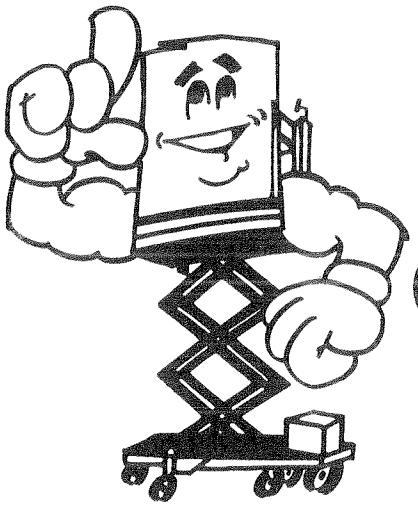
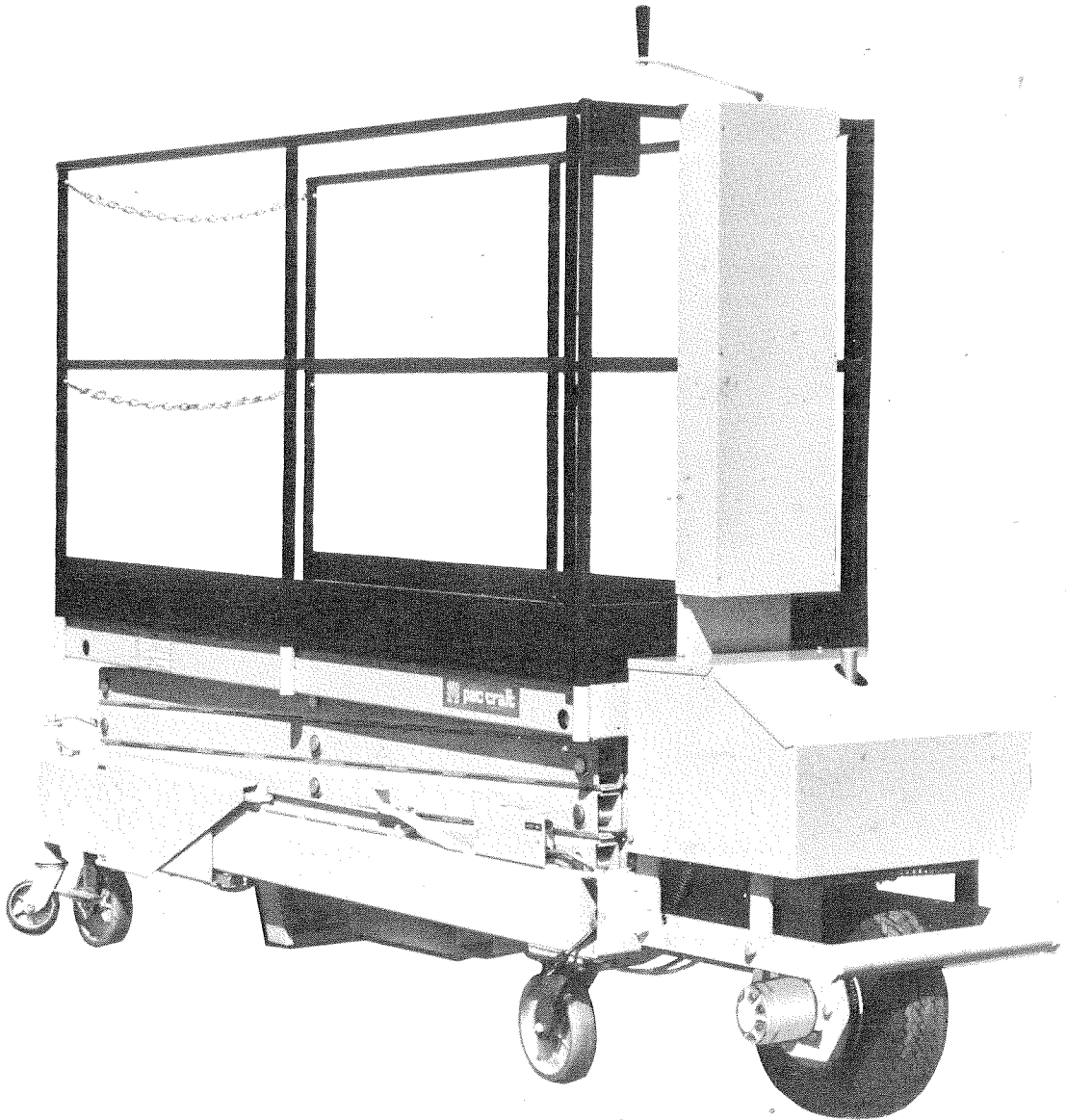
# HEFF-T-HERMAN



## Model 116BM, BSP, EM
## Model 125BM, BSP, EM

# Operating, Service and Maintenance Manual



PAC-CRAFT PRODUCTS, INC.
A SUBSIDIARY OF
MAYVILLE ENGINEERING COMPANY, INC.
715 SOUTH STREET, P.O. BOX 267
MAYVILLE, WISCONSIN 53050



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## WARRANTY

Pac-Craft, Inc., warrants its equipment against defects in workmanship and materials under normal use and service for ninety (90) days from date of purchase. Warranty is limited to replacement of equipment shipped prepaid to Pac-Craft, and which has been found, upon inspection by us, to be defective. Authorization must be obtained from Pac-Craft before shipping components to the factory for replacement or repair. Pac-Craft shall not be liable for damages arising out of failure of equipment, or for breakage or for work delays, and makes no warranty on accessories or auxiliary equipment, such items being subject to the warranty made by their manufacturers.

Use of other than factory authorized parts, misuse, or other modification of original unit voids all warranties and liabilities.

## OPERATOR QUALIFICATION

Heff-T-Herman is to be operated and maintained by qualified personnel only!

To qualify for operation and maintenance of this unit, an individual must read and thoroughly understand this manual. If a proposed operator or maintenance man fails to understand any segment of this manual, his Supervisor can clarify the misunderstanding through written correspondence or a phone call to:


Pac-Craft Products, Inc.
A Subsidiary of
Mayville Engineering Company, Inc.
715 South Street, P.O. Box 267
Mayville, Wisconsin 53050
414-387-4500

# HEFF-T-HERMAN Model 116/125

## DESCRIPTION

### GENERAL

HEFF-T-HERMAN, Model 116 and 125 series lift platforms are electrically actuated, hydraulic operated units. The Model 116/125BM are self-contained, battery operated lift mechanisms. The Model 116/125BSP is the basic model 116/125BM with a Self-Propelling unit attached. The Model 116/125EM is the same basic unit as the 116/125BM except that it requires an external 110 vac, 60 hz (cps) electrical power source.

## SPECIFICATIONS

| | Model 116 | Model 125 |
|---|---|---|
| Maximum Platform Height | 15 ft. (4.6m) | 19 ft. (5.8m) |
| Minimum Platform Height | 27.5 in. (70cm) | 31 in. (78.7cm) |
| Minimum Stowed Height w/Siderails | 70 in. (177.8cm) | 73 in. (186.7cm) |
| Platform Size | 27 x 81 in. (68.6 x 205.7cm) | 27 x 81 in. (68.6 x 205.7cm) |
| Load Capacity | 1000 lbs. (453.6 kgr) | 500 lbs. (226.8 kgr) |
| Wheel Base | 74.25 in. (188.6cm) | 74.25 in. (188.6cm) |
| Track | 23.25 in. (59.7cm) | 23.25 in. (59.7cm) |
| Ground Clearance | 4.25 in. (10.8cm) | 4.25 in. (10.8cm) |
| Railing Height | 42 in. (106.7cm) | 42 in. (106.7cm) |
| Hydraulic Pressure (Maximum) | 2000 PSI | 2000 PSI |
| Electrical Power: | | |
| Model 116BM & 125BM – 12 VDC | | |
| Model 116BSP & 125BSP – 12 VDC | | |
| Model 116EM & 125EM – 110 VAC | | |
| Overall Dimensions: | | |
| Length 116BM & 125BM | 86.5 in. (219.7cm) | |
| 116EM & 125EM | 86.5 in. (219.7cm) | |
| 116BSP & 125BSP | 109.0 in. (276.9cm) | |
| Width w/Outriggers Stowed | 30.75 in. (78.1cm) | |
| w/Outriggers Extended | 92.25 in. (234.3cm) | |

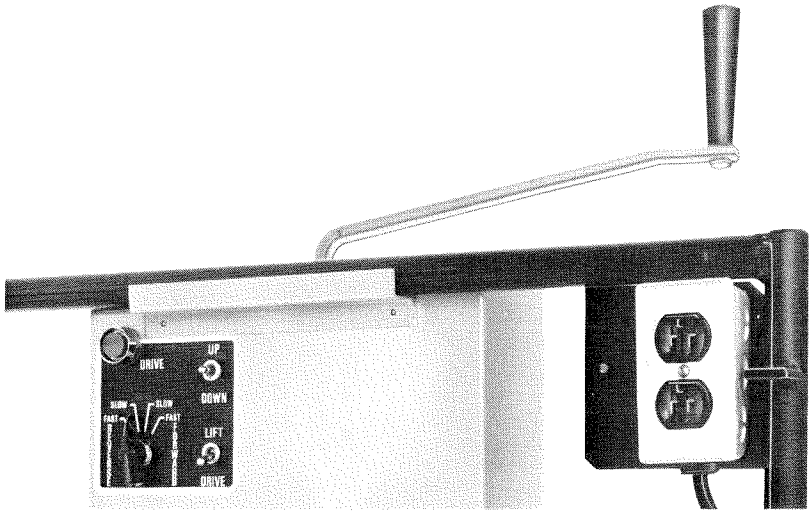
## OPERATION

### GENERAL

Operation of ol' Heff-T is pretty simple. But, we want you to do it right and we want you to do it safely! So, that's why we said, on page i, that only qualified operators should operate the unit. Now, first we're going to tell you about a few of the operational goodies we put in the different models.

All Heff-T-Hermans have foot operated friction brakes on the casters and it is a good practice to use them when you've positioned the unit at the worksite. (It's also a good idea to release them before you try to move the unit.)

All models have dual controls for operating the platform; one on the platform console and an UP-DOWN toggle switch on the lower control panel mounted on the right side of the main chassis. AND HERE'S A LITTLE SAFETY FEATURE ABOUT THE DUAL CONTROLS -- No matter how hard you press on the UP switch at either station, the platform is going to come down or stay down if the switch at the other control station is held to the DOWN position. That's a good thing to remember in case of a short in the UP circuit or if your pal is trying to keep you up in the air through the coffee break.

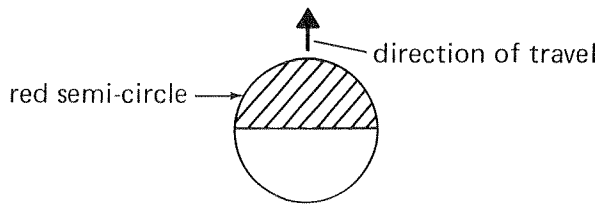



Another safety device called a velocity fuse (us shop guys call it a "slam valve") is installed in the hydraulic circuit to prevent the platform from dropping too fast in case of a ruptured hydraulic line or an improperly adjusted flow control valve. If Heff-T springs a leak and the platform starts to drop too fast, the slam valve activates and stops the hydraulic fluid from dumping out of the cylinder. The platform isn't going to drop any more; it's hydraulically locked wherever the slam valve activates.

The self-propelled models have a couple of other gadgets to operate. The platform console has an additional switch for LIFT or DRIVE. You select one or the other, but you can't get both modes at the same time. The LIFT mode operates the same as all other models. However, when you select DRIVE, you can move Heff-T forward, backward or around in pretty tight circles.

Two speeds are available in both forward or reverse when the platform is either down or not over seven feet up. When the platform is over seven feet up, the unit automatically switches into SLOW mode even if you have FAST selected.

Before you start driving the unit, look over the front railing and you will see a round shaft sticking up through the hood of the lower drive unit. The top of the shaft has a red semi-circle painted on it. The semi-circle indicates the direction the drive wheel is pointed as shown in the following figure.




## OPERATING INSTRUCTIONS

The following instructions must be complied with to ensure safe operating of the Heff-T-Herman. Detailed procedures for performing these steps are contained in this section or the MAINTENANCE section of this manual.

## OPERATING INSTRUCTIONS (continued)

- Before operation – Ensure that the unit is properly serviced. (Battery fully charged, hydraulic fluid at proper level, etc. Refer to Servicing Instructions.)
- Ensure that platform guard railings and safety chains are in place when anyone is on the platform.
- ALWAYS EXTEND AND LOCK OUTRIGGERS DURING OPERATION OF UNIT.
- DO NOT operate the unit on uneven terrain.
- DO NOT exceed the load capacity of the platform.
- ALWAYS check your clearances around the machine before maneuvering – especially before lowering the platform!!
- DO NOT operate unit while charging battery.

### Outrigger Extension

1. Position unit in work area.
2. Release latching device and swing outriggers to fully extended and locked position.
3. Rotate jack handle until outrigger wheel makes solid contact with surface.
4. Repeat on opposite outrigger.

### Outrigger Stowing

1. Turn wheel up to limit with jack handle.
2. Disengage outrigger latch and push outrigger beams to side of unit until latched closed.

### Platform Operation

1. Position unit in work area.
2. Extend outriggers.
3. Ensure that siderails are in position and safety chains are securely attached.

**WARNING!**

**Do not exceed the maximum lifting capacity of the HEFF-T-HERMAN platform.**

4a. Model 116/125BSP only – Set mode selector switch on control panel to LIFT.
4b. All models – Operate platform with control on platform console.

### Self-Propelled Drive Operation, Model 116BSP and 125BSP Only

1. Set mode selector switch on platform console to DRIVE.
2. Select drive direction (forward or reverse) and speed on drive selector switch.
3. Check direction indicator located on top of drive unit to ensure that drive wheel is pointing in desired direction of travel.
4. Grasp front railing with left hand. Depress drive button.
5. To stop, release drive button.

## TROUBLESHOOTING

We decided to help you troubleshoot by running you through the principles of operation by mode (you can follow it through on the schematics), then provide a Troubleshooting Table and then include electrical and hydraulic schematics. If you still can't find the problem, contact your dealer or the factory as stated on page i.

## PRINCIPLES OF OPERATION

### Model 116BM and 125BM:

UP Mode – Electrical power is applied from the battery through the fuse to the lower control panel terminal board. Power is then parallel routed to both UP-DOWN switches, through the UP contact (when actuated) and back to the terminal board. From there the UP signal is routed through the normally closed UP Limit Switch, through the terminal board to the motor solenoid. The solenoid actuates and connects battery power to the motor. The motor drives a hydraulic pump applying hydraulic pressure to the lifting cylinder. Releasing the UP switch de-activates the motor solenoid stopping the motor and hydraulic pump. If the UP switch is held after the platform up limit is reached, the UP Limit Switch will be mechanically actuated by the lower beam striking the switch plunger. This will open the switch, cutting the power to the motor solenoid thereby stopping the motor.

DOWN Mode – Electrical power is applied to the UP-DOWN switches the same as in the UP Mode. When actuated to DOWN, electrical power is applied through the terminal board to the hydraulic dump valve. The dump valve opens, releasing the hydraulic fluid from the cylinder back to the reservoir.

