

# TM 10-3930-609-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR AND ORGANIZATIONAL  
MAINTENANCE MANUAL

TRUCK, FORK, LIFT, ELECTRIC, SOLID RUBBER TIRES,  
2,000 LBS CAPACITY, 144 IN. LIFT,  
BAKER MODEL FTD-020-EE-SS, ARMY MODEL MHE-204,  
FSN 3930-935-7864

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HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1969

## **SAFETY PRECAUTIONS**

### **BEFORE OPERATION**

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

Avoid contact with the battery electrolyte. If the solution comes in contact with the skin, rinse the area immediately with clean water to avoid skin burns.

Check equipment logbook for record of proper servicing and maintenance.

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

### **DURING OPERATION**

Be alert for other workers to be sure they are not in the way of the load or the moving truck.

Be sure there is sufficient clearance overhead and on each side of the truck.

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

Avoid sudden starting and stopping of the truck. Reduce speed when making a turn.

Face in the direction of travel.

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 it and keep the load against the carriage backrest.

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

When unloading a heavy elevated load, position the load directly over the unloading spot, as low as possible, before tilting the mast forward.

Be very careful when high-tiering.

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

Report any evidence of faulty truck performance.

### **AFTER OPERATION**

Make sure forks are lowered to the ground and handbrake is engaged firmly.

If truck is parked on an incline, block at least two wheels in the event of handbrake failure.

## Changes in force: C1, C2, and C3

TM 10-3930-609-12

C 3

CHANGE

No. 3

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington D.C., 22 March 1991

### Operators and Organizational Maintenance Manual TRUCK, FORK LIFT, ELECTRIC, SOLID RUBBER TIRES, 2,000-LB CAPACITY, 144-INCH LIFT, BAKER MODEL FTD-020-EE-SS, ARMY MODEL MHE-204, NSN 3930-00-935-7864

TM 10-3930-609-12, 21 May 1969, is changed as follows:

*Page 1-1.*

Paragraph 1-1. Change "Federal Stock Number 3930-935-7864" to "National Stock Number 3930-00-935-7864".

Paragraph 1-2 is superseded as follows:

#### **1-2. Maintenance Forms, Records, and Reports**

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 1-3 is superseded as follows:

#### **1-3. Reporting Errors and Recommending Improvements**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: 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. Reporting Equipment Improvement Recommendations (EIRs)**

If your fork lift needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank-Automotive Com-

mand, ATTN: AMSTA-MP, Warren, MI 48397-5000. We'll send you a reply.

*Page 2-1.*

Paragraph 2-3b(2). Change "TM 38-750" to "DA Pam 738-750".

Paragraph 2-4e. Change "TM 10-1690A" to "TM 10-6140-200-14".

*Page 2-6, paragraph 2-23.* Change "TB 5-4200-200-10" to "TB 5-4200-200-100".

*Page 3-3, Table 3-1.* Add *Item number: 17; Interval: Monthly; Item to be inspected: Seat, overhead guard, and access covers; Procedure: Check for damage to seat, overhead guard, and all access covers. Tighten any loose component.*

*Page 3-17.* Paragraph 3-31.1 is added after paragraph 3-31.

#### **3-31.1. Wheel Cylinders**

##### *a. Removal.*

(1) Remove brakeshoes (para 3-30c).

(2) Disconnect both brake tubing from adapters on wheel cylinder. Use care to prevent kinking or denting tubing, and to avoid entrance of foreign matter.

(3) Remove bolts and washers that secure wheel cylinders to backing plates. Remove wheel cylinders.

*b. Installation.* Reverse procedure in a above.

*Page 3-23.* Paragraphs 3-47 through 3-49 are rescinded.

*Page 3-24.* Paragraph 3-50 and figure 3-16 are rescinded.

Page 3-25. Paragraph 3-52 is superseded as follows:

**3-52. Directional Control Switch Lever**

*a. Removal.* If knob is damaged, unscrew and remove from lever. To remove lever, remove screw and lockwasher.

*b. Repair.* Repair by replacing knob, lever, or mounting hardware.

*c. Installation.* Reverse procedure in *a* above.  
Page A-1. Appendix A is superseded as follows:

**APPENDIX A  
REFERENCES**

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**A-1. Fire Protection**

TB 5-4200-200-100 Hand Portable Fire Extinguishers Approved for Army Users

**A-2. Lubrication**

LO 10-3930-609-12 Lubrication Order

**A-3. Painting**

TM 43-0139 Painting Instructions for Field Use

**A-4. Radio Interference Suppression**

FM 11-65 High Frequency Radio Communications

**A-5. Maintenance**

DA Pam 738-750 The Army Maintenance Management System (TAMMS)

TM 9-6140-200-14 Operator's, Organizational, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries

TM 10-6140-200-14 Installation, Use, Maintenance, and Repair of Industrial Motive Power Storage Batteries for Materials Handling Equipment

TM 10-3930-609-20P Organizational Maintenance Repair Parts and Special Tools Lists

**A-6. Shipment and Storage**

TB 740-93-2 Preservation of USAMEC Mechanical Equipment for Shipment and Storage

TM 740-90-1 Administrative Storage of Equipment

TM 38-230 Packaging of Material: Preservation

MIL-STD-129 Marking for Shipment and Storage

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

**APPENDIX C  
MAINTENANCE ALLOCATION CHART**

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**Section I. INTRODUCTION**

**C-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.

## **C-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 spe-

cific 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.

## **C-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 C-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.

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

a. *Column 1, Tool or Test Equipment Reference Code.* The tool and test equipment reference code

correlates with a code used in the MAC, Section II, Column 5.

b. *Column 2, Maintenance Level.* The lowest level of maintenance authorized to use the tool or test equipment.

c. *Column 3, Nomenclature.* Name or identification of the tool or test equipment.

d. *Column 4, National/NATO Stock Number.* The National or NATO Stock Number of the tool or test equipment.

e. *Column 5, Tool Number.* The manufacturer's part number.

**C-5. Explanation of Columns in Remarks, Section IV**

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) Remark
			C	O	F	H	D		
06	<b>ELECTRICAL SYSTEM</b>								
0606	Seat Switch	Inspect Adjust Replace		0.1 1.0 1.5					
0609	Lights								
	Lamps	Inspect Replace		0.1 0.4					
	Stoplight, Taillight, Headlight	Inspect Replace Repair		0.1 0.4 0.2					
0611	Horn								
	Button, Horn	Replace Repair		0.2 0.4					
	Horn Assembly	Test Replace		0.1 0.4					
	Contact Assembly	Inspect Replace Repair		0.2 1.0 0.4					

**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		
0612	Batteries, Storage	Inspect Test Service Replace Repair		0.2 0.4 0.4 0.4					
	Receptacle, Charging	Inspect Replace		0.1 0.5	8.0				
<b>10</b>	<b>FRONT AXLE</b>								
1000	Front Axle Assembly	Inspect Service Replace Repair Overhaul		0.1 0.4					
					4.0 8.0		8.0		
1003	Final Drive								
	Input Case Assembly	Replace Repair			6.0 3.0				
<b>11</b>	<b>REAR AXLE</b>								
1100	Rear Axle Assembly	Inspect Adjust Replace Repair		0.2 1.0					
					4.0 4.0				
	Bearing, Bell Crank	Inspect Replace			2.0 2.5				
	Bell Crank	Inspect Replace			2.0 2.0				
1102	Differential	Inspect Service Replace Repair							
				0.4	1.0 4.0 8.0				
<b>12</b>	<b>BRAKES</b>								
1201	Hand Brakes								
	Brake Shoe Assembly, Motor	Inspect Adjust Replace Repair		1.0 1.4					
					2.0 1.0				

**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		
1201	<i>Hand Brakes (Con't)</i>								
	Cable, Hand Brake	Inspect Adjust Replace		0.1 0.5 0.5					
	Control, Linkage	Adjust Replace		0.5 0.5					
	Drum, Brake	Replace			2.0				
	Lever, Hand Brake	Inspect Replace		0.1 0.4					
1202	<i>Service Brakes</i>								
	Brake Shoe Assembly	Inspect Adjust Replace Repair		0.5 0.8 1.0	1.0				
1204	<i>Hydraulic Brake System</i>								
	Master Cylinder	Inspect Service Replace		0.1 0.3 1.0					
	Tube Assembly, Metal	Inspect Replace		0.5 0.5					
	Wheel, Cylinder	Inspect Replace		1.0 1.0					
1206	<i>Mechanical Brake System</i>								
	Pedal, Brake	Replace		0.4					
<b>13</b>	<b>WHEELS</b>								
1311	<i>Wheel Assembly</i>								
	Bearings and Seals, Rear Wheels	Inspect Service Adjust Replace		0.5 0.8 0.5 0.8					
	Wheel Assembly, Steering Axle	Inspect Align Replace Repair		0.2 0.6 0.3 1.0					



**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		
1311	<i>Wheel Assembly (Con't)</i>								
	Wheel, Solid Rubber, Drive Axle	Replace			1.5				
1313	<i>Tires</i>	Inspect Replace		0.1		1.0			
<b>14</b>	<b>STEERING</b>								
1401	<i>Mechanical Steering Gear Assembly</i>								
	Drag Link	Inspect Service Adjust Replace		0.2 0.3	0.5 1.0				
	Rod Assembly, Tie	Service Adjust Replace Repair		0.3 0.4	1.0 1.0				
	Steering Gear Assembly	Service Adjust Replace Repair		0.4 0.8	2.0 4.0				
	Wheel, Steering	Replace		0.4					
<b>18</b>	<b>BODY, CAB AND HOOD</b>								
1801	<i>Body, Cab and Hood Assemblies</i>								
	Covers and Doors	Inspect Replace		0.1 0.1					
	Overhead Guard	Inspect Replace		0.5 0.5					
1806	<i>Upholstery Seats</i>	Inspect Replace Repair		0.1 0.4 0.5					

**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		
			<b>22</b>	<b>BODY CHASSIS AND ACCESSORY ITEMS</b>					
2210	<i>Data Plates and Instruction Holders</i>	Replace			0.2				
<b>24</b>	<b>HYDRAULIC AND FLUID SYSTEMS</b>								
2401	<i>Pump and Motor</i>								
	Pump, Rotary, Power Driven, Hydraulic	Inspect Replace Repair			1.0 1.0 2.5				
	Motor, Direct Current, Hydraulic Pump	Inspect Test Replace Repair Overhaul			2.0 1.0 2.0 3.0 4.0				
2402	<i>Control Valves</i>								
	Valve, Directional Control	Inspect Test Replace Repair		0.8	1.0 0.8 2.0				
2403	<i>Hydraulic Controls</i>								
	Bracket, Valve Lever	Replace		0.5					
	Levers, Control	Replace		0.4					
2404	<i>Tilt Cylinders</i>								
		Inspect Test Replace Repair		0.1 0.2 0.5	1.5				
2405	<i>Mast Column</i>								
	Chain Assembly	Inspect Service Adjust Replace		0.2 0.2 0.4 0.5					
	Cross Head	Replace			1.5				

**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	<i>Mast Column (Con't)</i>								
	Cylinder Assembly, Hoist Actuating	Inspect Replace Repair		0.1	1.5 1.5				
	Forks	Replace		0.2					
	Roller, Carriage	Replace			1.5				
	Upright Assembly	Inspect Service Replace Repair		0.1 0.3	2.0 4.0				
	Lift Carriage	Replace Repair			4.5 1.0				
	2406	<i>Filters, Lines and fittings</i>							
Hydraulic Oil Filter		Replace Repair		0.2 0.5					
Filter Element		Replace		0.2					
Hose Assemblies, Rubber		Inspect Replace Repair		0.1 0.4 0.4					
Valve, Bypass		Replace		0.6					
2408		<i>Liquid Tanks</i>							
	Tank, Oil	Inspect Service Replace Repair		0.1 0.1	0.8 1.5				
	40	<b>ELECTRIC MOTORS AND GENERATORS</b>							
		4000	<i>Motor Generator and Rotating Exciter Assemblies</i>						
Motor Assembly, Travel	Inspect Test Replace Repair Overhaul				4.0 1.5 4.0 8.0	8.0			

**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	<i>Control Panels, Housing Cubicles</i>					
	Electrical Wiring	Inspect Test Replace		1.2 1.0	2.0				
	Dash Panel, Instrumentation	Replace		0.4					
4010	<i>Master or Auxiliary Control Assembly</i>								
	Control Panel	Replace Repair			0.5 1.0				
	Potentiometer	Inspect Replace			1.0 0.4				
	Control, Accelerator	Inspect Replace Repair		0.8	1.0 2.0				
	Switch, Sensitive	Replace			1.2				
	SCR Panel	Replace Repair			1.0 4.0				
	Fuse, Cartridge	inspect Replace		0.1 0.2					
	Fuse Holder	Replace			0.4				
	Link, Fuse	Replace		0.8					
4011	<i>Circuit Breakers, Cut-outs, Fuse and Fuse Holders</i>								
	Switch, Battery Disconnect	Replace			1.0				
4012	<i>Switches</i>								
	Lever, Switch	Inspect Adjust Replace Repair		0.1 0.2 0.2 0.5					
	Switch, Directional Control	Inspect Replace Repair		0.8	0.5 0.8				

**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		
4015	<i>Relay or Assembly</i> Relays, Armature	Inspect			0.4				
		Test			0.5				
		Replace			0.5				
	Contacts, Relay	Inspect		0.4					
Replace				0.4					
4019	<i>Radio interference Suppression</i>	Inspect		0.4					
		Test		0.4					
		Replace		0.4					
		Repair		1.0					
		Replace			1.0				

**Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS**

Not Applicable.

**Section IV. REMARKS**

Not Applicable.

*Page I-1.*

Change "Directional control switch" to "Directional control switch lever".

Change "Maintenance forms and records" to "Maintenance forms, records, and reports".

*Page I-2.*

Delete the entry for "Motor brush replacement".

Delete the entry for "Relay contact replacement".

Delete the entry for "Relay interlock switch replacement".

Before *Reporting of equipment manual improvements*, add "Reporting equipment improvement recommendations, paragraph 1-3.1, page 1-1".

Change "Reporting of equipment manual improvements" to "Reporting errors and recommending improvements".

After *Wheel alinement measurement*, add "Wheel cylinder, paragraph 3-31.1, page 3-17".

By Order of the Secretary of the Army:

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

Official:

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

Distribution:

To be distributed in accordance with DAForm 12-25-E, block 2116, Operator and Unit maintenance requirements for TM 10-3930-609-12.

CHANGE }  
No. 2 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 7 February 1980

**Operator and Organizational  
Maintenance Manual**

**TRUCK, FORK LIFT, ELECTRIC, SOLID RUBBER TIRES, 2000 LBS CAPACITY, 144 IN LIFT,  
BAKER MODEL FTD-020-EE-SS, ARMY MODEL MHE-204, NSN 3930-00-935-7864.**

TM 10-3930-609-12, 21 May 1969, is changes as follows.  
Page 3-2, paragraph 3-6. Add the following before paragraph 3-6.

**WARNING**

Insure that static electricity discharge straps are installed on the forklift truck and are in good condition. Failure to use the straps could result in the generation of a spark which could ignite explosives or flammables.

By Order of the Secretary of the Army:

Official:

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

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

Distribution:

To be distributed in accordance with DA Form 12-25A, Organizational maintenance requirements for Warehouse Equipment.





**TM 10-3930-609-12**  
**C1**

CHANGE  
No. 1

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 March 1972

**Operator and Organizational  
Maintenance Manual**

**TRUCK, FORK, LIFT, ELECTRIC, SOLID RUBBER TIRES,  
2000 LBS CAPACITY, 144 IN. LIFT,  
BAKER MODEL FTD-O20-EE-SS, ARMY MODEL MHE-204  
FSN 3930-935-7864**

TM 10-3930-609-12 21 May 1969, is changed  
as follows:

*Page 2-1.* Paragraph 2-3c is added as follows:

*c. Maintenance and Operating Supplies.* For a listing of maintenance and operating supplies required for initial operation, refer to table 2-1.

C1, TM 10-3930-609-12

Table 2-1 Maintenance and Operating Supplies

(1) Component application	(2) Federal stock No.	(3) Description	(4) Quantity required F/initial operation	(5) Quantity required F/8 hrs operation	(6) Notes
BRAKE MASTER CYLINDER	9150-231-9071(1)	BRAKE FLUID, AUTO- MOTIVE: gal can as follows HB	1 pt	(2)	(1) See C9100-IL for additional data and req- uisitioning procedure. (2) See current LO for grade, application and replenishment intervals.
DIFFERENTIAL DRIVE AXLE	9150-577-5844(1)	LUBRICATING OIL, GEAR: 5 gal drum as follows:	1 qt	(2)	
HYDRAULIC SYSTEM	9150-257-5440(1)	GO-90	20 qt	(2)	
LUBRICATION FITTINGS	9150-265-9428(1)	OIL, LUBRICATING :	1 qt	(2)	
	9150-242-7603(1)	5 gal pails as follows: OE-10	20 qts	(2)	
	9150-190-0904(1)	GREASE, AUTOMO- TIVE AND ARTIL- LERY: 1 lb can as follows: GAA	1 lb	(2)	

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

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

**Section 1. INTRODUCTION**

**B-1. Stop.**

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 truck when evacuated.

**B-3. Explanation of Columns.**

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

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

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

<i>Code</i>	<i>Explanation</i>
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 essentiality 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:

<i>Code</i>	<i>Explanation</i>
C__Crew/Operator	

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

<i>Code</i>	<i>Explanation</i>
R----	Applied to repair parts (assemblies and components), special tools and test equipment which are considered economically repairable at direct 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 basin.

*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 (C/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 Furnished with Equipment (BILL only).* This column indicates the quantity of an item furnished with the equipment.

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

*g. Illustration (BILL Only).* 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.

**C1, TM 10-3930-609-12**

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

(1) Smjr code	(2) Federal Stock No.	(3) Ref No. & Mfr Code	Description	Usable on code	(4) Unit of Meas	(5) Qty Auth
	7510-889-3494		BINDER, Looseleaf		ea	1
	7520-559-9618		CASE, Maintenance and Operating Manuals		ea	1
	4210-889-2222		EXTINGUISHER, Fire. 2 1/2 lb. Fed. Spec. O-E95		ea	1

By Order of the Secretary of the Army:

W.C. WESTMORELAND,  
*General, United States Army,  
Chief of Staff.*

Official:

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

Distribution:

To be distribution in accordance with DA Form 12-25A (qty rqr block No. 891) Organizational Maintenance requirements for Warehouse.

GPO 887-578



**OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL**  
**TRUCK, FORK, LIFT, ELECTRIC, SOLID RUBBER TIRES,**  
**2,000 LBS CAPACITY, 144 IN. LIFT, BAKER MODEL**  
**FTD-020-EE-SS, ARMY MODEL MHE-204,**  
**FSN 3930-935-7864**

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## CHAPTER 1

### INTRODUCTION

---

#### Section I. GENERAL

##### 1-1. Scope

These instructions are published for the use of personnel responsible for the operation and organizational maintenance of Truck, Fork, Lift, Electric, Solid Rubber Tires, 2,000 Pound Capacity, Baker Model FTD-020-EE-SS, Army Model MHE-204, Federal Stock No. 3930-935-7864.

##### 1-2. Maintenance Forms and Records

The DA forms and records used for equipment maintenance will be only these prescribed in TM 38-750.

##### 1-3. Report of Equipment Manual Improvements

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 DA Publications) and forwarded direct to the Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMS-ME-MPP, 4300 Goodfellow Boulevard, St. Louis, MO. 63120.

#### Section II. DESCRIPTION AND DATA

##### 1-4. Description

*a. General.* Army Model MHE-204 (Baker Model-FTD-020-EE-SS, type EE, spark enclosed) is a nonnatactical fork-Lift truck designed for warehouse operation. This truck (fig. 1 and 2) can be used to load, transport, unload, and stack loads weighing as much as 2,000 pounds at a load center of 24 inches. (The load center is measured from the heel of the forks.) The truck is designed to lift loads to a height of 144 inches.

*b. Truck.* Power for travel and lifting is by a 36-volt battery. The travel system includes motor, motor controls, and power axle assembly to provide stepless speeds forward and reverse. The lifting system includes an electric motor, pump, controls, reservoir, lift and tilt cylinders, mast assembly, and forks. Hydraulic service brakes, and both hand and automatic parking brakes are used.

*c. Power Axle and Motor Assembly.* The power train consists of the travel motor, coupling; power axle with differential, axle shafts, and wheels. Power is transmitted direct from the travel motor through an adapter incorporating

reduction gearing, to a bevel ring gear and pinion in the axle, through the axle drive shafts and wheels.

*d. Control System.* The travel motor power and vehicle speed and direction are regulated by a system which includes relays, an electronic SCR control system, an accelerating master switch and directional switch providing stepless speeds forward or reverse. A foot accelerator operates the accelerating master switch to control the speed of the truck.

*e. Steering System.* The steering system includes a recirculating ball type steering gear mounted at front of truck, connected by a drag-link to the steering bellcrank, tie rods, and steering knuckles, mounted on the trailing axle.

*f. Brake System.* The brake system consists of a mechanical parking brake and a hydraulic foot brake. The mechanical brake operates on a drum on the travel motor armature shaft. This brake is applied either by a handle on the steering column, or automatically through spring action as the driver rises from the seat. The hydraulic brake is a conventional automotive type system, effective only on the front (drive) wheels.

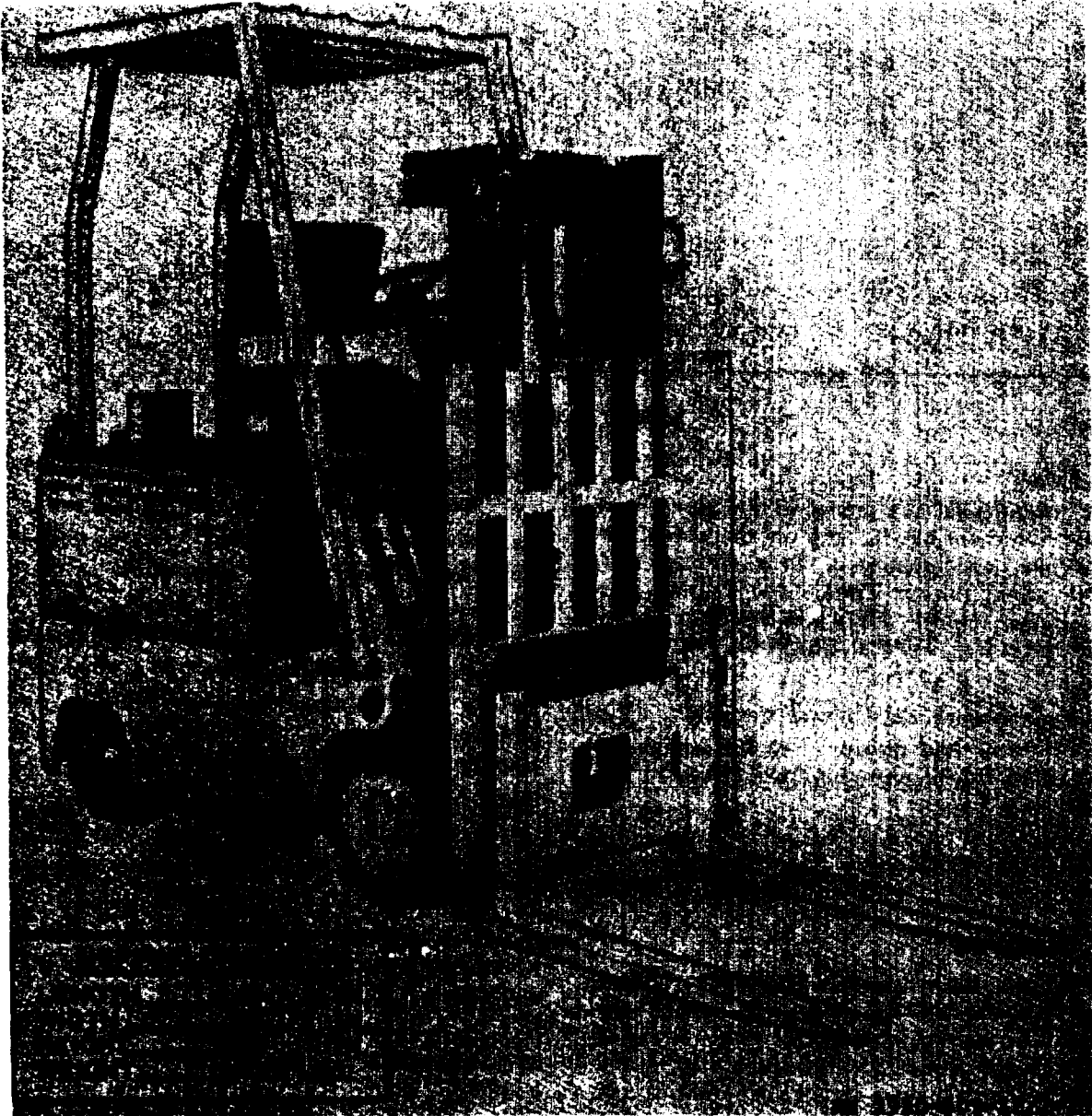


Figure 1-1. Truck, three-quarter front view, with shipping dimensions.

*g. Mast Assembly.* The mast assembly consists of five main assemblies as follows:

(1) *Outer upright assembly.* The outer upright assembly is a welded one-piece assembly that is mounted on the frame assembly and incloses the hoist cylinder, intermediate upright assembly and inner upright assembly.

(2) *Inner upright assembly.* The inner upright assembly is a welded one-piece assembly that is mounted within the intermediate upright assembly. The hoist cylinder, mounted in the

base of the outer upright assembly, is secured to the inner upright assembly. The inner upright assembly is raised or lowered by action of the hoist cylinder.

