

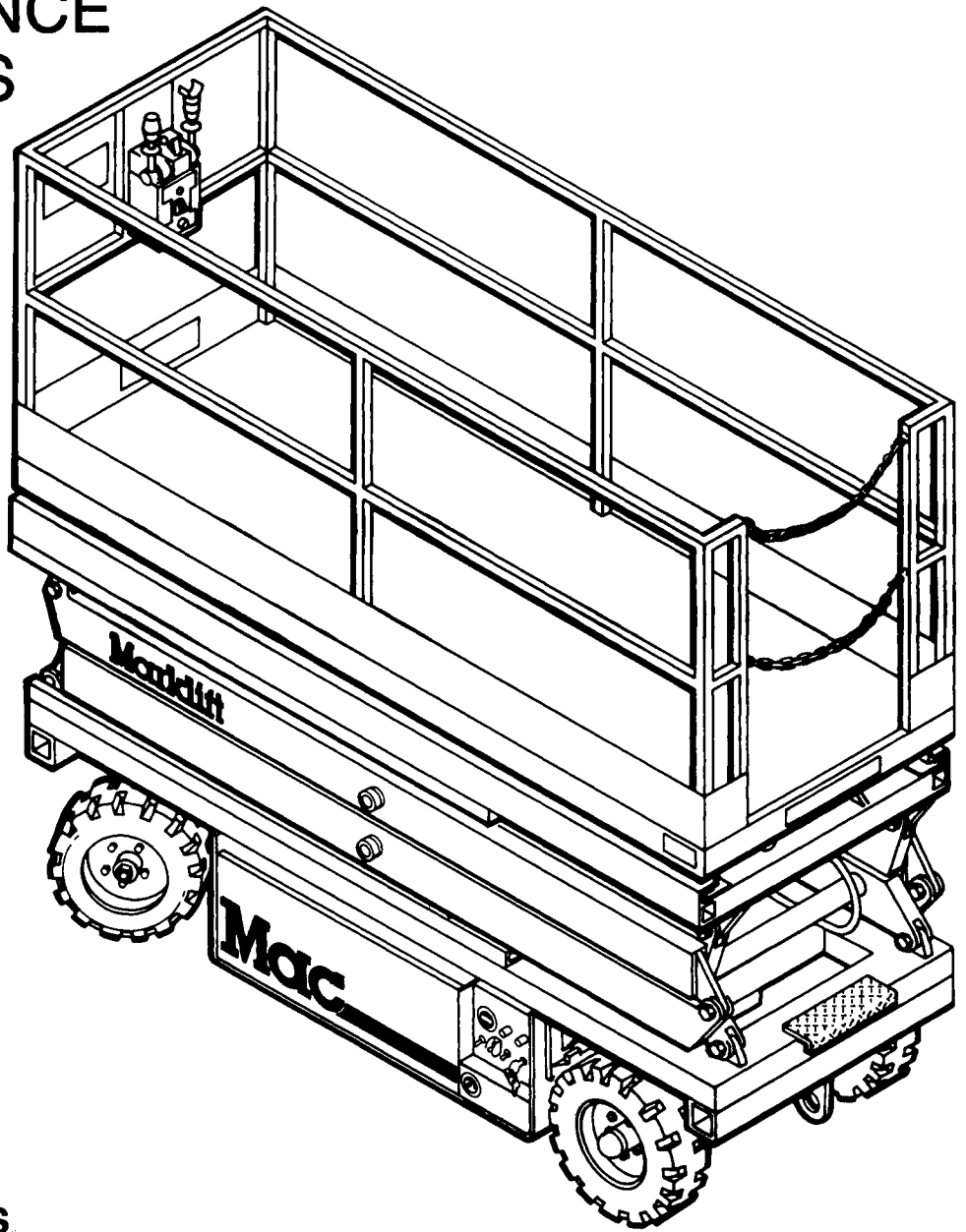
# **The Marklifts.<sup>®</sup>**

A Product of Mark Industries

## **OPERATION MAINTENANCE AND PARTS MANUAL**

M 15S  
M 15ST  
M 20S  
M 20ST  
M 20T  
M 20  
M 25T  
M 25

## **MARKLIFT SELF PROPELLED SCISSOR LIFT**



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## MARKLIFT SELF PROPELLED SCISSOR LIFT

## OPERATION MAINTENANCE AND PARTS MANUAL

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 USAGE OF THIS MACHINE MAY RESULT IN SERIOUS PERSONNEL INJURY. 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 main frame.

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 final minor adjustments and inspections must be made prior to putting the unit in service. These functions are outlined in the inspection and checkout instructions in the operation section of this manual.

15S  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH         | METRIC             |
|----------------------------|-----------------|--------------------|
| HEIGHT-WORKING (ELEVATED)  | 21'             | 6.40m              |
| HEIGHT-PLATFORM (ELEVATED) | 15'             | 4.57m              |
| (LOWERED)                  | 36"             | 0.91m              |
| LENGTH (OVERALL)           | 96"             | 2.43m              |
| WIDTH (OVERALL)            | 30"             | 0.76m              |
| PLATFORM-SIZE(INSIDE)      | 26.5"x92.5"     | 0.67mx2.34m        |
| PLATFORM-SAFETY RAILS      | 39"             | 0.99m              |
| PLATFORM-TOE PLATE         | 6"              | 0.15m              |
| LIFT CAPACITY              | 750 LBS         | 340 kg             |
| WHEEL BASE                 | 67.75"          | 1.72m              |
| WHEEL TRACK                | 25"             | 0.63m              |
| TURNING RADIUS             | 7'7"            | 2.31m              |
| DRIVE SPEED                | 0-2.5mph        | 0-4km/hr           |
| LIFT SPEED--HIGH           | 25sec.          |                    |
| LOW                        | 47sec.          |                    |
| LOWER SPEED                | 26sec.          |                    |
| POWER SYSTEM               | 24VDC           |                    |
| BATTERY VOLTAGE            | 6VDC            |                    |
| CAPACITIES-BATTERY         | 250 AMP/HR(4)   |                    |
| CAPACITIES-HYDRAULIC TANK  | 13 gal          | 49.21 Liters       |
| BATTERY CHARGER            | 30 AMP          |                    |
| TIRE SIZE                  | 4.00 x 8(SOLID) |                    |
| SHIPPING WEIGHT            | 2610 LBS.       | 118.3 kg           |
| SHIPPING CUBE--U.S.        | 125 Cu. Ft.     | 3.53m <sup>3</sup> |
| EXPORT                     | 110 CU. Ft.     | 3.11m <sup>3</sup> |

# SPECIFICATIONS

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## 15ST SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH         | METRIC             |
|----------------------------|-----------------|--------------------|
| HEIGHT-WORKING (ELEVATED)  | 21'             | 6.40m              |
| HEIGHT-PLATFORM (ELEVATED) | 15'             | 4.57m              |
| (LOWERED)                  | 40.5"           | 1.02m              |
| LENGTH (OVERALL)           | 96"             | 2.43m              |
| WIDTH (OVERALL)            | 30"             | 0.76m              |
| PLATFORM-SIZE (INSIDE)     | 26.5"x92.5"     | 0.67mx2.34m        |
| PLATFORM EXTENDS--FRONT    | 48"             | 1.21m              |
| REAR                       | 24"             | 0.60m              |
| PLATFORM-TOE PLATE         | 6"              | 0.15m              |
| PLATFORM-SAFETY RAILS      | 29"             | 0.99m              |
| LIFT CAPACITY              | 750LBS          | 340 kg             |
| WHEEL BASE                 | 67.75"          | 1.72m              |
| WHEEL TRACK                | 25"             | 0.63m              |
| TURNING RADIUS (INSIDE)    | 7'7"            | 2.31m              |
| DRIVE SPEED                | 0-2.5mph        | 0-4km/hr           |
| LIFT SPEED--HIGH           | 25 sec.         |                    |
| LOW                        | 47 sec.         |                    |
| LOWER SPEED                | 26 sec.         |                    |
| POWER SYSTEM               | 24 VDC          |                    |
| BATTERY VOLTAGE            | 6 VDC           |                    |
| CAPACITIES-BATTERY         | 250 AMP/HR(4)   |                    |
| CAPACITIES-HYDRAULIC TANK  | 13 gal.         | 49.21 Liters       |
| BATTERY CHARGER            | 30 AMP          |                    |
| TIRE SIZE                  | 4.00 x 8(SOLID) |                    |
| SHIPPING WEIGHT            | 2880 LBS        | 1306.3 kg          |
| SHIPPING CUBE--U.S.        | 130 Cu. Ft.     | 3.64m <sup>3</sup> |
| EXPORT                     | 121.34 Cu. Ft.  | 3.43m <sup>3</sup> |

20S  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH        | METRIC             |
|----------------------------|----------------|--------------------|
| HEIGHT-WORKING (ELEVATED)  | 26'            | 7.92m              |
| HEIGHT-PLATFORM (ELEVATED) | 20'            | 6.09m              |
| (LOWERED)                  | 41.25"         | 1.04m              |
| LENGTH (OVERALL)           | 96"            | 2.43m              |
| WIDTH (OVERALL)            | 30"            | 0.76m              |
| PLATFORM-SIZE (INSIDE)     | 26.5"x92.5"    | 0.67mx2.34m        |
| PLATFORM-SAFETY RAILS      | 39"            | 0.99m              |
| PLATFORM-TOE PLATE         | 6"             | 0.15m              |
| LIFT CAPACITY              | 750 LBS.       | 340 kg.            |
| WHEEL BASE                 | 67.75"         | 1.72m              |
| WHEEL TRACK                | 25"            | 0.63m              |
| TURNING RADIUS (INSIDE)    | 7'7"           | 2.31m              |
| DRIVE SPEED                | 0-2.5mph       | 0-4km/hr           |
| LIFT SPEED--HIGH           |                | 36 sec.            |
| LOW                        |                | 55 sec.            |
| LOWER SPEED                |                | 27 sec.            |
| POWER SYSTEM               |                | 24 VDC             |
| BATTERY VOLTAGE            |                | 6 VDC              |
| CAPACITIES-BATTERY         |                | 250 AMP/HR(4)      |
| CAPACITIES-HYDRAULIC       | 13 gal.        | 49.21 Liters       |
| BATTERY CHARGER            |                | 30AMP              |
| TIRE SIZE                  |                | 4.00 x 8(SOLID)    |
| SHIPPING WEIGHT            | 3070 LBS.      | 1392.5 kg.         |
| SHIPPING CUBE--U.S.        | 133.33 Cu. Ft. | 3.77m <sup>3</sup> |
| EXPORT                     | 124.83 CU. Ft. | 3.53m <sup>3</sup> |

20ST  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH         | METRIC             |
|----------------------------|-----------------|--------------------|
| HEIGHT-WORKING (ELEVATED)  | 26'             | 7.92m              |
| HEIGHT-PLATFORM (ELEVATED) | 20'             | 6.09m              |
| (LOWERED)                  | 45.75"          | 1.16m              |
| LENGTH (OVERALL)           | 96"             | 2.43m              |
| WIDTH (OVERALL)            | 30"             | 0.76m              |
| PLATFORM-SAFETY RAILS      | 39"             | 0.99m              |
| PLATFORM-SIZE (INSIDE)     | 26.5"x92.5"     | 0.67mx2.34m        |
| PLATFORM EXTENDS--FRONT    | 48"             | 1.21m              |
| REAR                       | 24"             | 0.60m              |
| PLATFORM-TOE PLATE         | 6"              | 0.15m              |
| LIFT CAPACITY              | 750LBS          | 340 kg             |
| WHEEL BASE                 | 67.75"          | 1.72m              |
| WHEEL TRACK                | 25"             | 0.63m              |
| TURNING RADIUS (INSIDE)    | 7'7"            | 2.31m              |
| DRIVE SPEED                | 0-2.5mph        | 0-4km/hr           |
| LIFT SPEED--HIGH           | 36sec.          |                    |
| LOW                        | 55sec.          |                    |
| LOWER SPEED                | 27sec.          |                    |
| POWER SYSTEM               | 24 VDC          |                    |
| BATTERY VOLTAGE            | 6 VDC           |                    |
| CAPACITIES-BATTERY         | 250 AMP/HR(4)   |                    |
| CAPACITIES-HYDRAULIC TANK  | 13 gal          | 49.21 Liters       |
| BATTERY CHARGER            | 30 AMP          |                    |
| TIRE SIZE                  | 4.00 x 8(SOLID) |                    |
| SHIPPING WEIGHT            | 3340 LBS.       | 1514.9 kg.         |
| SHIPPING CUBE--U.S.        | 141.67 Cu. Ft.  | 4.01m <sup>3</sup> |
| EXPORT                     | 135.34 CU. Ft.  | 3.83m <sup>3</sup> |



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## SELF PROPELLED SCISSOR LIFT

| DESCRIPTION               | ENGLISH     | METRIC             |
|---------------------------|-------------|--------------------|
| HEIGHT-WORKING (ELEVATED) | 26'         | 7.92m              |
| HEIGHT-PLATFORM(ELEVATED) | 20'         | 6.09m              |
| (LOWERED)                 | 43.75"      | 1.11m              |
| LENGTH (OVERALL)          | 96"         | 2.43m              |
| WIDTH (OVERALL)           | 54"         | 1.37m              |
| PLATFORM-SIZE (INSIDE)    | 50.5"x92.5" | 1.28mx2.34m        |
| PLATFORM-SAFETY RAILS     | 39"         | 0.99m              |
| PLATFORM-TOE PLATE        | 6"          | 0.15m              |
| LIFT CAPACITY             | 750LBS.     | 340kg.             |
| WHEEL BASE                | 67.75"      | 1.72m              |
| WHEEL TRACK               | 47.5"       | 0.63m              |
| TURNING RADIUS (INSIDE)   | 7'7"        | 2.31m              |
| DRIVE SPEED               | 0-3.25mph   | 0-5km/hr           |
| LIFT SPEED --HIGH         |             | 36 sec.            |
| LOW                       |             | 55 sec.            |
| LOWER SPEED               |             | 27 sec.            |
| POWER SYSTEM              |             | 24 VDC             |
| BATTERY VOLTAGE           |             | 6 VDC              |
| CAPACITIES-BATTERY        |             | 250 AMP/HR(4)      |
| CAPACITIES-HYDRAULIC TANK | 13 gal.     | 49.21 Liters       |
| BATTERY CHARGER           |             | 30 AMP             |
| TIRE SIZE                 |             | 6.00x9(SOLID)      |
| SHIPPING WEIGHT           | 3380LBS.    | 1533kg.            |
| SHIPPING CUBE--U.S.       | 249 Cu. Ft. | 7.05m <sup>3</sup> |
| EXPORT                    | 170 Cu. Ft. | 4.81m <sup>3</sup> |

20T  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH        | METRIC              |
|----------------------------|----------------|---------------------|
| HEIGHT-WORKING (ELEVATED)  | 26'            | 7.92m               |
| HEIGHT-PLATFORM (ELEVATED) | 20'            | 6.09m               |
| (LOWERED)                  | 48.25"         | 1.22m               |
| LENGTH (OVERALL)           | 96"            | 2.43m               |
| WIDTH (OVERALL)            | 54"            | 1.37m               |
| PLATFORM-SIZE(INSIDE)      | 50.5"x92.5"    | 1.28mx2.34m         |
| PLATFORM EXTENDS--FRONT    | 48"            | 1.21m               |
| REAR                       | 24"            | 0.60m               |
| PLATFORM-SAFETY RAILS      | 39"            | 0.99m               |
| PLATFORM-TOE PLATE         | 6"             | 0.15m               |
| LIFT CAPACITY              | 750LBS.        | 340kg.              |
| WHEEL BASE                 | 67.75"         | 1.72m               |
| WHEEL TRACK                | 47.5"          | 0.63m               |
| TURNING RADIUS             | 7'7"           | 2.31m               |
| DRIVE SPEED                | 0-3.25mph      | 0-5km/hr            |
| LIFT SPEED--HIGH           |                | 36sec.              |
| LOW                        |                | 55sec.              |
| LOWER SPEED                |                | 27sec.              |
| POWER SYSTEM               |                | 24 VDC              |
| BATTERY VOLTAGE            |                | 6 VDC               |
| CAPACITIES-BATTERY         |                | 250 AMP/HR(4)       |
| CAPACITIES-HYDRAULIC TANK  | 13 Gal.        | 49.21 Liters        |
| BATTERY CHARGER            |                | 30 AMP              |
| TIRE SIZE                  |                | 6.00x0(SOLID)       |
| SHIPPING WEIGHT            | 3900LBS        | 1769kg.             |
| SHIPPING CUBE--U.S.        | 261 Cu. Ft.    | 7.39 m <sup>3</sup> |
| EXPORT                     | 179.44 Cu. Ft. | 5.08 m <sup>3</sup> |

M 25E  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION               | ENGLISH       | METRIC             |
|---------------------------|---------------|--------------------|
| HEIGHT-WORKING (ELEVATED) | 31'           | 9.44m              |
| HEIGHT-PLATFORM(ELEVATED) | 25'           | 7.62m              |
| (LOWERED)                 | 44.5"         | 1.13m              |
| LENGTH (OVERALL)          | 120"          | 3.04m              |
| WIDTH (OVERALL)           | 59"           | 1.49m              |
| PLATFORM-SIZE (INSIDE)    | 50.5"x116.5"  | 1.28mx2.95m        |
| PLATFORM-SAFETY RAILS     | 39"           | 0.99m              |
| PLATFORM-TOE PLATE        | 6"            | 0.15m              |
| LIFT CAPACITY             | 1000LBS.      | 453kg.             |
| WHEEL BASE                | 77"           | 1.95m              |
| WHEEL TRACK               | 52.5"         | 1.33m              |
| TURNING RADIUS (INSIDE)   | 8'6"          | 2.59m              |
| DRIVE SPEED               | 0-2.5mph      | 0-4km/hr           |
| LIFT SPEED --HIGH         | 58 sec.       |                    |
| LOW                       | 79 sec.       |                    |
| LOWER SPEED               | 27 sec.       |                    |
| POWER SYSTEM              | 24 VDC        |                    |
| BATTERY VOLTAGE           | 6 VDC         |                    |
| CAPACITIES-BATTERY        | 250 AMP/HR(4) |                    |
| CAPACITIES-HYDRAULIC TANK | 13 gal.       | 49.21 Liters       |
| BATTERY CHARGER           | 30 AMP        |                    |
| TIRE SIZE                 | 6.00x9(SOLID) |                    |
| SHIPPING WEIGHT           | 4060 LBS.     | 1842 kg.           |
| SHIPPING CUBE--U.S.       | 350 Cu. Ft.   | 9.91m <sup>3</sup> |
| EXPORT                    | 241.5 Cu. Ft. | 6.83m <sup>3</sup> |

25T  
SELF PROPELLED SCISSOR LIFT

| DESCRIPTION                | ENGLISH       | METRIC              |
|----------------------------|---------------|---------------------|
| HEIGHT-WORKING (ELEVATED)  | 31'           | 9.44m               |
| HEIGHT-PLATFORM (ELEVATED) | 25'           | 7.62m               |
| (LOWERED)                  | 49"           | 1.24m               |
| LENGTH (OVERALL)           | 120"          | 3.04m               |
| WIDTH (OVERALL)            | 59"           | 1.49m               |
| PLATFORM-SIZE(INSIDE)      | 50.5"x116.5"  | 1.28mx2.95m         |
| PLATFORM EXTENDS--FRONT    | 48"           | 1.21m               |
| REAR                       | 24"           | 0.60m               |
| PLATFORM-SAFETY RAILS      | 39"           | 0.99m               |
| PLATFORM-TOE PLATE         | 6"            | 0.15m               |
| LIFT CAPACITY              | 1000 LBS.     | 453kg.              |
| WHEEL BASE                 | 77"           | 1.95m               |
| WHEEL TRACK                | 52.5"         | 1.33m               |
| TURNING RADIUS             | 8'6"          | 2.59m               |
| DRIVE SPEED                | 0-2.5mph      | 0-4km/hr            |
| LIFT SPEED--HIGH           | 58 sec.       |                     |
| LOW                        | 79 sec.       |                     |
| LOWER SPEED                | 27 sec.       |                     |
| POWER SYSTEM               | 24 VDC        |                     |
| BATTERY VOLTAGE            | 6 VDC         |                     |
| CAPACITIES-BATTERY         | 250 AMP/HR(4) |                     |
| CAPACITIES-HYDRAULIC TANK  | 13 gal        | 49.21Liters         |
| BATTERY CHARGER            | 30 Amp        |                     |
| TIRE SIZE                  | 6.00x9(SOLID) |                     |
| SHIPPING WEIGHT            | 4400LBS       | 1996kg              |
| SHIPPING CUBE--U.S.        | 370 Cu. Ft.   | 10.47m <sup>3</sup> |
| EXPORT                     | 260 Cu. Ft.   | 7.36m <sup>3</sup>  |

# 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 Brea, 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. Brea, 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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TELEX 194402 FAX 1-714-879-8884

## WARRANTY REGISTRATION

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## MARKLIFT MAC SELF PROPELLED SCISSOR LIFT

MODEL 15S ☐ 15ST ☐ 20S ☐ 20ST ☐ 20 ☐ 20T ☐ 25 ☐ 25T ☐

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.

MARK INDUSTRIES P.O.BOX 720, LONG BEACH, CA 90801 ATTN: SERVICE DEPT.

## (WARRANTY REGISTRATION)

|    |                                                             | YES                      | NO                       |
|----|-------------------------------------------------------------|--------------------------|--------------------------|
| 1  | CAPACITY DECAL IS <input type="text"/>                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 2  | ALL APPLICABLE WARNING DECALS ARE INSTALLED                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 3  | EMERGENCY DESCENT VALVE FUNCTIONS PROPERLY                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4  | OPERATORS INSTRUCTIONS ARE PROPERLY INSTALLED               | <input type="checkbox"/> | <input type="checkbox"/> |
| 5  | OPERATORS HANDBOOK                                          | <input type="checkbox"/> | <input type="checkbox"/> |
| 6  | ELECTRICAL SCHEMATIC RECEIVED                               | <input type="checkbox"/> | <input type="checkbox"/> |
| 7  | ALL CONTROLS ARE IDENTIFIED AND OPERATE PROPERLY            | <input type="checkbox"/> | <input type="checkbox"/> |
| 8  | PLATFORM GUARD RAILS IN GOOD CONDITION                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 9  | PLATFORM SAFETY CHAIN WORKS PROPERLY                        | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 | HORN/BEACON OPERATES PROPERLY (OPTIONAL)                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 | BRAKES OPERATE PROPERLY                                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 | CIRCUIT BREAKER OPERATES PROPERLY                           | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | SCISSOR ARM SHAFT COLLARS ARE IN PLACE AND TIGHT            | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 | LIFT CYLINDER IS FREE OF LEAKS                              | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 | SYSTEM PRESSURE IS SET AT <input type="text"/> PSIG         | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 | DRIVE MOTORS ARE FREE OF LEAKS                              | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 | DRIVE GEAR BOX OIL LEVEL (SRT MODELS)                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 | ALL NUTS & BOLTS ARE TIGHT                                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 | (2) WHEEL NUTS ARE TORQUED AT <input type="text"/> FT. LBS. | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 | LUG NUTS ON THE WHEELS ARE <input type="text"/> FT. LBS.    | <input type="checkbox"/> | <input type="checkbox"/> |
| 21 | BATTERY FLUID LEVEL IS CORRECT                              | <input type="checkbox"/> | <input type="checkbox"/> |
| 22 | HYDRAULIC HOSES AND FITTINGS ARE FREE OF LEAKS              | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 | HYDRAULIC OIL LEVEL <input type="text"/>                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 | HYDRAULIC OIL TANK & FITTINGS ARE FREE OF LEAKS             | <input type="checkbox"/> | <input type="checkbox"/> |
| 25 | STEERING CYLINDER IS FREE OF LEAKS                          | <input type="checkbox"/> | <input type="checkbox"/> |
| 26 | MANUAL OVERRIDE ON VALVES OPERATE PROPERLY                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 27 | ALL ELECTRICAL CONNECTIONS ARE TIGHT                        | <input type="checkbox"/> | <input type="checkbox"/> |
| 28 | CHARGER FUNCTIONS PROPERLY                                  | <input type="checkbox"/> | <input type="checkbox"/> |

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

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

When a loading dock is unavailable and a fork-lift must be used, remember, every Mac machine is equipped with fork-lift boots at the front or rear of the unit. Always use the fork-lift boots to lift the Mac. 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.

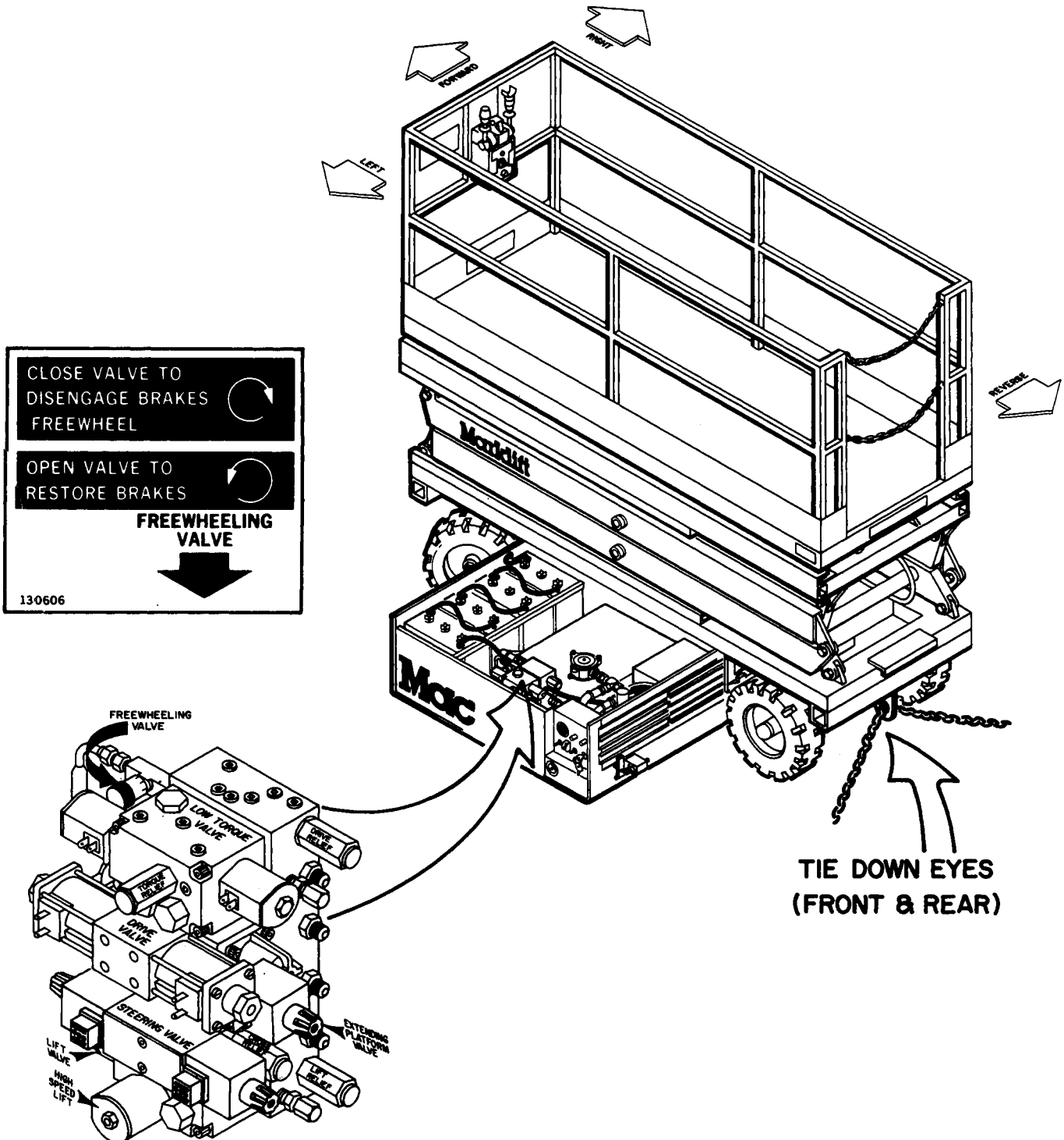
WHEN PREPARING FOR FREEWHEELING, MAKE SURE UNIT IS ON A LEVEL SURFACE, Brake is disengaged by closing the freewheeling valve and momentarily activating rotary drive switch. Use caution when brakes are disengaged! ALWAYS REMEMBER TO OPEN FREEWHEELING VALVE TO RESTORE BRAKING! (See drawing on facing page 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.



**BEFORE OPERATING ANY  
MARKLIFT, FAMILIARIZE YOUR-  
SELF WITH THE MACHINE FROM  
THE DRIVING POSITION AS  
SHOWN.**



MAC15, MAC20, MAC25  
SELF PROPELLED SCISSOR LIFT

All MAC units 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.

Test Drive

- A. Forward
- B. Reverse

Test Steer

- C. Left
- D. Right

Test Lift

- E. Up
- F. 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.

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<br>(Phase to Phase) | Minimum Required<br>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<br>(Phase to Phase) | Minimum Required<br>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.

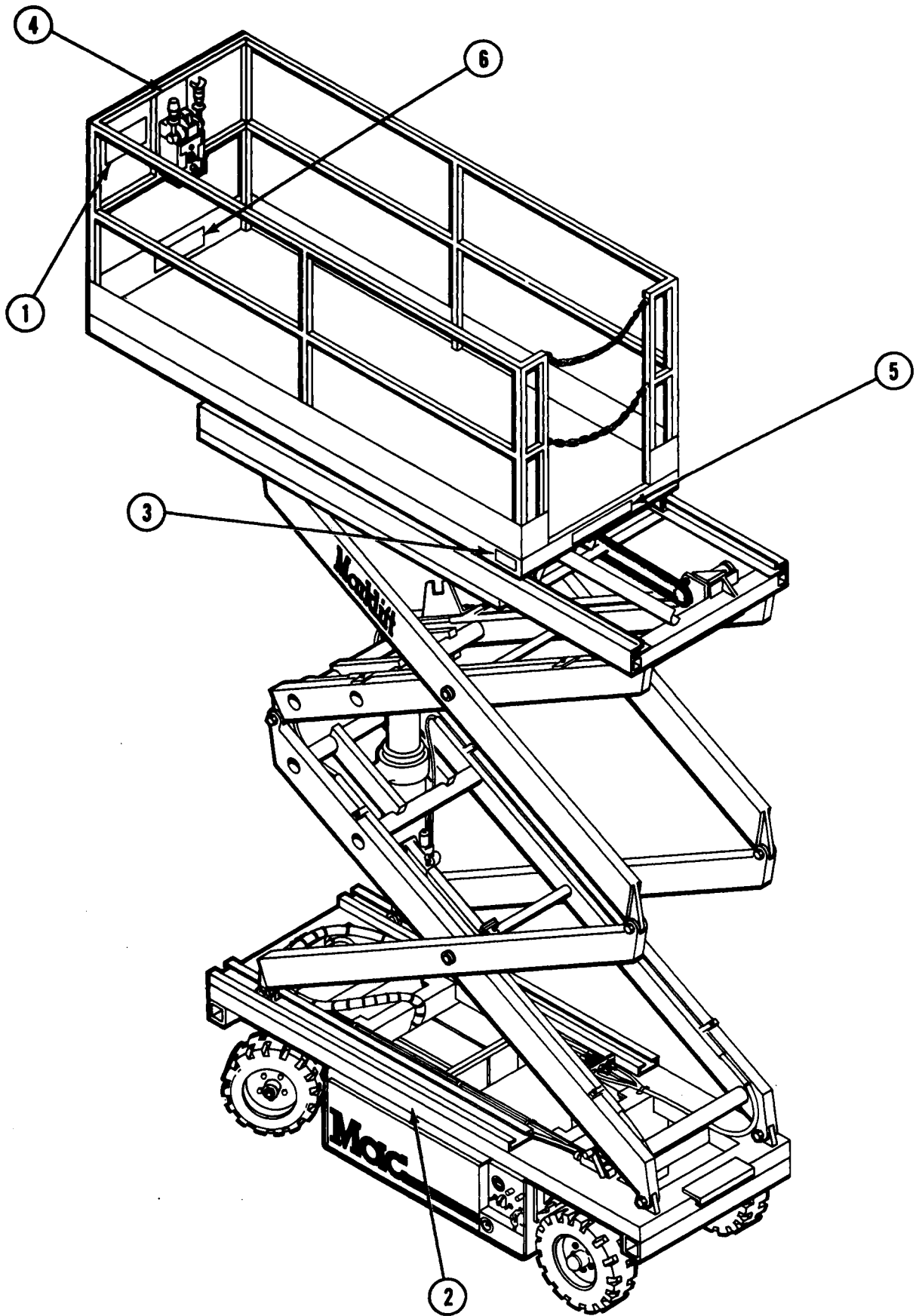
(c) The specified clearance shall not be reduced by movement due to any strains impressed (by attachments or otherwise) upon the structures supporting the high-voltage line or upon any equipment, fixtures, or attachments thereon.

(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

BEFORE USING ANY EQUIPMENT, READ AND UNDERSTAND THE FOLLOWING INSTRUCTIONS.

- ① **TURN POWER SWITCH AT GROUND CONTROL STATION TO "ON" POSITION. SELECTOR SWITCH TO "AERIAL", THEN ENTER PLATFORM. ATTACH SAFETY CHAINS AFTER ENTERING PLATFORM! FLIP BACK RED EMERGENCY SWITCH GUARD, TURN ON POWER SWITCH, TO ACTIVATE AERIAL CONTROLS AND WARNING DEVICES.**
- ② **FORWARD OR REVERSE DRIVE**  
PULL DRIVE CONTROLLER LOCKING STEM UPWARD, THEN MOVE CONTROLLER HANDLE SLOWLY IN DIRECTION DESIRED.
- ③ **TO STEER MACHINE**  
USE THUMB ROCKER SWITCH ON TOP OF DRIVE CONTROLLER, TO STEER RIGHT OR LEFT.
- ④ **TO RAISE OR LOWER PLATFORM**  
PULL PLATFORM LIFT CONTROLLER LOCKING STEM UPWARD, THEN MOVE CONTROLLER, FORWARD FOR UP, BACK FOR 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



130506

## — WARNING —

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

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

2023

**CAUTION**

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

**CAUTION**

**CAUTION**

**GUARD RAILS ARE FOR YOUR SAFETY  
DO NOT REMOVE**

OPERATING THIS MACHINE WITHOUT GUARD RAILS  
COULD RESULT IN DEATH OR SERIOUS INJURY

**CAUTION**

31109

**ATTACH SAFETY CHAINS  
BEFORE RAISING PLATFORM**

M-SERIES  
SELF PROPELLED SCISSOR

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.

1. STARTING

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.  
Attach safety chains after entering platform!

Pull out the red emergency ON/OFF button located in the center of the aerial control box. Electric models are now operational.

2. STEERING

Steering the machine is done from the aerial control box only. 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.

MAC15, MAC20, MAC25  
SELF PROPELLED SCISSOR LIFT

HYDRAULIC FLUID TABLE

| Oil Company   | Chevron          | Gulf             | Shell    | Union         |
|---------------|------------------|------------------|----------|---------------|
| Brand Name    | ATF<br>Dexron 11 | ATF<br>Dexron 11 | Donaz-T6 | ATF<br>Dexron |
| Viscosity -   |                  |                  |          |               |
| Sus @ 100 F   | 187.4            | 195              | 200      | 200           |
| Sus @ 210 F   | 49.2             | 50.4             | 50       | 52.3          |
| Viscosity -   |                  |                  |          |               |
| Index typical | 153              | 155              | 160      | 172           |
| Flash Point F | 400              | 405              | 390      | 395           |
| Pour Point F  | -40              | -50              | -50      | -45           |

SERVICE TOOLS

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

1. Volt/Ohm Meter
2. Hydraulic Pressure Gauge (0-3000 PSI)
3. Female Quick Disconnect Couplet (P/N 842)
4. Battery Hydrometer
5. Battery Load Tester
6. Standard Mechanics Hand Tools
7. Scissor Arm Supports
8. Electrical Test Light
9. Hydraulic Pressure Gauge (0-1000 PSI)

## MARKLIFT SELF-PROPELLED SCISSOR

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

The tables (on page 28) 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                 |
| 1.140         | 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 .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 .04 points; and for every 10° above 80°F, add .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 .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.

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<br>(27°C) | 0°F<br>(-18°C) | -10°F<br>(-23°C) | -20°F<br>(-29°C) | -30°F<br>(-34°C) | -45°F<br>(-43°C) | -65°F<br>(-54°C) | Approx.<br>State of<br>Charge<br>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 |

MAC15, MAC20, MAC25  
SELF PROPELLED SCISSOR LIFT

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 (page 26).

A large percentage of electrical problems can be attributed to insufficiently charged or defective batteries.

(Some Helpful Hints)

ELECTRICAL

1. If problem seems to be electrical, use your 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.

#### (Trouble Shooting Check List)

#### 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.

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.

If this trouble shooting check list does not help to solve your problem, contact your local Mac Unit representative or the MARK INDUSTRIES Service Department.

# MAINTENANCE CHECK LIST

34

Model: \_\_\_\_\_

Serial No. \_\_\_\_\_

Date: \_\_\_\_\_

Equip. No. \_\_\_\_\_

Location: \_\_\_\_\_

Mechanic: \_\_\_\_\_

- 1 Batteries
- 2 Battery Terminals
- 3 Motor Brushes
- 4 Hydraulic Fluid
- 5 Hyd. Oil Filter
- 6 Hydraulic System
- 7 Hydraulic Pressure
- 8 Hydraulic Hoses
- 9 Cylinders
- 10 Drive Motors
- 11 Brake
- 12 Aerial Control Box
- 13 Ground Control Box
- 14 Relays
- 15 Wire Connections
- 16 Safety Cut-outs
- 17 Bushings
- 18 Wear Pads

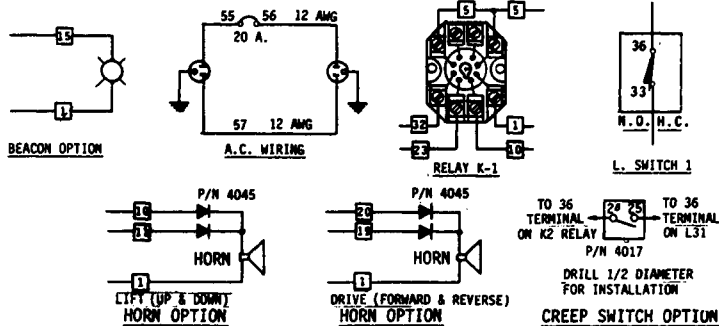
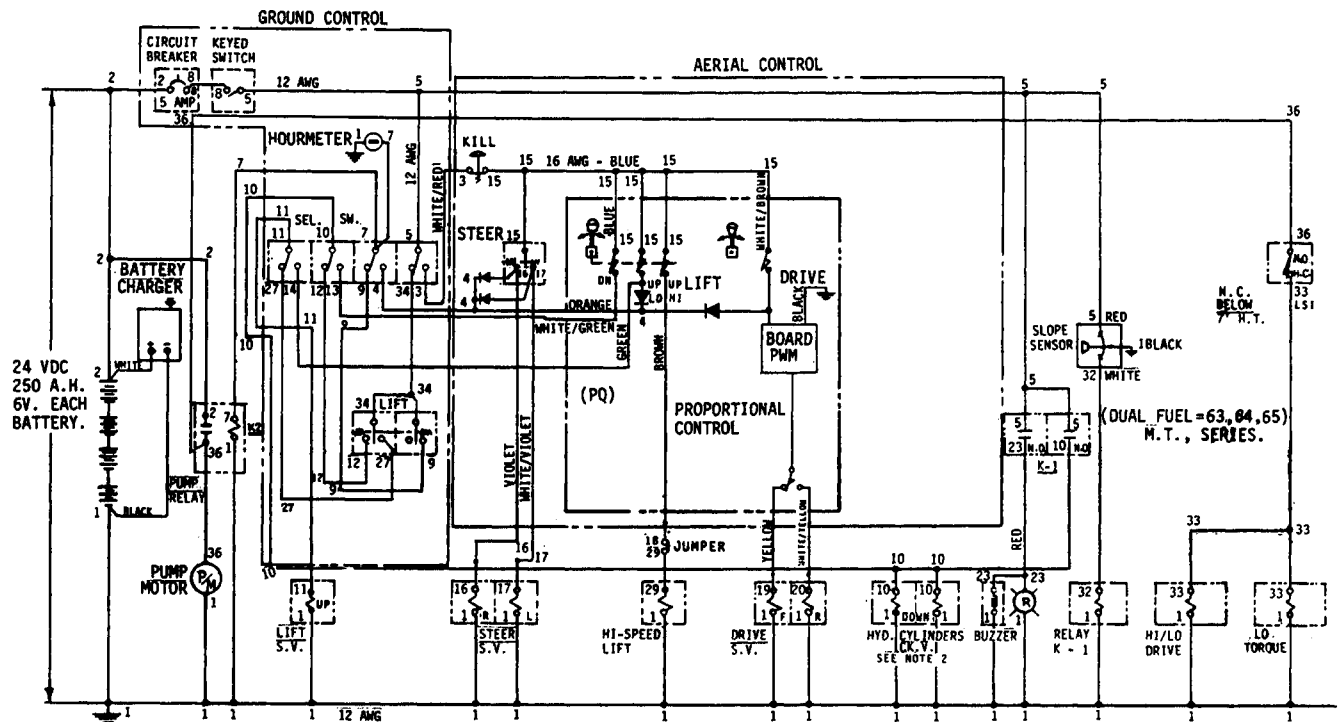
- 19 Front End Assy.
- 20 Tire Condition
- 21 Wheel Nuts
- 22 Wheel Bearing
- 23 Nuts & Bolts
- 24 Lubrication
- 25 Warning Decals
- 26 Operation Instructions
- 27 General Decals
- 28 Paint
- 29 All Operations
- 30 Lift
- 31 Steering
- 32 Forward Drive
- 33 Reverse Drive
- 34 Tilt Switches
- 35 Options
- 36 Other

CODE

F - Filled  
R - Repaired  
C - Checked  
A - Adjusted  
X - Needs Repair

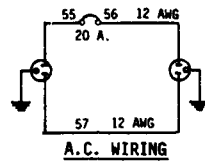
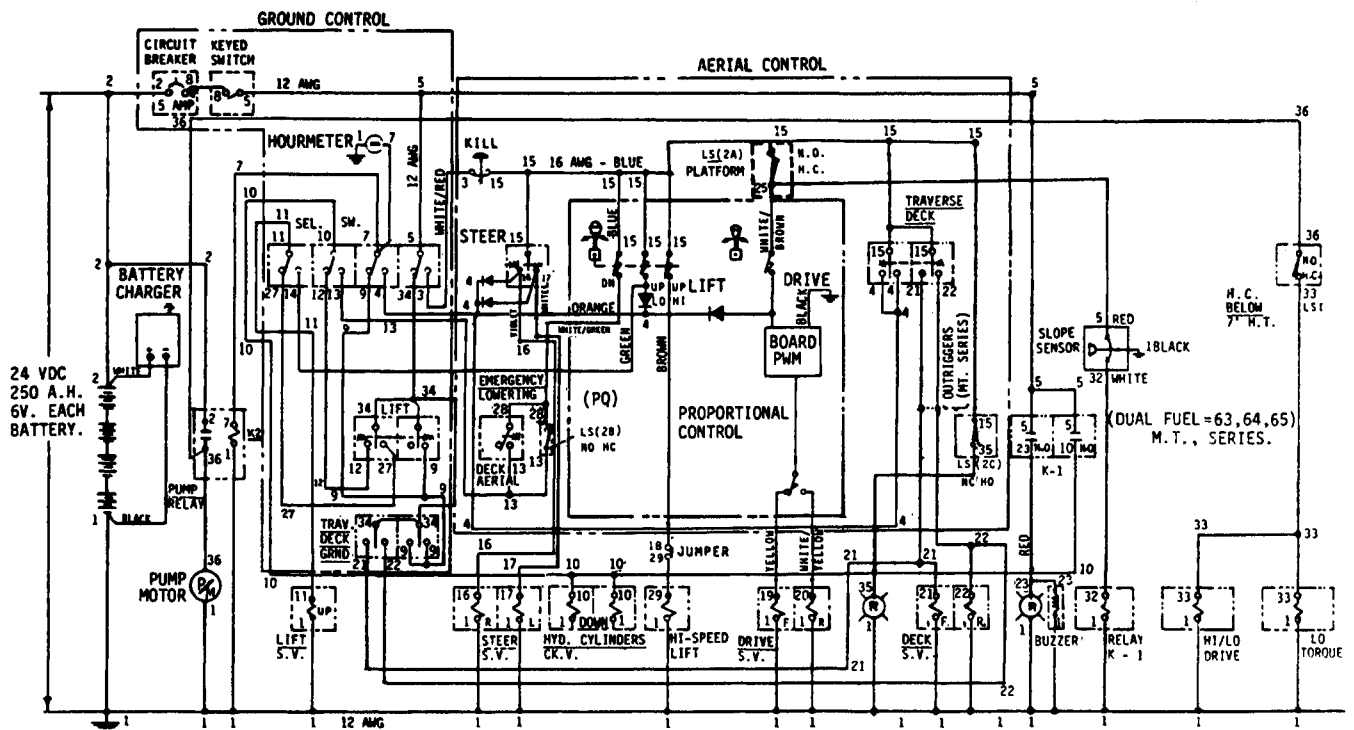
Other Comments:





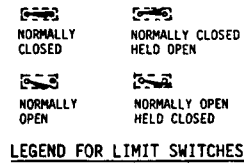
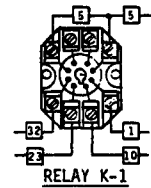
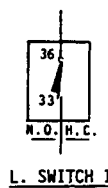
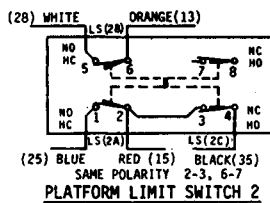
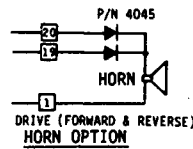
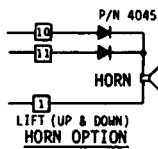
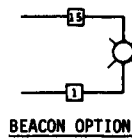
## NOTES

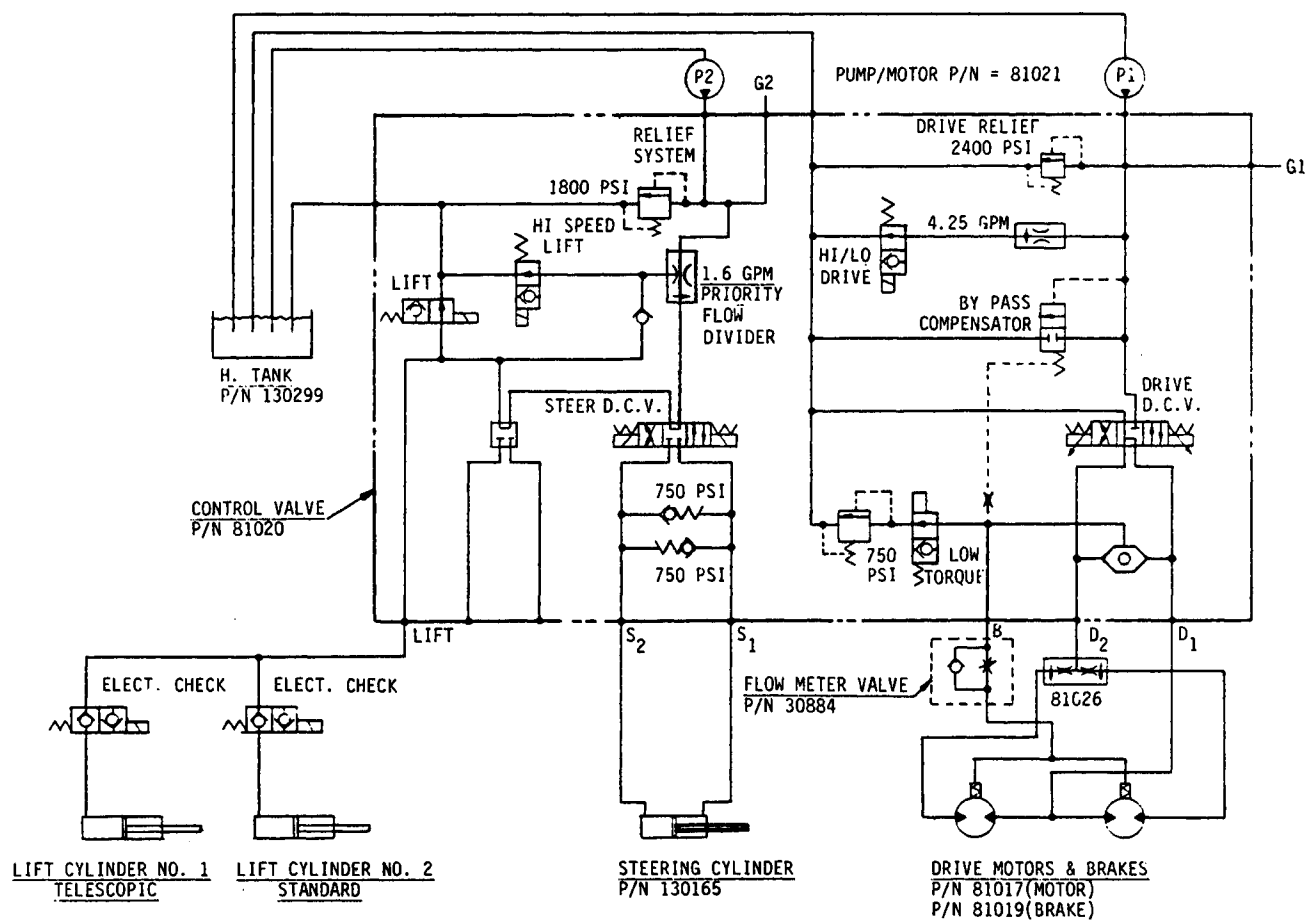
1. INSTALL 12 GAUGE GROUND WIRE FROM THE NEGATIVE SIDE (NUMBER ONE OF THE ELECTRICAL SCHEMATIC) OF THE VALVE PACKAGE - SOENIODS TO THE NEAREST MOUNTING BOLT OF THE SAME PACKAGE.
2. USE ONLY ONE LIFT CYLINDER FOR MAC 155



## NOTES

1. INSTALL 12 GAUGE GROUND WIRE FROM THE NEGATIVE SIDE (NUMBER ONE OF THE ELECTRICAL SCHEMATIC) OF THE VALVE PACKAGE - SOLENOIDS TO THE NEAREST MOUNTING BOLT OF THE SAME PACKAGE.





