

# UpRight



**TM12**

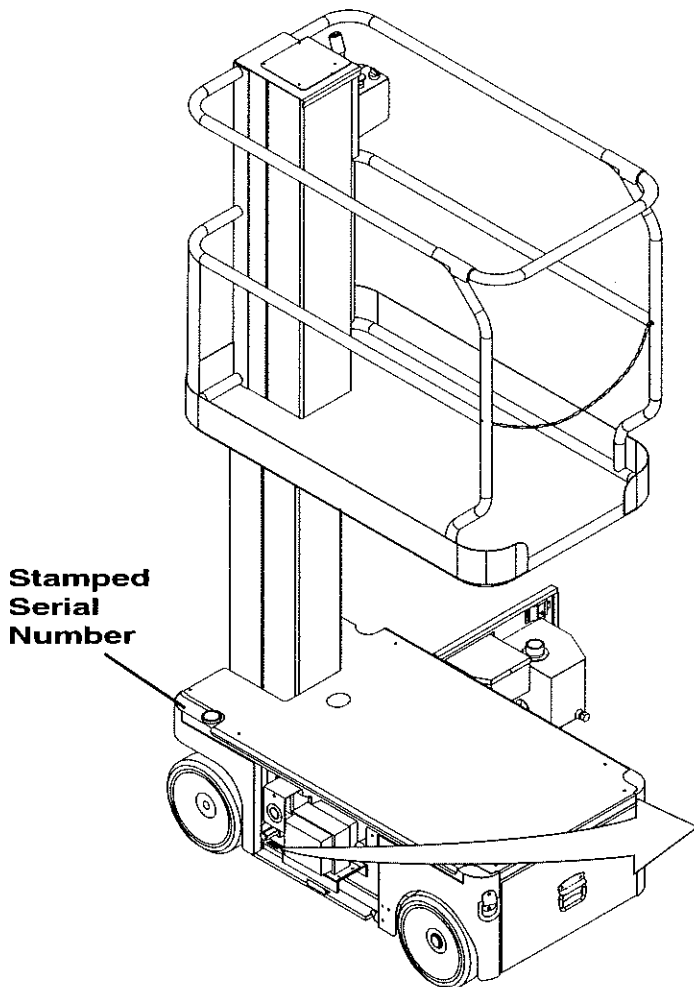
**SERIES**

**Work  
Platforms**

**Service &  
Parts Manual**

# SERVICE & PARTS MANUAL TM12

## Aerial Work Platform Serial Numbers 5000 to Current



When contacting UpRight for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate. Should the nameplate be missing, the SERIAL NUMBER is also stamped on top of the chassis above the front axle pivot.

<b>UpRight Inc.</b>	
1775 PARK ST. SELMA CALIFORNIA 93662 USA	
Model: _____	Serial number: _____
GVW: _____ lbs.	Mfg. date: _____
Occupants and equipment must not exceed the rated workload _____ lbs. Rated number of occupants: _____	
Maximum platform height: _____ ft.	
Nominal system voltage: _____ vdc	
Maximum wheel and/or outrigger load: _____ lbs.	
This machine is manufactured to comply with ANSI A92.6-1999.	
CAUTION: CONSULT OPERATOR'S MANUAL BEFORE USE. THIS PLATFORM IS NOT ELECTRICALLY INSULATED	
061205-005	

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# UpRight

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# FOREWORD

## HOW TO USE THIS MANUAL

This manual is divided into 6 sections.

### SECTION 1 INTRODUCTION

General description and machine specifications.

### SECTION 2 OPERATION AND SPECIFICATIONS

Information on how to operate the work platform and how to prepare it for operation.

### SECTION 3 MAINTENANCE

Preventative maintenance and service information.

### SECTION 4 TROUBLESHOOTING

Causes and solutions to typical problems.

### SECTION 5 SCHEMATICS

Schematics and valve block diagram with description and location of components. Large schematic drawings may be located in the back of the manual.

### SECTION 6 ILLUSTRATED PARTS BREAKDOWN

Complete parts lists with illustrations. Large parts drawings may be located in the back of the manual.

## SPECIAL INFORMATION

### **DANGER**

*Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*

### **WARNING**

*Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*

### **CAUTION**

*Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.*

**NOTE:** Gives helpful information.

## WORKSHOP PROCEDURES

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice. No part of this publication may be reproduced, stored in retrieval system, or transmitted, in any form by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. This includes text, figures and tables.

### **▲ CAUTION ▲**

*Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. Please note that this manual does contain warnings and cautions against some specific service methods which could cause personal injury, or could damage a machine or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by UpRight, Inc., might be done, or of the possible hazardous consequences of each conceivable way, nor could UpRight Inc. investigate all such ways. Anyone using service procedures or tools, whether or not recommended by UpRight Inc., must satisfy themselves thoroughly that neither personal safety nor machine safety will be jeopardized.*

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# INTRODUCTION

## 1.1 INTRODUCTION

### PURPOSE

The purpose of this service and parts manual is to provide instructions and illustrations for the operation and maintenance of the Work Platform manufactured by UpRight, Inc. of Selma, California.

### SCOPE

The manual includes procedures for proper operation, maintenance, adjustment, and repair of this product as well as recommended maintenance schedules and troubleshooting.

## 1.2 GENERAL DESCRIPTION

The TM12 Work Platform is a self-propelled aerial work platform designed to be used as a means of elevating personnel and equipment and to provide a mobile work platform. They are designed to provide mobility with the platform elevated is automatically limited to the low speed range.

## 1.3 PURPOSE AND LIMITATIONS

The objective of the Work Platform is to provide a quickly deployable, self-propelled, variable height work platform. The elevating function shall only be used when the work platform is on a firm level work area. The work platform is intended to be self-propelled when in relatively close proximity to the work area.

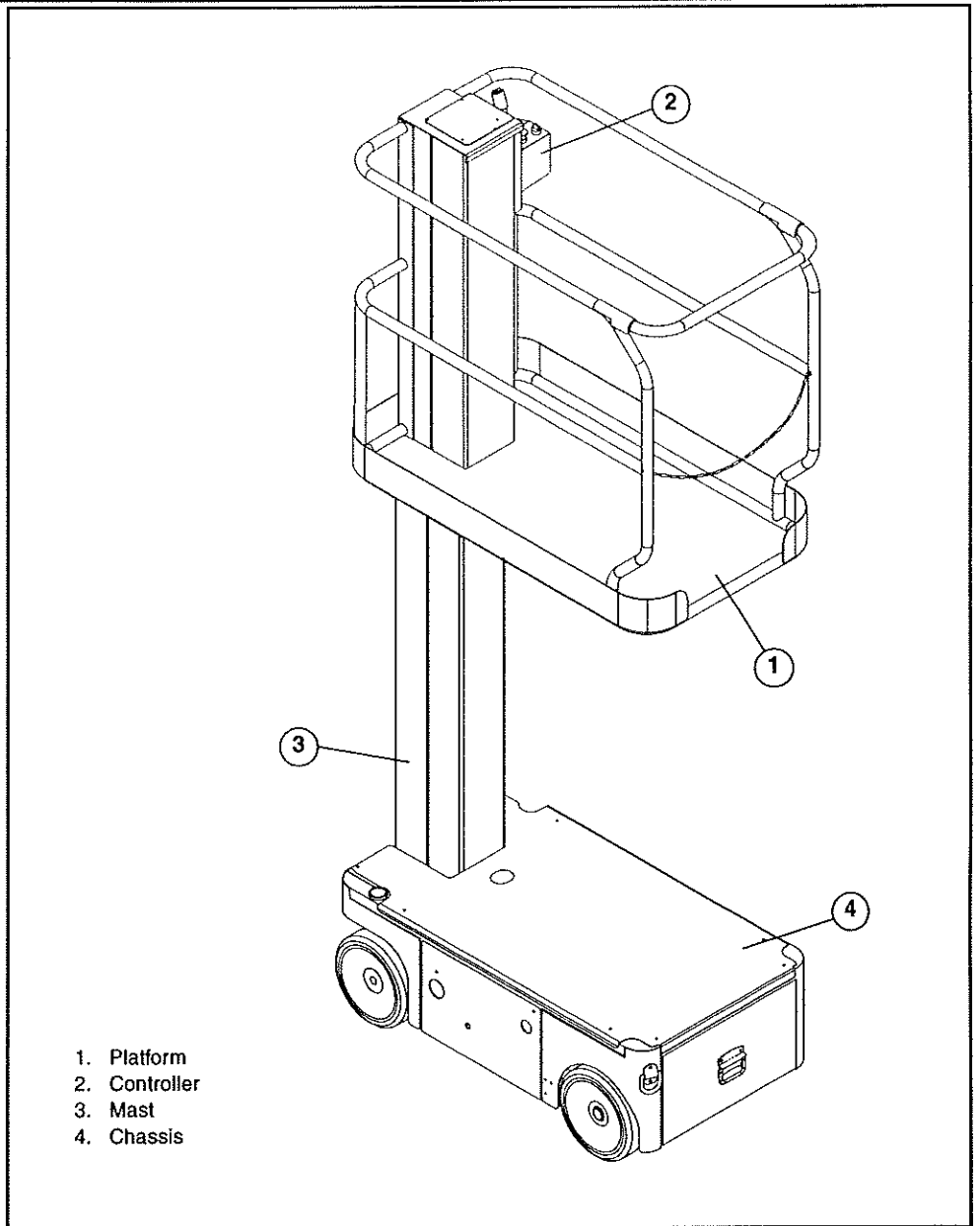
### **! DANGER !**

*The elevating function shall ONLY be used when the work platform is level and on a firm surface. The work platform is NOT intended to be driven over uneven, rough or soft terrain.*

# 1.4 SPECIFICATIONS

The Specifications Table is located at the end of Section 2.

Figure 1-1: TM12 Work Platform

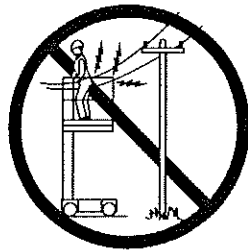


# OPERATION AND SPECIFICATIONS

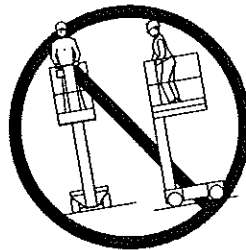
## WARNING

All personnel shall carefully read, understand and follow all safety rules, operating instructions, and the Scaffold Industry Association's **MANUAL OF RESPONSIBILITIES of ANSI A92.6-1999** before performing maintenance on or operating any UpRight Aerial Work Platform.

### Safety Rules



NEVER operate the machine within ten feet of power lines.  
THIS MACHINE IS NOT INSULATED



NEVER elevate the platform or drive the machine while elevated unless the machine is on firm level surface.



NEVER sit, stand or climb on guardrail or midrail.

**NEVER** operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps and debris.

**NEVER** operate the machine if all guardrails are not properly in place and secured with all fasteners properly torqued.

**SECURE** chain or bar across entrance after mounting platform.

**NEVER** use ladders or scaffolding on the platform.

**NEVER** attach overhanging loads or increase platform size.

**LOOK** up, down and around for overhead obstructions and electrical conductors.

**DISTRIBUTE** all loads evenly on the platform. See the back cover for maximum platform load.

**NEVER** use damaged equipment. (Contact UpRight for instructions. See toll-free phone number on back cover.)

**NEVER** change operating or safety systems.

**INSPECT** the machine thoroughly for cracked welds, loose hardware, hydraulic leaks, damaged control cable, loose wire connections and wheel bolts.

**NEVER** climb down elevating assembly with the platform elevated.

**NEVER** perform service on machine while platform is elevated without blocking elevating assembly.

**NEVER** recharge battery near sparks or open flame; batteries that are being charged emit highly explosive hydrogen gas.

**AFTER USE** secure the work platform against unauthorized use by turning key switch off and removing key.

**NEVER** replace any component or part with anything other than original UpRight replacement parts without the manufacturer's consent.

## 2.1 INTRODUCTION

This manual covers operation of the TM12 Self Propelled Elevating Work Platform. **This manual must be stored on the machine at all times.**

## 2.2 PRE-OPERATION SAFETY INSPECTION (FIGURES 1, 2, AND 3)

Carefully read, understand and follow all safety rules, operating instructions, labels and the Scaffold Industry Association's MANUAL OF RESPONSIBILITIES. Perform the following steps each day before use.

1. Open module covers and inspect for damage, oil leaks or missing parts.
2. Check the level of the hydraulic oil with the platform fully lowered. Open the Chassis Door and remove the reservoir cap, oil should be visible on the dipstick. Add recommended hydraulic oil if necessary.
3. Check that fluid level in the batteries is correct (See "Battery Maintenance" on Page 2-9).
4. Verify that batteries are charged.
5. Check that AC extension cord has been disconnected from chassis outlet.
6. Check that all guardrails are in place with fasteners properly tightened.
7. Inspect the machine thoroughly for cracked welds, loose hardware, hydraulic leaks, damaged control cable, loose wire connections and wheel bolts.
8. Move machine, if necessary, to unobstructed area to allow for full elevation.
9. Pull Chassis Emergency Stop Switch to the ON position.
10. Pull Platform Emergency Stop Switch to the ON position.

Figure 2-1: Chassis Controls

11. Turn and hold the Chassis Key Switch to CHASSIS. Push the Chassis Lift/Lower Switch to the UP position and fully elevate the platform.
12. Visually inspect the mast assembly for damage or erratic operation. Check for missing or loose parts.
13. Verify that the depression mechanism supports have fully rotated into position under the machine.
14. Turn and hold the Chassis Key Switch to CHASSIS. Partially lower the platform by pushing the Chassis Lift/ Lower Switch to the DOWN position, and check operation of the audible lowering alarm.

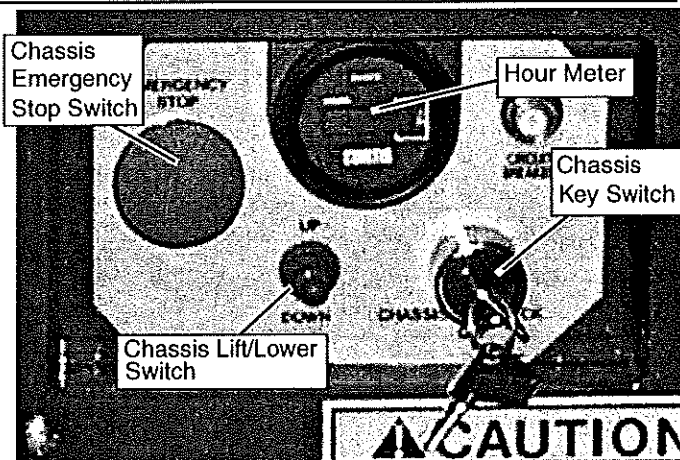


Figure 2-2: Chassis, Left Side

15. Open the Emergency Lowering Valve (See Figure 2) by pushing in on the knob and turning ¼ turn counterclockwise to check for proper operation. When the platform is lowered, close the valve by pushing in and turning the knob ¼ turn clockwise until the detent engages.
16. Turn the Chassis Key Switch to DECK.
17. Close and secure module covers.
18. Check that route is clear of obstacles (persons, obstructions, holes, drop-offs, bumps and debris) is level, and is capable of supporting the wheel loads.
19. Mount the platform and properly close the entrance.

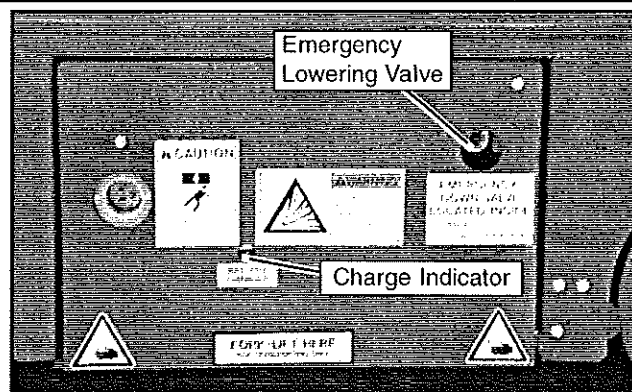
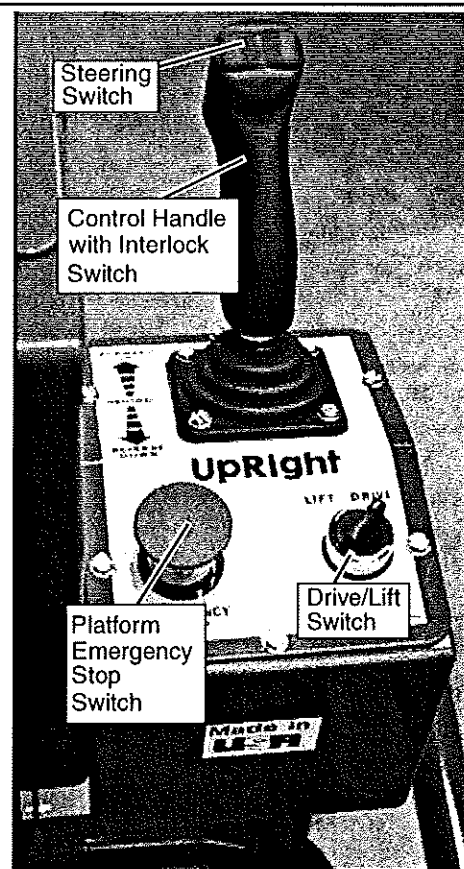


Figure 2-3: Platform Controls

20. **PLATFORM CONTROLS.** Turn the Drive/Lift Switch to DRIVE. While engaging the Interlock Switch, move the Control Handle to FORWARD, then REVERSE, to check for speed control.
21. Push the Steering Switch RIGHT, then LEFT, to check for steering control.
22. Turn the Drive/Lift Switch to LIFT. Grasp the Control Handle, engage the Interlock Switch and push it forward to check platform lift controls. Raise the platform to full elevation.
23. Pull back on the Control Handle. The platform should descend and the audible lowering alarm should sound.
24. Push the Platform Emergency Stop Switch button to check for proper operation. All machine functions should be disabled. Pull out the Platform Emergency Stop Switch to resume.



## 2.3 OPERATION

Before operating the work platform, ensure that the pre-operation safety inspection has been completed and that any deficiencies have been corrected. **Never operate a damaged or malfunctioning machine.** The operator must be thoroughly trained on this machine, and must read, fully understand, and follow this Operator Manual and Scaffold Industry Association's Manual of Responsibilities of ANSI A92.6-1999.

### TRAVEL WITH PLATFORM LOWERED

1. Check that route is clear of obstacles (persons, obstructions, holes, drop-offs, bumps and debris), is level, and is capable of supporting the wheel loads.
2. Verify that the Chassis Key Switch is turned to DECK and that Chassis Emergency Stop Switch is on (pulled out).
3. Mount the platform and properly close the entrance.
4. Check clearances above, below and to the sides of the platform.
5. Pull the Platform Emergency Stop Button out to the ON position.
6. Turn the Drive/Lift Switch to DRIVE.
7. Engage the Interlock Switch and move the Control Handle to FORWARD or REVERSE to travel in the desired direction. The speed of the machine will vary depending on how far from center the Control Handle is moved.

### STEERING

1. Turn the Drive/Lift Switch to DRIVE.
2. While engaging the Interlock Switch, push the Steering Switch to RIGHT or LEFT to turn wheels in the desired direction. Observe the tires while operating the machine to ensure proper direction.

**NOTE: Steering is not self-centering. Wheels must be returned to the straight ahead position by operating the Steering Switch.**

### ELEVATING PLATFORM

1. Select a firm, level surface.
2. Turn the Drive/Lift Switch to Lift.
3. While engaging the Interlock Switch, push the Control Handle forward.
4. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. **If the tilt alarm sounds the platform must be lowered and the machine moved to a firm level surface before attempting to re-elevate the Platform.**

**NOTE: Depression supports will deploy automatically as the platform elevates.**

**Depression supports will retract after;**

- the platform has been lowered completely,
- high speed has been activated,
- and the platform has been driven.



### TRAVEL WITH PLATFORM ELEVATED

**NOTE:** The machine will travel at reduced speed when platform is elevated.

1. Check that route is clear of obstacles (persons, obstructions, holes, drop-offs, bumps and debris), is level, and is capable of supporting the wheel loads.
2. Check clearances above, below and to the sides of platform.
3. Turn the Drive/Lift Switch to DRIVE.
4. Engage the Interlock Switch, and move the Control Handle to FORWARD or REVERSE to travel in the desired direction. The speed of the machine will vary depending on how far from center the Control Handle is moved.
5. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. **If the tilt alarm sounds the platform must be lowered and the machine moved to a firm level surface before attempting to re-elevate the Platform.**

### LOWERING PLATFORM

1. Turn the Drive/Lift Switch to LIFT.
2. Check around the base of the platform to ensure that no one is in contact with the machine. Engage the Interlock Switch and pull back on the Control Handle to lower the platform.

### EMERGENCY LOWERING

## ▲ WARNING ▲

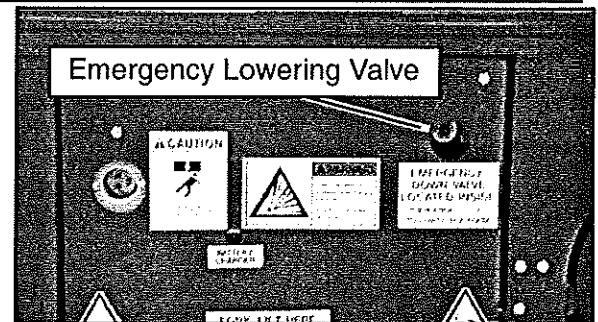
*If the platform should fail to lower, NEVER climb down the elevating assembly. Stay clear of the elevating assembly while operating the Emergency Lowering Valve.*

**Figure 2-4:** Emergency Lowering Valve

The Emergency Lowering Valve is located through a hole on the right side of the machine. (See Figure 4)

1. Open the Emergency Lowering Valve by pushing in on the Knob and turning ¼ turn counterclockwise.
2. To close, push in on the knob and turn ¼ turn clockwise until the detent engages.

**NOTE:** The platform will not elevate if the Emergency Lowering Valve is open.



## PARKING BRAKE RELEASE

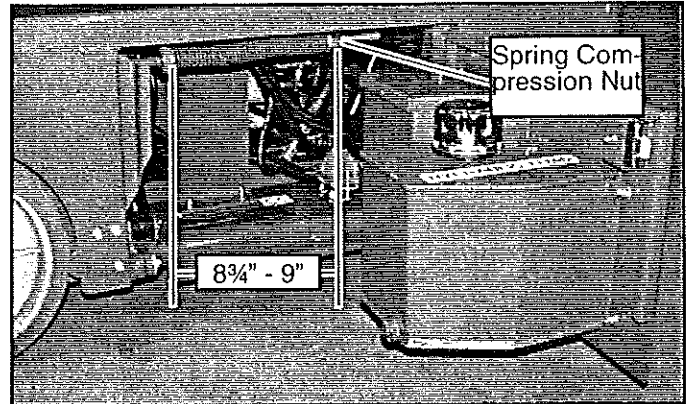
Figure 2-5: Parking Brake Adjustment

Perform the following only when the machine will not operate under its own power and it is necessary to move the machine or when winching onto a trailer to transport.

1. Loosen the spring compression nut so the spring is loose and the brake bars are away from the tires.
2. The machine will now roll when pushed or pulled.

After moving the machine and before normal operation:

1. Tighten the spring compression nut until the spring measures 8 $\frac{3}{4}$ "-9" (22,2 cm-22,8 cm) in length, verify that the brake bars have fully engaged the tires before the machine is operated.



### **▲ W A R N I N G ▲**

*Never tow faster than 1 ft./sec. (0,3m/sec.).*

*Never operate work platform with the Parking Brakes released. Serious injury or damage could result.*

### AFTER USE EACH DAY

1. Ensure that the platform is fully lowered.
2. Park the machine on a firm, level surface, preferably under cover, secure against vandals, children and unauthorized operation.
3. Turn the Key Switch to **OFF** and remove the key to prevent unauthorized operation.

## 2.4 TRANSPORTING WORK PLATFORM

Figure 2-6: Transporting the Work Platform

### BY FORKLIFT

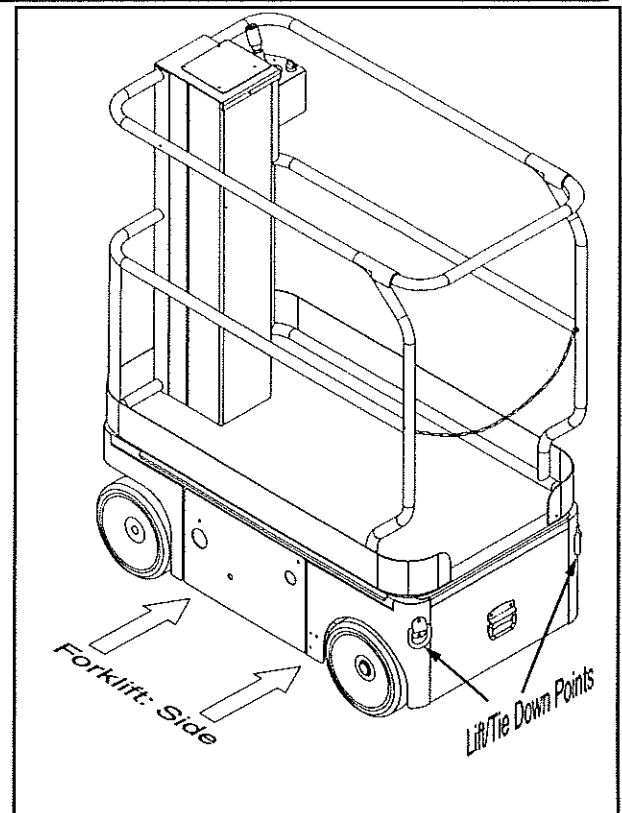
Forklift from the side by lifting under the chassis modules.

### BY CRANE

Secure straps to chassis lifting/tie down points only.

### BY TRUCK

1. Maneuver the work platform into transport position and chock wheels.
2. Secure the work platform to the transport vehicle with chains or straps of adequate load capacity to the chassis lifting/tie down points.
3. Open the Emergency Lowering Valve. The platform must be in the fully lowered position for transport.



## ! DANGER !

*Forklifting is for transporting only.*

*See specifications for weight of work platform and be certain that forklift is of adequate capacity to lift the work platform.*

## ! CAUTION !

*Overtightening of chains or straps attached to tie down lugs may result in damage to work platform.*

## 2.5 MAINTENANCE

### ⚠ WARNING ⚠

*Never perform service while the platform is elevated without first blocking the elevating assembly.*

**DO NOT** stand in elevating assembly area while placing block.

**DO NOT** block elevating assembly with a load on the platform.

## BLOCKING THE ELEVATING ASSEMBLY

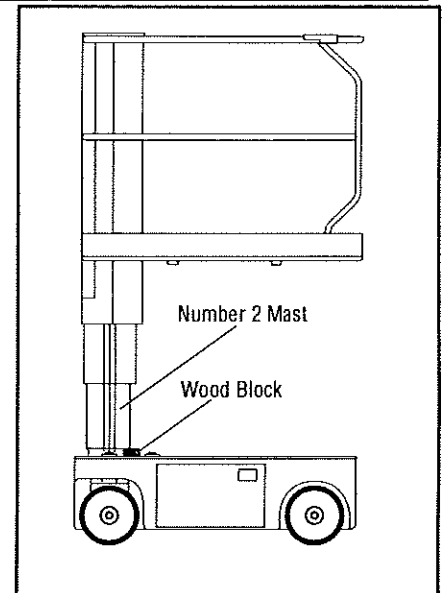
*Figure 2-7: Blocking the Elevating Assembly*

### BLOCK INSTALLATION

1. Park the work platform on firm, level surface.
2. Verify that the Chassis and Platform Emergency Stop Switches are ON by pulling each button out.
3. Turn and hold Chassis Key Switch to CHASSIS.
4. Push Chassis Lift Switch to UP and elevate platform approximately 4 feet (1,2 m).
5. Place a solid wood block, 2"x 4"x18" (51mm x 100mm x 45cm) between the second mast section and Chassis just behind the mast assembly. (See Figure 7)
6. Push Chassis Lift Switch to DOWN position and gradually lower the platform until the second mast section is supported by the block.

### BLOCK REMOVAL

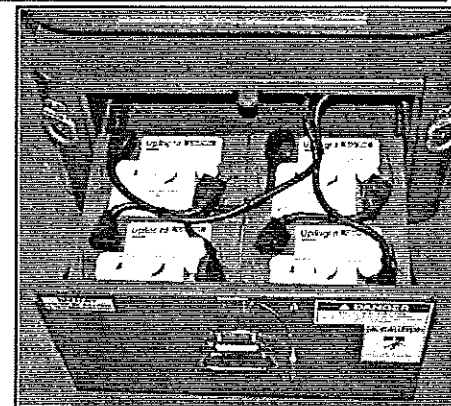
1. Turn and hold the Chassis Key Switch to Chassis. Push the Lift/Lower Switch to UP and gradually raise the platform until the wood block can be removed.
2. Remove the wood block.
3. Turn and hold the Chassis Key Switch to CHASSIS. Push the Lift/Lower Switch to DOWN and completely lower platform.



**BATTERY MAINTENANCE**

Figure 2-8: Access to Batteries

<b>▲ W A R N I N G ▲</b>
<p><i>Hazard of explosive gas mixture. Keep sparks, flame and smoking material away from batteries.</i></p> <p><i>Always wear safety glasses when working near batteries.</i></p> <p><i>Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.</i></p> <p><i>Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 62 lbs. (28 kg) each.</i></p>



Check the battery fluid level daily, especially if the work platform is being used in a warm, dry climate.

If electrolyte level is lower than 3/8 in. (10 mm) above the plates, add distilled water ONLY. Do not use tap water with high mineral content, as it will shorten battery life.

The battery and cables should be inspected regularly for signs of cracks in the case, electrolyte leakage and corrosion of the terminals. Inspect cables for worn spots or breaks in the insulation and for broken cable terminals. Keep terminals and tops of batteries clean.

Refer to the Service Manual to extend battery life and for complete service instructions.

## BATTERY CHARGING

Charge the batteries at end of each work shift or sooner if batteries have been discharged.

**NOTE:** If voltage falls below 17 volts (for a 24 volt system), the charger will not recharge the batteries. If this extreme voltage drop occurs, disconnect and recharge each battery separately using a 6 volt charger to bring the voltage up to at least 4½ volts.

### **▲ W A R N I N G ▲**

*Charge batteries only in a well ventilated area.*

*Do not charge the batteries if the work platform is near a source of sparks or flames.*

*Permanent damage to batteries will result if the batteries are not recharged immediately after discharging.*

*Never leave the charger operating for more than two days.*

*Never disconnect the cables from the batteries when the charger is operating.*

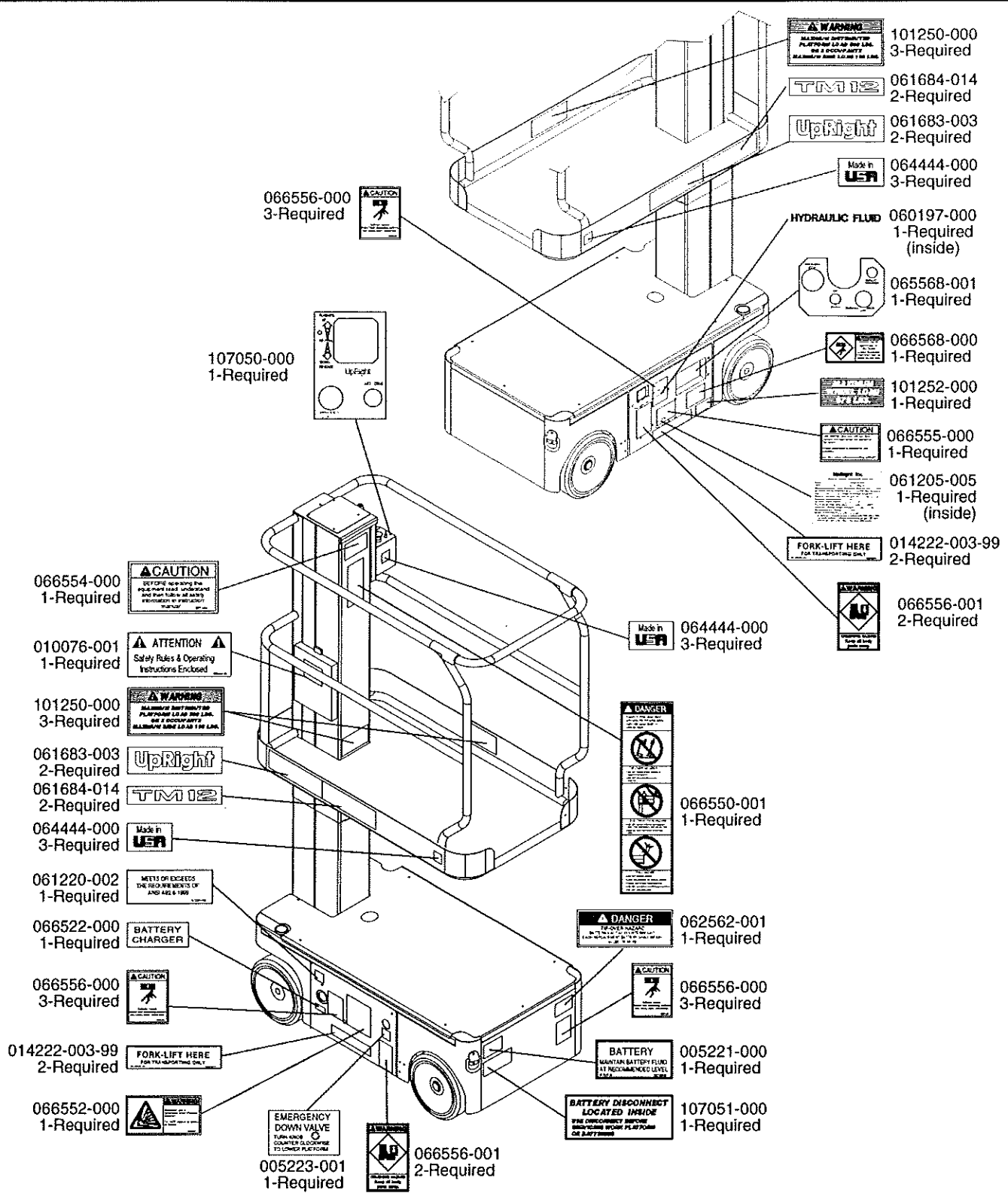
*Keep the battery charger dry.*

1. Check battery fluid level. If electrolyte level is lower than 3/8 in. (10 mm) above plates add distilled water only.
2. Verify charger voltage switch is set to the correct voltage.
3. Connect extension cord (12 gauge [1,5 mm<sup>2</sup>] minimum conductor diameter; 50 ft. (15 m) maximum length) to charger plug located through cutout at the left side of the chassis.
4. Connect an extension cord to properly grounded outlet of proper voltage and frequency.
5. The battery charger turns on automatically after a short delay, the LED charge indicator will illuminate.
6. The battery charger turns off automatically when batteries are fully charged, the LED charge indicator will blink indicating that the charger is in a continuing maintenance mode. DO NOT leave the charger plugged in for more than 48 hours, as permanent damage to the batteries may occur.