(3) *Intermediate upright assembly.* The intermediate upright assembly positioned between the inner and outer uprights provides additional mast rigidity and an overall lower truck profile while permitting a lift height of 145 1/2 inches. As the inner upright approaches its extended height, the intermediate upright starts to raise



Figure 1-2. Truck, three-quarter rear view.

until it reaches its full extended height at which time the carriage is at its maximum lift height of 145 1/2 inches.

(4) *Crosshead assembly.* The crosshead assembly is mounted over the hoist cylinder. Chains are attached to the chain anchors secured to the outer upright base. The chain is reeved over the crosshead, under the outer channel rollers, over the inner channel rollers and connected to the rear at the carriage. As the cylinder rises, the

crosshead assembly rises, tightening the chains and raising the lift carriage assembly.

(5) *Lift carriage assembly.* The lift carriage assembly rides on four rollers within the inner upright assembly, which in turn slides up and down inside of the intermediate upright channels. Two forks are mounted on the front of the lift carriage assembly for handling of loads.

*h. Lift Hydraulic System.* The hydraulic system consists of a reservoir, pump, control valve, hoist and tilt cylinder, and hydraulic hoses. The hoist cylinder raises the lift carriage and forks by hydraulic pressure supplied by the pump. Gravity lowers the lift carriage.

*i. Lift Cylinder.* A compound lift is used on this vehicle. The lift carriage rises to the top of the outer upright before the inner and intermediate uprights together with the lift carriage move upward. This is achieved by a dual hydraulic hoist cylinder assembly with two pistons working in sequence.

*j. Tilt Cylinders.* The tilt cylinders are double-acting. The uprights are tilted in and out by hydraulic pressure to the tilt cylinders.

*k. Electrical System.* The electrical system is a two-wire, ungrounded type. The battery is connected into the circuit by means of a removable connector. The charging connection is also made through this connector. The weight of the operator in the driver's seat closes the circuit to the accelerating switch by an interlock switch. Travel control is through the accelerating switch, with circuit made and broken by relay. A panic switch mounted on the dash panel opens and closes the travel circuit. The direction of travel is selected by the directional switch lever on the steering gear post. The stop and taillight is inclosed in a guard on the rear of the truck. The headlight, mounted on the right side of the hoist upright, is controlled by a toggle switch on the instrument housing.

*1. Battery.* The 36-volt battery (Government-furnished equipment) used will weigh approximately 1,600 pounds. The inside of the truck battery compartment is 26 13/16 inches long, 32 7/8 inches wide, and 23 3/8 inches high.

*m. Accelerator Master Assembly.* The accelerator master assembly contains three sensitive switches, operated in sequence by cams. The cams are actuated by the accelerator pedal. The switches energize relays which through the SCR control system govern the speed of the travel motor. A potentiometer governs signal strength and thereby power output of the SCR travel motor control circuit. The accelerating switch is located under the floor plate.

*n. Directional Switch.* The directional switch selects "forward" or "reverse" operation of the travel motor. This switch is a three-position, manually operated, two-circuit pilot device. The direction switch is located on the steering gear post.

*o. Relays and SCR Control System.* The relays make and break the circuits in response to related manual and automatic controls. The SCR control system provides close stepless control over the truck travel system with protection against over-current or overvoltage. These relays are mounted at the rear of the truck.

*p. Travel Motor.* The travel motor, under the operator's floor plate, is a series wound, direct current electric motor. Connected to the power axle, it drives the truck forward or backward.

*q. Hydraulic Pump Motor.* The pump motor for the upright hydraulic system is controlled by a switch which closes the pump motor relay. The switch is operated by either the lift control, or the tilt control, starting the motor when either lever is moved about onequarter of its travel toward lift or tilt position. The switch is opened when the lever is returned to neutral position. The pump motor is a series wound, direct current motor.

*r. Hourmeter.* The hourmeter is the only instrument used on this truck. This meter automatically records the number of hours truck has been in operation.

**1-5. Identification and Tabulated Data**

*a. Identification.* The truck has three major identification plates.

(1) *Travel motor identification plate.* Located on the travel motor housing. Specifies the manufacturer, type and serial number.

(2) *Pump motor identification plate.* Located on the pump motor housing. Specifies the manufacturer, type and serial number.

(3) *Manufacturers identification plate.* Located on the right front of the truck, it specifies nomenclature, type tires, capacity, manufacturer, serial number, model number, registration number, contract number or order number, service weight, wheel loading (no load on forks), wheel loading (rated load on forks), and center of gravity.

*b. Tabulated Data.*

( 1 ) *Capacities.*

Differential _____	2	pt (pint)
Hydraulic system _____	5	gal (gallon)
Brake system _____	1	pt
Steering gear _____	1	pt

(2) Overall dimensions and weight.

Ground clearance (at mast center) 3 in. (inch)  
 Height (overall):  
 With uprights extended 164 3/4 in. (less back rest).  
 With uprights retracted (with overhead guard) 83 in. (less overhead guard) 68 in.  
 Length:  
 Overall 106 in.  
 Forks 36 in.  
 weight w/battery 5,626 lb (pound)  
 Weight w/o battery 4,026 lb  
 Width 35 1/2 in  
 Wheel land (empty) :  
 Drive 2,740 lb  
 Steer 2,886 lb  
 Shipping dimensions Refer fig. 1-1

(3) Performances.

Aisle width (minimum) (carrying 48 in cube) :  
 Intersecting 69 in.  
 Right angle stacking 128 in.  
 Gradeability (maximum load) 15 percent  
 Hoist speed (empty) 55.5 ft/minute  
 Hoist speed (maximum load) 36.6 ft/minute  
 Lift height (maximum) 145 1/4 in.  
 Lad capacity (maximum) 2,000 lb  
 Maximum speed (empty) :  
 Forward 5.8 mph  
 Reverse 5.8 mph  
 Maximum speed (loaded) :  
 Forward 5.6 mph  
 Reverse 5.6 mph  
 Tilt limitation:  
 Backward 1 0°  
 Forward 3°  
 Turning radius (no load) :  
 Inside 6 7/8 in.  
 Outside 64 in.

(4) Hydraulic system.

Hydraulic fluid capacity 5 gal  
 Type of fluid Oil, Engine OE-10 MIL-L-210H  
 Pressure relief setting 1,400 psi (pound per square inch)  
 Hydraulic lift and tilt pump  
 Manufacturer Tyrone  
 Part number GPA1-30A-DY  
 Capacity 3.40 gpm at 1,200 rpm and 1,000 psi  
 Splined shaft rotation Counterclockwise  
 Directional control valve  
 Manufacturer Parker Hydraulics  
 Part number VDP11PD5  
 Tape 2 spool  
 Tilt cylinders  
 Manufacturer Baker  
 Part number 9025JY and 9025JY6  
 Bore 3 in.

Stroke 3.250 in.  
 Clued length (mounting centers) 13.531 in.  
 Lift cylinder  
 Manufacturer Baker  
 Part number A9025GV25  
 Extended length 109.250 in.  
 Compressed length 43.375 in.  
 Primary stroke 35.625 in.  
 Secondary stroke 36.250 in.  
 Hydraulic system filter  
 Manufacturer Marvel Engineering  
 Part number (element) 529206-1106  
 Rating 10 micron  
 Regulator valve (lift cylinder).  
 Manufacturer Waterman Hydraulic  
 Part number 1461T10-1

(5) Brake system.

Master cylinder  
 Manufacturer Wagner Electric  
 Part number FE 2796  
 Wheel cylinder  
 Manufacturer Rockwell Standard  
 Part number A1-3761B28

(6) Steering gear.

Steering gear  
 Manufacturer Saginaw Steering  
 Part number 7804220  
 Travel  
 Left hand (2.72 turns of steering wheel) 46°  
 Right hand (2.72 turns of steering wheel) 46°  
 Gear ratio 21.3:1

(7) Electrical system.

Hydraulic system pump motor.  
 Manufacturer Baker  
 Part number 9044H6  
 Bating (36 volts) 1.8 HP at 3,920 rpm (revolutions per minute)  
 Current draw (no load) 90 amp (amperes)  
 Current draw (with load) 150 amp  
 Travel motor  
 Manufacturer Baker  
 Part number 9044AW1  
 Bating (36 volts) 2.0 hp at 2,100 rpm  
 shaft rotation Clockwise and counterclockwise  
 Current draw (no load) 55/110 amp  
 Current draw (with load) 65/115 amp  
 Stall test 82 ft-lb (foot pounds)  
 Hydraulic pump relay  
 Manufacturer General Electric  
 Part number 1C2800M120A412  
 Accelerating relay  
 Manufacturer General Electric  
 Part number 1C2800M250A006B  
 Master switch relay  
 Manufacturer General Electric  
 Part number 1C2800M120A414

**TM 10-3930-609-12**

Reversing relay  
 Manufacturer \_\_\_\_\_ General Electric  
 Part number \_\_\_\_\_ 1C2800M254C006B

Directional control switch  
 Manufacturer \_\_\_\_\_ Baker  
 Part number \_\_\_\_\_ 177MHW1  
 Type \_\_\_\_\_ Double pole double throw-  
 3 position--center off

Accelerator switch  
 Manufacturer \_\_\_\_\_ General Electric  
 Part number \_\_\_\_\_ 1C3012BH742AF01

Fuses  
 Type \_\_\_\_\_ Cartridge  
 Rating  
 1 required \_\_\_\_\_ 140 amp 125 v (volts)  
 1 required \_\_\_\_\_ 225 amp 125 v  
 5 required \_\_\_\_\_ 14 amp 125 v

Headlight  
 Manufacturer \_\_\_\_\_ Baker  
 Part number \_\_\_\_\_ 424MBD1  
 Lamp \_\_\_\_\_ General Electric 60W  
 PAR46, sealed beam

Stop Light-Taillight  
 Manufacturer \_\_\_\_\_ Baker  
 Part number \_\_\_\_\_ 424 MCY1  
 Lamp \_\_\_\_\_ General Electric 1054,36 v  
 incandescent

Hourmeter  
 Manufacturer \_\_\_\_\_ Hamilton  
 Part number \_\_\_\_\_ 572-36/48DCNB  
 Maximum reading \_\_\_\_\_ 9,999.9 hr (hour(r))  
 Reading increment \_\_\_\_\_ 0.1 hr

Battery (Government-fur-  
 nished equipment).  
 Voltage \_\_\_\_\_ 36 v  
 Type \_\_\_\_\_ Lead-acid o nickel-iron  
 Part number \_\_\_\_\_ MS 15367 Battery, Storage  
 for Electric Powered  
 Industrial Trucks and  
 Tractors

(8) *Chassis.*

Drive axle  
 Manufacturer \_\_\_\_\_ Rockwell Standard  
 Part number \_\_\_\_\_ TA260FHX32  
 Type \_\_\_\_\_ Single-reduction, ring and  
 pinion  
 Overall reduction (in-  
 cluding adapters). \_\_\_\_\_ 20.300:1  
 Bevel gear reduction \_\_\_\_\_ 5-1/6:1  
 Width (hub to hub) \_\_\_\_\_ 32.000 in.  
 Pinion gear backlash \_\_\_\_\_ 0.004 to 0.012 in.  
 Brake \_\_\_\_\_ Hydraulic drum type

Differential  
 Manufacturer \_\_\_\_\_ Rockwell Standard  
 Part number \_\_\_\_\_ A3-3835L350-5-1/6:1  
 Type \_\_\_\_\_ Conventional

(9) *Tires.*  
 Type \_\_\_\_\_ Solid rubber

Number:  
 Drive \_\_\_\_\_ 2  
 Steer \_\_\_\_\_ 2

Size:  
 Drive \_\_\_\_\_ 16 1/4 x 5 x 11 1/4  
 Steer \_\_\_\_\_ 13 x 4 1/2 x 8

(10) *Nut and bolt torque data.* The follow-  
 ing lists bolt and nut torque specifications recom-  
 mended for applications where specific torque  
 requirements are not stated.

Grade B o l t	Comm. Low-Carb. SAE - 2	SAE-5	SAE-7	SAE-8
<b>Head Marking</b>				
<b>Bolt or Nut Size</b>	<b>In.-Lbs</b>			
4-40	8	--	--	--
6-32	12	--	--	--
8-32	20	--	--	--
10-24	25	--	--	--
10-32	30	--	--	--
12-24	35	--	--	--
	<b>Ft-Lbs</b>	<b>Ft-Lbs</b>	<b>Ft-Lbs</b>	<b>Ft-Lbs</b>
1/4-20	4	7	9	11
1/4-28	5	9	11	13
6/16-18	9	15	19	23
5/16-24	10	17	21	26
3/8-16	15	27	35	42
3/8-24	18	33	42	50
7/16-14	25	45	60	70
7/16-20	30	55	70	80
1/2-13	40	75	90	105
1/2-20	46	85	105	120
9/16-12	60	110	135	150
9/16-18	65	120	150	165
5/8-11	80	140	170	200
5/8-18	90	155	200	230
3/4-10	125	240	300	350
3/4-16	140	275	350	400
7/8-9	175	375	500	575
7/8-14	200	400	550	625
1-8	250	575	750	850
1-12	275	650	825	950

(11) *Wiring diagram and schematic.* Refer  
 to figure 1-3 for the wiring diagram and figure  
 1-4 for the wiring schematic.

**1-6. Difference in Models**

This manual covers the Baker Model FTD-020-  
 EE-SS fork lift truck (Army Model MHE-204).  
 No known differences exist for the model cov-  
 ered by this equipment publication.

- LEGEND**
- - MASH FILTER
  - - RECTIFIER
  - FU - FUSE
  - IF & IR - REVERSING RELAY
  - IMP - PUMP RELAY
  - IMS - MASTER SWITCH RELAY
  - IA - ACCELERATING RELAY
  - E.T.I. - ELAPSED TIME INDICATOR

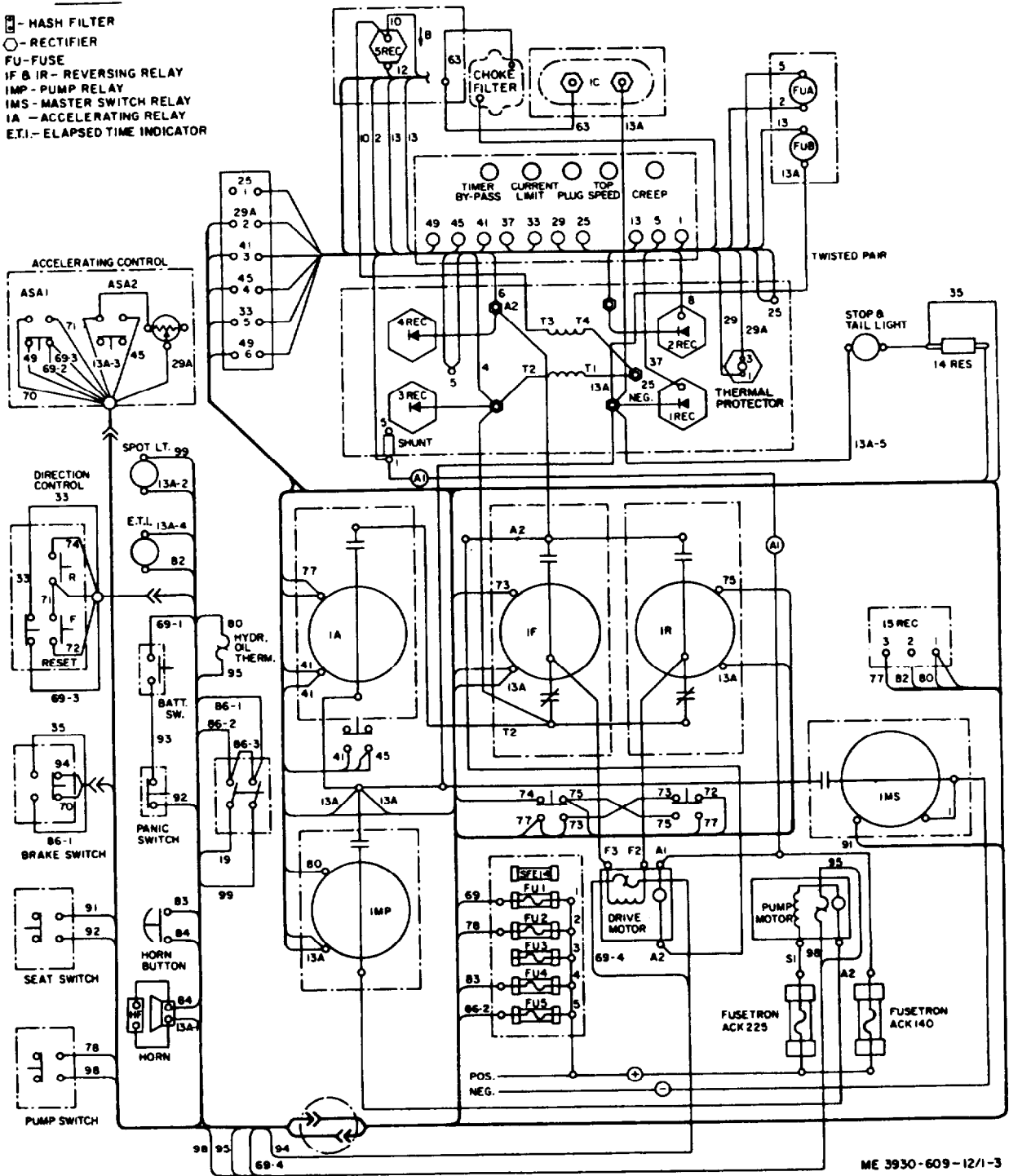


Figure 1-3. Wiring diagram.

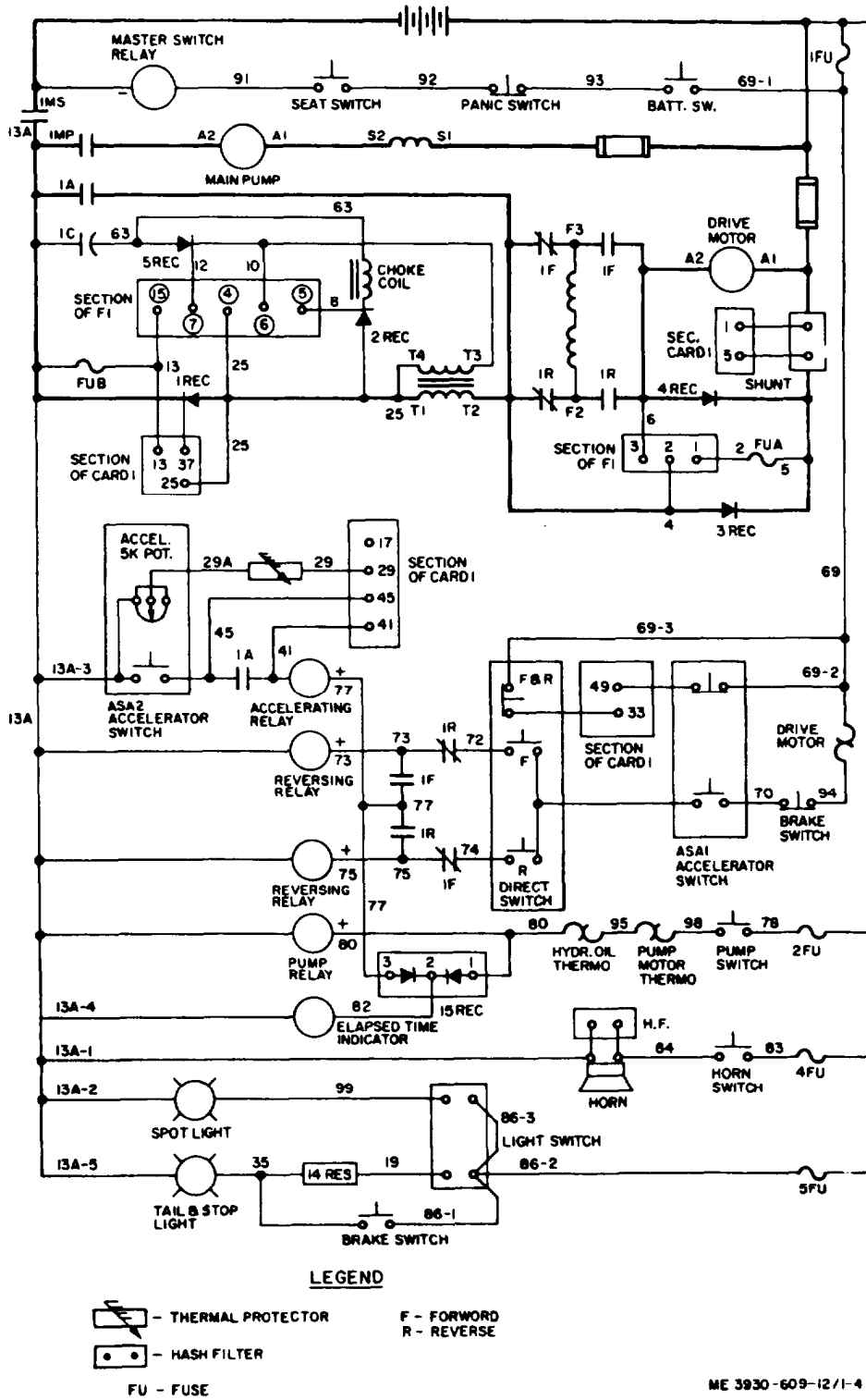


Figure 1-4. Wiring schematic.



## CHAPTER 2

### INSTALLATION AND OPERATING INSTRUCTIONS

---

#### Section I. SERVICE UPON RECEIPT OF TRUCK

##### 2-1. General

When a new truck is received by an organization, it must be serviced as described in paragraphs 2-2 and 2-3 by organizational maintenance personnel.

##### 2-2. Removal of Preservatives

a. Remove tape, paper, or other packing. Use extreme care when unpacking and installing separately packaged components.

b. Remove with SD (solvent, drycleaning) preservative compound from exposed metal surfaces. Because this compound is not a lubricant, take special care to see that it is completely removed from all wearing surfaces.

c. Fill drive axle, hydraulic tank and master cylinder with proper lubricant as indicated in lubrication order (fig. 3-1).

d. Refer to paragraph 2-4e. for battery installation.

##### 2-3. Inspecting and Servicing the Equipment

###### a. *Inspecting.*

(1) Inspect the packing list for missing components.

(2) Inspect exterior surfaces for broken or dented parts, and for damaged painted surfaces.

(3) Inspect visible wiring and hydraulic lines for cuts, breaks, or other damage.

(4) Inspect the lift chain and carriage assembly for damage.

(5) Inspect the controls and instruments for breaks, cracks, bends, or other defects.

###### b. *Servicing.*

(1) The organization mechanic will perform the services and tests that are listed and described in paragraph 3-7. The services performed at this time will begin the cycle of regularly scheduled preventive maintenance services.

(2) The deficiencies and shortcomings noted, and the corrective action taken will be reported on the appropriate forms prescribed and explained in TM 33-750.

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

a. *Fire Extinguisher.* Remove separately packed fire extinguisher and install in bracket at front of truck. Be certain bracket clamp locks properly to secure fire extinguisher in position.

b. *Directional Control Switch Knob.* Screw directional control switch knob onto lever of directional control switch secured to steering gear column.

###### c. *Headlight.*

(1) Secure headlight to left side of outer upright with two screws, nuts and lockwashers.

(2) Remove headlight guard, bezel and sealed beam light.

(3) Insert conduit through rear of headlight shell and connect conduit leads securely to headlight terminals.

(4) Install sealed beam light, bezel and headlight guard using the same hardware that was removed.

d. *Forks.* Pull up ring catch on fork, position fork in desired location on carriage and release ring catch to lock fork on carriage. Repeat to install other fork.

e. *Battery.* The battery is a Government furnished, 36 volt storage type, shipped dry and separately from the equipment. The electrolyte is also packed in a separate container. Fill the battery with electrolyte to the level 3/8 inch above the plates and connect the battery to a charge until it is fully charged, Service in accordance with TM 10-1690A. To install battery, proceed as follows:

(1) Open battery compartment top and side doors. Latch top door to overhead guard.

(2) Using a hoist rated at more than 2,000 pound capacity, lift battery by hooks inserted through lifting eyes at each side of battery. Use a spreader bar as wide as the battery between the lifting hooks to avoid an inward pull on the battery case.

**Warning: Avoid contact with the battery electrolyte. If the solution comes in contact with the skin, rinse the area immediately with clean water to avoid skin burns. Do not smoke or use an open flame in the vicinity when servicing batteries as they generate hydrogen, an explosive gas.**

(3) Position battery between battery clamps in battery compartment and remove

hoist. Tighten battery clamp screws to prevent battery movement.

(4) Connect battery leads securely at battery receptacles and close battery compartment doors.

### 2-5. Installation of Setting Up Instructions

The truck is shipped as a completed unit except for the separately packed components (para 2-4). After the separately packed components are installed, the preservatives removed (para 2-2) and the inspection and servicing preformed (para 2-3) the truck may be entered into service. No other installation or setting up procedures are required other than operator orientation and training.

## Section II. MOVEMENT TO A NEW WORKSITE

### 2-6. Local Worksite

When the new worksite is near, the fork lift truck may be operated under its own power if the area is relatively level. If the ground is rough, sandy, or muddy, the fork lift may be loaded into a truck, trailer, or other carrier to be moved. No dismantling of the truck is required for movement to a local worksite.

### 2-7. Distant Worksite

When the fork lift truck must be moved to a distant worksite, it may be loaded onto a truck, trailer, or other carrier and secured with blocking, strapping, cables and the like. Disconnect the battery cable connector before transporting the fork lift truck. The only reinstallation after movement required is the connection of the battery cable connector with its mating receptacle.

