

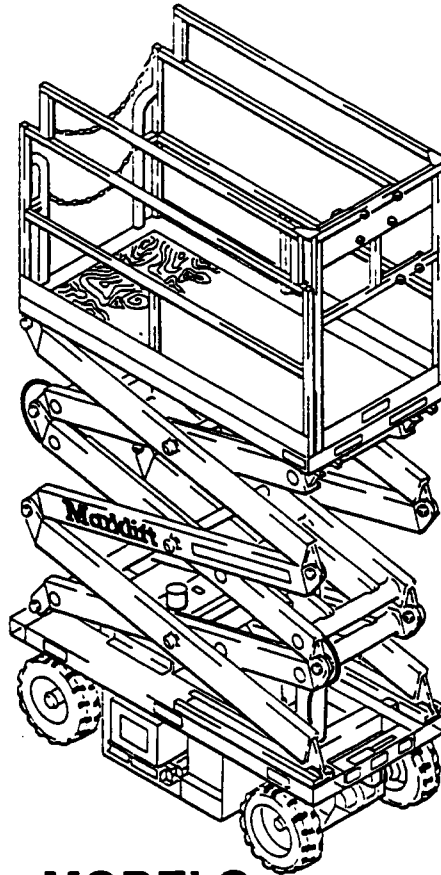
# **The Marklifts®**

A Product of Mark Industries

## **SELF-PROPELLED SCISSOR OPERATION MAINTENANCE AND PARTS MANUAL**

SECOND EDITION - September 1988

RE-PRINTED: November 1989



**MODELS:  
M-15, M-15T, M-15EP**



**Mark Industries**

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17208

THIS MARKLIFT SELF PROPELLED SCISSOR MODELS M-15, M-15 T AND M-15EP OPERATION, MAINTENANCE AND PARTS MANUAL IS DESIGNED AS:

## GENERAL

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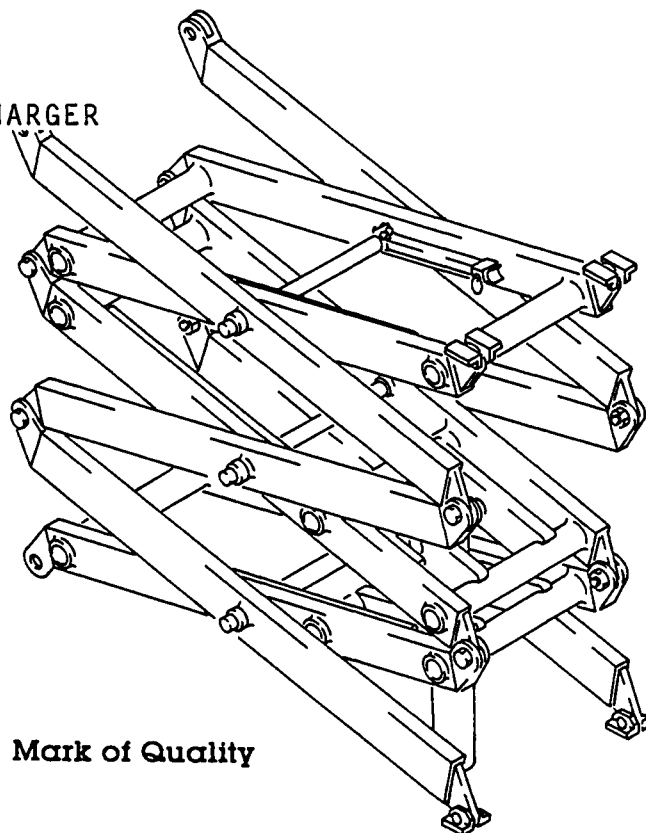
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Mark of Quality



The purpose of this manual is to provide the customer with operation maintenance and parts information that will enhance the reliable performance of the MARKLIFT. Schematic and vendor information is also furnished.

**WARNING: IMPROPER USE OF THIS MACHINE WILL RESULT IN SERIOUS INJURY OR DEATH! TO PROTECT YOURSELF AND THE EQUIPMENT, STUDY THIS MANUAL BEFORE STARTING OPERATIONS.**

The model capacity, pressure settings and serial number can be found on the ID Plate mounted on the rear of the base.

The serial number should be used when ordering parts. This will help our parts department in giving prompt and accurate service.

If additional information or service is needed, we urge the customer to contact his local dealer. If this is not possible, please get in touch with the MARK INDUSTRIES Service Department.

All MARKLIFTS are tested and operated to assure their proper operating condition before shipment. At this time, all necessary adjustments are made and an overall physical inspection is conducted. After the unit is delivered, some minor adjustments and inspections must be made before putting the unit in service. These functions are outlined in the INSPECTION AND CHECKOUT INSTRUCTIONS in the operation section of this manual.



DESCRIPTION			ENGLISH	METRIC
HEIGHT	WORKING (maximum)		21'3"	6.48 m
	PLATFORM (maximum)		15'3"	4.65 m
	PLATFORM (minimum)		41"	1.04 m
LENGTH (overall)			69.5"	1.77 m
WIDTH (overall)			30"	0.76 m
PLATFORM	DIMENSION (inside)		28" x 68"	0.71 m x 1.73 m
	EXTENDABLE (traveling)		NOT AVAILABLE THIS MODEL	
	SAFETY RAIL	UP	42"	1.07 m
		DOWN	33.5"	0.85 m
	TOE PLATE		4"	0.10 m
LOAD CAPACITY			1,000 lbs	453 kg
WHEEL	BASE		51.5"	1.31 m
	TRACK		24.5"	0.62 m
TURNING RADIUS (inside)			5'8"	1.73 m
DRIVE SPEED	LOW		0.5 mph	0.80 km/h
	HIGH		1.62 mph	2.61 km/h
HIGH SPEED CUTOUT			7"	2.13 m
SPEED (maximum load)	LIFT		29 sec	
	LOWER		13 sec	
POWER SYSTEM			24 VDC	
BATTERY VOLTAGE			6 VDC	
CAPACITIES	BATTERY		250 amp/hr	
	HYDRAULIC TANK		8 gal	30.3 l
BATTERY CHARGER			36 amp	
TIRE SIZE			4 x 8 solid	
SHIPPING	WEIGHT		2,405 lbs	1,091 kg
	CUBE		93 cu. ft	2.63 cu. m

DESCRIPTION			ENGLISH	METRIC
HEIGHT	WORKING (maximum)		21'8"	6.60 m
	PLATFORM (maximum)		15'8"	4.78 m
	PLATFORM (minimum)		45"	1.14 m
LENGTH (overall)			69.5"	1.77 m
WIDTH (overall)			30"	0.76 m
PLATFORM	DIMENSION (inside)		28" x 68"	0.71 m x 1.73 m
	EXTENDABLE FORWARD / REAR		36" / 18"	0.91 m / 0.45 m
	SAFETY RAIL	UP	42"	1.07 m
		DOWN	34.75"	0.88 m
	TOE PLATE		4"	0.10 m
LOAD CAPACITY			750 lbs	3.40 kg
WHEEL	BASE		51.5"	1.31 m
	TRACK		24.5"	0.62 m
TURNING RADIUS (inside)			5'8"	1.73 m
DRIVE SPEED	LOW		0.5 mph	0.80 km/h
	HIGH		1.62 mph	2.61 km/h
HIGH SPEED CUTOUT			7"	2.13 m
SPEED (maximum load)		LIFT	29 sec	
		LOWER	13 sec	
POWER SYSTEM			24 VDC	
BATTERY VOLTAGE			6 VDC	
CAPACITIES	BATTERY		250 amp/hr	
	HYDRAULIC TANK		8 gal	30.3 l
BATTERY CHARGER			36 amp	
TIRE SIZE			4 x 8 solid	
SHIPPING	WEIGHT		2,645 lbs	1,200 kg
	CUBE		96.6 cu. ft	2.74 cu. m

REV.



DESCRIPTION			ENGLISH	METRIC
HEIGHT	WORKING (maximum)		21'5"	6.53 m
	PLATFORM (maximum)		15'5"	4.70 m
	PLATFORM (minimum)		42"	1.07 m
LENGTH (overall)			71.5"	1.82 m
WIDTH (overall)			30"	0.76 m
PLATFORM	DIMENSION (inside)		23.5" x 104"	0.60 m x 2.64 m
	EXTENDABLE (forward)		36"	0.91 m
	SAFETY RAIL	UP	42"	1.07 m
		DOWN	33.5"	0.85 m
	TOE PLATE		4"	0.10 m
LOAD CAPACITY			750 lbs	340 kg
WHEEL	BASE		51.5"	1.31 m
	TRACK		24.5"	0.62 m
TURNING RADIUS (inside)			5'8"	1.73 m
DRIVE SPEED	LOW		0.5 mph	0.80 km/h
	HIGH		1.62 mph	2.61 km/h
HIGH SPEED CUTOUT			7"	2.13 m
SPEED (maximum load)		LIFT	29 sec	
		LOWER	13 sec	
POWER SYSTEM			24 VDC	
BATTERY VOLTAGE			6 VDC	
CAPACITIES	BATTERY		250 amp/hr	
	HYDRAULIC TANK		8 gal	30.3 l
BATTERY CHARGER			36 amp	
TIRE SIZE			4 x 8 solid	
SHIPPING	WEIGHT		2.580 lbs	1170 kg
	CUBE		94.8 cu. ft	2.68 cu. m

REV.



## **MANUFACTURERS' LIMITED WARRANTY**

Mark Industries makes no warranty, express or implied, on any product manufactured or sold by Mark Industries except for the following limited warranty against defects in materials and workmanship on products manufactured by Mark Industries.

Mark Industries warrants the products manufactured by Mark Industries to be free from defects in material and workmanship under normal use and service for a period of six (6) months from the date of shipment. This limited warranty does not extend to any product of another manufacturer or to any part, component, accessory or attachment not manufactured by Mark Industries. The warranty, if any, with respect to any product of another manufacturer or to any part, component, accessory or attachment not manufactured by Mark Industries is limited to the warranty, if any extended to mark Industries by the manufacturer of the other product, part, component, accessory or attachment.

This limited warranty does not extend to any product (or any part or parts of any product) which has been subject to improper use or application, misuse, abuse, operation beyond its rated capacity, repair or maintenance except in accordance with the sales and service manuals and special instructions of Mark Industries, or modification without the prior written authorization of mark Industries (whether by the substitution of nonapproved parts or otherwise).

The sole obligation and liability of Mark Industries under this limited warranty (and the exclusive remedy for any purchaser, owner or user of Mark Industries products) is limited to the repair or replacement, at the option of Mark Industries, of any product (or any part or parts of any product) manufactured by Mark Industries which, within six (6) months from the date of shipment, shall have been returned to the mark Industries facility in Carson, California (or any other location within the United States as shall be designated by Mark Industries), at no expense to Mark Industries, and demonstrated to the satisfaction of Mark Industries as being defective in material or workmanship.

To make a claim under this limited warranty, contact Mark Industries or the Mark Industries distributor from whom the product was originally purchased. A statement giving the model and serial number of the allegedly defective product, the date and a description of the alleged defect, the date of the purchase and proof of the purchase and purchase date must accompany the returned product (or any part or parts of any product). Any product (or any part or parts of any product) determined by Mark Industries to be defective will be repaired or replaced, at the option of Mark Industries, free of charge, f.o.b. Carson, California. No credit will be given for any allegedly defective product (or any part or parts of any product) not returned to Mark Industries.

There are no other warranties, express or implied, in addition to this limited warranty. **This limited warranty is exclusive and in lieu of all other warranties, express or implied (in fact or by operation of law or otherwise), including the implied warranties of merchantability and fitness for a particular purpose.**

Mark Industries shall not be liable for any special, indirect or consequential damages. Further, no representation or warranty made by any person, including any representative of Mark Industries, which is inconsistent or in conflict with, or in addition to the terms of the foregoing limited warranty (or the limitations of the liability of mark Industries as set forth above) shall be binding upon Mark Industries unless reduced to writing and approved by an officer of Mark Industries.

Tires, batteries, filter elements and electrical components are specifically excluded from this limited warranty.



## **Mark Industries**

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PURCHASER

\_\_\_\_\_  
COMPANY NAME\_\_\_\_\_  
ADDRESS  
\_\_\_\_\_  
\_\_\_\_\_\_\_\_\_\_  
TELEPHONE NUMBER\_\_\_\_\_  
DATE SHIPMENT RECEIVED

UNIT WILL BE USED \_\_\_\_\_

\_\_\_\_\_  
DATE OF INVOICE

UNIT WILL BE SOLD \_\_\_\_\_

\_\_\_\_\_  
DATE UNIT PUT INTO SERVICE

INSPECTION _____	GEN'L MAINTENANCE _____	PAINTING/SANDBLAST _____
MINING _____	HEATING/AIR COND. _____	STEEL FABRICATION _____
WELDING _____	CARPENTRY _____	RIGGING _____
CONSTRUCTION _____	PLUMBING _____	ROOFING _____
SCAFFOLDING _____	ELECTRICAL _____	GLAZING _____
MECHANICAL _____	SPRINKLER _____	OTHER _____

\_\_\_\_\_  
COMMENTS:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_\_\_\_\_\_  
INSPECTION COMPLETED BY:WARRANTY WILL BE VOID UNLESS THIS INSPECTION REPORT IS POSTMARKED  
TO MARK INDUSTRIES NOT MORE THAN 14 DAYS FROM DATE SHIPMENT RECEIVED.



	YES	NO
1. PLATFORM CAPACITY DECAL _____ LBS. _____	<input type="checkbox"/>	<input type="checkbox"/>
2. ALL WARNING, CAUTION & EMERGENCY DECALS INSTALLED _____	<input type="checkbox"/>	<input type="checkbox"/>
3. EMERGENCY DESCENT VALVE FUNCTIONS PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
4. OPERATION INSTRUCTIONS PROPERLY INSTALLED _____	<input type="checkbox"/>	<input type="checkbox"/>
5. OPERATION & SAFETY HANDBOOK RECEIVED _____	<input type="checkbox"/>	<input type="checkbox"/>
6. ELECTRICAL SCHEMATIC RECEIVED _____	<input type="checkbox"/>	<input type="checkbox"/>
7. ALL CONTROLS (AERIAL & GROUND) ARE IDENTIFIED AND OPERATE CORRECTLY _____	<input type="checkbox"/>	<input type="checkbox"/>
8. STOP SWITCHES OPERATE PROPERLY (AERIAL & GROUND) _____	<input type="checkbox"/>	<input type="checkbox"/>
9. PLATFORM GUARD RAILS, SECURE AND UNDAMAGED _____	<input type="checkbox"/>	<input type="checkbox"/>
10. PLATFORM ACCESS GATE WORKS PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
11. HORN AND BEACON OPERATE PROPERLY (OPTIONAL) _____	<input type="checkbox"/>	<input type="checkbox"/>
12. BRAKES ADJUSTED AND OPERATE CORRECTLY _____	<input type="checkbox"/>	<input type="checkbox"/>
13. CIRCUIT BREAKERS OPERATE PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
14. ENGINE R.P.M. _____	<input type="checkbox"/>	<input type="checkbox"/>
15. ALL HYDRAULIC CYLINDERS FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
16. ALL HYDRAULIC CYLINDER RODS FREE OF PAINT OR SCRATCHES _____	<input type="checkbox"/>	<input type="checkbox"/>
17. HYDRAULIC PUMP FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
18. HYDRAULIC HOSES & FITTINGS TIGHT _____	<input type="checkbox"/>	<input type="checkbox"/>
19. HYDRAULIC OIL LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
20. HYDRAULIC TANK & FITTINGS FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
21. DRIVE MOTORS FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
22. TURRET ROTATION GEAR BOX OIL LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
23. TURRET RING GEAR BOLTS TORQUED TO _____ FT. LBS. _____	<input type="checkbox"/>	<input type="checkbox"/>
24. WHEEL LUG NUTS TORQUED TO _____ FT. LBS. _____	<input type="checkbox"/>	<input type="checkbox"/>
25. BATTERY WATER LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
26. ENGINE COOLANT (RADIATOR) LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
27. COOLANT HOSES & FITTINGS FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
28. ELECTRIC RADIATOR FAN OPERATES PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
29. TIRE PRESSURE _____ PSI _____	<input type="checkbox"/>	<input type="checkbox"/>
30. SYSTEM PRESSURE _____ PSIG _____	<input type="checkbox"/>	<input type="checkbox"/>
31. PILOT PRESSURE _____ PSIG _____	<input type="checkbox"/>	<input type="checkbox"/>
32. FUEL TANK & FITTINGS FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
33. MANUAL OVERRIDES OPERATE PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
34. MUFFLER TIGHT AND FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
35. ENGINE OIL LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
36. ENGINE OIL FILTER, FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
37. ALL ELECTRICAL CONNECTIONS TIGHT _____	<input type="checkbox"/>	<input type="checkbox"/>
38. ENGINE ALTERNATOR FUNCTIONS PROPERLY _____	<input type="checkbox"/>	<input type="checkbox"/>
39. VALVE MANIFOLD & FITTINGS, FREE OF LEAKS _____	<input type="checkbox"/>	<input type="checkbox"/>
40. DRIVE WHEEL, TORQUE HUB OIL LEVEL _____	<input type="checkbox"/>	<input type="checkbox"/>
41. RETRACTION CABLE TENSION _____ FT. LBS. _____	<input type="checkbox"/>	<input type="checkbox"/>
42. 110V GENERATOR OPERATES PROPERLY (OPTIONAL) _____	<input type="checkbox"/>	<input type="checkbox"/>

MODEL NUMBER \_\_\_\_\_ SERIAL NUMBER \_\_\_\_\_

INSPECTOR \_\_\_\_\_ OPTIONS \_\_\_\_\_

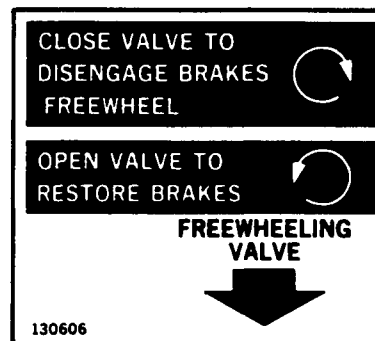


THE **MARK INDUSTRIES** AUTHORIZED UNLOADING  
AND TRANSPORTING PROCEDURE FOR ALL **M-SERIES**  
**MARKLIFT** SELF PROPELLED SCISSORS.

When a loading dock is unavailable and a fork-lift must be used, remember, every **MARKLIFT** is equipped with fork-lift boots at the front or rear of the unit. Always use the fork-lift boots to lift the **MARKLIFT**. Do not attempt to lift the machine from the side!

The **MARKLIFT** may be freewheeled for very short distances at no greater than 5 mph.

**WHEN PREPARING FOR FREEWHEELING, MAKE SURE UNIT IS ON A LEVEL SURFACE.** Brake is disengaged by closing the freewheeling valve and momentarily activating drive controller. Use caution when brakes are disengaged! **ALWAYS REMEMBER TO OPEN FREEWHEELING VALVE TO RESTORE BRAKING!** (See Chapter Parts, Section 3, Figure 1A, 1B or 1C for valve location.)



If a rollback is used to load or unload the **MARKLIFT**. Use a winch and attach chain or strap through the tie down eye on front of unit.

When securing the **MARKLIFT** for transport make sure to attach the chain or strap through front and rear tie down eyes. Do not chain or strap the unit over the platform or guard rails.



All **MARKLIFTS** are tested and operated to assure proper operating condition before shipment.

At this time, all necessary adjustments are made and an overall physical inspection is conducted. After the unit is delivered, some minor adjustments and inspections must be made before putting the unit into service.

The following should be reviewed:

**1. Check electric power units.**

- A. Electric Power
- B. Battery Water Level
- C. Battery Specific Gravity Readings
- D. Battery Charger
- E. Battery Connections

**2. Check electrical system.**

After the key in the ground control box has been turned on, move the selector switch to aerial position, enter platform, attach safety chains, flip back red emergency switch guard, turn on power switch to activate aerial controls and warning devices.

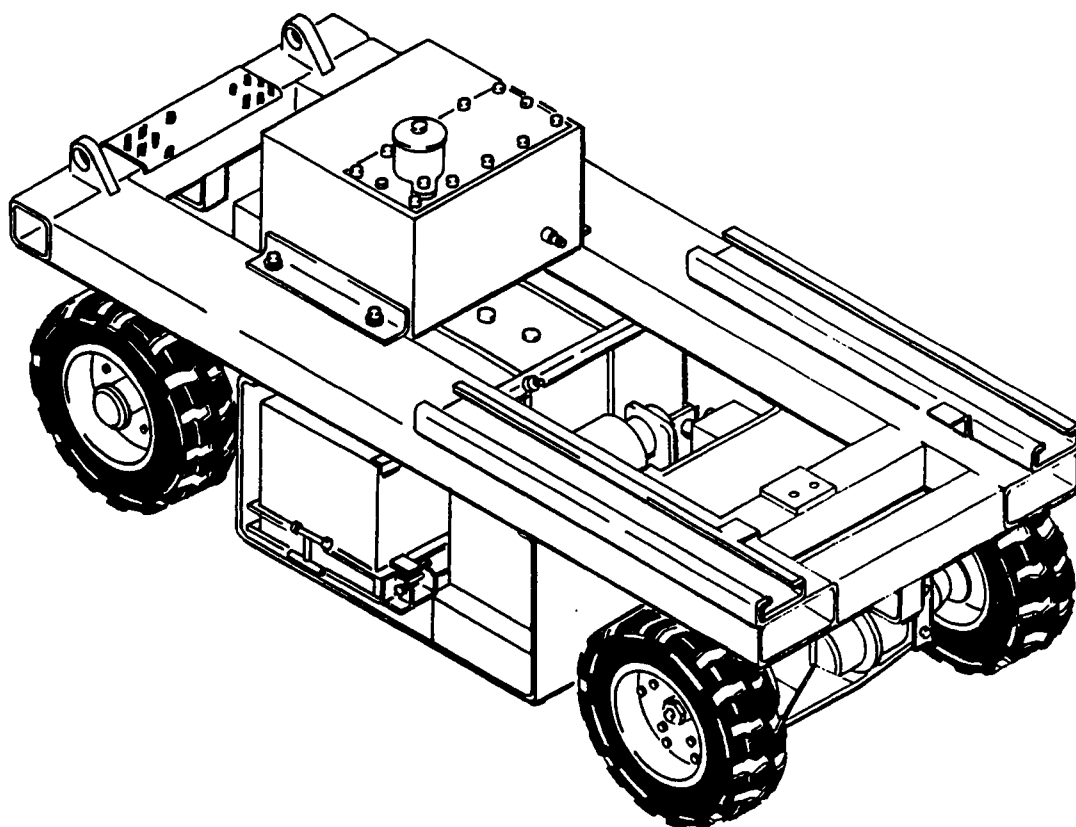
- A. Test drive: Forward and Reverse
- B. Test steer: Left and Right
- C. Test lift: Up and Down

**3. Inspect all electrical connections.**

- A. See
- B. Feel
- C. Tighten

**4. Check hydraulic system.**

- A. Hydraulic fluid level
- B. Filter on top of tank
- C. Hydraulic lines
- D. Hydraulic pump
- E. Hydraulic cylinders



5. Check tires and wheels.
  - A. For cuts
  - B. Wheel spindle nuts and cotter pins in place
6. Structural connections and fittings.
  - A. Check all nuts and bolts for tightness.
7. Brake
  - A. Check for holding on incline up to four (4) degrees.



Every operator of the **MARKLIFT** must read, understand and follow the safety rules set forth herein.

1. The **MARKLIFT** self-propelled aerial work platform is a personnel lifting device, and it is essential that it be properly maintained and operated to perform all functions with maximum safety and efficiency.
2. The operation of any new and unfamiliar equipment can be hazardous in the hands of untrained operators. Only trained operators must be assigned to operate the **MARKLIFT**.
3. It is the responsibility of the operator to read and understand this manual and to follow all recommendations made. Never exceed manufacturer's recommended platform load capacity.
4. Although the **MARKLIFT** conforms to specified **ANSI & OSHA** requirements, it is the responsibility of the owner to instruct the operators with safety requirements made not only by **MARK INDUSTRIES**, but by the various safety boards in your area, as well as requirements set forth by **ANSI & OSHA**.
5. The **MARKLIFT** is a non-insulated personnel carrier and **must not** be operated within 10 feet of a 50,000 volt line. (See page 10 & 11 articles.)
6. Remember, the load capacity of the **MARKLIFT** is total combined weight of personnel and tools, fixtures, accessories, etc.
7. Always distribute load evenly over platform floor area.
8. The **MARKLIFT** platform is equipped with safety belt rings. A body belt for **each person must be worn attached** with lanyard to anchor points provided.
9. It is recommended that head gear (hard hats) be worn by all personnel in the work platform.
10. Under no circumstances should horseplay be tolerated.



11. The **MARKLIFT** structure must not be used as a welding ground. Disconnect both battery leads prior to performing any welding operations.
12. **DO NOT** lean over platform guard railings to perform work.
13. **DO NOT** use ladders or scaffolding on the platform to obtain greater height.
14. Battery sulphuric acid can cause a **serious burn**. Flush away acid with water as soon as possible.
15. Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture **can explode** if frames or sparks are near battery vents.
16. **DO NOT** store loose material in the work platform such as pipe, rope, extension cords, wire or miscellaneous boxes. If necessary to store such items, they must be positioned in such a way that no one will trip over them when operating or working in the platform.
17. **DO NOT** alter equipment in any fashion.
18. **DO NOT** override any hydraulic, mechanical, or electrical safety devices.
19. **DO NOT** drive on uneven, sloping or soft terrain, as this is hazardous and must be avoided. The **MARKLIFT** must not be operated on more than a 5 degree out-of-plumb condition.
20. **DO NOT** work on platform if your physical condition is such that you feel dizzy or unsteady in any way.
21. **DO NOT** jump start other vehicles using **MARKLIFT** battery.
22. Monitor batteries during charging.  
**DO NOT** allow batteries to overcharge and boil.
23. When machine is not in use, remove key from ground control box to prevent unauthorized use.
24. When working under elevated platform always remember to raise the **Safety Support Arm**, (See Chapter Part, Section 4, Figure 1A, 1B or 1C for location) to prevent accidental descent.



TITLE 8 DIVISION OF INDUSTRIAL SAFETY  
(Register 73, No. 30--7-28-73)

358.38.113

### Article 86. Provisions for Preventing Accidents

#### Article 86. Provisions for Preventing Accidents Due to Proximity to Overhead Lines

2946. Provisions for Preventing Accidents Due to Proximity to Overhead lines. (a) General. No person, firm, or corporation, or agent of same, shall require or permit any employee to perform any function in proximity to energized high-voltage lines; to enter upon any land, building, or other premises and thereto engage in any excavation, demolition, construction, repair, or other operation; or to erect, install, operate, or store in or upon such premises any tools, machinery, equipment, materials, or structures (including scaffolding, house moving, well drilling, pile driving, or hoisting equipment) unless and until danger from accidental contact with said high-voltage lines has been effectively guarded against.

(b) Clearances or Safeguards Required. Except where electrical distribution and transmission lines have been de-energized and visibly grounded or effective barriers have been erected to prevent physical and arcing contacts with the high-voltage lines, the following provisions shall be met:

(1) Over Lines. The operation, erection, or handling of tools, machinery, apparatus, supplies, or materials, or any part thereof, over energized high-voltage lines shall be prohibited.

(2) Equipment and Materials in Use. The operation, erection, or handling of tools, machinery, equipment, apparatus, materials, or supplies, or any part thereof within the minimum clearances from energized lines set forth in Table X shall be prohibited.

Table X  
Required Clearances from Overhead High-Voltage Lines

Nominal voltage (Phase to Phase)	Minimum Required Clearance (Feet)
750 - 50,000	10
over 50,000 - 75,000	11
over 75,000 - 125,000	13
over 125,000 - 175,000	15
over 175,000 - 250,000	17
over 250,000 - 370,000	21
over 370,000 - 550,000	27
over 550,000 - 1,000,000	42

(3) Transportation or Transit. The transportation or transit of any tool, machinery, equipment, or apparatus, or the moving of any house or other building in proximity to overhead high-voltage lines shall be expressly prohibited if at any time during such transportation or transit such tool, machinery, equipment, apparatus, or building, or any part thereof, can come closer to high-voltage lines than the minimum clearances set forth in Table Y.



**Article 86. Provisions for Preventing Accidents**

Except where the boom of boom-type equipment is lowered and no load is imposed thereon, the equipment in transit shall conform to the minimum required clearances set forth in Table X.

Table Y  
Required Clearances from Energized High-Voltage Conductors  
(While in Transit)

Nominal Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
750 - 50,000	6
over 50,000 - 345,000	10
over 345,000 - 750,000	16
over 750,000 - 1,000,000	20

(4) Storage. The storage of tools, machinery, equipment, supplies, materials, or apparatus under, by, or near energized high-voltage lines is hereby expressly prohibited if at any time during such handling or other manipulation it is possible to bring such tools, machinery, equipment, supplies, materials, or apparatus, or any part thereof, within the minimum required clearances from high-voltage lines as set forth in Table X.

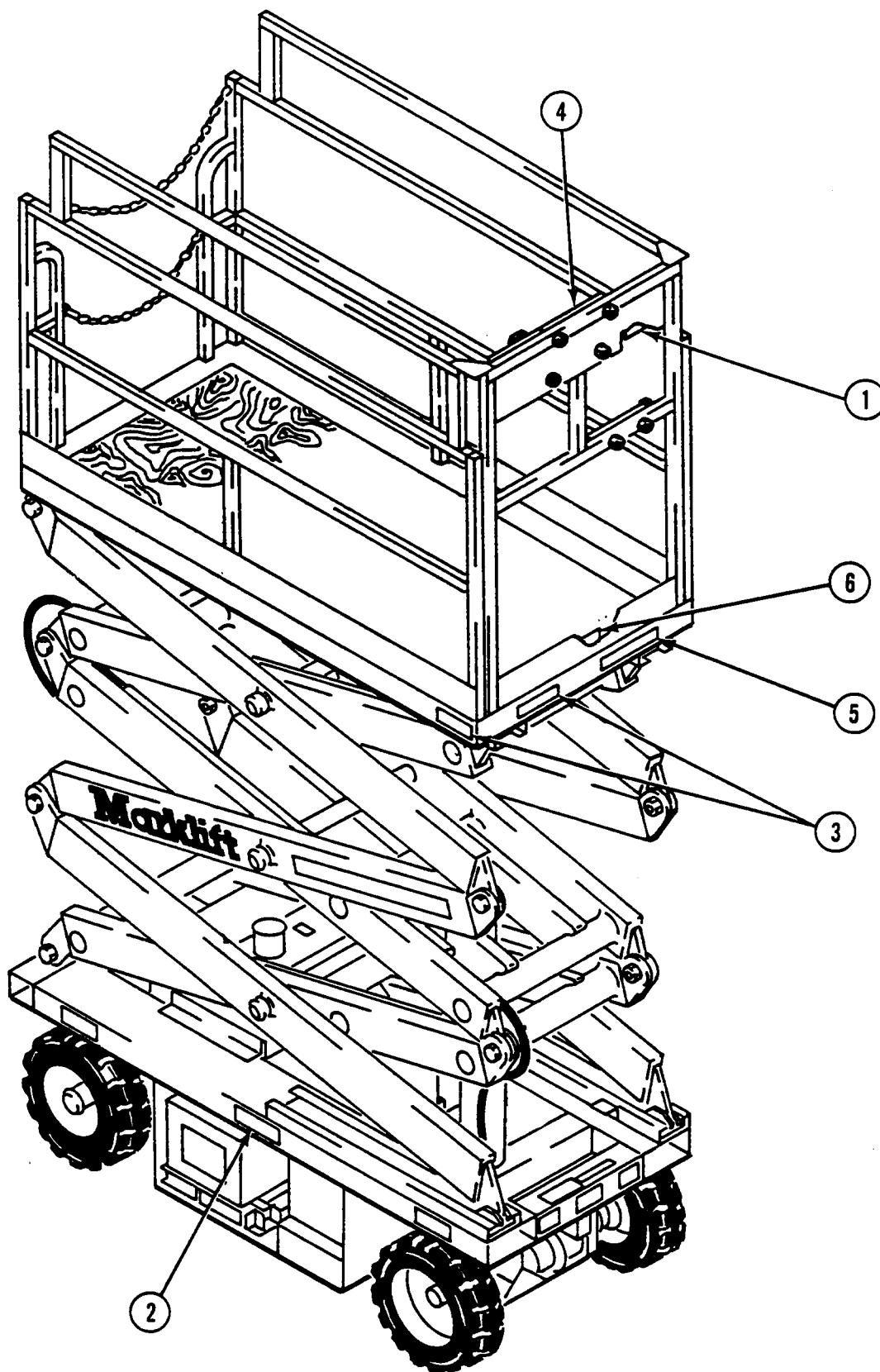
(c) The specified clearance shall not be reduced by movement due to any strains impressed (by attachments or otherwise) upon the structures supporting the high-voltage line or upon any equipment, fixtures, or attachments thereon.

(d) Insulated cage-type boom guards, boom stops, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the required clearances set forth in Table X.

(e) Any overhead conductor shall be considered to be energized unless and until the person owning or operating such line verifies that the line is not energized, and the line is visibly grounded at the work site.

2947. Warning Signs Required. The owner, agent, or employer responsible for the operations of equipment shall post and maintain in plain view of the operator and driver on each crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver, or similar apparatus, a durable warning sign legible at 12 feet reading: "Unlawful To Operate This Equipment Within 10 Feet of High-Voltage Lines of 50,000 Volts Or Less."

In addition to the above wording, the following statement in small lettering shall be provided on the warning sign: "For Minimum Clearances of High-Voltage Lines In Excess of 50,000 Volts, See Article 86, Title 8, High-Voltage Electrical Safety Orders."



**OPERATION INSTRUCTIONS****BE SURE TO USE ALL SAFETY EQUIPMENT, AS REQUIRED BY O S H A**

- ① **TURN POWER SWITCH AT GROUND CONTROL STATION TO "ON" POSITION SELECTOR. SWITCH TO "AERIAL", THEN ENTER PLATFORM. ATTACH SAFETY CHAINS AFTER ENTERING PLATFORM! PULL EMERGENCY ON/OFF SWITCH OUT. TO ACTIVATE AERIAL CONTROLS AND WARNING DEVICES.**

- ② **FORWARD OR REVERSE DRIVE**  
ROTATE SWITCH CLOCKWISE FOR REVERSE LOW SPEED AND HIGH SPEED.  
ROTATE SWITCH COUNTER CLOCKWISE FOR FORWARD LOW SPEED AND HIGH SPEED.

- ③ **TO STEER MACHINE**  
PUSH TOGGLE SWITCH LEFT OR RIGHT.

- ④ **TO RAISE OR LOWER PLATFORM**  
PUSH LIFT SWITCH UP OR DOWN.

- ⑤ **WARNING LIGHT**  
WHEN LIGHT IS ON, MACHINE IS IN AN UNSAFE OUT OF LEVEL CONDITION, AND THE PLATFORM WILL LOWER AUTOMATICALLY IF NOT EXTENDED.

IT IS THE OPERATOR'S RESPONSIBILITY TO READ AND UNDERSTAND THE OPERATION & SAFETY HANDBOOK AND ALL DECALS BEFORE USING THIS MACHINE!

MARK INDUSTRIES



130801

**— WARNING —**

DO NOT WORK UNDERNEATH THIS LIFT  
UNLESS IT IS MECHANICALLY LOCKED.

**LOAD CAPACITY      LBS.**  
**(EVENLY DISTRIBUTED LOAD)**

**CAUTION** UNLAWFUL TO OPERATE THIS EQUIPMENT  
WITHIN 10 FEET OF HIGH VOLTAGE LINES **CAUTION**

**CAUTION** **GUARD RAILS ARE FOR YOUR SAFETY**  
**DO NOT REMOVE** **CAUTION**  
OPERATING THIS MACHINE WITHOUT GUARD RAILS  
COULD RESULT IN DEATH OR SERIOUS INJURY

**ATTACH SAFETY CHAINS**  
**BEFORE RAISING PLATFORM**

It shall be the responsibility of all **MARKLIFT** operators to read, understand and comply with the following operating instructions. They are designed to promote safety and a better understanding of the operation of the self-propelled aerial platform. (See Chapter Parts, Section 2, Figure 3A, 3B or 3C for location of aerial control box and Section 3, Figure 7A, 7B or 7C for location of ground control box.)

## 1. STARTING

The Marklift should be started from the ground control station. Before the aerial or ground control boxes will function the keyed master switch at the ground control box must be turned on.

### A. GROUND CONTROL

The only functions that can be operated from the ground control station are ON/OFF, RAISE/LOWER and extend platform.

### B. AERIAL CONTROL

Turn power switch at ground control station to ON, position selector switch to AERIAL, then enter platform. First, **ATTACH SAFETY CHAINS BEFORE RAISING PLATFORM.** Pull out the red emergency ON/OFF button located in the center of the aerial control station. Your **MARKLIFT** is now operational.

## 2. STEERING

Steering the **MARKLIFT** is done only from the aerial control station. By pushing the steering toggle switch to the left, the front wheels will turn left. Pushing the switch to the right, the front wheels will turn to the right. The steering switch is a momentary switch that automatically centers itself to the off position when released. The front steering wheels will stay at the angle they were left, until the steering switch is moved in the opposite direction.



### 3. EXTENDING PLATFORM

Platform extending toggle switch, is located on the face of the aerial control box (upper center). Platform may be extended forward or reverse, by pushing extend platform toggle switch in direction desired.

When **yellow extend platform light** is on, platform is extended. Drive and descent are inactive.

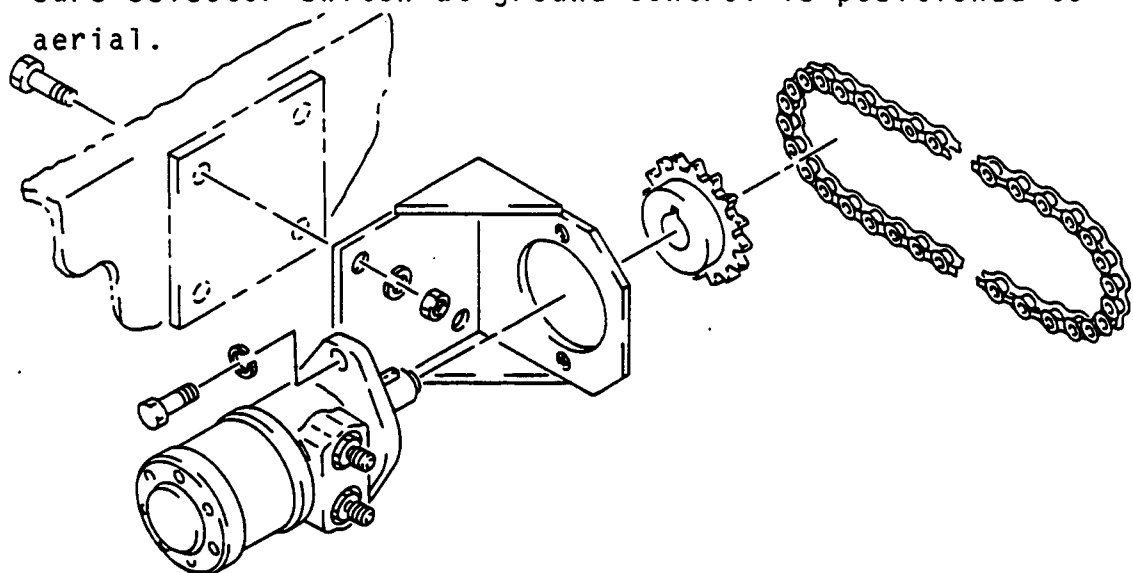
If the operator has platform extended and needs to descend, push down and hold **emergency down switch**, the push lift switch down.

Use caution when lowering platform in extended mode! Remember to **check below extended platform before using emergency down switch**, to avoid damage to anything underneath.

### 4. LIFT

To raise or lower platform from ground control, push lift switch up or down. The lift switch at ground control box is a momentary switch that will return to center (stop) position when released. The platform will remain stationary when switch is released.

To raise or lower platform from aerial control, first be sure selector switch at ground control is positioned to aerial.



**5. DRIVE**

Forward and reverse drive is done from the aerial control box only. The machine is capable of three speeds for both forward and reverse drive: Low speed, high speed, and creep speed. Low and high speed drive are activated by a rotary switch.

Turn switch to the **right for reverse** low or high speed.  
Turn switch to the **left for forward** low or high speed.

**A. CREEP SPEED**

Creep speed will automatically cut-in when the platform is raised over one half of its rated height.

**6. OUT OF LEVEL WARNING LIGHT (red)**

As a safety feature this machine is equipped with an out of level sensor that will cut-out the lift circuit whenever the unit is in an unsafe out of level condition.

An unsafe condition consists of a tilt of three (3) degrees side and six (6) degrees forward and aft. If the platform is already in the down position, it cannot be raised. This unsafe condition is indicated by a red warning light located in the top center of the control box. When light is on the platform will lower automatically, if not extended.

**7. WARNING HORN (option)**

For some industrial applications, and to meet certain safety requirements, a warning horn may be needed. The warning horn option on the Marklift can be used as an automatic movement indicator, or manually activated, as required. The horn is activated by a 3-position switch on the aerial control box. The middle position is off. When the switch is positioned auto the horn will sound when the drive or lift function is activated (forward and reverse, up and down).

**8. FREEWHEELING**

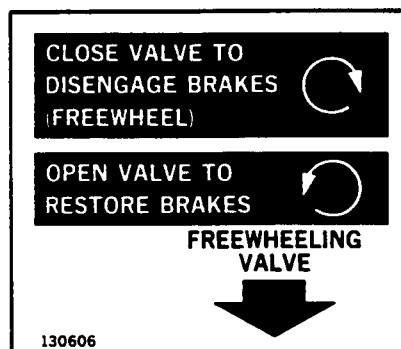
In order to move the machine in a freewheeling condition for loading, unloading and positioning, the Marklift may be freewheeled for very short distances at no greater than 5 mph.

When preparing for freewheeling, make sure machine is on a level surface!

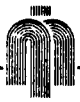
Brake is disengaged by closing the freewheeling valve and momentarily activating rotary drive switch.

Use caution when brakes are disengaged!

**Always remember to open freewheeling valve to restore braking.**



When preparing for freewheeling, make sure machine is on a level surface!



To properly and efficiently service your **MARKLIFT**, several basic tools are required. The following list of tools should be available.

1. Volt/OHM meter.
2. Hydraulic pressure gauge.  
(0-1,000 PSI and 0-3,000 PSI)
3. Female quick disconnect couplet  
(Part number: 842)
4. Battery hydrometer.
5. Battery load tester.
6. Standard mechanics hand tools.
7. Scissor arm supports.
8. Electrical test light.

**Mark Industries**205 South Puente Street, Brea, California 92621  
P.O. Box 2255, Brea, California 92622





MILESTONE			HYDRAULIC FLUID TABLE			
OIL COMPANY			CHEVRON	GULF	SHELL	UNION
BRAND NAME			ATF Dexron 11	ATF Dexron 11	Donaz-T6	ATF Dexron
VISCOSITY	SUS AT 100 <sup>0</sup> F (37.8 <sup>0</sup> C)		187.4	195	200	200
	SUS AT 210 <sup>0</sup> F (98.9 <sup>0</sup> C)		49.2	50.4	50	52.3
	INDEX	<sup>0</sup> F	153 <sup>0</sup>	155 <sup>0</sup>	160 <sup>0</sup>	172 <sup>0</sup>
		<sup>0</sup> C	67.2 <sup>0</sup>	68.3 <sup>0</sup>	71.1 <sup>0</sup>	77.8 <sup>0</sup>
FLASH POINT		<sup>0</sup> F	400 <sup>0</sup>	405 <sup>0</sup>	390 <sup>0</sup>	395 <sup>0</sup>
		<sup>0</sup> C	204.4 <sup>0</sup>	207.2 <sup>0</sup>	198.9 <sup>0</sup>	201.7 <sup>0</sup>
POUR POINT		<sup>0</sup> F	-40 <sup>0</sup>	-50 <sup>0</sup>	-50 <sup>0</sup>	-45 <sup>0</sup>
		<sup>0</sup> C	-40 <sup>0</sup>	-45.6 <sup>0</sup>	-45.6 <sup>0</sup>	-42.8 <sup>0</sup>



A new fully charged battery will have a specific gravity of 1.260 or 1.280 at 80°F.

The tables (on Maintenance page 4) show the specific gravity as a function of percentage battery charge

1.260 Sp. Gr.	1.280	100% charged
1.230	1.250	75% charged
1.200	1.220	50% charged
1.170	1.190	25% charged
1.40	1.160	Very little useful capacity
1.110	1.130	Discharged

The percentage charge of a battery should be checked with a good hydrometer that has a thermometer and temperature correction scale built into it. This allows a temperature correction to be made readily. A correction of 0.04 points in gravity shall be made for each ten degrees either above or below 80°F. For every 10°F below 80°F, subtract 0.04 points; and for every 10°F above 80°F, add 0.04 points.

Within every thirty day period, the cell of each battery should be checked to determine the percentage charge. If any cell has a hydrometer reading of more than 0.020 less than the other cells in the battery, that cell is bad and the battery should be removed from service.

Periodic checks by hydrometer after charging, but prior to any discharge, is recommended to determine if batteries are receiving a full charge.

Either excessive overcharge or moderate undercharge can shorten battery life.



With proper attention to water level and charging time, compared to hydrometer reading, the batteries should give a long useful life.

### TEMPERATURE/SPECIFIC GRAVITY CORRECTION TABLE FOR BATTERIES

Actual Hydrometer Reading at Actual Temperature\*

80°F (27°C)	0°F (-18°C)	-10°F (-23°C)	-20°F (-29°C)	-30°F (-34°C)	-45°F (-43°C)	-65°F (-54°C)	Approx. State of Charge In %
1.280	1.312	1.316	1.320	1.324	1.330	1.338	100
1.250	1.282	1.286	1.290	1.294	1.300	1.308	75
1.220	1.252	1.256	1.260	1.264	1.270	1.278	50
1.190	1.222	1.226	1.230	1.234	1.240	1.248	25
1.160	1.192	1.196	1.200	1.204	1.210	1.218	0

Specific Gravity  
Corrected to 80°F (17°C)

Freezing Temperature

1.280	-90°F	-68°C
1.250	-62°F	-52°C
1.200	-16°F	-27°C
1.150	+ 5°F	-15°C
1.000	+19°F	- 7°C

**INTRODUCTION**

Whenever trouble shooting any problem the initial consideration must be to **"Check the basics."**

Check the basics, means to insure that the batteries are in good shape, and have **at least a three quarter charge**, determined by use of a hydrometer, and battery maintenance instructions (see Maintenance page 3 and 4.) A large percentage of electrical problems can be attributed to insufficiently charged or defective batteries.

**ELECTRICAL**

1. If problem seems to be electrical, use your Schematic, (see Chapter Schematic) and test light to trace power flow (electrical current) starting at battery and continuing through system until the problem is located.
2. Keep in mind, if you do not have a good ground to a valve coil, relay, etc., then even if you have proper electrical current to the coil or relay, the item will not function properly.
3. Diodes can be thought of as **"One way electrical check valves"** they permit current flow in one direction and stop it in the opposite direction.
4. The basic purpose of a relay is to maintain full electrical current. When sending an electrical signal to the relay coil, the electrical current flows through relay contacts and to the desired valve coil.

**HYDRAULIC**

1. For the various functions the system pressure is utilized. If a slower drive speed is needed, a portion of the hydraulic fluid is dumped to tank by low speed valve.
2. Directional valves (Steering and Drive) have two opposite electrical coils with a moveable spool between the coils.
3. One way valves (Lift, Descent, Dump, Creep) can be both N/C (Normally Closed) or N/O (Normally Open) depending if flow is desired or not.

**STEERING**

1. **Steers in one direction only.**
  - A. Loose electrical connection.
  - B. Loss of ground to coil on affected direction.
  - C. Spool sticking in one direction.
  - D. Faulty thumb rocker switch.

**DRIVE**

1. **Will drive forward. No reverse.**
  - A. Loose electrical connection in reverse circuit.
  - B. Faulty drive controller.
  - C. Valve spool sticking in one direction.
2. **No forward or reverse drive.**
  - A. Faulty drive controller.
  - B. Batteries require charging.
  - C. Valve sticking.
3. **No functions working.**
  - A. Faulty circuit breaker.
  - B. Loose power connections.
  - C. Power relay inoperative (electric machines only).
4. **No system pressure.**
  - A. No hydraulic oil.
  - B. Hydraulic tank valve is in OFF position.
  - C. Loose electrical connections in dump circuit.
  - D. Batteries require charging.
  - E. Relief valve inoperative.
  - F. Pressure relief valve inoperative.
  - G. Hydraulic pump inoperative.



5. **Low system pressure.**
  - A. Pressure relief valve out of adjustment.
  - B. Relief valve faulty.
  - C. Hydraulic pump faulty.
  - D. Hydraulic tank sump filter obstructed.

**LIFT**

1. **Will not lift. All other functions work.**
  - A. Low batteries.
  - B. Loose electrical connections.
  - C. Faulty lift controller.
  - D. Tilt switches out of adjustment.
2. **Will not lift rated load.**
  - A. Low system pressure.
  - B. Low batteries.
  - C. Internal seal leaking in cylinder.

If this trouble shooting check list does not help to solve your problem, contact your local **MARKLIFT** representative or the **MARK INDUSTRIES** service department.



Mark Industries

ILLUSTRATED  
PARTS CATALOG

MAINTENANCE CHECK LIST

MAIN  
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MODEL : \_\_\_\_\_ DATE SOLD \_\_\_\_\_  
SER. NO. : \_\_\_\_\_ WARRANTY PERIOD \_\_\_\_\_  
DATE IN SERVICE \_\_\_\_\_ OPTIONS \_\_\_\_\_

CODE :  
C-CHECKED N-NEW PART  
A-ADJUSTED X-MILES  
R-REPAIRED REPAIR

DATE	W.O.	MECH.	HR METER	PREVENTIVE MAINT.	ELECTRICAL	HYDRAULIC	FUEL	STEER	TIRE MAJ.	MISC.
				OIL CHANGE						
				AIR FILTER						
				HYDRAULIC OIL CHANGE						
				HYDRAULIC OIL CHANGE						
				DRIVE BEARING PACK						
				PUMP MOTOR						
				ELECTRICAL BRUSHES						
				TRANS & DIFF CONTROLS						
				TUNE UP SPARK PLUGS						
				VOLTAGE REGULATOR						
				BATTERY						
				STARTER						
				POINTS AND CONDENSER						
				LEV CYL						
				HYD CYL SEALS						
				AND CONTROL VALVE						
				STAMPY VALVE						
				LEFT ANTILOCK						
				AND HOSES						
				FUEL SYS						
				STEERING PUMP						
				STEERING HOSES						
				STEERING SHAR						
				DRIVE CYL						
				STEER TIRE						
				STEER TIRE						
				DRIVE O/H						
				DRIVE AXLE O/H						
				SPARKS						

DATE	REMARKS	DATE	REMARKS	AGENCY

**Mark Industries**ILLUSTRATED  
PARTS CATALOG**MARKLIFT SERVICE MAINTENANCE RECORD**MAIN  
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MODEL: \_\_\_\_\_ SERIAL NO. \_\_\_\_\_  
DATE: \_\_\_\_\_ EQUIP. NO. \_\_\_\_\_  
LOCATION: \_\_\_\_\_ MECHANIC: \_\_\_\_\_

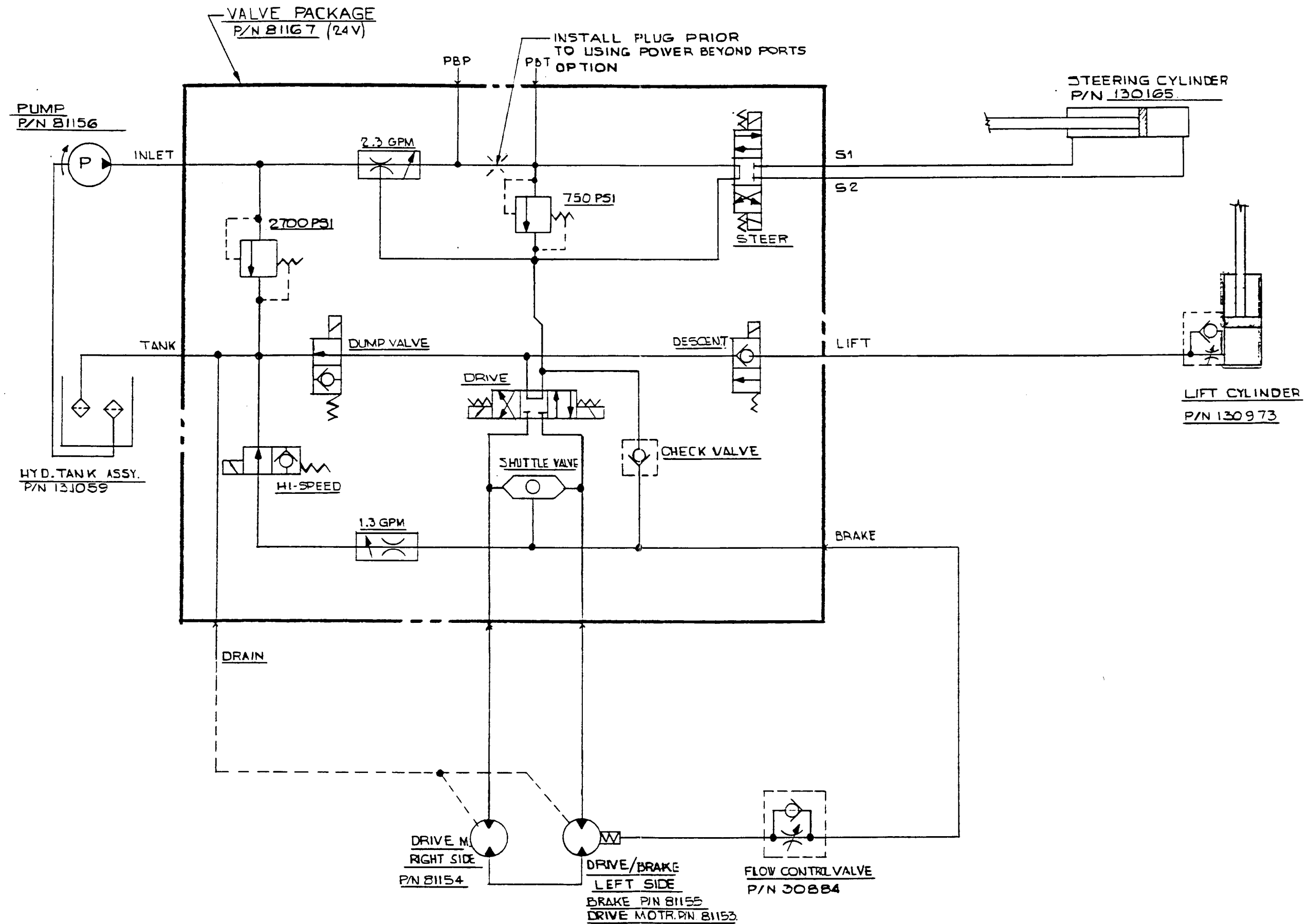
ITEM	CODE	COMMENTS	ITEM	CODE	COMMENTS
ENGINE OIL			SAFETY CUT-OUTS		
ENGINE OIL FILTER			BUSHINGS		
AIR FILTER			ROLLERS		
FUEL FILTER			WEAR PAD		
TUNE-UP			FRONT END ASSY.		
CHOKE			TIRE PRESSURE		
ENGINE RPM			TIRE CONDITION		
CHARGING SYSTEM			WHEEL NUTS		
FUEL SYSTEM LPG-GAS			WHEEL BEARING		
BATTERIES			NUTS & BOLTS		
BATTERY TERMINALS			GUARD RAILS		
MOTOR BRUSHES			LUBRICATION		
HYDRAULIC FLUID			WARNING DECALS		
HYD. OIL FILTER			OPERATION INSTRUCTIONS		
HYDRAULIC SYSTEMS			GENERAL DECALS		
HYDRAULIC PRESSURE			PAINT		
HYDRAULIC HOSES			ALL OPERATIONS		
CYLINDERS			LIFT		
DRIVE MOTORS			STEERING		
BRAKES			FORWARD DRIVE		
EMERGENCY LOWERING VALVE			REVERSE DRIVE		
AERIAL CONTROL BOX			TILT SWITCHES		
GROUND CONTROL BOX			FUEL LEVEL		
RELAYS			LITERATURE		
WIRE CONNECTIONS			OPTIONS		

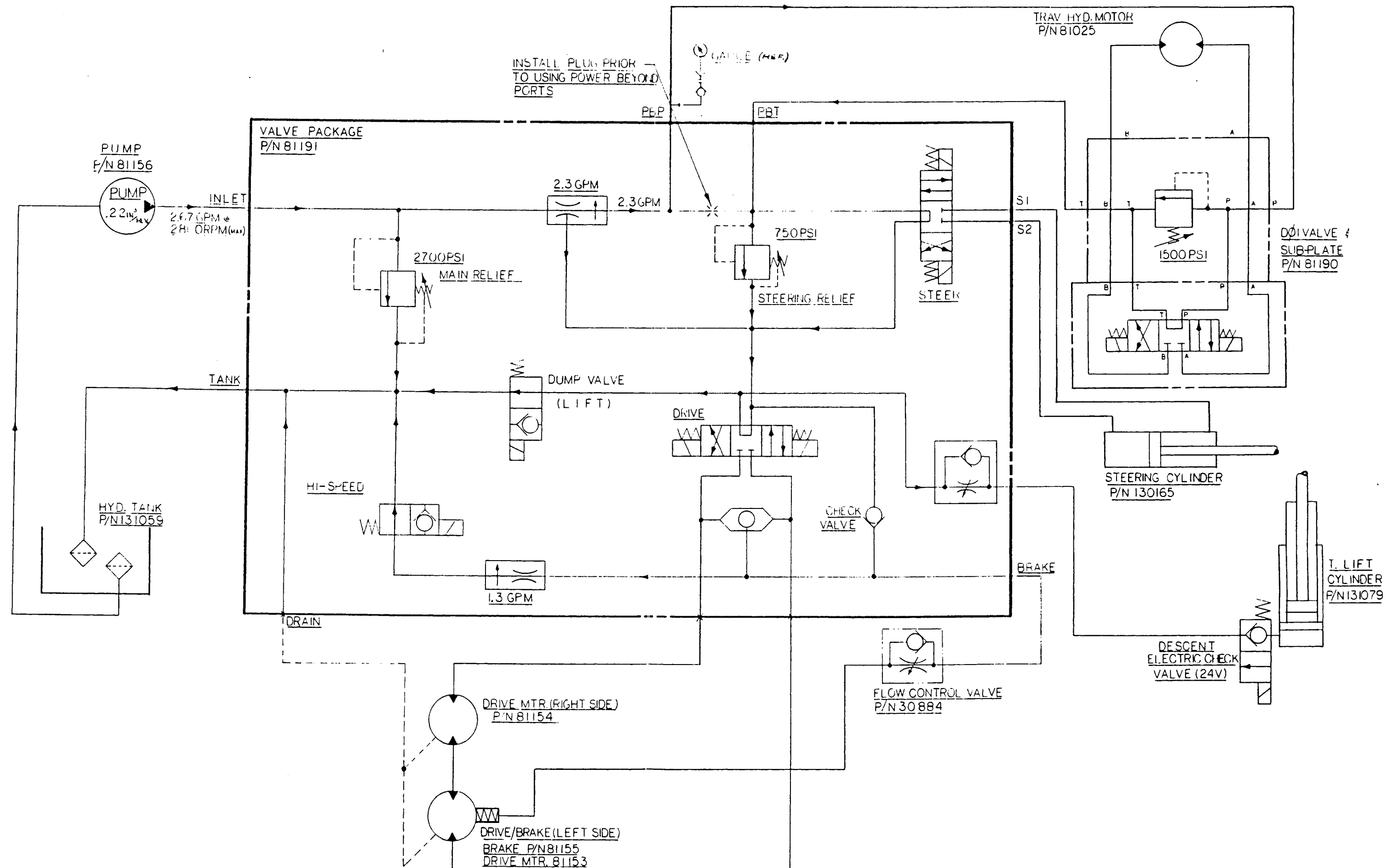
**CODE**

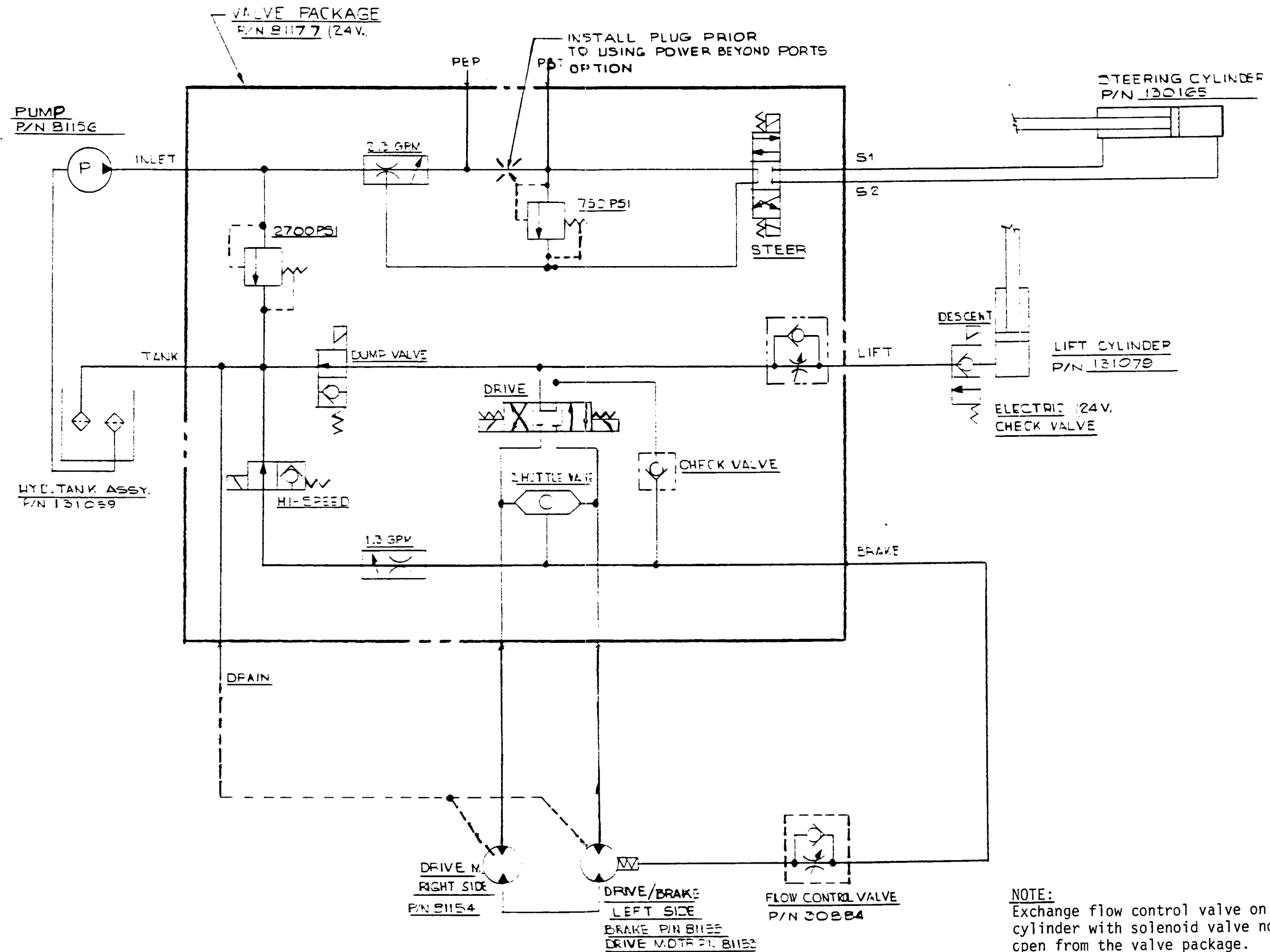
F - FILLED  
R - REPAIRED  
C - CHECKED  
A - ADJUSTED  
X - NEEDS REPAIR