### Model 116BSP and 125BSP:

UP-DOWN Modes – The UP and DOWN modes operate the same as on the BM Models except that the LIFT-DRIVE Selector Switch is installed in the power circuit between the fuse and UP-DOWN switch. In addition, an UP solenoid and valve are utilized in the LIFT mode. When the LIFT mode is selected, power is applied to the UP-DOWN switches through the LIFT-DRIVE selector switch. Actuating either UP switch simultaneously actuates the motor start solenoid and the UP solenoid allowing hydraulic fluid to be pumped through the UP valve to the cylinder.

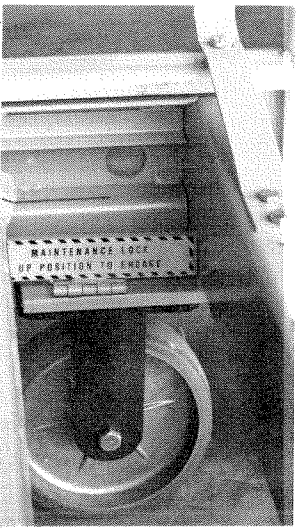
DRIVE Modes – Looks complicated, but it isn't when you know how we did it. FAST mode, in either direction, is attained by routing all the hydraulic output of the pump to the drive wheel hydraulic motor. When SLOW mode is selected, in either direction, an additional SLOW solenoid and valve is actuated which bypasses about 50% of the hydraulic pump output back to the reservoir, thereby cutting the hydraulic motor speed in half. A safety switch is also incorporated in the speed circuit to ensure that Heff-T only runs in slow speed when the platform is extended above seven feet. The switch is normally open when the platform is down or extended less than seven feet. When the platform is extended above seven feet, the switch closes, actuating the SLOW solenoid and valve regardless of speed selection. DO NOT DISABLE THIS SAFETY FEATURE!!

**WARNING**

**BEFORE ANY ATTEMPT IS MADE TO SERVICE MACHINE WHEN EXTENDED OR PARTIALLY EXTENDED, IT IS ABSOLUTELY NECESSARY TO ENGAGE THE MAINTENANCE LOCKS. (Procedure shown below:)**

1. **Raise platform as high as necessary to engage MAINTENANCE LOCKS.**
2. **Raise MAINTENANCE LOCKS located at the rear inside corners of the unit lower frame so that MAINTENANCE LOCKS are turned into the full lock position.**
3. **Lower platform until lower beams make contact with the MAINTENANCE LOCKS.**

**DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED MACHINE UNTIL THE ABOVE PROCEDURE IS FOLLOWED.**



**WARNING**

**DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED UNIT WITHOUT ENGAGING MAINTENANCE LOCKS!**

MODEL 116/125BM

| Problem | Possible Causes | Repair Procedure |
|---|---|---|
| No Up Motion (Pump not operating) | 1. Blown fuse. | 1. Check fuse and replace if necessary. |
| | 2. Dead battery. | 1. Check and charge battery as directed in MAINTENANCE section. |
| | 3. Defective UP limit switch. | 1. Check continuity. If defective, replace switch. |
| | 4. Electrical circuitry defective. | 1. Refer to Electrical Schematic. |
| No Up Motion (Pump operating) | 1. Hydraulic fluid level low. | 1. Add fluid (see MAINTENANCE section). |
| | 2. Solenoid dump valve on hydraulic pump stuck open. | 1. Flush valve as follows:<br>a. Depress DOWN switch at base of unit and hold.<br>b. Depress UP switch at platform console and hold.<br>NOTE – This allows oil to pass freely through system, flushing all components and allowing screen in reservoir to pick up foreign material.<br>2. Remove wire # 33 from terminal # 3.<br>a. If unit lifts properly, troubleshoot electrical short in wiring.<br>b. If unit still does not lift, replace solenoid dump valve. |
| | 3. Pump cavitation caused by:<br>a. Improper fluid for temperature conditions.<br>b. Fouled screen in reservoir. | 1. Drain reservoir and bleed system. Use only recommended type fluids. (See MAINTENANCE section.)<br><br>1. Drain reservoir, clean screen and bleed system. (See MAINTENANCE.) |
| Ascent speed slow or erratic | 1. Weak battery. | 1. Charge battery (see MAINTENANCE). |
| | 2. Loose connection in electrical circuitry. | 1. Perform visual inspection and ensure all connections are secure. |
| | 3. Momentary short in wiring. | 1. Refer to electrical schematic. |

**WARNING**

**DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED UNIT WITHOUT ENGAGING MAINTENANCE LOCKS!**

| Problem | Possible Causes | Repair Procedure |
|---|---|---|
| Ascent speed slow or erratic (cont) | 4. Foreign matter lodged in dump valve on pump. | 1. Flush valve as follows: Simultaneously --<br>a. Depress DOWN switch at base of unit and hold.<br>b. Depress UP switch at platform console and hold.<br>NOTE – This allows oil to pass freely through system, flushing all components.<br>2. If problem continues, replace dump valve. (See REPLACEMENT section.) |
| | 5. Bent structural members. | 1. Replace damaged members as necessary. Replacement of structural parts to be performed by factory authorized service personnel only. |
| | 6. Restriction in hydraulic lines. | 1. Replace defective hydraulic lines. |
| | 7. Defective or jammed seals in hydraulic cylinder. | 1. Repalce hydraulic cylinder. |
| | 8. Gear or gear cavity in pump worn or damaged. | 1. Remove motor/pump/tank assembly as a unit and return to factory for reconditioning. (See REPLACEMENT section.) |
| Descent speed slow | 1. Flow control valve out of adjustment. | 1. Adjust as shown in ADJUSTMENTS section. |
| | 2. Friction in structural members. | 1. Grease and check for damage. See MAINTENANCE section.<br>2. Replace damaged structural components as required. This is to be done by factory authorized personnel only. |
| | 3. Obstruction in hydraulic hose. | 1. Replace defective hydraulic hose. |
| | 4. Obstruction in dump valve. | 1. Flush system as described under "Ascent speed slow or erratic." |
| | 5. Misadjustment of dump valve. | 1. Follow procedure in ADJUSTMENTS section. |

**WARNING**

**DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED UNIT WITHOUT ENGAGING MAINTENANCE LOCKS!**

| Problem | Possible Causes | Repair Procedure |
|---|---|---|
| Unit will not Descend | 1. Down signal not applied to Dump Solenoid. | 1. Check fuse.<br>2. Check battery charge.<br>3. Check faulty wiring. Refer to wiring diagram. |
| | 2. Faulty Dump Solenoid. | 1. Replace Dump Solenoid. |
| | 3. Actuated Velocity Fuse (Slam Valve). | 1. Check for large hydraulic leak and repair as necessary. Reset Velocity Fuse. Refer to MAINTENANCE section.<br>2. Check that unit is serviced with proper hydraulic fluid. Replace if necessary. Reset Velocity Fuse. Refer to MAINTENANCE section.<br>3. Check Flow Control Valve. Adjust or replace as required. Reset Velocity Fuse. Refer to MAINTENANCE section. |
| | 4. Misadjusted Dump Valve. | 1. Adjust Dump Valve. Refer to MAINTENANCE section. |
| Unit Creeps Down | 1. Dirt lodged in dump valve. | 1. Flush system as described under "Ascent speed slow or erratic." |
| | 2. Damaged seal on hydraulic cylinder piston. | 1. Replace hydraulic cylinder. Refer to MAINTENANCE section. |
| | 3. Misadjusted Flow Control Valve. | 1. Adjust Flow Control Valve. Refer to MAINTENANCE section. |
| | 4. Misadjustment of Dump Valve. | 1. Adjust dump valve. Refer to MAINTENANCE section. |
| | | |

## Model 116BSP & 125BSP

For problems associated with the LIFT functions, refer to the Model 116/125BM Troubleshooting Table. Use the Model 116/125BSP wiring diagrams because the BSP models have two additional components that could fail in the LIFT mode. One is the LIFT-DRIVE Selector Switch, which is added between the fuse and UP-DOWN switch. The other component is the Up Solenoid and Valve, which is added between the hydraulic pump and the hydraulic cylinder.

### NOTE

The following table assumes that the LIFT mode is operating properly and there are no external hydraulic leaks.

**WARNING**

**DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED UNIT WITHOUT ENGAGING MAINTENANCE LOCKS!**

MODEL 116/125BSP

| Problem | Possible Causes | Repair Procedure |
|---|---|---|
| DRIVE function inoperative (Hydraulic Pump not operating) | 1. Defective LIFT-DRIVE switch. | 1. Check continuity. Replace defective switch. |
| | 2. Defective DRIVE-GO pushbutton switch. | 1. Check for continuity when actuated. Replace defective switch. |
| | 3. Faulty electrical wiring between fuse and Start Solenoid. | 1. Refer to electrical wiring diagram. |
| DRIVE function inoperative in either direction (Hydraulic Pump operating) | 1. Broken drive chain in lower drive unit. | 1. Repair or replace defective chain. |
| | 2. Defective Drive Selector Switch. | 1. Replace defective switch. |
| | 3. Faulty electrical wiring between Drive Selector Switch and Forward & Reverse Solenoid. | 1. Refer to electrical wiring diagram. |
| | 4. Defective Forward & Reverse solenoids or hydraulic valves. | 1. Replace defective components. |
| | 5. Defective Hydraulic Drive Motor in lower drive unit. | 1. Replace defective drive motor. |

**WARNING**

DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED UNIT WITHOUT ENGAGING MAINTENANCE LOCKS!

| Problem | Possible Causes | Repair Procedure |
|---|---|---|
| No motion in one DRIVE direction only | 1. Defective solenoid or hydraulic valve in faulty mode (forward/reverse). | 1. Replace defective component. |
| | 2. Faulty electrical wiring or Drive Selector Switch. | 1. Refer to electrical wiring diagram.<br>2. Replace defective switch. |
| Machine runs in fast speed when platform is extended above 7 ft. | 1. Misadjusted or defective Speed Limit Switch | 1. Adjust or replace defective switch. |
| | 2. Faulty electrical wiring | 1. Refer to electrical wiring diagram. |
| Machine runs in fast speed when SLOW is selected | 1. Defective Slow Solenoid or valve. | 1. Replace defective solenoid or valve. |
| | 2. Faulty electrical wiring or Drive Selector Switch | 1. Refer to electrical wiring diagram.<br>2. Replace defective switch. |
| Steering system inoperative. | 1. Loose mechanical connection between steering column & hydraulic motor in upper unit. | 1. Tighten connection. |
| | 2. Fluid low. | 1. Fill with hydraulic fluid conforming to Mil Spec MIL-0-5606 or equivalent. |
| | 3. System air locked. | 1. Rotate steering handle clockwise until drive wheel is 90° to the right. Make 2-3 more revolutions with handle. If system does not operate properly, replace check valve or hydraulic steering motor. |
| | 4. Faulty check valve beneath filler bottle. | 1. Replace check valve. |
| | | |

# MAINTENANCE

## Use of NOTES, CAUTIONS and WARNINGS

NOTE – Additional information to further understand instructions.

CAUTION – Denotes that failure to comply with instructions could cause damage to the equipment.

WARNING – Denotes that failure to comply with instructions would create a hazardous condition that could result in injury to personnel.

**WARNING!**

**Maintenance on the Heff-T-Herman series is relatively simple with a minimum of servicing required. However, with any scissors type lifting device, a hazard to personnel exists when maintenance is performed by working through the lifting beams with the unit raised.**

**Maintenance Locks are built into the unit to mechanically lock the mechanism in the raised position. However, all servicing and maintenance that can be performed through the floorboard with the unit lowered should be standard practice to eliminate undue hazard to personnel.**

This section contains three basic maintenance functions; Servicing, Replacement and Adjustments.

"SERVICING" describes items to be checked and serviced when necessary, on a daily basis or prior to using the unit after it has been out of service for a period of time.

"REPLACEMENT" describes the proper method for removal and installation of replaceable components in case of failure.

"ADJUSTMENT" describes any adjustments necessary to ensure proper operation of the unit or adjustments required after the replacement of components, if necessary.

## SERVICING

### Battery Servicing

WARNING!

NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY WHILE SERVICING BATTERY OR OTHER COMPONENTS. PROVIDE PLENTY OF VENTILATION. PRESENCE OF HYDROGEN FUMES COULD LEAD TO EXPLOSION!

Battery Servicing (continued)

Your Heff-T-Herman, 116/125BM or BSP, is supplied with a heavy duty truck-type battery. The care and maintenance of your battery has much to do with how well your Heff-T-Herman functions. Battery wiring and water level should be checked daily. After using Heff-T-Herman continuously for a period of time, it is recommended that the batteries be brought to a full charge as soon as possible. If the batteries are allowed to remain discharged, the lead plates will harden and become sulfated. This will shorten their life as much as over-charging. In this sulfated condition, the battery fails to deliver its rated capacity or come up to full charge. Several long, slow charges and fast discharges are then necessary to correct the sulfation and hardened plates. It is recommended that once a month, the battery be given an equalizing charge of 25% over the regular charge. The equalizing charge must always be given a low rate to eliminate excessive gassing. Whenever battery temperature reaches 125° F, the charging rate should be reduced or the battery taken off charge and allowed to cool to room temperature.

Do not overfill. When the cells are filled too full, the battery fluid will expand as it becomes warm from charging, causing fluid to seep out. Each time this happens, the solution weakens by adding water. Loss of ampere hour capacity will result.

CAUTION: NEVER ADD ACID TO BATTERY. The solution is at its proper strength when the battery is manufactured. Use distilled water and keep fluid up to proper level. When required, water should be added to battery after charging, unless water level is below the plates.

Battery Care – (Every 10 hours of use or when recharging)

1. Completely lower platform.
2. Remove front floorboard.
3. Remove battery caps and check fluid level.
4. Fill each cell (if needed) to split ring with distilled water.
5. Reinstall caps.
6. Wash all dirt, debris, acid, etc., off battery whenever corrosion is detected. Use solution of 5 tsp. soda per quart of warm water.
7. Coat terminals with petroleum jelly or other commercially available coating.

Battery Charging – (On units with optional built-in charger)

1. Completely lower platform.
2. Remove front floorboard.
3. Remove battery caps and fill, if necessary.
4. Plug charger in to 110 vac, 60 hz power source.
5. Allow to charge until meter on charger indicates zero (0).
6. Remove plug, reinstall caps.

Battery Charging – (On units without built-in charger)

1. Completely lower platform.
2. Remove front floorboard.
3. Remove battery caps and fill, if required.

CAUTION: Ensure charger is turned off before performing following:

4. Connect negative battery charger cable to negative (-) post on battery.
5. Connect positive battery charger cable to positive (+) post on battery.

**Battery Charging (continued)**

6. Follow battery charger manufacturer's instructions for charging a 12 VDC battery.
7. After charging, turn off battery charger, remove battery charger cables and reinstall battery caps.

**Hydraulic Reservoir Servicing** – (Every 40 hours of useage)

1. Completely lower platform.
2. Remove front floorboard.
3. Unscrew filler plug/dipstick located on forward top of hydraulic reservoir.
4. Check that level is up to 1" from top of reservoir.
5. Fill with mineral base hydraulic fluid conforming to Mil Spec MIL-0-5606 or equivalent.
6. Replace filler plug in reservoir.