## Section III. CONTROLS AND INSTRUMENTS

### 2-8. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments to insure proper operation of the Baker FTD-020-EE-SS (Army Model MHE-204) Fork Lift Truck.

### 2-9. Controls

*a. Operator's Seat.* As the operator places his weight on the operator's seat (fig. 2-1), a switch is closed which activates the travel motor circuit. Simultaneously, the travel motor brake is released. As the driver removes his weight from the seat, the motor brake is engaged and the travel motor circuit is opened.

*b. Horn Button.* The horn button is located in the center of the steering handwheel. Depress the button to sound horn.

*c. Parking Brake Lever.* The parking brake lever is located to the right of the operator's seat in front of the cowl. Pull up on the lever to apply the brake and hold the truck in a stationary position. Twist the lever clockwise and move downward to release brake.

*d. Steering Handwheel.* The steering handwheel controls the direction of travel of the truck. Turn the handwheel to the right (clockwise) to move the truck to the right; turn the handwheel to the left (counterclockwise) to move the truck to the left.

*e. Accelerator Pedal.* The accelerator pedal is located on the floor plate, convenient to the operator's right foot. Depression of the accelerator pedal either rapidly or slowly will cause the truck to move in the direction selected at the speed and acceleration desired by the operator. Release the pressure on the pedal to slow the speed of the truck.

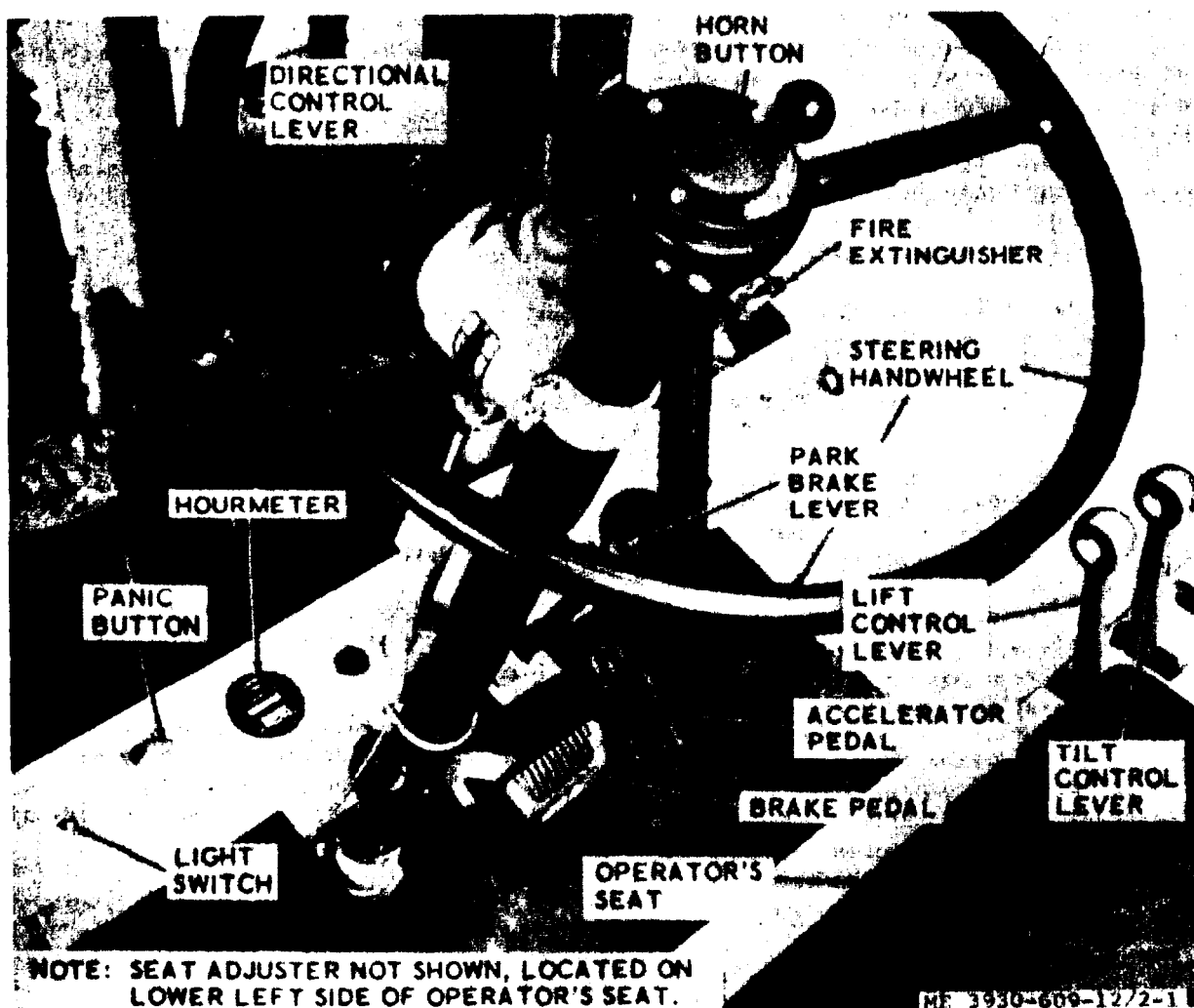


Figure 2-1. Controls and Instruments.

*f. Light Switch.* The light switch is located on the left side of the instrument panel. Push the light switch up to turn on the headlight and taillight. Push the light switch down to turn off the headlight and taillight.

*g. Panic Button.* The panic button is located to the right of the light switch. Push in the panic switch to open the power circuit. Pull out the panic switch to close the power circuit.

*h. Lift Control Lever.* The lift control lever is located on the cowl to the right of the operator's seat. Move the lever to the rear to lift the forks. Move the lever forward to lower the forks.

*i. Tilt Control Lever.* The tilt control lever is located directly to the right of the lift control

lever. Move the tilt control lever forward to tilt the forks forward. Move the lever backward to tilt the forks backward.

*j. Direction Control Lever.* The direction control lever is located on the right side of the steering column. This lever provides three position control of the truck; forward, off, and reverse. Move the lever forward for forward travel, move the lever to the center position for off, and move the lever backward for reverse travel. Leave the lever in the off position when the truck is parked. Mechanical linkages attached to the operator's seat will automatically return the lever to the off position when the operator rises from the seat. The directional control lever may be used for either forward or reverse

torque braking. Move the direction control lever in the opposite position you are traveling. The truck will come to almost a complete stop before going in the opposite direction. Depress the accelerator pedal if more severe torque braking is required.

*k. Brake Pedal.* The brake pedal is located on the floor immediately to the right of the steering column. Depress the brake pedal to stop the truck and simultaneously illuminate the stop-light.

*l. Seat Adjuster.* The seat adjuster is located on the lower left side of the operator's seat.

Move the adjuster lever toward the seat and move the seat forward or backward as desired. Release the adjuster lever when seat is in position.

## 2-10. Instruments

The hourmeter is the only instrument used on this truck. It is located on the instrument panel to the right of the panic switch. This meter operates only when the truck is in motion. The figure (extreme right center) records 10th of an hour. The small indicator (upper right) visibly turns when the meter is recording.

## Section IV. OPERATION UNDER USUAL CONDITIONS

### 2-11. 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. This section gives instructions on starting and stopping the fork lift truck, operation of the fork lift 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.

### 2-12. Driving the Truck

#### *a. Starting.*

(1) Perform the preventive maintenance checks and services required by paragraph 3-7.

(2) Mount truck and take position in operator's seat.

(3) Check that panic button is pulled out (toward operator).

(4) Depress brake pedal with right foot, and simultaneously release parking brake lever with right hand.

(5) Move the lift control lever gradually to the rear to raise the forks to normal traveling position (8 to 10 inches above working surface).

(6) Move the tilt control lever backward and tilt the forks backward.

(7) Move the direction control lever from the center-off position to forward or reverse position, depending on desired direction.

(8) Place foot on the accelerator pedal and gradually depress the accelerator pedal until truck begins to travel. Continue to depress the accelerator pedal until safe operating speed is at-

tained. If the truck fails to move, report this to the proper authority.

#### *b. Stopping.*

(1) Remove foot from the accelerator pedal.

(2) Apply gradual pressure on the brake pedal to bring the truck to a safe smooth stop. Avoid sudden stops.

(3) Apply the parking brake. Move the direction control lever to the center-off position.

(4) Move the tilt control lever forward to bring the mast to the vertical position.

(5) Move the lift control lever forward and lower the forks to the ground.

(6) As the operator removes his weight from the seat, the travel motor brake is applied and the seat switch is opened, thereby cutting off current to the travel motor. The direction control lever is also automatically returned to the center off position.

(7) Every 8 hours or after a day's work with the truck, the operator must have the battery charged over night for efficient operation of the fork lift truck the following day.

*c. Emergency Stopping.* The mechanical brake is automatically applied when the operator's weight is removed from the seat. The power circuit is automatically opened whenever the operator depresses the panic switch mounted on the instrument panel. Either above procedure will permit emergency stopping of the truck.

### 2-13. Picking Up the Load

*a.* Approach the load squarely with forks spaced to divide load evenly and halt the truck. Move the tilt control lever forward and bring the mast assembly to the vertical position. Raise or lower the forks to the proper height to pick up the load.

b. Move the truck forward until the forks are positioned under the load. Make certain the forks are fully inserted in the pallet or under the load.

c. Apply the parking brake to prevent the truck from shifting position during the lifting operation.

d. Move the direction control lever to the center-off position.

e. Move the lift control lever to the rear and raise the load approximately 12 inches above ground level. Release the lift control lever. Move the tilt control lever backward to tilt the forks backward. Release the tilt control lever.

#### 2-14. Moving Load

a. Move the direction control lever from the center-off position to the proper position for the desired direction of travel.

b. Release the parking brake lever, depress the accelerator pedal, and move the load to the desired location.

**Caution:** Accelerate only as needed to overcome truck gravity, release brake pedal, then continue to accelerate. Do not accelerate to the extent that the drive motor must overcome brakes. This is not only detrimental to the drive motor, but also increases brake lining wear.

**Warning:** The operator must be alert at all times while operating the fork lift truck. Failure to observe this warning can result in serious injury or death to the operator or other personnel.

#### 2-15. Dpositing the Load

a. *Depositing the Load on a Tiered Stack.*

(1) Move the lift control lever to the rear until the load reaches the desired height above the tier.

(2) Drive the truck forward until the load is above its resting place.

(3) Pull up on the parking brake lever to apply the parking brake.

(4) Move the direction control lever to the center-off position. Move the tilt control lever forward and tilt the forks forward until the load is aligned with the tier.

(5) Move the lift control lever forward and carefully lower the load into position on the tier. Continue to lower the forks until they can be easily withdrawn from the pallet.

(6) Move the direction control lever to the reverse position. Release the parking brake lever, and slowly back the truck away from the tiered stack until the forks are clear.

(7) Move the lift control lever forward to lower the forks into normal traveling position (8 to 10 inches above surface).

b. *Depositing the Load in a Storage Area.*

(1) Carefully drive up to the position at which the load is to be deposited. Depress the brake pedal to halt the truck.

(2) Apply the parking brake, and move the direction control lever to the center-off position.

(3) Move the tilt control lever forward and bring the mast assembly to the vertical position.

(4) Move the lift control lever forward and carefully lower the load to the ground. Continue to lower the forks until they can be easily withdrawn from under the load.

(5) Place the direction control lever in the reverse position. Release the parking brake lever, and slowly back the truck away from the deposited load.

### Section V. OPERATION UNDER UNUSUAL CONDITIONS

#### 2-16. Operation in Extreme Cold (Below 0° F.)

a. See that hydraulic reservoir is filled to proper level. (Refer to current lubrication order.) Inspect for leaks at all accessible lines, hoses and fittings.

b. Inspect brakes for proper operation.

c. Keep battery fully charged, if battery indicator shows low charge or is low on electrolyte, report this condition to proper authority.

d. Lubricate as specified in the current lubrication order.

e. Be extremely careful when handling hoses, lines, or wiring to avoid breakage.

f. Wipe exposed areas dry with a clean cloth.

#### 2-17. Operation in Extreme Heat

a. Make certain that hydraulic reservoir is filled to proper level.

b. Inspect lines, and fittings for breaks, or leaks.

- c. Inspect battery for low electrolyte level.

### **2-18. Operation in Dusty or Sandy Areas**

a. *Protection.* Shield the fork lift truck from dust and sand as much as possible when not in use. Take advantage of natural barriers which offer protection from dust and sand.

b. *Hydraulic System.* Check air filter frequently for clogged condition. Wipe dust and dirt from filter area before removing from reservoir. Wipe dust and dirt from cylinders frequently as sand and dust is an abrasive and can damage the lift cylinders.

c. *Lubrication.* Clean all lubrication points thoroughly before applying lubricants.

d. *Cleaning.* Wipe dust and dirt from all external areas regularly.

### **2-19. Operation Under Rainy or Humid Conditions**

If unit is outside and not operating, protect it with a canvas or other waterproof covering. Remove cover during dry periods. Keep hydraulic reservoir full to avoid condensation. Wipe excess moisture from external surfaces.

### **2-20. Operation in Salt-Water Areas**

a. *General.* Wash the unit frequently with clean, fresh water. Do not contaminate hydraulic system or damage electrical components.

b. *Protection.* Coat exposed metal surfaces with rust-proofing material. Remove rust immediately and apply paint or oil as applicable.

## **Section VI. OPERATION OF AUXILIARY MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT**

### **2-21. Fire Extinguisher (Dry Chemical Type)**

The dry chemical type fire extinguisher is effective in areas where ambient temperature is -25°F. and above. If winterized (pressurized with nitrogen), the fire extinguisher may be used in temperatures below -25°F. The fire extinguisher is a 2 1/2 pound, stored pressure, lever-operated extinguisher.

### **2-22. Operating the Extinguisher (fig. 2-1)**

a. Disconnect the clamp that secures the extinguisher to its mounting bracket, swing the clamp open, and remove the extinguisher.

b. Hold the extinguisher upright, aim the nozzle at the base of the fire and raise the operating lever.

c. Direct the discharge at the base of the fire with a side-to-side sweeping motion.

### **2-23. Maintenance**

Weigh the fire extinguisher every 6 months. Replace the extinguisher if the weight is less than 4 1/2 pounds, or the pressure is below 1,25 pounds. The dry chemical type fire extinguisher will be serviced at installation level through Repair and Utilities facilities, with the filling agent supplied by local procurement through Troop Supply Channels. Refer to TB 5-4200-200-10.

**CHAPTER 3**  
**OPERATOR AND ORGANIZATIONAL MAINTENANCE**  
**INSTRUCTIONS**

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**Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE**  
**REPAIR PARTS, TOOLS AND EQUIPMENT**

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

No special tools or equipment are required by the operator or organizational maintenance personnel for the maintenance of the fork lift truck.

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

Tools and repair parts issued with or authorized

for the fork lift truck are listed in Appendix B.

**3-3. Organizational Maintenance Repair Ports**

Organizational maintenance repair parts are listed and illustrated in TM 10-3930-609-20P.

**Section II. LUBRICATION**

**3-4. General lubrication Information**

a. This section contains lubrication instructions which are supplemental to, and not specifically covered in the lubrication order.

b. For current lubrication order, refer to LO 10-3930-609-12.

*Figure 3-1. Not used.*

**3-5. Detailed lubrication Information**

a. *Care of Lubricants and Lubrication Equipment.* Keep all lubricants in closed containers and store in a clean, dry area away from heat. Do not allow dirt, dust, water, or other foreign matter to come in contact with the lubricants at any time. Keep all lubrication equipment clean and ready for use.

b. *Cleaning.*

(1) *General.* Keep the fork lift truck clean by wiping it regularly with a cloth dampened lightly in an approved cleaning solvent and dry thoroughly. Clean lubrication points and area around hydraulic reservoir fill before lubrication.

(2) *Grease fittings.* Wipe grease fittings with a clean, dry cloth before lubrication. Remove old or hardened lubricants with an ap-

proved cleaning solvent. Remove all excess lubricant after lubrication.

(3) *Drain plug and breather.* Keep the area clean around the drain plug, and hydraulic reservoir breather. Remove the drain plug only when necessary to remove hydraulic oil.

(4) *Bearings.* Clean and lubricate unsealed bearings ( (a) and (b) below).

(a) Wash all of the old lubricant out of the bearings with volatile mineral spirits or drycleaning solvent and dry the parts thoroughly.

**Caution: Bearings must not be spun dried with compressed air.**

(b) Pack the bearings by hand or with a mechanical packer, introducing the lubricant carefully between the balls and rollers. Do not smear grease only on the outside of the bearings and expect it to work in. Great care must be exercised to insure that dirt, grit, lint, or other contaminants are not introduced into the bearings. If the bearings are not to be installed immediately after repacking, wrap them in clean oilproof paper to protect them from contaminants.

c. *Usual Conditions.* Service intervals specified on the lubrication order are for normal opera-

tion and where moderate temperature, humidity, and atmospheric conditions prevail.

d. *Unusual Conditions.* Reduce service intervals specified on the lubrication order, i.e., lubricate more frequently, to compensate for abnormal or extreme conditions, such as high or low temperatures, continued operation in sand or dust, or exposure to moisture or salt water environment. Any one of these operations or conditions may cause contamination and quickly destroy the protective qualities of the lubricants. Intervals may be extended during inactive periods commensurate with adequate preservation.

e. *Changing Grade of Lubricants.* Lubricants

are prescribed in the "Key" in accordance with three temperature ranges; above +32°F., +40° to -10°F., and from 0° to -65°F. Change the grade of lubricants whenever weather forecast data indicate that air temperatures will be consistently in the next higher or lower temperature range or when sluggish operation caused by lubricant thickening occurs. No change in grade will be made when a temporary rise in temperature is encountered.

f. *Maintaining Proper Lubricant Levels.* Lubricant levels must be observed closely and necessary steps taken to replenish in order to maintain proper levels at all times.

### Section III. PREVENTIVE MAINTENANCE SERVICES

#### 3-6. 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 are listed and described in paragraph 3-7. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if deficiency is noted during operation which would damage

the equipment if operation were continued. AU deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 at the earliest possible opportunity.

#### 3-7. Preventive Maintenance Checks and Servicer

a. *General.* This paragraph contains tabulated listing of preventive maintenance checks and services which must be performed by the operator and/or Organizational Maintenance personnel. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to Table 3-1 for the preventive maintenance checks and services.

Table 3-1. Preventive Maintenance Checks and Services

Item number	Interval						B--Before operation D--During operation	A--After operation W-- Weekly	M--Monthly Q--Quarterly	
	Operator				Org.					
	Daily						Item to be inspected	Procedure	Reference	
	B	D	A	W	M	Q				
1	X			X	X	X			Para 3-42	
2				X	X	X	Headlight and tail-light	Lubricate in accordance with the Lubrication Order. Check operation. Replace defective lamp.		
3	X			X	X	X			Para 3-60	
4				X	X	X	Tires	Check for cuts. Remove embedded foreign material.		
5				X	X	X	laster cylinder	Check for leaks and loose connections. Fill as required to within 1/4-inch of top.		
6	X	X					Hydraulic oil tank	Check fluid level. Fill as required. Replace dirty air cleaner element.		
				X	X	X				
							Battery	Remove corrosion. Add electrolyte as required.		
							Brake pedal	Check for strong pressure when brake pedal is applied. Check for exercise travel.		



Item number	Interval						B--Before operation D--During operation	A--After operation W--Weekly	M--Monthly Q--Quarterly	
	Operator				Org.					
	Daily						Item to be inspected	Procedure	Reference	
	B	D	A	W	M	Q				
7	X	X						Horn	Check operation. Replace if defective.	Para 3-44 & 3-45
8	X	X						Controls and instrument	Check for proper operation. Controls should operate freely with no binding.	
9		X			X	X		General	Check for unusual noise, vibration or any other indication signifying trouble.	
10				X	X	X		Fire extinguisher	Check for proper charge.	
11	X	X		X	X	X		Tilt cylinder	Check for leaks and loose connections. Mast will tilt evenly when properly adjusted.	
12				X	X	X		Lift chains	Check for cracked, broken or excessively worn links.	
13	X	X						Hoist cylinder	Check for leaks and loose connection.	
14	X	X			X	X		Handbrake lever	Check for proper operation.	
15	X			X	X	X		Power axle	Check for lubricant leakage.	
16	X	X		X	X	X		Steering gear	Check for lubricant leakage. Check for proper operation.	

b. Intervals. Each truck will be inspected by its assigned operator, each day it is operated. This service is divided into three parts.

(1) *Before-operation service.* This is a brief service to ascertain that the truck is ready for operation; it is mainly a check to see if conditions affecting the truck's readiness have changed since the last after-operation service.

(2) *During-operation service.* This service consists of detecting unsatisfactory performances. While driving or operating, the driver should be alert for any unusual noises or odors, steering irregularities, or any other indication of malfunction of any part of the truck. Every time the operator picks up or deposits a load, applies the brakes, accelerates or turns the truck, it should be considered a test and any unusual or unsatisfactory performance noted.

(3) *After-operation service.* This is the basic daily service for all trucks. It consists of correcting, so far as possible, any operating deficiencies, so that the truck is prepared to be operated again, upon a moment's notice, should the situation so require.

c. *General Procedures for AU Services and Inspections.*

(1) The general procedures ((2) below) apply to all inspections and are just as important as the specific procedures.

(2) Inspections to see if items are in good condition, correctly assembled, secure, not ex-

cessively worn, not leaking, and adequately lubricated apply to most items in the preventive-maintenance and inspection procedures. Any or all of these checks that are pertinent to any item (including supporting, attaching, or connecting members) will be performed automatically as general procedures, in addition to any specific procedures given.

(a) Inspection for good condition is usually visual inspection to determine if the unit is safe or serviceable. Good condition is explained further as meaning: not bent or twisted, not chafed or burned, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut, not deteriorated.

(b) Inspection of a unit to see if it is correctly assembled is usually a visual inspection to see if the unit is in its normal position in the truck and if all its parts are present and in their correct relative positions.

(c) Inspection of a unit to see if it is secure is usually a visual, hand-feel, pry-bar, wrench, or screwdriver inspection for looseness in the unit. This inspection will include any brackets, lockwashers, locknuts, locking wires, and cotter pins as well as any connecting tubes, hoses, or wires.

(d) Excessively worn is understood to mean worn beyond serviceable limits, or likely to fail if replaced before the next scheduled inspection. Excessive wear of mating parts or linkage

connections is usually evidenced by too much play (lash or lost motion). It includes illegibility as applied to markings and data plates, and printed matter.

*d. General Cleaning.* Any special cleaning instructions required for specific mechanism or parts are contained in the pertinent section. General cleaning instructions are shown in (1) through (4) below.

(1) Use dry-cleaning solvent or volatile mineral spirits to clean or wash grease or oil from all parts of the truck.

(2) A solution of one part grease-cleaning compound to four parts of dry-cleaning solvent or volatile mineral spirits may be used for dissolving grease and oil from chassis, mast and other parts. Use cold water to rinse off any solution which remains after cleaning.

(3) After the parts are cleaned, rinse and dry them thoroughly. Apply a light grade of oil to all polished metal surfaces to prevent rusting.

(4) Before installing new parts, remove any preservative materials, such as rust-preventive

compound, protective grease, etc.; prepare parts as required (oil seals, etc.); and for those parts requiring lubrication, apply the lubricant prescribed in the lubrication order.

*e. General Precautions in Cleaning.*

(1) Dry-cleaning solvent and volatile mineral spirits are inflammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are used. Use only in well ventilated places.

(2) These cleaners evaporate quickly and have a drying effect on the skin. If used without gloves, they may cause cracks in the skin and, in the case of some individuals, a mild irritation or inflammation.

(3) Avoid getting petroleum products, such as dry-cleaning solvent, volatile mineral spirits, engine fuels, or lubricants on rubber parts as they will deteriorate the rubber.

(4) The use of diesel fuel oil, gasoline, or benzene (benzol) for cleaning is prohibited.

### Section IV. OPERATORS MAINTENANCE

#### 3-8. General

Instructions in this section are published for the information and guidance of the operator to maintain the fork lift truck.

#### 3-9. Operator's Maintenance

Operator maintenance is limited to the inspec-

tions and services outlined in the preventive maintenance checks and services (table 3-1) and the general services outlined in paragraph 3-7 c through 3-7 e. Refer to the applicable referenced paragraphs for the corrective action required and the performance of the specific maintenance service.