**OTHER COMMENTS:**

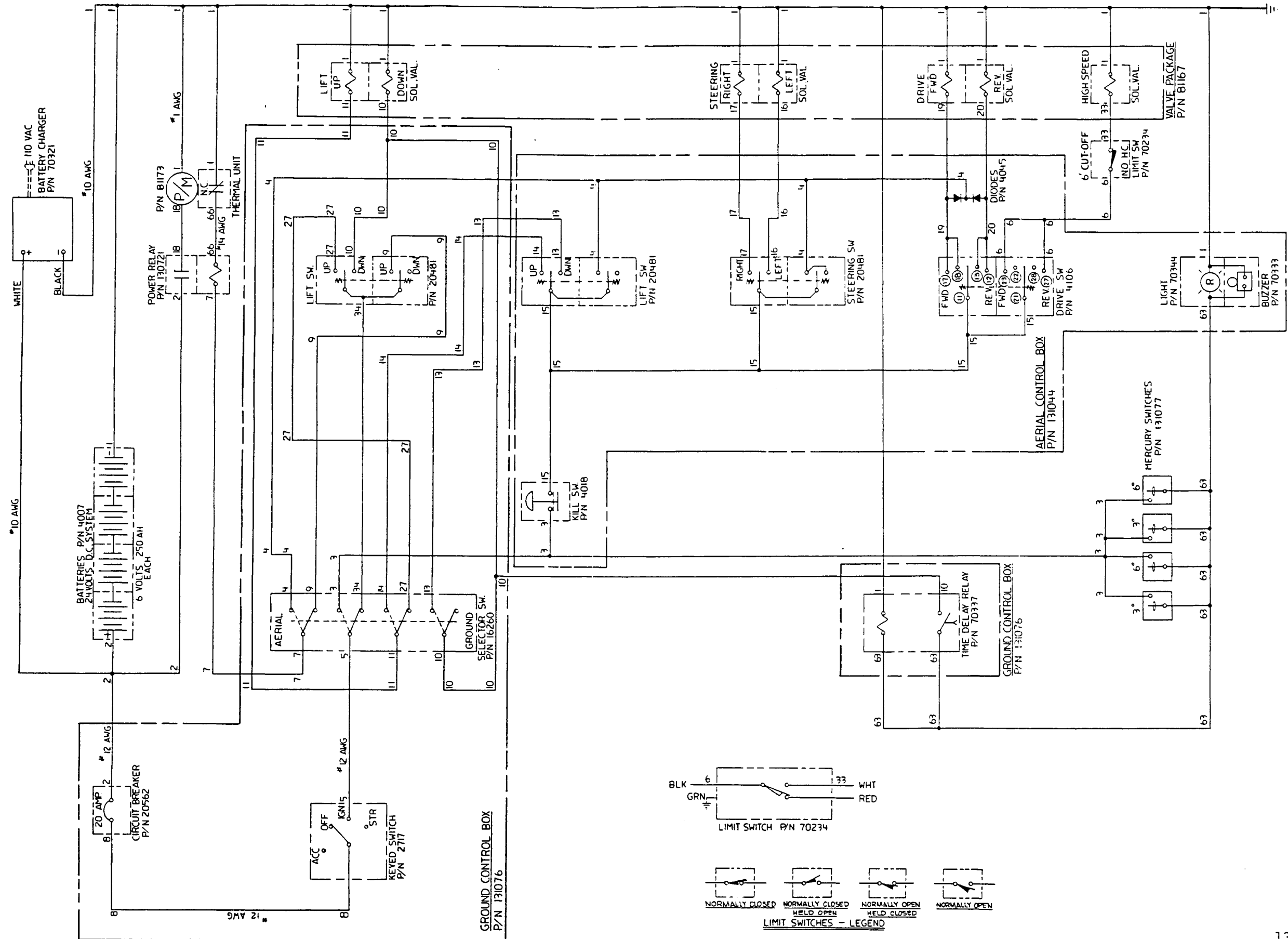


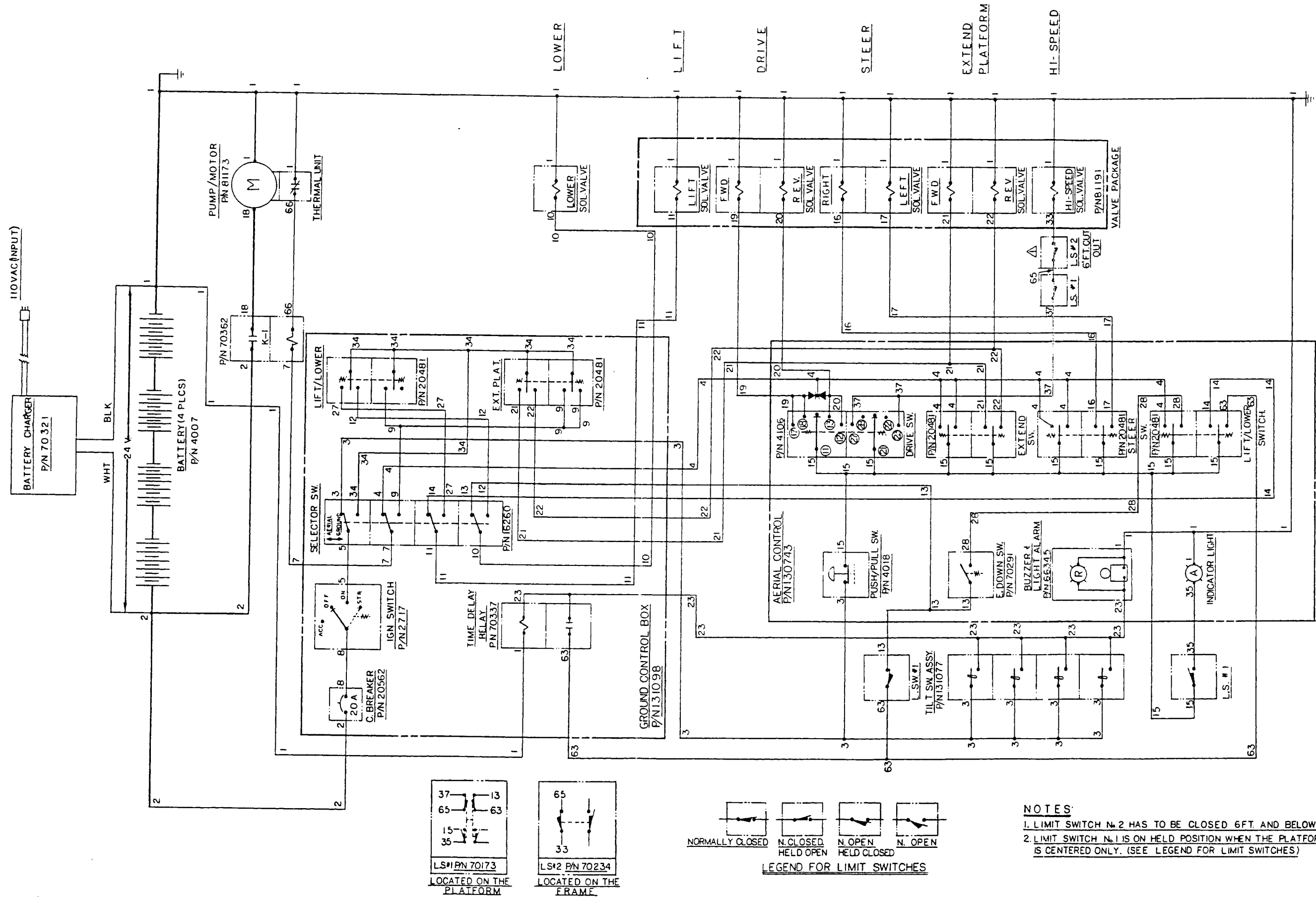



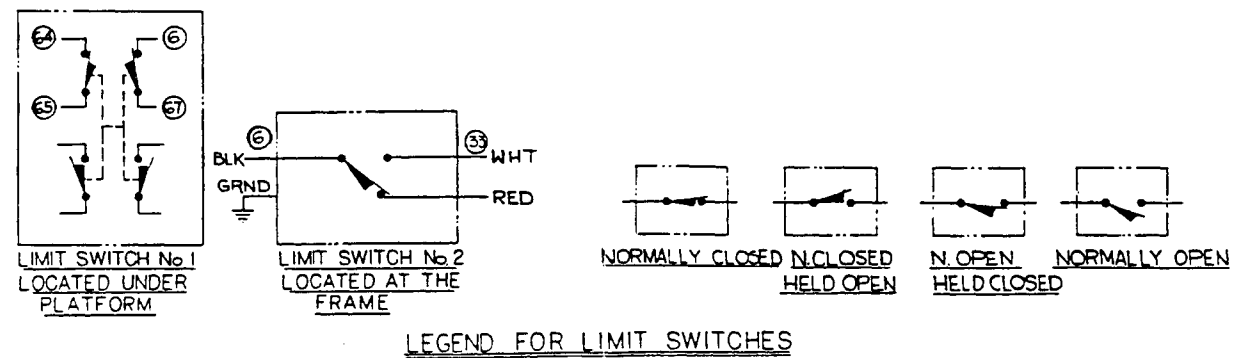
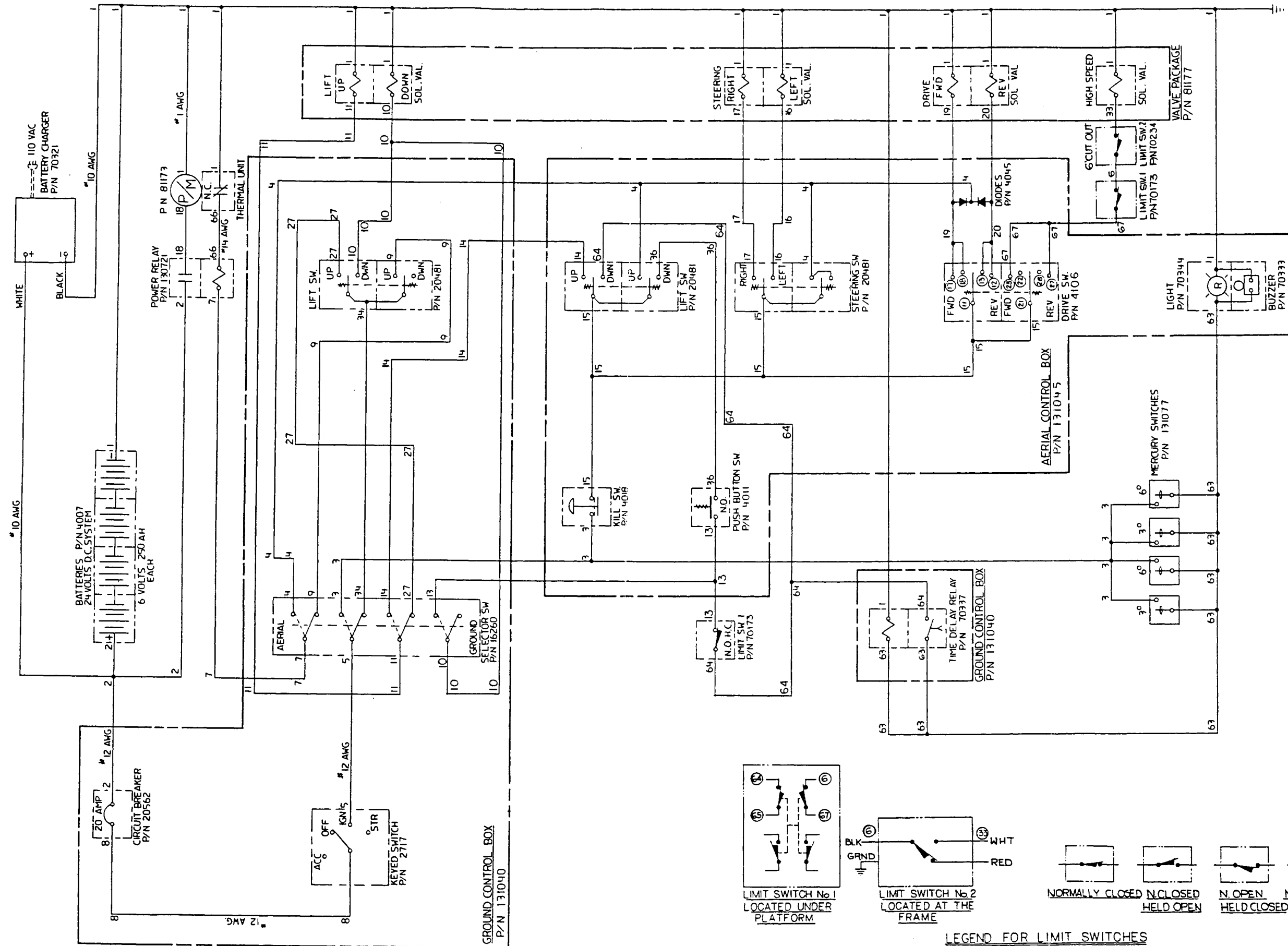




NOTE:  
Exchange flow control valve on the lift  
cylinder with solenoid valve normally  
open from the valve package.









THIS PARTS CHAPTER IS DESIGNED AS:

**SECTION 1 MARKLIFT PART CHAPTER**

FIGURE 1 HOW TO ORDER PARTS

FIGURE 2 HOW TO USE PARTS CATALOG

**SECTION 2 MARKLIFT FINAL ASSEMBLIES**

FIGURE 1A M-15 FINAL ASSEMBLY

FIGURE 1B M-15T FINAL ASSEMBLY

FIGURE 1C M-15EP FINAL ASSEMBLY

FIGURE 2A M-15 AND M-15EP HYDRAULIC HOSE INSTALLATION

FIGURE 2B M-15T HYDRAULIC HOSE INSTALLATION

FIGURE 3A M-15 UPPER CONTROL BOX ASSEMBLY

FIGURE 3B M-15T UPPER CONTROL BOX ASSEMBLY

FIGURE 3C M-15EP UPPER CONTROL BOX ASSEMBLY

**SECTION 3 MARKLIFT FRAME ASSEMBLIES**

FIGURE 1A M-15 FRAME ASSEMBLY

FIGURE 1B M-15T FRAME ASSEMBLY

FIGURE 1C M-15EP FRAME ASSEMBLY

FIGURE 2 MOTOR DRIVE ASSEMBLY

FIGURE 3 MOTOR DRIVE AND PARKING BRAKE ASSEMBLY

FIGURE 4 TIE ROD ASSEMBLY

FIGURE 5 STEERING CYLINDER ASSEMBLY

FIGURE 6 HYDRAULIC TANK ASSEMBLY

FIGURE 7A M-15 GROUND CONTROL BOX ASSEMBLY

FIGURE 7B M-15T GROUND CONTROL BOX ASSEMBLY

FIGURE 7C M-15EP GROUND CONTROL BOX ASSEMBLY

FIGURE 8 PUMP MOTOR ASSEMBLY



FIGURE 9A M-15 VALVE PACKAGE ASSEMBLY  
FIGURE 9B M-15T VALVE PACKAGE ASSEMBLY  
FIGURE 9C M-15EP VALVE PACKAGE ASSEMBLY  
FIGURE 10 TILT SWITCH ASSEMBLY  
FIGURE 11 TRAVERSING VALVE ASSEMBLY

**SECTION 4 MARKLIFT SCISSOR ASSEMBLIES**

FIGURE 1A M-15 SCISSOR ASSEMBLY  
FIGURE 1B M-15T SCISSOR ASSEMBLY  
FIGURE 1C M-15 EP SCISSOR ASSEMBLY  
FIGURE 2 SCISSOR SUB-ASSEMBLY  
FIGURE 3A M-15 LIFT CYLINDER ASSEMBLY  
FIGURE 3B M-15T AND M-15EP LIFT CYLINDER ASSEMBLY  
FIGURE 4 INNER ARM SUPPORT ASSEMBLY

**SECTION 5 MARKLIFT PLATFORM ASSEMBLIES**

FIGURE 1A M-15 PLATFORM ASSEMBLY  
FIGURE 1B M-15 T PLATFORM ASSEMBLY  
FIGURE 1C M-15 EP PLATFORM ASSEMBLY  
FIGURE 2 HYDRAULIC MOTOR ASSEMBLY

**SECTION 6 MARKLIFT OPTIONAL ASSEMBLIES**

FIGURE 1 OPTIONS  
FIGURE 2 REMOTE DRIVE KIT  
FIGURE 3 DELUXE BATTERY CHARGER  
FIGURE 4 HOURMETER  
FIGURE 5 P.Q. SLOPE SENSOR  
FIGURE 6 TRAVEL WARNING HORN \*  
FIGURE 7 PROPORTIONAL DRIVE CONTROL \*

\* DRAWINGS NOT AVAILABLE THIS REVISION





Mark Industries

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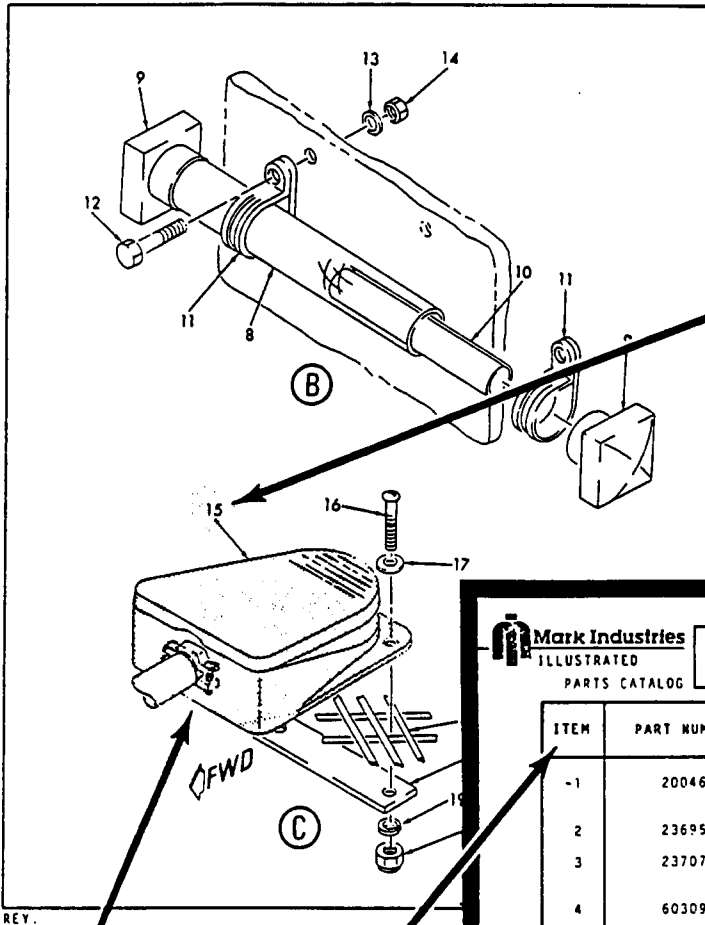
## HOW TO ORDER PARTS

PARTS  
SECT. 1  
FIG. 1  
PAGE 1

Mark Industries  
ILLUSTRATED  
PARTS CATALOG

AERIAL CONTROL BOX, FOOT SWITCH  
AND PLATFORM INSTALLATION (30 4 X 4)  
(CONTINUED)

PARTS  
SECT. 2  
FIG. 2  
PAGE 2



Mark Industries  
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AERIAL CONTROL BOX, FOOT SWITCH  
AND PLATFORM INSTALLATION (30 4 X 4)  
(CONTINUED)

PARTS  
SECT. 2  
FIG. 2  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
-1	20046	ASSEMBLY, FINAL (See Sect. 2, Fig. 1 for NHA)	REF
2	23695	.WELDMENT, PLATFORM 5'	1
3	23707	.ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1
4	60309	.SCREW, CAP (attaching part)	AR
5	61239	.NUT, LOCK (attaching part)	AR
6	65910	.BOLT, SNAP OPEN EYE	4
7	255	.TIE, CABLE	9
8	130927	.CONTAINER, PLASTIC	1
9	65842	.CAP, ANTI-ROLL	2
10	16629	.HANDBOOK, OPERATION SAFETY	1
11	65867	.CLAMP, UMPCO	2
12	60314	.SCREW, CAP (attaching part)	2
13	63401	.WASHER, FLAT (attaching part)	2
14	61239	.NUT, LOCK (attaching part)	2
15	92202	.SWITCH, FOOT	1
16	60314	.SCREW, CAP (attaching part)	2
17	63401	.WASHER, FLAT (attaching part)	2
18	23753	.BACKING PLATE DEADMAN SWITCH	1
19	63301	.WASHER, LOCK (attaching part)	2
20	63701	.NUT, HEX (attaching part)	2

REV.

- ITEM NOT ILLUSTRATED

REV.



1. Finding the Mark Industries Part Number.
  - A. Using the Table of Contents, find the Section and Figure Number. Locate the correct page by referencing these numbers.
  - B. Match the required part to the figure illustration. Note the Item Number.
  - C. Find the Item Number on the part listing that follows the figure.
  - D. Use the Mark Industries Part Number listed next to the Item Number when ordering.
  
2. Ordering: Listed below are the methods of ordering parts. The preferred method of ordering parts is by FAX.
  - A. By FAX: (714) 879-8884
  - B. By Phone: (714) 879-MARK
  - C. By Mail: MARK INDUSTRIES  
ATTENTION: PARTS DEPARTMENT  
P.O. BOX 2225  
BREA, CA. 92622

**Mark Industries**205 South Puente Street, Brea, California 92621  
P.O. Box 2255, Brea, California 92622



Mark Industries

ILLUSTRATED  
PARTS CATALOG

HOW TO USE PARTS CATALOG

PARTS  
SECT. 1  
FIG. 2  
PAGE 1

Mark Industries ILLUSTRATED PARTS CATALOG				PARTS SECT. 2 FIG. 2 PAGE 3
AERIAL CONTROL BOX, FOOT SWITCH AND PLATFORM INSTALLATION (30 4 X 4) (CONTINUED)				
ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.	
	1234567			
-1	20046	ASSEMBLY, FINAL (See Sect. 2, Fig. 1 for NHA)	REF	
2	23695	.WELDMENT, PLATFORM 5'	1	
3	23707	.ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1	
4	60309	.SCREW, CAP (attaching part)	AR	
5	61239	.NUT, LOCK (attaching part)	AR	
6	65910	.BOLT, SNAP OPEN EYE	4	
7	255	.TIE, CABLE	9	
8	130927	.CONTAINER, PLASTIC	1	
9	65842	.CAP, ANTI-ROLL	2	
10	16629	.HANDBOOK, OPERATION SAFETY	1	
11	65867	.CLAMP, UMPCO	2	
12	60314	.SCREW, CAP (attaching part)	2	
13	63401	.WASHER, FLAT (attaching part)	2	
14	61239	.NUT, LOCK (attaching part)	2	
15	92202	.SWITCH, FOOT	1	
16	60314	.SCREW, CAP (attaching part)	2	
17	63401	.WASHER, FLAT (attaching part)	2	
18	23753	.BACKING PLATE DEADMAN SWITCH	1	
19	63301	.WASHER, LOCK (attaching part)	2	
20	63701	.NUT, HEX (attaching part)	2	
REV.				- ITEM NOT ILLUSTRATED

REV.



1. This area refers to the corresponding illustration.
  - 1) **Chapter** should be divided with General, Operation, Maintenance, Schematics, Parts, Vendor and Service Bulletins.
  - 2) **Section and Figure** belong to Parts Chapter only. Please check page of contents and each Section in Parts Chapter.
  - 3) Page numbers are followed for chapter or section, and figure.
2. The **Item Number** corresponds to the item number shown for the part in the illustration. (Parts with item numbers preceded by a dash are not illustrated such as -1, -5, etc.)
3. **Parts** that carry a **Mark Industries** part number.
4. The **Indenture System** used in the detail parts list of this catalog shows the relationship of one part to another. For a given item, the number of indentures depicts the relationship of the item to the associated installation, next higher assembly, or components of the item as follows:

1    2    3    4    5    6    7

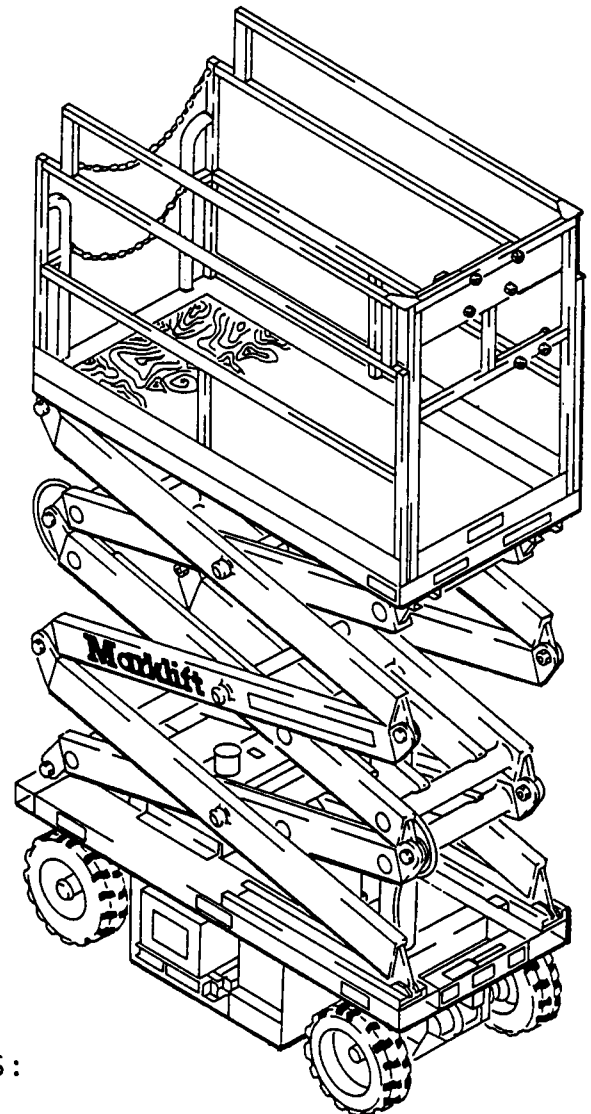
Installation

- . Detail parts for installation
- . Assembly
  - . Attaching parts for Assembly
    - . . Detail parts for Assembly
    - . . Sub-Assembly
      - . . Attaching parts for Sub-Assembly
        - . . . Detail parts for Sub-Assembly
        - . . . Sub-Sub-Assembly
          - . . . Attaching parts for Sub-Sub-Assembly
            - . . . . Detail parts for Sub-Sub-Assembly
            - . . . . Sub-Sub-Sub-Assembly



5. **NHA** (Next Higher Assembly) and **DETAILS** - Section and Figure reference catalog location indicates where the installation or assembly is listed under NHA and where illustrated for more detailed breakdown.
6. **UNIT PER ASSEMBLY** - Entries are as follows:
  - 1) **"REF"** indicates the item is listed previously in the NHA and then again in this figure.
  - 2) **"AR"** indicates the part is used in a quantity "As Required."
  - 3) **A number** entry indicates the quantity of the part used in its next higher application.





THIS SECTION 2 IS ILLUSTRATED AS:

FIGURE 1A M-15 FINAL ASSEMBLY

FIGURE 1B M-15 T FINAL ASSEMBLY

FIGURE 1C M-15 EP FINAL ASSEMBLY

FIGURE 2A M-15 AND M-15 EP HYDRAULIC HOSE INSTALLATION

FIGURE 2B M-15T HYDRAULIC HOSE INSTALLATION

FIGURE 3A M-15 UPPER CONTROL BOX ASSEMBLY

FIGURE 3B M-15T UPPER CONTROL BOX ASSEMBLY

FIGURE 3C M-15EP UPPER CONTROL BOX ASSEMBLY

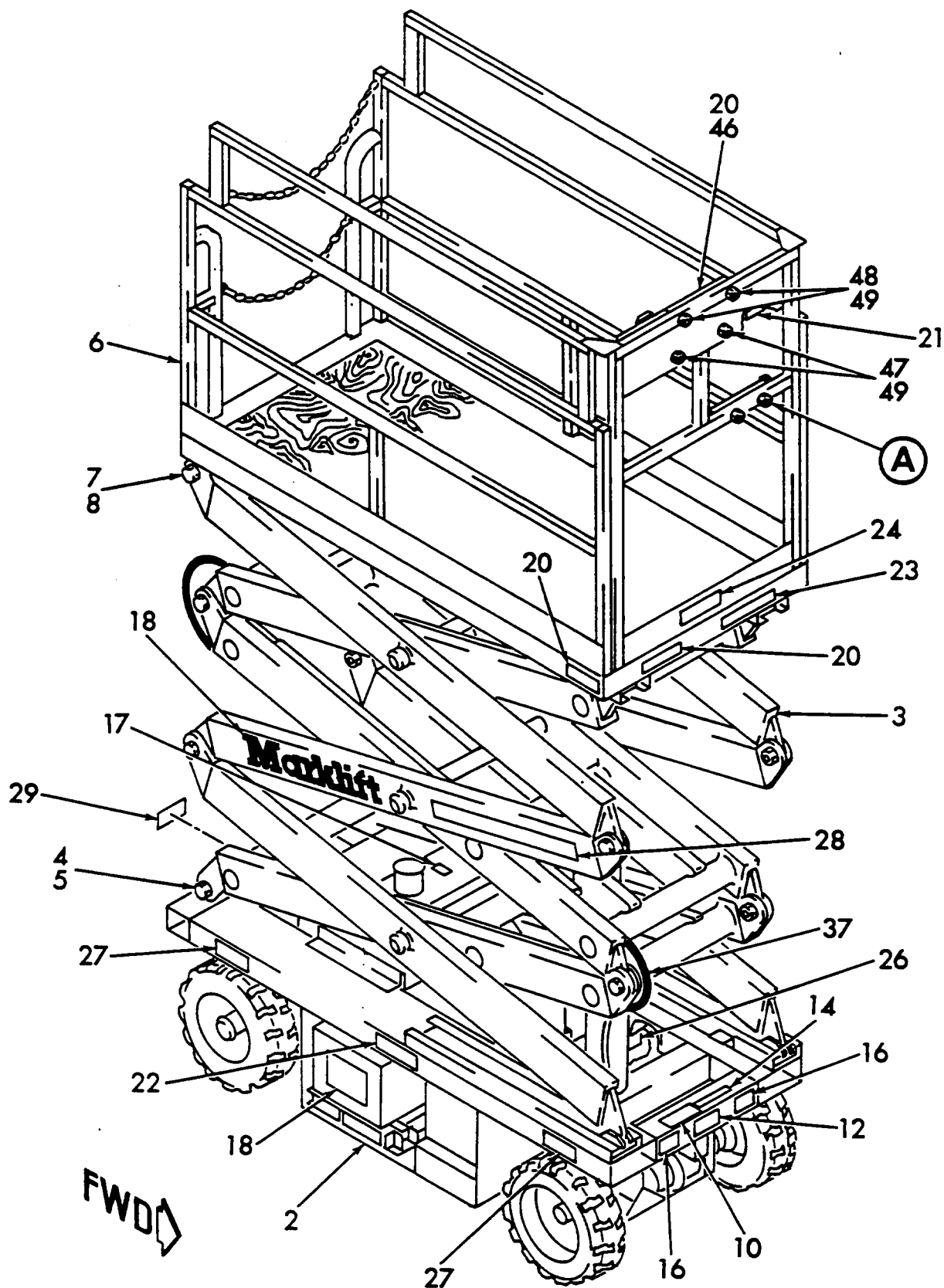


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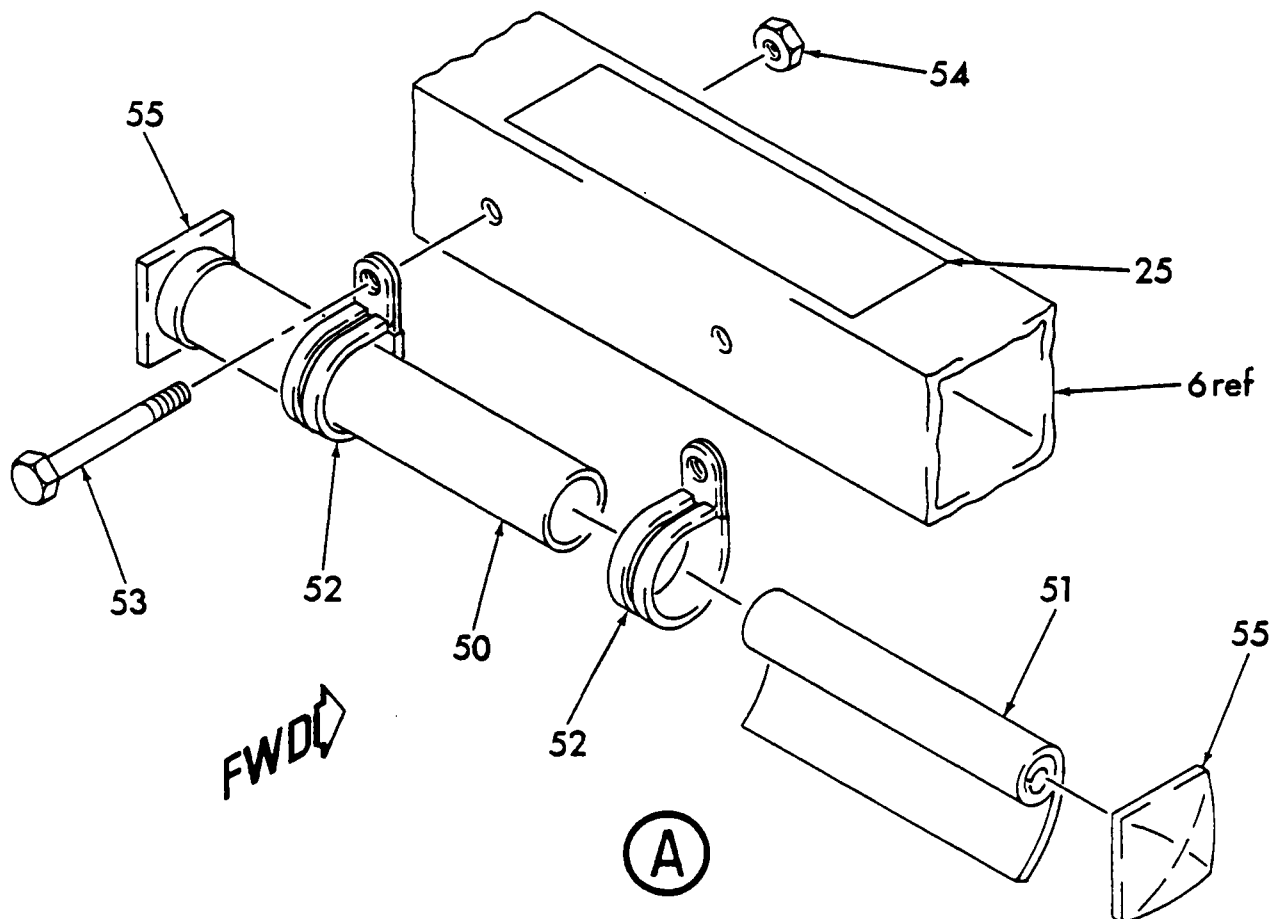
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PARTS CATALOG

**M-15 FINAL ASSEMBLY**

PARTS  
SECT. 2  
FIG. 1A  
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REV.



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130028	ASSEMBLY, FINAL	REF
2	130896	.ASSEMBLY, FRAME (See Sect. 3, Fig. 1A for Details)	1
3	131019	.ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1A for Details)	1
4	130696	.BOLT, EAR PIVOT (attaching part)	2
5	61249	.NUT, LOCK (attaching part)	2
6	130951	.ASSEMBLY, PLATFORM (See Sect. 5, Fig. 1A for Details)	1
7	130696	.BOLT, EAR PIVOT (attaching part)	2
8	61249	.NUT, LOCK (attaching part)	2
-9		.KIT, DECAL	1



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(CONTINUED)

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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	30520	..PLATE, PATENT NUMBER	1
-11	375	..RIVET, POP (attaching part)	4
12	20660	..PLATE, IDENTIFICATION	1
-13	375	..RIVET, POP (attaching part)	4
14	20661	..PLATE, ANSI A92	1
-15	375	..RIVET, POP (attaching part)	4
16	2002	..DECAL, FORKLIFT BOOT	2
17	2017	..DECAL, HYDRAULIC SYSTEM	1
18	2003	..DECAL, BATTERY WATER LEVEL	2
19	31259	..DECAL, <b>MARKLIFT</b>	2
20	2024	..DECAL, LOAD CAPACITY 1,000 LBS	5
21	130801	..DECAL, OPERATION INSTRUCTION	1
22	2016	..DECAL, DO NOT WORK UNDERNEATH	2
23	31109	..DECAL, CAUTION SCISSOR GUARD RAILS	2
24	32368	..DECAL, <b>M-SERIES</b>	1
25	130820	..DECAL, OPERATION AND SAFETY HANDBOOK	1
26	130606	..DECAL, FREE WHEELING VALVE	1
27	130949	..DECAL, DANGER THIS SOLID TIRE	4
28	130596	..DECAL, PRODUCT OF <b>MARK INDUSTRIES</b>	2
29	2041	..DECAL, DO NOT LIFT THIS END	2
-30	130505	..DECAL, GROUND CONTROL BOX (See Sect. 3, Fig. 7A for Details)	1
-31	2009	..DECAL, CONTROL BOX (See Sect. 2, Fig. 3A for Details)	1
-32	2014	..DECAL, CAUTION (See Sect. 2, Fig. 3A for Details)	1
-33	2015	..DECAL, WARNING (See Sect. 2, Fig. 3A for Details)	1
-34	255	.TIE CABLE	50

REV.

- ITEM NOT ILLUSTRATED

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-35	256	.TIE CABLE	50
-36	65116	.OIL, HYDRAULIC (13 GAL)	AR
37	131043	.INSTALLATION, HYDRAULIC HOSE (See Sect. 2, Fig. 2A for Details)	1
-38	131034	.SCHEMATIC, HYDRAULIC (See Chapter Schematic for Details)	1
-39	131042	.SCHEMATIC, ELECTRICAL (See Chapter Schematic for Details)	1
-40	65389	.PAINT, BLUE WATER BASE (2 GAL)	AR
-41	16608	.PAINT, WHITE WATER BASE (5 GAL)	AR
-42	65368	.KRYLON, NO. 1910	1
-43	2673	.PAINT, WHITE KIT KOTE NO. 1221	1
-44	65655	.CLAMP, CUSHIONED	6
-45	63654	.RIVET, POP (attaching part)	6
46	131044	.ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 3A for Details)	1
47	60353	.SCREW, CAP (attaching part)	2
48	60315	.SCREW, CAP (attaching part)	2
49	60711	.NUT, LOCK (attaching part)	4
50	130927	.CONTAINER, PLASTIC	1
51	17034	.HANDBOOK, OPERATION AND SAFETY BOOK	1
52	65867	.CLAMP	2
53	60315	.SCREW, CAP (attaching part)	2
54	60711	.NUT, LOCK (attaching part)	2
55	65842	.CAP, ANTI-ROLL	2
M-15 FINAL ASSEMBLY			

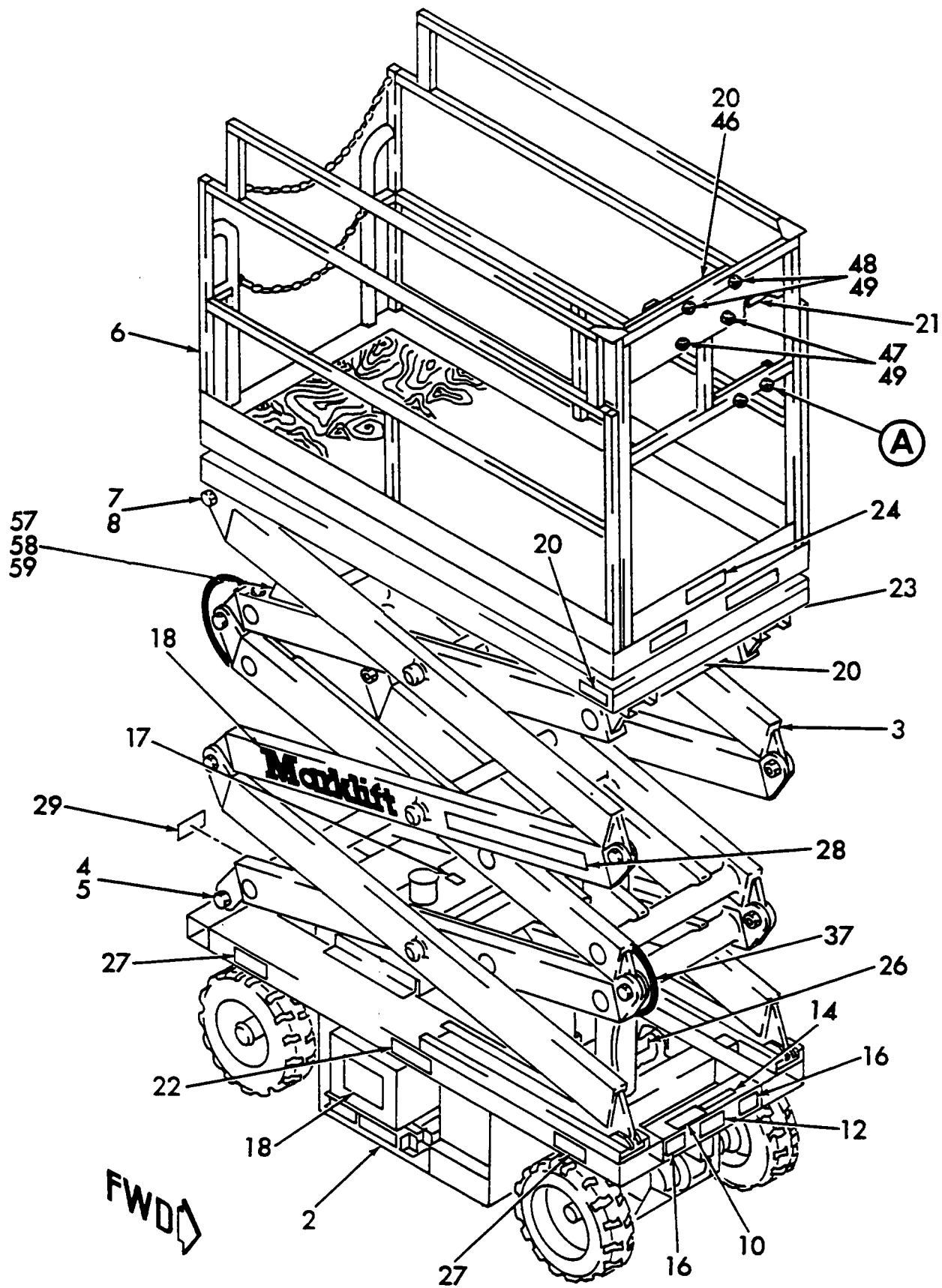


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**M-15T FINAL ASSEMBLY**

PARTS  
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FIG. 1E  
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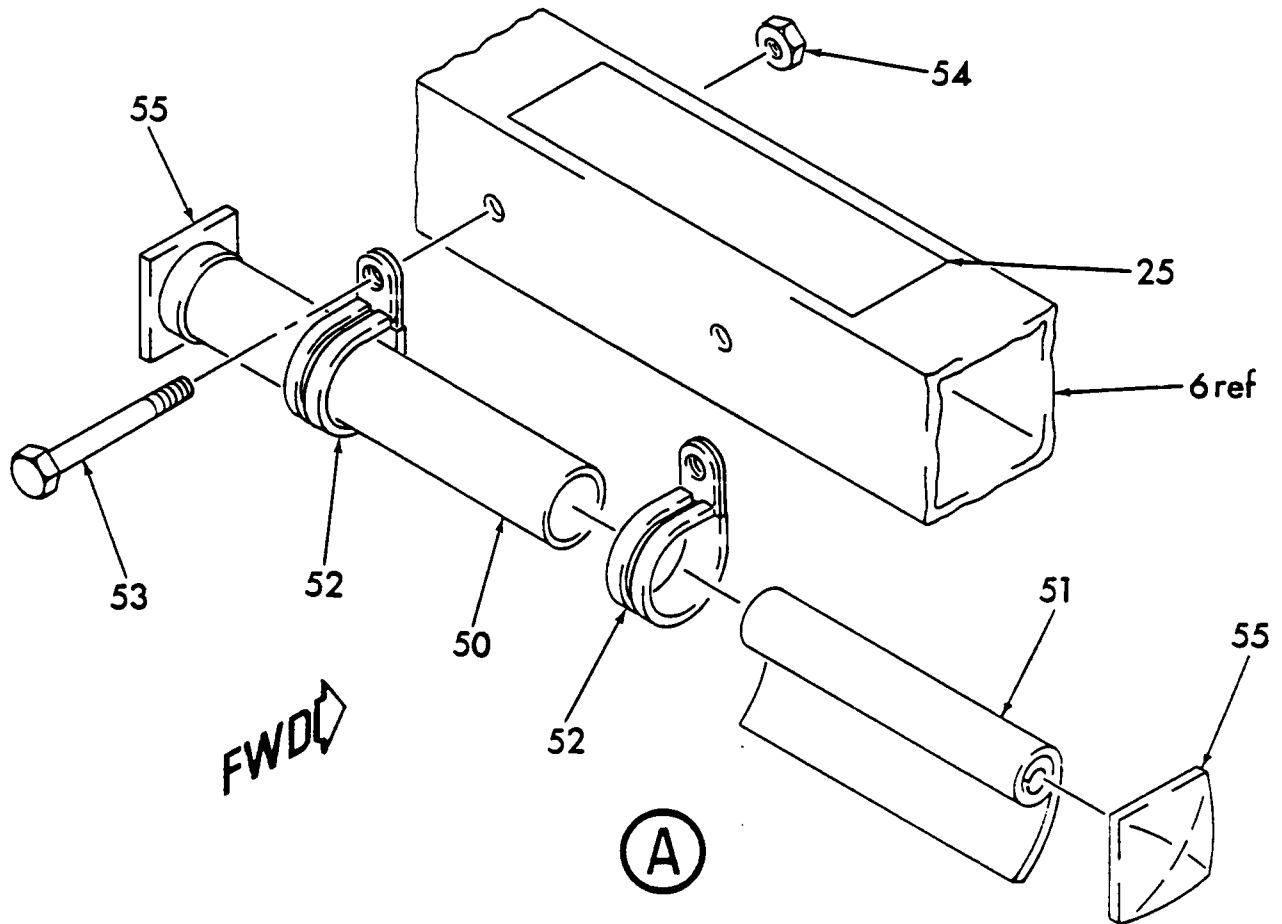
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**M-15T FINAL ASSEMBLY**

(CONTINUED)

PARTS  
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FIG. 1B  
PAGE 2



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130032	ASSEMBLY, FINAL	REF
2	131101	.ASSEMBLY, FRAME (See Sect. 3, Fig. 1B for Details)	1
3	131102	.ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1B for Details)	1
4	130696	.BOLT, EAR PIVOT (attaching part)	2
5	61249	.NUT, LOCK (attaching part)	2
6	131086	.ASSEMBLY, PLATFORM (See Sect. 5, Fig. 1B for Details)	1
7	130696	.BOLT, EAR PIVOT (attaching part)	2
8	61249	.NUT, LOCK (attaching part)	2
-9		.KIT, DECAL	1

REV.

- ITEM NOT ILLUSTRATED

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	30520	..PLATE, PATENT NUMBER	1
-11	375	..RIVET, POP (attaching part)	4
12	20660	..PLATE, IDENTIFICATION	1
-13	375	..RIVET, POP (attaching part)	4
14	20661	..PLATE, ANSI A92	1
-15	375	..RIVET, POP (attaching part)	4
16	2002	..DECAL, FORKLIFT BOOT	2
17	2017	..DECAL, HYDRAULIC SYSTEM	1
18	2003	..DECAL, BATTERY WATER LEVEL	2
19	31259	..DECAL, MARKLIFT	2
20	2023	..DECAL, LOAD CAPACITY 750 LBS	5
21	130801	..DECAL, OPERATION INSTRUCTION	1
22	2016	..DECAL, DO NOT WORK UNDERNEATH	2
23	31109	..DECAL, CAUTION SCISSOR GUARD RAILS	2
24	32368	..DECAL, M-SERIES	1
25	130820	..DECAL, OPERATION AND SAFETY HANDBOOK	1
26	130606	..DECAL, FREE WHEELING VALVE	1
27	130949	..DECAL, DANGER THIS SOLID TIRE	4
28	130596	..DECAL, PRODUCT OF MARK INDUSTRIES	2
29	2041	..DECAL, DO NOT LIFT THIS END	2
-30	130505	..DECAL, GROUND CONTROL BOX (See Sect. 3, Fig. 7B for Details)	1
-31	31280	..DECAL, CONTROL BOX (See Sect. 2, Fig. 3B for Details)	1
-32	2014	..DECAL, CAUTION (See Sect. 2, Fig. 3B for Details)	1
-33	2015	..DECAL, WARNING (See Sect. 2, Fig. 3B for Details)	1
-34	255	.TIE CABLE	57



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-35	256	.TIE CABLE	57
-36	65116	.OIL, HYDRAULIC (13 GAL)	AR
37	131032	.INSTALLATION, HYDRAULIC HOSE (See Sect. 2, Fig. 2B for Details)	1
-38	131099	.SCHEMATIC, HYDRAULIC (See Chapter Schematic for Details)	1
-39	131100	.SCHEMATIC, ELECTRICAL (See Chapter Schematic for Details)	1
-40	65389	.PAINT, BLUE WATER BASE (2 GAL)	AR
-41	16608	.PAINT, WHITE WATER BASE (5 GAL)	AR
-42	65368	.KRYLON, NO. 1910	1
-43	2673	.PAINT, WHITE KIT KOTE NO. 1221	1
-44	65655	.CLAMP, CUSHIONED	6
-45	63654	.RIVET, POP (attaching part)	6
46	130743	.ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 3A for Details)	1
47	60353	.SCREW, CAP (attaching part)	2
48	60315	.SCREW, CAP (attaching part)	2
49	60711	.NUT, LOCK (attaching part)	4
50	130927	.CONTAINER, PLASTIC	1
51	17034	.HANDBOOK, OPERATION AND SAFETY BOOK	1
52	65867	.CLAMP	2
53	60315	.SCREW, CAP (attaching part)	2
54	60711	.NUT, LOCK (attaching part)	2
55	65842	.CAP, ANTI-ROLL	2
-56	130337	.CABLE, CONDUCT (47 ft)	AR
57	130478	.WELDMENT, LOCK BRACKET	1
58	60322	.SCREW, CAP (attaching part)	2
59	63302	.WASHER, LOCK (attaching part)	2

**M-15T FINAL ASSEMBLY**

(CONTINUED)

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-60	65451	.CLAMP, HOSE	2
-61	90547	.CABLE (12 ft)	AR
-62	765	.CLAMP, HOSE	10

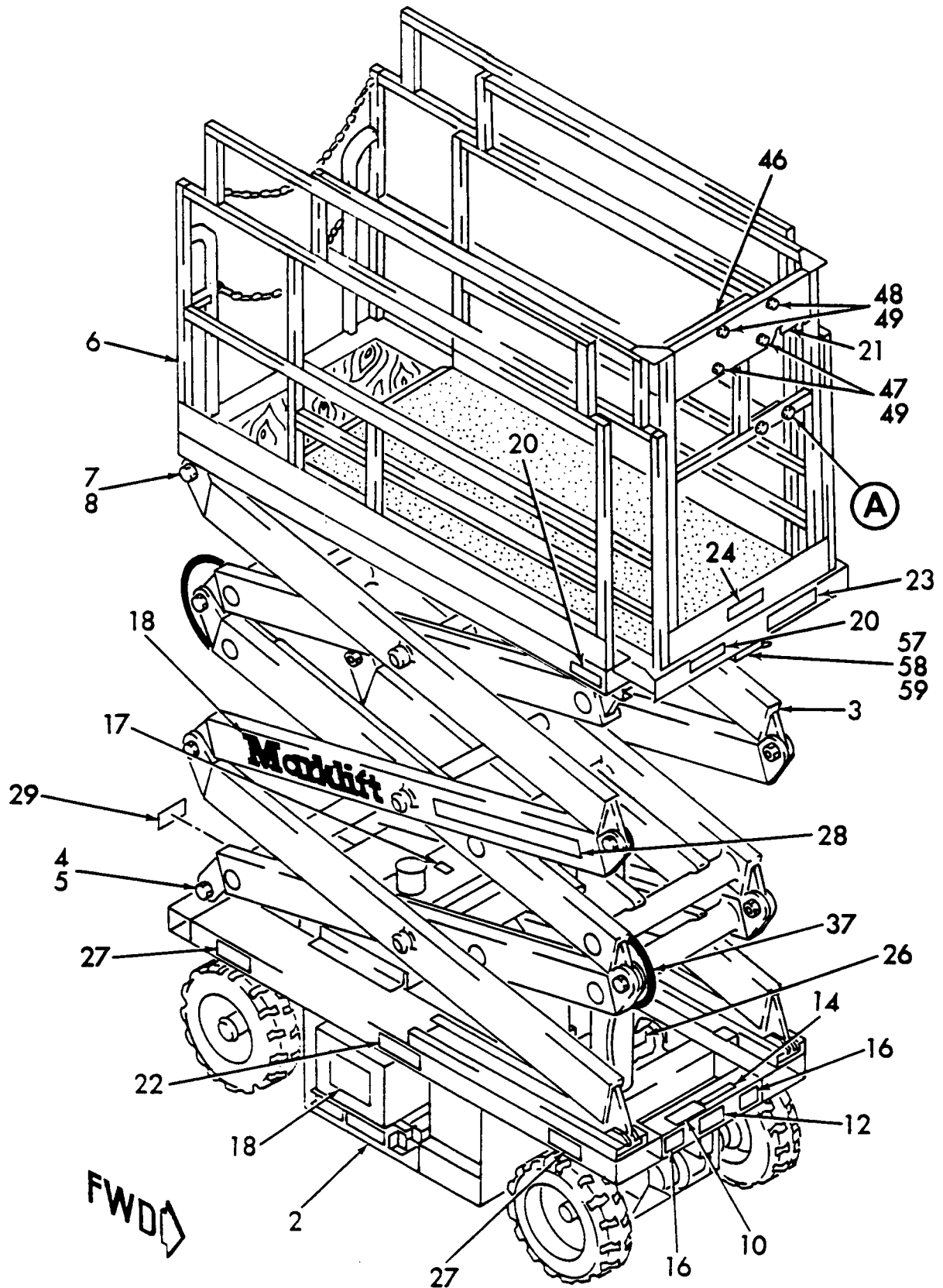


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**M-15EP FINAL ASSEMBLY**

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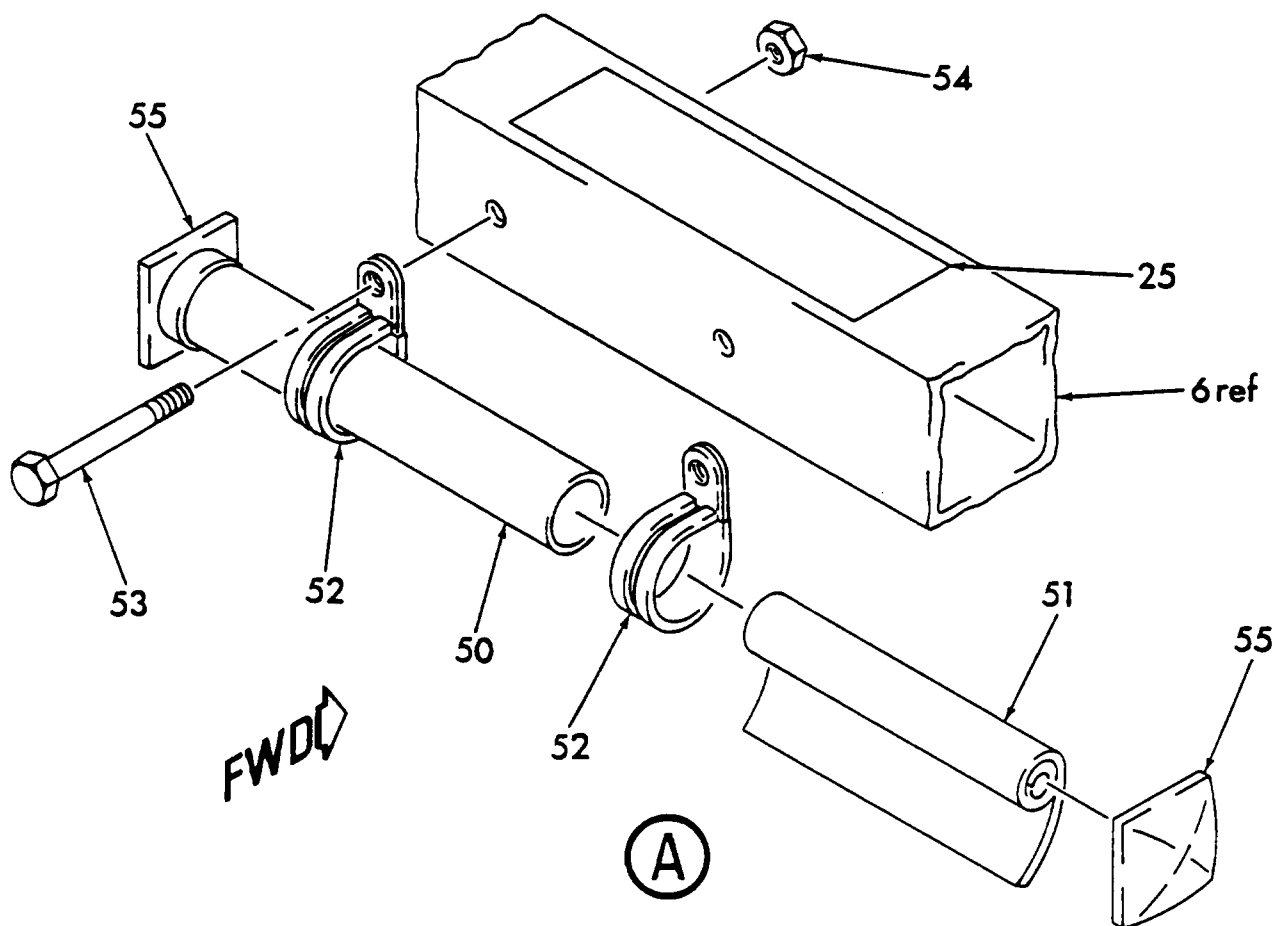
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PARTS CATALOG

**M-15EP FINAL ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 2  
FIG. 1C  
PAGE 2



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130029	ASSEMBLY, FINAL	REF
2	130974	.ASSEMBLY, FRAME (See Sect. 3, Fig. 1C for Details)	1
3	131080	.ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1C for Details)	1
4	130696	.BOLT, EAR PIVOT (attaching part)	2
5	61249	.NUT, LOCK (attaching part)	2
6	130995	.ASSEMBLY, PLATFORM (See Sect. 5, Fig. 1C for Details)	1
7	130696	.BOLT, EAR PIVOT (attaching part)	2
8	61249	.NUT, LOCK (attaching part)	2
-9		.KIT, DECAL	1

REV.

- ITEM NOT ILLUSTRATED

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	30520	..PLATE, PATENT NUMBER	1
-11	375	..RIVET, POP (attaching part)	4
12	20660	..PLATE, IDENTIFICATION	1
-13	375	..RIVET, POP (attaching part)	4
14	20661	..PLATE, ANSI A92	1
-15	375	..RIVET, POP (attaching part)	4
16	2002	..DECAL, FORKLIFT BOOT	2
17	2017	..DECAL, HYDRAULIC SYSTEM	1
18	2003	..DECAL, BATTERY WATER LEVEL	2
19	31259	..DECAL, MARKLIFT	2
20	2023	..DECAL, LOAD CAPACITY 750 LBS	5
21	130801	..DECAL, OPERATION INSTRUCTION	1
22	2016	..DECAL, DO NOT WORK UNDERNEATH	2
23	31109	..DECAL, CAUTION SCISSOR GUARD RAILS	2
24	32368	..DECAL, M-SERIES	1
25	130820	..DECAL, OPERATION AND SAFETY HANDBOOK	1
26	130606	..DECAL, FREE WHEELING VALVE	1
27	130949	..DECAL, DANGER THIS SOLID TIRE	4
28	130596	..DECAL, PRODUCT OF MARK INDUSTRIES	2
29	2041	..DECAL, DO NOT LIFT THIS END	2
-30	130505	..DECAL, GROUND CONTROL BOX (See Sect. 3, Fig. 7C for Details)	1
-31	2009	..DECAL, CONTROL BOX (See Sect. 2, Fig. 3C for Details)	1
-32	2014	..DECAL, CAUTION (See Sect. 2, Fig. 3C for Details)	1
-33	2015	..DECAL, WARNING (See Sect. 2, Fig. 3C for Details)	1
-34	130713	..DECAL, DESCENT OVERRIDE (See Sect. 2, Fig. 3C for Details)	1

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M-15EP FINAL ASSEMBLY

(CONTINUED)

PARTS  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-35	256	.TIE CABLE	50
-36	65116	.OIL, HYDRAULIC (13 GAL)	AR
37	131043	.INSTALLATION, HYDRAULIC HOSE (See Sect. 2, Fig. 2A for Details)	1
-38	131033	.SCHEMATIC, HYDRAULIC (See Chapter Schematic for Details)	1
-39	130640	.SCHEMATIC, ELECTRICAL (See Chapter Schematic for Details)	1
-40	65389	.PAINT, BLUE WATER BASE (2 GAL)	AR
-41	16608	.PAINT, WHITE WATER BASE (5 GAL)	AR
-42	65368	.KRYLON, NO. 1910	1
-43	2673	.PAINT, WHITE KIT KOTE NO. 1221	1
-44	65655	.CLAMP, CUSHIONED	6
-45	63654	.RIVET, POP (attaching part)	6
46	131045	.ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 3A for Details)	1
47	60353	.SCREW, CAP (attaching part)	2
48	60315	.SCREW, CAP (attaching part)	2
49	60711	.NUT, LOCK (attaching part)	4
50	130927	.CONTAINER, PLASTIC	1
51	17034	.HANDBOOK, OPERATION AND SAFETY BOOK	1
52	65867	.CLAMP	2
53	60315	.SCREW, CAP (attaching part)	2
54	60711	.NUT, LOCK (attaching part)	2
55	65842	.CAP, ANTI-ROLL	2
-56	255	.TIE, CABLE	50
57	70234	.SWITCH, MINI	1

REV.