**NOTE:** The battery charger circuit must be used with a GFI (Ground Fault Circuit Interrupt) outlet.

**NOTE:** DO NOT operate the machine while charger is plugged in.

NOTE: Labels can be ordered by using part number located by each label.



**Proper TM12 label installation is required. These labels Shall Be Present and in Good condition before operating the work platform. Be sure to read, understand, and follow these labels BEFORE operating the work platform.**

## 2.6 PREVENTATIVE MAINTENANCE

The complete inspection consists of periodic visual and operational checks, together with all necessary minor adjustments to assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems. The inspection and maintenance schedule is to be performed at regular intervals. Inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures.

<b>▲ W A R N I N G ▲</b>
<i>Before performing preventative maintenance, familiarize yourself with the operation of the machine.</i>
<i>Always block the elevating assembly whenever it is necessary to perform maintenance while the platform is elevated.</i>

The preventative maintenance table has been designed to be used primarily for machine service and maintenance repair. Please photocopy and use the table as a checklist when inspecting the machine for service.



## 2.7 PREVENTATIVE MAINTENANCE CHECK LIST

### PREVENTATIVE MAINTENANCE KEY

**INTERVAL**

- Daily=each shift or every day
- 50h/30d=every 50 hours or 30 days
- 250h/6m=every 250 hours or 6 months
- 1000h/2y=every 1000 hours or 2 years
- Y=Yes/Acceptable
- N=No/Not Acceptable
- R=Repaired/Acceptable

### PREVENTATIVE MAINTENANCE REPORT

Date: \_\_\_\_\_

Owner: \_\_\_\_\_

Model No: \_\_\_\_\_

Serial No: \_\_\_\_\_

Serviced By: \_\_\_\_\_

Service Interval: \_\_\_\_\_

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery System	Check electrolyte level	Daily			
	Check battery cable condition	Daily			
	Charge batteries	Daily			
	Check charger condition & operation	Daily			
	Check specific gravity	6m			
	Clean exterior	6m			
	Clean terminals	6m			
Hydraulic Oil*	Check oil level	Daily			
	Change Filter	6m			
	Drain and replace oil	2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	30d			
	Check hoses for exterior wear	30d			
Drive Motors	Check for operation and leaks	Daily			
Emergency Down	Check procedure for Emergency Down	Daily			
Hydraulic Pump	Check for fitting leaks	Daily			
	Wipe clean	30d			
	Check for leaks at mating surfaces	30d			
	Check mounting bolts for proper torque	6m			
Controller	Check condition & operation	Daily			
Platform Deck & Rails	Check fasteners for proper torque	Daily			
	Check welds for cracks	Daily			
	Check condition of deck	Daily			
	Check entry way closure	Daily			

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Elevating Assembly	Inspect for external damage, dents, loose rivets or cracks	Daily			
	Check chains and sheaves for wear	6m			
Chassis	Check cables for pinch or rubbing points	Daily			
	Check welds for cracks	Daily			
	Check component mounting for proper torque	6m			
Lift Cylinder	Check for leaks	Daily			
	Check for proper torque	6m			
Entire Unit	Perform pre-operation inspection	Daily			
	Check for and repair collision damage	Daily			
	Lubricate	30d			
	Check fasteners for proper torque	6m			
Labels	Check for corrosion; remove and repaint	6m			
	Check for peeling, missing, or unreadable labels & replace	Daily			
Wheels	Check for loose components	Daily			
Steering System	Oil pivot pins	30d			
	Oil king pins	30d			
	Check steering cylinder for leaks	30d			
	Check hardware & fittings for proper torque	6m			

\* NOTE: Use ISO #46 during summer and ISO #32 during winter.

## 2.8 SPECIFICATIONS

ITEM	SPECIFICATION
<b>Platform Size</b>	29 in. x 41 in. (0,74 m x 1,04 m) Inside Toeboards
<b>Maximum Platform Capacity</b>	500 lbs. (227 kg)
<b>Maximum Number of Occupants</b>	Two people
<b>Height</b>	
Working Height	18 ft. (5,49 m)
Maximum Platform Height	12 ft. (3,66 m)
Minimum Platform Height	19 in. (0,48 m)
<b>Dimensions</b>	
Weight	1710 lbs. (776 kg)
Overall Width	30 in. (0,76 m)
Overall Height	64.75 in. (1,64 m)
Overall Length	53.5 in. (1,36 m)
<b>Driveable Height</b>	12 ft. (3,66 m)
<b>Drive Speed</b>	
Platform Lowered	2.27 mph (3,65 km/h)
Platform Raised	.62 mph (0,99 km/h)
<b>Energy Source</b>	24V battery pack Four 220 ampere hour, 6 Volt batteries, min. wt. 62 lbs. (28,12 kg) each 4 HP DC electric motor
<b>System Voltage</b>	24 VDC
<b>Battery Charger</b>	20 AMP, 110/220 VAC
<b>Hydraulic Tank Capacity</b>	1.9 gal (7,2 L)
<b>Maximum Hydraulic System Pressure</b>	3000 psi (207 bar)
<b>Hydraulic Fluid</b>	
Above 32° F [0° C]	ISO #46
Below 32° F [0° C]	ISO #32
Below 0° F [-17° C]	ISO #15
<b>Lift System</b>	One Single Stage Lift Cylinder
<b>Drive Control</b>	Proportional
<b>Control System</b>	Proportional Control Handle with Interlock, Selector Switch, Red Mushroom Emergency Stop Switches
<b>Drive System</b>	Dual Front Wheel Hydraulic Motors
<b>Tires</b>	12 in. (30,5 cm) diameter solid rubber, Non-marking
<b>Parking Brakes</b>	Dual, Spring Applied, Hydraulic Release
<b>Turning Radius</b>	14.5 in. (37 cm) Inside
<b>Maximum Gradeability</b>	25% (14°)
<b>Wheel Base</b>	38.5 in. (97,8 cm)
<b>Guardrails</b>	45 in. (1,14 m)
<b>Toeboard</b>	6 in. (152 mm)

Specifications are subject to change without notice. Hot weather or heavy use may affect performance.

Refer to the Service Manual for complete parts and service information.

The TM12 meets or exceeds all applicable requirements of OSHA and ANSI A92.6-1999

# MAINTENANCE

## 3.1 INTRODUCTION

### **▲ WARNING ▲**

*Be sure to read, understand and follow all information in the Operation Section of this manual before attempting to operate or perform service on any Work Platform.*

**NOTE:** For Information on the engine refer to your local engine dealer.

This section contains instructions for the maintenance of the Work Platform. Procedures for the operation inspection, adjustment, scheduled maintenance, and repair/removal are included.

Referring to Section 2 will aid in understanding the operation and function of the various components and systems of the work platform, and help in diagnosing and repair of the machine.

### TERMINOLOGY

- TERMINAL BLOCKS** Located in upper and lower control boxes. Designated by TB##. (##) designates the number of the block which is written on the terminal block. "R" right or "L" may follow the number.
- WIRE COLOR** Indicated by color/color. First color refers to insulation color and second color indicates stripe. If second color is not given there is no stripe.
- FORWARD** Front of machine indicated by yellow arrows on chassis.
- AFT** Rear of machine indicated by orange arrows on machine.

### GENERAL PROCEDURES

- CONTACT BLOCKS** Removed by inserting a flat screwdriver into the slot at either end of block and prying outward. Installed by pressing into an empty slot.
- SWITCH MOUNT BASE** Assembled to back of switch actuator. Removed by rotating the small black lever counterclockwise and lifting off base.
- TERMINAL BLOCKS** Remove wires by inserting a small flat bladed screwdriver into square beside wire. Install wires by stripping ½" of insulation, inserting screwdriver in square and inserting wire. Be sure no strands are bend backwards. Replace wires with same rating and type.

## 3.2 DATE CODE IDENTIFICATION ON HOSES

- GATES** uses a five digit code: Year, Month, Day.  
i.e.: 6 11 29 - means 1996, month 11 (November), day 29.
- PARKER** uses a ten digit code: Plant, Year, Month, Day.  
i.e.: XXXX 6 11 29 - means Plant XXXX, 1996, month 11 (November), day 29.
- DAYCO** stamps month, day and year on each hose.

### 3.3 SPECIAL TOOLS

The following is a list of special tools which may be required to perform certain maintenance procedures on the work platform.

- (0-69 bar) Hydraulic Pressure Gauge with Adapter Fittings
- (0-207 bar) Hydraulic Pressure Gauge with Adapter Fittings
- (0-414 bar) Hydraulic Pressure Gauge with Adapter Fittings
- Small UpRight Connector Field Kit (UpRight P/N 030899-000)
- Large UpRight Connector Field Kit (UpRight P/N 030898-000)
- Inclinometer

### 3.4 UPRIGHT CONNECTORS

UpRight connectors are designed so that connector parts, contacts or electrical cables may be replaced without replacing the entire connector.

Figure 3-1: UpRight Connector Kits

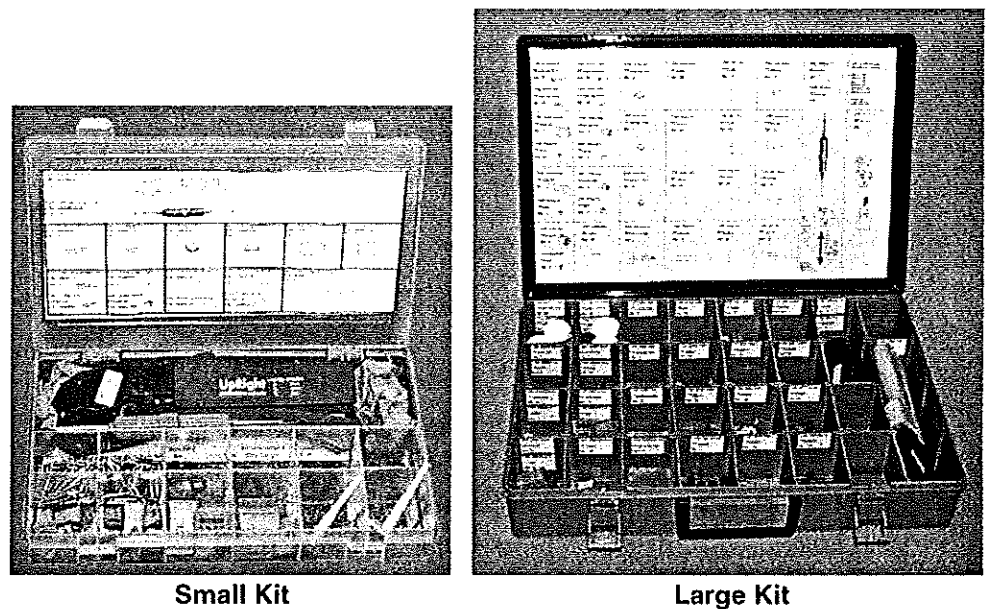
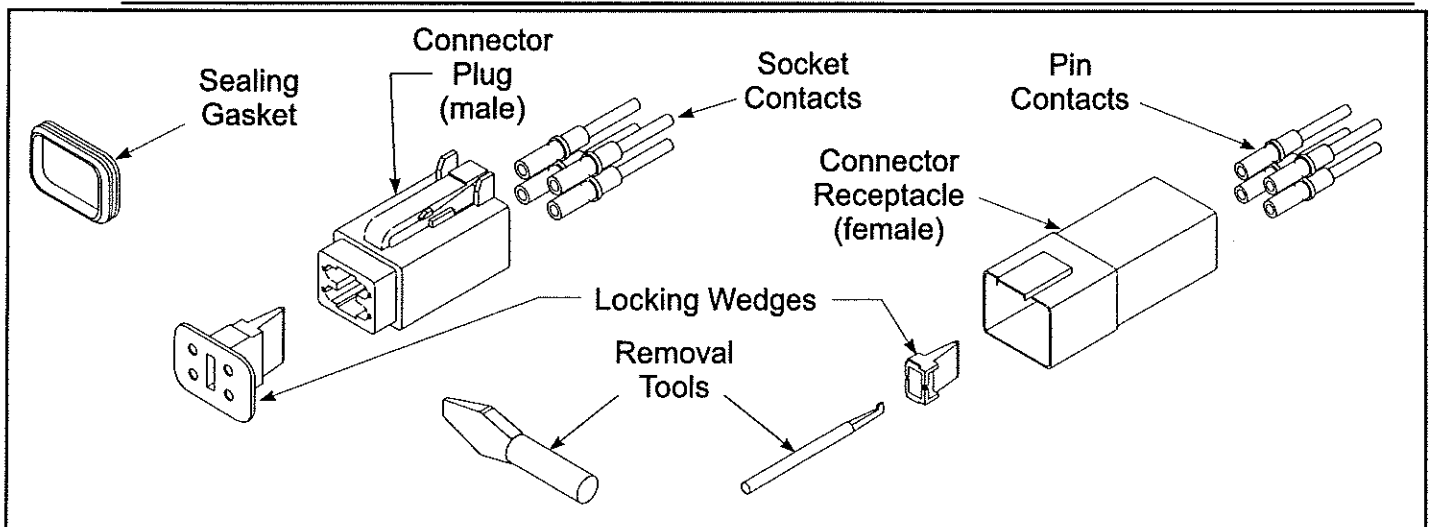


Figure 3-2: Plugs and Receptacles, UpRight Connectors



### MALE CONNECTOR (PLUG)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the flat end of the Removal Tool (or flat blade screwdriver), pry the Locking Wedge from the Male Connector. Care should be taken that the Silicon Gasket is not damaged during this procedure.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or rewire the wires and contacts. Refer to "Crimping" procedure.

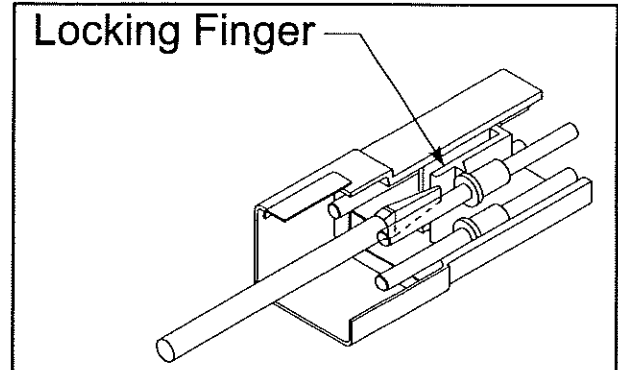
### FEMALE CONNECTOR (RECEPTACLE)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the notched end of the Removal Tool (or a wire hook), pull the Locking Wedge from the Female Connector.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or rewire the wires and contacts. Refer to "Crimping" procedure.

### RELEASING LOCKING FINGERS

Figure 3-3: Locking Finger, UpRight Connector

1. The Locking Fingers can be released following the removal of the Locking Wedge of either the male or female connector.
2. Use the removal tool (or flat bladed screwdriver) to push the Locking Fingers aside. This will release the grip on the contact.
3. Pull the wire and contact out of the connector.



### CRIMPING

1. Strip ¼" (6 mm) from the wire.

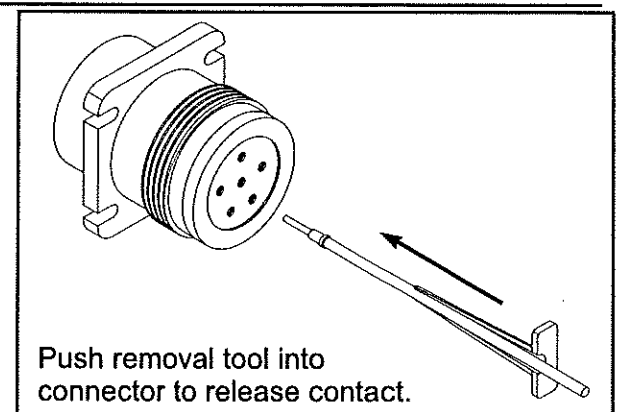
**NOTE:** Complete crimping instructions are included in each Field Kit.

2. Insert the contact into the crimping tool.
3. Insert the stripped wire into the contact. Copper strands should be visible in the bleed hole of the contact and no copper strands should be loose (outside) of the contact barrel.
4. Completely close the handles of the crimping tool. Release the handles of the crimping tool and remove the crimped contact.
5. Inspect the crimped contact to ensure that all strands are secure in the crimp barrel.

### REMOVING CONTACT FROM HEAVY DUTY PLUG

Figure 3-4: Heavy Duty UpRight Connector

1. Slip the removal tool along the wire to be replaced.
2. Push the removal tool into the connector until the contact is released.
3. Pull the wire and contact out of the plug.



### 3.5 PREVENTATIVE MAINTENANCE

*Reference:* • Section 2, Preventative Maintenance Table

The Complete inspection consists of periodic visual and operational checks, together with all necessary minor adjustments to assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems. The inspection and maintenance schedule is to be performed at regular intervals. Inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures

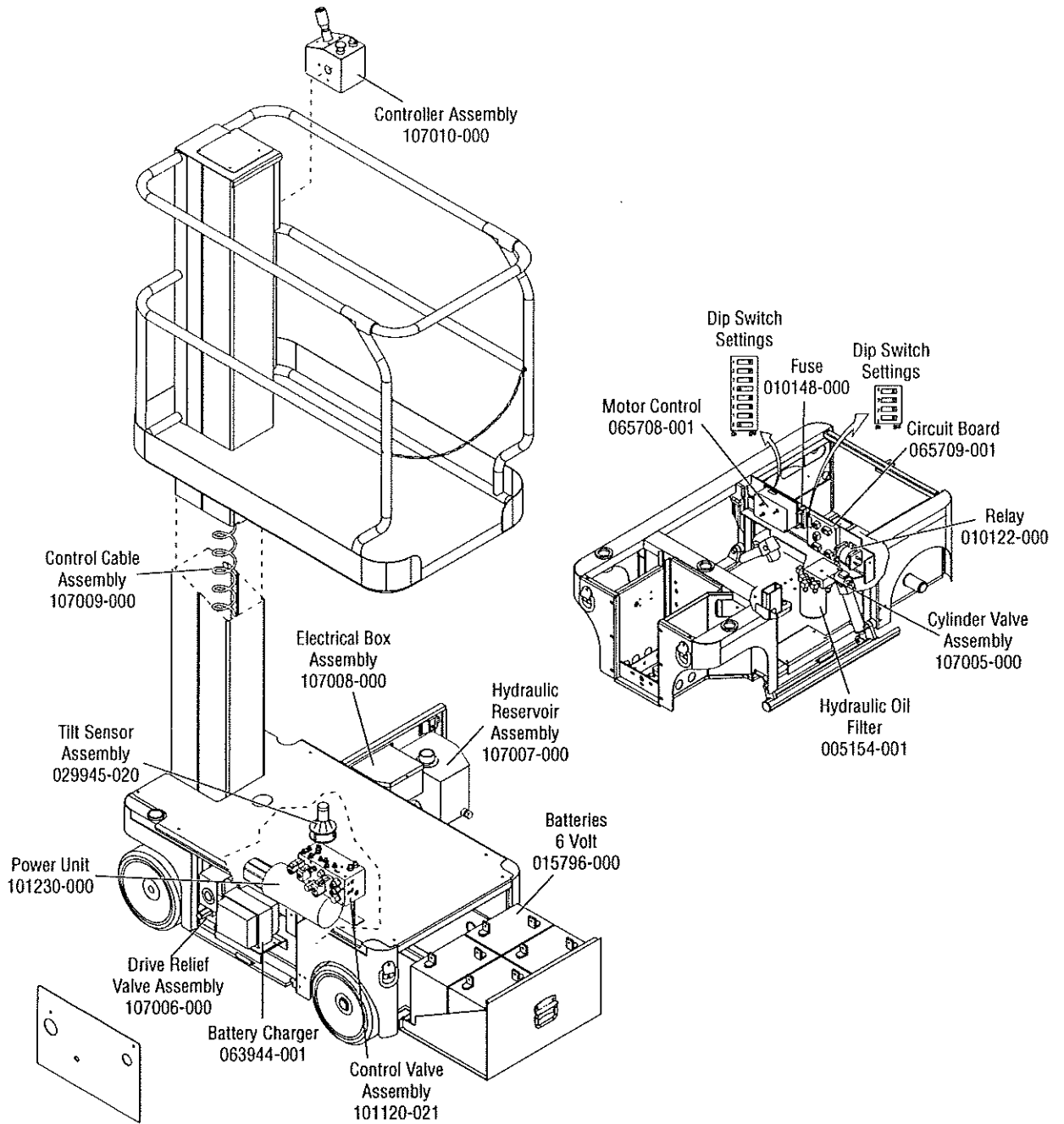
#### **▲ W A R N I N G ▲**

*Before performing preventative maintenance, familiarize yourself with the operation of the machine.*

The preventative maintenance table in Section 2 has been designed to be used primarily for machine service and maintenance repair.

### 3.6 PARTS LOCATION

Figure 3-5: Parts Location



### 3.7 SUPPORTING ELEVATING ASSEMBLY

## ⚠ WARNING ⚠

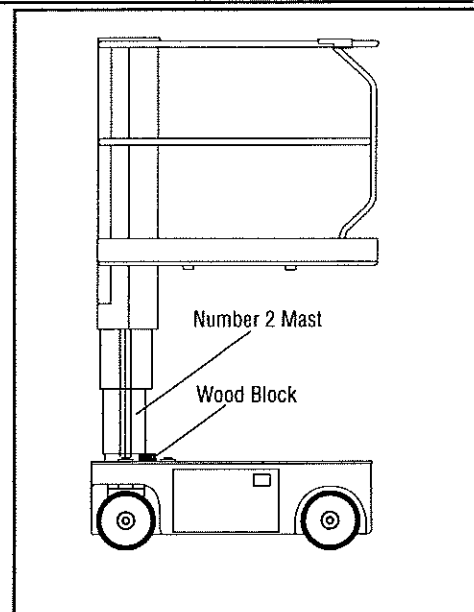
*Never perform service on the work platform in the elevating assembly area while platform is elevated without first blocking the elevating assembly.  
DO NOT stand in elevating assembly area while deploying or storing brace.*

**Figure 3-6:** Supporting the Elevating Assembly

1. Park the Work Platform on firm level ground.
2. Verify Platform Emergency Stop Switch is **ON**.
3. Turn Chassis Key Switch to **CHASSIS**.
4. Position Chassis Lift/Lower Switch to **UP** and elevate Platform approximately 4 feet (1.2m).
5. Place a wood block, 2 in. x 4 in. x 18 in. (5cm x 10cm x 46cm) long between the #2 Mast and Chassis just behind the Mast Assembly.
6. Push Chassis Lift Switch to **DOWN** position and gradually lower Platform until the #2 Mast is supported by the block.

#### REMOVAL

1. Push Chassis Lift Switch to **UP** position and gradually raise Platform until wood block can be removed.
2. Remove block.
3. Push Chassis Lift Switch to **DOWN** position and completely lower Platform





### 3.8 BATTERY MAINTENANCE

Electrical energy for the motor is supplied by four 6 volt batteries wired in series for 24 volts DC. Proper care and maintenance of the batteries and motor will ensure maximum performance from the Work Platform

Reference: • See Section 2 for battery access instructions

**⚠ WARNING ⚠**

*Hazard of explosive gas mixture. Keep sparks, flame, and smoking material away from battery.*

*Always wear safety glasses when working with batteries.*

*Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.*

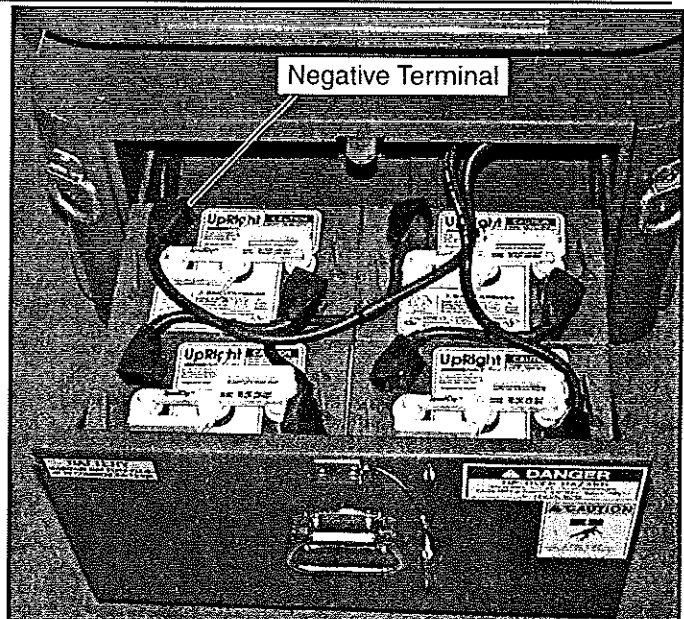
#### BATTERY INSPECTION AND CLEANING

Figure 3-7: Battery Tray

Check battery fluid level daily, especially if work platform is being used in a warm, dry climate. If required, add distilled water ONLY. Use of tap water with high mineral content will shorten battery life.

The batteries and cables should be inspected regularly for signs of cracks in the case, electrolyte leakage and corrosion of the terminals. Inspect cables for worn spots or breaks in the insulation and for broken cable terminals.

Clean the batteries when it shows signs of corrosion at the terminals or when electrolyte has overflowed during charging. Use a baking soda solution to clean the battery, taking care not to get the solution inside the cells. Rinse thoroughly with clean water. Clean battery and cable contact surfaces to a bright metal finish whenever a cable is removed.



**⚠ CAUTION ⚠**

*If battery water level is not maintained, batteries will not fully charge, creating a low discharge rate which will damage Motor/Pump unit and void warranty.*

**⚠ WARNING ⚠**

*Before disconnecting the battery negative (-) lead, make sure all switches are OFF. If ON, a spark will occur at the ground terminal which could cause an explosion if hydrogen gas or fuel vapors are present.*

## BATTERY CHARGING

Charge batteries at end of each work shift or sooner if batteries have been discharged.

**NOTE:** If voltage falls below 17 volts (for a 24 volt system), the charger will not recharge the batteries. If this extreme voltage drop occurs, disconnect and recharge each battery separately using a 6 volt charger to bring the voltage up to at least 4½ volts.

### ⚠ WARNING ⚠

Charge the battery only in a well ventilated area. Do not charge the battery when the work platform is in an area containing sparks or flames.

Permanent damage will result if the battery is not immediately recharged after discharging. Never leave the charger unattended for more than two days. Never disconnect the cables from the battery when the charger is operating. Keep the charger dry.

**NOTE:** Do not operate machine when battery charger is plugged in.

When night air temperatures fall below 65°F (18°C), batteries charged in unheated areas should be placed on charger as soon after use as possible. Under such conditions a 4 hour equalize charge once a week in the early afternoon will improve state of charge and battery life.

Figure 3-8: Battery Charger Outlet

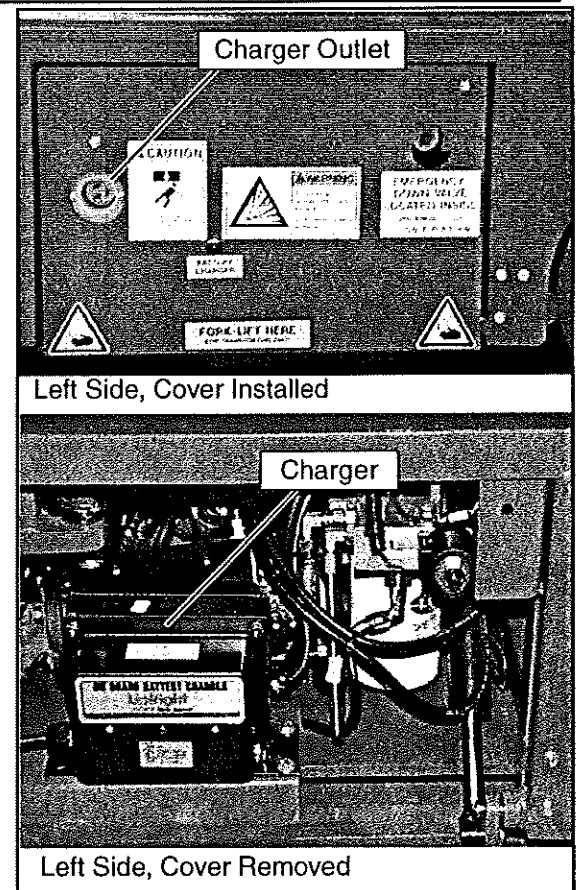
1. Check battery fluid level. If electrolyte level is lower than 3/8 in. (10 mm) above plates add distilled water only.
2. The outlet plug for the battery charger is located in the left chassis door. Connect extension cord (12 gauge conductor minimum and 50 ft. (15 m) in length maximum) to the charger plug. Connect other end of extension cord to properly grounded outlet of proper voltage and frequency.
3. Charger turns on automatically after a short delay, the LED charge indicator will illuminate.
4. Charger turns off automatically when batteries are fully charged, the LED charge indicator will blink.

## BATTERY CELL EQUALIZATION

The specific gravity of the electrolyte in the battery cells should be equalized monthly. To do this, charge batteries as outlined in Battery Charging. After this initial charge, check the electrolyte level in all cells and add distilled water as necessary. Then, turn the charger on for an additional eight hours. During this time, the charging current will be low (four amps) as cells are equalizing.

After equalization, the specific gravity of all cells should be checked with a hydrometer. The temperature corrected specific gravity in this state should be 1.260. If any corrected readings are below 1.230, the batteries containing such cells should be replaced.

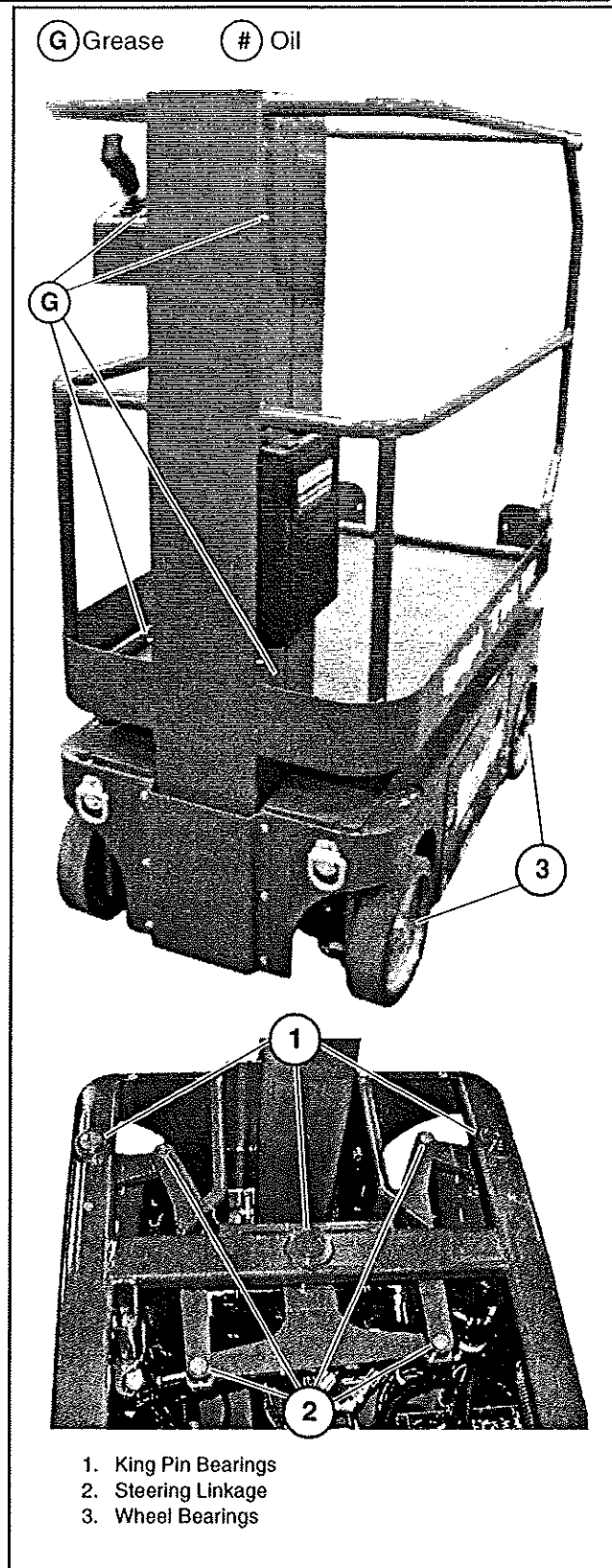
Do not check the specific gravity in a cell to which water has just been added. If there is not enough electrolyte in a fully charged cell to obtain a sample for the hydrometer, add water and continue charging for one to two hours to adequately mix the water and electrolyte.