MAC 15S = 130481

(ONE CYLINDER ONLY)

MAC 20S & MAC 20  
= 130205

MAC 20S &amp; 20 = 130204

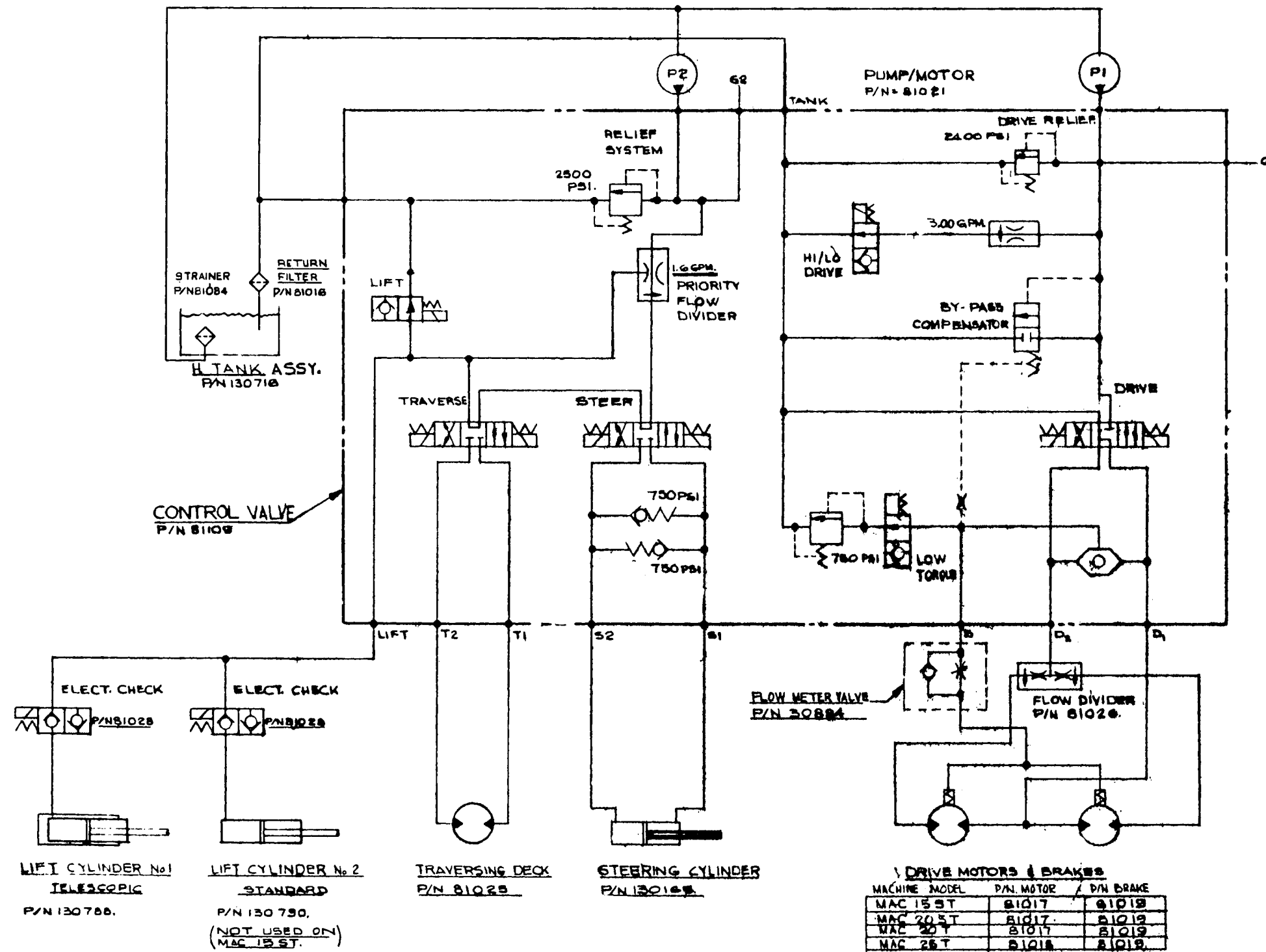
MAC 25 = 130481

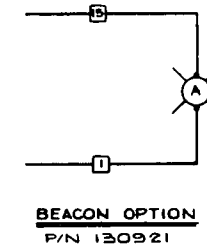
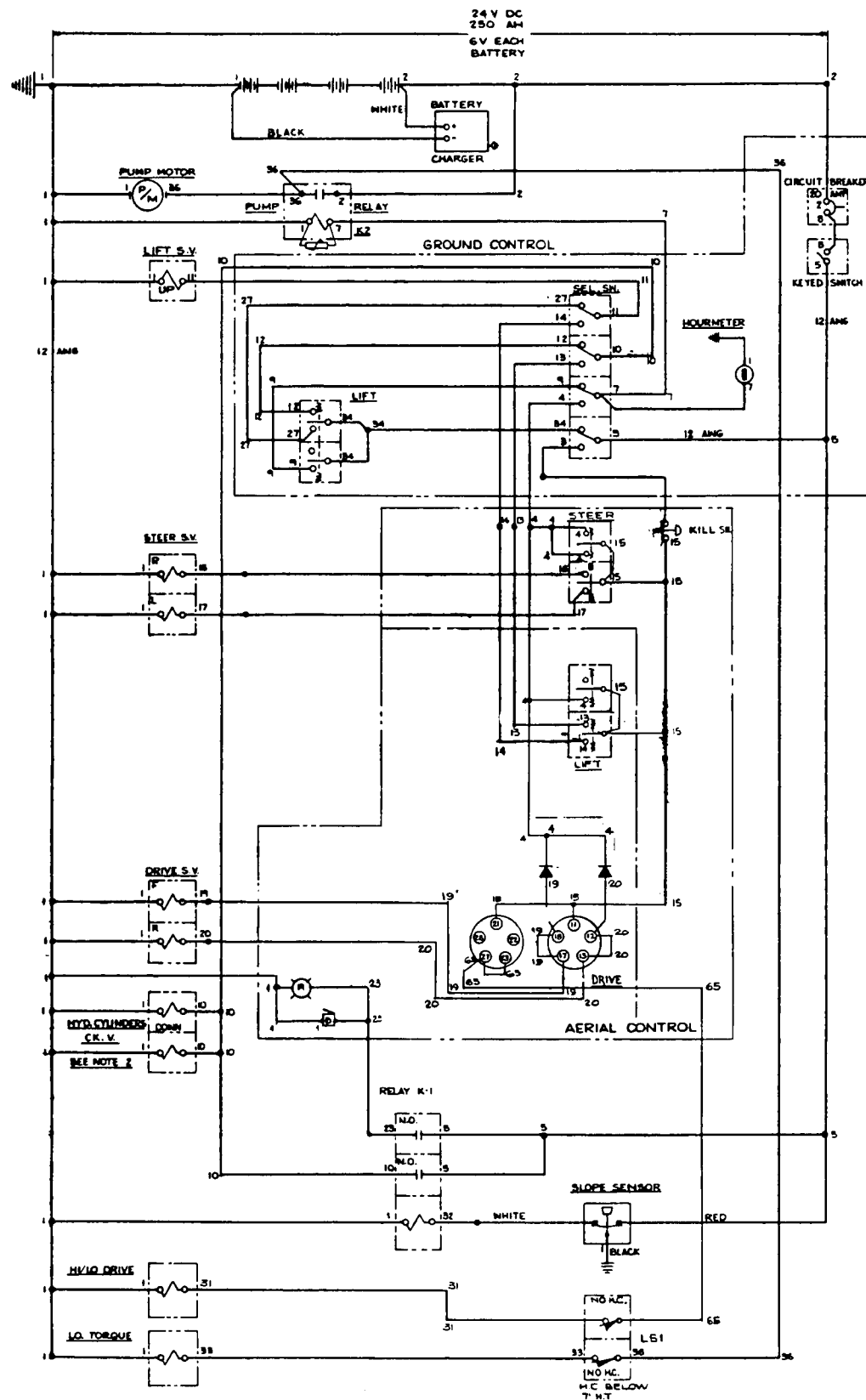
MAC 25 = 130204



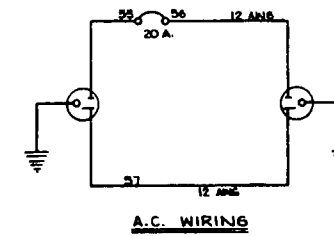




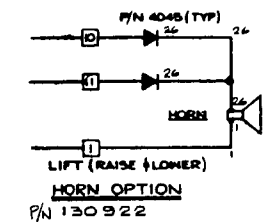
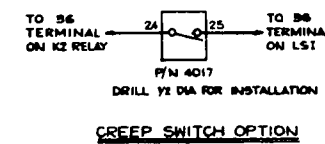




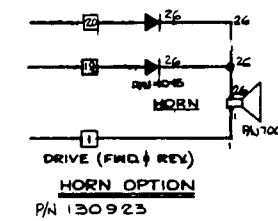
BEACON OPTION  
P/N 130921



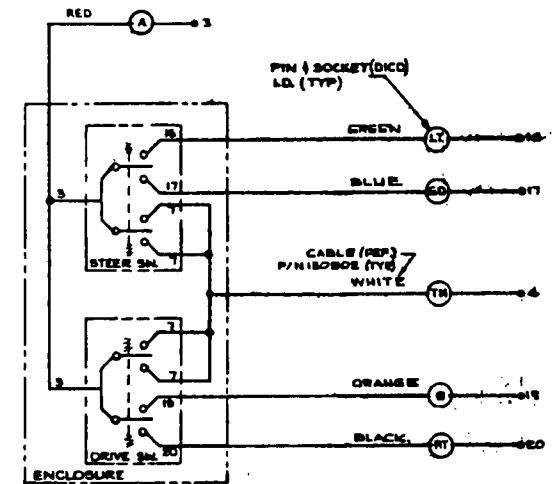
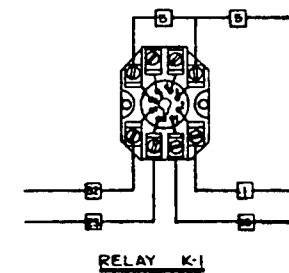
A.C. WIRING



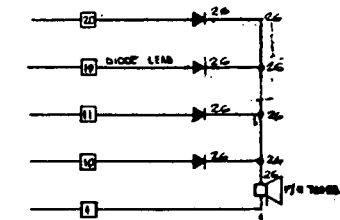
P/N 130922



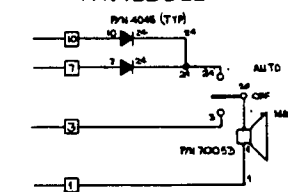
P/N 130923



REMOTE CONTROL OPTION



LIFT & DRIVE ONLY  
HORN OPTION  
P/N 130925



MOVEMENT HORN OPTION  
P/N



## M SERIES SCISSOR LIFTS

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**RECOMMENDED SPARE PARTS LIST**  
(QTY. BASED ON 5 MACHINES SERVICED EVERY 6 MONTHS)

41

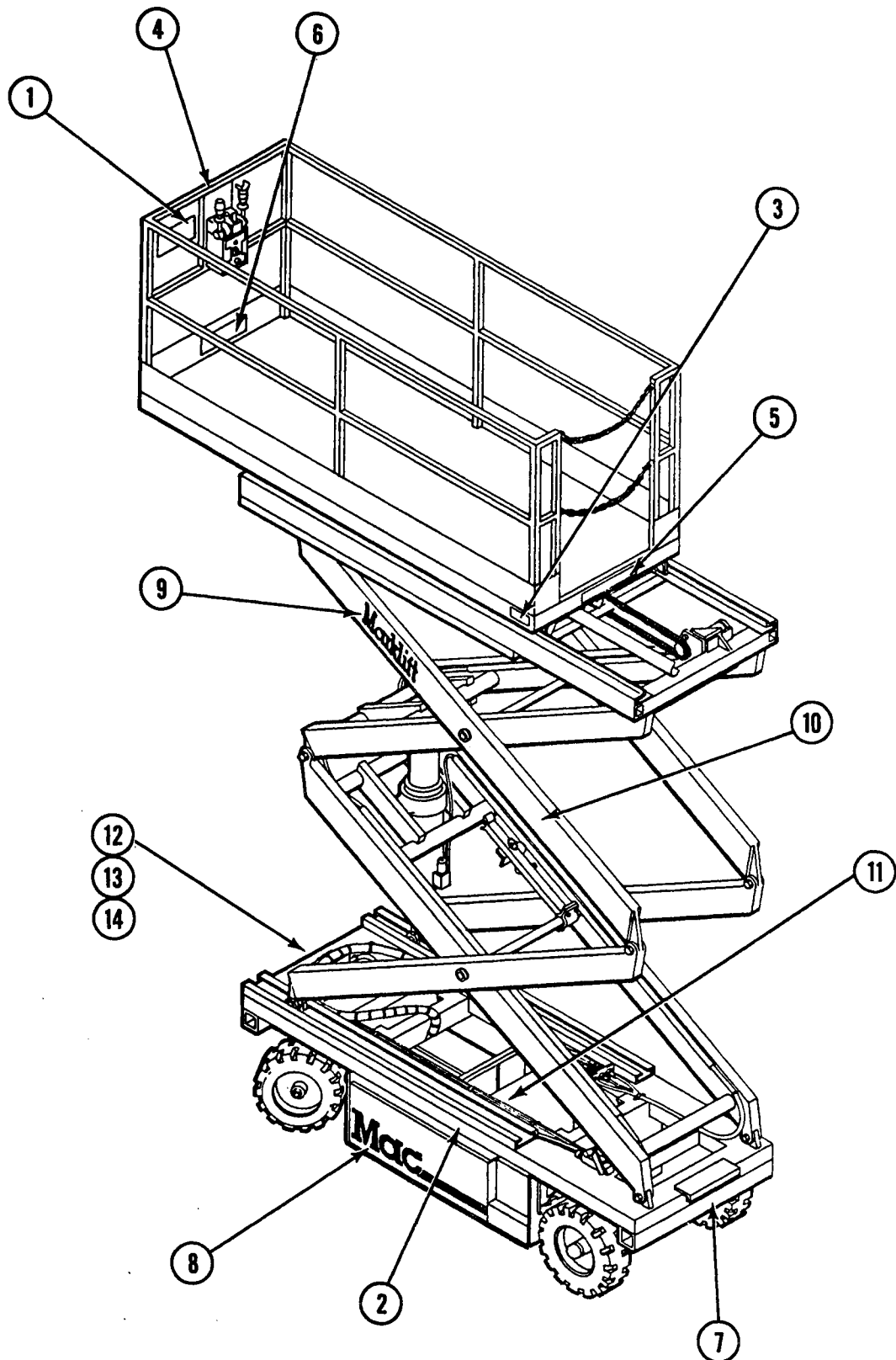
| ITEM | QTY | PART NO. | DESCRIPTION                                                |
|------|-----|----------|------------------------------------------------------------|
|      | 3   | 4020     | PUSH BUTTON                                                |
|      | 3   | 70243    | 5 AMP CIRCUIT BREAKER                                      |
|      | 7   | 20481    | TOGGLE SWITCH                                              |
|      | 2   | 31074    | SLOPE SENSOR                                               |
|      | 2   | 70238    | RELAY, TIME DELAY                                          |
|      | 2   | 784-A    | SOCKET                                                     |
|      | 6   | 4045     | DIODE - 6 AMP 200 VDC(UPPER CONTROL BOX)                   |
|      | 2   | 66738    | DRIVE CONTROLLER                                           |
|      | 4   | 130326   | WEAR PAD - LOWER                                           |
|      | 3   | 16260    | SELECTOR SWITCH                                            |
|      | 5   | 66694    | COIL - 18 VDC                                              |
|      | 3   | 66688    | SOLENOID VALVE(CARTRIDGE & COIL) (N.O. VALVE)              |
|      | 15  | 66807    | FILTER ELEMENT(FILTER ASSEMBLY:66739)                      |
|      | 2   | 130506   | DECAL - OPERATION INSTRUCTION                              |
|      | 2   | 66640    | SEAL KIT - STEERING CYLINDER (130165)                      |
|      | 2   | 66649 *  | SEAL KIT - TELESCOPIC LIFT CYLINDER MAC 20's (130205)      |
|      | 4   | 66648 *  | SEAL KIT - TELESCOPIC LIFT CYLINDER MAC 15 & 25's (130481) |
|      | 2   | 66650 *  | SEAL KIT - SINGLE ACTING LIFT CYL. MAC 20 & 25's (130204)  |
|      | 2   | 66725    | TIMER-ELECTRONIC CARD(CHARGER) 24 VOLT TIMER KIT           |
|      | 1   | 66735    | RECEPTACLE-125/20 TWIST LOCK(CHARGER)                      |
|      | 1   | 66731    | DIODE ASSEMBLY(CHARGER)                                    |
|      | 1   | 66727    | FUSE ASSEMBLY(CHARGER)                                     |
|      | 1   | 66728    | RELAY-120 VAC, 15AMP(CHARGER)                              |
|      | 1   | 70173    | LIMIT SWITCH(TRAVERSING)                                   |
|      | 2   | 70242    | STARTER SOLENOID - 200 AMP                                 |
|      | 2   | 81028    | SOLENOID VALVE(LOWERING) SOLENOID ELECTRIC CHECK           |
|      | 2   | 16918    | DRIVE LIFT MICRO SWITCH                                    |

RECOMMENDED SPARE PARTS LIST  
(QTY. BASED ON 5 MACHINES SERVICED EVERY 6 MONTHS)

42

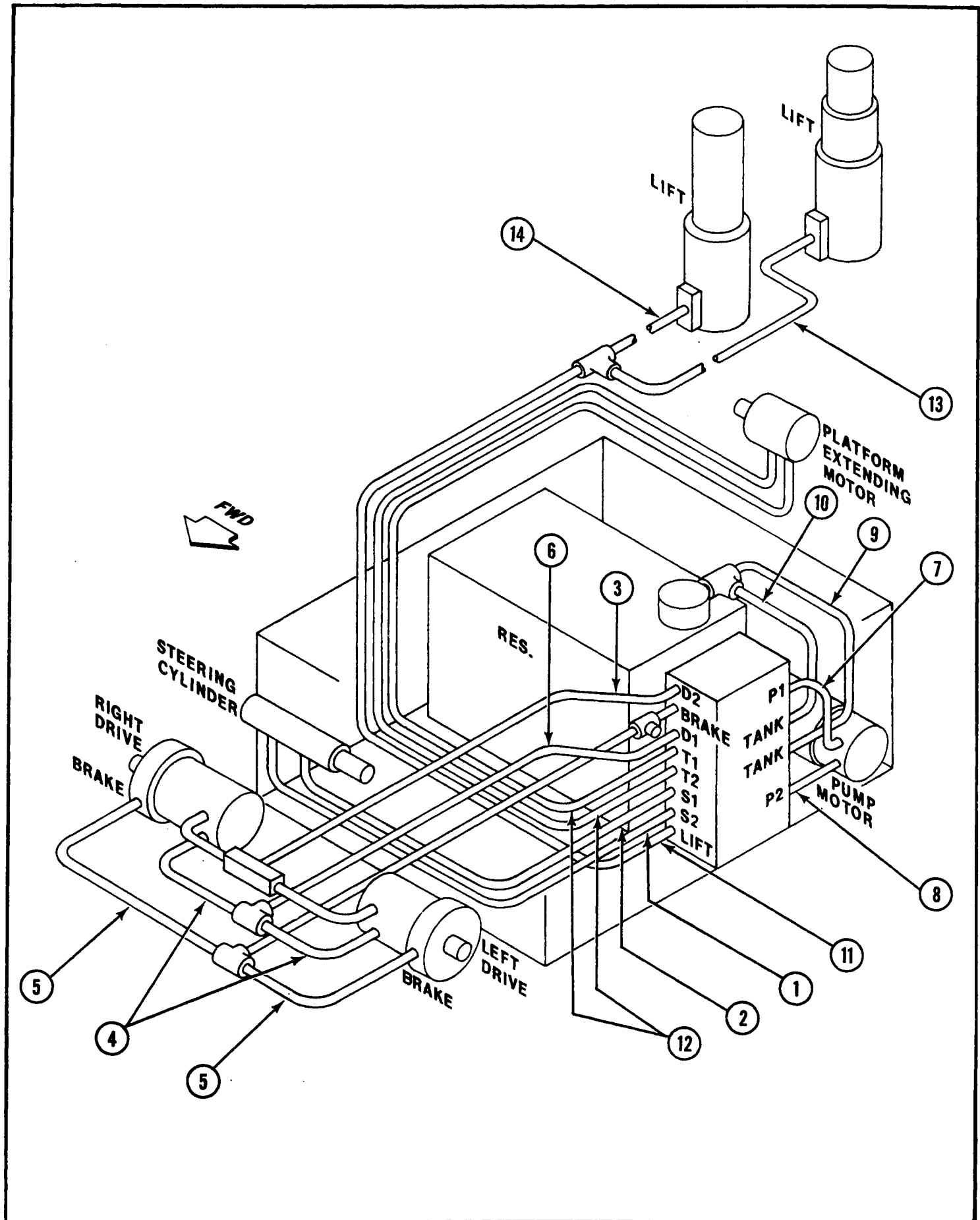
| ITEM | QTY | PART NO. | DESCRIPTION                                                      |
|------|-----|----------|------------------------------------------------------------------|
|      | 1   | 20803    | LIMIT SWITCH(7' CUTOUT)                                          |
|      | 3   | 20562    | 20 AMP CIRCUIT BREAKER                                           |
|      | 2   | 20884    | SWITCH GUARD                                                     |
|      | 2   | 66212    | MICRO SWITCH(STEERING)                                           |
|      | 1   | 2717     | KEY SWITCH                                                       |
|      | 1   | 66219    | CONTROL HANDLE ASSEMBLY(DRIVE)                                   |
|      | 3   | 4031     | LIGHT- PILOT INDICATOR                                           |
|      | 1   | 70147    | CAPACITOR(CHARGER)                                               |
|      | 1   | 130801   | DECAL, OPERATION INSTRUCTION - MAC II                            |
|      | 1   | 130802   | DECAL, EMERGENCY DOWN INSTRUCTIONS                               |
|      | *   | *        | <u>BELOW FIND SEAL KIT INFO. FOR MAC II:</u>                     |
|      |     | 66818    | SEAL KIT - LIFT CYLINDER (130788)<br>ALL MAC II 15's,20's & 25's |
|      |     | 66822    | SEAL KIT - LIFT CYLINDER (130790)<br>ALL MAC II 20's & 25's      |

FIGURE 1 DECAL LOCATIONS ALL MODELS





| ITEM | QTY | PART NO. | DESCRIPTION                                |
|------|-----|----------|--------------------------------------------|
| 1    | 1   | 130506   | DECAL - OPERATION INSTRUCTION              |
| 2    | 2   | 2016     | DECAL - DO NOT WORK UNDER                  |
| 3    | 4   | 2023     | DECAL - LOAD CAPACITY 750LBS               |
| 4    | 1   | 2014     | DECAL - CAUTION UNLAWFUL TO OPERATE        |
| 5    | 2   | 31109    | DECAL - CAUTION DO NOT REMOVE GUARD RAILS  |
| 6    | 1   | 11064    | DECAL - ATTACH SAFETY CHAIN BEFORE RAISING |
| 7    | 1   | 2041     | DECAL - DO NOT LIFT THIS END               |
| 8    | 2   | 130507   | DECAL - MAC                                |
| 9    | 2   | 31259    | DECAL - MARKLIFT                           |
| 10   | 2   | 130596   | DECAL - PRODUCT OF MARK INDUSTRIES         |
| 11   | 1   | 130606   | DECAL - FREE WHEELING VALVE                |
| 12   | 1   | 30520    | PLATE PATENT NUMBER                        |
| 13   | 1   | 20660    | PLATE IDENTIFICATION                       |
| 14   | 1   | 20661    | PLATE ANSI A92                             |



| ITEM | QTY | PART NO.      | DESCRIPTION                                                                                           |
|------|-----|---------------|-------------------------------------------------------------------------------------------------------|
| 1    | 1   | 13210-04-0884 | HOSE ASSEMBLIES<br> |
| 2    | 1   | 13210-04-0834 |                                                                                                       |
| 3    | 1   | 13210-08-0864 |                                                                                                       |
| 4    | 2   | 13210-08-0182 |                                                                                                       |
| 5    | 2   | 13213-04-1094 |                                                                                                       |
| 6    | 1   | 13212-08-0864 |                                                                                                       |
| 7    | 1   | 1320-08-0204  |                                                                                                       |
| 8    | 1   | 13213-08-0210 |                                                                                                       |
| 9    | 1   | 13203-08-0130 |                                                                                                       |
| 10   | 1   | 13205-08-0210 |                                                                                                       |
| 11   | 1   | 13211-06-1290 |                                                                                                       |
| 12   | --  | -----         |                                                                                                       |
| 13   | 1   | 13230-03-1684 |                                                                                                       |
| 14   | 1   | 13230-03-3000 |                                                                                                       |

| ITEM | QTY | PART NO.      | DESCRIPTION                                                                                           |
|------|-----|---------------|-------------------------------------------------------------------------------------------------------|
| 1    | 1   | 13210-04-0884 | HOSE ASSEMBLIES<br> |
| 2    | 1   | 13210-04-0834 |                                                                                                       |
| 3    | 1   | 13210-08-0864 |                                                                                                       |
| 4    | 2   | 13210-08-0182 |                                                                                                       |
| 5    | 2   | 13213-04-0184 |                                                                                                       |
| 6    | 1   | 13212-08-0864 |                                                                                                       |
| 7    | 1   | 13210-08-0204 |                                                                                                       |
| 8    | 1   | 13213-08-0210 |                                                                                                       |
| 9    | 1   | 13203-08-0130 |                                                                                                       |
| 10   | 1   | 13205-08-0110 |                                                                                                       |
| 11   | 1   | 13211-06-1290 |                                                                                                       |
| 12   | 2   | 13210-04-1294 |                                                                                                       |
| 13   | 1   | 13230-03-1684 |                                                                                                       |
| 14   | 1   | 13230-03-3000 |                                                                                                       |

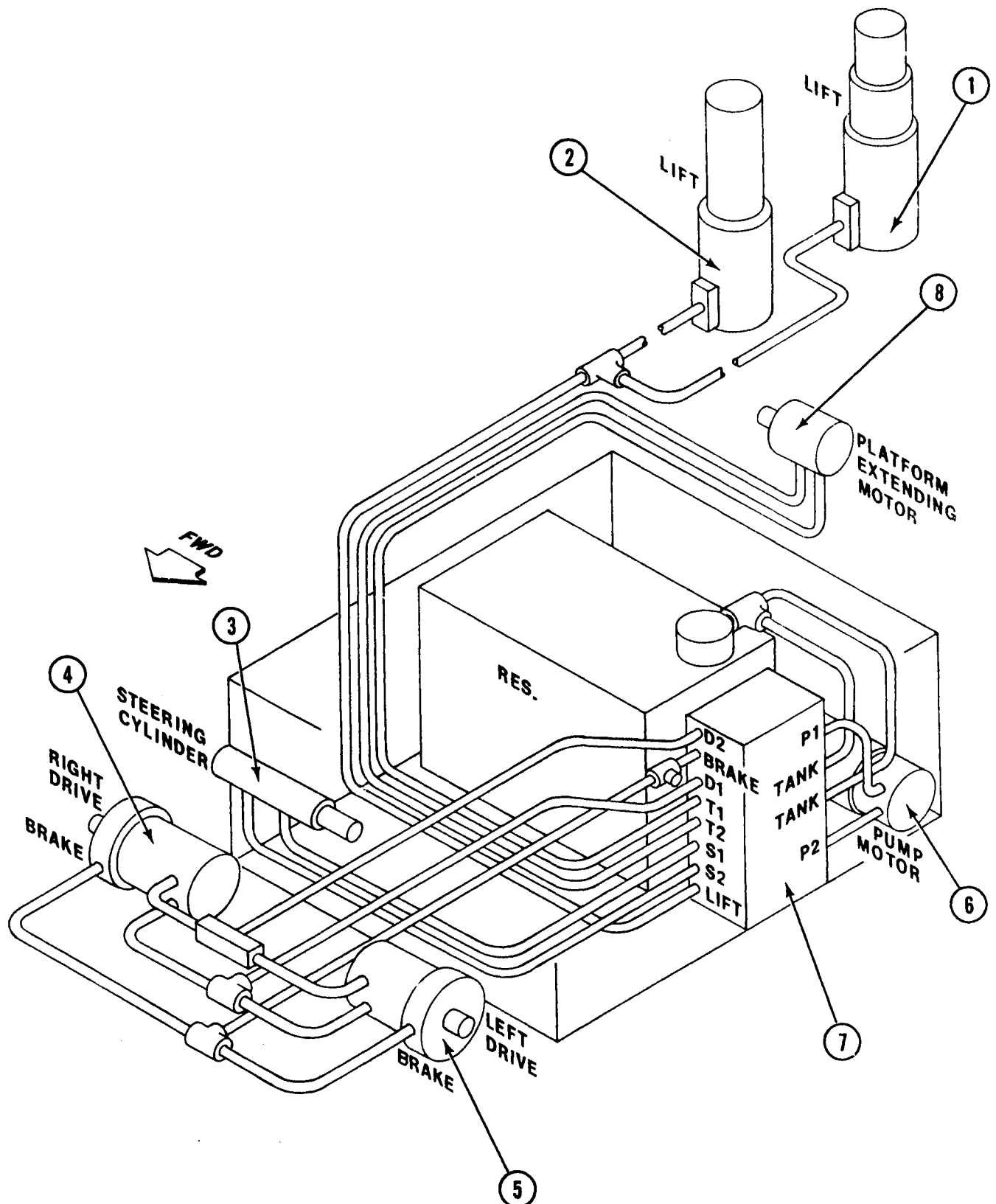
| ITEM | QTY | PART NO.      | DESCRIPTION          |
|------|-----|---------------|----------------------|
| 1    | 1   | 13210-04-0884 | HOSE ASSEMBLIES<br>↓ |
| 2    | 1   | 13210-04-0834 |                      |
| 3    | 1   | 13210-04-0864 |                      |
| 4    | 2   | 13210-08-0265 |                      |
| 5    | 2   | 13213-04-0262 |                      |
| 6    | 1   | 13212-08-0864 |                      |
| 7    | 1   | 13210-08-0204 |                      |
| 8    | 1   | 13213-08-0210 |                      |
| 9    | 1   | 13203-08-0130 |                      |
| 10   | 1   | 13205-08-0110 |                      |
| 11   | 1   | 13211-06-1290 |                      |
| 12   | --  | ----          |                      |
| 13   | 1   | 13230-03-1684 |                      |
| 14   | 1   | 13230-03-3000 |                      |

| ITEM | QTY | PART NO.      | DESCRIPTION          |
|------|-----|---------------|----------------------|
| 1    | 1   | 13210-04-0884 | HOSE ASSEMBLIES<br>↓ |
| 2    | 1   | 13210-04-0864 |                      |
| 3    | 1   | 13210-04-0834 |                      |
| 4    | 2   | 13210-08-0265 |                      |
| 5    | 2   | 13213-04-0262 |                      |
| 6    | 1   | 13212-08-0864 |                      |
| 7    | 1   | 13210-08-0204 |                      |
| 8    | 1   | 13213-08-0210 |                      |
| 9    | 1   | 13203-08-0130 |                      |
| 10   | 1   | 13205-08-0110 |                      |
| 11   | 1   | 13211-06-1290 |                      |
| 12   | 2   | 13210-04-1294 |                      |
| 13   | 1   | 13230-03-1684 |                      |
| 14   | 1   | 13230-03-3000 |                      |

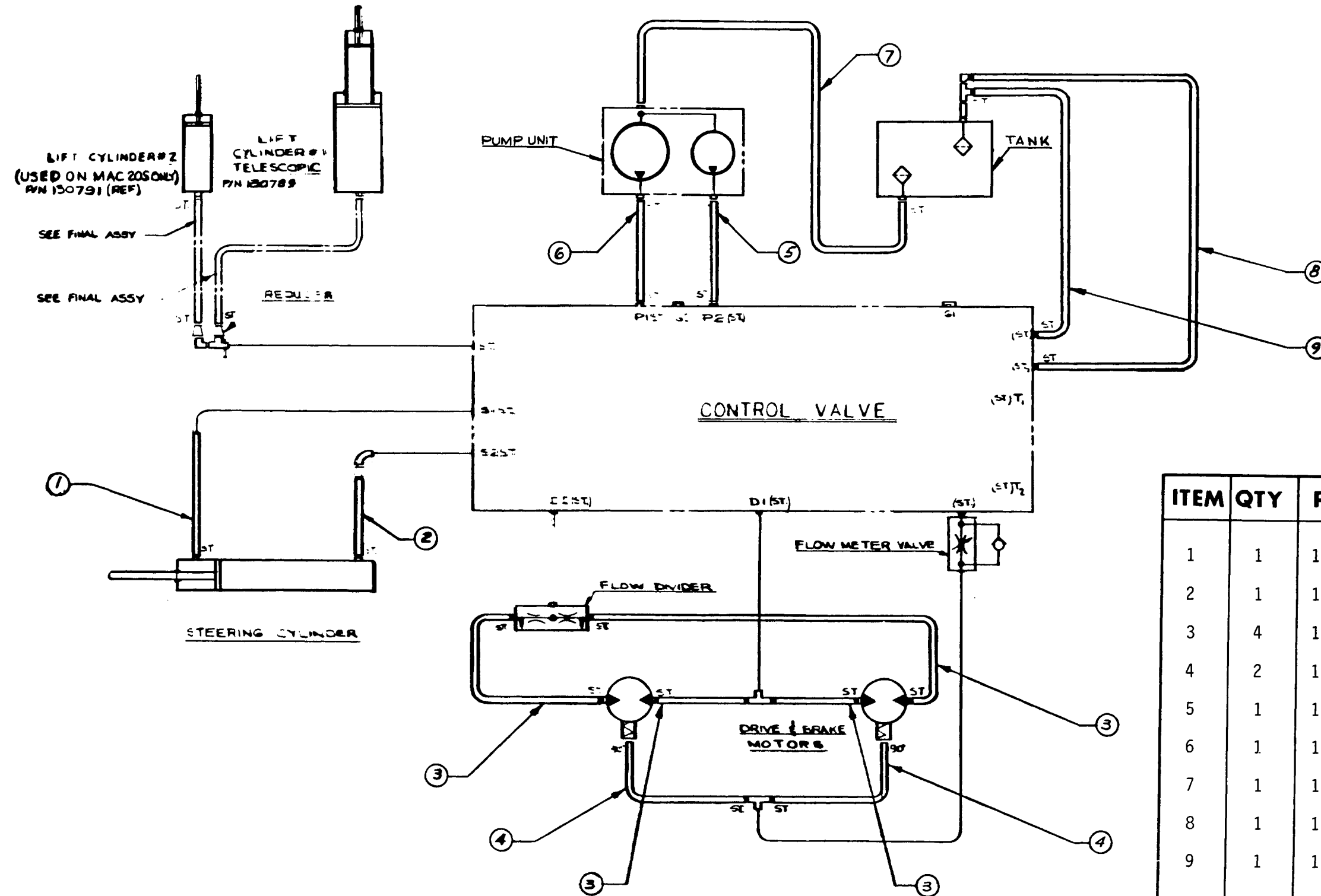
| ITEM | QTY | PART NO.      | DESCRIPTION          |
|------|-----|---------------|----------------------|
| 1    | 1   | 13210-04-0970 | HOSE ASSEMBLIES<br>↓ |
| 2    | 1   | 13210-04-0940 |                      |
| 3    | 1   | 13210-08-0864 |                      |
| 4    | 4   | 13210-08-0260 |                      |
| 5    | 2   | 13213-04-0262 |                      |
| 6    | 1   | 13212-08-0864 |                      |
| 7    | 1   | 13210-08-0204 |                      |
| 8    | 1   | 13213-08-0210 |                      |
| 9    | 1   | 13203-08-0130 |                      |
| 10   | 1   | 13205-08-0110 |                      |
| 11   | 1   | 13211-06-1440 |                      |
| 12   | --  | -----         |                      |
| 13   | 1   | 13230-03-1684 |                      |
| 14   | 1   | 13230-03-3000 |                      |

| ITEM | QTY | PART NO.      | DESCRIPTION          |
|------|-----|---------------|----------------------|
| 1    | 1   | 13210-04-0970 | HOSE ASSEMBLIES<br>↓ |
| 2    | 1   | 13210-04-0940 |                      |
| 3    | 1   | 13210-08-0864 |                      |
| 4    | 4   | 13210-08-0260 |                      |
| 5    | 2   | 13213-04-0262 |                      |
| 6    | 1   | 13212-08-0864 |                      |
| 7    | 1   | 13210-08-0204 |                      |
| 8    | 1   | 13213-08-0130 |                      |
| 9    | 1   | 13203-08-0130 |                      |
| 10   | 1   | 13205-08-0110 |                      |
| 11   | 1   | 13211-06-1440 |                      |
| 12   | 2   | 13210-04-1410 |                      |
| 13   | 1   | 13230-03-1684 |                      |
| 14   | 1   | 13230-03-3000 |                      |





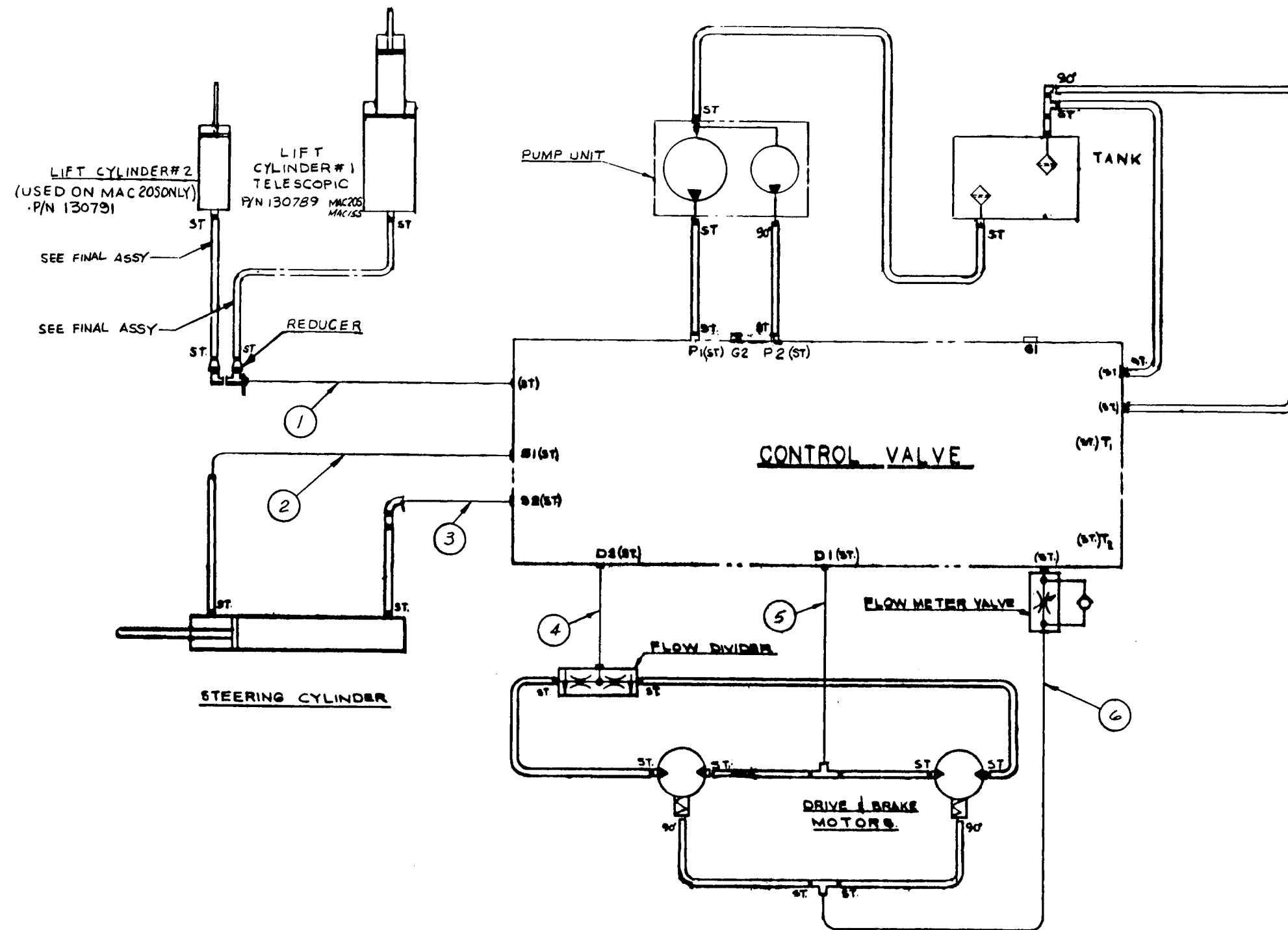
| ITEM | QTY | PART NO. | DESCRIPTION                                    |
|------|-----|----------|------------------------------------------------|
| 1    | 1   | 130481   | TELESCOPIC LIFT CYLINDER MAC 15 & MAC 25       |
|      | 1   | 130205   | TELESCOPIC LIFT CYLINDER MAC 20                |
| 2    | 1   | 130204   | LIFT CYLINDER MAC 25 & MAC 20                  |
| 3    | 1   | 130237   | STEERING CYLINDER ASSEMBLY                     |
| 4    | 1   | 130442   | MOTOR DRIVE/BRAKE ASSY(R.H.) - MAC 15 & MAC 20 |
|      | 1   | 130607   | MOTOR DRIVE/BRAKE ASSY(R.H.) - MAC 25          |
| 5    | 1   | 130490   | MOTOR DRIVE/BRAKE ASSY(L.H.) - MAC 15 & MAC 20 |
|      | 1   | 130608   | MOTOR DRIVE/BRAKE ASSY(L.H.) - MAC 25          |
| 6    | 1   | 130300   | PUMP & MOTOR ASSEMBLY                          |
| 7    | 1   | 30884    | CONTROL VALVE                                  |
| 8    | 1   | 81025    | PLATFORM EXTENDING MOTOR                       |



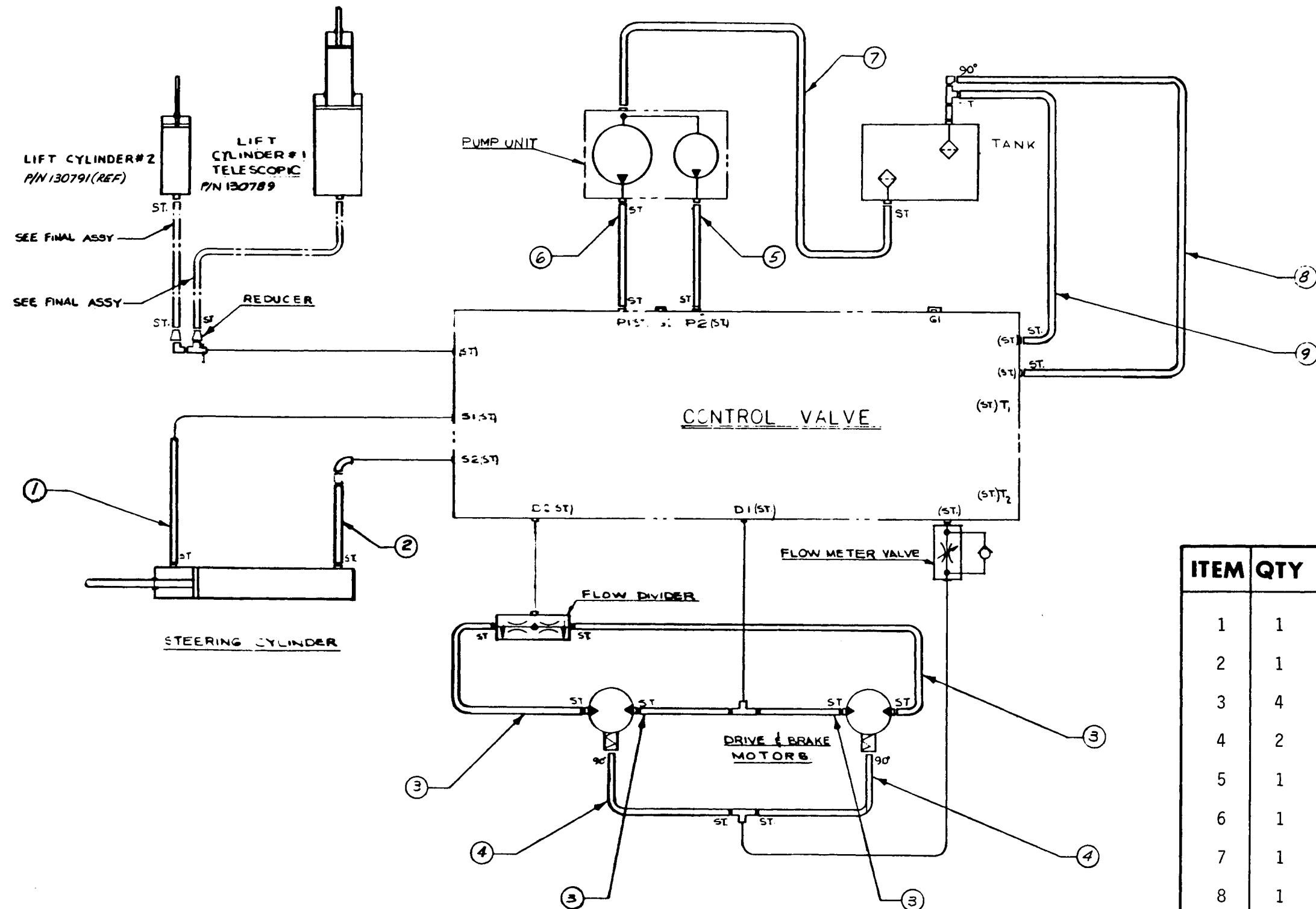
| ITEM | QTY | PART NO.      | DESCRIPTION |
|------|-----|---------------|-------------|
| 1    | 1   | 13210-04-0126 | HOSE ASSY.  |
| 2    | 1   | 13210-04-0166 | HOSE ASSY.  |
| 3    | 4   | 13210-08-0264 | HOSE ASSY.  |
| 4    | 2   | 13210-04-0306 | HOSE ASSY.  |
| 5    | 1   | 13213-08-0210 | HOSE ASSY.  |
| 6    | 1   | 13210-08-0204 | HOSE ASSY.  |
| 7    | 1   | 13205-12-0260 | HOSE ASSY.  |
| 8    | 1   | 13203-08-0130 | HOSE ASSY.  |
| 9    | 1   | 13205-08-0110 | HOSE ASSY.  |

FIG.3.1  
HYDRAULIC TUBE DIAGRAM - MAC II - 15S / 20 / 20S - 130770

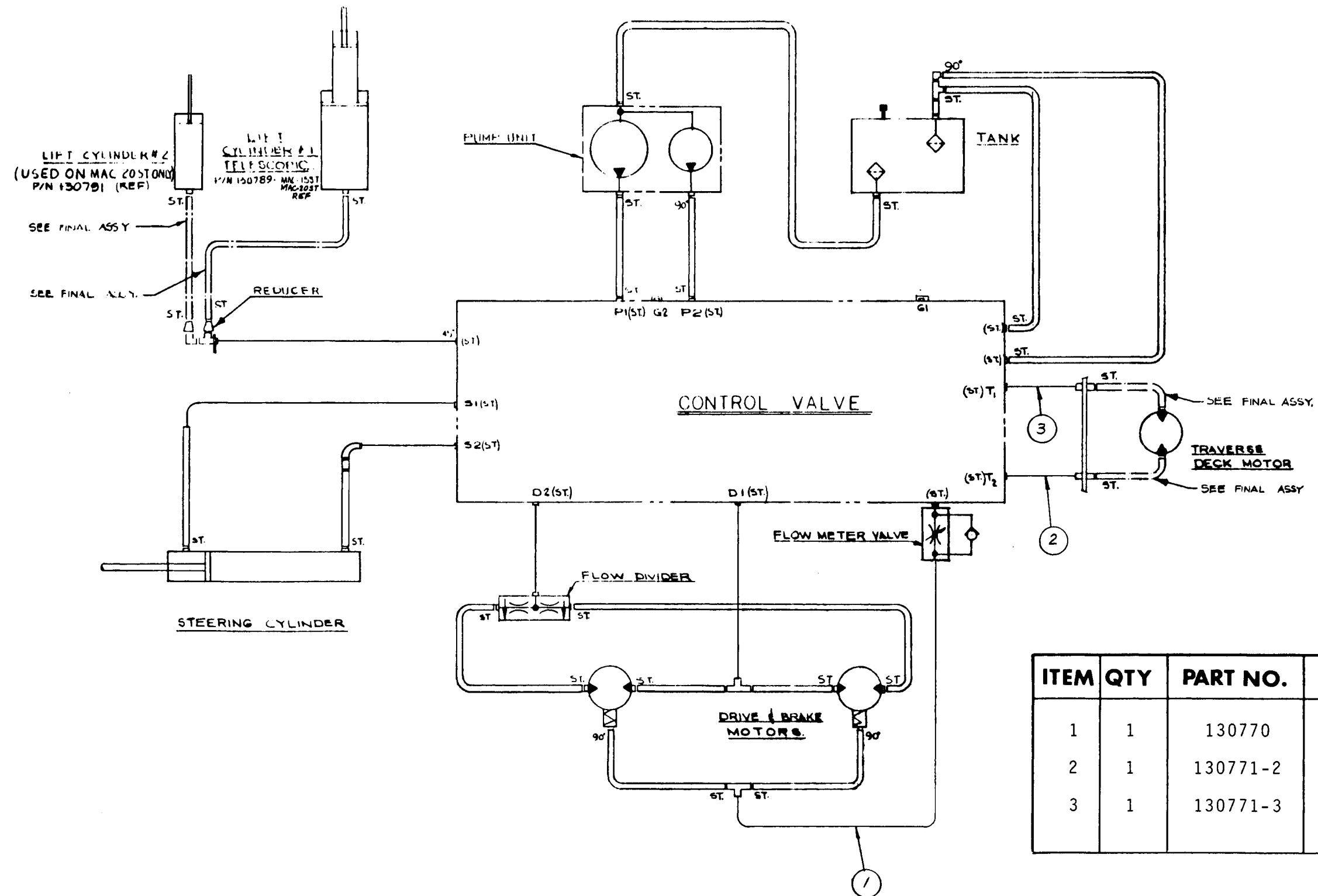
54.1



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|----------|-------------|
| 1    | 1   | 130770-1 | TUBE ASSY.  |
| 2    | 1   | 130770-2 | TUBE ASSY.  |
| 3    | 1   | 130770-3 | TUBE ASSY.  |
| 4    | 1   | 130770-4 | TUBE ASSY.  |
| 5    | 1   | 130770-5 | TUBE ASSY.  |
| 6    | 1   | 130770-6 | TUBE ASSY.  |

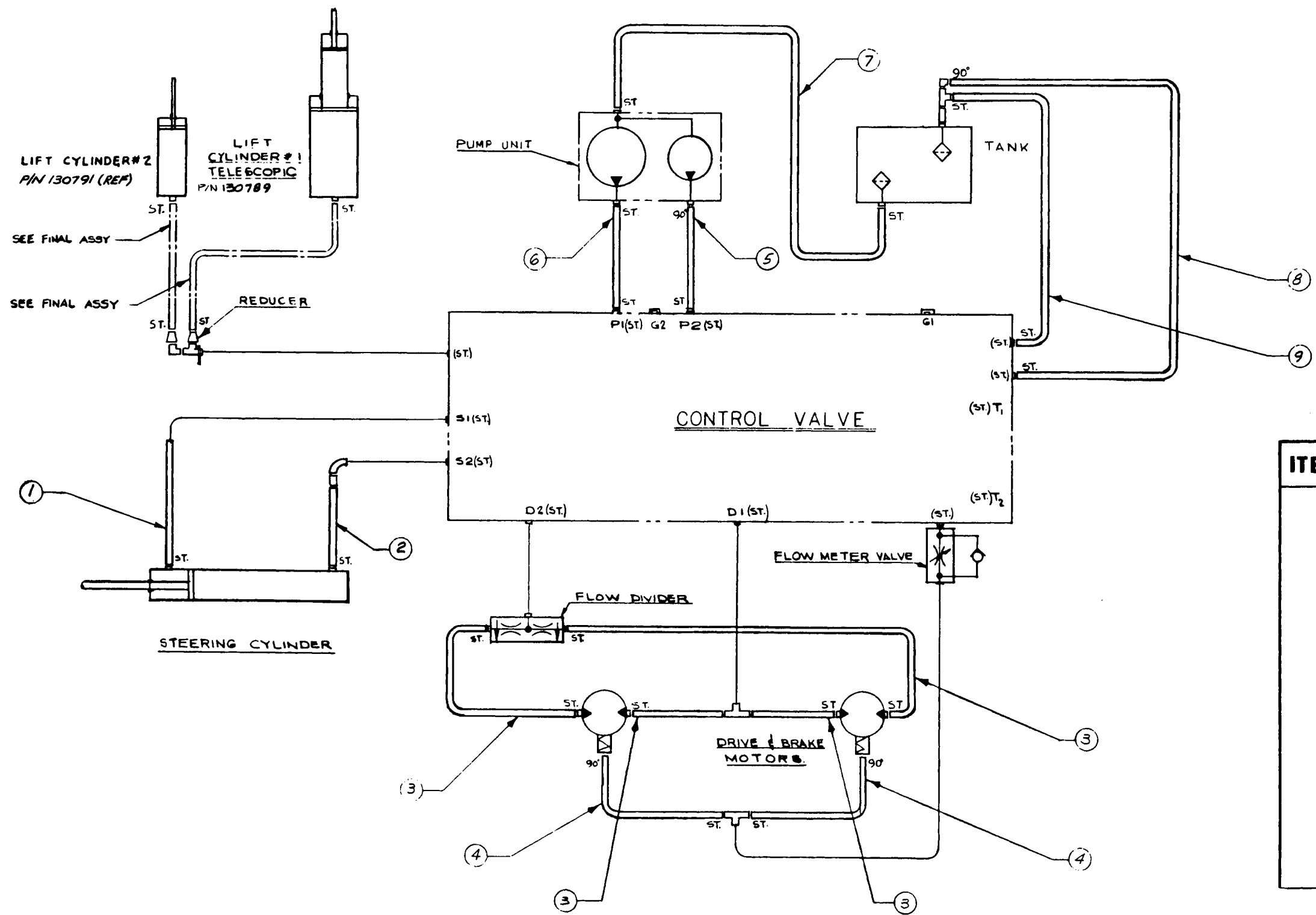


| ITEM | QTY | PART NO.      | DESCRIPTION |
|------|-----|---------------|-------------|
| 1    | 1   | 13210-04-0166 | HOSE ASSY.  |
| 2    | 1   | 13210-04-0236 | HOSE ASSY.  |
| 3    | 4   | 13210-08-0290 | HOSE ASSY.  |
| 4    | 2   | 13210-04-0326 | HOSE ASSY.  |
| 5    | 1   | 13213-08-0210 | HOSE ASSY.  |
| 6    | 1   | 13210-08-0204 | HOSE ASSY.  |
| 7    | 1   | 13205-12-0260 | HOSE ASSY.  |
| 8    | 1   | 13203-08-0130 | HOSE ASSY.  |
| 9    | 1   | 13205-08-0110 | HOSE ASSY.  |



