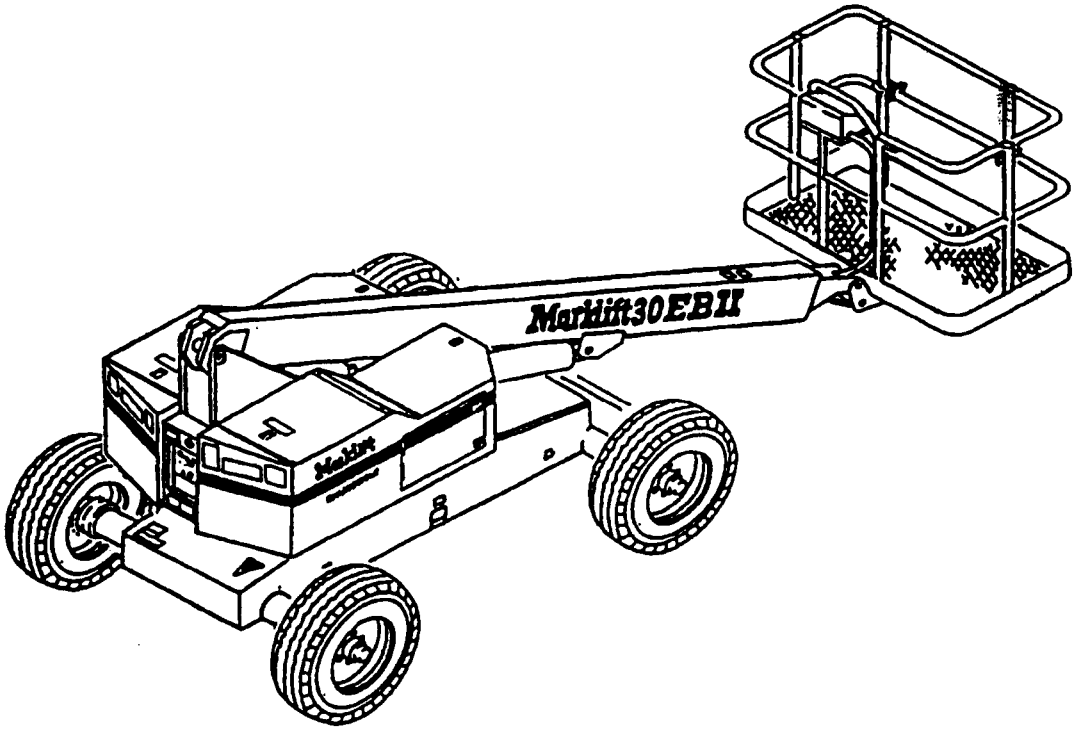
The Marklifts.®
A Product of Mark Industries

SELF-PROPELLED BOOM OPERATION MAINTENANCE AND PARTS MANUAL (30EB II MODEL)



FIRST EDITION: JULY 1989

Mark Industries

P.O. Box 2255
Brea, California 92622
205 South Puente Street, Brea, California 92621
(714) 879-6275, FAX (714) 879-8884

17120

Mark Industries

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INTRODUCTION

The purpose of this manual is to provide the customer with operation, safety, maintenance and parts information that will enhance the reliable performance of the **MARKLIFT**. Schematic and vendor information is also furnished. If additional information is needed, we urge the customer to contact the local dealer. If this is impossible, please contact the Mark Industries Service Department at (714) 879-6275 ext. 362.

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

The model capacity, pressure settings and serial number can be found on the ID plate mounted on the rear of the frame assembly. The serial number should be used when ordering parts. This will help our parts department give prompt and accurate service.

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

Description	Model
	30 EBII
Height –	
Working (maximum)	37'5" (11.40m)
Platform (maximum)	31'5" (9.58m)
Load capacity (unrestricted)	500 lbs (226.8 kg)
Stowed height	6'4" (1.93m)
Width	5'9" (1.75m)
Length (minimum)	17'1" (5.21m)
Wheelbase	5'9" (1.75m)
Wheel track	4'11" (1.50m)
Turning Radius (inside)	5'11" (1.80m)
Turning Radius (outside)	13'0" (3.96m)
Tires	F60 - 14 (monofilled)
Turret rotation	Noncontinuous 360°
Tailswing	Zero
Power source	24 VDC
Ground clearance	5" (.13m)
Travel speed (proportional)	
High	0 - 2.2 MPH (0 - 3.5 km/h)
Low	0 - 1.2 MPH (0 - 1.9 km/h)
Controls	Proportional drive
	all others solenoid
Hydraulic capacity	14 gallons (531)
Platform dimensions	30" x 48 (.76m x 1.22m)
Horizontal reach	25'3" (7.70m)
Boom elevation	75° above horizontal
	20° below horizontal
Weight	10,460 lbs (4,745 kg)

Filling in the Warranty: Please refer to the applicable decals on your machine for the figures and quantities needed to fill in the blanks below (Items 1, 24, 25, 26, 32, 33,39,40,41,42).

		YES	NO
1.	Platform capacity decal _____. lbs.	☐	☐
2.	All warning, caution and emergency decals installed	☐	☐
3.	Emergency descent valve functions properly	☐	☐
4.	Operation instructions properly installed	☐	☐
5.	Operation and safety handbook received	☐	☐
6.	Electrical schematic received	☐	☐
7.	All controls (aerial & ground) are identified and operate correctly	☐	☐
8.	Stop switches operate properly (aerial & ground)	☐	☐
9.	Platform guard rails, secure and undamaged	☐	☐
10.	Platform access gate works properly	☐	☐
11.	Horn and beacon operate properly (optional)	☐	☐
12.	Brakes adjusted and operate correctly	☐	☐
13.	Circuit breakers operate properly	☐	☐
14.	All Hydraulic cylinders free of gas	☐	☐
15.	All hydraulic cylinder rods free of paint or scratches	☐	☐
16.	Hydraulic pump free of leaks	☐	☐
17.	Hydraulic hoses and fittings free of leaks	☐	☐
18.	Hydraulic oil level	☐	☐
19.	Hydraulic tank and fittings free of leaks	☐	☐
20.	Drive motors free of leaks	☐	☐
21.	Battery water level	☐	☐
22.	Coolant hoses and fittings free of leaks	☐	☐
23.	Electric radiator fan operates properly	☐	☐
24.	System pressure _____. PSI	☐	☐
25.	Pilot pressure _____. PSI	☐	☐
26.	Tire pressure _____. PSI	☐	☐
27.	Manual overrides operate properly	☐	☐
28.	Muffler is tight and free of leaks	☐	☐
29.	All electrical connections tight	☐	☐
30.	Manifold valve and fittings free of leaks	☐	☐
31.	110V generator operates properly (optional)	☐	☐
32.	Wheel lug nuts torqued to _____. lbs	☐	☐
—Internal Combustion Units—			
33.	Engine _____ .R.P.M	☐	☐
34.	Engine coolant (radiator) level	☐	☐
35.	Fuel tank and fitting free of leaks	☐	☐
36.	Engine oil level	☐	☐
37.	Engine oil filter free of leaks	☐	☐
38.	Engine alternator functions properly	☐	☐
39.	Turret rotation gear box oil level _____.	☐	☐
40.	Turret ring gear bolts torqued to _____ Ft. lbs	☐	☐
41.	Drive wheel, torque hub oil level _____ .	☐	☐
42.	Retraction cable tension _____ Ft. lbs	☐	☐

MODEL	SERIAL NUMBER
INSPECTOR	OPTIONS

MANUFACTURERS' LIMITED WARRANTY

Mark Industries makes no warranty, expressed or implied, on any product manufactured or sold by Mark Industries except for the following limited warranty against defect 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 one (1) year 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 on 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 on any product) manufactured by Mark Industries which, within one (1) year 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 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, expressed or implied, in addition to this limited warranty. **This limited warranty is exclusive and in lieu of all other warranties, expressed 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, electrical components are specifically excluded from this limited warranty.

Mark Industries

P.O. Box 2255, Brea, CA 92622-2255
714-879-6275 800-448-MARK
TELEX 194402 FAX 1-714-879-8884

WARRANTY REGISTRATION

Purchaser

Company Name

Address

Telephone

Date shipment received

Date of invoice

Date unit put into service

Unit will be used

Unit will be sold

Unit will be used for:

- ☐ Inspection
- ☐ Mining
- ☐ Welding
- ☐ Construction
- ☐ Scaffolding
- ☐ Mechanical
- ☐ General maintenance
- ☐ Heating/Air conditioning
- ☐ Carpentry
- ☐ Plumbing
- ☐ Electrical
- ☐ Sprinkler
- ☐ Painting/Sandblast
- ☐ Steel fabrication
- ☐ Rigging
- ☐ Roofing
- ☐ Glazing
- ☐ Other

Comments

Inspection completed by: Title:

Warranty will be void unless this inspection report is postmarked to Mark Industries not more than fourteen (14) days from the date shipment is received.

REV.

IMPORTANT: Due to the width of the **Marklift** and the overall width of the trailer, extreme caution must be taken when loading and unloading.

When loading and unloading the **MARKLIFT**, it is necessary to use a combination of winching and driving the boom in low drive speed. The operator in the basket must wear a safety belt attached with lanyard to the safety rings provided.

1. Make sure that the parking brake is set for immediate braking by opening the parking brake control valve. (See Figure 1.)

2. Extend the boom in order to achieve the lowest travel speed. Use **LOW DRIVE** at all times when loading and unloading.

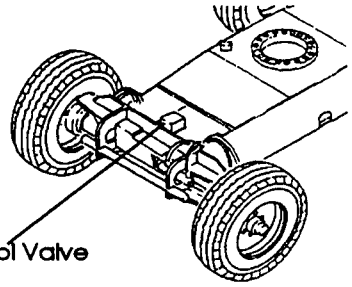


Figure 1: Parking Brake Control Valve

LOADING

1. With the trailer on level ground, align the tires of the **MARKLIFT** with the ramps of the trailer.

2. Attach the winch cable to the boom at the drive wheel end of the base through the tow or lift if provided.

3. Exercise great care while driving and steering the unit up the ramp. Use low drive speed and keep all slack out of the winch cable (If the ramp is too steep for the unit to climb, the winch will pull the unit up.) **You must keep the drive function engaged while winching, otherwise the brakes will prevent the machine from rolling.**

4. When the Marklift is on the truck and properly located, chain the boom down as shown in Figure 2 of this instruction.

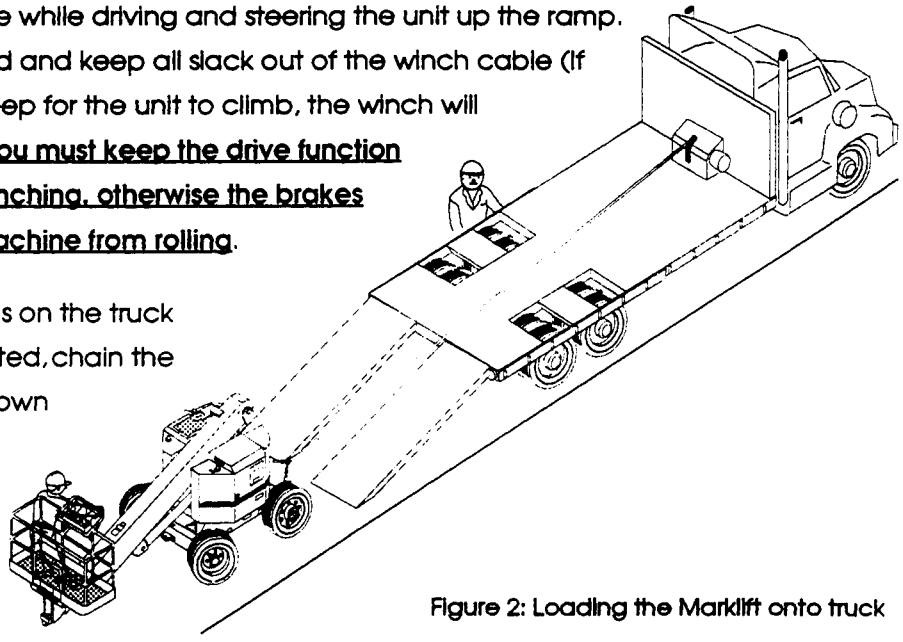
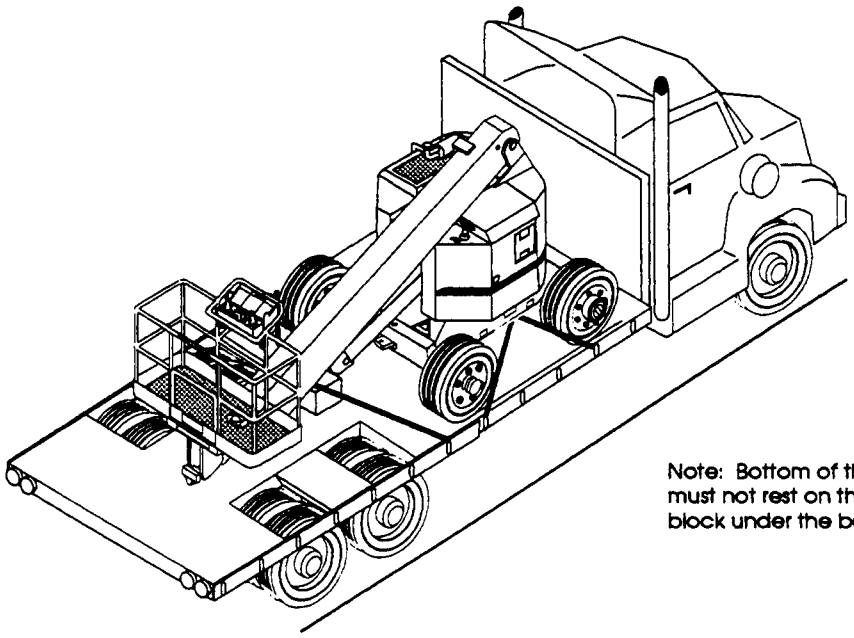


Figure 2: Loading the Marklift onto truck



Note: Bottom of the basket weldment fork must not rest on the truck bed. Place a wooden block under the basket end of the boom arm.

Figure 3: Securing the Marklift to the Platform

UNLOADING

1. With the trailer on level ground, disconnect the tie-down chains from the **MARKLIFT** and make sure that the winch cable is still properly attached to the unit.

2. Select the low drive speed on the platform control console.

3. use great care while driving and steering the unit off the trailer. Keep all slack out of the winch cable.

Warning:	**Do Not** allow slack in the winch cable when going down the ramp, because of the possibility of snapping the cable should the unit descend the ramp too fast.

4. When all the wheels are on level ground, disconnect the winch cable from the unit.

5. Re-adjust the boom parking brakes so that they apply immediately after the dynamic brakes stop the unit. The procedure for re-adjusting the parking brakes is as follows: First, close the needle valve completely. Open the valve 1/8 turn then place the unit on a flat surface, approximately 10 feet wide x 30 feet long. Position the boom slightly below horizontal and completely retract the boom. Select "High" drive speed at the platform console. Drive the **MARKLIFT** with the controller handle in maximum position, approximately 15 feet, release the

controller while the wheel is next to a visual marker on the ground. A good slowing and braking distance would be 3 feet measured from the marker to the center line of the same wheel after the unit has completely stopped. Adjust the needle valve on the parking brakes to achieve this distance. Repeat this procedure, driving in both directions until the **MARKLIFT** comes to a complete stop within 18" to 24". The deceleration valves have been set at the factory and should not be readjusted without first consulting the **MARK INDUSTRIES** Customer Service Engineering Department. It is best to completely open the needle valve if the unit is to be used in a facility that has very steep slopes or inclines. However, very abrupt stops can be expected on flat surfaces if the drive controller is quickly released or returned to a neutral position.

BEFORE OPERATING THE MARKLIFT, REVIEW THE FOLLOWING PROCEDURES:

1. Visually inspect all exposed parts of the **MARKLIFT**. Secure any loose bolts and nuts. Replace any damaged hydraulic lines or broken wires. Check for any structural damage, including cut or damaged tires.

2. Check hydraulic oil level - sight gauge shows full with unit in stowed position.

3. Check battery for 1200 ± 50 reading on the hydrometer. Charge battery if reading is below 1100 (see Battery Maintenance page 44).

4. Check the hydraulic valve manifolds for leaks, loose fittings or loose wires.

5. Position selector switch to ground then operate switches, moving as follows: Boom UP/DOWN, rotation RIGHT/LEFT, and extend OUT/IN. Check for hose leaks.

6. After the ground control functions have been checked-out, position the selector switch to "Aerial" for operation at work platform. After entering the platform, depress the footswitch before using any control function switches. This increases engine RPM (if HIGH-LOW selector is positioned to High) and electrically completes the circuit to the controls.

7. Your **MARKLIFT** is equipped with a proportional drive control. When using the proportional drive function, press the footswitch, raise the controller locking device, then gradually move the controller in the desired direction . The controller handle is spring-centered and self locking to prevent accidental operation.

8. The travel or drive arrangement is with the boom located over the boom's steering wheels. This provides the best weight distribution for maximum traction. If the boom is rotated 180° the drive and steer decals read in reverse. The forward triangle decals on each end of the base will show the drive direction correctly, regardless of turret position.

9. Brake adjustments may be made by turning a small needle valve. (See PARTS section.) This valve is merely a time delay for applying the brakes. With the valve completely open, the time delay for applying the brakes is minimum. Set the delay valve to stop the machine in approximately three feet on level ground while driving at high speed.

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

1. The **MARKLIFT** self-propelled aerial work platform is a personnel lifting device, and it is essential that it be properly maintained and operated to perform all functions with maximum safety and efficiency.

2. The operation of any new and unfamiliar equipment can be hazardous in the hands of untrained operators. Only trained operators must be assigned to operate the **MARKLIFT.**

3. It is the responsibility of the operator to read and understand this manual and to follow all recommendations made.

4. Although the **MARKLIFT** conforms to specified **ANSI & OSHA** requirements, it is the responsibility of the owner to instruct the operators about safety requirements made not only by MARK INDUSTRIES, but by the various safety boards in your area, as well as requirements set forth by **ANSI & OSHA**.

5. **Do Not** change, alter, or vary the equipment in any way.

6. **Do Not** override any hydraulic, mechanical, or electrical safety devices.

7. **Do Not** store loose material in the work platform such as pipe, rope, extenstion cords, wire or miscellaneious boxes. If it is necessary to store such items, they must be positioned in such a way that no one will trip over them when operating or working in the platform.

8. Never exceed the manufacturer's recommended platform capacity. Remember, the load capacity of the **MARKLIFT** is the total combined weight of the personnel, tools, fixtures, and accessories.

9. Always distribute the load evenly over the platform area.

10. Do **Not** work on the platform if your physical condition is such that you feel dizzy or unsteady in any way.

11. The **MARKLIFT** platform is equipped with safety belt rings. Each operator of the **MARKLIFT** must wear a body belt. The belt must be attached with lanyard to the provided anchor points.

12. It is recommended that head gear (hard hats) be worn by all personnel on the work platform.

13. **Do Not** drive on uneven, sloping or soft terrain, unless the boom is fully retracted and raised just above horizontal.

14. The **MARKLIFT** non-insulated personnel carrier and must not be operated within 10 feet of a 50,000 volt line. (See the Division of Industrial Safety.)

15. **Do Not** raise or lower the boom into objects.

16. **Do Not** drive carriage or platform into objects.

17. **Do Not** use ladders or scaffolding on the platform to obtain greater height.

18. **Do Not** lean over the platform guard railings to perform work.

19. The **MARKLIFT** structure must not be used as a welding ground. Disconnect both battery leads before performing any welding operations.

20. Under no circumstances should horseplay be tolerated on the **MARKLIFT**.

21. **Do Not** oeprate the unit in more than a 5° front to rear or 3° side to side out-of-level condition.

22. **Do Not** jump start other vehicles using the **MARKLIFT** battery.

TITLE 8 DIVISION OF INDUSTRIAL SAFETY 358.38.113

(Register 73, No. 30—7-28-73)

Article 86. Provisions for Preventing accidents

Article 86. Provision for Preventing Accidents Due to Proximity to Overhead Lines

2946. Provisions for Preventing Accidents Due to Proximity to Overhead Lines.

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

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

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

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

TABLE X

Required clearances from Overhead High-Voltage Lines

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

(3) **TRANSPORTATION OR TRANSIT.** The transportation or transit of any tool, machinery, equipment, or apparatus, or the moving of any house or other building in proximity to overhead high-voltage lines shall be expressly prohibited if at any time during such transportation or transit of such tool, machinery, equipment, apparatus, or buildng, or any part thereof, can come closer to high-voltage lines than the minmum 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.

(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.

Table Y

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

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

(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."**

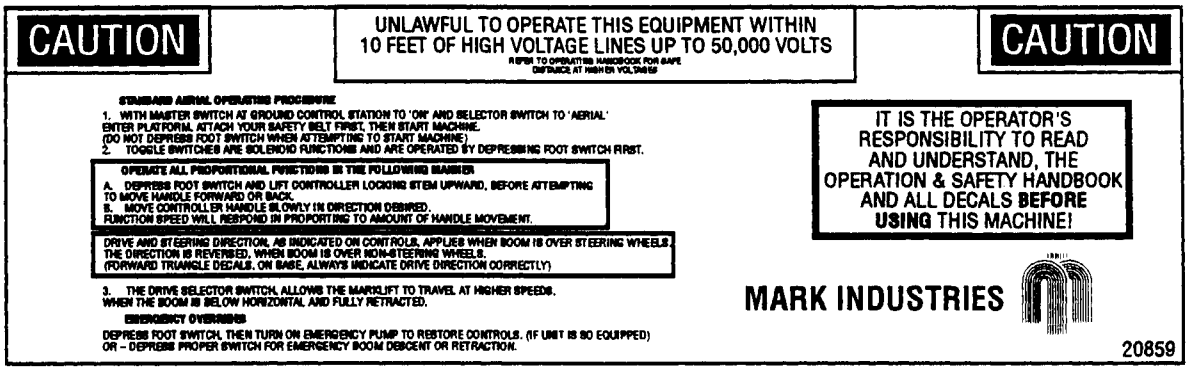
Marklift units with Lead Counterweights

If your MARKLIFT has lead counterweights, please refer to OSHA 29 CFR 1910.1025 for requirements concerning occupational exposure to lead. It is your responsibility to obtain the regulations that pertain to lead usage for your place of employment and for the protection of your employees.

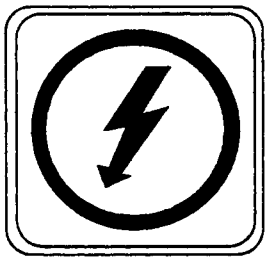
If you are unable to obtain said regulations, you may contact Mark Industries directly for assistance at (714)879-6275. You may also contact Mark Industries for a copy of the Materiel Safety Data Sheet for lead.

OBSERVE ALL DANGER, WARNING, CAUTION AND EMERGENCY DECALS AT THE VARIOUS LOCATIONS ON THE **MARKLIFT** IN ORDER TO TAKE TIMELY PREVENTIVE AND CORRECTIVE ACTIONS.

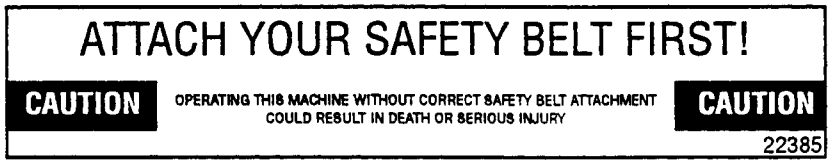
It is the primary responsibility of the user and operator to be thoroughly knowledgeable of all decal information, definition and location. The following page(s) illustrates a chart in which decals for the **MARKLIFT** can be replaced if the existing decal(s) is worn-out, torn, or illegible. This chart also refers to the decal's location and quantity used in that application.

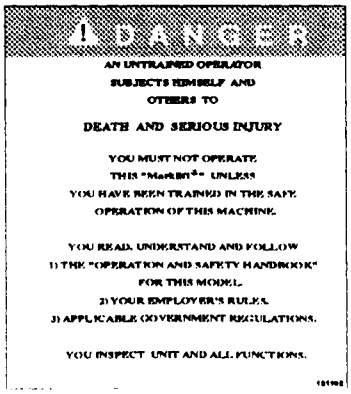














DANGER

NO SMOKING OR OPEN FLAMES WHEN CHARGING BATTERY



22449

⚠ WARNING

FAILURE TO OBEY THE FOLLOWING CAN RESULT IN

DEATH OR SERIOUS INJURY

- Do not sand, grind, flame cut , brase or weld on lead counterweights or couterweight's dry primer paint without air respirator (NIOSH/MSHA TC-19C), eye protection, gloves, and protective clothing.
- Wash hands and face thoroughly after performing any of the above tasks before eating, drinking or smoking.

183301

⚠ WARNING

This counterweight contains pure LEAD, known to the State of California to cause birth defects or other reproductive harm. Wash thoroughly after handling and before eating, drinking or smoking.

DO NOT grind, drill or perform other machining on counterweight unless all requirements of OSHA 29 CFR 1910.1025 are followed. FAILURE TO DO SO CAN CAUSE LEAD POISONING. Refer to the Operation, Maintenance and Parts Manual for a copy of OSHA requirements.

183302

⚠ DANGER

FAILURE TO OBEY THE FOLLOWING

CAN RESULT IN
DEATH OR SERIOUS INJURY
TO YOU OR OTHERS

- UNLAWFUL TO OPERATE THIS "Marklift®" WITHIN 10 FEET (3.05 METERS) OF HIGH VOLTAGE LINE UP TO 50,000 VOLTS.

VOLTAGE (PHASE TO PHASE)	MINIMUM SAFE APPROACH DISTANCE	
	(FEET)	(METERS)
OVER 50,000 TO 200,000 VOLTS	15	4.60
OVER 200,000 TO 350,000 VOLTS	20	6.10
OVER 350,000 TO 500,000 VOLTS	25	7.62
OVER 500,000 TO 750,000 VOLTS	35	10.67
OVER 750,000 TO 1,000,000 VOLTS	45	13.72

- ATTACH YOUR SAFETY BELT FIRST!
- BE SURE TO USE ALL SAFETY EQUIPMENT AS REQUIRED BY O.S.H.A.
- DO NOT LOAD BEYOND RATED CAPACITY.

181103

CAUTION

MONOFILLED TIRES ONLY

CAUTION

22175

LOAD CAPACITY **500** LBS.
(EVENLY DISTRIBUTED LOAD)

2022

DECAL P/N	DECAL DESCRIPTION 30EB II	ASSEMBLY(LOCATION)	QTY
67640	Decal Set	All Standard Decals	1
2003	Battery Water	Final Assy	1
2017	Hydraulic System	Final Assy	2
20410	Mark Industries Logo	Final Assy	1
20411	Stripe Square End	Final Assy	4
20419	Danger, Keep Clear	Final Assy	2
20420	Tire Pressure 75 PSI	Final Assy	2
20460	Ground Control	Ground Control Box	1
20461	Forward Arrow	Final Assy	1
20462	Forward Arrow Aft	Final Assy	1
20495	Emergency Ground Control	Final Assy	1
20508	Transportation	Final Assy	2
20660	I.D. Plate	Final Assy	1
20661	ANSI A92	Final Assy	1
20662	Patent No. Plate	Final Assy	1
20859	Caution Aerial Operating and Instructions	Final Assy	1
20860	General Checkout and Operating Instructions	Final Assy	1 1
2022	Load Capacity 500 Lbs	Final Assy	1
20896	Brake	Final Assy	1
20871	"30"	Final Assy	2
21235	Emergency Descent	Final Assy	1
20408	MARKLIFT	Final Assy	2
21237	Grease Fitting	Final Assy	2
22385	Caution, Attach Safety Belt	Final Assy	1
22386	D-Ring, Attach Safety Belt	Final Assy	2

DECAL P/N	DECAL DESCRIPTION 30EB II	ASSEMBLY(LOCATION)	QTY
11064	Attach Safety Chain Before Raising	Final Assy	2
20412	Blue Stripe Round End	Final Assy	2
21530	EB	Final Assy	2
20998	I	Final Assy	4
22175	Caution, Monofilled Tires	Final Assy	8
22449	No Smoking	Final Assy	2
23931	Boom Aerial	Aerial Control Box	1
23666	Aerial Control Switches	Aerial Control Box	1
31260	Marklift	Final Assy	2
130596	Product of Mark Industries	Final Assy	2
130820	Operation & Safety hndbk	Final Assy	1
185718	Circuit breaker 20 amp	Lower control panel	1
183301	Warning lead paint CTW	Final assy	2
183302	Warning this counterwght	Final Assy	2
181103	Danger, obey the following	Final Assy	2
181102	Danger, Do not operate	Final Assy	2

These instructions do not propose to be all inclusive, nor to supplement or replace other additional safety and/or precautionary measures covering usual or unusual conditions. If these instructions conflict in any way with the state, local or federal statute or regulations, said statute or regulations shall supersede these instructions, and it shall be the responsibility of each user to comply therewith, and inform MARK INDUSTRIES of the variances.

The following are applicable excerpts from the federal register, title 29, chapter XVII, O.S.H.A - 1926.556.

"EXTENSIBLE AND ARTICULATING BOOM PLATFORMS"

1. Lift controls shall be tested each day, prior to use, to determine that such controls are in safe and working condition.

2. Only authorized persons shall operate an aerial lift.

3. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

4. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

5. A body belt shall be worn and a lanyard attached to the boom or basket when working from an aerial lift.

6. Boom and basket load limits specified by the manufacturer shall not be exceeded.

7. Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for over-riding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

8. Climbers shall not be worn while performing work from aerial lift.

9. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled.

It shall be the responsibility of all **MARKLIFT** operators to read and act according to the following operating instructions. The purpose of these instructions are to promote safety and a better understanding of the functions of the **MARKLIFT** self-propelled boom. **The MARKLIFT must be inspected prior to use on each workshift. See preventive maintenance section for specific instructions.**

1. STARTING

A. GROUND CONTROL

The only functions that can be operated from the ground control station are: ON/OFF, RAISE/LOWER, ROTATE TURRET, and EXTEND/RETRACT boom. To start, position the master switch to "ON" and set selector switch to "Ground". Turn key to start, when the engine starts, release key. The **MARKLIFT** is now ready for operation.

B. AERIAL CONTROL

Turn master switch at ground control station to "ON". Position selector switch to "AERIAL". Enter the platform, ATTACH SAFETY CHAIN AFTER ENTERING PLATFORM. Pull open the red emergency stop switch cover located on the top right of the aerial control box. Pull down the toggle switch to the start position, when the engine starts, release the toggle switch. The **MARKLIFT** is now ready to operate.

2. DRIVE

Forward and reverse drive is achieved from the aerial control box only. The drive selector switch allows the Marklift to travel at higher speeds when the boom is below horizontal and fully retracted. For the drive to function, the operator must use both the footswitch and the forward/reverse controller knob.

The controller knob has a self-centering safety feature. For best operation, place thumb over controller knob and wrap fingers loosely around locking stem. Apply a downward pressure with the thumb, while the index finger lifts the locking stem. Once the stem is disengaged the lever can be moved forward or reverse, the pressure on the thumb may be relaxed because the locking stem has engaged the cam and cannot drop into the locking position until the lever or handle is returned to the center position.

3. STEERING

Steering the **MARKLIFT** is achieved by pressing the footswitch and operating the steering toggle switch. While the engine is running, push the steering toggle to the left or right to turn the wheels. The steering toggle switch is a momentary switch that self centers itself to the "Off" position. However, the steering wheels will remain in the last angle travelled until the switch is moved in another direction.

4. LIFT/LOWER

To raise or lower the boom from the ground control, set selector switch to the "ground control" position, then push the toggle switch up or down.

To operate from the aerial control box, position the selector switch to the "Aerial" position. Raise or lower the platform by operating the "Lift/Lower toggle switch. The toggle switch is self-centering. When it is released it will automatically set itself to center (the neutral position). The boom will remain stationary.

5. EXTENDING/RETRACTING

The boom extension/retraction toggle switch is located on the face of the ground control station and on the aerial control box. The boom may be extended forward, reversed, or retracted by pushing the toggle switch in the direction desired. This switch also has a self-centering momentary function.

6. WARNING LIGHT AND BUZZER

As a special safety feature, the **MARKLIFT** is equipped with an "out-of- level" sensor that will disable the boom functions whenever the **MARKLIFT** is in an unsafe out-of-level position. An unsafe out-of-level condition is sensed by the level sensor when the machine is tilted 5° front to rear or 3° side to side.

The unsafe condition is indicated by a red warning light and buzzer, located on the top center of the aerial control box. When the warning light and buzzer are on, "Lift/ Lower, Extend/Retract, and Turret Rotation will not operate but the drive and steer functions will. Should the warning signals come on, maneuver the **MARKLIFT** until it is on a safe, level operating surface and all functions will be restored.

All operators of the **MARKLIFT** should be instructed by trained operators. The new operators should spend 30 minutes practicing and becoming familiar with operating the boom. He should begin by raising the boom approximately 5 feet off the ground. The operator will soon find that gradual starts and stops are easy to perform.

Gradually raise the boom higher, and drive the **MARKLIFT** again until maximum height is reached. Remember, that the proportional signal from the controller to the valve is controlled by the operator. There is approximately 3 degrees of "dead" motion on each side of the controller center position.

MARK INDUSTRIES recommends that the following items be checked according to the schedules indicated. Any machine not in safe operating condition must be removed from service until it is repaired by a qualified service person.

DAILY (BEFORE USE ON EACH WORK SHIFT)

1. Make sure that operation and safety decals are in place and readable.
2. Check the water level in the battery.
3. Check for loose or worn hardware.
4. Check for structural defects.
5. Make sure the operating controls perform correctly.
6. Check for and correct any hydraulic leaks.
7. Check for and correct any structural damage.
8. Check for wear on cables and hoses.

WEEKLY

1. Check the condition of the tires. Make sure they are free of serious cuts or defects.
2. Check that operation and safety decals are in place and readable.
3. Check for proper brake operation.
4. Optional Record hour meter reading.
5. Clean unit by removing all dirt, oil, and grease. The machine may be washed with soap and water.
6. Check for and correct any hydraulic leaks.

7. Check for and correct any structural damage.

8. Check overall performance.

9. Check for wear on cables and hoses.

MONTHLY (or first 50 hours)

1. Check and lubricate, if necessary. (See lubrication instructions.)

2. Check battery condition.

3. Change the hydraulic oil return filter.

4. Grease ring gear, and rotation gear box worm gear.

5. Grease steering linkage.

EVERY SIX MONTHS (or 100 hours)

1. Check and lubricate, if necessary. (See lubrication instructions.)

2. Change pilot filter element. (See lubrication instructions.)

3. Change the hydraulic oil return filter.

EVERY YEAR

1. Re-pack all wheel bearings.

2. Change the hydraulic oil.

3. Change the hydraulic oil return filter.

ELECTRICAL

Whenever trouble shooting any problem, begin by checking the basics. This means checking to make sure that the batteries are in good shape and have at least a three quarter charge, determined by using a hydrometer and battery maintenance instructions. A large percentage of electrical problems are often due to poorly charged or defective batteries.

A. If a problem seems to be electrical, check the schematic, (see the SCHEMATICsection for more information) and use a volt/OHM meter to trace the power flow (electrical current) starting at the battery and continuing through the system until the problem is located.

B. Keep in mind, if you **DO NOT** have a good ground to a valve coil, relay, etc., then even if you have a proper electrical current to the coil or relay, the items will not function properly.

C. 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.

D. The basic purpose of a relay is to remotely switch other electrical devices.

HYDRAULIC

A. The various hydraulic functions are controlled by the electric solenoid valves. When a slower drive speed is needed, a portion of the hydraulic fluid is routed to the tank by the low speed valve thereby reducing the speed. If a problem seems to be hydraulic refer to the hydraulic schemaatic. (See the SCHEMATIC section.)

B. Directional valves have two opposite electrical coils with a moveable spool between the coils.

C. One way valves (lift, descent, and creep) are normally open and are closed to prevent flow.

LUBRICATION INSTRUCTIONS

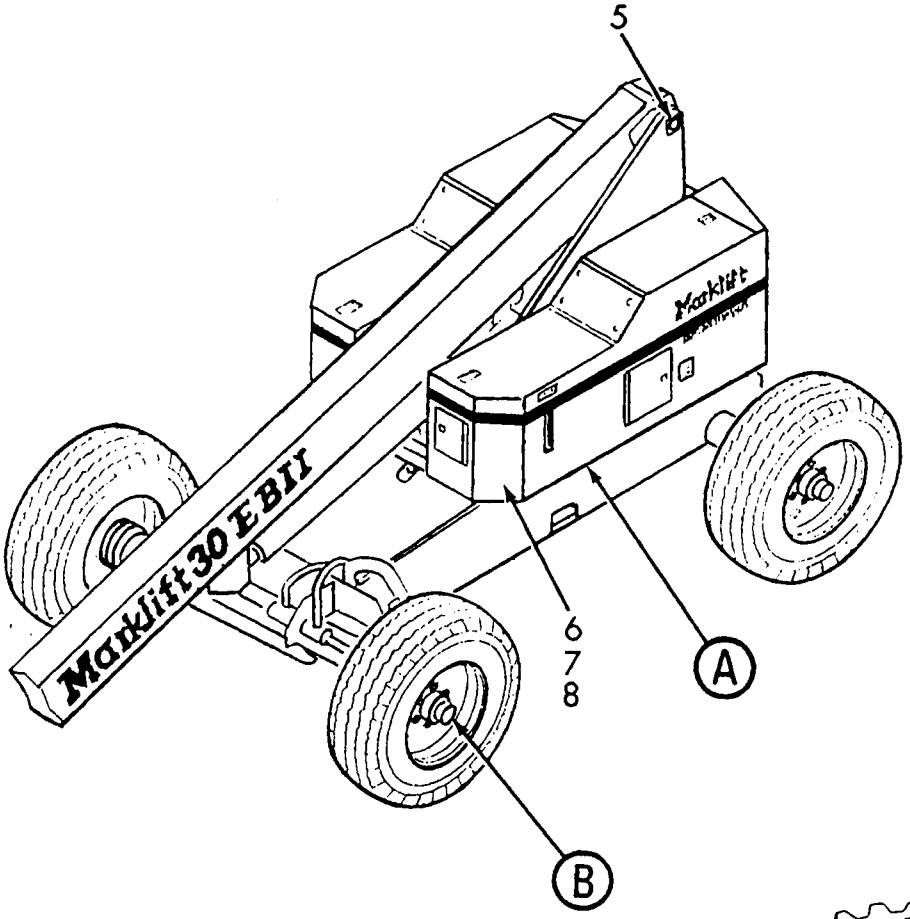
Item	Description*	Lubricant	Frequency
1	Ring Gear	Grease-Mobil (2) Zerk Fittings Rotate Gear While Greasing	Monthly
2	Tie Rod Pin	Grease-Mobil	Monthly
3	Steering Yoke King Pins	Grease-Mobile VA6L36AG or Equivalent**	Monthly
4	Wheel Bearings	Grease-Mobil VA6L36AG	Yearly
5	Boom Pivot Pin	Grease-Mobil VA6L36AG or Equivalent**	Monthly
6	Return Line Filter Element-81182		Replace Every 100 Hrs
7	Suction Filter Element-81183		Replace Every 100 Hrs.
8	Hydraulic Fluid	(See Hydraulic Fluid Table)	Yearly

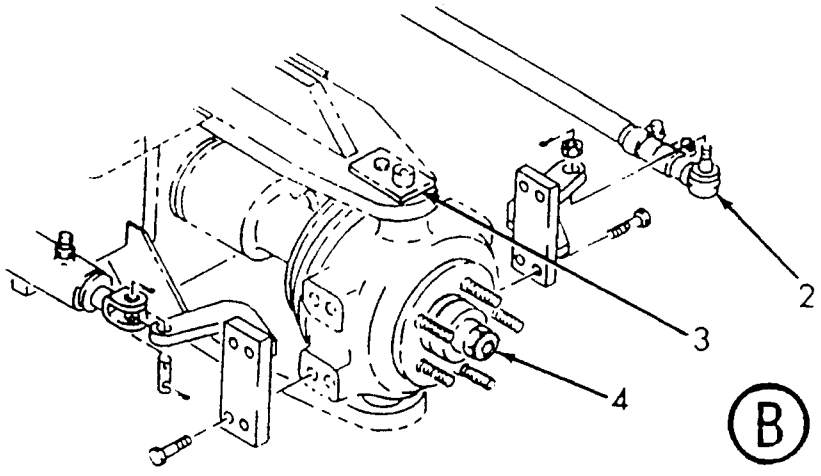
* See Following Page for Locations

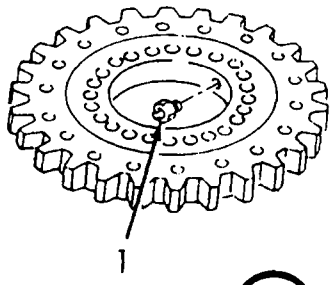
** Equivalent Bearing Grease: Union - Unoba EP-2, Shell - Alvinia EP-2

Lubrication Instructions

30 EB II







Battery Fill Instructions

Water or Acid Loss to Batteries

Water loss from the battery is mainly due to evaporation brought on by temperature rises during heavy charging cycles. A very small amount of water is lost due to hydrogen and oxygen formed during charging. Acid is lost if the case becomes cracked or if the battery is allowed to tip over. Therefore, acid is seldom needed.

Checking the Water Level

When checking the water level, don't allow dirt to enter into the battery cells once the caps have been removed. Take particular care to avoid setting the caps down on a dirty surface. Replace the caps immediately after checking the water level.

Materials and Equipment Required

1. Battery Filler Bottle
2. Distilled Water (if available)
3. Hydrometer

Filling the Battery

Electric Scissor Lifts and Booms:
Use a hydrometer to see how much charge the battery has. A reading 1.260 and above in all cells indicates fully charged. (See chart on following page.) If the battery is fully charged, add water up to the level indicator.

If the battery's water level is far below the lead plates, add only enough water to barely cover the plates before charging. After the batteries are fully charged, add water up to the level indicator.

Gas or Diesel Scissor Lifts and Booms:
Gas and diesel powered machines have alternators that keep the batteries fully charged. For these units, add water to the level indicator.

Either excessive overcharge or moderate undercharge can shorten battery life. With proper attention to water level and charging time, compared to hydrometer readings, the batteries should give a long useful life.

TEMPERATURE/SPECIFIC GRAVITY CORRECTION TABLE FOR BATTERIES
ACTUAL HYDROMETER READING AT ACTUAL TEMPERATURE

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

HYDRAULIC SYSTEM

The following information will help the mechanic trouble shoot and make adjustments to the hydraulic system. It is the mechanic's responsibility to read and understand the given information.

The **MARKLIFT** employs the latest components in mobile hydraulic equipment. The hydraulic circuit contains 2 two-stage electrically driven hydraulic pumps. One stage is for the drive function only, the other stage is for the steer and boom functions. The drive stage of the pump supplies the drive manifold. The drive manifold contains a bypass compensator, a load sense shuttle, a relief valve, and a proportional control valve. The bypass compensator is controlled by the load sense shuttle. The bypass compensator acts as a dump valve, returning all of the drive pump output back to the hydraulic pump when the pump is running and the proportional drive valve is not energized. As the drive controller is moved, flow is automatically diverted proportionally from the tank to the drive motors. This provides maximum efficiency and minimum oil heat. The relief valve insures that the pressure will not exceed the drive requirement. The proportional control valve spool is pilot driven. The steer and boom function manifold contains the following:

1. Manifold pressure relief valve.
2. Dump Valve
3. Two directional control valves, for steer and rotation functions.
4. Six three way valves: two each for left, extension and platform leveling.
5. Two crossover relief valves for the rotation function.
6. Extension relief valve
7. Two over-center valves for the slave leveling function.

Manifold Relief Valve

The manifold pressure relief valve insures that the manifold pressure does not exceed the maximum pressure rating for the pump.

Dump Valve

The dump valve allows all of the flow from the steer and boom function stage of the pumps to free flow back to the hydraulic tank when steer and boom functions are not activated. The dump valve closes to pressurize the manifold when a steer or boom function is activated. This provides fuel economy, over-all efficiency and minimizes oil heat build up.

Directional Control Valve

The directional control valves for the steer and rotation functions provide flow in the proper direction upon demand.

Three Way Valves

The three way valves provide flow to the function when electrically activated they are normally closed in design allowing the function to be connected to tank in a neutral or a de-energized condition.

Crossover Relief Valves

The cross over relief valves for the rotation function limit the pressure which limits the force of the boom rotation function. This limits the possibility of damage when the boom is rotated into an obstacle.

Extension Relief Valve

The extension relief valve limits the force of the extension cylinder when it is being extended. This provides protection from damage to the extension cylinder rod when the boom is extended into an obstacle.

Over-center Valves

The over-center valves in the slave leveling circuit provide protection to the circuit from over pressure when the slave leveling cylinder is bottomed out and the boom is being lifted or lowered (the movement of the boom drives the master leveling cylinder which would cause the pressure to rise to the over-center relief setting).

Electrical System

The **MARKLIFT** electrical system is very straight forward and easy to trouble shoot because of it's simplicity. There are two major junction boxes which also serve as the ground and aerial control consoles. The source for the electrical system is a 12 volt battery with a negative ground. All electrical components operate directly from the source through either switches or a proportional controller.

The ground control console houses the necessary switches for starting and stopping the engine; a selector switch for isolating either the ground or aerial control console, and the required toggle switches for moving the boom. The ground control console also contains a keyed ignition/start switch, as well as an engine stop switch, ammeter, and fuel gauge. When the selector switch is placed in the aerial position, the electrical source is routed to the aerial control junction box. The intent of the footswitch is to provide an additional safety interlock in the control circuit to produce foot as well as hand movement by the operator, thereby requiring maximum operator attention. The function of the footswitch only completes the electrical circuit to the aerial control console and engine throttle. **The footswitch is not directly connected to the drive braking system.**

The aerial control console is equipped with a controller and all switches necessary to operate the boom functions, as well as drive and steer. It also contains a start/stop and an emergency pump switch. Your **MARKLIFT** is equipped with a proportional control valve for the drive function. The aerial control console contains an electrical controller complete with a manual lockout, for the drive function. The controller is spring-centered and is designed to produce a variable output signal to the control valve. The output signal is directly proportional to the handle movement on the controller. The valve is electrically coupled to the controller and responds only to the signal level transmitted to it by the operator.

The operator must learn how to move the controller slowly to obtain a smooth transition from start up to wide open and back to neutral.

The **MARKLIFT** boom unit has additional safety systems for driving. When the unit is driven with the boom extended or raised above horizontal, the unit is automatically shifted into low speed. This is accomplished through two limit switches sensing the altitude and extension

positions of the boom, wired in series to a relay which connects the controller signal to a variable resistor (or potentiometer) that is connected to the ground and is parallel to the solenoid coil. This drains off some of the drive signal, limiting the speed when the machine is extended or raised above horizontal.

DRIVE MOTOR

1. Unit will not start or run.

   A. Check ground control box circuit breaker.
   B. Check for low battery reading.
   C. Refer to your local service facility.

2. Unit dies under load.

   B. Check hydraulic pressure.
   C. Refer to your local service facility.

HYDRAULIC WHEEL DRIVE MOTOR

Turns wheel while unloaded, but slows down or stops when load is applied.

A. Check hydraulic high pressure port with 3000 PSI gauge.
B. Refer to your local service facility.

Hydraulic Pump

Pump producing excessive noise.

A. Check hydraulic oil level (sight gauge on tank.)
B. Check oil. See hydraulic fluid table.
C. Refer to your local service facility.

Lift

1. Functions will not operate from aerial control console.

   A. Check "Aerial/Ground" selector switch.
   B. Check footswitch continuity.
   C. Check for loose wire in aerial junction box.
   D. Refer to your loacl service facility.

