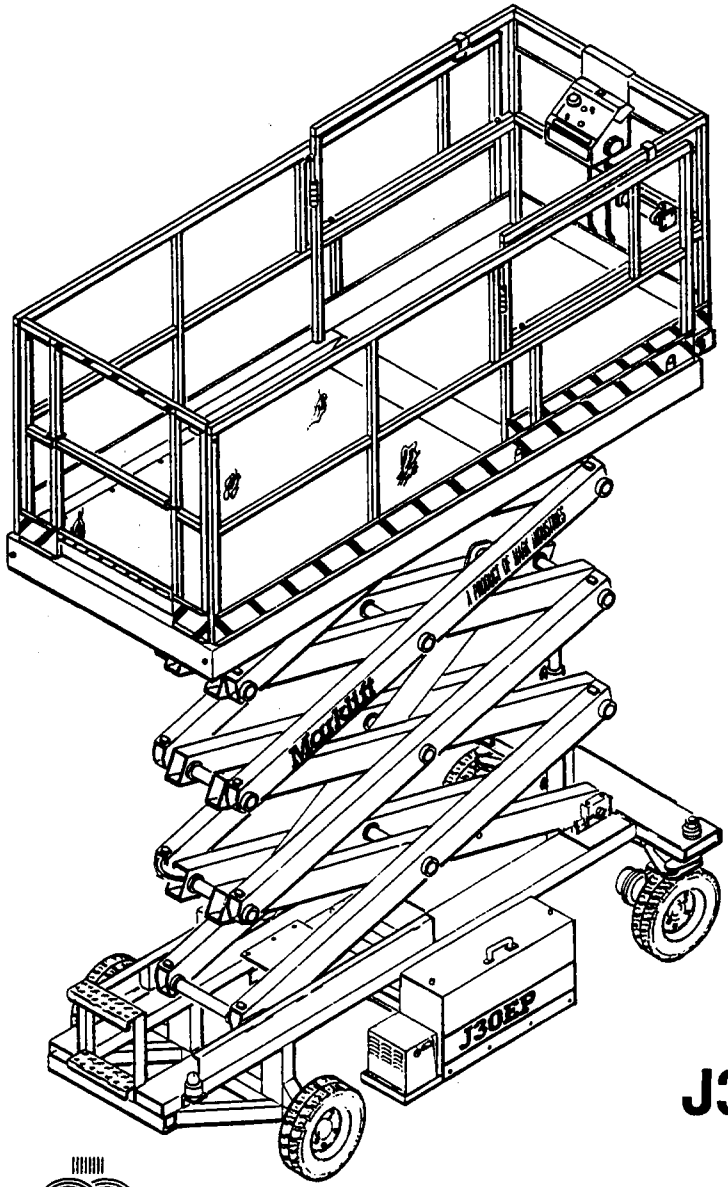
The Marklifts.®

A Product of Mark Industries

SELF-PROPELLED SCISSOR OPERATION MAINTENANCE AND PARTS MANUAL



J30EP

Mark Industries

106 12th Street S.E.
Waverly, Iowa 50677-9466
TEL. (319) 352-3920, FAX (319) 352-5727

17224

TABLE OF CONTENTS

GENERAL

Introduction 3

Specifications 4

Warranty 5

Warranty Registration 6

New Equipment Condition Report 7

OPERATION

The MARKLIFT Safety 8
Division of Industrial Safety 10
General Decal Listing 12

Dynamic Brake Adjustment 14

Inspection and Checkout 18

Operating Instructions 19

MAINTENANCE

Preventive Maintenance 20

Battery Maintenance 22
Battery Fill Instructions 22
Avoiding Battery Hazards 22
Battery Hydrometer Reading 23

Recommended Service Chart 24

Troubleshooting 25
Troubleshooting Checklist 26

New Equipment Maintenance Record 28

Hydraulic Fluid Table 29

Recommended Spare Parts List 30

TABLE OF CONTENTS (CONT.)

SCHEMATICS

Electrical Schematic — Page

J30EP 1

Hydraulic Schematics

J30EP 2

PARTS

The MARKLIFT Parts Catalog ..... Section 1

Final Assembly ..... Section 2

Frame Assembly ..... Section 3

Scissor Assembly ..... Section 4

Platform Assembly ..... Section 5

Options ..... Section 6

VENDOR

Drive Motor P/N 81380 ..... Section 1

Eskridge Brake P/N 81155 ..... Section 2

Battery Charger P/N 70525 ..... Section 3

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 Customer 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
	J30EP
Height	
Working (maximum)	36' (10.97m)
Platform (maximum)	30' (9.14m)
Platform (minimum)	54.5" (1.38m)
Total stowed (minimum)	96.5" (2.45m)
Length (overall)	122" (3.10m)
Width (overall)	48" (1.22m)
Platform	
Dimenions (inside)	44.5" x 106.5" (1.13m x 2.71m)
Safety rail height	44" (1.12m)
Toe plate height	6" (4" at entry) (.15m/.10m at entry))
Extends	36" forward (.91m)
Load capacity	800 lbs (362.88 kg)
Wheel base	85" (2.16m)
Wheel track	43" (1.09m)
Turning radius (inside)	34" (.86m)
Gradeability	18% (10.8 degrees)
Drive speed	
Low	1.3 mph (2.10 km/h)
High	3.3 mph (5.31 km/h)
High speed cut-out	7' (2.13m)
Drive cut-out	26' (7.92m)
Lift/lower speed	69/69 seconds
Power system	24VDC
Battery voltage	4 @ 6 VDC (series)
Hydraulic tank capacity	16 gal. (60.56 l)
Battery charger	230 VAC/50 HZ
Tire size	4 x 8 (solid)
Maximum system pressure	2500 psi (172 bar)
Shipping Weight	4500 lbs. (2041.2 kg)

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.

NEW EQUIPMENT CONDITION REPORT

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) P1 _____ P2 _____.	☐	☐	☐
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	☐	☐	☐

MODEL
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."**

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

> It is the primary responsibility of the user and operator to be thoroughly knowledgeable of all decal information, definition and location.

The following page illustrates a chart in which decals for the **MARKLIFT** are listed. This will enable you to replace the existing decal(s) if they become worn-out, torn, or illegible. It is essential that all decals be in a readable condition for the safe operation of the **MARKLIFT**. It is therefore recommended that they be properly maintained.

Danger, Warning and Caution are used to identify levels of hazard seriousness. Given below is a definition of each term as it applies to the decals:

- Danger (indicated in red):
  Immediate hazards which **Will** result in severe personal injury or death.

- Warning (indicated in orange):
  Hazards or unsafe practices which **Could** result in severe personal injury or death.

- Caution (indicated in yellow):
  Hazards or unsafe practices which **Could** result in minor personal injury or product or property damage.

DECAL P/N	DESCRIPTION J30EP	LOCATION	QTY
600338	Decal Set	All Standard Decals	1
182778	Ground Control Panel	Ground Control Panel	1
20661	Plate, ANSI A92	Final Assembly	1
181780	Nameplate, Metal Foreign I.D.	Final Assembly	1
31259	Marklift (small scissor)	Final Assembly	2
2003	Battery Water Level	Final Assembly	2
181791	Machine Designation J30EP	Final Assembly	2
181728	Panel Strip	Final Assembly	2
181800	Safe Working Load 455kg	Final Assembly	4
2017	Hydraulic System Fluid	Final Assembly	1
130937	J-Series	Final Assembly	1
2016	'Do Not Work Under...'	Final Assembly	2
182106	Operation Instructions	Final Assembly	1
130606	Freewheeling Valve	Final Assembly	1
130820	Operation & Safety Handbook	Final Assembly	1
2002	Forklift Boot	Final Assembly	2
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	2
130938	Mark	Final Assembly	1
131061	Blue Stripe	Final Assembly	1
181800	Safe Working Load 455kg	Upper Control Box	1
182777	Upper Control Panel	Upper Control Box	1
2015	Warning Unstable Condition	Upper Control Box	1
182776	Drive/Upper Control Box	Upper Control Box	1
2014	Caution High Voltage Lines	Upper Control Box	1
181304	Emergency pump	Final Assembly	1

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 shaft counterclockwise approximately 1-1/2 turns. Lock the setting by tightening the jam nut. Drive the unit forward briefly. EXERCISE CAUTION!

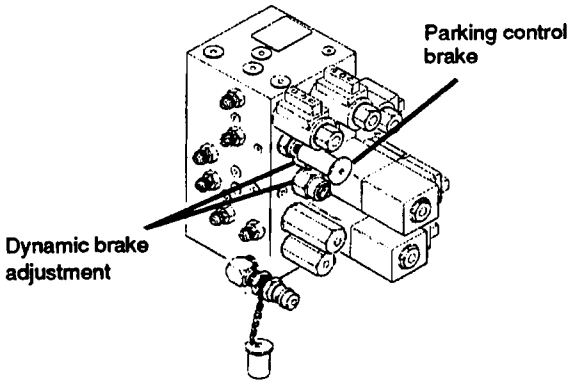


Figure A: Function Control Valve (J19W/J25/J20NEP)

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, J30EP 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

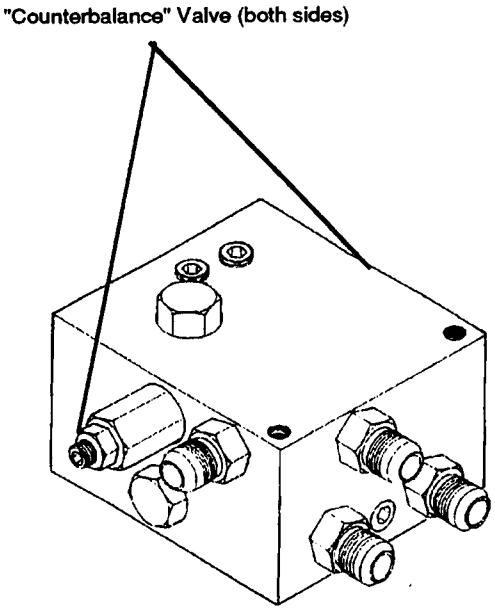


Figure B: Drive Brake Valve (P/N 21214)

(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.

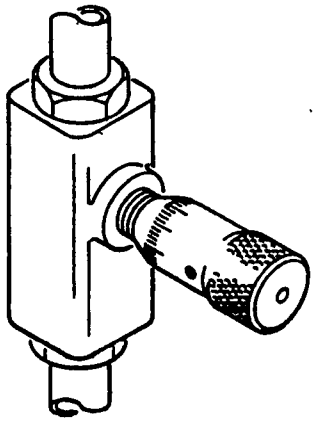


Figure C: Parking Brake Control Valve (MT, LS, SPS31)

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 the model J30EP, which employs a disc type brake, follow the same procedure as for those machines using the 21214.)

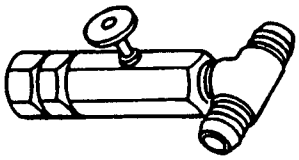


Figure D: Parking Brake Control Valve (30 4x4, 40 4x4, 30EBII)

For units employing the "21214" drive brake valve (MT, LS, SPS31,30 4X4, 40 4X4 and 30EBII), open the 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.

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 specific gravity reading of 1.200 ± 50 on the hydrometer. Charge the battery if the reading is below 1.125. 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. 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.

7. Make sure the brakes are adjusted to stall the drive motors. (See Dynamic Brake Adjustment procedure.)

With the exception of the instructions for extending the platform, the Operation and Safety Handbook covers all the operation instructions for the J30EP. Please refer to the Operation and Safety Handbook which accompanied your MARKLIFT for specific operation instructions.

Extending Platform J30EP

The J30EP is manually extended from the aerial platform. To extend, raise the handles up from the lock position. Using the handles, push the platform forward until fully extended. Lower the handles back into the lock position.

To retract the platform, raise the handles from the lock position, then pull the platform inward until fully retracted. Lower the handles into the lock position.

Safety Reminder

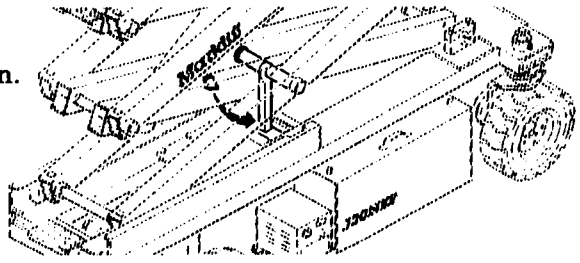
When working under the elevated platform, always remember to set the the safety support arm to prevent accidental platform descent.

To set the safety support arm:

* Set the "Aerial/Ground" selector to "Ground".
* Turn the Marklift on.
* Raise the platform approximately 6 ft.
* Remove safety lock pin from safety support arm.
* Lift the safety support arm up and over to free it from the stowed position.
* Move arm along bar to line up with safety stand pin. (See Illustration.)
* Slowly lower the platform making sure the support arm remains lined up with the safety stand pin.
* Lower until there's no load on cylinder (bottoms out).

To remove safety support arm from locked position:

* Raise platform approximately 1 ft.
* Lift arm up and over to stowed position.
* Replace safety lock pin.



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

Perform all daily maintenance items.

1. Check the condition of the tires. Make sure they are free of serious cuts or defects.
2. Test instability alarm system (slope sensor/mercury switches).
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 good overall performance.
7. Check for wear on electrical cables and hydraulic hoses.

MONTHLY

Perform all daily and weekly maintenance items.

1. Check and lubricate, if necessary. (See Recommended Service Chart.)

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

3. Change the hydraulic oil return filter.

YEARLY

Perform all weekly and monthly maintenance items.

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 termperatures 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.

RECOMMENDED SERVICE CHART

Service chart not available at this time.

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 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

Hydraulic fluid must be clean and well filtered to provide trouble free operation of a hydraulic control valve. Contaminated fluid accounts for a substantial number of hydraulic malfunctions.

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, but simply provides a possible cause.

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.

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 switch.

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 switch.

C. Valve spool stuck.

D. Refer to local authorized MARKLIFT dealer.

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

MODEL: J30EP

PART NO.	QTY.	DESCRIPTION
600338	1	Decal Set
133501	1	Electrical Schematic
133502	1	Hydraulic Schematic
130927	2	Plastic Container
65842	4	Anti-Roll Cap
160137	4 ft	Warning Tape
70619	1	Limit Switch
133696	2	Kick Cylinder Wear Pad
70612	1	Mini Strobe (Amber)
4106	1	Drive Switch
65753	1	Fluted Knob
20481	1	Toggle Switch
31080	1	Emergency Knob
70615	1	Pilot Indicator Light
70333	1	Buzzer
70611	1	Emergency On/Off Switch
70610	1	Ignition Key Switch
16260	1	Toggle Switch
20562	1	Circuit Breaker
4014	2	Mercury Switch
70362	1	Relay
70590	1	Time Delay Relay
16947	6	Return Filter Canister
70479	4	Diode
90127-24	1	Solenoid Valve
81176	2	Seal Kit (Pump/Motor)
66731	2	Diode Assembly
66747	1	Ammeter
67975	1	Timer Kit
66750	1	Capacitor
66727	1	Fuse Assembly
600356	2	Seal Kit (Lift Cylinder)(TH)

RECOMMENDED SPARE PARTS LIST

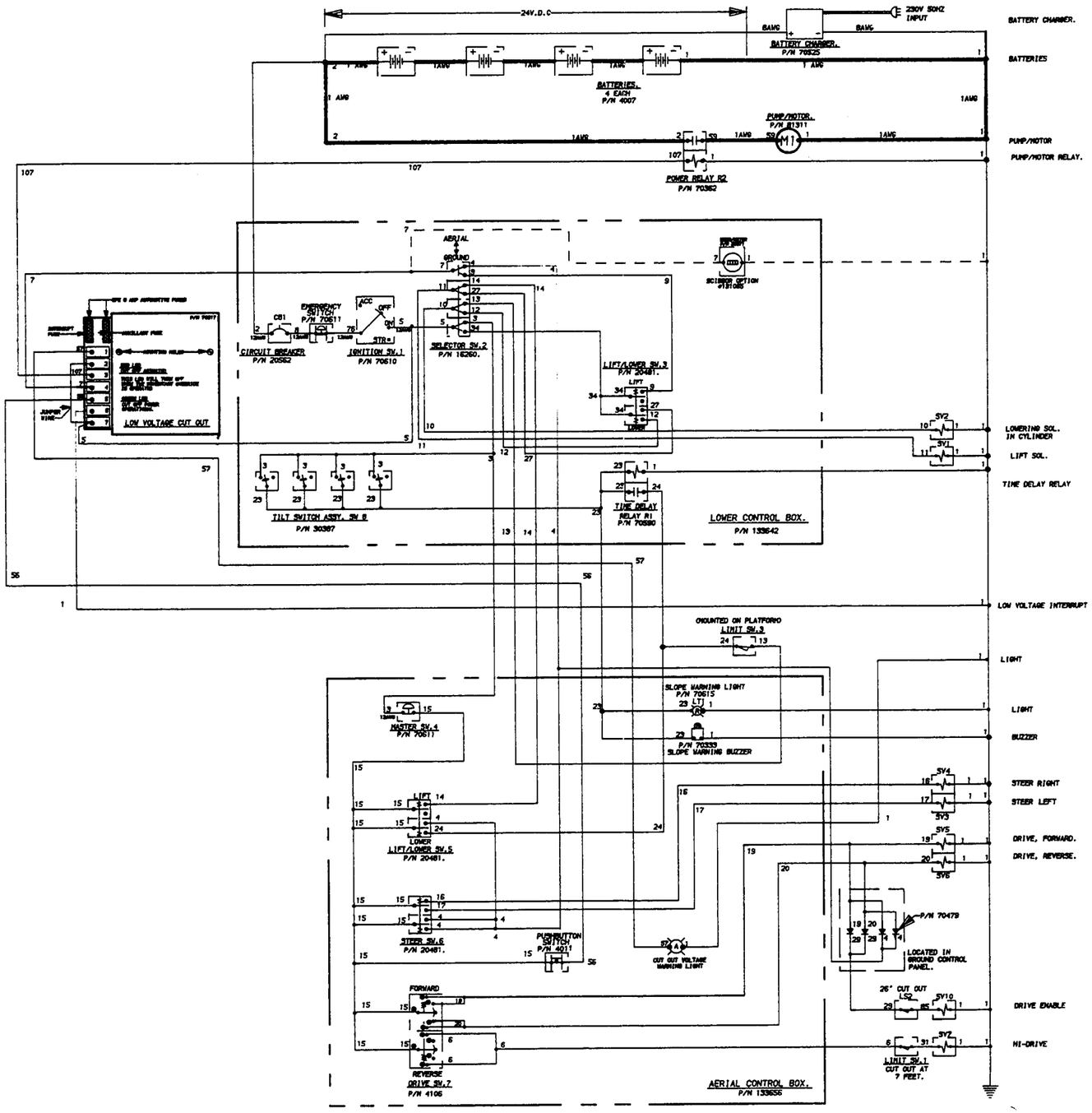
MODEL: J30EP

PART NO.	QTY.	DESCRIPTION
600367	2	Seal Kit (Lift Cylinder)(GB)
68067	2	Seal Kit (Drive Motor)
66852	2	Seal Kit (Disc Brake)
600323	2	Seal Kit (Kick Cylinder)
67842	2	Seal Kit (Steering Cylinder)(TH)
70629	2	Waterproof Lampholder
70630	1	Waterproof Lens Cap (amber)
70632	2	Incandescent lamp
4011	1	Pushbutton Switch
70373	1	Pushbutton Boot
70617	1	Low Voltage Interrupt

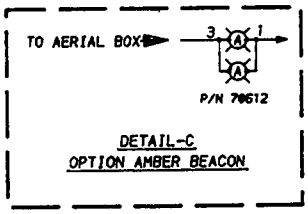
Mark Industries

TITLE	ELECTRICAL SCHEMATIC
MODEL	J30EP
NOTES	133501

SCHEMATIC
PAGE 1



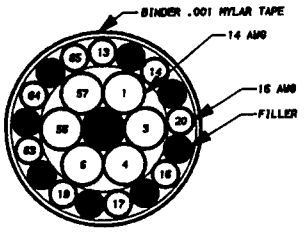
Mark Industries	TITLE	ELECTRICAL SCHEMATIC	SCHEMATIC
	MODEL	J30EP	PAGE 2
	NOTES	133501	



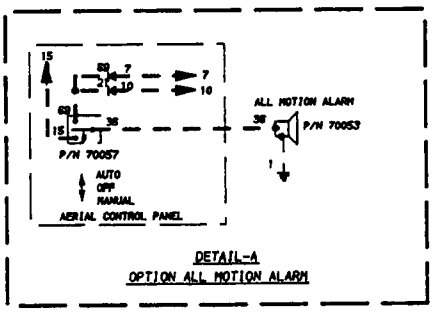
DETAIL-C
OPTION AMBER BEACON

USE P/N70423 H07RNF CABLE
RUN THIS CABLE SEPERATE FROM THE ARM CABLE

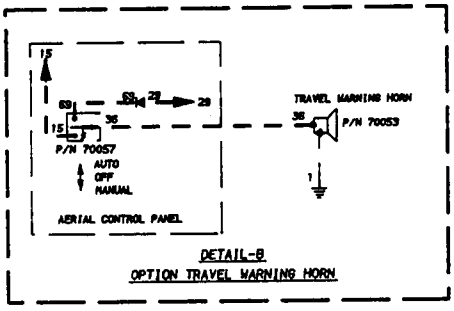
INTERNATIONAL COLOR AND POWER SPEC CABLE OPTION.



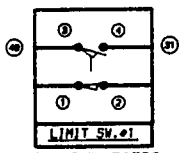
P/N 130228
(ARM CABLE)



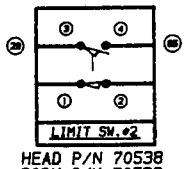
DETAIL-A
OPTION ALL MOTION ALARM



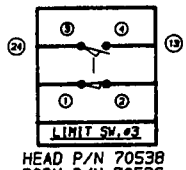
DETAIL-B
OPTION TRAVEL WARNING HORN



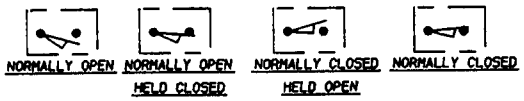
HEAD P/N 70538
BODY P/N 70536
7' CUTOUT



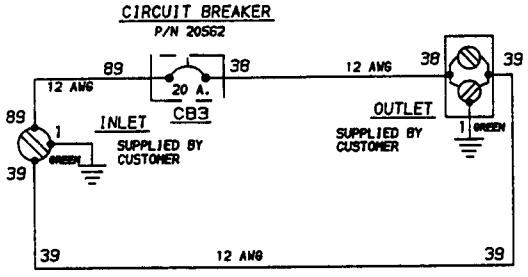
HEAD P/N 70538
BODY P/N 70536



HEAD P/N 70538
BODY P/N 70536



LEGEND FOR LIMIT SWITCHES.

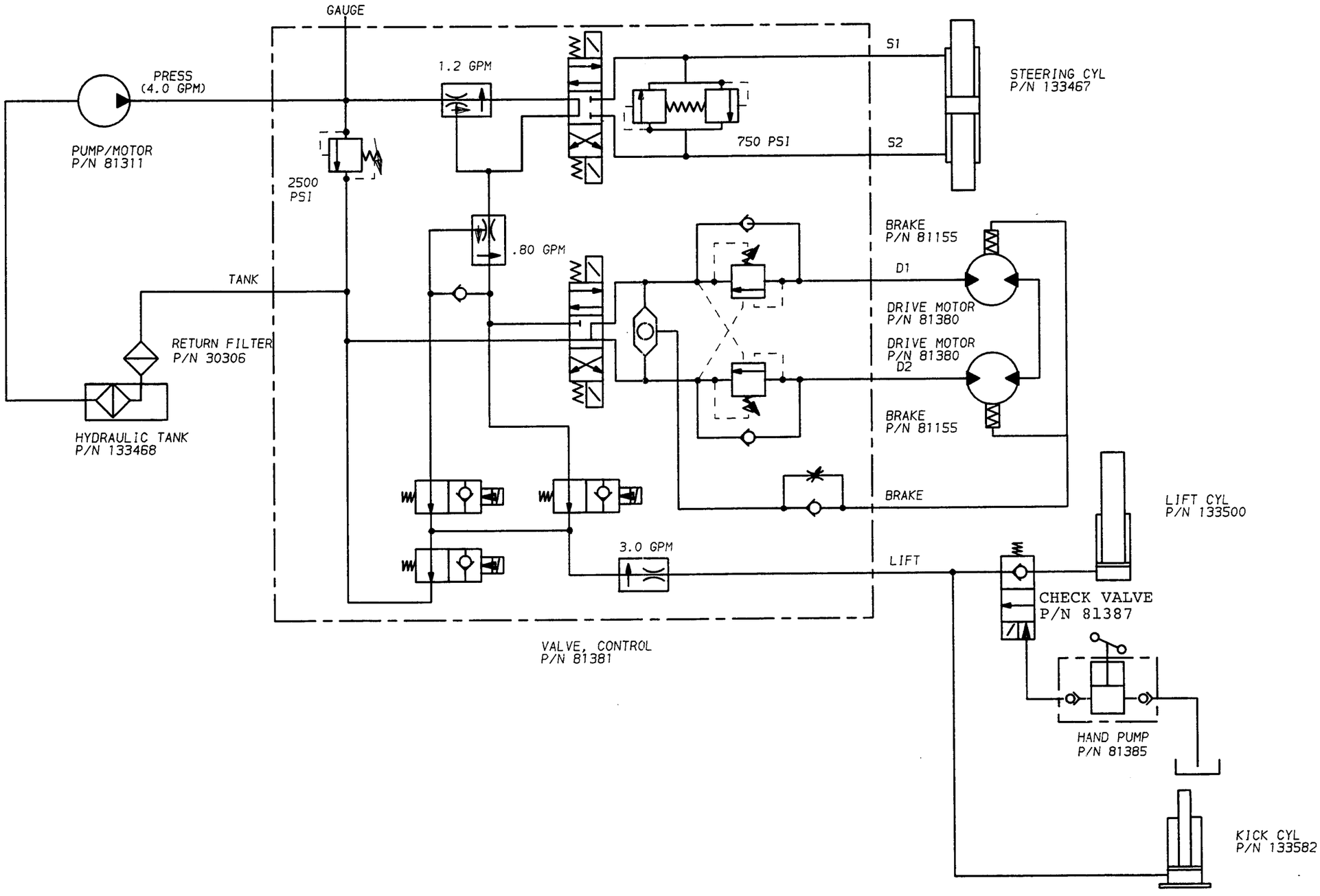


50Hz 230V. A.C. WIRING.

Mark Industries

TITLE	HYDRAULIC SCHEMATIC
MODEL	J30EP
NOTES	133502

SCHEMATIC
PAGE 3



SECTION 1 CONTAINS:

PAGE NO.	TITLE
1	NOTICE TO USERS
2	TABLE OF CONTENTS
3	HOW TO USE THE PARTS CHAPTER
5	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.

SECTION 1 INTRODUCTION TO THE PARTS CHAPTER

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

SECTION 2 FINAL ASSEMBLY

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

SECTION 3 FRAME ASSEMBLY

FIG. NO.	TITLE
1	FRAME ASSEMBLY
2	CONTROL BOX ASSEMBLY
3	COMPONENT BOX ASSEMBLY
4	BATTERY CHARGER (INTERNATIONAL)
5	BATTERY CABLE KIT
6	VALVE PACKAGE ASSEMBLY

SECTION 4 SCISSOR ASSEMBLY

FIG. NO.	TITLE
1	SCISSOR ASSEMBLY
2	LIFT CYLINDER ASSEMBLY
2A	LIFT CYLINDER ASSEMBLY

SECTION 5 PLATFORM ASSEMBLY

FIG. NO.	TITLE
1	PLATFORM ASSEMBLY

SECTION 6 OPTIONS

FIG. NO.	TITLE
1	SAFETY SKIRT

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.