- ITEM NOT ILLUSTRATED

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
58	62620	.SCREW, MACHINE (attaching part)	2
59	70235	.LEVER, LIMIT SWITCH	1
-60	65322	.COIL, PROTECTIVE PLASTIC (2 ft)	AR

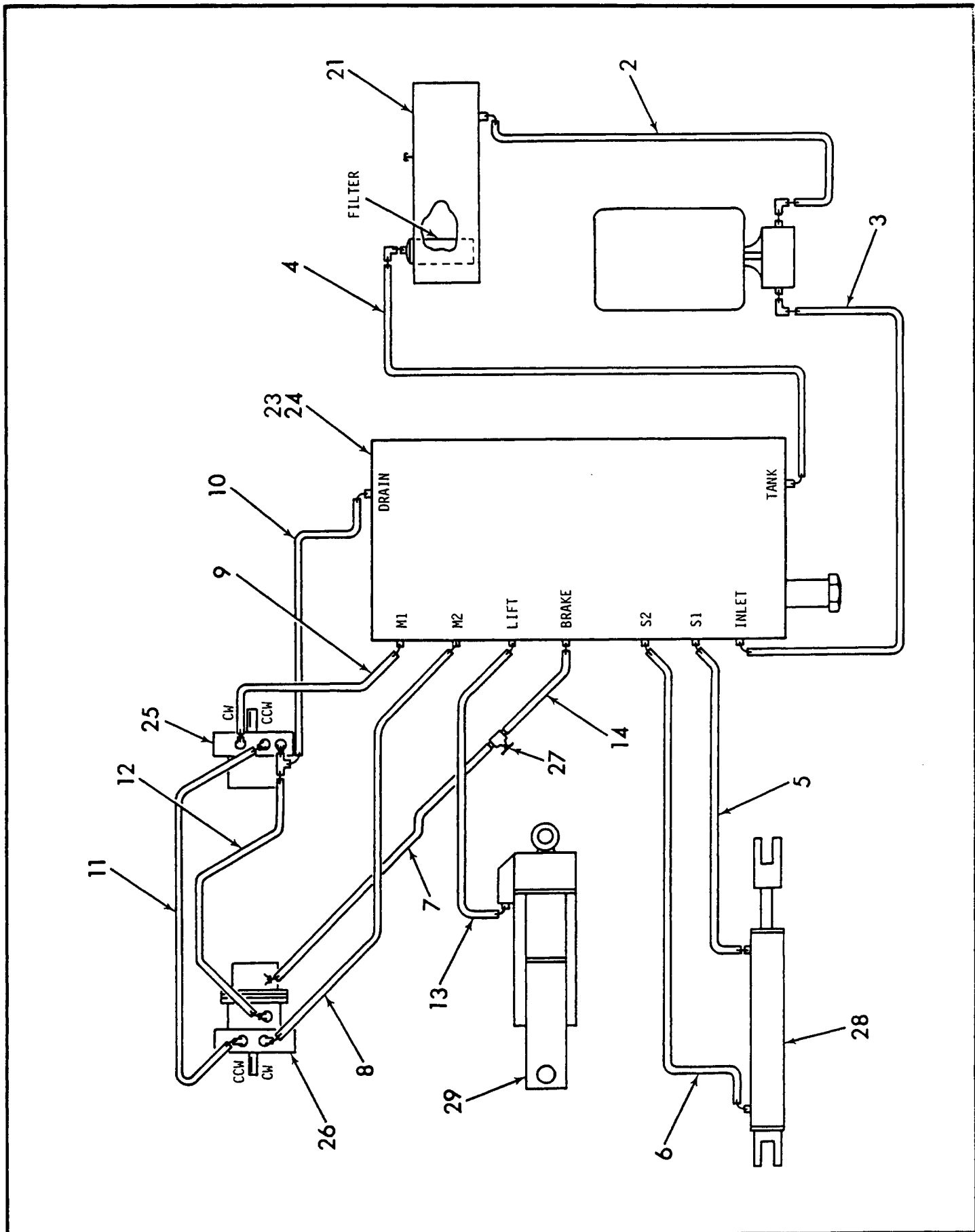


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**M-15 AND M-15EP HYDRAULIC HOSE INSTALLATION**

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FIG. 2A  
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**M-15 AND M-15EP HYDRAULIC HOSE INSTALLATION**

(CONTINUED)

PARTS  
SECT. 2  
FIG. 2A  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131043	INSTALLATION, HYDRAULIC HOSE (See Sect. 2, Fig. 1A or 1C for NHA)	REF
2	13205-12-0174	.ASSEMBLY, HOSE	1
3	13210-06-0170	.ASSEMBLY, HOSE	1
4	13213-06-0414	.ASSEMBLY, HOSE	1
5	13213-04-0424	.ASSEMBLY, HOSE	1
6	13213-04-0380	.ASSEMBLY, HOSE	1
7	13214-04-0594	.ASSEMBLY, HOSE (270°)	1
8	13217-06-0510	.ASSEMBLY, HOSE (180°)	1
9	13217-06-0324	.ASSEMBLY, HOSE (0°)	1
10	13213-04-0464	.ASSEMBLY, HOSE	1
11	13217-06-0394	.ASSEMBLY, HOSE (0°)	1
12	13214-04-0414	.ASSEMBLY, HOSE (180°)	1
13	13212-06-1540	.ASSEMBLY, HOSE	1
14	13214-04-0164	.ASSEMBLY, HOSE (180°)	1
21	131059	ASSEMBLY, HYDRAULIC TANK (See Sect. 3, Fig. 6 for Details)	REF
22	131075	ASSEMBLY, PUMP MOTOR (See Sect. 3, Fig. 8 for Details)	REF
23	130981	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 9A for Details)	REF
24	131078	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 9B for Details)	REF
25	130990	ASSEMBLY, MOTOR DRIVE (See Sect. 3, Fig. 2 for Details)	REF
26	130989	ASSEMBLY, MOTOR DRIVE AND PARKING BRAKE (See Sect. 3, Fig. 3 for Details)	REF
27	30884	VALVE, FLOW CONTROL (See Sect. 3, Fig. 1A or 1C for Details)	REF

REV.

- ITEM NOT ILLUSTRATED



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**M-15 AND M-15EP HYDRAULIC HOSE INSTALLATION**

(CONTINUED)

PARTS  
SECT. 2  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
28	130237	ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 5 for Details)	REF
29	130972	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 3A for Details)	REF
-30	131079	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 3B for Details)	REF
M-15 AND M-15EP HYDRAULIC HOSE INSTALLATION			

REV.

- ITEM NOT ILLUSTRATED



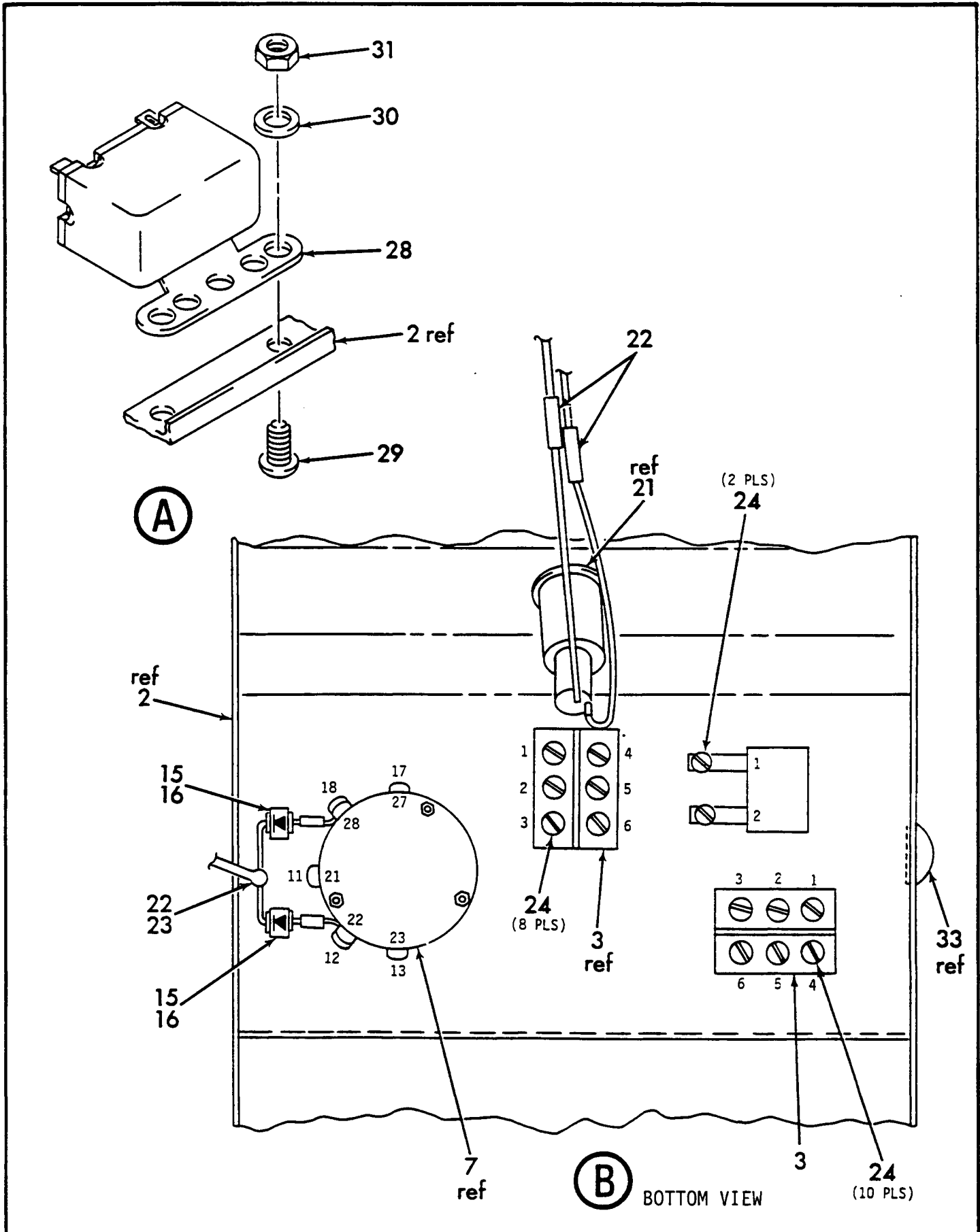
THIS FIGURE 2B M-15T HYDRAULIC HOSE INSTALLATION  
IS NOT AVAILABLE THIS REVISION.

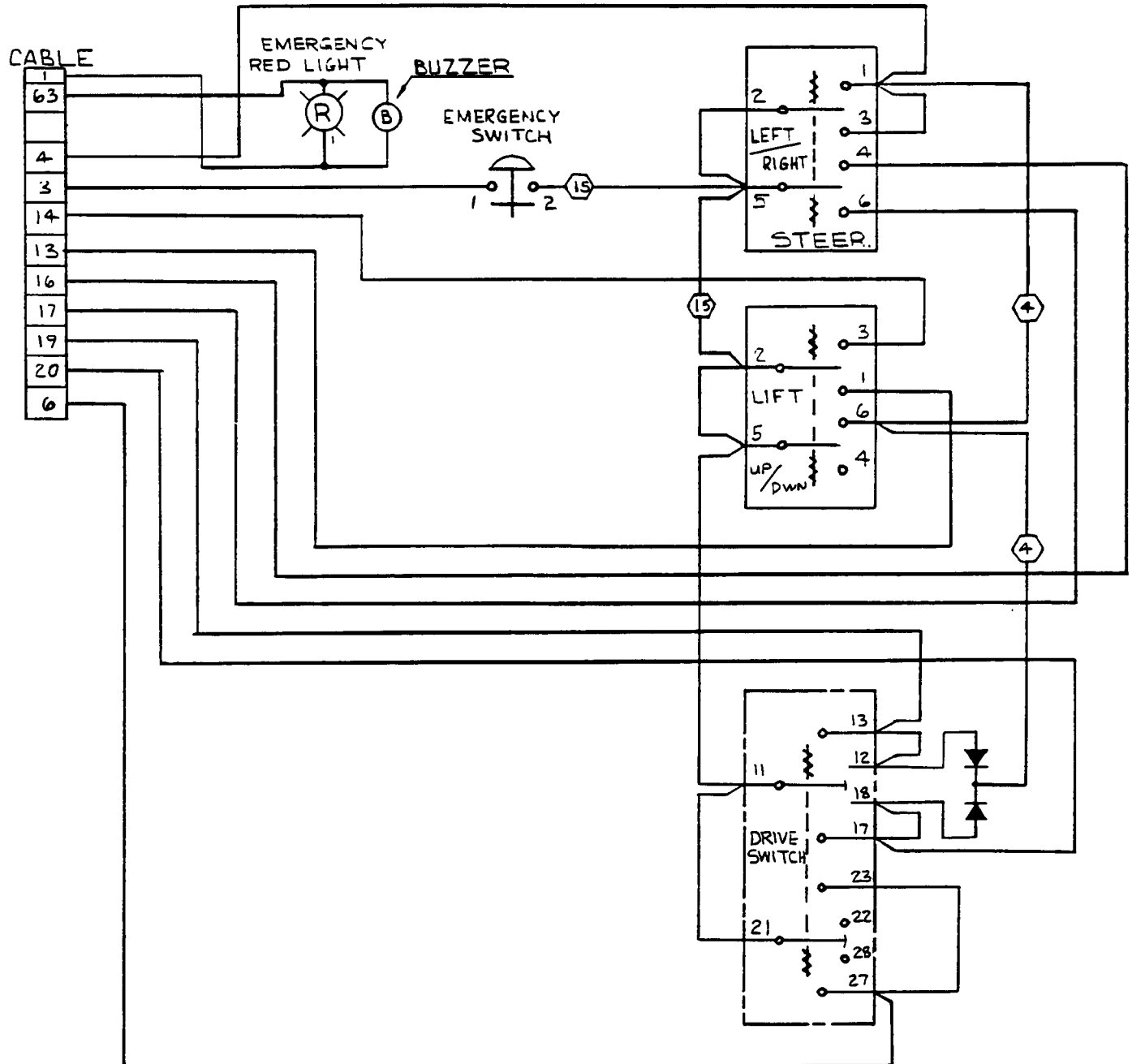




PARTS  
SECT. 2  
FIG. 3A  
PAGE 1







ELECTRICAL SCHEMATIC



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131044	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 1A for NHA)	REF
2	130188	.BOX, UPPER CONTROL	1
3	20481	.SWITCH, TOGGLE	2
4	65131	.NUT, RUBBER COATED (attaching part)	
5	4018	.SWITCH, PUSH-PULL	1
6	31080	.KNOB	1
7	4106	.SWITCH, 5 POSITION	1
8	62209	.SCREW, SET (attaching part)	2
9	65131	.NUT, RUBBER COATED (attaching part)	1
10	65151	.KNOB, DRIVE SWITCH	1
11	117-G	.RELIEF, STRAIN	1
12	61115	.NUT, CONDUIT (attaching part)	1
13	130228	.CABLE (35)	AR
14	2024	.DECAL, LOAD CAPACITY 1,000 LBS (EVENLY DISTRIBUTED LOAD)	1
15	4045	.DIODE (6 AMP)	2
16	16228-1	.TERMINAL	AR
17	130227	.COVER, UPPER CONTROL BOX	1
18	61711	.SCREW, SELF TAPPING (attaching part)	4
19	2009	.DECAL, CONTROL BOX	1
20	2015	.DECAL, WARNING	1
21	70344	.LIGHT, PILOT INDICATOR	1
22	117-D	.CONNECTOR, BUTT	3
23	70233	.WIRE, WHITE 14 AWG (5 FT)	AR
24	117-C	.TERMINAL	20
-25	255	.TIE, LARGE CABLE	2
-26	256	.TIE, SMALL CABLE	10

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**M-15 UPPER CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS

SECT. 2

FIG. 3A

PAGE 5

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	2014	.DECAL, CAUTION	1
28	70333	.BUZZER	1
29	62703	.SCREW (attaching part)	2
30	63413	.WASHER, FLAT (attaching part)	2
31	60802	.NUT, (attaching part)	2
-32	70036	.CABLE (9 FT)	AR
33	771	.PLUG, HOLE	3

REV.

- ITEM NOT ILLUSTRATED

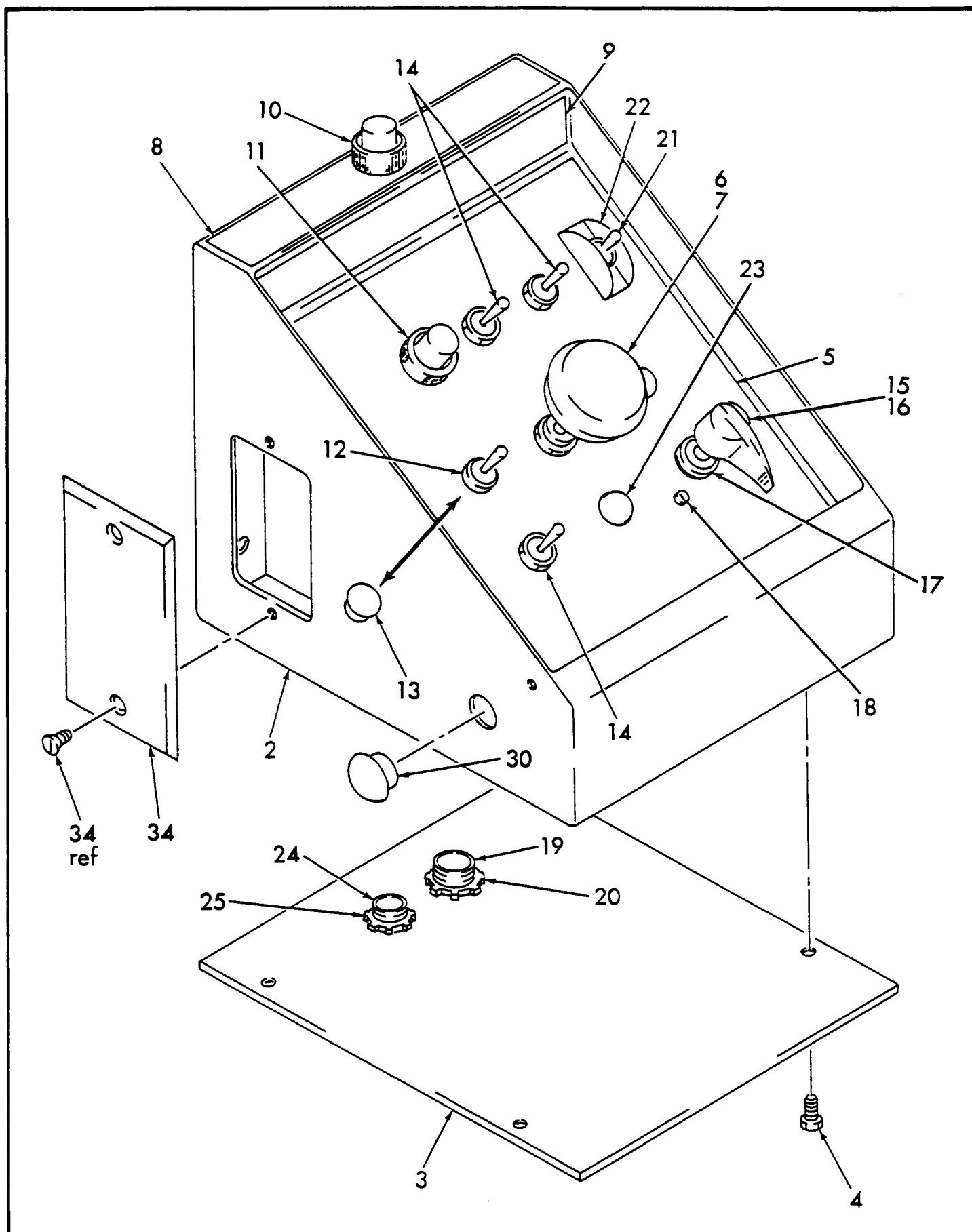


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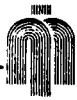
ILLUSTRATED  
PARTS CATALOG

**M-15T UPPER CONTROL BOX ASSEMBLY**

PARTS  
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FIG. 3B  
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REV.



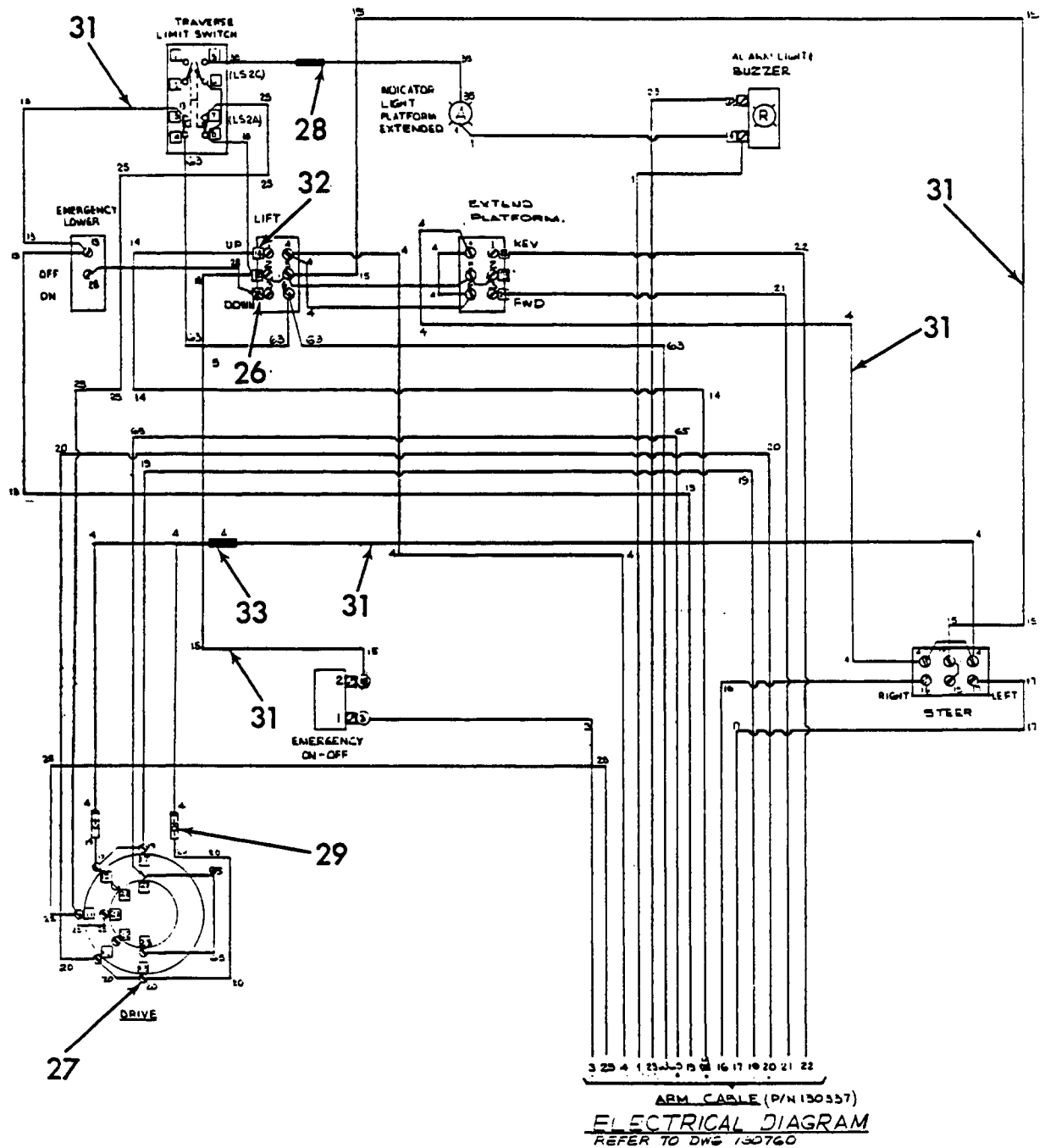
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ILLUSTRATED  
PARTS CATALOG

M-15T UPPER CONTROL BOX ASSEMBLY

(CONTINUED)

PARTS  
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FIG. 3E  
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130743

REV.

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PARTS CATALOG

**M-15T UPPER CONTROL BOX ASSEMBLY**

(CONTINUED)

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FIG. 3B  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130743	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 1B for NHA)	REF
2	130741	.MACHINING, CONTROL BOX	1
3	130753	.COVER	1
4	61711	.SCREW, CAP (attaching part)	4
5	31280	.DECAL, CONTROL BOX	1
6	31080	.KNOB, EMERGENCY	1
7	4018	.SWITCH, PUSH-PULL	1
8	2015	.DECAL, WARNING	1
9	2014	.DECAL, CAUTION	1
10	66345	.BUZZER, ALARM	1
11	70293	.LAMP, AMBER	1
12	70057	.SWITCH, TOGGLE (OPTION ITEM NO. 13)	1
13	771	.PLUG, WHITE (OPTION ITEM NO. 12)	1
14	20481	.SWITCH, TOGGLE	3
15	65151	.KNOB, DRIVE SWITCH	1
16	4106	.SWITCH, 5 POSITION	1
17	65131	.NUT, RUBBER COATED (attaching part)	1
18	62209	.SCREW, SET (attaching part)	2
19	2807	.RELIEF, STRAIN	1
20	2809	.NUT, LOCK (attaching part)	1
21	70291	.SWITCH, TOGGLE	1
22	20884	.GUARD, SWITCH	1
23	771	.PLUG, WHITE	2
24	70251	.RELIEF, STRAIN	1
25	2808	.NUT, LOCK (attaching part)	1
26	117-C	.TERMINAL, RING	32

REV.

- ITEM NOT ILLUSTRATED



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ILLUSTRATED

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**M-15T UPPER CONTROL BOX ASSEMBLY**

(CONTINUED)

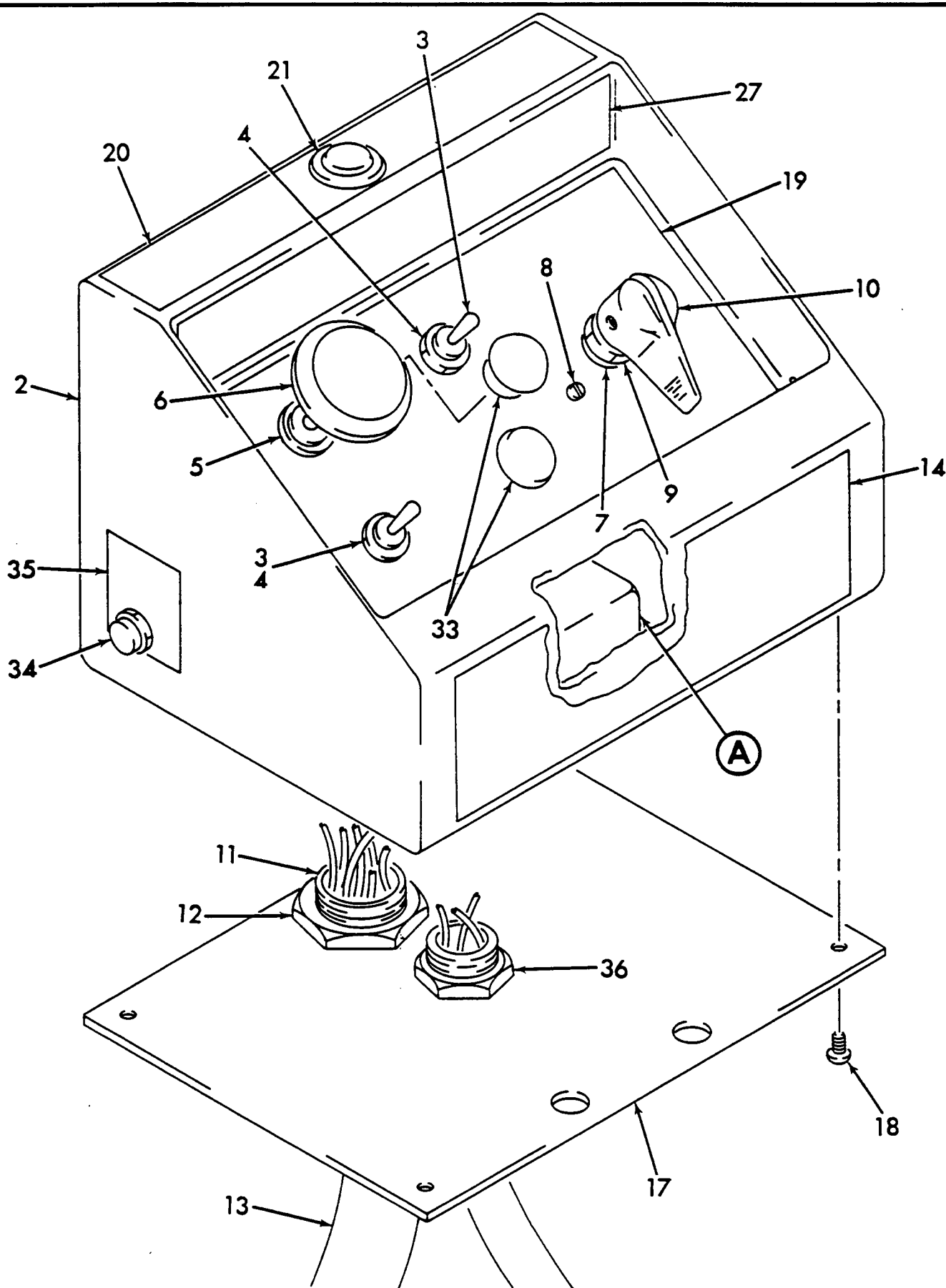
PARTS  
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FIG. 3B  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	16213	.TERMINAL, RING	15
28	70069	.CONNECTOR, BUTT	1
29	4045	.DIODE	2
30	775	.PLUG, WHITE	1
31	70009	.WIRE, RED (4 FT)	AR
32	16228	.TERMINAL, RING	8
33	70162	.CONNECTOR, BUTT	1
34	902	.PLATE, COVER	1
-35	10036	.CABLE	AR

REV.

- ITEM NOT ILLUSTRATED

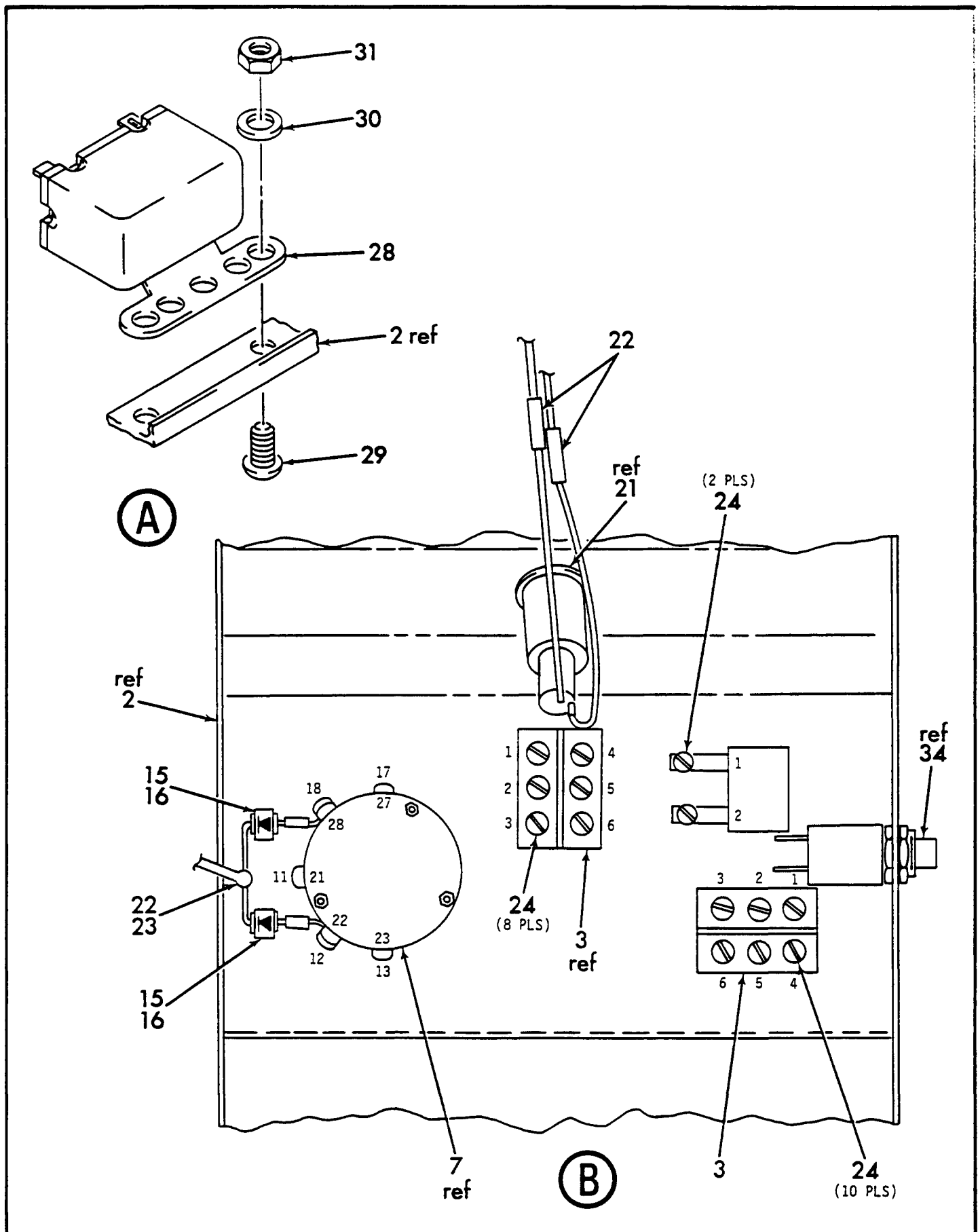
**M-15EP UPPER CONTROL BOX ASSEMBLY**





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FIG. 3C  
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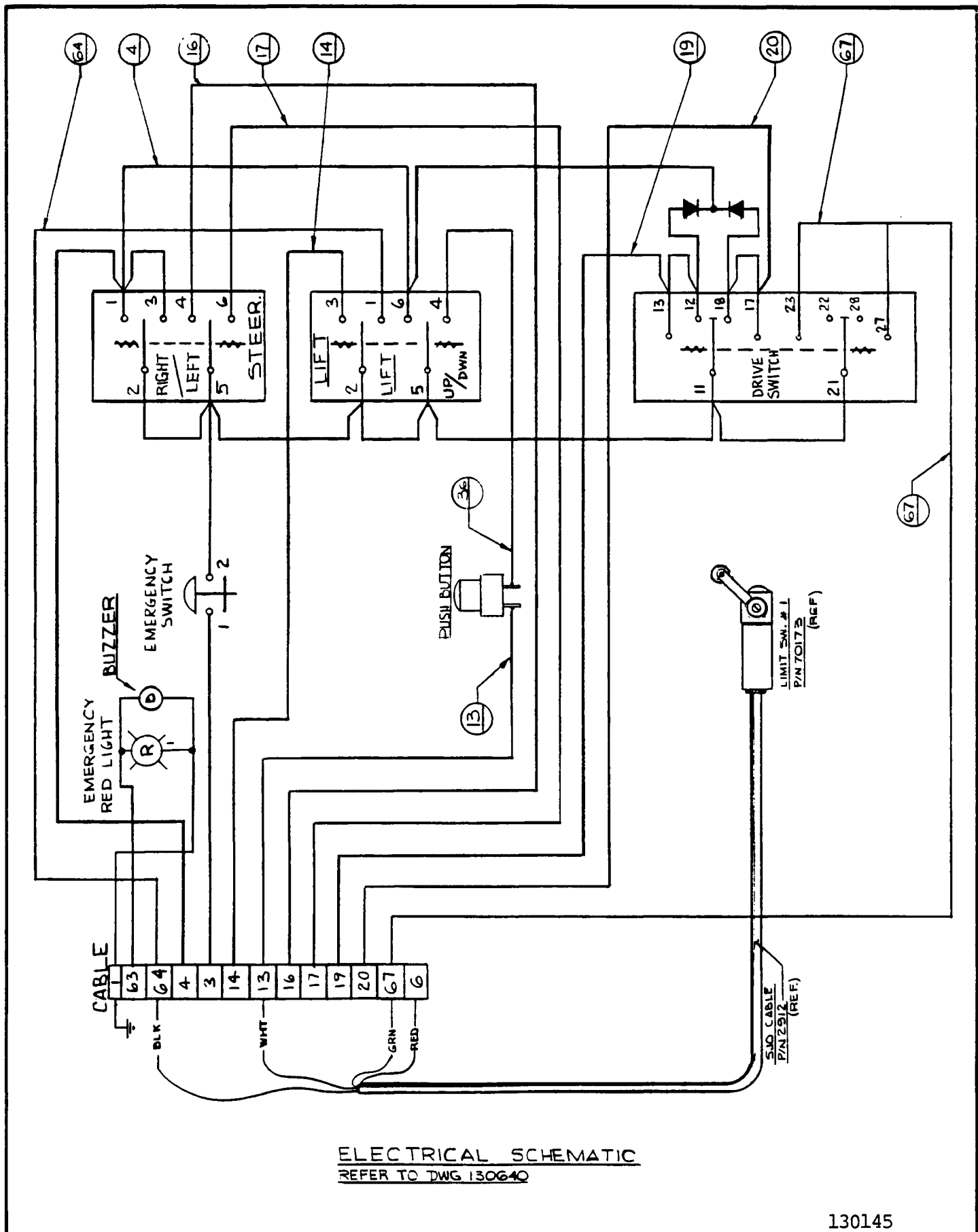
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**M-15EP UPPER CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS  
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**ELECTRICAL SCHEMATIC**  
REFER TO DWG 130640

130145

REV.

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131045	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 1C for NHA)	REF
2	130188	.BOX, UPPER CONTROL	1
3	20481	.SWITCH, TOGGLE	2
4	65131	.NUT, RUBBER COATED (attaching part)	
5	4018	.SWITCH, PUSH-PULL	1
6	31080	.KNOB	1
7	4106	.SWITCH, 5 POSITION	1
8	62209	.SCREW, SET (attaching part)	2
9	65131	.NUT, RUBBER COATED (attaching part)	1
10	65151	.KNOB, DRIVE SWITCH	1
11	117-G	.RELIEF, STRAIN	1
12	61115	.NUT, CONDUIT (attaching part)	1
13	130228	.CABLE (40)	AR
14	2023	.DECAL, LOAD CAPACITY 750 LBS (EVENLY DISTRIBUTED LOAD)	1
15	4045	.DIODE (6 AMP)	2
16	16228-1	.TERMINAL	AR
17	130227	.COVER, UPPER CONTROL BOX	1
18	61711	.SCREW, SELF TAPPING (attaching part)	4
19	2009	.DECAL, CONTROL BOX	1
20	2015	.DECAL, WARNING	1
21	70344	.LIGHT, PILOT INDICATOR	1
22	117-D	.CONNECTOR, BUTT	3
23	70233	.WIRE, WHITE 14 AWG (5 FT)	AR
24	117-C	.TERMINAL	20
-25	255	.TIE, LARGE CABLE	2
-26	256	.TIE, SMALL CABLE	10

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PARTS CATALOG

**M-15EP UPPER CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS  
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FIG. 30  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	2014	.DECAL, CAUTION	1
28	70333	.BUZZER	1
29	62703	.SCREW (attaching part)	2
30	63413	.WASHER, FLAT (attaching part)	2
31	60802	.NUT, (attaching part)	2
-32	70036	.CABLE (9 FT)	AR
33	771	.PLUG, HOLE	2
34	4011	.SWITCH, PUSH BUTTON	1
35	130713	.DECAL, DESCENT OVERRIDE	1
36	117-F	.RELIEF, STRAIN	1

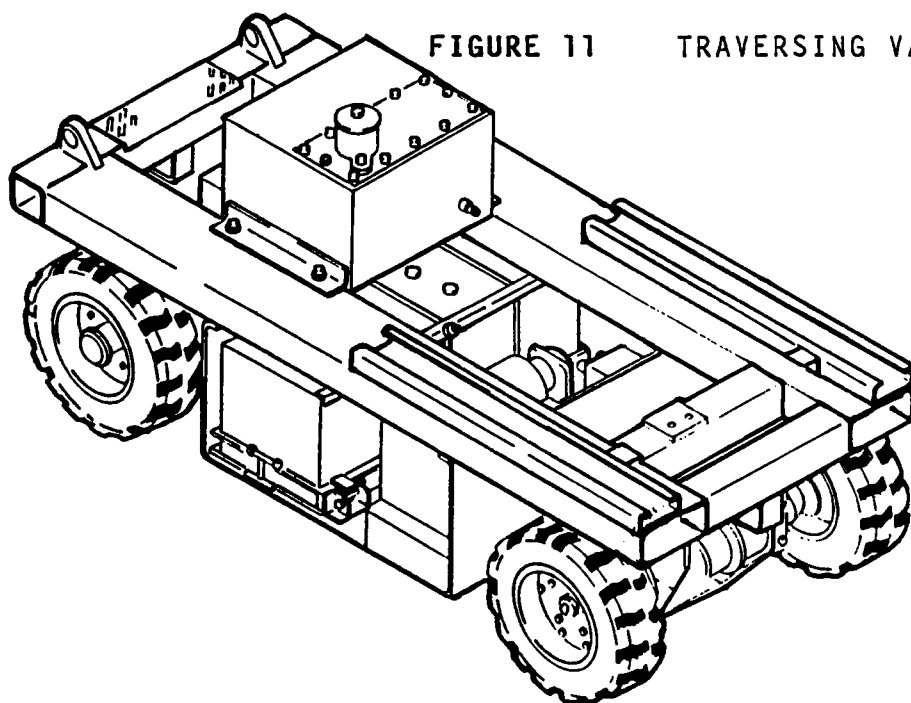
REV.

- ITEM NOT ILLUSTRATED



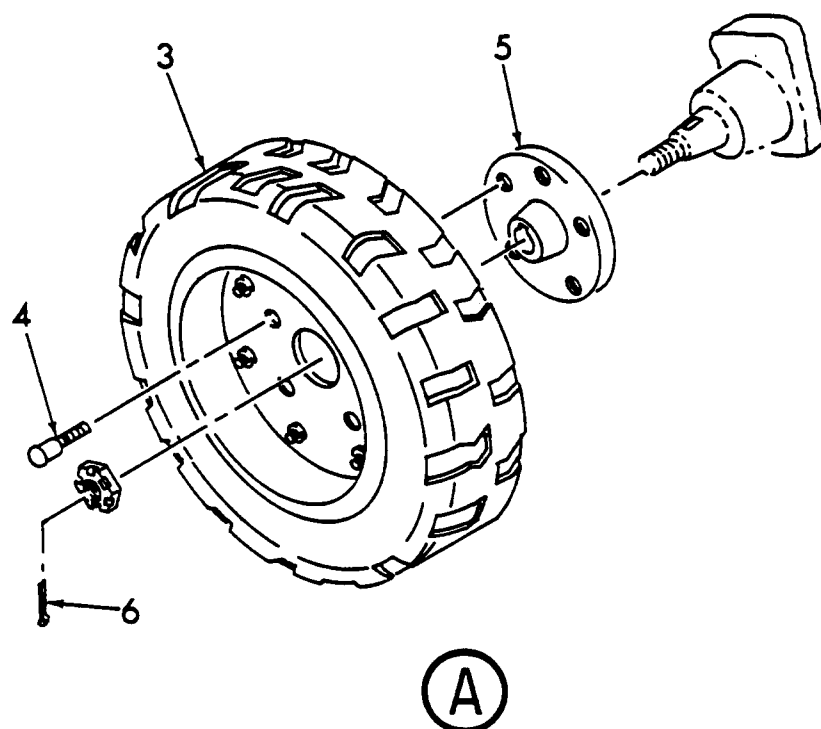
THIS SECTION 3 IS ILLUSTRATED AS:

- |           |  |
|-----------|--|
| FIGURE 1A | M-15 FRAME ASSEMBLY                    |
| FIGURE 1B | M-15T FRAME ASSEMBLY                   |
| FIGURE 1C | M-15EP FRAME ASSEMBLY                  |
| FIGURE 2  | MOTOR DRIVE ASSEMBLY                   |
| FIGURE 3  | MOTOR DRIVE AND PARKING BRAKE ASSEMBLY |
| FIGURE 4  | TIE ROD ASSEMBLY                       |
| FIGURE 5  | STEERING CYLINDER ASSEMBLY             |
| FIGURE 6  | HYDRAULIC TANK ASSEMBLY                |
| FIGURE 7A | M-15 GROUND CONTROL BOX ASSEMBLY       |
| FIGURE 7B | M-15T GROUND CONTROL BOX ASSEMBLY      |
| FIGURE 7C | M-15EP GROUND CONTROL BOX ASSEMBLY     |
| FIGURE 8  | PUMP MOTOR ASSEMBLY                    |
| FIGURE 9A | M-15 VALVE PACKAGE ASSEMBLY            |
| FIGURE 9B | M-15T VALVE PACKAGE ASSEMBLY           |
| FIGURE 9C | M-15EP VALVE PACKAGE ASSEMBLY          |
| FIGURE 10 | TILT SWITCH ASSEMBLY                   |
| FIGURE 11 | TRAVERSING VALVE ASSEMBLY              |





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REV.





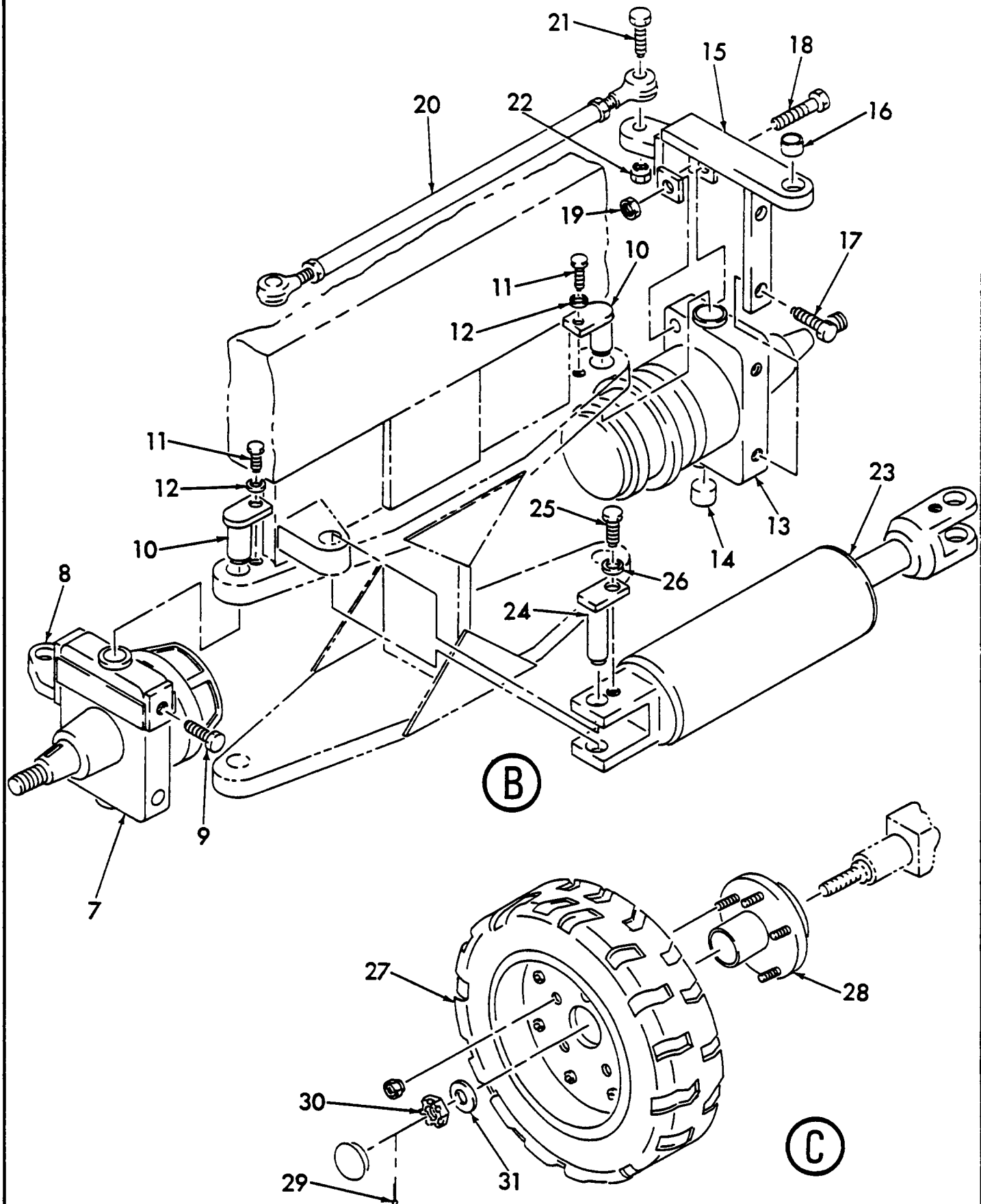
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ILLUSTRATED  
PARTS CATALOG

**M-15 FRAME ASSEMBLY**

(CONTINUED)

PARTS  
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FIG. 1A  
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REV.



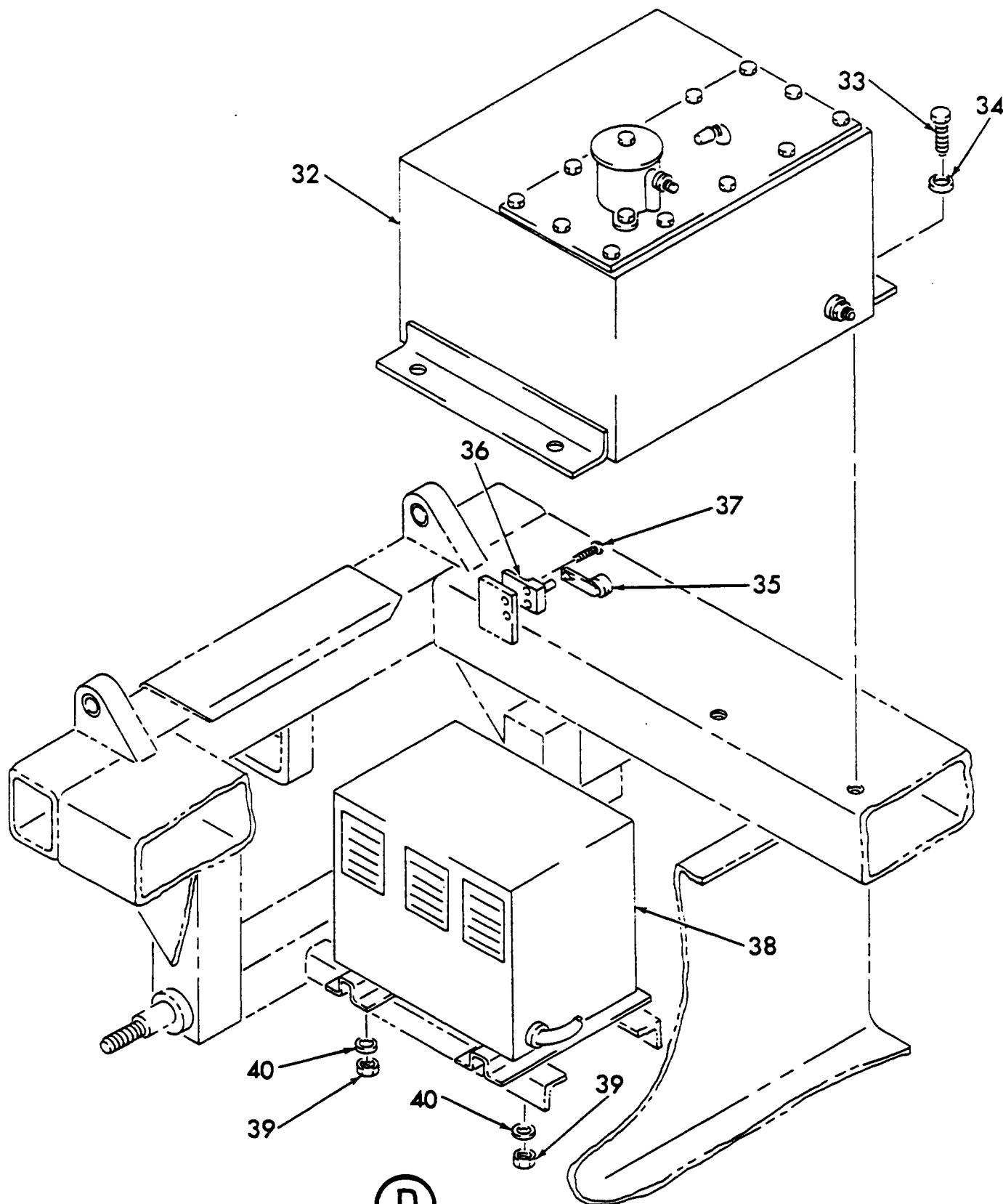
**Mark Industries**

ILLUSTRATED  
PARTS CATALOG

**M-15 FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1A  
PAGE 3





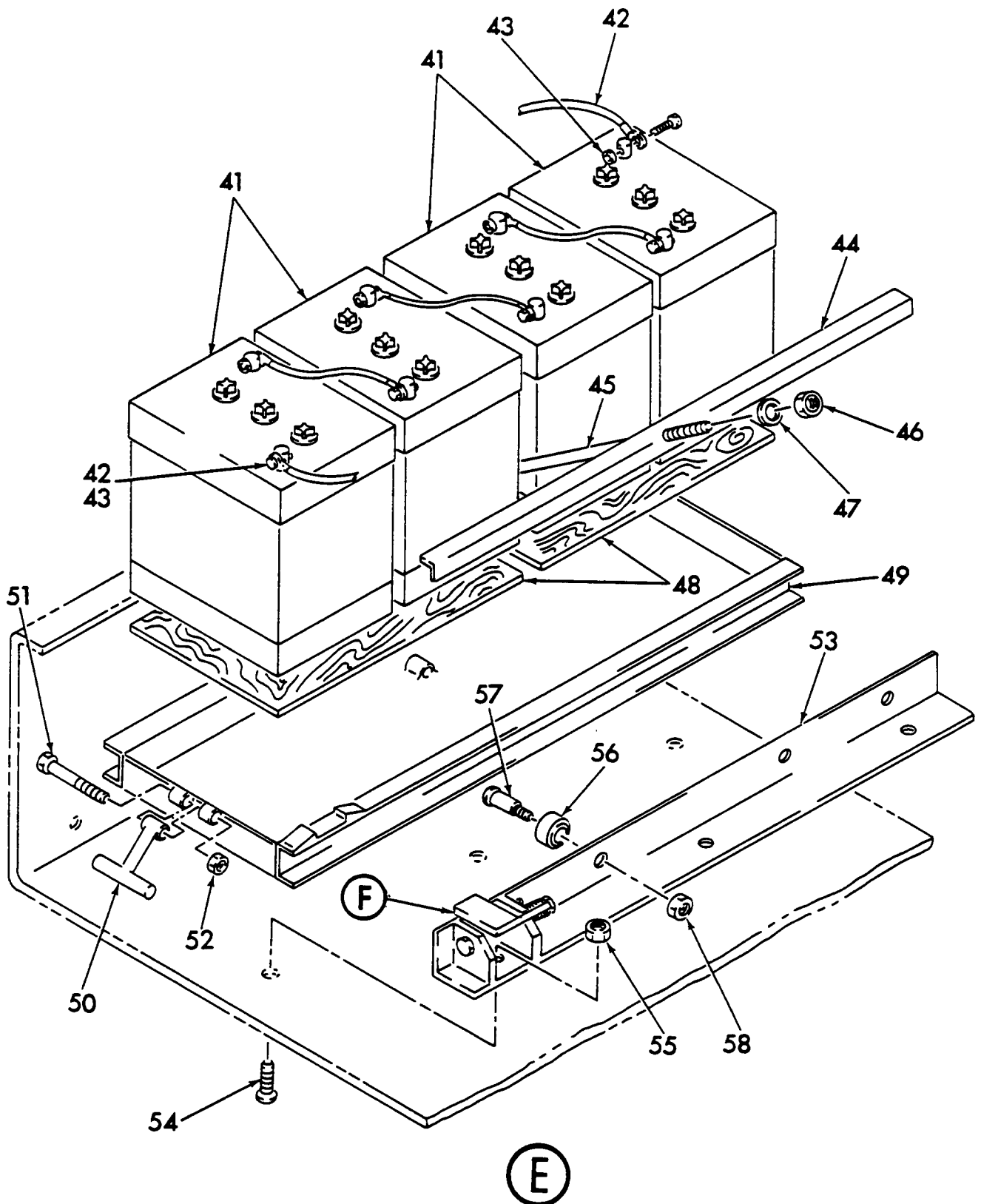
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ILLUSTRATED  
PARTS CATALOG

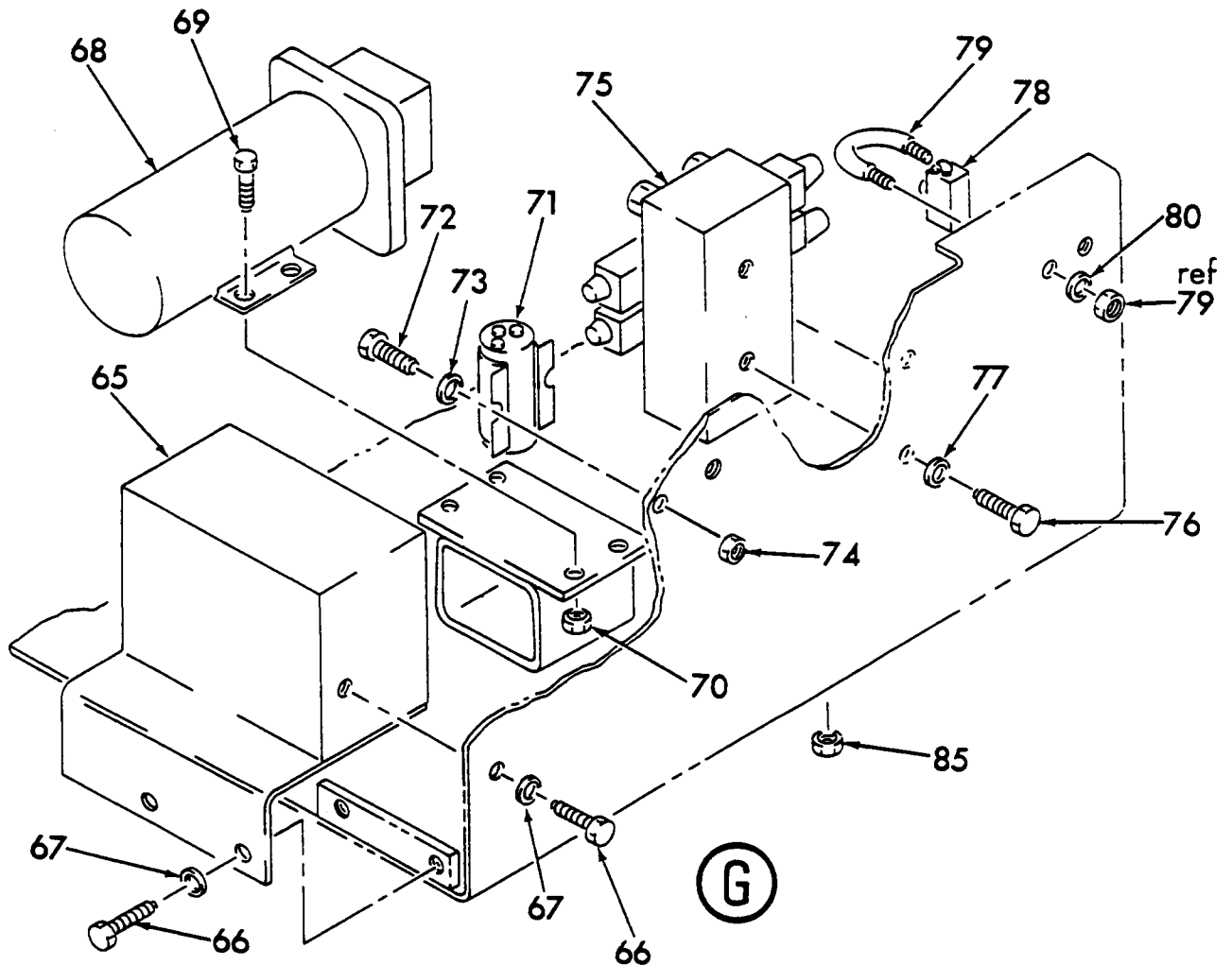
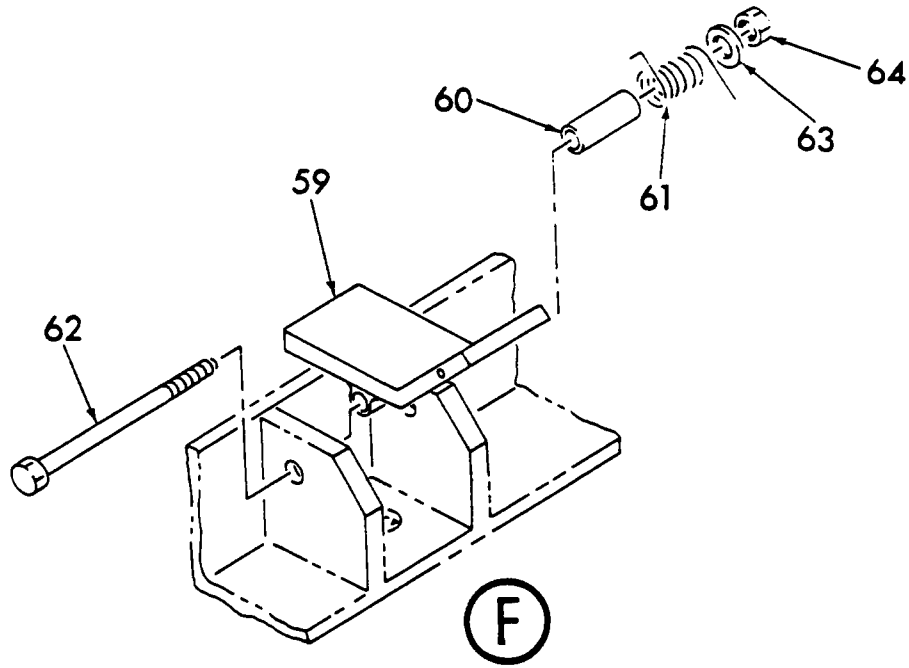
**M-15 FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1A  
PAGE 4



REV.