### 3.9 LUBRICATION

Figure 3-9: Lubrication Points

- Apply grease to each zerk.
- Apply one or two drops of motor oil to each bearing.



## 3.10 HYDRAULICS

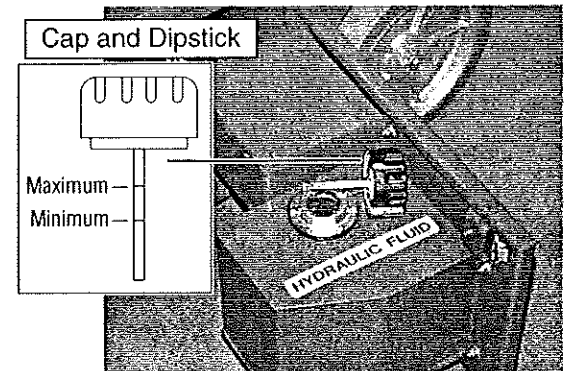
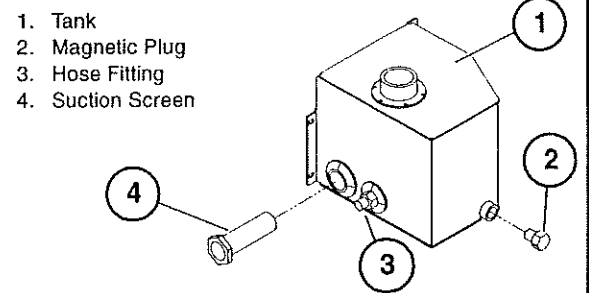
### HYDRAULIC OIL TANK AND FILTER FLUID LEVEL

Figure 3-10: Hydraulic Oil Tank and Filter

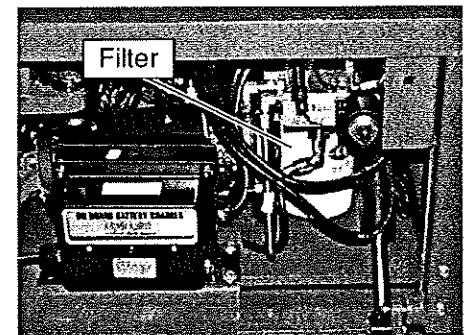
With Platform fully lowered, oil should be visible on the dipstick, if not, fill the tank until oil registers on the dipstick. **DO NOT** fill above the lower line on the dipstick or when the Platform is elevated.

### OIL AND FILTER REPLACEMENT

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Provide a suitable container to catch the drained oil. Hydraulic tank has a 1.9 US gal. (7,2 liter) capacity.
3. Open module door.
4. Remove the magnetic drain plug and allow all oil to drain.
5. Check the magnetic plug for metal fragments.
6. Clean and re-install the drain plug.
7. Un-thread the suction screen from the tank.
8. Wash the suction screen in cleaning solvent and then blow out with clean compressed air.
9. Apply a thin film of clean hydraulic oil (ISO #46) to the threads and re-install the suction screen.
10. Un-thread the filter from the Control Valve Block.
11. Apply a thin film of clean hydraulic oil (ISO #46) to the gasket of the replacement filter.
12. Thread the replacement filter onto the filter head until the gasket makes contact, then rotate the filter  $\frac{3}{4}$  of a turn further.
13. Fill the hydraulic reservoir with hydraulic oil until the oil comes up just past the end of the dipstick. Hydraulic tank has a 1.9 US gallon (7,2 liter) capacity.



Right Side Door



Left Side, Behind Panel

## CAUTION

*The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.*

## HYDRAULIC PUMP

The Hydraulic Pump is located in the Power Module, and is mounted on the rear of the motor.

### REMOVAL

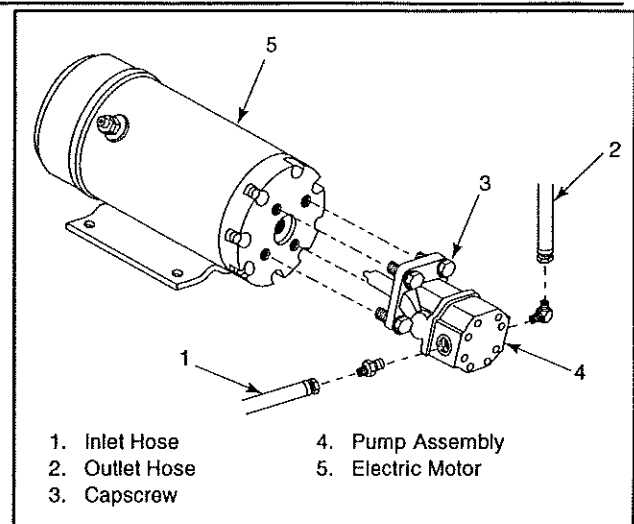
**NOTE:** If the hydraulic tank has not been drained, suitable means for plugging the hoses should be provided to prevent excessive fluid loss.

1. Mark, disconnect and plug the hose assemblies.
2. Loosen the capscrews and remove the pump assembly from the motor.

### INSTALLATION

Figure 3-11: Hydraulic Pump

1. Lubricate the pump shaft with general purpose grease and attach the pump to the motor with the capscrews.
2. Using a crisscross pattern, torque each capscrew a little at a time until all capscrews are torqued to 20 Ft/Lbs (27 Nm).
3. Unplug and reconnect the hydraulic hoses.
4. Check the oil level in the hydraulic tank before operating the work platform.



## HYDRAULIC VALVE ASSEMBLIES

### REMOVAL

1. Disconnect the battery ground cable.
2. Tag and disconnect the solenoid valve leads from the terminal strip.
3. Tag, disconnect, and plug hydraulic hoses.
4. Remove the filter.
5. Remove the locknuts, jam nut and bolts that hold the valve block to the mounting bracket.
6. Remove valve block.

### DISASSEMBLY.

**NOTE: Mark all components as they are removed so as not to confuse their location during assembly.**

1. Remove coils from solenoid valves.
2. Remove spool valve cover and spool valve.
3. Remove solenoid valves, lift relief valve, counter- balance valves and divider combiner valve.
4. Remove fittings, plugs, springs, balls and orifices.

### CLEANING AND INSPECTION

1. Wash the valve block in cleaning solvent to remove built up contaminants and then blow out all passages with clean compressed air.
2. Inspect the valve block for cracks, thread damage and scoring where O-rings seal against internal and external surfaces.
3. Wash and dry each component and check for thread damage, torn or cracked O-rings and proper operation.
4. Replace parts and O-rings found unserviceable.

### ASSEMBLY

**NOTE: Lubricate all O-rings before installation to prevent damage to O-rings. Seat all balls in valve block by lightly tapping on the ball with a brass drift punch.**

1. Install fittings, plugs, springs, balls and orifices. Use one drop of Loctite #242 on each screw-in orifice.
2. Install solenoid valves, lift relief valve, counter balance valves, divider combiner valve, and spool valve.
3. Install coils on solenoid valves.

### INSTALLATION

1. Attach valve block assembly to mounting brackets with bolts, washers, and locknuts.
2. Connect solenoid leads to terminal strip (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to valve block.
4. Install oil filter.
5. Operate each hydraulic function and check for proper function and leaks.

Adjust all hydraulic pressures according to instructions in "Setting Hydraulic Manifold Pressures" on Page 3-16.

## CYLINDER VALVE ASSEMBLY

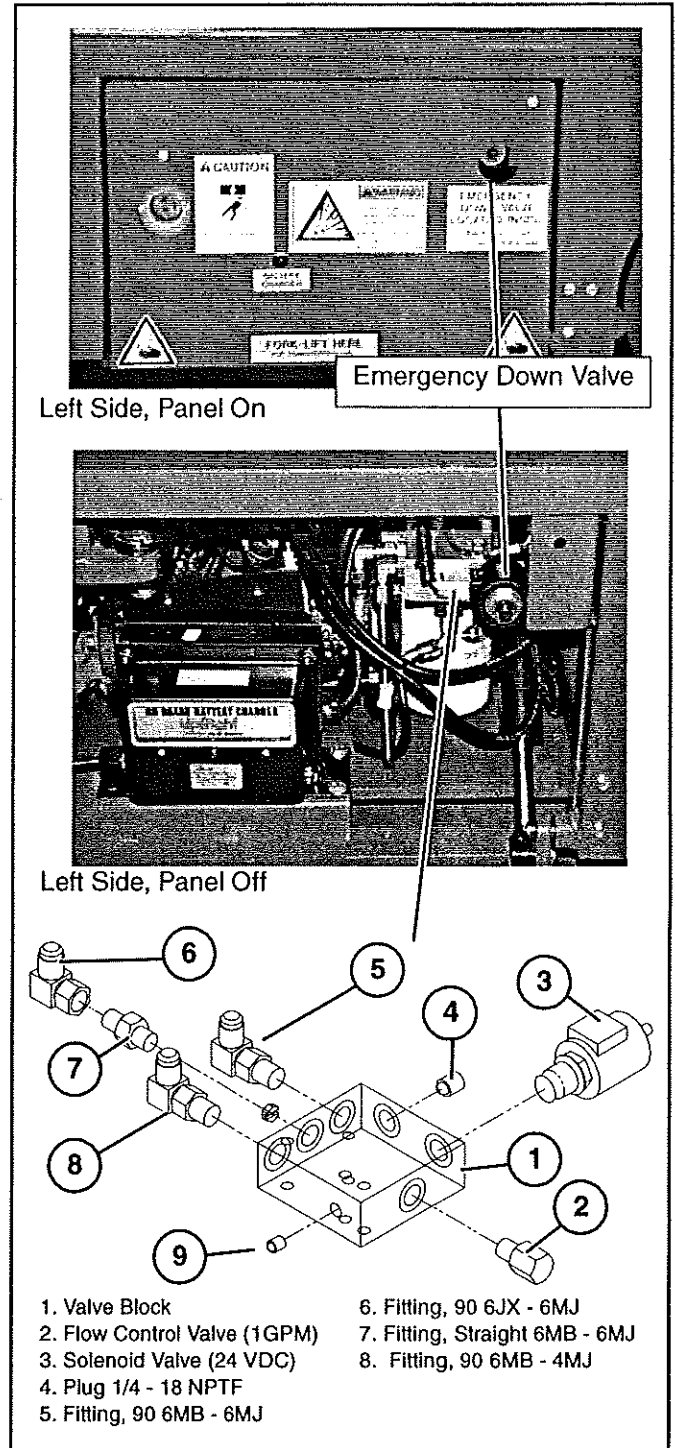
Figure 3-12: Cylinder Valve

### EMERGENCY DOWN VALVE

The Emergency Down Valve is accessible through a hole in the panel on the left side of the machine. The valve is a 24 Volt DC solenoid mounted on the Cylinder Valve Block.

### CYLINDER VALVE BLOCK

The Cylinder Valve Block is located behind the panel on the left side of the machine, toward the rear.



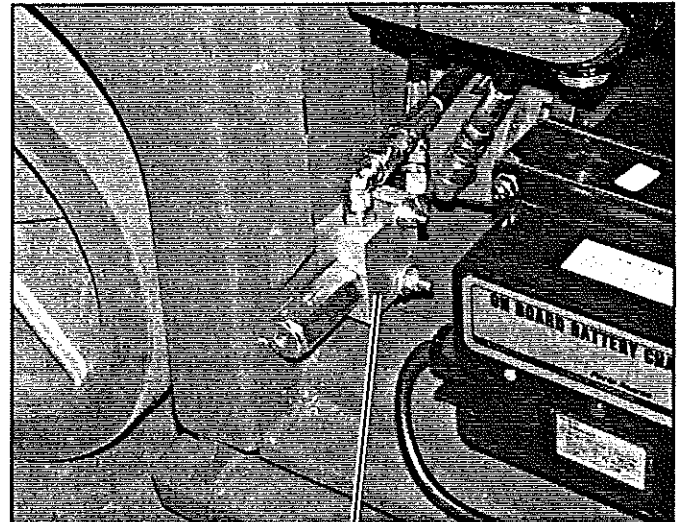
## DRIVE RELIEF VALVE ASSEMBLY

Figure 3-13: Drive Relief Valve

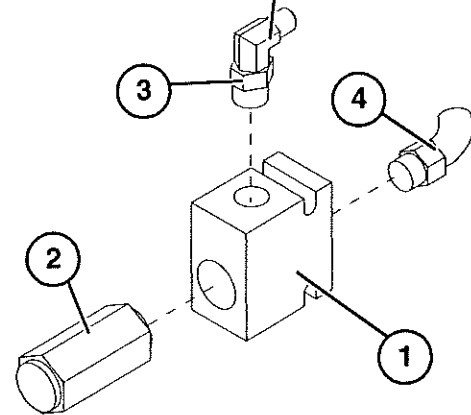
The Drive Relief Valve Assembly is located behind the panel on the left side of the machine, toward the front.

### SETTING DRIVE RELIEF VALVE PRESSURE

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Move machine so the front is against a wall or other unmovable object.
3. Install the gauge in the gauge port of the hydraulic manifold (see Figure 3-15).
4. Loosen locknut or remove cover on the Drive Relief Valve and turn adjusting screw counter-clockwise two full turns.
5. While one person drives the machine forward against the wall, slowly turn the Drive Relief Valve adjusting screw clockwise to increase the pressure until the gauge reads 3,000 psi (207 bar).
6. Tighten locknut or replace Drive Relief Valve cover and torque to 6 Ft/Lbs (8 Nm).
7. Remove gauge and replace cap.



Left Side, Panel Off



- |  |                           |
|--|---------------------------|
| 1. Valve Block   | 3. Hose Fitting, 90°      |
| 2. Drive Relief Valve<br>(torque to 40 ft. lbs. [54 Nm]) | 4. Hose Fitting, Straight |

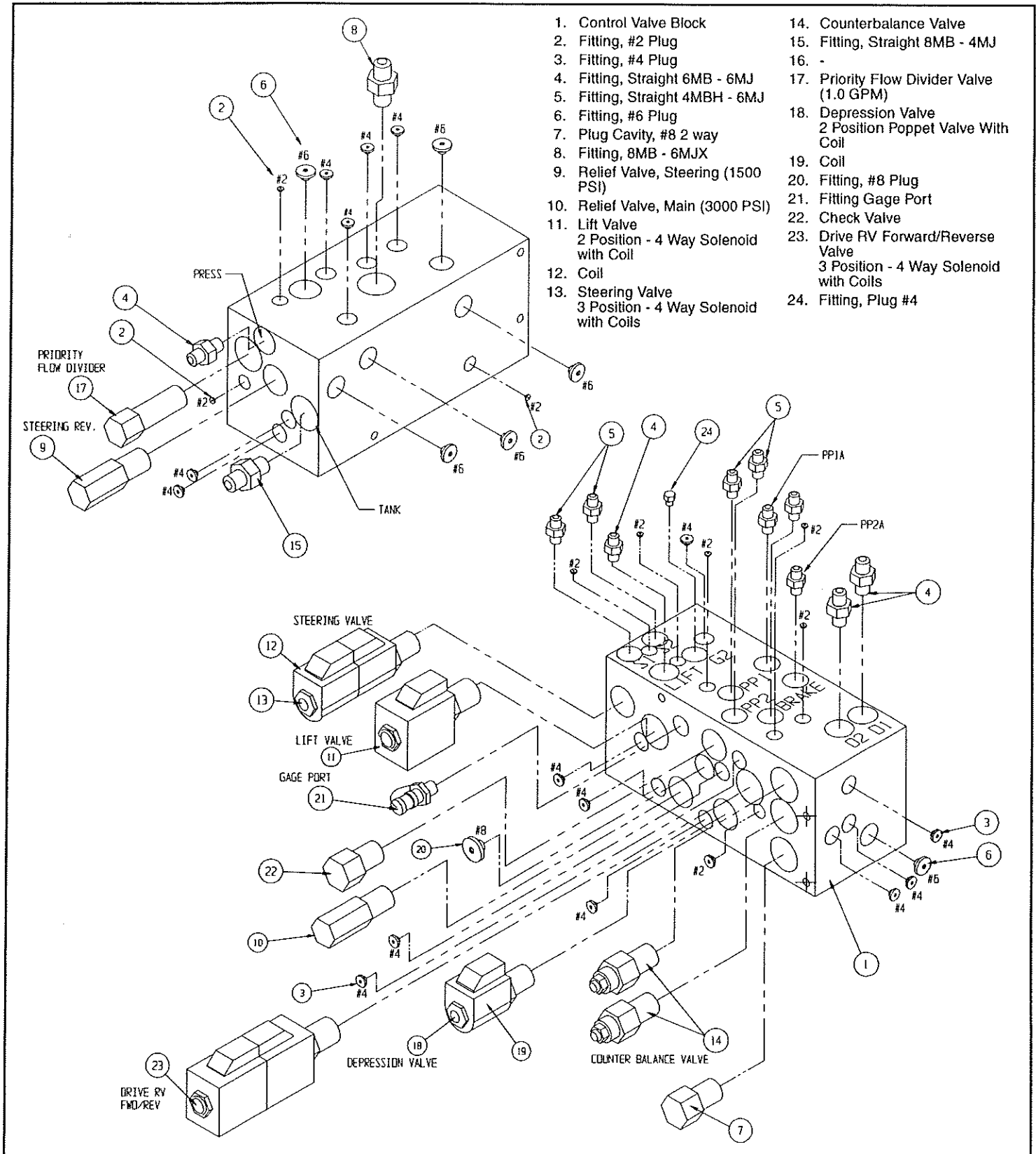


# MAIN HYDRAULIC MANIFOLD

Reference: • "Figure 3-14: Hydraulic Manifold, Exploded View" on Page 3-15

Though it is not necessary to remove the manifold to perform all maintenance procedures, a determination should be made prior to beginning as to whether or not the manifold should be removed before maintenance procedures begin.

Figure 3-14: Hydraulic Manifold, Exploded View



## SETTING HYDRAULIC MANIFOLD PRESSURES

Reference: • Figure 3-15

### ⚠ WARNING ⚠

The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.

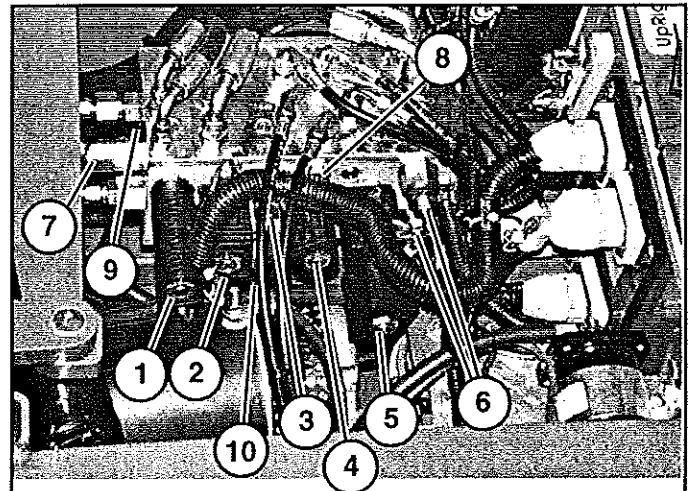
The oil in the hydraulic system is under very high pressure which can easily cause severe cuts. **Obtain medical assistance immediately if cut by hydraulic oil.**

**NOTE:** Check the hydraulic pressures whenever the pump, manifold or relief valves have been serviced or replaced

### MAIN RELIEF VALVE

Figure 3-15: Hydraulic Manifold

1. Operate the hydraulic system 10 to 15 minutes to warm the oil.
2. Remove the cap or loosen the locknut on the Main Relief Valve.
3. Turn the Main Relief Valve adjustment screw counterclockwise two full turns.
4. Place maximum rated load on the platform (Refer to specifications).
5. Turn the Chassis Key Switch to CHASSIS. Position the chassis Lift Switch to UP position and hold it there.
6. Loosen locknut or remove cover on the Lift Relief Valve and slowly turn the adjustment screw clockwise until the platform begins to rise.
7. Release the Chassis Lift Switch.
8. Replace the cap, or tighten the locknut on the Lift Relief Valve, and torque to 6 Ft Lbs (8 Nm).
9. Remove the load from the platform



- |                          |                          |
|--------------------------|--------------------------|
| 1. Steering Valve        | 7. Steering Relief Valve |
| 2. Lift Valve            | 8. Check Valve           |
| 3. Gage Port             | 9. Flow Divider Valve    |
| 4. Depression Valve      | 10. Main Relief Valve    |
| 5. Forward/Reverse Valve |                          |
| 6. Counterbalance Valves |                          |

### COUNTERBALANCE VALVES

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Remove lower gauge port cap and install the pressure gauge assembly.
3. Remove the red Control Cable wire from terminal #9.
4. Lift work platform and block front wheels off ground.
5. Loosen the locknuts on Counterbalance Valves.
6. With the Chassis Key Switch on **DECK** and the Drive/Lift Switch in **DRIVE**, depress the Foot Switch and slowly pull the Control Lever to **REVERSE** to drive the wheels.
7. Adjust the Forward Counterbalance Valve by turning the adjustment screw until the pressure gauge indicates 1200 psi (83 bar).
8. Slowly push the Control Lever to **FORWARD** to drive the wheels.
9. Adjust the Reverse Counterbalance Valve by turning the adjustment screw until the pressure gauge indicates 1200 psi (83 bar).
10. Check the settings by slowly moving the Control Lever **FORWARD**, then **REVERSE**, checking the gauge to ensure pressures are properly set. Re-adjust as needed.
11. Tighten locknuts on valves to 6 Ft/Lbs (8 Nm). Remove blocks and lower work platform to ground.
12. Reconnect the red Control Cable wire to terminal #9.
13. Remove the gauge from the gauge port and re-install cap.
14. Check for proper operation of the drive system and brake.

### STEERING RELIEF VALVES

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Install gauge in lower gauge port.
3. Loosen locknut or remove cover on the Steering Relief Valve and turn adjusting screw counter-clockwise two full turns.
4. While one person holds the Steering Switch to steer right or left, slowly turn the Steering Relief Valve adjusting screw clockwise to increase the pressure until the gauge reads 1000 psi (69 bar).
5. Tighten locknut or replace Steering Relief Valve cover and torque to 6 Ft/Lbs (8 Nm).
6. Remove gauge and replace cap.

## 3.11 CYLINDER REPAIR

### **▲ W A R N I N G ▲**

*Cylinders may be very heavy. Support heavy cylinders before removing pins which secure cylinder to machine.*

#### **REMOVAL**

**NOTE:** Refer to "Illustrated Parts Section" for location of cylinder and list of parts which secure cylinder.

1. Remove cylinder from machine.
2. Mark and disconnect hoses and IMMEDIATELY cap the openings to prevent contamination.

#### **DISASSEMBLY**

1. Remove head from cylinder body.
2. Carefully slide rod assembly out of cylinder.
3. Remove seal kit components (wipers, rod seals, o-rings and backup rings) from head and piston.
4. Inspect parts for scratches, pits or polishing. Check seal grooves and sealing surfaces. Scratches or pits deep enough to catch the fingernail are unacceptable; replace the cylinder. Polishing is a sign of uneven loading. when this occurs, the surface should be checked for roundness. Cylinders not round within .007" (0,18 mm) should be replaced.

#### **ASSEMBLY**

**NOTE:**

•To avoid cutting the seals, do not use sharp edged tools during seal replacement. After installing seals allow at least one hour for the seals to elastically restore to their original shape before assembling cylinder.

•Torque all hardware to torques according to Table 3-1, "Torque Specifications for Hydraulic Components," on Page 3-32 unless otherwise specified.

1. Lubricate all components with clean hydraulic fluid.
2. Install new seal kit components.
3. Lubricate rod wiper and seal with hydraulic fluid and slide head onto rod.
4. Lubricate seals on piston and head.
5. Carefully slide rod assembly into cylinder.
6. Secure head into cylinder.

#### **INSTALLATION**

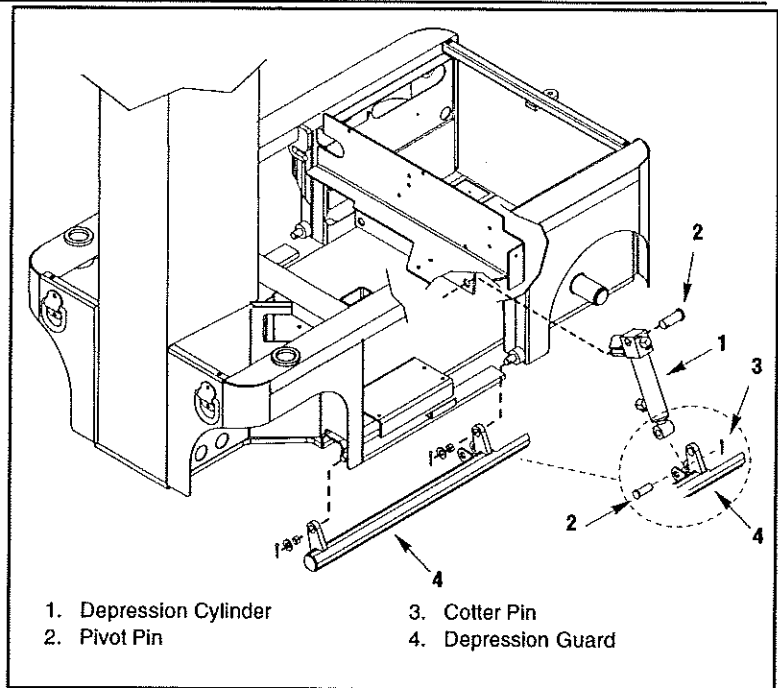
1. Installation is reverse of removal.
2. Carefully remove elevating assembly support.
3. Slowly cycle cylinder several times to remove air from the hydraulic system.
4. Check for proper cylinder operation. Check hydraulic connections for leaks.

## DEPRESSION CYLINDER

Figure 3-16: Depression Cylinder Remove & Replace

### REMOVAL

1. Mark and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
2. Place a support under the depression guard.
3. Remove the cotter pins from the pivot pins.
4. Remove the pivot pins while supporting the cylinder.
5. Remove the cylinder.



### REPAIR

Reference: • "3.11 Cylinder Repair" on Page 3-18

Depression Cylinder Seal Kit, Part Number: 065970-011

### INSTALLATION

Installation is reverse of removal.

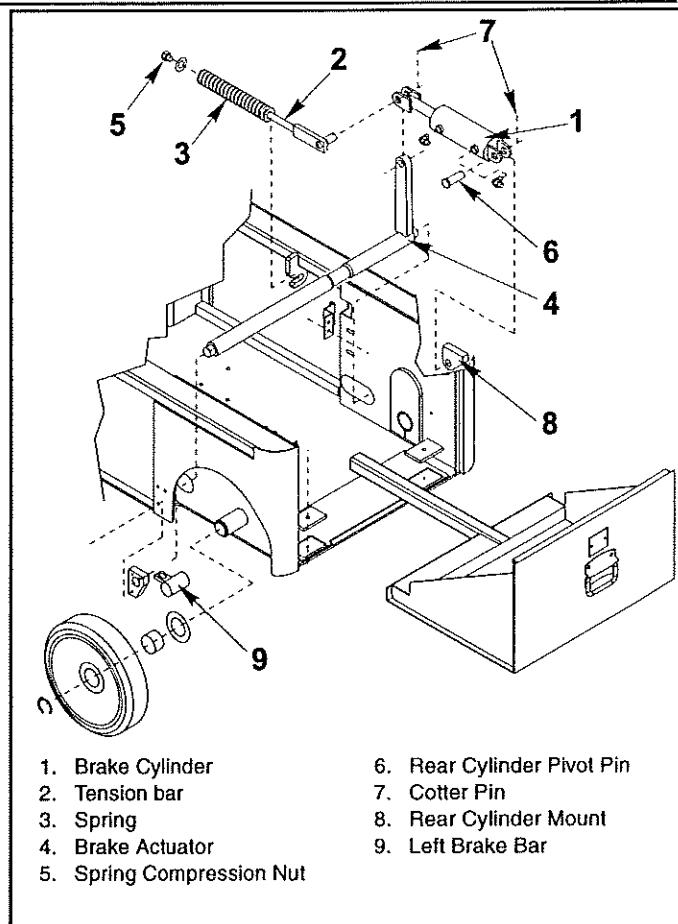
## BRAKE CYLINDER

The brake cylinder is located inside the right rear chassis wall above the wheel.

Figure 3-17: Brake Cylinder, Remove & Replace

### REMOVAL

1. Block the wheels to prevent the work platform from rolling when the brake is removed.
2. Use a one ton (1000 Kg) capacity jack to raise the rear of the machine. Position blocks under the machine to prevent the work platform from falling if the jack fails.
3. Block the front wheels to prevent the machine from rolling.
4. Remove the spring compression nut and flat washer from the tension bar.
5. Remove the retaining ring and right rear wheel.
6. Remove the cotter pin and pivot pin from the rear cylinder mount.
7. Remove the cotter pin from the tension bar pivot allowing the cylinder to be lowered.
8. Disconnect the hose assemblies and cap the openings to prevent foreign material from entering.
9. Remove the cylinder from the chassis.



### INSTALLATION

1. Connect the hose assemblies.
2. Install the tension bar pivot through the cylinder clevis and brake actuator and secure with a new cotter pin.
3. Install the pivot pin through the cylinder mounting tabs and rear cylinder mount and secure with a new cotter pin.
4. Install the wheel and retaining ring.
5. Install the flat washer and spring compression nut on the tension bar. Tighten the nut until at least flush with the tension bar shaft or until the brake bar has full engagement with the tire.
6. Lower the machine and operate the drive circuit and check that the brake bars retract and clear the tires when driving and fully engage the tires when stopped. Check for leaks

## STEERING CYLINDER REMOVAL

Figure 3-18: Steering Cylinder Remove & Replace

1. Mark and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
2. Remove the cotter pins from the pivot pins.
3. Remove the pivot pins while supporting the cylinder. Remove the cylinder.

### INSTALLATION

1. Position the cylinder assembly in the chassis and insert pivot pins and secure with new cotter pins.
2. Connect the hose assemblies to the fittings.
3. Operate the steering circuit several times throughout its' entire range of travel to expel trapped air and check for leaks.

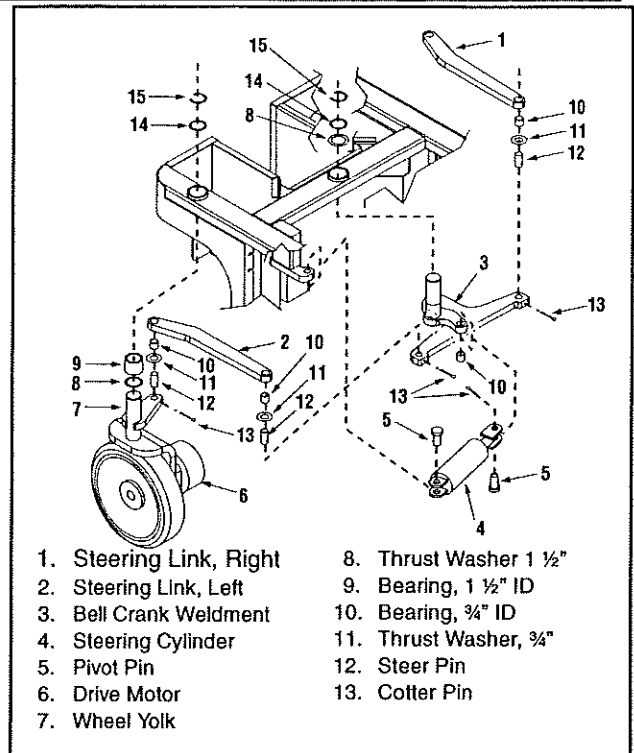
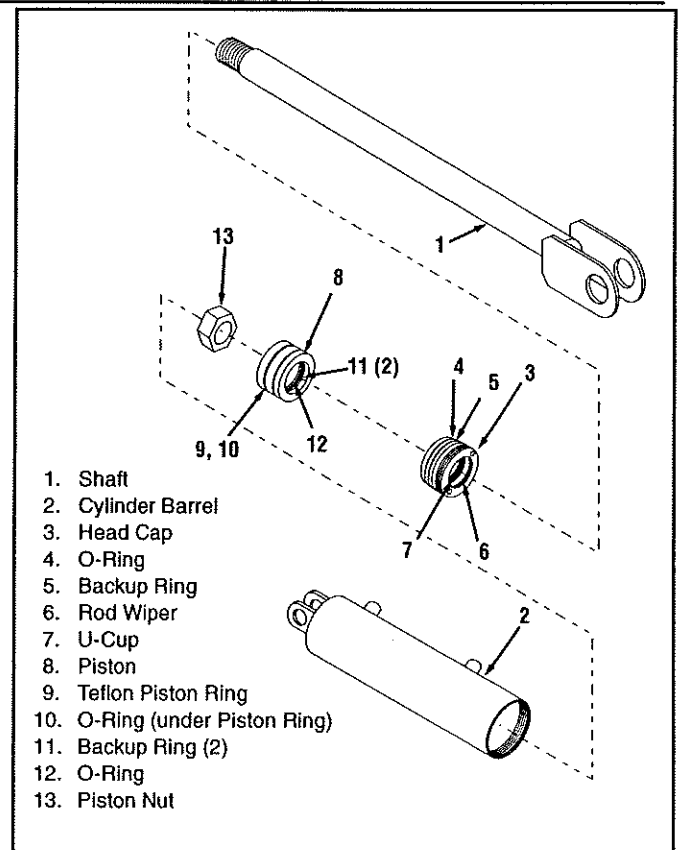


Figure 3-19: Brake and Steering Cylinder Seal Kit, Part Number: 065397-011

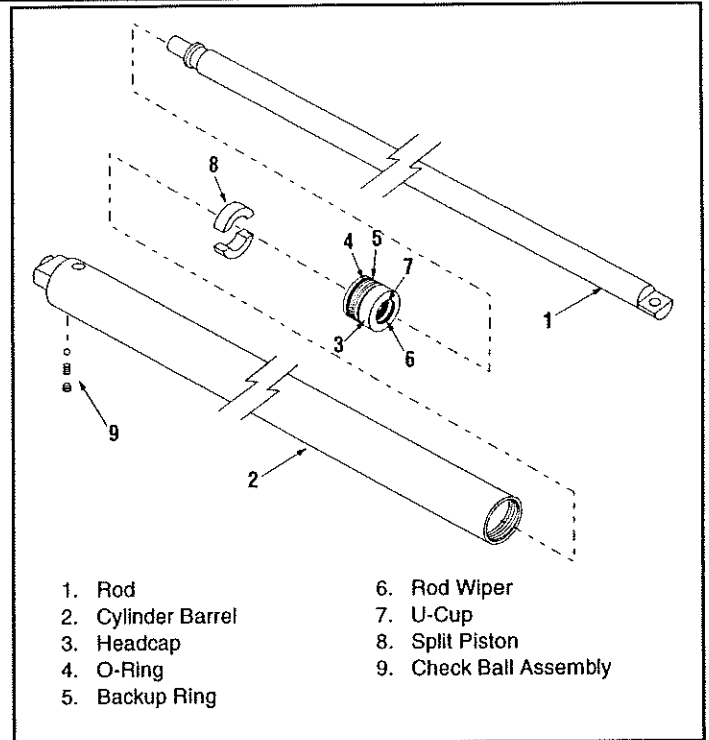
### REPAIR

Reference: • "3.11 Cylinder Repair" on Page 3-18.