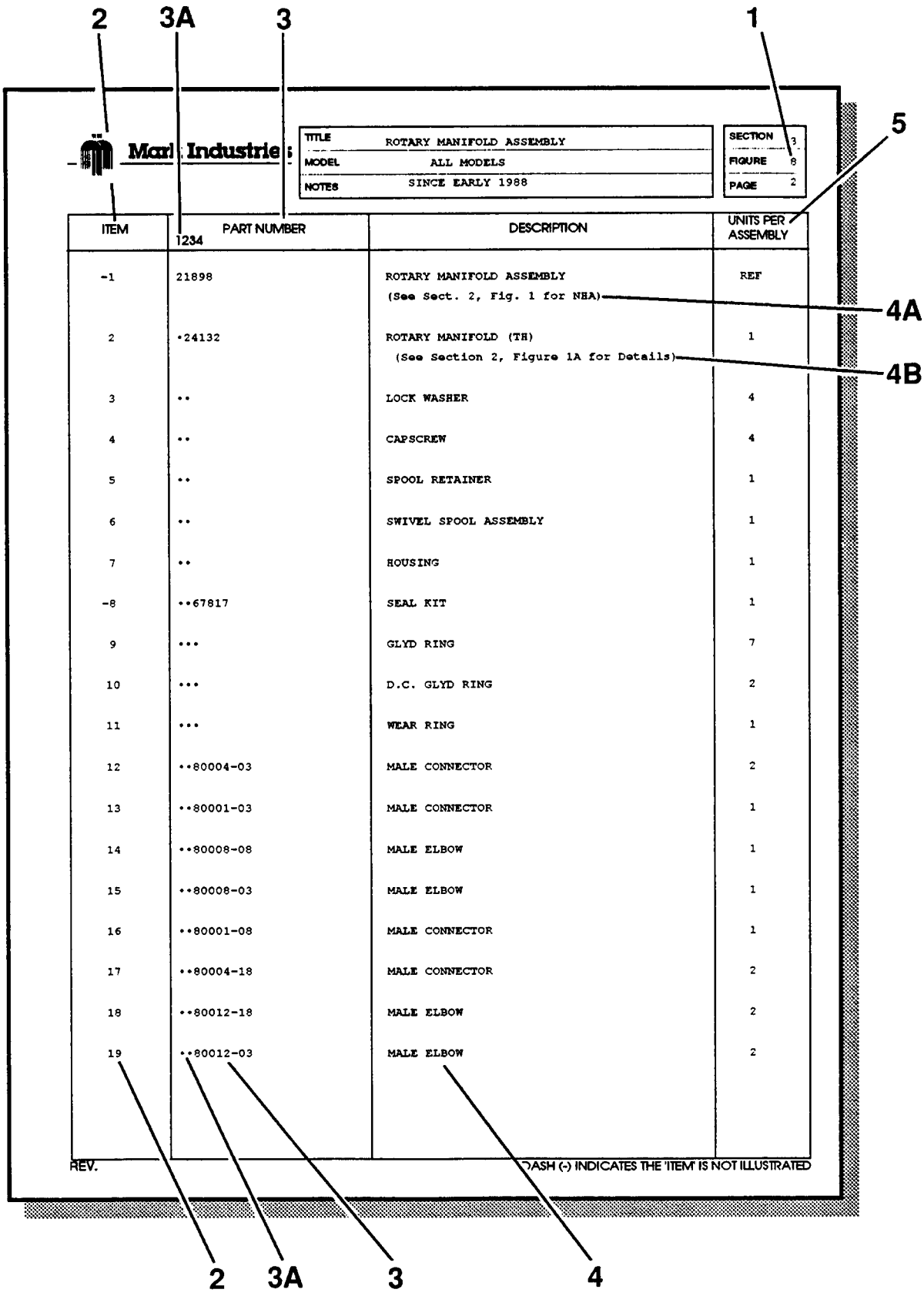
   B. **DETAILS** corresponds to the Section and Figure to be referred to for a more detailed breakdown of this item.

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.



Mark Industries

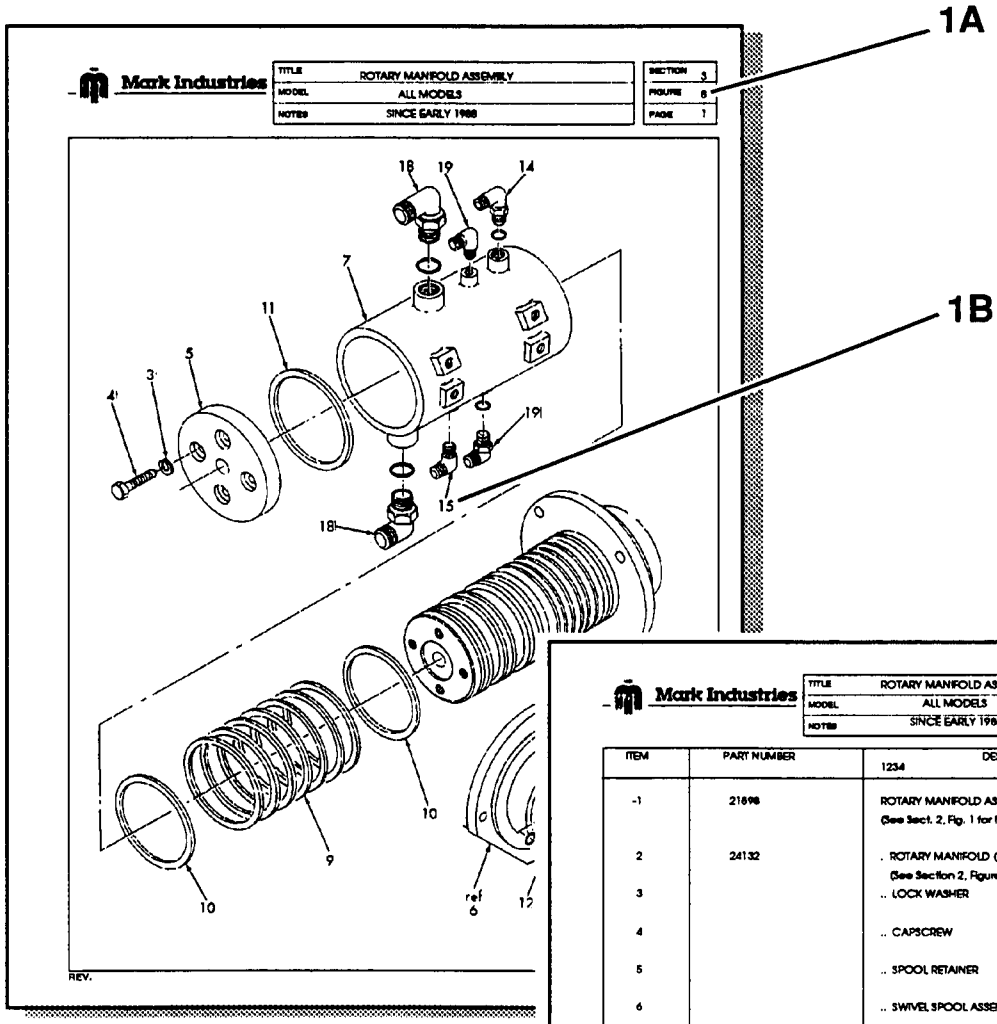
TITLE	ROTARY MANIFOLD ASSEMBLY
MODEL	ALL MODELS
NOTES	SINCE EARLY 1988

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.

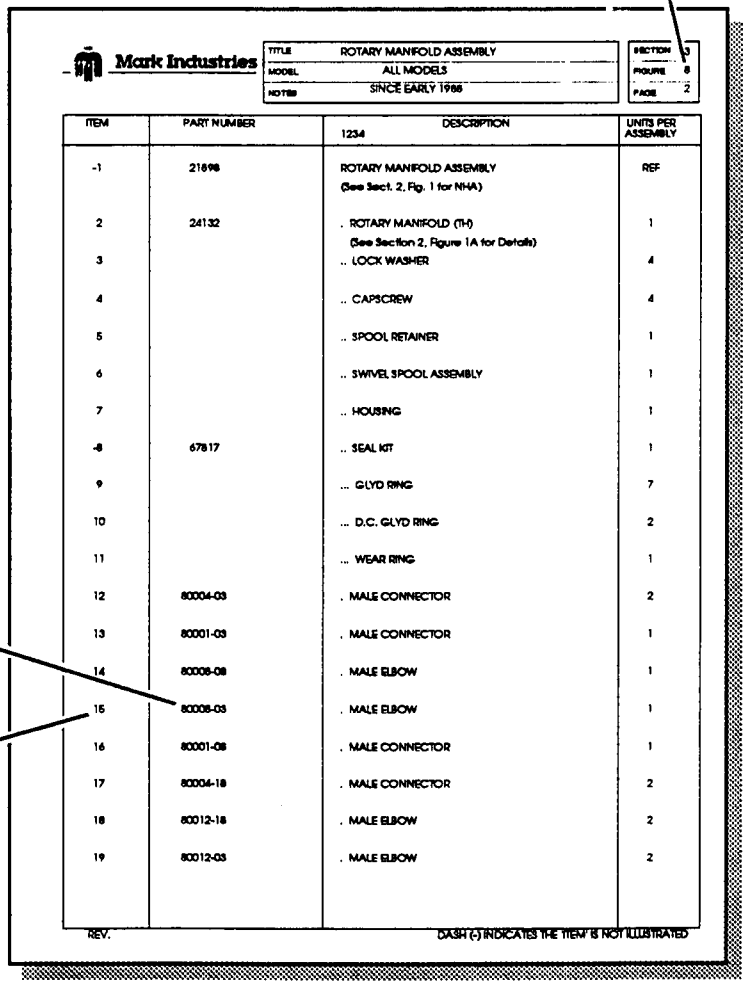
DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED



1A

1B

1A



ITEM	PART NUMBER	1234 DESCRIPTION	UNITS PER ASSEMBLY
-1	21698	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

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**.

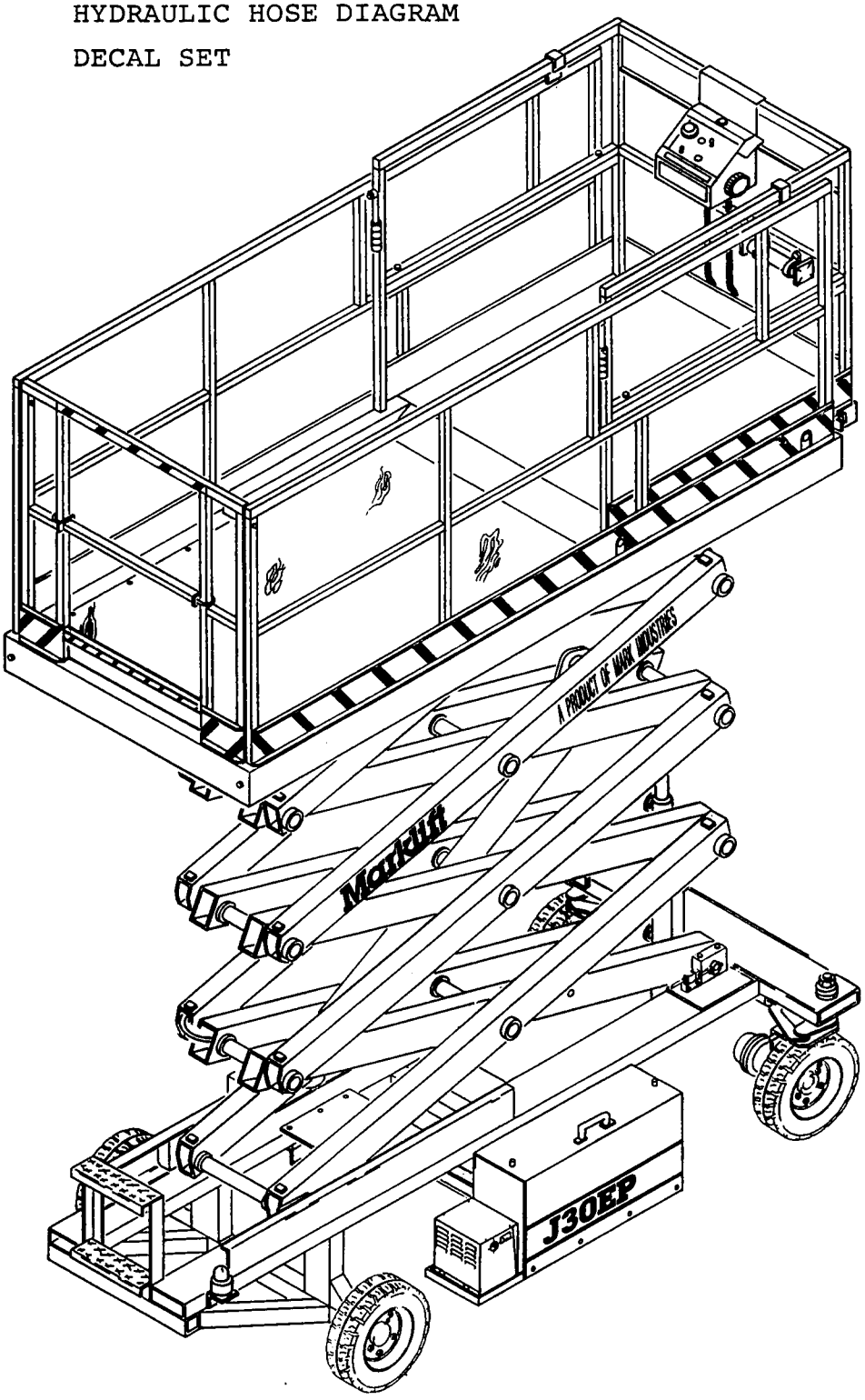
   A. By **FAX**: **(714) 879-8884**

   B. By Phone: (714) 879-MARK

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

SECTION 2 CONTAINS:

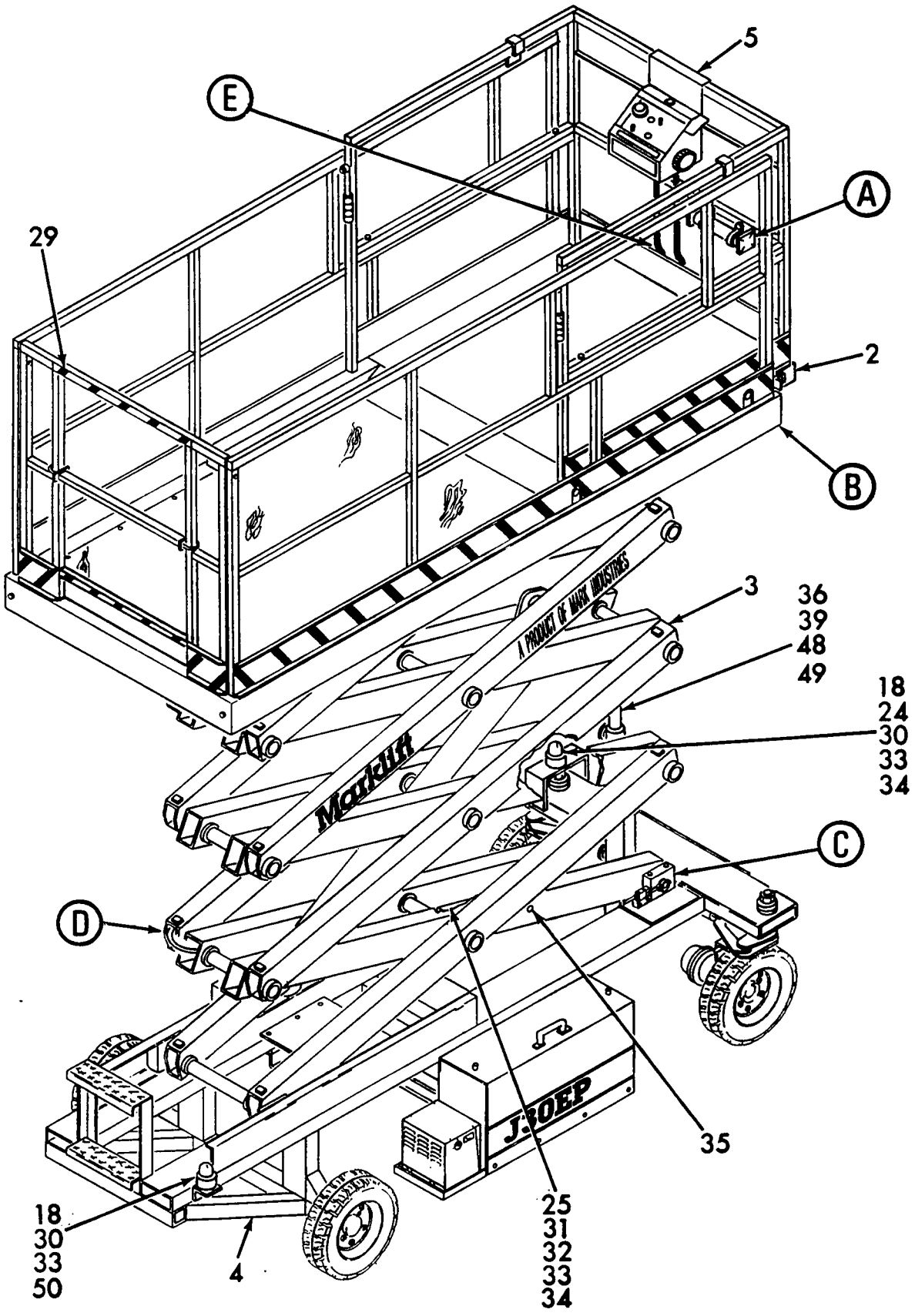
FIG. NO.	TITLE
1	FINAL ASSEMBLY
2	UPPER CONTROL BOX ASSEMBLY
3	HYDRAULIC HOSE DIAGRAM
4	DECAL SET



Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	2
FIGURE	1
PAGE	1

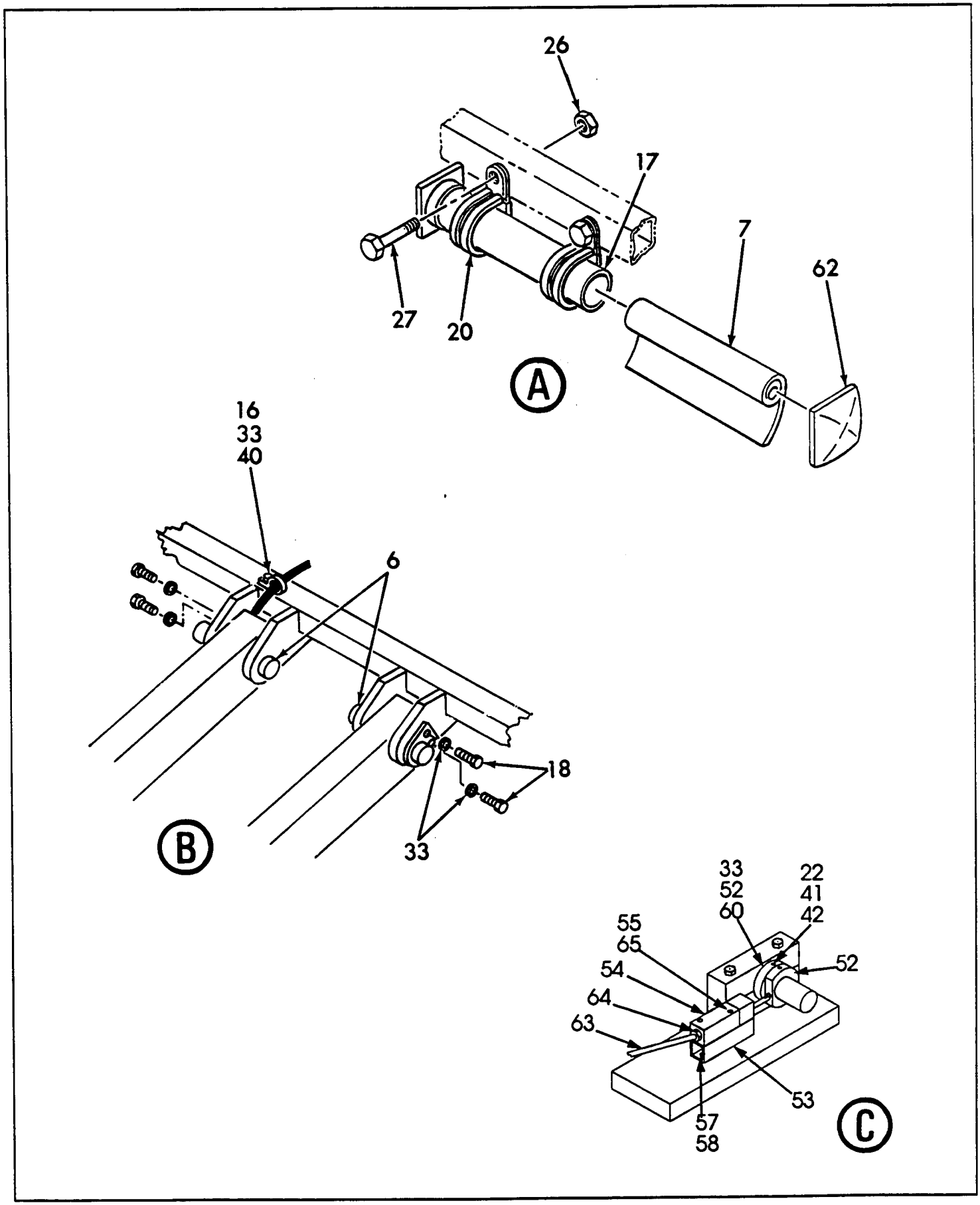


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Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J30EP
NOTES	

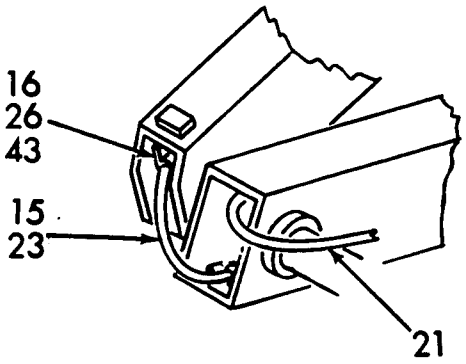
SECT.	2
FIG.	1
PAGE	2



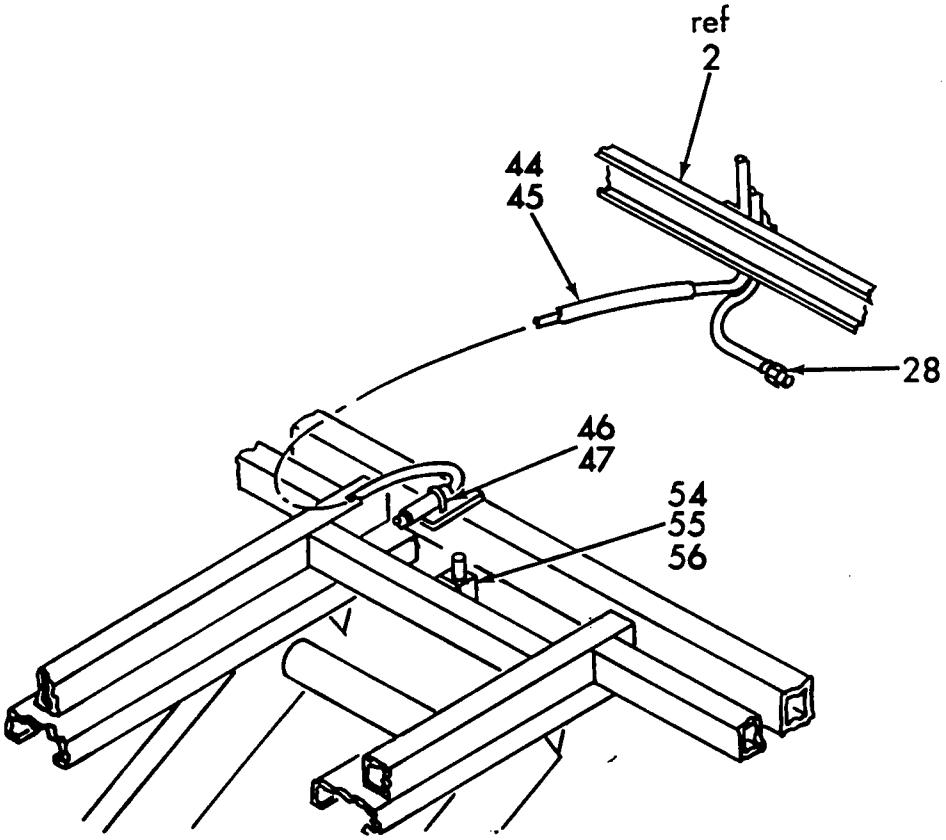
Mark Industries

TITLE	FINAL ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	2
FIGURE	1
PAGE	3



D



E

REV.

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	130065	ASSEMBLY, FINAL	REF
2	.133480	ASSEMBLY, EXTENDABLE PLATFORM (See Sect. 5, Fig. 1 for Details)	1
3	.133581	ASSEMBLY, SCISSOR (See Sect. 4, Fig. 1 for Details)	1
4	.133572	ASSEMBLY, FRAME (See Sect. 3, Fig. 1 for Details)	1
5	.133656	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 2 for Details)	1
6	.131692	PIN, PLATFORM ARM	2
7	.17034	HANDBOOK, OPERATION & SAFETY	1
-8	.2673	PAINT, WHITE (TOUCH-UP)	1 CAN
-9	.65368	PAINT, BLUE (TOUCH-UP)	1 CAN
-10	.16608	PAINT, WHITE	3 GAL
-11	.65389	PAINT, BLUE	1 GAL
-12	.133501	SCHEMATIC, ELECTRICAL (See Schematic Chapter for Details)	1
-13	.133502	SCHEMATIC, HYDRAULIC (See Schematic Chapter for Details)	1
-14	.375	RIVET, POP	8
15	.255	TIE, CABLE	23
16	.764	CLAMP, RUBBER	6
17	.130927	CONTAINER, PLASTIC	1
18	.60353	SCREW, CAP	16
-19	.65116	OIL, HYDRAULIC	10 GAL
20	.65867	CLAMP	2
-21	.133503	DIAGRAM, HYDRAULIC HOSE (See Sect. 2, Fig. 3 for Details)	1
22	.160407	BEARING	2

Mark Industries

TITLE	FINAL ASSEMBLY	SECT.	2
MODEL	J30EP	FIG.	1
NOTES		PAGE	5

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
23	.63654	RIVET, POP	13
24	.133625	BRACKET, FRONT BEACON	1
25	.60341	SCREW, CAP	1
26	.60711	NUT, HEX	6
27	.60315	SCREW, CAP	2
28	.2807	RELIEF, STRAIN	4
29	.160137	TAPE, WARNING	36 FT
30	.70612	STROBE, MINI	2
31	.131766	CLAMP, SERVICE STAND	1
32	.131767	ARM, SERVICE STAND	1
33	.63301	WASHER, LOCK	27
34	.60701	NUT, HEX	7
35	.30701	PIN, BALL-LOCK	1
36	.133680	ASSEMBLY, KICK CYLINDER	1
37	..133582	CYLINDER, KICK (TH)	1
-38	...600323	KIT, SEAL (TH)	1
39	..80001-08	CONNECTOR, MALE	1
40	.60342	SCREW, CAP	6
41	.62238	SCREW, SET	2
42	.65577	COLLAR, SHAFT	2
43	.60309	SCREW, CAP	4
44	.133290	HOSE, HYDRAULIC	1
45	.65451	CLAMP, HOSE	1
46	.65218	U-BOLT	1
47	.61318	NUT, LOCK	2

REV.