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130896	ASSEMBLY, FRAME (See Sect. 2, Fig. 1A for NHA)	REF
2	130975	.WELDMENT, FRAME	1
3	130945	.ASSEMBLY, TIE AND WHEEL	2
4	34044	.BOLT, CONE	10
5	31158	.MACHINING, DRIVE HUB	2
6	64306	.PIN, COTTER	2
7	130990	.ASSEMBLY, MOTOR DRIVE (See Sect. 3, Fig. 2 for Details)	1
8	131026	.WELDMENT, R.H. STEERING LEVER	1
9	60622	.SCREW, HEX HEAD CAP (attaching part)	2
10	130474	.PIN, STEERING	4
11	60338	.SCREW, HEX HEAD CAP (attaching part)	4
12	63302	.WASHER, LOCK SPLIT (attaching part)	4
13	130989	.ASSEMBLY, MOTOR DRIVE AND PARKING BRAKE (See Sect. 3, Fig. 3 for Details)	1
14	65658	.BEARING, THRUST	AR
15	131021	.WELDMENT, L.H. STEERING LEVER	1
16	64903	..BUSHING	2
17	60516	.SCREW, HEX HEAD CAP (attaching part)	1
18	60502	.SCREW, HEX HEAD CAP (attaching part)	1
19	61318	.NUT, LOCK (attaching part)	1
20	131115	.ASSEMBLY, TIE ROD (See Sect. 3, Fig. 4 for Details)	1
21	60393	.SCREW, HEX HEAD CAP (attaching part)	2
22	61247	.NUT, LOCK (attaching part)	2
23	130237	.ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 5 for Details)	1
24	20252	.PIN, STEERING CYLINDER ANCHOR	2

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PARTS CATALOG

**M-15 FRAME ASSEMBLY**

(CONTINUED)

PARTS

SECT. 3

FIG. 17

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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
25	60353	.SCREW, HEX HEAD CAP (attaching part)	2
26	63301	.WASHER, SPLIT LOCK (attaching part)	2
27	130945	.ASSEMBLY, TIRE AND WHEEL	2
28	134	.ASSEMBLY, HUB	2
29	64306	.PIN, COTTER	2
30	60811	.NUT, SLOTTED HEX	2
31	63409	.WASHER, FLAT	2
32	131059	.ASSEMBLY, HYDRAULIC TANK (See Sect. 3, Fig. 6 for Details)	1
33	60338	.SCREW, HEX HEAD CAP (attaching part)	4
34	63302	.WASHER, SPLIT LOCK (attaching part)	4
35	70235	.LEVER, LIMIT SWITCH	1
36	70234	.SWITCH, MINI	
37	62620	.SCREW, ROUND HEAD(attaching part)	2
38	70321	.CHARGER, BATTERY	1
39	61312	.NUT (attaching part)	4
40	63041	.WASHER, FLAT (attaching part)	4
41	4007	.BATTERY	4
42	131036	.KIT, BATTERY CABLE	1
43	61246	.NUT, LOCK (attaching part)	2
44	130392	.BATTERY, HOLD DOWN	1
45	130733	.BOLT, HOLD DOWN	1
46	61302	.NUT, HEX (attaching part)	1
47	63403	.WASHER, FLAT (attaching part)	1
48	65768	.PLYWOOD	2
49	130725	.WELDMENT, BATTERY TRAY	1
50	130787	.WELDMENT, HANDLE	2

REV.

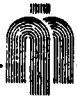
- ITEM NOT ILLUSTRATED



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
51	60339	.SCREW, HEX HEAD CAP (attaching part)	2
52	61246	.NUT, LOCK (attaching part)	2
53	130798	.WELDMENT, BATTERY TRAY BRACKET	1
54	61944	.SCREW, BUTTON HEAD SOCKET CAP (attaching part)	3
55	61318	.NUT, LOCK (attaching part)	3
56	7073	.ROLLER, BATTERY TRAY	8
57	62101	.SCREW, SOCKET HEAD SHOULDER (attaching part)	8
58	61318	.NUT, LOCK (attaching part)	8
59	130785	.WELDMENT, BELLY PAN LOCK	1
60	36437	.TUBE, ROUND	1
61	130482	.SPRING, R.H. TENSION	1
62	60344	.SCREW, HEX HEAD CAP (attaching part)	1
63	63403	.WASHER, FLAT (attaching part)	1
64	61318	.NUT, LOCK (attaching part)	1
65	131076	.ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Fig. 7A for Details)	1
66	60324	.SCREW, HEX HEAD CAP (attaching part)	3
67	63302	.WASHER, SPLIT LOCK (attaching part)	3
68	131075	.ASSEMBLY, PUMP MOTOR (See Sect. 3, Fig. 8 for Details)	1
69	60338	.SCREW, HEX HEAD CAP (attaching part)	4
70	61246	.NUT, LOCK (attaching part)	4
71	70362	.RELAY, POWER	1
72	63359	.SCREW, HEX HEAD CAP (attaching part)	2
73	63041	.WASHER, FLAT (attaching part)	2
74	61312	.NUT (attaching part)	2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
75	130981	.ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 9A for Details)	1
76	60343	.SCREW, HEX HEAD CAP (attaching part)	2
77	63403	.WASHER, FLAT (attaching part)	2
78	30884	.VALVE, FLOW CONTROL	1
79	65365	.U-BOLT WITH NUTS	1
80	63041	.WASHER, FLAT (attaching part)	2
81	131077	.ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 10 for Details)	1



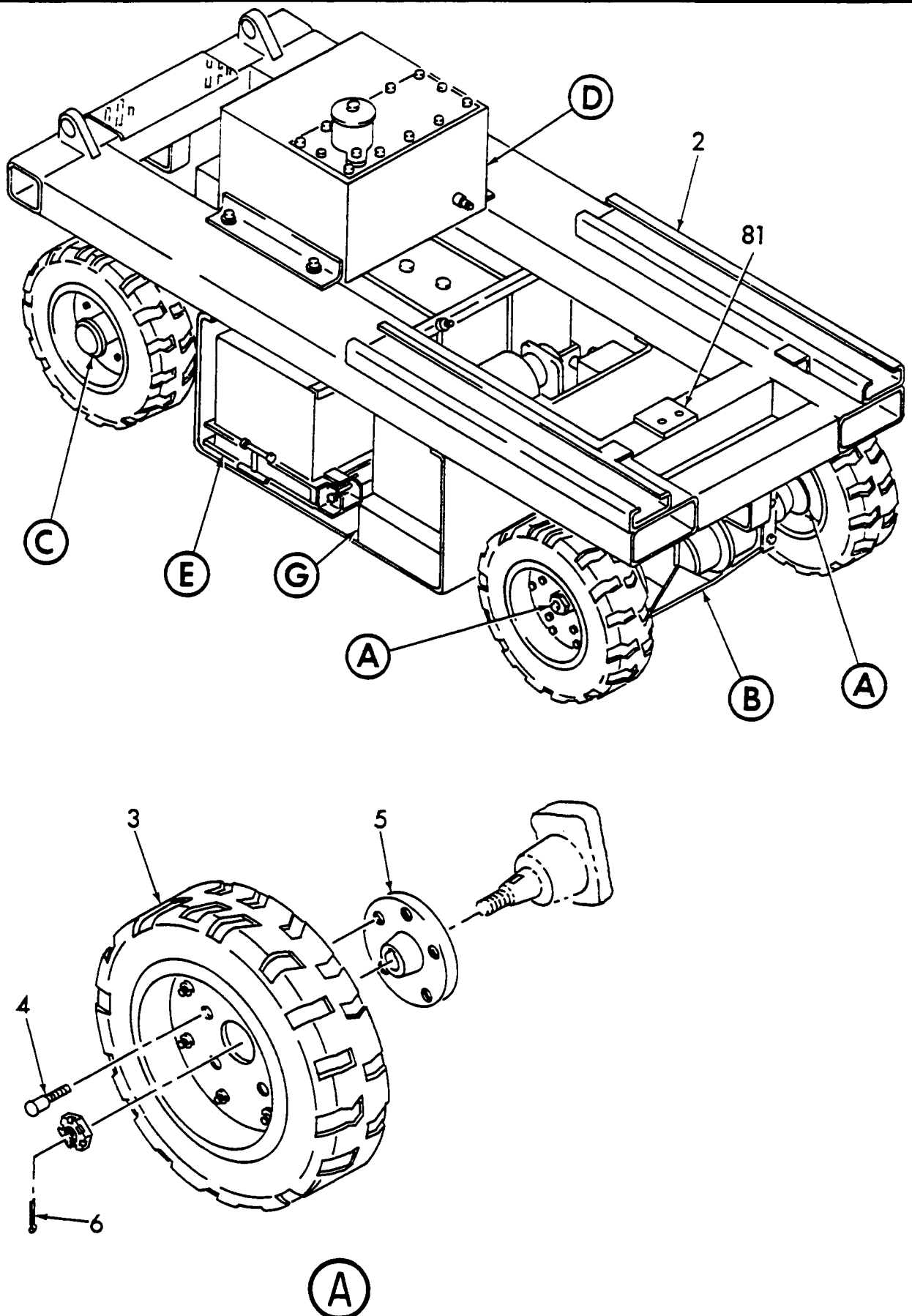


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PARTS CATALOG

**M-15 T FRAME ASSEMBLY**

PARTS  
SECT. 3  
FIG. 1B  
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REV.



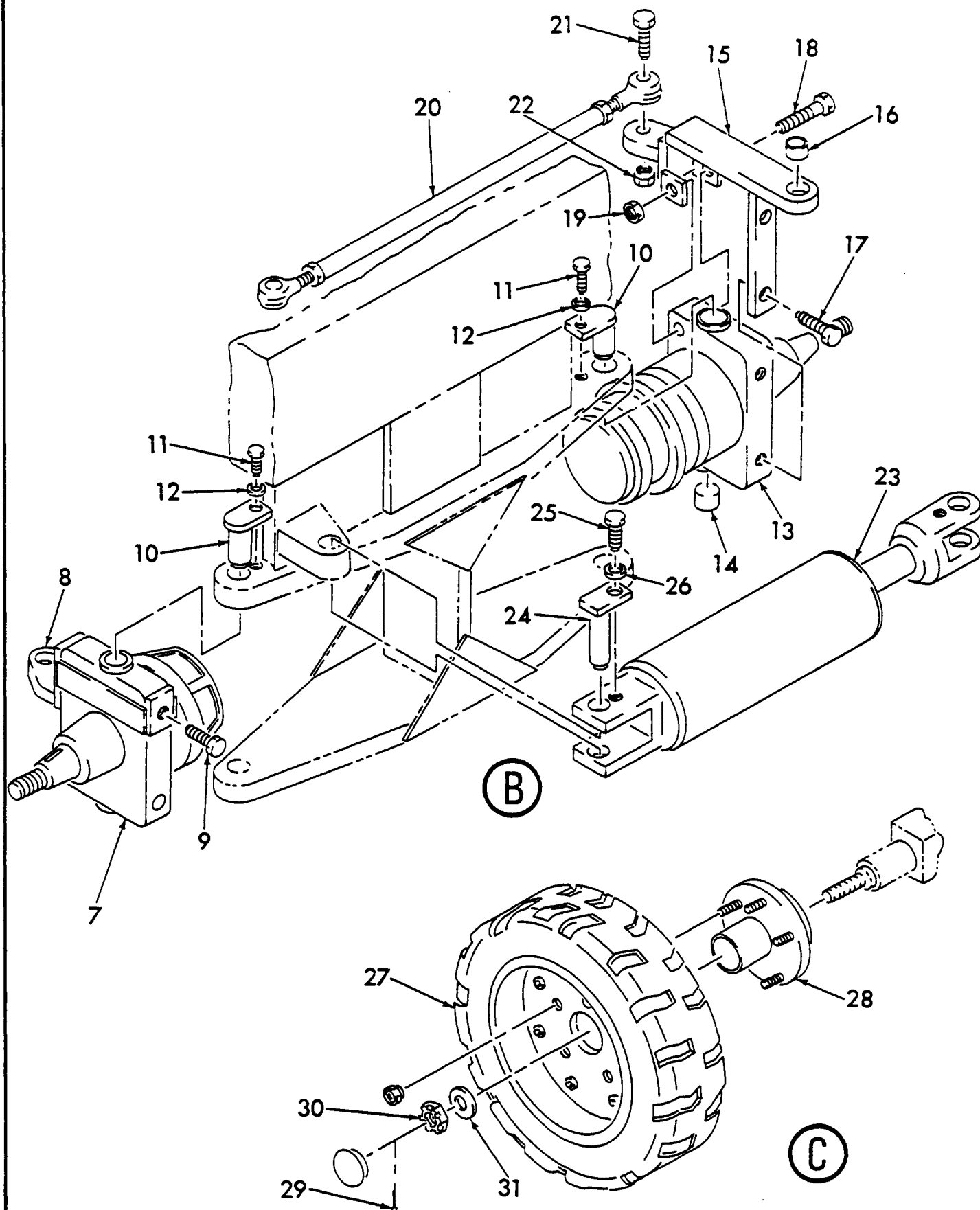
**Mark Industries**

ILLUSTRATED  
PARTS CATALOG

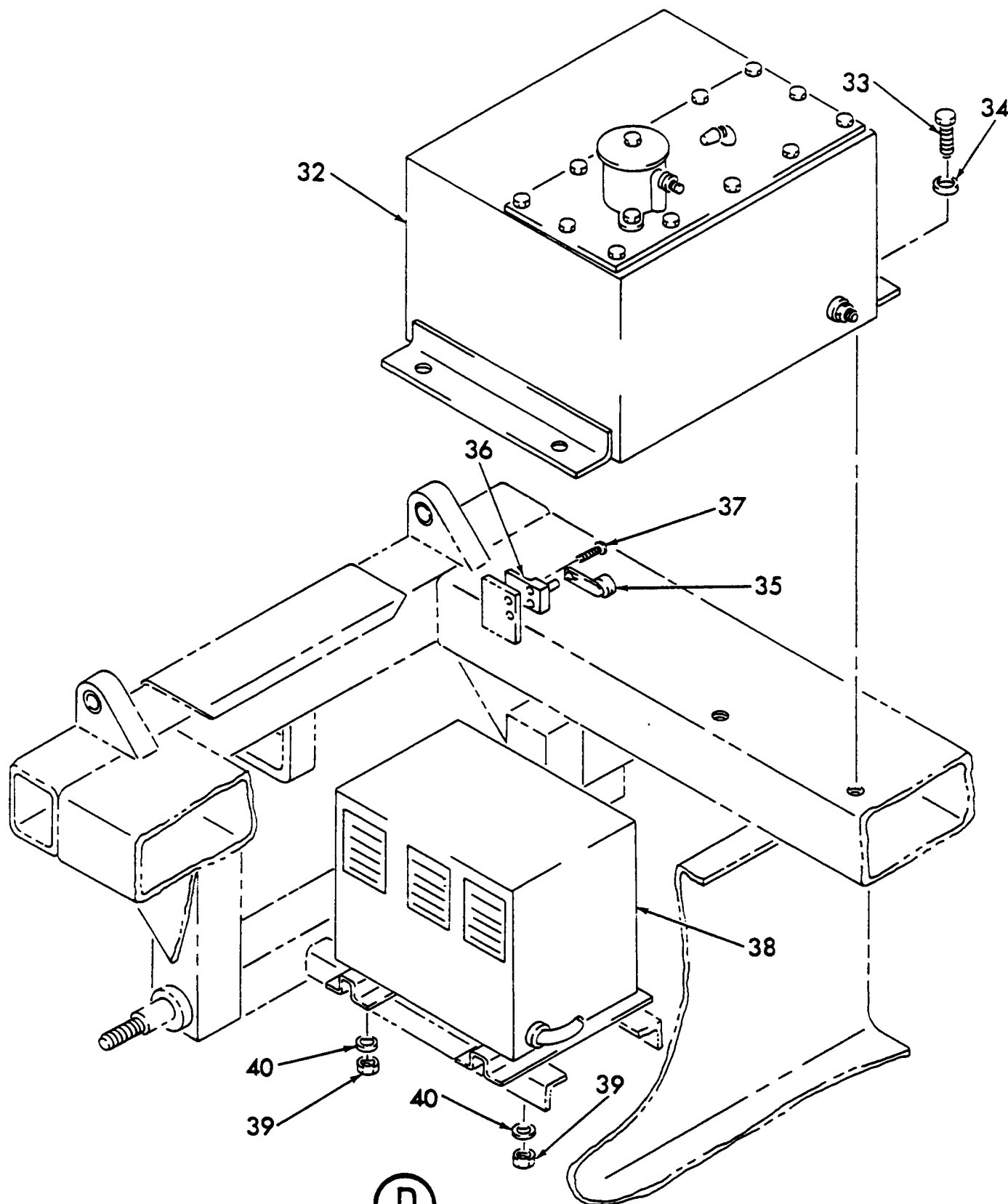
**M-15 T FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1B  
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REV.



(D)



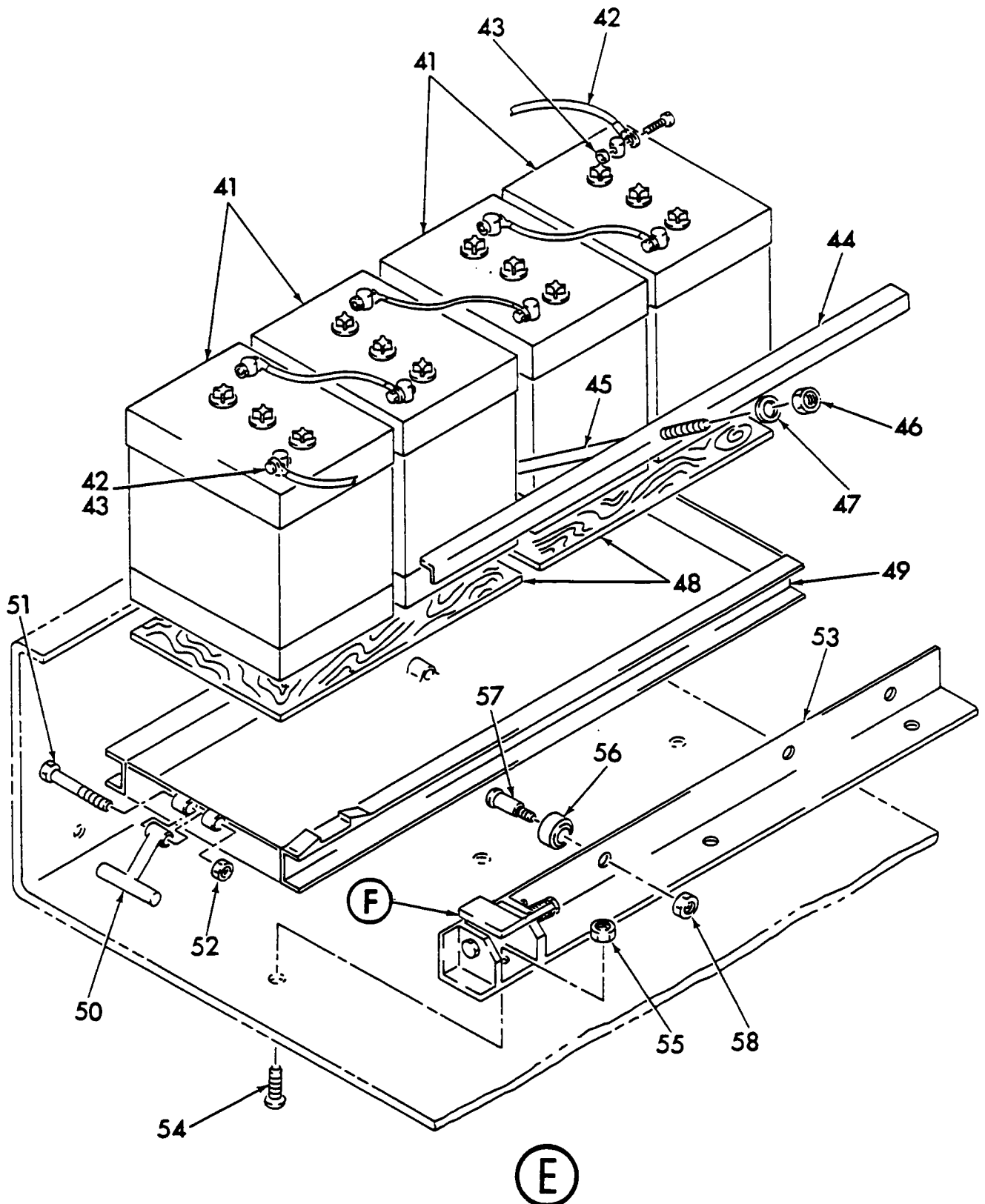
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PARTS CATALOG

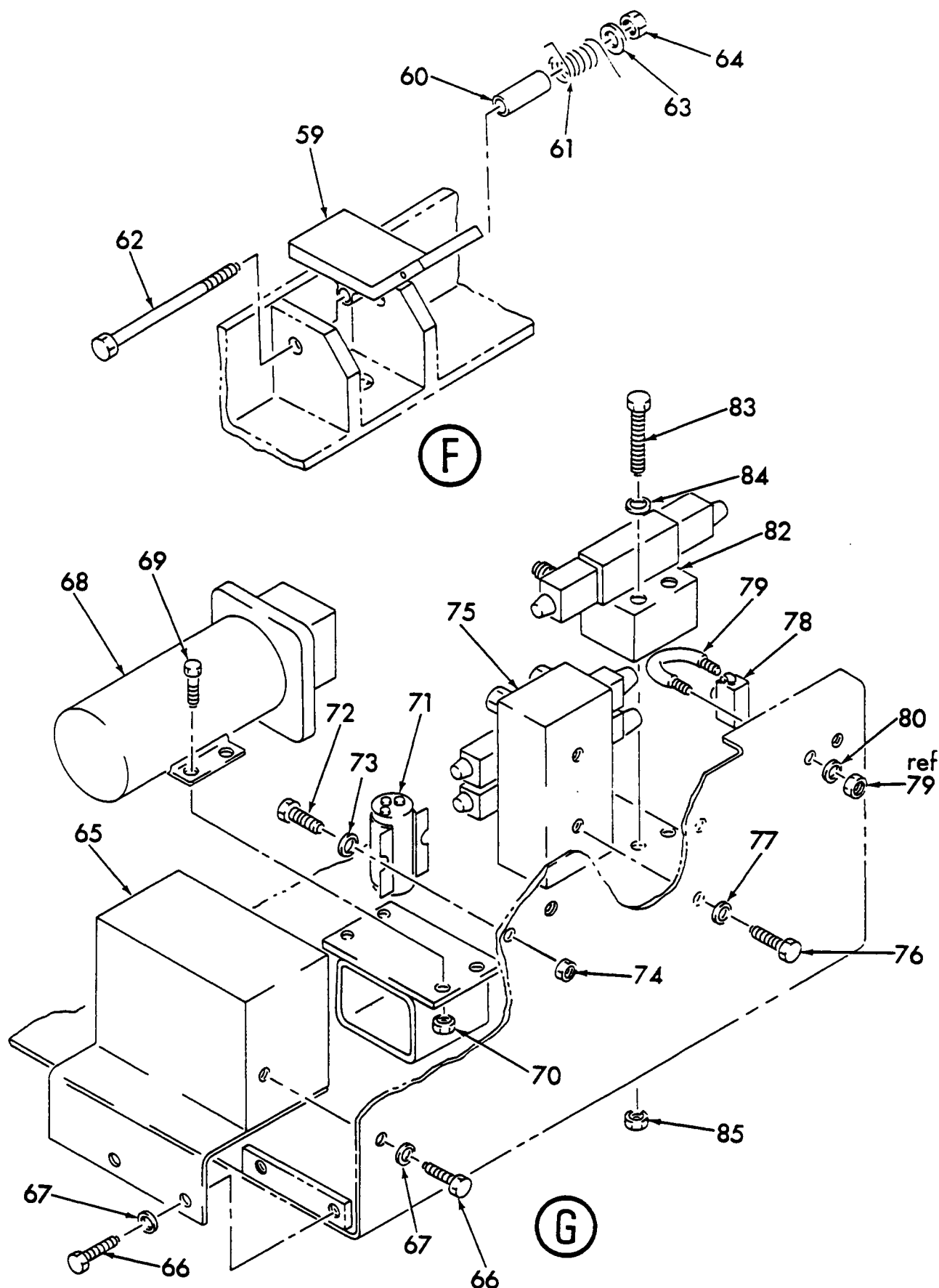
**M-15 T FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1B  
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REV.





ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131101	ASSEMBLY, FRAME (See Sect. 2, Fig. 1B for NHA)	REF
2	130975	.WELDMENT, FRAME	1
3	130945	.ASSEMBLY, TIE AND WHEEL	2
4	34044	.BOLT, CONE	10
5	31158	.MACHINING, DRIVE HUB	2
6	64306	.PIN, COTTER	2
7	130990	.ASSEMBLY, MOTOR DRIVE (See Sect. 3, Fig. 2 for Details)	1
8	131026	.WELDMENT, R.H. STEERING LEVER	1
9	60622	.SCREW, HEX HEAD CAP (attaching part)	2
10	130474	.PIN, STEERING	4
11	60338	.SCREW, HEX HEAD CAP (attaching part)	4
12	63302	.WASHER, LOCK SPLIT (attaching part)	4
13	130989	.ASSEMBLY, MOTOR DRIVE AND PARKING BRAKE (See Sect. 3, Fig. 3 for Details)	1
14	65658	.BEARING, THRUST	AR
15	131021	.WELDMENT, L.H. STEERING LEVER	1
16	64903	..BUSHING	2
17	60516	.SCREW, HEX HEAD CAP (attaching part)	1
18	60502	.SCREW, HEX HEAD CAP (attaching part)	1
19	61318	.NUT, LOCK (attaching part)	1
20	131115	.ASSEMBLY, TIE ROD (See Sect. 3, Fig. 4 for Details)	1
21	60393	.SCREW, HEX HEAD CAP (attaching part)	2
22	61247	.NUT, LOCK (attaching part)	2
23	130237	.ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 5 for Details)	1
24	20252	.PIN, STEERING CYLINDER ANCHOR	2



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
25	60353	.SCREW, HEX HEAD CAP (attaching part)	2
26	63301	.WASHER, SPLIT LOCK (attaching part)	2
27	130945	.ASSEMBLY, TIRE AND WHEEL	2
28	134	.ASSEMBLY, HUB	2
29	64306	.PIN, COTTER	2
30	60811	.NUT, SLOTTED HEX	2
31	63409	.WASHER, FLAT	2
32	131059	.ASSEMBLY, HYDRAULIC TANK (See Sect. 3, Fig. 6 for Details)	1
33	60338	.SCREW, HEX HEAD CAP (attaching part)	4
34	63302	.WASHER, SPLIT LOCK (attaching part)	4
35	70235	.LEVER, LIMIT SWITCH	1
36	70234	.SWITCH, MINI	
37	62620	.SCREW, ROUND HEAD(attaching part)	2
38	70321	.CHARGER, BATTERY	1
39	61312	.NUT (attaching part)	4
40	63041	.WASHER, FLAT (attaching part)	4
41	4007	.BATTERY	4
42	131036	.KIT, BATTERY CABLE	1
43	61246	.NUT, LOCK (attaching part)	2
44	130392	.BATTERY, HOLD DOWN	1
45	130733	.BOLT, HOLD DOWN	1
46	61302	.NUT, HEX (attaching part)	1
47	63403	.WASHER, FLAT (attaching part)	1
48	65768	.PLYWOOD	2
49	130725	.WELDMENT, BATTERY TRAY	1
50	130787	.WELDMENT, HANDLE	2

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**M-15 T FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1B  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
51	60339	.SCREW, HEX HEAD CAP (attaching part)	2
52	61246	.NUT, LOCK (attaching part)	2
53	130798	.WELDMENT, BATTERY TRAY BRACKET	1
54	61944	.SCREW, BUTTON HEAD SOCKET CAP (attaching part)	3
55	61318	.NUT, LOCK (attaching part)	3
56	7073	.ROLLER, BATTERY TRAY	8
57	62101	.SCREW, SOCKET HEAD SHOULDER (attaching part)	8
58	61318	.NUT, LOCK (attaching part)	8
59	130785	.WELDMENT, BELLY PAN LOCK	1
60	36437	.TUBE, ROUND	1
61	130482	.SPRING, R.H. TENSION	1
62	60344	.SCREW, HEX HEAD CAP (attaching part)	1
63	63403	.WASHER, FLAT (attaching part)	1
64	61318	.NUT, LOCK (attaching part)	1
65	131098	.ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Fig. 7B for Details)	1
66	60324	.SCREW, HEX HEAD CAP (attaching part)	3
67	63302	.WASHER, SPLIT LOCK (attaching part)	3
68	131075	.ASSEMBLY, PUMP MOTOR (See Sect. 3, Fig. 8 for Details)	1
69	60338	.SCREW, HEX HEAD CAP (attaching part)	4
70	61246	.NUT, LOCK (attaching part)	4
71	70362	.RELAY, POWER	1
72	63359	.SCREW, HEX HEAD CAP (attaching part)	2
73	63041	.WASHER, FLAT (attaching part)	2
74	61312	.NUT (attaching part)	2

REV.

- ITEM NOT ILLUSTRATED





ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
75	131111	.ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 9B for Details)	1
76	60343	.SCREW, HEX HEAD CAP (attaching part)	2
77	63403	.WASHER, FLAT (attaching part)	2
78	30884	.VALVE, FLOW CONTROL	1
79	65365	.U-BOLT WITH NUTS	1
80	63041	.WASHER, FLAT (attaching part)	2
81	131077	.ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 10 for Details)	1
82	131112	.ASSEMBLY, TRAVERSING VALVE (See Sect. 3, Fig. 11 for Details)	1
83	60362	.SCREW, HEX HEAD CAP (attaching part)	2
84	63402	.WASHER, FLAT (attaching part)	2
85	61246	.NUT, LOCK (attaching part)	2

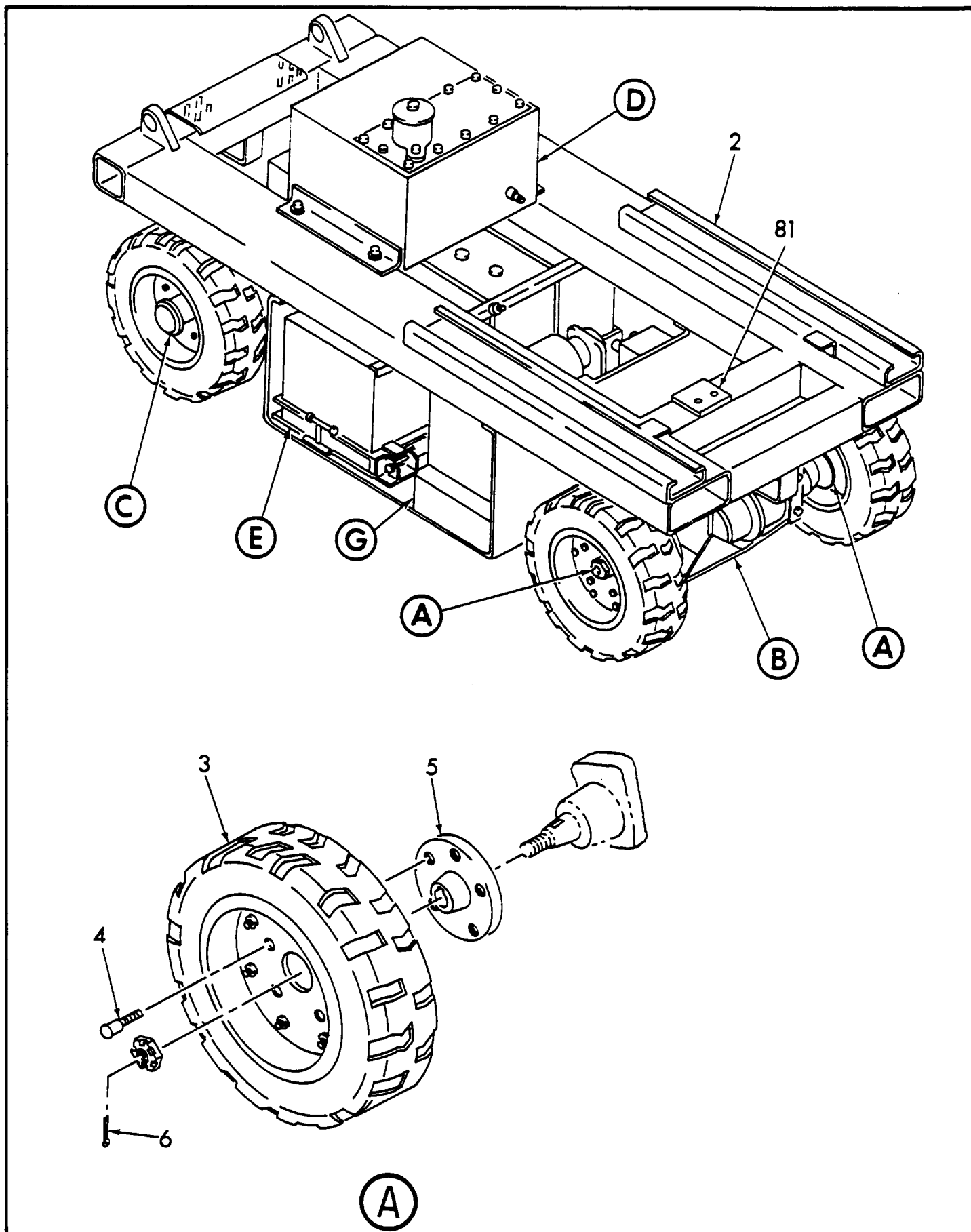


**Mark Industries**

ILLUSTRATED  
PARTS CATALOG

**M-15EP FRAME ASSEMBLY**

PARTS  
SECT. 3  
FIG. 1C  
PAGE 1

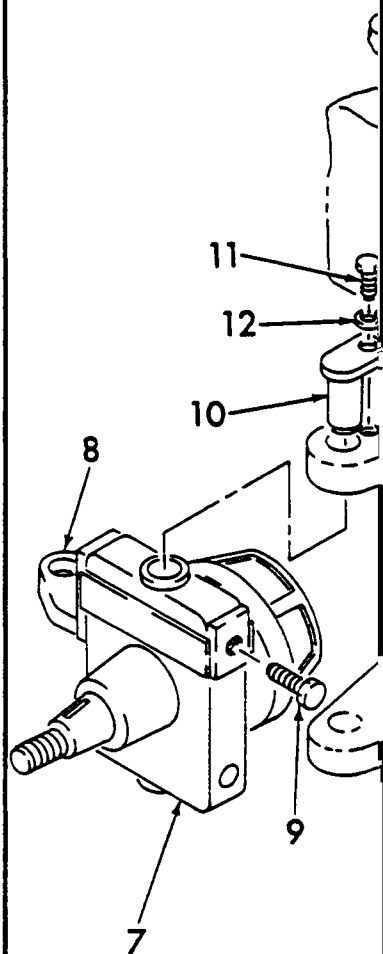


REV.



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PARTS CATALOG



REV.



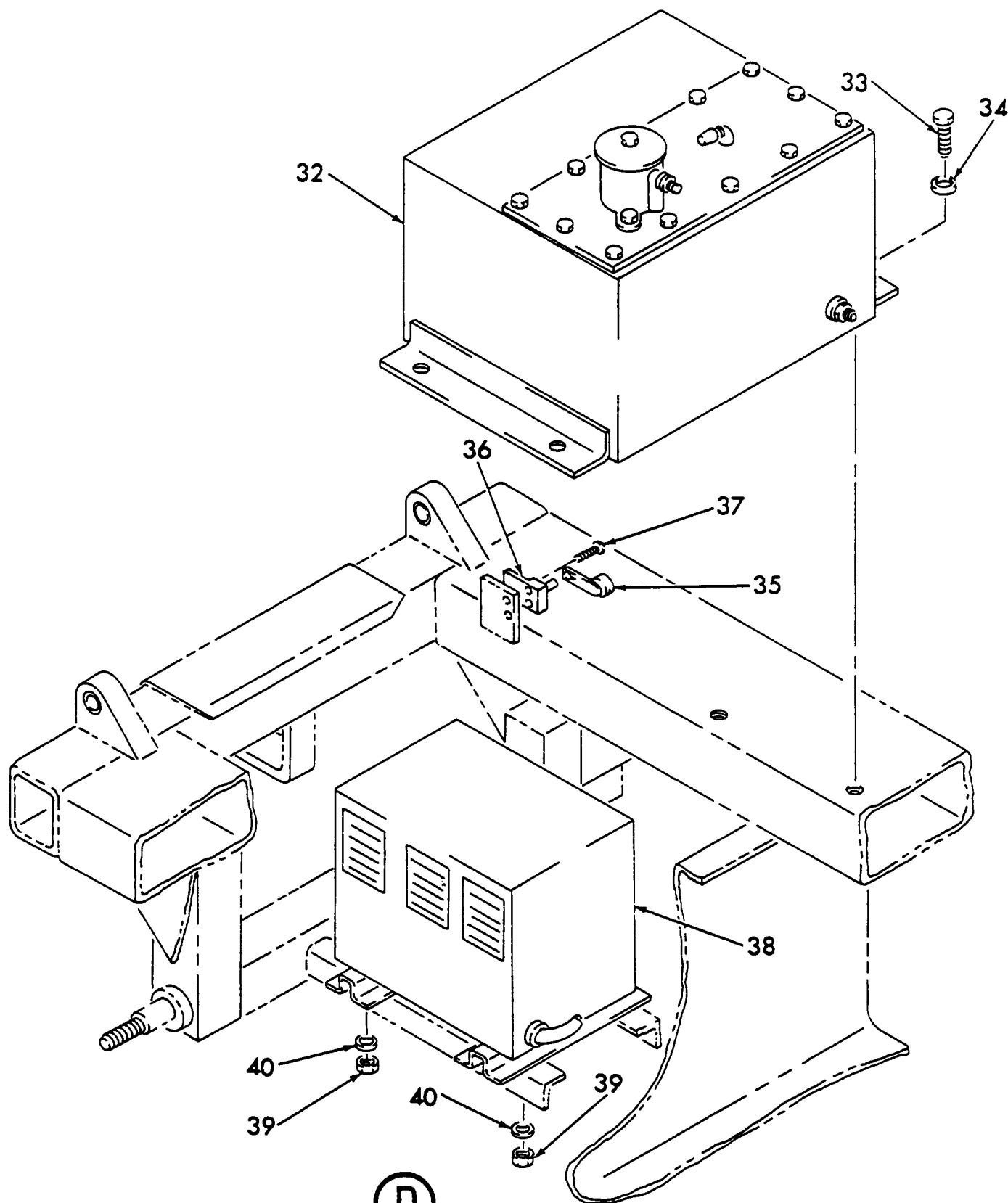
**Mark Industries**

ILLUSTRATED  
PARTS CATALOG

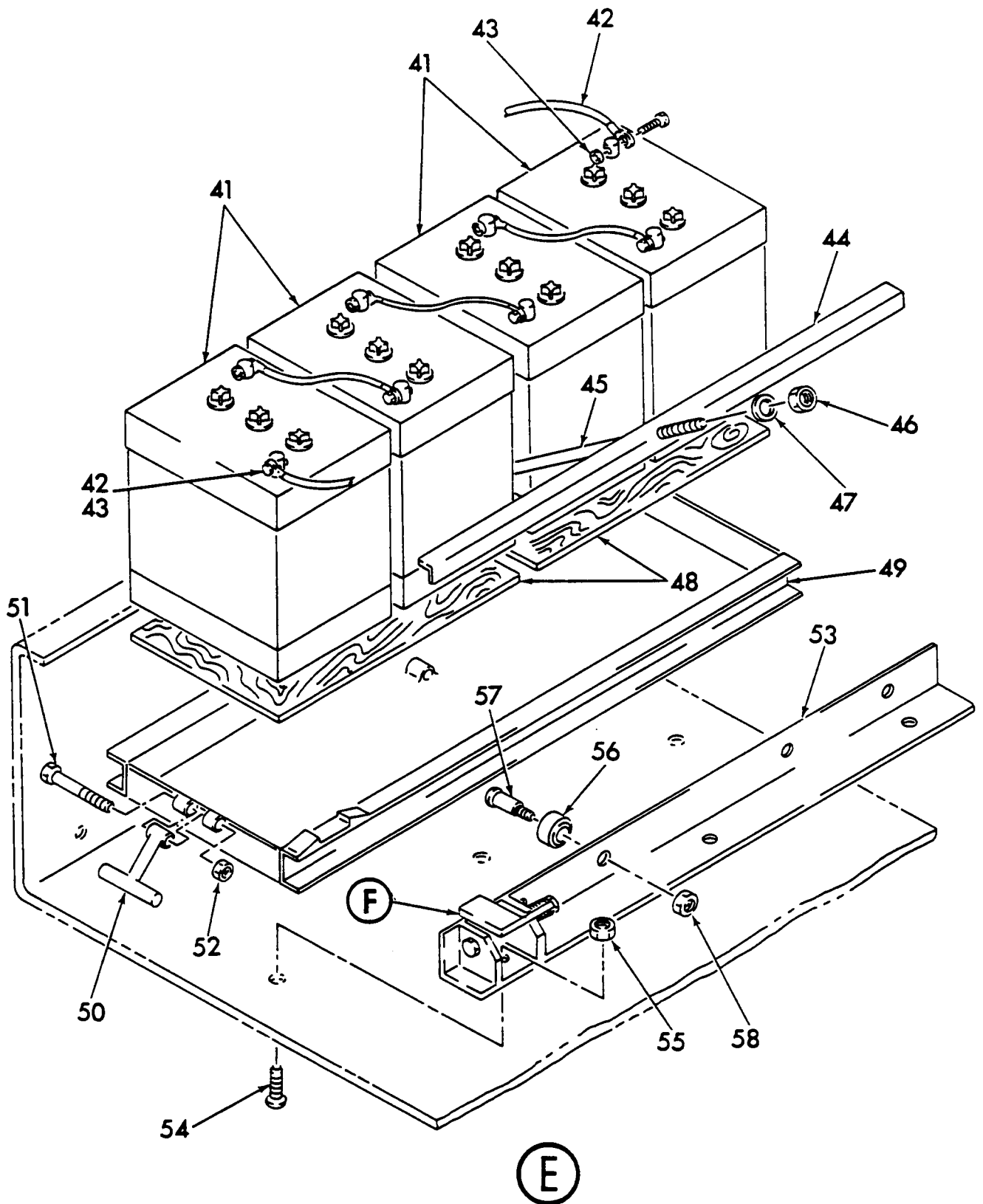
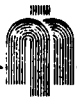
**M-15EP FRAME ASSEMBLY**

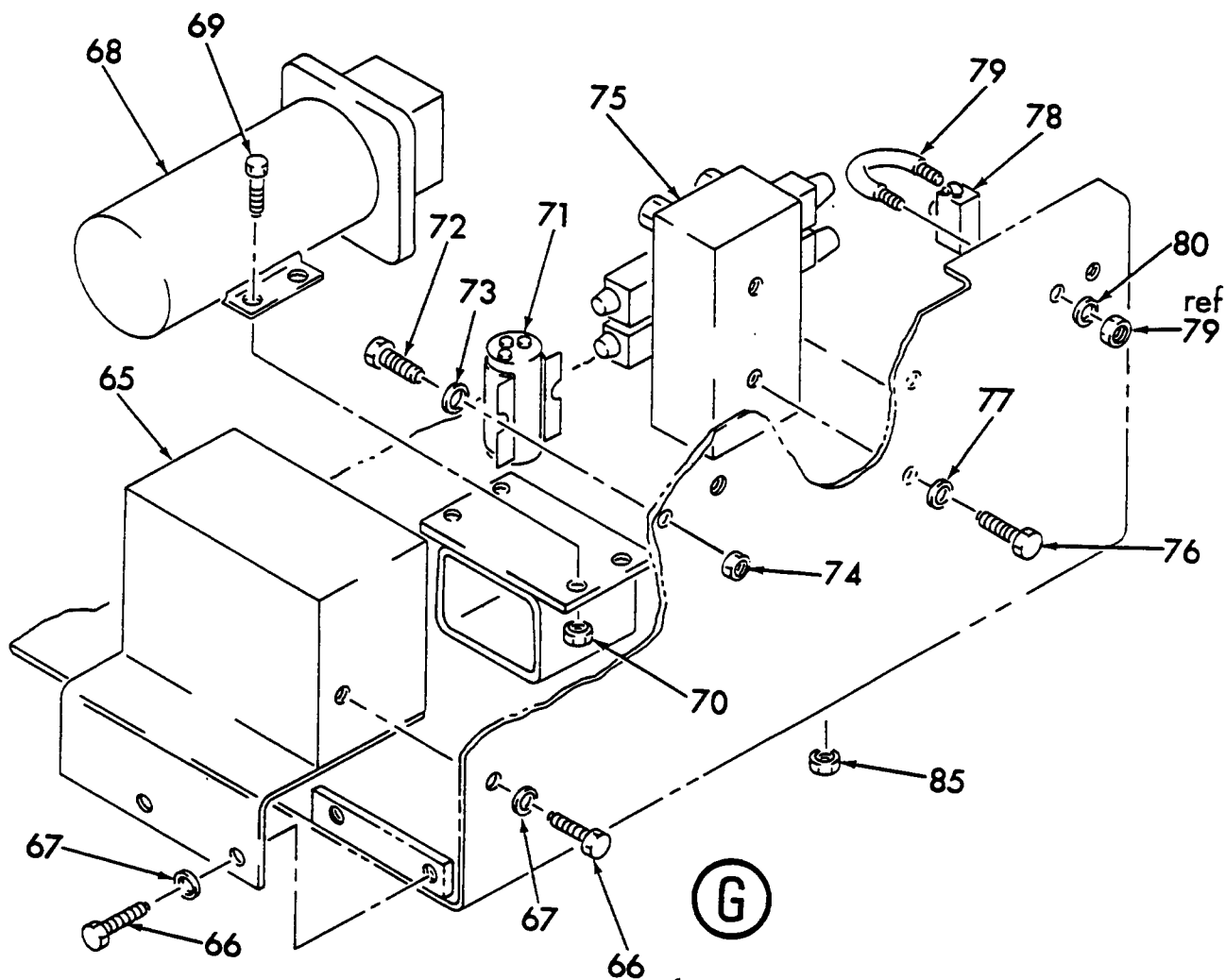
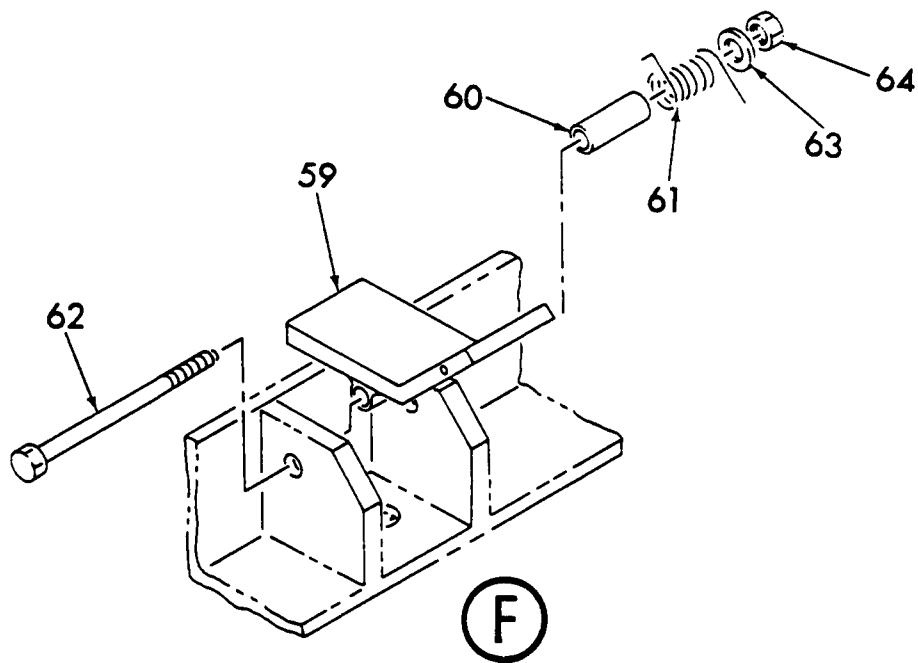
(CONTINUED)

PARTS  
SECT. 3  
FIG. 1C  
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REV.





**Mark Industries**

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PARTS CATALOG

**M-15EP FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1C  
PAGE 6

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130974	ASSEMBLY, FRAME (See Sect. 2, Fig. 1C for NHA)	REF
2	130975	.WELDMENT, FRAME	1
3	130945	.ASSEMBLY, TIE AND WHEEL	2
4	34044	.BOLT, CONE	10
5	31158	.MACHINING, DRIVE HUB	2
6	64306	.PIN, COTTER	2
7	130990	.ASSEMBLY, MOTOR DRIVE (See Sect. 3, Fig. 2 for Details)	1
8	131026	.WELDMENT, R.H. STEERING LEVER	1
9	60622	.SCREW, HEX HEAD CAP (attaching part)	2
10	130474	.PIN, STEERING	4
11	60338	.SCREW, HEX HEAD CAP (attaching part)	4
12	63302	.WASHER, LOCK SPLIT (attaching part)	4
13	130989	.ASSEMBLY, MOTOR DRIVE AND PARKING BRAKE (See Sect. 3, Fig. 3 for Details)	1
14	65658	.BEARING, THRUST	AR
15	131021	.WELDMENT, L.H. STEERING LEVER	1
16	64903	..BUSHING	2
17	60516	.SCREW, HEX HEAD CAP (attaching part)	1
18	60502	.SCREW, HEX HEAD CAP (attaching part)	1
19	61318	.NUT, LOCK (attaching part)	1
20	131115	.ASSEMBLY, TIE ROD (See Sect. 3, Fig. 4 for Details)	1
21	60393	.SCREW, HEX HEAD CAP (attaching part)	2
22	61247	.NUT, LOCK (attaching part)	2
23	130237	.ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 5 for Details)	1
24	20252	.PIN, STEERING CYLINDER ANCHOR	2

REV.

- ITEM NOT ILLUSTRATED

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PARTS CATALOG

**M-15EP FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1C  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
25	60353	.SCREW, HEX HEAD CAP (attaching part)	2
26	63301	.WASHER, SPLIT LOCK (attaching part)	2
27	130945	.ASSEMBLY, TIRE AND WHEEL	2
28	134	.ASSEMBLY, HUB	2
29	64306	.PIN, COTTER	2
30	60811	.NUT, SLOTTED HEX	2
31	63409	.WASHER, FLAT	2
32	131059	.ASSEMBLY, HYDRAULIC TANK (See Sect. 3, Fig. 6 for Details)	1
33	60338	.SCREW, HEX HEAD CAP (attaching part)	4
34	63302	.WASHER, SPLIT LOCK (attaching part)	4
35	70235	.LEVER, LIMIT SWITCH	1
36	70234	.SWITCH, MINI	
37	62620	.SCREW, ROUND HEAD(attaching part)	2
38	70321	.CHARGER, BATTERY	1
39	61312	.NUT (attaching part)	4
40	63041	.WASHER, FLAT (attaching part)	4
41	4007	.BATTERY	4
42	131036	.KIT, BATTERY CABLE	1
43	61246	.NUT, LOCK (attaching part)	2
44	130392	.BATTERY, HOLD DOWN	1
45	130733	.BOLT, HOLD DOWN	1
46	61302	.NUT, HEX (attaching part)	1
47	63403	.WASHER, FLAT (attaching part)	1
48	65768	.PLYWOOD	2
49	130725	.WELDMENT, BATTERY TRAY	1
50	130787	.WELDMENT, HANDLE	2

REV.

- ITEM NOT ILLUSTRATED



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PARTS CATALOG

**M-15 EP FRAME ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 1C  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
51	60339	.SCREW, HEX HEAD CAP (attaching part)	2
52	61246	.NUT, LOCK (attaching part)	2
53	130798	.WELDMENT, BATTERY TRAY BRACKET	1
54	61944	.SCREW, BUTTON HEAD SOCKET CAP (attaching part)	3
55	61318	.NUT, LOCK (attaching part)	3
56	7073	.ROLLER, BATTERY TRAY	8
57	62101	.SCREW, SOCKET HEAD SHOULDER (attaching part)	8
58	61318	.NUT, LOCK (attaching part)	8
59	130785	.WELDMENT, BELLY PAN LOCK	1
60	36437	.TUBE, ROUND	1
61	130482	.SPRING, R.H. TENSION	1
62	60344	.SCREW, HEX HEAD CAP (attaching part)	1
63	63403	.WASHER, FLAT (attaching part)	1
64	61318	.NUT, LOCK (attaching part)	1
65	131040	.ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Fig. 7C for Details)	1
66	60324	.SCREW, HEX HEAD CAP (attaching part)	3
67	63302	.WASHER, SPLIT LOCK (attaching part)	3
68	131075	.ASSEMBLY, PUMP MOTOR (See Sect. 3, Fig. 8 for Details)	1
69	60338	.SCREW, HEX HEAD CAP (attaching part)	4
70	61246	.NUT, LOCK (attaching part)	4
71	70362	.RELAY, POWER	1
72	63359	.SCREW, HEX HEAD CAP (attaching part)	2
73	63041	.WASHER, FLAT (attaching part)	2
74	61312	.NUT (attaching part)	2

REV.

- ITEM NOT ILLUSTRATED

**Mark Industries**

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PARTS CATALOG

**M-15EP FRAME ASSEMBLY**

(CONTINUED)

PARTS

SECT. 3

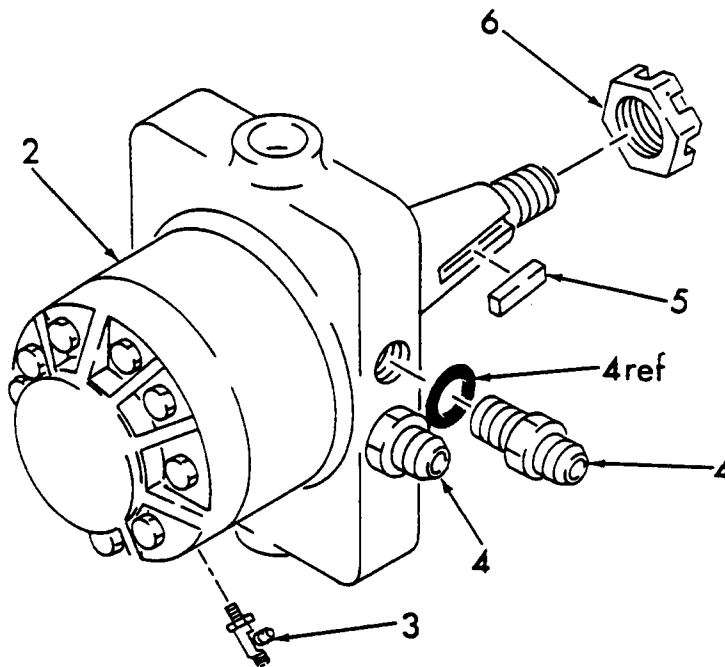
FIG. 1C

PAGE 9

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
75	131078	.ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 9C for Details)	1
76	60343	.SCREW, HEX HEAD CAP (attaching part)	2
77	63403	.WASHER, FLAT (attaching part)	2
78	30884	.VALVE, FLOW CONTROL	1
79	65365	.U-BOLT WITH NUTS	1
80	63041	.WASHER, FLAT (attaching part)	2
81	131077	.ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 10 for Details)	1

REV.

- ITEM NOT ILLUSTRATED

**MOTOR DRIVE ASSEMBLY**

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130990	ASSEMBLY, MOTOR DRIVE (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	81154	.DRIVE, MOTOR	1
-2A	67477	..KIT, SEAL	1
3	80033-03	.TEE, STRAIGHT THREAD RUN	1
4	80004-08	.CONNECTOR, STRAIGHT THREAD	2
5	65174	.KEY, WOODRUFF	1
6		.NUT, HEX	1

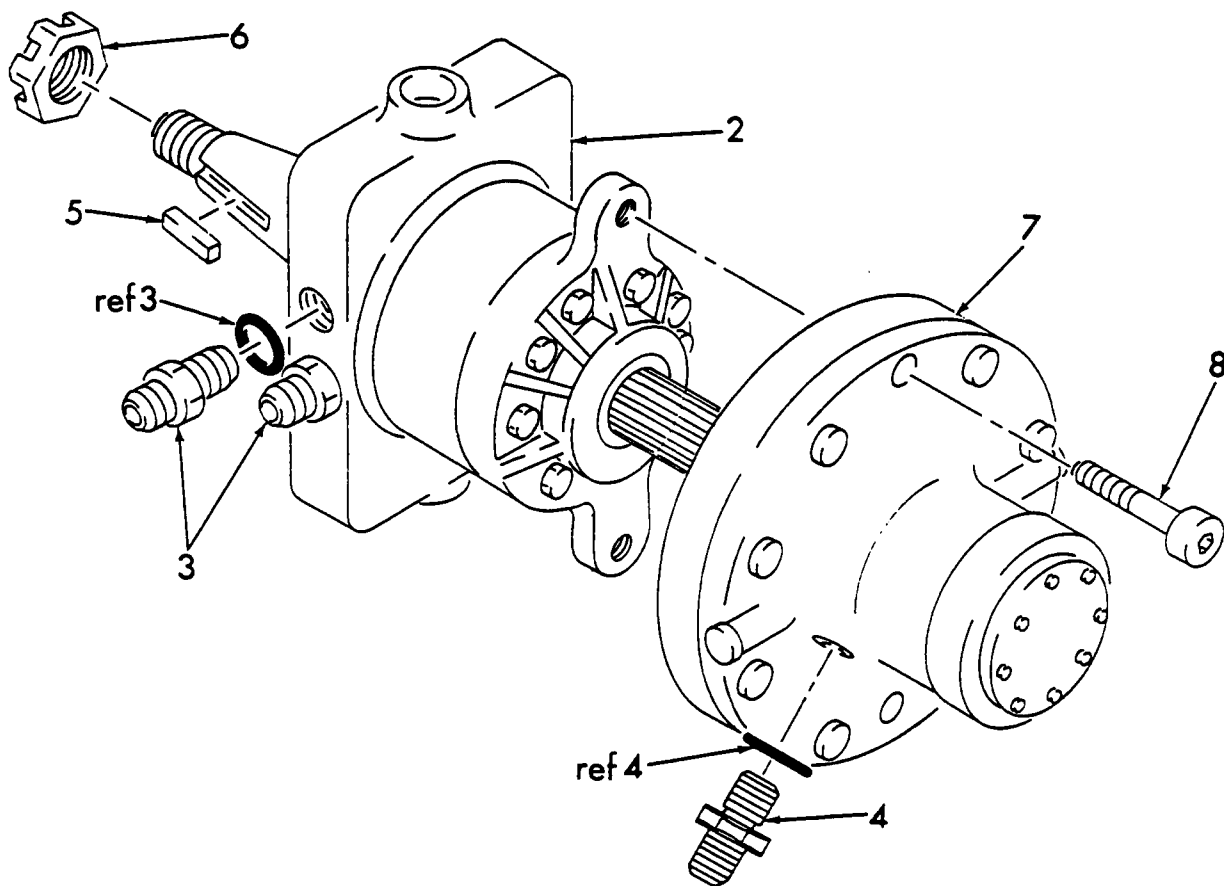


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PARTS CATALOG

**MOTOR DRIVE AND PARKING BRAKE ASSEMBLY**

PARTS  
SECT. 3  
FIG. 3  
PAGE 1

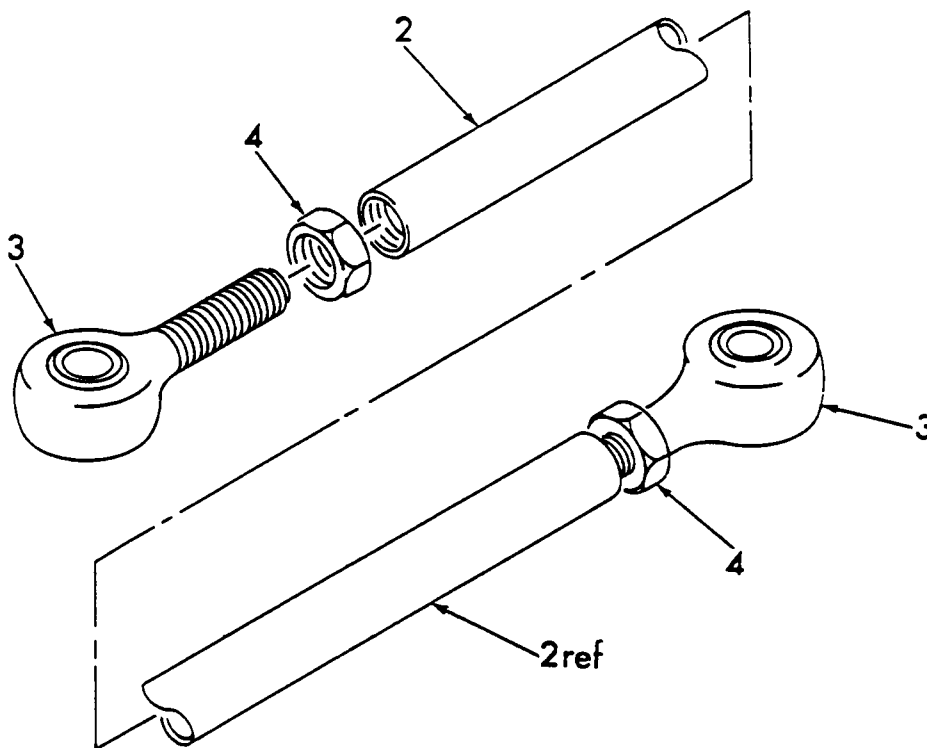


ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130989	ASSEMBLY, MOTORDRIVE & PARKING BRAKE (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	81153	.DRIVE, MOTOR	1
-2A	67478	..KIT, SEAL	1
3	80004-08	.CONNECTOR, STRAIGHT THREAD	2
4	80004-03	.CONNECTOR, STRAIGHT THREAD	1
5	65174	.KEY, WOODRUFF	1
6		.NUT, HEX	1
7	81155	.BRAKE, MULTIPLE DISC (66852 Seal Kit)	1
8	61935	.SCREW, CAP (attaching part)	2

REV.1

- ITEM NOT ILLUSTRATED

TIE ROD ASSEMBLY



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131115	ASSEMBLY, TIE ROD (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	131114	.ROD, TIE	1
3	2274	.END, TIE ROD	2
4	60901	.NUT, HEX JAM	2

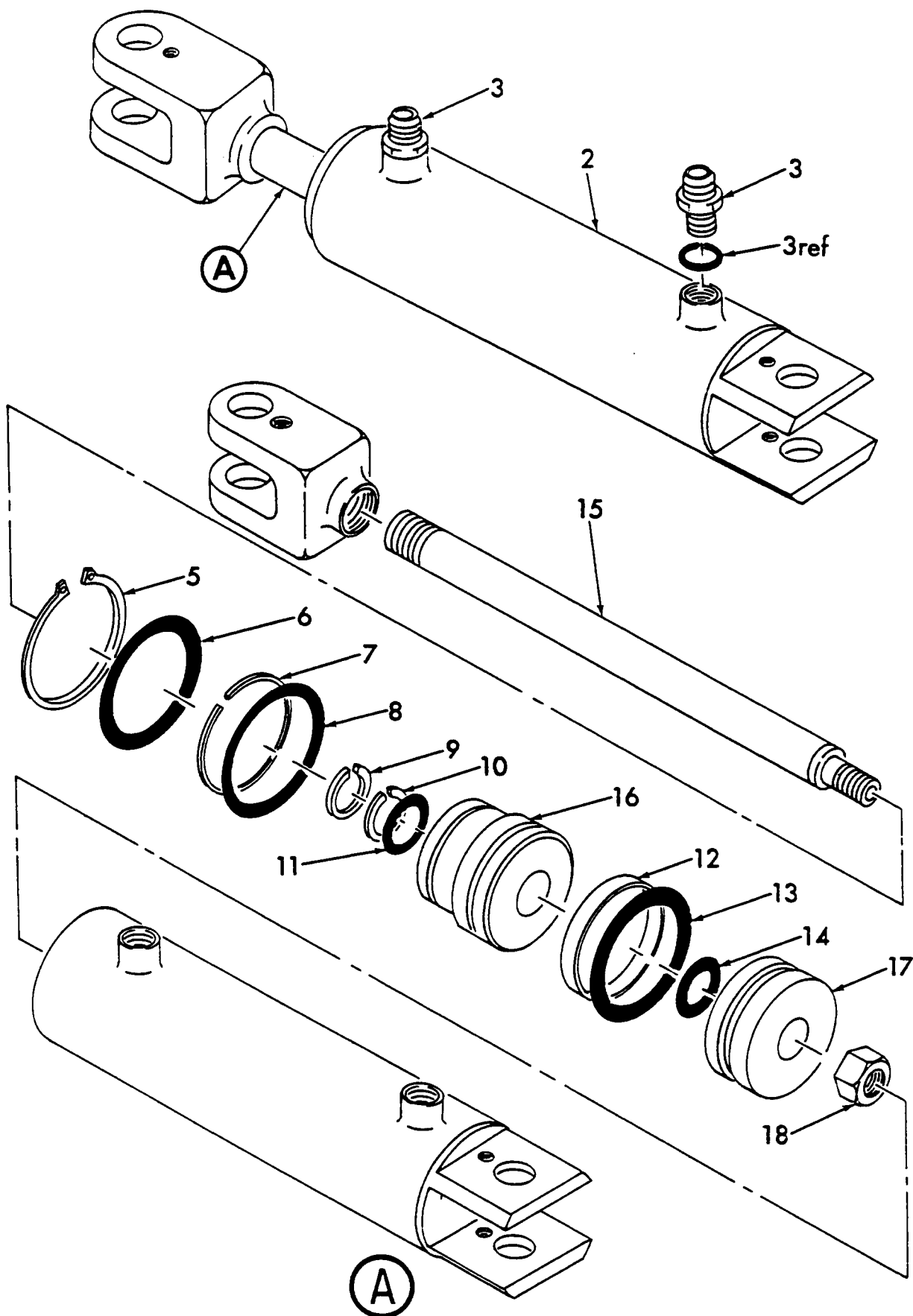


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PARTS CATALOG

STEERING CYLINDER ASSEMBLY

PARTS  
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FIG. 5  
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REV.

