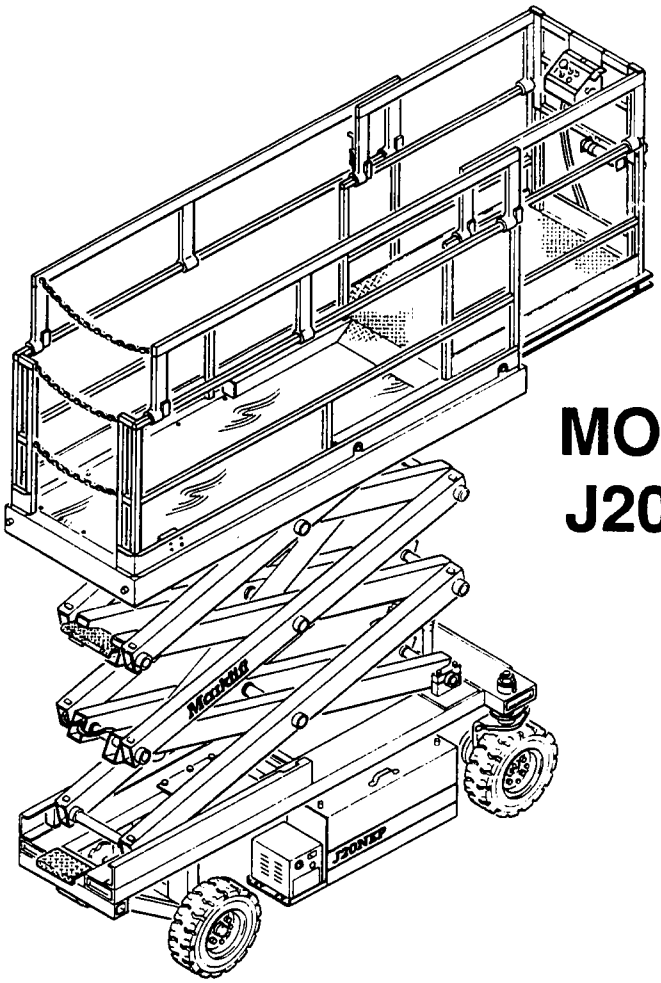
The Marklifts.®

A Product of Mark Industries

SELF-PROPELLED SCISSOR OPERATION MAINTENANCE AND PARTS MANUAL

PRELIMINARY



MODEL: J20NEP

PRELIMINARY EDITION
JUNE 1990

Mark Industries

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

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SERVICE BULLETINS

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 not possible, please contact the Mark Industries Service Engineering Department at (714) 879-MARK.

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 frame assembly. The serial number should be used whenever ordering parts. This will help our parts department provide 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.

MARK INDUSTRIES reserves the right to continually make product and safety improvements. Your participation in implementing such improvements will be required.

Description	Model J20NEP
Height	
Working (maximum)	26'0" (7.92m)
Platform (maximum)	20'0" (6.10m)
Platform (minimum)	49.25" (1.25m)
Length (overall)	99.0" (2.51m)
Width (overall)	31.75" (.81m)
Platform	
Dimenions (inside)	28.25" x 91.5" (.72m x 2.32m) (retracted)
Safety rails (nonremovable)	up 42" (1.07m) down 28" (.71m)
Toe plate	4" (.10m)
Extends	34" forward (.86m)
Load capacity (evenly distributed)	750 lbs (340.2 kg)
Wheel base	70" (1.78m)
Wheel track	26.75" (.68m)
Turning radius (inside)	24" (.61m)
Ground Clearance	4.75" (.12m)
Drive speed	
Low	1.3 mph (2.09 km/h)
High	3.3 mph (5.31 km/h)
High speed cut-out	7'0" (2.13m)
Lift/lower speed	37/30 seconds
Power system	24VDC
Battery voltage	4 @ 6 VDC (series)
Capacities	
Battery	250 amp/hr. (4)
Hydraulic tank	10 gal. (37.85 l)
Battery charger	40 amp
Tire size	4.00 x 8 (solid)
Work pressure (hydraulic)	2500 psi (175.77 kg/cm^2)
Shipping Weight	3320 lbs. (1505.95 kg)
Shipping cube	150 cu. ft. (4.25m^3)

Specifications are nominal and are subject to change due to continual design improvements.

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 or from date first put into service upon proper notification. 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 or in service date whichever is applicable, 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.

Warranty effective as of 2/90

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/Dealer:

Company Name:

Address:

Telephone:

Date shipped (from invoice):

Date shipment received:

Date unit put into service:

Unit will be placed in rental fleet:

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.

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.

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

MODES
SERIAL NUMBER
INSPECTOR

OPTIONS

The MARKLIFT conforms to applicable ANSI and OSHA requirements. Since the safety requirements made by ANSI, OSHA and the various safety boards in your area are subject to change, it is the responsibility of the owner to instruct the operators about all such current requirements.

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

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 . The operation of any new and unfamiliar equipment can be hazardous in the hands of untrained operators.

1. Inspect the machine periodically as specified in the Inspection and Checkout, and Preventive Maintenance sections and as required by ANSI, OSHA, local safety boards and the owner. All unsafe items must be corrected by a qualified service person before use of the machine.

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

5. Always distribute the load evenly over the platform floor area.

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

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

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

9. **Do Not** store loose material in the work platform such as pipe, rope, extension cords, wire or miscellaneous 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.

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** is a non-insulated personnel carrier and must not be operated within 10 feet of a 50,000 volt line. (See Division Of Industrial Safety for required clearances from overhead high voltage lines.)

12. Under no circumstances should horse play be tolerated on the **MARKLIFT.**

13. **Do Not** drive on uneven, sloping or soft terrain that sets the unit in an out-of-level condition of more than 6 degrees fore and aft, or 3 degrees side to side.

14. **Do Not** drive the platform into objects.

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

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

17. **Do Not** raise or lower scissor into objects.

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

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

20. When a machine is not in use, remove the key from the ground control panel to prevent unauthorized use.

21. When working under the elevated platform, always remember to raise the **Safety Support Arm** to prevent accidental platform descent.

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 such tool, machinery, equipment, apparatus, or building, or any part thereof, can come closer to high-voltage lines than the minimum clearances set forth in Table Y.

Article 86. Provisions for Preventing Accidents

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

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

Nominal Voltage (Phase to Phase)			Minimum Required Clearance (Feet)
750	-	50,000	6
over 50,000	-	345,000	10
over 345,000	-	750,0000	16
over 750,000	-	1,000,000	20

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

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

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

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

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

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

DECAL P/N	DESCRIPTION J20NEP	LOCATION	QTY
600137	Decal Set	All Standard Decals	1
182738	Ground Control Panel	Ground Control Panel	1
20661	Plate, ANSI A92	Final Assembly	1
20660	Nameplate, Identification	Final Assembly	1
31259	Marklift	Final Assembly	3
2003	Battery Water Level	Final Assembly	2
181777	J20NEP	Final Assembly	2
181728	Panel Strip	Final Assembly	2
2023	Load Capacity 750 Lbs.	Final Assembly	4
2017	Hydraulic System Fluid	Final Assembly	1
130937	J-Series	Final Assembly	1
2016	'Do Not Work Under...'	Final Assembly	2
182784	Operation Instructions	Final Assembly	1
130606	Free Wheeling Valve	Final Assembly	1
130820	'Operation & Safety Handbook	Final Assembly	1
2002	Forklift Boot	Final Assembly	2
2041	'Do Not Lift This End...'	Final Assembly	1
130949	'Danger, This is a Solid...'	Final Assembly	4
130596	A Product of Mark Industries	Final Assembly	2
31109	Caution Scissor Guard Rail	Final Assembly	1
11064	'Attach Safety Chains...'	Final Assembly	1
2015	Warning unstable condition	Final Assembly	1
130713	Descent override	Final Assembly	1
2014	Caution high voltage lines	Final Assembly	1
130782	Drive	Final Assembly	1
182739	Control box operation	Aerial control station	1

After the unit is delivered and unloaded, some minor inspections must be made before putting the unit into service. The following must be checked:

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 the hydraulic oil level - sight gauge shows full when the scissor stack is fully lowered.

3. Check the battery for a 1.200 ± 50 on the hydrometer. Charge the battery if its reading is below 1.100. If the battery requires water, fill to the proper level **AFTER** charging. Do Not overfill. See Battery Maintenance for filling instructions.

4. Check the hydraulic valve manifold for leaks, loose fittings or loose electrical connections.

5. Check hoses for leaks.

6. Make sure that the brakes are adjusted to stall the drive motors. (See Dynamice Brake Adjustment.)

7. Test switches: Position the selector switch to "ground", then raise the platform up and down. Position the selector switch to "aerial" and test the "drive", "steering", and "raise platform" switches.

The Marklift is designed with a "hydro-static" or "dynamic" braking system in addition to parking brakes. The dynamic brakes are designed to stop the Marklift (while moving) within a minimum given distance. Brake torque is generated to accomplish this by "hydraulically locking" (hydro-static) the drive motors. The parking brakes **ARE NOT** intended for dynamic (while the unit is still moving) application.

To adjust the dynamic brakes, the parking brakes must first be disengaged. This can be accomplished on scissor lifts by closing the parking brake control valve and then operating drive momentarily in either direction. On boom lifts, the parking brake control valve must be closed while simultaneously operating drive (the valve used on boom lifts does not have a "free flow" check incorporated in the valve). To insure that the parking brakes remain in the released position while adjusting the dynamic brakes (application could affect dynamic brake adjustment), a pressure gauge (0-5000 psi) should be "teed" (installed parallel) into the brake supply line (in between the parking brake control valve and the parking brake). A maintained (constant) pressure reading between 250 - 500 psi insures that the parking brakes remain fully released.

CAUTION: Parking brakes should be disengaged ONLY while the unit is on flat, level ground. When operating unit with parking brakes disengaged, remain clear of hazards such as obstructions, slopes, drops or holes, etc.

To determine the maximum distance required for the unit to stop, the Marklift must be driven at high travel speed (boom below horizontal and fully retracted or scissor platform fully down) and if equipped with a gasoline/propane powered engine, the engine should be operating at high throttle (full revolutions). Push the drive controller or rotate the drive rotary switch to full "on" and drive the unit for a minimum of approximately ten (10) feet; this insures that maximum travel momentum is achieved. Make a mark or place an object on the ground (approximately 10 to 15 feet in front of the machine) to serve as a reference point. Drive the unit until one wheel (this will be called the reference wheel) passes the object or mark on the ground. As the wheel passes the mark, release the controller or drive switch. Simply let go of the handle or switch; **DO NOT** proportion the controller or rotate the switch to the "off" position! After the unit stops, measure the distance from the center of the reference wheel back to the mark, this is the "dynamic" braking distance (insure that a minimum of 500 psi is still indicated on the gauge installed in the parking brake release line).

There are two counterbalance dynamic brake adjustment valves incorporated in the dynamic braking system, one for each direction of travel, (forward/reverse).

First you will need to determine which valve corresponds to a specific direction of travel. To determine this, loosen the jam nut on one of the counterbalance valves (insert an allen wrench into the threaded shaft to prevent unintentional turning of the adjustment screw) and rotate the threaded shasft counterclockwise approximately 1-1/2 turns. Lock the setting by tightening the jam nut. Drive the unit forward briefly. EXERCISE CAUTION!

If the unit now appears to travel a greater distance before stopping (whenever the drive switch or controller is released) than before any adjustment was made, then the valve which was adjusted controls the dynamic braking distance in the forward direction of travel. If no change in stopping distance was achieved, then the valve that was adjusted affects the braking in the reverse direction of travel.

To decrease the braking distance in either direction, loosen the jam nut on the counterbalance valve which corresponds with the direction of travel in which you are adjusting the braking distance, either in the function control valve for J19W/J25 and J20NEP series of machines (see Figure A), or in the drive brake valve (Mark Industries part number 21214) for MT, LS, SPS31, 30 4X4, 40 4X4 and 30EBII (see Figure B), and adjust the threaded shaft

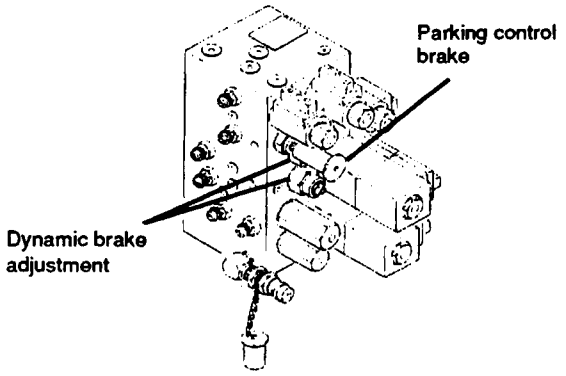


Figure A: Function Control Valve (J19W/J25/J20NEP)

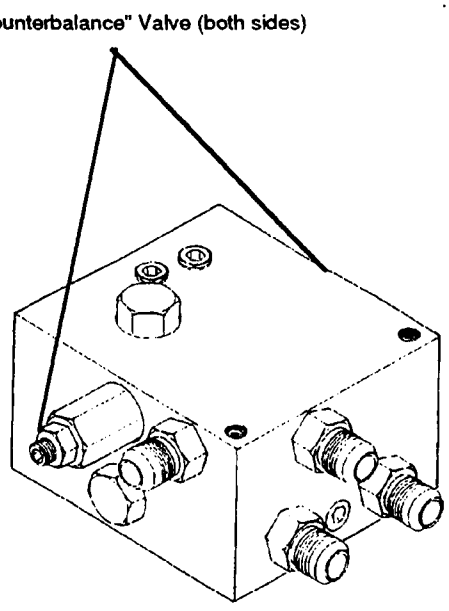


Figure B: Drive Brake Valve (P/N 21214)

(allen head screw) "in" (clockwise). This increases pressure against the relief spring inside the counterbalance valve and requires a higher hydraulic pressure generated by the motors to operate the valve; consequently, the braking distance is shortened. Adjusting the threaded shaft "out" (counterclockwise) results in a lower relief pressure and therefore a greater (longer) braking distance will be obtained. Adjust the threaded shaft (clockwise/ counterclockwise) to stop the unit within approximately 1 to 3 feet (high travel and engine speed). This distance is variable to allow somewhat for operator comfort. Assess the job site (traffic, hazards, etc.) to determine if the prevailing adjustment is **SAFE!** Tighten the jam nut once the desired braking distance has been achieved.

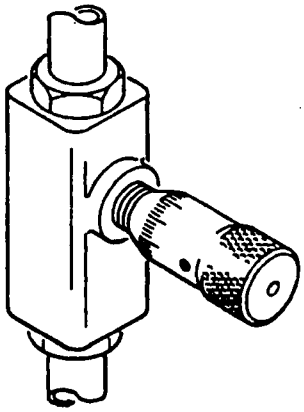


Figure C: Parking Brake Control Valve (MT, LS, SPS31)

REMEMBER the purpose of the dynamic brake is to generate the maximum brake torque necessary to stop the machine in a minimum distance; smooth (soft) controlled braking can only be accomplished by proper operation of the controller!

Once the desired dynamic braking distance has been achieved, it will be necessary to adjust the parking brake(s). For the model J19W/J25 and J20NEP series of machines, adjust the parking brake control valve (Figure A) so that the brake cylinder **DOES NOT** contact the sprocket on the left hand rear wheel until the unit comes to a complete stop. For units employing the "21214" drive brake valve (MT, LS, SPS31, 30 4X4, 40 4X4 and 30EBII), open the

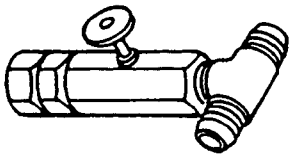


Figure D: Parking Brake Control Valve (30 4x4, 40 4x4, 30EBII)

parking brake control valve (Figures C or D) slightly (approximately 1/8 turn) to permit the pressure in the parking brake circuit to dissipate. Drive the unit (forward or reverse) briefly and observe the pressure gauge (which was previously installed in the parking brake release circuit), with the unit at a complete stop a minimum pressure of 250 to 500 PSI should remain on the gauge. This pressure should dissipate to "0" (zero) psi within 2 (two) to 3 (three) seconds of the unit stopping completely. Tighten the "jam" nut or lock screw on the valve shaft to insure that this setting is maintained. Remove the pressure gauge from the parking brake circuit. This completes adjustment of the dynamic braking of the Marklift.

Please refer to the Operation and Safety Handbook which accompanied your Marklift for operational instructions.

MARK INDUSTRIES recommends that the following items be checked periodically as stated below. Any machine not in safe operating condition must be removed from service until it is repaired by a qualified service person.

DAILY

1. Make sure that operation and safety decals are in place and easy to read.
2. Check hydraulic tank level, add oil as required.
3. Check the water level in the batteries
4. Check for loose or missing hardware, wire connections, etc., repair or replace as required.
5. Inspect the controls for proper operation.
6. Check for and correct any hydraulic leaks.
7. Check for and correct any cracked welds or other structural damage.

WEEKLY

1. Check the condition of the tires. Make sure they are free of serious cuts or defects.
2. Test instability alarm system (slope sensor).
3. Check for proper brake operation.
4. Record optional hour meter reading.
5. Clean unit by removing all dirt, oil, and grease. The machine may be washed with soap and water. (Keep clear of the electrical panels and charging units.)
6. Check for and correct any hydraulic leaks.
7. Check for and correct any structural damage.
8. Check good overall performance.
9. Check for wear on electrical cables and hydraulic hoses.

MONTHLY

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

2. Check condition of the battery. (See Battery Maintenance.)

3. Change the hydraulic oil return filter.

YEARLY

1, Re-pack all wheel bearings.

2. Change the hydraulic oil.

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

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.

Avoid Battery Hazards!

Batteries produce flammable and explosive gasses. Keep electric arcs, sparks, flames and lighted tobacco away from batteries.

Battery acid will damage eyes or skin on contact. Always wear a face shield during battery maintenance to avoid acid in eyes. Also wear rubber gloves and protective clothing to keep acid off skin.

Never check the battery by placing a metal object across the posts. Serious burns or an explosion can result.

Charge batteries only in a well ventilated area.

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 have a long useful life.

TEMPERATURE/SPECIFIC GRAVITY CORRECTION TABLE FOR BATTERIES

ACTUAL HYDROMETER READING AT ACTUAL TEMPERATURE°

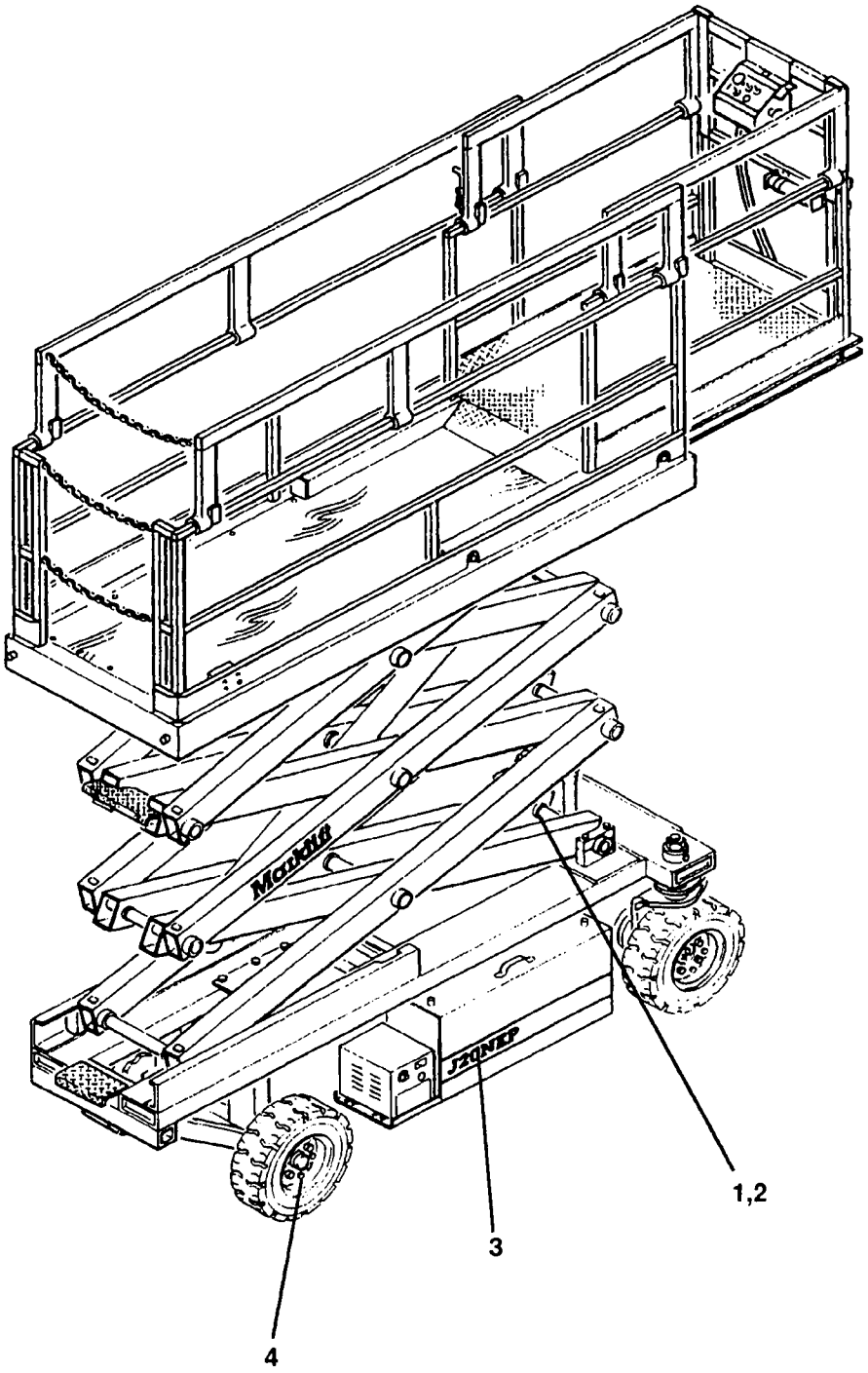
80°F (27°C)	0°F (-18°C)	-10°F (-23°C)	-20°F (-29°C)	-30°F (-34°C)	-45°F (-43°C)	-65°F (-54°C)	Approx. State of Charge In%
1.280	1.312	1.316	1.320	1.324	1.330	1.338	100
1.250	1.282	1.286	1.290	1.294	1.300	1.308	75
1.220	1.252	1.256	1.260	1.264	1.270	1.278	50
1.190	1.222	1.226	1.230	1.234	1.240	1.248	25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

Note: Cold temperatures have a numbing effect on the electrochemical action of the battery, greatly reducing its capacity. Therefore, it is highly recommended that the battery be kept in an almost fully charged condition during cold weather.

J20NEP



RECOMMENDED SERVICE CHART

ITEM NO.	SERVICE DESCRIPTION	LUBRICANT	FREQUENCY
1.	Hydraulic Oil	ATF Dexron II	Change yearly
2.	Inlet Strainer		Inspect/Clean Yearly
3.	Batteries	See Battery Maint.	Daily
4.	Wheel Bearings	Mobil (VA6L36AG)	Yearly
5.	Return Filter (in compartment opposite #3)	(131774)	Replace/ 100 Hours

1. 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, as determined by using a hydrometer and following the 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, refer to the schematic, (see the SCHEMATIC section for more information) and use a volt/ohm meter to trace 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., (even if you have a enough electrical power to operate the coil or relay), these items will not operate properly.

C. Diodes can be thought of as "one way electrical check valves" they permit current to 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.

2. HYDRAULIC

A. The various hydraulic functions are controlled by 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 priority valve, thus reducing the speed.

B. Directional valves (steering, drive, etc.) have two electrical coils with a moveable spool between the coils.

C. One way valves are normally open or closed to permit or prevent passage of fluid when electrically energized.

This troubleshooting checklist is not intended to indicate all the possible fault conditions which may be encountered on the MARKLIFT.

MARKLIFT will not run.

A. Check the battery for proper charge.

B. Check battery connections.

C. Check ground control box circuit breaker.

D. Refer to local authorized MARKLIFT dealer.

Hydraulic pump

Pump producing excessive noise.

A. Check suction hose from tank to pump for kinks

B. Check hydraulic oil level.

C. Check suction line fittings for tightness.

D. Refer to local authorized MAKRLIFT dealer.

Lift

Will not lift, all other functions work.

A. Check for loose electrical connections.

B. Defective lift solenoid valve coil.

C. Low system pressure (loss of flow to lift circuit).

D. Malfunctioning level sensor.

E. Refer to local authorized MARKLIFT dealer.

Will not lift rated load.

A. Low system pressure (loss of flow).

B. Mechanical binding (friction).

D. Refer to local authorized MARKLIFT dealer.

Steering

Steers in one direction only.

A. Loose electrical connection.

B. Loss of ground to coil on affected directions.

C. Spool sticking in one direction.

D. Faulty steering switch on top of the drive controller.

E. Flow control valve to steering cylinder stuck.

F. Refer to local authorized MARKLIFT dealer.

Drive

Drives in one direction only.

A. Loose electrical connection in forward or reverse circuit.

B. Faulty drive controller.

C. Valve spool sticking in one direction.

D. Refer to local authorized MARKLIFT dealer.

No forward or reverse drive.

A. Freewheeling valve is open.

B. Faulty drive controller.

C. Valve spool stuck.

D. Drive cut out switch in stabilizer malfunctionng.

E. Refer to local authorized MARKLIFT dealer.

Mark Industries

NEW EQUIPMENT MAINTENANCE RECORD

MODEL	SERIAL NUMBER
DATE	EQUIPMENT NUMBER
LOCATION	MECHANIC

ITEM	CODE	COMMENTS	ITEM	CODE	COMMENTS
Engine oil (gas units)			Safety cut-outs		
Engine oil filter(gas units)			Bushings		
Air filter (gas units)			Rollers(MT 40 Only)		
Fuel filter (gas units)			Wear pad		
Tune-up (gas units)			Front end assembly		
Choke(gas units)			Tire pressure		
Engine RPM (gas units)			Tire condition		
Charging system			Wheel nuts		
Fuel system (LPG/gas)			Wheel bearing		
Batteries			Nuts and bolts		
Battery terminals			Guard rails		
Motor brushes			Lubrication		
Hydraulic fluid			Warning decals		
Hydraulic oil filter			Operating inst.		
Hydraulic systems			General decals		
Hydraulic pressure			Paint		
Hydraulic hoses			All operations		
Cylinders			Lift		
Drive motors			Steering		
Brakes			Forward drive		
Aerial control box			Tilt switches		
Ground control box			Fuel level (gas units)		
Relays			Literature		
Wire connections			Options		

Code
F = Filled
R = Repaired
C = Checked
A = Adjusted
X = Needs repair
NA = Not Applicable

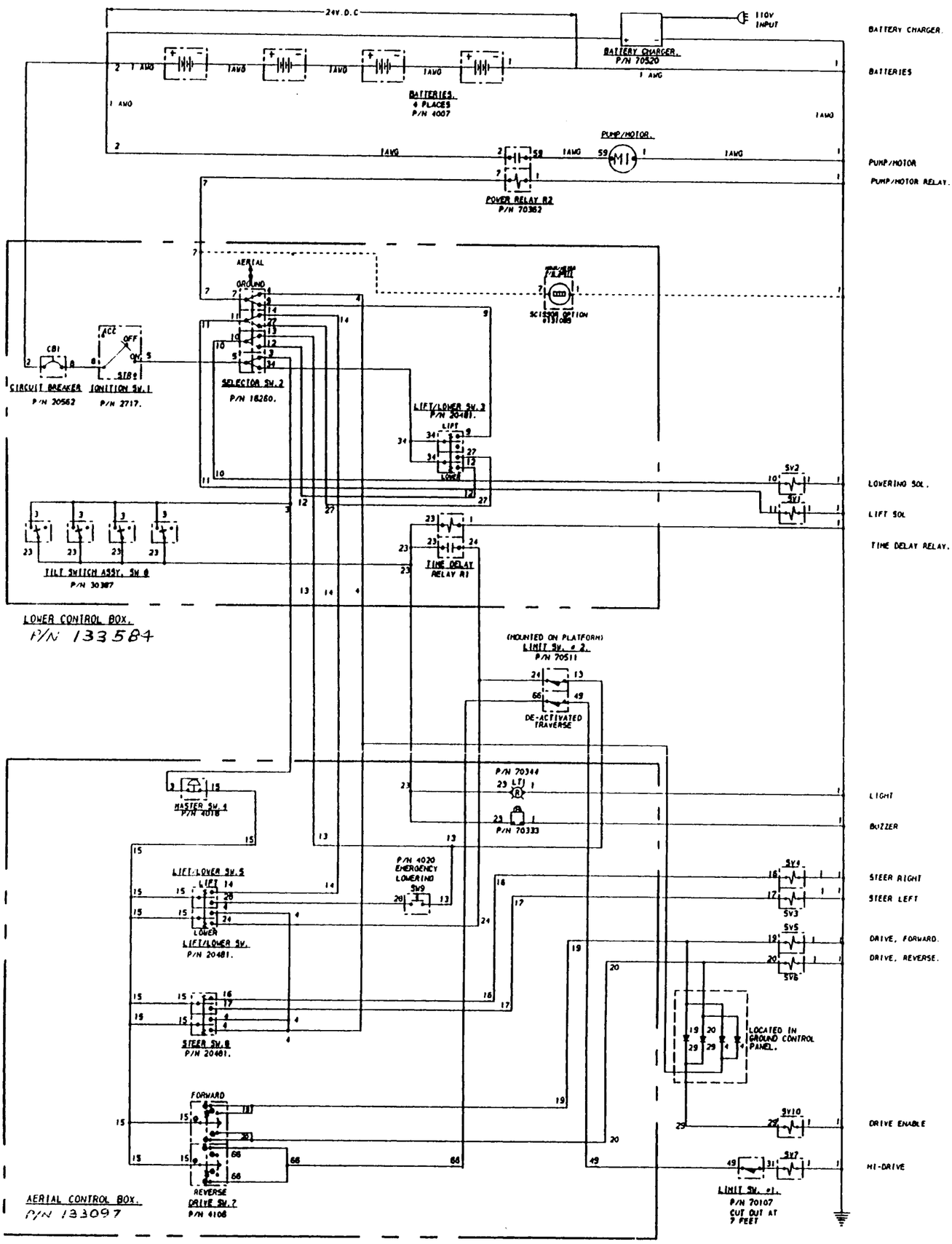
Comments

HYDRAULIC FLUID TABLE

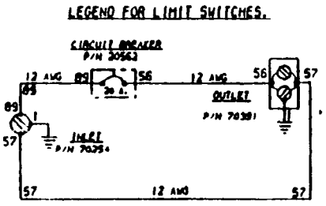
Milestone			Hydraulic fluid			
Oil company			Chevron	Gulf	Shell	Union
Brand Name			ATF Dexron II	ATF Dexron II	Donaz-T6	ATF Dexron
Viscosity	SUS AT 100°F (37.8°C)		187.4	195	200	200
	SUS AT 210°F (98.9°C)		49.2	50.4	50	52.3
	Index	°F	153°	155°	160°	172°
		°C	67.2°	68.3°	71.1°	77.8°
Flash point		°F	400°	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°

MODEL: J20NEP

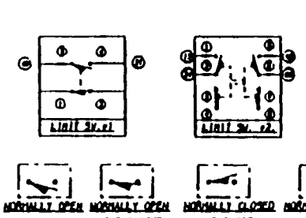
PART NO.	QTY.	DESCRIPTION
600137	1	Decal Set
17034	1	Operation & Safety Handbook
133098	1	Electrical Schematic
131737	1	Hydraulic Schematic
130927	1	Plastic Container
65842	2	Anti-Roll Cap
70391	1	Receptacle Duplex
70392	1	Snap Cover
70173	1	Limit Switch
70032	1	Lever
81028	1	Electric Check Solenoid
160159	12	Bushing Oilite
67844	1	Seal Kit (Lift Cylinder)
67842	1	Seal Kit (Steering Cylinder)
67843	1	Seal Kit (Brake Cylinder)
16947	6	Filter Element
20481	1	Toggle Switch
4106	1	5 Position Switch
65753	1	Fluted Torque Hub
4011	1	Push Button Switch
4018	1	Push/Pull Switch
31080	1	Emergency Knob
70344	1	Pilot Indicator Light
70333	1	Buzzer
2717	1	Ignition Switch
16260	1	Toggle Switch
20562	1	Circuit Breaker
4014	4	Mercury Switch
70337	1	Time Delay Relay
70479	4	Diode



LEGEND FOR LIMIT SWITCHES.



115 A.C. WIRING.



NOTES:
1. TO CONNECT GROUND CONTROL AND AERIAL CONTROL USE ARM CABLE P/N 130228.
2. FOR 115V A.C. GENERATOR OPTION SEE DWG 131529.
3. USE 6A. 1000V DIODE P/N 70479.
4. WIRING AND SWITCHES ARE SHOWN IN STOWED POSITION.
5. IDENTIFY EACH WIRE BY NUMBER FLAG AT BOTH ENDS WRAPPING COMPLETELY AROUND.
6. USE WIRE #23 FOR 23 AND #8 FOR 49.
7. RUN SEPERATE CABLE FOR 115V A.C. ARE (12-3 CORD) 5FT. EXTRA COILED AT BOTH ENDS.
8. RELABELED WIRE #64 TO WIRE #24.
9. RELABEL WIRE #56 IN ARM CABLE TO 32 TO BE USED IN SOLID STATE SLOPE SENSOR CIRCUIT.
10. RELABEL WIRE #57 IN ARM CABLE TO #21 TO BE USED IN TRAVEL WARNING HORN OPTION.

