry thoroughly.

(2) Inspect chains for bent, cracked or damaged links. Replace defective links.

(3) Lubricate chains with oil (OE/HDO).

e. Installation.

(1) Refer to figure 4-9 and place chains through crossheads and around chain bearings.

(2) Connect chains to chain anchors with chain links (fig. 4-9) and cotter pins.

(3) Lower ends of chains to anchors on carriage (fig. 4-10) and attach chains to anchors with chain links and cotter pins.

(4) Operate lift mechanism and check chains for bending or uneven operation. If cylinders are fully retracted, carriage should be level and forks should not touch floor. Refer to *f.* below to adjust chains.

f. Chain Adjustment.

(1) Check to see that mast is in a vertical position and that cylinder cluster is fully retracted.

(2) Loosen locknuts and adjusting nuts (fig. 4-9) on the chain anchors.

(3) Turn the adjusting nuts to vary chain length. Tighten or loosen the chains until the chains are a snug fit and forks barely clear the floor.

(4) Tension must be equal on both chains and carriage must be level.

(5) Tighten locknuts. Check adjustment to see it has not been disturbed.

(6) Operate lift mechanism and check chain operation.

(7) Lower carriage and fully retract cylinder cluster. Check for carriage level and forks clearing floor.

4-36. Carriage, Backrest and Forks

a. General. The carriage rides in the masts and rolls on bearings. Lift forks are attached to the carriage. Connections for the lift chains are provided on the rear of the carriage. The backrest helps to support and steady the load.

b. Inspection.

(1) Operate lift mechanism and check carriage movement. Carriage should move smoothly through entire length of inner mast. If carriage binds or catches in mast, inspect bearing alignment and bearings for damage.

(2) Inspect welds on carriage and backrest for breaks and damage. Check backrest for bent frame.

(3) Inspect forks and locking pins for damage.

c. Removal.

(1) Remove screws (1, fig. 4-11), lockwashers (2), washers (3) and nuts (4). Remove backrest (5) from carriage.

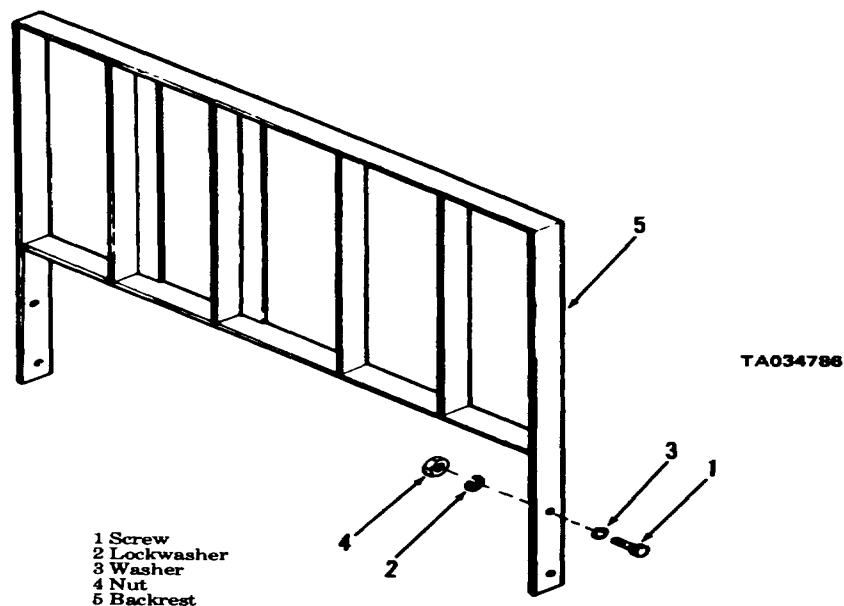
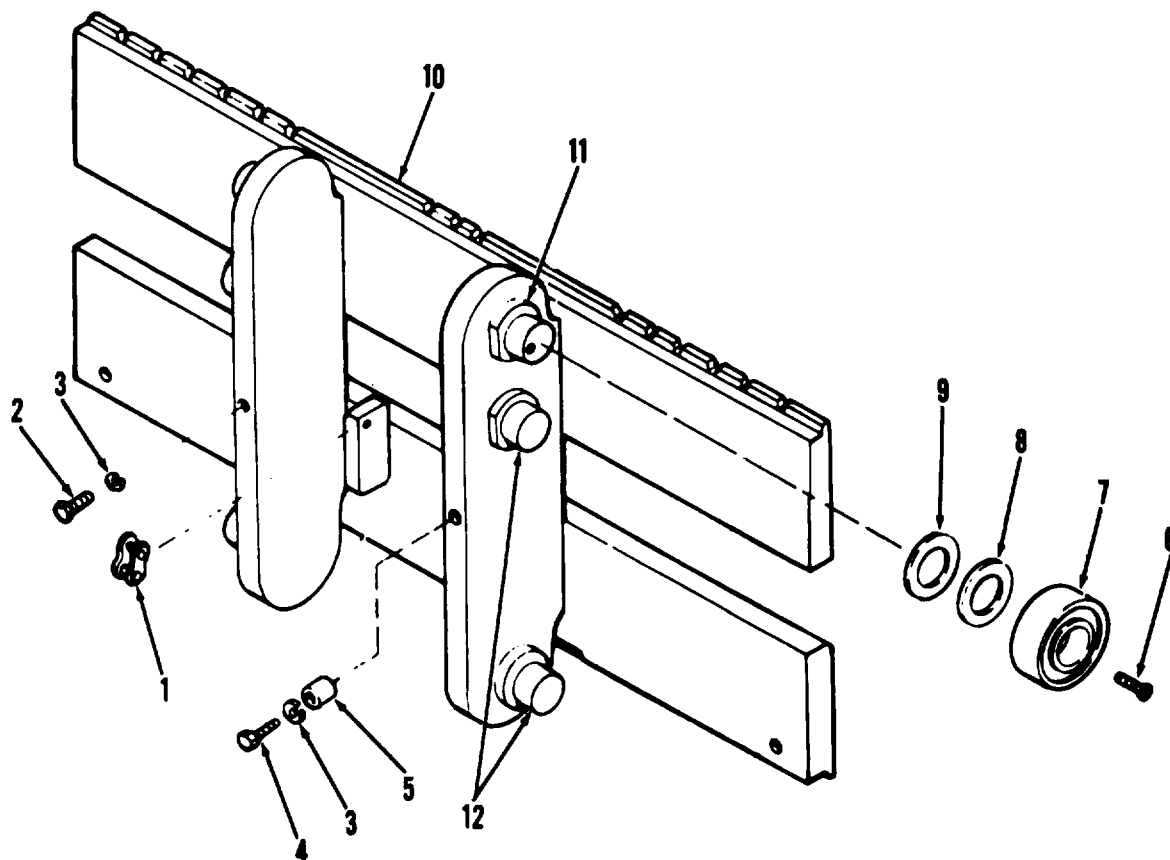


Figure 4-11. Backrest, removal and installation.

(2) Place two pieces of wood at least two inches (508 mm) thick under forks (one under front of forks and one under carriage frame).

(3) Remove screws (2 and 4, fig. 4-12), lockwashers (3) and spacers (5).



TA034797

- | | |
|--------------|-------------|
| 1 Link | 7 Bearing |
| 2 Screw | 8 Shim |
| 3 Lockwasher | 9 Shim |
| 4 Screw | 10 Carriage |
| 5 Spacer | 11 Stud |
| 6 Screw | 12 Stud |

Figure 4-12. Carriage. removal and insulation.

(4) Refer to figure 4-10 and disconnect lift chains from carriage.

(5) Start engine and raise mast until carriage bearings clear inner mast channels.

(6) Back lift truck away from carriage. Refer to figure 4-1 and remove lift forks. Support carriage with blocks.

d. Disassembly.

(1) Remove screws (6, fig. 4-12) and remove upper bearings (7) from studs. Count number of shims (8 and 9) used with each bearing. Tie shim groups together and mark for correct installation.

(2) Remove remaining bearings from studs and

tag shims as above.

(3) Inspect studs for damage. If studs require replacement, notify direct and general support maintenance.

e. Reassembly.

(1) Install shims (8 and 9, fig. 4-12) and bearings

(7) on same studs as before disassembly.

(2) Secure bearings on upper studs with screws (6).

f. Adjustment.

(1) Use an inside spanning tool (fig. 4-13) and determine narrowest point along channels of inner mast.

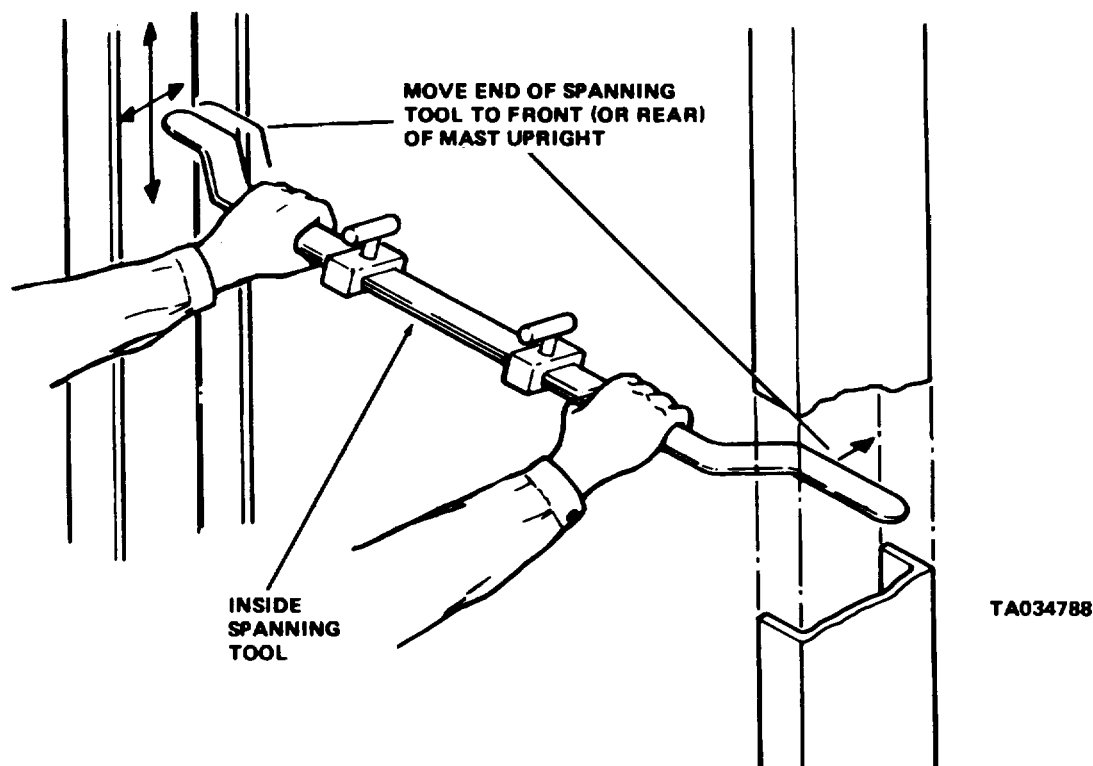


Figure 4-13. Spanning mast channels

(2) Set outside spanning tool to match inside spanning tool distance as shown in figure 4-14. Lock outside tool at this setting.

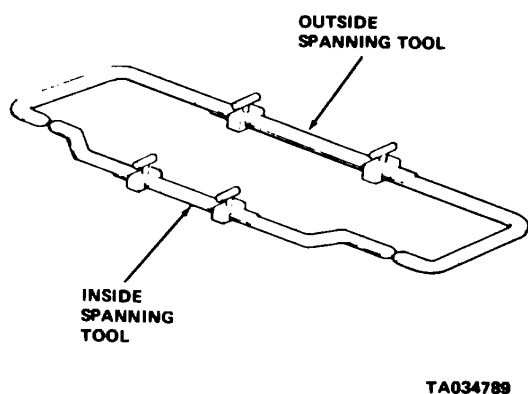


Figure 4-14. setting outside panning tool.

(3) Check bearings (7, fig. 4-12) on roller studs. Span bearings on carriage at the maximum camber point with outside spanning tool. Span all three sets of bearings. Remove bearings if necessary and shim bearings to produce a maximum of 0.015-inch (0.38 mm) clearance between end of spanning tool and bearings.

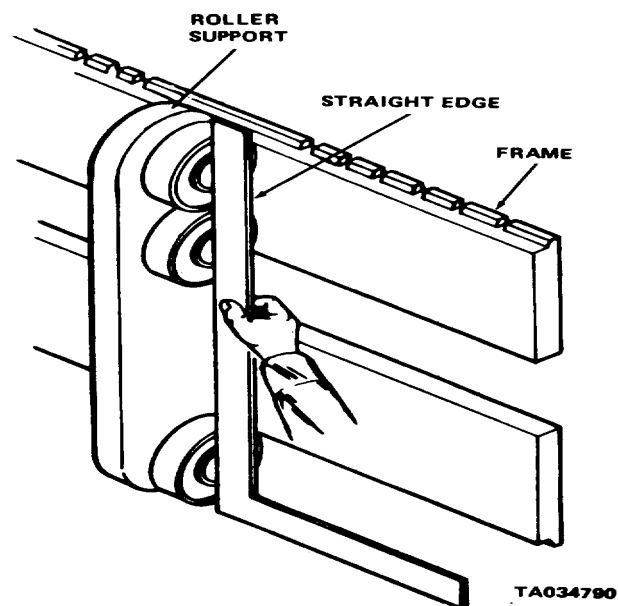


Figure 4-15. Check bearing alinement

(4) Check bearing alignment by placing a straightedge as shown in figure 4-15. Place straightedge against stud centerline of all three bearings on both sides of carriage. No visible gap should be seen between bearings and straightedge.

(5) Check to see that upper bearing mounting screws are tightened to a secure fit.

g. Installation.

(1) Refer to figure 4-1 and install lift forks on carriage. Place wood under carriage and forks as described in c. above. Adjust wood and blocks to bring carriage to a straight upright position.

(2) Operate engine and raise mast high enough for inner mast channels to clear carriage bearing.

(3) Move truck to bring inner mast channels directly above and centered over carriage bearings. Slowly lower inner mast, making sure carriage bearings enter inner mast channels smoothly.

(4) Install screws (2 and 4, fig. 4-12), lockwashers

(3) and spacer (5).

(5) Refer to figure 4-10 and connect lift chains to carriage.

(6) Install backrest (5, fig. 4-11) on carriage and secure with screws (1), lockwashers (2), washers (3) and nuts (4).

(7) Operate lift mechanism and check carriage travel.

4-37. Tilt Cylinders

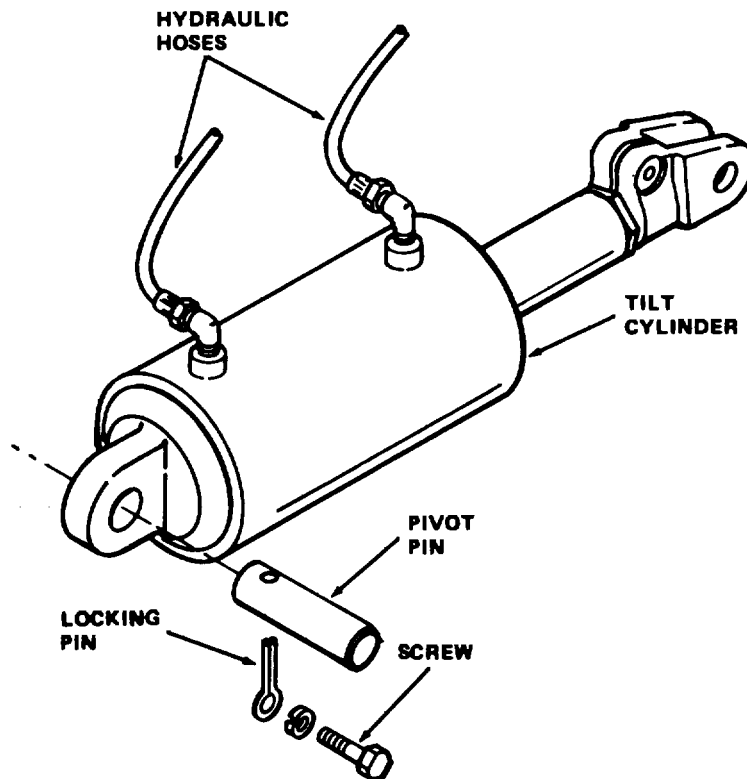
a. General Tilt cylinders, anchored at the frame and attached to the outer mast, extend through the front of the frame. Hydraulic pressure from the control valve extends or retracts cylinder rods to tilt the mast.

b. Inspection

(1) Operate truck and check tilt cylinder operation. Check degrees of tilt (e. below).

(2) Remove floor and toe plates from operator's compartment.

(3) Inspect hoses (fig. 4-16) and fittings at tilt cylinder for leaks and damage.



TA034791

Figure 4-16. Tilt cylinder, removal and installation.

(4) Check tilt cylinder (fig. 4-16) for secure mounting at frame and mast. c. Removal.

(1) Remove floor and toe plates.

(2) Disconnect hoses (fig. 4-16) from tilt cylinder.

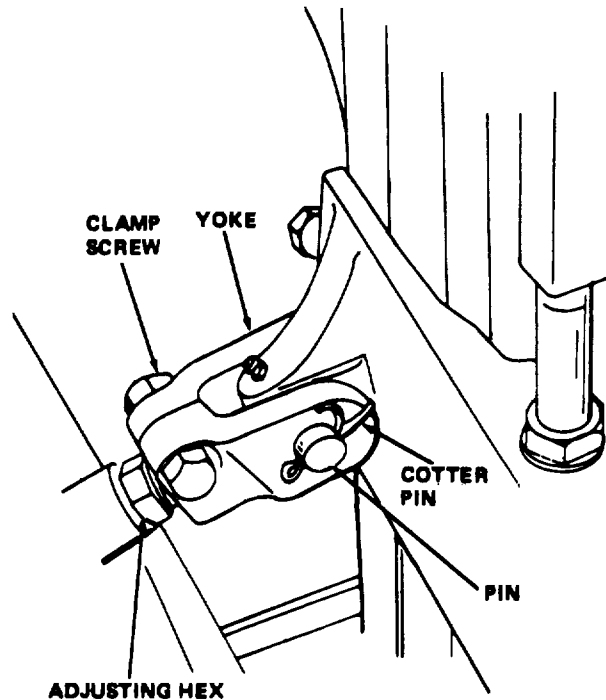
Plug hose ends and cylinder ports.

(3) Support tilt cylinder with a block of wood.

(4) Remove screw (fig. 4-16) and lockwasher securing locking pin and remove locking pin and pivot pin (fig. 4-16).

(5) Remove cotter pins and remove yoke pin (fig.

4-17) from cylinder and mast.



TA034792

Figure 4-17. Tilt cylinder yoke, install view.

(6) Remove cylinder from truck.

d. Installation.

(1) Position cylinder in truck with yoke in line with mast. Install pin (fig. 4-17) through mast and yoke. Secure pin with two cotter pins (fig. 4-17).

(2) Install pivot pin (fig. 4-16) through end of cylinder and frame and secure with locking pin (fig. 4-16), screw and lockwasher.

(3) Install floor and toe plates.

(4) Bleed hydraulic system (para 4-32).

e. Tilt Adjustment.

NOTE

Place truck on a flat level surface to check and adjust mast tilt.

(1) Normal tilt on model ACC40-24PS100 trucks is 3° forward and 10° backward. Operate tilt cylinders and check tilt angle with a protractor (fig. 4-18). Make sure both cylinders have reached the end of their stroke.

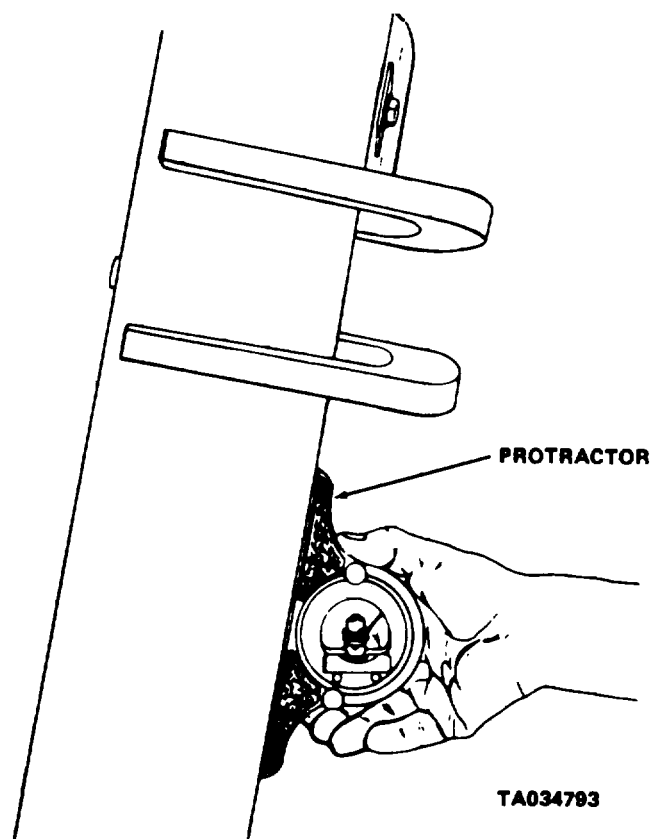


Figure 4-18. Checking degrees of mast tilt

(a) Set protractor to measure ten degrees of tilt. Place protractor against mast as shown. Tilt mast to end of cylinder backward stroke. Bubble must be centered if tilt is correct.

(b) If tilt is not correct, tilt mast as far forward as possible (end of stroke). Loosen clamp screw (fig. k17) on yoke at front of cylinder. Turn adjusting hex on cylinder rod (fig. 4-17) to extend or retract rod as necessary to adjust tilt.

(c) After adjusting, check degree of tilt.

Continue adjusting piston rod until ten degrees of backward tilt is obtained. Tighten clamp screw (fig. 4-17) on yoke.

(d) Forward tilt is automatically adjusted to proper angle when backward tilt is correct.

(e) Install floor and toe plates.

(2) Normal tilt of the mast on model ACC40-24PS180 trucks is 3° forward and 5.5° backward. Check and set tilt as described in (1) above to these limits.

4-38. Cluster Cylinder

a. General Both models use a cluster cylinder to

raise the carriage and mast. The cylinder includes two outer cylinders and a center cylinder. The crossheads are secured to the top of the outer cylinder rods. As rods extend the crossheads rise and carry the chains over the bearings, lifting the carriage and forks.

b. Inspection.

(1) Inspect the cylinders and connections for leaks and damage.

(2) Inspect crosshead bearings for good condition.

(3) Operate lift mechanism and check chain and cylinder operation.

c. Removal (Model ACC40-24PS180).

(1) Lower mast to bring cluster cylinder to fully lowered position.

(2) Refer to paragraph 4-33 and remove the lift chains.

(3) Refer to paragraph 4-34 and remove carriage.

(4) Remove screw (1), fig. 4-19) and lockwasher (2) and remove guard (3) from tube.

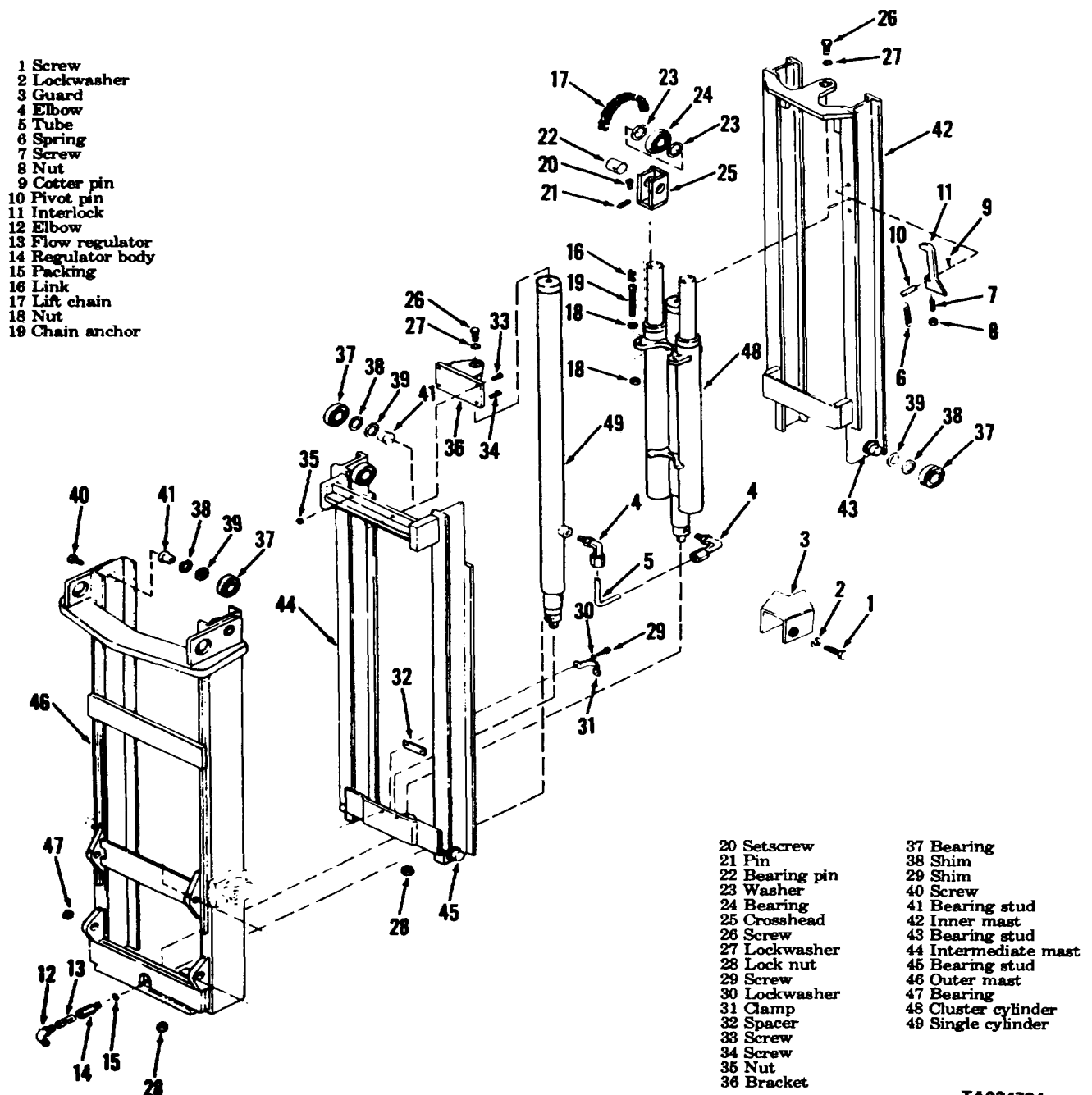


Figure 4-19. Mast assembly (model ACC40-24PS180), exploded view.

(5) Disconnect tube (5, fig. 4-19) from the cluster and single lift cylinders. Plug ends of tube and cylinder ports.

(6) Have two persons support the cluster cylinder. Remove screw (26), lockwasher (27) and nut

(28) securing cluster cylinder (48) to inner and intermediate masts.

(7) Carefully lift cluster cylinder from mast.
d. Removal (Model ACC40-24PS100)

(1) Perform steps (1) thru (3) above.

(2) From beneath truck disconnect hose from elbow (13, fig. 4-20). Plug hose. Remove regulator (14), body (15) and packing (16) from cylinder. Plug cylinder port.

(3) Have two persons support the cluster cylinder (46). Remove screw (27) and nut (28) securing cylinder to retainer and outer mast. Remove spacer

(29).

(4) Remove two screws (30), lockwashers (31) and nut (32) and remove retainer (33). Carefully lift cluster cylinder (46) from mast.

e. *Installation (Model ACC40-24PS100).*

(1) Lift cluster cylinder (46, fig. 4-20) into position on outer mast and retainer.

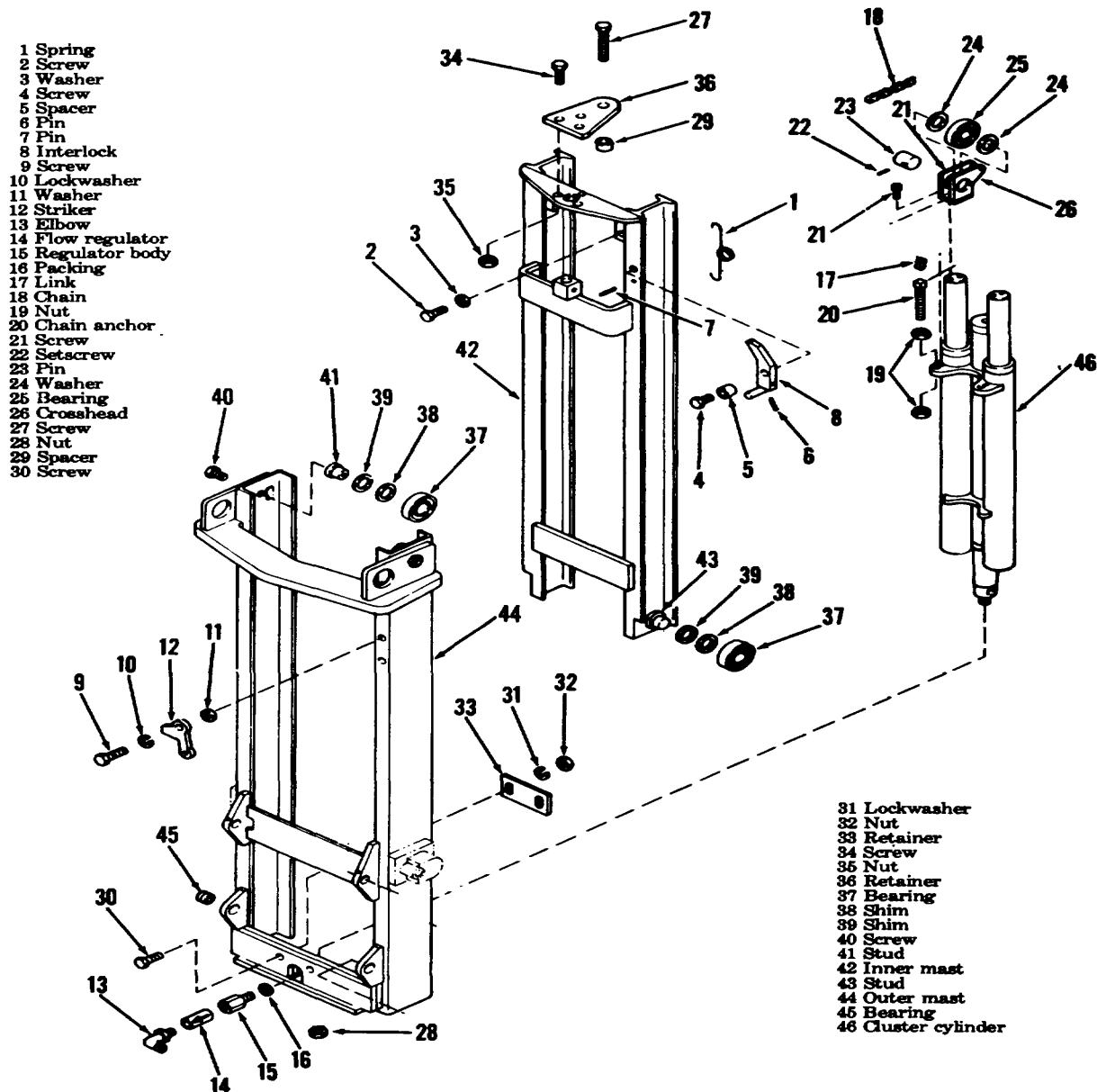


Figure 4-20. Mast assembly (model ACC40-24PS100), exploded view.

(2) Secure cylinder to outer mast to outer with nut (28). Install spacer (29) on top of cylinder and secure cylinder to retainer with screw (27).

(3) Install retainer (33) behind cylinder and secure with screw (30), lockwasher (31) and nut (32).

(4) remove plug and install new packing (16), body (15), regulator (14) and elbow (13) inlet port of cylinder. Remove plug and connect to elbow.

(5) Refer to paragraph 4-36 and install carriage and forks.

(6) Refer to paragraph 4-35 and install lift chains.

(7) Operate lift mechanism and check operation.

f. Installation (Model ACC40-24PS180).

(1) Lift cluster cylinder (48, fig. 4-19) into position on intermediate and inner masts. Secure cylinder to masts with screw (26), lockwasher (27) and nut (28).

(2) Remove plugs and connect tube (5) to cluster cylinder and single cylinder. Install guard (3) over tube and secure with screw (1) and lockwasher (2).

(3) Refer to paragraph 4-36 and install carriage, forks and backrest.

(4) Refer to paragraph 4-35 and install lift chains.

(5) Operate lift mechanism. Refer to paragraph 4-34 and bleed hydraulic system, if necessary.

4-39. Single Lift Cylinder (Model ACC40-24PS180)

a. General. In addition to the cluster cylinder, model ACC40-24PS180 trucks have a single lift cylinder to supply the final stage of the three-stage lift. A tube connects from single cylinder to the cluster cylinder to provide hydraulic pressure.

b. Removal

(1) Refer to paragraph 4-38 and remove the cluster cylinder.

(2) From beneath the truck, disconnect the hose from elbow (12, fig. 4-19). Plug end of hose.

(3) Remove elbow (12), flow regulator (13), body (14) and packing (15) from the inlet port of the single cylinder. Plug cylinder port.

(4) Support the cylinder (49) and remove screw (26), lockwasher (27) and nut (28) securing cylinder to bracket (36) and outer mast.

(5) Remove screws (29) and lockwashers (30) and remove clamp (31) and spacer (32) securing bottom of cylinder to mast.

(6) Carefully remove cylinder from mast.

c. Installation.

(1) Place cylinder (49, fig. 4-19) into position on mast and install clamp (31) and spacer (32). Secure clamp around cylinder with screws (29) and lockwashers (30).

(2) Secure top and bottom of cylinder to retainer and mast with screw (26), lockwasher (27) and nut (28).

(3) Refer to paragraph 4-38 and install cluster cylinder, carriage and chains. 4-40. Mast Assembly

4-40. Mast Assembly

a. General. The telescoping mast assemblies raise and support the carriage and load. Canted roller-type construction uses ball bearings to provide friction free operation within the telescoping channels.

(1) Model ACC40-24PS100 lift trucks incorporate a two-section mast and one cluster cylinder. The inner mast (42, fig. 4-20) rides inside the outer mast channels on bearings attached to the bottom of the inner mast and inside the top of the outer mast.

(2) Model ACC40-24PS180 lift trucks incorporate a three-section mast, a cluster cylinder and a single-lift cylinder. The inner mast (42, fig. 4-19) rides inside the intermediate mast channels. Bearings at the bottom of the inner mast and top inside of the intermediate mast guide the mast. The intermediate mast (44, fig. 4-19) operates in the same manner inside the outer mast.

b. Inspection.

(1) Operate lift mechanism and check operation.

Masts should function smoothly and sequence properly.

(2) Inspect bearings for wear and damage.

(3) Inspect mast channels for wear and damage.

Check all welds for good condition.

c. Removal (Model ACC40-24PS180).

(1) Refer to paragraph 4-35 and remove lift chains.

(2) Refer to paragraph 4-36 and remove carriage, backrest, and forks.

(3) Refer to paragraphs 4-38 and 4-39 and remove cluster and lift cylinders.

(4) Attach a hoist of sufficient capacity to mast lifting eyes on outer mast.

(5) Refer to paragraph 4-37 and disconnect tilt cylinders from outer mast.

(6) Remove lockwire (3, fig. 4-21) securing screws

(4). Remove screws (4) and lockwashers (5). Raise mast with hoist to relieve tension on pins.

(7) Remove pins (6) from both sides of mast.

(8) Use the hoist and lift mast assembly from truck and place mast on suitable supports.

d. Removal (Model ACC40-24PS100).

(1) Refer to paragraph 4-35 and remove lift chains.

(2) Refer to paragraph 4-36 and remove carriage, backrest and forks.

(3) Refer to paragraph 4-38 and remove cluster cylinder.

(4) Attach a hoist of sufficient capacity to mast lifting eyes on outer mast.

(5) Refer to paragraph 4-37 and disconnect tilt cylinders from outer mast.

(6) Remove lockwire (3, fig. 4.21) securing screws

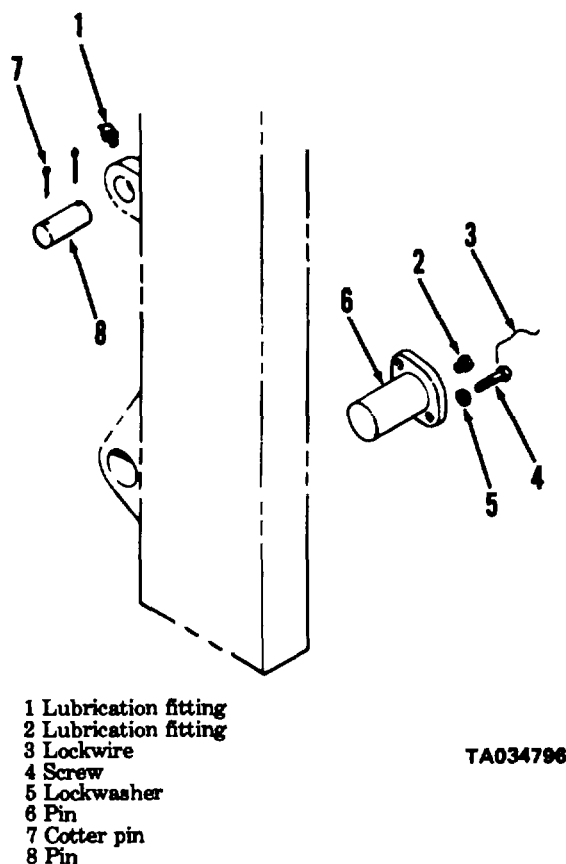


Figure 4-21. Mast mounting, exploded view.

(4) Remove screws (4) and lockwashers (5).
Raise mast with hoist to relieve tension on pins.

(7) Remove pins (6) from both sides of mast.

(8) Use the hoist and lift mast assembly from truck and place mast on suitable supports

e. *Installation (Model ACC40-24PS100).*

(1) Use a hoist and lift mast assembly into position on truck. Block mast as necessary.

(2) Install pins (6, fig. 4-21) through mast and frame. Secure pins with screws (4) and lockwashers (5). Install lockwire (3) to secure screws.

(3) Refer to paragraph 4-37 and connect tilt cylinders to mast: Remove hoist.

(4) Refer to paragraph 4-38 and install cluster cylinder.

(5) Refer to paragraph 4-36 and install carriage, backrest and forks.

(6) Refer to paragraph 4-35 and install and adjust lift chains.

(7) Bleed hydraulic system (para 4-34).

(8) Check mast tilt and adjust if necessary (para 4437).

(9) Operate lift mechanism and check for smooth operation.

f. *Installation (Model ACC40-24PS180).*

(1) Use a hoist and lift mast assembly into

position on truck. Block mast as necessary.

(2) Install pins (6, fig. 4-21) through mast and frame. Secure pins with screws (4) and lockwashers (5). Install lockwire (3) to secure screws.

(3) Refer to paragraph 4-37 and connect tilt cylinders to mast. Remove hoist.

(4) Refer to paragraphs 4-38 and 4-39 and install cluster and lift cylinders.

(5) Refer to paragraph 4-36 and install carriage, backrest and forks.

(6) Refer to paragraph 4-35 and install and adjust lift chains.

(7) Bleed hydraulic system (para 4-34).

(8) Check mast tilt and adjust if necessary (para 4-37).

(9) Operate lift mechanism and check for smooth operation.