### Section V. TROUBLESHOOTING

#### 3-10. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the fork lift truck and its com-

ponents. Malfunctions which may occur are listed in table 3-2. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Truck will not start or develop full power.	<p>a. Dead battery.</p> <p>b. Fuse blown.</p> <p>c. Defective battery plug or receptacle.</p> <p>d. Contacts dirty, worn, or broken in relay.</p> <p>e. Dirt in relay causing mechanical restriction.</p> <p>f. Snap switches malfunctioning in accelerator master assembly.</p>	<p>a. Charge or replace (para 3-46).</p> <p>b. Replace (para 3-51).</p> <p>c. Replace plug or receptacle (para 3-51).</p> <p>d. Clean or replace contacts (para 3-49).</p> <p>e. Clean relay thoroughly.</p> <p>f. Replace accelerator master assembly (para 3-56).</p>

Malfunction	Probable cause	Corrective action
	<ul style="list-style-type: none"> <li><i>g.</i> Seat switch not working.</li> <li><i>h.</i> Open circuit due to loose connections in accelerator master assembly.</li> <li><i>i.</i> Mechanical binding in accelerator master assembly.</li> <li><i>j.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>g.</i> Adjust or replace switch (para 3-54).</li> <li><i>h.</i> Clean and secure connections firmly (para 3-56).</li> <li><i>i.</i> Replace accelerator master assembly (para 3-56).</li> <li><i>j.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
2. All speeds not obtainable.	<ul style="list-style-type: none"> <li><i>a.</i> Object lodged in relay.</li> <li><i>b.</i> Dirty contacts on relay.</li> <li><i>c.</i> Switches in accelerator master assembly malfunctioning.</li> <li><i>d.</i> Sticking or binding of accelerator any part of stroke.</li> <li><i>e.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Remove object.</li> <li><i>b.</i> Replace contacts (para 349).</li> <li><i>c.</i> Replace accelerator master assembly. (para 3-56).</li> <li><i>d.</i> Replace accelerator master assembly (para 3-56).</li> <li><i>e.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
3. overheating.	<ul style="list-style-type: none"> <li><i>a.</i> Dirty relay contacts.</li> <li><i>b.</i> Vehicle operating in low speed for prolonged periods.</li> <li><i>c.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Replace contacts (para 3-49).</li> <li><i>b.</i> No technical remedy. Advise operator to avoid practice if possible.</li> <li><i>c.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
4. Improper plugging control and timing through all speeds.	<ul style="list-style-type: none"> <li><i>a.</i> Dirt in relay or directional switch.</li> <li><i>b.</i> Dirty contact in relay.</li> <li><i>c.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Clean unit thoroughly.</li> <li><i>b.</i> Clean or replace contacts (para 3-49).</li> <li><i>c.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
5. Brakes dragging.	<ul style="list-style-type: none"> <li><i>a.</i> Improper brake adjustment.</li> <li><i>b.</i> Plugged master cylinder compensating port.</li> <li><i>e.</i> Seat brake improperly adjusted.</li> <li><i>d.</i> Mineral oil in brake system.</li> <li><i>e.</i> Brake return spring weak or broken</li> <li><i>f.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Adjust brakes (para 3-30a).</li> <li><i>b.</i> Open wheel cylinder bleeder fitting. If brakes release when fluid escapes, replace master cylinder (para 3-31).</li> <li><i>c.</i> Adjust so that brake does not drag when seat is down and is firmly applied when seat is up (para 3-29b).</li> <li><i>d.</i> Bleed brake system (para 3-30b).</li> <li><i>e.</i> Replace brake system return spring (para 3-30c).</li> <li><i>f.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
6. Brake pedal goes to floor.	<ul style="list-style-type: none"> <li><i>a.</i> Worn lining.</li> <li><i>b.</i> Air in system.</li> <li><i>c.</i> Fluid low in master cylinder.</li> <li><i>d.</i> Pedal improperly adjusted.</li> <li><i>e.</i> Broken brake line.</li> <li><i>f.</i> other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Install new lined brake shoes (para 3-30d).</li> <li><i>b.</i> Bleed system (para 3-30b).</li> <li><i>c.</i> Replenish fluid and check for leaks.</li> <li><i>d.</i> Adjust brake pedal (para 3-30a).</li> <li><i>e.</i> Replace brake line.</li> <li><i>f.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
7. Brake pedal under pressure gradually goes to floor plate.	<ul style="list-style-type: none"> <li><i>a.</i> Leaks in hydraulic brake system.</li> <li><i>b.</i> Scored master cylinder barrel or defective cup.</li> <li><i>c.</i> other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Locate and eliminate leaks.</li> <li><i>b.</i> Replace master cylinder (para 3-41).</li> <li><i>c.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>
8. Brake pedal has springy or rubbery action.	<ul style="list-style-type: none"> <li><i>a.</i> Air in system.</li> <li><i>b.</i> Other causes.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Bleed system (para 3-30b).</li> <li><i>b.</i> Refer other causes to direct and general support maintenance personnel.</li> </ul>

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Malfunction	Probable cause	Corrective action
9. Weak braking action.	<ul style="list-style-type: none"> <li>a. Oil on linings.</li> <li>b. Incorrect lining.</li> <li>c. Improper brake adjustment.</li> <li>d. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace brakeshoes (para 3-30c).</li> <li>b. Replace brakeshoes (para 3-30c).</li> <li>c. Adjust brakes (para 3-30a).</li> <li>d. Refer other causes to direct and general support maintenance personnel.</li> </ul>
10. Harsh braking action.	<ul style="list-style-type: none"> <li>a. Brake lining grease or oil soaked.</li> <li>b. Brake backing plate loose.</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace brakeshoes (para 3-30c).</li> <li>b. Refer to direct support.</li> <li>e. Refer other causes to direct and general support maintenance personnel.</li> </ul>
11. Brake releases slowly.	<ul style="list-style-type: none"> <li>a. Hydraulic fluid congealed.</li> <li>b. Retraction of brakeshoes restricted by weak return springs or dirt.</li> <li>c. Dirt in master cylinder.</li> <li>d. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Drain, flush, and replace with proper brake fluid (para 3-30b).</li> <li>b. Clean, adjust or replace as necessary (para 3-30b).</li> <li>c. Replace master cylinder (para 3-31).</li> <li>d. Refer other cause to direct and general support maintenance personnel.</li> </ul>
12. Truck pulls to one side.	<ul style="list-style-type: none"> <li>a. Brake lining grease or oil soaked.</li> <li>b. Brake line closed</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace brakeshoes (para 3-30b).</li> <li>b. Replace brake line.</li> <li>c. Refer other causes to direct and general support maintenance personnel.</li> </ul>
13. Steering difficult or wandering.	<ul style="list-style-type: none"> <li>a. Steering gear adjustment too slack.</li> <li>b. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Readjust steering gear (para 3-66).</li> <li>b. Refer other causes to direct and general support maintenance personnel.</li> </ul>
14. Lift carriage will not lift load.	<ul style="list-style-type: none"> <li>a. Lift chains broken.</li> <li>b. Oil leaks in hoses.</li> <li>c. Fuse-tron blown.</li> <li>d. Hydraulic fluid low.</li> <li>e. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace lift chains (pan 3-24).</li> <li>b. Inspect fittings and couplings Tighten or replace as required.</li> <li>c. Replace (para 3-51).</li> <li>d. Fill reservoir to prescribed level.</li> <li>e. Refer to direct and general support maintenance personnel.</li> </ul>
15. Load creeps down from raised position.	<ul style="list-style-type: none"> <li>a. Oil leak in lines.</li> <li>b. Leaky control valve</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten fittings.</li> <li>b. Tighten connections.</li> <li>c. Refer other cause to direct and general support maintenance personnel.</li> </ul>
16. Hoisting speed erratic	<ul style="list-style-type: none"> <li>a. Air in system.</li> <li>b. Low level in reservoir.</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Bleed air from system by operation</li> <li>b. Fill reservoir to prescribed level.</li> <li>c. Refer other causes to direct and general support maintenance personnel.</li> </ul>
17. Control valve plungers will not return to neutral.		<ul style="list-style-type: none"> <li>a. Refer malfunction to direct and general support maintenance personnel.</li> </ul>
18. Forks uneven when load is lifted.	<ul style="list-style-type: none"> <li>a. Lift chains out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust so chain raises forks evenly (para 3-24a).</li> </ul>
19. No motion of hydraulic unit when first started up.	<ul style="list-style-type: none"> <li>a. Oil supply in tank too low.</li> <li>b. Oil viscosity too heavy.</li> <li>c. Air leak in pump inlet line.</li> <li>d. Restricted pump inlet hose.</li> <li>e. Truck overloaded</li> <li>f. Failure at switch.</li> <li>g. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Fill reservoir to prescribed level.</li> <li>b. Change to oil specified</li> <li>c. Tighten hose connection.</li> <li>d. Repair or replace (para 3-62).</li> <li>e. Reduce load.</li> <li>f. Replace control lever switch (para 3-53).</li> <li>g. Refer other causes to direct and general support maintenance personnel.</li> </ul>

Malfunction	Probable cause	Corrective action
20. Loss of motion during operation.	<ul style="list-style-type: none"> <li>a. Loss of oil supply due to broken pump inlet, outlet or cylinder connecting hoses or tank return hose</li> <li>b. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace hose (para 3-62).</li> <li>b. Refer other causes to direct and general support maintenance personnel.</li> </ul>
21. Slow motion	<ul style="list-style-type: none"> <li>a. Failure in hydraulic hoses.</li> <li>b. Aerated oil supply (foam in tank).</li> <li>c. Oil too thin.</li> <li>d. Oil supply too low.</li> <li>e. Cylinder misalignment.</li> <li>f. Mechanical obstruction of moving parts.</li> <li>g. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace hoses (para 3-62).</li> <li>b. Change oil.</li> <li>c. See LO 10-3930-609-12 for proper grade.</li> <li>d. Fill reservoir (LO 10-3930-609-12).</li> <li>e. Correct chain adjustment (para 3-24a).</li> <li>f. Remove obstruction.</li> <li>g. Refer other causes to direct and general support maintenance personnel.</li> </ul>
22. Jerky motion.	<ul style="list-style-type: none"> <li>a. Air in system.</li> <li>b. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Bleed hydraulic system by operation.</li> <li>b. Refer other causes to direct and general support maintenance personnel.</li> </ul>
23. Speed or operation slow down after usage.	<ul style="list-style-type: none"> <li>a. Improper oil used in system.</li> <li>b. Dirt or foreign matter in system.</li> <li>c. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. See LO 10-3930-609-12 for proper grade.</li> <li>b. Drain, flush out system, replace with new oil.</li> <li>c. Refer other causes to direct and general support maintenance personnel.</li> </ul>
24. Noisy operation.	<ul style="list-style-type: none"> <li>a. Air in hydraulic system.</li> <li>b. Insufficient oil supply.</li> <li>c. Air leak in pump intake line.</li> <li>d. Vibration of pump lines.</li> <li>e. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Bleed system by operation.</li> <li>b. Fill reservoir (LO 10-3930-609-12).</li> <li>c. Tighten hose.</li> <li>d. Secure lines.</li> <li>e. Refer other causes to direct and general support maintenance personnel.</li> </ul>
25. Oil heats up rapidly.	<ul style="list-style-type: none"> <li>a. Bump slippage, oil too thin.</li> <li>b. Operating pressure is close to relief valve pressure setting.</li> <li>c. Dirty oil.</li> <li>d. Other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. See LO 10-3930-609-12.</li> <li>b. Check operation of truck.</li> <li>c. Change oil (LO 10-3930-609-12).</li> <li>d. Refer other causes to direct and general support maintenance personnel.</li> </ul>
26. Hoist cylinder packing leaks.		Refer malfunction to direct and general support maintenance personnel.
27. Hoist or tilt cylinder lowers or tilts while truck stands idle.	<ul style="list-style-type: none"> <li>a. Wrong packing.</li> <li>b. Worn or soored seals, packing or cylinders.</li> <li>c. Failure in hydraulic hose.</li> <li>d. other causes.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace tilt cylinder (para, 3-59a).</li> <li>b. Replace tilt cylinder (para 3-59a).</li> <li>c. Check, tighten or replace hose.</li> <li>d. Refer other causes to direct and general support maintenance personnel.</li> </ul>
28. Reservoir flows over.	<ul style="list-style-type: none"> <li>a. Excess oil in reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check oil level with forks in lowered position and tilted back.</li> <li>b. Refer other causes to direct and general support maintenance personnel.</li> </ul>
		<ul style="list-style-type: none"> <li>a. Replace tilt cylinders (para 3-59).</li> </ul>

Malfunction	Probable cause	Corrective action
	b. Hydraulic fluid low. c. Other causes.	b. Replenish hydraulic fluid c. Refer other causes to direct and general support maintenance personnel.

**Section VI. FIELD EXPEDIENT REPAIRS**

**3-11. General**

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

**3-12. Truck Will Not Start**

Trouble	Expedient Remedy
Seat switch, battery receptacle switch or panic switch malfunctioning fuse blown.	Short circuit switch leads to by-pass defective switch short across fuseholder contacts.

**3-13. Hydraulic Brakes Fail**

Trouble	Expedient Remedy
Air in system, low fluid level. broken brake line or pedal improperly adjusted.	Use parking brake in conjunction with directional control to slow, stop and otherwise control truck speed.

**Section VII. SEAT, OVERHEAD GUARD AND ACCESS COVERS**

**3-14. General**

The seat is mounted on a spring type mounting so when the seat is depressed the travel motor brake is released. The overhead guard provided for operator protection is constructed of a heavy tubular frame and is mounted at each frame side on the front and rear. The battery compartment is housed with a cover and two side panels which are retained by the cover. The floorboard is mounted to the frame and supports the accelerator and also serves as a foot rest. The control panel cover is mounted with eight screws and serves as a protective cover for the contractor panel. The fuse panel cover is secured to the control panel cover with six screws, providing ready access to the fuses. The instrument panel and cowl houses the various controls and instruments used in the operation of the fork lift truck.

**3-15. Seat Assembly**

*a. Removal.* Tilt seat forward, remove two screws (fig. 3-2). nuts and washers securing seat to brake actuating bar and remove seat assembly from truck.

*b. Disassembly.*

(1) Remove four wood screws securing seat backrest to frame and remove backrest.

(2) Reaching under seat cushion, remove four nuts and washers securing seat cushion to frame studs and remove seat cushion.

(3) Turn seat adjuster knob counterclockwise to release from guide rail. Spring will fall free.

(4) Do not disassemble guide rails.

*c. Repair.* Repair slightly damaged (tom) upholstery material in accordance with good commercial practice, by sewing or application of an adhesive patch. If wear or damage is extensive, replace backrest or seat cushion.

*d. Assembly.* Reverse procedure in b above.

*e. Installation.* Reverse procedure in a above. Adjust seat position as desired for operator convenience.

**3-16. Overhead Guard**

*a. Removal.*

(1) Remove two screws (fig. 3-3), nuts and lockwashers securing overhead guard at rear of truck.

(2) Remove three screws, nuts and flatwashers securing overhead guard to each side of cowl.

(3) Using suitable hoisting equipment., remove overhead guard from truck.

*b. Installation.* Reverse procedure in a above.

**3-17. Battery Compartment Covers**

*a. Removal.*

(1) Tilt seat assembly full forward and fully raise battery compartment top cover (fig. 3-3) releasing battery compartment side covers.

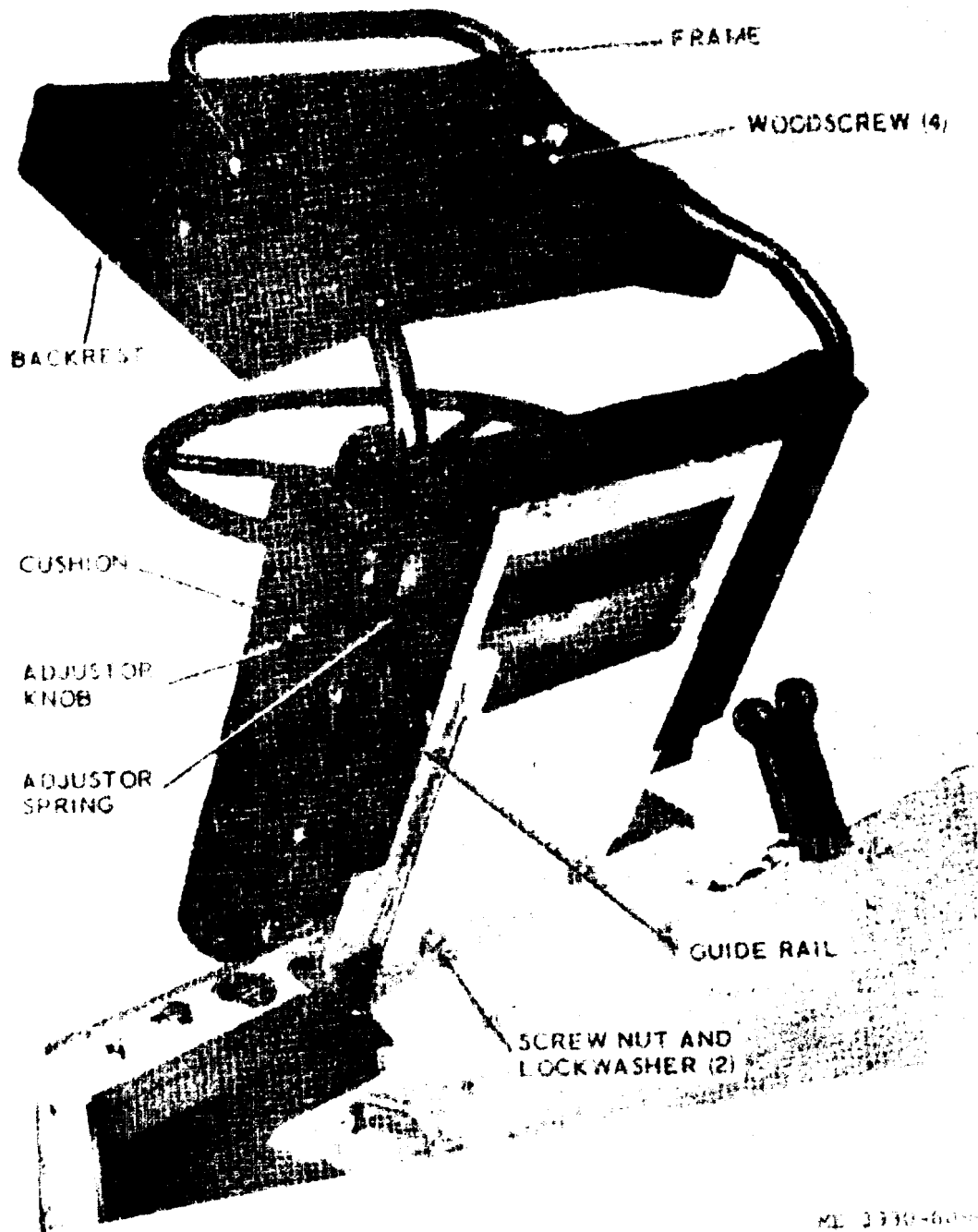


Figure 3-2. Seat assembly.

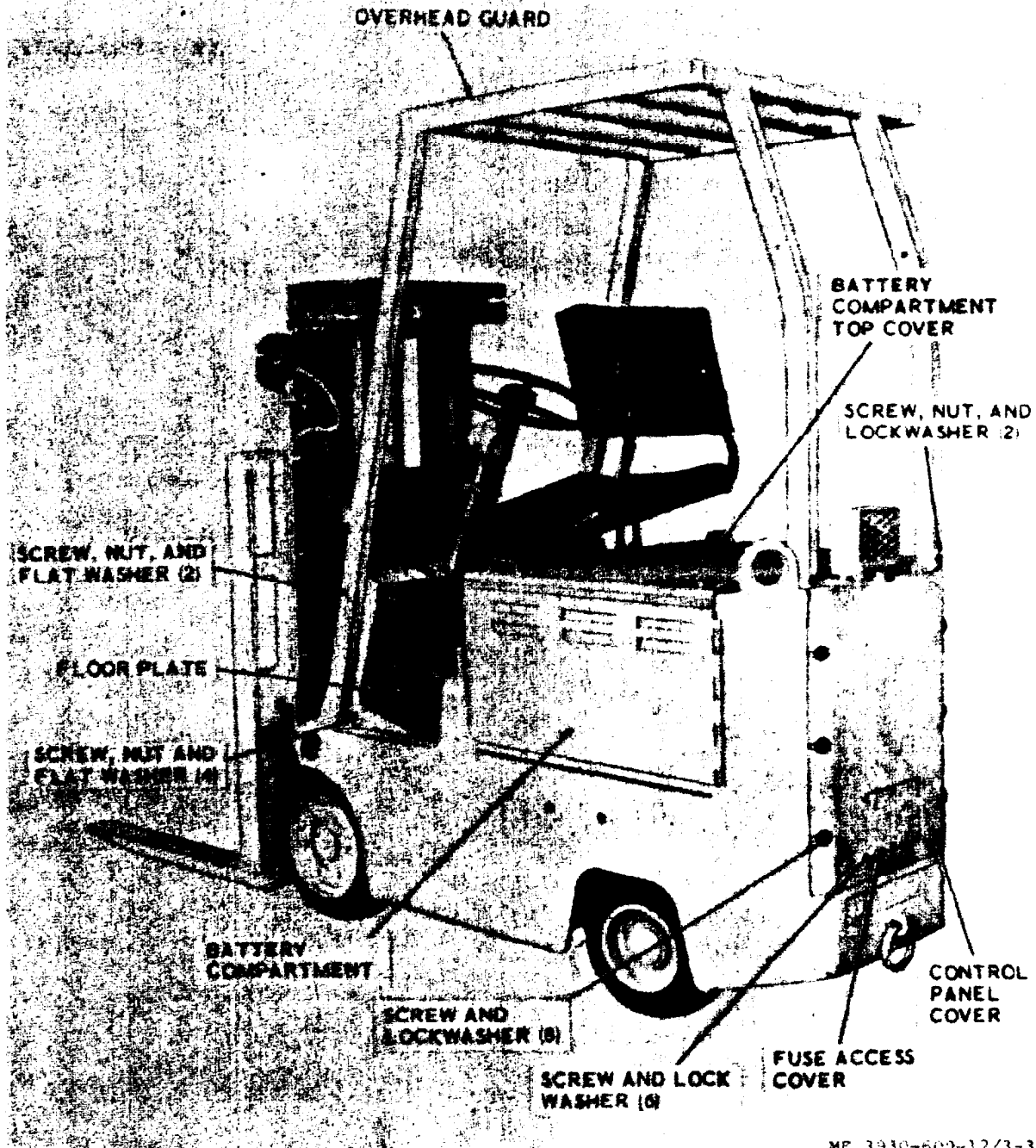
- (2) Open side covers and lower top cover.
- (3) Use a small diameter drift pin and drive top and side cover hinge pins out to release covers and remove covers from truck.

*b. Installation.* Reverse procedure in a above. Oscillate door while mating hinges to facilitate installation of hinge pins.

### 3-18. Floor Plate

#### a. Removal.

- (1) Disengage accelerator pedal from accelerator rod by pulling pedal upward.
- (2) Remove four screws and flatwashers securing floorplate (fig. 3-3) to frame and remove floorplate from truck.



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Figure 3-3. Overhead guard and access covers.

*b. Installation.* Reverse procedure in a above.

### 3-19. Control Panel Cover

a. Removal. Remove eight screws and lockwashers (fig. 3-3) securing control panel cover to truck and remove from truck.

*b. Installation.* Reverse procedure in a above.

Replace cover mounting gasket if it is damaged to prevent dust, dirt and other contaminants from entering control panel compartment.



**3-20. Fuse Access Cover**

a. *Removal.* Remove six screws and lockwashers (fig. 3-3) securing fuse access cover to control panel cover and remove fuse access cover from truck.

b. *Installation.* Reverse procedure in a above.

**3-21. Valve Cover**

a. *Removal.* Remove six screws and lockwashers (fig. 3-4) securing valve cover frame and remove valve cover from truck.

b. *Installation.* Reverse procedure in a above.

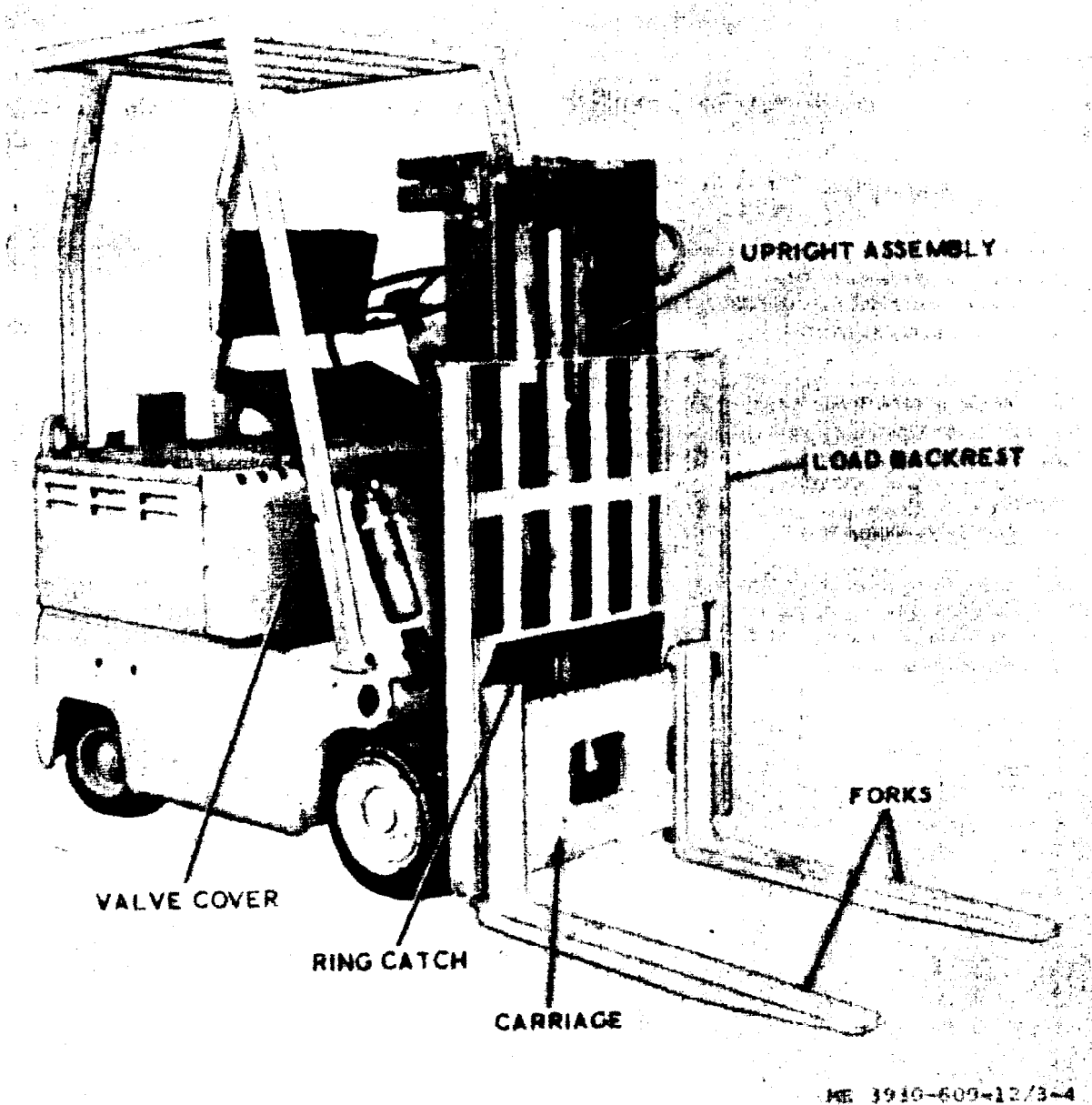


Figure 3-4. Valve cover, load backrest, forks and upright assembly.