Mark Industries

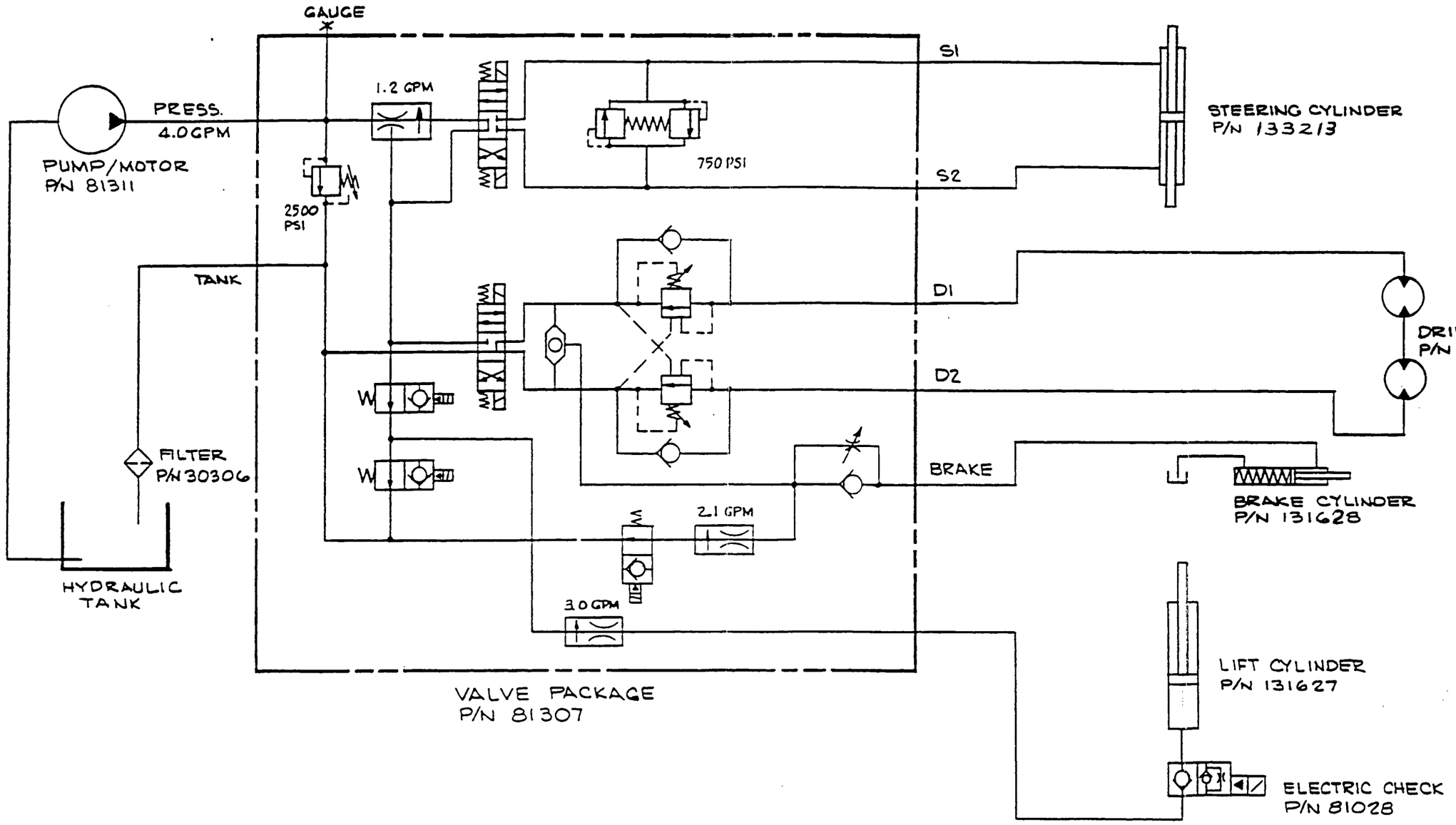
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MODEL	J20NEP
NOTES	133098 REV NC

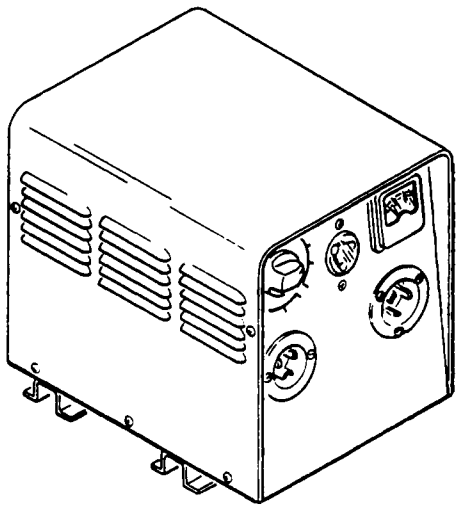
SCHEMATIC	
PAGE	1

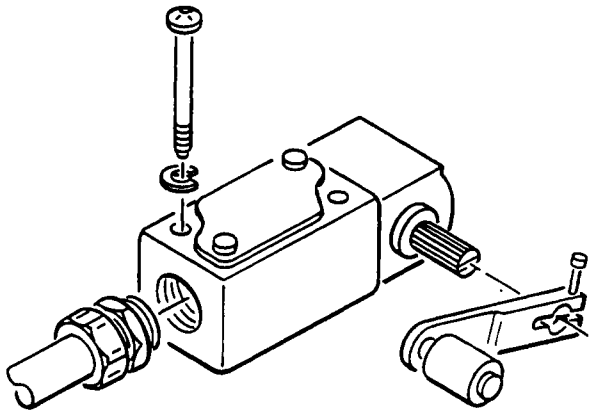
Mark Industries

TITLE	HYDRAULIC SCHEMATIC
MODEL	J20NEP
NOTES	133318 REV NC

SCHEMATIC PAGE 2



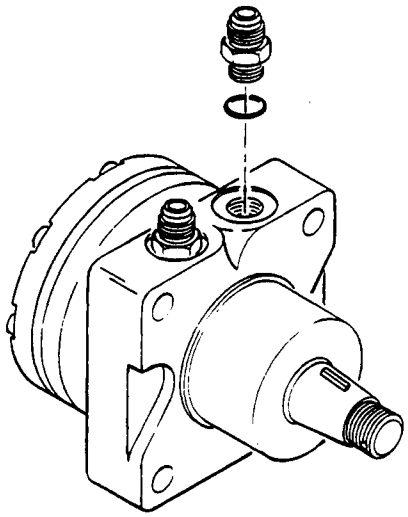


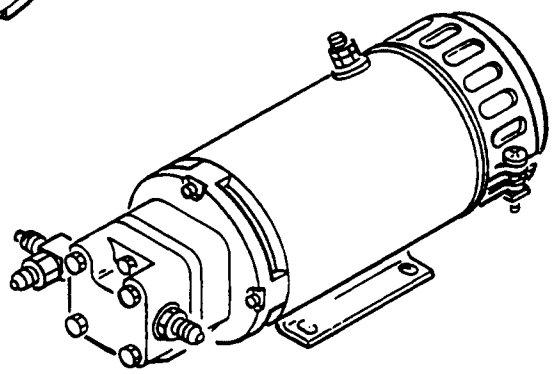


SECTION 1 CONTAINS:

PAGE NO.	TITLE
1	NOTICE TO USERS
2	TABLE OF CONTENTS
4	HOW TO USE THE PARTS CHAPTER
6	HOW TO ORDER PARTS







DISCLAIMER

MARK INDUSTRIES strives to include in the Parts Chapter, information and illustrations that are accurate, complete, and current. Due to on-going changes and revisions by our many suppliers, it is often impossible to show all variations of a given assembly. Therefore, this information is subject to change without notice.

Despite the care and effort taken in preparing this Parts Chapter, MARK INDUSTRIES makes **no warranties** that the information and illustrations herein are totally accurate and complete.

NOTICE

The Parts Chapter, though sometimes helpful in the process of assembly/ disassembly, is **NOT** intended to be assembly/disassembly instructions.

THIS PARTS CHAPTER CONTAINS:

SECTION 1	INTRODUCTION TO THE PARTS CHAPTER
PAGE NO.	TITLE
1	NOTICE TO USERS
2	TABLE OF CONTENTS
4	HOW TO USE THE PARTS CHAPTER
6	HOW TO ORDER PARTS

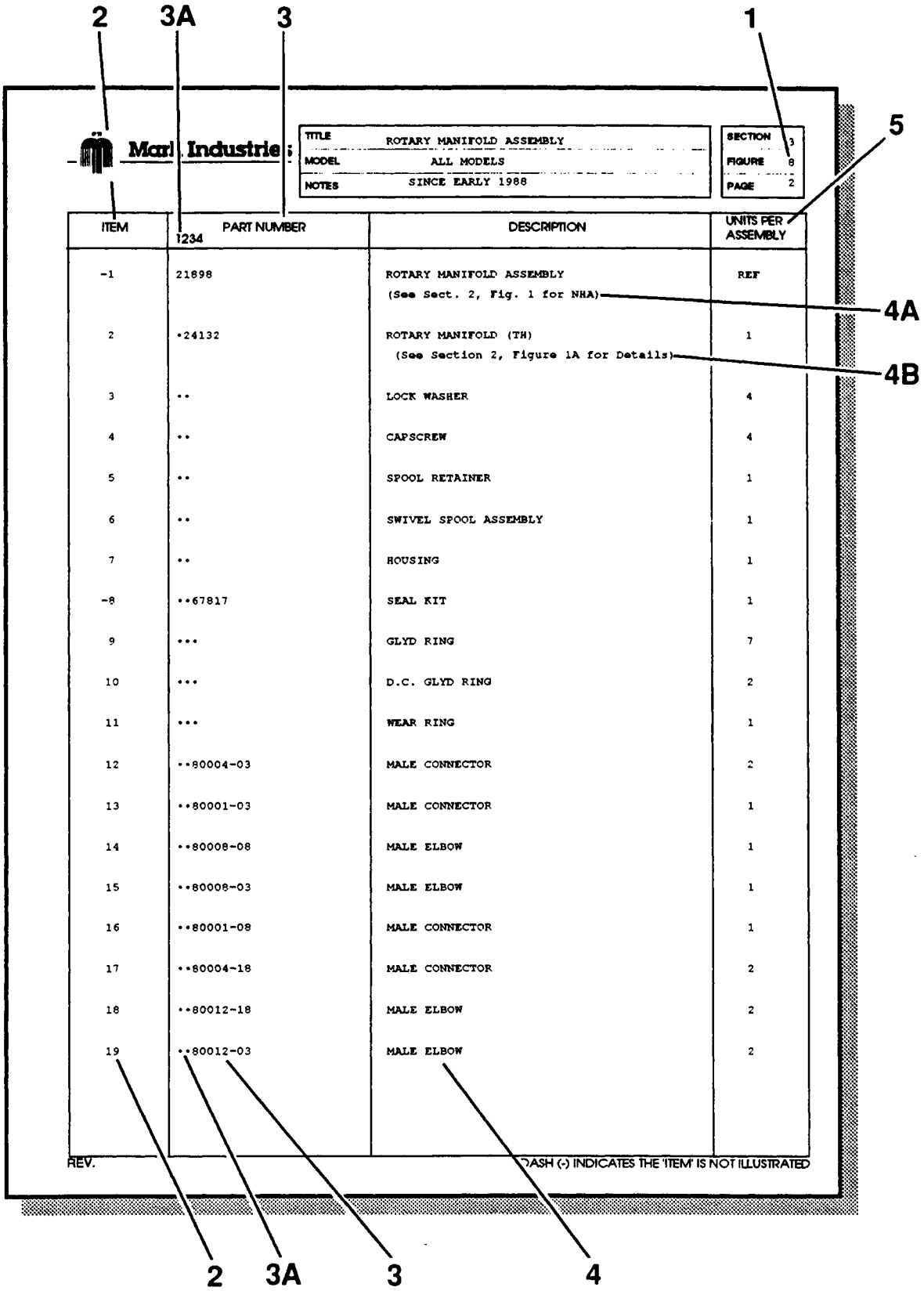
SECTION 2	FINAL ASSEMBLY
FIG. NO.	TITLE
1	FINAL ASSEMBLY
2	UPPER CONTROL BOX ASSEMBLY
3	DECAL SET
4	HYDRAULIC HOSE KIT

SECTION 3	FRAME ASSEMBLY
FIG. NO.	TITLE
1	FRAME ASSEMBLY
2	TIRE & WHEEL ASSEMBLY
3	HUB ASSEMBLY
4	BRAKE-HUB WELDMENT ASSEMBLY
5	BRAKE CYLINDER ASSEMBLY
6	PUMP/MOTOR ASSEMBLY
7	CONTROL BOX ASSEMBLY
8	VALVE PACKAGE ASSEMBLY (BEFORE JULY 1990)
8A	VALVE PACKAGE ASSEMBLY (AFTER JULY 1990)
9	TILT SWITCH ASSEMBLY
10	FILTER ASSEMBLY
11	BATTERY CABLE KIT
12	STEERING CYLINDER ASSEMBLY
13	DRIVE MOTOR ASSEMBLY
14	COMPONENT BOX ASSEMBLY
15	BATTERY CHARGER (DOMESTIC)
16	BATTERY CHARGER (INTERNATIONAL)

SECTION 4	SCISSOR ASSEMBLY
FIG. NO.	TITLE
1	SCISSOR ASSEMBLY
2	INNER ARM FIRST STAGE WELDMENT
3	INNER ARM SECOND STAGE WELDMENT
4	INNER ARM THIRD STAGE WELDMENT
5	OUTER ARM ASSEMBLY
6	LIFT CYLINDER ASSEMBLY

SECTION 5	PLATFORM ASSEMBLY
FIG. NO.	TITLE
1	PLATFORM ASSEMBLY

SECTION 6	OPTIONS
FIG. NO.	TITLE
1	WARNING HORN
2	HOURMETER
3	REMOTE DRIVE KIT
4	ROTATING AMBER BEACON
5	24 VOLT PLATFORM WORK LIGHT
6	SWING GATE
7	FEMALE PLUG ONLY FOR REMOTE DRIVE
8	LANYARD/CONTROL BOX ONLY FOR REMOTE DRIVE
9	TUV PACKAGE
10	ALL MOTION ALARM
11	SOLID STATE SLOPE SENSOR
12	SOLID STATE DELUXE CHARGER



Mark Industries

TITLE	ROTARY MANIFOLD ASSEMBLY
MODEL	ALL MODELS
NOTES	SINCE EARLY 1988

SECTION	3
FIGURE	8
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSEMBLY
-1	21898	ROTARY MANIFOLD ASSEMBLY (See Sect. 2, Fig. 1 for NHA)	REF
2	•24132	ROTARY MANIFOLD (TH) (See Section 2, Figure 1A for Details)	1
3	••	LOCK WASHER	4
4	••	CAPSCREW	4
5	••	SPOOL RETAINER	1
6	••	SWIVEL SPOOL ASSEMBLY	1
7	••	HOUSING	1
-8	••67817	SEAL KIT	1
9	•••	GLYD RING	7
10	•••	D.C. GLYD RING	2
11	•••	WEAR RING	1
12	••80004-03	MALE CONNECTOR	2
13	••80001-03	MALE CONNECTOR	1
14	••80008-08	MALE ELBOW	1
15	••80008-03	MALE ELBOW	1
16	••80001-08	MALE CONNECTOR	1
17	••80004-18	MALE CONNECTOR	2
18	••80012-18	MALE ELBOW	2
19	••80012-03	MALE ELBOW	2

REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

1. The Parts Chapter Pagination.

   A. **SECTION** refers to the major divisions of the Parts Chapter.

   B. **FIGURE** refers to the items illustrated separately in each section.

   C. **PAGE** indicates the page number of the figure illustrated.

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.)

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

   A. The **Indenture System** used in the Parts Chapter of this Technical Manual shows the relationship of one part to another.

   Part Number

   1 2 3 4

   . Items ***included*** as part of the **figure**.

   . . Items ***included*** as part of the **single indentured** item listed directly above it.

   . . . Items ***included*** as part of the **double indentured** item listed directly above it.

   . . . . Items ***included*** as part of the **triple indentured** item listed directly above it.

4. Elements of the **Description**.

   A. **NHA** (**N**ext **H**igher **A**ssembly) corresponds to the Section and Figure to be referred to for the major assembly that this item is part of.

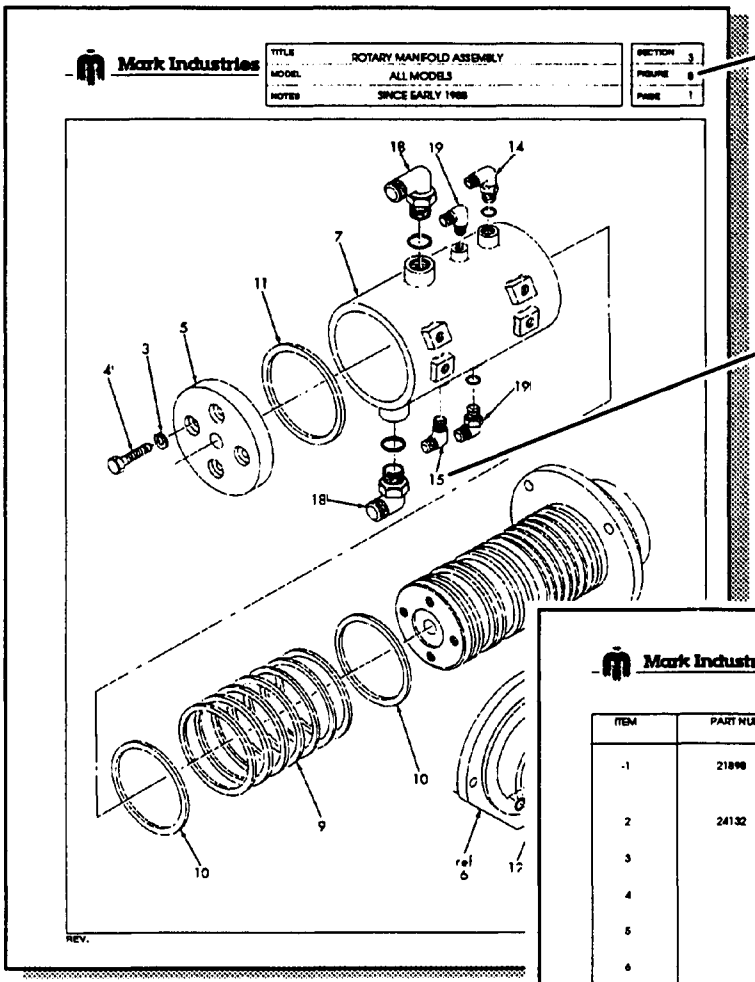
   B. **DETAILS** corresponds to the Section and Figure to be referred to for a more detailed breakdown of this item.

5. **UNITS PER ASSEMBLY** entries are as follows:

   A. **REF** indicates the item is already listed in the NHA figure.

   B. **AR** indicates the part is used in a quantity *As Required.*

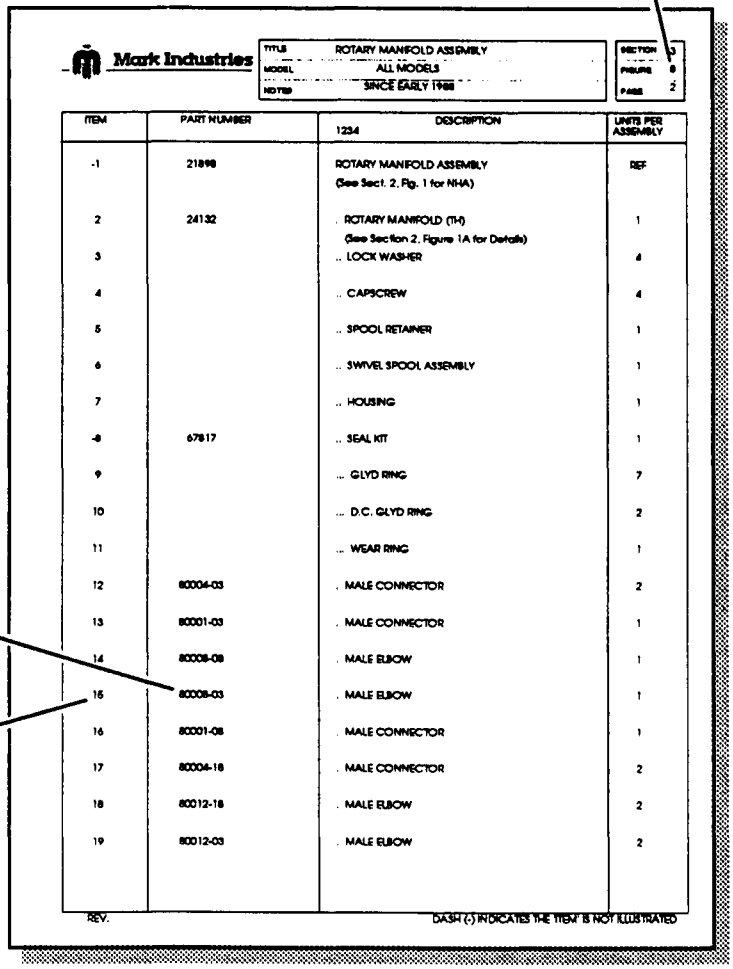
   C. A **number** indicates the *quantity* of the part used in the next higher assembly.



1A

1B

1A



ITEM	PART NUMBER	DESCRIPTION 1234	UNITS PER ASSEMBLY
-1	21898	ROTARY MANIFOLD ASSEMBLY (See Sect. 2, Fig. 1 for NHA)	REF
2	24132	. ROTARY MANIFOLD (TH) (See Section 2, Figure 1A for Details)	1
3		.. LOCK WASHER	4
4		.. CAPSCREW	4
5		.. SPOOL RETAINER	1
6		.. SWIVEL SPOOL ASSEMBLY	1
7		.. HOUSING	1
-8	67817	.. SEAL KIT	1
9		... GLYD RING	7
10		... D.C. GLYD RING	2
11		... WEAR RING	1
12	80004-03	. MALE CONNECTOR	2
13	80001-03	. MALE CONNECTOR	1
14	80008-08	. MALE ELBOW	1
15	80008-03	. MALE ELBOW	1
16	80001-08	. MALE CONNECTOR	1
17	80004-16	. MALE CONNECTOR	2
18	80012-16	. MALE ELBOW	2
19	80012-03	. MALE ELBOW	2

REV.

DASH (-) INDICATES THE ITEM IS NOT ILLUSTRATED

1D

1C

1. Finding the Mark Industries Part Number.

   A. Using the Table of Contents, find the Section and Figure Number. Locate the correct page by referencing these numbers.

   B. Match the required part to the figure illustration. Note the Item Number.

   C. Find the Item Number on the part listing that follows the figure.

   D. Use the Mark Industries Part Number listed next to the Item Number when ordering.

2. Ordering: Listed below are the methods of ordering parts. The **preferred** method of ordering parts is by **FAX**.

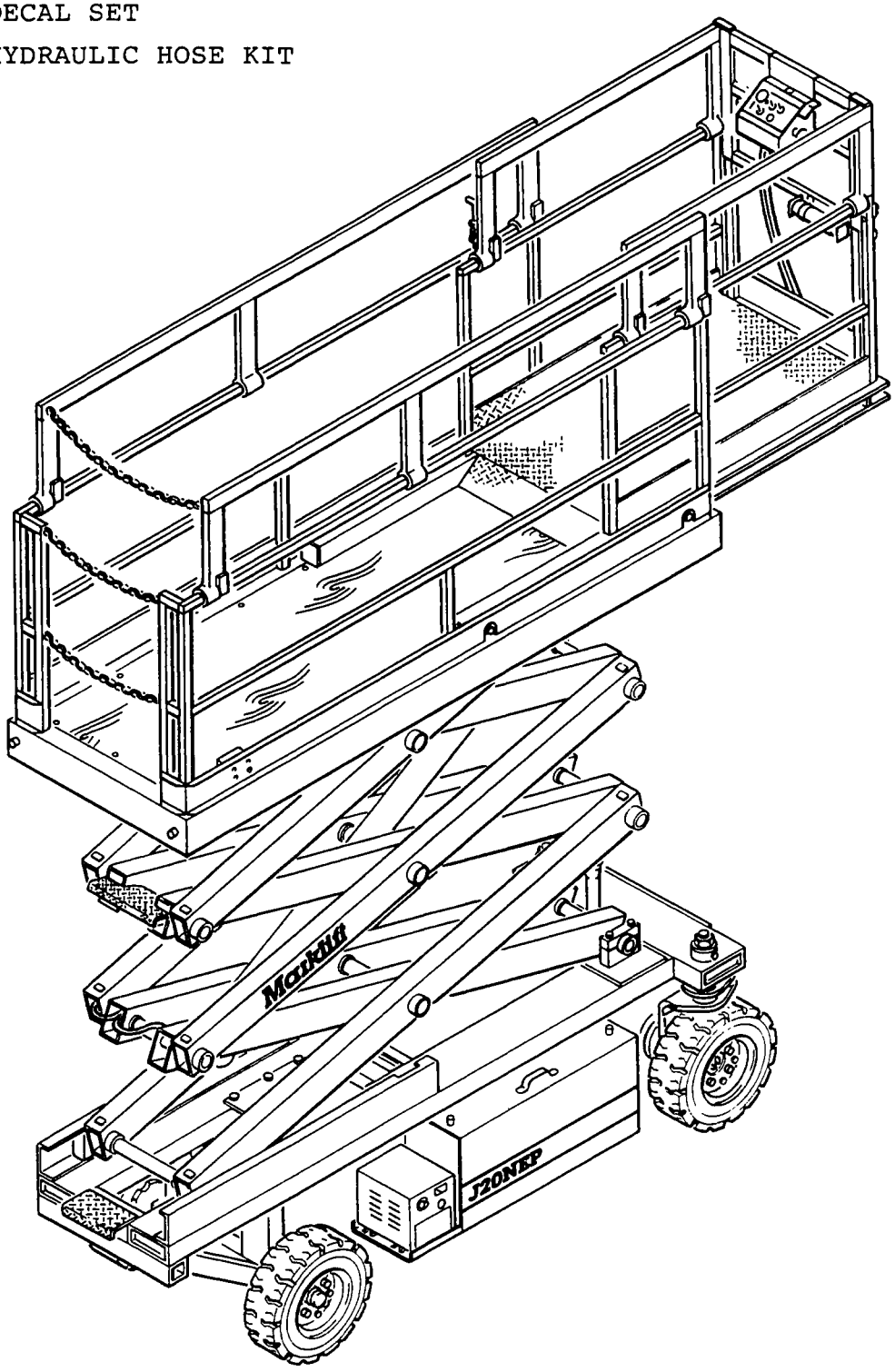
   A. By **FAX**: **(714) 879-8884**

   B. By Phone: (714) 879-MARK

   C. By Mail: MARK INDUSTRIES
   ATTENTION: PARTS DEPARTMENT
   P.O. BOX 2255
   BREA, CA. 92622

SECTION 2 CONTAINS:

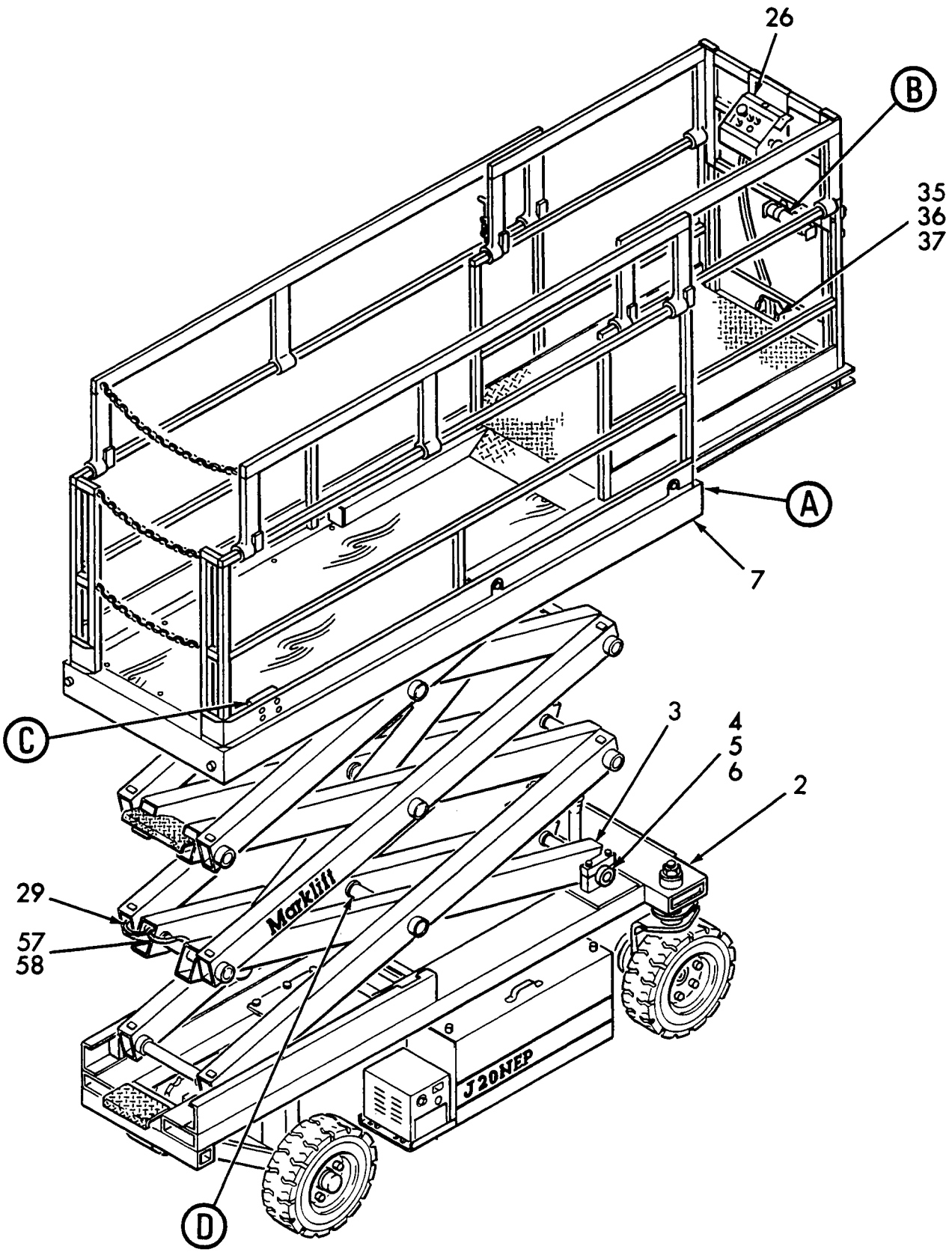
FIG. NO.	TITLE
1	FINAL ASSEMBLY
2	UPPER CONTROL BOX ASSEMBLY
3	DECAL SET
4	HYDRAULIC HOSE KIT



Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	1
PAGE	1

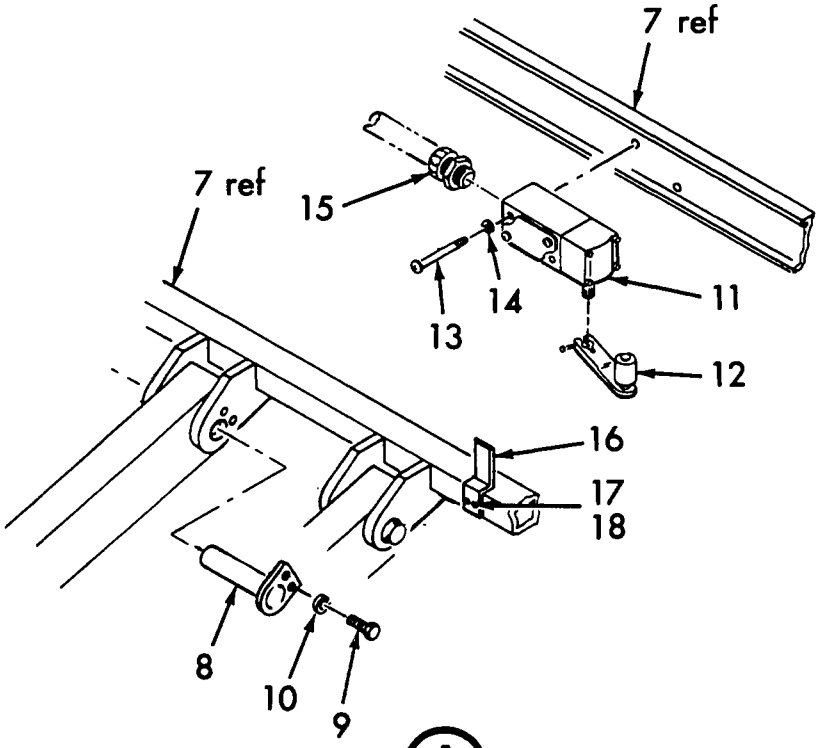


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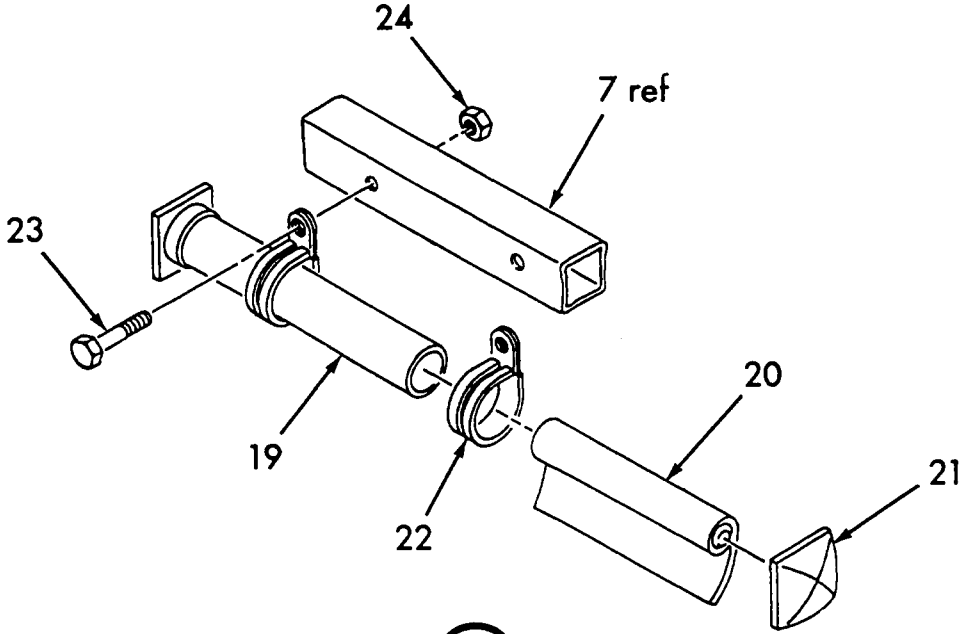
Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	1
PAGE	2



