
DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL
MAINTENANCE MANUAL
TRUCK, LIFT, FORK, EMD, SOLID RUBTER
TIRED WHEELS, 2000 LBS CAPACITY, 144 IN LIFT
ARMY MODEL MHE 219
ALLIS CHALMERS MODEL FE20-24EE
FSN 3930-151-4432

This copy is a reprint which includes current
pages from Changes 1,3 and 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY
JUNE 1971

WARNING

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

Make sure fire extinguisher (Class BC) is on the truck.

USE EXTREME CARE WHEN HIGH TIERING: Position elevated load, with slight back tilt of mast, directly over loading spot then tilt mast forward to stack.

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

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

Avoid sudden starting and stopping. Reduce speed on turns. Know the rated capacity of the truck and do not overload it. Never pick up a load until certain it can be carried safely. Make sure the load is steady before lifting and keep the load against the carriage back rest.

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

Do not butt loads with the forks or with the rear of the truck.

Make sure forks are lowered to the ground and parking brake is properly engaged.

If the truck is parked on an incline, set brakes and block at least two wheels in the event of parking brake failure.

CHANGE

No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 28 December 1989

Operator's and Organizational Maintenance Manual

TRUCK, LIFT, FORK, EMD, SOLID RUBBER TIRED WHEELS,
2000 LBS CAPACITY, 144 IN. LIFT,
ARMY MODEL MHE-219
(ALLIS CHALMERS MODEL FE20-24EE AND
ALLIS CHALMERS MODEL ACE20-24EE)
NSN 3930-00-151-4432

TM 10-3930-628-12, 10 June 1971, is changed as follows:

Cover and page i. The manual title is changed to read as shown above.

Warning page. The following is added after the second sentence. "If battery is received with metal cover, remove and discard metal cover and install battery."

"Do not use the same hydrometer to check specific gravities of the nickel/iron, nickel/cadmium, or lead-acid batteries. Mixing of the slightest amounts of different electrolytes will damage the battery."

Page ii, List of Illustrations.

Number 1-3. Change "Wiring diagram" to "Wiring diagram, model FE20-24EE".

Delete entry for number 4-11.

Delete entry for number 4-12.

Add number 4-16.1, Brake pedal assembly and related parts, exploded view, page 4-18".

Number 4-31. Change "exploded view" to "installed view".

Number 4-32. Change "installed view" to "exploded view".

Add number "4-40, Lift cylinder assembly, removal and installation, page 4-37".

Page 1-1.

Paragraph 1-2c is superseded as follows:

c. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA Pam 738-750.

Paragraph 1-id is superseded as follows:

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

Paragraph 1-3.1 is added after paragraph 1-3.

1-3.1. Destruction of Army Materiel to Prevent Enemy Use

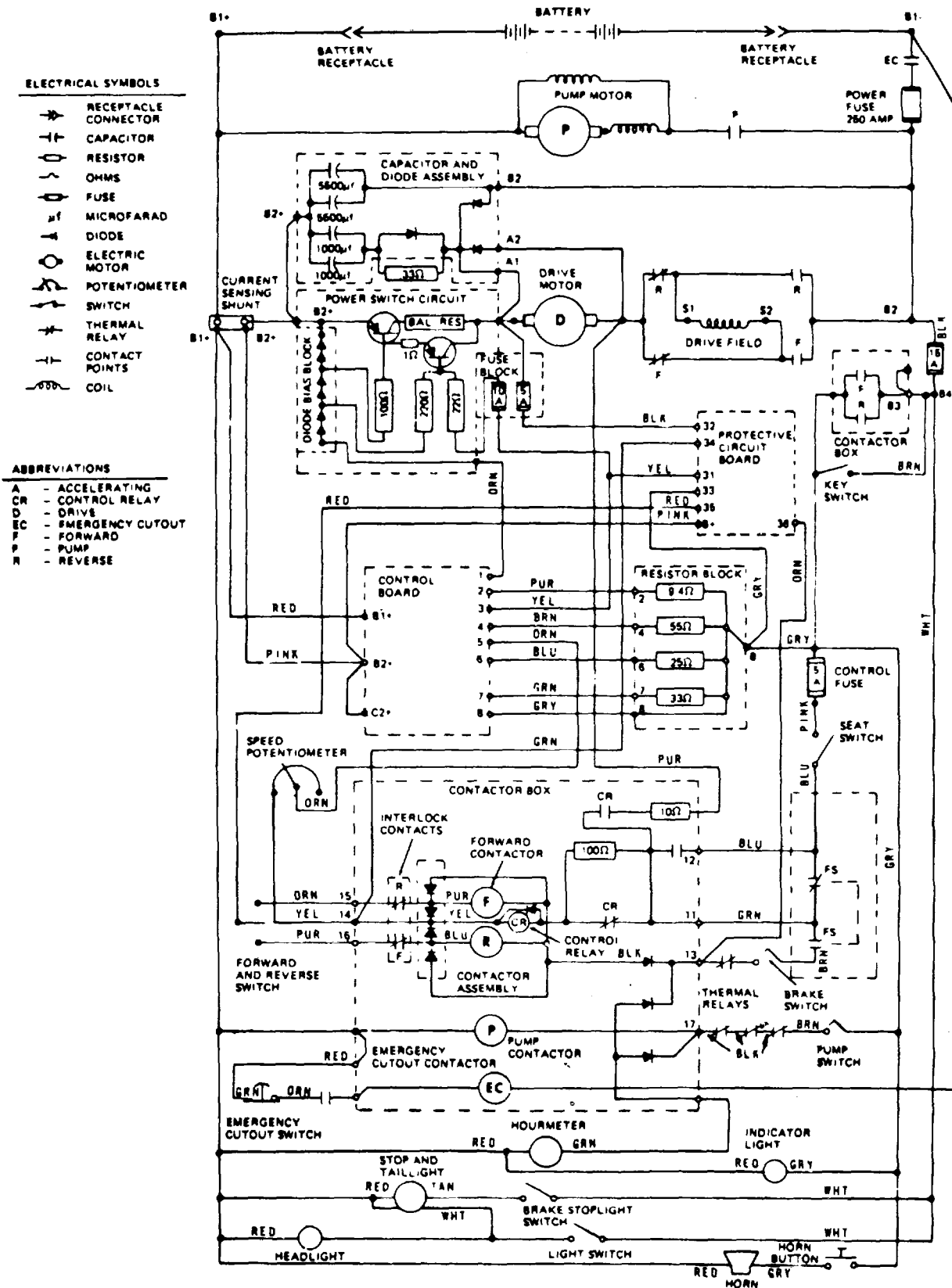
Procedures to be used for destruction of U.S. Army Tank-Automotive equipment to prevent enemy use are in TM 750-244-6.

Page 1-5. Figure 1-3 is superseded as shown on the following page.

Page 2-1.

Paragraph 2-1b, second sentence. "Pay particular attention to sheet metal panels and controls and instruments." is rescinded.

*This change supersedes C2, 28 November 1972.



ME 3930-628-12/1-3 C2

Figure 1-3. Wiring diagram, model FE20-24EE

Paragraph 2-le and Warning are superseded as follows:

Warning: If battery is received with metal cover, remove and discard metal cover and install battery.

Warning: When servicing battery, do not smoke or use flame in the vicinity. Batteries generate hydrogen, a highly explosive gas. Do not use the same hydrometer to check specific gravities of the nickel/iron, nickel/cadmium, or lead-acid batteries. Mixing of the slightest amounts of different electrolytes will damage the battery.

e. Check battery to determine type battery installed. For lead-acid type batteries, fill battery with electrolyte to 5/8 inch above the plates. For lead-acid or nickel/iron batteries, check specific gravity of electrolyte as prescribed in TM 10-6140-200-14. Use battery charger, NSN 6130-00-500-0069, 36 volts to 60 volts, 160 amp, 230 volts ac, metallic rectifier type, alternating operating power, when charging lead-acid or nickel/iron batteries.

Page 2-2. Paragraph 2-5 is rescinded.

Page 2-4. Paragraph 2-9a(2) is rescinded.

Page 2-9, paragraph 2-13f, second sentence. "Avoid sharp turns at too high of a speed, which could cause load to slip off or tip truck." is rescinded.

Page 2-11. Paragraph 2-17b(4) is rescinded.

Page 3-2, Table 3-1. Add the following:

Item number: "11" Interval: "B" and "A" Item to be Inspected: "Power switch modules"; Procedure: "Open swing-out door located on the left side of the truck frame. Visually inspect each of the power switch modules for physical damage to the heat sinks, printed circuit board, and components. Report all problems to organizational maintenance."

Page 3-3. Paragraph 3-8. Add the following Warning before subparagraph a.

Warning: When servicing battery, do not smoke or use flame in the vicinity. Batteries generate hydrogen, a highly explosive gas. Do not use the same hydrometer to check specific gravities of the nickel/iron, nickel/cadmium, or lead-acid batteries. Mixing of the slightest amounts of different electrolytes will damage the battery.

Page 4-1, paragraph 4-ib(3), line 2. Change "4-22" to "4-25".

Page 4-2, Table 4-1.

Item number 3. Delete "X" in W column and add "X" in M column.

Item number 6. In reference column, change "4-35" to "4-34".

Page 4-3, Chart 4-1, item *le*. In corrective action column, change "(para 4-34)" to "(para 4-35)".

Page 4-4, Chart 4-1.

Item 9a. In corrective action column, change "(para 4-35)" to "(Para 4-34)".

Following item 14, item 15 is added.

Malfunction	Probable Cause	Corrective Action
15. Oil leaking from reservoir breather.	a. Reservoir overfull. b. Control linkage improperly adjusted.	a. Drain reservoir to proper level. b. Adjust control linkage (para 4-52).

Page 4-11, paragraph 4-25b(3)(c), fourth sentence. Change "TM 9-6140-200-15" to "TM 10-6140-200-14".

Page 4-13. Paragraph 4-29 and figure 4-11 are rescinded.

Page 4-14. Paragraph 4-30b and figure 4-12 are rescinded.

Page 4-15. Add paragraph 4-30.1 as follows:

4-30.1. Forward and Reverse Control Switch

a. Removal.

- (1) Remove instrument panel and cover.
- (2) Drive out spring pins from tube which connects forward and reverse control lever to switch shaft. Remove lever and tube.

(3) Remove three screws and lockwashers holding switch box assembly to top of instrument panel.

(4) Pull switch box assembly out of panel compartment. Tag and disconnect wires from switch terminals. Remove switch assembly from box.

b. Installation.

(1) Place switch assembly into switch box. Connect wires to switch terminals and secure with nuts.

(2) Align three holes in switch upper plate with those in box and top of instrument panel. Install three screws and lockwashers, and tighten securely.

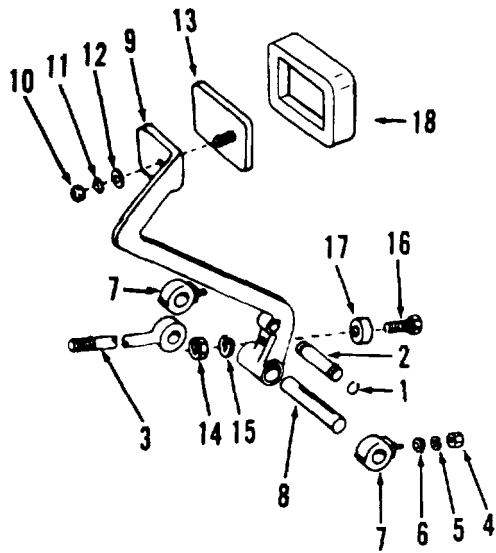
(3) Install control lever and tube on switch shaft and drive in two spring pins.

(4) Install instrument panel cover.

Page 4-18. Add paragraphs 4-33c through 4-33g as follows:

c. Removal.

- (1) Remove floor plates and toe plate.
- (2) Remove retaining rings (1, fig. 4-16.1).



TA501731

- | | |
|-------------------|----------------------|
| 1. Retaining ring | 10. Nut |
| 2. Shaft | 11. Lockwasher |
| 3. Rod | 12. Washer |
| 4. Nut | 13. Support assembly |
| 5. Lockwasher | 14. Nut |
| 6. Washer | 15. Lockwasher |
| 7. Bearings | 16. Screw |
| 8. Pivot pin | 17. Bumper |
| 9. Brake pedal | 18. Pad |

Figure 4-16.1. Brake pedal assembly and related parts, exploded view.

(3) Remove shaft (2) to free pedal (9) from master cylinder rod (3).

(4) Remove nuts (4), lockwashers (5), and washers (6). Remove pillow block bearings (7) from pivot pin (8).

(5) Drive pivot pin (8) from pedal (9).

d. *Disassembly.* Refer to figure 4-16.1 and disassemble pedal as follows:

(1) Remove nut (10), lockwasher (11), washer (12), support assembly (13), and pad (18).

(2) Remove nut (14), lockwasher (15), screw (16), and bumper (17) only if replacement is necessary,

e. *Inspection.* Inspect all parts for damage and wear. Replace defective parts as authorized.

f. *Assembly.* Refer to figure 4-16.1 and assemble brake pedal in reverse order of disassembly.

g. *Installation.* Refer to figure 4-16.1 and install brake pedal as follows:

(1) Install pivot pin (8) in pedal (9).

(2) Install bearings (7) on pin (8).

(3) Install assembly in truck with nuts (4), lockwashers (5), and washers (6).

(4) Align cylinder rod (3) with pedal hole and install shaft (2).

(5) Install retaining rings (1).

(6) Adjust (para 4-33b) and lubricate (LO 10-3930-628-12) linkage.

Page 4-27, paragraph 4-44c, first sentence. Change "right front" to "left front".

Page 4-29. Paragraph 4-50 is superseded as follows:

4-50. Hydraulic Reservoir Breather Element

a. *Removal.*

(1) Remove floor plate and toe plate.

(2) Refer to figure 4-29 and remove element screw from top of breather.

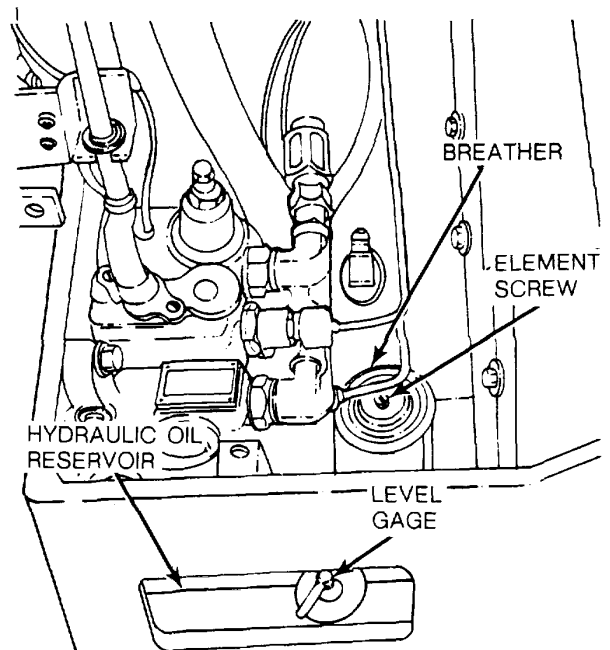


Figure 4-29. Hydraulic oil reservoir and breather, installed view

(3) Refer to figure 4-30 and remove breather cap and element form inside of breather

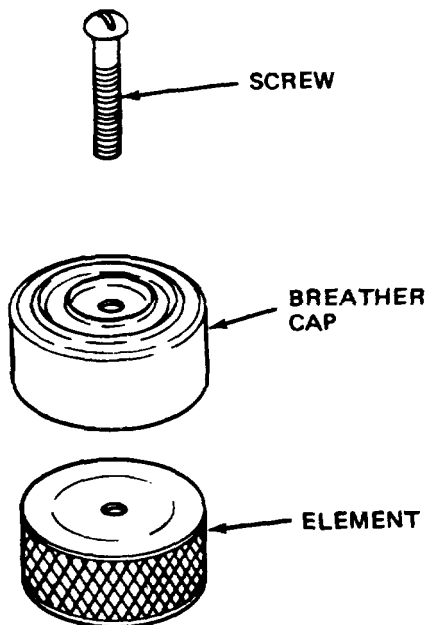


Figure 4-30. Hydraulic reservoir breather, exploded view.

b. *Cleaning and Inspection.* Clean the filter with hydraulic oil or with a reverse flow of compressed air. If element cannot be cleaned or is damaged, replace element.

c. *Installation.* Install the hydraulic oil breather element as follows:

(1) Install filter element (fig. 4-30) in breather, and secure with breather cap and element screw.

(2) Check oil level on level gage (fig. 4-29). Add oil (OE) to bring level to FULL mark on gage.

d. *Assembly.* Install floor and toe plates on truck to cover reservoir.

Page 4-30.

Paragraph 4-51b, third sentence. Change figure 4-31" to "figure 4-32".

Paragraph 4-51c, second sentence. Change "figure 4-32" to "figure 4-31".

Paragraph 4-51c(2). Change "(4, fig. 4-31)" to "(4, fig. 4-32)".

Page 4-31, Figure 4-31. The caption is changed to read "Hydraulic filter, installed view."

Page 4-32.

Paragraph 4-51d(1). Change "(4, fig. 4-32)" to "(4, fig. 4-31)".

Paragraph 4-51d(2). Change "(fig. 4-31)" to "(fig 4-32)".

Paragraph 4-51d(3). Change "(fig. 4-23)" to "(fig. 4-31)".

Figure 4-32. The caption is changed to read "Hydraulic filter, exploded view."

Page 4-33.

Paragraph 4-52b, first sentence. Change "figure 4-32" to "figure 4-31".

Paragraph 4-52c(1). Change "(fig. 4-32)" to "(fig. 4-31)".

Second paragraph 5-52d is superseded as follows:

e. *Control Lever Replacement.* Refer to figure 4-31 and replace control lever as follows:

Page 4-34.

Paragraph 4-53b(5). Change "self-locking nut" to "nut".

Figure 4-34. Change "SELF-LOCKING NUT" to "NUT".

Page 4-37. Add paragraph 4-56 as follows:

4-56. Lift Cylinder Assembly

a. *Removal.* To remove the cylinder cluster without removing the inner mast, refer to figure 4-40 and proceed as follows:

Caution: When disassembling or reassembling the cylinders, use extreme care to avoid damaging the finish of ram surfaces.

(1) Raise the inner mast (1) approximately 24 inches from the floor and block in this position.

(2) Remove the carriage as follows:

(a) Remove the screws and spacer from the carriage roller supports.

(b) Remove the carriage forks.

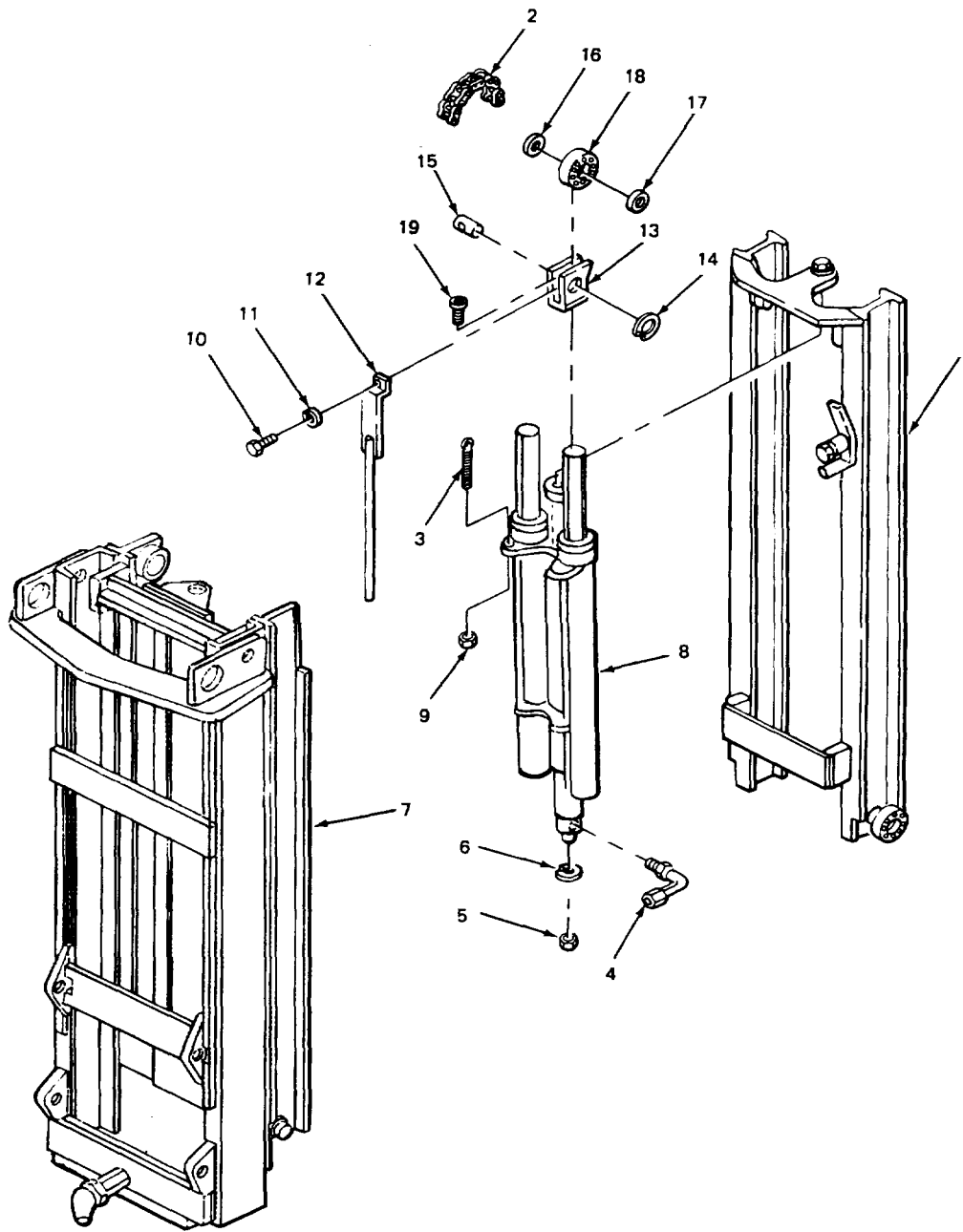
(c) Attach a hoist to the carriage, remove the chain anchor pins, and disconnect the chains (2) from the carriage.

(d) Lower the carriage out of the bottom of the inner mast.

(3) Disconnect the lift chains (2) from the chain anchors (3) on the top of the cylinder cluster and then remove chains through the bottom of the mast. Match-mark the nut positions in anchors.

(4) With the cylinders completely collapsed, disconnect the center cylinder of the cluster at the elbow (4).

(5) Remove the nut (5) and lockwasher (6) securing the cluster center cylinder to the intermediate mast (7).



- | | |
|----------------------|--------------------|
| 1. Inner mast | 11. Lockwasher |
| 2. Chains | 12. Chain guard |
| 3. Chain anchors | 13. Crosshead |
| 4. Elbow | 14. Shaft retainer |
| 5. Nut | 15. Bearing shaft |
| 6. Lockwasher | 16. Washer |
| 7. Intermediate mast | 17. Washer |
| 8. Cylinder cluster | 18. Bearing |
| 9. Nut | 19. Screw |
| 10. Screw | |

Figure 4-40. Lift cylinder assembly, removal and installation

(6) Using a hoist, carefully lift the cylinder cluster (8) from the intermediate mast (7).

(7) Remove the chain anchors (3) and nuts (9) from the cluster (8).

(8) Remove the screws (10), lockwashers (11), and chain guards (12) from the crossheads (13).

(9) Remove the bearing shaft retainer (14) and tap out the bearing shaft (15). Remove washers (16 and 17) and bearings (18) from the crossheads.

(10) Remove the screws (19) and crossheads (13) from the top of the cylinder cluster (8).

b. Installation. To install the cylinder cluster without installing the inner mast, refer to figure 4-40 and proceed as follows:

(1) Install the crossheads (13) on top of the cylinder cluster (8) and secure with screws (19).

(2) Install bearings (18), washers (16 and 17), and bearing shafts (15) in the crossheads (13), and secure the assemblies to crossheads with the bearing shaft retainer (14).

(3) Install the chain guards (12) on crossheads (13), with the rods through the holes in the cylinder brackets. Secure the guards to the crossheads with screws (10) and lockwashers (11).

(4) Using a hoist, carefully install the cylinder cluster (8) on the intermediate mast (7) and secure at the bottom with nut (5) and lockwasher (6).

(5) Attach the chains (2) to the chain anchors (3) and install the anchors and nuts (9), noting matchmark of previous adjustment.

(6) Run the chains (2) evenly around the bearings (18), allowing them to hang free.

(7) Connect tube center cylinder of the cluster (8) at the elbow (4).

(8) Using hoist, raise carriage into inner mast (1) and attach the chains (2) to the chain anchors (3).

(9) Lower the inner mast, and install the screws and spacer on carriage roller supports and carriage forks. Install and lock forks in position.

(10) Using the chain anchors (3) and nuts (9), adjust the carriage to 2 3/4 to 3 1/4 inches from the floor. Adjust both anchors to equal the chain tension.

(11) Check to see that the bleeder screws are loose. Operate the control valve to actuate the cylinders, and slowly raise and lower mast. When a clear, bubble free oil flow from bleeder screw hole is obtained, tighten the bleeder screws.

Page A-1.

Paragraph A-1. Change "TB 5-4200-200-10" to "TB 5-4200-200-100".

Paragraph A-2. Change the title of LO 10-3930-628-12 to "Truck, Lift, Fork, EMD, Solid Rubber Tired Wheels, 2000 lbs Capacity, 144 In. Lift, Army Model MHE-219 (Allis-Chalmers Model FE20-24EE and ACE20-24EE) NSN 3930-00-151-4432".

Paragraph A-3. Change "TM 9-213" to "TM 43-0139".

Paragraph A-5.

Change "TM 38-750" and its title to "DA Pam 738-750, The Army Maintenance Management System (TAMMS)".

"TM 9-6140-200-15" and its title are rescinded.

Add "TM 10-6140-200-14, Installation, Use, Maintenance, and Repair of Industrial Motive Power Storage Batteries for Materials Handling Equipment". Add "TM 10-3930-628-20P, Organizational Maintenance Repair Parts and Special Tools Lists, Truck, Lift, Fork, EMD, Solid Rubber Tired Wheels, 2000 lbs Capacity, 144 In. Lift, Army Model MHE-219 (Allis Chalmers Model FE20-24EE and Allis Chalmers Model ACE20-24EE) NSN 3930-00-151-4432".

Paragraph A-7. Change "TM 750-244-3" and its title to "TM 750-244-6, Destruction of Tank-Automotive Equipment to Prevent Enemy Use".

Page B-1 Appendix B is superseded as follows:

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 the various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application

of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. *Test.* To verify serviceability by measuring the mechanical, pneumatic, hydraulic, 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 (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. *Adjust.* To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. *Aline.* To adjust specified variable elements of an item to bring about optimum or desired performance.

f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. *Remove/Install.* To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace.* To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position of the SMR code.

i. *Repair.* The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles

and 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) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). 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 materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/ miles, etc.) considered in classifying Army equipment/components.

B-3. Explanation of Columns in the MAC, Section II

a. *Column 1, Group Number.* Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00."

b. *Column 2, Component/Assembly.* Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. *Column 3, Maintenance Function.* Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, see paragraph B-2.)

d. *Column 4, Maintenance Level.* Column 4 specifies, by the listing of a *work time* figure in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/ fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The

symbol designations for the various maintenance levels are as follows:

- C..... Operator or Crew
- O..... Organizational Maintenance
- F..... Direct Support Maintenance
- H..... General Support Maintenance
- D..... Depot Maintenance

e. *Column 5, Tools and Equipment.* Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support

equipment required to perform the designated function.

f. *Column 6, Remarks.* This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III

a. *Column 1, Reference Code.* The code recorded in Column 6, Section II.

b. *Column 2, Remarks.* This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
06 0607	ELECTRICAL SYSTEM <i>Instrument or Engine Control Panel</i> Switch, Push-Pull	Inspect Replace	0.1	0.2					
0608	Meter, Time Totalizing <i>Miscellaneous Items</i> Resistor, Fixed	Inspect Replace Test Replace	0.1	0.2	0.5 0.5				
0609	<i>Lights</i> Headlight, Truck	Inspect Replace Repair	0.1	0.4 0.2					
0611	Stoplight-Taillight <i>Horn, Siren</i> Horn Assembly	Inspect Replace Repair Test Replace	0.1	0.4 0.2 0.4					
0612	<i>Batteries, Storage</i>	Inspect Test Service Replace	0.1	0.2 0.2 0.4					
0613	<i>Hull or Chassis Wiring</i> Harness	Replace			1.0				
		9							

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
10 1000	FRONT AXLE <i>Front Axle Assembly</i>	Inspect		0.1					
		Service		0.3					
1002	<i>Differential</i>	Replace			4.0				
		Inspect			0.5				
		Service		0.2					
		Replace			4.0				
		Repair			8.0				
11 1100	REAR AXLE <i>Rear Axle Assembly</i>	Inspect		0.1					
		Adjust		2.0					
1104	<i>Steering, Sideshift, and Wheel Leaning Mecha- nism</i>	Replace			4.0				
	Pivot Arm and Spindles	Replace			6.0				
12 1201	BRAKES <i>Hand Brakes</i> Brake Shoe Set	Inspect		1.0					
		Adjust		1.0					
		Replace			2.0				
		Repair			3.0				
	Brake Drum	Inspect		1.0					
1202	<i>Service Brakes</i> Brake Shoes	Replace			2.0				
		Inspect		1.0					
		Replace		2.0					
1204	<i>Hydraulic Brake System</i> Wheel Cylinder	Inspect		1.0					
		Replace		2.0					
	Master Cylinder	Inspect		0.2					
		Service		0.1					
		Replace		0.5					
1206	<i>Mechanical Brake System</i> Pedal Assembly	Replace		1.8					
		Repair		1.8					
	Pad Assembly	Replace		0.1					
		10							

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
13 1311	WHEELS AND TRACKS <i>Wheel Assembly</i> Drive Wheel	Inspect Replace	0.1 0.5						
	Rear Wheel	Inspect Replace	0.1 0.5						
1313	<i>Tires, Tubes, Tire Chains</i> Tires, Solid Cushion	Inspect Replace	0.1 1.0						
14 1401	STEERING <i>Mechanical Steering Gear Assembly</i>								
	Wheel, Steering	Inspect Replace	0.1 0.5						
	Steering Gear Assembly	Service Adjust Replace	0.1 0.5	2.0					
	Tie Rod, Steering	Repair Adjust Replace	4.0 0.5	4.0					
	Drag Link, Steering	Repair Inspect Service Adjust Replace Repair	4.0 0.2 0.2	2.0					
15 1502	FRAME, TOWING AT- TACHMENTS, DRAW- BARS, AND ARTICULA- TION SYSTEMS <i>Counterweights</i>	Replace	1.0						
18 1801	BODY, CAB, HOOD AND HULL <i>Body, Cab, Hood, and Hull Assemblies</i> Guard, Assembly	Inspect Replace	0.1 0.1						
11									

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
1801	Body, Cab, Hood, and Hull Assemblies (Con't)								
	Cover, Battery Compartment	Inspect Replace	0.1	0.2					
1805	Floors, Subfloors, and Related Components Plates, Floor	Inspect Replace		0.1 0.2					
1806	Upholstery Seats and Carpets Seat, Vehicular	Inspect Replace Repair	0.1	0.4	0.4				
24	HYDRAULIC AND FLUID SYSTEMS								
2401	Pump and Motor Pump Assembly, Hydraulic	Inspect Test Replace Repair			0.1 1.0 2.0 4.0				
	Motor, Hydraulic Pump	Test Replace Repair			1.0 4.0 8.0				
2402	Manifold and/or Control Valves								
	Valve Assembly, Hydraulic Control	Inspect Test Replace Repair			0.5 1.0 1.6 2.5				
2403	Hydraulic Controls and/or Manual Controls Levers	Inspect Adjust Replace	0.1	0.4 2.0					
2404	Tilt Cylinders	Inspect Adjust Replace Repair	0.1	0.5 1.0	4.0				
		12							

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
2405	Mast Column Crosshead Cylinder Assembly, Lift	Replace Inspect Replace Repair	0.1		1.0 4.0 8.0				
	Fork, Lifting	Inspect Replace		0.1 0.2					
2406	Strainers, Filters, Lines and Fittings								
	Hose Assemblies, Nonmetallic Element, Filter, Fluid	Inspect Replace Replace	0.1	0.4 0.1					
2408	Liquid Tanks or Reser- voirs								
	Reservoir, Hydraulic Oil Breather	Replace Replace Repair			7.0 0.2 0.2				
40	ELECTRIC MOTORS AND GENERATORS								
4000	Major Assemblage: Mo- tor Generator and Rotat- ing Exciter Assemblies								
	Drive Motor	Replace			8.0				
4001	Rotor Assemblies								
	Armature, Motor	Replace			2.0				
4003	Brush Holders Brush, Electrical Contact	Inspect Replace			1.0 2.0				
	Holder, Electrical Contact	Inspect Replace			1.0 2.0				
4004	Ventilating System Fan, Armature	Replace			0.3				
4005	Frame Support and Housing, Drive Motor	Replace			1.0				
		13							

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
4009	Control Panels, Housing, Cubicles Mounting Plate, Control Board	Replace			0.3				
4010	Master or Auxiliary Con- trol Assembly								
	Switch, Electrical Power	Inspect Replace Repair	0.1		0.4 1.5				
	Fuse, Cartridge	Replace		0.1					
	Contacts, Electrical	Inspect Replace			1.0 2.0				
	Diode and Capacitor	Test Replace Repair			4.0 2.0 1.0				
	Shunt Assembly	Inspect Replace Repair			1.0 2.0 1.0				
	Printed Circuit Board	Replace Repair			4.0		4.0		
	Protective Circuit Board	Replace Repair			2.0		4.0		
4012	Switches Emergency Cutout Switch	Replace		1.0					
	Forward and Reverse Switch	Replace Repair		1.0	1.0				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Not Applicable.

Section IV. REMARKS

Not Applicable.

Page C-4. In column (4), the three entries of "6 pt." Are changed to "5 pt."

Page I-1.

Change "Breather, hydraulic reservoir" to "Breather element, hydraulic reservoir".

Delete entries for "Contact relay: Installation, Removal, and Repair".

Following *Cylinders, hydraulic*;, add "Lift, paragraph 4-56, page 4-37".

Add "E" and "Element, hydraulic reservoir breather, paragraph 4-50, page 4-29".

Add "Forward and reverse switch, paragraph 4-30.1, page 4-15".

Change "Hydraulic reservoir breather" to "Hydraulic reservoir breather element".

Following *Inspection, electrical components*;, delete entry for "Brushes, motor".

Add "Lift cylinder assembly, paragraph 4-56, page 4-37".

Page 1-2.

Following *Service brake system: Bleeding*, add "Pedal and linkage, paragraph 4-33, page 4-18".

Following *Switches: Brakes*, add ^{Forward} and reverse, paragraph 4-30.1, page 4-15".

By Order of the Secretary of the Army:

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

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25F-R (Block Nos. 2131 and 2132) Operator and Unit maintenance requirements for Fork Lift, 2000 LB Capacity, Solid Tire (Model MHE-219). (Cumulative).