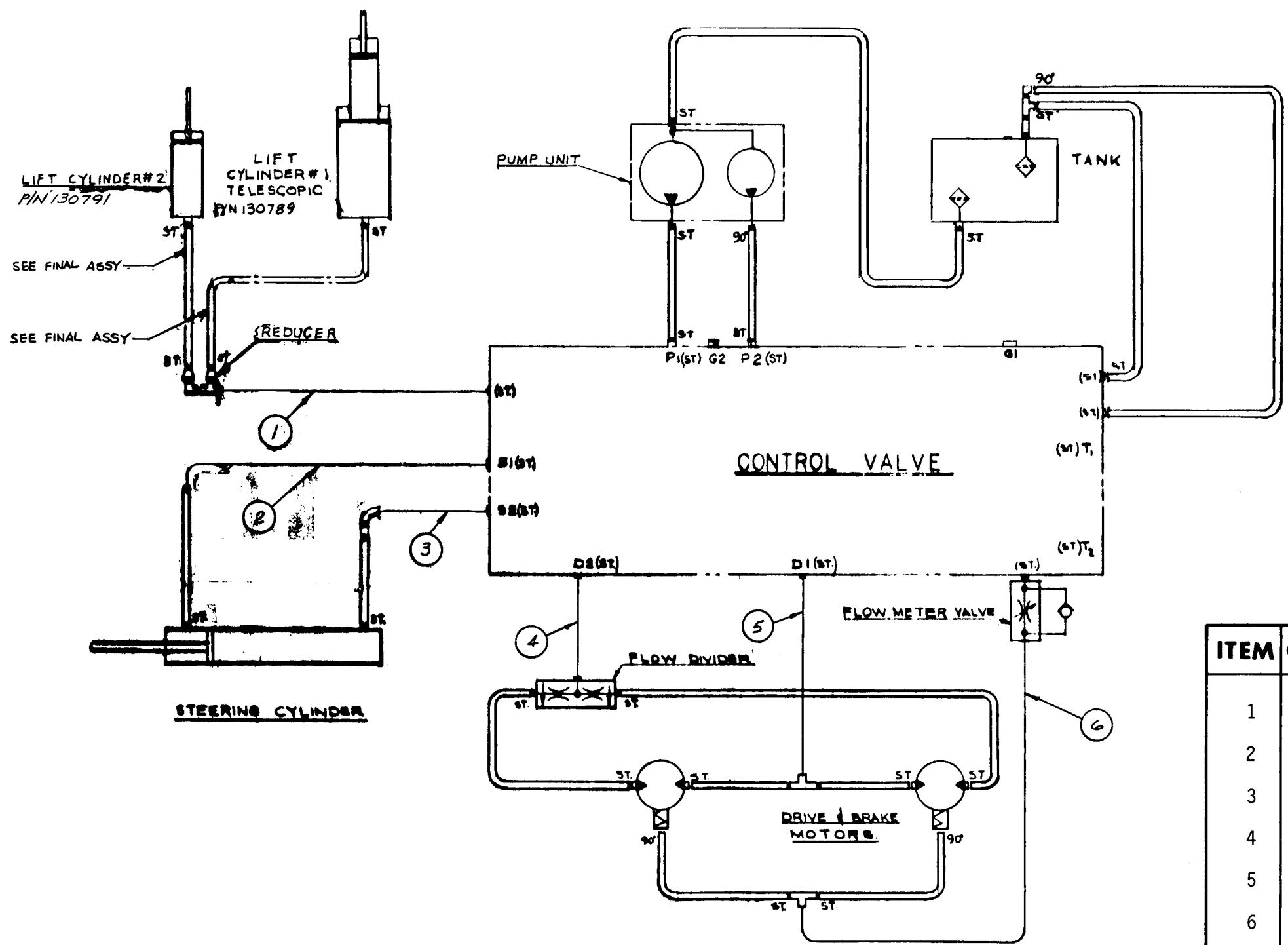
| ITEM | QTY | PART NO. | DESCRIPTION                    |
|------|-----|----------|--------------------------------|
| 1    | 1   | 130770   | HYD. TUBE DIAGRAM - 15S,20,20S |
| 2    | 1   | 130771-2 | TUBE ASSEMBLY                  |
| 3    | 1   | 130771-3 | TUBE ASSEMBLY                  |

FIG.3.1  
HYDRAULIC HOSE DIAGRAM - MAC II - 25 / 25T - 130809



| ITEM | QTY | PART NO.      | DESCRIPTION |
|------|-----|---------------|-------------|
| 1    | 1   | 13210-04-0226 | HOSE ASSY.  |
| 2    | 1   | 13210-04-0182 | HOSE ASSY.  |
| 3    | 4   | 13210-08-0264 | HOSE ASSY.  |
| 4    | 2   | 13210-04-0306 | HOSE ASSY.  |
| 5    | 1   | 13213-08-0210 | HOSE ASSY.  |
| 6    | 1   | 13210-08-0204 | HOSE ASSY.  |
| 7    | 1   | 13205-12-0260 | HOSE ASSY.  |
| 8    | 1   | 13203-08-0130 | HOSE ASSY.  |
| 9    | 1   | 13205-08-0110 | HOSE ASSY.  |

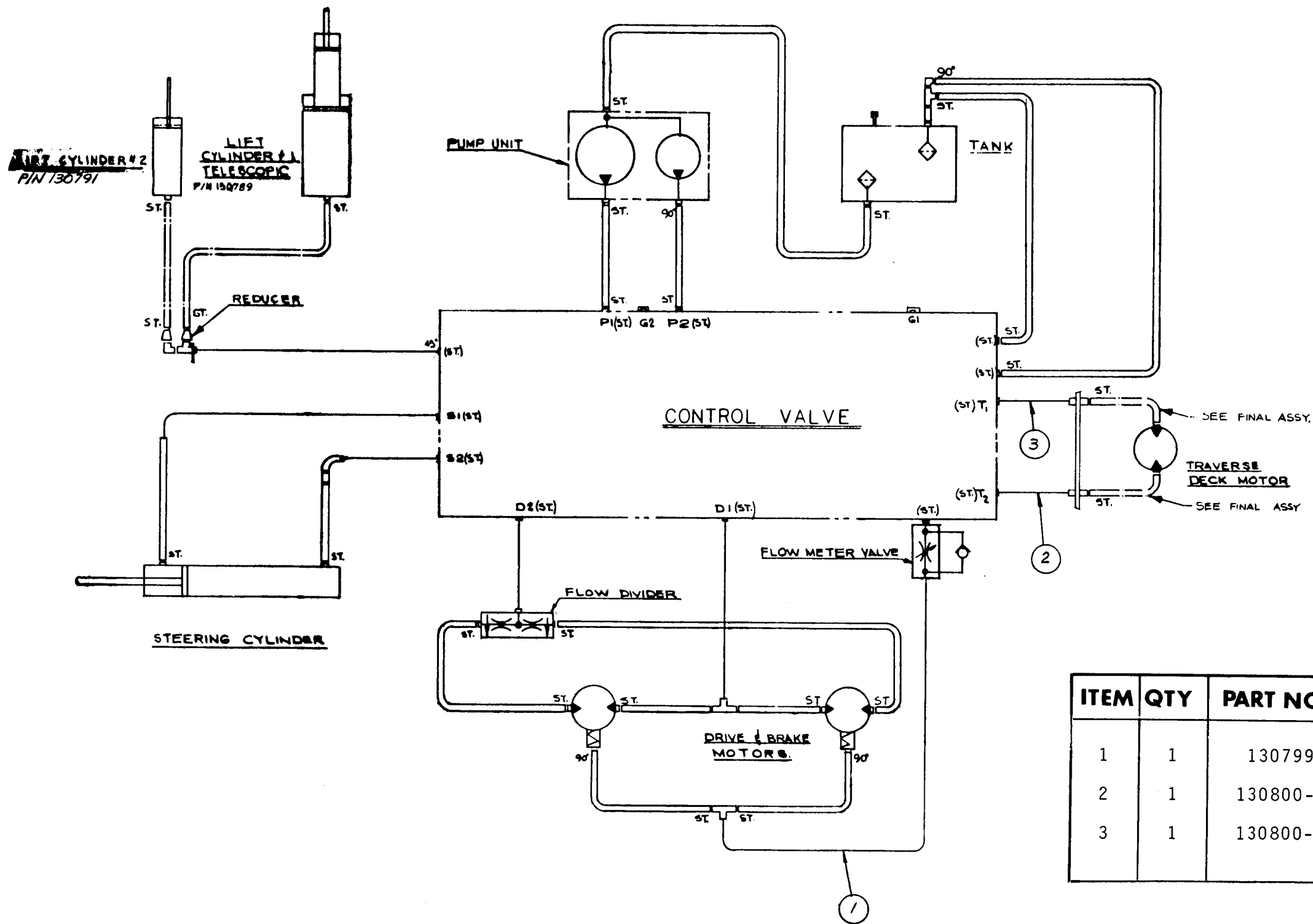




| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|----------|-------------|
| 1    | 1   | 130799-1 | TUBE ASSY.  |
| 2    | 1   | 130770-2 | TUBE ASSY.  |
| 3    | 1   | 130770-3 | TUBE ASSY.  |
| 4    | 1   | 130770-4 | TUBE ASSY.  |
| 5    | 1   | 130770-5 | TUBE ASSY.  |
| 6    | 1   | 130770-6 | TUBE ASSY.  |

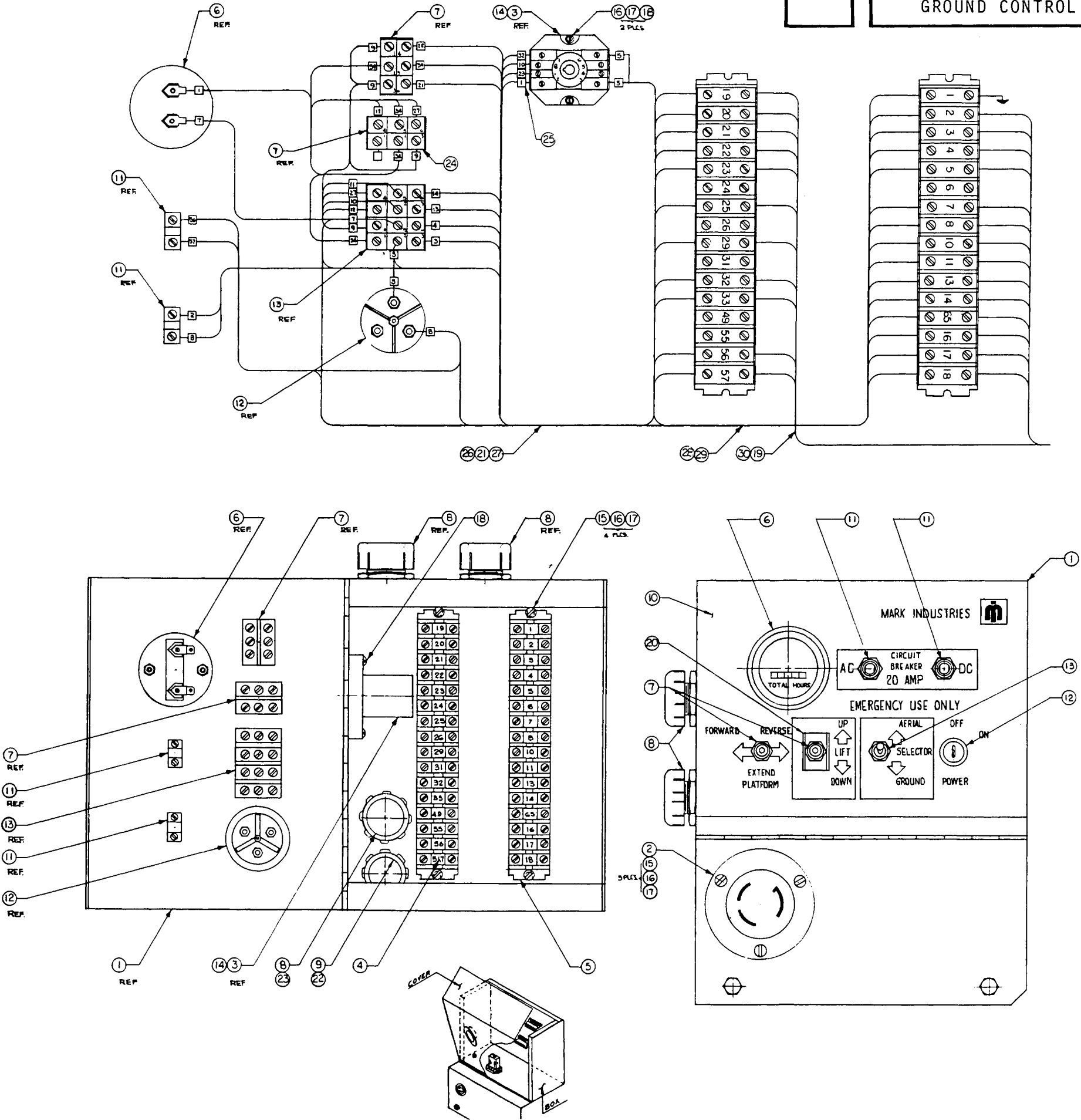


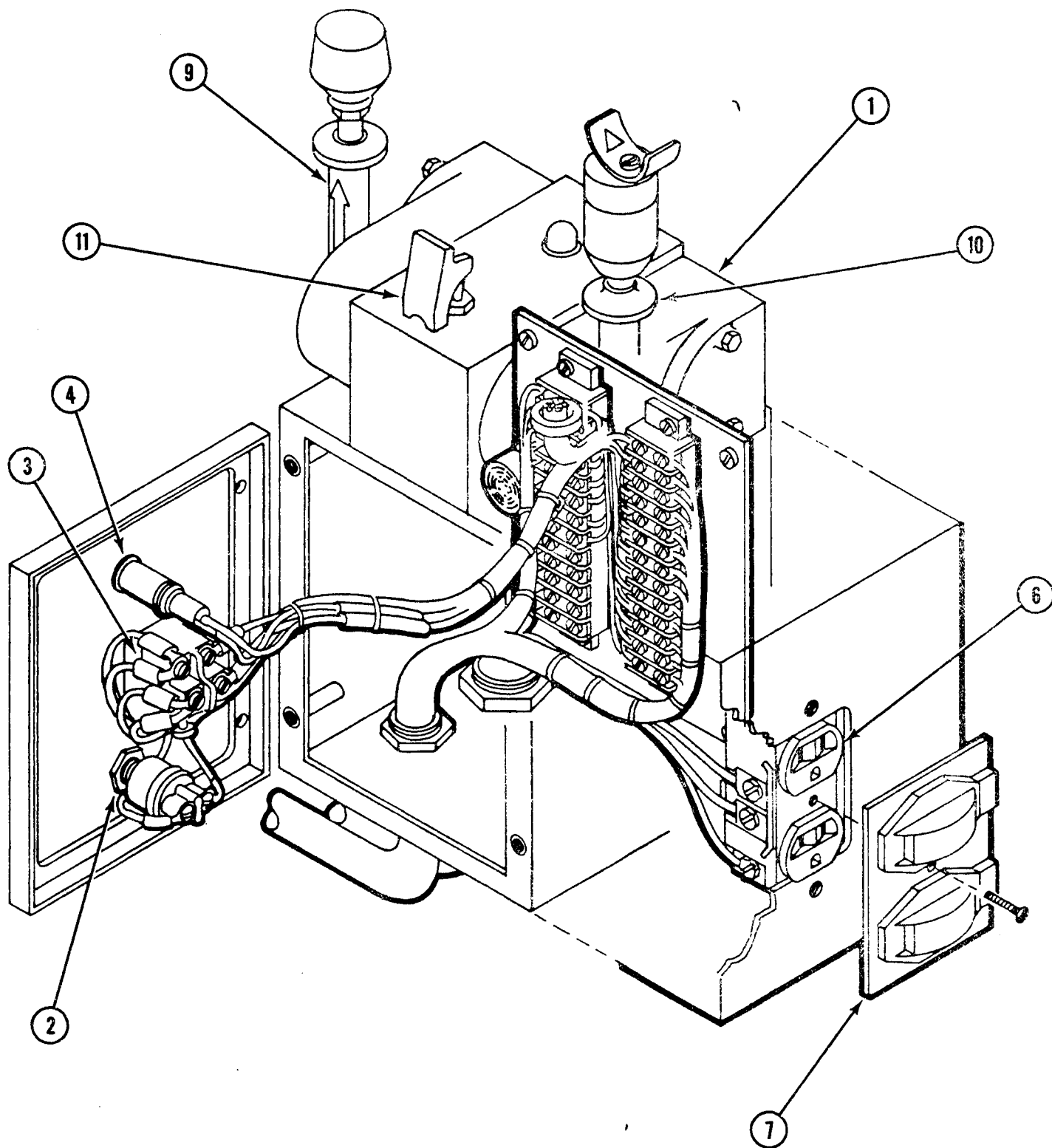
FIG.3.1  
HYDRAULIC TUBE DIAGRAM - MAC II - 25T - 130800



- FIGURE 4 - 130389: EXTENDING  
GROUND CONTROL BOX ASSEMBLY - 130492: NON EXTENDING

| ITEM | QTY | PART NO. | DESCRIPTION         |
|------|-----|----------|---------------------|
| 1    | 1   | 130390   | GROUND CONTROL BOX  |
| 2    | 1   | 70254    | RECEPTACLE          |
| 3    | 1   | 70238    | RELAY               |
| 4    | 32  | 4027     | TERMINAL BLOCK      |
| 5    | 4   | 117-A    | TERMINAL, BLOCK END |
| 6    | 1   | 20571    | METER, HOUR         |
| 7    | 2   | 20481    | SWITCH, TOGGLE      |
| 8    | 3   | 2807     | STRAIN RELIEF       |
| 9    | 1   | 2806     | STRAIN RELIEF       |
| 10   | 1   | 130505   | DECAL               |
| 11   | 2   | 20562    | CIRCUIT BREAKER     |
| 12   | 1   | 2717     | IGNITION SWITCH     |
| 13   | 1   | 16260    | SELECTOR SWITCH     |
| 14   | 1   | 70239    | SOCKET              |
| 15   | 9   | 62612    | SCREW, CAP          |
| 16   | 11  | 63312    | WASHER, LOCK        |
| 17   | 11  | 61502    | NUT, HEX            |
| 18   | 2   | 62623    | SCREW, CAP          |
| 19   | 1   | 70231    | WIRE, RED           |
| 20   | 1   | 20884    | GUARD, SWITCH       |
| 21   | 3   | 70008    | WIRE, YELLOW        |
| 22   | 1   | 2808     | NUT, LOCK           |
| 23   | 3   | 2809     | NUT, LOCK           |
| 24   | 40  | 117-C    | CONNECTOR, RING     |
| 25   | 6   | 16213    | CONNECTOR           |
| 26   | 5   | 4034     | CABLE               |
| 27   | 4   | 70233    | WIRE, WHITE         |
| 28   | 3   | 70232    | WIRE, WHITE         |
| 29   | 17  | 2990     | WIRE, WHITE         |
| 30   | 1   | 2991     | WIRE, WHITE         |



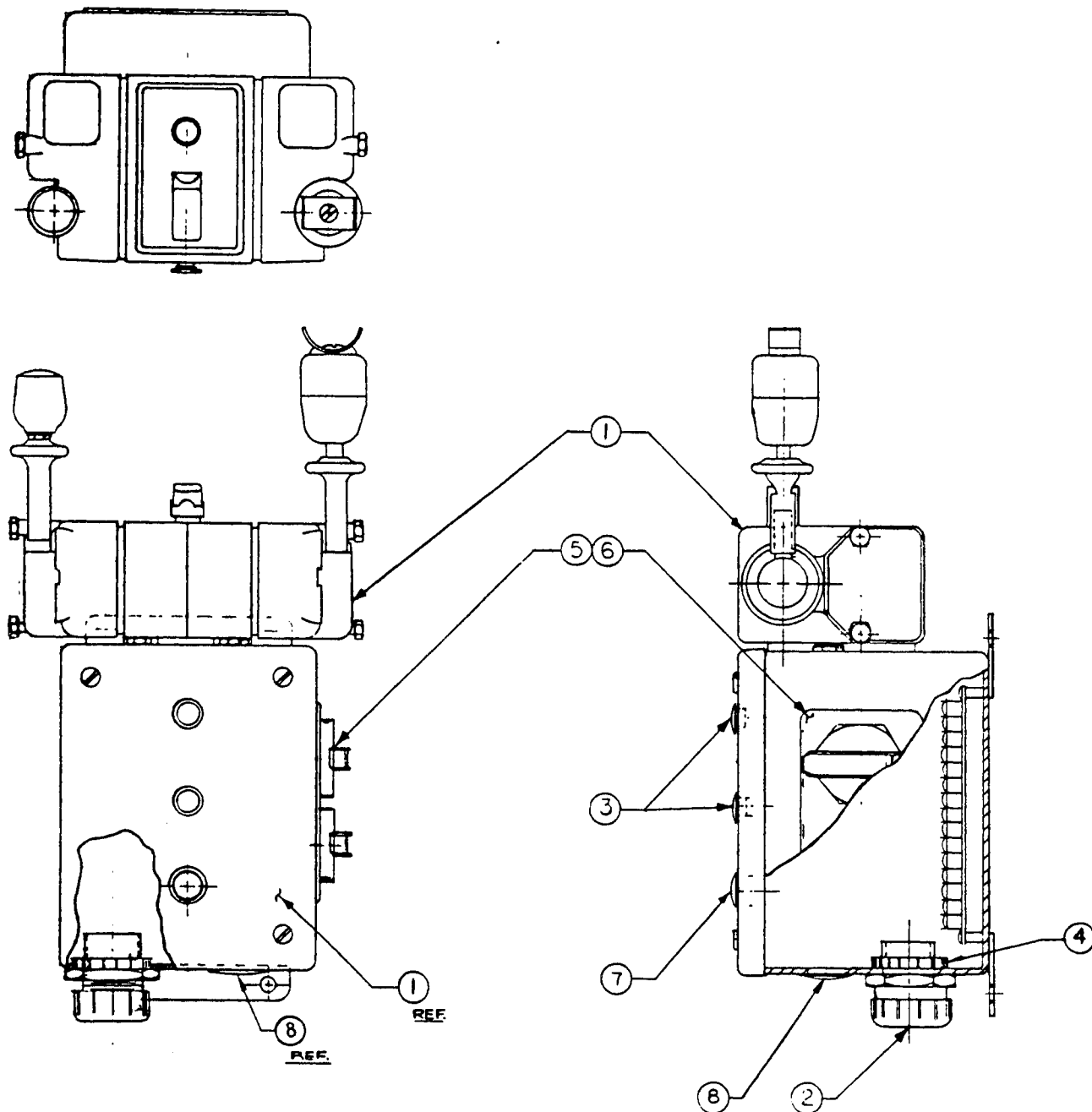


| ITEM | QTY | PART NO. | DESCRIPTION                            |
|------|-----|----------|----------------------------------------|
| 1    | 1   | 130210   | UPPER CONTROL BOX                      |
| 2    | 1   | 4020     | PUSH BUTTON                            |
| 3    | 1   | 20481    | SWITCH, TOGGLE                         |
| 4    | 1   | 4031     | LIGHT, PILOT INDICATOR                 |
| 5    | 1   | 20884    | GUARD, SWITCH                          |
| 6    | 1   | 70126    | RECEPTACLE                             |
| 7    | 1   | 288      | PLATE, COVER SNAP                      |
| 8    | 1   | 130508   | DECAL - UPPER CONTROL BOX              |
| 9    |     |          | EXTEND PLATFORM CONTROLLER ASSEMBLY    |
|      | 1   | 16902    | CAST HOUSING                           |
|      | 1   | 20539    | KNOB, HANDLE, & LOCKOUT ASSEMBLY       |
|      | 1   | 2047 9   | KNOB ONLY                              |
|      | 1   | 16903    | HANDLE ONLY                            |
|      | 1   |          | HEX NUT FOR KNOB                       |
|      | 1   | 16916    | SLIDELOCK SLEEVE                       |
|      | 1   | 16915    | SLIDELOCK SPRING                       |
|      | 1   | 66208    | SLIDELOCK                              |
|      | 1   | 16917    | SPRING GUIDE                           |
|      | 1   | 16904    | TORSION SPRING                         |
|      | 1   | 16906    | SECTOR GEAR                            |
|      | 1   |          | FLAT WASHER                            |
|      | 1   |          | SCREW                                  |
|      | 1   | 66737    | CAM ASSEMBLY W/ MICRO-SWITCHES & WIRES |

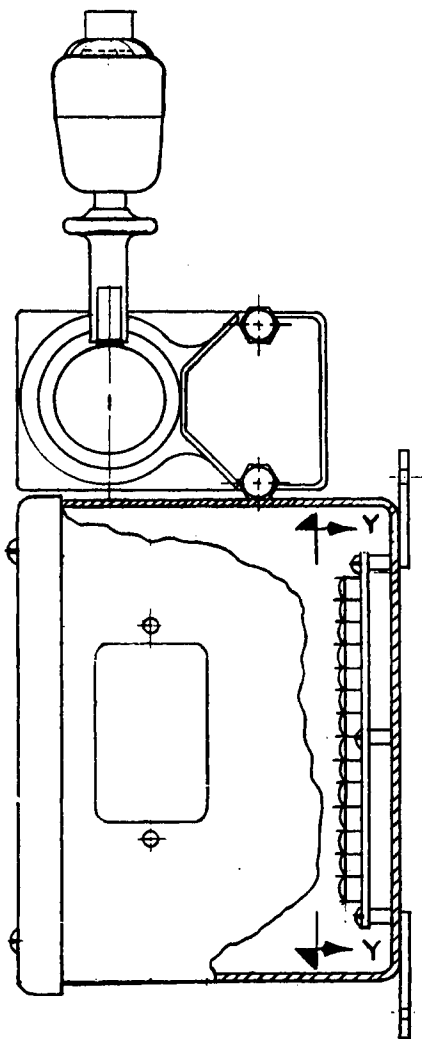
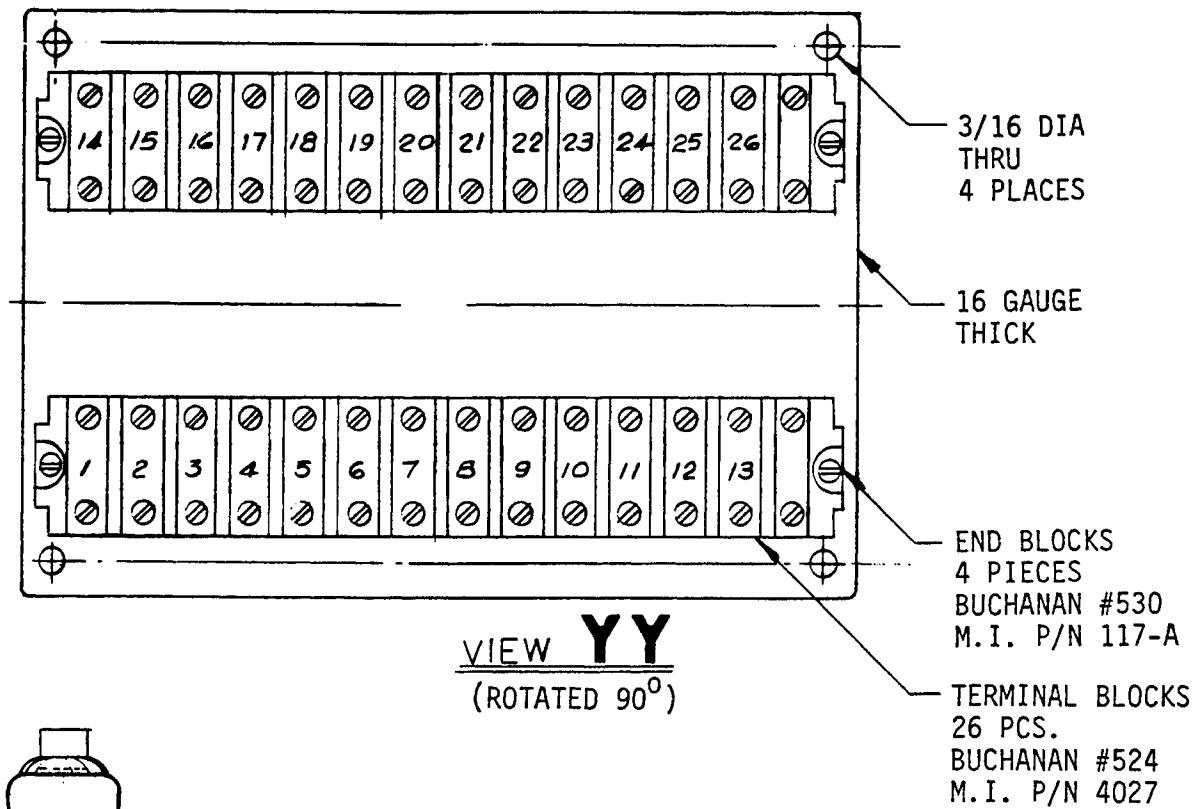
| ITEM | QTY | PART NO. | DESCRIPTION                     |
|------|-----|----------|---------------------------------|
| 10   |     |          | DRIVE/STEER CONTROLLER ASSEMBLY |
|      | 1   | 16902    | CAST HOUSING                    |
|      | 1   | 667 59   | DRIVE CONTROLLER LESS HOUSING   |
|      | 1   | 66225    | HANDLE ONLY                     |
|      | 1   | 667 60   | ALUMINUM ROCKER(STEER SWITCH)   |
|      | 1   | 66216    | RUBBER COVER                    |
|      | 1   | 66215    | INSIDE ROCKER                   |
|      | 1   | 66214    | FLAT SPRING                     |
|      | 1   | 66213    | SWITCH ACTUATOR                 |
|      | 2   | 66212    | MICRO SWITCH                    |
|      | 2   | 66211    | HANDLE VALVES                   |
|      | 1   | 66210    | SLIDELOCK SLEEVE                |
|      | 1   | 66209    | SLIDELOCK SPRING                |
|      | 1   | 20581    | SLIDELOCK CAST                  |
|      | 1   | 16917    | TORSION SPRING GUIDE            |
|      | 1   | 16904    | TORSION SPRING                  |
|      | 1   | 16906    | SECTOR GEAR                     |
|      | 1   | 667 38   | DRIVE CIRCUIT BOARD             |
| 11   | 1   | 260      | ON/OFF SWITCH                   |
|      | 1   | 16912    | SWITCH GUARD                    |
|      |     |          | DECAL SET                       |
|      | 1   | 667 62   | DECK DECAL (LIFT/LOWER)         |
|      | 1   | 667 61   | PANEL DECAL (CENTER)            |
|      | 1   | 667 63   | DRIVE DECAL (FORWARD/REVERSE)   |

FIGURE 5.1 MAC UPPER CONTROL BOX ASSY.130489 (NON EXTENDING)

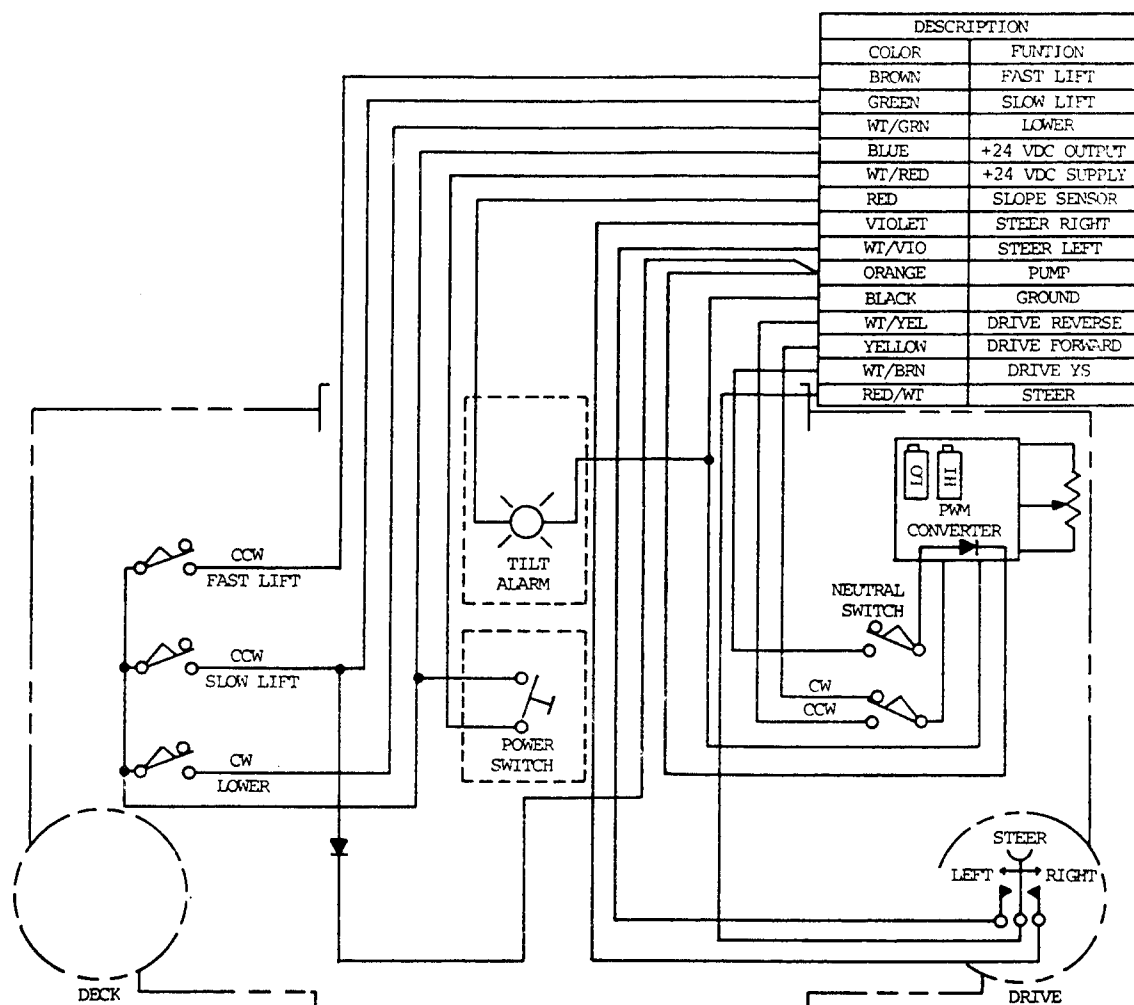
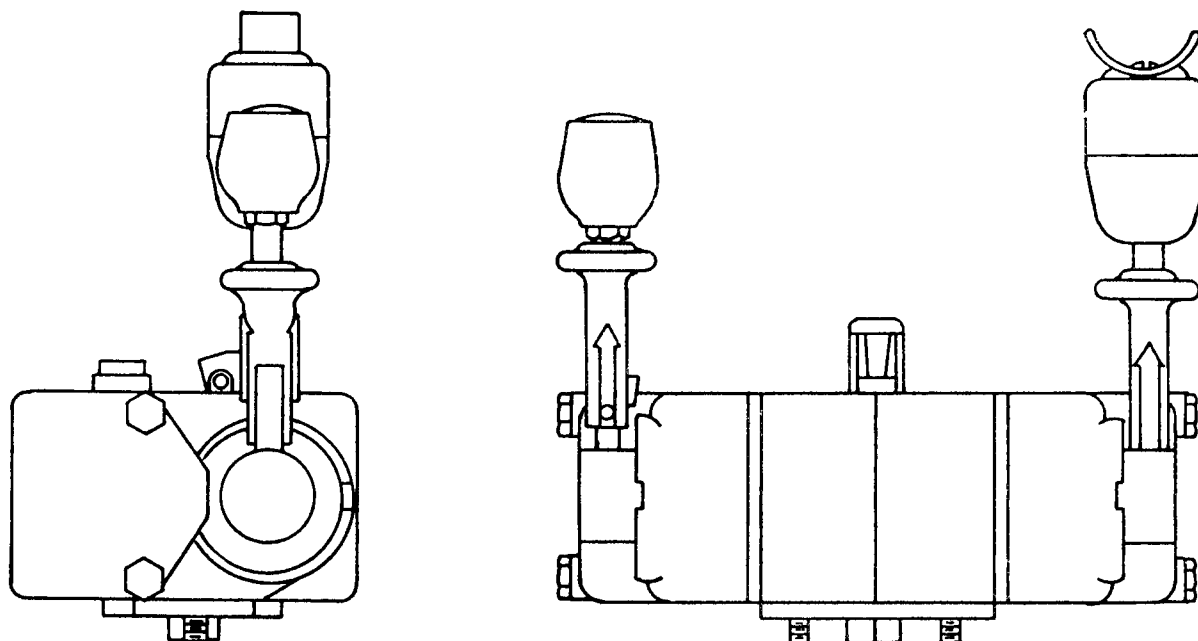
57.2



| ITEM | QTY | PART NO. | DESCRIPTION       |
|------|-----|----------|-------------------|
| 1    | 1   | 130210   | UPPER CONTROL BOX |
| 2    | 1   | 2807     | STRAIN RELIEF     |
| 3    | 2   | 771      | WHITE PLUG        |
| 4    | 1   | 2809     | LOCK NUT          |
| 5    | 1   | 70126    | DUPLEX RECEPTACLE |
| 6    | 1   | 288      | SNAP COVER PLATE  |
| 7    | 1   | 772      | WHITE PLUG        |
| 8    | 2   | 775      | WHITE PLUG        |



| 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         |            |

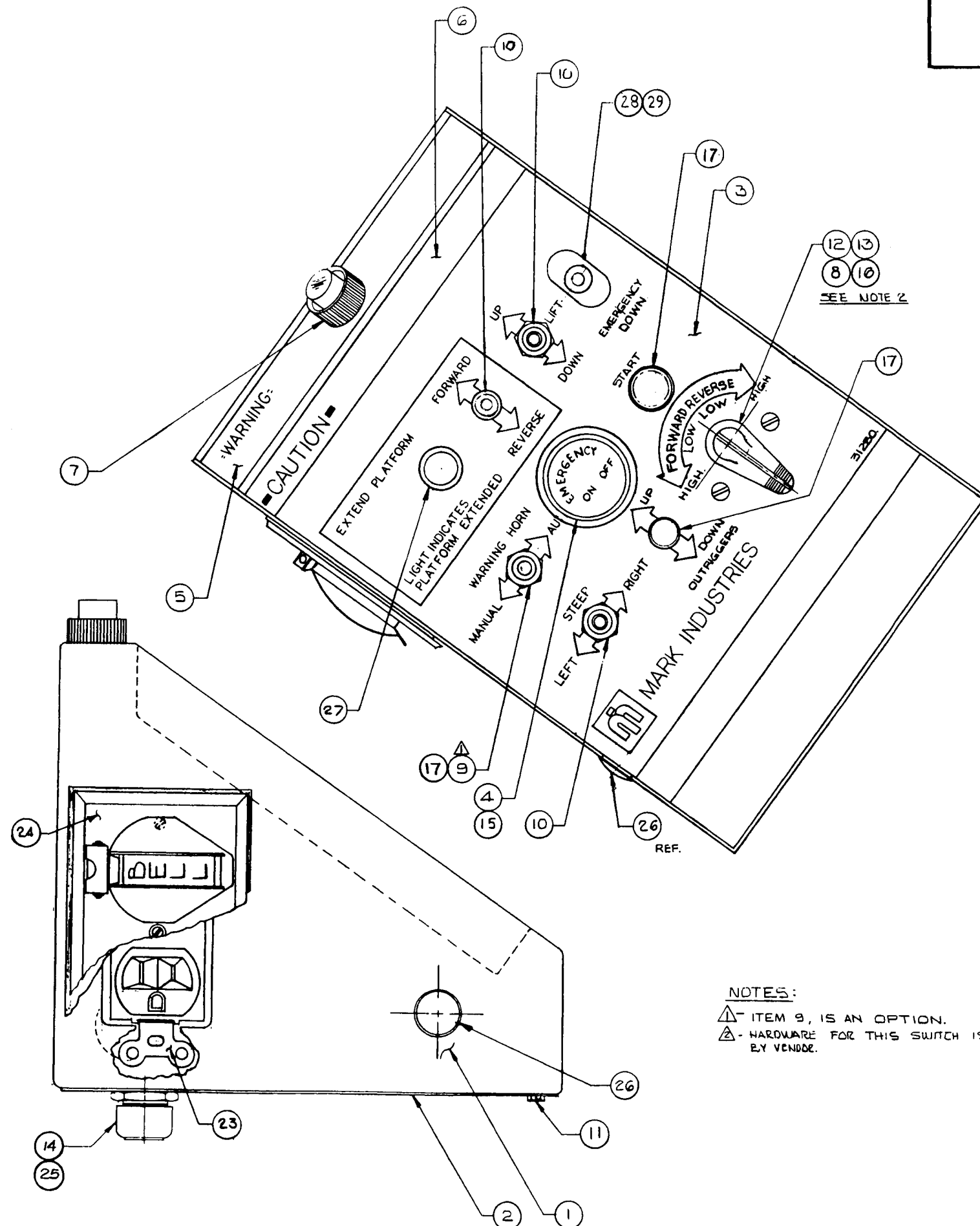


ELECTRICAL CONNECTION



- FIGURE 7 - 130743 (EXTENDING)  
MAC II UPPER CONTROL BOX ASSEMBLY - 130803 (NON EXTENDING)

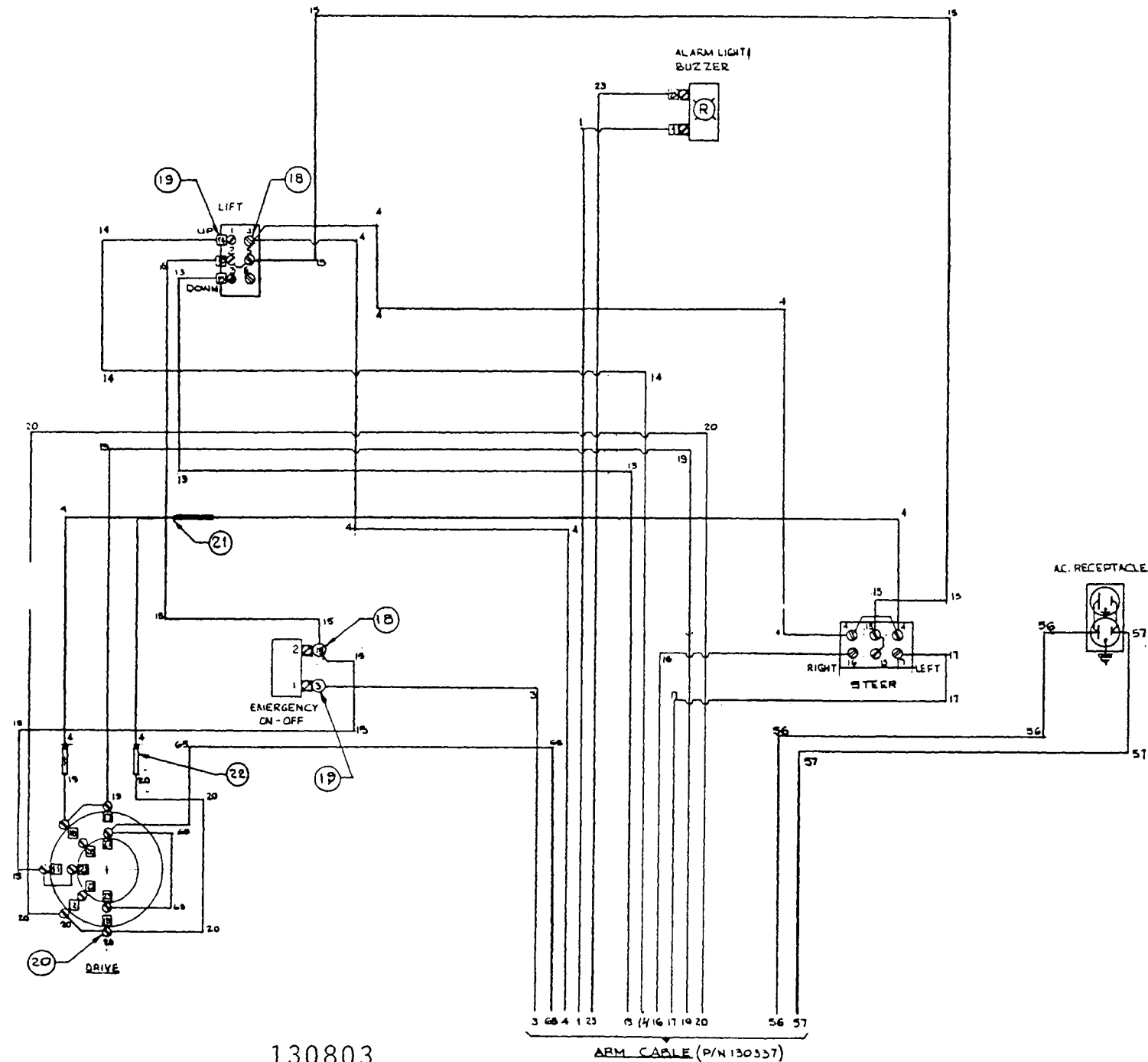
59.1



**NOTES:**

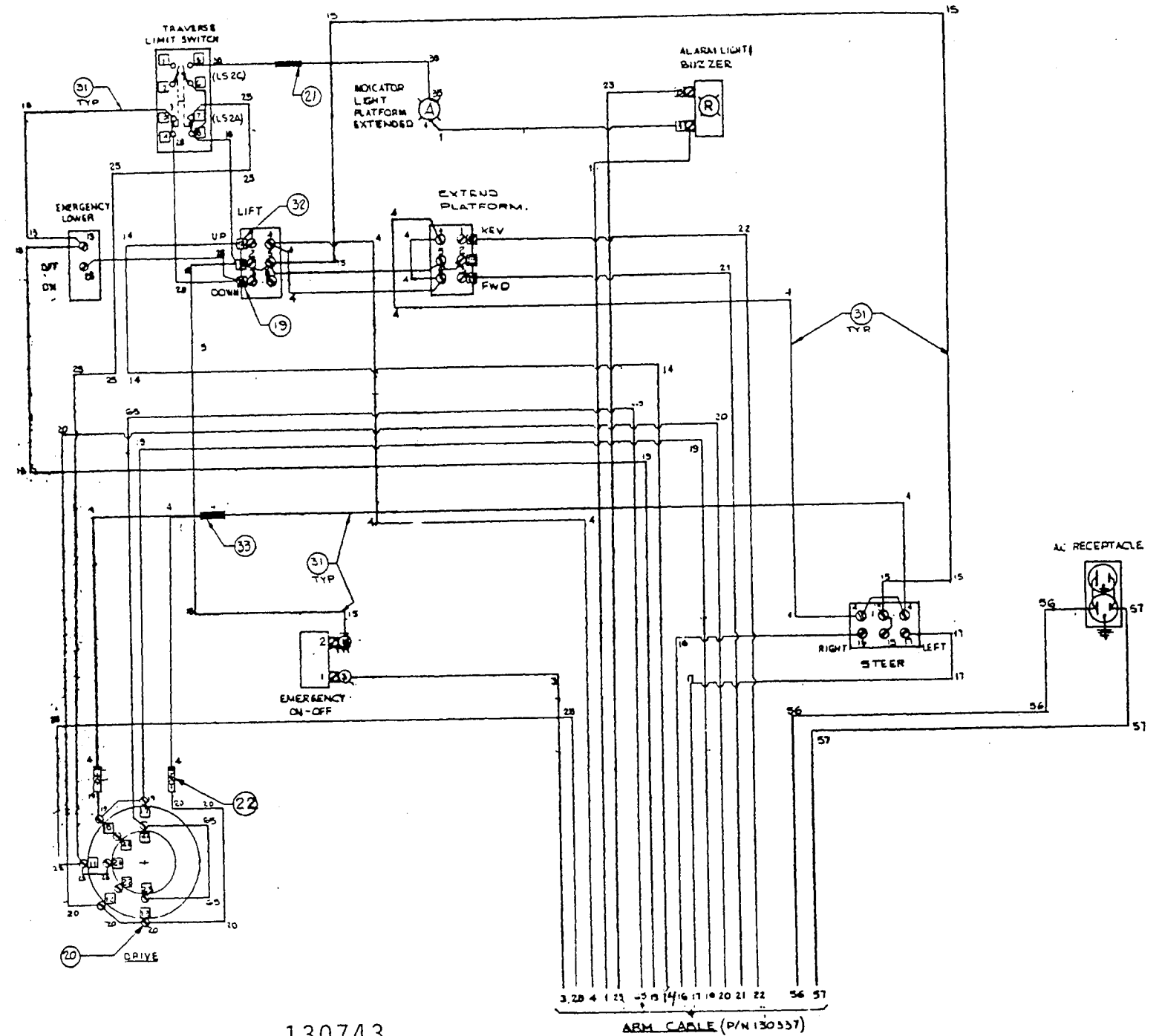
- △ - ITEM 9, IS AN OPTION.  
△ - HARDWARE FOR THIS SWITCH IS SUPPLIED BY VENDOR.

| ITEM | QTY | PART NO. | DESCRIPTION           |
|------|-----|----------|-----------------------|
| 1    | 1   | 130741   | CONTROL BOX MACHINING |
| 2    | 1   | 130753   | COVER                 |
| 3    | 1   | 31280    | DECAL                 |
| 4    | 1   | 31080    | EMERGENCY KNOB        |
| 5    | 1   | 2015     | DECAL                 |
| 6    | 1   | 2014     | DECAL                 |
| 7    | 1   | 66345    | ALARM BUZZER          |
| 8    | 1   | 62209    | SET SCREW             |
| 9    | 1   | 70057    | TOGGLE SWITCH         |
| 10   | 3   | 20481    | TOGGLE SWITCH         |
| 11   | 4   | 61711    | CAP SCREW             |
| 12   | 1   | 65151    | DRIVE SWITCH KNOB     |
| 13   | 1   | 4106     | 5 POSITION SWITCH     |
| 14   | 1   | 2807     | STRAIN RELIEF         |
| 15   | 1   | 4018     | PUSH & PULL SWITCH    |
| 16   | 1   | 65131    | RUBBER COATED NUT     |
| 17   | 3   | 771      | WHITE PLUG            |
| 18   | 5   | 16228    | RING TERMINAL         |
| 19   | 10  | 117-C    | RING TERMINAL         |
| 20   | 15  | 16213    | RING TERMINAL         |
| 21   | 1   | 70162    | BUTT CONNECTOR        |
| 22   | 2   | 4045     | DIODE                 |
| 23   | 1   | 70126    | RECEPTACLE            |
| 24   | 1   | 288      | PLATE, COVER SNAP     |
| 25   | 1   | 2809     | LOCK NUT              |
| 26   | 1   | 775      | WHITE PLUG            |
| 27   | 1   | 70293    | AMBER LAMP            |
| 28   | 1   | 20884    | SWITCH GUARD          |
| 29   | 1   | 70291    | TOGGLE SWITCH         |