4-41. Control Valve Levers

a. *General.* Two levers, attached to the control valve at the right front of the truck, allow the operator to control lift and tilt functions. When the inner lever is pulled to the rear, the carriage and mast will lift. When the lever is pushed forward, the load and carriage will lower. When the lever is in the center or neutral position, the carriage will remain where it is halted. The outer lever operates the tilt function. Pulling the lever to the rear will tilt the mast to the rear. Pushing the lever forward will tilt the mast forward.

b. *Inspection*

(1) Remove screws and remove right-hand cowl from truck.

(2) Check control valve levers (fig. 2-1), for secure attachment to control valve.

(3) Move levers through entire range of operation. Movement should be smooth and positive.

c. *Removal.*

(1) Remove nuts and screws attaching control levers (fig. 4-22) to control valve. Remove links (fig. 4-22).

(2) Remove retaining rings (fig. 4-22) and pins securing levers to control valve plungers. Remove levers.

d. *Installation.*

(1) Install control valve levers (fig. 4-22) in position on control valve.

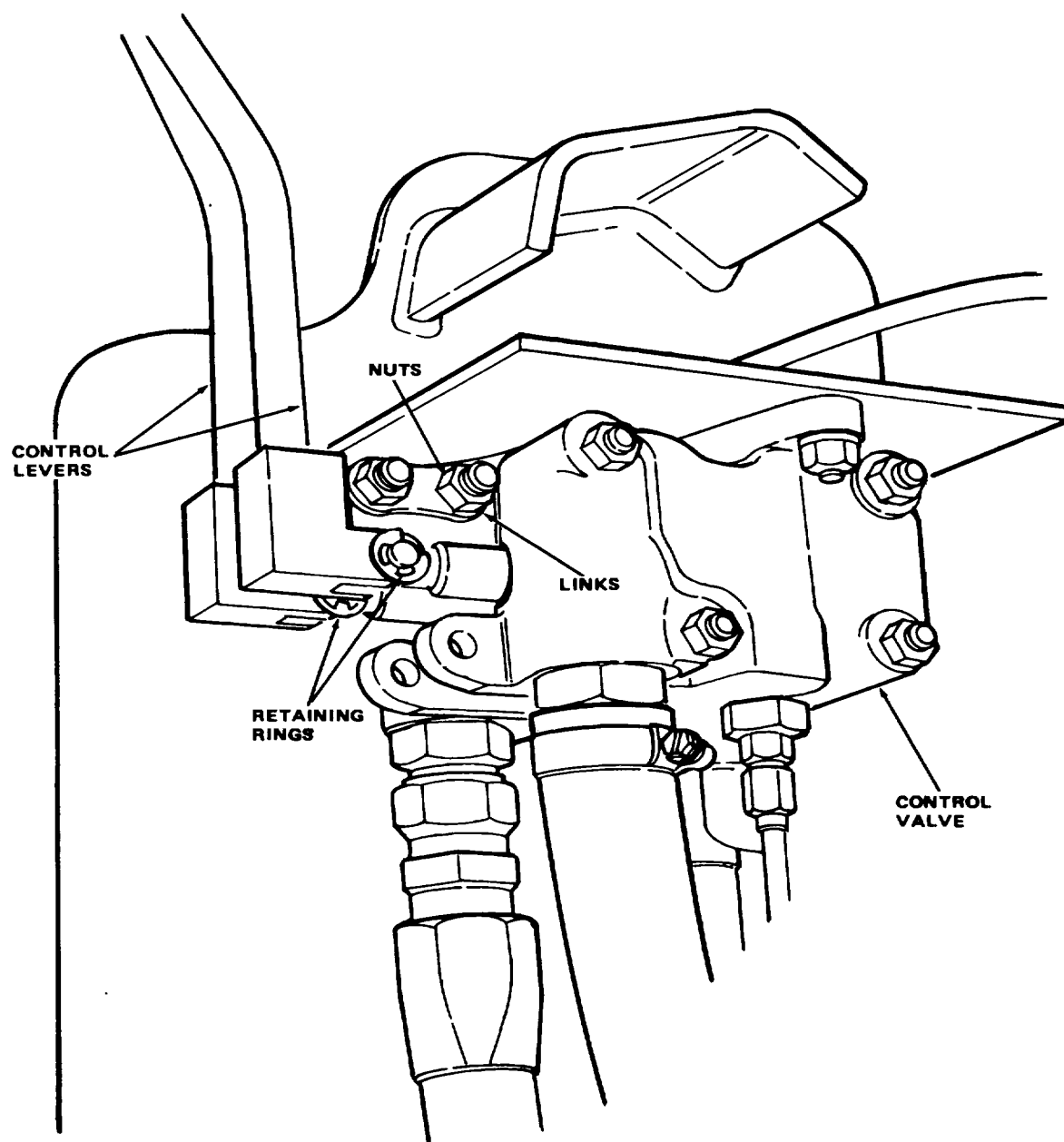
(2) Secure levers to control valve plungers with pins and retaining rings (fig. 4-22).

(3) Install links (fig. 4-22) and control levers on control valve. Install screws through levers and links and secure with nuts.

(4) Install right hand cowl on truck.

442. Hydraulic Filter Element Indicator

a. *General* The hydraulic filter element indicator is mounted on the front of the truck next to the control



TA034797

Figure 4-22. Control valve levers, installed view.

levers. It enables the operator to check the condition of the filter element.

b. Inspection.

(1) Check indicator hoses for leaks. Tighten connections if necessary.

(2) Inspect indicator for damage and proper operation.

c. Removal

(1) Disconnect hoses at rear of indicator (fig. 4-23). Plug hoses and indicator.

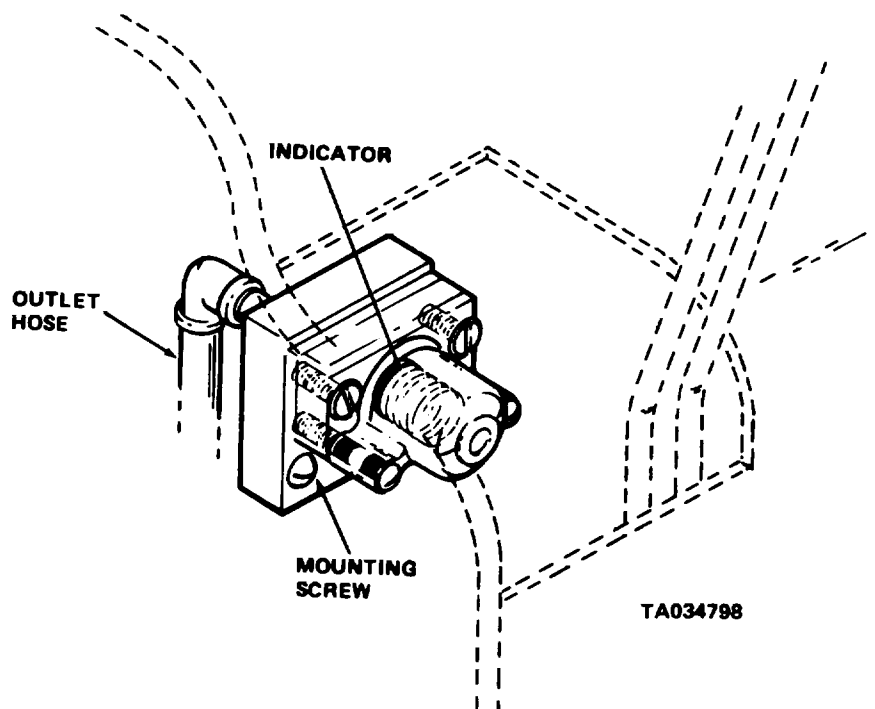


Figure 4-23. Hydraulic filter element indicator, installed view.

(2) Remove screws, lockwashers and nuts securing indicator to bracket and remove indicator.

d. Installation.

(1) Install indicator (fig. 4-23) in position on bracket. Secure indicator with screws, lockwashers and nuts.

(2) Remove plugs from indicator and hoses. Connect hoses to indicator.

(3) Check oil level in reservoir and fill to proper level. Refer to current lubrication order for correct oil.

(4) Bleed hydraulic system (para 4-34).

(5) Operate truck and observe indicator. Indicator should register filter element condition.

4-43. Hydraulic Filter

a. General. The hydraulic filter is mounted at the right front of the truck. All hydraulic oil flows from the control valve and steering valve through the filter and returns to the reservoir.

b. Service. The filter element must be replaced at intervals shown on the current lubrication order. It should also be replaced at any time the filter element indicator shows flow through the element is restricted. To replace the element, proceed as follows:

(1) Remove attaching parts and remove right front cowl.

(2) Place a suitable container below filter. Use an appropriate wrench on the large hex on hydraulic

filter housing. (fig. 4-24).

(3) Remove hydraulic filter housing. Remove packing from filter head (fig. 4-24).

(4) Remove filter element from housing.

(5) Clean inside of filter body and filter head with cleaning compound, solvent (Fed. Spec. P-D-680) and dry thoroughly.

(6) Install new filter element in filter housing.

(7) Install new packing in filter head and install housing and filter element by screwing housing into head.

(8) Tighten housing to 20 to 30 pound-feet (27.1 to 40.6 N-m).

(9) Check oil level in hydraulic reservoir and add oil if necessary. Refer to current lubrication order for correct oil.

(10) Operate hydraulic system and check for leaks. Correct leaks if necessary.

(11) Bleed hydraulic system (para 4-34).

(12) Install right front cowl.

c. Filter Replacement.

(1) *Removal.*

(a) Remove right front cowl.

(b) Disconnect steering system return hose (fig. 4-24) from elbow at inlet hose (fig. 4-24). Remove elbow and packing from inlet elbow.

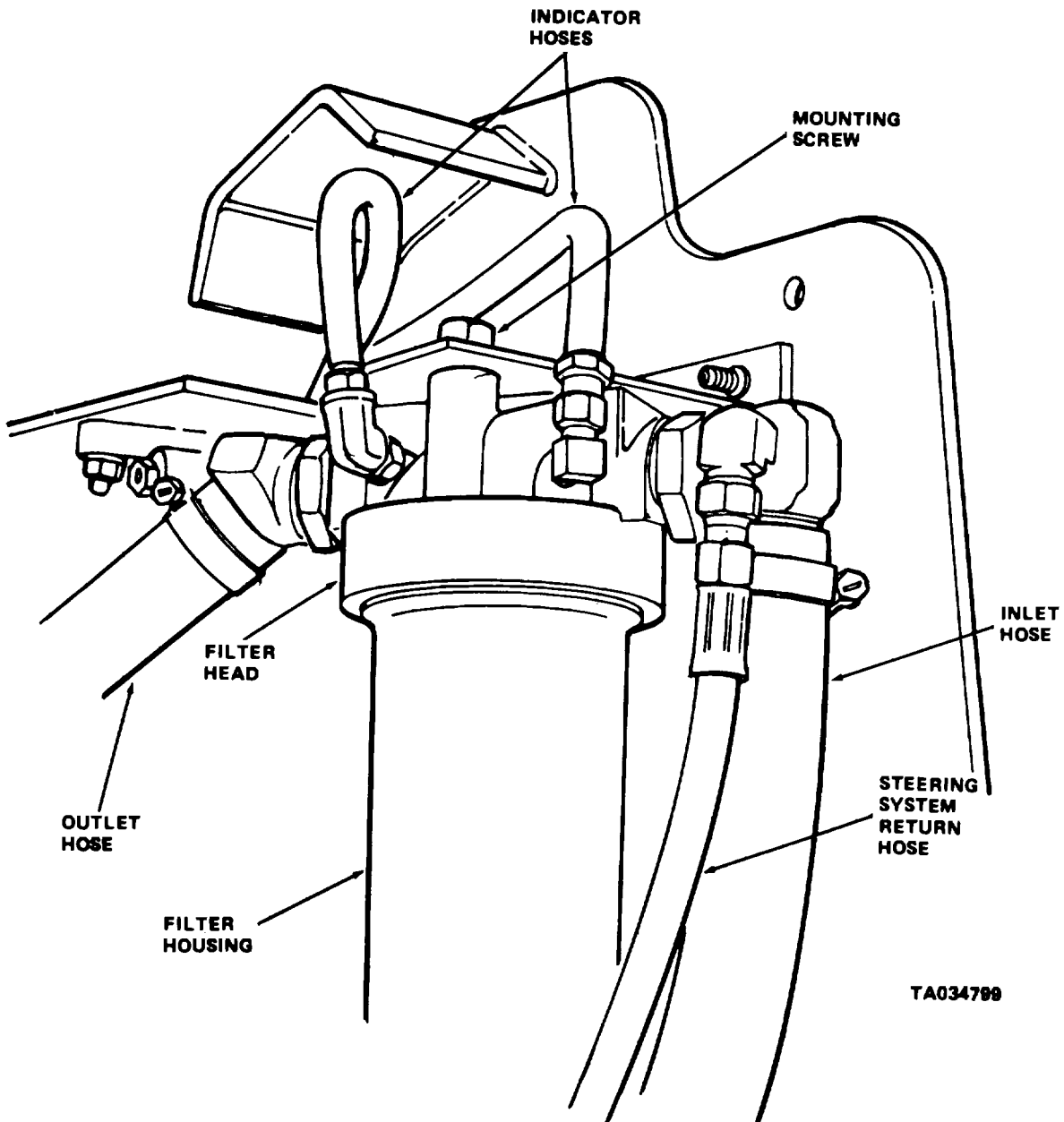


Figure 4-24. Hydraulic filter, installed view.

(c) Loosen hose clamps and disconnect inlet outlet hoses (fig. 4-24) from filter head. Plug hoses and filter.

(d) Disconnect indicator hoses from filter head.

(e) Remove screws and lockwashers attaching filter head to bracket. Remove filter from bracket.

(f) Remove all elbows and fittings from filter head.

(2) Installation.

(a) Install correct elbows and fittings in filter head. Check to see that new packing is installed with elbow used with steering system return hose.

(b) Install new filter on bracket and secure with screws and lockwashers.

(c) Unplug and connect indicator hoses to fittings in filter.

(d) Remove plugs from inlet and outlet hoses

(fig. 424) and install hoses on elbows in filter head. Tighten clamps securely.

(e) Remove plug from steering system return hose (fig. 4-24) and connect hose to elbow in filter head inlet elbow.

(f) Check oil level in hydraulic reservoir and add oil if necessary. Refer to current lubrication order for correct oil

(g) Operate hydraulic system and check for leaks. Correct if necessary.

(h) Bleed hydraulic system (para 434).

(i) Install front Cowl

4-44. Hydraulic Reservoir

a. *General.* The hydraulic reservoir serves as a storage receptacle for the hydraulic oil. It is mounted

on the right side of the frame.

b. *Service.* Open right side panel to gain access to the top of the reservoir.

(1) Oil Level.

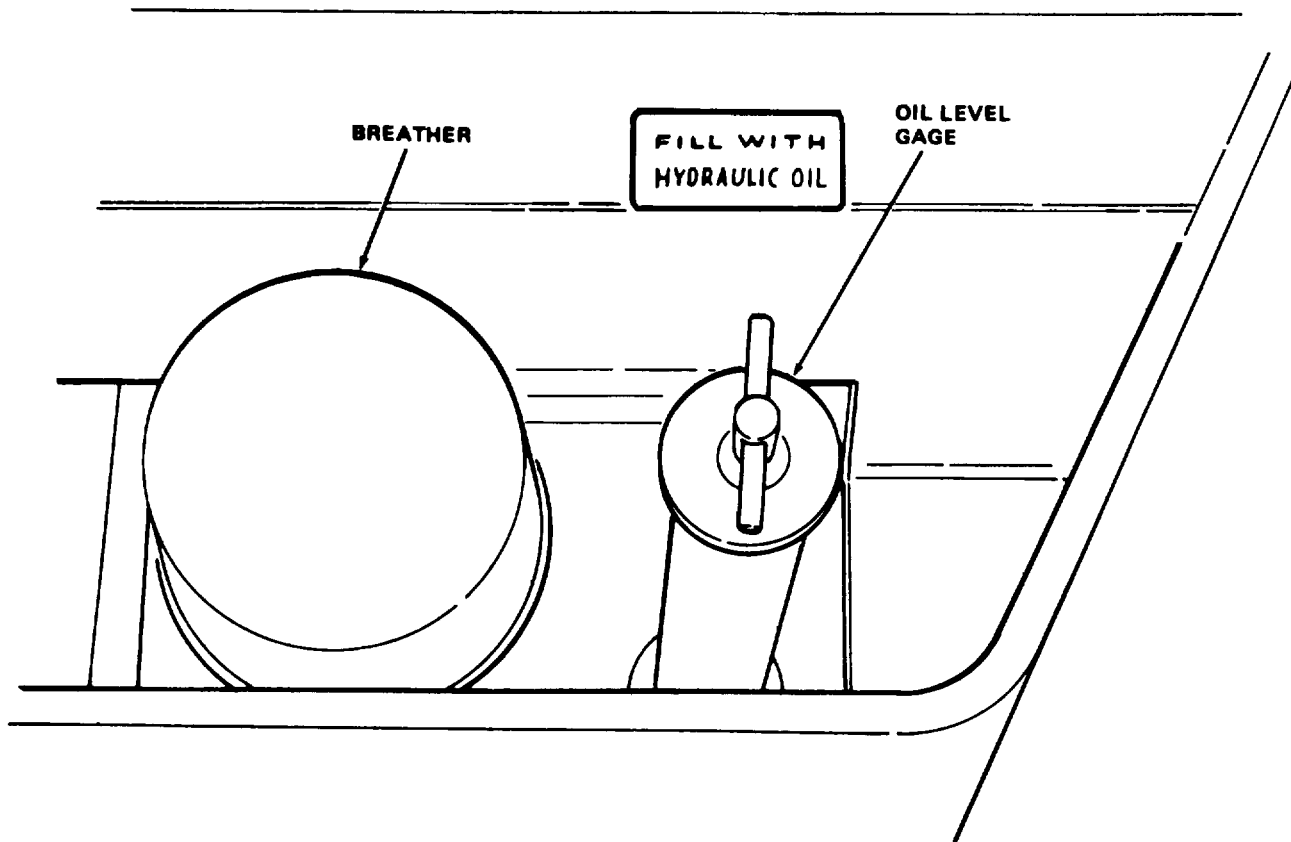
(a) Lower mast and retract all cylinders.

(b) Remove oil level gage (fig. 4-25) and check oil level. Oil level should be to full mark on gage with oil temperature at approximately 70°F (21°C).

(c) Fill reservoir to correct level. Refer to current lubrication order for correct Oil

(d) Install oil level gage.

(2) Breather and Screen. Every 200 hours the breather should be replaced. Unscrew breather (fig. 4-25) from top of reservoir. Install new breather. Remove oil level gage and remove screen. Clean screen in cleaning compound solvent (P-D-680) and dry thoroughly. Install screen and gage.



TA034800

Figure 4-25. Hydraulic reservoir breather and oil level gage..

(3) Draining and Refueling. At interval specified in current lubrication order, drain and refill reservoir.

(a) Raise and block truck as necessary. Place a suitable container beneath the

hydraulic reservoir drain.

(b) Remove drain plug (fig. 4-26) and washer from bottom of reservoir (fig. 4-26) and drain reservoir.

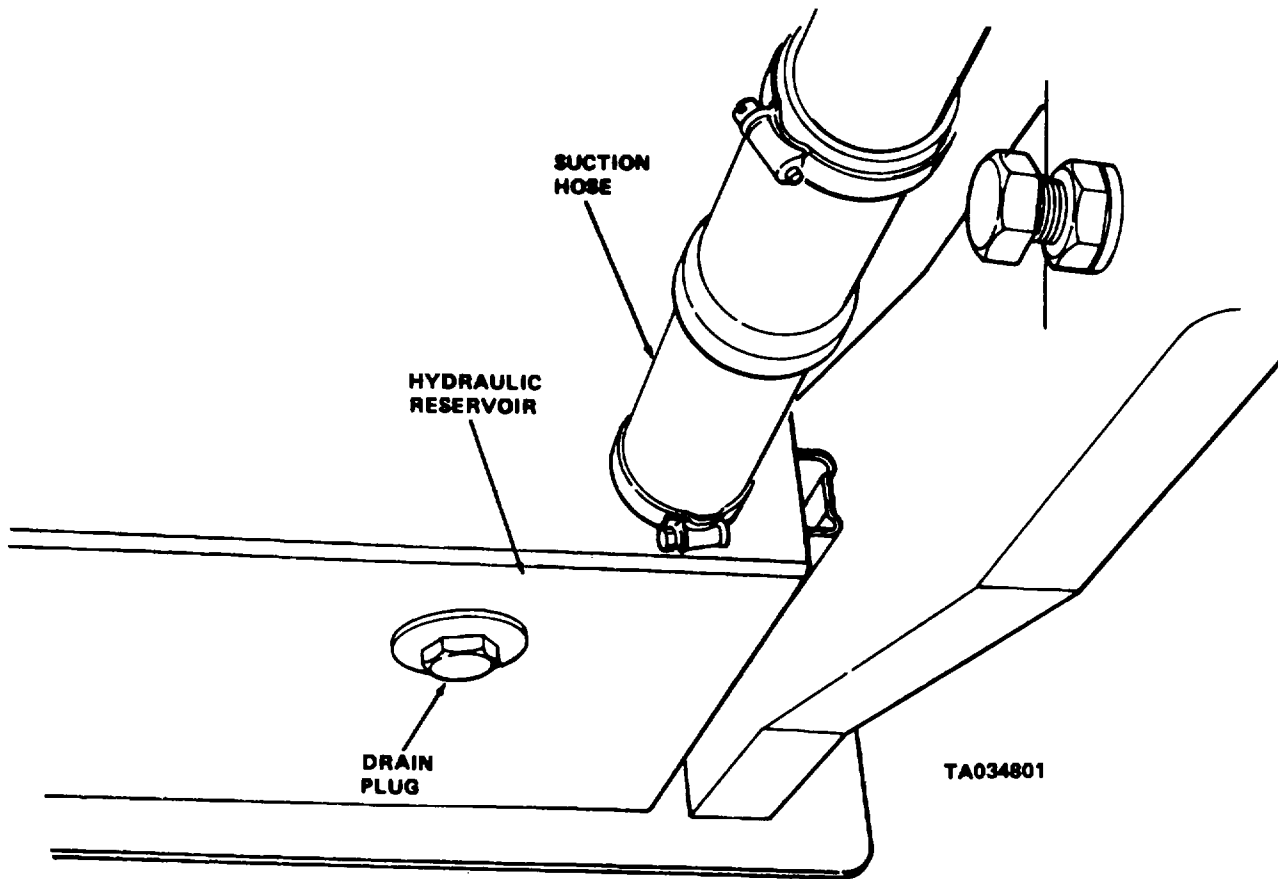


Figure 4-26. Hydraulic reservoir drain plug.

(c) Refill reservoir with proper grade of oil. Refer to current lubrication order.

(d) Operate hydraulic system and check for leaks. Correct if necessary.

(e) Bleed hydraulic system (para 4-34)

c. Removal

(1) Refer to b above and drain hydraulic reservoir.

(2) Loosen clamps and remove outlet hose (fig. 4-26) from reservoir. Plug tube to pump.

(3) Remove screws (7 and 8, fig. 4-27), lockwashers (9) and washers (10) securing reservoir to frame. Remove reservoir from truck.

d. Cleaning.

(1) Remove nuts (13, fig. 4-27) and remove cover (14) and gasket (15).

(2) Flush inside of reservoir with cleaning compound solvent (P-D80). Dry interior of reservoir thoroughly.

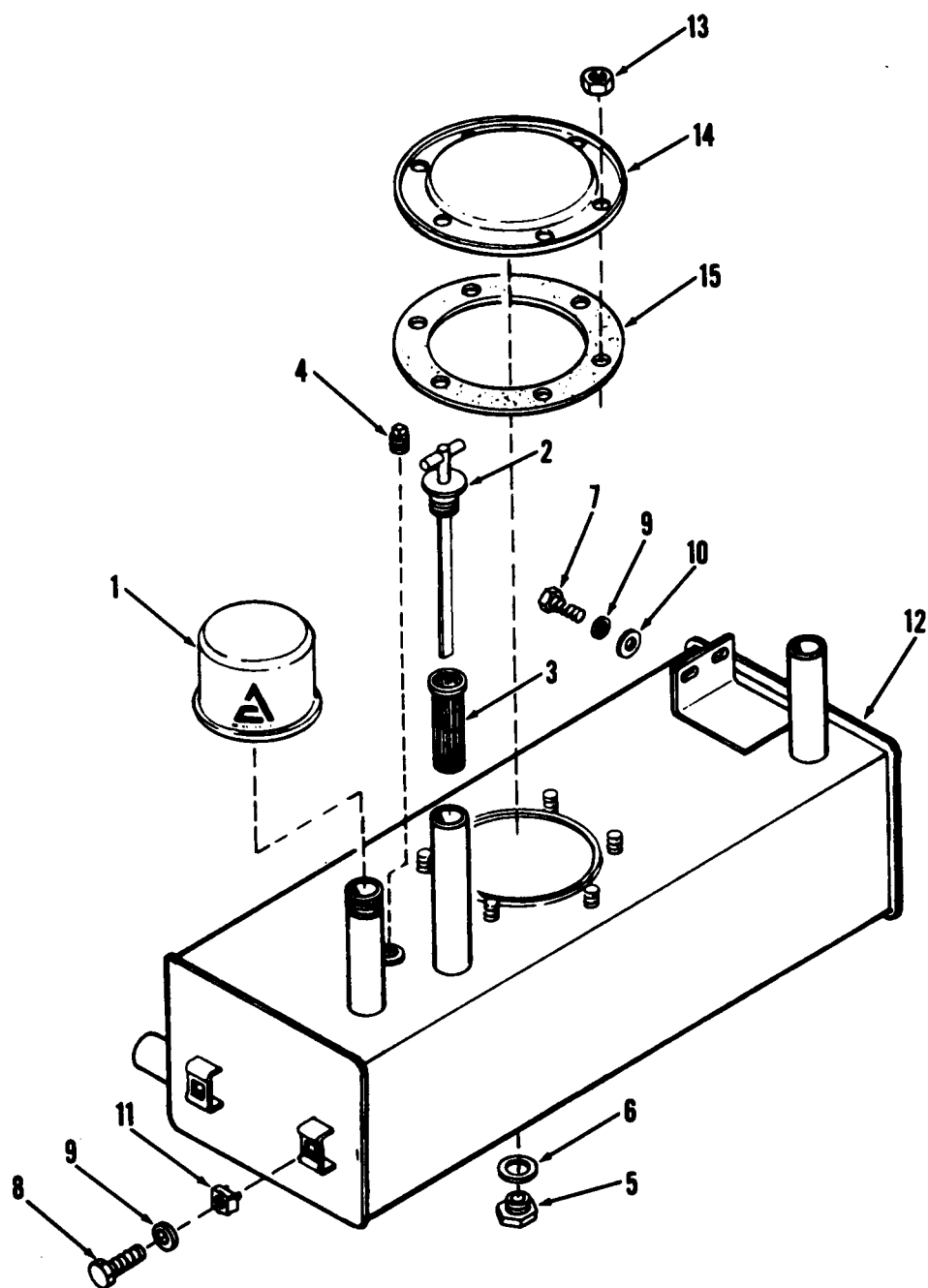
(3) Install cover (14) and new gasket (15) on reservoir (12). Secure cover with nuts (13).

e. Installation.

(1) Lift reservoir into position on right side of frame. Secure reservoir to frame with screws (7 and 8, fig. 4-27), lockwashers (9), and washers (10).

(2) Remove plug from tube and install outlet hose (fig. 4-26) on reservoir and tube. Tighten clamps securely.

(3) Refer to b above and fill reservoir.



- | | |
|--------------|--------------|
| 1 Breather | 9 Lockwasher |
| 2 Level gage | 10 Washer |
| 3 Screen | 11 Nut |
| 4 Plug | 12 Reservoir |
| 5 Drain plug | 13 Nut |
| 6 Washer | 14 Cover |
| 7 Screw | 15 Gasket |
| 8 Screw | |

Figure 4-27. Hydraulic reservoir, exploded view.

Section XIII. ELECTRICAL SYSTEM

4-45. General

a. This section provides organizational maintenance of the truck electrical system, except for electrical applications of the instrument panel which are contained in paragraph 4-32.

b. The electrical system is protected by three fuses.

A 10-amp fuse mounted beneath the instrument panel protects the instrument system. The horn electrical system is protected by a 20-amp fuse mounted on the same fuse holder as the 10-amp fuse described above. Lights are protected by a 20-amp fuse mounted in a fuse holder which is part of the cable supplying the headlight.

c. To further understand the electrical system, refer to figure 3-1. This electrical schematic diagram illustrates the system and shows interconnections and routing.

CAUTION

Before attempting any replacement or repairs to the electrical system, refer to paragraph 4-46 and disconnect the battery ground (negative) cable.

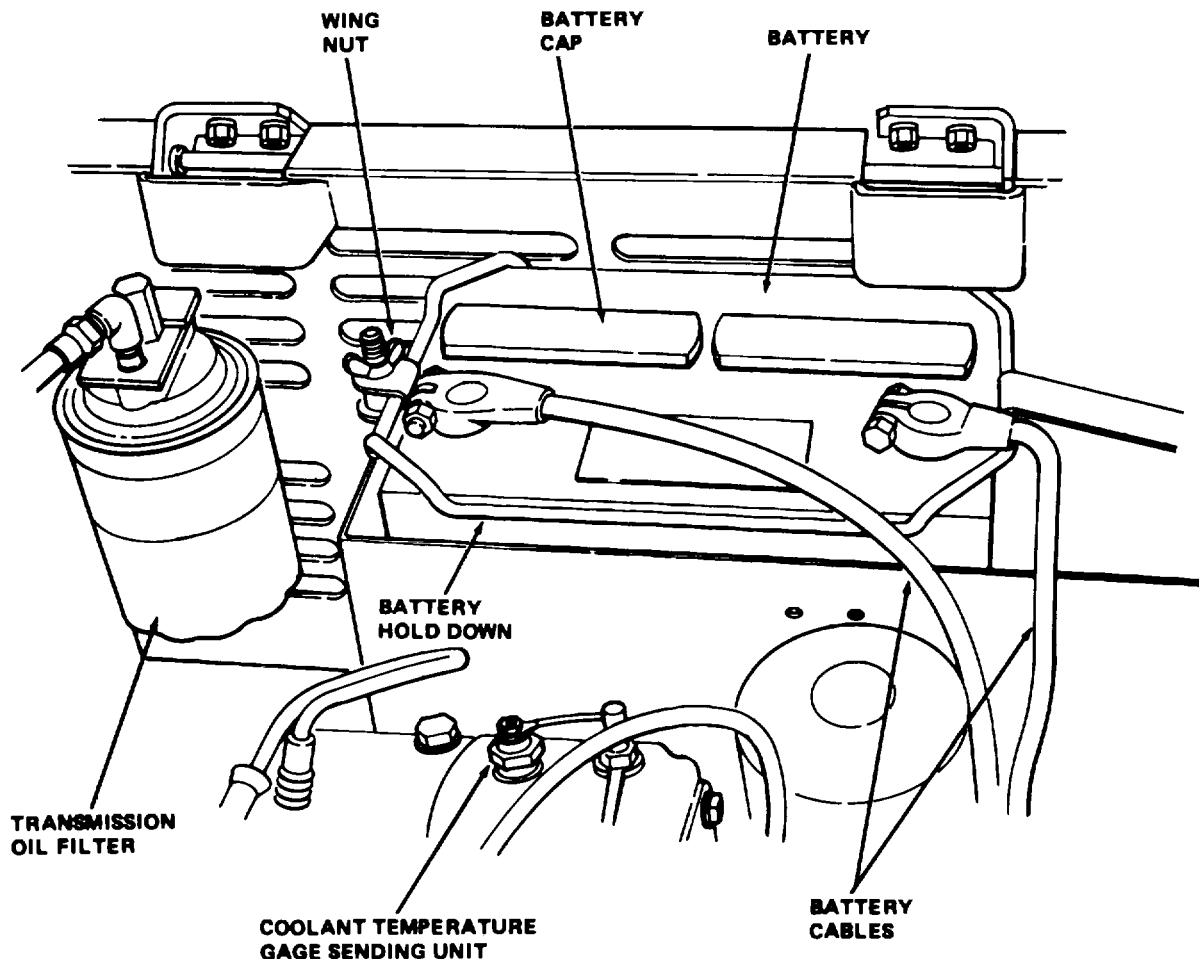
4-46. Battery and Cables

a. *General.* The battery is mounted at the front of the engine compartment. It stores electrical energy and supplies power to start the truck engine and operate the lights and instruments.

b. *Inspection.*

(1) Lift seat up and tilt seat and support forward
(2) Lift seat prop from right side of compartment and install prop to hold seat in an open position.

(3) Inspect battery (fig. 4-28) for good condition and any evidence of leakage.



TA034903

Figure 4-28. Battery, installed view.

(4) Inspect cables for secure connection and evidence of corrosion.

(5) Remove caps from battery and check level of fluid in battery. Level should be three eighths of an inch above plates.

c. Service.

(1) Fill battery to proper level if necessary.

(2) Check filler caps for tight fit and cover vent holes.

(3) Clean top of battery, posts and cable terminals with a solution of baking soda and water. Do not allow solution to enter battery cells.

(4) When foaming stops flush battery and cables terminals with clean, fresh water. Remove covers from vent holes in caps.

(5) Replace damaged or frayed cables. Disconnect cables from battery, starter and ground at engine. Install new cables and tighten securely. Install ground cable (negative) last.

(6) Check condition of battery using a hydrometer. If specific gravity is 1.225 or lower, recharge battery. A fully charged battery should read 1.265 to 1.290 specific gravity.

d. Removal

(1) Lift and prop seat in open position.

(2) Disconnect battery cables (fig. 4-28) from battery.

(3) Remove wing nut (fig. 4-28) and washer and lift battery holddown up and to the right to free battery.

(4) Use a suitable battery lifting tool and lift battery from battery tray.

(5) Remove screws and remove battery box and holddown.

e. Installation.

(1) Install battery box and holddown (fig. 4-28) and secure with screws, lockwashers and nuts.

(2) Use a suitable battery lifting tool and lift battery (fig. 4-28) into position in battery tray.

(3) Place battery holddown into position to secure battery. Install wing nut (fig. 4-28) and washer and tighten wing nut securely.

(4) Connect battery cables to battery posts and tighten securely. Install ground cable (negative) last.

(5) Remove prop and lower seat and support into position.

4-47. Lights

a. Headlight.

(1) General. The truck headlight is mounted on the left side of the mast. Operation is controlled through a push-pull light switch (fig. 21) mounted on the instrument panel. Bracket mounting of

the headlight allows it to be rotated and directed as necessary to illuminate the work area.

(2) Inspection.

(a) Turn on light switch and check switch and

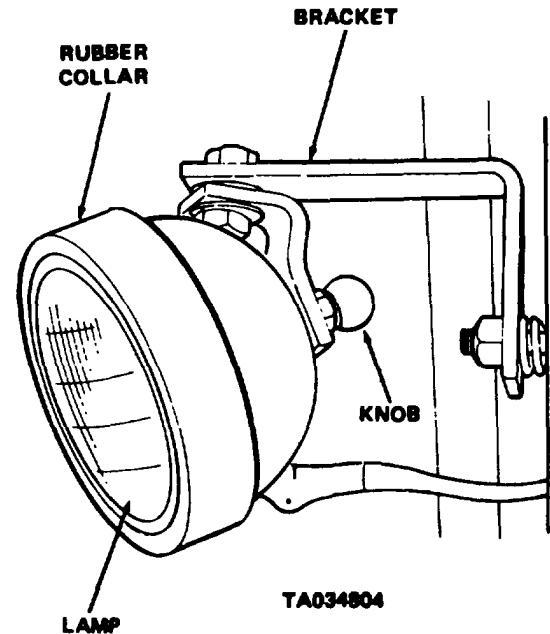


Figure 4-29. Headlight, installed view.

(b) To remove headlight, slide boot down wire and disconnect wire from headlight.

(c) Unscrew knob (fig. 4-29) from rear of headlight. Remove nut and washer from bracket and remove headlight.

(d) To remove wire from mast, remove screws and remove clamp. Disconnect wire at double connector and remove wire.

(4) Installation.

(a) Connect wire to double connector and secure wire to mast with clamp.

(b) Install headlight with stud at rear of headlight (fig. 4-29) through bracket. Secure light with washer and nut. Install knob.

(c) Connect wire to headlight and slide boot into position to protect connection.

b. Combination Rear Light. The light mounted at the top of the counterweight is a combination light. When the light switch is on, it is lit to function as a taillight. Depressing the brake pedal actuates a

pressure switch and closes the circuit. The light then operates as a stoplight.

(1) *Inspection.*

(a) Check light for secure mounting and secure wire connections.

(b) Turn on light switch and check taillight operation. Depress brake pedal and check

stoplight operation.

(c) Inspect light for broken lens and other damage.

(2) *Removal*

(a) To replace lamps in combination rear light, remove retaining ring and lens (fig. 4-30).

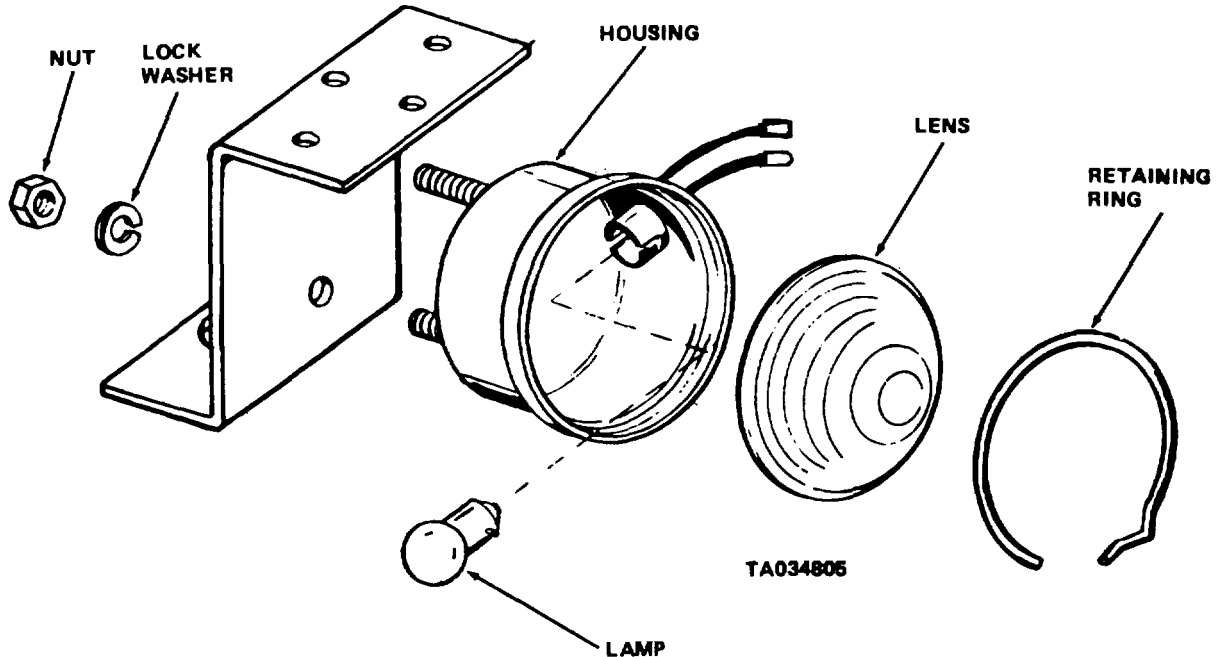


Figure 4-30. Combination rear light, exploded view.