Changes in force: C1, C2, and C3

CHANGE &
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C, 3 April 1974

**Operator's and Organizational
Maintenance Manual
TRUCK, LIFT, FORK, EMD, SOLID RUBBER
TIRED WHELLS, 2000 LBS. CAPACITY, 144 IN. LIFT
ARMY MODEL MHE-219
ALLIS CHALMERS MODEL FE20-24EE
ALLIS CHALMERS MODEL ACE 20-24EE
FSN 3930-151-4432**

TM 103930-62812, 10 June 1971, is changed as follows:

The title is changed to read as shown above. *Page ii A* List of illustrations is added in numerical sequence as follows:

- 1-3.1 Wiring diagram, model ACEM24EE
- 2-2.1 Controls and instrument, model ACE20-24EE
- 2-4.1 Starting the truck, model ACE2-24EE
- 2-5.1 Truck stopping instructions/, model ACE20-24EE
- 4-1.1 Instruments removal and installation model ACE20-24E
- 4-28.1 Hydraulic system schematic diagram, model ACE202EEK
- 4-31.1 Indicator valve and hoses, exploded view, model
- 4-32.1 Hydraulic filter, installed view, model ACE-224EE

Page 1-1. Paragraph 1-1 is superseded as follows:

1-1. Scope

a. These instructions are published for the use of personnel to whom the Allis Chalmers Fork Lift Trucks Models ACE20-24EE and FE20-24EE, MHE-219, Federal stock number 390-151-4432 is issued. They provide information on the 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

Paragraph 1-4 is superseded as follows:

1-4. Description

a. The Army Model MHE-219 (Allis Chalmers Models ACE20-24EE and FE20-24EE) are nontactical fork lift trucks (fig. 1-1 and 1-2) designed for

warehouse operations. The truck can be used to load, transport, unload and stack loads weighing as much as 2,000 pounds at a 24-inch load center. (The load center is measured from the heel of the fork.)

Paragraph 1-2d is superseded as follows:

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

Page 1t paragraph 1-Sa is superseded as follows:

a. *Lift Truck.*

Make	Al Chalmers
Model	ACE224EE and FE202EE
Army model	MH219

Page 1-4 paragraph 1-Sh is superseded as follows:

h. *Wiring Diagram.* Refer to figure 1-3 and 1-3.1 for the wiring diagram for the fork lift trucks

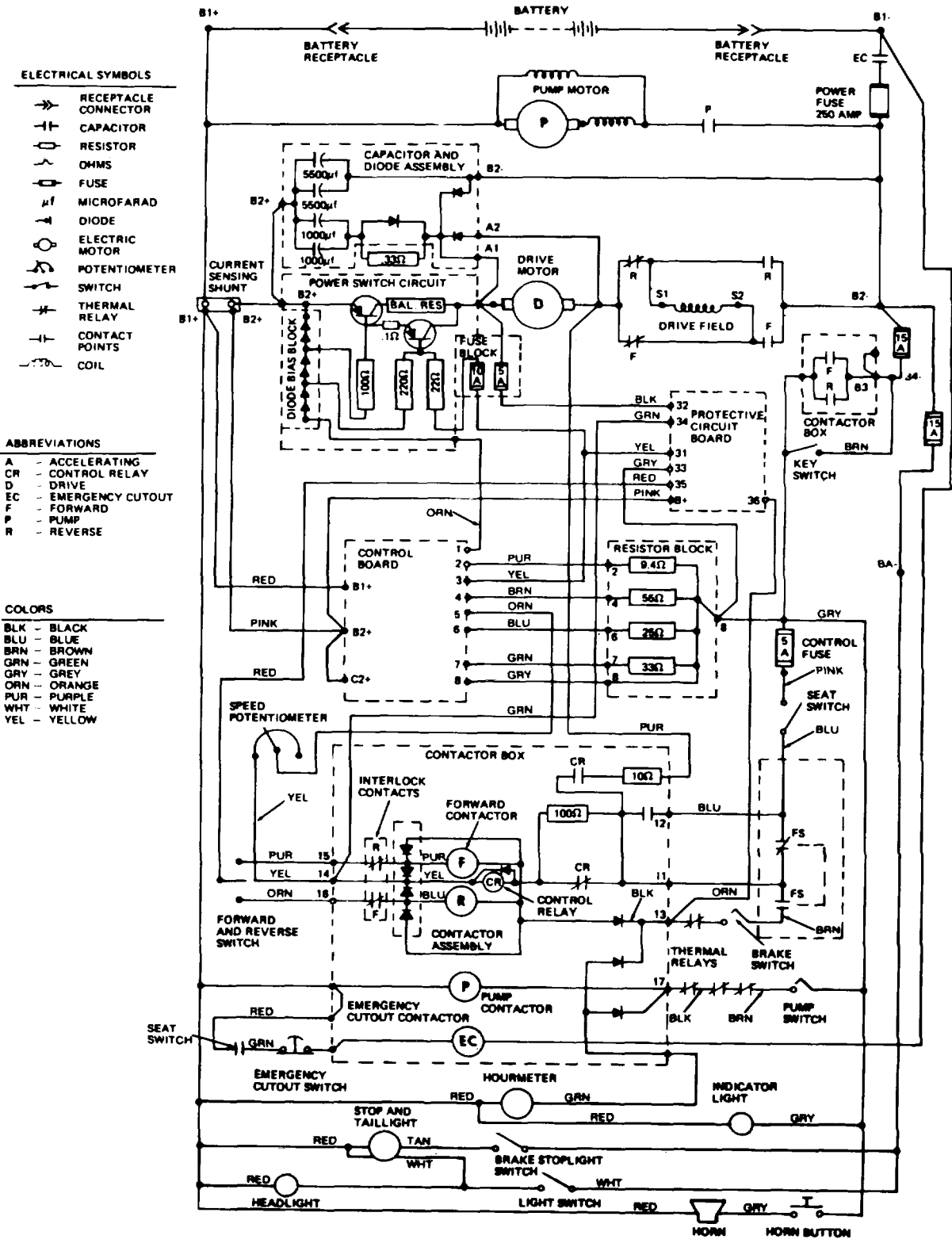
Paragraph 1-5f is superseded as follows:

f. *Battery*

Voltage	36
Polarity	Negative to main fuse
Battery FSN.....	614116296
Battery charger.....	A1
Acid, sulfuric, (l gal).....	8124993

Page 1-5. The caption under figure 1-3, Wiring diagram, is changed to "Figure 13. Wiring diagram, model FE20-24EE"

Figure 1-3.1 Is added after figure 1.



ME 3930-628-12/1-3.1 C3

Figure 1-3.1. Wiring, diagram model ACE20-24EE.

Page 1-6. Paragraph 14 is superseded as follows:

1-6 Difference Between Modes

No major differences exist between the models ACE20-24EE and the FE2024EE Army model MHE-219, 2000-Pound Fork Lift Trucks. *Page 2-2.* Paragraph 27 is superseded as follows:

2-7. Controls and Instruments

a. Model FE20-24EE. Refer to figure 2-2 and 2-3 for the purpose, normal reading, and location of the controls and instruments for the model FE20-24EE Fork Lift Truck

b. Model ACE224EE. Refer to figure 2-2.1 and 2-3 for the purpose, normal reading, and location of the

controls and instruments for the model ACE20-24EE Fork Lift Truck

Page 2-. The caption under figure 2-2, Controls and instruments is changed to "Figure 2-2. Controls and instruments, model FE20-24EE."

Immediately after figure 2-2, figure 2-2.1 is added. *Page 2-4.* Paragraph 29b is superseded as follows:

b. Starting

(1) Refer to figure 2-4 for starting the model FE20-24EE Fork Lift Truck

(2) Refer to figure 2-41 for starting the model ACE20-24EE Fork Lift Truck.

Page 2-5. The caption under figure 2-4, Starting the truck, is changed to "Figure 24 Starting the truck, model FE20-24EE"

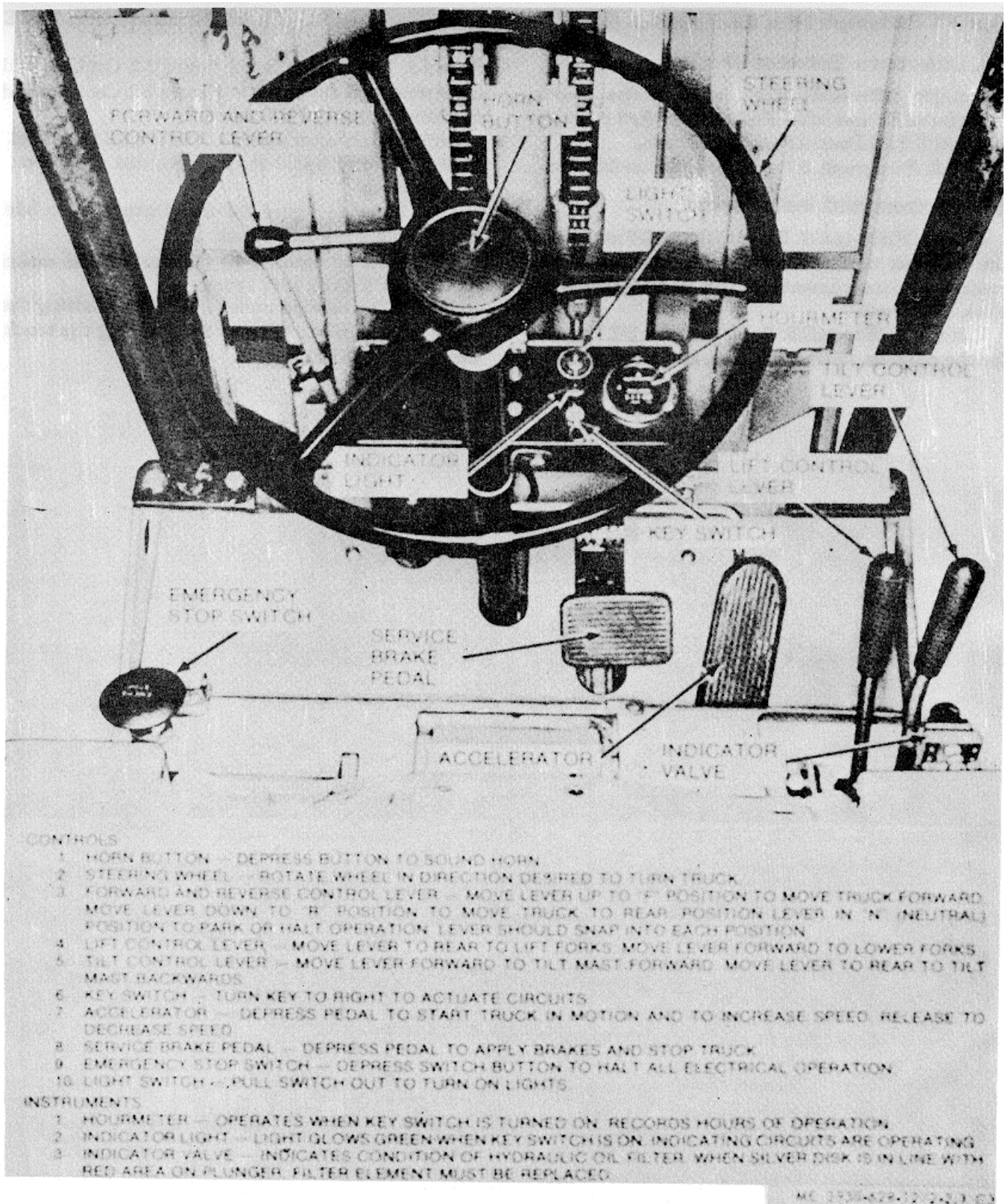


Figure 2-4.1. Starting the truck, model ACE20-24EE..

Immediately after figure 2-4. Figure 2-4.1 is added as follows

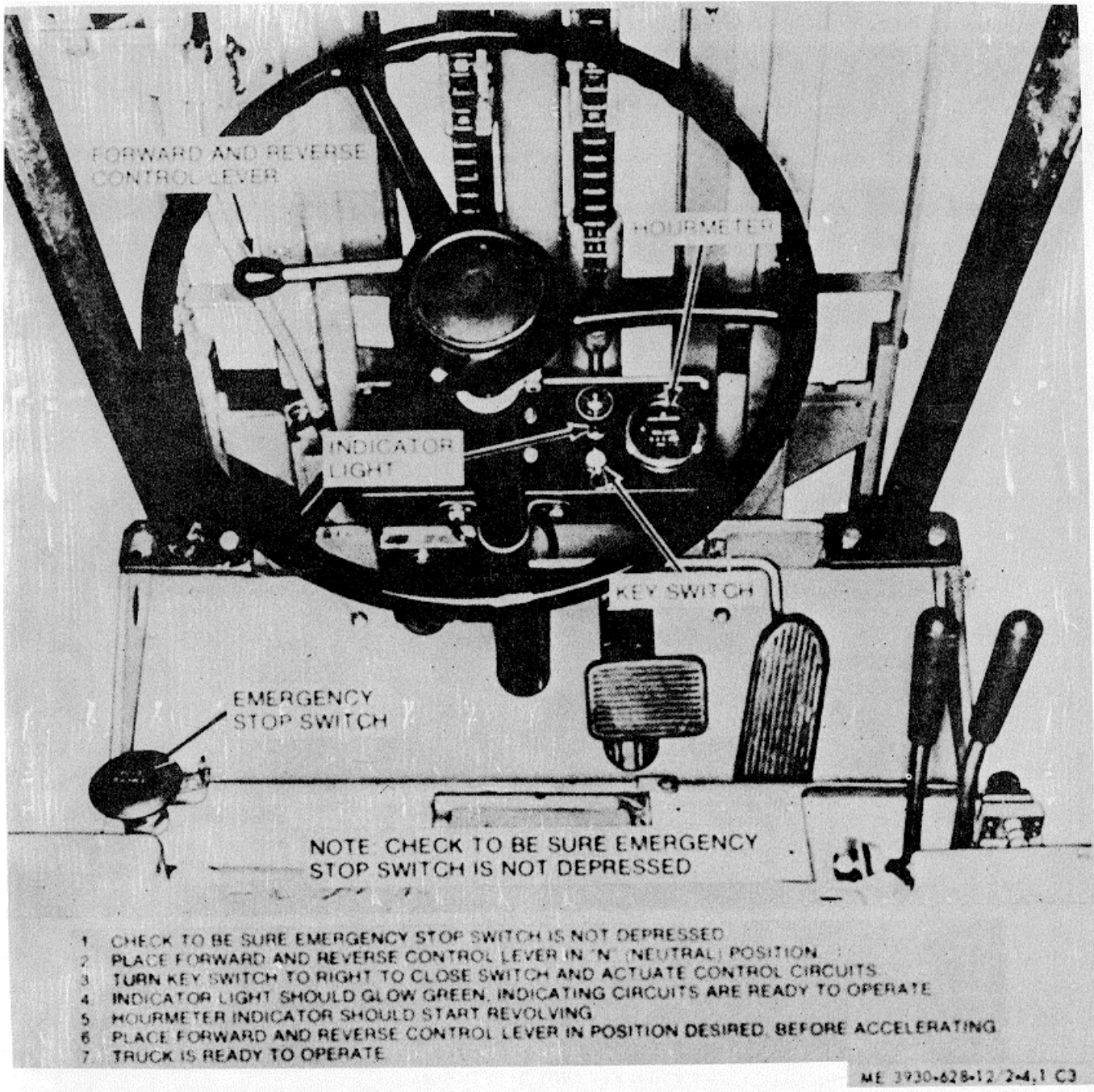


Figure 2-4.1. Starting the truck, model ACE20-24EE

Page 2-6. The caption under figure 2-5, Truck Stopping Instructions, is changed to "Figure 2-5. Truck stopping instructions, model FE20-24EE."

Immediately after figure 2-5, figure 2-5.1 is added as follows:

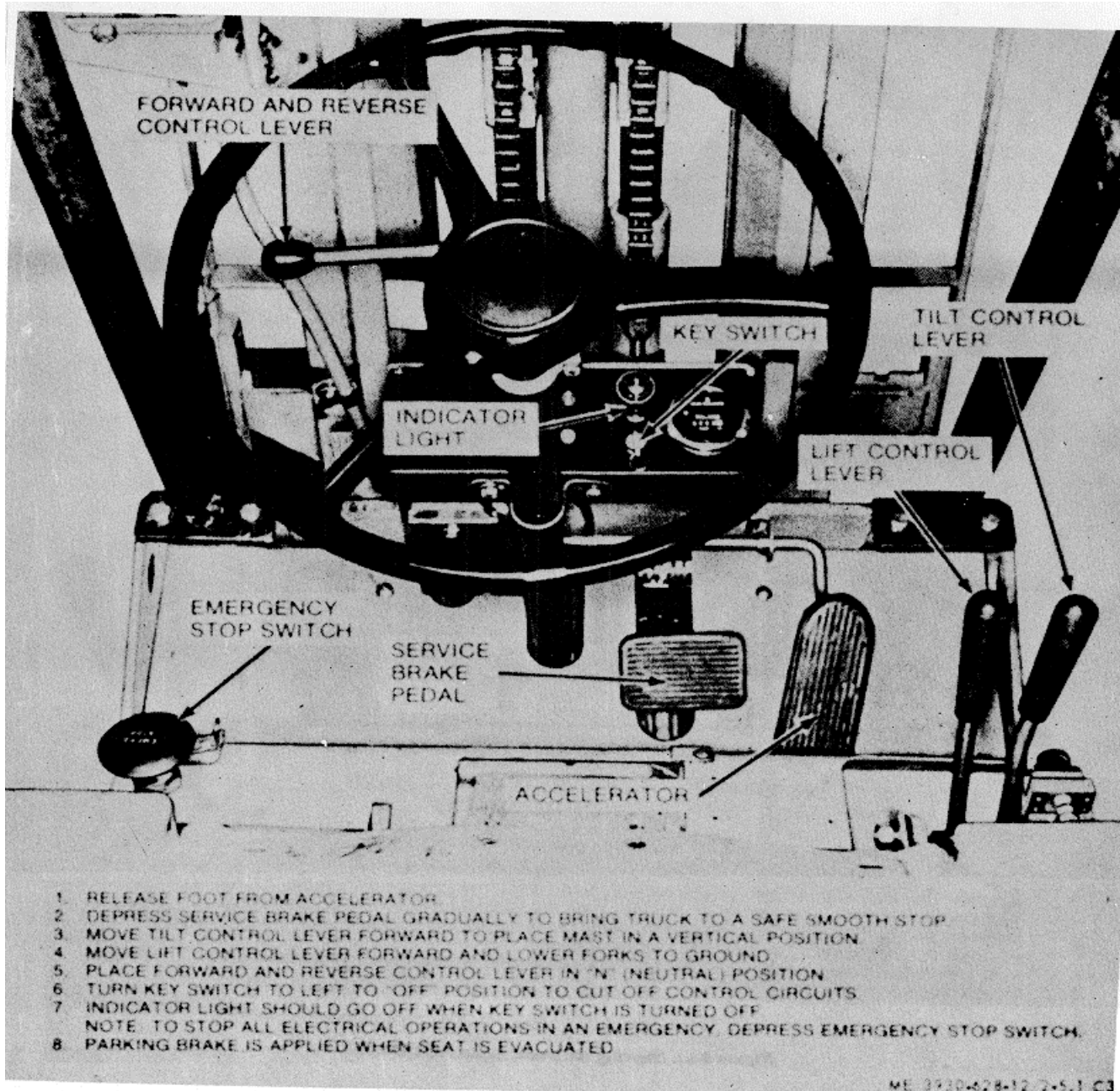


Figure 2-5.1. Truck stopping instructions, model ACE20-24EE.

Page 4-5. Paragraph 420 is superseded as follows:

4-20. Instruments.

a. Removal Remove the sheet metal or plastic cover to gain access to the instruments

(1) Refer to figure 4-1 for the removal of instruments for the model FE20-24EE Truck

(2) Refer to figure 4-1.1 for the removal of instruments for the model ACE20-24EE Truck.

b. Lamp Replacement.

(1) Refer to figure 41 to replace the indicator light for the model FE20-24EE Truck Remove the Lens, remove the lamp from the socket, and install a new lamp.

(2) Refer to figure 41.1 and replace the indicator lamp in the model ACE20-24EE Truck in a similar manner.

c. Installation.

(1) Refer to figure 4-1 and install the instruments on the model FE20-24EE.

(2) Refer to figure 4-1.1 and install the instruments on the model ACE20-24EE Truck. The caption under figure 4-1, Instruments, Removal and Installation, is changed to "Figure 4-1. Model FE20-24EE instruments, removal and installation." Immediately after figure 4-1, figure 4-1.1 is added as follows:

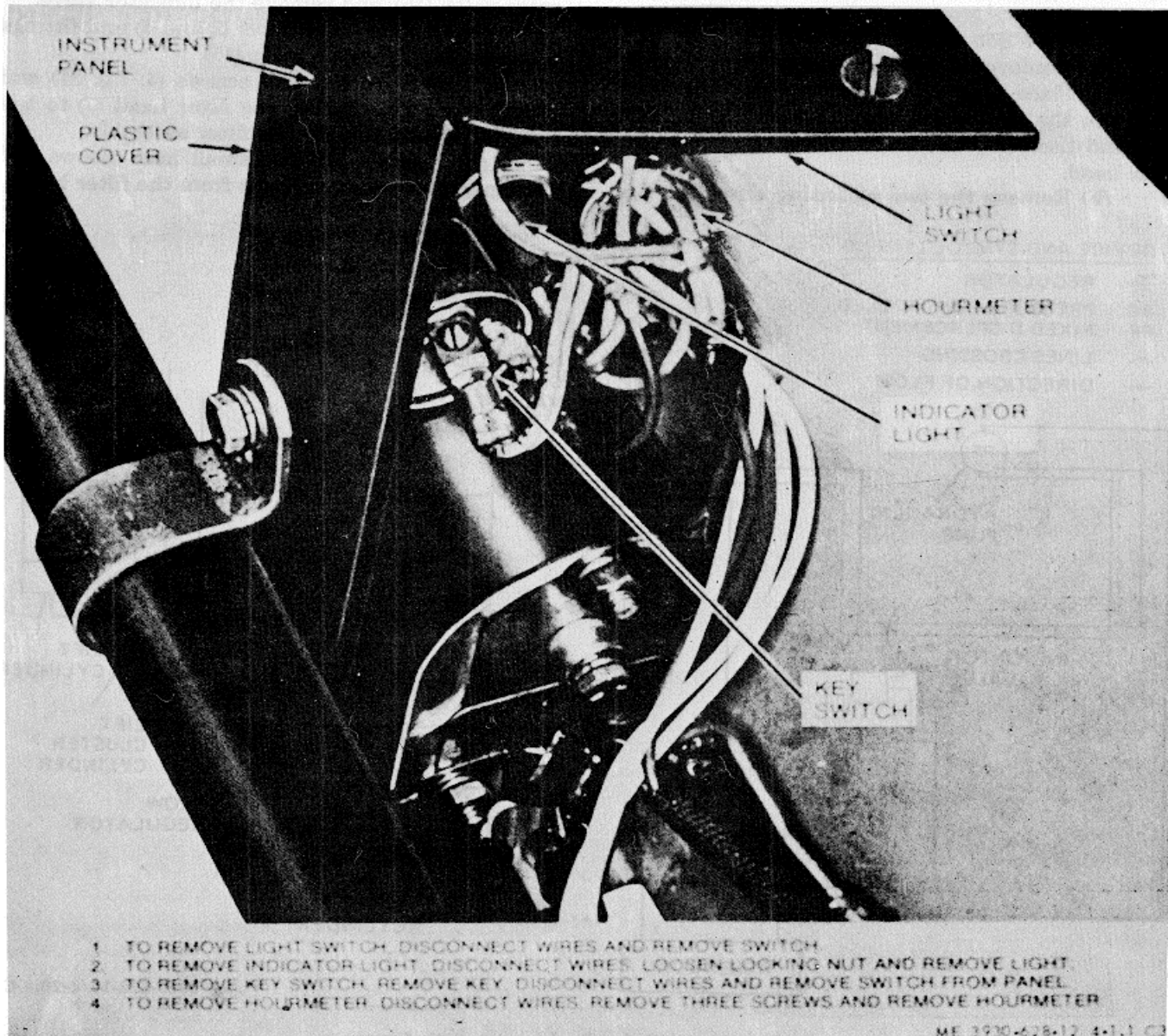


Figure 4-1.1 Instruments, removal and installation, model ACE20-24EE.

Page 4-28. Paragraph 4-49a lines 2 and 3, reference to figure 4-28 is deleted.

Paragraph 4-49b is superseded as follows:

b. Refer to figure 428 for a hydraulic system schematic diagram for the model FE20-24EE Truck and figure 4-28.1 for the model ACE 20-24EE Truck.

The caption under figure 4-28, Hydraulic system schematic diagram, is changed to "Figure 4-28. Hydraulic system schematic diagram, model FE20-24EE truck".

Immediately after figure 4-28, figure 4-28.1 is added.

Page 440. Paragraph 4-51c is superseded as follows:

c. Removal

(1) Model FE20-24EE Truck Filter.

(a) Remove the sheet metal cover.

(b) Place a suitable container below the filter to catch the oil Loosen the two hose clamps (fig. 4-31) and disconnect the hoses from both sides of the "filter head

(c). Remove the two mounting screws (4, fig.

4-32) and lockwashers (5) securing the filter head (7) to the bracket (3).

(d) Remove the two elbows from the filter head.

(2) Model ACE20-24EE Truck Filter.

(a) Remove the sheet metal cover.

(b) Place a suitable container below the filter to catch the oil Plug the hoses to prevent entrance of foreign material

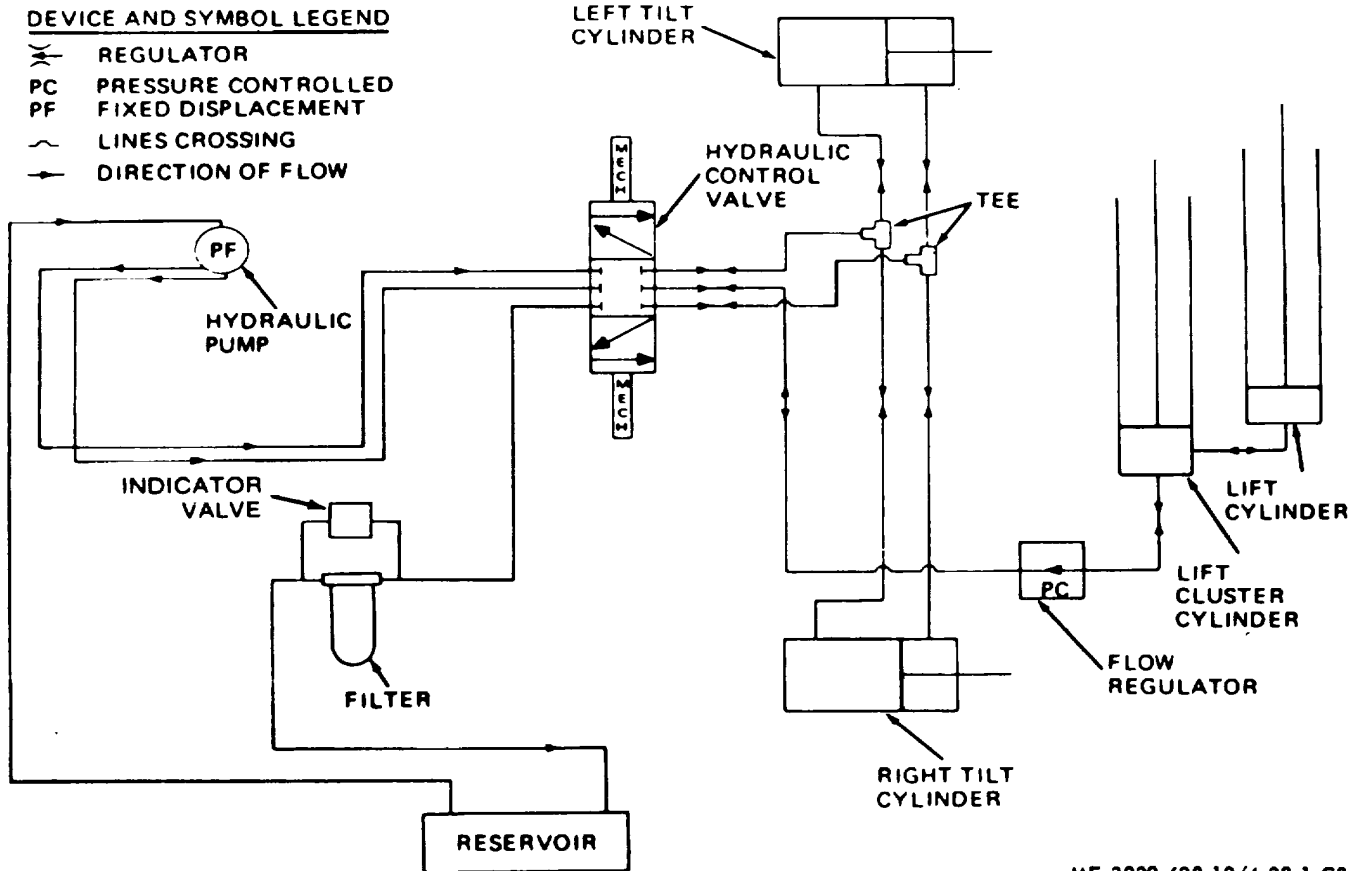
(c) Disconnect the two hoses (fig. 4-321) at the indicator valve and the filter head.

(d) Remove the two nuts (5, fig 431.1), lockwashers (6), and screws (14) securing the indicator valve (15), and remove the indicator valve.

(e) Remove the elbows (2 and 4) and fittings (11) from the indicator valve (15)

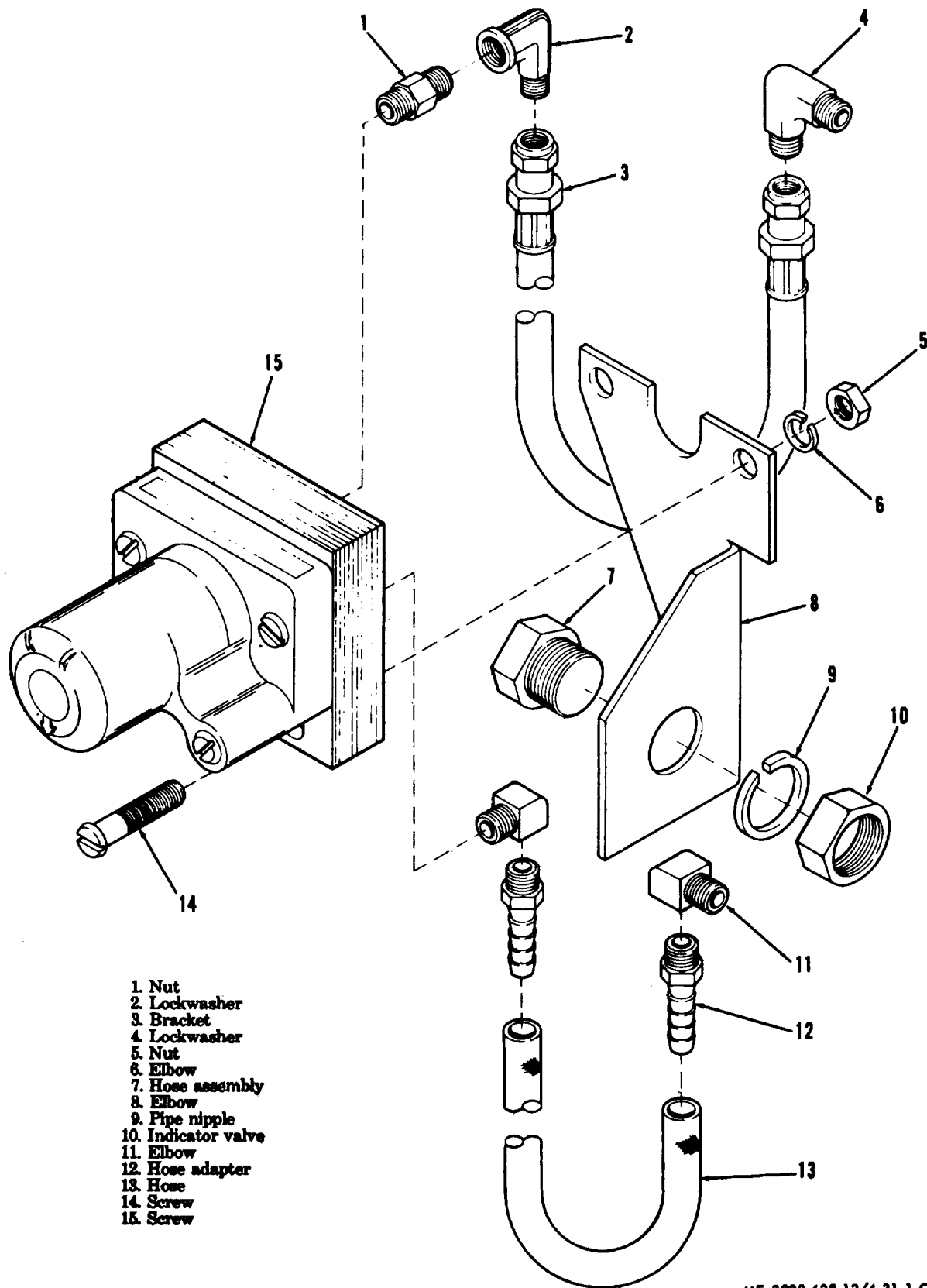
(f) Remove the two screws (4, fig. 31) and lockwashers (5) securing the filter head (7) to the bracket (3), and remove the filter assembly.