## Section VIII. LOAD BACKREST, FORKS AND UPRIGHT ASSEMBLY

### 3-22. Load Backrest (fig. 3-4)

*a. Removal.* Hoist load backrest to disengage from carriage and remove from truck.

*b. Installation.* Reverse procedure in a above.

### 3-23. Forks (fig. 3-4)

*a. Removal.* Fully lower carriage, pull up on ring catch to release fork lock and disengage fork from carriage. Repeat with other fork.

*b. Installation.* Reverse procedure in a above positioning forks in desired locations on carriage.

### 3-24. Chain Assemblies

*a. Adjustment.* Lift chain adjustment is provided at the base of the outer channel. Lower carriage (fig. 3-5) until hoist cylinder bottoms. Remove slack from chains, adjusting the chain adjusting nuts until chains are taut.

**Caution: Be certain load is shared equally by both chains, otherwise first chain to begin lifting will cock crosshead and cause rapid wear and damage to hoist cylinder.**

*b. Removal.*

(1) Lower carriage until hoist cylinder bottoms.

(2) Remove bottom adjusting nuts securing chain anchor to outer upright.

(3) Remove cotterpin and bottom chain link from rear of carriage.

(4) Remove chain assembly from truck by reeving over rollers.

(5) Repeat steps (1) through (4) for remaining chain assembly.

*c. Repair.* Repair is limited to replacing damaged links.

(1) With chain removed from truck, use a chain breaking tool and remove damaged link or links from chain. Failure of one link may damage adjacent links. Remove all damaged links.

(2) Install replacement link and rivet pin end to secure side plates of chain.

*Note.* Plates of end links are secured by cotterpins. Do not rivet or peen these pins.

*d. Installation.*

(1) Insert link in end of chain and into brackets on carriage assembly. Secure link with cotterpins in ends.

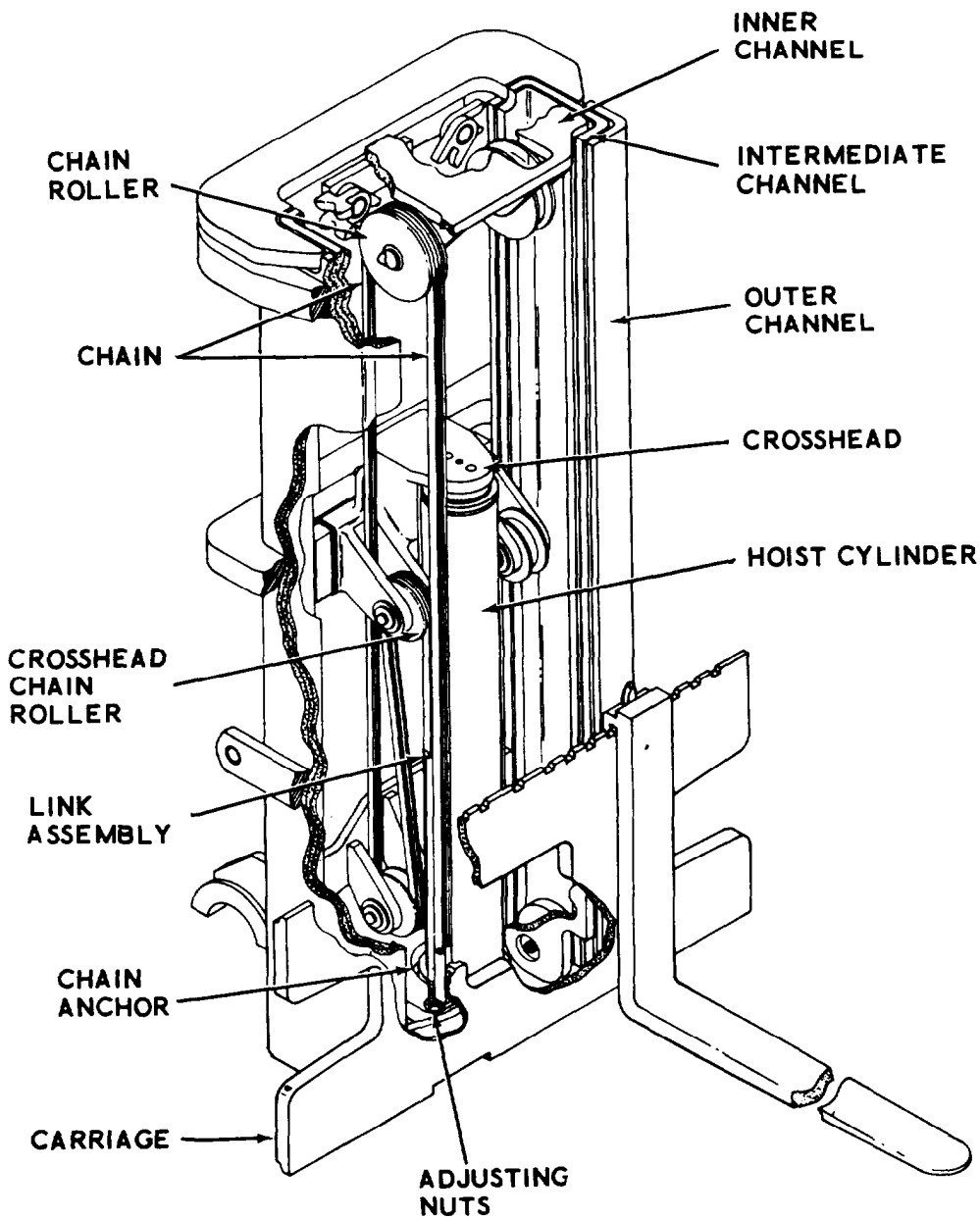
(2) Reeve chains over rollers as shown in figure 3-5.

(3) Secure chain to chain anchor with cotterpin through link ends.

(4) Secure chain anchors to base of outer upright with adjustment nuts and adjust chain tension (para 3-24a).

### 3-25. Upright Assembly

Organizational maintenance of the upright assembly is performed in accordance with the lubrication indicated in the lubrication order (LO 10-3930-609-12).



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Figure 3-5. Triple lift upright assembly.

**Section IX. BRAKE SYSTEM**

**3-26. General**

This section contains organizational maintenance instructions for the mechanical parking brake system which is applied by raising the operator's

seat or pulling up on the handbrake lever to apply the travel motor brake. The hydraulic service brake system is also included in this section. Depressing the brake pedal applies the drive axle hydraulic brakes.

### 3-27. Handbrake Lever

#### a. Removal.

(1) Fully release handbrake lever (fig. 3-6) and remove screws, nuts and washers securing handbrake lever to forward angle.

(2) Remove screw, nut and lockwasher securing handbrake lever to control cable and pull handbrake lever out of truck.

b. *Installation.* Reverse procedure in a above, adjusting handbrake cable (para 3-28c) after installation.

### 3-28. Handbrake Cable and Control linkage

#### a. Removal.

(1) Disengage handbrake lever from control cable (para 3-27a (2)).

(2) Unscrew nut securing control cable in clevis and remove spring.

(3) Pull cable from clevis and remove outside clevis nut.

(4) Remove nut securing control cable outer covering to travel motor mounting bracket and pull control cable off truck.

b. *Installation.* Reverse procedure in a above, adjusting handbrake cable (para 3-28c) after installation.

#### c. Adjustment.

(1) Check seat brake adjustment (para 3-29b).

(2) Fully release handbrake lever and fully depress operator's seat.

(3) Rack off outside clevis nut and press control cable into clevis. Run outside clevis nut up to clevis.

(4) Tighten inside clevis nut to prevent spring from free movement but not enough to compress spring.

(5) Sit in operator's seat and engage handbrake to be certain travel motor brake fully engages

(6) If brakes do not fully engage, repeat steps (2) through (5) above pressing control cable further into clevis. Reverse this procedure if brakes engage with no application of handbrake lever.

### 3-29. Seat Brake and Control Linkage

a. *General.* The parts shown in figure 3-7 comprise the footbrake and seat brake linkage. With the exception of the brake master cylinder, these parts and linkages are not subject to repair other than replacement of individual damaged parts. The parts are illustrated for general

orientation, and to facilitate removal and installation that may be performed in conjunction with the organizational maintenance services.

#### b. Seat Brake Adjustment.

(1) Two adjustments are provided to maintain the motor brake at required efficiency. The brake shoe adjusting nut (on brake actuating clevis) provides the basic adjustment on which the seat actuation adjustment depends.

(2) Remove truck cowl and valve cover (para 3-21) and floor plate (para 3-18). With truck seat occupied and handbrake released, check with leaf or round feeler gage for brake shoe lining-to-drum clearance of 0.010 inch to 0.020 inch.

(3) If required, tighten brake shoe adjusting nut to set clearance between these values. Do not overtighten, so brake will not drag.

(4) With loaded truck held on 15° incline by foot brake application, raise from operator's seat and release foot brake. If truck rolls, stop with foot brake and continue to (5) below.

(5) Tighten spring adjusting nut not over two turns, and repeat (4) above to test results. Repeat until spring application of motor brake holds loaded truck on 15° incline.

#### c. Brake Rod Adjustment.

(1) Adjust spring tension raising seat to suit operator, by turning large nut above spring.

(2) Adjust position of motor switch support strip with seat bottomed by operator's weight, so motor switch is definitely actuated.

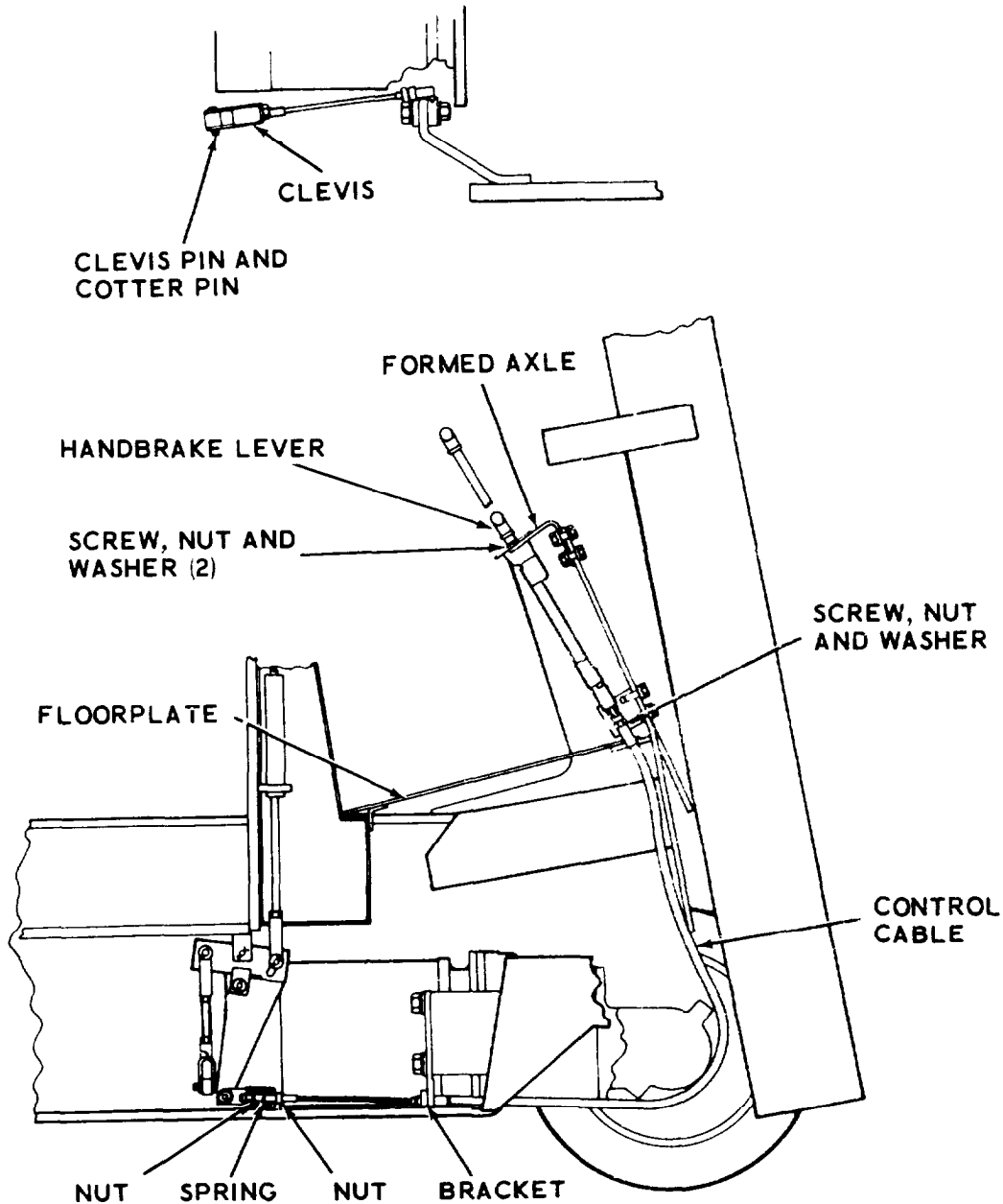
### 3-30. Service Brake

a. *Brake Adjustment.* The service brakes are self-adjusting to take up play due to lining wear. Refer to paragraph 3-31b(4) for pedal adjustment.

b. *Bleeding Service Brake System.* The hydraulic brake system must at times be bled to expel air in the system. The need is generally indicated by springy or spongy brake pedal action. Unless special brake bleeding equipment is available, two men are required to bleed the system, one to maintain a constant supply of fluid in the master cylinder and to pump the brake pedal, the other to perform the bleeding operation.

(1) Remove floor plate (para 3-18). Remove filler plug from master cylinder and fill with hydraulic brake fluid.

(2) Clean bleeder screws at each wheel cylinder (fig. 3-8). Remove small screws from bore of bleeder screws. Attach one end of bleeder hose to bleeder screw and place other end of



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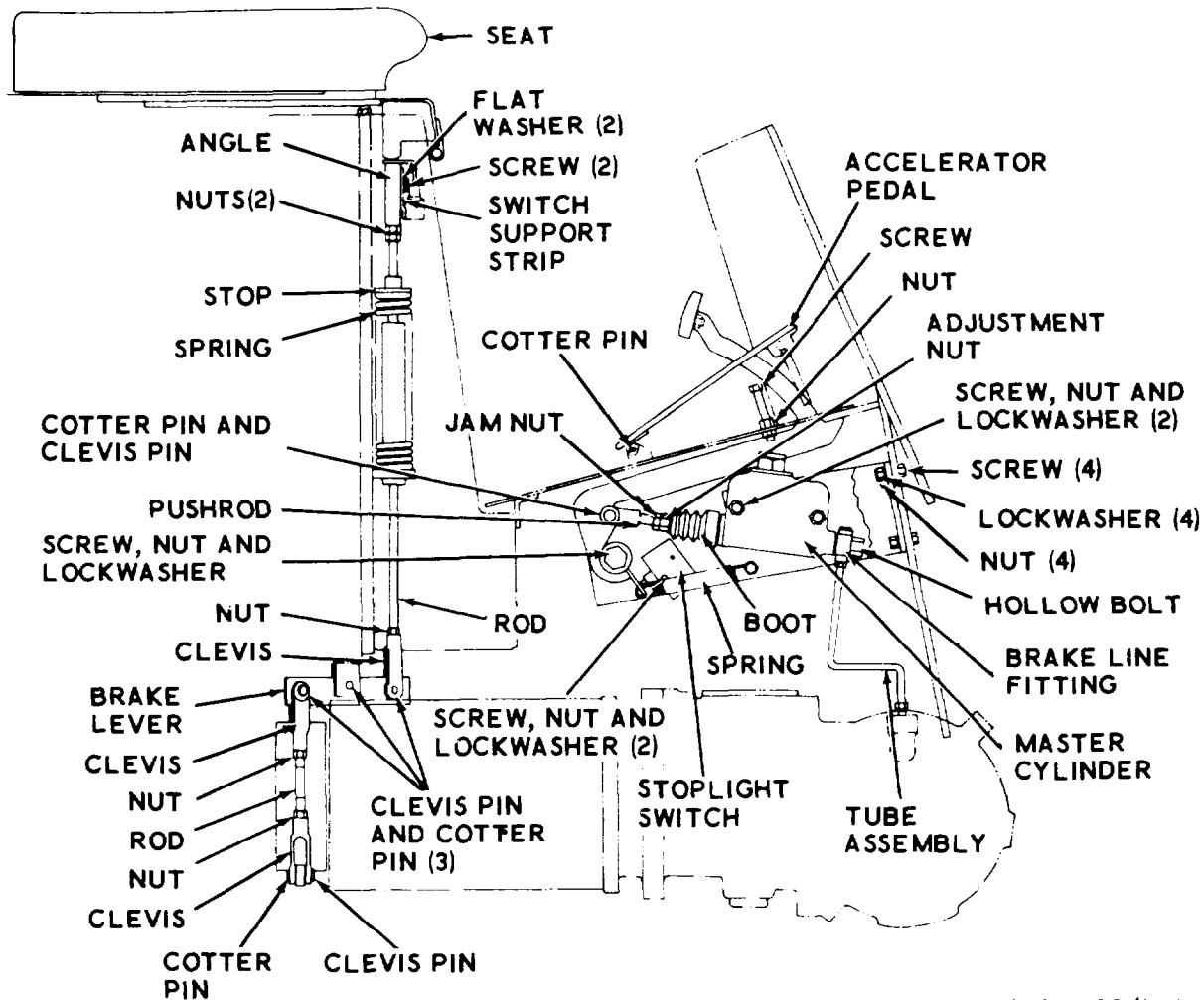
Figure 3-6. Handbrake lever, cable and control linkage.

hose in clean container partially filled with hydraulic brake fluid. Be sure end of hose is submerged in the hydraulic fluid.

(3) Turn bleeder screw counterclockwise three-quarters of a turn. Apply steady pressure to brake pedal. Hydraulic fluid containing air bubbles should be forced through bleeder hose into container.

(4) Maintain fluid level in master cylinder and continue to operate brake pedal until fluid flows in a steady solid stream without air bubbles. Close bleeder screw by turning it clockwise. Remove bleeder hose, and replace small screw in bleeder screw.

(5) Repeat bleeding procedure at other wheel, replenishing brake fluid in master cy-



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Figure 3-7. Foot brake and seat brake linkage.

linder before each wheel cylinder is bled. Replace filler plug in master cylinder.

**Caution:** Hydraulic brake fluid bled from the brake system must not be reused.

*c. Brakeshoe Removal.*

- (1) Remove drive axle wheel (para 3-72).
- (2) With brake spring pliers, remove brakeshoe return spring (fig. 3-9) and retainer spring. Carefully remove brakeshoes, and install brake clamps on wheel cylinder to prevent pistons being pushed out of cylinder by residual pressure in brake lines.

*d. Brakeshoe Installation.*

- (1) Reverse procedure in c(2) above.
- (2) Temporarily adjust shoes inward as far as they will go. This procedure consists essen-

tially of tapping self-adjuster levers toward center of axle.

- (3) Install front wheels (para 3-72) and operate brake pedal several times to adjust brakes.

**3-31. Master Cylinder**

*a. Removal.*

- (1) Remove floor plate (para 3-18).
- (2) Remove hollow bolt (fig. 3-7) and brakeline fitting from front of master cylinder. Take precautions to keep dirt from entering brakeline.
- (3) Remove nuts, lockwashers, and screws attaching master cylinder to truck, and remove master cylinder. Pushrod will remain connected to brak shaft and need not be removed.

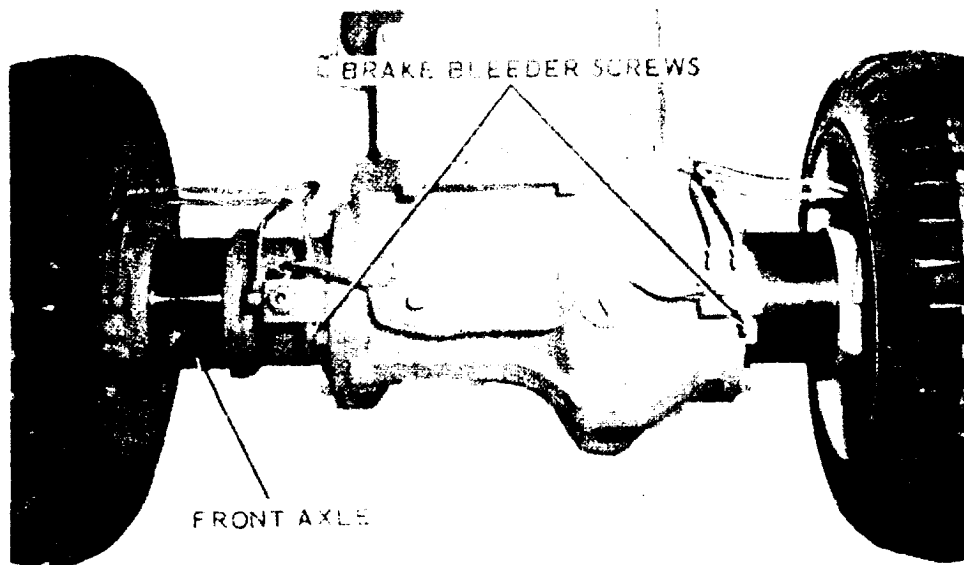


Figure 3-8. Bleeding Brakes.

*b. Installation.*

- (1) Reverse procedures in a above.
- (2) Fill cylinder with brake fluid (LO 10-3930-609-12).
- (3) Bleed brake hydraulic system (para 3-30b).
- (4) Loosen jamnut on pushrod, and adjust length of pushrod by turning adjustment to give 1/4 inch to 5/8 inch free travel of pedal before brake application begins. Tighten jamnut to secure adjustment.

**3-32. Brake Pedal**

*a. Removal.*

- (1) Remove floor plate (para 3-18) from truck.
- (2) Remove cotterpin and clevis pin (fig. 3-7) from pushrod. Disconnect spring from brake pedal.
- (3) Remove screw, nut, and lockwasher attaching brake pedal and remove pedal from truck. Lift free of truck.

*b. Installation and Adjustment.* Reverse procedures in a above and check for proper pedal adjustment (para 3-31b(4)).

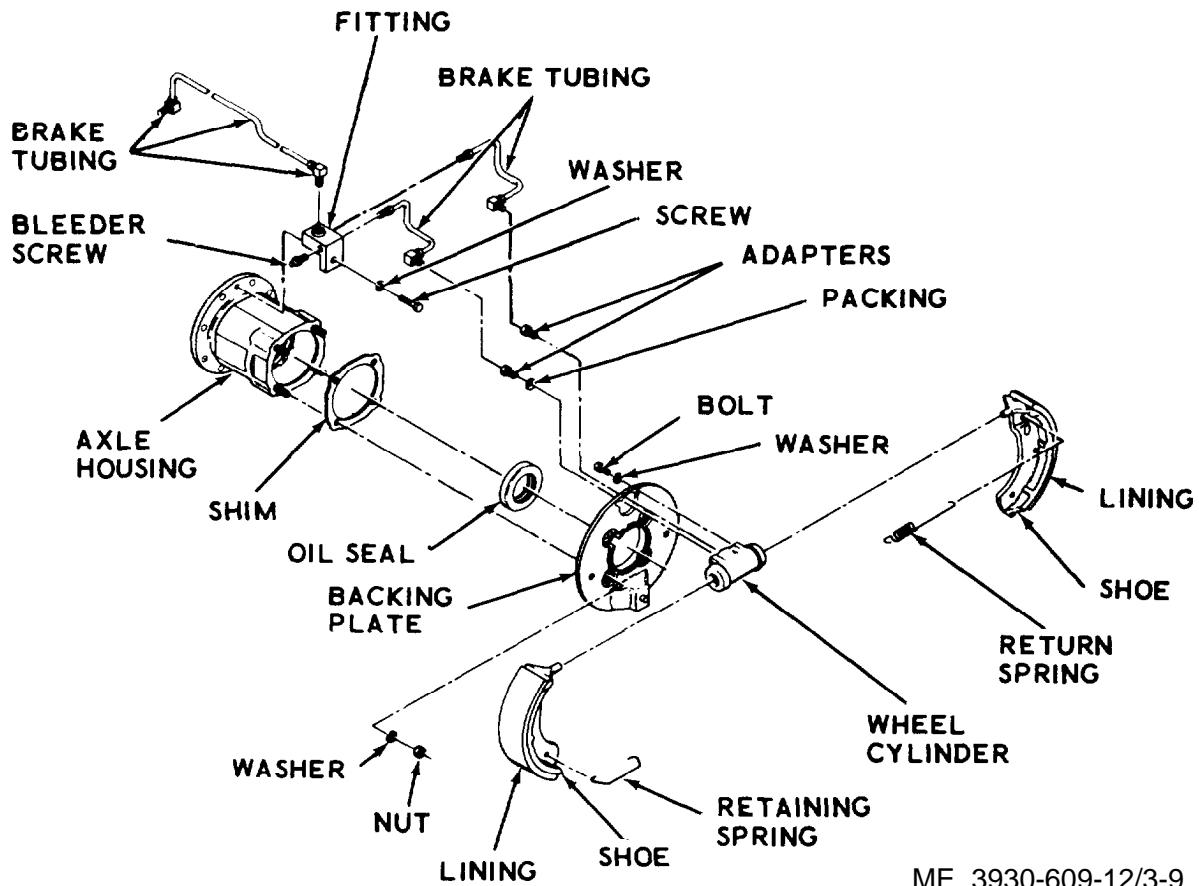


Figure 3-9. Service brake assembly, exploded view.