**LIFT CYLINDERS****REMOVAL****Figure 3-20: Lift Cylinder Seal Kit, Part Number: 065398-010**

1. Fully lower platform.
2. Provide a suitable container to catch the hydraulic fluid, then disconnect the hydraulic hose. Immediately plug hoses to prevent foreign material from entering.
3. Remove velocity fuse, adapter and fitting from the base of the cylinder.
4. Remove retaining ring securing cylinder to the Chassis.
5. Remove top mast cover.
6. Remove capscrew, washers and locknut securing cylinder rod to the upper cylinder mount.
7. Attach a suitable hoisting device and sling to the cylinder. Carefully remove cylinder by lifting up through the top of the mast.

**REPAIR**

*Reference:* • "3.11 Cylinder Repair" on Page 3-18.

**INSTALLATION**

1. Attach a suitable hoisting device and sling to the cylinder. Carefully lower cylinder through the top of the Mast. The flat in the cylinder rod and fitting port at the base of the cylinder face to the rear of the machine.
2. Secure the base of the cylinder to the Chassis with the retaining ring.
3. Install capscrew, washers and locknut securing cylinder rod to the upper cylinder mount.
4. Install top mast cover.
5. Install velocity fuse, adapter and fitting into the base of the lift cylinder.
6. Unplug hydraulic hose and attach to the velocity fuse.
7. Test with weight at rated Platform load to check system operation. Check for leaks



## 3.12 DRIVE MOTORS

### REMOVAL

1. Use a one ton (1000 Kg) capacity jack to raise the front of the machine. Position blocks under the machine to prevent the work platform from falling if the jack fails.
2. Block the rear wheels to prevent the machine from rolling.
3. Remove the cotter pin, nut, and washer.
4. Remove the wheel.

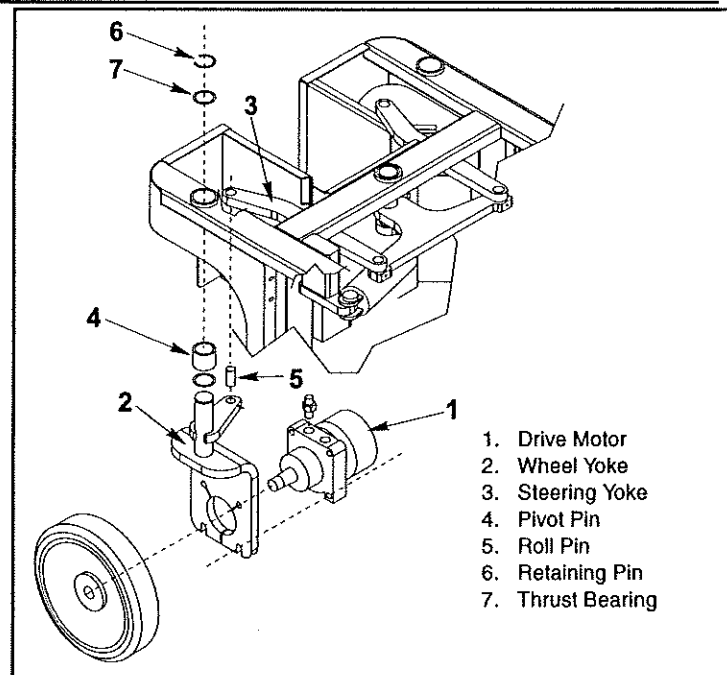
**NOTE:** Before disconnecting hoses, thoroughly clean off all outside dirt around fittings. (After disconnecting hoses and before removing from vehicle, IMMEDIATELY plug port holes.)

5. Tag, disconnect and plug the hose assemblies to prevent foreign material from entering.
6. Remove the roll pin, securing the pivot pin to the steering arm on the wheel yoke, by driving it through the steering arm with a punch.
7. Support the drive motor/wheel yoke assembly and remove the retaining ring at the top of the wheel yoke pivot. Remove the drive motor/wheel assembly from the machine.
8. Remove the locknuts, flat washers, capscrews and drive motor from the wheel yoke.

Figure 3-21: Drive Motor Assembly

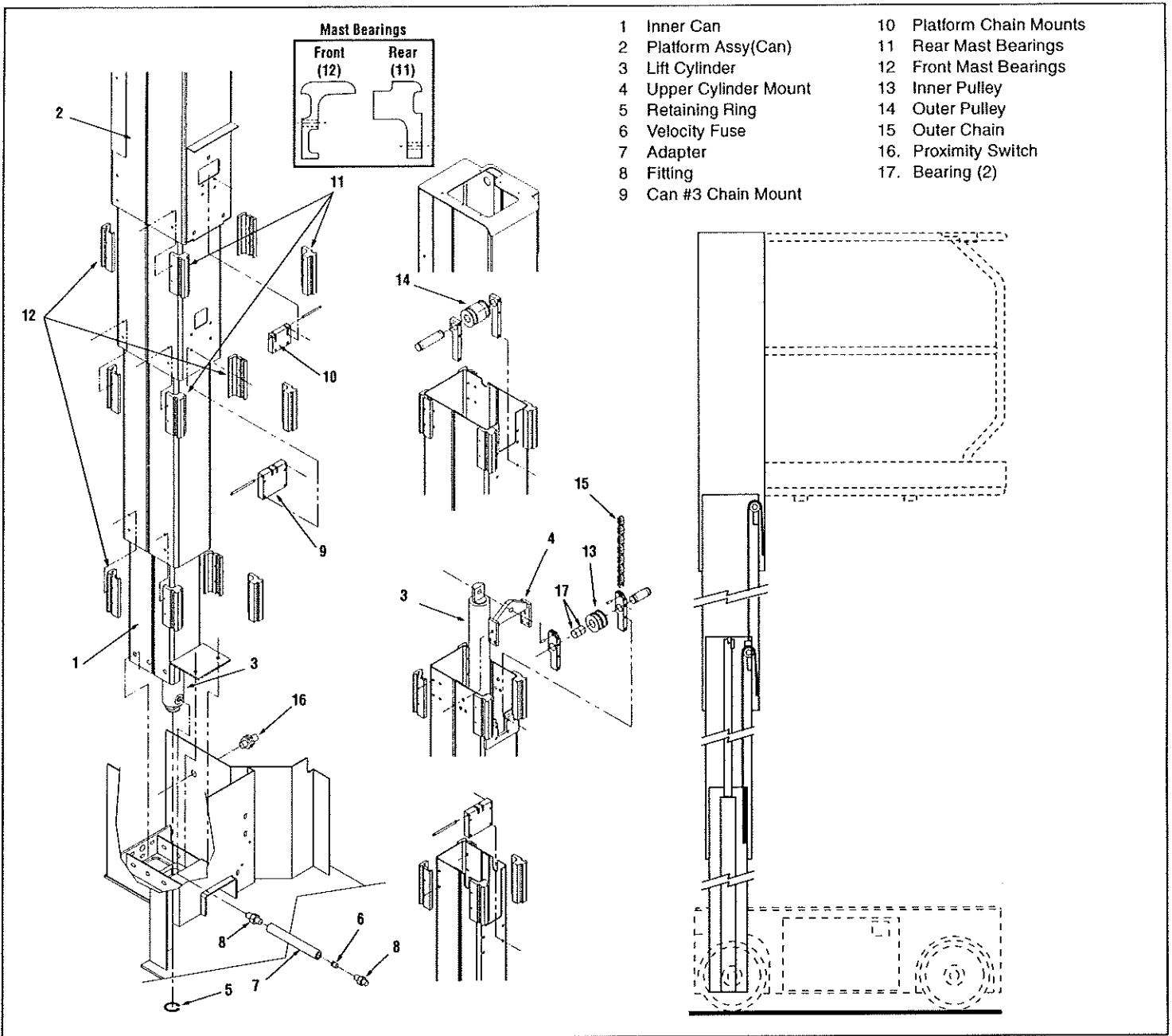
### INSTALLATION

1. Position the drive motor in the wheel yoke and secure with capscrews, flat washers and locknuts.
2. Install the drive motor/wheel yoke assembly into the pivot bearing along with the lower thrust washer, thrust bushing, and retaining ring.
3. Install the pivot pin in the wheel yoke steering arm and steering link and secure with a new roll pin.
4. Remove the plugs from the hose assemblies and connect to the drive motor.
5. Install the shaft key, wheel, washer and slotted nut. Torque the locknut to 75 Ft/Lbs (102 Nm). Install a new cotter pin. **DO NOT** back-off the nut to install cotter pin.
6. Remove blocks, lower the jack and remove. Operate the drive system and check for leaks.



### 3.13 MAST ASSEMBLY

Figure 3-22: Mast Assembly



#### REMOVAL

1. Remove the chain mounts and lower mast bearings.
2. Remove the can with the hoisting device.
3. Support the next can with the sling and hoisting device.
4. Remove capscrews, washers and locknut securing cylinder rod to the upper cylinder mount.
5. Remove the lower mast bearings.
6. Remove the can with the hoisting device.
7. Support the inner can with the sling and hoisting device.
8. Remove locknuts, washers and carriage bolts securing the can to the Chassis.
9. Remove the can with the hoisting device.

## INSTALLATION

1. Using the hoisting device and sling lower the inner can over the lift cylinder (if installed).
2. Secure inner can to the Chassis with the nuts, washers and bolts. Torque to 50 ft. lbs. (68 N-m).
3. Using the hoisting device and sling, partially lower the next can over the first. Support the can with the sling along with the blocking device used to support the Mast Assembly.
4. Install the lower mast bearings, refer to Figure to help determine front and rear bearings.

**NOTE: Always use Loctite Primer #770 and Retainer #405 on the capscrews that secure the mast bearings to the masts.**

5. Install capscrews, washers and locknut securing cylinder rod to the upper cylinder mount.
6. Pull the inner chains attached to the inner can up and over the inner pulley.
7. Using the hoisting device and sling carefully lower the third can over the first two
8. Install the lower mast bearings and chain mount.
9. Using the hoisting device and sling carefully lower the Platform Assembly over the three cans.
10. Install the lower mast bearings.
11. Move the outer chains attached to the top of the second can up and over the outer pulley.
12. Install the outer chain mounts.
13. Install the cable clamp securing the control cable to the Platform and pull the cable through the hole in the platform can.
14. Connect the control cable wires to the Controller.
15. Remove the blocking device from the Mast Assembly.
16. Raise and lower the Platform, checking for proper operation and leaks.
17. Install the top mast cover.

## 3.14 TILT SENSOR

### ⚠ WARNING ⚠

Never perform service on the work platform in the elevating assembly area while platform is elevated without first blocking the elevating assembly.  
DO NOT stand in elevating assembly area while deploying or storing brace.

The Tilt Sensor has three wires; red-power (24v in), black-ground, white-output (24v out). To verify the sensor is working properly, there is one red LED under the sensor. If the LED is on, the sensor is off level..

Figure 3-23: Tilt Sensor

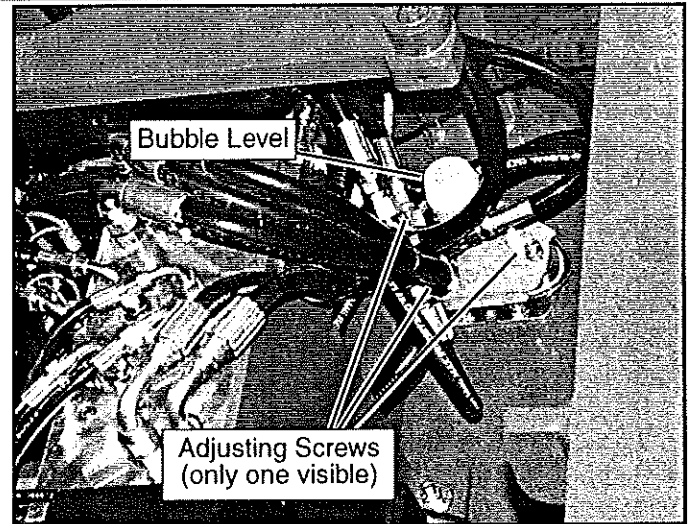
#### ADJUSTMENT

1. Place machine on firm level surface  $\pm 1/4^\circ$ .
2. Use the Inclinator (p/n 010119-000) to ensure front and rear of Chassis is level  $\pm 1/4^\circ$ .
3. Adjust the three leveling screws until the bubble is centered in the circle on the attached bubble level.

#### TEST

1. Raise the platform approximately 7 feet (2 meters).
2. Support the elevating assembly (see "3.7 Supporting Elevating Assembly" on Page 3-6).
3. Push the level sensor to the side.

The red LED should turn on, and the tilt alarm should sound.

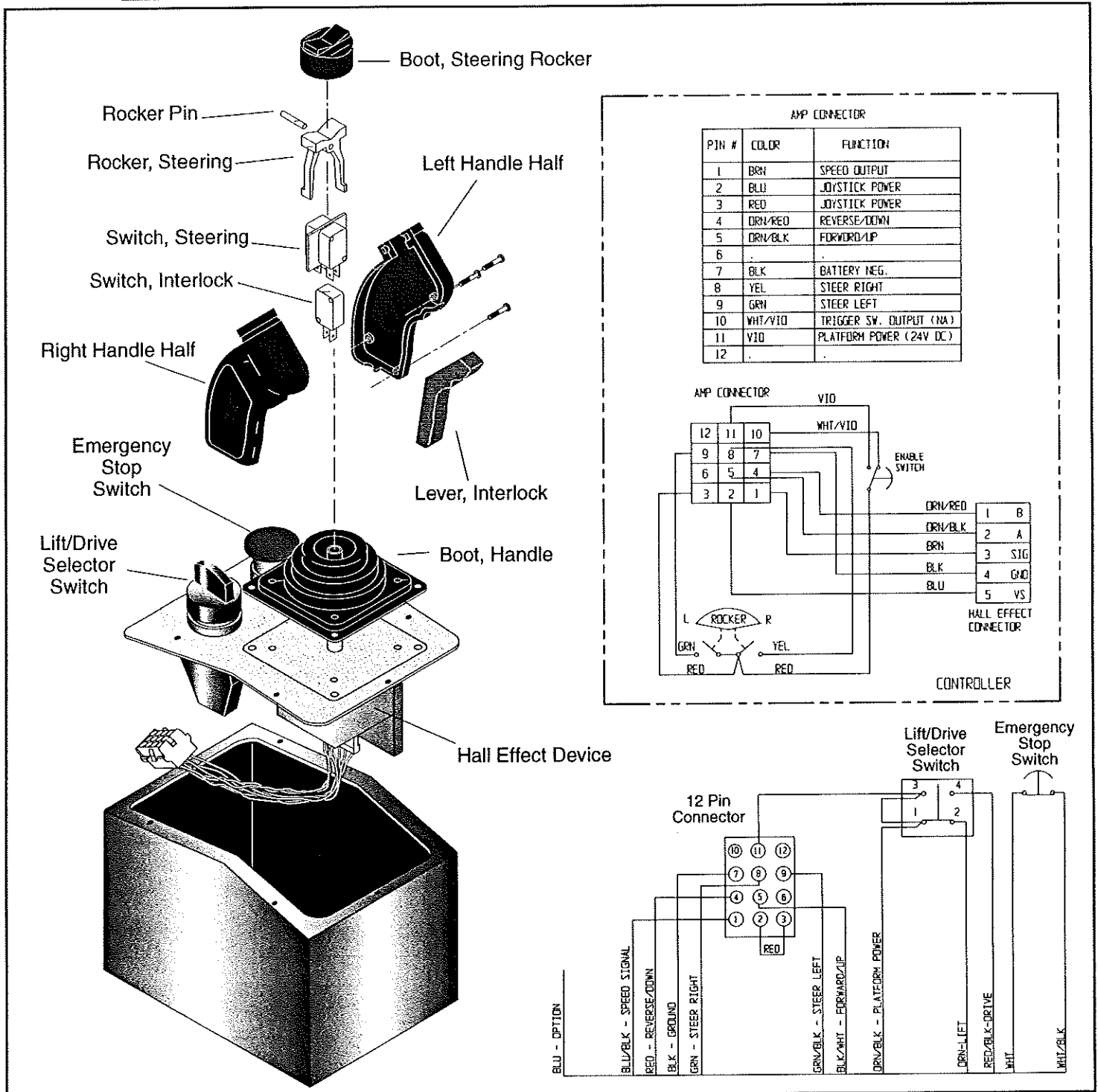


# 3.15 CONTROLS

## PLATFORM CONTROLS

The Proportional Controller can be disassembled to replace defective switches. See Section 6 for replacement part numbers.

Figure 3-24: Upper Controls

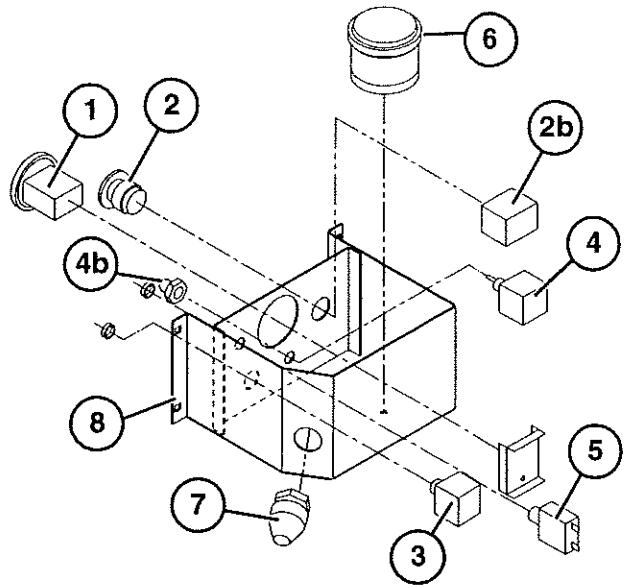
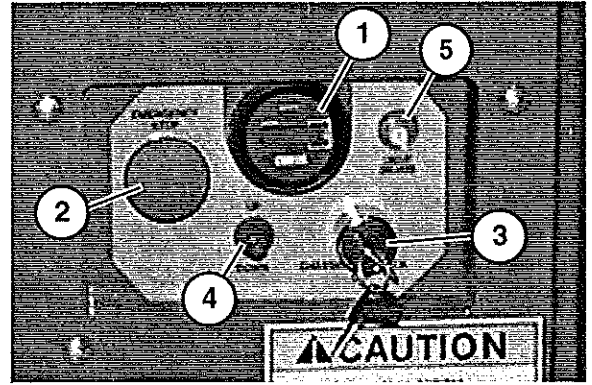


## CHASSIS CONTROLS

Figure 3-25: Chassis Controls

The chassis control assembly is mounted on the inside of the chassis door, to the left of the Hydraulic tank. It is secured to the door with Four carriage bolts (1/4-20UNC x 3/4).

Right Side Door



- |   |                          |
|---|--------------------------|
| 1. Hour Meter                           | 4. Up/Down Toggle Switch |
| 2. Mushroom Emergency Stop Switch       | 4b. Boot Switch Cover    |
| 2b. E-Stop Switch Contact               | 5. Circuit Breaker       |
| 3. Key Chassis/Platform Selector Switch | 6. Alarm, Dual Tone      |
|   | 7. Connector Cable, 3/4" |
|   | 8. Box Weldment          |

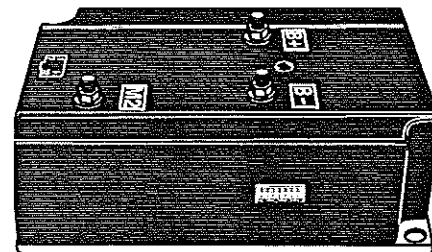
### 3.16 MOTOR CONTROLLER AND I/O BOARD DIP SWITCH SETTINGS

**NOTE:** - Before dip switch settings will take effect, power must be disconnected or Emergency Stop switches must be depressed.  
 - Refer to Section 4 for diagnostics.

#### CONTROLLER

Figure 3-26: Controller

	1	2	3	4	5	6	7	8
TM12	off	off	off	on	off	off	off	on
MX15/19	off	on	off	on	off	on	off	on
X/20N	on	off	off	on	off	off	off	on
X20W	on	on	off	on	off	off	off	on
X26/31	on	on	off	on	off	off	off	on
SL20	on	off	off	on	off	off	off	on



The above table shows the default dip switch settings on the controller box when the machine leaves the factory. The following adjustments may be made to these settings:

Switches 3 & 4 determine the elevated "creep" speed. If the machine does not operate at the specified speed at the default settings, use the following table to adjust the dip switch settings

Switches 5 & 6 determine the deceleration time. Switch 5 is for the deceleration rate while the platform is lowered. Switch 6 is for the elevated rate.



	3	4
1 (slowest)	off	off
2	on	off
3 (default)	off	on
4 (fastest)	on	on

Decel	5	6
.24 sec.	off	off
1.27 sec.	on	on

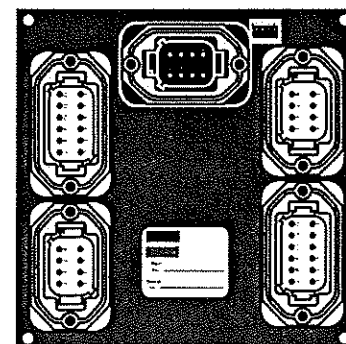
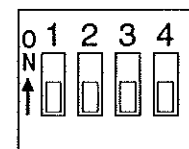
#### I/O (CIRCUIT) BOARD

Figure 3-27: I/O Board

	1	2	3	4
TM12	off	off	off	off
MX15/19	off	off	off	off
X/20N	off	off	off	off
X20W	off	off	off	off
X26/31	off	off	off	off
SL20	off	off	off	off

The above table shows the default dip switch settings on the I/O board when the machine leaves the factory. Switches three and four work together to determine the optional alarm settings.

1	2	3	4	Result
on				Two Speed Mode (not used)
off				Proportional Control
	on			not used
	off			Depression Mechanism extends when platform is raised
		off	off	Down alarm only
		on	off	Down and Reverse alarm
		off	on	Drive and Down alarm
		on	on	All Motion alarm



## 3.17 ELECTRIC MOTOR

### TROUBLESHOOTING

1. Read the nameplate to become familiar with the motor, especially the rated voltage.
2. Try to turn the shaft by hand. Keep motor leads separated while doing this. If the shaft turns freely go to step 3. If the shaft won't turn, proceed to step a.
  - a. The shaft could be tight for a number of reasons, this check is to determine if the tightness is of a temporary nature only. Obtain power to produce the nameplate voltage. **Do not Make A Permanent Connection.** First touch the motor leads quickly to the power supply just long enough to observe if the shaft runs. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to Step 3. If the motor sounds noisy, it should be taken apart as described in the disassembly section.
3. If the motor turned freely, connect an ammeter in the circuit as shown in Figure 3-28A. With rated voltage applied and the shaft running free, the ammeter should read less than 20% of the nameplate full load current. If the motor meets the above conditions, then it can be assumed the original problem is external to the motor.

### DISASSEMBLY

1. Remove throw bolts.
2. Remove pulley end cover.
3. Pull the armature out of the assembly in one swift motion.
4. Remove commutator end cover.

**NOTE: Do not place the stator ring in any mechanical holding device during the disassembly or assembly operation. Permanent distortion or other damage will result.**

### INSPECTION

Once the motor has been disassembled, go through the following check-list steps to determine where the problem lies.

1. Bearings should spin smoothly and easily and have ample lubrication and be free of corrosion.
2. Armature should be checked for grounds and shorted turns. Re-finish commutator surface if pitted or excessively worn.
3. Brushes should be checked for wear and to ensure that they are free in the brush holders.

**NOTE: Observe how brushes are assembled in brush holders and position of brush lead. New brushes must be installed in the same manner. Brushes should be removed as follows:**

- Remove brush spring clip from its mounting on brush assembly.
  - Lift brush assembly from brush holder.
  - Disconnect brush assembly lead.
  - New brush assembly to be installed by reversing above procedure.
4. Inspect wire harness and all connections for signs of damage due to overheating.
  5. Check stator to see if it is securely mounted.



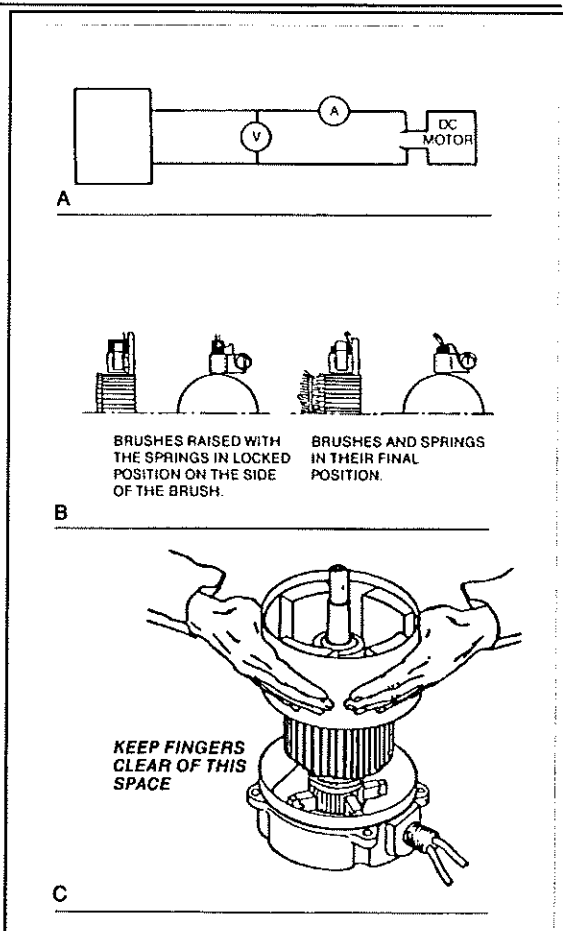
Figure 3-28: Electric Motor Service

**REASSEMBLY**

1. Install new brushes and be sure they are free in the holder. Install brush with the lead wires positioned as when received. Raise all brushes to the locked position. (See Figure 3-28B and step 3 in the Inspection section).
2. Place commutator cover on a work bench with brush assembly facing upward.
3. Place the bearing spring into the bearing bore.
4. Take a complete armature assembly, including bearings, and insert commutator end bearing into the bearing bore.

**NOTE:** Do not re-use bearings which have been removed from armature shaft. Keep assembly in a vertical position. Use extreme care not to damage armature with bearing pullers. New bearings should be installed by pressing inner race of bearing onto proper position on armature shaft.

5. Set the brushes to final position as shown in Figure 3-28B.
6. Place the complete stator down over the vertical armature, and into position on the commutator cover.
7. The stator assembly must be placed in a definite relationship with the commutator covers in order to obtain a neutral brush setting. There is a match-mark on both items. These two marks must line up exactly. Rotate until they do.
8. Assemble the pulley end cover in the proper relationship. Insert mounting bolts and tighten alternately to ensure a good mechanical alignment.
9. Spin the shaft by hand to see if it is free. Be sure motor leads (if used) are not touching together. If the leads are touching, a generator action will give the effect of friction in the motor. A no-load test can now be performed. At rated voltage, observe the no-load current. It should be less than 20% of the nameplate full load current. Anything higher indicates:
  - Brushes are not on neutral setting (check match-marks for exact alignment).
10. Faulty armature.



### 3.18 TORQUE SPECIFICATIONS

#### HYDRAULIC COMPONENTS

**NOTE:** Always lubricate threads with clean hydraulic oil prior to installation

Use the following values to torque hydraulic components used on UpRight Work Platforms.

**Table 3-1:** Torque Specifications for Hydraulic Components

Type: SAE Part Series	Cartridge Poppel		Fillings		Hoses	
	Ft/Lbs	N-m	Ft/Lbs	N-m	In/Lbs	N-m
#4	N/A	N/A	N/A	N/A	135-145	15-16
#6	N/A	N/A	10-20	14-27	215-245	24-28
#8	25-30	34-41	25-30	34-41	430-470	49-53
#10	35-40	47-54	35-40	47-54	680-750	77-85
#12	85-90	115-122	85-90	115-122	950-1050	107-119
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

#### FASTENERS

This standard applies to the preloading of fasteners measured by installation torque.

**NOTE:** For other preloading methods or fasteners consult UpRight Engineering Department.

This general standard applies to all SAE and Metric fasteners unless otherwise specified.

#### THREAD CONDITION

- For lubed or zinc plated fasteners use K = .15
- For dry unplated fasteners use K = .20

#### TORQUE TABLES

**Table 3-2:** Torque Specifications for SAE Fasteners





															
		SAE J429 Grade 5		SAE J429 Grade 8				SAE J429 Grade 5		SAE J429 Grade 8					
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque			
		K=.15	K=.20		K=.15	K=.20			K=.15	K=.20		K=.15	K=.20		
	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.		
Unified Coarse Thread Series	1/4 -20	2,000	75	100	2850	107	143	Unified Fine Thread Series	1/4 -28	2,300	85	115	3250	120	163
	5/16 - 18	3,350	157	210	4700	220	305		5/16-24	3,700	173	230	5200	245	325
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.			lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-16	4,950	23	31	6950	32.5	44		3/8-24	5,600	26	35	7900	37	50
	7/16-14	6,800	37	50	9600	53	70		7/16-20	7,550	42	55	10700	59	78
	1/2-13	9,050	57	75	12800	80	107		1/2-20	10,200	64	85	14400	90	120
	9/16-12	11,600	82	109	16400	115	154		9/16-18	13,000	92	122	18300	129	172
	5/8-11	14,500	113	151	20300	159	211		5/8-18	16,300	128	170	23000	180	240
	3/4-10	21,300	200	266	30100	282	376		3/4-16	23,800	223	298	33600	315	420
	7/8-9	29,435	321	430	41550	454	606		7/8-14	32,480	355	473	45855	500	668
1-8	38,600	483	640	54540	680	900	1-12	42,270	528	704	59670	745	995		

Table 3-3: Torque Specifications for Metric Fasteners, U.S. Customary Units







		 Grade 8.8		 Grade 10.9		 Grade 12.9			
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
3	-	-	-	-	-	-	823	14.6	19.5
3.5	-	-	-	-	-	-	1,109	22.9	30.5
4	-	-	-	-	-	-	1,436	33.9	45.2
5	1,389	41.0	19.5	1,987	58.7	19.5	2,322	68.6	91.2
6	1,966	69.7	28.3	2,813	100.0	28.3	3,287	116.8	155.8
7	2,826	116.8	37.2	4,044	167.3	37.2	4,727	195.6	260.2
		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.
8	3,579	14.1	18.8	5,122	20.1	26.9	5,986	23.6	31.4
10	11,742	27.9	37.2	8,117	39.9	53.3	9,486	46.7	62.3
12	8,244	48.7	64.9	11,797	69.7	92.2	13,787	81.1	108.4
14	11,246	77.4	103.3	16,093	110.6	147.5	18,808	129.1	172.6
16	15,883	125.4	166.7	21,971	173.3	230.9	25,677	202.1	269.2
18	19,424	171.9	229.4	26,869	238.2	317.2	31,401	278.1	371.0
20	2,304	243.4	325.3	34,286	337.8	449.9	40,070	394.6	525.9
22	30,653	331.9	442.5	42,403	458.8	612.2	49,556	536.2	715.4
24	35,711	420.4	562.0	49,400	583.4	778.1	57,733	682.2	909.4
27	46,435	617.3	84.8	64,235	853.4	1138.1	75,069	997.2	1329.8
30	56,753	837.9	1117.4	78,509	1159.4	1545.2	91,751	1354.9	1807.0
33	70,208	1140.3	1520.1	97,121	1576.9	2102.8	113,503	1843.9	2457.5
36	82,651	1464.1	1952.3	114,334	2025.3	2700.9	133,620	2367.6	3156.0

Table 3-4: Torque Specifications for Metric Fasteners, SI Units

		 Grade 8.8		 Grade 10.9		 Grade 12.9			
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	N	N-m	N-m	N	N-m	N-m	N	N-m	N-m
3	-	-	-	-	-	-	3,660	1.65	2.2
3.5	-	-	-	-	-	-	4,932	2.59	3.45
4	-	-	-	-	-	-	6,387	3.83	5.11
5	6,177	4.63	2.2	8,840	6.63	2.2	10,330	7.75	10.3
6	8,743	7.87	3.2	12,512	11.3	3.2	14,623	13.2	17.6
7	12,570	13.2	4.2	17,990	18.9	4.2	21,025	22.1	29.4
8	15,921	19.1	25.5	22,784	27.3	36.5	26,626	32	42.6
10	52,230	37.8	50.5	36,105	54.1	72.2	42,195	63.3	84.4
12	36,670	66	88	52,475	94.5	125	61,328	110	147
14	50,025	105	140	71,587	150	200	83,663	175	234
16	70,650	170	226	97,732	235	313	114,218	274	365
18	86,400	233	311	119,520	323	430	139,680	377	503
20	10,250	330	441	152,513	458	610	178,238	535	713
22	136,350	450	600	188,618	622	830	220,433	727	970
24	158,850	570	762	219,743	791	1055	256,808	925	1233
27	206,550	837	115	285,728	1157	1543	333,923	1352	1803
30	252,450	1136	1515	349,223	1572	2095	408,128	1837	2450
33	312,300	1546	2061	432,015	2138	2851	504,885	2500	3332
36	367,650	1985	2647	508,582	2746	3662	594,368	3210	4279

NOTES:

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# TROUBLESHOOTING

## 4.1 INTRODUCTION

The following section on troubleshooting provides guidelines on the types of problems users may encounter in the field, helps determine the cause of problems, and suggests proper corrective action.