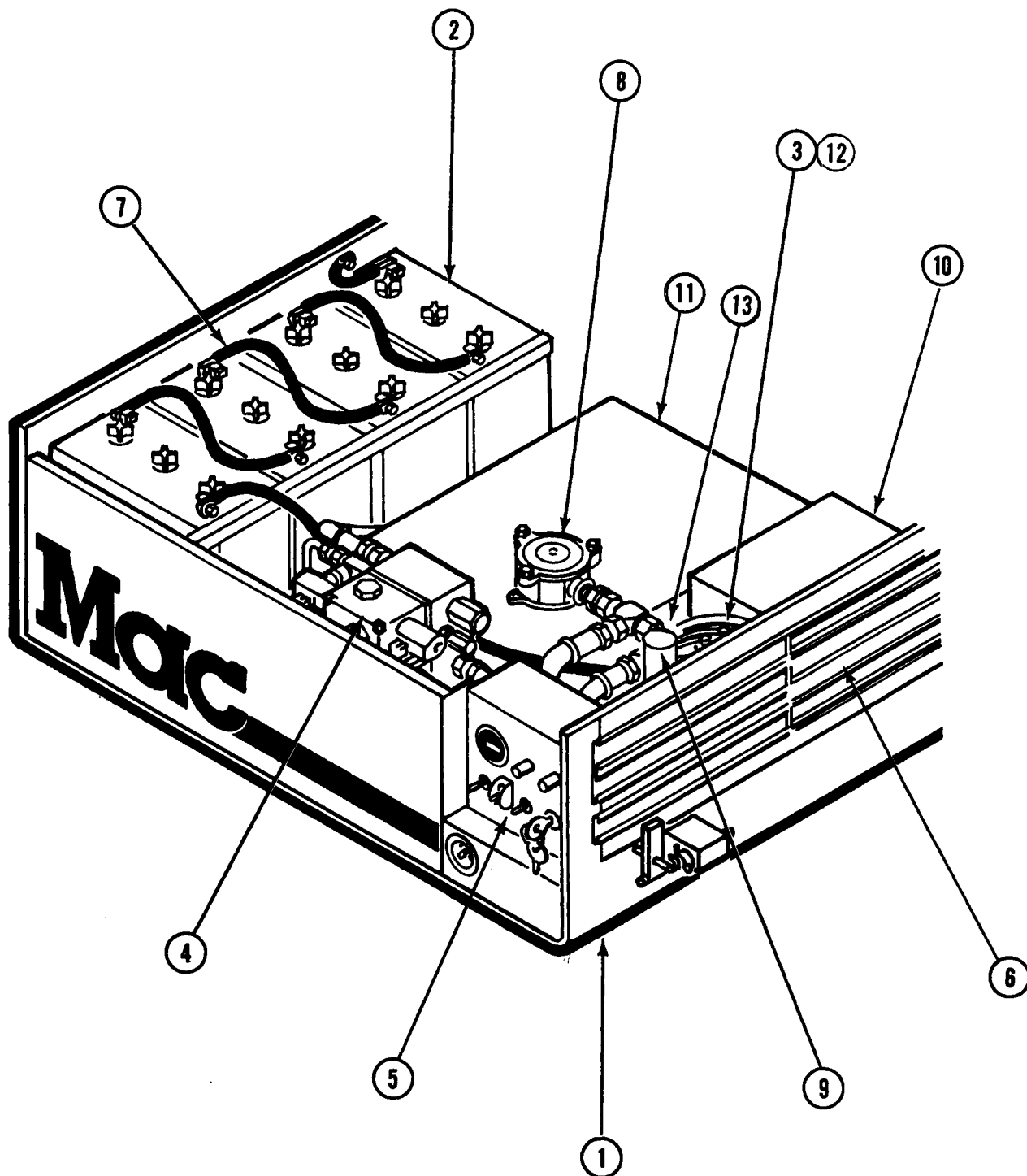
130803

- 3: HOT WIRE
- 4: PUMP
- 1: GROUND
- 23: BUZZ/HOT
- 65: HI SPEED
- 13: DOWN
- 14: UP
- 16: RIGHT
- 17: LEFT
- 19: FORWARD
- 20: REVERSE



130743

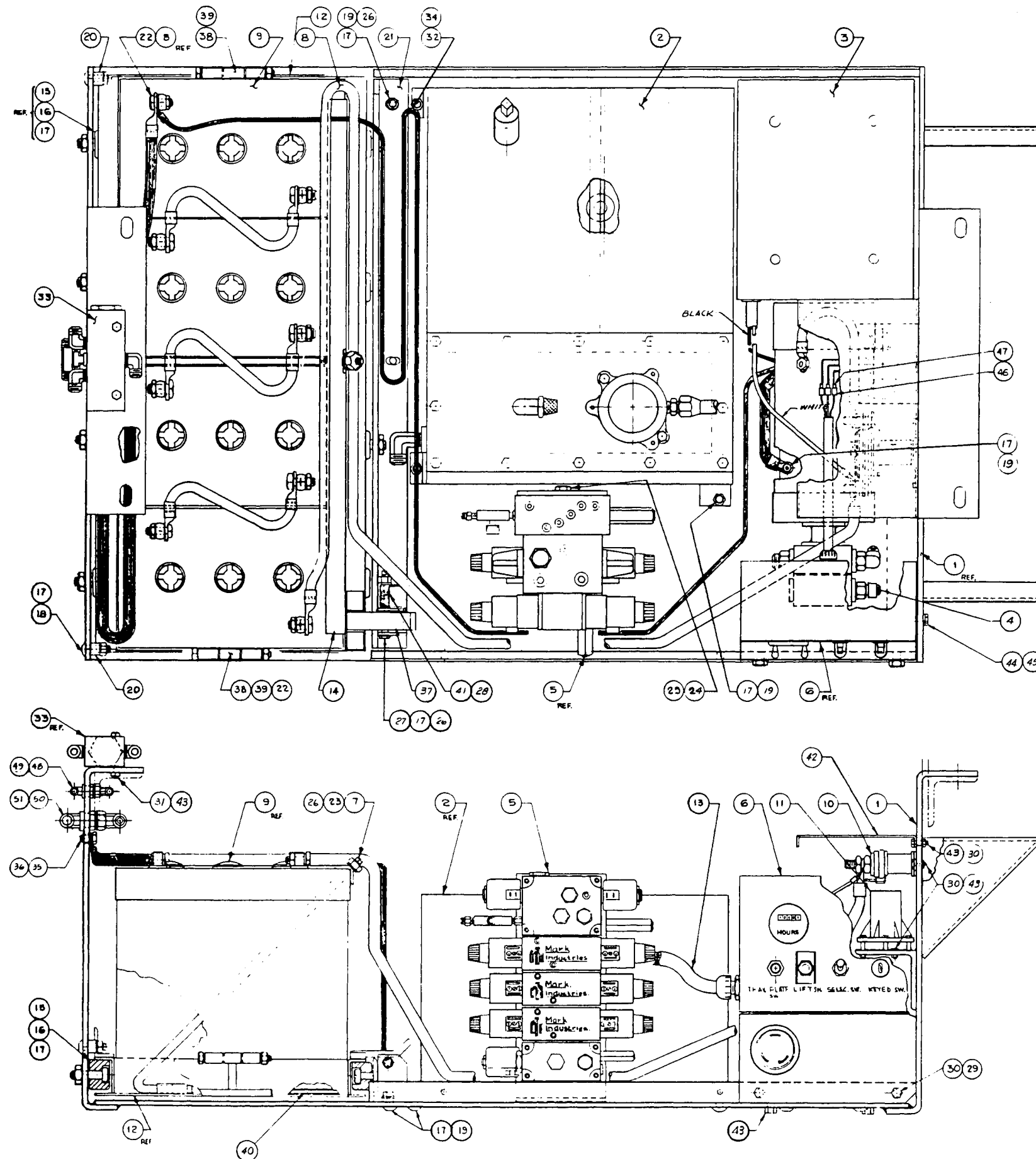
- 3: HOT WIRE
- 4: PUMP
- 1: GROUND
- 23: BUZZ/HOT
- 65: HI SPEED
- 13: DOWN
- 14: UP
- 16: RIGHT
- 17: LEFT
- 19: FORWARD
- 20: REVERSE
- 21: FORWARD
- 22: REVERSE
- 56.57: 115 AC



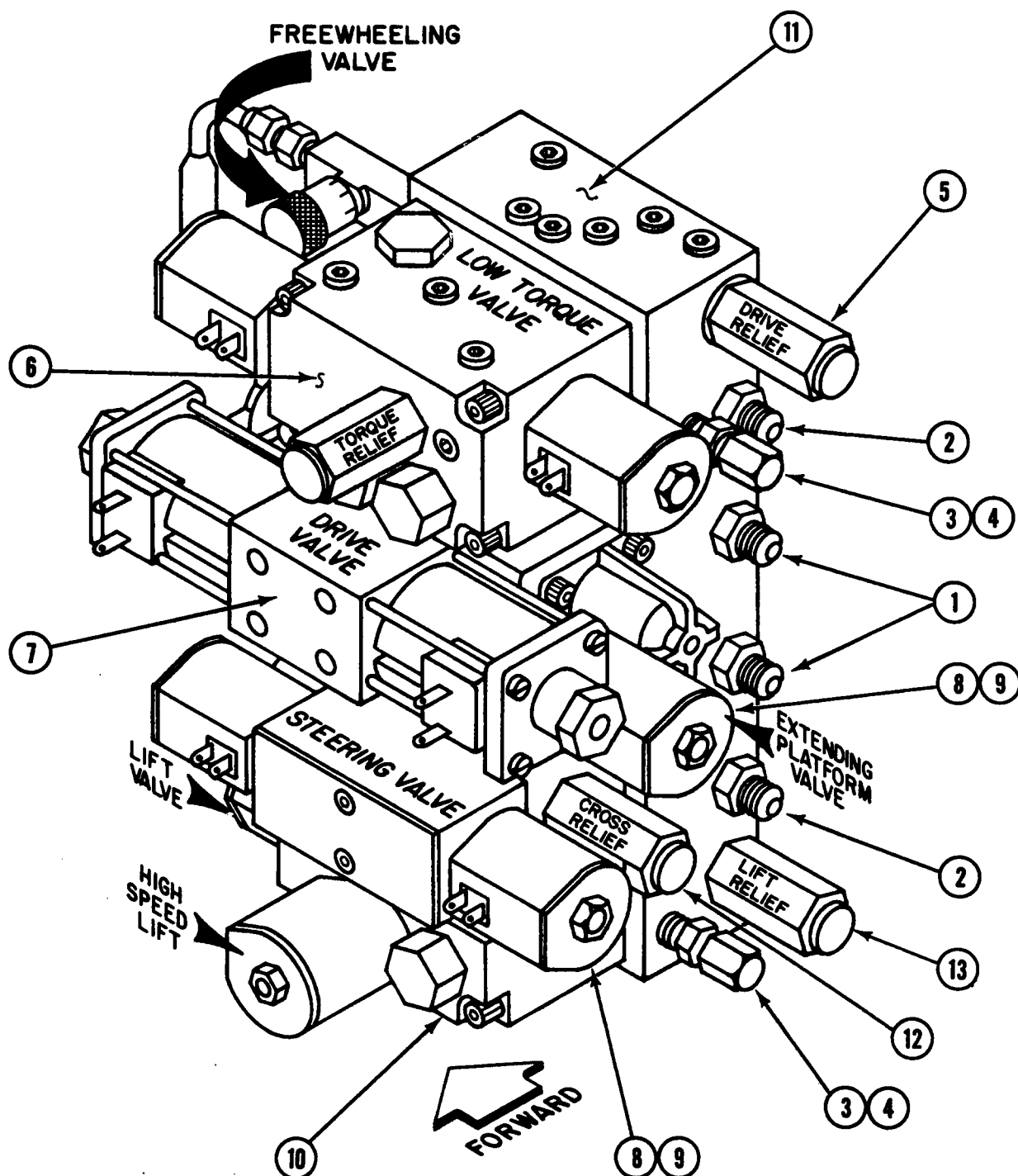
| ITEM | QTY | PART NO. | DESCRIPTION                                          |
|------|-----|----------|------------------------------------------------------|
| 1    | 1   | 130294   | WELDMENT BELLY PAN                                   |
| 2    | 4   | 4007     | BATTERY TROJAN 6 VOLT, 250 AMP                       |
| 3    | 1   | 70242    | STARTER SOLENOID                                     |
| 4    | 1   | 130298   | VALVE PACKAGE ASSEMBLY (130496, NON-TRAVERSING)      |
| 5    | 1   | 130389   | GROUND CONTROL BOX ASSEMBLY (130492, NON-TRAVERSING) |
| 6    | 2   | 65547    | SLIDE                                                |
| 7    | 1   | 130421   | BATTERY CABLE KIT                                    |
| 8    | 1   | 66739    | FILTER ASSEMBLY FILTER ELEMENT: 66807)               |
| 9    | 1   | 31074    | SLOPE, SENSOR                                        |
| 10   | 1   | 70228    | BATTERY CHARGER (REF VENDOR SECTION)                 |
| 11   | 1   | 130654   | HYDRAULIC TANK ASSEMBLY                              |
| 12   | 1   | 130721   | POWER RELAY ASSEMBLY                                 |
| 13   | 1   | 130300   | PUMP & MOTOR ASSEMBLY                                |

- FIGURE 8.1 - 130758(NON EXTENDING)  
MAC II BELLY PAN ASSEMBLY - 130714(EXTENDABLE)

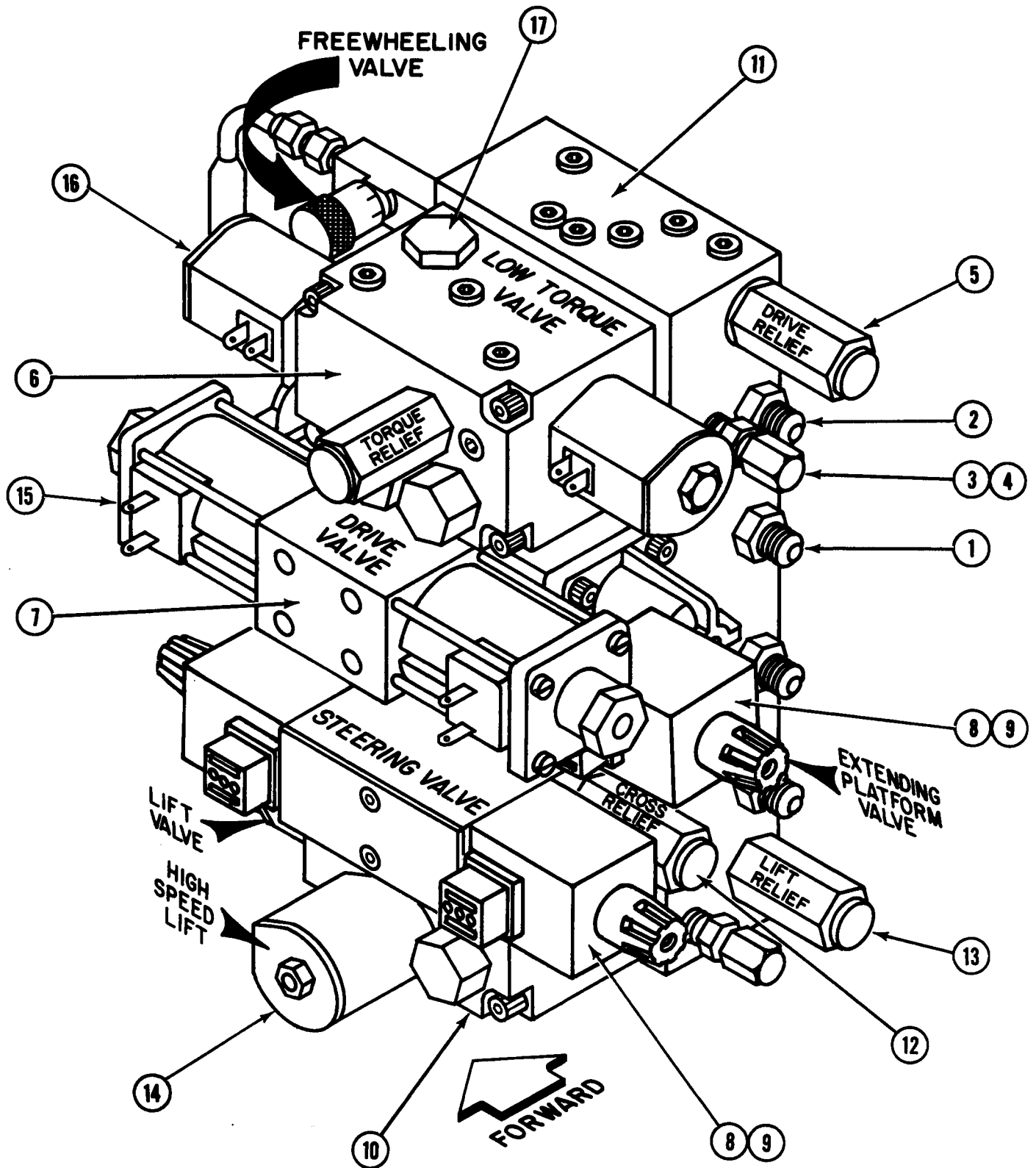
61.1



| ITEM | QTY   | PART NO.  | DESCRIPTION                                    |
|------|-------|-----------|------------------------------------------------|
| 1    | 1     | 130762    | WELDMENT, BELLY PAN                            |
| 2    | 1     | 130654    | ASS., HYDRAULIC TANK                           |
| 3    | 1     | 70228     | CHARGER, BATTERY                               |
| 4    | 1     | 130300    | ASSY., PUMP & MOTOR                            |
| 5    | 1     | 130761    | ASSY., VALVE PACKAGE 130767-NON EXTENDING      |
| 6    | 1     | 130389    | ASSY., GROUND CONTROL BOX 130492-NON EXTENDING |
| 7    | 1     | 130733    | J-BOLT, HOLD DOWN                              |
| 8    | 1     | 130768    | KIT, BATTERY CABLE                             |
| 9    | 4     | 4007      | BATTERY                                        |
| 10   | 1     | 130721    | ASSY., POWER RELAY                             |
| 11   | 1     | 31074     | SLOPE SENSOR                                   |
| 12   | 1     | 130725    | WELDMENT, BATTERY TRAY                         |
| 13   | 1     | 130600-07 | CABLE, CONDUCTOR                               |
| 14   | 1     | 130392    | BATTERY, HOLD DOWN                             |
| 15   | 8     | 7073      | ROLLER, BATTERY TRAY                           |
| 16   | 8     | 62101     | BOLT, SHOULDER                                 |
| 17   | 20    | 61318     | NUT, HEX SELF LOCKING                          |
| 18   | 2     | 61946     | SCREW, BUTTON HEAD SOCKET                      |
| 19   | 9     | 61944     | SCREW, BUTTON HEAD SOCKET                      |
| 20   | 2     | 36666     | TUBE, ROUND                                    |
| 21   | 1     | 130798    | WELDMENT, BATTERY TRAY BRACKET                 |
| 22   | 10    | 61246     | NUT, LOCK                                      |
| 23   | 1     | 61302     | NUT, LOCK                                      |
| 24   | 2     | 60343     | SCREW, CAP                                     |
| 25   | 2     | 63319     | WASHER, LOCK                                   |
| 26   | 4     | 63403     | WASHER, FLAT                                   |
| 27   | 1     | 60344     | SCREW, CAP                                     |
| 28   | 1     | 130482    | SPRING, TORSION - R.H.                         |
| 29   | 2     | 63301     | WASHER, LOCK                                   |
| 30   | 9     | 63359     | SCREW, CAP                                     |
| 31   | 2     | 60340     | SCREW, CAP                                     |
| 32   | 2     | 70270     | TERMINAL, RING                                 |
| 33   | 1     | 130305    | ASSY., FLOW DIVIDER                            |
| 34   | 10 FT | 70269     | WIRE, BLACK                                    |
| 35   | 1     | 65681     | WASHER, LOCK                                   |
| 36   | 1     | 60324     | SCREW, CAP                                     |
| 37   | 1     | 130785    | WELDMENT, BELLY PAN LOCK                       |
| 38   | 2     | 130787    | WELDMENT, HANDLE                               |
| 39   | 2     | 60339     | SCREW, CAP                                     |
| 40   | 2     | 65768     | PLYWOOD                                        |
| 41   | 1     | 36437     | TUBE, ROUND                                    |
| 42   | 1     | 130797    | GUARD, TILT SENSOR                             |
| 43   | 13    | 61312     | NUT, LOCK                                      |
| 44   | 1     | 60322     | SCREW, CAP                                     |
| 45   | 1     | 63302     | WASHER, LOCK                                   |
| 46   | 3     | 66356     | TERMINAL, FEMALE QUICK DISCONNECT              |
| 47   | 3     | 66357     | TERMINAL, MALE QUICK DISCONNECT                |
| 48   | 1     | 80035-03  | BULKHEAD BRANCH UNIVERSAL TEE                  |
| 49   | 1     | 80015-03  | SWIVEL NUT ELBOW                               |
| 50   | 1     | 80035-06  | BULKHEAD BRANCH UNIVERSAL TEE                  |
| 51   | 1     | 80015-06  | SWIVEL NUT ELBOW                               |



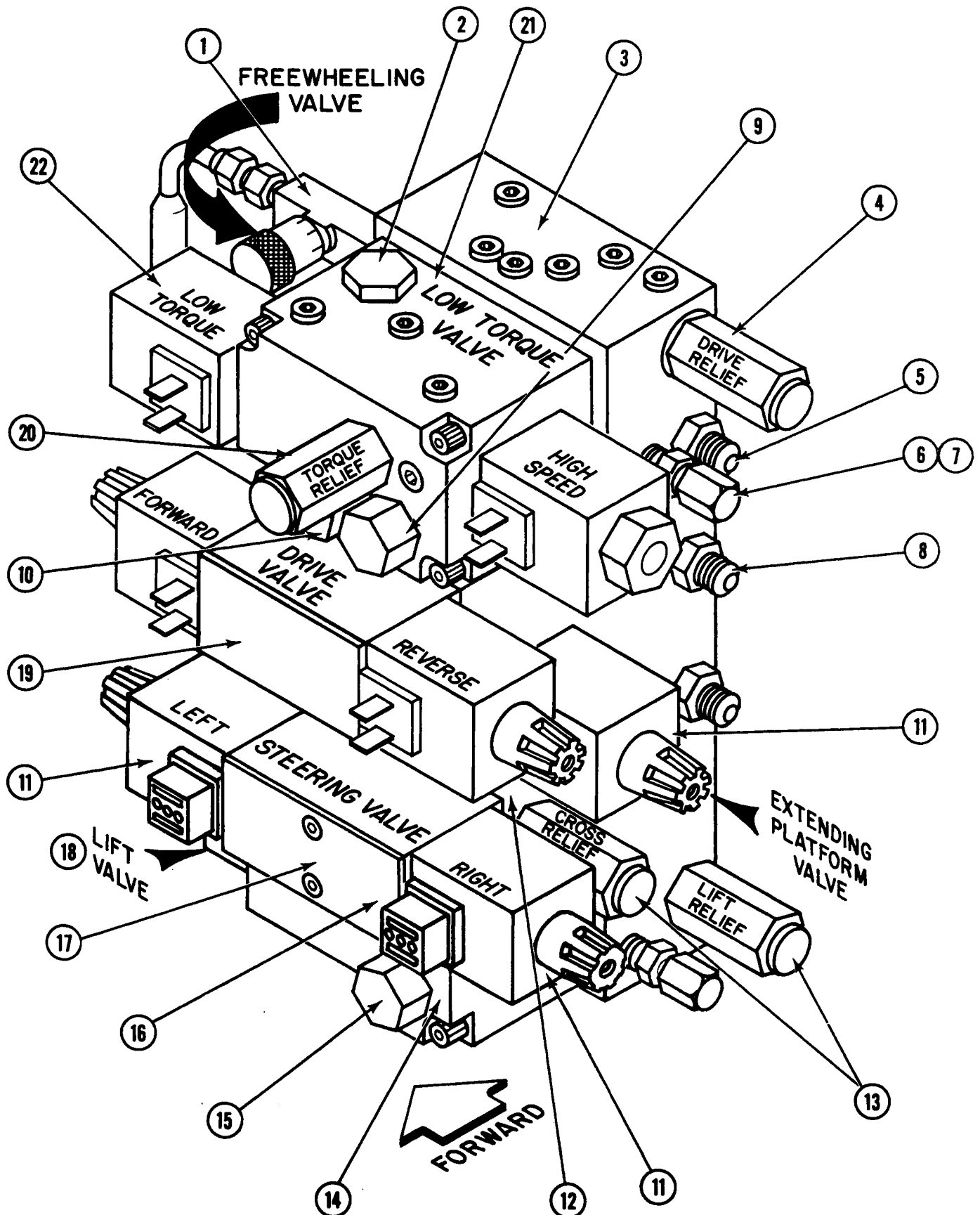
| ITEM                                                                                  | QTY | PART NO. | DESCRIPTION                       |
|---------------------------------------------------------------------------------------|-----|----------|-----------------------------------|
| 1                                                                                     | 4   | 80004-11 | STRAIGHT THREAD CONNECTOR         |
| 2                                                                                     | 2   | 80004-12 | STRAIGHT THREAD CONNECTOR         |
| 3                                                                                     | 2   | 80001-04 | MALE CONNECTOR                    |
| 4                                                                                     | 2   | 80059-03 | CAP                               |
| 5                                                                                     | 1   | 66666    | RELIEF VALVE                      |
| 6                                                                                     | 1   | 66667    | FLOW REGULATOR                    |
| 7                                                                                     | 1   | 81022    | PROPORTIONAL VALVE                |
| 8                                                                                     | 2   | 66668    | SOLENOID VALVE 66864; (COIL ONLY) |
| 9                                                                                     | 2   | 66669    | COVER PLATE 420008                |
| 10                                                                                    | 1   | 66670    | INLET LIFT SECTION                |
| 11                                                                                    | 1   | 66671    | SUB-PLATE MANIFOLD                |
| 12                                                                                    | 1   | 66661    | CROSS RELIEF VALVE                |
| 13                                                                                    | 1   | 66672    | RELIEF VALVE                      |
| <p><u>NOTE:</u> REFER TO FIGURE 10 &amp; 10.1<br/>           FOR MORE INFORMATION</p> |     |          |                                   |



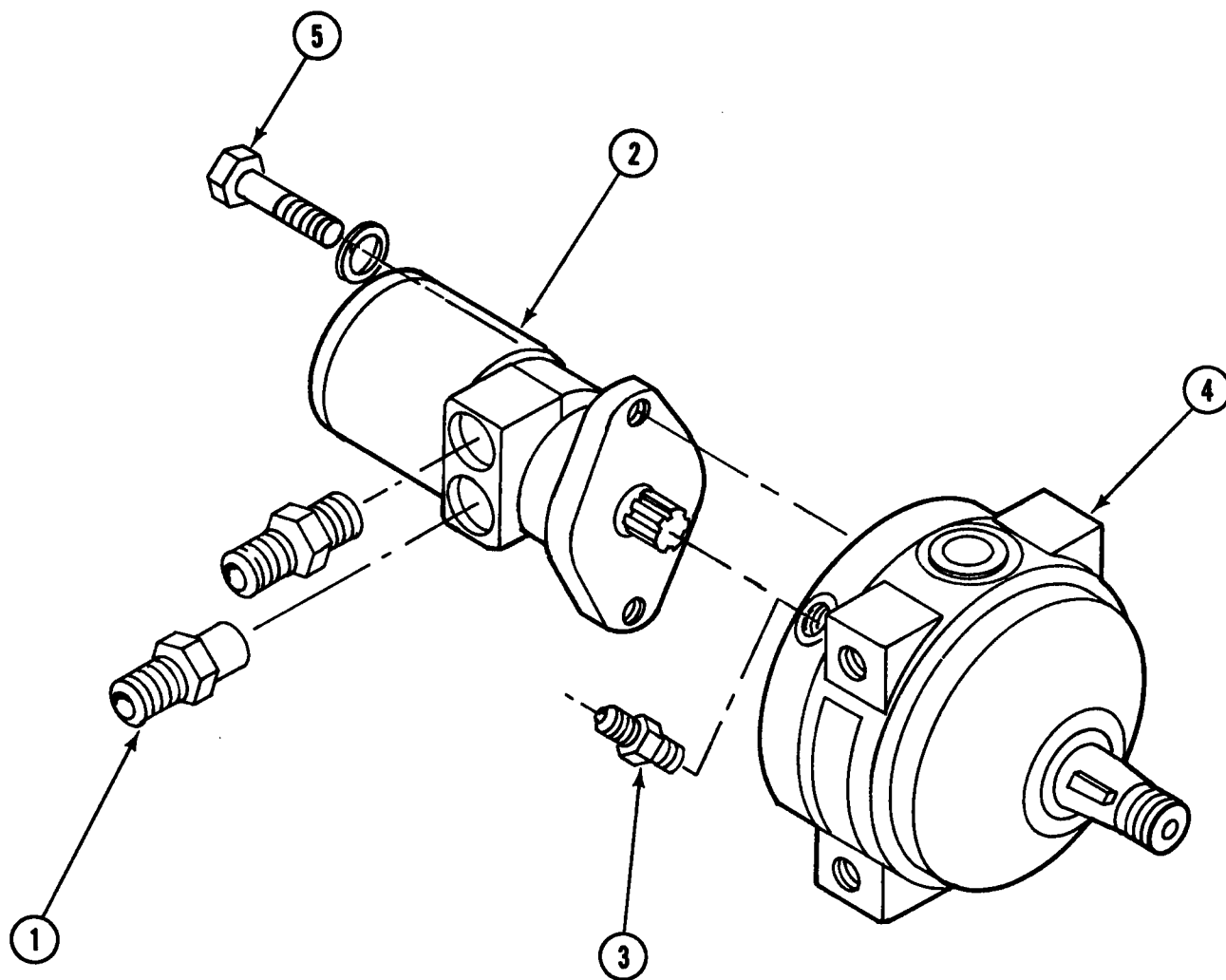


| ITEM | QTY | PART NO. | DESCRIPTION                                               |
|------|-----|----------|-----------------------------------------------------------|
| 1    | 4   | 80004-11 | STRAIGHT THREAD CONNECTOR                                 |
| 2    | 2   | 80004-12 | STRAIGHT THREAD CONNECTOR                                 |
| 3    | 2   | 80001-04 | MALE CONNECTOR                                            |
| 4    | 2   | 80059-03 | CAP                                                       |
| 5    | 1   | 66666    | RELIEF VALVE                                              |
| 6    | 1   | 66667    | FLOW REGULATOR                                            |
| 7    | 1   | 81022    | PROPORTIONAL VALVE                                        |
| 8    | 2   | 66668    | SOLENOID VALVE 66864: (COIL ONLY)                         |
| 9    | 2   | 69999    | COVER PLATE                                               |
| 10   | 1   | 66670    | INLET LIFT SECTION                                        |
| 11   | 1   | 66671    | SUB-PLATE MANIFOLD                                        |
| 12   | 1   | 66661    | CROSS RELIEF VALVE                                        |
| 13   | 1   | 66672    | RELIEF VALVE                                              |
| 14   | 1   | 66688    | N.O. HIGH SPEED LIFT SOLENOID                             |
| 15   | 2   | 66797    | COIL                                                      |
| 16   | 2   | 66676    | N.O. 2 WAY SOLENOID VALVE, 2 PCS.                         |
| 17   | 1   | 66664    | DRIVE BRAKE SHUTTLE                                       |
|      |     |          | <u>NOTE:</u> REFER TO FIGURE 10.1<br>FOR MORE INFORMATION |

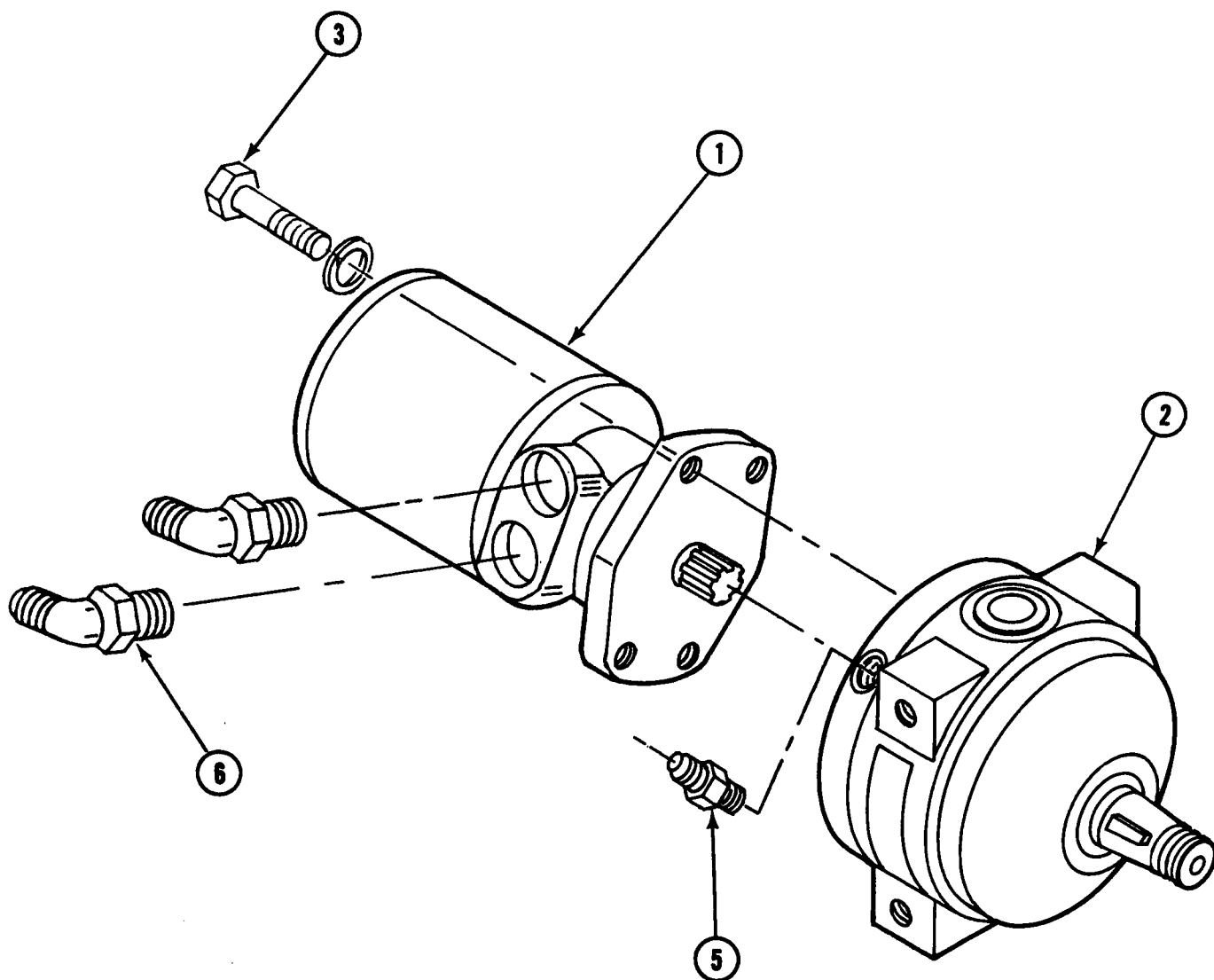
FIGURE 10.1 MAC II CONTROL VALVE ASSEMBLY



| ITEM        | QTY | PART NO. | DESCRIPTION                                     |
|-------------|-----|----------|-------------------------------------------------|
| 1           | 1   | 30884    | FREEWHEELING VALVE                              |
| 2           | 1   | 66664    | DRIVE BRAKE SHUTTLE                             |
| 3           | 1   | 66671    | MANIFOLD SUB BASE                               |
| 4           | 1   | 66666    | RELIEF VALVE (2400 P.S.I.)                      |
| 5           | 2   | 80004-12 | STRAIGHT THREAD CONNECTOR                       |
| 6           | 2   | 80001-04 | MALE CONNECTOR                                  |
| 7           | 2   | 80059-03 | CAP                                             |
| 8           | 4   | 80004-11 | STRAIGHT THREAD CONNECTOR                       |
| 9           | 1   | 66690    | FLOW REDUCER 4.25 GPM (66841 3.0 GPM NON-PROP.) |
| 10          | 1   | 66689    | FLOW REGULATOR                                  |
| 11          | 4   | 66864    | VALVE BANK COIL (LARGE)                         |
| 12          | 1   | 66661    | CROSS RELIEF VALVE (750 P.S.I.)                 |
| 13          | 2   | 66658    | CROSS RELIEF & LIFT RELIEF CARTRIDGE            |
| 14          | 1   | 66670    | LIFT LOWER SECTION                              |
| 15          | 1   | 66674    | FLOW REGULATOR LIFT VALVE                       |
| 16          | 1   | 66660    | STEERING VALVE ASSEMBLY                         |
| 17          | 1   | 66669    | COVER PLATE                                     |
| 18          | 1   | 66674    | LIFT CHECK VALVE (HIDDEN)                       |
| 19          | 1   | 81022    | PROPORTIONAL DRIVE VALVE                        |
| 20          | 1   | 66680    | LOW TORQUE RELIEF                               |
| 21          | 1   | 66667    | LOW TORQUE VALVE                                |
| 22          | 2   | 66865    | VALVE BANK COIL (SMALL)                         |
| <u>PART</u> |     |          | <u>SEAL KITS</u>                                |
| 66667       |     |          | 66691                                           |
| 66670       |     |          | 66692                                           |
| 81020       |     |          | 66693(MANIFOLD)                                 |
| 66676       |     |          | 66684                                           |
| 66678       |     |          | 66695                                           |
| 66661       |     |          | 66685                                           |
| 66677       |     |          | 66683                                           |

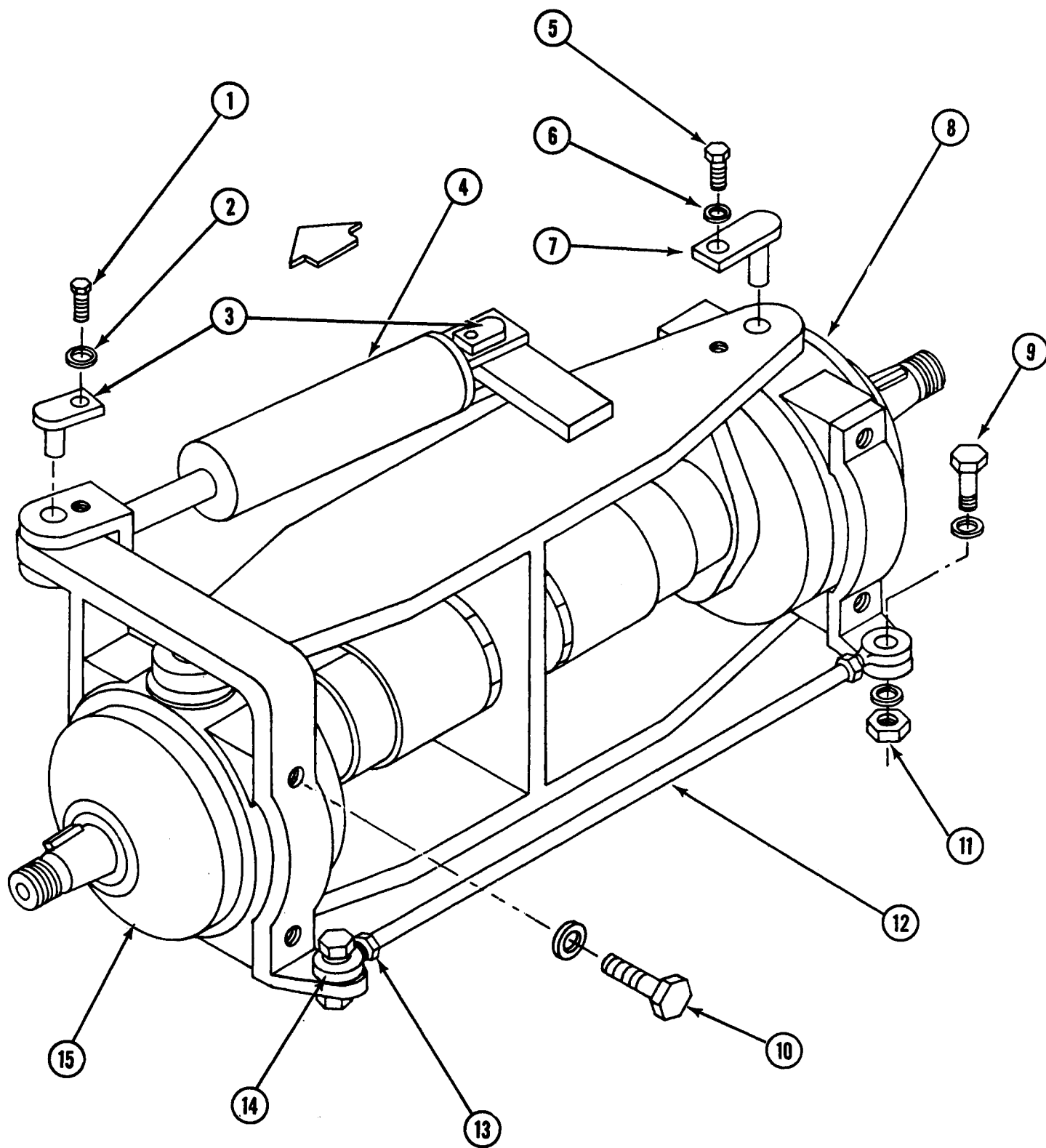


| ITEM | QTY | PART NO. | DESCRIPTION                         |
|------|-----|----------|-------------------------------------|
| 1    | 2   | 80004-13 | CONNECTOR STRAIGHT THREAD           |
| 2    | 1   | 81017    | HYDRAULIC WHEEL MOTOR TRW MAF 24069 |
| 3    | 1   | 80004-03 | CONNECTOR STRAIGHT THREAD           |
| 4    | 1   | 81019    | MULTIPLE DISC BRAKE                 |
| 5    | 2   | 60610    | SCREW, H.H.C.                       |



| ITEM | QTY | PART NO. | DESCRIPTION                          |
|------|-----|----------|--------------------------------------|
| 1    | 1   | 81018    | MOTOR, HYDRAULIC WHEEL TRW MAB 20002 |
| 2    | 1   | 81019    | BRAKE, MULTIPLE DISC                 |
| 3    | 2   | 60622    | SCREW, H.H.C.                        |
| 5    | 1   | 80004-03 | CONNECTOR STRAIGHT THREAD            |
| 6    | 2   | 80018-13 | ELBOW, 45 DEGREE STRAIGHT THREAD     |

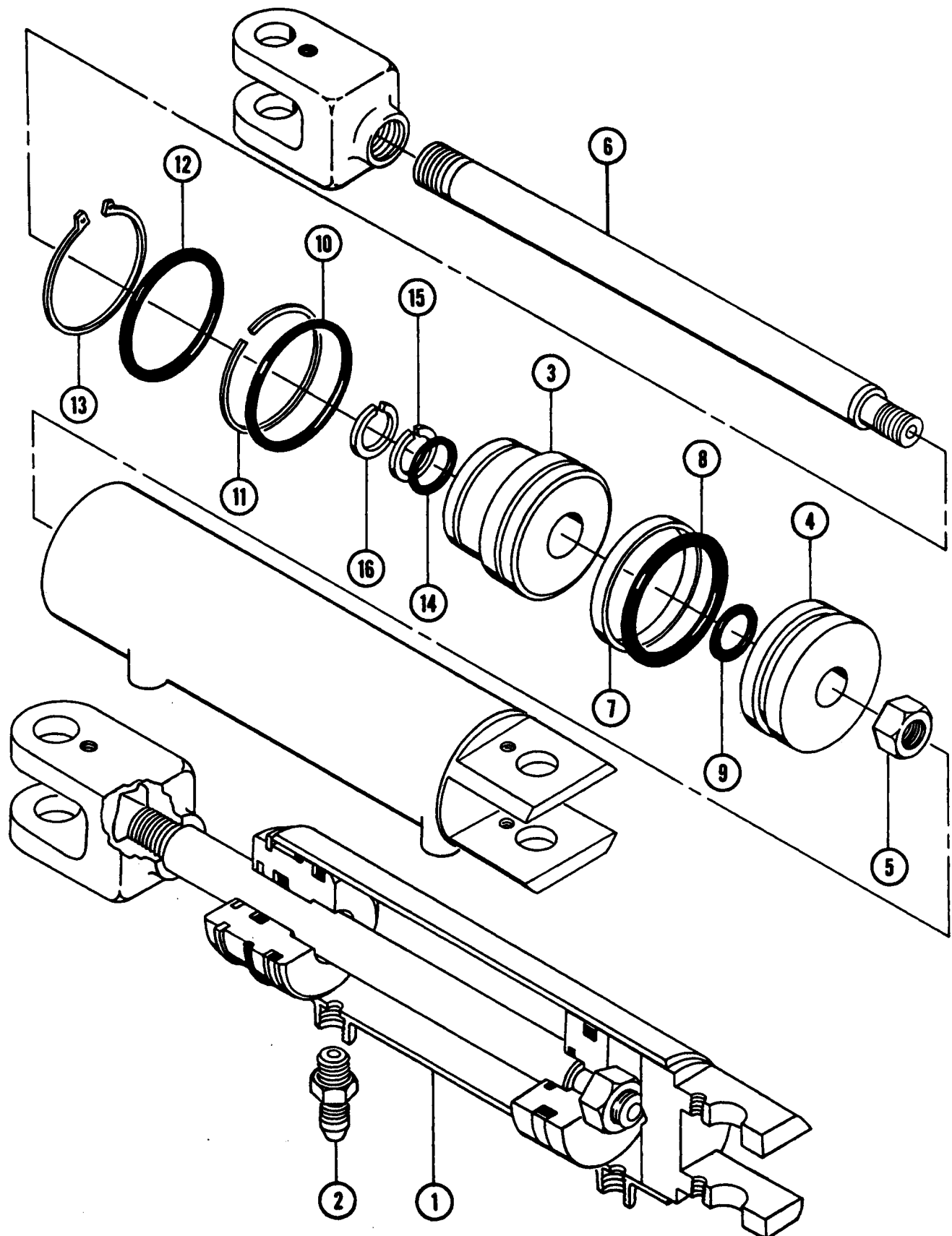
FIGURE 13 STEERING ASSEMBLY





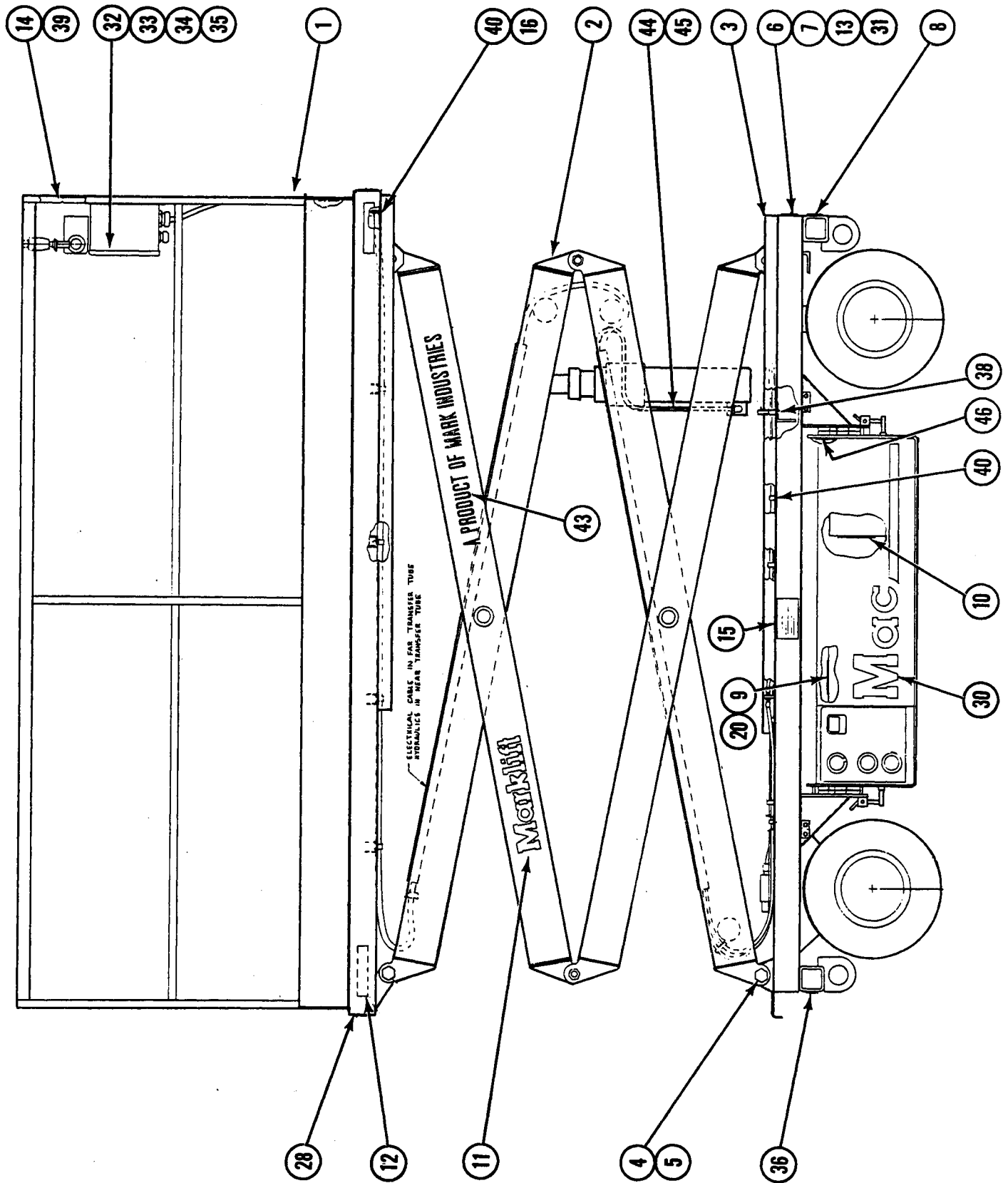
| ITEM | QTY | PART NO. | DESCRIPTION                                                                                 |
|------|-----|----------|---------------------------------------------------------------------------------------------|
| 1    | 2   | 60353    | SCREW CAP                                                                                   |
| 2    | 2   | 63301    | WASHER, LOCK SPLIT (4)                                                                      |
| 3    | 2   | 20252    | PIN, STERRING CYLINDER ANCHOR                                                               |
| 4    | 1   | 130237   | CYLINDER, STEERING                                                                          |
| 5    | 2   | 60338    | SCREW, CAP                                                                                  |
| 6    | 2   | 63302    | WASHER, LOCK SPLIT 5/16 NOM (4)                                                             |
| 7    | 2   | 130474   | PIN, TRUNNION STEERING CYLINDER (4)                                                         |
| 8    | 1   | 130442   | ASSEMBLY, MOTOR DRIVE/BRAKE (R.H.)-MAC 15 & 20<br>ASSEMBLY, MOTOR DRIVE/BRAKE (R.H.)-MAC 25 |
| 9    | 2   | 60370    | SCREW, CAP                                                                                  |
| 10   | 4   | 60622    | SCREW,                                                                                      |
| 11   | 2   | 61242    | NUT, HEX                                                                                    |
| 12   | 1   | 130444   | TIE ROD - MAC 20                                                                            |
|      |     | 130303   | TIE ROD - MAC 15                                                                            |
|      |     | 130470   | TIE ROD - MAC 25                                                                            |
| 13   | 2   | 60901    | NUT, JAM                                                                                    |
| 14   | 2   | 2274     | END, TIE ROD                                                                                |
| 15   | 1   | 130490   | ASSEMBLY, MOTOR DRIVE/BRAKE (L.H.)-MAC 15 & 20                                              |
|      |     | 130608   | ASSEMBLY, MOTOR DRIVE/BRAKE (L.H.)-MAC 25                                                   |
|      |     |          | STEERING ASSEMBLY                                                                           |
|      |     |          | MAC 20ST - 130289      MAC 20T - 130290      MAC 15ST - 130248                              |
|      |     |          | MAC 20S - 130483      MAC 15S - 130591      MAC 20 - 130484                                 |
|      |     |          | MAC 25T - 130375      MAC 25 - 130485                                                       |

