

# UpRight

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***MX 15/19***  
**WORK PLATFORM**

**Service &  
Parts Manual**

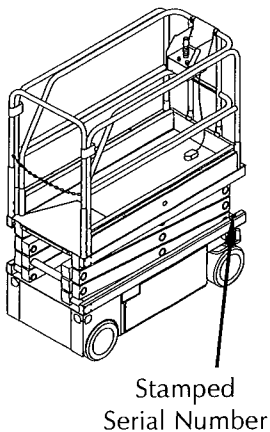
060569-000

# SERVICE & PARTS MANUAL

## MX15/19

### Aerial Work Platform

#### Serial Numbers 1004 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 the right scissor slide block channel above the right front wheel.

**UpRight, Inc.**  
1775 PARK ST. SELMA, CA 93662 USA

MODEL NO.	_____	MAX. PLATFORM HEIGHT	_____
SERIAL NO.	_____	BATTERY VOLTAGE	_____
MAX. DISTRIBUTED LOAD	_____	_____	_____

CAUTION: CONSULT OPERATOR'S MANUAL BEFORE USE.  
THIS PLATFORM IS NOT ELECTRICALLY INSULATED

P/N 61205-000-00

# UpRight

Call Toll Free in U.S.A.

**1-800-926-LIFT**

**UpRight, Inc.**  
1775 Park Street  
Selma, California 93662  
TEL: 209/891-5200  
FAX: 209/896-9012  
PARTSFAX: 209/896-9244

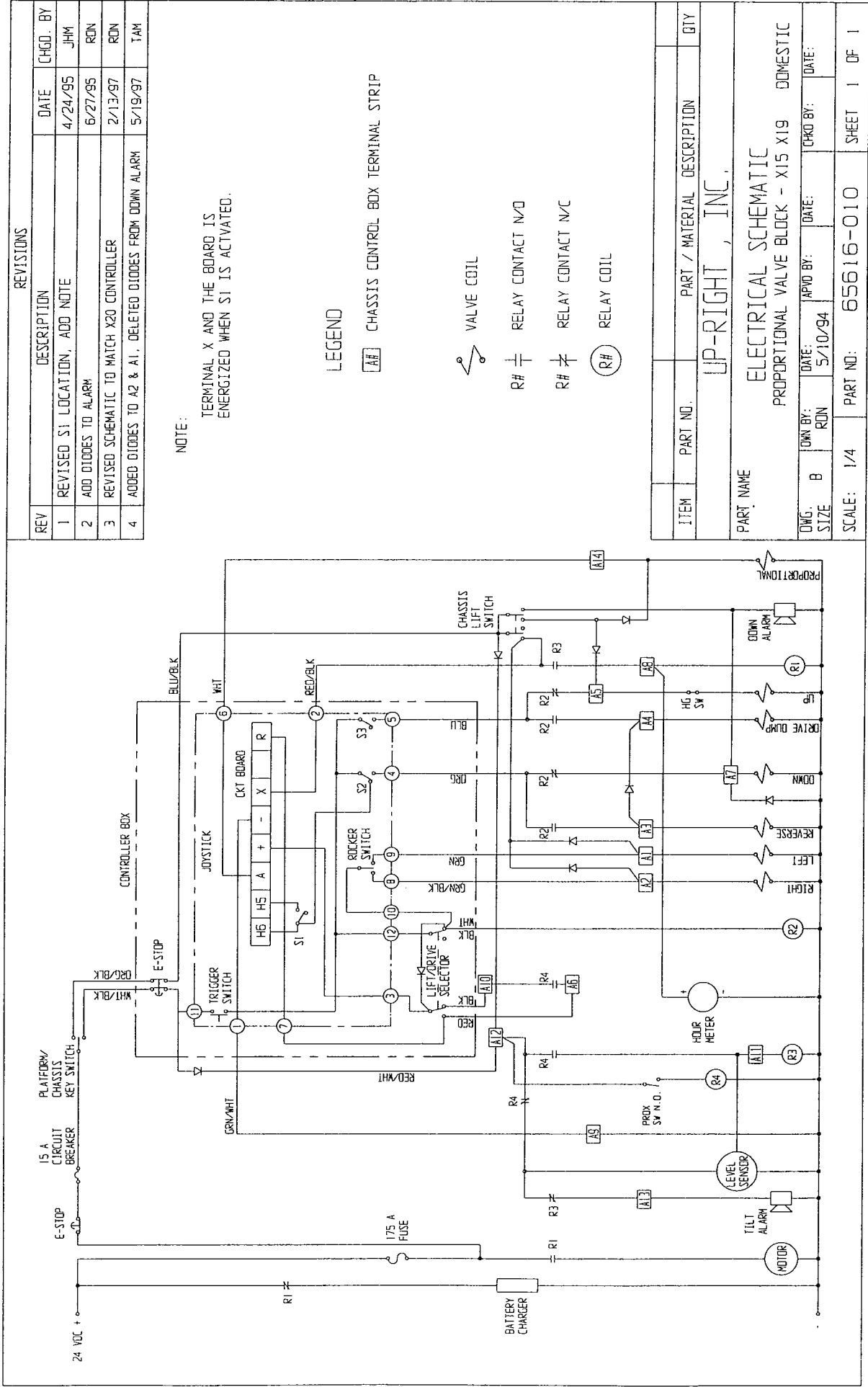
**UpRight, Europe**  
(Europe, Africa & Middle East)  
Pottery Road  
Dun Laoire, Ireland  
TEL: 353/1/285-3333  
FAX: 353/1/284-0015

# UpRight

## ***Parts Source***

This *Addendum* contains revisions to the *MX15/19 Parts and Service Manual*(60569-000). The affected serial number range is *5851- Current*. The final page of this addendum, offers *Conversion Kits* for units prior to serial number 5851. Please contact *UpRight Product Support Department* (1-800-926-5438 or 209-891-5200)with any questions or concerns.



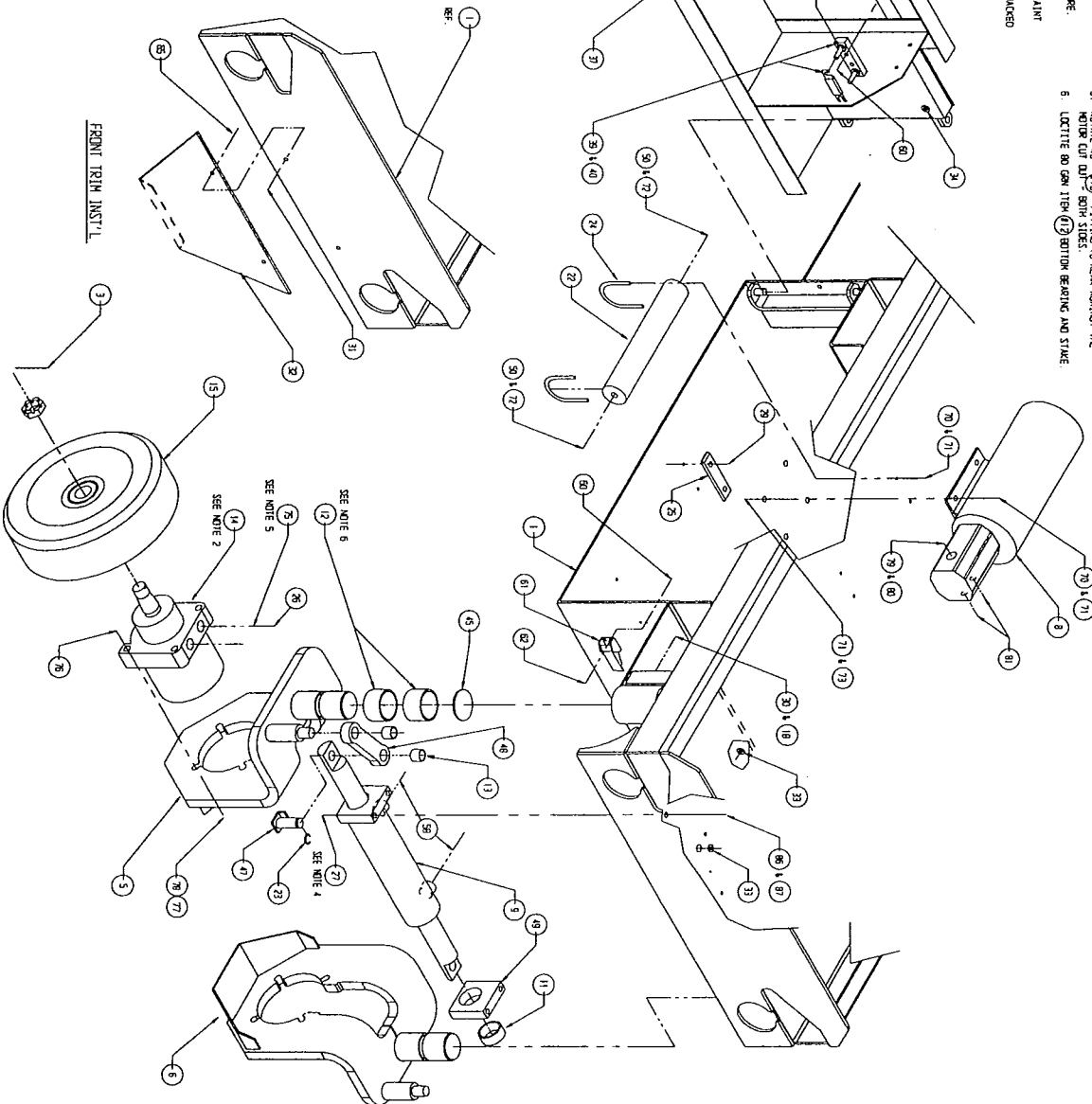


# MX15/19 ADDENDUM: AFFECTIVE SERIAL NUMBERS 5851-CURRENT

## NOTES:

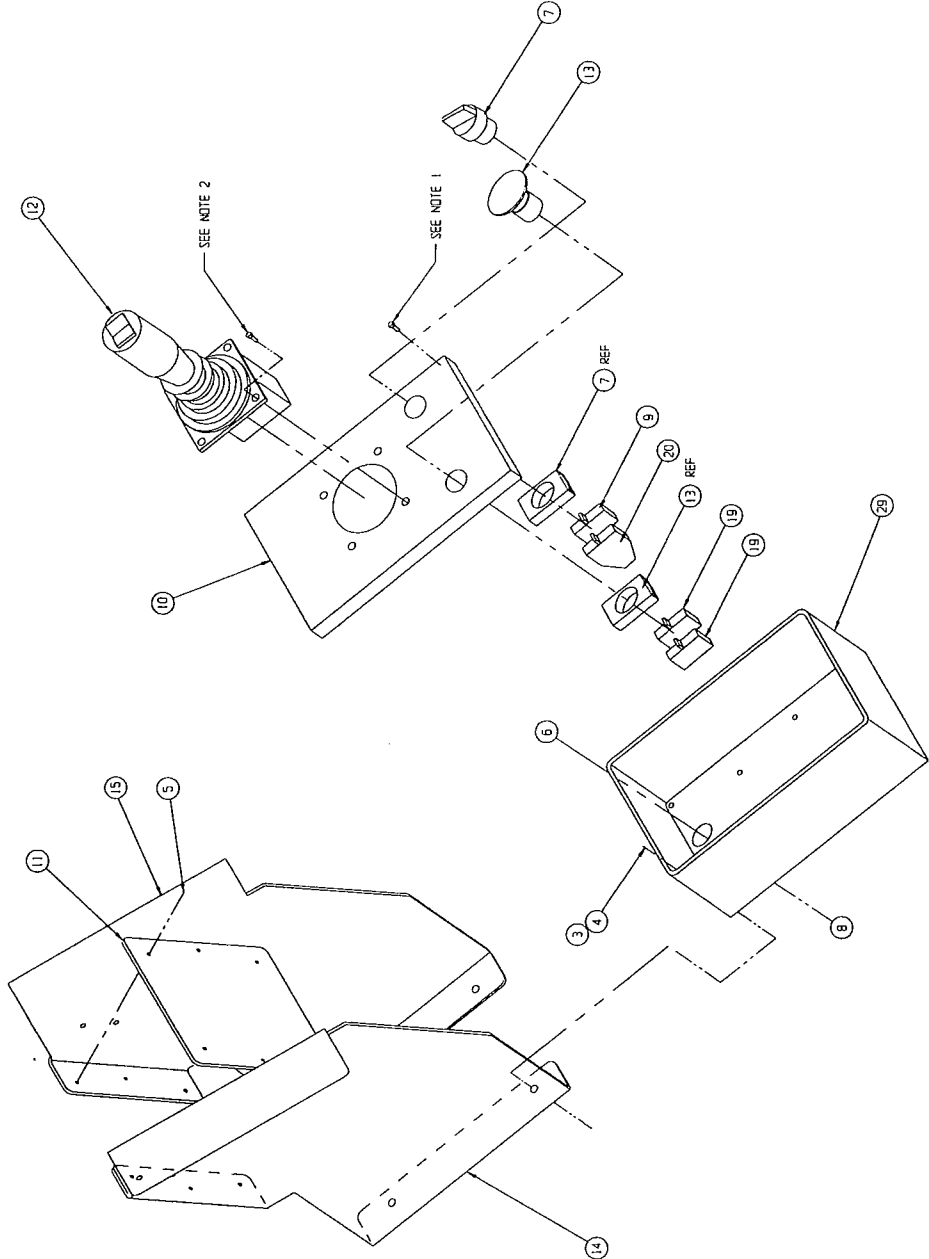
1. 1-20 WHEEL SCOTTER NUT & 1/8" x 1-1/2" CUTTER PIN INCLUDED WITH ITEM (2) DRIVE MOTOR. CLEAN MOTOR SHAFT AND NUT BEFORE INSTALLATION. DO NOT REUSE NUTS AND SCOTTER PINS. AFTER INSTALLING NUTS, MAX. ADJUST NUT AND CUTTER PIN AND PAINT NUT, CUTTER PIN, AND SHAFT SILVER.
2. WHEEL (16) MUST TURN FREELY WITH NUT FROM TIGHTENED & BACKED OFF 1-2 SCOT'S WASHING.
3. INITIAL AS SHOWN TO REDUCE HYDRAULIC NOISE DURING.
4. ROTATE 45° (90°) FITTING TO REAR AGAINST THE SHIM SIDES.
5. LOCATE 80 CAN ITEM (17) BOTTOM BEARING AND SHAKE.

TORQUE SPECIFICATIONS			
TYPE	FASTENER	SIZE	INCH-POUNDS
SERIES	FASTENER	(F1-LBS)	(F1-LBS)
14	NUT	M8	15-145
15	NUT	M8	15-145
16	NUT	M8	15-145
17	NUT	M8	15-145
18	NUT	M8	15-145
19	NUT	M8	15-145
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94	NUT	M8	15-145
95	NUT	M8	15-145
96	NUT	M8	15-145
97	NUT	M8	15-145
98	NUT	M8	15-145
99	NUT	M8	15-145
100	NUT	M8	15-145



ITEM	DESCRIPTION	QTY	UNIT
1	DRIVE MOTOR	1	EA
2	WHEEL	2	EA
3	WHEEL	2	EA
4	WHEEL	2	EA
5	WHEEL	2	EA
6	WHEEL	2	EA
7	WHEEL	2	EA
8	WHEEL	2	EA
9	WHEEL	2	EA
10	WHEEL	2	EA
11	WHEEL	2	EA
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94	WHEEL	2	EA
95	WHEEL	2	EA
96	WHEEL	2	EA
97	WHEEL	2	EA
98	WHEEL	2	EA
99	WHEEL	2	EA
100	WHEEL	2	EA

- 1. SUPPLIED WITH BOX.
- 2. SUPPLIED WITH JOYSTICK.