2. Functions will not operate from ground control box.

A. Check position of "Aerial/Ground" box selector switch.

B. Solenoid dump valve.

C. Refer to your local service facility.

Drive

A. Make sure hydraulic system is up to recommended pressure.

B. Refer to your local service facility.

Milestone			Hydraulic fluid			
Oil company			Chevron	Gulf	Shell	Union
Brand Name			ATF Dextron II	ATF Dextron II	Donaz-T6	ATF Dextron
Viscosity	SUS AT 100°F (37.8°C)		187.4	195	200	200
	SUS AT 210°F (98.9°C)		49.2	50.4	50	52.3
	Index	°F	153°	155°	160°	172°
		°C	67.2°	68.3°	71.1°	77.8°
Flash point		°F	400°	405°	390°	395°
		°C	204.4°	207.2°	198.9°	201.7°
Pour point		°F	-40°	-50°	-50°	-45°
		°C	-40°	-45.6°	-45.6°	-42.8°

MARKLIFT SERVICE MAINTENANCE CHECKLIST

MODEL NUMBER ____________ SERIAL NUMBER ____________ DATE SOLD ____________

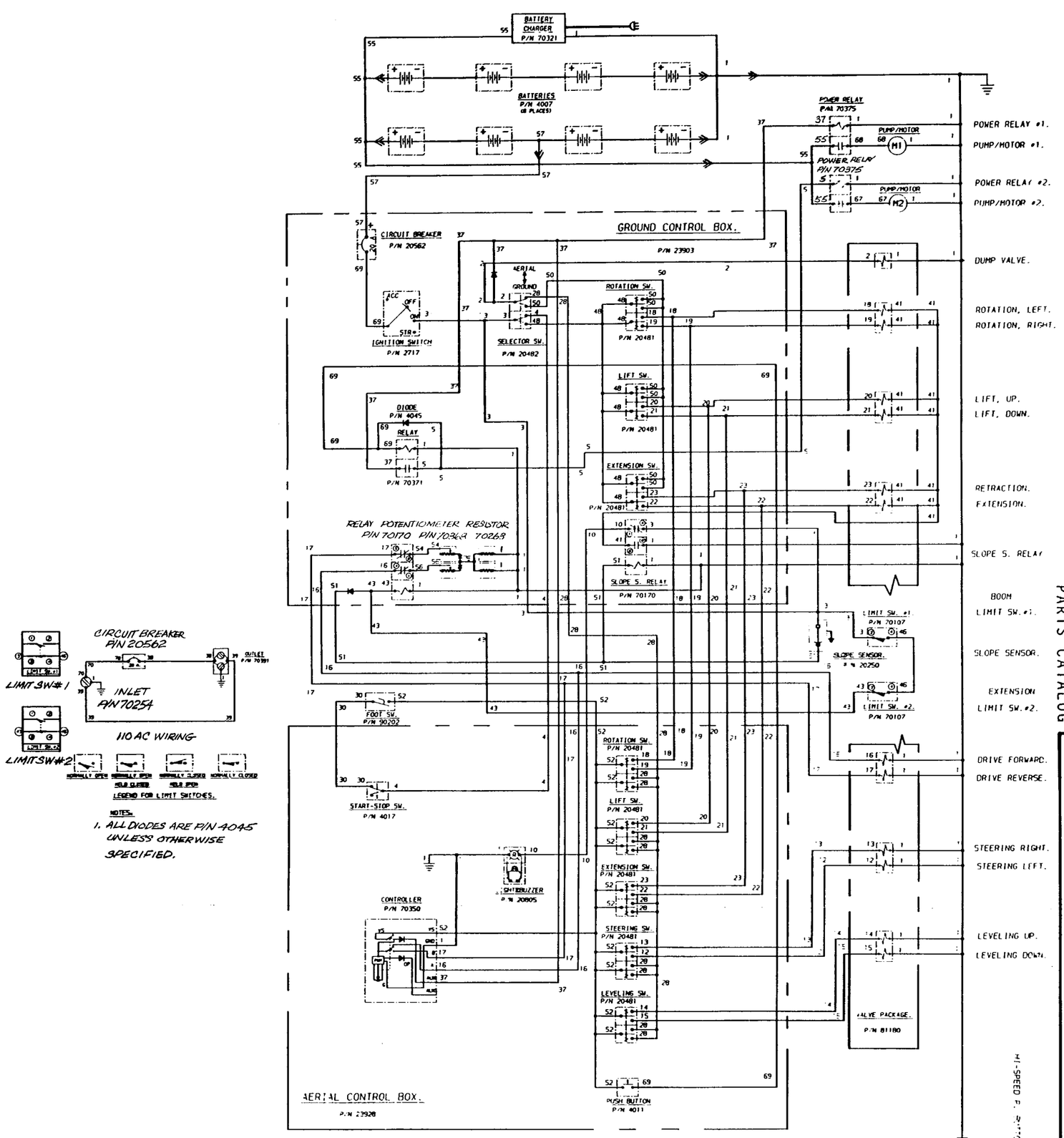
DATE IN SERVICE ____________ OPTIONS ____________ WARRANTY PERIOD ____________

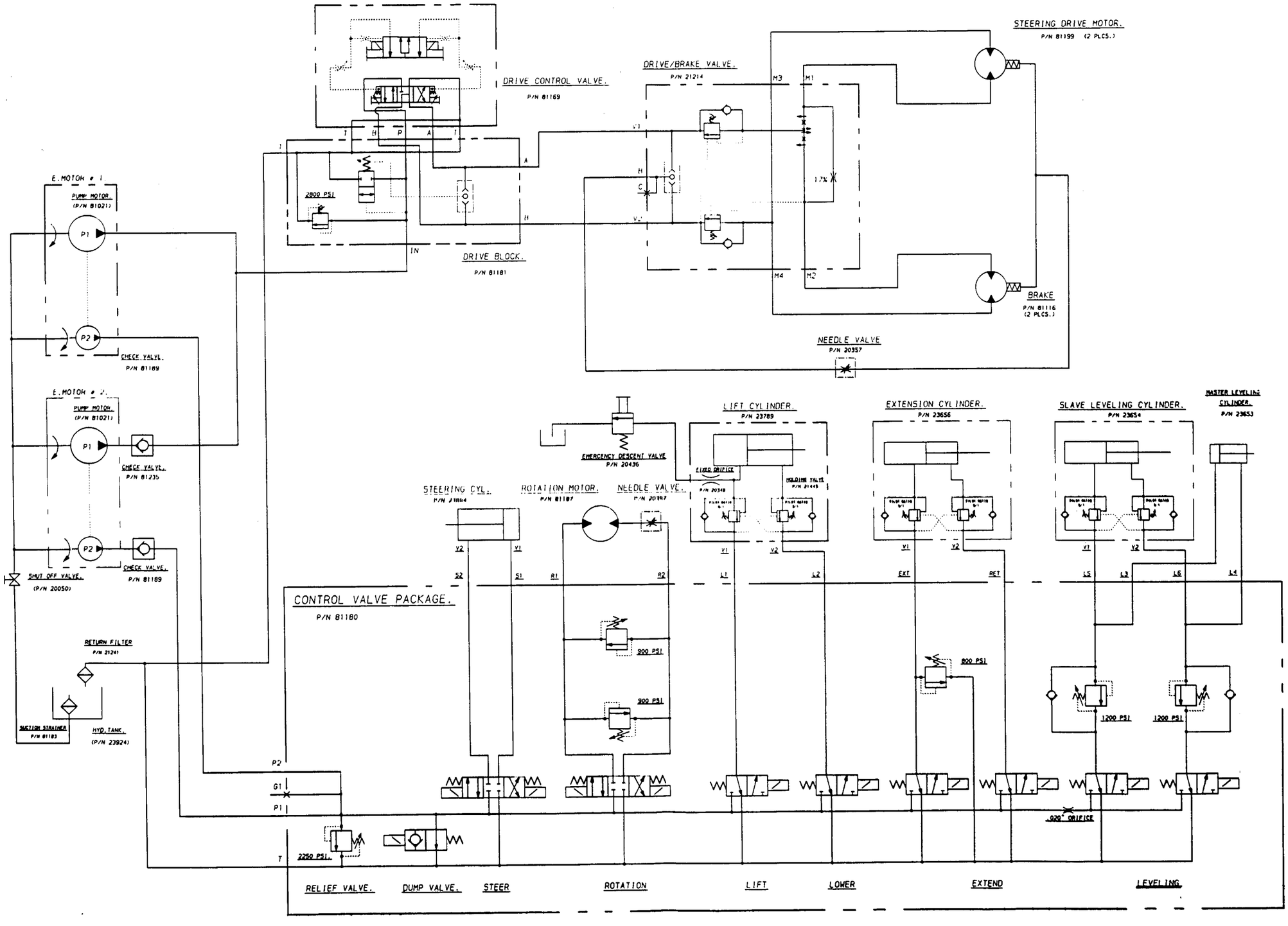
[shaded box] APPLIES TO MODELS WITH ENGINES ONLY

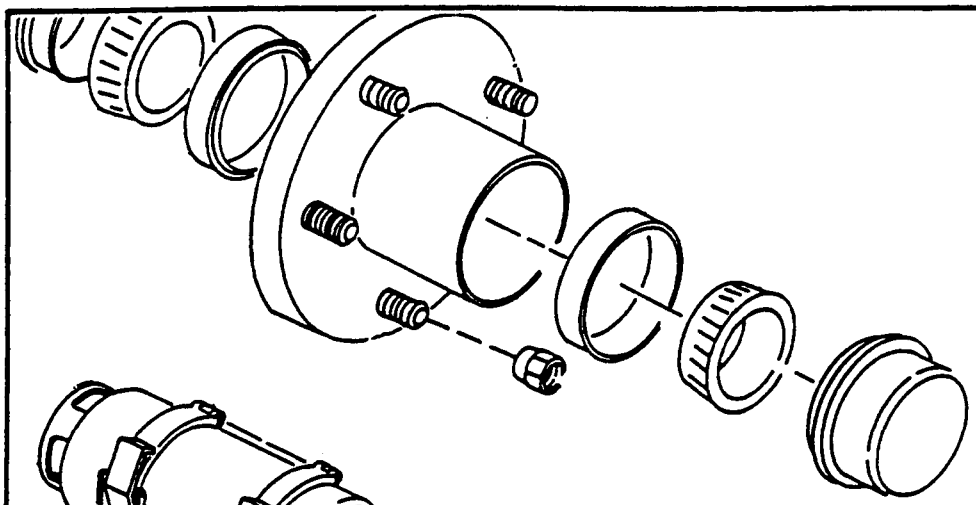
CODE:
C – CHECKED
A – ADJUSTED
R – REPAIRED
N – NEW PART
X – NEEDS REPAIR

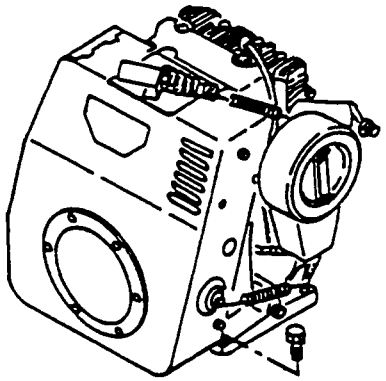
Group	Item
PREVENTIVE MAINT.	OIL CHANGE
	OIL FILTER
	AIR FILTER
	HYDRAULIC OIL CHANGE
	HYDRAULIC OIL FILTER
	WHEEL BEARING PACK
	DRIVE MOTOR
	PUMP MOTOR BRUSHES
	ELECTRICAL CONTROLS
	TRANSDIFF OIL CHANGE
ELECTRICAL	TUNE UP SPARK PLUGS
	GENERATOR
	VOLTAGE REGULATOR
	BATTERY
	STARTER
	POINTS / CONDENSER
HYDRAULIC	HYDRAULIC SYSTEM
	LEV CYLINDER
	LIFT CYLINDER SEALS
	HYD CONTROL VALVE
	HYDRAULIC PUMP
	ROTARY MANIFOLD
	LIFT ROLLERS
	HYDRAULIC HOSES
	BRAKES
FUEL	FUEL SYSTEM
	CARBURATOR
	FUEL PUMP
STEER	STEERING
	STEERING HOSES
	STEER GEAR
	STEER CYLINDER
TIRE	DRIVE TIRES
	STEER TIRES
MAJ.	ENGINE OVERHAUL
	DRIVE AXEL OVERHAUL
MISC.	

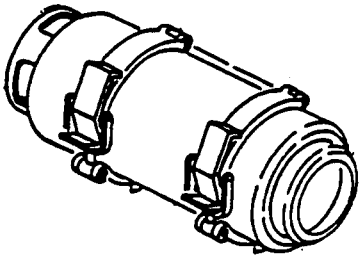
DATE	REMARKS	DATE	REMARKS	AGENCY

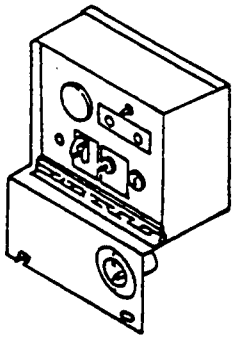

BATTERY CHARGER P/N 70321
BATTERIES P/N 4007 (8 PLACES)
GROUND CONTROL BOX.
P/N 23903
CIRCUIT BREAKER P/N 20562
AERIAL
GROUND
IGNITION SWITCH P/N 2717
SELECTOR SW. P/N 20482
DIODE P/N 4045
RELAY P/N 70371
ROTATION SW. P/N 20481
LIFT SW. P/N 20481
EXTENSION SW. P/N 20481
RELAY POTENTIOMETER RESISTOR P/N 70170 P/N 70268
SLOPE S. RELAY P/N 70170
FOOT SW. P/N 90202
START-STOP SW. P/N 4017
STEERING SW. P/N 20481
LEVELING SW. P/N 20481
PUSH BUTTON P/N 4011
CONTROLLER P/N 70350
SPITBUZZER P/N 20805
POWER RELAY P/N 70375
PUMP/MOTOR
POWER RELAY #1.
PUMP/MOTOR #1.
POWER RELAY #2.
PUMP/MOTOR #2.
DUMP VALVE.
ROTATION, LEFT.
ROTATION, RIGHT.
LIFT, UP.
LIFT, DOWN.
RETRACTION.
EXTENSION.
SLOPE S. RELAY
BOOM LIMIT SW.#1.
LIMIT SW. #1. P/N 70107
SLOPE SENSOR. P/N 20250
EXTENSION LIMIT SW.#2.
LIMIT SW. #2. P/N 70107
DRIVE FORWARD.
DRIVE REVERSE.
STEERING RIGHT.
STEERING LEFT.
LEVELING UP.
LEVELING DOWN.
VALVE PACKAGE. P/N 81180
AERIAL CONTROL BOX. P/N 23928
CIRCUIT BREAKER P/N 20562
INLET P/N 70254
110 AC WIRING
LIMIT SW#1
LIMIT SW#2
LEGEND FOR LIMIT SWITCHES.
NOTES.
1. ALL DIODES ARE P/N 4045 UNLESS OTHERWISE SPECIFIED.


E. MOTOR # 1
PUMP MOTOR
(P/N 81021)
P1
P2
CHECK VALVE.
P/N 81189
E. MOTOR # 2.
PUMP MOTOR.
(P/N 81021)
P1
CHECK VALVE.
P/N 81235
P2
SHUT OFF VALVE.
(P/N 20050)
CHECK VALVE.
P/N 81189
RETURN FILTER
P/N 21241
SUCTION STRAINER
P/N 81183
HYD. TANK.
(P/N 23924)
DRIVE CONTROL VALVE.
P/N 81169
T
H
P
A
I
2800 PSI
IN
DRIVE BLOCK.
P/N 81181
DRIVE/BRAKE VALVE.
P/N 21214
M3
M1
V1
H
C
V2
17%
M4
M2
STEERING DRIVE MOTOR.
P/N 81199 (2 PLCS.)
BRAKE
P/N 81116
(2 PLCS.)
NEEDLE VALVE
P/N 20357
EMERGENCY DESCENT VALVE
P/N 20436
LIFT CYLINDER.
P/N 23789
FIXED ORIFICE
P/N 20348
HOLDING VALVE
P/N 21445
EXTENSION CYLINDER.
P/N 23656
SLAVE LEVELING CYLINDER.
P/N 23654
MASTER LEVELING
CYLINDER.
P/N 23653
STEERING CYL.
P/N 23884
ROTATION MOTOR.
P/N 81187
NEEDLE VALVE.
P/N 20357
V2
V1
S2
S1
R1
R2
L1
L2
EXT
RET
L5
L3
L6
L4
CONTROL VALVE PACKAGE.
P/N 81180
900 PSI
900 PSI
800 PSI
1200 PSI
1200 PSI
.020" ORIFICE
P2
G1
P1
T
2250 PSI.
RELIEF VALVE.
DUMP VALVE.
STEER
ROTATION
LIFT
LOWER
EXTEND
LEVELING



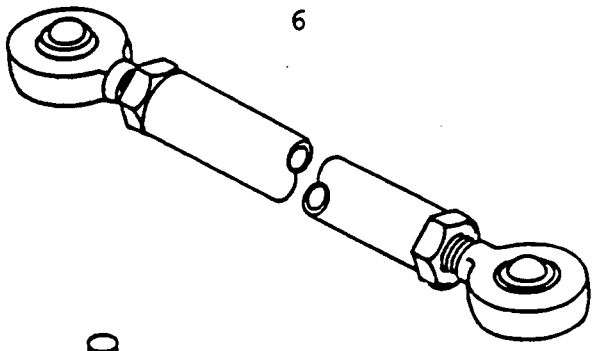


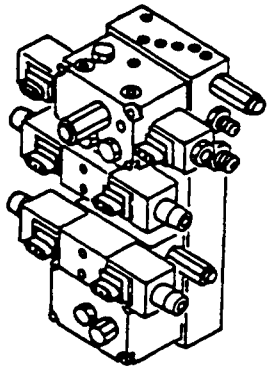


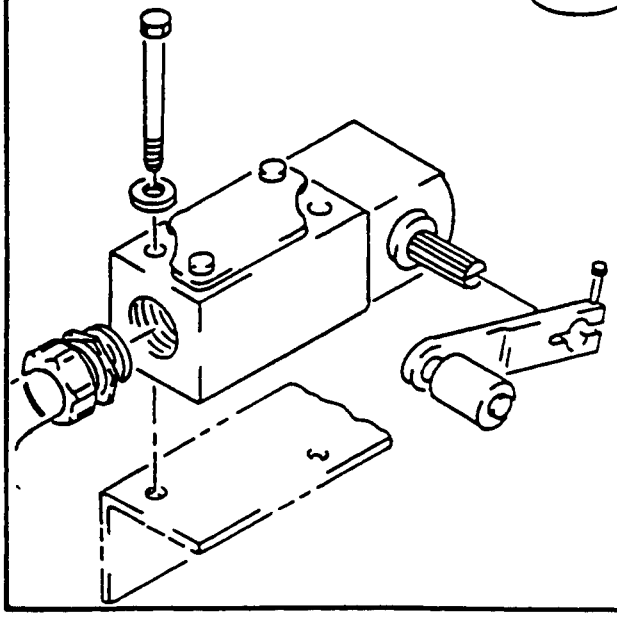


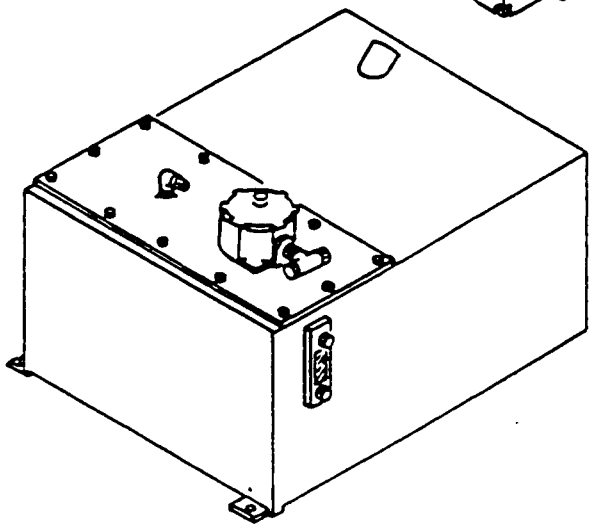
THIS SECTION 1 CONTAINS THE FOLLOWING MATTER:

PAGE NO.	TITLE
1	TABLE OF CONTENTS
3	HOW TO USE PARTS CATALOG
6	HOW TO ORDER PARTS









THIS PARTS CHAPTER CONTAINS:

SECTION 1	THE MARKLIFT PARTS CATALOG
PAGE NO	TITLE
1	TABLE OF CONTENTS
3	HOW TO USE PARTS CATALOG
6	HOW TO ORDER PARTS

SECTION 2	FINAL ASSEMBLY
FIG. NO.	TITLE
1	FINAL ASSEMBLY
2	DECAL SET
3	AERIAL CONTROL BOX ASSEMBLY
4	SHEET METAL KIT
5	HYDRAULIC HOSE DIAGRAM
6	SLIDE BAR ASSEMBLY
7	FOOT SWITCH ASSEMBLY

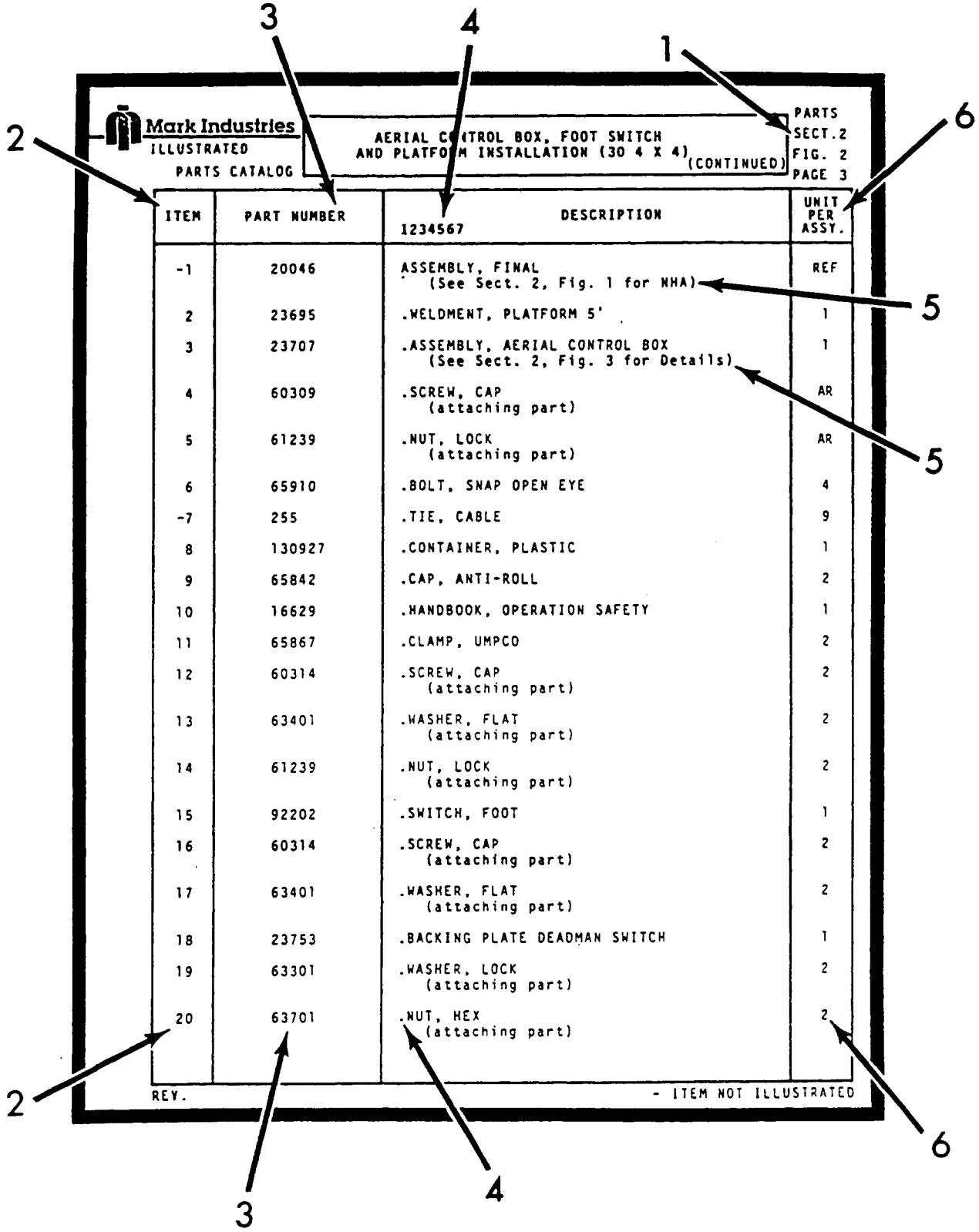
SECTION 3	CARRIAGE ASSEMBLY
1	CARRIAGE ASSEMBLY
2	TIRE & WHEEL ASSEMBLY
3	MOTOR BRAKE ASSEMBLY
4	HUB ASSEMBLY
5	STEERING CYLINDER ASSEMBLY
6	TIE ROD ASSEMBLY
7	DRIVE/BRAKE VALVE ASSEMBLY

SECTION 4	TURRET ASSEMBLY
1	TURRET ASSEMBLY
2	MASTER LEVELING CYLINDER ASSEMBLY
3	HYDRAULIC TANK ASSEMBLY
4	ROTATION GEAR BOX ASSEMBLY
5	DRIVE BLOCK ASSEMBLY
6	HYDRAULIC PUMP AND MOTOR ASSEMBLY

SECTION 4	TURRET ASSEMBLY (CONT'D)
FIG. NO.	TITLE
7	HYDRAULIC PUMP AND MOTOR ASSEMBLY
8	CONTROL VALVE ASSEMBLY
9	EMERGENCY DESCENT VALVE ASSEMBLY
10	LIFT CYLINDER ASSEMBLY
11	LOWER CONTROL PANEL ASSEMBLY
12	HYDRAULIC TANK SUB-ASSEMBLY

SECTION 5	BOOM ASSEMBLY
1	FINAL BOOM ASSEMBLY
2	INNER BOOM ASSEMBLY
3	SLAVE LEVELING CYLINDER ASSEMBLY
4	EXTENSION CYLINDER ASSEMBLY

SECTION 6	OPTIONS
1	HOURMETER
2	CONTINUOUS TURRET ROTATION
3	TRAVEL WARNING HORN
4	ALL MOTION ALARM
5	ROTATING AMBER BEACON
6	2 HEADLIGHTS & 2 REAR RED LIGHTS
7	STOP, TURN & CLEARANCE LIGHTS
8	12 VOLT PLATFORM WORK LIGHT
9	1/2" AIRLINE TO PLATFORM
10	1/2" HYDRAULIC LINE TO PLATFORM
11	LIFTING LUGS
12	BATTERY CONDITION INDICATOR GAUGE
13	5' PLATFORM - IN ADDITION TO STANDARD
14	SOLID STATE CHARGER DELUXE
	PARTS & SERVICE MANUAL



Mark Industries
ILLUSTRATED
PARTS CATALOG

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

PARTS SECT. 2
FIG. 2
PAGE 3

ITEM	PART NUMBER	1234567 DESCRIPTION	UNIT PER ASSY.
-1	20046	ASSEMBLY, FINAL (See Sect. 2, Fig. 1 for NHA)	REF
2	23695	.WELDMENT, PLATFORM 5'	1
3	23707	.ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1
4	60309	.SCREW, CAP (attaching part)	AR
5	61239	.NUT, LOCK (attaching part)	AR
6	65910	.BOLT, SNAP OPEN EYE	4
-7	255	.TIE, CABLE	9
8	130927	.CONTAINER, PLASTIC	1
9	65842	.CAP, ANTI-ROLL	2
10	16629	.HANDBOOK, OPERATION SAFETY	1
11	65867	.CLAMP, UMPCO	2
12	60314	.SCREW, CAP (attaching part)	2
13	63401	.WASHER, FLAT (attaching part)	2
14	61239	.NUT, LOCK (attaching part)	2
15	92202	.SWITCH, FOOT	1
16	60314	.SCREW, CAP (attaching part)	2
17	63401	.WASHER, FLAT (attaching part)	2
18	23753	.BACKING PLATE DEADMAN SWITCH	1
19	63301	.WASHER, LOCK (attaching part)	2
20	63701	.NUT, HEX (attaching part)	2

REV. - ITEM NOT ILLUSTRATED

1. This area refers to the corresponding illustration.

   1) **Chapter** should be divided with General, Operation, Maintenance, Schematics, Parts, Vendor and Service Bulletins.

   2) **Section and Figure** belong to Parts Chapter only. Please check page of contents and each Section in Parts Chapter.

   3) Page numbers are followed for chapter or section, and figure.

2. The **Item Number** corresponds to the item number shown for the part in the illustration. (Parts with item numbers preceded by a dash are not illustrated such as -1, -7, etc.)

3. **Parts** that carry a **Mark Industries** part number.

4. The **Indenture System** used in the detail parts list of this catalog shows the relationship of one part to another. For a given item, the number of indentures depicts the relationship of the item to the associated installation, next higher assembly, or components of the item as follows:

   1 2 3 4 5 6 7

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

5. **NHA** (Next Higher Assembly) and **DETAILS** - Section and Figure reference catalog location indicates where the installation or assembly is listed under NHA and where illustrated for more detailed breakdown.

6. **UNIT PER ASSEMBLY** - Entries are as follows:

   1) **"REF"** indicates the item is listed previously in the NHA and then again in this figure.

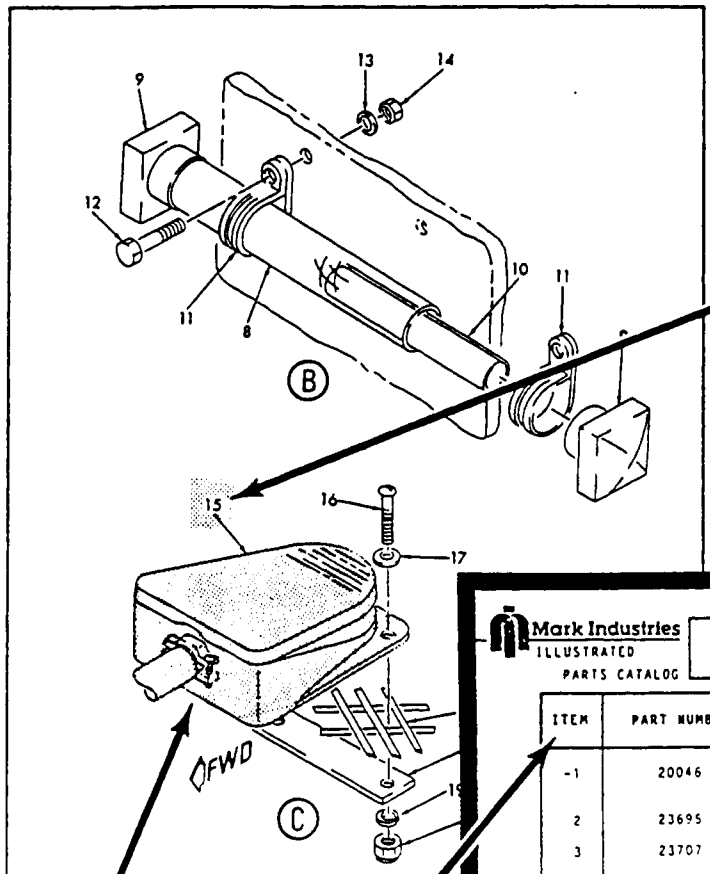
   2) **"AR"** indicates the part is used in a quantity "As Required."

   3) **A number** entry indicates the quantity of the part used in its next higher application.

Mark Industries
ILLUSTRATED
PARTS CATALOG

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

PARTS
SECT. 2
FIG. 2
PAGE 2



REV.

Mark Industries
ILLUSTRATED
PARTS CATALOG

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

PARTS
SECT. 2
FIG. 2
PAGE 3

ITEM	PART NUMBER	1234567 DESCRIPTION	UNIT PER ASSY.
-1	20046	ASSEMBLY, FINAL (See Sect. 2, Fig. 1 for NHA)	REF
2	23695	.WELDMENT, PLATFORM 5'	1
3	23707	.ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1
4	60309	.SCREW, CAP (attaching part)	AR
5	61239	.NUT, LOCK (attaching part)	AR
6	65910	.BOLT, SWAP OPEN EYE	4
7	255	.TIE, CABLE	9
8	130927	.CONTAINER, PLASTIC	1
9	65842	.CAP, ANTI-ROLL	2
10	16629	.HANDBOOK, OPERATION SAFETY	1
11	65867	.CLAMP, UMPCO	2
12	60314	.SCREW, CAP (attaching part)	2
13	63401	.WASHER, FLAT (attaching part)	2
14	61239	.NUT, LOCK (attaching part)	2
15	92202	.SWITCH, FOOT	1
16	60314	.SCREW, CAP (attaching part)	2
17	63401	.WASHER, FLAT (attaching part)	2
18	23753	.BACKING PLATE DEADMAN SWITCH	1
19	63301	.WASHER, LOCK (attaching part)	2
20	63701	.NUT, HEX (attaching part)	2

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- ITEM NOT ILLUSTRATED

1. PART NUMBER

STEP 1. Locate Section and Figure number within the table of contents and each Section page.

STEP 2. Match your required part with the illustration page.

STEP 3. Refer to the item number on the detail part list page.

STEP 4. Part number is located in the part number column. Order by using that part number.

2. TO ORDER:

By Phone: Service Department

(800) 448-MARK

or

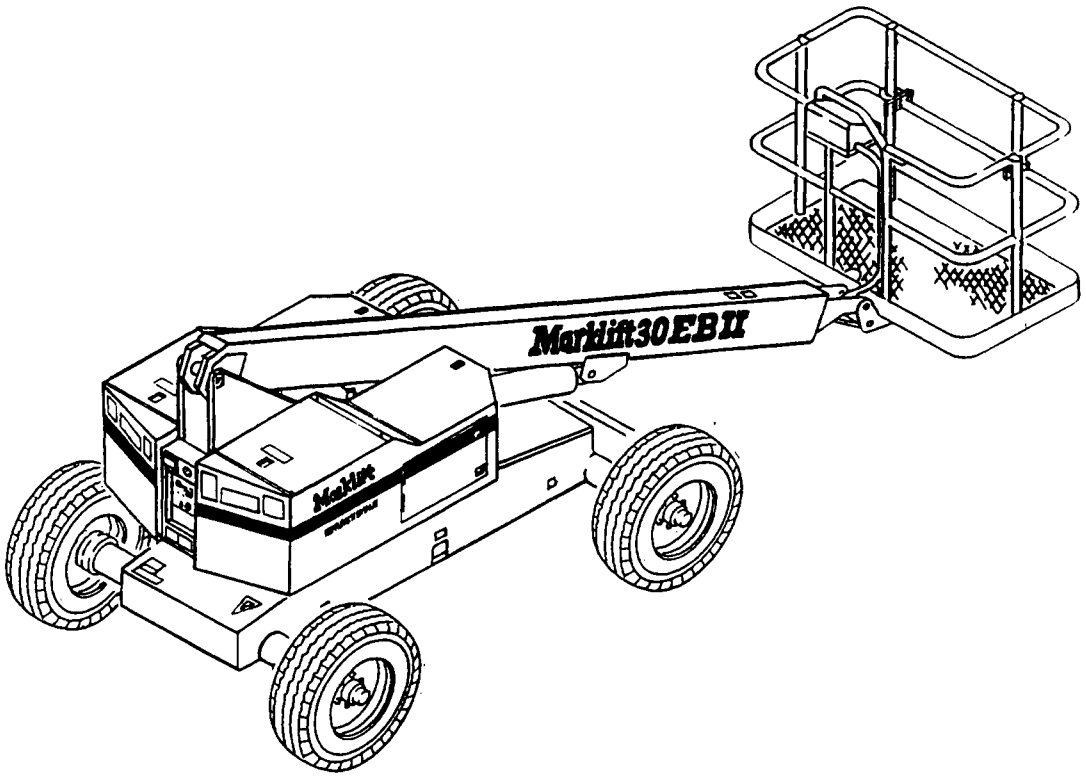
(714) 879-MARK

By Fax: (714) 879-8884

By Mail: Attention Service Department

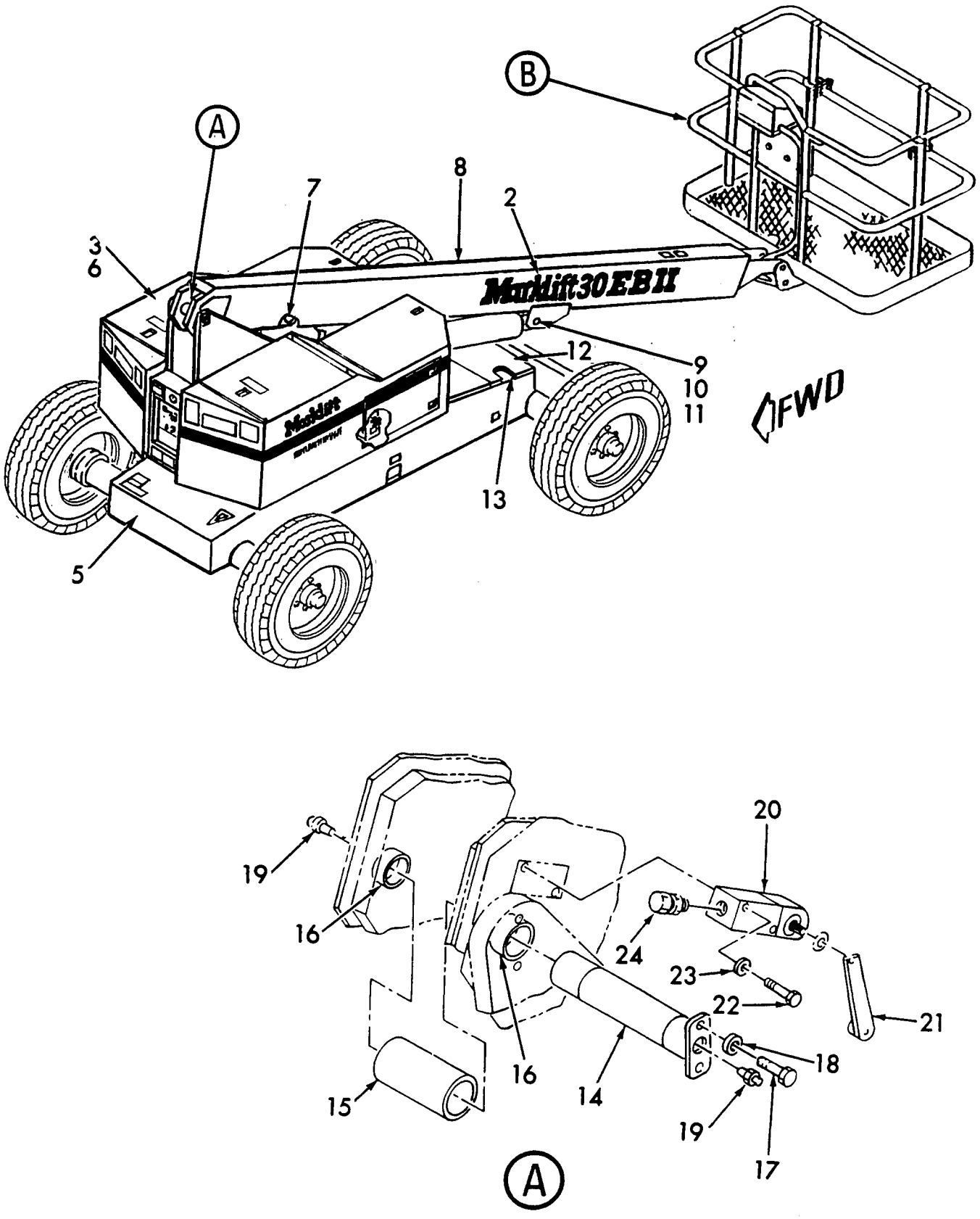
MARK INDUSTRIES
Post Office Box 2255
Brea, California 92622

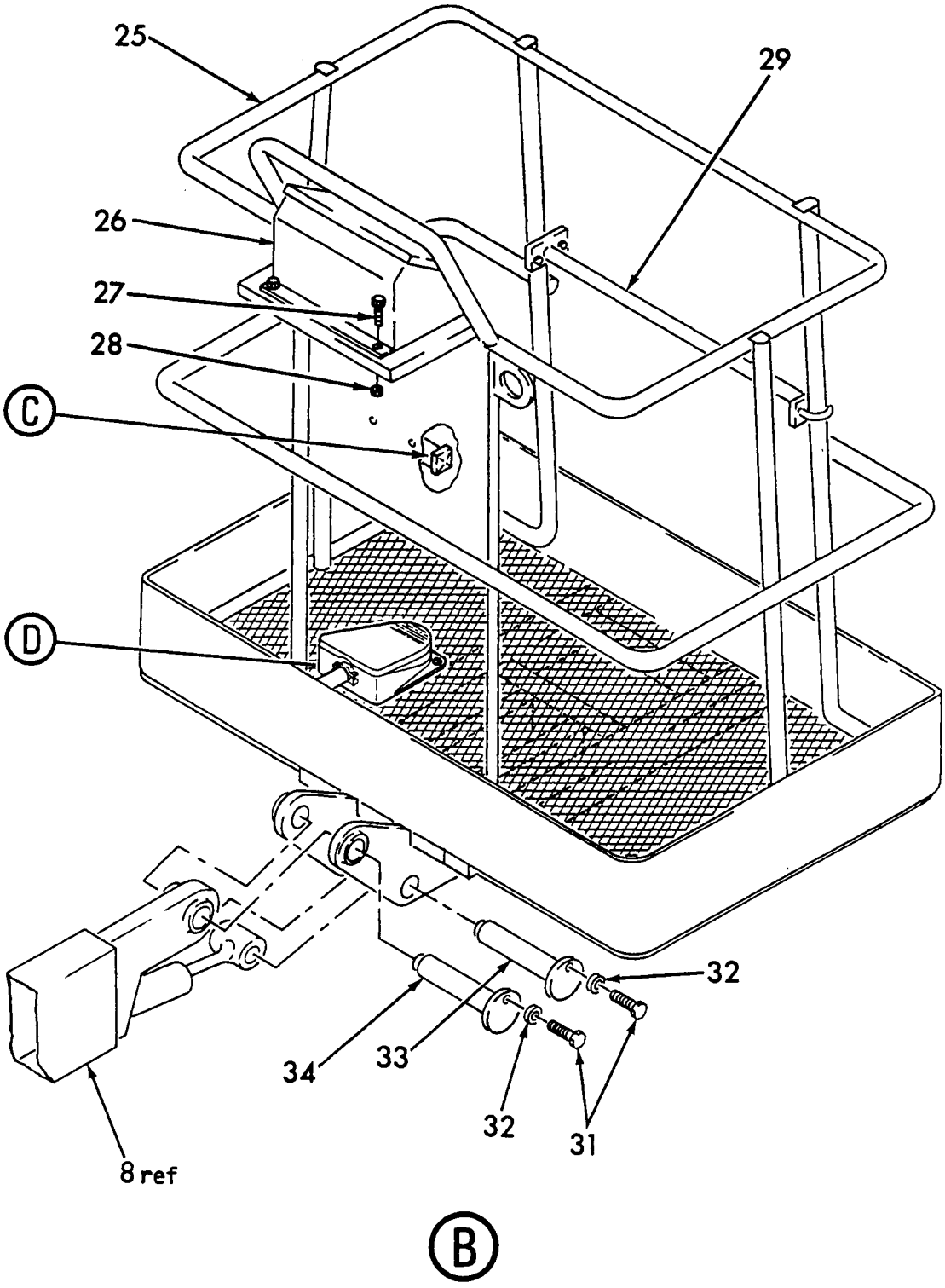
MARK INDUSTRIES
P.O. Box 2255
Brea, California 92622
205 South Puente Street, Brea, California 92621
(714)879-6275, FAX (714)879-8885



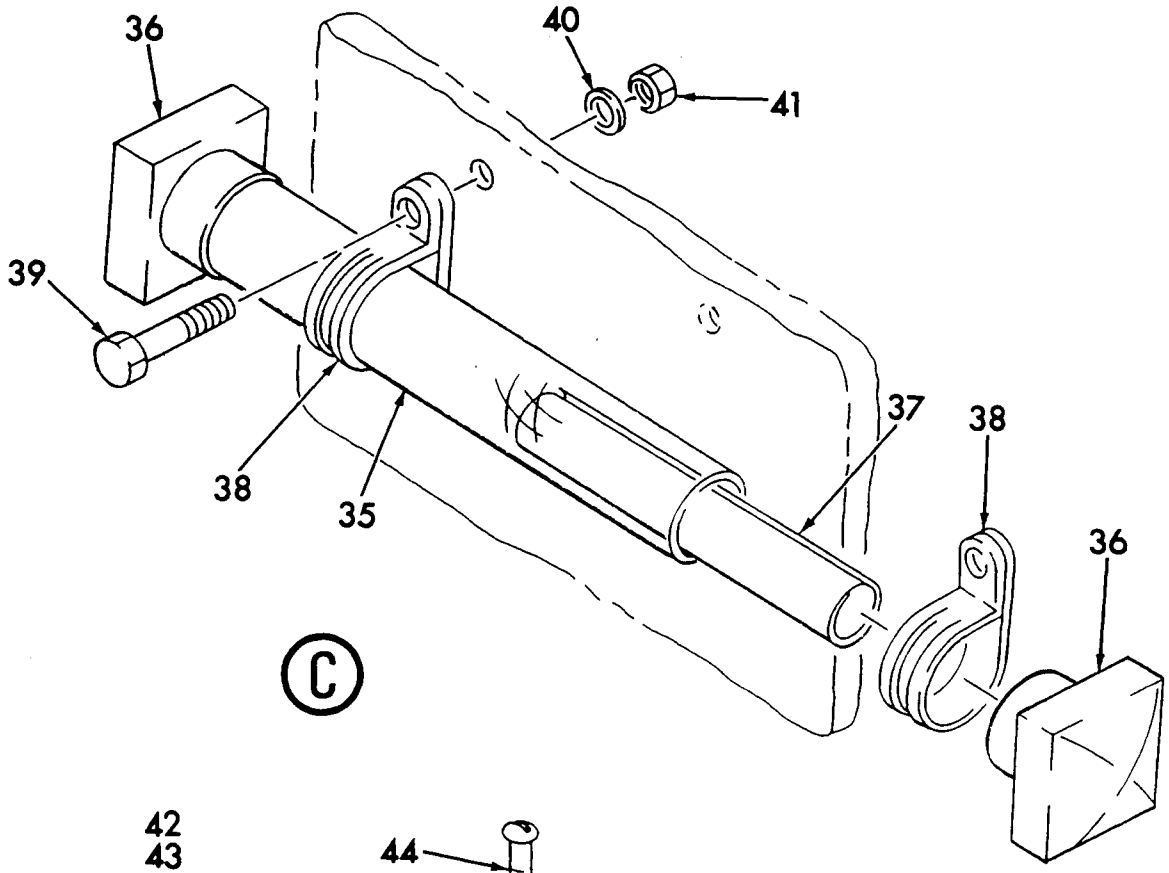
THIS SECTION 2 CONTAINS THE FOLLOWING FIGURES:

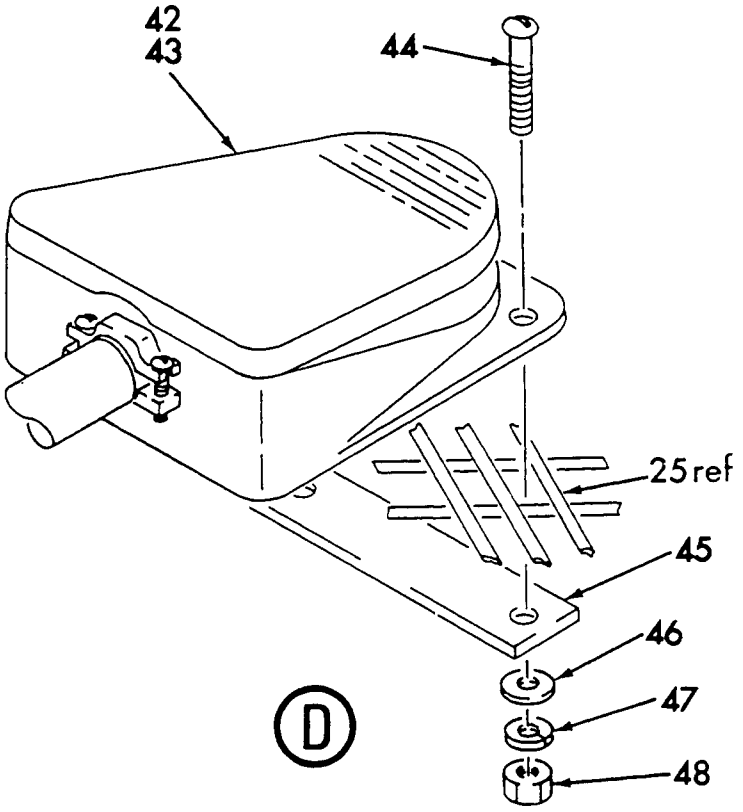
FIG. NO.	TITLE
1	FINAL ASSEMBLY
2	DECAL SET
3	AERIAL CONTROL BOX ASSEMBLY
4	SHEET METAL KIT
5	HYDRAULIC HOSE DIAGRAM
6	SLIDE BAR ASSEMBLY
7	FOOT SWITCH ASSEMBLY


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8 ref
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FINAL ASSEMBLY (30 EBII)





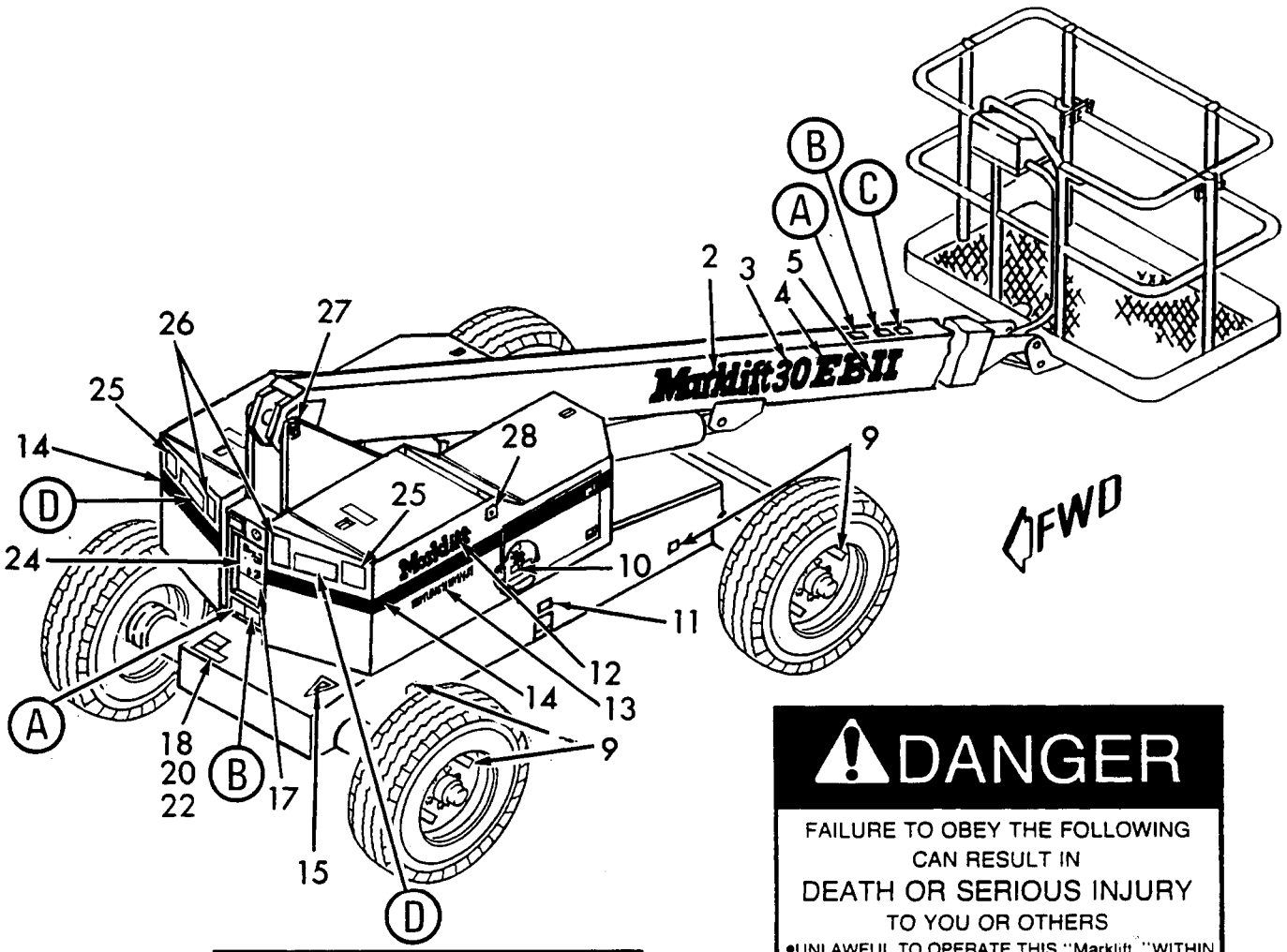
FINAL ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	20048	ASSEMBLY, FINAL	REF
2	67640	.SET, DECAL (See Sect. 2, Fig. 2 for Details)	1
3	23934	.KIT, SHEET METAL (See Sect. 2, Fig. 4 for Details)	1
-4	24057	.DIAGRAM, HYDRAULIC HOSE (See Sect. 2, Fig. 5 for Details)	1
5	23849	.ASSEMBLY, CARRIAGE (See Sect. 3, Fig. 1 for Details)	1
6	23581	.ASSEMBLY, TURRET (See Sect. 4, Fig. 1 for Details)	1
7	23913	.PIN, MASTER LEVELING CYLINDER	1
8	23660	.ASSEMBLY, FINAL BOOM (See Sect. 5, Fig. 1 for Details)	1
9	60539	.SCREW, CAP (attaching part)	2
10	63303	.WASHER, LOCK (attaching part)	2
11	23509	.PIN, LIFT CYLINDER (attaching part)	1
12	23917	.COVER, FRAME	1
13	65915	.RUBBER, EXTRUSION	2 FT.
14	23911	.PIN (attaching part)	1
15	26454	.TUBE, ROUND	1
16	23935	.COLLAR	2
17	62009	.SCREW, CAP (attaching part)	2
18	63303	.WASHER, LOCK (attaching part)	2
19	65103	.FITTING, GREASE	2
20	70107	.SWITCH, LIMIT	1
21	70032	.LEVER, OPERATING	1
22	62615	.SCREW, CAP (attaching part)	2
23	63313	.WASHER, LOCK	2

- ITEM NOT ILLUSTRATED

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
24	2806	.RELIEF, STRAIN	1
25	23695	.WELDMENT, PLATFORM (5 FT.)	1
26	23928	.ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1
27	60309	.SCREW, CAP (attaching part)	4
28	61239	.NUT, LOCK (attaching part)	4
29	24088	.ASSEMBLY, SLIDE BAR (See Sect. 2, Fig. 6 for Details)	1
-30	255	.TIE, CABLE	10
31	60539	.SCREW, CAP (attaching part)	2
32	63303	.WASHER, LOCK (attaching part)	2
33	20261	.PIN, LEVELING CYLINDER (ROD END)	1
34	20457	.PIN, PIVOT BOOM/FORK	1
35	130927	.CONTAINER, PLASTIC	1
36	65842	.CAP, ANTI-ROLL	2
37	16629	.HANDBOOK, OPERATION SAFETY	1
38	65867	.CLAMP	2
39	60309	.SCREW, CAP (attaching part)	2
40	63401	.WASHER, FLAT (attaching part)	2
41	61239	.NUT, LOCK (attaching part)	2
42	92202	.SWITCH, FOOT	1
-43	66336	..SWITCH, SNAP	1
44	72726	.SCREW, MACHINE (attaching part)	2
45	23753	.BACKING PLATE, DEADMAN SWITCH	1
46	63413	.WASHER, FLAT (attaching part)	2
47	63313	.WASHER, LOCK (attaching part)	4

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
48	60802	.NUT, HEX (attaching part)	2
-49	60546	.SCREW, CAP (attaches carriage to ring gear)	18
-50	65116	.FLUID, HYDRAULIC	15 GAL.
-51	23921	.SCHEMATIC, HYDRAULIC (See Schematic Section)	1
-52	23920	.SCHEMATIC, ELECTRICAL (See Schematic Section)	1
-53	65112	.PAINT, WHITE	1 GAL.
-54	16608	.PAINT, WHITE WATERBASE	5 GAL.
-55	16609	.PAINT, BLUE WATERBASE	½ GAL.



CAUTION

1. INSPECT VEHICLE AND AERIAL DEVICE, INCLUDING OPERATION, PRIOR TO USE, DAILY.
2. FOR STATIONARY OPERATION VEHICLE MUST BE SECURELY PARKED AND STABILIZED FOR THE WORK TO BE PERFORMED BEFORE AERIAL DEVICE IS OPERATED.
3. OUTRIGGERS WHEN REQUIRED MUST BE ON SOLID FOOTING.
4. OPERATORS SHALL WEAR A BODY BELT, AND ATTACH WITH A LANYARD TO BOOM OR PLATFORM.
5. OPERATE ALL CONTROLS SLOWLY FOR SMOOTH PLATFORM MOTION.
6. DO NOT LOAD BEYOND RATED CAPACITY.

20416

B 7

DANGER

FAILURE TO OBEY THE FOLLOWING CAN RESULT IN

DEATH OR SERIOUS INJURY

TO YOU OR OTHERS

- UNLAWFUL TO OPERATE THIS "Marklift" WITHIN 10 FEET (3.05 METERS) OF HIGH VOLTAGE LINE UP TO 50,000 VOLTS

VOLTAGE (PHASE TO PHASE)	MINIMUM SAFE APPROACH DISTANCE	
	(FEET)	(METERS)
OVER 50 000 TO 200 000 VOLTS	15	4 60
OVER 200 000 TO 350 000 VOLTS	20	6 10
OVER 350 000 TO 500 000 VOLTS	25	7 52
OVER 500 000 TO 750 000 VOLTS	35	10.67
OVER 750 000 TO 1 000 000 VOLTS	45	13 72

- ATTACH YOUR SAFETY BELT FIRST!
- BE SURE TO USE ALL SAFETY EQUIPMENT, AS REQUIRED BY O.S.H.A.
- DO NOT LOAD BEYOND RATED CAPACITY.

181103

A 6

REV.

⚠ DANGER

AN UNTRAINED OPERATOR
SUBJECTS HIMSELF AND
OTHERS TO
DEATH OR SERIOUS INJURY
YOU MUST NOT OPERATE
THIS "Marklift®" UNLESS

- YOU HAVE BEEN TRAINED IN THE SAFE OPERATION OF THIS MACHINE.
- YOU READ, UNDERSTAND AND FOLLOW
  1) THE "OPERATION AND SAFETY HANDBOOK" FOR THIS MODEL.
  2) YOUR EMPLOYER'S RULES.
  3) APPLICABLE GOVERNMENT REGULATIONS.
- YOU INSPECT UNIT AND ALL FUNCTIONS.

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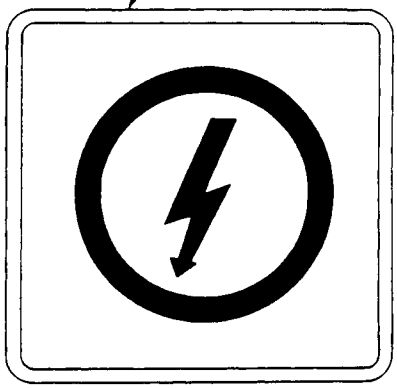
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DANGER

ELECTROCUTION HAZARD
KEEP CLEAR

DEATH OR SERIOUS INJURY CAN RESULT FROM CONTACT WITH THIS EQUIPMENT OR VEHICLE IF IT SHOULD BE ELECTRICALLY CHARGED 20419



CAUTION

UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN 10 FEET OF HIGH VOLTAGE LINES UP TO 50,000 VOLTS
REFER TO OPERATING HANDBOOK FOR SAFE DISTANCE AT HIGHER VOLTAGES

CAUTION

STANDARD AERIAL OPERATING PROCEDURE

1. WITH MASTER SWITCH AT GROUND CONTROL STATION TO ON AND SELECTOR SWITCH TO AERIAL ENTER PLATFORM ATTACH YOUR SAFETY BELT FIRST, THEN START MACHINE (DO NOT DEPRESS FOOT SWITCH WHEN ATTEMPTING TO START MACHINE)
2. TOGGLE SWITCHES ARE SOLENOID FUNCTIONS AND ARE OPERATED BY DEPRESSING FOOT SWITCH FIRST

OPERATE ALL PROPORTIONAL FUNCTIONS IN THE FOLLOWING MANNER

A. DEPRESS FOOT SWITCH AND LIFT CONTROLLER LOCKING STEM UPWARD BEFORE ATTEMPTING TO MOVE HANDLE FORWARD OR BACK
B. MOVE CONTROLLER HANDLE SLOWLY IN DIRECTION DESIRED FUNCTION SPEED WILL RESPOND IN PROPORTION TO AMOUNT OF HANDLE MOVEMENT

DRIVE AND STEERING DIRECTION AS INDICATED ON CONTROLS APPLIES WHEN BOOM IS OVER STEERING WHEELS. THE DIRECTION IS REVERSED WHEN BOOM IS OVER NON-STEERING WHEELS. (FORWARD TRIANGLE DECALS ON BASE ALWAYS INDICATE DRIVE DIRECTION CORRECTLY.)

3. THE DRIVE SELECTOR SWITCH ALLOWS THE MARKLIFT TO TRAVEL AT HIGHER SPEEDS WHEN THE BOOM IS BELOW HORIZONTAL AND FULLY RETRACTED

EMERGENCY OVERRIDES

DEPRESS FOOT SWITCH, THEN TURN ON EMERGENCY PUMP TO RESTORE CONTROLS (IF UNIT IS SO EQUIPPED) OR — DEPRESS PROPER SWITCH FOR EMERGENCY BOOM DESCENT OR RETRACTION

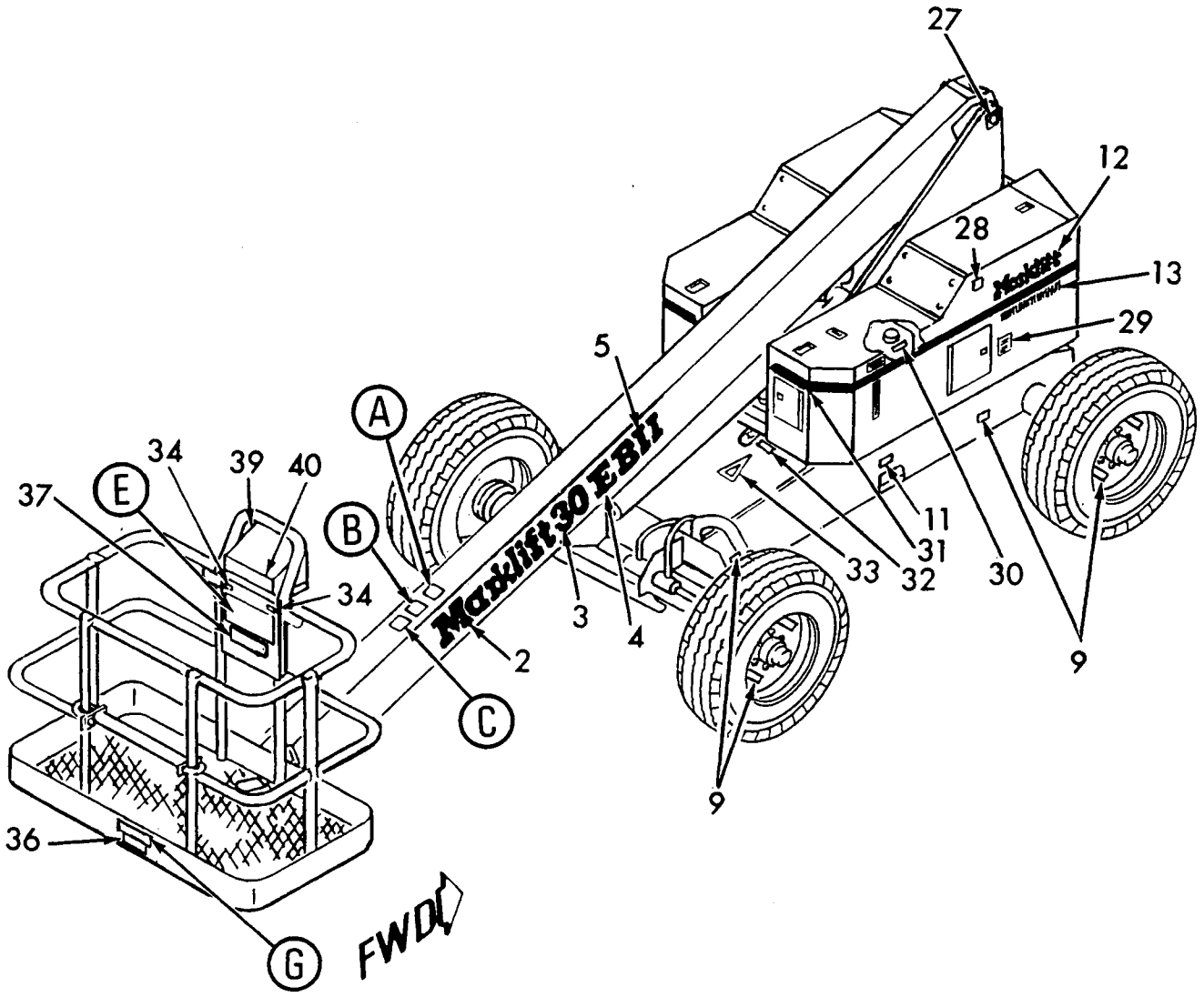
IT IS THE OPERATOR'S RESPONSIBILITY TO READ AND UNDERSTAND, THE OPERATION & SAFETY HANDBOOK AND ALL DECALS BEFORE USING THIS MACHINE!

MARK INDUSTRIES

20859

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ATTACH YOUR SAFETY BELT FIRST!
CAUTION
OPERATING THIS MACHINE WITHOUT CORRECT SAFETY BELT ATTACHMENT
COULD RESULT IN DEATH OR SERIOUS INJURY
CAUTION
22385

35

G

DECAL SET (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	67640	SET, DECAL (See Sect. 2, Fig. 1 for NHA)	REF
2	20408	.DECAL, **"MARKLIFT"**	2
3	20871	.DECAL, 30	2
4	21530	.DECAL, EB	2
5	20948	.DECAL, I	4
6	181103	.DECAL, DANGER (Electrocution)	2
7	20416	.DECAL, CAUTION	2
8	181102	.DECAL, DANGER	2
9	22175	.DECAL, MONOFILLED TIRES	10
10	21235	.DECAL, EMERGENCY DESCENT	1
11	20508	.DECAL, FACTORY RECOMMENDED TIE DOWN TRANSPORTATION DIAGRAM	2
12	31260	.DECAL, MARKLIFT	2
13	130596	.DECAL, A PRODUCT OF MARK INDUSTRIES	2
14	20411	.DECAL, SQUARE END STRIPE	2
15	20461	.DECAL, FORWARD ARROW	1
16	20419	.DECAL, DANGER KEEP CLEAR	2
17	20860	.DECAL, GENERAL CHECKOUT AND OPERATION INSTRUCTIONS	1
18	20660	.PLATE, IDENTIFICATION	1
-19	63653	.RIVET, POP (attaching part)	4
20	20661	.PLATE, ANSI-A92	1
-21	63653	.RIVET, POP (attaching part)	4
22	20662	.PLATE, PATENT NUMBER	1

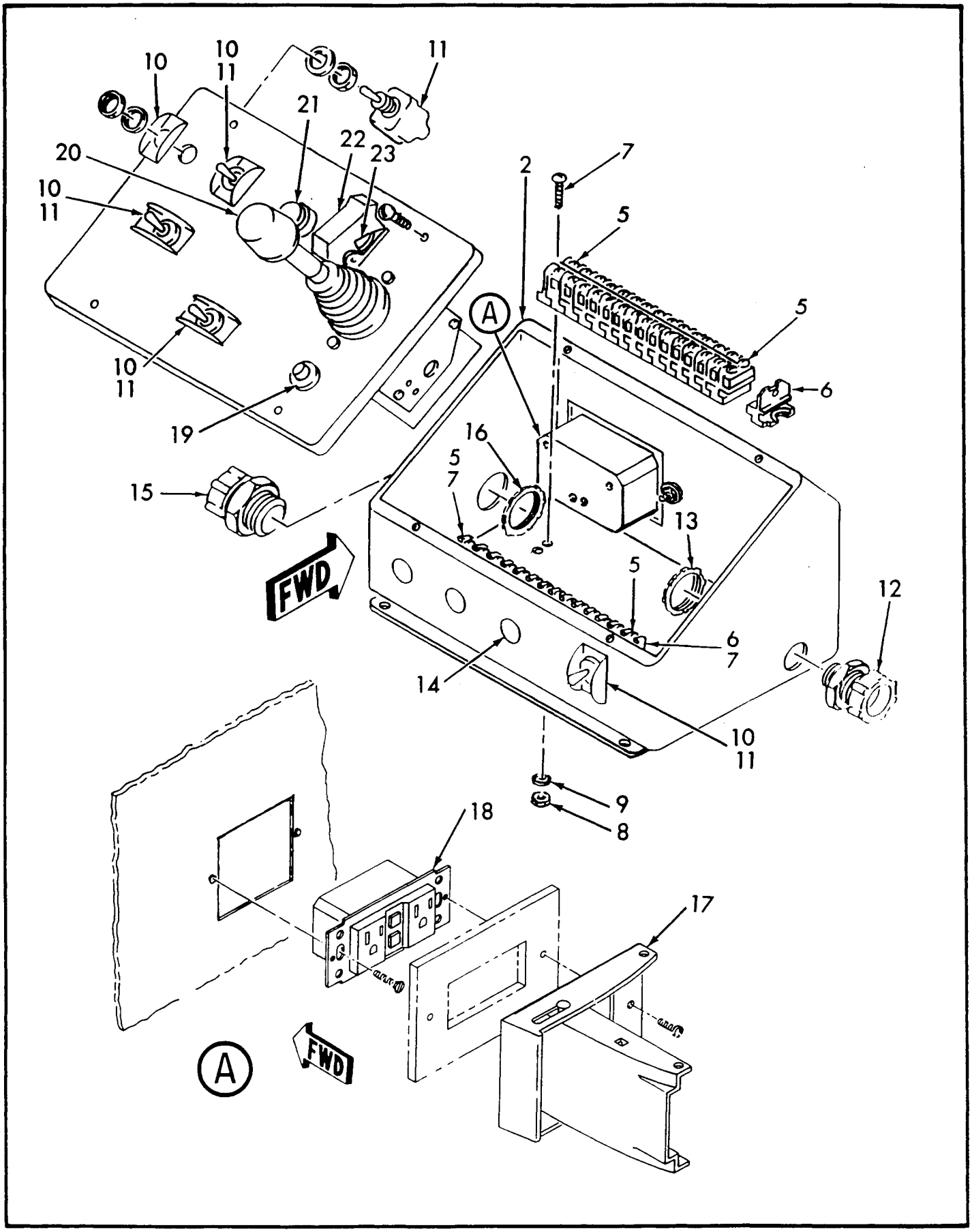
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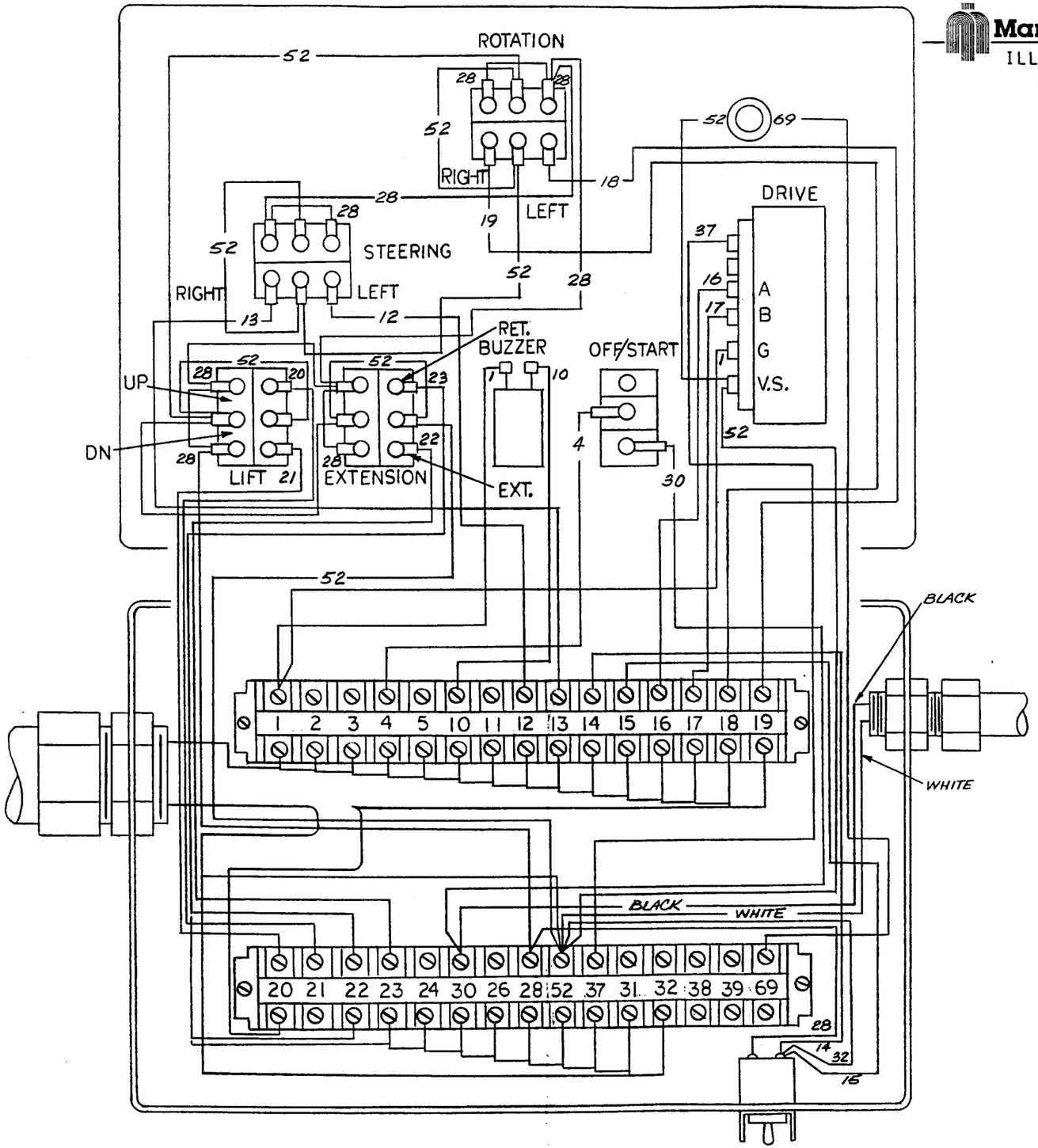
DECAL SET (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-23	63654	.RIVET, POP (attaching part)	4
24	20460	.DECAL, GROUND CONTROL CONSOLE	1
25	22449	.DECAL, NO SMOKING	2
26	2003	.DECAL, CHECK BATTERY WATER LEVEL	2
27	21237	.DECAL, GREASE FITTING	2
28	20410	.DECAL, **"MARK INDUSTRIES"** LOGO	2
29	2005	.DECAL, BATTERY CHARGER PLUG	1
30	2017	.DECAL, THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE G.M. TRANSMISSION FLUID TYPE "B" WITH DEXTRON	1
31	20412	.DECAL, ROUND END STRIPE	2
32	20896	.DECAL, OPEN FOR FASTER BRAKING	1
33	20462	.DECAL, AFT FORWARD ARROW	1
34	22386	.DECAL, ATTACH SAFETY BELT	2
35	22385	.DECAL, CAUTION ATTACH SAFETY BELT	2
36	2022	.DECAL, LOAD CAPACITY 500 LBS	2
37	130820	.DECAL, OPERATION AND SAFETY HANDBOOK	1
38	20859	.DECAL, CAUTION AERIAL OPERATING INSTRUCTIONS	1
39	23931	.DECAL, BOOM AERIAL CONTROL CONSOLE	1
40	23666	.DECAL, BOOM AERIAL CONTROL SWITCHES	1

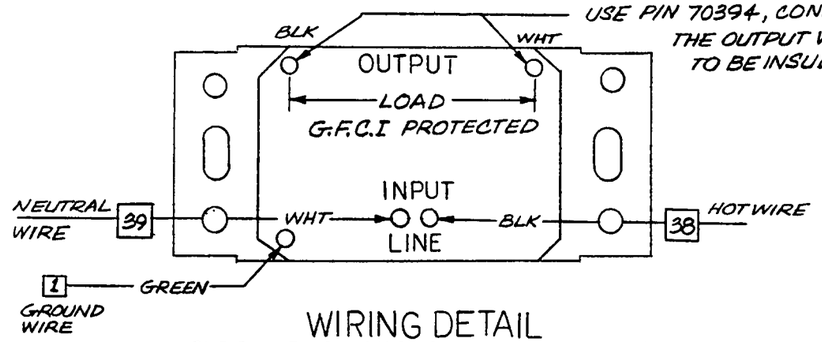
- ITEM NOT ILLUSTRATED

AERIAL CONTROL BOX ASSEMBLY (30 EBII)

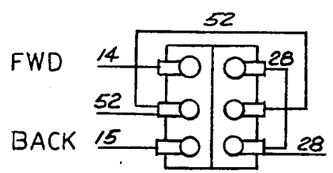




WIRING DIAGRAM



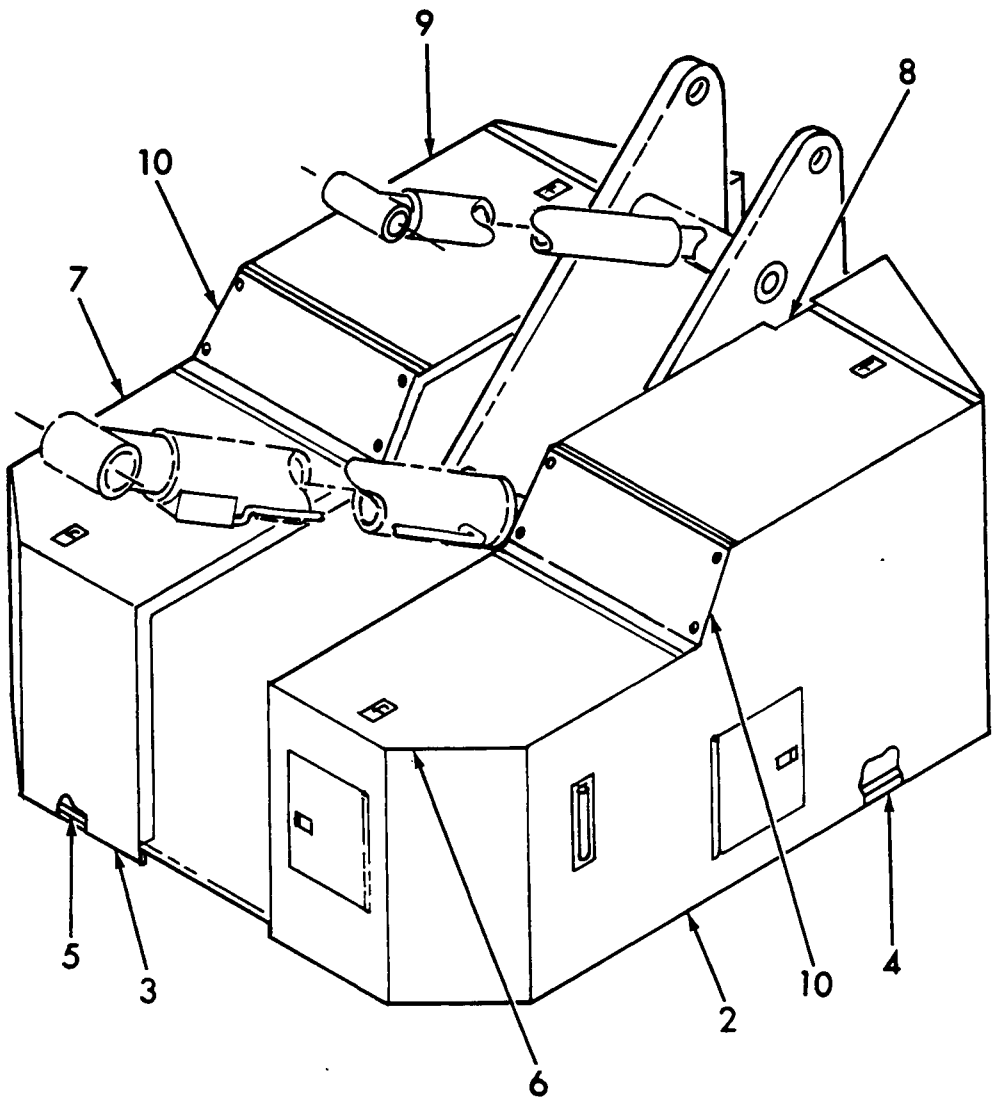
WIRING DETAIL
G.F.C.I. RECEPTACLE PIN 70391 (REF)



AERIAL CONTROL BOX ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23928	ASSEMBLY, AERIAL CONTROL BOX (See Sect. 2, Fig. 1 for NHA)	REF
2	23702	.MACHINING, UPPER CONTROL PANEL	1
5	4027	.BLOCK, TERMINAL	30
6	117-A	.END, TERMINAL BLOCK	2
7	62636	.SCREW, MACHINED (attaching part)	8
8	61532	.NUT, HEX (attaching part)	8
9	63312	.WASHER, LOCK (attaching part)	8
10	20884	.GUARD, SWITCH	5
11	20481	.KIT, TOGGLE SWITCH	5
12	2806	.RELIEF, STRAIN	1
13	2808	.NUT, LOCK	1
14	771	.PLUG, WHITE	3
15	16215	.RELIEF, STRAIN	1
16	16105	.NUT, LOCK	1
17	70392	.PLATE, COVER	1
18	70391	.RECEPTACLE	1
19	4011	.KIT, PUSH BUTTON SWITCH	1
20	70350	.KIT, AERIAL CONTROL STATION	1
21	20805	.KIT, ALARM BUZZER	1
22	70303	.SWITCH, GUARD	1
23	4017	.KIT, TOGGLE SWITCH	1

SHEET METAL KIT (30 EBII)



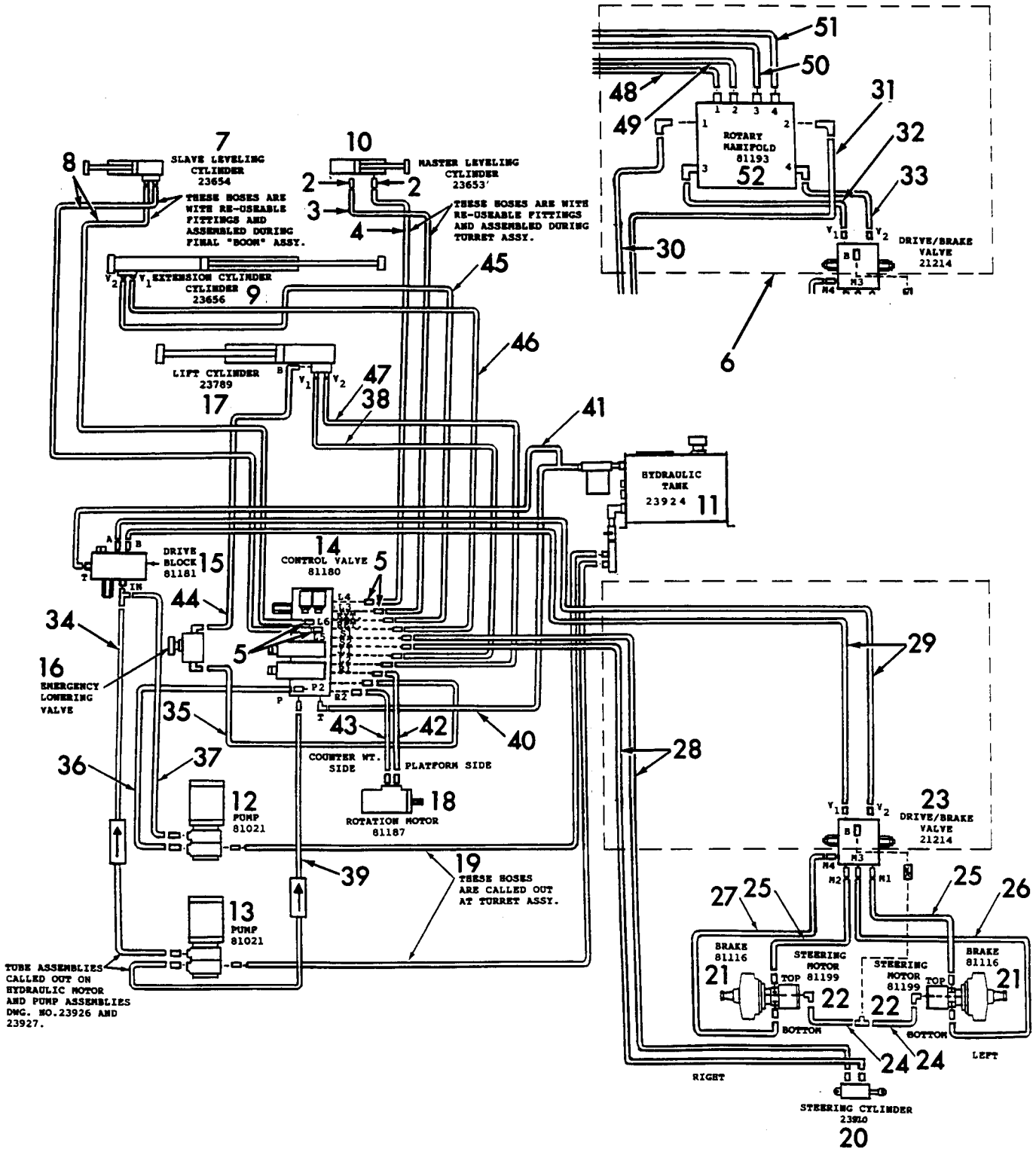
REV.

SHEET METAL KIT (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23934	KIT, SHEET METAL (See Sect. 2, Fig. 1 for NHA)	REF
2	23968	.ASSEMBLY, RIGHT SIDE COVER	1
3	23973	.ASSEMBLY, LEFT SIDE COVER	1
4	23967	.ANGLE, RIGHT SIDE	1
5	23974	.ANGLE, LEFT SIDE	1
6	23970	.COVER, RIGHT SIDE	1
7	23975	.COVER, LEFT SIDE	1
8	23972	.COVER, RIGHT SIDE	1
9	23977	.COVER, LEFT SIDE	1
10	23976	.COVER, MID	2

- ITEM NOT ILLUSTRATED

HYDRAULIC HOSE DIAGRAM (30 EBII)



REV.

HYDRAULIC HOSE DIAGRAM (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	24057	DIAGRAM, HYDRAULIC HOSE	REF
2	2562	.FITTING, STRAIGHT SWIVEL HOSE	2
3	2568-0710	.HOSE, HYDRAULIC	1
4	2568-0880	.HOSE, HYDRAULIC	1
5	2594	.ELBOW, SWIVEL	1
6	23933	.OPTION, CONTINUOUS TURRET ROTATION	REF
7	23654	.CYLINDER, SLAVE LEVELING	1
8	2568-0732	.HOSE, HYDRAULIC	2
9	23656	.CYLINDER, EXTENSION	1
10	23653	.CYLINDER, MASTER LEVELING	1
11	23924	.TANK, HYDRAULIC	1
12	81021	.PUMP	1
13	81021	.PUMP	1
14	81180	.VALVE, CONTROL	1
15	81181	.BLOCK, DRIVE	1
16	22189	.VALVE, EMERGENCY LOWERING	1
17	23789	.CYLINDER, LIFT	1
18	81187	.MOTOR, ROTATION	1
19	81236-24	.HOSE, SUCTION	2
20	23910	.CYLINDER, STEERING	1
21	81116	.BRAKE, HYDRAULIC	2
22	81199	.MOTOR, DRIVE	2
23	21214	.VALVE, DRIVE/BRAKE	1
24	13213-04-0524	.ASSEMBLY, HOSE	2
25	13210-08-0440	.ASSEMBLY, HOSE	2

- ITEM NOT ILLUSTRATED

HYDRAULIC HOSE DIAGRAM (30 EBII)

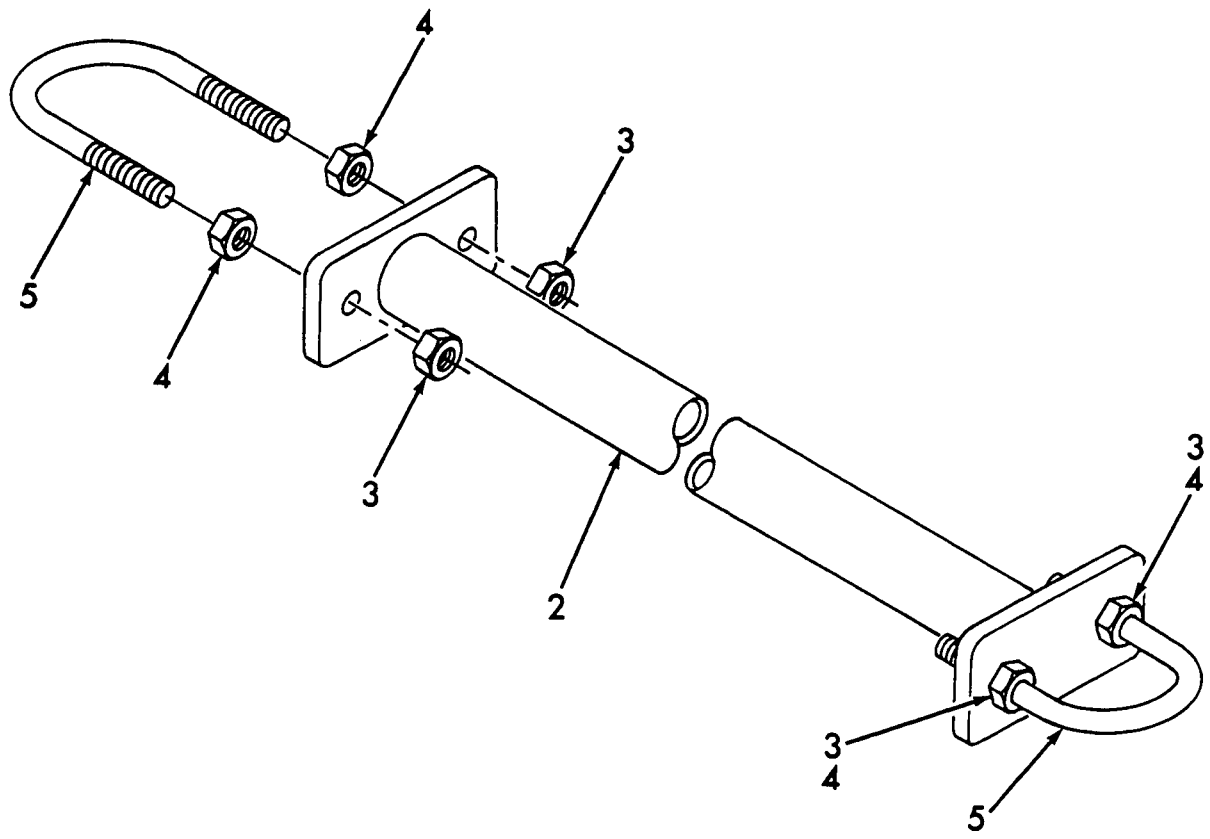
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
26	13210-08-0534	.ASSEMBLY, HOSE	1
27	13210-08-0520	.ASSEMBLY, HOSE	1
28	13213-04-1600	.ASSEMBLY, HOSE	1
29	13213-10-1200	.ASSEMBLY, HOSE	2
30	13210-04-0750	.ASSEMBLY, HOSE (Option) (See Item 6)	1
31	13210-04-0770	.ASSEMBLY, HOSE (Option) (See Item 6)	1
32	13210-10-0320	.ASSEMBLY, HOSE (Option) (See Item 6)	
33	13210-10-0340	.ASSEMBLY, HOSE (Option) (See Item 6)	1
34	13210-10-0120	.ASSEMBLY, HOSE	1
35	13213-04-0200	.ASSEMBLY, HOSE	1
36	13213-08-0204	.ASSEMBLY, HOSE	1
37	13215-10-0080	.ASSEMBLY, HOSE (180°)	1
38	13211-06-0720	.ASSEMBLY, HOSE	1
39	13210-08-0234	.ASSEMBLY, HOSE	1
40	13210-12-0544	.ASSEMBLY, HOSE	1
41	13210-10-0510	.ASSEMBLY, HOSE	1
42	13213-06-0204	.ASSEMBLY, HOSE	1
43	13213-06-0180	.ASSEMBLY, HOSE	1
44	13210-04-0810	.ASSEMBLY, HOSE	1
45	13213-06-0950	.ASSEMBLY, HOSE	1
46	13213-06-0970	.ASSEMBLY, HOSE	1
47	13213-06-0720	.ASSEMBLY, HOSE	1
48	13214-04-0270	.ASSEMBLY, HOSE (Optional)	1
49	13216-04-0284	.ASSEMBLY, HOSE (Optional)	1

HYDRAULIC HOSE DIAGRAM (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
50	13214-04-0180	.ASSEMBLY, HOSE (270^0) (Optional)	1
51	13214-04-0220	.ASSEMBLY, HOSE (270^0) (Optional)	1
52	81193	.MANIFOLD, ROTARY	1

- ITEM NOT ILLUSTRATED

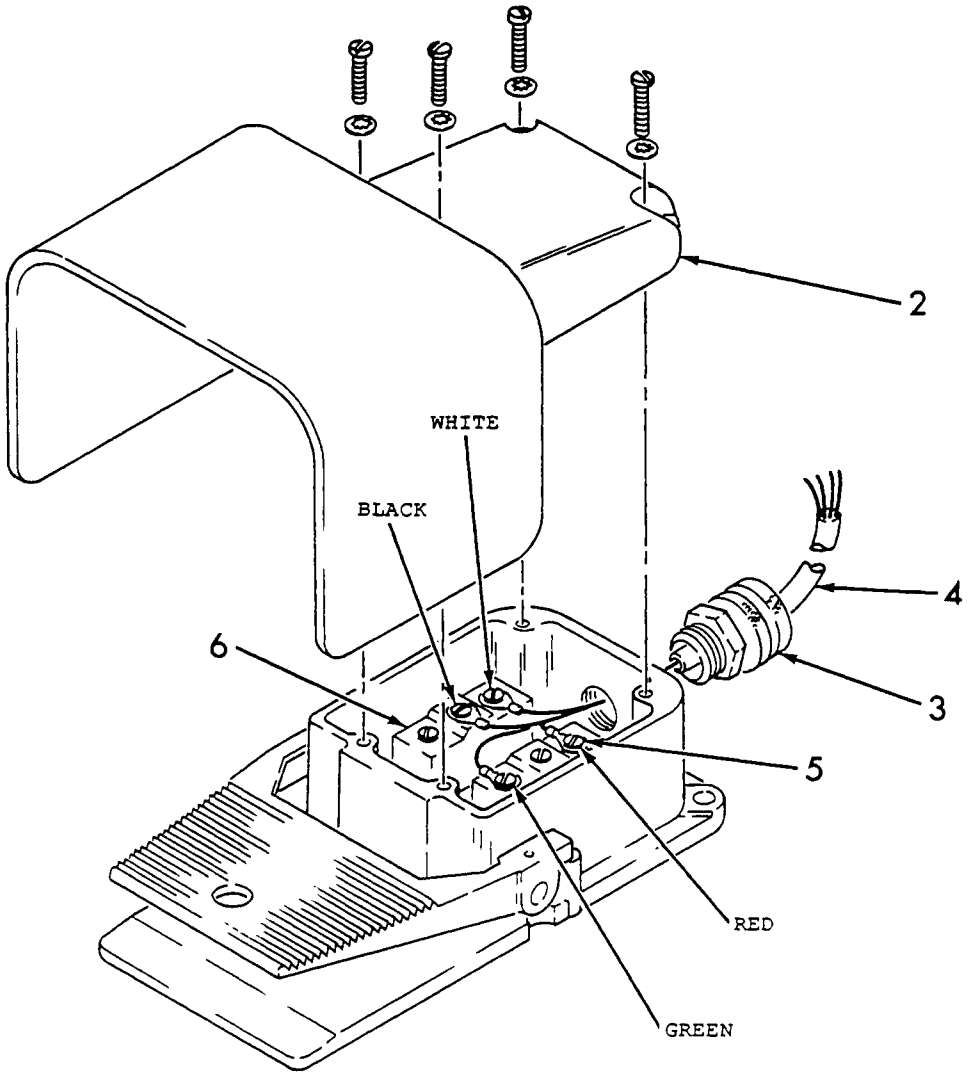
SLIDE BAR ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	24088	ASSEMBLY, SLIDE BAR (See Sect. 2, Fig. 1 for NHA)	REF
2	24167	.WELDMENT, SLIDE BAR	1
3	61318	.NUT, HEX LOCK	4
4	60703	.NUT, HEX	4
5	160017	.U-BOLT	2

REV.