Careful inspection and accurate analysis of the symptoms listed in the Troubleshooting Guide will localize the trouble more quickly than any other method. This manual cannot cover all possible problems that may occur. If a specific problem is not covered in this manual, call our toll free number for service assistance.

Referring to Section 2.0 and 5.0 will aid in understanding the operation and function of the various components and systems of the Work Platform and help in diagnosing and repair of the machine.

### GENERAL PROCEDURE

Thoroughly study hydraulic and electronic schematics in **Section 5**. Check for loose connections and short circuits. Check/repair/replace each component in the Truth Table which is listed under each machine function which does not operate properly.

Use the charts on the following pages to help determine the cause of a fault in your UpRight Work Platform.

**NOTE:** Spike protection diodes at components have been left out of the charts to eliminate confusion.

### **▲ W A R N I N G ▲**

*When troubleshooting, ensure that the work platform is resting on a firm, level surface.*

*Unplug the machine or disconnect the battery when replacing or testing the continuity of any electrical component.*

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                            FAX: 1-559-896-9244

UPRIGHT EUROPE      Tel: +31-10-238-0000  
                            FAX: +31-10-238-0001

## 4.2 CAUSE AND REMEDY

1. Verify your problem.
  - Do a full function test from both platform controls and chassis controls and note all functions that are not operating correctly.
2. Narrow the possible causes of the malfunction.
  - Use the troubleshooting guide to determine which components are common to all circuits that are not functioning correctly.
3. Identify the problem component.
  - Test components that are common to all circuits that are not functioning correctly. Remember to check wires and terminals between suspect components. Be sure to check connections to battery negative.
4. Repair or replace component found to be faulty.
5. Verify that repair is complete.
  - Do a full function test from both platform and chassis controls to verify that all functions are operating correctly and machine is performing to specified values

### SPECIAL TOOLS

Following is a list of tools which may be required to perform certain maintenance procedures on the UpRight Work Platform.

- Flow Meter with Pressure Gauge  
(UpRight P/N 067040-000)
- 0-1000 PSI Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 014124-010)
- 0-3000 PSI Hydraulic Pressure Gauge with Adapter Fittings (UpRight P/N 014124-030)
- Adapter Fitting (UpRight P/N 063965-002)
- Inclinator (UpRight P/N 010119-000)
- Crimping Tool (UpRight P/N 028800-009)
- Terminal Removal Tool  
(UpRight P/N 028800-006)

### ADJUSTMENT PROCEDURES

Hydraulic settings must be checked whenever a component is repaired or replaced.

Connect a pressure meter of appropriate range to the test port located on the hydraulic manifold.

Correct pressure settings are listed in the hydraulic schematic.

### CHECKING PUMP PRESSURES

Remove hose from pump port and connect pressure tester.

Table 4-1: Cause and Remedy

TROUBLE	PROBABLE CAUSE	REMEDY
All functions inoperable, Electric Motor does not start.	1. Open control circuit Circuit Breaker	Check control circuit Circuit Breaker. Reset if open.
	2. Blown Electric Motor Fuse	Check 175 amp Electric Motor Fuse. Replace if blown.
	3. Faulty Battery Charger	Check the voltage output of the Battery Charger. If less than 24 VDC, repair and replace.
	4. Faulty Battery (ies)	After completely charging Batteries, test each Battery. Replace as required.
	5. Faulty Electric Motor	While operating the steering function, check voltage across the Electric Motor terminals. If 24 VDC is present, replace the Motor.
	6. Faulty Motor Relay	While operating the steering, check voltage across the coil terminals of Motor Relay. If no voltage is present, proceed with step 7. If 20 VDC or more, check continuity across the contact terminals of Motor Relay while still operating the steering function. If there is no continuity, replace the defective Motor Relay.
	7. Emergency Stop Switch failed open	With the Emergency Stop Switch in the ON position, check continuity across the contacts. If none, replace.
All functions inoperable. Electric Motor starts when control is actuated.	1. Hydraulic Reservoir low	Check hydraulic fluid level, top off as required.
	2. Faulty Hydraulic Pump	Check pressure and delivery of the Hydraulic Pump. Replace if required.
	3. Faulty Controller	Check operation. Replace switch if required.
	4. Proportional Valve	Check operation. Replace if required.
Electric Motor continues to run after controls are returned to the OFF position.	Motor relay contacts fused together	Check operation, replace if required. With 0 voltage at the coil terminals of the Motor Relay (CR1) check continuity across the contact terminals. If there is continuity, replace the Motor Relay.
Steering inoperable or functions sluggishly.	1. Faulty Steering Switch	Test Steering Switch for continuity. Replace if defective.
	2. Mechanical damage	Inspect all steering components. Replace damaged parts.
	3. Steering Valve stuck	Inspect Steering Valve. If spool is sticking, replace.
	4. Steering Cylinder piston seal leaking	Check Steering Cylinder for leakage from one port to another. Repair as required.
	5. Steering Relief	Adjust the relief valve, if not adjustable replace.
Work Platform will not steer right.	1. Faulty Steering Switch	Test Controller Switch for continuity. Replace if defective.
	2. Faulty Diode	Test Diode. Replace if defective.
	3. Faulty Steer Right Solenoid	Test Steer Right Solenoid. If the proper voltage is present and the coil is not magnetized, replace.
Work Platform will not steer left.	1. Faulty Steer Switch	Test Steering Switch for continuity. Replace if defective.
	2. Faulty Diode	Test Diode. Replace if defective.
	3. Faulty Steer Left Solenoid	Test Steer Left Solenoid. If the proper voltage is present and the coil is not magnetized, replace.
Work Platform will not drive forward or reverse. Lift function operable.	1. Faulty Drive/Lift Selector Switch	Check continuity of Drive/Lift Switch. Replace if defective.
	2. Faulty Drive/Lift Valve	Check the Drive/Lift Valve. If the spool is not shifting, replace the valve.
	3. Mechanical failure	Inspect Drive Motor shafts, hubs, and keys.
	4. Worn Drive Motors	Check hydraulic pressure being delivered to the Drive Motors. If sufficient, replace Drive Motors.
No high speed drive.	1. Faulty Relay	Test Relay (CR4). Replace if faulty.
	2. Faulty Down Limit Switch	Check Switch for continuity. Replace if faulty.
	3. Faulty Proportional Coil/Valve	Test coil and valve. Replace if defective.
No drive forward but drives in reverse. Lift function operable.	1. Faulty Drive/Lift Selector Switch	Test Drive/Lift Switch for continuity. Replace if faulty.
	2. Faulty Counterbalance Valves	Check pressure of Counterbalance Valves. Replace or reset valves as required.
No drive forward but drives in reverse. No lift function.	1. Faulty Drive/Lift Selector Switch	Test Drive/Lift Switch for continuity. Replace if faulty.
	2. Faulty Controller	Check operation of controller switch. Replace if required.
	3. Faulty Up/Fwd Relay	Test Relay. Replace if faulty.

Table 4-1: Cause and Remedy (Continued)

TROUBLE	PROBABLE CAUSE	REMEDY
No drive reverse but drives in forward. Lift function operable.	1. Faulty Drive/Lift Selector Switch	Test Drive/Lift Switch for continuity. Replace if faulty.
	2. Faulty Diode	Test Diode. replace if faulty.
	3. Faulty Reverse Coil	Test Reverse Coil, if proper voltage is present and coil is not magnetized, replace.
	4. Faulty Counterbalance Valves	Check pressure of Counterbalance Valves. Replace or reset valves as required.
No drive reverse but drives in forward. No lift functions.	1. Faulty Drive/Lift Selector Switch	Test Drive/Lift Switch for continuity. Replace if faulty.
	2. Faulty Controller	Check operation of Controller Switch. Replace if required.
	3. Faulty Down/Reverse Relay	Test Relay, replace if faulty.
Platform will not elevate or elevates slowly.	1. Emergency Down Valve open	Close Emergency Down Valve.
	2. Platform overloaded	Observe maximum load rating.
	3. Faulty Diode	Test Diode, replace if faulty.
	4. Faulty Lift Valve Coil	Test Lift Valve Coil. If proper voltage is present and coil is not magnetized, replace.
	5. Faulty Drive/Lift Selector Switch	Test Drive/Lift Switch for continuity. Replace if faulty.
	6. Lift Relief Valve out of adjustment or faulty	Adjust the Lift Relief Valve. If not adjustable, replace.
	7. Drive/Lift Valve sticking	Replace the Lift Valve.
	8. Faulty Up/Fwd Relay	Test Relay, replace if faulty.
	9. Faulty Controller	Check operation of Controller. Replace if required.
	10. Faulty Lift Flow Control	Replace Flow Control.
Platform drifts down after being elevated.	1. Emergency Lowering/Down Valve partly open or faulty	Ensure that the Emergency Lowering Valve is completely closed. Replace the valve.
Platform will not lower. Drive function operable.	1. Faulty Down Valve Coil	Test Down Valve Coil. If proper voltage is present and coil is not magnetized, replace.
	2. Faulty Drive/Lift Selector Switch	With the Drive/Lift Switch in the LIFT position, check continuity. Replace if defective.
	3. Down Valve stuck	Replace the Down Valve.
	4. Plugged Down Orifice	Remove and clean orifice.
	5. Velocity Fuse Valve sticking or frozen	Repeat lifting and lowering platform to warm oil, if possible move machine out of cold environment, replace the Velocity Fuse Valve.
Motion Alarm does not sound.	1. Faulty Down Alarm	Check voltage to Down Alarm. If proper voltage is present, replace the Alarm.
	2. Faulty Relay	Test Relay. Replace if faulty.
Brake will not release.	1. Brake Orifice plugged	Remove and clean Orifice.
	2. Faulty Brake Cylinder	Check and replace seals in Brake Cylinder.
	3. Brake out of adjustment	Adjust nut to disengage brakes from tires when driving <b>only</b> .
Brake will not lock wheel.	1. Brake Orifice plugged	Remove and clean Orifice.
	2. Faulty Brake Cylinder	Check and replace seals in Brake Cylinder.
	3. Brake out of adjustment	Adjust nut so brakes fully engage tires when not driving.



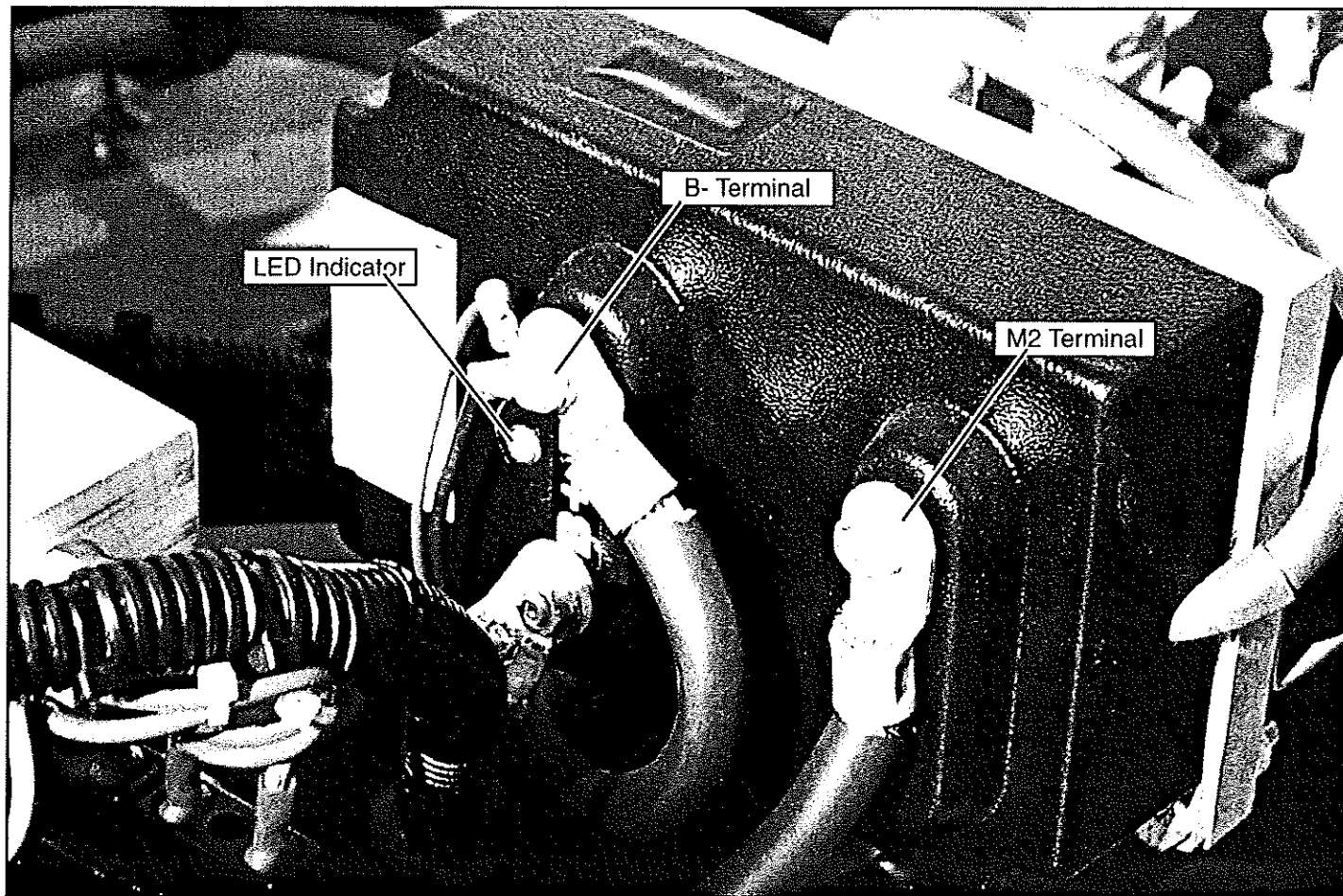
### 4.3 UPRIGHT MOTOR CONTROLLER DIAGNOSTICS

Batteries must be fully charged before troubleshooting.

Check/Repair all connections before replacing any components

**Table 4-2:** Motor Controller Diagnostics

Flash Code	Meaning	Status	Corrective Action
LED on	Power to the controller and the controller is operational.	System is functional	None.
LED off	No power to the controller, or internal fault in the controller.	Battery cables not connected properly; Failed controller	Check battery cable connections. Replace the controller.
2 Flash	Procedural fault.	Lift, drive, or steer switch is engaged at startup; Drive/Lift Switch rotated while operating	Cycle the control handle through neutral to clear fault.
3 Flash	Controller senses B- at the M2 terminal.	Short circuit at the motor; M2 cable in contact with B- cable; Short circuit within controller	Check cable routing and connections. Test terminals for source of B-. Replace the controller
4 Flash	Controller senses B+ at the M2 terminal before engaging the motor start relay.	B+ cable routed incorrectly; M2 cable making contact with B+ cable; Motor start relay contacts welded closed.	Check cable routing and connections. Test terminals for source of B+. Replace the motor start relay.
5 Flash	Controller senses open circuit at M2 after engaging the motor start terminal.	Cables loose or not connected; Faulty motor start relay	Check the cable routing and connections. Check the signal from motor controller to relay. Check/replace the motor start relay.
6 Flash	Faulty signal from control handle or I/O board.	Faulty control handle; Wiring error	If upper controls are affected, check/replace the control handle. If lower controls are affected, check/replace the I/O board.
7 Flash	Battery voltage below 12V or above 45V.	Dead batteries; Bad cable connections	Check batteries and cable connections.
8 Flash	Thermal cut-off.	Controller is overheated due to overuse or other failure	Allow system to cool. Locate and repair other source of overheat.



## 4.4 MEASURED VOLTAGE AT I/O BOARD

**Table 4-3:** I/O Board Voltage

CONNECTOR	PIN NUMBER	DESCRIPTION
J1	1	24 Volts = Lift Mode Active / 0 Volts = Lift Mode inactive
	2	No Connection
	3	24 Volts = Drive Allowed / 0 Volts = Drive Not Allowed
	4	24 Volts from Lower E-Stop / Lower E-Stop Not Depressed
	5	24 Volts from Upper E-Stop / Lower and Upper E-Stops Not Depressed
	6	24 Volts Out to Interlock Lever when Upper Controls Selected & Upper/Lower E-Stops Not Depressed
	7	No Connection
	8	24 Volts = Drive Forward or Lift Up / 0 Volts = Stop Drive Forward or Lift Up
	9	24 Volts = Drive Reverse or Lift Down / 0 Volts = Stop Reverse Drive or Lift Down
	10	Accelerator Input / 20K Pot / 3.5 Volts to 0 Volts, Minimum to Maximum Speed
	11	24 Volts = Steer Left / 0 Volts = Stop Steer Left
	12	24 Volts = Steer Right / 0 Volts = Stop Steer Right.
J2	1	Goes to 0 Volts to Activate Depression Mechanism Extend Solenoid / 24 Volts = Solenoid OFF
	2	No Connection
	3	24 Volt Supply for Solenoids
	4	Goes to 0 Volts to Activate Forward Solenoid / 24 Volts = Solenoid OFF
	5	Goes to 0 Volts to Activate Reverse Solenoid / 24 Volts = Solenoid OFF
	6	Goes to 0 Volts to Activate Lift Up Solenoid / 24 Volts = Solenoid OFF
	7	Goes to 0 Volts to Activate Steer Left Solenoid / 24 Volts = Solenoid OFF
	8	Goes to 0 Volts to Activate Steer Right Solenoid / 24 Volts = Solenoid OFF
J3	1	Goes to 0 Volts to Activate Alarm / 24 Volts = Alarm OFF
	2	24 Volts = Tilt Inactive / 0 Volts = Tilt Active
	3	24 Volt Supply for Alarm, Tilt Sensor, Lift Down and Depression Mechanism Retract Solenoids
	4	24 Volts = Below Height Limit / 0 Volts = Above Height Limit
	5	Goes to 0 Volts to Activate Lift Down Solenoid / 24 Volts = Solenoid OFF
	6	Goes to 0 Volts to Activate Depression Mechanism Solenoid / 24 Volts = Solenoid OFF
	7	24 Volts = High Speed Active / 0 Volts = Low Speed Active
	8	Battery Negative Supply for Tilt Sensor
J4	1	Goes to 0 Volts to Activate Line Contactor / 24 Volts = Line Contactor OFF
	2	Supplies 24 Volts to Upper Control / Lower Control Switch
	3	24 Volts = Lower Control Mode
	4	Supplies 24 Volts to Ground Lift Switch when in Lower Control Mode
	5	24 Volt Supply Output
	6	Goes to 0 Volts to Activate Hour Meter / 24 Volts = Hour Meter Not Activated
	7	24 Volts = Lift Up from Ground Control / 0 Volts = Lift Up OFF
	8	24 Volts = Lift Down from Ground Control / 0 Volts = Lift Down OFF
	9	24 Volt Supply Input from Battery via Lower E-Stop / Lower E-Stop Not Depressed
	10	24 Volts from Upper Control Switch / 24 Volts = Upper Control Mode
	11	Battery Negative Input to I/O Board
	12	24 Volt Supply for Hour Meter and Line Contactor
J5	1	24 Volts power to Pin 1 of SC1000 (Key ON Power)
	2	24 Volts = Command Controller to Drive / 0 Volts = Stop Controller Drive
	3	24 Volts = Command Controller to Steer / 0 Volts = Steer OFF
	4	24 Volts = Command Controller to Lift / 0 Volts = Stop Lift
	5	24 Volts = Command Normal Speed / 0 Volts = Command Speed Cutback
	6	24 Volts = Line Contactor OFF / 0 Volts = Line Contactor ON
	7	24 Volts = No Direction Solenoid Allowed / 0 Volts = Direction Solenoid Allowed to Activate
	8	Accelerator 3.5 Volts to 0 Volts / Minimum to Maximum Speed

# 4.5 ELECTRIC

Table 4-4: Electrical Truth Table

Component	Function	Lower Controls	Upper Controls	Drive Forward	Drive Reverse	High Speed	Creep Speed	Raise Platform	Lower Platform	Steer Left	Steer Right	Depression Mechanism Extend	Depression Mechanism Retract	Brakes	Tilt Alarm	Down Alarm	Battery Charge
ALM - Alarm									X						X	X	
BAT - Batteries		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
CHG - Battery Charger																	X
F1 - 5 AMP Circuit Breaker		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
F2 - 175 AMP Fuse		X	X	X	X	X	X	X	X	X	X	X	X	X			
HM - Hour Meter/Low Voltage Indicator																	
I/O - I/O Board		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
MC - Motor Control		X	X	X	X	X	X	X	X	X	X	X	X	X			
MOT - Motor		X	X	X	X	X	X	X	X	X	X	X	X	X			
R1 - Motor Relay		X	X	X	X	X	X	X	X	X	X	X	X	X			
S1 - Chassis Emergency Stop Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
S2 - Chassis Lift Switch								X	X								
S3 - Chassis Key Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
S4 - Proximity Switch						X	X										
S5 - Lift/Drive Selector Switch			X	X	X			X	X								
S6 - Platform Emergency Stop Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
S7 - Interlock Switch		X	X	X	X	X	X	X	X	X	X	X	X				
S8 - PQ Control Handle			X	X	X			X	X								
S9 - Platform Steering Switch (2)										X	X						
SNSR - Tilt Sensor		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
SOL1 - Steering Solenoid (right)											X						
SOL2 - Steering Solenoid (left)										X							
SOL3 - Platform Lift Solenoid								X									
SOL4 - Reverse Solenoid					X												
SOL5 - Forward Solenoid				X													
SOL6 - Depression Mechanism Extension Solenoid												X					
SOL7 - Down Solenoid									X								
SOL8 & SOL9 - Depression Mechanism Retraction Solenoid													X				

# 4.6 HYDRAULIC

Table 4-5: Hydraulic Truth Table - Model

Component	Function	Raise Platform	Lower Platform	Steer Right	Steer Left	Drive Forward	Drive Reverse	Creep	Depression Mechanism Extend	Depression Mechanism Retract	Brakes
CV - Check Valve									X	X	
CYL1 - Steering Cylinder				X	X						
CYL2 - Lift Cylinder	X										
CYL3 - Depression Mechanism Cylinders (2)									X	X	
CYL4 - Break Cylinder											X
FD - Priority Flow Divider	X			X	X	X	X	X	X	X	X
FL1 - Suction Strainer	X			X	X	X	X	X	X	X	
FL2 - Return Filter	X			X	X	X	X	X	X	X	
MOT - Drive Motors (2)						X	X				
PMP - Pump	X			X	X	X	X	X	X	X	
RV1 - Main Relief Valve	X					X	X	X	X	X	X
RV2 - Steering Relief Valve				X	X						
TNK - Tank											
V1 - Steering Right/Left Valve				X	X						
V2 - Lift Valve	X										
V3 - Down/Emergency Lowering Valve			X								
V4 - Depression mechanism Retract Valve										X	
V5 - Depression Mechanism Extend Valve									X		
V6 - Forward/Reverse Valve						X	X				
V7 - Counterbalance Valve						X	X	X			X

# SCHEMATICS

## 5.1 INTRODUCTION

This section contains electrical and hydraulic power schematics and associated information for maintenance purposes.

The diagrams are to be used in conjunction with the *Troubleshooting Truth Tables* in **Section 4**. They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding during troubleshooting analysis.

The components that comprise the electrical and hydraulic systems are given a reference designation and are explained as to function and location in the following tables.

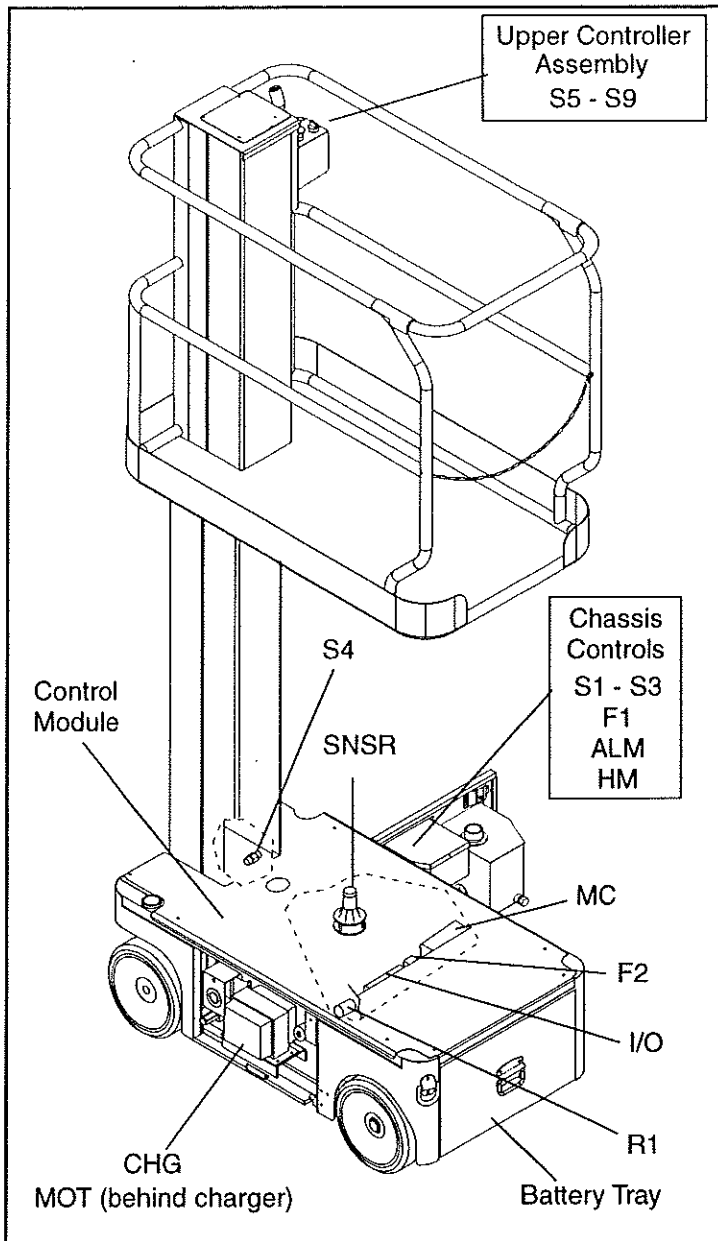
### CONTENTS

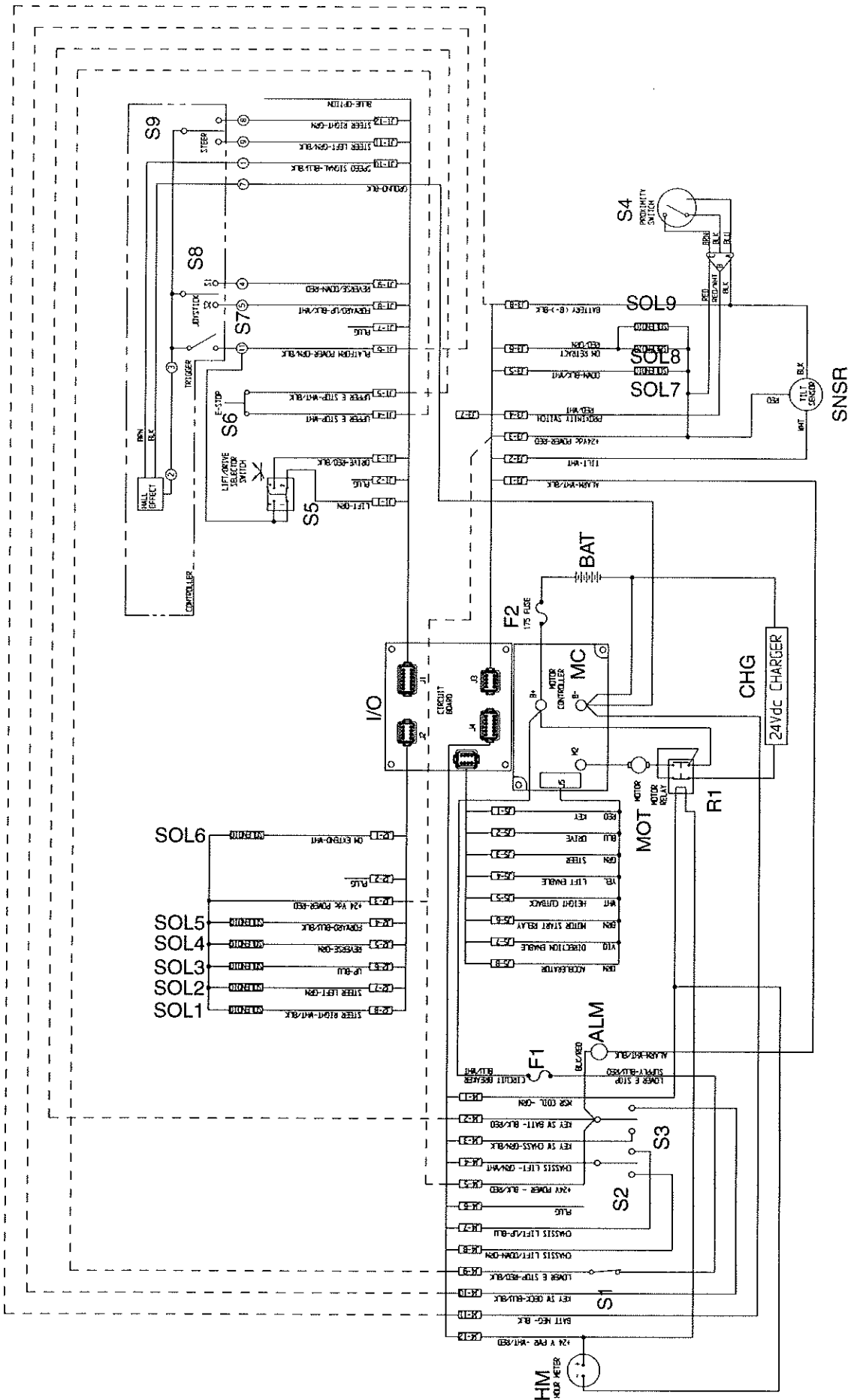
5.2 Electric .....	5-2
Electric Schematic (107016-000) .....	5-2
5.3 Hydraulic Schematic .....	5-4
Hydraulic Schematic Legend (107015-000) .....	5-4

# 5.2 ELECTRIC

**Legend:** Electric Schematic (107016-000)

DESIGNATION	NAME	FUNCTION	LOCATION
ALM	Alarm	Provides warning sound	Chassis Controls
BAT	Batteries	Provides power to work platform	Battery Tray
CHG	Battery Charger	Charges battery	Control Module
F1	5 AMP Circuit Breaker	Electrical overload protection	Chassis Controls
F2	175 AMP Fuse	Overload protection for electric motor	Control Module
HM	Hour Meter	Indicates hours of use and low battery voltage.	Chassis Controls
I/O	I/O Board	Connection point for machine function wiring	Control Module
MC	Motor Control	Controls the speed of electric motor	Control Module
MOT	Motor	Provides power to hydraulic pump	Control Module
R1	Motor Relay	Controls the speed of the electric motor	Control Module
S1	Chassis Emergency Stop Switch	Shuts down all machine functions	Chassis Controls
S2	Chassis Lift Switch	Elevates platform	Chassis Controls
S3	Chassis Key Switch	Allows some machine functions to be initiated from ground level	Chassis Controls
S4	Proximity Switch	Provides high speed cutout	Control Module
S5	Lift/Drive Selector Switch	Activates lift or drive functions	Platform Controls
S6	Platform Emergency Stop Switch	Shuts down all machine functions	Platform Controls
S7	Interlock Switch	Safety mechanism for PQ Control Handle	Platform Controls
S8	PQ Control Handle	Proportionally controls the drive and lift functions	Platform Controls
S9	Platform Steering Switch (2)	Control left and right steering solenoids	Platform Controls
SNSR	Tilt Sensor	Activates tilt alarm	Control Module
SOL1	Steering Solenoid (right)	Shifts steering valve to the left	Hydraulic Manifold
SOL2	Steering Solenoid (left)	Shifts steering valve to the right	Hydraulic Manifold
SOL3	Platform Lift Solenoid	Raises platform	Hydraulic Manifold
SOL4	Reverse Solenoid	Shifts forward/reverse valve to reverse	Hydraulic Manifold
SOL5	Forward Solenoid	Shifts forward/reverse valve to forward	Hydraulic Manifold
SOL6	Depression Mechanism Extension Solenoid	Extends depression mechanism bars	Hydraulic Manifold
SOL7	Down Solenoid	Lowers platform	Lift Cylinder
SOL8 & SOL9	Depression Mechanism Retraction Solenoid	Retracts depression mechanism bars	Depression Mechanism cylinder