(g) Remove the two small hose elbows and



ME 3930-628-12/4-28.1 C3

Figure 4-28.1. Hydraulic system schematic diagram model ACE20-24EE



- 1. Nut
- 2. Lockwasher
- 3. Bracket
- 4. Lockwasher
- 5. Nut
- 6. Elbow
- 7. Hose assembly
- 8. Elbow
- 9. Pipe nipple
- 10. Indicator valve
- 11. Elbow
- 12. Hose adapter
- 13. Hose
- 14. Screw
- 15. Screw

ME 3930-628-12/4-31.1 C3

Figure 3-31.1 Indicator valve and hoses, exploded view, model ACE20-24EE

Page 4-42. Immediately after figure 4-32, figure 4-32 1 is added as follows:

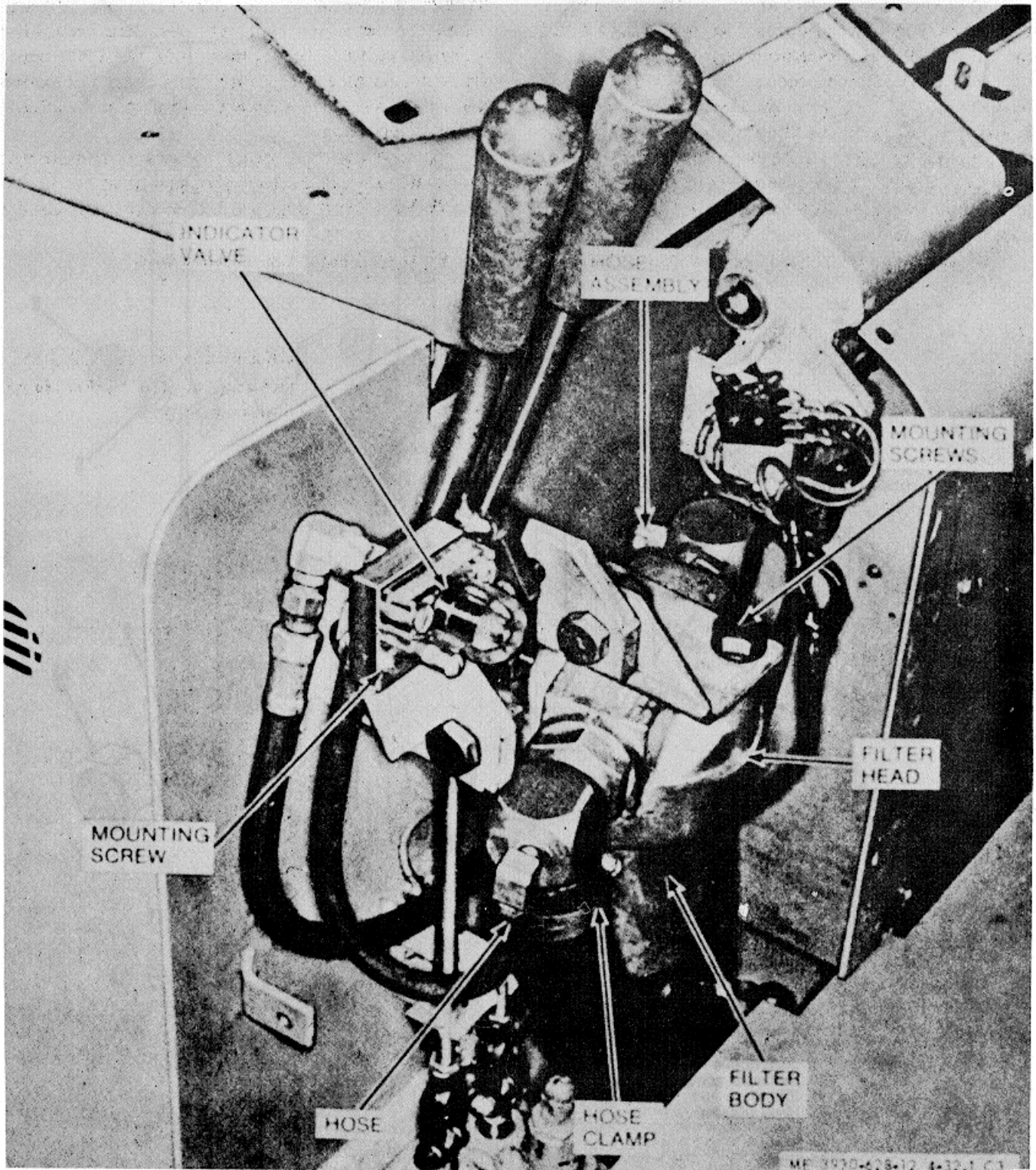


Figure 4-32.1. Hydraulic filter, installed view, model ACE20-24EE.

In paragraph 4-51, subparagraph *d* is superseded as follows:

d Installation. Refer to *b* above to service the filter, if necessary. Refer to figures 4-31, 4-31.1, and 4-32.1 and install the filter assembly as follows:

(1) Install the two small elbows (8 and 11, fig. 4-31.1) in the two large elbows (fig. 4-32.1) and install the large elbows in the filter head. Install the hose adapter (12, fig. 4-31.1) in the elbow at the filter head.

(2) Install the filter assembly on the bracket and secure it with the two screws (14, fig. 4-31) and lockwashers (5)

(3) Remove the plugs from the hoses. Connect

the hose assemblies to the elbows. Tighten the hose clamps (fig. 4-32.1) securely.

(4) Install the elbows (6 and 11, fig. 4-31.1) and fittings (9 and 12) in the indicator valve (10) and install the indicator valve on the bracket. Secure the indicator valve to the bracket with the two screws (14), nuts (1), and lockwashers (2). Connect the small hoses (7 and 13) to the indicator valve and the elbows in the filter head.

(5) Operate the truck hydraulic system and check the filter, indicator valve and hoses for leaks.

(6) Add oil to the reservoir to bring it up to the full mark on the gage.

(7) Install the sheet metal cover.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-2A, (qty rqr block No. 898) Operator Maintenance Requirements for Warehouse.

CHANGES }

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 May 1972

**Operator and Organizational Maintenance Manual
TRUCK, LIFT, FORK, EMD, SOLID RUBBER TIRED WHEELS,
2000 LBS CAPACITY, 144 IN. LIFT, ARMY MODEL MHE-219
(ALLIS CHALMERS MODEL FE20-24EE)
FSN 3930-151-4432**

TM 10-930-628-12, 10 June 1971, is changed as follows:

Page i. Correct title to read as above.

Page 2-1. Paragraph 2-lh is added as follows:

h. A list of maintenance and operating supplies required for initial operation of the fork lift truck are contained in Table 2-1.

TAGO U3A

Table 2-1. Maintenance and Operating Supplies

(1) Component Application	(2) Federal Stock No.	(3) Description	(4) Quantity Required for Initial Operation	(5) Quantity Required for 8 Hrs Operation	(6) Notes
Hydraulic Brake System		OIL, HYDRAULIC: 1 gal can as follows:			(1) See current LO for grade application and replenishment intervals.
	9150-231-9071	HB-nonpetroleum base, automotive	½ pt.	(1)	(2) Includes quantity to fill hydraulic system as follows:
	9150-262-9375	HBA-nonpetroleum base, automotive, arctic-type.	½	(1)	1 qt. - filter 2 1/2 qt. - lines 3 3/4 gal. - reservoir
Differential		OIL, LUBRICATING, GEAR: 55 gal drum as follows:			(3) See C9100-IL for additional data and requisitioning procedure.
	9150-577-5845(3)	GO 90	6pt.	(1)	
	9150-240-2244(3)	GO 75	6 pt.	(1)	
	9150-257-5442(3)	GOS	6 pt.	(1)	
Hydraulic System		OIL, LUBRICATING: 55 gal drum as follows:			
	9150-265-9429(3)	OE 90	14 ¼ qt(2)	(1)	
	9150-242-7604(3)	OES	14 ¼ qt(2)		
Lubricating Fittings		GREASE, AUTOMOTIVE AND ARTILLERY: 35 lb. Can as follows:			
	9150-190-0907(3)	GAA	As required	(1)	

Page C-1. Appendix 'C is superseded as follows:

APPENDIX C

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1. Scope

This appendix lists items required by the operator for operation of the fork lift truck.

B-2. General

This list is divided into the following sections:

a. Basic Issue Items List-Section II. Not applicable.

b. Items Troop Installed or Authorized List Section III. A list of items in alphabetical sequence which, at the discretion of the unit commander, may accompany the fork lift truck. These items are not subject to turn-in with the fork lift truck when evacuated.

B-3. Explanation of Columns

The following provides. an explanation of columns in the tabular list of Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code(s) (SMR):

(1) Source code indicates the source of the listed item. Source codes are:

Code	Explanation
P	Repair parts, special tools, and test equipment supplied from GSA/DSA or Army supply system and authorized for use at indicated maintenance levels.
P2	Repair parts, special tools and test equipment which are procured and stocked for insurance purposes because the combat or military essentially of the end item dictates that a minimum quantity be available in the supply system.

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

Code	Explanation
C	Crew/Operator

(3) Recoverability Code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverability codes are:

Code	Explanation
R	Applied to repair parts (assemblies and components), special tools, and test equipment which are considered economically repairable at direct support and general support maintenance levels.
S	Repair parts, special tools, test equipment, and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis.

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

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

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr, etc.

e. Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock No.	(3) Description Ref No. & Mfr Code Usable on code	(4) Unit of meas	(5) Qty Auth
	7510-889-3494	BINDER, LOOSE LEAF	EA	1
	75205669-9618	CASE, MAINTENANCE AND OPERATION	EA	1
	4210-889-2222	EXTINGUISHER, FIRE, 2% lb	EA	1

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United State Army,
Chief of Staff.

Official:
VERNE L. BOWERS,
Major General, United State Army,
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 893) Operator Maintenance Requirement for Warehouse.

**OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
TRUCK, LIFT, FORK, END, SOLID RUBBER TIRES,**

**2000 LBS CAPACITY, 144 IN LIFT, ARMY MODEL MHE 219
ALLIS CHALMERS MODEL FE20-24EE**

FSN 3930-151-4432

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CHAPTER 1

INTRODUCTION

Section I. GENERAL**1-1. Scope**

a. These instructions are published for the use of personnel to whom the Allis-Charmers Fork Lift Truck Model FE20-24EE, Army Model MHE- 219, Federal Stock Number 3930-151-4432 is issued. They provide information on the 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.

b. Appendix A contains a list of publications applicable to this manual. Appendix B consists of Maintenance Allocation Chart. Appendix C contains a list of basic issue items and maintenance and operating supplies authorized the operator of the equipment. Spare parts allocated to organizational maintenance are listed in TM 10- 3930-628-20P.

1-2. Record and Report Forms

a. DA Form 2258, Depreservation Guide to Engineer Equipment.

b. DA Form 1397, Processing and Deprocessing for Shipment, Storage, and Issue of Vehicles and Spare Engines.

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

d. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

1-3. Orientation

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

Section II. DESCRIPTION AND DATA**1-4. Description**

a. The Army Model MHE-219 (Allis-Charmers Model FE20-24EE) is a nontactical fork' lift truck (figs 1-1 and 1-2) designed for warehouse HAPTER 1

operation. The truck can be used to load, transport, unload, and stack loads weighing as much as 2,000 pounds at a 24 inch load center. (The load center is measured from the heel of the fork.)

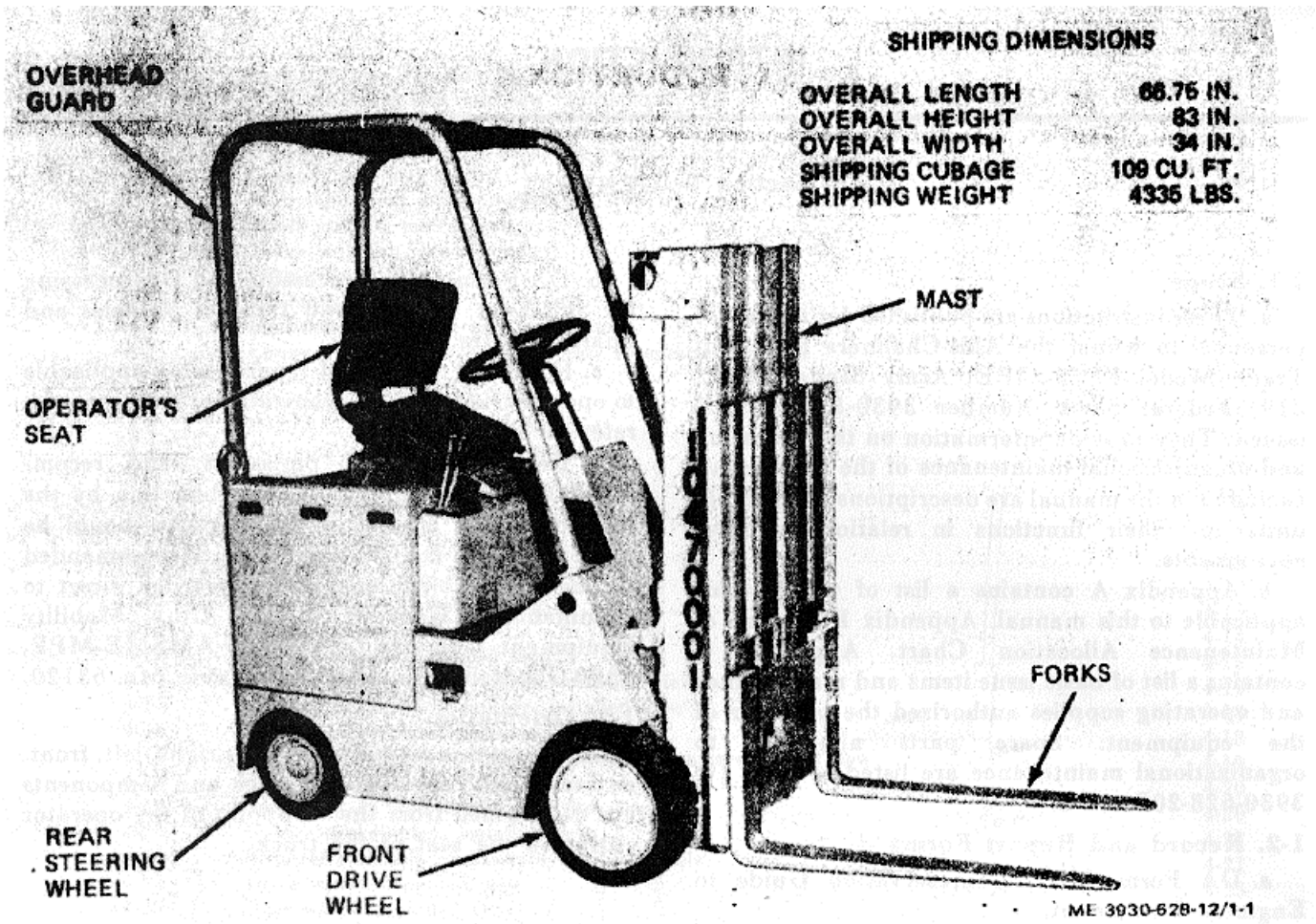


Figure 1-1. Fork lift truck with shipping dimensions, right side view.

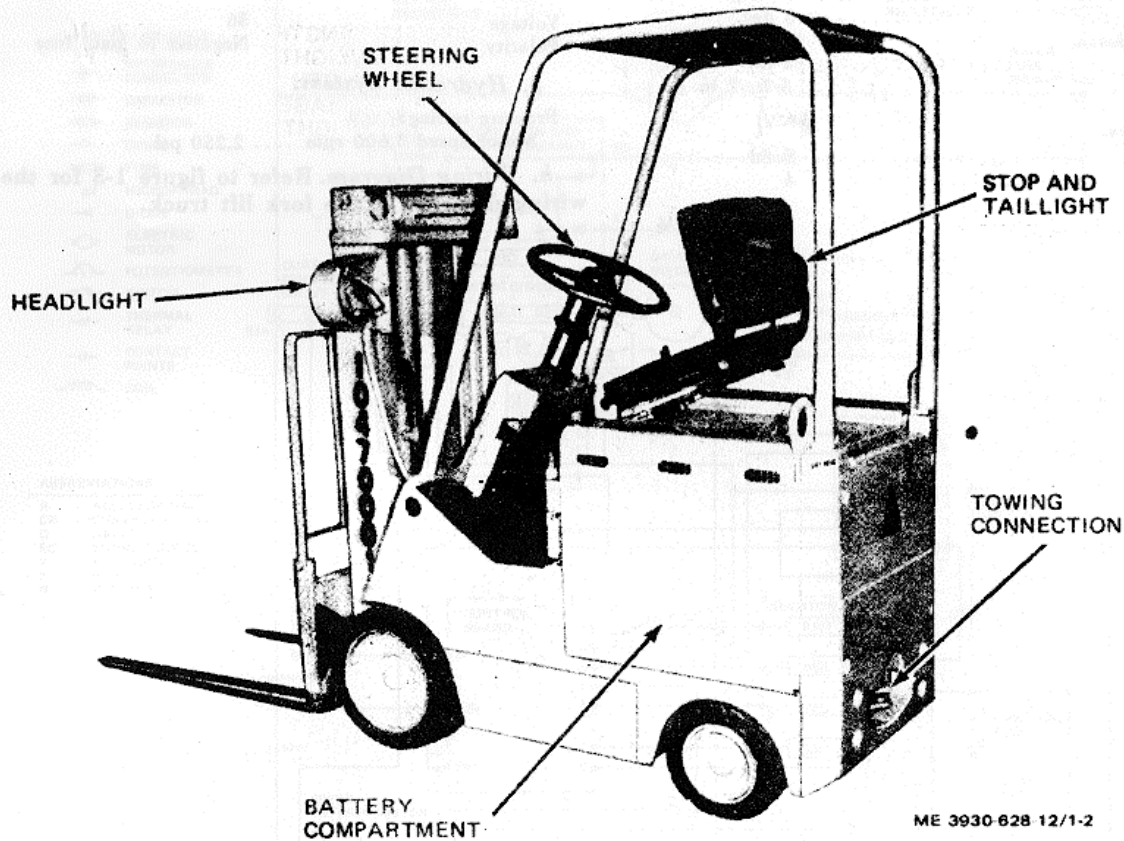


Figure 1-2. Fork lift truck, left side view

b Loads weighing up to 2,000 pounds as described above can be lifted to a height of 144 inches. Lifts of this height are made possible by the use of a three-section mast, with a lift cylinder and a cylinder cluster providing power for movement.

c. The truck is powered by a 36 volt battery. The battery furnishes current to an electric motor which drives the forward drive axle.

d. Hydraulic oil pressure for the lift cylinders, and tilt cylinders is supplied by a dual hydraulic pump. The pump is directly driven by an electric motor.

1.5. Tabulated Data

a. Lift Truck.

Make Allis Chalmers
 Model FE20-24EE
 Army model MHE219

b. Capacities.

Hydraulic system 4.2 gal. (full) 3.9 gal. (useable)

c. Dimensions and Weight.

Ground clearance (at mast center).....	3 in.
With uprights extended.....	192 in.
With uprights retracted	85 in.
Overall	1041.5 in.
Forks	36 in.
Forks spread (maximum)	32 in.
Width	36 in.
Weight	433 lbs.

d. Performance.

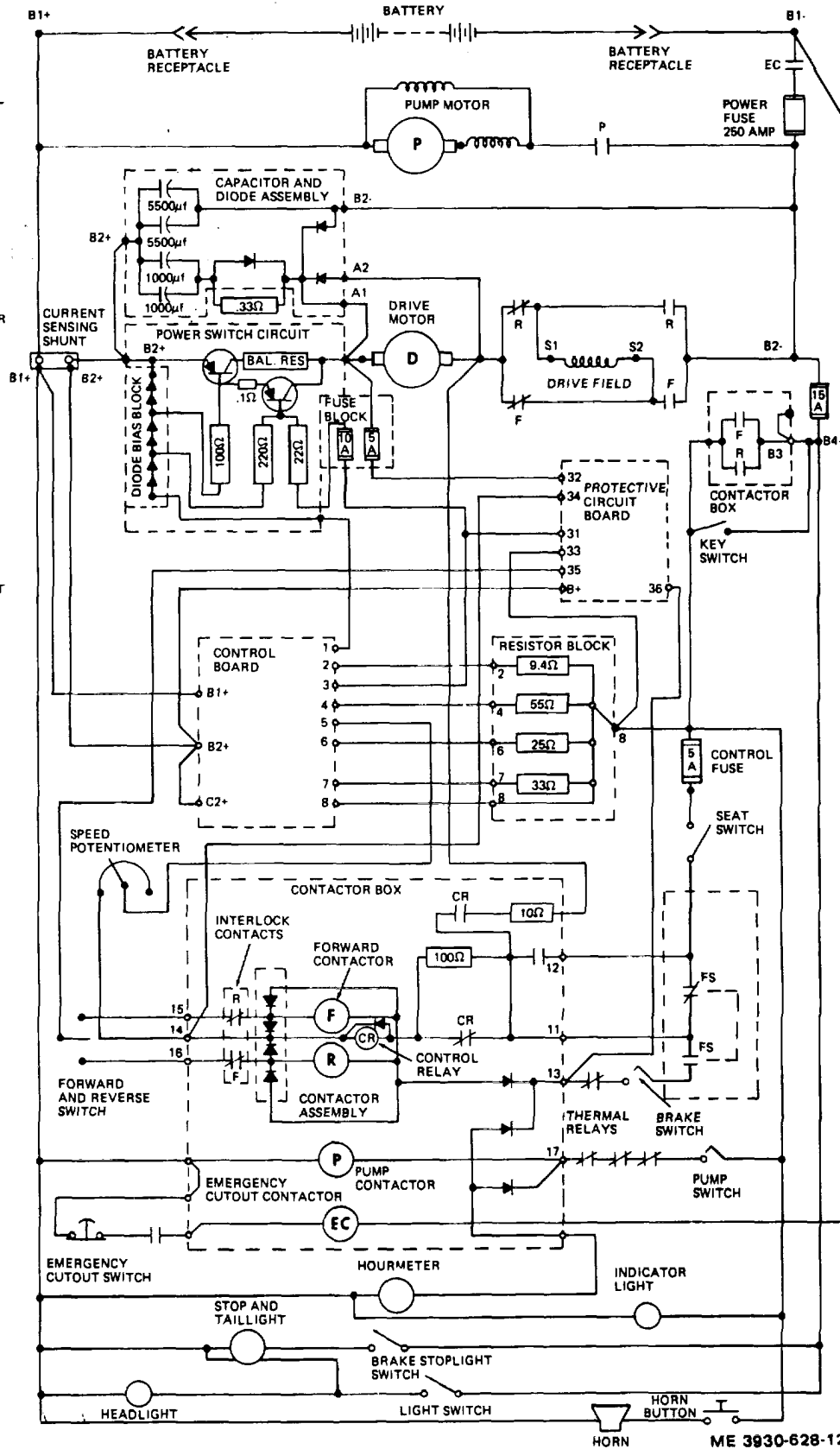
Aisle width (minimum:	
Intersecting	42 in.
.....	75 in.
Right angle stacking	144 in.
Lift height Maximum)	2,000
Load capacity (maximum)	lbs
Maximum speed (empty):	
Forward.....	4 mph (min.
Reverse	4 mph min.)
Number of speeds:	
Forward.....	1
Reverse	1

Tilt limitations:
Backward..... 10 deg.
Forward 3 deg.
Turning radius:
Inside - 3 in.
Outside 5 ft. 2 in.
e. Tires.
Type..... Solid
Number..... 4
Size:
Drive 18 x 6 x 12

Steer 14 x 4'A x
f. Battery.
Voltage..... 36
Polarity Negative to main fuse
g. Hydraulic System.
Pressure setting:
Motor speed 3,600 rpm 2,250 psi
h. Wiring Diagram. Refer to figure 1-3 for the
wiring diagram of the fork lift truck.

- ELECTRICAL SYMBOLS**
- RECEPTACLE CONNECTOR
 - ⊥ CAPACITOR
 - ▭ RESISTOR
 - Ω OHMS
 - ⊞ FUSE
 - μf MICROFARAD
 - ⊥ DIODE
 - ⊞ ELECTRIC MOTOR
 - ⊞ POTENTIOMETER
 - ⊞ SWITCH
 - ⊞ THERMAL RELAY
 - ⊞ CONTACT POINTS
 - ⊞ COIL

- ABBREVIATIONS**
- A - ACCELERATING
 - CR - CONTROL RELAY
 - D - DRIVE
 - EC - EMERGENCY CUTOUT
 - F - FORWARD
 - P - PUMP
 - R - REVERSE



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Figure 1-3. Wiring diagram.

i Maintenance and Operating Supplier. Refer to appendix B, section II, for a complete list of maintenance and operating supplier required for . initial operation.

1-6. Difference between Models

The only model covered in this manual i the AW-Charmers Model FE20-24EE, Army Model MHE 219, 2,000 pound fork lift truck.

CHAPTER 2

OPERATING INSTRUCTIONS

2-1. 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 in paragraph 3-7.

b. Carefully inspect the truck for any signs of dents or damage that may have occurred during shipment. Pay particular attention to sheet metal panels and controls and instruments.

c. Remove tape, paper and other packing materials. Remove forks from truck by removing

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

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

e. Fill battery with electrolyte to five-eighths of an inch above the plates. Check specific gravity of electrolyte as prescribed in TM 9-6140-200-15.

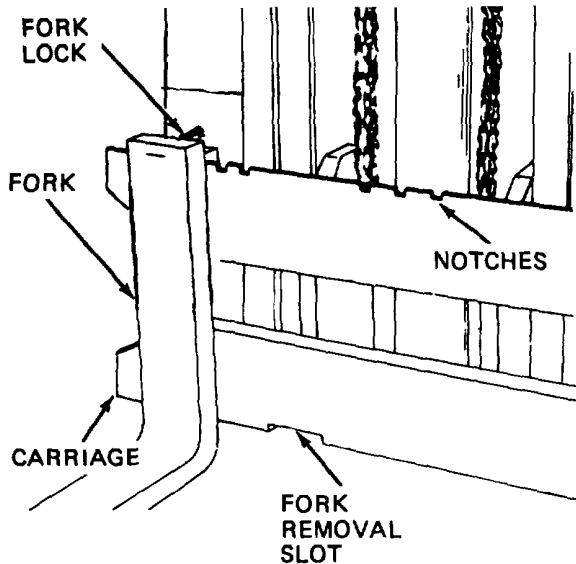
Warning: When servicing battery, do not smoke or use flame in the vicinity. Batteries generate hydrogen, a highly explosive gas. f. Lubricate the truck in accordance with the current lubrication order.

g. Fill hydraulic reservoir with proper grade of oil. Refer to current lubrication order.

2-2. Installation of Separately Packed Components

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

b. Fire Extinguisher. Remove separately packed fire extinguisher and install in bracket on instrument panel. Be-certain bracket clamp locks properly to secure fire extinguisher in position.



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.

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Figure 2-1. Removing, installing, or adjusting carriage forks.

Section II. MOVEMENT TO A NEW WORKSITE

2-3. Dismantling for Movement

The only component that may require dismantling for movement is the forks. If necessary to conserve space when transporting the lift truck by means of another carrier, refer to figure 2-1 and remove the forks.

2-4. Reinstallation after Movement

If forks were removed to transport the lift truck,

refer to figure 2-1 and install the forks on the carriage.

2-5. Normal Movement

The fork lift truck is fully mobile and can normally be moved to a new worksite under its own power.

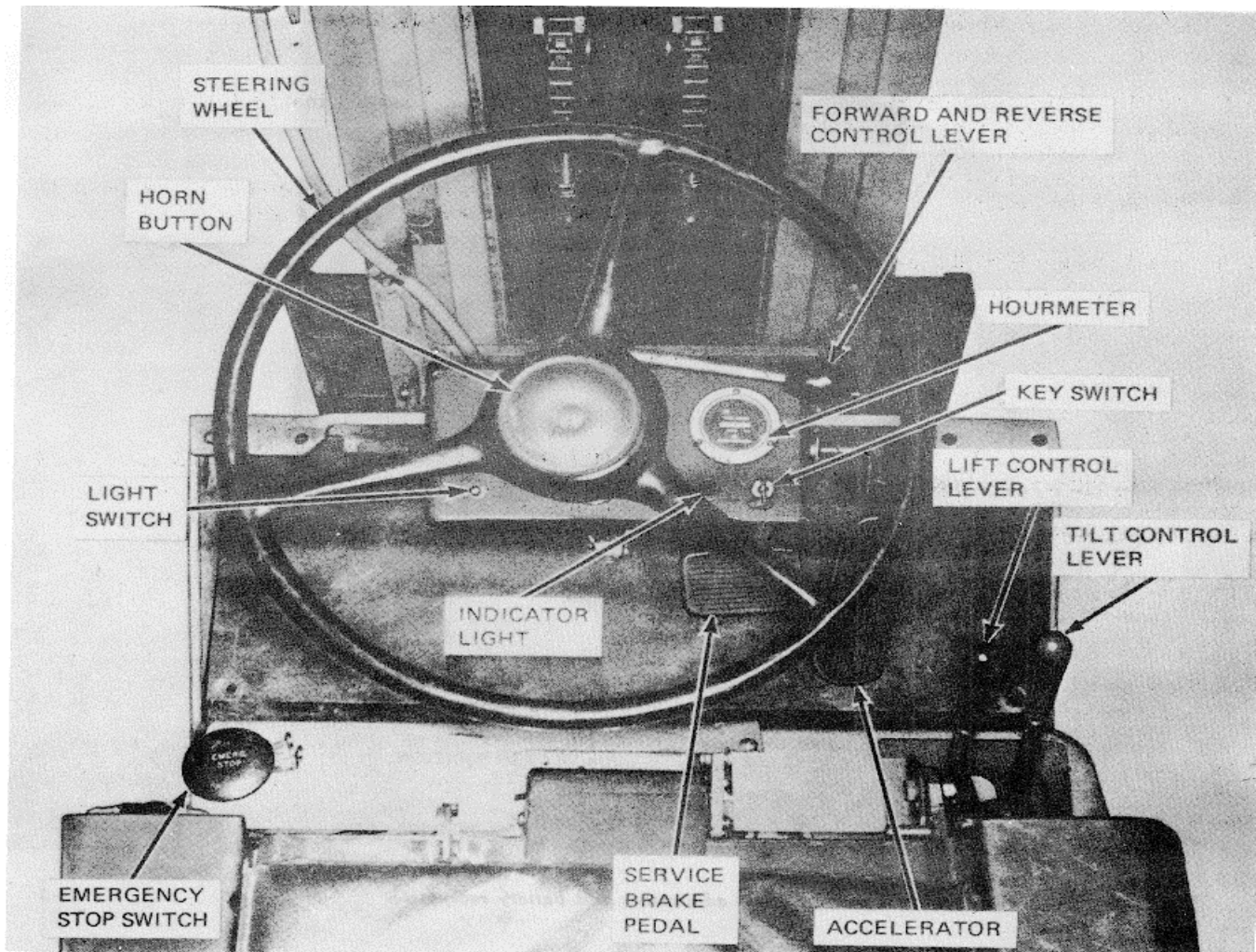
Section III. CONTROLS AND INSTRUMENT

2-6. 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.

2-7. Controls and Instruments

Refer to figures 2-2 and 2-3 for the purpose, normal readings, and location of all controls and instruments.



CONROLS

1. HORN BUTTON - DEPRESS BUTTON TO SOUND HORN.
2. STEERING WHEEL - ROTATE WHEEL IN DIRECTION DESIRED TO TURN TRUCK.
3. FORWARD AND REVERSE CONTROL LEVER - MOVE LEVER UP TO "F" POSITION TO MOVE TRUCK FORWARD; MOVE LEVER DOWN TO "R" POSITION TO MOVE TRUCK TO REAR; POSITION LEVER IN "N" (NEUTRAL) POSITION TO PARK OR HALT OPERATION. LEVER SHOULD SNAP INTO EACH POSITION.
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 BACKWARDS.
6. KEY SWITCH - TURN KEY TO RIGHT TO ACTUATE CIRCUITS.
7. ACCELERATOR - DEPRESS PEDAL TO START TRUCK IN MOTION AND TO INCREASE SPEED; RELEASE TO DECREASE
8. SERVICE BRAKE PEDAL - DEPRESS PEDAL TO APPLY BRAKES AND STOP TRUCK SPEED.
9. EMERGENCY STOP SWITCH - DEPRESS SWITCH BUTTON TO HALT ALL ELECTRICAL OPERATION.
10. LIGHT SWITCH - PULL SWITCH OUT TO TURN ON LIGHTS

INSTRUMENTS

1. HOURMETER - OPERATES WHEN KEY SWITCH IS TURNED ON. RECORDS HOURS OF OPERATION.
2. INDICATOR LIGHT - LIGHT GLOWS GREEN WHEN KEY SWITCH IS ON, INDICATING CIRCUITS ARE OPERATING.

ME 3930-628-12/2-2

Figure 2-2. Controls and instruments.

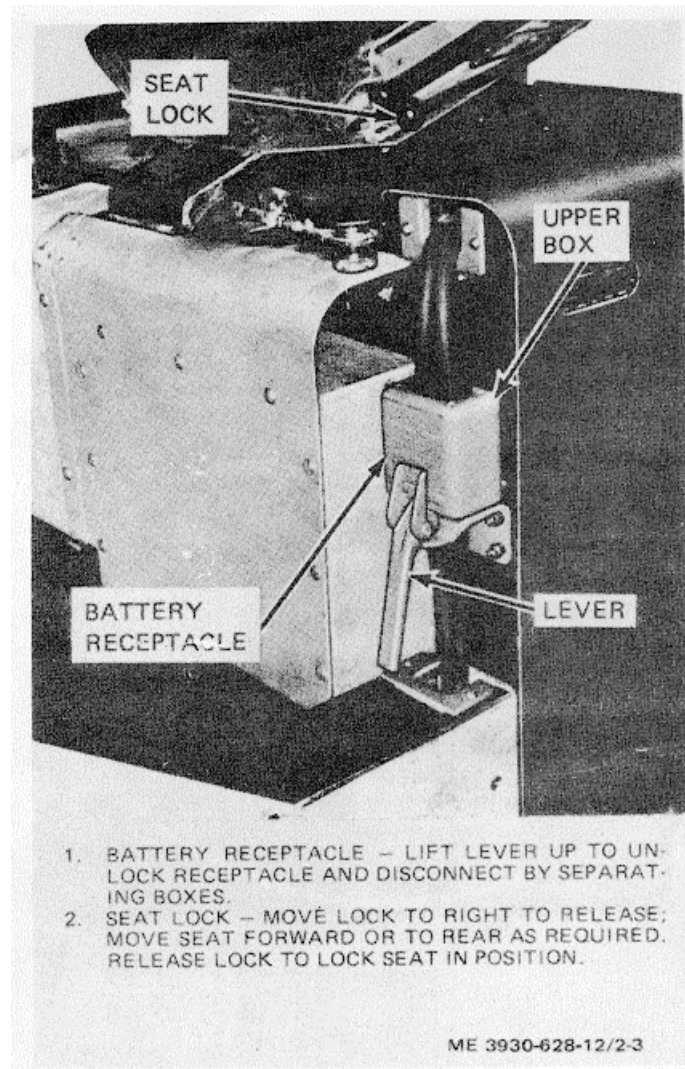


Figure 2-3. Seat adjustment and battery receptacle.

Section IV. OPERATION UNDER USUAL CONDITIONS

2-8. General

a. The instructions in this section 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. The 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 presents a different problem

the operator may have to vary given procedures to fit the individual job.

2-9. Starting

a. Preparation for Starting.

(1) Perform the before operation services (para 3-5).

(2) If necessary, lubricate the truck as specified in the current lubrication order.

b. Starting. Refer to figure 2-4 and start the truck.