REVISIONS		
REV	DESCRIPTION	DATE
1	60175-013 A - Q14 WAS -010	4/29/97
2	CORRECTED WIRING DIT 2 (ADDED RED WIRE L (ANVHT) WIRE)	5/19/97

ITEM	PART NO.	PART / MATERIAL DESCRIPTION	QTY
29	60175-013	ENCLOSURE BOX BODY	1
28	29452-089	WIRE 18 GA. THIN COP BLACK	FT 5
27	29450-089	WIRE 18 GA. THIN COP BLUE	FT 2
26	29451-089	WIRE 18 GA. THIN COP WHITE	FT 1
25	29453-089	WIRE 18 GA. THIN COP ORANGE	FT 1
24	29457-089	WIRE 18 GA. THIN COP GREEN	FT 3/5
23	29456-089	WIRE 18 GA. THIN COP RED	FT 2/3
22	29455-089	WIRE 18 GA. THIN COP RED	FT 2
21	29450-002	BUTT CONN 14-16 GA	2
20	66805-012	CONTACT BLACK N.O. A/C	1
19	66805-011	CONTACT BLACK N.C.	2
18	294015-002	CONV PLUG 14-16 GA #8	7
17	29510-002	CONV FORK 14-16 GA #8	19
16			
15	66095-010	PANEL, CONTROLLER R. H.	1
14	66094-010	PANEL, CONTROLLER L. H.	1
13	66805-006	PUSH BUTTON	1
12	66765-002	CONTROLLER HANDLE W/12 PIN PIGTAIL	1
11	66092-000	PANEL, CONTROLLER	1
10	60175-014	ENCLOSURE BOX COVER	1
9	66805-010	CONTACT BLACK N.O.	1
8	66805-002	CONTACT 3/4" W/2 POSITION SELECTOR	1
7	29503-003	LOCKW/ 3/4" W/2	1
6	29551-007	RIVET 1/8" DIA X 1/4" L/8" GRIP	6
5	11236-004	WASHER 1/4" LOCK	4
4	11232-004	SCREW 1/4-20 UNC H/C X 1/2	4
3	63956-010	CONV PIN MALE	10
2	63956-003	CONV 12 PIN	1
1			

UP-RIGHT, INC.		
PART NAME		
CONTROLLER ASSY - PROPORTIONAL		
DDM / EURO X20N		
QTY	UNIT	DATE
0	CON	2/28/98
SCALE	1/2	PART NO. 60020-010
SHEET	1	OF 2

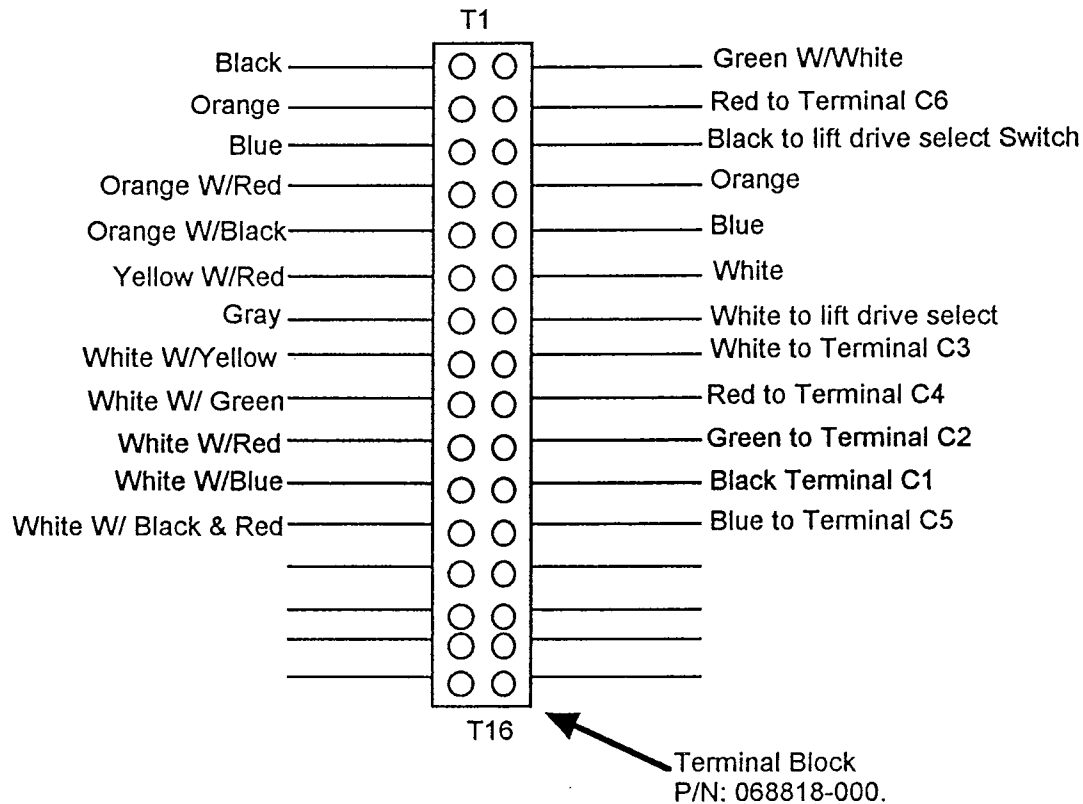
Part NO. 030849-000

# Proportional Controller Conversion

Replaces Part # 066544-000 Controller with Part # 066786-000

Wires from controller "pigtail"

Control cable and switch wires  
removed from old controller



Wires on left side come from "pigtail" on controller.

Wires on right side come from control cable or switches as indicated.

1. Remove old controller and install new controller in control box.
2. Cut 12 pin plug off of "pigtail", leaving wires as long as possible.
3. Cut terminals off control cable and switch wires removed from old controller.
3. Strip each wire and insert it into proper terminal on terminal strip P/N 068818-000. as shown on drawing above.
4. Close control box and perform full function check on new controller including checking elevated drive speed at 20 feet in 18 - 22 seconds.

If you have any questions regarding this product enhancement, please contact the UpRight Service Department at (800) 926-5438, in the USA; (209) 891-5200, outside the USA; or by FAX at (209) 896-9244



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## Introduction

### HOW TO USE THIS MANUAL

This manual is divided into 7 sections. The right hand pages of each section is marked with a black tab that lines up with one of the thumb index tabs on the right side of this page. You can quickly find each section without looking through the table of contents which follows this page. The section number printed at the top corner of each page can also be used as a quick reference guide.

### SPECIAL INFORMATION



#### DANGER



Indicates the hazard or unsafe practice *will* result in severe injury or death.



#### WARNING



Indicates the hazard or unsafe practice *could* result in severe injury or death.



#### CAUTION



Indicates the hazard or unsafe practice could result in *minor* injury or property damage.

NOTES: Give helpful information.

### WORKSHOP PROCEDURES

**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.

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.

## Introduction & Specifications

# 1.0

General description and machine specifications.

## Machine Preparation

# 2.0

Information on preparation for use & shipment, forklifting, transporting and storage.

## Operation

# 3.0

Operating instructions and safety rules.

## Maintenance

# 4.0

Preventative maintenance and service information.

## Troubleshooting

# 5.0

Causes and solutions to typical problems.

## Schematics

# 6.0

Schematics and valve block diagram with description and location of components.

## Illustrated Parts Breakdown

# 7.0

Complete parts lists with illustrations.

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## 1.0 Introduction

### PURPOSE

This manual provides illustrations and instructions for the operation and maintenance of the MX15/19 Work Platforms manufactured by UpRight, Inc. Selma, California. (See Figure 1-1).

### SCOPE

This manual includes both operation and maintenance responsibilities concerning the MX15/19 Work Platform's readiness. The Maintenance Section covers scheduled maintenance, troubleshooting, repair, adjustment and replacement.

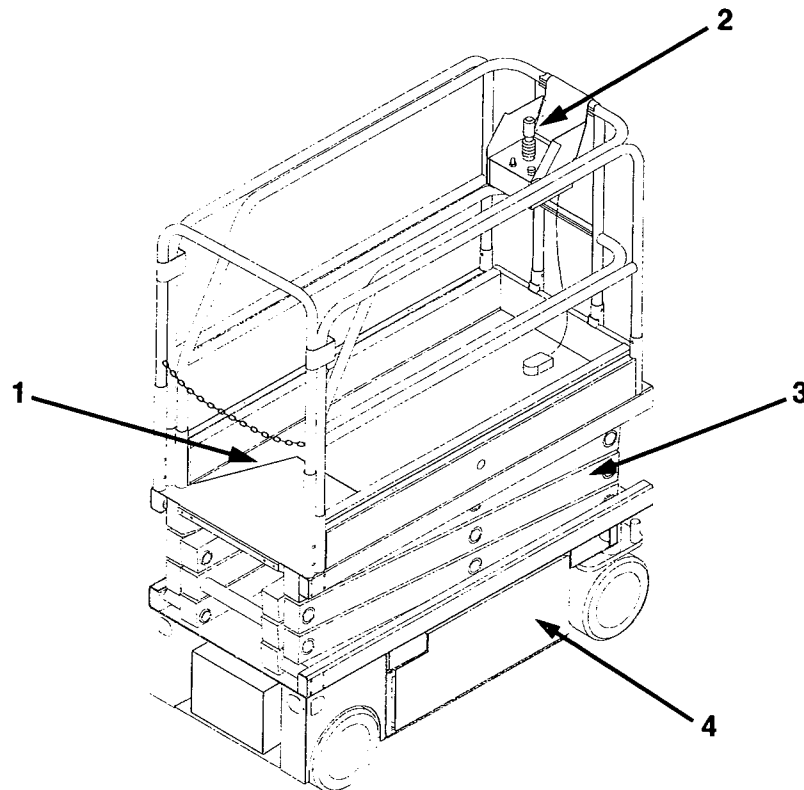
## 1.1 General Information

### DESCRIPTION

The MX15/19 Work Platforms are self-propelled aerial work platforms designed to be used as a means of elevating personnel and equipment to provide a mobile work platform. They are designed to provide mobility with the Platform in a raised or lowered position. Travel with the Platform elevated is automatically limited to the low speed range.

### PURPOSE AND LIMITATIONS

The objective of the MX15/19 Work Platforms 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.



1. Platform
2. Controller
3. Elevating Assembly
4. Chassis

Figure 1-1: MX15/19 Series Work Platform

## 1.2 Specifications\*

Table 1-1: Specifications

ITEM	MX15	MX19
Platform Size (inside Toeboards Deck extended)	28.5 in. x 97 in. (72 cm x 2.46 m)	28.5 in. x 97 in. (72 cm x 2.46 m)
Maximum Platform Capacities	550 lbs. (250 kg.) or two people	500 lbs. (227 kg.) or two people
Height		
Working Height	21 ft. (6.4 m)	25 ft. (7.62 m)
Max. Platform Height	15 ft. (4.57 m)	19 ft. (5.79 m)
Min. Platform Height	35.88 in. (91 cm)	38.88 in. (99 cm)
Weight	1,962 lbs. (890 kg)	2,160 lbs. (980 kg)
Dimensions		
Overall Width	29.75 in. (75 cm)	29.75 in. (75 cm)
Overall Height	76 in. (1.93 m)	79 in. (2.0 m)
Overall Length	62.75 in. (1.59 m)	62.75 in. (1.59 m)
Driveable Height	15 ft. (4.57 m)	19 ft. (5.79 m)
Surface Speed		
Platform Lowered	2.7 mph (4.4 km/h)	2.7 mph (4.4 km/h)
Platform Raised	.7 mph (1.2 km/h)	.7 mph (1.2 km/h)
Lift Speed	12 seconds	15 seconds
Energy Source	24V battery pack (4-220 ampere hour, 6 Volt batteries, min. wt. 62 lbs. (28.12 kg) each), 4 HP DC electric motor	24V battery pack (4-220 ampere hour, 6 Volt batteries, min. wt. 62 lbs. (28.12 kg) each), 4 HP DC electric motor
System Voltage	24 VDC	24 VDC
Battery Charger	25 AMP, 110 VAC, 60 Hz	25 AMP, 110 VAC, 60 Hz
Battery Duty Cycle	25% for 8 Hours	25% for 8 Hours
Hydraulic Tank Capacity	2.68 gal. (10.2 l)	2.68 gal. (10.2 l)
Hydraulic System Pressure, Max.	2500 psi (172 bar)	2700 psi (186 bar)
Hydraulic Fluid		
Normal use (> 32 °F [0 °C])	ISO #46	ISO #46
Low Temp. Use (-10 to 32 °F [-23 to 0 °C])	5W-20 Motor Oil	5W-20 Motor Oil
Lift System	One Single Stage Lift Cylinder	One Single Stage Lift Cylinder
Drive Control	Proportional	Proportional
Control System		
Serial Nos. 1004-1599	Proportional Joystick Controller with Toggle Selector Switch, Red Mushroom Emergency Stop and Foot-Operated Interlock Switch	Proportional Joystick Controller with Toggle Selector Switch, Red Mushroom Emergency Stop and Foot-Operated Interlock Switch
Serial Nos. 1600-Current	Proportional Joystick Controller with Interlock Lever, Toggle Selector Switch and Red Mushroom Emergency Stop Switch	Proportional Joystick Controller with Interlock Lever, Toggle Selector Switch and Red Mushroom Emergency Stop Switch
Horizontal Drive	Dual Front Wheel	Dual Front Wheel
Tires	12 in. (30.5 cm) diameter Solid Rubber, Non-marking	12 in. (30.5 cm) diameter Solid Rubber, Non-marking
Parking Brakes	Dual, Spring Applied, Hydraulic Release	Dual, Spring Applied, Hydraulic Release
Turning Radius (Inside)	1 in. (25 mm)	1 in. (25 mm)
Gradeability	25% (14°)	25% (14°)
Wheel Base	48.75 in. (1.24 m)	48.75 in. (1.24 m)
Guardrails	39 in. (99 cm) or 43.5 in. (1.10 m)	39 in. (99 cm) or 43.5 in. (1.10 m)
Toeboard	6 in. (152 mm)	6 in. (152 mm)

\*Specifications subject to change without notice.

Read, understand and follow all safety rules and operating instructions before attempting to operate the machine.

## 2.1 Preparation for Use



### **WARNING**



STAND CLEAR when cutting the metal banding to avoid being cut when the banding snaps back.

1. Remove the metal banding from the machine.
2. Lift the front of the machine and remove banding and blocks from front wheels.
3. Lower machine.
4. Connect the negative battery lead terminal (Figure 2-1).

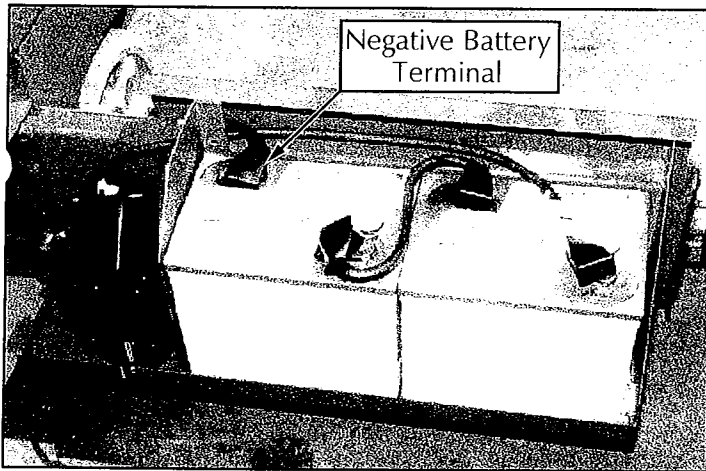


Figure 2-1: Left Chassis Module

## 2.2 Preparation For Shipment

1. Grease all grease fittings per lubrication instructions in Section 4.0, Maintenance.
2. Fully lower the Platform.
3. Disconnect the battery negative (-) lead from the battery terminal (Figure 2-1).
4. Band the Platform Assembly to the Chassis.

## 2.3 Forklifting Of Work Platform

**NOTE:** Forklifting is for transporting only.



### CAUTION



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

Forklift from the side by lifting under the Chassis (Figure 2-2).

## 2.4 Lifting Work Platform

Secure straps to chassis tie down/lift points **only** (Figure 2-2).

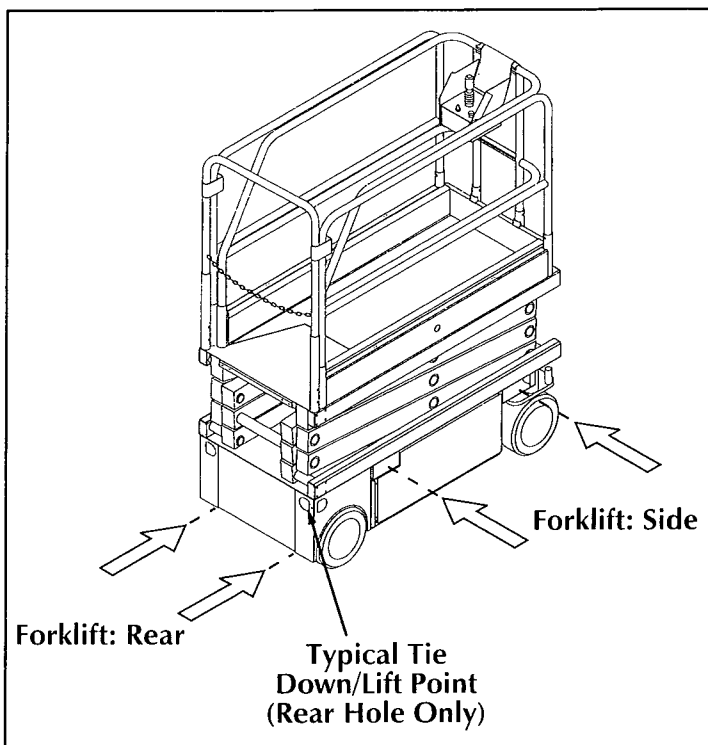


Figure 2-2: Transporting machine

## 2.5 Transport

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 attached to the chassis tie down points (Figure 2-2).



### CAUTION



Over-tightening of chains or straps attached to tie down lugs may result in damage to work platform.