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**STEERING CYLINDER ASSEMBLY**

(CONTINUED)

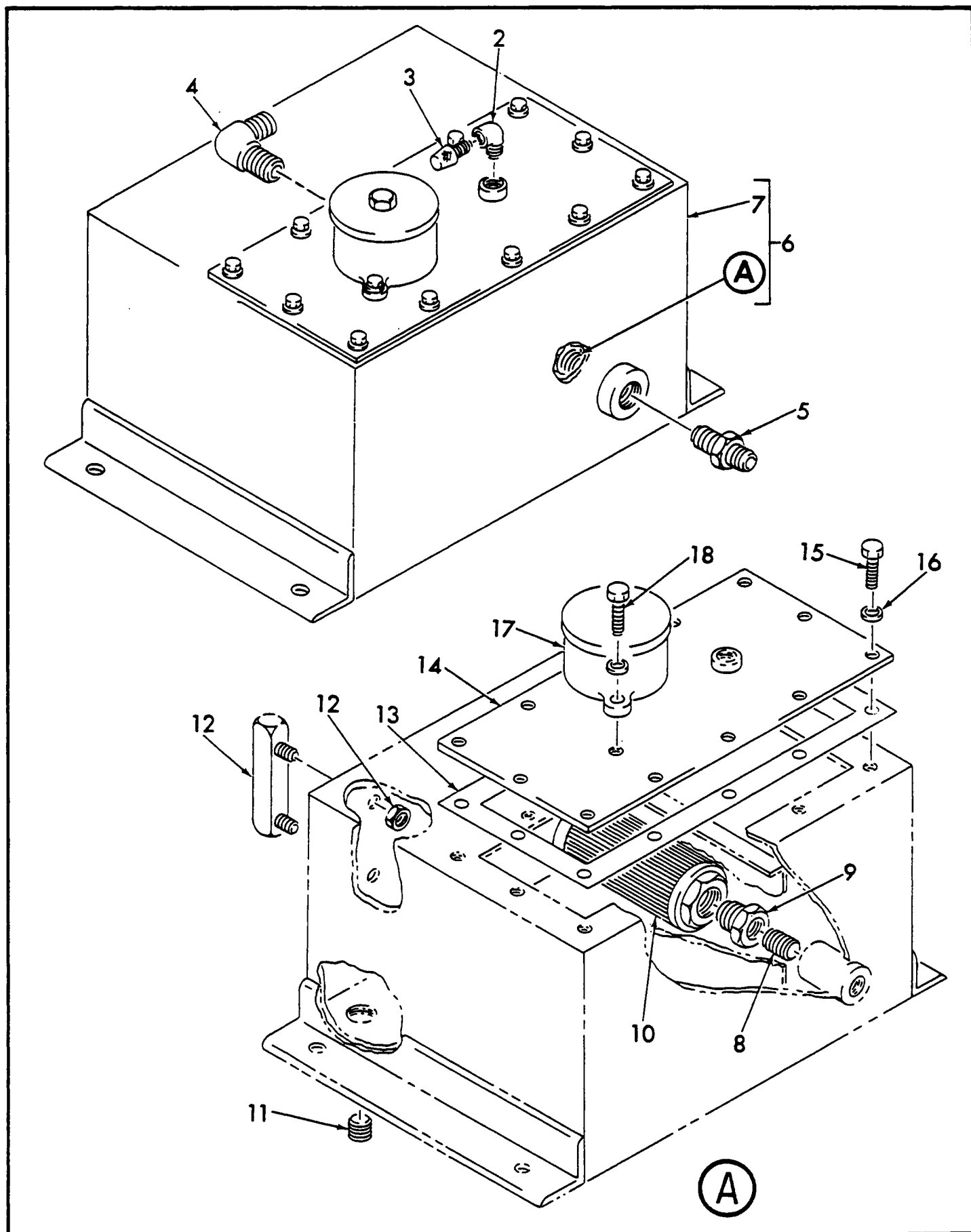
PARTS  
SECT. 3  
FIG. 5  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130237	ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	130165	.CYLINDER, STEERING	1
3	80004-03	.CONNECTOR, STRAIGHT THREAD	2
4	66640	.KIT, SEAL	1
5		..RING, RETAINER	1
6		..RING, LOCK	1
7		..WASHER, BACK UP	1
8		..O-RING	1
9		..SEAL, WIPER	1
10		..WASHER, BACK UP	1
11		..O-RING	1
12		..RING, SLIPPER	1
13		..O-RING	1
14		..O-RING	1
15		.ROD, CHROME PLATED	1
16		.BEARING	1
17		.PISTON	1
18		.NUT, LOCK	1

REV.

- ITEM NOT ILLUSTRATED

HYDRAULIC TANK ASSEMBLY





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PARTS CATALOG

**HYDRAULIC TANK ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 6  
PAGE 2

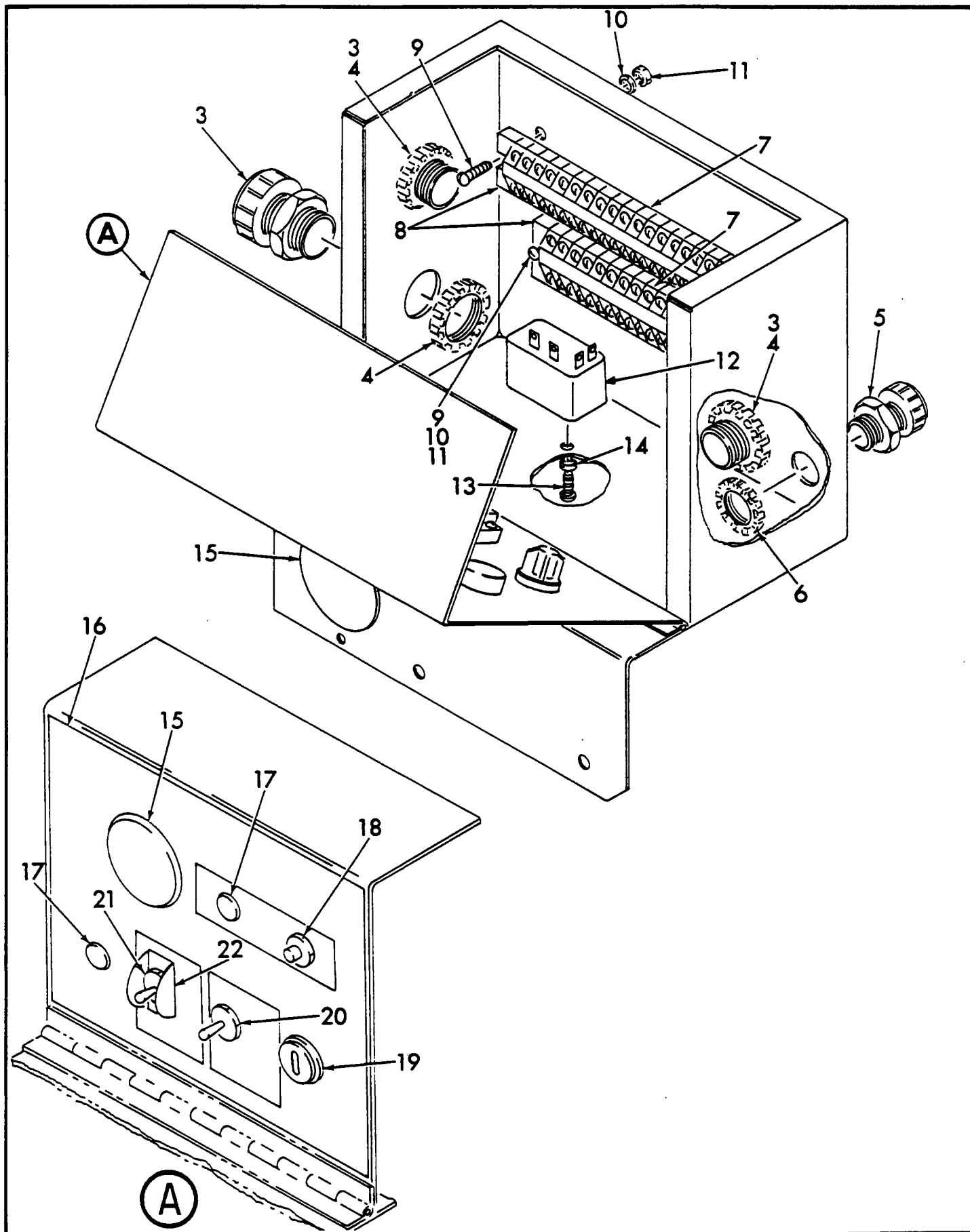
ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131059	ASSEMBLY, HYDRAULIC TANK (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	80021-03	.ELBOW, STREET	1
3	65213	.BREATHER	1
4	80008-11	.ELBOW, MALE	1
5	80001-20	.CONNECTOR, MALE	1
6	131058	.SUB-ASSEMBLY, HYDRAULIC TANK	1
7	131057	..WELDMENT, TANK	1
8	80052-09	..NIPPLE, PIPE	1
9	80057-16	..REDUCER, PIPE THREAD	1
10	81084	..STRAINER	1
11	54200	..PLUG, MAGNETIC PIPE	1
12	3018	..GAUGE, SIGHT	1
13	131056	..GASKET	1
14	131060	..COVER, TANK	1
15	60342	..SCREW, CAP (attaching part)	12
16	63301	..WASHER, LOCK (attaching part)	12
17	81016	..FILTER	1
18	60342	..SCREW, CAP (attaching part)	2
19	63301	..WASHER, LOCK (attaching part)	2

REV.

- ITEM NOT ILLUSTRATED

**M-15 GROUND CONTROL BOX ASSEMBLY**

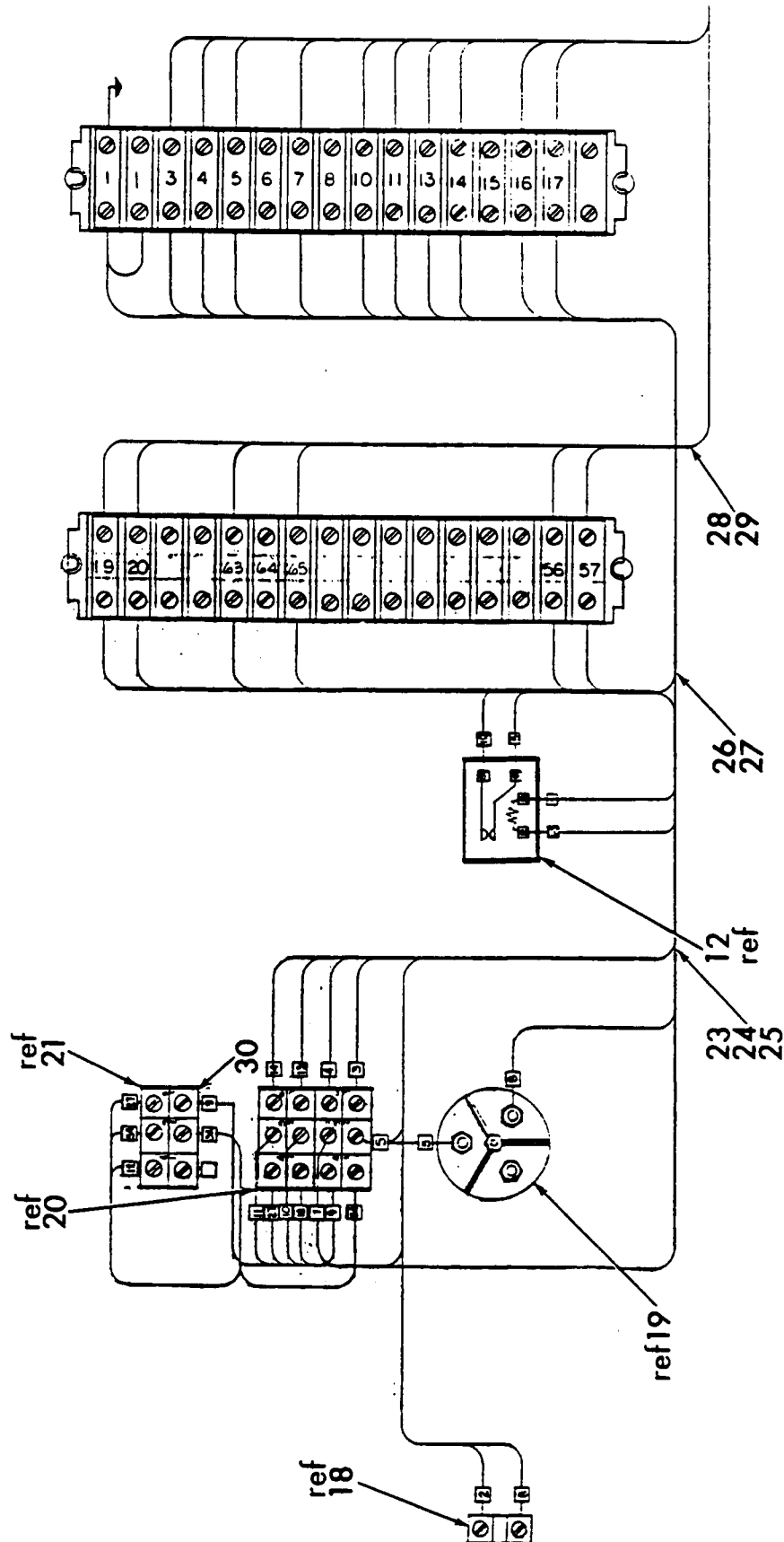
PARTS  
SECT. 3  
FIG. 7A  
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REV.

**M-15 GROUND CONTROL ASSEMBLY**

(CONTINUED)



WIRING DIAGRAM

131076

REV.

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PARTS CATALOG

**M-15 GROUND CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 7A  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131076	ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Fig. 1A for NHA)	REF
2	32390	.BOX, GROUND CONTROL	1
3	2807	.RELIEF, STRAIN	3
4	2809	.NUT, LOCK	3
5	2806	.RELIEF, STRAIN	1
6	2808	.NUT, LOCK	1
7	4027	.BLOCK, TERMINAL	32
8	117-A	.END, TERMINAL BLOCK	4
9	62612	.SCREW, CAP (attaching part)	6
10	63312	.WASHER, LOCK (attaching part)	6
11	61502	.NUT, HEX (attaching part)	6
12	70337	.RELAY, TIME DELAY	1
13	61728	.SCREW (attaching part)	1
14	63322	.WASHER, LOCK (attaching part)	1
15	65244	.PLUG	2
16	130505	.DECAL	1
17	771	.PLUG, WHITE	2
18	20562	.BREAKER, CIRCUIT	1
19	2717	.SWITCH, IGNITION	1
20	16260	.SWITCH, SELECTOR	1
21	20481	.SWITCH, TOGGLE	1
22	20884	.GUARD, SWITCH	1
23	4034	.CABLE (3 FT)	AR
24	70008	.WIRE, YELLOW (3 FT)	AR
25	70231	.WIRE, RED (1 FT)	AR
26	2991	.WIRE, WHITE (1 FT)	AR

REV.

- ITEM NOT ILLUSTRATED

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PARTS CATALOG

**M-15 GROUND CONTROL ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 7A  
PAGE 4

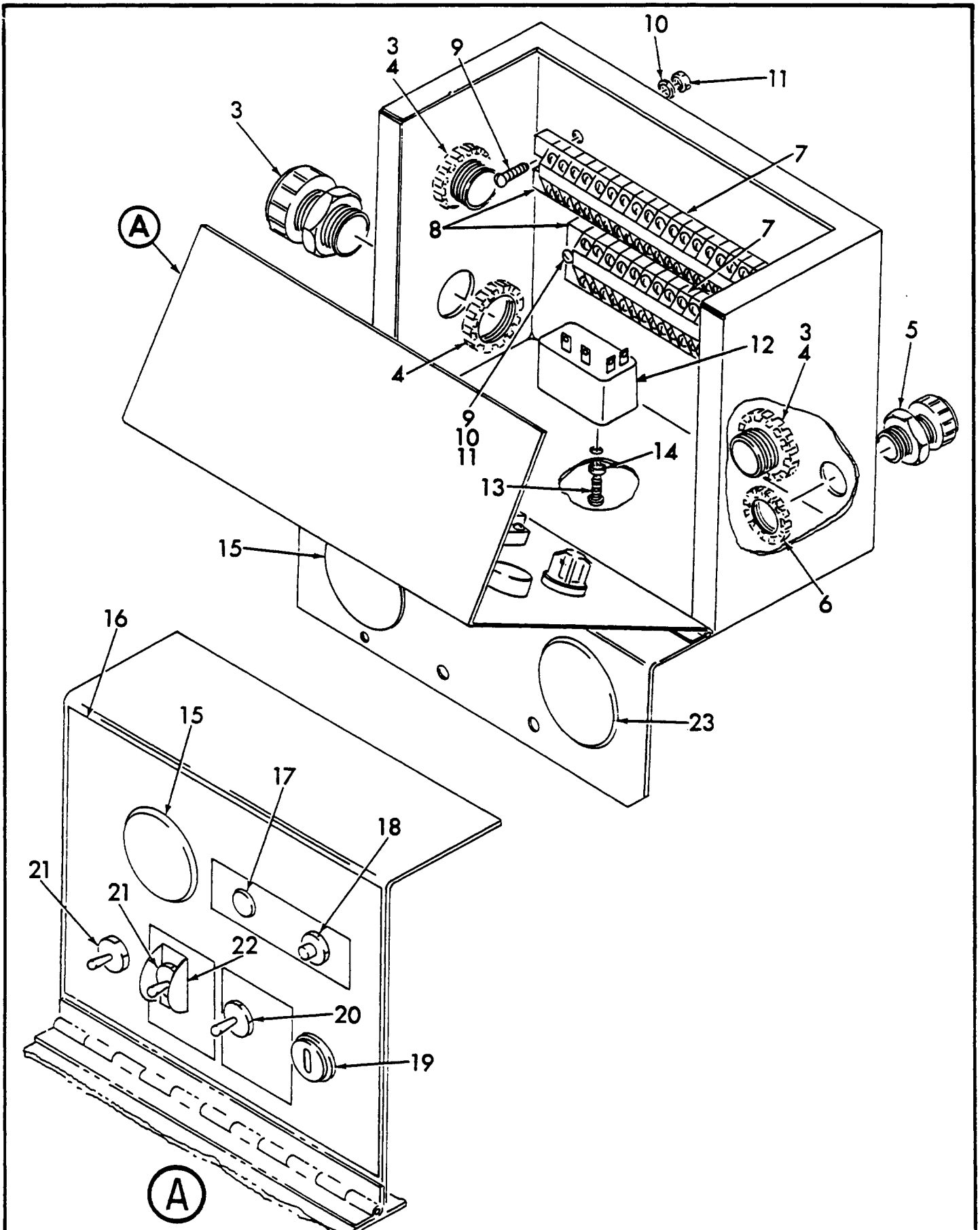
ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	2990	.WIRE, WHITE (12 FT)	AR
28	70232	.WIRE, WHITE (2 FT)	AR
29	70233	.WIRE, WHITE (2 FT)	AR
30	117-C	.RING, CONNECTOR	33
-31	16213	.CONNECTOR	6

REV.

- ITEM NOT ILLUSTRATED

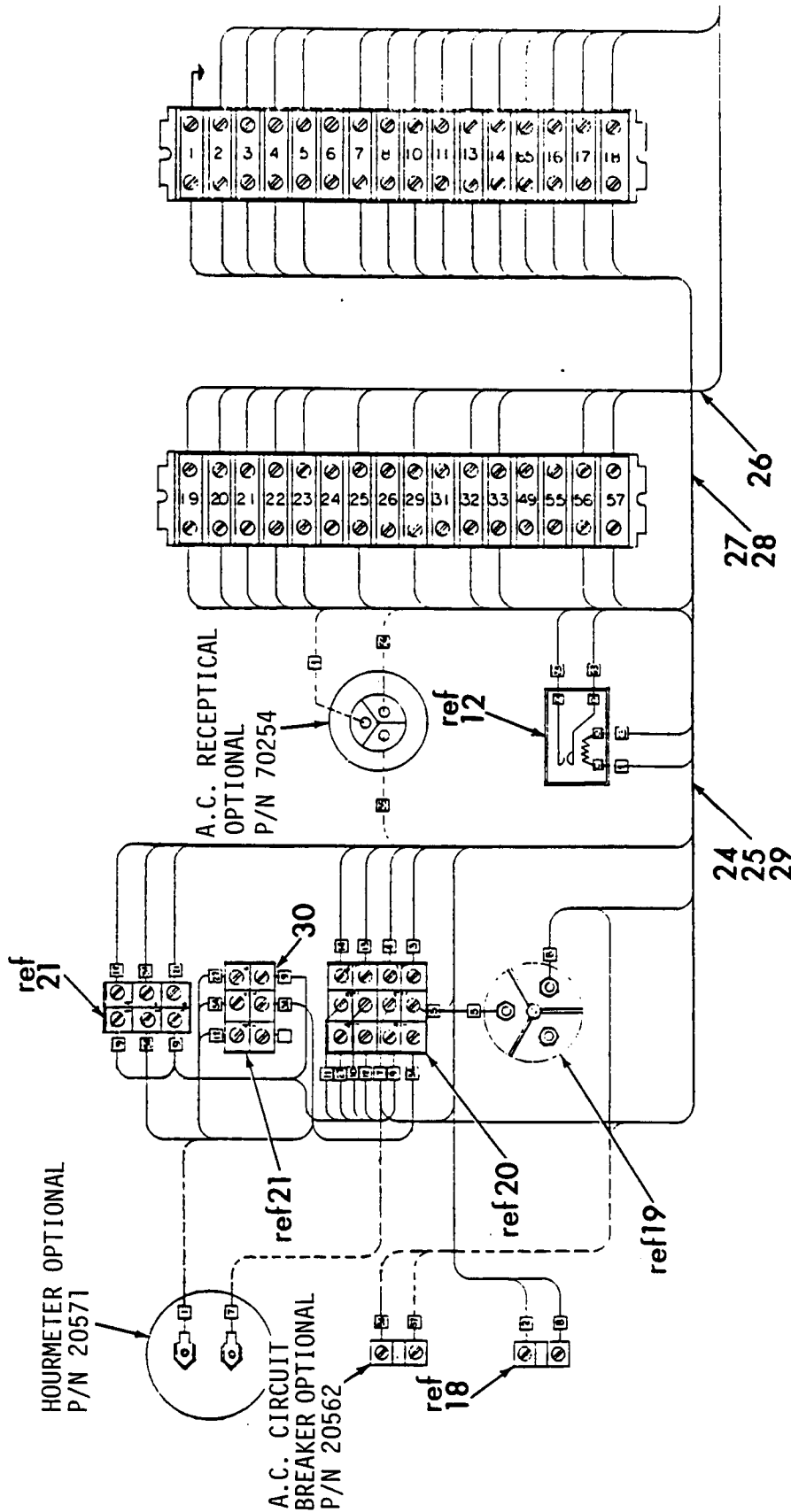
**M-15 T GROUND CONTROL BOX ASSEMBLY**

PARTS  
SECT. 3  
FIG. 7B  
PAGE 1



**M-15 T GROUND CONTROL BOX ASSEMBLY**

(CONTINUED)



WIRING DIAGRAM

131098

REV.



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131098	ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Figure 1B for NHA)	REF
2	32390	.BOX, GROUND CONTROL	1
3	2807	.RELIEF, STRAIN	3
4	2809	.NUT, LOCK	3
5	2806	.RELIEF, STRAIN	1
6	2808	.NUT, LOCK	1
7	4027	.BLOCK, TERMINAL	32
8	117-A	.END, TERMINAL BLOCK	4
9	62612	.SCREW, CAP (attaching part)	6
10	63312	.WASHER, LOCK (attaching part)	6
11	61502	.NUT, HEX (attaching part)	6
12	70337	.RELAY, TIME DELAY	1
13	61728	.SCREW (attaching part)	1
14	63322	.WASHER, LOCK (attaching part)	1
15	65244	.PLUG	2
16	130505	.DECAL	1
17	771	.PLUG, WHITE	1
18	20562	.BREAKER, CIRCUIT	1
19	2717	.SWITCH, IGNITION	1
20	16260	.SWITCH, SELECTOR	1
21	20481	.SWITCH, TOGGLE	2
22	20884	.GUARD, SWITCH	1
23	65243	.PLUG, WHITE	1
24	4034	.WIRE, CABLE (5 FT)	AR
25	70008	.WIRE, YELLOW (3 FT)	AR
26	2991	.WIRE, WHITE (2 FT)	AR



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PARTS CATALOG

**M-15 T GROUND CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 7B  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	2990	.WIRE, WHITE (17 FT)	AR
28	70232	.WIRE, WHITE (3 FT)	AR
29	70233	.WIRE, WHITE (4 FT)	AR
30	117-C	.RING, CONNECTOR	40
-31	16213	.CONNECTOR	AR

REV.

- ITEM NOT ILLUSTRATED

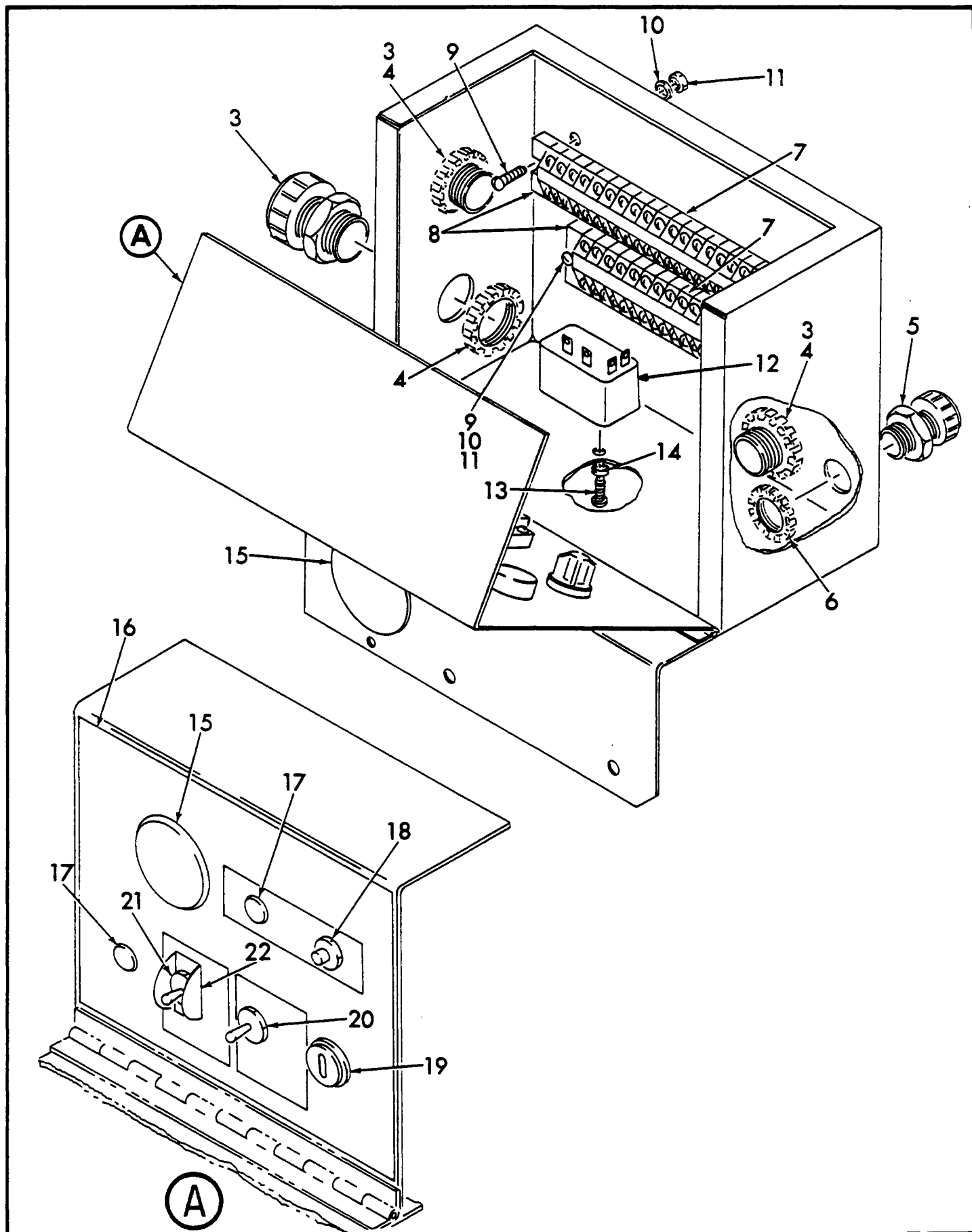


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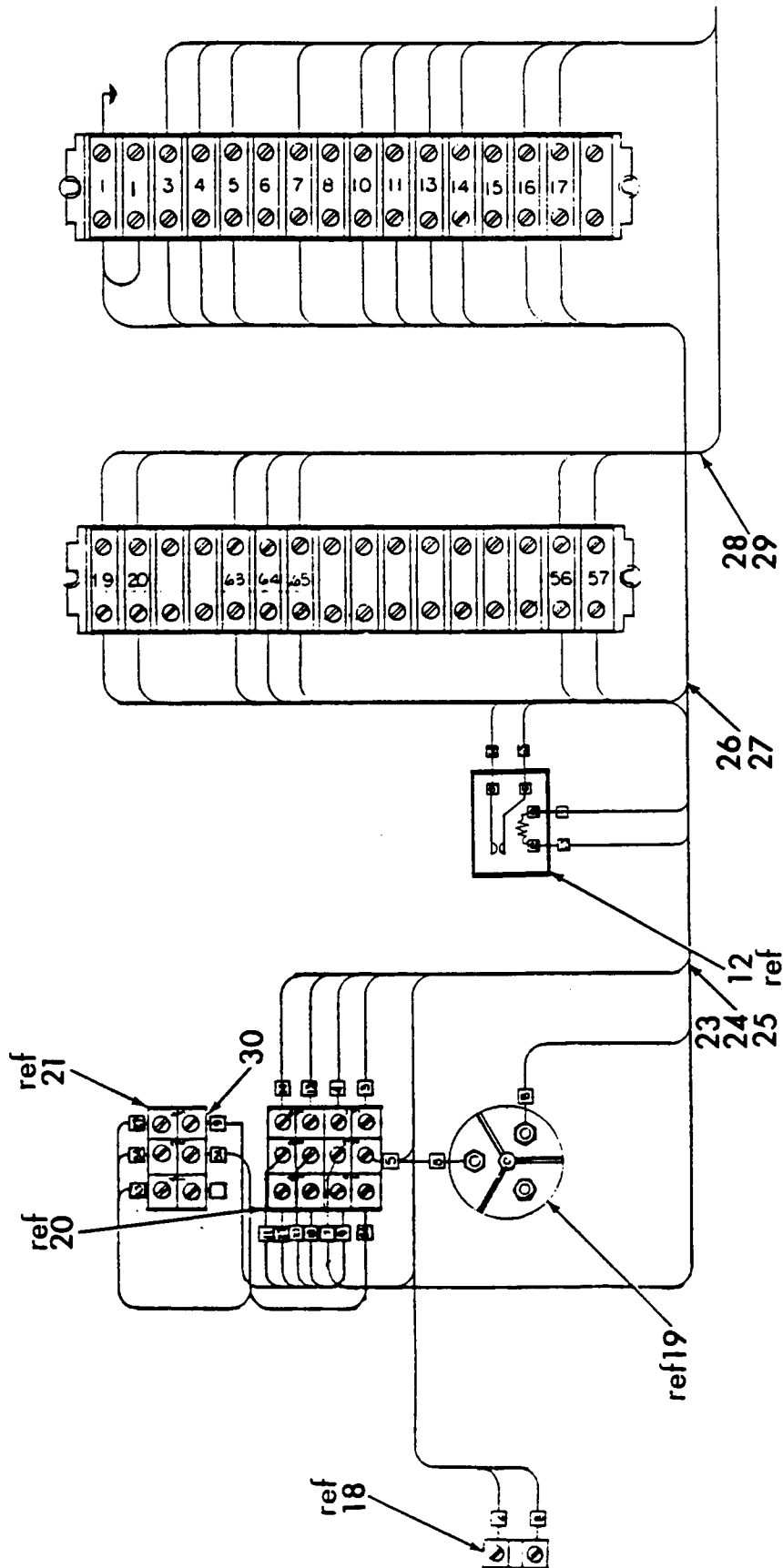
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**M-15EP GROUND CONTROL BOX ASSEMBLY**

PARTS  
SECT. 3  
FIG. 7C  
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REV.



WIRING DIAGRAM

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**M-15EP GROUND CONTROL BOX ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 7C  
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ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131040	ASSEMBLY, GROUND CONTROL BOX (See Sect. 3, Fig. 1C for NHA)	REF
2	32390	.BOX, GROUND CONTROL	1
3	2807	.RELIEF, STRAIN	3
4	2809	.NUT, LOCK	3
5	2806	.RELIEF, STRAIN	1
6	2808	.NUT, LOCK	1
7	4027	.BLOCK, TERMINAL	32
8	117-A	.END, TERMINAL BLOCK	4
9	62612	.SCREW, CAP (attaching part)	6
10	63312	.WASHER, LOCK (attaching part)	6
11	61502	.NUT, HEX (attaching part)	6
12	70337	.RELAY, TIME DELAY	1
13	61728	.SCREW (attaching part)	1
14	63322	.WASHER, LOCK (attaching part)	1
15	65244	.PLUG	2
16	130505	.DECAL	1
17	771	.PLUG, WHITE	2
18	20562	.BREAKER, CIRCUIT	1
19	2717	.SWITCH, IGNITION	1
20	16260	.SWITCH, SELECTOR	1
21	20481	.SWITCH, TOGGLE	1
22	20884	.GUARD, SWITCH	1
23	4034	.CABLE (3 FT)	AR
24	70008	.WIRE, YELLOW (3 FT)	AR
25	70231	.WIRE, RED (1 FT)	AR
26	2991	.WIRE, WHITE (1 FT)	AR

REV.

- ITEM NOT ILLUSTRATED

**Mark Industries**

ILLUSTRATED

PARTS CATALOG

**M-15EP GROUND CONTROL BOX ASSEMBLY**

(CONTINUED)

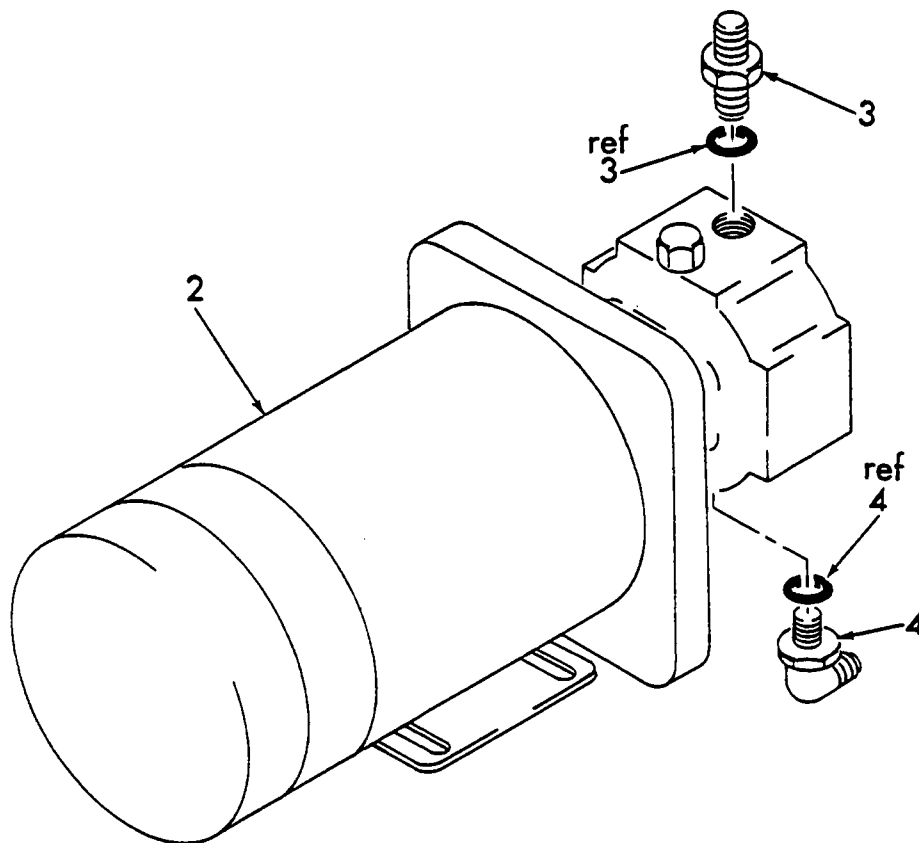
PARTS  
SECT. 3  
FIG. 7C  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	2990	.WIRE, WHITE (12 FT)	AR
28	70232	.WIRE, WHITE (2 FT)	AR
29	70233	.WIRE, WHITE (2 FT)	AR
30	117-C	.RING, CONNECTOR	33
-31	16213	.CONNECTOR	6

REV.

- ITEM NOT ILLUSTRATED

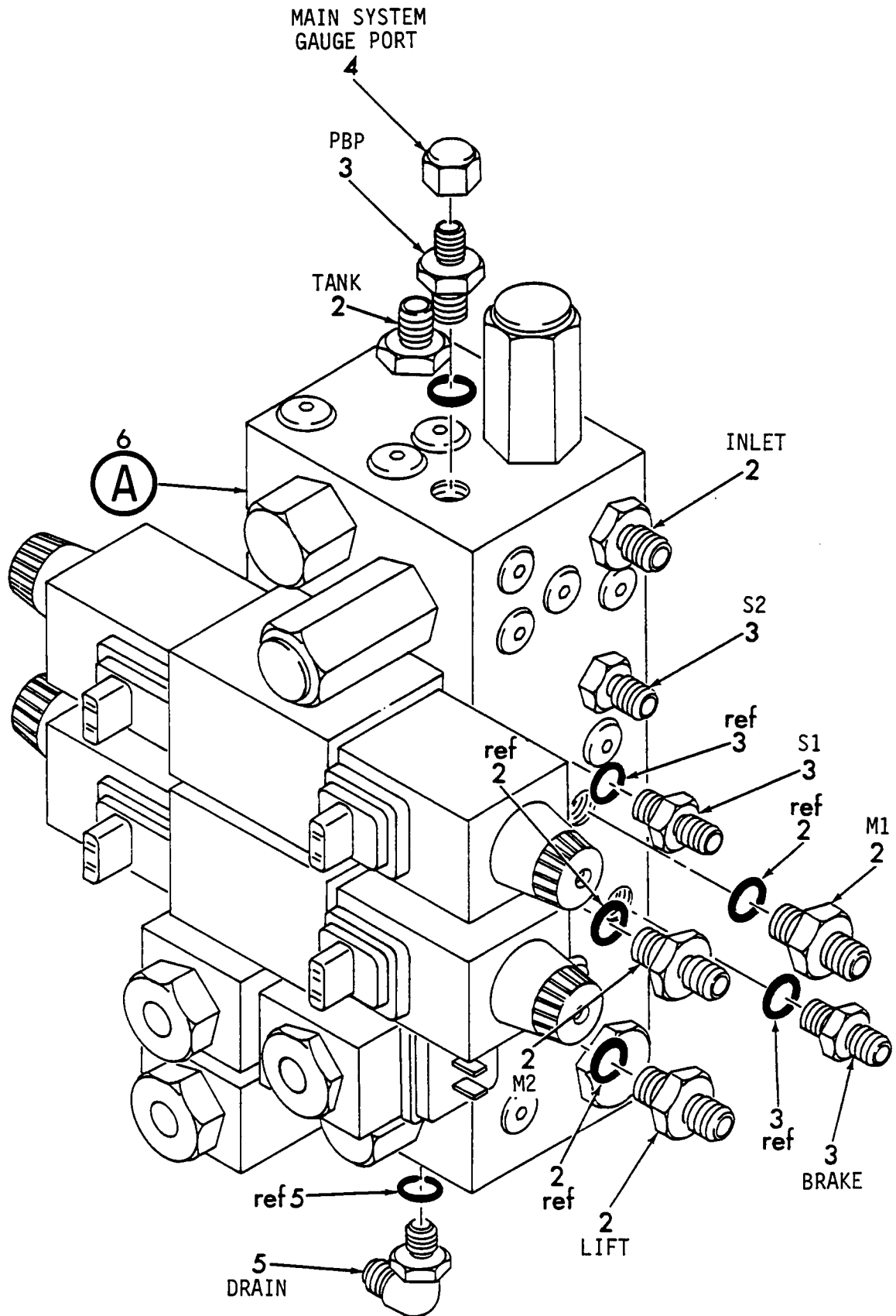
**PUMP MOTOR ASSEMBLY**

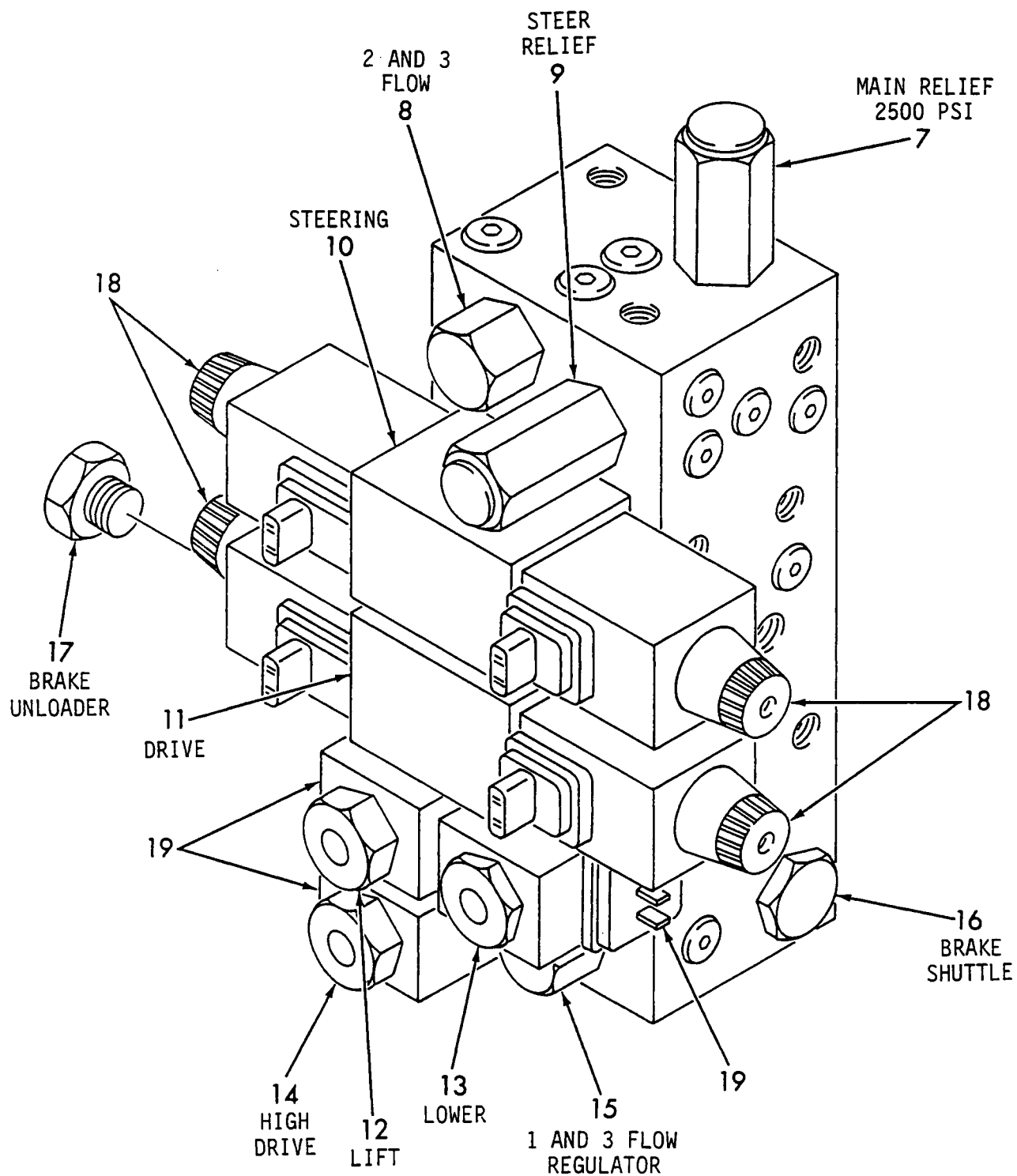


ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131075	ASSEMBLY, PUMP/MOTOR (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	81173	.MOTOR, PUMP	1
3	80001-20	.CONNECTOR, MALE	1
4	80008-10	.ELBOW, MALE	1
2A	67954	MOTOR ONLY	
2B	67955	PUMP ONLY	



M-15 VALVE PACKAGE ASSEMBLY





(A)



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PARTS CATALOG

**M-15 VALVE PACKAGE ASSEMBLY**

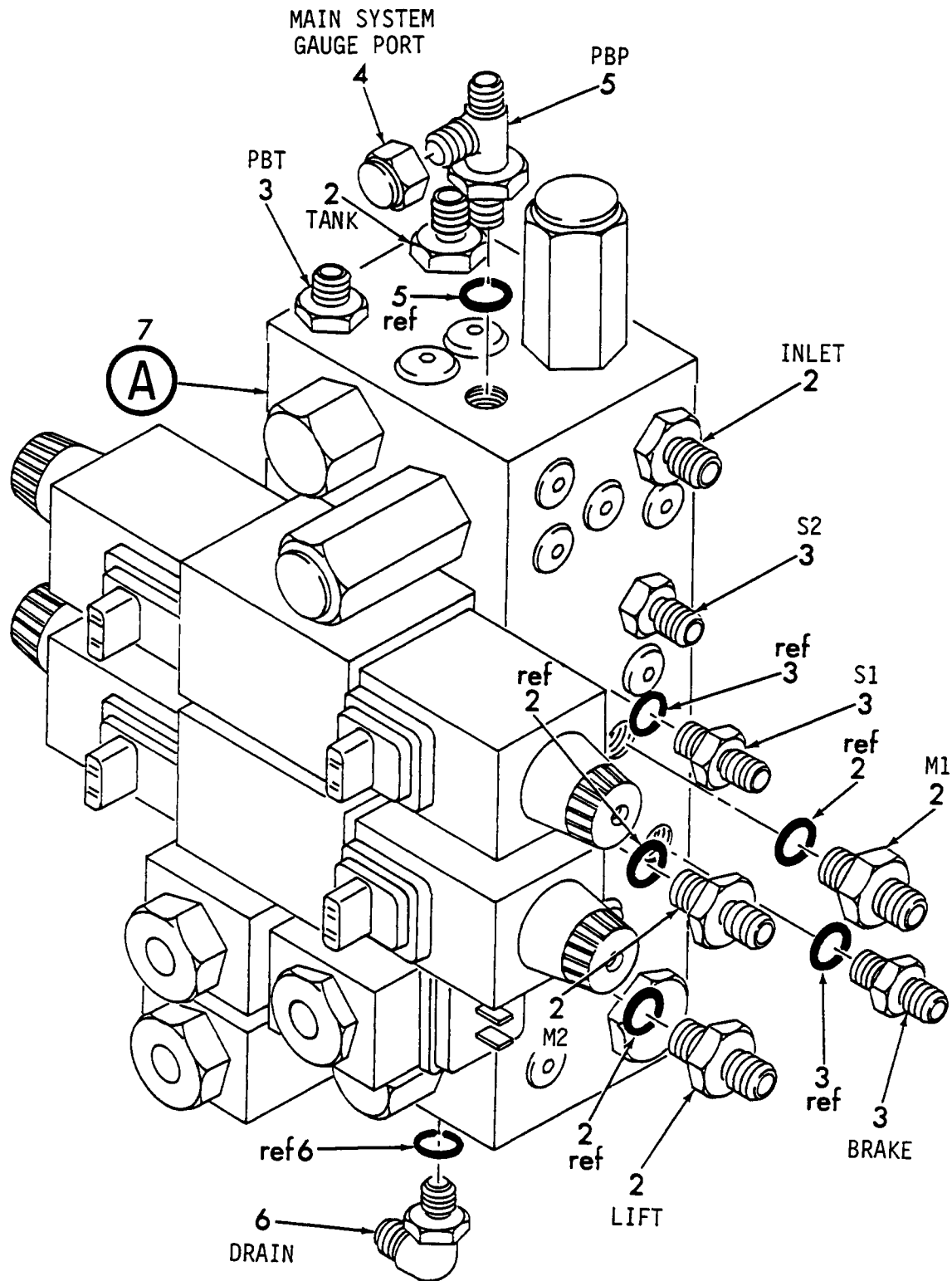
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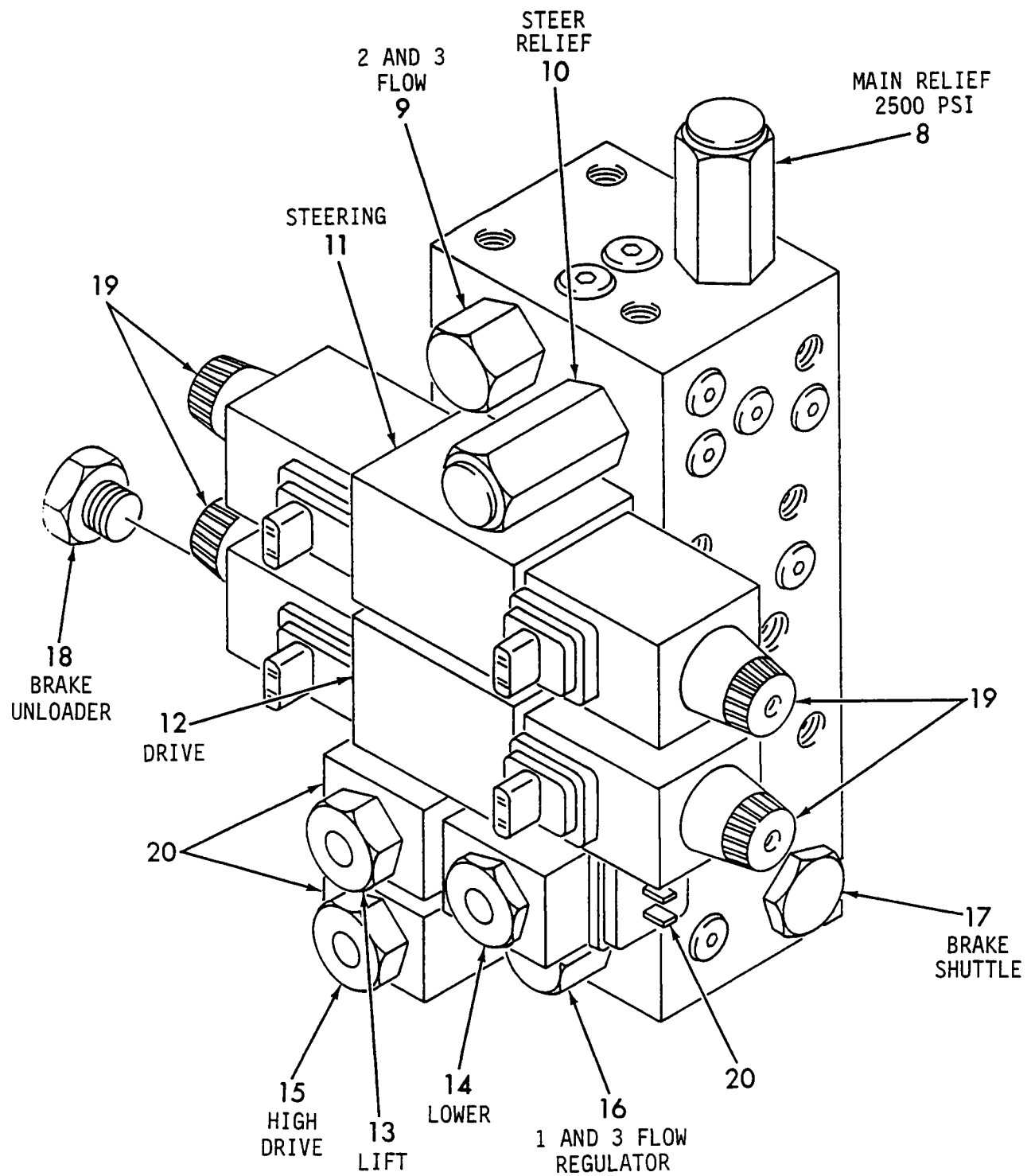
PARTS  
SECT. 3  
FIG. 9A  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130981	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 1A for NHA)	REF
2	80004-08	.CONNECTOR, STRAIGHT THREAD	5
3	80004-03	.CONNECTOR, STRAIGHT THREAD	4
4	80059-03	.CAP	1
5	80012-03	.ELBOW, STRAIGHT THREAD	1
6	81167	.PACKAGE, VALVE	1
7	66816	..RELIEF, MAIN	1
8	67004	..REGULATOR, 2 AND 3 FLOW	1
9	66926	..STEERING DCV	1
10	66668	..RELIEF, STEERING	1
11	66668	..DRIVE, DVC	1
12	66688	..VALVE, LIFT	1
13	81028	..VALVE, LOWERING	1
14	66688	..VALVE, HI-DRIVE	1
15	66678	..REGULATOR, 1 AND 3 FLOW	1
16	66664	..SHUTTLE, BRAKE	1
17	66674	..CHECK, UNLOADING	1
18	66864	..DCV, COIL (ONLY) LARGE	4
19	66865	..CARTRIDGE, COIL (ONLY) SMALL	3

REV.