FIGURE 14 STEERING CYLINDER ASSEMBLY -130237



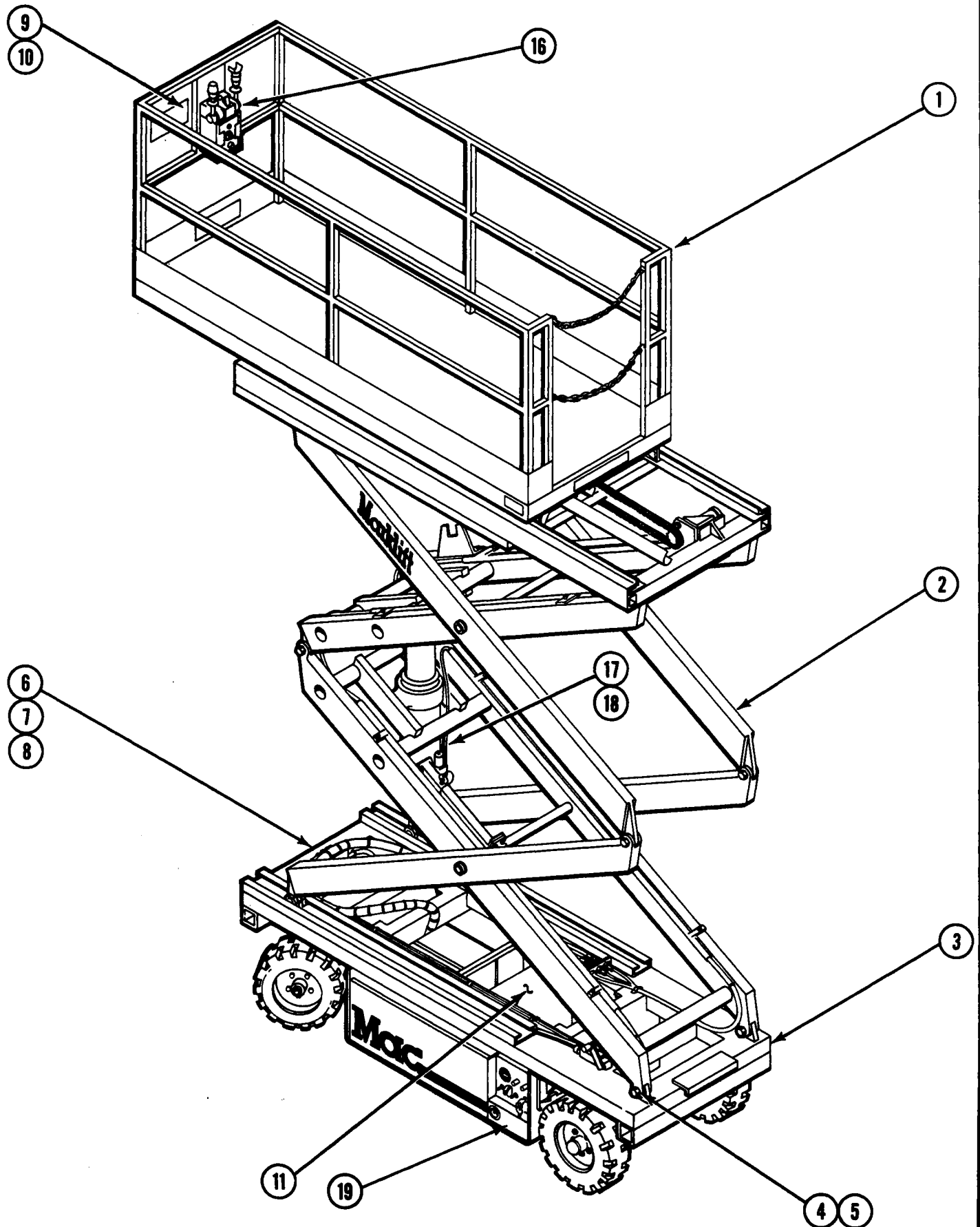
| ITEM | QTY | PART NO. | DESCRIPTION                |
|------|-----|----------|----------------------------|
| 1    | 1   | 130165   | CYLINDER, STEERING         |
| 2    | 2   | 80004-03 | CONNECTOR, STRAIGHT THREAD |
|      |     | 66640    | SEAL KIT                   |
| 3    | 1   |          | BEARING                    |
| 4    | 1   |          | PISTON                     |
| 5    | 1   |          | NUT, LOCK                  |
| 6    | 1   |          | ROD, CHROME PLATED         |
| 7    | 1   |          | RING, SLIPPER              |
| 8    | 1   |          | O'RING                     |
| 9    | 1   |          | O'RING                     |
| 10   | 1   |          | O'RING                     |
| 11   | 1   |          | WASHER, BACK UP            |
| 12   | 1   |          | RING, LOCK                 |
| 13   | 1   |          | RING, RETAINING            |
| 14   | 1   |          | O'RING                     |
| 15   | 1   |          | WASHER, BACK UP            |
| 16   | 1   |          | SEAL, WIPER                |

FIGURE 15 FINAL ASSEMBLY MAC 15S - 130008  
130020 - MAC II



| ITEM | QTY    | PART NO. | DESCRIPTION                                           |
|------|--------|----------|-------------------------------------------------------|
| 1    | 1      | 130590   | PLATFORM ASSEMBLY                                     |
| 2    | 1      | 130614   | SCISSOR ASSEMBLY                                      |
| 3    | 1      | 130591   | FRAME ASSEMBLY (MAC II: 130744)                       |
| 4    | 4      | 130696   | BOLT EAR PIVOT                                        |
| 5    | 4      | 61249    | NUT LOCK HEX HEAD 3/4-10UNC                           |
| 6    | 1      | 30520    | PLATE PATENT NUMBER                                   |
| 7    | 1      | 20660    | PLATE IDENTIFICATION                                  |
| 8    | 2      | 2002     | DECAL - FORKLIFT BOOT                                 |
| 9    | 1      | 2017     | DECAL - HYDRAULIC SYSTEM                              |
| 10   | 1      | 2003     | DECAL - BATTERY WATER LEVEL                           |
| 11   | 2      | 31259    | DECAL - MARKLIFT                                      |
| 12   | 4      | 2023     | DECAL - LOAD CAPACITY 750LBS (MAC II: 2024, 1000lbs.) |
| 13   | 1      | 20661    | PLATE ANSI A92                                        |
| 14   | 1      | 130506   | DECAL - OPERATION INSTRUCTION (MAC II: 130801)        |
| 15   | 2      | 2016     | DECAL - DO NOT WORK UNDER                             |
| 16   | 15     | 63654    | RIVET POP 3/16 x 3/8 LG                               |
| 17   | 1      | 130422   | OPERATORS HANDBOOK                                    |
| 18   | 50     | 256      | TIE CABLE                                             |
| 19   | 50     | 255      | TIE CABLE                                             |
| 20   | 13 GAL | 65116    | HYDRAULIC OIL                                         |
| 21   | 1      | 130524   | DIAGRAM - HYDRAULIC HOSE (MAC II: 130769)             |
| 22   | 1      | 130499   | SCHEMATIC HYDRAULIC (MAC II: 130773)                  |
| 23   | 1      | 130500   | SCHEMATIC ELECTRICAL (MAC II: 130759)                 |
| 24   | 2 GAL  | 65389    | PAINT BLUE WATER BASE                                 |
| 25   | 5 GAL  | 16608    | PAINT WHITE WATER BASE                                |
| 26   | 1      | 65368    | KRYLON 1910 TRUE BLUE                                 |
| 27   | 1      | 2673     | PAINT WHITE KIT KOTE 1221                             |

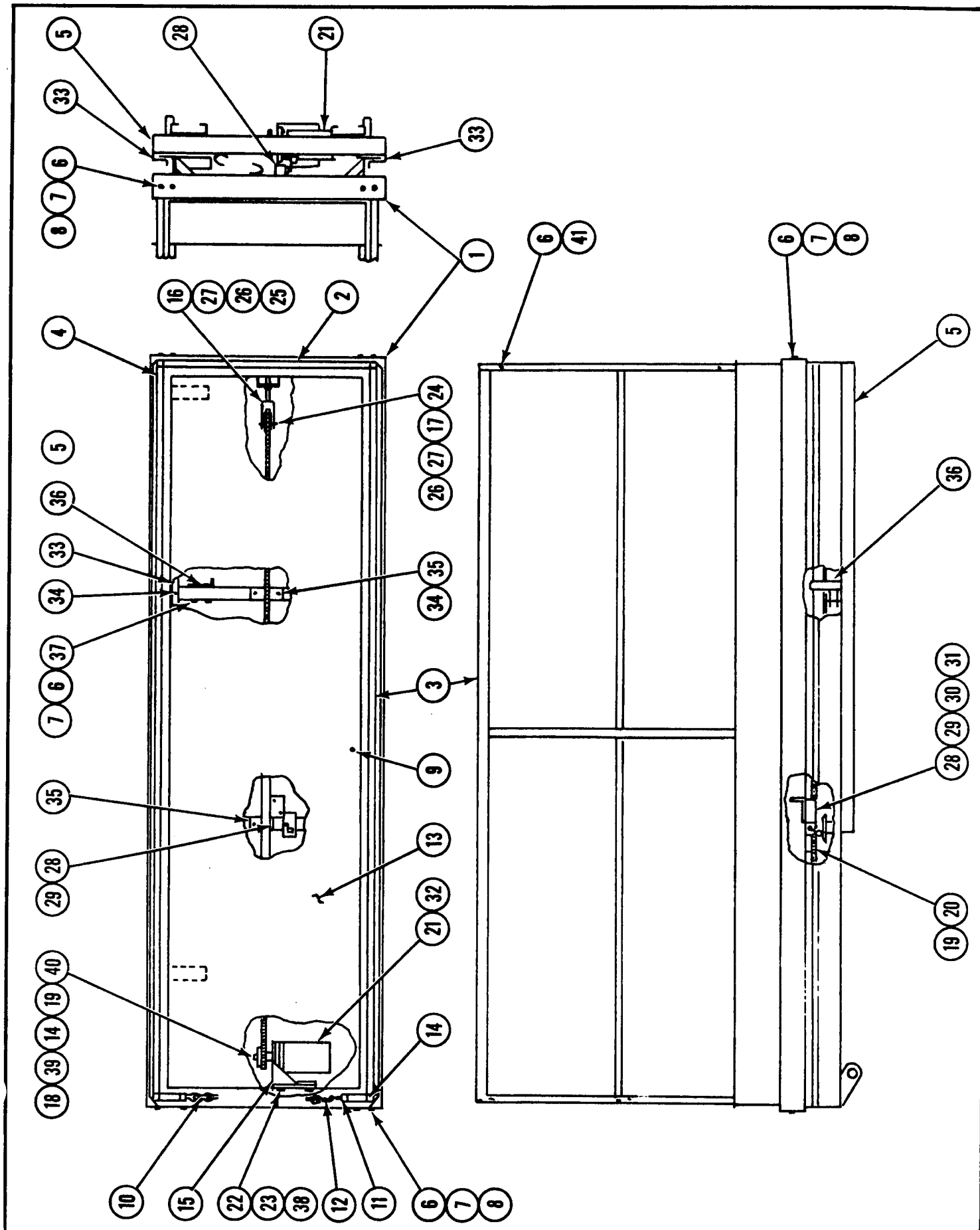
| ITEM | QTY | PART NO.  | DESCRIPTION                                 |
|------|-----|-----------|---------------------------------------------|
| 28   | 2   | 31109     | DECAL - CAUTION                             |
| 29   | 1   | 130337-42 | CABLE CONDUCTOR 42 FT                       |
| 30   | 2   | 130507    | DECAL - MAC (MAC II: 130805)                |
| 31   | 12  | 375       | RIVET POP                                   |
| 32   | 1   | 130489    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130803) |
| 33   | 4   | 60342     | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5  |
| 34   | 4   | 63301     | WASHER LOCK SPLIT 1/4                       |
| 35   | 4   | 60701     | NUT HEX 1/4-20UNC                           |
| 36   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                |
| 37   | 1   | 11064     | DECAL - SAFETY CHAIN                        |
| 38   | 3   | 16268     | CLAMP CABLE                                 |
| 39   | 1   | 65581     | DOCUMENT PLASTIC BAG                        |
| 40   | 9   | 65655     | CLAMP CUSHIONED                             |
| 41   | 1   | 65643     | CLAMP                                       |
| 42   | 3   | 765       | CLAMP RUBBER                                |
| 43   | 2   | 130596    | DECAL - A PRODUCT OF MARK INDUSTRIES        |
| 44   | 1   | 2568-15   | HOSE, HYDRAULIC                             |
| 45   | 2   | 2562      | SAE 37 <sup>0</sup> SWIVEL                  |
| 46   | 1   | 130606    | DECAL - FREE WHEELING VALVE                 |



| ITEM | QTY    | PART NO.  | DESCRIPTION                                    |
|------|--------|-----------|------------------------------------------------|
| 1    | 1      | 130247    | PLATFORM ASSEMBLY                              |
| 2    | 1      | 130249    | SCISSOR ASSEMBLY                               |
| 3    | 1      | 130248    | FRAME ASSEMBLY (MAC II: 130745)                |
| 4    | 4      | 130316    | BOLT EAR PIVOT (MAC II: 130696)                |
| 5    | 4      | 61304     | NUT LOCK HEX HEAD 3/4-10 UNC (MAC II: 61249)   |
| 6    | 1      | 30520     | PLATE PATENT NUMBER                            |
| 7    | 1      | 20660     | PLATE IDENTIFICATION                           |
| 8    | 1      | 20661     | PLATE ANSI A92                                 |
| 9    | 1      | 130506    | DECAL - OPERATION INSTRUCTION (MAC II: 130801) |
| 10   | 1      | 130422    | OPERATORS HANDBOOK                             |
| 11   | 13 GAL | 65116     | HYDRAULIC OIL                                  |
| 12   | 1      | 130523    | DIAGRAM - HYDRAULIC HOSE (MAC II: 130769)      |
| 13   | 1      | 130419    | SCHEMATIC HYDRAULIC (MAC II: 130772)           |
| 14   | 1      | 130420    | SCHEMATIC ELECTRICAL (MAC II: 130760)          |
| 15   | 1      | 130337-49 | CABLE CONDUCTOR 49 FT                          |
| 16   | 1      | 130488    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130743)    |
| 17   | 1      | 2568-25   | HOSE, HYDRAULIC                                |
| 18   | 2      | 2594      | SAE 37 <sup>0</sup> SWIVEL                     |
| 19   | 1      | 130389    | ASSEMBLY GROUND CONTROL BOX                    |
|      |        | 130801    | OPERATION INSTRUCTION DECAL                    |



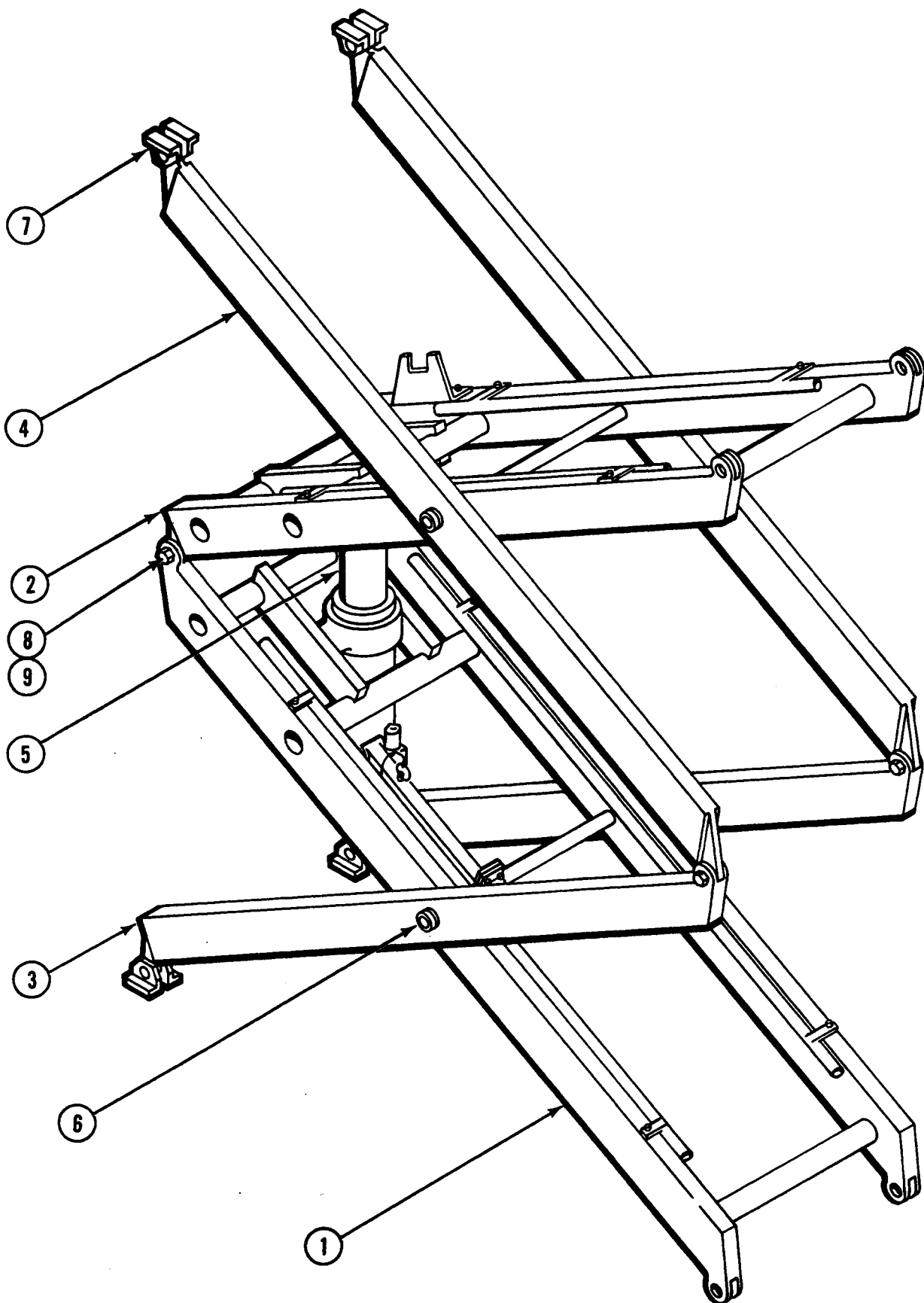
FIGURE 17 PLATFORM ASSY. MAC 15S(130590) & MAC 15ST(130247)



| ITEM | QTY | PART NO. | DESCRIPTION                                      |
|------|-----|----------|--------------------------------------------------|
| 1    | 1   | 130306   | WELDMENT PLATFORM MAC 15ST                       |
|      |     | 130589   | WELDMENT PLATFORM MAC 15S                        |
| 2    | 1   | 130313   | GUARD RAIL FRONT                                 |
| 3    | 1   | 130314   | GUARD RAIL SIDE L.H.                             |
| 4    | 1   | 130315   | GUARD RAIL SIDE R.H.                             |
| 5    | 1   | 130307   | WELDMENT TOP FRAME                               |
| 6    | 14  | 60337    | SCREW CAP HEX HEAD 1/4-20UNC x 3 LG              |
| 7    | 10  | 63301    | WASHER LOCK SPLIT 1/4                            |
| 8    | 8   | 60701    | NUT HEX 1/4-20UNC                                |
| 9    | 10  | 61713    | SCREW SELF TAPPING 1/4-20UNC x 1 1/4 #2 PHL FL H |
| 10   | 2   | 65544    | CHAIN, LINK                                      |
| 11   | 2   | 65636    | CHAIN LINK                                       |
| 12   | 2   | 65637    | SNAP-OPEN END BOLT                               |
| 13   | 1   | 130397   | PLYWOOD FLOOR                                    |
| 14   | 4   | 91541    | CAP PLUG                                         |
| 15   | 1   | 130319   | WELDMENT BRACKET HYDRAULIC MOTOR                 |
| 16   | 1   | 130320   | WELDMENT CLEVIS                                  |
| 17   | 1   | 65585    | IDLER SPROCKET                                   |
| 18   | 1   | 65578    | SPROCKET STEEL 5/8 PITCH                         |
| 19   | 1   | 65579    | CHAIN SELF LUBRICATED                            |
| 20   | 2   | 65580    | MASTER LINK                                      |
| 21   | 1   | 130341   | ASSEMBLY HYDRAULIC MOTOR                         |
| 22   | 4   | 60307    | SCREW CAP HEX HEAD 3/8-16UNC x 1 1/2 LG GR 5     |
| 23   | 4   | 63319    | WASHER LOCK SPLIT 3/8                            |
| 24   | 1   | 60370    | SCREW CAP HEX HEAD 1/2-13UNC x 2 LG GR 5         |
| 25   | 2   | 63415    | WASHER FLAT 1/2                                  |
| 26   | 2   | 63305    | WASHER LOCK SPLIT                                |

| ITEM | QTY | PART NO.          | DESCRIPTION                                              |
|------|-----|-------------------|----------------------------------------------------------|
| 27   | 3   | 61242             | NUT LOCK 1/2-13UNC                                       |
| 28   | 1   | 20803             | SWITCH LIMIT                                             |
| 29   | 1   | 70169             | LEVER LIMIT SWITCH                                       |
| 30   | 2   | 62615             | SCREW MACHINE RD HD SLOTTED 10-32UNF x 1 3/4 LG          |
| 31   | 2   | 63313             | WASHER LOCK SPLIT 10                                     |
| 32   | 2   | 60326             | SCREW CAP HEX HEAD 1/2-13UNC x 1LG GR 5                  |
| 33   | 2   | 31058             | WEAR PAD                                                 |
| 34   | 20  | 16217             | RIVET POP                                                |
| 35   | 4   | 130399            | WEAR PAD                                                 |
| 36   | 1   | 130371            | STOP                                                     |
| 37   | 2   | 60318             | SCREW CAP HEX HEAD 1/4-20UNC x 2 1/4 LG GR 5             |
| 38   | 4   | 60703             | NUT HEX 3/8-16 UNC                                       |
| 39   | 1   | 31061             | WASHER DRUM                                              |
| 40   | 1   | 60342             | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5               |
| 41   | 4   | 61227             | NUT, HEX LOCK 1/4-20UNC NYLON                            |
|      |     |                   | FOR MACHINES WITH <u>OPTIONAL</u> FOLD DOWN GUARD RAILS: |
|      |     | 130681            | PLATFORM ASSEMBLY                                        |
|      |     | 130664            | SIDE RAIL R.H.                                           |
|      |     | 130665            | SIDE RAIL L.H.                                           |
|      |     | 130701/<br>130703 | FRONT RAIL                                               |

FIGURE 18 MAC 15S SCISSOR ASSEMBLY - 130614  
MAC 15ST SCISSOR ASSEMBLY - 130249



| ITEM | QTY | PART NO. | DESCRIPTION                         |
|------|-----|----------|-------------------------------------|
| 1    | 1   | 130262   | ASSEMBLY LOWER INNER ARM            |
| 2    | 1   | 130265   | ASSEMBLY UPPER INNER ARM            |
| 3    | 2   | 130254   | ASSEMBLY LOWER OUTER ARM            |
| 4    | 2   | 130257   | ASSEMBLY UPPER OUTER ARM            |
| 5    | 1   | 130323   | * TELESCOPIC LIFT CYLINDER ASSEMBLY |
| 6    | 4   | 130493   | PIN - TRUNNION                      |
| 7    | 8   | 130326   | WEAR PAD                            |
| 8    | 4   | 130696   | BOLT EAR PIVOT                      |
| 9    | 4   | 61249    | NUT LOCK HEX HEAD 3/4-10UNC         |
| 5    | 1   | 130481   | * LIFT CYLINDER (FOR 130323)        |
|      |     | 66648    | SEAL KIT                            |
|      |     |          | <u>FOR MAC II</u>                   |
| 5    | 1   | 130789   | TELESCOPIC LIFT CYLINDER ASSEMBLY   |
|      |     | 130788   | LIFT CYLINDER                       |
|      |     | 66818    | SEAL KIT                            |

FIGURE 19 FRAME ASSY. MAC15S(130591) & 15ST(130248)  
130744 & 130745 - MAC II

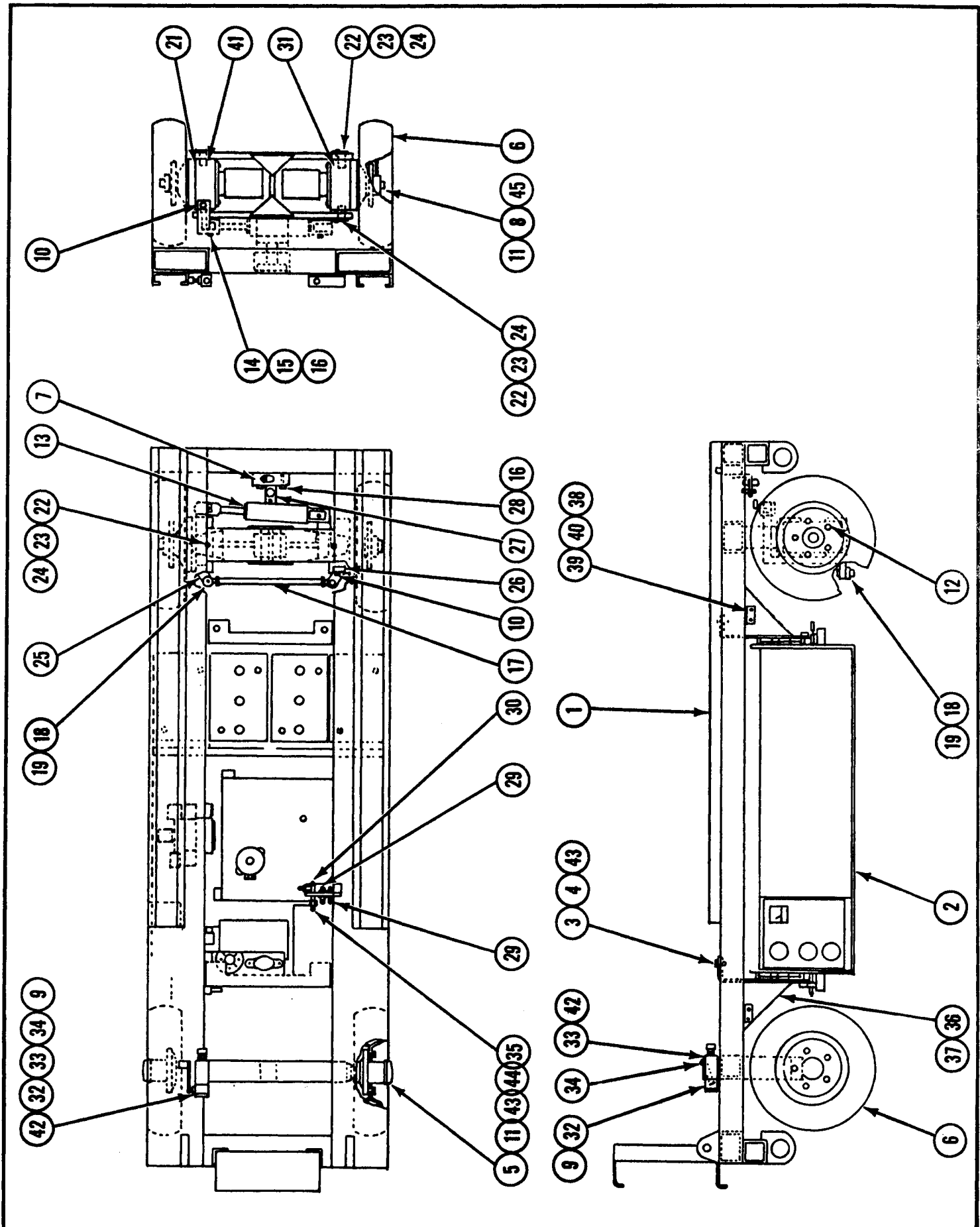


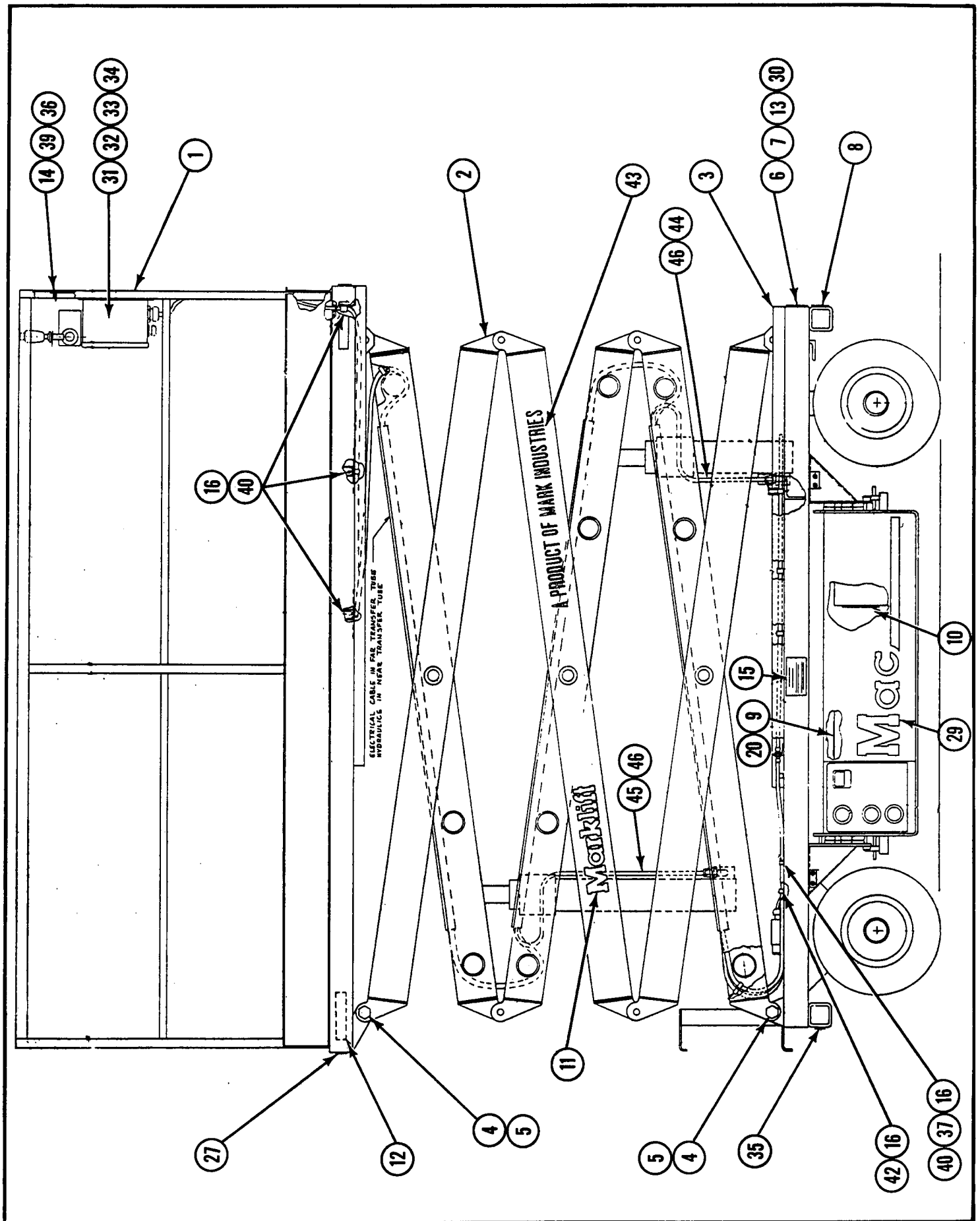
FIGURE 19 FRAME ASSY. MAC15S(130591) & 15ST(130248)  
130744 & 130745 - MAC II

| ITEM | QTY | PART NO. | DESCRIPTION                                 |
|------|-----|----------|---------------------------------------------|
| 1    | 1   | 130333   | WELDMENT FRAME (MAC II: 130737, 15S & 15ST) |
| 2    | 1   | 130293   | ASSEMBLY, BELLY PAN -15ST (MAC II: 130714   |
| 3    | 4   | 130497   | ASSEMBLY, BELLY PAN - 15S (MAC II: 130758   |
|      |     | 60311    | SCREW, H.H.C. 1/2-13UNC x 1 1/4 LG GR 5     |
| 4    | 4   | 63415    | WASHER, FLAT 1/2 NOM                        |
| 5    | 2   | 134      | ASSEMBLY, HUB                               |
| 6    | 4   | 30786    | ASSEMBLY, TIRE & WHEEL SOLID                |
| 7    | 1   | 130305   | ASSEMBLY, FLOW DIVIDER                      |
| 8    | 2   | 31158    | MACHINING, HUB                              |
| 9    | 1   | 2806     | STRAIN RELIEF (MAC II: 70288, 15S & 15ST)   |
| 10   | 5   | 60602    | SCREW, H.H.C. 1/2-13UNC x 1 1/2 LG          |
| 11   | 4   | 64306    | PIN, COTTER                                 |
| 12   | 10  | 34044    | BOLT, CONE                                  |
| 13   | 1   | 130237   | ASSEMBLY, STEERING CYLINDER                 |
| 14   | 2   | 20252    | PIN, STEERING CYLINDER ANCHOR               |
| 15   | 2   | 60353    | SCREW, H.H.C 1/4-20UNC x 1/2 LG GR 5        |
| 16   | 4   | 63301    | WASHER, LOCK SPLIT 1/4 NOM                  |
| 17   | 1   | 130302   | ASSEMBLY, TIE ROD                           |
| 18   | 2   | 60393    | SCREW, H.H.C. 1/2-13UNC x 2 LG GR 5         |
| 19   | 6   | 61242    | NUT, HEX 1/2-13UNC                          |
| 20   | 6   | 63305    | WASHER, LOCK SPLIT 1/2 NOM                  |
| 21   | 1   | 130442   | ASSEMBLY, DRIVE MOTOR/BRAKE R.H.            |
| 22   | 4   | 130474   | PIN, STEERING                               |
| 23   | 4   | 60338    | SCREW, H.H.C 5/16-18UNC x 1 LG GR 5         |
| 24   | 4   | 63302    | WASHER, LOCK SPLIT 5/16 NOM                 |
| 25   | 1   | 130393   | MACHINING, STEERING LEVER ARM L.H.          |
| 26   | 1   | 130394   | MACHINING, STEERING LEVER ARM R.H.          |

FIGURE 19 FRAME ASSY. MAC15S(130591) & 15ST(130248)  
130744 & 130745 - MAC II

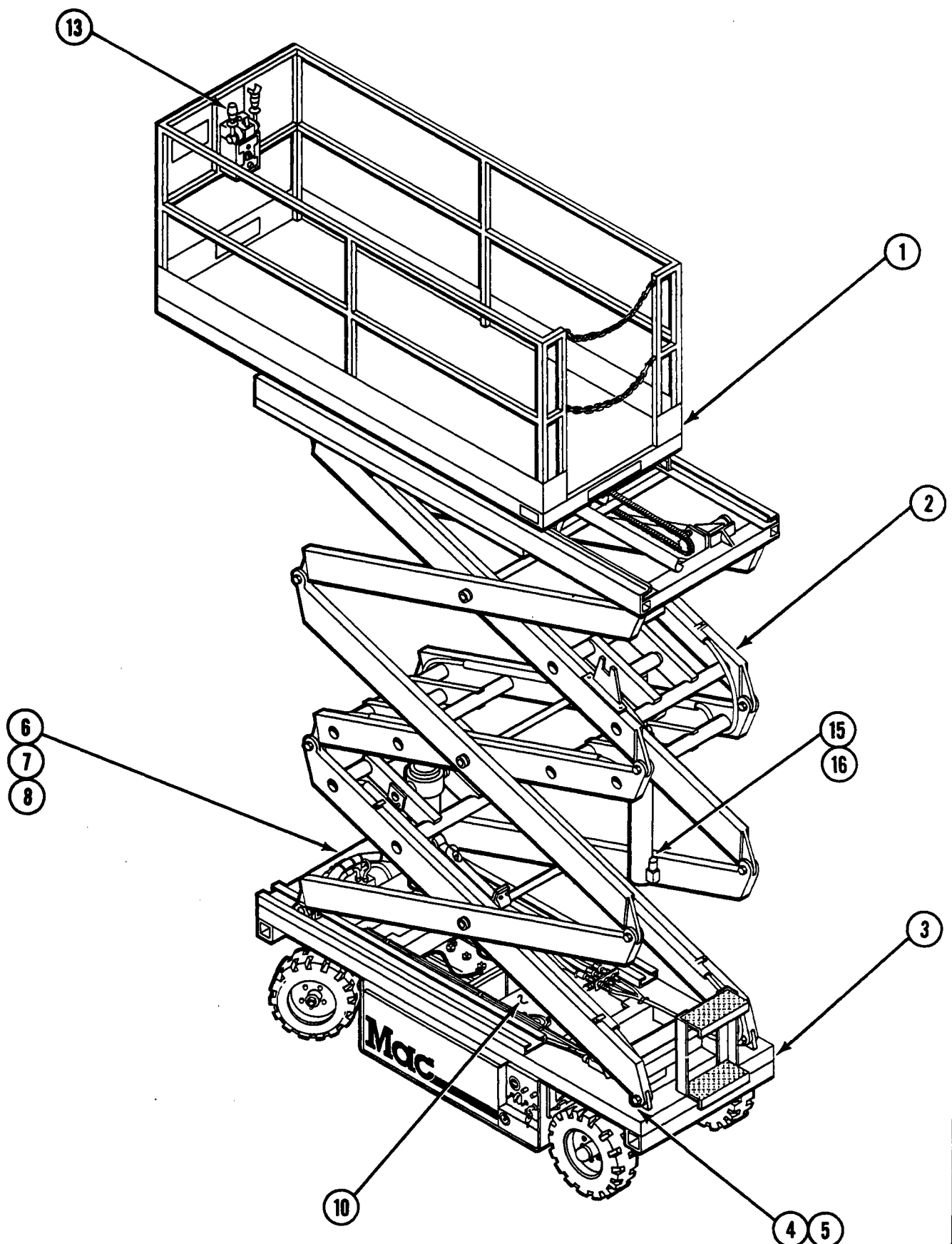
| ITEM | QTY | PART NO.     | DESCRIPTION                               |
|------|-----|--------------|-------------------------------------------|
| 27   | 1   | 130480       | ASSEMBLY, BULKHEAD BRAKE & DRIVE          |
| 28   | 2   | 60318        | SCREW, H.H.C. 1/4-20UNC x 2 1/4 LG GR 5   |
| 29   | 2   | 80045-03     | UNION, BULKHEAD                           |
| 30   | 1   | 80032-05     | TEE, BULKHEAD                             |
| 31   | 1   | 130490       | ASSEMBLY, DRIVE MOTOR/BRAKE LH.           |
| 32   | 1   | 20803        | SWITCH, LIMIT (MAC II: 70107, 15S & 15ST) |
| 33   | 2   | 62615        | SCREW, RD. HD. SL. 10-32UNF x 1 3/4 LG    |
| 34   | 1   | 70032        | LEVER, OPERATING                          |
| 35   | 2   | 80056-01     | REDUCER, TUBE END                         |
| 36   | 2   | 130598       | GUSSET R.H.                               |
| 37   | 2   | 130597       | GUSSET L.H.                               |
| 38   | 8   | 60343        | SCREW, CAP 3/8-16UNC x 1 LG HEX HEAD      |
| 39   | 8   | 63319        | WASHER, LOCK 3/8 SPLIT                    |
| 40   | 8   | 60703        | NUT, HEX 3/8-16UNC                        |
| 41   | 2   | 65658        | BEARING THRUST                            |
| 42   | 2   | 63313/ 61305 | WASHER, LOCK NO. 10, SPLIT                |
| 43   | 2   | 60811        | NUT, HEX SLOTTED 1-14 UNS                 |
| 44   | 2   | 63409        | WASHER, FLAT 1" SAE                       |
| 45   | 2   | 65174        | NUT, HEX SLOTTED 1-20 UNEF                |





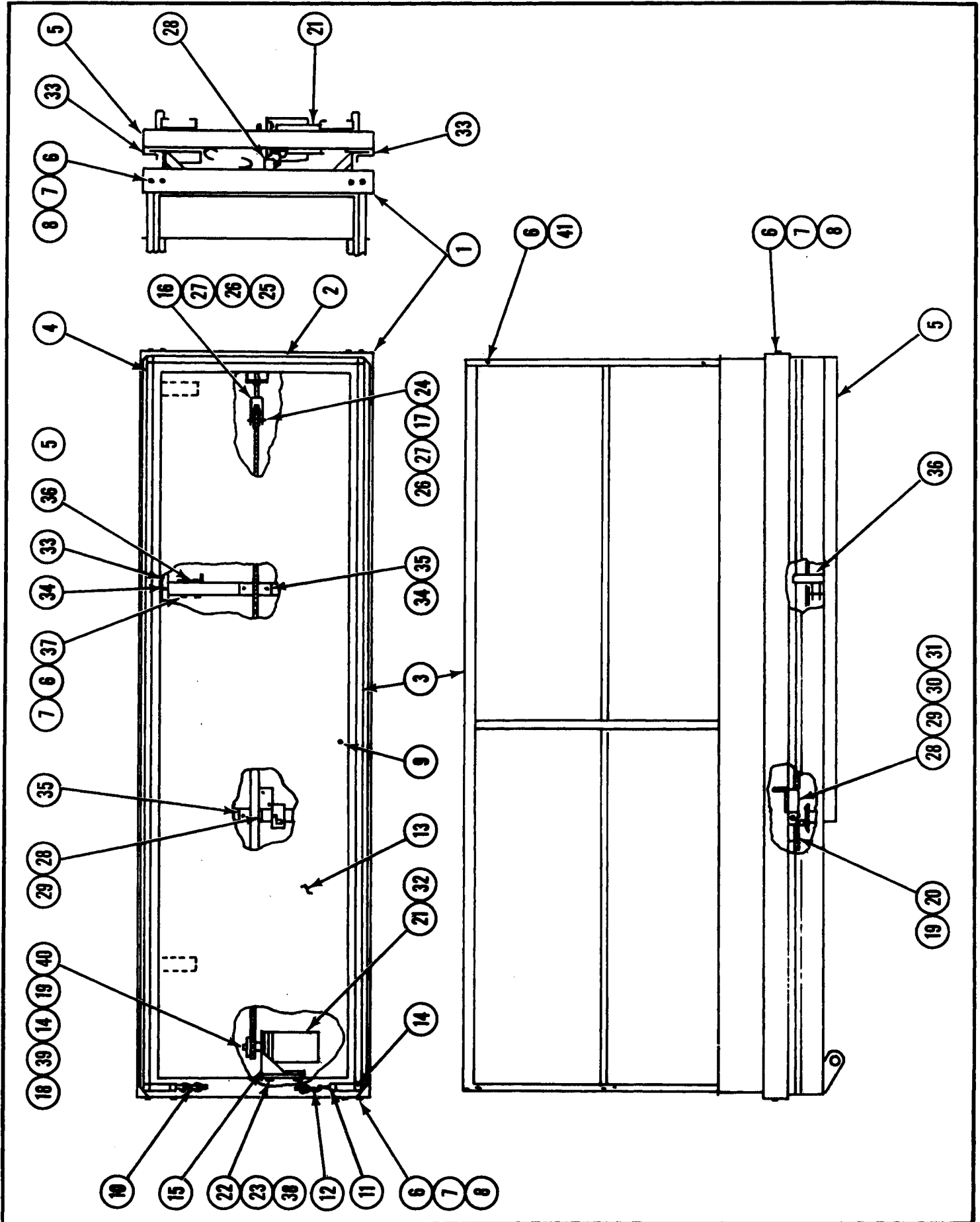
| ITEM | QTY   | PART NO.    | DESCRIPTION                                     |
|------|-------|-------------|-------------------------------------------------|
| 1    | 1     | 130335      | PLATFORM ASSEMBLY                               |
| 2    | 1     | 130615      | SCISSOR ASSEMBLY                                |
| 3    | 1     | 130483      | FRAME ASSEMBLY (MAC II: 130747)                 |
| 4    | 4     | 130696      | BOLT EAR PIVOT                                  |
| 5    | 4     | 61249       | NUT LOCK HEX HEAD                               |
| 6    | 1     | 30520       | PLATE PATENT NUMBER                             |
| 7    | 1     | 20660       | PLATE IDENTIFICATION                            |
| 8    | 2     | 2002        | DECAL - FORKLIFT BOOT                           |
| 9    | 1     | 2017        | DECAL - HYDRAULIC SYSTEM                        |
| 10   | 1     | 2003        | DECAL - BATTERY LEVEL                           |
| 11   | 2     | 31259       | DECAL - MARKLIFT                                |
| 12   | 4     | 2023        | DECAL - LOAD CAPACITY 750                       |
| 13   | 1     | 20661       | PLATE ANSI A92                                  |
| 14   | 1     | 130506      | DECAL - OPERATION INSTRUCTIONS (MAC II: 130801) |
| 15   | 2     | 2016        | DECAL - DO NOT WORK UNDER                       |
| 16   | 14    | 63654       | RIVET TOP 3/16 x 3/8 LG                         |
| 17   | 1     | 130422      | OPERATORS HANDBOOK                              |
| 18   | 50    | 256         | TIE CABLE                                       |
| 19   | 50    | 255         | TIE CABLE                                       |
| 20   | 13 GL | 65116       | HYDRAULIC OIL                                   |
| 21   | 1     | 130524      | DIAGRAM, HYDRAULIC HOSE (MAC II: 130769)        |
| 22   | 1     | 130499      | SCHEMATIC, HYDRAULIC (MAC II: 130773)           |
| 23   | 2 GL  | 65387/65389 | PAINT BLUE WATER BASE                           |
| 24   | 5 GL  | 16608       | PAINT WHITE WATER BASE                          |
| 25   | 1     | 65368       | KRYLON 1910 TRUE BLUE                           |

| ITEM | QTY | PART NO.  | DESCRIPTION                                 |
|------|-----|-----------|---------------------------------------------|
| 26   | 1   | 2673      | PAINT WHITE KIT KOTE 1221                   |
| 27   | 2   | 31109     | DECAL - CAUTION                             |
| 28   | 1   | 130337-49 | CABLE CONDUCTOR                             |
| 29   | 2   | 130507    | DECAL - MAC (MAC II: 130805)                |
| 30   | 12  | 375       | RIVET POP                                   |
| 31   | 1   | 130489    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130803) |
| 32   | 4   | 60342     | SCREW CAP HEX HEAD 1/4-20UNC x 5/8LG GR 5   |
| 33   | 4   | 63301     | WASHER LOCK SPLIT 1/4                       |
| 34   | 4   | 60701     | NUT HEX 1/4-20 UNC                          |
| 35   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                |
| 36   | 1   | 11064     | DECAL - ATTACH SAFETY CHAIN                 |
| 37   | 4   | 16268     | CLAMP CABLE                                 |
| 38   | 1   | 130500    | SCHEMATIC, ELECTRICAL (MAC II: 130759)      |
| 39   | 1   | 65581     | DOCUMENT, PLASTIC BAG                       |
| 40   | 8   | 65655     | CLAMP, CUSHIONED                            |
| 41   | 1   | 65463     | CLAMP (MAC II: 65787)                       |
| 42   | 1   | 765       | CLAMP RUBBER                                |
| 43   | 2   | 130596    | DECAL - A PRODUCT OF MARK INDUSTRIES        |
| 44   | 1   | 2568-15   | HOSE, HYDRAULIC                             |
| 45   | 1   | 2568-25   | HOSE, HYDRAULIC                             |
| 46   | 4   | 2562      | SAE 37 <sup>0</sup> SWIVEL                  |



| ITEM | QTY    | PART NO. | DESCRIPTION                                  |
|------|--------|----------|----------------------------------------------|
| 1    | 1      | 130358   | PLATFORM ASSEMBLY                            |
| 2    | 1      | 130250   | SCISSOR ASSEMBLY                             |
| 3    | 1      | 130289   | FRAME ASSEMBLY (MAC II: 130746)              |
| 4    | 4      | 130696   | BOLT EAR PIVOT                               |
| 5    | 4      | 61249    | NUT LOCK HEX HEAD                            |
| 6    | 1      | 30520    | PLATE PATENT NUMBER                          |
| 7    | 1      | 20660    | PLATE IDENTIFICATION                         |
| 8    | 1      | 20661    | PLATE ANSI A92                               |
| 9    | 1      | 130422   | OPERATORS HANDBOOK                           |
| 10   | 13 GAL | 65116    | HYDRAULIC OIL                                |
| 11   | 1      | 130420   | SCHEMATIC, ELECTRICAL (MAC II: 130760)       |
| 12   | 1      | 130419   | SCHEMATIC, HYDRAULIC (MAC II: 130772)        |
| 13   | 1      | 130488   | ASSEMBLY, UPPER CONTROL BOX (MAC II: 130743) |
| 14   | 1      | 2568-15  | HOSE, HYDRAULIC                              |
| 15   | 1      | 2568-25  | HOSE, HYDRAULIC                              |
| 16   | 4      | 2594     | SAE 37 <sup>0</sup> SWIVEL                   |
|      |        | 130801   | OPERATION INSTRUCTION DECAL                  |
|      |        | 130802   | EMERGENCY DOWN INSTRUCTION DECAL             |

FIGURE 22 PLATFORM ASSY. MAC 20S(130335) & MAC 20ST(130358)



| ITEM | QTY | PART NO. | DESCRIPTION                             |
|------|-----|----------|-----------------------------------------|
| 1    | 1   | 130306   | WELDMENT PLATFORM -20ST                 |
|      |     | 130342   | WELDMENT PLATFORM - 20S                 |
| 2    | 1   | 130313   | GUARD RAIL FRONT                        |
| 3    | 1   | 130314   | GUARD RAIL SIDE L.H.                    |
| 4    | 1   | 130315   | GUARD RAIL SIDE R.H.                    |
| 5    | 1   | 130363   | WELDMENT TOP FRAME                      |
| 6    | 14  | 60337    | SCREW CAP HEX HEAD 1/4-20UNC x 3 LG     |
| 7    | 8   | 63301    | WASHER LOCK SPLIT 1/4                   |
| 8    | 8   | 60701    | NUT, HEX 1/4-20UNC                      |
| 9    | 10  | 61713    | SCREW SELF TAPPING 1/4-20UNC x 1 1/4    |
| 10   | 2   | 65544    | CHAIN LINK                              |
| 11   | 2   | 65636    | CHAIN LINK                              |
| 12   | 2   | 65637    | SNAP OPEN END BOLT                      |
| 13   | 1   | 130397   | PLYWOOD                                 |
| 14   | 4   | 91541    | CAP PLUG                                |
| 15   | 1   | 130319   | WELDMENT BRACKET HYDRAULIC MOTOR        |
| 16   | 1   | 130320   | WELDMENT CLEVIS                         |
| 17   | 1   | 65585    | IDLER SPROCKET                          |
| 18   | 1   | 65578    | SPROCKET STEEL 5/8 PITCH                |
| 19   | 1   | 65579    | CHAIN SELF LUBRICATED                   |
| 20   | 1   | 65580    | MASTER LINK                             |
| 21   | 1   | 130341   | ASSEMBLY HYDRAULIC MOTOR                |
| 22   | 4   | 60343    | SCREW CAP HEX HEAD 3/8-16UNC x 1LG GR 5 |
| 23   | 4   | 63319    | WASHER LOCK SPLIT 3/8                   |
| 24   | 1   | 60370    | SCREW CAP HEX HEAD 1/2-13UNC x 1LG GR 5 |
| 25   | 2   | 63415    | WASHER FLAT 1/2                         |
| 26   | 2   | 63305    | WASHER LOCK SPLIT 1/2                   |

| ITEM | QTY | PART NO.          | DESCRIPTION                                              |
|------|-----|-------------------|----------------------------------------------------------|
| 27   | 3   | 61242             | NUT LOCK 1/2-13UNC                                       |
| 28   | 1   | 20803             | SWITCH LIMIT                                             |
| 29   | 1   | 70169             | LEVER LIMIT SWITCH                                       |
| 30   | 2   | 62615             | SCREW MACHINE ROD HEAD SLOTTED 1/2-13UNC X 1LG           |
| 31   | 2   | 63313             | WASHER LOCK SPLIT                                        |
| 32   | 2   | 60326             | SCREW CAP HEX HEAD 1/2-13UNC x 1LG GR 5                  |
| 33   | 2   | 31058             | WEAR PAD                                                 |
| 34   | 20  | 16217             | RIVET, POP                                               |
| 35   | 4   | 130399            | WEAR PAD                                                 |
| 36   | 1   | 130371            | STOP                                                     |
| 37   | 2   | 60318             | SCREW CAP HEX HEAD 1/4-20UNC x 2 1/4LG GR 5              |
| 38   | 4   | 60703             | NUT HEX 3/8-16UNC                                        |
| 40   | 1   | 60342             | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5               |
| 41   | 4   | 61227             | NUT, HEX LOCK 1/4-20UNC NYLON                            |
|      |     |                   | FOR MACHINES WITH <u>OPTIONAL</u> FOLD DOWN GUARD RAILS: |
|      |     | 130681            | PLATFORM ASSEMBLY (130655 for 20S)                       |
|      |     | 130664            | SIDE RAIL R.H.                                           |
|      |     | 130665            | SIDE RAIL L.H.                                           |
|      |     | 130701/<br>130703 | FRONT RAIL                                               |



FIGURE 23 SCISSOR ASSY. MAC 20S(130615), MAC 20ST(130250)  
MAC 20(130615), & MAC 20T(130250)