## 2.6 Storage

No preparation is required for normal storage. Regular maintenance per Table 4-1 should be performed. If the work platform is to be placed in long term storage (dead storage) use the following preservation procedure.

### PRESERVATION

1. Clean painted surfaces. If the paint surface is damaged, repaint.
2. Fill the hydraulic tank to operating level with the Platform fully lowered, fluid should be visible on the dipstick.
3. Coat all exposed unpainted metal surfaces with preservative.

### BATTERIES

1. Disconnect the battery ground cable terminal and secure to the chassis.
2. Disconnect the remaining battery leads and secure to the chassis.
3. Remove the batteries and place in alternate service.



## 3.0 Introduction

### GENERAL FUNCTIONING

#### *Machines With Serial Numbers 1004-1599*

**Refer to the Hydraulic and Electrical Schematics,  
Section 6.**

The battery powered electric motor directly drives a two section hydraulic pump. The low section supplies oil under pressure to operate steering and joins the high section flow to provide oil to the other work platform functions. The oil flow is directed to the different functions by electrically activated solenoid valves.

#### *Driving*

With both Emergency Stop Switches ON (pull up), the Key Switch on PLATFORM, the Foot Switch depressed and the Drive/Lift Switch in DRIVE the machine will drive at a speed proportional to the angle of the Control Lever from center and steer in the direction you wish to travel. Driving forward will energize the Drive Coil, the Proportional Coil and the Motor Start Relay through CR2 NC contacts and CR4 NO contacts, with the Platform down, to start the Electric Motor. Oil will now flow through the Proportional Valve. The greater the angle (from center) of the Control Lever the more the Proportional Valve closes. As the Proportional Valve closes more oil is allowed to flow to the Drive/Lift Valve, the Brake Cylinder and through the Forward/Reverse Valve to the Drive Cushion Cylinder, Hydraulic Motors and back through the Forward/Reverse Valve to tank. Driving reverse is the same except the Forward/Reverse Valve is energized reversing the flow of oil to the Hydraulic Motors.

Driving with the Platform elevated is the same, except the Proportional Controller is in the midrange or creep speed (CR4 is no longer energized by the Down Limit Switch), thus limiting the machine to a lower speed. And the Motor Start Relay is energized through CR2 NC contacts, CR4 NC and CR5 NO contacts as long as the machine is level.

#### *Steering*

Steering left or right will energize the Steering Coils and the Motor Relay. This allows oil to flow through the Steering Valve to the Steering Cylinder.

#### *Raising and Lowering The Platform*

With both Emergency Stop Switches ON (pull up), the Key Switch on PLATFORM, the Foot Switch depressed and the Drive/Lift Switch in LIFT, the Platform will raise at a speed proportional to the angle of the Control

Lever. Actuating the Control Lever energizes the Proportional Coil, the UP Coil and Motor Relay through CR2 NC contacts, CR4 NC contacts and CR5 NO contacts, as long as the machine is level, to start the Electric Motor. The greater the angle (from center) of the Control Lever the more the Proportional Valve closes. As the Proportional Valve closes more oil is allowed to flow through the Drive/Lift Valve increasing lift speed. Oil will now flow through the Drive/Lift Valve and Down Valve to the Lift Cylinder in proportion to the angle of the Control Lever. Lowering the Platform electrically energizes the Down Coil, CR2 (closing CR2 NO contacts) and the 60 Hz Down Alarm. This allows the oil to flow out of the Lift Cylinder through the Down Valve and Down Orifice, which controls the rate of descent, then back to tank. During the last inch (25 mm) of Platform lowering, the oil flows through the Lift Cylinder Internal Cushion Orifice to slow the Platform even further (Cushion Speed). Lowering the Platform manually with the Emergency Down Valve allows the oil to flow out of the Lift Cylinder in the same manner but there is no Down Alarm.

#### *Machines With Serial Numbers 1600-Current*

**Refer to the Hydraulic and Electrical Schematics,  
Section 6.**

The battery powered electric motor directly drives a two section hydraulic pump. The low section supplies oil under pressure to operate steering, the high section supplies oil under pressure to operate the other work platform functions. The oil flow is directed to the different functions by electrically activated solenoid valves.

#### *Driving*

With both Emergency Stop Switches ON (pull up), the Key Switch on PLATFORM, the Interlock Lever depressed and the Drive/Lift Switch in DRIVE the machine will drive at a speed proportional to the angle of the Control Lever from center and steer in the direction you wish to travel. Driving forward will energize the Proportional Coil, the Drive Dump Coil through CR2 NO contacts and the Motor Start Relay through CR3 NO contacts, with the Platform down, to start the Electric Motor. Oil will now flow through the Proportional Valve. The greater the angle (from center) of the Control Lever the more the Proportional Valve closes. As the Proportional Valve closes more oil is allowed to flow through the Lift Valve to the Brake Cylinder and through the Forward/Reverse Valve to the Drive Cushion Cylinder, Hydraulic Motors and back through the Forward/Reverse Valve to tank. Driving reverse is the same except the Forward/Reverse Valve is energized reversing the flow of oil the Hydraulic Motors.

Driving with the Platform elevated is the same, except the Joystick Controller second speed circuit (R terminal) is no longer supplied with power (CR4 is no longer energized by the Down Limit Switch), thus limiting the machine to a lower speed. The Motor Start Relay is still energized through CR3 NO contacts as long as the machine is level but CR3 is now energized by the Tilt Sensor.

### ***Steering***

Steering left or right will energize the Steering Coils and the Motor Relay. This allows oil to flow through the Steering Valve to the Steering Cylinder.

### ***Raising and Lowering The Platform***

With both Emergency Stop Switches ON (pull up), the Key Switch on PLATFORM, the Interlock Lever depressed and the Drive/Lift Switch in LIFT, the Platform will raise at a speed proportional to the angle of the Control Lever. Actuating the Control Lever energizes the Proportional Coil, the Lift Coil and Motor Relay through CR3 NO contacts, as long as the machine is level, to start the Electric Motor. The greater the angle (from center) of the Control Lever the more the Proportional Valve closes. As the Proportional Valve closes more oil is allowed to flow through the Drive/Lift Valve increasing lift speed. Oil will now flow through the Drive/Lift Valve and Down Valve to the Lift Cylinder in proportion to the angle of the Control Lever. Lowering the Platform electrically energizes the Down Coil and the 60 Hz Down Alarm. This allows the oil to flow out of the Lift Cylinder through the Down Valve and Down Orifice, which controls the rate of descent, then back to tank. During the last inch (25 mm) of Platform lowering, the oil flows through the Lift Cylinder Internal Cushion Orifice to slow the Platform even further (Cushion Speed). Lowering the Platform manually with the Emergency Down Valve allows the oil to flow out of the Lift Cylinder in the same manner but there is no Down Alarm.

## ***DESIGN FEATURES***

The MX15/19 Work Platforms have the following features to ensure safe operation:

- The drive speed is limited to Creep Speed when operating the work platform while the Platform is elevated.
- The Platform descent rate is controlled by an orifice (Fixed Speed). In the last 25 mm of Platform lowering the oil flows through the lift cylinder internal cushion orifice, slowing the Platform descent even further (Cushion Speed).
- Parking brakes are automatically engaged when the Drive Switch is released and the machine comes to a full stop or if power is lost.
- The Chassis is equipped with passive pothole protection.
- The Chassis Controls and Controller are equipped with an Emergency Stop Switch for stopping all powered functions.
- An Interlock Switch must be depressed for the Controller to function; a Foot Switch on machines with Serial Numbers 1004-1599 and an Interlock Lever on the Joystick on machines with Serial Numbers 1600-current.
- An alarm (60 Hz) is provided to signal when the Platform is lowering.
- A Lift Switch is located in the Chassis Control Panel on the right side of the Chassis for lifting and lowering the Platform from ground level.
- The Tilt Alarm (600 Hz) is activated on slopes of 2 degrees side to side and fore and aft when the Platform is elevated.
- An Emergency Lowering Valve Knob is provided at the rear of the Chassis to lower the Platform in the event electrical power is lost.

## 3.1 Safety Rules and Precautions

### Before using the MX15/19 Work Platform:

**NEVER** operate the machine within 10 feet (3 meters) of power lines. **THIS MACHINE IS NOT INSULATED.**

**NEVER** elevate the Platform or drive the machine while elevated unless the machine is on a firm level surface.

**NEVER** sit, stand or climb on guardrail.

**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 unless all guardrails are properly in place and secured with fasteners that are properly torqued.

**SECURE** chain 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 *Table 1-1* for maximum Platform load.

**NEVER** use damaged equipment. (Contact UpRight, Inc. for instructions.)

**NEVER** change or modify 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 Platform elevated.

**NEVER** enter the area between the Platform and Chassis while the Platform is elevated without first blocking the Elevating Assembly.

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

**SECURE** the work Platform against unauthorized use by turning key switch off and removing key from key switch.

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

## 3.2 Controls and Indicators

The controls and indicators for operation of the MX15/19 Work Platform are shown in Figure 3-1. The names and functions of the controls and indicators are listed in Table 3-1. The index numbers in the figure correspond to the index numbers in the table. **The operator shall know the location of each control and indicator and have a thorough knowledge of the function and operation of each before attempting to operate the unit.**

Table 3-1: Controls and Indicators

### Platform/Controller

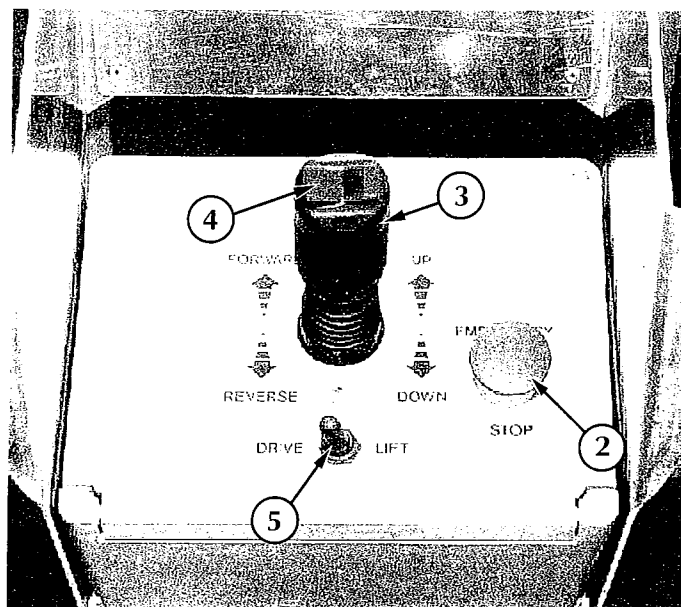
INDEX NO.	NAME	FUNCTION
1	Foot Switch, Serial Numbers: 1004-1599 OR Interlock Lever, Serial Numbers: 1600-Current	Provides power to the Controller only when depressed, preventing accidental activation of the Controller.  Provides power to the Joystick only when depressed, preventing accidental activation of the Controller.
2	Emergency Stop Switch	Push red button to cut off power to all functions (OFF). Pull UP to provide power (ON).
3	Control Lever (Joystick)	Move Joystick forward or backward to proportionally control drive functions or lift/lower functions depending on position of Drive/Lift Switch.
4	Steering Switch (Top of Joystick)	Push switch right or left to control steering. <b>Steering is not self-centering. Wheels must be returned to straight ahead position by operating Steering Switch.</b>
5	Drive/Lift Switch	Selecting <b>DRIVE</b> allows the machine to move forward or reverse. Selecting <b>LIFT</b> allows the Platform to raise or lower.

Table 3-1: Controls and Indicators (cont'd.)

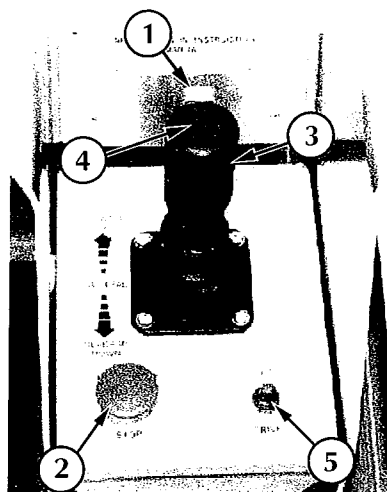
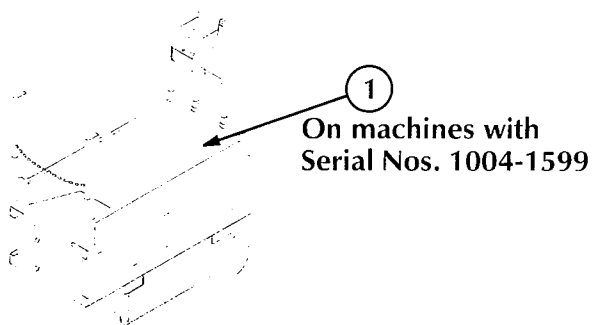
### Chassis

INDEX NO.	NAME	FUNCTION
6	Emergency Stop Switch	Push red button to cut off power to all functions (OFF). Pull out to provide power (ON).
7	Chassis Lift Switch	Toggle switch to <b>UP</b> to lift the Platform and toggle switch to <b>DOWN</b> to lower the Platform.
8	Chassis Key Switch	Turn switch to <b>PLATFORM</b> to provide power to Controller and to <b>CHASSIS</b> to provide power to Chassis Controls.
9	Hour Meter	Indicates hours machine has been operated.
10	Emergency Lowering Valve	Pull knob out, opening the valve, to lower the Platform. Release the knob, closing the valve, to stop Platform lowering. <b>The Platform cannot be raised until this valve is closed.</b>
11	Brake Release	Loosen locknut and brake adjustment bolt to disengage brakes. Tighten brake adjustment bolt until brakes fully engage tires, secure bolt with locknut. <b>DO NOT operate the machine with the Brakes disengaged.</b>
12	Charge Indicator	LED illuminates when batteries are charging. When batteries are fully charged the LED will blink.
13*	Down Alarm (60 Hz)	Sounds an audible signal anytime the Platform is lowering during normal operation. If the Emergency Lowering Valve is used the alarm <b>does not</b> sound.
14*	Tilt Alarm (600 Hz)	Sounds an audible signal when the platform is elevated and on a slope of 2° side to side or 2° fore and aft.

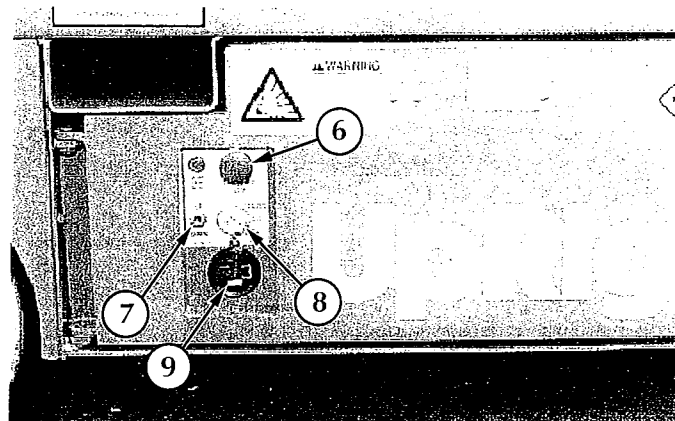
\* Not Shown



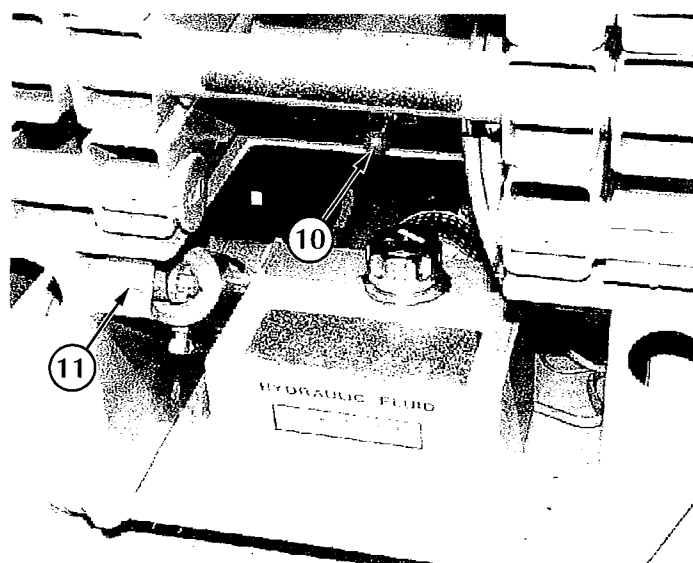
Controller, Serial Numbers 1004-1599



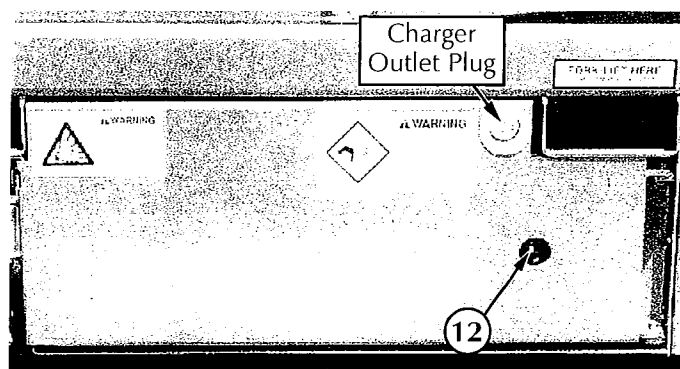
Controller, Serial Numbers 1600-Current



Chassis Control Panel



Chassis, Rear



Chassis Module, Left Side

\* Items 13 & 14 are mounted on the electrical box mounted inside the right chassis door.