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

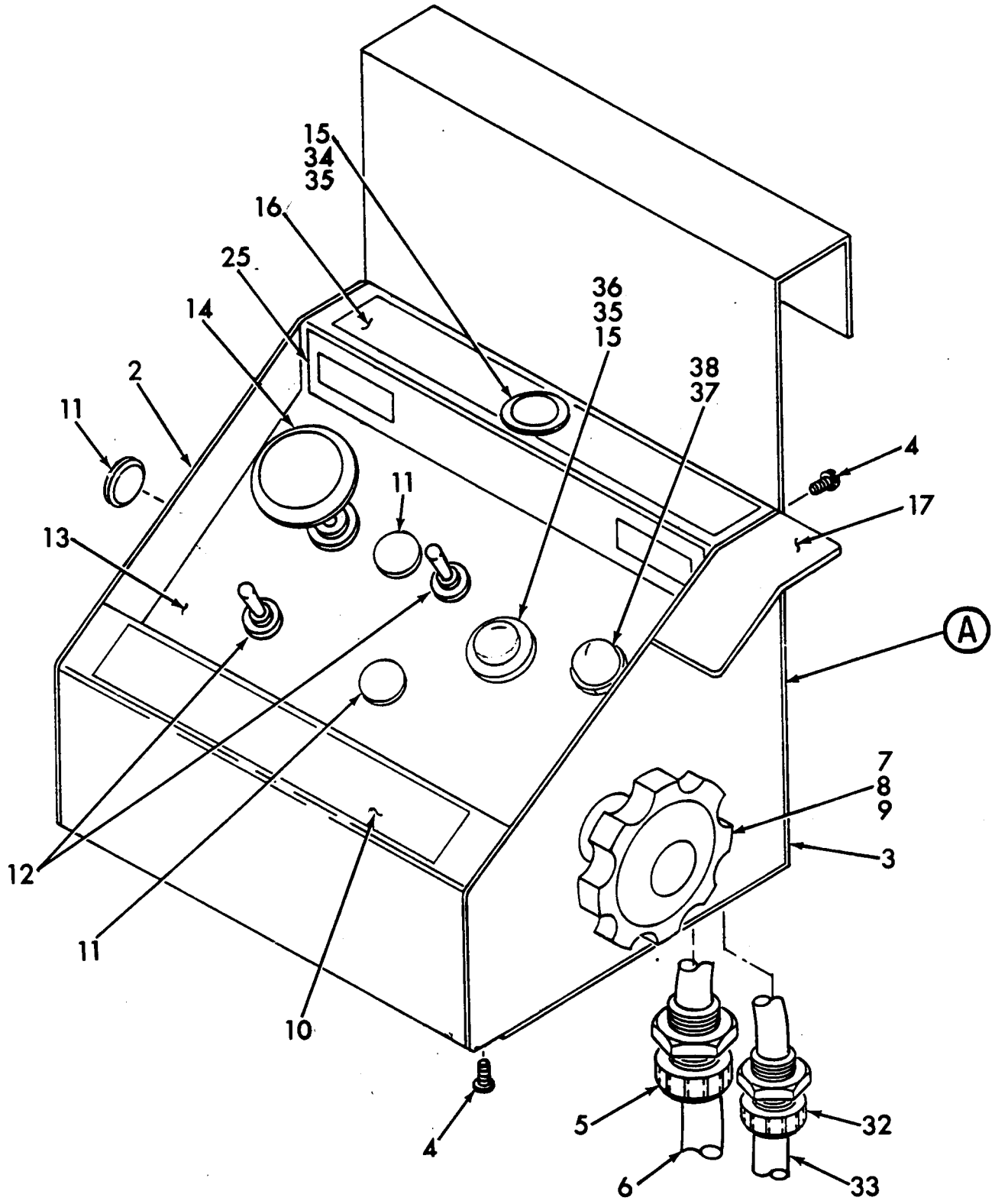
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
48	.63302	WASHER, LOCK	4
49	.60510	SCREW, CAP	4
50	.133664	BRACKET, REAR BEACON	1
51	.133693	CAM, LIMIT SWITCH	1
52	.133918	CAM, LIMIT SWITCH	2
53	.133697	BASE	2
54	.70619	SWITCH, LIMIT	3
55	.62714	SCREW, MACHINE	6
56	.61241	NUT, LOCK	2
57	.61833	SCREW, CAP	4
58	.63402	WASHER, FLAT	4
-59	.133696	PAD, KICK CYLINDER WEAR	1
60	.62640	SCREW, MACHINE	2
-61	.600338	SET, DECAL (See Sect. 2, Fig. 4 for Details)	1
62	.65842	CAP, ANTI-ROLL	2
63	.70423	CABLE, 12-3	15'
64	.2806	RELIEF, STRAIN (1/2")	2
68	.1210-7	WASHER, LOCK	2
66	.180713	NAMEPLATE, IDENTIFICATION	1

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

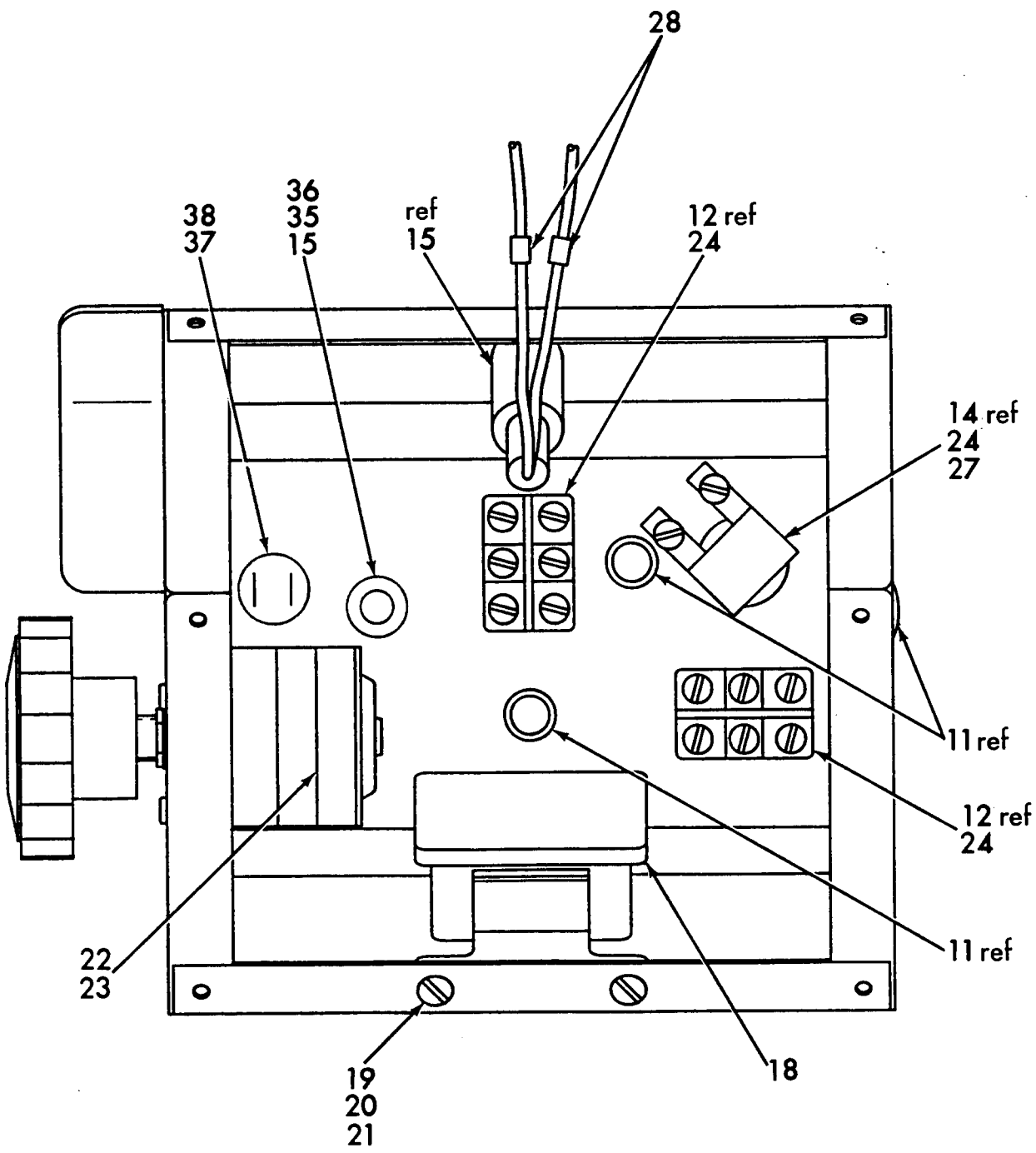
Mark Industries

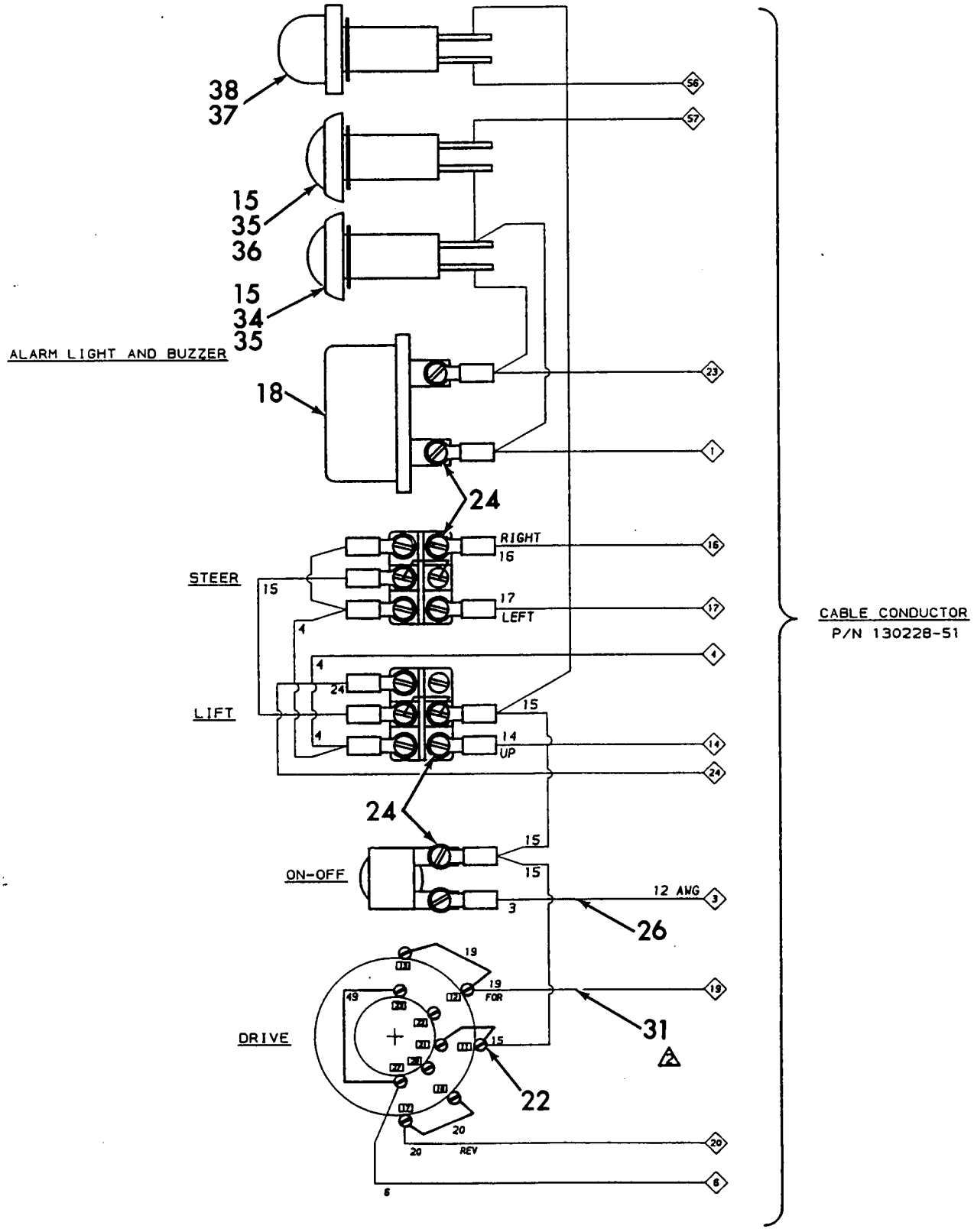
TITLE	UPPER CONTROL BOX ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	2
FIGURE	2
PAGE	1



REV.


28
36
35
15
38
37
ref
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12 ref
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14 ref
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11 ref
12 ref
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21



ELECTRICAL DIAGRAM

(REFER TO ELECTRICAL SCHEMATIC DWG. NO. 133501)

REV.

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133656	ASSEMBLY, UPPER CONTROL BOX (See Sect. 2, Fig. 1 for NHA)	REF
2	.133900	BOX, UPPER CONTROL	1
3	.133112	COVER, CONTROL BOX	1
4	.61711	SCREW, SELF-TAPPING	6
5	.2807	RELIEF, STRAIN	1
6	.130228	CABLE	51 FT
7	.4106	SWITCH, 5 POSITION	1
8	.65753	KNOB, FLUTED TORQUE	1
9	.62209	SCREW, SET	1
10	.181800	DECAL, SAFE WORKING LOAD 455KG	1
11	.771	PLUG	3
12	.20481	SWITCH, TOGGLE	2
13	.182777	DECAL, UPPER CONTROL PANEL	1
14	.31080	KNOB, EMERGENCY ON/OFF	1
15	.70629	LIGHT, PILOT INDICATOR	1
16	.2015	DECAL, WARNING UNSTABLE CONDITION	1
17	.182776	DECAL, DRIVE/UPPER CONTROL BOX	1
18	.70333	BUZZER	1
19	.62703	SCREW, MACHINE	2
20	.60802	NUT, HEX	2
21	.63413	WASHER, FLAT	2
22	.117-B	CONNECTOR	12
23	.160369	NUT	1
24	.117-C	CONNECTOR, RING	14
25	.2014	DECAL, CAUTION HIGH VOLTAGE LINES	1

Mark Industries

TITLE	UPPER CONTROL BOX ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	2
FIG.	2
PAGE	5

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.2991	WIRE, WHITE	1 FT
27	.70611	SWITCH, EMERGENCY ON/OFF	1
28	.117-D	CONNECTOR, BUTT	2
-29	.255	TIE, CABLE	2
-30	.256	TIE, CABLE	10
31	.70232	WIRE, WHITE	5 FT
32	.2806	RELIEF, STRAIN	1
33	.90547	CABLE, CONDUCTOR	7 FT
34	.70630	CAP, LENS (RED)	1
35	.70632	LAMP, INCANDESCENT	2
36	.70631	CAP, LENS (AMBER)	1
37	.4011	SWITCH, PUSH BUTTON	1
38	.70373	BOOT, PUSH BUTTON SWITCH	1

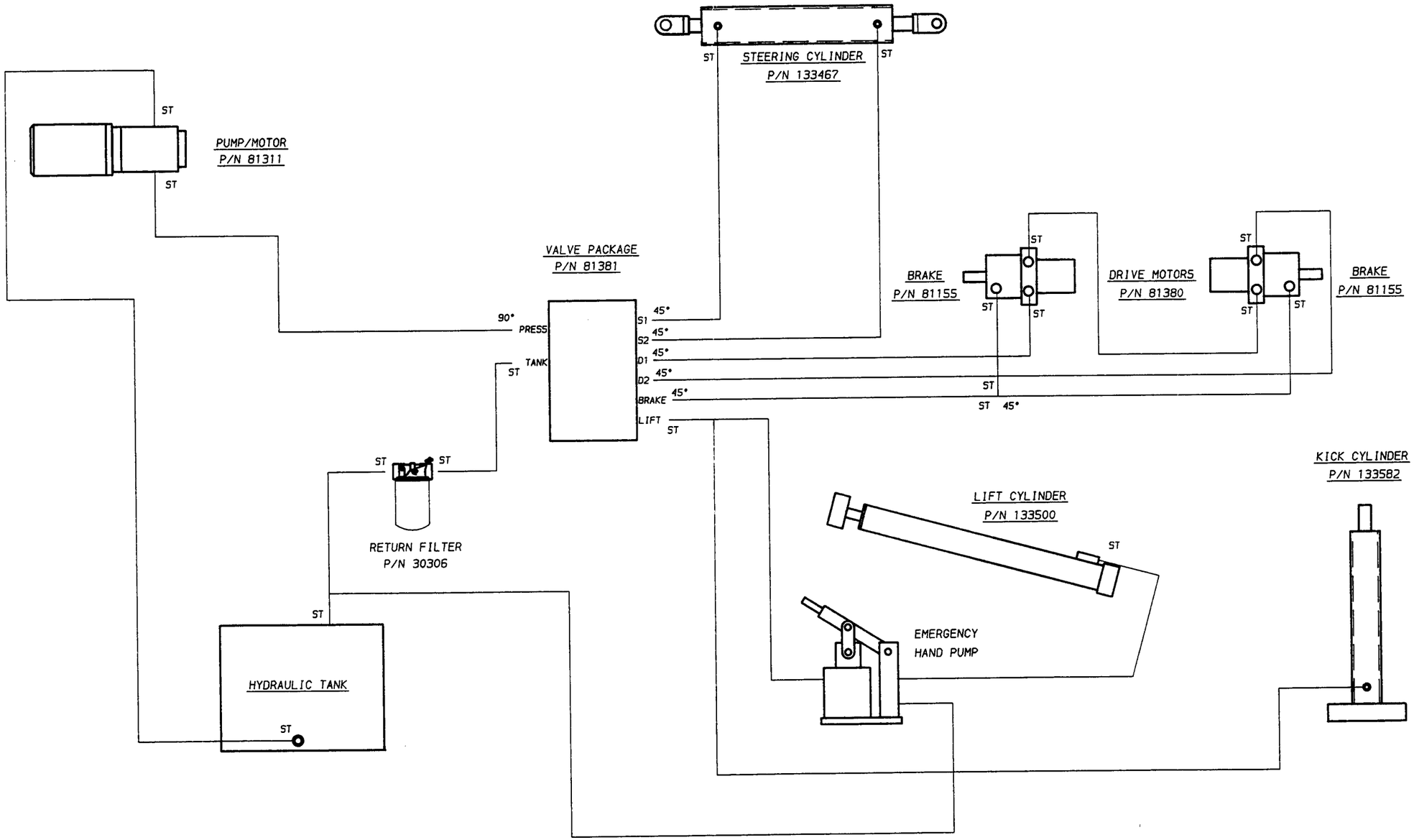
REV.

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

Mark Industries

TITLE	HYDRAULIC HOSE DIAGRAM
MODEL	J30EP
NOTES	

SECTION	2
FIGURE	3
PAGE	1



Mark Industries

TITLE	HYDRAULIC HOSE DIAGRAM
MODEL	J30EP
NOTES	

SECT.	2
FIG.	3
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
		PARTS LIST NOT AVAILABLE AT THIS TIME	

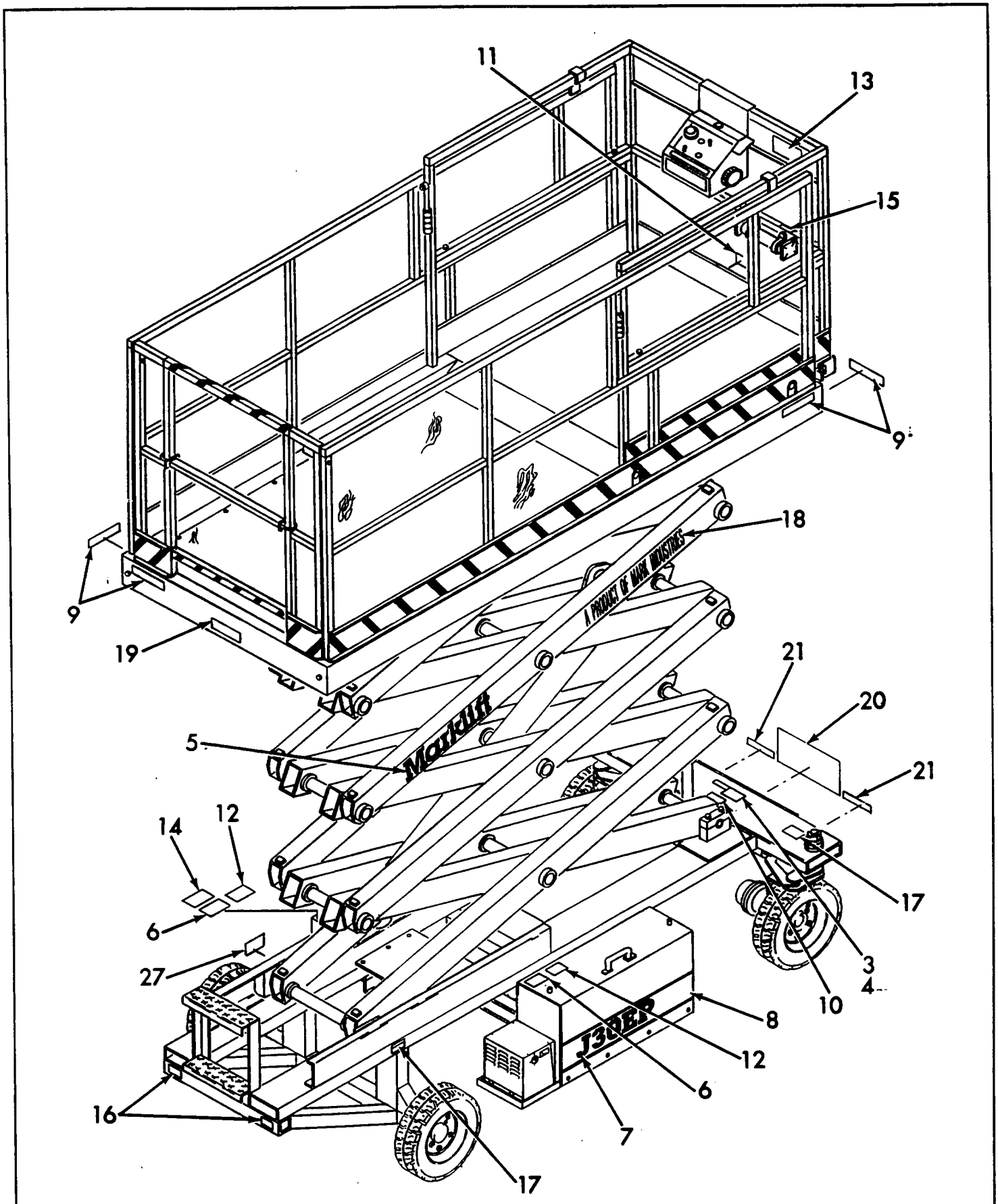
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DASH (-) INDICATES THE 'ITEM' IS NOT ILLUSTRATED

Mark Industries

TITLE	DECAL SET
MODEL	J30EP
NOTES	

SECTION	2
FIGURE	4
PAGE	1



REV.

Mark Industries

TITLE	DECAL SET
MODEL	J30EP
NOTES	

SECT.	2
FIG.	4
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	600338	SET, DECAL	REF
2	.182778	DECAL, GROUND CONTROL PANEL (See Ground Control Box for Details)	1
3	.20661	PLATE, ANSI A92	1
4	.181780	NAMEPLATE, METAL FOREIGN I.D.	1
5	.31259	DECAL, MARKLIFT (SMALL SCISSOR)	2
6	.2003	DECAL, BATTERY WATER LEVEL	2
7	.181791	DECAL, MACHINE DESIGNATION J30EP	2
8	.181728	DECAL, PANEL STRIP	2
9	.181800	DECAL, SAFE WORKING LOAD 455KG	4
10	.2017	DECAL, HYDRAULIC SYSTEM FLUID	1
11	.130937	DECAL, J-SERIES	1
12	.2016	DECAL, 'DO NOT WORK UNDER...'	2
13	.182106	DECAL, OPERATION INSTRUCTIONS	1
14	.130606	DECAL, FREEWHEELING VALVE	1
15	.130820	DECAL, 'OPERATION & SAFETY HANDBOOK'	1
16	.2002	DECAL, FORKLIFT BOOT	2
17	.130949	DECAL, 'DANGER, THIS IS A SOLID...'	4
18	.130596	DECAL, 'A PRODUCT OF MARK INDUSTRIES'	2
19	.31109	DECAL, CAUTION SCISSOR GUARD RAIL	2
20	.130938	DECAL, MARK	1
21	.131061	DECAL, BLUE STRIPE	1
22	.181800	DECAL, SAFE WORKING LOAD 455KG (See Upper Control Box for Details)	1
23	.182777	DECAL, UPPER CONTROL PANEL (See Upper Control Box for Details)	1

Mark Industries

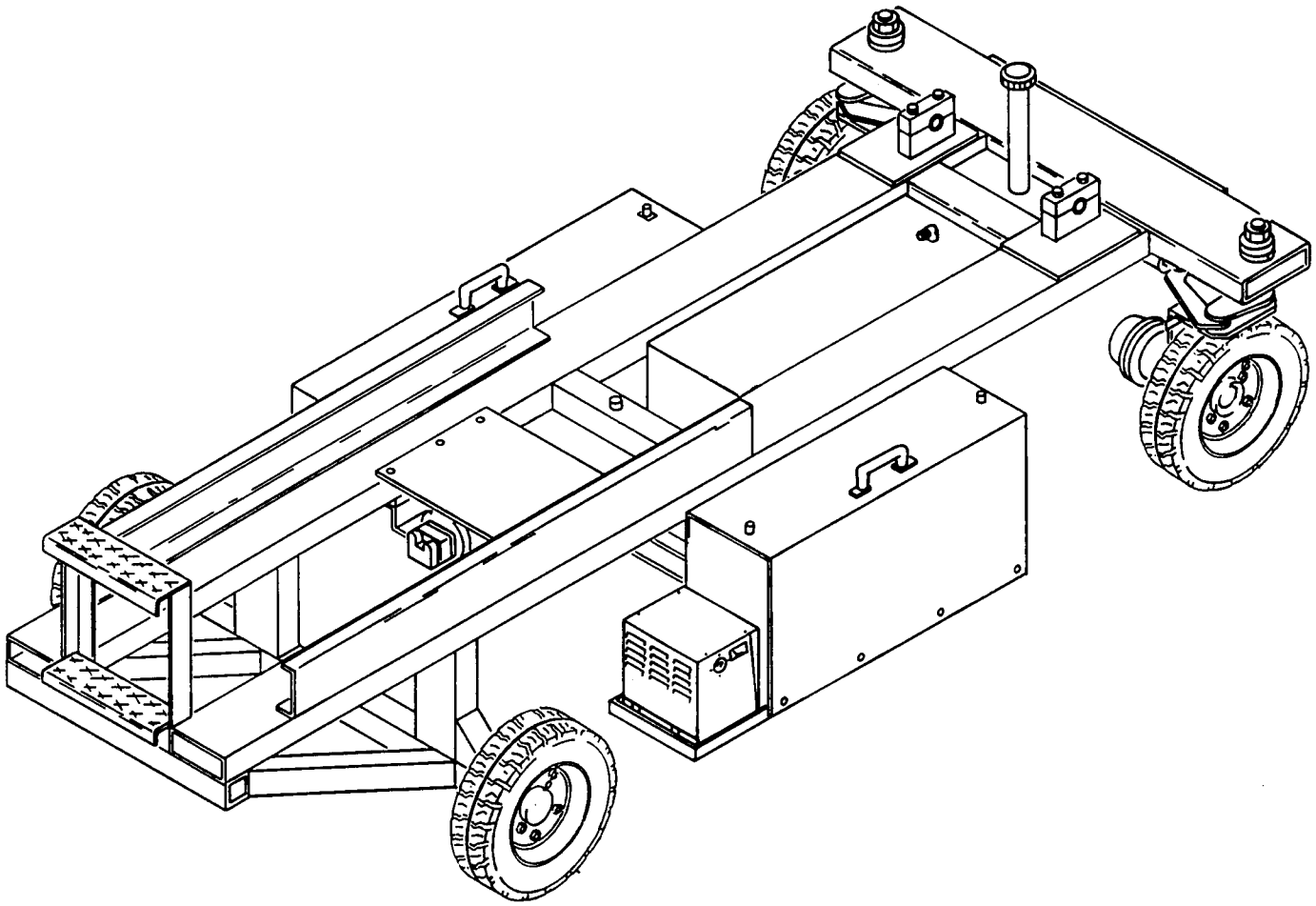
TITLE	DECAL SET
MODEL	J30EP
NOTES	

SECT.	2
FIG.	4
PAGE	3

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
24	.2015	DECAL, WARNING UNSTABLE CONDITION (See Upper Control Box for Details)	1
25	.182776	DECAL, DRIVE/UPPER CONTROL BOX (See Upper Control Box for Details)	1
26	.2014	DECAL, CAUTION HIGH VOLTAGE LINES (See Upper Control Box for Details)	1
27	.181798	DECAL, EMERGENCY HAND PUMP	1