- ITEM NOT ILLUSTRATED



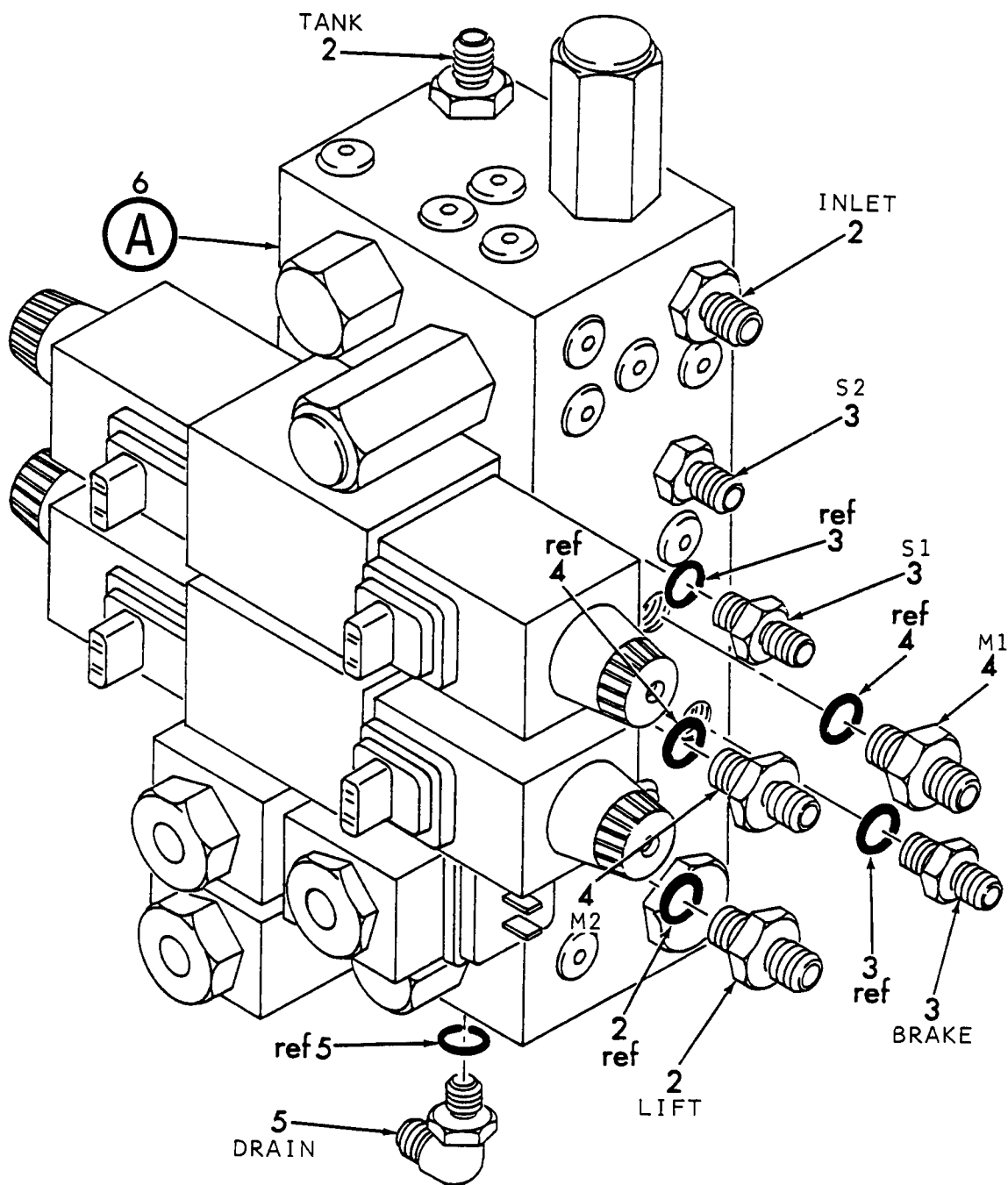


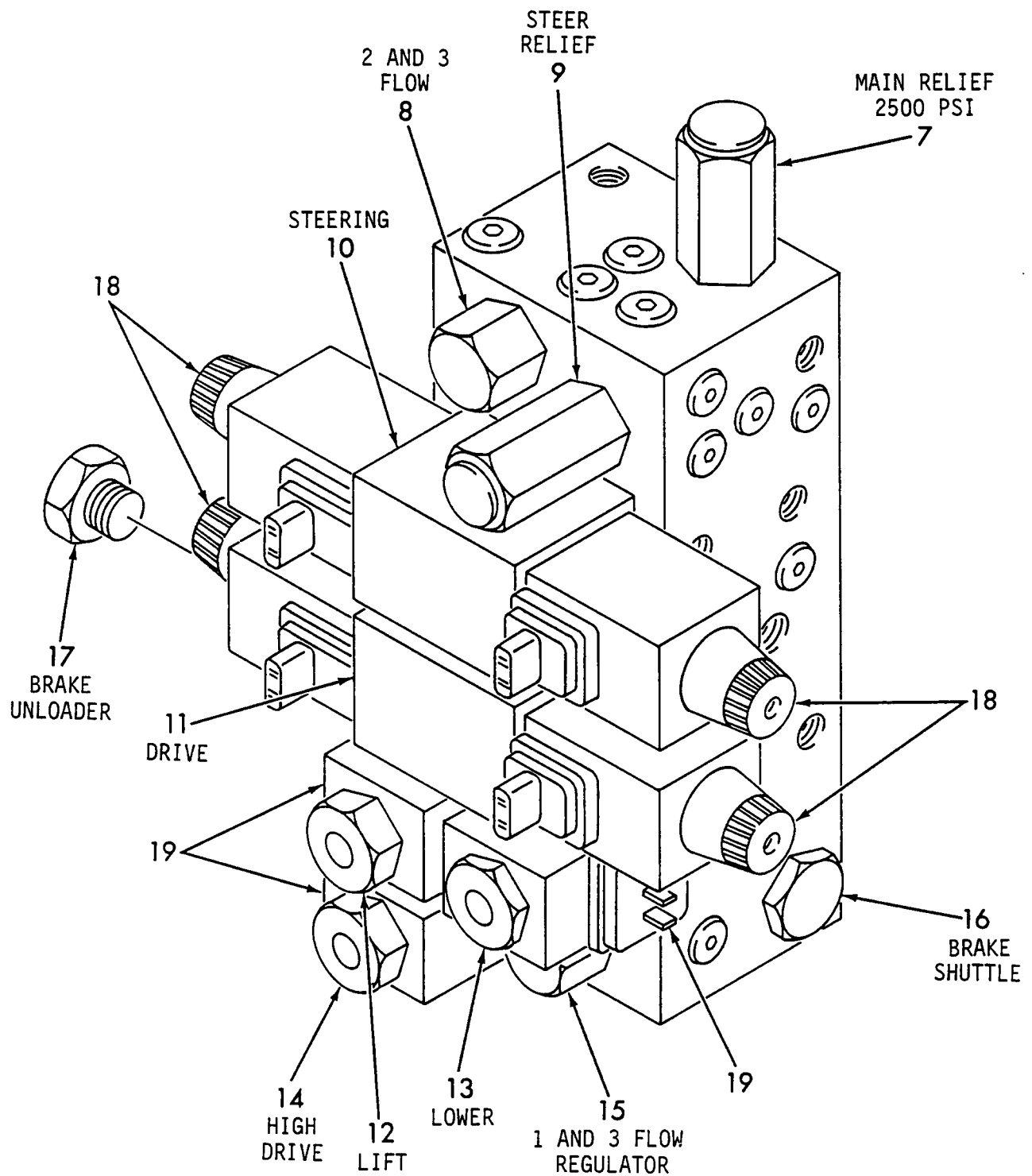
(A)



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131111	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 1B for NHA)	REF
2	80004-08	.CONNECTOR, STRAIGHT THREAD	5
3	80004-03	.CONNECTOR, STRAIGHT THREAD	4
4	80059-03	.CAP	1
5	80033-03	.TEE RUN, STRAIGHT THREAD	1
6	80012-03	.ELBOW	1
7	81191	.PACKAGE, VALVE	1
8	66816	..RELIEF, MAIN	1
9	67004	..REGULATOR, 2 AND 3 FLOW	1
10	66926	..STEERING DCV	1
11	66668	..RELIEF, STEERING	1
12	66668	..DRIVE, DVC	1
13	66688	..VALVE, LIFT	1
14	81028	..VALVE, LOWERING	1
15	66688	..VALVE, HI-DRIVE	1
16	66678	..REGULATOR, 1 AND 3 FLOW	1
17	66664	..SHUTTLE, BRAKE	1
18	66674	..CHECK, UNLOADING	1
19	66864	..DCV, COIL (ONLY) LARGE	4
20	66865	..CARTRIDGE, COIL (ONLY) SMALL	3

M-15EP VALVE PACKAGE ASSEMBLY





(A)



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131078	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 1C for NHA)	REF
2	80004-08	.CONNECTOR, STRAIGHT THREAD	3
3	80004-03	.CONNECTOR, STRAIGHT THREAD	3
4	81078	.CONNECTOR	2
5	80012-03	.ELBOW, STRAIGHT THREAD	1
6	81177	.PACKAGE, VALVE	1
7	66816	..RELIEF, MAIN	1
8	67004	..REGULATOR, 2 AND 3 FLOW	1
9	66926	..STEERING DCV	1
10	66668	..RELIEF, STEERING	1
11	66668	..DRIVE DVC	1
12	66688	..VALVE, LIFT	1
13	81028	..VALVE, LOWERING	1
14	66688	..VALVE, HI-DRIVE	1
15	66678	..REGULATOR, 1 AND 3 FLOW	1
16	66664	..SHUTTLE, BRAKE	1
17	66674	..CHECK, UNLOADING	1
18	66864	..DCV, COIL (ONLY) LARGE	4
19	66865	..CARTRIDGE, COIL (ONLY) SMALL	3

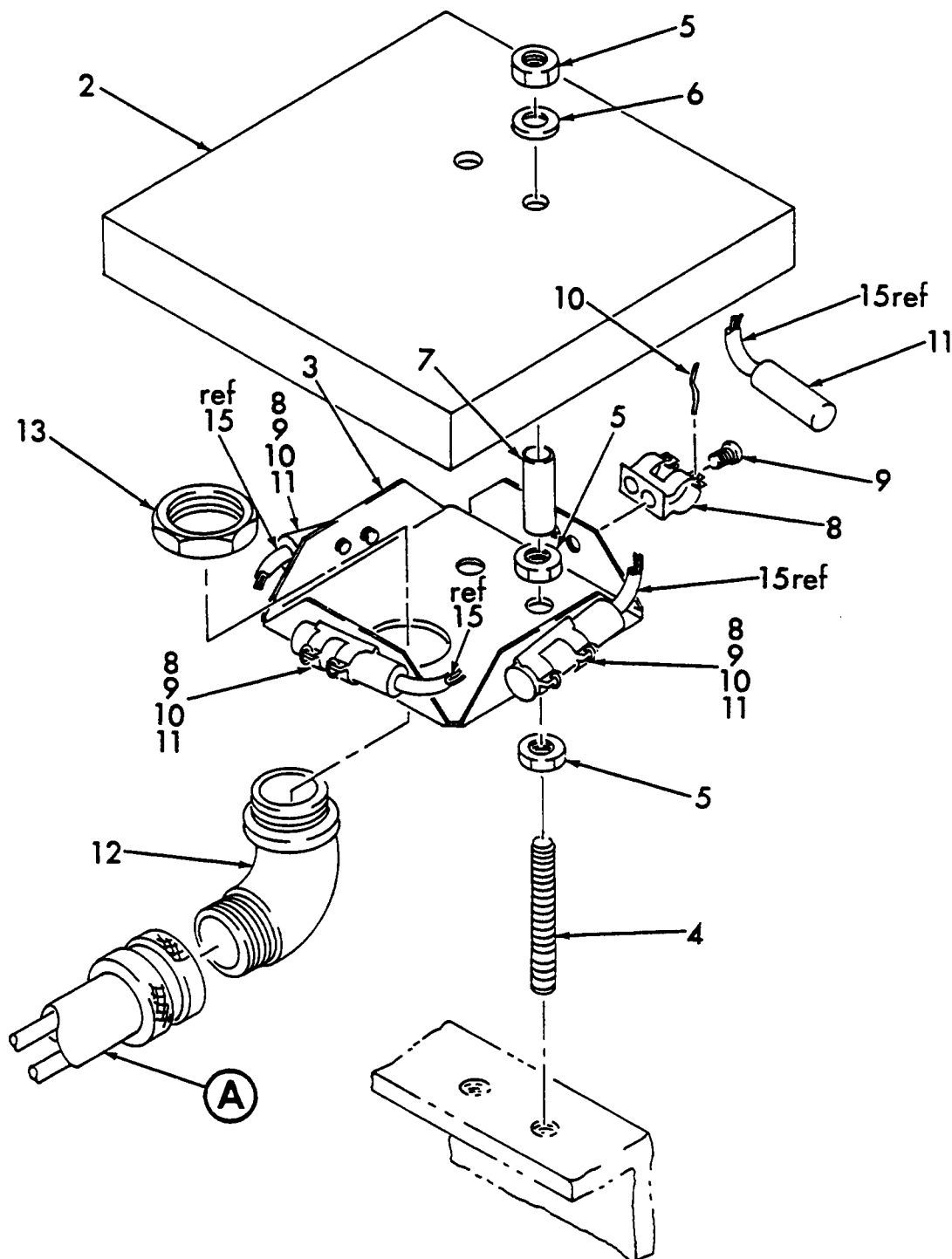


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PARTS CATALOG

TILT SWITCH ASSEMBLY

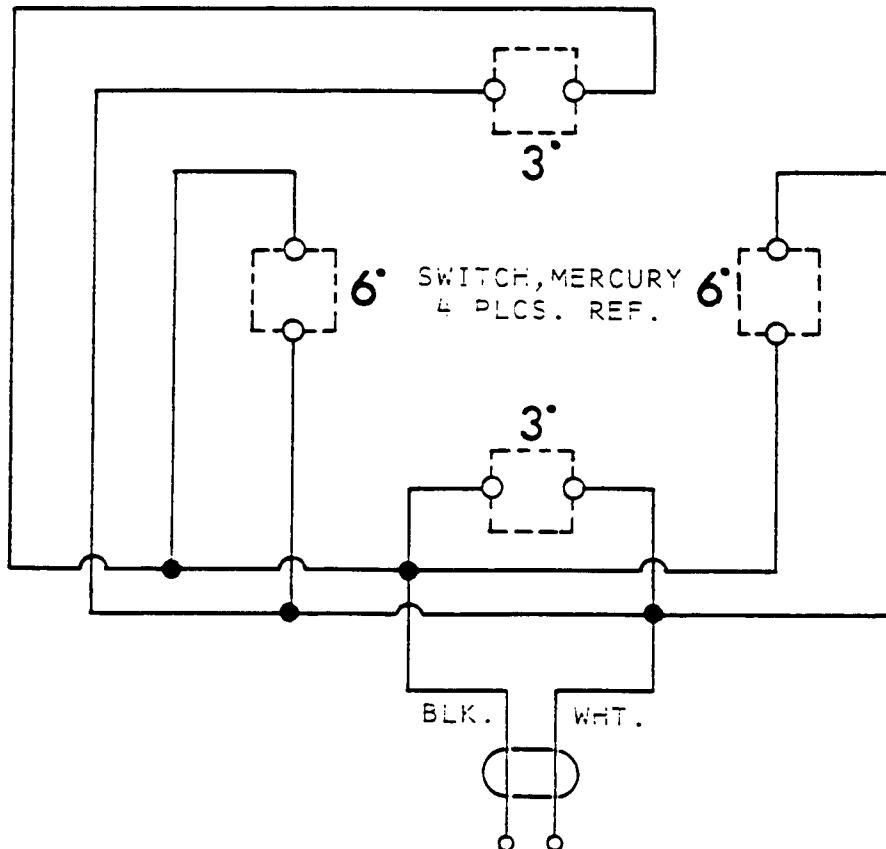
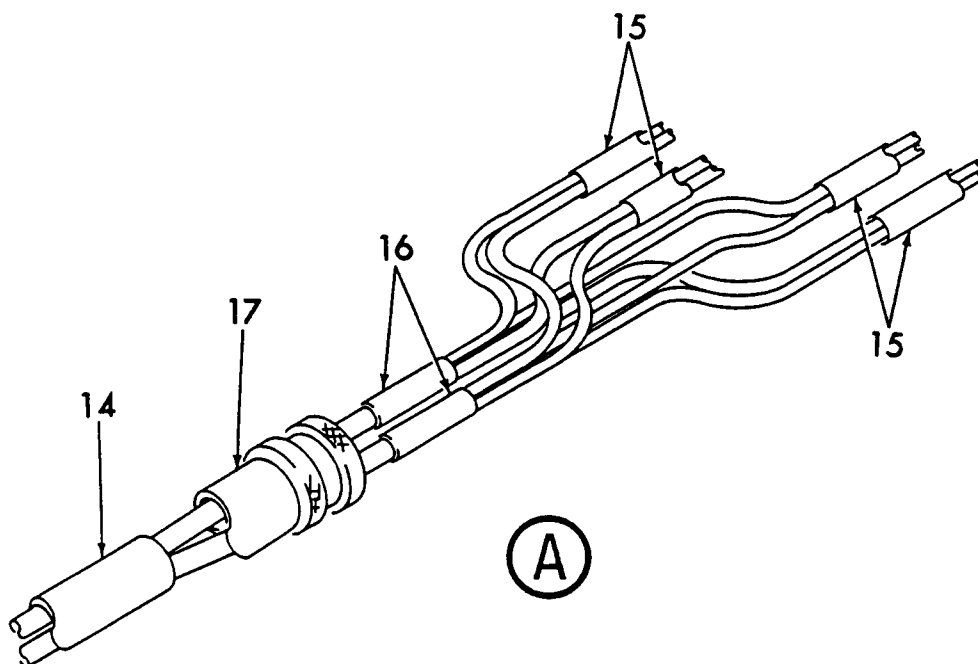
PARTS  
SECT.3  
FIG.10  
PAGE 1



REV.



TILT SWITCH ASSEMBLY



WIRING DIAGRAM

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PARTS CATALOG

**TILT SWITCH ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 3  
FIG. 10  
PAGE 3

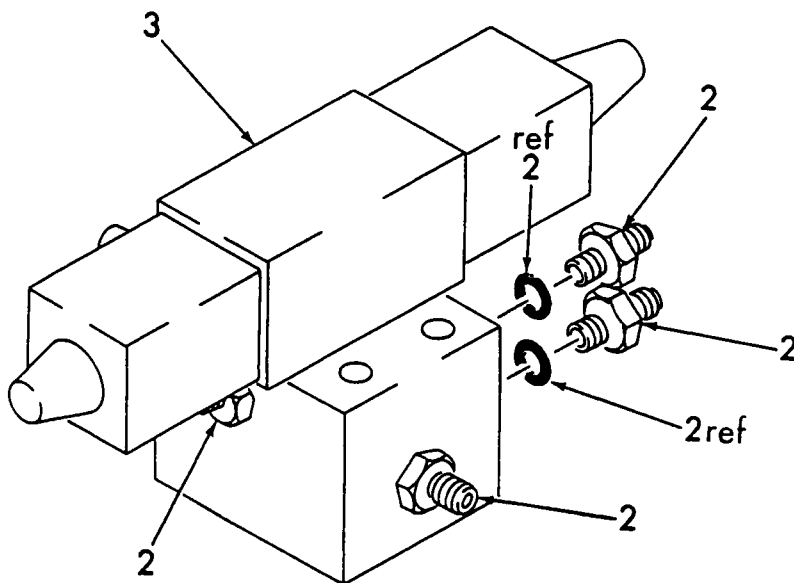
ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131077	ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 1A, 1B or 1C for NHA)	REF
2	30386	.COVER, TILT SWITCH	1
3	30385	.BRACKET, TILT SWITCH	1
4	63606	.ROD, THREADED (attaching part)	2
5	60701	.NUT (attaching part)	6
6	63301	.WASHER, LOCK (attaching part)	2
7	35715	.TUBE, ROUND (attaching part)	2
8	119-A	.BRACKET, SWITCH	4
9	62605	.SCREW, ROUND HEAD (attaching part)	8
10	70225	.WIRE, SAFETY	8
11	4014	.SWITCH, MERCURY	4
12	70226	.CONNECTOR, 90 DEGREE	1
13	61317	.NUT (attaching part)	1
14	70036	.WIRE (9 FT)	AR
15	65898	.TUBE, HEAT SHRINK	4
16	117-D	.CONNECTOR, BUTT	2
17	65899	.TUBE, HEAT SHRINK	1

REV.

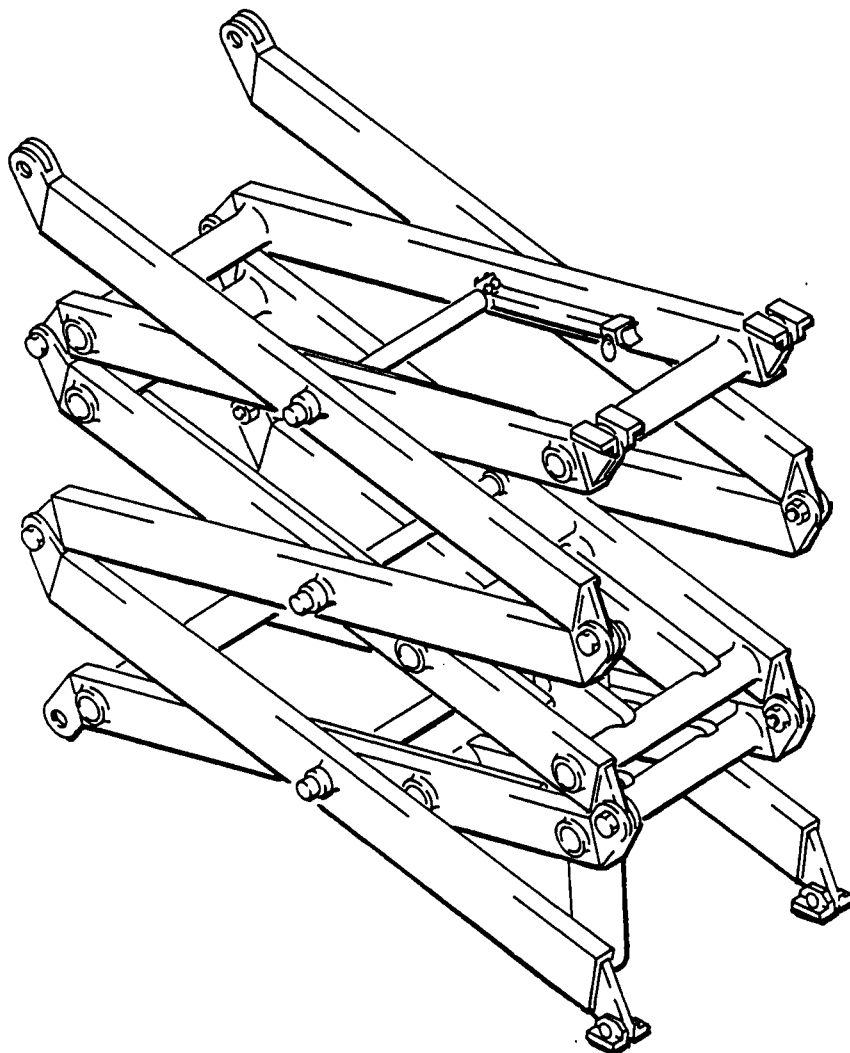
- ITEM NOT ILLUSTRATED

TRAVERSING VALVE ASSEMBLY

PARTS  
SECT. 3  
FIG. 11  
PAGE 1



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131112	ASSEMBLY, TRAVERSING VALVE (See Sect. 3, Fig. 1B for NHA)	REF
2	80004-03	.CONNECOTR, STRAIGHT THREAD	4
3	81190	.VALVE, TRAVERSING	1

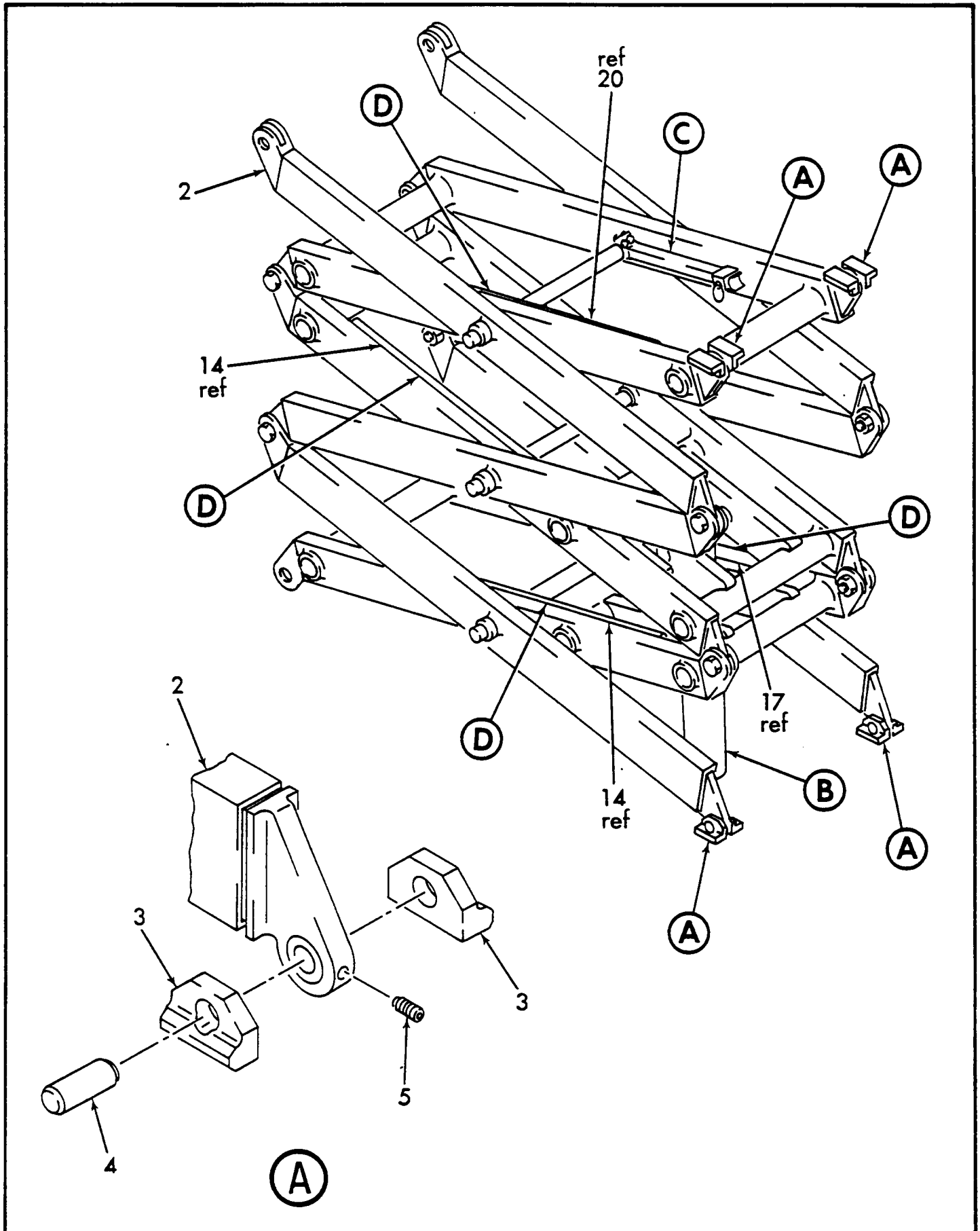


THIS SECTION 4 IS ILLUSTRATED AS:

- FIGURE 1A M-15 SCISSOR ASSEMBLY
- FIGURE 1B M-15T SCISSOR ASSEMBLY
- FIGURE 1C M-15EP SCISSOR ASSEMBLY
- FIGURE 2 SCISSOR SUB-ASSEMBLY
- FIGURE 3A M-15 LIFT CYLINDER ASSEMBLY
- FIGURE 3B M-15T AND M-15EP LIFT CYLINDER ASSEMBLY
- FIGURE 4 INNER ARM SUPPORT ASSEMBLY

M-15 SCISSOR ASSEMBLY

PARTS  
SECT. 4  
FIG. 1A  
PAGE 1

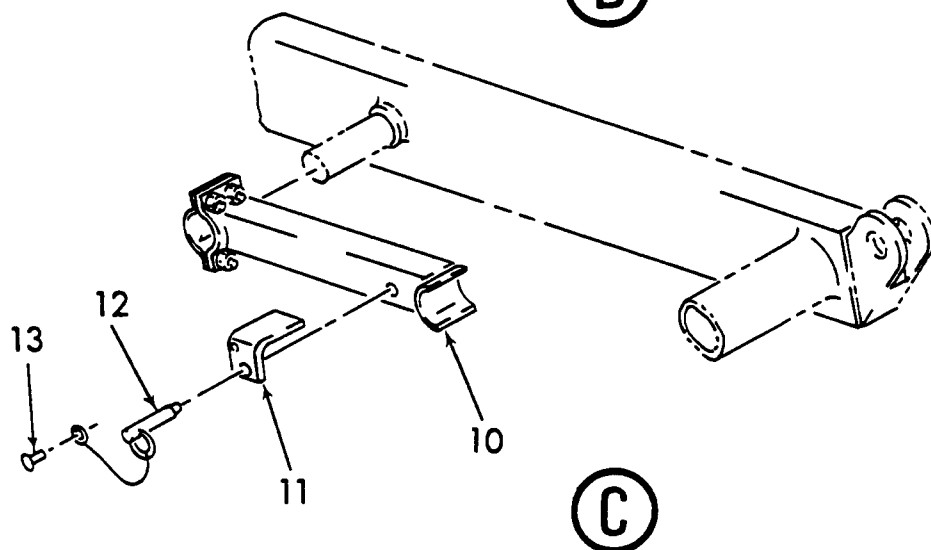
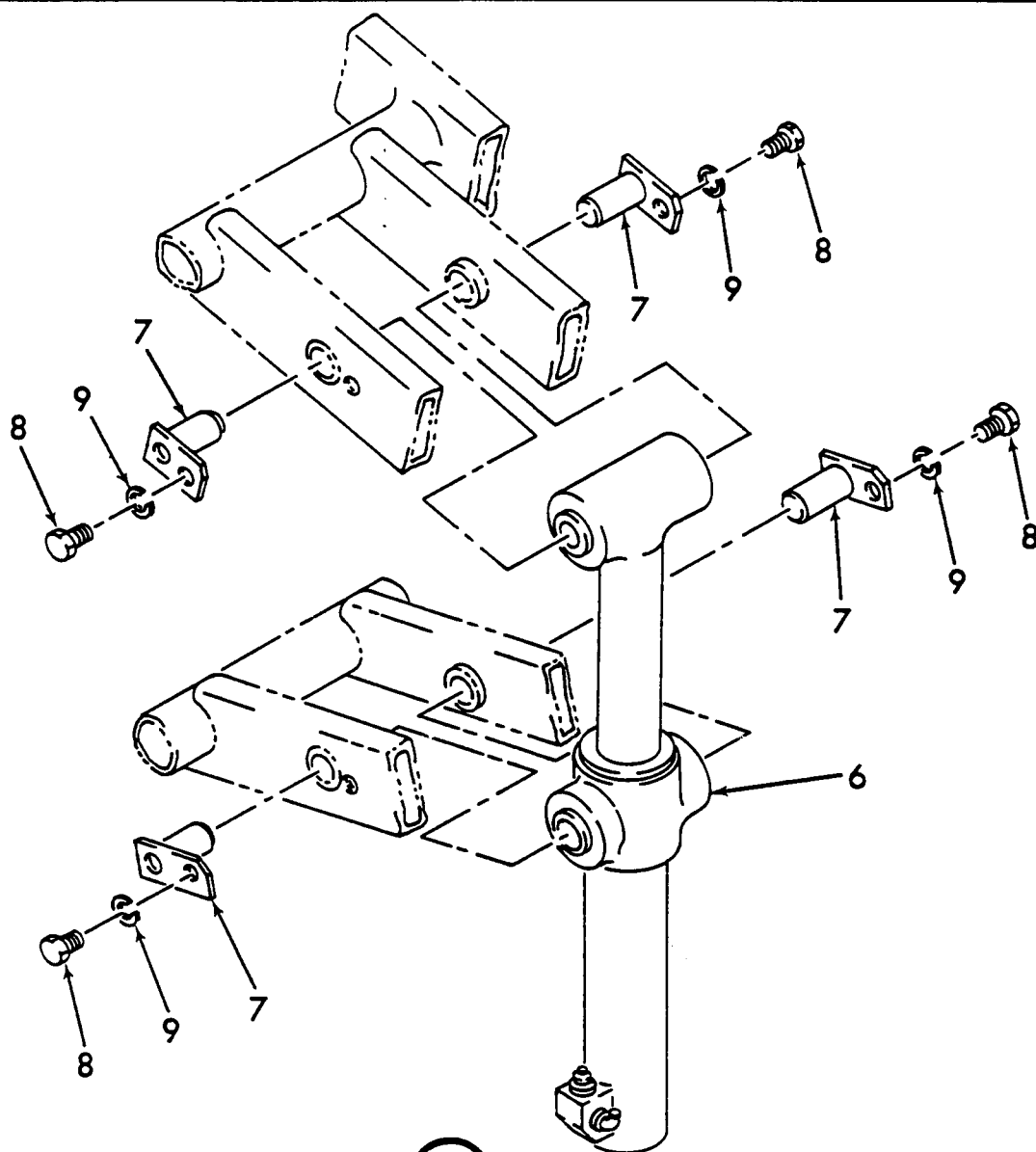


REV.

M-15 SCISSOR ASSEMBLY

(CONTINUED)

PARTS  
SECT. 4  
FIG. 1A  
PAGE 2



REV.



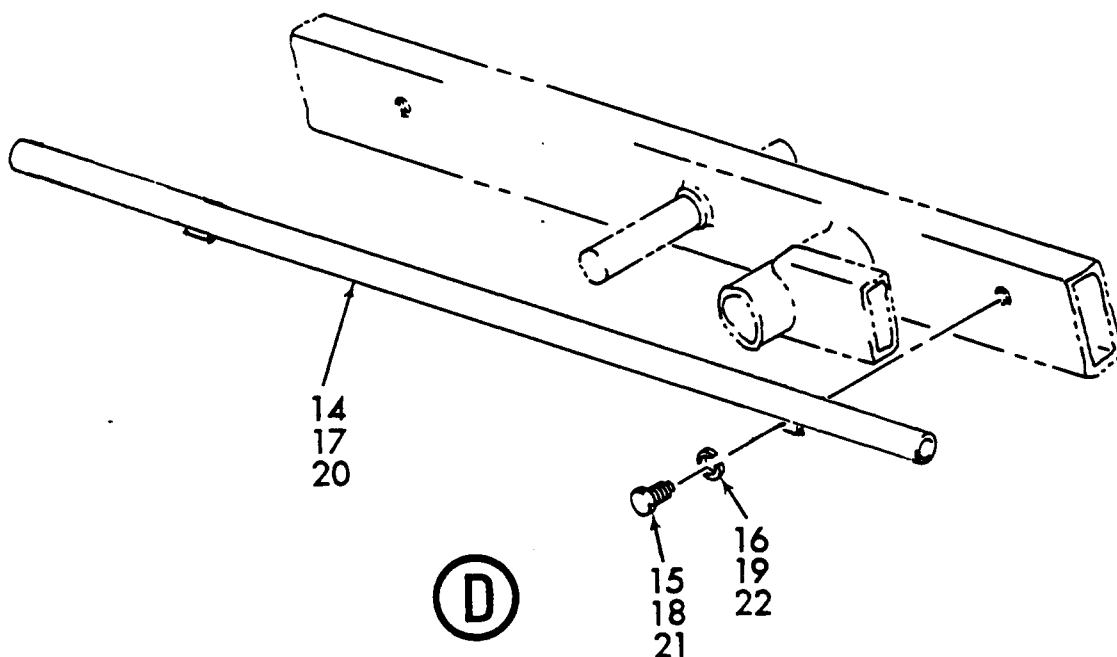
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ILLUSTRATED  
PARTS CATALOG

**M-15 SCISSOR ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 1A  
PAGE 3



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131019	ASSEMBLY, SCISSOR (See Sect. 2, Fig. 1A for NHA)	REF
2	130958	.SUB-ASSEMBLY, SCISSOR (See Sect. 4, Fig. 2 for Details)	1
3	130326	.PAD, WEAR	8
4	130327	.PIN, WEAR PAD	4
5	62201	.SCREW, SOCKET SET (attaching part)	4
6	130972	.ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 3A for Details)	1
7	130493	.PIN, TRUNNION	4
8	60533	.SCREW, CAP (attaching part)	4
9	63302	.WASHER, LOCK (attaching part)	4

REV.

- ITEM NOT ILLUSTRATED

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ILLUSTRATED

PARTS CATALOG

**M-15 SCISSOR ASSEMBLY**

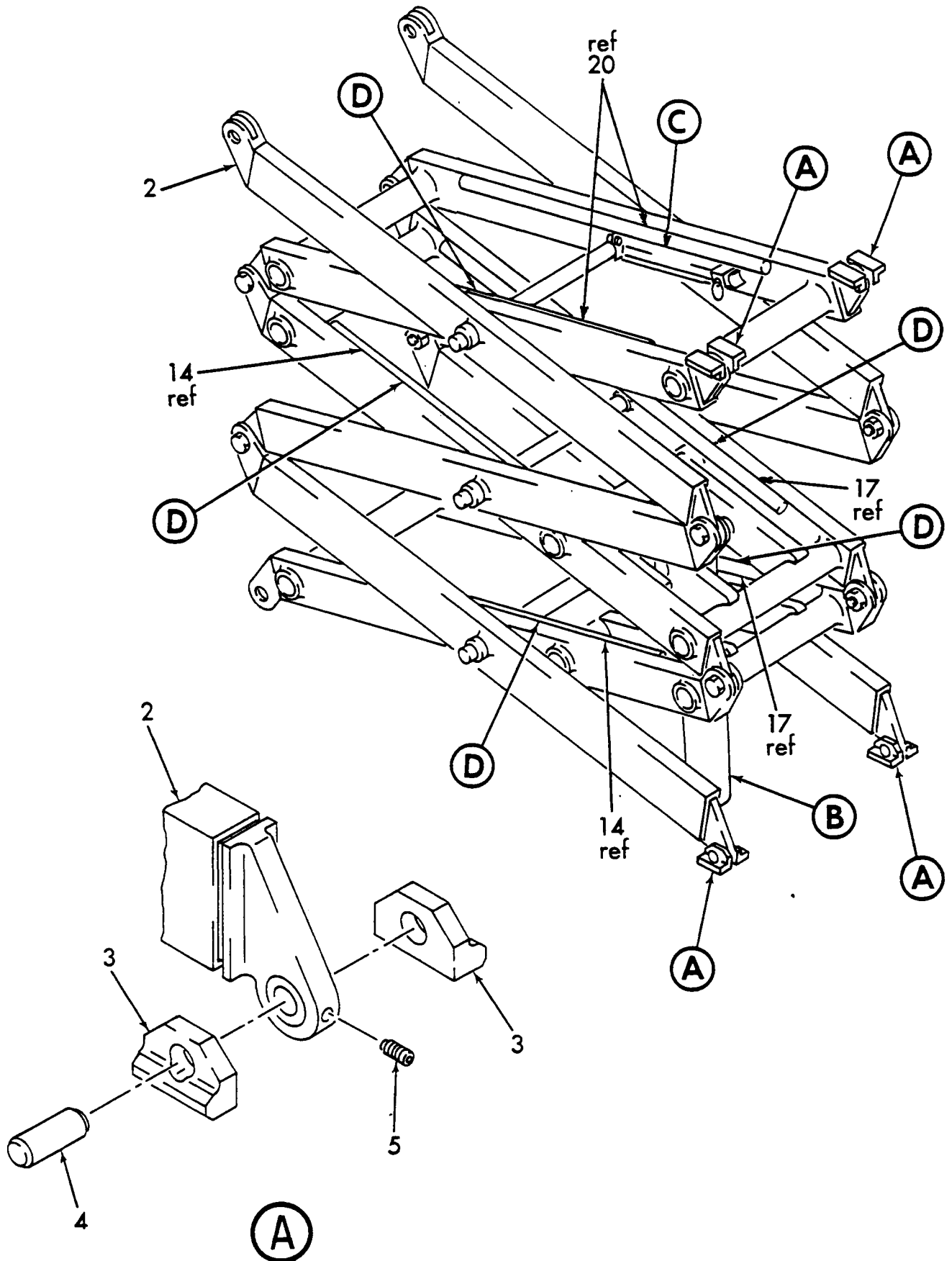
(CONTINUED)

PARTS  
SECT. 4  
FIG. 1A  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	130511	.ASSEMBLY, INNER ARM SUPPORT (See Sect. 4, Fig. 4 for Details)	1
11	131030	.BRACKET, ARM SUPPORT	1
12	12007	.PIN, BALL-LOC DETENT	1
13	375	.RIVET (attaching part)	1
14	131103	.WELDMENT, TRANSFER TUBE (R.H.)	2
15	60325	.SCREW, CAP (attaching part)	4
16	63319	.WASHER, LOCK (attaching part)	4
17	131104	.WELDMENT, TRANSFER TUBE (L.H.)	1
18	60325	.SCREW, CAP (attaching part)	2
19	63319	.WASHER, LOCK (attaching part)	2
20	131029	.TUBE, TRANSFER	1
21	60325	.SCREW, CAP (attaching part)	2
22	63319	.WASHER, LOCK (attaching part)	2



M-15 T SCISSOR ASSEMBLY





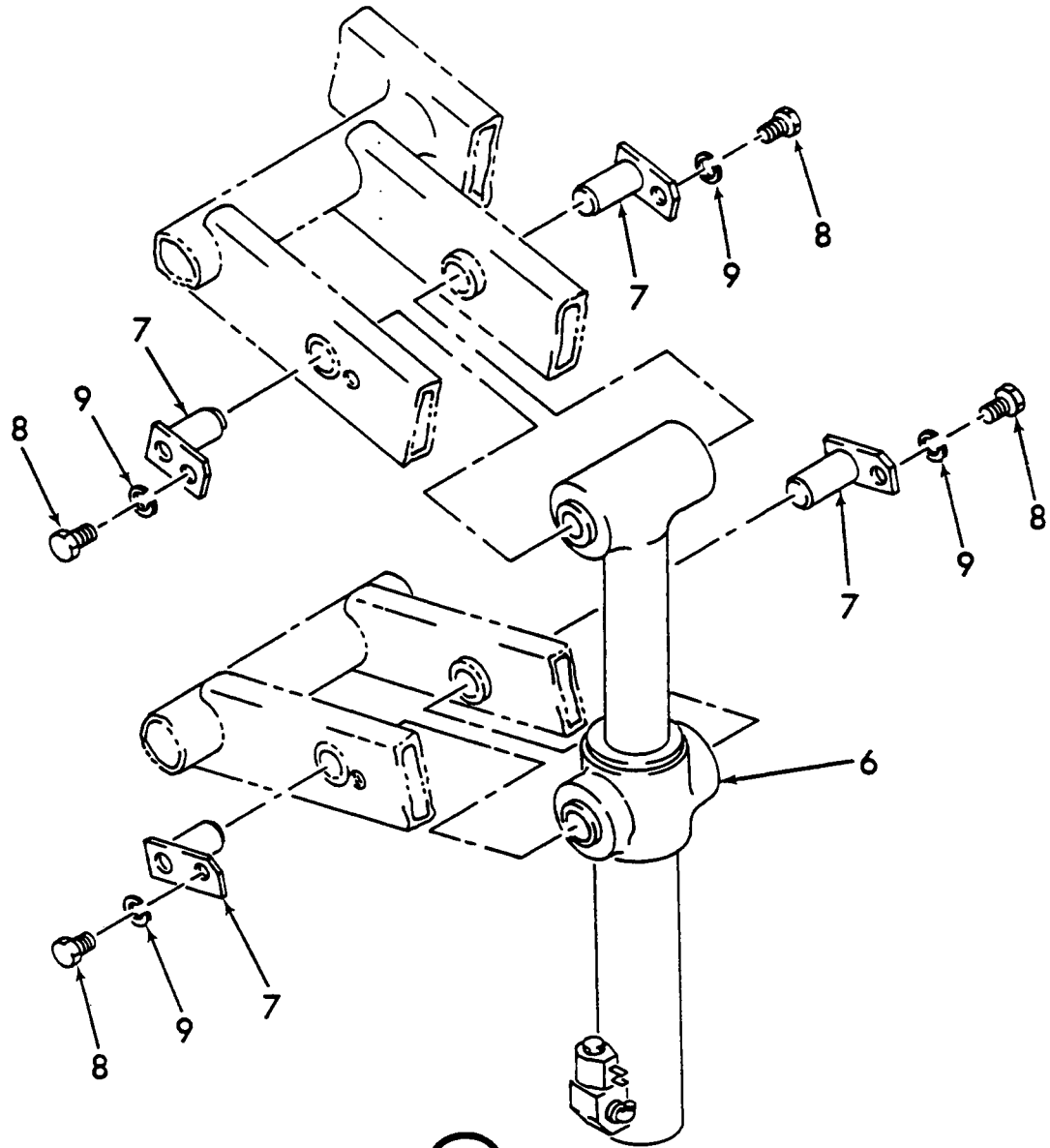
**Mark Industries**

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PARTS CATALOG

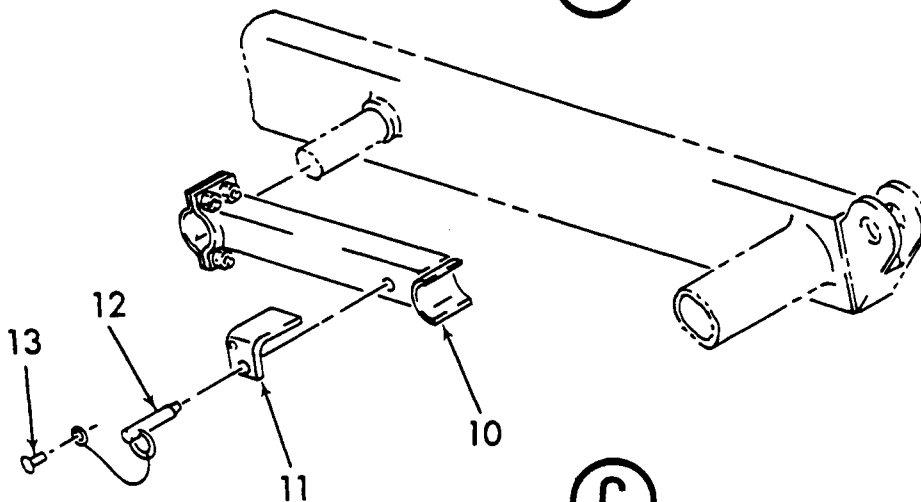
**M-15 T SCISSOR ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 1B  
PAGE 2

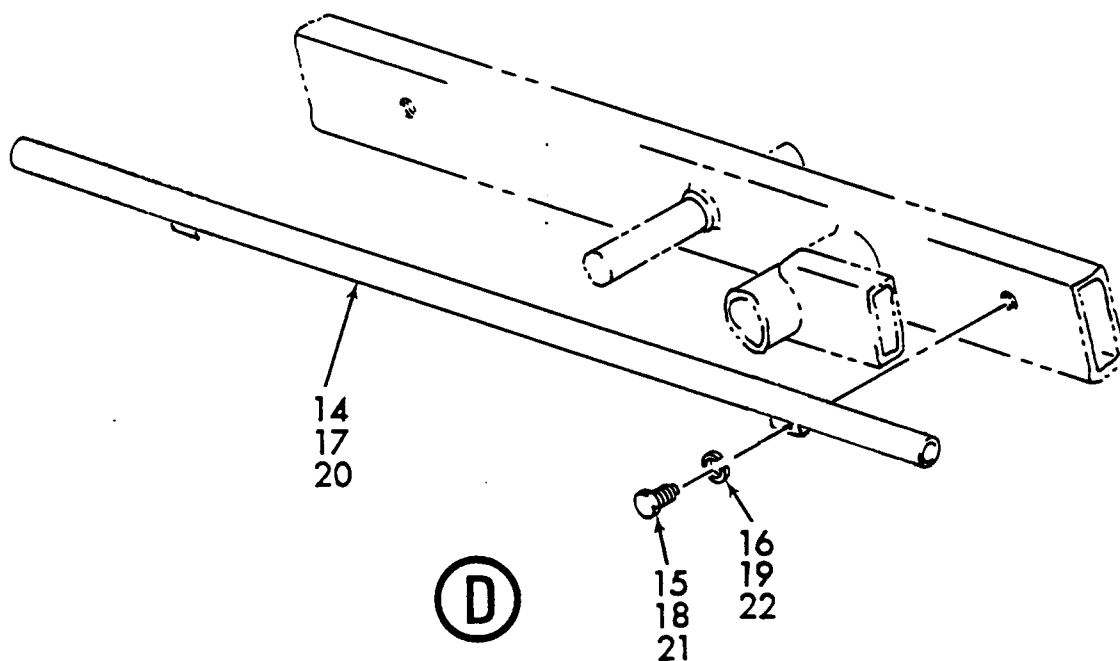


**(B)**



**(C)**

REV.



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131102	ASSEMBLY, SCISSOR (See Sect. 2, Fig. 1B for NHA)	REF
2	130958	.SUB-ASSEMBLY, SCISSOR (See Sect. 4, Fig. 2 for Details)	1
3	130326	.PAD, WEAR	8
4	130327	.PIN, WEAR PAD	4
5	62201	.SCREW, SOCKET SET (attaching part)	4
6	131079	.ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 3B for Details)	1
7	130493	.PIN, TRUNNION	4
8	60533	.SCREW, CAP (attaching part)	4
9	63302	.WASHER, LOCK (attaching part)	4

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PARTS CATALOG

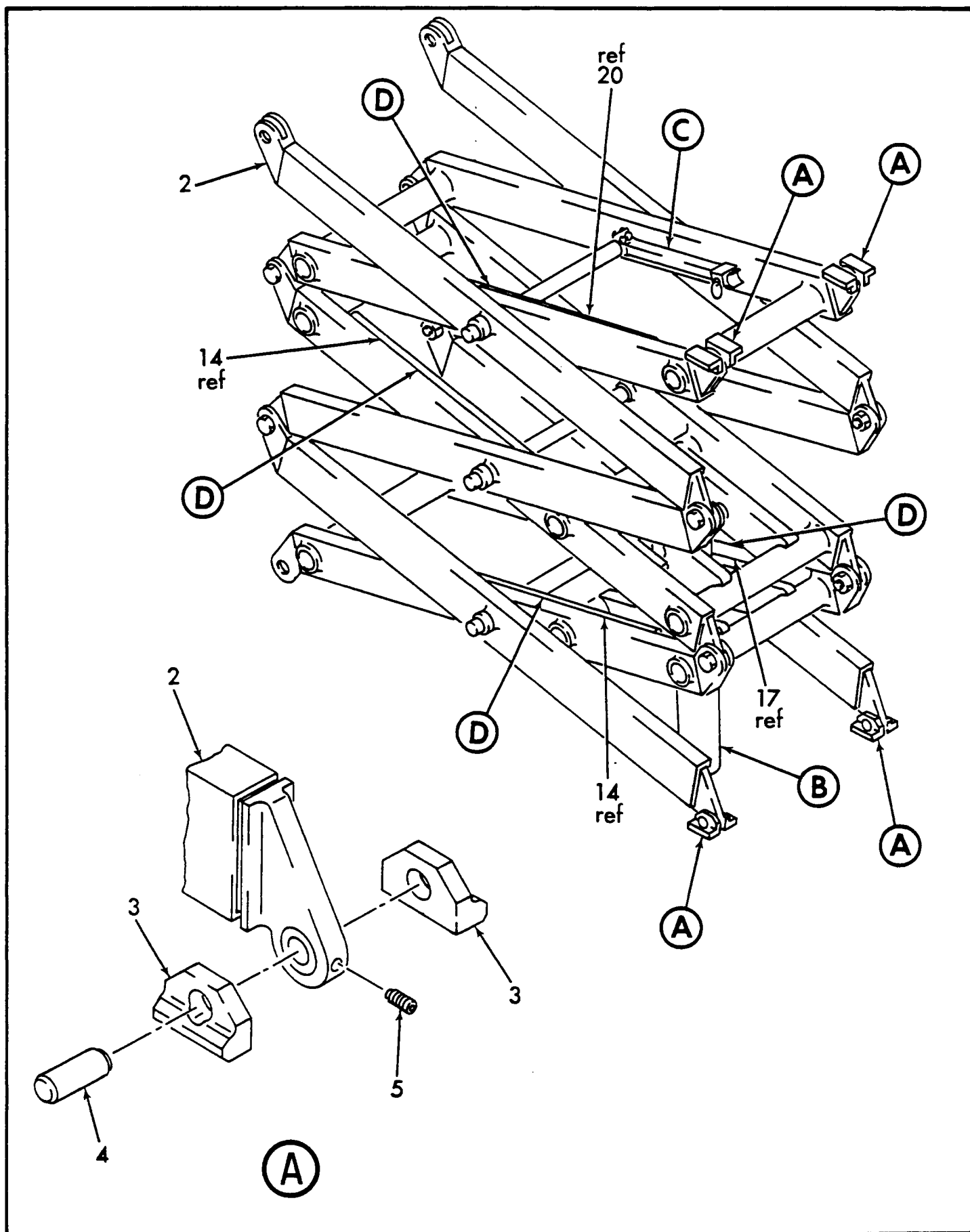
**M-15 T SCISSOR ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 1B  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	130511	.ASSEMBLY, INNER ARM SUPPORT (See Sect. 4, Fig. 4 for Details)	1
11	131030	.BRACKET, ARM SUPPORT	1
12	12007	.PIN, BALL-LOC DETENT	1
13	375	.RIVET (attaching part)	1
14	131103	.WELDMENT, TRANSFER TUBE (R.H.)	2
15	60325	.SCREW, CAP (attaching part)	4
16	63319	.WASHER, LOCK (attaching part)	4
17	131104	.WELDMENT, TRANSFER TUBE (L.H.)	2
18	60325	.SCREW, CAP (attaching part)	4
19	63319	.WASHER, LOCK (attaching part)	4
20	131029	.TUBE, TRANSFER	2
21	60325	.SCREW, CAP (attaching part)	4
22	63319	.WASHER, LOCK (attaching part)	4

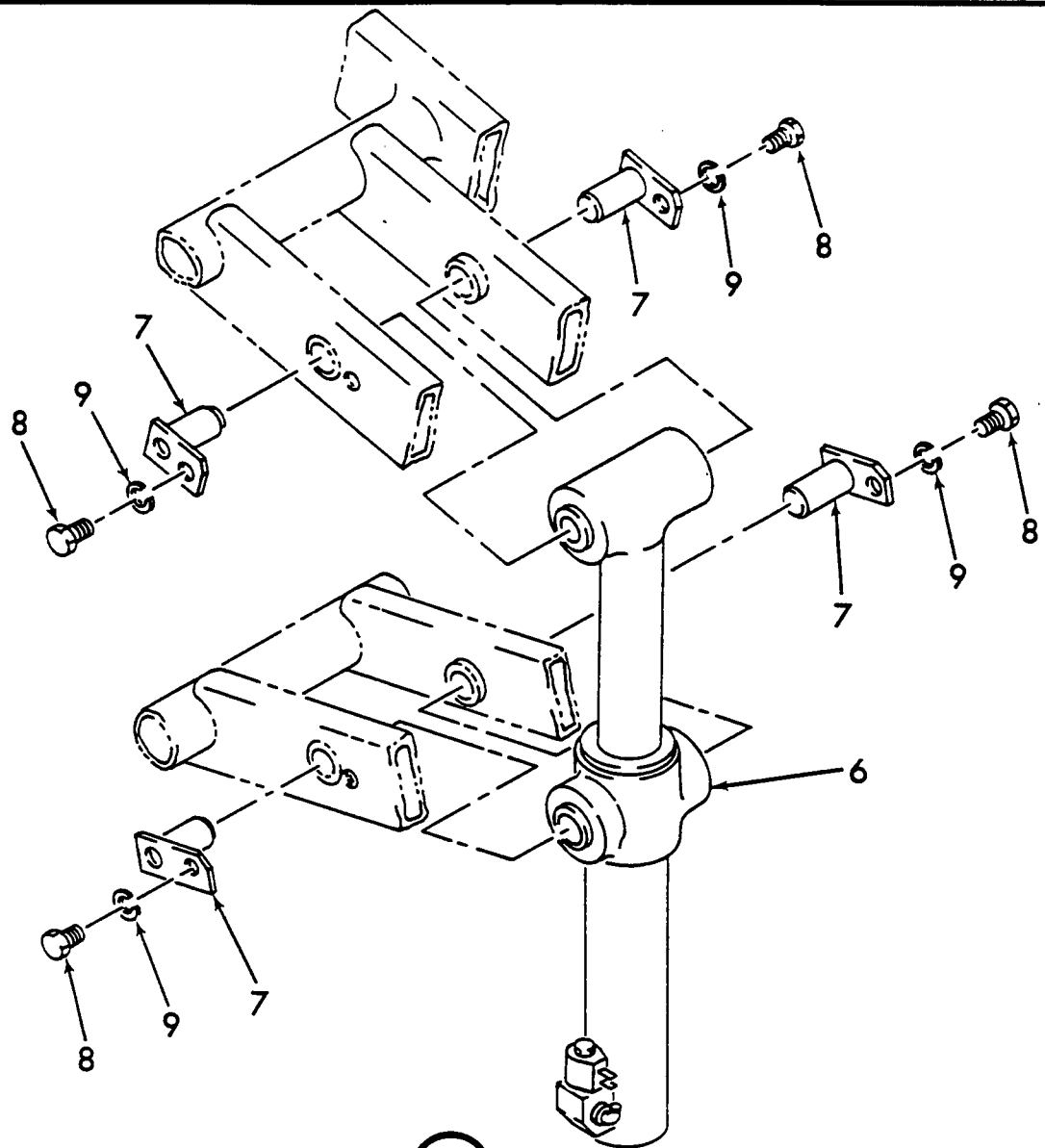
M-15EP SCISSOR ASSEMBLY



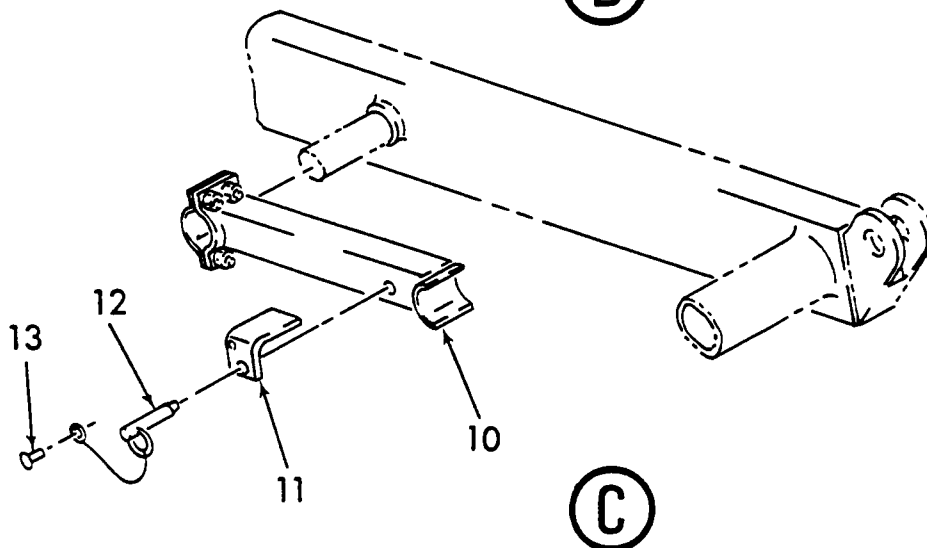
M-15EP SCISSOR ASSEMBLY

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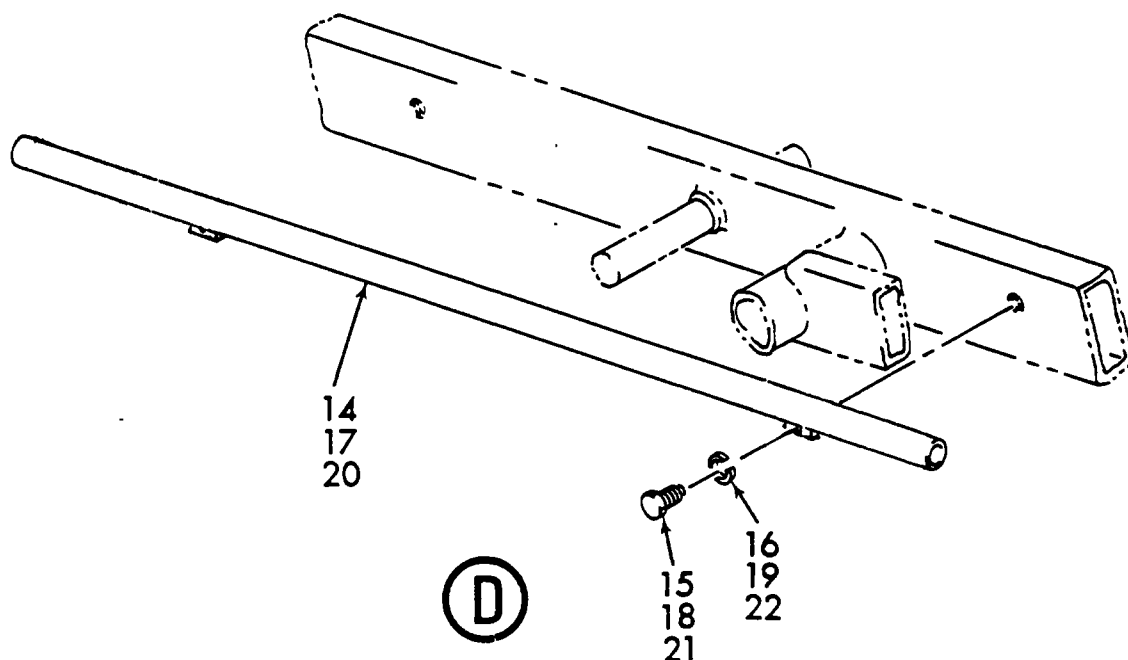
PARTS  
SECT. 4  
FIG. 1C  
PAGE 2



(B)



(C)



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131080	ASSEMBLY, SCISSOR (See Sect. 2, Fig. 1C for NHA)	REF
2	130958	.SUB-ASSEMBLY, SCISSOR (See Sect. 4, Fig. 2 for Details)	1
3	130326	.PAD, WEAR	8
4	130327	.PIN, WEAR PAD	4
5	62201	.SCREW, SOCKET SET (attaching part)	4
6	131079	.ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 3B for Details)	1
7	130493	.PIN, TRUNNION	4
8	60533	.SCREW, CAP (attaching part)	4
9	63302	.WASHER, LOCK (attaching part)	4

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PARTS CATALOG

**M-15EP SCISSOR ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 1C  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
10	130511	.ASSEMBLY, INNER ARM SUPPORT (See Sect. 4, Fig. 4 for Details)	1
11	131030	.BRACKET, ARM SUPPORT	1
12	12007	.PIN, BALL-LOC DETENT	1
13	375	.RIVET (attaching part)	1
14	131103	.WELDMENT, TRANSFER TUBE (R.H.)	2
15	60325	.SCREW, CAP (attaching part)	4
16	63319	.WASHER, LOCK (attaching part)	4
17	131104	.WELDMENT, TRANSFER TUBE (L.H.)	1
18	60325	.SCREW, CAP (attaching part)	2
19	63319	.WASHER, LOCK (attaching part)	2
20	131029	.TUBE, TRANSFER	1
21	60325	.SCREW, CAP (attaching part)	2
22	63319	.WASHER, LOCK (attaching part)	2



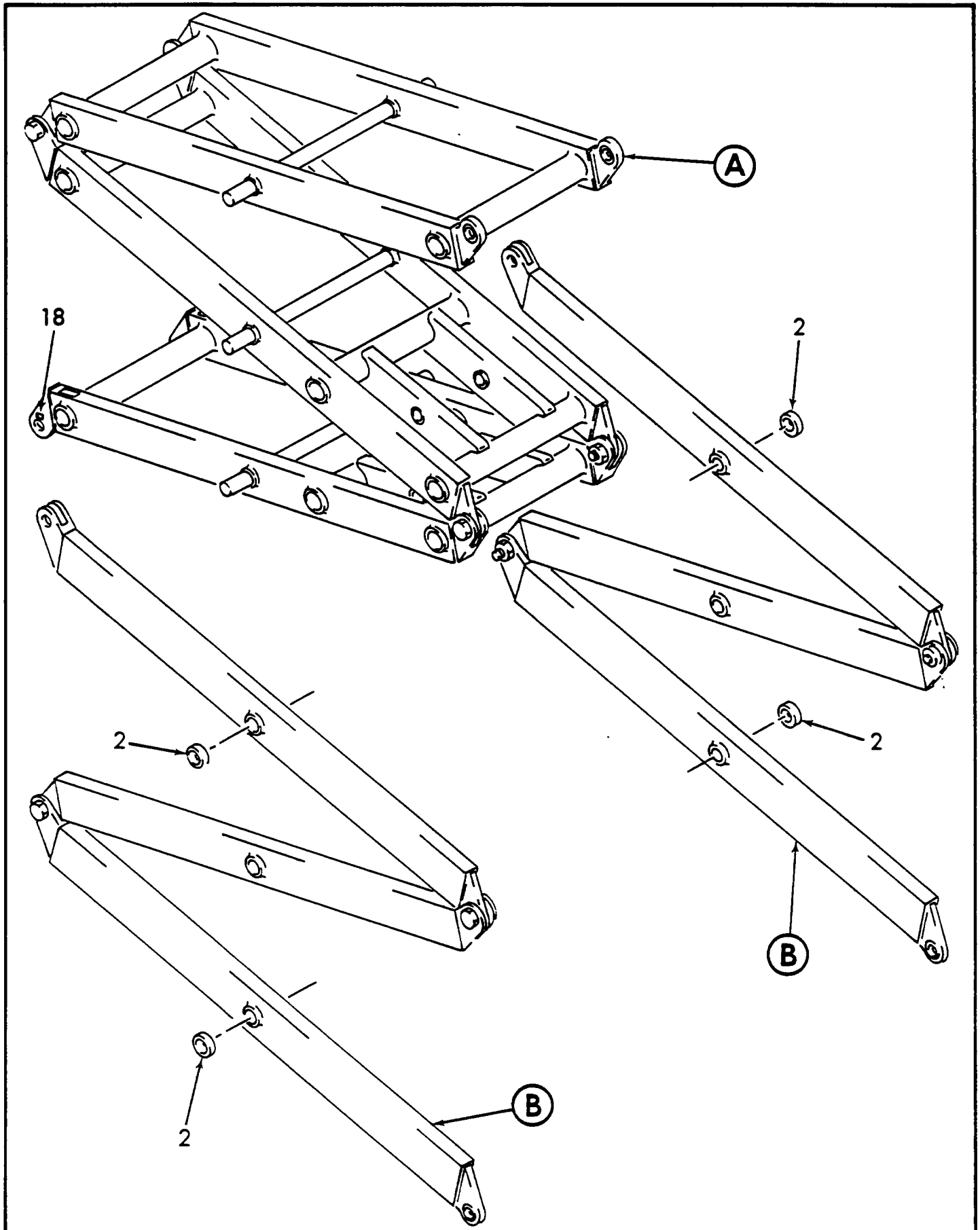


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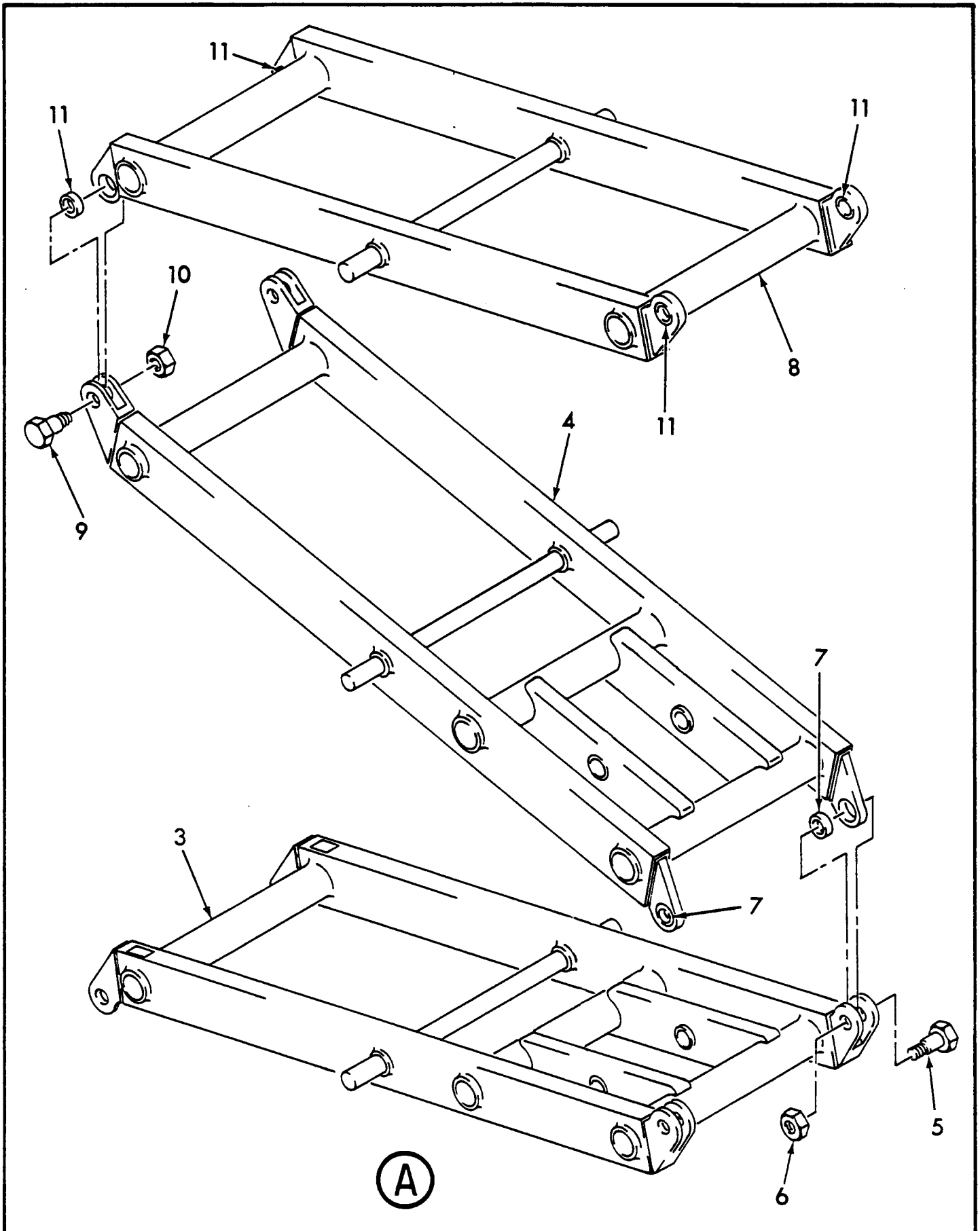
ILLUSTRATED  
PARTS CATALOG

SCISSOR SUB-ASSEMBLY

PARTS  
SECT. 4  
FIG. 2  
PAGE 1

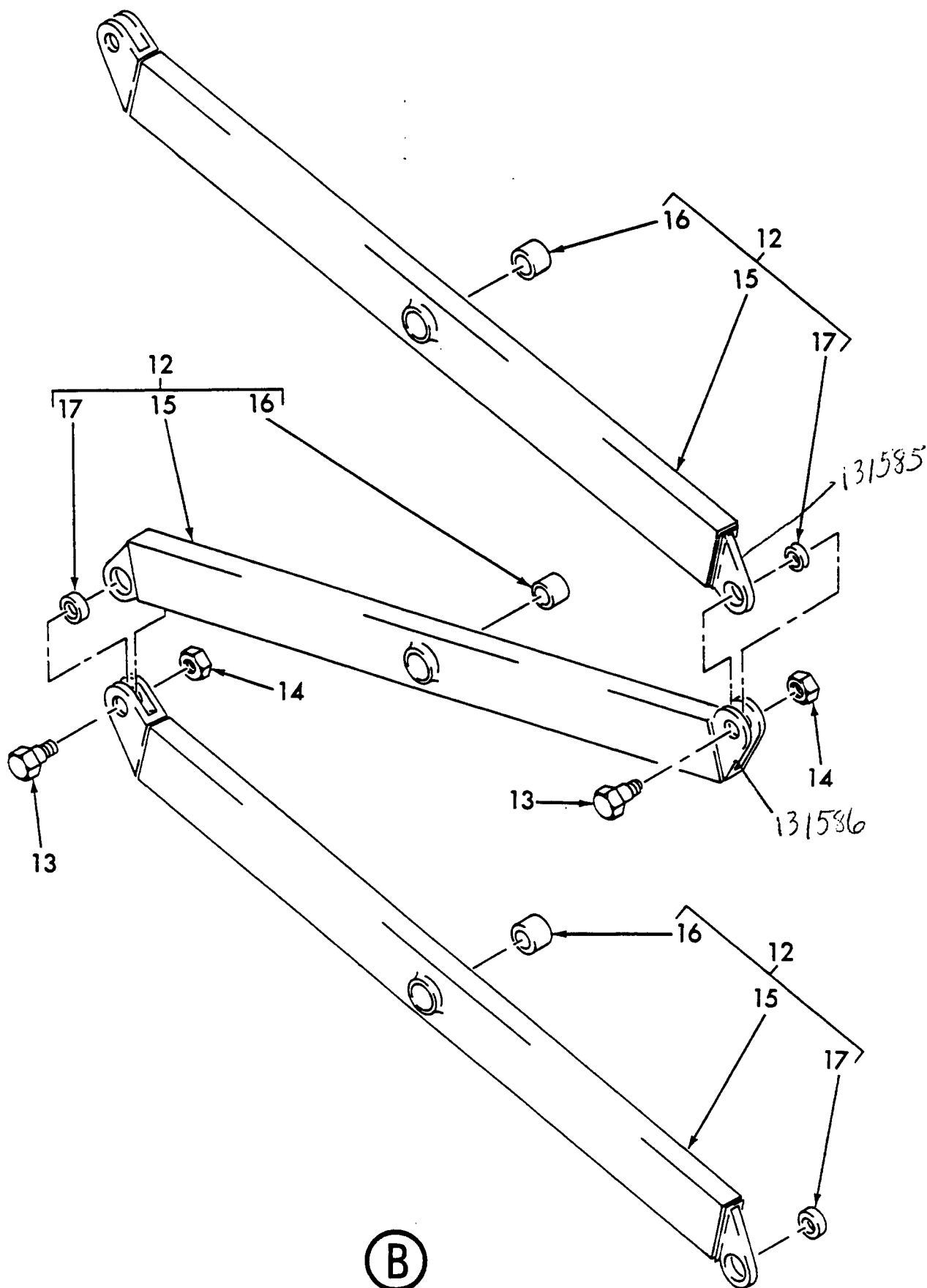


REV.