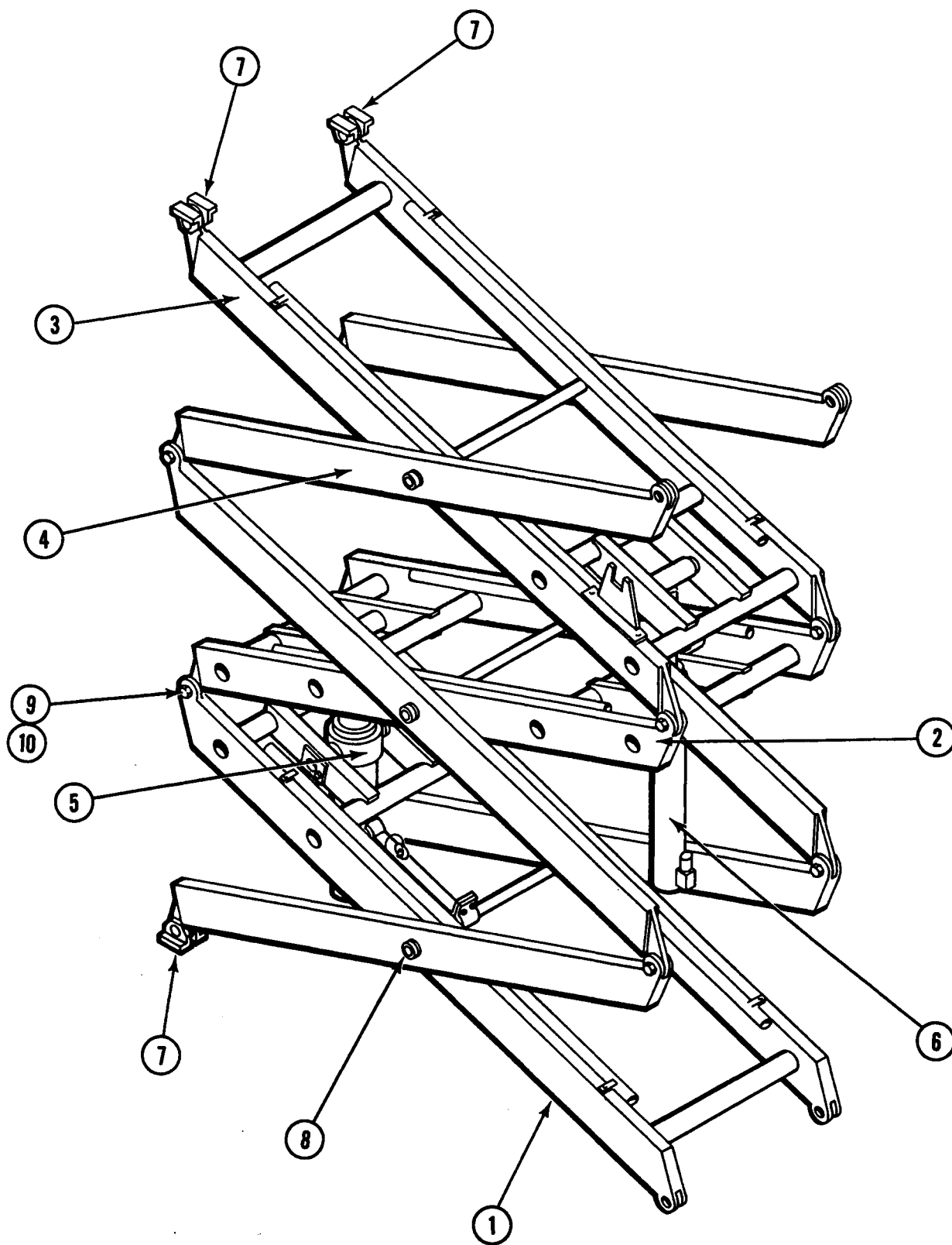


FIGURE 23 SCISSOR ASSY. MAC 20S(130615), MAC 20ST(130250)  
MAC 20(130615), & MAC 20T(130250)

| ITEM | QTY | PART NO. | DESCRIPTION                         |
|------|-----|----------|-------------------------------------|
| 1    | 1   | 130262   | INNER ARM ASSEMBLY                  |
| 2    | 1   | 130268   | INNER ARM ASSEMBLY                  |
| 3    | 1   | 130272   | INNER ARM ASSEMBLY                  |
| 4    | 6   | 130254   | OUTER ARM ASSEMBLY                  |
| 5    | 1   | 130516   | * TELESCOPIC LIFT CYLINDER ASSEMBLY |
| 6    | 1   | 130324   | * STANDARD LIFT CYLINDER ASSEMBLY   |
| 7    | 8   | 130326   | WEAR PAD                            |
| 8    | 6   | 130493   | PIN, TRUNNION                       |
| 9    | 4   | 130696   | BOLT EAR PIVOT                      |
| 10   | 4   | 61249    | NUT LOCK HEX HEAD 3/4-10UNC         |
| 5    | 1   | 130481   | * LIFT CYLINDER (FOR 130516)        |
|      |     | 66648    | SEAL KIT                            |
| 6    | 1   | 130204   | * LIFT CYLINDER (FOR 130324)        |
|      |     | 66650    | SEAL KIT                            |
|      |     |          | <u>FOR MAC II</u>                   |
| 5    | 1   | 130789   | TELESCOPIC LIFT CYLINDER ASSEMBLY   |
|      |     | 130788   | LIFT CYLINDER                       |
|      |     | 66818    | SEAL KIT                            |
| 6    | 1   | 130791   | STANDARD LIFT CYLINDER ASSEMBLY     |
|      |     | 130790   | LIFT CYLINDER                       |
|      |     | 66822    | SEAL KIT                            |

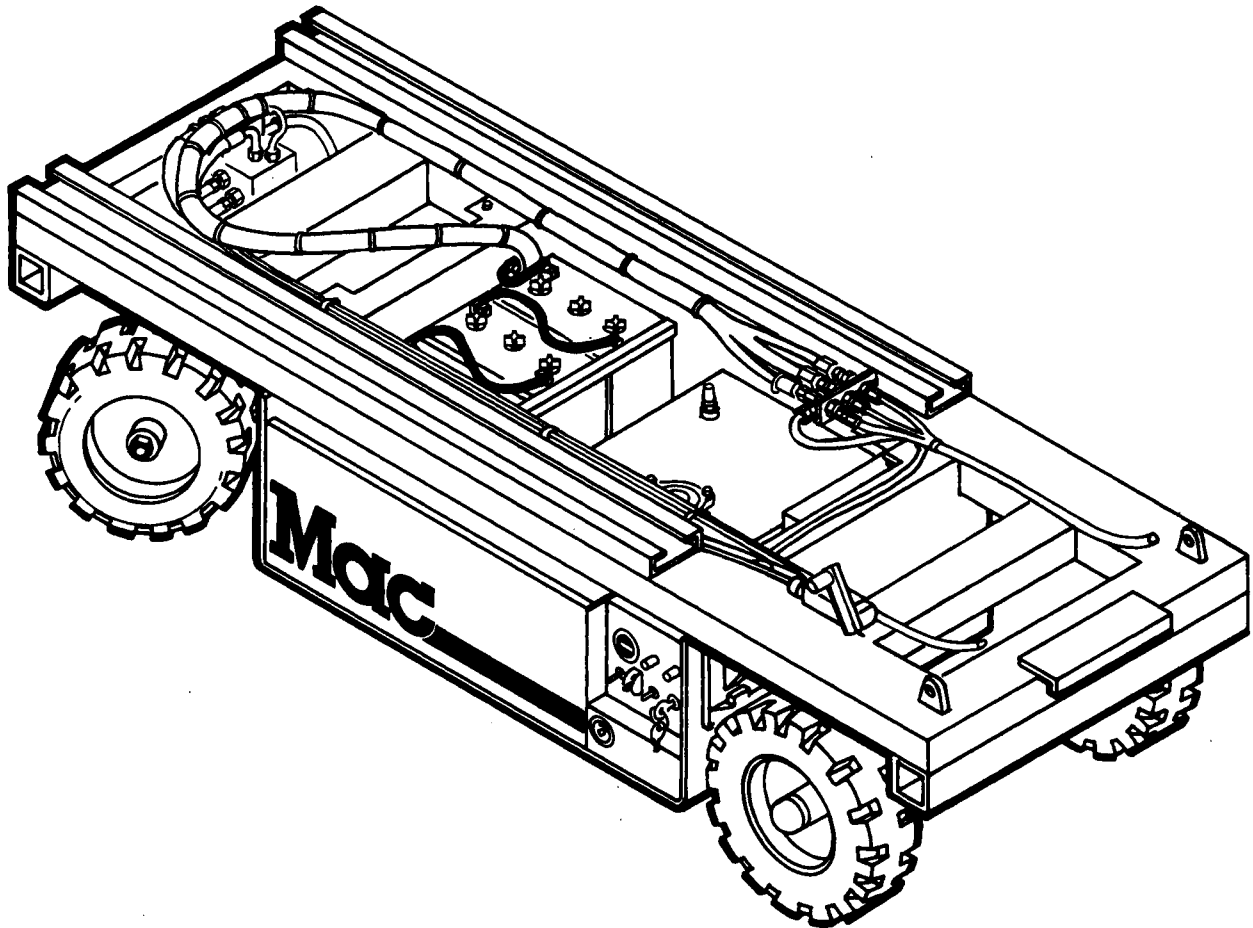
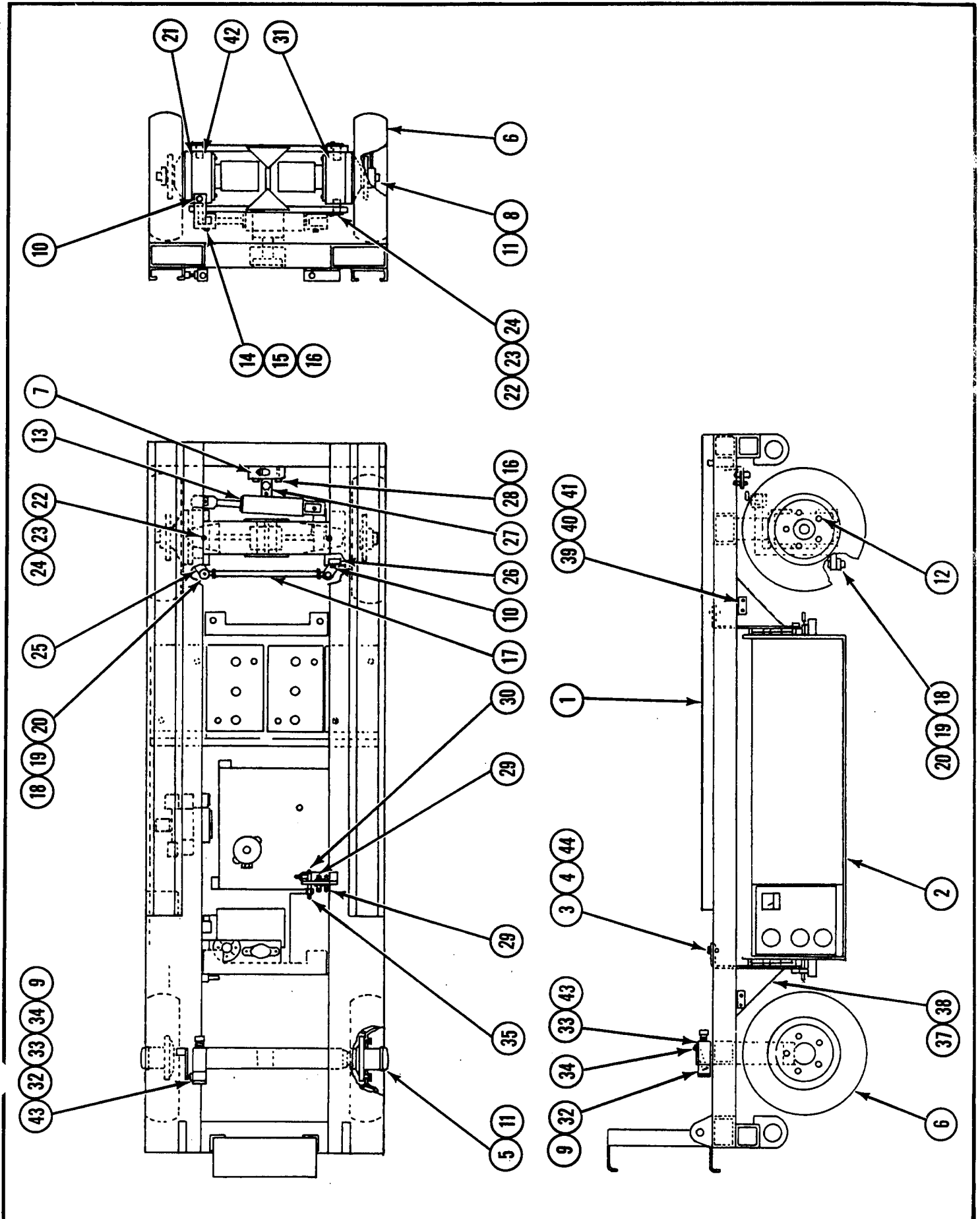


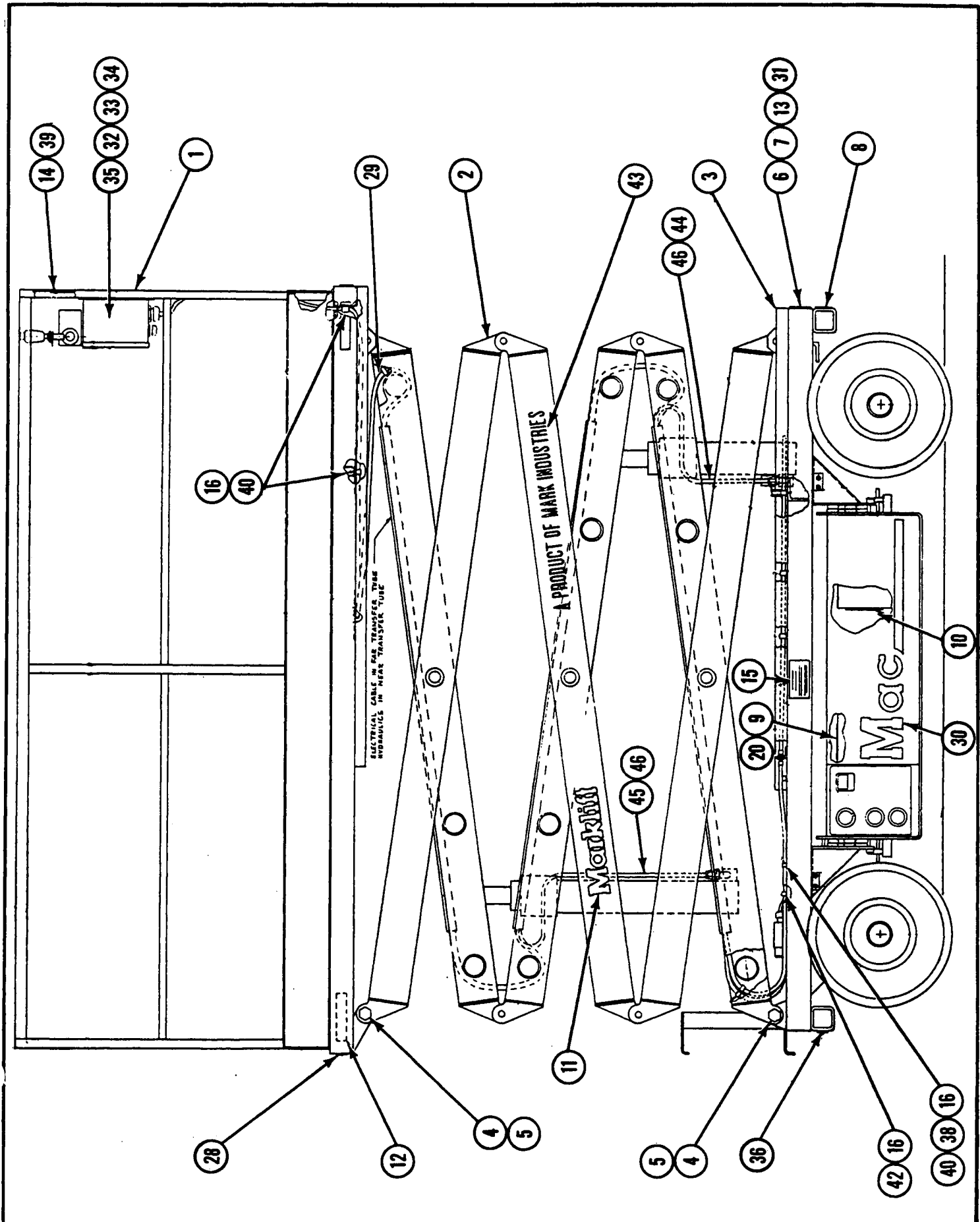
FIGURE 25 FRAME ASSY. MAC 20S(130483) & MAC 20ST(130289)  
130747 & 130746 - MAC II



| ITEM | QTY | PART NO. | DESCRIPTION                                 |
|------|-----|----------|---------------------------------------------|
| 1    | 1   | 130334   | WELDMENT FRAME (MAC II: 170738, 20S & 20ST) |
| 2    | 1   | 130293   | ASSEMBLY, BELLY PAN -20ST (MAC II: 130714)  |
|      |     | 130497   | ASSEMBLY, BELLY PAN - 20S (MAC II: 130758)  |
| 3    | 4   | 60311    | SCREW, H.H.C. 1/2-13UNC x 1 1/4LG GR 5      |
| 4    | 8   | 63415    | WASHER FLAT 1/2 NOM                         |
| 5    | 2   | 134      | ASSEMBLY, HUB                               |
| 6    | 4   | 30786    | ASSEMBLY, TIRE & WHEEL SOLID                |
| 7    | 1   | 130305   | ASSEMBLY, FLOW DIVIDER                      |
| 8    | 2   | 31158    | MACHINING HUB                               |
| 9    | 1   | 2806     | STRAIN RELIEF (MAC II: 70288, 20S & 20ST)   |
| 10   | 5   | 60622    | SCREW, H.H.C. 1/2-13UNC x 1 1/2LG           |
| 11   | 4   | 64306    | PIN, COTTER                                 |
| 12   | 10  | 34044    | BOLT, CONE                                  |
| 13   | 1   | 130237   | ASSEMBLY, STEERING CYLINDER                 |
| 14   | 2   | 20252    | PIN, STEERING CYLINDER ANCHOR               |
| 15   | 2   | 60353    | SCREW, H.H.C. 1/2-13UNC x 1 1/2LG           |
| 16   | 4   | 63301    | WASHER, LOCK SPLIT 1/4 NOM                  |
| 17   | 1   | 130302   | ASSEMBLY, TIE ROD                           |
| 18   | 2   | 60393    | SCREW, H.H.C 1/2-13UNC x 2 LG GR 5          |
| 19   | 2   | 61242    | NUT, HEX. 1/2-13UNC                         |
| 20   |     |          | WASHER, LOCK SPLIT 1/2 NOM                  |
| 21   | 1   | 130442   | ASSEMBLY DRIVE MOTOR BRAKE                  |
| 22   | 4   | 130474   | PIN, STEERING                               |
| 23   | 4   | 60338    | SCREW, H.H.C 5/16-18UNC x 1LG GR 5          |
| 24   | 4   | 63302    | WASHER, LOCK SPLIT 5/16 NOM                 |
| 25   | 1   | 130393   | MACHINING STEERING LEVER ARM L.H.           |
| 26   | 1   | 130394   | MACHINING STEERING LEVER ARM R.H.           |

| ITEM | QTY | PART NO.      | DESCRIPTION                                                        |
|------|-----|---------------|--------------------------------------------------------------------|
| 27   | 1   | 130480        | ASSEMBLY BULKHEAD BRAKE & DRIVE                                    |
| 28   | 2   | 60318         | SCREW, H.H.C 1/4-20UNC x 2 1/4LG GR 5                              |
| 29   | 2   | 80045-03      | UNION, BULKHEAD                                                    |
| 30   | 1   | 80032-05      | TEE, BULKHEAD                                                      |
| 31   | 1   | 130490        | ASSEMBLY DRIVE MOTOR/BRAKE L.H.                                    |
| 32   | 1   | 20803         | SWITCH, LIMIT (MAC II: 70107, 20S & 20ST)                          |
| 33   | 2   | 62615         | SCREW, ROUND HEAD SLT. 10-32UNF x 1 3/4LG                          |
| 34   | 1   | 70032         | LEVER, OPERATING                                                   |
| 35   | 2   | 80056-01      | REDUCER, TUBE END                                                  |
| 36   | 1   | 130523/130524 | DIAGRAM HYDRAULIC HOSE MAC 20ST/ MAC 20S<br>(MAC II:130769 S & ST) |
| 37   | 2   | 130598        | GUSSET R.H.                                                        |
| 38   | 2   | 130597        | GUSSET L.H.                                                        |
| 39   | 8   | 60343         | SCREW, CAP 3/8-16UNC x 1LG HEX HEAD                                |
| 40   | 8   | 63319         | WASHER, LOCK 3/8 SPLIT                                             |
| 41   | 8   | 60703         | NUT, HEX 3/8-16UNC                                                 |
| 42   | 2   | 65658         | BEARING, THRUST                                                    |
| 43   | 2   | 63313         | WASHER, LOCK NO. 10, SPLIT - 20ST                                  |
| 44   | 4   | 61305         | NUT, LOCK 1/2-13UNC                                                |
| 45   | 2   | 60811         | HEX SLOTTED NUT 1-14 UNC                                           |
| 46   | 2   | 63409         | WASHER FLAT 1" SAE                                                 |

FIGURE 26 FINAL ASSEMBLY MAC 20 - 130005  
130025 - MAC II

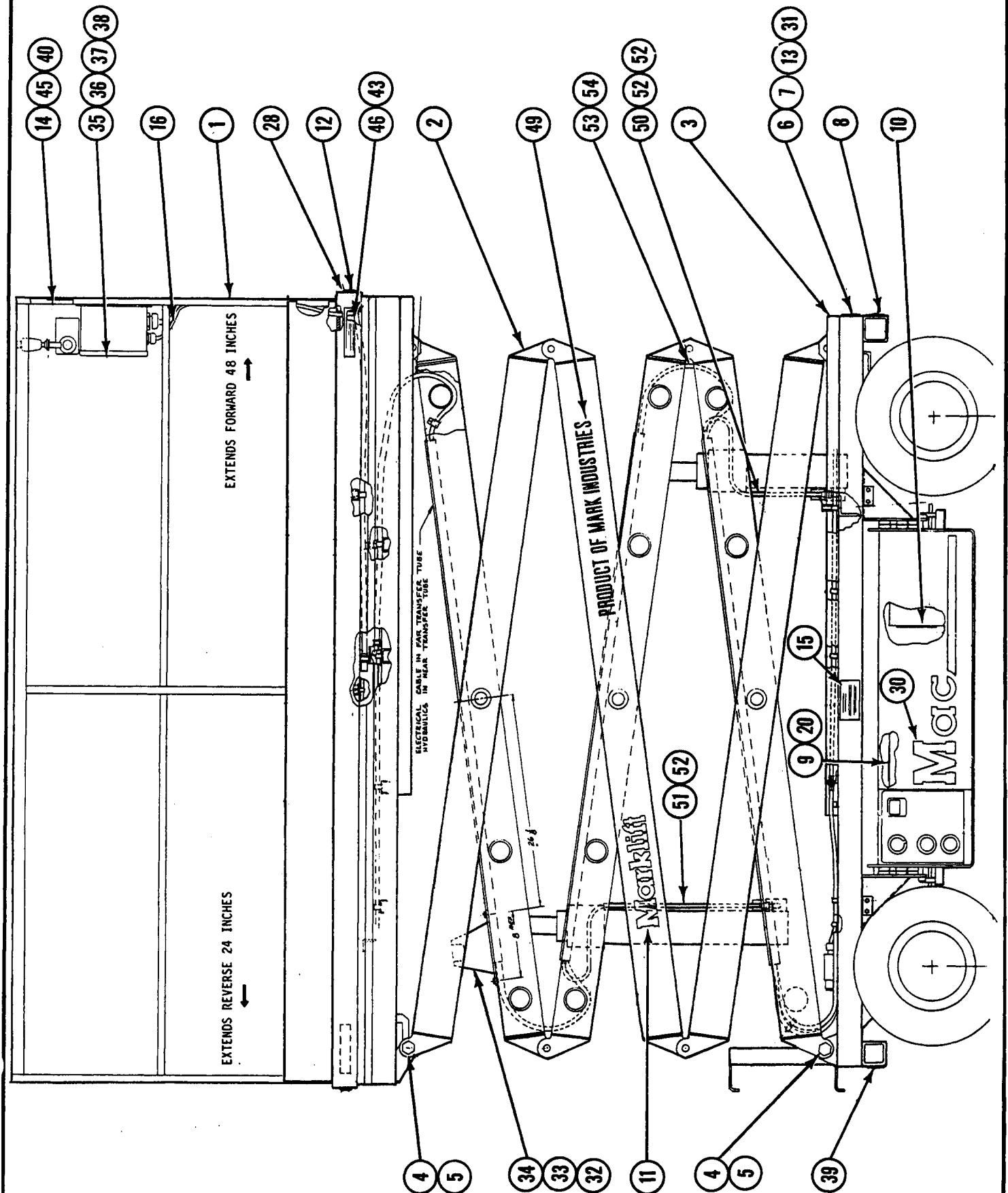


| ITEM | QTY    | PART NO. | DESCRIPTION                                           |
|------|--------|----------|-------------------------------------------------------|
| 1    | 1      | 130347   | PLATFORM ASSEMBLY                                     |
| 2    | 1      | 130615   | SCISSOR ASSEMBLY                                      |
| 3    | 1      | 130484   | FRAME ASSEMBLY (MAC II: 130749)                       |
| 4    | 4      | 130696   | BOLT EAR PIVOT                                        |
| 5    | 4      | 61249    | NUT LOCK HEX HEAD 3/4-10UNC                           |
| 6    | 1      | 30520    | PLATE PATENT NUMBER                                   |
| 7    | 1      | 20660    | PLATE IDENTIFICATION                                  |
| 8    | 2      | 2002     | DECAL - FORKLIFE BOOT                                 |
| 9    | 1      | 2017     | DECAL - HYDRAULIC SYSTEM                              |
| 10   | 1      | 2003     | DECAL - BATTERY WATER LEVEL                           |
| 11   | 2      | 31259    | DECAL - MARKLIFT                                      |
| 12   | 4      | 2023     | DECAL - LOAD CAPACITY 750 LBS (MAC II: 2024, 1000lbs) |
| 13   | 1      | 20661    | PLATE ANSI A92                                        |
| 14   | 1      | 130506   | DECAL - OPERATION INSTRUCTION (MAC II: 130801)        |
| 15   | 2      | 2016     | DECAL - DO NOT WORK UNDER                             |
| 16   | 19     | 63654    | RIVET POP 3/16 x 3/8 LG                               |
| 17   | 1      | 130422   | OPERATORS HANDBOOK                                    |
| 18   | 50     | 256      | TIE CABLE                                             |
| 19   | 50     | 255      | TIE CABLE                                             |
| 20   | 13 GAL | 65116    | HYDRAULIC OIL                                         |
| 21   | 1      | 130498   | DIAGRAM HYDRAULIC HOSE (MAC II: 130808)               |
| 22   | 1      | 130499   | SCHEMATIC HYDRAULIC (MAC II: 130773)                  |
| 23   | 1      | 130500   | SCHEMATIC ELECTRICAL (MAC II: 130759)                 |
| 24   | 2 GAL  | 65389    | PAINT BLUE WATER BASE                                 |
| 25   | 5 GAL  | 16608    | PAINT WHITE WATER BASE                                |
| 26   | 1      | 65638    | KRYLON 1910 TRUE BLUE                                 |



| ITEM | QTY | PART NO.  | DESCRIPTION                                      |
|------|-----|-----------|--------------------------------------------------|
| 27   | 1   | 2673      | PAINT WHITE KIT KOTE 1221                        |
| 28   | 2   | 31109     | DECAL - CAUTION                                  |
| 29   | 1   | 130337-51 | CABLE CONDUCTOR 51 FT                            |
| 30   | 2   | 130507    | DECAL - MAC                                      |
| 31   | 12  | 375       | RIVET POP                                        |
| 32   | 1   | 130489    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130803)      |
| 33   | 4   | 60342     | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5       |
| 34   | 4   | 63301     | WASHER LOCK SPLIT 1/4                            |
| 35   | 4   | 60701     | NUT HEX 1/4-20UNC                                |
| 36   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                     |
| 37   | 1   | 11064     | DECAL - SAFETY CHAIN                             |
| 38   | 4   | 16268     | CLAMP CABLE                                      |
| 39   | 1   | 65581     | DOCUMENT PLASTIC BAG                             |
| 40   | 8   | 65655     | CLAMP CUSHIONED                                  |
| 41   | 1   | 65463     | CLAMP                                            |
| 42   | 1   | 765       | CLAMP RUBBER                                     |
| 43   | 2   | 130596    | DECAL - A PRODUCT OF MARK INDUSTRIES             |
| 44   | 1   | 2568-15   | HOSE, HYDRAULIC                                  |
| 45   | 1   | 2568-25   | HOSE, HYDRAULIC                                  |
| 46   | 4   | 2594      | SAE 37 <sup>0</sup> SWIVEL 90 <sup>0</sup> ELBOW |

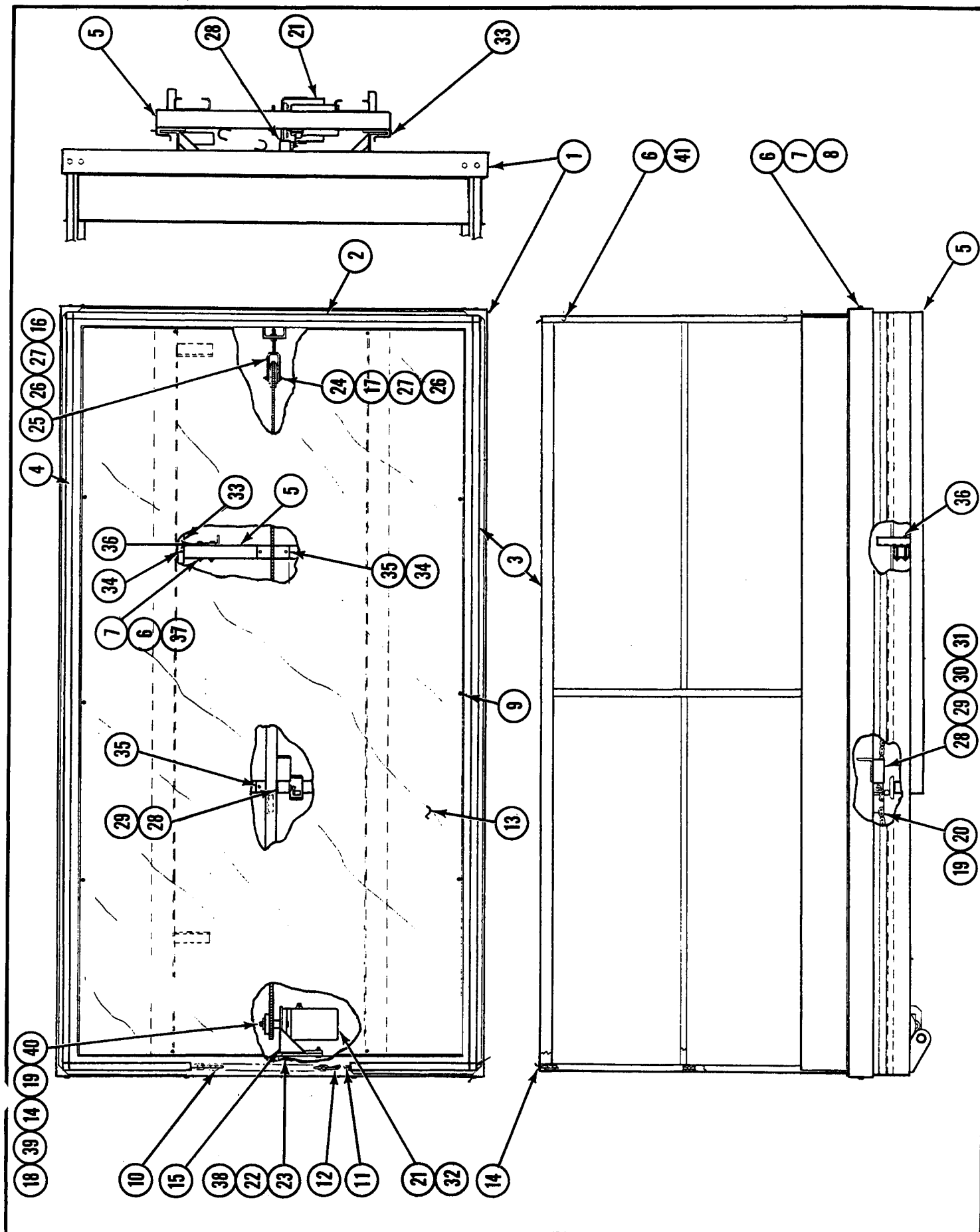
FIGURE 27 MAC 20T FINAL ASSEMBLY - 130004  
130024 - MAC II



| ITEM | QTY   | PART NO.  | DESCRIPTION                                    |
|------|-------|-----------|------------------------------------------------|
| 1    | 1     | 130348    | PLATFORM ASSEMBLY                              |
| 2    | 1     | 130250    | SCISSOR ASSEMBLY                               |
| 3    | 1     | 130290    | FRAME ASSEMBLY (MAC II: 130748)                |
| 4    | 4     | 130696    | BOLT EAR PIVOT                                 |
| 5    | 4     | 61249     | NUT LOCK HEX HEAD 3/4-10UNC                    |
| 6    | 1     | 30520     | PLATE PATENT NUMBER                            |
| 7    | 1     | 20660     | PLATE IDENTIFICATION                           |
| 8    | 2     | 2002      | DECAL - FORKLIFT BOOT                          |
| 9    | 1     | 2017      | DECAL - HYDRAULIC SYSTEM                       |
| 10   | 1     | 2003      | DECAL - BATTERY WATER LEVEL                    |
| 11   | 2     | 31259     | DECAL - MARKLIFT                               |
| 12   | 4     | 2023      | DECAL - LOAD CAPACITY 750                      |
| 13   | 1     | 20661     | PLATE ANSI A92                                 |
| 14   | 1     | 130506    | DECAL - OPERATION INSTRUCTION (MAC II: 130801) |
| 15   | 2     | 2016      | DECAL - DO NOT WORK UNDER                      |
| 16   | 1     | 70036-156 | CABLE (MAC II: 90547-156)                      |
| 17   | 1     | 130422    | OPERATORS HANDBOOK                             |
| 18   | 50    | 256       | TIE CABLE                                      |
| 19   | 50    | 255       | TIE CABLE                                      |
| 20   | 13 GL | 65116     | HYDRAULIC OIL                                  |
| 21   | 1     | 130418    | DIAGRAM, HYDRAULIC HOSE (MAC II: 130808)       |
| 22   | 1     | 130419    | SYSTEM HYDRAULIC (MAC II: 130772)              |
| 23   | 1     | 130420    | SCHEMATIC, ELECTRIC: (MAC II: 130760)          |
| 24   | 2 GL  | 65389     | PAINT BLUE WATER BASE                          |
| 25   | 5 GL  | 16608     | PAINT WHITE WATER BASE                         |
| 26   | 1     | 65368     | KRYLON -1910 TRUE BLUE                         |

| ITEM | QTY | PART NO.  | DESCRIPTION                                 |
|------|-----|-----------|---------------------------------------------|
| 27   | 1   | 2673      | PAINT WHITE KIT KOTE 12                     |
| 28   | 2   | 31109     | DECAL - CAUTION                             |
| 29   | 1   | 130337-57 | CABLE CONNECTOR                             |
| 30   | 2   | 130507    | DECAL - MAC (MAC II: 130805)                |
| 31   | 12  | 375       | RIVET TOP                                   |
| 32   | 1   | 130478    | WELDMENT LOCK BRACKET                       |
| 33   | 2   | 60322     | SCREW CAP HEX HEAD 5/16-18UNC x 3/4LG GR 5  |
| 34   | 2   | 63302     | WASHER SPLIT LOCK 5/16                      |
| 35   | 1   | 130488    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130743) |
| 36   | 4   | 60342     | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5  |
| 37   | 4   | 63301     | WASHER LOCK SPLIT 1/4                       |
| 38   | 4   | 60701     | NUT HEX 1/4-20UNC                           |
| 39   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                |
| 40   | 1   | 11064     | DECAL - SAFETY CHAIN                        |
| 41   | 4   | 16268     | CLAMP CABLE                                 |
| 42   | 2   | 65451     | CLAMP HOSE                                  |
| 43   | 20  | 63654     | RIVET POP 5/16 x 3/8 LG                     |
| 44   | 1   | 31034     | HOSE                                        |
| 45   | 1   | 65581     | DOCUMENT PLASTIC BAG                        |
| 46   | 9   | 65655     | CLAMP, CUSHIONED                            |
| 47   | 1   | 65463     | CLAMP                                       |
| 48   | 12  | 765       | CLAMP RUBBER                                |
| 49   | 2   | 130596    | DECAL - A PRODUCT OF MARK INDUSTRIES        |
| 50   | 1   | 2568-15   | HOSE, HYDRAULIC                             |
| 51   | 1   | 2568-25   | HOSE, HYDRAULIC                             |
| 52   | 7   | 2562      | SAE 37 <sup>0</sup> SWIVEL                  |

| ITEM | QTY | PART NO. | DESCRIPTION                                      |
|------|-----|----------|--------------------------------------------------|
| 53   | 2   | 2568-40  | HOSE, HYDRAULIC                                  |
| 54   | 1   | 2594     | SAE 37 <sup>0</sup> SWIVEL 90 <sup>0</sup> ELBOW |
|      |     | 130606   | DECAL, FREE WHEELING                             |
|      |     | 130802   | DECAL, EMERGENCY DOWN INSTRUCTIONS               |



| ITEM | QTY | PART NO. | DESCRIPTION                                      |
|------|-----|----------|--------------------------------------------------|
| 1    | 1   | 130349   | WELDMENT PLATFORM- MAC 20T                       |
|      |     | 130344   | WELDMENT PLATFORM - 20                           |
| 2    | 1   | 130356   | GUARD RAIL FRONT                                 |
| 3    | 1   | 130355   | GUARD RAIL SIDE L.H.                             |
| 4    | 1   | 130354   | GUARD RAIL SIDE R.H.                             |
| 5    | 1   | 130363   | WELDMENT TOP FRAME                               |
| 6    | 14  | 60337    | SCREW CAP HEX HEAD 1/4-20UNC x 3 LG              |
| 7    | 14  | 63301    | WASHER LOCK SPLIT 1/4                            |
| 8    | 12  | 60701    | NUT HEX 1/4-20UNC                                |
| 9    | 10  | 61713    | SCREW SELF TAPPING 1/4-20UNC x 1 1/4 #2 PHL FL H |
| 10   | 2   | 65544    | CHAIN, LINK                                      |
| 11   | 2   | 65636    | CHAIN, LINK                                      |
| 12   | 2   | 65637    | SNAP, OPEN END BOLT                              |
| 13   | 1   | 130398   | PLYWOOD FLOOR                                    |
| 14   | 4   | 91541    | CAP PLUG                                         |
| 15   | 1   | 130319   | WELDMENT BRACKET HYDRAULIC MOTOR                 |
| 16   | 1   | 130320   | WELDMENT CLEVIS                                  |
| 17   | 1   | 65585    | IDLER SPROCKET                                   |
| 18   | 1   | 65578    | SPROCKET STEEL 5/8 PITCH                         |
| 19   | 1   | 65579    | CHAIN SELF LUBRICATING                           |
| 20   | 2   | 65580    | MASTER LINK                                      |
| 21   | 1   | 130341   | ASSEMBLY HYDRAULIC MOTOR                         |
| 22   | 4   | 60307    | SCREW CAP HEX HEAD 3/8-16UNC x 1 1/2 LG GR 5     |
| 23   | 4   | 63319    | WASHER LOCK SPLIT 3/8                            |
| 24   | 1   | 60370    | SCREW CAP HEX HEAD 1/2-13UNC x 2 LG GR 5         |
| 25   | 2   | 63415    | WASHER FLAT 1/2                                  |
| 26   | 2   | 63305    | WASHER LOCK SPLIT 1/2                            |

| ITEM | QTY | PART NO. | DESCRIPTION                                     |
|------|-----|----------|-------------------------------------------------|
| 27   | 3   | 61242    | NUT LOCK                                        |
| 28   | 1   | 20803    | SWITCH LIMIT                                    |
| 29   | 1   | 70169    | LEVER LIMIT SWITCH                              |
| 30   | 2   | 62615    | SCREW MACHINE RD HD SLOTTED 10-32UNF x 1 3/4 LG |
| 31   | 3   | 63313    | WASHER LOCK SPLIT 10                            |
| 32   | 2   | 60326    | SCREW CAP HEX HEAD 1/2-13UNC x 1 LG GR 5        |
| 33   | 2   | 31058    | WEAR PAD                                        |
| 34   | 20  | 16217    | RIVET POP                                       |
| 35   | 4   | 130399   | WEAR PAD                                        |
| 36   | 1   | 130371   | STOP                                            |
| 37   | 2   | 60318    | SCREW CAP HEX HEAD 1/4-20UNC x 2 1/4 LG GR 5    |
| 38   | 4   | 60703    | NUT HEX 3/8-16UNC                               |
| 39   | 1   | 31061    | WASHER DRUM                                     |
| 40   | 1   | 60342    | SCREW CAP HEX HEAD 1/4-20UNC x 5/8 LG GR 5      |
| 41   | 4   | 61227    | NUT, HEX LOCK 1/4-20UNC NYLON                   |



FIGURE 29 FRAME ASSEMBLY MAC 20(130484) & MAC 20T(130290)  
130749 & 130748 - MAC II

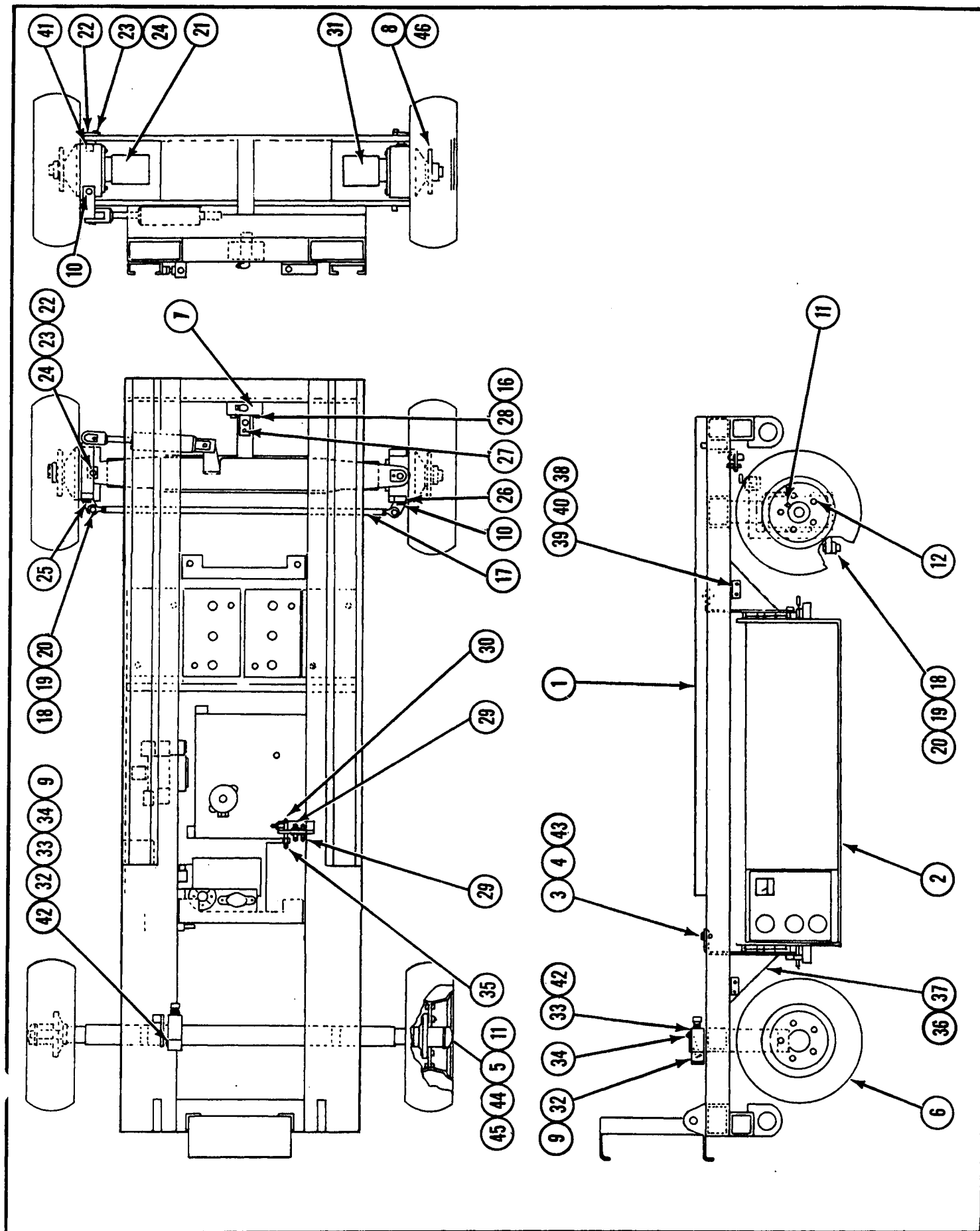


FIGURE 29 FRAME ASSEMBLY MAC 20(130484) & MAC 20T(130290)  
130749 & 130748 - MAC II

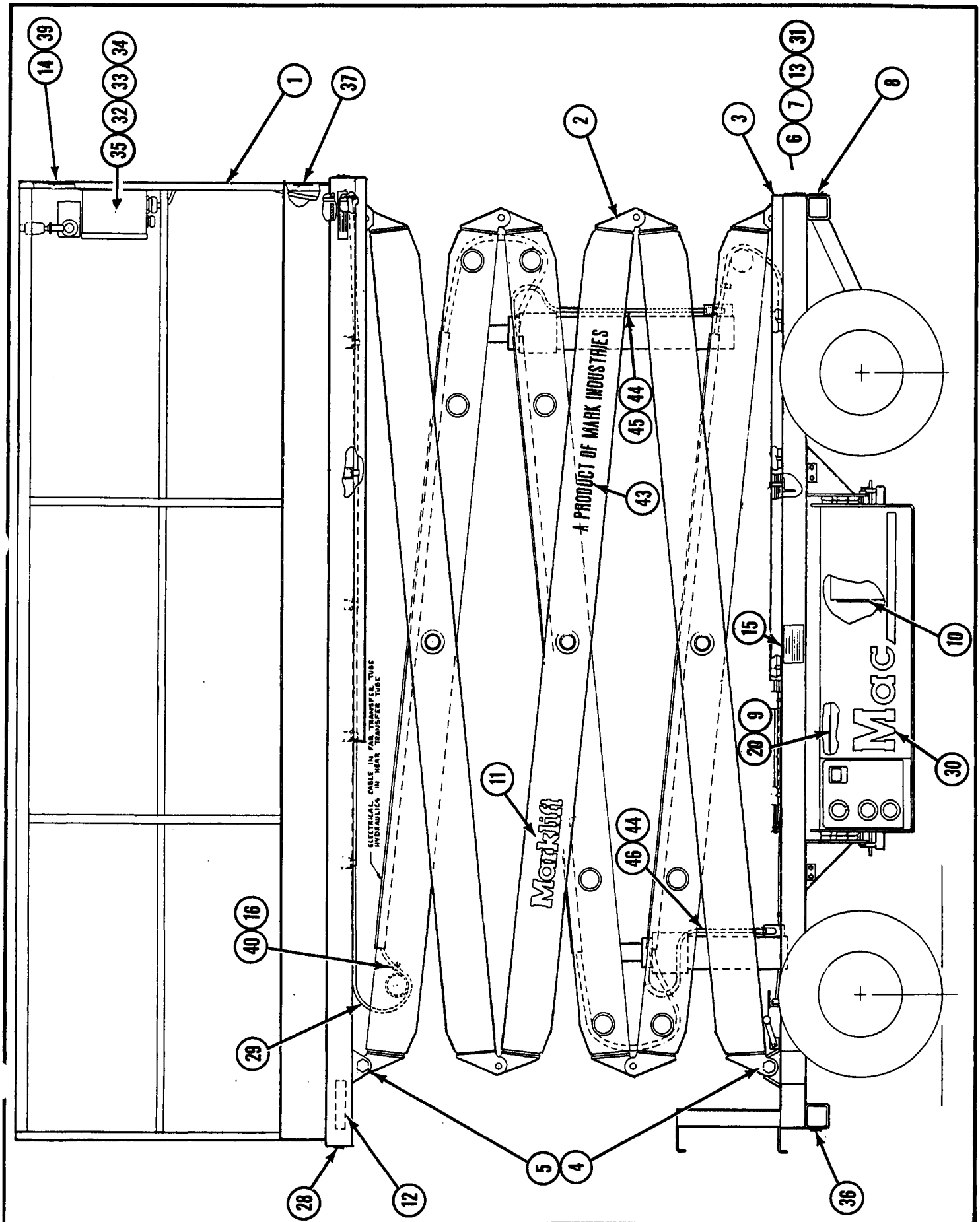
112

| ITEM | QTY | PART NO. | DESCRIPTION                               |
|------|-----|----------|-------------------------------------------|
| 1    | 1   | 130372   | WELDMENT FRAME (MAC II: 130739, 20 & 20T) |
| 2    | 1   | 130293   | ASSEMBLY, BELLY PAN -20T (MAC II: 130714) |
|      |     | 130497   | ASSEMBLY, BELLY PAN - 20 (MAC II: 130758) |
| 3    | 4   | 60311    | SCREW, H.H.C 1/2-13UNC x 1 1/4LG GR 5     |
| 4    | 8   | 63415    | WASHER, FLAT 1/2 NOM                      |
| 5    | 2   | 134      | ASSEMBLY, HUB                             |
| 6    | 4   | 130330   | ASSEMBLY, TIRE & WHEEL SOLID              |
| 7    | 1   | 130305   | ASSEMBLY, FLOW DIVIDER                    |
| 8    | 2   | 130425   | HUB, DRIVE                                |
| 9    | 1   | 2806     | STRAIN RELIEF (MAC II: 70288, 20 & 20T)   |
| 10   | 5   | 60622    | SCREW, H.H.C 1/2-13UNC x 1 1/2LG          |
| 11   | 4   | 64306    | PIN, COTTER                               |
| 12   | 10  | 61316    | NUT, LUG 1/2-20UNF                        |
| 13   | 1   | 130237   | ASSEMBLY, STEERING CYLINDER               |
| 14   | 2   | 20252    | PIN, STEERING CYLINDER ANCHOR             |
| 15   | 2   | 60353    | SCREW, H.H.C 1/4-20UNC x 1/2 LG GR 5      |
| 16   | 2   | 63301    | WASHER, LOCK SPLIT 1/4 NOM                |
| 17   | 1   | 130443   | ASSEMBLY, TIE ROD                         |
| 18   | 2   | 60370    | SCREW, H.H.C 1/2-13UNC x 1/2 LG GR 5      |
| 19   | 2   | 61242    | NUT, HEX 1/2-13UNC                        |
| 20   | 2   |          | WASHER, LOCK SPLIT 1/2 NOM                |
| 21   | 1   | 130442   | ASSEMBLY, DRIVE MOTOR BRAKE R.H.          |
| 22   | 4   | 130474   | PIN, STEERING                             |
| 23   | 4   | 60338    | SCREW, H.H.C 5/16-18UNC x 1LG GR 5        |
| 24   | 4   | 63302    | WASHER, LOCK SPLIT 5/16 NOM               |
| 25   | 1   | 130395   | MACHINING, STEERING LEVER ARM L.H.        |
| 26   | 1   | 130396   | MACHINING, STEERING LEVER ARM R.H.        |