(b) Depress lamp and turn one-quarter turn counterclockwise to remove from socket.

(c) To remove combination light, disconnect wires from connectors at rear of light.

(d) Remove nuts and lockwashers (fig. 4-30) and remove light from mounting bracket.

(3) *Installation.*

(a) Install combination rear light on bracket and secure with nuts and lockwashers (fig. 4-30).

(b) Connect wires to connectors at rear of light.

(c) Install new lamps (fig. 4-30) by depressing lamps in socket and turning one-quarter turn clockwise.

(d) Install lens (fig. 4-30) in light and secure with retaining ring.

c. *Stoplight Switch.* The stoplight switch is a pressure switch mounted on the forward end of the brake master cylinder. When the brake pedal is depressed, hydraulic pressure closes the switch and operates the stoplight.

(1) *Inspection.*

(a) Remove the floor plate to gain access to the master cylinder mounted on the right side of the frame.

(b) Check stoplight switch (fig. 4-31) wires for secure connections and good condition.

(c) Check around switch for evidence of oil leakage.

(d) Depress brake pedal and check stoplight operation.

(2) *Removal.*

(a) Remove floor plate.

(b) Disconnect wires from stoplight switch (fig. 4-31).

(c) Remove stoplight switch from fitting connected to master cylinder (fig. 4-31).

(3) *Installation.*

(a) Install stoplight switch (fig. 4-31) in fitting in master cylinder.

(b) Connect wires to stoplight switch.

(c) Install floor plate.

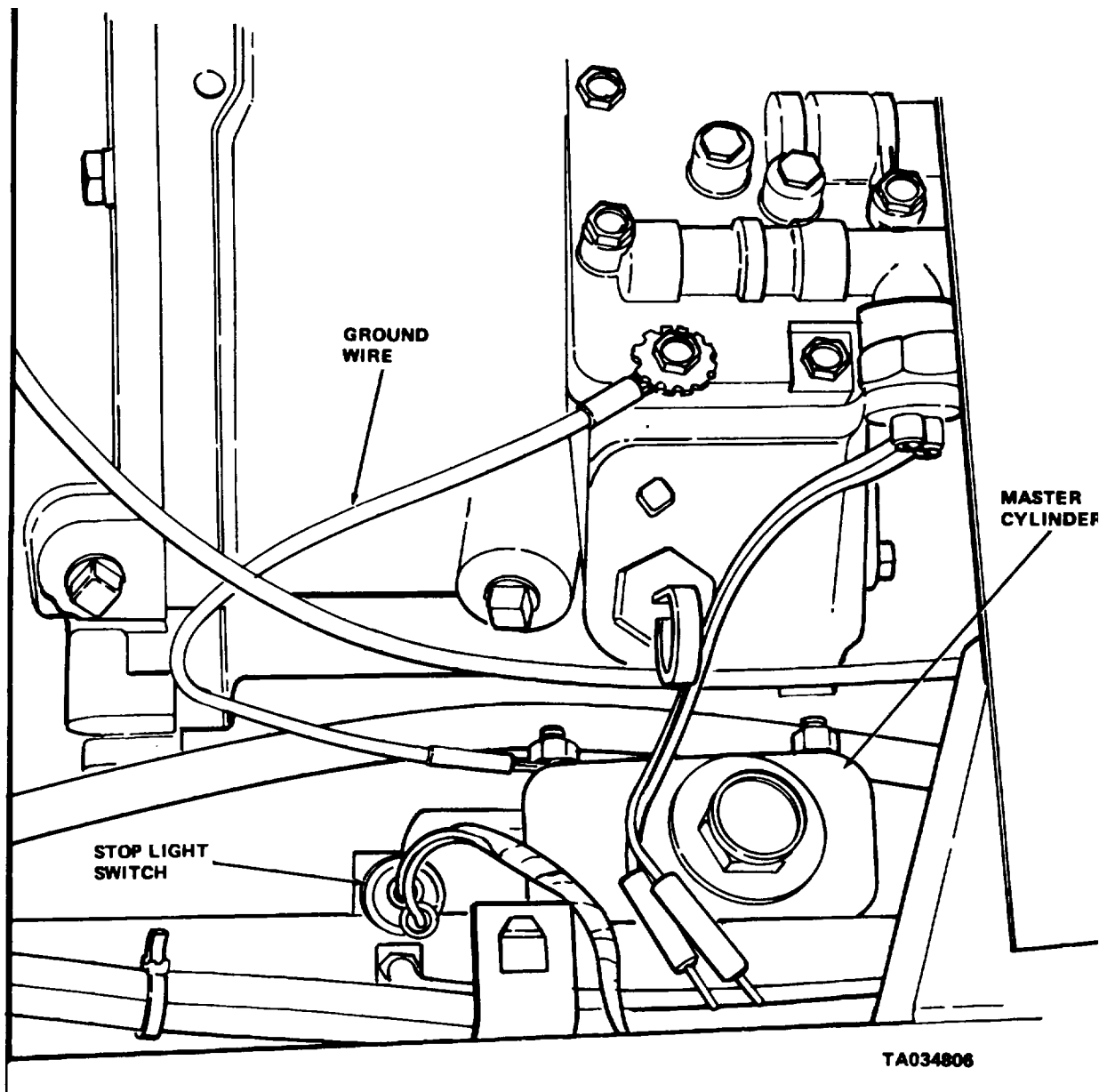


Figure 4-31. Brake master cylinder, installed view.

4-48. Horn

a. *General.* A horn is installed on the truck as a warning device. The circuit for the horn includes a relay. Depressing the horn button in the center of the steering wheel closes the circuit and operates the horn. The horn is mounted on the right side of the truck behind the hydraulic oil filter.

b. *Inspection.*

- (1) Depress horn button and check horn operation.
- (2) Remove right front cowl. Check horn and relay connections.
- (3) Check horn and relay for secure mounting.

(4) If horn is producing a weak signal proceed as follows:

(a) Connect a voltmeter between the horn terminal and ground. Press the horn button and observe the voltage on voltmeter.

(b) If voltage is between 0 and 10.7 volts, check for an open circuit, defective horn relay, defective wiring or shorted horn coil. Check horn button-to-ground contact.

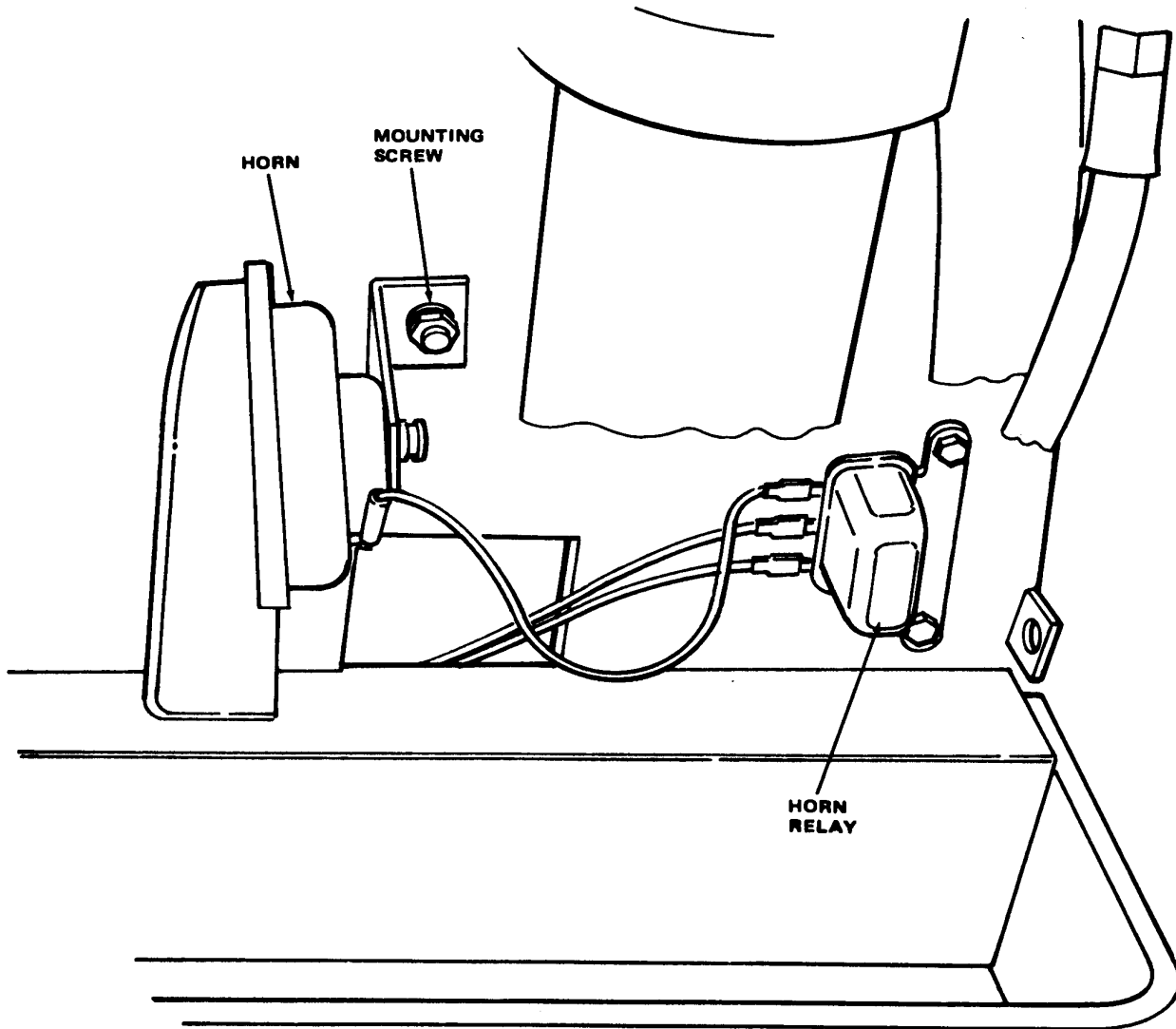
(c) If voltage is normal and horn signal is

weak, replace horn.

c. *Removal*

- (1) Remove right front cowl.

- (2) Tag and disconnect wires from horn (fig. 4-32) and relay.



TA034807

Figure 4-32. Horn and relay, installed view.

- (3) Remove screw, lockwasher and nut securing horn to frame. Remove horn.

- (4) Remove screws, lockwashers and nuts and remove relay (fig. 4-2) from frame.

d. *Installation..*

- (1) Install relay (fig. 4-32) on frame and secure with screws, lockwashers and nuts.

- (2) Install horn (fig. 4-32) on frame and

secure with screw, lockwasher and nut. Connect wires to horn and relay.

- (3) Operate horn button and check horn operation.

- (4) Install right front cowl.

4-49. Wiring

a. *General.* Electrical wiring for the truck consists mainly of two harnesses. A harness with a multiple plug connects the instruments and fuses on the instrument panel. Connection to the frame harness is made with a matching multiple plug at the right side of the instrument panel. Additional wires connect to the horn, transmission neutral start switch, fuel level gage and transmitter, and between instruments on the panel. The engine ignition and associated wiring are covered in their appropriate paragraphs.

b. *Inspection.*

CAUTION

Before attempting any replacement or repairs to the electrical system, refer to paragraph 446 and disconnect the battery ground (negative) cable.

(1) Check electrical connections for security.

(2) Inspect wires for damage to insulation, wire and terminals.

(3) Check clamp for secure mounting.

c. *Repair.*

(1) Tighten loose connections if necessary.

(2) Cover damaged insulation with

electrical tape if possible.

(3) Replace damaged wires and terminals.

(4) Tighten clamp mounting screws and install missing clamps if necessary.

4-50. Sending Units

a. *General.* The engine oil pressure gage, hourmeter, coolant temperature gage, and fuel level gage are actuated by sending units mounted on the engine and fuel tank. Connections are made to the oil and temperature gages through the frame wiring harness. Two wires connected by a quick-disconnect coupling lead from the fuel tank to the fuel gage. The fuel level gage sending unit is covered with the fuel tank.

b. *Oil Pressure Gage Sending Unit.* The oil pressure and hourmeter actuator sending units are mounted on the engine crankcase on the left side below the air cleaner.

(1) *Inspection.* Open left side panel to gain access to the oil pressure gage sending unit.

(a) Check wire connections to sending units

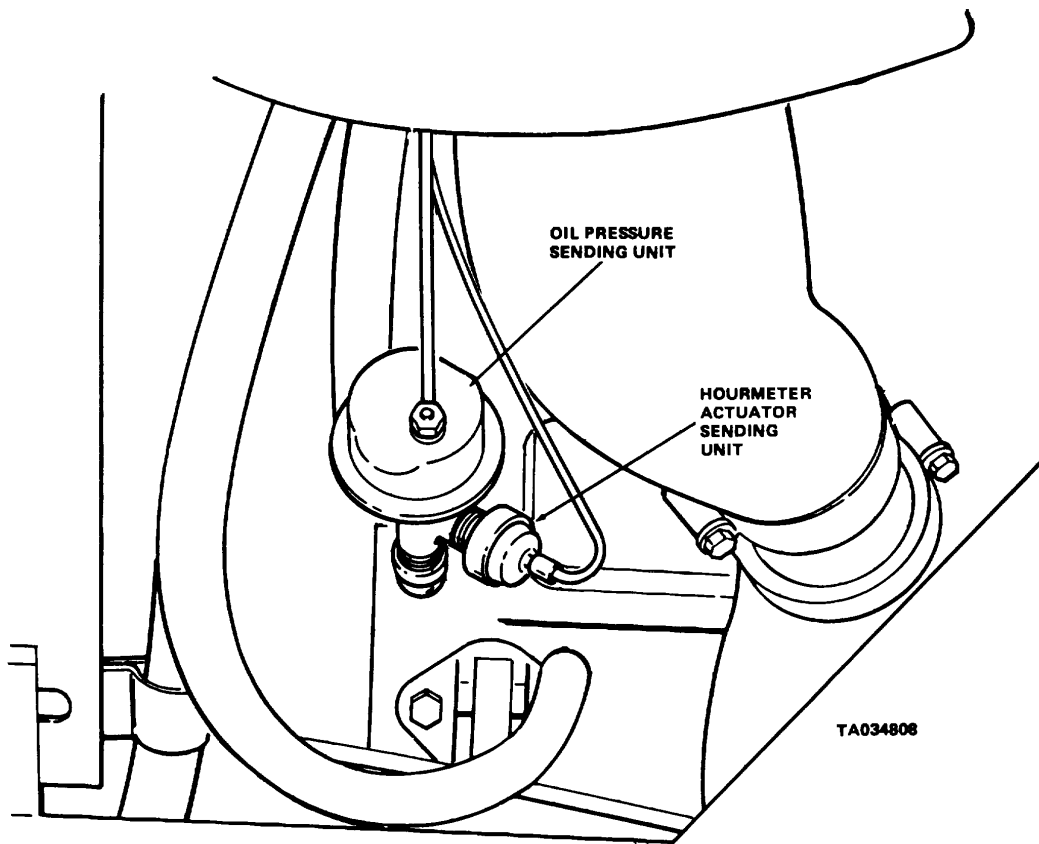


Figure 4-33. Oil pressure and hourmeter actuator sending units, installed view.

(b) Inspect sending units for evidence of oil leakage where unit and fittings thread into crank-case.

(2) *Removal*

(a) Remove nuts and lockwashers and disconnect wires from sending units (fig. 4-33).

(b) Use a wrench on the hex and remove oil pressure sending unit from crankcase. Remove hourmeter actuator sending unit.

(c) Remove elbow and tee from crankcase.

(3) *Installation.*

(a) Install tee and elbow in crankcase.

(b) Install sending units (fig. 4-33) in tee.

(c) Install wires on sending units and secure with nuts and lockwashers.

c. *Coolant Temperature Gage Sending Unit.* The coolant temperature sending unit (fig. 4-28) is mounted on the top rear end of the cylinder head.

(1) *Inspection.* Lift seat and prop in open position to gain access to coolant temperature sending unit.

(a) Check wire connection at coolant temperature sending unit (fig. 4-28).

(b) Check sending unit installation in head for evidence of leakage.

(2) *Removal*

(a) Drain radiator (para 4-68).

(b) Remove nut and lockwasher and disconnect wire from coolant temperature sending unit (fig. 4-28).

(c) Remove temperature sending unit from cylinder head.

(3) *Installation.*

(a) Install coolant temperature sending unit (fig. 4-28) in threaded opening in cylinder head.

(b) Connect wire to sending unit and secure with nut and lockwasher.

(c) Fill cooling system (para 4-68).

4-51. Alternator

a. *General.* The alternator is mounted on the right side of the engine. A belt drives the alternator and fan. Incorporated into the alternator is a voltage regulator which prevents over-charging the battery.

b. *Belt Adjustment.*

(1) Open right side panel.

(2) Check belt deflection between alternator pulley and fan pulley (fig. 4-34).

(3) Deflection should be $\frac{1}{2}$ -inch midway between pulleys.

(4) If adjustment is necessary, loosen screw attaching alternator to adjusting brace (fig. 435).

CAUTION

Apply pressure with pry bar against stator laminations, not against end frames.

(5) Place pry bar as shown on figure 4-34 and pry alternator away from engine until correct deflection

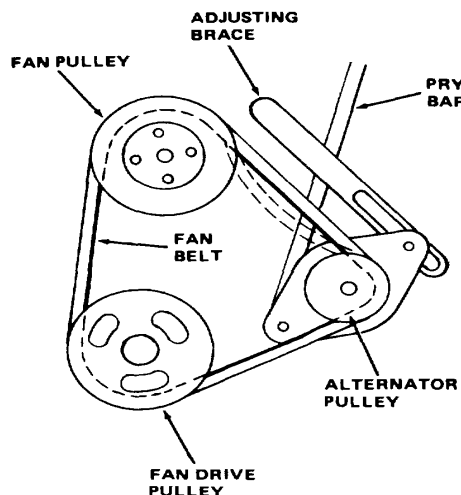


Figure 4-34. Fan belt adjustment.

is obtained.

(6) Tighten adjusting brace screw to hold alternator in position. Remove pry bar.

c. *Voltage Test.* Turn ignition switch on.

(1) Connect a voltmeter between "BAT" terminal (fig. 4-36) and ground. Voltmeter should read 10.7 to 12 volts.

(2) Connect a voltmeter between No. 1 terminal (fig. 4-36) and ground. Voltmeter should read 10.7 to 12 volts.

(3) Connect a voltmeter between No. 2 terminal (fig. 436) and ground. Voltmeter should read 10.7 to 12 volts.

(4) A zero reading on the voltmeter indicates an open circuit. Check wiring harness and wiring and correct.

(5) If there is an open circuit from No. 2 terminal the alternator internal circuits will prevent current output.

d. *Amperage Test.*

(1) Disconnect battery ground cable.

(2) Connect a carbon pile or load rheostat in series with the "BAT" terminal (fig. 4-36) as shown on figure 4-37.

(3) Connect battery ground cable.

(4) Operate engine at moderate speed and adjust load rheostat to obtain maximum alternator output.

(5) If ammeter reads 27 to 37 amps, alternator is not defective.

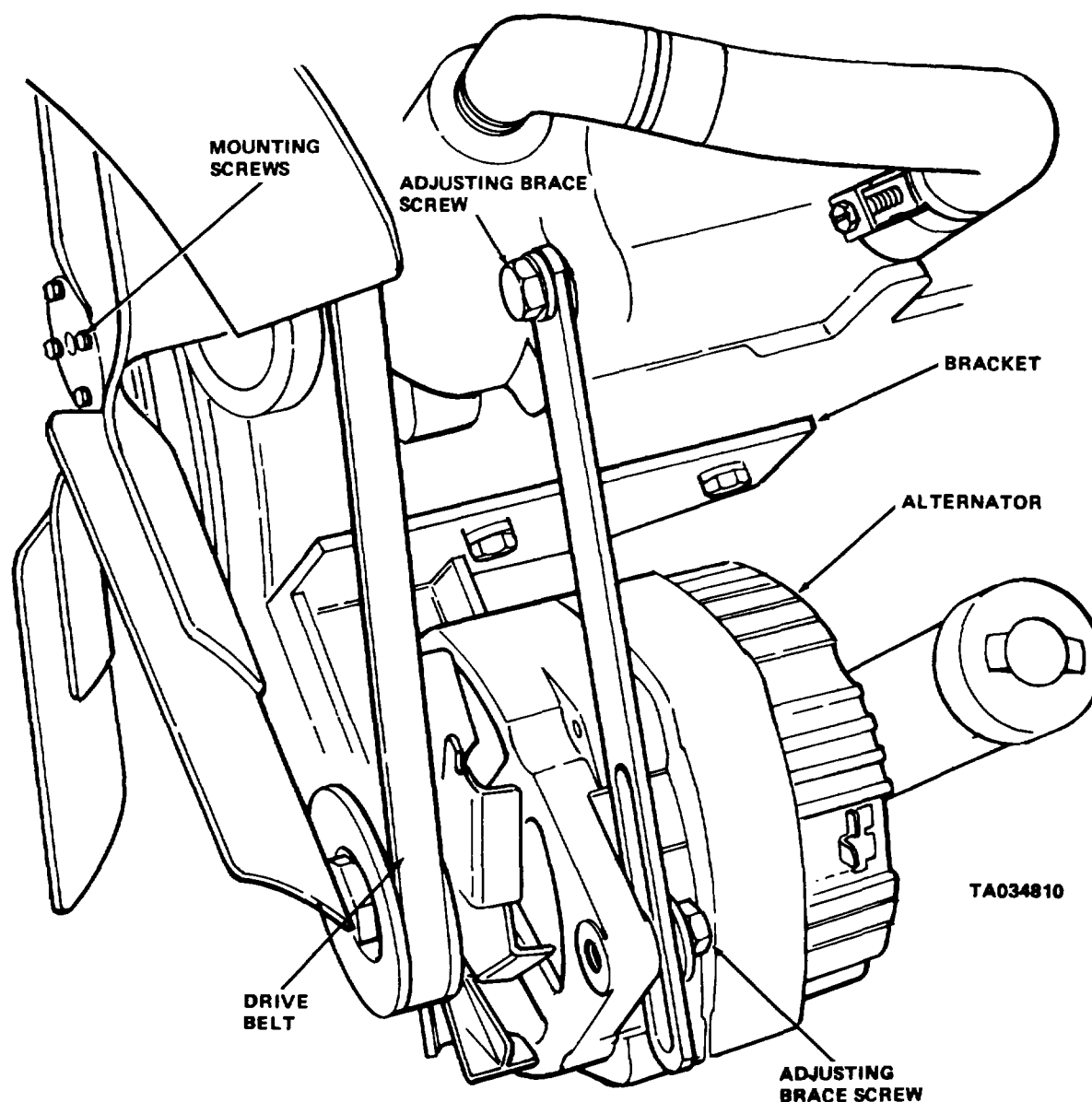


Figure 4-35. Alternator, installed view.

CAUTION

Tab for screwdriver in test hole is within 3/4 inch of casting surface. Do not force screwdriver deeper than one inch into hole.

(6) If ammeter reads less than 27 amps, ground the field winding by inserting a screwdriver into the test hole (fig. 4-36).

(7) Operate engine at moderate speed and adjust load rheostat to obtain maximum current output. If output exceeds 27 amps, replace alternator.

e. Removal.

(1) Open left side panel to gain access to alternator (fig. 4-35).

(2) Remove nut and lockwasher and disconnect wire from alternator (fig. 4-35).

(3) Refer to figure 4-35 and loosen alternator adjusting brace screw. Loosen nuts on long screw attaching bottom of alternator to alternator bracket.

(4) Push alternator towards engine and disengage drive belt (fig. 4-35) from alternator pulley, fan

pulley and fan drive adapter.

(5) Support alternator and remove alternator adjusting brace screw, lockwasher and washer from alternator brace.

(6) Remove nut and lockwasher from long screw at bottom of alternator, at bracket. Remove screw and remove alternator from bracket.

f. Installation.

(1) Lift alternator (fig. 4-35) into position on bracket and install long screw through alternator mounting holes and bracket. Install nut and lockwasher on long screws and tighten only finger tight.

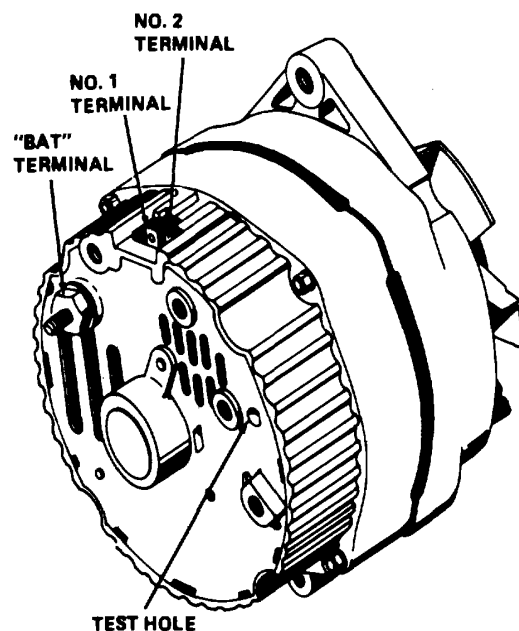
(2) Install washer and lockwasher and insert screw through alternator and adjusting brace. Tighten only finger tight.

(3) Lift alternator up and install drive belt (fig. 4-35) over alternator pulley, fan drive pulley and drive adapter pulley.

(4) Refer to b above and adjust belt deflection. Tighten brace and mounting screws.

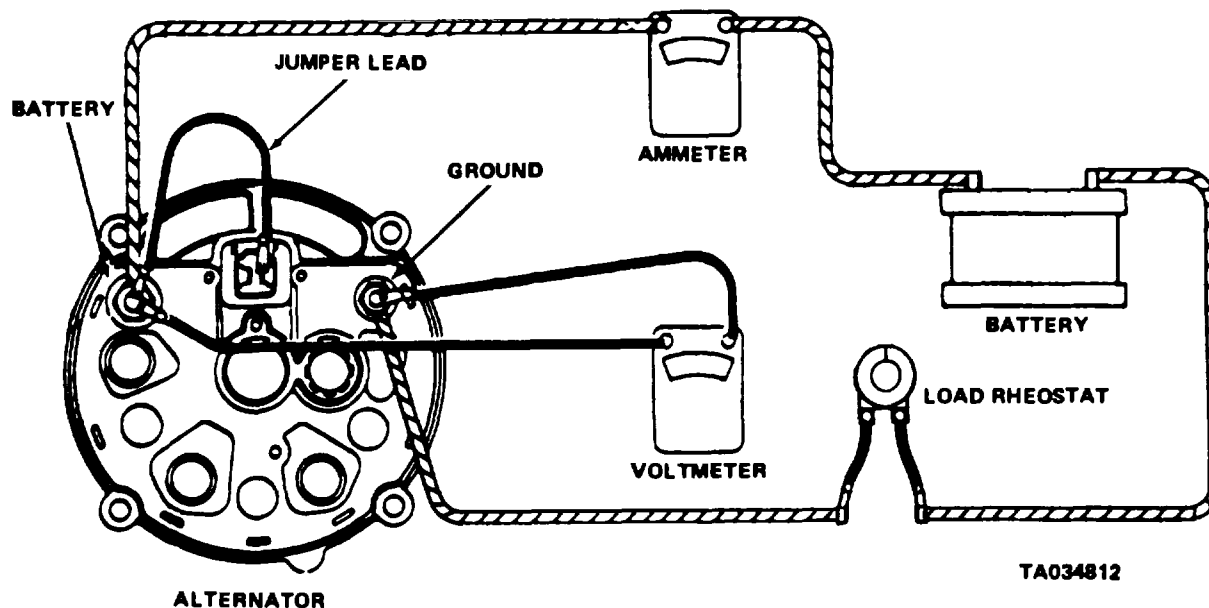
4-52. Starter

a. General The starter rotates the flywheel and starts the engine. When the ignition switch is turned



TA034811

Figure 4-36. Alternator connections.



TA034812

Figure 4-37. Checking alternator output

all the way to the right the starter will operate. An overrunning clutch will disengage the starter from the flywheel when the engine starts.

b. Starter Testing. No tests can be performed with the starter installed in the truck. If starter is removed and tests are required refer to direct and general support maintenance.

c. Removal

- (1) Open left side panel to gain access to the starter.
- (2) Disconnect battery ground (negative) cable.
- (3) Tag and disconnect wires from starter solenoid (fig. 4-38).

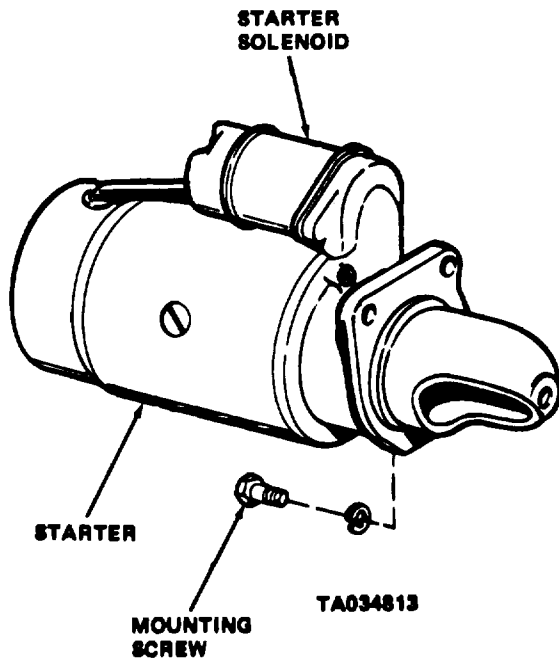


Figure 4-38. Starter, removal and installation

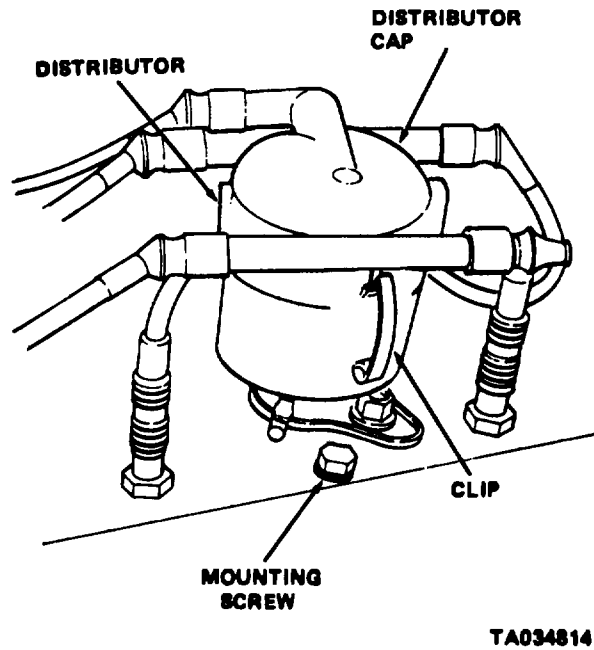


Figure 4-39. Distributor, installed view.

(4) Support starter (fig. 4-38) and remove screws and lockwashers securing starter to flywheel housing.

(5) Carefully pull starter from housing and remove from truck.

d. Installation.

(1) Lift starter (fig. 4-88) into position on flywheel housing with starter drive in line with flywheel ring gear.

(2) Install screws and lockwashers to attach starter to flywheel housing. Tighten screws securely.

(3) Check tap and connect wires to starter solenoid (fig. 4-38).

4-53. Distributor

a. General. The distributor is mounted on the top of the cylinder head. High tension wires connect the distributor to the spark plugs and coil A shaft, driven by the engine, extends up to a coupling and drives the distributor.

b. Service.

(1) Lift and tip seat forward and prop in an open position.

(2) Disengage clips at sides of distributor (fig. 4-89) and lift cap from distributor. Remove rotor and dust seal

(3) Inspect interior of cap for burned or worn contacts, carbon tracks and cracks. Wipe distributor cap with a clean cloth.

(4) Inspect breaker points for pitting and wear. Refer to figure 4-40 and check breaker point gap. Rotate cam to bring breaker lever to high point on cam. Insert feeler gage between breaker points. Gap should be 0.020 inches (0.50 mm) between points. If points require adjustment, loosen lock screw (fig. 4-40) and place screwdriver in adjusting slot. Move breaker lever until correct gap is obtained. Tighten lock screw to hold adjustment. Correct dwell angle is 66 to 72°.

(5) Apply a light coat of grease (GAA) to distributor cam. Place a few drops of oil (OE/HDO) in oil cup.

(6) Install dust seal, rotor and distributor cap and secure cap with clamps

(7) Remove prop and lower seat and support into position above engine.

c. Removal

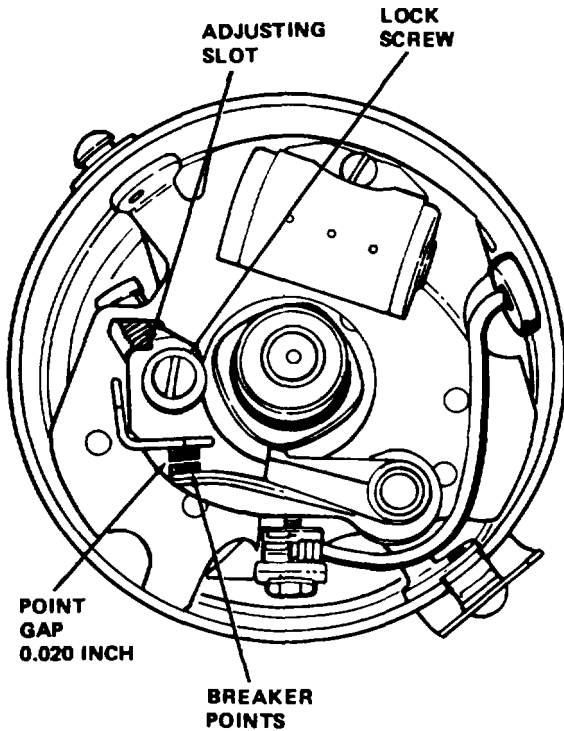
(1) Lift and tip seat forward and prop in open position.

(2) Disconnect spark plug wires (2, fig. 4-41) from distributor cap. Disconnect coil wire (1) from distributor cap. Disconnect primary lead from coil

(3) Remove screw (12) and lockwasher (18) and lift distributor, with clamp (14) attached, from engine.

d. Disassembly.

(1) Disengage clamps (2, fig. 4-42) and remove distributor cap (3) from distributor.



TA034815

Figure 4-40. Adjusting distributor breaker point gap.

(2) Mark position of rotor and remove rotor (4) and dust seal (5) from shaft.

(3) Remove screws and remove contact set (7) and capacitor (8) from plate (6). Disconnect primary lead (9) from contact set.

(4) Carefully remove plate (6) from distributor being careful not to damage primary lead or rubber grommet.

(5) Scribe a mark on shaft and coupling to assure proper installation and grind off head of coupling pin (15). Remove pin, coupling (16) and seal (17) from shaft.

(6) Remove retaining ring (10) and remove cam (11) from shaft.

(7) Lift shaft (18) from distributor and remove springs (13) and weights (14) from shaft (18).

(8) Do not remove bearings (20) from housing (21) unless replacement is necessary. Press bearings from housing to remove.

e. Cleaning, Inspection and Repair.

(1) Clean all metal parts in cleaning compound, solvent (P-D680) and dry thoroughly.

(2) Wipe distributor cap, dust seal, rotor, capacitor and housing clean with a dry cloth.

(3) Check weights, springs and plate for wear and damage.

(4) Replace dust seal if hard, worn or dirty.

(5) Inspect contact set for burned or pitted

points. Inspect set for worn cam arm.

(6) Check cam for wear and damage.

(7) Check capacitor for leakage and damage.

(8) Check distributor cap and rotor for cracks, burned or pitted contacts, carbon streaks and damage.

(9) Replace unserviceable parts.

f. Assembly.

(1) If bearings (20, fig. 4-42) were removed, press new bearings into housing. Do not ream, scrape or file bearing surfaces. Drill 0.125 inch (3.18 mm) hole in bearing through oil cup hole. Clean bearing thoroughly after drilling.

(2) Install weights (14) and springs (13) on shaft (18).

(3) Install washers (19) and shaft (18) through bearings. Install seal (17) and coupling (16) on end of shaft. Make sure scribe marks are aligned. Drive pin (15) through coupling and shaft. Peen ends of pin to secure coupling.

(4) Install bushing (12) and cam (11) on shaft and secure with retaining ring (10).

(5) Install contact set (7) and capacitor (8) on plate assembly (6). Connect primary lead (9) to plate and install plate in housing. Pull primary lead through grommet in housing.

(6) Refer to b above and set breaker point gap. Apply a light coat of grease (GAA) to cam.

(7) Install dust seal (5) and rotor (4) on shaft. Install rotor in same position as it was when removed. Install oil cup (11).

g. Installation.

(1) Install distributor through cylinder head. Coupling and shaft must mate with distributor drive shaft. Rotate distributor until tongue on distributor shaft mates with slot in drive shaft.

(2) Secure distributor clamp (14, fig. 441) to cylinder head with capscrew (12) and lockwasher (13). Install distributor cap (3, fig. 442).

(3) Connect spark plug wires (2) to distributor and spark plugs. Connect high tension coil wire (1) to distributor. Connect primary lead from distributor to coil (10).

(4) Place a few drops of oil (OE/HDO) in oil cup on distributor.

(5) Check ignition timing (h below).

h. Ignition Timing Check.

(1) Remove distributor cap, rotor and dust seal (d above). Check contact point gap (b above). Disconnect wire and remove number one spark plug (located nearest fan) (para 4-54).

(2) Refer to timing marks on flywheel flex plate.

(a) To gain access to flex plate timing marks (fig. 4-43), remove battery and battery tray (para 4-54).