A



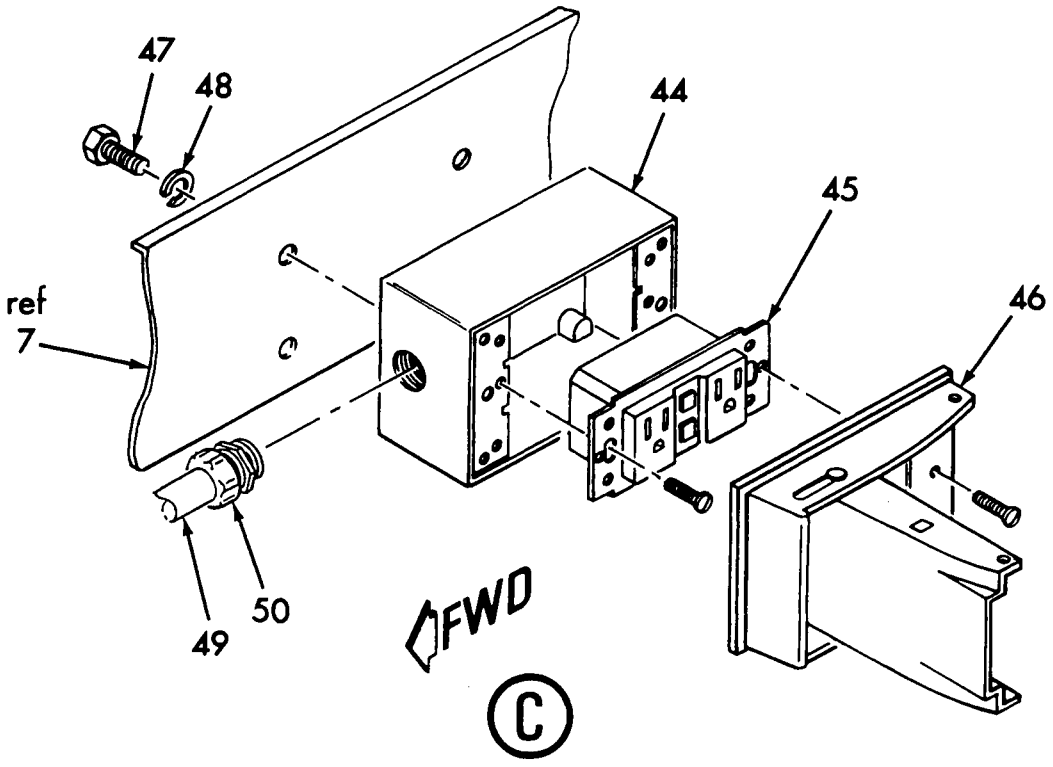
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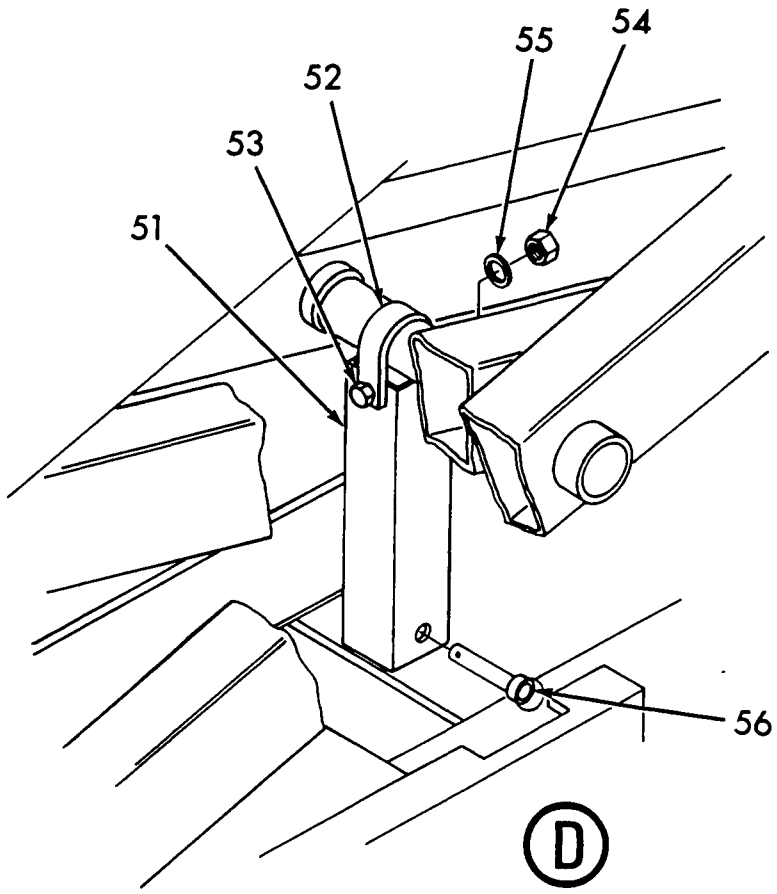
REV.

Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	1
PAGE	3





REV.

Mark Industries

TITLE	FINAL ASSEMBLY	SECT.	2
MODEL	J20NEP	FIG.	1
NOTES		PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	130064	ASSEMBLY, FINAL	REF
2	.133291	ASSEMBLY, FRAME (See Sect. 3, Fig. 1 for Details)	1
3	.131681	ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1 for Details)	1
4	.160177	BEARING, SLEEVE	2
5	.65577	SHAFT, COLLAR	2
6	.62238	SCREW, SET	2
7	.133190	ASSEMBLY, PLATFORM (See Sect. 5, Fig. 1 for Details)	1
8	.131692	PIN, ARM/DECK	2
9	.60353	SCREW, HEX HEAD CAP	4
10	.63301	WASHER, LOCK	4
11	.70173	SWITCH, LIMIT	4
12	.70032	LEVER, OPERATING	1
13	.62708	SCREW, MACHINE	1
14	.63313	WASHER, LOCK	2
15	.2806	RELIEF, STRAIN	1
16	.133110	STOP, LIMIT SWITCH	1
17	.60353	SCREW, CAP	2
18	.63301	WASHER, LOCK	2
19	.130927	CONTAINER, PLASTIC	1
20	.17034	HANDBOOK, OPERATION & SAFETY	1
21	.65842	CAP, ANTI-ROLL	2
22	.65867	CLAMP	2
23	.60315	SCREW, HEX HEAD CAP	2
24	.60711	NUT, HEX	2

Mark Industries

TITLE	FINAL ASSEMBLY	SECT. 2
MODEL	J20NEP	FIG. 1
NOTES		PAGE 5

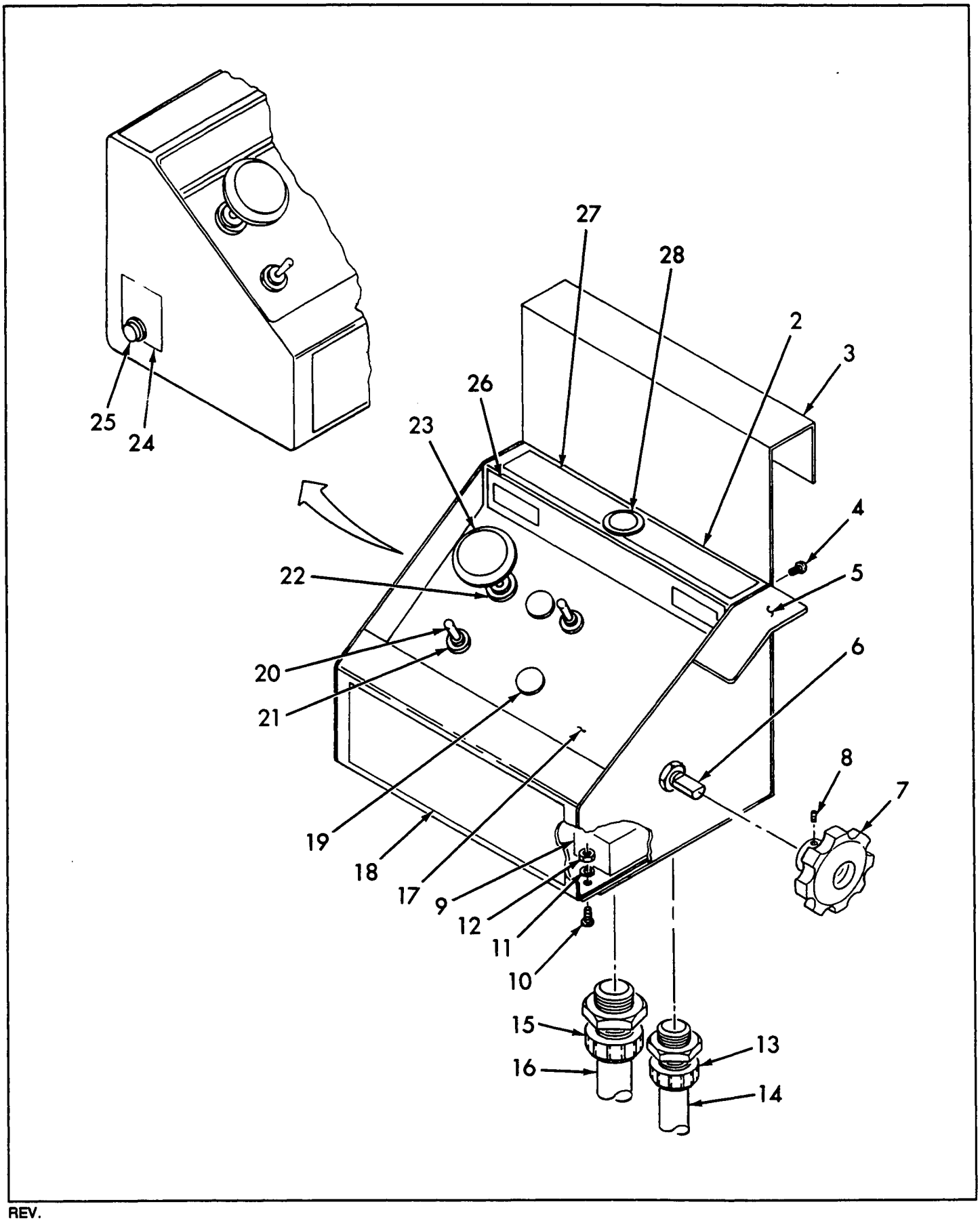
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-25	.600137	SET, DECAL (See Sect. 2, Fig. 2 for Details)	1
26	.133097	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 3 for Details)	1
-27	..2806	RELIEF, STRAIN (UPPER CONTROL BOX)	1
-28	..2807	RELIEF, STRAIN (UPPER CONTROL BOX)	1
29	.130228-51	CABLE, CONDUCTOR	51 FT
-30	.764	CLAMP, RUBBER	7
-31	.60342	SCREW, CAP	7
-32	.63301	WASHER, LOCK	7
-33	.60309	SCREW, CAP	2
-34	.60711	NUT, HEX	2
35	.133135	BRACKET, CABLE	1
36	.160292	SCREW, CAP	2
37	.63313	WASHER, LOCK	2
-38	.133290	HOSE, HYDRAULIC (CONDUCTOR CABLE CONDUIT)	50 FT
-39	.65451	CLAMP, HOSE	1
-40	.160017	U-BOLT	1
-41	.61318	NUT, LOCK	2
-42	.255	TIE, CABLE	22
-43	.133098	SCHEMATIC, ELECTRICAL (See Schematic Section for Details)	1
44	.70262	BOX, UNIVERSAL	1
45	.70391	DUPLEX, RECEPTACLE	1
46	.70392	COVER, SNAP	1
47	.62607	SCREW, MACHINE	4
48	.63313	WASHER, LOCK	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
49	.4034	CABLE	40 FT
50	.2807	RELIEF, STRAIN	1
51	.131767	ARM, SERVICE STAND	1
52	.131766	CLAMP, SERVICE STAND	1
53	.60341	SCREW, HEX HEAD CAP	1
54	.60701	NUT, HEX	1
55	.63301	WASHER, LOCK	1
56	.30701	DETENT, PIN BALL-LOK	1
-57	.131737	SCHEMATIC, HYDRAULIC (See Schematic Section for Details)	1
-58	.133318	DIAGRAM, HYDRAULIC HOSE (See Sect. 2, Fig. 4 for Details)	1
-59	.63654	RIVET, POP	9
-60	.65116	OIL, HYDRAULIC	10 GAL
-61	.2673	PAINT, WHITE (TOUCH UP)	1 CAN
-62	.65368	PAINT, BLUE (TOUCH UP)	1 CAN
-63	.16608	PAINT, WHITE WATER BASE	3 GAL
-64	.65389	PAINT, BLUE WATER BASE	1 GAL
-65	.17223	MANUAL, TECHNICAL (J20NEP)	1

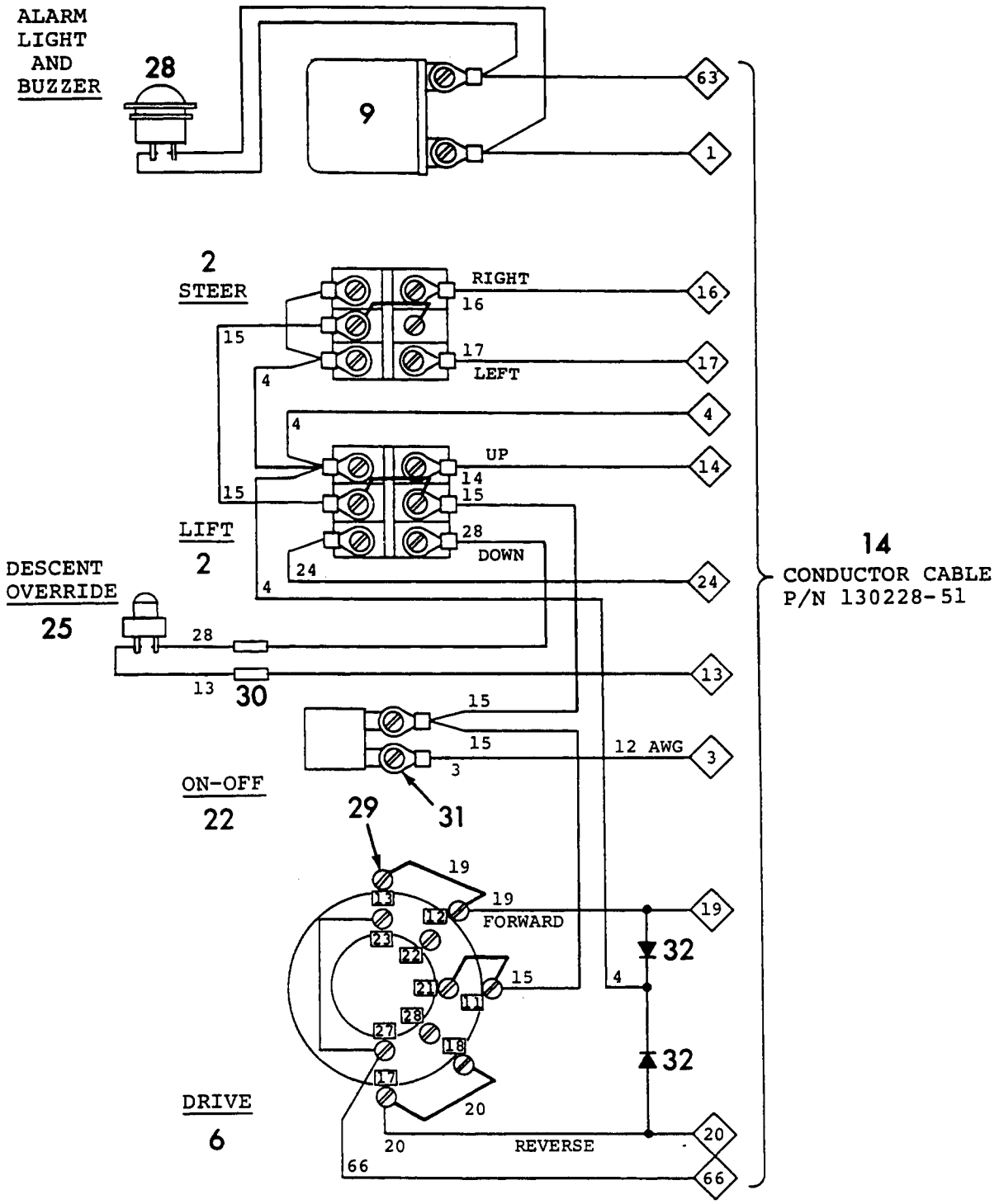
Mark Industries

TITLE	UPPER CONTROL BOX ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	2
FIGURE	2
PAGE	1



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ALARM LIGHT AND BUZZER
28
9
63
1
2
STEER
RIGHT
16
15
17
LEFT
4
4
UP
14
15
LIFT
2
28
DOWN
24
DESCENT OVERRIDE
25
28
13
30
13
15
15
12 AWG
3
3
ON-OFF
22
29
31
19
19
FORWARD
32
15
4
32
DRIVE
6
20
20
REVERSE
66
66
14
CONDUCTOR CABLE
P/N 130228-51

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Mark Industries

TITLE	UPPER CONTROL BOX ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	2
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ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133097	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 1 for NHA)	REF
2	.131730	BOX, UPPER CONTROL	1
3	.133112	COVER, CONTROL BOX	1
4	.61711	SCREW, SELF-TAPPING	6
5	.130782	DECAL, DRIVE	1
6	.4106	SWITCH, 5 POSITION	1
7	.65753	KNOB, FLUTED TORQUE	1
8	.62209	SCREW, SET	1
9	.70333	BUZZER (UNIVERSAL 24V)	1
10	.62703	SCREW, SLOTTED ROUND HEAD	2
11	.63413	WASHER, FLAT	2
12	.60802	NUT, HEX	2
13	.2806	RELIEF, STRAIN	1
14	.90547-84	CABLE, CONDUCTOR	7 FT
15	.2807	RELIEF, STRAIN	1
16	.130228-51	CABLE, CONDUCTOR	51 FT
17	.182739	DECAL, CONTROL BOX OPERATION	1
18	.20556	DECAL, LOAD CAPACITY 750 LBS.	1
19	.771	PLUG, WHITE	2
20	.20481	SWITCH, TOGGLE	2
21	.65131	NUT, RUBBER COATED	2
22	.4018	SWITCH, PUSH-PULL	1
23	.31080	KNOB, EMERGENCY ON/OFF	1
24	.130713	DECAL, DESCENT OVERRIDE	1
25	.4011	SWITCH, PUSH BUTTON	1

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries

TITLE	UPPER CONTROL BOX ASSEMBLY
MODEL	J20NEP
NOTES	

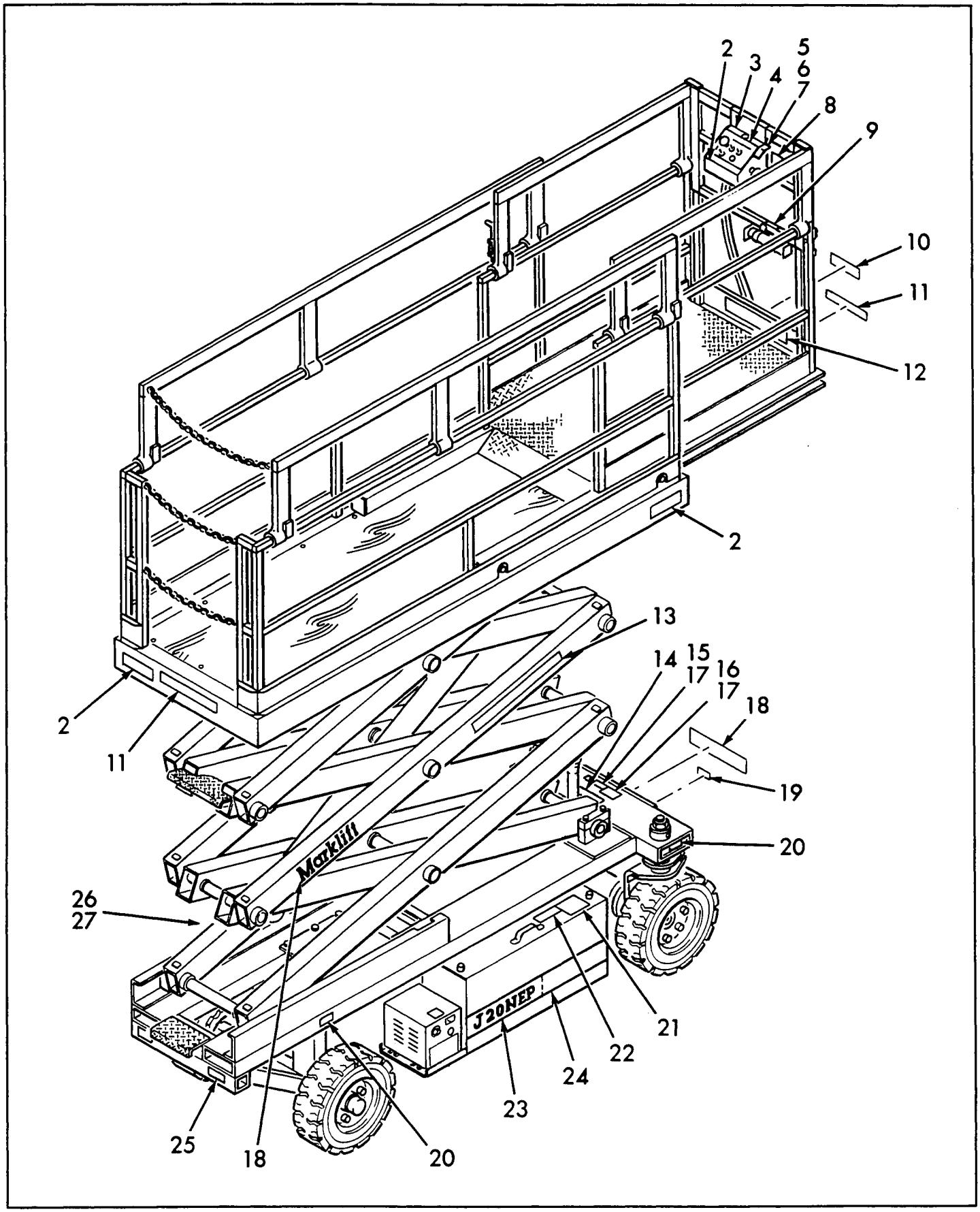
SECT.	2
FIG.	2
PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.2014	DECAL, "CAUTION" HIGH VOLTAGE LINE	1
27	.2015	DECAL, "WARNING" UNSTABLE CONDITION	1
28	.70344	LIGHT, PILOT INDICATOR	1
29	.16228-1	CONNECTOR, RING	12
30	.117-D	CONNECTOR, BUTT	2
31	.117-C	CONNECTOR, RING	22
32	.4045	DIODE (6 AMP, 200V)	2
33	.2991	WIRE, WHITE	1 FT
34	.255	TIE, CABLE	1
35	.256	TIE, CABLE	2

Mark Industries

TITLE	DECAL SET
MODEL	J20NEP
NOTES	

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FIG.	3
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Mark Industries

TITLE	DECAL SET	SECT.	2
MODEL	J20NEP	FIG.	3
NOTES		PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	600137	SET, DECAL (See Sect. 2, Fig. 1 for NHA)	REF
2	.2023	DECAL, LOAD CAPACITY 750 LBS.	5
3	.2014	DECAL, CAUTION HIGH VOLTAGE LINES (See Sect. 2, Fig. 2 for Details)	1
4	.2015	DECAL, WARNING UNSTABLE CONDITIONS (See Sect. 2, Fig. 2 for Details)	1
5	.182739	DECAL, UPPER CONTROL BOX (See Sect. 2, Fig. 2 for Details)	1
6	.130782	DECAL, UPPER CONTROL BOX (DRIVE) (See Sect. 2, Fig. 2 for Details)	1
7	.130713	DECAL, DESCENT OVERRIDE (See Sect. 2, Fig. 2 for Details)	1
8	.182784	DECAL, OPERATING INSTRUCTIONS	1
9	.130820	DECAL, OPERATION & SAFETY HANDBOOK	1
10	.130937	DECAL, J-SERIES	1
11	.31109	DECAL, CAUTION SCISSOR GUARD RAILS	2
12	.11064	DECAL, ATTACH SAFETY CHAINS	1
13	.130596	DECAL, A PRODUCT OF MARK INDUSTRIES	2
14	.2017	DECAL, HYDRAULIC SYSTEM FLUID	1
15	.20661	PLATE, ANSI A92	1
16	.20660	NAMEPLATE, IDENTIFICATION	1
17	.63653	RIVET, POP	8
18	.31259	DECAL, MARKLIFT	3
19	.2041	DECAL, DO NOT LIFT THIS END	1
20	.130949	DECAL, DANGER THIS IS A SOLID TIRE	4
21	.2003	DECAL, BATTERY WATER LEVEL	2
22	.2016	DECAL, DO NOT WORK UNDER	2

Mark Industries

TITLE	DECAL SET
MODEL	J20NEP
NOTES	

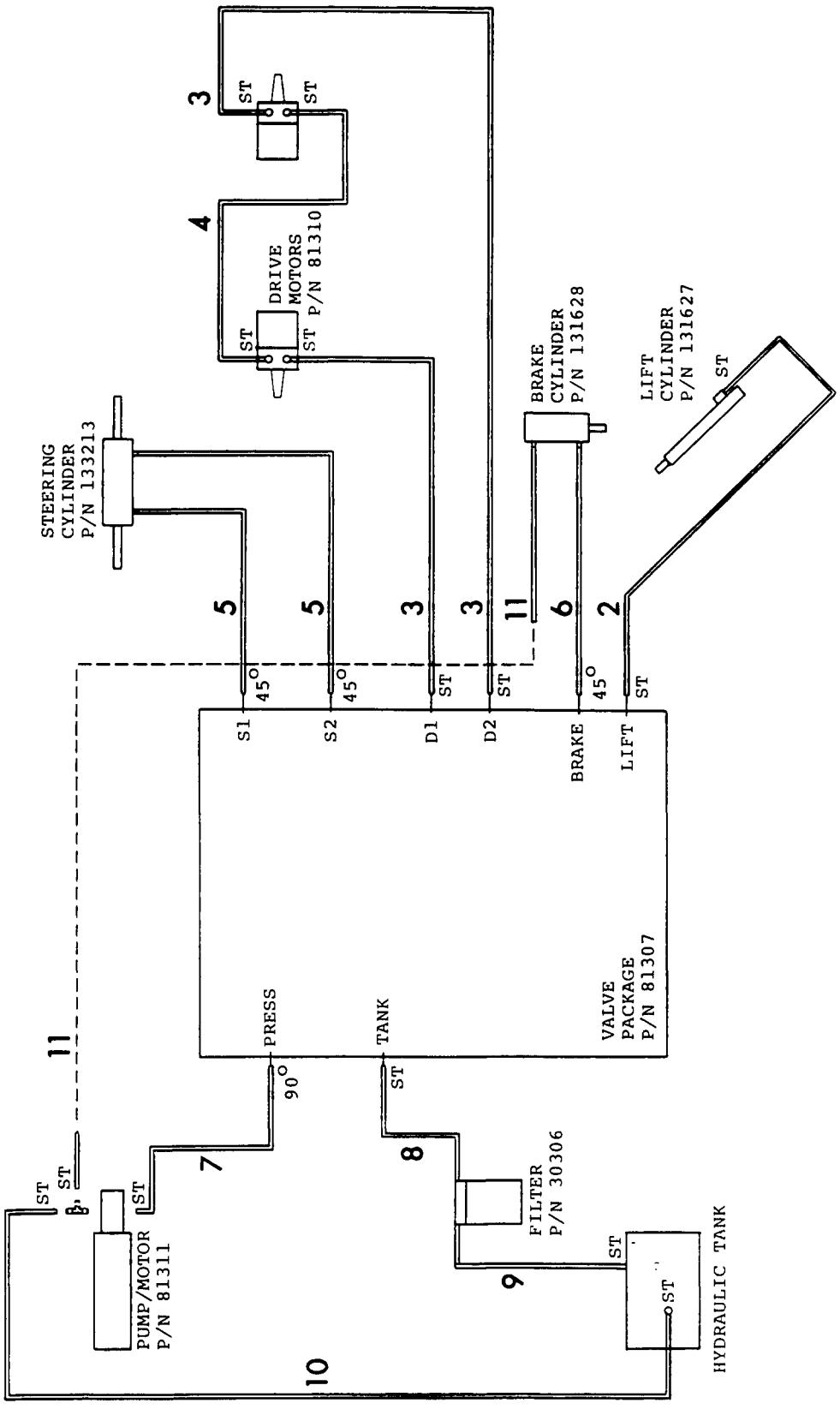
SECT.	2
FIG.	3
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ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
23	.181777	DECAL, J20NEP	2
24	.181728	DECAL, PANEL STRIP (CUT TO FIT)	2
25	.2002	DECAL, FORKLIFT BOOT	2
26	.182738	DECAL, GROUND CONTROL PANEL (See Sect. 3, Fig. 7 for Details)	1
27	.130606	DECAL, FREEWHEELING VALVE (See Sect. 3, Fig. 7 for Details)	1

Mark Industries

TITLE	HYDRAULIC HOSE KIT
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	4
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Mark Industries

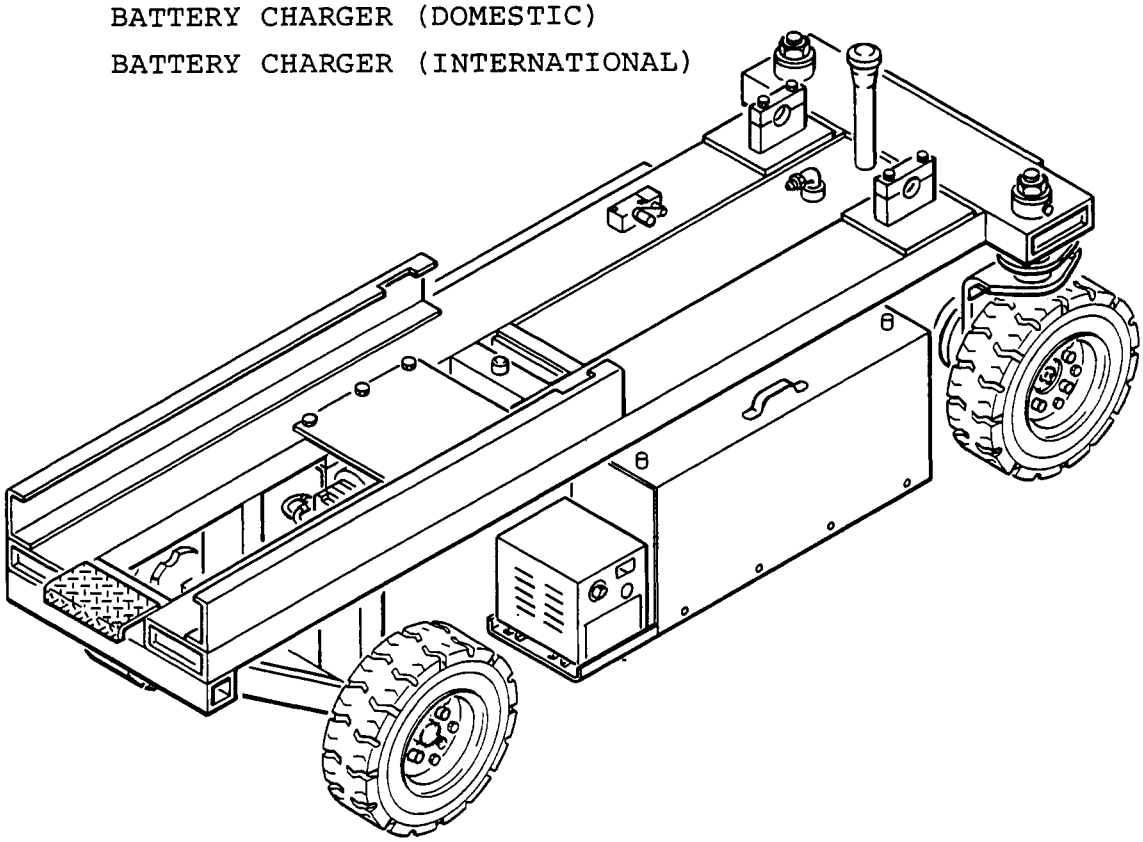
TITLE	HYDRAULIC HOSE DIAGRAM
MODEL	J20NEP
NOTES	