Figure 3-1: Controls and Indicators

### 3.3 Pre-Operation Inspection

**NOTE:** 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.



#### **WARNING**



**DO NOT** perform service on or in the Elevating Assembly with the Platform elevated unless the Platform is properly blocked.

1. Open module doors.
2. Check the level of the hydraulic oil with the Platform fully lowered. Oil should be visible on the dipstick. Add hydraulic oil if necessary (see Sections 1.2 & 4.4).
3. Check that fluid level in the batteries is correct (see *Battery Maintenance*, Section 4.3).
4. Verify that batteries are charged.
5. Check that AC extension cord has been disconnected from the chassis outlet.
6. Carefully inspect the entire work platform for damage such as cracked welds or structural members, loose or missing parts, oil leaks, damaged cables or hoses, loose connections and tire damage.
7. Move machine, if necessary, to unobstructed area to allow for full elevation.
8. Turn Chassis and Platform Emergency Stop Switches ON (Figure 3-1) by pulling up.
9. Turn the Chassis Key Switch (Figure 3-1) to **CHASSIS**.
10. Push Chassis Lift Switch (Figure 3-1) to **UP** position and fully elevate Platform.
11. Visually inspect the Elevating Assembly for damage or erratic operation. Check for missing or loose parts.
12. Partially lower the Platform by pushing Chassis Lift Switch to **DOWN** and check the operation of the audible lowering alarm.
13. Open the Emergency Lowering Valve (Figure 3-1), to check for proper operation, by pulling the knob out. Once the Platform is fully lowered, close the valve by releasing the knob or pushing in slightly.
14. Turn the Chassis Key Switch to **PLATFORM**.
15. Close and latch module doors.
16. Check that route is clear of persons, obstructions, holes and drop-offs, is level and capable of supporting the wheel loads.
17. After mounting Platform secure chain across entrance.
18. Position Drive/Lift Switch to **DRIVE**.
19. While depressing either the Foot Switch or Interlock Lever, slowly position the Control Lever to **FORWARD** then **REVERSE** to check for speed and directional control. The farther the Control Lever is pushed or pulled from center the faster the machine will travel.
20. Push the Steering Switch, on the top of the Control Lever, **RIGHT** then **LEFT** to check for steering control.
21. Push the Emergency Stop Switch Button.

## 3.4 Operation

**NOTE:** Before operating work platform ensure that the pre-operation and safety inspection has been completed, any deficiencies have been corrected and the operator has been thoroughly trained on this machine.

### TRAVEL WITH PLATFORM LOWERED

1. Check that route is clear of people, obstructions, holes and drop-offs, is level and capable of supporting wheel loads.
2. Verify Chassis Key Switch is on **PLATFORM** and Chassis Emergency Stop Switch is **ON**, pull up.
3. After mounting Platform secure chain across entrance.
4. Check clearances above, below and to the sides of the machine.
5. Turn Controller Emergency Stop Switch **ON** by pulling up. When the button is pushed down Emergency Stop Switch will automatically go to **OFF** position.
6. Position Drive/Lift Switch to **DRIVE**.
7. While depressing either the Foot Switch or Interlock Lever, slowly push or pull the Control Lever to **FORWARD** or **REVERSE** position to travel in the desired direction. The farther the Control Lever is pushed or pulled from center the faster the machine will travel.

### STEERING

1. Position Drive/Lift Switch to **DRIVE**.
2. While depressing either the Foot Switch or Interlock Lever, push the Steering Switch, on the end of the Control Lever, to **RIGHT** or **LEFT** to turn wheels in the desired direction. Observe the tires while maneuvering the work platform to ensure proper direction.

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

### ELEVATING PLATFORM



#### **WARNING**



**LOOK** up and around for obstructions before performing the lift function.

**DO NOT** elevate the Platform unless the work platform is on a firm and level surface.

**DO NOT** operate the work platform within 10 ft. (3 m) of any electrical lines .  
**THIS WORK PLATFORM IS NOT INSULATED.**

**NEVER** enter the Elevating Assembly area while the Platform is elevated without first blocking the Elevating Assembly.

1. Position Drive/Lift Switch to **LIFT**.
2. While depressing either the Foot Switch or Interlock Lever, push Control Lever to **UP**.

### TRAVEL WITH PLATFORM ELEVATED



#### **WARNING**



Travel with Platform elevated **ONLY** on firm and level surfaces.

**NOTE:** Work platform will travel at reduced speed when Platform is elevated.

1. Check that route is clear of people, obstructions, holes and drop-offs, is level and capable of supporting the wheel loads.
2. Check clearances above, below and to the sides of work platform.
3. Position Drive/Lift Switch to **DRIVE**.
4. While depressing either the Foot Switch or Interlock Lever, slowly push or pull the Control Lever to **FORWARD** or **REVERSE** position to travel in the desired direction.

### LOWERING PLATFORM

1. Position Drive/Lift Switch to **LIFT**.
2. While depressing either the Foot Switch or Interlock Lever, pull Control Lever to **DOWN**.

## EMERGENCY LOWERING

The Emergency Lowering Valve Knob is located at the rear of the Chassis (see Figure 3-1).

1. Open the Emergency Lowering Valve by pulling out on the knob.

**Note: the Down Alarm will not sound when using the Emergency Lowering Valve.**

2. Once the Platform is fully lowered, be certain the Emergency Lowering Valve is closed again. The Platform will not elevate if the Emergency Lowering Valve has not been closed.
3. To close the Emergency Lowering Valve, release the knob and push in slightly.

## AFTER USE EACH DAY

1. Ensure that the Platform is fully lowered.
2. Park the machine on level ground, preferably under cover. Secure against vandals, children or unauthorized operation.
3. Turn the Key Switch to **OFF** (center position) and remove the key to prevent unauthorized operation.
4. Plug in Battery Charger and verify charger is operating, see *Battery Charging*, Section 4.3.

## PARKING BRAKE RELEASE

(Figure 3-1)

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

1. Loosen the locknut and turn the brake adjustment bolt counterclockwise until the brakes have cleared the tires.
2. The machine will now roll when pushed or pulled.

After moving the machine and before normal operation:

Tighten the brake adjustment bolt until the brakes fully engaged the tires, secure the adjustment bolt with the locknut. Verify that the brakes clear the tires when driving and fully engage the tires when stopped.



### WARNING



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



## 4.0 Introduction

This section contains instructions for the maintenance of the MX15/19 Work Platforms. Procedures for the operational checkout adjustment, scheduled maintenance, and repair/removal are included.

Referring to *Section 3.0* will aid in understanding the operation and function of the various components and systems of the MX15/19 Work Platforms and help in diagnosing and repair of the machines.



### SPECIAL TOOLS

The following is a list of special tools that are required to perform certain maintenance procedures. These tools may be purchased from your dealer.

Description	Part Number
Inclinometer	10119-000-00
Gauge, 0-3000 psi	14124-030-00
Fitting, Quick Disconnect	63965-002-00

## 4.1 Preventative Maintenance (Table 4-1)

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. Complete descriptions of the procedures are in the text following the table.

 <b>WARNING</b> 
<p>Before performing preventative maintenance familiarize yourself with the operation of the machine.</p> <p>Always use the Elevating Assembly brace whenever it is necessary to enter the Elevating Assembly when the Platform is elevated.</p>

The Preventative Maintenance Table has been designed to be used for machine service and maintenance repair. **Please copy the following page and use this table as a checklist when inspecting a machine for service.**

## Preventative Maintenance Table 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: \_\_\_\_\_

Table 4-1: Preventative Maintenance

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	50h/30d			
	Clean exterior	250h/6m			
	Clean terminals	250h/6m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	250h/6m			
	Drain and replace oil (ISO #46)	1000h/2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	50h/30d			
	Check for exterior wear	50h/30d			
Emergency Hydraulic System	Open the emergency lowering valve and check for serviceability	Daily			
Controller	Check condition & operation	Daily			
Control Cable	Check the exterior of the cable for pinching, binding or wear	Daily			
Platform Deck and Rails	Check fasteners for proper torque	Daily			
	Check welds for cracks	Daily			
	Check condition of deck	Daily			
	Check entry way closure	Daily			
Hydraulic Pump	Check for hose fitting leaks	Daily			
	Wipe clean	50h/30d			
	Check for leaks at mating surfaces	50h/30d			
	Check mounting bolts for proper torque	50h/30d			
Drive Motors	Check for operation and leaks	Daily			
Steering System	Lubricate pivot pins	250h/6m			
	Lubricate king pins	250h/6m			
	Check steering cylinder for leaks	50h/30d			
	Check hardware & fittings for proper torque	250h/6m			
Elevating Assembly	Inspect for structural cracks	Daily			
	Check pivot bearings for wear	50h/30d			
	Check pivot pin mounting bolts for proper torque	50h/30d			
	Check Scissor Arms for bending	250h/6m			
Chassis	Check hoses for pinch or rubbing points	Daily			
	Check welds for cracks	Daily			
	Check tires for damage	Daily			
	Check component mounting for proper torque	250h/6m			
Lift Cylinder	Check cylinder rod for wear	50h/30d			
	Check pivot pin retaining bolts	50h/30d			
	Check seals for leaks	50h/30d			
	Check pivot points for wear	50h/30d			
	Check fittings for proper torque	50h/30d			
Entire Unit	Perform pre-operation inspection	Daily			
	Check for and repair collision damage	Daily			
	Lubricate	50h/30d			
	Check fasteners for proper torque	250h/6m			
	Check for corrosion-remove and repaint	250h/6m			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			

## 4.2 Blocking Elevating Assembly (Figure 4-1)

⚠ **DANGER** ⚠

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 installing or removing brace.

### INSTALLATION

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 Switch to UP and elevate Platform approximately seven (7) feet (2.1 m) for the MX15 or nine (9) feet (2.7 m) for the MX19.
5. Rotate Scissors Brace towards the rear, holding it perpendicular to the scissor tube.
6. Push Chassis Lift Switch to DOWN position and gradually lower Platform until the scissor tube rests on the brace.

### REMOVAL

1. Push Chassis Lift Switch to UP position and gradually raise Platform until the Scissors Brace will clear the scissor tube.
2. Rotate Scissors Brace towards the front so that it rests on the Chassis.
3. Push Chassis Lift Switch to DOWN position and completely lower platform.
4. Turn Chassis Key Switch to **DECK**.

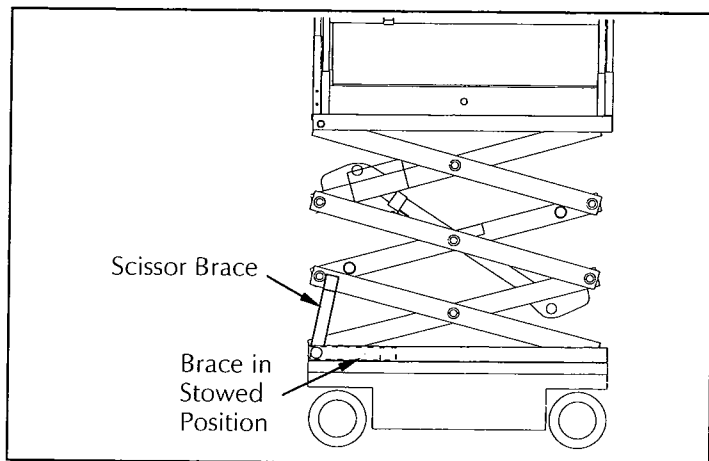


Figure 4-1: Blocking the Elevating Assembly

## 4.3 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.

⚠ **WARNING** ⚠

Hazard of explosive gas mixture. Keep sparks, flame and smoking materials away from batteries.

Always wear safety glasses when working with batteries.

Battery fluid is highly corrosive. Rinse away any spilled fluid thoroughly with clean water.

### BATTERY INSPECTION AND CLEANING

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.

⚠ **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.

Batteries should be inspected periodically for signs of cracks in the cases, electrolyte leakage and corrosion of the terminals. Inspect cables for worn spots or breaks in the insulation and for broken cable terminals.

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

## BATTERY CHARGING

(Figure 4-2)

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



### CAUTION



Charge batteries in a well ventilated area.

Do not charge batteries when the work platform is in an area containing sparks or flames.

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

Never leave charger operating unattended for more than two days.

Never disconnect cables from batteries when charger is operating.

Keep charger dry.

When night air temperatures fall below 65°F (18°C) batteries charged in unheated areas should be placed on charge 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.

1. Check battery fluid level. If electrolyte level is lower than  $\frac{3}{8}$  in. (10 mm) above plates add distilled water only.
2. The battery charger is located inside the left chassis door. Connect extension cord (12 guage (1.5 mm<sup>2</sup>) conductor minimum and 50 ft. (15 m) in length maximum) to the charger cord or to the outlet plug located in the left chassis door. 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 indicator will come on.
4. Charger switches to trickle charge automatically when batteries are fully charged, the LED 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.

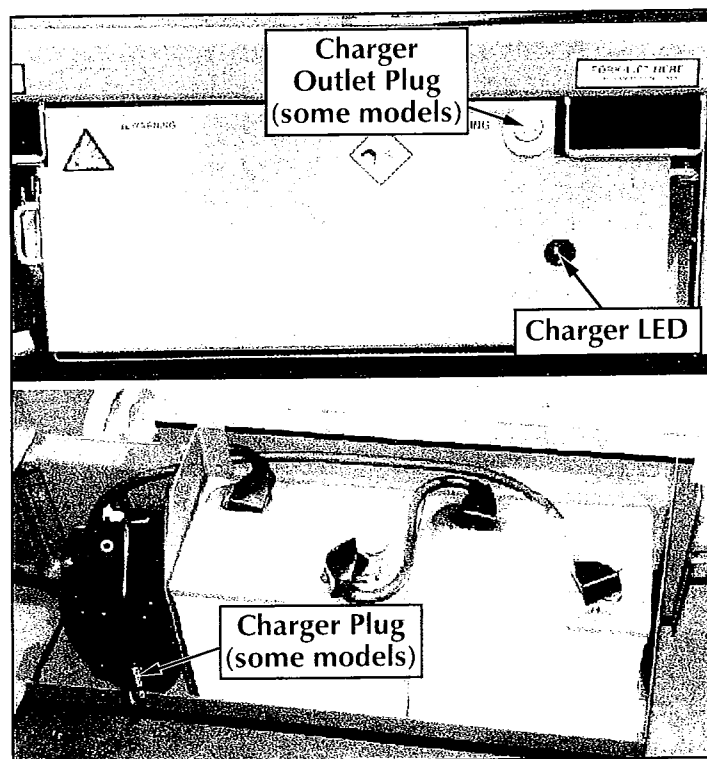


Figure 4-2: Battery Charger

## 4.4 Lubrication

### STEERING LINKAGE

Apply two to three drops of oil to each king pin or linkage bearing.

### HYDRAULIC OIL TANK AND FILTER (Figure 4-3 and 4-4)

#### Fluid Level

With the Platform fully lowered, open the Left Module and remove the reservoir cap, oil should be visible on the dipstick.

#### Oil and Filter Replacement

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.



### CAUTION



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

2. Provide a suitable container to catch the drained oil. Hydraulic tank has a 2.68 gal. (10.2 liter) capacity.
3. Remove the drain plug (the hydraulic tank is located at the rear of the machine) and allow all oil to drain. Dispose of hydraulic fluid properly, contact your local oil recycler.
4. Clean magnet on drain plug and reinstall.
5. Unscrew the filter (located under valve block, easiest access is through the right module) from the filter assembly.
6. Apply a thin film of clean hydraulic oil to the gasket of the replacement filter.
7. Screw the replacement filter onto the filter head until the gasket makes contact, then rotate the filter  $\frac{3}{4}$  of a turn further.
8. Fill the hydraulic reservoir with hydraulic oil (see Section 1.2) until the oil is visible on the dipstick, do not fill above the lower line on the dipstick. Hydraulic tank has a 2.68 gal. (10.2 liter) capacity.