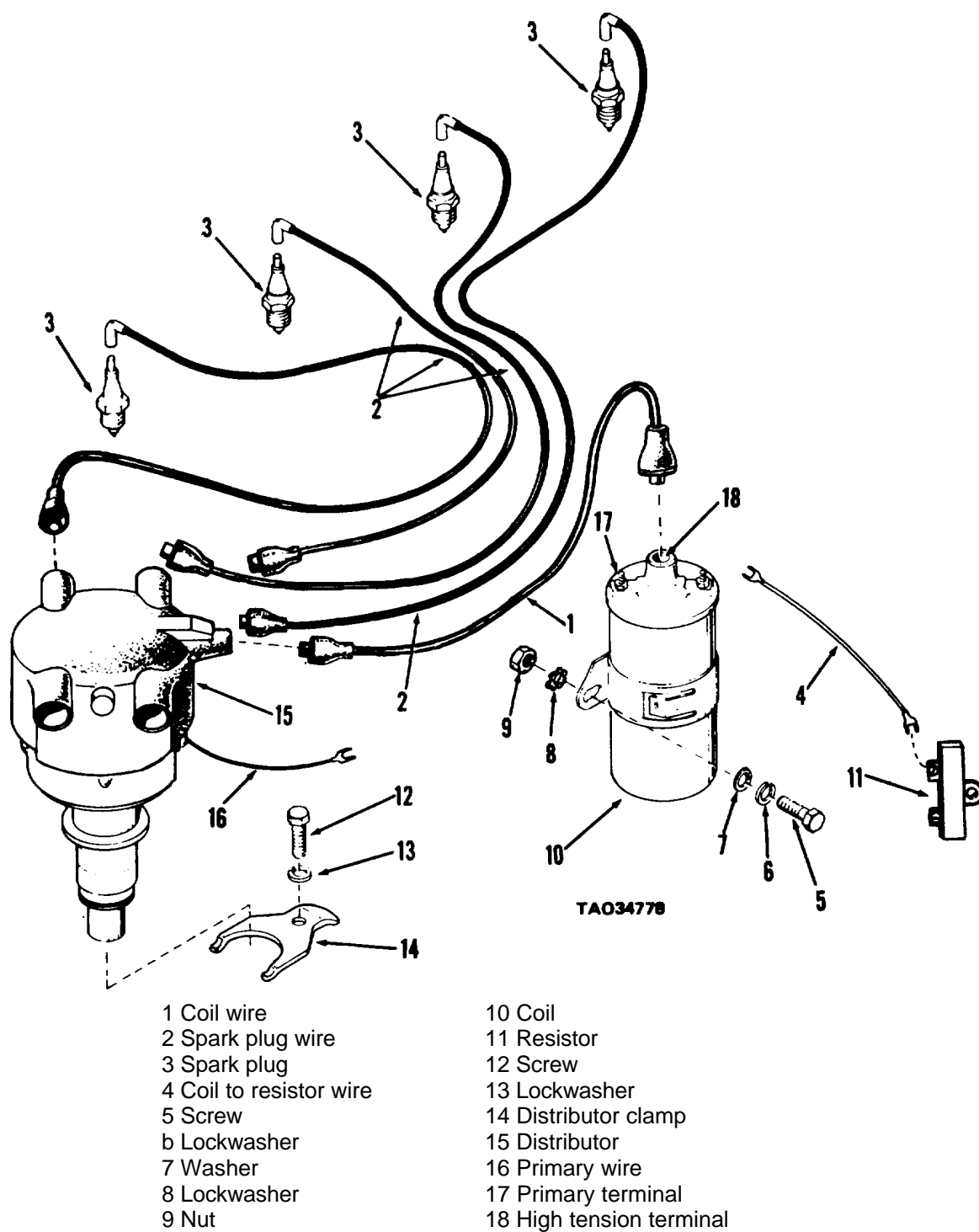
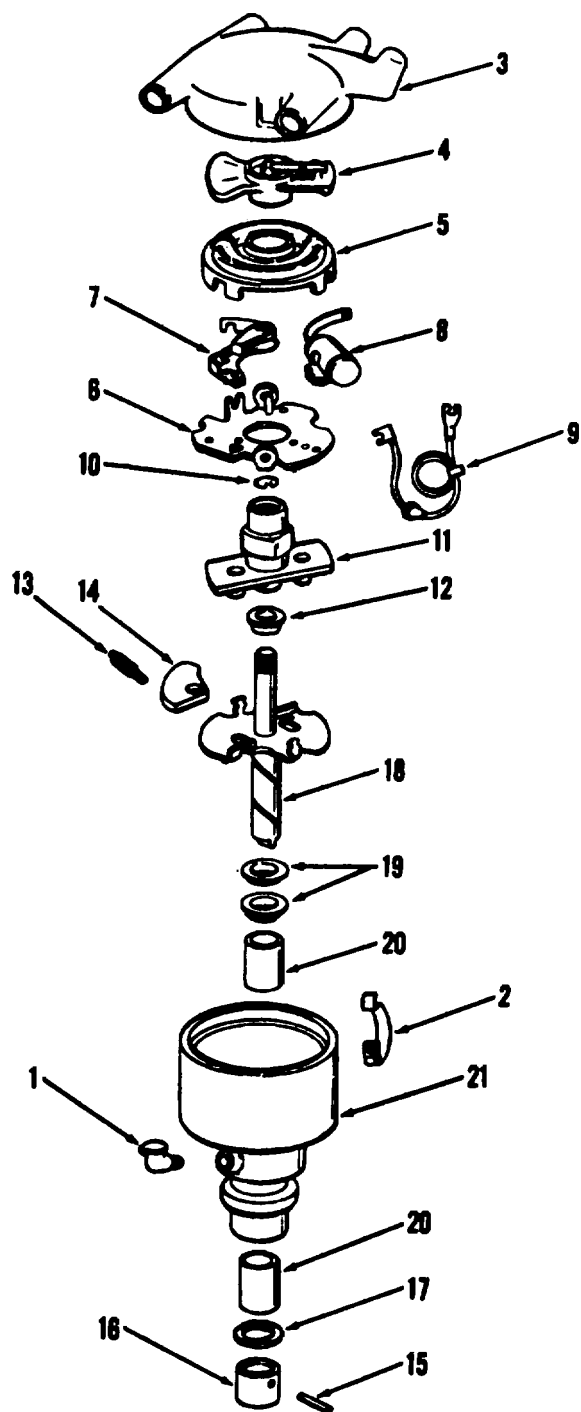


Figure 4-41. Spark plugs and coils, exploded view.

(b) Timing marks on flywheel (fig.

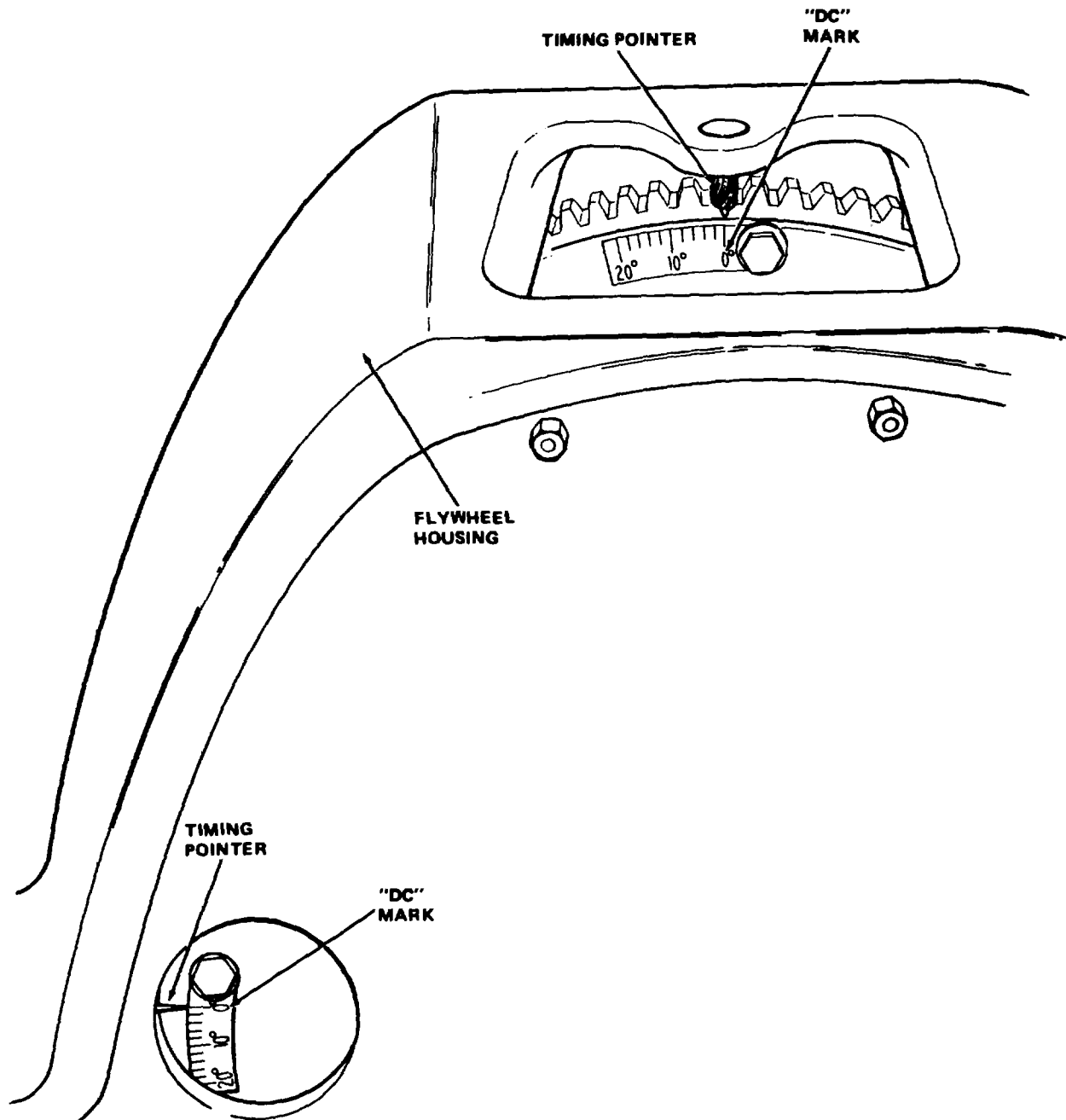
443) at fuel pump location are accessible through hole in flywheel housing.



TA034817

- | | | |
|------------------|-------------------|-------------|
| 1 Oil cup | 8 Capacitor | 15 Pin |
| 2 Clamp | 9 Primary lead | 16 Coupling |
| 3 Cap | 10 Retaining ring | 17 Seal |
| 4 Rotor | 11 Cam | 18 Shaft |
| 5 Dust seal | 12 Bushing | 19 Washer |
| 6 Plate assembly | 13 Spring | 20 Bearing |
| 7 contact set | 14 Weight | 21 Housing |

Figure 4-42. Distributor, explode view.



TA034818

Figure 4-43. Flywheel timing marks.

(3) Place thumb over spark plug hole and crank engine until an outward pressure is felt through hole.

(4) Continue cranking until "DC" mark (fig. 443) on flywheel is aligned with timing pointer.

(5) Loosen screw (12, fig. 441) securing distributor clamp. Slowly rotate distributor until breaker point lever is at high point on cam. Points should be at

their maximum opening. Gap should be 0.020 inch (0.50 mm). Refer to b above to adjust gap.

(6) Tighten screw (12, fig. 441) to secure distributor in position. Check point gap to be certain it did not change.

(7) Install dust seal rotor and distributor cap on distributor.

(8) Install No. 1 spark plug and connect wire (para 4-54).

(9) If removed, install timing cover on the top of flywheel housing. Install battery box and battery (para 446).

4-54. Spark Plugs

a. *General.* The four spark plugs are mounted along the left side of the cylinder head.

b. *Inspection.*

(1) Lift seat up and tilt forward and prop in open position.

(2) Inspect spark plugs and wires for cracks and breaks in insulation and porcelain.

(3) Inspect contact at top of plug and in wires for good condition and clean contact surfaces.

(4) Clean dirt and grease from plugs and wires.

c. *Removal*

(1) Disconnect spark plug wires (2, fig. 4-41) from spark plugs. Blow dirt from spark plug wells with compressed air.

(2) Remove spark plugs (3) from cylinder head using a suitable spark plug wrench.

(3) Remove copper gaskets from spark plug wells.

d. *Cleaning.*

(1) Scrape carbon and lead deposits from electrodes and insulator body of plugs.

(2) Sand blast spark plug electrodes with care. Do not leave plug in sand blast machine too long. Damage to glaze could result.

(3) Use a fine mill file and file electrodes to provide a square or flat surface at gap area

e. *Adjustment.*

(1) Adjust spark plug gap by bending outside electrode. Do not bend center electrode.

(2) Use a round feeler gage to measure gap between electrodes. Adjust gap to 0.025 inch (0.634 mm).

f. *Testing.*

(1) Test all spark plugs after cleaning and adjusting. Test plugs in a standard plug machine. Discard all plugs showing an unsatisfactory test.

g. *Installation.*

(1) Use new copper gaskets and install plugs in cylinder head.

(2) Tighten plugs by hand and then tighten plugs to 30 to 40 pound-feet (40.6 to 54.2 N-m).

(3) Connect spark plug wires (2, fig. 4-41) to plugs.

4-55. Ignition Coil

a. *General.* High voltage required to provide a spark for engine operation is provided by the ignition coil. The coil (10, fig. 441) is mounted on a bracket on the right side of the engine block. A 50-ohm resistor is connected in series with the coil. A limit of 12 volts is provided to the primary side of the coil from the alternator.

b. *Amperage Draw Test.* Open right side panel and lift seat into open position.

(1) Connect the ignition coil in a circuit as shown in figure 4-44.

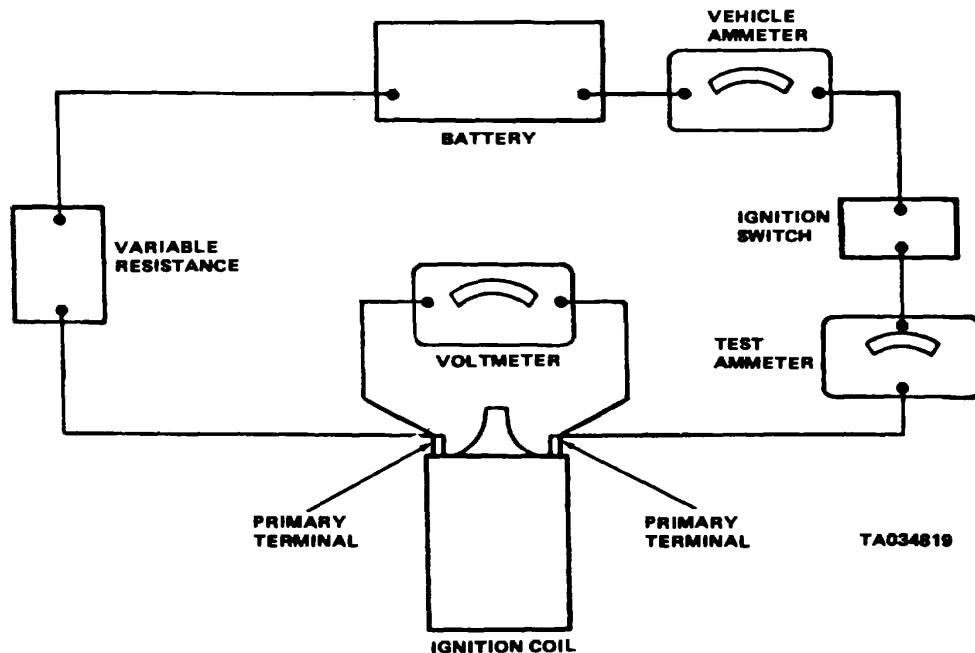


Figure 4-44. Ignition coil test wiring..

(2) A test ammeter is required as shown to give an accurate measurement.

(3) Close ignition switch and adjust voltage with adjustable resistance (fig. 444) to 12 volts.

(4) Test ammeter should read 2 to 3 amperes.

(5) If reading is not correct, replace coil

(6) Turn ignition switch off. Remove connections and instruments used for the test.

c. Primary Ignition Circuit Resistance Test.

(1) Disconnect wire from resistor to coil primary from coil primary terminal

(2) Connect a voltmeter with a one volt scale in series with the positive battery terminal and coil primary terminal

(3) Remove distributor cap, rotor, and dust seal (para 4-53) and rotate engine to close breaker points in distributor.

(4) Turn ignition switch on. Voltmeter should not read more than 0.20 volts.

(5) Turn ignition switch off. Disconnect voltmeter leads from battery and coil Connect resistor to coil terminal

(6) Connect one voltmeter lead to coil primary terminal that holds the distributor primary lead.

(7) Ground other voltmeter lead on distributor housing.

(8) Turn ignition switch on. Voltmeter should read less than 0.10 volts.

(9) If readings exceed voltage specified, replace coil.

(10) Turn ignition switch off and disconnect

voltmeter.

(11) Install dust seal, rotor and distributor cap (para 4.53).

d. Coil Primary Continuity Test.

(1) With ignition switch off, connect an ohmmeter across coil primary terminals.

(2) Ohmmeter reading should be steady. If ohmmeter fluctuates, replace coil

(3) Disconnect ohmmeter.

e. Coil Secondary (High Tension) Continuity Test).

(1) Disconnect high tension coil wire (1, fig. 4-41) from top of ignition coil (10).

(2) Connect an ohmmeter across the high tension terminal (18) at top of coil to primary terminal (17) on distributor.

(3) Ohmmeter should read less than 20,000 ohms resistance. If reading exceeds this value, replace coil.

(4) Disconnect ohmmeter and install high tension coil wire on coil.

f. Removal

(1) Disconnect high tension coil wire (1, fig. 4-41) from top of coil Disconnect distributor primary wire (16) and coil to resistor wire (4) from terminals on top of coil Disconnect wires from resistor (11).

(2) Remove screws (5), washers (7), lockwashers (6 and 8) and nuts (9) and remove coil (10) and resistor (11) from bracket.

g. Installation.

(1) Install coil (10, fig. 4-41) and resistor (11) on bracket and secure with screws (5), lockwashers (6 and 8), washers (7) and nuts (9).

Section XIV. FUEL SYSTEM

4-56. General

The fuel system (fig. 445) consists of the fuel tank (51), fuel filter (52), fuel pump (21), carburetor(32) and governor (28). Fuel is drawn from the tank by the fuel pump through the fuel filter. The fuel pump delivers it to the carburetor where it is mixed with air from the air cleaner and the mixture is supplied to the intake manifold. The velocity type governor monitors the amount of fuel to the manifold and regulates engine speed. The air cleaner is mounted on the trunk frame and connected to the carburetor with hoses. An indicator, mounted in the air line, indicates condition of the air cleaner element.

4-57. Air Cleaner

a. General. The dry-type air cleaner (fig. 446) is mounted on the left side of the engine compartment. The air cleaner bracket is attached to the truck frame.

b. Service.

(1) When the air cleaner indicator (fig. 3-1) shows the element requires replacement remove element as follows:

(2) Open left side panel and tilt seat up and forward

(3) Remove wing nut (10, fig. 4-46) and lock washer (11).

(4) Remove cover (13) and remove filter element (14).

(5) Install new element into cover and install cover and element on base.

(6) Secure cover and element to bracket with wing nut and lockwasher.

(7) Close side panel and lower seat into position.

e. Removal.

(1) Lift seat up and forward. Position rod to hold seat in open position. Open left side panel.

(2) Loosen tywrap (3, fig. 4-46). Loosen clamps (1) and remove hose (2) from air cleaner and engine.

(3) Remove indicator (6) from tube. Loosen clamps (4) and remove hose (5) and tube (7) from carburetor.

(4) Loosen clamp (9) and remove hose (8) from air cleaner.

(5) Remove wing nut (10) and lock washer (11) and remove air cleaner cover and base (13) and

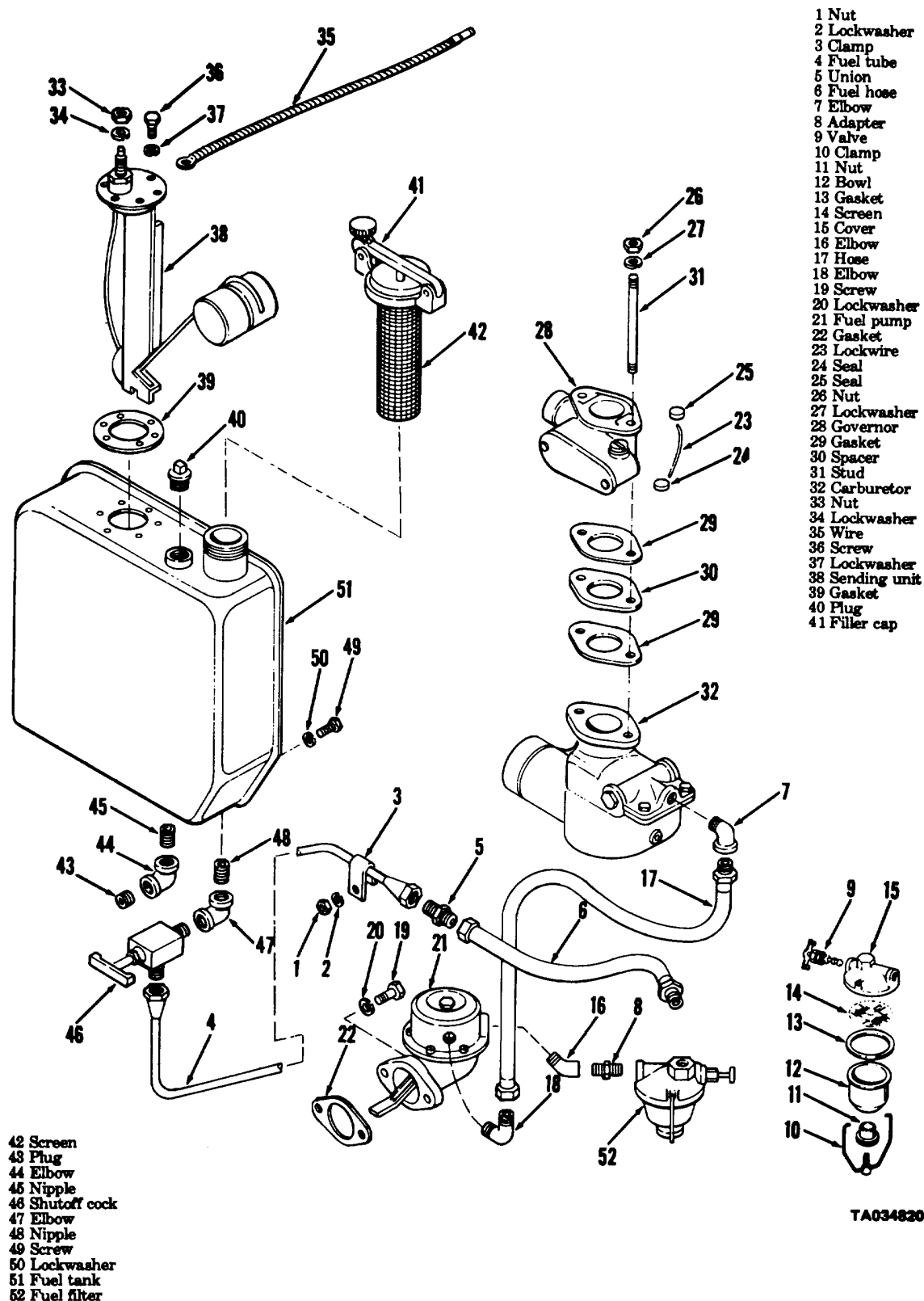
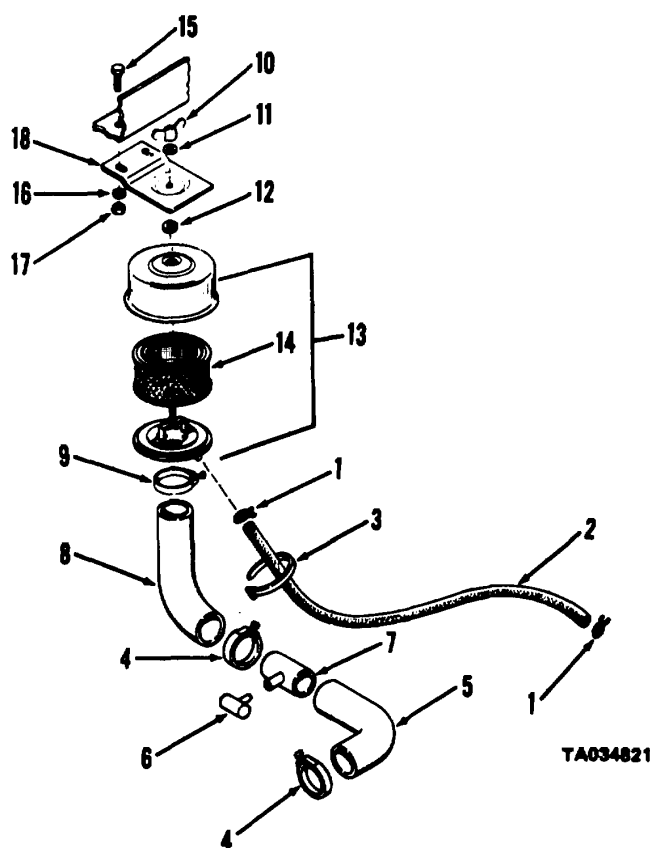


Figure 4-45. Fuel system exploded view.



- | | |
|-------------|-------------------|
| 1 Clamp | 10 Wire nut |
| 2 Hose | 11 Lockwasher |
| 3 Tywrap | 12 Rubber washer |
| 4 Clamp | 13 Cover and base |
| 5 Hose | 14 Element |
| 6 Indicator | 15 Screw |
| 7 Tube | 16 Lockwasher |
| 8 Hose | 17 Nut |
| 9 Clamp | 18 Bracket |

Figure 4-46. Air cleaner, exploded view

element (14) from truck.

d. Inspection and Repair.

(1) Inspect hoses for damage and deterioration.

(2) Inspect tube and indicator for dents and damage. Check for restrictions in tube. Remove restriction if present.

(3) Check clamps for damaged threads and cracks.

(4) Check air cleaner cover for dents and damage

(5) Replace unserviceable parts.

e. Installation

(1) Install assembled air cleaner cover and base (13, fig. 4-46) with element on bracket and secure with wing nut (10) and lockwasher (11).

(2) Connect hose (8) and clamp (9) to bottom

of air cleaner. Do not fully tighten clamp.

(3) Connect clamps (4), tube (7) and hose (5) to air cleaner hose and carburetor. Aline hoses and tube and tighten clamps

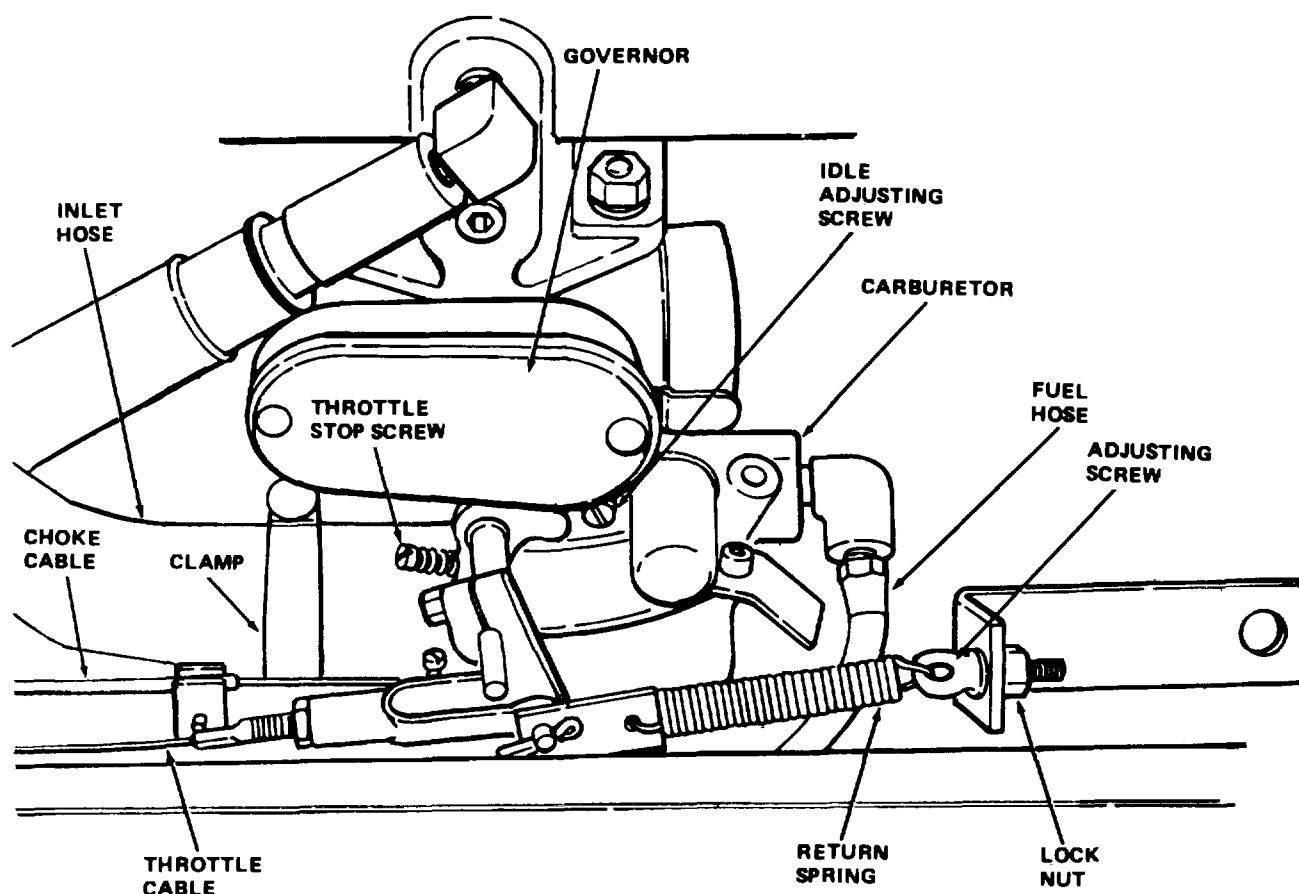
(4) Connect hose (2) to air cleaner and engine with clamps (1). Install tywrap (3).

(5) Close side panel and lower seat.

4-58. Carburetor

a. General. The carburetor is mounted below the intake manifold on the left side of the engine. Cables connect the accelerator pedal and choke control knob to the carburetor.

b. Adjustments. Open left side panel to gain access to the carburetor (fig. 4-47).



TA034822

Figure 4-47. Carburetor adjustment

(1) *Choke adjustment.*

(a) Loosen clamps and remove inlet hose (fig. 4-47) from carburetor.

(b) Pull choke control knob on instrument panel all the way out.

(c) Observe position of choke plate through air inlet hose opening in carburetor. Choke plate should completely close opening to carburetor.

(d) If choke plate is not completely closed, loosen clamps and move choke cable (fig. 4-47) until choke is completely closed. Tighten clamps.

(e) Move choke control knob in and out and check choke operation. Cable should operate smoothly and should completely close choke plate.

(f) Install air inlet hose on carburetor and tighten clamps.

(2) *Throttle Adjustment.*

(a) Depress accelerator and observe throttle cable (fig. 4-47) movement at carburetor.

(b) Release accelerator and observe action of return spring (fig. 4-47). Throttle cable should return carburetor to idle position. If necessary, loosen lock nut and adjust spring tension with adjusting screw

to provide correct throttle motion. Tighten lock nut.

(3) *Idle Adjustment*

(a) Start engine and allow to reach operating temperature. Adjust governor if necessary (para 4-59).

(b) Adjust throttle stop screw (fig. 447) to an idle speed of 500 to 550 rpm.

(c) Gradually turn idle adjusting screw (fig. 447) in until engine begins to miss. Slowly turn screw out until engine begins to run unevenly. Count number of turns between two points.

(d) Rotate screw to bring it to approximately midpoint between the two points reached in (4) above, or until engine runs smoothly. Stop engine.

(e) Close side panel.

c. *Removal*

(1) Open left side panel

(2) Disconnect throttle cable (fig. 447) and choke cable from carburetor.

(3) Loosen clamp and disconnect air inlet hose from carburetor.

(4) Disconnect fuel hose (17, fig. 4-45) from carburetor.

(5) Remove nuts (26) and lockwashers (27) and remove carburetor (32) and governor (28) from manifold.

(6) Lift governor, gaskets (29) and spacer (30) from carburetor. Remove elbow (7) from carburetor.

(7) Remove studs (31) from carburetor.

d. Installation.

(1) Install studs (31, fig. 445) in carburetor (32).

(2) Install new gaskets (29), spacer (30) and governor (28) on carburetor.

(3) Install assembled carburetor and governor on manifold, using a new gasket. Carburetor studs should extend through manifold flange.

(4) Secure carburetor in position with nuts (26) and lockwashers (27).

(5) Install elbow (7) in carburetor and connect fuel hose (17) to elbow.

(6) Slide air inlet hose on carburetor and tighten clamp.

(7) Connect throttle cable (fig. 447) and choke cable to carburetor levers.

(8) Operate engine and adjust carburetor (b above).

(9) Close left side panel

4-59. Governor

a. General The velocity type governor is mounted between the carburetor and manifold. Operation of the governor prevents the engine speed from exceeding 2450 rpm. Air mixed with gas flows through the governor throat. Velocity of the air creates a pressure above the governor valve. A regulating spring is attached to the throttle valve and tends to keep the valve open. When the pressure above the valve exceeds the force exerted by the spring the valve will move toward the closed position. The closing action of the valve will exactly balance the spring and when this occurs governing action takes place and maximum speed is fixed at this point. An adjusting screw varies spring tension and thereby regulates top speed.

b. Adjustment.

(1) Start engine and allow engine to reach operating temperature.

(2) Open left side panel

(3) Adjust accelerator and choke cable operation (para 4-58) if necessary.

(4) Depress accelerator and check maximum speed of engine. Speed should be 2350 to 2450 rpm

(5) If engine speed is not within the above limits, adjust governor with the adjusting screw (fig. 4-48). The screw is located on the left bottom side of the governor. Turn screw clockwise to increase engine speed and counterclockwise to decrease engine speed.

(6) Stop engine and close left side panel

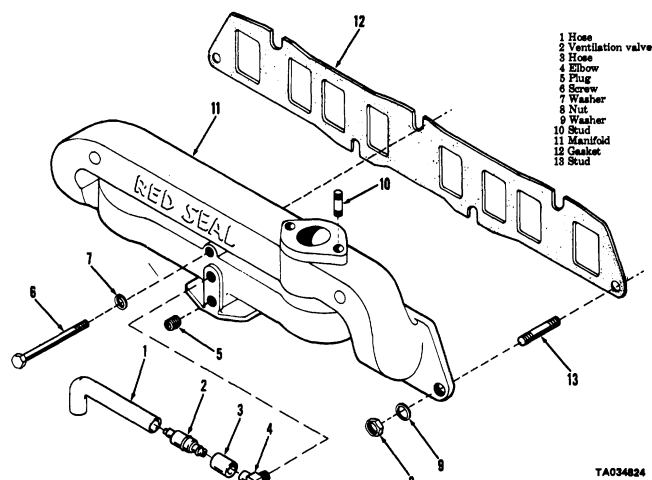


Figure 4-48. Governor adjustment

c. Removal. Refer to paragraph 4-58 to remove governor.

c. Installation. Refer to paragraph 4-58 and install governor.

4-60. Fuel Pump

a. General. The mechanically operated fuel pump is located on the left front side of the engine below the air cleaner.

b. Pressure Test.

(1) Open left side panel

(2) Disconnect fuel outlet hose (17, fig. 4-45) from fuel pump. Use appropriate fittings and connect a 0-15 psi pressure gage between fuel pump and carburetor.

(3) Start engine and allow to reach operating temperature. Check pressure on gage at idle and maximum speed. At 1800 rpm gage should register between 1½ to 214 psi.

(4) If pressure is not within limits described above, replace fuel pump.

(5) Remove gage and connect hose (17) to fuel pump. Stop engine and close side panel.

c. Removal

(1) Close fuel tank shutoff cock (46, fig. 445).

(2) Open left side panel.

(3) Disconnect fuel hose (6) from fuel filter (52).

(4) Disconnect hose (17) from fuel pump (21). Remove screws (19) and lockwashers (20) and remove fuel pump (21) from side of engine. Remove gasket (22).

(5) Remove fuel filter (52) and fittings from fuel pump.

d. Installation.

(1) Install fittings (8, 16, and 18, fig. 4-45) in fuel

pump (21) inlet and outlet. Install fuel filter on fuel pump.

(2) Use a new gasket (22) and install fuel pump and filter on engine. Secure fuel pump with screws (19) and lockwashers (20).

(3) Connect hose (17) to fuel pump. Connect fuel hose (6) to fuel filter

(4) Open fuel shutoff cock (46). Operate engine and check fuel pump operation. Test outlet pressure (b above) if necessary.

(5) Shut off engine and close left side panel.

4-61. Fuel Filter

a. *General.* The fuel filter is the bowl and screen type and is mounted at the fuel pump inlet. Fuel from the fuel tank is drawn through the filter before being pumped to the carburetor.

b. *Service*

(1) Close fuel tank shutoff cock (46, fig. 4-45).

(2) Open left side panel.

(3) Loosen nut (11) and remove bowl (12) and gasket (13) from cover (15). Remove screen (14).

(4) Inspect screen and if damaged or clogged, replace screen.

(5) Install screen (14) in cover (15). Use a new gasket (13) and install bowl (12) on cover.

(6) Swing clamp (10) down into position and secure bowl by tightening nut (11).

(7) Open fuel tank shutoff cock (46) and operate engine and check fuel filter for leaks.

(8) Shut off engine and close side panel

c. *Removal*

(1) Refer to paragraph 4-60 and remove fuel filter from fuel pump.

(2) Remove fittings (7 and 8, fig. 4-45) from fuel filter (52).

d. *Installation.*

(1) Install fittings (7 and 8, fig. 4-45) in fuel filter (52).

(2) Refer to paragraph 4.60 and install fuel filter and fuel pump on engine.

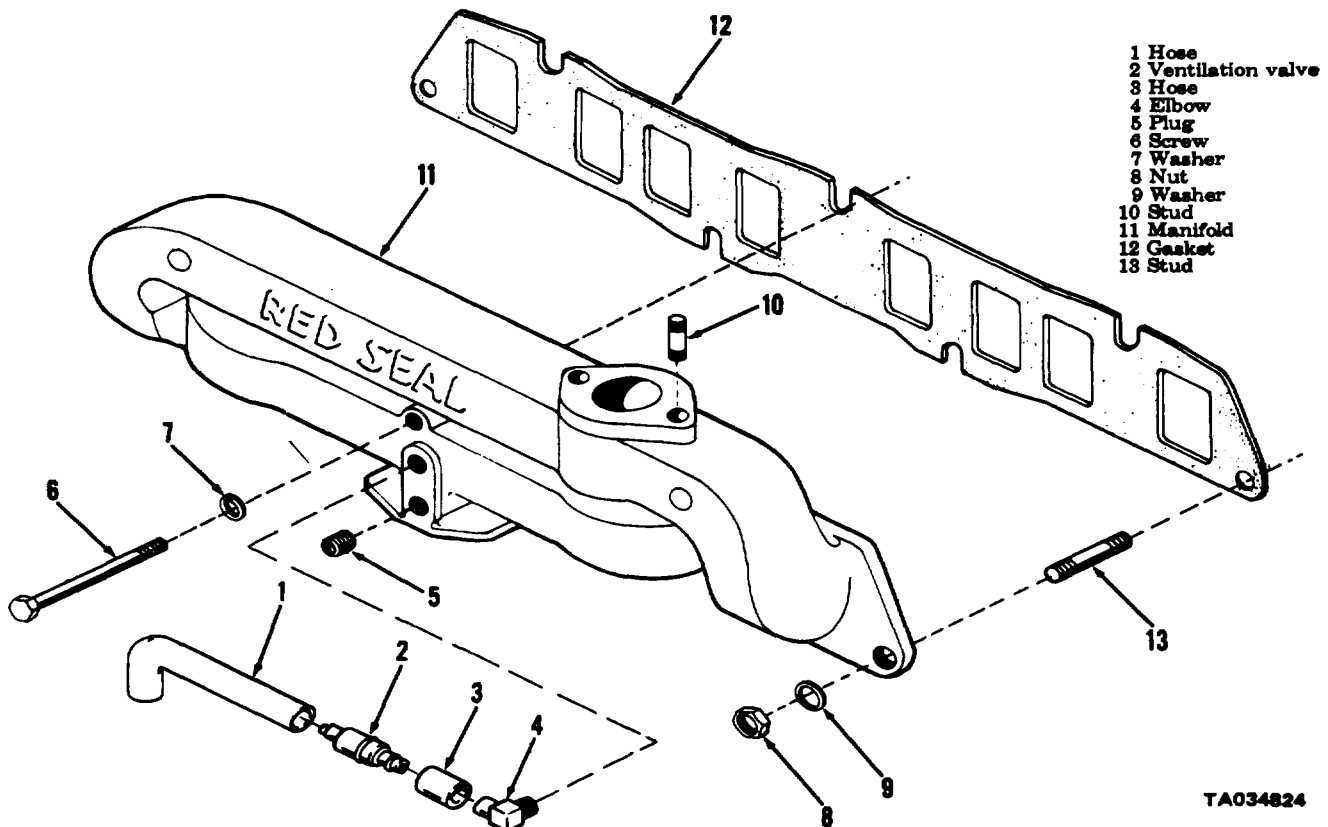
4-62. Crankcase Ventilation

a. *General* The positive crankcase ventilation valve is connected to an elbow in the manifold. A hose connects the valve to a pipe in the valve chamber cover.

b. *Removal.*

(1) Open left side panel

(2) Disconnect hose (1, fig. 449) from chamber cover and valve (2).