SECTION 3 CONTAINS:

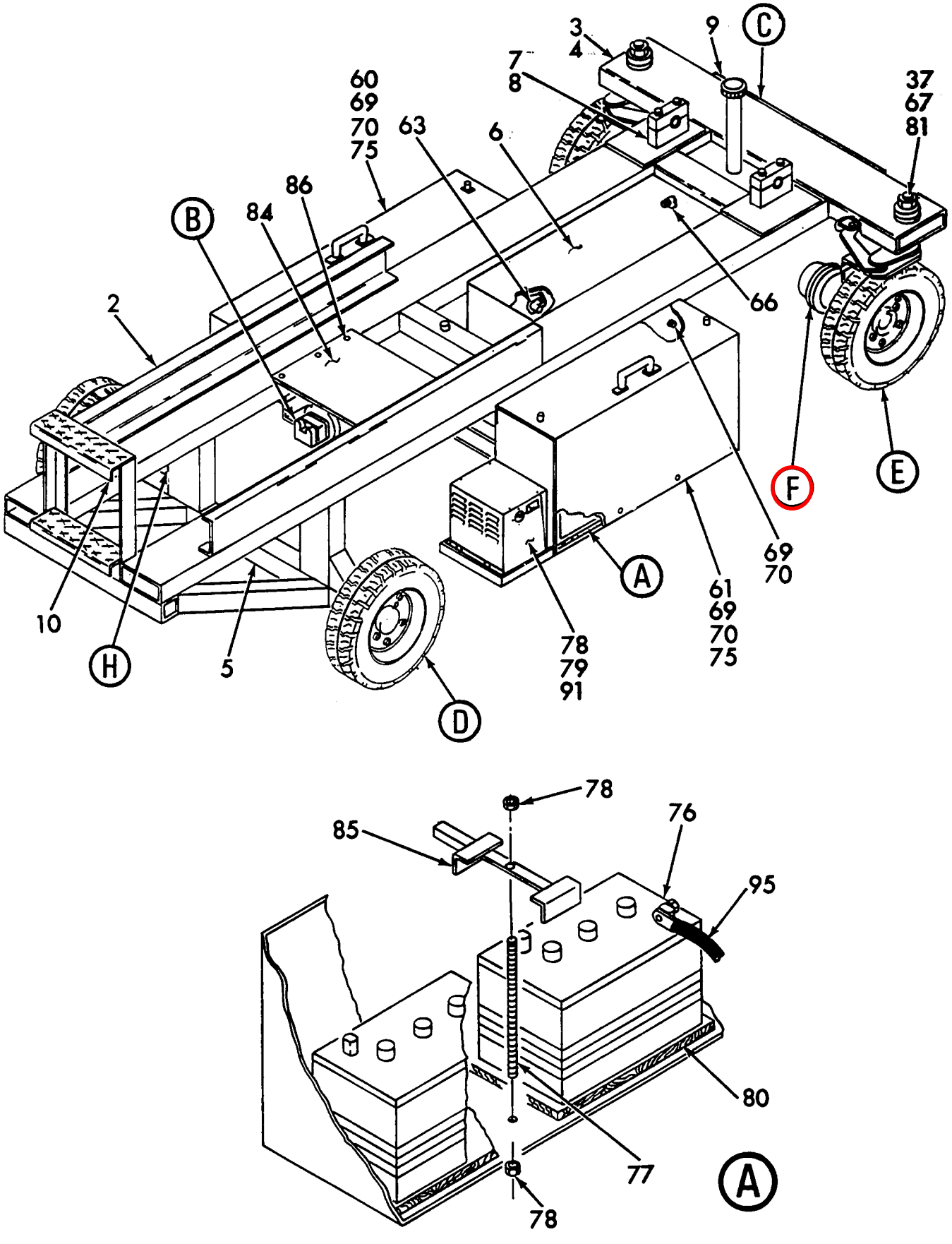
FIG. NO.	TITLE
1	FRAME ASSEMBLY
2	CONTROL BOX ASSEMBLY
3	COMPONENT BOX ASSEMBLY
4	BATTERY CHARGER (INTERNATIONAL)
5	BATTERY CABLE KIT
6	VALVE PACKAGE ASSEMBLY



Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	1
PAGE	1

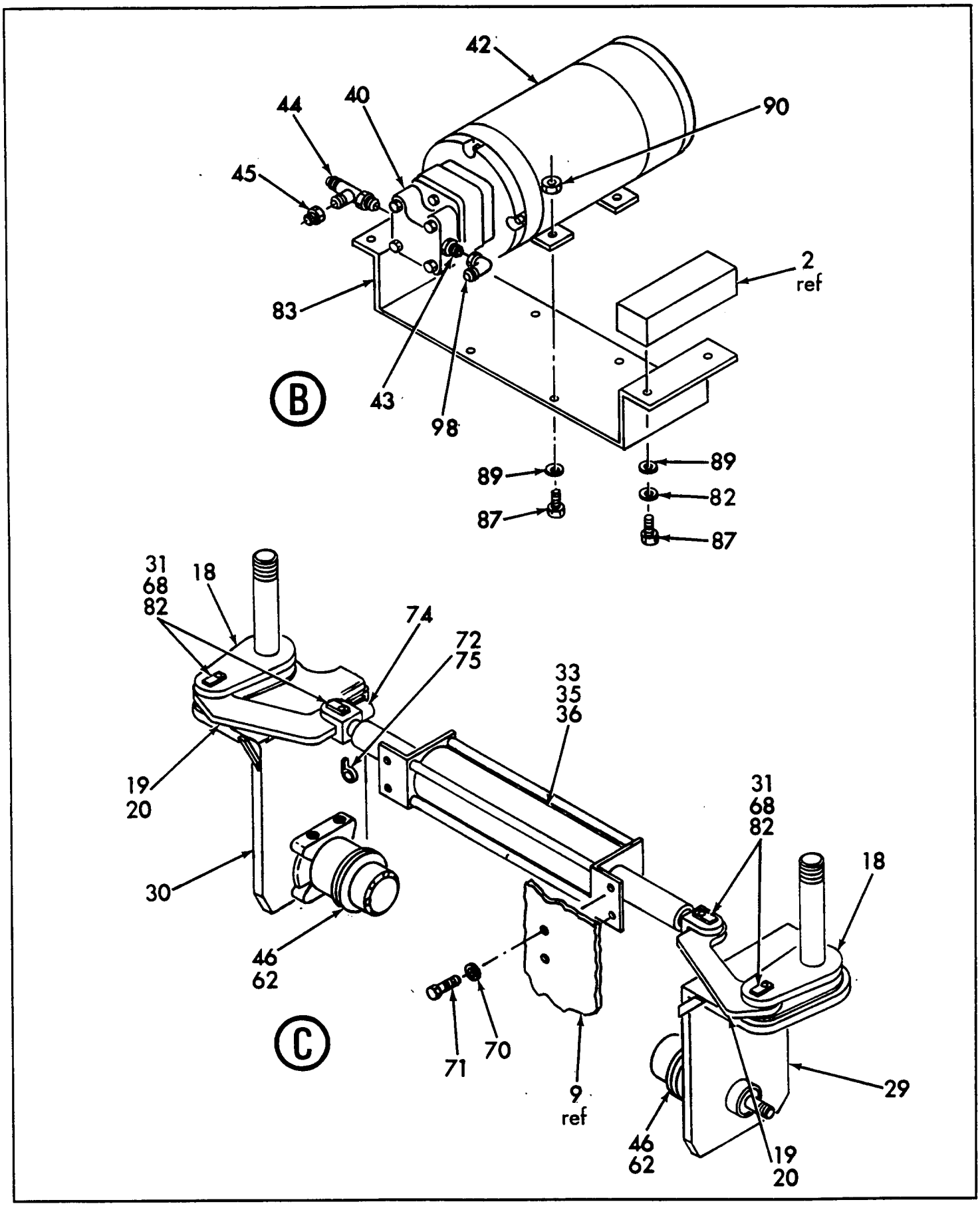


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Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	1
PAGE	2

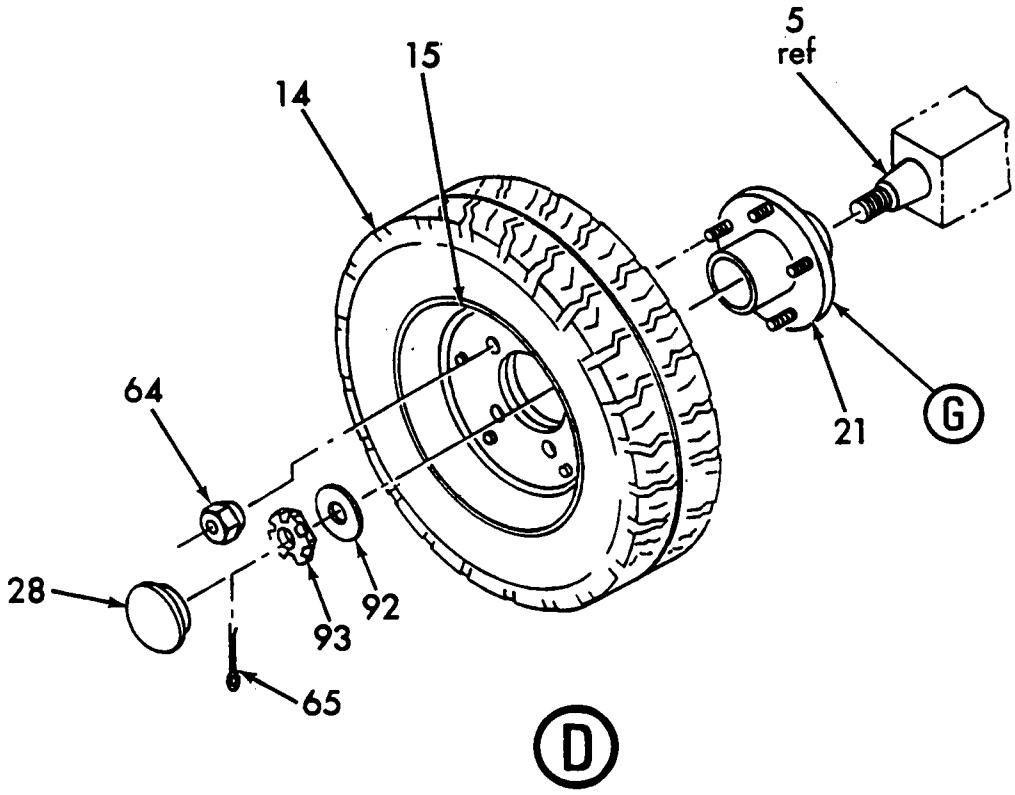


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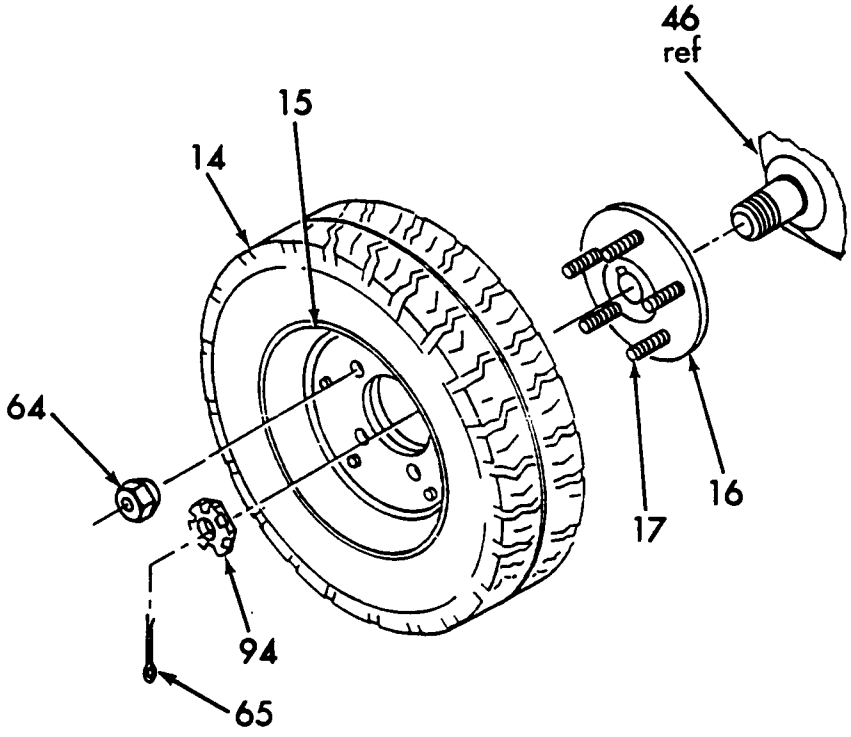
Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	1
PAGE	3



D



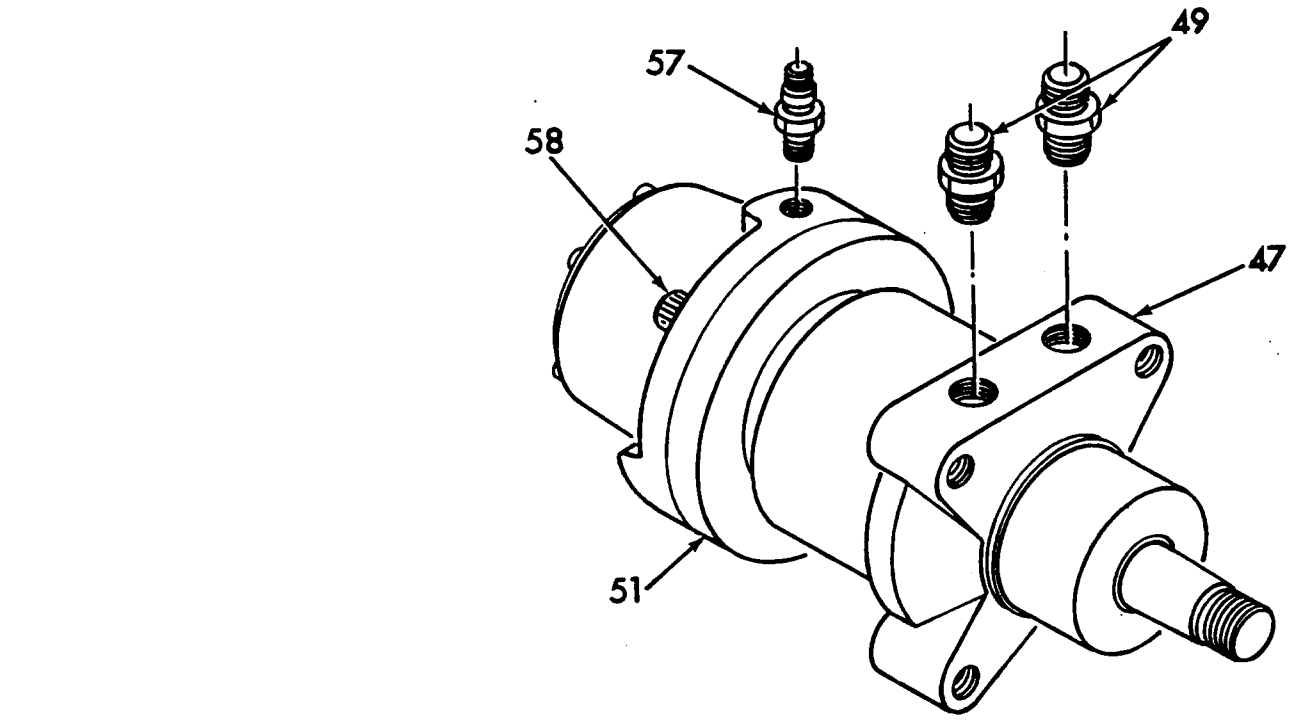
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REV.

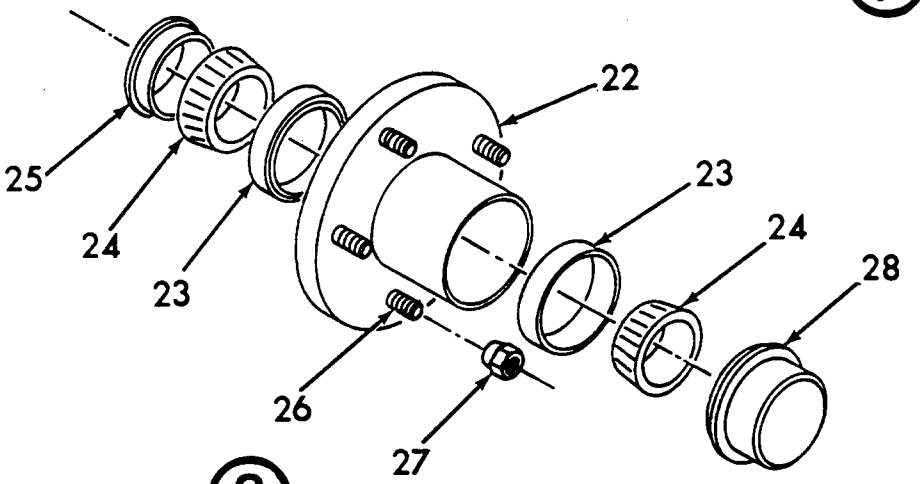
Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J30EP
NOTES	

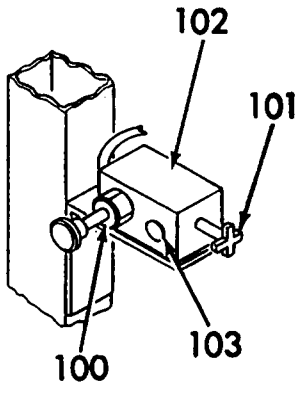
SECTION	3
FIGURE	1
PAGE	4



F



G



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Mark Industries

TITLE	FRAME ASSEMBLY	SECT.	3
MODEL	J30EP	FIG.	1
NOTES		PAGE	5

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133572	ASSEMBLY, FRAME (See Sect. 2, Fig. 1 for NHA)	REF
2	.133450	WELDMENT, FRAME	1
3	..131603	MACHINING, FRONT AXLE	1
4	...160402	BEARING	2
5	..131605	WELDMENT, REAR AXLE	1
6	..133468	SUB-ASSEMBLY, HYDRAULIC TANK	1
7	..131662	MACHINING, TRUNNION MOUNT	2
8	...60639	SCREW, CAP	2
9	..133458	WELDMENT, FRONT PLATE	1
10	..133555	WELDMENT, FRAME STEPS	1
-11	..133459	WELDMENT, SUPPORT CHANNEL	1
-12	..133457	MACHINING, BATTERY BOX SUPPORT	4
-13	.131620	ASSEMBLY, WHEEL & TIRE	4
14	..131630	TIRE	4
15	..131631	WHEEL	4
16	.131609	HUB, DRIVE	2
17	..30309	STUD, WHEEL	10
18	.131669	SPINDLE, BEARING THRUST	2
19	.133469	MACHINING, ARM LINKAGE WITH BUSHING	2
20	..160161	BUSHING	4
21	.134-1	ASSEMBLY, HUB	2
22	..65684	HUB	2
23	..65686	RACE, BEARING	4
24	..65059	BEARING	4
25	..66113	SEAL, GREASE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	..65685	BOLT, LUG	10
27	..61316	NUT, LUG	10
28	..137	CAP, DUST	2
29	.131606	WELDMENT, STEERING LEVER (L.H.)	1
30	.131607	WELDMENT, STEERING LEVER (R.H.)	1
31	.131616	PIN, STEERING	4
-32	.133451	ASSEMBLY, STEERING CYLINDER	1
33	..133467	CYLINDER, STEERING (TH)	1
-34	...67842	KIT, SEAL (TH)	1
35	...67866	CLEVIS, ROD	2
36	..80012-03	ELBOW, STRAIGHT THREAD	2
37	.131670	WASHER, SPINDLE	2
-38	.131699	ASSEMBLY, PUMP/MOTOR	1
-39	..81311	PUMP/MOTOR	1
40	...67835	PUMP	1
-41	81176	KIT, SEAL	1
42	...67836	MOTOR	1
43	..80004-08	CONNECTOR, STRAIGHT THREAD	1
44	..80033-11	TEE, STRAIGHT THREAD	1
45	..80056-02	REDUCER, TUBE END	1
46	..80060-06	NUT	1
47	.133463	ASSEMBLY, DRIVE MOTOR/BRAKE	2
48	..81380	MOTOR, DRIVE (See Vendor Chapter for Details)	2
-49	...68067	KIT, SEAL	1
50	..80004-10	CONNECTOR, STRAIGHT THREAD	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
51	..81155	BRAKE, MULTIPLE DISC (See Vendor Chapter for Details)	2
-52	...66852	KIT, SEAL (ESK)	1
-53	...600055	SPRING	10
-54	...600056	BEARING	1
-55	...600057	DISK, FRICTION	10
-56	...600058	PLATE, SEPARATOR	9
57	..80004-03	CONNECTOR, STRAIGHT THREAD	2
58	..61935	SCREW, CAP	4
-59	.63301	WASHER, LOCK	4
60	.133642	ASSEMBLY, CONTROL BOX (See Sect. 3, Fig. 2 for Details)	1
61	.133491	ASSEMBLY, COMPONENT BOX (See Sect. 3, Fig. 3 for Details)	1
62	.62005	SCREW, CAP	8
63	.80008-15	ELBOW, MALE	1
64	.61316	NUT, WHEEL	10
65	.64306	PIN, COTTER	4
66	.80008-19	ELBOW, MALE	1
67	.61310	NUT, LOCK	2
68	.60367	SCREW, CAP	4
69	.60326	SCREW, CAP	8
70	.63305	WASHER, LOCK	12
71	.60536	SCREW, CAP	4
72	.160203	CLIP, WIRE LOOM	2
-73	.16600	SEALANT, LOCTITE	1
74	.131860	COVER, STEERING BRACKET	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
75	.60342	SCREW, CAP	2
76	.4007	BATTERY (6 VOLT)	4
77	.160155	ROD, THREADED	2
78	.61239	NUT, LOCK	8
79	.70525	CHARGER, BATTERY (INTERNATIONAL) (See Sect. 3, Fig. 4 for Details)	1
80	.131570	PLYWOOD, BATTERY BASE	4
81	.80049-02	PLUG	2
82	.63302	WASHER, LOCK	8
83	.133461	BRACKET, PUMP/MOTOR ASSEMBLY	1
84	.133462	COVER, PUMP/MOTOR ASSEMBLY	1
85	.131684	WELDMENT, BATTERY RETAINER	2
86	.60353	SCREW, CAP	6
87	.60338	SCREW, CAP	8
-88	.65192	ADHESIVE, RUBBER	1
89	.63402	WASHER, FLAT	7
90	.61246	NUT, LOCK	4
91	.63401	WASHER, FLAT	4
92	.63409	WASHER, FLAT	2
93	.60811	NUT, HEX	2
94	.65174	NUT, JAM	2
95	.133454	KIT, BATTERY CABLE (See Sect. 3, Fig. 5 for Details)	1
-96	.411-23.8	EXTRUSION, RUBBER	1
-97	..411	EXTRUSION, RUBBER	2 FT
98	.80015-05	ELBOW, SWIVEL NUT	1

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

Mark Industries

TITLE	FRAME ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	3
FIG.	1
PAGE	9

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-99	.81385	MANIFOLD, PUMP	1
100	..600414	VALVE, PUMP	1
101	..600415	VALVE, NEEDLE	1
102	..	BODY	1
103	..	PLUG, #4 SAE	1

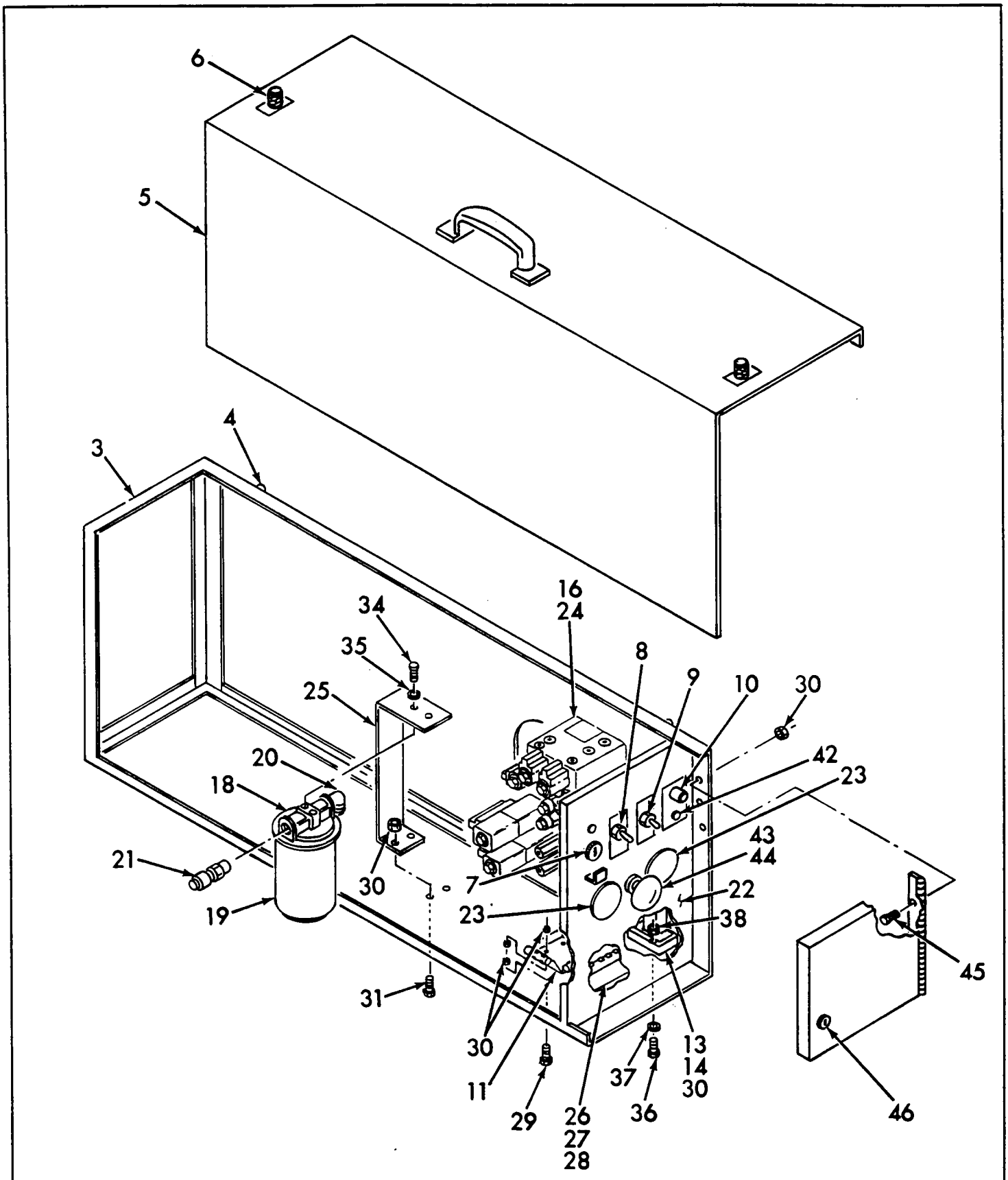
REV.

