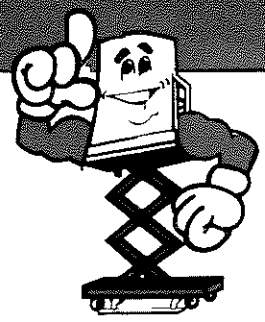
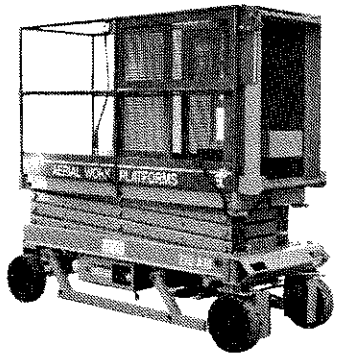
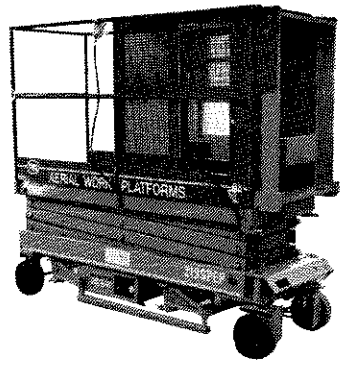
HEFF-T-HERMAN

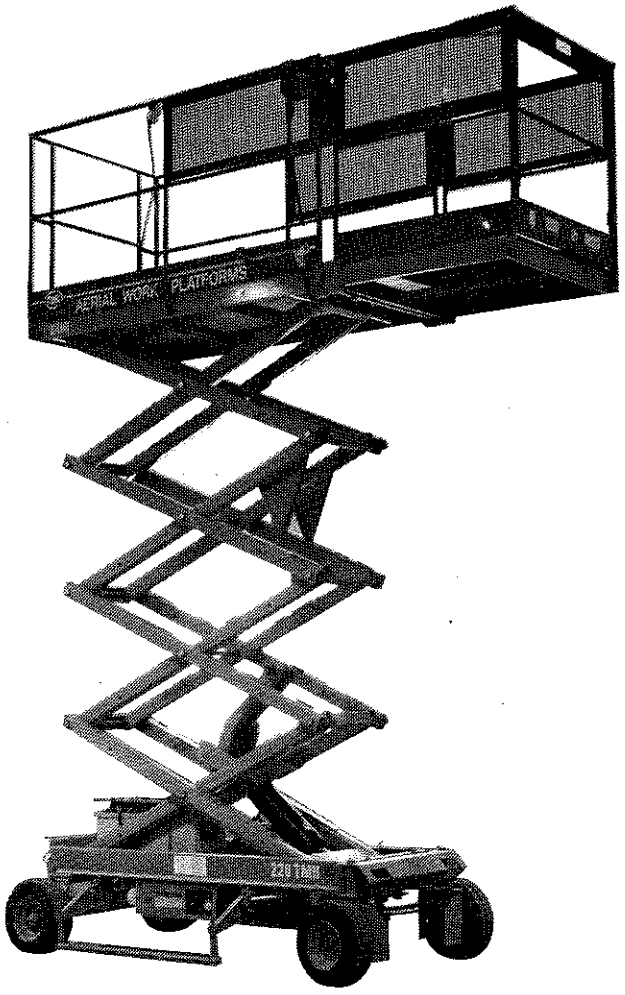
Models: 015BMEP, 115SPEP, 215SPEP,
216AM, 019BMEP, 119SPEP,
219SPEP, 220AM, 215TM II, 220TM II



Operating, Service and Maintenance Manual







MAYVILLE ENGINEERING CO.
AERIAL WORK PLATFORMS
A DIVISION OF
MAYVILLE ENGINEERING CO., INC.
715 SOUTH STREET
MAYVILLE, WISCONSIN 53050

U.S. PATENT NO. 4114854

6644
REV. 2
2-89

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LIMITED OWNER WARRANTY

Mayville Engineering Co. warrants its equipment, to the original purchaser only, against defects in workmanship and materials under normal use and service for one (1) year from date of authenticated purchase or date equipment is first placed in use, whichever is earlier; excluded from such warranty are the batteries which carry a ninety (90) day warranty from such date of purchase and prorated thereafter up to one (1) year from such date of purchase. Warranty within such warranty period is limited to replacement or repair, at MEC's option, of equipment or parts thereof shipped prepaid to MEC which are found, upon inspection by MEC, to be defective. MEC's sole obligation and buyer's exclusive remedy hereunder shall be limited to such repair or replacement.

MEC SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR CONTINGENT DAMAGES WHATSOVER. USE OF OTHER THAN FACTORY AUTHORIZED PARTS, MISUSE, IMPROPER MAINTENANCE OR MODIFICATION OF THE EQUIPMENT VOIDS THIS WARRANTY. PARTS OTHER THAN OF OUR MANUFACTURE ARE SUBJECT TO THE ORIGINAL MANUFACTURER'S WARRANTY.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OF IMPLIED. ALL SUCH OTHER WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED.

NO DEALER, SALES REPRESENTATIVE OR OTHER PERSON PURPORTING TO ACT ON BEHALF OF MEC IS AUTHORIZED TO ALTER THE TERMS OF THIS WARRANTY OR TO IN ANY MANNER ASSUME ON BEHALF OF MEC ANY LIABILITY OR OBLIGATION WHICH EXCEEDS MEC'S OBLIGATIONS UNDER THIS WARRANTY.

1. INTRODUCTION

OPERATOR QUALIFICATIONS

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:

Mayville Engineering Co. Aerial Work Platforms
Division of Mayville Engineering Co., Inc.
715 South Street
Mayville, Wisconsin 53050
#414-387-4500

SAFETY AND LIMITATIONS

MEC designs Heff-T-Herman work platforms to be safe and reliable. They are rugged and maneuverable but must be used only for purposes and ways intended. That is to raise personnel and tools to overhead work areas.

The following precautions are based on common sense and on the code of safe practices developed by the Scaffold Industry Association, Inc. for the elevating work platform industry.

1. Respect your machine; do not neglect or misuse it.
2. Check jobsite for unsafe working conditions.
3. Inspect machine before using. Do not use machine if it is malfunctioning in any way.
4. Use machine only for purposes for which it was designed.
5. Never take chances. Do not use machine if your physical condition is uncertain in any way.
6. The platform and its enclosures are not insulated. Do not use near electrically energized circuits.
7. An operator of any type of work platform is subject to certain hazards that cannot be protected by mechanical means. It is therefore essential that operators be competent, careful, physically and mentally fit and thoroughly trained in safe operation of this machine.

DESCRIPTION

General

Heff-T-Herman aerial work platforms are electrically actuated, hydraulically operated units. The platform is raised and lowered by a scissors mechanism. The one wheel drive (fifth wheel type) and the two wheel (front wheel drive) self-propelled units are steered by a hydraulic cylinder which is operated from the control console on the platform. Emergency lowering and auxiliary lift controls are located at the base of the machine.

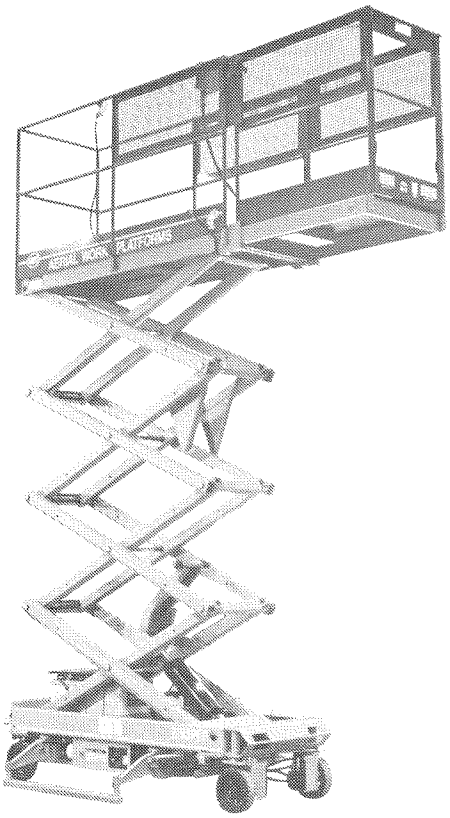


Figure 1. 219 SPEP Plant Master

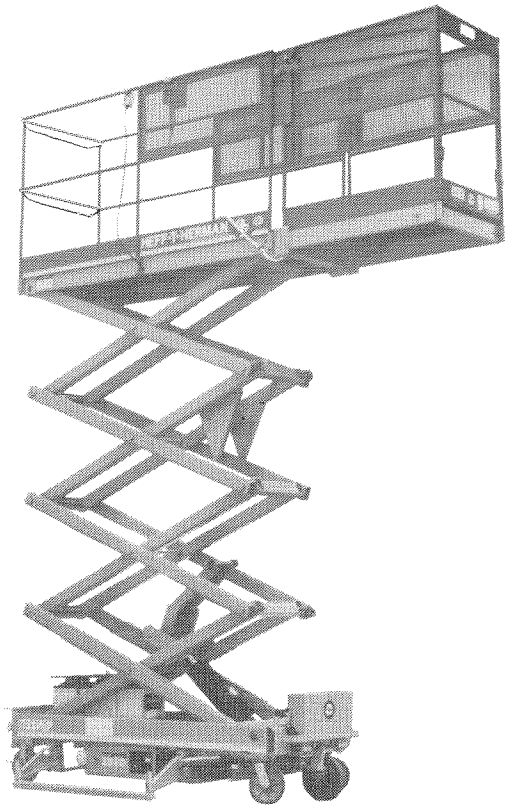


Figure 2. 119 SPEP Plant Master

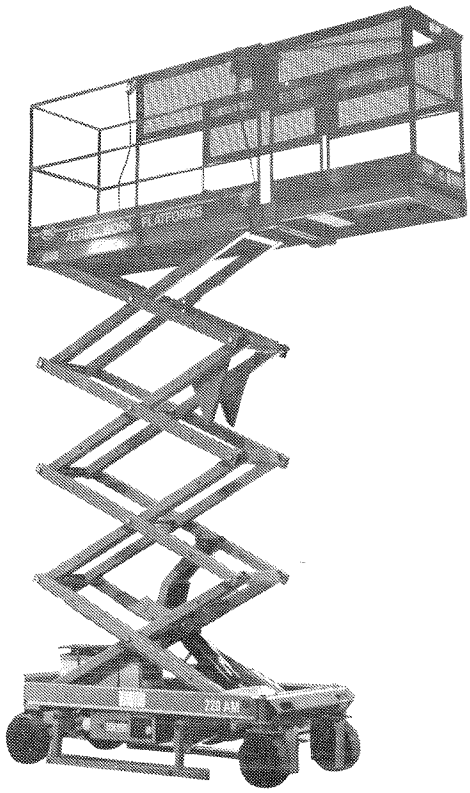


Figure 3. 220 AM Aisle Master

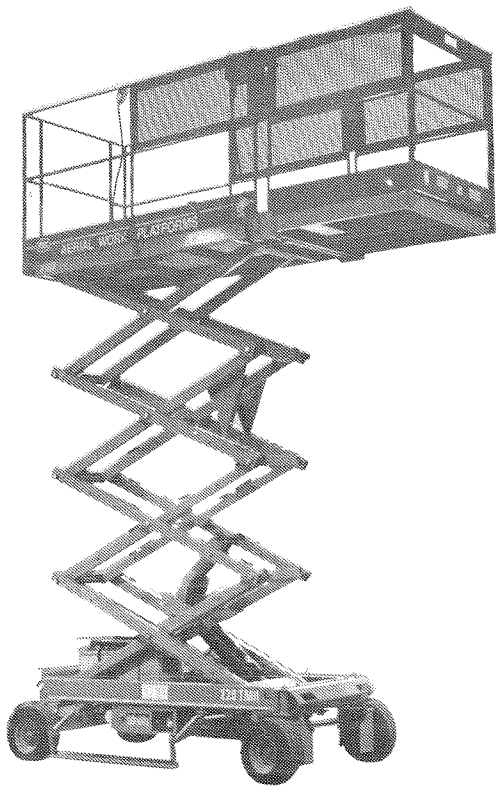


Figure 4. 220 TM II Torque Master

HEFF-T-HERMAN SPECIFICATIONS:

Through our constant efforts to improve our products, specifications may change without notice.

PLANT-MASTER:

MODEL NO.	DRIVE	PLAT. HT.	WORK HT.	STOW. HT.	LIFT. CAP.	PLAT. EXT.	POWER	O/A LENGTH	WHEEL BASE	O/A WIDTH	WHEEL TRACK	GRND. CLEAR.	INSIDE TURN RAD.	APPROX. WT.†
015BMEP	PUSH AROUND	15' (4.58m)	21' (6.41m)	28" (.71m)	1000# (453.6kg)	Yes	24 vdc Batt.	89" (2.97m)	73.5" (1.87m)	31" (.79m)	24" (.61m)	2.5" (63.5mm)	N/A	2490# (1129kg)
019BMEP		19'4" (5.90m)	25'4" (7.73m)	31.5" (.80m)	500# (226kg)	Yes	24 vdc Batt.	89" (2.97m)	73.5" (1.87m)	31" (.79m)	24" (.61m)	2.5" (63.5mm)	N/A	2750# (1247kg)
115SPEP	1 WHEEL DRIVE	15' (4.58m)	21' (6.41m)	28" (.71m)	1000# (453.6kg)	Yes	24 vdc Batt.	89" (2.97m)	73.5" (1.87m)	31" (.79m)	24" (.61m)	2.5" (63.5mm)	0"	2595# (1177kg)
119SPEP		19'4" (5.90m)	25'4" (7.73m)	31.5" (.80m)	500# (226kg)	Yes	24 vdc Batt.	89" (2.97m)	73.5" (1.87m)	31" (.79m)	24" (.61m)	2.5" (63.5mm)	0"	2850# (1293kg)
215SPEP	2 WHEEL DRIVE	15'2" (4.63m)	21'2" (6.46m)	30" (.76m)	1000# (453.6kg)	Yes	24 vdc Batt.	89" (2.97m)	77.5" (1.97m)	30" (.76m)	26" (.66m)	2" (50.8mm)	31" (.79m)	2715# (1231kg)
219SPEP		19'6" (5.95m)	25'6" (7.78m)	33.5" (.85m)	500# (226kg)	Yes	24 vdc Batt.	89" (2.97m)	77.5" (1.97m)	30" (.76m)	26" (.66m)	2" (50.8mm)	31" (.79m)	2975# (1349kg)

† Plant-Master weights include 125 lb. (57kg) skid.

AISLE-MASTER:

MODEL NO.	DRIVE	PLAT. HT.	WORK HT.	STOW. HT.	LIFT. CAP.	PLAT. EXT.	POWER	STEER.	O/A LENGTH	O/A WIDTH	GRND. CLEAR.	INSIDE TURN. RAD.	APPROX. WT.*
216 AM	2 WHEEL DRIVE	15'5" (4.69m)	21'5" (6.53m)	33" (.84m)	1000# (453.6kg)	Yes	24 vdc Batt.	Elec./ Hydr.	90.8" (2.31mm)	34.5" (.88m)	5" (127mm)	38" (.97m)	2765# (1254kg)
220 AM		19'9" (6.02m)	25'9" (7.85m)	36.5" (.927m)	500# (226.8kg)	Yes	24 vdc Batt.	Elec./ Hydr.	90.8" (2.31mm)	34.5" (.88m)	5" (127mm)	38" (.97m)	3025# (1372kg)
216 AM HT		15'5" (4.69m)	21'5" (6.53m)	33" (.84m)	1000# (453.6kg)	Yes	24 vdc Batt.	Elec./ Hydr.	90.8" (2.31mm)	34.5" (.88m)	5" (127mm)	38" (.97m)	2815# (1276kg)
220 AM HT		19'9" (6.02m)	25'9" (7.85m)	36.5" (.927m)	500# (226.8kg)	Yes	24 vdc Batt.	Elec./ Hydr.	90.8" (2.31mm)	34.5" (.88m)	5" (127mm)	38" (.97m)	3075# (1395kg)

* Aisle-Master weights include 125 lb. (57kg) skid.

TORQUE-MASTER II:

MODEL NO.	DRIVE	PLAT. HT.	WORK HT.	STOW. HT.	LIFT. CAP.	PLAT. EXT.	POWER	STEER.	O/A LENGTH	O/A WIDTH	GRND. CLEAR.	INSIDE TURN. RAD.	APPROX. WT.*
215 TM II	2 WHEEL DRIVE	15'9½" (4.81m)	21'9½" (6.61m)	33" (.838m)	1000# (453kg)	Yes	24 vdc Batt.	Elec./ Hydr.	94" (2.388m)	47½" (1.207m)	6" (152.4mm)	34.5" (.88m)	2845# (1290kg)
220 TM II	2 WHEEL DRIVE	19'9½" (6.032m)	25'9½" (7.86m)	37" (.940m)	500# (226.8kg)	Yes	24 vdc Batt.	Elec./ Hydr.	94" (2.388m)	47½" (1.207m)	6" (152.4mm)	34.5" (.88m)	3260# (1479kb)

* Torque-Master weight includes 150 lb. (68kg) skid.

2. OPERATION

PRELIMINARY INSTALLATIONS

1. Before operating the machine the control console must be mounted. The control is packed and located under the platform deck, between the scissors. To reach the control console, remove the phillips head screws in the deck board. Lift and remove board. Remove the control console and connect to cable at front of machine. Reinstall deck board in reverse procedure.

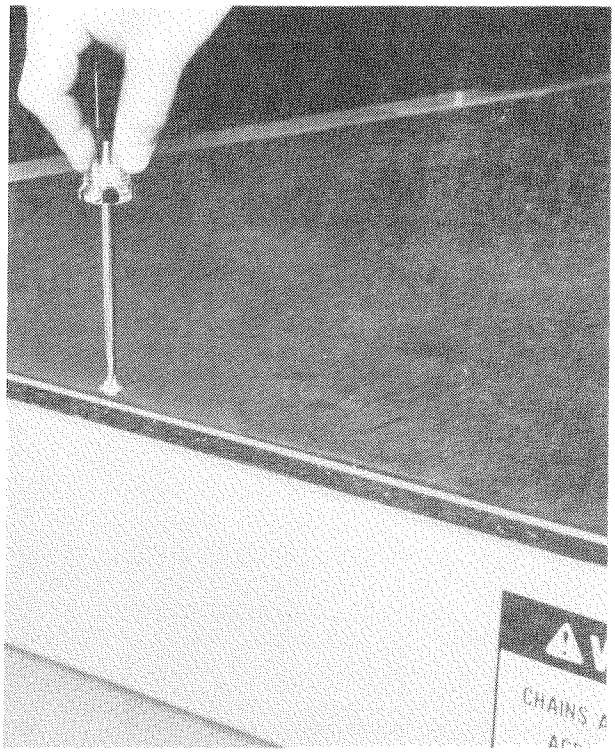


Figure 5. Deck Board Removal.

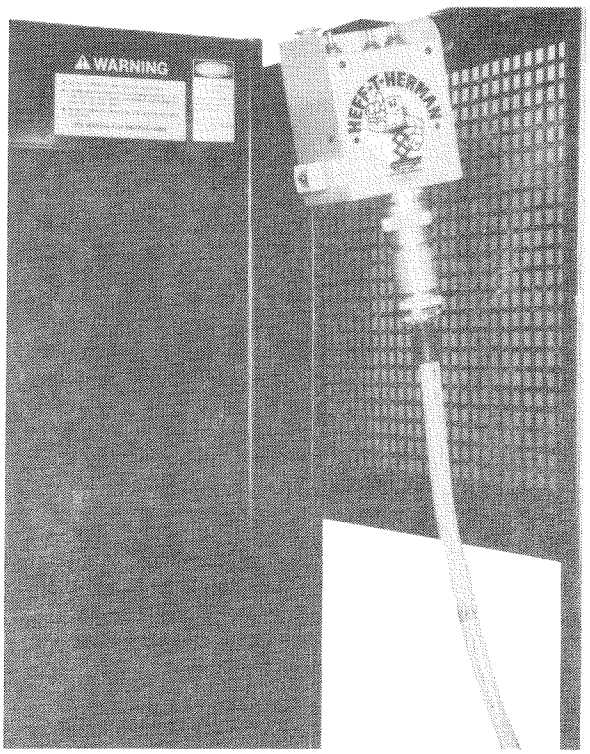


Figure 6. Mounting Control Console.

2. **Install Warning Decals**
   The warning decal specifying the carrying capacity of the extended platform is included in the pack with the operator's manual. Placement of decals is described in installation of the extended platform. (See Page 11.)

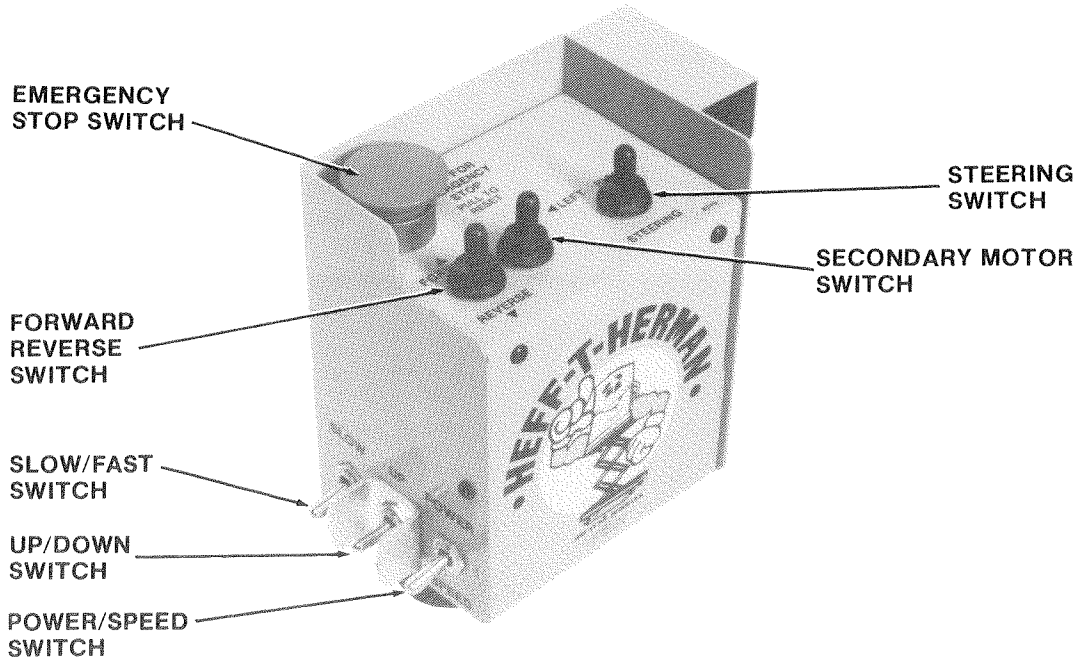


Figure 7. Control Switch Locations

SAFETY FEATURES

1. **Automatic Parking Brake** (Two Wheel Drive Units Only)
   The automatic parking brake is a spring actuated system. The brake is released during drive by hydraulic pressure built up in the drive circuit. A brake valve is used to maintain release during drive and an orifice is used to delay braking function during coast down.

2. **Emergency Stop** (All Self-Propelled Units)
   The emergency stop is located on the control console. Depress red knob as indicated and all functions of machine will be de-energized. Pull up on knob to reactivate circuits. (Fig. 7)

3. **Automatic Stabilizer**
   Stabilizers extend automatically as platform is elevated. When positioning unit for work, leave approximately 12 inches of space for stabilizer extension between the unit and any obstruction on both sides of the machine. If the stabilizers contact an immobile object while extending, the platform automatically stops rising.

4. **Automatic Pot Hole Bars** (Aisle Master Models only)
   Rotate down and out to be flush with the outside edge of wheels. The unit can be positioned with wheels against an obstruction but none between front and rear wheels. (Fig. 8)

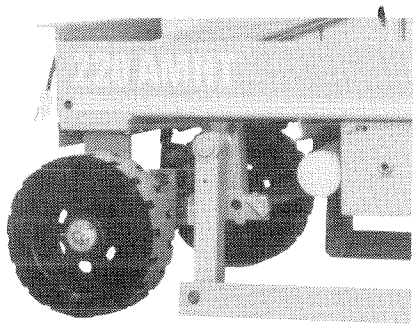


Figure 8. Pot Hole Bar.

OPERATING INSTRUCTIONS

A. ALL MODELS

1. To operate your Heff-T-Herman you must first turn the key to the "ON" position. The key is located at the lower control station at the base of the machine. (Figure 9)

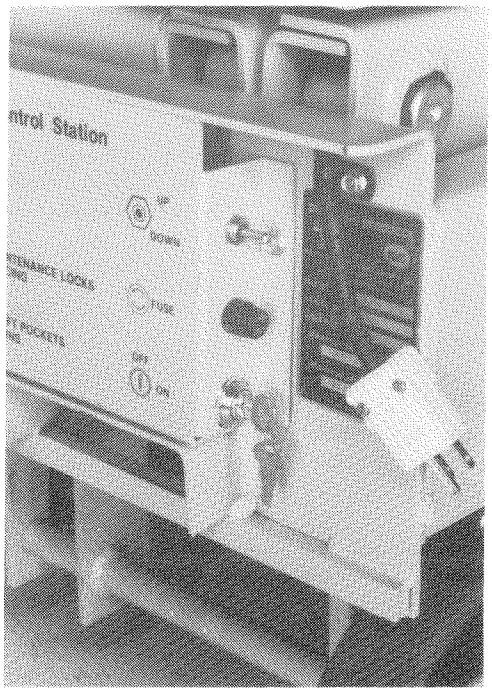


Figure 9. Key Switch Location.

2. To Raise Platform
   Activate up/down toggle switch to up position. To stop platform, release switch.
3. **To Lower Platform**
   Activate up/down toggle switch to down position. To stop platform, release switch.
4. All models have dual controls for raising and lowering. The second set of controls is found at the lower control station. (Figure 9)

B. SELF-PROPELLED MODELS

1. **To Travel** (Forward or Reverse)
   Activate forward/reverse toggle in direction desired.
2. **To Steer** (Left or Right)
   Activate steering toggle switch in desired direction.

C. TORQUE MASTER MODELS

1. **To Travel** (Slow Speed 1-mph)
   Position slow/fast switch to slow position. Activate primary drive switch (Figure 10) in direction desired. One power source (primary) will propel drive wheels in a series circuit at a reduced speed. (Automatically engaged when platform is elevated **beyond** four feet.)

2. **To Travel** (Regular Speed 2-mph)
   Position slow/fast switch to fast position. Activate primary drive switch in direction desired. One power source (primary) will propel drive wheels in a series circuit. (Only available when platform is **below** four feet in elevation.)

3. **To Travel** (High Speed 3-mph)
   Position slow/fast switch to fast position. Position power/speed switch to speed position. Activate primary drive switch and secondary motor switch simultaneously in direction desired. Both power sources will propel drive wheels in a series circuit at increased speed. (Only available when platform is **below** four feet in elevation.)

4. **To Travel** (Power Mode - Slow Speed 1-mph)
   Position slow/fast switch to slow position. Position power/speed switch to power position. Activate primary drive switch and secondary motor switch simultaneously in direction desired. The primary power source will propel one drive wheel, and the secondary power source will propel the other drive wheel, in a parallel circuit at a reduced speed.

5. **To Travel** (Power Mode - Regular Speed 2-mph)
   Position slow/fast switch to fast position. Position power/speed switch to power position. Activate primary drive switch and secondary motor switch simultaneously in direction desired. The primary power source will propel one drive wheel, and the secondary power source will propel the other drive wheel, in a parallel circuit. (Only available when platform is below four feet in elevation.)

6. **To Raise Platform** (Normal Speed)
   Activate the up/down switch to up position. (See Section A-2.)

7. **To Raise Platform** (High Speed)
   Position power/speed switch to speed position. Activate the up/down switch to up position and the secondary motor switch simultaneously.

8. **To Lower Platform**
   Activate the up/down switch to down position. (See Section A-3.)

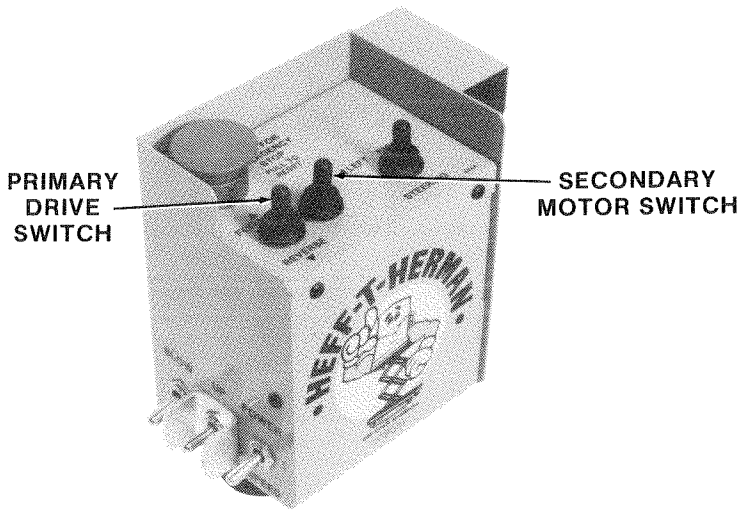


Figure 10. Torque Master Motor Switches

GENERAL OPERATING RULES AND SAFETY

1. The following instructions must be complied with to ensure safe operation of the Heff-T-Herman work platform.
2. Before operation — Ensure that the machine is properly serviced. (**Do Not Use** if machine is not working properly.)
3. Ensure that platform guard railings and safety chains are in place whenever someone is on the platform.
4. Always set parking brake or lock caster brakes before elevating platform.
5. **Do Not** operate on uneven or soft terrain.
6. **Do Not** exceed the load capacity of platform.
7. Always check clearance around machine before maneuvering. . . . Especially before lowering platform.
8. **Do Not** use near power lines. . . . Platform and enclosure are **not** insulated.
9. **Do Not** elevate on incline.

3. INSTALLATION EXTENDING PLATFORM

EXTENDING PLATFORM

1. Drive the expanpin from the pivot pin and remove the pivot pin from the main platform assembly. (Fig. 11)

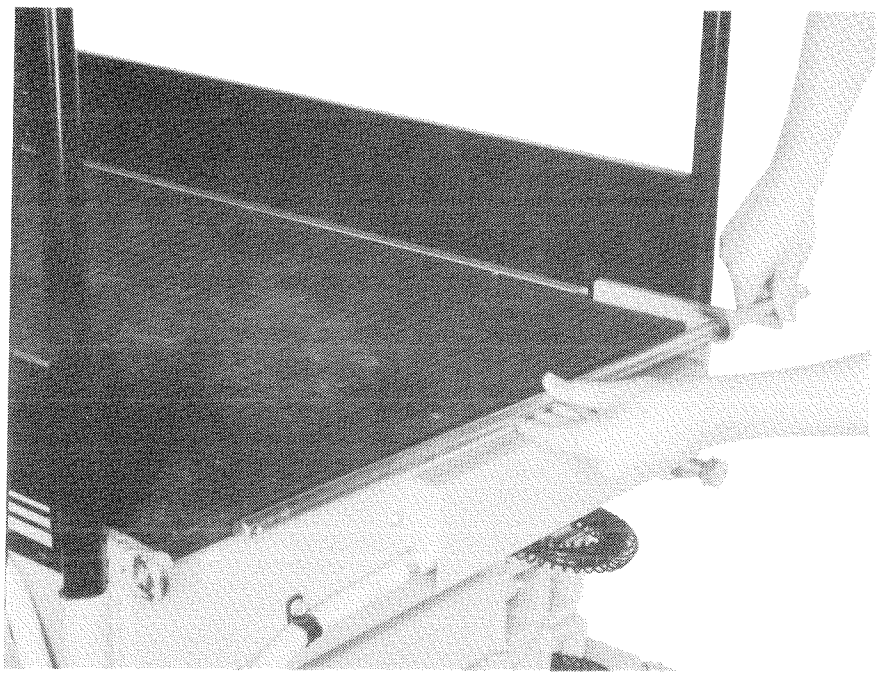


Figure 11. Pivot Pin Removal.

2. Lift the extending platform up into place, lining up the holes in the platform with those in the main unit.

3. Slide the pivot pin through the holes. (Fig. 12)

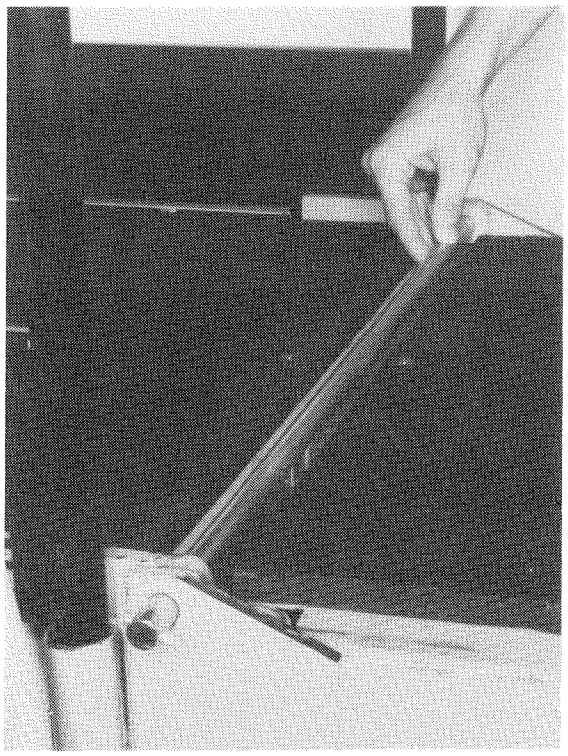


Figure 12. Pivot Pin Installation.

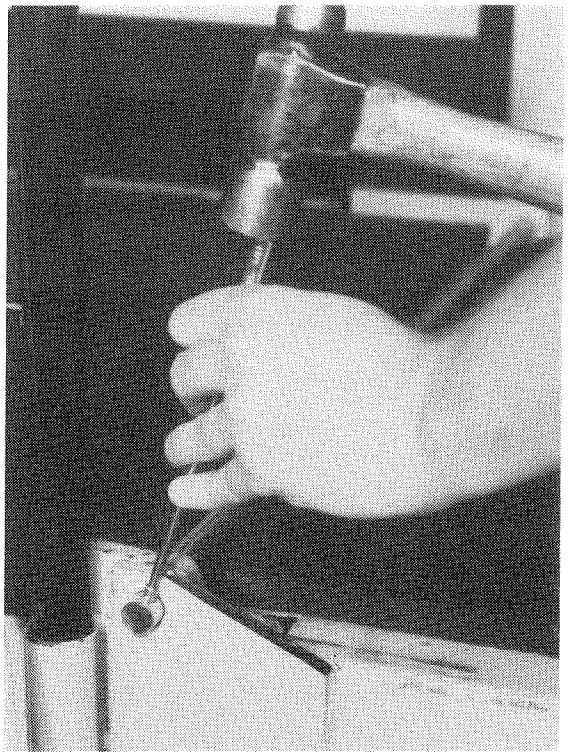


Figure 13. Expanpin Installation.