TA034824

Figure 4-49. Manifold, exploded view

(3) Remove hose (3) and elbow (4) from manifold.

c. Installation.

(1) Install elbow (4, fig. 449) in tapped hole in manifold (11)

(2) Connect hose (3) to elbow and install valve (2) in hose.

(3) Connect valve to valve chamber cover with hose (1). (4) Close side panel.

4-63. Accelerator Pedal and linkage

a. General The accelerator pedal controls the

speed of the truck engine. Depressing the pedal increases the speed. A cable connects the pedal to the carburetor. The cable is in turn connected to a return spring and bracket.

b. Adjustment. Refer to paragraph 4-58 to adjust the accelerator cable.

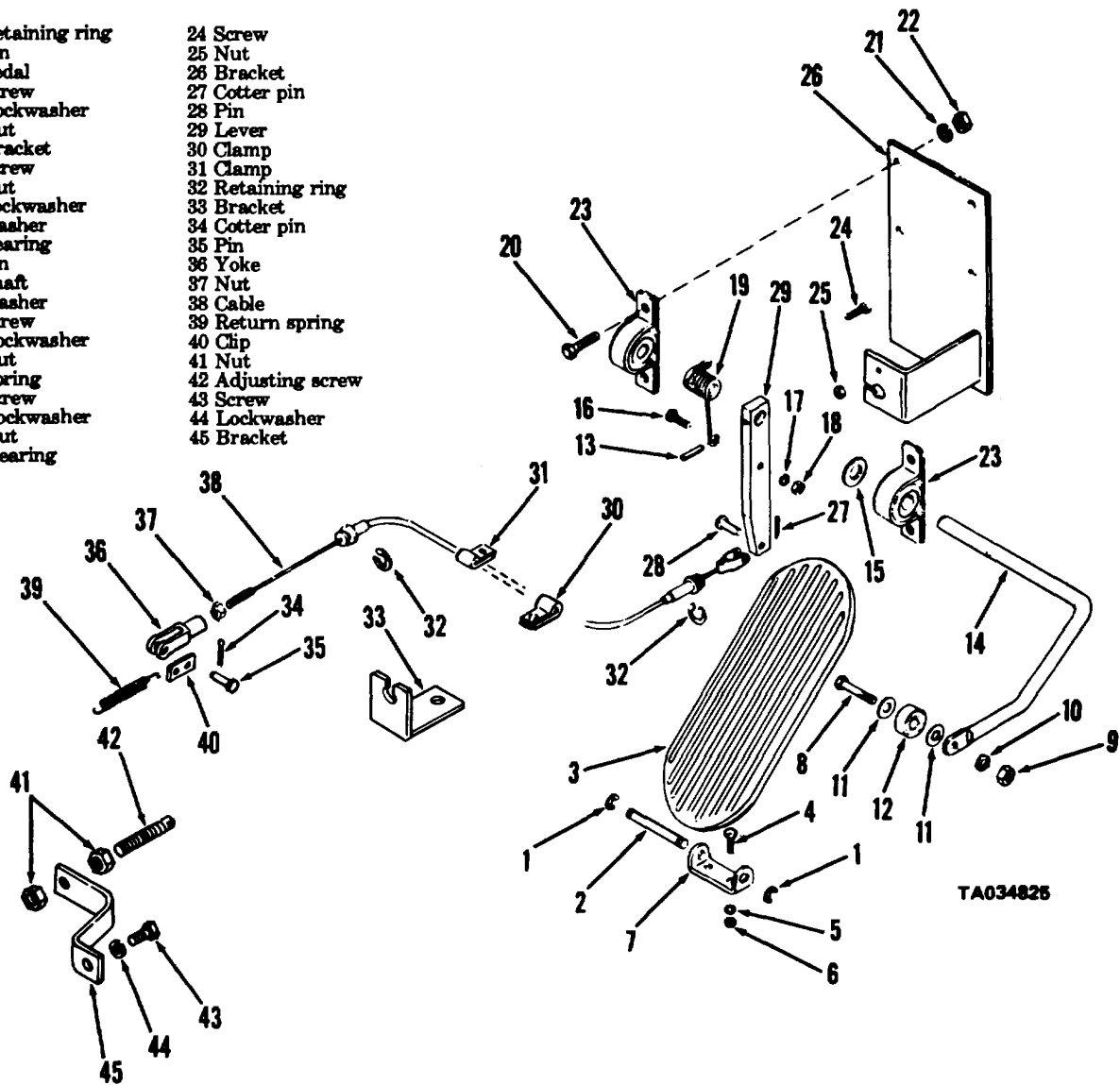
c. Removal

(1) Remove floor and toe plates.

(2) Remove retaining rings (1, fig. 4-50) and pin (2). Remove pedal (3) from toe plate.

- 1 Retaining ring
- 2 Pin
- 3 Pedal
- 4 Screw
- 5 Lockwasher
- 6 Nut
- 7 Bracket
- 8 Screw
- 9 Nut
- 10 Lockwasher
- 11 Washer
- 12 Bearing
- 13 Pin
- 14 Shaft
- 15 Washer
- 16 Screw
- 17 Lockwasher
- 18 Nut
- 19 Spring
- 20 Screw
- 21 Lockwasher
- 22 Nut
- 23 Bearing

- 24 Screw
- 25 Nut
- 26 Bracket
- 27 Cotter pin
- 28 Pin
- 29 Lever
- 30 Clamp
- 31 Clamp
- 32 Retaining ring
- 33 Bracket
- 34 Cotter pin
- 35 Pin
- 36 Yoke
- 37 Nut
- 38 Cable
- 39 Return spring
- 40 Clip
- 41 Nut
- 42 Adjusting screw
- 43 Screw
- 44 Lockwasher
- 45 Bracket



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Figure 4-50. Accelerator linkage, exploded view.

(3) Remove screw (8), nut (9) and lockwasher (10) and remove bearing (12) and washers (11) from shaft

(4) Remove cotter pin (27) and pin (28) and disconnect accelerator cable from lever (29).

(5) Remove screws (20), lockwashers (21) and from bracket.

(6) Remove pin (13) from shaft and lever. Slide bearings (23), spring (19), lever (29) and washers (15) from shaft.

(7) Remove screws and remove clamps (30 and 31) from cable. Remove retaining ring (32) from end of cable.

(8) Open left side panel. Remove retaining ring (32) from bracket (33) and cable.

(9) Mark position of yoke (36) on cable. Remove nut (37) and yoke.

(10) Check and mark length of adjusting screw. Remove nuts (41) and remove adjusting screw (42), spring (39) and clip (40) from bracket (45).

c. Installation.

(1) Install bearings (23, fig. 4-50), spring (19), washers (15) and lever (29) on accelerator shaft (14). Install pin (13) through lever and shaft.

(2) Position assembled shaft and bearings on bracket (26) and secure bearings to bracket with screws (20), lockwashers (21) and nuts (22)

(3) Install bearing (12) on shaft and secure with screw (8), nut (9), lockwashers (10) and washers (11).

(4) Connect cable (38) to lever (29) with pin (28) and cotter pin (27). Install retaining ring (32) on cable

(5) Secure cable to truck with clamps (30 and 31). Install cable in bracket (33) and secure with other retaining ring (32)

(6) Install yoke (36) and nut (37) on cable in same position as marked at removal. Install clip (40) and yoke on throttle lever at carburetor and secure with pin (35) and cotter pin (34)

(7) Connect return spring to clip and adjusting screw (42). Install adjusting screw in bracket (45). Adjust length of adjusting screw to length marked at removal with nuts (41)

(8) Install pedal (3) in bracket on toe plate and secure with pin (2) and retaining rings (1).

(9) Check operation of accelerator and cable. Adjust length of adjusting screw or cable as necessary (para 4-58) to provide proper operation and engine speed.

(10) Install floor and toe plates. Close side panel.

4-64. Fuel Lines

a. General The fuel lines illustrated on figure 4-45 connect the components of the fuel system.

b. Removal To identify and remove fuel lines and fittings refer to figure 4-45.

c. Repair. If fuel lines require repair, remove

fittings from hoses or tube and install fittings in new hose or tube. Inspect elbows and adapters for damaged threads and evidence of leakage. Replace unserviceable parts.

d. Installation. Refer to figure 4-45 and install fuel lines in fuel system.

4-65. Fuel Tank

a. General. The fuel tank is mounted on the left front of the truck. A shutoff cock is provided at the fuel tank outlet. Level of fuel is sent to the fuel level indicator on the instrument panel by a sending unit installed in the tank.

b. Removal.

(1) Remove left front cowl

(2) Close shutoff cock (46, fig. 445). Place a suitable container under tank. Remove drain plug (43) and drain fuel from tank.

(3) Disconnect wire (35) from sending unit (38). Remove screws (36) and lock washers (37) and remove sending unit and gasket (39) from fuel tank.

(4) Remove filler cap (41) and screen (42) from fuel tank.

(5) Disconnect tube (4) from shutoff cock.

(6) Remove screws (49) and lockwashers (50) and lift fuel tank from truck frame

(7) Remove shutoff cock, plug (40) and elbows and fittings from fuel tank

c. Cleaning, Inspection and Repair

(1) Remove any sediment and water from tank.

(2) Clean inside and outside of tank with cleaning compound (Fed. Spec. P-D-680). All solvent must be out of tank and tank dried thoroughly before filling with fuel.

(3) Clean inlet screen with solvent and dry with compressed air.

(4) Inspect tank for evidence of leakage, cracked welds and damage. If tank requires repair, refer to direct and general support maintenance.

(5) Inspect screen for dents and damage. Replace unserviceable screen

(6) Check fittings for damaged threads and evidence of leakage. Replace damaged parts

(7) Check operation of sending unit (38). Float arm should swivel smoothly and without binding. Replace sending unit if defective.

d. Installation.

(1) Install fittings and elbows (44, 45, 47 and 48, fig. 445) in fuel tank. Install shutoff cock (46) and drain plug (43). Install plug (40).

(2) Use a new gasket (39) and install sending unit (38) in tank. Secure unit with screws (36) and lockwashers (37).

(3) Install filler cap (41) and screen (42) in tank. Position fuel tank (51) on truck frame and secure with screws (49) and lockwashers (50).

(4) Connect wire (35) to sending unit. Connect tube (4) to shutoff cock.

- (5) Fill fuel tank with correct grade of fuel.
- (6) Open shutoff cock and start engine. Check

fuel tank and lines for leaks.

- (7) Shut off engine. Install left front cowl.

Section XV. COOLING SYSTEM

4-66. General

The cooling system for the lift truck engine consists of a water pump, a fan drive adapter, and cooling fan, drive belt, radiator, thermostat and connecting hoses. A gear in the fan drive adapter is driven by the camshaft gear. This gear drives a pulley. The belts are driven by the pulley and, in turn, drive the fan and alternator pulleys. A tank, mounted below, and an integral part of the radiator, cools the transmission oil. Capacity of the system is 9 quarts of coolant.

4-67. Drive Belt

a. *General.* The drive belt provides the motive force for the fan and alternator pulleys. It is driven by the fan drive pulley.

b. *Inspection.*

(1) Open side panels and lift seat to upright position.

(2) Inspect belts for fraying, wear, oil spots and evidence of stretching.

(3) Check belt tension (para 4-51) and adjust if necessary.

(4) Replace unserviceable belts.

c. *Removal* Refer to paragraph 4-51 and remove

drive belt.

d. *Installation.* Refer to paragraph 4-51 and install and adjust drive belt. Close side panels and lower seat.

4-68. Water Pump and Fan

a. *General.* The water pump is mounted on the top front of the engine block. It is connected to the radiator with a rubber hose. Coolant is circulated by the water pump from the radiator through the engine. The coolant then is discharged through the coolant outlet elbow and returns to the radiator.

b. *Inspection*

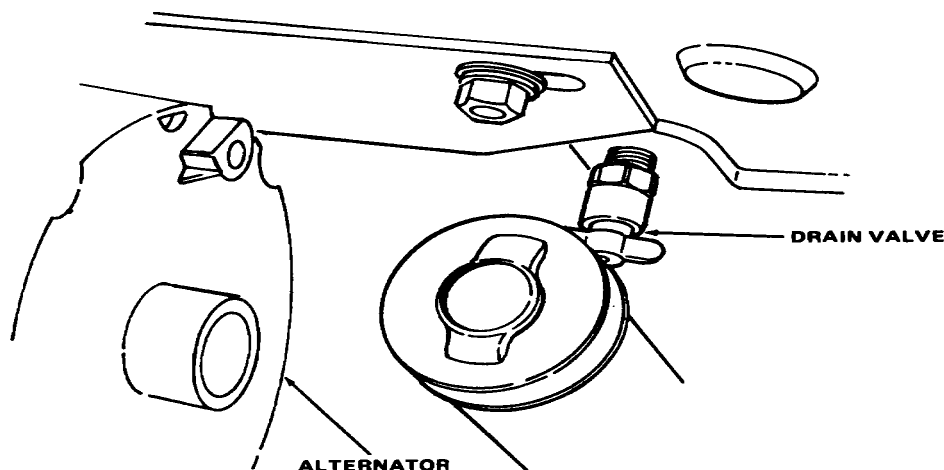
(1) Open side panels and lift seat to an upright position.

(2) Inspect fan blades for bent or damaged condition. Check fan for secure mounting

(3) Operate engine and check water pump and hoses for leaks. Shutoff engine.

c. *Removal.*

(1) Remove radiator cap (para. 3-12) and drain radiator by opening drain valve in radiator outlet elbow. Drain engine block by opening drain valve (fig. 4-51)



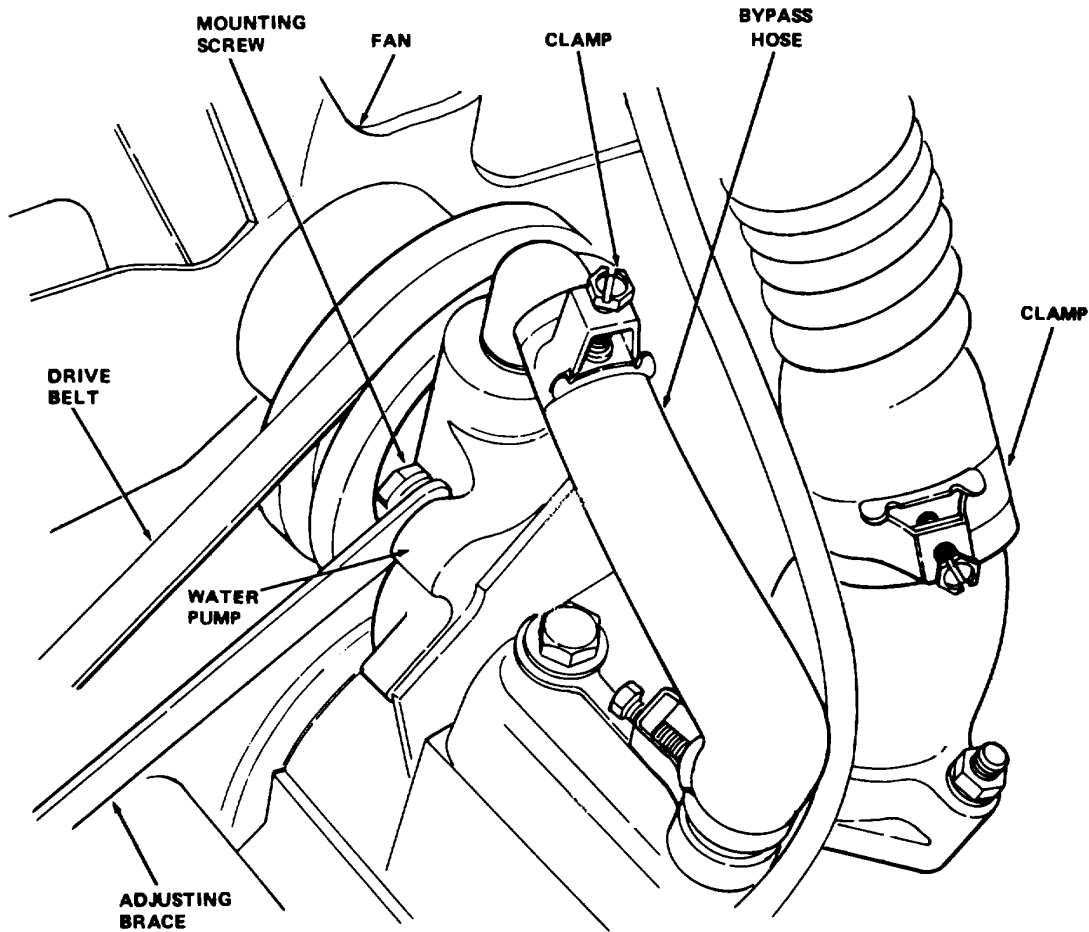
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Figure 4-51. Engine coolant drain valve.

(2) Refer to paragraph 4-51 and remove drive belt.

(3) Remove four screws and remove fan (fig. 4-52) from water pump pulley.



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Figure 4-52. Water pump and fan, installed view.

(4) Loosen clamp and disconnect lower hose (fig. 4-53) from water pump inlet

(5) Loosen clamp and disconnect bypass hose (fig. 4-52) from water pump (fig. 4-52).

(6) Remove mounting screws and remove water pump and gasket from engine block. Move alternator adjusting brace (fig. 4-52) away from water pump to remove pump.

d Installation.

(1) Clean pump mounting surface. Remove all rust and old gasket material from surface

(2) Install new gasket and water pump (fig. 4-52) on engine block. Secure pump to block with mounting screws. Attach alternator adjusting brace (fig. 4-52) with upper pump mounting screw

(3) Install bypass hose (fig. 4-52) on pump and secure hose by tightening clamp

(4) Connect lower hose (fig. 4-53) to pump inlet and secure with clamp.

(5) Install drive belt over fan and water pump drive pulley, drive adapter pulley and alternator pulley (fig. 4-34). Refer to paragraph 451 and adjust belt tension.

(6) Install fan (fig. 4-52) on pulley and secure with four screws.

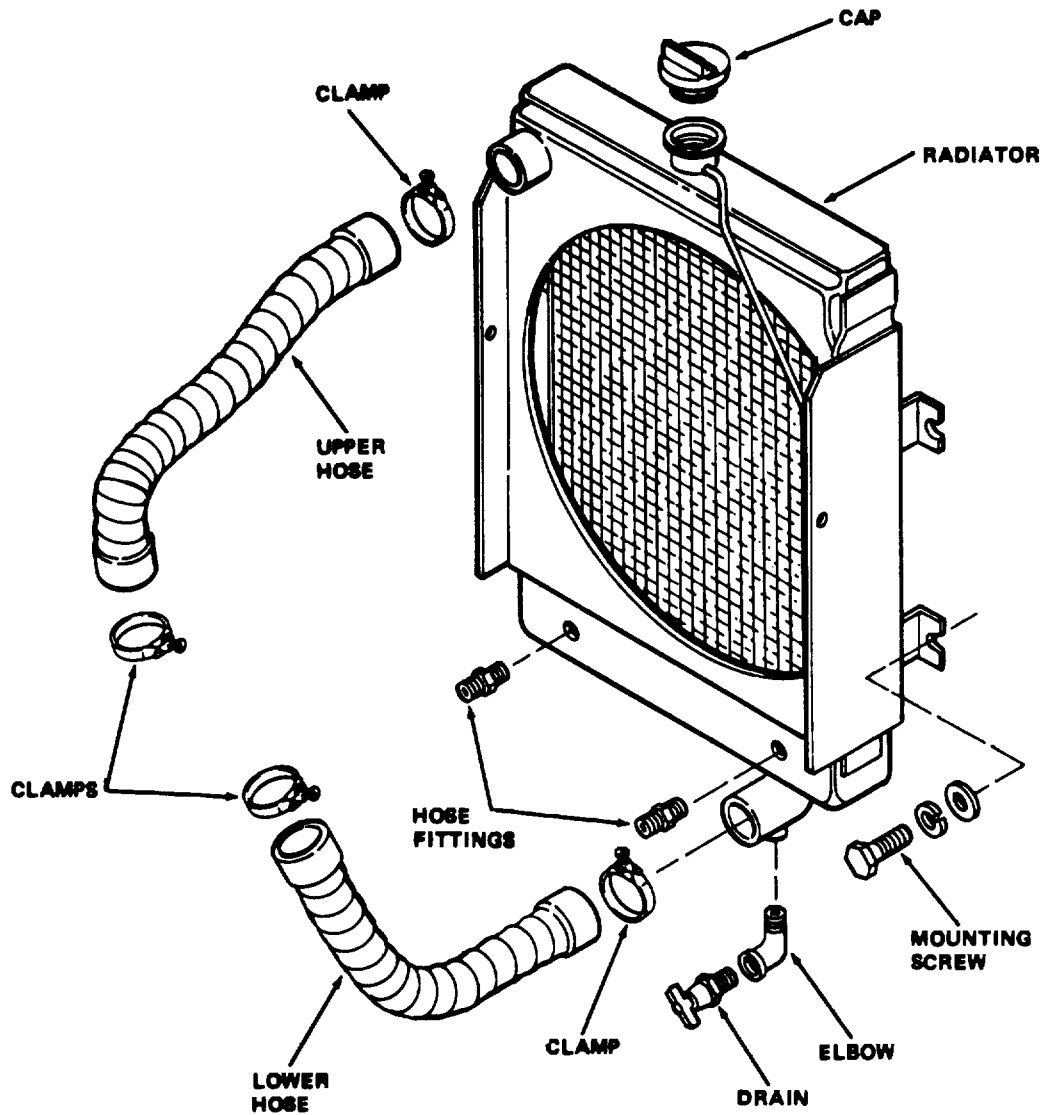
(7) Close drain valve (fig. 4-53) in radiator outlet elbow. Close drain valve (fig. 4-51) in engine block. Refer to paragraph 3-12 and fill radiator.

(8) Operate engine and check water pump and hoses for leaks. Shutoff engine.

(9) Close side panels and lower seat into position.

4-69. Radiator

a. General The radiator stores coolant and provides cooling surfaces for the fan driven air to pass over and lower the temperature of the coolant. It is mounted at the rear of the truck in a cutout in the counterweight. A grille protects the radiator.



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Figure 4-53. Radiator and hoses, removal and installation

b. Inspection and Test.

- (1) Open side panels and raise seat.
- (2) Check radiator (fig. 4-53) and hoses for evidence of leaks. Inspect hoses for cracks and deterioration.
- (3) Remove grille (para 4-28) and inspect radiator for dirt and debris in cooling passages. Clean out with compressed air.
- (4) Check coolant in radiator for presence of oil. If oil appears in coolant, bottom tank is damaged.
- (5) Replace radiator and hoses if leaking or damaged.

c. Removal

- (1) Drain radiator (para 4-70).
- (2) Disconnect upper and lower hoses (fig. 4-53) from radiator.

- (3) Place a suitable container under radiator and disconnect transmission hoses from fittings in bottom tank of radiator. Plug or cap hoses to prevent loss and spillage of transmission oil.

- (4) With grille removed, remove mounting screws (fig. 4-53) and remove radiator. Slide bottom of radiator out of counterweight by pulling out. When radiator filler neck has cleared hole in counterweight lift radiator out of truck.

- (5) If radiator requires repair notify direct and general support maintenance.

d. Installation.

- (1) Lift radiator into opening in. Tilt radiator to guide filler neck up into hole in top of counterweight and slide radiator into position.

- (2) Secure radiator with mounting screws (fig. 4-53).

- (3) Install grille (para 4-28).
- (4) Remove caps or fittings in bottom tank of radiator
- (5) Connect upper and lower hoses (fig. 453) to radiator.
- (6) Close valve at bottom of radiator. Fill radiator with coolant (para 3-12)
- (7) Check and add oil to transmission if necessary (para 3-16).
- (8) Operate engine and check radiator and hoses for leaks. Shutoff engine.
- (9) Close side panels and lower seat into position.

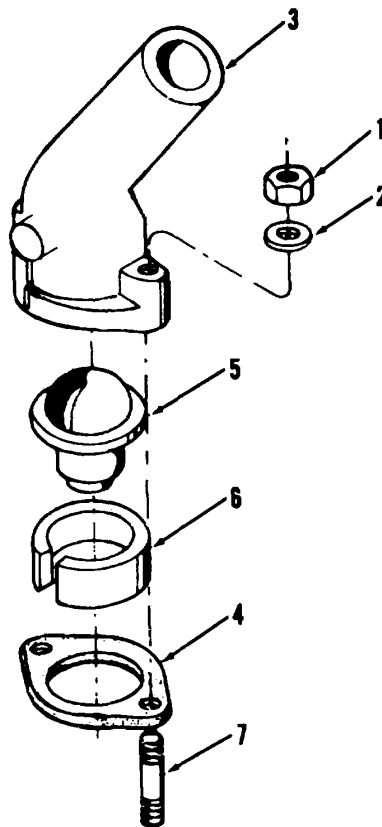
4-70. Thermostat

- a. *General.* The thermostat is installed in the

coolant outlet elbow on the cylinder head. The thermostat retains the coolant in the engine, bypassing it before it reaches the radiator. This allows the coolant to reach operating temperature faster for more efficient engine operation. When operating temperature is reached, thermostat opens and allows coolant to circulate through radiator.

b. Removal

- (1) Open side panels and lift and tilt seat forward.
- (2) Drain radiator and engine block (para 4-68).
- (3) Loosen clamp and disconnect radiator upper hose (fig. 4-2) from thermostat housing.
- (4) Remove nuts (1, fig. 4-54) and lock washers (2) and remove water output elbow (3) from cylinder head. Remove gasket (4).



1. Nut
2. Lockwasher
3. Outlet
4. Gasket
5. Thermostat
6. Adapter ring
7. Stud

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Figure 4-54. Thermostat, removal and installation.

(5) Remove adapter ring (6) and thermostat (5).

c. Test.

(1) Attach a wire or other means of suspension and submerge thermostat in a container of clean water

(2) Heat water and stir with an accurate thermometer. Check water temperature.

(3) As the water temperature approaches 180° F (82° C) observe the thermostat. If the thermostat does not start to open at 180° F (82° C) to 200° F (93° C) or if it opens well below 180° F (82° C), thermostat must be replaced.

d. Installation.

(1) Clean elbow mounting surface on cylinder head. Remove all rust and gasket material.

(2) Install thermostat (5, fig. 4-54) and adapter ring (6) in outlet elbow (3).

(3) Use a new gasket (4) and install assembled elbow on cylinder head. Secure elbow with nuts (1) and lock washers (2).

(4) Connect radiator upper hose (fig. 4-52) to outlet elbow and secure hose with clamp.

(5) Close drain valves and fill radiator with coolant (para 3-12).

(6) Close side panels and lower seat into position.

Section XVI. EXHAUST SYSTEM

4-71. General

The exhaust system on the truck consists of a exhaust pipe leading from the manifold to the muffler and a tail pipe leading out the rear of the truck The muffler is mounted on the lower left side of the truck frame

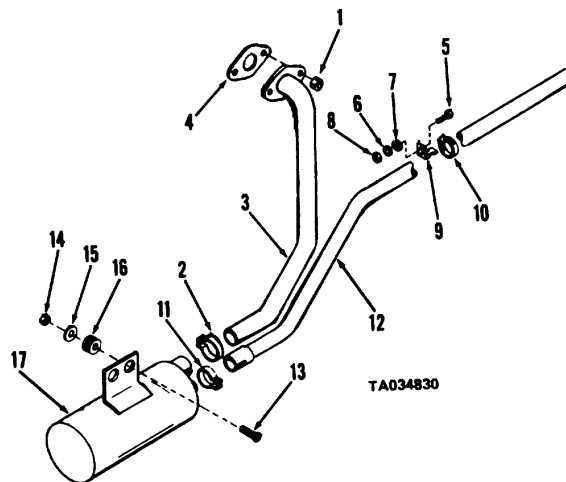
(2) If truck has been operating allow sufficient time to elapse to allow the muffler and pipes to cool.

(3) Remove nuts (1, fig. 4-55) and disconnect exhaust pipe (3) from manifold. Remove gasket (4) Loosen clamp (2) and remove exhaust pipe from truck.

4-72. Muffler and Pipes

a. Removal

(1) Open left side panel and lift seat into an upright position.



- | | |
|----------------|--------------|
| 1 Nut | 10 Clamp |
| 2 Clamp | 11 Clamp |
| 3 Exhaust pipe | 12 Tail pipe |
| 4 Gasket | 13 Tail pipe |
| 5 Screw | 14 Nut |
| 6 Lock washer | 15 Washer |
| 7 Washer | 16 Grommet |
| 8 Nut | 17 Muffler |
| 9 Support | |

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Figure 4-55. Exhaust system, exploded view

(4) Remove washer (7) and nut (8) and disconnect clamp (10) from support (9).

(5) Loosen clamp (11) and remove tail pipe screw (5), lock washer (6), (12) from muffler and truck. Remove clamp (10) from tail pipe.

(6) Remove screws (13), nuts (14) and washers (15) and remove muffler (17) from frame. Remove grommets (16) from muffler

c. Installation.

(1) Install grommets (16, fig. 4-55) in muffler (17). Install muffler on frame and secure with screws (13), nuts (14) and washers (15).

(2) Slide clamp (10) on tail pipe (12) and install tail pipe and clamp (11) on muffler. Secure clamp (10) to support (9) with screw (5), lock washer (6), washer (7) and nut (8). Tighten clamp (11) to secure tail pipe to muffler.

(3) Slide clamp (2) and exhaust pipe (3) on muffler inlet. Position exhaust pipe on manifold, using a new gasket (4). Secure pipe to manifold with nuts (1). Tighten clamp (2).

(4) Operate engine and check exhaust system for leaks. Shutoff engine.

(5) Close side panels and lower seat into position.

Section XVII. STEERING SYSTEM

4-73. General

The power steering system consists basically of the steering wheel, steering valve, steering cylinder, steering axle and wheels. The steering axle is mounted at the rear of the truck. Hydraulic pressure for the system is supplied by the hydraulic pump. Rotation of the steering wheel operates the steering valve, sending hydraulic pressure to the steering cylinder. Movement of the cylinder rod rotates a pivot arm on the axle. Two tie rods connected to the pivot arm are attached to the wheel spindles. As the arm rotates, the spindles are pulled or pushed in the direction of the turn, turning the wheels.

4-74. Steering Adjustments

a. General. Adjustments required consist of wheel toe-in, drag link and spindle stops.

b. Toe-In.

(1) Raise the rear end of the truck so that the steer wheels clear the floor. Use suitable blocking under truck to hold in this position. Block front wheels to prevent movement.

(2) Remove floor and toe plates.

(3) Operate truck and, sitting in operator's seat, turn wheels to bring them into position parallel with frame. Shut off truck engine

(4) Measure distance between centers of wheel treads at the rear of the tires and the frame and then at the front of the tires and the frame.

(5) If the measurements are the same, no adjustment is required. If measurements are unequal, adjust the tie rods.

(6) Remove cotter pin (12, fig. 4-56) and nut (11). Remove boot (10) and tap ball socket (9) from wheel spindle.

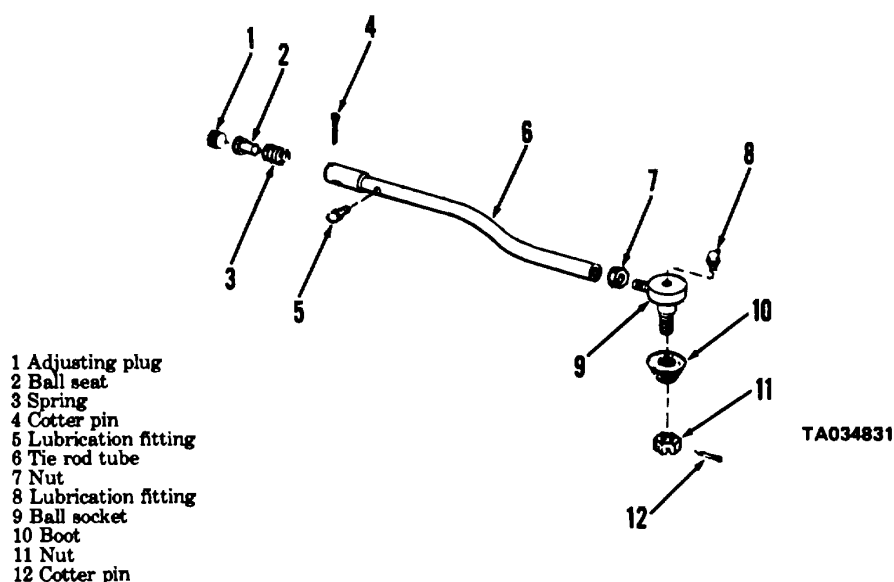


Figure 4-56. Tie rod, exploded view

(7) Loosen nut (7) and adjust length of rods by turning ball socket in or out on tube to bring both measurements ((5) above), equal Torque nut to 50 to 70 pound-feet (6.9 to 9.6 m/kg) to secure adjustment. Repeat for both wheels

(8) Install ball socket on spindle and secure with boot (10), nut (11) and cotter pin (12).

c. *Spindle Stops.* Two stop screws (fig. 4-7), secured by lock nuts, extend through the axle and prevent extreme inward pivoting of spindles and to

prevent bottoming of steering cylinder.

(1) Operate truck and turn wheels full right and full left. Measure distance between tire and steering axle housing at both wheels. Clearance should be a minimum of 0.50 inch (12.7 mm). Shut off truck engine

(2) Loosen lock nut (fig. 4-7) and adjust stop screw to stop spindle with proper clearance. Hold stop screw and tighten lock nuts to secure adjustment.

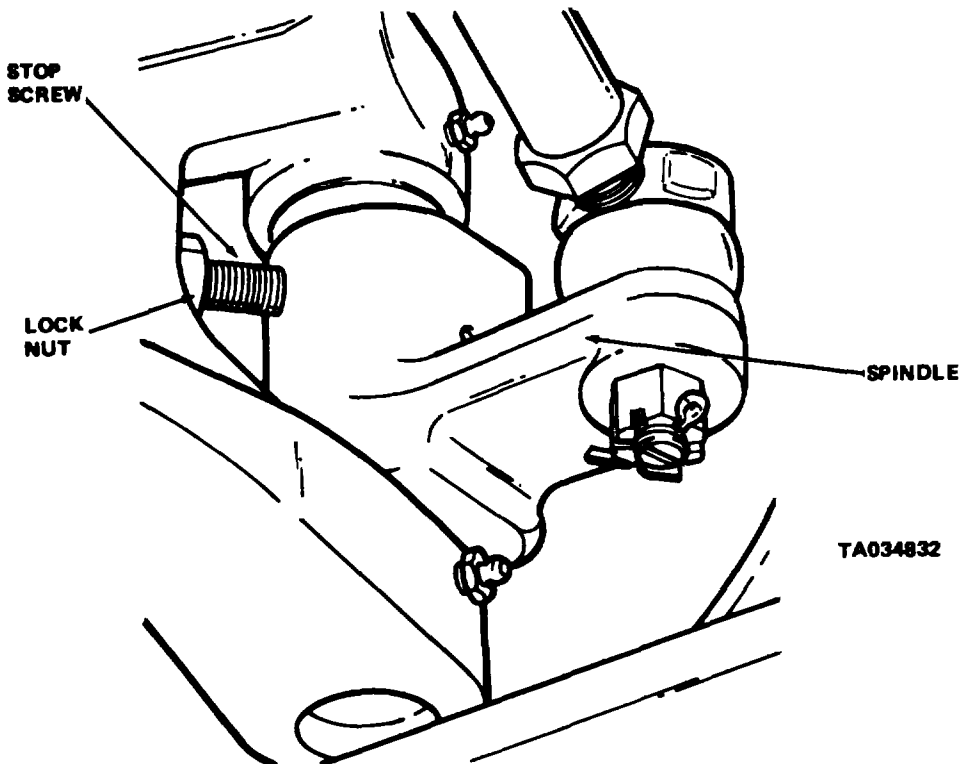


Figure 4-57. Spindle stop screw adjustment.

d. *Drag Link Adjustment.*

(1) Position the rear wheels straight ahead and parallel with the frame.

(2) Remove cotter pin (2, fig. 4-58) from the end of the drag link (3) and loosen adjusting plug (1).

(3) Lift drag link from ball stud on pivot arm.

(4) Position the cylinder plunger rod halfway out of the steering cylinder (5). Loosen lock nut (4).

(5) Turn drag link in or out on cylinder rod.

Place

wrench on flats of cylinder plunger rod to hold rod while adjusting ball socket. Adjust drag link until it is centered over pivot arm ball stud with the rear wheels in a straight ahead position and parallel with the frame.

(6) Connect drag link (3) to ball stud. Tighten adjusting plug (1) to secure drag link on stud. Install

cotter pin (2) in drag link to secure adjusting plug.

e. *Adjustment Checks*

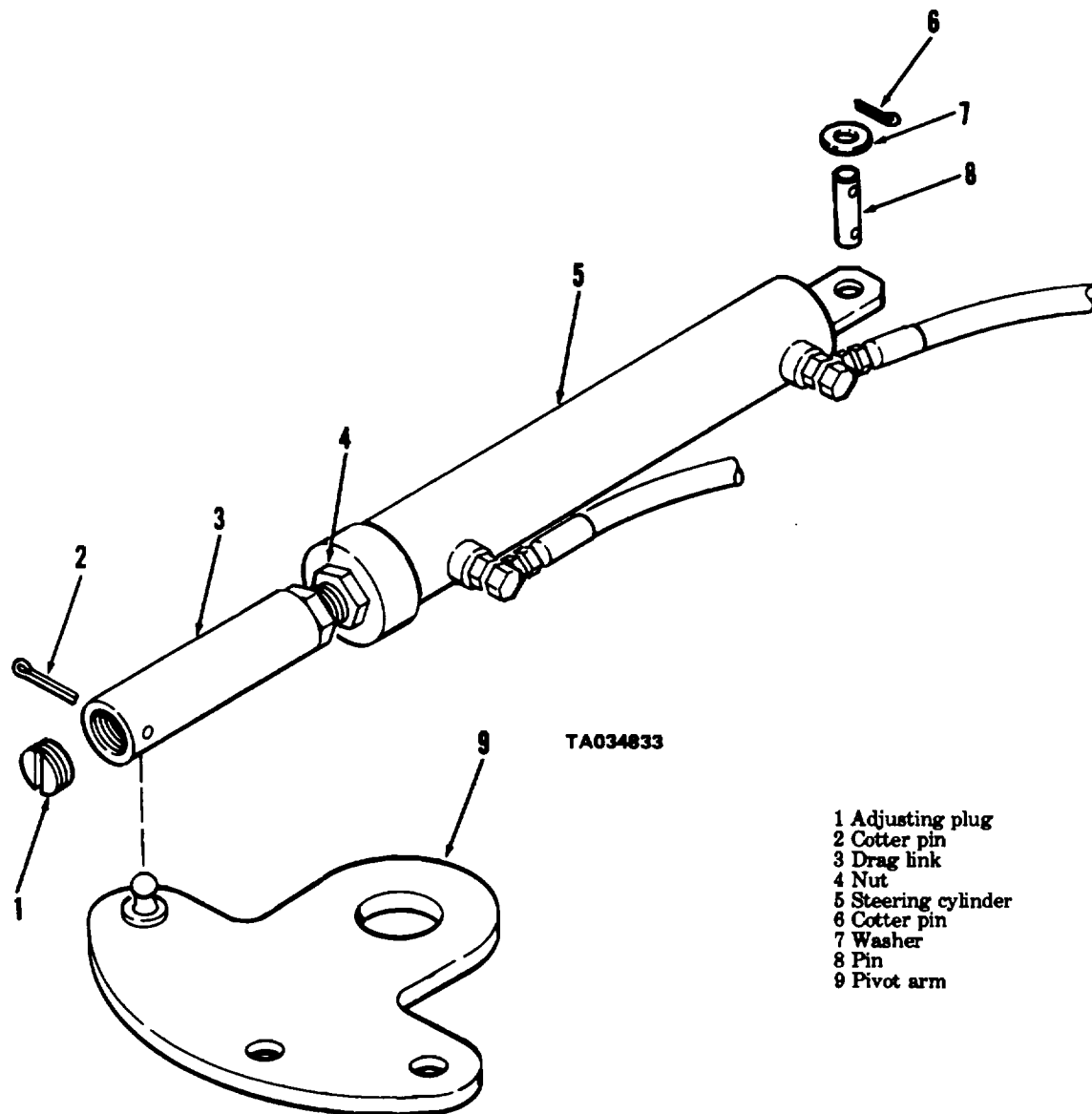
(1) Remove blocks and lower rear of truck to rest on wheels

(2) Sit in operator's seat and operate truck. Turn steering wheel to full left and full right positions. Wheel spindles should contact stop screws in each direction and cylinder plunger rod should extend and retract an equal distance.