**Hydraulic Reservoir Screen -- To Clean**

1. Remove pump (See REPLACEMENT section).
2. Remove reservoir.
3. Remove screen and clean.
4. Reassemble in reverse order.
5. Refill with recommended type fluid.

**Hydraulic System Bleeding**

The Heff-T-Herman hydraulic system is self-bleeding. After the system has been drained, such as during the replacement of a hydraulic system component, simply perform the Hydraulic Reservoir Servicing procedure. Actuate the platform full up and down for six cycles and recheck the reservoir fluid level between each cycle.

**Lubrication** – (Every 40 hours or monthly, whichever comes first):

Lubricate all pivot points with EP-90 oil or equivalent.

Grease fittings in following areas:

1. Lift arm pivot tube.
2. Cylinder rod at connecting point to lift arm.
3. All caster wheels and caster swivel plates.

## REPLACEMENT

**Battery**

1. Completely lower unit.
2. Remove front floorboard.
3. Remove both battery cables.
4. Remove both nuts from battery holddown board and remove board.
5. Raise battery lifting handles and lift battery straight up to remove. This is a two-man operation.

**Hydraulic Pump and Motor Assembly** – Model 116/125BM, 116/125BSP

**WARNING!**

**This procedure requires the platform to be raised to gain access to the unit through the opened lifting beams. Serious injury or death could result if the Maintenance Locks are not properly engaged before performing this procedure. NEVER work through the beams or place yourself under the raised platform during maintenance without the Maintenance Locks properly engaged.**

## Hydraulic Pump and Motor Assembly (continued)

1. Raise platform.
2. Raise Maintenance Locks, located at the rear inside corners of the unit lower frame, so that locks are turned into the full lock position.
3. Lower platform until lower beams make contact with the Maintenance Locks.
4. Remove positive (+) battery cable from battery.
5. Tag and remove wires and positive (+) battery cable from hydraulic pump and motor assembly.
6. Loosen low pressure return line hose clamp at hydraulic pump end and disconnect hose from nipple.

6a. BSP Models only – Loosen low pressure return line hose clamp on left side of hydraulic reservoir and disconnect hose from nipple.

**NOTE**

In the following step, the high pressure hydraulic line may still be under pressure and fluid will squirt out when line is disconnected. Use of a drip pan under unit is recommended. Do not reuse fluid, as it may become contaminated.

7. Disconnect high pressure hose from hydraulic pump.
8. Remove two bolts securing hydraulic pump to saddle mount from underside of saddle.
9. Remove two nuts, bolts and flatwashers securing hydraulic reservoir to saddle mount at battery end of reservoir.
10. Rotate hydraulic pump and reservoir assembly 90° and slide aft and down under unit to remove
11. Install new or repaired hydraulic pump and reservoir assembly in reverse order.
12. Fill hydraulic reservoir until fluid is approximately one inch (1") from top (use hydraulic fluid conforming to Mil Spec MIL-0-5606 or equivalent).
13. Raise platform, disengage Maintenance Locks and completely lower platform.
14. Perform hydraulic reservoir servicing procedure.
15. Cycle six times to purge air from hydraulic system (see Hydraulic System Bleeding).

## Hydraulic Pump and Motor Assembly - Model 116/125EM

**WARNING!**

**This procedure requires the platform to be raised to gain access to the unit through the opened lifting beams. Serious injury or death could result if the Maintenance Locks are not properly engaged before performing this procedure. NEVER work through the beams or place yourself under the raised platform during maintenance without the Maintenance Locks properly engaged.**

1. Raise platform.
2. Engage Maintenance Locks.
3. Lower platform until lower beams make contact with the Maintenance Locks.
4. Disconnect 110 vac, 60 hz electrical power from unit.
5. Remove motor mounted electrical junction box cover and disconnect electrical splices.
6. Loosen clamp securing BX wiring to motor junction box and remove BX.
7. Disconnect low pressure hose and high pressure line from pump.
8. Remove four (4) nuts and bolts securing hydraulic pump and motor assembly to saddle mount.
9. Remove hydraulic pump and motor assembly from unit.
10. Install new or repaired assembly in reverse order.
11. Raise platform, disengage Maintenance Locks and completely lower platform.
12. Perform hydraulic reservoir servicing procedure.
13. Bleed air from system as shown in Hydraulic System Bleeding.

## Hydraulic Cylinder

**WARNING!**

**This procedure requires the platform to be raised to gain access to the unit through the opened lifting beams. Serious injury or death could result if the Maintenance Locks are not properly engaged before performing this procedure. NEVER work through the beams or place yourself under the raised platform during maintenance without the Maintenance Locks properly engaged.**

1. Raise platform.
2. Engage Maintenance Locks.
3. Lower platform until lower beams make contact with the Maintenance Locks.
4. Remove positive (+) battery cable from battery or disconnect 110 vac from EM unit.
5. Loosen low pressure return line hose clamp at top end of cylinder and disconnect hose.
6. Disconnect high pressure hose from flow control valve beneath cylinder.
7. Remove cotter pin and retaining pin from piston/frame attach point.
8. Support hydraulic cylinder, remove retaining pin from lower beam/cylinder attach point and remove hydraulic cylinder.
9. Install new or repaired hydraulic cylinder in reverse order.
10. Raise platform, disengage Maintenance Locks and completely lower platform.
11. Perform Hydraulic Reservoir Servicing procedure.
12. Bleed air from system as shown in Hydraulic System Bleeding.

## Up-Limit Switch

**WARNING!**

**This procedure requires the platform to be raised to gain access to the unit through the opened lifting beams. Serious injury or death could result if the Maintenance Locks are not properly engaged before performing this procedure. NEVER work through the beams or place yourself under the raised platform during maintenance without the Maintenance Locks properly engaged.**

1. Raise platform.
2. Engage Maintenance Locks.
3. Lower platform until lower beams make contact with the Maintenance Locks.
4. Remove positive (+) battery cable from battery or disconnect 110 vac from EM unit.
5. Remove two bolts, lockwashers and flatwashers securing up-limit switch to mounting bracket.
6. Open cover on switch and disconnect wires, marking them for correct reassembly.
7. Connect wires to new switch and install in reverse order.
8. Perform Up Limit Switch Adjustment procedure in ADJUSTMENTS section.

## DISASSEMBLY OF STRUCTURAL COMPONENTS

Description of uncommon terminology - -

1. BEAM SECTION - Two outer beams and an inner beam assembly which pivot on a common center pivot pin.

2. BEAM NUMBERS - As used in these procedures, indicates sections of beams progressing from the bottom of the machine to the top.

EXAMPLE: No. 1 beams would be the bottom beam section.

No. 2 beams would be the second beam section from the bottom, etc.

**Model 116/125 BM and 116/125 EM Disassembly** – (Referenced Figure and Item Numbers are located in Parts Catalog section)

**WARNING!**

**Read carefully and follow instructions. Disassembly in any manner or procedure other than described in the following instructions could result in serious injury to personnel involved.**

NOTE

In this procedure, the platform entrance is to be considered the front of the machine.

1. Position machine in a work area free of obstructions, and engage the caster locks to prevent movement of machine while disassembling.

2. Lower platform to full down position and disconnect battery terminals or power source.

3. Disconnect control wires # 4, # 7 and # 8 at terminal board.

4. Remove wires by pulling them upwards through linkage assembly.

5. Remove side railings from platform.

6. Remove front railing and panel assembly.

7. Remove snap rings and front pivot pin from front of platform assembly.

8. Lift front of platform and turn 45 degrees to disengage rollers at rear of platform and remove platform.

8a. Model 125 Only – Remove snap rings from top three pivot bars.
8b. Model 125 Only – Remove # 4 outer beams. (Fig. 2, Items 13)
8c. Model 125 Only – Remove top three pivot bars.
8d. Model 125 Only – Remove # 4 inner beam. (Fig. 2, Item 26)

9. Remove snap rings from top three pivot bars.

10. Remove # 3 outer beams. (Fig. 1, Items 14 and 26)

11. Remove top three pivot bars.

12. Remove # 3 inner beam assembly. (Fig. 1, Item 13)

NOTE

At this point, it is necessary to extend remainder of beam sections slightly to enable further disassembly.

13. Attach a chain of sufficient strength (lifting weight approximately 1200 lbs.) from a chain fall or hoist to center pivot bar on # 2 beam assembly for the purpose of extending beam sections to gain access to remainder of pivot bars.

14. Elevate beam assemblies only high enough to insert a stout wooden 4 x 4 between the frame assembly and center portion of the # 1 set of beam assemblies. (Fig. 1, Items 29 and 30)

15. Lower the beam assemblies with the chain fall or lifting mechanism until beam is setting firmly on the 4 x 4.

16. Remove the chain and attach it to the free end of the # 2 inner beam assembly. (Fig. 1, Item 28)

17. At this point, elevate the beams only far enough to relieve strain which may exist on pivot bars and remove the snap rings from all remaining pivot bars.

18. Remove the outer # 2 beams (Fig. 1, Item 15) from the pivot bars.

19. Being careful to support the weight, remove pivot bar from the front end of # 2 inner beam. (Fig. 1, Item 28)

20. Gently lift and remove # 2 inner beam.

**NOTE**

At this point it is necessary to remove the lift cylinder assembly.

21. Remove hydraulic cylinder assembly hose at valve body.

22. Raise and support lift arm to gain access to cylinder rod-end attaching pin.

**CAUTION:** Cylinder weight is approximately 70 lbs.

23. Support cylinder firmly from the under side and remove rod-end attaching pin.

24. Remove lower cylinder attaching pin and gently remove cylinder assembly from under side of machine.

**CAUTION:** Lift arm assembly weight is approximately 55 lbs.

25. Remove center pivot bar from # 1 set of beams being careful to support weight of lift arm assembly while doing so.

26. Remove # 1 inner section of beam (Fig. 1, Item 30) by removal of snap rings and short attaching pins at front of machine frame.

27. Removal of # 1 outer beam assembly (Fig. 1, Item 29) is accomplished by elevating free end of beam assembly to the vertical position and turning it to free rollers from track assembly inside of frame members.

**Model 116/125 BM and 116/125 EM Assembly**

1. Assembly is in reverse order of disassembly.

**Model 116/125 BSP Disassembly** – (Referenced Figure and Item Numbers are located in the Parts Catalog section)

**WARNING!**

**Read carefully and follow instructions. Disassembly in any manner or procedure other than described in the following instructions could result in serious injury to personnel involved.**

NOTE

In this procedure, the drive unit end is considered the front of the machine.

1. Position machine in a work area free of obstructions and engage the caster locks to prevent movement of machine while disassembling.
2. Lower platform to full down position and disconnect battery terminals or power source.
3. Remove covers from drive unit at front of machine and access covers to platform control station.
4. Remove and drain hoses connected to steering motor on drive wheel assembly.
5. Remove steering hoses by pulling them upwards through linkage.
6. Disconnect control wires #4, #50, #51, #52, #35, #36, #37 and #8 at terminal board.
7. Continue at Step 4 of **Model 116/125 BM and 116/125 EM Disassembly** procedure.

## ADJUSTMENTS

### Up Limit Switch

1. Raise unit to specified height.
   15 ft. to top of platform board on model 116
   19 ft. to top of platform board on model 125
2. Set limit switch to actuate against lower beam at this height. Note – full stroke of cylinder is not used in lifting platform to ensure a more efficient hydraulic system.

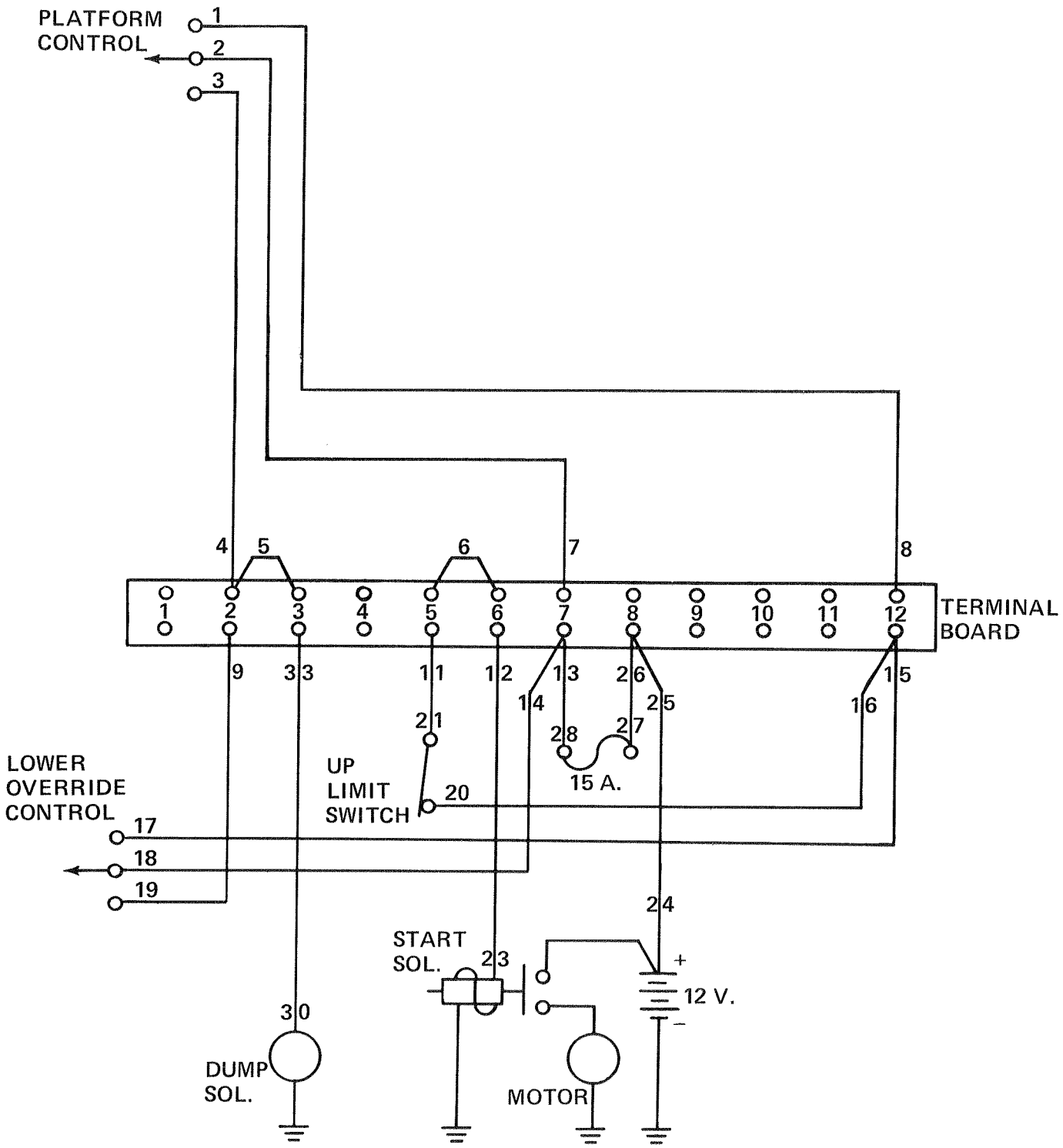
### Dump Valve Model 116/125BM and 116/125EM only

1. Raise platform and engage maintenance locks.
2. Lower platform until lower beams make contact with the Maintenance Locks.
3. Remove cover plate from solenoid.
4. Grasp plunger assembly with open end wrench and hold firmly.
5. Turn adjusting screw and set gap between solenoid plunger and valve plunger at 1/32".
6. Replace cover plate, disengage Maintenance Locks and resume operation.