SECT.	2
FIG.	4
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ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133318	DIAGRAM, HYDRAULIC HOSE (See Sect. 2, Fig. 1 for NHA)	REF
2	.13210-04-1800	ASSEMBLY, HOSE	1
3	.13210-06-0810	ASSEMBLY, HOSE	2
4	.13210-06-0680	ASSEMBLY, HOSE	1
5	.13211-04-0540	ASSEMBLY, HOSE	2
6	.13211-04-0430	ASSEMBLY, HOSE	1
7	.13213-06-0360	ASSEMBLY, HOSE	1
8	.13205-08-0120	ASSEMBLY, HOSE	1
9	.13205-12-0390	ASSEMBLY, HOSE	1
10	.13205-08-0460	ASSEMBLY, HOSE	1
11	.13205-04-0080	ASSEMBLY, HOSE	2

SECTION 3 CONTAINS:

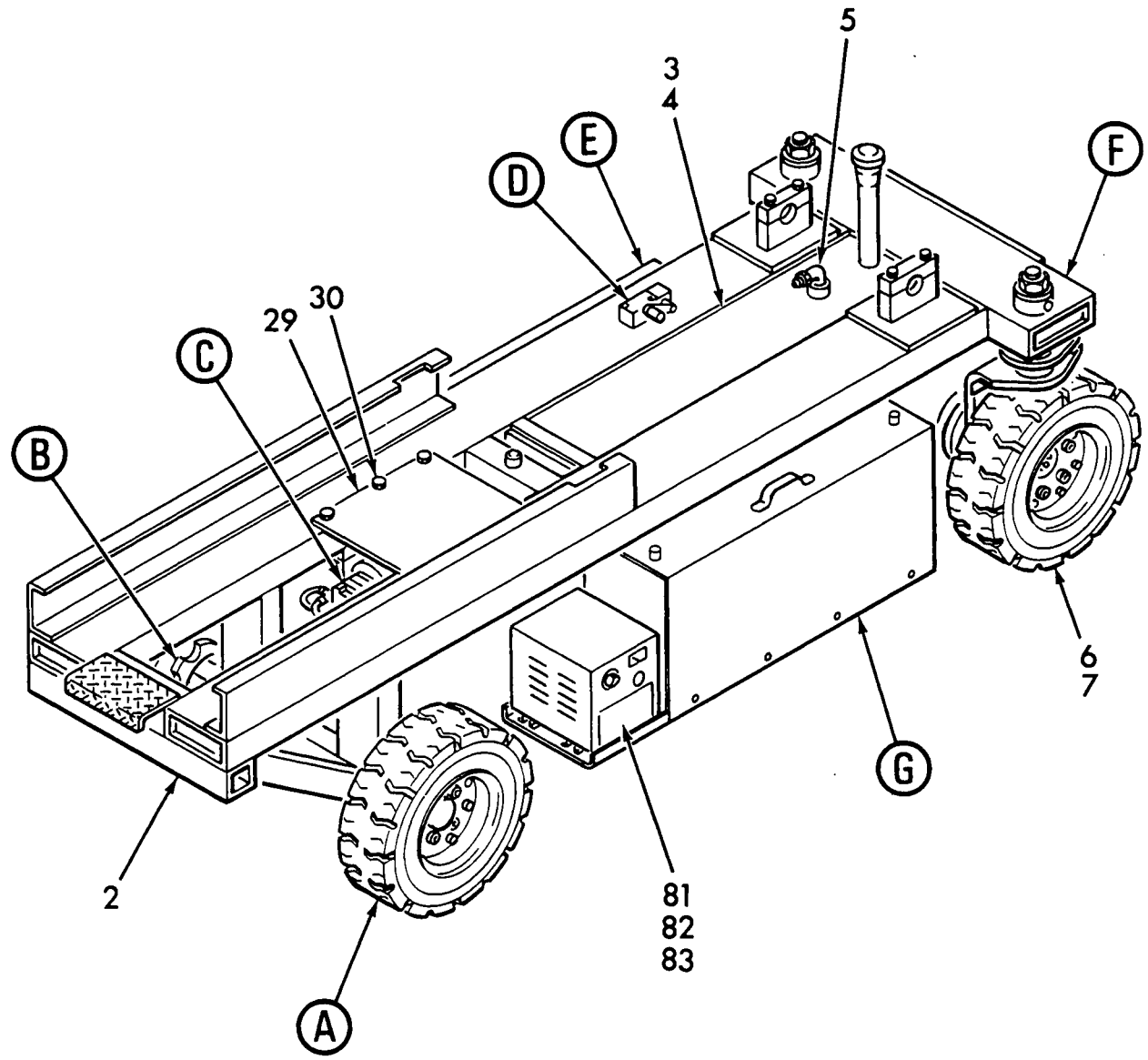
FIG. NO.	TITLE
1	FRAME ASSEMBLY
2	TIRE & WHEEL ASSEMBLY
3	HUB ASSEMBLY
4	BRAKE-HUB WELDMENT ASSEMBLY
5	BRAKE CYLINDER ASSEMBLY
6	PUMP/MOTOR ASSEMBLY
7	CONTROL BOX ASSEMBLY
8	VALVE PACKAGE ASSEMBLY (BEFORE JULY 1990)
8A	VALVE PACKAGE ASSEMBLY (AFTER JULY 1990)
9	TILT SWITCH ASSEMBLY
10	FILTER ASSEMBLY
11	BATTERY CABLE KIT
12	STEERING CYLINDER ASSEMBLY
13	DRIVE MOTOR ASSEMBLY
14	COMPONENT BOX ASSEMBLY
15	BATTERY CHARGER (DOMESTIC)
16	BATTERY CHARGER (INTERNATIONAL)



Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

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FIG.	1
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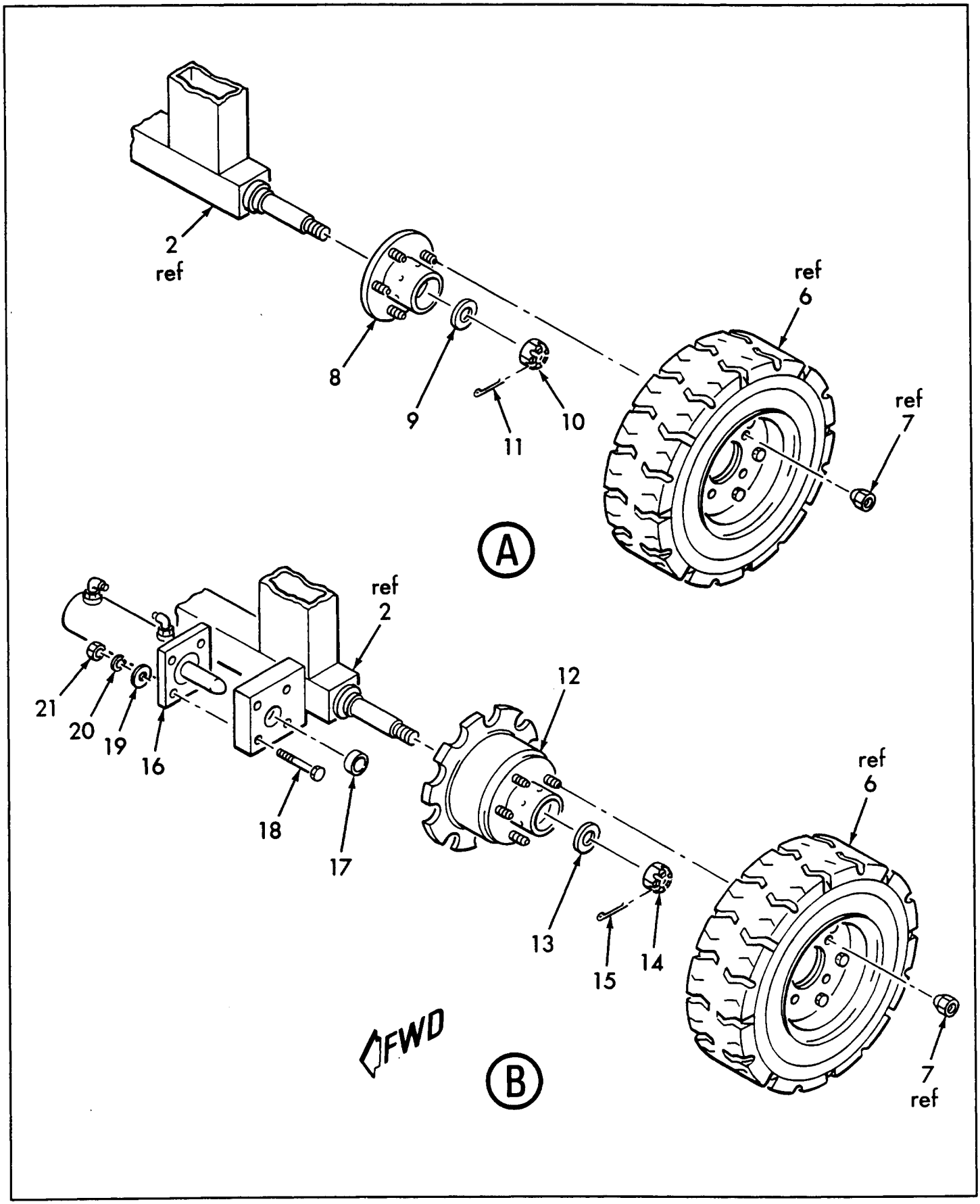


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	3
FIGURE	1
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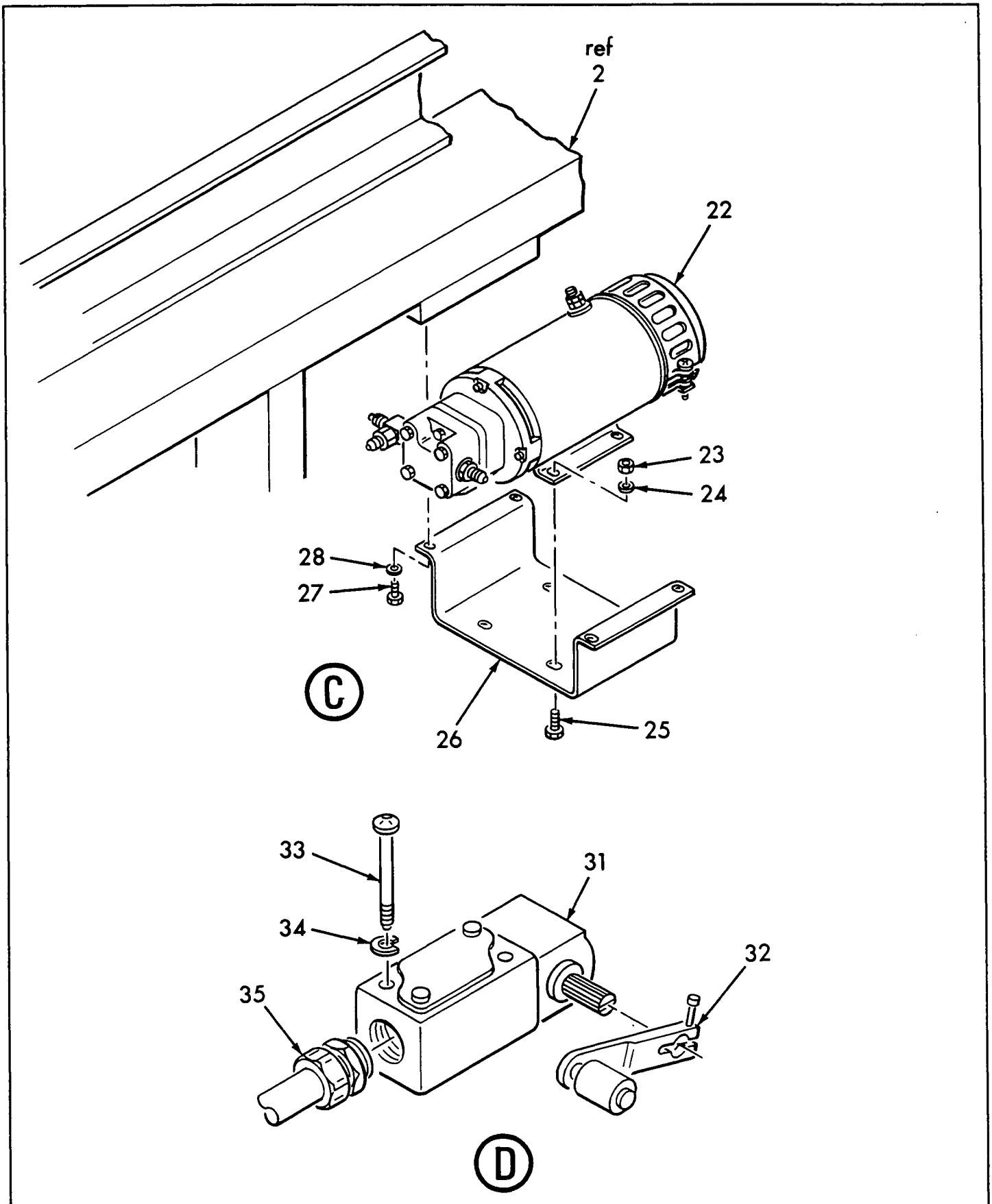


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	1
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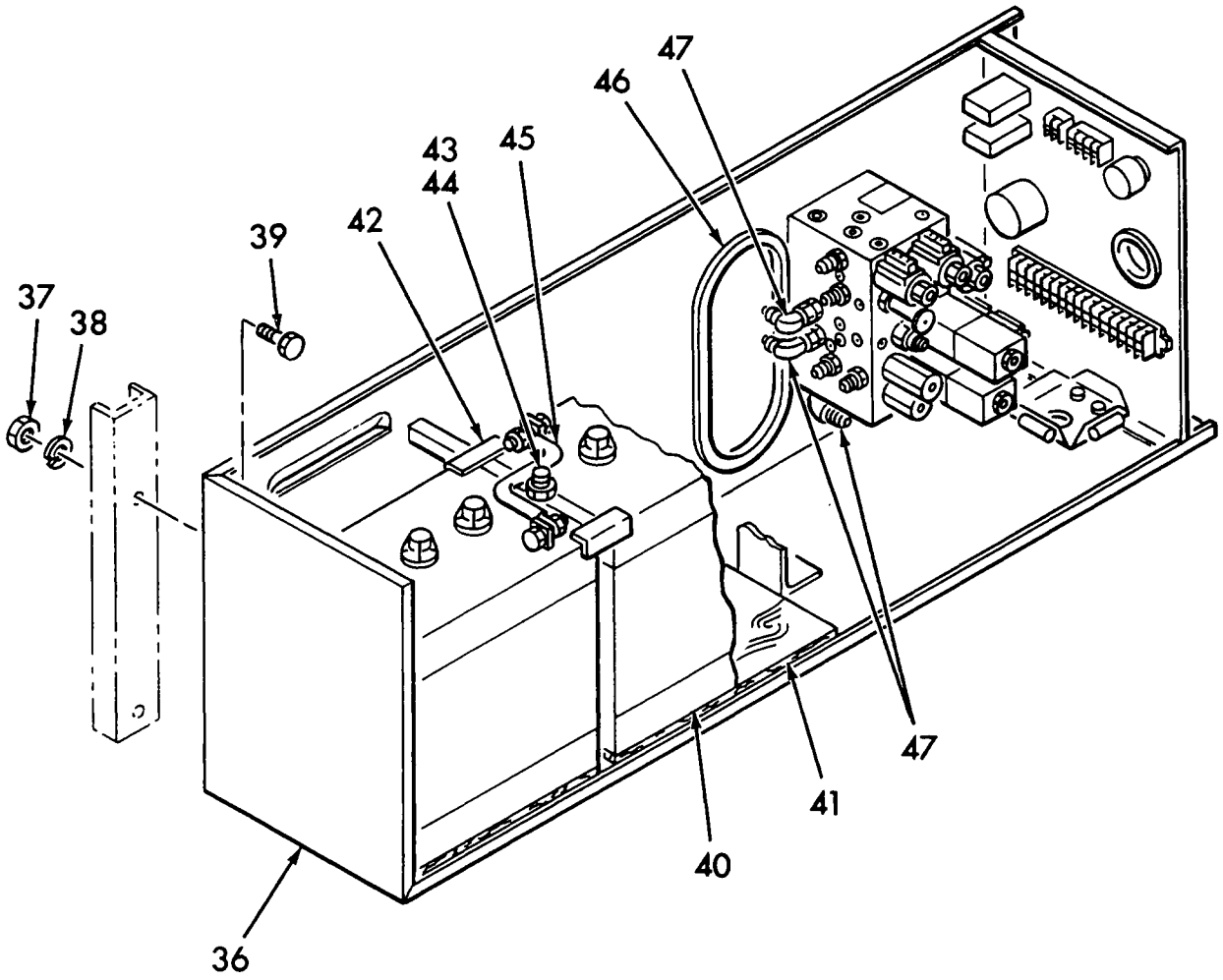


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	3
FIGURE	1
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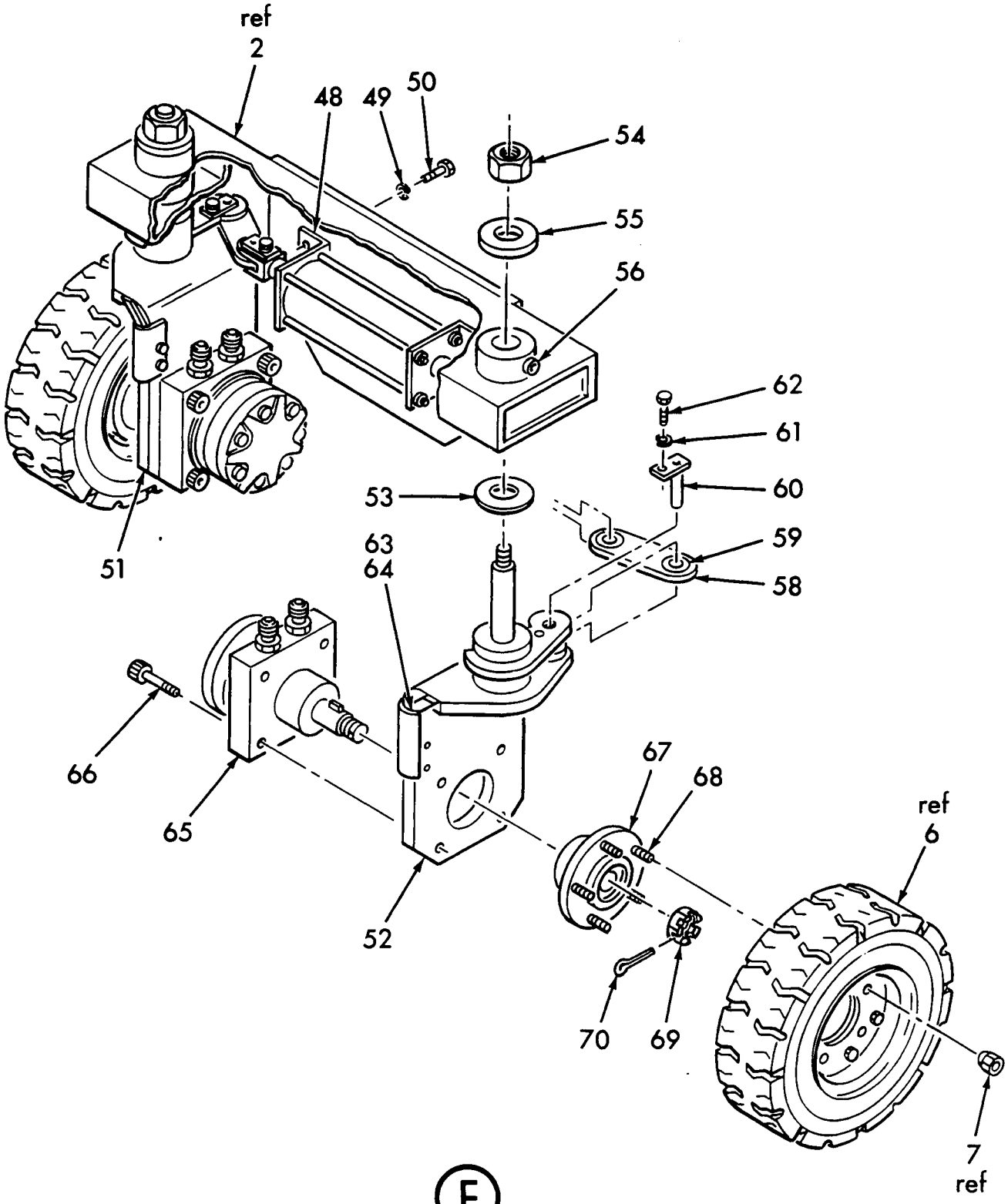


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	1
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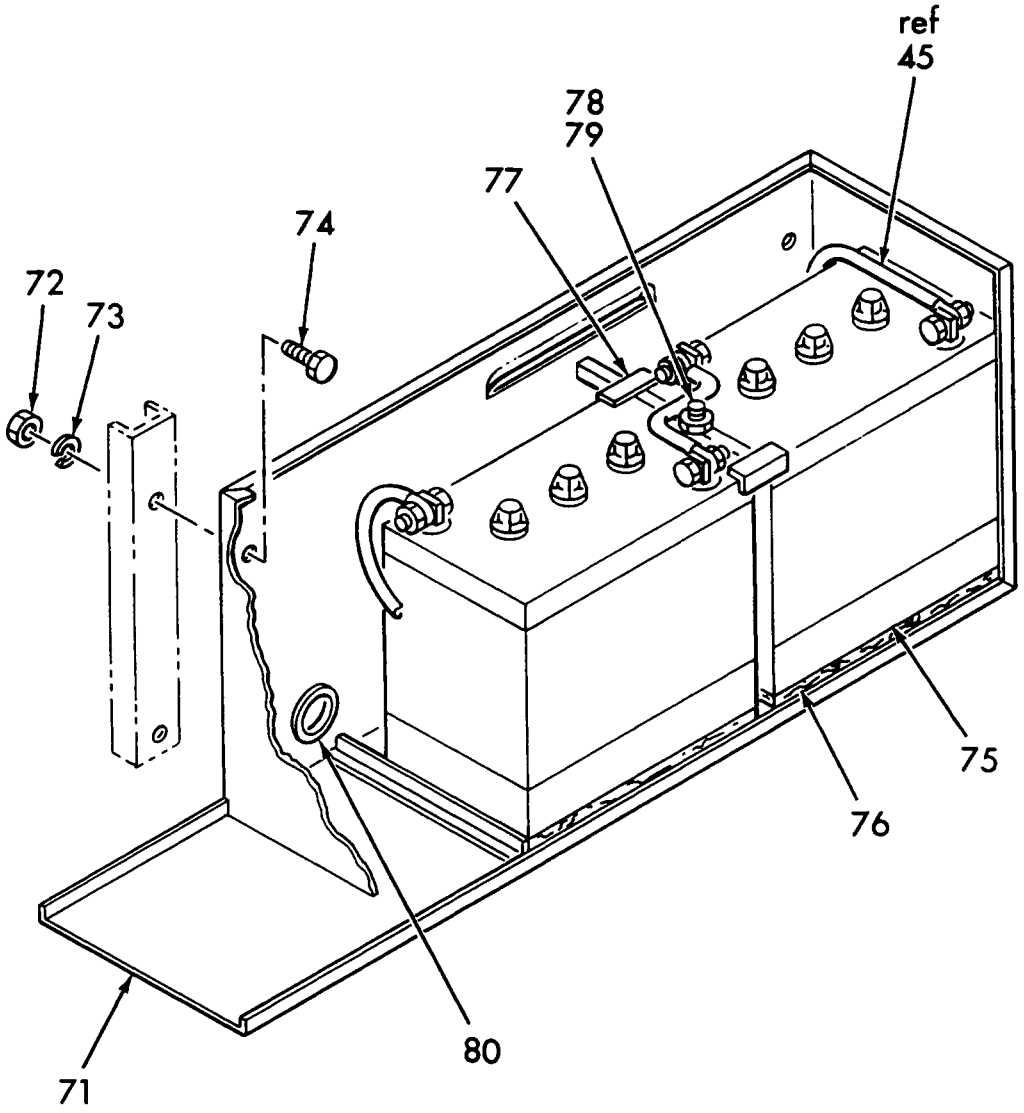


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

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FIG.	1
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Mark Industries

TITLE	FRAME ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	1
NOTES		PAGE	7

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133291	ASSEMBLY, FRAME (See Sect. 2, Fig. 1 for NHA)	REF
2	.133207	WELDMENT, FRAME	1
3	..133305	TANK, HYDRAULIC	1
-4	.80008-15	ELBOW, MALE (BOTTOM OF TANK)	1
5	.80008-19	ELBOW, MALE	1
6	.131620	ASSEMBLY, TIRE & WHEEL (See Sect. 3, Fig. 2 for Details)	4
7	.61316	NUT, LUG	20
8	134-1	ASSEMBLY, HUB (See Sect. 3, Fig. 3 for Details)	1
9	.63409	WASHER, FLAT	1
10	.60811	NUT, SLOTTED HEX	1
11	.64306	PIN, COTTER	1
12	.131685	ASSEMBLY, BRAKE-HUB WELDMENT (See Sect. 3, Fig. 4 for Details)	1
13	.63409	WASHER, FLAT	1
14	.60811	NUT, SLOTTED HEX	1
15	.64306	PIN, COTTER	1
16	.131698	ASSEMBLY, BRAKE CYLINDER (See Sect. 3, Fig. 5 for Details)	1
17	.160277	BUSHING	1
18	.60363	SCREW, CAP	4
19	.63405	WASHER, FLAT	4
20	.63305	WASHER, LOCK	4
21	.60705	NUT, HEX	4
22	.131699	ASSEMBLY, PUMP/MOTOR (See Sect. 3, Fig. 6 for Details)	1

Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	1
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ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
23	.61246	NUT, LOCK	4
24	.63402	WASHER, FLAT	4
25	.60338	SCREW, CAP	4
26	.131763	BRACKET, PUMP/MOTOR	1
27	.63402	WASHER, FLAT	3
28	.60353	SCREW, CAP	4
29	.131764	COVER, PUMP/MOTOR	1
30	.60353	SCREW, CAP	6
31	.70107	SWITCH, LIMIT	1
32	.70032	LEVER, OPERATING	1
33	.62615	SCREW, MACHINE	2
34	.63313	WASHER, LOCK	2
35	.70288	RELIEF, STRAIN	1
36	.133584	ASSEMBLY, CONTROL BOX (See Sect. 3, Fig. 7 for Details)	1
37	.60705	NUT, HEX	4
38	.63305	WASHER, LOCK	4
39	.60326	SCREW, CAP	4
40	.4007	BATTERY (6V 250 AMP)	2
41	.131570	PLYWOOD, BATTERY	2
42	.133316	WELDMENT, BATTERY RETAINER	1
43	.160155	ROD, THREADED	1
44	.61239	NUT, LOCK	2
45	.133314	KIT, BATTERY CABLE (See Sect. 3, Fig. 11 for Details)	1
46	.411-23.8	EXTRUSION, RUBBER	23.8"

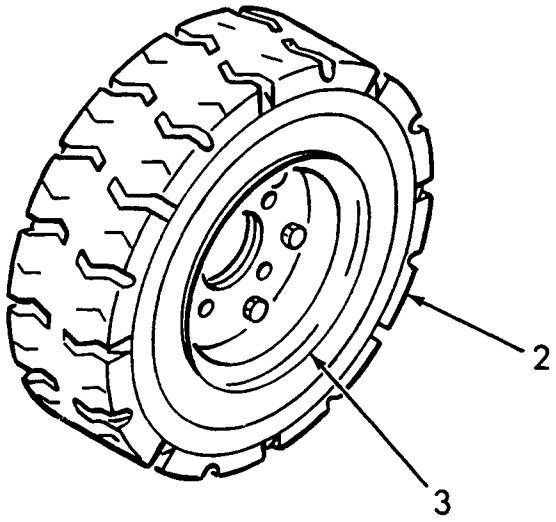
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
47	.80015-05	ELBOW, SWIVEL NUT	3
48	.133315	ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 12 for Details)	1
49	.63305	WASHER, LOCK	4
50	.60526	SCREW, CAP	4
51	.133282	WELDMENT, STEERING LEVER (L.H.)	1
52	.133283	WELDMENT, STEERING LEVER (R.H.)	1
53	.131669	BEARING, THRUST (SPINDLE)	2
54	.61310	NUT, LOCK HEX	2
55	.131670	WASHER, SPINDLE	2
56	.80049-02	PLUG	2
57	.133280	ASSEMBLY, LINKAGE ARM	2
58	..133279	ARM, LINKAGE	1
59	..160161	BUSHING	2
60	.131616	PIN, STEERING	4
61	.63302	WASHER, LOCK	4
62	.60367	SCREW, CAP	4
63	.131860	COVER, STEERING BRACKET	2
64	.60342	SCREW, CAP	4
65	.131700	ASSEMBLY, DRIVE MOTOR (See Sect. 3, Fig. 13 for Details)	2
66	.62005	SCREW, CAP	8
67	.131609	HUB, DRIVE	2
68	..30309	STUD, WHEEL	10
69	.65174	NUT, SLOTTED JAM	2
70	.64306	PIN, COTTER	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
71	.133599	ASSEMBLY, COMPONENT BOX (See Sect. 3, Fig. 14 for Details)	1
72	.60705	NUT, HEX	4
73	.63305	WASHER, LOCK	4
74	.60326	SCREW, CAP	4
75	.4007	BATTERY (6V 250 AMP)	2
76	.131570	PLYWOOD, BATTERY	2
77	.133316	WELDMENT, BATTERY RETAINER	1
78	.160155	ROD, THREADED	1
79	.61239	NUT, LOCK	2
80	.411-4.7	EXTRUSION, RUBBER	4.7"
81	.70520	CHARGER, BATTERY (DOMESTIC)(SHOWN) (See Sect. 3, Fig. 15 for Details)	1
-81	.70525	CHARGER, BATTERY (INTERNATIONAL) (See Sect. 3, Fig. 16 for Details)	1
82	.63401	WASHER, FLAT	4
83	.61239	NUT, LOCK	4
-84	.160203	CLIP, WIRE LOOM	4
-85	.63301	WASHER, LOCK	4
-86	.60342	SCREW, CAP	4

Mark Industries

TITLE	TIRE & WHEEL ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	3
FIGURE	2
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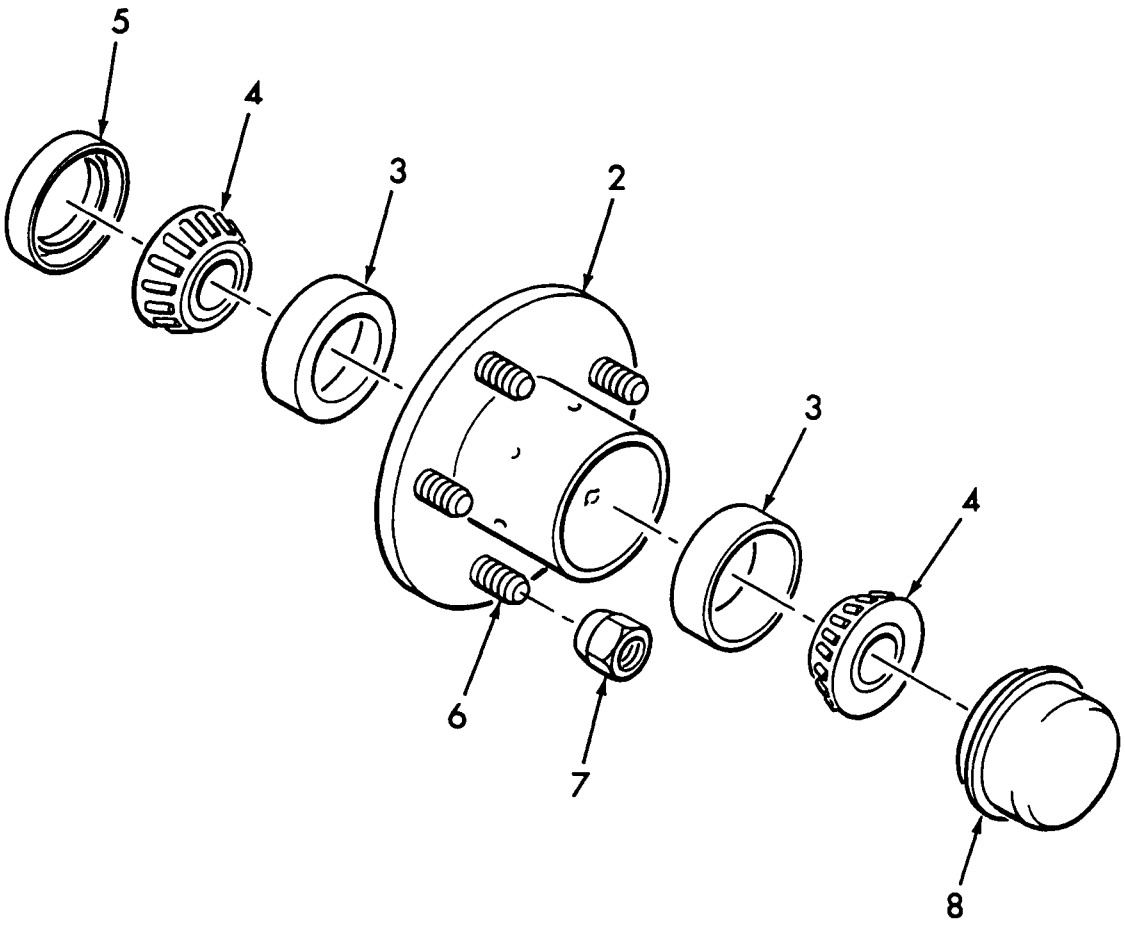
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131620	ASSEMBLY, TIRE & WHEEL (See Sect. 3, Fig. 1 for NHA)	REF
2	.131630	TIRE	4
3	.131631	WHEEL	4

REV.