FIGURE 29 FRAME ASSEMBLY MAC 20(130484) & MAC 20T(130290)  
130749 & 130748 - MAC II

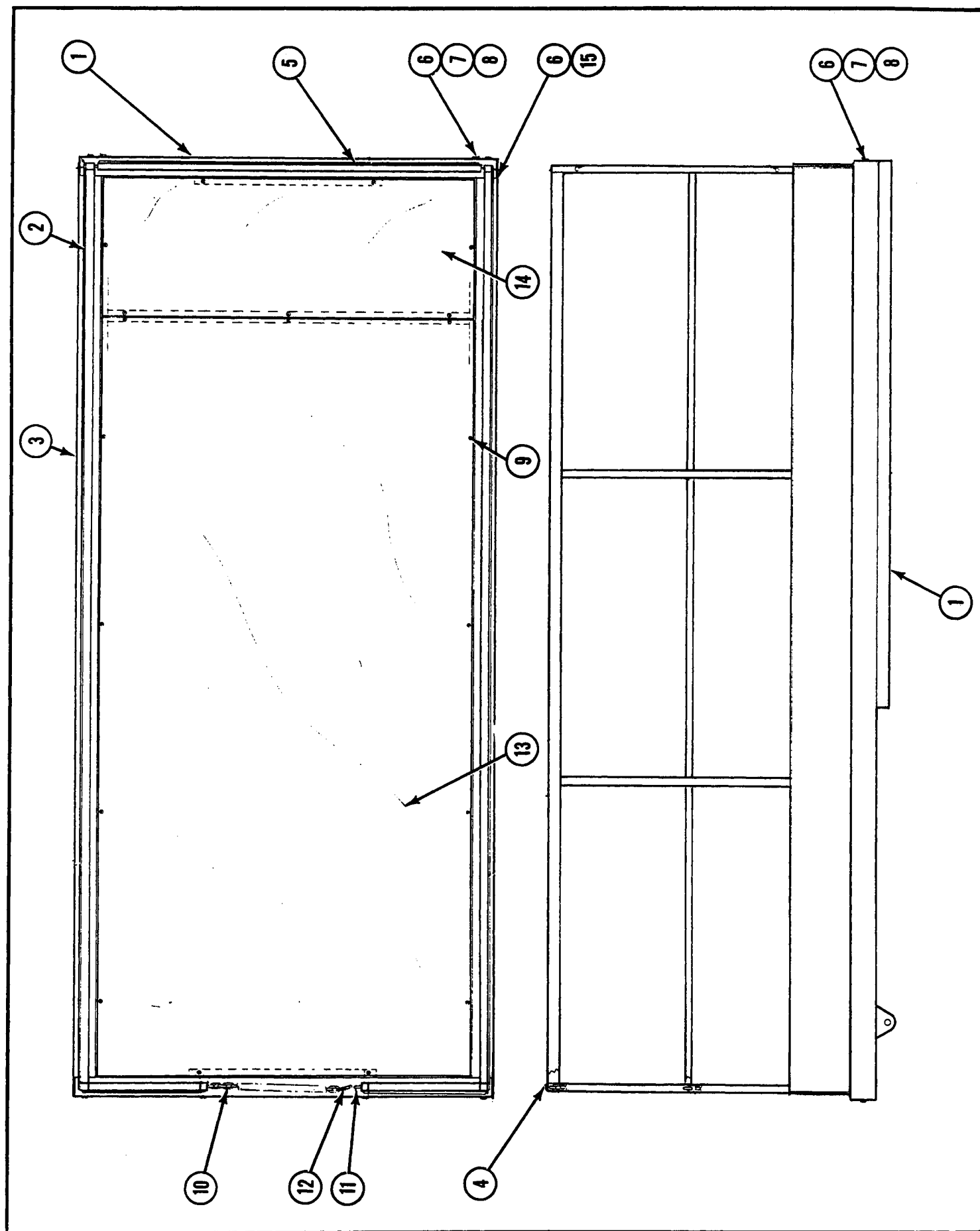
113

| ITEM | QTY | PART NO. | DESCRIPTION                                 |
|------|-----|----------|---------------------------------------------|
| 27   | 1   | 130480   | ASSEMBLY, BULKHEAD BRAKE & DRIVE            |
| 28   | 2   | 60318    | SCREW, H.H.C 1/4-20UNC x 2 1/4LG GR 5       |
| 29   | 2   | 80045-03 | UNION, BULKHEAD                             |
| 30   | 1   | 80032-05 | TEE, BULKHEAD                               |
| 31   | 1   | 130490   | ASSEMBLY, DRIVE MOTOR/BRAKE L.H.            |
| 32   | 1   | 20803    | SWITCH, LIMIT (MAC II: 70107, 20 & 20T)     |
| 33   | 2   | 62615    | SCREW, ROUND HEAD SLT. 10-32UNF. x 1 3/4 LG |
| 34   | 1   | 70032    | LEVER, OPERATING                            |
| 35   | 2   | 80056-01 | REDUCER, TUBE END                           |
| 36   | 2   | 130598   | GUSSET R.H.                                 |
| 37   | 2   | 130597   | GUSSET L.H.                                 |
| 38   | 8   | 60343    | SCREW, CAP 3/8-16 UNC x 1 LG HEX HEAD       |
| 40   | 8   | 60703    | NUT, HEX 3/8                                |
| 41   | 2   | 65658    | BEARING THRUST                              |
| 42   | 2   | 63313    | WASHER, LOCK NO. 10 SPLIT                   |
| 43   | 4   | 61305    | NUT, LOCK 1/2-13UNC                         |
| 44   | 2   | 60811    | NUT, HEX SLOTTED 1-14 UNS                   |
| 45   | 2   | 63409    | WASHER, FLAT 1" SAE                         |
| 46   | 2   | 65174    | NUT, HEX SLOTTED 1-20 UNEF                  |



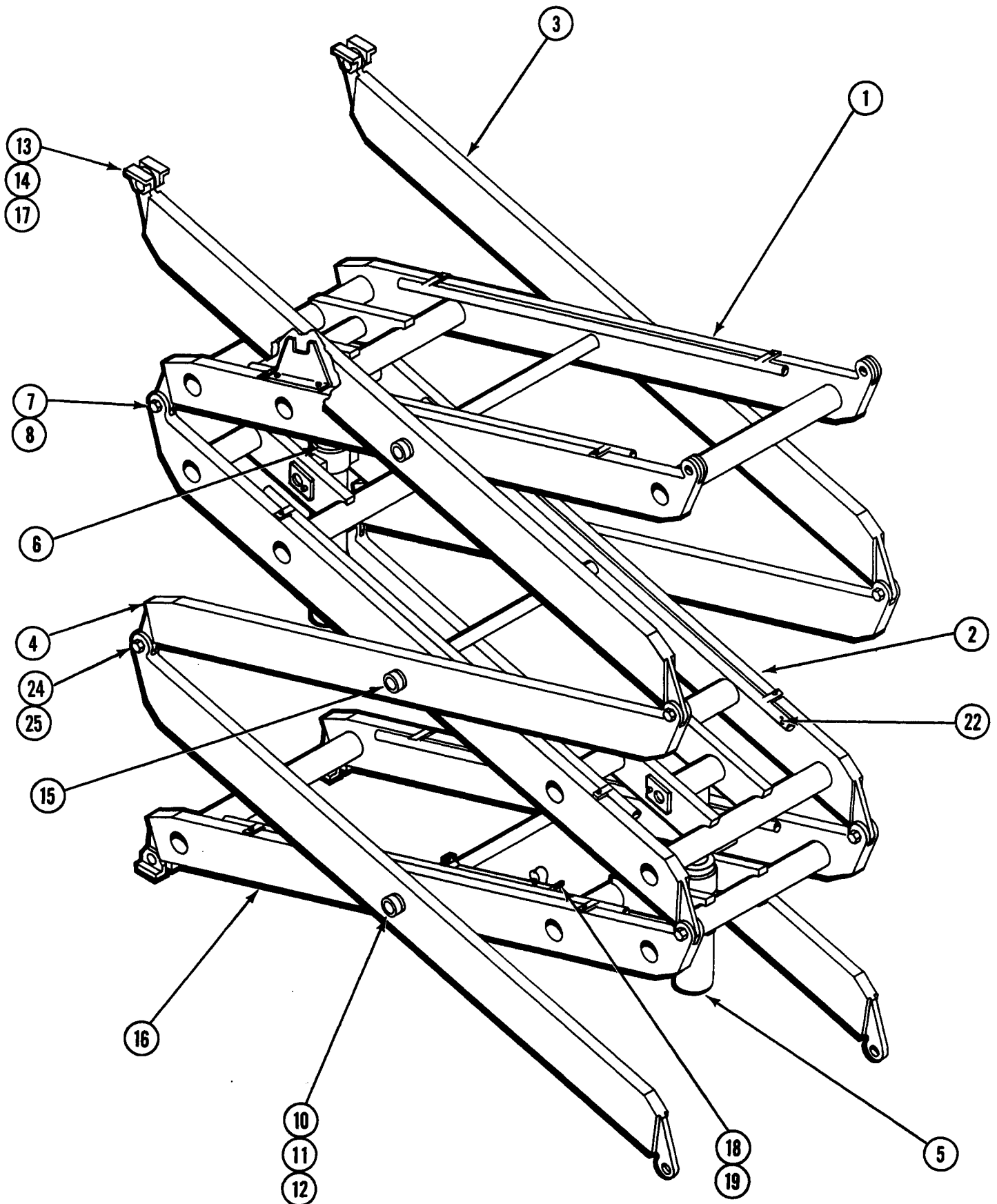
| ITEM | QTY   | PART NO. | DESCRIPTION                                    |
|------|-------|----------|------------------------------------------------|
| 1    | 1     | 130362   | PLATFORM ASSEMBLY                              |
| 2    | 1     | 130616   | SCISSOR ASSEMBLY                               |
| 3    | 1     | 130696   | FRAME ASSEMBLY (MAC II: 130751)                |
| 4    | 4     | 130696   | BOLT EAR PIVOT                                 |
| 5    | 4     | 61249    | NUT LOCK HEX HEAD 3/4-10UNC                    |
| 6    | 1     | 30520    | PLATE PATENT NUMBER                            |
| 7    | 1     | 20660    | PLATE IDENTIFICATION                           |
| 8    | 2     | 2002     | DECAL - FORKLIFT BOOT                          |
| 9    | 1     | 2017     | DECAL - HYDRAULIC SYSTEM                       |
| 10   | 1     | 2003     | DECAL - BATTERY WATER LEVEL                    |
| 11   | 2     | 31259    | DECAL - MARKLIFT                               |
| 12   | 4     | 2024     | DECAL - LOAD CAPACITY 1000                     |
| 13   | 1     | 20661    | PLATE ANSI A92                                 |
| 14   | 1     | 130506   | DECAL - OPERATION INSTRUCTION (MAC II: 130801) |
| 15   | 2     | 2016     | DECAL - DO NOT WORK UNDER                      |
| 16   | 19    | 63654    | RIVET POP 3/16 x 3/8                           |
| 17   | 1     | 130422   | OPERATORS HANDBOOK                             |
| 18   | 50    | 256      | TIE CABLE                                      |
| 19   | 50    | 255      | TIE CABLE                                      |
| 20   | 13 GL | 65116    | HYDRAULIC OIL                                  |
| 21   | 1     | 130579   | DIAGRAM. HYDRAULIC HOSE (MAC II: 130809)       |
| 22   | 1     | 130499   | SCHEMATIC. HYDRAULIC (MAC II: 130773)          |
| 23   | 1     | 130500   | SCHEMATIC. ELECTRICAL (MAC II: 130759)         |
| 24   | 2 GL  | 65389    | PAINT BLUE WATER BASE                          |
| 25   | 5 GL  | 16608    | PAINT WHITE WATER BASE                         |
| 26   | 1     | 65368    | KRYLON - 1910 TRUE BLUE                        |

| ITEM | QTY | PART NO.  | DESCRIPTION                                 |
|------|-----|-----------|---------------------------------------------|
| 27   | 1   | 2673      | PAINT WHITE KIT KOTE 1221                   |
| 28   | 2   | 31109     | DECAL - CAUTION                             |
| 29   | 1   | 130337-65 | CABLE CONNECTOR                             |
| 30   | 2   | 130507    | DECAL - MAC (MAC II: 130805)                |
| 31   | 12  | 375       | RIVET POP                                   |
| 32   | 1   | 130489    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130803) |
| 33   | 4   | 60342     | SCREW CAP HEX HEAD 1/4-20UNC x 5/8LG GR 5   |
| 34   | 4   | 63301     | WASHER LOCK SPLIT                           |
| 35   | 4   | 60701     | NUT HEX 1/4-20UNC                           |
| 36   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                |
| 37   | 1   | 11064     | DECAL - ATTACH SAFETY CHAINS                |
| 38   | 4   | 16268     | CLAMP CABLE                                 |
| 39   | 1   | 65581     | DOCUMENT PLASTIC BAG                        |
| 40   | 10  | 65655     | CLAMP, CUSHIONED                            |
| 41   | 2   | 65463     | CLAMP                                       |
| 42   | 3   | 765       | CLAMP RUBBER                                |
| 43   | 2   | 130596    | DECAL - PRODUCT OF MARK INDUSTRIES          |
| 44   | 4   | 2562      | SAE 37 <sup>0</sup> SWIVEL                  |
| 45   | 1   | 2568-30   | HOSE, HYDRAULIC                             |
| 46   | 1   | 2568-24   | HOSE, HYDRAULIC                             |
|      |     | 130606    | DECAL, FREEWHEELING VALVE                   |



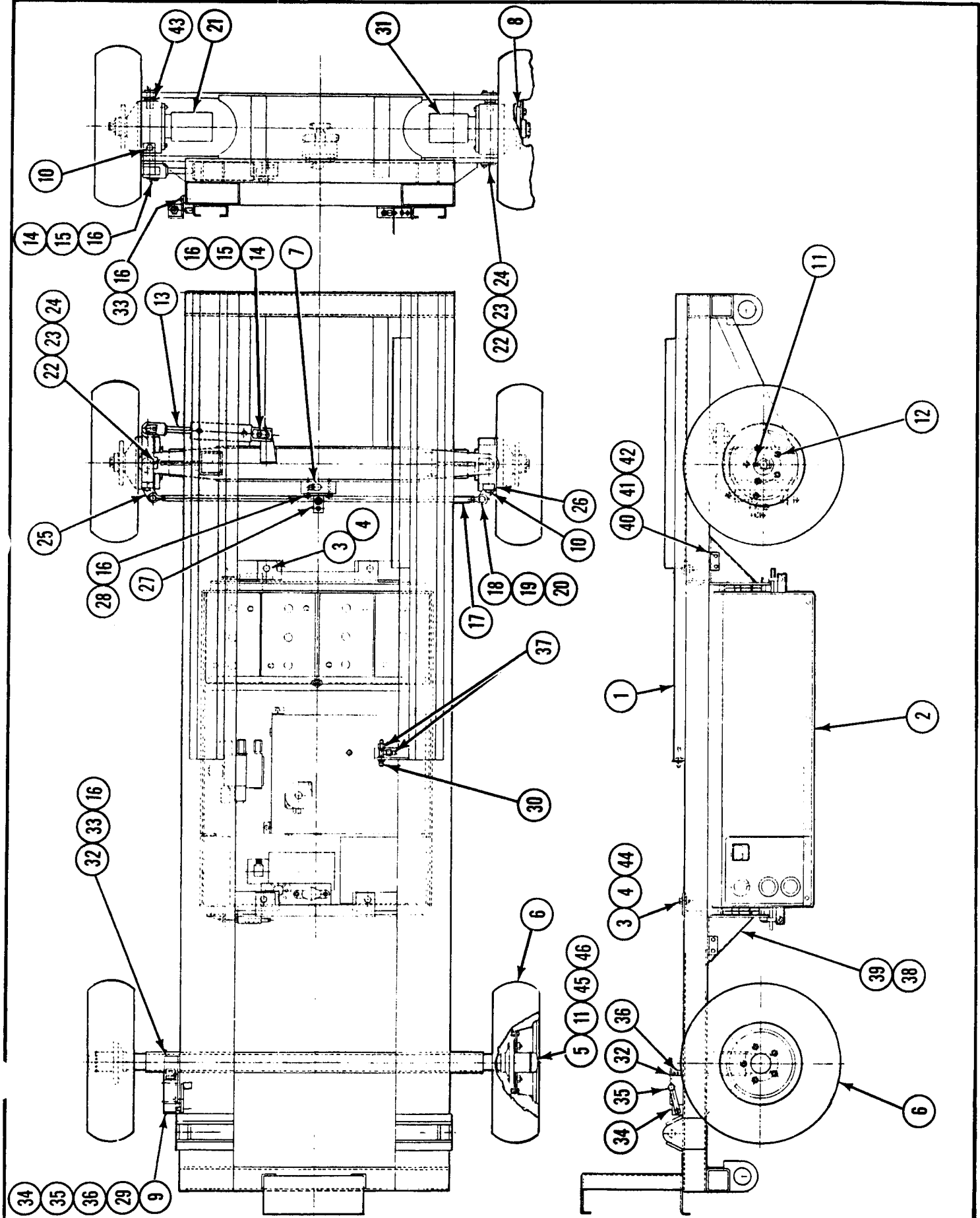
| ITEM | QTY | PART NO. | DESCRIPTION                                   |
|------|-----|----------|-----------------------------------------------|
| 1    | 1   | 130376   | WELDMENT PLATFORM                             |
| 2    | 1   | 130462   | GUARD RAIL SIDE R.H.                          |
| 3    | 1   | 130461   | GUARD RAIL SIDE L.H.                          |
| 4    | 6   | 91541    | CAP PLUG                                      |
| 5    | 1   | 130356   | GUARD RAIL FRONT                              |
| 6    | 12  | 60337    | SCREW CAP                                     |
| 7    | 8   | 63301    | WASHER, LOCK SPLIT 1/4                        |
| 8    | 8   | 60701    | NUT, HEX 1/4-20UNC x 3 LG GR 5                |
| 9    | 20  | 61713    | SCREW FHL FH SELF TAPPING 1/4-20UNC x 1 1/4LG |
| 10   | 2   | 65544    | CHAIN LINK                                    |
| 11   | 2   | 65636    | CHAIN LINK                                    |
| 12   | 2   | 65637    | SNAP, OPEN END BOLT                           |
| 13   | 1   | 130464   | PLYWOOD FLOOR                                 |
| 14   | 1   | 130463   | PLYWOOD FLOOR                                 |
| 15   | 4   | 61227    | NUT, HEX LOCK 1/4-20UNC NYLON                 |





| ITEM | QTY | PART NO. | DESCRIPTION                                                                             |
|------|-----|----------|-----------------------------------------------------------------------------------------|
| 1    | 1   | 130400   | ASSEMBLY, INNER ARM UPPER                                                               |
| 2    | 1   | 130408   | ASSEMBLY, INNER ARM MIDDLE                                                              |
| 3    | 4   | 130410   | ASSEMBLY, OUTER ARM W/FEMALE TO MALE EARS                                               |
| 4    | 2   | 130412   | ASSEMBLY, OUTER ARM W/MALE EARS                                                         |
| 5    | 1   | 130323   | * TELESCOPIC LIFT CYLINDER ASSEMBLY . . . <u>MAC II</u><br>130789                       |
| 6    | 1   | 130324   | ** STANDARD LIFT CYLINDER ASSEMBLY . . . 130791<br><u>LIFT CYL.</u><br>130788<br>130790 |
| 7    | 8   | 130316   | BOLT, EAR PIVOT                                                                         |
| 8    | 8   | 61304    | NUT, HEX 3/4-10UNC                                                                      |
| 9    | 6   | 65454    | COLLAR, SHAFT                                                                           |
| 10   | 4   | 130493   | PIN, TRUNNION                                                                           |
| 11   | 8   | 60533    | SCREW, CAP HEX HD 5/16-18UNC-2A x 3/4 LG                                                |
| 12   | 8   | 63302    | LOCKWASHER WASHER 5/16 NOM                                                              |
| 13   | 4   | 130327   | PIN, WEAR PAD                                                                           |
| 14   | 8   | 130326   | WEAR PAD                                                                                |
| 15   | 4   | 130494   | PIN, TRUNNION                                                                           |
| 16   | 1   | 130510   | ASSEMBLY, INNER ARM LOWER                                                               |
| 17   | 4   | 62201    | SCREW, SOC. HD. SET 1/4-20UNC x 1/2 LG                                                  |
| 18   | 1   | 130518   | ASSEMBLY, INNER ARM SUPPORT                                                             |
| 19   | 1   | 130515   | BRACKET, ARM SUPPORT                                                                    |
| 20   | 1   | 12007    | PIN, BALL- LOC DETENT                                                                   |
| 21   | 1   | 375      | RIVET                                                                                   |
| 22   | 6   | 130521   | TUBE, TRANSFER                                                                          |
| 23   | 12  | 61813    | SCREW, FLAT SOC. HD 3/8-16UNC x 3/4 LG                                                  |
| 25   | 4   | 130696   | BOLT EAR PIVOT                                                                          |
| 24   | 4   | 61249    | NUT LOCK HEX HEAD 3/4-10UNC                                                             |
|      |     | 130481   | * LIFT CYL. FOR 130323 (SEAL KIT IS 66648) <u>MAC II</u><br>66818                       |
|      |     | 130204   | ** LIFT CYL. FOR 130324 (SEAL KIT IS 66650) 66822                                       |

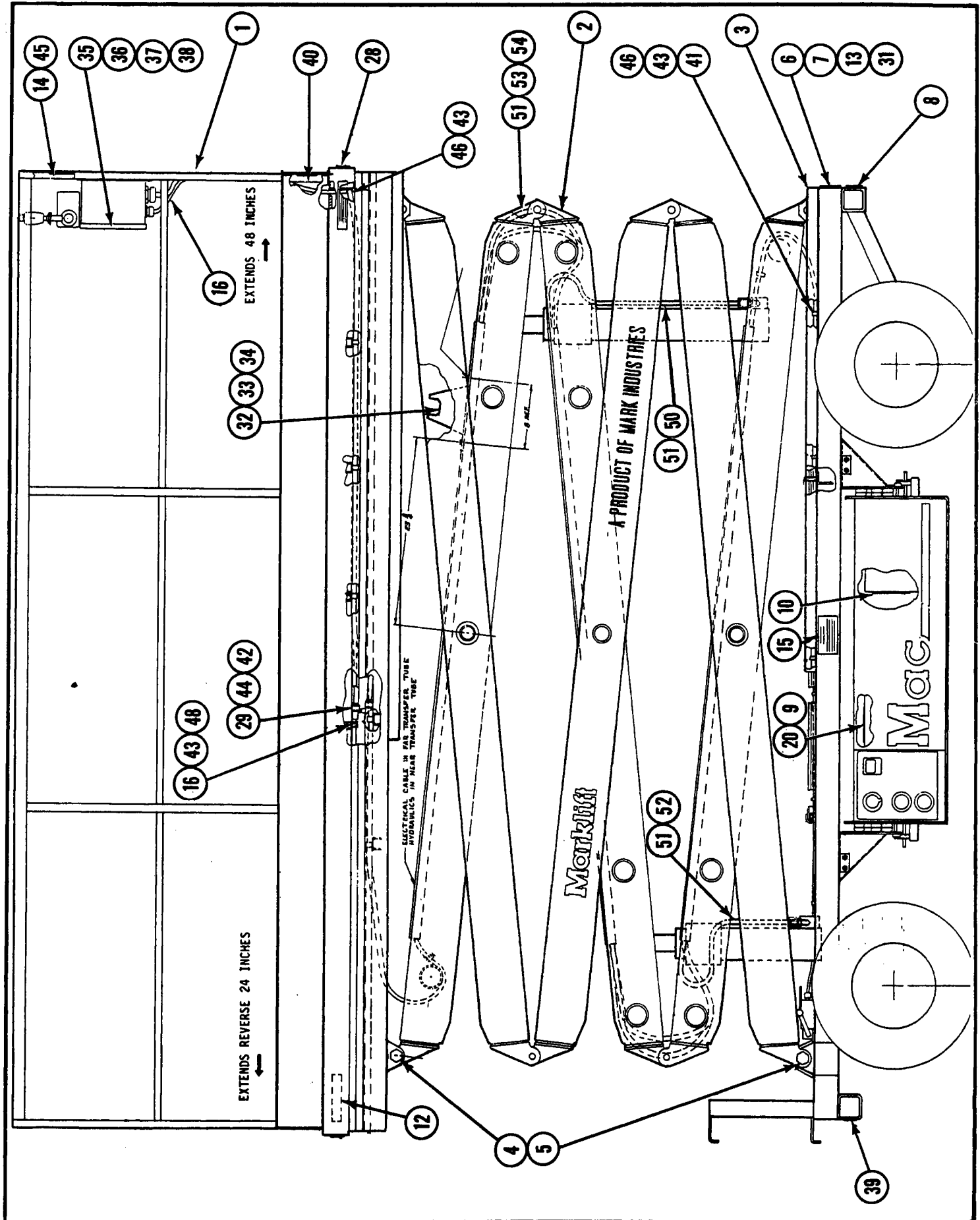
FIGURE 33 MAC 25 FRAME ASSEMBLY - 130485  
130751 - MAC II



| ITEM | QTY | PART NO. | DESCRIPTION                              |
|------|-----|----------|------------------------------------------|
| 1    | 1   | 130374   | WELDMENT FRAME (MAC II: 130740)          |
| 2    | 1   | 130497   | ASSEMBLY, BELLY PAN (MAC II: 130758)     |
| 3    | 4   | 60311    | SCREW, H.H.C 1/2-13UNC x 1 1/4LG GR 5    |
| 4    | 8   | 63415    | WASHER FLAT 1/2 NOM                      |
| 5    | 2   | 134      | ASSEMBLY, HUB                            |
| 6    | 4   | 130330   | ASSEMBLY, TIRE & WHEEL SOLID             |
| 7    | 1   | 130305   | ASSEMBLY, FLOW DIVIDER                   |
| 8    | 2   | 130425   | HUB, DRIVE                               |
| 9    | 2   | 62615    | SCREW ROUND HEAD SLT 10-32UNF x 1 1/4 LG |
| 10   | 5   | 60602    | SCREW H.H.C 1/2-13UNC x 1 1/2LG          |
| 11   | 4   | 64306    | PIN, COTTER                              |
| 12   | 10  | 61316    | NUT, LUG 1/2-20UNF                       |
| 13   | 1   | 130237   | ASSEMBLY, STEERING CYLINDER              |
| 14   | 2   | 20252    | PIN, STEERING CYLINDER ANCHOR            |
| 15   | 2   | 60353    | SCREW, H.H.C 1/2-13UNC x 1/2LG GR 5      |
| 16   | 6   | 63301    | WASHER LOCK SPLIT 1/4 NOM                |
| 17   | 1   | 130469   | ASSEMBLY, TIE ROD                        |
| 18   | 2   | 60393    | SCREW, H.H.C 1/2-13UNC x 2LG GR 5        |
| 19   | 2   | 61242    | NUT, LOCK 1/2-13UNC                      |
| 20   | 2   | 63305    | WASHER, LOCK SPLIT 1/2 NOM               |
| 21   | 1   | 130607   | ASSEMBLY, DRIVE MOTOR/BRAKE R.H.         |
| 22   | 4   | 130474   | PIN, STEERING                            |
| 23   | 4   | 60338    | SCREW, H.H.C 5/16-18UNC x 1LG GR 5       |
| 24   | 4   | 63302    | WASHER, LOCK SPLIT 5/16 NOM              |
| 25   | 1   | 130395   | MACHINING, STEERING LEVER ARM L.H.       |
| 26   | 1   | 130396   | MACHINING, STEERING LEVER ARM R.H.       |

| ITEM | QTY | PART NO. | DESCRIPTION                           |
|------|-----|----------|---------------------------------------|
| 27   | 1   | 130480   | ASSEMBLY, BULKHEAD BRAKE & DRIVE      |
| 28   | 2   | 60318    | SCREW, H.H.C 1/4-20UNC x 2 1/4LG GR 5 |
| 29   | 2   | 63313    | WASHER, LOCK NO. 10 SPLIT TYPE        |
| 30   | 1   | 80032-05 | TEE, BULKHEAD                         |
| 31   | 1   | 130608   | ASSEMBLY, DRIVE MOTOR/BRAKE L.H.      |
| 32   | 1   | 130514   | BRACKET, LIMIT SWITCH MOUNTING        |
| 33   | 2   | 60314    | SCREW, H.H.C 1/4-20UNC x 1 1/4LG GR 5 |
| 34   | 1   | 20803    | SWITCH LIMIT (MAC II: 70107)          |
| 35   | 1   | 70032    | LEVER, OPERATING                      |
| 36   | 1   | 2806     | STRAIN RELIEF (MAC II: 70288)         |
| 37   | 2   | 80056-01 | REDUCER TUBE END                      |
| 38   | 2   | 130598   | GUSSET R.H.                           |
| 39   | 2   | 130597   | GUSSET L.H.                           |
| 40   | 8   | 60343    | SCREW, CAP 3/8-16UNC x 1LG HEX HEAD   |
| 41   | 8   | 63319    | WASHER, LOCK 3/8 SPLIT                |
| 42   | 8   | 60703    | NUT HEX 3/8-16UNC                     |
| 43   | 2   | 65658    | BEARING THRUST                        |
| 44   | 4   | 61305    | NUT, LOCK 1/2-13UNC                   |
| 45   | 2   | 60811    | NUT, HEX SLOTTED 1-14 UNS             |
| 46   | 2   | 63409    | WASHER, FLAT 1" SAE                   |

FIGURE 34 MAC 25T FINAL ASSEMBLY - 130006  
130026 - MAC II

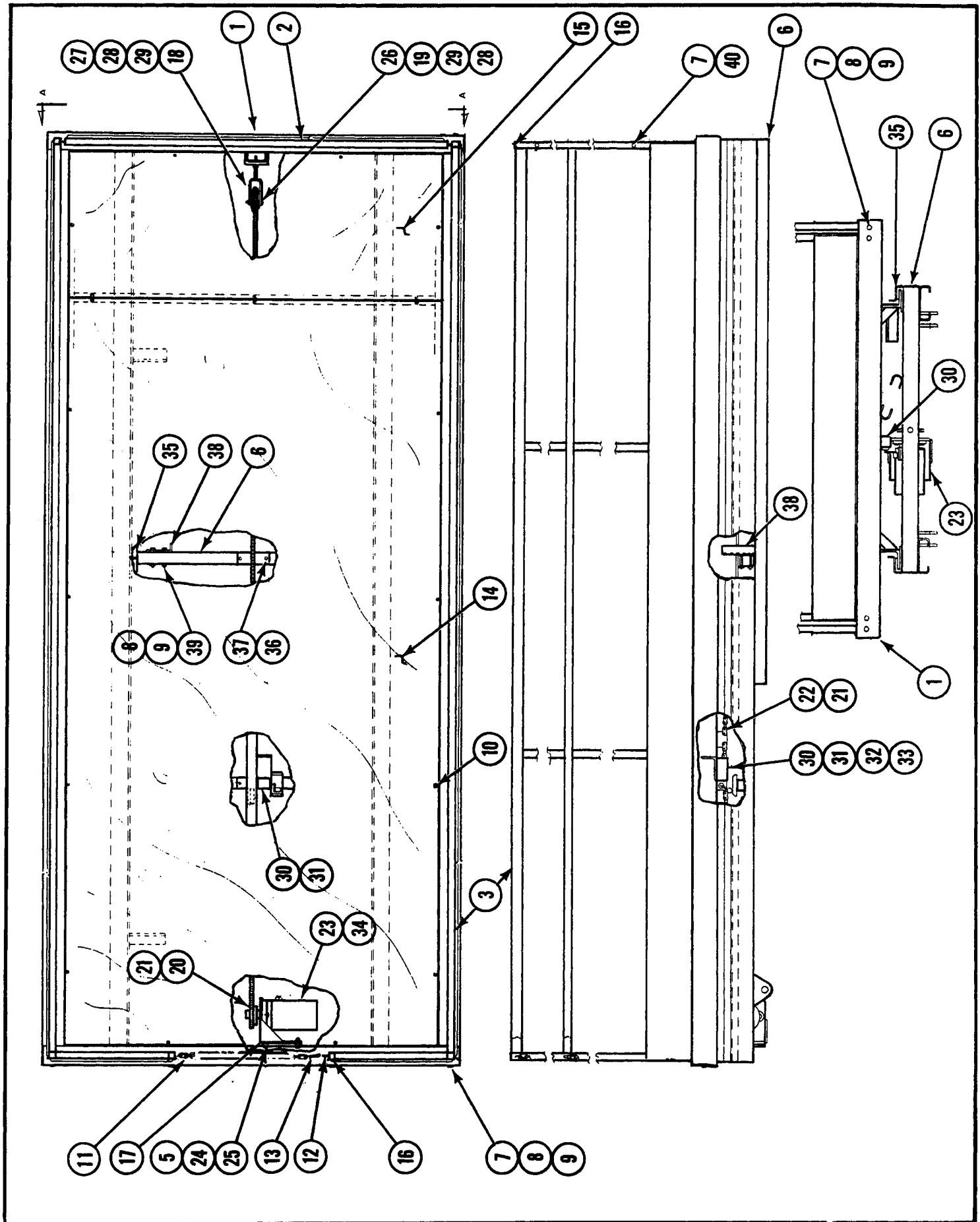


| ITEM | QTY   | PART NO.  | DESCRIPTION                                    |
|------|-------|-----------|------------------------------------------------|
| 1    | 1     | 130350    | PLATFORM ASSEMBLY                              |
| 2    | 1     | 130336    | SCISSOR ASSEMBLY                               |
| 3    | 1     | 130375    | FRAME ASSEMBLY (MAC II: 130750)                |
| 4    | 4     | 130316    | BOLT EAR PIVOT (MAC II: 130696)                |
| 5    | 4     | 61304     | NUT LOCK HEX HEAD 3/4-10UNC (MAC II: 61249)    |
| 6    | 1     | 30520     | PLATE PATENT NUMBER                            |
| 7    | 1     | 20660     | PLATE IDENTIFICATION                           |
| 8    | 2     | 2002      | DECAL - FORKLIFT BOOT                          |
| 9    | 1     | 2017      | DECAL - HYDRAULIC SYSTEM                       |
| 10   | 1     | 2003      | DECAL - BATTERY WATER LEVER                    |
| 11   | 2     | 31259     | DECAL - MARKLIFT                               |
| 12   | 4     | 2024      | DECAL LOAD CAPACITY 1000                       |
| 13   | 1     | 20661     | PLATE ANSI A92                                 |
| 14   | 1     | 130506    | DECAL - OPERATION INSTRUCTION (MAC II: 130801) |
| 15   | 2     | 2016      | DECAL - DO NOT WORK UNDER                      |
| 16   | 1     | 70036-192 | CABLE (MAC II: 90547-192)                      |
| 17   | 1     | 130422    | OPERATORS HANDBOOK                             |
| 18   | 50    | 256       | TIE CABLE                                      |
| 19   | 50    | 255       | TIE CABLE                                      |
| 29   | 13 GL | 65116     | HYDRAULIC OIL                                  |
| 21   | 1     | 130525    | DIAGRAM. HYDRO LIC HOSE (MAC II: 130809)       |
| 22   | 1     | 130419    | SCHEMATIC. HYDRAULIC (MAC II: 130772)          |
| 23   | 1     | 130420    | SCHEMATIC, ELECTRICAL (MAC II: 130760)         |
| 24   | 2 GL  | 65389     | PAINT BLUE WATER BASE                          |
| 25   | 5 GL  | 16608     | PAINT WHITE WATER BASE                         |
| 26   | 1     | 65368     | KRYLON-1910 TRUE BLUE                          |

| ITEM | QTY | PART NO.  | DESCRIPTION                                 |
|------|-----|-----------|---------------------------------------------|
| 27   | 1   | 2673      | PAINT WHITE KIT KOTE 12                     |
| 28   | 2   | 31109     | DECAL - CAUTION                             |
| 29   | 1   | 130337-70 | CABLE CONDUCTOR                             |
| 30   | 2   | 130507    | DECAL - MAC (MAC II: 130805)                |
| 31   | 12  | 375       | RIVET POP                                   |
| 32   | 1   | 130478    | WELDMENT LOCK BRACKET                       |
| 33   | 2   | 60322     | SCREW CAP HEX HEAD 5/16-18UNC x 3/4LG GR 5  |
| 34   | 2   | 63302     | WASHER LOCK SPLIT 5/16                      |
| 35   | 1   | 130488    | ASSEMBLY UPPER CONTROL BOX (MAC II: 130743) |
| 36   | 4   | 60342     | SCREW CAP HEX HEAD (MAC II: 61724)          |
| 37   | 4   | 63301     | WASHER LOCK SPLIT 1/4                       |
| 38   | 4   | 60701     | NUT HEX 1/4-20UNC                           |
| 39   | 1   | 2041      | DECAL - DO NOT LIFT THIS END                |
| 40   | 1   | 11064     | DECAL - SAFETY CHAIN                        |
| 41   | 7   | 16268     | CLAMP CABLE (MAC II: 65787)                 |
| 42   | 2   | 65451     | CLAMP HOSE                                  |
| 43   | 19  | 63654     | RIVET POP                                   |
| 44   | 1   | 31034     | HOSE                                        |
| 45   | 1   | 65581     | DOCUMENT PLASTIC BAG                        |
| 46   | 10  | 65655     | CLAMP CUSHIONED                             |
| 47   | 2   | 65463     | CLAMP                                       |
| 48   | 6   | 765       | CLAMP RUBBER                                |
| 49   | 2   | 130596    | DECAL - PRODUCT OF MARK INDUSTRIES          |
| 50   | 1   | 2568-30   | HOSE, HYDRAULIC                             |
| 51   | 7   | 2562      | SAE 37 <sup>0</sup> SWIVEL                  |
| 52   | 1   | 2568-24   | HOSE, HYDRAULIC                             |

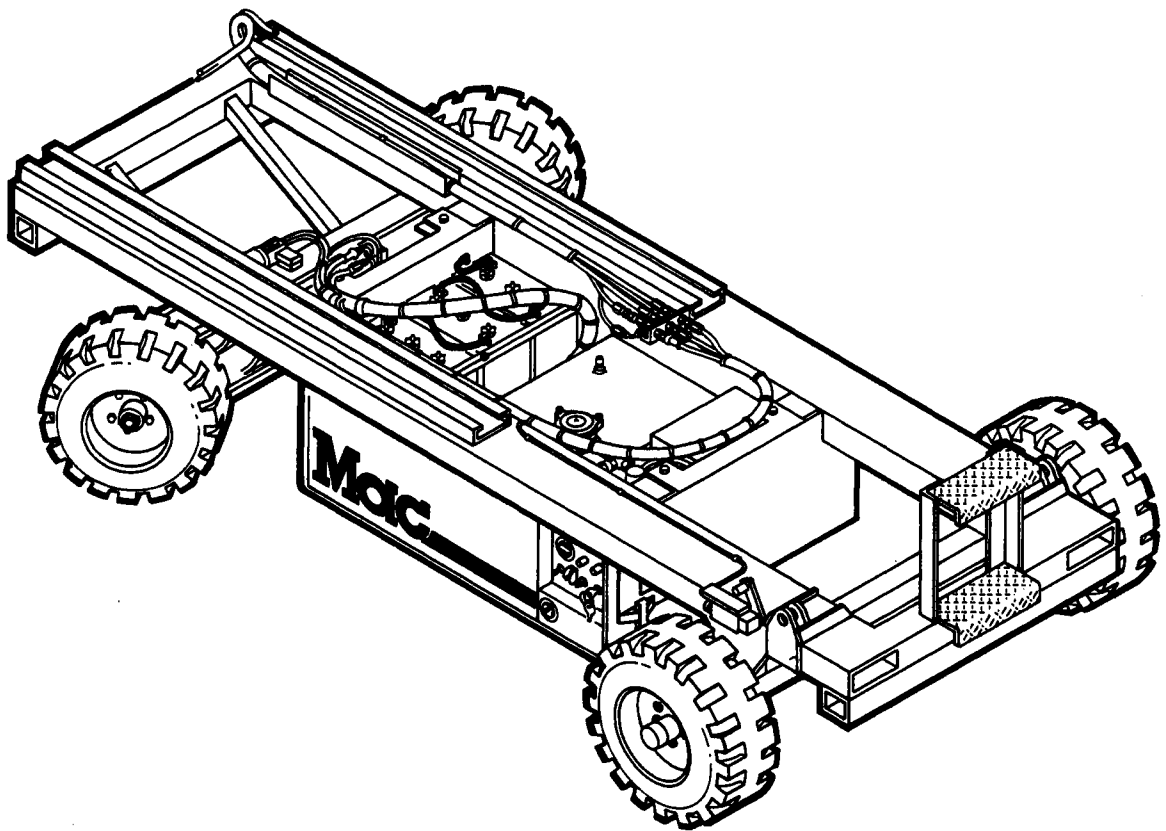


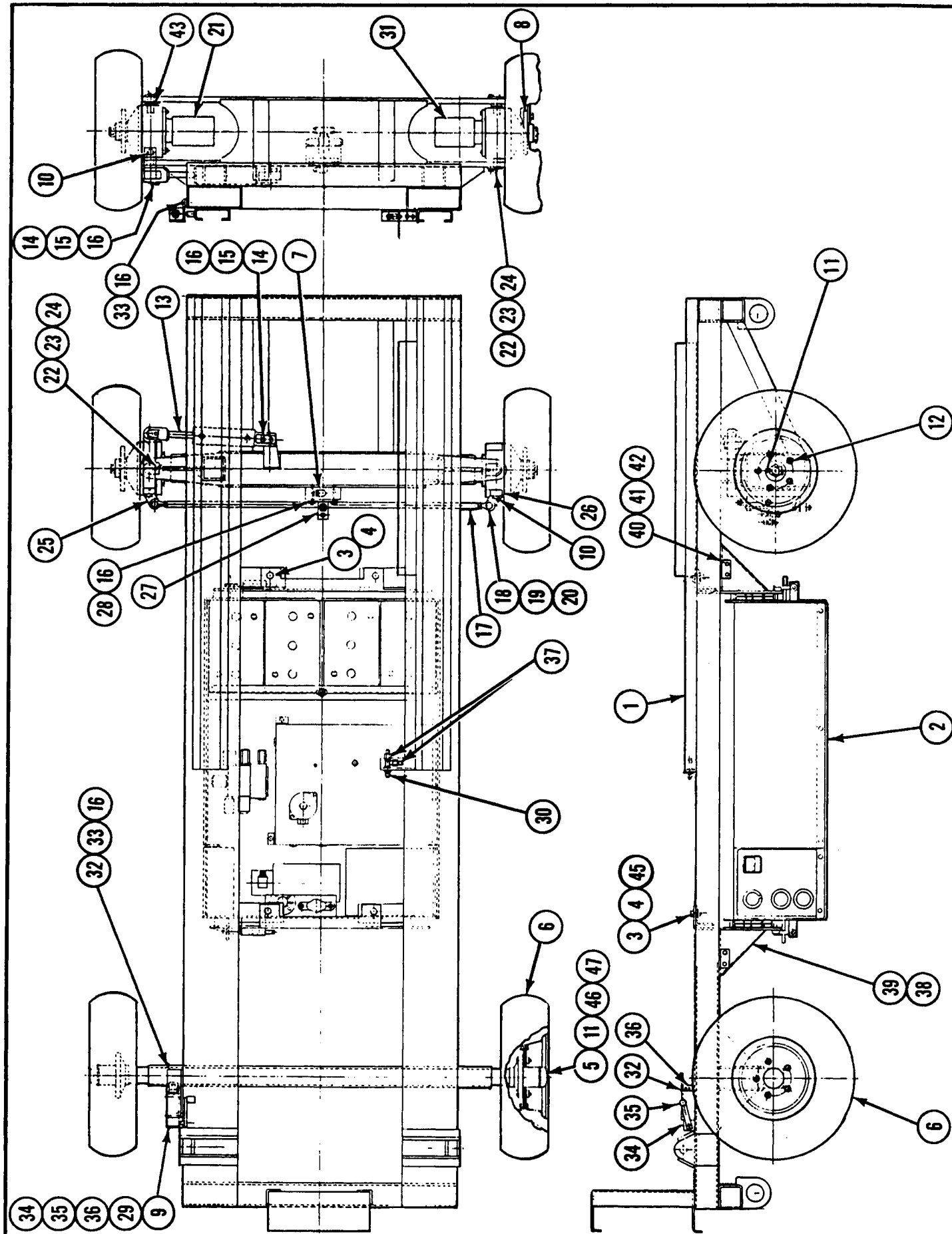
| ITEM | QTY | PART NO. | DESCRIPTION                                      |
|------|-----|----------|--------------------------------------------------|
| 53   | 2   | 2568-56  | HOSE, HYDRAULIC                                  |
| 54   | 1   | 2594     | SAE 37 <sup>0</sup> SWIVEL 90 <sup>0</sup> ELBOW |
|      |     | 130606   | DECAL, FREEWHEELING VALVE                        |
|      |     | 130802   | DECAL, EMERGENCY DOWN INSTRUCTIONS               |



| ITEM | QTY | PART NO. | DESCRIPTION                                 |
|------|-----|----------|---------------------------------------------|
| 1    | 1   | 130373   | WELDMENT PLATFORM                           |
| 2    | 1   | 130356   | GUARD RAIL FRONT                            |
| 3    | 1   | 130461   | GUARD RAIL SIDE L.H.                        |
| 4    | 1   | 130462   | GUARD RAIL SIDE R.H.                        |
| 5    | 4   | 60703    | NUT HEX 3/8-16UNC                           |
| 6    | 1   | 130364   | WELDMENT TOP FRAME                          |
| 7    | 12  | 60337    | SCREW CAP HEX HEAD 1/4-20UNC x 3 LG         |
| 8    | 10  | 63301    | WASHER LOCK SPLIT 1/4                       |
| 9    | 10  | 60701    | NUT HEX 1/4-20UNC                           |
| 10   | 20  | 61713    | SCREW SELF TAPPING 1/4-20UNC x 1 1/4        |
| 11   | 2   | 65544    | CHAIN LINK                                  |
| 12   | 2   | 65636    | CHAIN, LINK                                 |
| 13   | 2   | 65637    | SNAP, OPEN END BOLT                         |
| 14   | 1   | 130464   | PLYWOOD FLOOR                               |
| 15   | 1   | 130463   | PLYWOOD FLOOR                               |
| 16   | 6   | 91541    | CAP PLUG                                    |
| 17   | 1   | 130319   | WELDMENT BRACKET HYDRAULIC MOTOR            |
| 18   | 1   | 130320   | WELDMENT CLEVIS                             |
| 19   | 1   | 65585    | IDLER SPROCKET                              |
| 20   | 1   | 65578    | SPROCKET STEEL 5/8 PITCH                    |
| 21   | 1   | 65597    | CHAIN SELF LUBRICATING                      |
| 22   | 2   | 65580    | MASTER LINK                                 |
| 23   | 1   | 130341   | ASSEMBLY HYDRAULIC MOTOR                    |
| 24   | 4   | 60307    | SCREW CAP HEX HEAD 3/8-16UNC x 1 1/2LG GR 5 |
| 25   | 4   | 63319    | WASHER LOCK SPLIT 3/8                       |
| 26   | 1   | 60370    | SCREW CAP HEX HEAD 1/2-13UNC x 1 1/2LG GR 5 |

| ITEM | QTY | PART NO. | DESCRIPTION                                     |
|------|-----|----------|-------------------------------------------------|
| 27   | 2   | 63415    | WASHER FLAT 1/2                                 |
| 28   | 2   | 63305    | WASHER LOCK SPLIT 1/2                           |
| 29   | 3   | 61242    | NUT LOCK 1/2-13UNC                              |
| 30   | 1   | 20803    | SWITCH LIMIT                                    |
| 31   | 1   | 70169    | LEVER LIMIT SWITCH                              |
| 32   | 2   | 62615    | SCREW MACHINE ROUND HD. SLT. 10-32UNF X 1 3/4LG |
| 33   | 2   | 63313    | WASHER LOCK SPLIT 10                            |
| 34   | 2   | 60326    | SCREW CAP HEX HEAD 1/2-13UNC x 1 LG GR 5        |
| 35   | 2   | 130468   | WEAR PAD                                        |
| 36   | 24  | 16217    | RIVET POP                                       |
| 37   | 6   | 130399   | WEAR PAD                                        |
| 38   | 1   | 130371   | STOP                                            |
| 39   | 4   | 60318    | SCREW CAP HEX HEAD 1/4-20UNC x 2 1/4LG GR 5     |
| 40   | 2   | 61227    | NUT, HEX LOCK 1/4-20UNC NYLON                   |

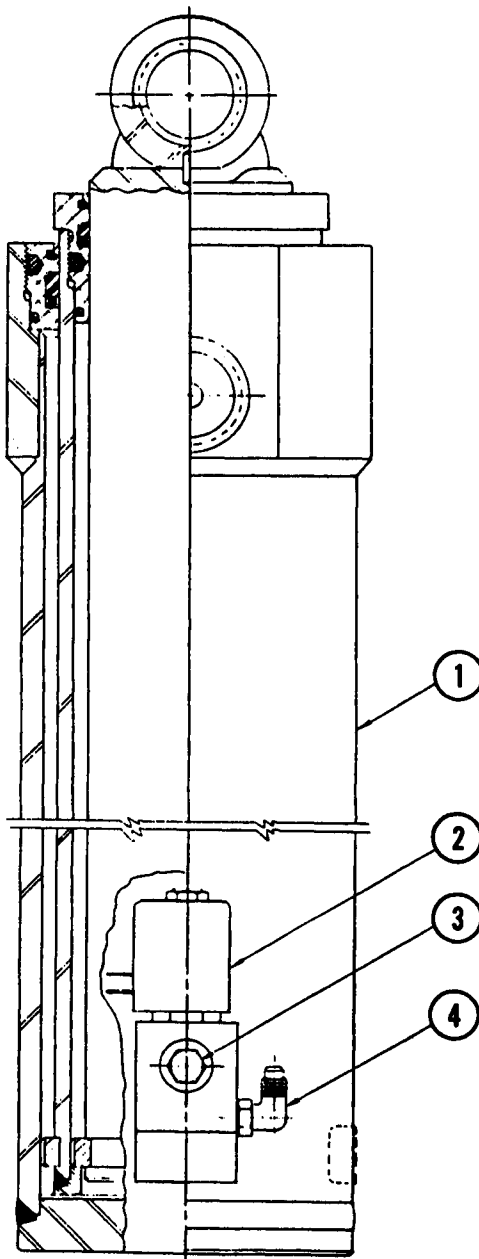




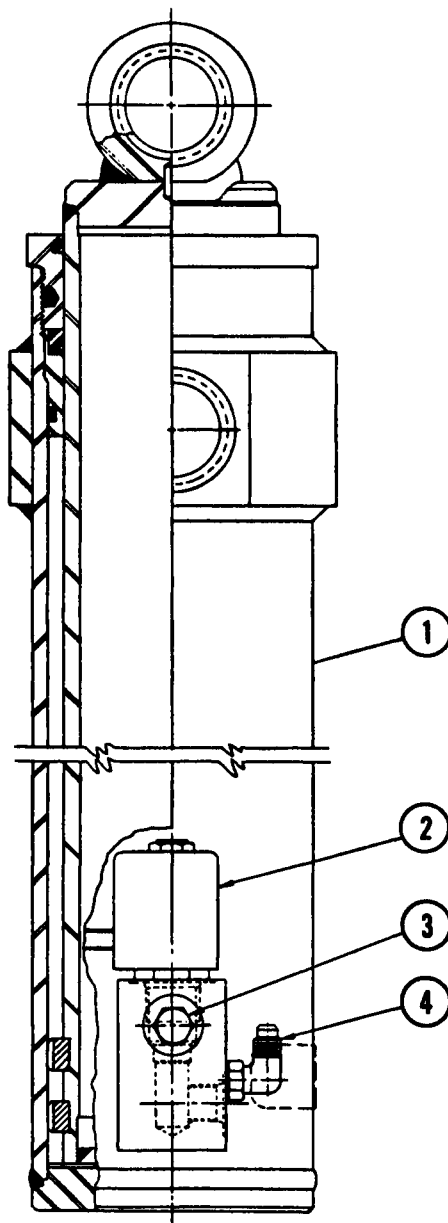
| ITEM | QTY | PART NO. | DESCRIPTION                           |
|------|-----|----------|---------------------------------------|
| 1    | 1   | 130374   | WELDMENT FRAME (MAC II: 130740)       |
| 2    | 1   | 130293   | ASSEMBLY, BELLY PAN (MAC II: 130714)  |
| 3    | 4   | 60311    | SCREW, H.H.C 1/2-13UNC x 1 1/4LG GR 5 |
| 4    | 8   | 63415    | WASHER, FLAT 1/2 NOM                  |
| 5    | 2   | 134      | ASSEMBLY, HUB                         |
| 6    | 4   | 130330   | ASSEMBLY, TIRE & WHEEL SOLID          |
| 7    | 1   | 130305   | ASSEMBLY, FLOW DIVIDER                |
| 8    | 2   | 130425   | HUB, DRIVE                            |
| 9    | 2   | 62615    | SCREW ROUND HD SLT 10-32UNF x 1 3/4   |
| 10   | 5   | 60602    | SCREW, H.H.C 1/2-13UNC x 1 1/2LG      |
| 11   | 4   | 64306    | PIN, COTTER                           |
| 12   | 10  | 61316    | NUT, LUG 1/2-20UNF                    |
| 13   | 1   | 130237   | ASSEMBLY, STEERING CYLINDER           |
| 14   | 2   | 20252    | PIN, STEERING CYLINDER ANCHOR         |
| 15   | 2   | 60353    | SCREW, H.H.C 1/4-20UNC x 1/2LG GR 5   |
| 16   | 6   | 63301    | WASHER; LOCK SPLIT 1/4 NOM            |
| 17   | 1   | 130469   | ASSEMBLY, TIE ROD                     |
| 18   | 2   | 60393    | SCREW, H.H.C 1/2-13UNC x 2LG GR 5     |
| 19   | 2   | 61242    | NUT LOCK 1/2-13 UNC                   |
| 20   |     |          | WASHER                                |
| 21   | 1   | 130607   | ASSEMBLY, DRIVE MOTOR/BRAKE R.H.      |
| 22   | 4   | 130474   | PIN, STEERING                         |
| 23   | 4   | 60338    | SCREW, H.H.C 5/16-18UNC x 1LG GR 5    |
| 24   | 4   | 63302    | WASHER, LOCK SPLIT 5/16 NOM           |
| 25   | 1   | 130395   | MACHINING, STEERING LEVER ARM L.H.    |
| 26   | 1   | 130396   | MACHINING, STEERING LEVER ARM R.H.    |

| ITEM | QTY | PART NO. | DESCRIPTION                            |
|------|-----|----------|----------------------------------------|
| 27   | 1   | 130480   | ASSEMBLY, BULKHEAD BRAKE & DRIVE       |
| 28   | 2   | 60318    | SCREW, H.H.C. 1/4-20UNC x 2 1/4LG GR 5 |
| 29   | 2   | 80045-03 | UNION, BULKHEAD                        |
| 30   | 1   | 80032-05 | TEE, BULKHEAD                          |
| 31   | 1   | 130608   | ASSEMBLY, DRIVE MOTOR/BRAKE L.H.       |
| 32   | 1   | 130514   | BRACKET, LIMIT SWITCH MOUNTING         |
| 33   | 2   | 60314    | SCREW, H.H.C 1/4-20UNC x 1 1/4 LG GR 5 |
| 34   | 1   | 20803    | SWITCH, LIMIT (MAC II: 70107)          |
| 35   | 1   | 70032    | LEVER, OPERATING                       |
| 36   | 1   | 2806     | STRAIN RELIEF (MAC II: 70288)          |
| 37   | 2   | 80056-01 | REDUCER, TUBE END                      |
| 38   | 2   | 130598   | GUSSET R.H.                            |
| 39   | 2   | 130597   | GUSSET L.H.                            |
| 40   | 8   | 60343    | SCREW, CAP 3/8-16UNC x 1LG HEX HEAD    |
| 41   | 8   | 63319    | WASHER, LOCK 3/8 SPLIT                 |
| 42   | 8   | 60703    | NUT, HEX 3/8-16UNC                     |
| 43   | 2   | 65658    | BEARING, THRUST                        |
| 44   | 2   | 63313    | WASHER, LOCK NO. 10 SPLIT TYPE         |
| 45   | 4   | 61305    | NUT, LOCK 1/2-13UNC                    |
| 46   | 2   | 60811    | NUT, HEX SLOTTED 1-14 UNS              |
| 47   | 2   | 63409    | WASHER, FLAT 1" SAE                    |





| ITEM | QTY | PART NO.          | DESCRIPTION                                  |
|------|-----|-------------------|----------------------------------------------|
| 1    | 1   | 130788            | LIFT CYLINDER                                |
| 2    | 1   | 81028             | SOLENOID VALVE                               |
| 3    | 1   | 80050-03          | O RING PLUG                                  |
| 4    | 1   | 80012-05<br>66818 | STRAIGHT THREAD ELBOW<br>SEAL KIT (BIG BEND) |



| ITEM | QTY | PART NO. | DESCRIPTION                 |
|------|-----|----------|-----------------------------|
| 1    | 1   | 130790   | SINGLE ACTING LIFT CYLINDER |
| 2    | 1   | 81028    | ELECTRIC CHECK SOLENOID     |
| 3    | 1   | 80050-03 | O RING PLUG                 |
| 4    | 1   | 80012-05 | STRAIGHT THREAD ELBOW       |
|      |     | 66822    | SEAL KIT (BIG BEND)         |

# LESTRONIC III BATTERY CHARGER

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## 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

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LESTER ELECTRICAL OF NEBRASKA, INC.  
625 WEST A ST., LINCOLN, NE 68522  
PHONE 402-477-8988

## CHARGER MODEL 11670 OPERATION

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.