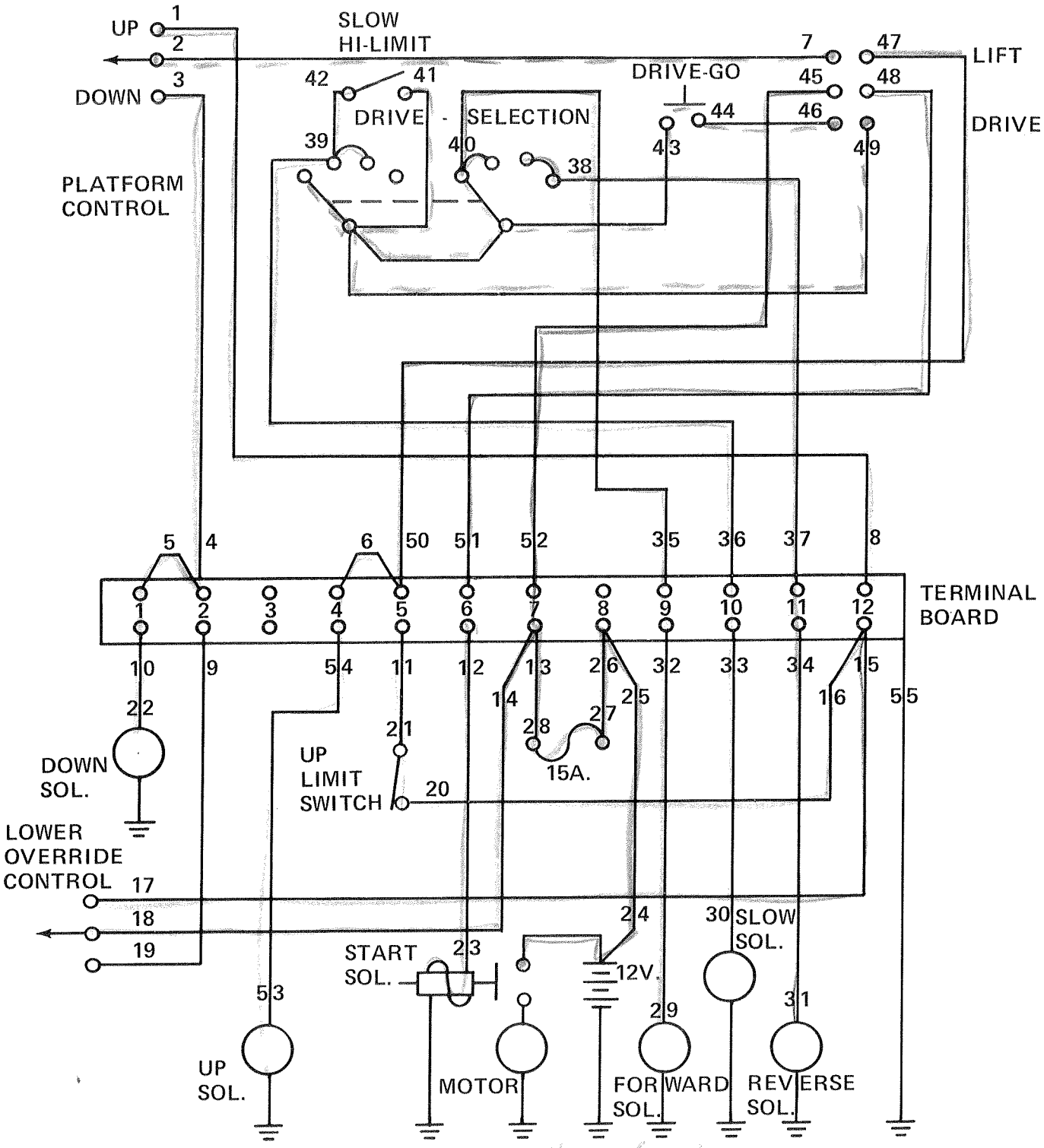
### Flow Control Valve

1. Raise unit to fully extended position.
2. Depress DOWN switch and open or close flow control valve, as necessary, to adjust descent speed of platform to about 6" per second.

HEFF-T-HERMAN MODEL 116/125BM

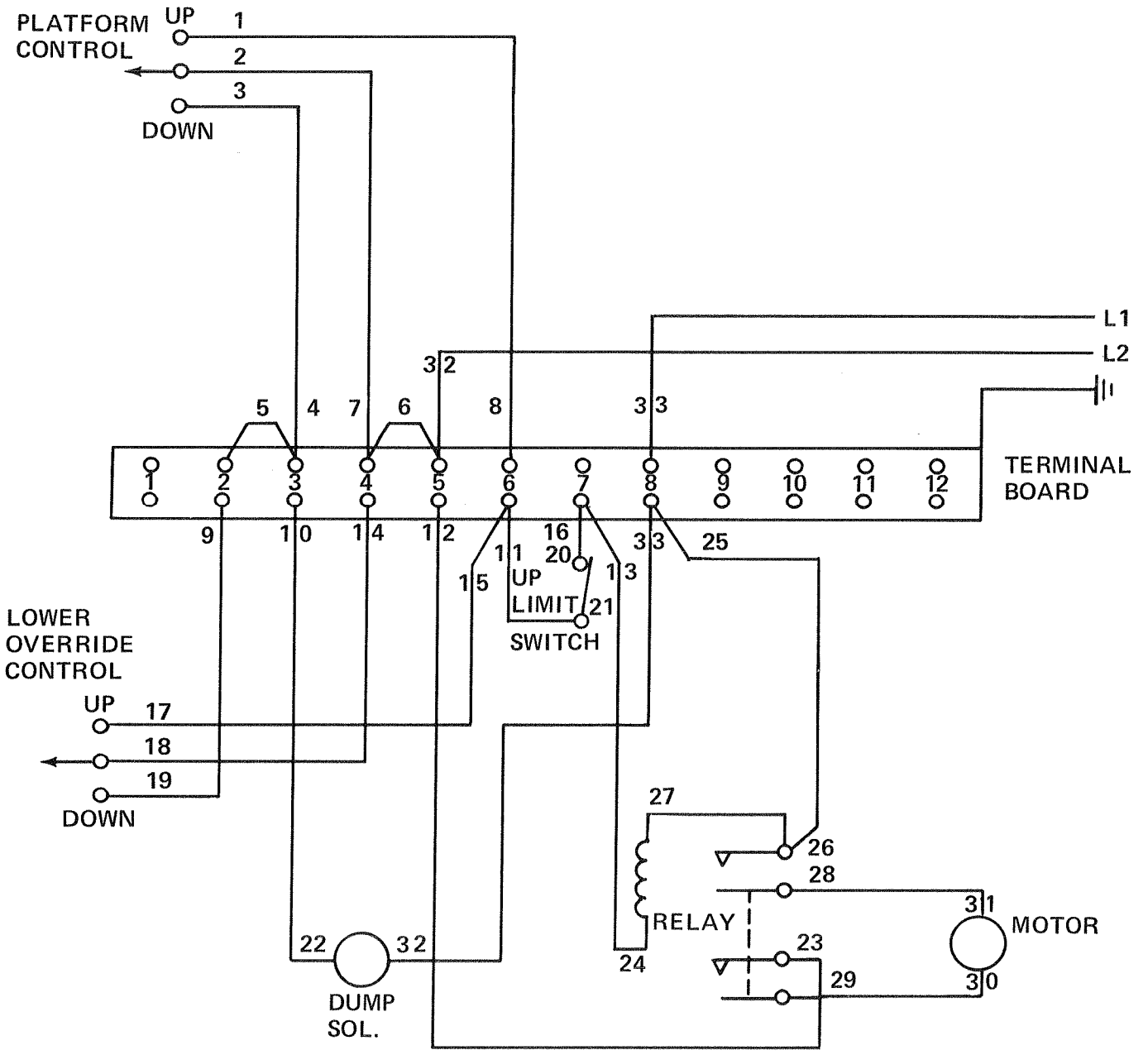


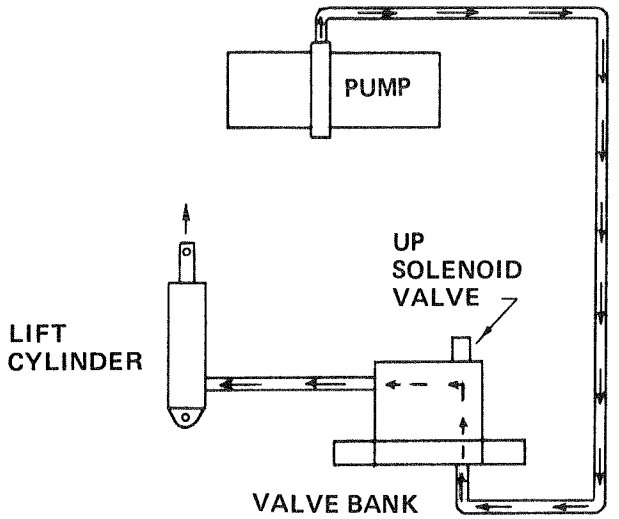
HEFF-T-HERMAN MODEL 116/125BSP



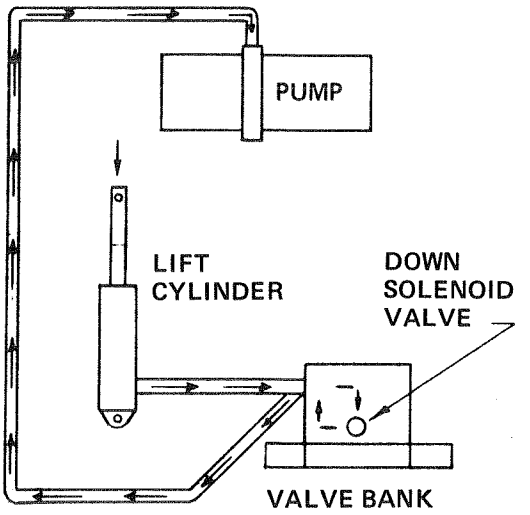

Primary circuits (wt)
Intermediate circuits
Secondary circuits

HEFF-T-HERMAN MODEL 116 & 125 EM

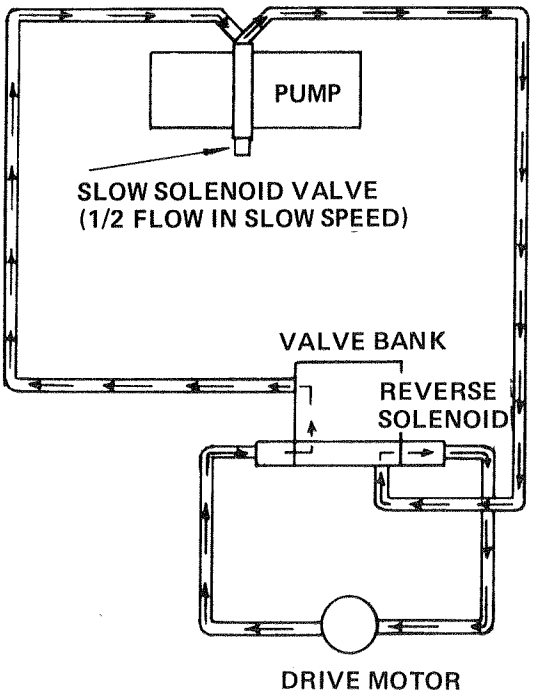




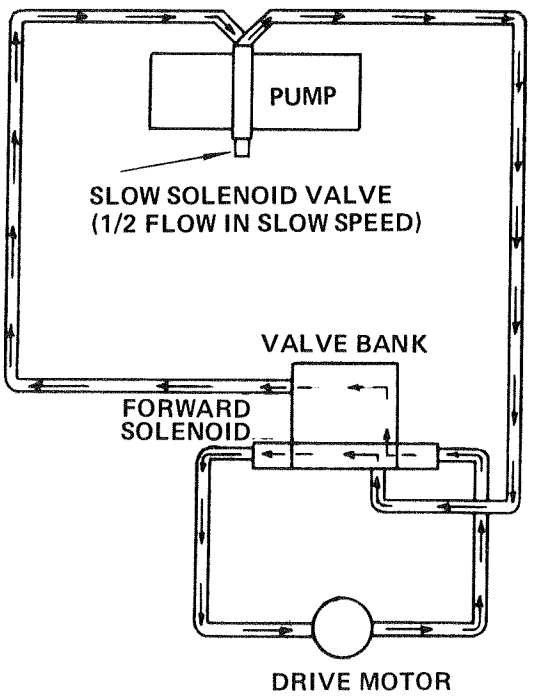

UP MODE




DOWN MODE




REVERSE MODE




REVERSE MODE

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## PARTS CATALOG

### PARTS ORDERING PROCEDURE

1. All parts should be ordered from Pac-Craft Products, Inc., a subsidiary of Mayville Engineering Company, Inc., 715 South Street, P.O. Box 267, Mayville, Wisconsin 53050.

2. All orders should be accompanied by a Purchase Order.

3. Always furnish part number from service manual or give complete description of parts desired, if part numbers are not available.

4. Provide Model and Serial Number of unit when ordering parts.

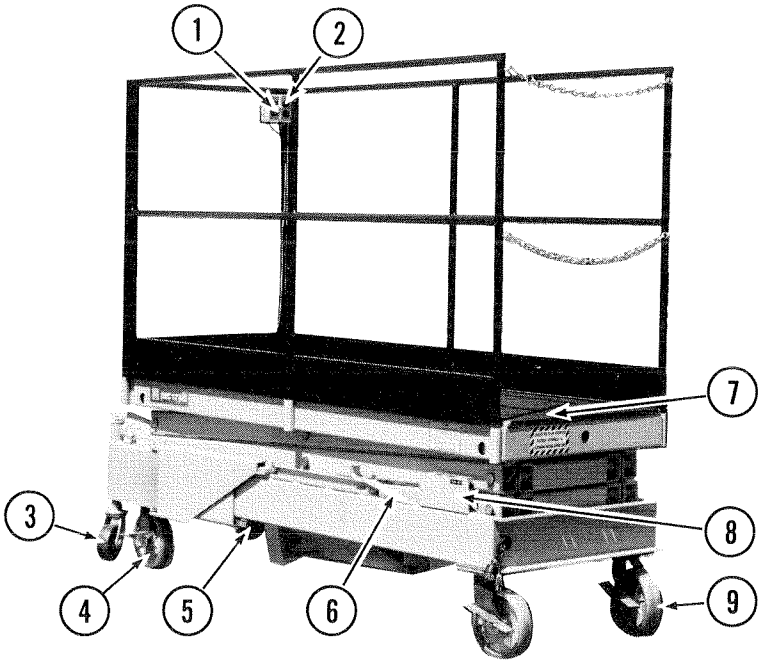
5. All parts will be shipped F.O.B. Mayville, Wisconsin

### RETURNING PARTS UNDER WARRANTY

1. Written authorization must be obtained from Pac-Craft Products Service Department before returning parts under warranty.