(3) Shut off truck. Install floor and toe plates.

4-75. **Tie Rods and Drag Link**

a. *General.* The tie rods connect the axle spindles to the steering axle pivot arm. Connection of the steering cylinder to pivot arm is accomplished with the adjustable drag link.



- 1 Adjusting plug
- 2 Cotter pin
- 3 Drag link
- 4 Nut
- 5 Steering cylinder
- 6 Cotter pin
- 7 Washer
- 8 Pin
- 9 Pivot arm

Figure 4-58. Drag link and steering cylinder, removal and installation

b. Tie Rods.

(1) Adjustment. Refer to paragraph 4-74 to adjust tie rods for correct steering.

(2) Removal.

(a) Refer to paragraph 4-74 to disconnect tie rod from spindle.

(b) Raise rear of truck and block surely. Block front wheels.

(c) Working from under truck, remove cotter pin (4, fig. 4-56) and loosen adjusting plug (1) and remove tie rod from pivot arm ball stud. Remove tie rod from truck.

(3) Inspection and Repair.

(a) Remove adjusting plug (1, fig. 4-56), ball seat (2) and spring (3) from tie rod.

(b) Inspect spring, ball seat and adjusting plug for wear and damage.

(c) Inspect ball socket, tube and boot for wear, damage and deterioration.

(d) Replace unserviceable parts.

(4) Installation.

(a) Install spring (3, fig. 4-56), ball seat (2) and adjusting plug (1) in tube (6). Do not tighten adjusting plug.

(b) Install tie rod on pivot arm and tighten adjusting plug. Secure adjusting plug with cotter pin (4).

(c) Refer to paragraph 4-74 and install tie rod on spindle. Adjust tie rod for proper operation (par. 4-74)

(d) Lower truck to ground and operate truck to check tie rod movement and adjustment.

c. Drag Link.

(1) Removal.

(a) Lift rear of truck and block into position. Block rear wheels.

(b) Working under truck, disconnect drag link (3, fig. 4-68) from cylinder.

(c) Remove cotter pin (2) and loosen adjusting plug (1). Lift drag link from ball stud on pivot arm.

(d) Loosen nut (4) and unscrew drag link from steering cylinder.

(2) Inspection and Repair.

(a) Remove adjusting plug (1, fig. 4-58) and remove ball seat, spring and link plug from socket.

(b) Inspect ball seat, spring and adjusting plug for wear and damage.

(c) Inspect ball socket for dents and damage.

(d) Replace unserviceable parts.

(3) Installation.

(a) Install plug, spring and ball seat in socket. Install adjusting plug (1, fig. 4-58) in socket but do not tighten.

(b) Install drag link on steering cylinder (5) by screwing on cylinder rod.

(c) Connect drag link to ball stud on pivot arm.

(d) Refer to paragraph 4-74 and adjust steering cylinder and drag link. Install cotter pin (2) to secure adjusting plug.

(e) Lower truck to ground. Operate truck and check steering cylinder action.

4-76. Steering Cylinder

a. Removal

(1) Lift rear of truck and block in position. Block front wheels.

(2) Disconnect hoses from steering cylinder (5, fig. 4-58). Cap or plug hoses and fittings to prevent entrance of foreign material into hydraulic system.

(3) Remove cotter pin (2) and loosen adjusting plug (1) and lift drag link (3) from pivot arm ball stud

(4) Support cylinder and remove cotter pins (6). and washers (7). Tap or drive pin (8) from frame bracket and cylinder.

(5) Remove cylinder from truck. Loosen lock nut (4) and remove drag link from cylinder.

b. Installation.

(1) Install drag link (3, fig. 4-58) and lock nut (4) on threaded end of cylinder rod. Do not tighten lock nut.

(2) Install cylinder and drag link in truck with cylinder in line with hole in frame bracket. Secure cylinder to bracket with pin (8), washer (7) and cotter

pins (6).

Refer to paragraph 4-74 to install and adjust drag link to position wheels correctly.

(4) Remove caps or plugs from cylinder and hoses and connect hoses to cylinder fittings.

(5) Check steering cylinder operation as described in paragraph 4-74.

(6) Check hydraulic reservoir (para 3-18) and add hydraulic oil if necessary.

(7) Check hydraulic connections for leaks.

(8) Lower truck to ground. Operate truck and again check steering operation.

4-77. Steering Wheel

a. General. The steering wheel is mounted at the top of the steering column above the instrument panel. Rotation of the wheel actuates the steering valve and operates the steering cylinder.

b. Removal

(1) Remove horn cover (1, fig. 4-59) by pressing down and turning counterclockwise.

(2) Remove horn button (2), contact cap (3) spring (4) and cup (5) from steering wheel

(3) Remove screws (6) and disconnect wire (8) from contact plate (7). Remove contact plate

(4) Remove nut (9) and lockwasher (10) from steering column. Use a suitable puller and remove steering wheel (11) from column.

c. Installation.

(1) Install steering wheel (11, fig. 4-59) on splines of steering column and push or tap in place. Secure wheel with nut (9) and lockwasher (10).

(2) Install wire (8) on contact plate (7) and secure contact plate with screws (6).

(3) Install cup (5), spring (4) and cap (3) under horn button (2). Install cover (1) in steering wheel by pressing cover down and turning clockwise

(4) Depress horn button to check horn operation

4-78. Steering Axle

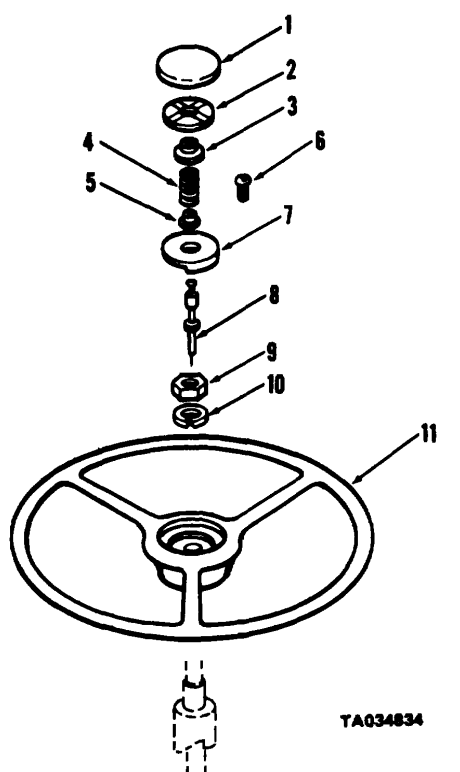
a. General. The steering axle is mounted under the rear of the truck. It mounts the rear wheels and tie rods.

b. Service

(1) Inspect steering axle for secure mounting.

(2) Check steering axle by pressing axle and attempting to shift axle in mounting. There should be no end play of axle. If axle shifts, loosen lock nut on adjusting screw at rear of truck. Turn screw counterclockwise to tighten axle in mounts. Tighten lock nut.

(3) Service the axle by lubricating. Refer to current Lubrication Order for points of lubrication and intervals.



- | | |
|---------------|-------------------|
| 1 Horn cover | 7 Contact plate |
| 2 Horn button | 8 Horn wire |
| 3 Contact cap | 9 Nut |
| 4 Spring | 10 Lockwasher |
| 5 Cup | 11 Steering wheel |
| 6 Screw | |

Figure 4-59. Steering wheel and horn button, exploded view.

Section XVIII. ENGINE

Figure 4-59. Steering wheel and horn button, exploded view

Section XVIII. ENGINE

4-79. General

The engine is a four cylinder, four cycle, L-head type engine. It is mounted at the rear of the truck beneath the operator's seat. The flywheel end is directly coupled to the torque converter. A hydraulic pump is directly driven by the other end of the crankshaft.

4-80. Engine Assembly

a. Inspection To gain access to the engine open the side panels and lift the seat and prop in the open position.

- (1) Inspect engine for oil and coolant leaks.

- (2) Check engine oil and coolant levels.
- (3) Inspect drive belt for proper tension and serviceable condition.
- (4) Check mounting of starter, alternator, fuel pump and carburetor. Tighten mounting bolts if necessary.
- (5) Inspect engine mounts for security. Resilient mounts should be in good condition.

b. Service

- (1) Check engine crankcase oil level (para 3-2) and add oil if necessary.
- (2) Change oil at intervals specified on current Lubrication Order.

(a) Remove engine oil filler cap (fig. 3-2). Place a suitable container beneath engine. Remove drain plug from oil pan and drain oil from engine.

(b) Install drain plug and fill crankcase with correct grade of oil. Refer to current Lubrication Order for quantity and grade.

(3) When the crankcase oil is changed the oil filter should be changed as follows.

(a) Drain oil from engine as described above.

(b) Unscrew oil filter (fig. 3-2) from filter base. Discard oil filter.

(c) Clean base and bracket with a clean lint-free cloth.

(d) Spread a light coat of clean engine oil on gasket surface of new filter. Install filter on filter base and hand tighten only.

(e) Fill crankcase with oil as described in (2) above.

(4) Close side panels and lower seat.

4-81. Manifolds

a. Inspection.

(1) Open left side panel.

(2) Inspect manifold for cracks and damage and for evidence of leaks.

(3) Check manifold mounting screws and nuts. Tighten if necessary.

b. Removal.

(1) Refer to paragraph 4-58 and remove carburetor and governor from manifold.

(2) Refer to paragraph 4-62 and disconnect crankcase ventilation hose and remove ventilation valve and elbow from manifold.

(3) Refer to paragraph 4-72 and disconnect exhaust pipe from top of manifold.

(4) Remove screws (6, fig. 4-49) and washers (7). Remove nuts (8) and washers (9).

(5) Remove manifold (11) and gasket (12) from cylinder block.

c. Installation.

(1) Clean carbon deposits from manifold and gasket surface on cylinder block with a wire brush.

(2) Install a new gasket (12, fig. 4-49) on cylinder block and install manifold (11).

(3) Secure manifold to engine with screw (6), washer (7), nuts (8) and washers (9). Tighten nuts to a torque of 25 to 30 pound-feet (33.7 to 40.6 N.m).

(4) Refer to paragraph 4-72 and connect exhaust pipe to top of manifold.

(5) Refer to paragraph 4-62 and install ventilation valve and elbow and connect hose to manifold.

(6) Refer to paragraph 4-58 and install carburetor and governor on manifold.

(7) Close left side panel.

4-82. Cylinder Head

a. General. The cylinder head encloses the top of

the engine and contains recesses which form the top of the cylinders. It also contains passages for engine coolant flow. The engine coolant outlet elbow is mounted on the cylinder head and contains the thermostat. Spark plugs and distributor are mounted on the top of the cylinder head.

b. Removal.

(1) Open side panels and lift seat into upright position.

(2) Refer to paragraphs 4-58 and 4-54 and remove distributor and spark plugs from cylinder head.

(3) Refer to paragraph 4-50 and remove coolant temperature sending unit from cylinder head.

(4) Refer to paragraph 4-70 and remove coolant outlet elbow and thermostat from cylinder head and disconnect coolant bypass hose.

(5) Mark locations of screws (4, fig. 4-60). Remove screws (4 and 5) and carefully remove cylinder head from engine.

(6) Remove gasket (10) from engine block.

(7) Remove remaining screws, studs and pipe plugs from cylinder head.

(8) Wipe all exposed internal engine areas with a clean dry cloth to remove all engine coolant. Cover exposed areas with a protective cover such as a plastic sheet.

c. Inspection and Service.

(1) Use a scraper and wire brush and remove all carbon from combustion areas.

(2) Clean the cylinder head with cleaning compound, solvent (Fed. Spec. P-D480) and dry thoroughly with compressed air.

(3) Check gasket contact surfaces to be sure they are clean, smooth and flat.

(4) Inspect cylinder head for cracks, holes, warpage and other damage.

(5) Check cylinder head for flatness shown in figures 4-61 and 4-62.

(a) Use a straightedge and feeler gage as shown in the illustrations to check flatness.

(b) Maximum out-of-flatness should not exceed 0.000765 inch (0.019 mm) per inch of width or length. On a cylinder head 16 inches (40.6 mm) long, maximum lengthwise out-of-flatness is 0.012 inch (0.305 mm). Any out-of-flatness should vary gradually and uniformly from end to end and side to side. Localized depressions or high spots should not exceed 0.008 inch (0.076 mm).

(c) If cylinder head requires grinding refer to direct and general support maintenance.

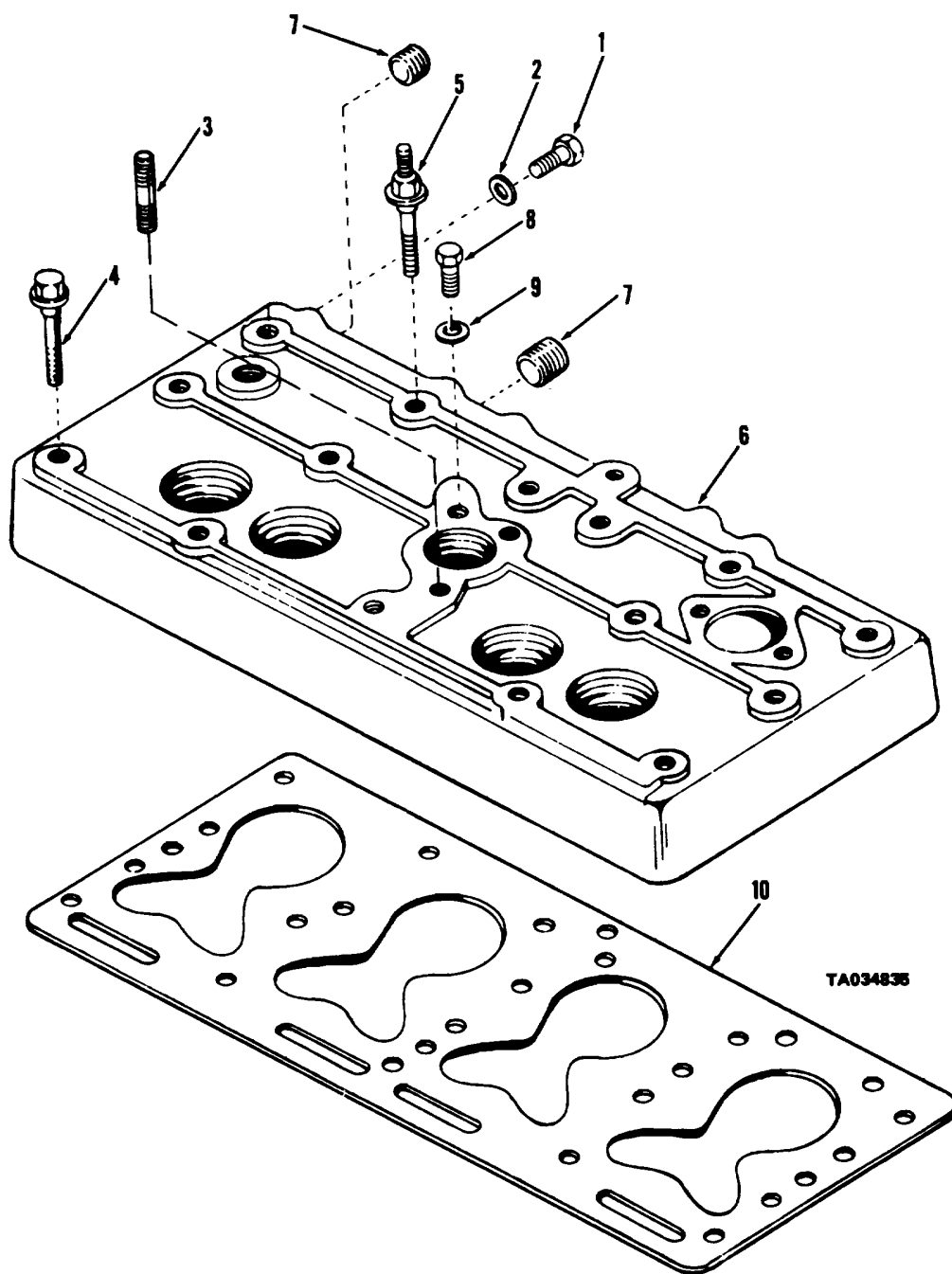
(d) Replace unserviceable cylinder head.

d. Installation.

(1) Install stud (8, fig. 4-60), screw (8) and washer (9), screw (1) and washer (2), and pipe plugs (7) in cylinder head.

(2) Install a new gasket (10) on engine block and install cylinder head.

(3) Install screws (4) in locations marked at removal. Install screws (5) in remaining holes. Torque screws in the sequence shown in fig. 4-63.



- 1 Screw
- 2 Washer
- 3 Stud
- 4 Screw
- 5 Screw
- 6 Cylinder head
- 7 Pipe
- 8 Screw
- 9 Washer
- 10 Gasket

Figure 4-60. Cylinder head, exploded view

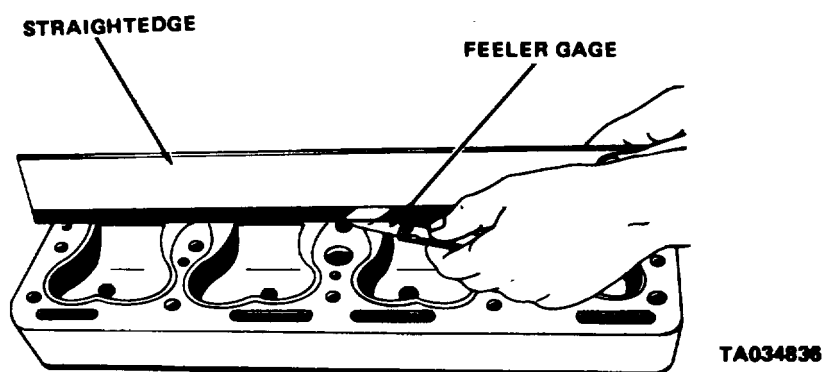


Figure 4-61. Checking cylinder head for flatness lengthwise

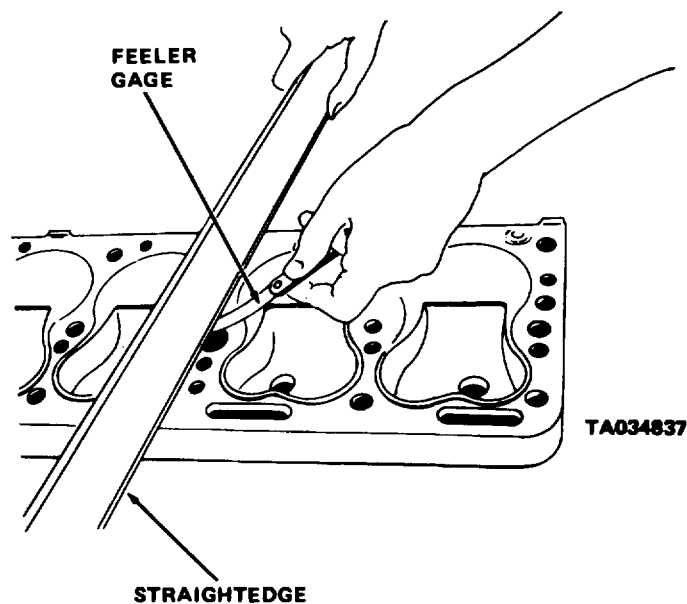


Figure 4-62. Checking cylinder head for flatness crosswise.

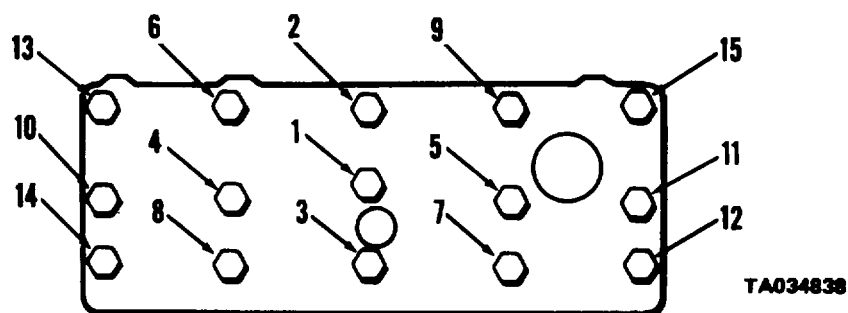


Figure 4-63. Cylinder head torquing sequence.

(4) Tighten screws in successive stages to ensure equal pressure over entire surface of cylinder head and gasket. Hold tension on each screw for a few seconds before releasing torque wrench.

(5) At first pass apply approximately one-half of the recommended torque and then increase the torque one-half each pass until recommended torque is obtained. Torque all screws to 70 to 75 pound-feet (94.9 to 101.5 N-m).

(6) Refer to paragraph 4-50 and install cooling temperature sending unit in cylinder head.

(7) Refer to paragraph 4-70 and install engine coolant outlet elbow and thermostat and connect coolant bypass hose to cylinder head.

(8) Refer to paragraphs 4-53 and 4-54 and install spark plugs and distributor in cylinder head.

(9) Close side panels and lower seat into position.

4-83. Engine Valves

a. *General* The intake and exhaust valves are mounted in the engine block and are operated by the camshaft.

b. *Adjustment.* The valve tappet clearance may require adjustment.

(1) Open left side panel

(2) Refer to paragraph 4-57 and remove the air cleaner.

(3) Refer to paragraph 4-58 and remove carburetor and governor and associated linkage.

(4) Refer to paragraph 4-50 and remove oil pressure and hourmeter actuator sending units.

(5) Disconnect crankcase ventilation hose from valve chamber cover and remove valve chamber cover (fig. 4-64) and gasket from left side of engine beneath manifold.

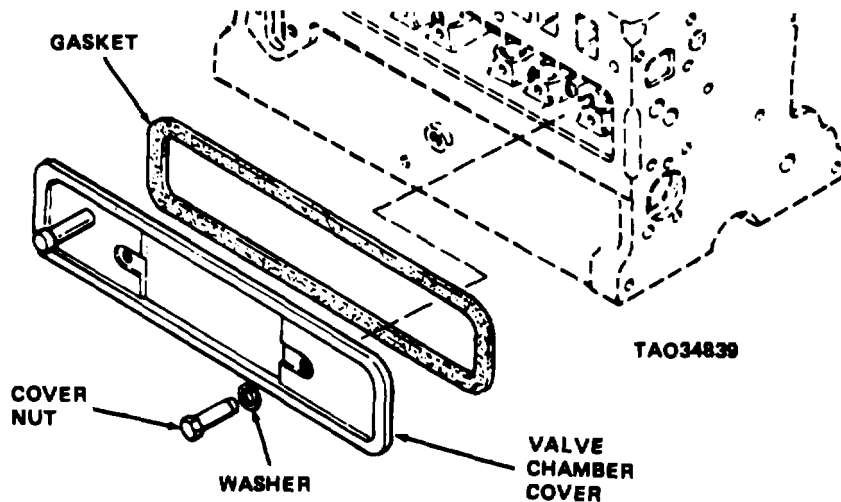


Figure 4-64. Valve chamber cover, removal and installation

(6) Disconnect high tension wire from top of distributor. Clean area around spark plug and remove spark plug from number one cylinder (spark plug closest to coolant outlet elbow).

(7) Refer to timing marks on flywheel or flex plate.

(a) To gain access to flex plate timing marks (fig. 4-43) remove battery and battery box (para 4-46). Remove access from flywheel housing.

(b) Timing marks (fig. 443) at fuel pump location are accessible through hole in flywheel housing.

(8) Place a thumb over the spark plug opening and slowly crank engine until outward pressure can be felt against thumb. This pressure indicates number one piston is moving toward Top Dead Center of the compression stroke.

(9) Continue cranking until timing pointer (fig.4-43) is in line with Dead Center mark on flywheel.

(10) When timing pointer is in this position both valves on number one cylinder are closed on compression stroke

(11) Check valve tappet clearance with a feeler gage as shown on figure 4-65.

(12) Clearance should be 0.012 inch (0.304 mm) for intake valves and 0.020 inch (0.508 mm) for exhaust valves.

(13) If clearances are not as specified use two thin wrenches as shown in figure 4-66 to adjust valve tappet clearance. Loosen the lock nut. Use the lower wrench to hold the tappet and the upper wrench to raise or lower tappet adjusting screw.

(14) Continue to raise or lower adjusting screw and checking with feeler gage until proper clearance is obtained.

(15) Tighten lock nut when correct clearance is obtained. Check clearance after tightening.

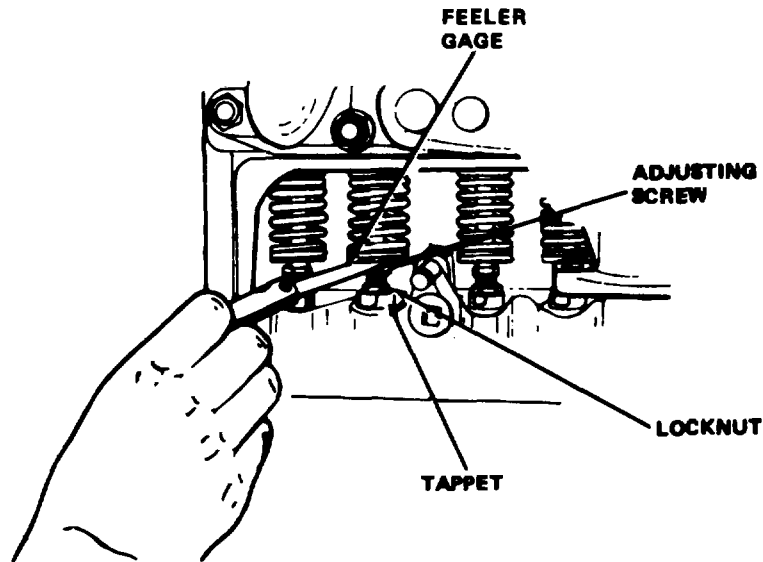


Figure 4-65. Checking valve tappet clearance

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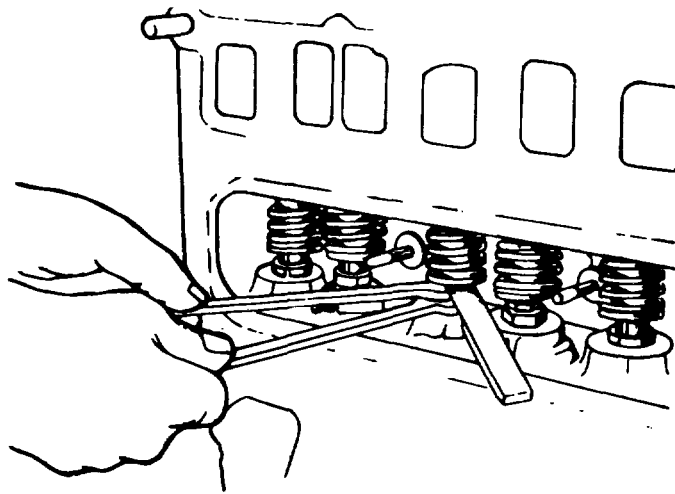


Figure 4-66. Adjusting valve tappet clearance

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(16) Crank the engine one-half revolution at a time and check clearance at each remaining set of valves in succession according to the engine firing order (1-4-2). Adjust valves to proper clearance if necessary.

(17) Install new gasket (fig. 4-4) and valve chamber cover on engine block and secure with nuts. Connect ventilation hose to cover.

(18) Install timing hole cover on top of flywheel

housing.

(19) Refer to paragraph 4-50 and install the oil pressure and hourmeter actuator sending units.

(20) Refer to paragraph 4S8 and install the carburetor, governor and linkage.

(21) Refer to paragraph -57 and install the air cleaner.

(22) Close left side panel.

Section XIX. WHEELS

4-84. General

Four wheels support and propel the lift truck. The front wheels are connected to the differential and drive the truck. Steering of the truck is accomplished with the rear wheels which are mounted on the spindles of the rear steering axle.

4-85. Wheels

a. Front Drive Wheels.

(1) Removal

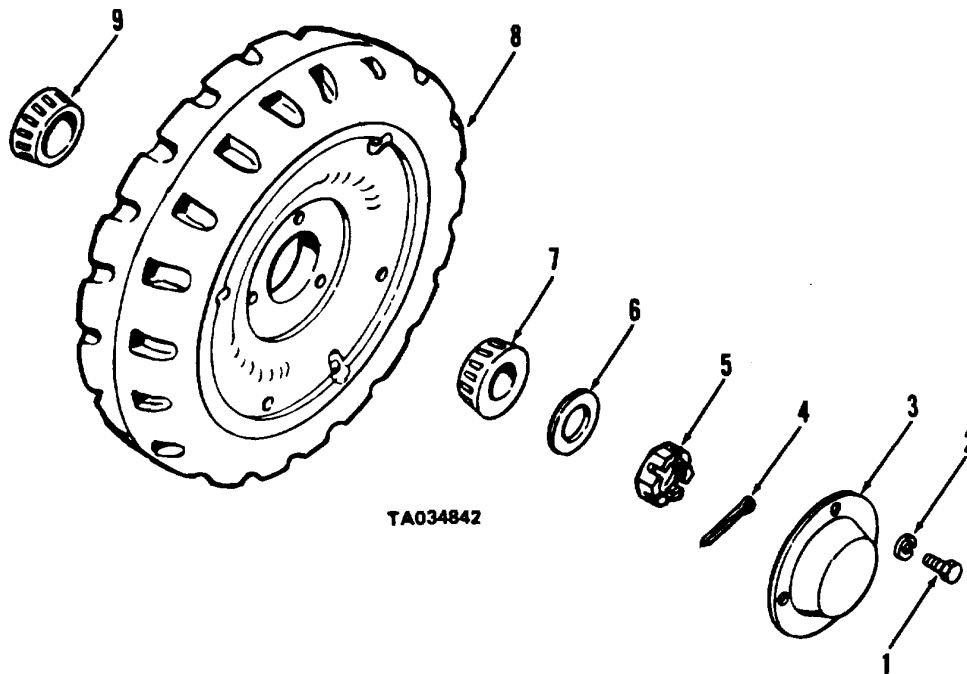
- (a) Raise the front of the truck until the

wheels clear the floor. Tilt mast to full backward position. Place a wooden block under the mast assembly and tilt mast forward to vertical position. Movement of the mast will elevate drive wheels clear of the floor.

- (b) Remove three screws (1, fig. 4-67) and lockwashers (2) and remove hub cap (3).

- (c) Remove cotter pin (4) and wheel nut (5) and remove nut and washer (6) from axle.

- (d) Remove outer wheel bearing (7) from wheel and axle.



- 1 Screw
- 2 Lockwasher
- 3 Hub cap
- 4 Cotter pin

- 6.Washer
- 7 Outer wheel bearing
- 8 Wheel and tire assembly
- 9 Inner wheel bearing

Figure 4-67. Drive wheel, removal and installation.

- (e) Remove wheel carefully to prevent damage to brake shoes or drums. assembly (8). Remove wheel

- (f) Remove inner wheel bearing (9).

(2) Inspection.

- (a) Inspect wheel and tire for damage. Check teeth on ring or bull gear inside wheel for damage.

- (b) Inspect brake drum for cracks, flat

spots, excessive wear and damage.

- (c) Inspect bearings and bearing cups in wheel for wear and damage.

- (d) Clean bearings and bearing surfaces with cleaning compound, solvent (Fed. Spec. P-D-680) and dry thoroughly.

(3) Installation.

- (a) Repack outer and inner bearings (7 and 9,

Fig. 4-67) with grease (GAA).

(b) Install inner bearing (9) on axle spindle with tapered side out.

(c) Install wheel assembly (8) on bearing and spindle. Hold wheel assembly in place and install outer wheel bearing (7) on spindle and inside wheel, tapered side in.

(d) Install washer (6) and wheel nut (5) on spindle. Tighten nut and as nut is tightened rotate wheel under power. Block other wheel to prevent turning. Continue tightening nut until heavy drag is felt while rotating wheel. Tighten nut to 120 pound-feet (162.7 N-m).

(e) Slowly loosen nut to aline cotter pin hole. Be sure wheel rotates freely and no bearing end

play is evident.

(f) Install cotter pin (4) to secure nut.

(g) Install hub cap (3) and secure with screws (1) and lockwashers (2).

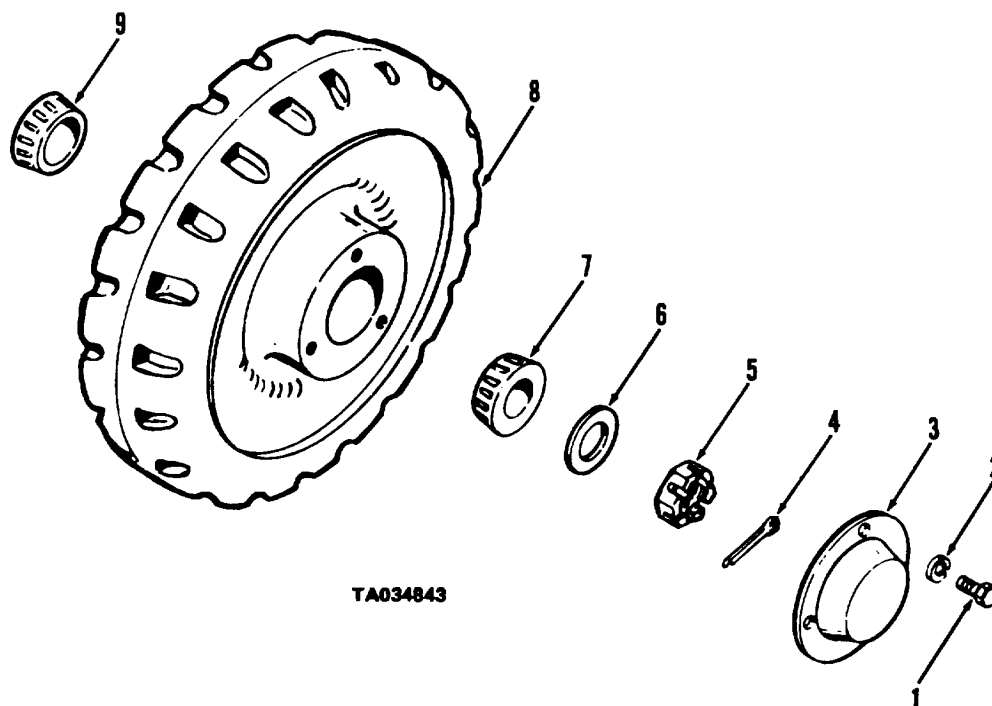
(h) Tilt mast backward to lower wheels to floor. Remove blocks from mast and wheel

b. Rear Steer Wheels.

(1) Removal

(a) Use a suitable jack and raise rear of truck until wheels clear the floor. Block front wheel to prevent truck from rolling.

(b) Remove screws (1, Fig. 4-68) and lockwashers (2) and remove hub cap (3).



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1 Screw

2 Lockwasher

3 Hub cap

4 Cotter pin

5 Wheel nut

6 Washer

7 Outer wheel bearing

8 Wheel and tire assembly

9 Inner wheel bearing

Figure 4-68. Rear wheel, removal and installation

(c) Remove cotter pin (4) and remove wheel nut (5) from axle spindle. Remove washer (6).

(d) Remove outer wheel bearing (7) and wheel assembly (8) from axle spindle.

(e) Remove inner bearing (9) from spindle.

(2) Inspection. Refer to b. above and inspect and clean wheel assembly.

(3) Installation.

(a) Repack inner and outer bearings (7 and 9) with grease (GAA).

(b) Install inner wheel bearing (9, Fig. 448), tapered side out, on axle spindle. Install wheel assembly (8) over bearing.

(c) Hold wheel in place and install outer wheel bearing (7), tapered side in, in wheel.

(d) Refer to b. above to adjust wheel bearings. Rotate wheels by hand. Torque wheel nuts (5) to 50 pound-feet (67.7 N.m), rotating wheel six times in each direction. Back off nut and re-torque to 25 pound-feet (33.8 N.m). Install cotter pin (4).

(e) Install hub cap (3) and secure with screws (1) and lockwashers (2).

(f) Lower jack and remove jack and blocks from truck.

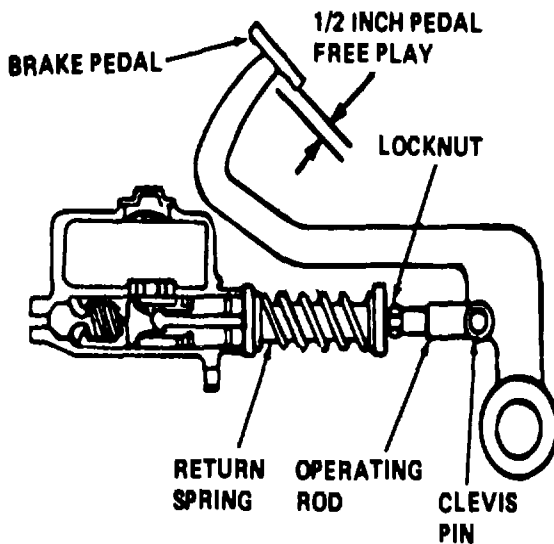
Section XX. BRAKES

4-86. General

a. The brakes on the fork lift truck consist of two systems; a lever operated parking brake on the drive shaft and service brakes on the two front wheels.

b. The parking brake is a dual-shoe mechanical operated type. When the lever in the truck is pulled to the rear the brake shoes are forced outward against the brake drum. This pressure keeps the shaft from rotating, locking the front wheels and holding the truck in position.

c. The service brakes are hydraulically actuated through a pedal and master cylinder. Depressing the pedal operates the master cylinder sending hydraulic pressure to the wheel cylinders. The wheel cylinders are the double end type and hydraulic pressure extends the ends of the cylinder pivoting the brake shoes against the brake drum inside the wheel. The pressure of the master cylinder also closes the stop light switch and operates the stop light. When the pedal is released, springs return the pedal and brake shoes to the released position. The brakes are self-adjusting.



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Figure 4-69. Service brake pedal adjustment

4-87. Service Brake Pedal and Linkage

a. *Adjustment.* Pedal free play should be adjusted to one-half inch (12.7 mm) to allow master cylinder to return to released position and reduce unused length of stroke in the master cylinder.

(1) Remove the floor and toe plates.

(2) Slowly depress brake pedal (Fig. 4-69) and check free travel. Observe push rod action at master cylinder.