Mark Industries

TITLE	HUB ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	3
FIGURE	3
PAGE	1



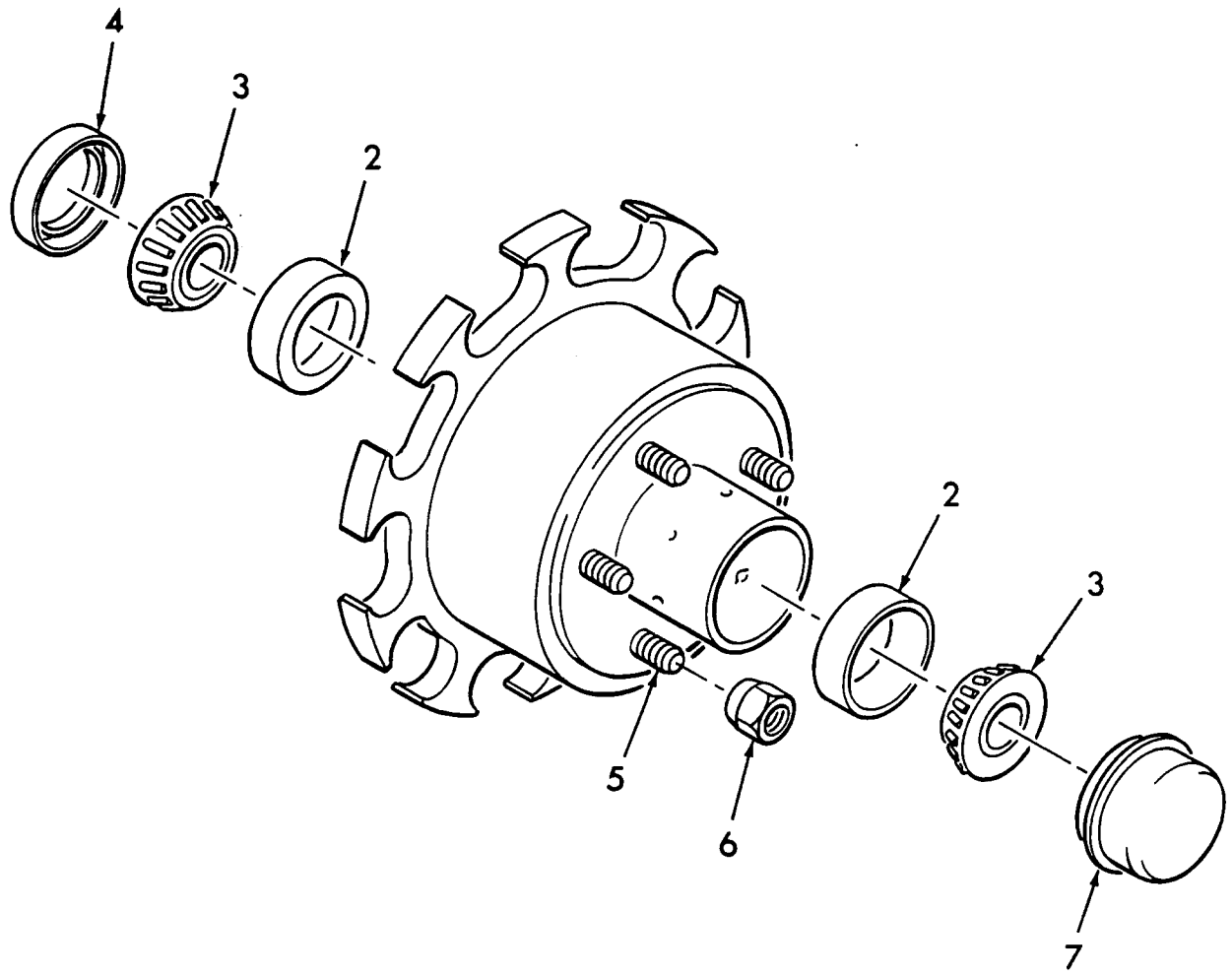
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	134-1	ASSEMBLY, HUB (See Sect. 3, Fig. 1 for NHA)	REF
2	.65684	HUB	1
3	.65686	RACE, BEARING	2
4	.65059	BEARING	2
5	.66113	SEAL, GREASE	1
6	.65685	BOLT, LUG	5
7	.61316	NUT, LUG	5
8	.137	CAP, DUST	1

REV.

Mark Industries

TITLE	BRAKE-HUB WELDMENT ASSEMBLY
MODEL	J20NEP
NOTES	

SECTION	3
FIGURE	4
PAGE	1



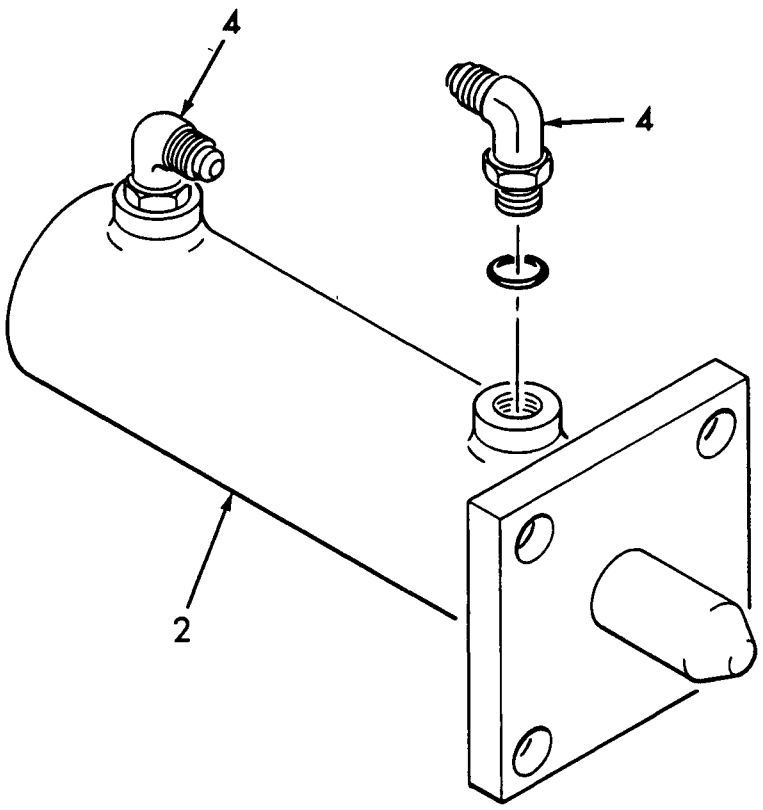
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131685	ASSEMBLY, BRAKE-HUB WELDMENT (See Sect. 3, Fig. 1 for NHA)	REF
2	.65686	RACE, BEARING	2
3	.65059	BEARING	2
4	.66113	SEAL, GREASE	1
5	.65685	BOLT, LUG	5
6	.61316	NUT, LUG	5
7	.137	CAP, DUST	1

REV.

Mark Industries

TITLE	BRAKE CYLINDER ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	5
PAGE	2



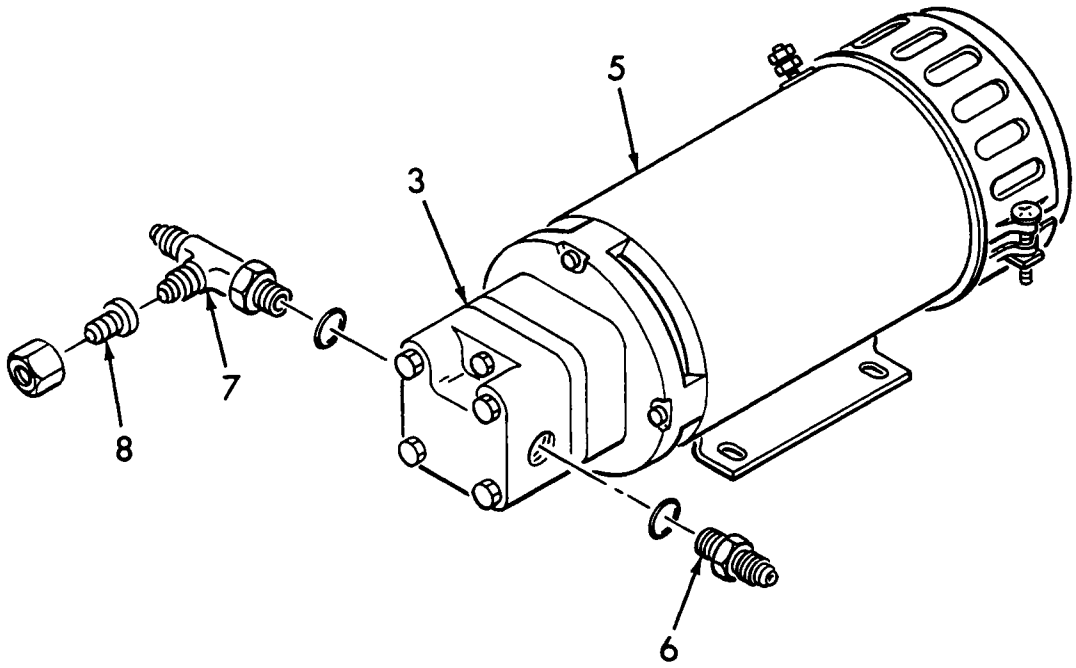
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131698	ASSEMBLY, BRAKE CYLINDER (See Sect. 3, Fig. 1 for NHA)	REF
2	.131628	CYLINDER, BRAKE	1
-3	..67843	KIT, SEAL (TH)	1
4	.80012-03	ELBOW, STRAIGHT THREAD	2

REV.

Mark Industries

TITLE	PUMP/MOTOR ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	6
PAGE	1



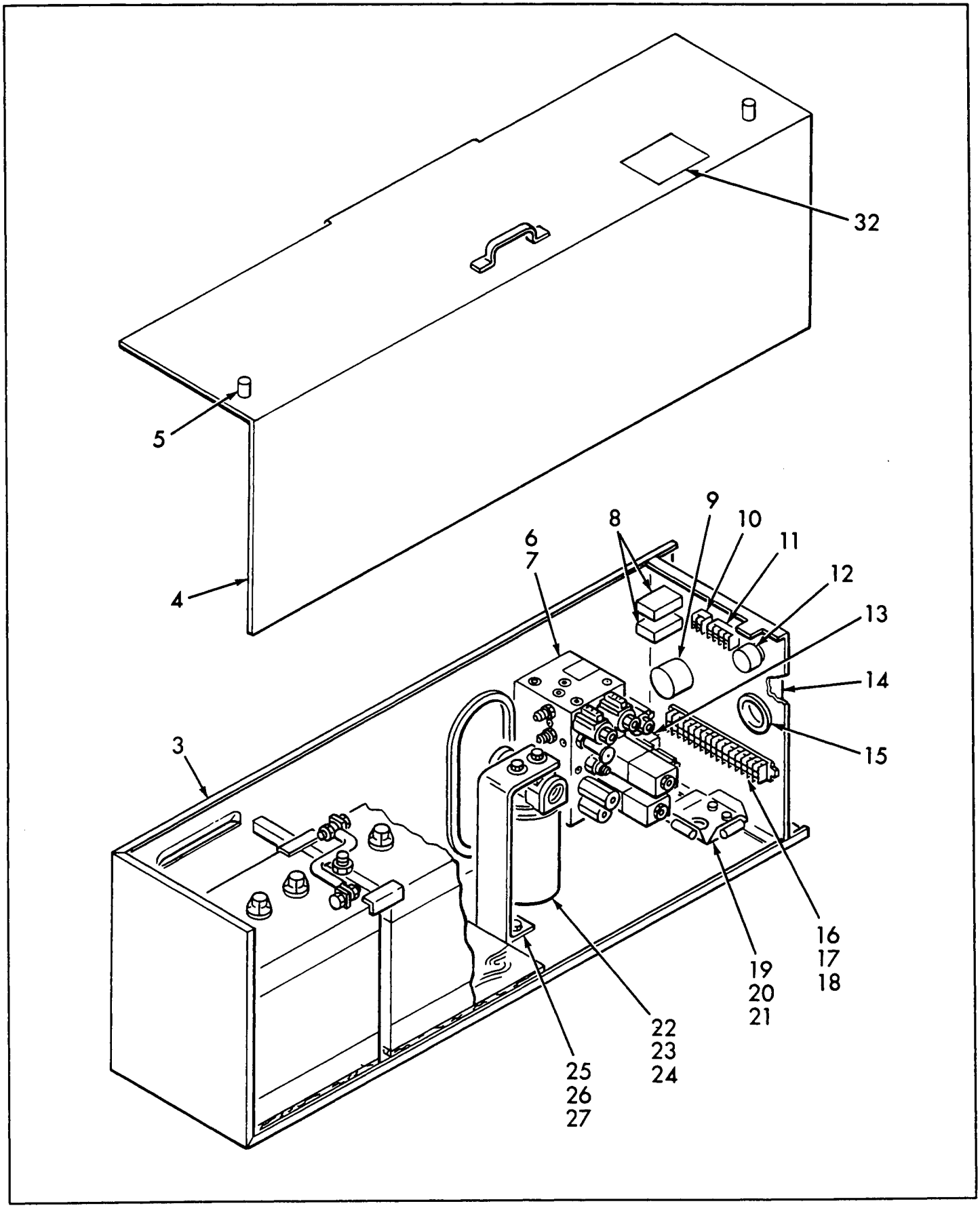
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131699	ASSEMBLY, PUMP/MOTOR (See Sect. 3, Fig.1 for NHA)	REF
-2	.81311	PUMP/MOTOR	1
3	..67835	PUMP	1
-4	...81176	KIT, SEAL	1
5	..67836	MOTOR	1
6	.80004-08	CONNECTOR, STRAIGHT THREAD	1
7	.80033-11	TEE, STRAIGHT THREAD	1
8	.80056-02	REDUCER, TUBE END	1

REV.

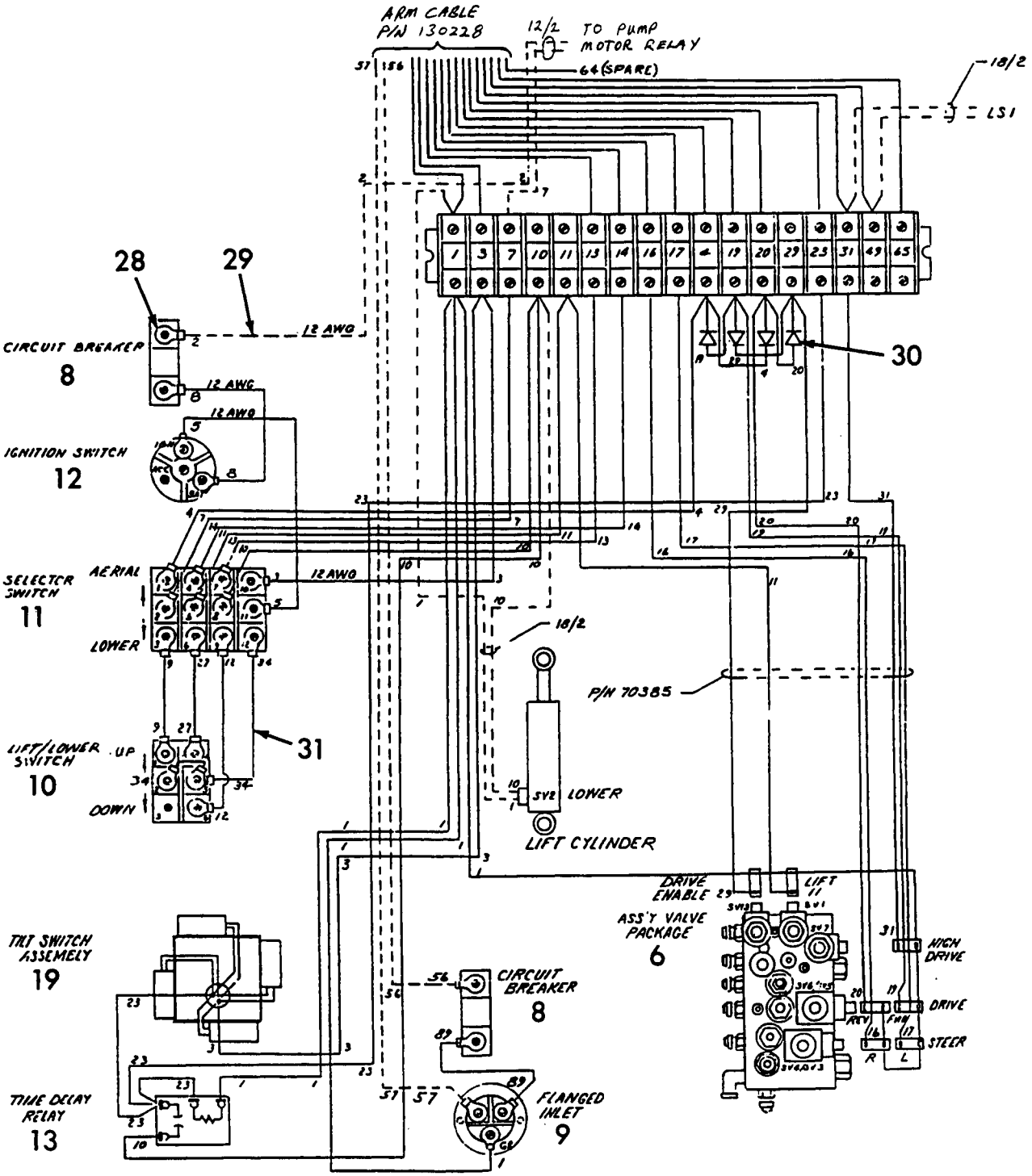
Mark Industries

TITLE	CONTROL BOX ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	7
PAGE	1



REV.



ELECTRICAL DIAGRAM

REFER TO ELECTRIAL SCHEMATIC 133098

REV.

Mark Industries

TITLE	CONTROL BOX ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	7
NOTES		PAGE	3

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133584	ASSEMBLY, CONTROL BOX (See Sect. 3, Fig. 1 for NHA)	REF
-2	.133597	SUB-ASSEMBLY, CONTROL BOX	1
3	..133580	WELDMENT, CONTROL BOX	1
4	..133587	WELDMENT, CONTROL BOX COVER	1
5	..160121	LATCH, ADJUSTABLE GRIP	2
6	.131729	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 8 or 8A for Details)	1
7	.60395	SCREW, CAP	2
8	.20562	BREAKER, CIRCUIT (AC/DC)	2
9	.70409	INLET, FLANGED (POWER TO PLATFORM)	1
10	.20481	SWITCH, TOGGLE (LIFT UP/DOWN)	1
11	.16260	SWITCH, TOGGLE (AERIAL/GROUND SELECTOR)	1
12	.2717	SWITCH, IGNITION (ON/OFF)	1
13	.70337	RELAY, TIME DELAY	1
14	.182738	DECAL, GROUND CONTROL PANEL	1
15	.65244	PLUG, WHITE	1
16	.4027	BLOCK, TERMINAL	17
17	.117-A	BLOCK, TERMINAL END	2
18	.62621	SCREW, MACHINE	2
19	.130193	ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 9 for Details)	1
20	.160256	SCREW, CAP	2
21	.60711	NUT, HEX	6
22	.133760	ASSEMBLY, FILTER (See Sect. 3, Fig. 10 for Details)	1
23	.60342	SCREW, CAP	2

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries

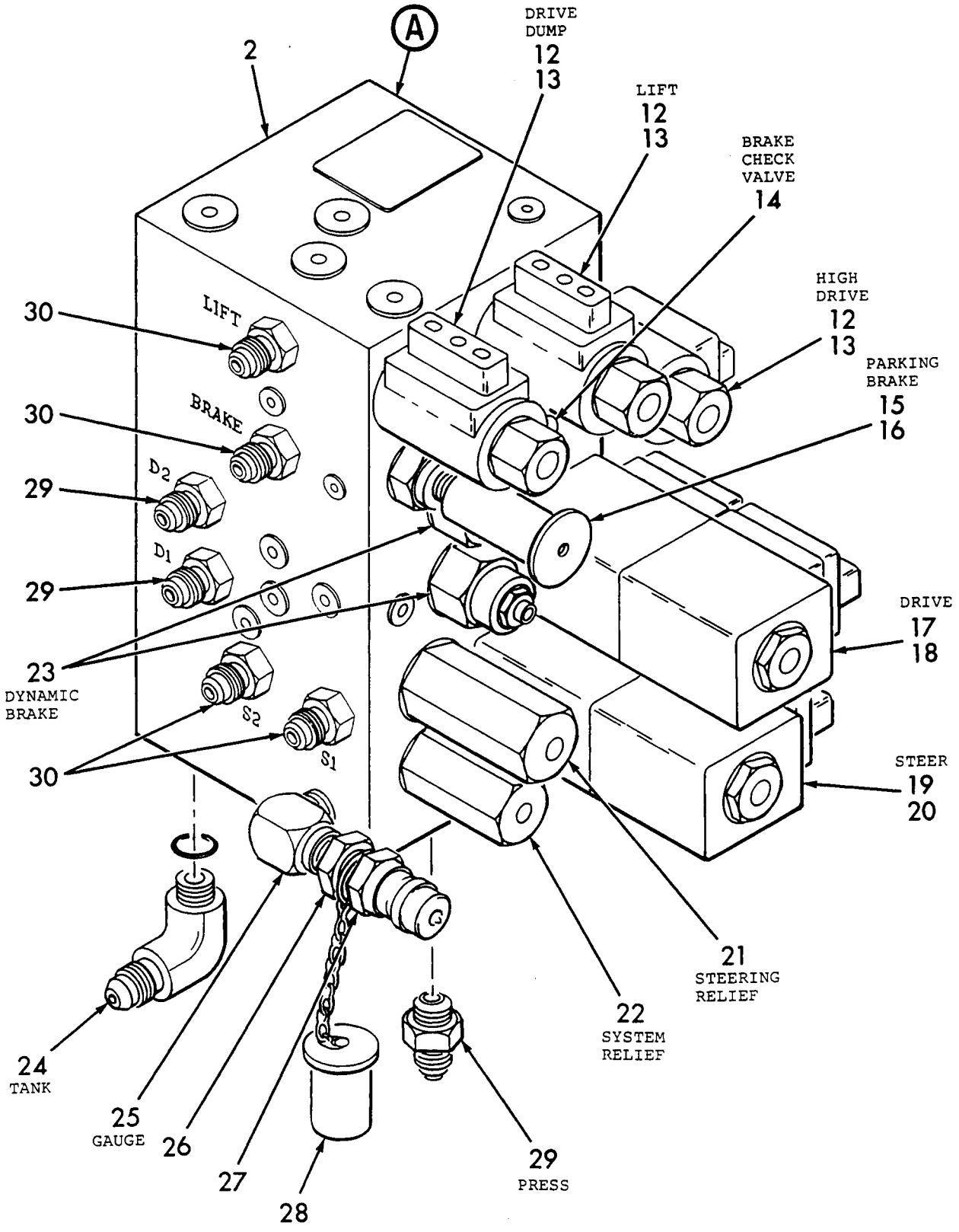
TITLE	CONTROL BOX ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	7
NOTES		PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
24	.63301	WASHER, LOCK	2
25	.131739	BRACKET, FILTER MOUNTING	1
26	.60309	SCREW, CAP	2
27	.60711	NUT, HEX	2
28	.117-C	CONNECTOR, RING	26
29	.2991	WIRE, WHITE	4 FT
30	.70479	DIODE	4
31	.70232	WIRE, WHITE	4 FT
32	.130606	DECAL, FREEWHEELING VALVE (PARKING BRAKE)	1

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	BEFORE JULY 1990

SECTION	3
FIGURE	8
PAGE	1

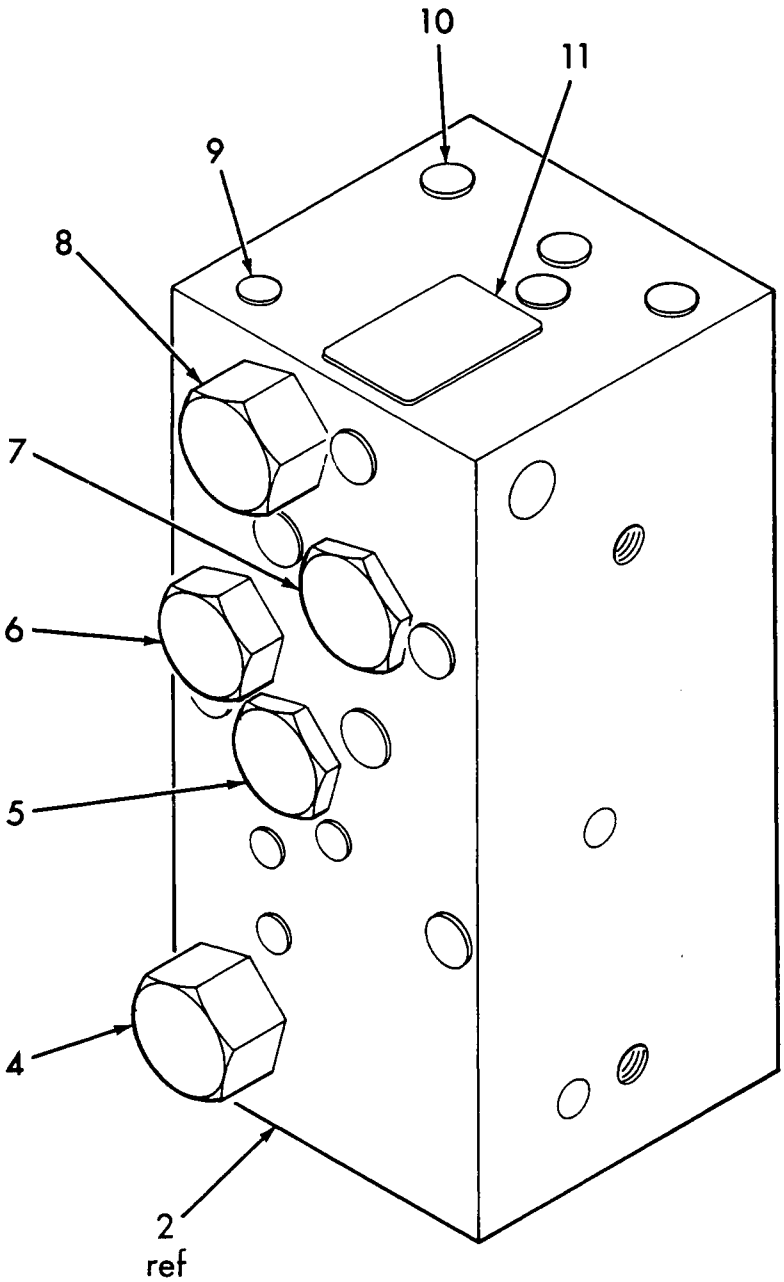


REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	BEFORE JULY 1990

SECTION	3
FIGURE	8
PAGE	2



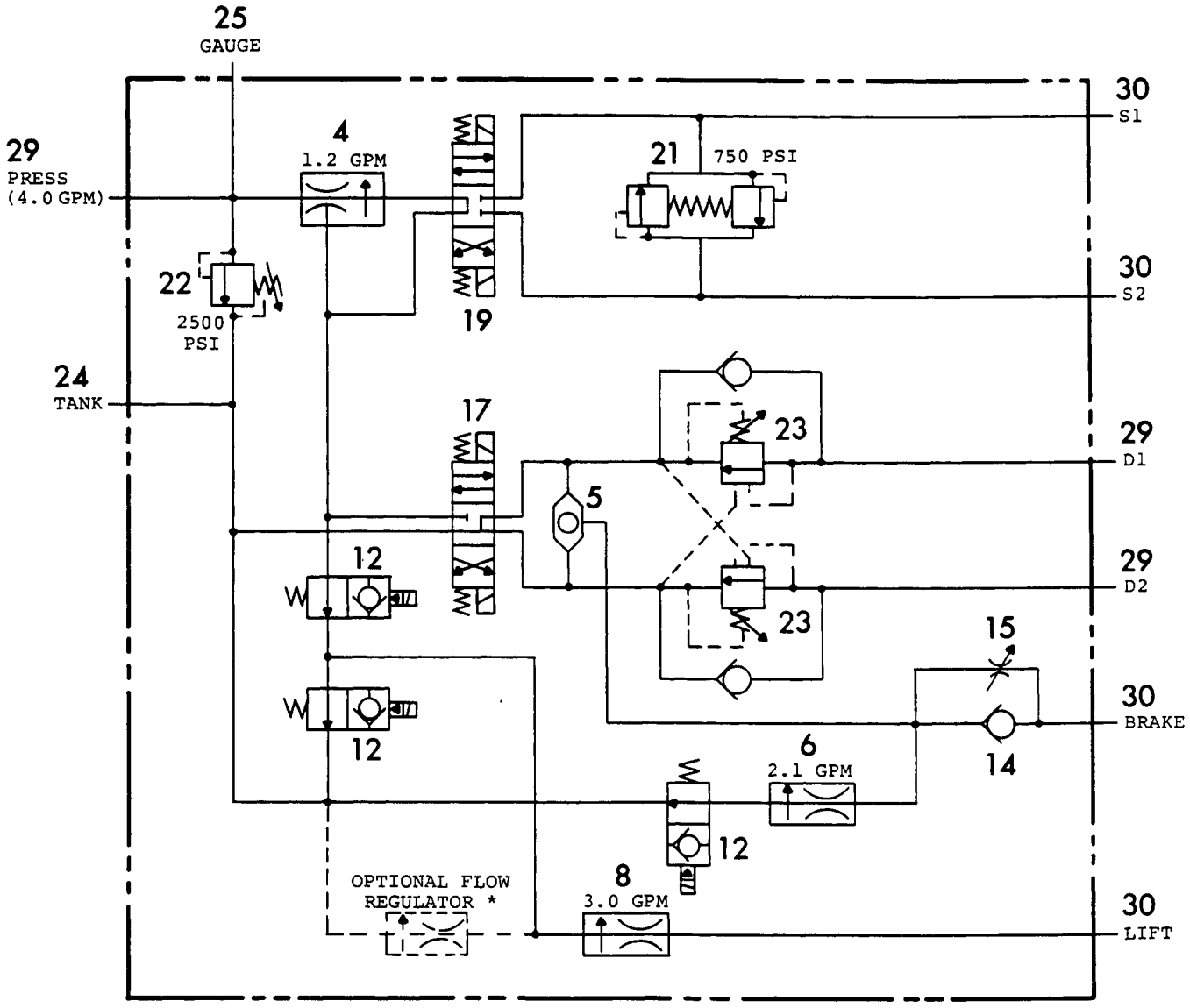
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REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	BEFORE JULY 1990

SECTION	3
FIGURE	8
PAGE	3



*TO USE OPTIONAL FLOW REGULATOR
REMOVE 10-2 CAVITY PLUG - THEN
INSTALL FLOW REGULATOR.

REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	8
NOTES	BEFORE JULY 1990	PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131729	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 7 for NHA)	REF
2	.81307	VALVE, CONTROL	1
-3	..67945	KIT, SEAL (COMPLETE VALVE PACKAGE)	1
4	..67982	REGULATOR, FLOW (1.2 GPM)	1
5	..67990	VALVE, SHUTTLE (BRAKE)	1
6	..67989	REGULATOR, FLOW (2.1 GPM)	1
7	..	PLUG, PIPE	1
8	..67025	REGULATOR, FLOW (3.0 GPM)	1
9	..	PLUG, NO. 2 SAE	13
10	..	PLUG, NO. 4 SAE	20
11	..	PLATE, IDENTIFICATION	1
12	..67986	VALVE, SOLENOID	3
13	...600028	COIL, 20V (WIDE SPACED SPADES)	3
14	..67988	VALVE, CHECK (BRAKE)	1
15	..67987	VALVE, NEEDLE	1
16	..600032	KNOB, EXTENSION	1
17	..67983	VALVE, CONTROL (DIRECTIONAL DRIVE)	1
18	...66865	COIL, 20V	2
19	..67341	VALVE, CONTROL (DIRECTIONAL STEER)	1
20	...66865	COIL, 20V	2
*21	..68057	VALVE, RELIEF (STEER)	1
		NOTE: PRIOR TO USE, RELIEF VALVES WITH ASTERISK (*) MUST BE ADJUSTED TO THE PRESSURE INDICATED ON THE SPECIFIC MACHINE'S HYDRAULIC SCHEMATIC.	