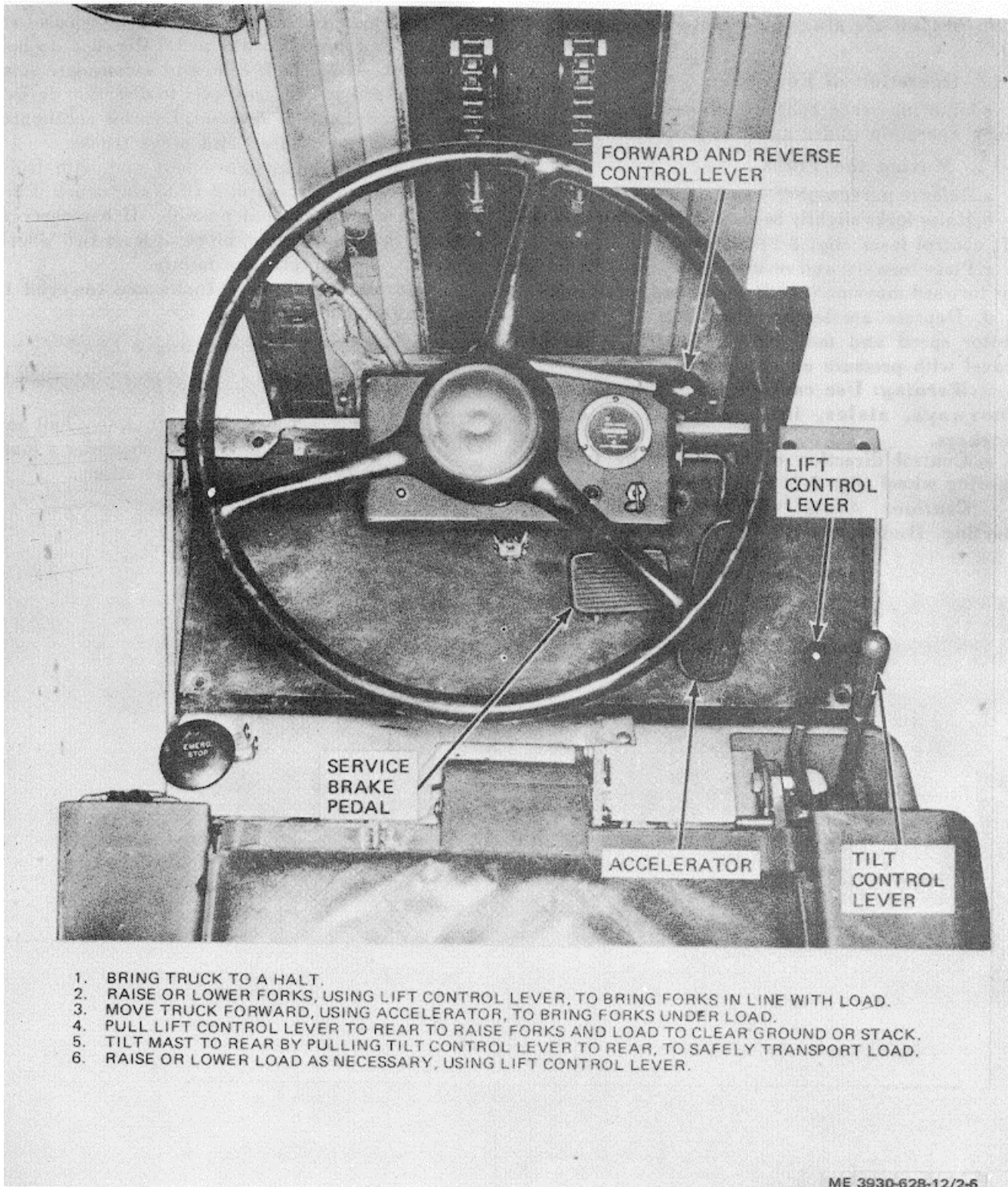


Figure 2-4. Starting the truck.

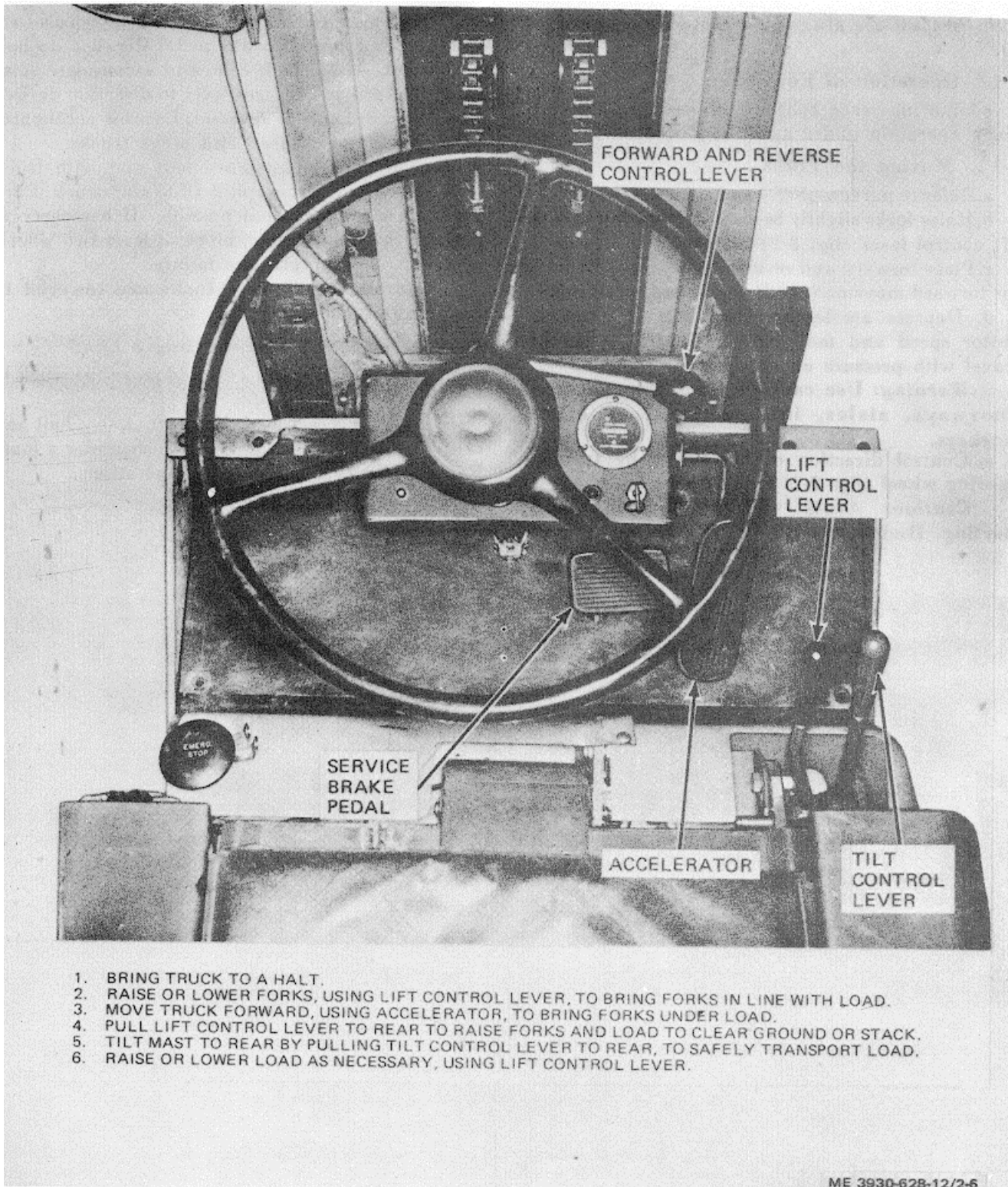


Figure 2-5. Truck stopping instructions.

b. Perform the after-operation services (para 3- 7).

2-11. Operation of Equipment

The following paragraphs and illustrations describe truck operation under usual conditions. 2-12. Moving the Truck

- a. Refer to paragraph 2-9 and start the truck.
- b. Raise forks slightly to clear ground by pulling lift control lever (fig. 2-2) to rear.
- c. Place forward and reverse lever (fig. 2-2) in F for forward movement or R for reverse movement.
- d. Depress accelerator (fig. 2-2) to increase motor speed and move truck. Control speed of travel with pressure on accelerator.

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

e. Control direction of movement by turning steering wheel (fig. 2-2) to guide truck. Caution: Avoid sudden stopping and starting. Reduce speed on turns.

Caution: Avoid sudden stopping and starting. Reduce speed on turns.

f. To change direction of travel, release accelerator and depress brake pedal (fig. 2-2) to .halt movement. After truck comes to a complete stop. move forward and reverse lever to direction desired (F for forward; R for reverse). Depress' accelerator to increase motor speed and move truck.

g. After completing movement and with truck parked, refer to paragraph 2-10 to stop truck. Park truck on level surface if possible. If necessary to park truck on an incline, block at least two wheels in event of parking brake failure.

Caution: Make sure forks are lowered to the ground.

2-13. Lifting and Transporting a Load

a. Refer to paragraph 2-12 and move the truck to the vicinity of the load.

b. As truck nears load, bring truck to a halt and raise or lower forks to position them under a load. Refer to figure 2-6 for lifting operations.

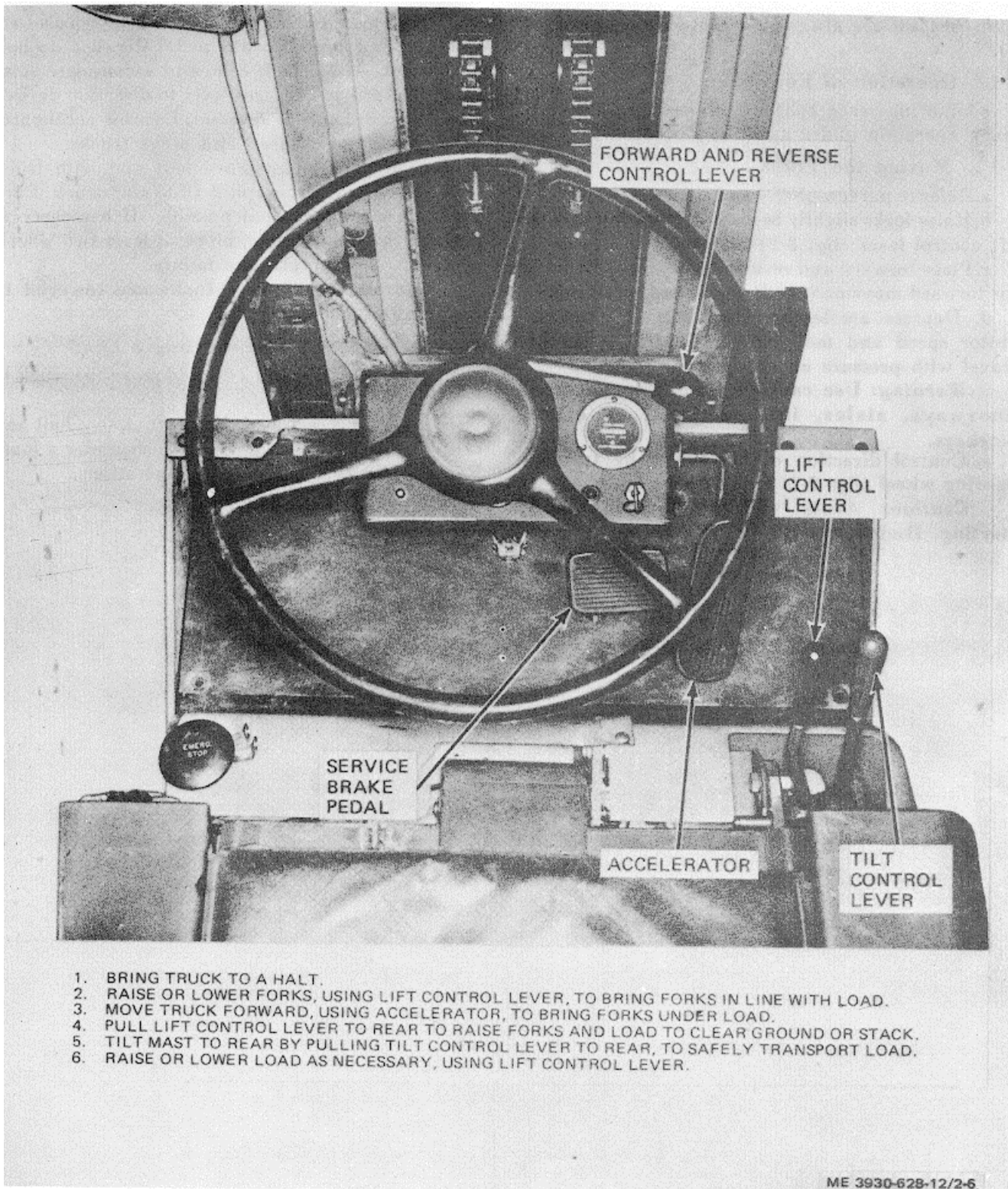


Figure 2-6. Lifting operation.

c. If load is on a pallet, center forks between upper and lower members of pallet. With the mast in vertical position, move truck forward (para 2-12), using accelerator, until load rests against rear of forks.

Caution: Know the rated capacity of the truck. Do not overload it. Never pick up a load until certain it can be carried safely. Make sure the load is steady before lifting and keep the load against the carriage backrest.

d. Raise forks (fig. 2-6) enough to clear stack or floor below the load. Tilt back by pulling tilt control lever (fig. 2-6) to rear. Mast must be tilted far enough to rear to travel safely with load.

e. Place directional control 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 operator to see.

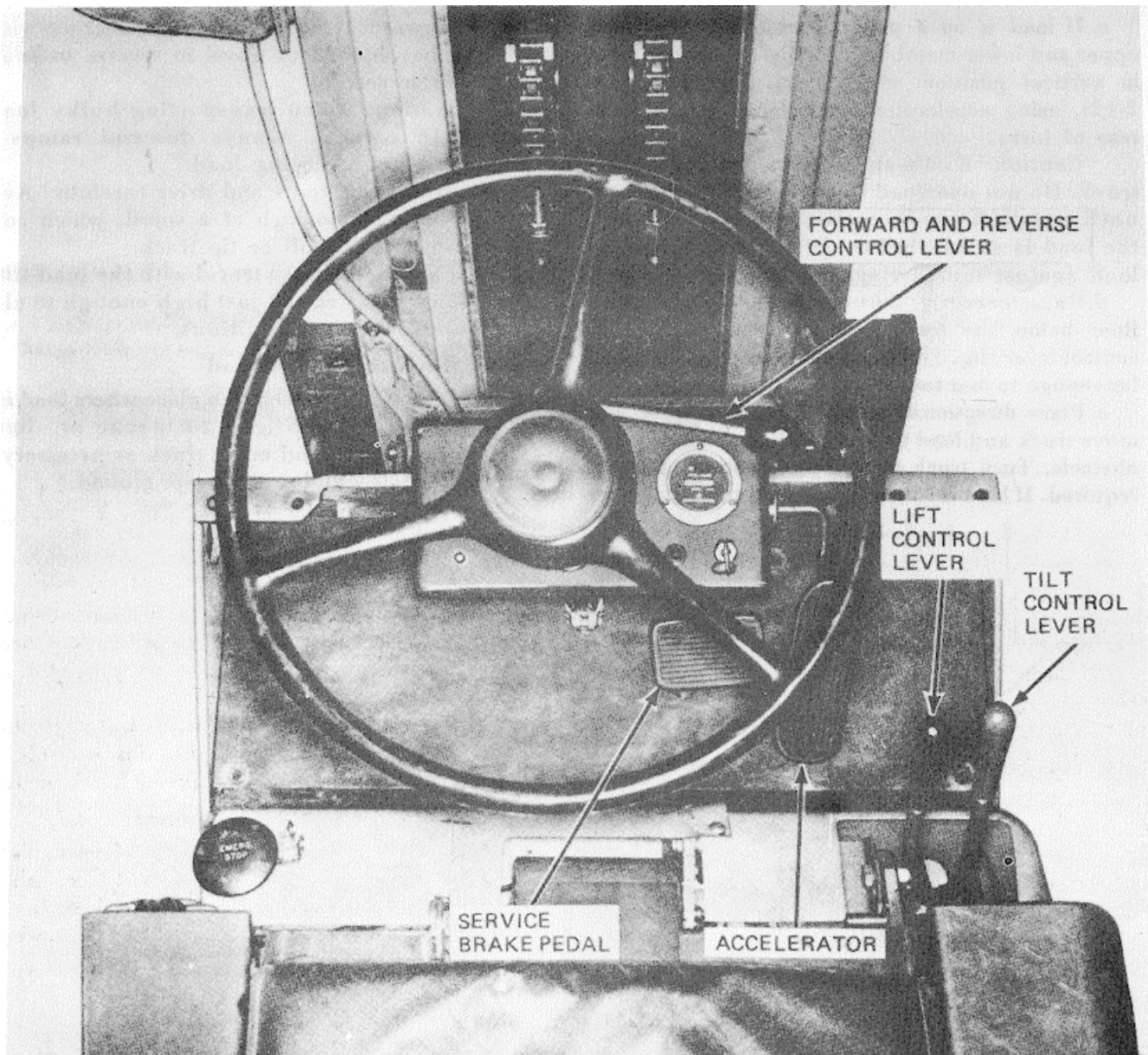
Caution: When transporting bulky loads, travel in reverse. Always descend ramps in reverse when carrying load.

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.

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

2-14. Depositing the Load

a. Move truck with load to place where load is to be deposited. Refer to figure 2-6 to raise or figure 2-7 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 ACCELERATOR TO BRING FORKS AND LOAD OVER PLACE TO DEPOSIT LOAD.
2. HALT TRUCK WITH SERVICE BRAKE PEDAL. MOVE FORWARD AND REVERSE CONTROL LEVER TO "N" (NEUTRAL) POSITION.
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 DIRECTIONAL CONTROL LEVER IN "R" (REVERSE) POSITION AND, USING ACCELERATOR, MOVE TRUCK AWAY FROM LOAD.

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Figure 2-7. Lowering operation.

- b. Move tilt control lever forward to align forks horizontally with stack or ground.
- c. Refer to figure 2-7 and lower load into desired position.

- d. Refer to paragraph 2-12 and move truck away from load and return for further loading operations or parking place.

Section V. OPERATION UNUSUAL CONDITIONS

2-15. 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.

2-16. Operation in Extreme Heat

- a. Check battery electrolyte level more often. Maintain level 5 / 8-inch above the plates.
- b. Check specific gravity of battery more often.
- c. Clean battery cables frequently.
- d. If thermal relays cut out electric motors due to overheating, allow truck to cool. Relays will automatically reset and allow operation to resume.

2-17. 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 into the wind and cover with a tarpaulin. Fasten tarpaulin securely to prevent it from blowing away.

b. Electrical System.

- (1) Check specific gravity of battery more often.
- (2) Do not add water to the battery unless the truck is going to be operated immediately or charging is to be performed.
- (3) Keep battery charged as much as possible to insure proper operation and prevent freezing at low temperatures.
- (4) Remove and store the battery in a warm place if truck is not going to be parked in a shelter, if possible.

2-18. Operation in Sandy or Dusty Areas

- a. Remove all sand from axles, wheels, steering spindles, and brake assemblies periodically. Check all parts often to prevent undue wear caused by sand.
- b. Protect lift and tilt mechanisms from entrance of sand. Cover exposed parts of lift and tilt cylinder rods, lift chains, and reservoir during sand storms.

2-19. Operation in Damp Tropical Areas

- a. Check all paint for chipping 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. BASIC ISSUE ITEMS

3-1. Basic Issue Items

Tools, equipment, and repair parts issued with or

authorized for the MHE 219 Fork Lift Truck are listed, the basic issue items list, appendix C.

Section II. LUBRICATION

3-2. 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.

3-3. 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.

Section III. PREVENTIVE MAINTENANCE'

3-4. General

To insure that the fork lift truck is ready to 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 3-5. 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 together with the corrective action taken on DA Form 2404 at the earliest possible opportunity. authorized for the MHE 219 Fork Lift Truck are listed in the basic issue items list, appendix C.

3-5. 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 lists 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 and seat depressed to operate electrical circuits.

Item number	Interval						Item to be Inspected	Procedure	Reference
	Operator			Org.					
	B	D	A	W	M	Q			
1			X				Battery	Check electrolyte level. Fill to 5/8 inch above plates. Charge at regular rate.	Para 4-25
2	X						Horn	Check horn for operation.	Para 2-7
3	X						Lights	Inspect for proper operation.	Para 2-7
4	X						Fire extinguisher	Inspect for broken seal and correct pressure.	
5	X						Leaks, general	Check under truck for leaks. Report to organizational maintenance.	
6		X					Instruments	Check that all instruments indicate within the required ranges.	Para 2-7
7		X					Controls	Check that controls perform as required.	Para 2-7
8		X					Brakes	Check parking brake and service brake to assure safe operation.	Para 4-32
9		X					Unusual noises and vibration	Listen for unusual noises and check for excessive vibration. If present, shut off truck and report to organizational maintenance.	
10		X					Tires	Remove imbedded material, check for gouges and other damage.	Para 4-39

Section IV. TROUBLESHOOTING

3-6. General

This section provides information useful in probable causes of the trouble. The corrective diagnosing and correcting unsatisfactory operation action recommended is described opposite the or failure of the fork lift truck and its components. probable cause. Malfunctions which may occur are listed in chart

3-1. Each malfunction stated is followed by a list of probable cause of the trouble. The corrective action recommended is described opposite the probable cause.

Chart .3-1. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Truck does not move when accelerator is depressed.	a. Emergency stop switch depressed. b. Loose or defective battery receptacle, loose.	a. Reset emergency stop switch. h. Inspect receptacle and connect if loose.
2. Tilt and lift mechanism does not operate when levers are actuated.	a. Emergency stop switch depressed. b. Loose or defective battery receptacle.	a. Reset emergency stop switch. h. Inspect receptacle and connect if loose.
3. Head and taillights do not operate when switch is actuated.	a. Emergency stop switch depressed. b. Loose or defective battery receptacle. c. Loose wiring to lights.	a. Reset emergency) stop switch. h. Inspect receptacle and connect if loose. c. Tighten loose connections.
4. Horn does not sound.	Emergency stop switch depressed.	Reset emergency stop switch.

Section V. Maintenance of Truck**3-7. General**

Operator's maintenance of the truck is limited to the following items.

3-8. Battery

- a. Check specific gravity of battery.
- b. Inspect battery and receptacle for damage.
- c. Check battery receptacle for good condition

and secure connection.

3-9. Lubrication

- a. Lubricate truck in accordance with the current lubrication order.
- b. Refer to paragraph 3-3 for detailed lubrication information.

3-10. Controls and Instruments

- a. Check hourmeter for proper operation.
- b. Check all controls to see that they function

properly.

3-11. Tires

- a. Inspect tires for imbedded material and remove if possible.
- b. Check tires for gouges and other damages.

3-12. Brake and Hydraulic Systems

- a. Check systems for leaks.
- b. Inspect hose and tubes for damage.
- c. Tighten loose connections.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1. Inspecting and Servicing the Equipment.

- a. Refer to paragraph 2-1 and inspect the truck.
- b. Service the truck as described in paragraph 2-1.

(2) Using a hoist of sufficient capacity, lift battery into compartment.

(3) Service and charge battery as described in paragraph 4-22.

(4) Connect battery receptacle as shown in figure 2-3.

Caution: Do not reverse polarity of battery cables.

4-2. Installation of Separately Packed Components

a. Fire Extinguisher and Forks. Refer to paragraphs 2-1 and 2-2 to install the fire extinguisher and forks.

b. Battery.

(1) Open battery compartment and remove side panels.

Section II. MOVEMENT TO A NEW WORKSITE'

4-3. Dismantling for Movement

Refer to paragraph 2-3 for removal of forks if required in moving the truck or transporting by means of another carrier.

4-4. Reinstallation after Movement

If forks were removed to transport the lift truck, refer to figure 2-1 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 issued with or authorized for the fork lift truck are listed in the basic issue items list, appendix C.

perform organizational maintenance of the fork lift truck.

4-6. Special Tools and Equipment

No special tools and equipment are required to

4-7. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list ITM 10-3930-628-20P) for the fork lift truck.

Section IV. LUBRICATION INSTRUCTION

4-8. General

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

b. Refer to paragraph 4-50 to service the reservoir and breather.

4-9. Hydraulic Filter

a. Replacement of the filter element is required at regular intervals.

b. Refer to paragraph 4-51 to service the hydraulic filter.

4-11. Brake Master Cylinder

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

b. Refer to paragraph 4-34 to fill the master cylinder.

4-10. Hydraulic Reservoir

a. The hydraulic system reservoir and breather must be serviced at regular intervals.

4-12. Drive Axle

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

b. To drain axle differential, remove drain plug

Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-13. 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 3-5. Organizational Maintenance checks and services are listed and described in paragraph 4-14. The item numbers indicate the sequence of minimum inspection requirements. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 at the earliest possible opportunity.

4-14. 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 4-1 lists 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 organizational maintenance personnel. 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, an operator must be seated on seat and seat depressed to operate electrical circuits.

Item number	Interval						Item to be Inspected	Procedures	Reference
	Operator			Org.					
	B	D	A	W	M	Q			
1				X			Hydraulic reservoir	Check oil level. Add oil as required.	Para 4-50
2				X			Battery	Check for frayed cables, remove corrosion. Fill to 3/8 inch above plates. Clean vent holes in caps. Charge at regular rate and with finishing charge.	Para 4-25
3				X			Brake master cylinder	Inspect for leaks, clean fill plug vent, add fluid as required.	Para 4-34
4					X		Brake pedal	Adjust if brake pedal does not have 1/2 inch free travel.	Para 4-33
5					X		Steering gear	Check operation. Adjust if necessary.	Para 4-42
6					X		Brakes	Correct deficiencies if brake application is spongy, or ineffective.	Para 4-35
7					X		Axle differential	Check oil level. Fill if necessary. Refer to current lubrication order.	Para 4-44
8					X		Lift chains	Clean and inspect chains.	Para 4-55
9					X		Lift and tilt cylinders	Inspect for leaks.	Para 4-53
10						X	Drive gears	Inspect mounting screws. Tighten if necessary.	Para 4-44
11						X	Contact points	Inspect for wear and burning. Replace if necessary.	Para 4-29
12						X	Parking brake	Check operation. Adjust if necessary.	Para 4-32
13						X	Hydraulic system	Check tubes and hoses for leaks and deterioration.	Para 4-51
14						X	Electrical system	Check and adjust electrical components including motors, contractors, and controls.	Para 4-30
15						X	Service brake lining.	Check brake lining. If lining is worn to less than 1/8 inch thickness, replace brake shoes.	Para 4-36
16						X	Brake interlock switch	Check operation. Adjust if necessary.	Para 4-35

Section VI. TROUBLESHOOTING

4-15. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the fork lift truck and its components. Malfunctions which may occur are listed in chart

4-1. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause

Chart 4-1. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Truck does not move when accelerator is depressed.	<ul style="list-style-type: none"> a. Low battery b. Defective fuse. c. Defective contractors or control boards. d. -Actuated or defective thermal relay. e. Defective or improperly adjusted seat or brake interlock switch. 4-34). 	<ul style="list-style-type: none"> a. Check specific gravity and charge if necessary (para 4-25). b. Replace fuse (para 4-24). c. Refer to direct and general support maintenance personnel. d.. Allow truck to cool. Replace defective relay (para 4-26). e. Adjust or replace seat switch (para 4-32) or brake switch (para
2. Tilt and lift mechanism does not operate when levers are actuated.	<ul style="list-style-type: none"> a. Low battery if necessary (para 4-25). b. Defective fuse. c. Switch out of adjustment or defective. d. Seat switch not properly adjusted or defective e. Defective contractors f. Defective hydraulic motor or pump. 	<ul style="list-style-type: none"> a. Check specific gravity and charge b. Replace fuse para 4-27). c. Adjust switch or replace defective switch para 4-52). d. Adjust switch or replace defective switch (para 4-32). e. Refer to direct and general support maintenance personnel. f. Refer to direct and general support maintenance personnel.
3. Truck accelerates unevenly and does not inch properly.	<ul style="list-style-type: none"> a. Defective controls or control boards. b. Controls not adjusted properly. maintenance personnel. 	<ul style="list-style-type: none"> a. Refer to direct and general support maintenance personnel. . Refer to direct and general support
4. Inadequate power for climbing grades and transporting loads.	<ul style="list-style-type: none"> a. Low battery: b. improperly adjusted or defective controls. c. Defective motor or drive axle. maintenance personnel. 	<ul style="list-style-type: none"> a. Check specific gravity and charge if necessary (para. 4-25). b.. Refer to direct and general support maintenance personnel. c. Refer to direct and general support
5. Head and taillights do not operate when switch is actuated.	<ul style="list-style-type: none"> a. Defective light. b. Defective switch. c. Loose or defective wiring. defective wires. d. Seat switch not adjusted properly or defective. 	<ul style="list-style-type: none"> a. Replace lamps or replace lights (para 4-23). b. Replace switch (para 4-20). c. Tighten loose connections. Replace d. Adjust switch or replace defective switch (para 4-32).
6. Stoplight does not operate when brakes are applied.	<ul style="list-style-type: none"> a. Defective fuse. b. Defective pressure switch. c. Loose or defective wiring. defective wiring (para 4-22). d. Seat switch not properly adjusted or defective. e. Defective master cylinder. maintenance personnel. 	<ul style="list-style-type: none"> a. Replace fuse (para 4-27). b. Replace pressure switch (para c. Tighten loose connection or replace d. Adjust switch or replace defective switch (para 4-32). e. Refer to direct and general support
6. Horn does not sound.	<ul style="list-style-type: none"> a. Defective fuse. b. Defective horn button. c. Loose wiring. d. Seat switch not properly adjusted or defective. e. Defective horn. 	<ul style="list-style-type: none"> a. Replace fuse. b. Replace horn button or parts. c. Tighten connections. d. Adjust switch or replace defective switch (para 4-32). e. Replace horn (para 4-24).
8. Service brakes drag.	<ul style="list-style-type: none"> a. Improperly adjusted pedal or linkage. 	<ul style="list-style-type: none"> a. Adjust pedal free travel (para 4-33).

Chart 4-1. Troubleshooting (Continued)

Malfunction	Probable cause	Corrective action
8. Service brakes drag-Cont'd	b. Weak or broken return spring. c. Brake linings not fitted properly. d. Wheel bearing loose.	b. Replace return spring (para 4-33). c. Replace brake shoes (para 4-36). d. Adjust bearing (para 4-39)
9. Brake pedal soft or sponge.	a. Air in system. b. Inadequate oil supply c. Defective wheel cylinder.	a. Bleed system (para 4-35). b. Fill master cylinder (para 4-34) c. Replace wheel cylinder (para 4-37)
10. Brake pedal hard to depress.	a. Improperly adjusted pedal or linkage d. Brake lining glazed.	a. Adjust pedal free travel (para 4-33). b. Replace brake shoes (para 4-37).
11. Excessive pedal travel required to	a. Air in system.	a. Pump pedal several times. If pressure builds up to normal travel, bleed brake system (para 4-35).
Truck pulls to one side when brakes are applied	b. Inadequate oil supply. a. Fluid or grease on brake lining.	b. Fill master cylinder (para 4-34) a. Replace brake shoes (para 4-34).
	b. Brake shoe return spring defective. c. Defective wheel cylinder. d. Wheel bearing loose.	b. Replace spring (para 4-37). c. Replace wheel cylinder (para 4-37). d. Adjust wheel bearing (para 4-39).
13. Parking brake dragging.	a. Linkage improperly adjusted. b. Defective parking brake.	a. Adjust linkage (para 4-32). b. Refer to direct and general support maintenance personnel.
14. Steering mechanism not operating properly.	a. Steering mechanism not adjust properly. b. Incorrect wheel alignment	a. Adjust steering mechanism (para 4-42). b. Adjust wheel alignment (para 4-42).

Section VII. RADIO INTERFERENCE SUPPRESSION

4-16. 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 bonding straps, and using capacitors and resistors.

4-17. Interference Suppression Components
Radio interference suppression in the fork lift truck is obtained through the use of two bonding straps

4-18. Replacement of Suppression Components

- a. Remove drip Fan from beneath truck.
- b. Remove two screws and lock washers attaching drive motor to drive axle and remove two bonding straps fig. 4-37).
- c. Install bonding straps on flange and secure with two screws and lock washers.
- d. Install drip pan.

Section VIII. ELECTRICAL SYSTEM

4-19. General

a. Refer to figure 1-3 for a schematic diagram of the electrical system.

b. The main components of the -electrical system are the battery, which supplies the electrical power; the controls, which control and distribute the power: the instruments and the electric motors, which convert the electrical energy. into mechanical energy. The motors power the drive axle and hydraulic pump.

c. Operational controls consist of a directional

control and a speed control. The forward and reverse lever allows the operator to select the direction of travel. Speed control of the truck is maintained through a foot pedal or accelerator.

d. A key switch on the instrument panel opens and closes the circuits to operate the truck. An hourmeter installed on the instrument panel records elapsed running time of the truck. A green light on the panel glows when the key switch is in the "on" position.

e. All circuits on the truck are protected by fuses.

Lights, hourmeter, and hour are protected by a 15 amp fuse. The control fuse is 5 amps. The main power fuse 250 amps. The key switch and contractor circuit is protected by a 15 amp fuse. The power switch circuit is protected by 5 and 10 amp fuses. All fuses are the cartridge type.

Caution: Before performing any electrical repairs on the truck, disconnect battery receptacle (fig. 2-3). Discharge capacitors by turning key switch on and off several times.

4-20. Instruments

a. Removal. Remove sheet metal cover to gain access to instruments. Refer to figure 4-1 and remove the instruments.

b. Lamp Replacement. To replace lamp in indicator light (fig. 4-1), remove lens, remove lamp from socket and install new lamp.

c. Installation. Refer to figure 4-1 and install instructions.