4. Install the expanpin in the pivot pin. (Fig. 13)

5. Adjust level of extending platform by turning adjusting bolts on main platform. When the extending platform is sitting in the same plane as the main platform, lock the adjustment bolts by turning nuts tight against the main platform. (Fig. 14)

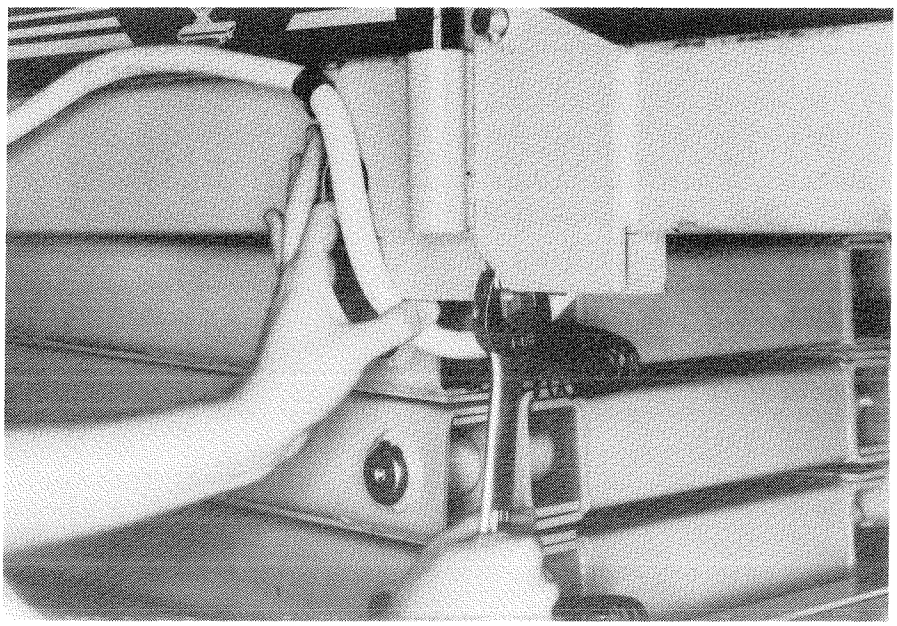


Figure 14. Leveling Platform.

6. Install the right hand side rail into its pockets on the platform, with the retaining clip to the inside. Do not bottom the rail completely in its pockets.

7. Slide a two by four under the rail to keep it from dropping all the way into its pockets. (Fig. 15)

8. Lay the front rail down on the platform, and engage the pin in the front rail in the hole on the right hand rail. (Fig. 16)

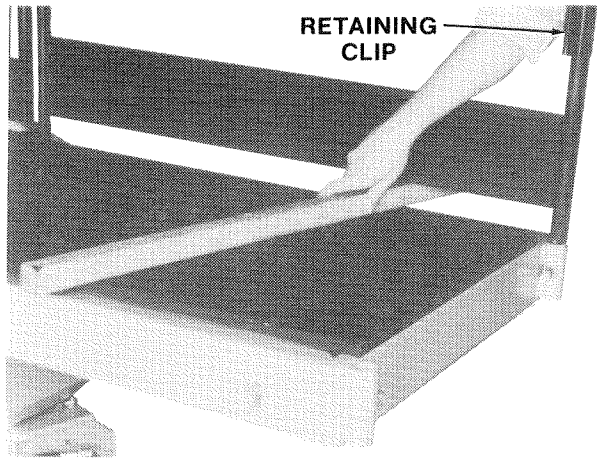


Figure 15. Right Hand Rail Installation.

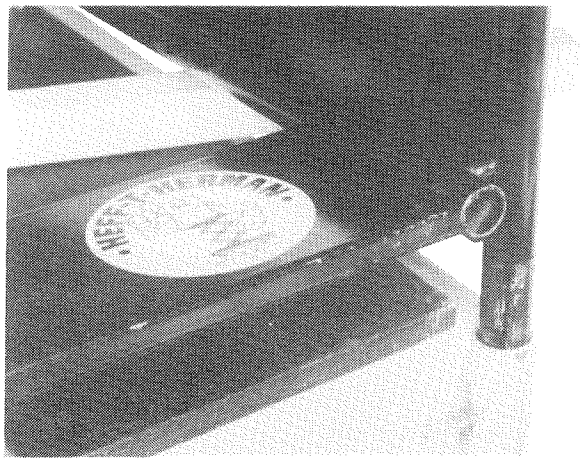


Figure 16. Front Rail Installation.

9. Lift left rail up into position. Engage the pin on the front rail in the hole while installing the side rail in its pockets. (Fig. 17)

10. Remove two-by-four and bottom the rails in their pockets.

11. Secure rails by tightening bolts in the four pockets. (Fig. 18)

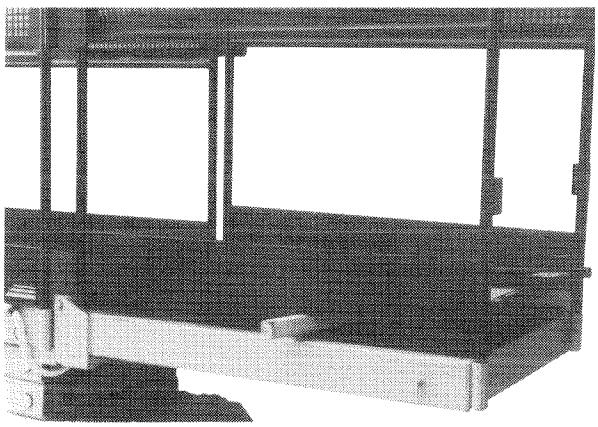


Figure 17. Left Rail Installation.

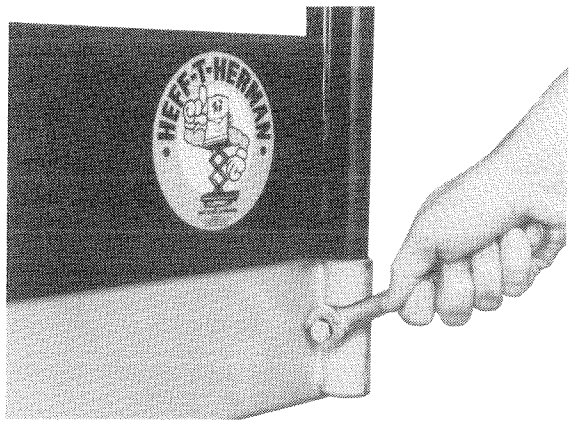


Figure 18. Securing Rails.

NOTE

Decals are found in literature pack. Check to make sure that capacity on decal corresponds with capacity on serial plate.

12. Attach decals with platform in extended position as follows: (Fig. 19)

    a. Place one decal upside down on outside front end of platform.

NOTE

Operator can see this decal when platform is in stowed position.

    b. Place one decal right side up on inside of front railing.

NOTE

Operator can see this decal when platform is in extended position.

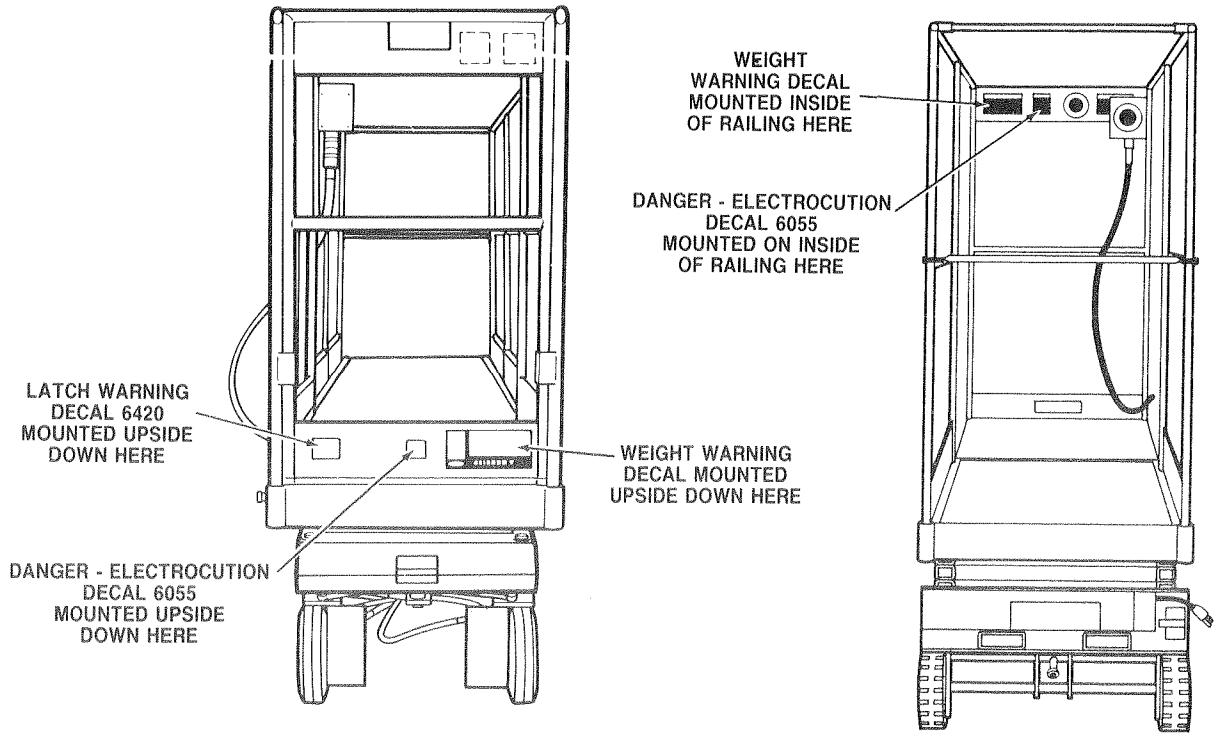


Figure 19. Warning Decal Installation.

CAUTION

When stowing or extending the platform be sure to move the control box and cord out of the way.

13. To return platform to its stowed position, grasp the front rail and pivot back until it disengages from the retaining clips.

14. Walk backwards while pulling on front rail until extending platform rotates to its stowed position. Lower railing to its stowed position. (Fig. 20)

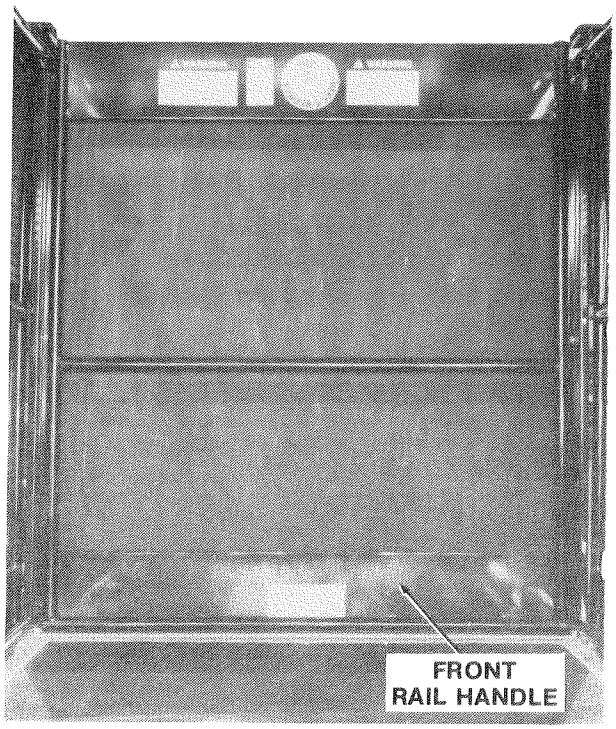


Figure 20. Railing Stowed Position.

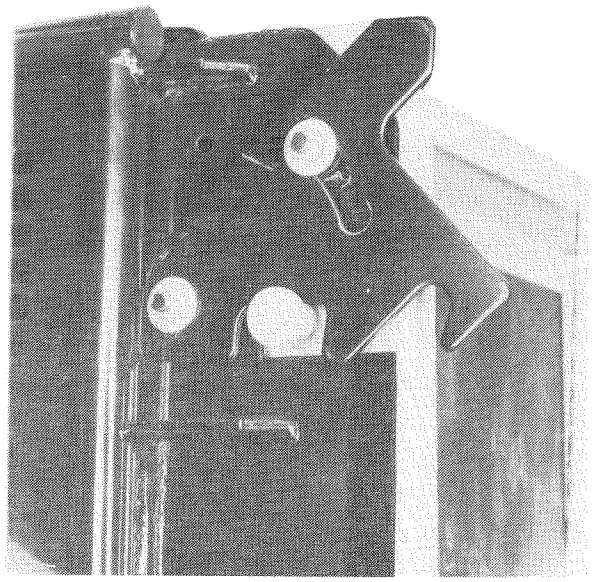


Figure 21. Platform Latch.

15. Extend the platform by grasping the top rail with the left hand and free the latch with the right hand. (Fig. 21)

16. Lower platform carefully with both hands on the front rail and walk toward the extended platform as it lowers into position. (Fig. 22) Pivot front rail to its vertical position until it snaps into the retaining clips.

17. To retract extending platform, pull back on front hand rail pulling extended platform into the stowed position. Lower front hand rail and check to see that platform latch is in locked position. See Fig. 21.

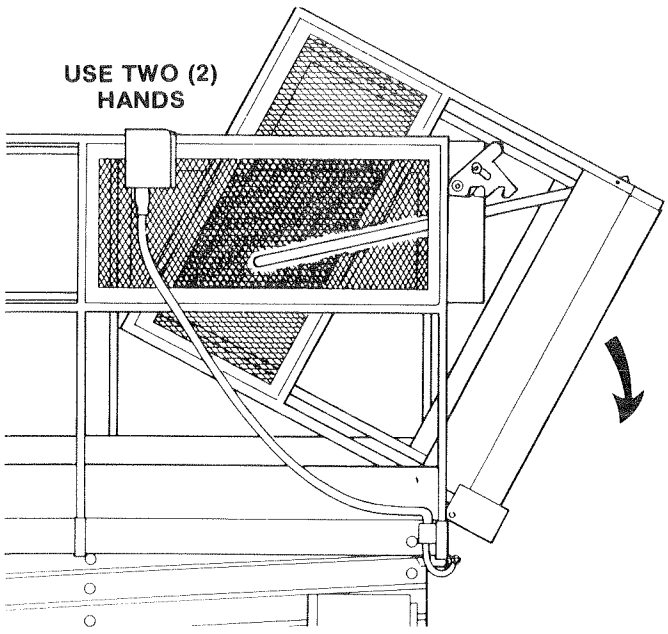


Figure 22. Lowering Extended Platform.

4. 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 scissor type lifting device, a hazard to personnel exists when maintenance is performed by working through the lifting beams with the unit raised.

When possible, all maintenance should be performed through the floorboards with the platform lowered. The power core can also be removed to provide access to components while in the lowered position.

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. Remove load from platform.
2. Raise platform as high as necessary to engage MAINTENANCE LOCKS.
3. MAINTENANCE LOCKS located at the front inside corners of the unit lower frame. Lift and slide back to engage. (Fig. 23)

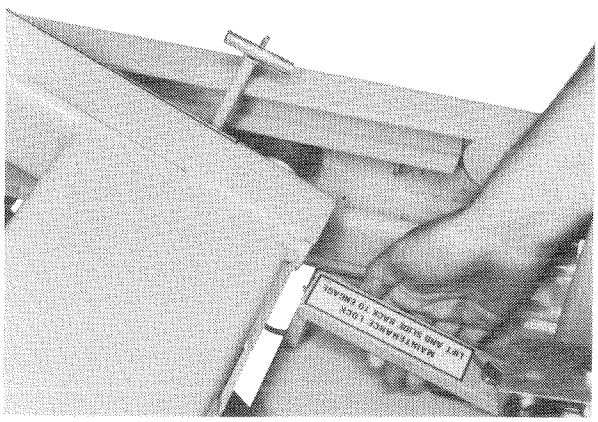


Figure 23. Positioning Maintenance Locks.

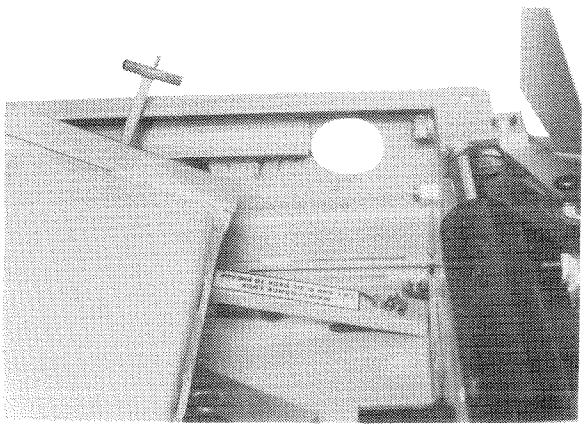


Figure 24. Engaging Maintenance Locks.

4. Lower platform until lower beams make contact with the MAINTENANCE LOCKS. (Fig. 24)

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

INSPECTION AND LUBRICATION

1. **Visual Structural Inspection**

   a. Visually check machine for bent structural members. (Beams, main frame, platform, lift arm, pivot pins, etc.) Machines which have been overloaded could have bent members and fatigued pivot pins. Replace all bent members and pins, and always replace lower pivot pin at center of lower cross beams to insure a safe operating machine.

   b. Check bushings in scissor beams for broken or cracked welds. Replace beams if bushing welds are cracked or bushings elongated.

2. **Lubrication**

¡ WARNING !

All pivot areas of scissors and lift cylinder must be lubricated as described. Failure to do so will result in extensive damage to structural members and bushings which would create a hazardous condition and could result in injury or death to personnel.

Every 15 hours or weekly, whichever comes first, lubricate the following areas with EP-90 oil or equivalent:

a. All pivot areas of scissor members and lift cylinder. (Both sides of bushing in beams.) (Figs. 25 and 26)

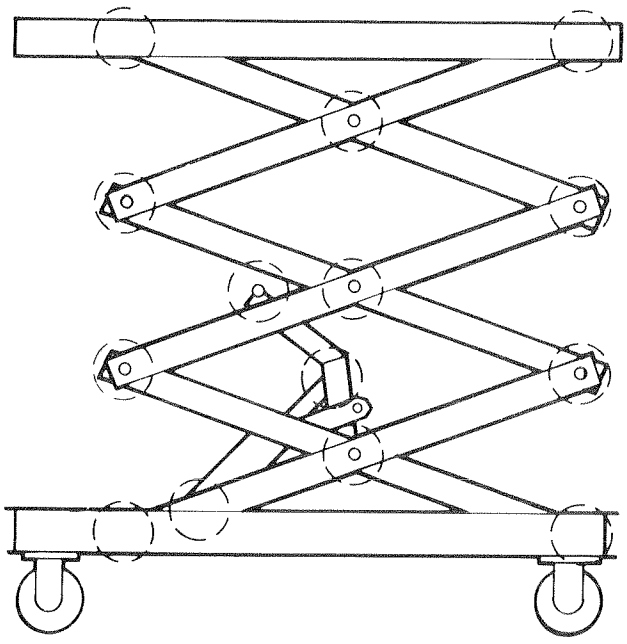


Figure 25. Scissors Lubrication Areas.

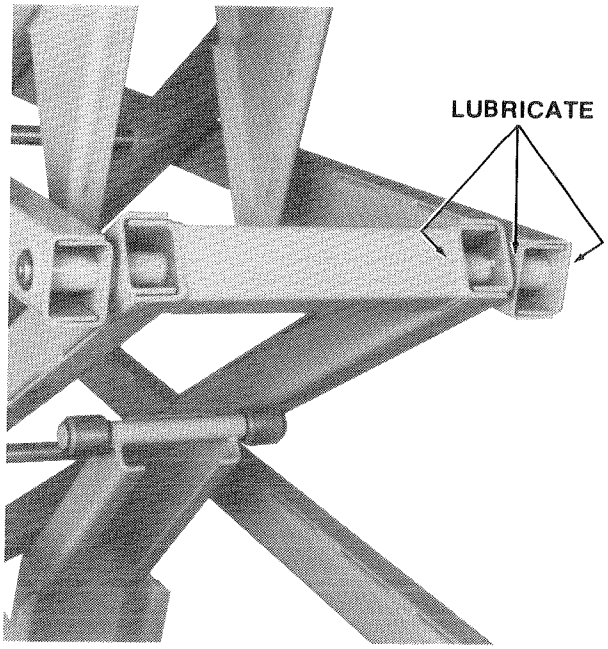
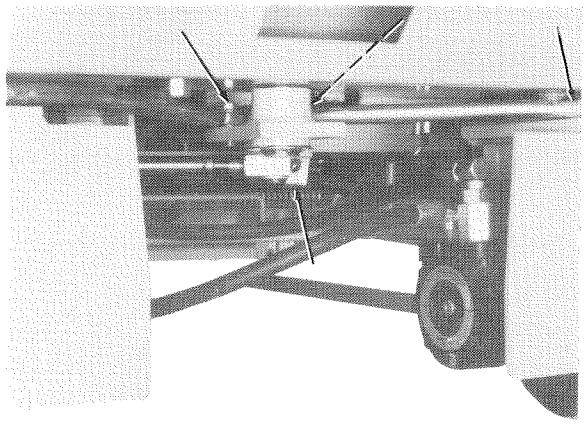
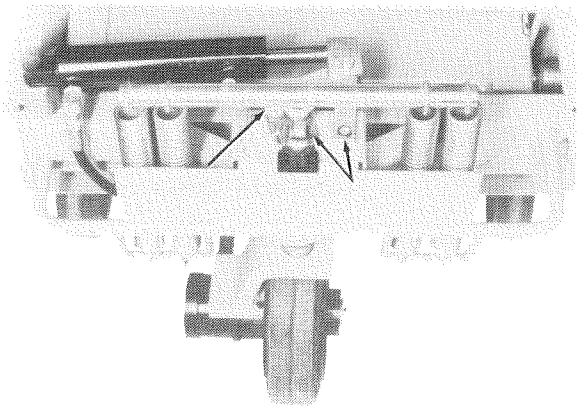


Figure 26. Scissors Lubrication.



2-Wheel Drive



1-Wheel Drive

Figure 27. Lubricating Steering Linkage.

b. Pivot points of steering cylinder and pivot areas of steering linkage. (Fig. 27)

c. Pivot points of brake cylinder.

d. Lubricate bushings (4). (Fig. 28)

e. Lift arm, platform, and base rollers. (Fig. 29 and 30) Lubricate shaft on both sides of roller.

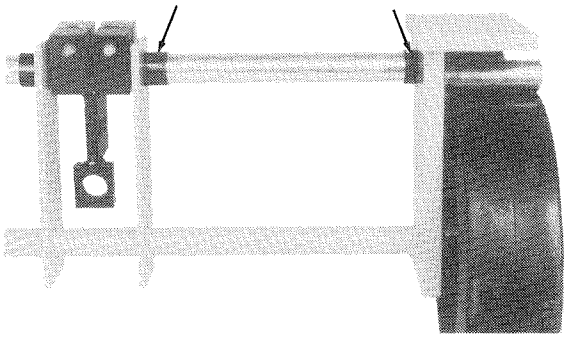


Figure 28. Lubricating Brake Linkage.

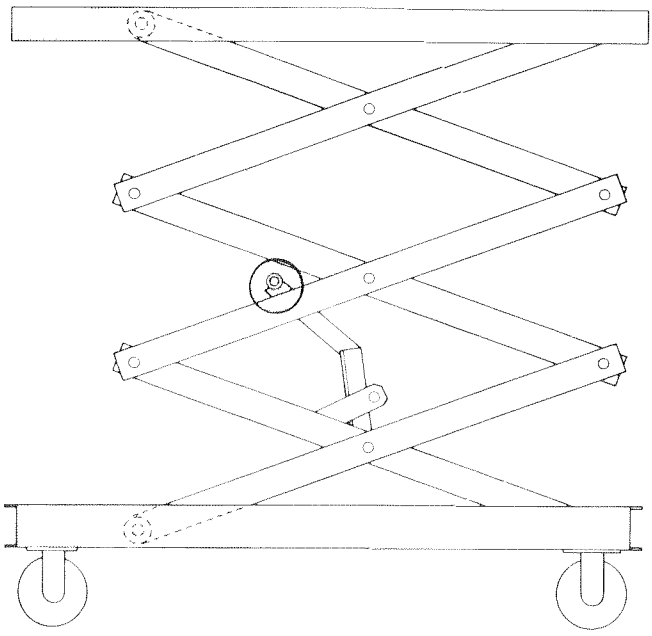


Figure 29. Lift Arm and Platform Lubrication Points.

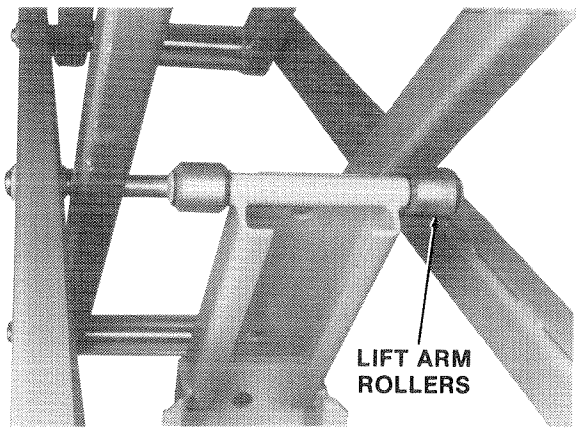


Figure 30. Lubricating Roller at Lift Arm.

Grease the following fittings weekly:

a. Lift arm pivot tube. (Fig. 31)

b. Caster swivel plates and caster axles.

Pack rear wheel bearings every six months, or sooner if required (on 2-wheel self-propelled models only).

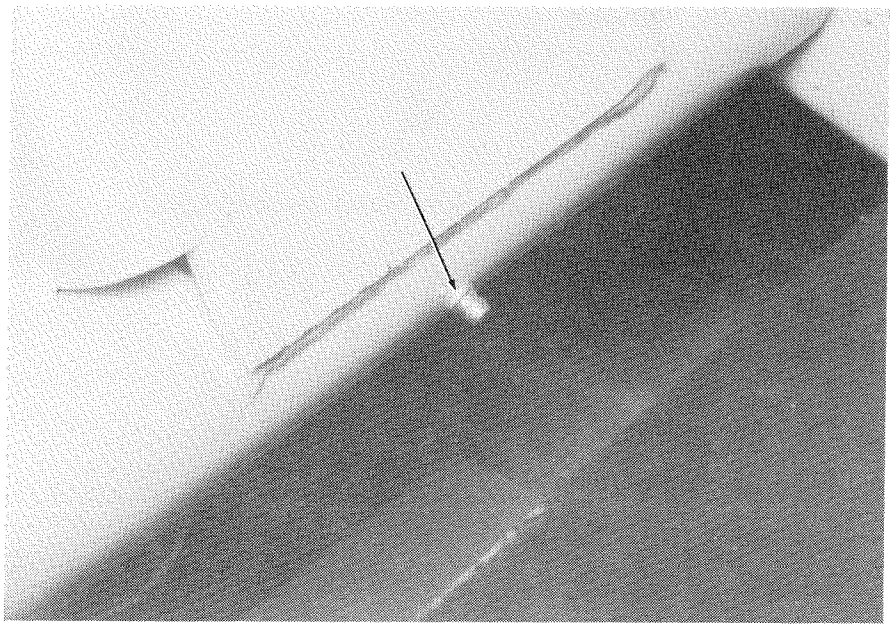


Figure 31. Grease Fitting Location.

Battery
1. Check Wiring
2. Check Fluid Level

Hydraulic System
1. Check for Leaks
2. Check Hoses

Scissor System
1. Check for Damage
2. Check Snap Rings

Platform
1. Safety Chains
2. Extension Latch and Pin
3. Extension Pivot Pin
4. Railings Secure in Pockets
5. Safety Decals

Keep log as follows:
1. Inspect components
2. Check Boxes if components OK
   or
   Make repairs
3. Initial boxes

Key:
B = Battery
H = Hydraulic System
S = Scissor System
P = Platform

MONTH																														
DAY						7						14						21						28						
INIT.																														
B-1																														
2																														
H-1																														
2																														
S-1																														
2																														
P-1																														
2																														
3																														
4																														
5																														
MONTH																														
DAY						7						14						21						28						
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5																														

Table 3A. Inspection and Lubrication Daily Log.

COMPONENT	Check and Initial Every 15 hours of USE, or Weekly
MONTH	
DAY	
INITIAL	
Battery	
1. Clean Battery	
2. Coat Terminals	
Hydraulic System	
1. Check Fluid Level	
2. Inspect Commutator and brushes*	Date Last Checked _____
3. Check Fittings	
Scissor System	
1. Oil Pivot Points & Rollers	
Drive and Lift Mechanisms	
1. Oil Steering Pivot Points	
2. Oil Brake Pivot Points	
3. Grease Lift Arm, Pivot Tube (All Models)	
Main Frame	
1. Grease Caster Axles and Swivel Plates (Manual and 1 SP)	
2. Grease Drive Assembly Spindles (2 Wheel Drive Models)	
3. Check Structure and Pivot Pins	
Control System	
1. Check Terminals and Plugs	
2. Check Cords	

*Check every 6 months

Table 3B. Inspection and Lubrication Weekly Log.

	TIME INTERVAL			
COMPONENT	**DAILY**	**WEEKLY**	**6 MONTHS**	**1 YEAR**
Battery				
1. Check Wiring	X			
2. Check Fluid Level	X			
3. Clean Battery Connections		X		
4. Coat Terminals		X		
Hydraulic System				
1. Check for Leaks	X			
2. Check Fluid Level		X		
3. Inspect Commutator and Brushes			X	
4. Check Hoses	X			
5. Check Fittings		X		
6. Oil Filter (Replace)				X
Scissor System				
1. Check for Damage	X			
2. Oil Pivot Points and Rollers		X		
Drive and Lift Mechanism				
1. Oil Steering Pivot Points		X		
2. Oil Brake Pivot Points		X		
3. Grease Lift Arm, Pivot Tube		X		
Main Frame				
1. Grease Casters		X		
2. Check Structure		X		
3. Check Pivot Pins				X
4. Grease Wheel Spindles		X		
Control System				
1. Check Terminals and Plugs		X		
2. Check Cords		X		
Safety Decals*				
1. Check if missing. Add if necessary.	X			
2. Check if legible. Replace if necessary.	X			
Platform				
1. Safety Chains	X			
2. Extension Latch and Pin	X			
3. Oil Latch Pivot Pin	X			
4. Extension Pivot Pin	X			
5. Oil Extension Pivot Pin	X			
6. Railing Secure in Pockets	X			

* See page 61 for safety decals and locations.

Table 3C. Inspection & Lubrication Schedule.

SERVICING, REPLACEMENT & ADJUSTMENTS

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.

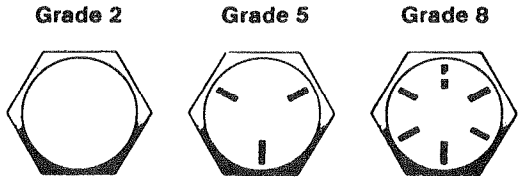
REPLACEMENT describes the proper method for removal and installation of replaceable components in case of failure.

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

CAP SCREWS

NOTE: Any bolt replacement should be of same grade or greater than original bolt. Any questions, call the factory for verification.

Grade markings for Cap Screws grades 2, 5, and 8 are based on SAE J429. Markings may be raised or depressed (Manufacturer's option).



1. BATTERY

¡ 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!

Heff-T-Herman battery models are supplied with heavy duty deep-cycle batteries. The care and maintenace of your batteries 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 batteries be given an equalizing charge of 25% over the regular charge. The equalizing charge must always be given at 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. Do not run battery dead. Put battery on charge when approximately 80% discharged. (Hydrometer reading of 1.500 at 80° F. or 26.6° C.)

WARNING

NEVER SMOKE OR USE OTHER COMBUSTIBLES NEAR BATTERY. MAKE SURE THERE IS PLENTY OF VENTILATION. HYDROGEN FUMES COULD LEAD TO EXPLOSION.

a. **Checking and Filling** (Every 15 hours of use or when recharging)

(1) Lower platform completely.

(2) Remove floorboard.

(3) If there is any dirt or corrosion on battery, wash with solution of 5 teaspoons baking soda per quart of warm water.

(4) Remove battery caps and check fluid.

(5) Fill, if needed, as follows:

(a) Before charging, fluid must be above plates in battery.

(b) After charging, fill to split ring.

CAUTION

Do not overfill. Fluid will expand as it becomes warm from charging and seep out of the battery. When water is then added, the solution is weakened and a loss of ampere hour capacity results.

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 top of the plates.

(6) Coat terminals with petroleum jelly or equivalent coating.

b. **Charging Notes**

(1) The surrounding temperature has a great effect on the power reserve in a battery.

(a) A battery 100% charged at 80° F.
—drops to 65% at 32° F.
—drops to 40% at 0° F.

(b) A battery 46% charged at 80° F.
—drops to 32% at 31° F.
—drops to 21% at 0° F.

(2) When battery temperature reaches 125°, battery should be taken off charge and cooled to room temperature or the charging rate should be lowered.

(3) Battery should be brought to full charge as soon as possible after continuous use. (Hydrometer reading of 1.265 at 80° F. or 26.6° C.

(Lead plates in discharged batteries become hardened and sulfated. The battery eventually will not deliver its rated capacity or come up to a full charge. Several long slow charges and fast discharges help restore plate condition.)

(4) Once a month, battery should be given an equalizing charge of 25% over regular charge. Charge must be given at low rate to avoid gassing.

c. **Charging**

(1) Lower platform completely.

(2) Remove floorboards.

(3) Remove caps, check fluid level and if needed, fill to cover plates.

(4) Reinstall caps before charging.

NOTE

After charging, fill to split ring.

(5) Plug charger into 120 VAC, 60 HZ power source.

(6) Turn timer clockwise to "ON" position.

(7) Charge until meter reads in finish area or near zero (0). (Charger will turn off automatically when timer runs out.)

(8) Unplug charger.

(9) Check that fluid level is up to split rings and reinstall caps.

d. **Battery Replacement**

(1) Completely lower unit.

(2) Remove floorboard.

(3) Remove nuts from battery hold down and remove.

(4) Remove battery cables.

(5) Remove battery.

(6) Reverse procedure.

2. HYDRAULIC SYSTEM

a. **Hydraulic Pump Motor Servicing**

Common maintenance on DC motors is brush replacement. It is recommended that brushes be checked and replaced if necessary, along with commutator inspection, approximately every six months. The time element will greatly vary depending on how the machine is being used and the condition of the battery. It is to your advantage to keep the batteries fully charged and in top condition to eliminate service problems in general, and to extend the life of the motor and brushes. (See Battery servicing)

b. **Check and Fill Hydraulic Reservoir**

(1) Raise platform, engage safety locks and lower platform on safety locks.

(2) Check sight gauge on right side of machine. (Fig. 32)

(3) If oil is not visible in sight gauge, unscrew the filler plug located inside the left frame member and fill the reservoir with hydraulic fluid conforming to MIL. Spec. O-5606. (Fig. 32)

(a) The reservoir should be filled with the platform raised and the safety locks engaged. Check the reservoir level with the platform lowered onto the safety locks. Oil should be visible in the sight gauge at this position. This ensures that the proper amount of oil is available when the platform is fully lowered.

(b) If filling the reservoir is required when the platform is in a stowed position, remove the reservoir sight guage and fill the reservoir with oil through the sight gauge hole. Then replace the sight gauge, raise the platform, engage the safety locks and adjust the oil level to the proper height.

c. **Spin-on Oil Filter** — The spin-on oil filter in the Hydraulic system should be changed yearly. Replace with filter part #6156 only. (Fig. 32)

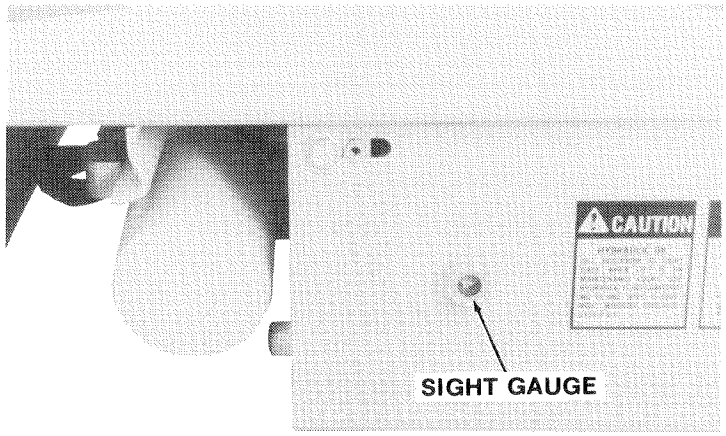


Figure 32. Hydraulic Oil Sight Gauge and Oil Filter.

d. **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, actuate the platform full up and down for six cycles and recheck the reservoir fluid level between each cycle. Fill as required.

e. **Hydraulic Pump and Motor Replacement**

(1) Disconnect positive and negative battery cables by separating quick disconnect connector located beneath left frame rail.