2. All defective parts returned to Pac-Craft must be shipped to Pac-Craft Products, Inc. PREPAID.

3. Any parts returned should be accompanied by unit Model and Serial number from which the part was taken.



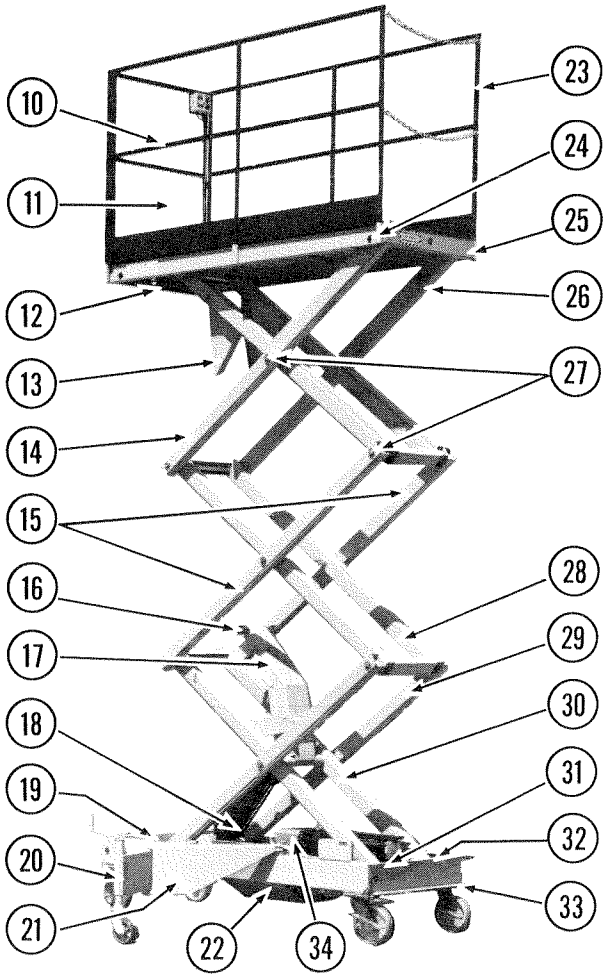




Figure 1. Model 116 BM/EM

**Figure 1**

| No. | Description | 116BM | 116EM | Qty. |
|---|---|---|---|---|
| 1. | Outlet Box Assembly | 1487 | 1487 | 1 |
| | Outlet Box | 5233 | 5233 | 1 |
| | Cover Plate | 5231 | 5231 | 1 |
| | Toggle Switch | 5230 | 5230 | 1 |
| | Harness | 53601 | 53601 | 1 |
| | Guard | 1313 | 1313 | 1 |
| 2. | 110 AC Platform Kit (Optional) | 1506 | 1506 | 1 |
| 3. | Outrigger Caster | 1315 | 1315 | 2 |
| 4. | Caster, Rigid | 5087 | 5087 | 2 |
| 5. | Pivot Bar & Pin Assembly | 1302 | 1302 | 4 |
| 6. | Outrigger Latch | 1297 | 1297 | 4 |
| 7. | Floor Board | 1279 | 1279 | 2 |
| 8. | Control Box | See Fig. 6 | See Fig. 8 | 1 |
| 9. | Caster, Swivel | 5088 | 5088 | 2 |
| 10. | Side Rail Assembly | 1287 | 1287 | 1 |
| 11. | Front Rail Assembly | 1057 | 1057 | 1 |
| 12. | Roller Bar | 1062 | 1062 | 1 |
| | Retaining Ring | 5339 | 5339 | 4 |
| | Roller Assembly | 1033 | 1033 | 2 |
| 13. | Upper Inner Beam | 1277 | 1277 | 1 |
| 14. | Beam Assembly, Upper | 1483 | 1483 | 1 |
| 15. | Middle Outer Beam | 1028 | 1028 | 2 |
| 16. | Roller Assembly | 1033 | 1033 | 2 |
| | Retaining Ring | 1039 | 1039 | 4 |
| 17. | Lift Arm Assembly | 1316 | 1316 | 1 |
| 18. | Cylinder Assembly | See Fig. 5 | See Fig. 5 | 1 |
| 19. | Roller Bar | 1036 | 1036 | 1 |
| | Roller Assembly | 1033 | 1033 | 2 |
| 20. | Outrigger & Jack Assembly (Shown) | 1303 | 1303 | 1 |
| | Outrigger & Jack Assembly (Opposite Side) | 1304 | 1304 | 1 |
| 21. | Support Beam & Pivot (Shown) | 1306 | 1306 | 1 |
| | Support Beam & Pivot (Opposite Side) | 1307 | 1307 | 1 |
| 22. | Pump Assembly | See Fig. 6 | See Fig. 8 | 1 |
| 23. | Side Rail Assembly | 1286 | 1286 | 1 |
| 24. | Connecting Pin | 1377 | 1377 | 1 |
| | Retaining Ring | 1039 | 1039 | 2 |
| 25. | Platform Assembly | 1040 | 1040 | 1 |
| 26. | Beam Assembly, Upper | 1334 | 1334 | 1 |
| 27 | Pivot Bar | 1037 | 1037 | 7 |
| | Retaining Ring | 1039 | 1039 | 14 |
| 28. | Middle Inner Beam | 1027 | 1027 | 1 |
| 29. | Lower Outer Beam | 1026 | 1026 | 1 |
| 30. | Beam & Support Arm, Lower | 1317 | 1317 | 1 |
| 31. | Battery | 5218 | None | 1 |
| | Battery Board | 5354 | None | 1 |
| | Tie Rod | 1319 | None | 2 |
| | Battery Cable (Negative) | 5212 | None | 1 |
| | Battery Jumper Wire (Positive Post to Terminal Board) | 53607 | None | |
| 32. | Connecting Pin | 1038 | 1038 | 2 |
| | Retaining Ring | 1039 | 1039 | 4 |
| 33. | Base Weldment | 1004 | 1004 | 1 |
| 34. | Battery Charger (Optional) | 1507 | None | 1 |

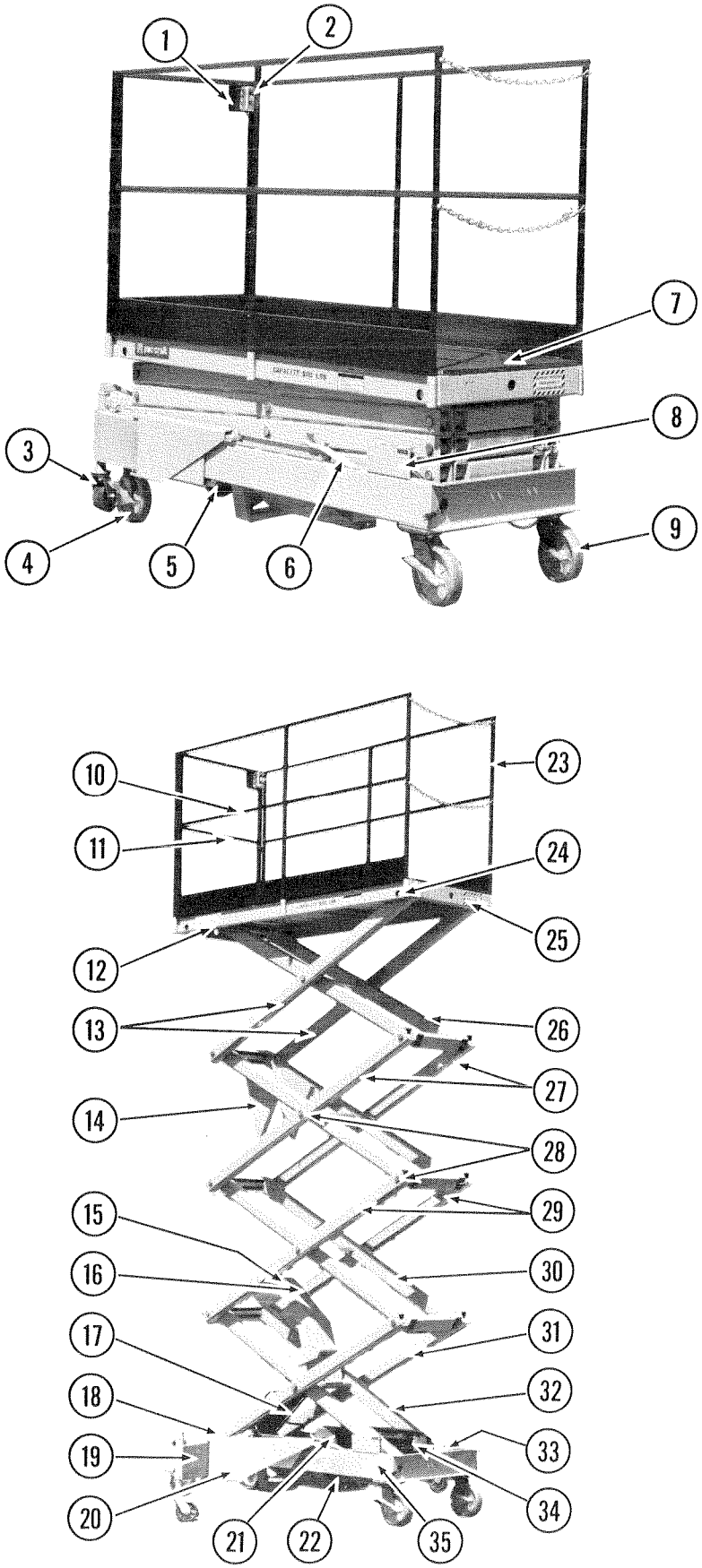



Figure 2. Model 125 BM/EM

## Figure 2

| No. | Description | 125BM | 125EM | Qty. |
|---|---|---|---|---|
| 1. | 110 AC Platform Kit (Optional) | 1523 | 1523 | 1 |
| 2. | Outlet Box Assembly | 1514 | 1514 | 1 |
| | Outlet Box | 5233 | 5233 | 1 |
| | Cover Plate | 5231 | 5231 | 1 |
| | Toggle Switch | 5230 | 5230 | 1 |
| | Harness | 5394 | 5394 | 1 |
| | Guard | 1313 | 1313 | 1 |
| 3. | Outrigger Caster | 1315 | 1315 | 2 |
| 4. | Caster, Rigid | 5087 | 5087 | 2 |
| 5. | Pivot Bar & Pin Assembly | 1302 | 1302 | 4 |
| 6. | Outrigger Latch | 1297 | 1297 | 4 |
| 7. | Floor Board | 1279 | 1279 | 2 |
| 8. | Control Box | See Fig. 6 | See Fig. 8 | 1 |
| 9. | Caster, Swivel | 5088 | 5088 | 2 |
| 10. | Side Rail Assembly | 1287 | 1287 | 1 |
| 11. | Front Rail Assembly | 1057 | 1057 | 1 |
| 12. | Roller Bar | 1062 | 1062 | 1 |
| | Retaining Ring | 5339 | 5339 | 4 |
| | Roller Assembly | 1033 | 1033 | 2 |
| 13. | Beam Assembly | 1028 | 1028 | 2 |
| 14. | Upper Inner Beam | 1513 | 1513 | 1 |
| 15. | Roller Assembly | 1033 | 1033 | 2 |
| | Retaining Ring | 1039 | 1039 | 4 |
| 16. | Lift Arm Assembly | 1316 | 1316 | 1 |
| 17. | Cylinder Assembly | See Fig. 5 | See Fig. 5 | 1 |
| 18. | Roller Bar | 1036 | 1036 | 1 |
| | Roller Assembly | 1033 | 1033 | 2 |
| 19. | Outrigger & Jack Assembly (Shown) | 1303 | 1303 | 1 |
| | Outrigger & Jack Assembly (Opposite Side) | 1304 | 1304 | 1 |
| 20. | Support Beam & Pivot (Shown) | 1306 | 1306 | 1 |
| | Support Beam & Pivot (Opposite Side) | 1307 | 1307 | 1 |
| 21. | Battery Charger (Optional) | 1507 | None | 1 |
| 22. | Pump Assembly | See Fig. 6 | See Fig. 8 | 1 |
| 23. | Side Rail Assembly | 1286 | 1286 | 1 |
| 24. | Connecting Pin | 1377 | 1377 | 1 |
| | Retaining Ring | 1039 | 1039 | 2 |
| 25. | Platform Assembly | 1040 | 1040 | 1 |
| 26. | Middle Inner Beam | 1027 | 1027 | 1 |
| 27. | Beam Assembly | 1028 | 1028 | 2 |
| 28. | Pivot Bar | 1037 | 1037 | 10 |
| | Retaining Ring | 1039 | 1039 | 20 |
| 29. | Beam Assembly | 1028 | 1028 | 2 |
| 30. | Middle Inner Beam | 1027 | 1027 | 1 |
| 31. | Lower Outer Beam | 1026 | 1026 | 1 |
| 32. | Beam & Support Arm, Lower | 1317 | 1317 | 1 |
| 33. | Connecting Pin | 1038 | 1038 | 2 |
| | Retaining Ring | 1039 | 1039 | 4 |
| 34. | Battery | 5218 | None | 1 |
| | Battery Board | 5354 | None | 1 |
| | Tie Rod | 1319 | None | 1 |
| | Battery Cable (Negative) | 5212 | None | 1 |
| | Battery Jumper Wire (Positive Post to Terminal Board) | 53607 | None | 1 |
| 35. | Base Weldment | 1004 | 1004 | 1 |