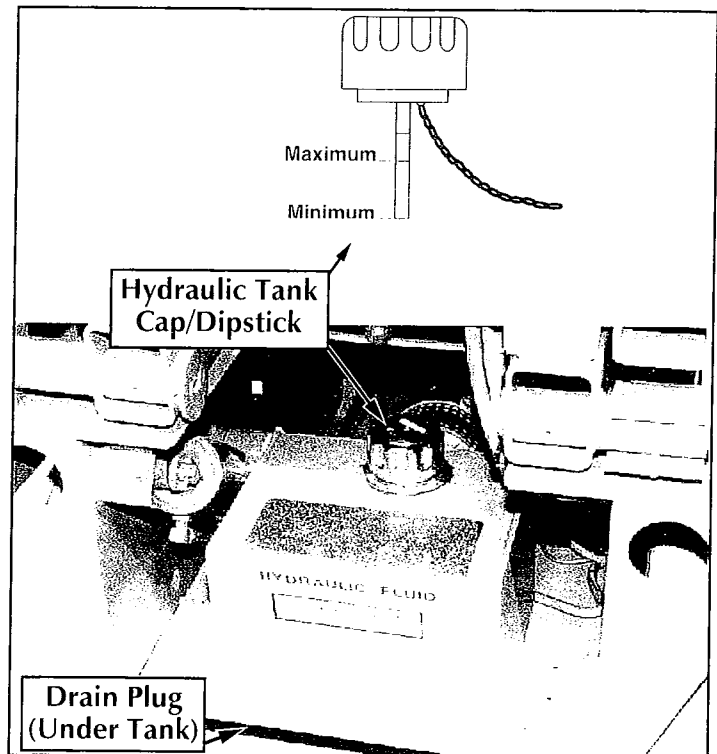


Figure 4-3: Hydraulic Oil Tank

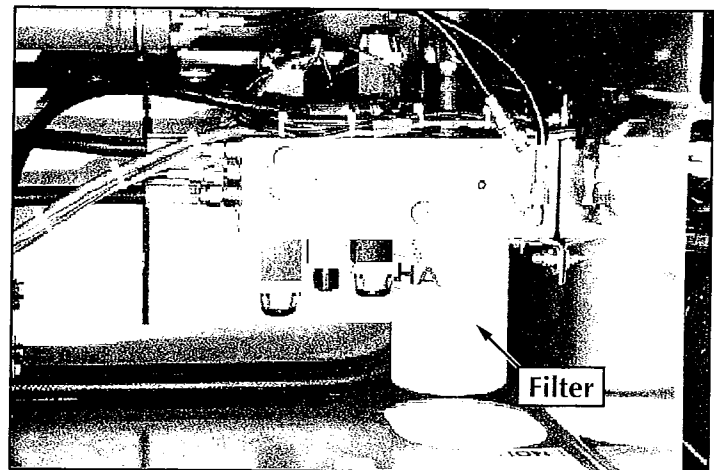


Figure 4-4: Hydraulic Oil Filter

## 4.5 Setting Hydraulic Pressures (Figure 4-5 & 4-6)

Check the hydraulic pressures whenever the pump, manifold or relief valves have been serviced or replaced.



### WARNING

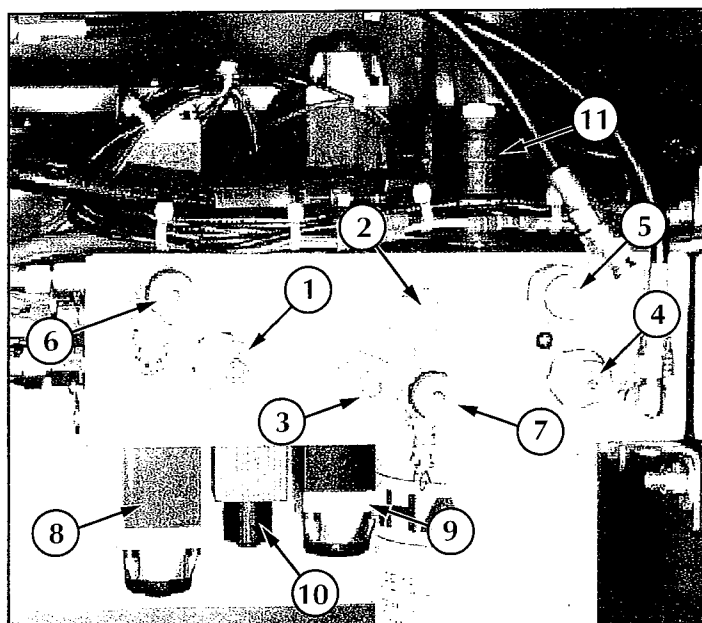


The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.

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.**

### MAIN (LIFT) RELIEF VALVE

1. Operate the hydraulic system 10-15 minutes to warm the oil.
2. Loosen locknut or remove cover on the Main Relief Valve and turn adjusting screw counterclockwise two full turns.
3. Place the maximum rated load, see *Table 1-1*, on the Platform.
4. Turn the Chassis Key Switch to **CHASSIS**. Position the Chassis Lift Switch to **UP** position and hold it there.
5. Slowly turn the Main Relief Valve adjusting screw clockwise to increase the pressure until the Platform just begins to raise.
6. Release the Chassis Lift Switch. Tighten locknut or replace Main Relief Valve cover and torque to 6 Ft/Lbs (8 Nm.).



- |                           |                           |
|---------------------------|---------------------------|
| 1. Main Relief            | 7. Low Press. Gauge Port  |
| 2. Steering Relief        | 8. Drive/Lift Valve       |
| 3. Low Drive Relief       | 9. Steering Valve         |
| 4. Fwd. C-Balance Valve   | 10. Proportional Valve    |
| 5. Rev. C-Balance Valve   | 11. Forward/Reverse Valve |
| 6. High Press. Gauge Port |                           |

**Figure 4-5: Hydraulic Manifold, for Machines with Serial Numbers 1004-1599**

### LOW DRIVE RELIEF VALVE

**This adjustment is for machines with serial numbers 1004-1599 ONLY.**

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 gauge in low pressure gauge port.
4. Loosen locknut or remove cover on the Low Drive Relief Valve and turn adjusting screw counterclockwise two full turns.
5. While one person drives the machine forward against the wall, slowly turn the Low Drive Relief Valve adjusting screw clockwise to increase the pressure until the gauge reads 1750 psi (121 bar).
6. Tighten locknut or replace Low Drive Relief Valve cover and torque to 6 Ft/Lbs (8 Nm).
7. Remove gauge and replace cap.

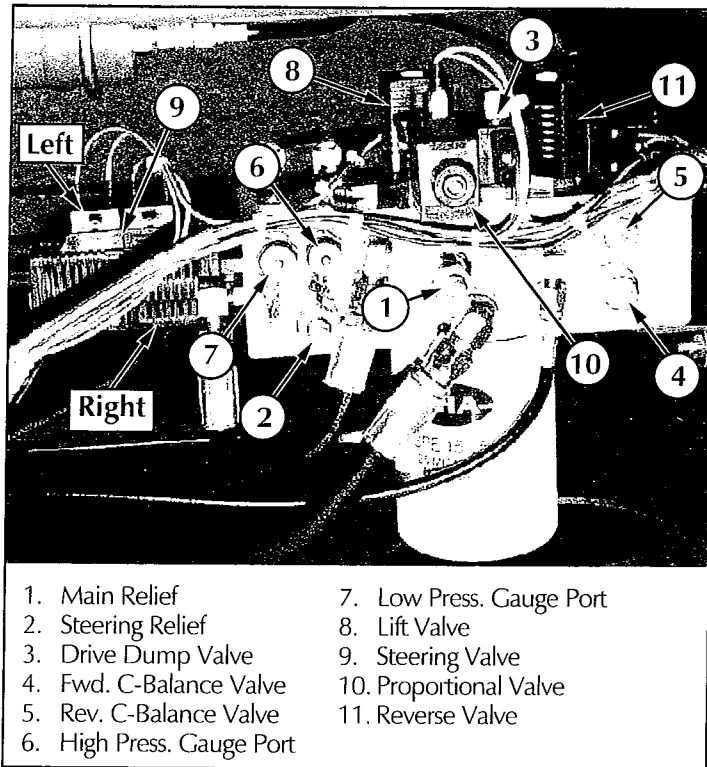


Figure 4-6: Hydraulic Manifold, for Machines with Serial Numbers 1600-Current

## COUNTERBALANCE VALVES

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. For machines with serial numbers 1004-1599:  
Remove low pressure gauge port cap and install the pressure gauge assembly.  
For machines with serial numbers 1600-current:  
Remove high pressure gauge port cap and install the pressure gauge assembly.
3. For machines with serial numbers 1004-1599:  
Remove the red Control Cable wire from terminal #9.  
For machines with serial numbers 1600-current:  
Remove the red Control Cable wire from terminal #A6.
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 or Interlock Lever 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 800 psi (55 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 800 psi (55 bar).
10. Check the settings by slowly moving the Control Lever **FORWARD**, then **REVERSE** checking the gauge to ensure pressures are properly set. Readjust 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 the proper terminal.
13. Remove the gauge from the gauge port and reinstall cap.
14. Check for proper operation of the drive system and brake.

## STEERING RELIEF VALVE

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Install gauge in low pressure gauge port.
3. Loosen locknut or remove cover on the Steering Relief Valve and turn adjusting screw counterclockwise 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 1200 psi (82.7 bar).
5. Tighten locknut or replace Steering Relief Valve cover and torque to 6 Ft/Lbs (8 Nm).
6. Remove gauge and replace cap.

## 4.6 Switch Adjustments



### WARNING



Always use the Elevating Assembly Brace whenever it is necessary to enter the Elevating Assembly when the Platform is elevated.

### TILT SENSOR (Figure 4-7)

#### Introduction

The Tilt Sensor has three wires; red-power (24 v in), black-ground, white-output (24 v out). To verify the sensor is working properly there are two LED's under the sensor; green indicates the sensor is on (has power), red indicates the sensor is level and the white wire is 'hot' (24 v out).

#### Adjustment

1. Place machine on firm level surface  $\pm 1/4^\circ$ .
2. Use the Inclinator (P/N: 10119-000-00) to ensure front and rear of Chassis is level  $\pm 1/4^\circ$ .
3. Use the Chassis Controls to raise Platform to approximately 9 feet (2.7 m).
4. Install the Scissors Brace, see page 4-3.
5. Remove Tilt Sensor Electrical Box cover at front of machine.
6. Adjust the three leveling locknuts until the bubble is centered in the circle on the attached bubble level.
7. Replace the Tilt Sensor Electrical Box cover.
8. Store the Scissors Brace and lower the Platform.

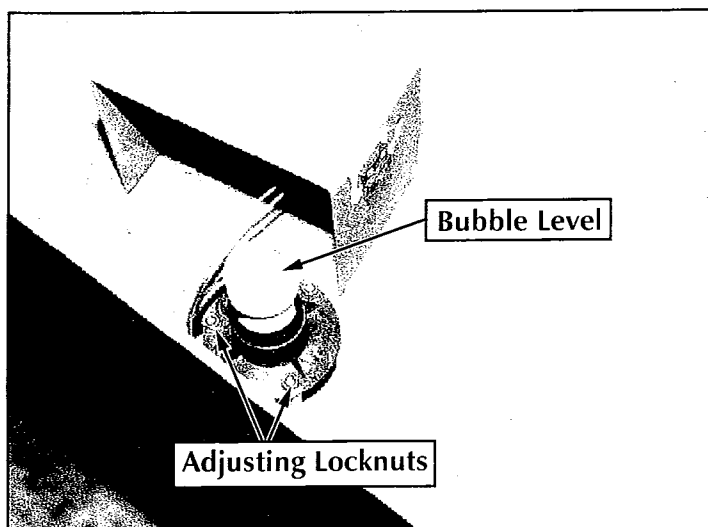


Figure 4-7: Tilt Sensor Adjustment

### DOWN LIMIT SWITCH (Figure 4-8)

The Down Limit Switch cuts power to the High Speed Circuit and supplies power to the Tilt Sensor Circuit when the Platform is elevated. The Down Limit Switch is a proximity switch that uses a magnet to close the switch. The switch is located on the left side of the Tilt Sensor Electrical Box at the front of the machine. The magnet is mounted on a bracket attached to the lower inner scissor arm assembly.

No adjustment of the switch should be necessary. If for some reason the switch fails to close when the Platform is down, bend the bracket, the magnet is mounted on, just enough to actuate the switch. DO NOT allow the magnet to hit the switch.

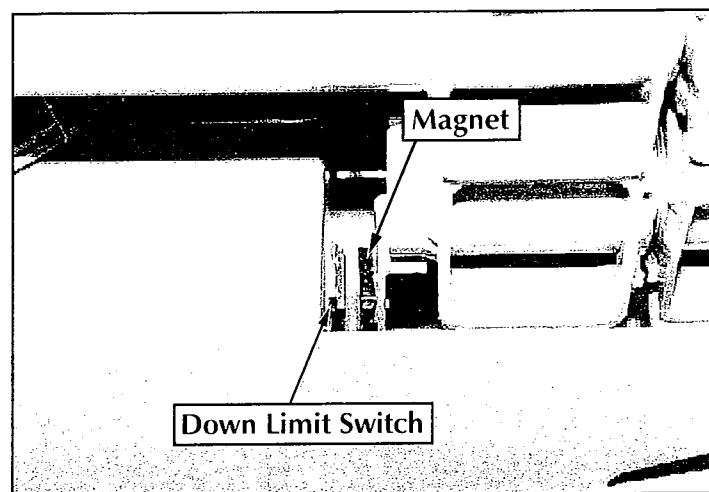


Figure 4-8: Down Limit Switch

### UP LIMIT SWITCH (Figure 4-9)

The Up Limit Switch cuts power to the Lift (Up) Solenoid when the Platform is fully elevated, preventing the Lift Cylinder from 'bottoming out'. The Up Limit Switch is a mercury switch that is located just in front of the right rear scissor pivot on the lower inner scissor assembly.

To adjust the switch, disconnect the wires to the switch and install a jumper, connecting the wires together. Slowly, elevate the Platform to full height. Place a mark on the Chassis where the scissor slide block currently is. Lower the Platform just enough to move the slide block  $1/4$ - $1/2$  in. (7-13 mm), mark this location. Install a continuity tester or ohmmeter across the Up Limit Switch. Rotate the switch until it just opens, secure the switch with the mounting screw and reconnect the wires to the switch.

Lower and raise the Platform to verify the adjustment, the slide block should stop at the second mark on the Chassis.



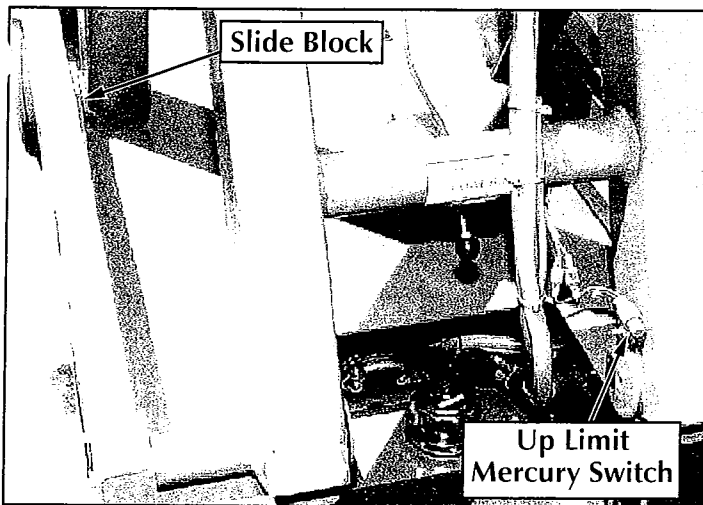


Figure 4-9: Up Limit Switch Adjustment

## PROPORTIONAL CONTROLLER

### PQ Controller, Serial Numbers 1004 to 1599 (Figure 4-10)

To perform the adjustment the Controller (Control Box) must be opened by removing the two screws at the top corners of the Controller and rotating the top forward to expose the proportional controller.

1. Push Control Lever just far enough to illuminate the PWM LED indicator.
2. Set the 'LO' pot so the motor turns on when the LED lights up but the machine does not move.
3. Select **LIFT** with Drive/Lift Switch and elevate Platform 6 in. (152 mm).
4. Select **DRIVE** with Drive/Lift Switch.
5. Push Control Lever fully to **FORWARD** or **REVERSE** and check that machine speed is 20 ft. (6.1 m) in 18-22 seconds.
6. Adjust 'MID' trim pot if required, turning clockwise increases speed.
7. Lower platform fully.
8. Push Control Lever fully to **FORWARD** or **REVERSE** and check that machine speed is 20 ft. (6.1 m) in 5-7 seconds.
9. Adjust 'HI' trim pot if required.

### OEM Controller, Serial Numbers 1600 to Current (Figure 4-11)

To perform the adjustment the Controller (Control Box) must be opened by removing the screws at the corners of the Controller and rotating the top forward to expose the proportional controller. Remove the potting material from the LO potentiometer adjustment screw if necessary.