(2) Remove power core from base.

(3) Tag and remove wires from hydraulic pump and motor assembly.

(4) Remove hydraulic hoses from pump.

NOTE

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

(5) Remove four bolts securing pump motor to base mount from underside of base.

(6) Lift pump up out of base and remove.

(7) Install new or repaired hydraulic pump assembly in reverse order of removal. Install power core to base.

(8) Refill hydraulic reservoir to replace fluid lost during disassembly.

(9) Raise and lower the platform six times to bleed the system. Check the fluid level after cycling and fill as required.

3. SLOW SPEED SWITCH (Self-Propelled Units Only)

a. **Adjustment**

(1) Raise platform approximately (4) four feet.

(2) Remove lower control box.

(3) Adjust switch in or out to activate circuit at this height. Slow speed valve will then be energized when platform reaches this height allowing machine to travel in slow speed only.

4. BRAKES (2-WHEEL SELF-PROPELLED UNITS ONLY)

NOTE

Adjust brakes so that parking brake holds machine on an incline which it is capable of climbing.

a. **Adjust brake rods and spring tension as follows:**

(1) Loosen adjustment block bolts. (Fig. 33)

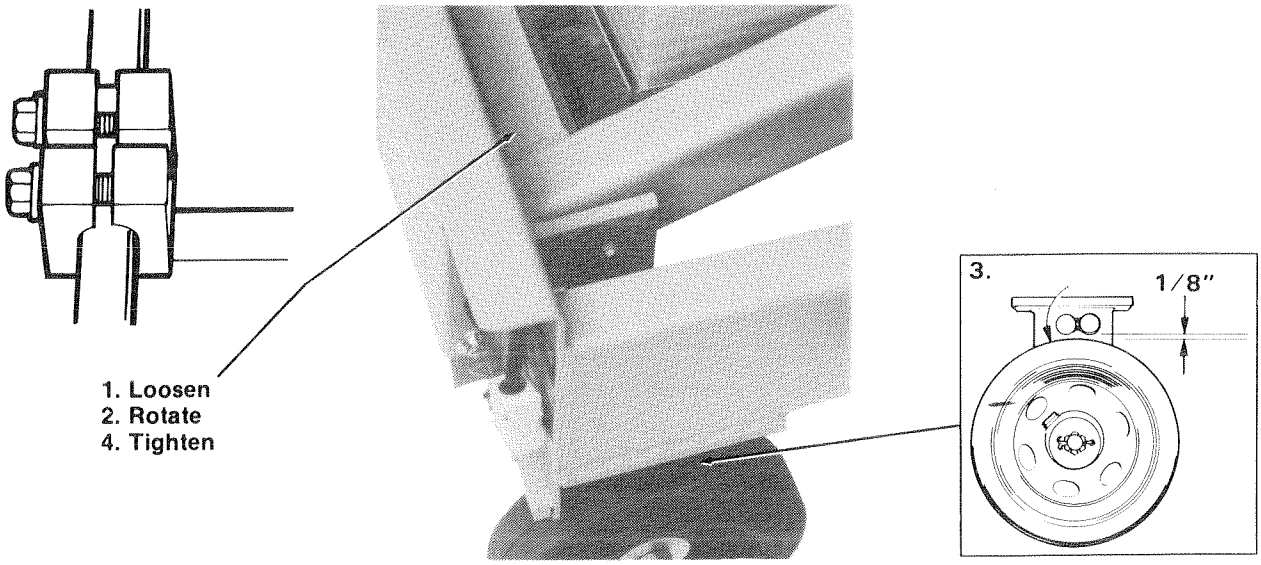


Figure 33. Adjusting Brakes.

(2) Loosen spring adjustment nut until nut is at end of stud (PM models only).

(3) Remove screws holding lower control panel. Lay on boards stuck in fork pockets.

(4) Remove wire 3 (coming from component tray) from terminal board TS1-3. Temporarily connect to TS1-1.

(5) Actuate drive switch forward then reverse to fill brake cylinder with fluid. Valve V4 should be energized by step 4 and hold cylinder in extend position. Brake cylinder must remain at full extension during setup.

NOTE

If this does not occur, check to make sure V4 is energized or it is not leaking. If so, replace first.

(6) Rotate brake eccentric shafts to obtain the following:

(a) SPEP's:
1/8" gap between brake pad and wheel. (Fig. 33)

(b) TM and AM Models:
1/16" gap between brake shoe and wheel drum. (Fig. 35)

NOTE

Brake pad eccentrics must be toward rear of unit.

(7) Tighten bolts in adjustment block when dimensions are achieved on both sides.

(8) Return wire 3 to proper location.

(9) Tighten brake spring adjustment nut to obtain 3/4" to 1" of thread showing at end of threaded stud.

(10) Test drive unit on flat surface and observe brake pad action. Both brake pads should lift off wheels on start up and come back to rest near end of coast down. If braking action is too soon, repeat steps above increasing gap slightly. If too long, reduce gap.

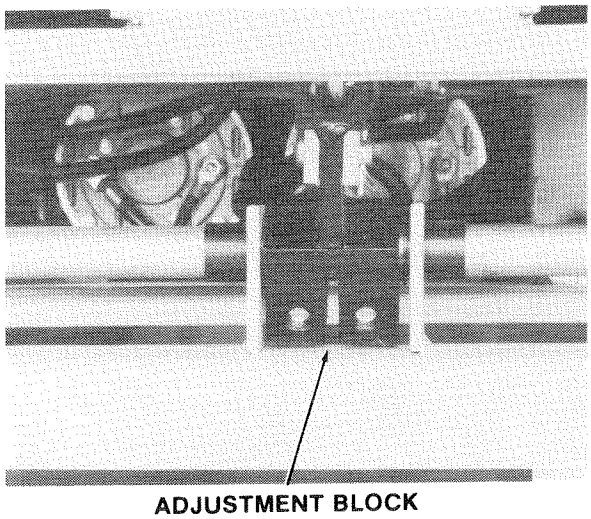


Figure 34. Brake Adjustment Block.

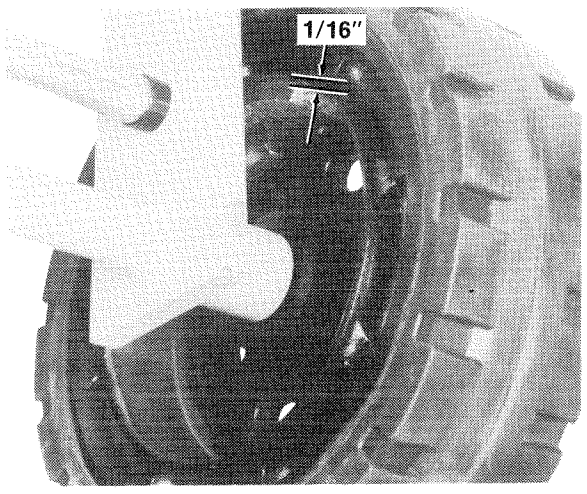


Figure 35. Brake Shoe Clearance.

5. FRONT WHEEL ALIGNMENT (All 2 WHEEL DRIVE MODELS)

NOTE

Front wheels should be aligned so that wheel brackets are parallel to the center bar. (Fig. 36)

a. **Adjust tie rods so that brackets are parallel to center bar.**

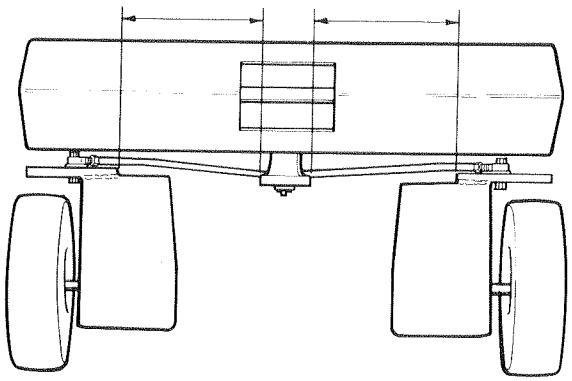


Figure 36. Aligning Front Wheels.

b. **Steering Stop Adjustment** (TM II Model and AM Model)

1. Loosen the lock nut, and back all four steering stop bolts out completely so they do not protrude from the bracket. (Fig. 37)
2. Turn the front wheels hard left so the steering cylinder is completely extended. (Fig. 38)
3. There should be a slight gap between the steering stop and the adjustment bracket. Turn the front adjustment bolt in so that the gap is removed and the bolt just contacts the stop. Tighten the locking nut.
4. Turn the steering hard right and repeat the adjustment on the rear steering stop bolt.
5. Repeat the adjustment for the opposite wheel.

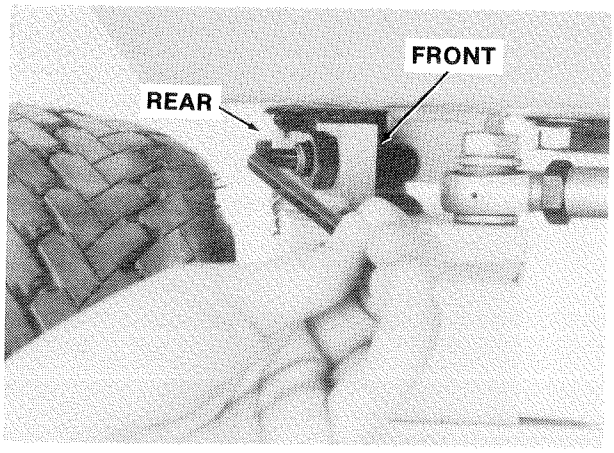


Figure 37. Steering Stop Bolt.

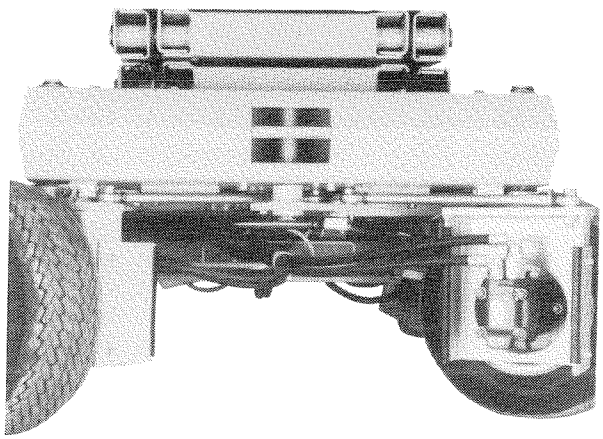


Figure 38. Steering Stop Adjustment.

c. **Flow Control Valve**

(1) Raise unit to fully extended position. (Engage maintenance locks while adjusting.)

(2) Depress DOWN switch and open or close flow control valve, as necessary, to adjust descent speed of platform to about 6″ per second.

6. HYDRAULIC LIFT CYLINDER (ALL MODELS)

¡ WARNING !

1. This procedure requires platform to be raised for access to unit through opened lifting beams.

   NEVER work through beams unless maintenance locks are engaged correctly; serious injury or death can result if locks are not correctly engaged. (Fig. 39)

2. Follow steps in order. Failure to do this could result in serious injury or death.

A. **Replacement**

1. Raise platform.
2. Engage maintenance locks. (Fig. 35)
3. Place a 4″ × 4″ × 36″ long block of hardwood under center pivot pin of lower beam for added safety. (Fig. 40)

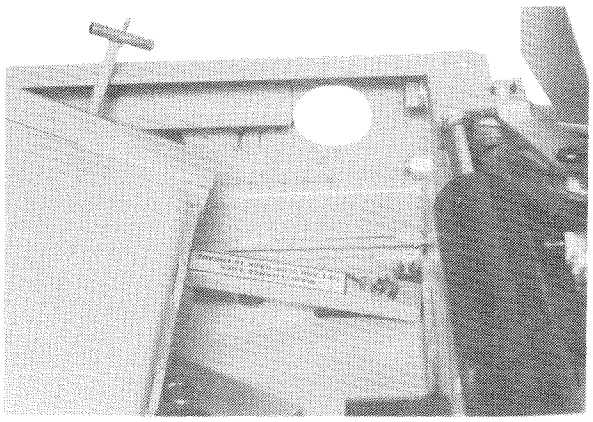


Figure 39. Engaging Maintenance Locks.

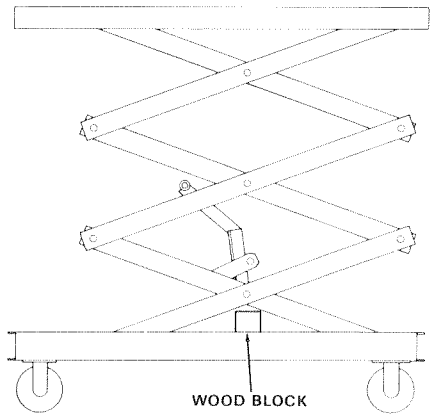


Figure 40. Installing Wood Block for Safety.

4. Lower platform until lower beams touch maintenance locks.
5. Remove cotter pin from lower cylinder pin.
6. Set up to remove cylinder as follows:

   a. Attach rope to end of lift arm, around roller and wrap once around center pivot bar which is third from bottom center pivot bar. Attach a weight of about 8 lbs. to end of rope. (Fig. 41)

NOTE

The weight counterbalances the lift arm and makes it easy to maneuver.

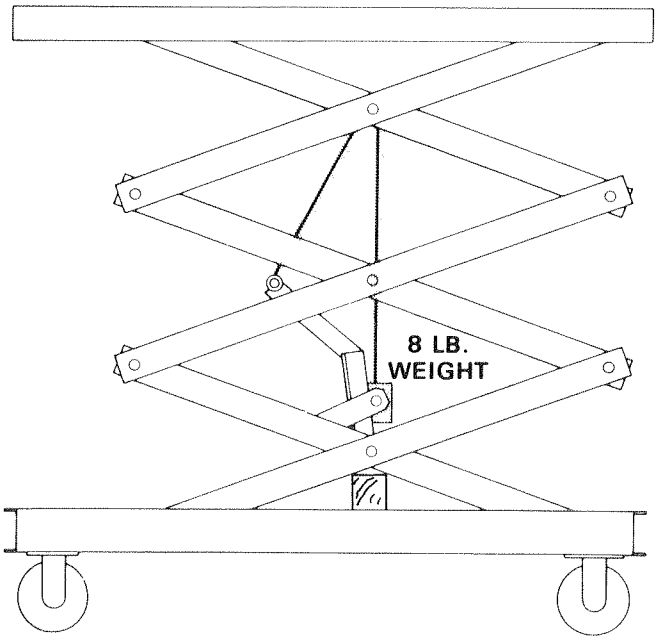


Figure 41. Counter Balancing Lift Arm.

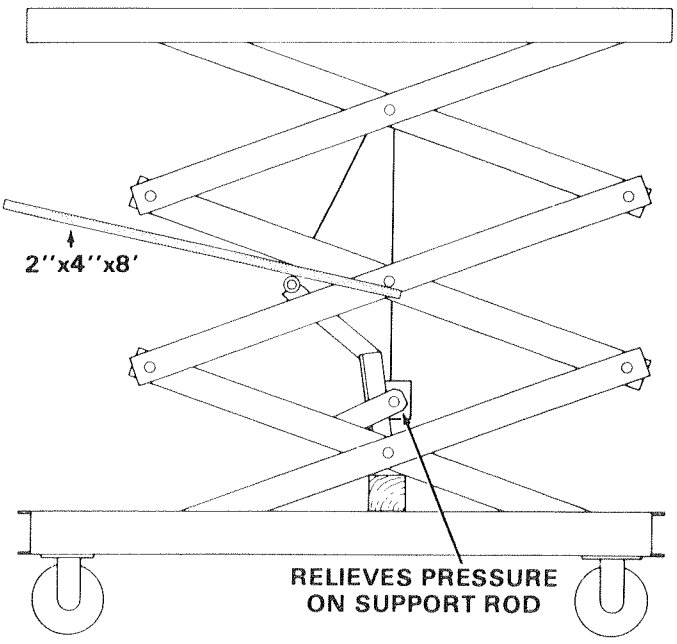


Figure 42. Taking Pressure Off Lift Support Rod.

Relieve pressure on lift arm support rod by activating down switch with the aid of a vise grip pliers as weight, and forcing lift arm down with a board (2" x 4" x 8") until there is 1/2" clearance between arm and support rod. (Fig. 42)

7. Remove low pressure hose from upper end of cylinder and high pressure hose from lower end of cylinder.
8. Remove lower cylinder pin. Lower cylinder toward floor and pivot lift arm down as far as possible.
9. Remove one plug from lift arm at attaching point to cylinder.
10. Remove upper lift arm pin and remove cylinder.
11. Install new or repaired hydraulic cylinder in reverse order.
12. Grease top cylinder pin before reinstalling new cylinder. (Fig. 43)

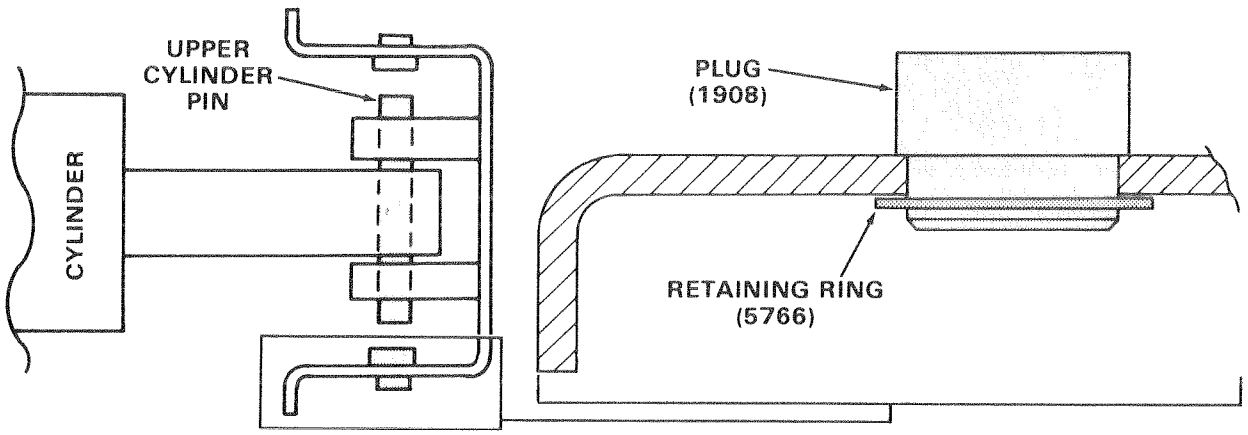


Figure 43. Top Cylinder Pin.

13. Grease and replace bottom cylinder pin as follows: (Fig. 44)

    a. Install pin with spacer on each side and secure with cotter pin.

WARNING

Be sure that one leg of cotter pin is bent 90° to ensure that when cylinder pin rotates it will not straighten leg of cotter pin.

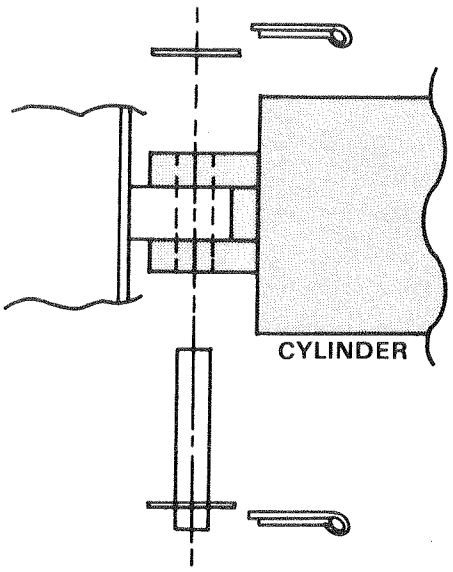


Figure 44. Bottom Cylinder Pin.

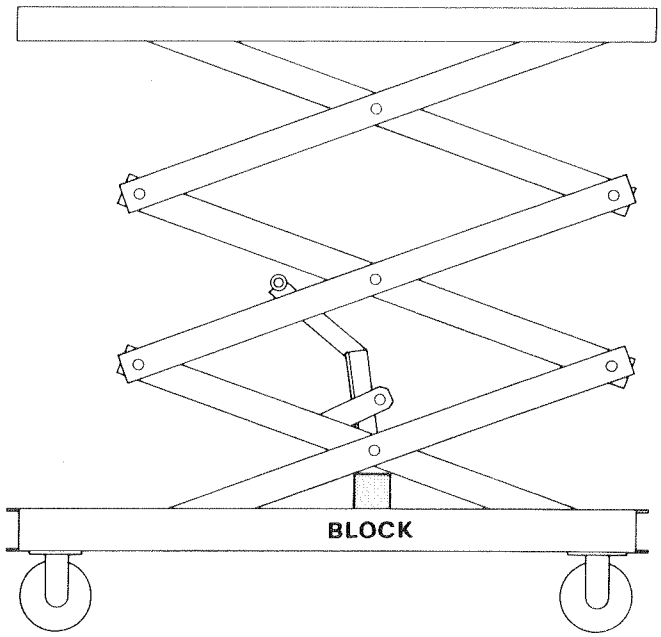


Figure 45. Blocking Up Lower Beam.

14. Raise platform, disengage maintenance locks and completely lower platform.

15. Bleed air from system (see Step #9 under Servicing — Hydraulic System).

7. CENTER PIVOT BAR, LOWER BEAM (ALL MODELS)

WARNING

Failure to follow instructions in proper sequence could result in serious injury or death.

A. **Replacement**

1. Place machine so that there is room to work on both sides of machine.

2. Set up to remove pivot bar as follows:

    a. Raise platform high enough to place a 4" x 4" x 36" long block of hardwood on top of machine base and under lower beam center pivot bar. (Fig. 45)

b. Lower platform until beams rest on 4 x 4.

c. Insert jack between second and third inner beam from bottom of unit. (Fig. 46)

d. Spread beams approximately 2" with jack.

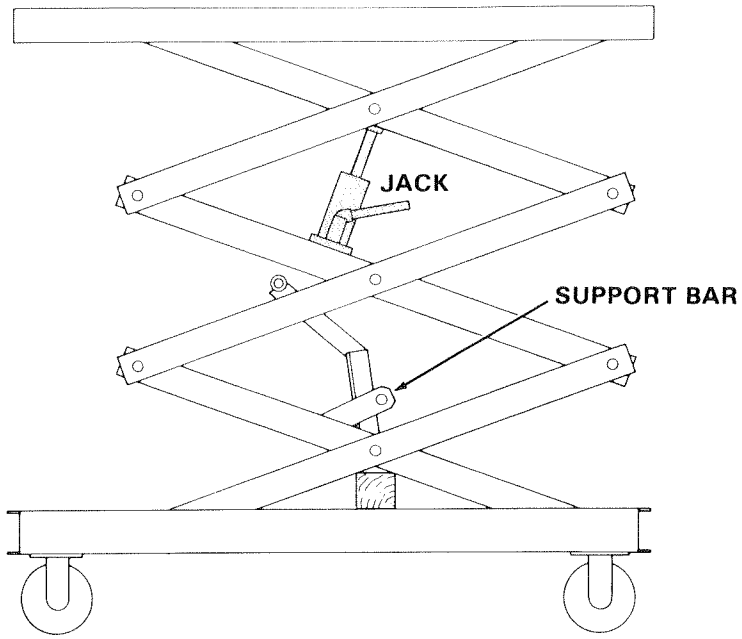


Figure 46. Installing Jack.

e. Actuate lift switch until lift arm makes firm contact with support bar. (Fig. 46)

NOTE

This step is designed to remove free play from lift arm to maintain alignment of bushings.

CAUTION

Do not overlift or jack may fall out of place.

3. Remove retaining ring from end of pivot bar.

4. Attach one retaining ring to new pivot bar (Part Number 1946).

5. Install new bar as follows:

   a. Lubricate new pivot bar with heavy grease.

WARNING

Keep opposite side of machine clear of people when driving the old bar out with the new pivot bar, in the next step. The old bar can shoot out of beam bushings at high speed, causing injury to people and/or damage to nearby equipment.

CAUTION

In the following step, use a rawhide or lead hammer. Do not use a steel hammer on pivot bar or damage to the retaining ring groove can result.

b. Rap the end of the old pivot bar with the hammer to start the bar through the first beam.

c. Place the free end of the new pivot bar against the old bar and drive the new bar in with hammer.

NOTE

If bushings become misaligned, it may be necessary to do one of the following:

1. If bushings are vertically misaligned, the 4 x 4 must be moved fore or aft with hammer.
2. If bushings are horizontally misaligned, adjust with jack either up or down.

c. Attach retaining ring to other end of pivot bar.

6. Remove hydraulic jack and remove 4 x 4 block raising unit with lift control.
7. Check unit for proper operation before returning to service.

8. ALL OTHER BEAM PIVOT BARS (ALL MODELS)

WARNING

Perform the following procedure with unit in the fully down (stowed) position. Attempting to replace this pivot bar with the platform raised could cause serious injury or death.

A. **Replacement**

1. Place machine so that there is room to work on both sides of machine.
2. Remove retaining ring from end of pivot bar.
3. Attach one retaining ring to new pivot bar (Part Number 1946).
4. Install new pivot bar as follows:

a. Lubricate new pivot bar with heavy grease.

WARNING

Keep opposite side of machine clear of people when driving the old pivot bar out with the new pivot bar. The old bar can shoot out of beam bushings at high speed, causing injury to people or damage to nearby equipment.

CAUTION

In the following step, use a rawhide or lead hammer. Do not use a steel hammer directly on pivot bar or damage to retaining ring groove can result.

b. Rap the end of the old pivot bar with hammer to start bar through the first beam.

c. Place free end of new pivot bar against old bar and drive new bar in with hammer.

NOTE

If bushings get misaligned, realign by jogging platform up slightly with lift control.

d. Attach retaining ring to other end of pivot bar.

5. Check unit for proper operation before returning to service.

9. AUTOMATIC STABILIZERS

There are three (3) areas of concern when replacing stabilizer components.

— Stabilizer switch adjustment
— Stabilizer activating arm adjustment
— Stabilizer bar spacing to floor

a. **Stabilizer Switch Adjustments**

(1) Raise lift to its full elevated position.

(2) Check spacing between switch plunger and actuator angle. (Fig. 47) This space should be about .060 inch (the thickness of a nickel).

(3) To adjust loosen locknut on adjustment bolt and adjust in or out accordingly to obtain the .060 spacing.

(4) Retighten locknut, then recheck spacing between plunger and angle.

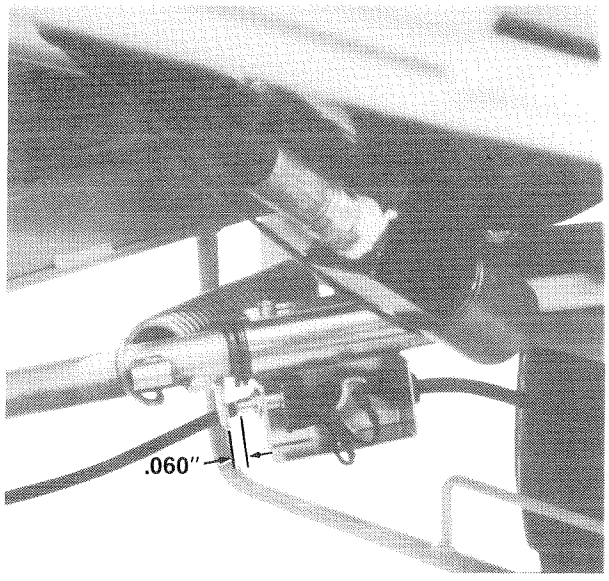


Figure 47. Stabilizer Switch Adjustment.

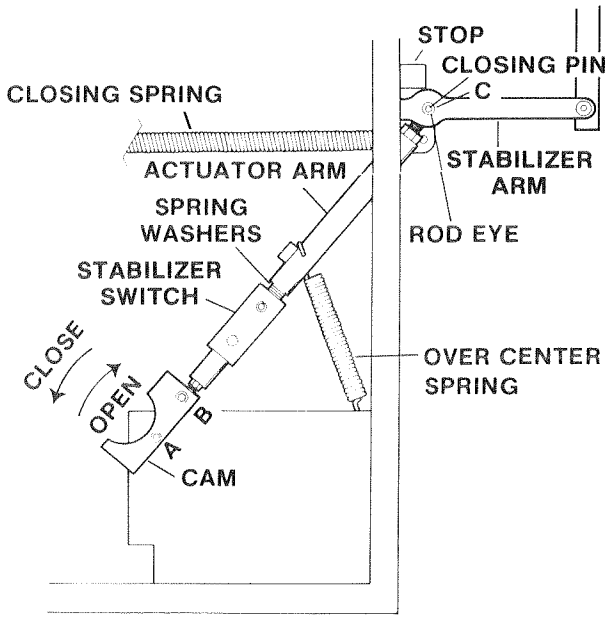


Figure 48. Activating Arm Adjustment.

b. **Stabilizer Activating Arm Adjustment:**

(1) Raise lift to full elevated position.

WARNING

Stabilizers are spring loaded — Care must be taken when performing the next step of these instructions.

(2) Close stabilizers manually by rotating cam pivot (Fig. 48) back over center so stabilizers are in the closed position.

(3) Remove stabilizer closing spring between stabilizers.

(4) Remove stabilizer over center spring.

(5) Remove roll pin from closing pin at stabilizer arm.

(6) Adjust length of actuator arm by rotating rod eye.

To obtain proper length, align pivot points A, B, & C in a straight line while stabilizer arm is **against stop.** *It is important that the stabilizer is against the stop when making this adjustment.* When rotating cam to full open position the spring washers should collapse slightly, but not enough to activate the stabilizer switch.

c. **Stabilizer Bar Spacing to Floor**

(1) Before removing the stabilizer arms or stabilizer bar from the unit, mark the location of all spacers and washers.

(2) When assembled correctly, the space from the lower edge of the stabilizer bar to the floor must not exceed .750 inch. (Fig. 49)

NOTE

On Aisle Master Models only the space from the lower edge of the stabilizer bar to the floor must not exceed .500 inch (Fig. 50)

(3) When reassembling the stabilizer arms and bar, the large spacer is always placed on top of the stabilizer arm on caster mounted units (Fig. 51), and between the arm and the bar on 2-wheel drive units. The smaller spacers are placed either on top or bottom of stabilizer arm depending on manufacturing tolerances. Place these smaller spacers accordingly to obtain a space of approximately .500 to .750 inch from stabilizer bar to the floor, when the stabilizers are in the extended position. Stabilizer has to be mounted with largest part of bar in outside position.

NOTE: On TM models there are no spacers. Reassemble as removed.

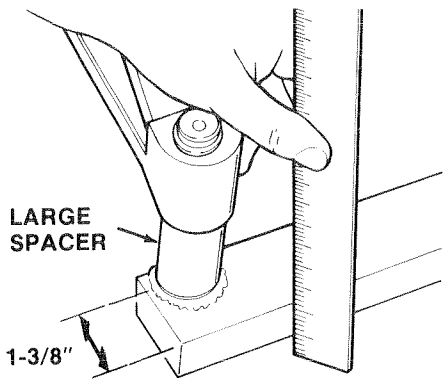


Figure 49. Stabilizer Bar Clearance Setting.

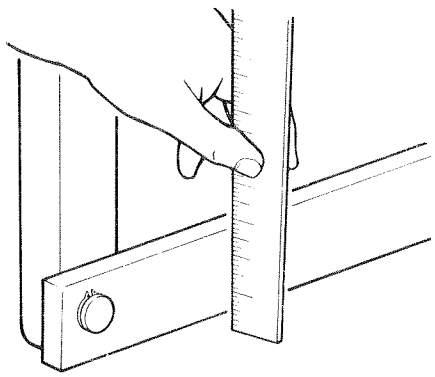


Figure 50. Automatic Pot Hole Bar.

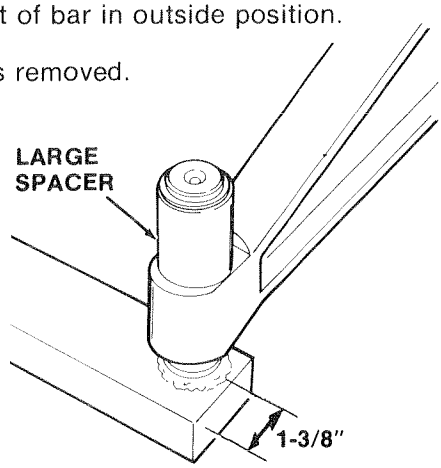


Figure 51. Caster Mounted Units.

5. TROUBLESHOOTING

¡ 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 on Page 13.)

1. Remove load from platform.
2. Raise platform as high as necessary to engage MAINTENANCE LOCKS.
3. MAINTENANCE LOCKS located at the front inside corners of the unit lower frame. Lift and slide back to engage.
4. 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.

PROBLEM	POSSIBLE CAUSES	REPAIR PROCEDURE
No LIFT motion (pump not operating). (All Models)	1. Blown fuse.	1. Check fuse and replace if necessary.
	2. Dead battery.	1. Check and charge battery as directed in MAINTENANCE section.
	3. Electrical circuit defective.	1. Refer to electrical schematic.
	4. Worn brushes.	1. Replace brushes and springs.
	5. Shorted armature	1. Replace motor.
	6. Defective motor contactor.	1. Replace contactor.
	7. Defective emergency stop switch or coil.	1. Replace switch or coil.
	8. Defective key switch.	1. Replace key switch.
	9. Defective UP switch.	1. Replace UP switch.
No FAST LIFT (TM II only) (one pump not operating)	1. Electrical circuit defective.	1. Refer to electrical schematic.
	2. Worn brushes.	1. Replace brushes and springs.
	3. Defective motor contactor.	1. Replace contactor.
	4. Defective secondary pump switch.	1. Replace secondary pump switch.