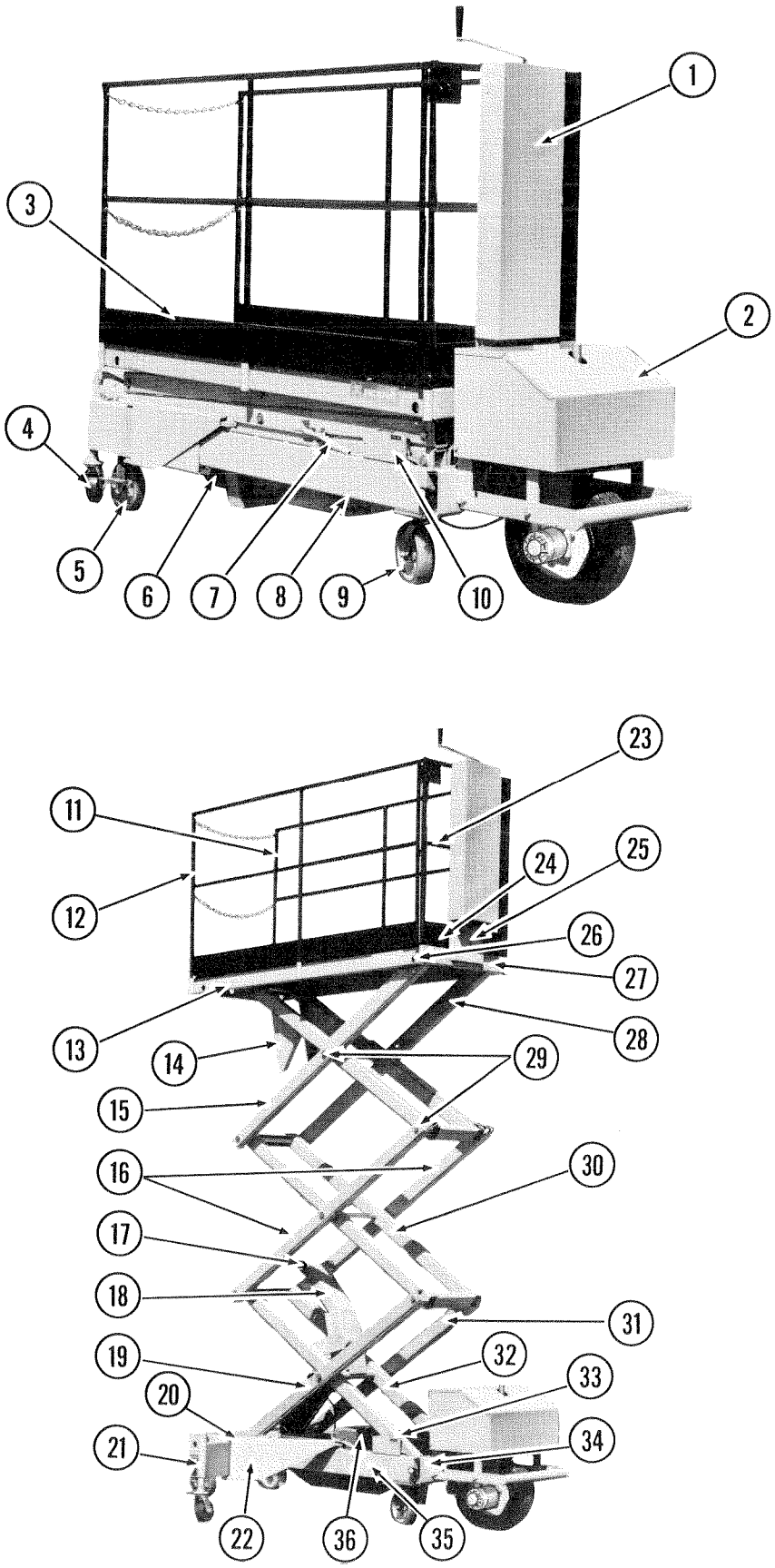
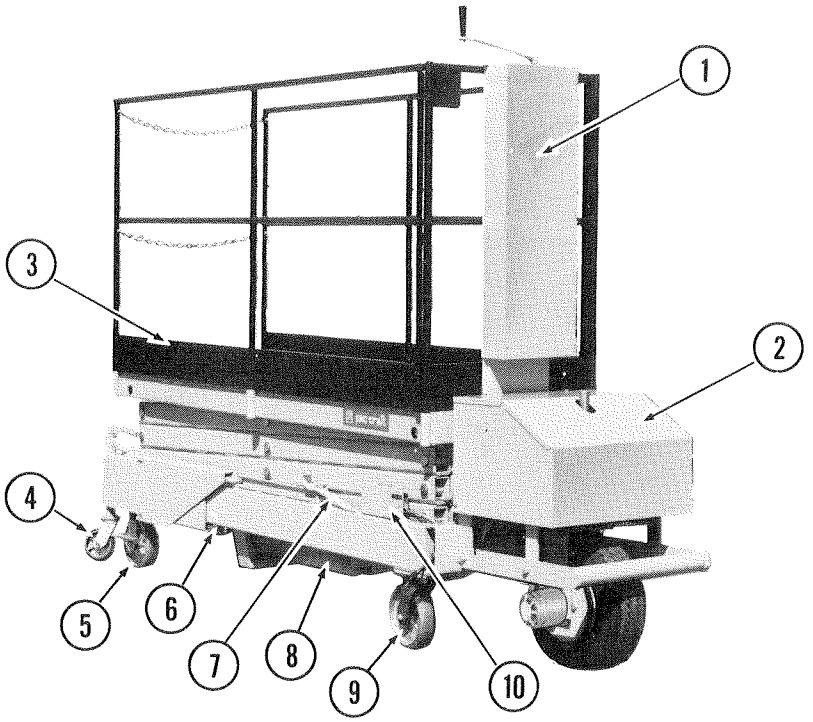



Figure 3. Model 116 BSP

Figure 3

| No. | Description | 116BSP | Qty. |
|---|---|---|---|
| 1. | Upper Self-Drive | See Fig. 9 | 1 |
| | Cover, Control Panel | 1457 | 1 |
| 2. | Lower Self-Drive | See Fig. 10 | 1 |
| | Hood Weldment | 1360 | 1 |
| 3. | Floor Board | 1279 | 2 |
| 4. | Outrigger Caster | 1315 | 2 |
| 5. | Caster, Rigid | 5087 | 2 |
| 6. | Pivot Bar & Pin Assembly | 1302 | 4 |
| 7. | Outrigger Latch | 1297 | 4 |
| 8. | Pump Assembly | See Fig. 7 | 1 |
| 9. | Caster, Swivel | 5245 | 2 |
| 10. | Control Box | See Fig. 7 | 1 |
| 11. | Side Rail Assembly | 1287 | 1 |
| 12. | Side Rail Assembly | 1286 | 1 |
| 13. | Roller Bar | 1062 | 1 |
| | Retaining Ring | 5339 | 4 |
| | Roller Assembly | 1033 | 2 |
| 14. | Upper Inner Beam | 1277 | 1 |
| 15. | Beam Assembly, Upper | 1483 | 1 |
| 16. | Middle Outer Beam | 1028 | 2 |
| 17. | Roller Assembly | 1033 | 2 |
| | Retaining Ring | 1039 | 4 |
| 18. | Lift Arm Assembly | 1316 | 1 |
| 19. | Cylinder Assembly | See Fig. 5 | 1 |
| 20. | Roller Bar | 1036 | 1 |
| | Roller Assembly | 1033 | 2 |
| 21. | Outrigger & Jack Assembly (Shown) | 1303 | 1 |
| | Outrigger & Jack Assembly (Opposite Side) | 1304 | 1 |
| 22. | Support Beam & Pivot (Shown) | 1306 | 1 |
| | Support Beam & Pivot (Opposite Side) | 1307 | 1 |
| 23. | Front Rail Assembly | 1057 | 2 |
| 24. | Switch | 5369 | 2 |
| 25. | Lower Panel | 1461 | 1 |
| 26. | Connecting Pin | 1377 | 1 |
| | Retaining Ring | 1039 | 2 |
| 27. | Platform Assembly | 1040 | 1 |
| 28. | Beam Assembly, Upper | 1334 | 1 |
| 29. | Pivot Bar | 1037 | 7 |
| | Retaining Ring | 1039 | 14 |
| 30. | Middle Inner Beam | 1027 | 1 |
| 31. | Lower Outer Beam | 1026 | 1 |
| 32. | Beam & Support Arm, Lower | 1317 | 1 |
| 33. | Battery | 5218 | 1 |
| | Battery Board | 5354 | 1 |
| | Tie Rod | 1319 | 2 |
| | Battery Cable (Negative) | 5212 | 1 |
| | Battery Jumper Wire (Positive Post to Terminal Board) | 53607 | 1 |
| 34. | Connecting Pin | 1038 | 2 |
| | Retaining Ring | 1039 | 4 |
| 35. | Base Weldment | 1004 | 1 |
| 36. | Battery Charger (Optional) | 1507 | 1 |



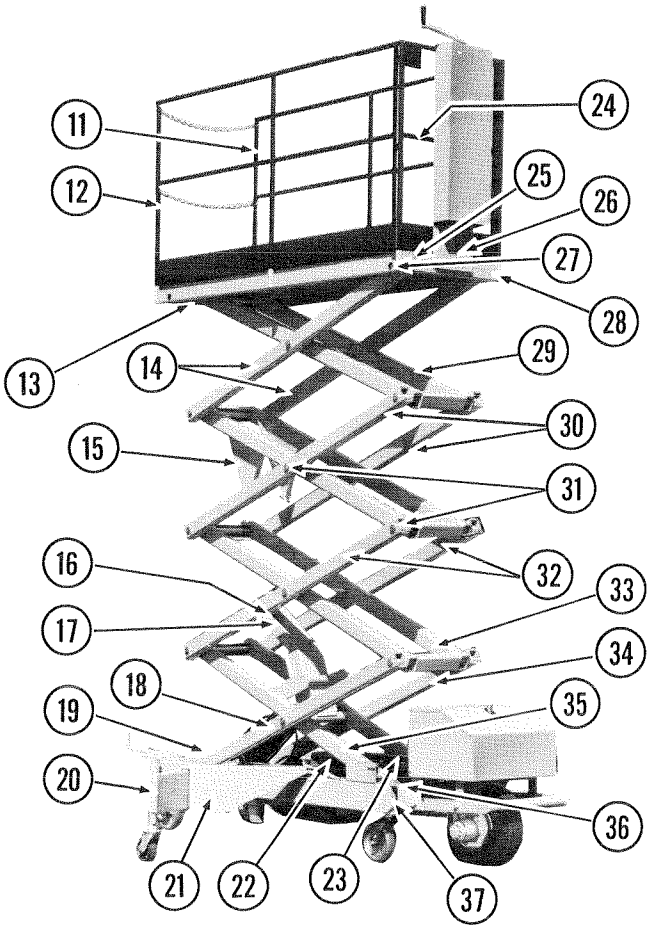




Figure 4. Model 125 BSP

Figure 4

| No. | Description | 125BSP | Qty. |
|---|---|---|---|
| 1. | Upper Self-Drive | See Fig. 9 | 1 |
| | Cover, Control Panel | 1457 | 1 |
| 2. | Lower Self-Drive | See Fig. 10 | 1 |
| | Hood Weldment | 1360 | 1 |
| 3. | Floor Board | 1279 | 2 |
| 4. | Outrigger Caster | 1315 | 2 |
| 5. | Caster, Rigid | 5087 | 2 |
| 6. | Pivot Bar & Pin Assembly | 1302 | 4 |
| 7. | Outrigger Latch | 1297 | 4 |
| 8. | Pump Assembly | See Fig. 7 | 1 |
| 9. | Caster, Swivel | 5245 | 2 |
| 10. | Control Box | See Fig. 7 | 1 |
| 11. | Side Rail Assembly | 1287 | 1 |
| 12. | Side Rail Assembly | 1286 | 1 |
| 13. | Roller Bar | 1062 | 1 |
| | Retaining Ring | 5339 | 4 |
| | Roller Assembly | 1033 | 2 |
| 14. | Beam Assembly | 1028 | 2 |
| 15. | Upper Inner Beam | 1513 | 1 |
| 16. | Roller Assembly | 1033 | 2 |
| | Retaining Ring | 1039 | 4 |
| 17. | Lift Arm Assembly | 1316 | 1 |
| 18. | Cylinder Assembly | See Fig. 5 | 1 |
| 19. | Roller Bar | 1036 | 1 |
| | Roller Assembly | 1033 | 2 |
| 20. | Outrigger & Jack Assembly (Shown) | 1303 | 1 |
| | Outrigger & Jack Assembly (Opposite Side) | 1304 | 1 |
| 21. | Support Beam & Pivot (Shown) | 1306 | 1 |
| | Support Beam & Pivot (Opposite Side) | 1307 | 1 |
| 22. | Battery Charger (Optional) | 1507 | 1 |
| 23. | Battery | 5218 | 1 |
| | Battery Board | 5354 | 1 |
| | Tie Rod | 1319 | 1 |
| | Battery Cable (Negative) | 5212 | 1 |
| | Battery Jumper Wire (Positive Post to Terminal Board) | 53607 | 1 |
| 24. | Front Rail Assembly | 1057 | 1 |
| 25. | Switch | 5369 | 1 |
| 26. | Lower Panel | 1461 | 1 |
| 27. | Connecting Pin | 1377 | 1 |
| | Retaining Ring | 1039 | 2 |
| 28. | Platform Assembly | 1040 | 1 |
| 29. | Middle Inner Beam | 1027 | 1 |
| 30. | Beam Assembly | 1028 | 2 |
| 31. | Pivot Bar | 1037 | 10 |
| | Retaining Ring | 1039 | 20 |
| 32. | Beam Assembly | 1028 | 2 |
| 33. | Middle Inner Beam | 1027 | 1 |
| 34. | Lower Outer Beam | 1026 | 1 |
| 35. | Beam & Support Arm, Lower | 1317 | 1 |
| 36. | Connecting Pin | 1038 | 2 |
| | Retaining Ring | 1039 | 4 |
| 37. | Base Weldment | 1004 | 1 |