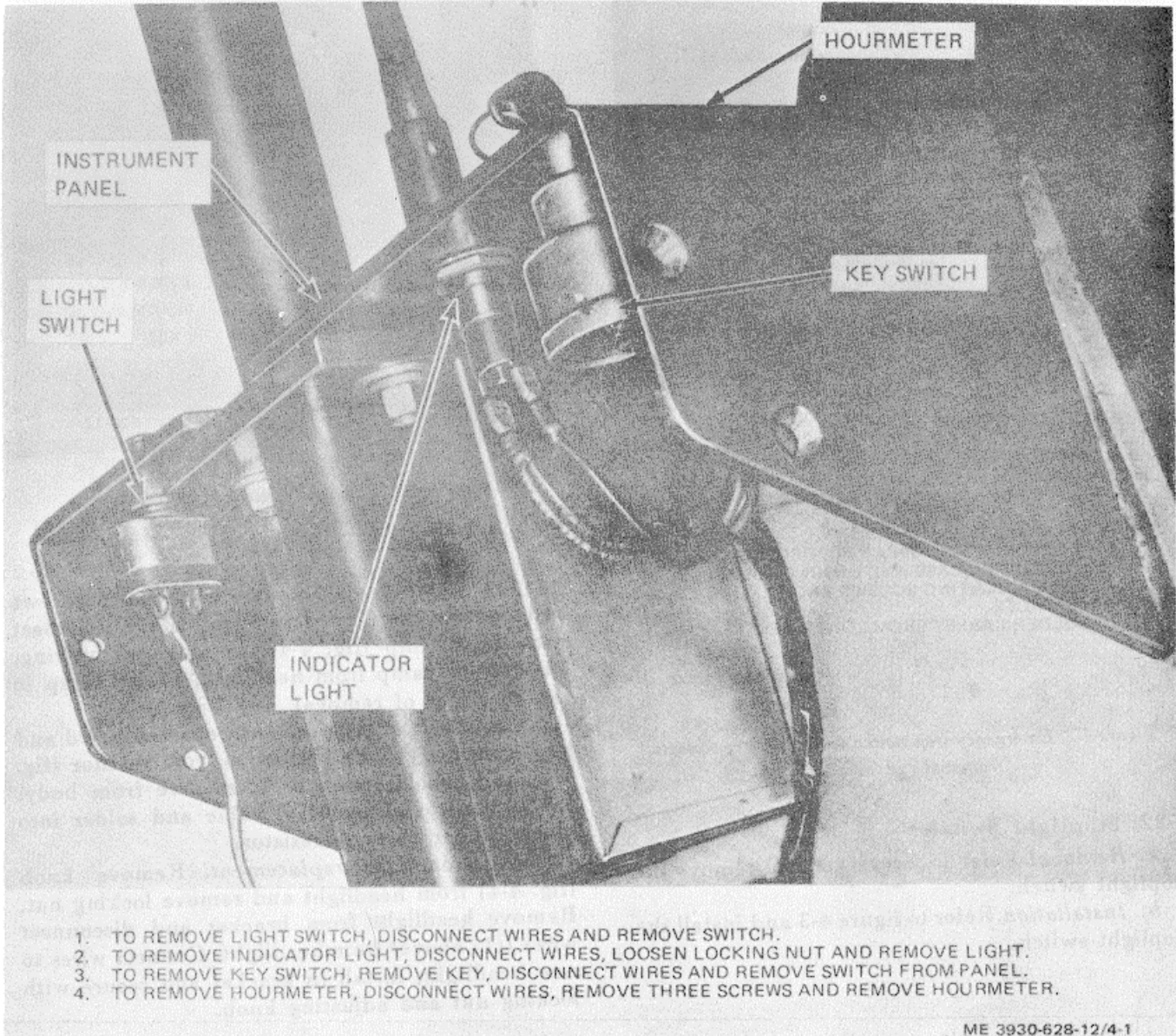
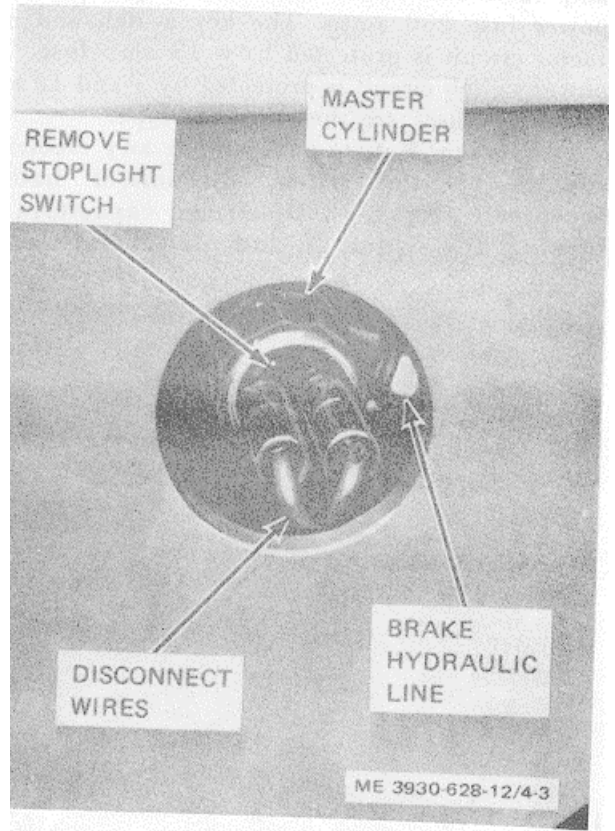
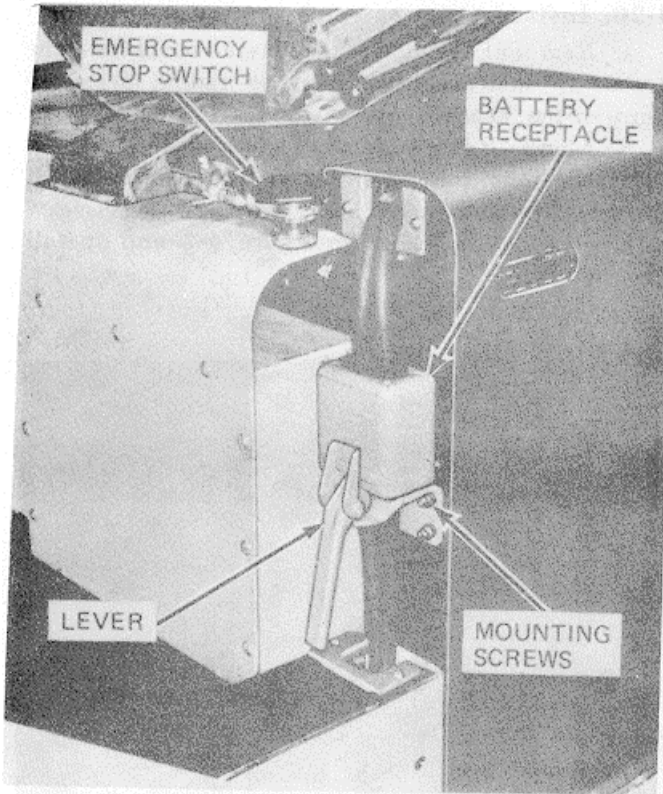


Figure 4-1. Instruments, removal and installation.

4-21. Emergency Stop Switch

a. Removal. Refer to figure 4-2 and remove the emergency stop switch.

b. Installation. Refer to figure 4-2 and install the emergency stop switch.



EMERGENCY STOP SWITCH

1. REMOVE SET SCREW AND REMOVE KNOB. REMOVE LEVERS.
2. DISCONNECT WIRES.
3. REMOVE ROUND NUT AND REMOVE SWITCH.

BATTERY RECEPTACLE

1. LIFT LEVER UP AND SEPARATE RECEPTACLES.
2. REMOVE UPPER CASE AND UNSOLDER CABLES.
3. REMOVE MOUNTING SCREWS AND REMOVE LOWER RECEPTACLE.
4. UNSOLDER CABLES FROM LOWER RECEPTACLE.

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Figure 1-2. Emergency stop switch and battery receptacle, removal and installation.

4-22. Stoplight Switch

- a. Removal. Refer to figure 4-3 and remove the stoplight switch.
- b. Installation. Refer to figure 4-3 and install the stoplight switch.

Figure 4-3. Stoplight switch. installed view.

4-23. Lights

a. Headlight.

(1) Lamp replacement. Remove two screws and separate guard and lens from body. Disconnect wires from lamp (fig. 4-4), remove locking ring, and remove lamp from headlight. Install lamp in reverse order of removal.

(2) Resistor replacement. Separate guard and lens from body. Unsolder wires from resistor (fig. 4-4) and unsolder resistor to remove from body. Install resistor of identical value and solder into place. Solder wires to resistor.

(3) Headlight replacement. Remove knob (fig. 4-4) from headlight and remove locking nut. Remove headlight from bracket and disconnect wires ((1) above) from headlight. Connect wires to new headlight, install in bracket and secure with nut and adjusting knob.

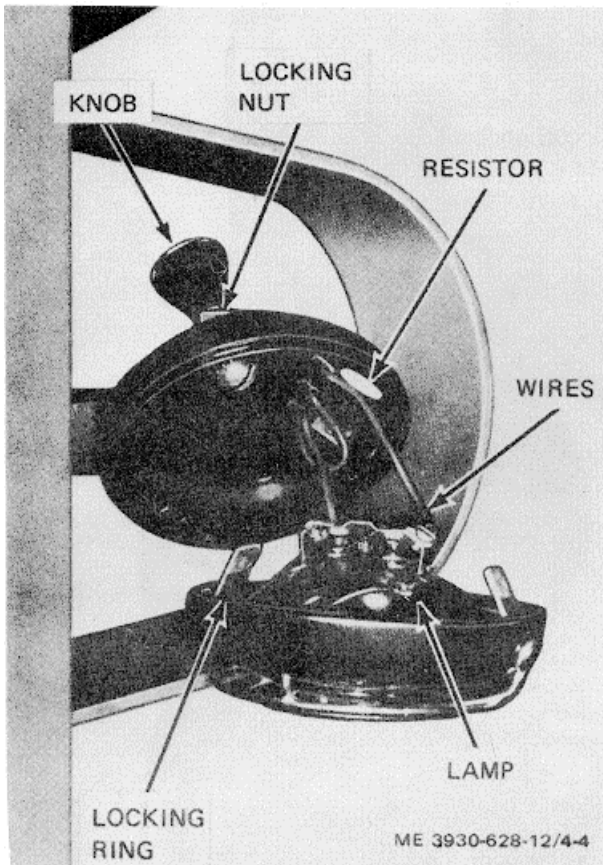


Figure 4-4. Headlight, removal and installation

b. Combination Rear Light.

(1) Lamp replacement. Remove screws attaching lens (fig. 4-5) to light. Push in on lamp and turn one-quarter turn to release lamp. Remove lamp from light. Both lamps are removed in this manner. Install new lamps and install lens. Secure lens with screws.

(2) Light replacement. Remove screws securing cover to junction box (fig. 4-5). Remove cover and light from junction box. Disconnect wires from light and remove light from cover. Install new light in cover, connect wires and install cover on junction box. Secure cover to junction box with screws.

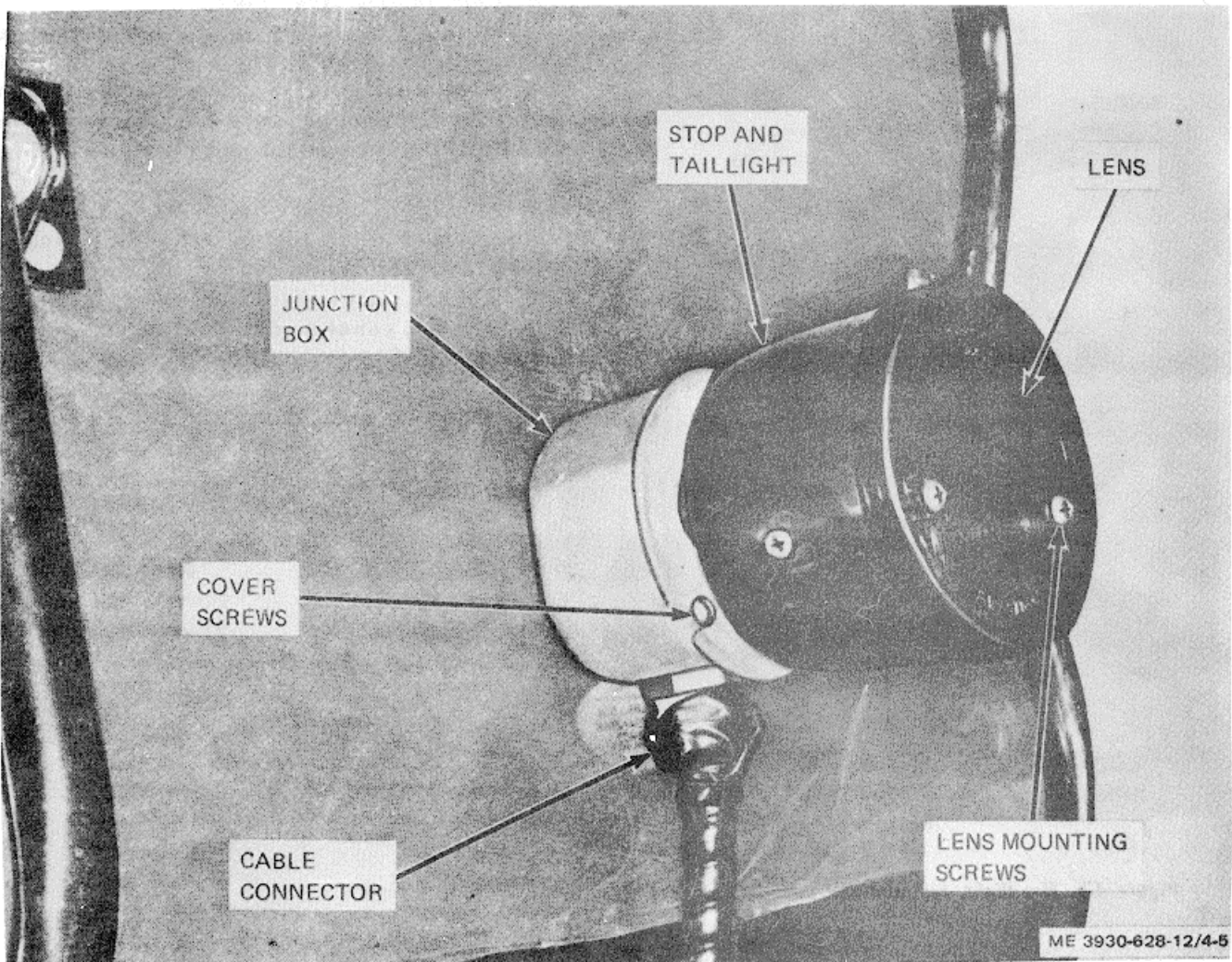


Figure 4-5. Combination rear light, installed view.

4-24. Horn

a. General. The horn is mounted below the shunt on the left side of the truck. Remove floor plate to gain access to horn.

b. Removal. Refer to figure 4-6 and disconnect

wires from horn. Remove one screw securing horn to frame and remove horn.

c. Installation. Install horn (fig. 4-6) and secure to frame with one screw. Connect wires to horn.

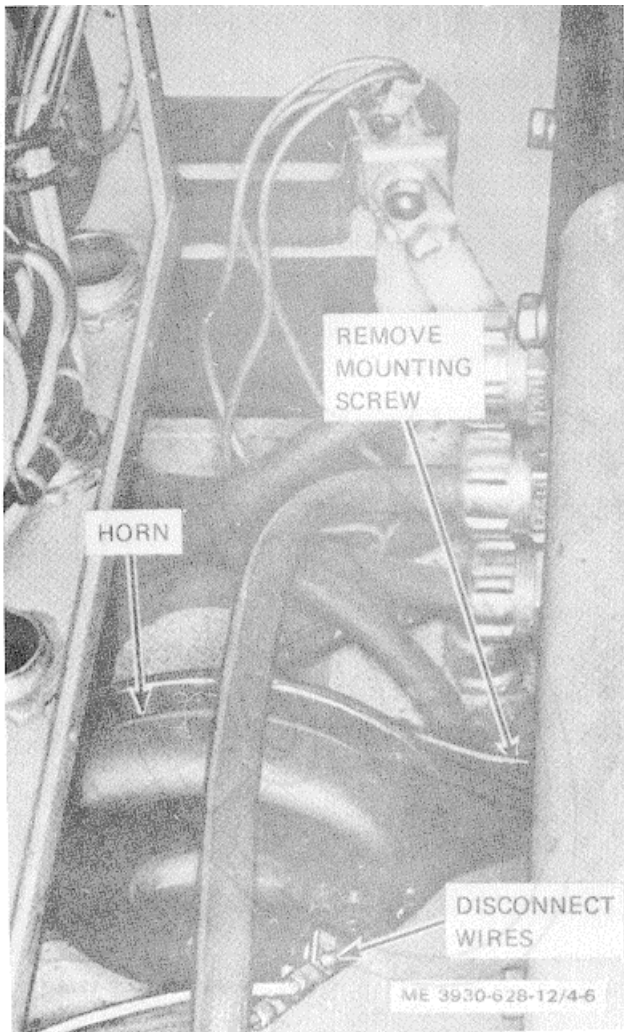
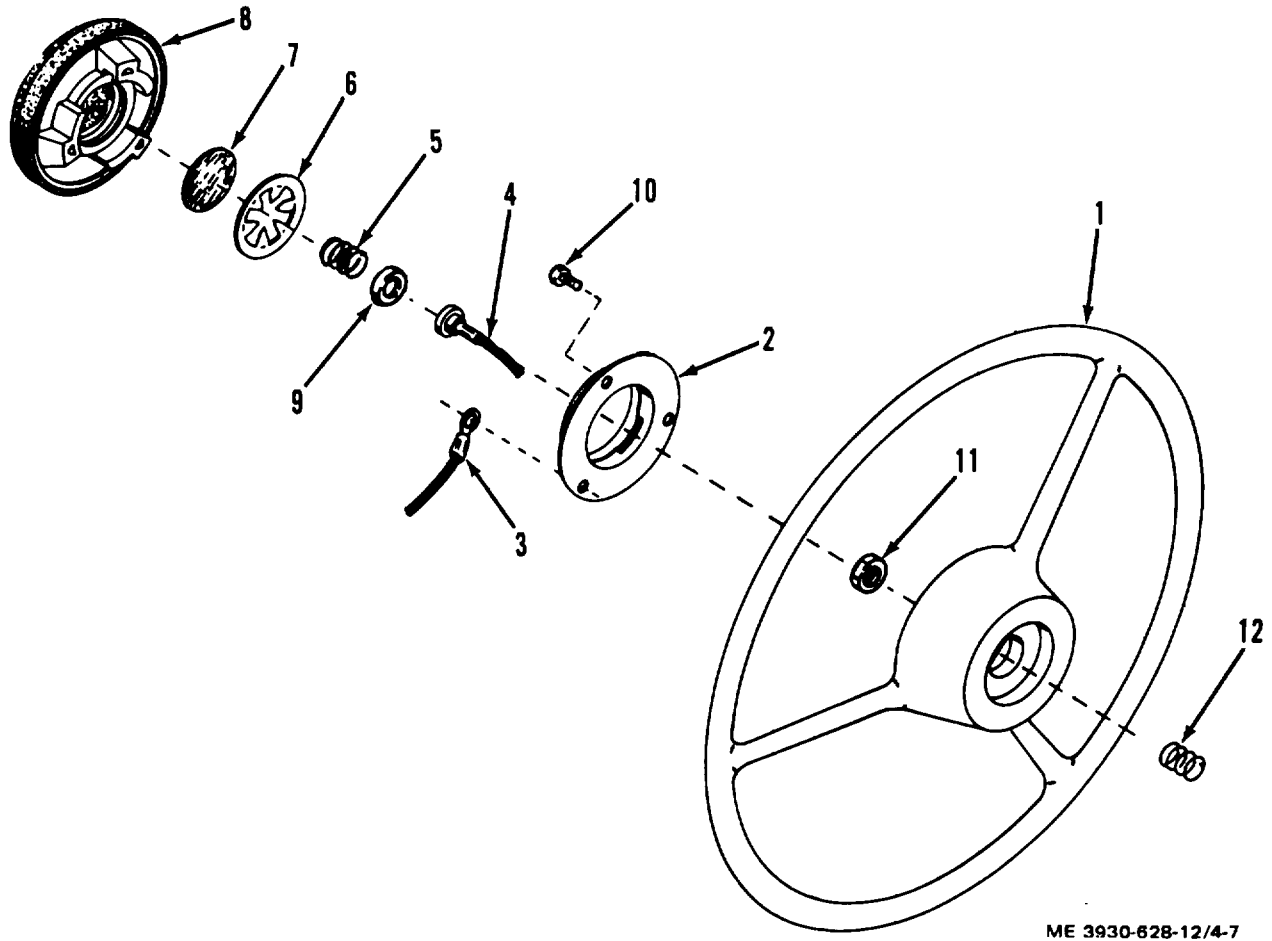


Figure 4-6. Horn, installed view.

d. Horn Button. The horn button is mounted in the center of the steering wheel.

(1) Removal Press down and twist cover (8, fig. 4-7) counterclockwise to remove from steering wheel. Remove button, spring and contact cup from wheel. Disconnect wires from contact cup and base plate.

(2) Installation. Connect wires to base plate (2, fig. 4-7) and contact cup. Install cup (6), spring (5) and button (7) in wheel. Install cover (8) and twist clockwise to engage lugs.



- | | |
|-------------------|------------|
| 1. Steering wheel | 7. Button |
| 2. Base plate | 8. Cover |
| 3. Ground wire | 9. Cap |
| 4. Wire | 10. Screw |
| 5. Spring | 11. Nut |
| 6. Contact cup | 12. Spring |

Figure 4-7. Horn button, exploded view.

4-25. Battery and Receptacle

a. General. The battery (fig. 4-8) is mounted in a compartment below and to the rear of the

operator's seat. The battery receptacle (fig. 4-2) is mounted on the left side of the battery compartment.

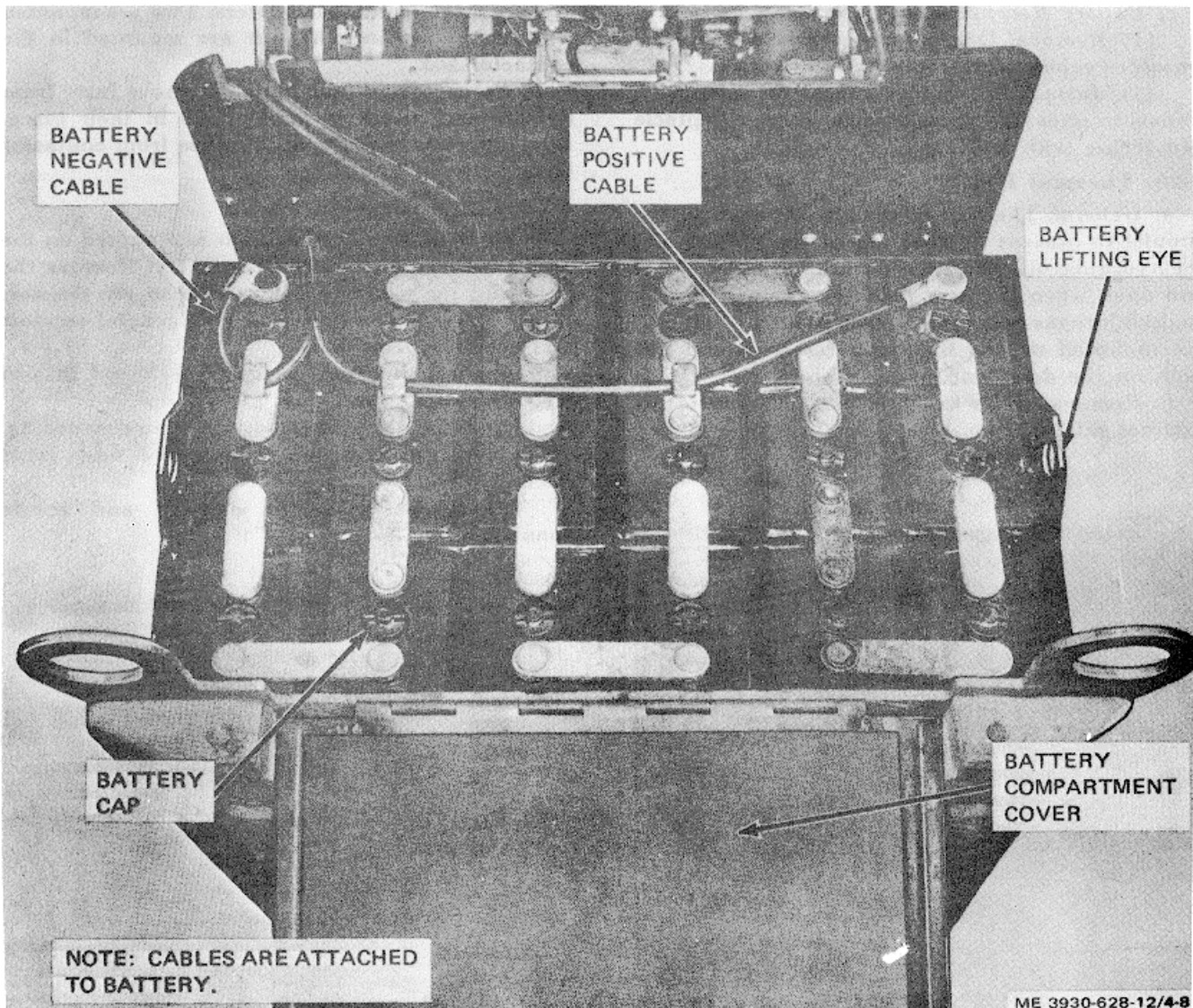


Figure 4-8. Battery service

b. Battery.

(1) Removal. Open battery cover and remove side panels. Raise seat to locked position to provide clearance when removing battery from truck. Disconnect battery receptacle (fig. 4-2). Attach a hoist of sufficient capacity to lifting eyes on battery and lift battery and receptacle connector from the truck.

(2) Cleaning. Tighten all filler caps securely. Clean battery posts, cable terminals, and top of battery with a solution of baking soda and water. Use care to prevent solution from entering filler caps and getting into battery. After foaming from solution stops, flush battery with clean, fresh water.

(3) Inspection and testing.

(a) Check cables for frayed insulation, broken strands, and damaged terminals.

(b) Inspect battery for cracks, breaks and other defects.

(c) Use a hydrometer and take a specific gravity reading of the battery. A fully charged battery should show a reading of approximately 1.275. If reading is 1.125 or lower, recharge battery. Refer to TM 9-6140-200-15 for checking specific gravity of battery.

(d) Check electrolyte level and fill to 5% inch above plates.

(4) Installation. Connect hoist to battery (fig. 4-8) and lift battery into compartment. Connect removable receptacle to lower receptacle and secure with lever. Install side panels and close battery cover.

c. Battery Receptacle and Cables.

(1) Removal. Disconnect receptacle (fig. 4-2). Unsolder cables from receptacle connector.

(2) Installation. Solder cables to receptacle. Connect removable receptacle to lower receptacle and secure with lever.

4-26. Thermal Relay.

a. General. Thermal relays are installed in the circuits to prevent overheating of the motors and the hydraulic oil. The switches are normally closed and open when the heat reaches a point where it could injure the component. Two switches (fig. 4-9) are mounted on the hydraulic reservoir and one each on the drive and pump motors.

b. Remotval. Refer to figure 4-9 and remove the thermal relays.

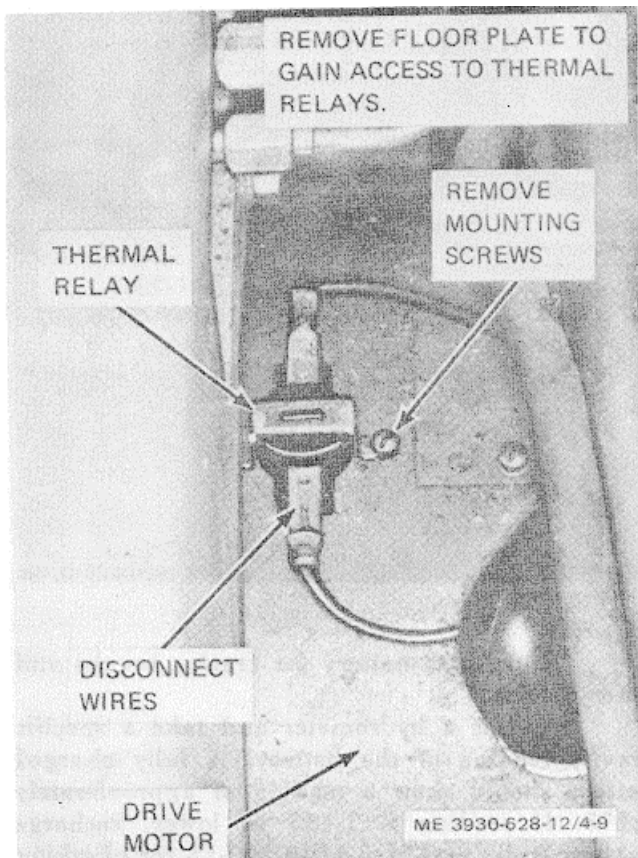


Figure 4-9. Thermal relay, installed view.

c. Installation. Refer to 4-9 and install the thermal relays.

4-27. Fuses.

a. General. The fuses are of the cartridge type

and are mounted in fuse holders. Two are mounted with the power switch, four are mounted in the contactor box.

b. Removal and Installation. Remove fuses from holders and install identical fuses in their place. Loosen screws to remove main fuse from contactor box.

4-28. Fixed Resistor.

a. General. The fixed resistor is mounted on the frame forward of the master cylinder. Remove the floor and toe plates to gain access to the resistor. Report any defects to direct and general support maintenance personnel.

b. Inspection. Refer to figure 4-10 and inspect resistor as follows:

(1) Inspect fixed resistor for secure mounting.

(2) Check resistor for cracks and other damage.

(3) Check wires for damage and secure connections.

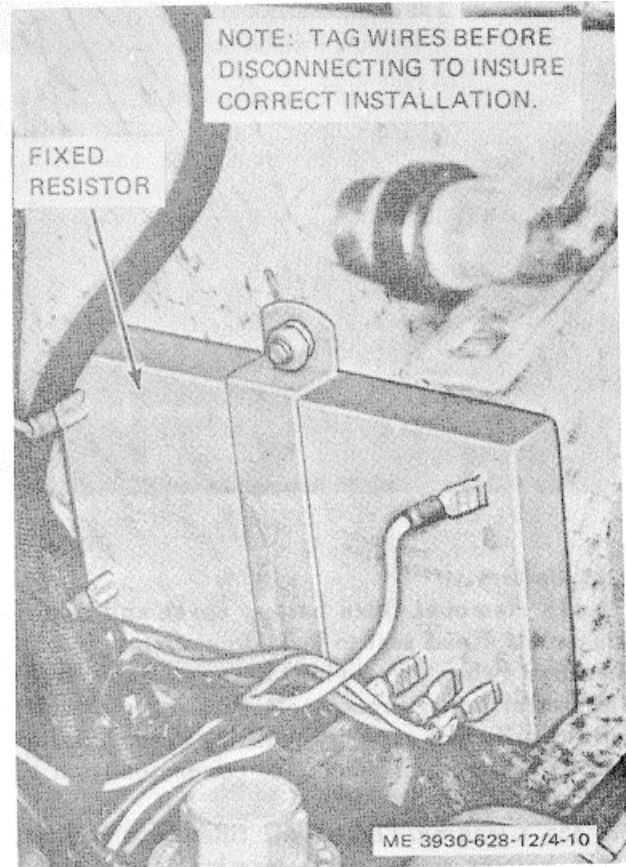


Figure 4-10. Fixed resistor, installed view.

4-29. Relay Contacts

a. General. Four contactor assemblies serve to connect components into the circuit. The contactors are mounted in the contactor box at the front of the battery compartment below the seat. The contactors operate the hydraulic-pump motor, forward and reverse motion (drive motor) and the emergency cutout. Contacts are made of a silver alloy. The contacts may have to be dressed or replaced to insure proper operation. Remove cover from contactor box to gain access to the contactors.

b. Removal. Refer to figure 4-11 and remove contacts from contactor armatures.

c. Cleaning. Clean contacts with a fine file to remove rough spots and erosion. Replace contacts when silver facings are almost worn through. Caution: Do not file or clean tips while they are installed in the contactor. Filings could cause damage to the electrical system.

d. Installation. Refer to figure 4-11 and install the contacts.

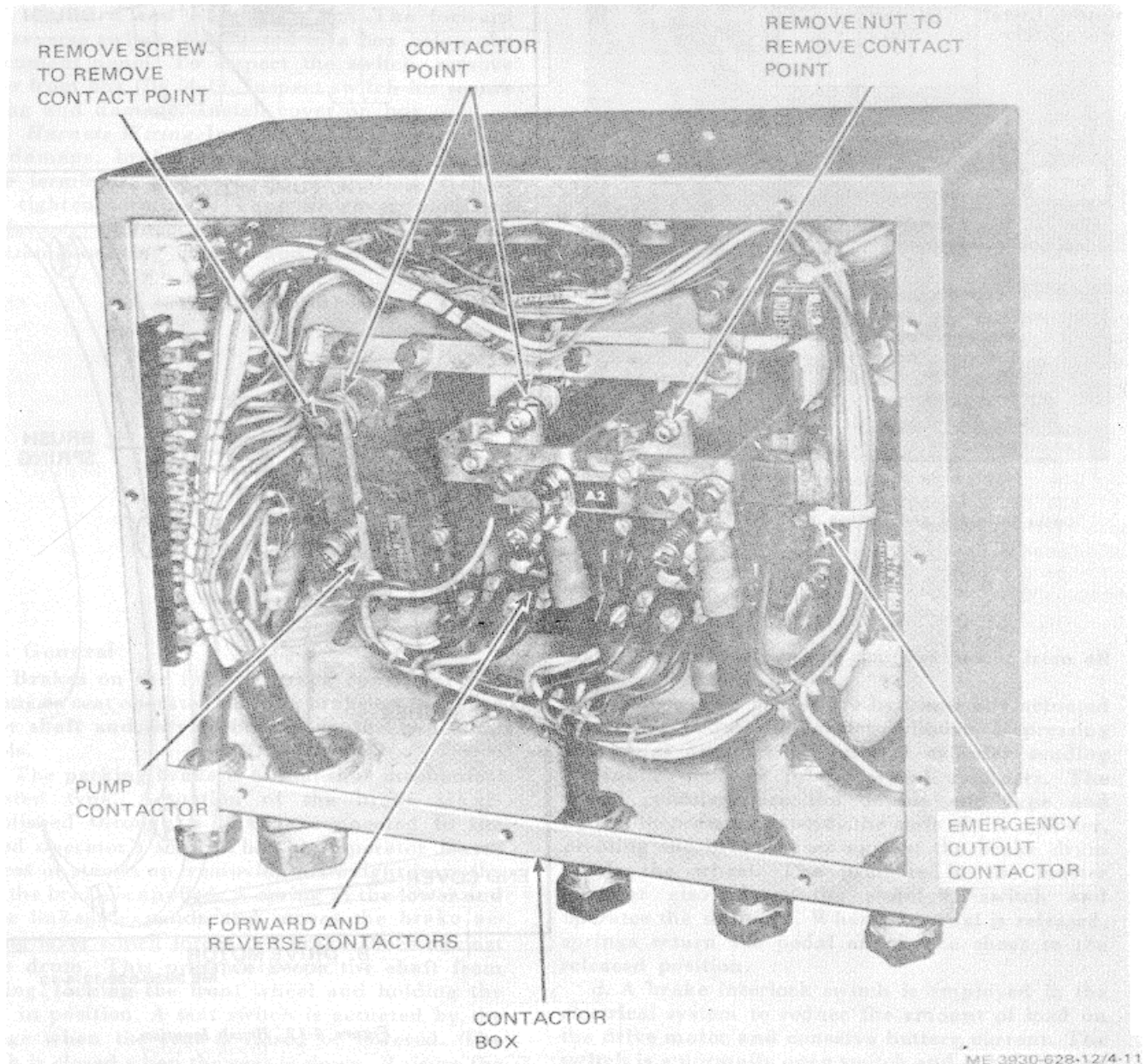
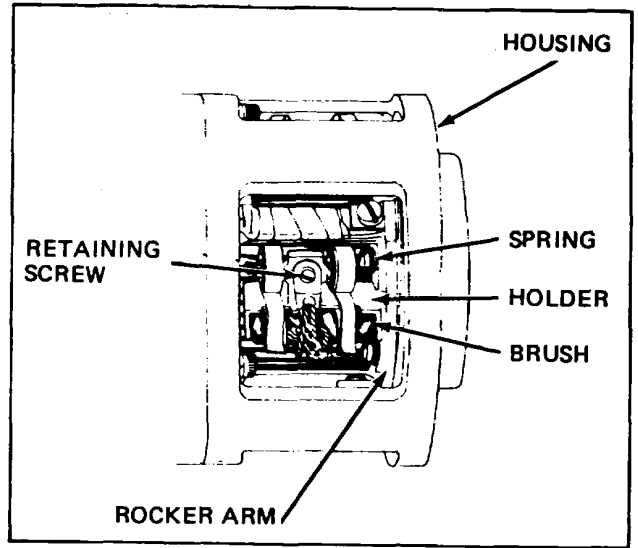


Figure 4-11. Contactor box, installed view

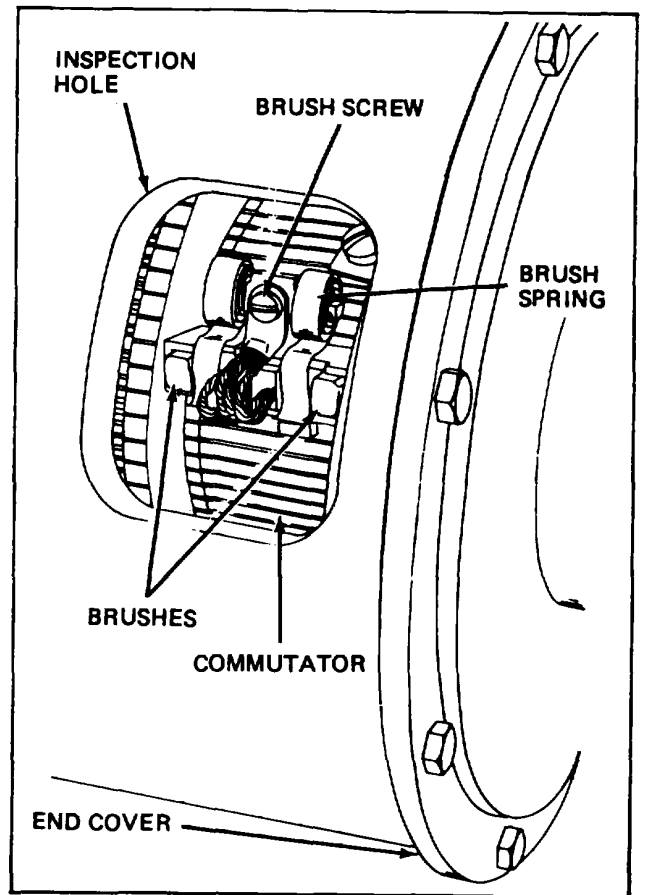
4-30. Electrical Component Inspection

a. General. The following components should be inspected periodically to maintain the truck in a serviceable condition. Any damage, wear, or conditions found that warrant replacement of the component should be brought to the attention of direct and general support personnel.

b. Motor Brushes. Remove drip pan and remove the rear band from the motor. Brushes will appear through inspection hole in the field yoke (fig. 4-12). Inspect brush condition and commutator for wear and damage. Check springs for cracks, damage, and serviceable condition. Install rear band on motor. Install drip pan.