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	BEFORE JULY 1990

SECT.	3
FIG.	8
PAGE	5

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
22	..67981	VALVE, RELIEF (SYSTEM)	1
23	..67985	VALVE, OVERCENTER	2
24	.80012-12	ELBOW, STRAIGHT THREAD (TANK)	1
25	.80021-03	ELBOW, STREET (GAUGE)	1
26	.80052-04	NIPPLE, PIPE	1
27	.2527	COUPLING, QUICK DISCONNECT	1
28	.845	CAP, QUICK DISCONNECT	1
29	.80004-08	CONNECTOR, STRAIGHT THREAD (PRESS, D1, D2)	3
30	.80004-05	CONNECTOR, STRAIGHT THREAD (S1, S2, BRAKE, LIFT)	4

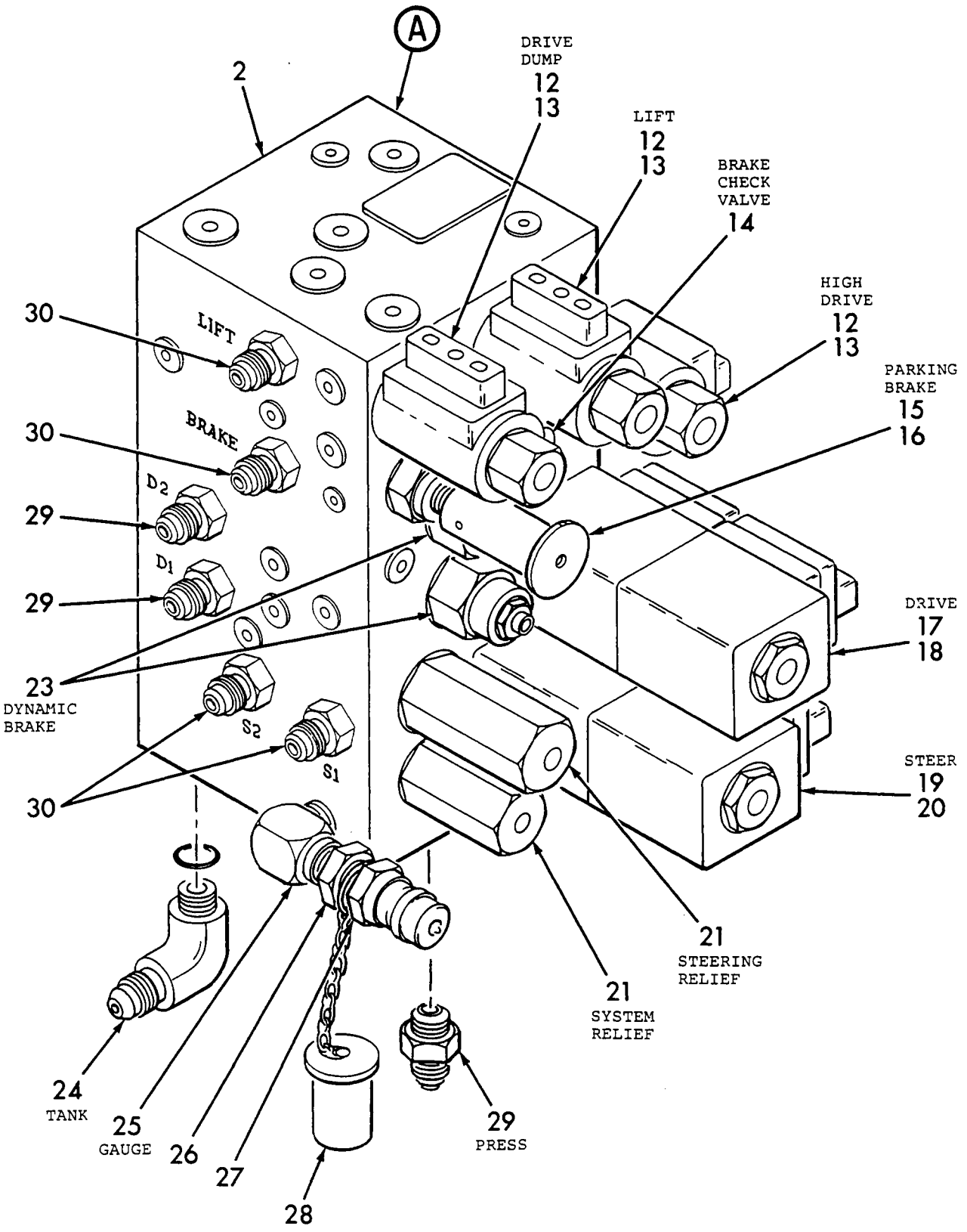
REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	AFTER JULY 1990

SECT.	3
FIG.	8A
PAGE	1

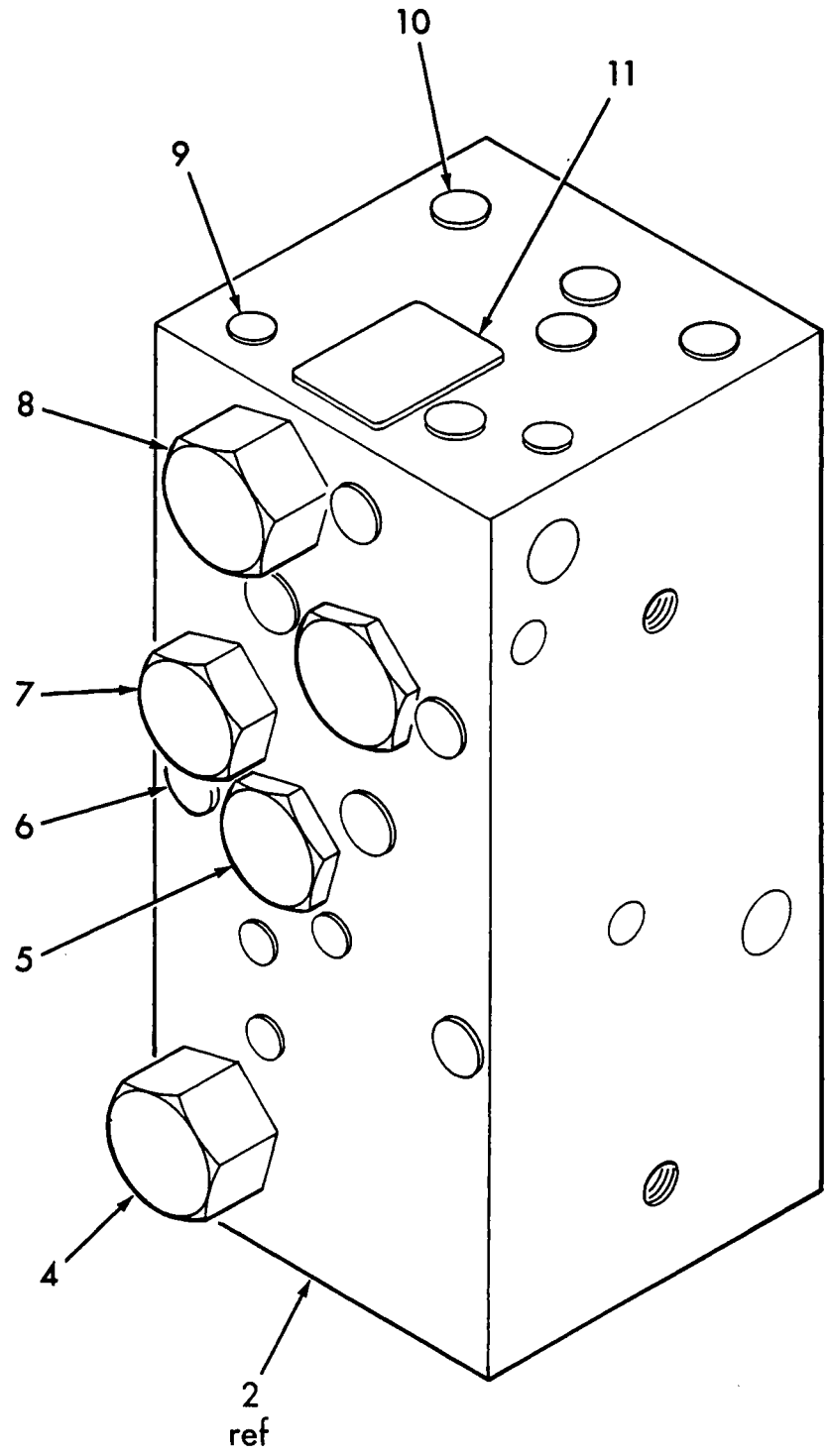


REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	AFTER JULY 1990

SECT.	3
FIG.	8A
PAGE	2



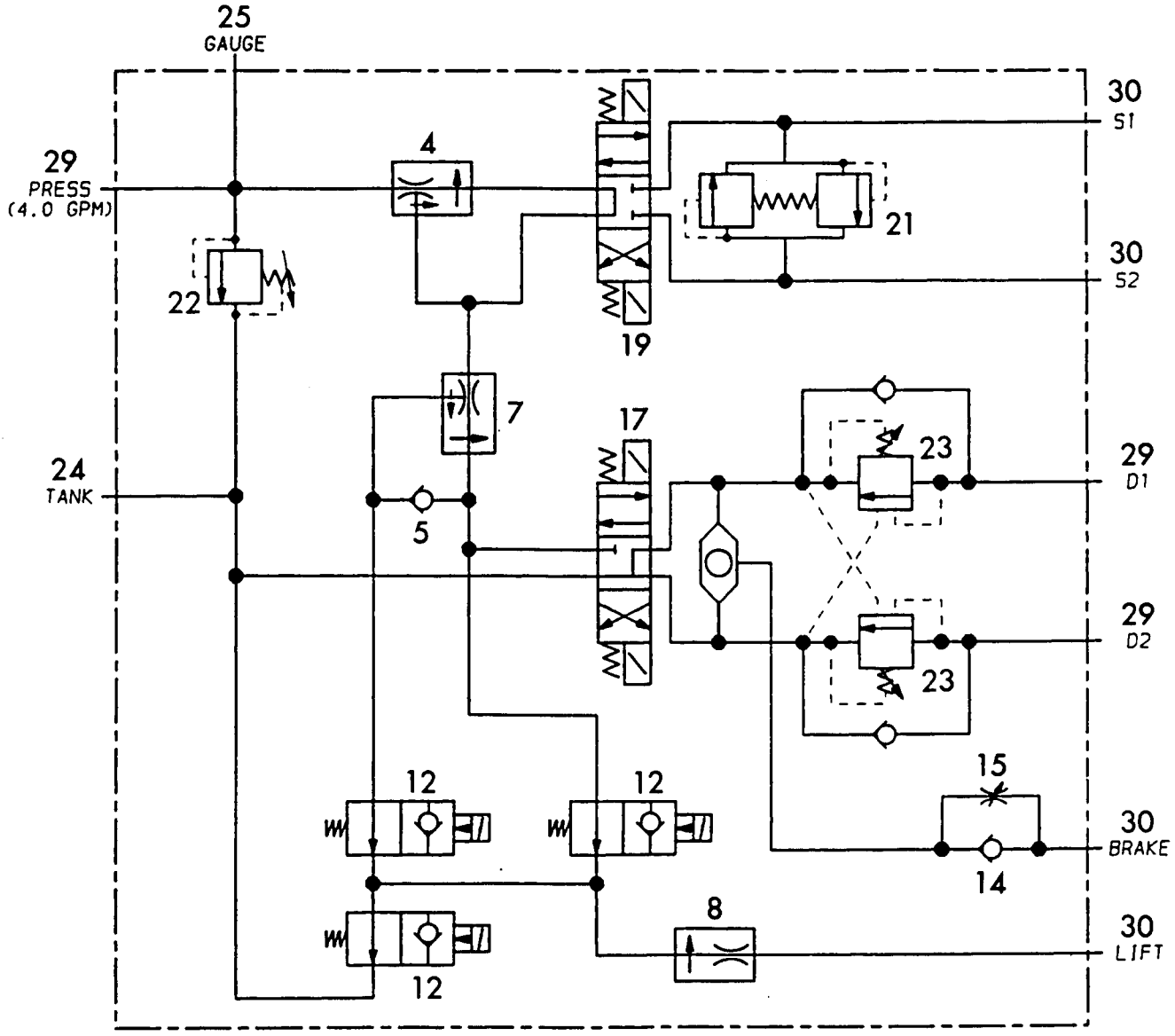
(A)

REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	AFTER JULY 1990

SECT.	3
FIG.	8A
PAGE	3



REV.

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J20NEP
NOTES	AFTER JULY 1990

SECT.	3
FIG.	8A
PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131729	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 7 for NHA)	REF
2	.81381	VALVE, CONTROL	1
-3	..	KIT, SEAL (COMPLETE VALVE PACKAGE)	1
4	..67982	REGULATOR, FLOW (1.2 GPM)	1
5	..600003	VALVE, CHECK	1
6	..600023	VALVE, SHUTTLE	1
7	..600314	REGULATOR, FLOW (2.1 GPM)	1
8	..67025	REGULATOR, FLOW (3.0 GPM)	1
9	..	PLUG, NO. 2 SAE	20
10	..	PLUG, NO. 4 SAE	25
11	..	PLATE, IDENTIFICATION	1
12	..67986	VALVE, SOLENOID	3
13	...600028	COIL, 20V (WIDE SPACED SPADES)	3
14	..67988	VALVE, CHECK (BRAKE)	1
15	..67987	VALVE, NEEDLE	1
16	..600032	KNOB, EXTENSION	1
17	..67983	VALVE, CONTROL (DIRECTIONAL DRIVE)	1
18	...66865	COIL, 20V	2
19	..67341	VALVE, CONTROL (DIRECTIONAL STEER)	1
20	...66865	COIL, 20V	2
*21	..67984	VALVE, RELIEF (STEER)	1
		NOTE: PRIOR TO USE, RELIEF VALVES WITH ASTERISK (*) MUST BE ADJUSTED TO THE PRESSURE INDICATED ON THE SPECIFIC MACHINE'S HYDRAULIC SCHEMATIC.	

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	8A
NOTES	AFTER JULY 1990	PAGE	5

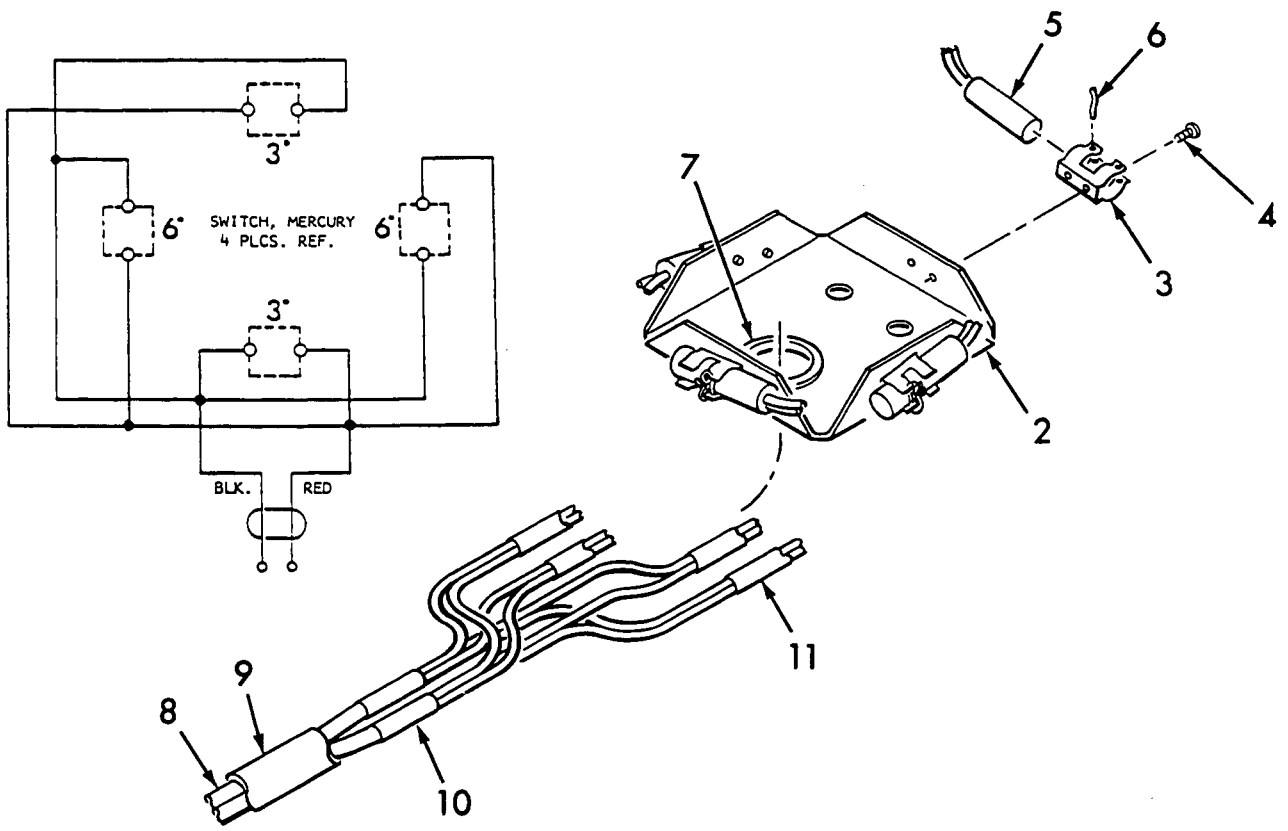
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
22	..67981	VALVE, RELIEF (SYSTEM)	1
23	..67985	VALVE, OVERCENTER	2
24	.80012-12	ELBOW, STRAIGHT THREAD (TANK)	1
25	.80021-03	ELBOW, STREET (GAUGE)	1
26	.80052-04	NIPPLE, PIPE	1
27	.2527	COUPLING, QUICK DISCONNECT	1
28	.845	CAP, QUICK DISCONNECT	1
29	.80004-08	CONNECTOR, STRAIGHT THREAD (PRESS, D1, D2)	3
30	.80004-05	CONNECTOR, STRAIGHT THREAD (S1, S2, BRAKE, LIFT)	4

REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries

TITLE	TILT SWITCH ASSEMBLY	SECT.	3
MODEL	J20NEP	FIG.	9
NOTES		PAGE	1



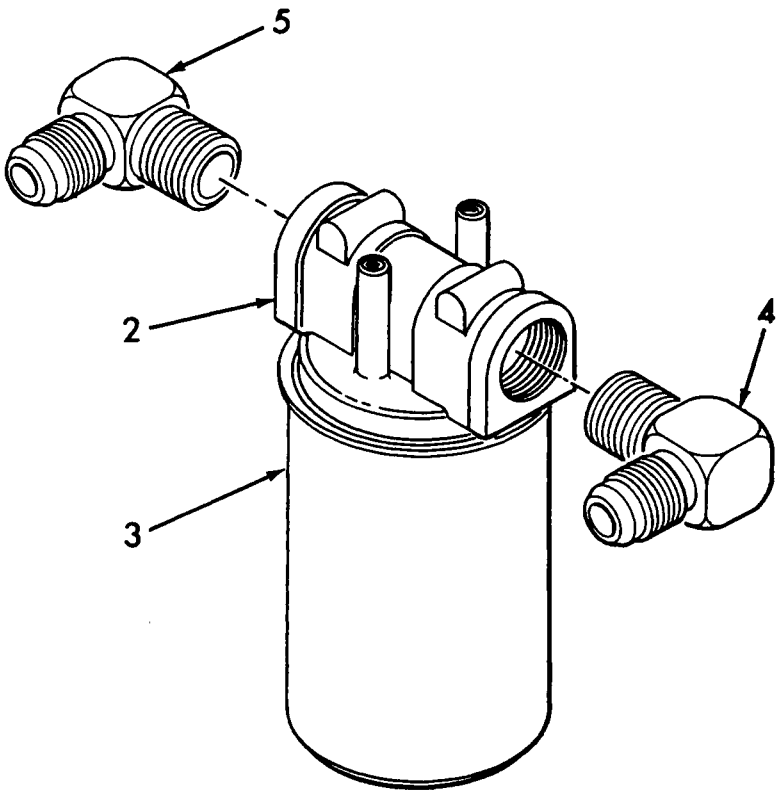
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	130193	ASSEMBLY, TILT SWITCH (See Sect. 3, Fig. 7 for NHA)	REF
2	.133356	BRACKET, TILT SWITCH	1
3	..199-A	BRACKET, MICROSWITCH	4
4	..62605	SCREW, MACHINE	8
5	.4014	SWITCH, MERCURY	4
6	.160342	WIRE, SAFETY	AR
7	.70230	GROMMET, RUBBER	1
8	.229	WIRE, BRAKE	1
9	.16307	TUBE, HEAT SHRINK	2
10	.117-D	CONNECTOR, BUTT	2
11	.16306	TUBE, HEAT SHRINK	1

REV.

Mark Industries

TITLE	FILTER ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	10
PAGE	1



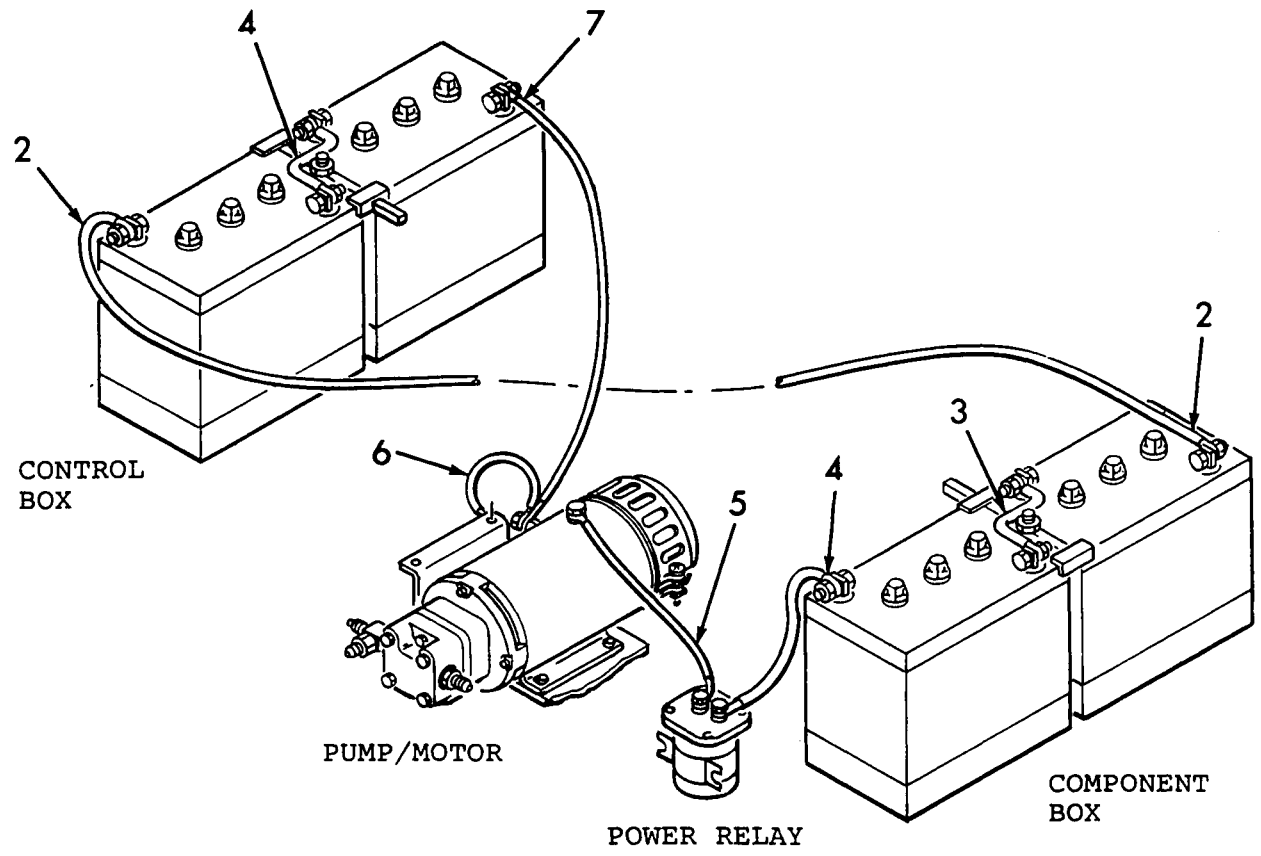
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133760	ASSEMBLY, FILTER (See Sect. 3, Fig. 7 for NHA)	REF
2	.30306	FILTER, CANISTER (RETURN LINE)	1
3	..16947	ELEMENT, FILTER	1
4	.80008-15	ELBOW, MALE	1
5	.80008-19	ELBOW, MALE	1

REV.

Mark Industries

TITLE	BATTERY CABLE KIT
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	11
PAGE	1



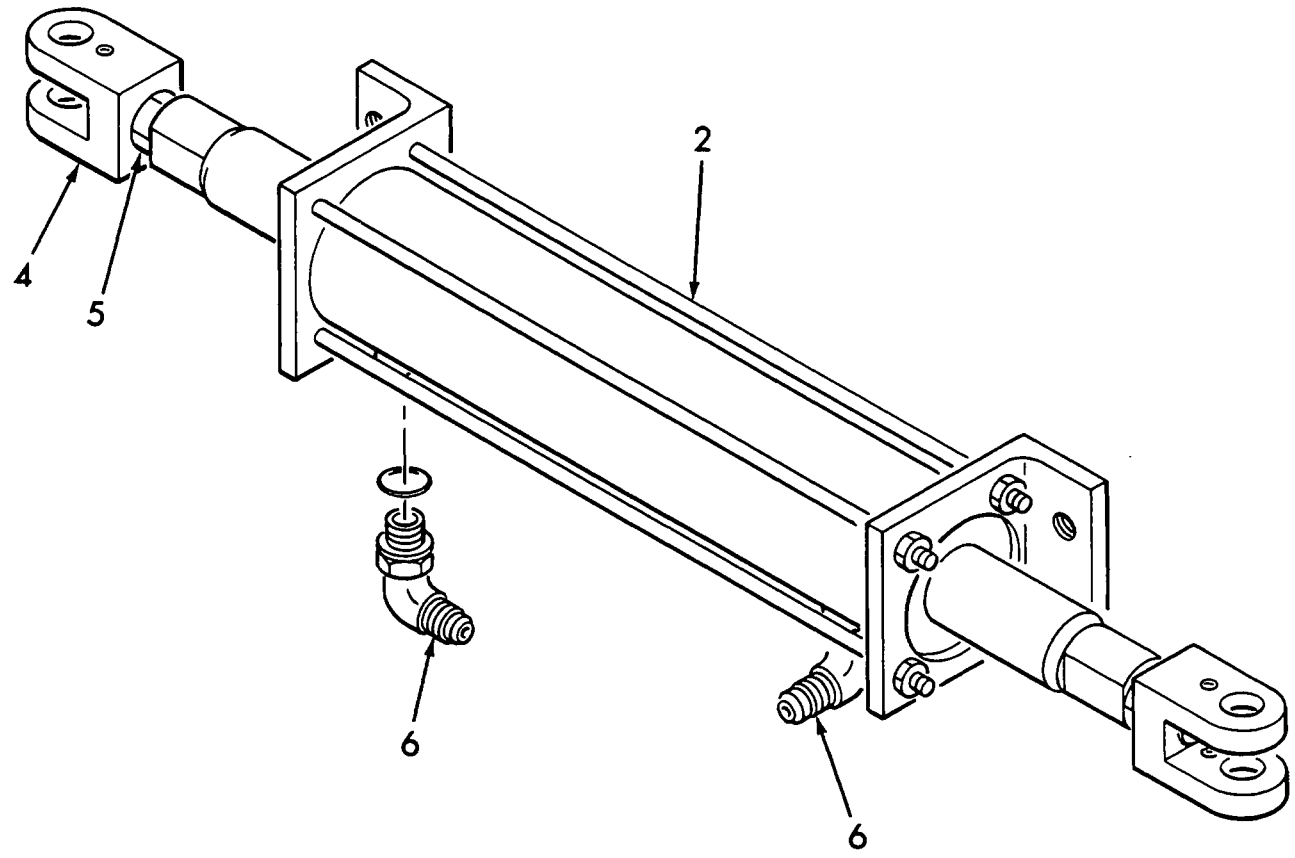
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133314	KIT, BATTERY CABLE (See Sect. 3, Fig. 1 for NHA)	REF
2	.13226-0640	CABLE, ELECTRICAL (64" LONG)	1
3	.13226-0110	CABLE, ELECTRICAL (11" LONG)	1
4	.13226-0120	CABLE, ELECTRICAL (12" LONG)	2
5	.13226-0480	CABLE, ELECTRICAL (48" LONG)	1
6	.13226-0130	CABLE, ELECTRICAL (13" LONG)	1
7	.13226-0580	CABLE, ELECTRICAL (58" LONG)	1

REV.

Mark Industries

TITLE	STEERING CYLINDER ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	12
PAGE	1



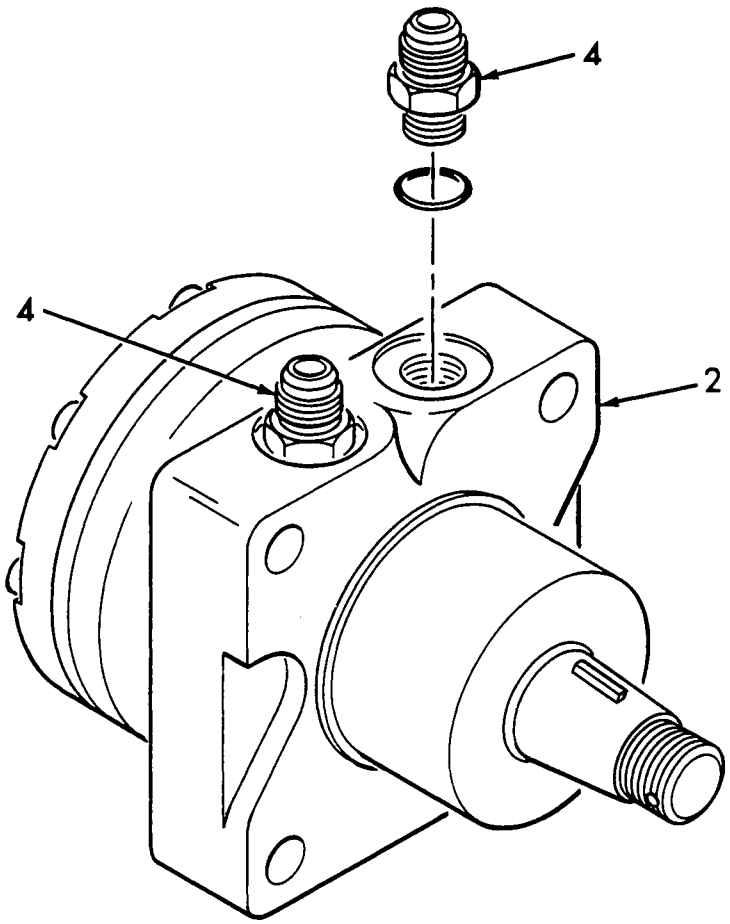
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133315	ASSEMBLY, STEERING CYLINDER (See Sect. 3, Fig. 1 for NHA)	REF
2	.133213	CYLINDER, STEERING	1
-3	..67842	KIT, SEAL (TH)	1
4	..600347	CLEVIS	2
5	..600346	NUT, CLEVIS JAM	2
6	.80012-03	ELBOW, STRAIGHT THREAD	2

REV.

Mark Industries

TITLE	DRIVE MOTOR ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	13
PAGE	1



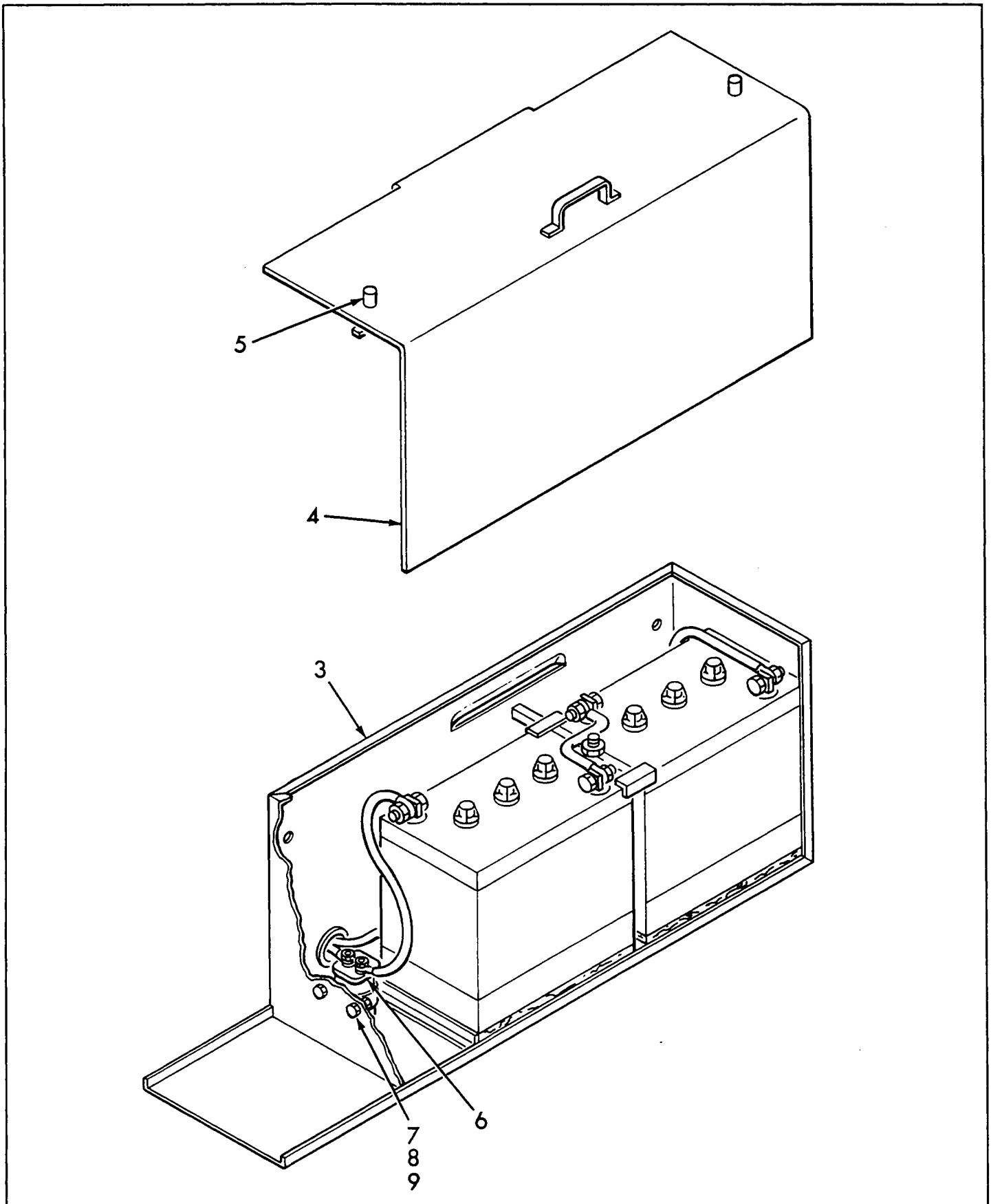
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131700	ASSEMBLY, DRIVE MOTOR (See Sect. 3, Fig. 1 for NHA)	REF
2	.81310	MOTOR, DRIVE (See Vendor Chapter for Details)	1
-3	..67841	KIT, SEAL	1
4	.80004-10	CONNECTOR, STRAIGHT THREAD	2

REV.