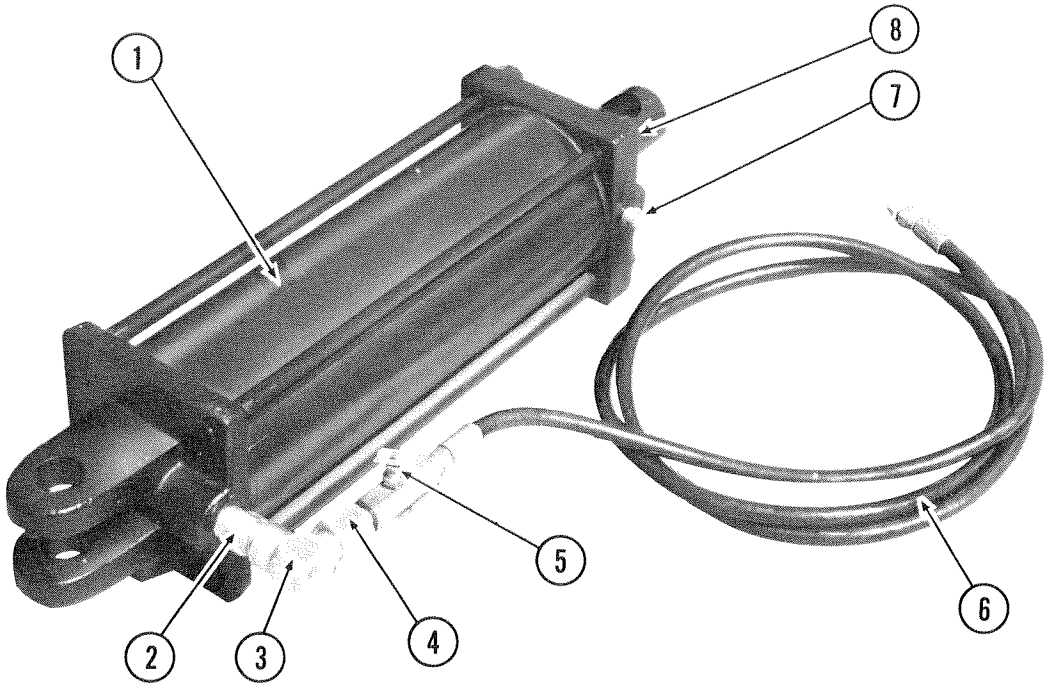



Figure 5. Cylinder Assembly - All Models

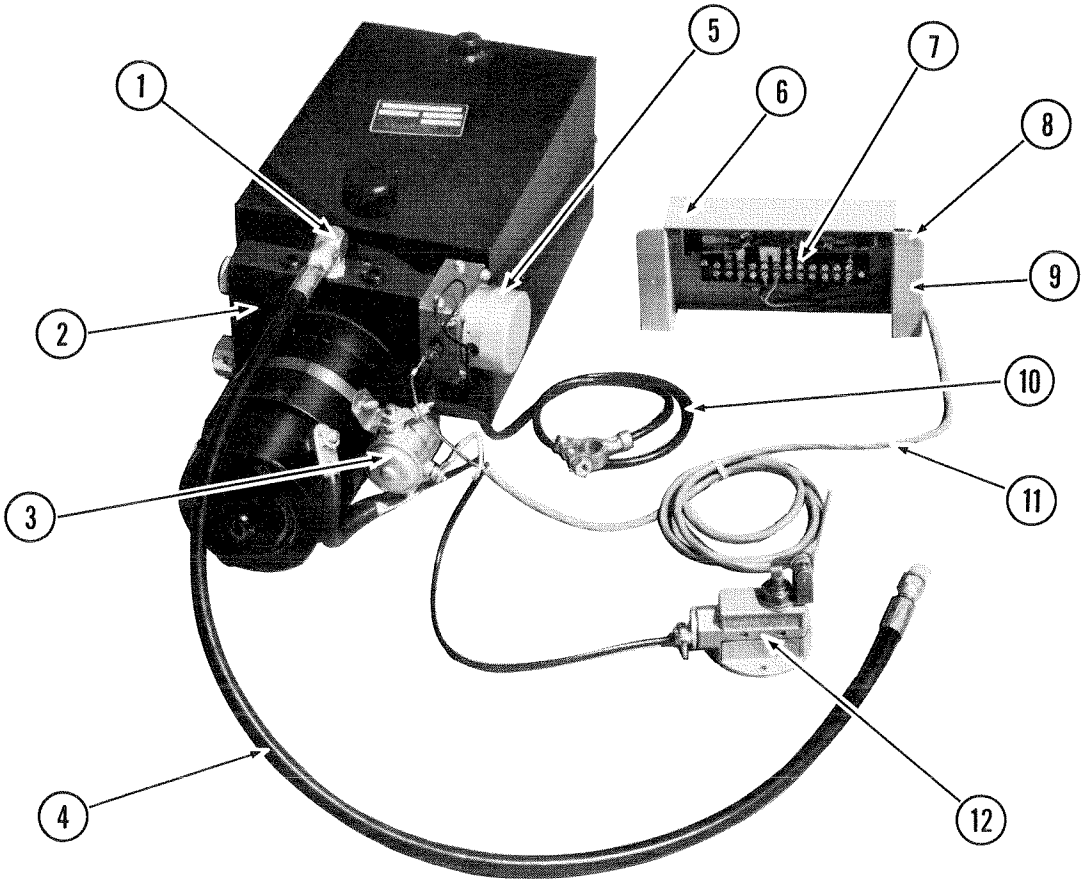



Figure 6. Pump Assembly - Model 116/125 BM

Figure 5

| No. | Description | 116EM 125EM | 116BM 125BM | 116BSP 125BSP | Qty. |
|---|---|---|---|---|---|
| 1. | Cylinder | 5220 | 5220 | 5220 | 1 |
| 2. | Velocity Fuse (Slam Valve) | 5103 | 5103 | 5103 | 1 |
| 3. | Street Elbow | 5031 | 5301 | 5031 | 1 |
| 4. | Reducer | 5244 | 5244 | 5244 | 1 |
| 5. | Flow Control Valve | 5222 | 5222 | 5222 | 1 |
| 6. | Hydraulic Hose Assembly | 5358 | 5221 | 5358 | 1 |
| 7. | Breather | 5321 | 5321 | 5321 | 1 |
| 8. | Grease Fitting | 5432 | 5432 | 5432 | 1 |

Figure 6

| No. | Description | 116BM | 125BM | Qty. |
|---|---|---|---|---|
| 1. | Street Elbow | 5309 | 5309 | 1 |
| 2. | Hydraulic Pump Unit | 5203 | 5203 | 1 |
| 3. | Start Solenoid | 5372 | 5372 | 1 |
| 4. | Hydraulic Hose Assembly | 5221 | 5221 | 1 |
| 5. | Dump Solenoid | 5366 | 5366 | 1 |
| 6. | Switch | 5230 | 5230 | 1 |
| 7. | Terminal Board | 5261 | 5261 | 1 |
| 8. | Fuse | 5264 | 5264 | 1 |
| | Fuse Holder | 5265 | 5265 | 1 |
| 9. | Control Box | 1482 | 1482 | 1 |
| 10. | Battery Cable (Positive) | 5211 | 5211 | 1 |
| 11. | Main Harness | 53602 | 53602 | 1 |
| 12. | Up-Limit Micro Switch | 5325 | 5325 | 1 |

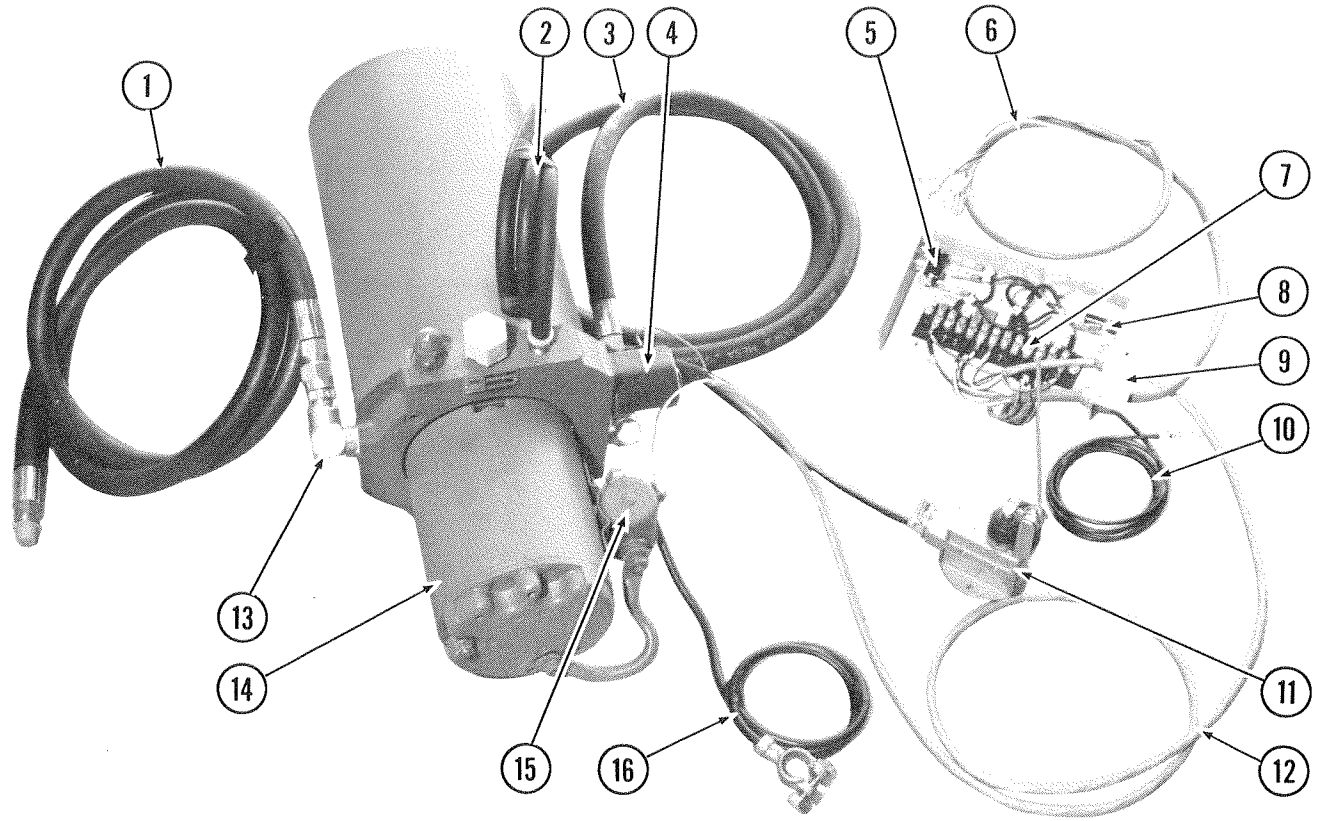



Figure 7. Pump Assembly - Model 116/125 BSP

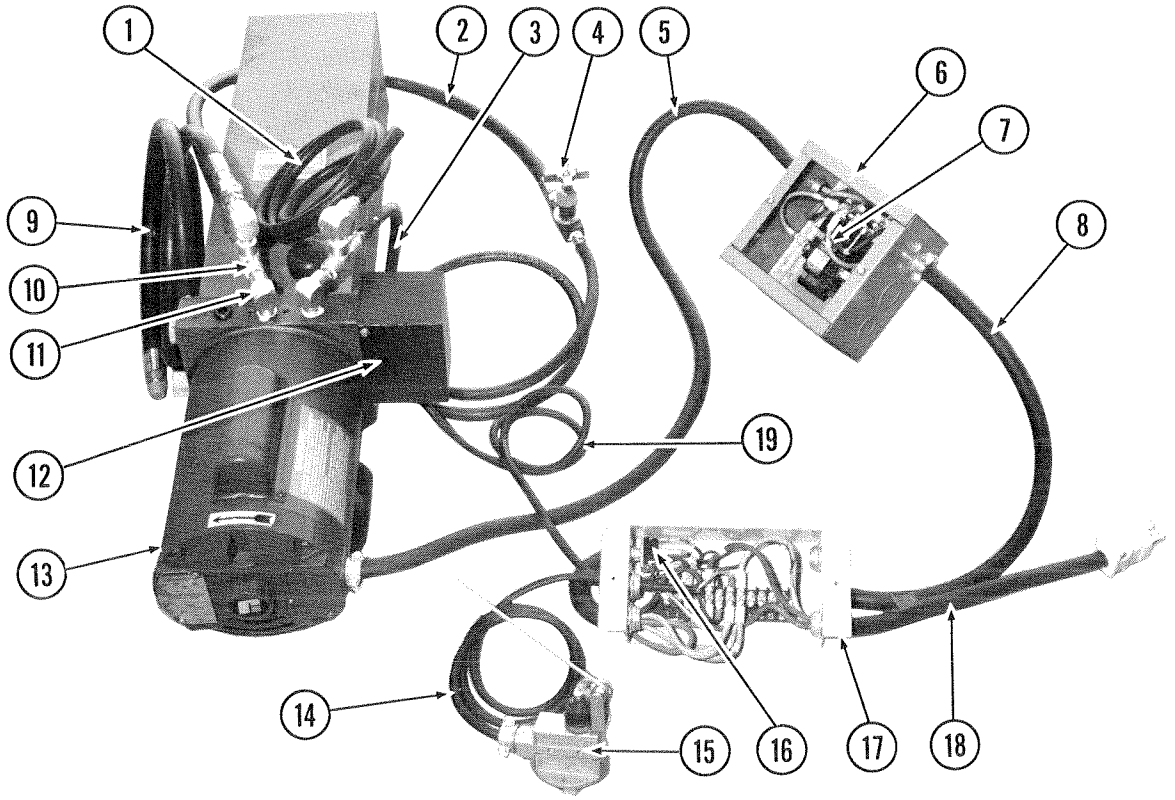



Figure 8. Pump Assembly - Model 116/125 EM

Figure 7

| No. | Description | 116BSP | 125BSP | Qty. |
|---|---|---|---|---|
| 1. | Hydraulic Hose - Pressure | 5357 | 5357 | 1 |
| 2. | Hose L.P. | 5430 | 5430 | 1 |
| 3. | Hydraulic Hose - Return | 5357 | 5357 | 1 |
| 4. | Solenoid Valve 2-Way | 5436 | 5436 | 1 |
| | Solenoid Only slow speed Solenoid | 5488 | 5488 | 1 |
| | "O" Ring Seal Kit | 5475 | 5475 | 1 |
| 5. | Switch | 5230 | 5230 | 1 |
| 6. | Valve Bank Harness | 53613 | 53613 | 1 |
| 7. | Terminal Board | 5261 | 5261 | 1 |
| 8. | Fuse Holder | 5265 | 5265 | 1 |
| | Fuse | 5264 | 5264 | 1 |
| 9. | Control Box | 1482 | 1482 | 1 |
| 10. | Jumper Wire | 53607 | 53607 | 1 |
| 11. | Hi-Limit Switch | 5325 | 5325 | 1 |
| 12. | Main Harness | 53612 | 53612 | 1 |
| 13. | Elbow 1/4 x 1/4 | 5106 | 5106 | 1 |
| 14. | Hydraulic Pump Unit | 5446 | 5446 | 1 |
| 15. | Start Solenoid | 5490 | 5490 | 1 |
| 16. | Battery Cable - Positive | 5211 | 5211 | 1 |

**Figure 8 Pump Assembly - Model 116/125EM**

| No. | Description | 116BSP | 125BSP | Qty. |
|---|---|---|---|---|
| 1. | Hose L.P. | 1563 | 1563 | 1 |
| 2. | Hydraulic Hose | 5221 | 5221 | 1 |
| 3. | Hose L.P. | 1563 | 1563 | 1 |
| 4. | Emergency Down Valve | 5460 | 5460 | 1 |
| 5. | Harness | 5453 | 5453 | 1 |
| 6. | Relay Box | 1444 | 1444 | 1 |
| 7. | Relay | 5397 | 5397 | 1 |
| 8. | Harness | 5450 | 5450 | 1 |
| 9. | Hydraulic Hose | 5221 | 5221 | 1 |
| 10. | Tee | 5032 | 5032 | 1 |
| 11. | Elbow 1/4 x 1/4 | 5106 | 5106 | 1 |
| 12 | Dump Solenoid | 5398 | 5398 | 1 |
| 13. | Hydraulic Pump Unit | 5392 | 5392 | 1 |
| 14. | Harness | 5454 | 5454 | 1 |
| 15. | Hi-Limit Switch | 5325 | 5325 | 1 |
| 16 | Switch | 5320 | 5320 | 1 |
| 17. | Control Box | 1482 | 1482 | 1 |
| 18. | AC Supply Cord | 5448 | 5448 | 1 |
| 19. | Harness | 5451 | 5451 | 1 |