PROBLEM	POSSIBLE CAUSES	REPAIR PROCEDURE
No LIFT motion (pump operating) (All Models)	1. Hydraulid fluid level low.	1. Add fluid (see MAINTENANCE section).
	2. Pump cavitation caused by improper fluid for temperature conditions.	1. Drain reservoir and bleed system. Use only recommended type fluids (see MAINTENANCE section).
	3. Defective UP valve or coil.	1. Replace UP valve or coil.
	4. Electrical circuitry defective.	1. Refer to electrical schematic.
	5. Stabilizer safety switch defective.	1. Test and/or replace switch.
No FAST LIFT (pump operating) (TM II only)	1. Hydraulic fluid level low.	1. Add fluid (see MAINTENANCE section).
	2. Pump cavitation caused by improper fluid for temperature conditions.	1. Drain reservoir and and bleed system. Use only recommended type fluids (see MAINTENANCE section).
	3. Electrical circuitry defective.	1. Refer to electrical schematic.
	4. Loose intake hose or oil filter.	1. Tighten.
	5. Defective high speed valve or solenoid.	1. Replace high speed valve or solenoid.
Ascent speed slow or erratic.	1. Weak battery.	1. Charge battery (see MAINTENANCE section).
	2. Loose connections in electrical circuitry.	1. Perform visual inspection and ensure all connections are secure.
	3. Momentary short in wiring.	1. Refer to electrical schematic.
	4. Bent structural members.	1. Replace damaged members as necessary (see visual structural inspection in MAINTENANCE section).
	5. Restriction in hydraulic hose.	1. Replace defective hydraulic hose.
	6. Defective or jammed seals in hydraulic lift cylinder.	1. Replace hydraulic cylinder (see MAINTENANCE section)

PROBLEM	POSSIBLE CAUSES	REPAIR PROCEDURE
Ascent speed slow or erratic (continued)	7. Gear or gear cavity worn or damaged.	1. Replace pump. (See REPLACEMENT section.)
	8. Worn brushes in motor.	1. Replace brushes.
	9. Defective valves.	1. Check V1 on cylinder and manifold. 2. Check V5 on cylinder.
	10. Defective high speed valve or coil.	1. Replace high speed valve or coil.
	11. Loose intake hose or oil filter.	1. Tighten connection or filter.
	12. Defective down valve in manifold or in cylinder.	1. Replace valve.
	13. Defective emergency down valve.	1. Replace valve.
Descent speed slow.	1. Flow control out of adjustment.	1. Adjust (see ADJUSTMENT section).
	2. Friction in structural members.	1. Lubricate and check for damaged members and cracked welds. (See MAINTENANCE.) 2. Replace damaged structural members. This is to be done by factory authorized personnel only.
	3. Obstruction in hydraulic hose.	1. Replace defective hose.
	4. Defective down valve.	1. Replace valve.
Unit will not descend.	1. Down signal not applied to down solenoid.	1. Check fuse. 2. Check battery charge. 3. Check electrical circuitry. Refer to electrical schematic.
	2. Defective down coil.	1 Replace coil.
	3. Defective down valve.	1. Replace valve.
Unit creeps down.	1. Damaged seal in lift cylinder.	1. Replace hydraulic cylinder (see MAINTENANCE section).
	2. Defective down valve.	1. Replace valve.
	3. Defective emergency down valve.	1. Replace valve.

NOTE: Torque Master models **must** have the front wheels off the ground in order to properly troubleshoot drive system for speed and power.

PROBLEM	POSSIBLE CAUSES	REPAIR PROCEDURE
Drive function inoperative (hydraulic pump not operating). Self-propelled units only!	1. Defective forward/reverse switch.	1. Check continuity. Replace switch.
	2. Defective electrical circuitry.	1. Refer to electrical schematic.
	3. Defective motor contactor.	1. Replace contactor.
Drive function. inoperative in either direction. (hydraulic pump operating). Self-propelled units only!	1. Defective forward/reverse switch.	1. Replace switch.
	2. Defective drive valve or coil.	1. Replace drive valve or coil.
	3. Defective electrical circuitry.	1. Refer to electrical schematic.
	4. Low battery.	1. Charge battery.
	5. Defective hydraulic motor.	1. Replace drive motor.
	6. Defective brake.	1. Adjust brake. (See MAINTENANCE.)
No motion in one **drive** direction only. Self-propelled units only!	1. Defective forward/reverse valve or solenoid in faulty mode.	1. Replace defective valve or solenoid.
	2. Defective electrical circuit.	1. Refer to electrical schematic.
Torque Master drive function inoperative (right wheel only).	1. Defective electrical circuitry.	1. Refer to electrical schematic.
	2. Defective power valve (secondary manifold).	1. Replace power valve (V3).
	3. Defective drive valve or coil (secondary manifold).	1. Replace drive valve or coil.
Machine travels in fast speed when platform is above 5 ft. Self-propelled units only!	1. Misadjusted or defective **SLOW SPEED** switch.	1. Adjust or replace switch.
	2. Defective electrical circuitry.	1. Refer to electrical schematic.
	3. Defective slow speed valve or coil or slow speed switch.	1. Replace valve, coil or switch.

PROBLEM	POSSIBLE CAUSES	REPAIR PROCEDURE
Brake does not release. Two wheel drive units only!	1. Defective brake valve.	1. Replace valve.
	2. Brake pads misadjusted.	1. Adjust brake. (See ADJUSTMENTS section.)
	3. Defective brake cylinder.	1. Replace cylinder.
	4. Contamination lodged in brake orifice.	1. Remove contamination.
Brake does not set. Two wheel drive units only!	1. Misadjusted brake pads or spring.	1. Adjust brake. (See ADJUSTMENT section.)
	2. Defective brake valve.	1. Replace.
	3. Defective electrical circuitry.	1. Refer to electrical schematic.
Steering inoperative. Self-propelled units only!	1. Defective electrical circuitry.	1. Refer to electrical schematic.
	2. Defective steering valve or coil.	1. Replace steering valve or coil.
	3. Defective steering cylinder.	1. Replace steering cylinder.
	4. Defective crossover relief valve.	1. Replace valve.
	5. Contamination lodged in steering orifice.	1. Remove contamination.

ELECTRICAL WIRING DIAGRAM
BATTERY MANUAL PLANT MASTER SERIES

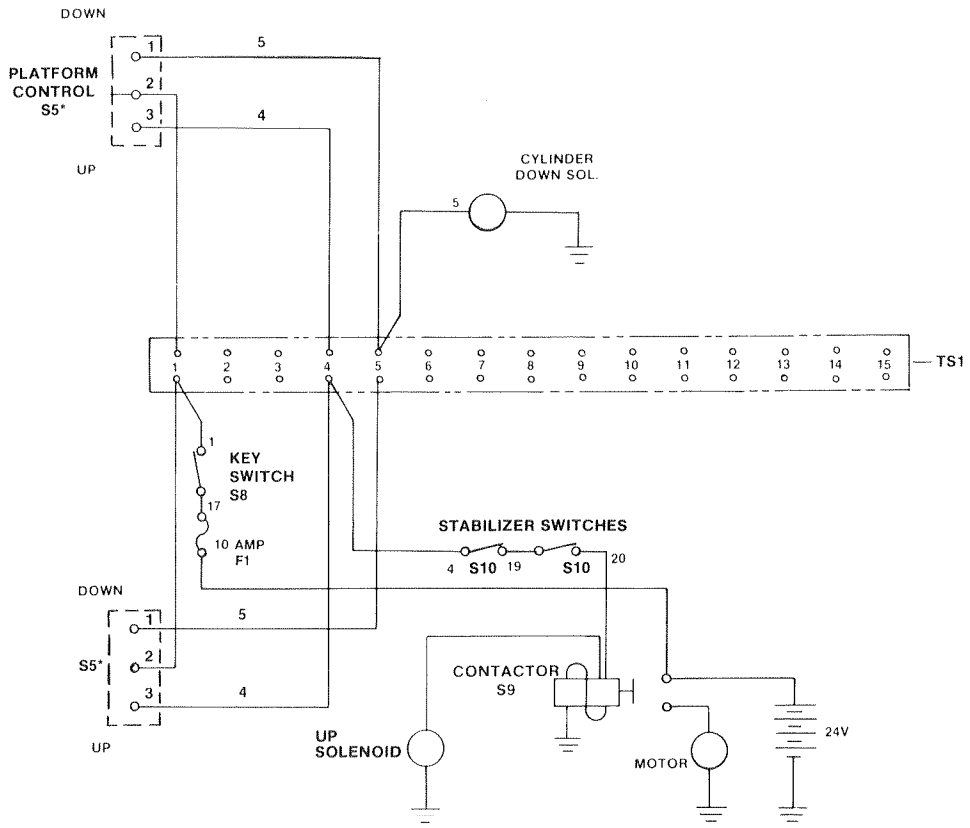


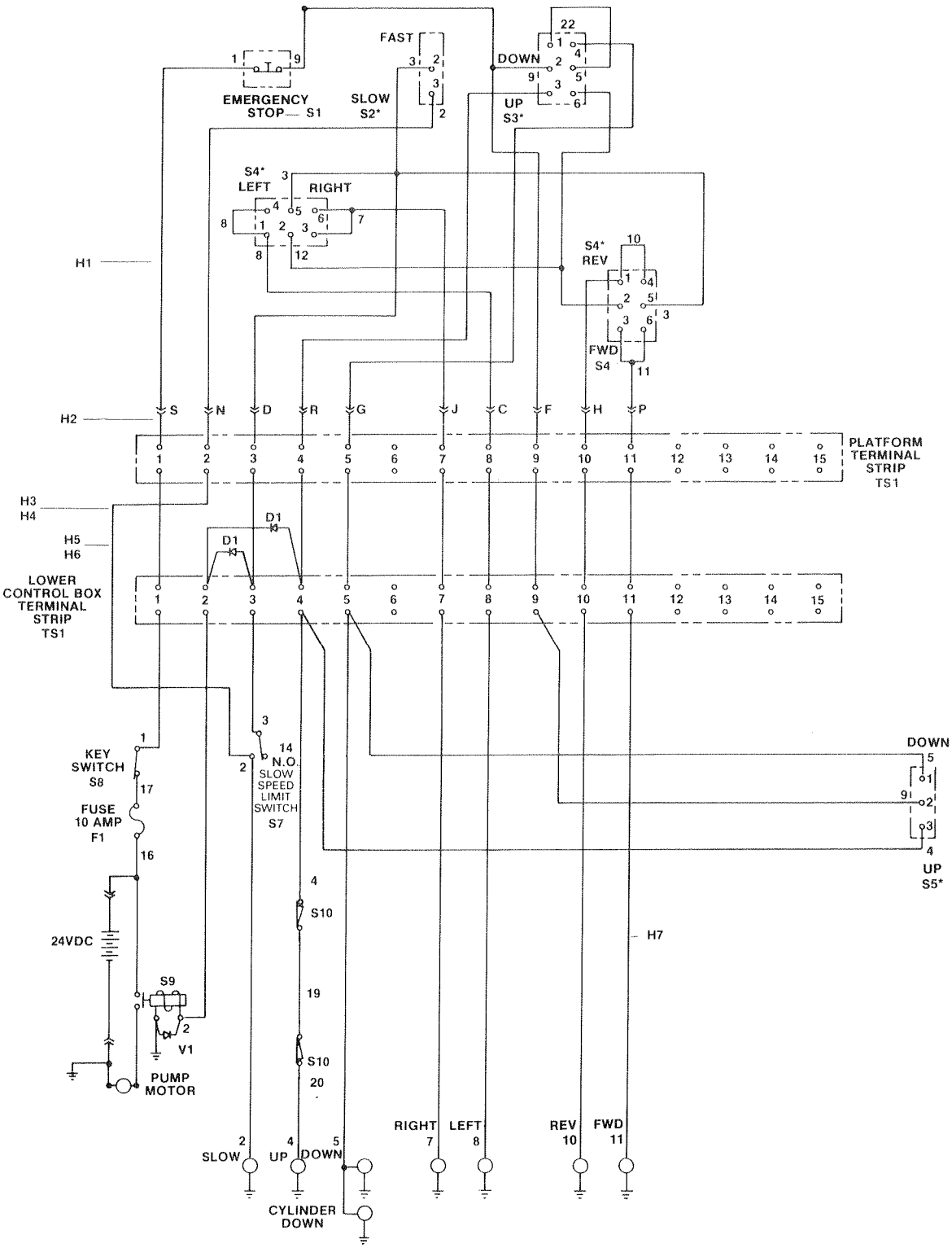
Figure 52.

*** NOTE: Switch wiring as seen from rear of switch.**

Symbol	Description	Part No.
F1	Fuse 10 AMP	6190
S5	Switch, Up/Down	5230
S8	Key Switch	5936
S9	Contactor	5967
S10	Stabilizer Switch	6504
TS1	Terminal Strip	5991

ELECTRICAL WIRING DIAGRAM

PLANT MASTER (PM) ONE-WHEEL DRIVE SERIES



* NOTE: Switch wiring as seen from rear of switch.

Up/Down Switch at Upper Control Box — Contacts Made With Toggle at Keyway Position 1-2, 4-5 — Center Position 1-2, 5-6 — Opposite Keyway 2-3, 5-6

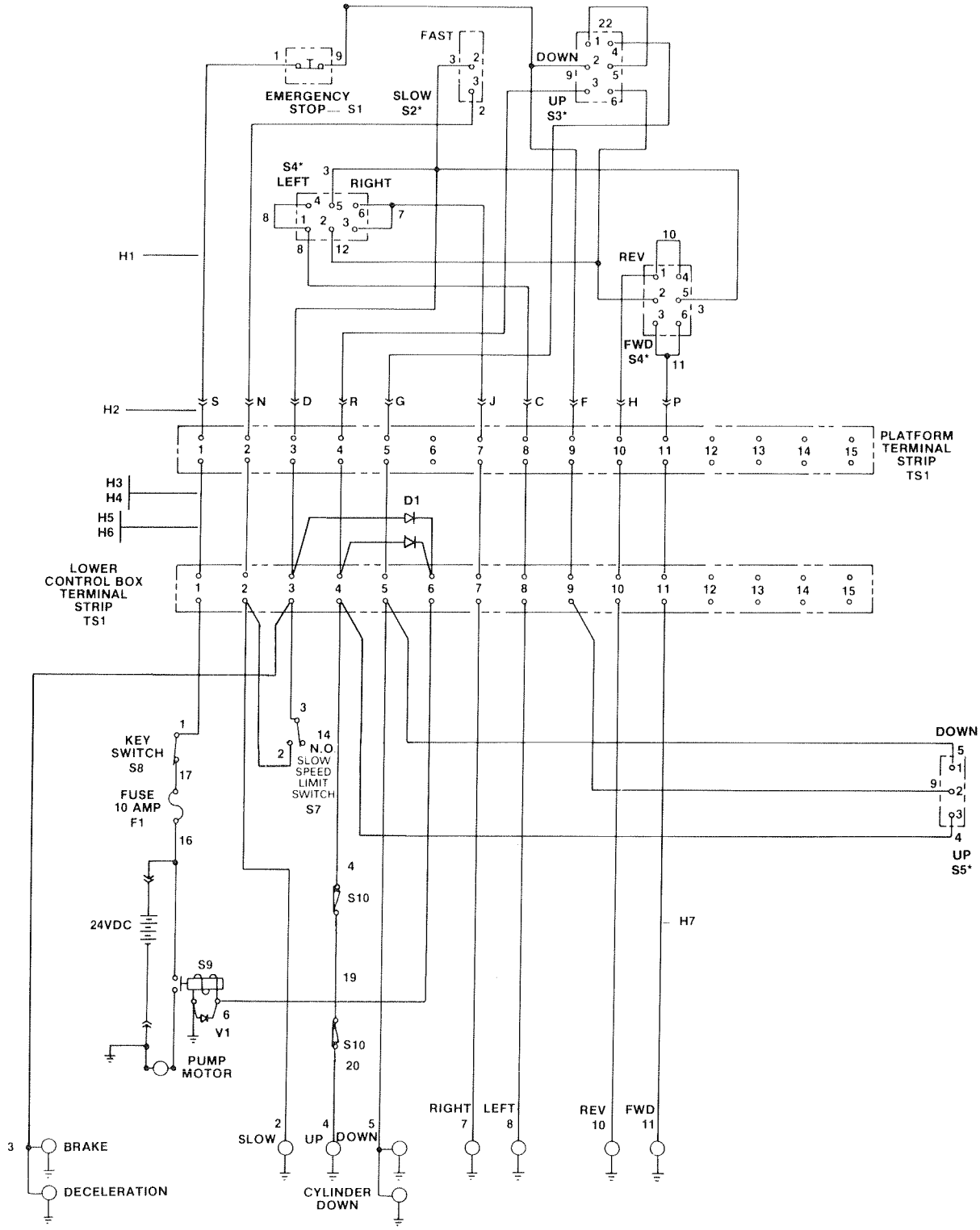
Figure 53.

Symbol Identification for Figure 53.

Symbol	Description	Part No.
D1	Diode Assembly (3A.600PIV)	6070
F1	Fuse	6190
H1	Harness, Control Box	5982
H2	Harness, To Control Box	5983
H3	Harness, 15' Nos. 1,3,9,10,11	6072
H4	Harness, 15' Nos. 2,4,5,6,7,8	6073
H5	Harness, 19' Nos. 1,3,9,10,11	6075
H6	Harness, 19' Nos. 2,4,5,6,7	6076
H7	Harness, Manifold	6021
S1	Switch, Emergency Stop	
	Body	6665
	Retainer	6666
	Contactor	6667
S2	Switch, Slow/Fast	5630
S3	Switch, Up/Down	5979
S4	Switch, Steering, Fwd./Rev.	5694
S5	Switch, Lower Up/Down	5230
S7	Switch, Slow Sp. Limit	6016
S8	Switch, Key	5936
S9	Contactor Assy., Motor Start	5967
S10	Switch, Stabilizer	6504
TS1	Terminal Strip	5991
V1	Varistor Assembly	6231

ELECTRICAL WIRING DIAGRAM

PLANT MASTER (PM) (TWO-WHEEL DRIVE SERIES)
AISLE MASTER (AM)



*** NOTE: Switch wiring as seen from the rear of switch.**

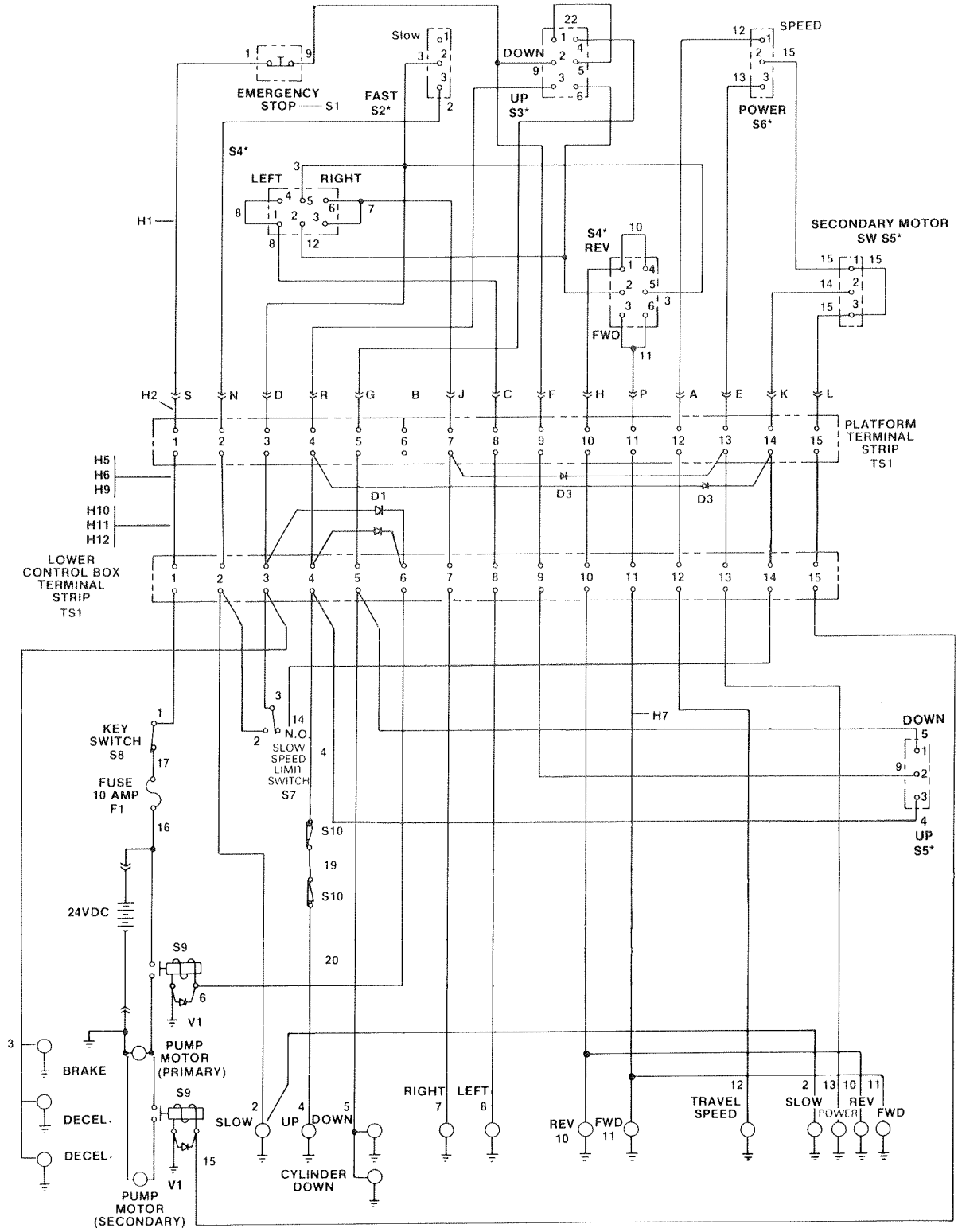
Up/Down Switch at Upper Control Box — Contacts Made With Toggle at Keyway Position 1-2, 4-5 — Center Position 1-2, 5-6 — Opposite Keyway 2-3, 5-6

Figure 54.

Symbol Identification for Figure 54.

Symbol	Description	Part No.
D1	Diode Assembly (3A.600PIV)	6070
F1	Fuse	6190
H1	Harness, Control Box	5982
H2	Harness, To Control Box	5983
H3	Harness, 15' Nos. 1,3,9,10,11	6072
H4	Harness, 15' Nos. 2,4,5,6,7,8	6073
H5	Harness, 19' Nos. 1,3,9,10,11	6075
H6	Harness, 19' Nos. 2,4,5,6,7,8	6076
H7	Harness, Manifold	6021
S1	Switch, Emergency Stop	
	Body	6665
	Retainer	6666
	Contactor	6667
S2	Switch, Slow/Fast	5630
S3	Switch, Up/Down	5979
S4	Switch, Steering, Fwd./Rev.	5694
S7	Switch, Slow Sp. Limit	6016
S8	Switch, Key	5936
S9	Contactor Assy., Motor Start	5967
S10	Switch, Stabilizer	6504
TS1	Terminal Strip	5991
V1	Varistor Assembly	6231

ELECTRICAL WIRING DIAGRAM
TORQUE MASTER (TM) SERIES

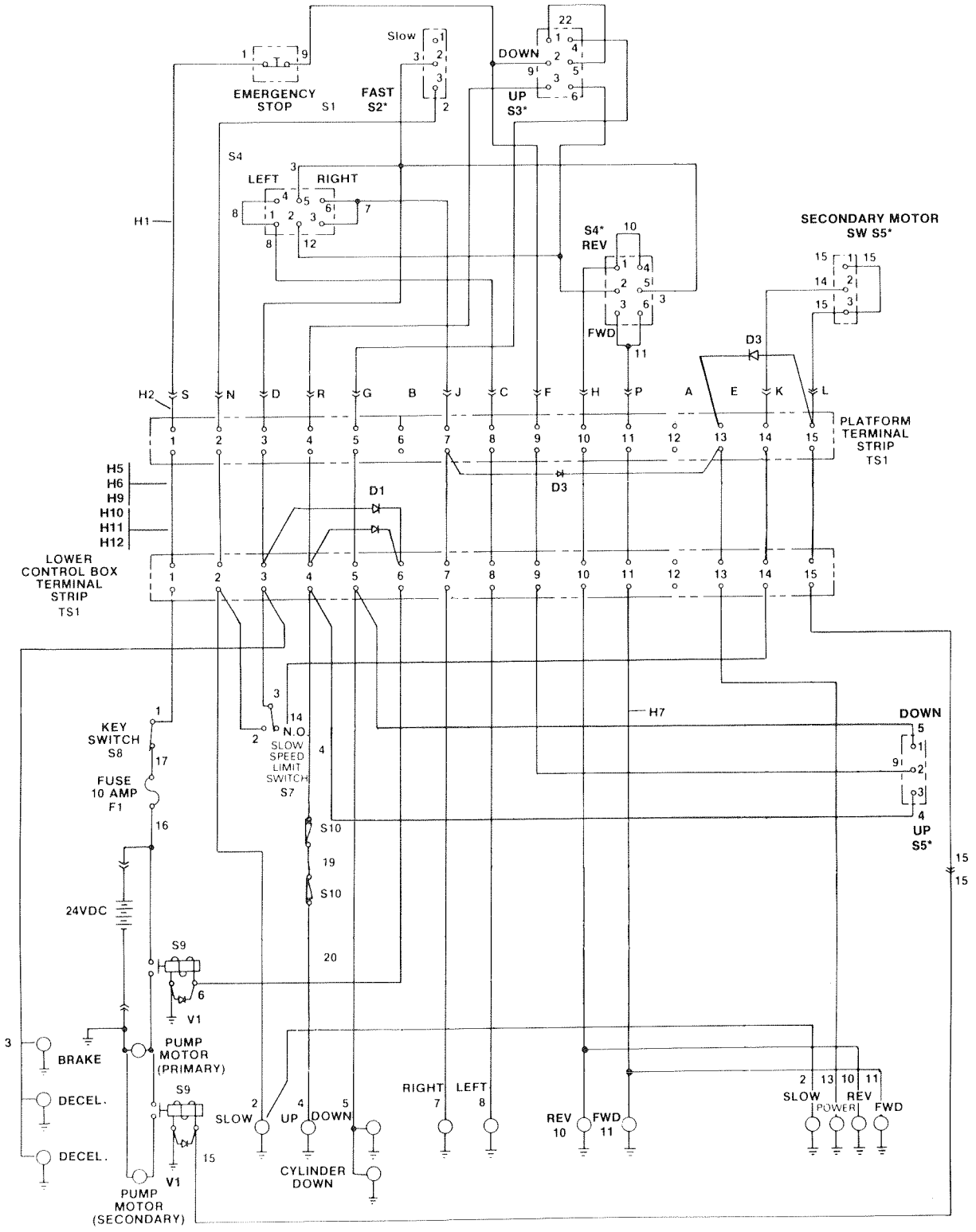


*** NOTE: Switch wiring as seen from rear of switch.**

Up/Down Switch at Upper Control Box — Contacts Made With Toggle at Keyway Position 1-2, 4-5 — Center Position 1-2, 5-6 — Opposite Keyway 2-3, 5-6

Figure 55.

ELECTRICAL WIRING DIAGRAM
AISLE MASTER (AM) AND PLANT MASTER (PM) HI TORQUE SERIES



UP/DOWN SWITCH AT UPPER CONTROL BOX - CONTACTS MADE WITH TOGGLE AT KEYWAY POSITION 1-2, 4-5 — CENTER POSITION 1-2, 5-6 — OPPOSITE KEYWAY 2-3, 5-6
NOTE: F2 FUSE (2A) - EMERGENCY STOP, 1 USED; FORWARD, 2 USED; REVERSE, 2 USED.

*** NOTE: Switch wiring as seen from rear of switch.**

Figure 56.

Symbol Identification for Figure 55 & 56.

Symbol	Description	Part No.
D1	Diode Assembly (3A.600PIV)	6070
D3	Diode Assembly(3A.600PIV)	6241
F1	Fuse	6190
H1	Harness, Control Box	5982
	Wire Set	6296
H2	Harness, To Control Box	5983
H5	Harness, 20 Nos. 1,3,9,10,11	6075
H6	Harness, 20 Nos. 2,4,5,6,7,8	6076
H7	Harness, Component Tray	6600
H9	Harness, 20 Nos. 12,13,14,15	6074
H10	Harness, 15 Nos. 1,3,9,10,11	6072
H11	Harness, 15 Nos. 2,4,5,6,7,8	6073
H12	Harness, 15 Nos. 12,13,14,15	6071
S1	Switch, Emergency Stop	
	Body	6665
	Retainer	6666
	Contactor	6667
S2	Switch, Slow/Fast	5630
S3	Switch, Up/Down	5979
S4	Switch, Steering, Fwd./Rev.	5694
S6	Switch, Power/Speed	6234
S7	Switch, Slow Sp. Limit	6016
S8	Switch, Key	5936
S9	Contactor Assy., Motor Start	5967
S10	Switch, Stabilizer	6504
TS1	Terminal Strip	5991
V1	Varistor Assembly	6231

HYDRAULIC SCHEMATIC
BATTERY MANUAL — PLANT MASTER SERIES

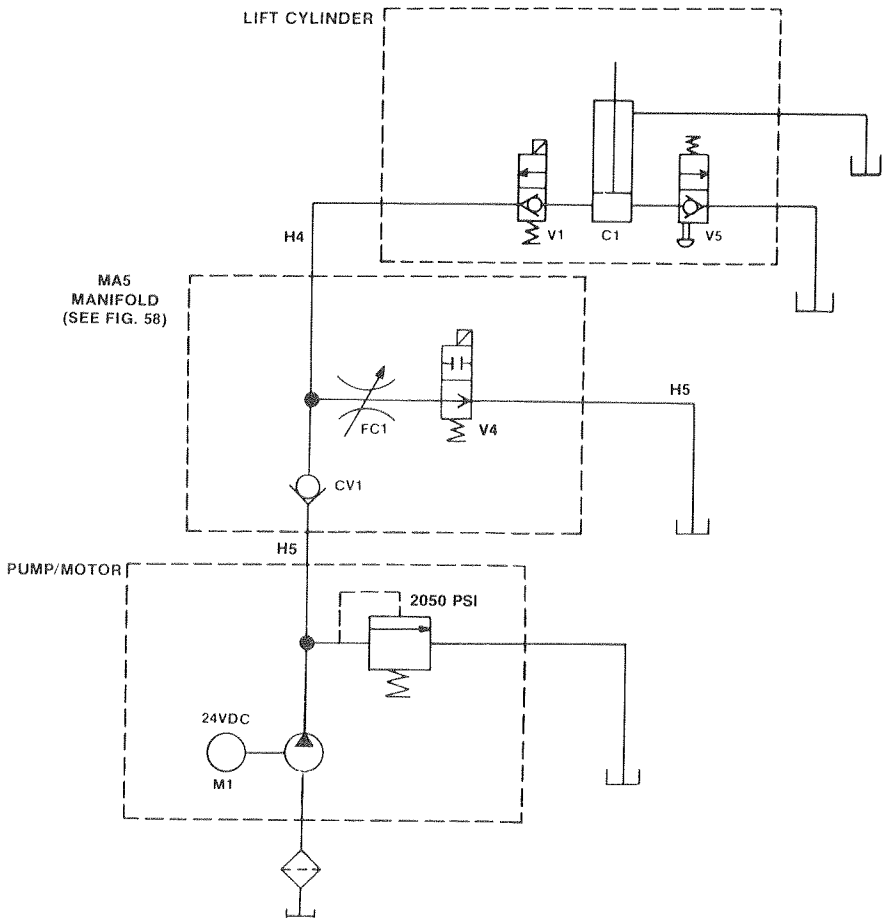


Figure 57.

Symbol	Description	Part No.
C1	Lift Cylinder	4155
	Seal Kit W/Wire Lock	4088
	Wire, Lock	6313
CV1	Check Valve	5434
	"O" Ring Kit	5475
F1	Filter Element	6156
FC1	Flow Control	5963
	"O" Ring Kit	5475
H4	Hose	6001
H5	Hose	5999
M1	24 VDC Motor	6194
MA5	Manifold Pt.	2141
P1	Hydraulic Pump	6334
V1	2-Way NC Valve - Down	5964
	"O" Ring Kit	5475
	Valve Only	6973
	Coil Only, 24V	6163
V4	2-Way N.O.	5962
	"O" Ring Kit	5475
	Valve Only	6974
	Coil Only, 24V	6163
V5	Manual Pull-Emergency Down	5435
	"O" Ring Kit"	5475

NOTES

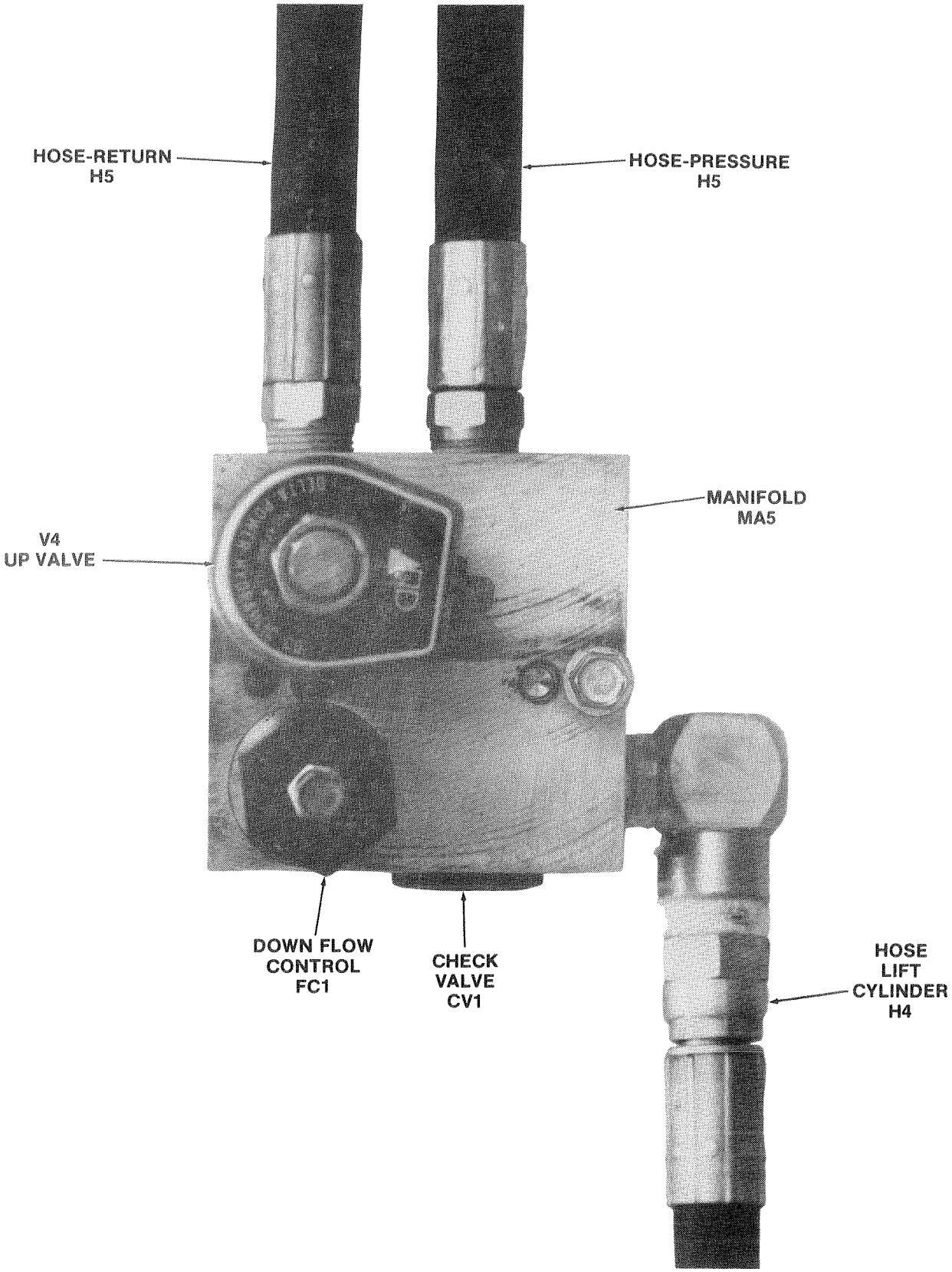


Figure 58. Manifold Assembly Battery Manual

HYDRAULIC SCHEMATIC
PLANT MASTER (PM) SERIES 1-WHEEL DRIVE

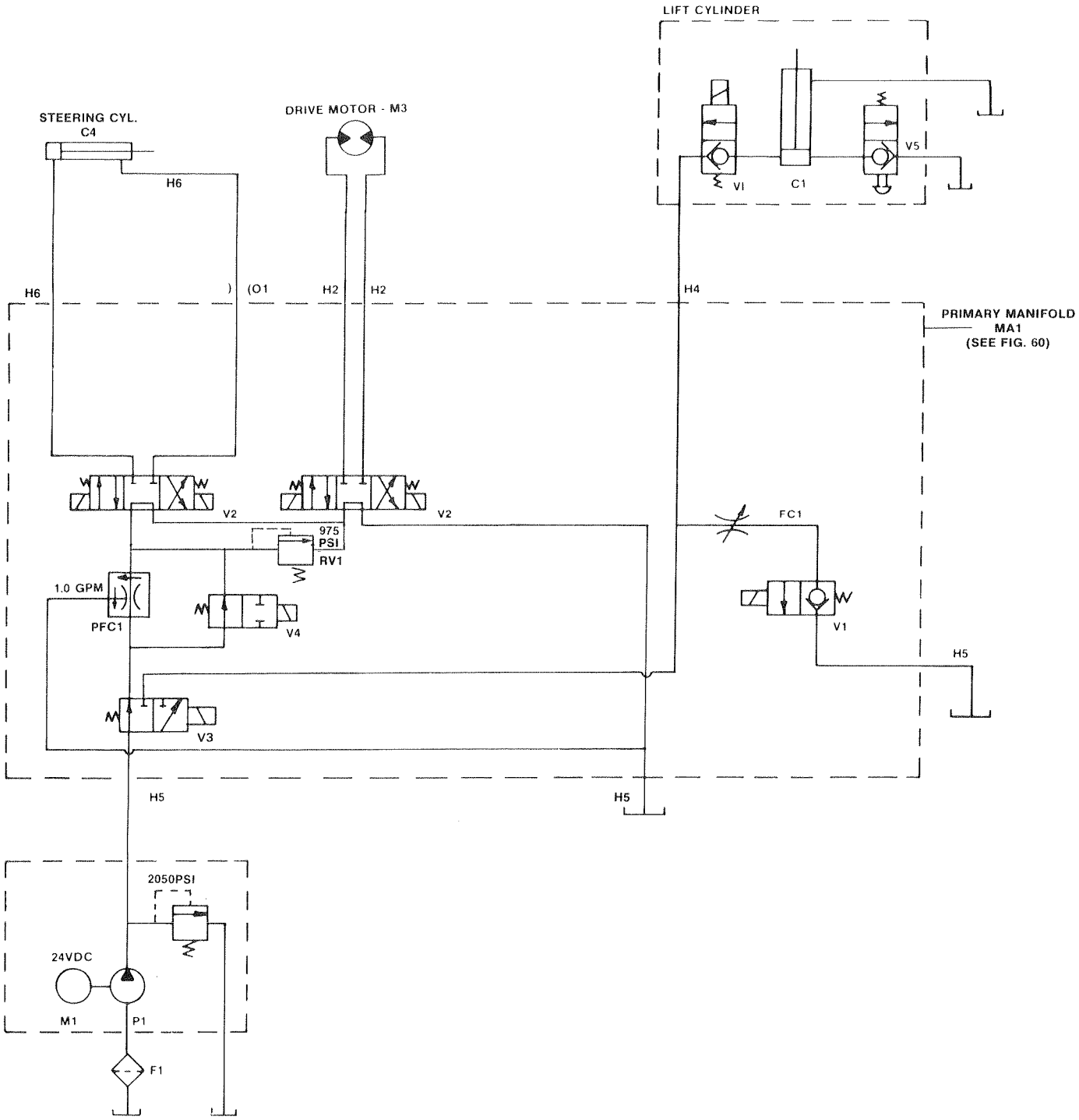


Figure 59.