Mark Industries

TITLE	COMPONENT BOX ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	3
FIG.	14
PAGE	1



REV.

Mark Industries

TITLE	COMPONENT BOX ASSEMBLY
MODEL	J20NEP
NOTES	

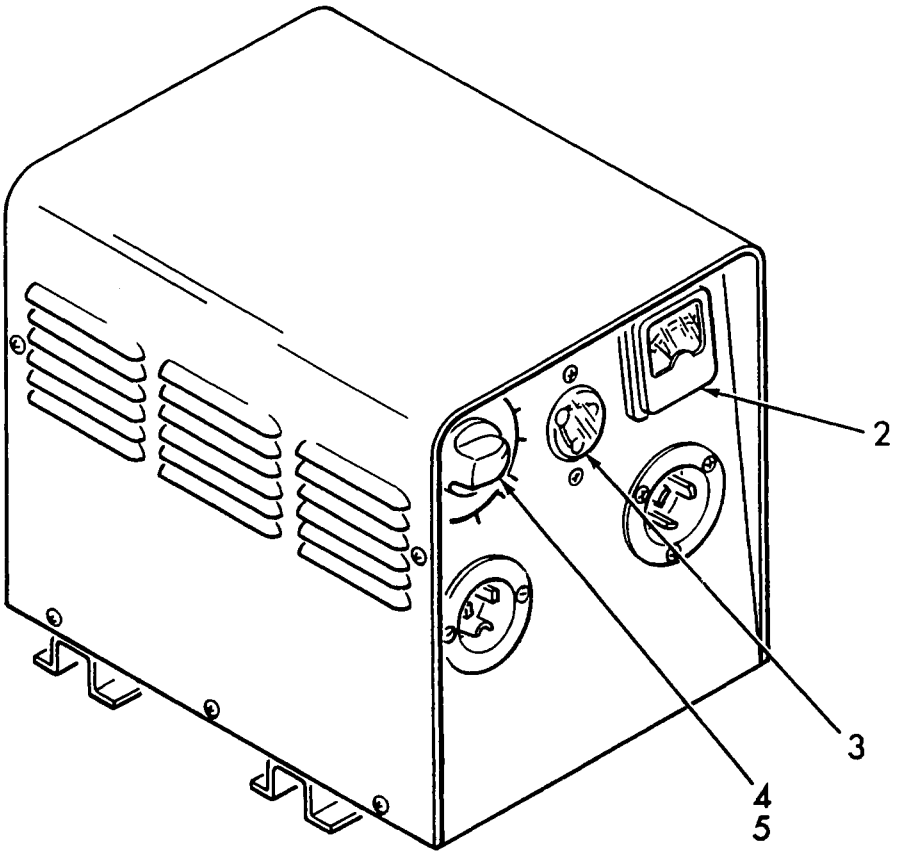
SECT.	3
FIG.	14
PAGE	2

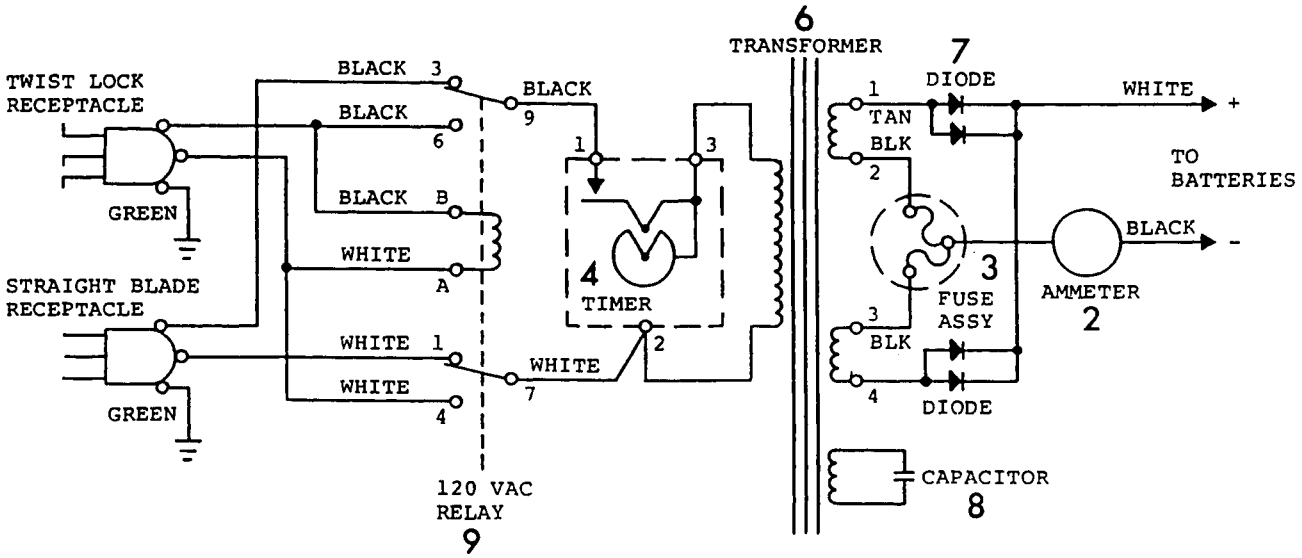
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133599	ASSEMBLY, COMPONENT BOX (See Sect. 3, Fig. 1 for NHA)	REF
-2	.133598	SUB-ASSEMBLY, COMPONENT BOX	1
3	..133603	WELDMENT, COMPONENT BOX	1
4	..133601	WELDMENT, COMPONENT COVER	1
5	..160121	LATCH, ADJUSTABLE GRIP	2
6	.70362	RELAY, POWER	1
7	.60309	SCREW, CAP	2
8	.63401	WASHER, FLAT	2
9	.61312	NUT, HEX	2

REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries			
TITLE	BATTERY CHARGER (DOMESTIC)	SECT.	3
MODEL	J20NEP	FIG.	15
NOTES	120 VAC/60 HZ, 24 VDC/40A	PAGE	1





REV.

Mark Industries

TITLE	BATTERY CHARGER (DOMESTIC)
MODEL	J20NEP
NOTES	120 VAC/60 HZ, 24 VDC/40A

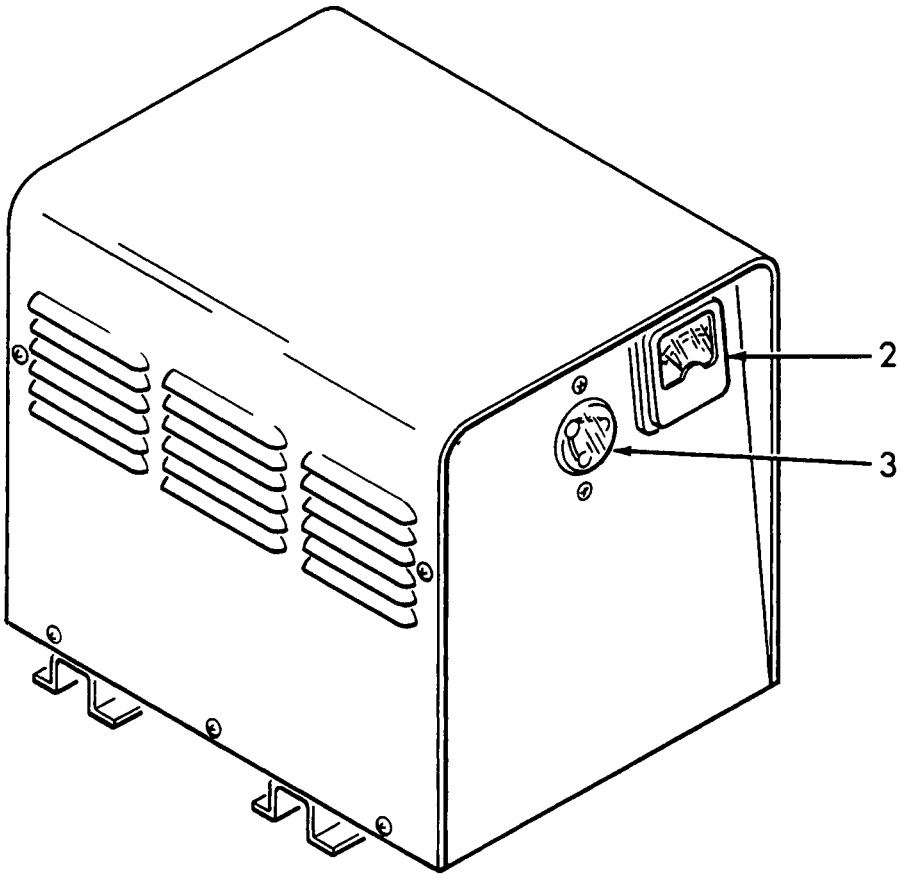
SECT.	3
FIG.	15
PAGE	2

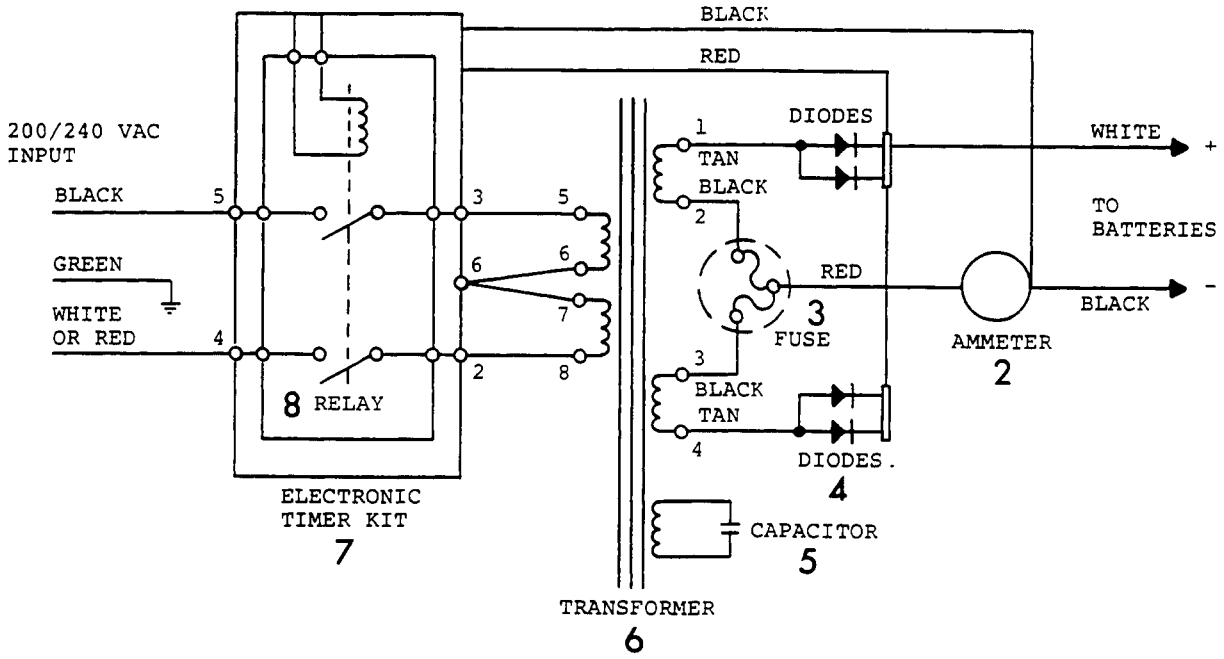
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	70520	CHARGER, BATTERY (See Vendor Chapter for Details)	REF
2	.66747	AMMETER	1
3	.600258	ASSEMBLY, FUSE (WITH PANEL)	1
4	.66732	TIMER, 12 HOUR	1
5	.66733	KNOB, TIMER	1
6	.600262	ASSEMBLY, TRANSFORMER	1
7	.600259	ASSEMBLY, HEAT SINK (WITH DIODES)	1
8	.66750	CAPACITOR (6.0 MFD, 660 VAC)	1
9	.66728	RELAY (120 VAC, DPDT, 15 AMP)	1

REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries			
TITLE	BATTERY CHARGER (INTERNATIONAL)	SECT.	3
MODEL	J20NEP	FIG.	16
NOTES	220 VAC/50 HZ, 24 VDC/40A	PAGE	1





REV.

Mark Industries

TITLE	BATTERY CHARGER (INTERNATIONAL)
MODEL	J20NEP
NOTES	220 VAC/50 HZ, 24 VDC/40A

SECT.	3
FIG.	16
PAGE	1

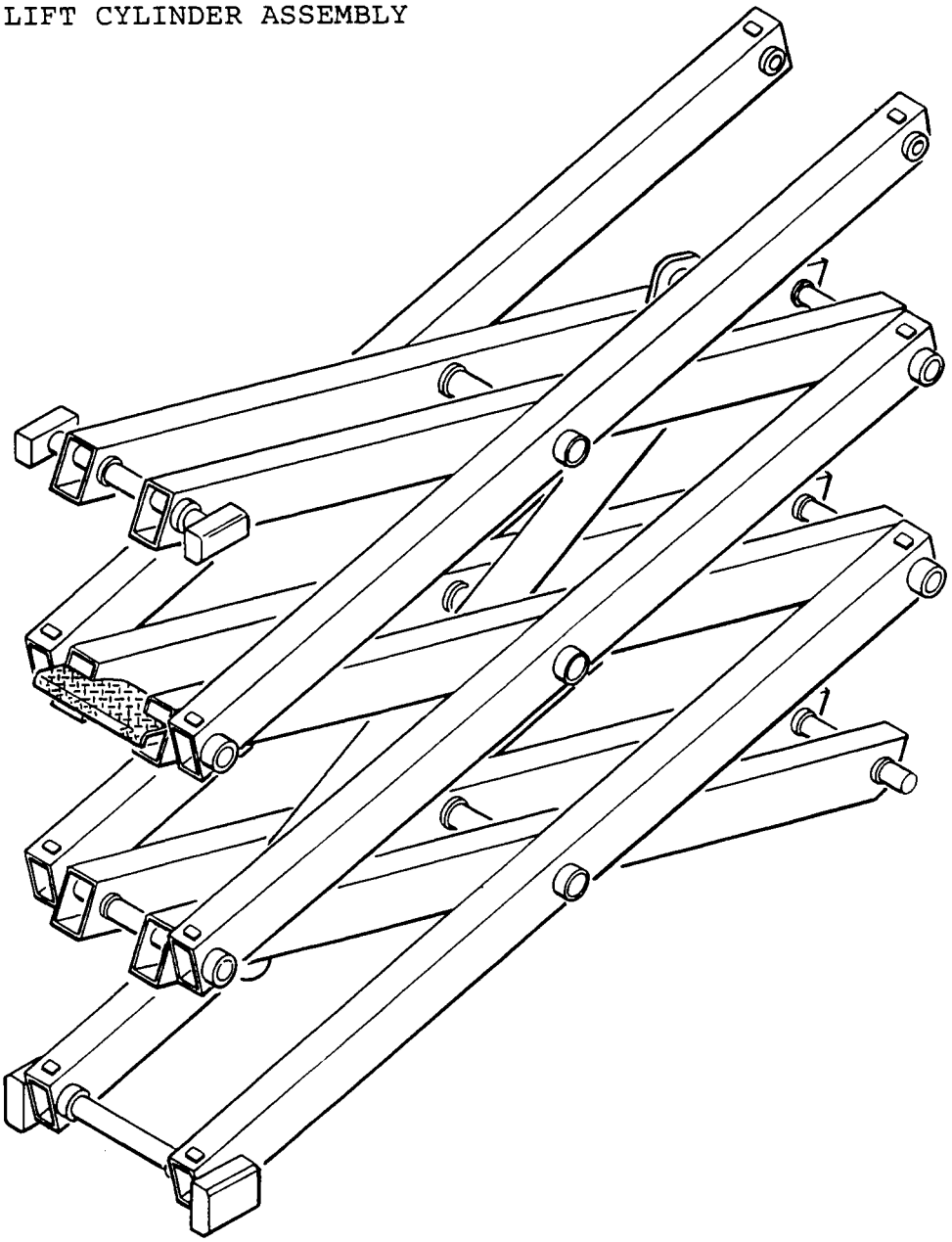
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	70525	CHARGER, BATTERY (INTERNATIONAL) (See Vendor Chapter for Details)	REF
2	.66747	AMMETER	1
3	.600258	ASSEMBLY, FUSE (WITH PANEL)	1
4	.600259	ASSEMBLY, HEAT SINK (WITH DIODES)	1
5	.66750	CAPACITOR (6.0 MFD, 660 VAC)	1
6	.600260	ASSEMBLY, TRANSFORMER	1
7	.600263	KIT, ELECTRONIC TIMER	1
8	.67979	RELAY, TIMER KIT	1

REV.

DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

SECTION 4 CONTAINS:

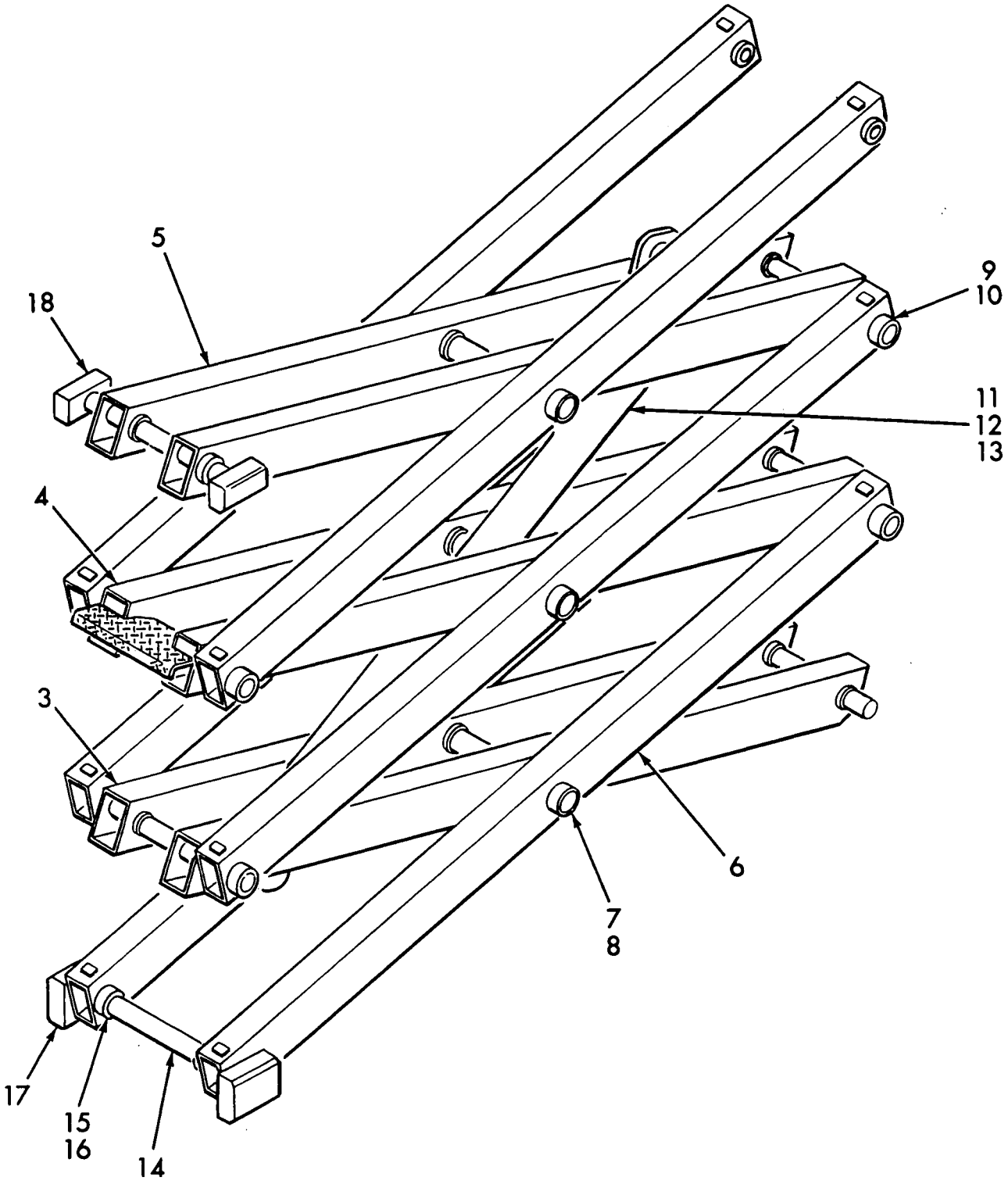
FIG. NO.	TITLE
1	SCISSOR ASSEMBLY
2	INNER ARM FIRST STAGE WELDMENT
3	INNER ARM SECOND STAGE WELDMENT
4	INNER ARM THIRD STAGE WELDMENT
5	OUTER ARM ASSEMBLY
6	LIFT CYLINDER ASSEMBLY



Mark Industries

TITLE	SCISSOR ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	4
FIG.	1
PAGE	1



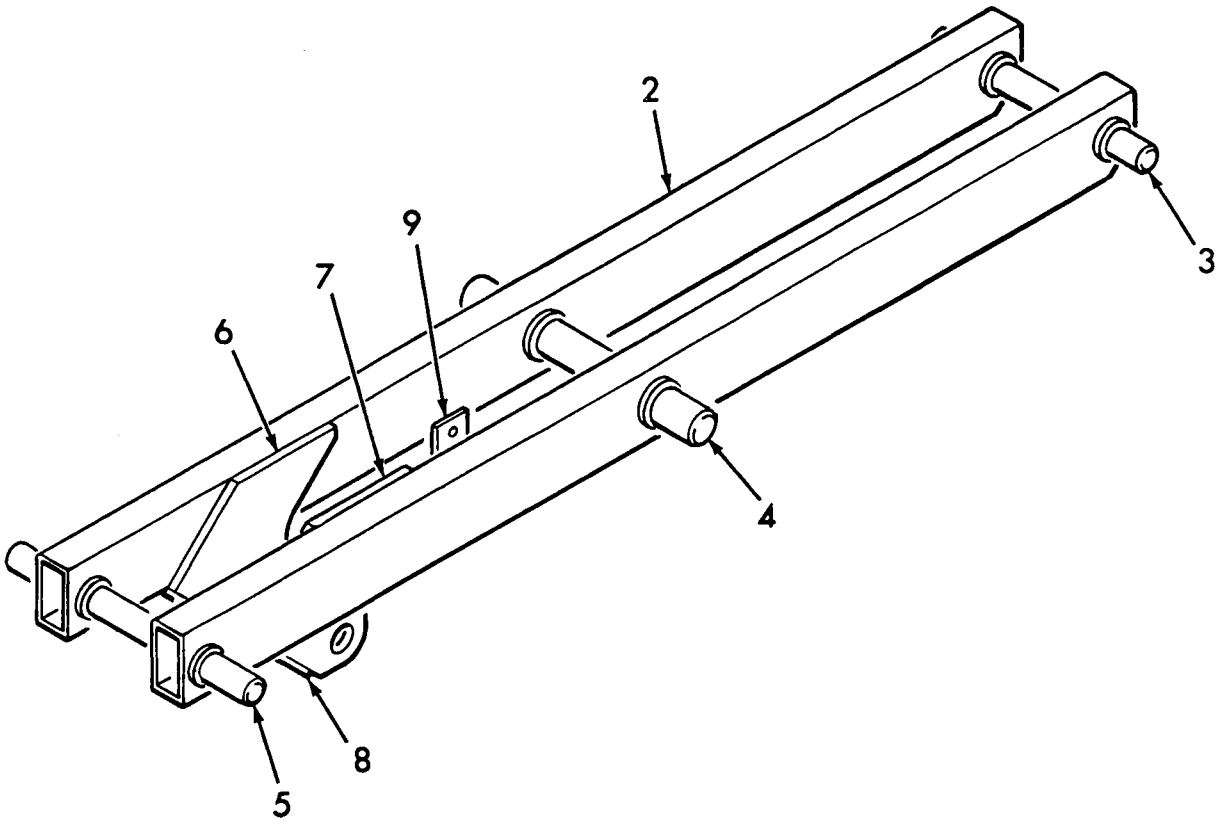
REV.

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131681	ASSEMBLY, SCISSOR (See Sect. 2, Fig. 1 for NHA)	REF
-2	.131622	SUB-ASSEMBLY, SCISSOR	1
3	..131671	WELDMENT, INNER ARM FIRST STAGE (See Sect. 4, Fig. 2 for Details)	1
4	..131672	WELDMENT, INNER ARM SECOND STAGE (See Sect. 4, Fig. 3 for Details)	1
5	..133216	WELDMENT, INNER ARM THIRD STAGE (See Sect. 4, Fig. 4 for Details)	1
6	..131655	ASSEMBLY, OUTER ARM (See Sect. 4, Fig. 5 for Details)	6
7	..2214	COLLAR	6
8	..62237	SCREW, SET	6
9	..65577	COLLAR, SHAFT	8
10	..62238	SCREW, SET	8
11	.131695	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 6 for Details)	1
12	.131691	PIN, CYLINDER	2
13	.61828	SCREW, CAP	4
14	.131773	PIN, WEAR PAD	1
15	.65577	COLLAR, SHAFT	2
16	.62238	SCREW, SET	2
17	.131693	PAD, WEAR	2
18	.131694	PAD, WEAR	2

Mark Industries

TITLE	INNER ARM FIRST STAGE WELDMENT
MODEL	J20NEP
NOTES	

SECT.	4
FIG.	2
PAGE	1



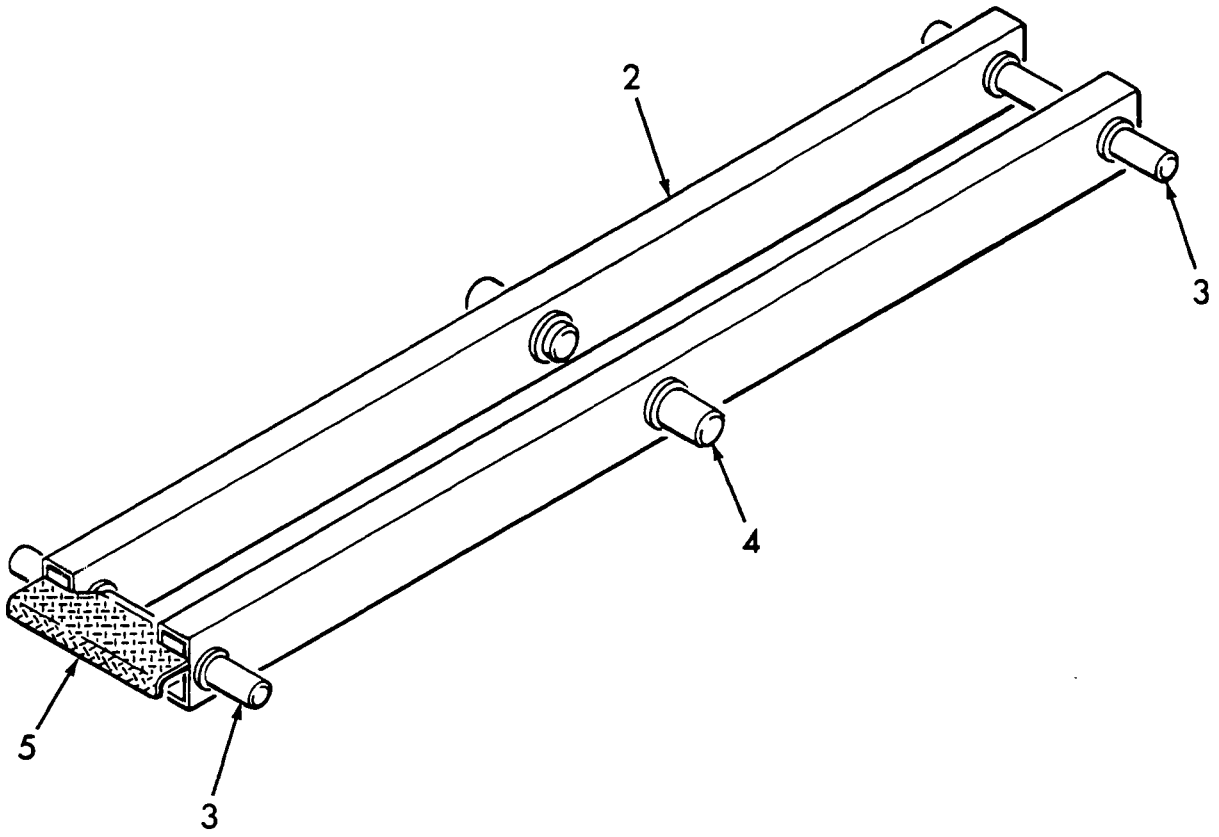
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131671	WELDMENT, INNER ARM FIRST STAGE (See Sect. 4, Fig. 1 for NHA)	REF
2	.131654	MACHINING, INNER ARM	2
3	.131689	PIN, END WEAR PAD	1
4	.131688	PIN, CENTER (LONG)	1
5	.131686	PIN, END (LONG)	1
6	.131715	BRACKET, CYLINDER (L.H.)	1
7	.131676	BRACKET, CYLINDER (R.H.)	1
8	.37596	TIE, PLATE	1
9	.131769	BRACKET, ARM SUPPORT	1

REV.

Mark Industries

TITLE	INNER ARM SECOND STAGE WELDMENT
MODEL	J20NEP
NOTES	

SECT.	4
FIG.	3
PAGE	1

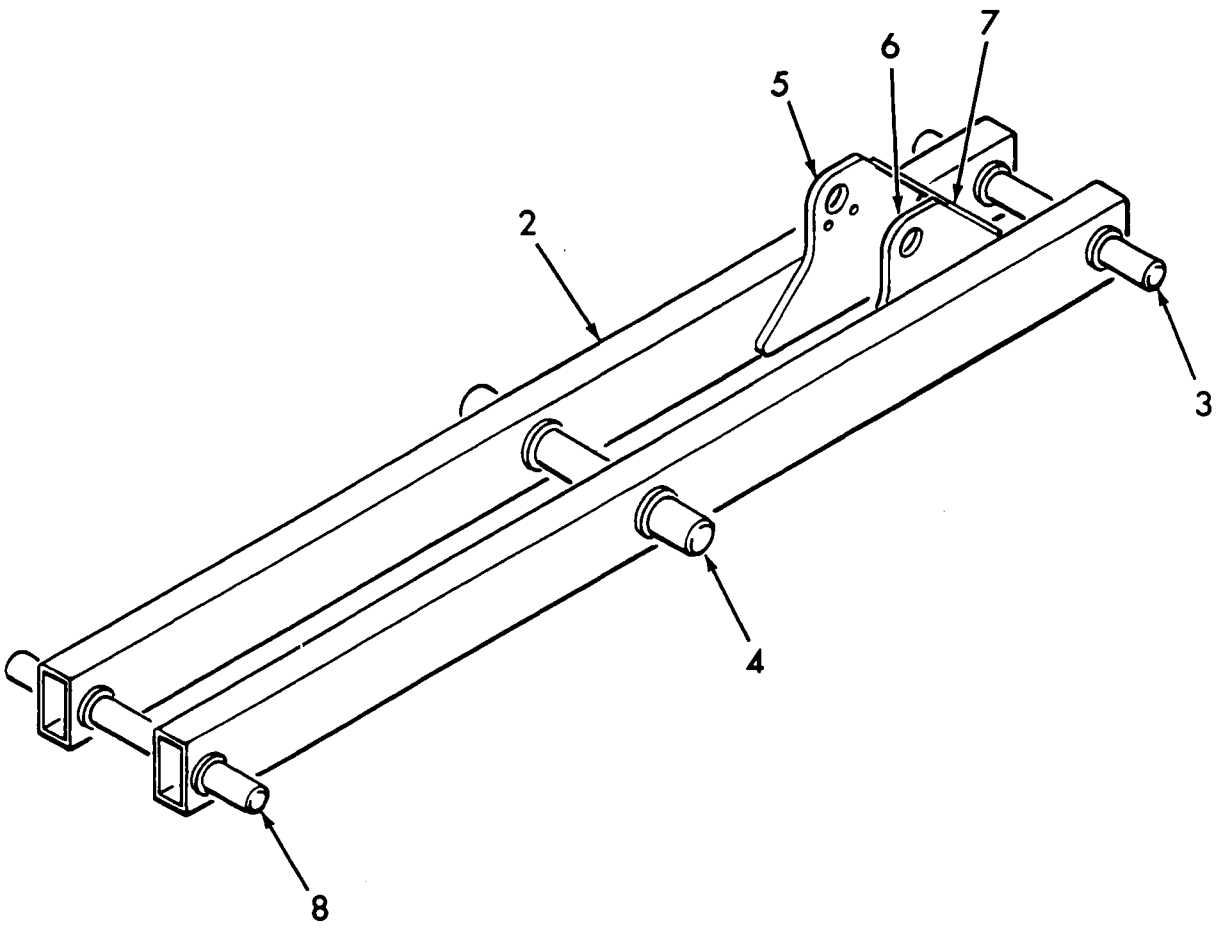


ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131672	WELDMENT, INNER ARM SECOND STAGE (See Sect. 4, Fig. 1 for NHA)	REF
2	.131648	MACHINING, INNER ARM	2
3	.131686	PIN, END (LONG)	2
4	.131687	PIN, CENTER (SHORT)	2
5	.131743	FRAME, STEP PLATE	1

REV.