FOOT SWITCH ASSEMBLY (30EB II)

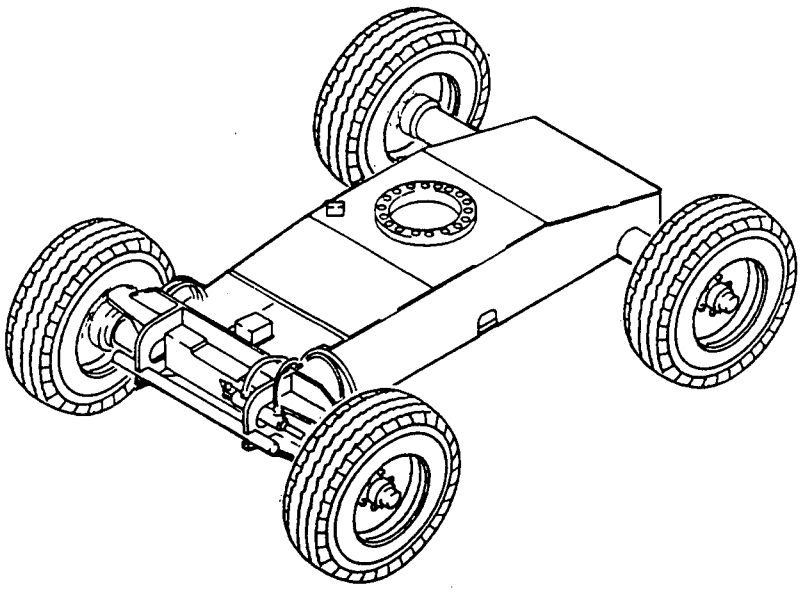


ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	20480	ASSEMBLY, FOOT SWITCH (See Sect. 2, Fig. 1 for NHA)	REF
2	70212	.SWITCH, FOOT	1
3	2531	.RELIEF, STRAIN	1
4	2912	.CABLE (5 FEET)	1
5	876	.RING, TERMINAL	4
6	92202	.SWITCH, SNAP (AFTER FEB. '84)	2
	66185	(BEFORE FEB. '84)	1

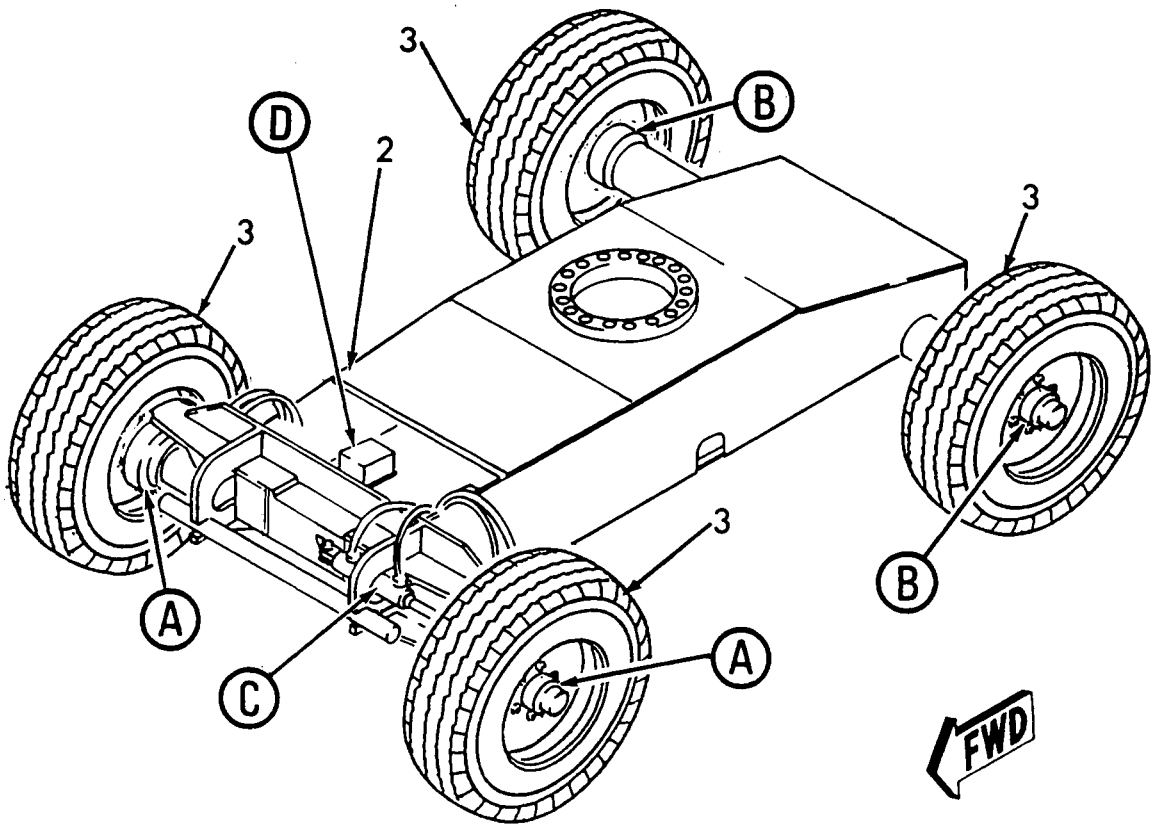
REV.

THIS SECTION 3 CONTAINS THE FOLLOWING FIGURES:

FIG. NO.	TITLE
1	CARRIAGE ASSEMBLY
2	TIRE & WHEEL ASSEMBLY
3	MOTOR BRAKE ASSEMBLY
4	HUB ASSEMBLY
5	STEERING CYLINDER ASSEMBLY
6	TIE ROD ASSEMBLY
7	DRIVE/BRAKE VALVE ASSEMBLY

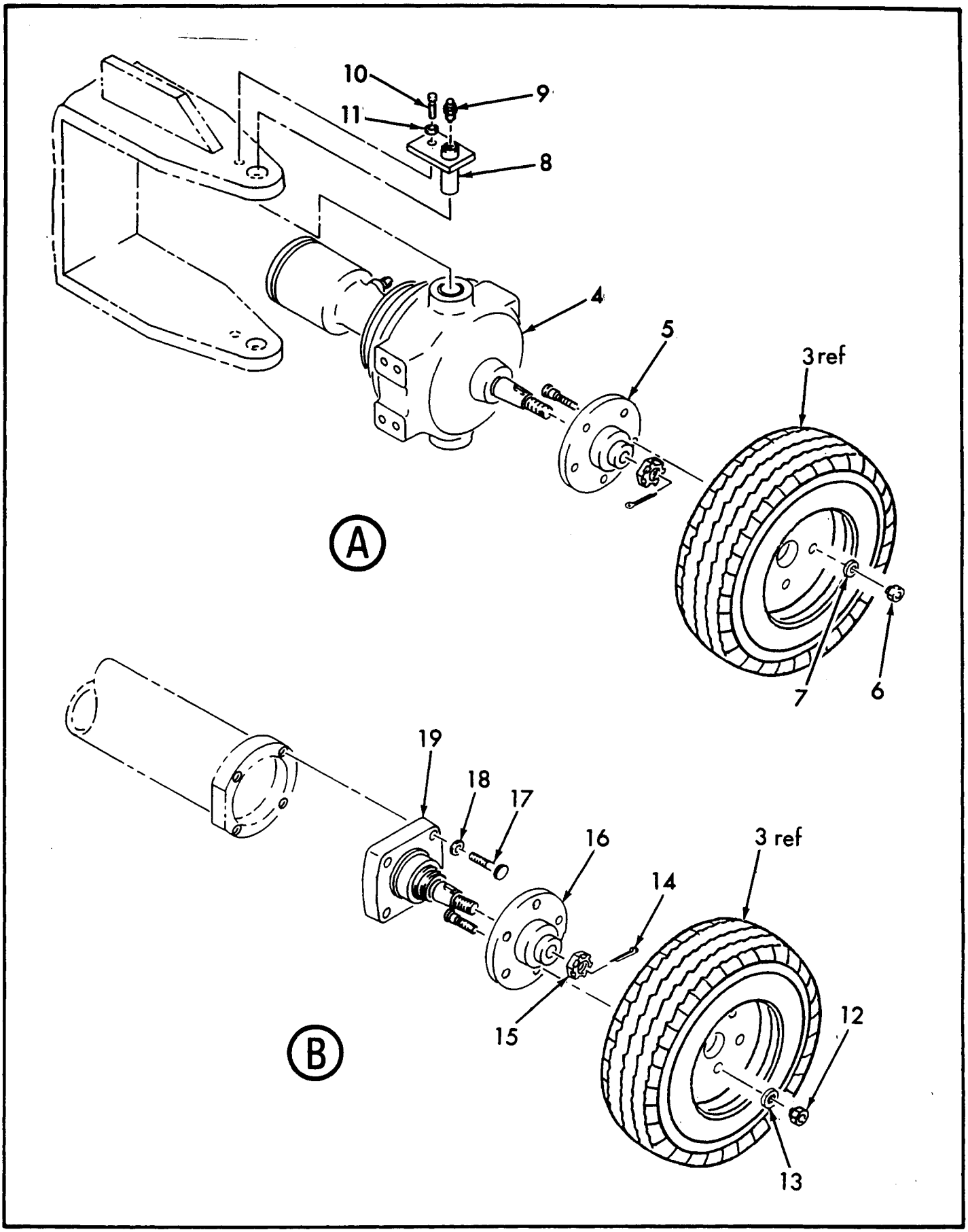


CARRIAGE ASSEMBLY (30 EBII)



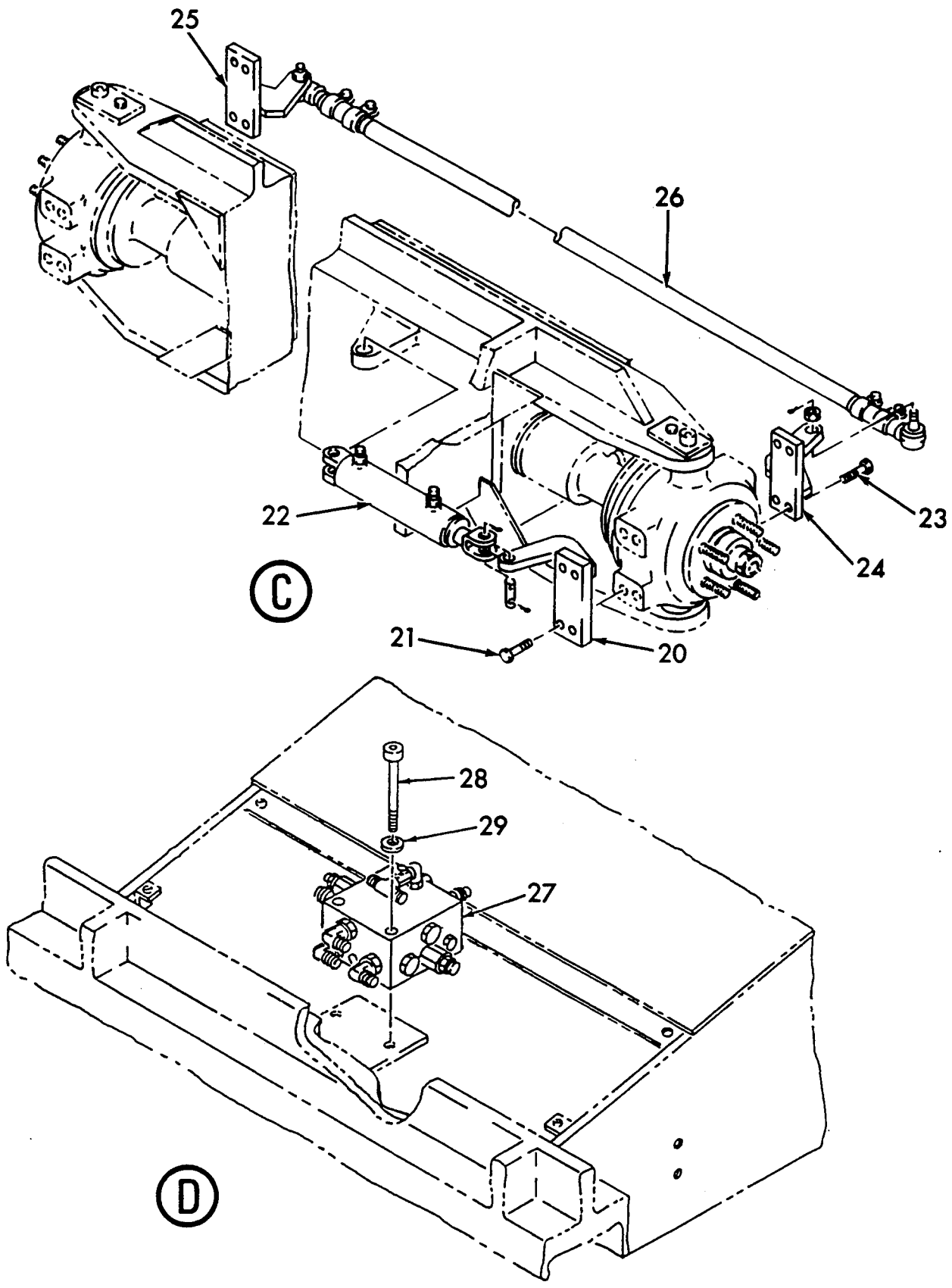
REV.

CARRIAGE ASSEMBLY (30 EBII)



REV.

CARRIAGE ASSEMBLY (30 EBII)



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CARRIAGE ASSEMBLY (30 EBII0

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23849	ASSEMBLY, CARRIAGE (See Sect. 2, Fig. 1 for NHA)	REF
2	23850	.WELDMENT, CARRIAGE	1
3	24055	.ASSEMBLY, TIRE & WHEEL (See Sect. 3, Fig. 2 for Details)	4
4	23925	.ASSEMBLY, MOTOR BRAKE (See Sect. 3, Fig. 3 for Details)	2
5	23867	.HUB, DRIVE	2
6	61301	.NUT, LOCK (attaching part)	10
7	63501	.WASHER, FLAT (attaching part)	10
8	32243	.WELDMENT, KING PIN	4
9	65103	.FITTING, GREASE	4
10	60322	.SCREW, CAP (attaching part)	4
11	63302	.WASHER, LOCK (attaching part)	4
12	61301	.NUT, LOCK (attaching part)	10
13	63501	.WASHER, FLAT (attaching part)	10
14	64310	.PIN, COTTER (attaching part)	2
15	16115	.NUT, SLOTTED JAM (attaching part)	2
16	31285	.ASSEMBLY, HUB (See Sect. 3, Fig. 4 for Details)	2
17	60609	.SCREW, CAP (attaching part)	8
18	63327	.WASHER, LOCK (attaching part)	8
19	23908	.WELDMENT, SPINDLE HUB	2
20	32222	.BRACKET, STEERING CYLINDER	1
21	60370	.SCREW, CAP (attaching part)	4
22	23910	.ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 5 for Details)	1
23	60370	.SCREW, CAP (attaching part)	8

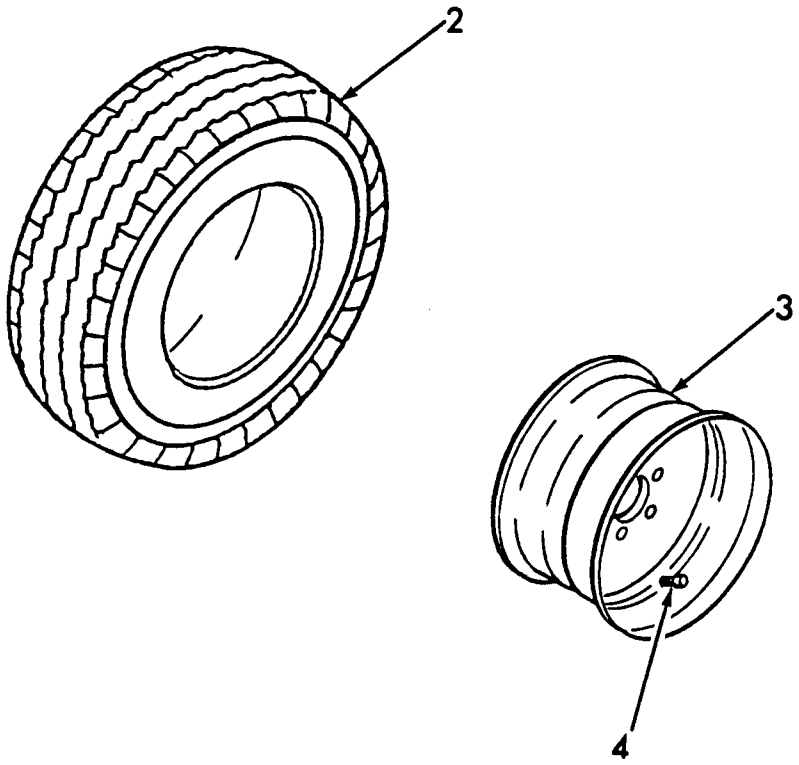
- ITEM NOT ILLUSTRATED

CARRIAGE ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
24	32194	.ARM, STEERING L.H.	1
25	32170	.ARM, STEERING R.H.	1
26	23919	.ASSEMBLY, TIE ROD (See Sect. 3, Fig. 6 for Details)	1
27	24032	.ASSEMBLY, DRIVE BRAKE VALVE (See Sect. 3, Fig. 7 for Details)	1
28	60362	.SCREW, CAP (attaching part)	2
29	63302	.WASHER, LOCK (attaching part)	2

- ITEM NOT ILLUSTRATED

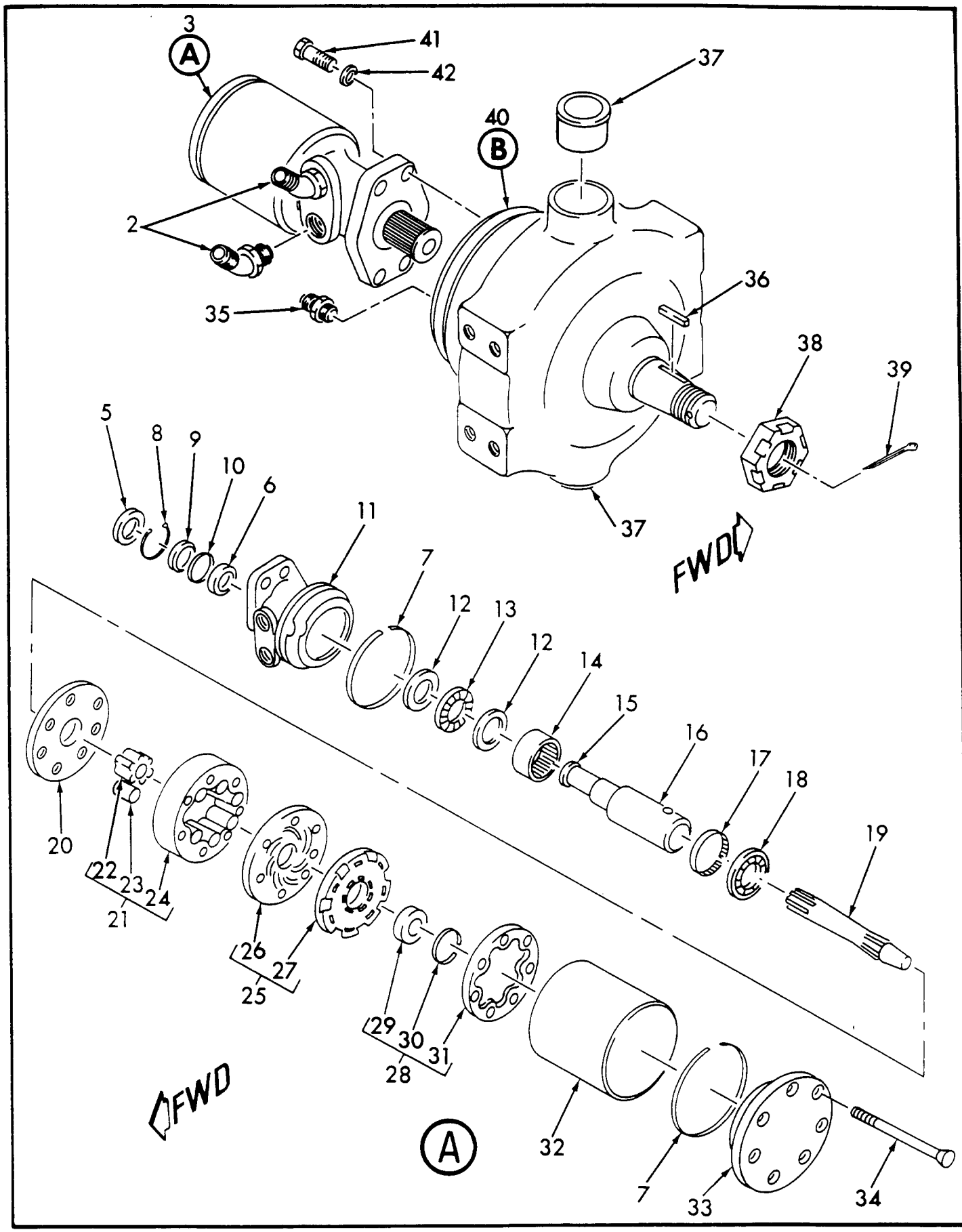
TIRE & WHEEL ASSEMBLY (30 EBII)

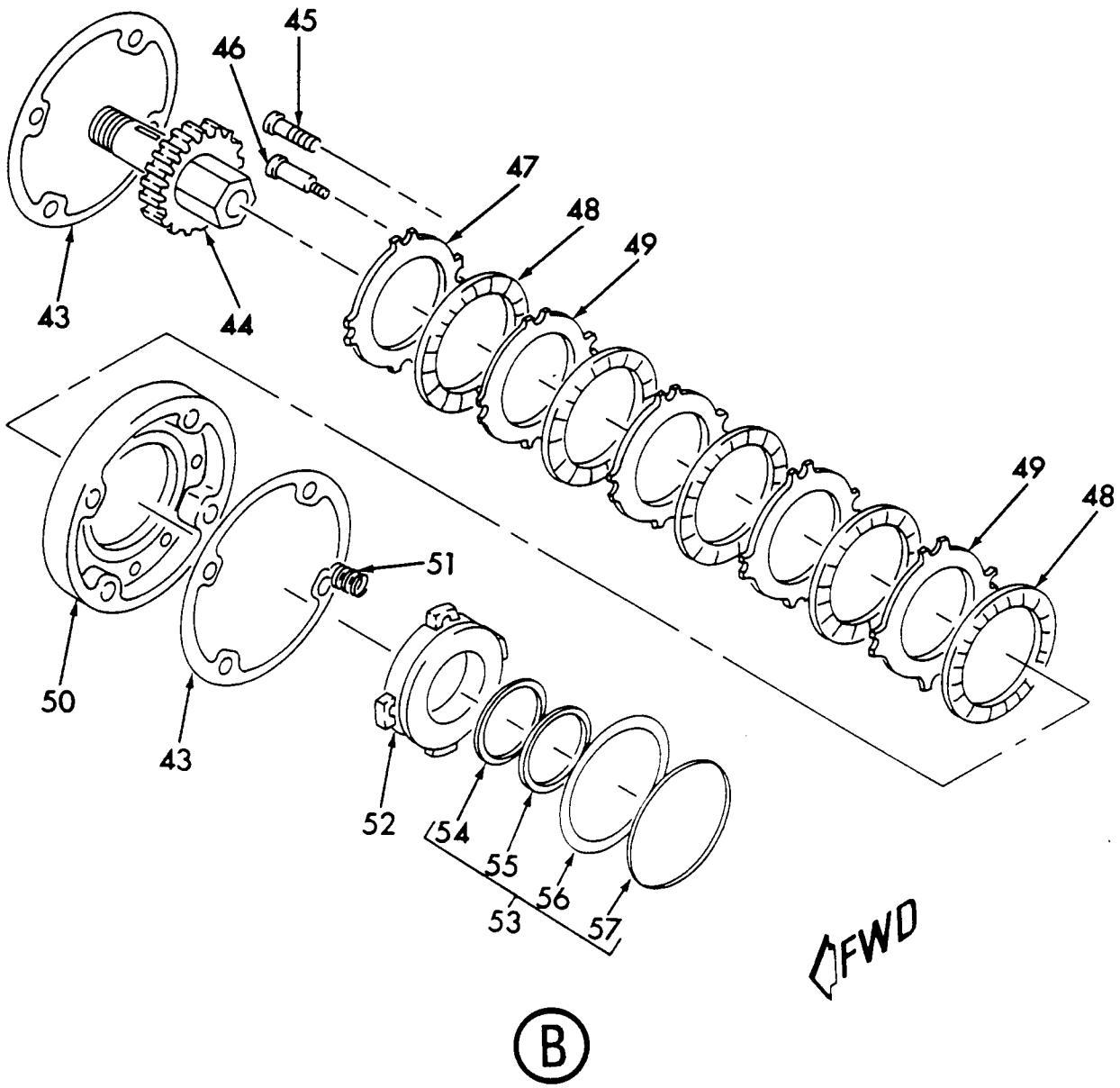


ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	24055	ASSEMBLY, TIRE & WHEEL (See Sect. 3, Fig. 1 for NHA)	REF
2	30357	.TIRE	1
3	30356	.WHEEL	1
4	2252	.STEM, VALVE	1

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MOTOR BRAKE ASSEMBLY (30 EBII)




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MOTOR BRAKE ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23925	ASSEMBLY, MOTOR BRAKE (See Sect. 3, Fig. 1 for NHA)	REF
2	80018-13	.CONNECTOR, ELBOW 45° STRAIGHT THREAD	2
3	81199	.ASSEMBLY, DRIVE MOTOR	1
-4	3036-A	..KIT, SEAL	1
5		...SEAL	1
6		...SEAL	1
7		...RING, SEAL	2
8		..RING, RETAINER	1
9		..WASHER, BACK-UP	1
10		..WASHER	1
11		..HOUSING	1
12		..WASHER, THRUST	2
13		..BEARING, THRUST	1
14		..BEARING	1
15		..WASHER	1
16		..SHAFT, COUPLING	1
17		..BEARING	1
18		..BEARING, THRUST	1
19		..LINK, DRIVE	1
20		..PLATE, WEAR	1
21		..SET, ROTOR	1
22		...ROTOR	1
23		...VALVE	7
24		...STATOR	1
25		..SET, MANIFOLD (For MAB TORQMOTORS)	1
26		...PLATE, MANIFOLD	1

- ITEM NOT ILLUSTRATED

MOTOR BRAKE ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
27		...MANIFOLD	1
28		..SET, COMMUTATOR	1
29		...COMMUTATOR	1
30		...RING, SEAL	1
31		...RING, COMMUTATOR	1
32		..SLEEVE	1
33		..ASSEMBLY, END COVER	1
34		..BOLT, SPECIAL	7
35	80004-03	.CONNECTOR, STRAIGHT THREAD	1
36	67037	.KEY, WOODRUFF	1
37	67036	.BUSHING	2
38	67035	.NUT	1
39	64310	.PIN, COTTER	1
40	81116	.ASSEMBLY, BRAKE	1
41	60522	.SCREW, CAP (attaching part)	4
42	63327	.WASHER, LOCK (attaching part)	4
43		..GASKET, CASE	2
44	67034	...ASSEMBLY, SPLINE SHAFT	1
45		..SCREWS, SOCKET HEAD CAP (Assembly Bolts)	4
46		..BOLTS, SOCKET HEAD SHOULDER (Tension Pins)	4
47		..DISC, PRIMARY	1
48		..DISCS, ROTOR	5
49		..DISCS, STATOR	4
50		..PLATE, SPRING	1
51		..SPRINGS	8

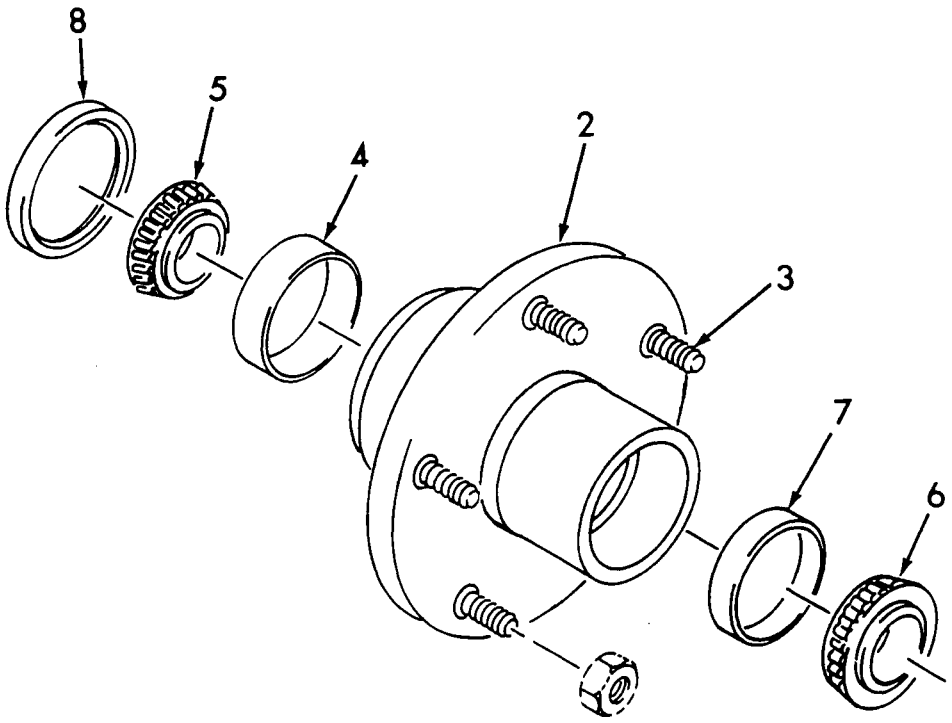
- ITEM NOT ILLUSTRATED

MOTOR BRAKE ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
- 52	-	..PISTON	1
53	66971	..KIT, SEAL	1
54		...RING, BACK-UP	1
55		...O-RING	1
56		...RING, BACK-UP	1
57		...O-RING	1

- ITEM NOT ILLUSTRATED

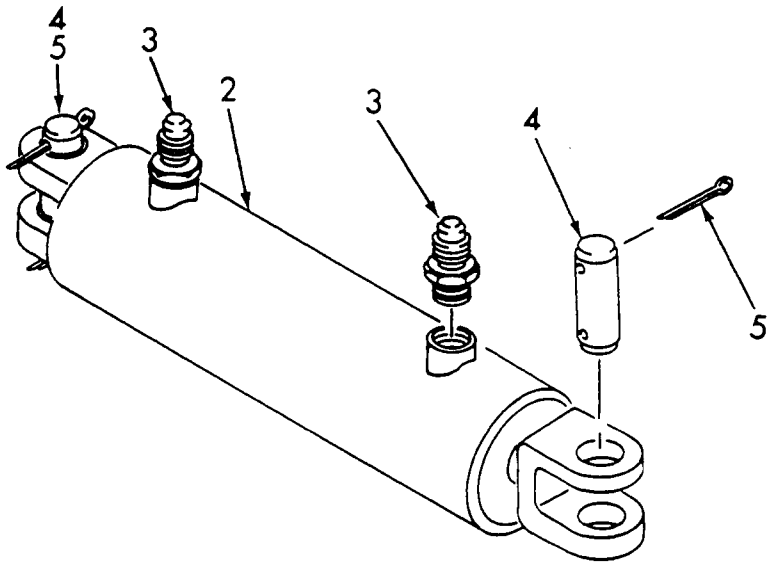
HUB ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	31285	ASSEMBLY, HUB (See Sect. 3, Fig. 1 for NHA)	REF
2	31144	.HUB, MACHINING	1
3	65530	.WHEEL, BOLT	5
4	66136	.CUP, INNER BEARING	1
5	66135	.CONE, INNER BEARING	1
6	66139	.CONE, OUTER BEARING	1
7	66138	.CUP, OUTER BEARING	1
8	66134	.SEAL, GREASE	1

REV.

STEERING CYLINDER ASSEMBLY (30 EBII)

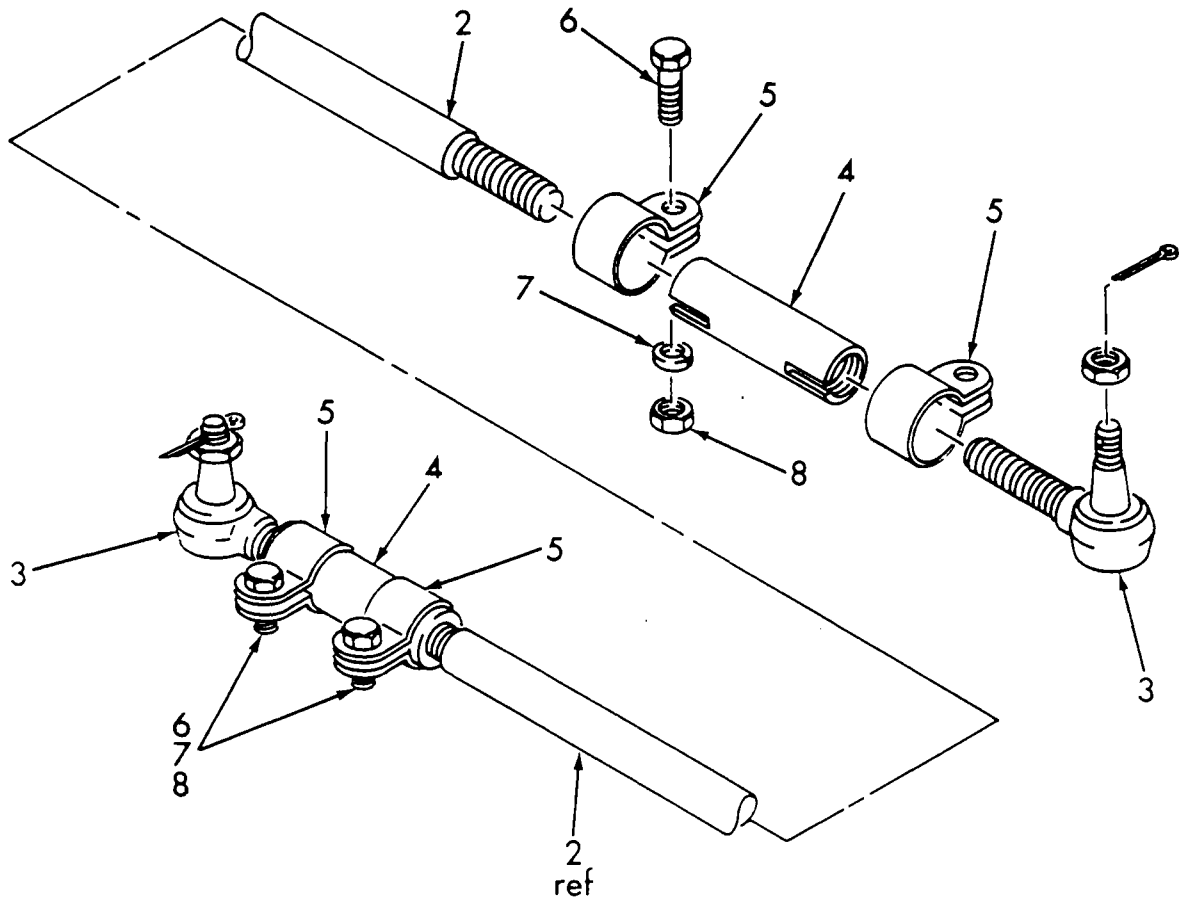


ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23910	ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 1 for NHA)	REF
2	32223	.CYLINDER, STEERING	1
3	80004-03	.CONNECTOR, STRAIGHT THREAD	2
4		.PIN	2
5		.PIN, COTTER	4

REV.

- ITEM NOT ILLUSTRATED

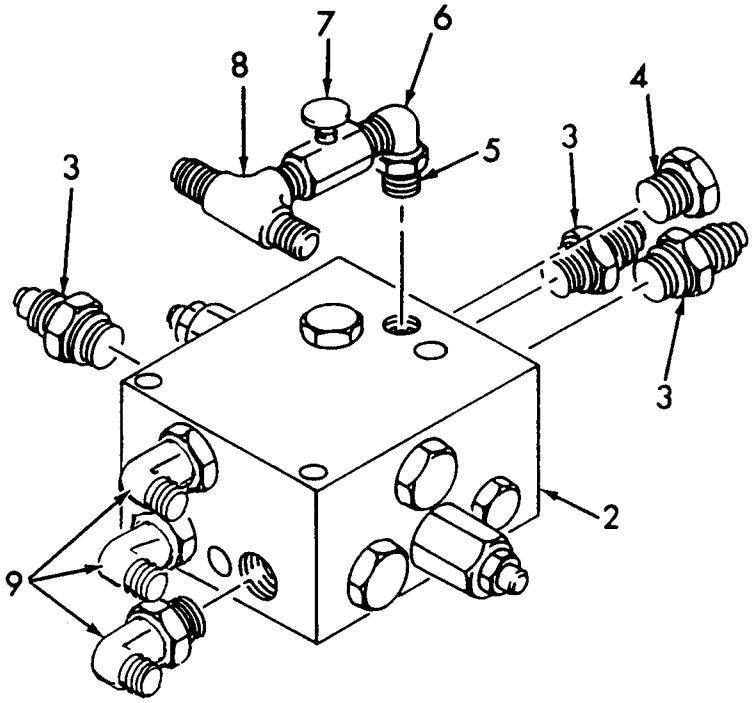
TIE ROD ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23919	ASSEMBLY, TIE ROD (See Sect. 3, Fig. 1 for NHA)	REF
2	23918	.TIE, ROD	1
3	66037	.TIE, ROD END	2
4	32212	.TURNBUCKEL	2
5	66239	.CLAMP	4
6	60415	.SCREW, CAP (attaching part)	4
7	63303	.WASHER, LOCK (attaching part)	4
8	60803	.NUT, HEX (attaching part)	4

REV.

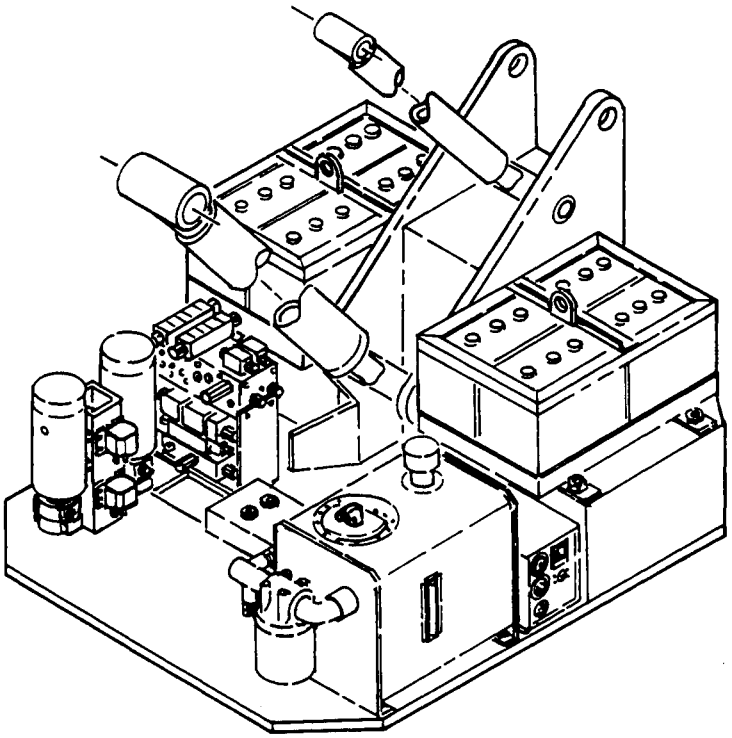
DRIVE/BRAKE VALVE ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	24032	ASSEMBLY, DRIVE BRAKE VALVE (See Sect. 3, Fig. 1 for NHA)	REF
2	21214	.VALVE, DRIVE BRAKE	1
3	80004-11	.CONNECTOR, STRAIGHT THREAD	3
4	80050-05	.PLUG, HEX HEAD STRAIGHT THREAD	1
5	80052-04	.NIPPLE, PIPE	1
6	80021-03	.ELBOW, STREET	1
7	20357	.VALVE, NEEDLE	1
8	80034-04	.TEE, MALE BRANCH	1
9	80012-11	.ELBOW, STRAIGHT THREAD	3

REV.