SCISSOR SUB-ASSEMBLY

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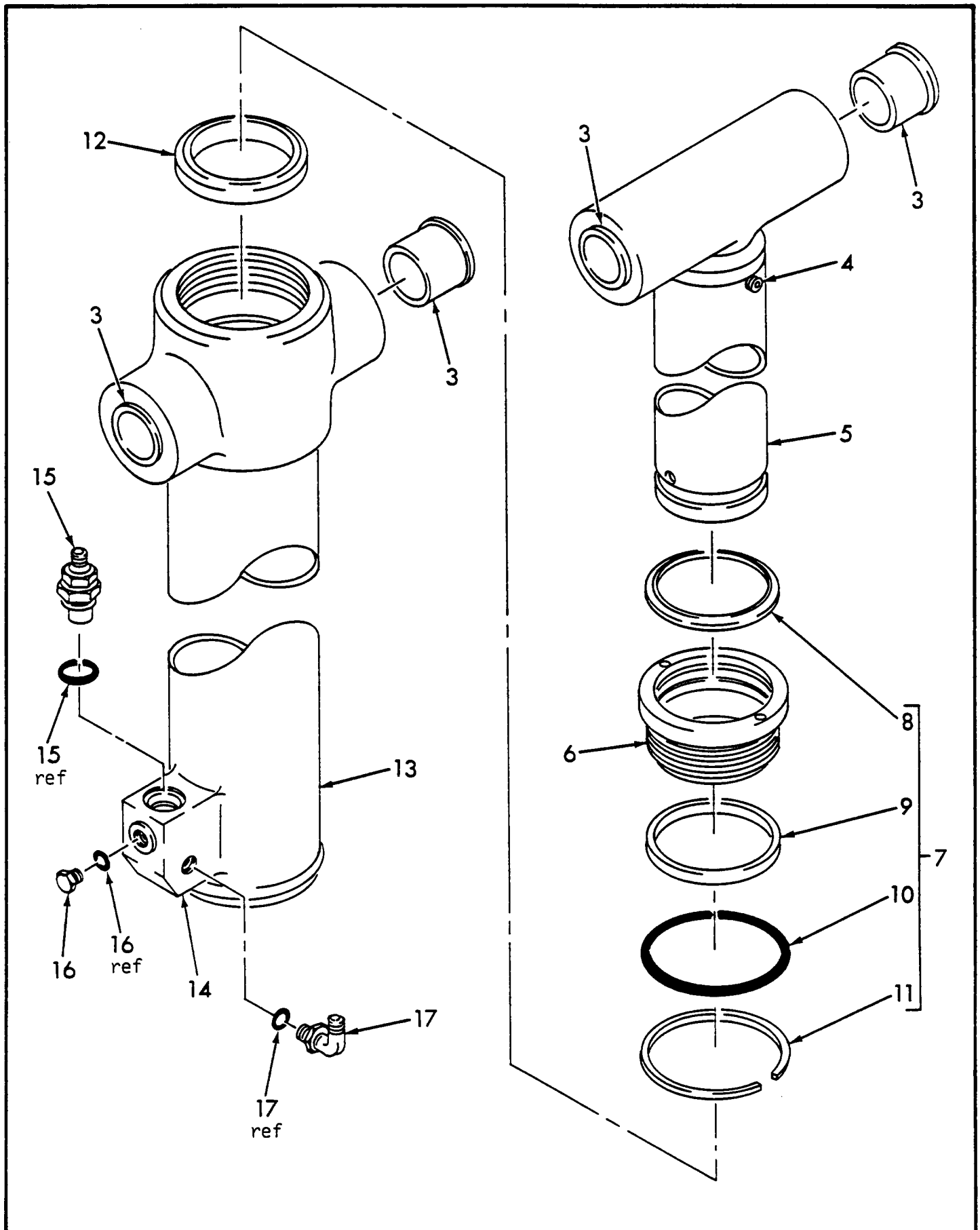
PARTS CATALOG

**SCISSOR SUB-ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 2  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION		UNIT PER ASSY.
		1234567		
-1	130958	SUB-ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1A, 1B, or 1C for NHA)		REF
2	65577	.COLLAR, SHAFT		6
3	130967	.ASSEMBLY, INNER ARM LOWER		1
4	130963	.ASSEMBLY, INNER ARM MIDDLE		1
5	130696	.BOLT, EAR PIVOT (attaching part)		2
6	61249	.NUT, HEX (attaching part)		2
7	916	..BUSHING		2
8	130959	.ASSEMBLY, INNER ARM UPPER		1
9	130696	.BOLT, EAR PIVOT (attaching part)		2
10	61249	.NUT, HEX (attaching part)		2
11	916	..BUSHING		4
12	130986	.SUB-ASSEMBLY, OUTER ARM		6
13	130696	.BOLT, EAR PIVOT (attaching part)		4
14	61249	.NUT, HEX (attaching part)		4
15	130987	.. MACHINING, OUTER ARM		1
16	64922	..BUSHING		1
17	916	..BUSHING		1
18	36398	.BAR, SQUARE		10



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PARTS CATALOG

**M-15 LIFT CYLINDER ASSEMBLY**

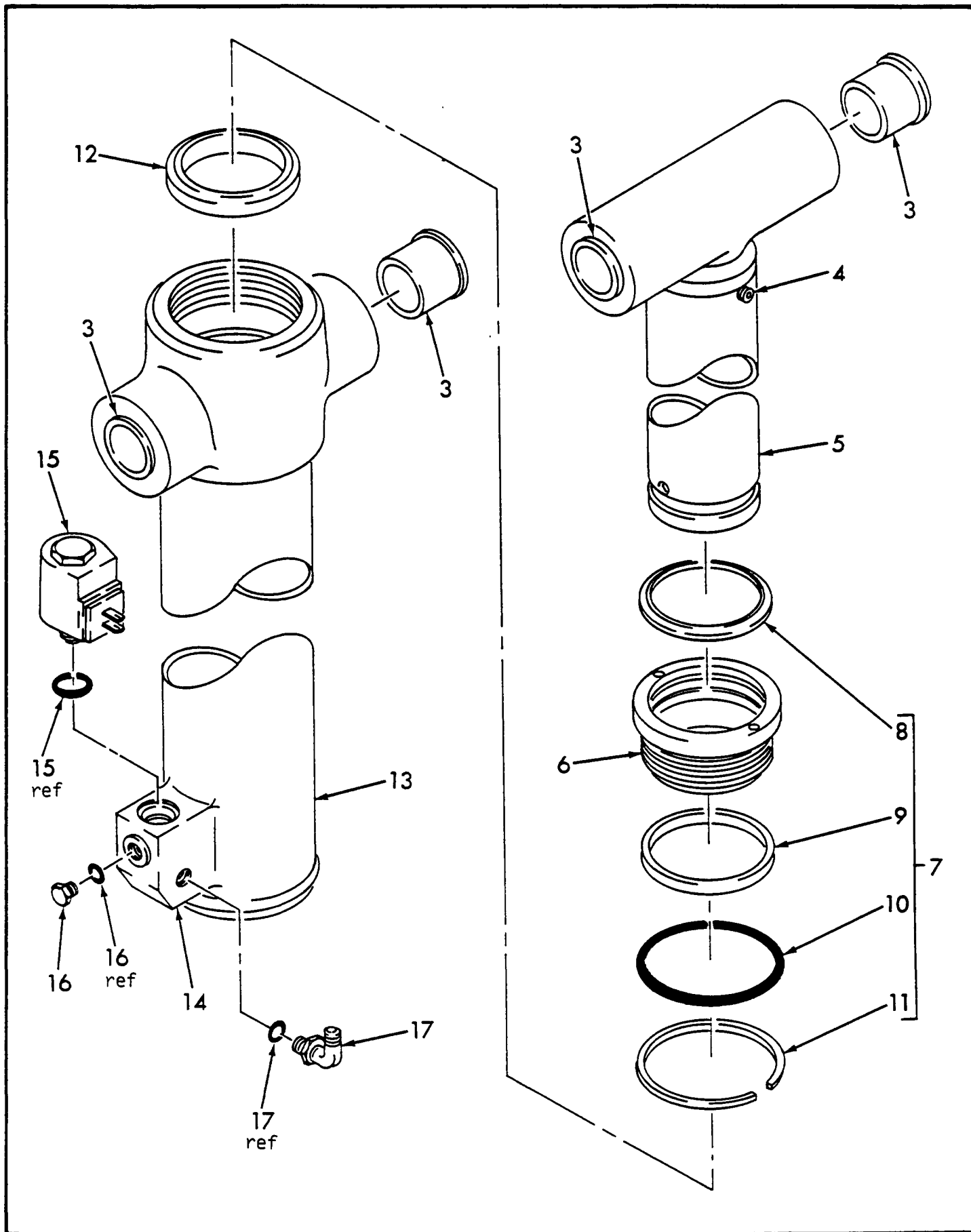
(CONTINUED)

PARTS  
SECT. 4  
FIG. 3A  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130972	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1A for NHA)	REF
-2	130973	.CYLINDER, LIFT	1
3		..BEARING, FLANGE	4
4		..PLUG, BLEED	1
5		..ROD	1
6		..NUT, ROD BEARING	1
7	<del>67038</del> 66818	..KIT, SEAL	1
8		...WIPER, ROD	1
9		...SEAL, ROD	1
10		...RING, BACK UP	1
11		...SEAL, STATIC	1
12		..PISTON	1
13		..BODY	1
14		..VALVE, CHECK	1
15	81059	.VALVE, FLOW CONTROL	1
16	80050-03	.PLUG, O-RING	1
17	80012-08	.ELBOW	1

REV.

ITEM NOT ILLUSTRATED



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PARTS CATALOG

**M-15T AND M-15EP CYLINDER ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 4  
FIG. 3B  
PAGE 2

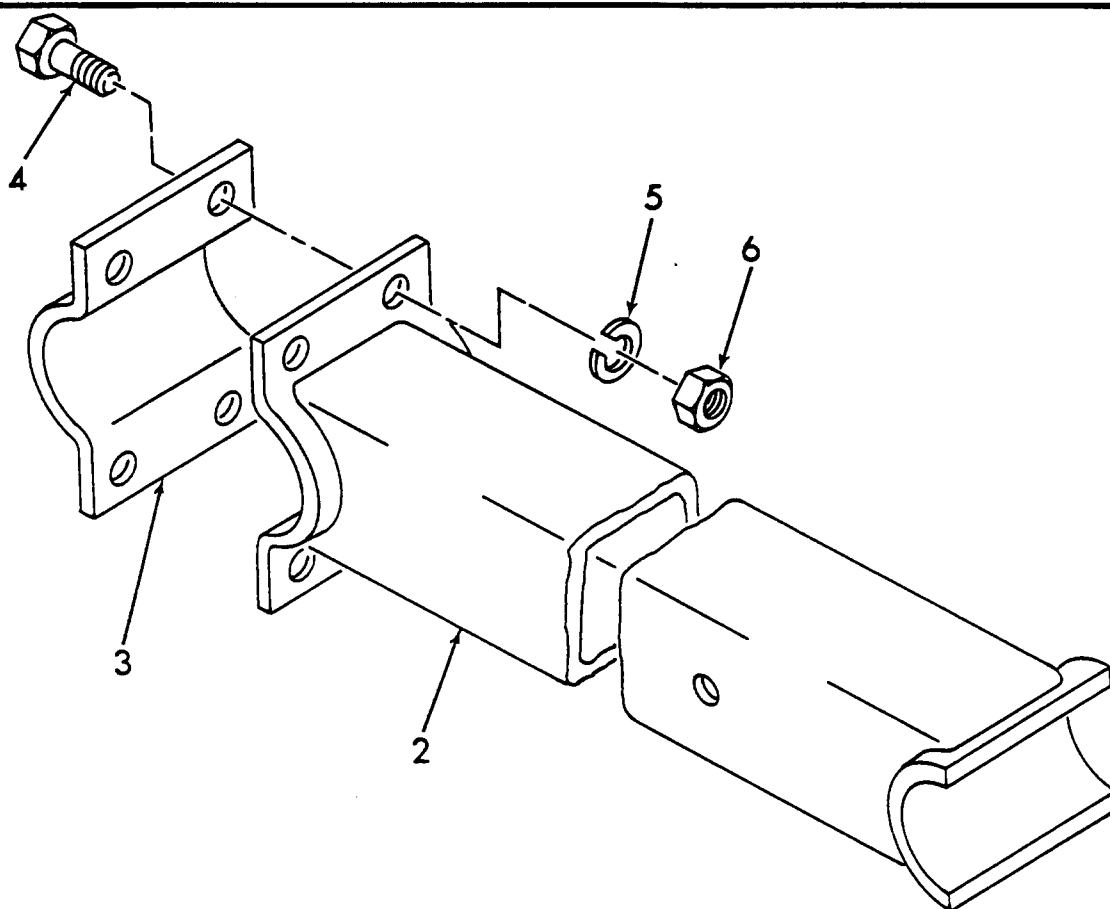
ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131079	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1B or 1C for NHA)	REF
-2	130973	.CYLINDER, LIFT	1
3		..BEARING, FLANGE	4
4		..PLUG, BLEED	1
5		..ROD	1
6		..NUT, ROD BEARING	1
7	67038	..KIT, SEAL	1
8		...WIPER, ROD	1
9		...SEAL, ROD	1
10		...RING, BACK UP	1
11		...SEAL, STATIC	1
12		..PISTON	1
13		..BODY	1
14		..VALVE, CHECK	1
15	81028	.CHECK, SOLENOID ELECTRIC	1
16	80050-03	.PLUG, O-RING	1
17	80012-08	.ELBOW	1

REV.

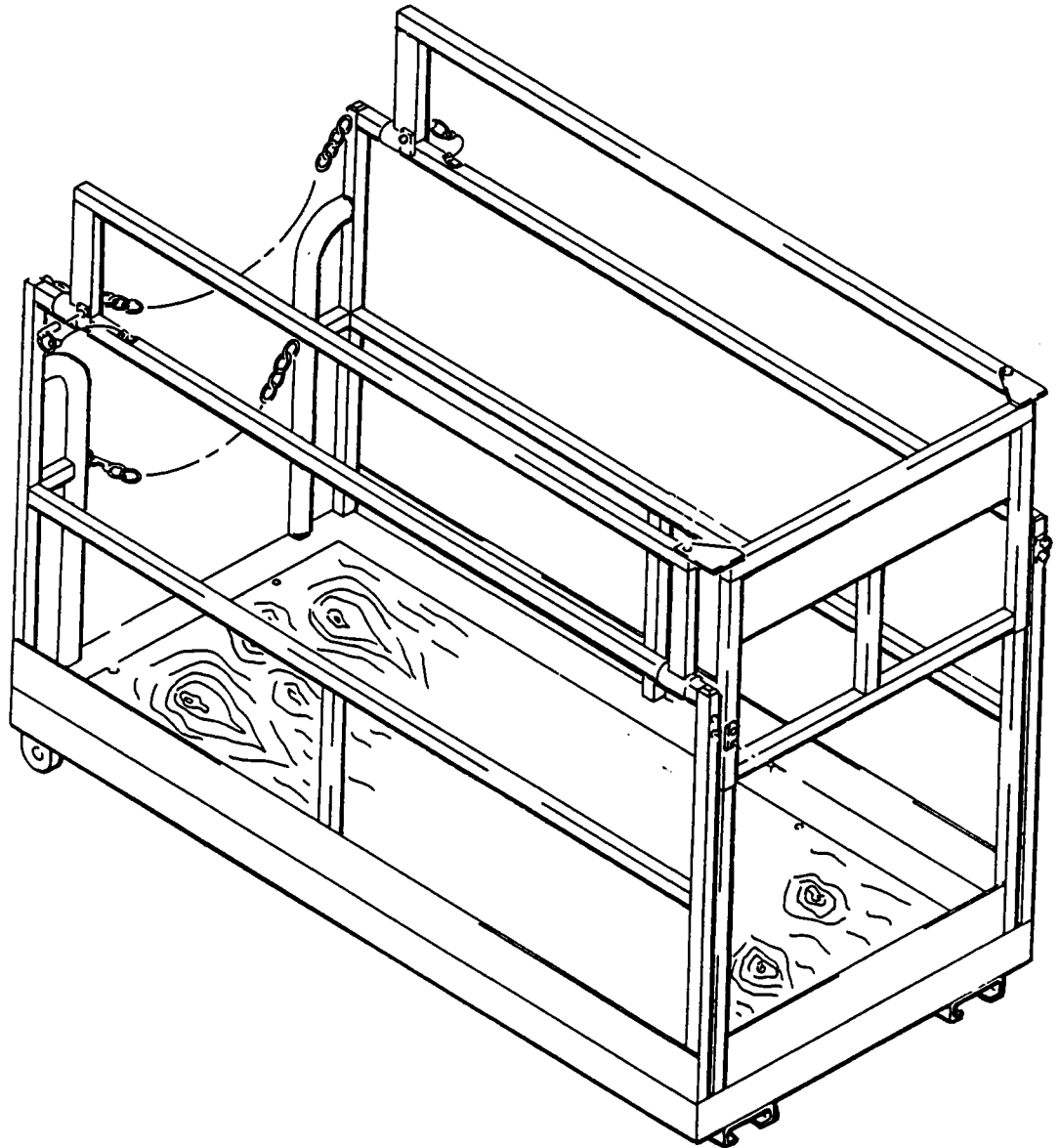
ITEM NOT ILLUSTRATED



## INNER ARM SUPPORT ASSEMBLY



ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130511	ASSEMBLY, INNER ARM SUPPORT (See Sect. 4, Fig. 1A, 1B or 1C for NHA)	REF
2	130512	.WELDMENT, INNER ARM SUPPORT	1
3	30693	.CLAMP, INNER ARM SUPPORT	1
4	60343	.SCREW, H.H.C. (attaching part)	4
5	63303	.WASHER, SLIT LOCK (attaching part)	4
6	60703	.NUT, HEX (attaching part)	4



THIS SECTION 5 IS ILLUSTRATED AS:

FIGURE 1A M-15 PLATFORM ASSEMBLY

FIGURE 1B M-15T PLATFORM ASSEMBLY

FIGURE 1C M-15EP PLATFORM ASSEMBLY

FIGURE 2 HYDRAULIC MOTOR ASSEMBLY

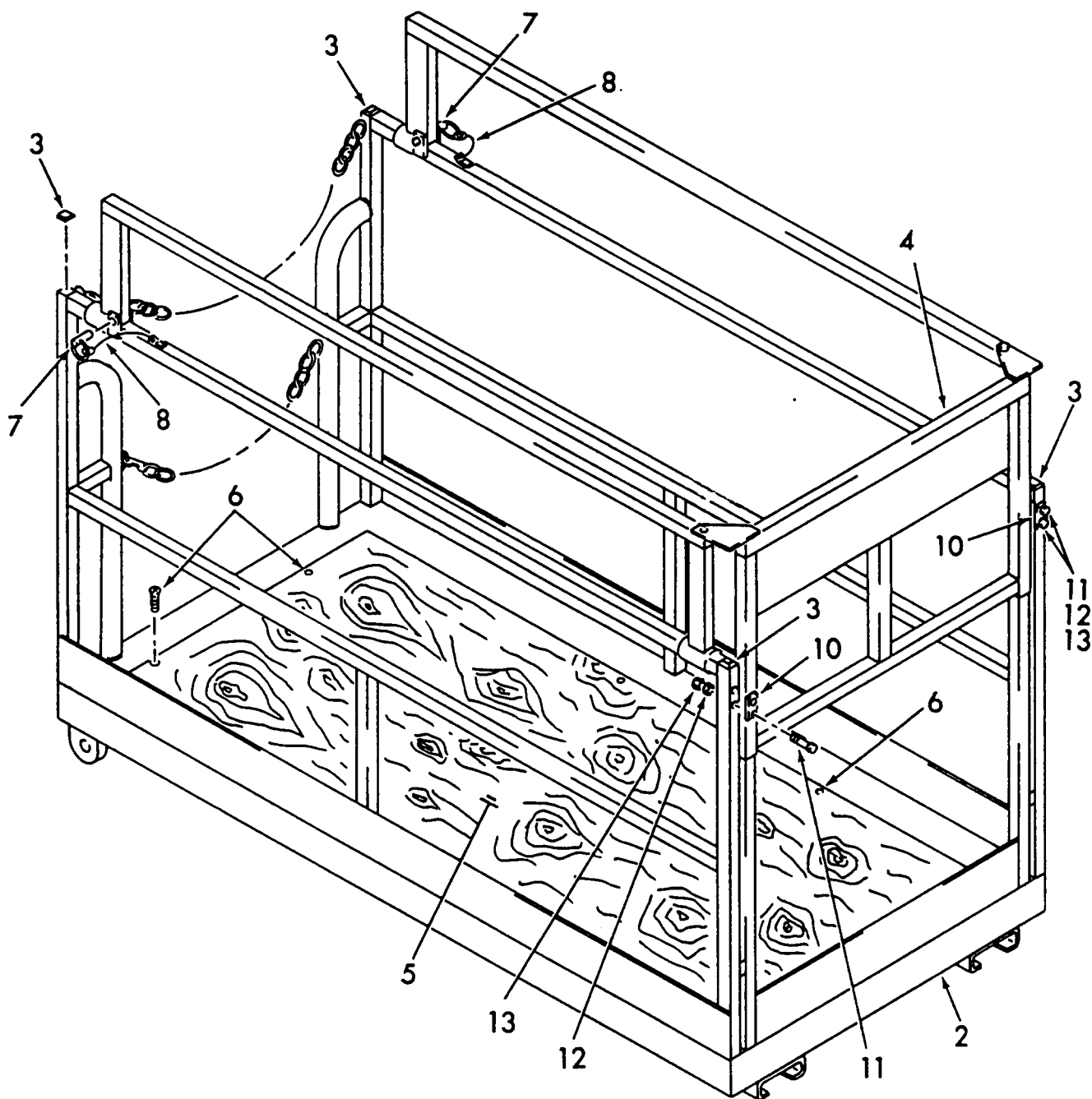


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PARTS CATALOG

**M-15 PLATFORM ASSEMBLY**

PARTS  
SECT. 5  
FIG. 1A  
PAGE 1



REV.

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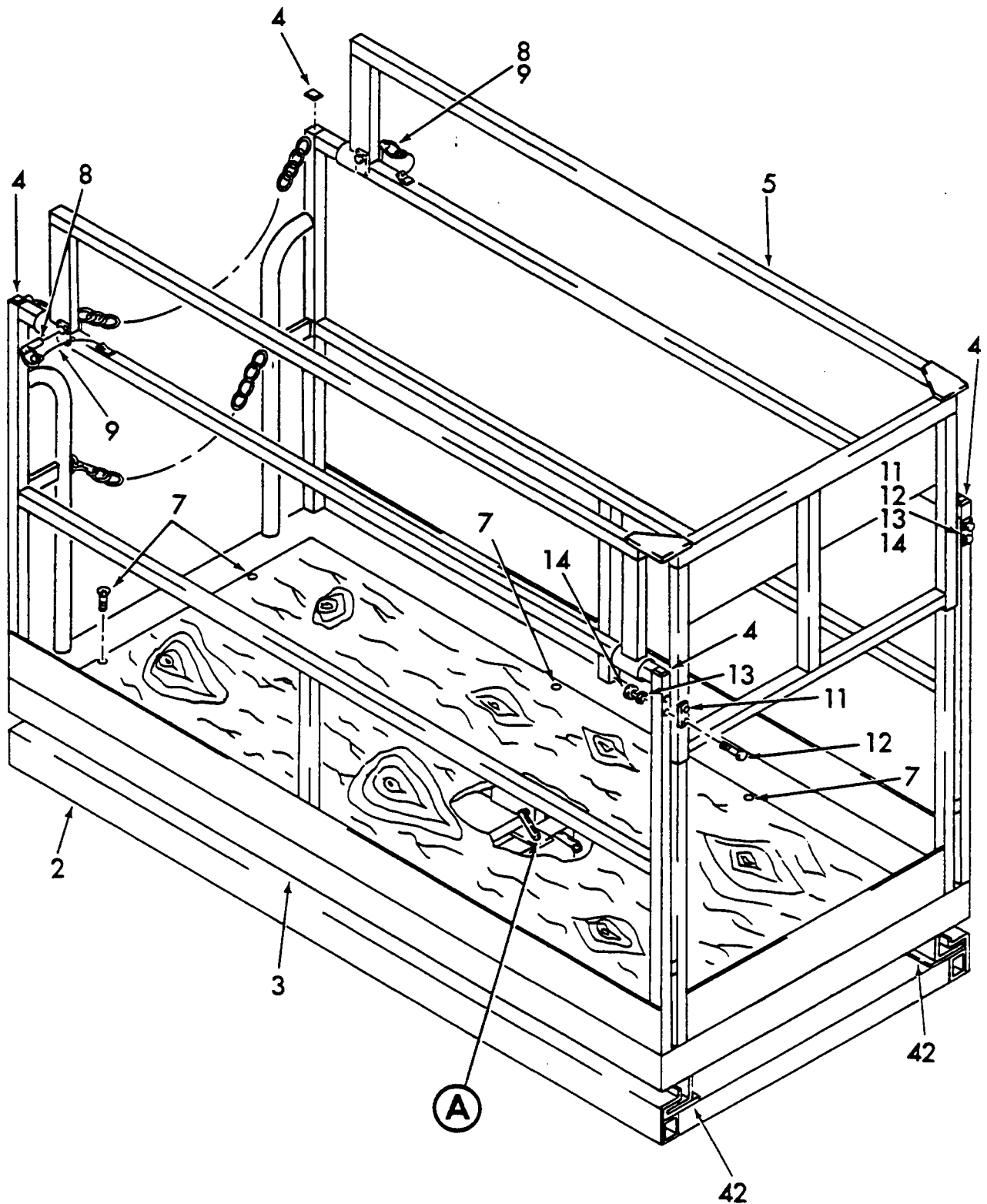
**M-15 PLATFORM ASSEMBLY**

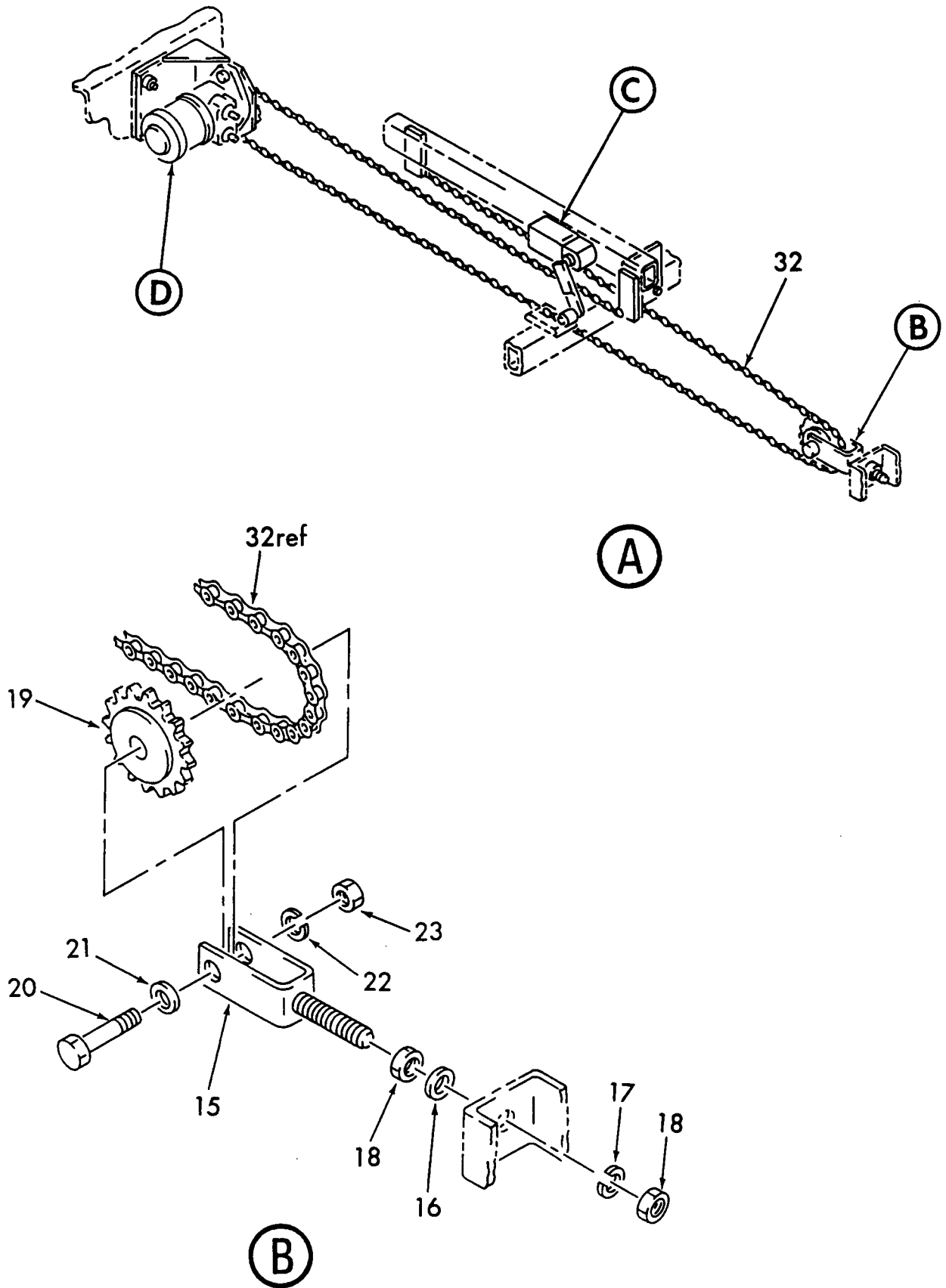
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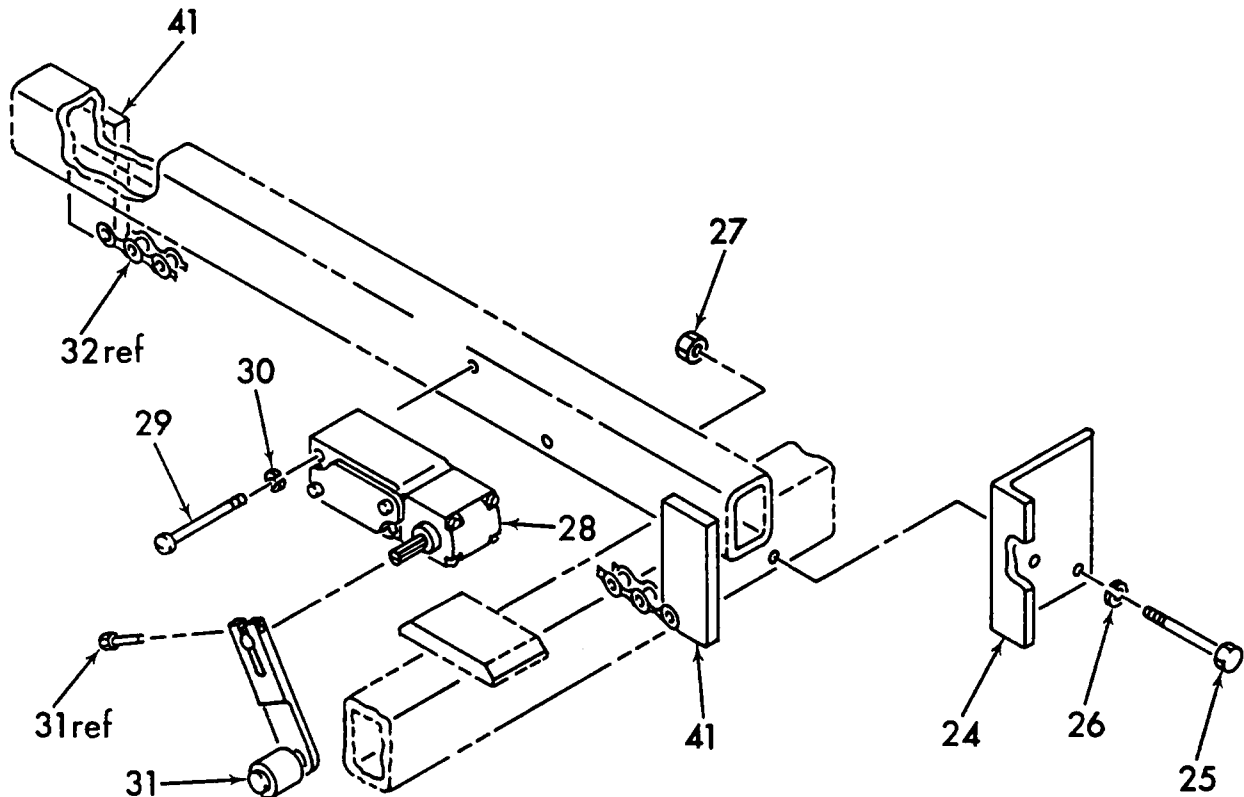
PARTS  
SECT. 5  
FIG. 1A  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130951	ASSEMBLY, PLATFORM (See Sect. 2, Fig. 1A for NHA)	REF
2	130952	.WELDMENT, PLATFORM	1
3	91541	.CAP, PLUG	4
4	131020	.WELDMENT, PLATFORM TOP AND RAIL	1
5	130957	.FLOOR, PLYWOOD	1
6	61713	.SCREW, CAP SELF-TAPPING (attaching Part)	8
7	65124	.PIN, BALL-LOK	2
8	65669	.ASSEMBLY, LANYARD	2
-9	63651	.RIVET, POP (attaching part)	2
10	130926	.PLATE, LOCK	2
11	60360	.SCREW, CAP (attaching part)	4
12	63302	.WASHER, LOCK (attaching part)	4
13	60702	.NUT, HEXAGON (attaching part)	4

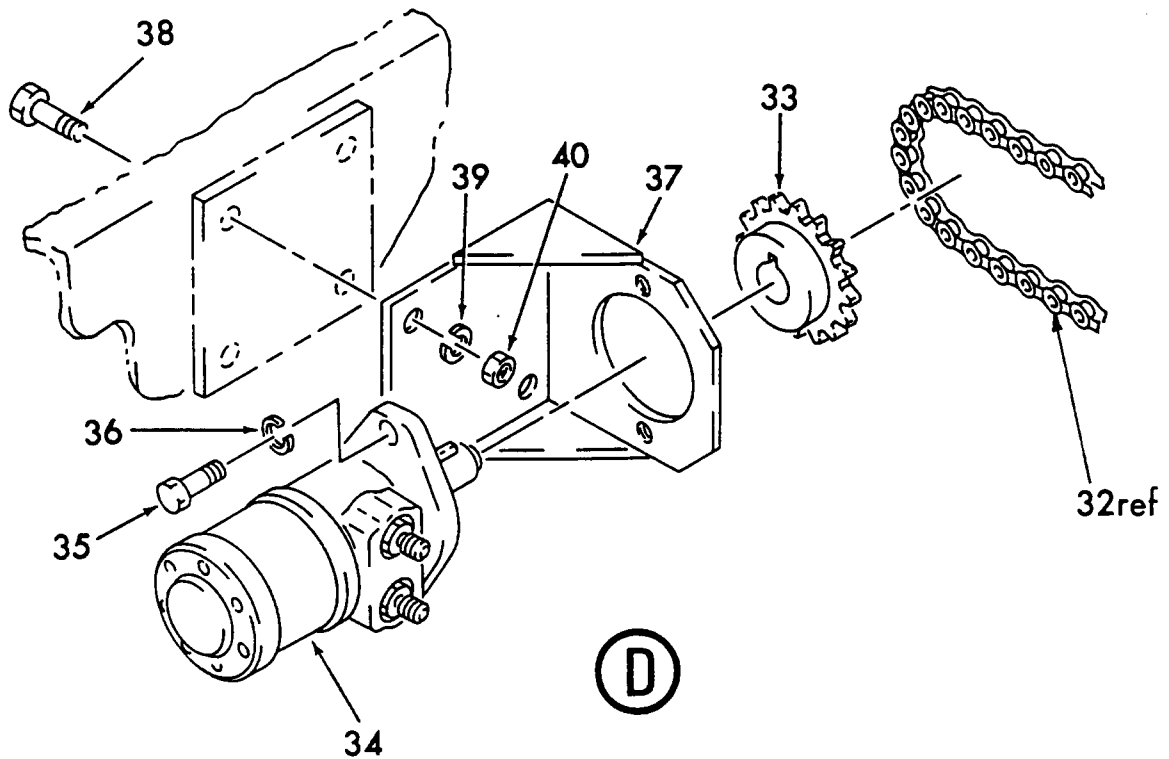
**M-15 T PLATFORM ASSEMBLY**







(C)



(D)

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PARTS CATALOG

**M-15 T PLATFORM ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 5  
FIG. 1B  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131086	ASSEMBLY, PLATFORM (See Sect. 2, Fig. 1B for NHA)	REF
2	131084	.WELDMENT, TOP FRAME	1
3	131085	.WELDMENT, PLATFORM	1
4	91541	.PLUG, CAP	4
5	131020	.WELDMENT, PLATFORM TOP AND RAIL	1
6	130957	.FLOOR, PLYWOOD	1
7	61713	.SCREW, CAP SELF-TAPPING (attaching part)	8
8	65124	.PIN, BALL-LOCK	2
9	65669	.ASSEMBLY, LANYARD	2
-10	63651	.RIVET, POP (attaching part)	2
11	130926	.PLATE, LOCK	2
12	60360	.SCREW, CAP (attaching part)	4
13	63302	.WASHER, LOCK (attaching part)	4
14	60702	.NUT, HEX (attaching part)	4
15	130320	.WELDMENT, CLEVIS	1
16	63415	.WASHER, FLAT (attaching part)	1
17	63305	.WASHER, LOCK (attaching part)	1
18	61242	.NUT, LOCK (attaching part)	2
19	65585	.SPROCKET, IDLER	1
20	60370	.SCREW, CAP (attaching part)	1
21	63415	.WASHER, FLAT (attaching part)	1
22	63305	.WASHER, LOCK (attaching part)	1
23	61242	.NUT, LOCK (attaching part)	1
24	130371	.STOP, EXTENDABLE PLATFORM	1
25	60340	.SCREW, CAP (attaching part)	2
26	63301	.WASHER, LOCK (attaching part)	2



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**M-15 T PLATFORM ASSEMBLY**

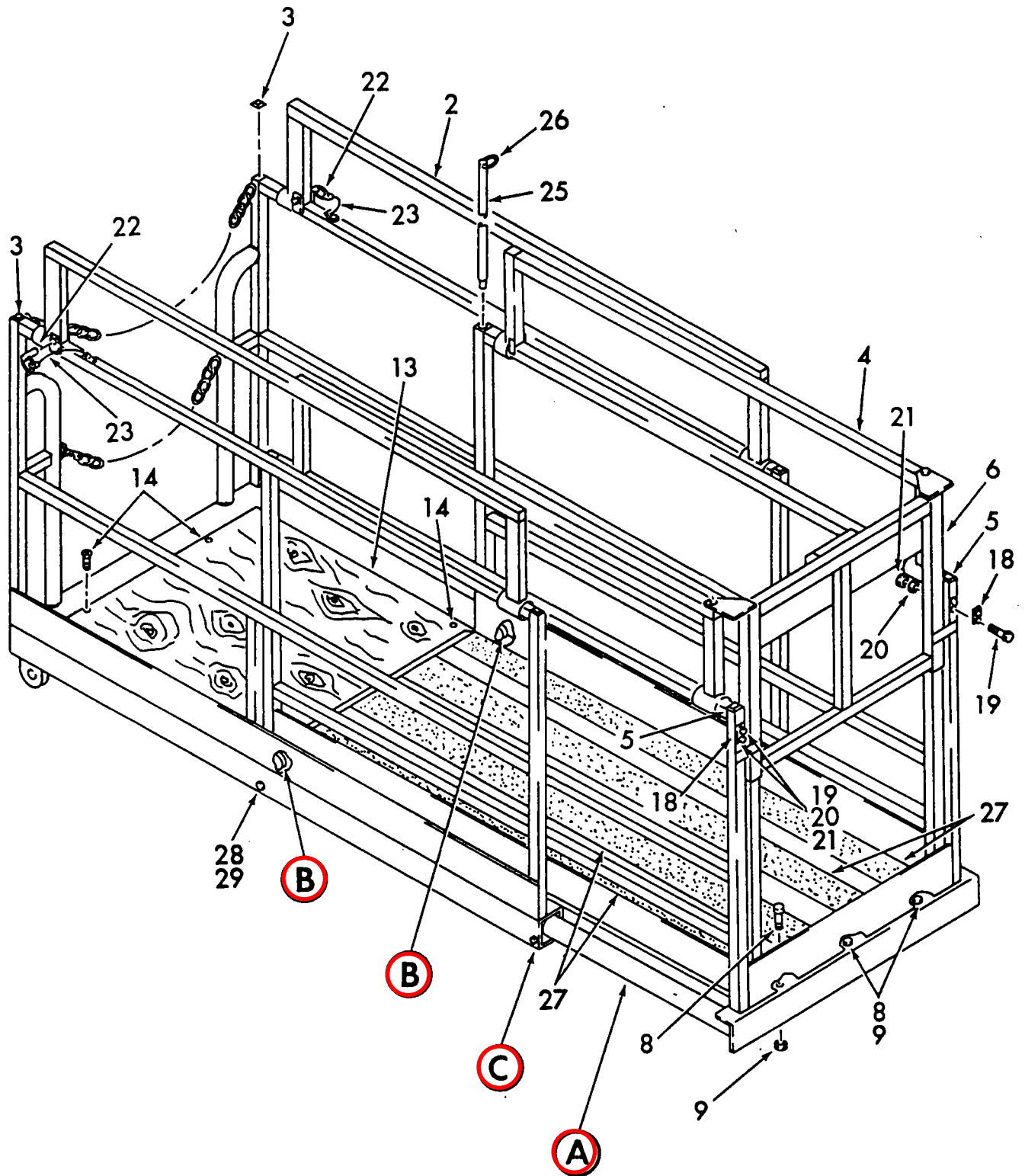
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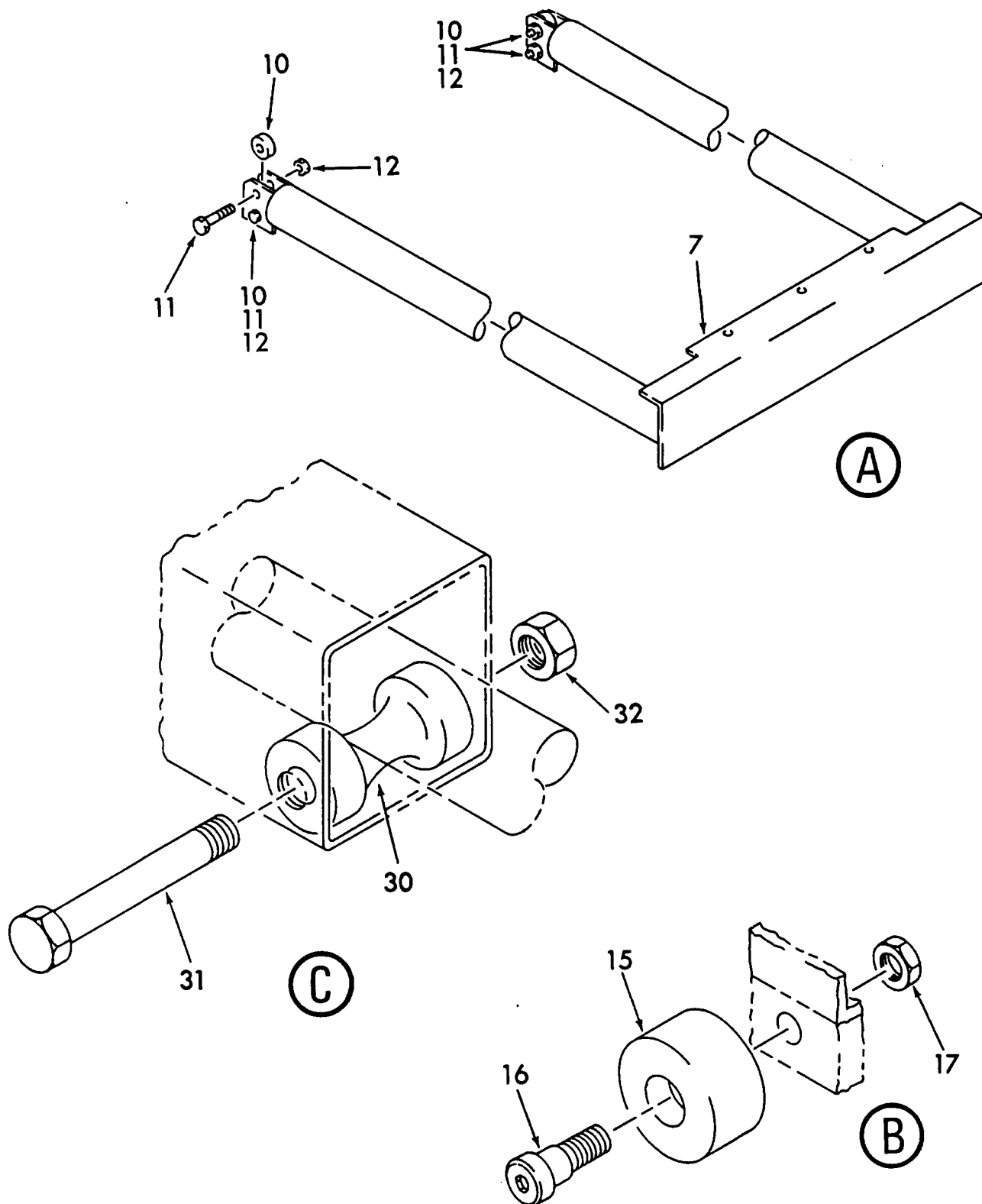
PARTS  
SECT. 5  
FIG. 1B  
PAGE 5

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
27	60701	.NUT, HEX (attaching part)	2
28	70173	.SWITCH, LIMIT	1
29	62615	.SCREW, MACHINE RD. HD. (attaching part)	2
30	63313	.WASHER, LOCK (attaching part)	2
31	70032	.LEVER, LIMIT SWITCH	1
32	65912	.CHAIN, SELF LUBRICATED	1
33	65578	.SPROCKET, STEEL	1
34	130341	.ASSEMBLY, HYDRAULIC MOTOR (See Sect. 5, Fig. 2 for Details)	1
35	60326	.SCREW, CAP (attaching part)	2
36	63305	.WASHER, LOCK (attaching part)	2
37	130319	.WELDMENT, HYDRAULIC MOTOR BRACKET	1
38	60618	.SCREW, CAP (attaching part)	4
39	63319	.WASHER, LOCK (attaching part)	4
40	60703	.NUT, HEX (attaching part)	4
41	65580	.LINK, MASTER	2
42	131093	.PAD, WEAR	2
-43	63651	.RIVET, POP (attaching part)	6

REV.