Mark Industries

TITLE	INNER ARM THIRD STAGE WELDMENT	SECT.	4
MODEL	J20NEP	FIG.	4
NOTES		PAGE	1



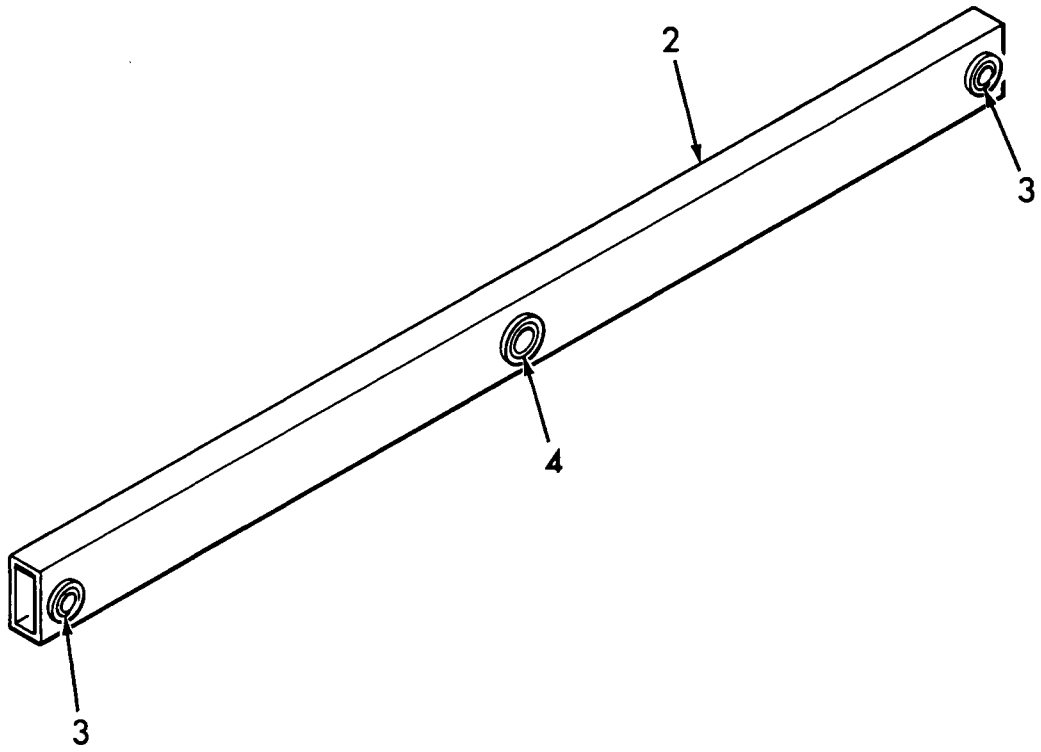
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133216	WELDMENT, INNER ARM THIRD STAGE (See Sect. 4, Fig. 1 for NHA)	REF
2	.131654	MACHINING, INNER ARM	2
3	.131686	PIN, END (LONG)	1
4	.131688	PIN, CENTER (LONG)	1
5	.131715	BRACKET, CYLINDER (L.H.)	1
6	.131676	BRACKET, CYLINDER (R.H.)	1
7	.37596	TIE, PLATE	1
8	.133215	PIN, END (LONG)	1

REV.

Mark Industries

TITLE	OUTER ARM ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	4
FIG.	5
PAGE	1



ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131655	ASSEMBLY, OUTER ARM (See Sect. 4, Fig. 1 for NHA)	REF
2	.131623	MACHINING, OUTER ARM	1
3	.160320	BEARING	2
4	.160317	BEARING	1

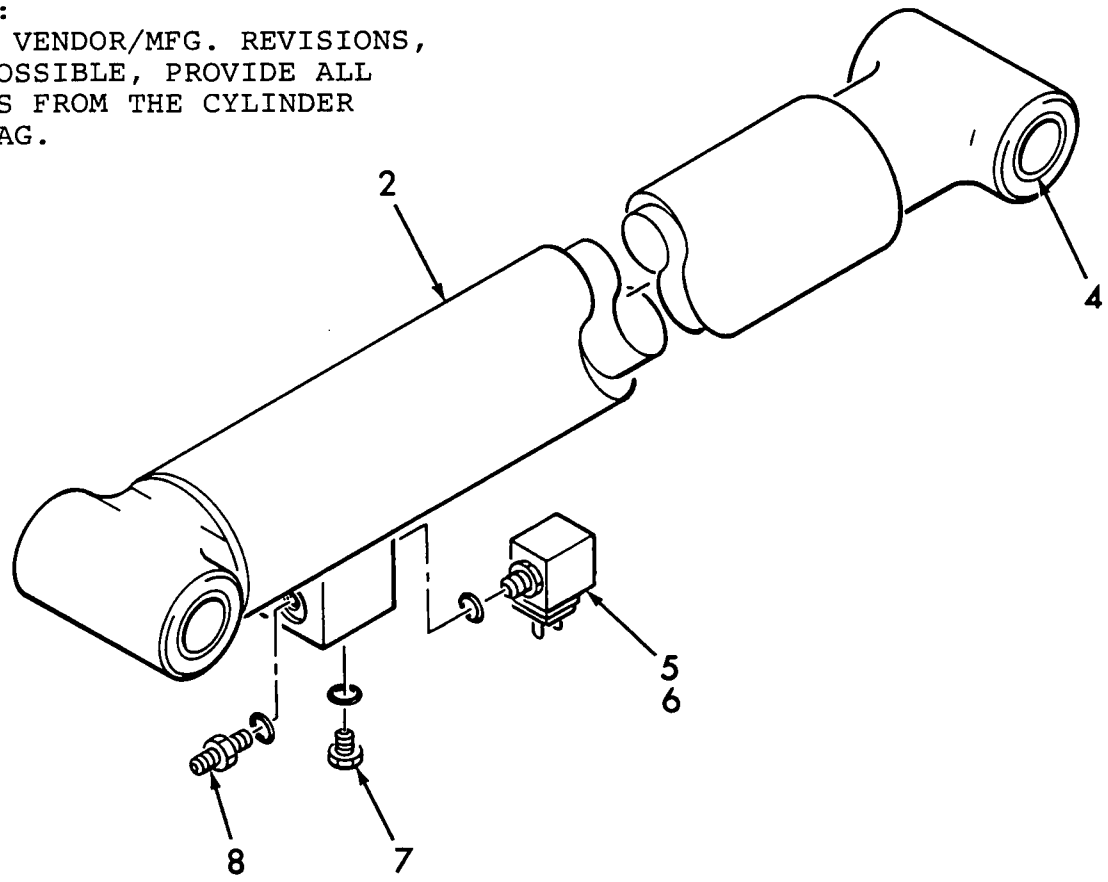
REV.

Mark Industries

TITLE	LIFT CYLINDER ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	4
FIG.	6
PAGE	1

NOTE 1:
DUE TO VENDOR/MFG. REVISIONS, WHEN POSSIBLE, PROVIDE ALL NUMBERS FROM THE CYLINDER I.D. TAG.

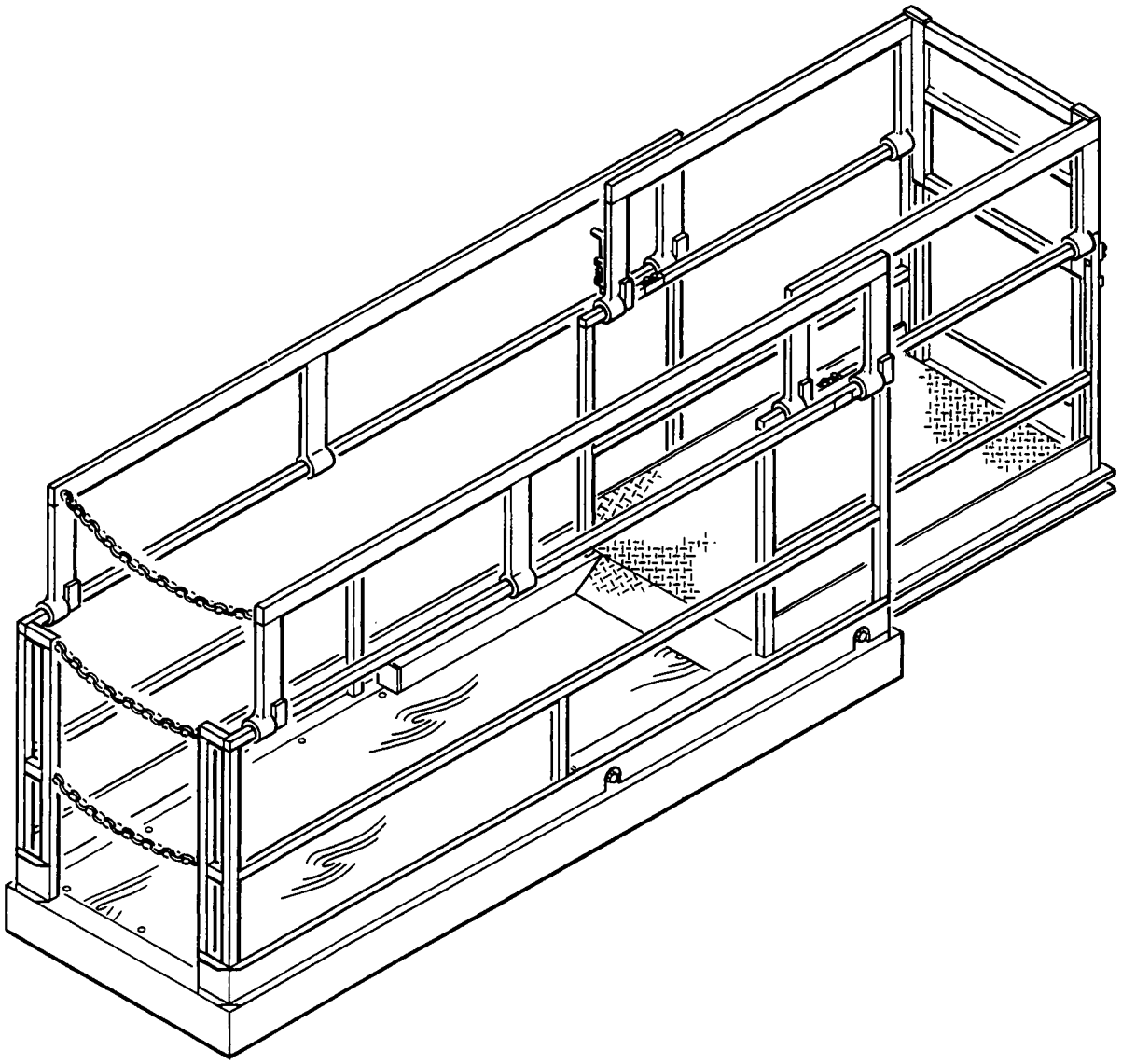


ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131695	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1 for NHA)	REF
2	.131627	CYLINDER, LIFT (TH) NOTE 2: INTERNAL SERVICE REPLACEMENT PARTS AVAILABLE ON A SPECIAL ORDER BASIS	1
3	..67844	KIT, SEAL	1
4	..600308	BUSHING	4
5	.81028	SOLENOID, ELECTRIC CHECK	1
6	..66865	COIL, 20V	1
7	.80050-03	PLUG (WITH O-RING)	1
8	.80004-05	CONNECTOR, STRAIGHT THREAD	1

REV.

SECTION 5 CONTAINS

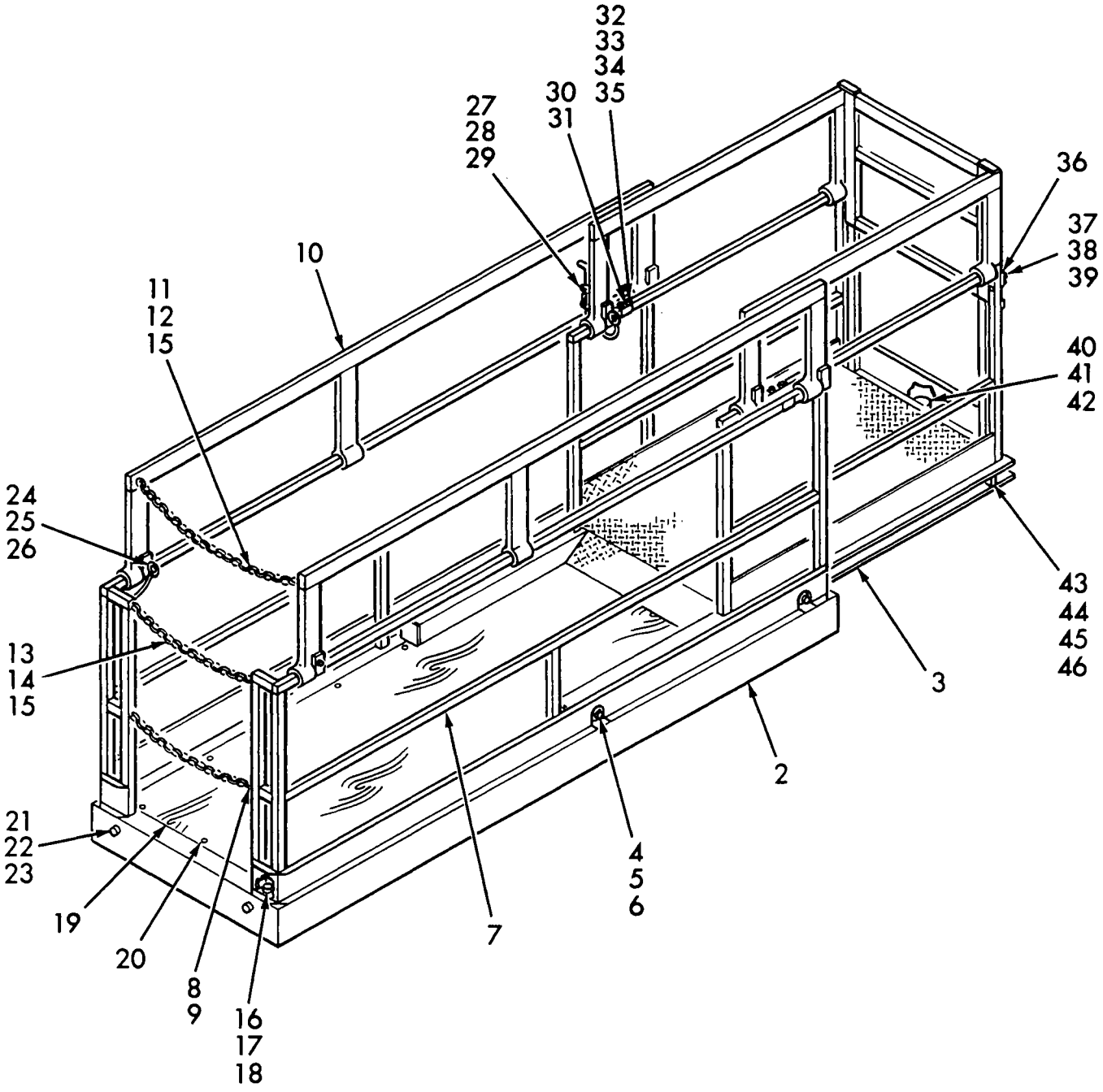
FIG. NO.	TITLE
1	PLATFORM ASSEMBLY



Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	5
FIG.	1
PAGE	1



REV.

Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	5
FIG.	1
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133190	ASSEMBLY, PLATFORM (See Sect. 2, Fig. 1 for NHA)	REF
2	.133146	WELDMENT, MAIN PLATFORM	1
3	.133153	WELDMENT, EXTENDABLE PLATFORM	1
4	.65555	FOLLOWER, CAM	4
5	.37808	TUBE, ROUND	4
6	.61232	NUT, HEX	4
7	.133174	RAIL, GUARD (R.H.)	1
8	..65636	CHAIN, LINK (1 LINK)	3
9	...65656	CHAIN	AR
10	.133173	RAIL, GUARD (L.H.)	1
11	..160001	CHAIN, LINK (23 LINKS)	1
12	...65656	CHAIN	2.2 FT
13	..160298	CHAIN, LINK (17 LINKS)	2
14	...65656	CHAIN	1.6 FT
15	..65990	SNAP, SWIVEL WIRE SPRING	3
16	.60309	SCREW, CAP	2
17	.63301	WASHER, LOCK	2
18	.60701	NUT, HEX	2
19	.133188	FLOOR, PLYWOOD	1
20	.61713	SCREW, SELF-TAP	14
21	.60337	SCREW	4
22	.63301	WASHER, LOCK	4
23	.60701	NUT, HEX	4
24	.65669	ASSEMBLY, LANYARD	3
25	.65124	PIN, BALL-LOK	3

Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J20NEP
NOTES	

SECT.	5
FIG.	1
PAGE	3

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.63651	RIVET, POP	3
27	.133287	HANDLE	1
28	.160308	SPRING, COMPRESSION	1
29	.64301	PIN, COTTER	1
30	.133643	SPACER, RAIL	2
31	.133629	BRACKET, RAIL	2
32	.160459	SCREW, CAP	4
33	.63401	WASHER, FLAT	4
34	.63301	WASHER, LOCK	4
35	.60701	NUT, HEX	4
36	.130926	PLATE, LOCK	2
37	.60360	SCREW	4
38	.63302	WASHER, LOCK	4
39	.60702	NUT, HEX	4
40	.133135	BRACKET, CABLE	1
41	.160292	SCREW	2
42	.63313	WASHER, LOCK	2
43	.133092	BRACKET, STOP	2
44	.60343	SCREW	4
45	.60333	WASHER, LOCK	4
46	.60703	NUT, HEX	4

SECTION 6 CONTAINS:

FIG. NO.	TITLE
1	WARNING HORN
2	HOURMETER
3	REMOTE DRIVE KIT
4	ROTATING AMBER BEACON
5	24 VOLT PLATFORM WORK LIGHT
6	SWING GATE
7	FEMALE PLUG ONLY FOR REMOTE DRIVE
8	LANYARD/CONTROL BOX ONLY FOR REMOTE DRIVE
9	TUV PACKAGE
10	ALL MOTION ALARM
11	SOLID STATE SLOPE SENSOR
12	SOLID STATE DELUXE CHARGER

PART NUMBERS FOR THE ABOVE OPTIONS WERE NOT AVAILABLE AT PRESS TIME. PLEASE CONTACT YOUR NEAREST DEALER FOR THE PART NUMBER ON THE OPTION YOU ARE INTERESTED IN.

HYDRAULIC DRIVE MOTOR

PRIOR TO DISASSEMBLY, CLEAN OFF THE EXTERIOR OF THE MOTOR. REMOVE KEY AND SNAP RING FROM SHAFT. IT MAY BE HELPFUL FOR LATER REFERENCE TO USE A FELT MARKER TO NOTE THE "TOP" AND "BOTTOM" OF EACH PIECE WITH RESPECT TO THE PIECE NEXT TO IT, AS PROPER REASSEMBLY IS CRITICAL IN THIS REGARD. THERE IS NO INTERNAL TIMING AND RADIAL LOCATION IS UNIMPORTANT.

DISASSEMBLY

(SEE FIGURE 1)

1. PLACE MOTOR IN VISE WITH SHAFT DOWN, CLAMPING AROUND MOTOR PORTS.
2. REMOVE BOLTS (19) AND END COVER (18).
3. REMOVE BALANCE PLATE TAKING CARE NOT TO DROP THE 4 3/8" BALLS (16) LOCATED IN 4 HOLES ON BALANCE PLATE (15).
4. REMOVE MOTOR ASSEMBLY (13), MANIFOLD BOOT (12), MANIFOLD (11), DRIVE LINK (9), SPACER (14), AND THRUST BEARING (7).
5. REMOVE SHAFT (8) UP THROUGH HOUSING (5).
6. TURN HOUSING OVER AND PRY OUT THE DUST SEAL (1).
7. PUSH THE SEAL CARRIER (6) AND THRUST BEARING (7) DOWN TOWARD THE ROLLER BEARING LOCATED IN HOUSING BORE, REMOVE SNAP RING (2), STEEL BACK-UP SHIM (3), AND LATHE CUT SEAL (4) FROM INNER BORE GROOVE WITH SMALL SCREWDRIVER.
8. LIFT OUT THE SEAL CARRIER (6) AND THRUST BEARING (7).

REASSEMBLY

(SEE FIGURE 2)

1. PLACE HOUSING IN VISE WITH FLANGE UP.
2. PLACE THRUST BEARING ON SHAFT.
3. PLACE THRUST WASHER (5) ON SHAFT.
4. PLACE THE PROTECTIVE SHAFT SEAL INSTALLATION SLEEVE WITH THE SHAFT SEAL STILL ON IT OVER SHAFT END. (APPLY OIL TO TEFLON BACK-UP (3) AND SEAL (4) PRIOR TO INSTALLATION).
5. INSTALL SEAL (4) OVER THE SLEEVE AND ONTO THE SHAFT DOWN TO THE THRUST WASHER (5) (ORIENTED AS SHOWN).
6. REMOVE INSTALLATION SLEEVE.
7. INSTALL THE TEFLON BACK-UP (3) ONTO THE SHAFT ORIENTED AS SHOWN. THE LIP ON THE TEFLON BACK-UP (3) SHOULD ENGAGE WITH THE SHAFT SEAL (4).
8. INSTALL BACK-UP EING (2) ONTO SHAFT AND DOWN AGAINST THE TEFLON BACK-UP (3).

9. PLACE SEAL CARRIER (1) ONTO THE SHAFT. WE RECOMMEND USING THE SEAL CARRIER INSTALLATION GUIDE (PE444501) TO PUSH THE SEAL CARRIER STRIGHT DOWN OVER THE SHAFT SEAL ASSEMBLY, TAKING CARE NOT TO COCK THE CARRIER WHILE INSTALLING. IF SEAL CARRIER INSTALLATION GUIDE IS NOT AVAILABLE, YOU MAY USE YOUR FINGERS OR A SHORT PIECE OF PIPE TO CAREFULLY AND VERY GENTLY PUSH SEAL CARRIER OVER THE SEAL.
10. IF APPLICABLE, INSTALL .062 DIA. WIRE RING ONTO THE SHAFT BEING USED.

(SEE FIGURE 1)

11. SLIDE SHAFT ASSEMBLY (8) INTO THE HOUSING SO THAT SEAL CARRIER (6) IS BEYOND THE INNER BORE SEAL GROOVE.
12. INSTALL LATHE CUT SEAL (4) INTO GROOVE.
13. INSTALL THE STEEL BACK-UP SHIM (3) NEXT TO SEAL SHIM MUST BE FOLDED AND BENT SLIGHTLY AND WORKED INTO PLACE WITH A SMALL SCREWDRIVER.
14. INSTALL WIRE RETAINING RING.
15. PLACE HOUSING (5) AND SHAFT ASSEMBLY (8) IN VISE WITH SHAFT (8) DOWN.
16. INSTALL DRIVE LINK (9), TAP LIGHTLY ON DRIVE LINK END TO SEAT THE SHAFT ASSEMBLY INTO THE RETAINING RING.
17. PLACE THRUST BEARING ON SHAFT END, MAKE SURE THE BEARING SITS INSIDE THE HOUSING BORE WITH ROLLERS FLUSH OR SLIGHTLY BELOW FACE OF HOUSING.
18. INSTALL BODY SEAL (10) INTO GROOVE IN HOUSING (5).
19. PLACE MANIFOLD (11) ON HOUSING (5), ALIGNING BOLT HOLES.
NOTE: MANIFOLD SIDE WITH ONLY 7 VALVING HOLES GOES TOWARD HOUSING.
20. PLACE MANIFOLD BOOT (12) AROUND MANIFOLD.
21. INSTALL BODY SEAL (10) IN GROOVE IN THE "BOTTOM" SIDE OF ROTOR ASSEMBLY, BOTTOM SIDE HAS 1 DEEP GROOVE IN ROTOR. PLACE ROTOR ASSEMBLY ON MANIFOLD, ENGAGING THE DRIVE LINK SPLINES (9). TURN ROTOR ASSEMBLY (13) TO ALIGN BOLT HOLES.
22. IF MODEL REQUIRES A SPACER (14), PLACE SPACER ON DRIVE LINK END.
23. PLACE BALANCE PLATE (15) ONTO ROTOR ASSEMBLY (13) AND INSTALL 4-3/16" CHECK BALLS (16) INTO HOLES PROVIDED. NOTE: ONLY MOTORS WITH DATE CODES LATER THAN 030-5 HAVE THE BALL CHECK BALANCE PLATES (15).
24. INSTALL 3.125" O.D. BODY SEAL (10) INTO SEAL GROOVE IN END COVER
NOTE: ONE EXTRA 3.782" O.D. BODY SEAL (17) IS INCLUDED IN SEAL KITS FOR MOTORS BUILT PRIOR TO JUNE, 1984, 17. PLACE END COVER ON BALANCE PLATE AND ALIGN BOLT HOLES.
25. INSERT BOLTS (19) AND TORQUE IN A CRISSCROSS MANNER TO 60 FT. LBS. REMOVE MOTOR FROM VISE AND PLACE ON WORK BENCH WITH SHAFT UP.
26. INSTALL DUST SEAL (1) TO FLUSH WITH PILOT FACE.

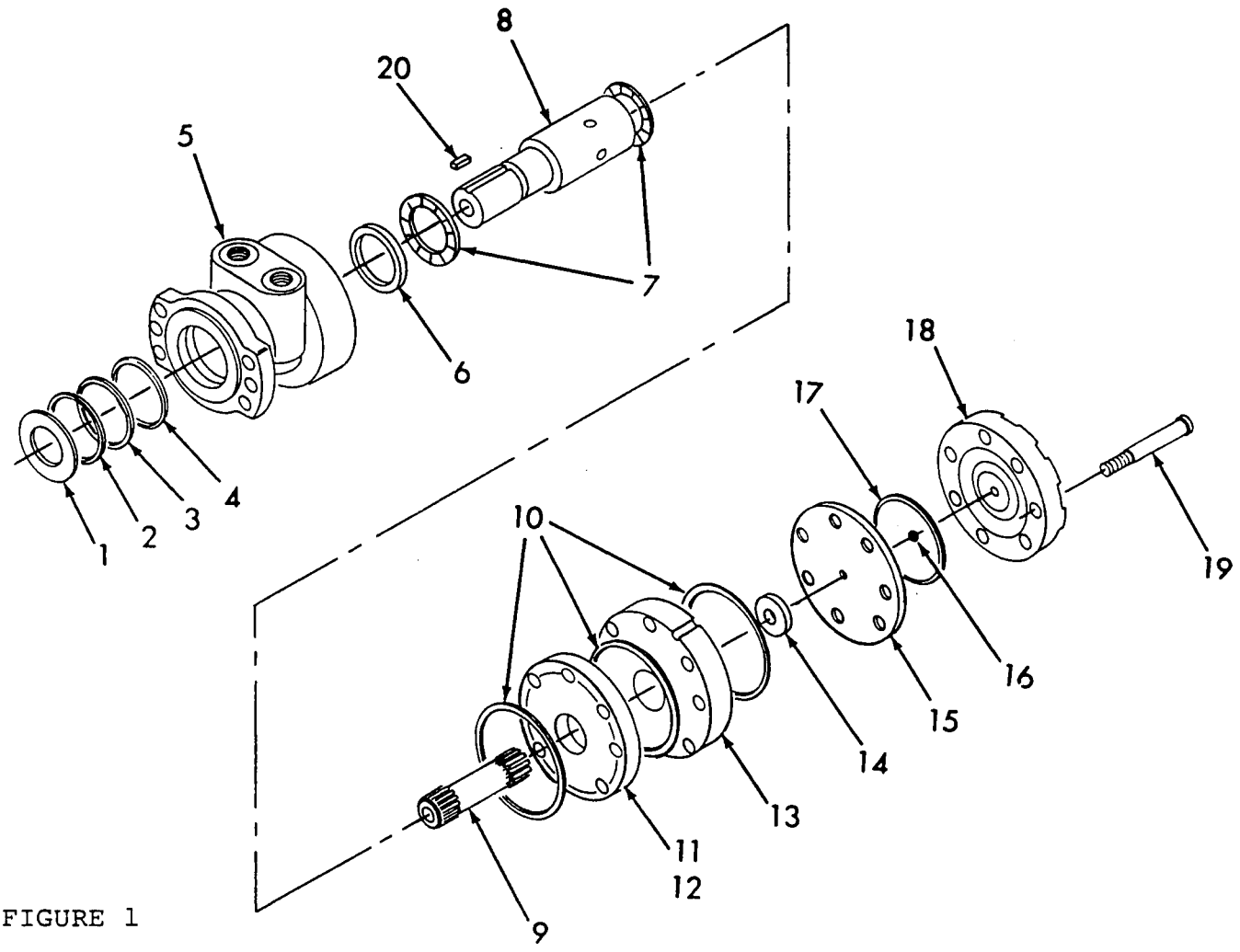


FIGURE 1

ITEM	DESCRIPTION	UNITS
1	DUST SEAL	1
2	RETAINING RING	1
3	STEEL BACK-UP	1
4	SEAL	1
5	HOUSING	1
6	SEAL CARRIER ASSEMBLY	1
7	THRUST BEARING	2
8	SHAFT	1
9	DRIVE LINK	1
10	SEAL	3
11	MANIFOLD PLATE	1
12	MANIFOLD BOOT	1
13	ROLLER STATOR	1
14	SPACER	1
15	PRESSURE PLATE	1

ITEM	DESCRIPTION	UNITS
16	3/16" DIA. BALL	4
17	SEAL	1
18	END COVER	1
19	BOLT	7
20	.3125 x .275	1
	.25 x 1.00 WOODRUFF KEY OR 1.00-20UNEF HEX NUT AND .3125 x 1.25 WOODRUFF KEY PROVIDED WITH THE APPROPRIATE SHAFT	

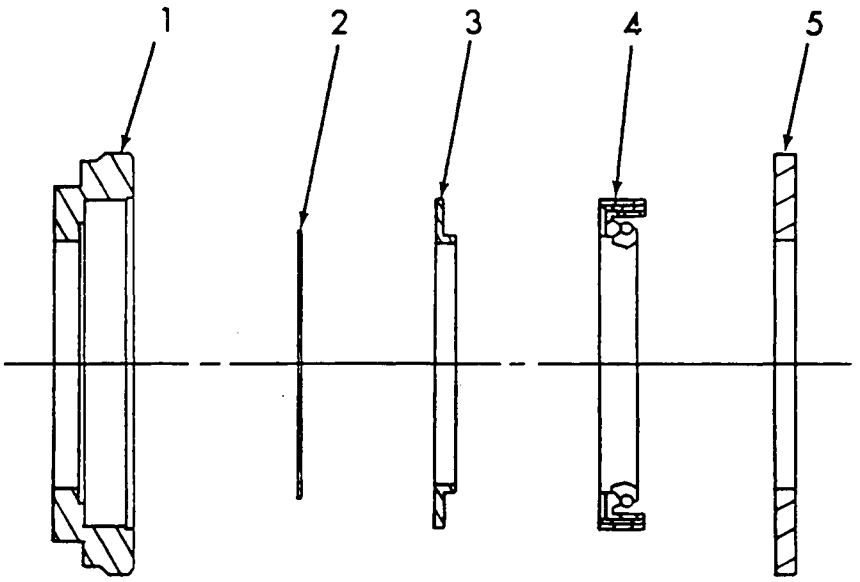


FIGURE 2

ITEM	DESCRIPTION	UNITS
1	SEAL CARRIER	1
2	BACK-UP RING	1
3	TEFLON BACK-UP	1
4	SHAFT SEAL	1
5	THRUST WASHER	1

SERVICE BULLETINS

As we make improvements to the **MARKLIFTS**, we like to supply you, the customer, with updated information which applies to your machine.

This section is provided as a place to store Service Bulletins as you receive them from MARK INDUSTRIES.