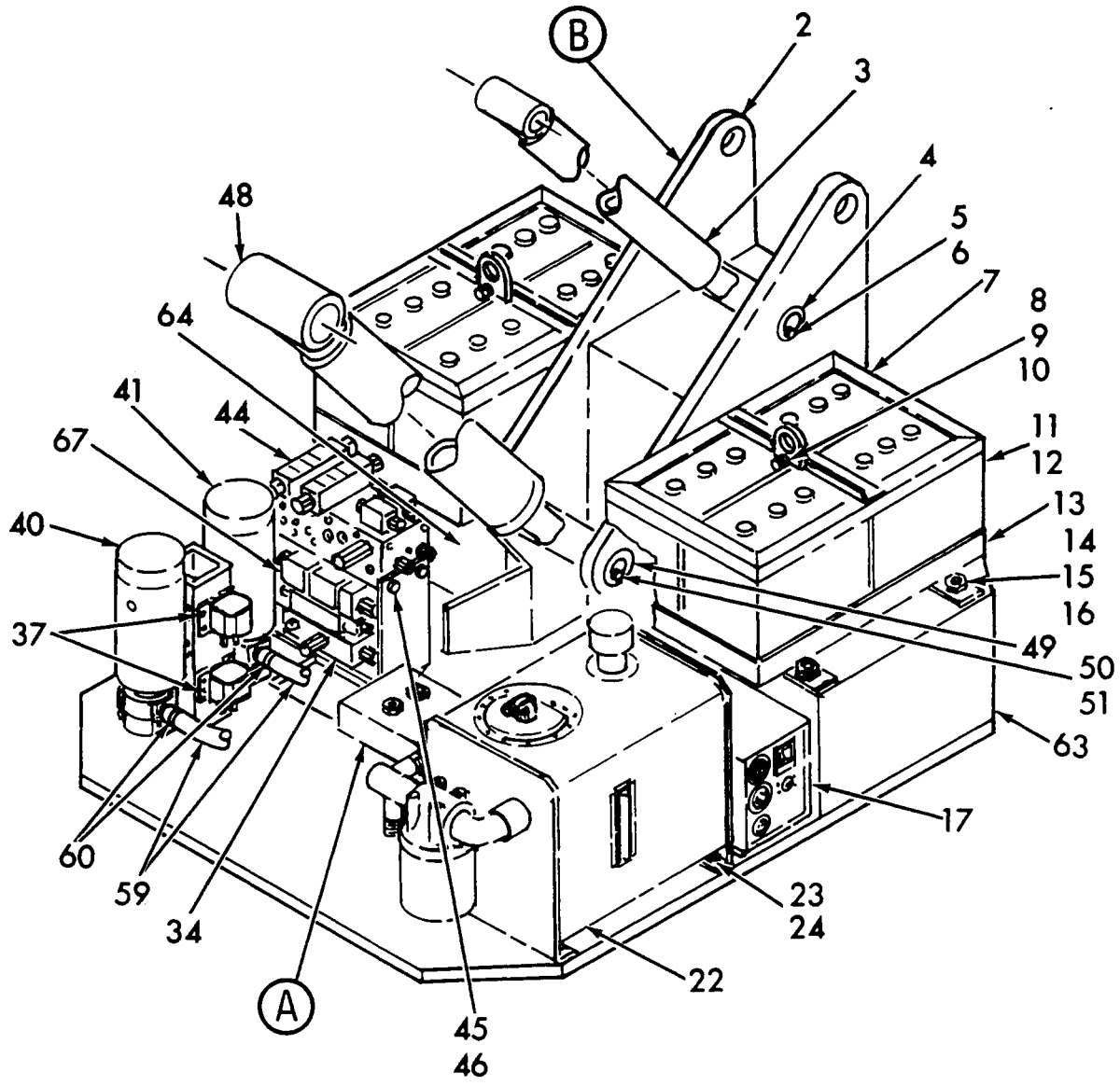
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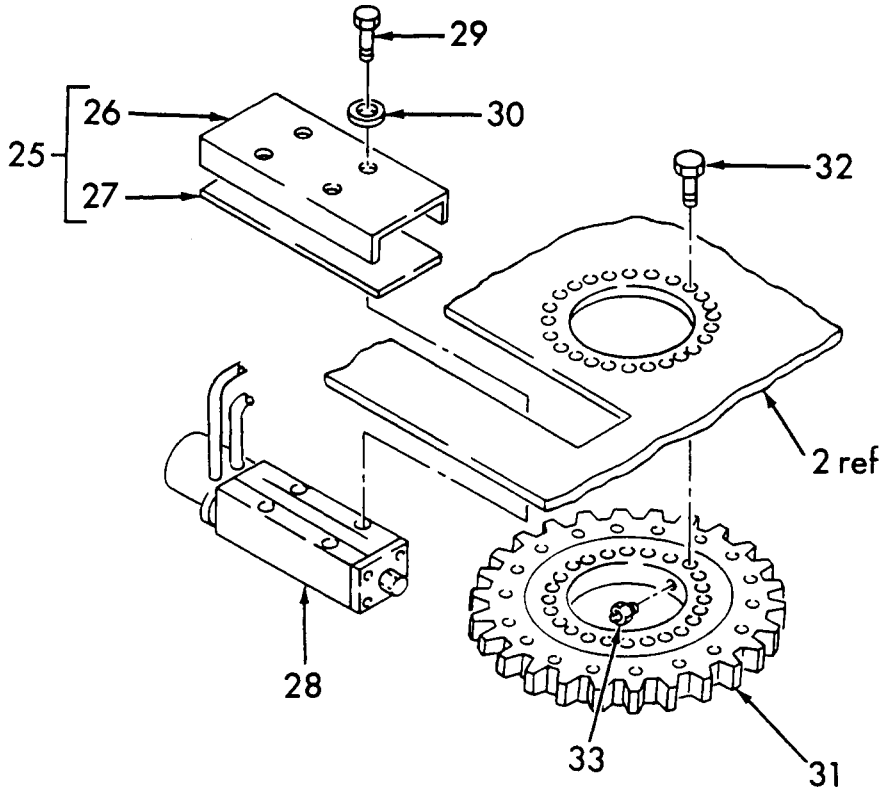
THIS SECTION 4 CONTAINS THE FOLLOWING FIGURES:

FIG. NO.	TITLE
1	TURRET ASSEMBLY
2	MASTER LEVELING CYLINDER ASSEMBLY
3	HYDRAULIC TANK ASSEMBLY
4	ROTATION GEARBOX ASSEMBLY
5	DRIVE BLOCK ASSEMBLY
6	HYDRAULIC PUMP AND MOTOR ASSEMBLY
7	HYDRAULIC PUMP AND MOTOR ASSEMBLY
8	CONTROL VALVE ASSEMBLY
9	EMERGENCY DESCENT VALVE ASSEMBLY
10	LIFT CYLINDER ASSEMBLY
11	LOWER CONTROL PANEL ASSEMBLY
12	HYDRAULIC TANK SUB-ASSEMBLY

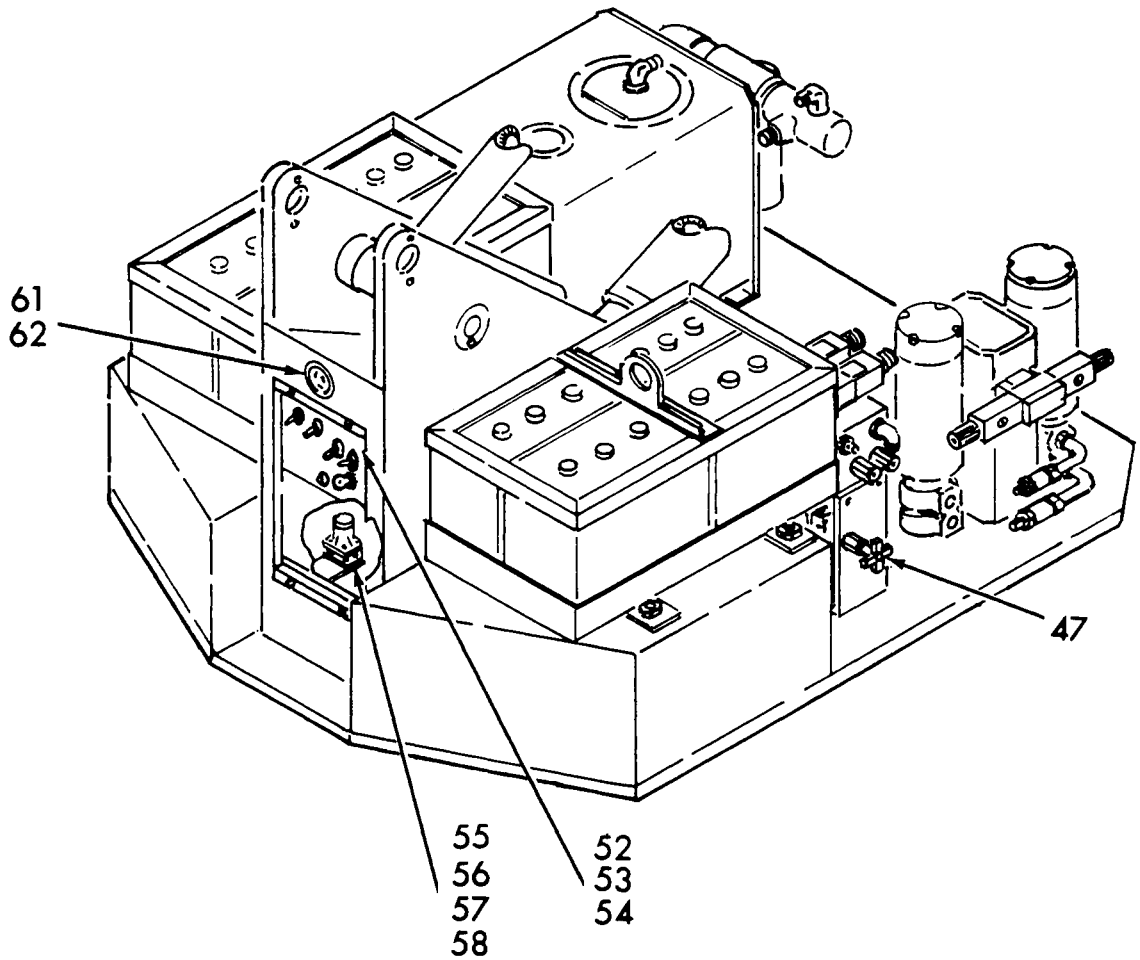
TURRET ASSEMBLY (30 EBII)



TURRET ASSEMBLY (30 EBII)



TURRET ASSEMBLY (30 EBII)



B

TURRET ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23851	ASSEMBLY, TURRET (See Sect. 2, Fig. 1 for NHA)	REF
2	23852	.WELDMENT, TURRET	1
3	23664	.ASSEMBLY, MASTER LEVELING CYLINDER (See Sect. 4, Fig. 2 for Details)	1
4	23913	.PIN, MASTER LEVELING CYLINDER	1
5	60542	.SCREW, CAP (attaching part)	1
6	63303	.WASHER, LOCK (attaching part)	1
7	23883	.TRAY, TOP BATTERY	2
8	60338	.SCREW, CAP (attaching part)	2
9	63302	.WASHER, LOCK (attaching part)	2
10	63429	.WASHER, FLAT (attaching part)	2
11	4007	.BATTERY	8
12	23898	.KIT, BATTERY CABLE	1
13	23884	.TRAY, BOTTOM BATTERY	2
14	60326	.SCREW, CAP (attaching part)	4
15	63305	.WASHER, LOCK (attaching part)	4
16	90565	.WASHER, FLAT (attaching part)	4
17	70321	.CHARGER, BATTERY	1
-18	60701	.NUT, HEX (attaching part)	4
-19	63041	.WASHER, FLAT (attaching part)	4
-20	65975	.SPACER, MALE/FEMALE THREADED (attaching part)	4
-21	63301	.WASHER, LOCK (attaching part)	4
22	23916	.ASSEMBLY, HYDRAULIC TANK (See Sect. 4, Fig. 3 for Details)	1
23	60395	.SCREW, CAP (attaching part)	4
24	63303	.WASHER, LOCK (attaching part)	4
25	23693	.WELDMENT, ROTATION MOUNTING BRACKET	1

- ITEM NOT ILLUSTRATED

TURRET ASSEMBLY (30 EBII)

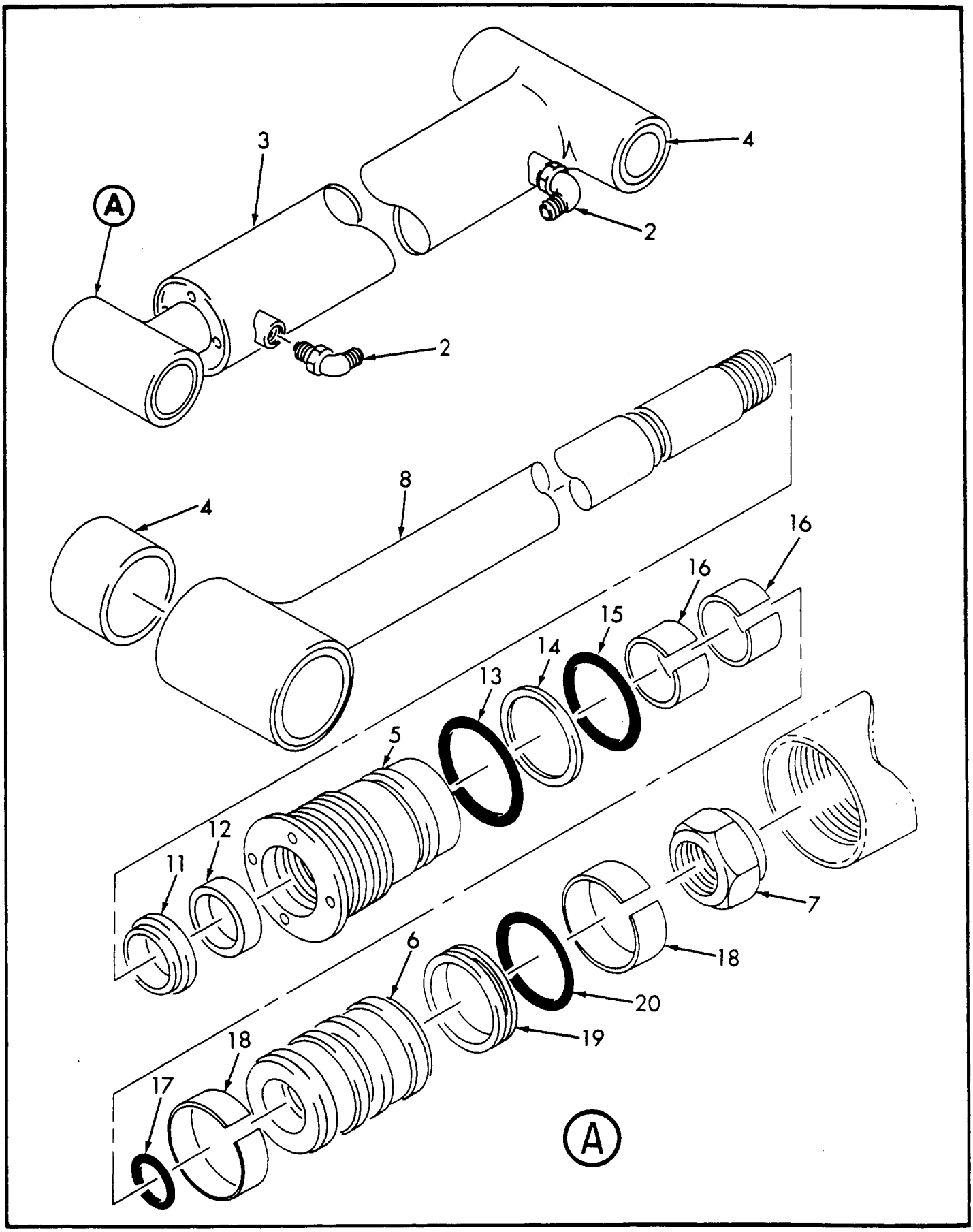
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
26	23639	..CHANNEL	1
27	26641	..BAR, FLAT	1
28	23694	.ASSEMBLY, ROTATION GEARBOX (See Sect. 4, Fig. 4 for Details)	1
29	60548	.SCREW, CAP (attaching part)	4
30	63407	.WASHER, FLAT (attaching part)	4
31	23722	.GEAR, RING	1
32	60547	.SCREW, RING (attaching part)	24
33	65103	.FITTING, GREASE	1
34	23929	.ASSEMBLY, DRIVE BLOCK (See Sect. 4, Fig. 5 for Details)	1
-35	60352	.SCREW, CAP (attaching part)	2
-36	63301	.WASHER, LOCK (attaching part)	2
37	70375	.RELAY, POWER	2
-38	60353	.SCREW, CAP (attaching part)	4
-39	63301	.WASHER, CAP (attaching part)	4
40	23927	.ASSEMBLY, HYDRAULIC PUMP AND MOTOR (See Sect. 4, Fig. 6 for Details)	1
41	23926	.ASSEMBLY, HYDRAULIC PUMP AND MOTOR (See Sect. 4, Fig. 7 for Details)	1
-42	60343	.SCREW, CAP (attaching part)	8
-43	63319	.WASHER, LOCK (attaching part)	8
44	23723	.ASSEMBLY, CONTROL VALVE (See Sect. 4, Fig. 8 for Details)	1
45	60376	.SCREW, CAP (attaching part)	4
46	63302	.WASHER, LOCK (attaching part)	4
47	22189	.ASSEMBLY, VALVE EMERGENCY DESCENT (See Sect. 4, Fig. 9 for Details)	1
48	23932	.ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 10 for Details)	1

TURRET ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-49	23912	.PIN, LIFT CYLINDER	1
50	60542	.SCREW, CAP (attaching part)	1
51	63303	.WASHER, LOCK (attaching part)	1
52	23903	.ASSEMBLY, LOWER CONTROL PANEL (See Sect. 4, Fig. 11 for Details)	1
-53	60353	.SCREW, CAP (attaching part)	4
-54	63301	.WASHER, LOCK (attaching part)	4
55	21250	.SENSOR, SLOPE	1
-56	60342	.SCREW, CAP (attaching part)	4
-57	63301	.WASHER, LOCK (attaching part)	4
-58	60701	.NUT, HEX (attaching part)	4
59	81236-24	.HOSE, SUCTION (See Sect. 2, Fig. 5 for Details)	2
60	16288	.CLAMP, HOSE (attaching part)	4
61	70409	.INLET, FLANGED	1
-62	62609	.SCREW, MACHINED	2
63	23876	.COUNTERWEIGHT, RIGHT SIDE	1
64	23914	.COUNTERWEIGHT, LEFT SIDE	1
-65	60537	.SCREW, CAP (attaching part)	4
-66	140517	.WASHER, FLAT (attaching part)	4
67	81169	.CONTROL VALVE, DIRECTIONAL	1

- ITEM NOT ILLUSTRATED

MASTER LEVELING CYLINDER ASSEMBLY (30 EBII)



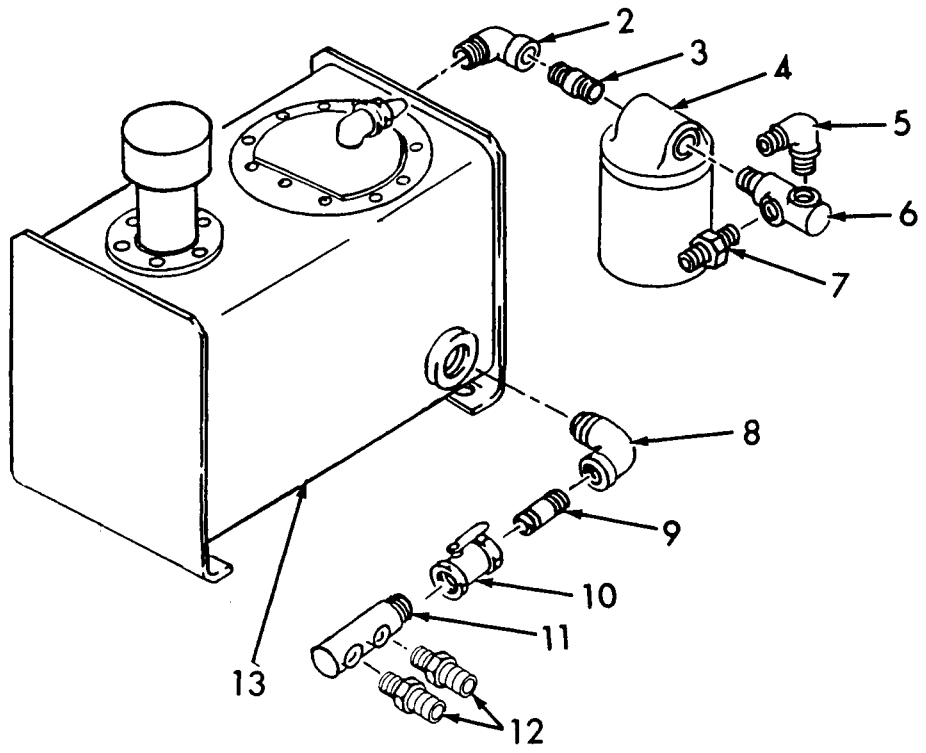
REV.

MASTER LEVELING CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23664	ASSEMBLY, MASTER LEVELING CYLINDER (See Sect. 4, Fig. 1 for NHA)	REF
2	80012-03	.ELBOW, STRAIGHT THREAD	2
3	23653	.CYLINDER, MASTER LEVELING	1
4	67123	.BUSHING	4
5		.NUT, GLAND	1
6		.PISTON	1
7		.NUT, LOCK	1
8		.ROD	1
-9		.BARREL	1
-10	67052	.KIT, SEAL	1
11		..WIPER, ROD	1
12		..SEAL, ROD, POLYPAK	1
13		..O-RING	1
14		..RING, BACK-UP	1
15		..O-RING	1
16		..BEARING, WEAR	2
17		..O-RING	1
18		..RING, WEAR (GLASS/NYLON)	2
19		..SEAL, A Q (SQUARE)	1
20		..O-RING	1

- ITEM NOT ILLUSTRATED

HYDRAULIC TANK ASSEMBLY (30EB11)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23916	ASSEMBLY, HYDRAULIC TANK (See Sect. 4 Fig. 1 for NHA)	REF
2	16503	. ELBOW, STREET	1
3	16552	. NIPPLE, CLOSE	1
4	21241	. FILTER, RETURN LINE	1
5	23922	. ADAPTER, HYDRAULIC TANK RETURN	1
6	80008-16	. ELBOW, MALE	1
7	80001-20	. CONNECTOR, MALE	1
8	52307	. ELBOW, STREET	1
9	16553	. NIPPLE	1
10	20050	. VALVE, BUTTERFLY	1
11	23923	. ADAPTER, HYDRAULIC TANK SUCTION	1

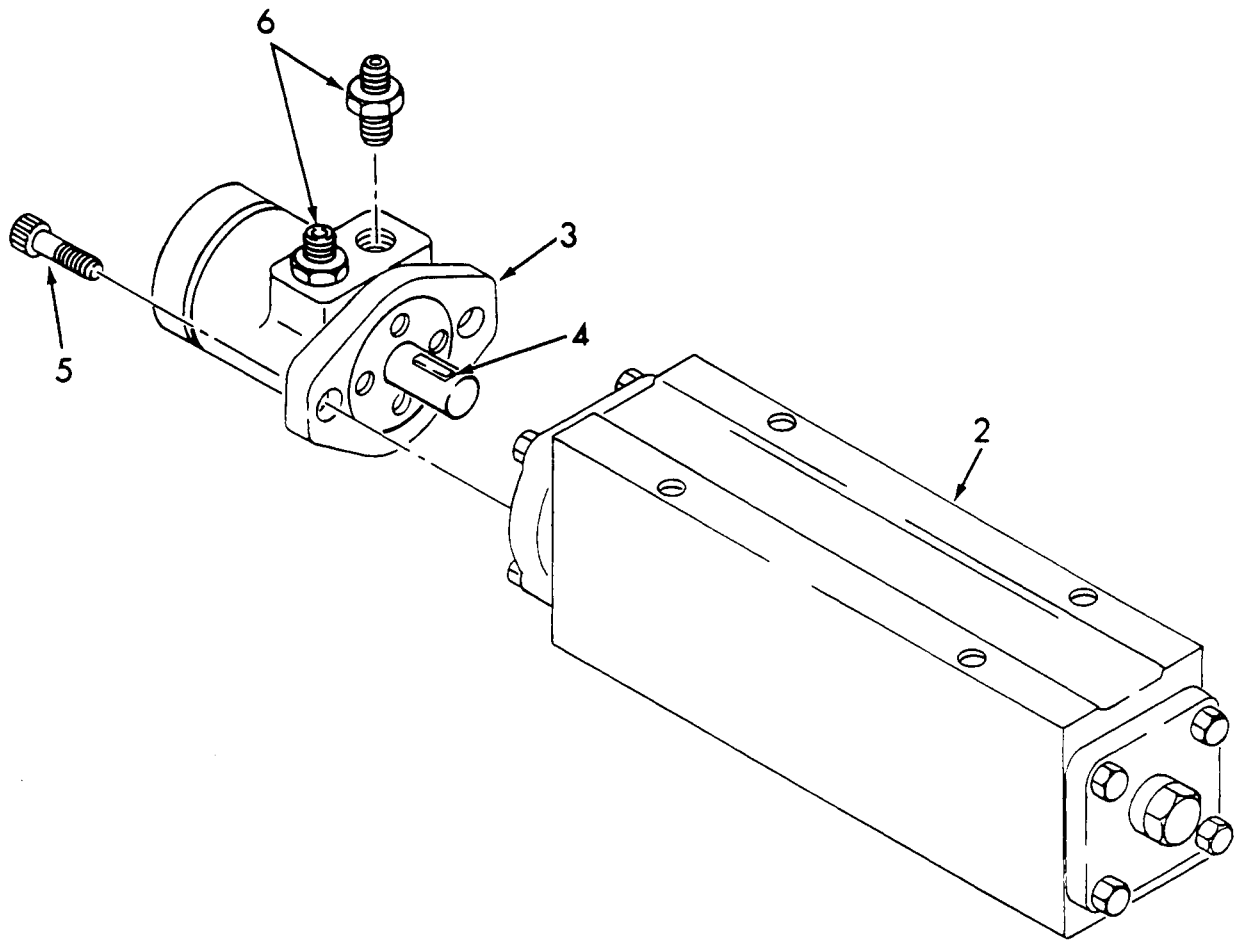
REV.

HYDRAULIC TANK ASSEMBLY (30EB11)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
12	81234	. ADAPTER, TANK	2
13	23915	. SUB-ASSEMBLY, HYDRAULIC TANK (See Sect. 4 Fig. 12 for Details)	1

- ITEM NOT ILLUSTRATED

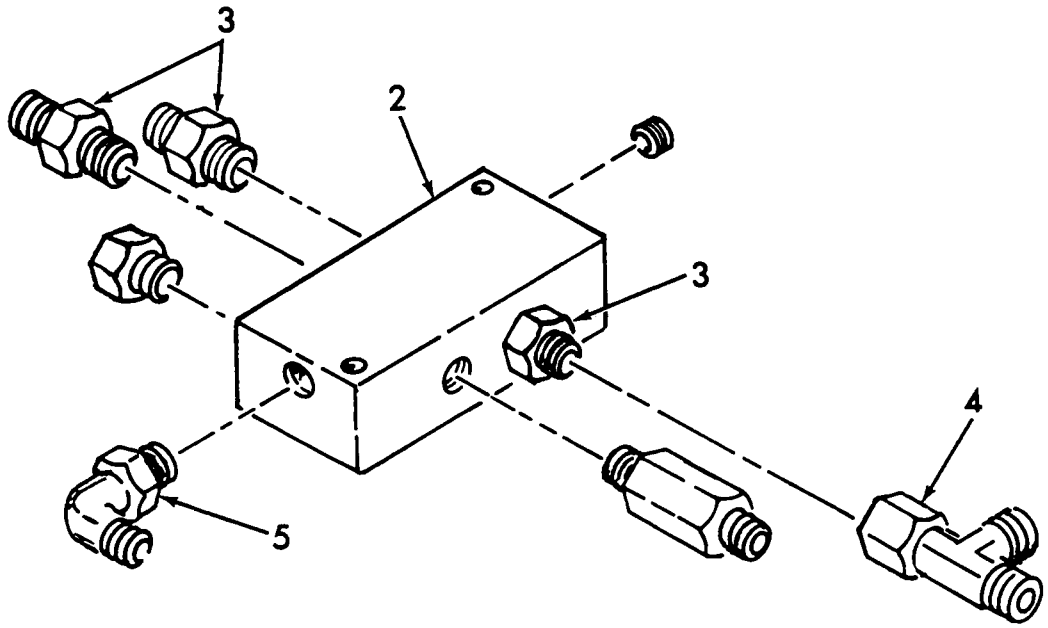
ROTATION GEAR BOX ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23694	ASSEMBLY, ROTATION GEAR BOX (See Sect. 4, Fig. 1 for NHA)	REF
2	23736	.ASSEMBLY, WORM GEAR	1
3	20520	.MOTOR, ORBIT	1
4		.KEY, WOODRUFF	1
5	62011	.SCREW, CAP (attaching part)	2
6	80001-11	.CONNECTOR, MALE	2

- ITEM NOT ILLUSTRATED

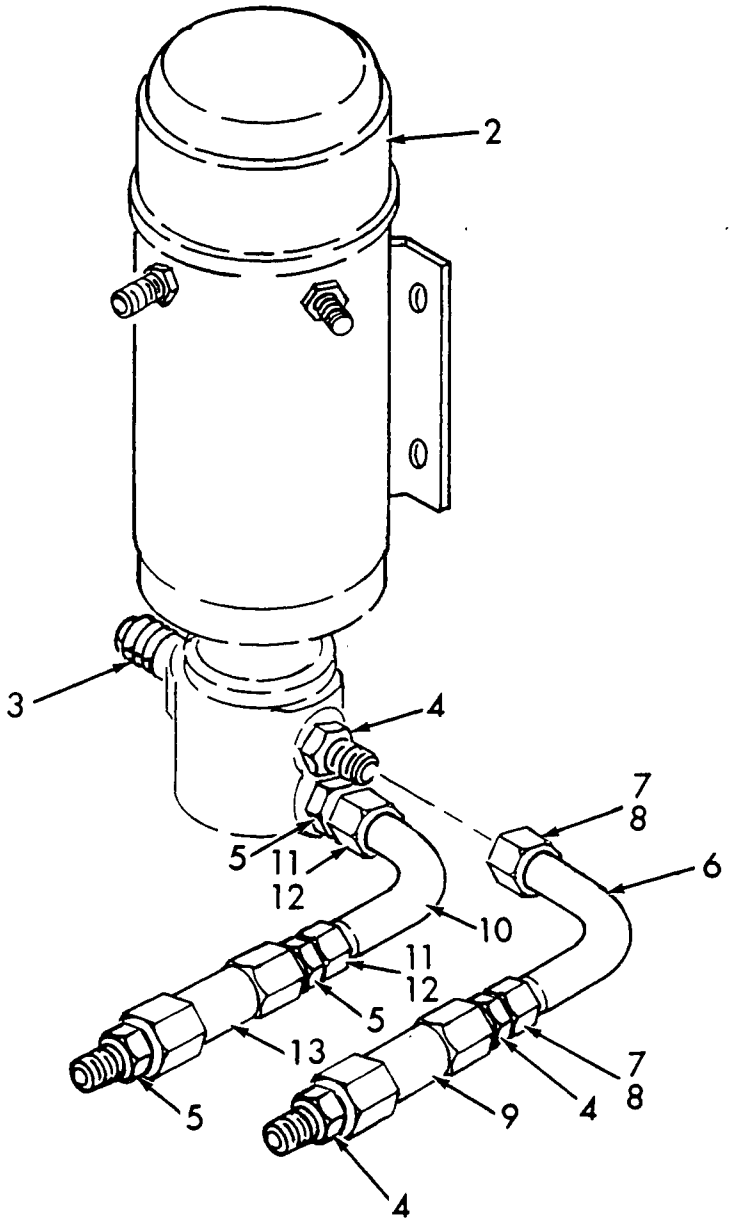
DRIVE BLOCK ASSEMBLY (30 EBII)



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23929	ASSEMBLY, DRIVE BLOCK (See Sect. 4, Fig. 1 for NHA)	REF
2	81181	.DRIVE, BLOCK	1
3	80004-16	.CONNECTOR, STRAIGHT THREADED	3
4	80028-07	.TEE, SWIVEL NUT RUN	1
5	80012-16	.ELBOW, STRAIGHT THREADED	1

REV.

HYDRAULIC PUMP AND MOTOR ASSEMBLY (30 EBII)

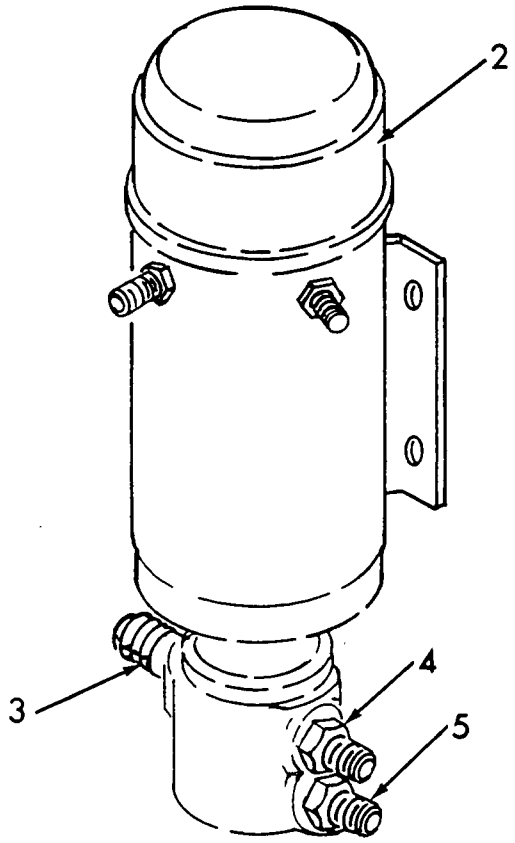


HYDRAULIC PUMP AND MOTOR ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23927	ASSEMBLY, HYDRAULIC PUMP AND MOTOR (See Sect. 4, Fig. 1 for NHA)	REF
2	81021	.HYDRAULIC, PUMP AND MOTOR	1
3	81233	.ADAPTER, TANK	1
4	80001-18	.CONNECTOR, MALE	3
5	80001-15	.CONNECTOR, MALE	3
6	27325	.TUBE, HYDRAULIC	1
7	60060-07	.NUT	2
8	80062-07	.SLEEVE	2
9	81235	.VALVE, CHECK	1
10	27326	.TUBE, HYDRAULIC	1
11	80060-06	.NUT	2
12	80062-06	.SLEEVE	2
13	81189	.VALVE, CHECK	1

- ITEM NOT ILLUSTRATED

HYDRAULIC PUMP AND MOTOR ASSEMBLY (30 EBII)

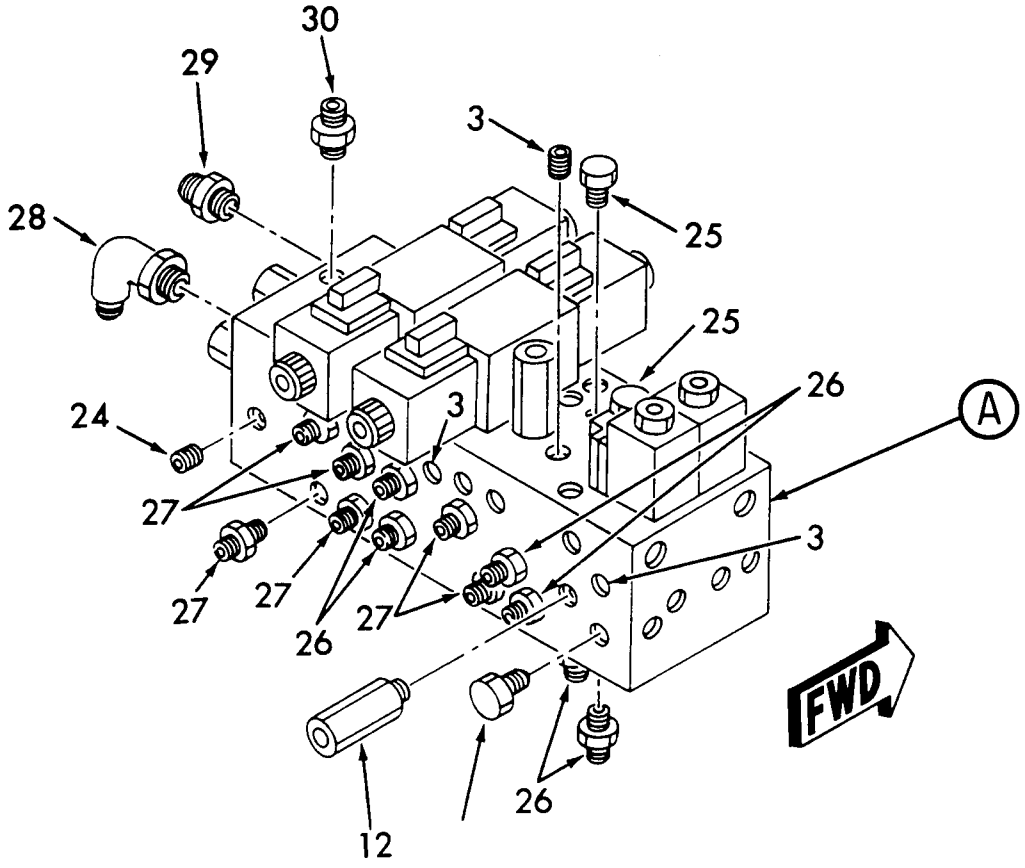


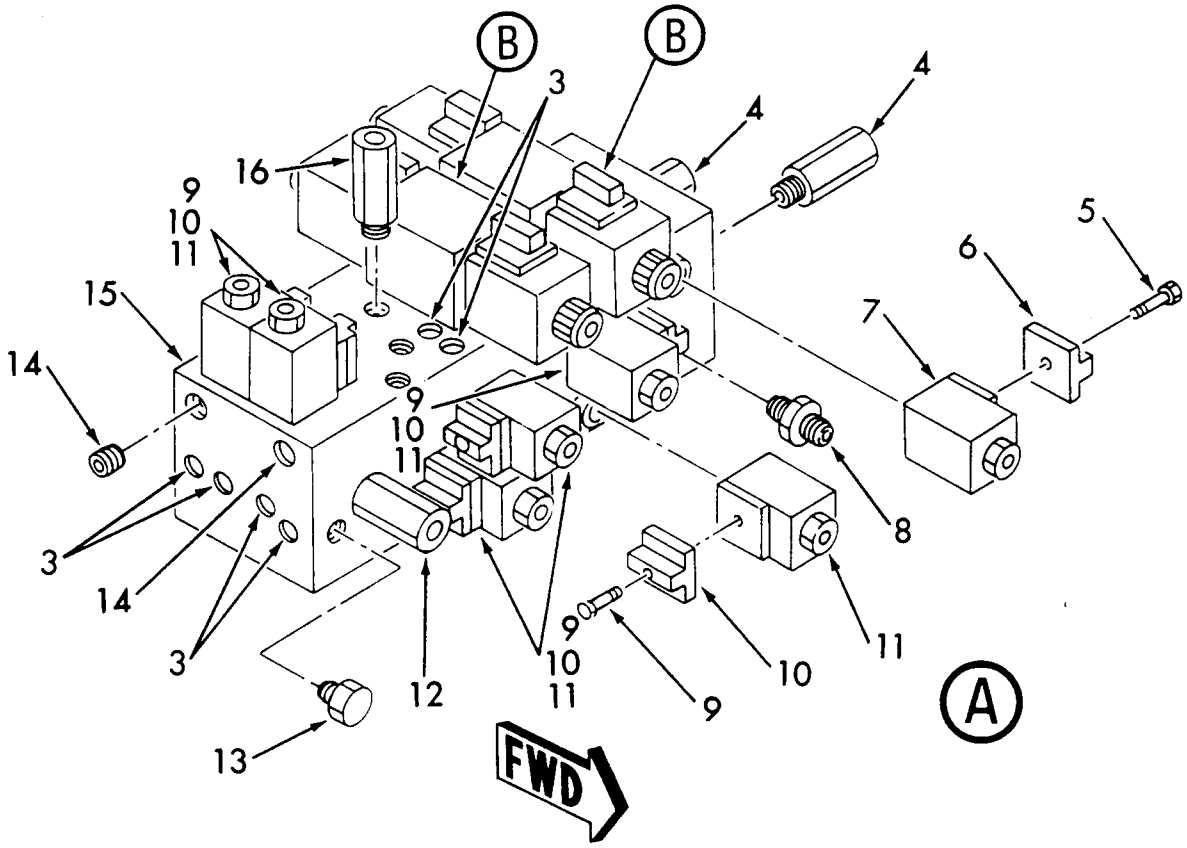
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23926	ASSEMBLY, HYDRAULIC PUMP AND MOTOR (See Sect. 4, Fig. 1 for NHA)	REF
2	81021	.HYDRAULIC, PUMP AND MOTOR	1
3	81233	.ADAPTER, TANK	1
4	80001-08	.CONNECTOR, MALE	1
5	80001-15	.CONNECTOR, MALE	1

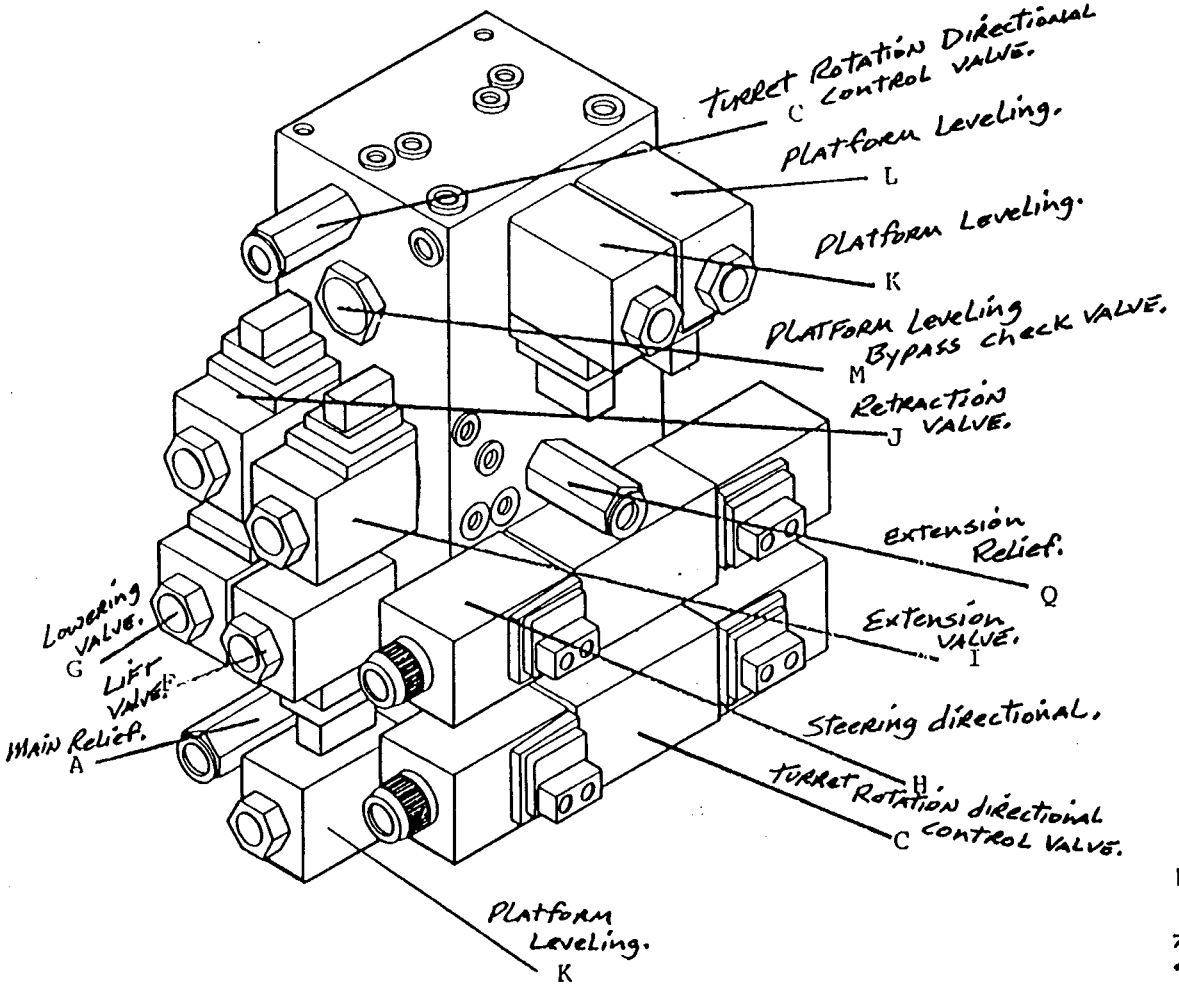
REV.

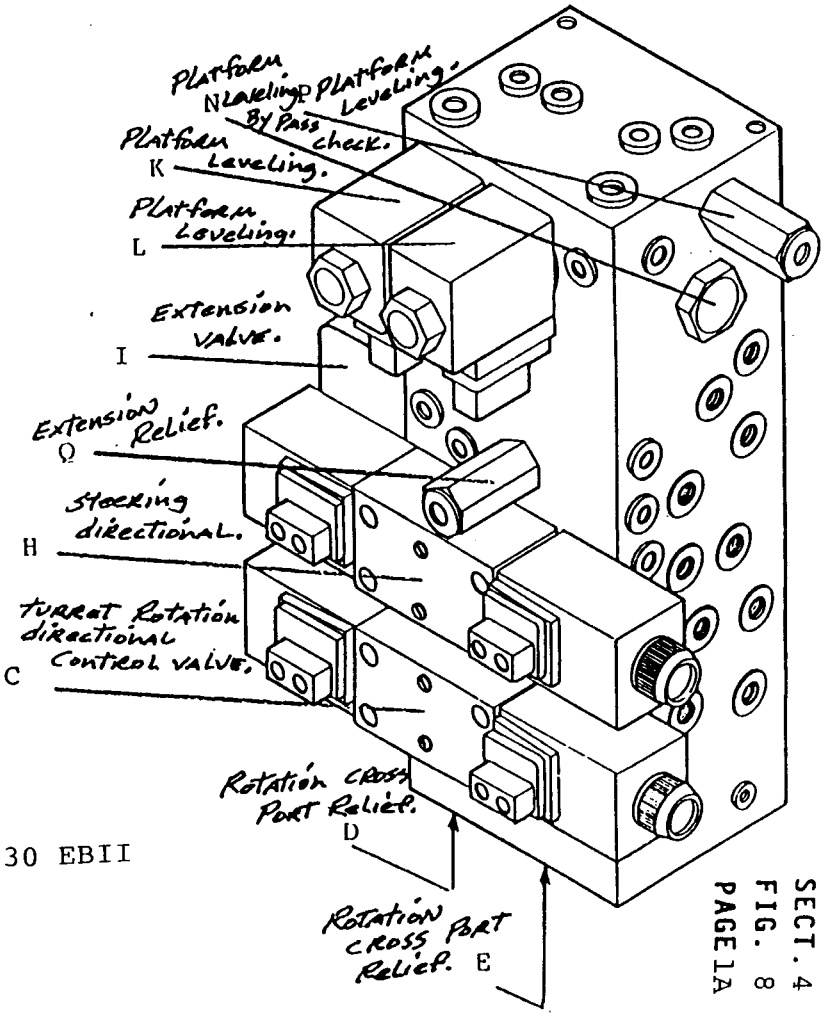
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CONTROL VALVE (30 EBII)









CONTROL VALVE 30 EBII

30 EBII VALVE PACKAGE

A. **MAIN RELIEF VALVE (66919)**
Establishes maximum relief pressure for boom lift/lower, boom retraction, platform rotation and steering.

ADJUSTMENT: Install pressure gauge at G1 bottom out function, remove plug from end of cartridge turn adjusting screw inside clockwise to increase or counter clockwise to decrease pressure.

B. **SYSTEM UNLOADING/DUMP VALVE (66920)**
Dump fluid back to tank when no function is being operated, normally open the valve closes when any function (other than drive) is operated.

C. **DIRECTIONAL CONTROL VALVE TURRET ROTATION (81169).**
Controls direction of turret rotation clockwise or counter clockwise.

D/E **ROTATION CROSS PORT RELIEF VALVE (66926)**
Limits maximum pressure that can be obtained in the rotation circuit, any pressure signal in excess of the relief valve setting will be exhausted "cross (the opposite) port".

F/G **LIFT/LOWERING VALVE (66923).**
Two way cartridge typed normally open on return closed to inlet/supply when actuated it will direct flow to the lift side (F) or to the lowering sie (G) of the lift cylinder.

H. **STEERING DIRECTIONAL CONTROL VALVE (81169).**
Supplies flow to rod or piston side of steer cylinder valve is normally closed to pressure inlet and return.

I/J **EXTENSION/RETRACTION VALVE (66923).**
Two way cartridge type normally open on return closed to inlet, when actuated will direct flow to the extension cylinder rod side (retract-J) or the piston side (extend-I).

K/L **PLATFORM LEVELING VALVE (66923)/.**
Two way cartridge type normally open on return closed to inlet, when actuated will direct flow to the rod end (L) or to the piston end (K) of the slave leveling cylinder.

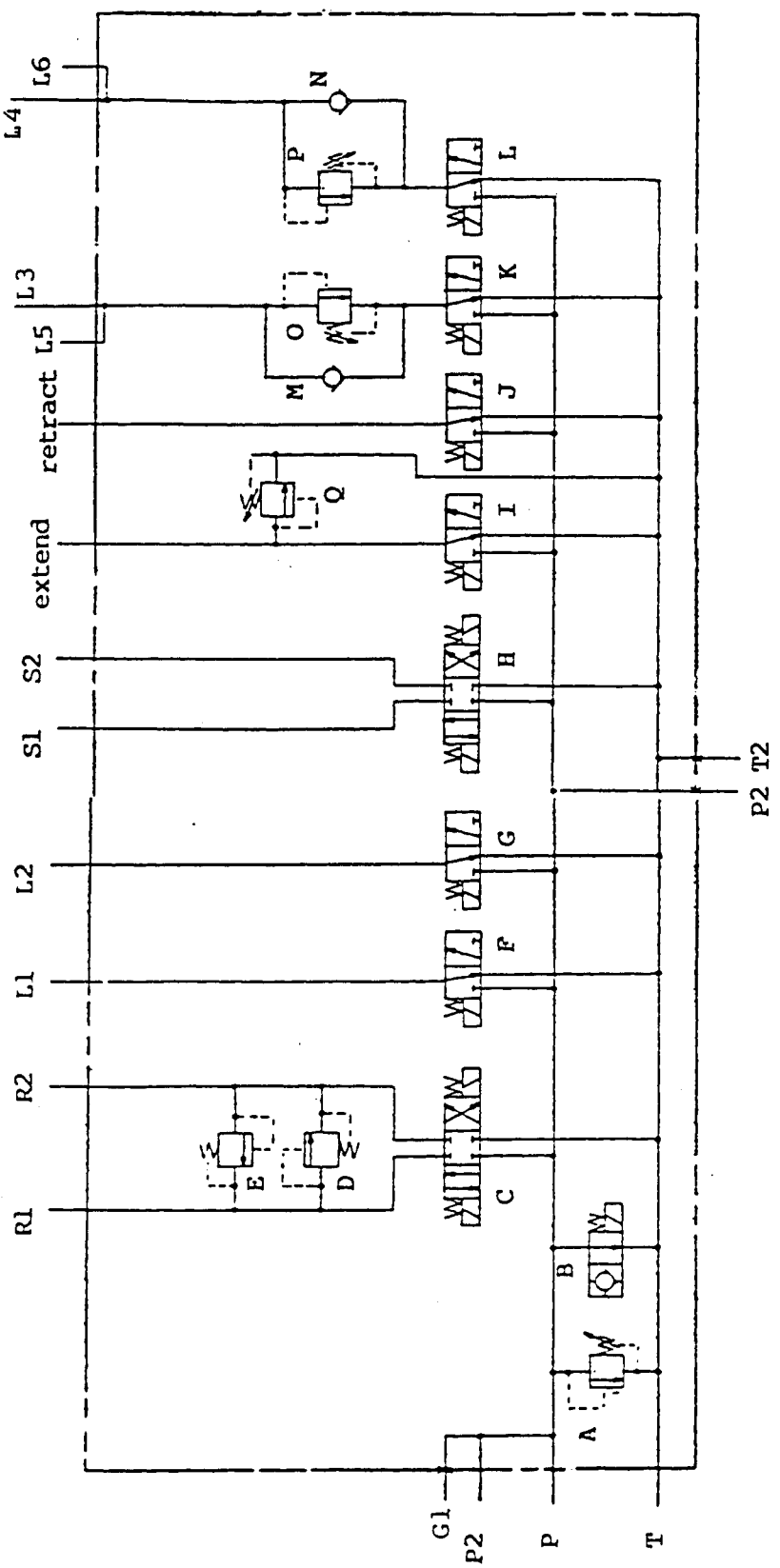
M/N **PLATFORM LEVELING BY-PASS CHECK VALVE (66674).**
Provides for one way flow (in) unrestricted past leveling cylinder relief valves O and P.

O/P **PLATFORM LEVELING RELIEF VALVE (66926).**

Establishes maximum relief pressure in the leveling circuit should pressure exceed the valve setting the relief will be "piloted" open and fluid exhausted back to tank across the platform leveling valves K or L.