## Section X. ELECTRICAL SYSTEM

### 3-33. General

The electrical system consists of a battery, headlight, stop and taillight, resistors, SCR control panel with magnetic relays, drive motor, pump motor and various switches for the operation and safety of the fork lift truck. The battery charge receptacle is a quick disconnect type so the battery can be disconnected from the circuit and recharged without being removed from the truck.

### 3-34. Hourmeter

#### a. Removal.

(1) Disconnect two leads at hourmeter (fig. 2-1) from under instrument panel, tape ends, and tag leads for identification.

(2) Remove two nuts holding hourmeter to instrument panel and lift hourmeter off panel.

b. *Installation.* Reverse procedures in a above.

### 3-35. Light Switch

#### a. Removal.

(1) Remove nut at top of light switch (fig. 2-1) and lower switch out bottom of instrument panel.

(2) Disconnect, tape, and tag leads from switch.

b. *Installation.* Reverse procedures in a above.

### 3-36. Panic Switch

#### a. Removal.

(1) Pull button off panic switch (fig. 2-1), unscrew knurled retaining nut at top of switch and lower switch out bottom of instrument panel.

(2) Disconnect, tape, and tag leads from switch.

b. *Installation.* Reverse procedures in a above.



### 3-37. Battery Connector Receptacle

*a. Removal.*

- (1) Release battery connector (fig. 3-10) and pull connector free from receptacle.
- (2) Remove four screws and lockwashers securing receptacle to vehicle.
- (3) Remove control panel cover (para 3-19).
- (4) Remove nuts, lockwashers and insulators securing plus (+) and minus (-) leads at bottom of control panel.
- (5) Remove clamps securing leads to bottom of vehicle and withdraw battery connector receptacle with leads attached.

*b. Installation.* Reverse procedures in a above being certain to properly secure leads with removed cable clamps to bottom of truck.

### 3-38. Stoplight Switch

Before replacing switch, check that it is truly defective, and not merely in need of adjustment, and that leads are correctly installed as in a following.

*a. Inspection and Test.*

- (1) Remove floor plate (para 3-18).
- (2) Inspect that wires labeled (35) and (86-1) at switch (fig. 3-7) are connected to terminals marked "A" and wires (70) and (94)

are connected to "B" terminals. If not, connect them correctly before proceeding.

(3) Connect a voltmeter lead to each "A" terminal, and operate switch button by hand. If meter reads system voltage with button free, and zero voltage with button pressed, switch is operative. Test at "B" terminals for opposite results.

(4) With voltmeter still connected as in (3) above, operate pedal manually. If operation of pedal does not give same results, switch position must be adjusted so brake application closes switch at "A" terminals and opens switch at "B" terminals, reversing this on releasing brake pedal.

*b. Adjustment.* Disconnect leads and loosen switch attaching nuts. Adjust switch position orientation so switch lights stoplight before braking action begins, and light goes out before pedal reaches top of travel. Tighten nuts.

*c. Removal.*

- (1) Remove floor plate (para 3-18).
- (2) Remove switch attaching screws, nuts and lockwashers and leads, and remove switch from bracket.

*d. Installation.* Reverse procedures in c above and adjust switch (b above).

### 3-39. Battery Connector Receptacle Switch

*a. Removal.*

- (1) Raise battery connector handle.
- (2) Unscrew switch extension (fig. 3-10) from switch.
- (3) Remove nut and lockwasher securing switch to bracket and pull switch free.
- (4) Disconnect, tape and tag leads from switch.

*b. Installation.* Reverse procedures in a above.

### 3-40. Headlight

*a. Removal.*

- (1) Remove clamps (fig. 3-11) holding conduit to outer upright.
- (2) Disconnect two wires at terminals at bottom end of conduit.
- (3) Remove two screws, nuts and washers attaching light to upright and remove light and conduit as an assembly.

*b. Repair.* Repair of headlight is confined to replacing the sealed beam lamp (para 3-42).

*c. Installation.* Reverse procedures in a above.

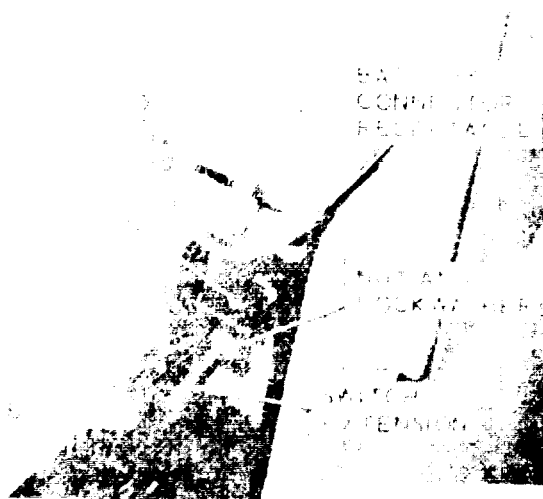


Figure 3-10. Battery connector receptacle and switch.

- (3) Disconnect stop and taillight connector.
- (4) Remove nut and washer holding light to truck and remove light and guard.
- b. *Repair.* Remove lens attaching screws and lens, and install new bulb. Replace lens attaching screws and lens.
- c. *Installation.* Reverse procedures shown in a above.

**3-42. Lamps**

- a. *Headlight Lamp Replacement.*
  - (1) Remove bezel from headlight.
  - (2) Withdraw sealed beam unit from headlight sheel and disconnect two wires from lamp.
- b. *Installation.* Reverse procedures in a above.
- c. *Stop and Taillight Lamp Replacement.* See paragraph 3-41 b.

**3-43. Taillight Resistor (fig. 3-13)**

- a. *Removal.*
  - (1) Remove control panel cover (para 3-19).
  - (2) Disconnect wires numbered (13A-5), (19) and (35) from resistor, located at top right. Remove two mounting screws and remove resistor.
- b. *Test.* Test resistor with ohmmeter across terminals for 40 ohms resistance, plus or minus 20 percent.
- c. *Installation.* Reverse procedures in a above.

Figure 3-11. Headlight.

**3-41. Stop and Taillight**

- a. *Removal.*
  - (1) Remove two screws, and washers (fig. 3-12) attaching guard to truck. Lift guard.
  - (2) Remove control panel cover (para 3-19).

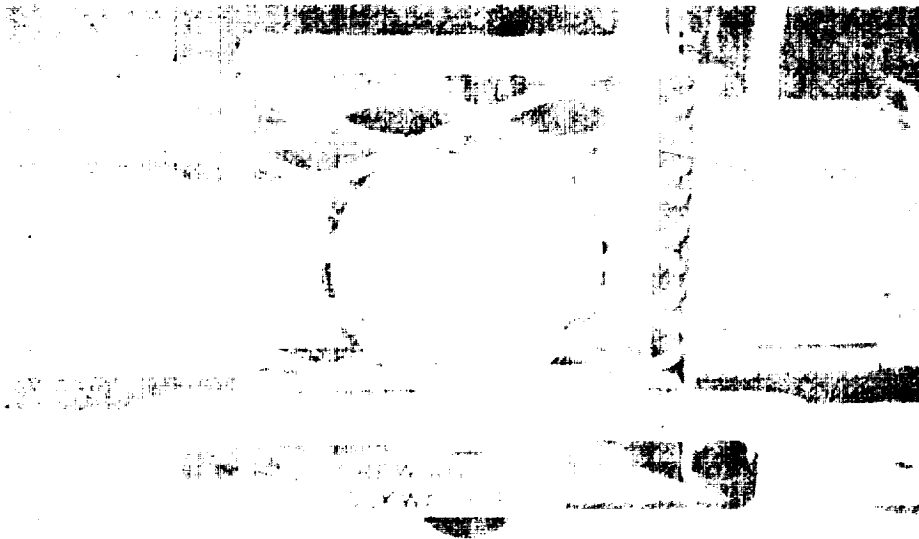
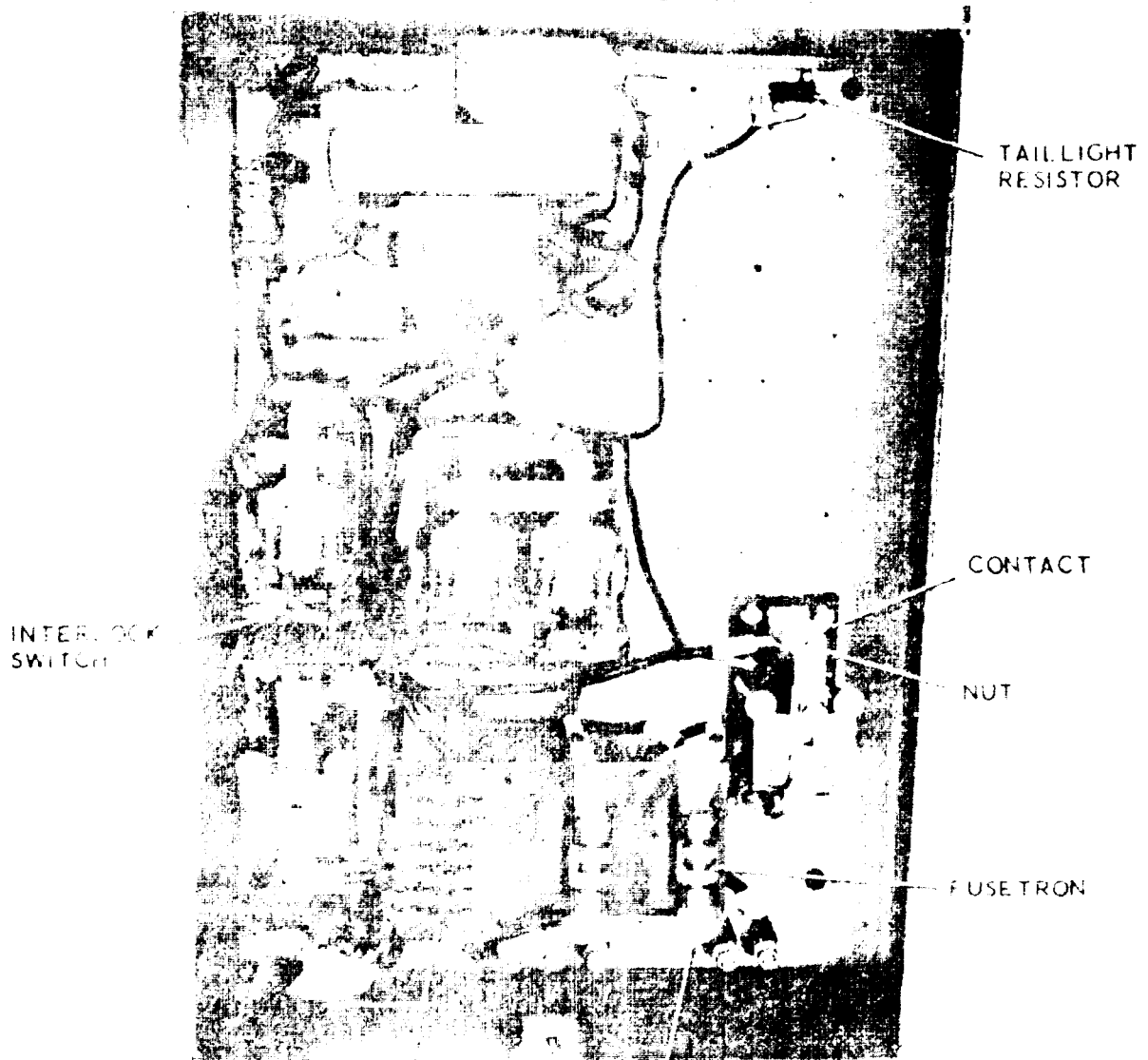


Figure 3-12. Stop and taillight.



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Figure 3-13. Control panel.

**3-44. Horn**

*a. Removal.*

- (1) Remove truck floor plate (para 3-18).
- (2) Disconnect wires (fig. 3-14) from horn.
- (3) Remove screws and washers holding horn to adapter and remove horn.

*b. Installation.* Reverse procedures in a above.

**3-45. Horn Button**

*a. Removal.* Remove four screws (fig. 3-15) and lift off cover, button, separator, insulator, contact, spring and contact.

*b. Installation.* Reverse procedures in a above.

**3-46. Battery Maintenance**

*a. Checking Specific Gravity.* The specific gravity of the electrolyte at 77°F, with electro-

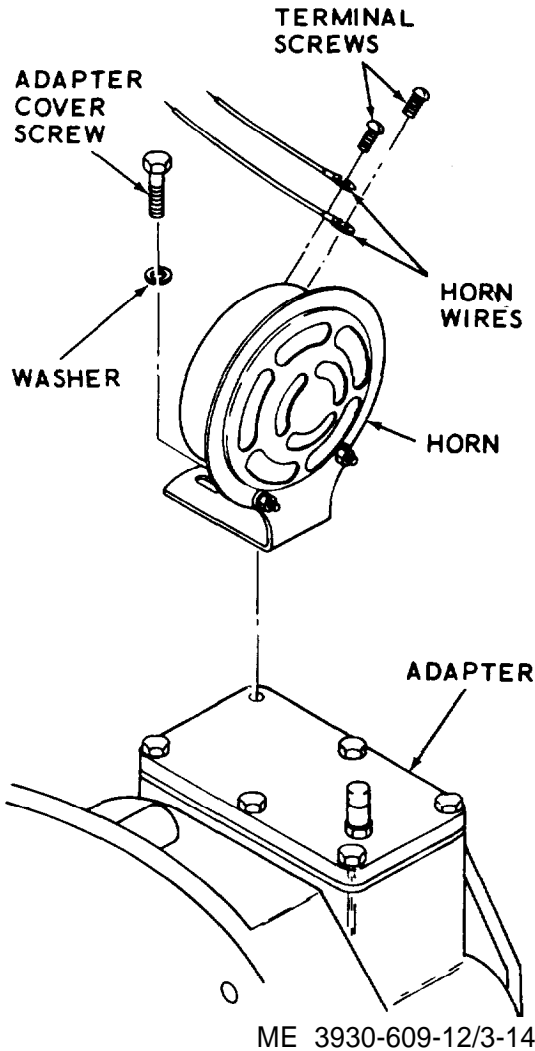


Figure 3-14. Horn.

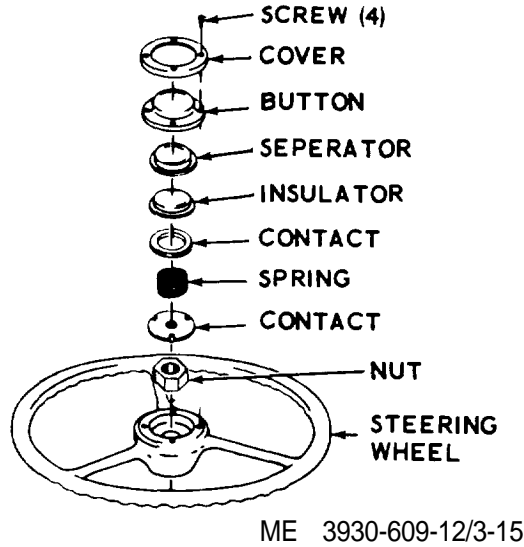


Figure 3-15. Horn button.

lyte at normal level and cells fully charged should be 1.265 to 1.285. This specific gravity is correct when the battery is delivered and will not require adjusting during the lift of the battery unless electrolyte is actually lost out of the battery.

*b. Adjusting Specific Gravity.* Acid or electrolyte should never be added to a cell without first being sure that charging will not restore the gravity. Give the battery a thorough equalizing charge (para 3-46e). Charge should be continued until specific gravity when tested every hour for three hours shows no further rise at any cell. If, after charge, gravity is still below normal proceed as follows:

(1) Put battery on charge again at the finish rate, so cells gas for thorough mixing of electrolyte.

**Note.** Never make a gravity adjustment on a cell which does not gas freely on charge.

(2) Draw off electrolyte down to splash cover from low reading cells. Slowly pour electrolyte of 1.300 to 1.350 specific gravity in cell to high lever (1/4 inch below filler neck).

**Caution:** Never use acid or higher specific gravity than 1.350.

(3) Wait twenty minutes for added electrolyte to become thoroughly mixed by gassing charge and then read specific gravities. If the gravity of any cell is still below normal repeat steps (1) through (3). Repeat as many times as necessary.

(4) Continue charging battery for one hour at the finishing rate, after gravity has been adjusted.

(5) If the corrected specific gravity of any cell is higher than normal (1.285) proceed as follows:

(6) As the battery charges, withdraw from the cell a small amount of electrolyte and replace with water. Repeat at 20 minute intervals, if necessary, until a 1.285 specific gravity reading is obtained.

*c. Adding Water to Battery.* Add only distilled water or chemically analyzed and approved water from public drinking source. The proper

level of electrolyte is 1/4 inch from bottom of filler neck.

**Caution: Do not use water which has passed through a water softener. This water is chemically destructive to a lead-acid battery. It is not equivalent to distilled water.**

(1) Add water slowly. Water should be added before charging to insure prompt mixing with the electrolyte.

(2) In sub-freezing temperatures battery must be put on finish charge for one hour after water has been added.

*d. Cleaning the Battery.* The entire battery and battery compartment should be kept clean and dry. If the electrolyte has been spilled or corrosion has formed on the battery proceed as follows:

(1) Add one pound of bicarbonate of soda to one gallon of warm water. Pour solution over corrosion or spilled electrolyte.

(2) When foaming action stops rinse off the entire battery with clear water.

**Caution: Vent plugs must be installed in cells to prevent soda solution from getting into the cells. Do not use steam or very hot water to clean battery.**

*e. Charging the Battery.* Batteries normally discharged more than one third of their capacity daily should be recharged daily. Other batteries in use should be charged at least once a week. Do not charge batteries more often than necessary to reduce gassing and water loss. Plan on recharge time, for a completely discharged battery, of about eight hours, proportionally less for partially discharged batteries. Charge as follows:

(1) Disconnect battery leads at battery connector receptacle and connect charger to battery half of connector.

(2) Using procedure appropriate to the charger being used, adjusted initial charging rate for a fully discharged battery of 130 to 160 amperes.

(3) At end of charging time disconnect charger and observe cell vent; caps for signs of excessive gassing. This is usually indicated by electrolyte around the fill hole of the cell.

*f. Removal.* Reverse the procedures outlined in paragraph 2-4e.

*g. Installation.* Refer to paragraph 2-4e.

### 3-47. Wiring Harness

Repair of the wiring harness is limited to isolating shorted and open circuits and using good

commercial practice in their repair. Refer to the wiring diagram (fig. 1-3) and conduct a systematic inspection using an ohmmeter to isolate the trouble. Remedy the trouble by splicing leads where required and applying electrical tape to prevent short circuits from occurring. Refer to direct support maintenance for replacement of a complete wiring harness or repair to wiring encased in flexible metal conduit.

### 3-48. Motor Brush Replacement

Motor brush replacement (fig. 3-16) for the travel motor or hydraulic pump motor is the same.

*a. Removal.*

(1) Remove screw, nut and lockwasher securing brush covers to motor housing and remove brush covers.

(2) Remove screw and lockwasher securing brush leads.

(3) Pull back on brush spring sufficiently to release brush and pull brush out of brush holder.

(4) Repeat steps (1) through (3) for removal of remaining brushes.

*b. Inspection.* Compare length of used brush with length of a new brush from stock. Replace any brush worn to half (or less) the length of new brush, as given below.

*c. Installation.*

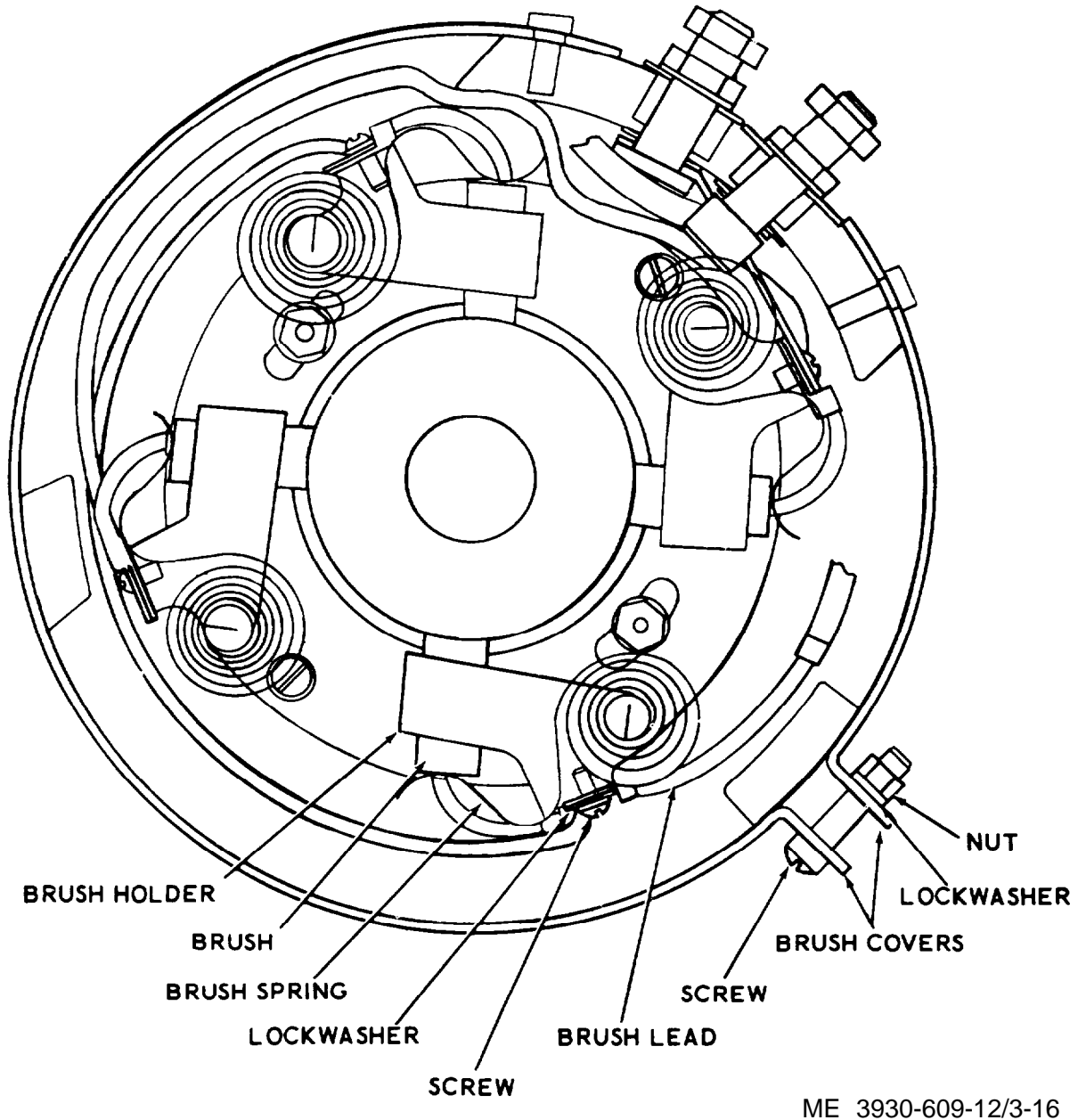
(1) Install new brushes in brush holders with short side of brush toward spring side of holder, so brush friction surface contour mates with surface of armature commutator. If brush edge meets commutator, reverse brush in holder. Fasten brush leads to holder with removed screws and lockwashers.

(2) Hook brush springs over brushes and check pressure exerted on brush with brush spring pull scale. Pressure should be 26 ounces to 32 ounces at time scale lifts spring from brush on either motor.

(3) Install brush covers and secure in position on motor housing with removed screw, nut and lockwasher.

### 3-49. Relay Contact Replacement

Relay contact maintenance is restricted to those relays having contacts visible for inspection, and replaceable without removing the relays. Maintenance requiring more than contact or interlock switch replacement, shall be performed by direct support maintenance personnel. Contacts require replacement when the silver has worn down to the steel support.



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Figure 3-16. Motor brush replacement.

*a. Removal.*

(1) Remove control panel cover (para 3-19).

(2) Remove nuts (fig. 3-13) holding contacts which are to be removed. Remove contacts from relay.

*b. Installation.* Put new contacts in position and install nuts. No special check or adjustment is needed after installation.

**3-50. Relay Interlock Switch Replacement**

*a. Removal.*

(1) Remove control panel cover (para 3-19).

(2) Disconnect leads from interlock switch (fig. 3-13).

(3) Remove the screws, flatwashers and lockwashers securing the interlock switch to its bracket and remove the switch.

*b. Installation.* Reverse the procedures in a above.

### 3-51. Fuse and Fusetron Replacement

#### *a. Removal.*

(1) Remove fuse access cover (para 3-20).

(2) Loosen screws (fig. 3-13) securing fusetron to fuse panel and slide fusetron off fuse panel.

(3) Pull fuses straight off fuse panel.