Symbol Identification for Figure 59.

Symbol	Description	Part No.
C1	Lift Cylinder	4155
	Seal Kit W/Wire Lock	5838
	Wire, Lock	6313
C4	Steering Cylinder	2512
	Seal Kit	5947
F1	Filter Element	6156
FC1	Flow Control	5963
	"O" Ring Kit	5475
H6	Hose	6003
H2	Hose	6002
H4	Hose	6001
H5	Hose	5999
M1	24VDC Motor	6194
M3	Drive Motor	5949
MA1	Primary Manifold Pt.	4166
O1	Orifice, Fitting Assembly	6107
P1	Hydraulic Pump	6334
PFC1	Priority Flow Control 1.0 GPM (STD.)	5954
	Priority Flow Control .5 GPM (Special)	6189
	"O" Ring Kit	5475
RV1	Relief Valve	6316
	"O" Ring Kit	5475
V1	2-Way N.C. Valve	5964
	"O" Ring Kit	5475
	Valve Only	6973
	Coil Only - 24VDC	6163
V2	4-Way 3-Position Valve	5960
	Spring and "O" Ring Kit	6161
	Valve Only	5960X
	Coil Only 24 VDC	6163
V3	3-Way 2-Position Valve	5961
	"O" Ring Kit	5476
	Valve Only	6976
	Coil Only 24 VDC	6163
V4	2-Way N.O.	5962
	"O" Ring Kit	5475
	Valve Only	6974
	Coil Only - 24 VDC	6163
V5	Manual Pull - Emergency Down	5435
	"O" Ring Kit	5475

NOTES

MANIFOLD ASSEMBLY
PLANT MASTER 1-WHEEL DRIVE

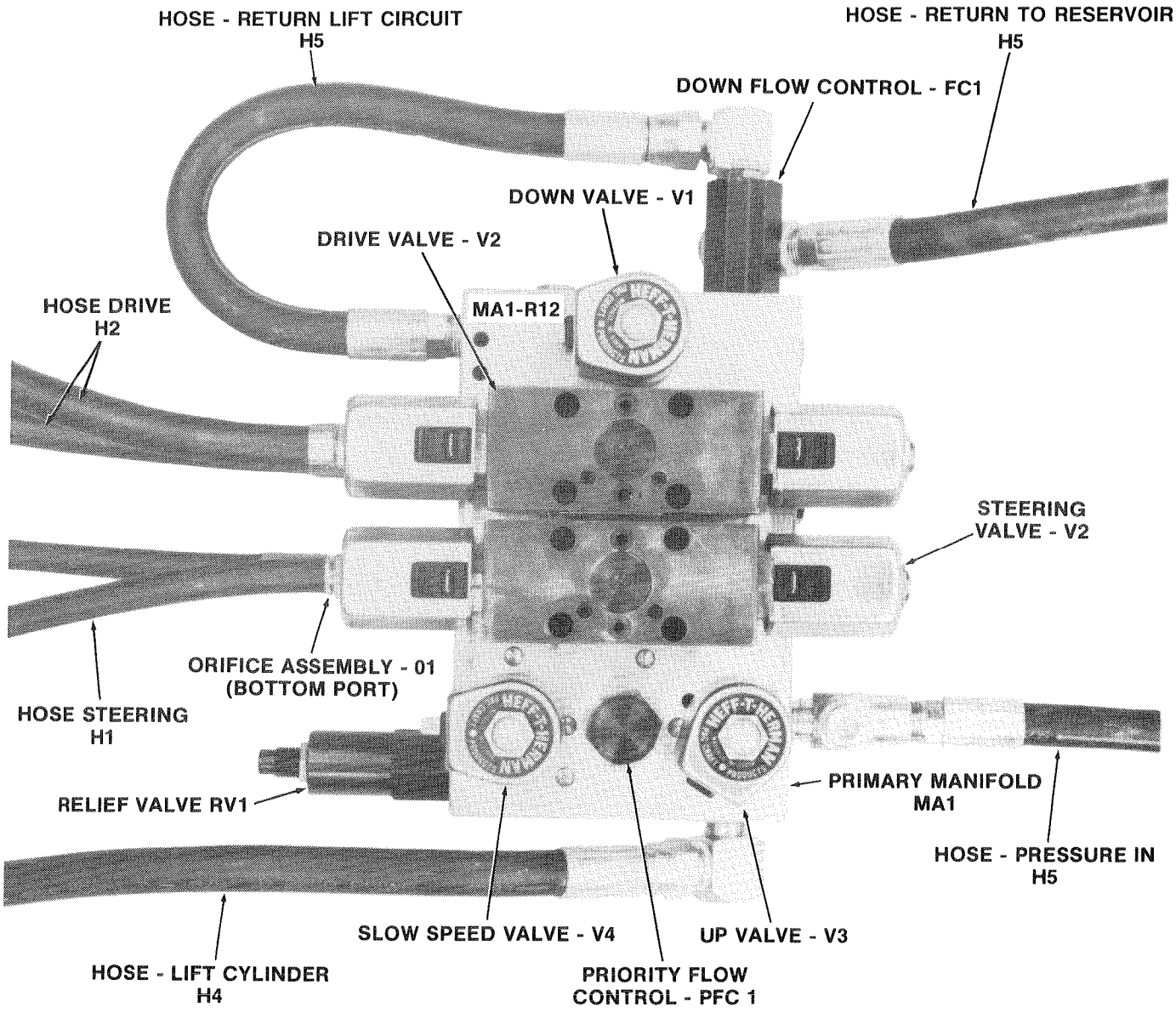


Figure 60.

AISLE MASTER HYDRAULIC SCHEMATIC
(AM) AND PLANT MASTER (PM) SERIES 2-WHEEL DRIVE

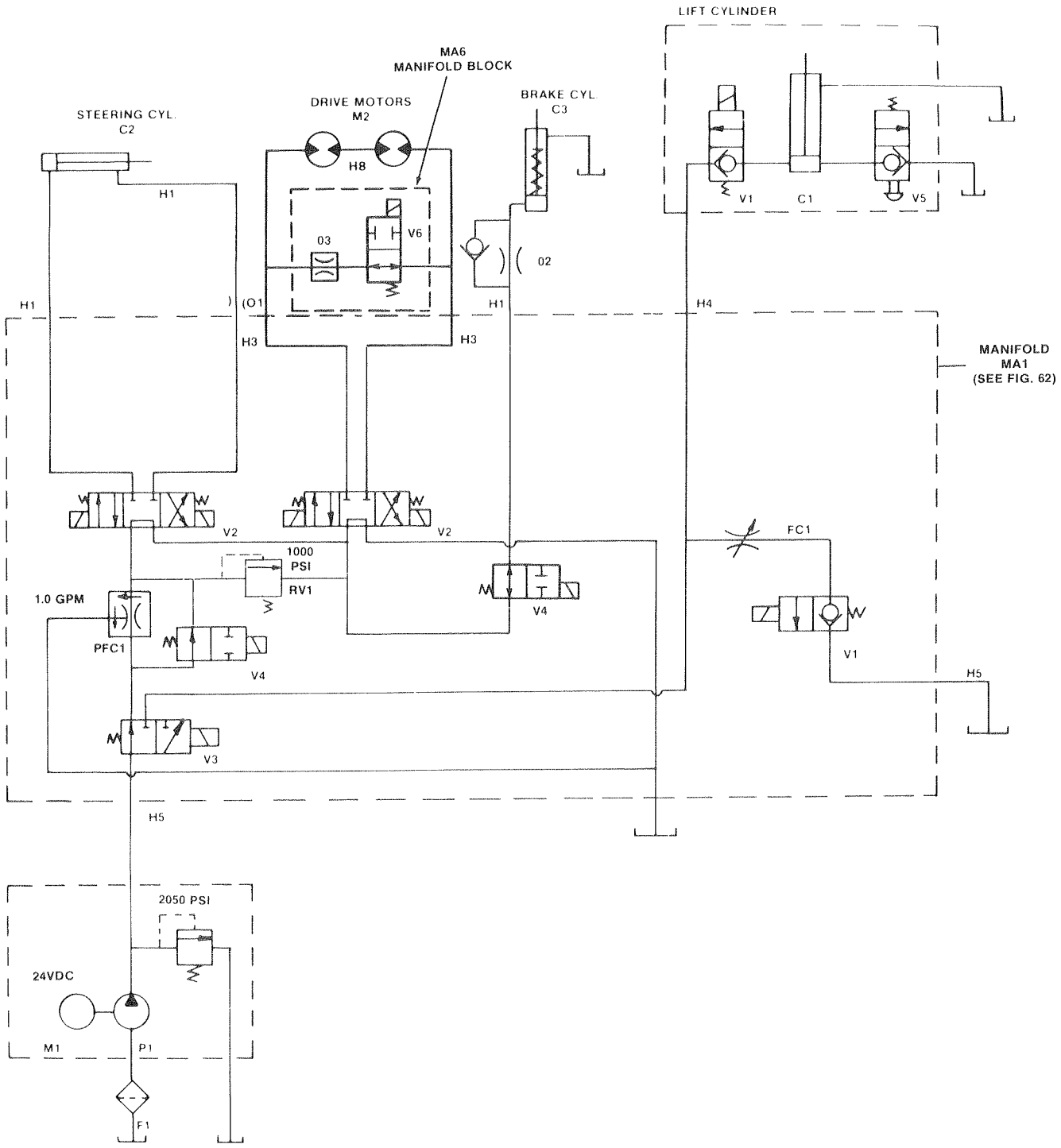


Figure 61.

Symbol Identification for Figure 61.

Symbol	Description	Part No.
C1	Lift Cylinder	4155
	Seal Kit	4088
C2	Steering Cylinder	2838
	Seal Kit	5947
C3	Brake Cylinder	2483
	Seal Kit	5947
F1	Filter Element	6156
FC1	Flow Control	5963
	"O" Ring Kit	5475
H1	Hose	5997
H3	Hose	6351
H4	Hose	6001
H5	Hose	5999
H8	Hose	5996
M1	24 VDC Motor	6194
M2	Drive Motor	6032
MA1	Primary Manifold	4166
MA6	Manifold Block	2972
O1	Orifice, Fitting Assembly	6107
O2	Orifice, Fitting Assembly	4055
O3	Orifice, Fitting (Brass)	2974
P1	Hydraulic Pump	6334
PFC1	Priority Flow Control 1.0 GPM (STD.)	5954
	Priority Flow Control .5 GPM (Special)	6189
	"O" Ring Kit	
RV1	Relief Valve	6316
	"O" Ring Kit	5475
V1	2-Way N.C. Valve	5964
	"O" Ring Kit	5475
	Valve Only	6973
	Coil Only - 24 VDC	6163
V2	4-Way 3-Position Valve	5960
	Spring and "O" Ring Kit	6161
	Valve Only	5960X
	Coil Only 24 VDC	6163
V3	3-Way 2-Position Valve	5961
	"O" Ring Kit	5476
	Valve Only	6976
	Coil Only 24 VDC	6163
V4	2-Way N.O.	5962
	"O" Ring Kit	5475
	Valve Only	6974
	Coil Only - 24 VDC	6163
V5	Manual Pull - Emergency Down	5435
	"O" Ring Kit	5475
V6	2-Way N.O. (Spool Valve)	6554
	"O" Ring Kit	5475
	Valve Only	6975
	Coil Only - 24 VDC	6163

NOTES

MANIFOLD ASSEMBLY
AISLE MASTER AND PLANT MASTER 2-WHEEL DRIVE

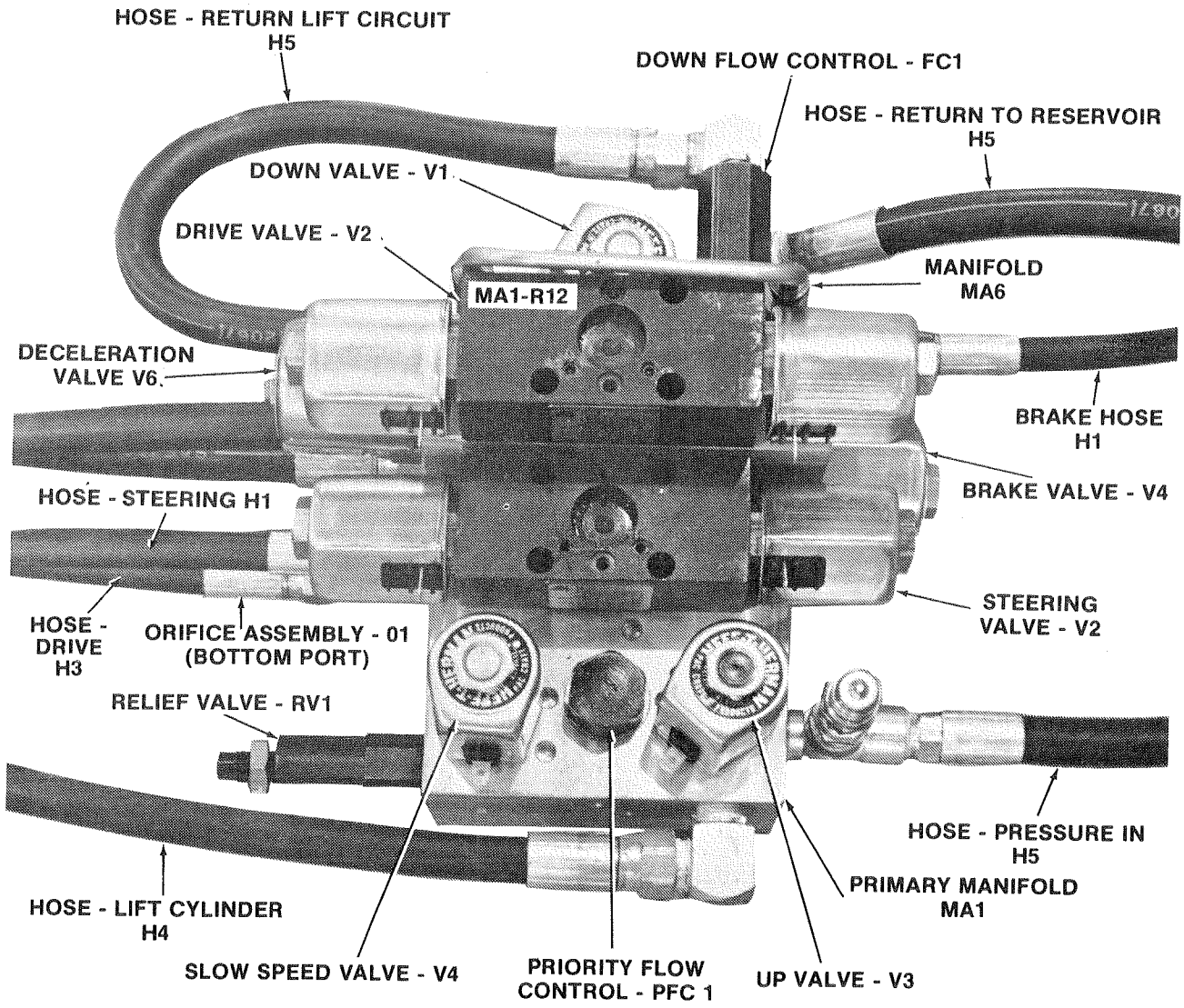


Figure 62.

HYDRAULIC SCHEMATIC
TORQUE MASTER (TM II) SERIES

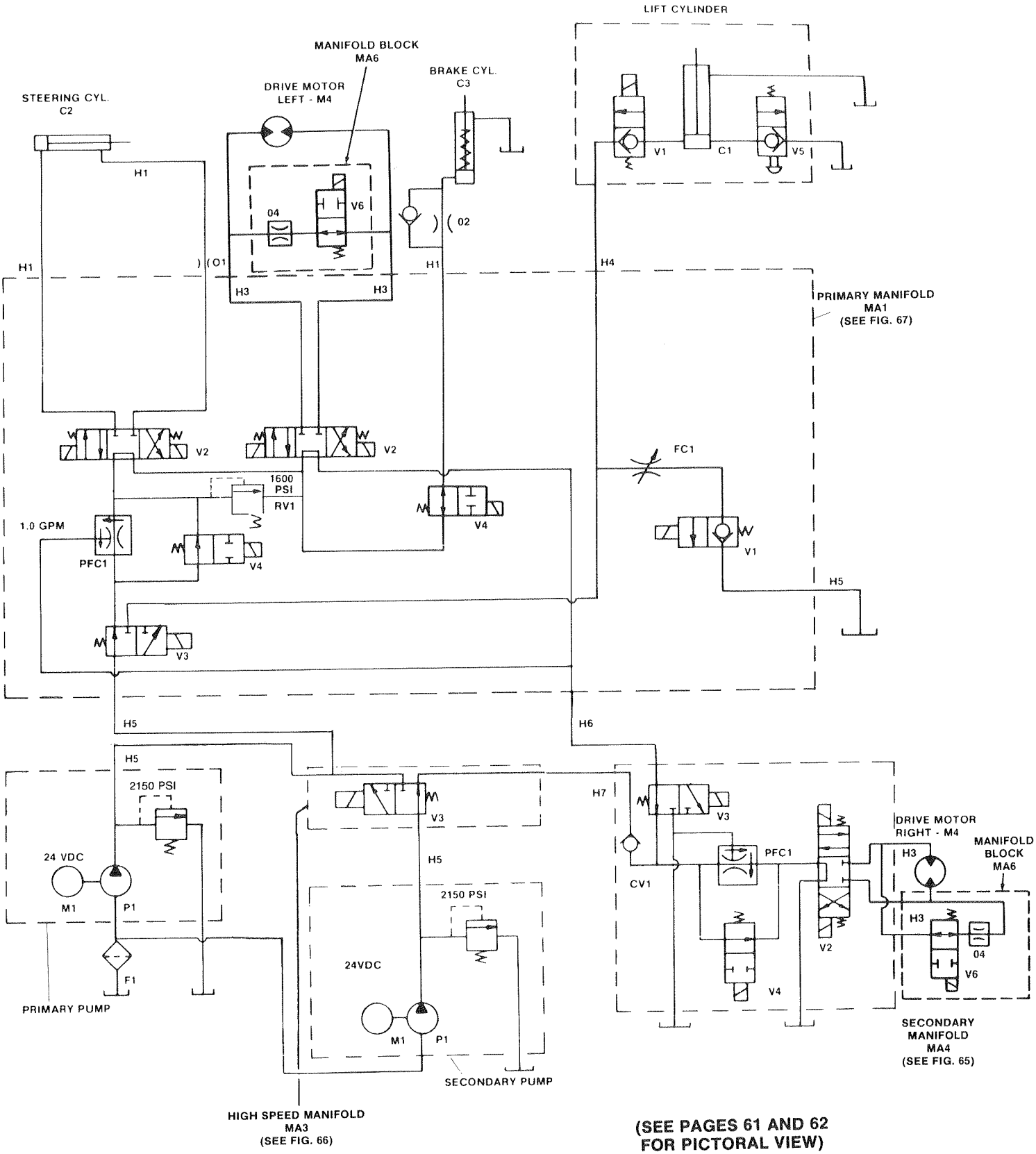
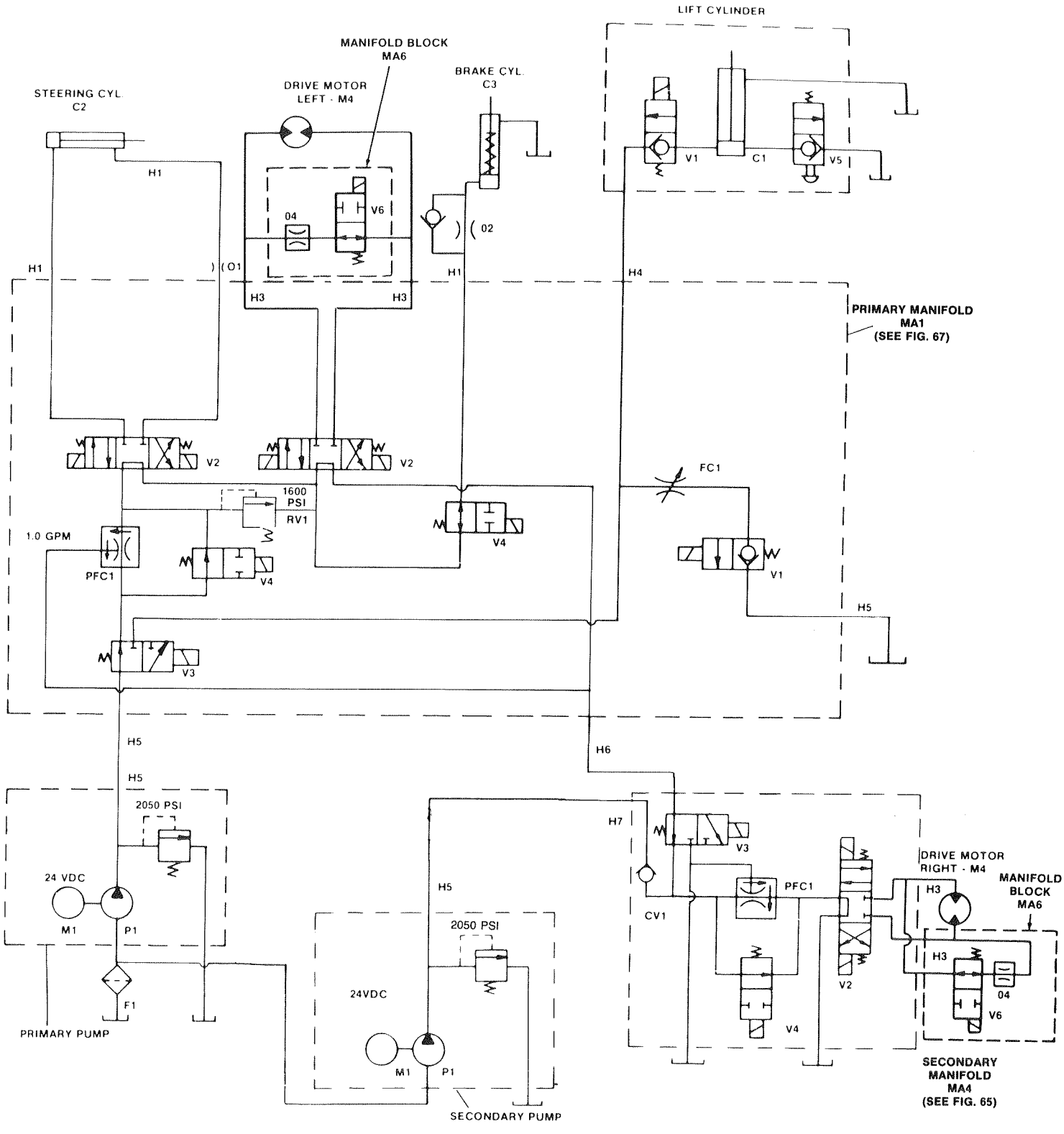


Figure 63.

HYDRAULIC SCHEMATIC
HI TORQUE SERIES(AM)
(PM)



(SEE PAGES 61 AND 62 FOR PICTORAL VIEW)

Figure 64.

Symbol Identification for Figures 63 & 64.

Symbol	Description	Part No.
C1	Lift Cylinder	4155
	Seal Kit W/Wire Lock	4088
C2	Steering Cylinder	2838
	Seal Kit	5947
C3	Brake Cylinder	2483
	Seal Kit	5947
CV1	Check Valve	5434
	"O" Ring Kit	5475
FC1	Flow Control	5963
	"O" Ring Kit	5475
H1	Hose	5997
H3	Hose	6351
H4	Hose	6001
H5	Hose	5999
H6	Hose	6237
H7	Hose	6238
M1	24 VDC Motor	6194
M4	Drive Motor (Hydraulic)	6210
MA1	Primary Manifold	4166
MA3	High Speed Manifold Pt.	2281
MA4	Secondary Manifold Pt.	4167
MA6	Manifold Block	2972
O1	Orifice, Fitting Assembly	6107
O2	Orifice, Fitting Assembly	4055
O4	Orifice, Fitting (Brass)	2975

Symbol	Description	Part No.
P1	Hydraulic Pump	6334
PFC1	Priority Flow Control 1.0 GPM (STD.)	5954
	Priority Flow Control .5 GPM (Special)	6189
	"O" Ring Kit	5475
RV1	Relief Valve	6316
	"O" Ring Kit	5475
V1	2-Way N.C. Valve	5964
	"O" Ring Kit	5475
	Valve Only	6973
	Coil Only - 24 VDC	6163
V2	4-Way 3-Position Valve	5960
	Spring and "O" Ring Kit	6161
	Valve Only	5960X
	Coil Only 24 VDC	6163
V3	3-Way 2-Position Valve	5961
	"O" Ring Kit	5476
	Valve Only	6976
	Coil Only - 24 VDC	6163
V4	2-Way N.O.	5962
	"O" Ring Kit	5475
	Valve Only	6974
	Coil Only - 24 VDC	6163
V5	Manual Pull - Emergency Down	5435
	"O" Ring Kit	5475
V6	2-Way N.O. (Spool Valve)	6554
	"O" Ring Kit	5475
	Valve Only	6975
	Coil Only - 24 VDC	6163

SECONDARY MANIFOLD ASSEMBLY
TORQUE MASTER

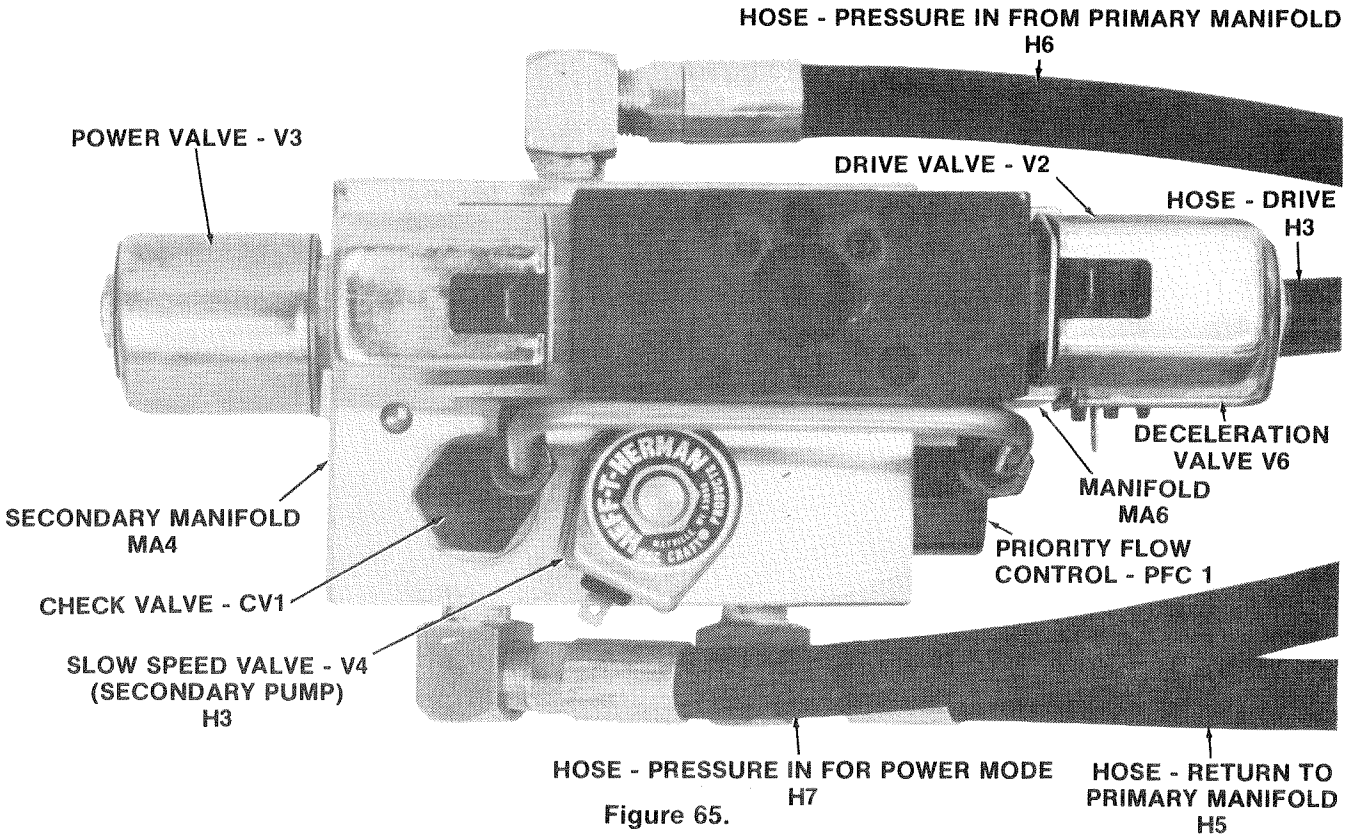


Figure 65.

HIGH SPEED MANIFOLD ASSEMBLY
TORQUE MASTER

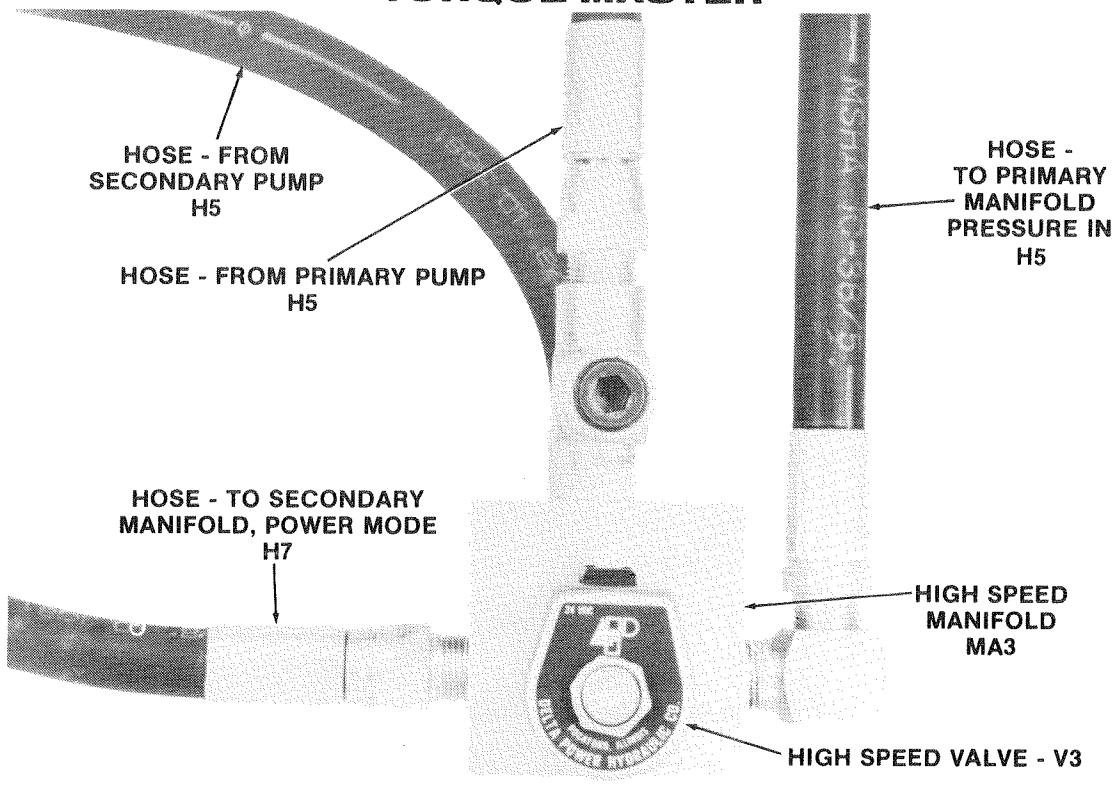


Figure 66.