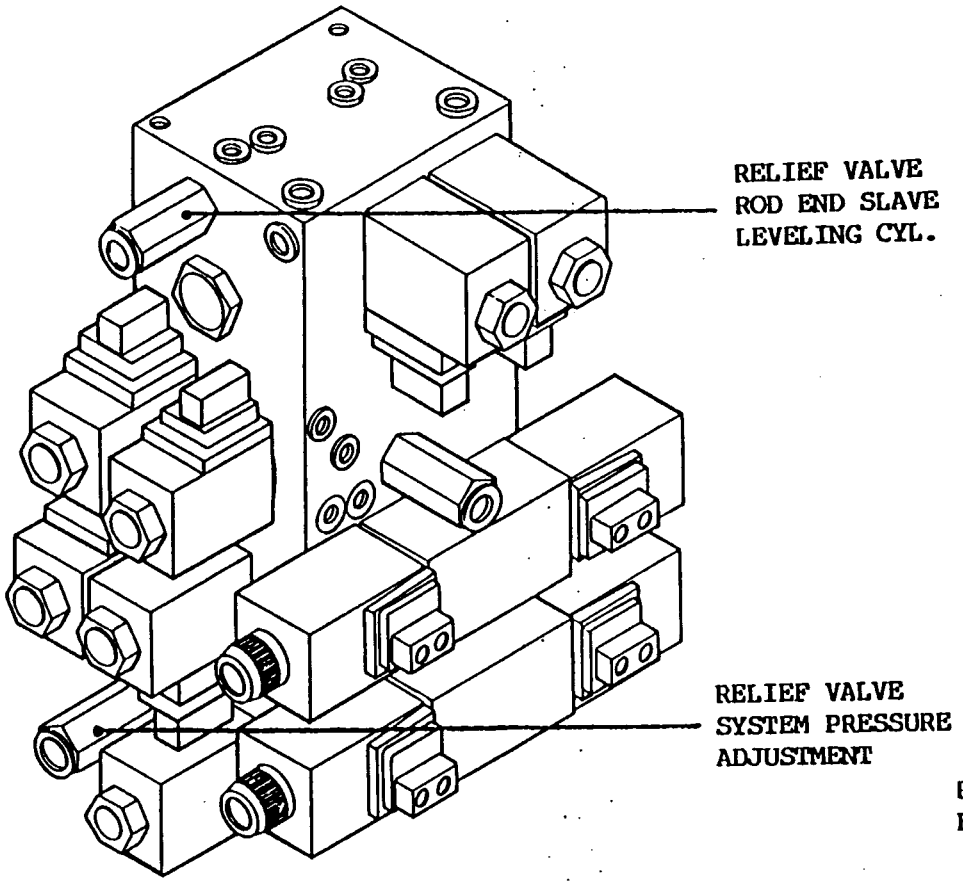
Q. **EXTENSION RELIEF VALVE (66922).**

Establishes maximum relief pressure for boom extension only, any increase in pressure over valve setting will be exhausted across relief to tank.



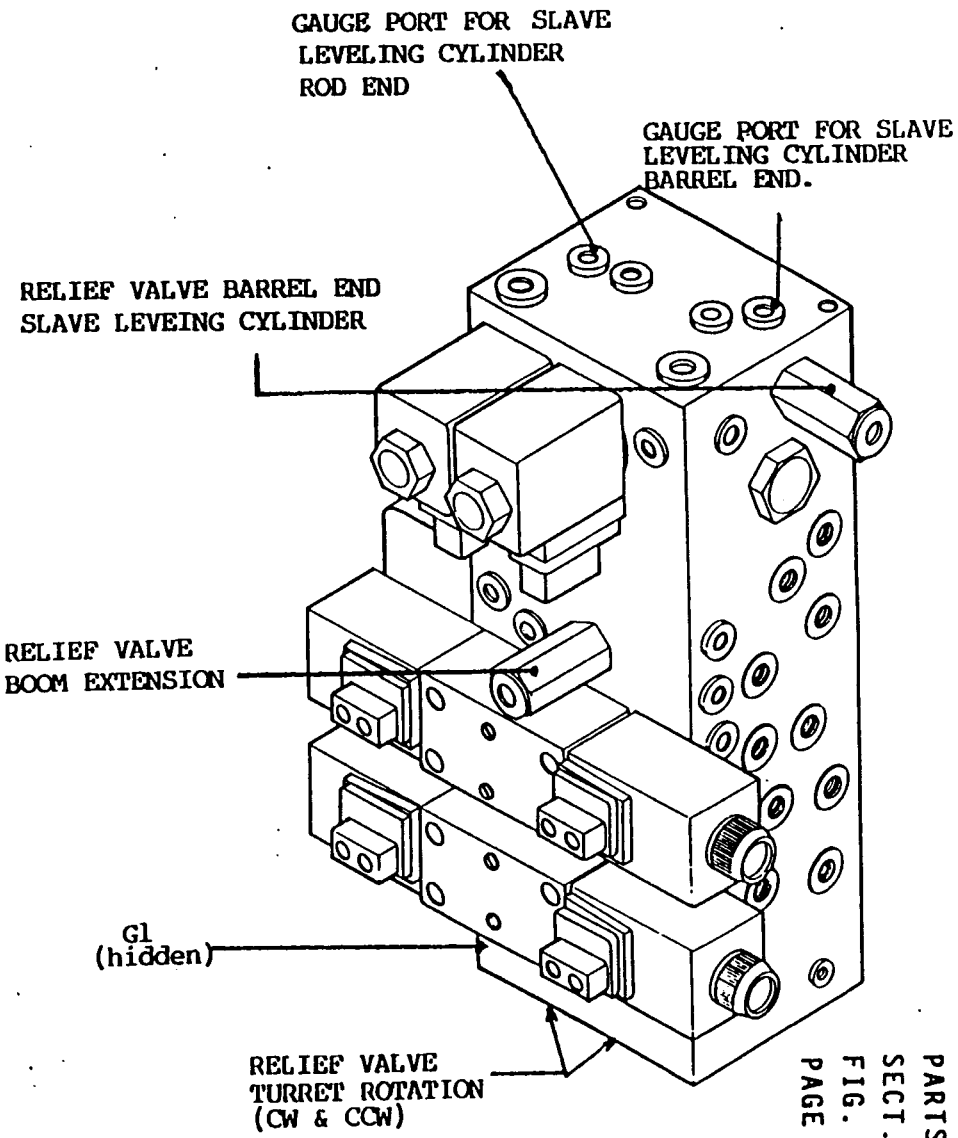
A.	MAIN RELIEF	66927	I. EXTEND VALVE	66923
B.	UNLOADING VALVE	66920	J. RETRACTION VALVE	66923
C.	ROTATION D.C.V.	81169	K. LEVELING	66923
D.	ROTATION RELIEF	66922	L. LEVELING	66923
E.	ROTATION RELIEF	66922	M. LEVELING CHECK	66674
F.	LIFT VALVE	66923	N. LEVELING CHECK	66674
G.	LOWER VALVE	66923	O-P LEVELING RELIEF	66922
H.	STEERING D.C.V.	81169	Q. EXTEND RELIEF	66922

30 EBII CONTROL VALVE
(P/N 81180)



L/H VIEW

R/H VIEW



CONTROL VALVE 30 EBII
P/N 81180

ADJUSTMENT PROCEDURE FOR 81180 CONTROL VALVE (30 EBII)

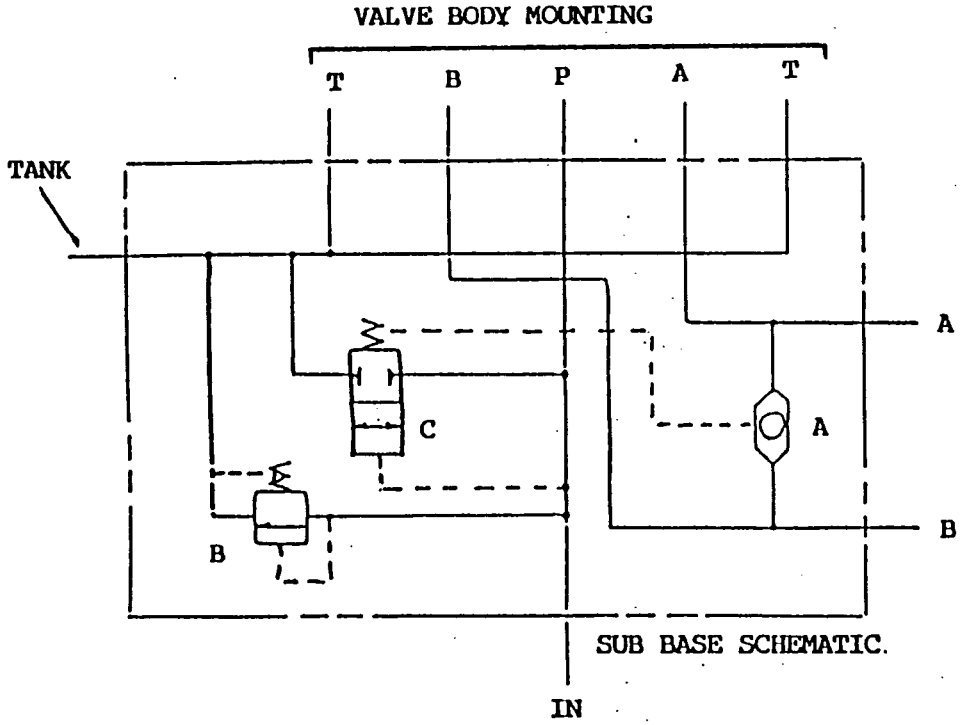
1. LOWER BOOM AND TILT PLATFORM FULL DOWN , RAISE BOOM TO OBSERVE ROD END PRESSURE OF SLAVE LEVELING CYLINDER. (GAUGE IN PORT REFERENCED)

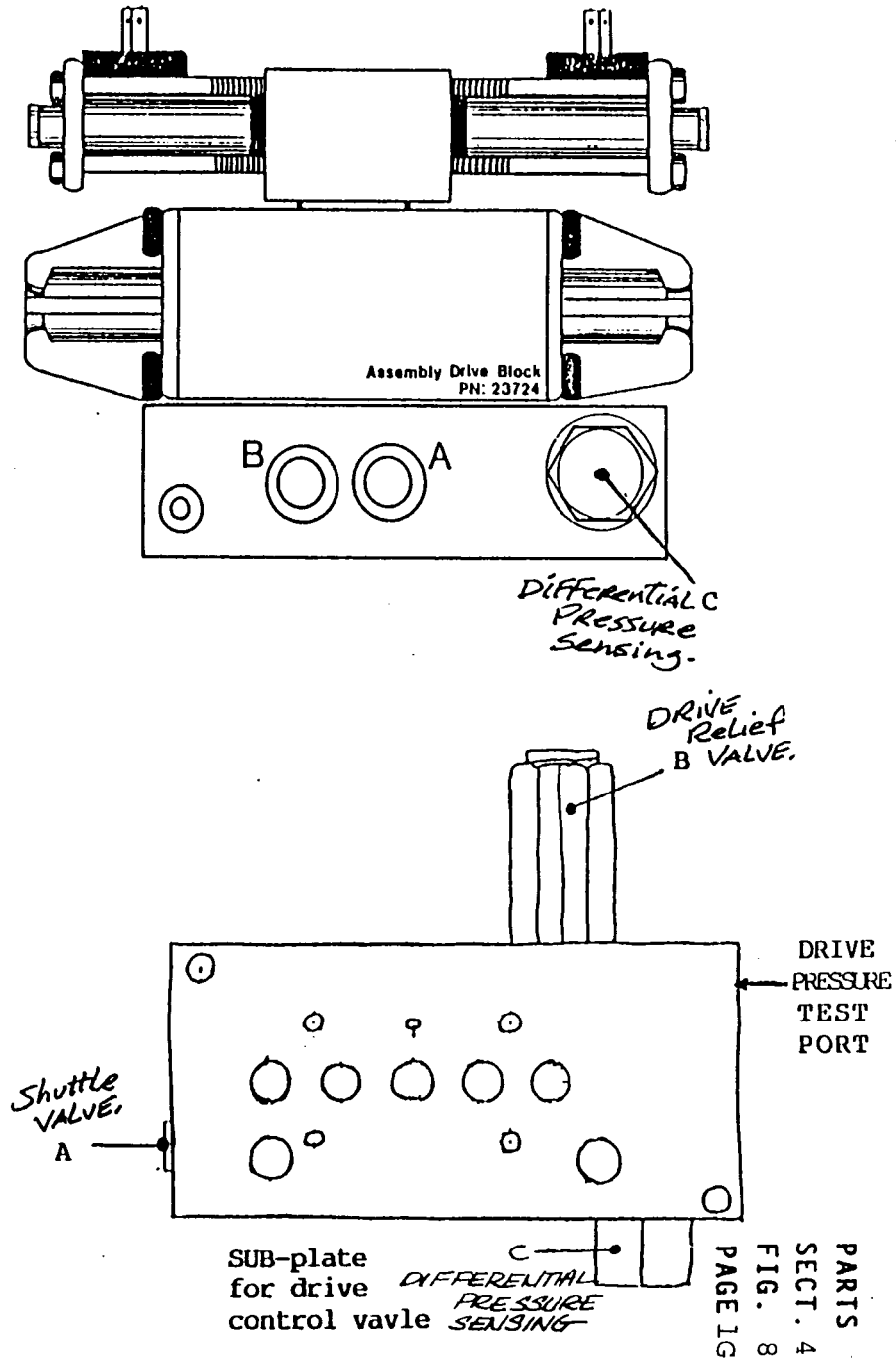
2. RAISE BOOM AND TILT PLATFORM FULL UP THEN LOWER BOOM TO OBSERVE BARREL END PRESSURE OF SLAVE LEVELING CYLINDER. (GAUGE IMPORT REFERENCED).

3. EXTEND BOOM OUT FULLY AND HOLD TO OBSERVE EXTENSION PRESSURE RELIEF SETTING (GAUGE IN G1).

4. CLOSE TURRET ROTATION NEEDLE VALVE ROTATE TURRET CW OR CCW ADJUST PRESSURE THEN REPEAT IN OTHER DIRECTION. (GAUGE IN G1) ADJUST TURRET RFOTATION TIMING AFTER PRESSURE ADJUSTMENT IS COMPLETED.

5. CLOSE BRAKE ADJUSTMENT VALVE, OPERATE DRIVE IN HIGH SPEED AND ADJUST PRESSURE IF NECESSARY. READJUST BRAKE UPON COMPLETION. CHECK DRIVE TIMING AT 100 FEET AFTER PRESSURE IS ADDED.





DRIVE VALVE
30 EBII

DRIVE CONTROL SUB-PLATE 30 EBII

A. SHUTTLE VALVE P/N 66924.

Senses the supply pressure to the drive motors across port A and B, this pressure signal is then directed against the spring chamber of the differential pressure valve (item C).

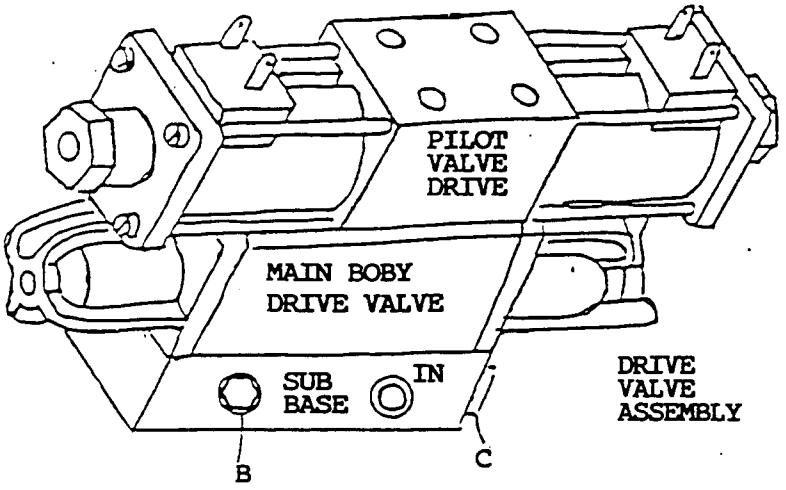
B. RELIEF VALVE: DRIVE SUB-PLATE P/N 66919.

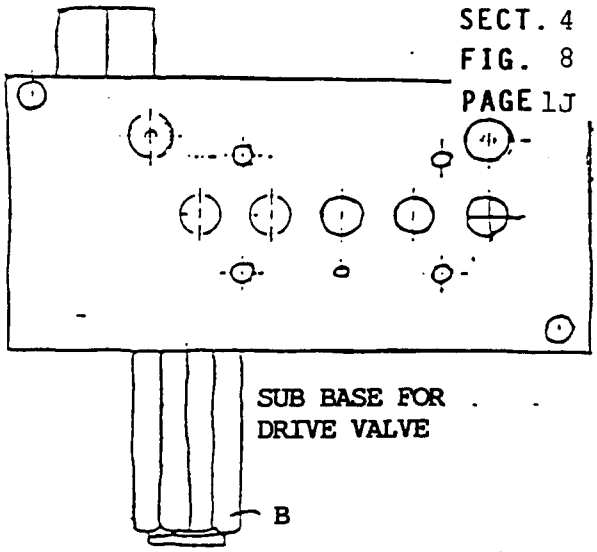
This valves establishes the maximum pressure that can be achieved in the drive circuit. The valve only affects circuit operation when outlet flow (ports A/B) is stalled out. Adjustment of this valve also regulates the drive torque, ie; gradeability.

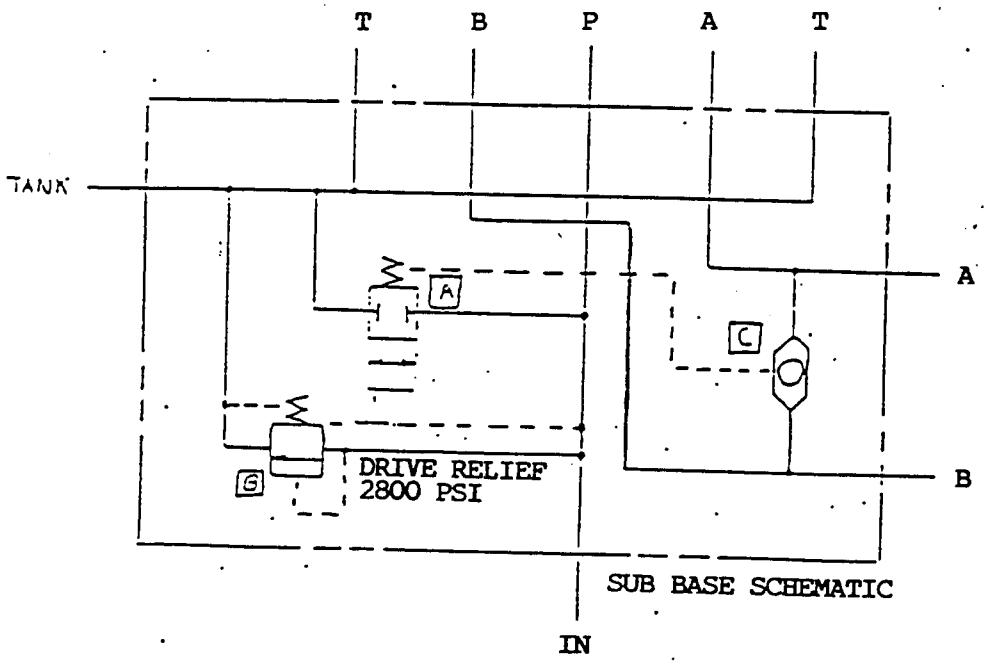
C. DIFFERENTIAL PRESSURE SENSING VALVE P/N 66689.

This valve regulates pump flow to the drive directional proportional control valve, by sensing the pressure differential across the sub-plate. This differential is sensed across the shuttle valve (item A) and is added to the spring pressure which opposes the inlet pressure thus modulating the valve and regulating flow. When drive is not operating, inlet pressure overrides the spring and allows pump flow to be exhausted back to tank without dumping across the relief valve (item B).

(30 EBII)





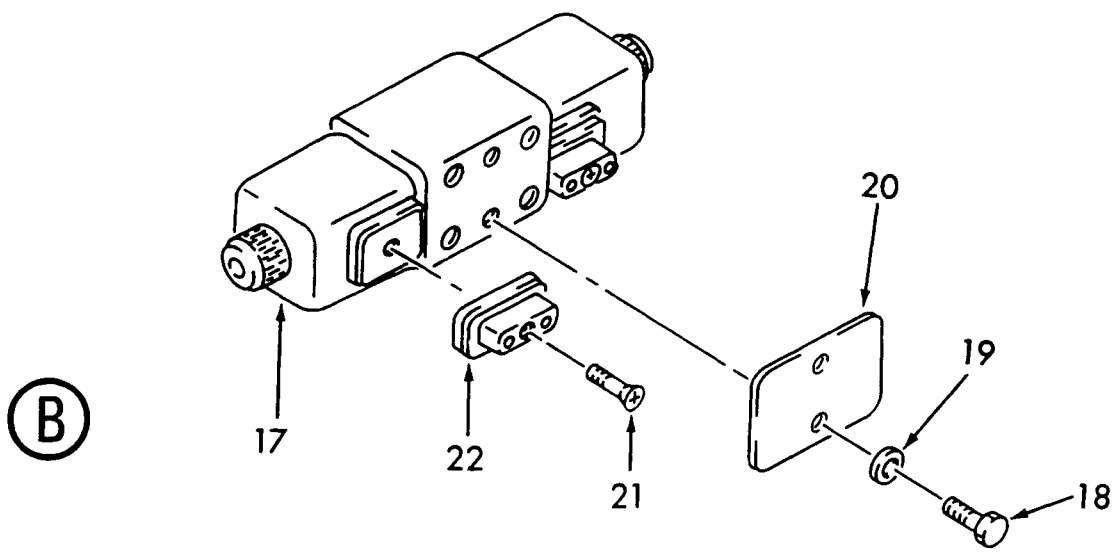


A – DIFFERENTIAL SENSING VALVE

B – DRIVE RELIEF VALVE

C – MINI SHUTTLE VALVE

CONTROL VALVE ASSEMBLY (30 EBII)



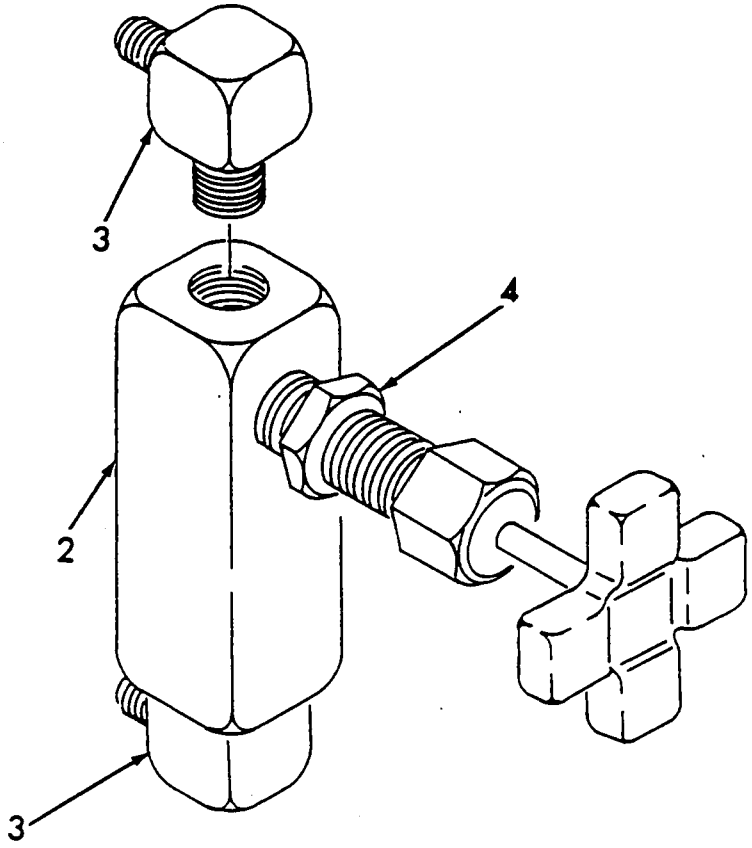
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23723	ASSEMBLY, CONTROL VALVE (See Sect. 4, Fig. 1 for NHA	REF
-2	81180	.VALVE, CONTROL	1
3		..PLUG, #4 SAE O-RING	22
4		..VALVE, RELIEF	2
5		..SCREW (attaching part)	1
6		..COVER, SPADE	1
7		..SOLENOID, N.O. POPPET	1
8		..VALVE, RELIEF	1
9		..SCREW (attaching part)	6
10		..COVER, SPADE	6

REV.

CONTROL VALVE ASSEMBLY (30 EBII)

11	66900-66923	..SOLENOID, 2 POSITION/3 WAY	6
12		..VALVE, CHECK	2
13		..VALVE, RELIEF	1
14		..PLUG, #6 SAE O-RING	2
15		..BODY	1
16		..VALVE, RELIEF	1
17	67154	..VALVE, DOI	2
18		..SCREW, CAP (attaching part)	4
19		..WASHER, LOCK (attaching part)	4
20		..PLATE, COVER	2
21		..SCREW (attaching part)	4
22		..COVER, SPADE	4
23		..VALVE, RELIEF	1
24	80050-03	..PLUG, #2 SAE O-RING	5
25	80004-05	.PLUG, STRAIGHT THREAD	2
26	80004-08	.CONNECTOR, STRAIGHT THREAD	6
27	80012-18	.CONNECTOR, STRAIGHT THREAD	6
28	80004-11	.ELBOW, STRAIGHT THREAD	1
29	80004-12	.CONNECTOR, STRAIGHT THREAD	1
30		.CONNECTOR, STRAIGHT THREAD	6

EMERGENCY DESCENT VALVE ASSEMBLY

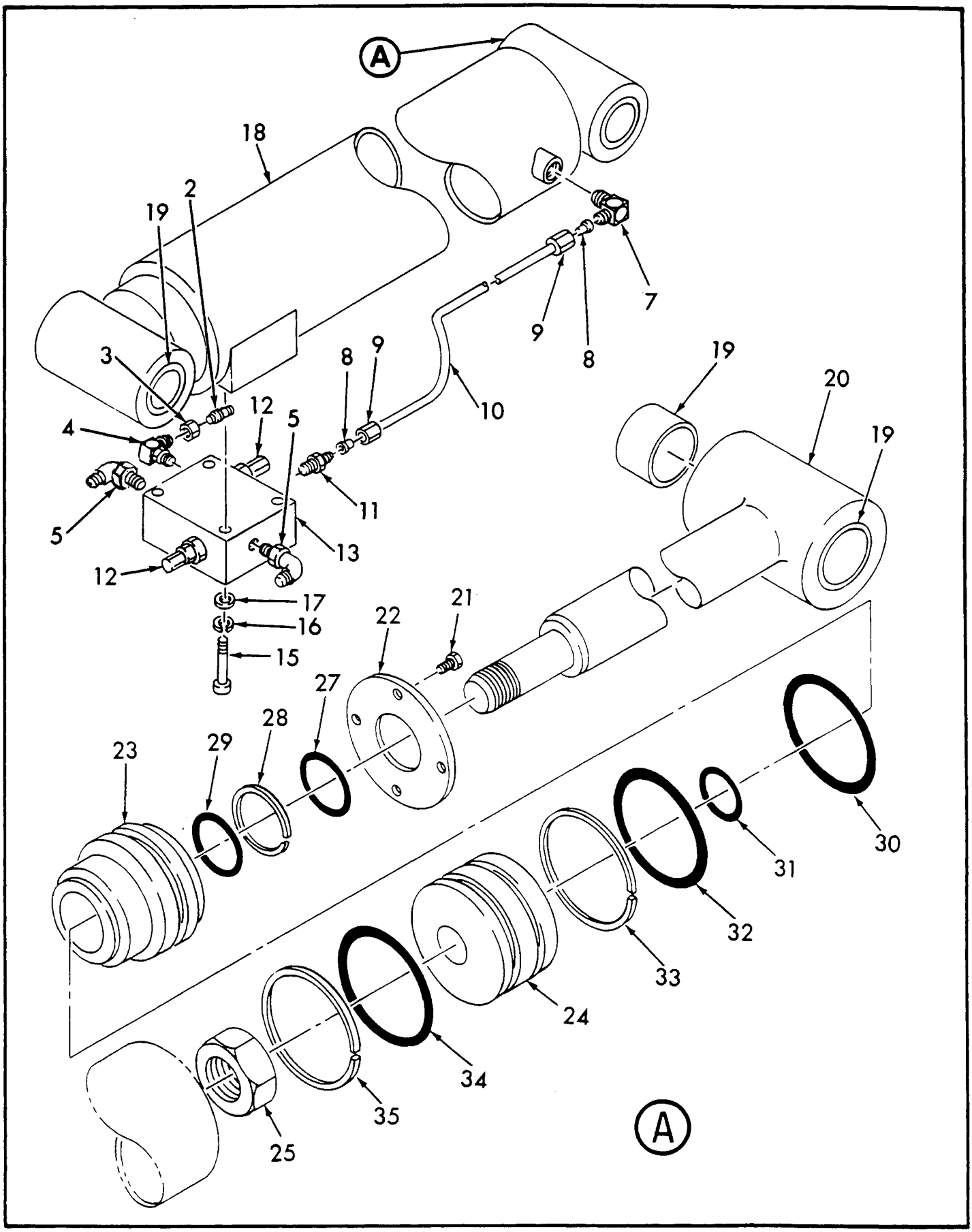


ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	22189	ASSEMBLY, EMERGENCY DESCENT VALVE (See Sect. 4, Fig. 1 for NHA)	REF
2	20436	.VALVE, NEEDLE	1
3	51107	.ELBOW, MALE	2
4	60911	.NUT, JAM	1

REV.

- ITEM NOT ILLUSTRATED

LIFT CYLINDER ASSEMBLY (30 EBII)



REV.

LIFT CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23932	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1 for NHA)	REF
2	20348	.ORIFICE, BLEED DOWN	1
3	80060-05	.NUT	1
4	50900	.ELBOW	1
5	80012-09	.ELBOW	2
-6	23790	.SUB-ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 11 for Details)	1
7	80012-09	..ELBOW	1
8	80062-05	..SLEEVE	2
9	80060-05	..NUT	2
10	26361	..TUBING, HYDRAULIC	1
11	80004-09	..CONTRACTOR	1
12	81006	..CARTRIDGE, OVERCENTER	2
13	21445	..VALVE BLOCK, BOOM CYLINDER	1
-14	65506	..O-RING	1
15	61918	..SCREW, CAP	4
16	63302	..WASHER, LOCK	4
17	63402	..WASHER, FLAT	4
18	23789	..CYLINDER, LIFT	1
19	67121	..BUSHING, D.U.	4
20		..ROD	1
21		..SCREW, CAP	1
22		..CAP	1
23		..HEAD	1
24		..PISTON	1
25		..NUT, LOCK	1
-26	66895	..KIT, SEAL	1

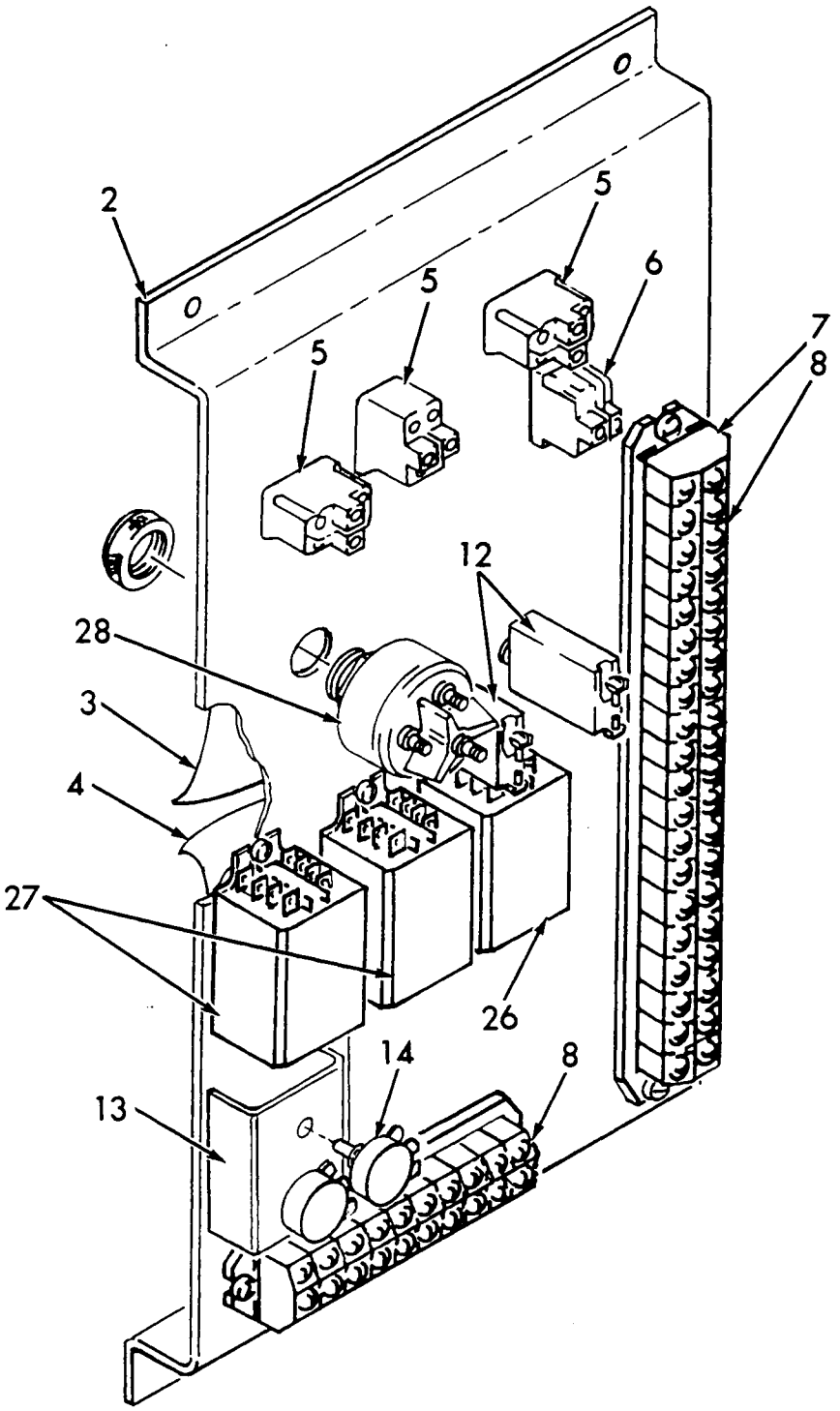
- ITEM NOT ILLUSTRATED

LIFT CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
27		...O-RING	1
28		...RING, WEAR	1
29		...O-RING	1
30		...O-RING	1
31		...O-RING	1
32		...O-RING	1
33		...RING, WEAR	1
34		...O-RING	1
35		...RING, WEAR	

- ITEM NOT ILLUSTRATED

LOWER CONTROL PANEL ASSEMBLY (30 EBII)



REV.

LOWER CONTROL PANEL ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23903	ASSEMBLY, LOWER CONTROL PANEL (See Sect. 4, Fig. 1 for NHA)	REF
2	23902	.PANEL, LOWER CONTROL	1
3	20460	.DECAL, GROUND CONTROL CONSOLE	1
4	20860	.DECAL, GENERAL CHECKOUT & OPERATION	1
5	20481	.SWITCH, TOGGLE	3
6	20482	.SWITCH, TOGGLE	1
7	117-A	.TERMINAL, END	2
8	4027	.BLOCK, TERMINAL	30
-9	62612	.SCREW, MACHINE	11
-10	63312	.WASHER, LOCK	6
-11	256	.TIE, CABLE	20
12	20562	.BREAKER, CIRUIT (20 AMP)	2
13	23803	.BRACKET, POTENTIOMETER	1
14	70368	.POTENTIOMETER	2
-15	60396	.SCREW, CAP (attaching part)	2
-16	63313	.WASHER, LOCK (attaching part)	2
-17	70263	.RESISTOR	2
-18	4045	.DIODE	4
-19	70162	.CONNECTOR, BUTT	1
-20	70068	.CONNECTOR, BUTT	2
-21	2990	.WIRE, WHITE	16 Ft
-22	70008	.WIRE, YELLOW/GREEN	3 Ft
-23	2991	.WIRE, WHITE	3 Ft
-24	16325	.CONNECTOR, TERM (attaching part)	16
-25	117-C	.RING, CONNECTOR	33

- ITEM NOT ILLUSTRATED

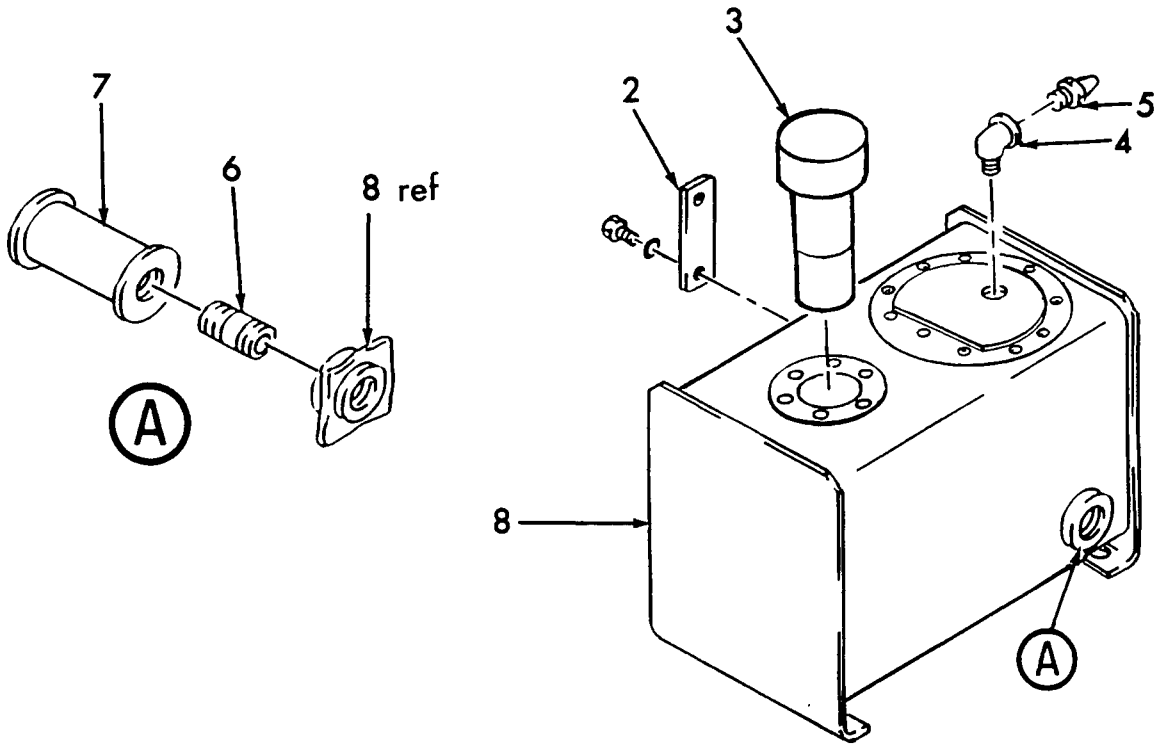
LOWER CONTROL PANEL ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
26	70403	.RELAY	1
27	70371	.RELAY	2
28	2717	.SWITCH, IGNITION	1

REV.

- ITEM NOT ILLUSTRATED

HYDRAULIC TANK SUB-ASSEMBLY (30EB11)

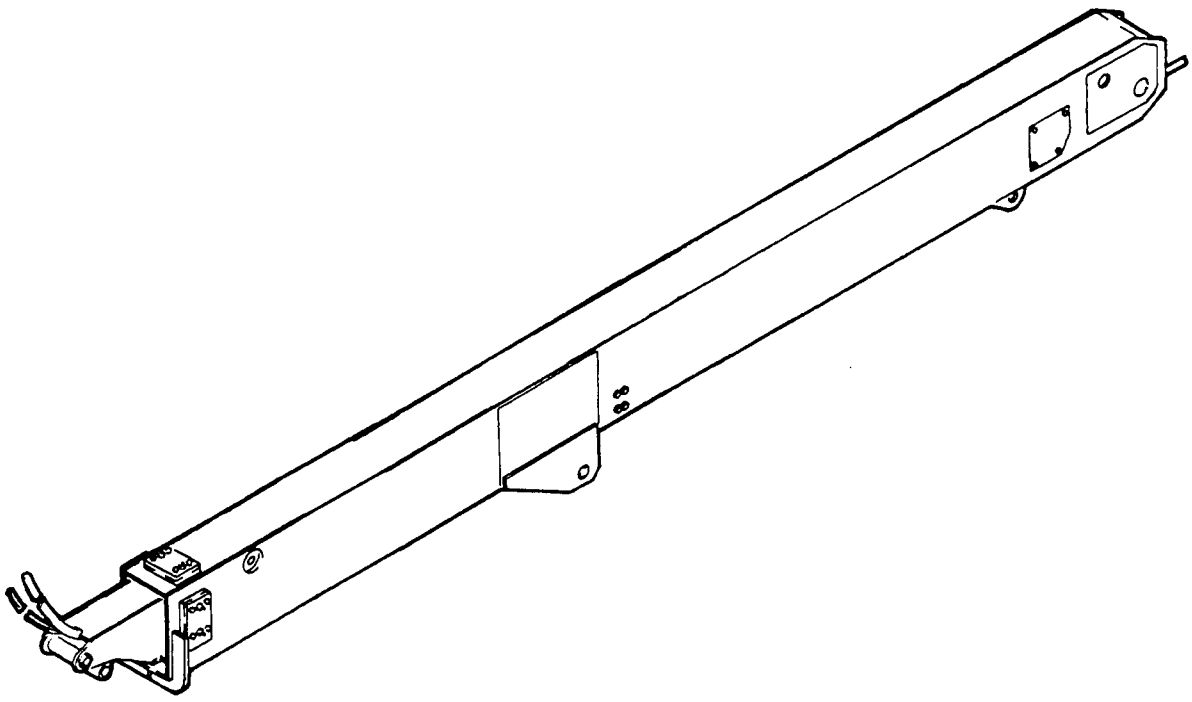


ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23915	SUB-ASSEMBLY, HYDRAULIC TANK (See Sect. 4, Fig. 3 for NHA)	REF
2	81184	..GAUGE, FLUID LEVEL	1
3	81185	..BREATHER, FILLER	1
4	80021-03	..ELBOW, STREET	1
5	65213	..BREATHER	1
6	16553	..NIPPLE	1
7	81183	..FILTER, SUCTION	1
8	23924	..TANK, HYDRAULIC	1

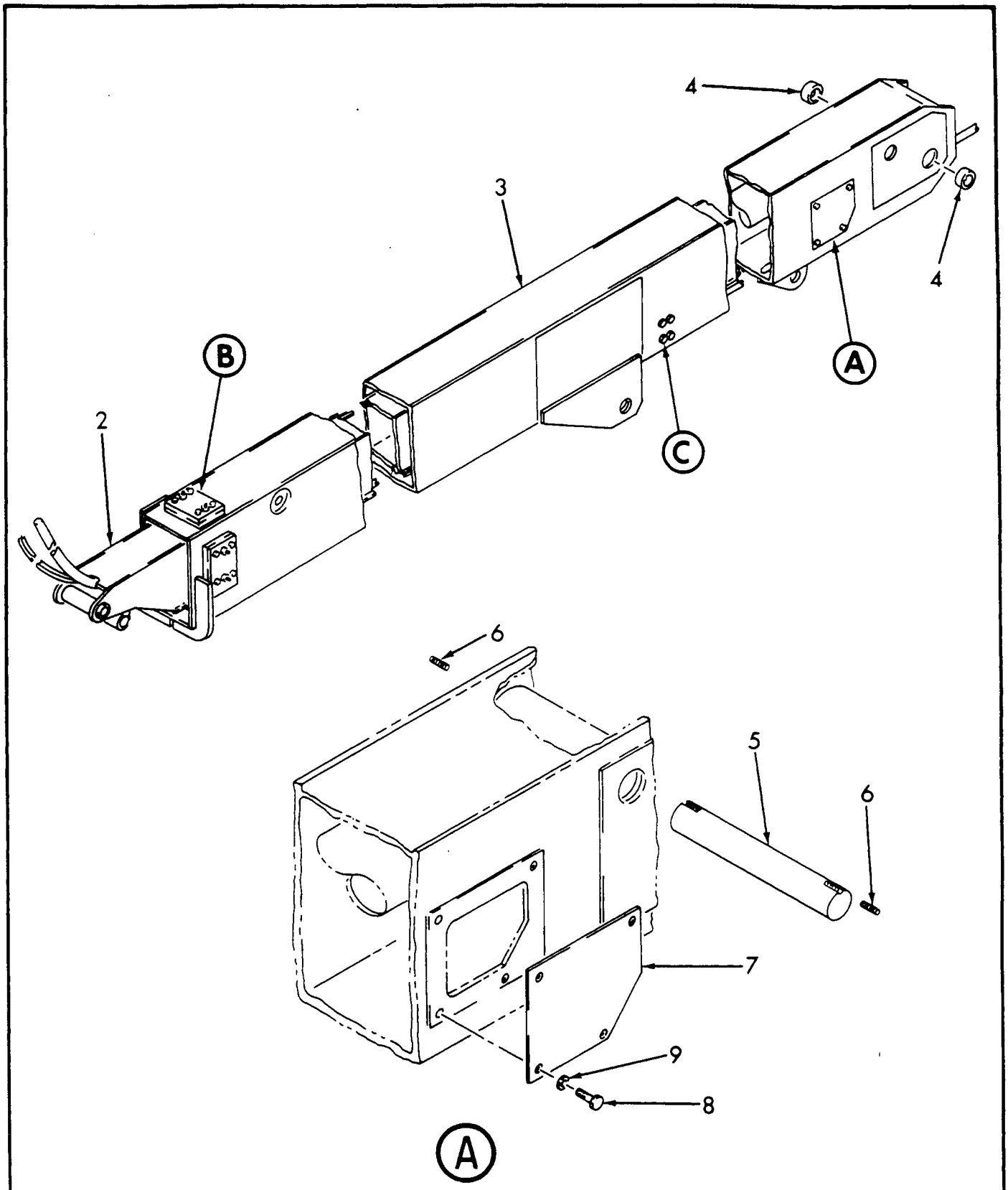
REV.