*b. Installation.* Reverse applicable procedures in a above to replace fusetrons and fuses.

### 3-52. Directional Control Switch

Maintenance of the directional control switch (fig. 2-1) consists of replacing internal switches. The switch need not be removed.

#### *a. Removal.*

(1) Remove cover attaching screws and washers, or remove cover.

(1) Disconnect and tag leads from switch terminals.

(3) Remove switch attaching screws and nuts, and remove switch.

*b. Installation.* Reverse procedure in a above.

### 3-53. Pump Motor Switch

#### *a. Removal.*

(1) Remove valve cover (para 3-21).

(2) Disconnect and tag leads at switch (fig. 3-17), loosen jamnut, and screw switch out of switch bracket.

*b. Installation.* Reverse procedures in a above, turning switch in switch bracket to point where switch is actuated when either the tilt or hoist lever is operated.

### 3-54. Seat Switch

#### *a. Removal.*

(1) Remove valve cover (para 3-21).

(2) Disconnect and tag leads at switch (fig. 3-17).

(3) Remove switch attaching screws, nuts and lockwashers securing switch to bracket and remove switch.

*b. Installation.* Reverse procedures in a above, adjusting switch position up or down as required so that it is just actuated as the operator's seat is fully lowered. Loosen bracket screws to position bracket with attached switch for proper actuation and then tighten bracket screws.

### 3-55. Thermal Relay

Each motor is protected by a thermal relay, externally mounted on the motor housing adjacent to the motor leads, which will open the motor circuit if overheating occurs. When temperature sensed by the relay drops to a safe operating value, the relay will automatically close.

#### *a. Removal.*

(1) Remove screw, lockwasher and clamp which fastens relay to motor and lift relay from motor.

(2) Scrap sealing compound from relay terminals. Unsolder leads at terminals.

*b. Installation.* Reverse procedures in a above, soldering leads to terminals with rosin flux and solder. Avoid unnecessary heating of the relay while soldering. Coat terminals after soldering with silicone rubber sealing compound.

#### *c. Test.*

(1) Test electrical continuity of relay between terminals with an ohmmeter or test light. Test at room temperature.

(2) If controlled temperature is available, test opening temperature of relay. It should open on rising temperature at 224°F, plus or minus 4°.

### 3-56. Accelerator Master Assembly

#### *a. Removal.*

(1) Remove floor plate from truck (para 3-18).

(2) Disconnect linkage and spring from operating lever (fig. 3-18), remove cover screws, and remove cover.

(3) Disconnect and carefully tag leads inside housing at switch terminal screws. Carefully tag leads inside housing at switch terminal screws. Carefully draw leads out through conduit fitting. Do not remove identification labels from leads.

(4) Remove screws and lockwashers holding mounting bracket to truck and remove assembly.

*b. Repair.* The following procedure does not require removal of the assembly.

(1) Remove cover screws and cover.

(2) Disconnect leads at switch to be replaced, remove switch holddown screws, and remove switch.

(3) Install new switch by reversing procedures in (1) to (3) above.

*c. Installation.* Reverse procedures in a above.

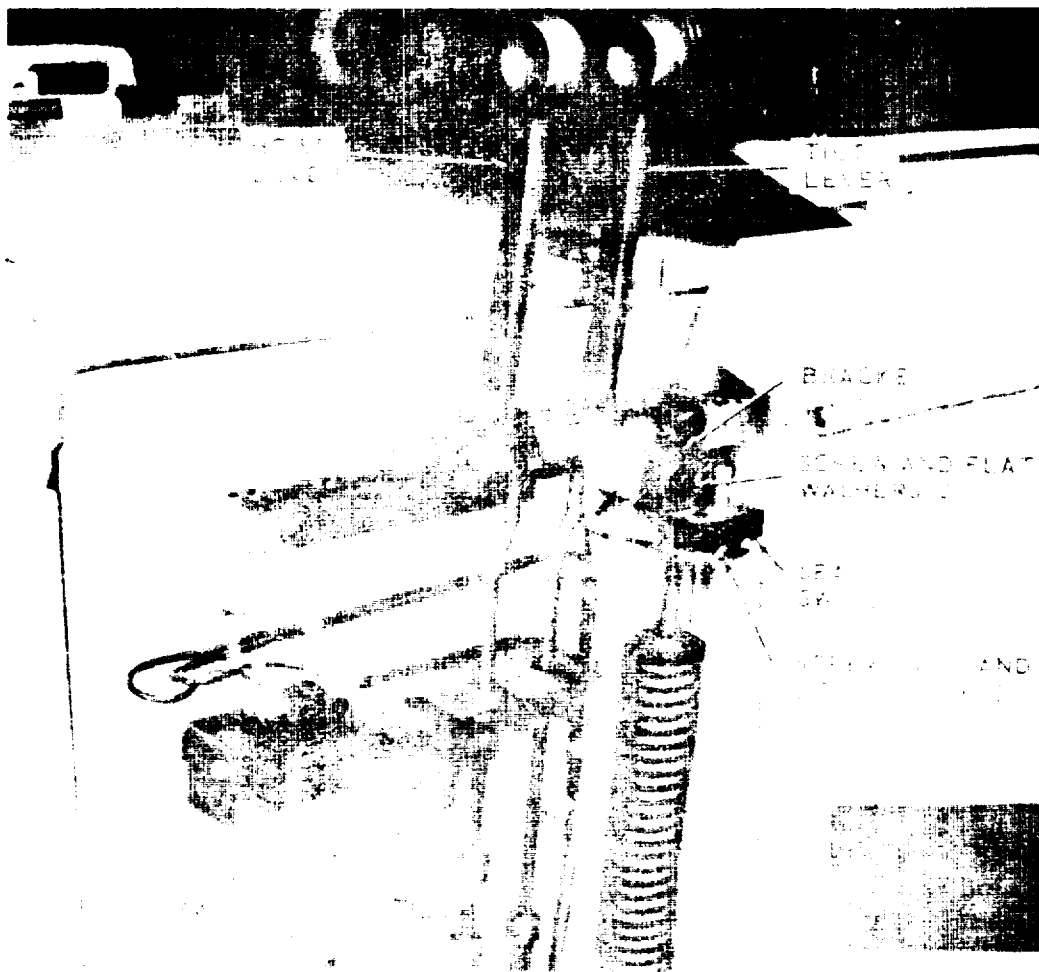


Figure 3-17. Seat switch and pump motor switch.





Figure 3-18. Accelerator master assembly.

## Section XI. HYDRAULIC SYSTEM

### 3-57. General

The hydraulic system (fig. 3-19) consists of a pump and drive motor, control valves, hoist and tilt cylinders, filters, hoses and lines for the operation of the tilt and lift functions of the fork lift truck. This section provides information useful in the repair of the hydraulic system. When ever hydraulic components are disconnected or removed, operate the tilt and hoist control valves several times after installation to purge air from the hydraulic system.

### 3-58. Control Valve levers and Linkage

#### a. Removal.

- (1) Remove valve cover plate (para 3-21).
- (2) Remove retaining rings (fig. 3-20) securing connecting rods to hoist and tilt levers.
- (3) Pull out cotterpin securing rod in bracket and pull out rod to release hoist and tilt levers.
- (4) Remove screws and lockwashers securing bracket to truck and remove bracket.
- (5) Remove cotterpins and clevis pins securing clevis and connecting rods to control valve. If valve actuation is proper, note position of sleeves and connecting rod clevises before disassembling them from the connecting rods.
- (6) Compress spring, turn disc to release pin and remove disc, spring and pin from bracket.
- (7) Remove screws securing spacer clips; remove spacer clips.

- (8) Remove screws, nuts and lockwashers securing bracket and switch actuator hinge; remove bracket and switch actuator hinge.

b. *Installation.* Reverse procedure in a above, adjusting position of sleeves on connecting rods until control valve actuation is proper, then secure with setscrews.

### 3-59. Tilt Cylinders

#### a. Removal.

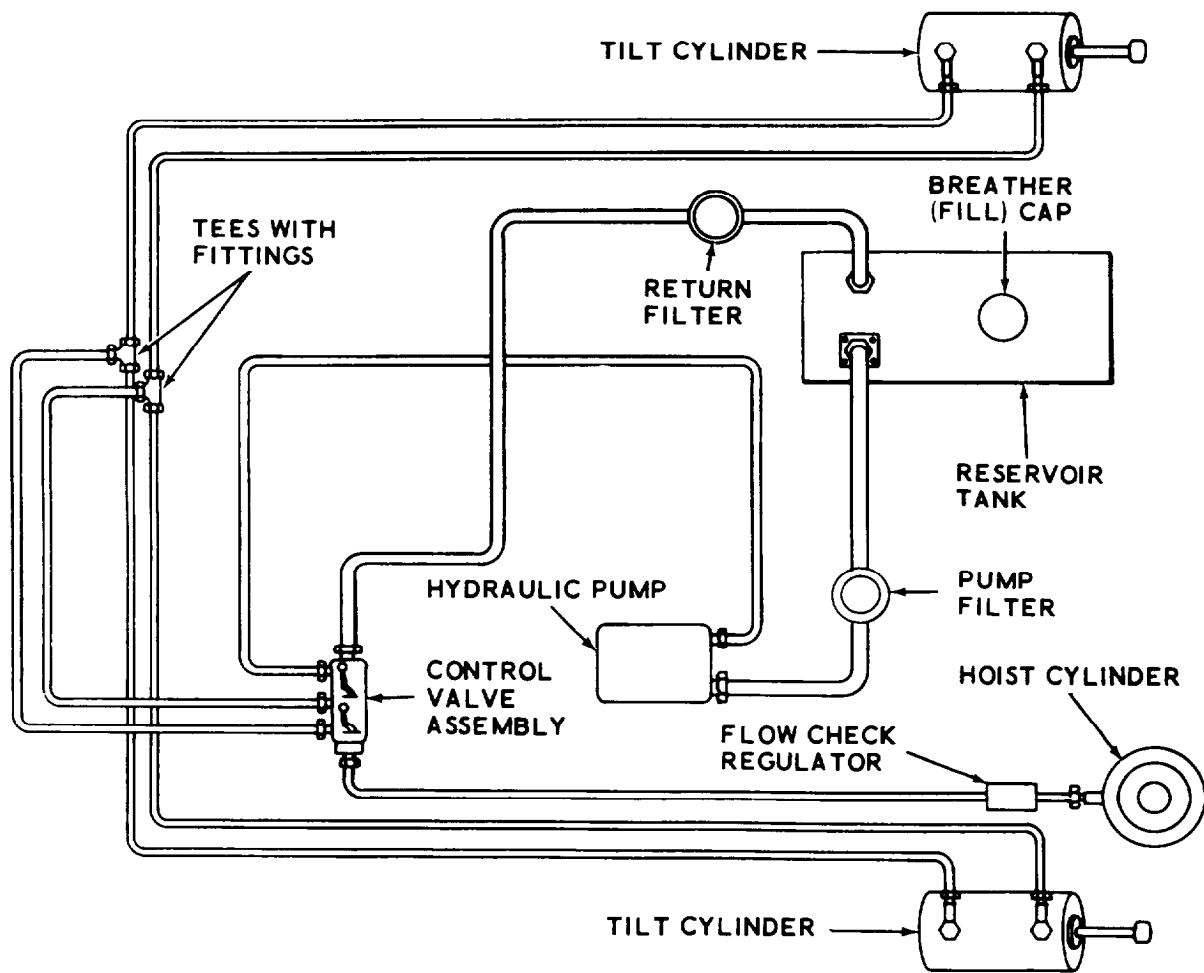
- (1) Remove truck floor plate (para 3-18).
- (2) Tag and disconnect hoses (fig. 3-21) from tilt cylinders. Cap hoses and plug ports in cylinders to exclude dirt.
- (3) Support mast so it will not suddenly tilt on removal of tilt cylinders.

**Warning:** If not supported the mast will fall forward when the tilt cylinders are disconnected.

- (4) Remove screws attaching shafts to brackets on truck frame and on uprights.
- (5) Pull or drive shafts from cylinder ends. Be careful not to let cylinder fall as shafts are removed.

#### b. Installation.

- (1) Position tilt cylinder (back end) in U shaped bracket on truck frame.
- (2) Aline bracket holes and cylinder end hole. Insert shaft through bracket and cylinder end hole. Secure shaft with screw.



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Figure 3-19. Hoist and tilt hydraulic system.

(3) Remove plugs from ports and caps from hoses and connect hydraulic hoses to cylinders.

(4) Check hydraulic fluid level in reservoir.

(5) After installation, operate tilt control lever several times to purge air from cylinders. Check cylinders and hose fittings for leakage while operating.

(6) Retract both tilt pistons fully. With mast tilted 10° to rear of vertical and pistons retracted fully, repeat step b above. Secure front end of tilt cylinders to upright brackets with shafts and attaching screws.

### 3-60. Air Cleaner

#### a. Removal.

(1) Remove truck floor plate (para 3-18).

(2) Unscrew and discard air cleaner and gasket (fig. 3-21) from hydraulic tank.

b. Installation. Reverse procedures in a above.

### 3-61. Filter Cartridges

Two filters are used in the hydraulic system; one in suction line adjacent to pump, the other in return line from control valve, at left rear of hydraulic tank.

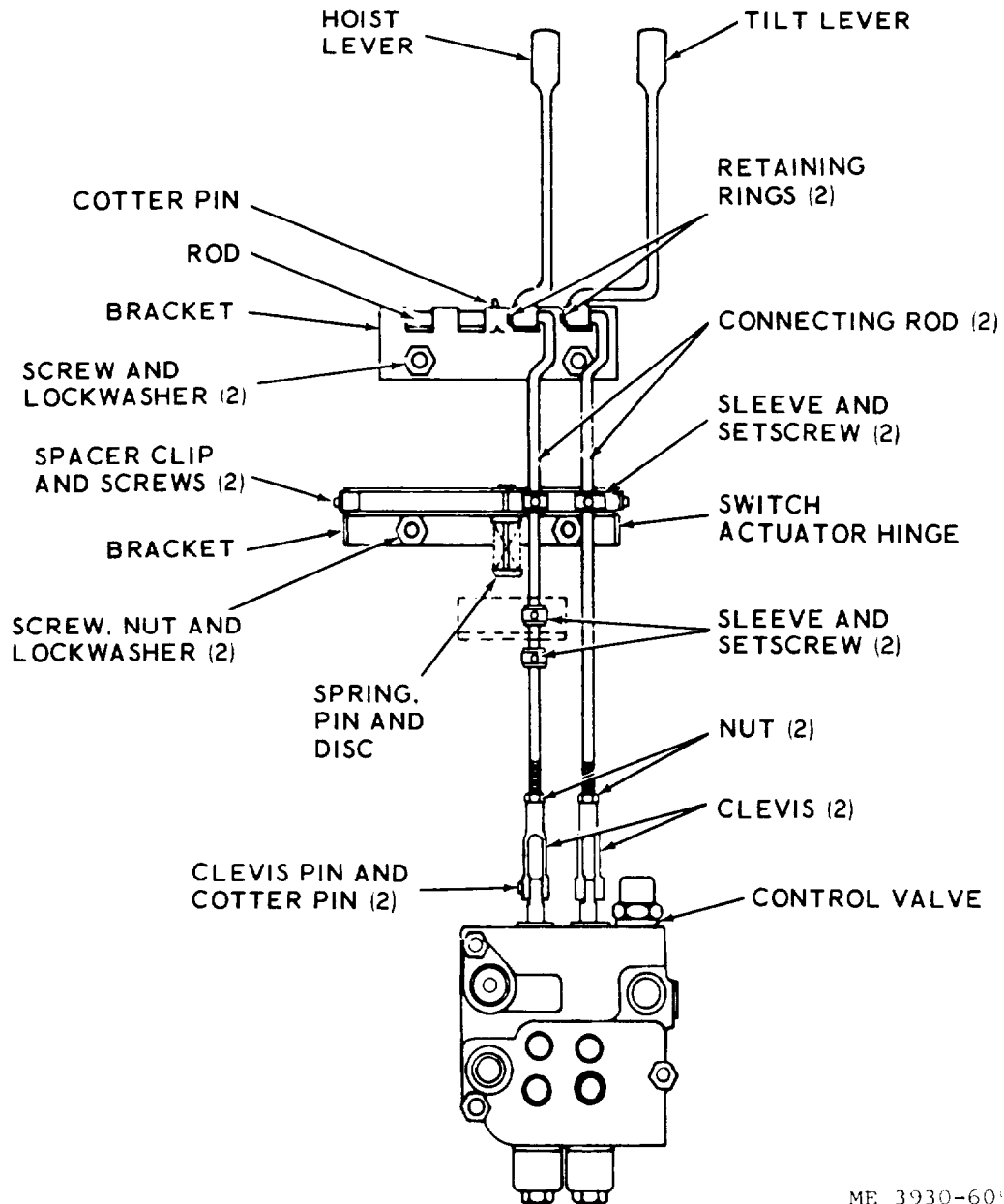
#### a. Return Filter Cartridge Replacement.

(1) Turn cartridge (fig. 3-22) from filter cover by hand.

(2) Install new cartridge by reversing procedure in (1) above.

#### b. Suction Filter Element Replacement.

(1) Unscrew filter housing (fig. 3-22) from head and discard housing seal.



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Figure 3-20. Control Levers and linkage.

(2) Remove and discard filter element and element seal.

(3) Install new filter element and seals by reversing procedures (1) and (2) above.

**3-62. Hydraulic Lines and Fittings**

Organizational maintenance of the hydraulic lines and fittings is limited to removal of de-

fective parts and replacement with new hydraulic lines and fittings. Visually inspect hydraulic lines and fittings during operation for signs of hydraulic fluid leakage or restrictions signified by operational malfunction. Tag hydraulic lines as they are disconnected to facilitate installation and cap hoses or plug parts, as required, to exclude dirt or other contamination.

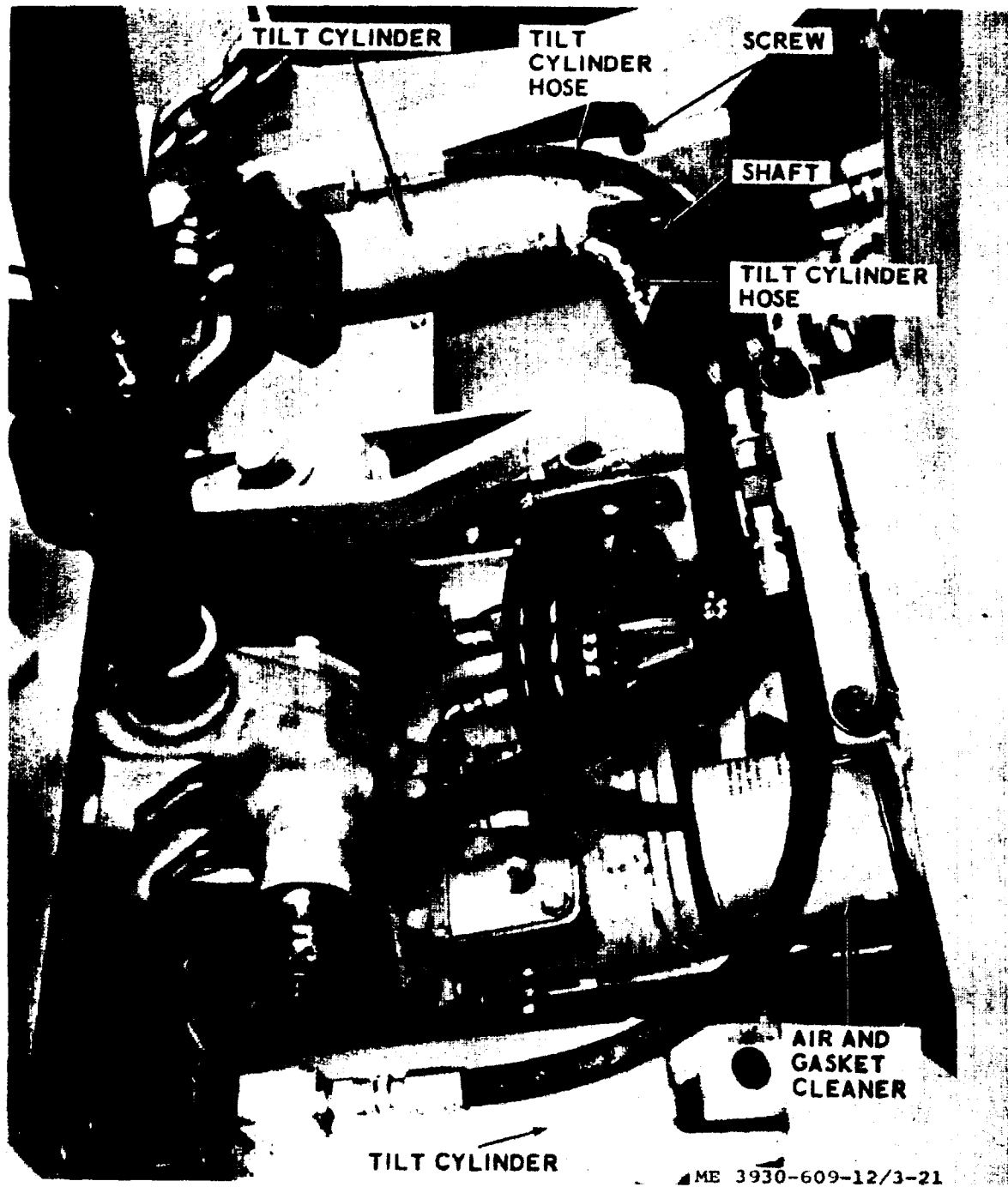


Figure 3-21. Tilt cylinders, hoses and air cleaner

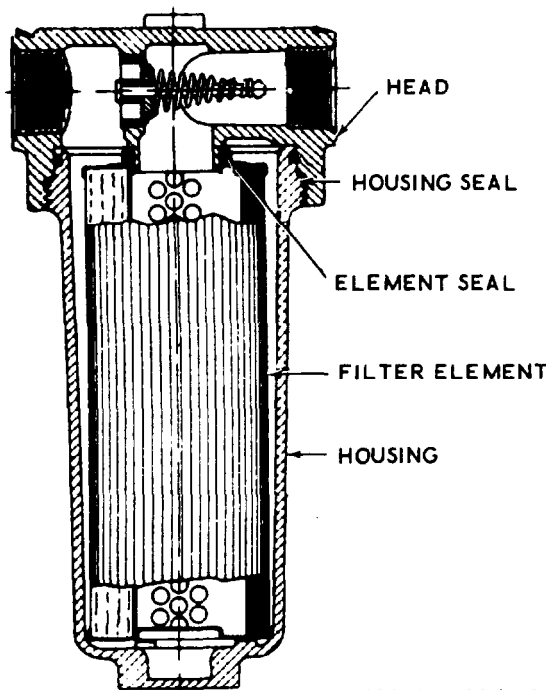
### 3-63. Hoist Regulating Valve

#### a. Removal.

- (1) Fully lower lift carriage.
- (2) While working from front of truck through hole in lift carriage, unscrew hose from

bottom of hoist regulating valve mounted just above base of hoist cylinder. Cap hose to exclude dirt.

- (3) Unscrew hoist regulating valve with attached fittings from hoist cylinder and move fittings. Discard O ring packings.



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Figure 3-22. Suction filter.

b. *Installation.* Reverse procedures in a above using new O ring packing. Operate hoist control valve several times to purge air and check for hydraulic fluid leakage at fittings. Tighten as required.

## Section VII. STEERING SYSTEM

### 3-64. General

The steering system consists of the steering wheel, steering gear assembly, steering axle with wheels and tie rods, and the draglink.

### 3-65. Steering Wheel

#### a. Removal.

- (1) Remove horn button (para 3-45).
- (2) Remove steering wheel nut (fig. 3-15) and using a suitable puller, remove steering wheel from steering gear column.

b. *Installation.* Reverse procedures in a above orienting steering wheel on steering gear column so that keyway properly mates with key before securing steering wheel with nut.

### 3-66. Steering Gear

Organizational maintenance of the steering gear is limited to lash adjustment and steering linkage adjustment. Refer all other maintenance to direct support maintenance.

#### a. Lash Adjustment.

- (1) Remove nut (fig. 3-23) holding draglink to pitman arm, and disconnect draglink.

*Note.* If necessary, use puller, but do not damage threads, or place strain on pitman arm.

- (2) Loosen jamnut and turn lash adjuster with screwdriver until steering wheel passes through center of travel with 14 to 18 ounces pull on the rim. Tighten jamnut, recheck adjustment and then install draglink.

#### b. Steering Linkage Adjustment.

- (1) With steering wheel halfway between extreme right and extreme left turn, assemble pitman arm to steering gear as shown in figure 3-23.

(2) With trailing axle wheels in straight ahead position, adjust draglink to proper length by loosening clamps and turning draglink tubing until tie rod end at front of draglink will enter hole in pitman arm freely, with pitman arm vertical.