PRIMARY MANIFOLD ASSEMBLY
TORQUE MASTER

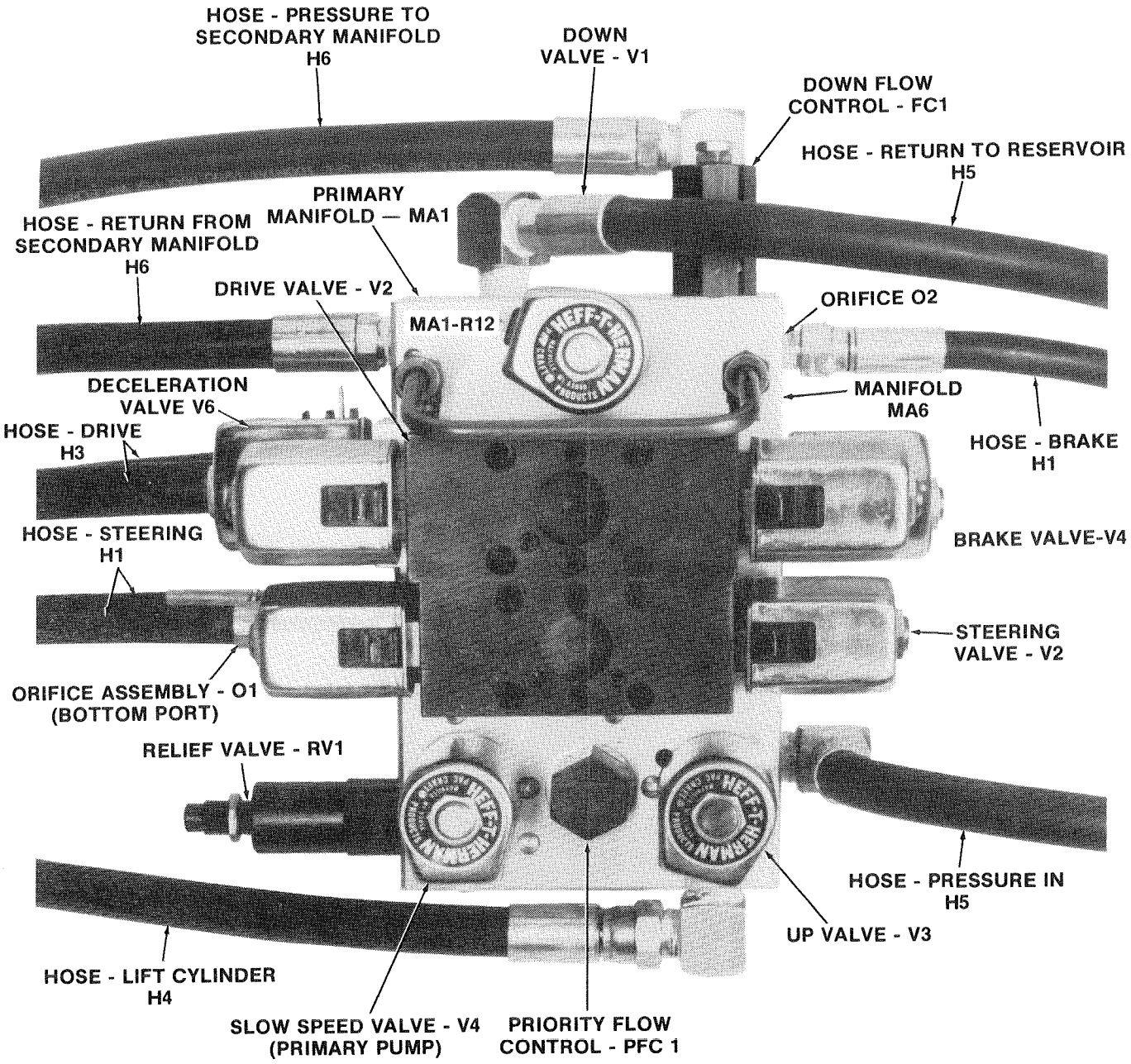


Figure 67.

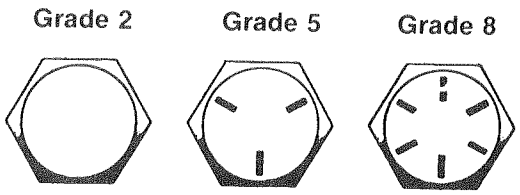
6. PARTS CATALOG

IMPORTANT REPLACEMENT PART NOTES

1. **CAPSCREWS**

   ANY BOLT REPLACEMENT SHOULD BE OF THE SAME GRADE OR GREATER THAN ORIGINAL BOLT. ANY QUESTIONS, CALL FACTORY FOR VERIFICATION.

   Grade markings for cap screws grades 2, 5, and 8 are based on SAE J429. Markings may be raised or depressed (manufacturer's option).



2. **BATTERY**

   Replacement battery MUST WEIGH AT LEAST 66 POUNDS, to maintain the stability factor of the machiine.

3. **TIRES**

   Tires on Torque Master machines must be replaced with manufacturer's replacement tires to maintain stability factor of the machine.

4. **DECALS AND LABELS**

   All decals and labels are furnished at no charge. Refer to the following part numbers when requesting decals. See next page for proper location or specific safety decals.

Part No.	Description	
2422	115SPEP	Decal Kit
2423	119SPEP	Decal Kit
2422	215SPEP	Decal Kit
2423	219SPEP	Decal Kit
2423	216AM	Decal Kit
2423	220AM	Decal Kit
2410	015BMEP	Decal Kit
2411	019BMEP	Decal Kit
2501	220TM II	Decal Kit
2502	215TM II	Decal Kit
2501	220AMHT	Decal Kit
2501	219AMHT	Decal Kit
2501	219SPHT	Decal Kit
2502	215SPHT	Decal Kit

Side Railing Decals

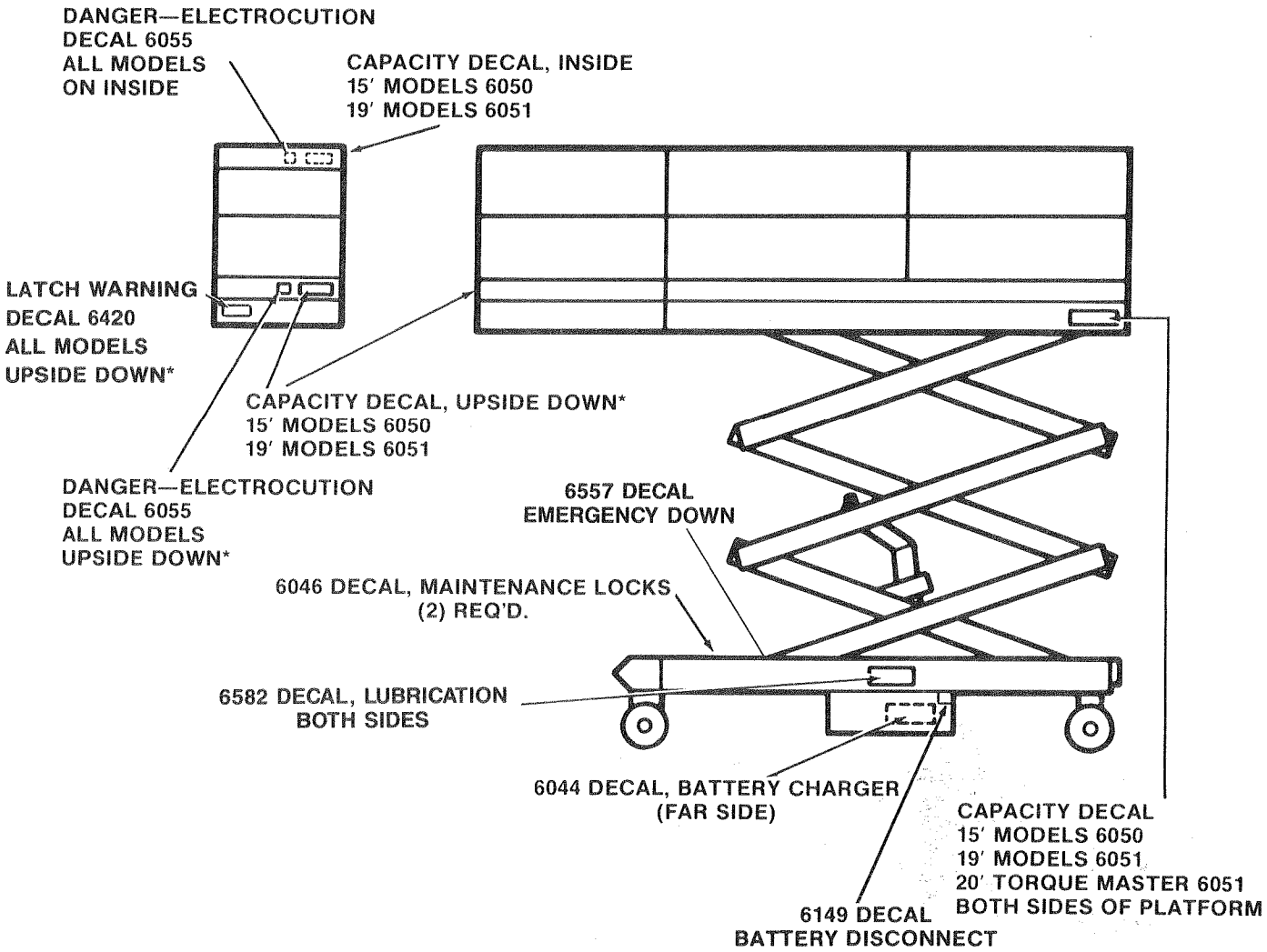
6692 Front
6693 Rear

NOTE: Side railing decals are not included in kit.

NOTES

IMPORTANT

When servicing machine check to see if decals shown in diagram below are in place and legible. If not, they must be added or replaced.



NOTE: Make sure capacity decals match capacity of machine.

*Decal placed upside down so that when extending platform is not extended, decals will read correctly to operator.

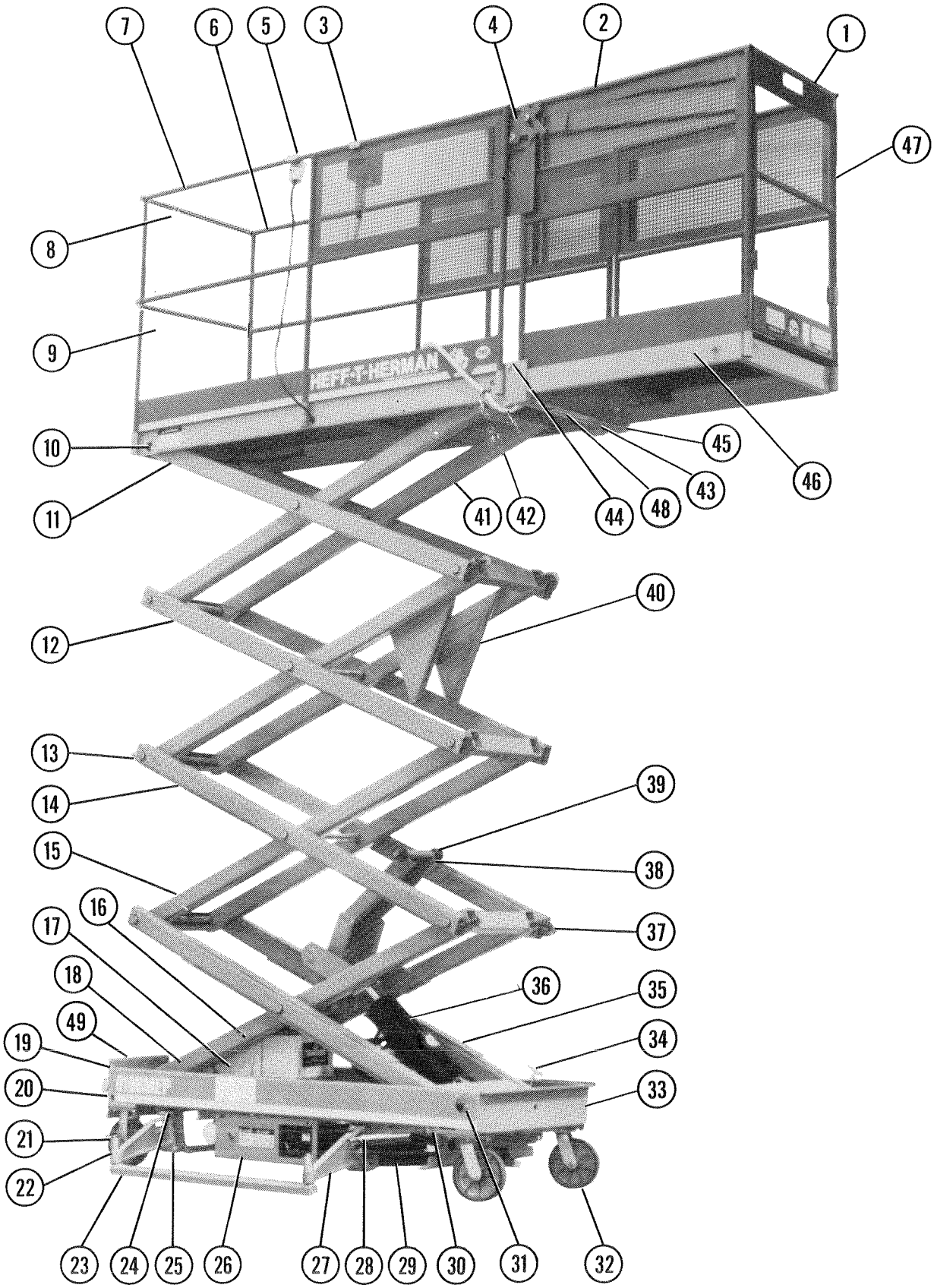


Figure 68. Models 019BMEP (shown), and 015BMEP

Item	015 BMEP Part No.	019 BMEP Part No.	Description
1	1827	1827	Front Rail Assy.
2	1823	1823	Side Rail (R.H.) (Ext. Plt.)
3	2137	2138	Control Box Assy. w/Harness
4	2854	2854	Latch Plate Kit
	6417	6417	Torsion Spring
5	1558	1558	110 A.C. Kit
	1906	1906	Hanger Clip
6	4142	4142	Side Rail Weld, L.H.
7	4143	4143	Side Rail Weld, R.H.
8	4069	4069	Guard Rail Tube
9	4038	4038	Guard Sliding Tube
	4191	4191	Parts Package
10	1377	1377	Connecting Pin
	5937	5937	Retaining Ring
11	—	1879P	Beam Assy.
12	1883 (R.H.)	1879P	Beam Assy.
	1884 (L.H.)	1879P	Beam Assy.
13	1946	1946	Pivot Bar
	5419	5419	Retaining Ring
14	1879P	1867P	Lower Beam Assy, Painted
15	1881	1877	Inner Beam Assy.
16	2989	2989	Battery Cover Assy.
	2983	2983	Hold Down, Battery
17	5970	5970	Battery (replacement battery must weigh at least 66 lbs. due to stability factor of machine)
	2025	2025	Battery Tray
	6208	6208	Battery Jumper
	6014	6014	Connector & Cable Assy, Battery
18	1870	1870	Beam & Support Arm Assy.
19	1038	1038	Connecting Pin
	1039	1039	Retaining Ring
20	(Fig. 75)	(Fig. 75)	Lower Control Box Assy. (Figure 75)
21	1983	1983	Spacer
	5919	5919	Retaining Ring
22	2177	2177	Stabilizer, Rear
	5930	5930	Bearing, Nyliner, Flanged
23	2006	2006	Support Bar Weldment
24	1978	1978	Stabilizer Mtg. Bearing Block
	1988	1988	Bearing, Nylon
25	1995	1995	Stabilizer Mtg. Bearing Block, L.H.
	1994	1994	Stabilizer Mtg. Bearing Block, R.H.
	1988	1988	Bearing, Nylon
26	2121	2121	Components Tray Assy. (Figure 77)
27	2088	2088	Stabilizer, Front
	5930	5930	Bearing, Nyliner, Flanged
28	2111	2111	Spring Anchor Weldment
	1966	1966	Closing Pin
29	5951	5951	Return Spring
30	5941	5941	Spring, Cam Lock
31	1036	1036	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1993	1993	Maintenance Lock Weld
	4187	4187	Cam Weldment, L.H.
	4188	4188	Cam Weldment, R.H.
	5912	5912	Bearing
	5901	5901	Cam Thrust Washer
	5918	5918	Retaining Ring
32	5520	5520	Caster, Swivel Lock, W/Brake
33	2051	2051	Base Assy.
34	2172	2172	Emergency Down Assy.
	2430	2430	Cam Roller Assembly
	5913	5913	Bearing
	5928	5928	Retaining Ring
35	2058	2058	Lower Outer Beam Assy.
36	4155	4155	Cylinder 5 x 12 (Figure 76)
37	2856	2856	Guard Spring
38	4042	4042	Lift Arm Assy.
32	5432	5432	Grease Fitting
	5823	5823	Bearing

Item	015 BMEP Part No.	019 BMEP Part No.	Description
39	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
40	1882	1880	Upper Inner Beam Assy.
41	1881	1881	Inner Beam Assy.
42	2055	2055	Platform Weldment
	6329	6329	Floor Board
	5213	5213	Screw, Floor Board
43	1893	1893	Cover, Terminal Board
	6350	6350	Foam Tape
	5991	5991	Terminal Board
44	1833	1833	Pivot Pin
	5719	5719	Pin, Expansion
45	5721	5721	Capscrew, 3/4-10 x 2.00 Lg.
	5022	5022	Hex Nut, 3/4-10
46	1782	1782	Extending Platform Weldment
	5716	5716	Floor Board
	5213	5213	Screw, Floor Board
	6668	6668	Manual Box
47	1824	1824	Side Rail (L.H.) (Ext. Plt.)
48	2238	2238	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
49	6305	6305	Safety Strip

NOTES

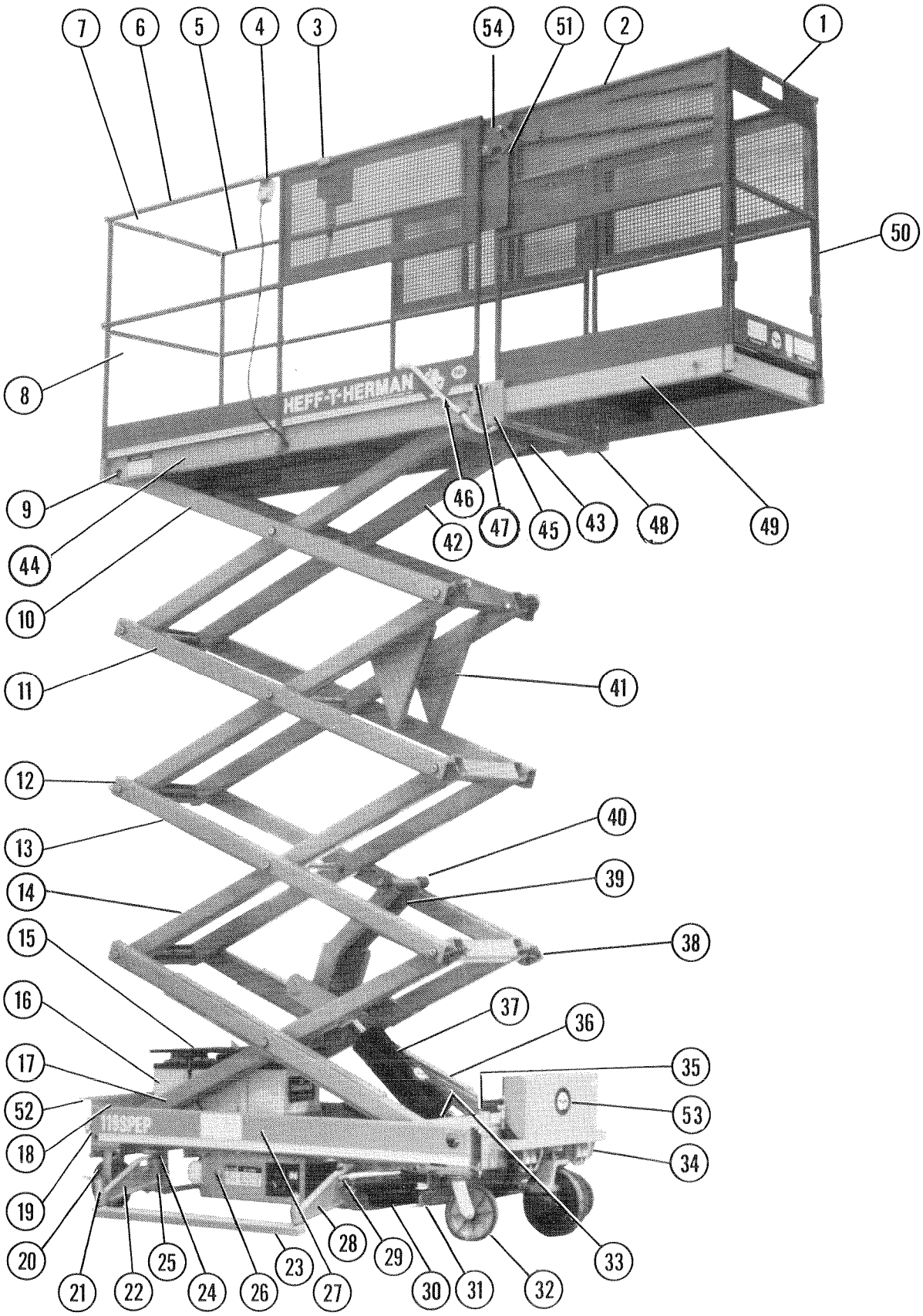


Figure 69. Models 119SPEP (Shown), and 115SPEP

Item	115 SPEP Part No.	119 SPEP Part No.	Description
1	1827	1827	Front Rail Assy.
2	1823	1823	Side Rail (R.H.) (Ext. Plt.)
3	2107	2107	Upper Control Box
4	1558	1558	110 A.C. Kit
	1906	1906	Hanger Clip
5	4142	4142	Side Rail Weld, L.H.
6	4143	4143	Side Rail Weld, R.H.
7	4069	4069	Guard Rail Tube
8	4038	4038	Guard Sliding Tube
	4191	4191	Parts Package
9	1377	1377	Connecting Pin
	5937	5937	Retaining Ring
10	1883 (R.H.)	1879P	Beam Assy.
	1884 (L.H.)	1879P	Beam Assy.
11	—	1879P	Beam Assy.
12	1946	1946	Pivot Bar
	5419	5419	Retaining Ring
13	1879P	1867P	Beam Assy.
14	1881	1877	Inner Beam Assy.
15	2989	2989	Battery Cover Assy.
	2983	2983	Hold Down, Battery
16	5970	5970	Battery (replacement battery must weigh at least 66 lbs. due to stability factor of machine)
	2025	2025	Battery Tray
	6208	6208	Battery Jumper
	6014	6014	Connector & Cable Assy., Battery
17	1870	1870	Beam & Support Arm Assy.
18	1038	1038	Connecting Pin
	1039	1039	Retaining Ring
19	(Fig. 75)	(Fig. 75)	Lower Control Box Assy.
20	5087	5087	Caster, Rigid, W/Brake
21	1983	1983	Spacer
	5919	5919	Retaining Ring
22	2177	2177	Stabilizer, Rear
	5930	5930	Bearing, Nyliner, Flanged
23	2006	2006	Support Bar Weldment
24	1978	1978	Stabilizer Mtg. Bearing Block
	1988	1988	Bearing
25	1995	1995	Stabilizer Mtg. Bearing Block, L.H.
	1994	1994	Stabilizer Mtg. Bearing Block, R.H.
	1988	1988	Bearing
26	2122	2122	Component Tray Assy. (Figure 68)
27	2051	2051	Base Assy.
28	2088	2088	Stabilizer, Front
	5930	5930	Bearing, Nyliner, Flanged
29	2111	2111	Spring Anchor Weld
	1966	1966	Closing Pin
30	5951	5951	Return Spring
31	5941	5941	Spring, Cam Lock
32	5245	5245	Swivel Caster
33	1036	1036	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	2210	2210	Stop Bracket
	1993	1993	Maintenance Lock Weld
	4187	4187	Cam Weldment, L.H.
	4188	4188	Cam Weldment, R.H.
	5912	5912	Bearing
	5901	5901	Cam Thrust Washer
	5918	5918	Retaining Ring
34	2131	2131	Front Drive Assy. (Figure 81)
35	2172	2172	Emergency Down Assy. (Not Shown)
36	2058	2058	Lower Outer Beam Assy.
	2430	2430	Cam Roller Assembly
	5913	5913	Bearing
	5928	5928	Retaining Ring
37	4155	4155	Cylinder 5 x 12 (Figure 76)
38	2856	2856	Guard Spring
	6072	6075	Harness
	6073	6076	Harness

Item	115 SPEP Part No.	119 SPEP Part No.	Description
39	4042	4042	Lift Arm Assy
	5432	5432	Grease Fitting
	5823	5823	Bearing
40	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
41	1882	1880	Upper Inner Beam Assy.
42	—	1881	Inner Beam Assy.
43	2238	2238	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
44	2055	2055	Platform Weld
	6329	6329	Floor Board
	5213	5213	Screws, Floor Board
45	1893	1893	Cover, Terminal Board
	6350	6350	Foam Tape
	5991	5991	Terminal Board
46	5983	5983	Harness Assy.
47	1833	1833	Pivot Pin
	5719	5719	Pin, Expansion
48	5721	5721	Cap Screw, 3/4-10 x 2.00 Lg.
	5022	5022	Hex Nut, 3/4-10
49	1782	1782	Extending Platform Weldment
	5716	5716	Floor Board, Extending Platform
	5213	5213	Screw, Floor Board
	6668	6668	Manual Box
50	1824	1824	Side Rail (L.H.) (Ext. Plt.)
51	6417	6417	Torsion Spring
52	6305	6305	Safety Strip
53	2082	2082	Cover
54	2854	2854	Latch Plate Kit

NOTES

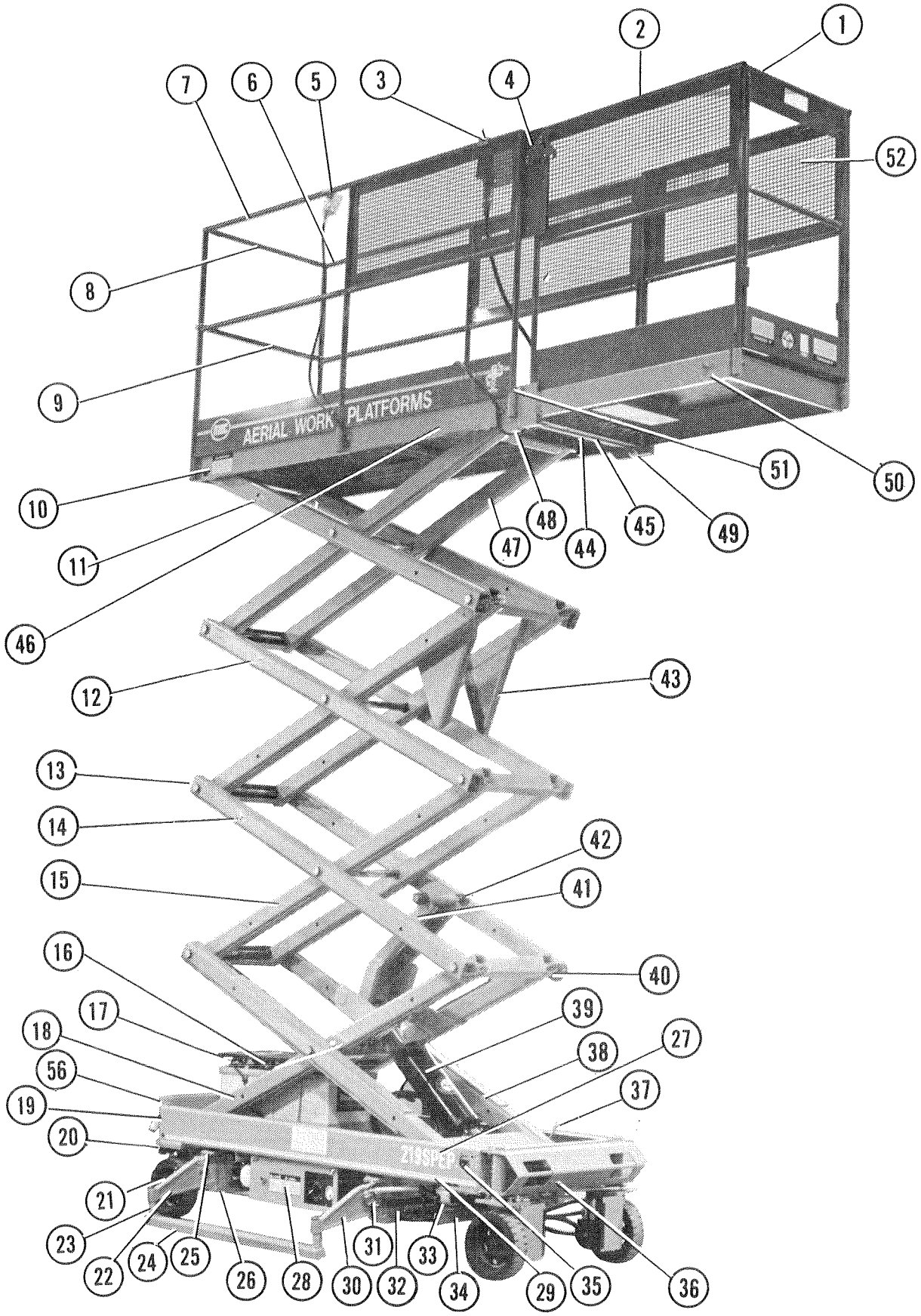


Figure 70. Models 219SPEP (Shown), 215SPEP

Item	215 SPEP Part No.	219 SPEP Part No.	Description
1	1827	1827	Front Rail Assembly
2	1823	1823	Side Rail (R.H.) (Ext. Plt.)
3	2106	2106	Upper Control Box
4	2854	2854	Latch Plate Kit
	6417	6417	Torsion Spring
5	1558	1558	110 A.C. Kit
	1906	1906	Hanger Clip
6	4142	4142	Side Rail Weld, L.H.
7	4143	4143	Side Rail Weld, R.H.
8	4069	4069	Guard Rail Tube
9	4038	4038	Guard Sliding Tube
	4191	4191	Parts Package
10	1377	1377	Connecting Pin
	5937	5937	Retaining Ring
11		1879P	Beam Assy.
12	1883(R.H.)	1879P	Beam Assy.
	1884(L.H.)	1879P	Beam Assy.
13	1946	1946	Pivot Bar
	5419	5419	Retaining Ring
14	1879P	1867P	Beam Assy.
15	1881	1877	Inner Beam Assy.
16	2989	2989	Battery Cover Assy.
	2983	2983	Hold Down, Battery
17	5970	5970	Battery (Replacement battery must weigh at least 66 lbs. due to stability factor of machine.)
	2025	2025	Battery Tray
	6208	6208	Battery Jumper
	6014	6014	Connector & Cable Assy, Battery
18	1870	1870	Beam & Support Arm Assy.
19	(Fig. 75)	(Fig. 75)	Lower Control Box Assy.
20	(Fig. 88)	(Fig. 88)	Rear Axle Assy.
21	4046	4046	Rear Wheel
22	2177	2177	Stabilizer, Rear
	5930	5930	Bearing, Nylon
23	1983	1983	Spacer
24	2006	2006	Support Bar Weldment
25	1978	1978	Stabilizer Mtg. Bearing Block
	1988	1988	Bearing, Nylon
26	1995	1995	Stabilizer Mtg. Bearing Block, L.H.
	1994	1994	Stabilizer Mtg. Bearing Block, R.H.
	1988	1988	Bearing, Nylon
27	1038	1038	Connecting Pin
	1039	1039	Retaining Ring
28	2123	2123	Components Tray Assy. (Figure 77)
29	2051	2051	Base Assembly
30	2088	2088	Stabilizer, Front
	5930	5930	Bearing, Nylon
31	2111	2111	Spring Anchor Weld
	1966	1966	Closing Pin
32	5951	5951	Return Spring
33	5941	5941	Spring, Cam Lock
34	2838	2838	Steering Cylinder
	2302	2302	Steering Cylinder Mount
35	1036	1036	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	2210	2210	Stop Bracket
	1993	1993	Maintenance Lock Weld
	4187	4187	Cam Weldment, L.H.
	4188	4188	Cam Weldment, R.H.
	5912	5912	Bearing
	5901	5901	Cam Thrust Washer
	5918	5918	Retaining Ring
36	(Fig. 70)	(Fig. 70)	Front Drive Assy.
37	2172	2172	Emergency Down Assy.

Item	215 SPEP Part No.	219 SPEP Part No.	Description
38	2058	2058	Lower Outer Beam Assy.
	2430	2430	Cam Roller Assembly
	5928	5928	Retaining Ring
39	4155	4155	Cylinder 5 x 12
40	2856	2856	Guard Spring
	6072	6075	Harness
	6073	6076	Harness
41	4042	4042	Lift Arm Assy.
	5432	5432	Grease Fitting
	5823	5823	Bearing
42	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
43	1882	1880	Upper Inner Beam Assy.
44	1062	1062	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing , Nylon
	1039	1039	Retaining Ring
45	1893	1893	Cover, Terminal Board
	6350	6350	Foam Tape
	5991	5991	Terminal Board
46	2055	2055	Platform Weld
	6329	6329	Floor Board
	5213	5213	Screw, Floor Board
47		1881	Inner Beam Assy.
48	5983	5983	Harness Assy.
49	5721	5721	Capscrew, 3/4-10 x 2.00 Lg.
	5022	5022	3/4-10 Hex Nut
50	1782	1782	Extending Platform, Weldment
	5716	5716	Floorboard, Extending Platform
	5213	5213	Screw, Floor Board
	6668	6668	Manual Box
51	1833	1833	Pivot Pin
	5719	5719	Pin, Expansion
52	1824	1824	Side Rail (L.H.) (Ext. Plt.)
	2066	2066	Rear Axle Weldment (Fig. 88)
	6305	6305	Safety Strip

NOTES

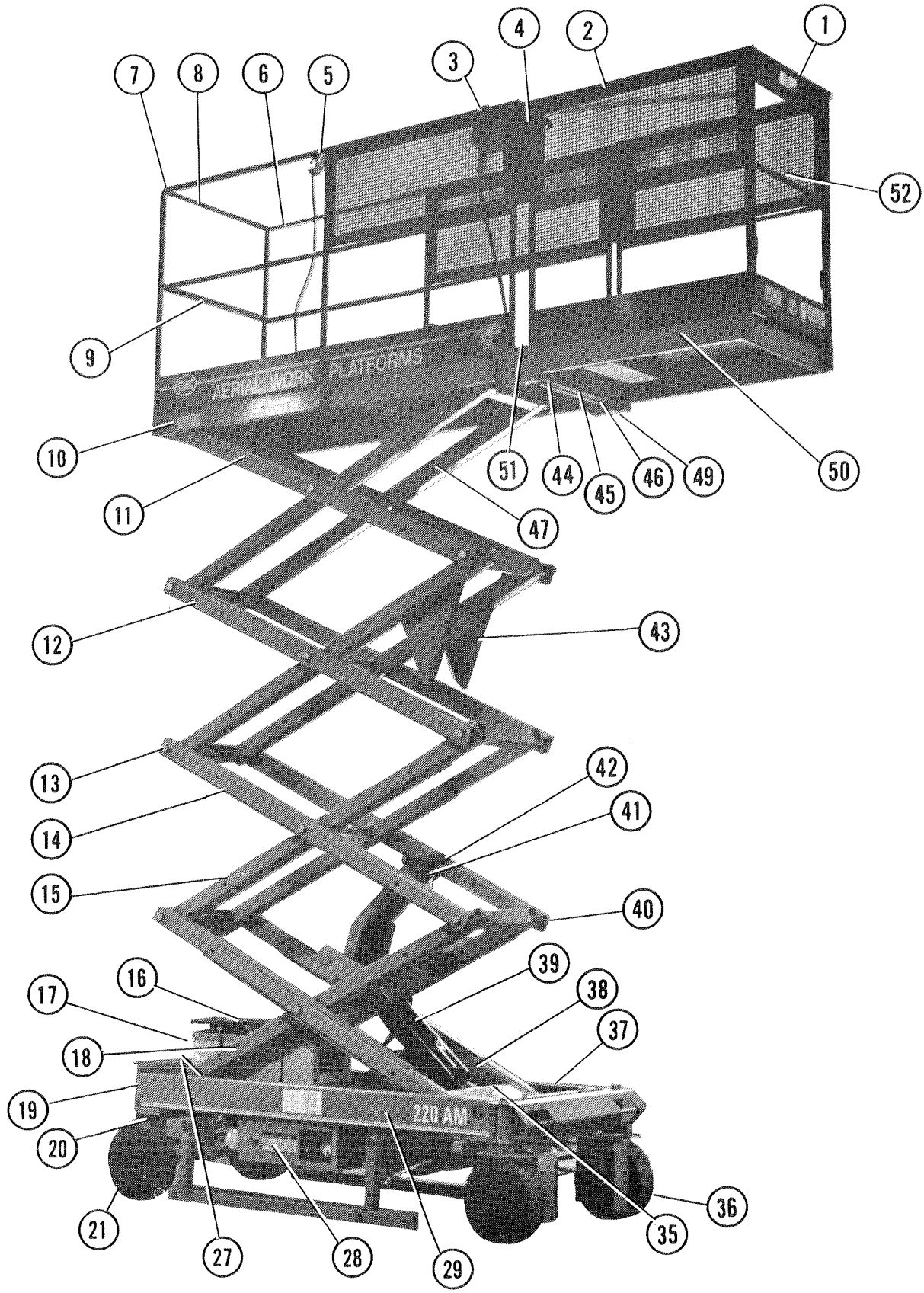


Figure 71. Models 216 AM (Not Shown) and 220 AM (Shown).