**Only the LO potentiometer might require adjustment, DO NOT attempt to adjust the other potentiometers as they are preset at the factory.**

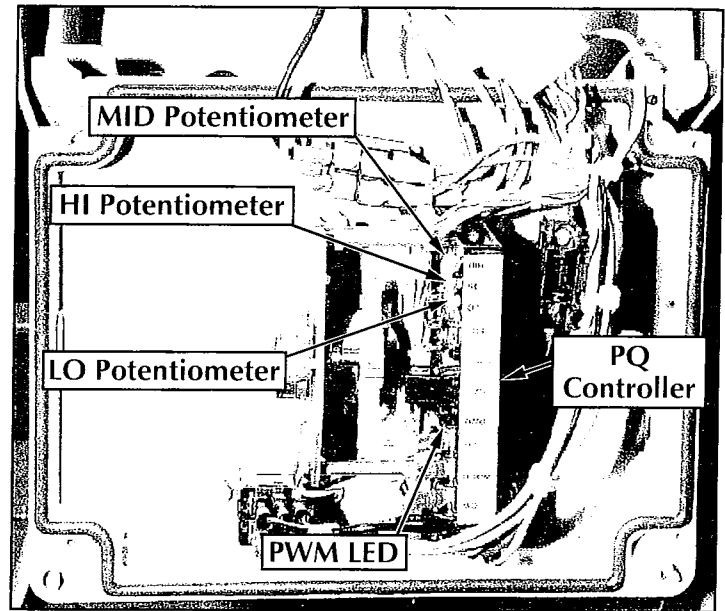


Figure 4-10: PQ Proportional Controller Adjustment

1. Select Lift with Drive/Lift Switch and elevate Platform 6 in. (152 mm).
2. Select Drive with Drive/Lift Switch.
3. Push Control Lever fully to **FORWARD** or **REVERSE** and check that machine speed is 20 ft. (6.1 m) in 18-22 seconds.
4. Adjust 'LO' trim pot if required, turning clockwise increases speed.

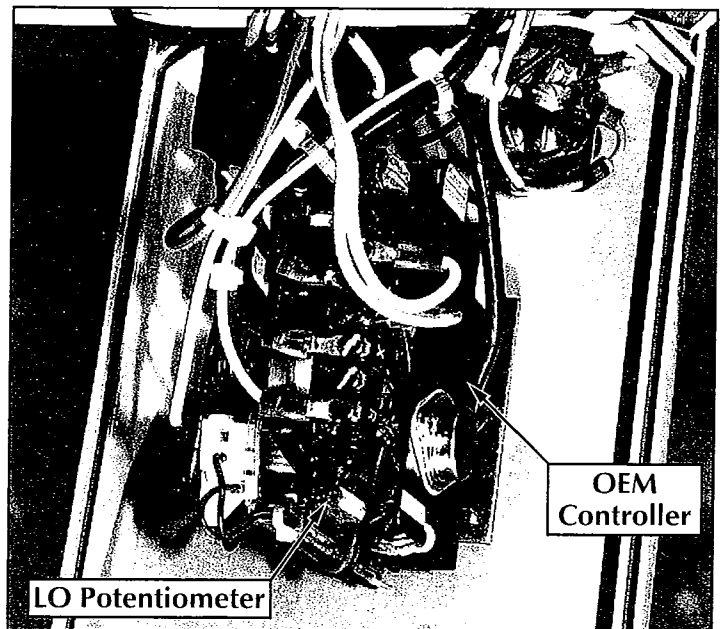


Figure 4-11: OEM Proportional Controller Adjustment

## 4.7 Hydraulic Manifold (Figure 4-12 or 4-13)

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

### REMOVAL

1. Tag and disconnect the solenoid valve leads.
2. Tag, disconnect and plug hydraulic hoses.
3. Remove the bolts that hold the manifold to the mounting bracket, being careful not to damage the ground wires.
4. Remove manifold block.

### DISASSEMBLY

**NOTE:** Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 4-12 or 4-13 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove spool valve covers and spool valves.
3. Remove solenoid valves, relief valves and counterbalance valves.
4. Remove fittings and plugs.

### CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built up contaminants and then blow out all passages with clean compressed air.
2. Inspect the manifold 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.

1. Install fittings and plugs.
2. Install counterbalance valves, relief valves, solenoid valves and spool valves.

**Note:** Refer to Table 4-2 for the proper torque values when installing any hydraulic component.

3. Install coils on solenoid valves.

### INSTALLATION

**Note:** Refer to Table 4-2 for hydraulic component torque specifications.

1. Attach manifold assembly to mounting brackets with bolts, make sure all the ground wires are attached with the right hand bolt.
2. Connect solenoid leads (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold.
4. Operate each hydraulic function and check for proper function and leaks.
5. Adjust all hydraulic pressures according to instructions in Section 4.5.

1. Valve Block
- 2.
- 3.
4. Filter Adapter
5. Valve Block, Proportional
- 6.
7. Valve, Proportional
8. Plug, 9MM
9. Valve, Drive/Lift
10. Valve, Forward/Reverse
11. Plug, Cavity
12. Ball, 7/16
13. Valve, Low Drive/Steer Relief
14. Valve, Main Relief
15. Valve, Counterbalance
16. Conn., Gauge
17. Plug, 10MM
18. Spring
19. Valve, Steering
20. Spring
21. Plug, #6
22. Plug, #4
23. Plug, Soc Hd 1/4-18 NPTF
24. Fitting, Straight
- 25.
26. Fitting, Straight
27. Fitting, 90° Elbow
28. Fitting, 90° Elbow
29. Fitting, Straight
30. Fitting, 90° Elbow
31. Fitting, 90° Elbow
32. Fitting, Tee
33. Filter
34. Ball, 5/16"
- 35.
36. O-Ring
- 37.
- 38.
- 39.
40. Orifice, #824
- 41.
42. Fitting, Straight
43. Fitting, 90° Elbow
44. Fitting, Straight
- 45.
46. Screw, Soc Hd Cap 10-24 X 2

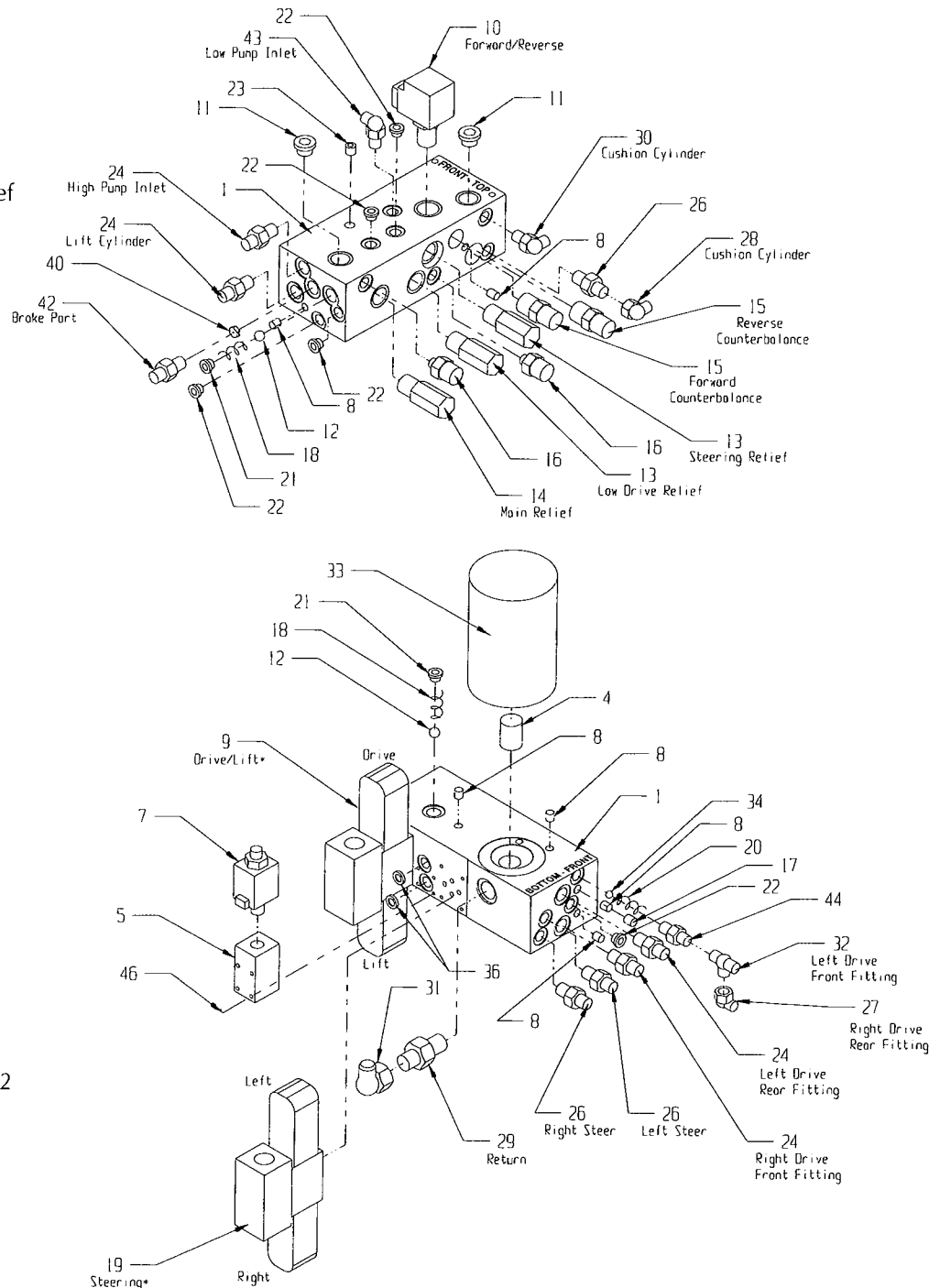


Figure 4-12: Hydraulic Manifold, Exploded View, Serial Numbers 1004-1599

060569-000

1. Valve Block
2. Filter
3. Filter Adapter
4. Plug, 9MM Expander
5. Valve, Steering
6. Valve, Lift & Valve, Reverse
7. Valve, Drive Dump
8. Valve, Main Relief & Valve, Steering Relief
9. Valve, Counterbalance
10. Plug, Cavity
11. Fitting, 90° Elbow
12. Plug, #4
13. Fitting, 90° Long
14. Fitting, Straight
15. Fitting, 90° Elbow
16. Plug, Cavity
17. Connector, Gauge
18. Fitting, 90° Elbow
19. Valve Block, Proportional
20. Valve, Proportional
21. O-Ring
22. Screw, Soc Hd Cap 10-24 X 2
23. Fitting, 45° Elbow
24. Fitting, 90° Elbow
25. Fitting, 90° Elbow

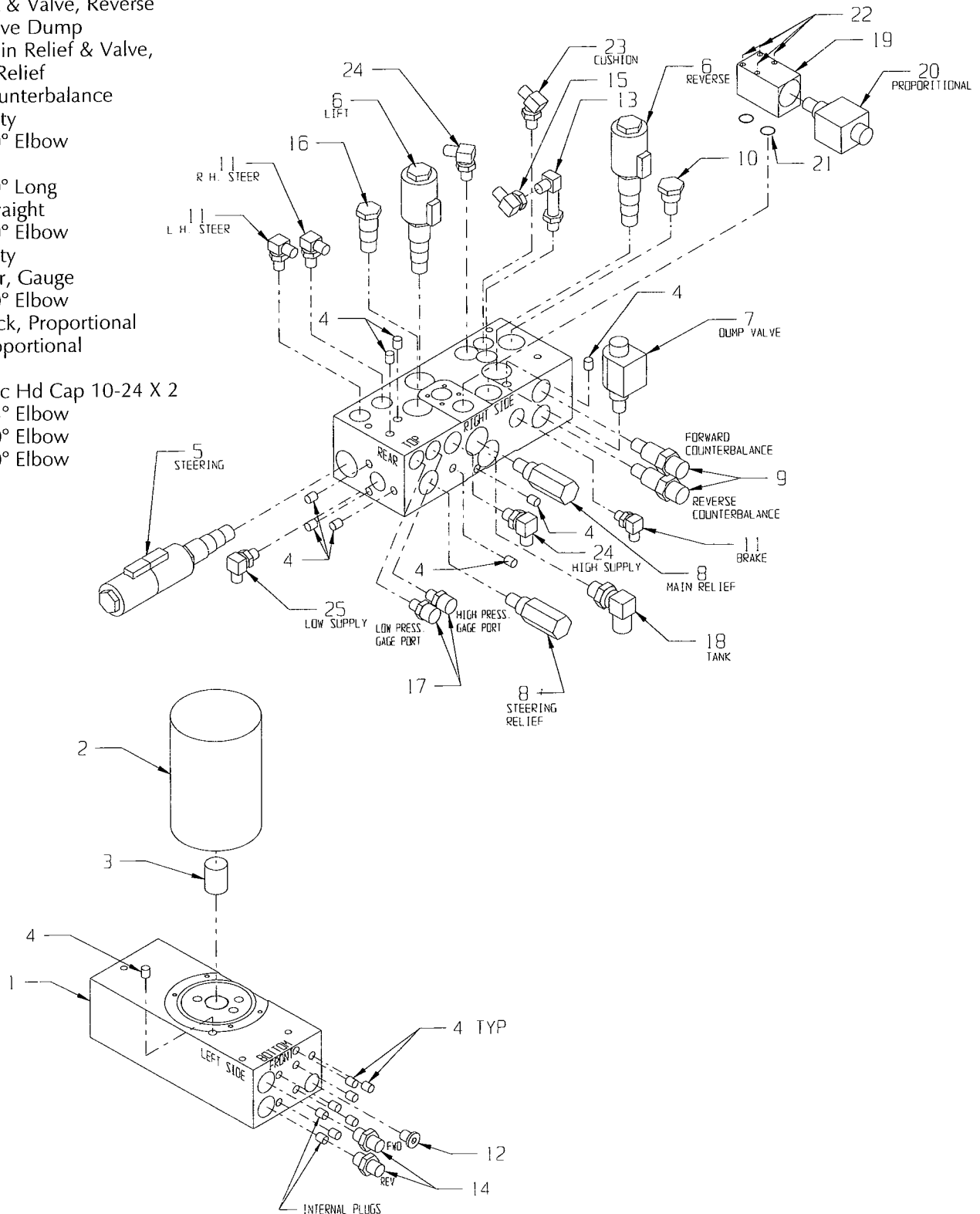


Figure 4-13: Hydraulic Manifold, Exploded View, Serial Numbers 1600-Current

060569-000

MX15/19 Work Platform

## 4.8 Hydraulic Pump (Figure 4-14)

### 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

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.

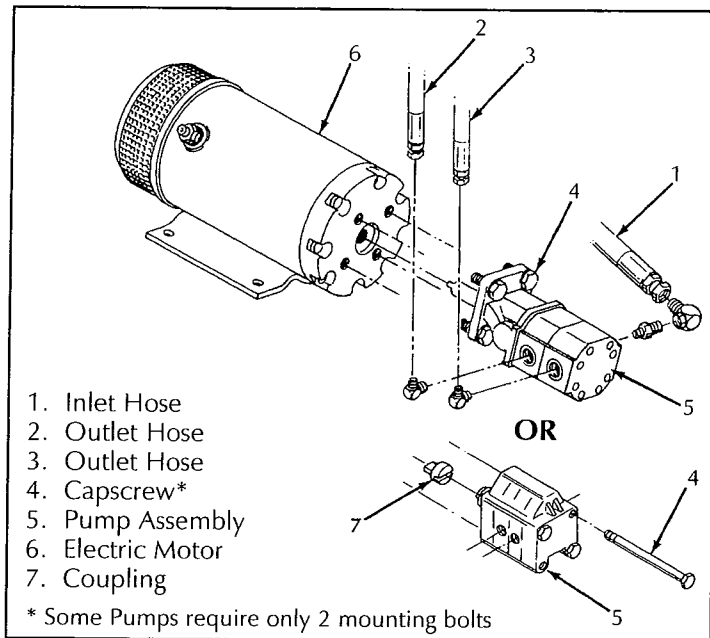


Figure 4-14: Hydraulic Pump

## 4.9 Hydraulic Drive Motors and Hubs (Figure 4-15)

### REMOVAL

1. Use a 1 ton (1000 Kg) capacity jack to raise the front of the machine. Position blocks under the 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, slotted nut, wheel and shaft key.

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

4. Tag, disconnect and plug the hose assemblies to prevent foreign material from entering.
5. Remove the locknuts, capscrews and drive motor.

### INSTALLATION

1. Position the drive motor in the wheel yoke and secure with capscrews and locknuts.
2. Install the shaft key, wheel and slotted nut. Torque the slotted nut to 75 Ft/Lbs (102 Nm). Install a new cotter pin, **DO NOT** back-off the nut to install the cotter pin.
3. Remove the plugs from the hose assemblies and connect to the drive motor.
4. Remove blocks, lower the jack and remove. Operate the drive system and check for leaks.