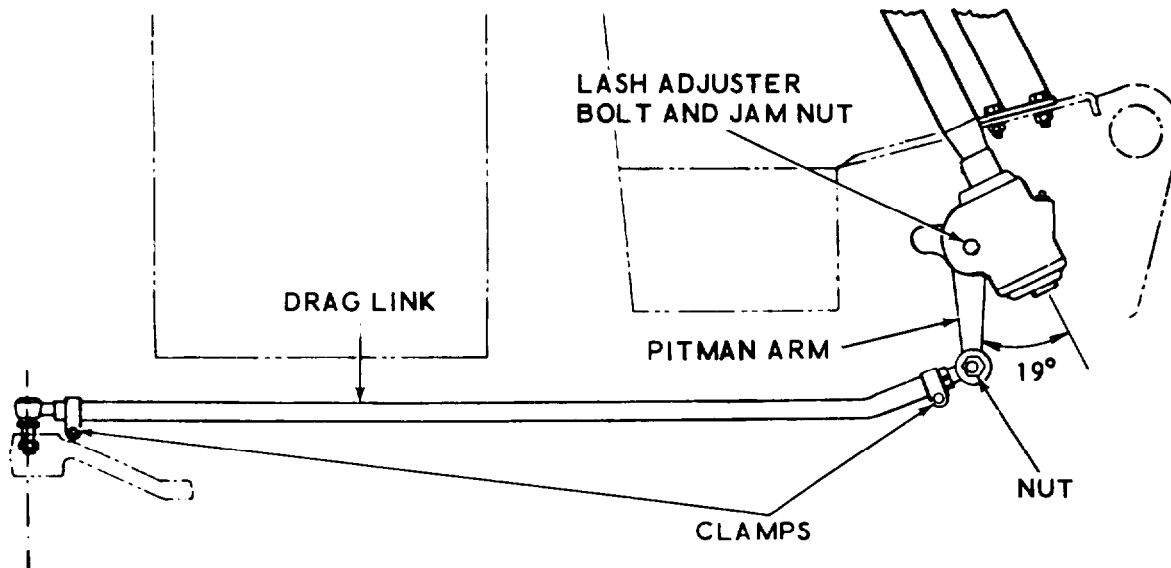
- (3) Tighten draglink clamps.

### 3-67. Wheel Alinement Measurement

Determine if wheel alinement adjustment is needed as follows:

- a. With rear axle level front to rear, and wheels in straight ahead position, measure inside span between tiers at hub height at front of axle.

- b. Repeat a above at rear of axle.



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Figure 3-23. Steering adjustment.

c. If measurements obtained in a and b above differ by 1/16 inch, adjust as below until wheels are parallel to within 1/16 inch as measured in a and b above.

### 3-68. Wheel Alinement Adjustment

- a. Loosen (but do not remove) screws and nuts from all tie rod end clamps (fig. 3-24).
- b. Turn each tie rod an equal number of turns in the direction necessary to change toe-in as required.

*Note.* Each tie rod has right hand threads at one end, left hand threads at the other, so adjustment can be made to change effective length without dismounting tie rod.

c. When adjustment has been completed, tighten tie rod clamp screws and nuts and recheck wheel alinement measurement (para 3-67).

### 3-69. Rear Wheels

#### a. Removal.

- (1) Lower forks fully and tilt mast back. Raise rear of truck until wheels clear floor.
- (2) Remove hub cap (fig. 3-25), and remove cotterpin, nut, and washer from bore of wheel.

(3) Draw wheel from steering axle spindle. Because of manufacturing tolerances the cone and rollers of the inboard bearing may remain with spindle. If so, it can easily be removed. Avoid damaging oil seal, if possible, when removing wheel.

*b. Installation.* Reverse procedures in a above, tightening wheel nut snug, then backing it off not more than 1/6 turn, and install cotterpin.

### 3-70. Rear Wheel Bearings

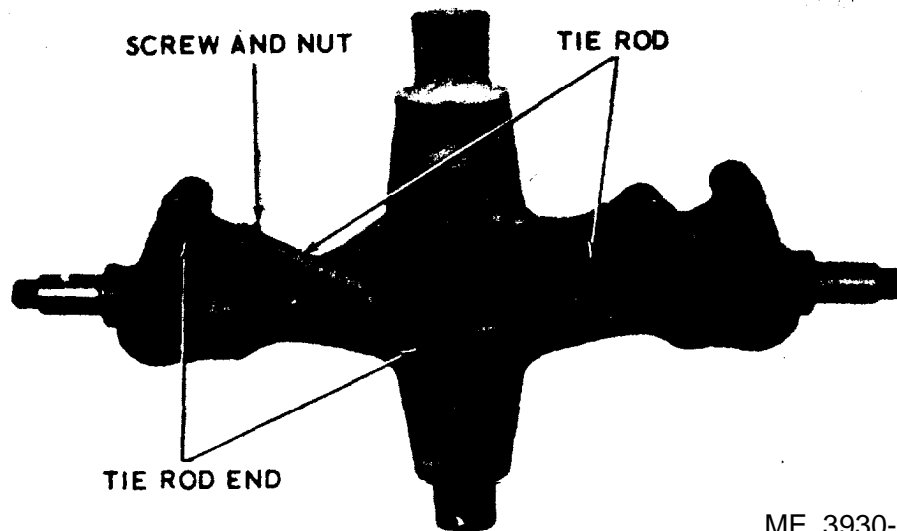
#### a. Removal.

- (1) Remove rear wheels (para 3-69a).
- (2) Pull bearings from bore of wheel. A slip hammer bearing puller may be used to pull bearings from wheel if they stick in bore.
- (3) Remove retaining rings which position bearings.

#### b. Service.

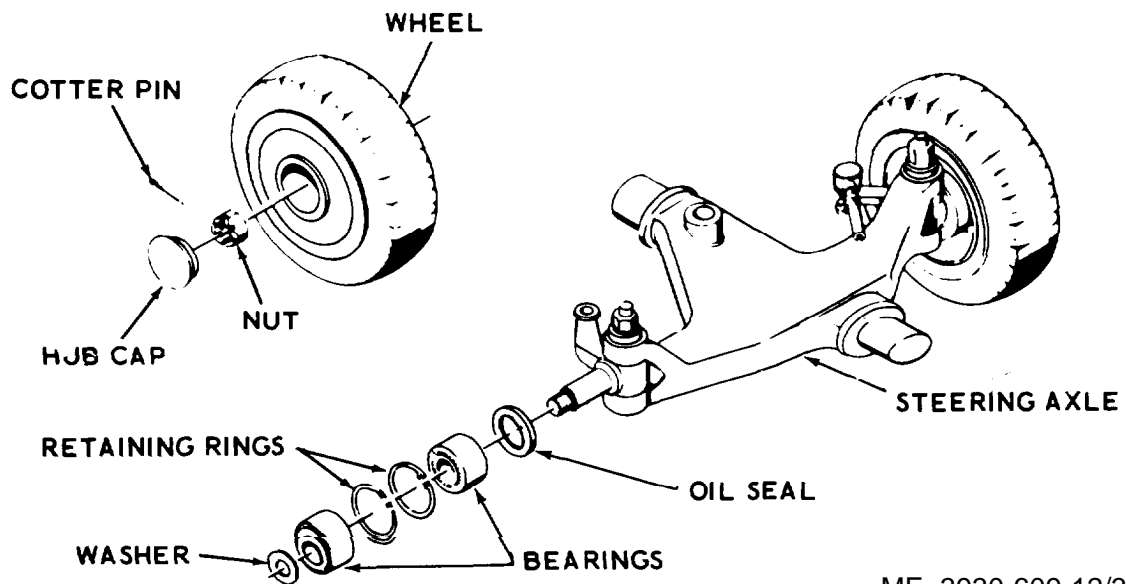
- (1) Clean bearings with SD and dry thoroughly.
- (2) Inspect cups and rollers for wear or failure. Inspect cone and roller assemblies for roughness when rotated.
- (3) If bearings are serviceable, repack with grease in accordance with LO 10-3930-609-12, using a bearing packing device, if available.

*c. Installation.* Reverse procedures in a above.



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Figure 3-24. Wheel alinement adjustment.



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Figure 3-25. Rear wheel and bearings.

### Section XIII. DRIVE AXLE

#### 3-71. General

This section contains instructions for replacement of the drive axle wheels. Refer service other than this to direct support maintenance.

#### 3-72. Drive Axle Wheels

##### a. Removal.

- (1) Jack up front wheels as follows:
  - (a) Tilt mast to extreme back position.

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(b) Place block directly under mast at lift cylinder.

(c) Tilt mast forward until wheels are clear.

(2) Remove six screws holding wheel to truck.

(3) Remove wheel.

*Note.* If brake lining drags on wheel, interfering with removal, slack off adjustment of brake self-adjusters by vigorously wiggling wheel to force brakeshoes inward.

*b. Installation.* Reverse procedures in a above.



**CHAPTER 4**  
**SHIPMENT, ADMINISTRATIVE STORAGE, AND DEMOLITION**  
**TO PREVENT ENEMY USE**

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**Section I. SHIPMENT AND ADMINISTRATIVE STORAGE**

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

*a. General.* Instructions for preparation of the Fork Lift Truck for domestic shipment are provided in this paragraph. Preservation and packaging shall be accomplished in a sequence that will not require the operation of previously preserved component.

*b. Inspection.* Examine the Fork Lift Truck for any unusual condition such as damage, rusting, accumulation of water and /or missing components. Make a complete inspection of the Fork Lift Truck as outlined in the Preventive Maintenance checks and services, paragraph 3-7.

*c. Preservation.* Clean, paint, preserve and weather-proof in accordance with applicable requirements of TM 740-90-1.

*d. Packing.* Pack the disassembled components, basic issue items, and publications in a suitable container, and secure to the Fork Lift Truck. Refer to TM 38-230 for guidance in selection, fabrication and packing of the container.

*e. Marking.* Mark in accordance with MIL-STD-129.

*f. Loading.* Load, block, and tie-down the Fork Lift Truck in accordance with carrier rules and regulations.

**4-2. Administrative Storage**

Preparation, care, and removal of equipment in administrative storage will be in accordance with the applicable requirements of TM 740-90-1 (Administrative Storage of Equipment).

**Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE**

**4-3. General**

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

**4-4 Demolition to Render the Fork Lift Truck Inoperative**

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

- (1) Contactors.

- (2) Battery.

- (3) Hydraulic motor and traveling motor.

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

- (4) Steering Column.

- (5) Hydraulic pump.

- (6) Mast.

*b. Demolition by Misuse.* Pour sand in the oil reservoir and operate the fork lift until failure occurs.

**4-5. Demolition by Explosives or Weapons Fire**

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

- (1) One 1/2-lb. charge on lift cylinder.

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(2) One 1/2-lb. charge inside of each drive wheel.

(3) One 1/2-lb. charge inside of each steering wheel.

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

(4) One 1/2-lb. charge inside of control panel.

(5) One 1/2-lb. charge on hydraulic oil pump and motor.

(6) One 1/2-lb. charge on the differential.

(7) Two 1/2-lb. charges on traveling motor.

(8) Two 1/2-lb. charges inside of battery compartment.

*b. Weapons Fire.* Fire on the fork lift truck with the heaviest practical weapons available.

**4-6. Other Demolition Methods**

*a. Burning.* Pack rags, clothing, or canvas, under, around, and inside the fork lift truck.

Saturate this packing with gasoline, oil, or diesel fuel and ignite.

*b. Submersion.* Totally submerge the fork lift truck in a body of water to provide water damage and concealment. Salt water will damage metal parts more than fresh water.

**4-7. Training**

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

## APPENDIX A

### REFERENCES

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**A-1. Fire Protection**

TB 5-4200-200-10 Hand Portable Fire Extinguishers Approved for Army Users

**A-2. Lubrication**

C9100IL Fuels, Lubricants, Oils and Waxes  
LO 10-3930-609-12 Lubrication Order

**A-3. Painting**

TM 9-213 Painting Instructions for Field Use

**A-4. Radio Suppression**

TM 11-483 Radio Interference Suppression

**A-5. Maintenance**

TM 38-750 Army Equipment Procedures  
TM 9-6140-200-15 Operation and Organizational Field and Depot Maintenance  
TM 10-3930-609-20P Organizational Maintenance Repair Parts & Special Tools List Manual

**A-6. Shipment and Storage**

TB 740-93-2 Preservation of USAMEC Mechanical Equipment for Shipment and Storage  
TM 740-90-1 Administrative Storage of Equipment



## APPENDIX B

### BASIC ISSUE ITEMS LIST

#### Section I. INTRODUCTION

#### B-1. Scope

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

#### B-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 fork lift truck or are required for the installation, operation, or operator's maintenance.

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

#### B-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), Column (1).*

*Note.* Common hardware items known to be readily available in Army supply will be assigned Maintenance Codes only. Source Codes, Recoverability Codes, and Quantity Authorized will not be assigned to this category of items.

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

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
A	Applied to assemblies which are not - procured or stocked as such, but made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled

Code	Explanation
	bled by units at indicated maintenance categories.
X	Applied to parts and assemblies which are not procured or stocked, the mortality of which is normally below that of the applicable end item, and the failure of which should result in retirement of the end item from the supply system.
X1	Applied to repair parts which are not procured or stocked, the requirement for which will be supplied by use of the next higher assembly or components.
X2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C	Applied to repair parts authorized for local procurements. If not obtainable from local procurement, such repair parts will be requisitioned through normal supply channels with a supporting statement of nonavailability from local procurement.
G	Applied to major assemblies that are procured with PEMA (Procurement Equipment Missile Army) funds for initial issue only to be used as exchange assemblies at DSU and GSU level or returned to depot supply level.

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

Code	Explanation
C --	Operator/crew
O --	Organizational maintenance

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

Recoverability codes are:

Code	Explanation
R	Applied to repair parts and assemblies which are economically repairable at DSU and

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

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

c. *Description, Column (3).* This column indicates the Federal item name and any additional description of the item required. A part number or other reference number follows the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

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

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

f. *Quantity Incorporated in Unit, Column (6).* This column indicates the quantity of the item used in the functional group.

g. *Quantity Furnished with Equipment, Column (7).* This column indicates the quantity of an item furnished with the equipment.

h. *Quantity Authorized, Column (8).* This column indicates the quantity of an item au-

thorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

i. *Illustration, Column (9).* This column is divided as follows:

(1) *Figure Number, Column (9)(a).* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number, Column (9)(b).* Indicates the callout number used to reference the item in the illustration.

#### B-4. Explanation of Columns in the Tabular list of Maintenance and Operating Supplies-Section III

a. *Component Application, Column (1).* This column identifies the component application of each maintenance or operating supply item.

b. *Federal Stock Number, Column (2).* This column indicates the Federal stock number for the item and will be used for requisitioning purposes.

c. *Description, Column (3).* This column indicates the item and brief description.

d. *Quantity Required for Initial Operation, Column, (4).* This 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, Column (5).* This column indicates the estimated quantities required for an average eight hours of operation.

f. *Notes, Column (6).* This column indicates informative 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 issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration	
									(a) Fig No.	(b) Item No.
P10	7520-559-9618	Case, maintenance and operational manuals		ea	1	1	1	1		
X20	4210-889-2221	Extinguisher, fire		ea	1	1	1	1		
X20		Fork Assembly (05416) A700FD3		ea	2	2	2	2		
X20		Headlight Assembly (05415) 424MBL2		ea	1	1	1	1		
X20		Knob, Directional Control (81487) 9203W7		ea	1	1	1	1		
		REPAIR PARTS								
		None authorized for operator maintenance.								

(1) SMR code	(2) Federal stock number	(3) Description		(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration	
		Ref No & Mfr Code	Useable on Code						(a) Fig No.	(b) Item No.
	7510-889-3494		<p>SPECIAL TOOLS None authorized for operator maintenance.</p> <p>RECORDS EQUIPMENT LOG BOOK Consisting of the following DA Forms: 2408, 2408-1, 2408-2, 2408-3, 2408-5, 2408-6, 2408-7, 2408- 8, 2408-10, and 2408-11.</p>							

**Section III. MAINTENANCE AND OPERATING SUPPLIES**

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required /initial operation	(6) Quantity required /8 hrs operation	(6) Notes
BRAKE MASTER CYLINDER	9150-231-9071 (1)	BRAKE FLUID, AUTOMOTIVE gal can as follows:  HB	1 pt	(2)	(1) See C9100-IL for addi- tional data an requisition- ing procedure. (2) See current LO for grade, application and replenishment intervals.
DIFFERENTIAL DRIVE AXLE	9150-577-5844 (1) 9150-257-5440 (1)	LUBRICATING OIL, GEAR: 5 gal drum as follows: GO-90 GOS	1 qt 20 qt	(2) (2)	
HYDRAULIC SYSTEM	9150-265-9428 (1) 9150-242-7603 (1)	OIL, LUBRICATING: 5 gal pails as follows: OE-10 OES	1 qt 20 qts	(2) (2)	
LUBRICATION FITTINGS	9150-190-0904 (1)	GREASE, AUTOMOTIVE AND ARTILLERY: 1 lb can as follows: GAA	lb	(2)	





## APPENDIX C

### MAINTENANCE ALLOCATION CHART

---

#### Section I. INTRODUCTION

##### C-1. General

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

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

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

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

##### C-2. Explanation of Columns in Section II

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

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

c. *Maintenance Functions, Column (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 an item to bring to optimum performance.
- B Test: To verify serviceability and to detect electrical or mechanical failure by use of test equipment
- C Service: To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.
- D Adjust: To rectify to the extent necessary to bring into proper operating range.
- E Aline: To adjust specified variable elements of an item to bring to optimum performance.
- F Calibrate: To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.
- G Install: To set up for use in an operational environment such as an emplacement, site, or vehicle
- H Replace: To replace unserviceable items with serviceable assemblies, subassemblies, or parts.
- I Repair: To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.
- J Overhaul: To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.
- K Rebuild: To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

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

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

**C-3. Explanation of Columns in Section III**

a. *Reference Code.* This column consists of a number and a letter separated by a dash. The number references the T&TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. *Maintenance Category.* This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. *Nomenclature.* This column lists the name or identification of the tool or test equipment.

d. *Tool Number.* This column lists the manufacturer's code and part number, or Federal stock number of tools and test equipment.

**C-4. Explanation of Columns in Section IV**

a. *Reference Code.* This column consists of two letters separated by a dash, both of which are reference 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**

Functional group number	Component assembly nomenclature	Maintenance functions											Note reference	
		A	B	C	D	E	F	G	H	I	J	K	L	M
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
06	ELECTRICAL SYSTEM													
0607	Instrument panel													
	Hour meter-----	0	--	--	--	--	--	0						
	Switch, light-----	0	0	--	--	--	--	0						
0608	Miscellaneous items													
	Receptacle battery-----	--	--	--	--	--	--	0						
	Switch, stoplight-----	0	--	--	--	--	--	0						
0609	Lights													
	Lamps-----	0	--	--	--	--	--	0						
	Lights-----	0	--	--	--	--	--	0						
	Resistors, lights-----	--	0					0						
0611	Horn													
	Button, horn-----	--	--	--	--	--	--	0	0	--	--	--		A
	Horn assembly-----	--	0	--	--	--	--	0						
0612	Batteries													
	Battery, storage-----	0	0	0	--	--	--	0						
	Cables, battery-----	--	--	--	--	--	--	0						
0613	Hull or chassis wiring harness													
	Harness, wiring-----	0	--	--	--	--	--	F	0					
19	FRONT AXLE													
1000	Front axle assembly													
	Axle assembly, driving-----	0	--	0	--	--	--	F	F	H				
1002	Differential													
	Differential assembly-----	F	--	0	--	--	--	F	F	H				
11	REAR AXLE													
1100	Rear axle assembly													
	Axle assembly, steering-----	0	--	--	0	--	--	F	F					
1104	Steering													
	Arm, steering-----	0	--	--	F	--	--	F						
	Axle, steering-----	--	--	--	--	--	--	F						
12	BRAKES													
1201	Handbrakes													
	Brakeshoe assembly, motor-----	--	--	--	--	--	--	F	F					
		0	--	0	0	--	--	0						

Functional group number	Component assembly nonmenclature	Maintenance functions											Note reference			
		A	B	C	D	E	F	G	H	I	J	K	L	M		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks		
1202	Control linkage-----	--	--	--	O	--	--	--	O	--	--	--	--	--		
	Drum, brake-----	--	--	--	--	--	--	--	F	--	--	--	--	--		
	Lever, handbrake-----	--	--	--	--	--	--	--	--	--	--	--	--	--		
1204	Service brakes															
	Brake assembly-----	F	--	--	O	--	--	--	F	F	--	--	--	--		
	Shoe assembly-----	O	--	--	O	--	--	--	O	F	--	--	--	--		
13	Hydraulic brake system															
	Master cylinder-----	O	--	O	--	--	--	--	O	F	--	--	--	--		B
	Tube assembly, metal-----	O	--	--	--	--	--	--	O	F	--	--	--	--		C
1311	WHEELS															
	Wheel assembly															
	Bearing and seals, rear wheels-----	O	--	O	O	--	--	--	O	O	--	--	--	--		
1313	Wheel assembly-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
	Tires															
14	Tires, solid-----	O	--	--	--	--	--	--	F	--	--	--	--	--		
	STEERING															
	Steering assembly															
1401	Bearing, bellcrank-----	--	--	--	--	--	--	--	F	F	--	--	--	--		
	Bellcrank-----	--	--	--	--	--	--	--	F	F	--	--	--	--		
	Drag, link-----	--	--	O	F	--	--	--	F	F	--	--	--	--		
	Rod assembly, tie-----	--	--	O	O	--	--	--	F	F	--	--	--	--		
	Steering gear assembly-----	--	--	O	O	--	--	--	F	F	--	--	--	--		
	Wheel, steering-----	--	--	--	--	--	--	--	O	--	--	--	--	--		
1801	BODY, CAB, HOOD AND HULL															
	Body, cab, hood, hull assemblies															
	Covers (Battery compartment)-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
1805	Overhead guard-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
	Floor															
1806	Plate, floor-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
	Seats															
2401	Seat assembly-----	O	--	--	--	--	--	--	O	O	--	--	--	--		
	HYDRAULIC LIFT COMPONENTS															
	Hydraulic pump															
2402	Pump, rotary, power driven, hydraulic-----	O	--	--	--	--	--	--	F	F	--	--	--	--		
	Hydraulic control valve															
2403	Valve, directional control-----	O	--	--	--	--	--	--	F	F	--	--	--	--		
	Hydraulic control levers and linkage															
2404	Bracket, control valve-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
	Levers, control-----	--	--	--	--	--	--	--	O	O	--	--	--	--		
2405	Hydraulic tilt cylinders															
	Cylinder assembly, tilt-----	O	--	--	--	--	--	--	O	F	--	--	--	--		
	Hydraulic mast column															
2406	Chain assembly-----	O	--	O	O	--	--	--	O	O	--	--	--	--		
	Crosshead-----	O	--	--	--	--	--	--	F	F	--	--	--	--		
	Cylinder assembly, actuating, hoist--	O	--	--	--	--	--	--	F	F	--	--	--	--		
	Forks-----	--	--	--	--	--	--	--	F	F	--	--	--	--		
	Roller assembly-----	--	--	--	--	--	--	--	F	F	--	--	--	--		
	Upright assembly-----	O	--	O	O	--	--	--	F	H	H	--	--	--		
2406	Hydraulic lines and fittings															
	Cap, oil breather-----	O	--	O	--	--	--	--	O	O	--	--	--	--		
	Filter element-----	O	--	--	--	--	--	--	O	O	--	--	--	--		
	Hoses assembly, rubber-----	O	--	--	--	--	--	--	O	O	--	--	--	--		
	Tank, oil-----	O	--	O	--	--	--	--	F	F	--	--	--	--		
	Valve, regulating-----	--	--	--	--	--	--	--	F	F	--	--	--	--		

Functional group number	Component assembly nomenclature	Maintenance functions											Note reference	
		A	B	C	D	E	F	G	H	I	J	K	L	M
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
40	ELECTRIC MOTORS													
4000	Motor assembly													
	Motor assembly, travel-----	F	F	--	--	--	--	F	F	H				
	Motor assembly, pump-----	F	F	--	--	--	--	F	F	H				
4001	Rotor assemblies													
	Armature, travel motor-----	F	F	--	--	--	--	F	F					
	Armature, pump motor-----	F	F	--	--	--	--	F	F					
4002	Stator assemblies													
	Winding motor field-----	F	F	--	--	--	--	F	F					
4003	Brush holders													
	Brush, electrical contact-----	O	--	--	--	--	--	O						
	Holder, electrical contact, brush----	F	--	--	--	--	--	F						
	Endbell-----	F	--	--	--	--	--	F						
4005	Frame supports and housings													
	Bearing, ball annular, drive motors-----	F	--	--	--	--	--	F						
4007	Drive components													
	Adapter assembly, gear reduction ----	O	--	O	--	--	--	F	F					
4010	Accelerator control assembly													
	Potentiometer -----	F	--	--	--	--	--	F						
	Control, accelerator-----	O	--	--	--	--	--	O	F					
	Switch, sensitive-----	--	--	--	--	--	--	F						
4011	Fuse and fuse holder, circuit breaker													
	Fuse, cartridge-----	O	--	--	--	--	--	O						
	Fuse holder-----	--	--	--	--	--	--	F						
	Link, fuse-----	--	--	--	--	--	--	F						
	Oscillator module-----	F	F	--	--	--	--	F						
4012	Switches													
	Lever, switch -----	--	--	--	--	--	--	F						
	Switch, directional control-----	O	--	--	--	--	--	F	F					
4014	Resistor													
	Resistor, fixed -----	--	O	--	--	--	--	O						
4015	Relay													
	Relay, armature-----	O	F	--	--	--	--	F	F					
	Contact, relay-----	O	--	--	--	--	--	O						
	Relay, thermal-----	O	O	--	--	--	--	O						
4017	Rectifier, transformer													
	SCR assembly-----	F	F	--	--	--	--	F						
4019	Radio interference suppression													
	Strap, static drag-----	--	--	--	--	--	--	F						

**Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS**

Reference	Maintenance level	Nomenclature	Tool No.
		No special tools or equipment are required by organizational, direct, general support, and depot personnel for performing maintenance on the truck, lift, fork.	

**Section IV. REMARKS**

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



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By Order of the Secretary of the Army:

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*General, United States Army,*  
*Chief of Staff.*

Official:

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