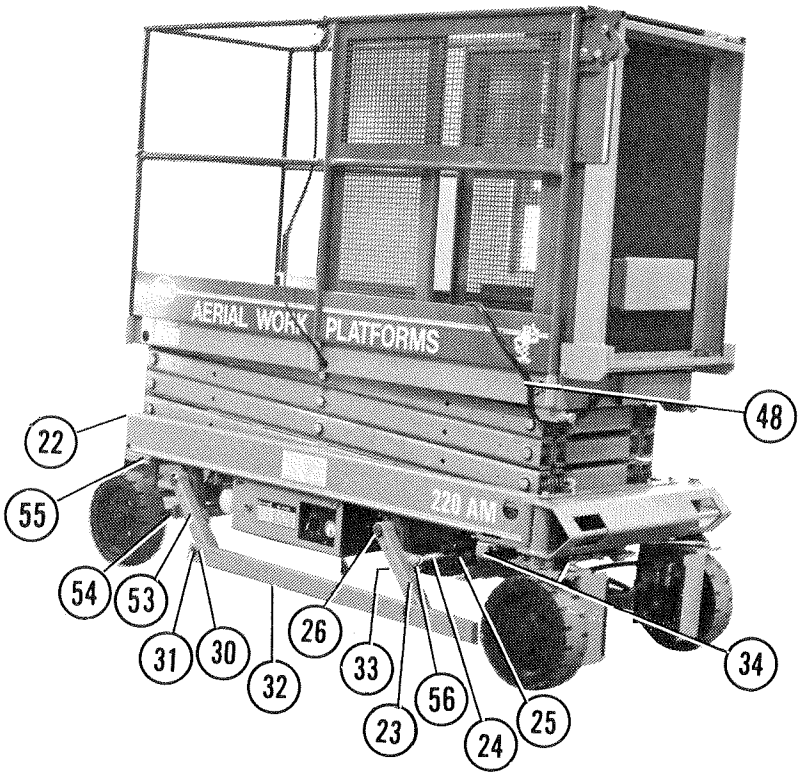


Figure 72. Model 220AMHT (Shown)

Item	216 AM Part No.	220 AM Part No.	Description
1	1827	1827	Front Rail Assembly
2	1823	1823	Side Rail (R.H.) (Ext. Plt.)
3	2107	2107	Upper Control Box
	2731	2731	Upper Control Box (HT Series)
4	2854	2854	Latch Plate Kit
	6417	6417	Torsion Spring
5	1558	1558	110 A.C. Kit
	1906	1906	Hanger Clip
6	4142	4142	Side Rail Weld, L.H.
7	4143	4143	Side Rail Weld, R.H.
8	4069	4069	Guard Rail Tube
9	4038	4038	Guard Sliding Tube
	4191	4191	Parts Package
10	1377	1377	Connecting Pin
	5937	5937	Retaining Ring
11		1879P	Beam Assy.
12	1883(R.H.)	1879P	Beam Assy.
	1884(L.H.)	1879P	Beam Assy.
13	1946	1946	Pivot Bar
	5419	5419	Retaining Ring
14	1879P	1867P	Beam Assy.
15	1881	1877	Inner Beam Assy.
16	2989	2989	Battery Cover Assy.
	2983	2983	Hold Down, Battery
17	5970	5970	Battery (Replacement battery must weigh at least 66 lbs. due to stability factor of machine.)
	2025	2025	Battery Tray
	6208	6208	Battery Jumper
	6014	6014	Connector & Cable Assy, Battery
18	1870	1870	Beam & Support Arm Assy.
19	(Fig. 75)	(Fig. 75)	Lower Control Box Assy.
20	(Fig. 87)	(Fig. 87)	Rear Axle Assy.

Item	216 AM Part No.	220 AM Part No.	Description
21	4071	4071	Rear Wheel
22	6305	6305	Safety Strip
23	4162	4162	Pivot Arm Weldment Front R.H.
	4164	4164	Pivot Arm Weldment Front L.H.
	6620	6620	Bearings, Pivot Arm (Not Shown)
24	4035	4035	Spring Pivot Arm Retractor
25	5941	5941	Spring Cam Lock
26	5766	5766	Retaining Ring, Pivot Arm
27	1038	1038	Connecting Pin
	1039	1039	Retaining Ring
28	2123	2123	Components Tray Assy. (Figure 77)
29	2051	2051	Base Assembly
30	5919	5919	Retaining Ring, Pot Hole Bar
31	5930	5930	Bearing-Nyliner, Pot Hole Bar
32	4023	4023	Pot Hole Bar
33	4016	4016	Pivot Arm Mounting Weld. Front
34	2838	2838	Steering Cylinder
	2302	2302	Steering Cylinder Mount
35	1036	1036	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	2210	2210	Stop Bracket
	1993	1993	Maintenance Lock Weld
	4187	4187	Cam Weldment, L.H.
	4188	4188	Cam Weldment, R.H.
	5912	5912	Bearing
	5901	5901	Cam Thrust Washer
	5918	5918	Retaining Ring
36	(Fig. 84)	(Fig. 84)	Front Drive Assy.
37	2172	2172	Emergency Down Assy.
38	2058	2058	Lower Outer Beam Assy.
	2430	2430	Cam Roller Assembly
	5913	5913	Bearing
	5928	5928	Retaining Ring
39	4155	4155	Cylinder 5 x 12
40	2856	2856	Guard Spring
	6072	6075	Harness
	6073	6076	Harness
41	4042	4042	Lift Arm Assy.
	5432	5432	Grease Fitting
	5868	5868	Bearing, Nylon
42	1033	1033	Roller
	5868	5868	Bearing, Nylon
	1039	1039	Retaining Ring
43	1882	1880	Upper Inner Beam Assy.
44	1062	1062	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing , Nylon
	1039	1039	Retaining Ring
45	1893	1893	Cover, Terminal Board
	6350	6350	Foam Tape
	5991	5991	Terminal Board
46	2055	2055	Platform Weld
	6329	6329	Floor Board
	5213	5213	Screw, Floor Board
	6668	6668	Manual Box
47		1881	Inner Beam Assy.
48	5983	5983	Harness Assy.
49	5721	5721	Capscrew, 3/4-10 x 2.00 Lg.
	5022	5022	3/4-10 Hex Nut
50	1782	1782	Extending Platform, Weldment
	5716	5716	Floorboard, Extending Platform
	5213	5213	Screw, Floor Board
51	1833	1833	Pivot Pin
	5719	5719	Pin, Expansion
52	1824	1824	Side Rail (L.H.) (Ext. Plt.)

Item	216 AM Part No.	220 AM Part No.	Description
53	4163	4163	Pivot Arm Weldment Rear R.H.
	4164	4164	Pivot Arm Weldment Rear L.H.
54	4017	4017	Pivot Arm Mounting Weld. Rear R.H.
	4018	4018	Pivot Arm Mounting Weld. Rear L.H.
55	4006	4006	Rear Axle Weldment (Fig. 88)
56	6617	6617	Rod End
	(Fig. 86)	(Fig. 86)	Activating Arm Assy.

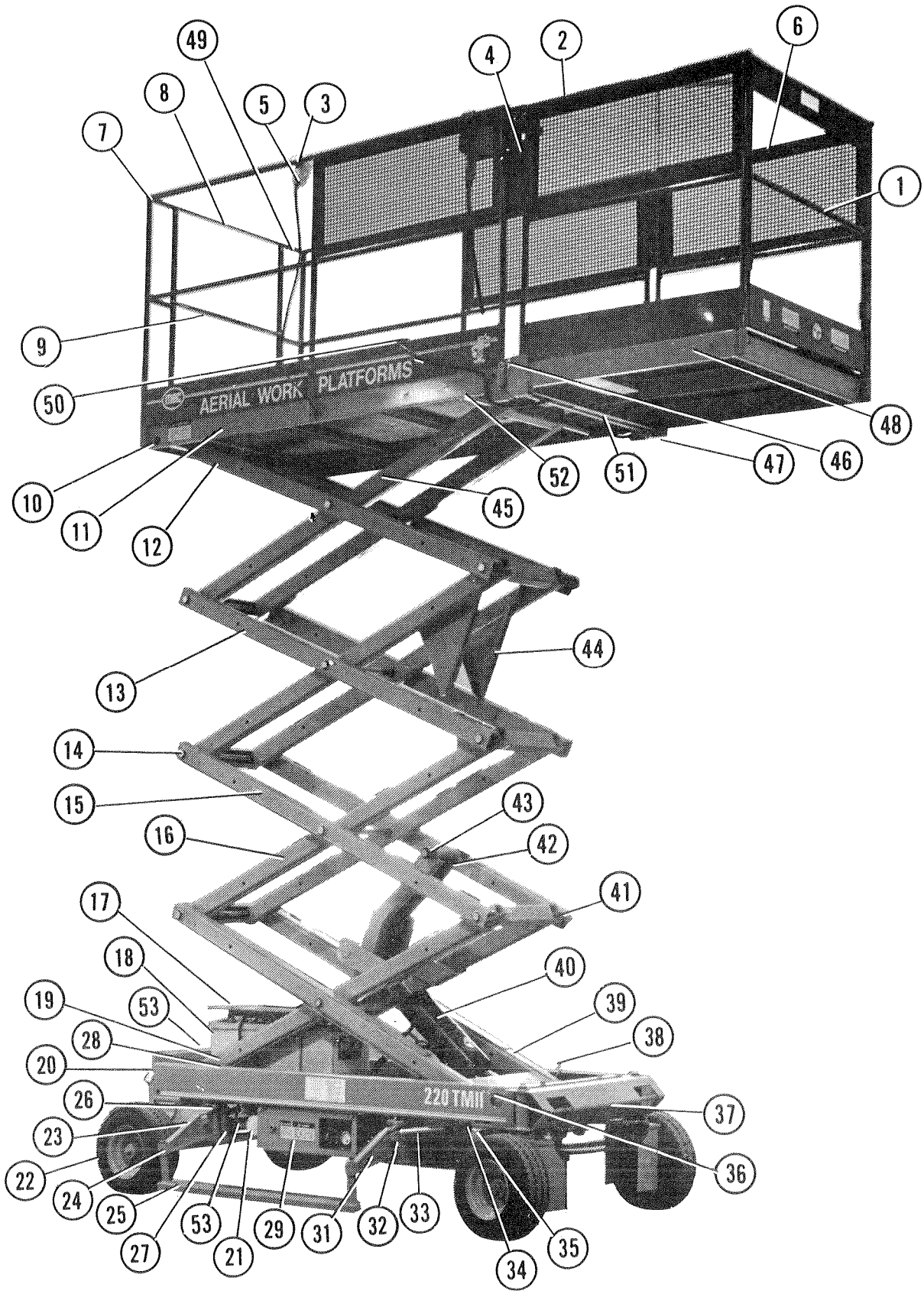


Figure 73. 220TM II Model
(215TM II Model Not Shown)

Item	215TM II Part No.	220 TM II Part No.	Description
1	2462	2462	Front Rail Assy.
2	1823	1823	Side Rail (R.H.) (Ext. Plt.)
3	2992	2992	Upper Control Box
4	2854	2854	Latch Plate Kit
	6417	6417	Torsion Spring
5	1558	1558	110 A.C. Kit
	1906	1906	Hanger Clip
6	1824	1824	Side Rail Weld, L.H. (Ext. Plt.)
7	2872	2872	Side Rail Weld, R.H.
8	4068	4068	Guard Rail Tube
9	4038	4038	Guard Sliding Tube
	4191	4191	Parts Package
10	2761	2761	Connecting Pin
	2773	2773	Spacer
	1039	1039	Retaining Ring
11	2439	2439	Platform Weld
	6325	6325	Floor Board
12		1879P	Beam Assy.
13	1884 (L.H.), 1883 (R.H.)	1879P	Beam Assy.
14	1946	1946	Pivot Bar
	5419	5419	Retaining Ring
15	1879P	1867P	Beam Assy.
16	1881	1877	Inner Beam Assy.
17	2989	2989	Battery Cover Assy.
	2983	2983	Hold Down, Battery
18	5970	5970	Battery (Replacement battery must weigh at least 66 lbs. due to stability factor of machine.)
	2025	2025	Battery Tray
	6208	6208	Battery Jumper
	6205	6205	Connector & Cable Assy, Battery
19	1870	1870	Beam & Support Arm Assy.
20	(Fig. 75)	(Fig. 75)	Lower Control Box Assy. (Figure 69)
21	(Fig. 86)	(Fig. 86)	Rear Axle Assy.
22	4045	4045	Rear Wheel
23	2177	2177	Stabilizer, Rear
24	2115	2115	Spacer
	5919	5919	Retaining Ring
25	2372	2372	Support Bar Weldment
26	1978	1978	Stabilizer Mtg. Bushing
	1988	1988	Bearing
27	1995	1995	Stabilizer Mtg. Block, L.H.
	1994	1994	Stabilizer Mtg. Block, R.H.
	1988	1988	Bearing
28	1038	1038	Connecting Pin
	1039	1039	Retaining Pin
29	2306	2306	Components Tray Assy. (Figure 77)
30	2051	2051	Base Assy.
31	2088	2088	Stabilizer, Front
32	5930	5930	Bearing, Nylinder Flanged
	2111	2111	Spring Anchor Weld
	5910	5910	Rod End
	1966	1966	Closing Pin
33	5951	5951	Return Spring
	(Fig. 86)	(Fig. 86)	Activating Arm Assy.
34	5941	5941	Spring, Cam Lock
35	2838	2838	Steering Cylinder
	2302	2302	Steering Cylinder Mount
36	1036	1036	Roller Bar
	1033	1033	Roller
	5868	5868	Bearing, Nylon
	2210	2210	Stop Bracket
	1993	1993	Maintenance Lock Weld
	4187	4187	Cam Weldment, L.H.
	4188	4188	Cam Weldment, R.H.
	5912	5912	Bearing
	5901	5901	Cam Thrust Washer
	5918	5918	Retaining Ring
37	2242	2242	Front Drive Assy. (Figure 84)

Item	215TM II Part No.	220 TM Part No.	Description
38	2172	2172	Emergency Down Assy.
39	2058	2058	Lower Outer Beam Assy.
	2430	2430	Cam Roller Assembly
	5913	5913	Bearing
	5928	5928	Retaining Ring
40	4155	4155	Cylinder 5 x 12 (Figure 76)
41	2856	2856	Guard Spring
	6071	6074	Harness
	6072	6075	Harness
	6073	6076	Harness
42	4042	4042	Lift Arm Assy.
	5432	5432	Grease Fitting
	5823	5823	Bearing
43	1033	1033	Roller
	5863	5868	Bearing, Nylon
	1039	1039	Retaining Ring
44	1882	1880	Upper Inner Beam Assy.
45		1881	Inner Beam Assy.
46	2468	2468	Pivot Pin
	5719	5719	Pin, Expansion
47	5721	5721	Cap Screw, 3/4-10
	5022	5022	Hex Nut, 3/4-10
48	2457	2457	Extending Platform Weldment
	6324	6324	Floor Board, Extending Platform
	5213	5213	Screw, Floor Board
	6668	6668	Manual Box
49	2871	2871	Side Rail Weld, L.H.
50	5983	5983	Harness Assy.
51	1893	1893	Cover, Terminal Board
	6030	6030	Foam Tape
	5991	5991	Terminal Board
52	2762	2762	Roller Bar
	2774	2774	Spacer
	1033	1033	Roller
	5868	5868	Bearing, Nylon
53	6305	6305	Safety Strip

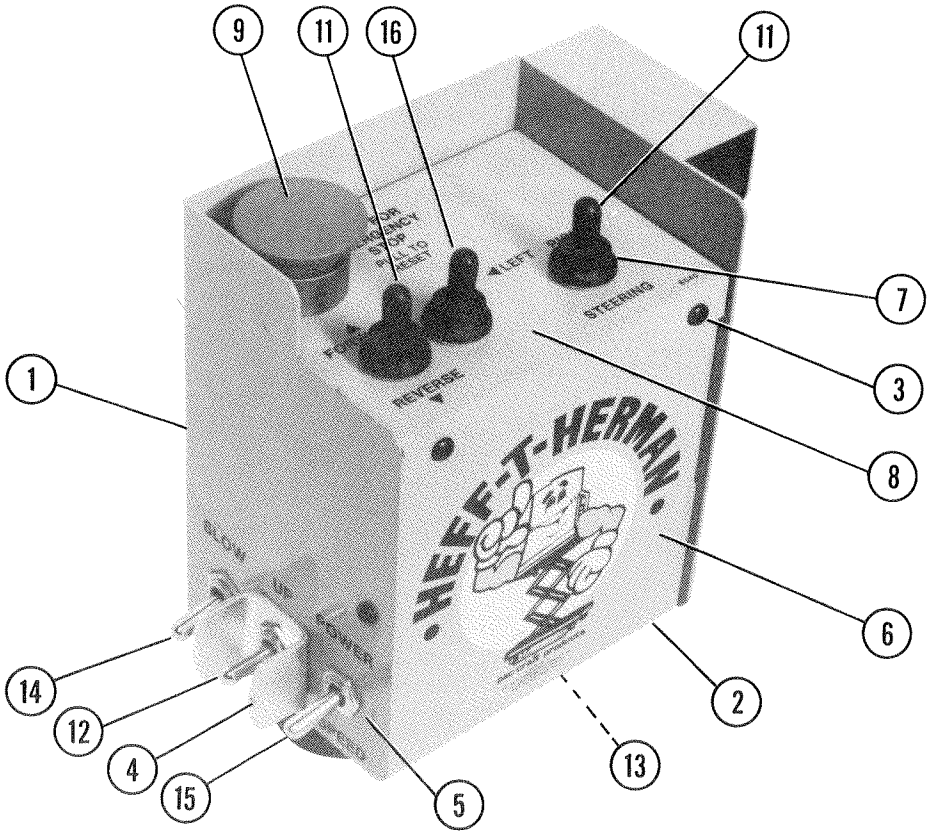


Figure 74. Upper Control Box Assembly (HT Shown)

Item	PM 1 Wheel Drive Part No.	PM & AM 2 Wheel Drive Part No.	AM & PM HT Series	TM II 2 Wheel Drive Part No.	Description
	2107	2107	2731	2992	Complete Control Box
1	2089	2089	2089	2318	Wrapper Weldment
2	2095	2095	2095	2095	Front and Bottom Panel
3	2094	2094	2991	2991	Cover
	5978	5978	5978	5978	Screw
4	1313	1313	1313	1313	Switch Guard
5	6572	6572	6572	6575	Decal Control, Box Side
6	6580	6580	6580	6580	Decal Control, Box Front
7	5692	5692	5692	5692	Boot, Toggle
8	6573	6573	6574	6574	Decal
9	6665	6665	6665	6665	Emergency Stop Switch, Body
	6666	6666	6666	6666	Emergency Stop Switch, Retainer
	6667	6667	6667	6667	Emergency Stop Switch, Contactor
11	5694	5694	5694	5694	Switch
12	5979	5979	5979	5979	Switch
13	5982	5982	5982	5982	Harness Set (TM II Also Requires Pt. 6296)
14	5630	5630	5630	5630	Switch
15				6234	Switch
16			5230	5230	Switch
17				6296	Harness Set (Not Shown)
	6318	6318	6318	6318	Connector Repair Kit 12 Pins 12 Sockets 1 Retractor
	6057	6057	6057	6057	Decal (Obstruction)

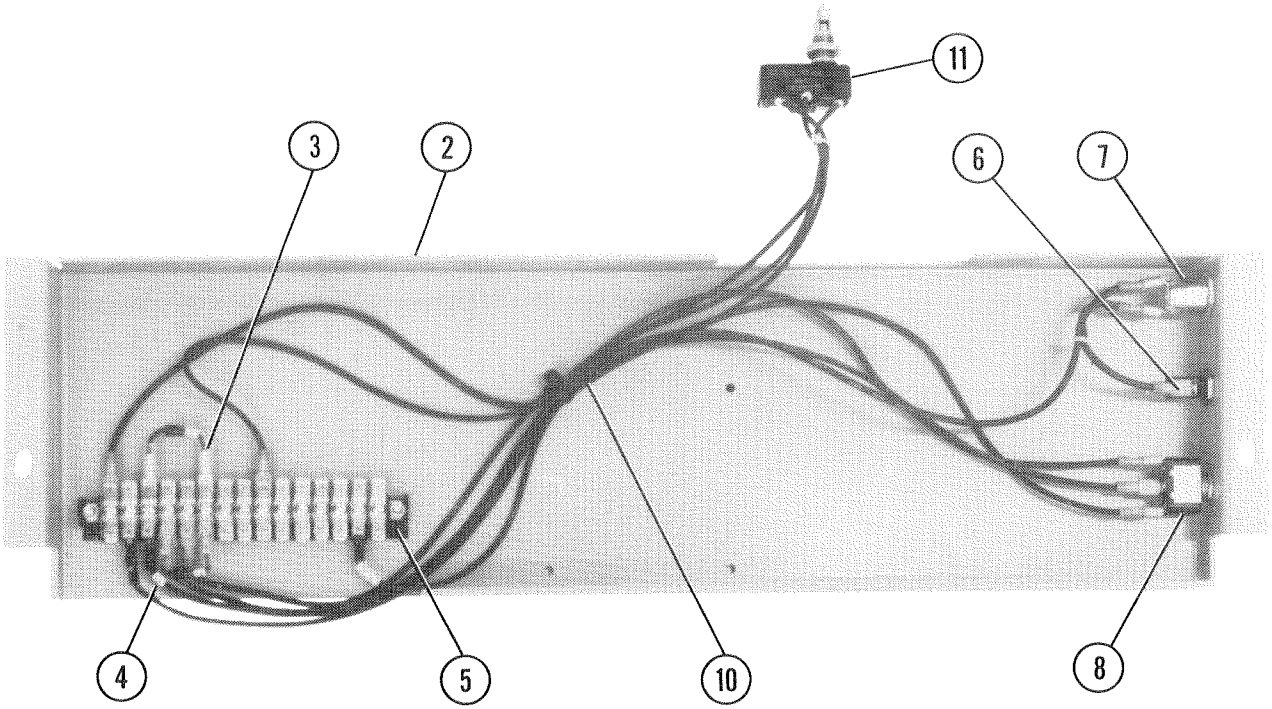


Figure 75. Lower Control Box Assembly

Item	Battery Man. PM Part No.	1 Whl. Drive PM Part No.	2 Whl. Drive PM & AM Part No.	2 Whl. Drive TM II Part No.	Description
2	2096	2096	2096	2096	Lower Control Box
3		6070	6070	6070	Diode
4		6070	6070	6070	Diode
5	5991	5991	5991	5991	Terminal Board
6	5265	5265	5265	5265	Fuse Holder
—	6190	6190	6190	6190	Fuse
7	5936	5936	5936	5936	Key Switch
8	5230	5230	5230	5230	Switch
9	6576	6576	6576	6576	Decal, Lower Control Station (Not Shown)
10	6285	6286	6286	6286	Harness Assy.
11	—	6016	6016	6016	Slow Speed SW
—	6581	6581	6581	6581	Decal, Fork Lift Pockets (Not Shown)

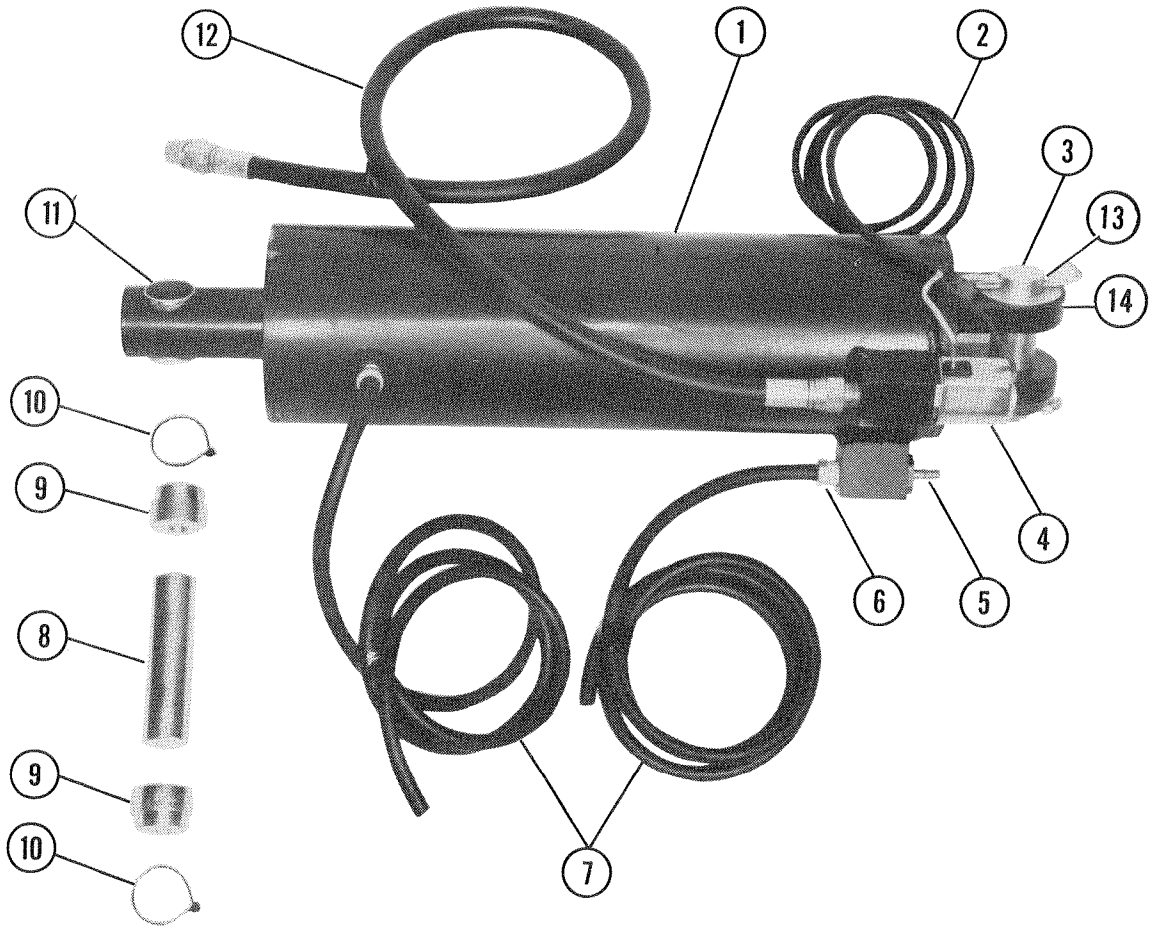


Figure 76. Lift Cylinder Assembly

Item	Part No.	Description
1	4155	Cylinder 5 x 12
	4088	Seal Kit W/Wire Lock (Not Shown)
2	6021	Harness (One & Two Wheel Drive)
	6022	Harness (Battery Manual Models)
3	1945	Cylinder Pin - Lower
4	5964	Valve, 2 Way, N.C., 24V DC - Battery Models
	5475	"O" Ring Kit
	6973	Valve Only
	6163	Coil Only - Battery Models
5	5435	Valve Manual Pull
	5475	"O" Ring Kit
6	6125	Fitting, Bayonet
7	2153	Return Line
8	1944	Cylinder Pin - Upper
9	1908	Plug
10	5766	Retaining Ring
11	5874	Bearing
12	6001	Hyd. Hose, Lift
13	5765	Cotter Pin
14	2389	Washer

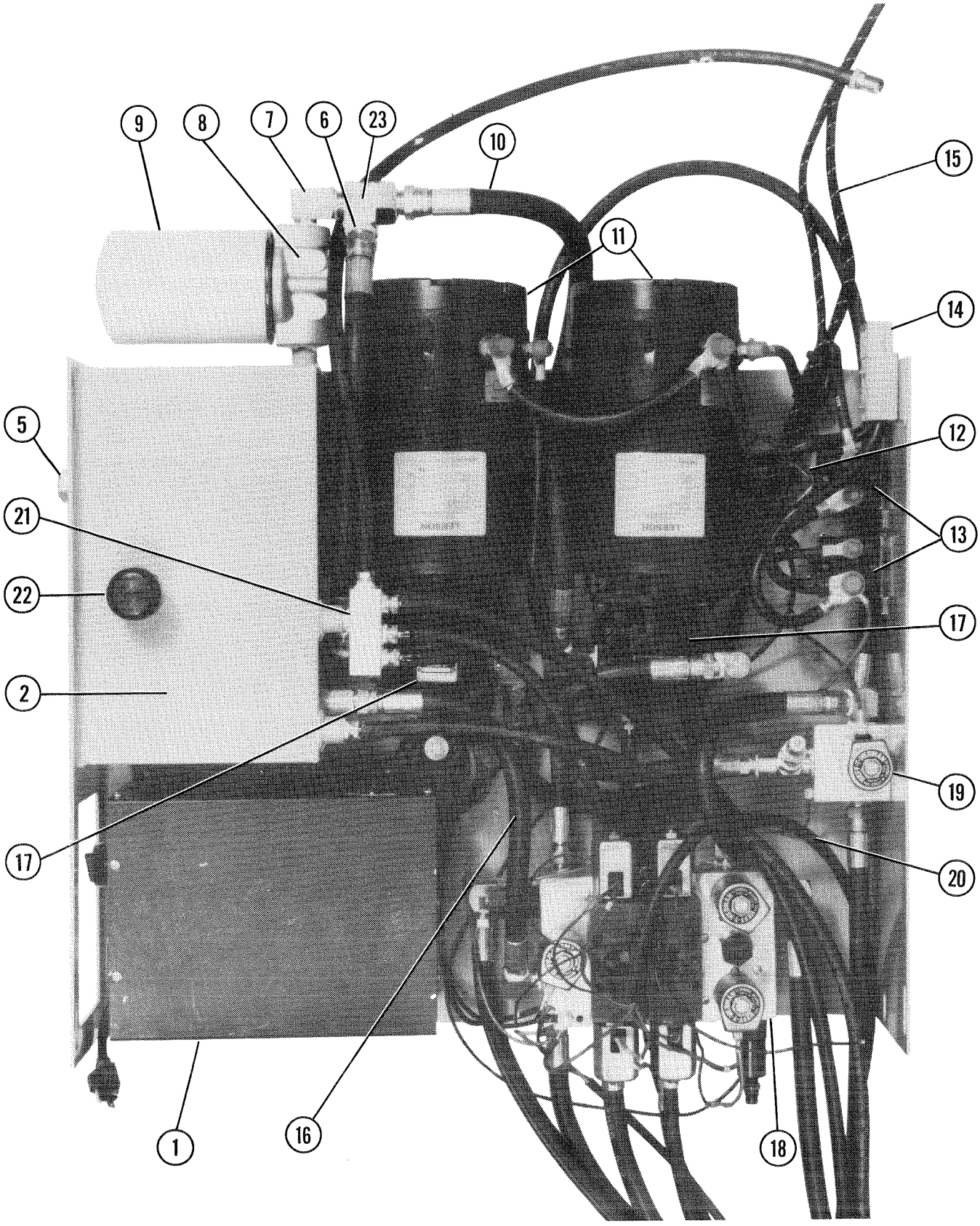


Figure 77. Component Tray Assembly (TM II & HT Shown)

Item	Batt. Manual PM Part No.	1 Whl. Drive PM Part No.	2 Whl. Drive PM & AM* Part No.	2 Whl. Drive TM II Part No.	Description
1	5955	5955	5955	5955	Battery Charger (See Fig. 78)
2	2102	2102	2102	2102	Component Tray Weld.
5	5938	5938	5938	5938	Gauge, Sight
6				5995	Hyd. Hose
7	6510	6510	6510	5493	Fitting
8	5969	5969	5969	5969	Filter Head
9	6156	6156	6156	6156	Filter Cartridge
10	6225	6225	6225	6225	Hyd. Hose
11	6194	6194	6194	6194	Motor (With Fan)
	4041	4041	4041	4041	Brush Set
	6371	6371	6371	6371	Armature
12	6231	6231	6231	6231	Varistor Assy.
13	5967	5967	5967	5967	Contactor 24VDC
14	5985	5985	5985	6206	Connector/Cable Assy.
15	6022	6021	6021	6021	Wire Harness
16	5999	5999	5999	5999	Hose
17	6334	6334	6334	6334	Pump
	*	*	*	*	Coupler
18	See Fig. 58	See Fig. 60	See Fig. 62	See Fig. 67	Manifold Assy.
19				See Fig. 66	Manifold Assy.
20				6230	Wire Harness - Secondary Manifold
21				2353	Return Block
	5052	5052	5052	5052	Bayonet Fitting
22	2392	2392	2392	2392	Breather Cap
	2185	2185	2185	2185	Cover, LH (Not Shown)
	2186	2186	2186	2186	Cover, RH (Not Shown)
	6127	6127	6127	6127	Wing Nut (Not Shown)
23				6511	'T' Fitting
	6607	6607	6607	6607	Drain Plug (Not Shown)

* Fenner Stone - 6012 Coupler and 6013 Spring
J.S. Barnes - 6314 Coupler
Webster - 6353 Coupler

*Hi-Torque models same as TM II less Item 19 (Manifold Assy.)