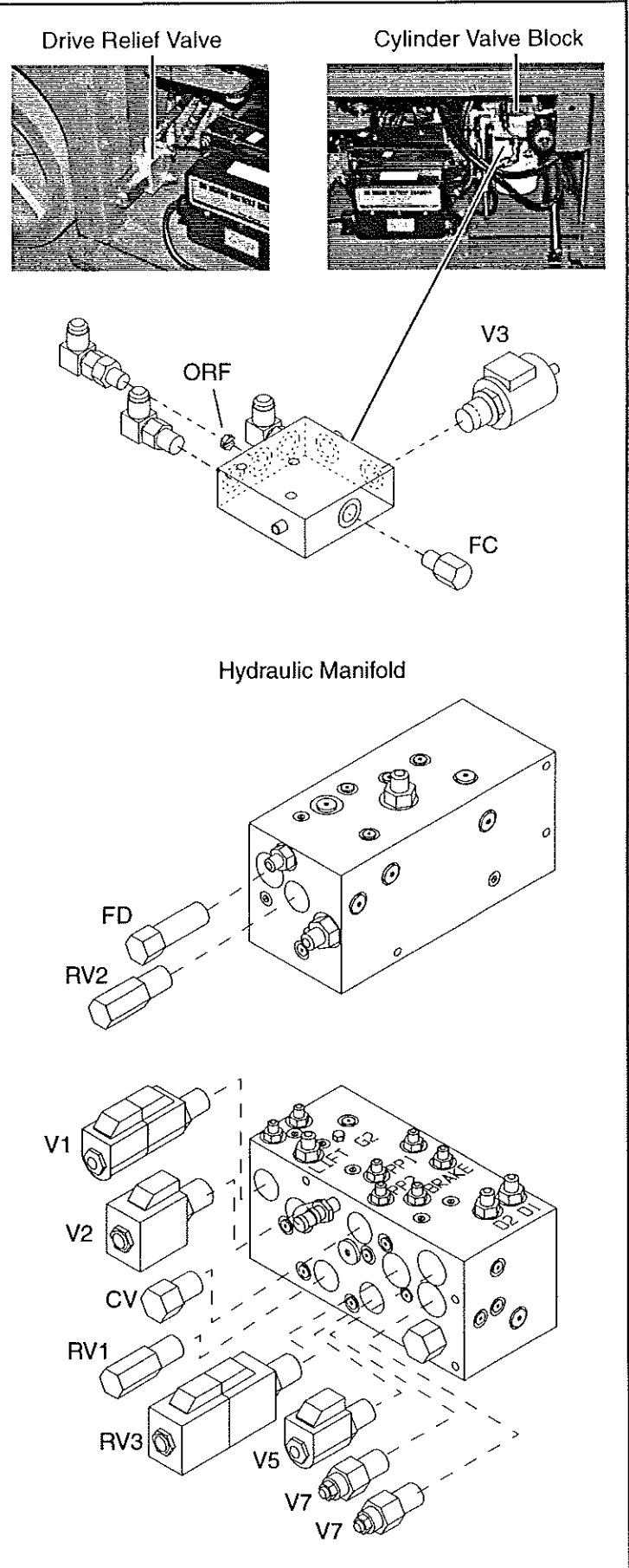




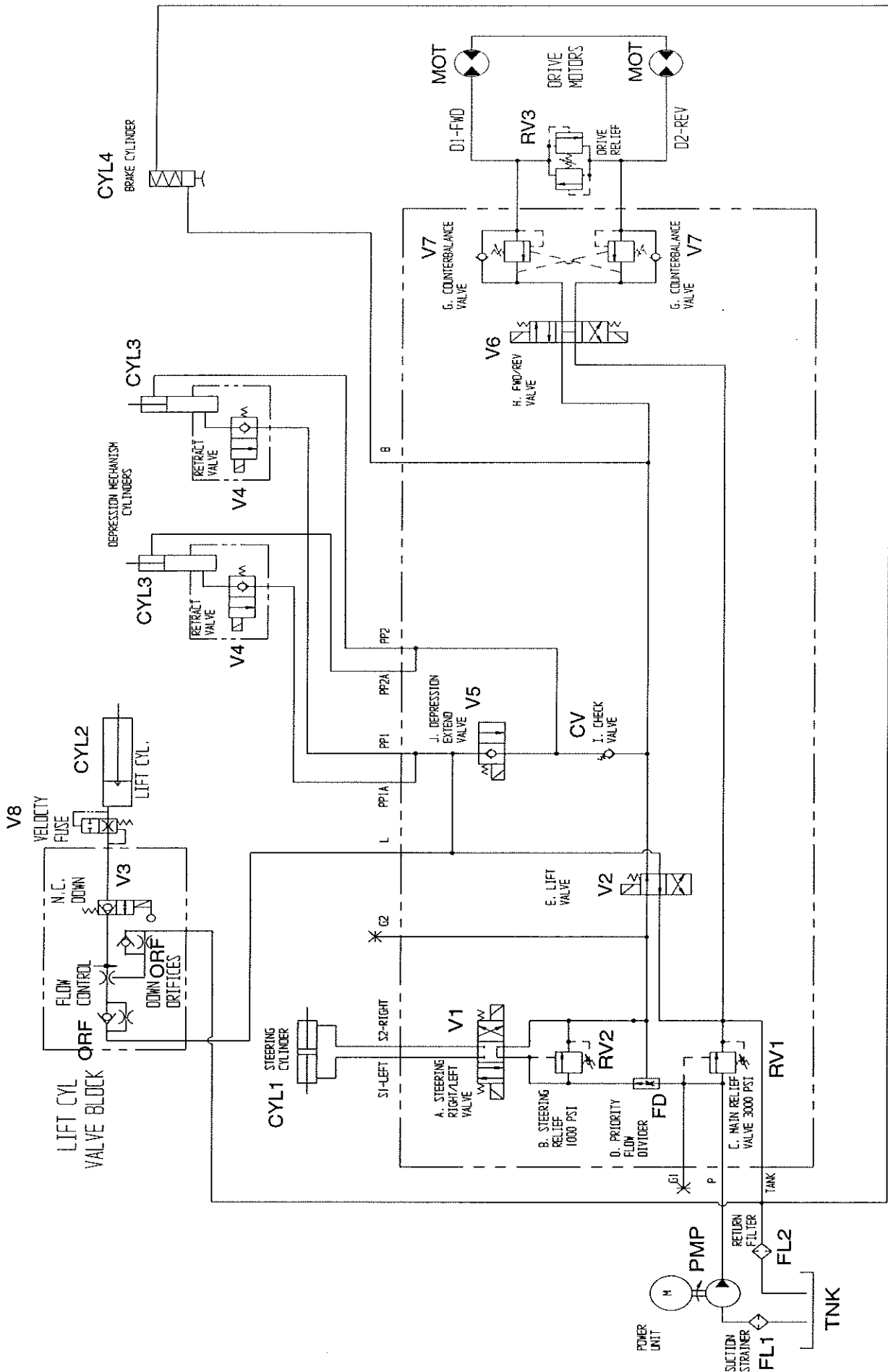
# 5.3 HYDRAULIC SCHEMATIC

**Legend:** Hydraulic Schematic Legend (107015-000)

DESIGNATION	NAME	FUNCTION	LOCATION
CV	Check Valve	Allows Depression Mechanism to retract in drive mode	Hydraulic Manifold
CYL1	Steering Cylinder	Provides force to turn front wheels	Mid-chassis
CYL2	Lift Cylinder	Provides force to lift platform	Mounted inside Mast Assembly
CYL3	Depression Mechanism Cylinders (2)	Extends or retracts DM bar	Mid-chassis
CYL4	Brake Cylinder	Stops machine from moving while parked	Battery Compartment
FC	Flow Control	Control Elevation Rate	Lift Cylinder Block
FD	Priority Flow Divider	Provides priority oil flow to steering	Hydraulic Manifold
FL1	Suction Strainer	Traps particles in hydraulic tank	Inside hydraulic tank at outlet
FL2	Return Filter	Filters oil returning to tank	Left side, rear of Charger
MOT	Drive Motors (2)	Provides tractive effort to move platform	Front Motor Mounts
ORF	Down Orifice (2)	Control descent rate	Lift Cylinder Block
PMP	Pump	Provides hydraulic pressure for all functions	On Electric motor, left side, behind charger
RV1	Main Relief Valve	Provides pressure protection to pump, limits platform load capacity.	Hydraulic Manifold
RV2	Steering Relief Valve	Provides pressure protection to pump and steering components when steering	Hydraulic Manifold
RV3	Drive Relief Valve	Provides pressure protection to Pump and Drive components	Left side, forward of Charger
TNK	Tank	Holds hydraulic oil	Right Side Door
V1	Steering Right/Left Valve	Provides directional control for steering	Hydraulic Manifold
V2	Lift Valve	Provides oil control for drive or lift functions	Hydraulic Manifold
V3	Down/Emergency Lowering Valve	Allows oil to return to tank; manually operated for emergency lowering	Lift Cylinder Block
V4	Depression mechanism Retract Valve	Provides oil control for DM bar	DM Cylinder
V5	Depression Mechanism Extend Valve	Provides oil control for DM bar	Hydraulic Manifold
V6	Forward/Reverse Valve	Provides oil control for drive or lift functions	Hydraulic Manifold
V7	Counterbalance Valve	Prevents machine from running away on slopes; cushions stops	Hydraulic Manifold
V8	Velocity Fuse Valve	Lock lift cylinder if line breaks	Lift Cylinder Block







NOTES:

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# ILLUSTRATED PARTS BREAKDOWN

## 6.1 INTRODUCTION

This section lists and illustrates the replaceable assemblies and parts of this product, as manufactured by UpRight, Inc.

Each parts list contains the component parts for that assembly.

### CONTENTS

Final Assembly		PQ Controller	
107000-000 .....	6-2	065512-000 .....	6-16
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107002-000 .....	6-10	107006-000 .....	6-20
Chassis Assembly, 4 of 4		Hydraulic Tank Assembly	
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Hose Kit		Label Kit	
107011-000 .....	6-12	107012-000 .....	6-22
Control Valve Assembly		Voltage/Hourmeter Option	
101120-021 .....	6-14	107032-000 .....	6-23
Controller Assembly			
107010-000 .....	6-15		

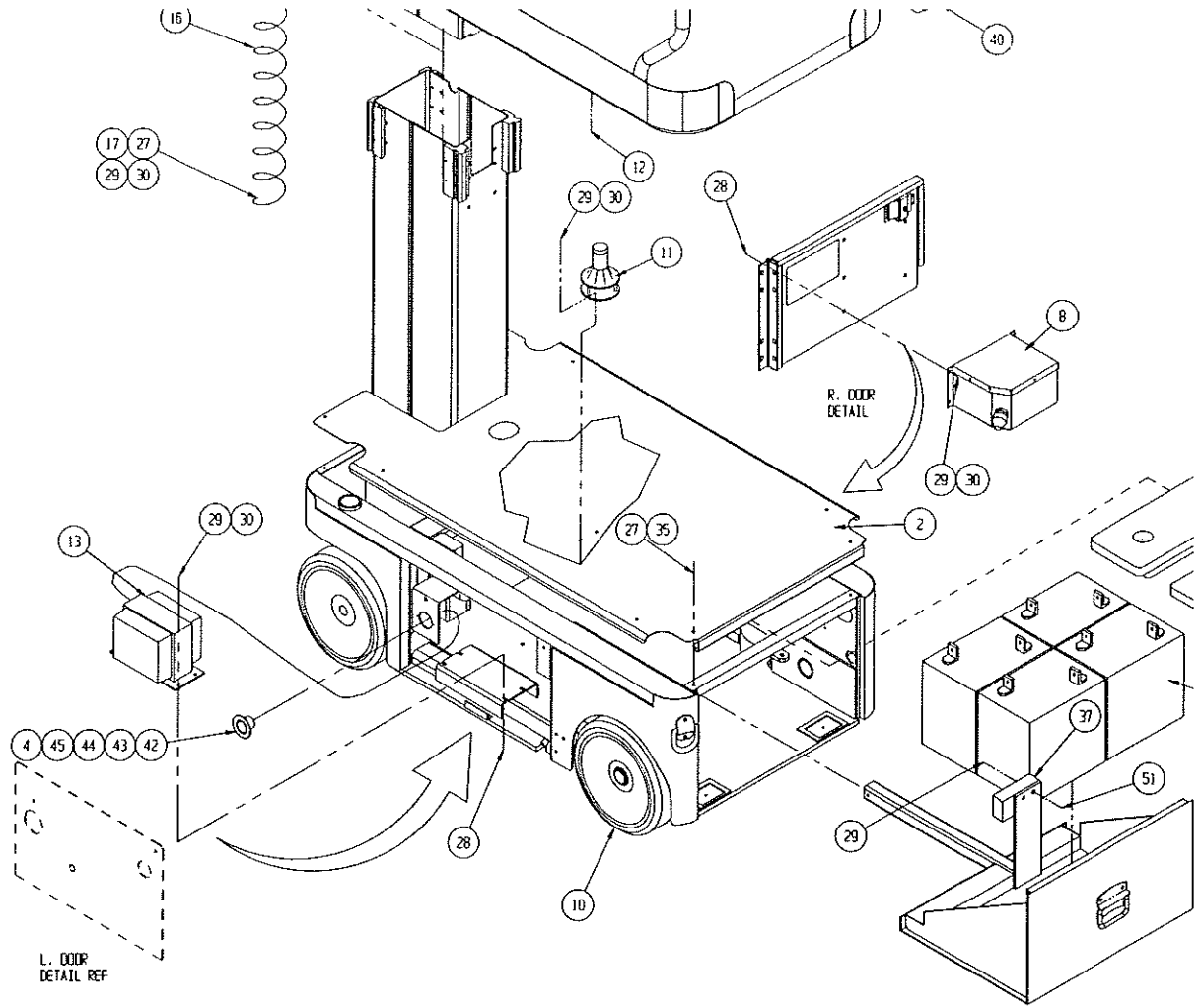
## Final Assembly

107000-000

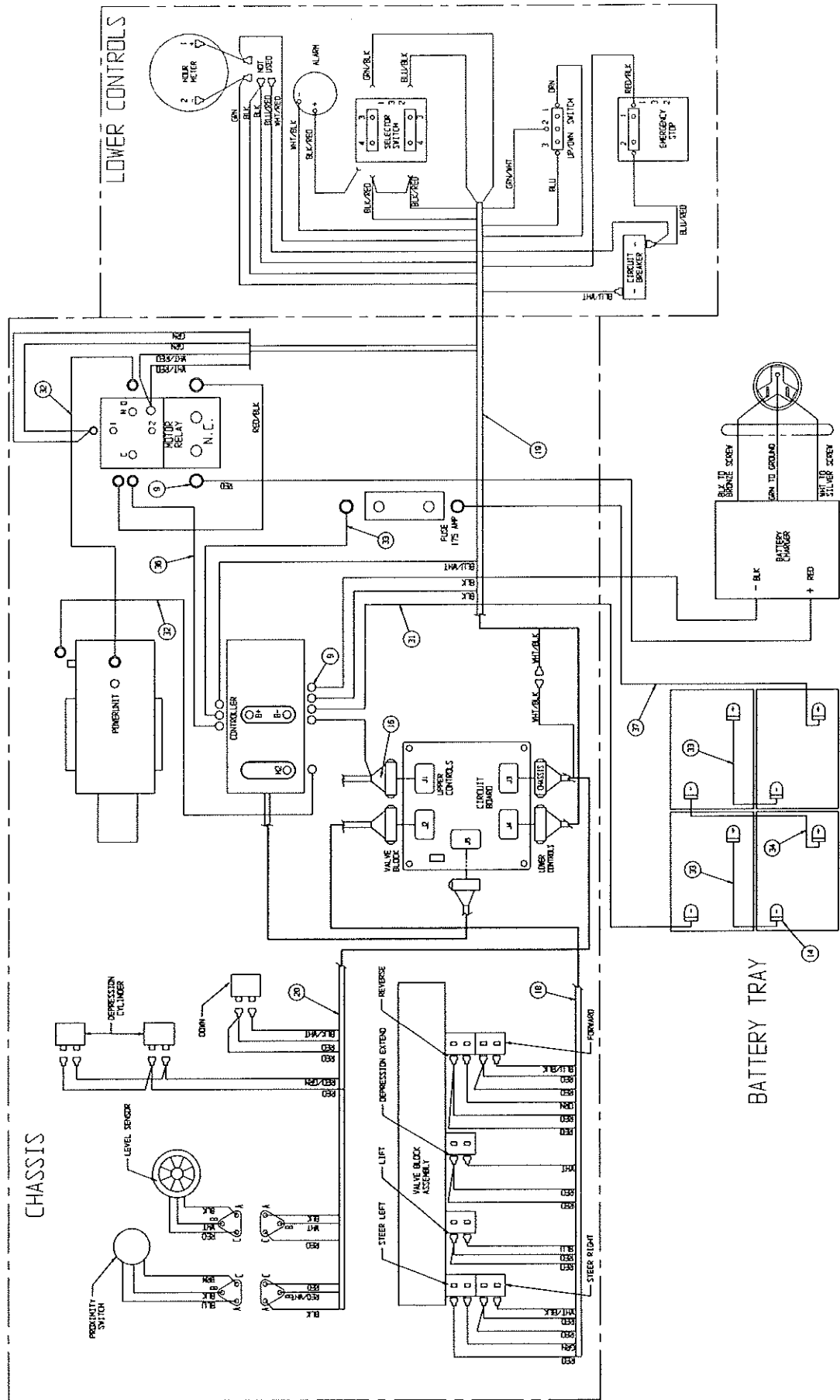
ITEM	PART NO.	DESCRIPTION	QTY
1	065543-000	COVER 4M	1
2	065536-000	TOP COVER	1
3	065580-001	PLATFORM WELDMENT	1
4	011240-001	WASHER #6	2
5	107012-000	DECAL KIT INSTL (NOT SHOWN)	1
6	107011-000	HOSE KIT (NOT SHOWN)	1
7	107010-000	CONTROLLER ASSY	1
8	107008-000	ELEC. BOX ASSY	1
9	029601-020	CONN RING 10-12 GA 1/4	2
10	107001-000	BASIC ASSY	1
11	029945-020	LEVEL SENSOR ASSY	1
12	010080-006	T-CLIP	4
13	063944-001	BATTERY CHARGER	1
14	010154-001	COVER BATTERY TERMINAL	8
15	015796-000	BATTERY 6V	4
16	107009-000	CONTROL CABLE ASSY	1
17	013919-018	CLAMP	2
18	107192-000	VALVE BLOCK CABLE ASSY	1
19	107193-000	LOWER CONTROL CABLE ASSY	1
20	107194-000	CHASSIS CABLE ASSY	1
21	011240-005	WASHER 5/16 STD FLAT	4
22	011248-005	LOCKNUT 5/16-18UNC HEX	2
23	011253-006	SCREW 5/16-18UNC HHC X 3/4	2
24	026616-008	NIPPLE 1 CHASE	1
25	029939-004	LOCKNUT 1 NPT	1

ITEM	PART NO.	DESCRIPTION	QTY
26	013923-004	SCREW #10 SLFTP X 1/2	4
27	011252-006	SCREW 1/4-20UNC HHC X 3/4	9
28	011829-006	BOLT 1/4-20UNC CARRIAGE X 3/4	7
29	011248-004	LOCKNUT 1/4-20UNC HEX	9
30	011240-004	WASHER 1/4 DIA STD FLAT	6
31	101182-006	BATTERY CABLE ASSY 5/16-5/16 X 50	1
32	062125-016	BATTERY CABLE ASSY 5/16-3/8 X 16	2
33	064195-008	BATTERY CABLE ASSY 5/16-5/16 X 8	3
34	064195-014	BATTERY CABLE ASSY 5/16-5/16 X 14	1
35	014252-004	NUTSERT 1/4-20 UNC	4
36	064195-018	BATTERY CABLE ASSY 5/16-5/16 X 18	1
37	101182-005	BATTERY CABLE ASSY 5/16-5/16 X 43	1
38	107188-000	CYL TUBE ASSY (NOT SHOWN-SEE HOSE KIT)	1
39	065369-001	HOSE GUARD X 18 (NOT SHOWN-SEE HOSE KIT)	2
40	063133-005	GUARD CHAIN ASSY	1
42	029961-000	RECEPTACLE	1
43	011715-006	SCREW MACH #6-32 RD HD X 3/4 LG	2
44	011248-047	NUT #6-32 ESNA	2
45	029961-001	SEAL	1
46	107081-000	WELDMENT BALLAST	2
47	107015-000	HYD SCHM	REF
48	107016-000	ELEC SCHM	REF
50	110010-000	SPECIFICATION SHEET	REF
51	011252-012	SCREW 1/4-20 X 1 1/2	2

**Illustrated Parts Breakdown - Final Assembly**



**Drawing # 1 of 2**



**NOTES:**

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Basic Assembly

107001-000

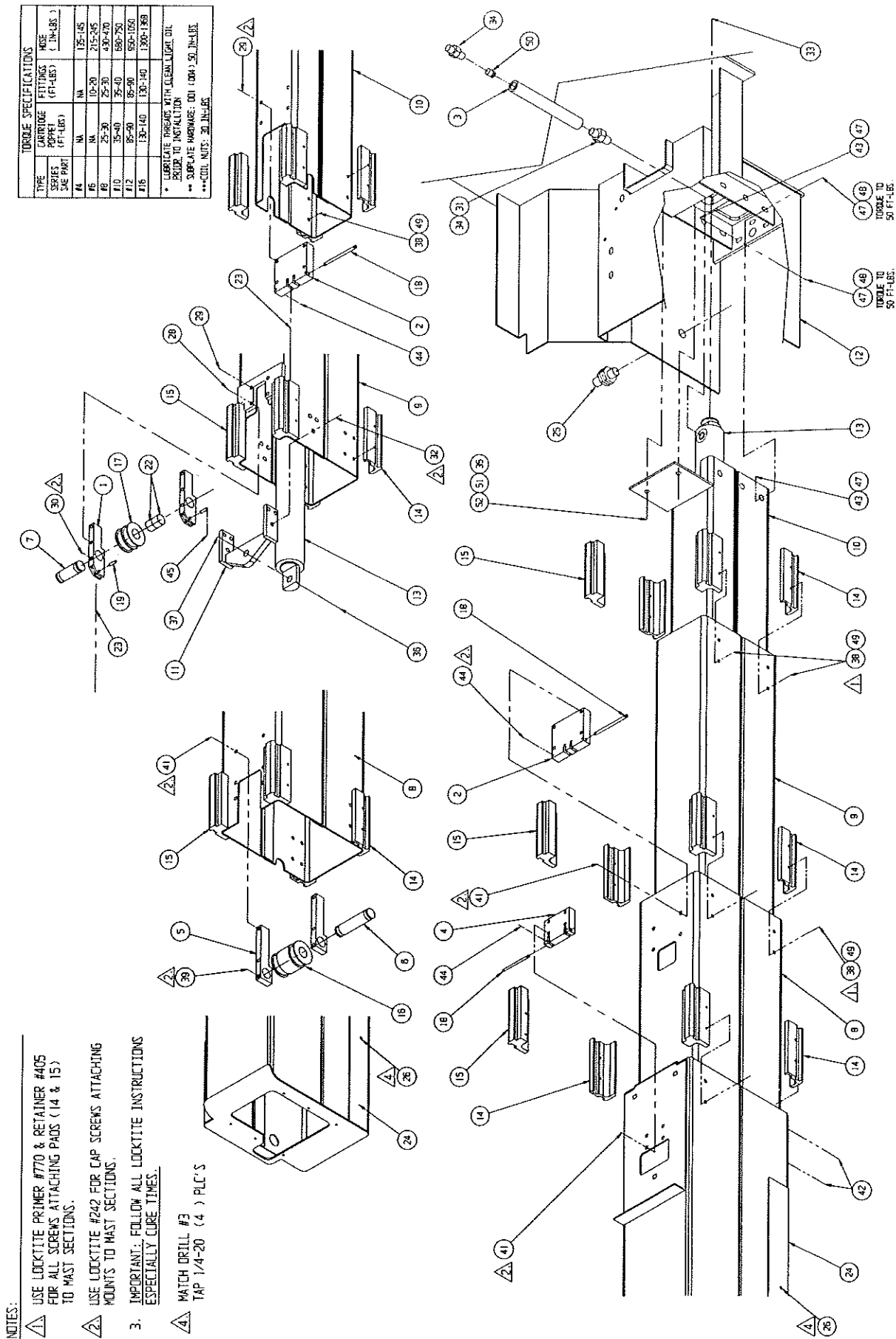
ITEM	PART NO.	DESCRIPTION	QTY
1	065562-001	INNER MOUNT	2
2	065561-001	ANCHOR INNER	2
3	065552-000	ADAPTER	1
4	065542-001	OUTER ANCHOR	1
5	065540-000	OUTER MOUNT	2
6	065539-001	OUTER AXLE	1
7	065538-001	INNER AXLE	1
8	065491-001	SECOND INNER MAST WEDMENT 4M	1
9	065488-001	LOWER INNER MAST WELDMENT	1
10	065485-003	BASE MAST WELDMENT	1
11	065450-001	CYL. BAR & PAD WELDMENT	1
12	107002-000	CHASSIS ASSY MAST LIFT	1
13	065398-003	CYL LIFT TM12	1
14	065389-000	FRONT PAD	12
15	065388-000	REAR PAD	12
16	065387-001	PULLEY OUTER	1
17	065386-001	PULLEY INNER	1
18	065383-001	PIN	3
19	065382-001	ANCHOR PIN	2
22	062642-019	BEARING 7/8 ID X 3/4 LG	2
23	062167-103	CHAIN LEAF	4
24	065580-001	PLATFORM WELDMENT	REF
25	065366-020	SWITCH, PROXIMITY ASSY	1
26	013336-011	GREASE ZERK	4

ITEM	PART NO.	DESCRIPTION	QTY
28	011828-010	SCREW, 1/4-20 X 1 1/4 FH	2
29	011821-006	SCREW, 1/4-20 X 3/4 BH	6
30	012553-012	SCREW 1/4-20UNC SOC HD x 1 1/2	2
31	011979-006	O-RING	1
32	011253-004	SCREW 5/16-18UNC HHC X 1/2	6
33	013315-009	RING RETAINING	1
34	011941-009	FITTING STR 8MB-6MJ	2
35	011248-006	LOCKNUT 3/8-16UNC HEX	2
36	011248-008	LOCKNUT 1/2-13UNC HEX	1
37	011256-016	SCREW 1/2-13UNC HHC X 2	1
38	013923-004	SCREW #10-ABHWH X 1/2	44
39	012553-010	SCREW 1/4-20UNC SOC HD x 1 1/4	2
41	012553-006	SCREW 1/4-20UNC SOC HD X 3/4	12
42	026553-001	POP-RIVET 3/16 X 1/8 GRIP	4
43	011264-210	SCREW HHC GR8 3/8-24 UNF X 1 1/4	9
44	011735-005	ROLL PIN 1/8 x 5/8	6
45	011751-006	COTTER PIN 1/16 X 3/4	4
47	011239-006	WASHER, FLAT ASTM A325 3/8	18
48	011261-106	NUT, HEX GR8 3/8-24 UNF	9
49	013949-003	WASHER #10 EXT. STAR	44
50	063096-010	FUSE VELOCITY	1
51	011240-006	WASHER 3/8 STD FLAT	4
52	011254-032	SCREW, HHC. 3/8-16 X 4	2



TORQUE SPECIFICATIONS		
TYPE SCREWS	CARBIDE FIBRE PAPER (FT-LBS)	FINISH (IN-LBS)
#4	NA	NA
#6	NA	125-125
#8	10-20	215-245
#10	25-30	430-470
#12	35-40	55-60
#14	85-90	950-1050
#16	130-140	1300-1400

\* LUBRICATE THREADS WITH CLEAN LIGHT OIL PRIOR TO INSTALLATION  
 \*\* SUPPLATE MARKING: DOI (DIM) 50 IN-LBS  
 \*\*\* COIL NUTS: 30 IN-LBS



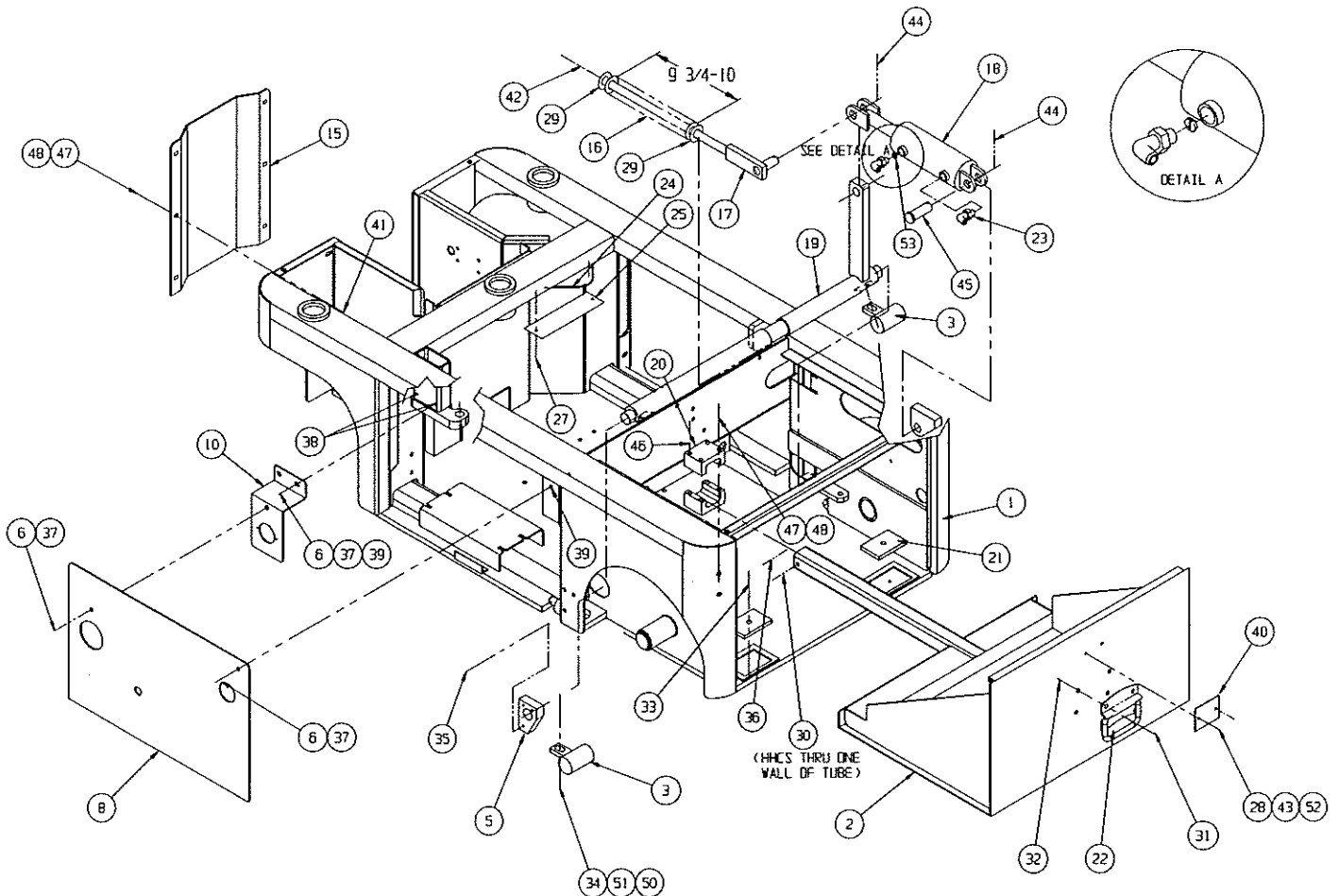
NOTES:

- 1. USE LOCKTITE PRIMER #770 & RETAINER #405 FOR ALL SCREWS ATTACHING PADS (14 & 15) TO MAST SECTIONS.
- 2. USE LOCKTITE #242 FOR CAP SCREWS ATTACHING MOUNTS TO MAST SECTIONS.
- 3. IMPORTANT: FOLLOW ALL LOCKTITE INSTRUCTIONS ESPECIALLY CURE TIMES.
- 4. MATCH DRILL #3 TAP 1/4-20 (4) PLCS