A. PUMP MOTOR



B. DRIVE MOTOR

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Figure 4-12. Brush location

c. Accelerator Control. This control is located on the front part of the frame to the left of the steering column. Remove the cover from the box to gain access to the components. Inspect components as follows:

(1) Check potentiometer (fig. 4-13) for secure mounting and operation.

(2) Check switch, actuator, and arm for proper operation. Depress accelerator and observe operation of switch and potentiometer.

(3) Inspect return spring for cracks and damage. Operate accelerator and observe action of return spring.

d. Forward and Reverse Switch. The forward and reverse switch is mounted in a box below the instrument panel. To inspect the switch, remove cover from box (fig. 4-1). Inspect switch for secure wiring and damage. Install cover on box.

e. Harness Wiring. Inspect the wiring harnesses for damage, broken wires, damaged insulation, loose terminals, and insecure mounting. Repair and tighten terminals. Tape or cover damaged insulation. Connect broken wires, if possible. Tighten mounting clamps and ties, if necessary.

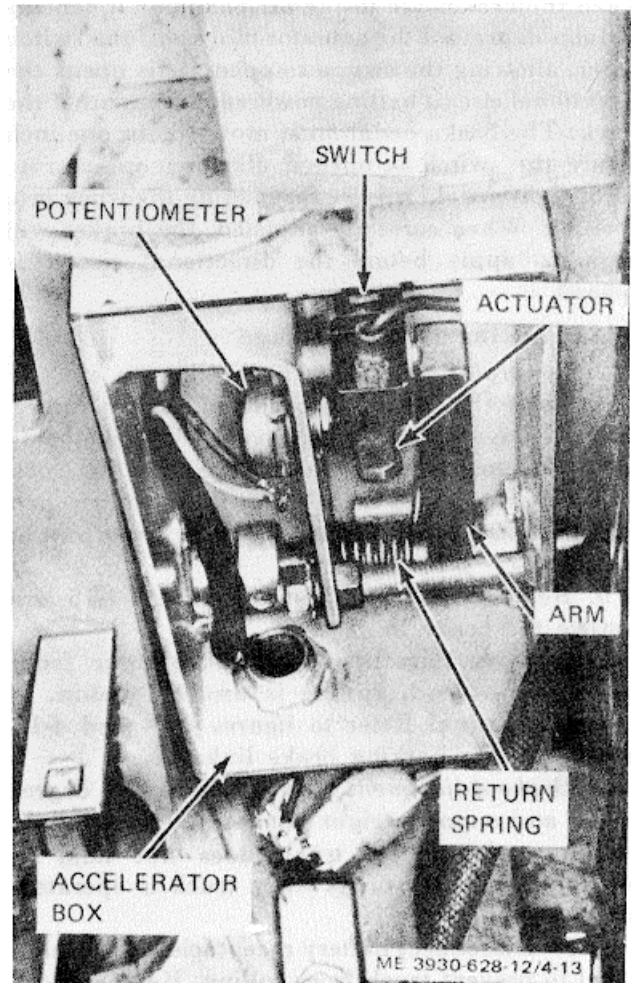


Figure 4-13. Accelerator control box, installed view.

Section IX. BRAKES

4-31. General

a. Brakes on the fork lift truck consist of two systems: a seat operated parking brake on the drive motor shaft and service brakes on the two front wheels.

b. The parking brake is a dual-shoe mechanical operated type. Actuation of the brake is accomplished through a linkage connected to the hinged operator's seat. When the operator leaves the seat or stands up, removing his weight from the seat, the brake is applied. A spring at the lower end of the linkage expands and moves the brake actuating lever which forces the brake shoes against brake drum. This pressure keeps the shaft from rotating, locking the front wheel and holding the truck in position. A seat switch is actuated by the linkage when the seat is raised or lowered. The switch is closed when the seat is down. Raising the

seat opens the switch and removes power from all electrical circuits.

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 in the master cylinder also closes the stoplight switch and operates the stoplight. When the pedal is released, springs return the pedal and brake shoes to the released position.

d. A brake interlock switch is employed in the electrical system to reduce the amount of load on the drive motor and conserve battery current. The switch is a normally open switch and is held closed

by an actuator attached to the brake pedal rod when the brakes are in the off position. When the pedal is depressed the actuator moves off the switch roller, allowing the switch to open. This opens the directional circuit halting powered movement of the truck. The brake pedal must move about one inch before the switch is opened allowing operator to apply light pedal pressure for inching the truck into position. When correctly adjusted, the brakes will begin to apply before the directional circuit is opened.

4-32. Parking Brake Linkage

a. General. The parking brake linkage extends down from the lower right side of the operator's seat. Remove sheet metal cover from right side below seat to gain access to linkage. Elevate truck with jacks and block in position. Remove drip pan from bottom of truck to gain access to lower part of linkage.

b. Removal. Refer to figures 4-14 and 4-15 and remove the brake linkage. Caution: Carefully remove retainer from lower end of rod. Spring is under tension.

c. Installation. Refer to figures 4-14 and 4-15 and install the parking brake linkage.

d. Brake Adjustment. Drive truck to a 15 degree incline and remove weight from seat. Truck should remain stationary. If truck does not hold in position or if brake drags when truck is operated, adjust as follows:

(1) Disconnect battery receptacle and block a wheel to prevent truck from rolling. Remove floor and toe plates and drip pan.

(2) Raise operator's seat all the way. Remove cotter pin and yoke pin (fig. 4-14) from upper end of linkage.

(3) Loosen lock nut (fig. 4-14) and adjust

yoke on rod. Turn yoke clockwise to shorten linkage and provide more brake action or counterclockwise to provide less brake action.

(4) Connect yoke to switch actuator (fig. 4-14) and measure distance from back of seat to battery compartment cover. When seat is raised, distance should measure between 41/2 to 51/2 inches. Adjust as above to obtain distance.

(5) If above adjustment does not hold truck on incline, adjust at lower end of linkage as follows:

(6) Loosen lock nut (fig. 4-15) and turn spring retainer counterclockwise to compress spring and shorten linkage. Recheck adjustment ((4) above). Tighten lock nut.

e. Switch Adjustment. If switch (fig. 4-14) does not open directional circuit when seat is raised, or when switch is replaced, adjust as follows:

(1) Disconnect battery receptacle.

(2) Remove pin from upper linkage yoke (fig. 4-14). This will allow seat to pivot freely.

(3) Operate seat and check operation of switch actuator (fig. 4-14) and switch. Switch should open just before parking brake is applied.

(4) Loosen switch mounting screws (fig. 4-14) and move switch horizontally on bracket. Move switch to right to provide faster switch action and to left to allow actuator to contact switch later. Tighten mounting screws and connect upper yoke to actuator.

(5) Check adjustment as follows:

(6) Connect battery receptacle and prepare truck to travel (para 2-9).

(7) With operator in seat and key switch on, start to place truck in motion (para 2-11).

(8) Remove weight from seat to apply parking brake. Indicator light (fig. 2-2) should go out.

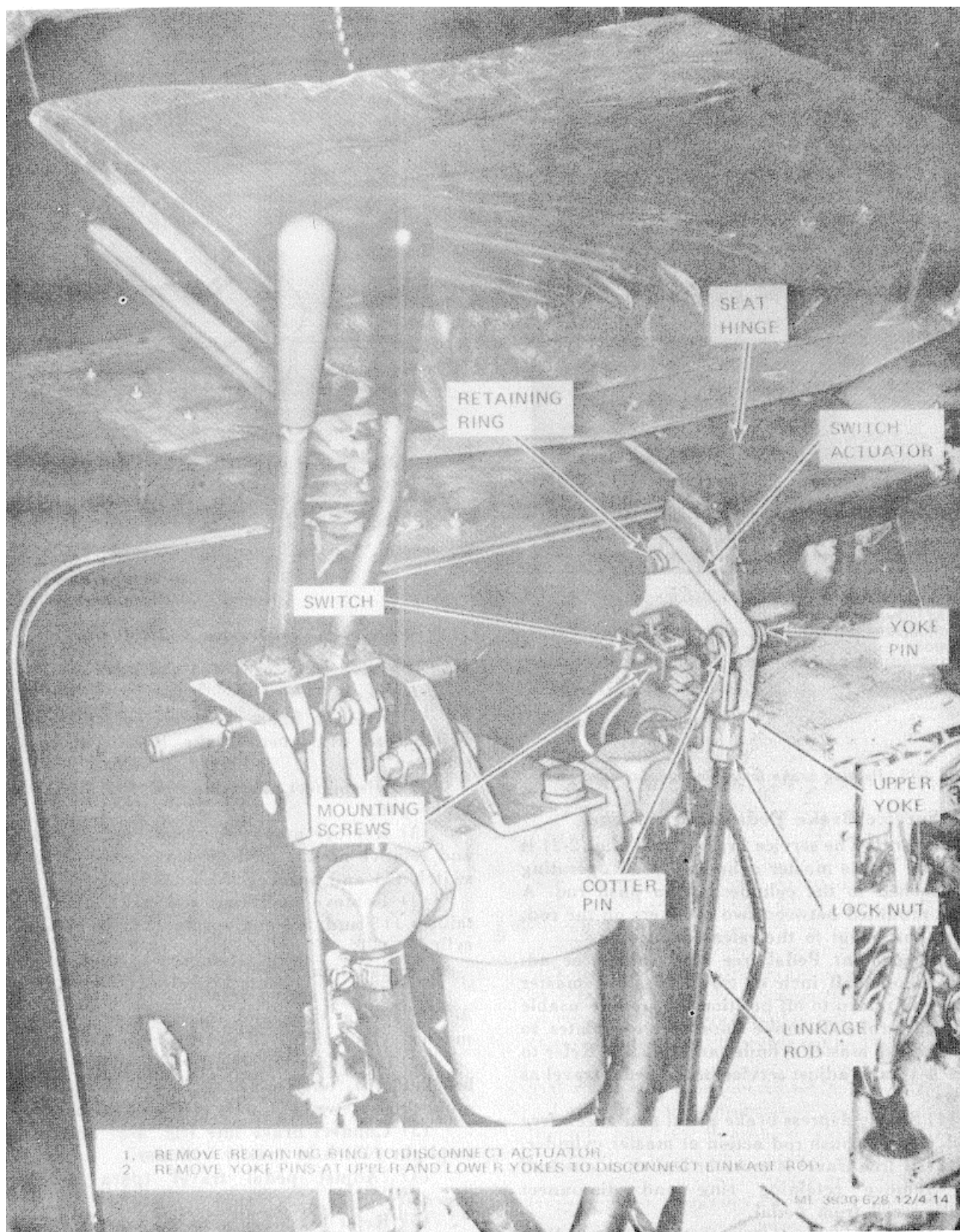
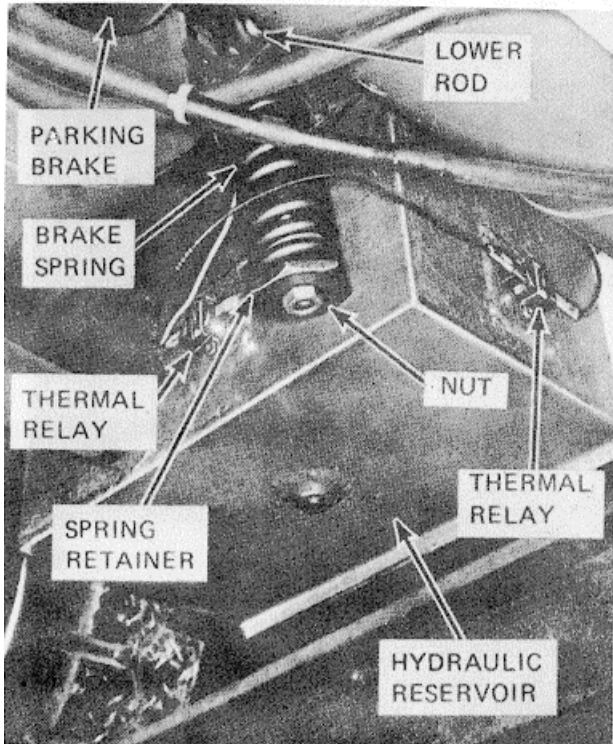


Figure 1-11. Parking brake upper linkage, installed view



1. REMOVE NUT FROM ROD.
2. REMOVE SPRING RETAINER AND SPRING FROM ROD
3. DISCONNECT LOWER ROD FROM PARKING BRAKE LEVER

Figure 1-15. Parking brake lower linkage. installed view.

4-33. Service Brake Pedal and Linkage

a. General. The service brake pedal (fig. 2-21) is connected to the master cylinder by an operating rod attached to the cylinder piston push rod. A spring, mounted between two retainers on the rod, returns the pedal to the released position.

b. Adjustment. Pedal free play should be adjusted to one-half inch of travel to allow master cylinder to return to off position and reduce usable length of stroke. Remove floor and toe plates to gain access to master cylinder and linkage. Refer to figure 4-16 and adjust service brake pedal travel as follows:

- (1) Slowly depress brake pedal and check free travel. Observe push rod action at master cylinder.
- (2) If free travel is more or less than one-half inch, remove retaining ring and disconnect operating rod from pedal.
- (3) Adjust locknut on operating rod to adjust travel in direction desired.

- (4) Connect operating rod to pedal and check travel. Adjust as above if necessary to bring travel within limits specified.

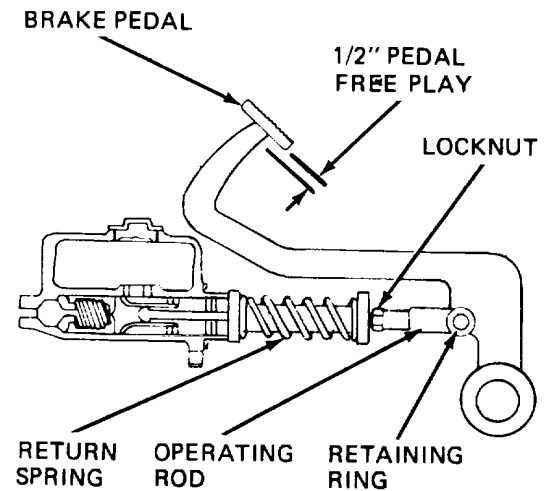


Figure 4-16. Service brake pedal adjustment

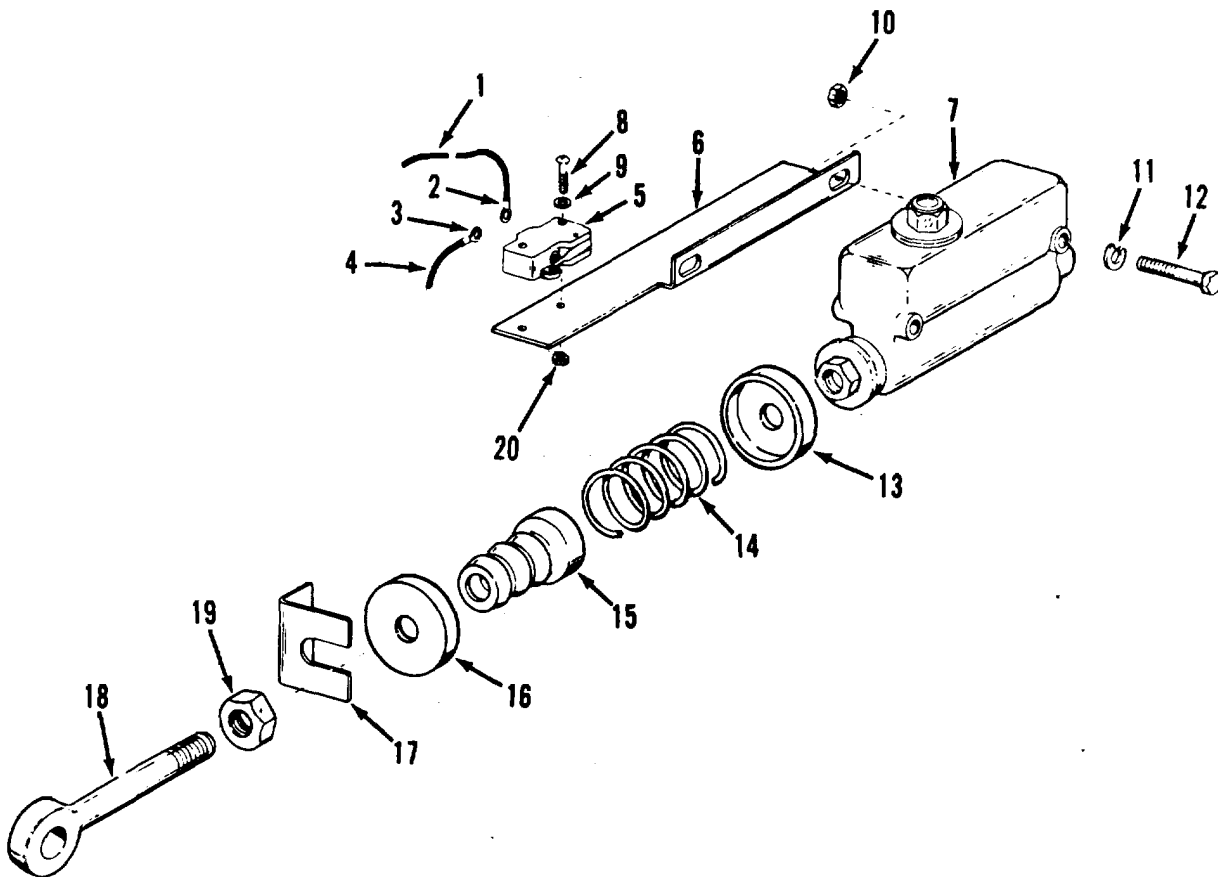
4-34. Service Brake Master Cylinder

a. Removal.

- (1) Refer to figure 4-3 and remove stoplight switch and disconnect brake line from master cylinder.
- (2) Disconnect operating rod (fig. 4-16) from brake pedal.
- (3) Remove mounting screws 112, fig. 4-11 and remove master cylinder from truck. Remove switch (5) and bracket 161 from truck.
- (4) Remove operating rod (8), spring retainers (13 and 16) and spring (4) from master cylinder (.)

b. Installation.

- (1) Install spring retainers (13 and 1 fig. 4-17 spring (4) and operating rod (18) on master cylinder. Install rod through boot (15).
- (2) Install master cylinder -switch (5) and bracket (6) on frame support. Secure with mounting screws (12) nuts (10) and washers (11).
- (3) Connect brake line fig. 4-31 and install stoplight switch in master cylinder.
- (4) Adjust pedal travel (para 4-33) if necessary
- (5) Refer to c. below to fill master cylinder and bleed brake hydraulic system.



- | | |
|--------------------|---------------------|
| 1. Wire | 11. Lock washer |
| 2. Terminal | 12. Screw |
| 3. Terminal | 13. Retainer |
| 4. Wire | 14. Spring |
| 5. Switch | 15. Boot |
| 6. Switch bracket | 16. Retainer |
| 7. Master cylinder | 17. Switch actuator |
| 8. Screw | 18. Rod |
| 9. Lock washer | 19. Nut |
| 10. Nut | 20. Nut |

Figure 4-17. Service brake master cylinder, exploded view

c. Bleeding Brake Hydraulic System. Each time the system has been drained or refilled or a part has been disconnected or replaced, the system must be bled as follows:

(1) Remove filler cap from master cylinder and fill to proper level (3/4 inch from top).

(2) Connect a bleeder hose to bleeder screw on front wheel (fig. 4-18). Submerge other end of hose in a glass jar filled with brake fluid.

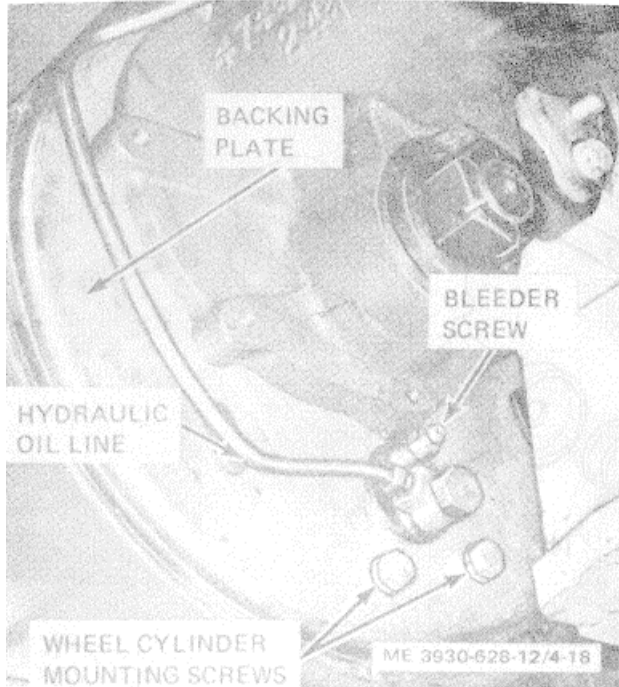


Figure 1-18. Service brake system bleeder screw.

(3) Repeat. Open the bleeder screw one turn.

(4) Slowly depress brake pedal to end of travel and release pedal. Repeat several times. Observe Cause in jar and repeat pumping of brake pedal until no air 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 as close to full as possible at all times

(5) Close bleeder screw and disconnect hose. Repeat operation on bleeder screw on other front wheel.

(6) Fill master cylinder to proper level after bleeding operation. Replace filler.

Caution: Discard fluid salvaged from brake system during bleeding operation. Do not use in system.

4-35. Brake Interlock Switch

a. General. The brake switch is operated by a switch actuator (17, fig. 4-17) Brake pedal should move about one inch before switch is opened. Depress brake pedal and check switch operation. If adjustment is necessary, adjust as follows:

b. Adjustment.

(1) Loosen switch mounting screws (8, fig. 4-17)

(2) Slide switch toward rear of truck to shorten pedal travel before switch action or toward front of truck to lengthen pedal travel.

(3) Tighten switch mounting screws to secure adjustment.

c Removal. To remove interlock switch (5, fig. 4-17), disconnect wires (1 and 4) and remove two mounting screws (8), nuts (20) and lock washers (9).

d. Installation. Install interlock switch (5, fig. 4-17) and secure with two screws (8), nuts (20) and lock washers (9). Connect wires (11 and 4) to switch. Adjust switch operation (b above).

4-36. Service Brake Brake Shoes

a. General. The service brake brake shoes are mounted behind the dust shield. The shoes are attached to the wheel cylinders and return springs. The brakes are self-adjusting.

b. Removal.

(1) Refer to paragraph 4-39 and remove the front drive wheel and tire assembly.

(2) Refer to figure 4-19 and remove brake dust shield as follows:

(a) Remove four screws and lock washers securing dust shield to axle. Remove wheel bearing from axle.

(b) Carefully remove dust shield from around axle pinion.

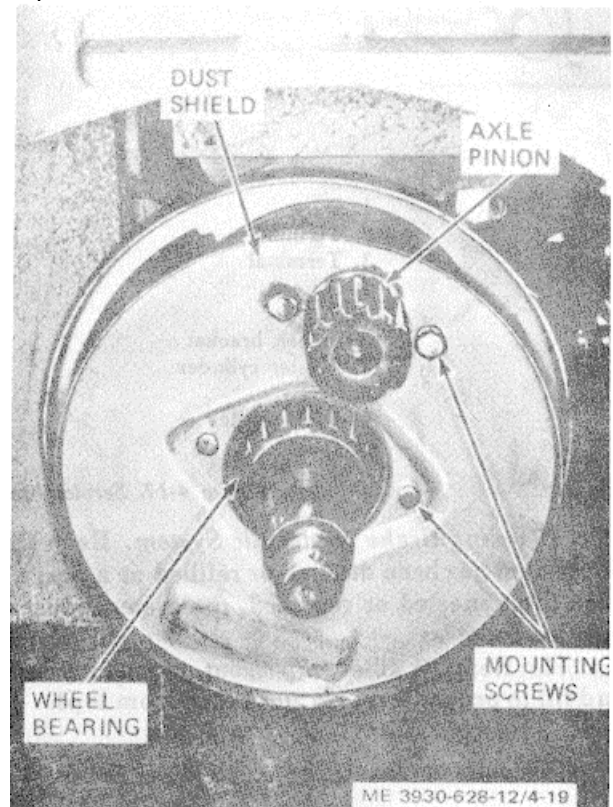


Figure 4-19. Service brake dust shield, installed view.

(3) Refer to figure 4-20 and remove brake shoes as follows:

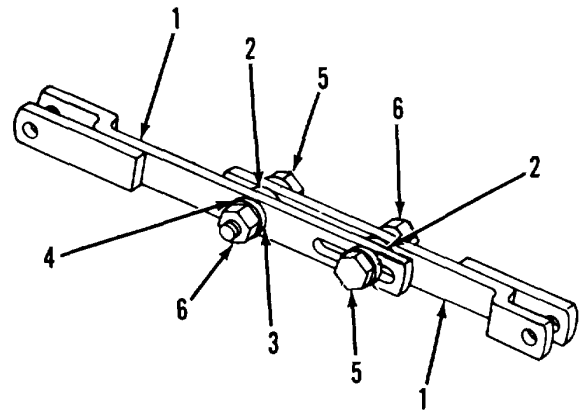
(a) Disconnect three springs from brake shoes.

(b) Disconnect brake shoes from wheel cylinder and lift brake shoes and attached adjuster assembly and cylinder links from backing plate.

(c) Using a brass drift, drive the spring pins from adjuster assembly and remove adjuster assembly from brake shoes.

(d) Remove pins securing cylinder links to brake shoes and remove links.

(e) Disassemble adjuster assembly by removing two screws (5, fig. 4-21), nuts (6) and washers (3 and 4). Separate slide assemblies (1)



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1. Slide assembly
2. Nylon washer
3. Washer
4. Lock washer
5. Screw
6. Nut

Figure 4-21. Adjuster assembly. disassembly and assembly.

c. Cleaning and Inspection.

(1) Inspect linings on shoes 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.

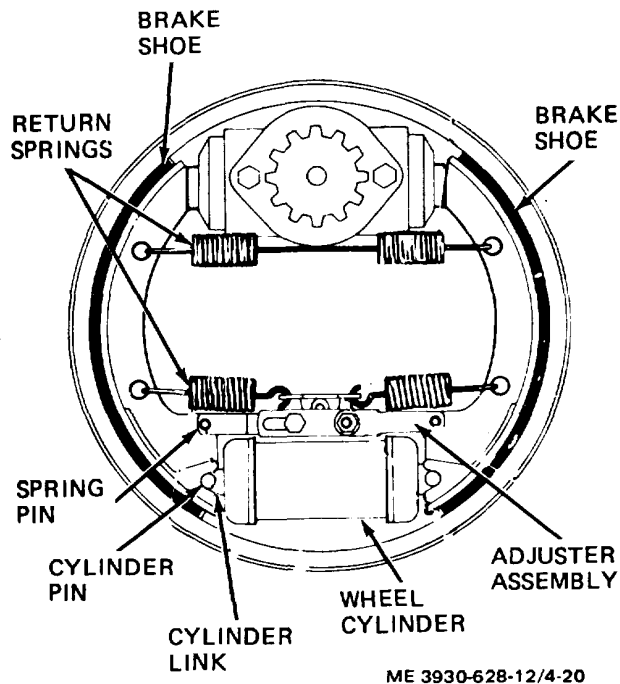
(4) If linings are worn to less than 1/8 inch or if linings are saturated with fluid or grease, replace shoes.

(5) Inspect brake shoes for wear, cracks or 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.



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(1) Refer to figure 4-21 and assemble adjuster assembly as follows:

(a) Install slide assemblies (1) with nylon washers (2) between slides.

(b) Secure slides with screws (5), nuts (6) and washers (3 and 4). Tighten only finger tight.

(c) Move slides along slot until center-to-center distance of holes in ends of slides is 5 1/4 inches.

(d) Tighten screws (5) to a torque of 14 to 16 pound-inches.

(e) Hold screws in position and tighten nuts (6) to a torque of 29 pound-inches.

(f) Check slip resistance of slide assemblies. Resistance must be 250 to 300 pounds.

(2) Refer to figure 4-20 and install brake shoes as follows:

(a) Install wheel cylinder links on bottom of brake shoes and-secure links with pins.

(b) Install adjuster assembly on brake shoes and secure to brake shoes with spring pins.

(c) Install brake shoes on backing plate, with links installed in ends of wheel cylinder. Hold shoes in position with three return springs.

(3) Refer to figure 4-19 and install dust shield and secure with four screws and lock washers.

(4) Refer to paragraph 4-39 and install front drive wheels.

4-37. Service Brake Wheel Cylinder

a. Removal.

(1) Refer to paragraph 4-36 and remove brake shoes.

(2) Refer to figure 4-18 and remove wheel cylinder as follows:

(a) Disconnect brake line from fitting in wheel cylinder.

(b) Remove two screws and lock washers securing cylinder to backing plate and remove wheel cylinder.

b. Installation.

(1) Refer to figure 4-18 and install wheel cylinder on brake backing plate as follows:

(a) Install wheel cylinder on backing plate and secure with two screws and lock washers.

(b) Connect brake line to fitting in wheel cylinder.

(2) Refer to paragraph 4-36 and install service brake shoes.

(3) Refer to paragraph 4-35 and bleed brake system hydraulic lines.

Section X. WHEELS

4-38. General

a. The front drive wheels are mounted on spindles attached to the axles. Jackshafts, with pinion gears, extend through the brake assemblies and mesh with the ring or bull gears in the wheels. Rotation of the pinions cause the ring gears to rotate around the spindles, driving the truck.

b. The rear steering wheels (fig. 4-24) mount on spindle attached to the steering axle. Action of the steering gear and drag link moves the pivot arm assembly. Tie rods, extending to the spindles, are connected to the pivot arm. As the pivot arm moves, the tie rods move the spindles, turning the wheels in the direction of travel desired.

c. Both pairs of wheels are mounted on tapered roller bearings. The bearings must be greased and adjusted as described in paragraph 4-39.

4-39. Wheels and Tires

a. General. The front or drive wheel assemblies consist of the wheel and brake drum, tire, wheel bearings, and a ring or bull gear. The rear or

steering wheel assemblies consist of the wheel, tire, and wheel bearings.

b. Front Wheel Removal.

(1) Raise the front of the truck until the wheel clears 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 mast will elevate drive wheel clear of the floor.

(2) Refer to figure 4-22 and remove front drive wheel as follows:

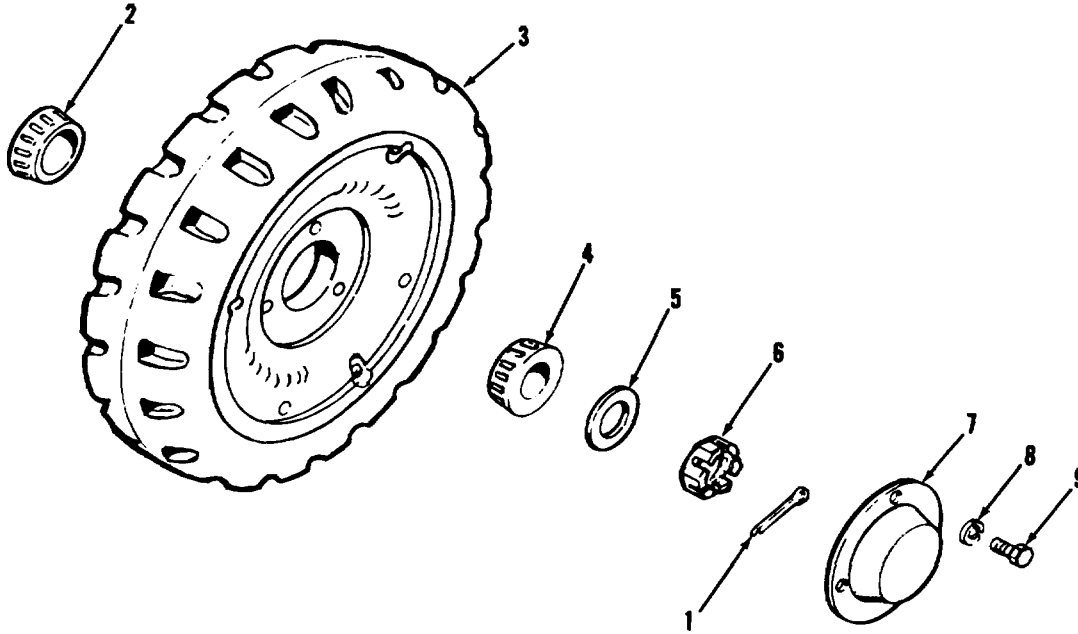
(a) Remove three screws (9) and lock washers (8) and remove hub cap (7).

(b) Remove cotter pin (1) from wheel nut (6) and remove wheel nut and washer (5) from axle.

(c) Remove outer wheel bearing (4) from wheel and axle.

(d) Remove wheel assembly (3). Remove wheel carefully to prevent damage to brake shoes or drums.

(e) Remove inner wheel gearing (2).



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1. Cotter pin
2. Inner wheel bearing
3. Wheel and tire assembly
4. Outer wheel bearing
5. Washer
6. Wheel nut
7. Hub cap
8. Lock washer
9. Screw

Figure 4-22. Drive wheel, exploded view.

c. Inspection.

(1) Inspect wheel and tire (3, fig. 4-22) for damage. Check teeth on ring or bull gear inside wheel for damage.

(2) Inspect brake drum for cracks, flat spots, excessive wear, and damage.

(3) Inspect bearings (2 and 4) and bearing cups in wheel for wear or damage.

(4) Clean bearings and bearing surfaces with cleaning compound, solvent (Fed. Spec. P-D-680).

d. Front Wheel Installation. Refer to figure 4-22 and install the wheel assembly as follows:

(1) Replace the inner and outer bearings (2 and 4) with grease (GAA).

(2) Install inner bearing (2) on axle spindle, with tapered side out.

(3) Install wheel assembly (3) on bearing and spindle. Hold wheel assembly in place and install outer wheel bearing (4) on spindle and inside wheel, tapered side in.