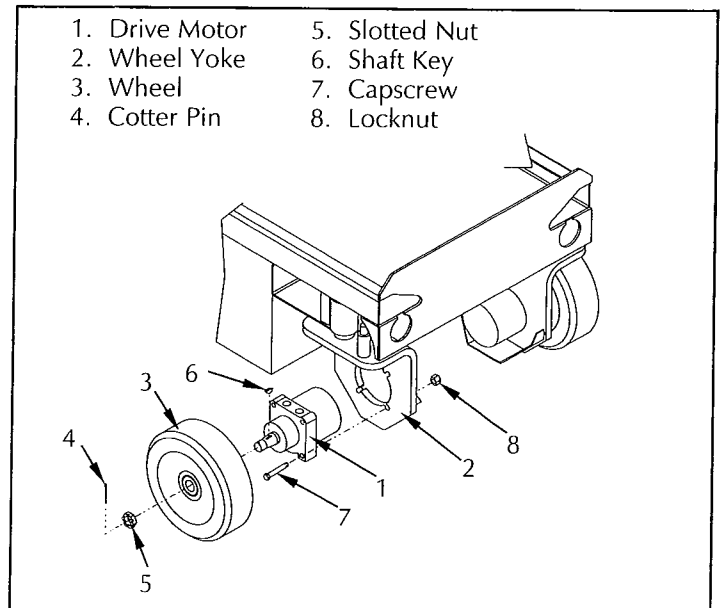


Figure 4-15: Drive Motor Installation

## 4.10 Brake Cylinder (Figure 4-16)

The brake cylinder is located between the rear wheels at the rear of the chassis.

### REMOVAL

1. Block the wheels to prevent the work platform from rolling when the brake is removed.
2. Remove the adjustment nut and bolt.
3. Tag and disconnect the hose assemblies and cap the openings to prevent foreign material from entering.
4. Remove the shoulder bolt and locknut that mounts the cylinder rod to the brake tube.
5. Remove the cotter pin and pivot pin from the rear cylinder mount. Remove the cylinder.

### DISASSEMBLY

1. Remove the set screw from the outside barrel assembly and unscrew the cylinder.
2. Completely disassemble the cylinder including removing the piston nut and piston.
3. Remove all the seals and o-rings noting their location to aid in re-assembly.

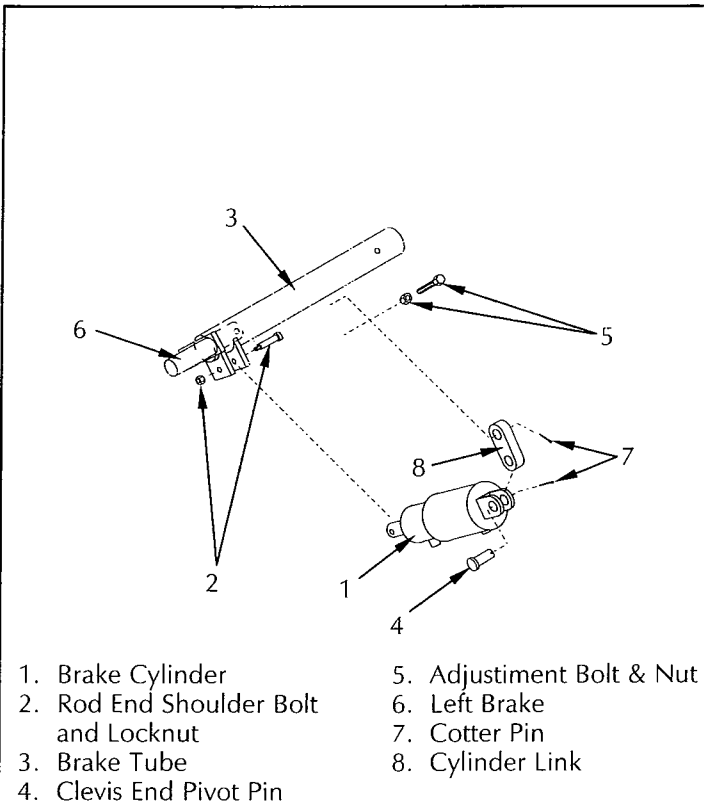


Figure 4-16: Brake Cylinder Installation

### CLEANING AND INSPECTION

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcap for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

### ASSEMBLY

1. Lubricate and install new seals and O-rings.
2. Install the headcap onto the shaft.
3. Install the new internal backup rings and O-rings on the piston.
4. Install the piston on the shaft and secure with the piston nut, torque to 250 Ft/Lbs (339 Nm).
5. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the inner cylinder barrel.
6. Install the spring and screw the cylinder barrels together until tight and the ports are in-line.
7. Install the set screw.

### INSTALLATION

1. Install the clevis end pivot pin through the cylinder clevis and cylinder link and secure with a new cotter pin.
2. Install the rod end shoulder bolt through the cylinder rod and brake tube mounting tabs and secure with the locknut.
3. Install the hydraulic hoses.
4. Install the adjustment bolt and locknut. Tighten the bolt until the brakes fully engage the tires, secure with the locknut.
5. Lower the machine and operate the drive circuit and check that the brakes retract and clear the tires when driving and fully engage the tires when stopped. Check for leaks.

## 4.11 Steering Cylinder (Figure 4-17)

### REMOVAL

1. Turn the wheels to the straight position.
2. Elevate the Platform and block the Elevating Assembly with the Brace (see page 4-3).
3. Tag and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
4. Remove the retaining rings from the pivot pins.
5. Remove the locknuts, washers and capscrews, while supporting the cylinder. Remove the cylinder.

### DISASSEMBLY

1. Unscrew the internal head caps from the barrel, removing one head cap assembly from the rod.
2. Withdraw the other head cap, piston and shaft assembly from the barrel tube.

3. Remove the snap rings from the piston washers and remove the piston washers, piston, O-ring and head cap.
4. Remove the rod wiper, u-cup, O-ring and backup ring from the headcap and discard the seals.
5. Remove the piston ring and O-ring from the piston and discard.

### CLEANING AND INSPECTION

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcaps for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

### ASSEMBLY

1. Lubricate and install new rod wiper, u-cup, O-ring and backup ring on the headcaps.
2. Install one headcap onto the shaft.
3. Install the new piston rings and O-ring on the piston.
4. Install the O-ring, piston and piston washers on the shaft. Secure piston washers with snap rings.
5. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the cylinder barrel.
6. Install the other head cap into cylinder barrel and tighten both head caps.

### INSTALLATION

1. Position the cylinder assembly in the chassis and secure with capscrews, washers and locknuts.
2. Insert pivot pins and secure with retaining rings.

**NOTE: On some machines the pivot pins do not have the anti-rotation tab welded on the bottom and require bonding to the steering cylinder shaft with Loctite 609®.**

3. Connect the hose assemblies to the fittings.
4. Operate the steering circuit several times throughout its entire range of travel to expel trapped air and check for leaks.

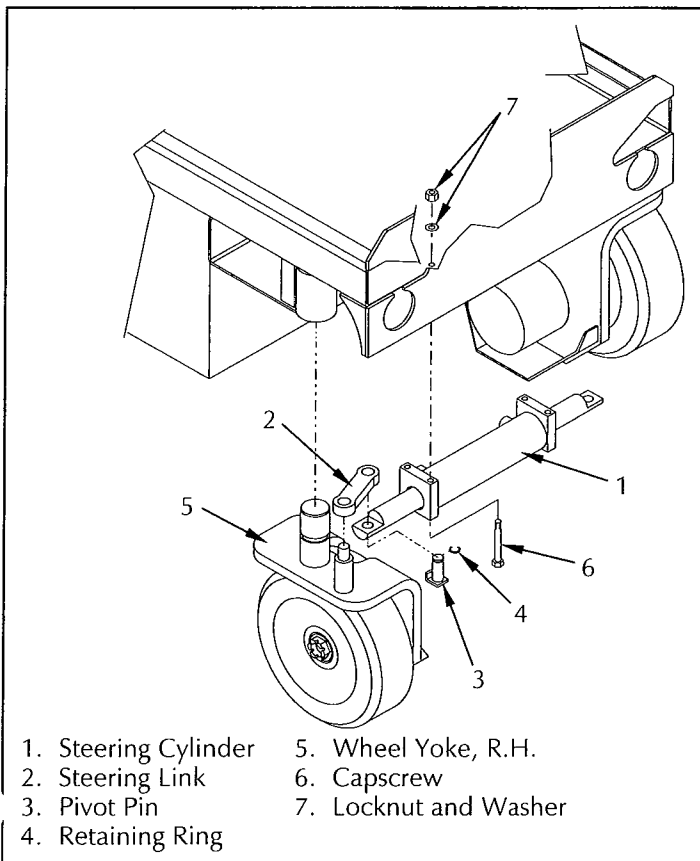


Figure 4-17: Steering Cylinder Installation

## 4.12 Lift Cylinder (Figure 4-18)

### REMOVAL

1. Elevate Platform and install Brace (see page 4-3).
2. Provide a suitable container to catch the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove emergency lowering valve cable and down valve wires from the emergency lowering/down valve.
4. Remove the cable bracket from the lift cylinder.
5. Remove capscrews and locknuts securing lift cylinder pivot pins.
6. Remove lower pivot pin and lower cylinder to rest on Chassis.
7. Attach a suitable hoisting device and sling to the cylinder and remove upper pivot pin.
8. Carefully remove cylinder.

### DISASSEMBLY

1. Remove the fittings, orifice, spring and down valve from the cylinder assembly.
2. Loosen the set screw and unscrew the thread cap. Unscrew the internal head cap and withdraw the rod and piston assembly from the barrel tube.
3. Remove the piston from the rod and then remove the head cap from the cylinder rod.
4. Remove all o-rings, seals and wipers from the head cap and cylinder barrel.

### CLEANING AND INSPECTION

1. Clean all metal parts in solvent and blow dry with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the head cap, inside of the cylinder barrel and the rod for signs of scoring or excessive wear.
4. Replace all seals and O-rings.

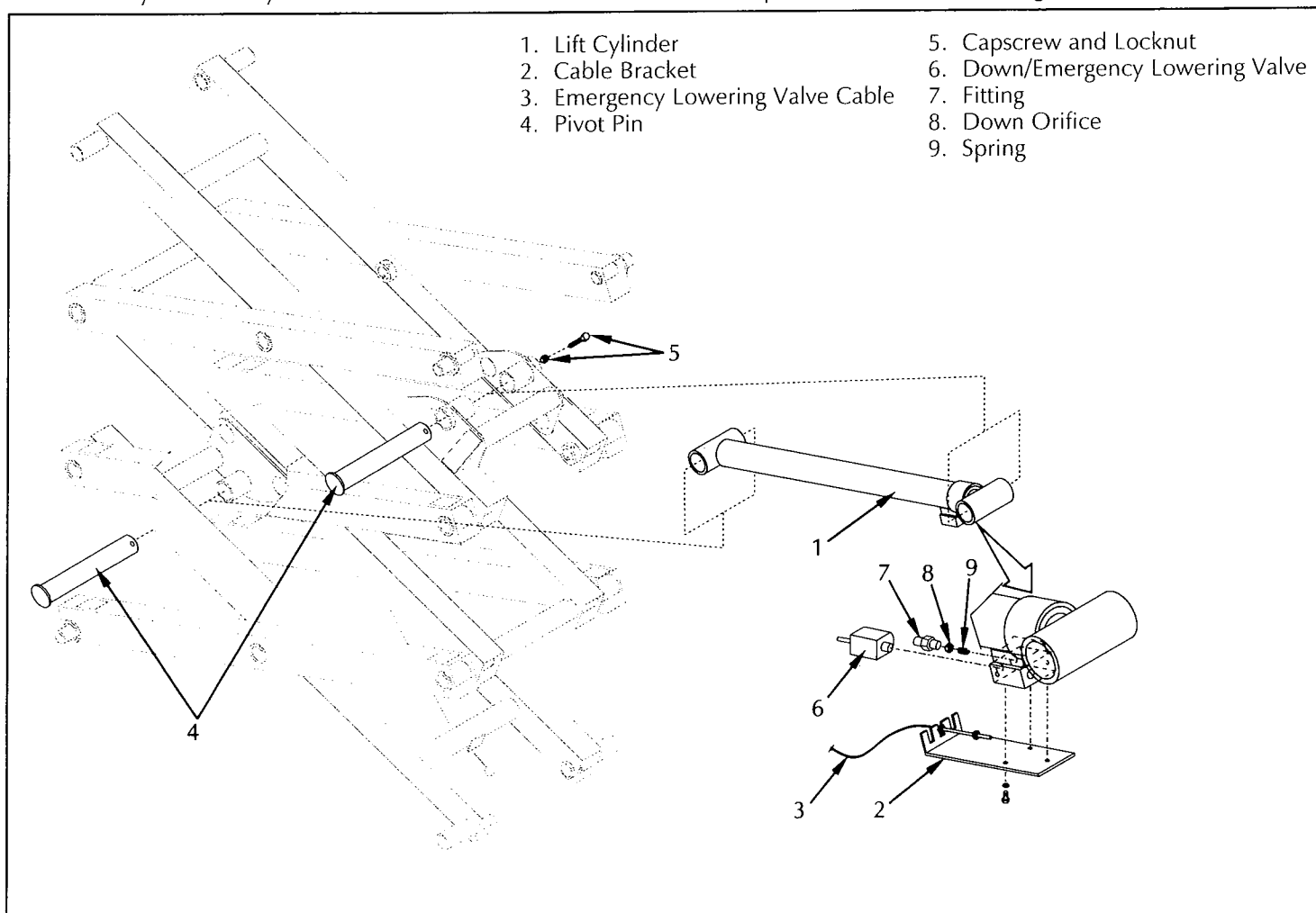


Figure 4-18: Lift Cylinder



## REASSEMBLY

1. Lubricate and install new O-rings, seals and wipers in the cylinder barrel and on the head cap.

**NOTE: Multipurpose lubricant should be used.**

2. Install the thread cap, head cap and piston on the cylinder rod.
3. Lubricate the piston and install the piston and rod assembly in the barrel tube.
4. Install the head cap into the barrel tube.
5. Thread the thread cap onto the barrel tube and tighten, secure with the set screw.
6. Install the down valve, orifice, spring and fittings.

## INSTALLATION

1. Coat both pivot pins with anti-seize compound.
2. Attach a suitable hoisting device and sling to the cylinder. Carefully position cylinder in the Elevating Assembly and install the upper pivot pin.
3. Install the capscrew and locknut.
4. Carefully lift the cylinder and align the lower mount and install the pivot pin. Install the capscrew and locknut securing the pivot pin.
5. Install the cable bracket and connect the emergency lowering valve Cable and down valve wires.
6. Unplug hydraulic hoses and attach to the cylinder.
7. Replace hydraulic fluid removed from lift cylinder.
8. Test with weight at rated Platform load to check system operation. Check for leaks and level of fluid.

## 4.13 Electric Motor (Figure 4-19)

### 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 2A.
- 2A. 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 4-19A. 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 thru 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. Refinish commutator surface if pitted or excessively worn.

- 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 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.
- Inspect wire harness and all connections for signs of damage due to overheating.
  - Check stator to see it is securely mounted.

## REASSEMBLY

- 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 4-19B and step 3 in the Inspection section).
- Place commutator cover on a work bench with brush assembly facing upward.
- Place the bearing spring into the bearing bore.
- Take a complete armature assembly, including bearings, and insert commutator end bearing into the bearing bore.

**Note: Do not reuse 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.**

- Set the brushes to final position as shown in Figure 4-19B.
- Place the complete stator down over the vertical armature, and into position on the commutator cover.
- 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.**
- Assemble the pulley end cover in the proper relationship. Insert mounting bolts and tighten alternately to ensure a good mechanical alignment.
- 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).
  - Faulty armature.