(3) If free travel is more or less than one-half inch (12.7 mm), loosen lock nut on clevis at master cylinder and remove cotter pin and clevis pin and disconnect clevis from pedal.

(4) Adjust clevis on operating rod to bring pedal travel to correct limits.

(5) Tighten lock nut. Connect clevis to brake pedal and install clevis pin and cotter pin. Check pedal travel and adjust if necessary to bring travel within limits specified.

(6) Install floor and toe plates.

b. *Removal*

(1) Remove floor and toe plates.

(2) Refer to paragraph 4-90 and remove master cylinder.

(3) Disconnect return spring (17, Fig. 4-70) and remove pin (16).

(4) Remove screws (18) and lockwashers (19) and remove bearings (20) from frame. Remove pedal (23) from frame.

(5) If worn or damaged, remove pad (22) from pedal.

c. *Installation.*

(1) If pad (22, Fig. 4-70) was removed, glue new pad on pedal.

(2) Install shaft of pedal (23) in bearings (20) and secure bearings (20) to frame with screws (18) and lockwashers (19).

(3) Attach spring (17) to pedal and pin (16).

(4) Refer to paragraph 4-90 and install master cylinder.

(5) Install floor and toe plates.

4-88. Service Brakes

a. *General.* The service brakes are mounted in the front wheels. The brakes are self-adjusting.

b. *Removal*

(1) Refer to paragraph 4-85 and remove front wheel

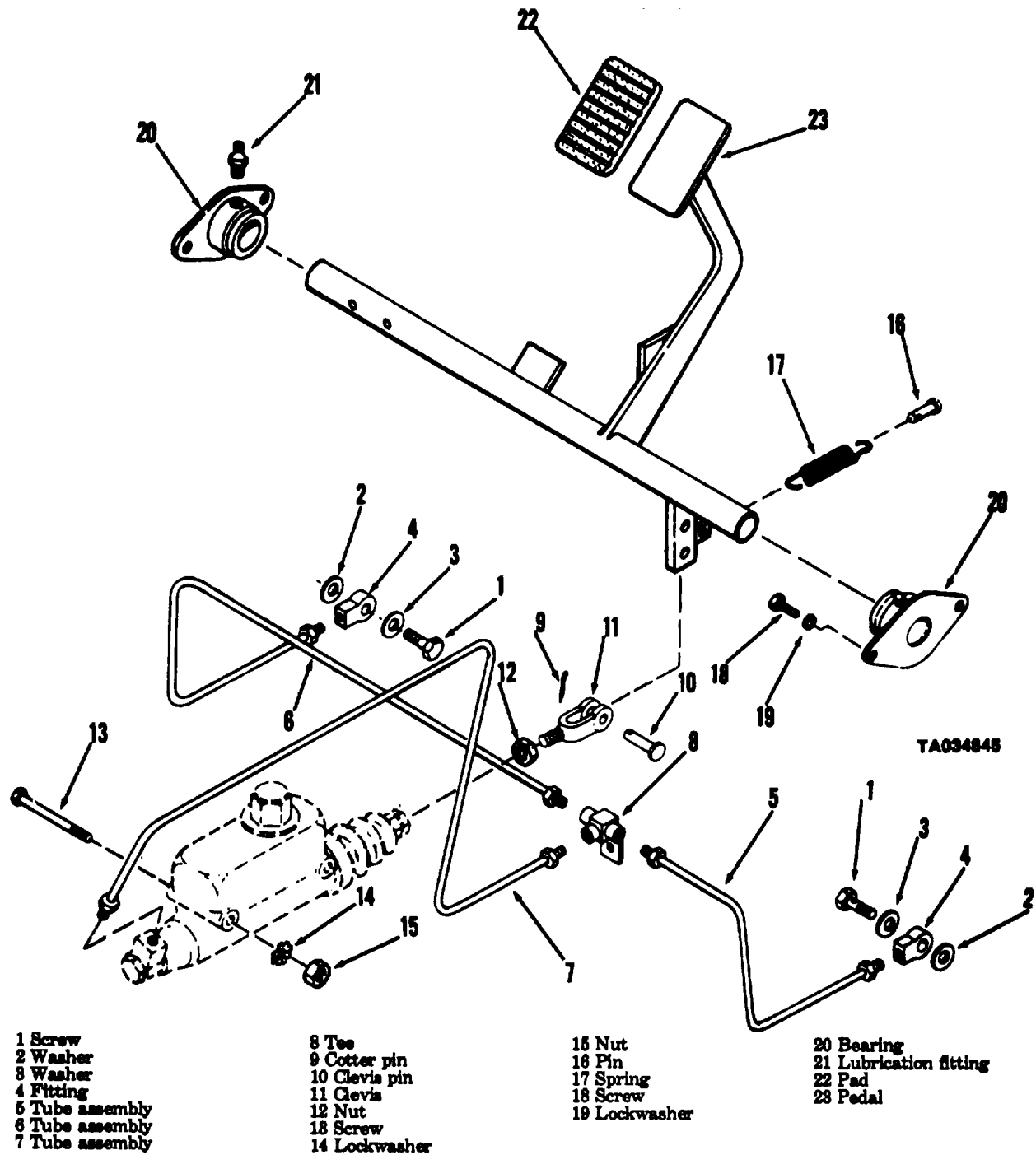
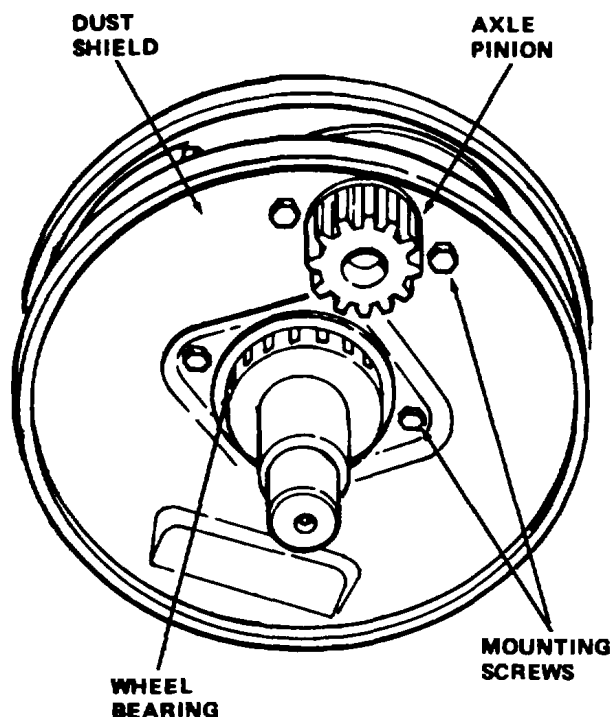


Figure 4-70. Brake pedal and linkage, exploded view.

- (2) Refer to figure 4-1 and remove dust shield from front wheel
- (3) Remove four screws and lockwashers securing dust shield to axle. Remove wheel bearing from axle.
- (4) Carefully remove dust shield from

around axle pinion.

- (5) Remove three springs (Fig. 4-72) from brake shoes.
- (6) Disconnect brake shoes from wheel cylinder



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Figure 4-71. Service brake dust shield, installed view.

and lift brake shoes and attached adjuster assembly and cylinder links from backing plate.

(7) Using a brass drift, drive spring pins from

adjuster assembly and remove adjuster assembly from brake shoes.

(8) Remove pins securing cylinder links to brake shoes and remove links.

(9) Disassemble the brake adjuster by removing two screws (5, Fig. 4-73), nuts (6) and washers (3 and 4). Separate slide assemblies (1) and remove nylon washers (2).

c. Inspection.

(1) Inspect linings for wear, dirt, grease and brake fluid.

(2) Clean linings to remove foreign matter.

(3) Inspect brake drums in wheels for cracks, deep scratches and other defects.

(4) If linings are worn to less than 0.125 inch (3.17 mm) or if linings are saturated with fluid or grease, replace shoes.

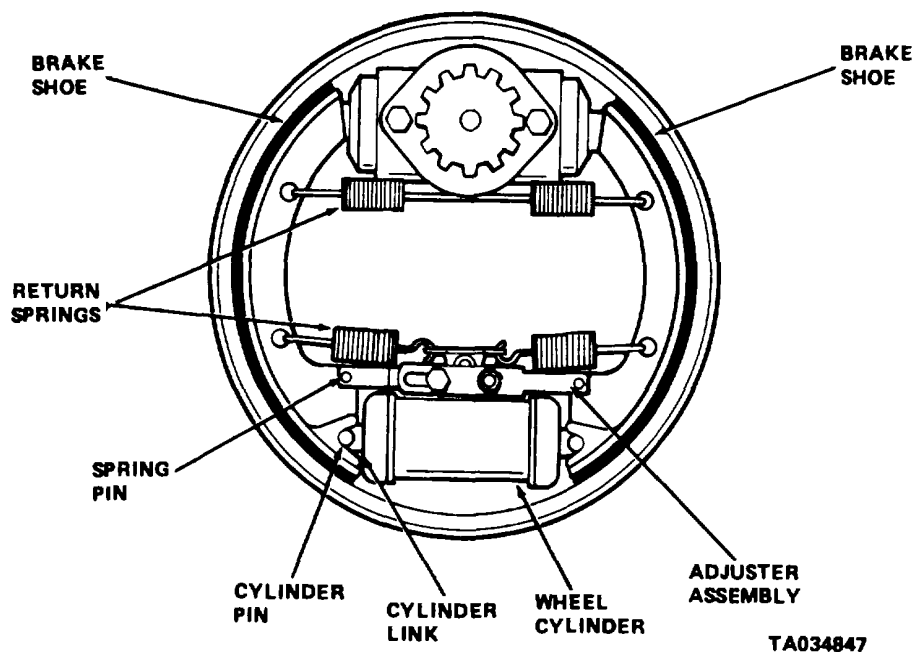
(5) Inspect brake shoes for wear, cracks, elongated holes and other damage.

(6) Inspect return springs for broken, nicked or fatigued coils.

d. Installation.

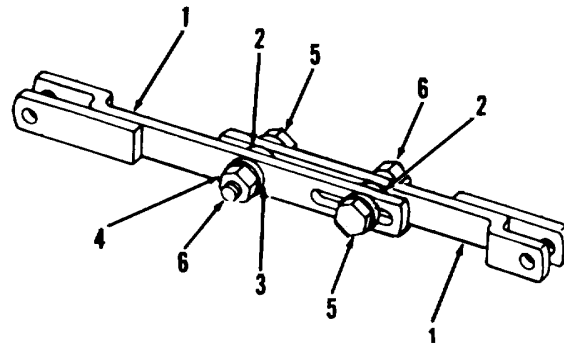
CAUTION

Brake shoes are free floating and self-adjusting. Check for obstructions during installation that could interfere with floating action.



TA034847

Figure 4-72. Service brake shoes, installed view



- | | |
|--------------------|--------------|
| 1 Slide assemblies | 4 Lockwasher |
| 2 Nylon washer | 5 Screw |
| 3 Washer | 6 Nut |

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Figure 4-73. Brake adjuster, disassembly and assembly

(1) Install slide assemblies (1, Fig. 4-73) with nylon washers (2) between slides.

(2) Secure slides with screws (5), nuts (6) and washers (3 and 4). Tighten only finger tight.

(3) Move slides along slot until center-to-center distance of holes in ends of slides is 5.15 inches (133.5 mm). Tighten screws (5) to a torque of 14 to 16 pound-inches (1.58 to 1.80 N-m).

(4) Hold screws in position and tighten nuts (6) to a torque of 29 pound-inches (3.2 N-m).

(5) Check slip resistance of slide assemblies. Resistance should be 250 to 300 pounds (113 to 135 kg).

(6) Install wheel cylinder links (Fig. 4-72) on bottom of brake shoes and secure with pins.

(7) Install adjuster assembly (Fig. 4-72) on brake shoes and secure to brake shoes with spring pins (fig. 4-72).

(8) Install brake shoes (Fig. 4-72) on backing plate, with links installed in ends of wheel cylinder (fig. 4-72). Hold shoes in position with three return springs (Fig. 4-72).

(9) Install dust shield (Fig. 4-71) on axle and secure with four screws and lockwashers.

(10) Refer to paragraph 4-85 and install front drive wheels.

4-89. Service Brake Wheel Cylinder

a. Inspection. Refer to paragraph 4-88 and remove front wheel and dust shield. Inspect wheel cylinder for leaks, damage and proper link movement. Replace wheel cylinder if necessary.

b. Removal

(1) Refer to paragraph 4-88 and remove brake shoes

(2) Disconnect hydraulic brake line (Fig. 4-74) from fitting in wheel cylinder.

(3) Remove two screws and lockwashers securing wheel cylinder to backing plate and remove

wheel cylinder.

c. Installation.

(1) Install wheel cylinder (Fig. 4-72) on backing plate.

(2) Secure wheel cylinder to backing plate with two screws (Fig. 4-74).

(3) Refer to paragraph 4-88 and install service brake shoes and backing plate.

(4) Refer to paragraph 4-85 and install front wheels.

(5) Refer to & below and bleed brake system.

d. Bleeding Brake Hydraulic System. Each time the system has been drained and refilled or a part has been disconnected or replaced the system must be bled.

(1) Remove filler cap from master cylinder and fill to proper level (0.375 to 0.50 inch (9.5 to 12.7 mm) from top).

(2) Connect a bleeder hose to bleeder screw (fig. 4-74) on front wheel. Submerge other end of hose in a glass jar filled with brake fluid.

(3) Open bleeder screw one turn.

(4) Slowly depress brake pedal to end of travel and release pedal. Repeat several times. Observe hose in jar and repeat pumping of brake pedal until no bubbles escape from hose. Hold pedal at bottom of travel and close bleeder screw to keep additional air from entering system.

NOTE

While pumping pedal check fluid level in master cylinder. Add fluid to keep cylinder close to full at all times.

(5) Close bleeder screw and disconnect hoses. Repeat operation on bleeder screw on other front wheel.

(6) Fill master cylinder to proper level after bleeding operation. Install filler cap.

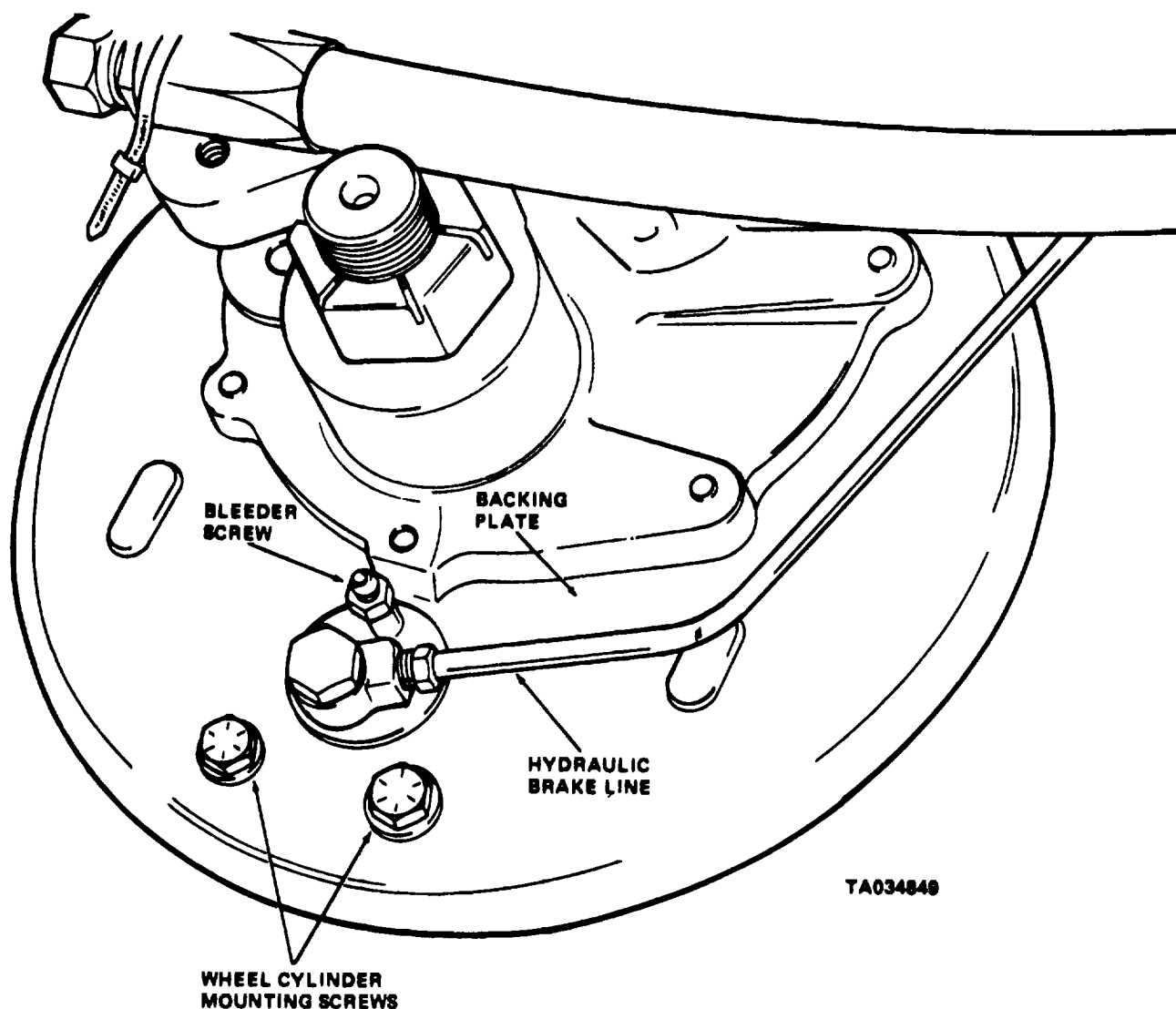


Figure 4-74. Brake System bleeder raw

CAUTION

Discard fluid salvaged from brake system during bleeding operation. Do not use in system.

4-90. Master Cylinder

a. *General.* The master cylinder is mounted on the right side of the truck frame.

b. *Inspection.*

- (1) Remove floor plate.
- (2) Inspect master cylinder and tubing for leaks and damage.

(3) Operate brake pedal and check stop light. When brake pedal is depressed stop light switch (fig 4-31) should actuate stop light.

c. *Removal*

(1) Disconnect wires from stop light switch (fig. 3-4) and remove stop light switch from master cylinder. Disconnect brake line from master cylinder.

(2) Disconnect clevis (Fig. 4-69) from brake pedal

(3) Remove mounting screws (1, Fig. 4-75), lockwashers (2) and nuts (3). Remove master cylinder (4) from truck.

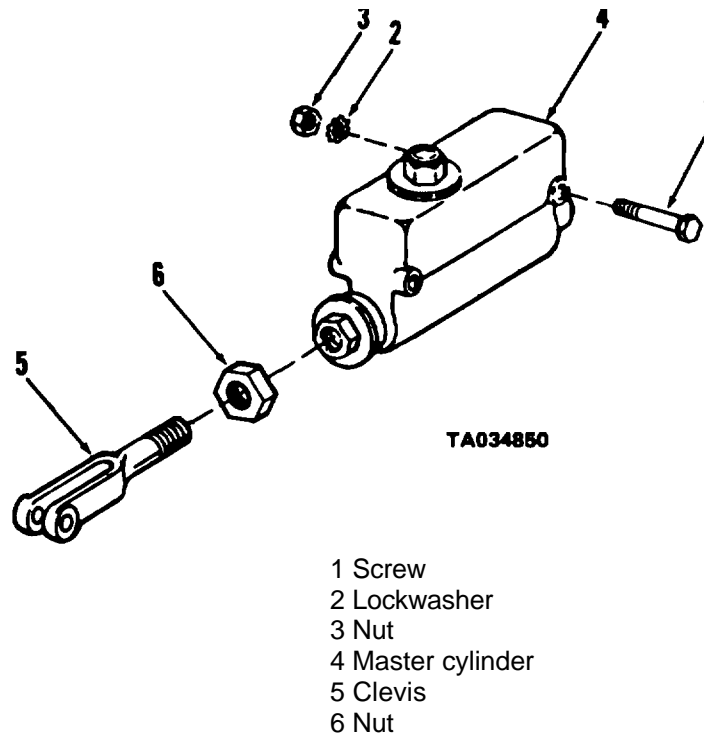


Figure 4-75. Service brake master cylinder, removal and installation

(4) Remove (6) and clevis (5) from master cylinder (4).

d. Installation.

(1) Install nut (6, Fig. 4-75) and clevis (5) on master cylinder.

(2) Install master cylinder on truck and secure with screws (1), lockwashers (2) and nuts (3). Connect ground wire to rear master cylinder mounting screw.

NOTE

Internal-external tooth lockwashers (2) must be installed with mounting screws for radio suppression.

(3) Connect clevis (Fig. 4-69) to brake pedal adjust pedal travel (par 4-87) as necessary.

(4) Refer to paragraph 4-89 to fill master cylinder and bleed brake system.

4-91. Parking Brake Lever and Linkage

a. General The parking brake lever mounted next to the instrument panel is connected to the parking

brake with a cable.

b. Adjustment. To compensate for brake lining wear the parking brake lever can be adjusted. If the adjusting knob on the parking brake lever will no longer provide correct brake adjustment and sufficient brake lining is still available, further adjustment can be made with the brake cable.

(1) Place brake lever in the fully released position.

(2) Remove setscrew (Fig. 4-76) in brake lever adjusting knob. Rotate knob (Fig. 4-76) one or two turns clockwise. Check adjustment by engaging brake.

(3) Repeat adjustment ((2) above) as necessary to assure correct lining contact with drum. After adjustment is correct, install setscrew to secure adjusting knob.

(4) If above steps do not provide proper braking action, adjust cable.

(5) Refer to figure 4-77 and remove cotter pin, washer and clevis pin securing clevis to cam lever.

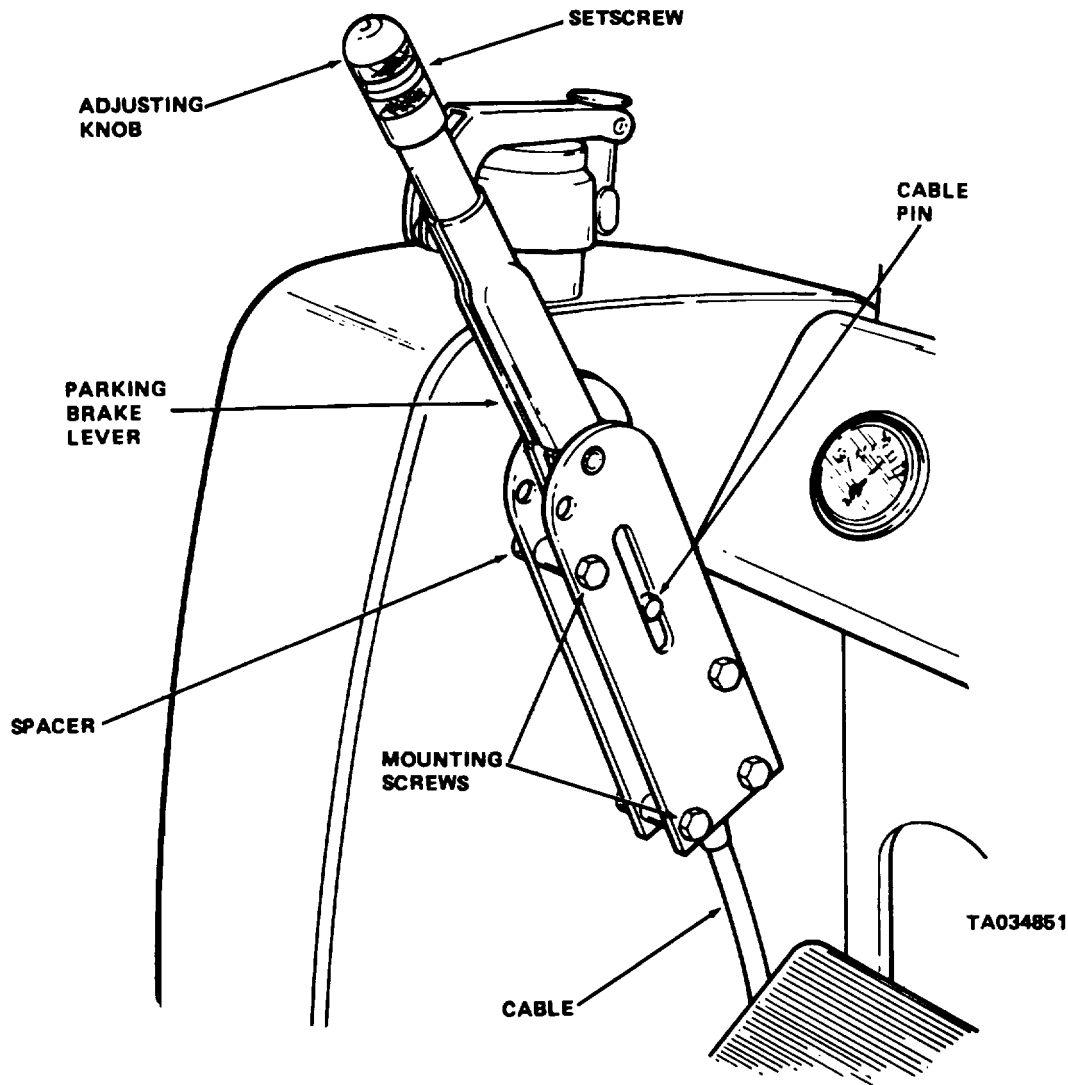


Figure 4-76. Parking brake lever, installed view.

(6) Loosen clevis locknut and turn clevis three or four turns clockwise to shorten the cable. Install clevis on cam lever and secure with clevis pin and cotter pin.

(7) Engage brake and check braking action. Adjust cable above until action is correct. Tighten locknut to secure adjustment.

c. Removal

(1) Place brake lever in released position (forward).

(2) Loosen setscrew securing adjusting knob and rotate knob counterclockwise to release tension on cable.

(3) Remove two screws (Fig. 476), lockwashers and nuts and disengage lever from frame. Remove spacers.

(4) Remove cotter pin and washer and remove cable pin and disconnect cable from lever.

(5) Disconnect cable from brake cam lever (b (5) above), remove clamps and remove cable.

d. Installation.

(1) Install cable (b (5) above) and connect cable to cam lever. Install clamps to secure cable to frame.

(2) Install end of cable in parking brake lever (fig. 4-76) and secure cable with cable pin, washer and cotter pin.

(3) Install mounting screws (Fig. 4-76), lockwashers and nuts and secure lever to frame.

(4) Refer to b. above and adjust lever and cable.

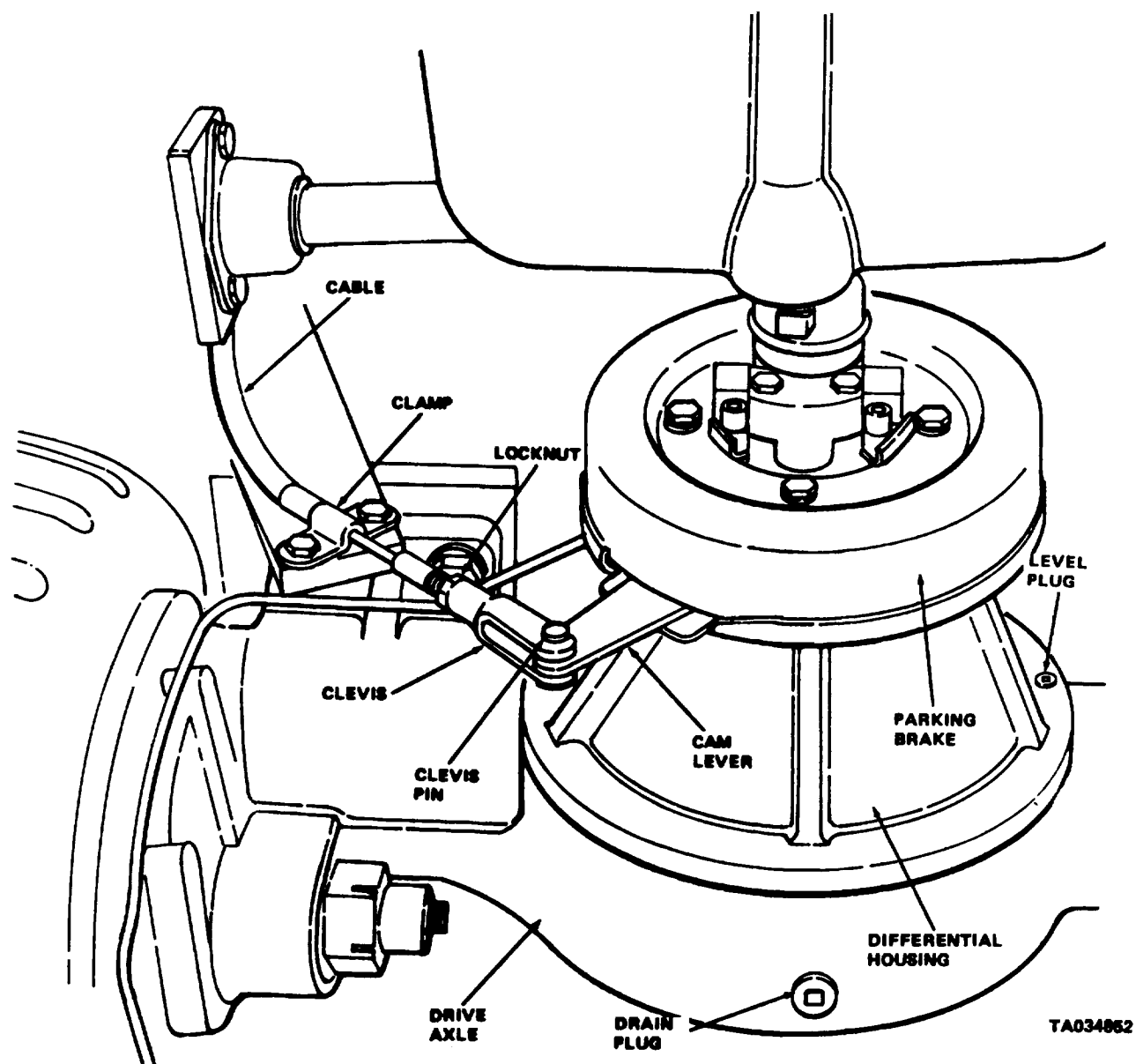


Figure 4-77. Parking brake cable, installed view.

4-92. Parking Brake

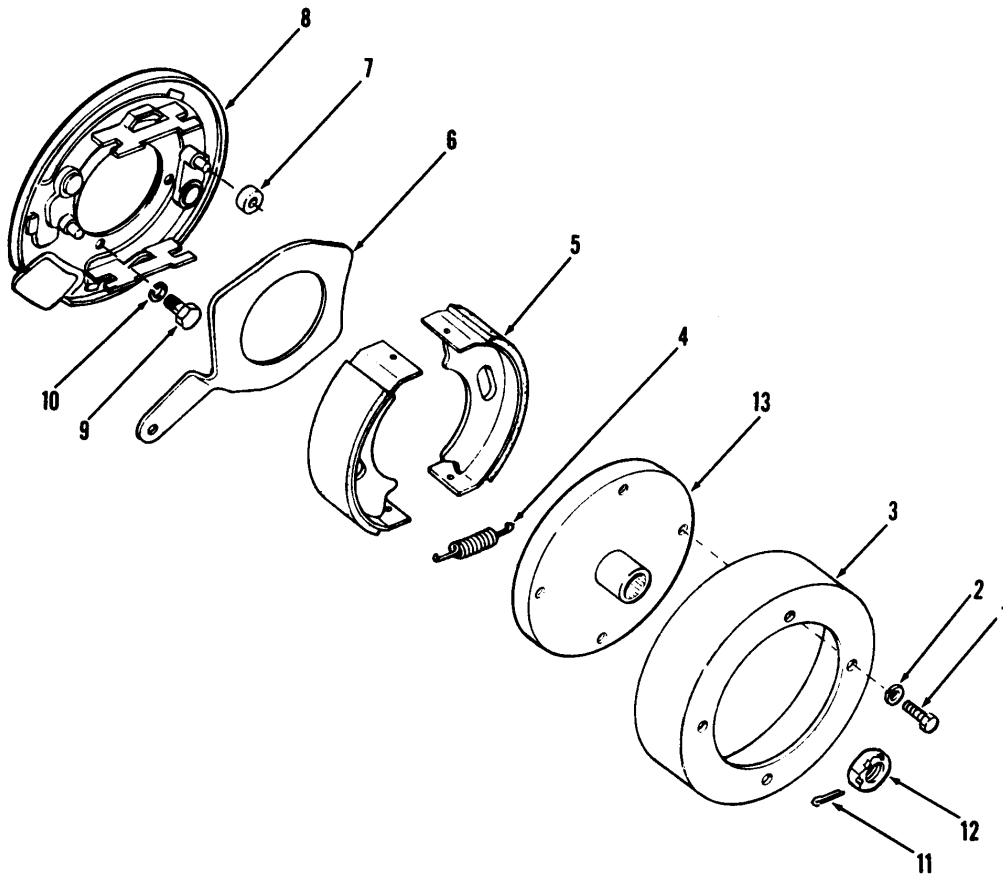
a. General. The parking brake is on the drive shaft to the rear of the drive axle.

b. Removal

(1) Disconnect drive shaft (para 4-94) from parking brake.

(2) Disconnect brake cable from parking brake (para 4-91).

(3) Remove screws (1, Fig. 4-78) and lockwashers (2) and remove brake drum (3) from pinion flange (13).



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- | | |
|---------------|-----------------|
| 1 Screw | 8 Backing plate |
| 2 Lockwasher | 9 Screw |
| 3 Brake drum | 10 Lockwasher |
| 4 Spring | 11 Cotter pin |
| 5 Brake shoe | 12 Nut |
| 6 Brake lever | 13 Flange |
| 7 Roller | |

Figure 4-78. Parking brake, exploded view.

(4) Remove cotter pin (11) and nut (12) from pinion shaft and remove flange (13).

(5) Remove brake lever (6) and rollers (7) from backing plate (8).

(6) Remove return springs (4) and remove brake shoes (5).

(7) Remove screws (9) and lockwashers (10)

and remove backing plate from differential carrier.

c. Inspection.

(1) Check backing plate for distortion, loose or sheared rivets and worn pawls.

(2) Inspect brake lining for wear or grease saturation.

(3) Check brake shoes for worn pawl holes, lever contact areas and worn pads.

(4) Check brake drum for cracks, wear and damage.

(5) Inspect springs for broken ends, cracks and fatigue.

(6) Replace unserviceable parts.

d. Installation.

(1) Install backing plate (8, Fig. 4-78) on differential carrier and secure with screws (9) and lockwashers (10). Apply light coat of grease (GAA) to wear pads and pawls.

(2) Install brake shoes (5) on backing plate and install return springs (4). Apply light coat of grease

(GAA) to roller slots and lever wear points on brake shoes.

(3) Install lever (6) and rollers (7) on brake shoes.

(4) Install flange (13) on pinion shaft and secure with nut (12) and cotter pin (11).

(5) Install brake drum (3) on flange and secure with screws (1) and lockwashers (2).

(6) Refer to paragraph 4-94 and connect drive shaft.

(7) Refer to paragraph 4-91 and connect cable to parking brake lever. Adjust brake as described in paragraph 4-91.

Section XXI. DRIVE AXLE

4-93. General

The drive axle propels the front wheels and provides motive force for the truck. It is connected to the transmission by a drive shaft. The service brakes are attached to the drive axle.

4-94. Drive Shaft

a. General. The drive shaft connects the

transmission to the parking brake and drive axle.

b. Removal.

(1) Raise front of truck and block in position. Block rear wheels.

(2) Remove self-locking screws (1, Fig. 4-79) securing drive shaft to transmission flange and parking brake.

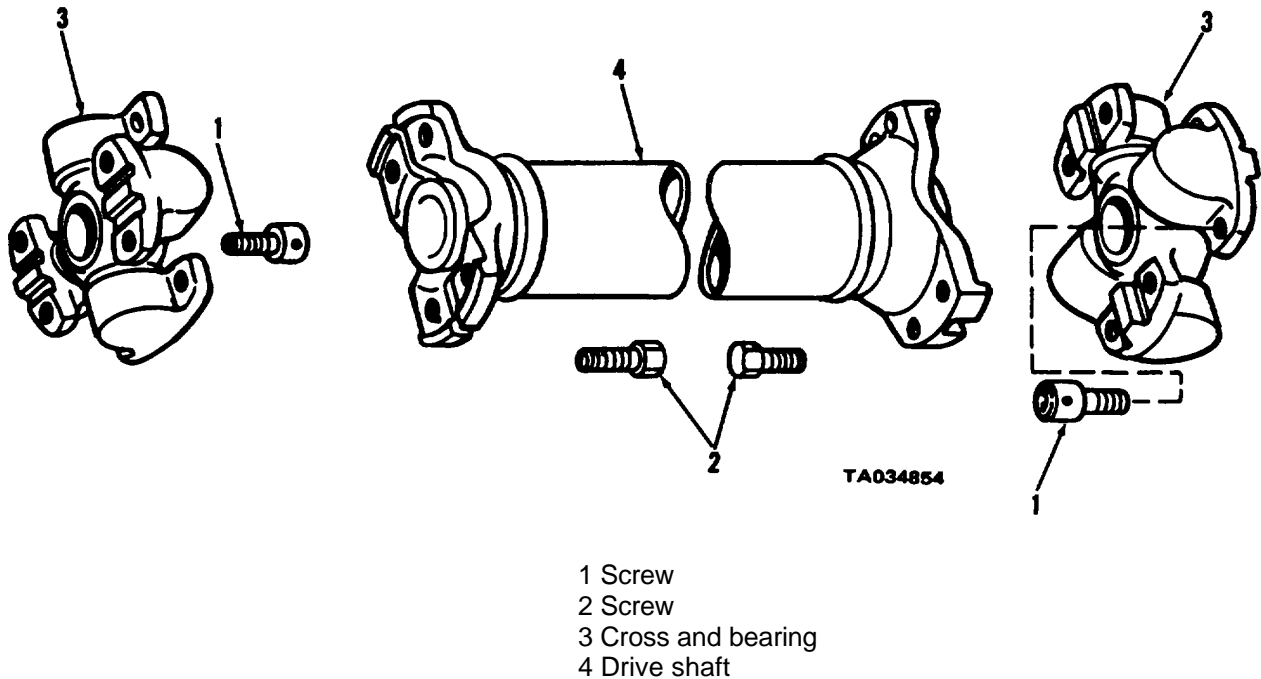


Figure 4-79. Drive shaft, exploded view.

(3) Slide transmission output shaft into transmission to allow drive shaft to clear parking brake. Remove drive shaft

(4) Remove screws (2) and remove cross and

bearings (3) from drive shaft (4).

(5) Remove output shaft from transmission.

c. Installation.

(1) Install cross assemblies (3, Fig. 4-79) on drive shaft (4) and secure with screws (2). Tighten screws to a torque of 25 to 30 pound-feet (338 to 40.6 N.m) dry or 20 to 24 pound-feet (27.1 to 32.5 N.m) lubricated.

(2) Install output shaft in transmission.

(3) Install drive shaft on transmission output shaft and parking brake and secure with screws (2). Tighten screws to a torque of 25 to 30 pound-feet (338 to 40.6 N.m) dry or 20 to 24 pound-feet (27.1 to 32.5 N.m) lubricated.

(4) Remove blocks and lower truck to ground.