# Chassis Assembly, 1 of 4

107002-000

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1	107133-000	CHASSIS WELDMENT TM12	1	31	064397-003	NUT ACORN 10-24 NC	4
2	065465-000	BATTERY PAN WELDMENT	1	32	011709-004	SCREW MRDHD 10-24UNC x 1/2	4
3	065472-000	SHOE PARK BRAKE	2	33	026553-008	RIVET 3/16 X .501-.625 GRIP	2
5	065384-000	BRAKE BEARING	2	34	011256-012	SCREW HHC 1/2-13UNC x 1 1/2	2
6	011252-004	SCREW HHC 1/4-20 X 1/2 LG	4	35	014066-006	SCREW 1/4 AB x 3/4	6
8	107131-000	CHASSIS ACCESS PANEL	1	36	011248-004	NUT HEX 1/4-20 UNC	1
10	107153-000	BRACKET CHARGER CORD	1	37	011240-004	WASHER FLAT STD 1/4	4
15	065532-000	FRONT COVER	1	39	014252-004	NUTSERT 1/4-20	3
16	010121-010	SPRING COMPRESSION	1	40	065569-000	LATCH PLATE	1
17	065474-000	TENSION BAR WELDMENT	1	41	011830-006	BOLT CARRIAGE 5/16-18 x 3/4	6
18	065397-001	CYLINDER, BRAKE	1	42	011248-010	NUT HEX 5/8-11 UNC	1
19	065469-000	BRAKE ACTUATOR WELDMENT	1	43	011240-003	WASHER STD FLAT #10	1
20	065385-000	GUIDE PAD	2	44	011757-010	COTTER PIN, RUE RING, 3/4	2
21	065380-000	SLIDE PAD	2	45	011848-041	PIN 3/4 PIVOT	1
22	026541-016	HANDLE	1	47	011248-005	NUT HEX 5/16-18 UNC	10
23	011935-001	FITTING 45° 4MBH - 4MJ	2	48	011240-005	WASHER FLAT STD 5/16	10
24	061796-099	GROMMET (EDGING)	1.33	50	011240-008	WASHER 1/2 STD FLAT	2
25	065656-000	WEAR PAD	2	51	011238-008	WASHER 1/2 SPLIT LOCK	2
27	065368-000	TACK	2	52	010414-001	LOCKING PIN ASSY X 6	1
28	026553-004	RIVET 3/16 X .250-.375 GRIP	2	53	015919-004	ORIFICE #824	1
29	014996-010	WASHER 5/8 SAE	2	55	065352-000	CHANNEL	1
30	011252-006	SCREW HHC 1/4-20UNC x 3/4	1				



Drawing # 1 of 4

# Chassis Assembly, 2 of 4

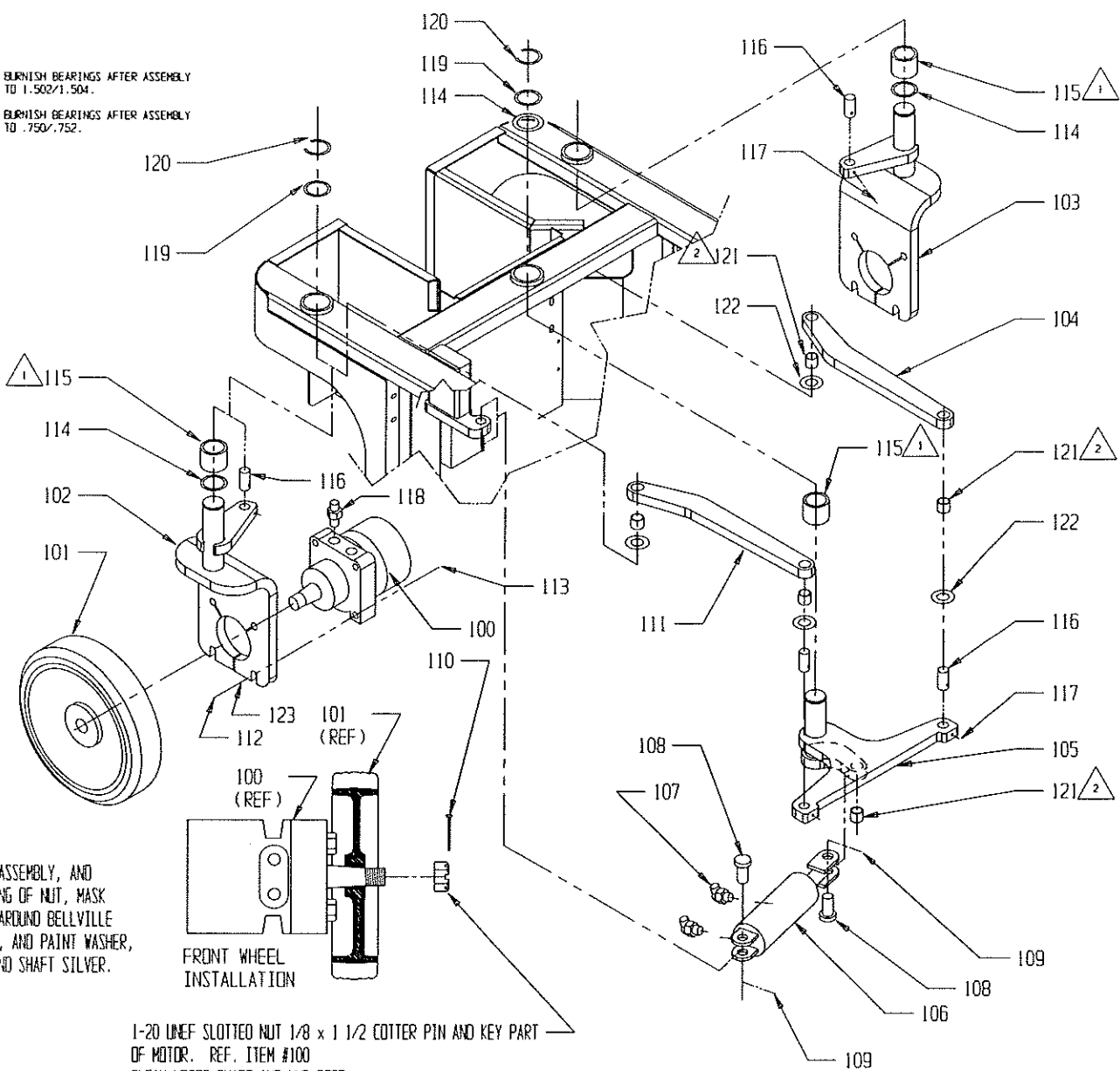
107002-000

ITEM	PART NO.	DESCRIPTION	QTY
100	101125-001	MOTOR HYDRAULIC	2
	101125-010	Seal Kit	
101	065393-002	WHEEL, DRIVE	2
102	107186-000	WHEEL YOKE, L.H.	1
103	107185-000	WHEEL YOKE, R.H.	1
104	065517-000	STEER LINK RH	1
105	065445-000	BELL CRANK WELDMT	1
106	065397-002	CYLINDER, STEERING	1
	065397-011	Seal Kit	
107	011934-001	FITTING, 90° 4MBH-4MJ	2
108	011848-041	PIN 3/4 PIVOT	2
109	011757-010	COTTER PIN, RUE RING 3/4"	2
110	011753-012	PIN COTTER 1/8 x 1 1/2	2
111	065518-000	STEER LINK LH	1

ITEM	PART NO.	DESCRIPTION	QTY
112	011256-026	SCREW HHC GR5 1/2-13 UNC x 3 1/4	8
113	011248-008	NUT HEX 1/2-13 UNC	8
114	010092-011	WASHER THRUST 1 1/2	3
115	027931-068	BEARING 1 1/2	3
116	065534-000	STEER PIN	4
117	011736-012	ROLL PIN 3/16 DIA. x 1 1/2	4
118	011941-005	FITTING STRAIGHT 6-6S	4
119	011786-007	BUSHING MACHINE 1 1/2 I.D.	3
120	013315-009	RETAINING RING	3
121	027931-022	BEARING 3/4 I.D.	5
122	010092-005	WASHER THRUST 3/4 I.D.	4
123	011240-008	WASHER FLAT STD 1/2	8

NOTES:

- 1 BURNISH BEARINGS AFTER ASSEMBLY TO .1.502/.1.504.
- 2 BURNISH BEARINGS AFTER ASSEMBLY TO .750/.752.



NOTE:

AFTER ASSEMBLY, AND TORQUING OF NUT, MASK WHEEL AROUND BELLVILLE WASHER, AND PAINT WASHER, NUT, AND SHAFT SILVER.

1-20 UNEF SLOTTED NUT 1/8 x 1 1/2 COTTER PIN AND KEY PART OF MOTOR. REF. ITEM #100  
 CLEAN MOTOR SHAFT AND HUB BORE.  
 LUBRICATE NUT FACE AND THREADS.  
 TORQUE SLOTTED NUT TO 75 ±5 FT LBS BOTH WHEELS.

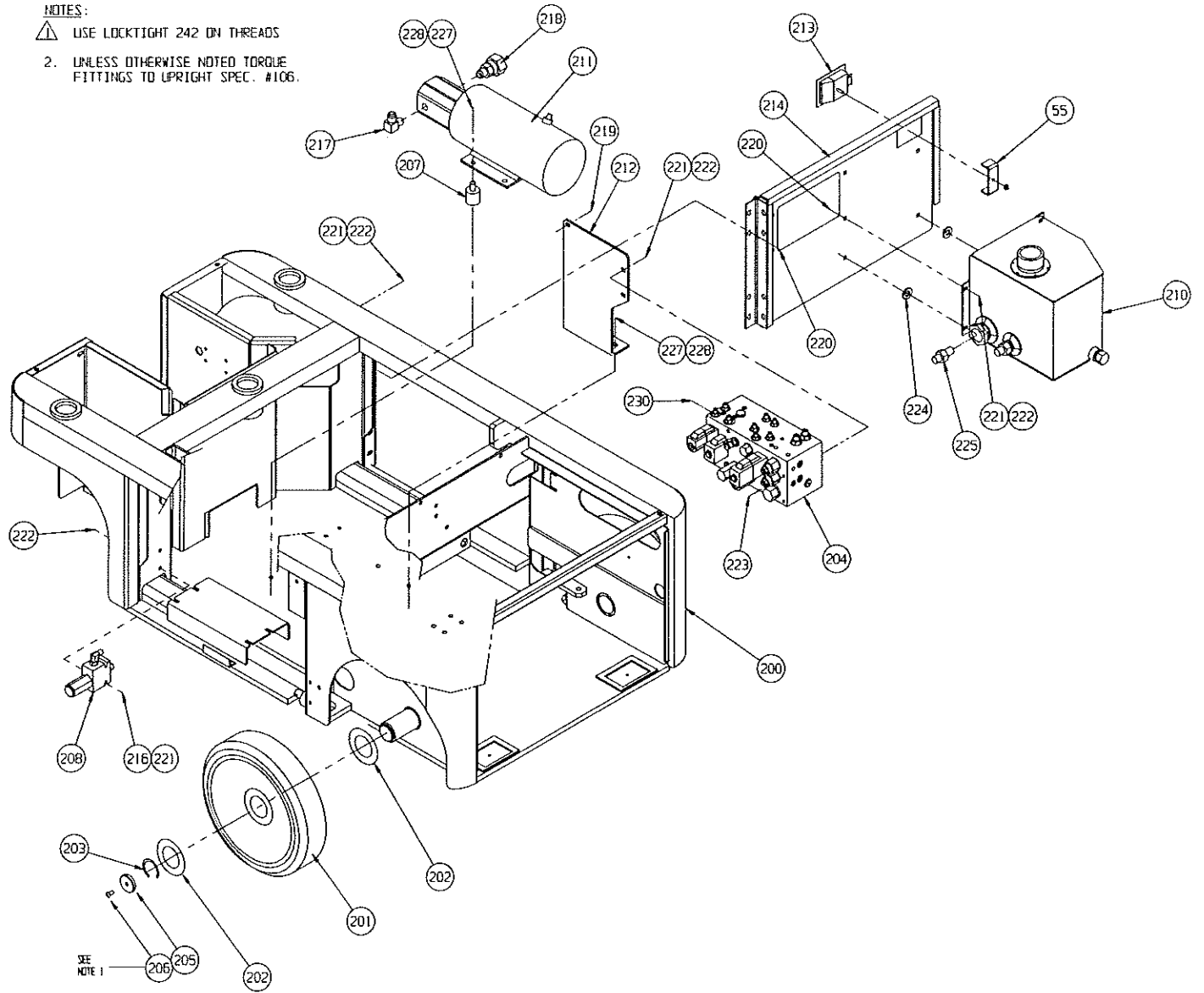
# Chassis Assembly, 3 of 4

107002-000

ITEM	PART NO.	DESCRIPTION	QTY
200	107133-000	CHASSIS WELDMENT	REF
201	065392-020	WHEEL IDLER	2
202	011786-014	BUSHING MACHINE 1 3/4 I.D.	4
203	013315-009	RETAINING RING 1 1/2	2
204	101120-021	CONTROL VALVE ASSEMBLY	1
205	065513-000	END CAP	2
206	011823-006	SCREW 3/8-16 BUTT HD X 3/4	2
207	066046-007	MOUNT, VIBRATION	4
208	107006-000	DRIVE RELIEF VALVE ASSY	1
210	107007-000	HYD RESERVOIR ASSY	1
211	101230-000	POWER UNIT	1
212	107152-000	BRACKET, CONTROL VALVE MOUNT	1
213	065395-000	LATCH	1
214	107150-000	PANEL WELDMENT RH	1
216	011252-016	SCREW HHC 1/4-20 X 2	2

ITEM	PART NO.	DESCRIPTION	QTY
217	011934-004	FITTING 90° 6MBH-6MJ	1
218	015959-004	FITTING 8MBH-12FJX	1
219	013919-010	CLAMP HOSE	1
220	011829-006	CARRIAGE BOLT 1/4-20 x 3/4	7
221	011240-004	WASHER FLAT STD 1/4	12
222	011248-004	NUT HEX 1/4-20 UNC	12
223	011252-040	SCREW HHC 1/4-20 X 5	3
224	107079-000	WASHER, RUBBER	2
225	011939-021	FITTING 12MP-12MJ	1
227	011240-005	WASHER FLAT 5/16	6
228	011248-005	NUT HEX 5/16-18	6
229	020032-003	FITTING TEE #6 - NOT SHOWN	2
230	020733-001	FITTING TEE #4	1

- NOTES:**
- 1. USE LOCKTIGHT 242 ON THREADS
  - 2. UNLESS OTHERWISE NOTED TORQUE FITTINGS TO UPRIGHT SPEC. #106.

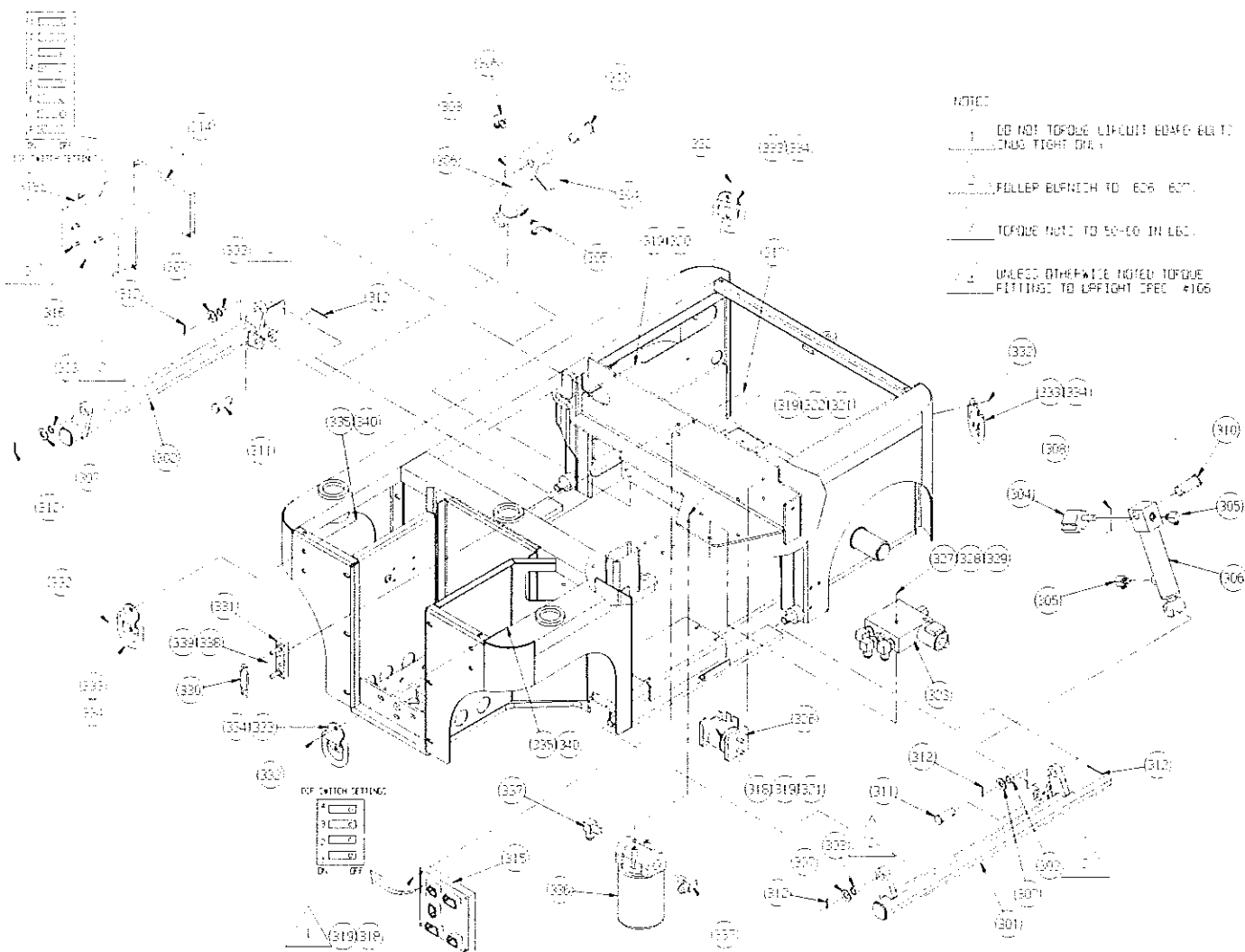


Drawing # 3 of 4

# Chassis Assembly, 4 of 4

107002-000

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
301	107179-000	GUARD WELDMNT-L.H.	1	321	011252-006	SCREW HHC 1/4-20 X 3/4	4
302	107180-000	GUARD WELDMNT-R.H.	1	322	011238-004	WASHER SPLIT LOCK 1/4	2
303	027931-063	BRONZE BUSHING #AA 710-27	4	323	107005-000	CYLINDER VALVE ASSY	1
304	063973-001	VALVE N.C.	2	326	010122-001	RELAY	1
305	011934-001	FITTING 4MBH-4MJ	4	327	011248-005	NUT HEX 5/16-18	2
306	065970-001	CYLINDER DEPRESSION	2	328	011240-005	WASHER 5/16 FLAT	4
	065970-011	Seal Kit		329	011253-018	SCREW HHC 5/16-18 X 2 1/4	2
307	014996-010	WASHER 5/8 SAE	4	330	010148-001	FUSE	1
308	011757-005	1/2 RUE RING	2	331	010149-000	FUSE BLOCK	1
310	011848-019	CLEVIS PIN 3/4 X 2 1/2	2	332	011254-008	SCREW HHC 3/8-16 X 1	8
311	011848-009	CLEVIS PIN 5/8 X2	2	333	107080-000	BRACKET - D-RING	4
312	011754-012	COTTER PIN 5/32 X 1 1/2	6	334	107080-001	D-RING	4
314	065984-000	HEATSINK PLATE	1	335	011248-006	NUT HEX ESNA 3/8-16	8
315	065709-001	CIRCUIT BOARD	1	336	005154-001	FILTER	1
316	065708-001	MOTOR CONTROL	1	337	011940-034	FITTING 90° 12MP-6MJ	2
317	011252-012	BOLT 1/4-20 UNC X 1 1/2	2	338	011709-008	SCREW #10-24 X 1	2
318	011248-004	LOCKNUT 1/4-20 HEX	6	339	011248-003	NUT HEX #10-24	2
319	011240-004	WASHER 1/4 DIA STD FLAT	8	340	011240-006	WASHER 3/8 FLAT	8
320	011252-010	SCREW HHC 1/4-20 X 1 1/4	2				



Illustrated Parts Breakdown - Hose Kit

Hose Kit

107011-000

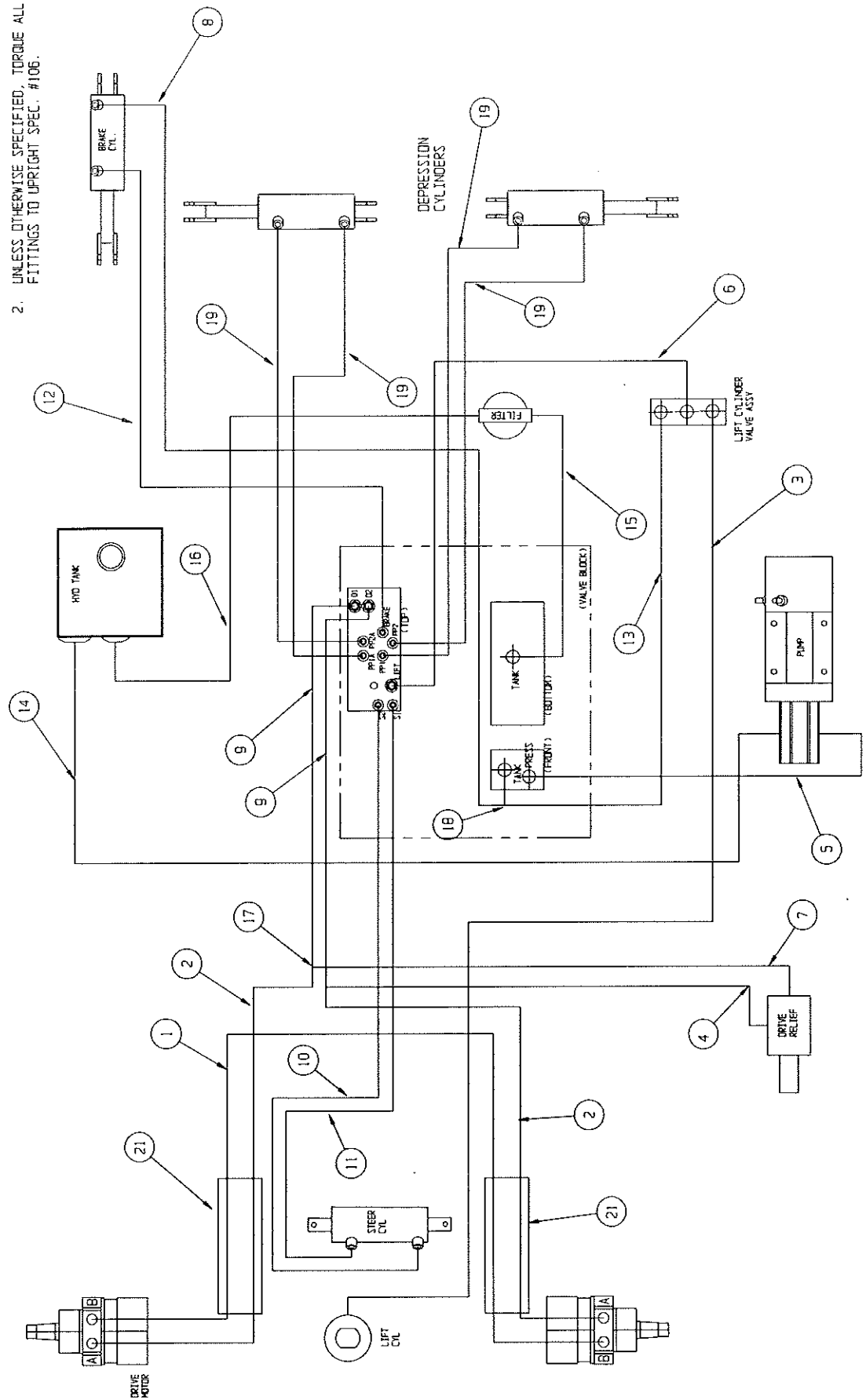
ITEM	PART NO.	DESCRIPTION	QTY
1	065419-042	HOSE ASSY 1/4 X 42 (6FJX-6FJX)	1
2	107092-028	HOSE ASSY 1/4 X 28 (6FJX-6FJX X 90)	2
3	107188-000	CYLINDER TUBE ASSY (SS) 3/8 DIA.	REF
4	065419-013	HOSE ASSY 1/4 X 13 (6FJX-6FJX)	1
5	068965-017	HOSE ASSY 3/8 X 17 (6FJX-6FJX X 90)	1
6	068965-038	HOSE ASSY 3/8 X 38 (6FJX-6FJX X 90)	1
7	065419-011	HOSE ASSY 1/4 X 11 (6FJX-6FJX)	1
8	107091-047	HOSE ASSY 3/16 X 47 (4FJX-4FJX X 90)	1
9	107092-020	HOSE ASSY 1/4 X 20 (6FJX-6FJX X 90)	2
10	107090-035	HOSE ASSY 1/4 X 35 (4FJX-4FJX X 90)	1
11	107090-029	HOSE ASSY 1/4 X 29 (4FJX-4FJX X 90)	1

ITEM	PART NO.	DESCRIPTION	QTY
12	107091-024	HOSE ASSY 3/16 X 24 (4FJX-4FJX X 90)	1
13	061351-053	HOSE ASSY 1/8 X 27 (4FJX-4FJX)	1
14	061789-026	HOSE ASSY 3/4 X 26 (12FJX-12MP)	1
15	068965-018	HOSE ASSY 3/8 X 18 (6FJX-6FJX X 90)	1
16	060861-054	HOSE ASSY 3/8 X 40 1/2 (6FJX - 6FJX)	1
17	020032-003	FITTING, TEE #6	REF
18	020733-001	FITTING, TEE #4	REF
19	107091-024	HOSE ASSY 3/16 X 24 (4FJX-4FJX X 90)	4
21	065369-099	HOSE GUARD NYLON X 18"	REF

# Illustrated Parts Breakdown - Hose Kit

**NOTES:**

1. UNLESS OTHERWISE SPECIFIED, TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.
2. UNLESS OTHERWISE SPECIFIED, TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.

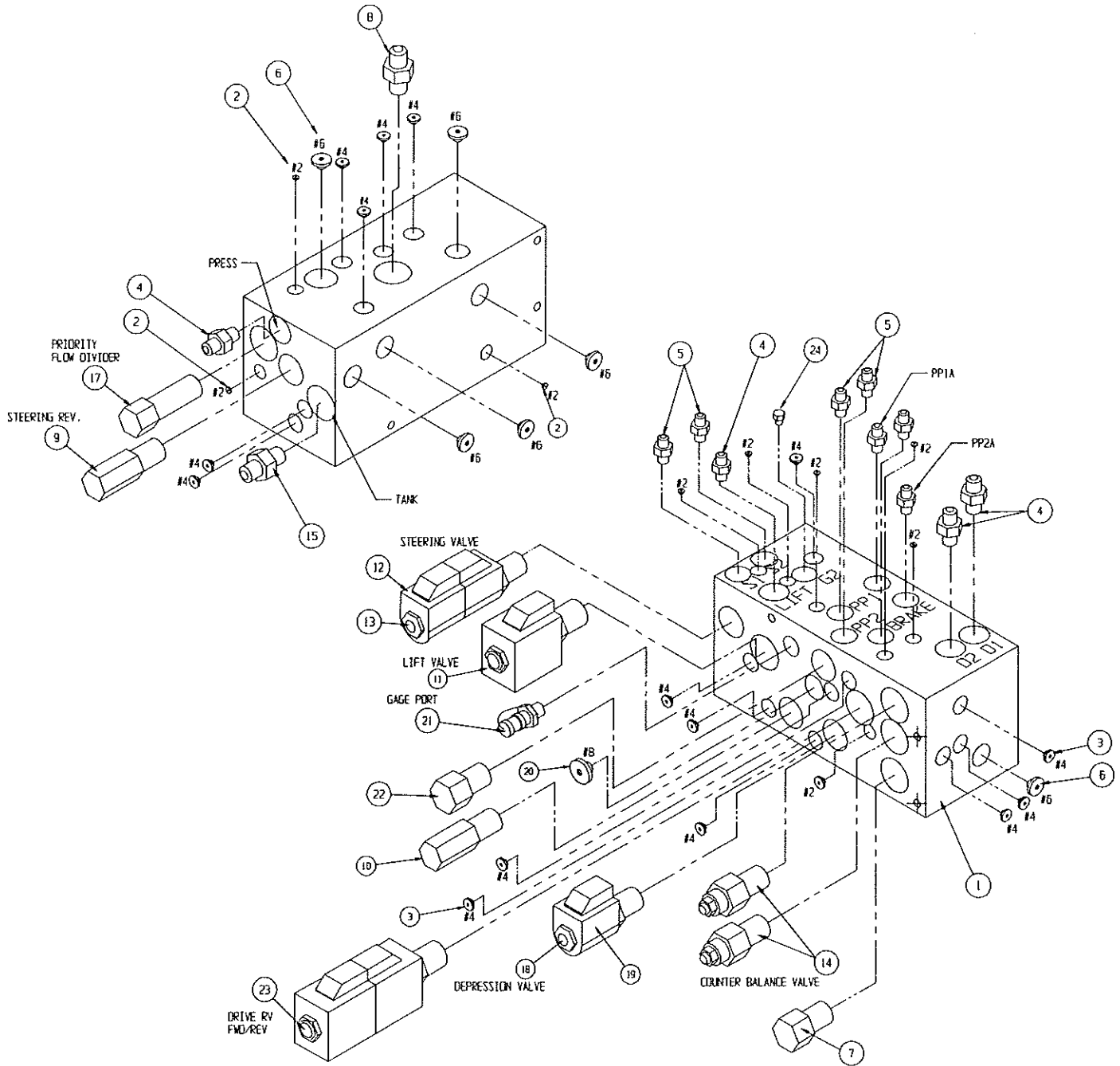


# Control Valve Assembly

101120-021

ITEM	PART NO.	DESCRIPTION	QTY
1	100020-040	CONTROL VALVE BLOCK	1
2	012004-002	FITTING #2 PLUG	9
3	012004-004	FITTING #4 PLUG	15
4	011941-005	FITTING STRAIGHT 6MB - 6MJ	3
5	011941-001	FITTING STR 4MBH - 4MJ	7
6	012004-006	FITTING PLUG #6	6
7	063955-008	PLUG CAVITY #8 2 WAY	1
8	011941-009	FITTING 8MB-6MJX	1
9	060390-013	RELIEF VALVE, STEERING (1500 PSI)	1
10	060390-025	RELIEF VALVE, MAIN (3000 PSI)	1
11	063923-006	2 POS - 4 WAY SOLENOID W/ COIL	1
12	101120-033	COIL	2

ITEM	PART NO.	DESCRIPTION	QTY
13	064845-000	3 POS - 4 WAY SOLENOID W/ COILS	1
14	101120-035	COUNTERBALANCE VALVE	2
15	011941-008	FITTING STR 8MB-4MJ	1
17	064843-000	FLOW DIVIDER VALVE (1.0 GPM)	1
18	063973-001	2 POS POPPET VALVE W/ COIL	1
19	101120-033	COIL	1
20	012004-008	FITTING #8 PLUG	1
21	063965-001	FITTING GAGE	1
22	064841-000	CHECK VALVE	1
23	063923-021	3 POS - 4 WAY SOLENOID W/ COILS	1
24	020021-004	FITTING, PLUG #4	1