(4) Install wheel nut (6) and washer (5) on spindle. Tighten nut and as nut is tightened rotate wheel under power. Elevate truck. Block other wheel to prevent turning. Continue tightening nut until heavy drag is felt while rotating wheel. Tighten nut to 50 foot-pounds.

(5) Slowly loosen nut two flats and rotate wheel. Loosen nut to a point where wheel rotates freely and no bearing end play is evident.

(6) Install cotter pin (1) to secure nut.

(7) Install hub cap (7) and secure with three screws (9) and lock washers (8).

(8) Tilt mast backward to lower wheel to floor. Remove block from under mast.

e. Rear Wheel Removal. Use a suitable jack and raise rear of truck until wheels clear the floor. Block front wheels to prevent truck from rolling. Refer to figure 4-23 and remove rear wheel as follows:

(1) Remove three screws (9) and lock washers (8) and remove hub cap (7).

(2) Remove cotter pin (6) from wheel nut (5) and remove wheel nut and washer (4).

(3) Remove outer wheel bearing (3) and wheel assembly (2) from axle spindle.

(4) Remove inner wheel bearing (1).

f. Inspection. Refer to b above to inspect and clean wheel assembly. Repack wheel bearings with grease (GAA).

g. Rear Wheel Installation. Refer to figure 4-23 and install rear wheels as follows:

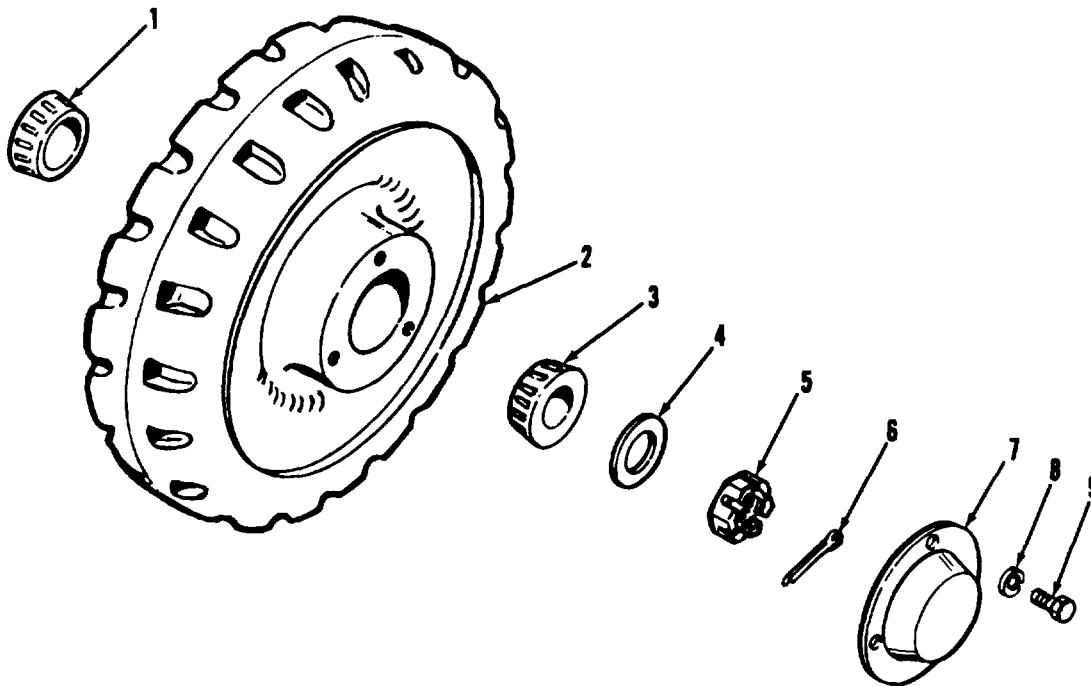
(1) Install rear wheel bearing (1) on spindle, tapered side out, and install wheel assembly (2) over bearing.

(2) Hold wheel in place and install outer wheel bearing (3), tapered side in, in wheel.

(3) Refer to c above to adjust wheel bearings. Rotate wheels by hand. Torque wheel nuts (5) to 50 foot-pounds, rotating wheel six times in each direction. Back off nut and retorquing nut to 25 footpounds. Install cotter pin (6).

(4) Install hub cap (7) and secure with three screws (9) and lock washers (8).

(5) Lower jack and remove jack from truck.



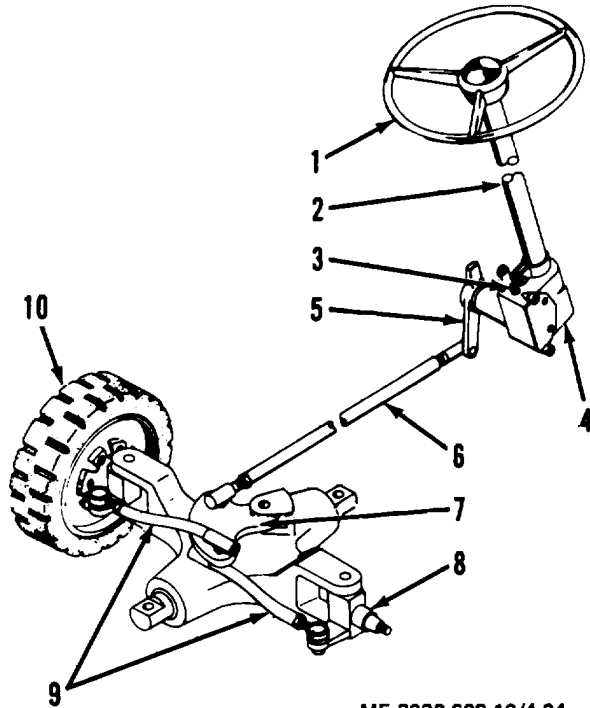
ME 3930-628-12/4-23

1. Inner wheel bearing
2. Wheel and tire assembly
3. Outer wheel bearing
4. Washer
5. Wheel nut
6. Cotter pin
7. Hub cap
8. Lock washer
9. Screw

Figure 4-23. Rear wheel. exploded view.

4-40. General

a. The steering system (fig. 4-24) is manually operated. Main components are the steering wheel, steering column, steering gear, steering arm, and drag link.



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1. Steering wheel
2. Steering column
3. Filler plug
4. Steering gear assembly
5. Steering arm
6. Drag link
7. Pivot arm
8. Wheel spindle
9. Tie rods
10. Rear wheel

Figure 4-24. Steering system.

b. The drag link (6) connects to the pivot arm (7) on the rear, or steering axle. Two tie rods (9) extend from the pivot arm to the wheel spindles (8). Rotation of the steering wheel (1) moves the

steering and pivot arms. Movement of the pivot arm pulls the tie rods in unison moving the wheels in direction of the turn desired.

4-41. Steering Wheel

a. Removal.

(1) Refer to paragraph 4-24 and remove the horn button.

(2) Remove screws (10, fig. 4-7) and remove base plate (2).

(3) Remove nut (11).

(4) Using a suitable puller, pull steering wheel

(1) from steering gear shaft. Remove spring (12).

b. Installation.

(1) Install steering wheel (1, fig. 4-7) and spring (12) on steering shaft. Secure wheel with nut (11).

(2) Install base plate (2) and secure with screws (10).

(3) Refer to paragraph 4-21 and install horn button.

4-42. Steering System Adjustments

a. General. Adjustments required consist of wheel toe-in, pivot arm stops and steering arm stops.

b. Toe-In.

(1) Place a jack under rear of truck and raise truck far enough to provide working clearance; Place blocks under truck to hold in raised position. Block front wheels to prevent movement.

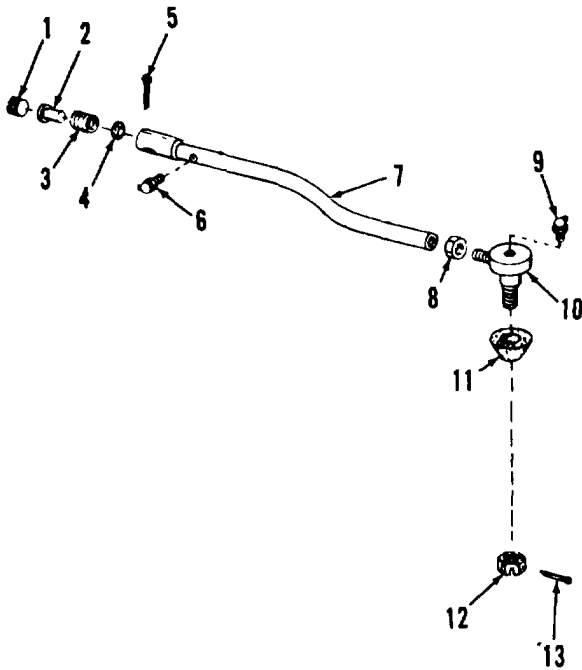
(2) Remove toe and floor plates to gain access to steering arm and steering gear.

(3) Rear wheels should be in line with and parallel to frame with zero toe-in. Turn steering wheel from lock to lock, counting number of turns. Center steering wheel and check wheel toe-in.

(4) Remove cotter pin (13, fig. 4-25) and nut (12). Remove boot (11) and tap ball socket (10) from wheel spindle.

(5) Loosen nut (8) and adjust length of tie rods to bring wheels in line with frame by turning ball socket (10) in or out of tie rod/tube (7). Torque nut (8) to 50-70 foot-pounds to cure adjustment.

(6) Install ball socket (10) in spindle and secure with boot (11), nut (12) and cotter pin (13).



- | | |
|------------------------|------------------------|
| 1. Adjusting plug | 8. Nut |
| 2. Ball seat | 9. Lubrication fitting |
| 3. Spring | 10. Ball socket |
| 4. Spacing washer | 11. Boot |
| 5. Cotter pin | 12. Nut |
| 6. Lubrication fitting | 13. Cotter pin |
| 7. The rod tube | |

Figure 4-25. Tie rod, exploded view

c. Pivot and Steering Arm Stops.

(1) Turn wheels full right or full left.

(2) Adjust the pivot arm stop screws (fig. 4-261 to allow 1/2 inch clearance between tire and steering axle with the wheels turned full right and full left. Stop screws should limit spindle travel to 86° as shown. Torque stop screw locknuts to 2-3 foot-pounds.

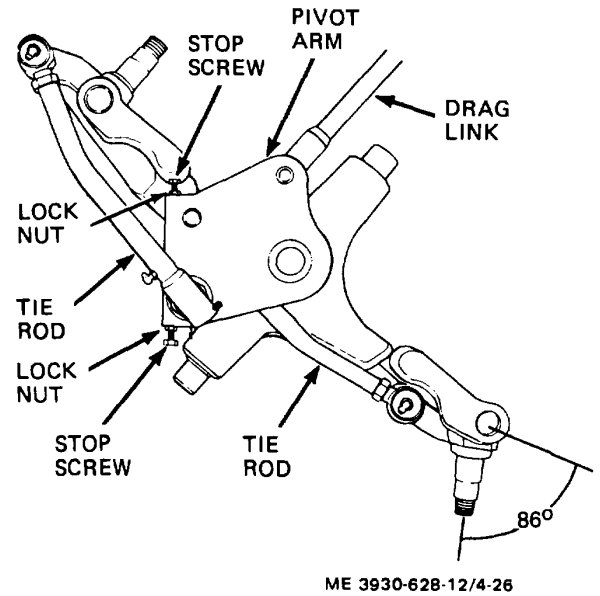


Figure 4-26. Pivot arm stop adjustment

(3) With the pivot stop screws adjusted ((2) above) adjust the steering arm stops (fig. 4-27) to contact steering arm at same time spindle contacts stop screws.

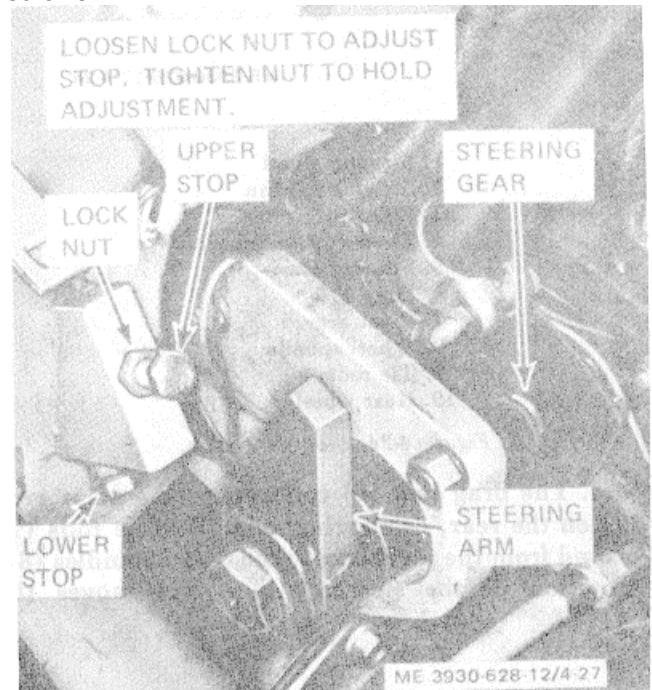


Figure 4-27. Steering arm stop adjustment.

Section XII. AXLE ASSEMBLIES

4-43. General

a. The front or driving axle is connected to the drive motor shaft. The shaft drives the differential in the center of the axle. Torque is transmitted to the axles or jackshafts. The pinion on the axle is meshed with a ring or bull gear in the wheel assembly. Rotation of the axles rotates the wheels providing motive power from the truck.

b. The rear or steering axle is mounted on brackets at the front and rear. The spindles pivot on king pins and are actuated by tie rods extending from a pivot arm mounted at the center of the axle. A steering gear, controlled by the steering wheel, rotates the pivot arm, through the drag link, in the direction required to turn the wheels.

c. The following paragraphs describe service functions allocated to organizational maintenance for the axles.

4-44. Front Axle

a. Service points on the front axle include the breather and drain and level plugs.

b. The breather is located on the right top of the differential housing. Remove breather and clean with cleaning compound, solvent (Fed. Spec. P-D- 680) and dry thoroughly. Install breather and tighten securely.

c. The level plug is located at the right front of the axle housing. Remove plug and check level of lubricant. Oil should be to level of plug hole. Add lubricant as required. Install plug.

d. The drain plug is located at the bottom of the differential housing. Remove level plug. Place a suitable container beneath axle, remove plug, and drain lubricant. Install plug and tighten securely. Fill differential through level plug opening to level of hole. Install level plug.

e. Lubrication of axle pinion and ring and bull gear is accomplished by removing the front wheel. Refer to paragraph 4-39 and remove the front wheels. Clean the pinion and ring gears with solvent and dry thoroughly with compressed air. Lubricate gears sparingly with grease (GAA). Install front wheels. Check bull gear mounting screws for tightness. Tighten if necessary.

4-45. Rear Axle

a. The rear, or steering axle, requires very little service. Lubricate according to the lubrication 3rder.

b. Check tie rods, axle, and drag link for damage.

c. Check steering action and adjust if necessary (para 4-42).

Section XIII. FRAME COMPONENTS

4-46. Battery Compartment Cover and Side Panels

a. General. The battery compartment cover is hinged at the rear and in the center. Lift cover up and to rear to gain access to battery compartment.

b. Removal.

(1) Remove screws securing cover rear hinge to rear plate.

(2) Remove cover from truck.

(3) Lift side panels from truck.

c. Inspection and Repair.

(1) Check covers, hinges and panels for damage.

(2) Straighten bent covers, hinges and panels, if possible.

d. Installation.

(1) Install side panels on truck.

(2) Install battery compartment cover and secure hinge to rear plate.

1-47. Overhead Guard

a. Removal.

(1) Remove four screws securing overhead guard to front corners of truck.

(2) Remove screws securing overhead guard to counterweight.

(3) Remove overlad guard. Use a hoist, if necessary.

b. Installation.

(1) Carefully lift overhead guard into place on truck.

(2) Secure overhead guard to front and counterweight with screws and nuts.

4-48. Operator's Seat

a. Removal.

(1) Refer to paragraph 4-23 and remove stop and taillight from rear of seat.

(2) Remove four self-locking nuts and bumpers securing seat to seat plate and remove seat.

b. Disassembly.

(1) Remove seat cushion from lower part of seat.

(2) Remove four screws and lock washers securing backrest cushion to seat frame and remove backrest.

c. Assembly.

(1) Install backrest cushion on seat frame and secure with four screws and lock washers. 12) Install seat cushion on seat.

d. Installation.

(1) Install seat on seat plate and secure with four bumpers and self-locking nuts. (2) Refer to paragraph 4-23 and install stop and taillight on rear of seat.

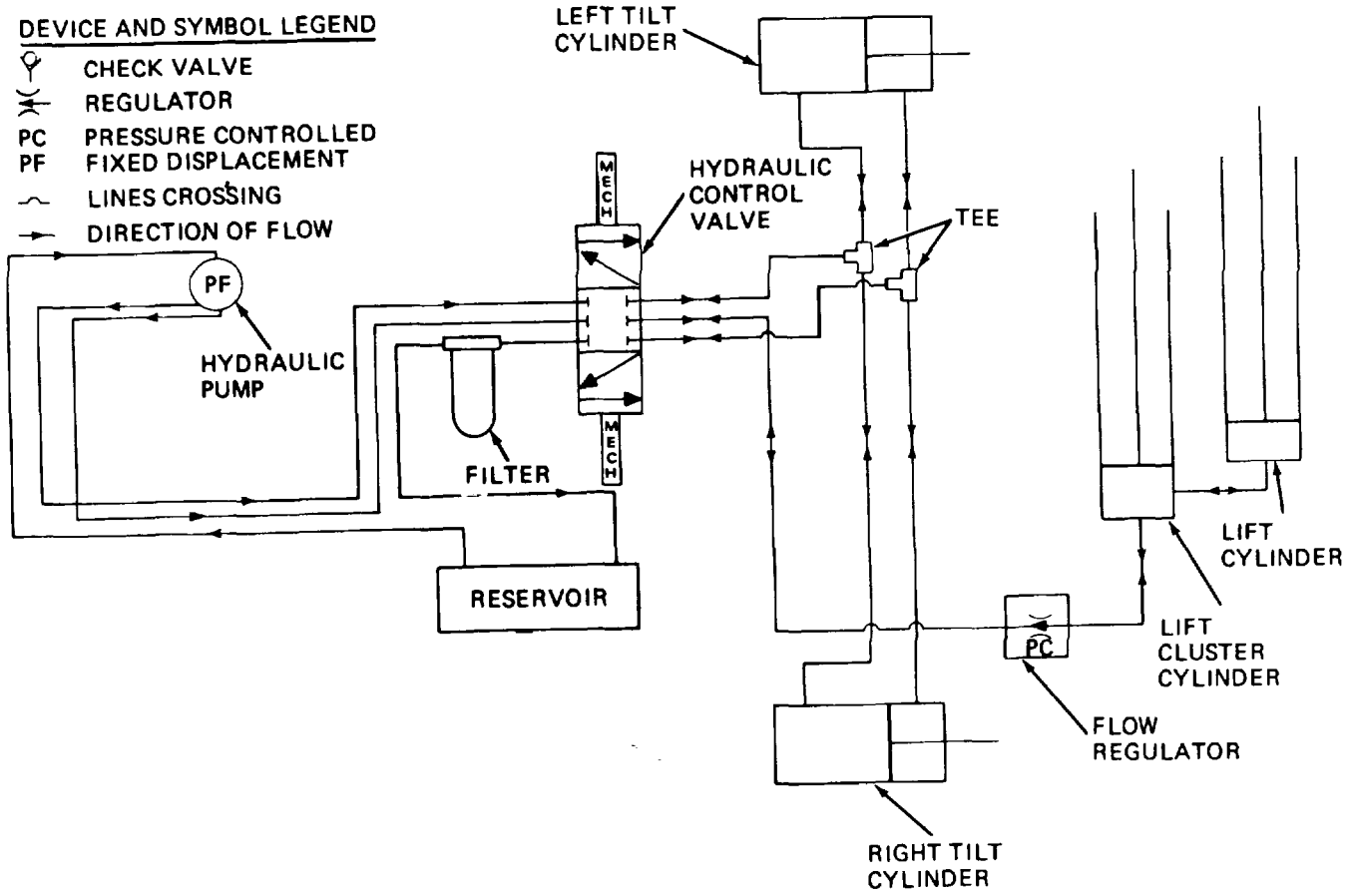
Section XIV. HYDRAULIC LIFT COMPONENTS

4-49. General

a. Power to raise, lower, and tilt the mast and carriage is supplied by the hydraulic system (fig. 4-28). Hydraulic oil is stored in the reservoir and pumped by the hydraulic pump to a control valve. Manipulation of the control valve levers opens and

closes ports to the various cylinders providing motion to lift and tilt mast.

b. The main components as illustrated on figure 4-28 are the hydraulic oil reservoir, motor-driven dual hydraulic pump, control valve, filter, lift and tilt cylinders and hoses and tubes.



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Figure 4-28. Hydraulic system, schematic diagram

4-50. Hydraulic Reservoir Breather

a. Removal. Remove floor plate and toe plate. Refer to figure 4-29 and remove the breather from the hydraulic reservoir as follows:

(1) Remove breather from hydraulic oil reservoir.

(2) Remove element screw (fig. 4-30) from top of breather and remove breather element (fig. 4-30) from inside of breather.

b. Cleaning and Inspection. Clean the filter element with hydraulic oil or with a reverse flow of

compressed air. If element cannot be cleaned or is damaged, replace breather.

c. Installation. Install the hydraulic reservoir breather as follows:

(1) Install filter element (fig. 4-30) in breather and secure with element screw.

(2) Check oil level on level gage (fig. 4-29). Add oil (OE) to bring level to FULL mark on gage.

(3) Install breather on reservoir.

d. Assembly. Install floor and toe plates on truck to cover reservoir.

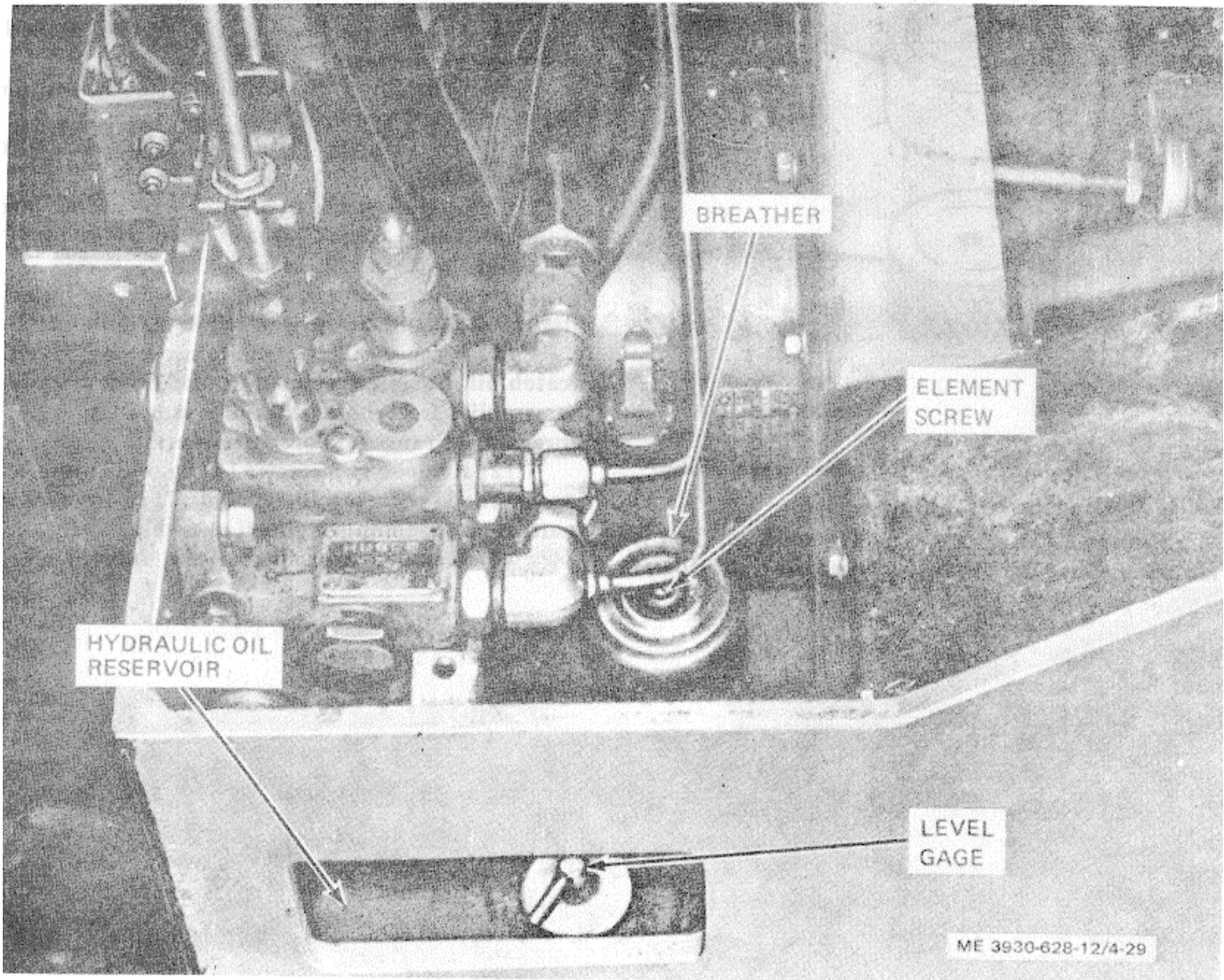


Figure 4-29. Hydraulic oil reservoir and breather, installed view

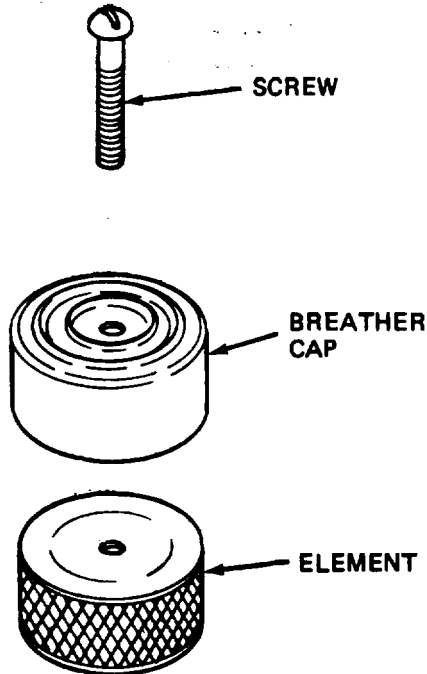


Figure 1-.30. Hydraulic reservoir breather. exploded view.

4-51. Hydraulic Oil Filter

a General. The micron-type hydraulic oil filter is mounted above the control valve on the right side of

the contactor box. Hose assemblies lead from the control valve to the filter and from the filter to the reservoir.

b. Service. Service of the filter consists of replacing the filter element. Remove sheet metal cover at right side below seat. Refer to figure 4-31 and service the filter as follows:

(1) Place a suitable container or rags below filter to catch oil as element is removed.

(2) Unscrew body (10) from filter head (7). Remove element (8) from body.

(3) Clean head and interior of body and inspect for nicks and defects.

(4) Inspect packing (9) in groove in body. Replace if necessary.

(5) Install new element (8) in body and new packing (9) if required.

(6) Install body (10) in filter head (7) and tighten snugly.

(7) Operate truck hydraulic system and check filter for leaks. Check level of oil in reservoir and add oil to bring to full mark on gage.

c Removal. Remove sheet metal cover. Refer to figure 4-32 and remove oil filter as follows:

(1) Place a suitable container below filter to catch oil. Loosen hose clamps and disconnect hose assemblies from both sides of head. Plug hoses to prevent entrance of foreign material.

(2) Remove two screws (4, fig. 4-31) and lock washers (5) securing filter head (7) to bracket (3) and remove complete filter assembly.

(3) Remove two elbows from filter head.

KEY to fig. 4-31:

- 1. Nut
- 2. Lock washer
- 3. Bracket
- 4. Screw
- 5. Lock washer
- 6. Screw
- 7. Head
- 8. Filter element
- 9. Packing
- 10. Body

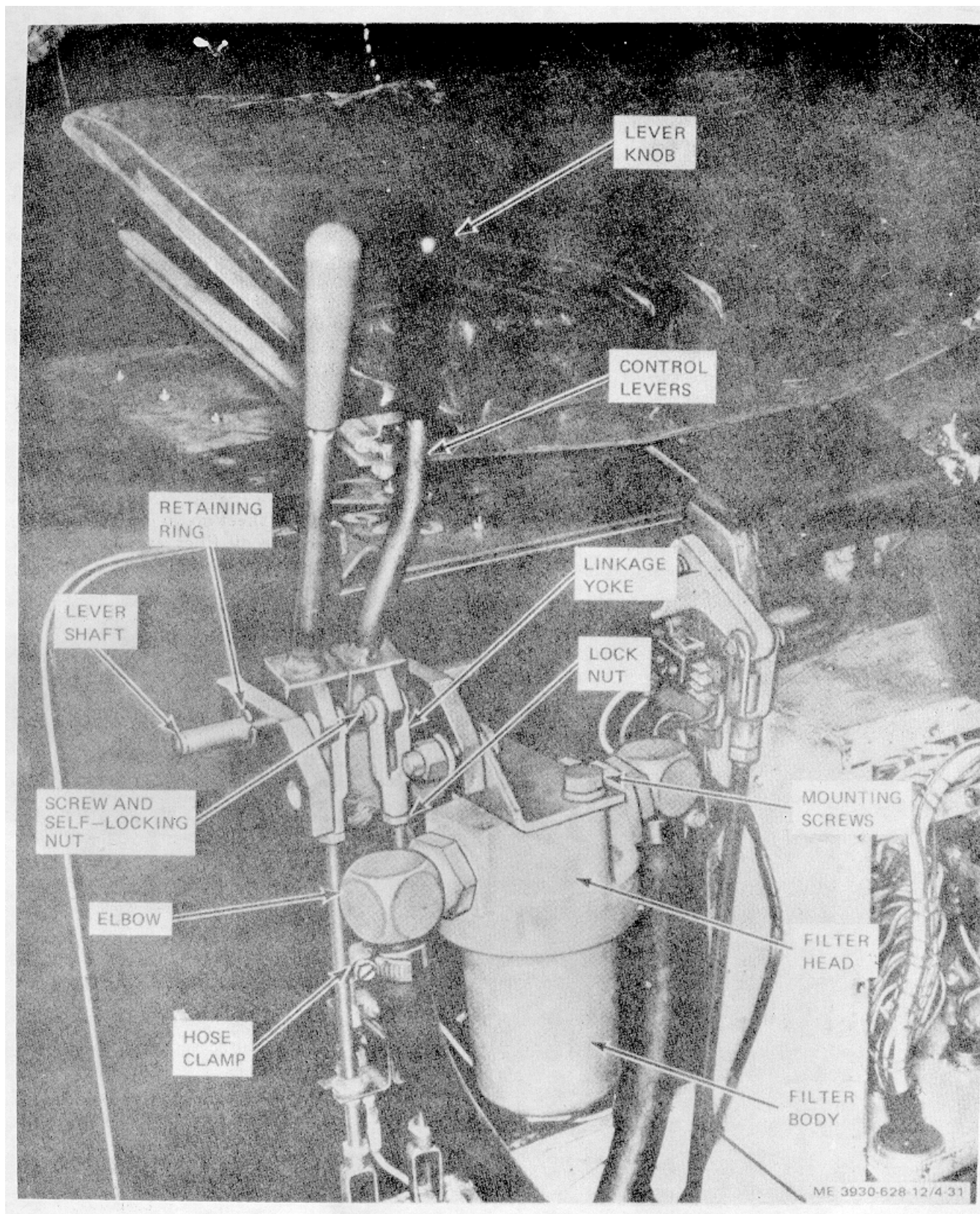
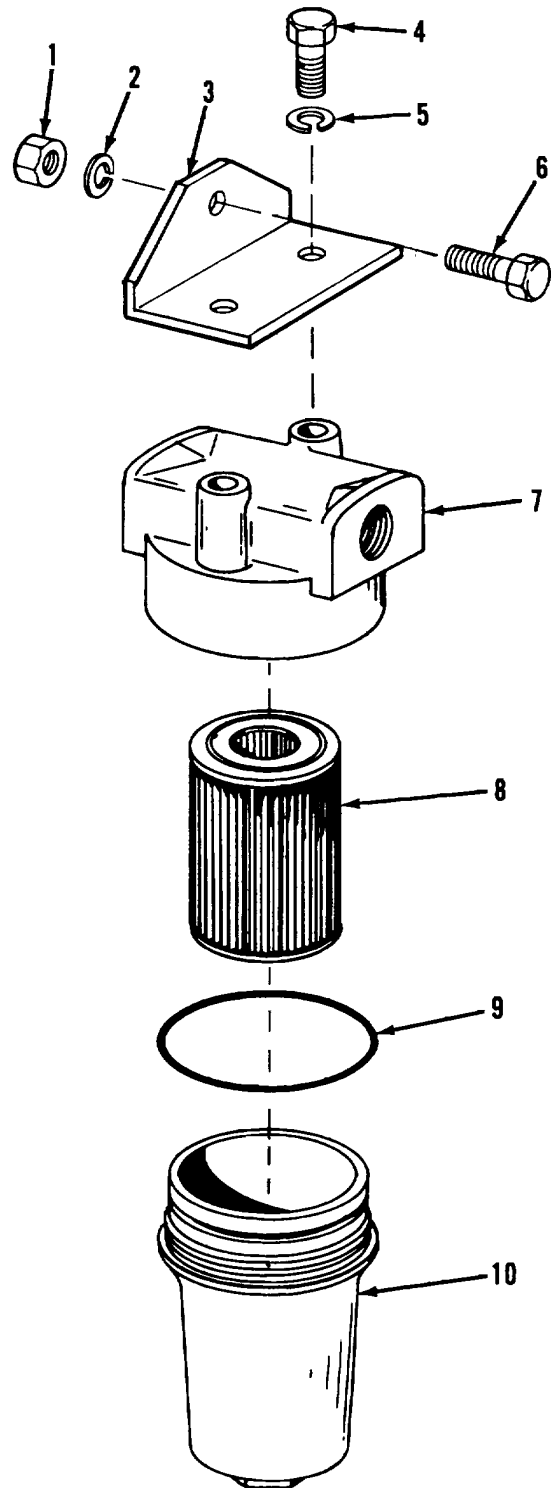


Figure 4-31. Hydraulic filter, exploded view.

d. *Installation.* Refer to b above to service filter, if necessary. Refer to figures 4-31 and 4-32 and install filter assembly as follows:

- (1) Install two elbows (fig. 4-32) in filter head.
- (2) Install filter assembly on bracket and secure with two screws (4, fig. 4-31) and lock washers (5).
- (3) Remove plugs from hoses. Connect hose assemblies to elbows. Tighten hose clamps (fig. 4-23) securely.
- (4) Operate truck hydraulic system and check filter and hoses for leaks.
- (5) Add oil to reservoir to bring to FULL mark on gage.
- (6) Install sheet metal cover.



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Figure 4-32. Hydraulic filter, installed view.