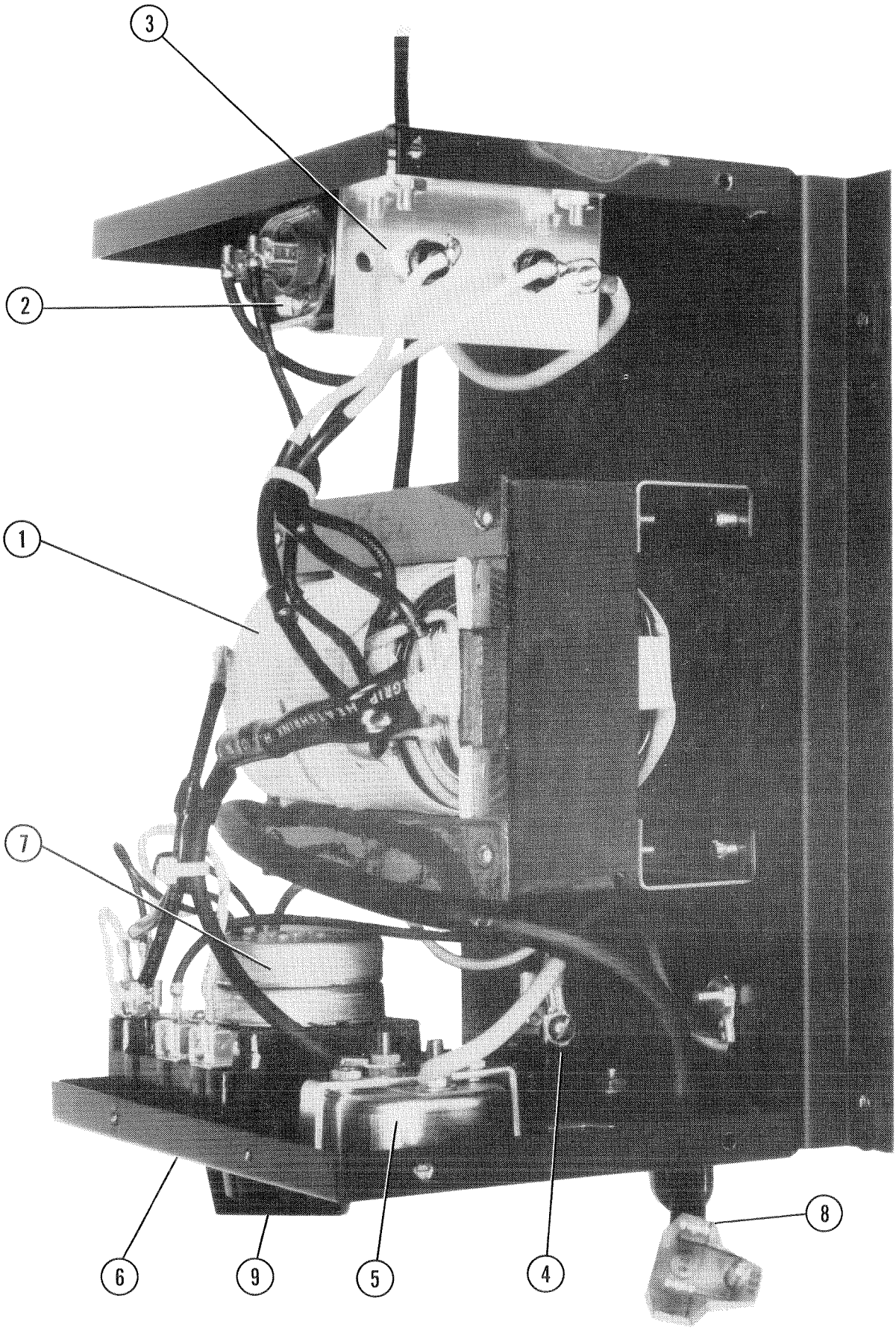


Figure 78. Battery Charger - MAC

Item	Part No.	Description
1	6157	Transformer
2	6158	Condenser
3	5553	Rectifier Assy.
4	6522	Circuit Breaker
5	5554	Ammeter
6	5643	Timer Dial Plate
7	5642	Timer
8	5649	A.C. Cord)
9	5556	Knob

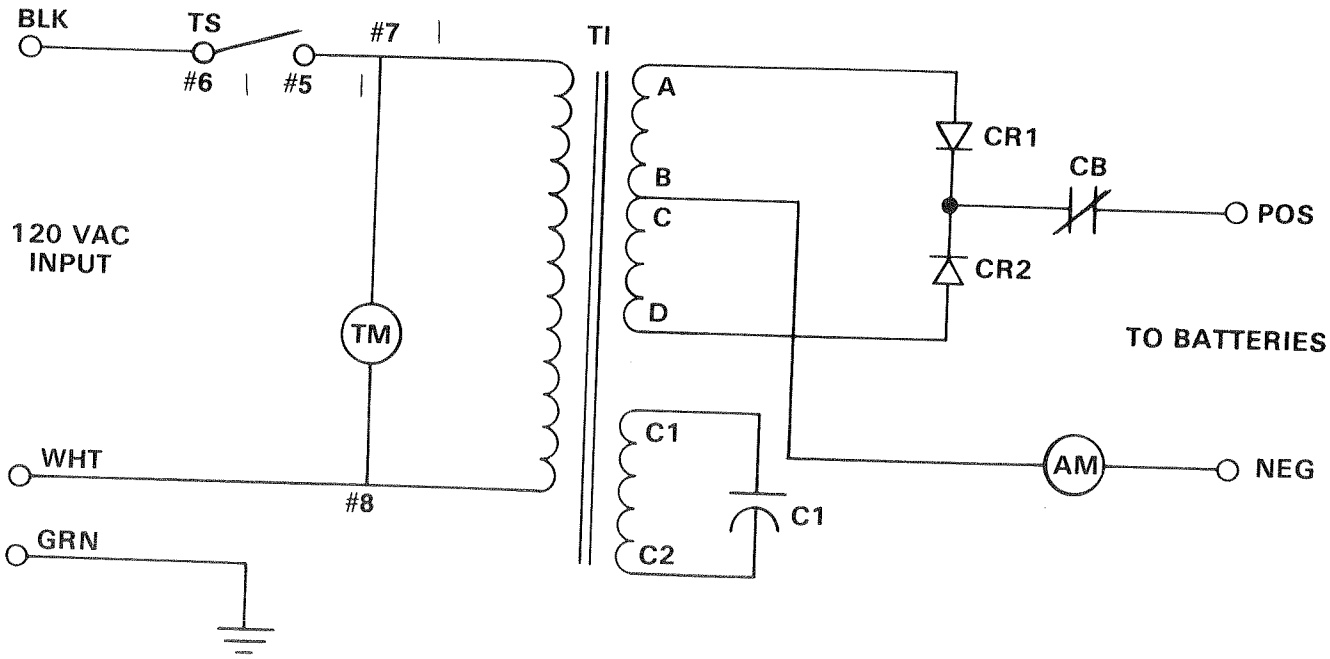


Figure 79.

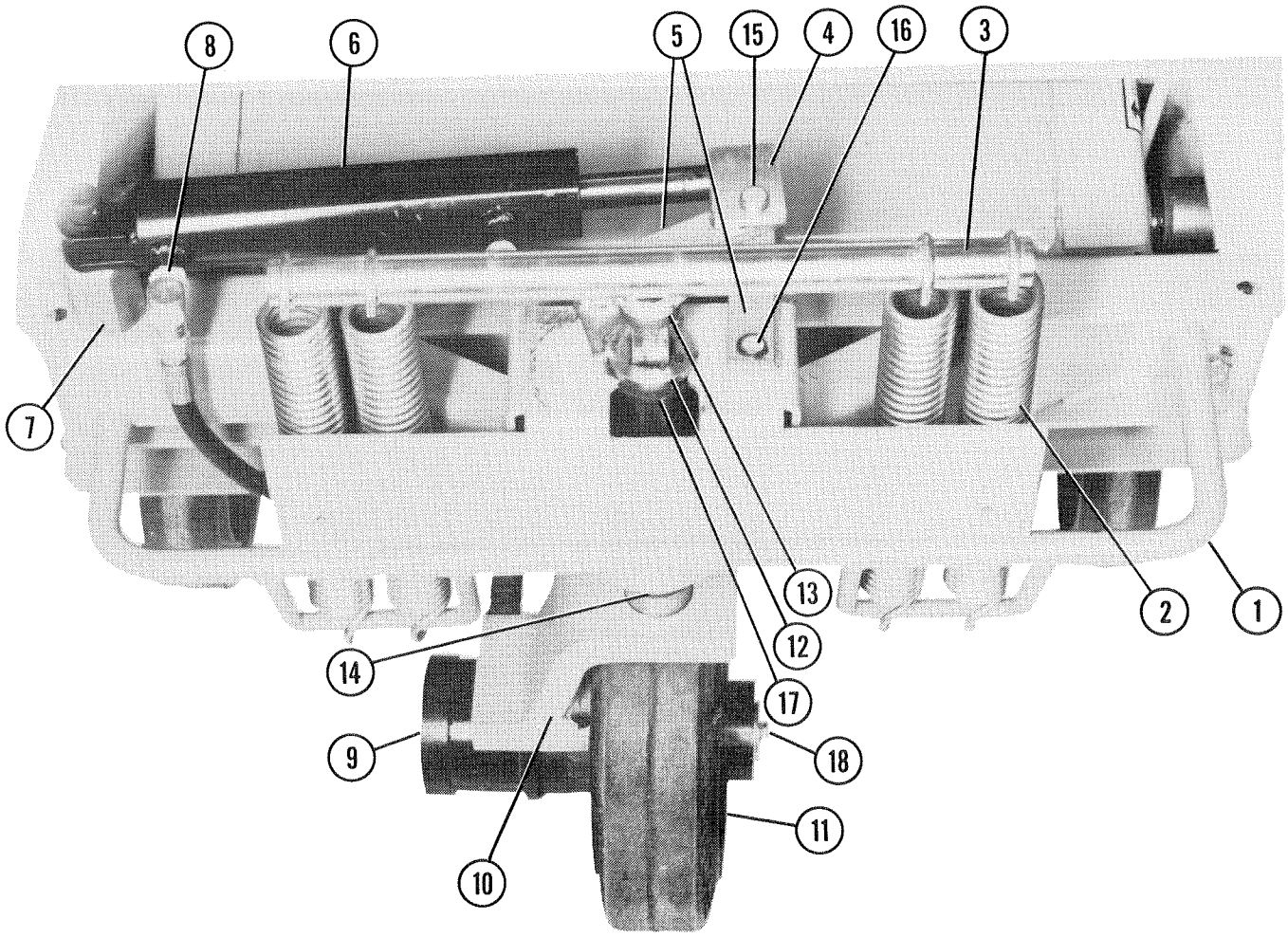


Figure 81. Front Drive Assembly, 1-Wheel Drive PM (115, 119)

Item	Part No.	Description
1	4160	Front Drive Weldment
2	5952	Traction Spring
3	2024	Pressure Bar Weldment
4	2505	Rod, Steering Cyl.
5	1962	Steering Link
6	2512	Steering Cylinder w/Rod End
	5947	Seal Kit
7	1959	Steering Cylinder Mount
	5916	Mounting Bolt
8	5122	Fitting, Elbow
9	5949	Motor, Drive (Char-Lynn)
	6816	Seal Kit H-Plus Series (Char-Lynn)
10	4161	Steering Brkt, Weld.
	5993	'O' Ring
	5992	Capscrew
11	2169	Drive Wheel (Non Marking)
12	2016	Steering Arm Weld.
13	1971	Thrust Washer
	5913	Thrust Washer
14	5915	Bushing (Not Shown, 1 Required))
	6326	Bearing (1 Required)
15	5710	Pin
16	5736	Retaining Ring
17	5928	Retaining Ring
18	6124	Cap Screw
	5470	Washer

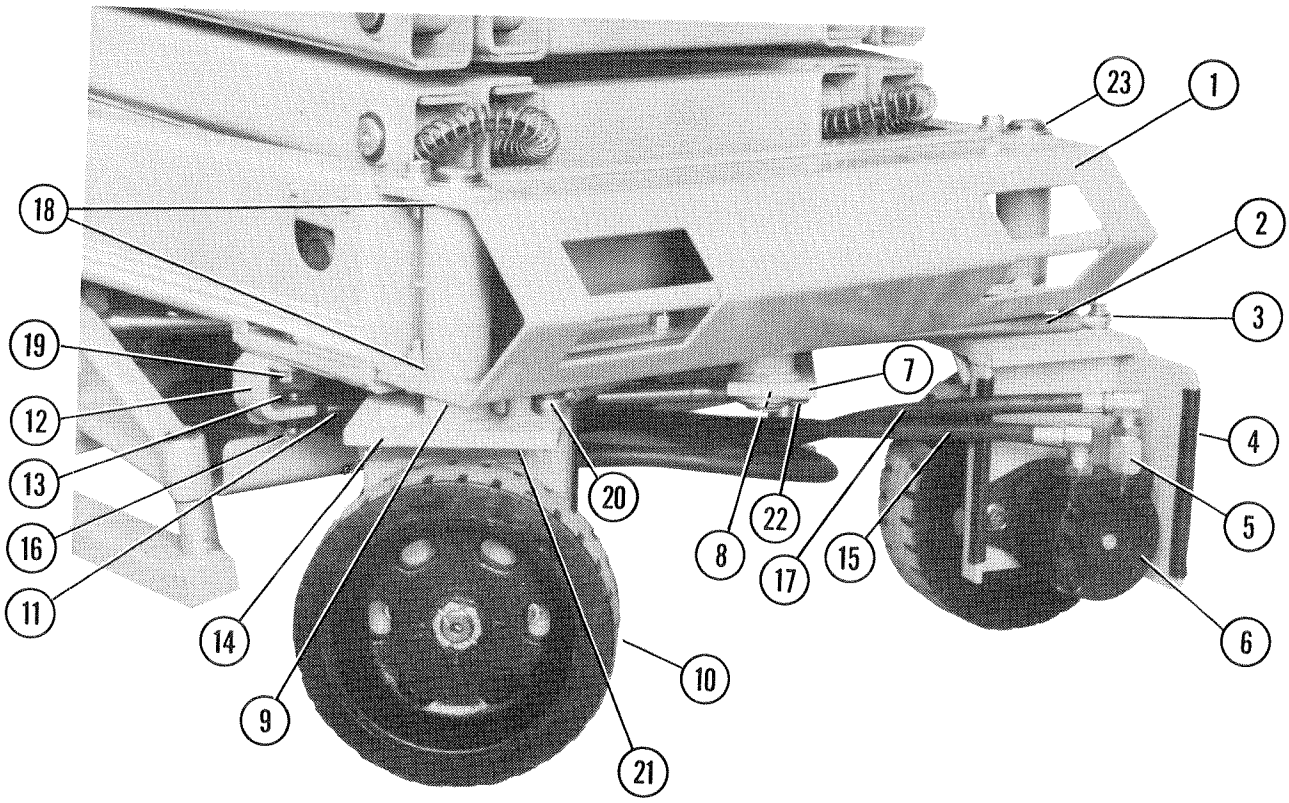


Figure 82. Front Drive Assembly, 2-Wheel Drive PM (215, 219)

Item	Part No.	Description
1	4159	Main Bracket, Front
2	2060	Tie Rod
3	5679	Rod End, Steering
	5680	Lock Nut
4	2074	L.H. Wheel Bracket
	2195	Trim
5	6134	Pipe Extender
6	6032	Drive Motor (HPI)
	6242	Seal Kit (HPI Motor)
	6307	Seal Kit (Char-Lynn Motor)
	6986	Castle Nut
7	4157	Pivot Plate
	5417	Capscrew
8	5874	Bearing (2 per Pivot Plate)
	5419	Retaining Ring
9	2389	Thrust Washer
10	2064	Front Wheel (Non Marking)
11	2838	Steering Cylinder w/Rod End
	2837	Cylinder Rod
	5947	Seal Kit
12	2302	Steering Cylinder Bracket
	5710	Clevis Pin
13	5916	Mounting Bolt
14	2073	R.H. Wheel Bracket
15	5996	Hose, Drive Crossover
16	5787	Cotter Pin
17	6351	Hose Drive
18	5874	Bearing (2 per Spindle)
	5432	Grease Fitting
19	6211	Capscrew (1/2" x 1-1/4")
	5417	Capscrew (3/8" x 1-1/4")
20	5756	Bolt
21	5039	Capscrew
22	5736	Retaining Ring
	5216	Washer
23	5419	Retaining Ring

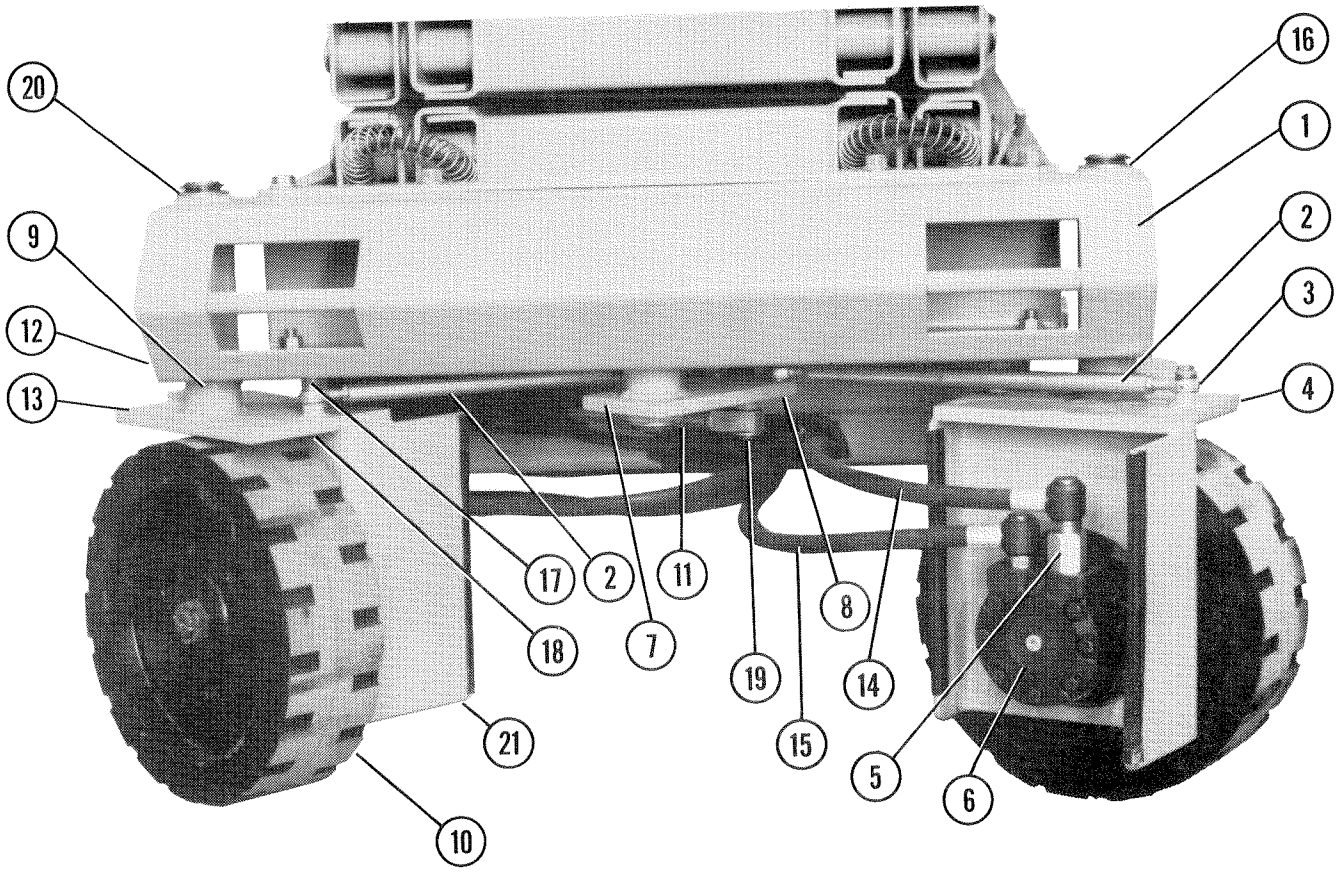


Figure 83. Front Drive Assembly, 2-Wheel Drive AM Models (216, 220)

Item	Part No.	Description
1	4158	Front Drive Weldment
2	2101	Tie Rod
3	5981	Rod End, Steering
	6498	Lock Nut
4	4010	L.H. Wheel Bracket
	6247	Adj. Screw (Not Shown)
	6248	Nut (Not Shown)
5	6134	Pipe Extender
6	6616	Drive Motor (HPI)
	6242	Seal Kit (HPI Motor)
	6986	Castle Nut
7	4156	Pivot Plate
	5874	Bearing (2 per Pivot Plate)
8	6211	Capscrew
9	2389	Thrust Washer
10	2996	Front Wheel
11	2838	Steering Cylinder w/Rod End
	2837	Cylinder Rod
	5947	Seal Kit
12	2302	Steering Cylinder Mount (Not Shown)
13	4009	R.H. Wheel Bracket
	6247	Adj. Screw (Not Shown)
	6248	Nut (Not Shown)
14	5996	Hose Drive Crossover
15	6351	Hose Drive
16	5874	Bearing (2 per spindle)
	5432	Grease Fitting
17	5693	Capscrew
18	5033	Nut
19	5736	Retaining Ring
	5216	Washer
20	5419	Retaining Ring
21	2195	Trim

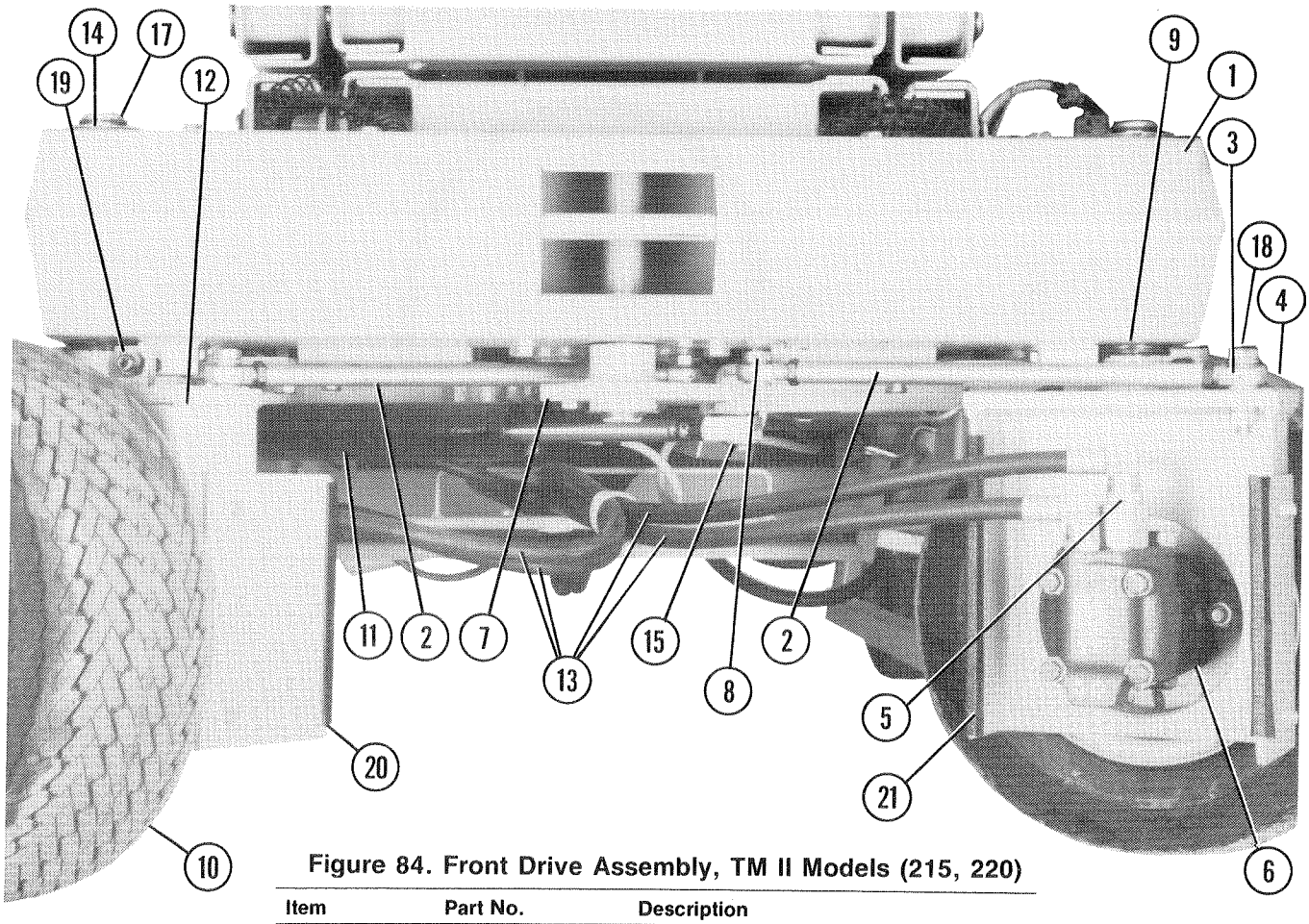


Figure 84. Front Drive Assembly, TM II Models (215, 220)

Item	Part No.	Description
1	4158	Main Bracket, Front
2	2101	Tie Rod
3	5981	Rod End, Steering
	6498	Lock Nut
4	2244	L.H. Wheel Bracket
5	6134	Pipe Extender
6	6210	Drive Motor (Char-Lynn Pictured) (HPI Also Available)
	6307	Seal Kit (Char-Lynn Pictured)
	6242	Seal Kit (HPI)
	6986	Castle Nut
7	4156	Pivot Plate
	5874	Bearing (2 per Pivot Plate)
8	6211	Capscrew
9	2389	Thrust Washer
10	2309	Front Wheel
11	2838	Steering Cylinder w/Rod End
	2837	Cylinder Rod
	5947	Seal Kit
	6004	45° Fitting (Not Shown)
	6006	90° Fitting (Not Shown)
12	2243	R.H. Wheel Bracket
13	6351	Hose Drive
14	5874	Bearing (2 per Spindle)
	5432	Grease Fitting
15	5736	Retaining Ring
	5216	Washer
16	6211	Capscrew
	5012	Washer
17	5419	Retaining Ring
	2389	Washer
18	5693	Capscrew
	5012	Washer
	5033	Nut
19	6247	Adj. Screw
	6248	Lock Nut
20	2370	Trim
21	2438	Trim

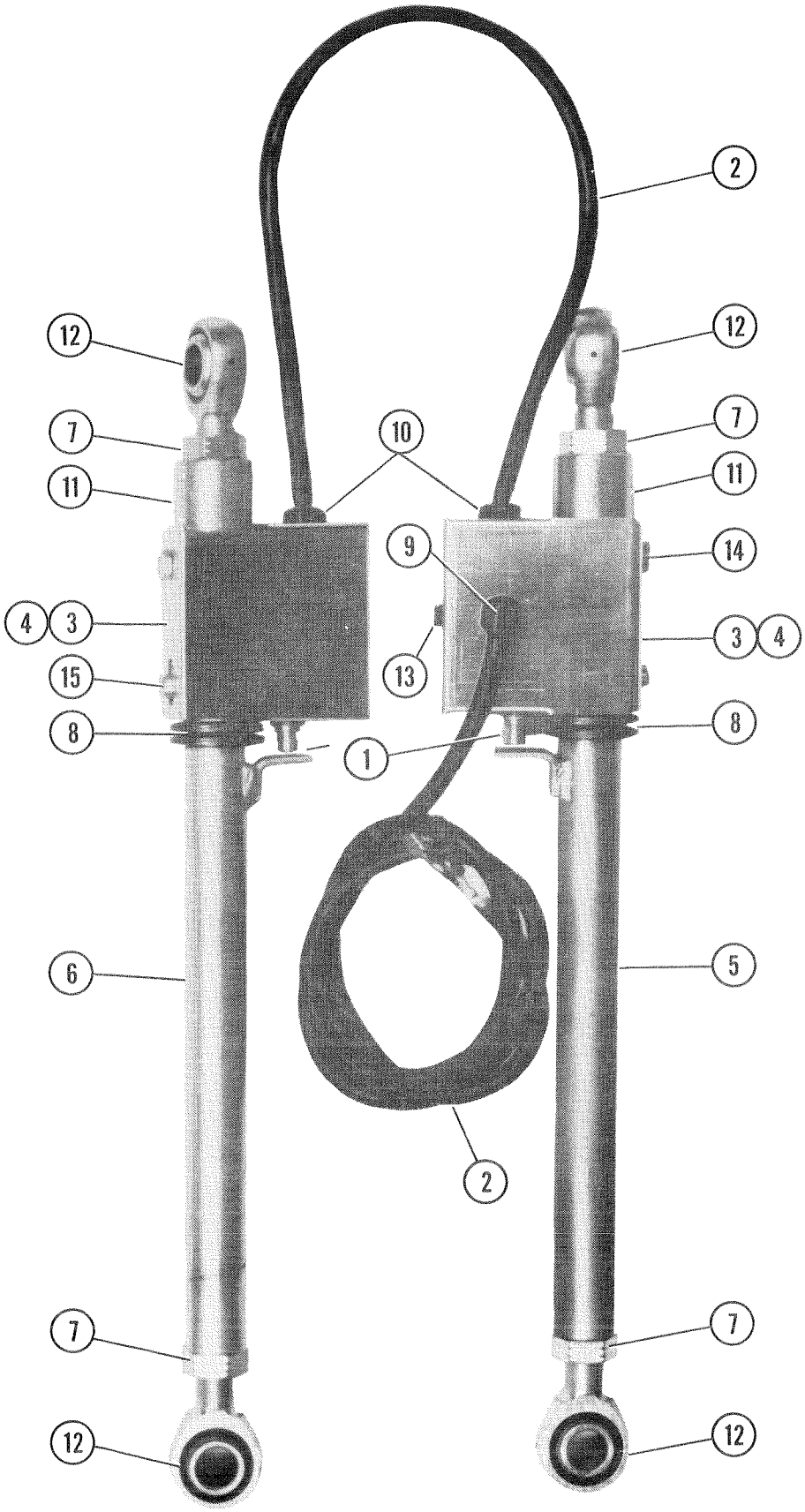


Figure 85. Stabilizer Activating arm Assembly - Part Number 2130

Item	Part No.	Description
1	6504	Switch, Stabilizers
	5723	Adj. Bolt (Not Shown)
	5276	Nut (Not Shown)
2	6036	Harness, Stabilizers
3	2158	Switch Bracket
4	2159	Switch Cover
5	2134	Actuator Bar Weld, L.H.
6	2161	Actuator Bar Weld, R.H.
7	5925	Hex Lock Nut
8	5923	Washer, Belle Ville Spring
9	6034	Strain Relief, 90 Degree
10	6033	Strain Relief, Straight
11	2015	Bar, Pressure Compensating
12	5910	Rod End, Stabilizers P.M.
	6617	Rod End, AM (Not Shown)
	5989	Capscrew (Not Shown)
	5994	Washer (Not Shown)
	5990	Nut (Not Shown)
	1966	Pin (Not Shown)
	8096	Retaining Pin (Not Shown)
13	8289	Screw
14	5926	Cap Screw
15	6061	Expanpin

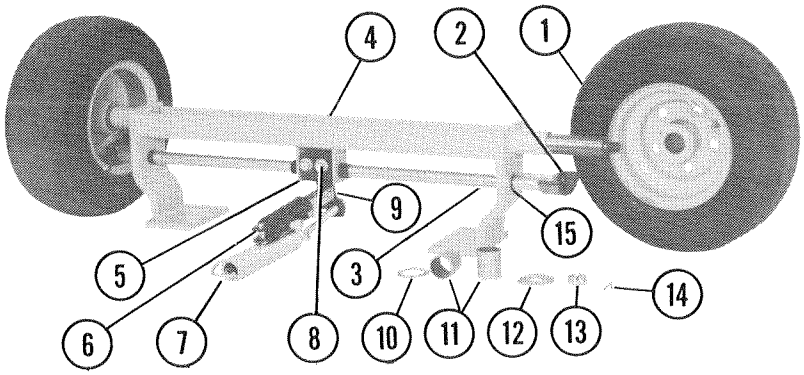


Figure 86. Rear Axle Assembly TM II (215, 220)

Item	Part No.	Description
1	4045	Wheel, Rear w/Bearings
2	2270	Brake Pad
	5736	Retaining Ring
3	2260	Eccentric Brake
4	2469	Rear Axle Weldment
5	2262	Brake Activator Assy.
6	2483	Brake Cylinder
	5947	Seal Kit
7	5687	Spring, Brake
8	5215	Capscrew
9	2272	Clevis, Brake Cylinder
10	6327	Washer, Inner
11	6326	D.U. Bearings (2 Req.)
12	1836	Washer, Outer
13	5737	Castle Nut
14	5738	Cotter Key
15	5866	Bearing, Brake Rod (Nylon) (4 Req.)

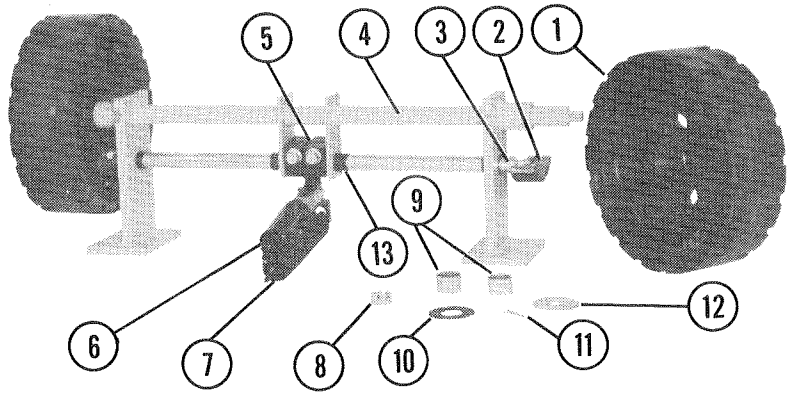


Figure 87. Rear Axle Assembly A.M. (216, 220)

Item	Part No.	Description
1	4071	Wheel, Rear w/Bearings
2	2270	Brake Pad
	5736	Retaining Ring
3	4001	Eccentric Brake
4	4006	Rear Axle Weldment
5	2262	Brake Activator Assy.
	5215	Capscrew
6	2483	Brake Cylinder
	5947	Seal Kit
7	5687	Spring, Brake
8	5737	Castle Nut
9	5874	D.U. Bearing (2 req.)
10	1835	Washer, Inner
11	5738	Cotter Key
12	1836	Washer, Outer
13	5866	Bearing, Brake Rod (Nylon) (4 req.)

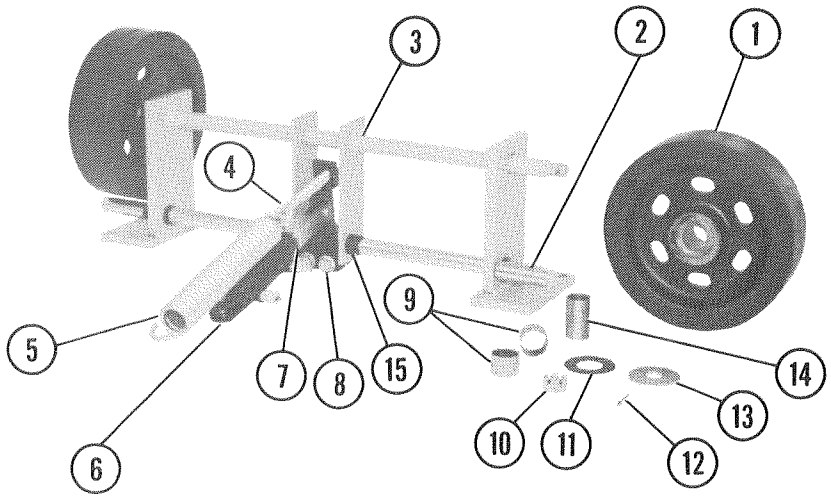


Figure 88. Rear Axle Assembly P.M. (215, 219)

Item	Part No.	Description
1	4046	Wheel, Rear w/Bearings
2	2098	Eccentric Brake
3	2066	Rear Axle Weldment
4	1851	Adjusting Rod
5	5687	Spring, Brake
6	2483	Brake Cylinder
	5947	Seal Kit
7	1864	Clevis Brake Cylinder
8	2262	Brake Activator Assy.
9	5874	D.U. Bearing (2 Req.)
10	5737	Castle Nut
11	1835	Washer, Inner
12	5738	Cotter Key
13	1836	Washer, Outer
14	5686	Spanner Bushing
15	5866	Bearing, Brake Rod (Nylon) (4 Req.)