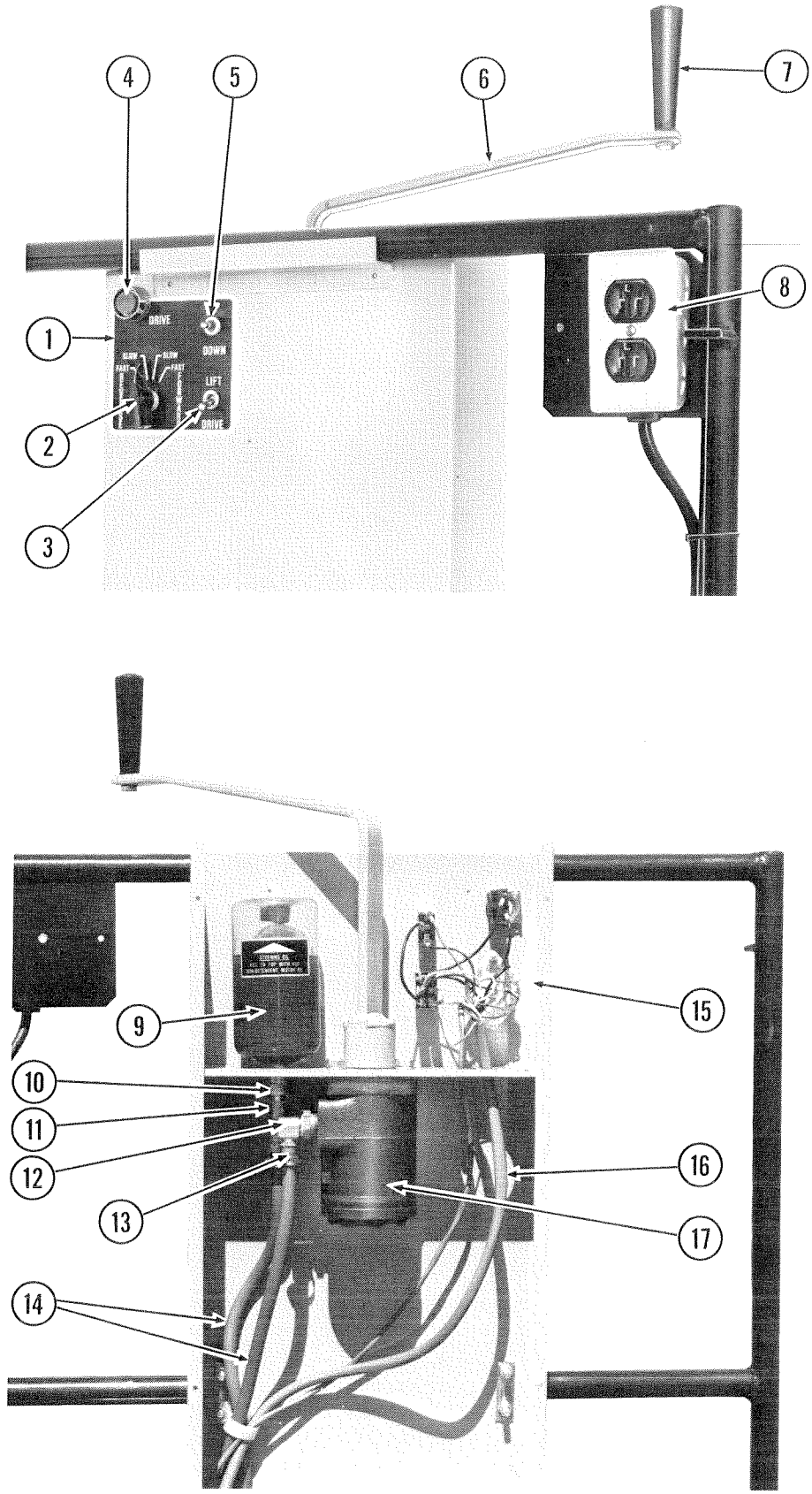



Figure 9. Upper Drive Unit - Model 116/125 BSP

Figure 9

| No. | Description | 116BSP | 125BSP | Qty. |
|---|---|---|---|---|
| 1. | Label | 5371 | 5371 | 1 |
| 2. | Rotary Switch - (Knob Only 5423) | 5399 | 5399 | 1 |
| 3. | Switch, Lift-Drive | 5275 | 5275 | 1 |
| 4. | Switch, Drive | 5273 | 5273 | 1 |
| 5. | Switch, Up-Down | 5230 | 5230 | 1 |
| 6. | Handle Weldment | 1466 | 1466 | 1 |
| 7. | Handle | 5331 | 5331 | 1 |
| | Spacer | 1474 | 1474 | 1 |
| | Washer | 5008 | 5008 | 1 |
| | Bolt | 5004 | 5004 | 1 |
| 8. | 110 AC Platform Kit (Optional) | 1506 | 1523 | 1 |
| 9. | Bottle | 5336 | 5336 | 1 |
| 10. | Check Valve | 1378 | 1378 | 1 |
| 11. | Tee | 5107 | 5107 | 1 |
| 12. | Street Elbow | 5122 | 5122 | 1 |
| 13. | Barbed Hose Fitting | 5052 | 5052 | 2 |
| | Hose Clamp | 5223 | 5223 | 2 |
| 14. | Hydraulic Hose | 1503 | 1524 | 2 |
| 15. | Control Panel | 1462 | 1462 | 1 |
| 16. | Wire Harness w/Switch | 53611 | 5395 | 1 |
| 17. | Hydraulic Motor | 5082 | 5082 | 1 |
| 18. | Steering Oil - Hydraulic Fluid Conforming to MIL. Spec. MIL-0-5606 | | | |

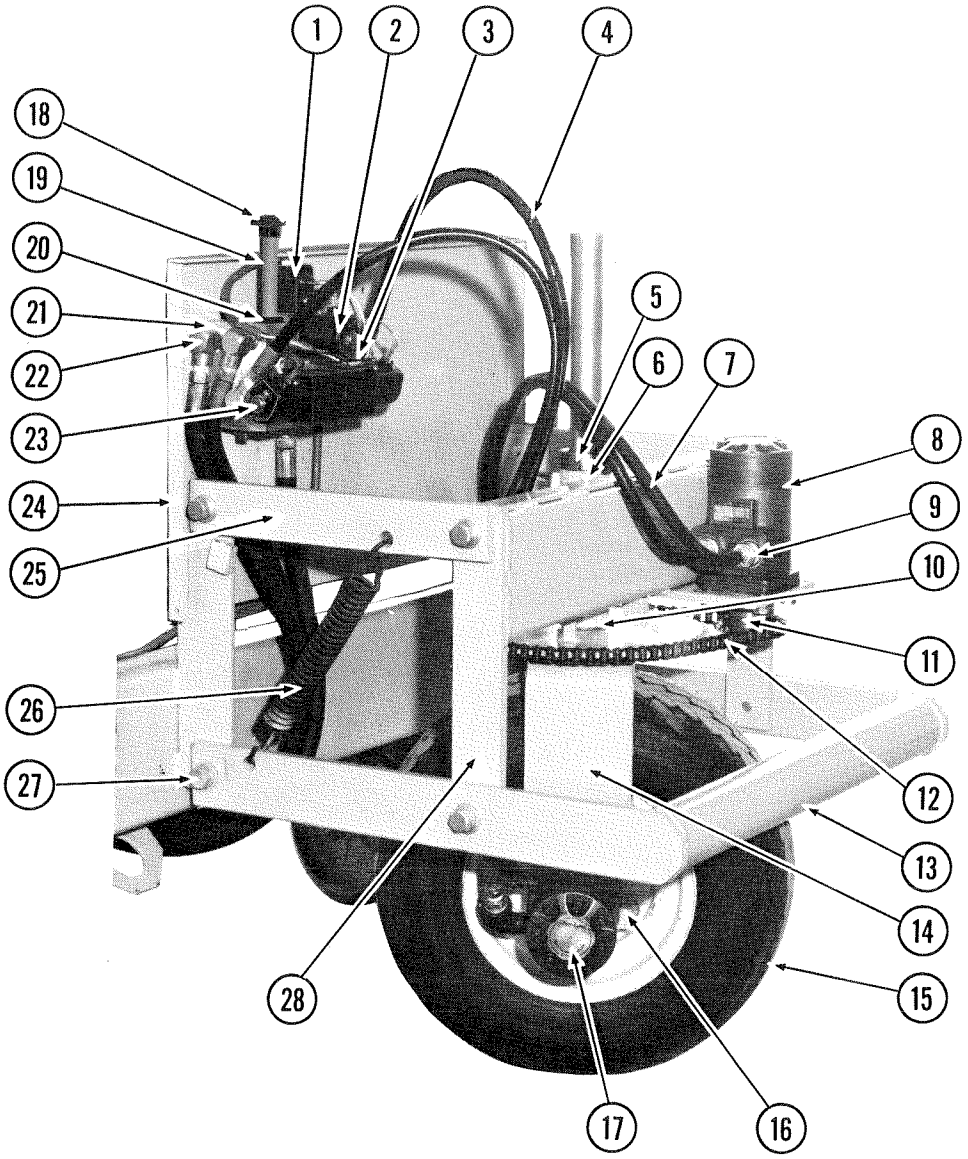
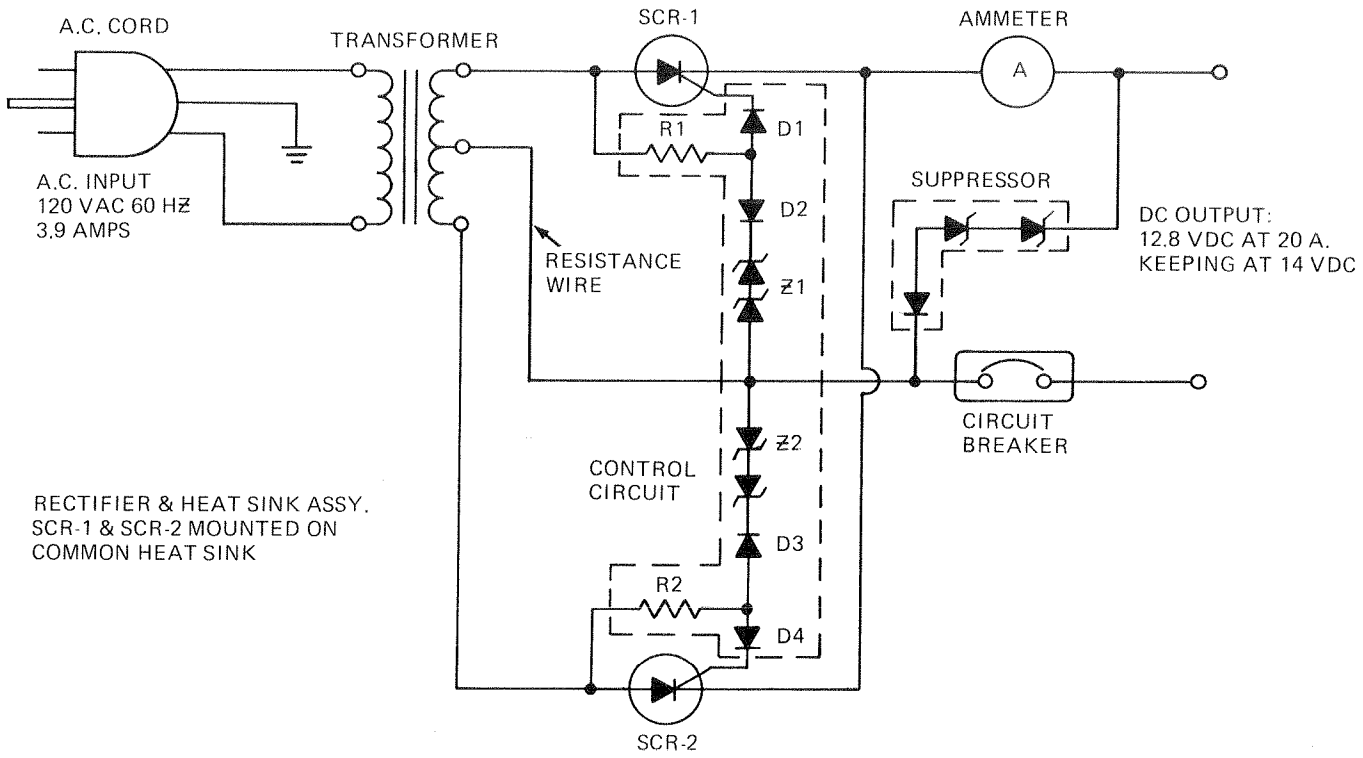



Figure 10. Lower Drive Unit - Model 116/125 BSP

Figure 10

| No. | Description | 116BSP | 125BSP | Qty. |
|---|---|---|---|---|
| 1. | Solenoid Valve 3-Way | 5463 | 5463 | 1 |
| | Solenoid Only | 5488 | 5488 | 1 |
| | "O" Ring Seal Kit | 5476 | 5476 | 1 |
| 2. | Solenoid Valve 2-Way | 5436 | 5436 | 1 |
| | Solenoid Only | 5488 | 5488 | 1 |
| | "O" Ring Seal Kit | 5475 | 5475 | 1 |
| 3. | Check Valve | 5434 | 5434 | 1 |
| | "O" Ring Seal Kit | 5475 | 5475 | 1 |
| 4. | Hydraulic Drive Hose | 5356 | 5356 | 2 |
| 5. | Colar | 5367 | 5367 | 1 |
| 6. | Sleeve Bearing | 5049 | 5049 | 1 |
| 7. | Steering Hose | 1503 | 1524 | 2 |
| 8. | Steering Motor | 5083 | 5083 | 1 |
| 9. | Barbed Hose Fitting | 5052 | 5052 | 2 |
| 10. | Flanged Bearing | 1251 | 1251 | 1 |
| 11 | Sprocket | 5067 | 5067 | 1 |
| 12. | Steering Chain | 5069 | 5069 | 1 |
| 13. | Bumper & Arm Assembly | 1364 | 1364 | 1 |
| 14. | Motor Bracket Weld | 1564 | 1564 | 1 |
| 15. | Tire & Wheel Assembly | 5077 | 5077 | 1 |
| 16. | Hub | 5469 | 5469 | 1 |
| 17. | Drive Motor | 5465 | 5465 | 1 |
| 18. | Knob | 5489 | 5489 | 1 |
| 19. | Extension | 1562 | 1562 | 1 |
| 20. | Manual Down Valve | 5435 | 5435 | 1 |
| | "O" Ring Seal Kit | 5488 | 5488 | 1 |
| 21. | Manifold Assembly Complete | 1560 | 1560 | 1 |
| | Manifold Block Only | 1561 | 1561 | 1 |
| 22. | Elbow 3/8 x 3/8 | 5472 | 5472 | 2 |
| | Elbow 1/4 x 1/4 | 5106 | 5106 | 2 |
| 23 | Solenoid Valve 4-Way | 5433 | 5433 | 1 |
| 24 | Back Panel | 1361 | 1361 | 1 |
| 25 | Upper Horizontal Arm | 1345 | 1345 | 2 |
| 26. | Extension Spring | 5024 | 5024 | 2 |
| 27. | Cap Screw | 5010 | 5010 | 8 |
| | Bushing | 1340 | 1340 | 8 |
| | Lockwasher | 5012 | 5012 | 8 |
| 28 | Drive Wheel Support | 1352 | 1352 | 1 |
| | PAC-Craft Yellow Touch-Up Paint (12 oz. Aerosol Can) | 5459 | 5459 | |

# BATTERY CHARGER SCHEMATIC AND PARTS LIST




| PART DESCRIPTION | PART NO. |
|---|---|
| Transformer | 5477 |
| Ammeter | 5478 |
| Circuit Breaker | 5425 |
| Rectifier & Heat Sink Assembly | 5479 |
| Control Circuit | 5480 |
| Resistance Wire | 5481 |
| Suppressor | 5482 |
| Positive Cord Set | 5483 |
| Negative Cord Set | 5484 |
| AC Cord Set | 5485 |
| Cord Strain Relief (DC) | 5486 |
| Cord Strain Relief (AC) | 5487 |

NOTES