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

Mark Industries

TITLE	CONTROL BOX ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	2
PAGE	1

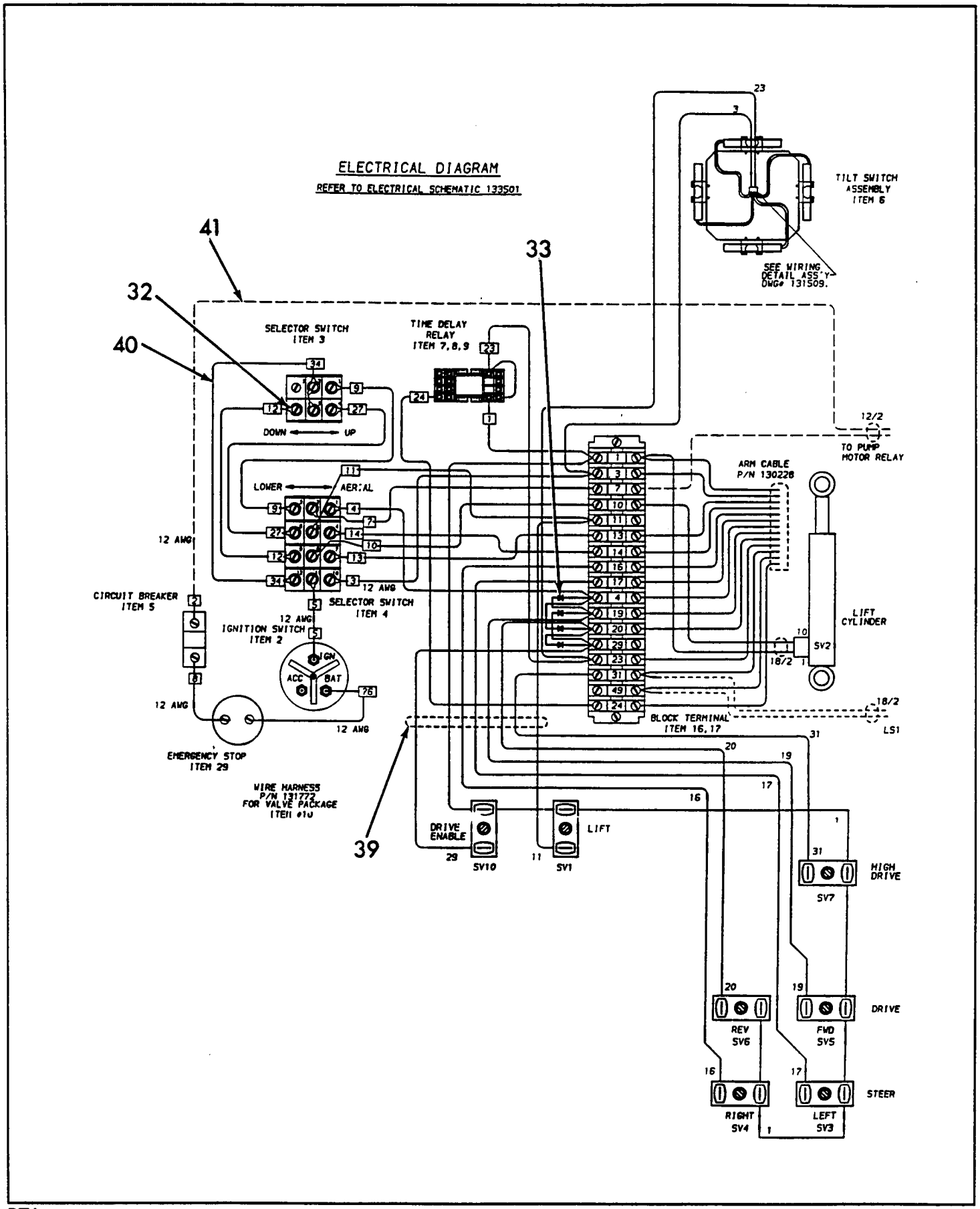


REV.

Mark Industries

TITLE	CONTROL BOX ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	2
PAGE	2



REV.

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133642	ASSEMBLY, CONTROL BOX (See Sect. 3, Fig. 1 for NHA)	REF
-2	.133607	SUB-ASSEMBLY, CONTROL BOX	1
3	..133596	WELDMENT, CONTROL BOX	1
4	...160172	PIN, STEEL CLEVIS	2
5	..133495	WELDMENT, COVER CONTROL BOX	1
6	...160121	LATCH (ADJUSTABLE GRIP)	2
7	.70610	SWITCH, KEY IGNITION	1
8	.16260	SWITCH, TOGGLE	1
9	.20481	SWITCH, TOGGLE	1
10	.20562	BREAKER, CIRCUIT	1
11	.130193	ASSEMBLY, TILT SWITCH	1
-12	..4014	SWITCH, MERCURY	4
13	.70590	RELAY, TIME DELAY	1
14	.70593	BASE, RELAY	1
-15	.70594	CLIP	1
16	.131729	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 6 for Details)	1
-17	.131774	ASSEMBLY, FILTER	1
18	..30306	FILTER, CANISTER	1
19	...16947	ELEMENT, FILTER	1
20	..80008-15	ELBOW, MALE	1
21	..80001-19	CONNECTOR, MALE	1
22	.182778	DECAL, GROUND CONTROL PANEL	1
23	.65244	PLUG	2
24	.60395	SCREW, CAP	2

Mark Industries

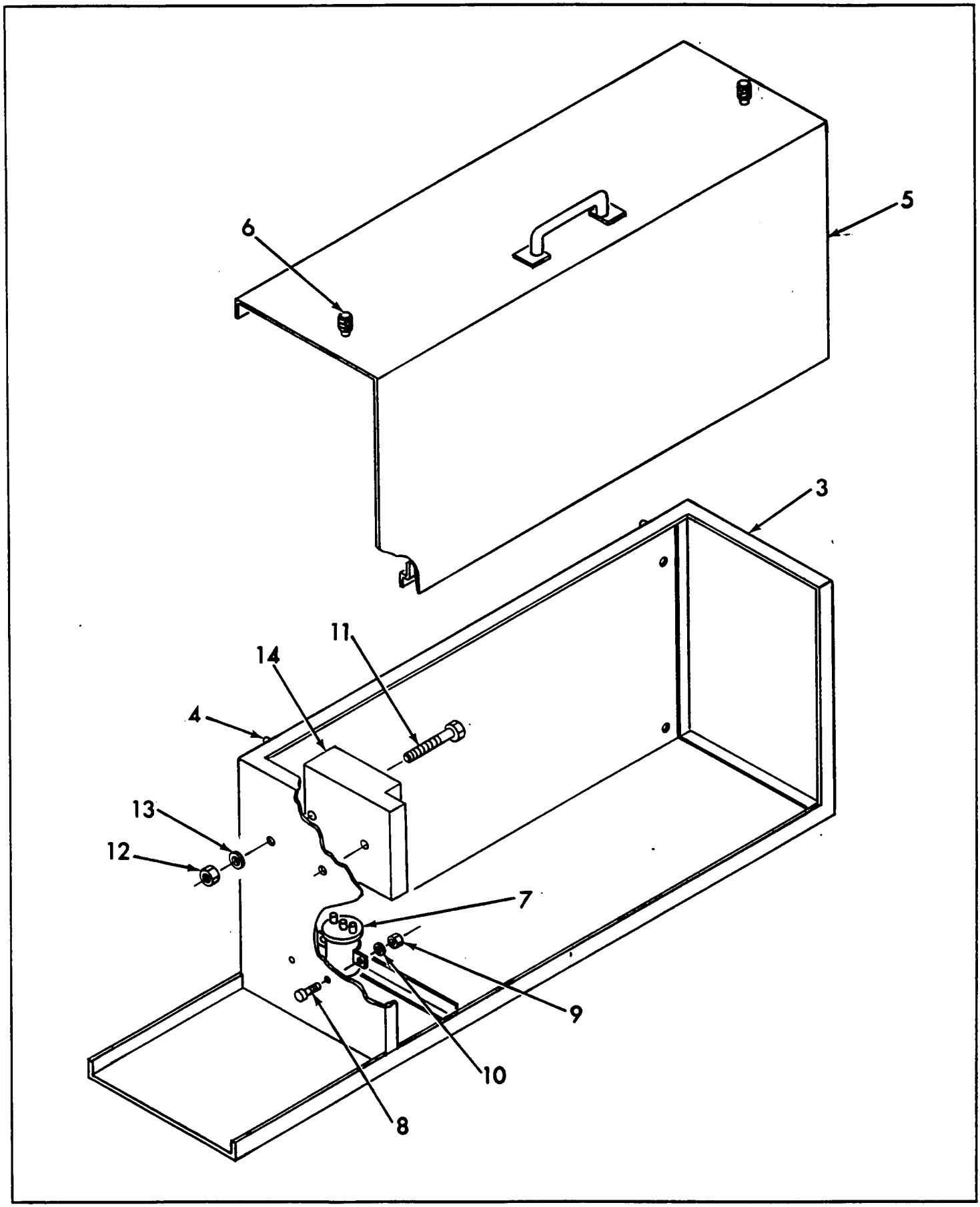
TITLE	CONTROL BOX ASSEMBLY	SECT. 3
MODEL	J30EP	FIG. 2
NOTES		PAGE 4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
25	.131739	BRACKET, MOUNTING FILTER	1
26	.4027	BLOCK, TERMINAL	17
27	.117-A	END, TERMINAL BLOCK	2
28	.62621	SCREW, MACHINE	2
29	.160256	SCREW, CAP	2
30	.60711	NUT, HEX	9
31	.60309	SCREW, CAP	2
32	.117-C	RING, CONNECTOR	24
33	.70479	DIODE	4
34	.60342	SCREW, CAP	2
35	.63301	WASHER, LOCK	2
36	.160408	SCREW, MACHINE	2
37	.160409	WASHER, FLAT	2
38	.61327	NUT, HEX	2
39	.70385	CABLE, CONDUCTOR	1 FT
40	.70232	WIRE, WHITE	4 FT
41	.2991	WIRE, WHITE	4 FT
42	.771	PLUG	1
43	.31080	KNOB, EMERGENCY ON/OFF	1
44	.70611	SWITCH, EMERGENCY ON/OFF	1
45	.61921	SCREW, CAP	3
46	.160410	LOCK, PANEL	1
-47	.411	EXTRUSION, RUBBER	1.15 FT

Mark Industries

TITLE	COMPONENT BOX ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	3
PAGE	1



REV.

Mark Industries

TITLE	COMPONENT BOX ASSEMBLY
MODEL	J30EP
NOTES	

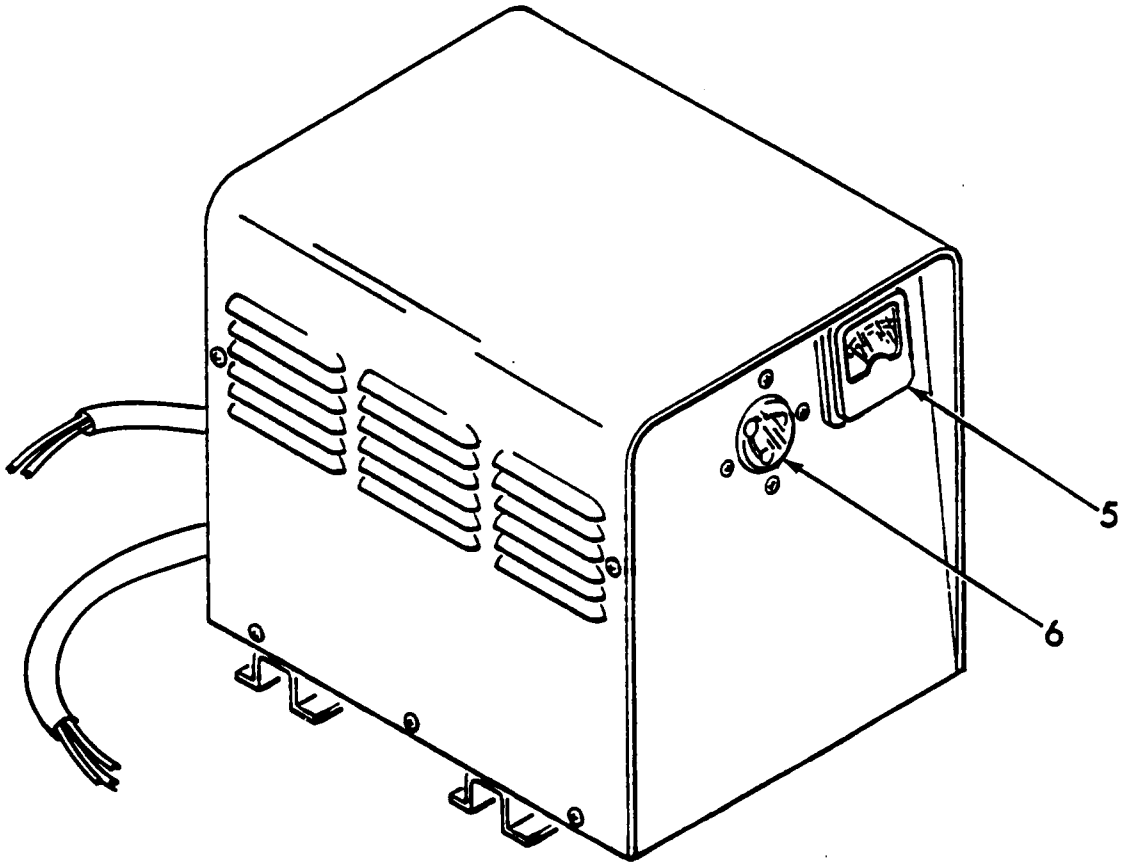
SECT.	3
FIG.	3
PAGE	2

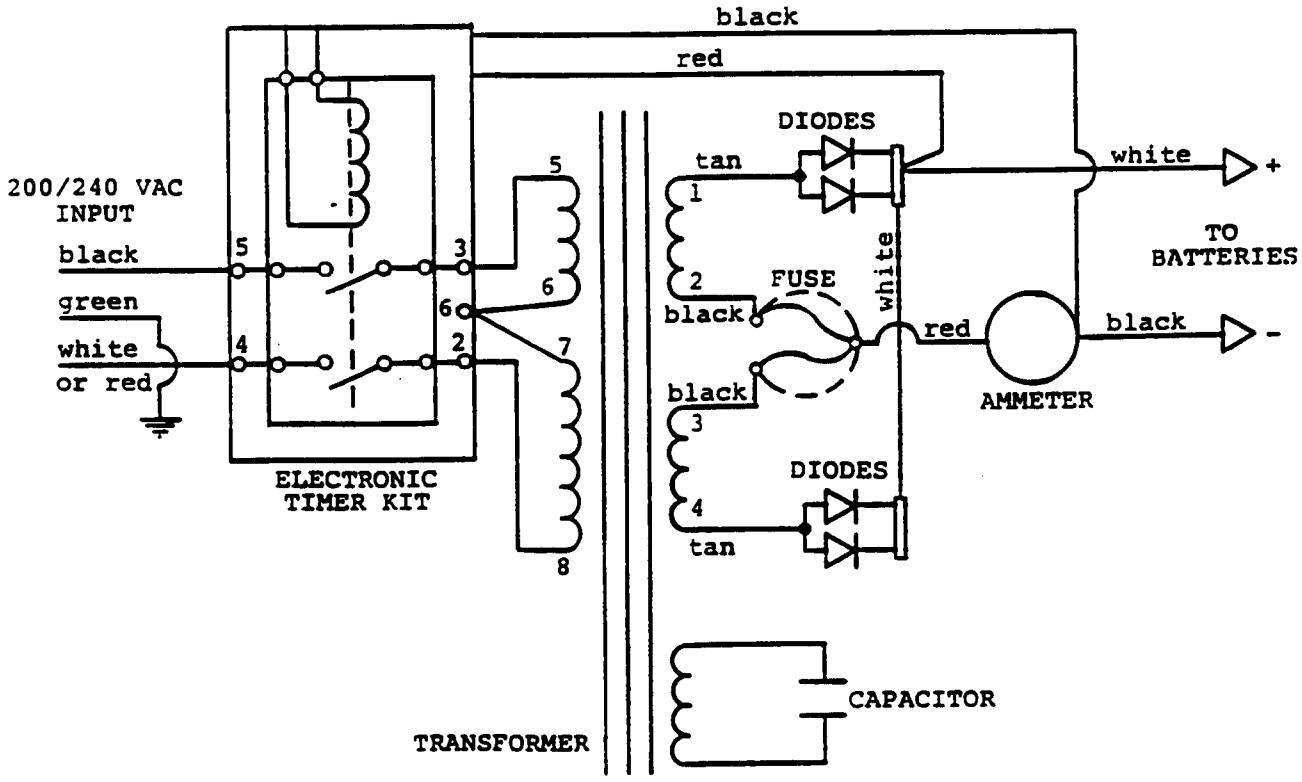
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133491	ASSEMBLY, COMPONENT BOX (See Sect. 3, Fig. 1 for NHA)	REF
-2	.133605	SUB-ASSEMBLY, COMPONENT BOX	1
3	..133488	WELDMENT, COMPONENT BOX	1
4	...160172	PIN, STEEL CLEVIS	2
5	..133487	WELDMENT, COMPONENT BOX COVER	1
6	...160121	LATCH (ADJUSTABLE GRIP)	2
7	.70362	RELAY (N.O.)	1
8	.60309	SCREW, CAP	2
9	.61312	NUT, SELF-LOCKING	4
10	.63401	WASHER, FLAT	4
11	.60434	SCREW, CAP	2
12	.61324	NUT, SELF-LOCKING	2
13	.63413	WASHER, FLAT	2
14	.70617	INTERRUPT, LOW VOLTAGE	1

Mark Industries

TITLE	BATTERY CHARGER (INTERNATIONAL)
MODEL	J30EP
NOTES	230V/50 HZ, 24V/40A

SECTION	3
FIGURE	4
PAGE	1





REV.

Mark Industries

TITLE	BATTERY CHARGER (INTERNATIONAL)
MODEL	J30EP
NOTES	230V/50 HZ, 24V/40A

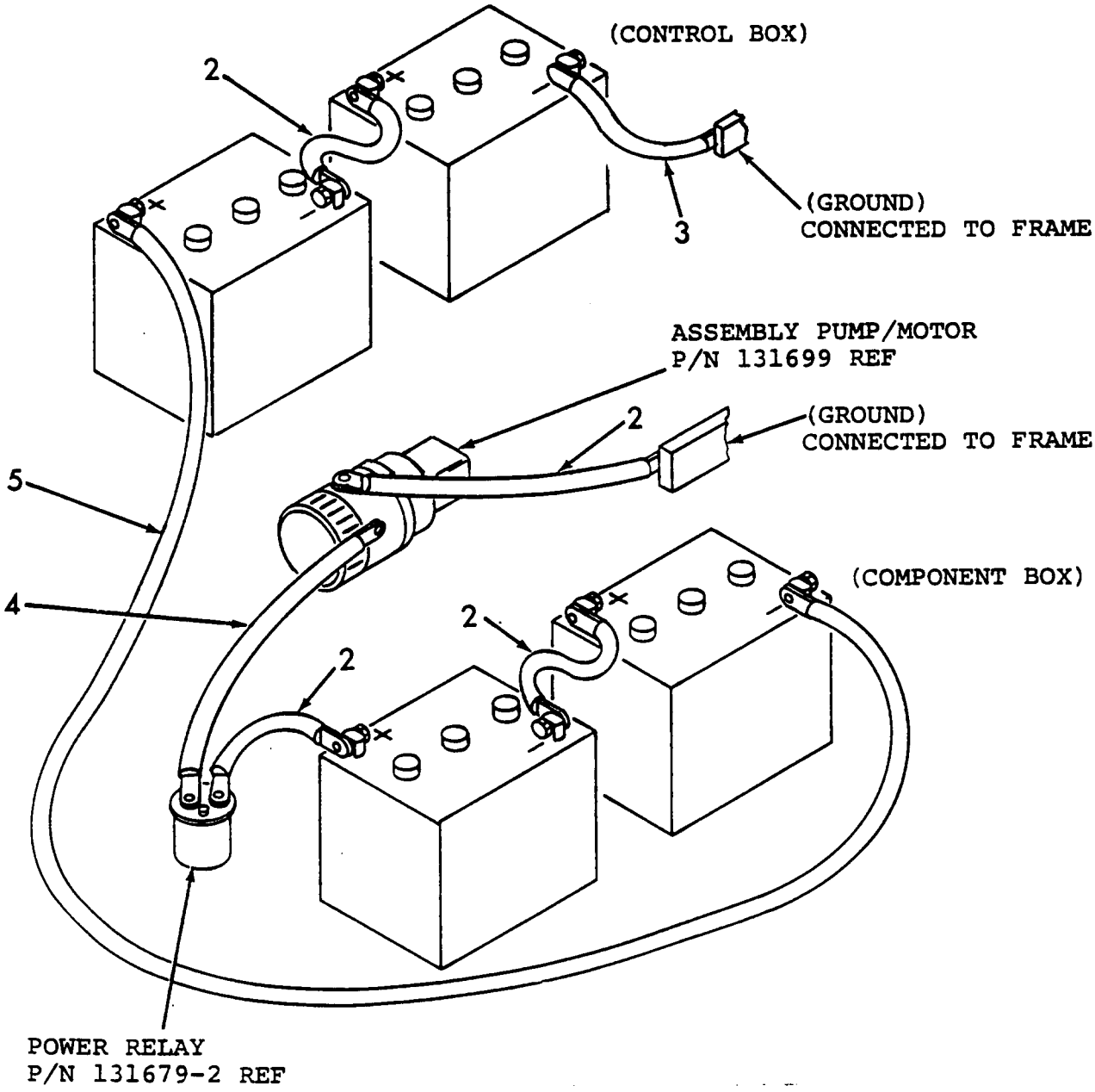
SECT.	3
FIG.	4
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	70525	CHARGER, BATTERY (INTERNATIONAL) (See Sect. 3, Fig. 1 for NHA) (See Vendor Chapter for Details)	REF
2	.600260	ASSEMBLY, TRANSFORMER	1
3	.66750	CAPACITOR	1
4	.600259	ASSEMBLY, HEATSINK (WITH DIODES)	2
5	.600258	ASSEMBLY, FUSE (WITH PANEL)	1
6	.66747	AMMETER	1
7	.600263	KIT, ELECTRONIC TIMER	1
8	.67976	RELAY, TIMER (24 VDC)	1

Mark Industries

TITLE	BATTERY CABLE KIT
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	5
PAGE	1



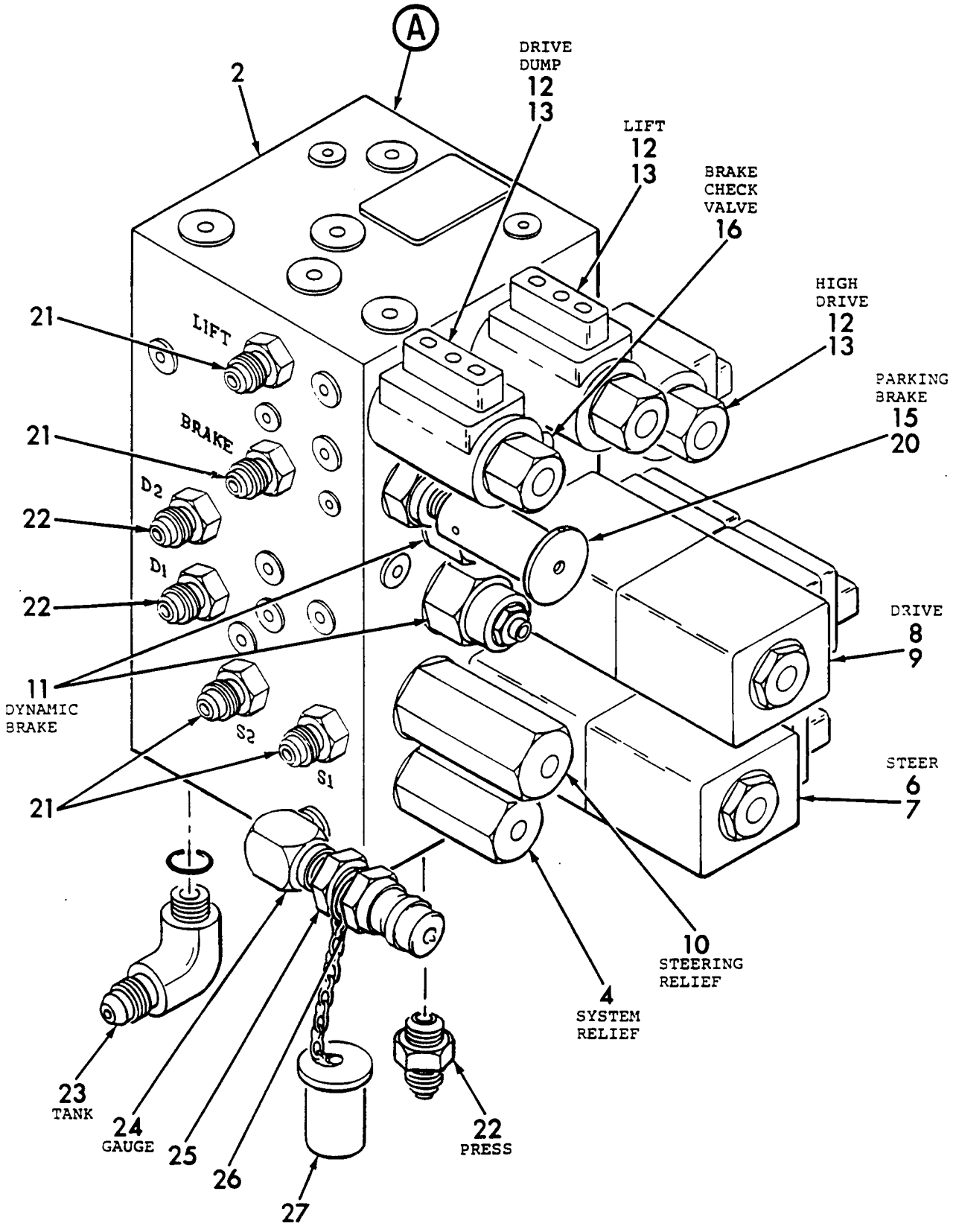
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133454	KIT, BATTERY CABLE (See Sect. 3, Fig. 1 for NHA)	REF
2	.13226-0120	ASSEMBLY, ELECTRICAL CABLE	4
3	.13226-0100	ASSEMBLY, ELECTRICAL CABLE	1
4	.13226-0560	ASSEMBLY, ELECTRICAL CABLE	1
5	.13226-1000	ASSEMBLY, ELECTRICAL CABLE	1

REV.