## LESTRONIC III BATTERY CHARGER

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

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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.**

## LESTRONIC III BATTERY CHARGER

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<br>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.

## LESTRONIC III BATTERY CHARGER

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.



# LESTRONIC III BATTERY CHARGER

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

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

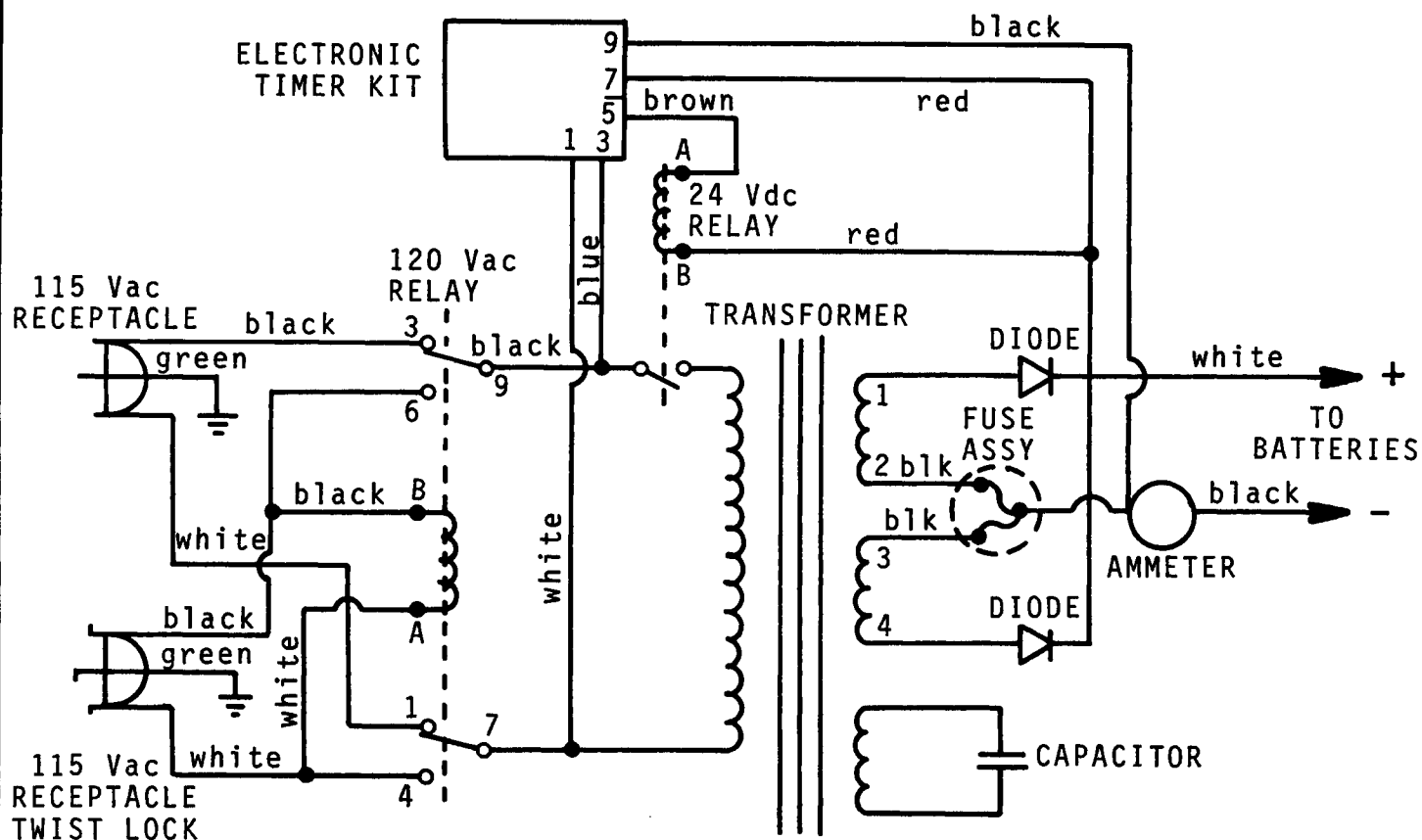
\*NOTE: THESE READINGS WILL VARY AS SHOWN DEPENDING ON THE VOLTAGE OF THE BATTERIES AT THE TIME OF THE READING.

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.

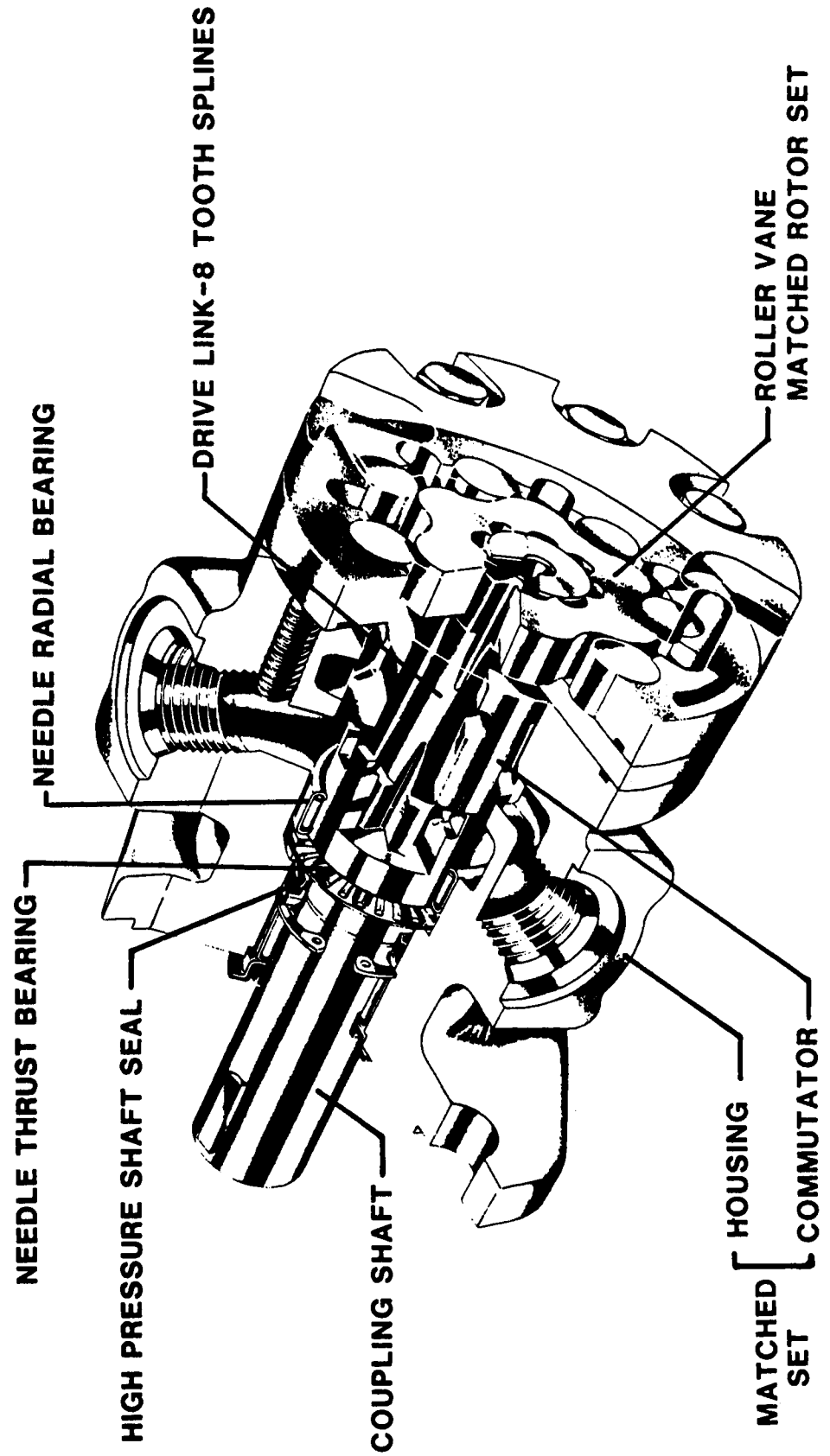
# LESTRONIC III BATTERY CHARGER



## PARTS LIST FOR LESTRONIC II 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                                |

## MAF Design Features



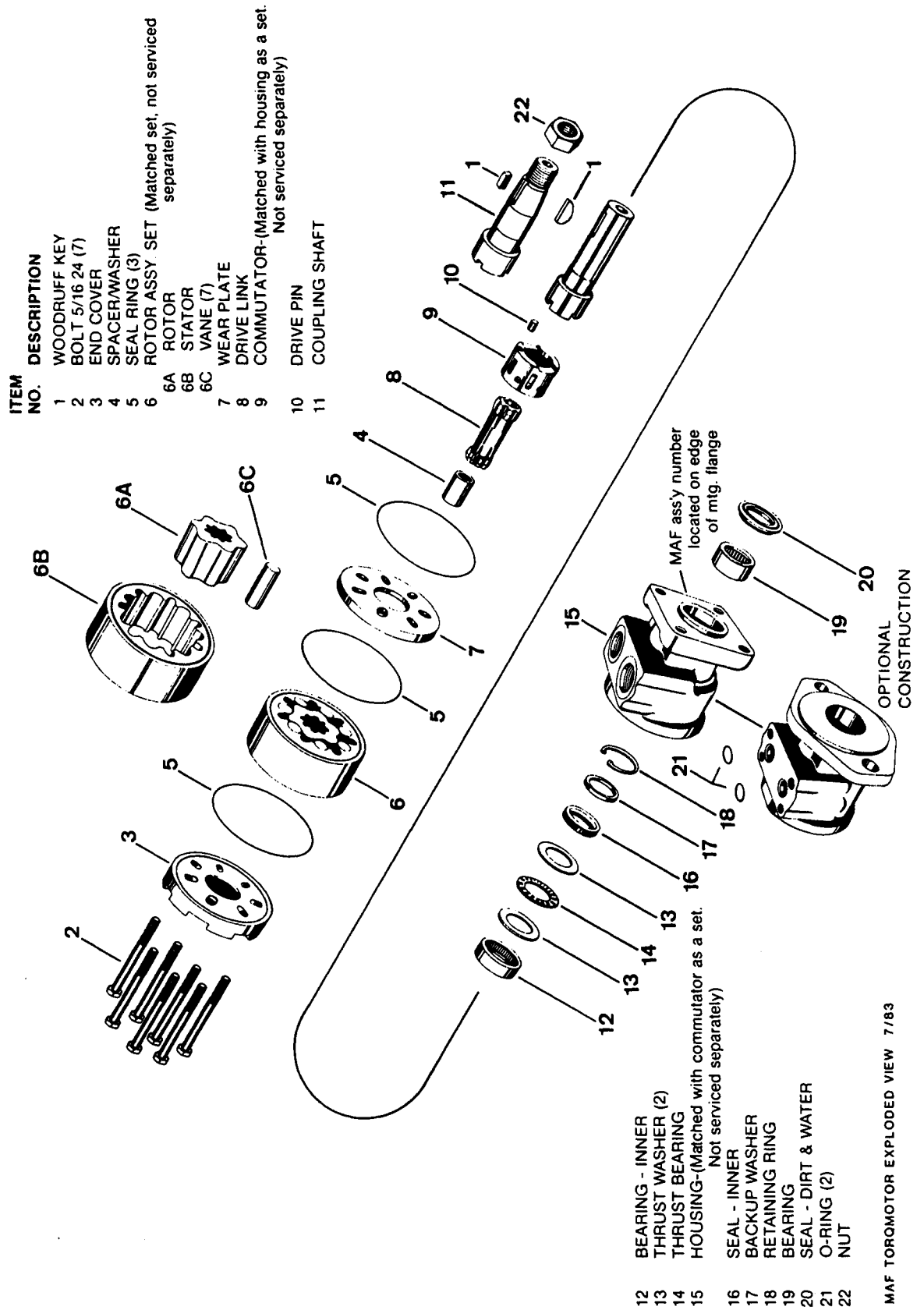
### Troubleshooting Checklist

| Trouble                                                                       | Cause                                                                   | Remedy                                                                                                                                                                         |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil Leakage                                                                   | 1. Hose fittings loose, worn or damaged.                                | Check & replace damaged fittings or "O" Rings. Torque to manufacturers specifications.                                                                                         |
|                                                                               | 2. Oil seal rings (5) deteriorated by excess heat                       | Replace oil seal rings by disassembling MAF unit.                                                                                                                              |
|                                                                               | 3. Special bolt (2) loose or its sealing area deteriorated by corrosion | (a) Loosen then tighten single bolt to 22-26 ft.-lbs. (30-35 N m)<br>(b) Replace bolt.                                                                                         |
|                                                                               | 4. Internal shaft seal (16) worn or damaged                             | Replace seal by disassembling MAF unit.                                                                                                                                        |
|                                                                               | 5. Worn coupling shaft (11) and internal seal (16)                      | Replace coupling shaft and seal by disassembling MAF unit.                                                                                                                     |
| Significant loss of speed under load                                          | 1. Lack of sufficient oil supply                                        | (a) Check for faulty relief valve and adjust or replace as required.<br>(b) Check for and repair worn pump.<br>(c) Check for and use correct oil for temperature of operation. |
|                                                                               | 2. High Internal motor leakage                                          | (a) Replace worn rotor set by disassembling MAF unit.                                                                                                                          |
|                                                                               | 3. Severely worn or damaged internal splines                            | Replace rotor set, drive link and coupling shaft by disassembling MAF unit.                                                                                                    |
|                                                                               | 4. Excessive heat                                                       | Locate excessive heat source in the system and correct the condition.                                                                                                          |
| Low mechanical efficiency or undue high pressure required to operate MAF unit | 1. Line blockage                                                        | Locate blockage source and repair or replace.                                                                                                                                  |
|                                                                               | 2. Internal interference                                                | Disassemble MAF unit, identify and remedy cause and repair, replacing parts as necessary.                                                                                      |
|                                                                               | 3. Lack of pumping pressure                                             | Check for and repair worn pump.                                                                                                                                                |
|                                                                               | 4. Excessive binding or loading in system                               | Locate source and eliminate cause.                                                                                                                                             |

CAUTION: IF THE HYDRAULIC SYSTEM FLUID BECOMES OVERHEATED (IN EXCESS OF 200°F (93.3°C.)), SEALS IN THE SYSTEM CAN SHRINK, HARDEN OR CRACK, THUS LOSING THEIR SEALING ABILITY.

Ross Gear extends close technical cooperation and assistance. If problems occur which you cannot solve, please contact our Ross Service Department or local Ross approved Distributor.

# MAF Torqmotor™ Exploded Assembly View - Typical



## MAF Service Parts List Chart REVISED 7-7-83

CHART USE EXAMPLE: MAF06001 TORQMOTOR™ INCLUDES PART NUMBERS LISTED TO THE RIGHT OF MAF.  
06- AND -001 SHOWN IN LEFT HAND COLUMN OF CHART.

NOTE: REFER TO INDIVIDUAL SERVICE PARTS LIST FOR TORQMOTORS NOT COVERED IN THIS CHART.

(continued)

| EXPLODED VIEW |                |               |                |               |                |        |  |  |  |
|---------------|----------------|---------------|----------------|---------------|----------------|--------|--|--|--|
| ITEM #        | DESCRIPTION    | 3             | 5              | 8             | 9*             |        |  |  |  |
| MAF           | SERVICE PART # | End Cover     | Seal Ring      | Drive Link    | Commutator     |        |  |  |  |
|               |                | 402400        | 032753 13      | MAF013001     | MAF014000      |        |  |  |  |
| EXPLODED VIEW |                |               |                |               |                |        |  |  |  |
| ITEM #        | DESCRIPTION    | 10            | 12             | 13            | 14             | 16     |  |  |  |
| MAF           | SERVICE PART # | Drive Pin     | Bearing        | Thrust Washer | Thrust Bearing | Seal   |  |  |  |
|               |                | 040145        | 088025         | 028483        | 065066         | 032377 |  |  |  |
| EXPLODED VIEW |                |               |                |               |                |        |  |  |  |
| ITEM #        | DESCRIPTION    | 17            | 18             | 19            | 20             |        |  |  |  |
| MAF           | SERVICE PART # | Backup Washer | Retaining Ring | Bearing       | Seal-Shaft     |        |  |  |  |
|               |                | 028484        | 401369         | 065067        | 032538         |        |  |  |  |
| EXPLODED VIEW |                |               |                |               |                |        |  |  |  |
| ITEM #        | DESCRIPTION    | 2             | 6              | 7             | 4              |        |  |  |  |
| MAF           | SERVICE PART # | Bolts (7)     | Rotor Set      | Wearplate     | Spacer         |        |  |  |  |
| 06-           | SERVICE PART # | 021353        | MAF067002 A1   | 477316        | 028485         |        |  |  |  |
| 08-           | SERVICE PART # | 021354        | MAF087002 A1   | 477293        | 028485         |        |  |  |  |
| 12-           | SERVICE PART # | 021355        | MAF127002 A1   | 477293        | 477294         |        |  |  |  |
| 16-           | SERVICE PART # | 021356        | MAF167002 A1   | 477293        | 477295         |        |  |  |  |
| 20-           | SERVICE PART # | 021306        | MAF207002 A1   | 477293        | 477302         |        |  |  |  |
| 24-           | SERVICE PART # | 021357        | MAF247002 A1   | 477293        | 477296         |        |  |  |  |
| 32-           | SERVICE PART # | 021358        | MAF327002 A1   | 477293        | 477298         |        |  |  |  |
| 40-           | SERVICE PART # | 021359        | MAF407002 A1   | 477293        | 477299         |        |  |  |  |
| EXPLODED VIEW |                |               |                |               |                |        |  |  |  |
| ITEM #        | DESCRIPTION    | 11            | COUPLING SHAFT | WOODRUFF KEY  | 15*            |        |  |  |  |
| MAF           | SERVICE PART # | 091471        |                | G124553       | MAF012000      |        |  |  |  |
| -001          | SERVICE PART # | 091469        |                |               | MAF012000      |        |  |  |  |
| -002          | SERVICE PART # | 091472        |                |               | MAF012000      |        |  |  |  |
| -003          | SERVICE PART # | 091470        |                |               | MAF012000      |        |  |  |  |
| -004          | SERVICE PART # | 091473        |                |               | MAF012000      |        |  |  |  |
| -005          | SERVICE PART # | 091477        |                |               | MAF012000      |        |  |  |  |
| -006          | SERVICE PART # | 091478        |                |               | MAF012000      |        |  |  |  |
| -007          | SERVICE PART # | ...           | 091485         |               | MAF012000      |        |  |  |  |
| -008          | SERVICE PART # | 091471        |                |               | MAF012000      |        |  |  |  |
| -011          | SERVICE PART # | 091471        |                |               | MAF012000      |        |  |  |  |
| -012          | SERVICE PART # | 091469        |                |               | MAF012000      |        |  |  |  |
| -013          | SERVICE PART # | 091472        |                |               | MAF012000      |        |  |  |  |
| -014          | SERVICE PART # | 091470        |                |               | MAF012000      |        |  |  |  |
| -015          | SERVICE PART # | 091473        |                |               | MAF012000      |        |  |  |  |
| -016          | SERVICE PART # | 091477        |                |               | MAF012000      |        |  |  |  |
| -017          | SERVICE PART # | 091478        |                |               | MAF012000      |        |  |  |  |
| -018          | SERVICE PART # | ...           | 091485         |               | MAF012000      |        |  |  |  |
| -021          | SERVICE PART # | 091471        |                |               | MAF012000      |        |  |  |  |
| -022          | SERVICE PART # | 091469        |                |               | MAF012000      |        |  |  |  |
| -023          | SERVICE PART # | 091472        |                |               | MAF012000      |        |  |  |  |
| -024          | SERVICE PART # | 091470        |                |               | MAF012000      |        |  |  |  |
| -025          | SERVICE PART # | 091473        |                |               | MAF012000      |        |  |  |  |
| -026          | SERVICE PART # | 091477        |                |               | MAF012000      |        |  |  |  |
| -027          | SERVICE PART # | 091478        |                |               | MAF012000      |        |  |  |  |
| -028          | SERVICE PART # | ...           | 091485         |               | MAF012000      |        |  |  |  |

NOTES:

- Seal Kit #SK000012 includes items #5, #16, #20.
- Seal Kit #SK000016 is available for MAF units (not shown on this chart) that use special fire retardant fluids.
- Bearing Kit #SK000013 includes items #5, #12, #13, #14, #16, #17, #18, #19, #20.
- Housing, item #15 and commutator, item #9, cannot be serviced individually. Item #15 part number with -X1 suffix, is the housing/commutator service kit number. EXAMPLE: MAF012000-X1. This matched set service kit includes items #9, #10, #12, #13, #14, #15, #16, #17, #18, #19, #20 and if required, two of item #21.
- MAF Toromotors with this housing require two #032200-10 O-Rings, item #21 on the exploded assembly view.
- MAF Toromotors with this shaft also require #025136 nut, item #22 on the exploded assembly view.

## NOTES:

Seal Kit #SK000012 includes items #5, #16, #20.

Seal Kit #SK000016 is available for MAF units (not shown on this chart) that use special fire retardant fluids.

Bearing Kit #SK000013 includes items #5, #12, #13, #14, #16, #17, #18, #19, #20.

\* Housing, item #15 and commutator, item #9, cannot be serviced individually. Item #15 part number with -X1 suffix, is the housing/commutator service kit number. EXAMPLE:

MAF012000-X1. This matched set service kit includes items #9, #10, #12, #13, #14, #15, #16, #17, #18, #19, #20 and if required, two of item #21.

\*\* MAF Torqmotors with this housing require two #032200-10 O-Rings, item #21 on the exploded assembly view.

\*\*\* MAF Torqmotors with this shaft also require #025136 nut, item #22 on the exploded assembly view.

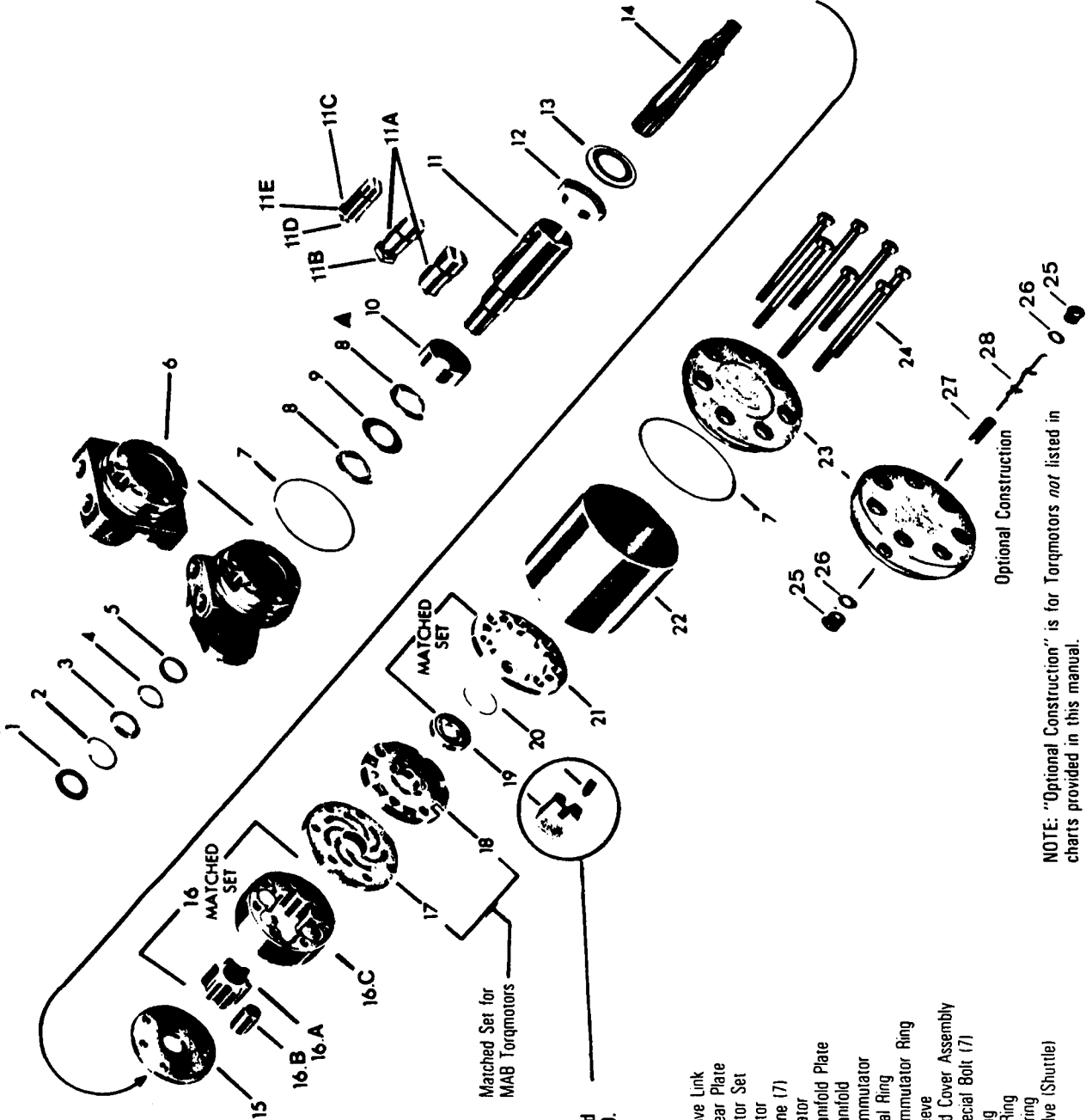
**Troubleshooting Checklist**

| Trouble                                                                              | Cause                                                                    | Remedy                                                                                                                                                                         |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil Leakage                                                                          | 1. Hose fittings loose, worn or damaged                                  | Check & replace damaged fittings or "O" Rings. Torque to manufacturers specifications.                                                                                         |
|                                                                                      | 2. Oil seal rings (7) deteriorated by excess heat                        | Replace oil seal rings by disassembling Torqmotor™ unit.                                                                                                                       |
|                                                                                      | 3. Special bolt (24) loose or its sealing area deteriorated by corrosion | (a) Loosen then tighten single bolt to 45-55 ft.lbs. (60-76 N m)<br>(b) Replace bolt.                                                                                          |
|                                                                                      | 4. Internal shaft seal (5) worn or damaged                               | Replace seal. Disassembly of Torqmotor™ unit not necessary.                                                                                                                    |
|                                                                                      | 5. Worn coupling shaft (11) and internal seal (5)                        | Replace coupling shaft and seal by disassembling Torqmotor™ unit.                                                                                                              |
| Significant loss of speed under load                                                 | 1. Lack of sufficient oil supply                                         | (a) Check for faulty relief valve and adjust or replace as required.<br>(b) Check for and repair worn pump.<br>(c) Check for and use correct oil for temperature of operation. |
|                                                                                      | 2. High internal motor leakage                                           | (a) Replace worn rotor set by disassembling Torqmotor™ unit.                                                                                                                   |
|                                                                                      | 3. Severely worn or damaged internal splines                             | Replace rotor set, drive link and coupling shaft by disassembling Torqmotor™ unit.                                                                                             |
|                                                                                      | 4. Excessive heat                                                        | Locate excessive heat source (usually a restriction) in the system and correct the condition.                                                                                  |
| Low mechanical efficiency or undue high pressure required to operate Torqmotor™ unit | 1. Line blockage                                                         | Locate blockage source and repair or replace.                                                                                                                                  |
|                                                                                      | 2. Internal interference                                                 | Disassemble Torqmotor™ unit, identify and remedy cause and repair, replacing parts as necessary.                                                                               |
|                                                                                      | 3. Lack of pumping pressure                                              | Check for and repair worn pump.                                                                                                                                                |
|                                                                                      | 4. Excessive binding or loading in system external to MAB/MAE unit.      | Locate source and eliminate cause.                                                                                                                                             |

**CAUTION:** If the hydraulic system fluid becomes overheated (in excess of 200°F (93.3°C)), seals in the system can shrink, harden or crack, thus losing their sealing ability.

Ross Gear extends close technical cooperation and assistance. If problems occur which you cannot solve, please contact our Ross Service Department or local Ross approved Distributor.

# MAB/MAE Torqmotor™ Exploded Assembly View—Typical



NOTE: Assemble Seal Flat Side Out as Shown in Enlarged View of Sectioned Segments of Items Number 19 and 20.

| Item No. | Description        |
|----------|--------------------|
| 1.       | Seal               |
| 2.       | Retaining Ring     |
| 3.       | Back-Up Washer     |
| 4.       | Washer             |
| 5.       | Seal               |
| 6.       | Housing            |
| 7.       | Seal Ring (2)      |
| 8.       | Thrust Washer      |
| 8A.      | Thrust Washer      |
| 9.       | Thrust Bearing     |
| 10.      | Bearing            |
| 11.      | Coupling Shaft     |
| 11A.     | Key                |
| 11B.     | Nut                |
| 11C.     | Washer             |
| 11D.     | Bolt               |
| 11E.     | Lock Washer        |
| 12.      | Bearing            |
| 13.      | Thrust Bearing     |
| 14.      | Drive Link         |
| 15.      | Wear Plate         |
| 16.      | Rotor Set          |
| 16A.     | Rotor              |
| 16B.     | Vane (7)           |
| 16C.     | Stator             |
| 17.      | Manifold Plate     |
| 18.      | Manifold           |
| 19.      | Commutator         |
| 20.      | Seal Ring          |
| 21.      | Commutator Ring    |
| 22.      | Sleeve             |
| 23.      | End Cover Assembly |
| 24.      | Special Bolt (7)   |
| 25.      | Plug               |
| 26.      | O-Ring             |
| 27.      | Spring             |
| 28.      | Valve (Shuttle)    |

NOTE: "Optional Construction" is for Torqmotors not listed in charts provided in this manual.



# MAB Service Parts List Chart (1 1/4 Inch, 31.8 mm, Seal Dia. Coupling Shaft)

CHART USE EXAMPLE: MAB06002 TORQMOTOR™ INCLUDES PART NUMBERS LISTED TO THE RIGHT OF MAB, 06- AND -002 SHOWN IN LEFT HAND COLUMN OF CHART.

CAUTION: THE CHARTED COMPONENT SERVICE INFORMATION IS FOR THE TORQMOTORS LISTED ONLY. REFER TO THE ORIGINAL EQUIPMENT MANUFACTURER OF THE EQUIPMENT USING THE TORQMOTOR FOR ASSEMBLY NUMBERS NOT LISTED BELOW.

| EXPLODED VIEW |                           |                  |                |                 |                |              |             |  |  |
|---------------|---------------------------|------------------|----------------|-----------------|----------------|--------------|-------------|--|--|
| ITEM #        | 1*                        | 2*               | 3*             | 4*              | 5*             | 7*           |             |  |  |
| DESCRIPTION   | Seal                      | Retaining Ring   | Back-Up Washer | Washer          | Seal           | Seal Ring(2) |             |  |  |
| MAB           | SERVICE PART #            | 032436           | 028398         | 029106          | 032633         | 032519       |             |  |  |
| EXPLODED VIEW |                           |                  |                |                 |                |              |             |  |  |
| ITEM #        | 8 & 8A**                  | 9**              | 10**           | 12**            | 13**           | 15           |             |  |  |
| DESCRIPTION   | Thrust Washer(2)          | Thrust Bearing   | Bearing        | Bearing         | Thrust Bearing | Wear Plate   |             |  |  |
| MAB           | SERVICE PART #            | 400103           | 067029         | 070502          | 070501         | 477237       |             |  |  |
| EXPLODED VIEW |                           |                  |                |                 |                |              |             |  |  |
| ITEM #        | 17 + 18                   | 19 + 21          | 20*            | 23              |                |              |             |  |  |
| DESCRIPTION   | Manifold Plate + Manifold | Commutator Assy. | Seal Ring      | End Cover Assy. |                |              |             |  |  |
| MAB           | SERVICE PART #            | MAB015003X1      | MAB018000S1    | 032435          | MAB016000A1    |              |             |  |  |
| EXPLODED VIEW |                           |                  |                |                 |                |              |             |  |  |
| ITEM #        | 14                        | 16               | 22             | 24              |                |              |             |  |  |
| DESCRIPTION   | Drive Link                | Rotor Set        | Sleeve         | Special Bolt(7) |                |              |             |  |  |
| 06-           | SERVICE PART #            | MAB083001        | MAB067001A1    | 099025          | 021270         |              |             |  |  |
| 08-           | SERVICE PART #            | MAB083001        | MAB087000A2    | 099025          | 021270         |              |             |  |  |
| 10-           | SERVICE PART #            | MAB103000        | MAB107000A1    | 099091          | 021270         |              |             |  |  |
| 16-           | SERVICE PART #            | MAB163001        | MAB167000A2    | 099026          | 021271         |              |             |  |  |
| 24-           | SERVICE PART #            | MAB243001        | MAB247000A3    | 099024          | 021272         |              |             |  |  |
| 32-           | SERVICE PART #            | MAB323001        | MAB327005A1    | 099085          | 021273         |              |             |  |  |
| EXPLODED VIEW |                           |                  |                |                 |                |              |             |  |  |
| ITEM #        | 6                         | 11               | 11A            | 11B***          | 11C            | 11D          | 11E         |  |  |
| DESCRIPTION   | Housing                   | Coupling Shaft   | Key            | Nut             | Washer         | Bolt         | Lock Washer |  |  |
| -002          | SERVICE PART #            | MAB012000A1      | 091399         |                 |                |              |             |  |  |
| -003          | SERVICE PART #            | MAB012002A1      | 091404         | 039027          | 025126         |              |             |  |  |
| -004          | SERVICE PART #            | MAB012000A1      | 091404         | 039027          | 025126         |              |             |  |  |
| -005          | SERVICE PART #            | MAB012002A1      | 091399         |                 |                |              |             |  |  |
| -008          | SERVICE PART #            | MAB012000A1      | 091405         |                 |                |              |             |  |  |
| -009          | SERVICE PART #            | MAB012002A1      | 091405         |                 |                |              |             |  |  |
| -010          | SERVICE PART #            | MAB012000A1      | 091416         |                 |                |              |             |  |  |
| -011          | SERVICE PART #            | MAB012002A1      | 091416         |                 |                |              |             |  |  |
| -014          | SERVICE PART #            | MAB012002A1      | 091462         | 039028          | 028413         | G223734      | G103325     |  |  |
| -015          | SERVICE PART #            | MAB012000A1      | 091937         |                 |                |              |             |  |  |
| -016          | SERVICE PART #            | MAB012000A1      | 091462         |                 |                |              |             |  |  |
| -017          | SERVICE PART #            | MAB012002A1      | 091437         |                 |                |              |             |  |  |
| -041          | SERVICE PART #            | MAB012000A1      | 091435         |                 |                |              |             |  |  |

## NOTES:

\*Included in MAB500003—standard seal kit. Other kits: MAB500004—viton, synthetic fluid applications, MAB500005—cold temperature applications

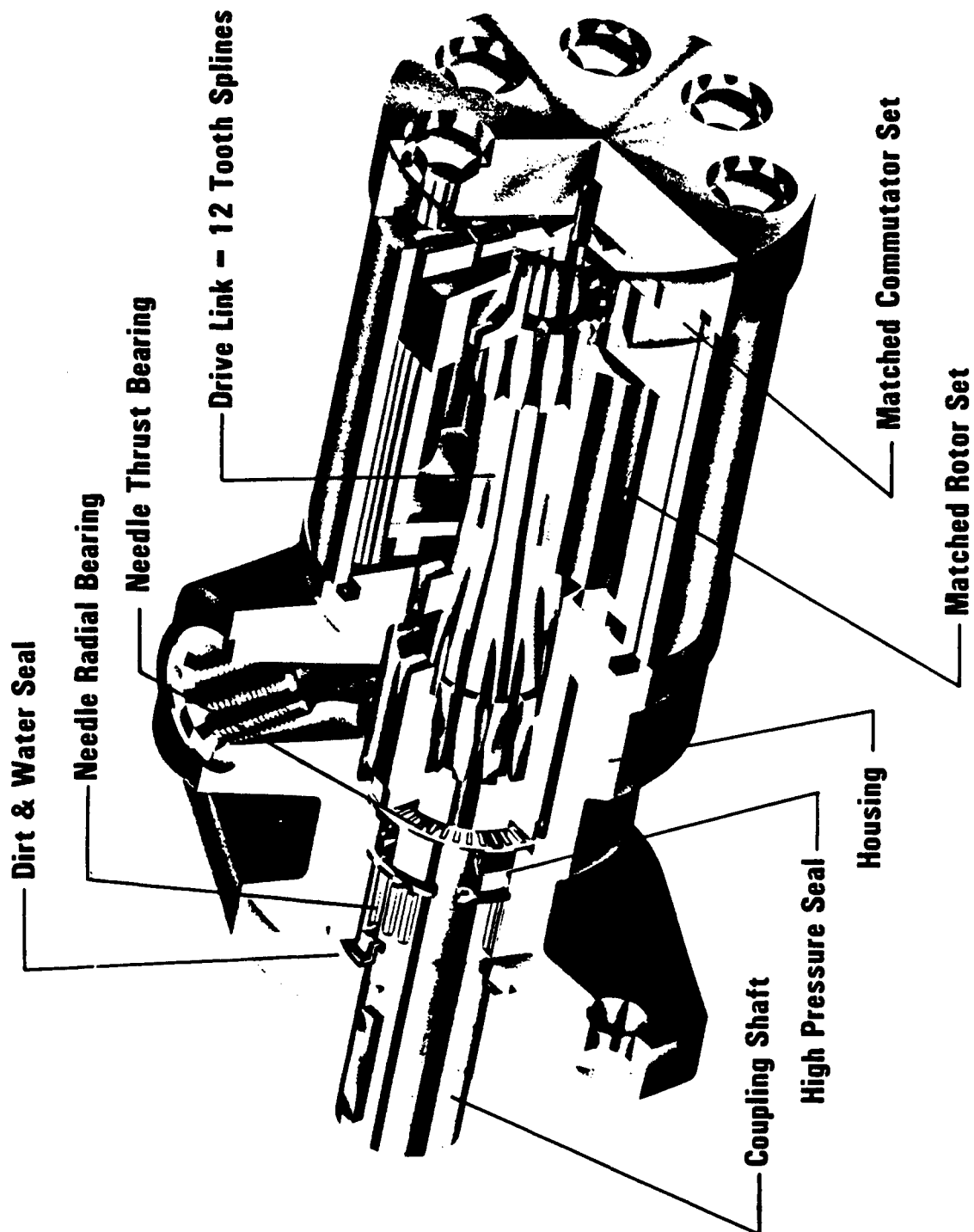
\*\*Included with item #6, Service Housing Assembly.

\*\*\*Item #11B nut service part number listed is for Torqmotor assembly part numbers with an A1 suffix only.

Item #11B nut service part number for Torqmotor assembly part numbers with an A4 suffix is 025113.

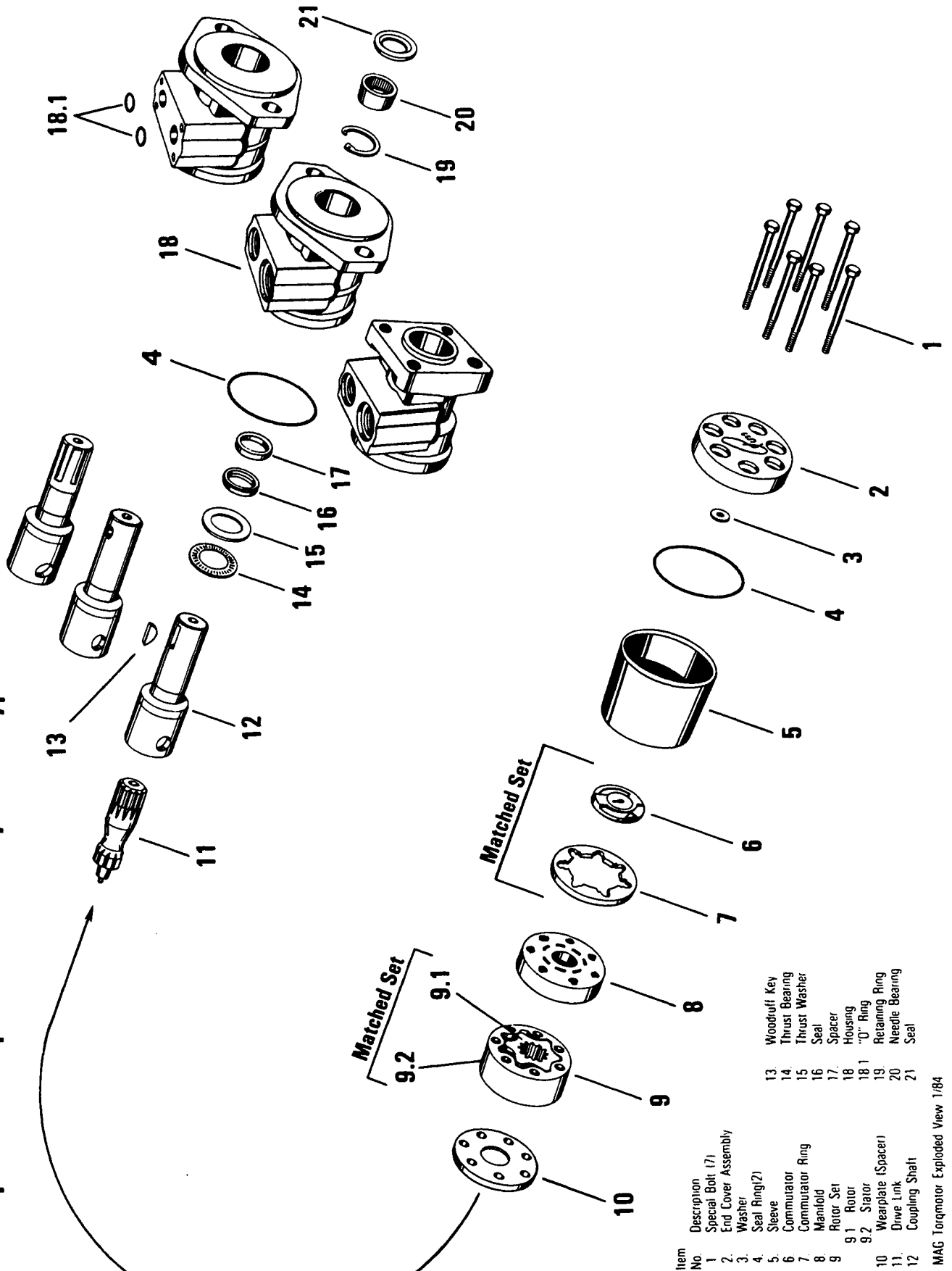
Item #11B nut service part number for Torqmotor assembly part numbers with an A7 suffix is 025132.

# EXTENDING PLATFORM MOTOR



# EXTENDING PLATFORM MOTOR

## MAG Torqmotor™ Exploded Assembly View-Typical



| Item No. | Description        |
|----------|--------------------|
| 1        | Special Bolt (7)   |
| 2        | End Cover Assembly |
| 3        | Washer             |
| 4        | Seal Ring(2)       |
| 5        | Sleeve             |
| 6        | Commutator         |
| 7        | Commutator Ring    |
| 8        | Manifold           |
| 9        | Rotor Set          |
| 9.1      | Rotor              |
| 9.2      | Stator             |
| 10       | Wearplate (Spacer) |
| 11       | Drive Link         |
| 12       | Coupling Shaft     |
| 13       | Woodruff Key       |
| 14       | Thrust Bearing     |
| 15       | Thrust Washer      |
| 16       | Seal               |
| 17       | Spacer             |
| 18       | Housing            |
| 18.1     | "O" Ring           |
| 19       | Retaining Ring     |
| 20       | Needle Bearing     |
| 21       | Seal               |

# MAG Service Parts List Chart

CHART USE EXAMPLE: MAG06001 TORQMOTOR™ INCLUDES PART NUMBERS LISTED TO THE RIGHT OF MAG, 06- AND -001 SHOWN IN LEFT HAND COLUMN OF CHART.

NOTE: REFER TO INDIVIDUAL SERVICE PARTS LIST FOR TORQMOTORS NOT COVERED IN THIS CHART.

| EXPLODED VIEW |                | 2                 | 3            | 4              | 6 & 7          | EXPLODED VIEW |                | 12             | 13           | 18**          | 18.1**     |
|---------------|----------------|-------------------|--------------|----------------|----------------|---------------|----------------|----------------|--------------|---------------|------------|
| ITEM #        | DESCRIPTION    | End Cover Assy.   | Washer       | Seal Ring (2)  | Commutator Set | ITEM #        | DESCRIPTION    | Coupling Shaft | Woodruff Key | Housing Assy. | O-Ring (2) |
| MAG-          | SERVICE PART # | 402364-A1         | 028395       | 032582         | MAC014000A2    | -014          | SERVICE PART # | 091430         |              | MAG012002A1   | 032200-10  |
| EXPLODED VIEW | ITEM #         | 8                 | 10           | 14             | 15             | -015          | SERVICE PART # | 091430         |              | MAG012005X1   | 032200-10  |
|               | DESCRIPTION    | Manifold          | Wearplate    | Thrust Bearing | Thrust Washer  | -016          | SERVICE PART # | 091430         |              | MAG012004X1   | 032200-10  |
| MAG-          | SERVICE PART # | MAC015000         | 477255       | 066980         | 400108         | -017          | SERVICE PART # | 091430         |              | MAG012001A1   |            |
| EXPLODED VIEW | ITEM #         | 16                | 17           | 19***          | 20**           | -018          | SERVICE PART # | 091430         |              | MAG012000A1   |            |
|               | DESCRIPTION    | Seal              | Spacer       | Retaining Ring | Needle Bearing | -022          | SERVICE PART # | 091446         |              | MAG012003A1   |            |
|               | ITEM #         | 032377            | 028414       | 401369         | 065067         | -024          | SERVICE PART # | 091446         |              | MAG012005X1   | 032200-10  |
| MAG-          | SERVICE PART # | 032377            | 028414       | 401369         | 065067         | -025          | SERVICE PART # | 091446         |              | MAG012000A1   |            |
| EXPLODED VIEW | ITEM #         | 1                 | 5            | 9              | 11             | -026          | SERVICE PART # | 091440         | G124553      | MAG012003A1   |            |
|               | DESCRIPTION    | Special Bolts (7) | Sleeve       | Rotor Set      | Drive Link     | -027          | SERVICE PART # | 091440         | G124553      | MAG012001A1   |            |
|               | ITEM #         | 021311            | 099061       | MAC047000      | MAC043000A1    | -028          | SERVICE PART # | 091440         | G124553      | MAG012005X1   | 032200-10  |
| 04-           | SERVICE PART # | 021311            | 099061       | MAC047000      | MAC043000A1    | -029          | SERVICE PART # | 091440         | G124553      | MAG012000A1   |            |
| 06-           | SERVICE PART # | 021311            | 099061       | MAC067000      | MAC063000A1    | -031          | SERVICE PART # | 091446         |              | MAG012001A1   |            |
| 08-           | SERVICE PART # | 021306            | 099060       | MAC087001      | MAC083000A1    | -035          | SERVICE PART # | 091454         |              | MAG012000A1   |            |
| 14-           | SERVICE PART # | 021307            | 099093       | MAC147000      | MAC143000A1    | -036          | SERVICE PART # | 091446         |              | MAG012002A1   |            |
| 16-           | SERVICE PART # | 021307            | 099059       | MAC167001      | MAC163000A1    | -043          | SERVICE PART # | 091454         |              | MAG012005X1   | 032200-10  |
| 20-           | SERVICE PART # | 021358            | 099099       | MAC207001      | MAG203000A1    | -044          | SERVICE PART # | 091454         |              | MAG012003A1   |            |
| 24-           | SERVICE PART # | 021308            | 099058       | MAC247001      | MAC243000A1    | -045          | SERVICE PART # | 091454         |              | MAG012002A1   |            |
| 32-           | SERVICE PART # | 021310            | 099057       | MAC327000      | MAC323000A1    |               |                |                |              |               |            |
| EXPLODED VIEW |                | 12                | 13           | 18**           | 18.1**         |               |                |                |              |               |            |
|               | DESCRIPTION    | Coupling Shaft    | Woodruff Key | Housing Assy.  | O-Ring (2)     |               |                |                |              |               |            |
| -001          | SERVICE PART # | 091417            | G124553      | MAG012003A1    |                |               |                |                |              |               |            |
| -002          | SERVICE PART # | 091417            | G124553      | MAG012001A1    |                |               |                |                |              |               |            |
| -003          | SERVICE PART # | 091417            | G124553      | MAG012005X1    | 032200-10      |               |                |                |              |               |            |
| -004          | SERVICE PART # | 091417            | G124553      | MAG012004X1    | 032200-10      |               |                |                |              |               |            |
| -005          | SERVICE PART # | 091417            | G124553      | MAG012002A1    |                |               |                |                |              |               |            |
| -006          | SERVICE PART # | 091417            | G124553      | MAG012000A1    |                |               |                |                |              |               |            |
| -007          | SERVICE PART # | 091436            |              | MAG012003A1    |                |               |                |                |              |               |            |
| -008          | SERVICE PART # | 091436            |              | MAG012002A1    |                |               |                |                |              |               |            |
| -009          | SERVICE PART # | 091436            |              | MAG012005X1    | 032200-10      |               |                |                |              |               |            |
| -010          | SERVICE PART # | 091436            |              | MAG012004X1    |                |               |                |                |              |               |            |
| -011          | SERVICE PART # | 091436            |              | MAG012001A1    |                |               |                |                |              |               |            |
| -012          | SERVICE PART # | 091436            |              | MAG012000A1    |                |               |                |                |              |               |            |
| -013          | SERVICE PART # | 091430            |              | MAG012003A1    |                |               |                |                |              |               |            |

NOTES: Seal Kit MAC500001 includes items #16, #17, #21, and two of item #4.

\*Service Housing Assy. item #18, with part number suffix A1 also includes items #19, #20.

\*\*Service Housing Assy. item #18 with part number suffix X1 also includes item #19, #20, and two of item #18.1.



**Mark Industries**

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SERVICE BULLETIN

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THIS CHAPTER HAS BEEN PROVIDED TO KEEP **MARK INDUSTRIES** SERVICE BULLETINS THAT APPLY TO THE IMPROVEMENT OF YOUR **MARKLIFT**.



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