- ITEM NOT ILLUSTRATED





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**M-15 EP PLATFORM ASSEMBLY**

(CONTINUED)

PARTS  
SECT. 5  
FIG. 1C  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	130995	ASSEMBLY, PLATFORM SLIDE OUT (See Sect. 2, Fig. 1C for NHA)	REF
2	130996	.WELDMENT, PLATFORM	1
3	91541	.PLUG, CAP	2
4	131001	.WELDMENT, PLATFORM SLIDE OUT	1
5	91541	.PLUG, CAP	2
6	131004	.RAIL, FRONT GUARD	1
7	130891	.WELDMENT, SIDE	1
8	60325	.SCREW, CAP (attaching part)	3
9	61318	.NUT, LOCK (attaching part)	3
10	131028	.ROLLER, REAR	4
11	60370	.SCREW, CAP (attaching part)	4
12	61305	.NUT, HEXAGON (attaching part)	4
13	131007	.FLOOR, PLYWOOD	1
14	61713	.SCREW, CAP SELF-TAPPING (attaching part)	6
15	31161	.ROLLER, BATTERY TRAY	2
16	62101	.SCREW, SHOULDER (attaching part)	2
17	61318	.NUT, LOCK (attaching part)	2
18	130926	.PLATE, LOCK	2
19	60360	.SCREW, CAP (attaching part)	4
20	63302	.WASHER, LOCK (attaching part)	4
21	60702	.NUT, HEXAGON (attaching part)	4
22	65124	.PIN, BALL-LOK	2
23	65669	.ASSEMBLY, LANDYARD	2
-24	63651	.RIVET, POP (attaching part)	2

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**M-15 EP PLATFORM ASSEMBLY**

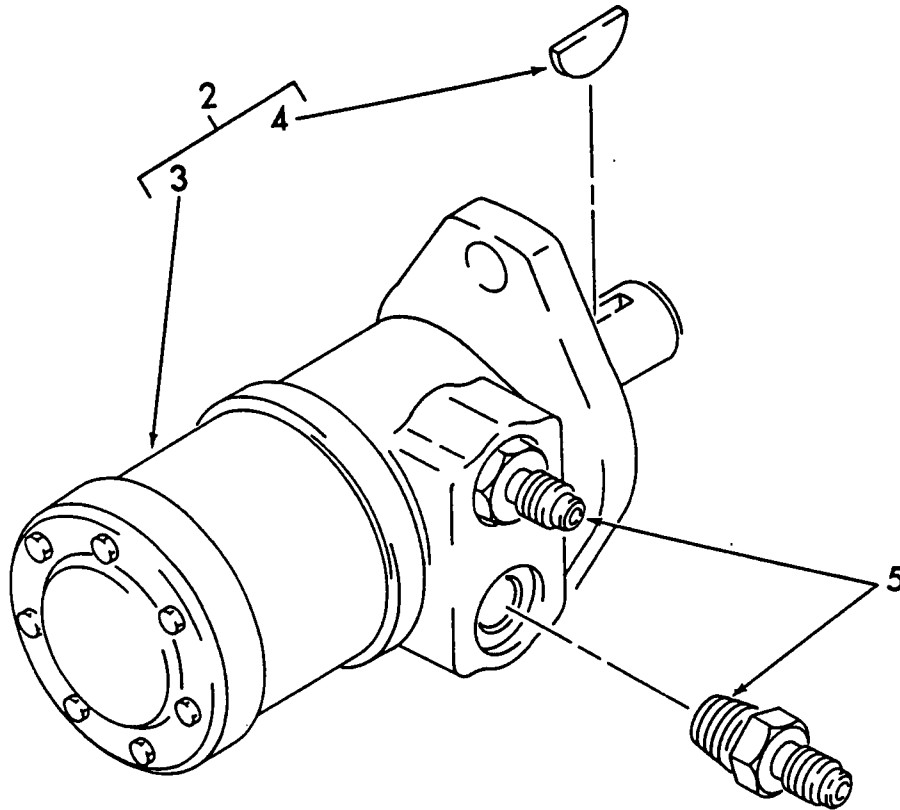
(CONTINUED)

PARTS  
SECT. 5  
FIG. 1C  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION		UNIT PER ASSY.
		1234567		
25	130825	.WELDMENT, LOCK PIN		2
26	65687	.SPLIT, RING		2
27	131035	.SURFACING, ANTI-SLIP		4
28	60388	.SCREW, CAP (attaching part)		8
29	61305	.NUT, HEXAGON (attaching part)		8
30	131023	.GUIDE, ROLLER		2
31	60385	.SCREW, CAP		2
32	60705	.NUT, HEXAGON		2

REV

ITEM NOT ILLUSTRATED

**HYDRAULIC MOTOR ASSEMBLY**

ITEM	PART NUMBER	DESCRIPTION		UNIT PER ASSY.
		1234567		
-1	130341	ASSEMBLY, HYDRAULIC MOTOR (See Sect. 5, Fig. 1C for NHA)		REF
2	81025	.MOTOR, HYDRAULIC		1
3	66965	..KIT, SEAL		1
4		..KEY, WOODRUFF		1
5	80001-05	.CONNECTOR, MALE		2

THIS SECTION 6 IS ILLUSTRATED AS:

FIGURE 1 OPTIONS

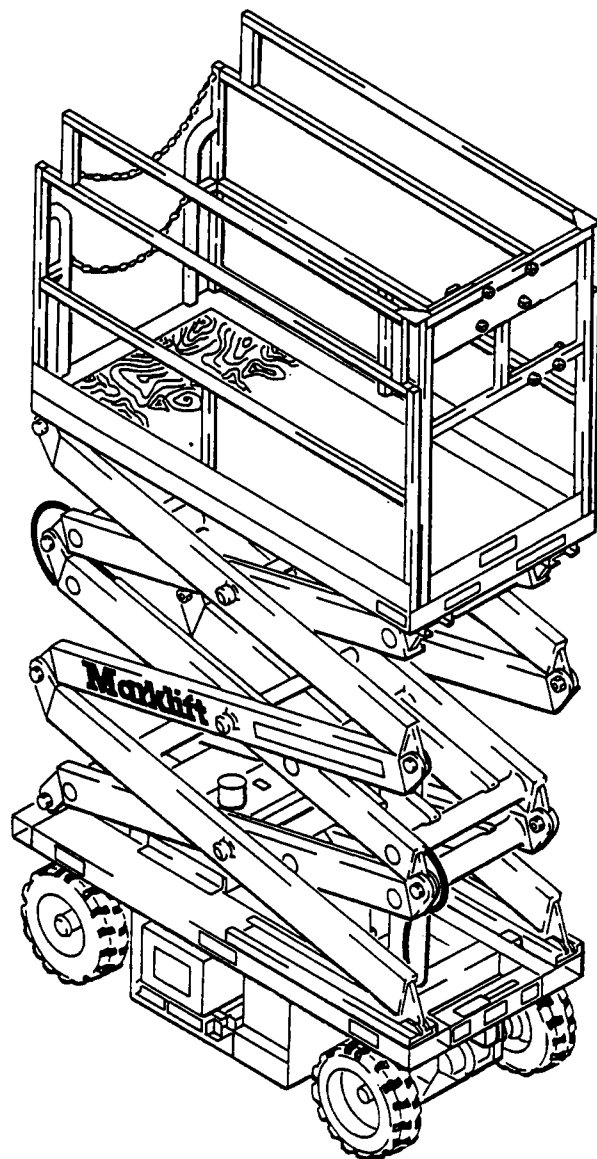
FIGURE 2 REMOTE DRIVE KIT

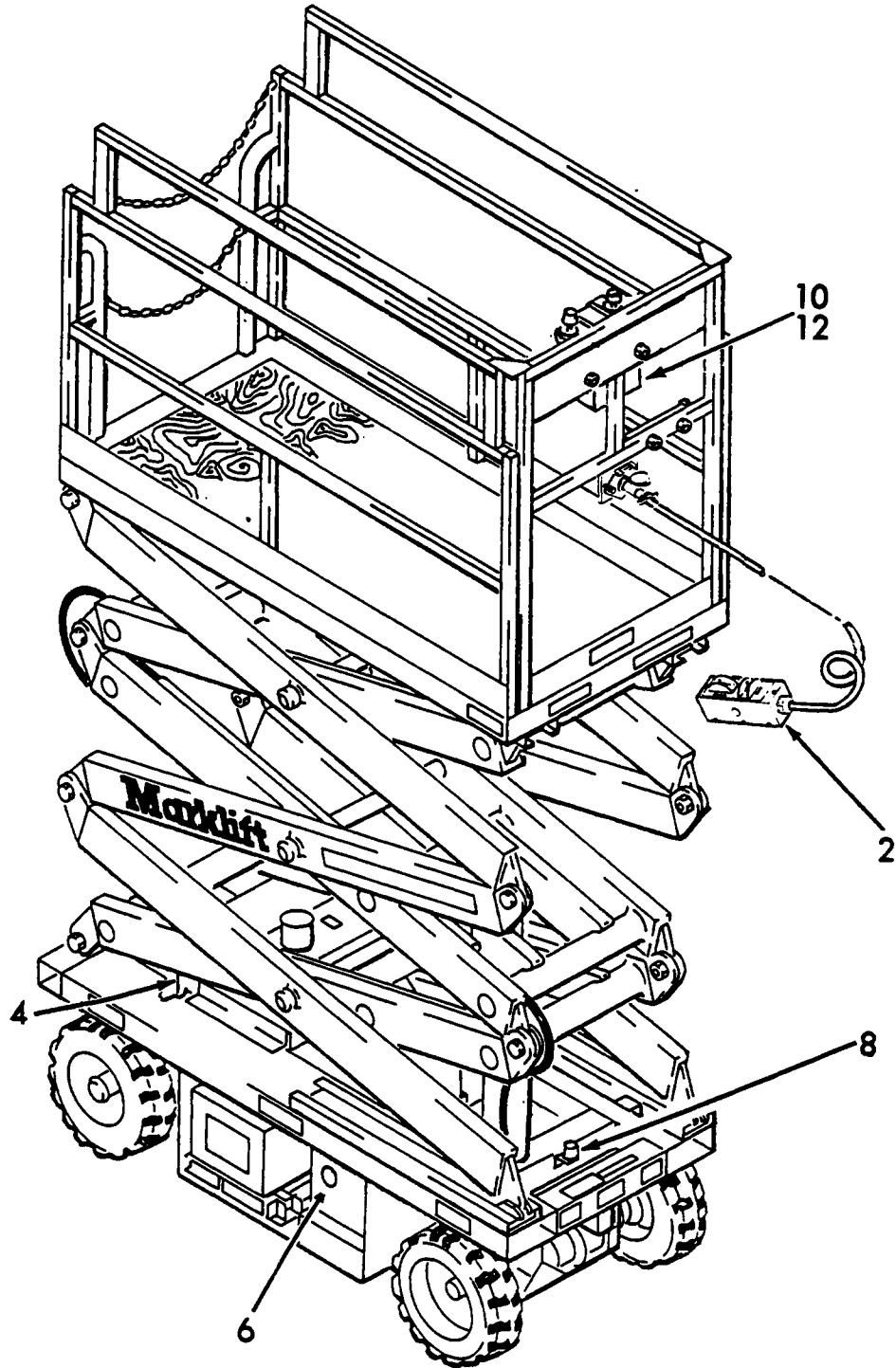
FIGURE 3 DELUXE BATTERY CHARGER

FIGURE 4 HOURMETER

FIGURE 5 P.Q. SLOPE SENSOR

FIGURE 6 TRAVEL WARNING HORN / PROPORTIONAL DRIVE CONTROL







**OPTIONS**

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1		ASSEMBLIES, OPTIONAL	REF
2	131916	.OPTION, REMOTE DRIVE KIT (See Sect. 6, Fig. 2 for Details)	1
4	70228	.OPTION, DELUXE BATTERY CHARGER (See Sect. 6, Fig. 3 for Details)	1
6	131065	.OPTION, HOURMETER (See Sect. 6, Fig. 4 for Details)	1
8	131942	.OPTION, P.Q. SLOPE SENSOR (See Sect. 6, Fig. 5 for Details)	1
10	131901	.OPTION, TRAVEL WARNING HORN (See Sect. 6, Fig. 6 for Details)	1
12	131921	.OPTION, PROPORTIONAL DRIVE CONTROL (See Sect. 6, Fig. 6 for Details)	1

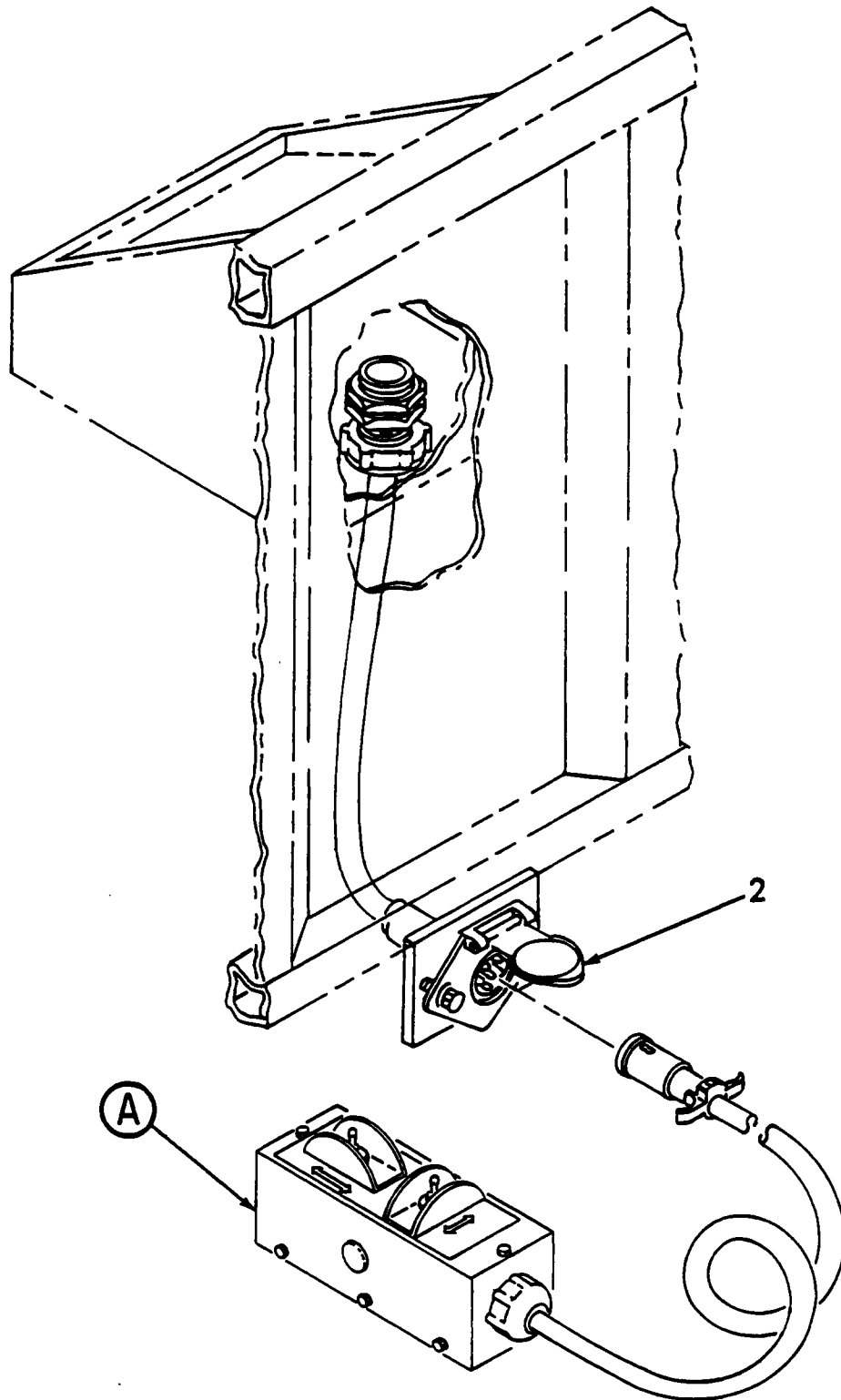


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REMOTE DRIVE KIT (OPTION)

PARTS  
SECT. 6  
FIG. 2  
PAGE 1





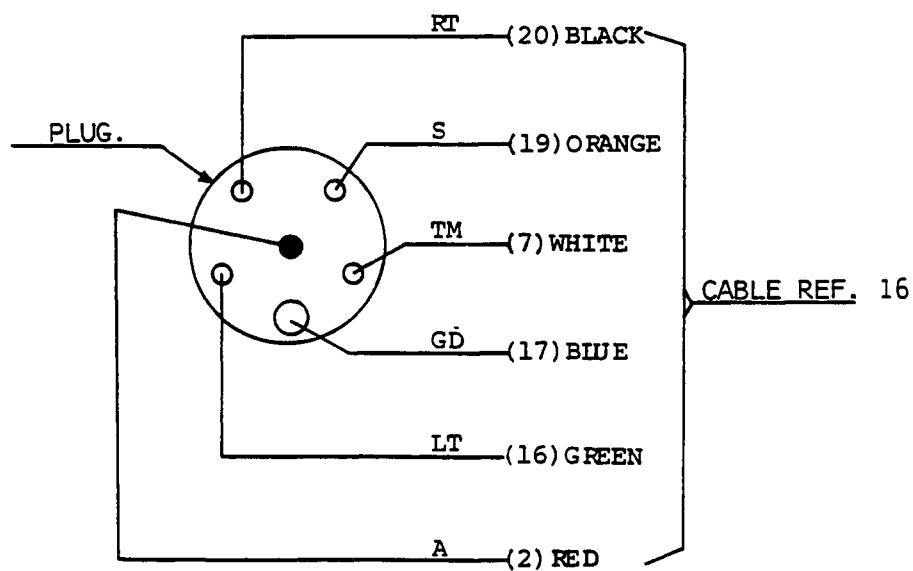
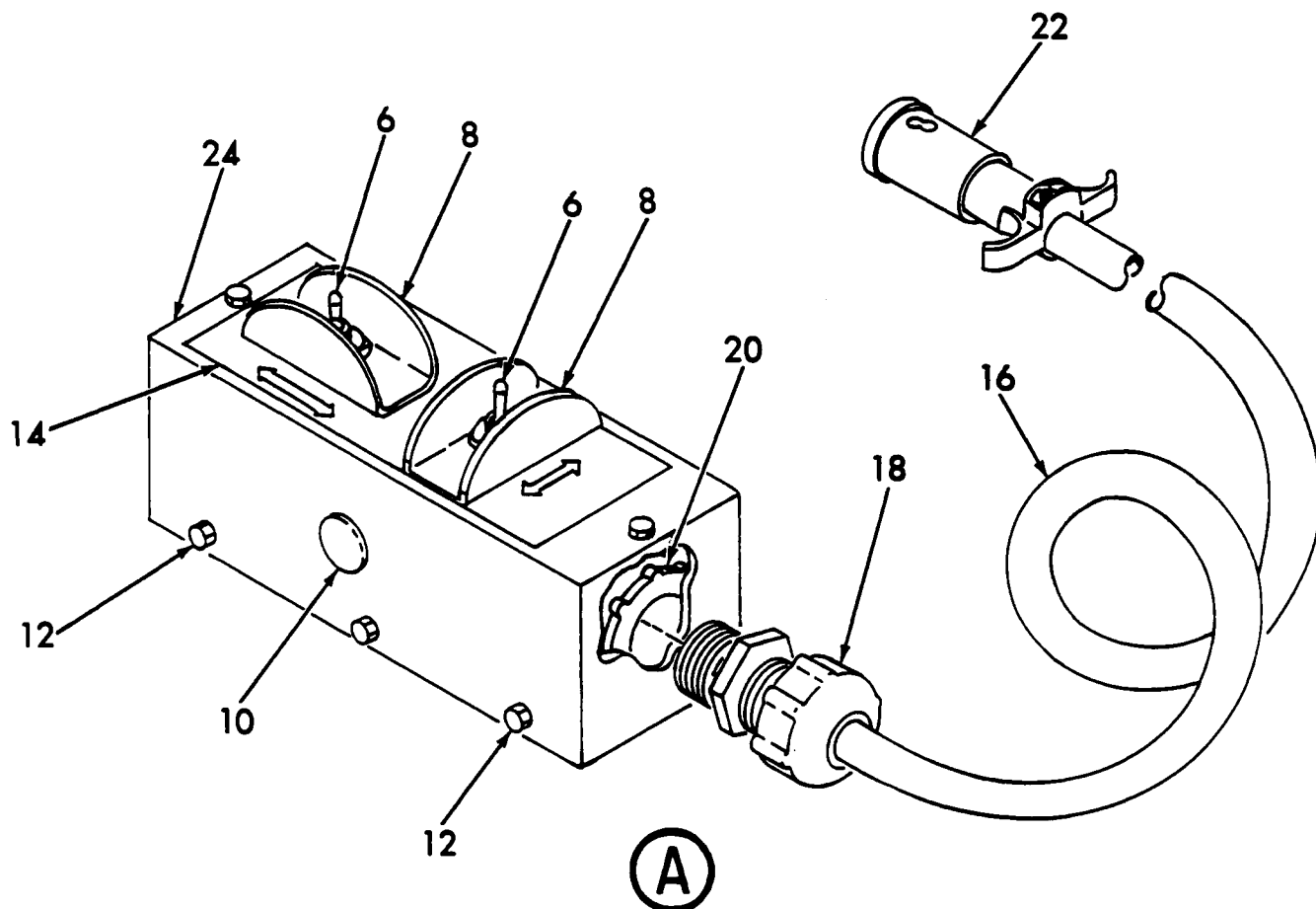
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**REMOTE DRIVE KIT (OPTION)**

(continued)

PARTS  
SECT. 6  
FIG. 2  
PAGE 2



PLUG WIRING DIAGRAM

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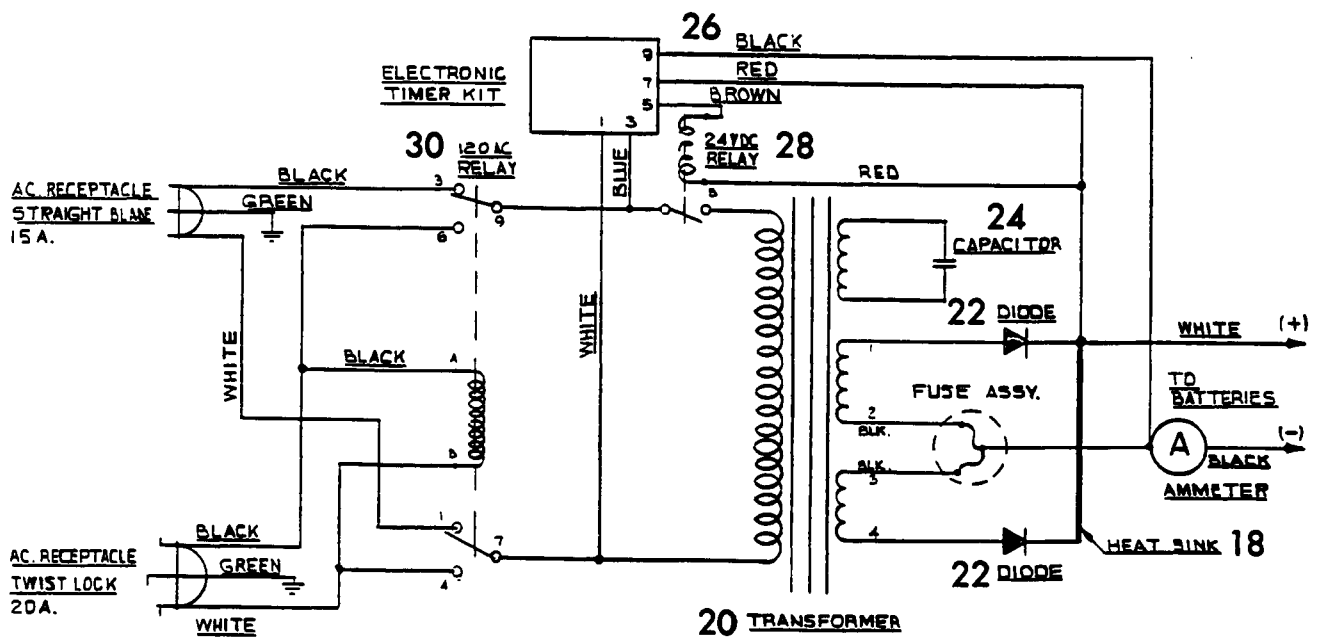
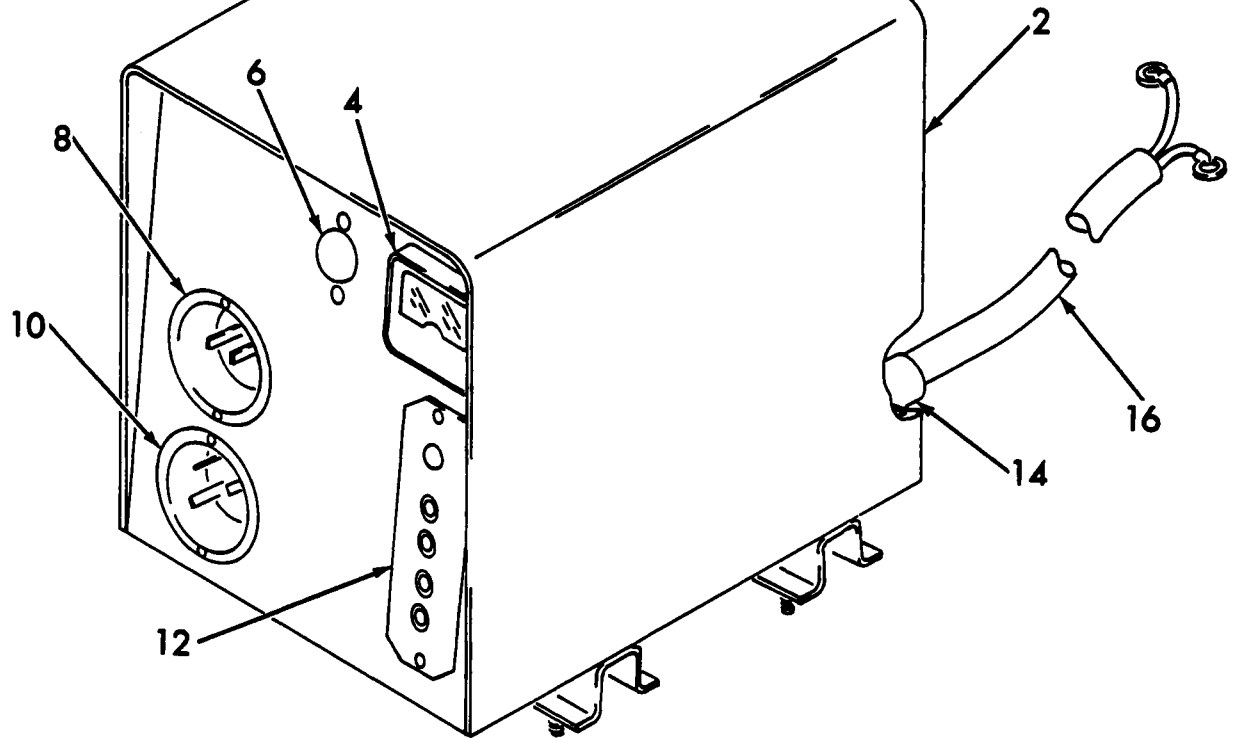
PARTS CATALOG

REMOTE DRIVE KIT (OPTION)

(continued)

PARTS  
SECT. 6  
FIG. 2  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131916	OPTION, REMOTE DRIVE KIT	REF
2	131940	.PLUG, FEMALE REMOTE DRIVE & STEER	1
-4	130911	.ASSEMBLY, REMOTE DRIVE LANYARD/CONTROL	1
6	20481	..SWITCH, TOGGLE	2
8	20884	..GUARD, SWITCH	2
10	771	..PLUG, WHITE	1
12	61726	..SCREW, SELF TAPPING	8
14	130906	..DECAL, R. CONTROL DRIVE & STEER	1
16	130902-08	..CABLE, CONDUCTOR	1
18	70281	..RELIEF, STRAIN	1
20	2808	..NUT, LOCK	1
22	70266	..PLUG, (6-POLE)	1
24	130901	..ASSEMBLY, ELECTRICAL	1



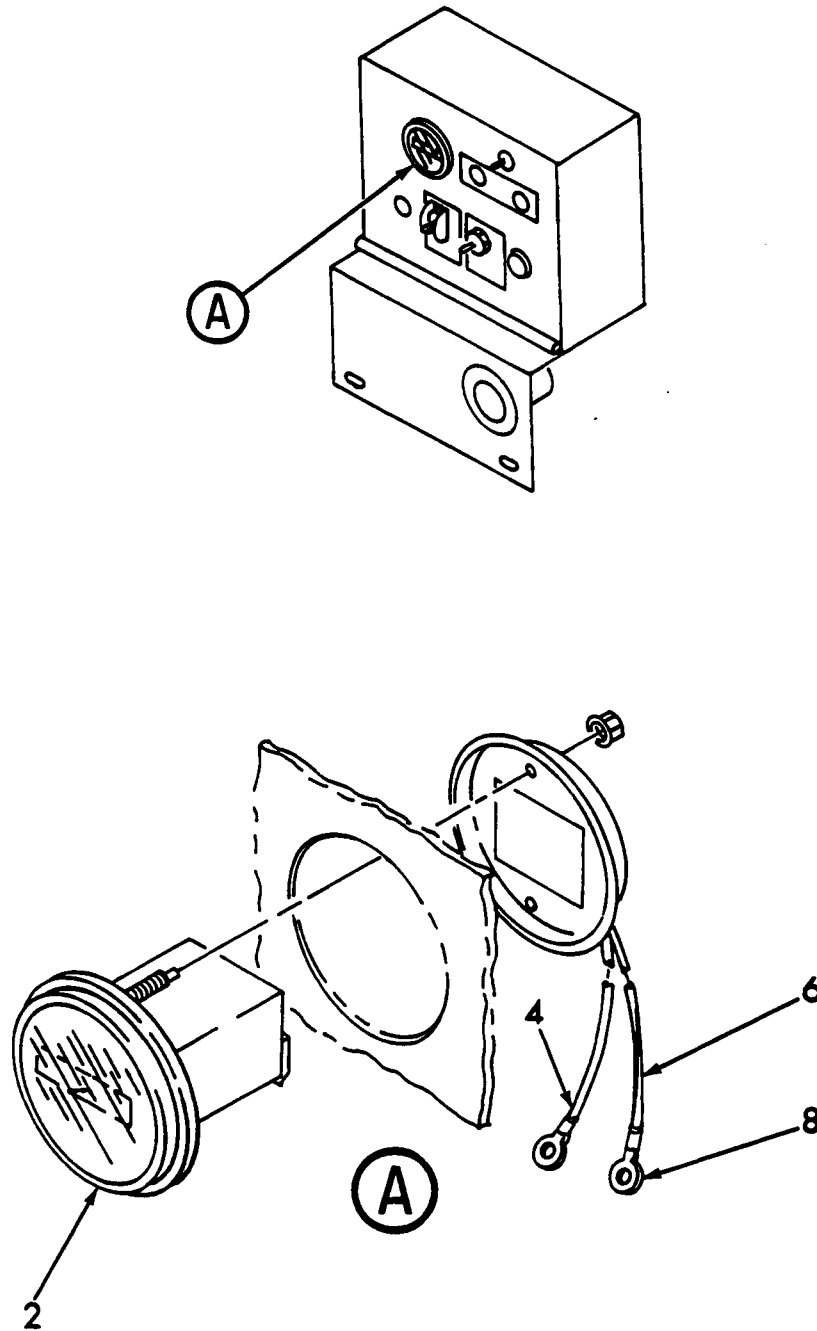
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**DELUXE BATTERY CHARGER (OPTION)**PARTS  
SECT. 6  
FIG. 3  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	70228	OPTION, DELUXE CHARGER	REF
2		.ASSEMBLY, CASE	1
4	66747	.AMMETER	1
6	66727	.ASSEMBLY, FUSE	1
8	66734	.RECEPTACLE, STRAIGHT BLADE	1
10	66736	.RECEPTACLE, TWIST LOCK	1
12	66725	.KIT, ELECTRONIC TIMER	1
14		.BUSHING, DC CORD INSULATOR	1
16		.CORD SET, DC NO PLUG	1
18		.ASSEMBLY, HEATSINK WITH DIODES	1
20		.ASSEMBLY, TRANSFORMER	1
22		.ASSEMBLY, DIODE	2
24	66750	.CAPACITOR, 660 VAC	1
26		.ASSEMBLY, CONTROL CABLE	1
28		.RELAY, 24 VDC	1
30		.RELAY, 120 VAC	1





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HOURLMETER (OPTION)

(continued)

PARTS

SECT. 6

FIG. 4

PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131065	OPTION, HOURLMETER	REF
2	20571	.HOURLMETER	1
4	70232	.WIRE, WHITE 1.5 FEET	AR
6	70008	.WIRE, YELLOW/GREEN 1.5 FEET	AR
8	117-C	.RING, CONNECTOR	2



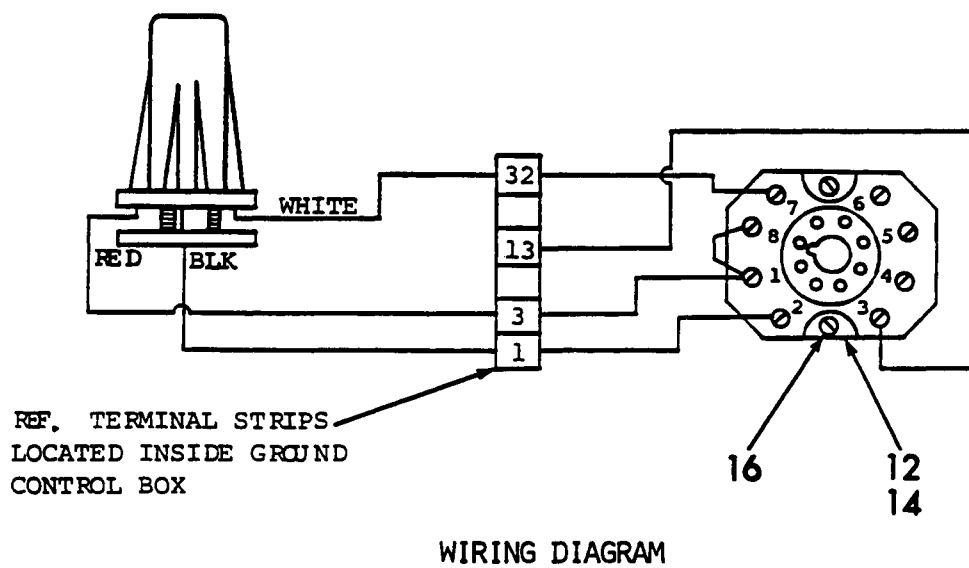
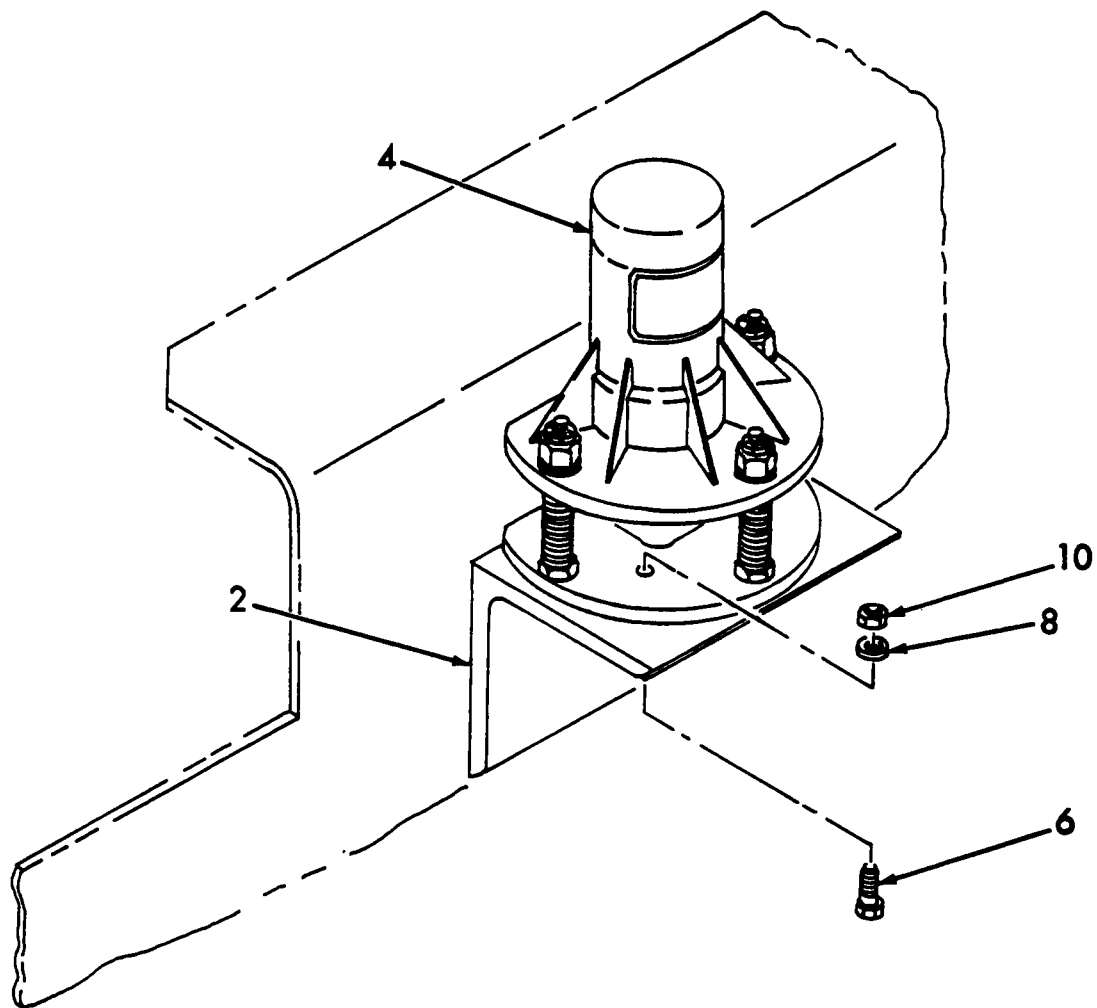


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**P.Q. SLOPE SENSOR (OPTION)**

PARTS  
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FIG. 5  
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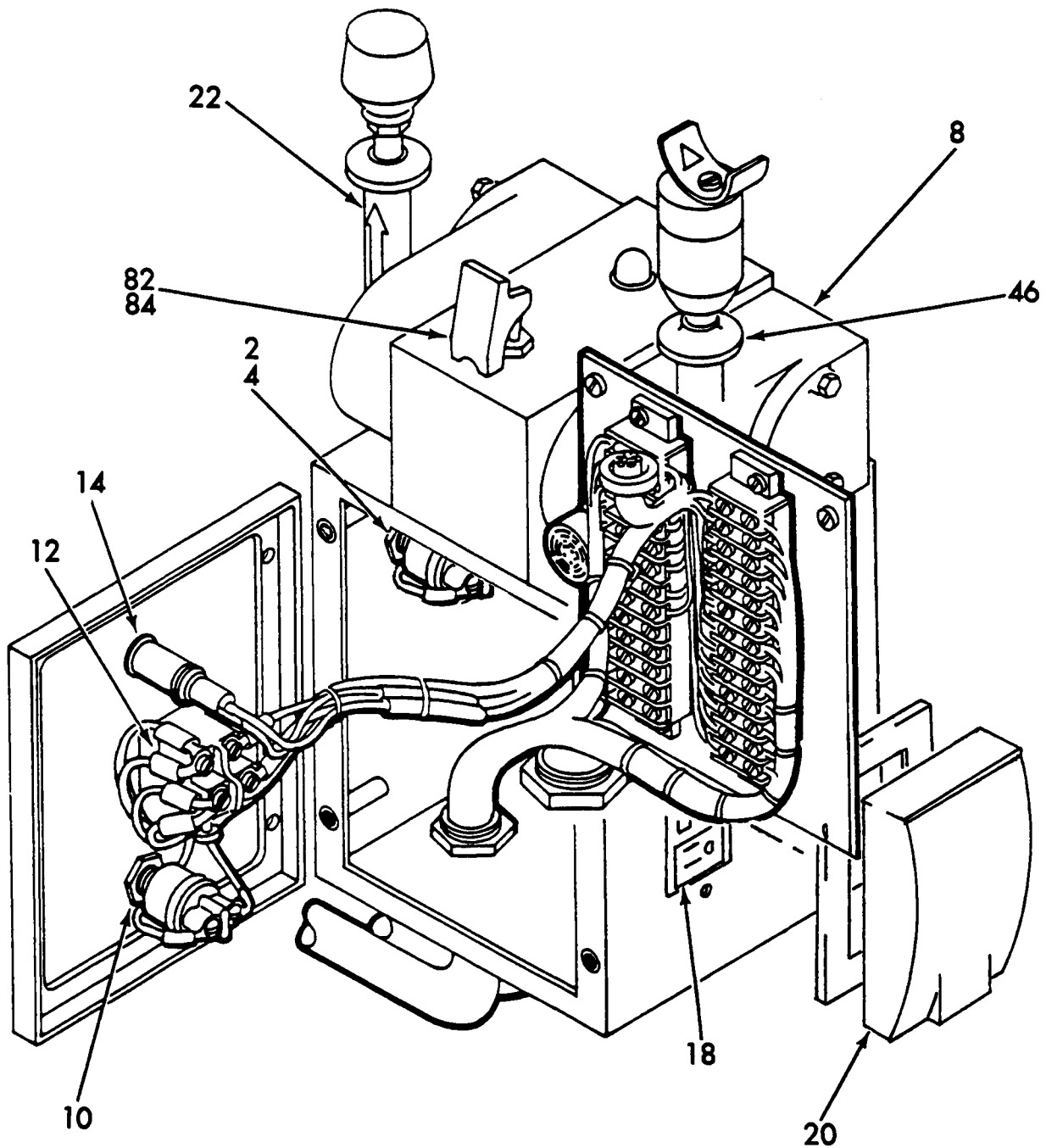
PARTS CATALOG

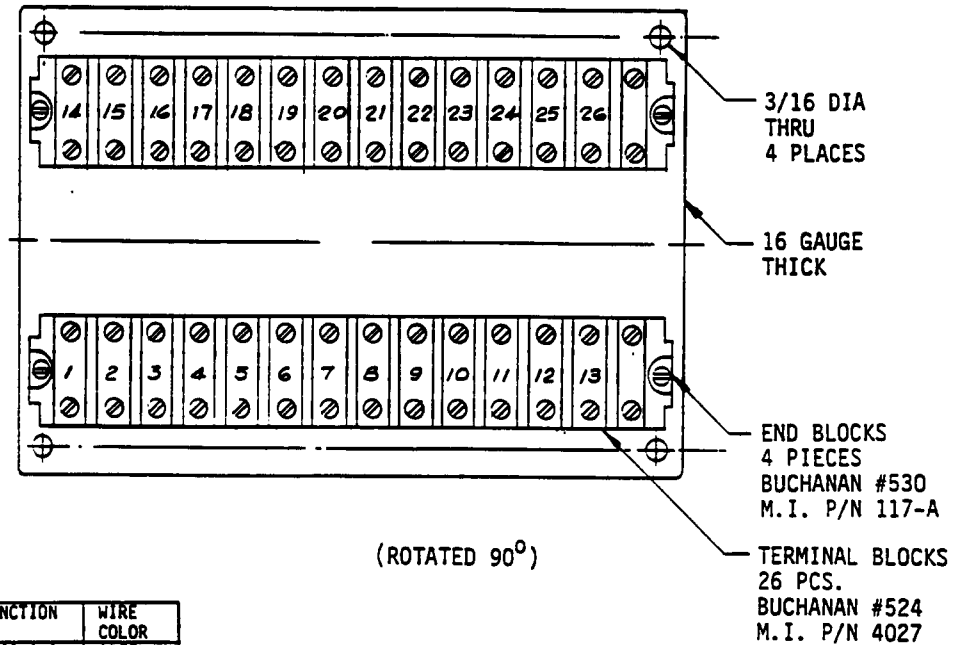
**P.Q. SLOPE SENSOR (OPTION)**

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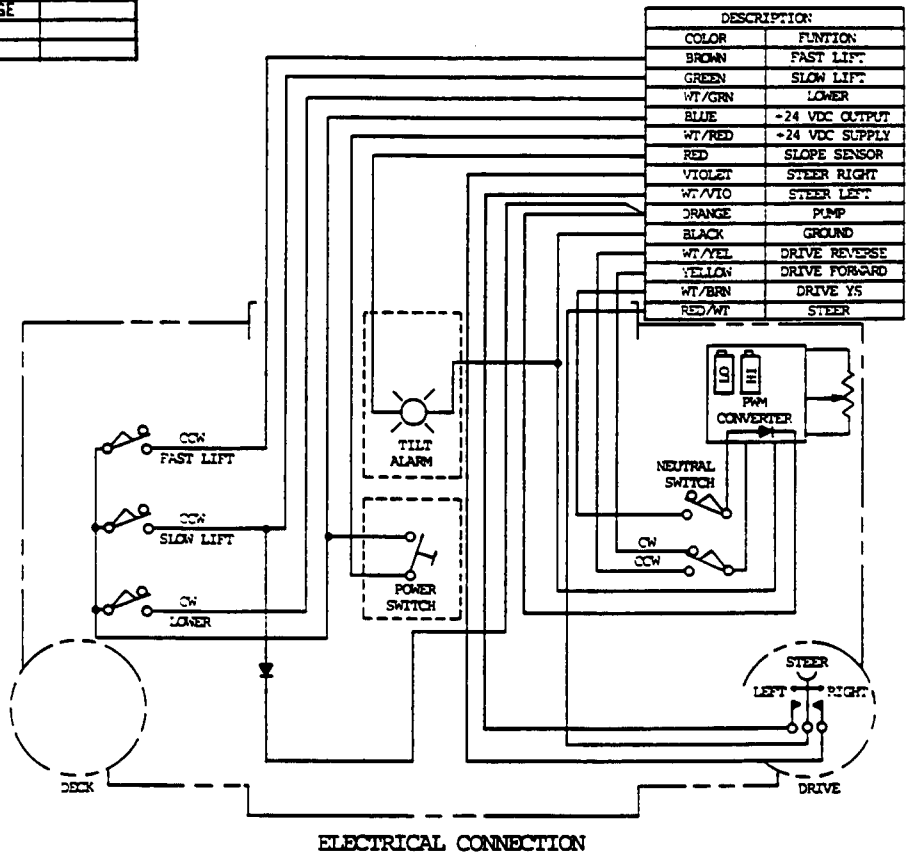
PARTS  
SECT. 6  
FIG. 5  
PAGE 2

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
-1	131942	OPTION, P.Q. SLOPE SENSOR	REF
2	130793	.BRACKET	1
4	31074	.SENSOR, SLOPE	1
6	60309	.SCREW, CAP	2
8	63301	.WASHER, LOCK	2
10	60701	.NUT, HEX	2
12	70170	.RELAY	1
14	70239	.SOCKET	1
16	62623	.SCREW, CAP	2





TERM	FUNCTION	WIRE COLOR	TERM	FUNCTION	WIRE COLOR
1	BAT. GND(-)	BLACK	14	LIFT(SLOW)	GREEN
2			15	IGNITION	BLUE
3	BATTERY (+)	WH/RED	16	STEER RIGHT	VIOLET
4	PUMP	ORANGE	17	STEER LEFT	WH/VIO
5			18	LIFT (FAST)	WH/GREEN
6	START		19	DRIVE FWD.	YELLOW
7			20	DRIVE REV.	WH/YEL
8			21	TRAVERSE	
9			22	TRAVERSE	
10			23	SLOPE SENSOR	RED
11			24	FUEL GAUGE	
12			25	CHOKE	
13	LOWER	BROWN	26	HORN	





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TRAVEL WARNING HORN/PROPORTIONAL DRIVE CONTROL

PARTS  
SECT.6  
FIG. 6  
PAGE 3

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
	1234567		
PARTS LISTING FOR PRINT NUMBER 131921 COULD NOT BE PROVIDED AT PRESS TIME DUE TO UNAVAILABLE ENGINEERING.			



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TRAVEL WARNING HORN/PROPORTIONAL DRIVE CONTROL

PARTS  
SECT.6  
FIG. 6  
PAGE 4

ITEM	PART NUMBER	DESCRIPTION	UNIT PER ASSY.
		1234567	
PARTS LISTING FOR PRINT NUMBER 131921 COULD NOT BE PROVIDED AT PRESS TIME DUE TO UNAVAILABLE ENGINEERING.			



OWNERS MANUAL

LESTRONIC III BATTERY CHARGER

MODEL 11670 - TYPE 24LC30-8ET

INPUT: 115 VAC, 60 HZ.

OUTPUT: 24 VDC, 30 AMP.

CAUTION: THIS CHARGER IS INTENDED FOR THE CHARGING OF A 12 CELL (24V) LEAD ACID STORAGE BATTERY ONLY. USE OF THIS CHARGER ON ANY OTHER BATTERY COULD CAUSE DAMAGE TO THE BATTERY AND/OR TO THE CHARGER.

THIS MANUAL CONTAINS VITAL INFORMATION FOR THE SAFE USE AND EFFICIENT OPERATION OF THE BATTERY CHARGER. CAREFULLY READ THIS MANUAL BEFORE USING CHARGER, AND RETAIN FOR FUTURE REFERENCE. FAILURE TO ADHERE TO INSTRUCTIONS COULD RESULT IN SERIOUS BODILY INJURY OR PROPERTY DAMAGE. ALL REPAIRS SHOULD BE MADE BY QUALIFIED PERSONNEL ONLY.

CAUTION  
DO NOT EXPOSE CHARGER TO WATER, MOISTURE,  
CLEANING AGENTS OR POWER WASH

1. CHARGER INSTALLATION: MOUNT THE CHARGER IN THE VEHICLE AND CONNECT THE CHARGER POSITIVE (WHITE) DC CORD LEAD TO THE POSITIVE BATTERY TERMINAL AND CONNECT THE CHARGER NEGATIVE (BLACK) DC CORD LEAD TO THE NEGATIVE BATTERY TERMINAL.
2. ELECTRICAL SUPPLY: THIS CHARGER MUST BE OPERATED FROM A PROPERLY GROUNDED 115 VOLT, 60 HZ AC OUTLET ONLY.
3. CHARGER OPERATION:
  - A. STARTING THE CHARGER, INSERT THE AC PLUG INTO THE APPROPRIATE CHARGER AC RECEPTACLE. THE CHARGER WILL START WHEN THE AC PLUG IS INSERTED.
  - B. MONITOR METERS: THE AMMETER SHOULD INDICATE AN INITIAL CHARGE RATE OF APPROXIMATELY 30 AMPS. THE CHARGE RATE WILL GRADUALLY TAPER TO A FINISH RATE OF FROM 2 TO 10 AMPS.
  - C. MONITOR LIGHTS (LIGHT EMITTING DIODES-L.E.D.): THE GREEN "AC POWER ON" LIGHT SHOULD GLOW AT ALL TIMES WHEN THE AC CORD IS PLUGGED INTO A "LIVE" 115 VAC 60 HZ OUTLET AND THE DC CORD IS CONNECTED TO THE BATTERY.



NOTE: THE GREEN LIGHT, DUE TO THE CHARACTERISTICS OF THE L.E.D., MAY NOT BE HIGHLY VISIBLE WHEN THE CHARGER IS LOCATED IN A BRIGHTLY LIGHTED AREA.

THE RED LIGHT "CHARGE ON/COMPLETE" SHOULD BLINK WHEN THE CHARGE STARTS AND REMAIN BLINKING UNTIL THE CHARGE IS COMPLETED. WHEN THE CHARGE IS COMPLETE THE LIGHT WILL STOP BLINKING AND GLOW CONTINUOUSLY. IF THE RED LIGHT IS "OFF", NOT GLOWING OR BLINKING, THEN A POSSIBLE PROBLEM EXISTS.

THE YELLOW LIGHT "AC INTERRUPT" WHEN GLOWING INDICATES THAT THE 115 VAC POWER SOURCE HAS BEEN INTERRUPTED WHILE THE CHARGE WAS IN PROGRESS. ALL LIGHTS WILL BE OFF DURING THE ABSENCE OF THE AC POWER.

NOTE: IF THE CHARGE IS TERMINATED BY UNPLUGGING THE AC CORD OR IF THE "AC INTERRUPT" LIGHT IS GLOWING WHEN THE AC CORD IS UNPLUGGED, THE STOP/RESTART SWITCH MUST BE MOMENTARILY ENGAGED PRIOR TO THE NEXT CHARGE TO PREVENT THE "AC INTERRUPT" LIGHT FROM GLOWING WHEN THE NEXT CHARGE IS STARTED.

THE ORANGE LIGHT "CHECK BATTERY" INDICATES ONE OF THE FOLLOWING TWO CONDITIONS: THAT THE BATTERIES ARE NOT BEING CHARGED BEFORE THE PRESET MAXIMUM TIME HAS ELAPSED, OR THE BATTERY POTENTIAL OF 2.35 VOLTS/CELL HAS NOT BEEN REACHED IN THE COURSE OF THE CHARGE. THIS LIGHT SHOULD NOT GLOW UNDER NORMAL CIRCUMSTANCES. IF THE ORANGE LIGHT GLOWS AFTER THE CHARGE IS TERMINATED, CHECK THE BATTERY FOR WEAK CELLS.

- D. CHARGE TERMINATION: THE CHARGER AUTOMATICALLY TERMINATES THE CHARGE WHEN THE BATTERIES ARE FULLY CHARGED OR, WHEN THE PRESET MAXIMUM TIME HAS ELAPSED, OR IF THE BATTERY POTENTIAL AFTER REACHING 2.16 VOLT/CELL STOPS INCREASING FOR A TIME PERIOD OF 80 MINUTES BEFORE REACHING 2.35 VOLTS/CELL. THE CHARGE MAY ALSO BE TERMINATED MANUALLY BY MOMENTARILY ENGAGING THE STOP/RESTART SWITCH. IF THE SWITCH IS DEPRESSED BEFORE (SIX) 6 MINUTES OF CHARGE TIME HAS ELAPSED OR IF THE BATTERY VOLTAGE IS BELOW 2.35 VOLT/CELL THE FAULT LIGHT WILL GLOW. IF VOLTAGE IS HIGHER THAN 2.35 THE COMPLETE LIGHT WILL GLOW. IF VOLTAGE IS HIGHER THAN 2.35 THE COMPLETE LIGHT WILL GLOW. THE PRESET MAXIMUM CHARGE TIME IS SIXTEEN (16) HOURS.

CAUTION: DO NOT DISCONNECT THE DC CORD FROM THE VEHICLE DURING CHARGE. IF THE BATTERY MUST BE DISCONNECTED, STOP CHARGER WITH THE STOP/RESTART SWITCH, THEN UNPLUG AC CORD.





- E. CHARGE TIME: THE TIME REQUIRED TO FULLY CHARGE THE BATTERIES WILL NORMALLY BE 8 TO 12 HOURS.
- F. FULL CHARGE TEST: TO TEST FOR A FULL CHARGE ON A 24V BATTERY, RESTART THE CHARGER WITH THE STOP/RESTART SWITCH. IF THE BATTERY IS FULLY CHARGED, THE CHARGE RATE SHOULD DROP TO APPROXIMATELY 8 TO 15 AMPS WITHIN 10 TO 20 MINUTES. THE CHARGER WILL AUTOMATICALLY SHUTOFF WITHIN 45 TO 90 MINUTES OR IT MAY BE SHUT OFF WITH THE STOP/RESTART SWITCH.
- G. AC POWER FAILURE: IF AN AC POWER FAILURE OCCURS DURING THE CHARGE, THE CHARGER WILL AUTOMATICALLY RESUME THE CHARGE WHEN THE AC POWER RETURNS. ALL CHARGER TIMING IS RESET TO ZERO TIME. THE "AC INTERRUPT" LIGHT WILL GLOW TO INDICATE THAT THE AC POWER HAS FAILED.
- H. CHARGER RESTART: THE CHARGER MAY BE RESTARTED AFTER IT HAS SHUT OFF BY UNPLUGGING THE AC POWER CORD FOR A FEW SECONDS (3 TO 5 SECONDS) AND THEN PLUGGING THE CORD BACK IN. ALSO, THE CHARGER MAY BE RESTARTED BY MOMENTARILY ENGAGING THE STOP/RESTART SWITCH.

IF THE CHARGER AC CORD REMAINS CONNECTED TO THE 115 VAC 60 HZ AND THE DC CORD REMAINS CONNECTED TO THE BATTERIES AFTER THE CHARGER HAS FINISHED THE FIRST CHARGE, THE CHARGER WILL AUTOMATICALLY RESTART AFTER A PRESET NUMBER OF DAYS (24 HOUR PERIODS). THE CHARGE TIME (PROVIDED THE BATTERIES ARE UNLOADED) WILL NORMALLY BE 15 TO 90 MINUTES. THE CHARGER WILL AUTOMATICALLY SHUT OFF AND AGAIN TURN

4

ON AFTER THE PRESET NUMBER OF DAYS. THIS CYCLE (CALLED A STORAGE MODE) WILL CONTINUE AS LONG AS THE CHARGER REMAINS CONNECTED TO THE AC POWER AND BATTERIES. THE PRESET NUMBER OF DAYS FOR TURN "ON" IS FOUR(4).

NOTE: THE ALLOWABLE MAXIMUM CHARGE TIME BEFORE SHUTOFF IS AUTOMATICALLY REDUCED IN THE STORAGE MODE TO PREVENT POSSIBLE OVERCHARGING OF THE BATTERIES. THE MAXIMUM CHARGE TIME IN THE STORAGE MODE IS THREE (3) HOURS.

IF AN AC POWER FAILURE OCCURS WHEN THE CHARGER IS IN THE STORAGE MODE THE CHARGER WILL START WHEN THE AC POWER RETURNS AND CONTINUE OPERATING IN THE STORAGE MODE.

IF THE BATTERY VOLTAGE DROPS TO APPROXIMATELY 21 VOLTS THEN THE CHARGER WILL AUTOMATICALLY RESTART WITHOUT WAITING FOR THE PRESET NUMBER OF DAYS TO ELAPSE. THE STORAGE MODE WILL CONTINUE AFTER THE BATTERIES ARE FULLY CHARGED.

TROUBLE SHOOTING INSTRUCTIONS FOR CHARGER MODEL 11170

THE FOLLOWING IS A LIST OF POSSIBLE PROBLEMS AND REMEDIES WHICH MIGHT OCCUR TO THE CHARGER.

THE VOM USED FOR MEASUREMENTS SHOULD HAVE A RESISTANCE OF 20,000 OHMS/VOLT DC, 5000 OHMS/VOLT AC OR GREATER.

IF A PROBLEM OCCURS IN THE CHARGER, DISCONNECT THE CHARGER FROM THE 115 VAC OUTLET AND BATTERIES AND EXAMINE THE AC AND DC CORDS FOR DAMAGE OR LOOSE CONNECTIONS. AFTER THE COVER HAS BEEN REMOVED EXAMINE THE INTERNAL PARTS AND CONNECTIONS FOR SIGNS OF DAMAGE OR LOOSE ELECTRICAL CONNECTIONS.

1. GREEN LIGHT (L.E.D.) DOES NOT GLOW AND CHARGER DOES NOT WORK WHEN CHARGER IS CONNECTED TO 115 AC 60 HZ AND BATTERIES.

NOTE: IF THE CHARGER WORKS WHEN USING ONE OF THE AC RECEPTACLES ONLY, THEN THE AC RELAY SHOULD BE REPLACED.

CAUTION: USE EXTREME CARE WHEN WORKING INSIDE THE CHARGER WHEN IT IS CONNECTED TO THE 115 VAC LINE AND/OR THE BATTERIES IN ORDER TO PREVENT ELECTRICAL SHOCK OR TO PREVENT POSSIBLE DAMAGE TO THE PRINTED CIRCUIT BOARD COMPONENTS.

READ THE AC VOLTAGE BETWEEN PINS 1 AND 3 OF THE COMPU-TIME 4 PRINTED CIRCUIT BOARD EDGE CONNECTOR. THE VOLTAGE SHOULD BE THE SAME POTENTIAL AS THE 115 VAC POWER. IF THE VOLTAGE IS NOT PRESENT, CHECK FOR LOOSE ELECTRICAL CONNECTIONS. IF THE VOLTAGE IS CORRECT, THE P.C. BOARD IS FAULTY AND MUST BE REPLACED. READ THE PRECAUTIONS BELOW ON HANDLING THE P.C. BOARD BEFORE REMOVING THE BOARD FROM THE CHARGER.

2. GREEN "AC POWER ON" LIGHT GLOWS BUT CHARGER WILL NOT START OR STARTS, BUT WILL NOT SHUT OFF WHEN CONNECTED TO THE 115 VAC AND THE BATTERY: THESE PROBLEMS COULD BE CAUSED BY THE P.C. BOARD

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AND THE FOLLOWING VOLTAGE MEASUREMENTS SHOULD DETERMINE IF THAT IS THE CASE.

- A. P1 VOLTAGE READINGS (P1 IS THE EDGE CONNECTOR OF THE P.C. BOARD), ALL VOLTAGE READINGS ARE REFERENCED TO PIN 9.

PIN	APPROXIMATE PIN VOLTAGE
7	SAME AS BATTERY VOLTAGE
5	CHARGER ON = LESS THAN 1 VDC CHARGER OFF = BATTERY VOLTAGE



IF ALL VOLTAGES ARE CORRECT, CHECK THE CONNECTOR TERMINALS TO BE SURE THEY ARE MAKING PROPER CONTACT WITH PINS. IF VOLTAGE IS NOT CORRECT, REPLACE THE P.C. BOARD AND RETURN THE DEFECTIVE BOARD TO THE FACTORY FOR REPAIR.

CAUTION: BEFORE REMOVING THE P.C. BOARD, FIRST DISCONNECT THE CHARGER FROM THE 115 VAC AND BATTERIES. THEN REMOVE THE TWO MOUNTING SCREWS FROM THE FRONT PANEL AND REMOVE THE BOARD BY PULLING IT OUT THRU THE FRONT OF THE CHARGER. UN-PLUG THE EDGE CONNECTOR.

DO NOT ATTEMPT TO REPLACE INDIVIDUAL COMPONENTS ON THE BOARD. DO NOT HANDLE THE BOARD ANY MORE THAN NECESSARY. SOME OF THE COMPONENTS ON THE BOARD COULD BE DAMAGED BY STATIC ELECTRICITY. PLACE THE BOARD IN AN ANTI-STATIC BAG OR WRAP THE BOARD IN ALUMINUM FOIL, THEN PACK CAREFULLY IN A CARDBOARD BOX AND SHIP TO FACTORY.

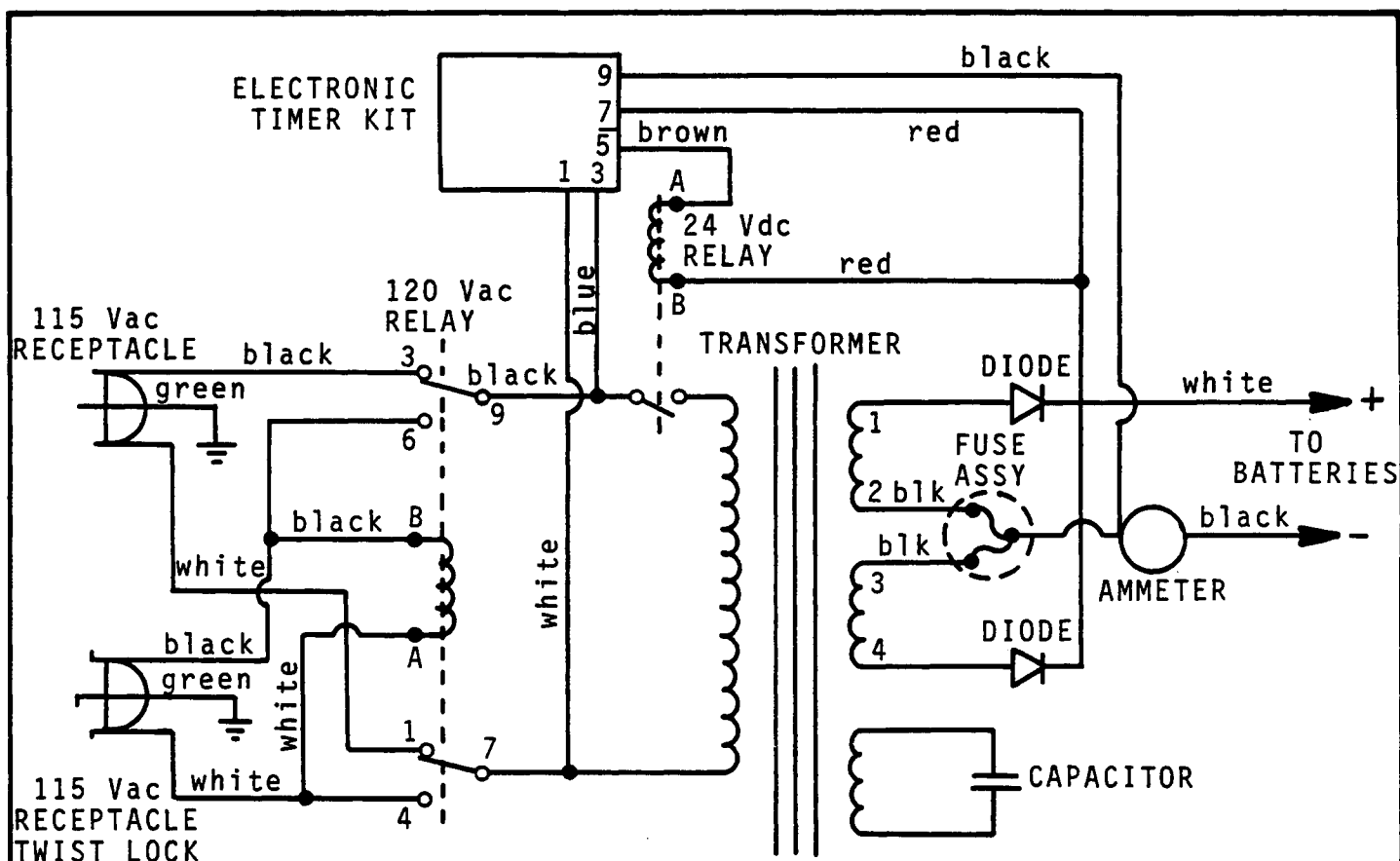
TO INSTALL A NEW PRINTED CIRCUIT BOARD, REVERSE THE REMOVAL PROCEDURES DESCRIBED ABOVE.

IF THE PRINTED CIRCUIT BOARD IS NOT THE PROBLEM, CHECK THE RELAY TO SEE IF THE CONTACTS ARE CLOSING OR STICKING.

3. CHARGER OPERATES AT A REDUCED RATE OF CHARGE CURRENT AND/OR TRIPS AN AC POWER CIRCUIT BREAKER OR BLOWS DC FUSES. ( A BLOWN DC FUSE WILL DISCOLOR THE BUBBLE WINDOW ON THE FUSE HOLDER. BEFORE CHANGING DC FUSE, CHECK BOTH DIODES FOR SHORTING CONDITION.)

THE PROBLEM COULD BE A FAULTY DIODE. DISCONNECT THE CHARGER FROM THE 115"VAC OUTLET AND BATTERIES AND CHECK CONTINUITY ACROSS THE DIODES WITH THE VOM. REMOVE THE TRANSFORMER LEADS FROM THE DIODES BEFORE READING CONTINUITY. IF A DIODE SHOWS APPROXIMATELY ZERO OHMS IN BOTH DIRECTIONS, IT IS SHORTED AND SHOULD BE REPLACED. IF A DIODE SHOWS AN OPEN CIRCUIT IN BOTH DIRECTIONS, IT IS OPEN AND SHOULD BE REPLACED.

IF THE DIODES ARE OK, CONNECT THE TRANSFORMER LEADS BACK TO THE DIODES. RECONNECT THE CHARGER TO THE BATTERIES AND PLUG IN THE AC CORD TO THE 115 VAC OUTLET AND MAKE THE FOLLOWING VOLTAGE MEASUREMENTS.



PARTS LIST FOR LESTRONIC III CHARGER  
MODEL 11670 TYPE 24LC30-8ET  
115 VAC 60 HZ

PART NO.	QTY	DESCRIPTION
12491S	1	CASE ASSEMBLY
11455S	1	TRANSFORMER ASSEMBLY
08524S	1	HEATSINK ASSEMBLY, WITH DIODES
08811S	2	DIODE ASSEMBLY
02367S	1	AMMETER
11225S	1	ELECTRONIC TIMER KIT
02390S	1	CAPACITOR, 6.0 MFD, 660 VAC
02008S	1	BUSHING, 8P-2, INSULATOR FOR DC CORD
11942S	1	CONTROL CABLE ASSEMBLY
11927S	1	CORDSET, DC, NO PLUG
08776S	1	FUSE ASSEMBLY
11813S	1	MOTOR BASE RECEPTACLE, 125/15, STRAIGHT BLADE
12394S	1	MOTOR BASE RECEPTACLE, 125/20, TWIST LOCK
04483S	1	RELAY, 24 VDC
04558S	1	RELAY, 120 VAC

**DANGER: USE EXTREME CAUTION WHEN WORKING NEAR THE CAPACITOR.**

PLACE METER LEADS ACROSS	*APPROXIMATE VOLTAGE READINGS	
	WITH CAPACITOR CONNECTED	WITH CAPACITOR DISCONNECTED
(1) AMMETER POST TO EACH DIODE ANODE (TRANSFORMER LEAD)	25-30 VAC	15-16 VAC
(2) AMMETER POST TO DIODE CATHODES (HEAT SINK)	27-31 VDC	26-31 VDC
(3) TRANSFORMER LEADS CONNECTED TO THE CAPACITOR	560-665 VAC	350 VAC

\*NOTE: THESE READINGS WILL VARY AS SHOWN DEPENDING ON THE VOLTAGE OF THE BATTERIES AT THE TIME OF THE READING.

IF THE READINGS ARE THE SAME WITH THE CAPACITOR CONNECTED AS THEY ARE WITH THE CAPACITOR DISCONNECTED, THE CAPACITOR SHOULD BE REPLACED.

IF READING # (2) ONLY, IS ABOUT ONE HALF OF THE VALUES SHOWN, A DIODE IS OPEN. RECHECK DIODE CONTINUITY AS WAS DONE ABOVE JUST PREVIOUS TO READING VOLTAGES.

IF THE VOLTAGES ARE STILL NOT CORRECT AND THE CAPACITOR AND DIODES ARE GOOD, THE TRANSFORMER MAY BE FAULTY AND SHOULD BE REPLACED.

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