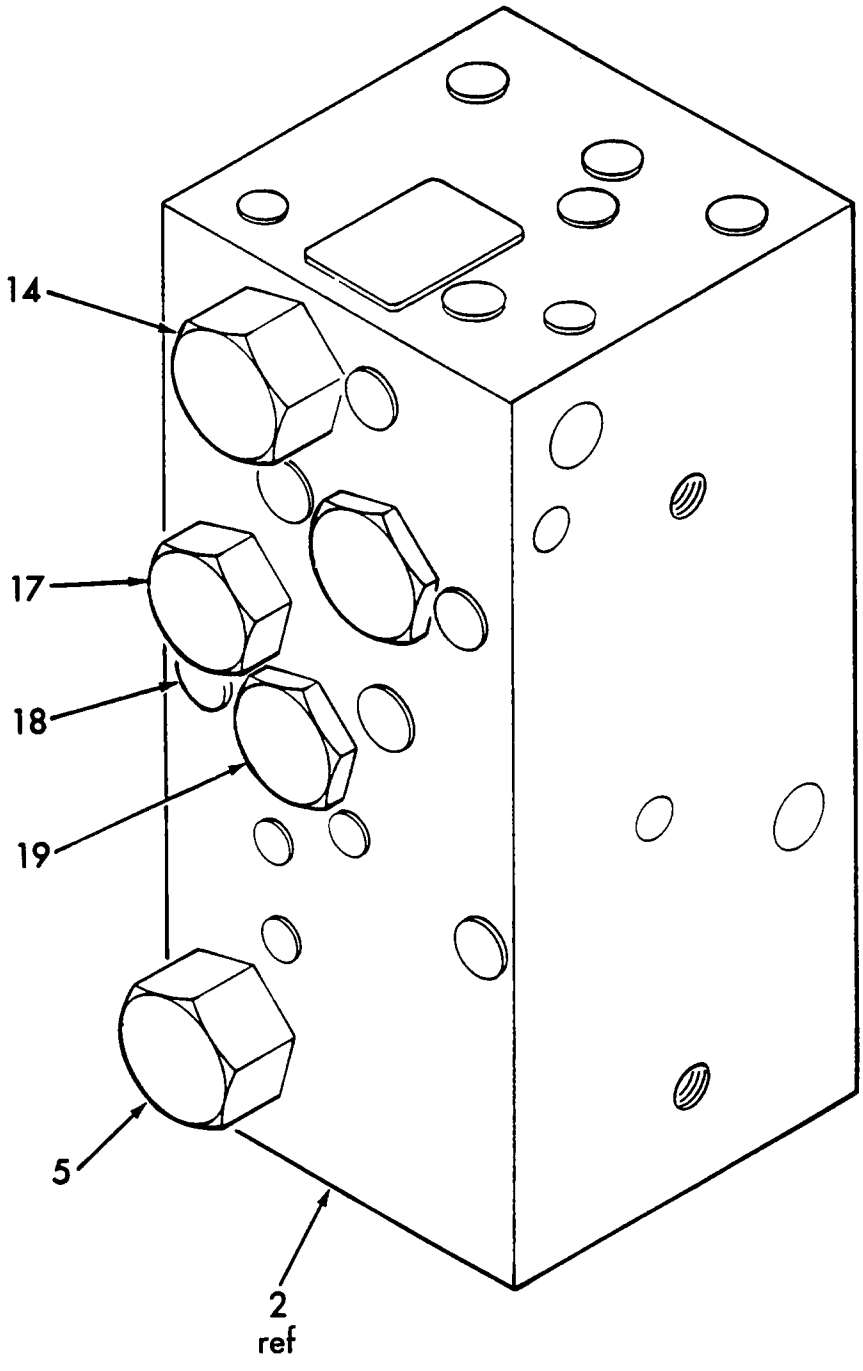
Mark Industries

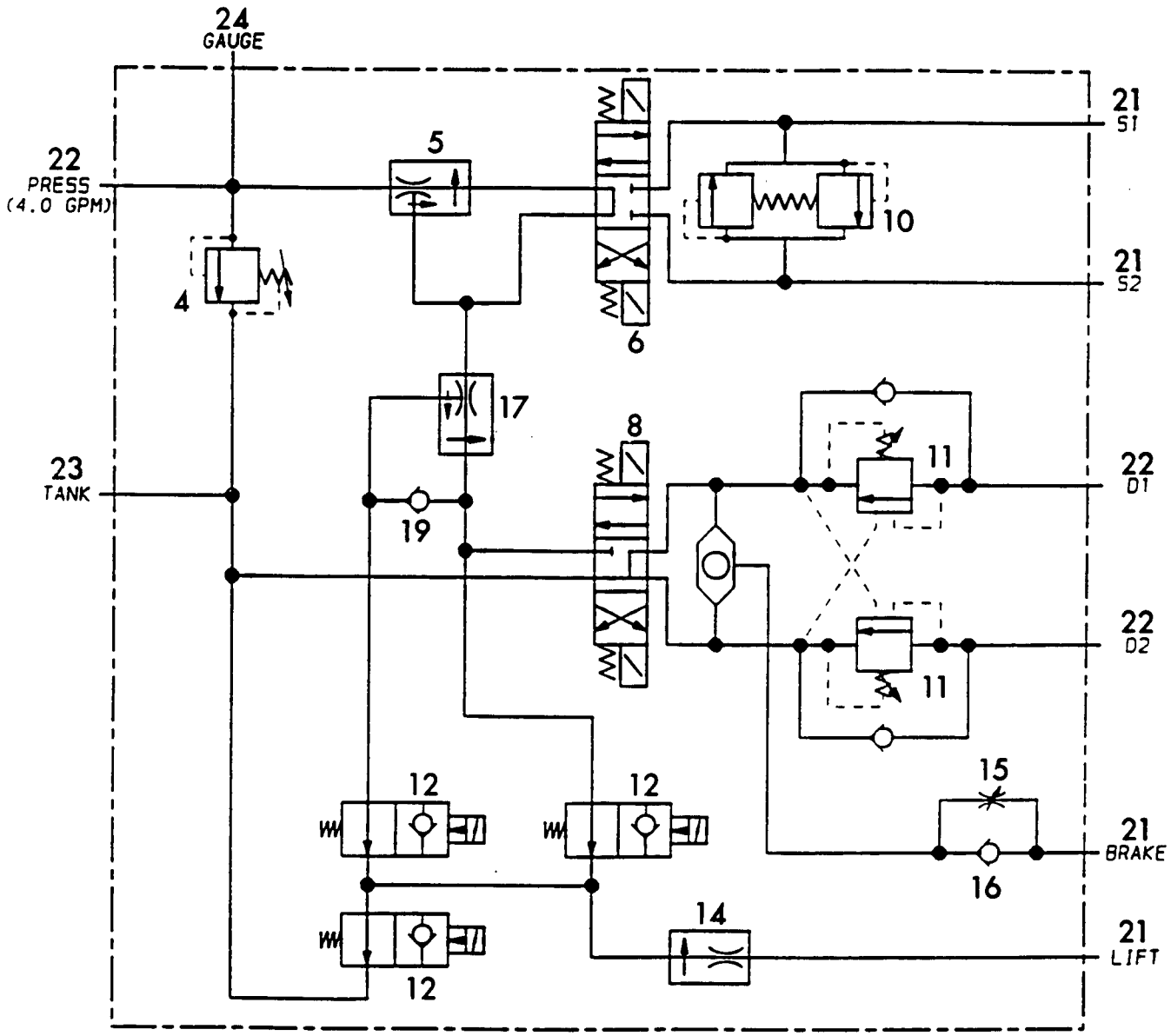
TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	3
FIGURE	6
PAGE	1



REV.


14
17
18
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ref
A


24
GAUGE
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PRESS
(4.0 GPM)
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TANK
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6
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S1
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S2
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11
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D1
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D2
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12
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12
15
16
21
BRAKE
14
21
LIFT

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	131729	ASSEMBLY, VALVE PACKAGE (See Sect. 3, Fig. 2 for NHA)	REF
2	.81381	VALVE, CONTROL	1
-3	..	KIT, SEAL	1
4	..67981	VALVE, RELIEF	1
5	..67982	REGULATOR, FLOW	1
6	..67341	VALVE, 3 POSITION 4 WAY	1
7	...66865	COIL, 20 VOLT	2
8	..67983	VALVE, 3 POSITION 4 WAY	1
9	...66865	COIL, 20 VOLT	2
10	..67984	VALVE, RELIEF	1
11	..67985	VALVE, OVERCENTER	2
12	..67986	VALVE, SOLENOID	3
13	...600028	COIL, 20 VOLT (ROUND)	3
14	..67025	REGULATOR, FLOW	1
15	..67987	VALVE, NEEDLE	1
16	..67988	VALVE, CHECK	1
17	..600314	REGULATOR, FLOW	1
18	..600023	VALVE, SHUTTLE	1
19	..600003	VALVE, CHECK	1
20	..600032	KIT, EXTENSION KNOB	1
21	.80004-05	CONNECTOR, STRAIGHT THREAD	4
22	.80004-08	CONNECTOR, STRAIGHT THREAD	3
23	.80012-12	ELBOW, STRAIGHT THREAD	1
24	.80021-03	ELBOW, STREET	1
25	.80052-04	NIPPLE, PIPE	1

Mark Industries

TITLE	VALVE PACKAGE ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	3
FIG.	6
PAGE	5

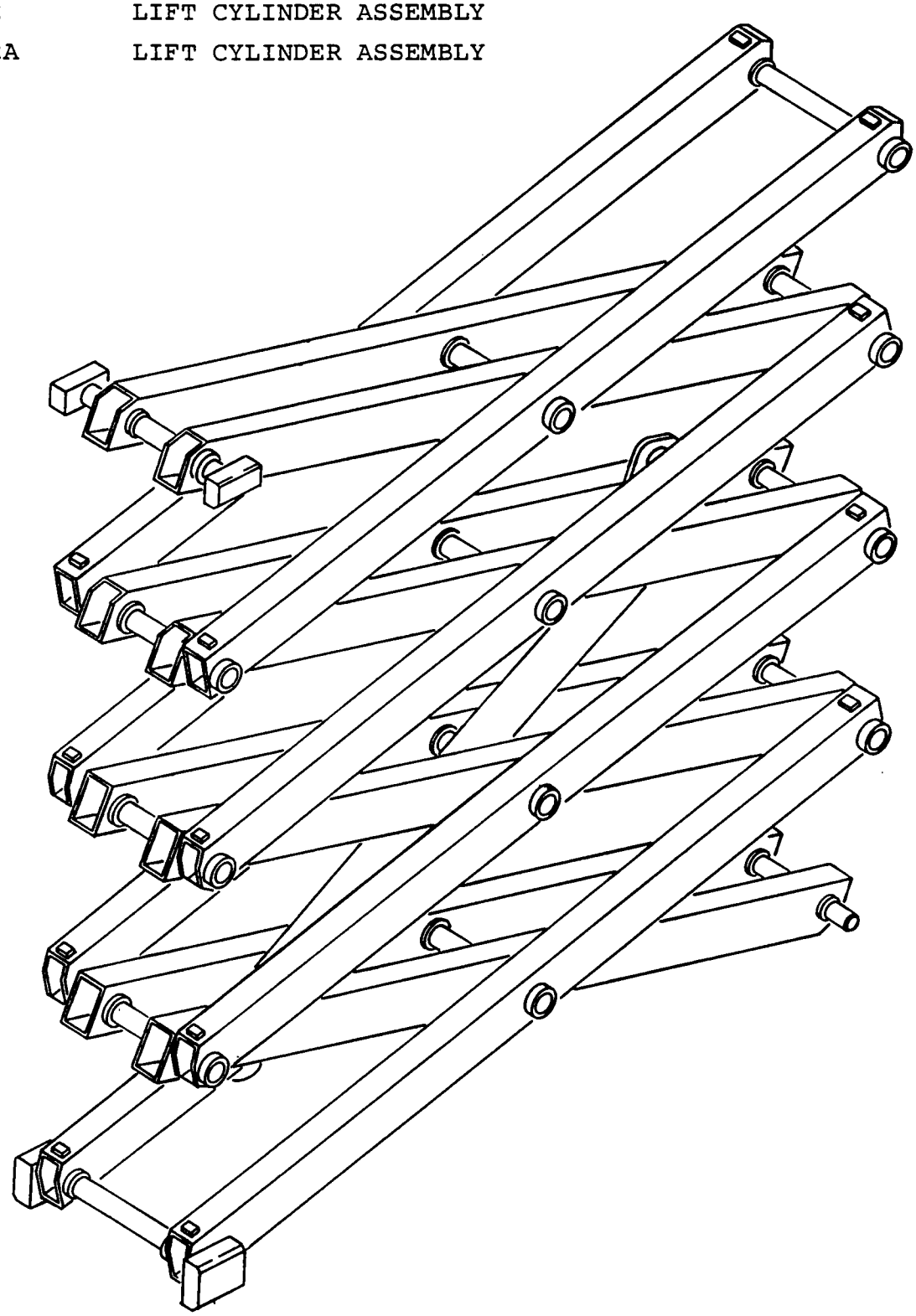
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.2527	COUPLING, QUICK DISCONNECT	1
27	.845	CAP, QUICK DISCONNECT	1

REV.

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

SECTION 4 CONTAINS:

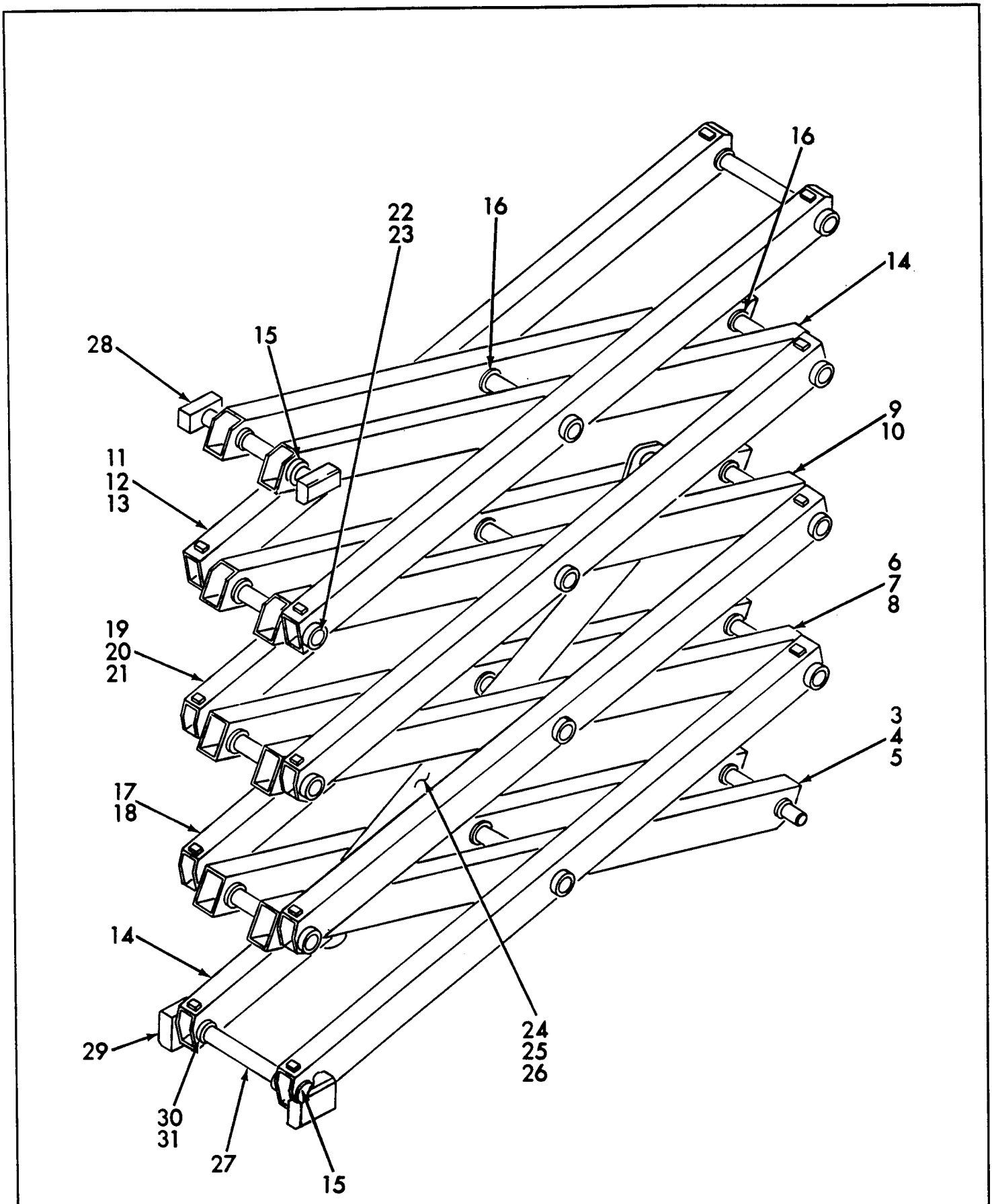
FIG. NO.	TITLE
1	SCISSOR ASSEMBLY
2	LIFT CYLINDER ASSEMBLY
2A	LIFT CYLINDER ASSEMBLY



Mark Industries

TITLE	SCISSOR ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	4
FIGURE	1
PAGE	1



REV.

Mark Industries

TITLE	SCISSOR ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	4
FIG.	1
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133581	ASSEMBLY, SCISSOR (See Sect. 3, Fig. 1 for NHA)	REF
2	.133579	SUB-ASSEMBLY, SCISSOR	1
3	..133556	WELDMENT, INNER ARM (FIRST STAGE)	1
4	...133535	PIN, LONG CENTER	2
5	...133533	PIN, TRUNNION END	1
6	..133560	WELDMENT, INNER ARM (SECOND STAGE)	1
7	...133535	PIN, LONG CENTER	2
8	...133534	PIN, SHORT CENTER	2
9	..133565	WELDMENT, INNER (THIRD STAGE)	1
10	...133535	PIN, LONG CENTER	3
11	..133564	WELDMENT, INNER ARM (FOURTH STAGE)	1
12	...133535	PIN, LONG CENTER	2
13	...133532	PIN, LONG END (PLATFORM END)	1
14	..133505	MACHINING, OUTER ARM	2
15	...160320	BEARING	2
16	...160401	BUSHING	4
17	..133566	MACHINING, OUTER ARM	1
18	...160401	BUSHING	3
19	..133509	MACHINING, OUTER ARM	1
20	...133508	WELDMENT, OUTER ARM	1
21	...160401	BUSHING	3
22	..2214	COLLAR	20
23	..62237	SCREW, SET	20
24	.133596	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 2 or 2A for Details)	1

Mark Industries

TITLE	SCISSOR ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	4
FIG.	1
PAGE	3

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
25	.133539	WELDMENT, CYLINDER PIN	2
26	.61828	SCREW, CAP	4
27	.133531	PIN, WEAR PAD	1
28	.131694	PAD, WEAR	2
29	.131693	PAD, WEAR	2
30	.65577	COLLAR, SHAFT	2
31	.62238	SCREW, SET	2

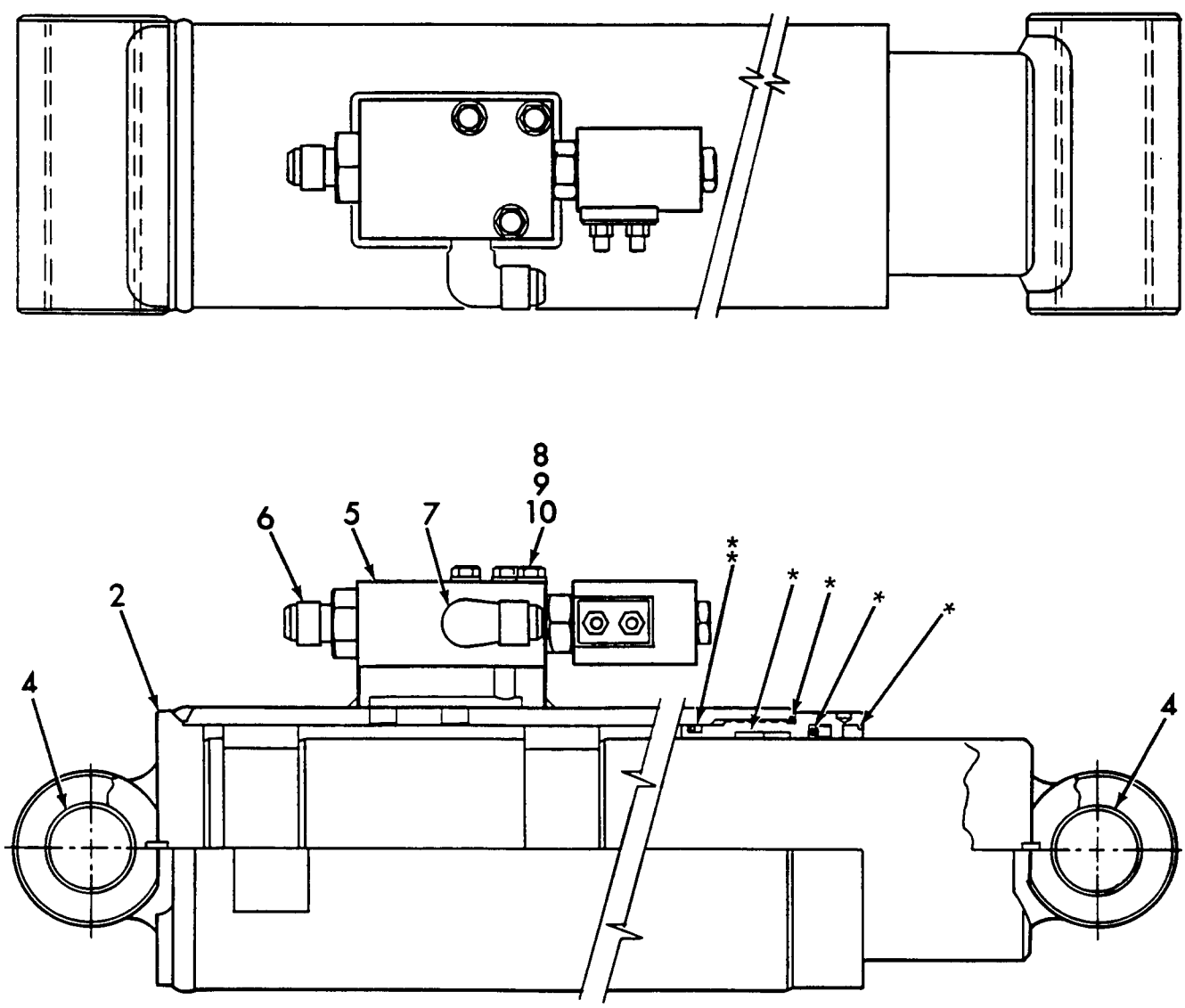
REV.

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

Mark Industries

TITLE	LIFT CYLINDER ASSEMBLY
MODEL	J30EP
NOTES	CONCURRENT USE

SECTION	4
FIGURE	2
PAGE	1



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

REV.

Mark Industries

TITLE	LIFT CYLINDER ASSEMBLY
MODEL	J30EP
NOTES	CONCURRENT USE

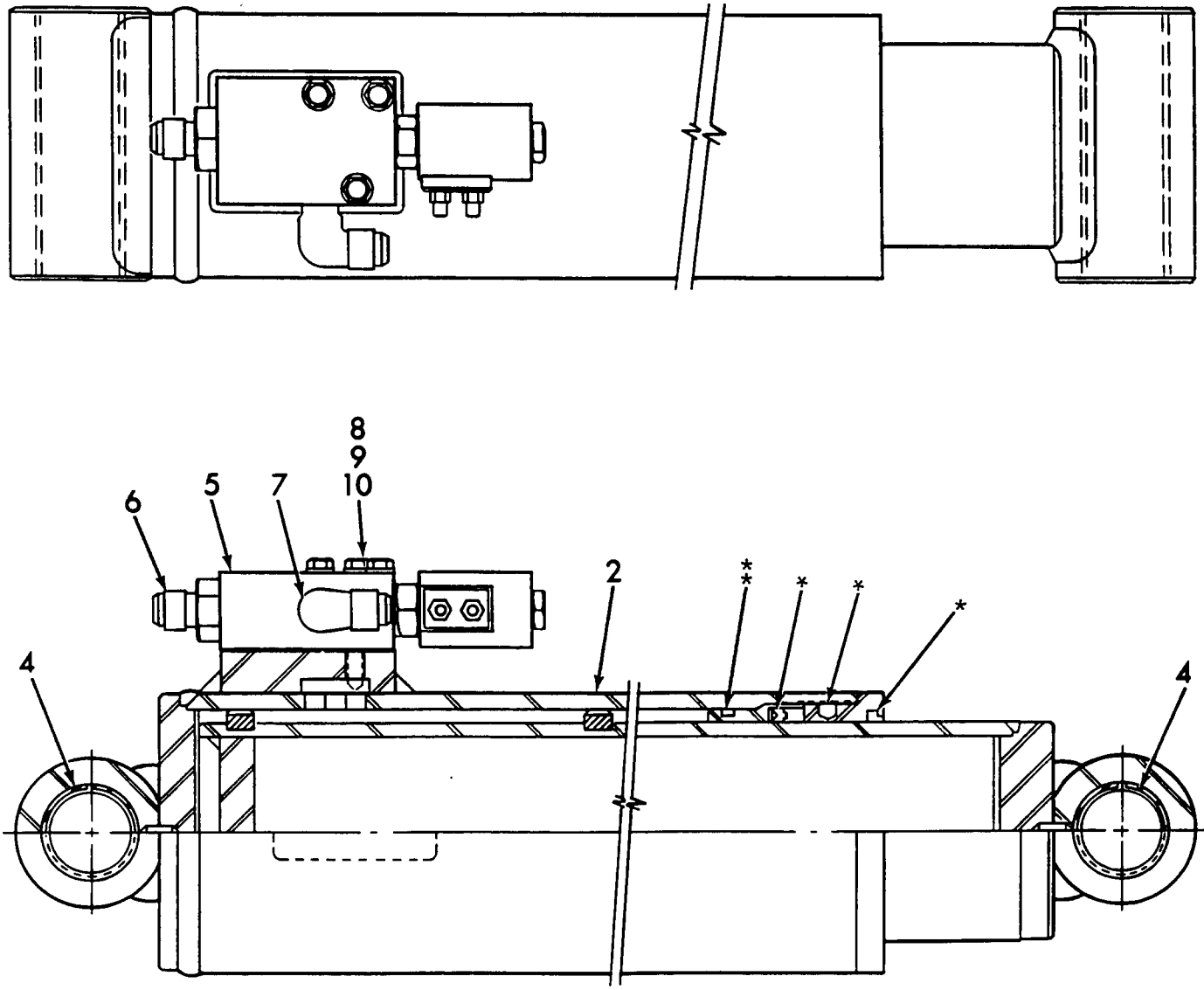
SECT.	4
FIG.	2
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133596	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1 for NHA)	REF
2	.133500	CYLINDER, LIFT (TH)	1
		NOTE 2: INTERNAL SERVICE REPLACEMENT PARTS AVAILABLE ON A SPECIAL ORDER BASIS.	
-3	..600353	KIT, SEAL (TH)	1
		NOTE 3: THE SEAL KIT INCLUDES ITEMS SHOWN WITH AN ASTERISK (*).	
4	..600366	BUSHING	4
5	.81387	VALVE, SOLENOID	1
6	.80004-03	CONNECTOR, STRAIGHT THREAD	1
7	.80012-08	ELBOW, STRAIGHT THREAD	1
8	.60329	SCREW, CAP	3
9	.63302	WASHER, LOCK	3
10	.63402	WASHER, FLAT	3

Mark Industries

TITLE	LIFT CYLINDER ASSEMBLY
MODEL	J30EP
NOTES	CONCURRENT USE

SECTION	4
FIGURE	2A
PAGE	1



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

REV.