THIS SECTION 5 CONTAINS THE FOLLOWING FIGURES:

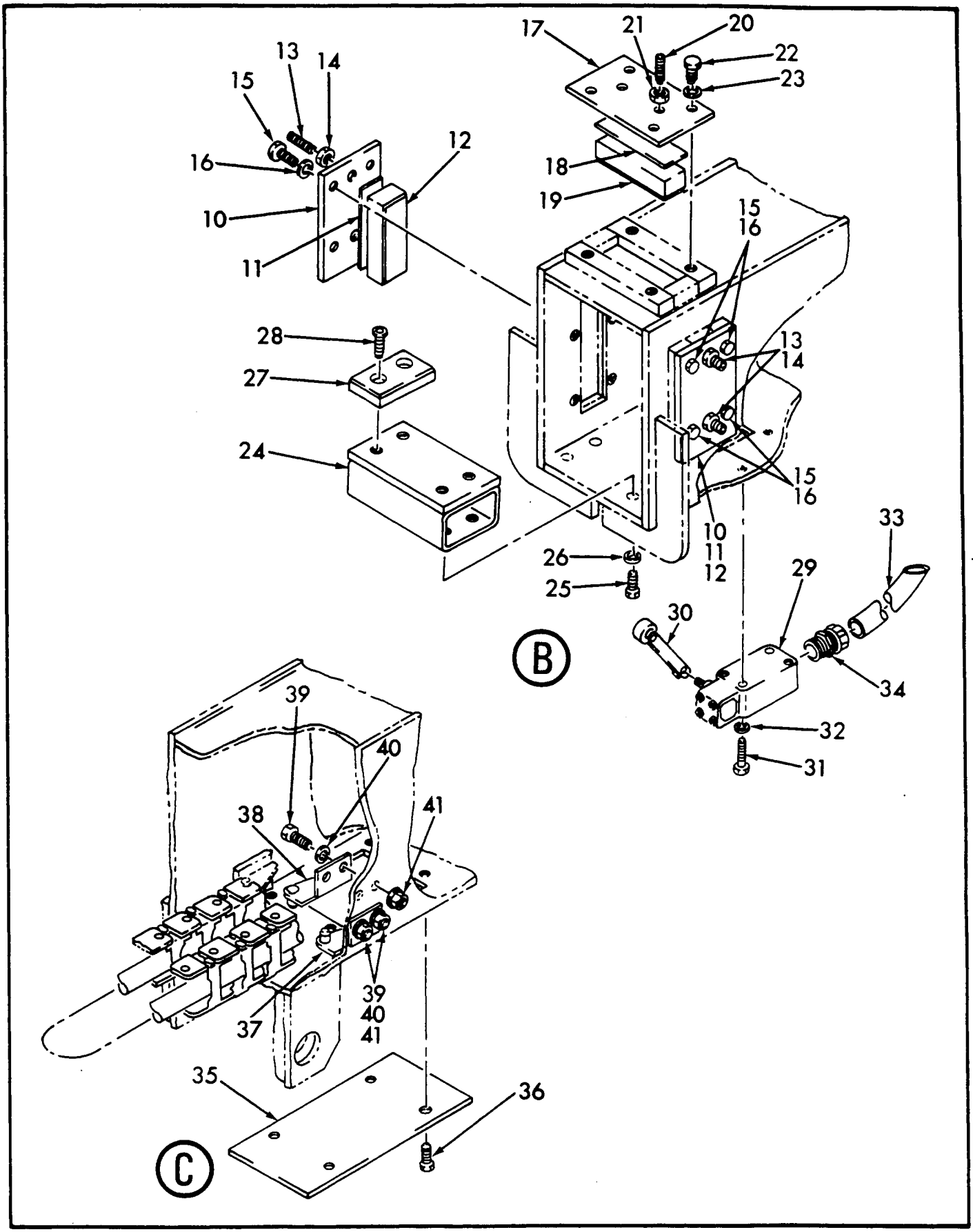
FIG. NO.	TITLE
1	FINAL BOOM ASSEMBLY
2	INNER BOOM ASSEMBLY
3	SLAVE LEVELING CYLINDER ASSEMBLY
4	EXTENSION CYLINDER ASSEMBLY



FINAL BOOM ASSEMBLY (30 EBII)



FINAL BOOM ASSEMBLY (30 EBII)



REV.

FINAL BOOM ASSEMBLY (30 EBII)

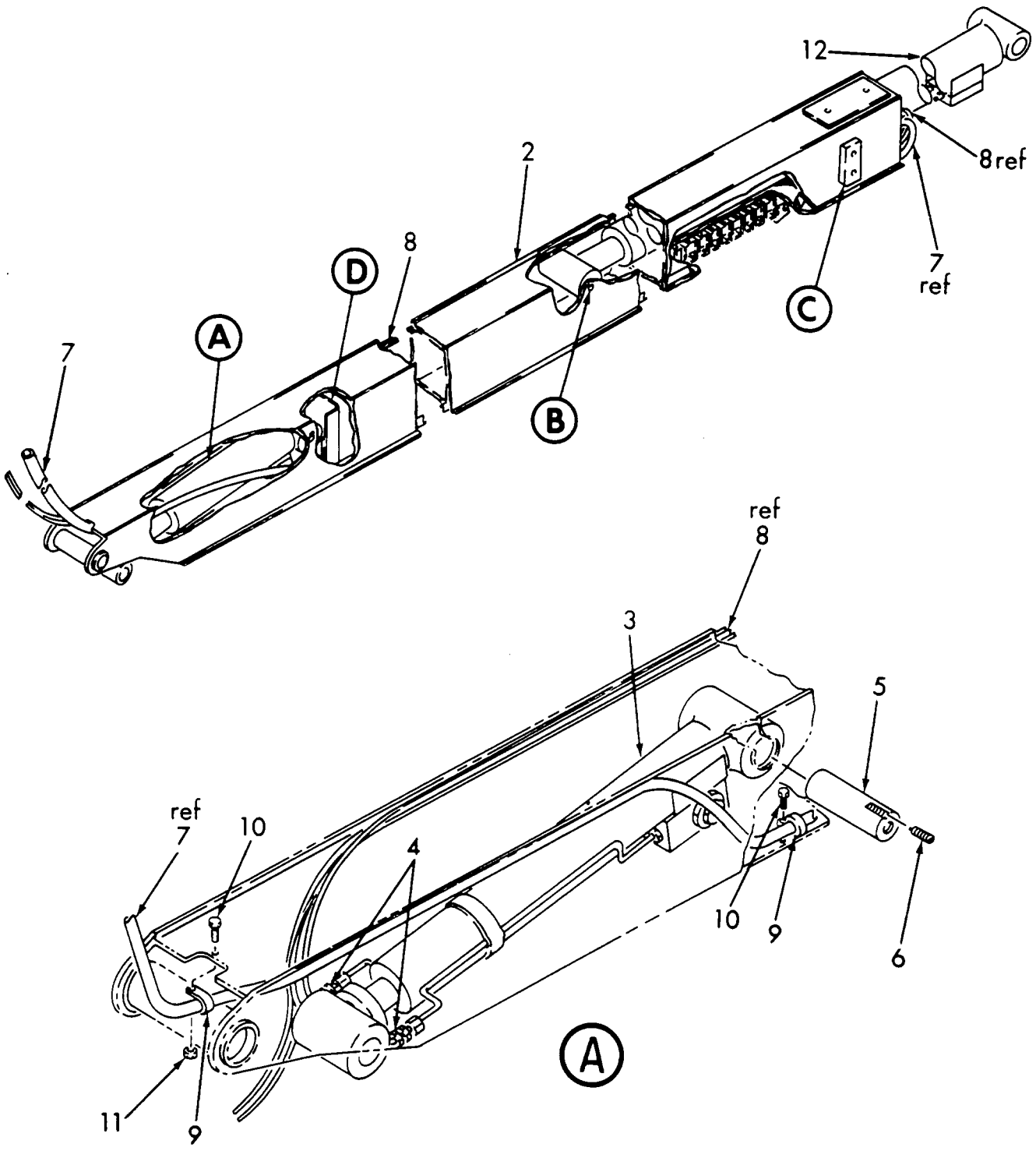
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23660	ASSEMBLY, FINAL BOOM (See Sect. 2, Fig. 1 for NHA)	REF
2	23661	.ASSEMBLY,INNER BOOM (See Sect. 5, Fig. 2 for Details)	1
3	23652	.MACHINING, OUTER BOOM	1
4	21782	..BUSHING	2
5	23163	.PIN, EXTENSION CYLINDER	1
6	62203	.SCREW, SET (attaching part)	2
7	23515	.COVER, DOUBLER PLATE	1
8	60324	.SCREW, CAP (attaching part)	4
9	63302	.WASHER, LOCK (attaching part)	4
10	23158	.COVER, PRESSURE PAD	2
11	22372	.PLATE, PAD PRESSURE	2
12	23160	.PAD, WEAR	2
13	62204	.SCREW, SET (attaching part)	4
14	61101	.NUT, JAM (attaching part)	4
15	60338	.SCREW, CAP (attaching part)	8
16	63302	.WASHER, LOCK (attaching part)	8
17	23159	.COVER, PRESSURE PAD	1
18	23164	.PLATE, PAD PRESSURE	1
19	23165	.PAD, WEAR	1
20	62204	.SCREW, SET (attaching part)	2
21	61101	.NUT, JAM (attaching part)	2
22	60338	.SCREW, CAP (attaching part)	4
23	63302	.WASHER, LOCK (attaching part)	4
24	23161	.BRACKET, BOOM END	1
25	60325	.SCREW, CAP (attaching part)	4
26	63303	.WASHER, LOCK (attaching part)	4

FINAL BOOM ASSEMBLY (30 EBII)

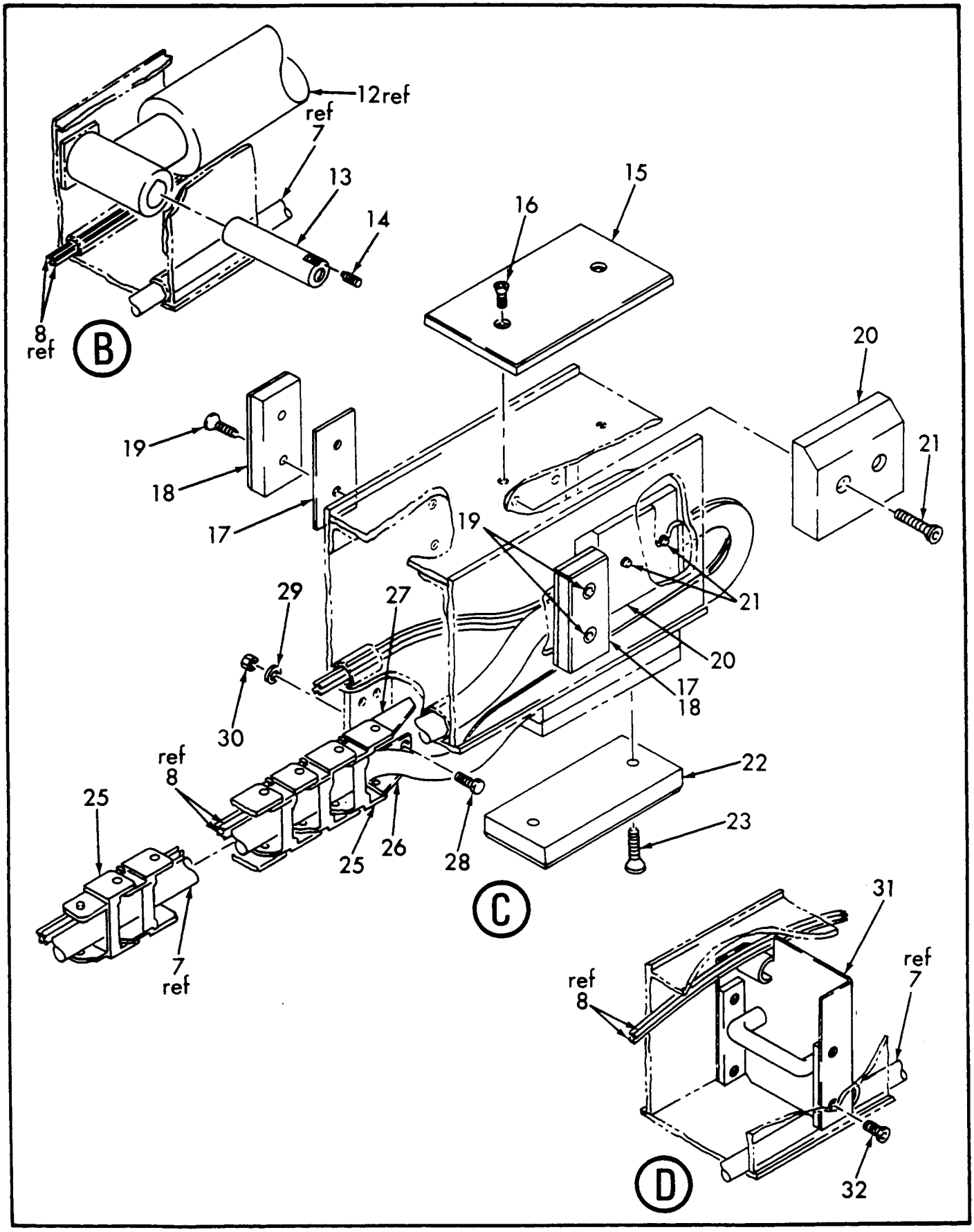
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
27	23162	.PAD, WEAR	2
28	61805	.SCREW, CAP (attaching part)	4
29	70107	.SWITCH, LIMIT	1
30	70148	.ARM, LEVER	1
31	62615	.SCREW, MACHINE (attaching part)	2
32	63313	.WASHER, LOCK (attaching part)	2
33	2768-270	.CABLE, ELECTRICAL	1
34	2806	.RELIEF, STRAIN	1
35	22373	.COVER, ACCESS	1
36	60322	.SCREW, CAP (attaching part)	4
37	22585	.BRACKET, MOUNTING STATIONARY (RH)	1
38	22586	.BRACKET, MOUNTING STATIONARY (LH)	1
39	60501	.SCREW, CAP (attaching part)	4
40	63401	.WASHER, FLAT (attaching part)	4
41	61312	.NUT, LOCK (attaching part)	4

- ITEM NOT ILLUSTRATED

INNER BOOM ASSEMBLY (30 EBII)



INNER BOOM ASSEMBLY (30 EBII)



INNER BOOM ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23661	ASSEMBLY, INNER BOOM (See Sect. 5, Fig. 1 for NHA)	REF
2	23092	.MACHINING, INNER BOOM	1
3	23662	.ASSEMBLY, SLAVE LEVELING CYLINDER (See Sect. 5, Fig. 3 for Details)	1
4	65133	.FITTING, SWIVEL HOSE	2
5	23084	.PIN, SLAVE LEVELING CYLINDER	1
6	62203	.SCREW, SET (attaching part)	1
7	20802-744	.CABLE, ELECTRICAL	1
8	2568-732	.HOSE, HYDRAULIC	4
9	16268	.CLAMP, RUBBER	2
10	60309	.SCREW, CAP (attaching part)	2
11	60711	.NUT, HEX (attaching part)	1
12	23680	.ASSEMBLY, EXTENSION CYLINDER (See Sect. 5, Fig. 4 for Details)	1
13	23156	.PIN, EXTENSION CYLINDER	1
14	62203	.SCREW, SET (attaching part)	1
15	23157	.PAD, WEAR	1
16	61822	.SCREW, CAP (attaching part)	2
17	21278	.SHIM, WEAR PAD	2
18	22567	.PAD, WEAR	2
19	61801	.SCREW, CAP (attaching part)	4
20	23677	.PAD, WEAR	2
21	61802	.SCREW, CAP (attaching part)	4
22	23150	.PAD, WEAR	1
23	61805	.SCREW, CAP (attaching part)	2
-24	23703	.ASSEMBLY, MARK TRACK	1
25	21933	..TRACK, MARK	42

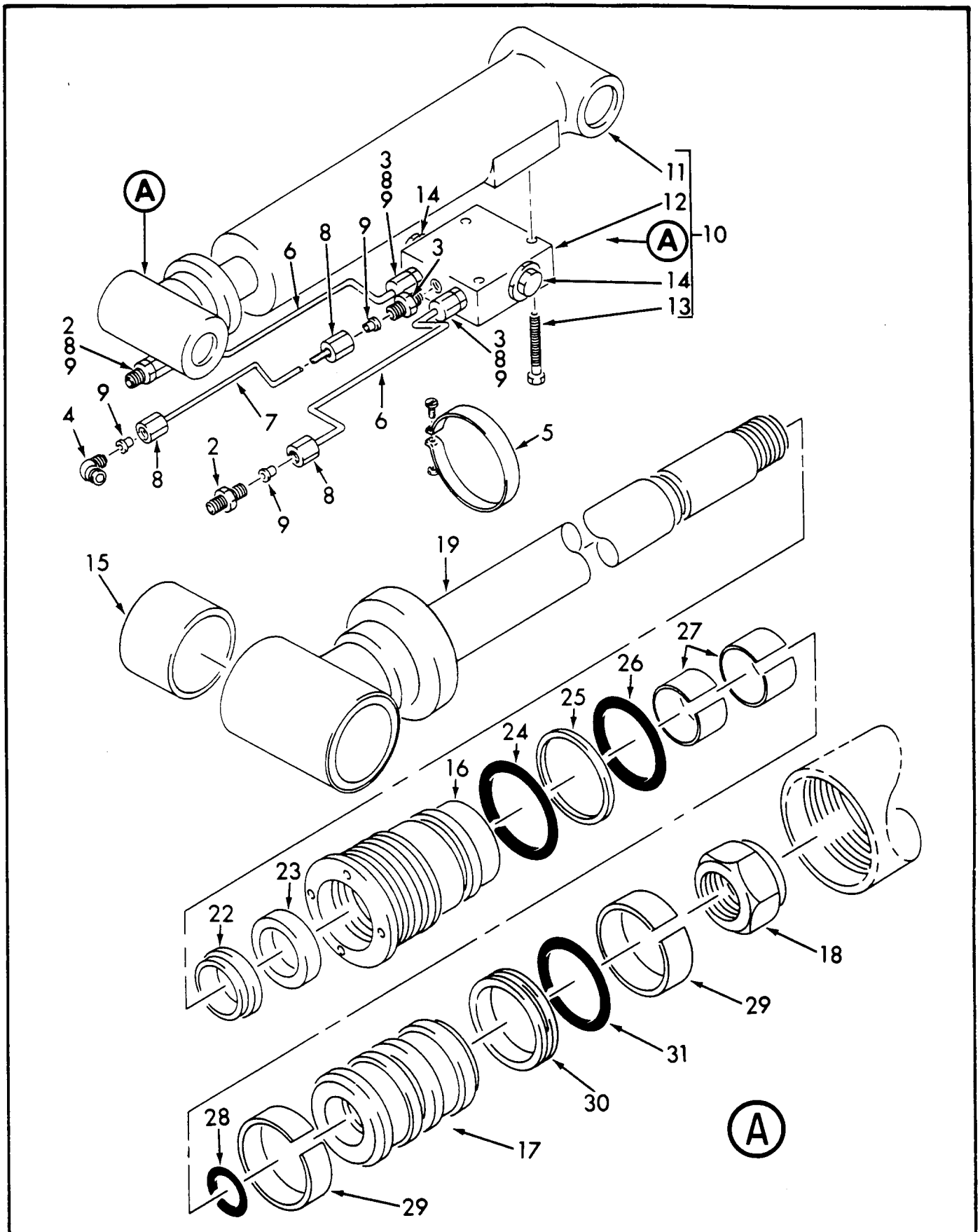
- ITEM NOT ILLUSTRATED

INNER BOOM ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
26	22587	.BRACKET, MOUNTING MOVABLE (R.H.)	1
27	22588	.BRACKET, MOUNTING MOVABLE (L.H.)	1
28	60501	.SCREW, CAP (attaching part)	4
29	63401	.WASHER, FLAT (attaching part)	4
30	61312	.NUT, LOCK (attaching part)	4
31	23166	.WELDMENT, BULKHEAD PLATE	1
32	61822	.SCREW, CAP (attaching part)	4

- ITEM NOT ILLUSTRATED

SLAVE LEVELING CYLINDER ASSEMBLY (30 EBII)



SLAVE LEVELING CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23662	ASSEMBLY, SLAVE LEVELING CYLINDER (See Sect. 5, Fig. 2 for NHA)	REF
2	80042-03	.UNION	2
3	80004-03	.CONNECTOR, STRAIGHT THREAD	3
4	80012-03	.ELBOW, STRAIGHT THREAD	1
5	16206	.STRAP	1
6	26646	.TUBE, HYDRAULIC	2
7	26647	.TUBE, HYDRAULIC	1
8	80060-03	.NUT	6
9	80062-03	.SLEEVE	6
10	23655	.SUB-ASSEMBLY, SLAVE LEVELING CYLINDER	1
11	23654	..CYLINDER, SLAVE LEVELING	1
12	21447	..BLOCK, MANIFOLD	1
13	61903	..SCREW, CAP (attaching part)	3
14	21267	..CARTRIDGE, OVER-CENTER	2
15	67123	..BUSHING,	4
16		..NUT, GLAND	1
17		..PISTON	1
18		..NUT, LOCK	1
19		..ROD	1
-20		..BARREL	1
-21	67051	..KIT SEAL	1
22		...WIPER, ROD	1
23		...SEAL, ROD POLYPAK	1
24		...O-RING	1
25		...RING, BACK-UP	1
26		...O-RING	1

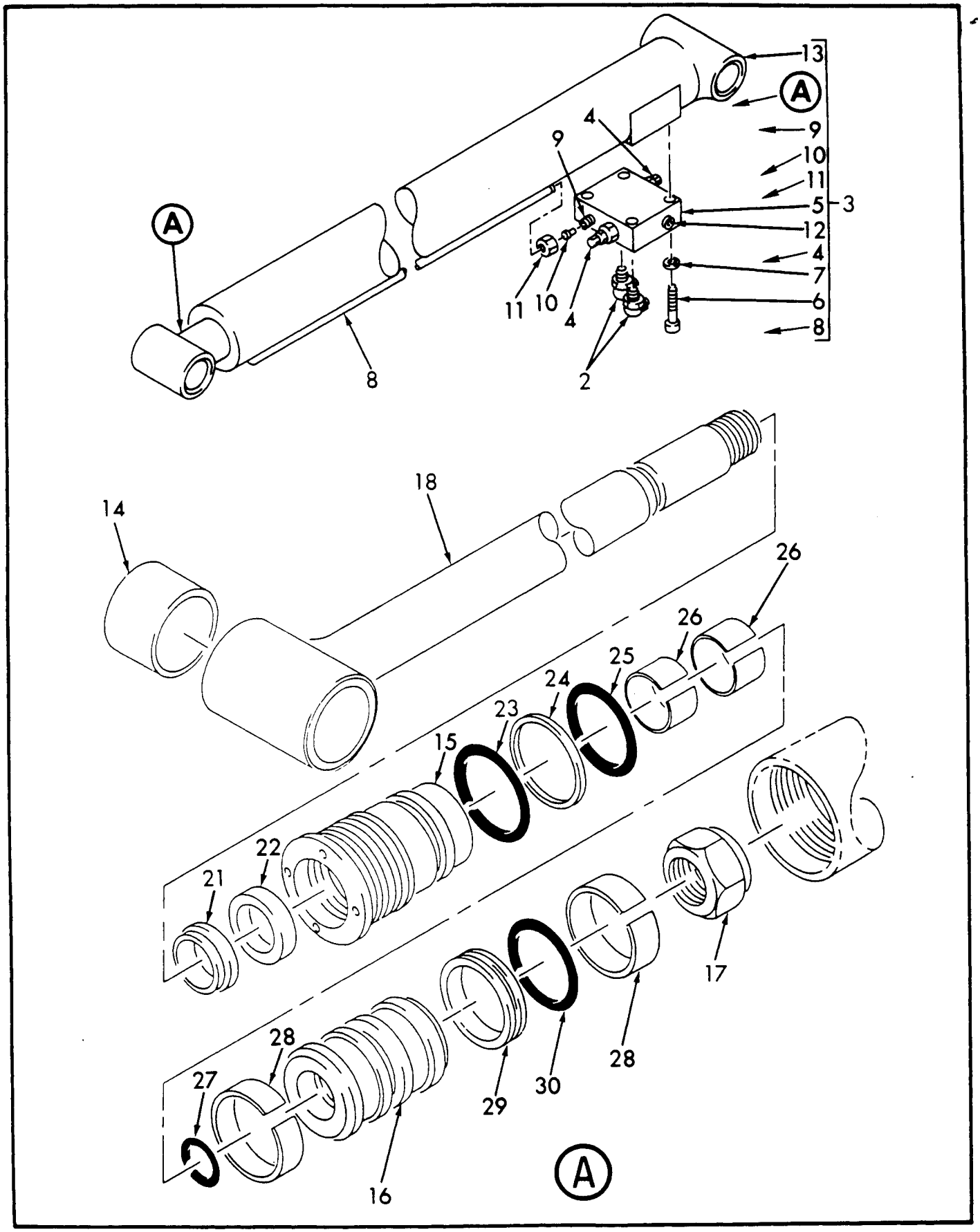
- ITEM NOT ILLUSTRATED

SLAVE LEVELING CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
27		...BEARING, WEAR	2
28		...O-RING	1
29		...RING, WEAR (GLASS/NYLON)	2
30		...SEAL, A.Q. (SQUARE)	1
31		...O-RING	1

- ITEM NOT ILLUSTRATED

EXTENSION CYLINDER ASSEMBLY (30 EBII)



EXTENSION CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-1	23680	ASSEMBLY, EXTENSION CYLINDER (See Sect. 5, Fig. 2 for NHA)	REF
2	80012-11	.ELBOW, STRAIGHT THREAD	2
3	23657	.SUB-ASSEMBLY, EXTENSION CYLINDER	1
4	81006	..CARTRIDGE, OVER CENTER	2
5	22820	..BLOCK MANIFOLD	1
6	61947	..SCREW, CAP (attaching part)	4
7	63302	..WASHER, LOCK (attaching part)	4
8	26298	..TUBE, HYDRAULIC	1
9	80004-11	..CONNECTOR, STRAIGHT THREAD	1
10	80062-06	..SLEEVE	1
11	80060-06	..NUT	1
12	80051-03	..PLUG	1
13	23656	..CYLINDER, BOOM EXTENSION	1
14	67122	..BUSHING	4
15		..NUT, GLAND	1
16		..PISTON	1
17		..NUT, LOCK	1
18		..ROD	1
-19		..BARREL	1
-20	67050	..KIT, SEAL	1
21		...WIPER, ROD	1
22		...SEAL, ROD POLYPAK	1
23		...O-RING	1
24		...RING, BACK-UP	1
25		...O-RING	1
26		...BEARING, WEAR	2

- ITEM NOT ILLUSTRATED

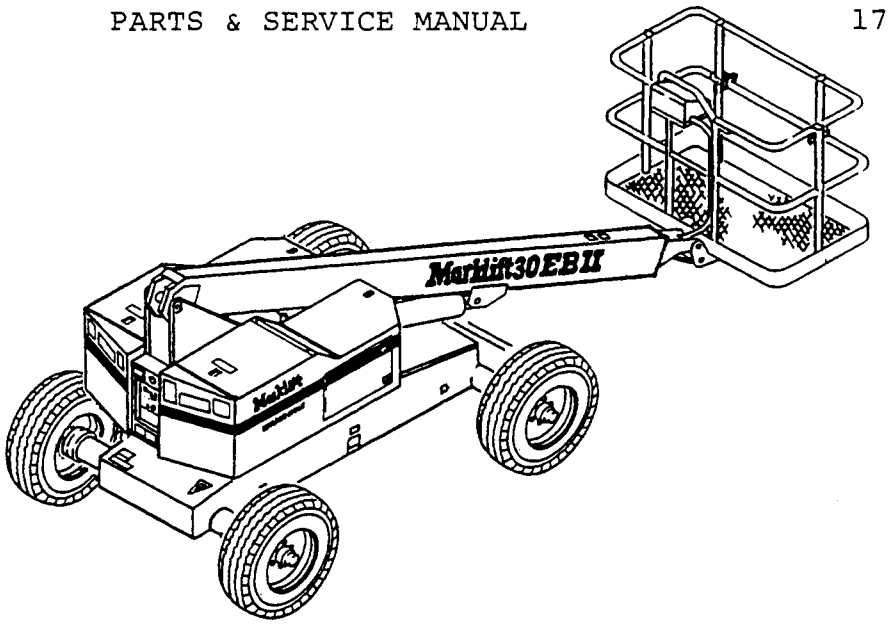
EXTENSION CYLINDER ASSEMBLY (30 EBII)

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
27		...O-RING	1
28		...RING, WEAR	2
29		...SEAL, A.Q. SQUARE	1
30		...O-RING	1

- ITEM NOT ILLUSTRATED

THIS SECTION 6 CONTAINS THE FOLLOWING FIGURES:

FIG. NO.	TITLE	PART NO.
1	HOURMETER	23327
2	CONTINUOUS TURRET ROTATION	23341
3	TRAVEL WARNING HORN	20108
4	ALL MOTION ALARM	23392
5	ROTATING AMBER BEACON	20107
6	2 HEADLIGHTS & 2 REAR RED LIGHTS	20078
7	STOP, TURN & CLEARANCE LIGHTS	20106
8	12 VOLT PLATFORM WORK LIGHT	20139
9	1/2" AIRLINE TO PLATFORM	23375
10	1/2" HYDRAULIC LINE TO PLATFORM	23377
11	LIFTING LUGS	23420
12	BATTERY CONDITION INDICATOR GAUGE	23385
13	5' PLATFORM - IN ADDITION TO STANDARD	23695
14	SOLID STATE CHARGER DELUXE	23329
	PARTS & SERVICE MANUAL	17120



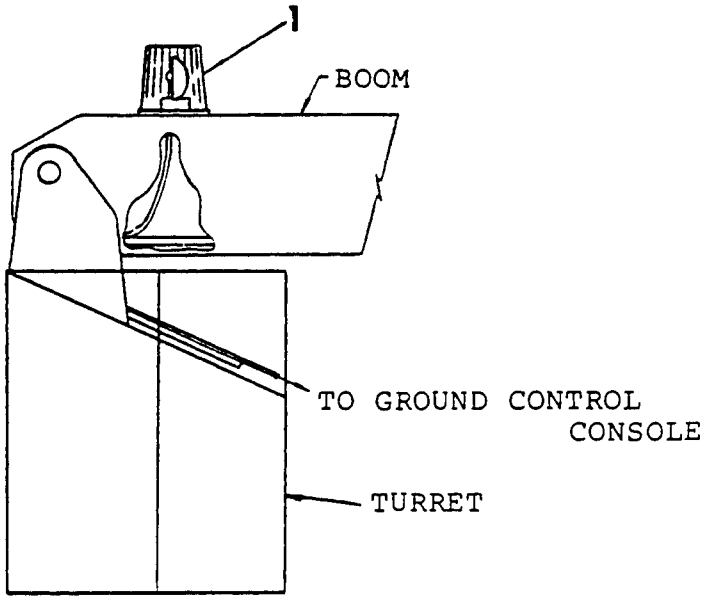
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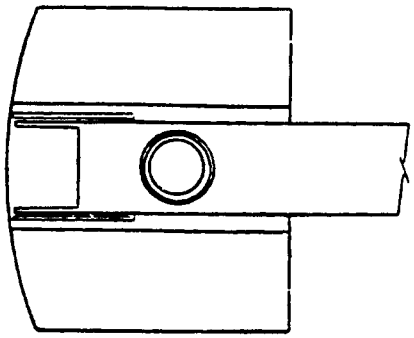
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THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 20108
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THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23392
IS NOT AVAILABLE THIS EDITION

ROTATING AMBER BEACON



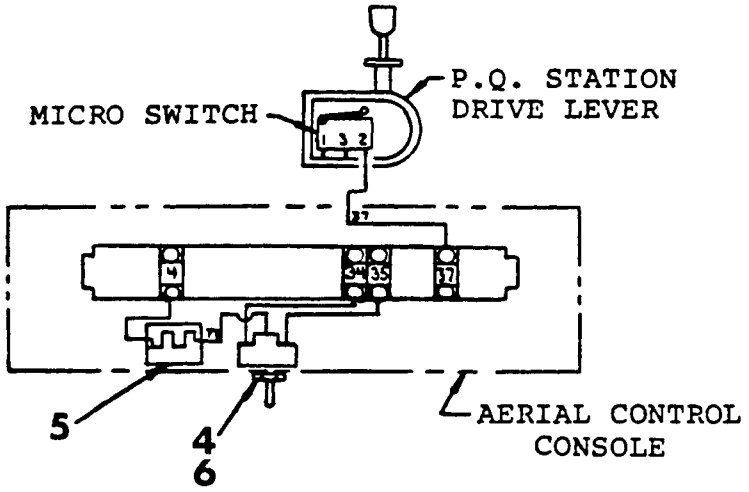


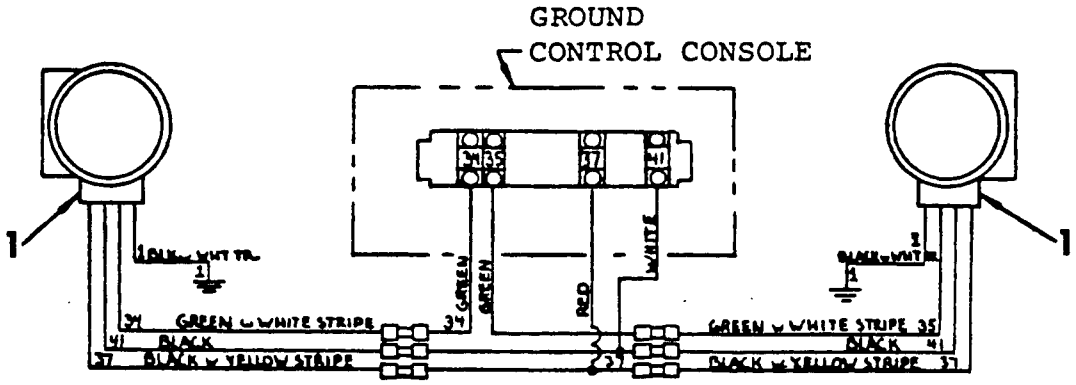
ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-	20107	ROTATING BEACON INSTALLATION	1
-1	20863	ROTATING BEACON -- YELLOW, RED OR BLUE	1

REV.

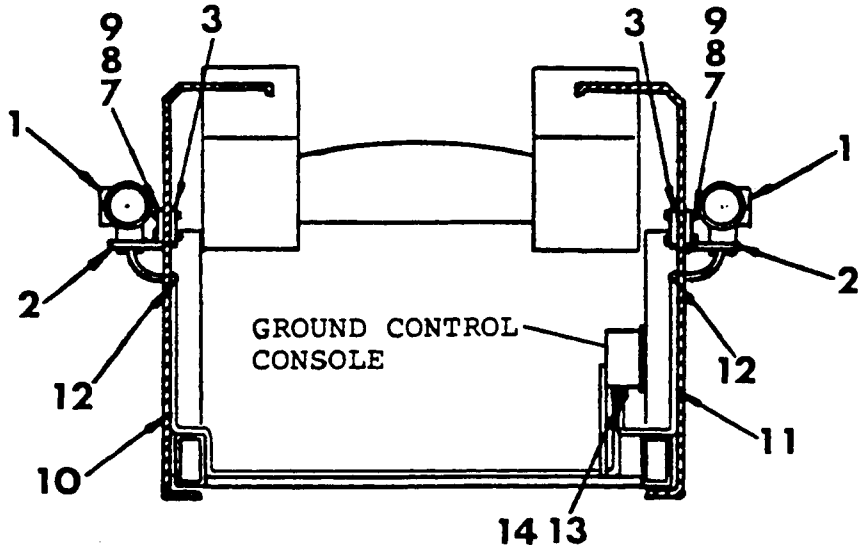
2 HEADLIGHTS & 2 REAR RED LIGHTS

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 20078
IS NOT AVAILABLE THIS EDITION





ELECTRICAL DIAGRAM

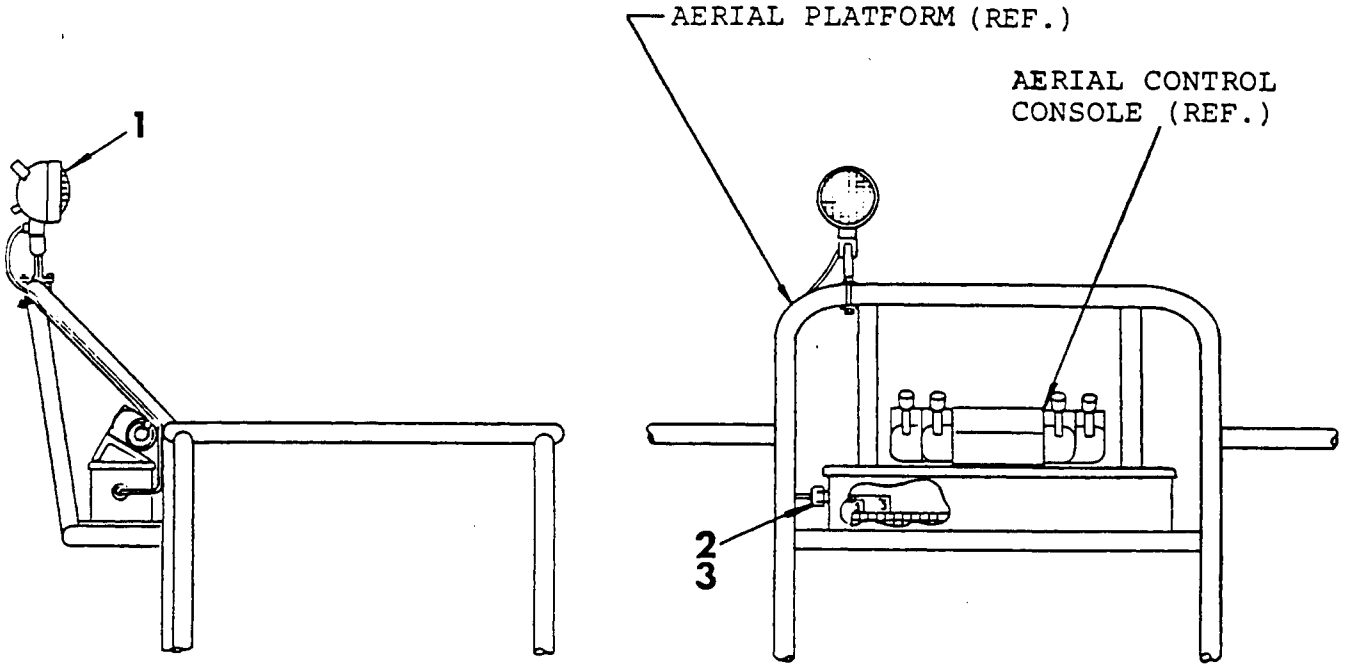


REV.

STOP TURN & CLEARANCE LIGHTS

ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-	20106	CLEARANCE, STOP AND TURNING LIGHTS	1
-1	20838	CLEARANCE LIGHT	2
-2	20864	MOUNTING BRACKET	2
-3	20865	BACK-UP PLATE	2
-4	4019	TOGGLE SWITCH	1
-5	448-A	FLASHER	2
-6	20866	TURN INDICATOR DECAL	1
-7	60331	HEX HEAD CAPSCREW - 3/8-16UNC X 1 1/4	4
-8	60703	HEX NUT - 3/8-16UNC	4
-9	63303	SPLIT LOCKWASHER - 3/8	4
-10	2912	CABLE - 18AWG 4 COND X A/R	1
-11	2912	CABLE - 18AWG 4 COND X A/R	1
-12	117-0	BUTT CONNECTOR	8
-13	2806	STRAIN RELIEF	2
-14	2808	LOCK NUT	2

12 VOLT PLATFORM WORKLIGHT



ITEM	PART NUMBER	DESCRIPTION 1234567	UNIT PER ASSY.
-	20139	12V PLATFORM WORKLIGHT	1
-1	20862	WORKLIGHT	1
-2	2522	STRAIN RELIEF	1
-3	141	LOCK NUT	1

REV.

1/2" AIRLINE TO PLATFORM

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23375
IS NOT AVAILABLE THIS EDITION

1/2" HYDRAULIC LINE TO PLATFORM

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23377
IS NOT AVAILABLE THIS EDITION

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23420
IS NOT AVAILABLE THIS EDITION

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23385
IS NOT AVAILABLE THIS EDITION

5' PLATFORM - IN ADDITION TO STANDARD

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23695
IS NOT AVAILABLE THIS EDITION

THIS SECTION 6 - OPTION ASSEMBLY
PRINT NO. 23329
IS NOT AVAILABLE THIS EDITION

THIS SECTION 7 CONTAINS THE FOLLOWING VENDOR DATA:

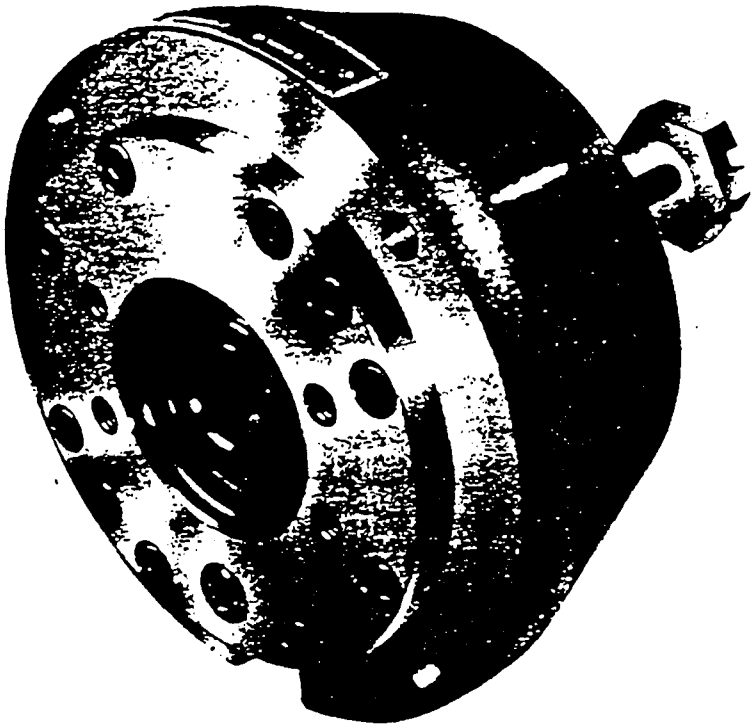
PAGE NO.	TITLE
1	MICRO DISC BRAKE
8	TROJAN BATTERY
12	ROSS GEAR DRIVE MOTOR
18	PRESTOLITE PUMP MOTOR

SY·TEC SERIES

MULTIPLE DISC BRAKE

(wheel mount)

SERVICE MANUAL MICO



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MICO WEST / SY•TEC

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Phone. (507) 625-6426 / TELEX 910-565-2444

MICO WEST / SY•TEC
701 East Francis St., P.O. Box 9058, Ontario, CA U.S.A. 91762-9058
Phone. (714) 947-4077 / TELEX 510-600-0132

TYPICAL BRAKE

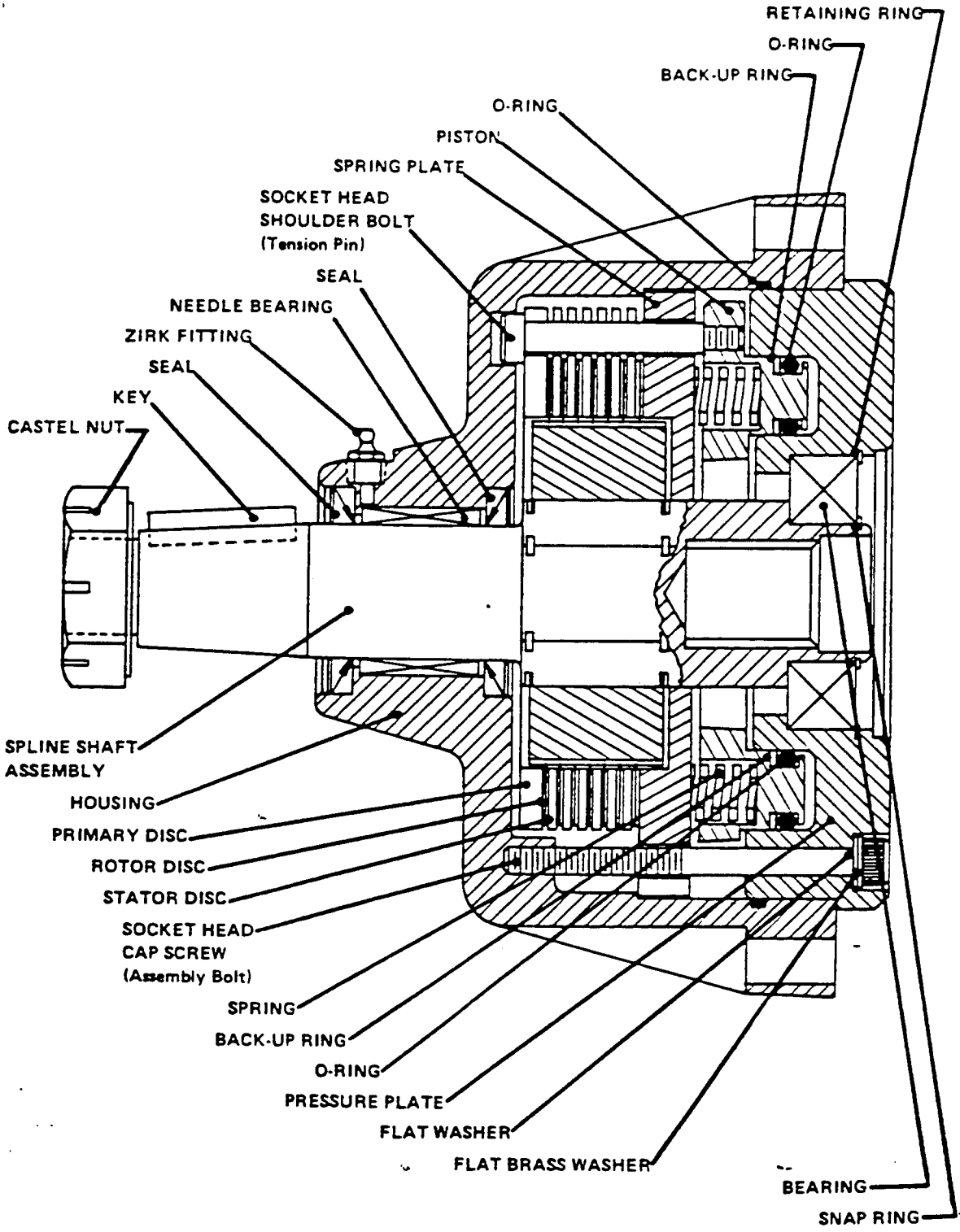


FIGURE 1

PRINCIPLES OF OPERATION

These brakes are spring-set, hydraulically released, multi-disc brakes. They are used primarily for holding loads, vehicles, conveyors, etc. in place when the hydraulic drive system is shut down or fails. Although the brakes are rated at 3,000 psi, they only require from 100 psi to 220 psi to make them function normally. The exact pressure required for operation is dependent upon the number of springs used to generate the torque necessary to hold the designed load. Thus, a brake with a full compliment of springs, will generate the highest level of torque and require approximately 220 psi to fully release the brake and provide adequate running clearance for the individual discs. A brake with 1/2 of the full spring compliment will have 1/2 as much torque and will require only 100 psi to fully release the brake. Consult catalog to choose the torque which best suits your design parameters.

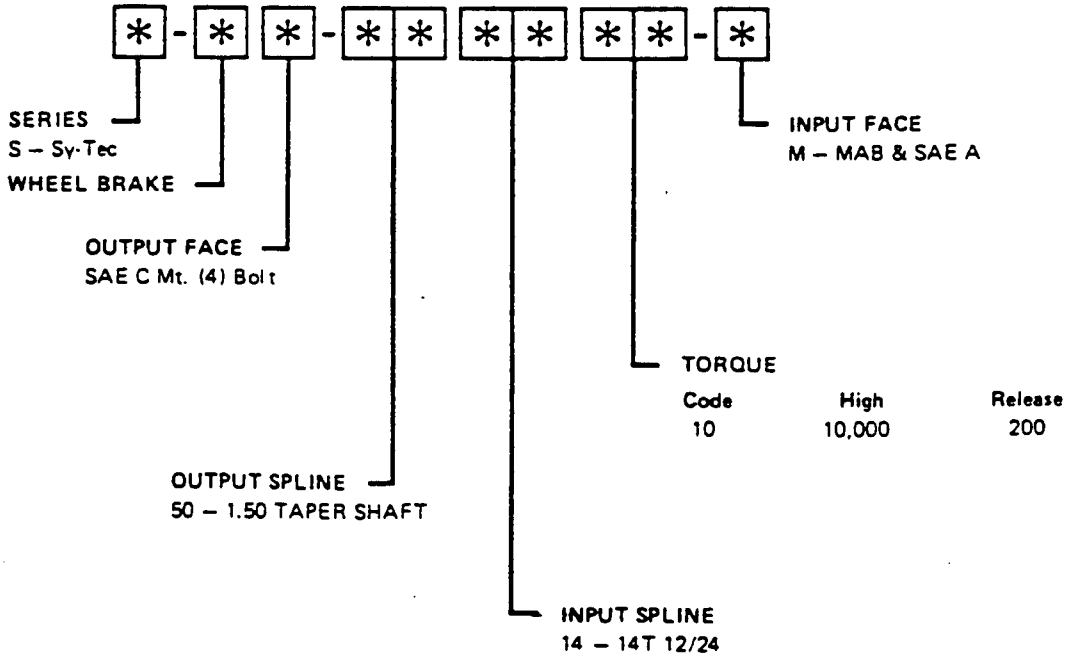
It is very important to remember that any pressure on the brake's release piston will directly effect the level of torque.