4-52. Control Levers and Linkage

a. General. Two control levers, connected to the control valve by linkages, actuate the lift and tilt cylinders. Movement of the levers opens ports in the valve to allow hydraulic pressure to flow to the cylinders. A switch, normally open, is mounted on a bracket behind the control rods. When a control lever is moved, the actuator contacts and closes the switch and starts the hydraulic pump motor. Remove sheet metal cover to gain access to linkage.

b. Lever Adjustment. Refer to figure 4-32 and adjust linkage as follows:

- (1) Remove screws and nuts attaching yokes to control levers or to control valve.
- (2) Loosen yoke lock nuts and adjust yokes on rods to shorten or lengthen linkage.
- (3) Linkage should be adjusted to allow the least amount of free play. When adjustment is complete, control valve plungers must be in the neutral position when levers are released.

c. Switch Adjustment. Switch actuators must be adjusted to have switch open when plungers are in neutral position. Adjustment must be such that the actuators close the switch with little movement of the control lever. Disconnect battery receptacle. Refer to figure 4-33 and adjust switch and actuators as follows:

- (1) Move control levers (fig. 4-32) as if operating lift and tilt mechanisms. Switch (fig. 4-33) should close with an audible click after little movement.
- (3) Loosen switch mounting screws and move switch in or out as required. Switch roller should just touch groove in actuators. Tighten switch mounting screws.
- (4) Move control levers and check adjustment.
- (5) Connect battery receptacle and check operation. Pump should operate before cylinders extend.

d. Switch Replacement. If switch requires replacement, disconnect battery receptacle and refer to figure 4-33 and replace switch as follows:

- (1) Disconnect wires from switch. (2) Remove two mounting screws and remove switch.
- (3) Install new switch and secure with mounting screws.
- (4) Connect wires to switch.
- (5) Check and adjust switch (c above) to assure proper operation.
- (6) Connect battery receptacle.

d. Control Lever Replacement. Refer to figure 4-32 and replace control levers as follows:

- (1) To replace lever knobs, remove knob from lever.
- (2) To replace lever, remove screw and self-locking nut to disconnect lever from yoke.

- (3) Remove retaining rings and remove lever shaft from brackets and levers.
- (4) Remove levers and spacing washers.
- (5) Install new levers, with shaft through brackets, levers and spacing washers. Secure shaft with retaining rings.
- (6) Connect yokes to levers with screws and self-locking nuts.

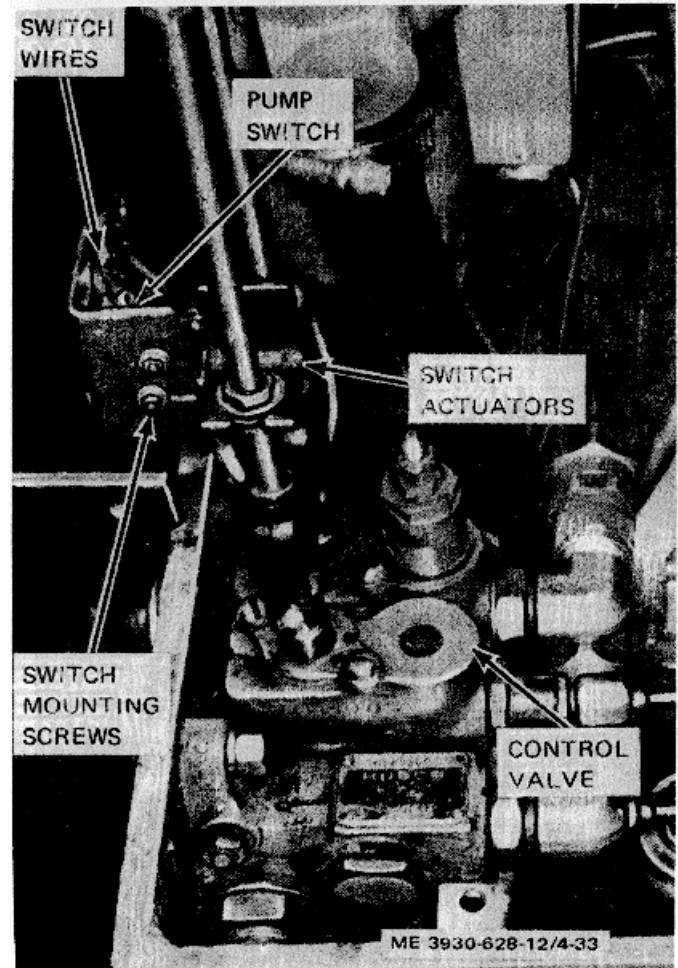


Figure 4-33. Hydraulic pump switch, installed view.

4-53. Tilt Cylinder

a. General. Two tilt cylinders, one on each side of the frame, provide power to tilt the mast.

b. Removal. Remove the tilt cylinder as follows:

- (1) Operate the tilt control lever (fig. 2-2) to tilt the mast forward. Connect a chain hoist to the mast to hold it in a forward position.
- (2) Remove floor and toe plates. Remove drip pan from underside of truck.
- (3) Disconnect hose assemblies (fig. 4-34) from elbows in underside of cylinder. Plug hose and cylinder ports.
- (4) Support cylinder with a block of wood.

Remove cotter pins and remove yoke pin (fig. 4-35) from yoke and mast.

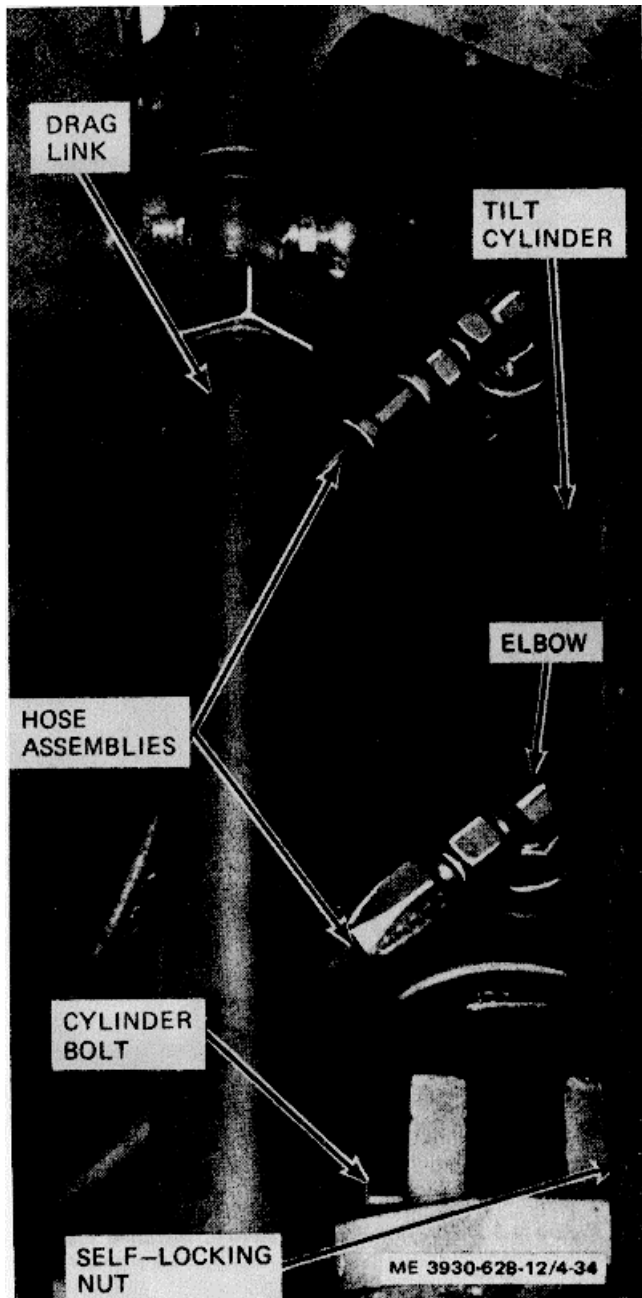
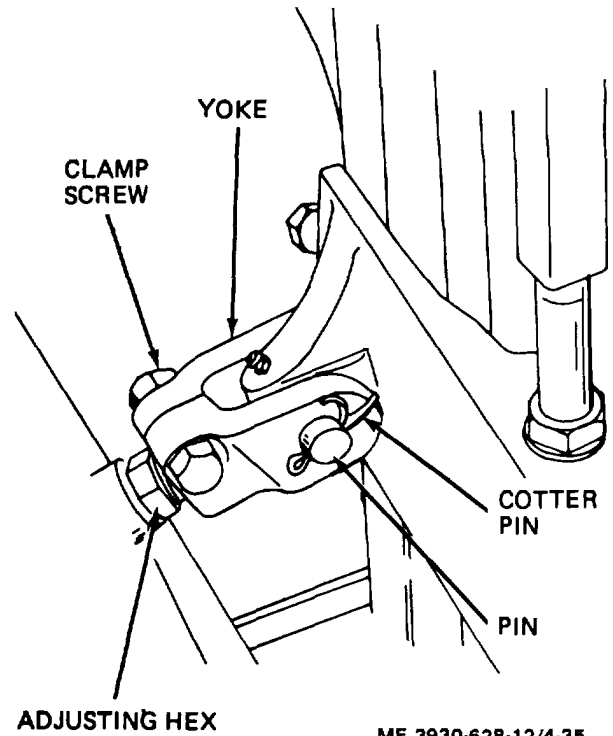


Figure 4-34. Tilt cylinder, installed view.



ME 3930-628-12/4-35

ME 3930-628-12/4-35

Figure 4-35. Tilt cylinder yoke, installed view.

(5) Remove cylinder bolt and self-locking nut (fig. 4-34) securing rear of cylinder to frame.

(6) Remove cylinder from truck.

c. *Installation.* Install tilt cylinder in truck as follows:

(1) Install tilt cylinder (fig. 4-34) in position on truck. Install cylinder bolt (fig. 4-34) through frame and cylinder and secure with self-locking nut (fig. 4-34).

(2) Install pin (fig. 4-35) through mast and yoke at front of cylinder. Secure pin with two cotter pins (fig. 4-35).

(3) Remove plugs from hoses and cylinder and connect hose assemblies (fig. 4-34) to tilt cylinder.

d. *Tilt Adjustment.* Normal tilt of the mast is 30 forward and 100 backward. Operate tilt cylinders and check tilt angle with a protractor as shown in

figure 4-36. Make sure both cylinders have reached the end of their stroke.

Note. Truck must be on a flat level surface to check and adjust mast tilt.

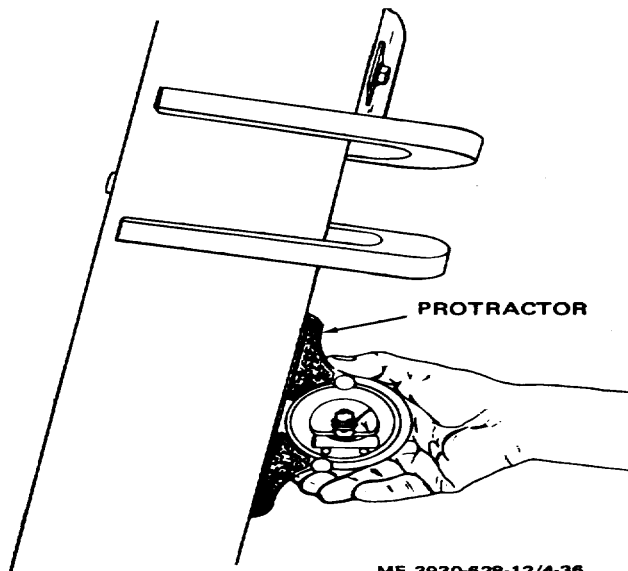
(1) Set protractor to measure 100 to tilt. Place protractor against mast as shown. Tilt mast to end of backward stroke. Bubble in protractor must be centered if tilt is correct.

(2) If tilt is not correct, tilt mast to the forward position and loosen clamp screw (fig. 4-35) on yoke at front end of cylinder. Turn adjusting hex on cylinder rod (fig. 4-35) to extend or retract rod as necessary to adjust tilt.

(3) After adjusting, check degree of tilt. Continue adjusting piston rod until 100 of backward tilt is obtained. Tighten clamp screw (fig. 4-35) on yoke.

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

(5) Install floor and toe plates and drip pan.



ME 3930-628-12/4-36

Figure 4-36. Checking degrees of mast tilt.

4-54. Flow Regulator

a. *General.* The flow regulator is connected to the inlet on the cluster cylinder. Flow of fluid back to the valve is regulated to allow a controlled lowering of the mast and carriage.

b. *Removal.* Refer to figure 4-37 and remove the flow regulator as follows:

(1) Jack or lift front end of truck. Block in position.

(2) Remove drip pan from beneath truck to gain access to components.

(3) Disconnect hose assembly from regulator. Plug hose and regulator to prevent entrance of foreign material.

(4) Remove flow regulator from cylinder. Remove elbow from regulator. Plug port in cylinder.

c. *Installation.* Refer to figure 4-37 and install flow regulator as follows:

(1) Install elbow in flow regulator.

(2) Remove plug from cylinder and install flow regulator in cylinder.

(3) Remove plug from hose assembly and connect hose assembly to regulator.

(4) Install drip pan beneath truck.

(5) Remove blocks and lower truck to ground.

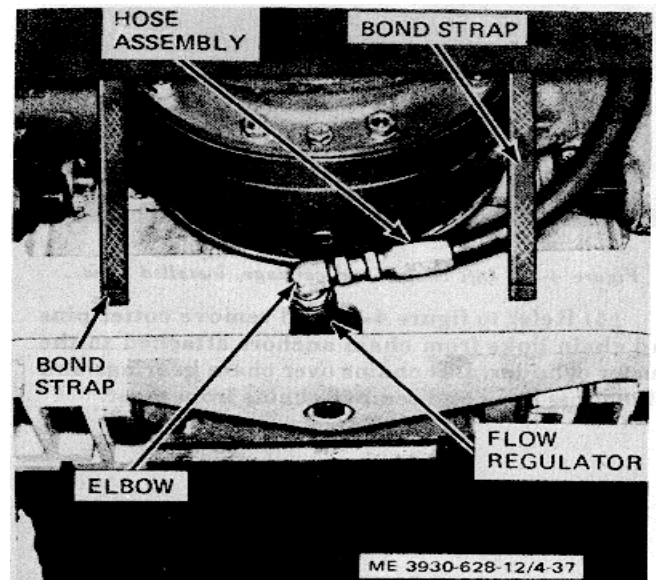


Figure 4-37. Flow regulator. installed view.

4-55. Lift Chains

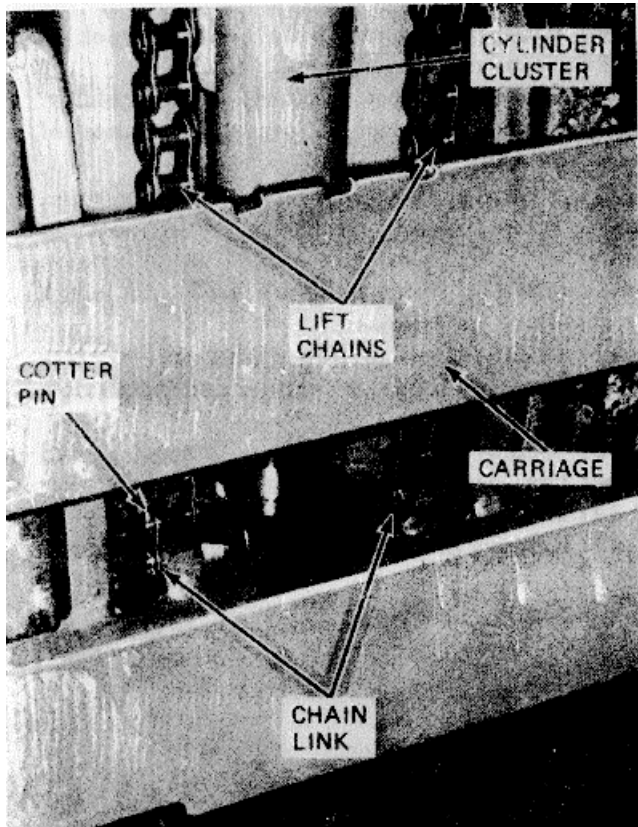
a. *General.* Extension of the two outer cylinders of the cylinder cluster raise the chain bearing and cross head. As the bearing raises the chains, which are anchored on the rear to the cylinder cluster, chains raise the carriage. Chains raise the carriage to the furthest extent of the cylinders.

b. *Removal.*

(1) Lower the mast and carriage to the lowest limit.

(2) Attach a chain hoist to the carriage and raise slightly to relieve tension on the chains.

(3) Refer to figure 4-38 and remove cotter pins and chain links securing chains to carriage.



ME 3930-628-12/4-38

Figure 4-38. Lift chains and carriage, installed view.

(4) Refer to, figure 4-39 and remove cotter pins and chain links from chain anchors attached to the cluster cylinder. Lift chains over chain bearings and off of cross head and remove chains from mast.

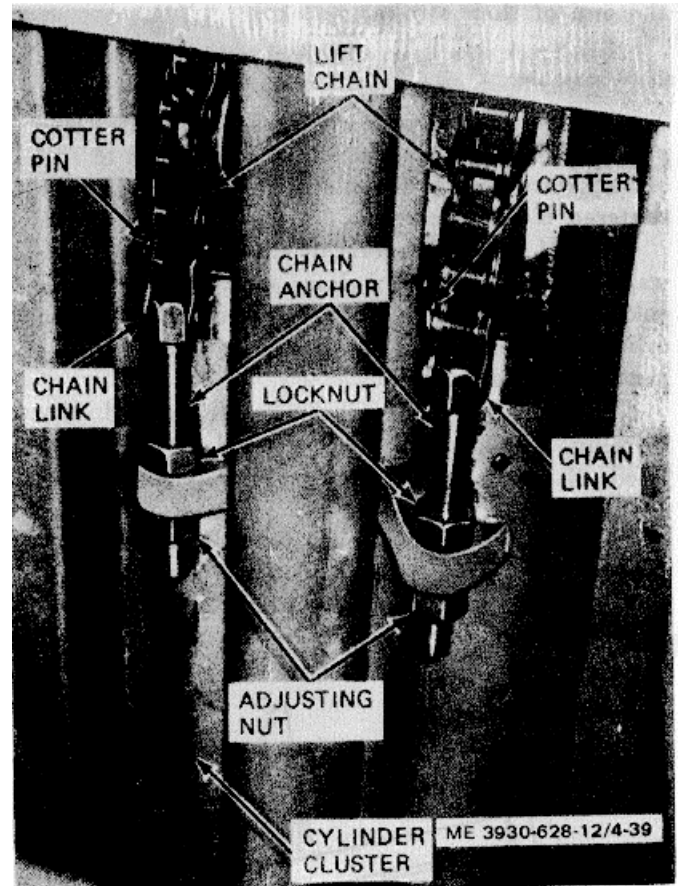


Figure 4-39. Lift chains and chain anchors, installed view.

c. 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).

d. Installation.

(1) Refer to figure 4-39 and place chains through cross heads and around chain bearings.

(2) Connect chains to chain anchors with chain links and cotter pins.

(3) Lower other ends of chains to anchors on carriage (fig. 4-38) and attach chains to anchors with chain links and cotter pins.

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

e. 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. 4-39) 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.

CHAPTER 5

ADMINISTRATIVE STORAGE

Section I. LIMITED STORAGE

5-1. General

a. Instructions in this chapter apply to the truck to make it available for immediate use upon receipt after shipment. The storage instructions apply to trucks being taken out of service for a period not to exceed six months. Refer to TM 740-90-1 for instructions covering administrative storage.

b. Instructions pertaining to overseas shipment are contained in MIL-STD-162A.

5-2. Preparation for Shipment or Storage

a. *Inspection.* Perform preventive maintenance services listed in paragraphs 3-5 and 4-14 and tables 3-1 and 4-1.

b. *Repair.* Correct all deficiencies noted during the inspection if facilities are available. If repairs required are beyond the scope of organizational maintenance, refer them to direct and general support maintenance personnel.

5-3. Truck Preparation*a. Electrical System.*

(1) Disconnect battery receptacle and tape openings to prevent accidental discharge. Use tape, adhesive (FSN 7510-269-8090).

(2) Do not remove battery from truck. Attach tag to steering wheel to alert personnel that battery ground cable has been disconnected.

b. Cleaning and Painting.

(1) Wash truck and remove debris from floor and battery compartment.

(2) Remove rust and corrosion, scrape any flaked and peeling paint. Dry all surfaces to be painted or coated with preservatives.

(3) Repaint surfaces as required to protect against deterioration. Use the following to paint surfaces.

(a) Primer coat, Specification JAN-P-735 (FSN 8010-161-7419).

(b) Final enamel coat, yellow gloss, color No. 13588, Federal Specification TT-E-489, Federal Standard 595 (FSN's 8010-286-7758, 8010-527-2045, and 8010-616-7488).

(4) Coat all exposed metal surfaces with Oil, Preservative (PL Medium).

(5) Clean all tires thoroughly to remove all grease and lubricants.

c. Accessories.

(1) Remove seat, cushion, backrest cushion, headlight, stop and taillight, and fire extinguisher from truck. Store all these accessories in a box, mark box with the truck serial number, and fasten box securely to the truck.

(2) Secure side panels, battery compartment cover, and seat support and seal joints with tape.

5-4. Storage Instruction*a. General.*

(1) Provide access to the truck during storage. Do not block the wheels but be sure tires are not resting on surfaces containing grease or oil.

(2) If the truck is to be stored outside, cover it with a tarpaulin or other means to provide protection against the weather.

(3) During storage, inspect and operate the truck at the intervals and in the manner described below.

b. 15 to 30 Days.

(1) While in storage, inspect the truck and operate it (for 15 to 20 minutes) one or more times each 15 to 30 days.

(2) Check truck for leaks and proper functioning of components.

c. 30 Days. In addition to the services of b above, perform the following every 30 days.

(1) Test each truck under full load and check hydraulic system for leaks.

(2) Maneuver the truck in all directions, both forward and reverse, for 10 to 15 minutes.

(3) After testing as described above, correct deficiencies as described in paragraph 5-2 b.

d. 180 Days. Perform 15 and 30 day services and the following every 180 days. Correct any deficiencies found during the procedures as described in paragraph 5-2 b.

(1) Check alignment, steering operation, and forward and reverse mechanism.

(2) Check parking brake linkage. Check and tighten service brake hydraulic lines if necessary.

(3) Lubricate the truck thoroughly in accordance with L.O. 10-3930-618-12.

(4) Inspect all electrical connections and tighten or adjust if necessary.

Section II. SHIPMENT**5-5. Loading and Blocking on Railroad Cars***a. Loading.*

(1) Remove forks and attach securely to truck.
(2) Load and unload truck under its own power whenever possible. Use ramps and spanning platforms in loading operations.

(3) If truck cannot be operated under its own power, carefully push, tow, or lift it into position.

(4) When using lifting equipment attach hooks, chains, or cables to lifting points marked LIFT HERE.

b. Clearances.

(1) Trucks must be positioned on flat cars to provide clearance for the brake handwheel on all sides.

(2) Overall car clearance must conform to

requirements of Association of American Railroads rules.

c. Setting Truck.

(1) With truck in position on flatcar set parking brake.

(2) Depress service brake pedal and wire or block pedal to hold it in the applied position.

d. Securing Truck.

(1) Place wood blocks in front and rear of each wheel. Blocks should not protrude beyond outside of tires. Spike blocks to flatcar floor.

(2) Place wood cleats, approximately the length of the wheel, outside each wheel and against the wheel. Spike cleats to flatcar floor. Place another cleat of the same size on top of each cleat against the wheel and spike top cleat to bottom cleat.

APPENDIX A

REFERENCES

- | | |
|---|--|
| <p>A-1. Fire Protection
TB 5-4200-200-10</p> | <p>Hand Portable Fire Extinguishers Approved for Army Users</p> |
| <p>A-2. Lubrication
C9100-IL
LO 10-3930-628-12</p> | <p>Fuels, Lubricants, Oils and Waxes
Truck, Lift, Fork, Electric, Solid Rubber Tired Wheels, 2000 Lb. Capacity, Army Model MHE 219, Allis Chalmers Model FE 20-24EE, FSN 3930-151-4432</p> |
| <p>A-3. Painting
TM 9-213</p> | <p>Painting Instructions for Field Use</p> |
| <p>A-4. Radio Suppression
TM 11-483</p> | <p>Radio Interference Suppression</p> |
| <p>A-5. Maintenance
TM 38-750
TM 9-6140-200-15</p> | <p>Army Equipment Procedures
Operation and Organizational Field and Depot Maintenance Storage Batteries, Lead Acid Type</p> |
| <p>A-6. Shipment and Storage
TM 7-40-93-2</p> | <p>Preservation of USAMEC Mechanical Equipment for Shipment and Storage
Administrative Storage of Equipment</p> |
| <p>TM 740-90-1</p> <p>A-7. Destruction of Army Material to Prevent Enemy Use
TM 750-244-3</p> | <p>Procedures for Destruction of Equipment to Prevent Enemy Use</p> |

A-1/A-2 blank

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. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III-not applicable

d. Section IV contains supplemental instructions, explanatory notes and / or illustrations required for a particular maintenance function.

B-2. Explanation of Columns in Section II

a. *Group Number, Column (1)*. The assembly group is a, numerical group assigned to each assembly in a top down breakdown sequence. The applicable assembly groups are listed on the MAC in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. *Assembly Group, Column (2)*. This column contains a brief description of the components of each assembly group.

c. *Maintenance Functions, Column (3)*. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

- C - Operator or crew
- O - Organizational maintenance
- F - Direct support maintenance
- H - General support maintenance
- D - Depot maintenance

The maintenance functions are defined as follows:

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

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

C - Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that

elements, such as painting and lubricating, be defined separately, they may be so listed.

D - Adjust. To rectify to the extent necessary to bring into proper operating range.

E - Align. To adjust specified variable elements of an item to bring to optimum performance.

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

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

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

J - Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

K - Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

d. *Tools and Equipment, Column (4)*. Not applicable.

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

B-3. Explanation of Columns in Section IV

a. *Reference Code*. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column (5) and the second letter references a maintenance function, column (3), A through K.

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) Functional 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	ELECTRICAL SYSTEM																
	Hourmeter	O									O						
	Switch, light	O									O						
	Switch, emergency stop	O									O						
	Switch, stoplight	O									O						
	Lights																
	... Lamps	O									O						
	... Lights Head, stop & tail.....	O									O						
	... Resistors, lights		O								O						
	Horn																
	... Button, horn.....										O	O					
	... Horn assembly		O								O						
	... Horn wiring	O									O						
	Batteries																
	... Receptacle, Charging.....	O						O		F							
	... Battery, Storage	O	O	O												D	
	... Cable, Battery.....	O								O							
	Hull or Chassis Wiring																
	... Harness, wiring	O								F	O						
02	FRONT AXLE																
	Front axle assembly																
	... Axle assembly, driving	O		O						F	F		H				
	Differential																
	... Differential assembly	F		O						F	F		H				
03	REAR AXLE																
	Rear axle assembly																
	... Axle assembly, steering	O			O					F	F						
	Steering																
	... Arm, steering	O			F					F							
	... Axle, steering	O								F							
04	BRAKES																
	Handbrakes																
	... Brakeshoe assembly, motor	O								F	F						
	... Cable, handbrake	O		O	O					O							
	... Control linkage				O					O							
	... Drum, brake	O								F							
	... Lever, handbrake									O							
	Service brakes																
	... Brake assembly	O			O					F	F						
	... Shoe assembly	O			O					O							
	Hydraulic brake system																
	... Master cylinder	O		O						O	F						B
	... Tube assembly, metal	O								O							
	... Wheel, cylinder	O								O	F						C
05	WHEELS																
	Wheel assembly																
	... Bearing and seals, rear wheels.....	O		O	O					O							
	... Wheel Assembly	O								O							
	Tires																
	... Tires, solid	O								H							
06	STEERING																
	Steering assembly																
	... Bearing, bellcrank	O								F	F						
	... Bellcrank	O								F	F						
	... Drag, link			O	F					F							
	... Rod assembly, tie				O					F							
	... Steering gear assembly.....			O	O					F	F						
	... Wheel, steering	O								O							

SECTION II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional 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					
07	BODY, CAB HOOD AND HULL																
	... Body, cab, hood, hull assemblies	O										O					
	... Covers (Battery compartment)	O										O					
	... Overhead guard	O										O					
	Floor																
	... Plate, floor	O										O					
	Seats																
	... Seat Assembly	O										O	O				
08	HYDRALUIC LIFT COMPONENTS																
	... Hydraulic pump																
	... Pump, rotary, power drivers, ... hydraulic	O										F	F				
	... Hydraulic control valve																
	... Valve, directional control	O										F	F				
	Hydraulic control levers and linkage																
	... Bracket, control valve	O										O					
	... Levers, control	O			O							O					
	Hydraulic tilt cylinders																
	... Cylinders assembly, tilt	O										O	F				
	Hydraulic side shift cylinder																
	... Cylinder assy, side shift	O										O	F				
	Hydraulic mast column																
	... Chain assembly	O		O	O							O	O				
	... Crosshead											F	F				
	... Cylinder assembly, actuating, hoist	O										F	F				
	... Forks	O										O					
	... Roller assembly	O										F					
	... Upright assembly	O		O	O							F	H	H			
	Hydraulic lines and fittings																
	... Cap, oil breather	O		O								O					
	... Filter element	O										O					
	... Hose assembly, rubber	O										O	O				
	... Tank, oil	O		O								F					
	... Valve, regulating	O										O					
	... Hose reel assembly	O										O	O				
09	ELECTRIC MOTORS																
	Motor assembly																
	... Motor assembly, travel	F	F									F	F	H			
	... Motor assembly, pump	F	F									F	F	H			
	... Motor assembly, steering	F	F									F	F	H			
	Brush holders																
	... Brush, electrical contact	O										F					
	... Holder, electrical contact, brush	F										F					
	... Endbell	F										F					
	Frame supports and housings																
	... Bearing, ball annular, drive motors	F										F					
10	DRIVE COMPONENTS																
	Adapter assembly, gear reduction	O		O								F	F				
	Accelerator control assembly																
	... Potentiometer	F										F					
	... Control, accelerator	O										F	F				
	... Switch, sensitive	O										F					
	... Contacts, electrical	O										F					
	... Contacts stationary	O										F					
	... Contacts finger	O										F					
11	FUSE AND CIRCUIT BREAKER																
	... Fuse, cartridge		O									O					
	... Fuse holder	O										F					
	... Link, fuse	O										F					

SECTION II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional 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					
12	SWITCHES, CONTACTORS, AND RELAYS																
	Switch, directional control	O								F	F						
	Contact, electrical	O			F					F	F						
	Switch, power	F								F	F						
	Contact, fwd and rev	O								F	F						
	...Contact, electrical	O			O					O							
	Contact, hydraulic pump	O								F	F						
	...Contact, electrical	O			O					O							
	Contact, Power Steering Pump	O								F	F						
	...Contact, electrical	O			O					O							
	Relay, control	O								F	F						
	...Contact, electrical	O			O					O							
13	SCR CONTROL																
	Control circuit board assy		F							F	D						
	Protective circuit board assembly		F							F	D						
14	ELECTRICAL CONTROL COMPONENTS																
	...Capacitor and Diode Pack		F							F	F						
	...Shunt Assembly	F								F							
	...Fixed Resistor		F							F							
15	RADIO INTERFERENCE SUPPRESSION																
	...Strap, static drag	O								O							

Section IV. REMARKS

Reference code	Remarks
A-I	Repair includes installing repair kit .
B-I	Repair includes installing repair kit.
C-I	Repair includes installing repair kit.

APPENDIX C

BASIC ISSUE ITEMS LIST AND MAINTENANCE

AND OPERATING SUPPLIES

Section I. INTRODUCTION

C-1. Scope

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

C-2. General

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

a. Basic Issue Items-Section II. A list of items which accompany the Truck, Lift, Fork and are required by the operator / crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies-Section III. A listing of maintenance and operating supplies required for initial operation.

C-3. Explanation of Columns

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

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code, indicates the selection status and source for the listed item. Source codes are:

<i>Code</i>	<i>Explanation</i>
P	Repair parts which are stocked in or 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 essentially of the end item dictates that a minimum quantity be available in the supply system.
M	Repair parts which are not procured or stocked, but are to be manufactured in 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 from the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is 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.

<i>Code</i>	<i>Explanation</i>
X 1	Repair parts which are not procured or stocked. The requirement of such items will be filled by use of the next higher assembly or component.
X 2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
C	Repair parts authorized for local procurement. Where such repair parts are not obtainable from local procurement, requirements will be requisitioned through normal channels accompanied by a supporting statement of non-availability from local procurement. Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above GS and DS level or returned to depot supply levels.

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

<i>Code</i>	<i>Explanation</i>
C	Operator/ crew
(3)	Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

<i>Codes</i>	<i>Explanation</i>
R	Repair parts and assemblies which are economically reparable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
S	Repair parts and assemblies which are economically reparable at DSU and GSU activities and which are normally furnished by supply on an exemption list s. When items are determined by RCC to be uneconomically reparable they will be evacuated to a depot for evaluation and analysis before final disposition.

Code	Explanation
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis (Such repair parts are normal) repaired or overhauled at depot maintenance activities.
U	Repair parts specified) selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

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

c. Description. This column indicates the Federal item name and any additional description of the item required. The abbreviation "w / e", when used as a part of the nomenclature, indicates the Federal stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parenthesis. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Measure (U/M). A 2 character alphabetic abbreviation indicating the amount or quantity) of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustration.

C-4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies- Section III

a. Component Application. This column identifies the component application of each maintenance or operating supply item.

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

c. Description. This column indicates the item name and brief description.

d. Quantity Required for Initial Operation. The column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours Operation. This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes. This column indicates information notes keyed to data appearing in a preceding column.

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal Stock Number	(3) Description Ref no. & Mfr Code Usable on code	(4) Unit of Meas	(5) Qty inc in Unit	(6) Qty furn with equip	(7) Illustration (A) (B) Fig Item No. No.
PC	7510-889-3494	Basic Issue Items Manufacturer or Depot Installed	Ea	1	1	
PC	7520-559-9618	Binder, Loose Leaf	Ea	1	1	
PC	4210-889-2221	Case, Operation and Maintenance Manuals	Ea	1	1	
PC		Extinguisher, Fire	Ea	1	1	
PC		Operator and Organizational Maintenance Manual TM 10-	Ea	1	1	
PC		3930-628-12	Ea	1	1	
PC		Lubrication Order LO 10-3930-628-12	Ea	1	1	

Section II. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required Final operation	(5) Quantity required F / 6 hrs operation	(6) Notes
HYDRAULIC BRAKE SYSTEM	9150-231-9071 9150-262-9375	OIL, HYDRAULIC: 1 gal. Can as follows: HB - nonpetroleum, base automotive.. HBA - nonpetroleum base, automotive, arctic- type	1/2 pt 1/2	(1) (1)	(1) See current LO for grade application and replenishment intervals
DIFFERENTIAL	9150-577-5845 (3) 9150-240-2244 (3) 9150-257-5442 (3)	OIL, LUBRICATING, GEAR: 55gal. Drum as follows: GO-90 GO-75 GOS	6 pt. 6 pt. 6 pt.	(1) (1) (1)	(2) Includes quantity to fill hydraulic system as follows: 1 qt. Filter 2 1/2 qt. Lines 3-3/4 gal. Reservoir
HYDRAULIC SYSTEM	9150-265-9429 (3) 9150-242-7604 (3)	OIL, LUBRICATING: 55gal. Drum as follows: OE-10 OES	14 1/4 qt.(2) 14 1/4 qt.(2)	(1)	(3) See C9100L for additional data and requisitioning procedures
LUBRICATION FITTINGS	9150-190-0907 (3)	GREASE, AUTOMOVITIVE AND AR- TILLERY: 35 lb. Can as follows: GAA	As required	(1)	

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