Mark Industries

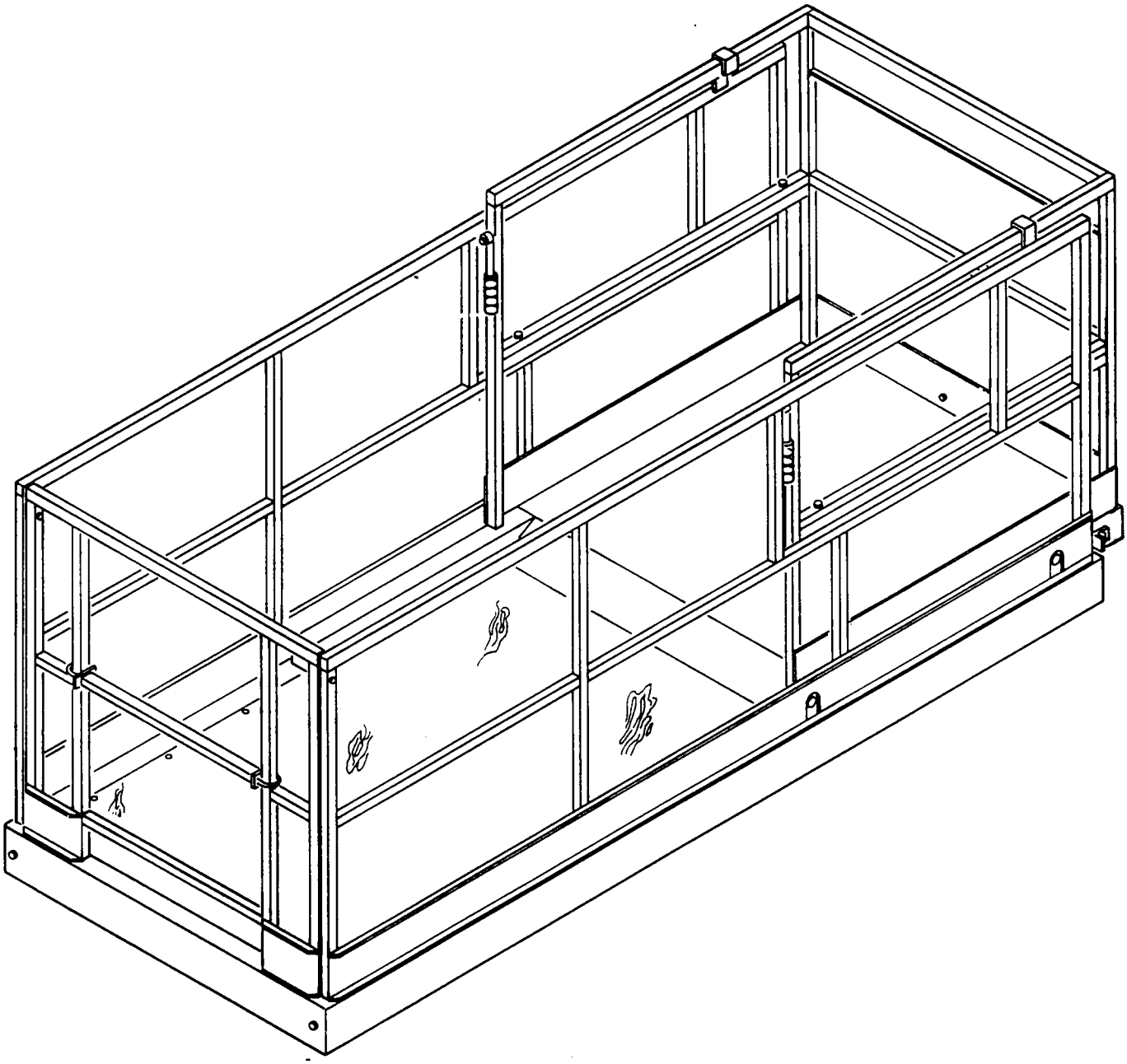
TITLE	LIFT CYLINDER ASSEMBLY
MODEL	J30EP
NOTES	CONCURRENT USE

SECT.	4
FIG.	2A
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133596	ASSEMBLY, LIFT CYLINDER (See Sect. 4, Fig. 1 for NHA)	REF
2	.133500	CYLINDER, LIFT (GB)	1
		NOTE 2: INTERNAL SERVICE REPLACEMENT PARTS AVAILABLE ON A SPECIAL ORDER BASIS.	
-3	..600367	KIT, SEAL (GB)	1
		NOTE 3: THE SEAL KIT INCLUDES ITEMS SHOWN WITH AN ASTERISK (*).	
4	..600368	BUSHING	4
5	.81387	VALVE, SOLENOID	1
6	.80004-03	CONNECTOR, STRAIGHT THREAD	1
7	.80012-08	ELBOW, STRAIGHT THREAD	1
8	.60329	SCREW, CAP	3
9	.63302	WASHER, LOCK	3
10	.63402	WASHER, FLAT	3

SECTION 5 CONTAINS:

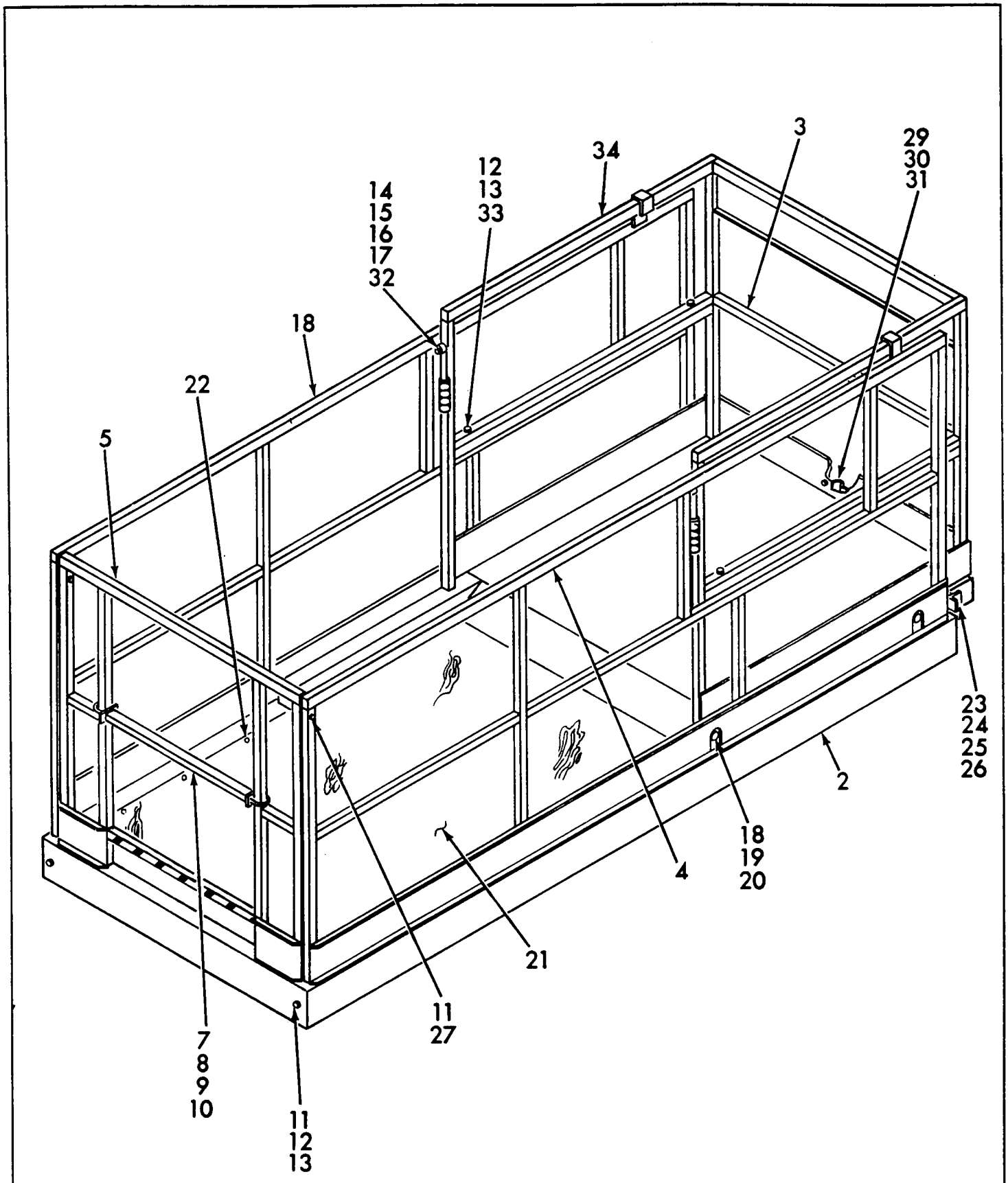
FIG. NO.	TITLE
1	PLATFORM ASSEMBLY



Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J30EP
NOTES	

SECTION	5
FIGURE	1
PAGE	1



REV.

Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	5
FIG.	1
PAGE	2

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133480	ASSEMBLY, EXTENDABLE PLATFORM (See Sect. 4, Fig. 1 for NHA)	REF
2	.133439	WELDMENT, MAIN PLATFORM	1
3	.133470	WELDMENT, EXTENDABLE PLATFORM BOTTOM	1
4	.133464	RAIL, R.H. SIDE GUARD	1
5	.133442	RAIL, REAR GUARD	1
-6	.133608	ASSEMBLY, SLIDE BAR	1
7	..32740	WELDMENT, SLIDE BAR	1
8	..160017	U-BOLT	2
9	..61318	NUT, LOCK	4
10	..60703	NUT, HEX	4
11	.60337	SCREW, CAP	6
12	.63301	WASHER, LOCK	8
13	.60701	NUT, HEX	8
14	.133119	WELDMENT, HAND RAIL HANDLE	2
15	.63403	WASHER, FLAT	6
16	.160290	SCREW, SHOULDER	2
17	.61322	NUT, LOCK	2
18	.37808	TUBE	4
19	.61232	NUT, LOCK	4
20	.65555	FOLLOWER, CAM	4
21	.133476	PLYWOOD, FLOOR	1
22	.61713	SCREW, SELF-TAPPING	13
23	.133092	BRACKET, STOP	2
24	.60343	SCREW, CAP	4
25	.60333	WASHER, LOCK	4

Mark Industries

TITLE	PLATFORM ASSEMBLY
MODEL	J30EP
NOTES	

SECT.	5
FIG.	1
PAGE	3

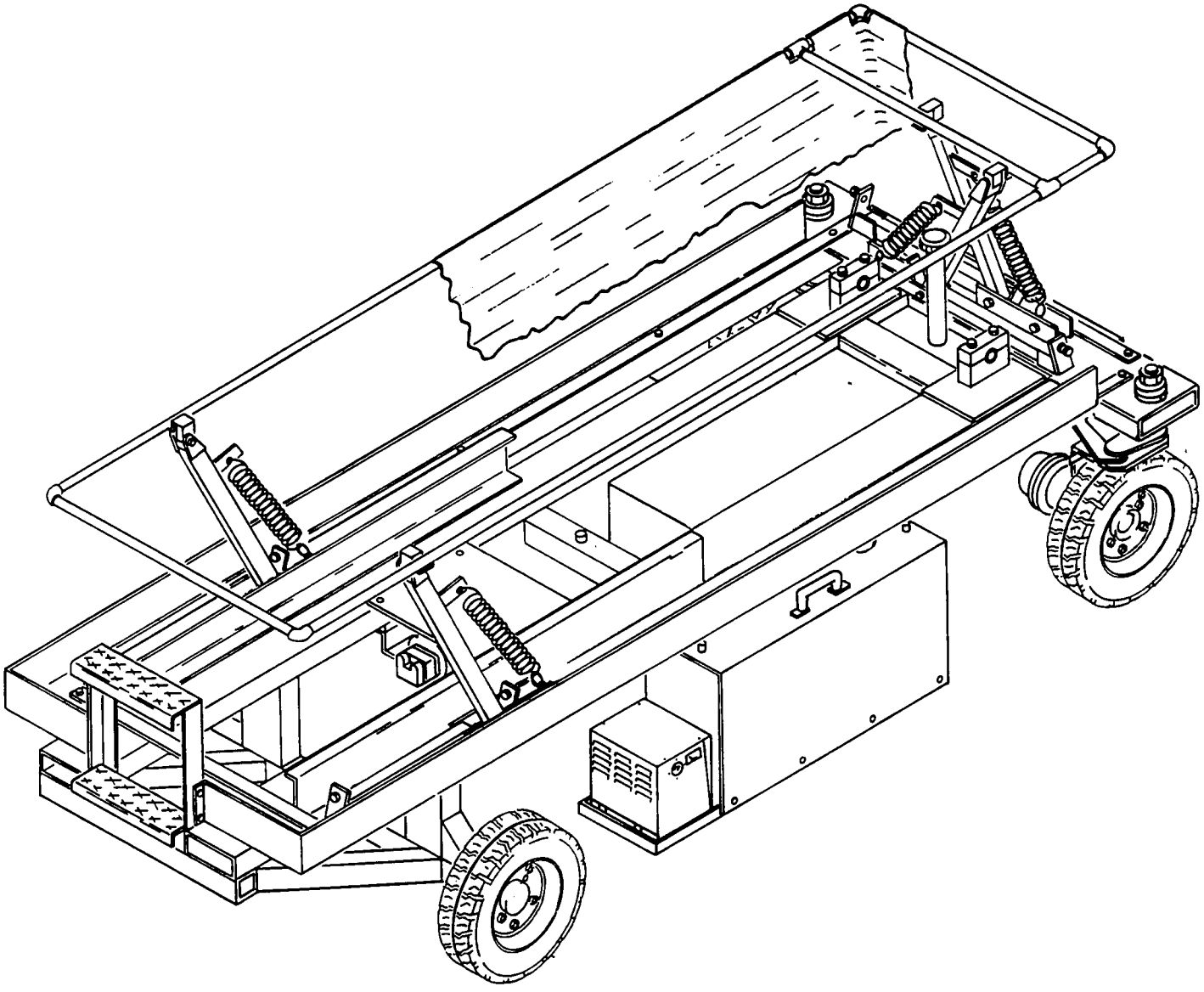
ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.60703	NUT, HEX	4
27	.60711	NUT, HEX	2
28	.133441	RAIL, L.H. SIDE GUARD	1
29	.133135	BRACKET, CABLE	1
30	.160292	SCREW, CAP	2
31	.63313	WASHER, LOCK	2
32	.160311	GRIP, HANDLE	2
33	.60352	SCREW, CAP	4
34	.133681	WELDMENT, EXTENDABLE PLATFORM TOP	1

REV.

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

SECTION 6 CONTAINS:

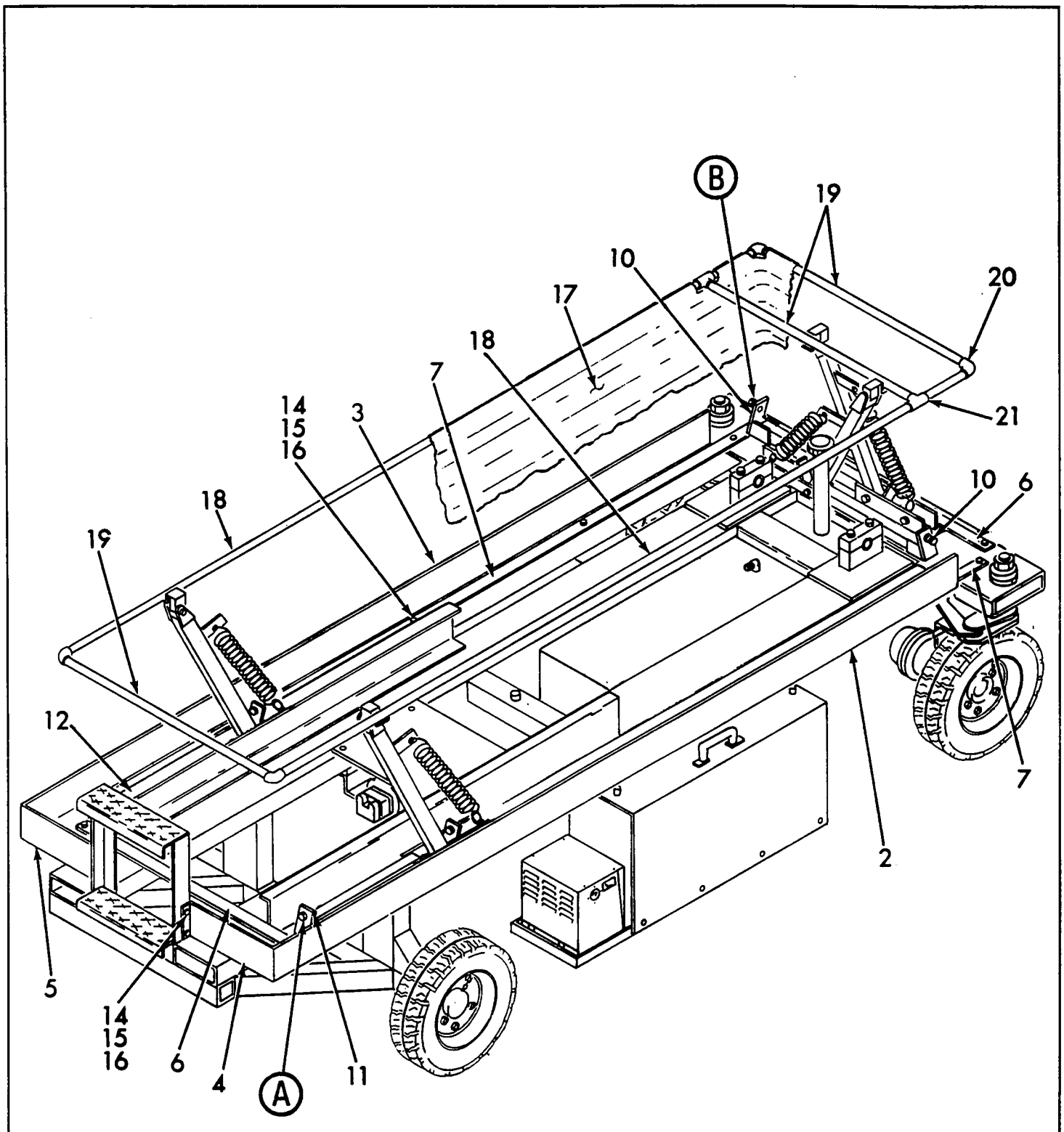
FIG. NO.	TITLE
1	SAFETY SKIRT



Mark Industries

TITLE	SAFETY SKIRT
MODEL	J30EP
NOTES	

SECTION	6
FIGURE	1
PAGE	1

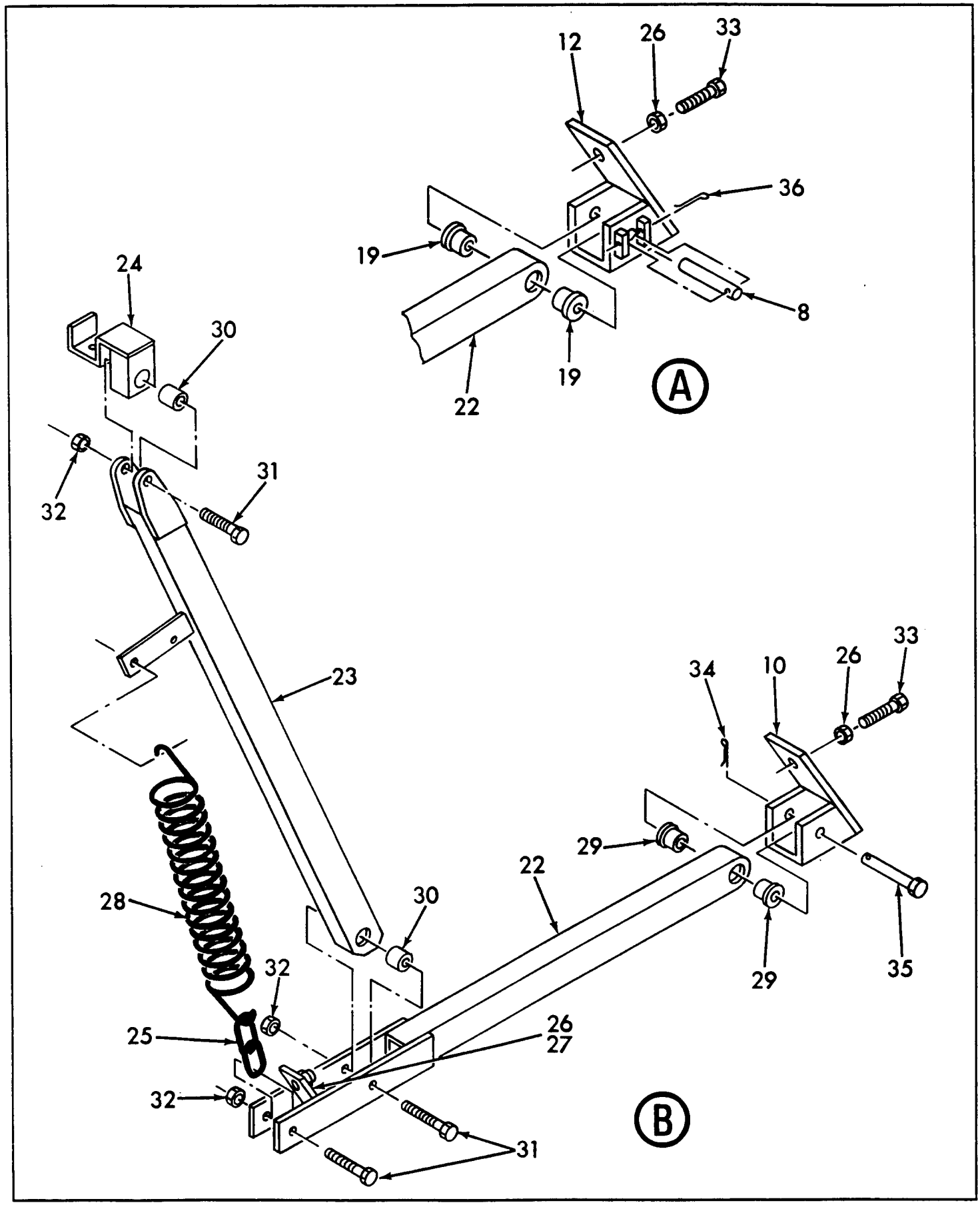


REV.

Mark Industries

TITLE	SAFETY SKIRT
MODEL	J30EP
NOTES	

SECTION	6
FIGURE	1
PAGE	2



REV.

Mark Industries

TITLE	SAFETY SKIRT
MODEL	J30EP
NOTES	

SECT.	6
FIG.	1
PAGE	3

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
-1	133594	SKIRT, SAFETY	REF
2	.133632	WELDMENT, R.H. SKIRT GUARD	1
3	.133633	WELDMENT, L.H. SKIRT GUARD	1
4	.133616	GUARD, R.H. REAR SKIRT	1
5	.133617	GUARD, L.H. REAR SKIRT	1
6	.133618	BAR, FRONT AND REAR MOUNTING	2
7	.133619	BAR, SIDE SKIRT MOUNTING	2
8	.133481	PIN, ARM MOUNTING	2
-9	.133613	SKIRT, FRONT/REAR SAFETY	2
10	.133592	BRACKET, FRONT ACTUATOR MOUNTING	2
11	.133622	WELDMENT, R.H. ACTUATOR ARM	1
12	.133621	WELDMENT, L.H. ACTUATOR ARM	1
-13	.60158	SCREW, CAP	2
14	.63301	WASHER, LOCK	26
15	.60309	SCREW, CAP	24
16	.60701	NUT, HEX	24
17	.133657	SKIRT, SIDE SAFETY	2
18	.38161	PIPE	2
19	.38162	PIPE	3
20	.160405	ELBOW, ALUMINUM SLIP-ON	4
21	.160406	TEE, ALUMINUM SLIP-ON	2
22	.133548	WELDMENT, ARM ASSEMBLY	4
23	.133553	WELDMENT, SUPPORT	4
24	.133588	WELDMENT, SKIRT TUBE SUPPORT	4
25	.160404	CHAIN (2 LINKS EACH)	4

REV.

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

Mark Industries

TITLE	SAFETY SKIRT	SECT.	6
MODEL	J30EP	FIG.	1
NOTES		PAGE	4

ITEM	PART NUMBER 1234	DESCRIPTION	UNITS PER ASSY
26	.61101	NUT, JAM	8
27	.62204	SCREW, SET	4
28	.160382	SPRING, EXTENSION	4
29	.160383	BUSHING, FLANGED	8
30	.160384	BUSHING	8
31	.60321	SCREW, CAP	12
32	.61318	NUT, LOCK	12
33	.60357	SCREW, CAP	4
34	.16244	PIN, COTTER	2
35	.160385	PIN, CLEVIS	2
36	.64310	PIN, COTTER	2

REV.

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

Mark Industries

TITLE	VENDOR CHAPTER
MODEL	J30EP

VENDOR CHAPTER CONTAINS:

SECTION	TITLE	PART NO.
1	DRIVE MOTOR	81380
2	BRAKE	81155
3	BATTERY CHARGER	70525

REV.

SERVICE INSTRUCTIONS AND PARTS LIST

110 SERIES

LOW SPEED HIGH TORQUE WHEEL MOTOR

INTRODUCTION

The 110 series low speed high torque (LSHT) hydraulic orbit wheel motors are designed to provide long life while operating with medium radial loads. Refer to catalog radial load limits. However, should maintenance be required, the instructions below should be used for disassembly, replacement of parts, cleaning and assembly.

NOTE: Prior to motor disassembly, plug the open ports and clean all dirt form the outside of the motor.

Prior to assembly, lightly oil all seals, rollers and threaded bolt ends.

PART I - SEAL REPLACEMENT

A. REPLACEMENT OF FRONT SEAL ASSEMBLY AND/OR SHAFT

1. Remove the key (15) from the shaft if there is a key.
2. Mount the motor in a vice or other holding device with the shaft facing down.
3. Remove the eight 5/16-24 bolts (9). If there are bolt washers under these bolts, remove and discard them.
4. Remove the cover/bearing assembly (19) or (20) and the square ring (8).
5. Remove snap ring (24) using snap ring pliers. DO NOT DISCARD. This snap ring will be reinstalled later.
6. Remove square ring (8) from cover/bearing assembly (19) and discard. Replace the cover on the motor and align the bolt holes. Install the eight bolts (9) into the bolt holes. FINGER TIGHTEN ONLY
7. Remove the motor from the vice or holding device place the motor on a clean flat surface with the shaft facing. up. Clean the front end of the motor to avoid contaminating the lube system during the procedure.
8. Remove the snap ring (1) using snap ring pliers. (For 1-1/4" straight keyed shaft model, remove outer snap ring first.)

9. Pull the shaft (16) or (17) out vertically. CAUTION: When pulling the shaft out, do not rotate the shaft or move the motor as this alters internal timing.