Two application examples:

1. The brake has a release pressure of 200 psi. The actuation pressure is provided by a charge pump. During certain phases of the machine's operation, the charge pump pressure dips from 200 psi to 100 psi. At 200 psi, the brake runs free (zero torque) but at 100 psi the brake will generate slightly less than half of its rated torque. The brake will drag – failure may occur. In this case, a brake should be selected which has a lower release pressure.
2. A brake has a release pressure of 200 psi. The system is set up to hold a load when a variable pump is shifted into neutral. Everything is running fine until the filter clogs, causing a build-up of back pressure in the return line to the tank. At a pressure of 60 psi, the brake will lose 25% of its holding torque; thus the load may slip. The situation can be corrected by replacing the filter or adding an extra margin of safety to your required brake torque in the initial design.

These brakes are designed to give thousands of trouble-free hours of service when set up correctly in the hydraulic circuit.

DESCRIPTION OF MODEL NUMBERS



DISASSEMBLY

1. Remove castle nut (item 26) and key (item 20) from output end of spline shaft assembly (item 19).
2. Remove 10 socket head assembly bolts (item 4) and flat washers (items 5 & 6). Washers (item 5) are brass. A suitable holding fixture is useful to keep brake in position.
3. Tap output end of spline shaft assembly (item 19) with a soft mallet to separate housing (item 22) from internal parts assembly.
4. Remove o-ring (item 21) from housing (item 22).
5. Needle bearing (item 24) and seals (items 23 & 25) will remain in housing (item 22). Inspect parts for wear and remove only if necessary.
6. Remove snap ring (item 1) from input end of spine shaft assembly (item 19).
7. Tap input end of spline shaft assembly (item 19) with a soft mallet to separate spline shaft from internal parts assembly.
8. Bearing (item 3) and retaining ring (item 2) will remain in pressure plate (item 7). Remove both and inspect for wear.
9. Remove four socket head shoulder bolts (item 18). A suitable holding fixture is useful to hold brake in position.

   CAUTION: Do not remove shoulder bolts without pressurization of brake (approx. 200 psi) or damage may result.

10. Remove primary disc (item 17), seven rotor discs (items 16) and six stator discs (items 15).
11. Remove spring plate (item 14).
12. Before removing springs (items 13), note pattern for reassembly purposes.
13. Separate piston (item 12) and pressure plate (item 7) by carefully exerting hydraulic pressure through brake release port on pressure plate.
14. Remove outside and inside o-rings (items 8 & 10) and outside and inside back-up rings (items 9 & 11) from piston (item 12).

    CAUTION: Care must be taken so as not to scratch or mar piston.

ASSEMBLY

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN SYSTEM.

1. Use an alkaline wash to clean parts before assembly.
2. Install back-up rings (items 9 & 11) on piston (item 12) toward spring pockets.
3. Install o-rings (items 8 & 10) on piston (item 12). Be sure o-rings are flat and all twists removed.

   CAUTION. Care must be taken so as not to scratch or mar piston.

4. Lubricate piston (item 12) with type fluid found in the system. Carefully press piston into pressure plate (item 7). Be sure piston is aligned correctly at all times and that there are no extrusions. Press piston until it bottoms on pressure plate (item 7).
5. Install springs (item 13) according to pattern noted during disassembly. Different colored springs must be alternated.
6. Place spring plate (item 14) over springs (item 13).
7. Install stator discs (item 15) and rotor discs (item 16). Begin with a rotor disc (item 16) and alternate with stator discs (item 15).
8. Install primary disc (item 17).
9. Align discs and partially screw in four socket head shoulder bolts (item 18).

   NOTE: Socket head shoulder bolts (items 18) should have loctite applied. Place one or two drops of loctite to the threads.

   Inspect for free movement of stack and check to see if spline shaft assembly (item 19) lines up with discs so it can fit through stack. Pressurize brake release port (approx. 200 psi) to release discs. Torque shoulder bolts to 20 ft. lbs. and release pressure. A suitable holding fixture is useful to hold brake in position.
10. Install spline shaft assembly (item 19) through stack input end first and out pressure plate (item 7).
11. Install bearing (item 3) and retaining ring (item 2) in pressure plate (item 7).
12. Install snap ring (item 1) on input end of spline shaft assembly (item 19).
13. If seals (items 23 & 25) and needle bearing (item 24) were removed from housing (item 22) they must be installed. Note direction of both seals.
14. Install o-ring (item 21) in housing (item 22).
15. Install housing (item 22) with the internal parts assembly using 10 socket head assembly bolts (item 4) and flat washers (items 5 & 6).

    NOTE: The ten socket head assembly bolts (item 4) should have loctite applied. Place one or two drops of loctite to the threads.

    Washers (item 5) are brass and should be first on the bolts. Torque bolts to 45 ft. lbs.
16. Install castle nut (item 26) and key (item 20) on output end of spline shaft assembly (item 19).

FOR REPAIR KIT INFORMATION REFER TO PAGE 7

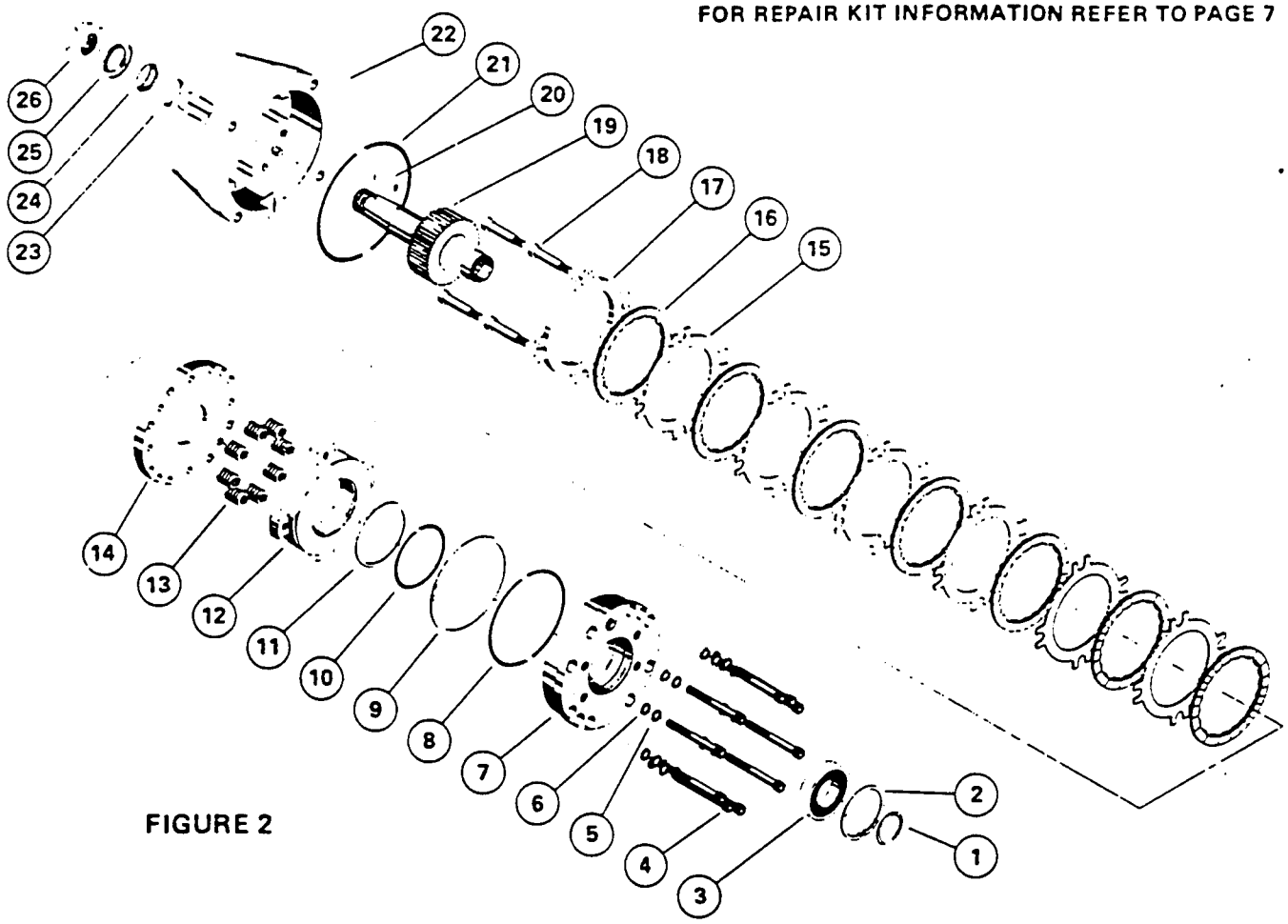


FIGURE 2

PARTS LIST

ITEM	DESCRIPTION
1	SNAP RING
2	RETAINING RING
3	BEARING
4	SOCKET HEAD CAP SCREWS (10) (Assembly Bolts)
5	FLAT BRASS WASHERS (10)
6	FLAT WASHERS (10)
7	PRESSURE PLATE
8	O-RING
9	BACK-UP RING
10	O-RING
11	BACK-UP RING
12	PISTON
13	SPRINGS (8)
14	SPRING PLATE
15	STATOR DISCS (8)
16	ROTOR DISCS (7)
17	PRIMARY DISC
18	SOCKET HEAD SHOULDER BOLTS (4) (Tension Pins)
19	SPLINE SHAFT ASSEMBLY
20	KEY
21	O-RING
22	HOUSING
23	SEAL
24	NEEDLE BEARING
25	SEAL
26	CASTLE NUT

BLEEDING

1. Install brake in system and connect pressure lines.
2. Bleed pressure release section of brake by pressurizing side inlet port and allowing air to escape from top port. Pressure should not exceed 100 psi during bleeding.
3. Apply sufficient pressure to release brake and check for proper operation in system.

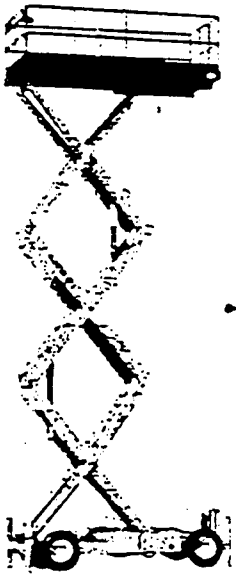
SERVICE DIAGNOSIS

PROBLEM	CAUSE	EXPLANATION	ACTION
Brake slips	A. Excessive pressure in hydraulic system	If there is back pressure in the brakes actuation line, the holding torque of the brakes is reduced.	Check filters, hose size, restrictions in other hydraulic components.
	B. Oil in brake if designed for dry use	Dry linings generate 66% more torque than linings saturated with oil. If the brake has oil in it, check the type of oil hydraulic or gearbox. 1. Gearbox oil 2. Hydraulic oil	Replace oil seal in brake Check motor seal Check piston seals Note: Internal components will need to be inspected, cleaned and replaced as required.
	C. Disc plates worn	The thickness of the disc stack sets the torque level. A thin stack reduces torque.	Check disc thickness
	D. Springs broken or have taken a permanent set	Broken or set springs can cause reduced torque - a rare occurrence	Check release pressure
Brake drags or runs hot	A. Low actuation pressure	The brake should be pressurized to minimum of 20 psi over the specified release pressure under normal operating conditions. Lower pressures will cause the brake to drag thus generating heat.	Place pressure gauge in bleed port & check pressure with system on
	B. Bearing failure	If the bearing should fail, a large amount of drag can be generated	Replace bearing
	C. Oil in brake	Excess fill of oil in sump condition thru wet brakes can cause the unit to run hot. Also excessive rpm in sump condition.	Drain oil and refill as specified for brakes Switch to flow thru cooling.
Brake will not release	A. Stuck valve or clogged	Brakes are designed to come on when system pressure drops below stated release pressure. If pressure cannot get to brake, the brake will not release.	Place pressure gauge in bleed port - check for adequate pressure - Replace defective line or component
	B. Bad o-rings	If release piston will not hold pressure, brake will not release.	
	C. Discs frozen	Sy-Tec brakes are designed for only limited dynamic braking. A severe emergency stop or prolonged reduced release pressure operation may result in this type of damage.	Replace disc stack

REPAIR KITS

(Refer to Page 5 for item numbers)

NUMBER	DESCRIPTION	INCLUDES
12-501-026	O-ring and Back-up Ring Kit	Flat Brass Washers (items 5) Seals (items 23 & 25) O-rings (items 8, 10 & 21) Back-up Rings (items 9 & 11) Loctite
12-501-106	Lining Kit	Flat Brass Washers (items 5) O-ring (item 21) Primary Disc (item 17) Stator Discs (items 15) Rotor Discs (items 16) Loctite
12-501-108	Bearing Kit	Flat Brass Washers (items 5) O-ring (item 21) Seals (items 23 & 25) Bearings (items 3 & 24) Loctite
12-501-110	Spring Kit	Flat Brass Washers (items 5) O-ring (item 21) Springs (items 13) Loctite



Making your work
easier to reach.

Mark of Quality

TROJAN MILEAGE MASTER BATTERIES



TROJAN BATTERY COMPANY

12380 CLARK STREET • SANTA FE SPRINGS, CA 90670

(213) 945-8381 • (714) 521-8215 Toll Free (Outside Calif.) (800) 423-6563 (Excluding Alaska and Hawaii)

proper care and maintenance of electric vehicle

1. NEW BATTERY RECEIVAL AND INSTALLATION

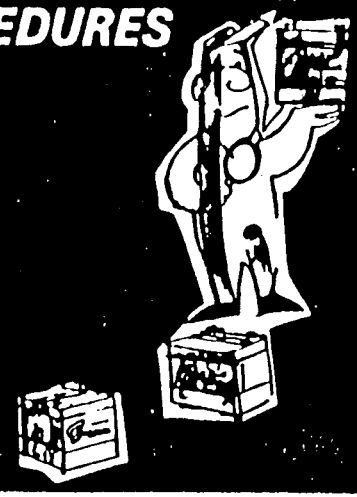


1. Always inspect incoming shipments of batteries for damage. Look for and pay particular attention for damage to or wet spots on the shipping cartons, examine those batteries for signs of breakage.
2. If damaged batteries are found secure acknowledgment of the damage from the carrier's representative and file a claim against the transportation company. Contact your supplier for battery replacement.
3. If batteries are received wet and not immediately placed in service, they must be charged at regular intervals as follows:

Storage Temperature	Charge
Below 40° F	None required
40° F to 60° F	Every 2 months
60° F and above	Once a month

4. Never stack one battery directly on top of another. Post damage and/or container damage can occur from improper stacking. If batteries are stored individually, place supporting boards between layers. Do not stack layers more than three (3) high and rotate stock so that the oldest batteries can be used first.
5. Dry charge batteries should be activated in accordance with instructions of the battery manufacturer.
6. Batteries should be installed in accordance with the vehicle manufacturer's instructions. Connections should be made tight enabling good contact between connector lugs and battery terminals. Always charge sets of batteries immediately after installation into the car.

2. MAINTENANCE-INSPECTION PROCEDURES



1. Water batteries at least once a week.
   a. Add only approved water to the cells. Distilled water is recommended, high mineral content water must not be used. Maximum allowable impurities in percent:Iron (.003), chloride (.004), fixed residue (.078).
   b. Remove vent caps and water batteries preferably after charging to prevent over flow of acid due to expansion.
   c. Fill all cells to the proper level. Do not overfill cells. Fill to level indicator or ⅛ inch over the top of the separators if there is no level indicator. Do not use a hose to water batteries.
   d. Spot check cells between weekly waterings to assure electrolyte is above separators. Excess water usage indicates the presence of any one or all of the following conditions which should be checked.
      1. Overcharging
      2. High temperature operation
      3. Nearing end of service life
   e. Do not allow the electrolyte level to drop below the top of the separators since this will lead to shortened battery life.
2. Clean batteries after weekly watering or when washing cars.
   a. Wash the tops of the batteries making sure the vent caps are in place. Do not allow water or other foreign matter to enter the cells.
   b. Use a solution of bicarbonate of soda and water to wash batteries if there is an accumulation of acid.
3. Inspection to insure good conditions which will give better battery service.
   a. When watering batteries inspect battery and other terminal connections for:
      1. Corrosion — If any exists, clean connection and apply a non-metallic grease or protective spray to retard further corrosion.
      2. Loose Connections — Be sure all connections are tight and that good contact is made between terminals.
      3. Broken or Frayed Cables — Be sure all cable connections are good and that no loose or broken wires are exposed. Replace any which look suspicious.
   b. Once a week after the batteries have been charged, spot check two (2) or more cells for specific gravity reading. Gravity should be 1.250 - 1.280. If low readings are noted:
      1. Check charger to insure that proper charge is being returned to the batteries.
      2. Check connections as specified under inspection 3a.
      3. Check all cells to determine if batteries are near the end of life. This should be done to the same procedure as called for under Section IV covering "Trouble Shooting" of batteries.
   c. On a regular interval, check car as outlined in the instruction manual for:
      1. Brake drag
      2. Proper tire pressure
      3. Proper alignment
      4. Proper lubrication
      5. Proper operation of electrical system
      6. Proper operation of drive and transmission system
      7. Condition of charger plug and receptacle in car

      Any of these conditions which are detrimental to car operation will shorten battery life.

3. CHARGING PROCEDURE



1. Become familiar with instructions issued with the charger or car manual.
2. Batteries are to be charged after each day's use as soon as play has been completed. Charging between rounds is permissible if it is determined feasible to do so.
3. Do not charge batteries if car was not used that day.
4. Do not allow batteries to sit in discharged condition for prolonged periods of time.
5. Always be sure batteries are fully charged each day prior to starting play.

4. TROUBLE SHOOTING FOR WEAK OR BAD BATTERIES



When a car fails to operate properly performing less than one round of golf, the car is to be brought into the shop and the batteries examined as follows:

1. Check terminal connections for corrosion, loose connections and broken or frayed cables.
2. If terminal connections appear to be in good condition, check all cells with a hydrometer for variation in specific gravity among cells. A variation of .030 points or more between cells of a battery is cause for suspect. Mark the low cells.
3. Recharge the batteries as recommended by the manufacturer.
4. Read all gravities again after recharge. Be sure that batteries are fully charged at gravities of 1.260 to 1.280. If cells vary by .030 points or more it is an indication of possible trouble within that battery.
5. Connect a load tester to the set of batteries and discharge the batteries at 75 Amps and record the time to a terminal voltage of 31.5 volts. Testers are now available having an automatic Shut-Off at this voltage. New batteries should run a minimum of 75 minutes on this test.
   a. If the batteries run less than 40 minutes they have either reached the end of life or a defective battery is in the circuit. Battery replacement is then necessary.
   b. If batteries run 40-50 minutes they have lost capacity and may be nearing the end of their useful life. In golf car service one round of golf may be expected on an average golf course.
   c. If batteries run more than 50 minutes, they are in good condition and satisfactory for continued service. Prior to putting the car back in service it should be checked for the existence of other trouble as outlined in the instruction manual.

5. BATTERY REPLACEMENT



Defective Batteries (Premature Failures)

1. Defective battery can be determined either by observation of gravity variance at the end of the 75 Amp discharge (.030 or more points between cells of a battery) or by turning the discharge tester back on and determining the battery or cell which is defective by use of a voltmeter.
2. Mark the defective battery.
3. Recharge the batteries with the defective battery in the circuit.
4. Remove the defective battery and replace with new battery or battery of comparable age which is fully charged.

Worn Out Batteries

1. Remove old set of batteries.
2. Clean and recondition battery trays, holddowns and cables.
3. Inspect new batteries for broken containers and proper electrolyte level before installing in the car.
4. Install batteries in car being sure that they are properly held down, firm but not too tight.
5. Replace cables, being sure terminals and connectors are clean and connections are tight.
6. Apply a light coating of non-metallic grease or protective coating.

6. WINTER STORAGE OF WET BATTERIES



1. Prior to storing car, batteries should be cleaned, fully charged and properly leveled.
2. While in storage the batteries should be recharged to full charge at time intervals shown below:

Storage Temperature	Charge
Below 40° F	None required
40° F to 60° F	Every 2 months
60° F and above	Once a month

3. Check batteries after car has been removed from storage and before service begins. Follow inspection and trouble shooting procedures to determine the condition of the batteries.

Battery Council International

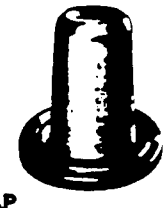
TROJAN MILEAGE MASTER BATTERIES

GROUP NUMBER	TYPE	VOLTS	REF. 20 HOUR RATE A.H.	75 AMPS TO 5.25 VOLTS AT 80° F MINUTES	OVERALL DIMENSIONS LENGTH	WIDTH	*HEIGHT	WEIGHT
GC-2	T-90	6	185	90	10-3/8	7-1/8	10-3/4	56
GC-2H	T-105	6	217	105	10-3/8	7-1/8	10-3/4	61
GC-2H	T-135	6	244	135	10-3/8	7-1/16	11-1/2	72

OTHER SPECIAL BATTERIES AVAILABLE FOR ELECTRIC VEHICLES.

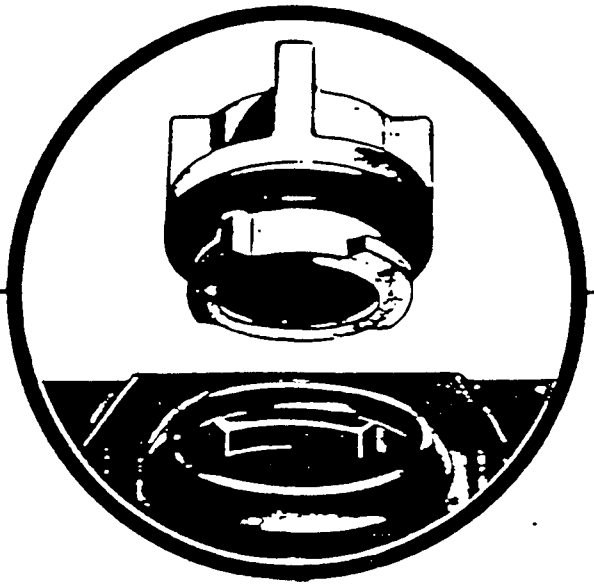
*TYPE OR TERMINAL WILL VARY HEIGHT SLIGHTLY

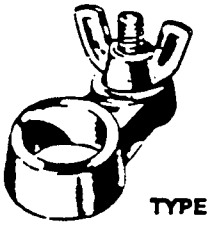
TROJAN "MILEAGE MASTER" TYPES FEATURE QUARTER-TURN VENT CAPS REDUCING SERVICE TIME 75%



TYPE AP

STRAIGHT POST



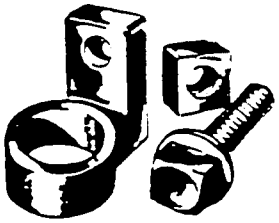


TYPE WT

WING NUT TERMINAL
3/16 or 5/16 Stud

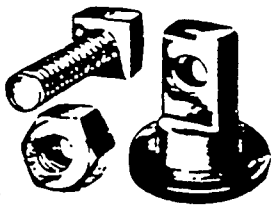
TYPE LT

ANGLE TERMINAL
5/16 Lead coated bolt



TYPE UT

UNIVERSAL TERMINAL



ALL BATTERIES COME WITH UNIVERSAL TERMINALS
UNLESS OTHERWISE SPECIFIED

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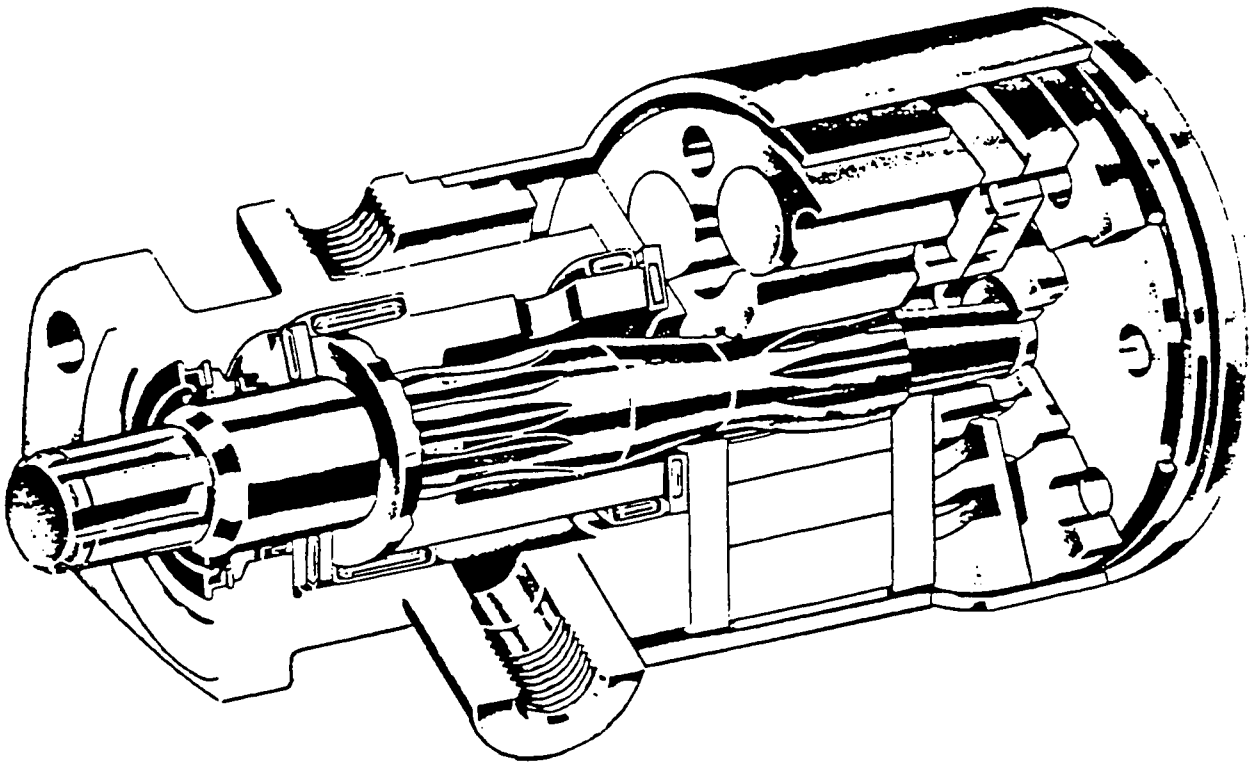
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TORQMOTOR®

SERVICE PROCEDURE

MAB SERIES



TRW

ROSS GEAR DIVISION

LAFAYETTE, INDIANA 47902

The *MAB* TORQMOTOR

- Low Speed,
- High Torque
- Hydraulic Motor.

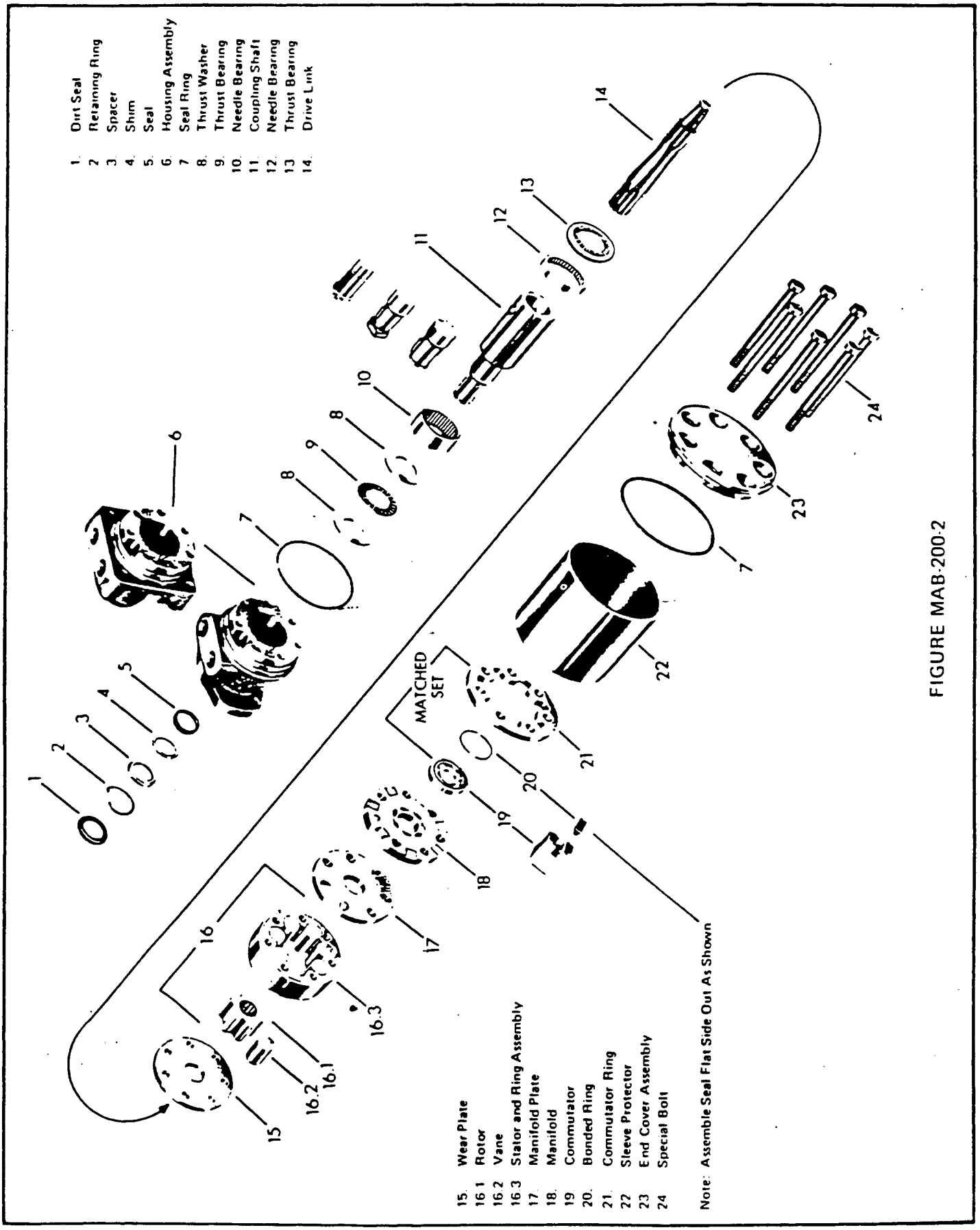


FIGURE MAB-200-2

SERVICE PROCEDURE

Preparation Before Disassembly

Remove port hole plugs before attempting to rotate shaft. Drain the motor assembly by turning the output shaft. Wash the complete motor in solvent and remove all particles of dirt from the exterior and blow dry before placing on work bench.

Clean Work Conditions

If it is necessary to disassemble the TORQMOTOR, make certain to use a clean work bench (a piece of clean wrapping paper makes an excellent and disposable top). The hands and tools of the repairman should be clean, and the operation should be carried out in a sheltered area free from drafts that may carry foreign material into the disassembled pieces. (Precision fits in the TORQMOTOR needs "white room" type care.)

Caution: Avoid wiping parts with a cloth, as lint and foreign particles may adhere to the working parts of the TORQMOTOR.

Handling

Care must be taken in handling the close fitting parts, as nicks and mutilations will result in serious damage.

REPLACEMENT OF HIGH PRESSURE SEAL (5) IN TORQMOTOR

(Reference Figure MAB-200-2)

1. Remove dirt seal (1) and retaining ring (2), if burr exists on retaining ring groove, remove with a scraping tool.
2. Set the motor with coupling shaft (11) down in a suitable clean can. Plug "A" port and connect "B" port to 120 psi air hose, or use a piston type hydraulic hand pump. Note: The air connection should be made with provisions for quick shut-off after the spacer (3), shim (4) and seal (5) have been ejected.
3. Apply clean grease to new seal (5) and assemble into housing assembly (6) with lip side inward.
4. Assemble shim (4), spacer (3) and retaining ring (2), be sure the rounded edge of the retaining ring is faced inward. Apply a small amount of clean grease to the back side of new dirt seal (1) and assemble into housing assembly (6).

TORQMOTOR DISASSEMBLY

(Reference Figure MAB-200-2)

1. In a vise, clamp down on the housing assembly (6) port bosses with the coupling shaft (11) pointed down.
2. Using wrench with a 12 point 9/16" socket, remove the seven special bolts (24) and place them on the work bench.
3. Remove the end cover assembly (23) and seal ring (7) by inserting screw driver between end cover assembly (23) and sleeve protector (22). Pry up end cover assembly (23) and lift from unit with seal ring (7) attached.
4. Remove seal ring (7) from end cover assembly (23) and discard.
5. Remove the commutator ring (21), commutator (19), bonded ring (20) and manifold (18) by using two of the special bolts (24) as a lifting tool, insert the two special bolts (24) into two holes and lift out the previously mentioned parts.
6. Remove bonded ring (20) from commutator (19) by using an air hose, blow air down into ring groove until bonded ring (20) is lifted out and discard.
7. Inspect manifold (18) for cracks and replace with new manifold if cracks are visible.
8. Remove manifold plate (17) by using the two special bolts (24) and method previously mentioned.
9. Remove rotor assembly (16), wear plate (15) and drive link (14) by using the two special bolts (24) and method previously mentioned.
10. Remove vanes (16.2) and rotor (16.1) from rotor assembly (16). Use caution not to drop these parts when handling.
11. Inspect rotor (16.1) outside lobes for pits and marks. If pits or wear marks are visible, discard rotor (16.1) and replace complete rotor assembly (16) with a new rotor assembly.
12. Remove thrust bearing (13).
13. Remove coupling shaft (11).
14. Remove sleeve protector (22) by inserting screw driver between sleeve protector (22) and housing assembly (6) and pry up. If rust exists on ends of sleeve protector (22), remove by sanding lightly.
15. Remove seal ring (7) from housing assembly (6) and discard.
16. Remove housing assembly (6) from vise, turn over and reclamp housing assembly in vise so that dirt seal (1) is pointed upward.
17. Remove dirt seal (1), retaining ring (2), spacer (3), shim (4) and seal (5) from housing assembly (6). Discard dirt seal (1) and seal (5). If burr exists on retaining ring groove, remove with a scraping tool.

18. Do not remove thrust washers (8), thrust bearing (9) and needle bearings (10) and (12) unless there is absolute evidence of damage. Needle bearings should be free to rotate and not show signs of surface breakdown. If needle bearing (10) requires replacement, use a 1.490 maximum diameter shaft and press out thrust washers (8), thrust bearing (9) and needle bearings (10) and (12). The housing assembly face should be placed on a block of wood during the pressing operation to protect it. Discard thrust washers, thrust bearing and needle bearings and replace with new parts as parts may have been damaged when being pressed out.

If needle bearing (12) needs replacement use a bearing puller to remove needle bearing, care should be taken to not damage the housing assembly (6) face with the bearing puller.

TOROMOTOR ASSEMBLY

(Reference Figure MAB-200-2)

Important: Before starting assembly, clean all parts with a clean petroleum base solvent and air dry. Do not wipe dry with rags. Be sure all dried paint lips have been removed from edges of lapped surfaces. Unless otherwise indicated, do not oil or grease parts before assembly. Note: Lubricate All Seals before assembly with SAE 10W-40 SD oil or clean grease.

1. In a vise, clamp down on the housing assembly (6) port bosses with the small bore end pointed up. Assemble new seal (5) with lip side inward, assemble shim (4), spacer (3) and retaining ring (2). Be sure the rounded edge of the retaining ring (2) is faced inward.

2. Apply a small amount of clean grease to the back side of new dirt seal (1) and assemble into housing assembly (6).

3. Remove housing assembly (6) from vise, turn over and reclamp in vise with large bore end up. (*** See Note.)

4. Apply "Scotch" tape around splines or keyway on coupling shaft (11) to prevent damaging seal (5). Assemble coupling shaft (11).

5. Assemble thrust bearing (13).

6. Assemble drive link (14).

7. Assemble wear plate (15).

8. Assemble rotor assembly (16) with counterbore in rotor (16.1) down.

9. Assemble manifold plate (17), manifold (18) and commutator ring (21).

10. Assemble commutator (19) and new bonded ring (20).

11. Assemble new seal rings (7) on housing assembly (6) and end cover assembly (23).

12. Apply a generous amount of "STP" to both ends on sleeve protector (22) and assemble over unit and onto unit and onto housing assembly (6). Make sure sleeve protector is setting in a non-cocked position.

13. Assemble end cover assembly (23) onto sleeve protector (22) in a non-cocked position.

14. Assemble seven special bolts (24) and screw in finger tight. Alternately and progressively tighten the seven special bolts to pull end cover assembly (23) and sleeve protector (22) down into place. (Torque the seven special bolts to 50 ± 5 ft. lbs.)

*** NOTE
If it was necessary to remove thrust washers (8), thrust bearing (9), needle bearing (10) and needle bearing (12), the following assembly procedure must be followed.

1. Assemble new thrust washer (8), new thrust bearing (9), new thrust washer (8) in this order into housing assembly (6).

2. Press in new needle bearing (10) with suitable tools to a 2.365 ± .030 dimension into housing assembly (6). Note: Bearing should indicate which side to press against.

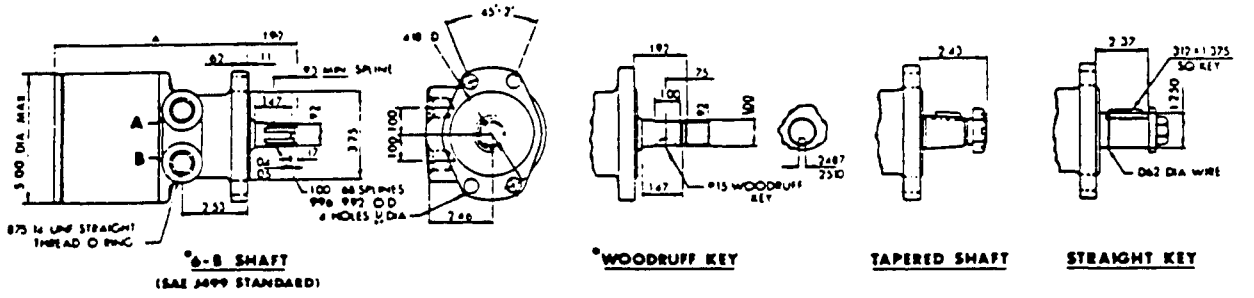
3. Press in new needle bearing (12) with suitable tools to a .18 ± .03 dimension into housing assembly (6). Note: Bearing should indicate which side to press against.

TROUBLE SHOOTING

Trouble	Cause	Remedy
Oil leakage	1. Hose fittings leaking	(a) Tighten fittings
		(b) Replace O ring in 7/8", 14 thread fitting
	2. Seal ring leak	(a) Replace seal ring by disassembling motor
	3. Special bolt leakage	(a) Tighten single bolt to 50 foot lbs.
	4. Faulty high pressure seal	Remove dirt seal, retaining ring and spacer. Blow out seal. Replace seal.
	5. Coupling shaft and high pressure seal	Replace coupling shaft and seal package.
High loss of speed, under load.	1. Lack of sufficient oil supply	(a) Adjust faulty pressure relief valve.
		(b) Repair worn pump.
		(c) Use correct oil for temperature of operation.
	2. High internal motor leakage.	(a) Replace worn rotor set with new rotor assembly
		(b) Replace worn commutator ring
		(c) Replace worn manifold
		(d) Replace worn wear plate.
Low mechanical efficiency or undue high pressure required to operate TORQMOTOR	1. Line blockage	(a) Replace blocked line.
	2. Internal Interference.	(a) Correct clearance of rotor set. (Replace rotor set)

PROVISIONING DATA

STANDARD MOUNT

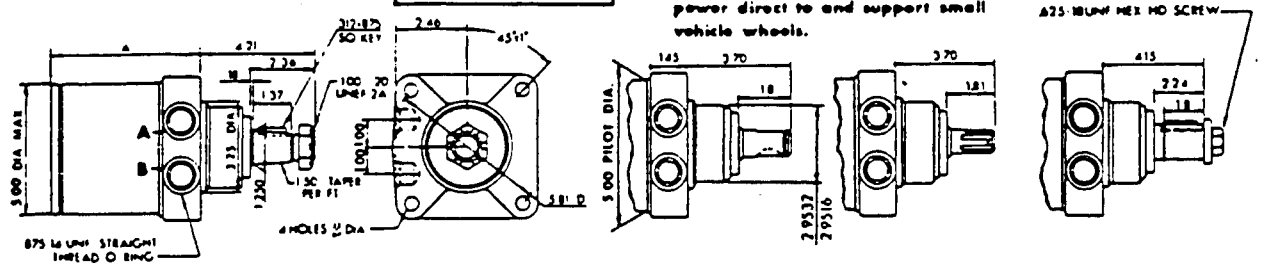


*6-B SHAFT (SAE J499 STANDARD) | *WOODRUFF KEY | TAPERED SHAFT | STRAIGHT KEY

WHEEL MOUNT

Use this design mounting when maximum side load is applied to the output shaft.

The Wheel Mount design (w/ 1-¼ taper output shaft) can be used to apply power direct to and support small vehicle wheels.



TAPERED SHAFT (SAE J501 STANDARD) | *WOODRUFF KEY | *6-B SHAFT | STRAIGHT KEY

*The 6-B Spline shaft and Woodruff Key shaft are machined for a WALDES TRUARC Snap Ring No. 5100-100 (or equivalent)

MOTOR SERIES	DISPLACEMENT CU IN / REV	DIMENSION "A" STD MTG	DIMENSION "A" WHL MTG	APPROX RPM WITH 10 GPM NO LOAD	APPROX RPM WITH 10 GPM @1500 PSI	THEO. TORQUE IN LBS/100 PSI	IN LB TORQUE @ 1500 PSI STARTING	IN LB TORQUE @ 1500 PSI RUNNING
MAB 08	5.9	7.409	5.630	400	365	94	1,040	1,250
MAB 16	11.8	7.910	6.131	200	180	188	2,150	2,850
MAB 24	17.7	8.410	6.631	130	115	282	3,600	4,150
MAB 40	29.6	9.410	7.631	78	65	470	6,050	6,800

Dimensional Values Shown Are Reference

MAB TORQMOTOR

NOTE: System Relief Valve Setting from 2,000-3,000 PSI Require Prototyping and Evaluation by Sales Engineer.

SPECIFICATION & IDENTIFICATION TAG GUIDE

EXAMPLE: MAB 08 0 02

SERIES — MAB

ROTOR WIDTH IN $\frac{1}{16}$ 'S
- 08
- 16
- 24
- 40

MOUNTING & SHAFT
- 02 STD. MTG. 6-B SHAFT
- 03 WHL. MTG. TAPERED SHAFT
- 04 STD. MTG. TAPERED SHAFT
- 05 WHL. MTG. 6-B SHAFT
- 08 STD. MTG. WOODRUFF KEY
- 09 WHL. MTG. WOODRUFF KEY
- 10 STD. MTG. STRAIGHT KEY
- 11 WHL. MTG. STRAIGHT KEY

REV.

ASSY. NO. MBD-5007

prestolite.

SERVICE PARTS LIST

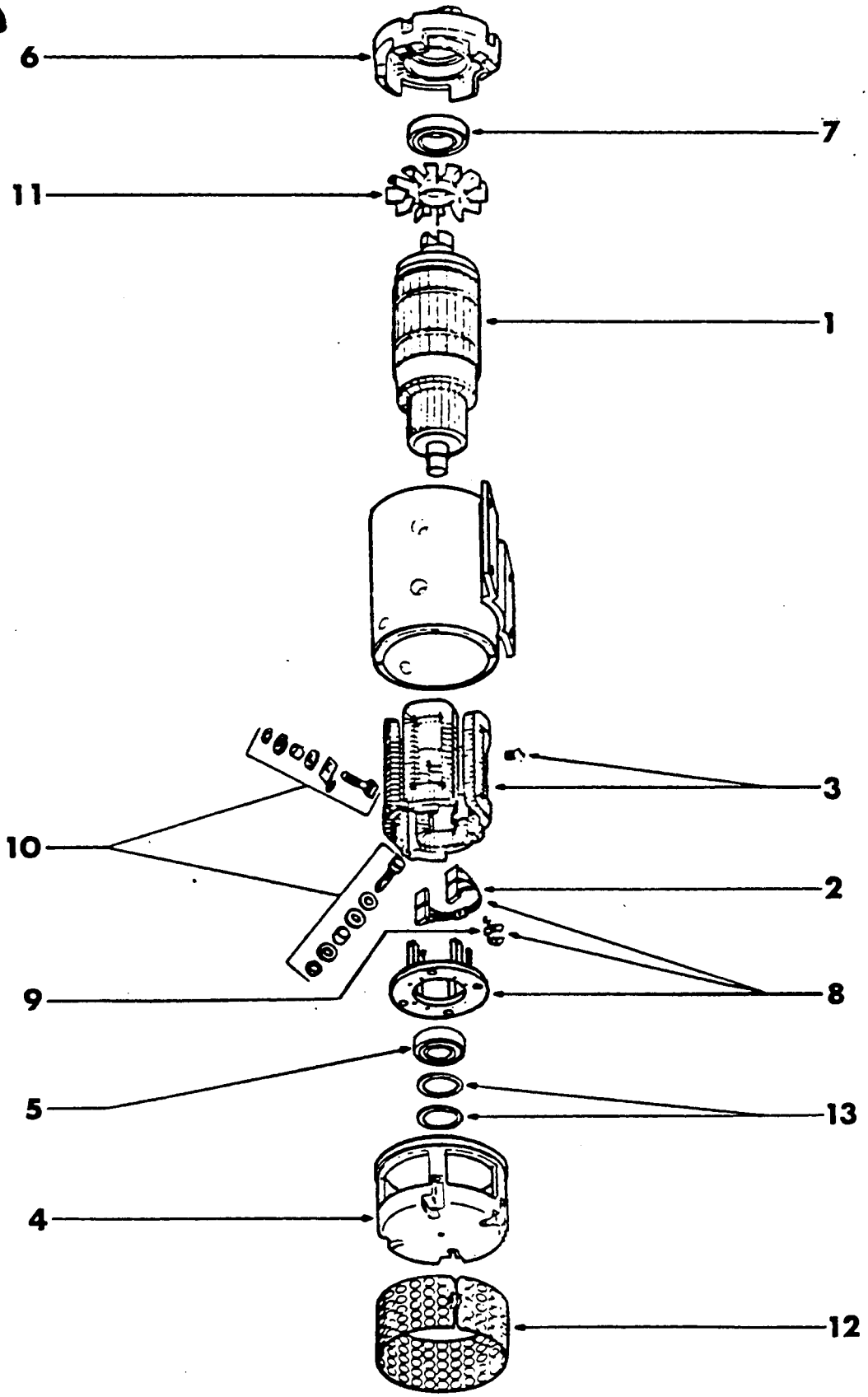
PUMP MOTOR
Issued 1-8-79

Application J.S. Barnes

ITEM	SERVICE PART NO.	NO. USED	PART DESCRIPTION
1	MBD-2525	1	ARMATURE
12	MBD-1468A	1	BAND,COVER
5	X-3991	1	BEARING, BALL,SEALED,#201,C.E.
7	X-3990	1	BEARING,BALL,SHIELDED,#203,D.E.
11	MBD-1427	1	FAN
3	MBD-1005PS	1	FIELD COIL PKG.(POLE SCREWS INCL.)
4	MBD-502	1	HEAD, COMM. END
6	MBD-423B	1	HEAD, DRIVE END
8	MBD-1564	1	PLATE ASSEMBLY, BRUSH
9	MBD-19S	1	SPRING SET, BRUSH
2	MBD-1512S	1	BRUSH SET, SERVICE
10	90-2591 +	1	TERMINAL STUD PKG.(HDWE. INCL.)
13	90-701	1	THRUST WASHER PACKAGE

+ Contains additional parts to service other applications.

Note: This is a Ventilated Motor; for totally enclosed version use SP-6058(70-42)Enclosing Kit.


6
7
11
1
3
10
2
9
8
5
13
4
12

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

Mark of Quality