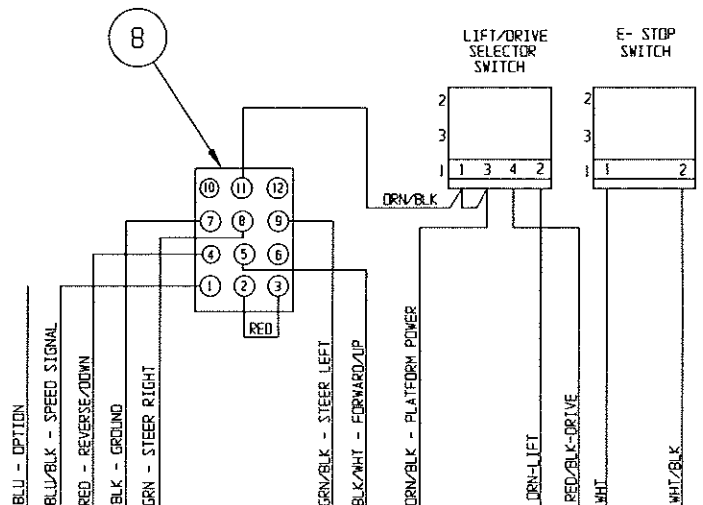
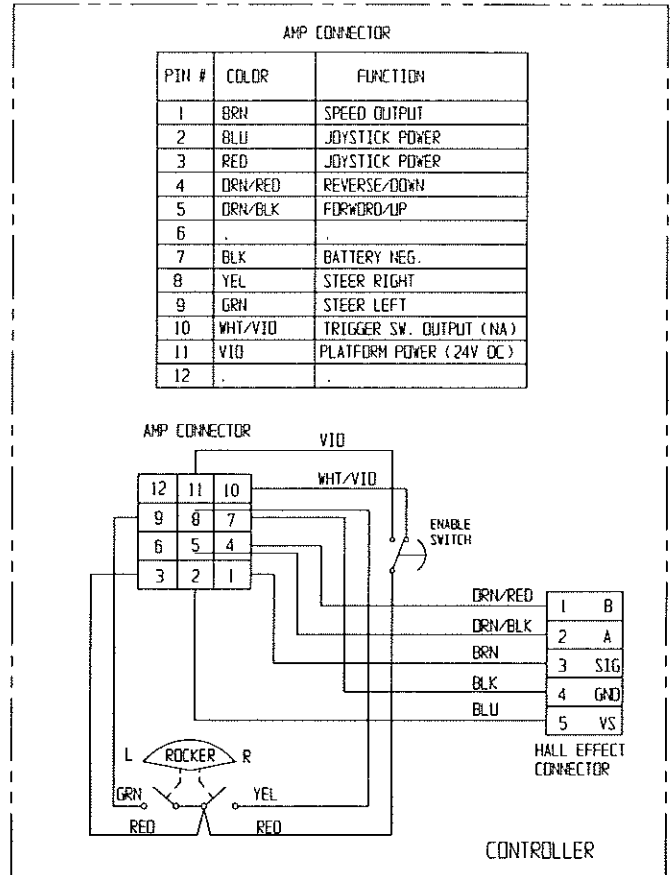
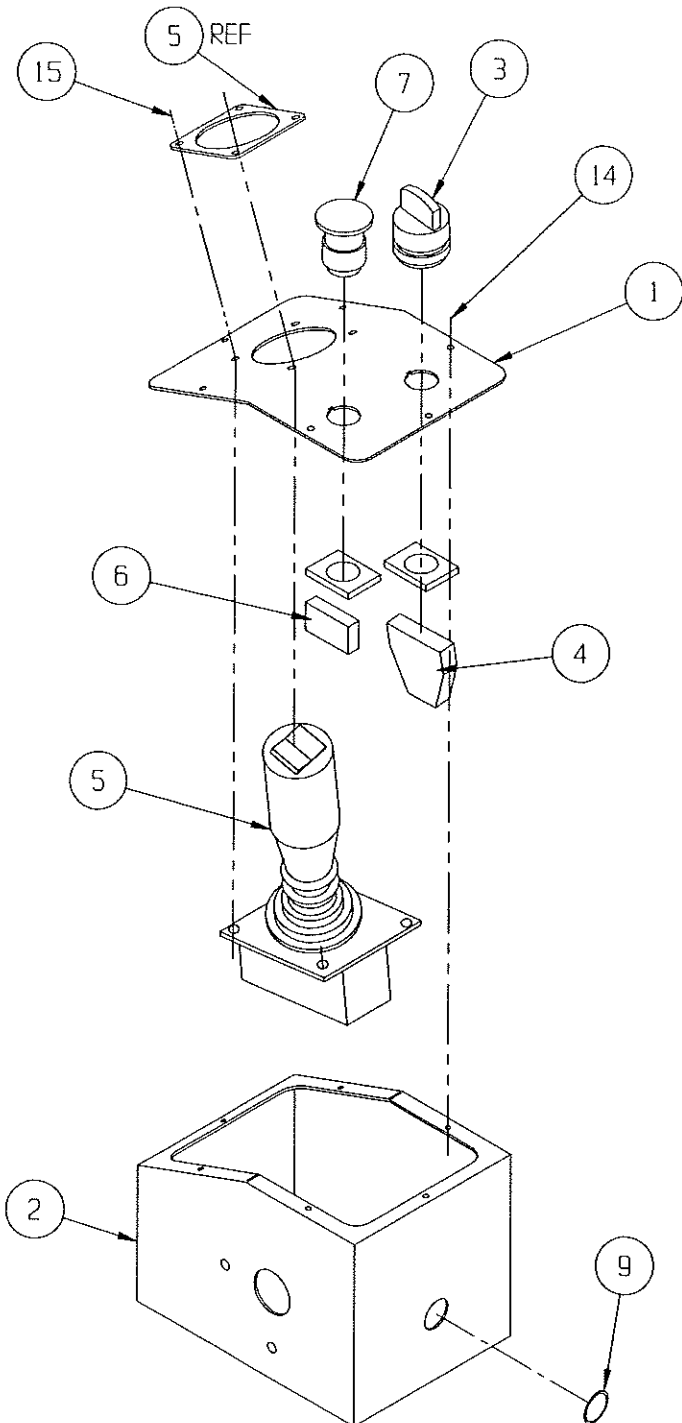


# CONTROLLER ASSEMBLY

107010-000

ITEM	PART NO.	DESCRIPTION	QTY
1	107157-000	CONTROL COVER	1
2	107159-000	CONTROLLER WELDMENT	1
3	066805-002	SWITCH, SELECTOR - 2 POSITION	1
-	068807-010	KEY (NOT SHOWN)	1
4	066805-012	CONTACT BLOCK, NO-NC	1
5	065512-000	CONTROLLER PQ	1
6	066805-011	CONTACT BLOCK	1

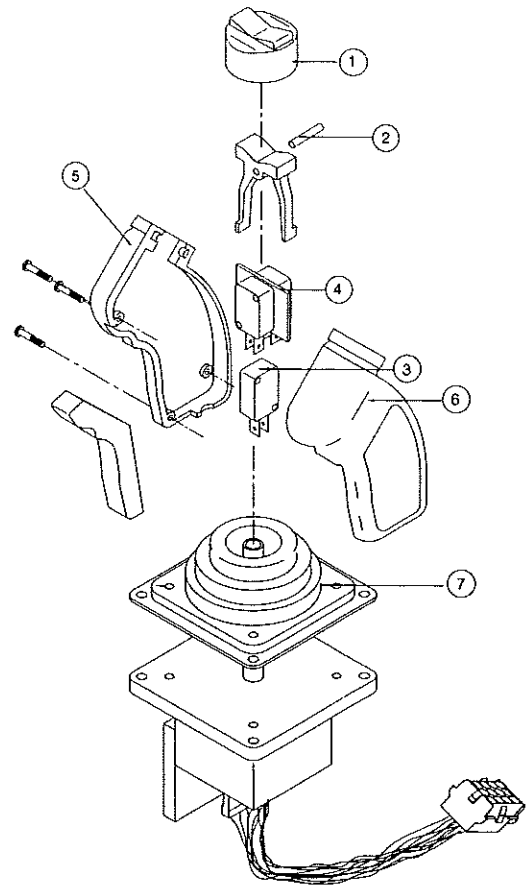
ITEM	PART NO.	DESCRIPTION	QTY
7	066805-006	PUSHBUTTON	1
8	063956-003	CONN 12 PIN MATE N LOC	1
9	064462-029	HOLE PLUG	1
14	011826-004	SCREW 10-32 SLFTP X 1/2	6
15	026525-008	SCREW #8 SLFTP ABHWH X 1	4



# PQ Controller

065512-000

ITEM	PART NO.	DESCRIPTION	QTY
1	063953-001	CAP, RUBBER	1
2	065512-013	ROCKER, PIN	1
3	063953-007	SWITCH, INTERLOCK	1
4	065512-015	SWITCH, STEERING	1
5	065512-016	HANDLE HALF, RIGHT	1
6	065512-017	HANDLE HALF, LEFT	1
7	065512-018	BOOT, HANDLE	1

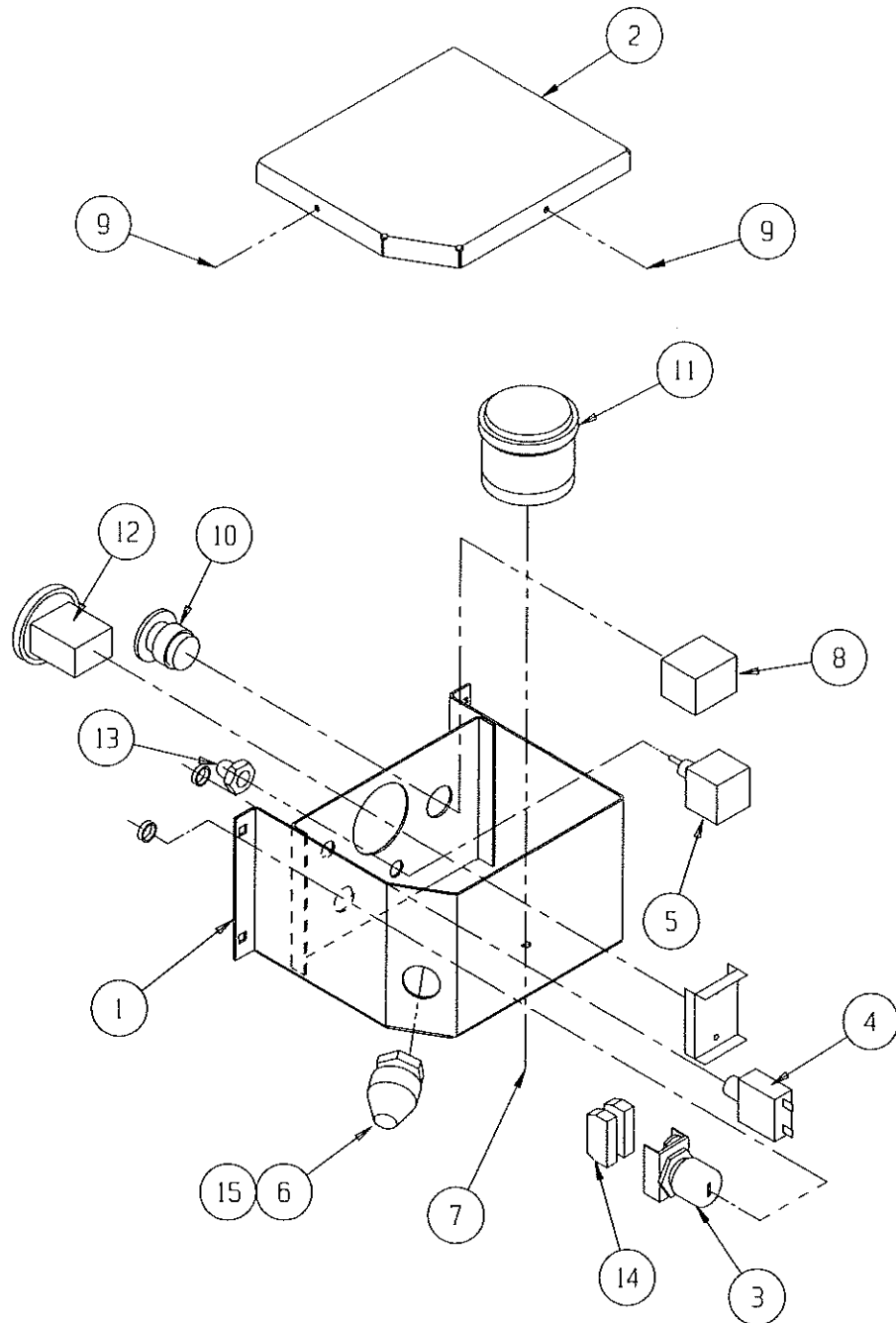


# ELECTRICAL BOX ASSEMBLY

107008-000

ITEM	PART NO.	DESCRIPTION	QTY
1	107123-000	BOX, ELECT. WELDMT	1
2	107148-000	BOX TOP	1
3	066805-004	SWITCH KEY SELECTOR	1
4	068582-005	CIRCUIT BREAKER 5 AMP	1
5	012798-000	SWITCH TOGGLE	1
6	029925-001	CONNECTOR CABLE 3/4	1
7	011725-006	SCREW, 1/4-20 UNC PAN HD x3/4	1
8	066805-011	SWITCH CONTACT	1

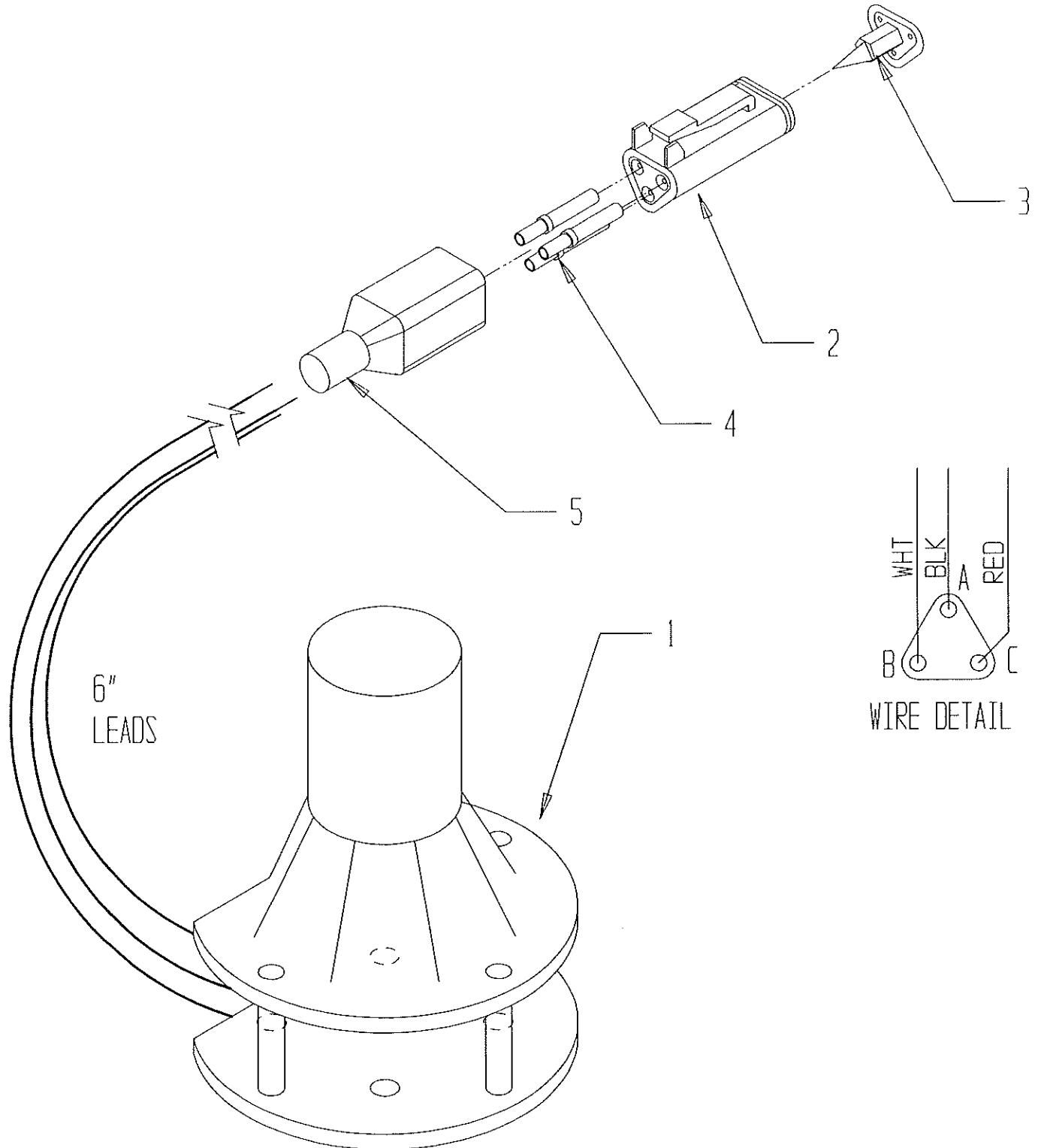
ITEM	PART NO.	DESCRIPTION	QTY
9	011811-004	SCREW,10-32 SELF-TAP x 1/2	3
10	066805-006	SWITCH HEAD-MUSHROOM	1
11	066807-001	ALARM, DUAL TONE	1
12	015752-000	HOUR METER	1
13	029872-000	BOOT SWITCH COVER	1
14	066805-010	CONTACT BLOCK	2
15	029939-003	LOCKNUT, CONDUIT 3/4	1



**LEVEL SENSOR WIRE ASSEMBLY**

029945-020

ITEM	PART NO.	DESCRIPTION	QTY
1	029945-011	LEVEL SENSOR PQ #40000-00006	1
2	067456-000	PLUG 3 CONTACT DT 06-3S	1
3	067456-002	WEDGE W3S-P012	1
4	068762-001	CONTACT SOCKET	3
5	067456-005	BOOT DT3S-BT	1

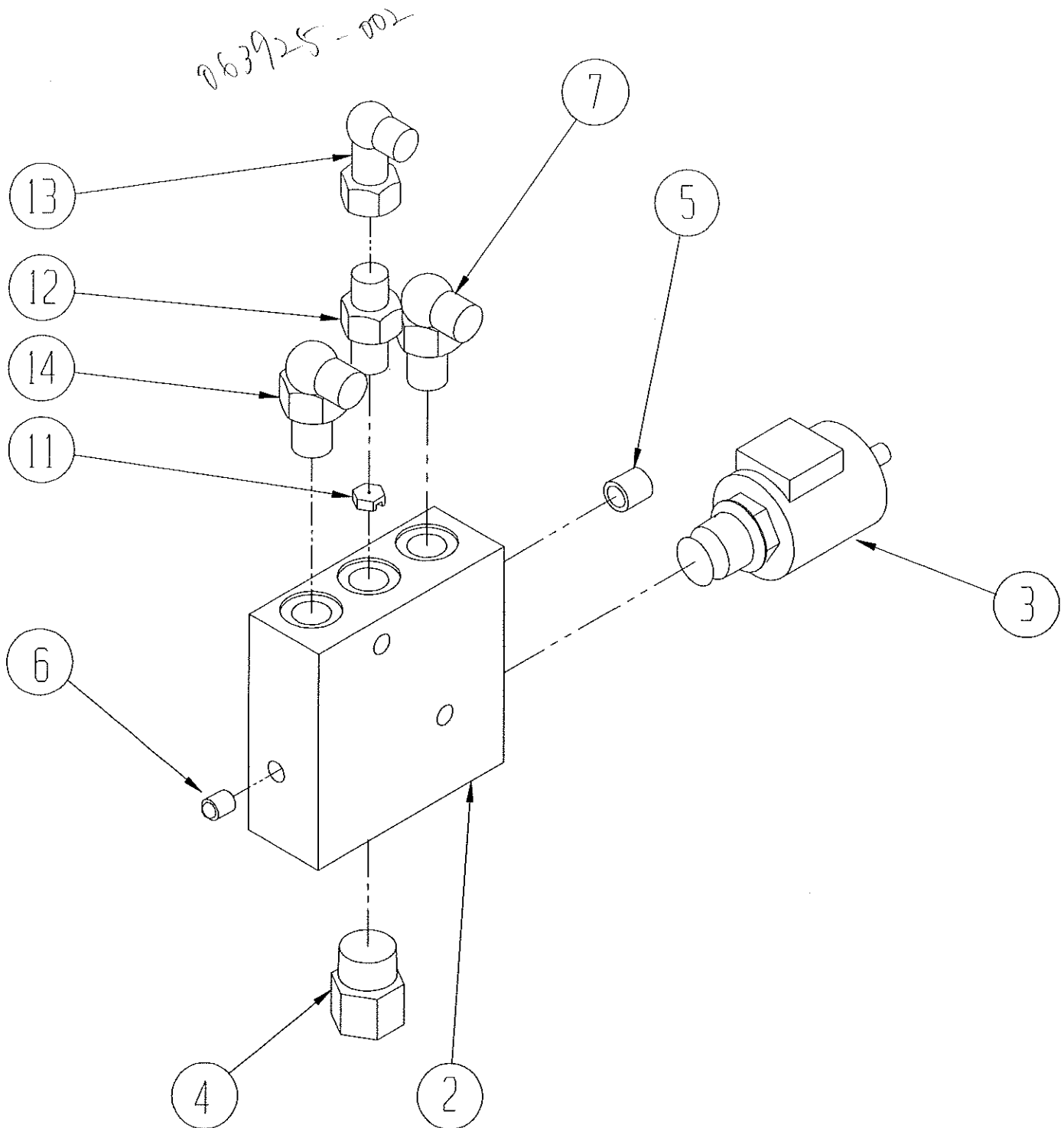


**CYLINDER VALVE ASSEMBLY**

107005-000

ITEM	PART NO.	DESCRIPTION	QTY
2	065545-000	VALVE BLOCK	1
3	063925-002	VALVE SOL 24 VDC	1
4	063924-005	VALVE FLOW CONTROL 1 GPM	1
5	011920-002	PLUG SOC.HD. 1/4-18 NPTF	1
6	063977-001	PLUG 9mm	1
7	011934-004	FITTING, 90 6MB-6MJ	1

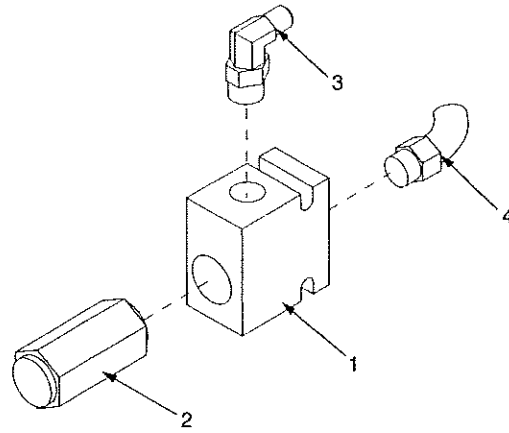
ITEM	PART NO.	DESCRIPTION	QTY
11	015919-000	ORIFICE	2
12	011941-005	FITTING STR 6MB-6MJ	1
13	011937-003	FITTING 90 6JX-6MJ	1
14	011934-003	FITTING 90 6MB-4MJ	1



# Drive Relief Valve Assembly

107006-000

ITEM	PART NO.	DESCRIPTION	QTY
1	107006-001	VALVE BLOCK	1
2	107006-002	VALVE, DRIVE RELIEF	1
3	011934-004	FITTING, 90°, 6MB - 6MJ	1
4	011935-003	FITTING, 45°, 6MB - 6MJ	1

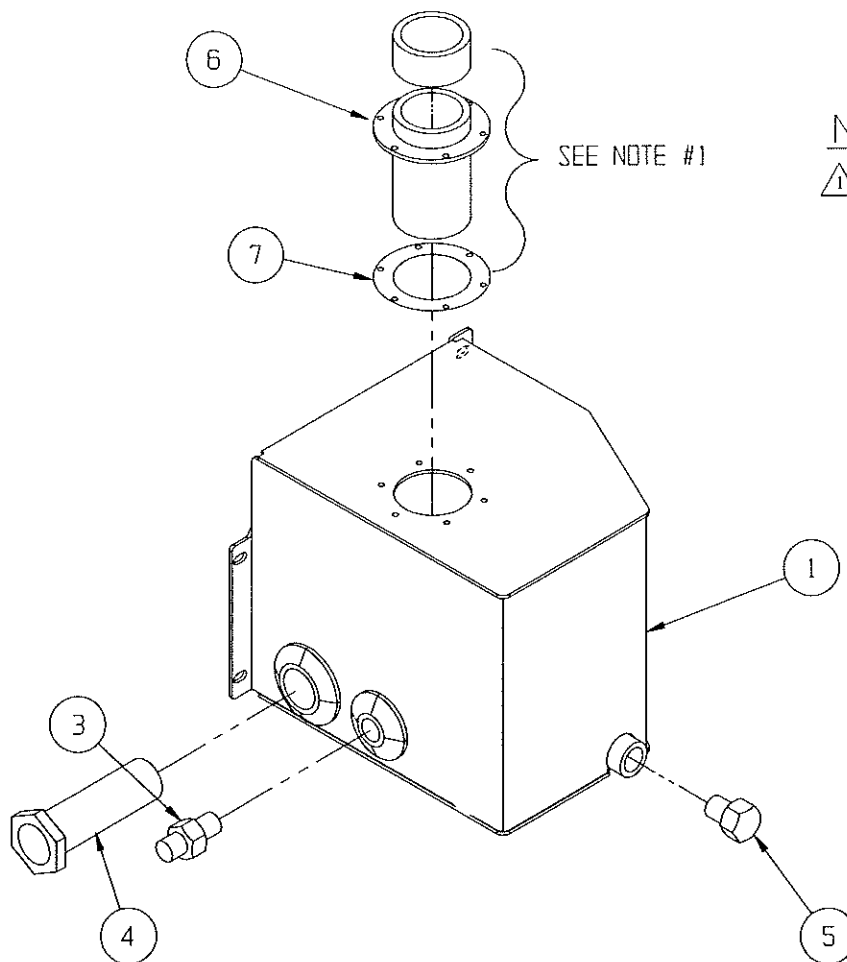


TORQUE DRIVE RELIEF VALVE TO 35 - 40 FT. LBS (47 - 54 Nm)

# Hydraulic Tank Assembly

107007-000

ITEM	PART NO.	DESCRIPTION	QTY
1	107127-000	TANK WELDMENT	1
3	011939-015	FITTING 8MP-8MJ	1
4	061818-000	SUCTION SCREEN/FITTING	1
5	021305-006	PLUG, MAGNETIC	1
6	005963-001	FILLER BREATHER	1
7	005963-010	Gasket	1



### NOTES:

⚠ USE EXISTING SCREWS SUPPLIED W/BREATHER. SILICON SEAL GASKET & SCREWS @ INSTALLATION.

USABLE VOLUME = 1.53 GAL.  
TOTAL VOLUME = 1.96 GAL.  
(MINUS FILL LEVEL)

Label Kit

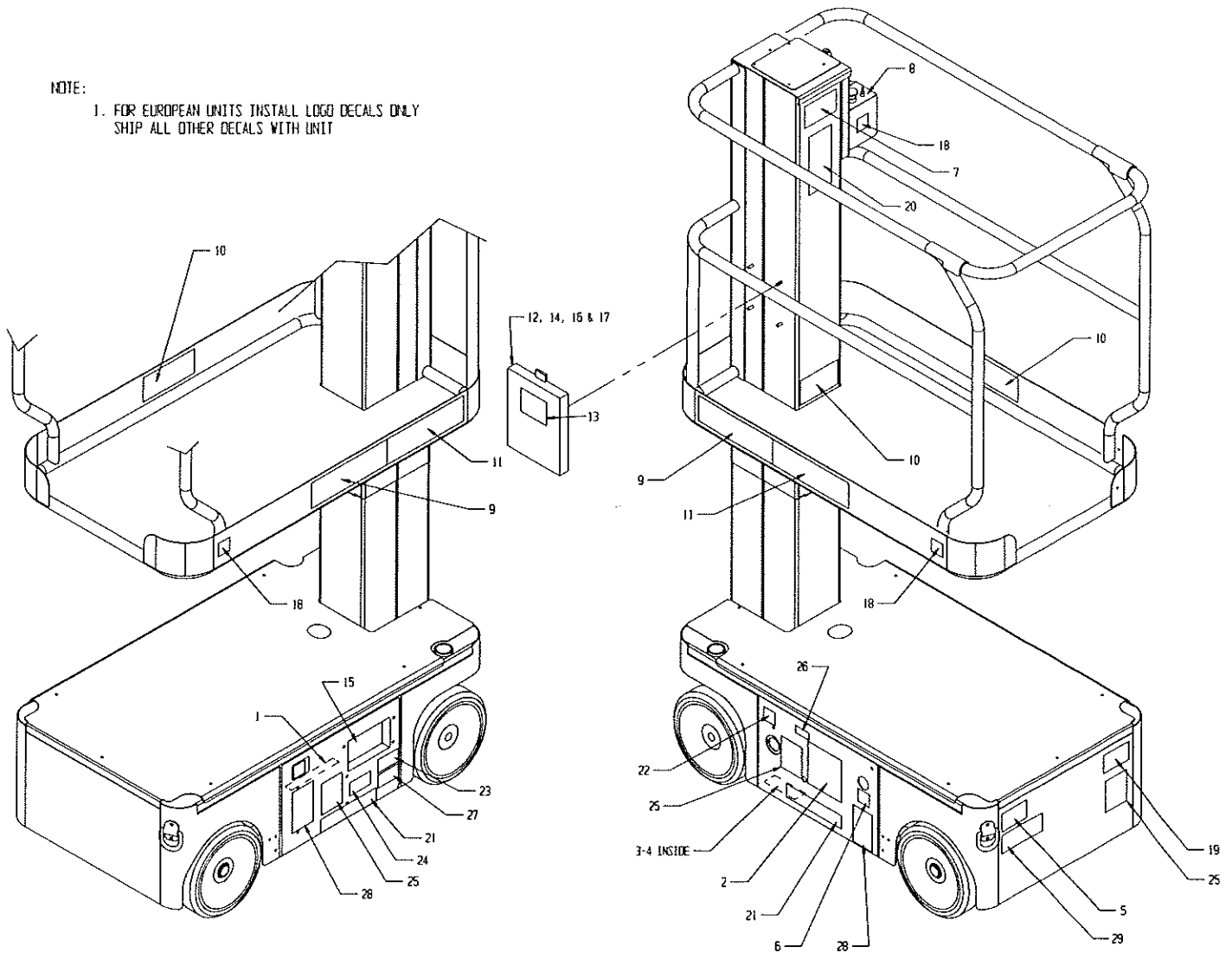
107012-000

ITEM	PART NO.	DESCRIPTION	QTY
1	060197-000	LABEL HYD OIL	1
2	066552-000	LABEL HYDROGEN GAS	1
3	061205-005	NAME PLATE	1
4	065368-000	TACK	4
5	005221-000	LABEL BATTERY FLUID	1
6	005223-001	LABEL EMERGENCY DOWN	1
7	066554-000	LABEL BEFORE OPERATING	1
8	107050-000	LABEL CONTROLLER	1
9	061683-003	LABEL UPRIGHT	2
10	101250-000	LABEL MAX LOAD 500 LBS.	3
11	061684-014	LABEL TM12	2
12	010076-000	MANUAL CASE	1
13	010076-001	LABEL ATTENTION	1
14	011248-004	NUT ESNA 1/4-20 UNC	4
15	065568-001	LABEL CONTROLS	1

ITEM	PART NO.	DESCRIPTION	QTY
16	107098-000	USER MANUAL	1
17	060557-004	ANSI MANUAL	1
18	064444-000	LABEL USA	3
19	062562-001	LABEL BATTERIES	1
20	066550-001	LABEL DANGER	1
21	14222-003-99	LABEL FORK LIFT	2
22	061220-002	ANSI	1
23	066555-000	LABEL RELIEF VALVE	1
24	066568-000	LABEL LOWER PLATFORM	1
25	066556-000	LABEL COLLISION HAZARD	3
26	066522-000	LABEL BATTERY CHARGER	1
27	101252-000	LABEL MAX WHEEL LOAD (675 LBS)	1
28	066556-001	LABEL WARNING	2
29	107051-000	LABEL, BATTERY DISCONNECT	1

NOTE:

1. FOR EUROPEAN UNITS INSTALL LOGO DECALS ONLY  
SHIP ALL OTHER DECALS WITH UNIT

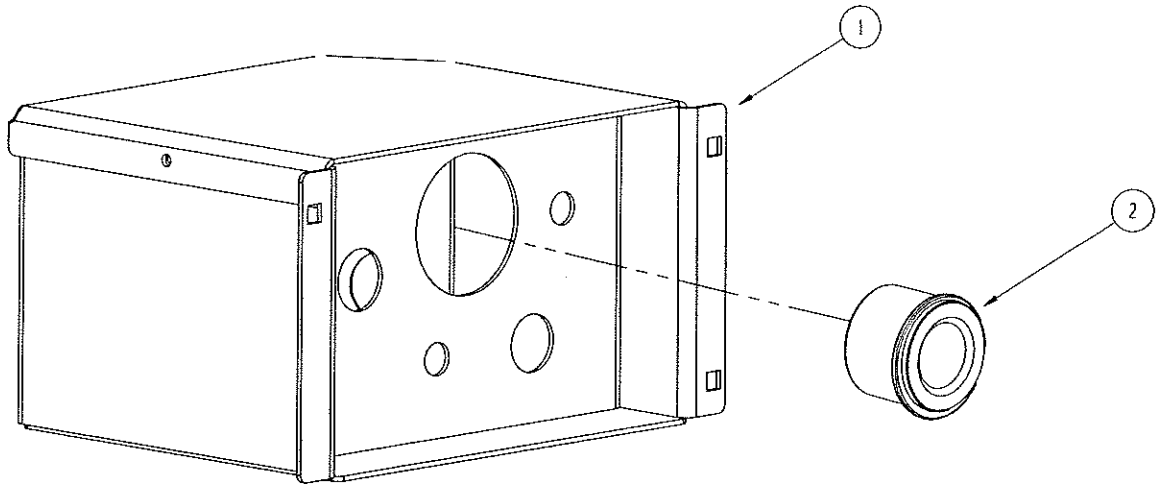
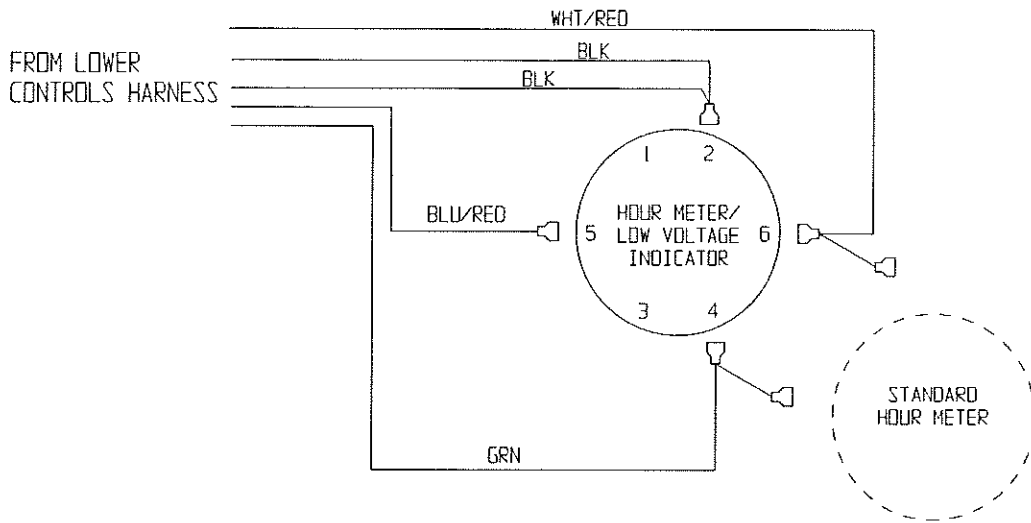




# Voltage/Hourmeter Option

107032-000

ITEM	PART NO.	DESCRIPTION	QTY
1	107008-000	ELECTRICAL BOX ASSY	REF
2	029959-000	VOLTAGE/HOUR METER	1



**NOTES:**

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**UpRight, Inc.**

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FAX:559/891-9012

PARTS:1-888-UR-PARTS

PARTS FAX:559/896-9244

# UpRight

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