10. With the seal retainer assembly and shaft assembly removed, remove all the parts from the shaft and inspect the various parts of the seal assembly (2,3,4) shaft (16) or (17) and thrust bearing assembly (10,11,12). Replace any worn or damaged parts. Always replace the seal retainer assembly (23). The shaft should have smooth, polished surfaces in the bearing and seal areas. If the shaft is lightly scratched in these areas, polish with fine emery paper in a circumferential direction. However, if the shaft has any pitting or deep scratches, the entire motor should be disassembled for inspection according to Part II.

B. **ASSEMBLY OF FRONT SEAL ASSEMBLY AND/OR SHAFT**

1. Assemble the thrust washers (11) and thrust bearing (12) on the shaft using the snap ring (10). The snap ring sharp edges must face away from the thrust washers with the thrust bearing (12) between the washers.

2. Slowly lower the spline end of the shaft (16) or (17) assembly into the motor body using caution not to rotate the internal parts once the shaft spline starts to engage.

3. Place the lightly oiled o-ring (13) into the groove in the body bore.

4. Gently slide the oiled seal retainer assembly (23) (items 2,3,4) over the shaft, chamfered side first, and press into the body bore. When fully in place, the body snap ring groove will be visible.

5. Install the snap ring (1) into its body groove with the snap ring's sharp edges facing outward and the retainer pin between the snap ring lugs. Be sure the snap ring is completely seated in the groove. (For 1-1/4" straight keyed shaft model, replace shaft snap ring.)

6. Remount the motor in a vice or other holding device with the shaft facing down.

7. Remove the eight 5/16 - 24 bolts (9) that you finger tightened previously. (Part I, Section A, Step 6)

8. Remove the cover/bearing assembly (19) or (20).

9. Install snap ring (21) onto the shaft in the snap ring groove directly behind the IGR assembly.

10. Place the lightly oiled square ring (8) into the cover

groove. Place the cover over the shaft end and align the bolt holes. Note: Be sure not to dislodge the square ring while installing the cover.

11. If the motor had bolt washers, install the bolts with new washers Part #1047.

    A. Install the eight bolts with lightly oiled thread ends into the bolt holes. Tighten diagonally to 15 ft. lbs. Now turn the shaft by hand through several revolutions.

    B. In a diagonal pattern, increase the torque of each bolt by 5 ft. lbs. Turn the shaft by hand through several revolutions.

    C. Repeat step B until the torque of each bolt has reached 27 ft. lbs.

PART II - SEAL REPLACEMENT

A. THRU COVER SHAFT SEAL REPLACEMENT

1. Mount the motor in a vice or other holding fixture with the shaft facing down.

2. Remove the eight bolts (9) from the motor (be sure not to disrupt the bolt hole orientation between the IGR (14) and body (18). Remove the thru cover (20).

3. The lip seal (21) can be removed using a dull pointed object such as a pencil point or the end of a paper clip. Do not use a sharp object such as a knife because the sealing surface in the cover can be damaged. Note: Earlier models pre-January 1986, serial number A6 and earlier contain quad rings and back-up rings.

4. With old seals removed, install the new lip seal (21) into the bore with the rubber lips facing the inboard side. Note: Earlier models pre-January 1986, serial number A6 and earlier require quad rings and back-up rings in the cover bore. Flush the back-up ring against the sealing surface toward the outside of the motor. Put the quad ring in next on the inboard side of the back-up ring and push it against the back-up ring.

5. Press the dust seal (22) into the bore on the outside of the cover. Make sure that the rubber lips are facing the outside of the motor. The dust seal's back should be flush with the bore floor.

6. Lubricate the inside diameter of the seals with oil.

7. To avoid cutting the seal on the sharp edges of the

spline, cover the spline with the tape provided.

8. Place the other lightly oiled square ring seal (8) into the groove on the cover and place the cover over the shaft end and align the bolt holes.

9. If the motor had bolt washers, install the bolts with new washers, Part #1047.

   A. Install the eight bolts with lightly oiled thread ends into the bolt holes. Tighten diagonally to 15 ft. lbs. Now turn the shaft by hand through several revolutions.

   B. In a diagonal pattern, increase the torque of each bolt by 5 ft. lbs. Turn the shaft by hand through several revolutions.

   C. Repeat step B until the torque of each bolt has reached 27 ft. lbs.

PART III - MOTOR DISASSEMBLY

A. DISASSEMBLY OF COVER SECTION OF MOTOR

1. Remove the key (15) from the shaft if there is a key.

2. Mount the motor in a vice or other holding device with the shaft facing down.

3. Remove the eight 5/16 - 24 bolts (9). If the current motor has bolt washers, remove and discard them.

4. Remove the cover/bearing assembly (19) or (20) and the square ring (8). Discard the square ring.

5. Remove snap ring (21) using snap ring pliers. DO NOT DISCARD. This snap ring will be reinstalled later.

6. Remove the IGR set components (14) starting with the outer locating ring, rollers, outer, rolls, inner rotor and valve plate (5). If any of these components are damaged, the entire IGR assembly must be replaced.

7. Remove the two check balls (6). Note: The check balls frequently fall into the body tapped holes or into the body valve ports during disassembly. Be sure that the check balls are removed.

B. DISASSEMBLY OF SHAFT SECTION OF MOTOR

1. Remove the motor from your vice or holding device. Place the motor on a clean, soft surface with shaft facing up, if possible. clean the front end of the motor to avoid

contaminating the lube system during the procedure.

2. Remove the snap ring (1) using snap ring pliers. (For 1-1/4" straight keyed shaft model remove outer snap ring first.)

3. Pull the shaft (16) or (17) out vertically through the front of body bearing assembly 918). Removing the shaft in this manner will also remove the seals and seal retainer.

4. With the seal retainer assembly and shaft assembly removed, remove all parts from the shaft. Inspect the shaft. Inspect the shaft and all parts of the seal assembly (2), (3), (4) and all components of the thrust bearing system (10, 11, 12). Replace any worn or damaged parts. always replace the seal retainer assembly (23). The shaft should have smooth polished surfaces in the bearing and seal areas. If the shaft is lightly scratched in these areas, polish with fine emery paper in a circumferential direction. However, if the shaft has pitting or deep scratches, the entire motor should be inspected for scratches, galling and contamination.

PART IV - MOTOR ASSEMBLY

A. ASSEMBLY OF COMPLETE MOTOR

1. Prior to assembly, all parts must be cleaned with a suitable solvent and free of nicks and burrs.

2. Mount the body bearing assembly with the pilot and bearing facing up, in a vice or other holding device.

3. Assemble the thrust washers (11) and thrust bearing 912) on the shaft using the snap ring (10). The snap ring sharp edges must face away from the thrust washers with the thrust bearing (12) between the washers.

4. Lower the spline end of the shaft (16) or (17) assembly into the motor body.

5. Place the lightly oiled o-ring (13) into the groove in the body bore.

6. Gently slide the oiled seal retainer assembly (23)(Items 2,3,4) over the shaft, chamfered side first, and press into the body bore. When fully in place, the body snap ring groove will be visible.

7. Install the snap ring (1) into its body groove with the snap ring's sharp edges facing outward and the retainer pin between the snap ring lugs. Be sure the snap ring is completely seated in the groove. (For 1-1/4" straight

keyed shaft model, replace shaft snap ring.)

8. Remount the body bearing assembly with the pilot and bearing facing down in a vice or other holding device.

9. Place the rotary valve (5) on the shaft spline with the "T" shaped slots on first.

10. Next, put the IGR inner member on the shaft spline with the semicircular roll pockets between the rotary valve rolls.

11. Place the contour member of the IGR over the inner and insert seven rolls into the inner pocket (large diameter rolls).

12. Lightly oil the square ring seal (8) and place in the body groove.

13. Place the check balls (6) over the two 1/8" diameter holes in the body. Be sure the check balls do not fall into the body tapped holes.

14. Place the locating ring section (4.5 inch diameter) of the IGR (14) onto the body with the check ball holes facing downward over the balls. Align the eight bolt holes in the locating ring with the eight holes in the body. The holes align in only one position.

    NOTE: Be sure not to dislodge the body square ring seal while moving the locating ring.

15. Install the eight locating ring rollers (small diameter rolls) into their pockets and oil lightly.

16. Place the other lightly oiled square ring seal (8) into the groove in the cover and place the cover over the shaft end and align the bolt holes.

17. If the motor had bolt washers, install the bolts with new washer, Part #1047.

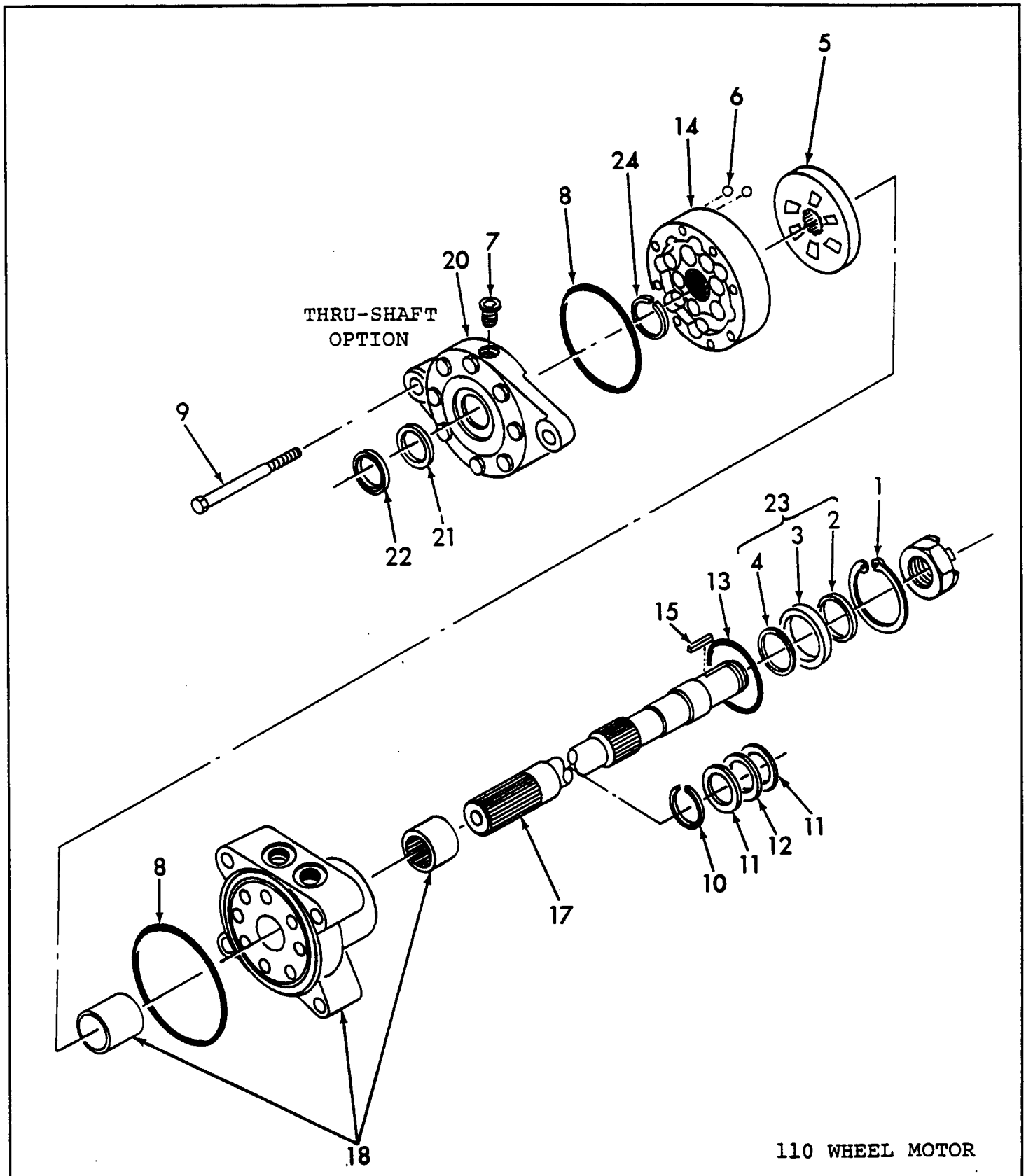
    A. Install the eight bolts with lightly oiled thread ends into the bolt holes. Tighten diagonally to 15 ft.lbs. Now, turn the shaft by hand through several revolutions.

    B. In a diagonal pattern, increase the torque of each bolt by 5 ft.lbs. Turn the shaft by hand through several revolutions.

    C. Repeat step B until the torque of each bolt has reached 27 ft.lbs.

PART V - INSTALLATION REQUIREMENTS

1. The motor may be mounted in any secure position.
2. If the system minimum downstream pressure exceeds 1000 PSI on a continuous basis, the external case drain (7) should be vented to tank.
3. The standard motor seals are suitable for use with petroleum base oils. Consult the factory for use with other fluids.
4. A minimum of 25 micro filtration with a B ratio of 2 is recommended.
5. for system pressure, please refer to catalog.
6. Shaft may not turn freely after assembly. A short running period may be required.
7. On tapered shafts, torque castle nut to 80-90 ft.lbs., then continue tightening nut until the cotter pin slot lines up with the shaft cross-hole.



110 WHEEL MOTOR
EXPLODED VIEW
114-5-HS-1

ESKRIDGE BRAKE

Installation Instructions

1. Attach the motor to the input end of the brake with appropriate sized bolts through the brake and into the motor flange to give approximately 1/2" thread engagement. Torque 1/2" bolts to 75 ft.-lbs.

2. Remove the plastic protective plug from the pressure port of the brake and attach a pressure line with 7/16-20 UNF-2B straight thread o-ring fitting.

3. Apply low pressure to the brake release port and bleed the air from the piston cavity through the bleeder port.

Disassembly Procedure

1. Remove motor from brake.

2. Loosen four cap screws (11). Alternately unscrew the cap screws 1/2 turn at a time until all the internal spring force is relieved. Remove the cover (2).

3. Remove thrust race (10) from the top of shaft (5).

4. Apply low air pressure (20-30 psi) to the brake release port while holding one hand on top of the piston (4) and springs (20). The air will force the piston out of the case (1).

5. Remove the shaft (5).

6. The friction disc (14), separator plates (15) and spacers (6) may now be removed from the case.

Alternate Disassembly Procedure

1. To replace the end cap bearing (9), or base gasket (8), alternately loosen cap screws (11) until all spring tension is off. It is not necessary to completely remove the cap screws or the cover. Invert the brake and remove the six end cap bolts (12). Remove the end cap (3). When reassembling, torque the #10-24 cap screw (12) to 60 in.-lbs.

Assembly Procedure

Assembly should be in order of disassembly with the following additional instructions.

1. Install the end cap bearing (9) and shaft (5).

2. The friction pack (spacer 6), friction disc (14), and

separator plate (15) must be installed in exactly the same order as it was removed. There must always be a stator (friction disc 14) on the top and bottom ends of the stack of plates. If a separator plate (15) is placed next to the piston (4) or spacer (6) the unit will overheat and seize up. Be careful not to contaminate the friction surfaces with dirt, grease or fluid media* other than what is specified for your particular brake.

3. Pour approximately 1 tablespoon of fluid media* over the friction plates or until the fluid level is even with top friction plate.

4. If replacing the piston o-rings (16, 17, 18, 19) be sure the two o-rings (18, 19) are nearest each other with the two backup rings (16, 17) to the outside of them. Gently slide the piston (4) until the large o-ring touches the case (1). Then press down firmly on the piston with the heel of both hands to squeeze the o-rings into the case and set the piston against the friction plates.

5. Insert the ten springs (20) into the piston (4).

6. Install the thrust race (10) on top of shaft 95).

7. Lay the cover gasket (7) on the case (1) and align the holes.

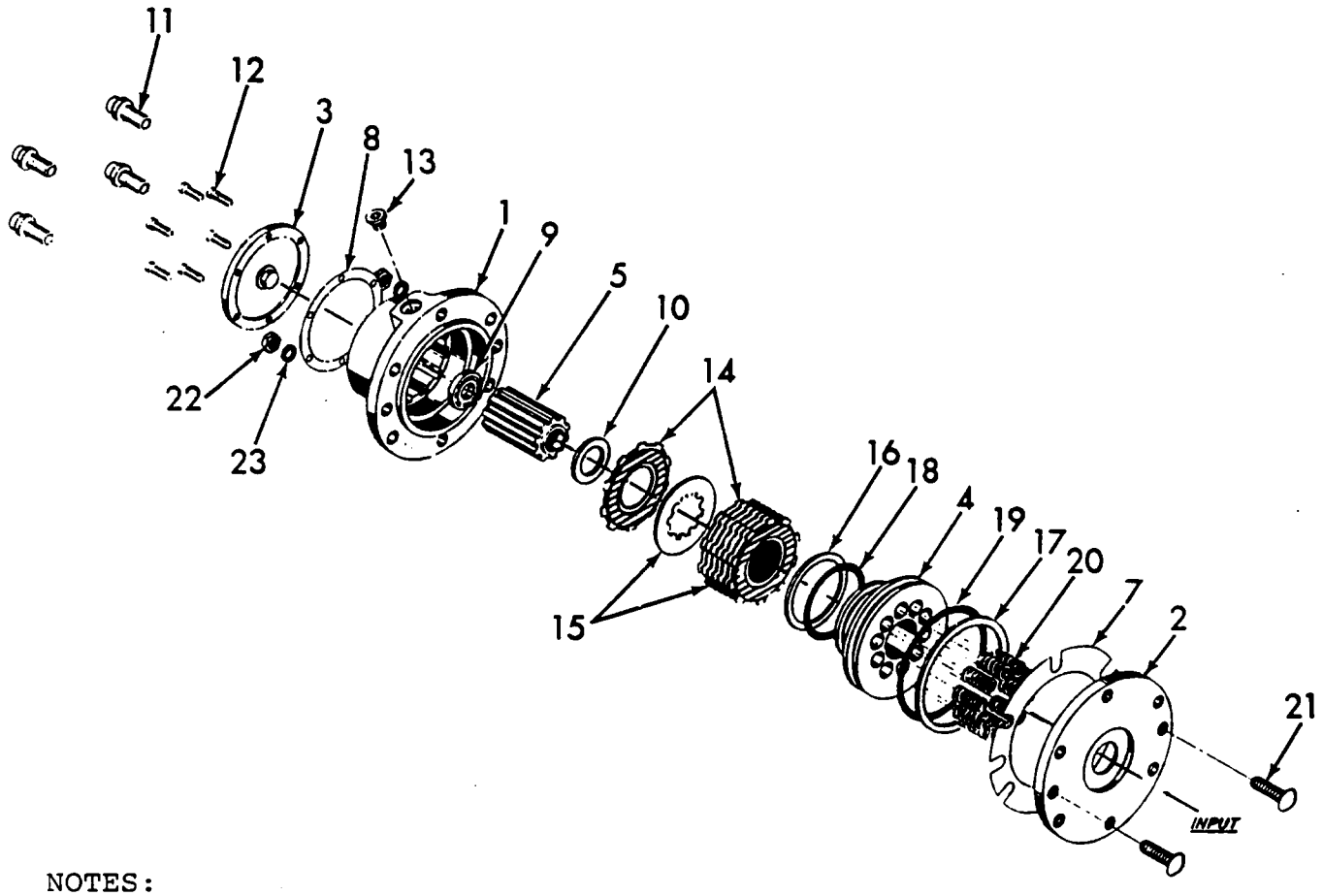
8. Set the cover (2) on top of piston springs (20) and align the holes. Start the four 12-point cap screws (11) through the case (1) and gasket (7) and into the cover (2) with your fingers. Alternately tighten the 12-point cap screws 1/2 turn at a time until cover is tight against the case. Torque cap screws (11) to 75 ft.-lbs.

* Unless otherwise specified, series 93 brakes use automatic transmission fluid (ATF-type F) as a fluid media. ATF-Dexron will give somewhat different torque characteristics. Some brakes are specifically designed to use hydraulic oil, gear lube or other fluid media.

NOTES:

1. Either bolt the motor to the brake or plug the input pilot in the cover before turning the upside down or the excess fluid media will run out.

2. Maximum operating pressure is 3,000 psi. Operation above this pressure is detrimental to the life of the brake and could be dangerous.



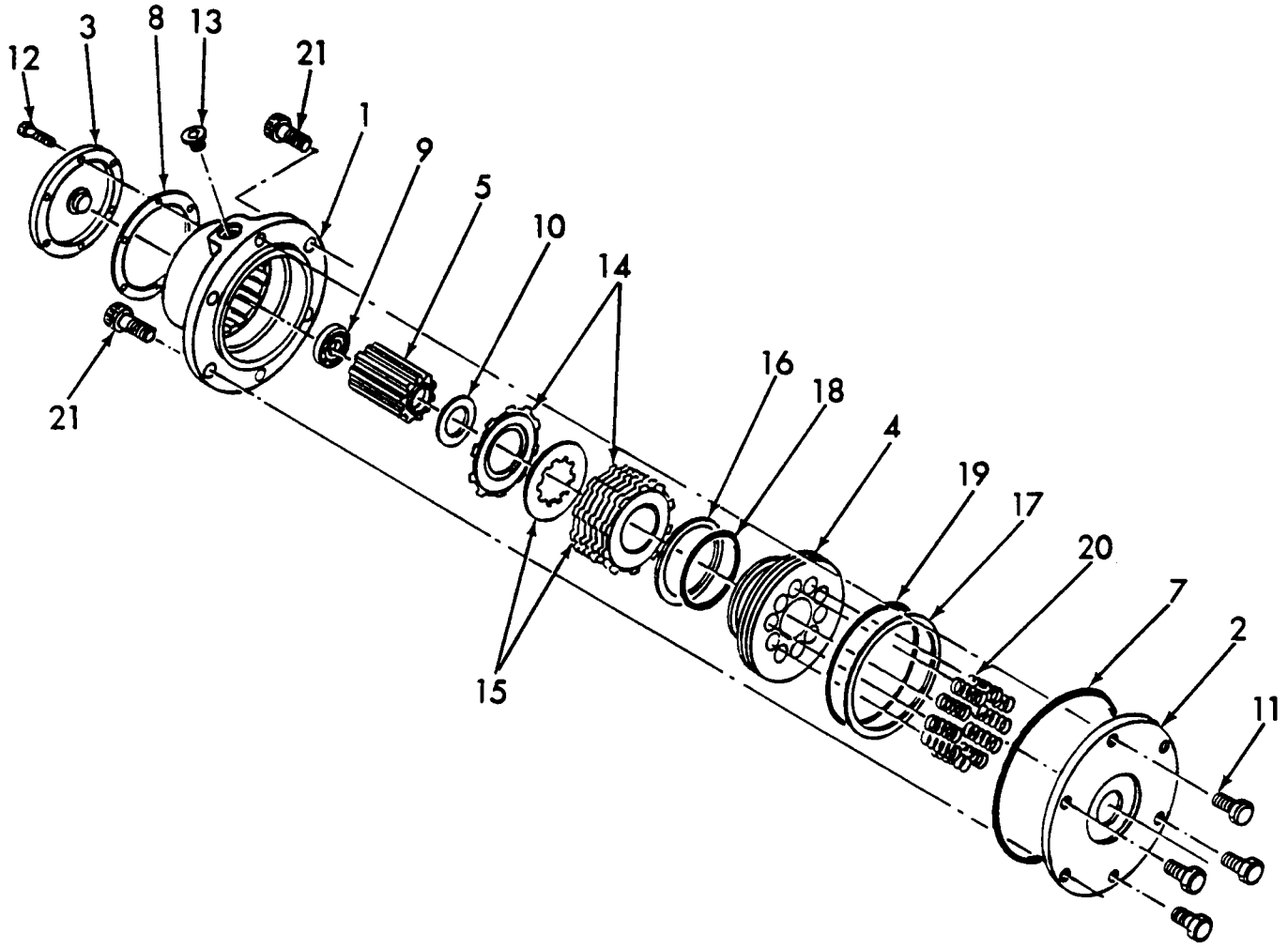
NOTES:

1. ON BRAKE M.I. P/N 81155, THIS ILLUSTRATION IS EFFECTIVE UNTIL W/BRAKE S/N 13341.
2. ON BRAKE M.I. P/N 81011, THIS ILLUSTRATION IS EFFECTIVE UNTIL W/BRAKE S/N 14412.

ITEM #	DESCRIPTION
1	CASE
2	COVER
3	END CAP
4	PISTON
5	SHAFT
7	COVER GASKET
8	BASE GASKET
9	BEARING

ITEM #	DESCRIPTION
10	THRUST RACE
11	12 POINT CAPSCREW
12	SOC. HD. CAPSCREW
13	HOLLOW HEX. PLUG
14	FRICTION DISC
15	SEPARATOR PLATE
16	BACK-UP RING
17	BACK-UP RING

ITEM #	DESCRIPTION
18	O-RING
19	O-RING
20	SPRING
21	CLAMPING BOLTS
22	HEX NUT
23	LOCKWASHER



NOTES:

1. ON BRAKE M.I. P/N 81155,THIS ILLUSTRATION IS EFFECTIVE W/BRAKE S/N 13341.

2. ON BRAKE M.I. P/N 81011,THIS ILLUSTRATION IS EFFECTIVE W/BRAKE S/N 14412.

ITEM #	DESCRIPTION	ITEM #	DESCRIPTION	ITEM #	DESCRIPTION
1	CASE	9	BEARING	15	SEPARATOR PLATE
2	COVER	10	THRUST RACE	16	BACK-UP RING
3	END CAP	11	BOLT	17	BACK-UP RING
4	PISTON	12	SOCKET HEAD CAP SCREW	18	O-RING
5	SHAFT			19	O-RING
7	O-RING	13	HOLLOW HEX PLUG	20	SPRING
8	BASE GASKET	14	FRICTION DISC	21	CLAMPING BOLTS

LESTRONIC II BATTERY CHARGER(S)

OPERATING INSTRUCTIONS

1. CONNECT POWER SUPPLY CORD TO PROPERLY GROUNDED OUTLET OF THE PROPER VOLTAGE AND FREQUENCY AS SPECIFIED ON THE CHARGER NAMEPLATE. CIRCUIT BREAKER OR FUSE PROTECTION IN THE AC LINE MUST BE ADEQUATE TO HANDLE THE INPUT POWER REQUIREMENTS. WHEN IT IS NECESSARY TO USE AN AC EXTENSION CORD TO THE CHARGER USE A THREE CONDUCTOR, 12 GAUGE CORD WITH GROUND AND KEEP AS SHORT AS POSSIBLE.

   IF DC OUTPUT CORD IS CONNECTED TO BATTERIES, CHARGER WILL AUTOMATICALLY TURN "ON" AFTER A SHORT DELAY.

2. CONNECT DC OUTPUT CORD TO BATTERIES (IF NOT ALREADY CONNECTED).

3. MONITOR AMMETER FOR CORRECT CHARGE RATE. NORMAL CHARGING AT THE FINISH CHARGE RATE FOR THE LAST 3 TO 5 HOURS IS IMPORTANT TO ACHIEVE EQUALIZATION OF ALL BATTERY CELLS EVERY TIME THE BATTERIES ARE CHARGED. NEW BATTERIES OR BATTERIES CHARGED IN COLD TEMPERATURES (BELOW 50 DEGREES F) WILL REQUIRE MORE TIME TO ACHIEVE FULL CHARGE.

4. CHARGER TURNS "OFF" AUTOMATICALLY WHEN BATTERIES ARE FULLY CHARGED.

CAUTION

DO NOT LEAVE CHARGER "ON" WHILE UNATTENDED FOR MORE THAN TWO CONSECUTIVE DAYS. SEVERE OVERCHARGING AND POSSIBLE DAMAGE TO BATTERIES WILL RESULT IF CHARGER SHOULD FAIL TO TURN "OFF".

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.