4-95. Differential

a. General The differential provides a double reduction internal gear drive. A pinion driven by the drive shaft is meshed with a ring gear which drives the differential. The differential is splined to the axle shafts, which drive pinions that are meshed with the ring or bull gears in the wheels.

b. Service

(1) Axle Breather. The breather is located on the right top of the differential housing. Remove

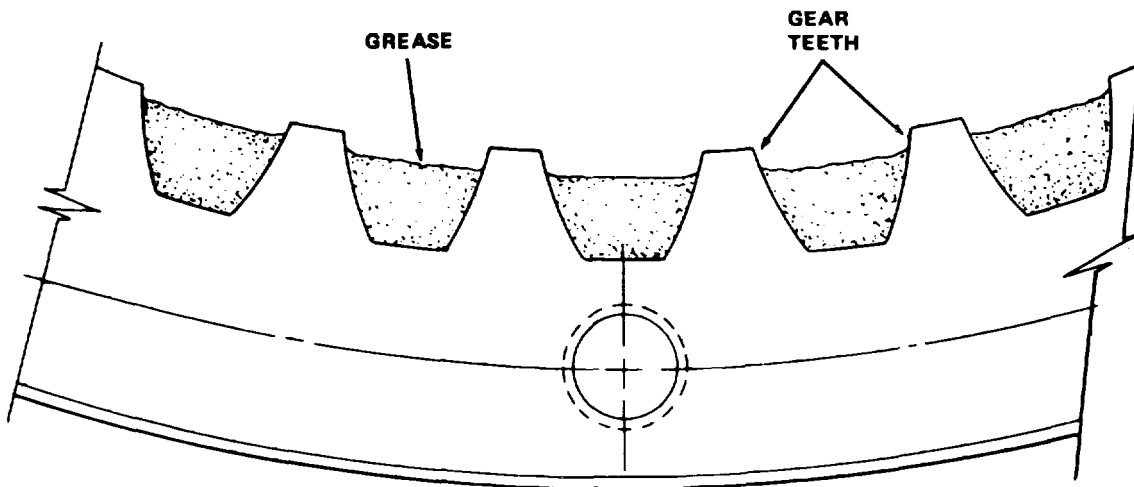
breather and clean in cleaning compound, solvent (Fed. Spec. P-D-680) and dry thoroughly. Install breather and tighten securely.

c. Lubrication

(1) The differential level plug is located on the right front of the axle housing. Remove plug and check level of oil. Oil should be to level of plug hole. Add lubricant as required. Refer to current Lubrication Order for correct lubricant. Install plug.

(2) The drain plug (Fig. 4-77) is located at the bottom of the differential housing. To drain axle, remove level plug (Fig. 4-77). Place a suitable container beneath axle, remove drain plug and drain lubricant. Install drain plug and tighten securely. Refer to current Lubrication Order for correct lubricant and fill housing through level plug hole. Install level plug.

(3) Lubrication of axle pinion and ring or bull gear is accomplished by removing the front wheel. Refer to paragraph 4-85 and remove the front wheel. Clean pinion and ring gears with solvent and dry with compressed air. Fill all spaces between ring or bull gear teeth with grease (GAA) to approximately three-fourths the height of the teeth (Fig. 4-80). Refer to paragraph 4-85 and install front wheels.



TA034855

Figure 4-80. Ring or bull gear lubrication.

4-96. Axle Shafts

a. General Drive from differential to the wheels is provided by the axle shafts. The inner end is splined to the differential and the outer end acts as a pinion riding in the ring or bull gear of the wheel.

b. Inspection

(1) Refer to paragraph 485 and remove the front wheels 440

(2) Inspect ring or bull gear in wheel for

cracked, broken, damaged or worn teeth.

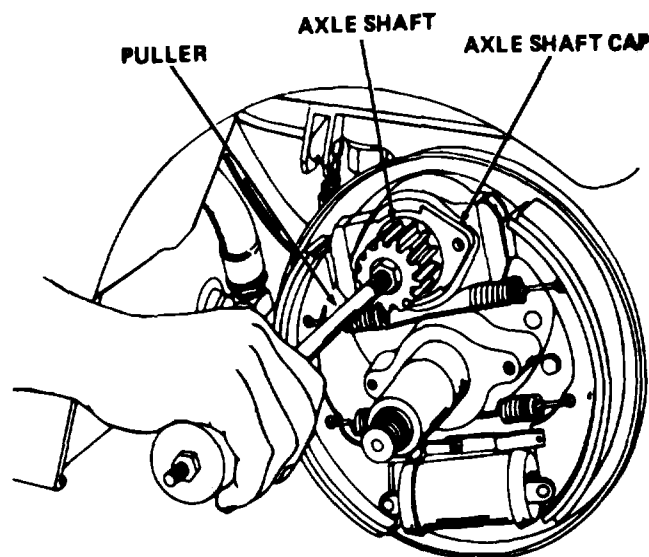
(3) Inspect axle pinion (Fig. 4-71) for cracked, broken, damaged or worn teeth.

c. Removal

(1) Refer to paragraph 4-85 and remove front wheels and dust shield.

(2) Remove two screws and lockwashers secur

ing axle shaft cap (Fig. 4-81) to drive axle. Install threaded puller into threaded end of axle shaft and carefully remove axle shaft with axle cap and bearing attached.



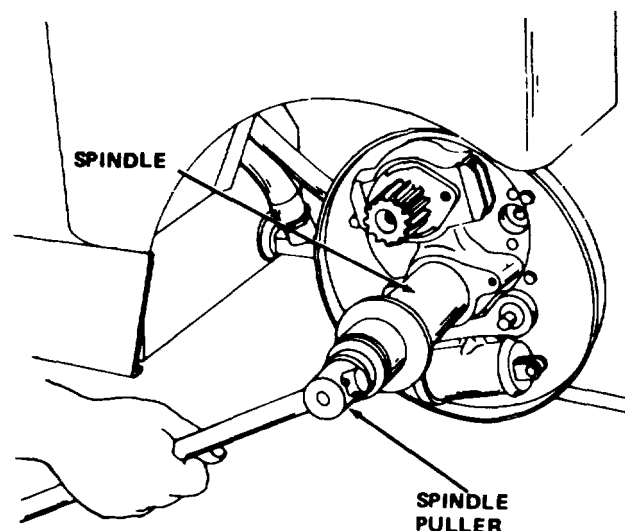
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Figure 4-81. Removing axle shaft.

(3) Inspect seal in axle shaft bore. If seal is damaged or shows evidence of leaking, remove seal

(4) Inspect seal in axle cap. If seal is damaged or shows evidence of leaking, notify organizational maintenance.

(5) Remove locknut securing spindle at inside of drive axle housing (Fig. 4-82). Install a spindle puller as shown in figure 4-82 and remove spindle.



TA034857

Figure 4-82. Removing spindle.

(6) Inspect spindle bearing surfaces for evidence of wear and damage. Replace unserviceable spindles.

b. Installation.

(1) Install spindle in drive axle housing and secure with locknut. Tighten locknut until spindle seats.

(2) If seal was removed ((3) above) install new oil seal in axle shaft bore.

(3) Slide axle shaft in position in drive housing. Align splines on shaft with splines in differential. Align holes in housing with holes in axle shaft cap. Use a soft mallet and drive the shaft in place on axle. Secure axle cap with screws and lockwashers.

(4) Refer to paragraph 4-85 and install front wheels.

Section XXII. TRANSMISSION

4-97. General

The power shift transmission has one speed forward and one speed in reverse. Direction of travel is controlled by a shift lever on the steering column. The transmission torque converter is directly coupled to the engine flywheel with two flex plates.

4-98. Transmission Oil Filter

a. General. The transmission oil filter is remotely mounted on the front left side of the engine compartment (Fig. 428). Oil flows from the converter

pump through the transmission control valve to the clutches. The oil returns through the oil cooler and oil filter to the transmission.

b. Inspection.

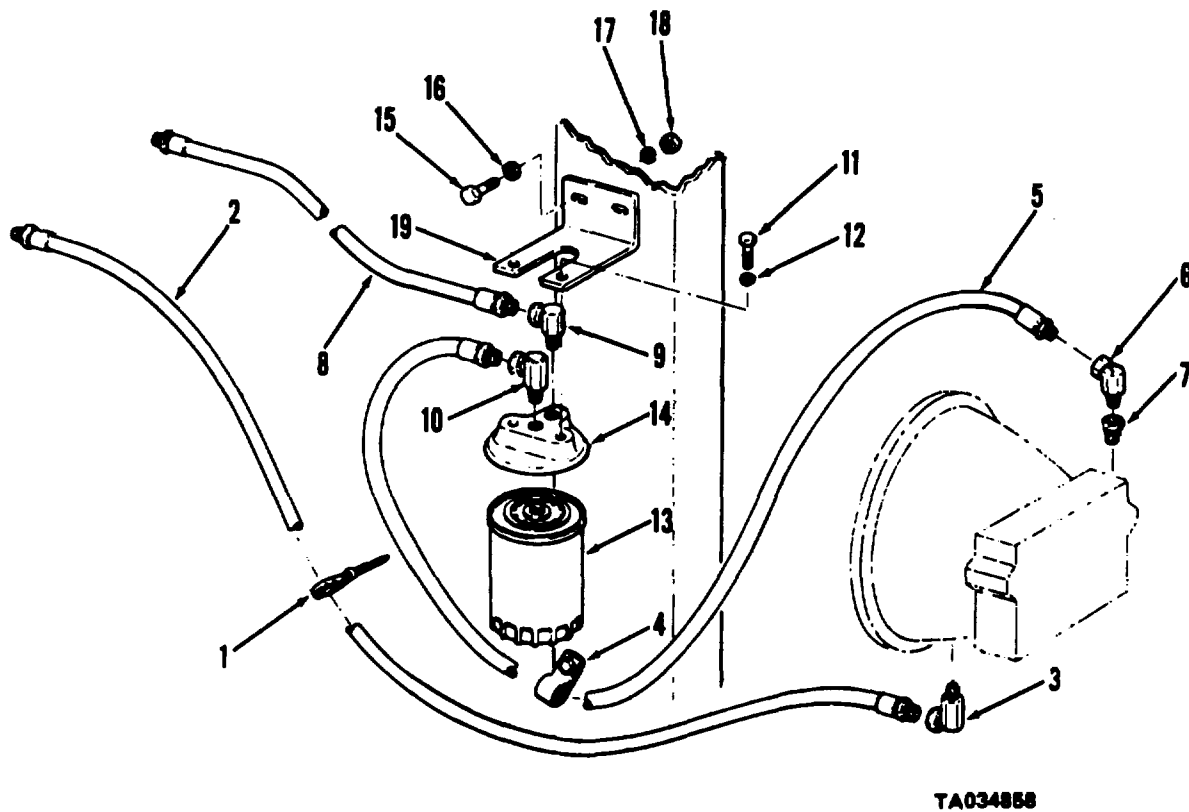
(1) Inspect transmission oil filter (Fig. 4-28) for leaks and damage.

(2) Inspect hoses for wear, leaks and deterioration.

c. Removal.

(1) Open left side panel

(2) Remove transmission oil filter (Fig. 4-28) by unscrewing filter from filter base (14, Fig. 4-83).



- | | |
|-----------|---------------|
| 1 Tywrap | 11 Screw |
| 2 Hose | 12 Lockwasher |
| 3 Elbow | 13 Filter |
| 4 Clamp | 14 Base |
| 5 Hose | 15 Screw |
| 6 Elbow | 16 Washer |
| 7 Fitting | 17 Lockwasher |
| 8 Hose | 18 Nut |
| 9 Elbow | 19 Bracket |
| 10 Elbow | |

Figure 4-83. Transmission oil filter and hoses, exploded view.

(3) If hoses require replacement disconnect hoses, remove clamps or tywrap and remove elbows and fittings as necessary. Plug hoses and openings to prevent entrance of foreign material

d. Installation.

(1) If hoses were disconnected or fittings were removed, remove plugs and install fittings and connect hoses. Secure hoses with tywrap or clamp as necessary.

(2) Apply a light coat of transmission oil to rubber gasket on filter. Screw filter (13, Fig. 483) into base by hand and hand tighten only.

(3) Close left side panel.

(4) Refer to paragraph 4-12 and add oil to transmission, if necessary.

4-99. Control Lever and Linkage

a. *General* The transmission is controlled through a linkage extending from the bottom of the control column. A lever at the end of the column is connected to the transmission forward and reverse plunger with a shift rod and yoke. The inching pedal operates the inching valve through a pin and screw attached to the valve plunger.

b. *Adjustment*

(1) Shift Rod.

(a) Remove floor and toe plates.

(b) With the engine off, place forward and reverse control lever in N (neutral) position. Attempt to start truck engine.

(c) If engine starts, transmission selector valve is in neutral position. If engine does not start, selector valve is not in neutral position and neutral start

switch has not closed starting circuit.

(d) Remove cotter pin and pin and detach yoke (Fig. 4-84) from transmission selector valve.

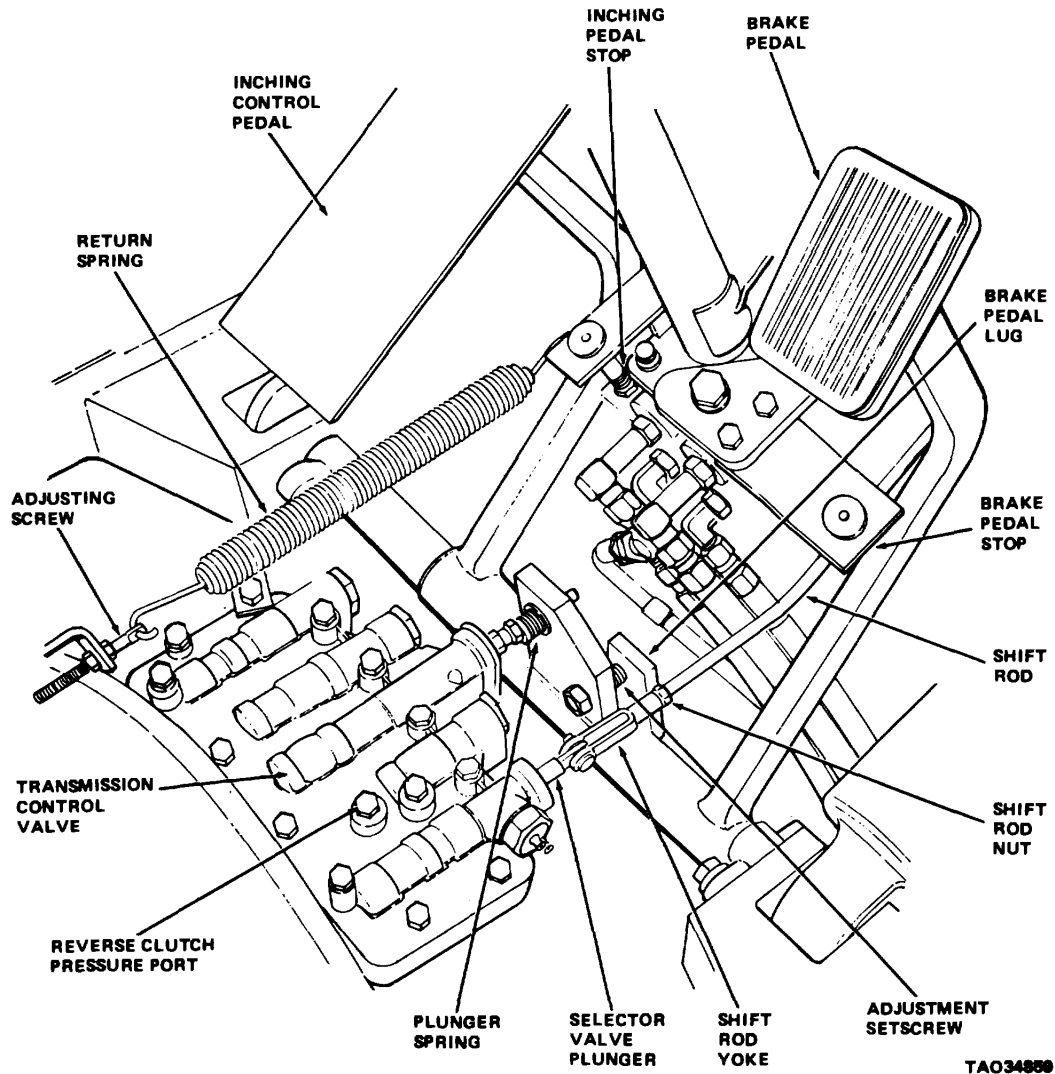


Figure 4-84. Transmission control adjustment.

(e) Move selector valve back and forth to determine center, or neutral, position. Again attempt to start engine. If engine starts, transmission is in neutral

(f) Hold selector valve in this position and loosen nut on shift rod (Fig. 4-84) to move yoke on rod to lengthen or shorten rod to align with selector valve in neutral position. Tighten nut to secure yoke.

CAUTION

Do not thread yoke to far on shift rod. End of shift rod must not protrude through yoke and come out on other side. If it does, selector valve movement will be restricted.

(g) Connect yoke to selector valve plunger with pin and cotter pin.

(h) Operate truck and check adjustment.

- (j) Install floor and toe plates.
- (2) Inching control.
 - (a) Remove floor and toe plates.
 - (b) Operate truck and check inching control operation. Truck should come to a full stop when inching control pedal is completely depressed and should move forward smoothly with the pedal released.
 - (c) Check brake pedal to see that it is fully retracted against brake stop (Fig. 4-84).
 - (d) Measure return spring (Fig. 4-84). Spring should measure 11.0 to 11.25 inches (279.4 to 285.7 mm) when inching pedal is retracted. If spring length requires adjustment, loosen nut on adjusting screw and adjust length of spring as required.
 - (e) With the return spring at proper length, adjust inching pedal stop (Fig. 4-84) so that plunger spring (Fig. 4-84) is compressed to a length of 0.062 to 0.125 inches (1.57 to 3.17 mm).
 - (f) With the brake pedal against brake stop (Fig. 4-84) set adjustment setscrew to allow a gap of 0.25 inch (6.35 mm) between brake pedal lug and inching pedal setscrew. Lock setscrew with locknut.
 - (g) To check adjustments, raise front wheels from floor and block truck in raised position. Block rear wheels. Operate truck and shift in F (forward) or R (reverse). With engine at high idle, inching pedal should not move forward. If it does, repeat adjustments above. Shift lever to N (neutral), stop engine and lower truck to floor.
 - (h) To check transmission output, operate truck and set parking brake. Return engine to low idle and shift into forward or reverse. Engine should approach a stall condition. Stop engine.
- (3) Pressure Check
 - (a) Install a zero to 300 psi gage in reverse clutch pressure port (Fig. 4-84).
 - (b) Raise front of truck and block in position.
 - (c) Engage parking brake. Depress brake pedal until shoes contact drums. This will occur when resistance to pedal movement is felt. Wedge a block of wood between brake pedal stop (Fig. 4-84) and pedal to hold brakes in applied position.
 - (d) Start engine. With engine at low idle (500 to 600 rpm) place transmission control lever in R (reverse). Depress inching pedal until gage reads 6 to 10 psi.
 - (e) Adjust inching pedal setscrew (Fig. 4-84) to engage brake pedal lug at this point. Lock setscrew with lock nut.

- (f) Disengage parking brake. Pressure gage should indicate at least 95 psi at 2000 rpm with transmission in R (reverse) position.
- (g) Shut off engine. Remove gage and install plug in transmission control valve.
- (h) Install floor and toe plates.

4-100. Neutral Start Switch

- a. *General.* A pressure switch, actuated by the transmission, prevents the truck starter from operating unless the transmission is in neutral. The switch is mounted on the right side of the transmission control valve.
- b. *Removal.*
 - (1) Place transmission in neutral and attempt to start truck. If starter does not operate, replace switch.
 - (2) Remove floor plate.
 - (3) Disconnect wires from neutral start switch (Fig. 3-4) and remove switch from control valve. Plug openings in valve to prevent entrance of foreign material.
- c. *Installation.*
 - (1) Remove plug from control valve.
 - (2) Install neutral start switch (Fig. 3-4) securely in control valve. Connect wires to switch.
 - (3) Start truck engine to check operation. Shut off engine.
 - (4) Install floor plate.

4-101. Transmission Service

- a. *General.* The transmission should be drained and refilled at specified intervals. Refer to current lubrication order for intervals and lubricant.
- b. *Service.*
 - (1) Remove transmission filler cap and level gage (Fig. 3-4).
 - (2) Place a suitable container under transmission drain plug (Fig. 4-77). Remove plug and allow oil to drain.
 - (3) Remove transmission screen through oil drain plug hole. Clean screen in cleaning compound, solvent (Fed. Spec. P-D-680) and blow dry with compressed air.
 - (4) Install screen in drain plug hole and install drain plug.
 - (5) Service transmission filter (para 4-98).
 - (6) Refer to current lubrication order and fill transmission with correct grade of oil. Install transmission filler cap and level gage (Fig. 3-4).

APPENDIX A REFERENCES

A-1 Fire Protection

TB 54200-20-10

Hand Portable Fire Extinguishers approved for Army Users

A-2 Lubrication

C9100IL

LO10-3930-630-12

Fuels, Lubricants, Oils and Waxes

Lubrication Order for: Truck, Lift, Fork, Gasoline, Solid Rubber Tired Wheels, 400 Lb Capacity, 100 and 180 Inch Lift, Allis-Chalmers Models ACC40-24PS100 and ACC40-24PS180

A-3 Painting

AR746-1

TM 43-0139

TB 746-93-1

Color, marking and preparation of equipment for shipment

Painting Instructions for Field Use

Color and Marking of Military Vehicles, Construction Equipment and Materials Handling Equipment

A-4 Radio Interference Suppression

TM 11-483

Radio Interference Suppression

A-5 Maintenance

TB 750-651

Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems

TM 9-6140-200-12

Operator's and Organizational Maintenance Manual for Lead-Acid Storage Batteries

TM 10-3930-630-12

Operator and Organizational Maintenance Manual for: Truck, Lift, Fork, Gasoline, Solid Rubber Tired Wheels, 4000 Lb Capacity, 100 and 180 Inch Lift, Army Model MHE-231, Allis-Chalmers Models ACC40-24PS100 and ACC40-24PS180

TM 10-3930-630-20P

Organizational Maintenance Repair Parts and Special Tools List for: Truck, Lift, Fork, Gasoline, Solid Rubber Tired Wheels, 4000 Lb Capacity, 100 and 180 Inch Lift, Army Model MHE-231, Allis Chalmers Models ACC40-24PS100 and ACC40-24PS180

TM 38-750

The Army Maintenance Management System (TAMMS)

A-6 Destruction to Prevent Enemy Use

TM 750-244-3

Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command)

A-7 Shipment and Storage

TB 740-97-2

Preservation of USAMECOM Mechanical Equipment for Shipment and Storage

TM 740-90-1

Administrative Storage of Equipment

APPENDIX B MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1 General

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

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function.

d. Section IV contains supplementary instructions or explanatory notes for a particular maintenance function.

B.2. Explanation of Columns In Section II

a. *Column 1. Group Number.* Column 1 lists a group of numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

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

c. *Column 3. Maintenance Functions.* This column lists the various maintenance functions (A through K). The lowest maintenance level authorized to perform these functions is indicated by a symbol in the appropriate column. Work measurement time standards (the active repair time required to perform the maintenance function) are shown directly below the symbol identifying the maintenance level. The symbol designations for the various maintenance levels are as follows:

- C - Operator or crew
- O -- Organization maintenance
- F - Direct support maintenance
- H - General support maintenance
- D - Depot maintenance

The maintenance functions are defined as follows:

a. *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards through examination.

b. *Test.* To verify serviceability and detect incipient failure 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, i.e., to clean, to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. *Adjust.* To maintain within prescribed limits, by bringing into proper exact position, or by setting the operating characteristics to specified parameters.

e. *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace.* The act of substituting a serviceable like type part, sub-assembly, or module (component or assembly) for an unserviceable counterpart.

i. *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, reventing, straightening, facing, remachining or resurfacing) 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 publication. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to 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 material 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.

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

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

B-3. Explanation of Columns in Section III

a. *Reference Code.* This column consists of a number and a letter separated by a dash entered from column 4 on the MAC. The number references the special tools and test equipment requirements and the letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. *Maintenance Level.* This column shows the

lowest level of maintenance authorized to use the special tools or test equipment.

c. *Nomenclature.* This column lists the name or identification of the tools or test equipment.

d. *Tool Number.* This column lists the manufacturer's code and part number, or national stock number of tools and test equipment.

B-4. Explanation of Columns in Section IV

a. *Reference Code.* This column consists of two letters separated by a dash, entered from column 5, section II. The first letter references the remark and the second letter references a maintenance function, column 3, A through K, to which the remark applies.

b. *Remarks.* This column lists information pertinent to the maintenance function being performed, as indicated on the MAC. section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Assembly Group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
01	OVERHEAD GUARD AND PANEL	O 0.2							O 1.0					
02	OPERATORS SEAT				O				O 0.5					
03	BODY PANEL AND HOODS	O 0.2							O 0.5	O 1.0				
04	INSTRUMENT PANEL AND INSTRUMENTS	C 0.2	D 0.3						O 1.0					
05	MAST ASSEMBLY	O 0.2	O 0.4	O 0.2	O 0.5				O 0.5	F 1.0				
06	HYDRAULIC LIFT COMPONENTS: Lines and Fittings	O 0.3	O 0.4						O 0.5					
	Lift Chains	O 0.1			O 0.4				O 0.5					
	Lift Cylinder				O 0.4				O 0.5	F 1.0				
	Tilt Cylinder				O 0.4		O		F 0.5	1.0				
	Control Valve								F 1.0	F 2.0				
	Hydraulic Tank and Oil Filter				O 0.2				O 1.0	F 1.0				
	Hydraulic Pump	F 0.2	F 0.5						F 1.0	F 2.5				
07	ELECTRICAL SYSTEM: Batteries and Cables	O 0.2	O 0.5						O 0.4	O 0.5				
	Lights, Horn and Wiring	O 0.4							O 0.5	O 0.5				
	Alternator		O 0.5			O			O 0.5	F 2.0				
	Starting Motor		O 0.5						O 0.5	F 4.0				
	Distributor			O 0.5	O 0.5			0.5	O 1.0	O				
	Spark Plugs		O 0.5	O 0.2					O 0.5					

(1) Group No.	(2) Assembly Group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
08	FUEL SYSTEM:													
	Air Cleaner	C 0.1		O 0.2					O 0.5					
	Carburetor			O 0.5					O F					
	Fuel Pump		O 0.2			0.5	1.5		O 0.5					
	Fuel Filter			O 0.2					O 0.5					
	PCV Valve			O 0.2					O 0.5					
	Governor				O				O 0.4	O 0.5				
	Fuel Tank Filler Cap and Screen	O 0.2		O 0.2					O 0.2	F 0.5				
	Fuel Lines	C 0.2							C 0.5	C 1.0				
09	COOLING SYSTEM:													
	Belts	O 0.2			O 0.2				O 0.5					
	Fan and Water Pump	O 0.2							O 0.5					
	Radiator	O 0.2	O 1.0	C 0.2					O H					
	Hoses and Thermostat	O 0.5				1.0	2.0		O 0.5					
10	EXHAUST SYSTEM:													
	Muffler and Pipes	C 0.2							O 0.5					
11	STEERING SYSTEM:													
	Drag Links				O 0.5				O 0.5	O 1.0				
	Tie Rod				O 0.5		O 0.5		O 1.5					
	Steering Gear Assembly				F 1.0				F 2.0	H 4.2				
	Steering Cylinder	O 0.3							O 1.2	F 2.0				
12	ENGINE:													
	Engine Assembly	O 0.3	O 1.0	C 0.4					F 1.5	F 8.0	H 6.0	D 16.0	A-B	
	Oil Filter	O 0.2							O 0.5					
	Manifolds	O 0.2							O 0.5					
	Cylinder Head	O 0.2							O 2.0					
	Engine Valves				O 1.5	3.0	5.0		F F	F F			C-1	
	Connecting Rod and Piston Assembly								F 4.0	H 8.0				
	Oil Pump	F 2.0							F 4.0					
	Timing Gears	F 2.0							F 4.0					
	Camshaft Assembly	F 2.0							F 8.0					
	Flywheel Assembly								F 4.0	F 8.0				

(1) Group No.	(2) Assembly Group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
13	ENGINE- CONTINUED													
	Crankshaft								H	D			B-1	
	Cylinder Block	H							6.0	8.0			B-1	
	Wheel Assembly	1.0							H	D				
	Tires	C							8.0	16.0				
	Wheel Bearings and Seals	0.4							H					
		C				1.7			1.5					
		0.2							H					
		O							O					
		0.9							1.5					
	WHEELS:													
	Service Brake Shoes	O			O				F					
	Parking Brake Shoes	0.9		O	0.5				0.9					
15	Wheel Cylinder	O			0.5				F					
	Brake Pedal and Linkage	0.9							1.0					
	Parking Brake Lever and Linkage	O							F	F				
	Parking Brake	0.4							1.8	2.0				
					O				O					
					0.5				1.0					
					O				O					
					0.5				1.5					
									O					
									2.0					
16	FRONT AXLE (DRIVE):													
	Propeller Shaft			O					O	F				
	Drive Axle Ends	O		0.2					1.0	2.5				
17	Differential	0.5			O				O					
				O					F	H				
				0.5					5.0	7.0				
17	REAR AXLE (STEERING):													
	Rear Axle Assembly			O	F				F	F			D-D	
				0.4	1.0				3.5	5.0				
	TRANSMISSION:													
	Oil Filter	O							O					
	Control Lever and Linkage	0.2			O				0.5					
	Filter Screen			F					F					
	Control Valve		F	0.2					F					
	Transmission Assembly		0.5						1.0	3.0			E-B	
	Torque Converter		F	C					F	H	D			
		F	1.0	0.2					3.0	8.0	16.0			
		0.2							F					
									3.0					

Section III. SPECIAL TOOLS AND TEST EQUIPMENT

No special tool or test equipment is authorized.

Section IV. SUPPLEMENTARY INSTRUCTIONS

Reference code	Remarks
A-B	Estimated sine unit manhour repair or replacement
B-1	Test includes engine operation and compression
C-1	Align and resize
D-D	Reface
E-B	Adjust toe-in
	Test hydraulic control pressure

APPENDIX C

BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists basic issue items and items troop installed or authorized required by crew/operator for operation and required for the performance of organizational maintenance of the fork lift truck.

C-2. General

This Basic Issue Items, Items Troop Installed or Authorized List is divided into the following sections:

a. *Basic Issue Items List-Section II.* A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with, the end item.

b. *Items Troop Installed Or Authorized List-Section III.* A list, in alphabetical sequence, of items which, at the discretion of the unit commander, may accompany the end item, but are not subject to be turned in with the end item.

C-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings.

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

(1) *Source code.* Indicates the source for the listed items. Source codes are:

Code	Explanation
P -	Repair parts, supplied from the GSA/DSA or Army supply system and authorized for use at indicated maintenance categories.
P2 -	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
P9 -	Assigned to items which are NSA design controlled: unique repair parts, which are stocked and supplied by the Army COMSEC Logistic System and which are not subject to the provisions of AR 380.4L
M -	Repair parts which are not procured or stocked as such in the supply system but are to be manufactured at indicated maintenance levels.
A -	Assemblies which are not procured or stocked as such but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately, and can be assembled to form the required assembly at indicated maintenance categories
X -	Parts and assemblies that are not procured or stocked because the failure rate is normally below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.
X1-	Repair parts which are not procured or stocked. The requirement for such items will be filled by the next higher assembly or component.

Code Explanation

X2 - Repair parts which are not stocked and have no foreseen mortality. The indicated maintenance category requiring such repair parts will attempt to obtain the parts through cannibalization or salvage. The item may be requisitioned, with exception data, from the end item manager for immediate use.

G - Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DS and GS level. These assemblies will not be stocked above DS and GS level or returned to depot supply level

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above except those coded X1.

(2) *Maintenance code.* Indicates the lowest category of maintenance authorized to install the listed item. Capabilities of higher maintenance categories are considered equal or better. Maintenance codes are:

Code	Explanation
C	Crew/Operator
0	Organizational maintenance
(3)	Recoverability code. Indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R	Repair parts (assemblies and components) which are considered economically repairable at direct and general support maintenance levels. When the item is no longer economically repairable, it is normally disposed of at the GS level. When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710-50. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DS and GS activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such items will be repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value, or reusable casings or castings.

b. National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Description. Indicates the Federal item name and a minimum description required to identify the item.

d. Unit of Measure (U/M). Indicates the standard or basic quantity by which the listed item is used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, e.g., ea, in, pr, etc.

e. Quantity Furnished with Equipment (Basic Issue Items Only). Indicates the quantity of the item furnished with the equipment.

f. Quantity Authorized (Items Troop Installed or Authorized Only). Indicates the quantity of the item authorized to be used with the equipment.

g. Illustration. This column is divided as follows:

(1) Figure number. Indicates the figure number of the illustration on which the item is shown.

(2) Item number. Indicates the callout number used to reference the item on the illustration.

Section II. BASIC ISSUE ITEMS LIST

No basic issue items are authorized.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) National stock number	(2) Description	(3) Unit of meas.	(4) Qty auth
7510-00-889-3494	Binder, loose leaf	Ea	1
7520-00-559-9618	Case operation and maintenance manual	Ea	1
4210-00-889-2221	Extinguisher, fire	Ea	1

INDEX

	Paragraph	Page
Abbreviations.....	1-10	1-5
Accelerator	4-63	4-59
Adjustments:		
Accelerator.....	4-63	4-44
Alternator belt.....	4-51	4-55
Carburetor.....	4-58	4-22
Carriage.....	4-36	4-20
Chain	4-35	4-57
Governor.....	4-59	4-83
Parking brake.....	4-91	4-78
Service brake	4-87	4-52
Spark plug.....	4-54	4-66
Steering	4-74	4-25
Tilt cylinder	4-37	4-25
Transmission control	4-99	4-90
Transmission shift rod	4-99	4-90
Valves, engine.....	4-83	4-71
Air cleaner and indicator	4-10	4-4
Air cleaner	4-57	4-53
Alternator.....	4-51	4-44
Axle, drive.....	4-11	4-4
Axle, steering.....	4-78	4-69
Axle shafts.....	4-96	4-88
Battery and cables	4-46	4-38
Belt, drive	4-67	4-61
Bleeding brakes	4-89	4-81
Brake master cylinder	4-10	4-4
Brake, parking	4-92	4-86
Breathers:		
Axle.....	4-95	4-88
Hydraulic reservoir	3-18	3-9
Carburetor	4-58	4-55
Carriage, backrest and forks	4-36	4-22
Coil, ignition.....	4-55	4-52
Controls and instruments	2-2	2-1
Cowls	4-25	4-12
Cluster cylinder.....	4-38	4-27
Crankcase ventilation.....	4-62	4-58
Cylinder head.....	4-82	4-71
Cylinder, cluster.....	4-38	4-27
Cylinder, lift	4-39	4-30
Cylinder, steering.....	4-76	4-69
Cylinder, tilt	4-37	4-25
Depositing a load	2-9	2-7
Description	1-8	1-1
Differences in models.....	1-10	1-5
Differential	4-95	4-88
Dismantling for movement	4-3	4-4
Distributor.....	4-53	4-47
Drag link.....	4-75	4-67
Drive axle.....	4-11	4-4
Drive belt	4-67	4-61
Drive shaft	4-94	4-87
Engine assembly	3-14	3-7
Engine crankcase	4-14	4-5
Engine oil filter.....	4-13	4-4
Fan	4-68	4-61
Filters:		
Engine oil.....	4-13	4-4
Fuel	4-61	4-58
Hydraulic oil.....	4-43	4-33
Transmission oil.....	4-98	4-89

	Paragraph	Page
Floor and toe plates	4-27	4-4
Front wheel	4-85	4-76
Maintenance	4-64	4-60
Service	3-11	3-6
Fuel tank.....	4-65	4-60
Governor	4-59	4-57
Grille and screen	4-28	4-14
Headlight	4-47	4-39
Horn	4-48	4-41
Hydraulic filter and reservoir.....	4-9	4-4
Hydraulic filter element indicator	3-17	3-8
Hydraulic lines and fittings	4-34	4-20
Hydraulic reservoir:		
Removal	4-44	4-35
Service.....	3-18	3-9
Indicators:		
Air cleaner.....	3-10	3-5
Hydraulic filter	3-17	3-8
Ignition timing	4-53	4-47
Indicator, hydraulic filter.....	4-42	4-31
Inspecting and servicing the equipment.....	4-1	4-1
Installation of separately packed components	4-2	4-2
Instrument panel:		
Maintenance.....	4-32	4-15
Service.....	3-9	3-5
Interference suppression components	4-20	4-10
Lamps:		
Headlight.....	4-47	4-39
Rear light	4-47	4-39
Lift chains	4-35	4-20
Lifting and transporting a load.....	2-8	2-5
Linkage, accelerator.....	4-63	4-59
Linkage, parking brake.....	4-91	4-83
Lubrication instructions, operator:		
Detailed.....	3-2	3-1
General.....	3-1	3-1
Lubrication instructions, organizational.....	4-8	4-4
Manifolds.....	4-81	4-71
Maintenance repair parts.....	4-7	4-4
Mast assembly.....	4-40	4-30
Master cylinder	4-90	4-82
Moving the truck	2-7	2-1
Muffler:		
Maintenance.....	4-72	4-65
Service.....	3-13	3-6
Oil filter, transmission	4-98	4-89
Operator	2-3	2-1
Operation in:		
Extreme heat.....	2-11	2-8
Extreme cold	2-12	2-8
Sandy or dusty areas	2-14	2-8
Damp tropical areas.....	2-14	2-8
Orientation.....	1-9	1-5
Overhead guard	4-23	4-10
Parking brake	4-92	4-86
Parking brake lever	4-91	4-83
Parking brake linkage.....	4-91	4-83
Pedal, accelerator	4-63	4-59
Pedal, brake	4-87	4-78
Pipes, muffler	4-72	4-65

	Paragraph	Page
Preventive maintenance:		
Operator's	3-4	3-1
Organizational	4-16	4-5
Pump, fuel	4-60	4-57
Pump, water	4-68	4-61
Radiator:		
Maintenance	4-69	4-62
Service	3-12	3-6
Rear light	4-47	4-39
Rear wheel	4-85	4-76
Records	1-2	1-1
Reinstallation after movement	4-4	4-4
Reservoir, hydraulic	4-44	4-35
Scope	1-1	1-1
Seat assembly	4-30	4-14
Sending units	4-50	4-43
Service brake pedal	4-4-87	4-78
Service brake linkage	4-87	4-78
Service brakes	4-88	4-78
Service transmission	4-101	4-92
Shafts, axle	4-96	4-88
Shaft, drive	4-94	4-87
Side panels	4-26	4-13
Single lift cylinder	4-39	4-30
Spark plugs	4-54	4-52
Special tools and equipment	4-6	4-4
Starter	4-52	4-46
Starting	2-4	2-1
Stopping	2-5	2-1
Switch, neutral start	4-100	4-92
Switch, stoplight	4-47	4-39
Tabulated data	1-9	1-5
Tank, fuel	4-65	4-60
Tie rods	4-75	4-67
Tilt cylinders	4-37	4-25
Tuning, ignition	4-53	4-47
Tools and equipment	4-5	4-4
Transmission	3-16	3-8
Transmission control lever	4-99	4-90
Transmission linkage	4-99	4-90
Transmission service	4-101	4-92
Troubleshooting:		
Operator's	3-6	3-2
Organizational	4-18	4-7
Valve, control	4-52	4-46
Valves, engine	4-83	4-74
Water pump	4-68	4-61
Wheel cylinder, brake	4-89	4-81
Wheel, steering	4-77	4-69
Wheels:		
Drive	4-85	4-76
Steer	4-85	4-76
Wiring	4-49	4-43

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