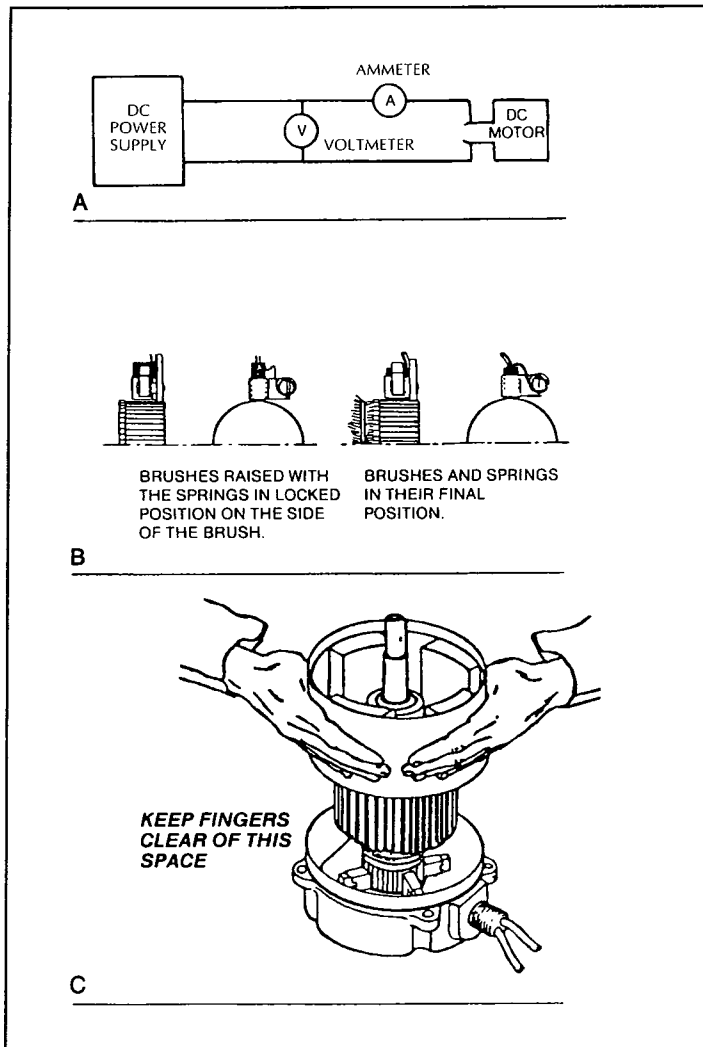


Figure 4-19: Electric Motor Service

## 4.14 Torque Specifications

### HYDRAULIC COMPONENTS

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

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

**Table 4-2: Hydraulic Component Torque**

TYPE: SAE PART SERIES	CARTRIDGE POPPET (Ft/Lbs Nm)	FITTINGS (Ft/Lbs Nm)	HOSES (In/Lbs Nm)
#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 107-131
#16	130-140 176-190	130-140 176-190	1300-1368 147-155

Spool Valve and Subplate fasteners: 50 In/Lbs (7 Nm).

Coil nuts: 30 IN/Lbs (3 Nm)

### FASTENERS

Use the following values to torque fasteners used on UpRight Work Platforms unless a specific torque value is called out for the part being installed.

**Table 4-3: Bolt Torque**

THREAD SIZE <small>American National Standard-UNF (fine)</small>	WIDTH ACROSS FLATS	TORQUE VALUE	
		ENGLISH	METRIC
$\frac{1}{4}$	$\frac{7}{16}$	110 In/Lbs	12 Nm
$\frac{5}{16}$	$\frac{1}{2}$	190 In/Lbs	22 Nm
$\frac{3}{8}$	$\frac{9}{16}$	30 Ft/Lbs	41 Nm
$\frac{7}{16}$	$\frac{5}{8}$	50 Ft/Lbs	68 Nm
$\frac{1}{2}$	$\frac{3}{4}$	75 Ft/Lbs	102 Nm
$\frac{5}{8}$	$\frac{15}{16}$	150 Ft/Lbs	203 Nm
$\frac{3}{4}$	$1 \frac{1}{8}$	250 Ft/Lbs	339 Nm
$\frac{7}{8}$	$1 \frac{5}{16}$	400 Ft/Lbs	542 Nm
1	$1 \frac{1}{2}$	600 Ft/Lbs	813 Nm

NOTES

## 5.0 Introduction

Table 5-1 provides a logical sequence of tests that are designed to isolate problems with MX15/19 machines. This table includes a list of probable causes and remedies.



### **WARNING**



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

When performing any service on or in the Elevating Assembly area, which requires the Platform to be raised, the Elevating Assembly must be blocked.

Disconnect the batteries ground cable when replacing or testing the continuity of any electrical component.

## GENERAL PROCEDURE

Troubleshooting should be carried out in two steps. First, thoroughly study both hydraulic and electric schematics to determine possible causes. Loose terminal connections and short circuits are always a potential cause when troubleshooting. Second, check suspect components electrically, hydraulically and mechanically to determine if they are at fault. Refer to Tables 6-1 and 6-2 for Reference Designations used in Table 5-1.

# Troubleshooting

Table 5-1: Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
All functions inoperable, Electric Motor does not start.	<ol style="list-style-type: none"> <li>1. Open control circuit Circuit Breaker (CB).</li> <li>2. Blown Electric Motor Fuse (FU).</li> <li>3. Faulty Battery Charger.</li> <li>4. Faulty Battery(ies) (BAT).</li> <li>5. Faulty Electric Motor (MOT).</li> <li>6. Faulty Motor Relay (CR1).</li> <li>7. Emergency Stop Switch (SW1, SW3) failed open.</li> <li>8. Faulty Controller switch (SW8)**.</li> </ol>	<p>Check control circuit Circuit Breaker. Reset if open.</p> <p>Check 175 amp Electric Motor Fuse. Replace if blown.</p> <p>Check the voltage output of the Battery Charger. If less than 24 VDC, repair or replace.</p> <p>After completely charging Batteries, test each Battery. Replace as required.</p> <p>While operating the steering function, check voltage across the Electric Motor terminals. If 24 VDC is present, replace the Motor.</p> <p>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 faulty Motor Relay.</p> <p>With the Emergency Stop Switch in the ON position, check continuity across the contacts. If none, replace.</p> <p>Check operation. Replace switch if required.</p>
All functions inoperable. Electric Motor starts when control is actuated.	<ol style="list-style-type: none"> <li>1. Hydraulic Reservoir low.</li> <li>2. Faulty Hydraulic Pump (PMP).</li> <li>3. Faulty Controller (CONT).</li> <li>4. Proportional Valve (V6).</li> </ol>	<p>Check hydraulic fluid level, top off as required.</p> <p>Check pressure and delivery of the Hydraulic Pump. Replace if required.</p> <p>Check operation. Replace if required.</p> <p>Check operation, replace if required.</p>
Electric Motor continues to run after controls are returned to the OFF position.	Motor Relay (CR1) contacts fused together.	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.	<ol style="list-style-type: none"> <li>1. Faulty Steering Switch.</li> <li>2. Mechanical damage.</li> <li>3. Steering Valve (V1) stuck.</li> <li>4. Steering Cylinder (CYL1) piston seal leaking.</li> <li>5. Steering Relief.</li> </ol>	<p>Test Steering Switch for continuity. Replace if faulty.</p> <p>Inspect all steering components. Replace damaged parts.</p> <p>Inspect Steering Valve. If spool is sticking, replace.</p> <p>Check Steering Cylinder for leakage from one port to another. Repair as required.</p> <p>Adjust the relief valve, if not adjustable replace.</p>
Work platform will not steer right.	<ol style="list-style-type: none"> <li>1. Faulty Steering Switch.</li> <li>2. Faulty Diode.</li> <li>3. Faulty Steer Right Solenoid (SOL1).</li> </ol>	<p>Test Controller Switch for continuity. Replace if faulty.</p> <p>Test Diode. Replace if faulty.</p> <p>Test Steer Right Solenoid. If the proper voltage is present and the coil is not magnetized, replace.</p>
Work platform will not steer left.	<ol style="list-style-type: none"> <li>1. Faulty Steering Switch.</li> <li>2. Faulty Diode.</li> <li>3. Faulty Steer Left Solenoid (SOL2).</li> </ol>	<p>Test Steering Switch for continuity. Replace if faulty.</p> <p>Test Diode. Replace if faulty.</p> <p>Test Steer Left Solenoid. If the proper voltage is present and the coil is not magnetized, replace.</p>

TROUBLE	PROBABLE CAUSE	REMEDY
Work platform will not drive forward or reverse. Lift function operable.	<ol style="list-style-type: none"> <li>1. Faulty Drive/Lift Selector Switch.</li> <li>2. Faulty Drive/Lift Valve (V4)*.</li> <li>3. Faulty Drive Dump Valve (V5)**.</li> <li>4. Mechanical failure.</li> <li>5. Worn Drive Motors (MOT1, MOT2).</li> <li>6. Faulty relay (CR2)**.</li> </ol>	<p>Check continuity of Drive/Lift Switch. Replace if faulty.</p> <p>Check the Drive/Lift Valve. If the spool is not shifting, replace the valve.</p> <p>Check the Drive Dump Valve. If the spool is not shifting, replace the valve.</p> <p>Inspect Drive Motor shafts, hubs, and keys.</p> <p>Check hydraulic pressure being delivered to the Drive Motors. If sufficient, replace Drive Motors.</p> <p>Test relay, replace if faulty.</p>
No high speed drive.	<ol style="list-style-type: none"> <li>1. Faulty Relay (CR4).</li> <li>2. Faulty Down Limit Switch (LSW1).</li> <li>3. Faulty Proportional Coil/Valve (SOL7/V6).</li> </ol>	<p>Test Relay (CR4). Replace if faulty.</p> <p>Check Switch for continuity. Replace if faulty.</p> <p>Test coil and valve. If faulty, replace.</p>
No drive forward but drives in reverse. Lift function operable.	<ol style="list-style-type: none"> <li>1. Faulty Drive/Lift Selector Switch.</li> <li>2. Faulty Counterbalance Valves (V2, V3).</li> </ol>	<p>Test Drive/Lift Switch for continuity. Replace if faulty.</p> <p>Check pressure of Counterbalance Valves. Replace or reset valves as required.</p>
No drive forward but drives in reverse. No lift function.	<ol style="list-style-type: none"> <li>1. Faulty Drive/Lift Selector Switch.</li> <li>2. Faulty Controller.</li> <li>3. Faulty Up/Fwd Relay (CR6)*.</li> <li>4. Faulty Controller switch (SW8)**.</li> </ol>	<p>Test Drive/Lift Switch for continuity. Replace if faulty.</p> <p>Check operation of Controller switch. Replace if required.</p> <p>Test relay, replace if faulty.</p> <p>Check operation of Controller switch. Replace if required.</p>
No drive reverse but drives in forward. Lift function operable.	<ol style="list-style-type: none"> <li>1. Faulty Drive/Lift Selector Switch.</li> <li>2. Faulty Diode (D3* or D8**).</li> <li>3. Faulty Reverse Coil (SOL4).</li> <li>4. Faulty Counterbalance Valves (V2, V3).</li> </ol>	<p>Test Drive/Lift Switch for continuity. Replace if faulty.</p> <p>Test Diode. Replace if faulty.</p> <p>Test Reverse Coil, if proper voltage is present and coil is not magnetized, replace.</p> <p>Check pressure of Counterbalance Valves. Replace or reset valves as required.</p>
No drive reverse but drives in forward. No lift function.	<ol style="list-style-type: none"> <li>1. Faulty Drive/Lift Selector Switch (SW5).</li> <li>2. Faulty Controller (CONT).</li> <li>3. Faulty Down/Reverse Relay (CR7)*.</li> <li>4. Faulty Controller switch (SW7)**.</li> </ol>	<p>Test Drive/Lift Switch for continuity. Replace if faulty.</p> <p>Check operation of Controller switch. Replace if required.</p> <p>Test relay, replace if faulty.</p> <p>Check operation of Controller switch. Replace if required.</p>

**Table 5-1: Troubleshooting**

TROUBLE	PROBABLE CAUSE	REMEDY
Platform will not elevate or elevates slowly.	<ol style="list-style-type: none"> <li>1. Emergency Down Valve (V7) open.</li> <li>2. Platform over-loaded.</li> <li>3. Faulty Diode (DIO5*).</li> <li>4. Faulty Lift Valve Coil.</li> <li>5. Faulty Drive/Lift Selector Switch (SW5* or SW9**).</li> <li>6. Lift/Main Relief Valve (RV1) out of adjustment or faulty.</li> <li>7. Drive/Lift Valve (V4) sticking.</li> <li>8. Faulty Up/Fwd Relay (CR6)*.</li> <li>9. Faulty Controller (CONT).</li> </ol>	<p>Close Emergency Down Valve.</p> <p>Observe maximum load rating (See Table 1-1).</p> <p>Test Diode, replace if faulty.</p> <p>Test Lift Valve Coil. If proper voltage is present and coil is not magnetized, replace.</p> <p>Test Drive/Lift Switch for continuity. Replace if faulty.</p> <p>Adjust the Lift/Main Relief Valve. If not adjustable, replace.</p> <p>Replace the Lift Valve.</p> <p>Test relay, replace if faulty.</p> <p>Check operation of Controller. Replace if required.</p>
Platform drifts down after being elevated.	Emergency Lowering/Down Valve (V7) partly open or faulty.	Ensure that the Emergency Lowering Valve is completely closed. Replace the valve.
Platform will not lower. Drive function operable.	<ol style="list-style-type: none"> <li>1. Faulty Down Valve Coil (SOL6* or SOL4**).</li> <li>2. Faulty Drive/Lift Selector Switch (SW5* or SW9**).</li> <li>3. Down Valve (V7) stuck.</li> <li>4. Plugged Down Orifice (ORF2).</li> <li>5. Faulty relay (CR2)**.</li> </ol>	<p>Test Down Valve Coil. If proper voltage is present and coil is not magnetized, replace.</p> <p>With the Drive/Lift Switch in the <b>LIFT</b> position, check continuity. Replace if faulty.</p> <p>Replace the Down Valve.</p> <p>Remove and Clean Orifice.</p> <p>Test Relay. Replace if faulty.</p>
Motion Alarm does not sound.	<ol style="list-style-type: none"> <li>1. Faulty Down Alarm (ALM1).</li> <li>2. Faulty Relay (CR2)*.</li> </ol>	<p>Check voltage to Down Alarm . If proper voltage is present, replace the Alarm.</p> <p>Test Relay. Replace if faulty.</p>
Brake will not release.	<ol style="list-style-type: none"> <li>1. Brake Orifice (ORF1) plugged*.</li> <li>2. Faulty Brake Cylinder (CYL2).</li> <li>3. Brake out of adjustment.</li> </ol>	<p>Remove and Clean Orifice.</p> <p>Check and replace seals in Brake Cylinder.</p> <p>Adjust bolt to disengage brakes from tires when driving <b>only</b>.</p>
Brake will not lock wheel.	<ol style="list-style-type: none"> <li>1. Brake Orifice (ORF1) plugged*.</li> <li>2. Faulty Brake Cylinder (CYL2).</li> <li>3. Brake out of adjustment.</li> </ol>	<p>Remove and Clean Orifice.</p> <p>Check and replace seals in Brake Cylinder.</p> <p>Adjust bolt so brakes fully engage tires when not driving .</p>

\*-On machines with serial numbers 1004-1599.

\*\* -On machines with serial numbers 1600-Current.

**NOTES**



## 6.0 Introduction

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

The diagrams are to be used in conjunction with *Table 5-1: Troubleshooting Guide*. 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.

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## 6.1 Electrical Schematic

Table 6-1: Electrical Schematic Legend, Serial Numbers 1004 to 1599

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM1	Alarm, Down	Provides warning sound (60 Hz) when the Platform is lowering.	Mounted on electrical box inside right chassis door. Red wire for 60 Hz.
ALM2	Alarm, Tilt	Provides warning sound (600 Hz) when Platform is elevated on slopes of 2° side to side and 2° fore and aft.	Mounted on electrical box inside right chassis door. White wire for 600 Hz.
BAT	Batteries (4), 6 volts each	To store energy.	Two each inside both chassis doors.
CB	Circuit Breaker	Overload protection for the control circuit.	Chassis Control Panel.
CONT	Controller, Proportional  & Switch, Steering	Supplies power to; Motor Start Relay circuit at T2 & T9, Up/Forward & Down/Reverse Relays, and Proportional Coil. Supplies power to either Right or Left Steer Valve Solenoids.	Platform Controller right center.  Top of Controller Joystick.
CR1	Relay, Motor Start	Connects Batteries to Motor.	Inside right Chassis Door. Mounted on electrical box.
CR2	Relay, Down Alarm	Energized with Down Coil, relay provides power to Down Alarm from down circuit and prevents Motor Start Relay from closing.	Middle relay in Electrical Box.
CR3	Relay, Tilt Sensor Power	Supplies power to Tilt Sensor.	Left side of electrical box towards front of machine.
CR4	Relay, Platform Down	Energized when Platform is down, cuts power to Tilt Sensor circuit and provides power to Motor Start Relay.	Mounted on right wall of Electrical Box.
CR5	Relay, Tilt Alarm	Energized by Tilt Sensor when level, provides power to Motor Start Relay when elevated. When machine is not within 2° of level Motor Start Relay circuit opens and power is provided to Tilt alarm.	Right side of electrical box towards rear of machine.
CR6	Relay, Up/Forward	When energized by Controller provides power to Drive Lift Switch.	Controller.
CR7	Relay, Down/Reverse	When energized by Controller provides power to Drive Lift Switch.	Controller.
D1	Diode	Supplies power to Motor Start Circuit, from Steer Right Circuit.	On Fanning Strip between terminals T1 and T2.

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
D2	Diode	Supplies power to Motor Start Circuit, from Steer Left Circuit.	On Fanning Strip between terminals T3 and T2.
D3	Diode	Provides power to Drive Coil from Reverse Circuit.	On Fanning Strip between terminals T6 and T4.
D4	Diode	Provides power to Motor Start Circuit from Lift Circuit	On Fanning Strip between terminals T7 and T2.
D5	Diode	Provides power to Controller for high speed Lift.	On Fanning Strip between terminals T7 and T9.
D6,7 & 8	Diode(s)	Protects diodes 1,2 & 5 from voltage spikes.	On Fanning Strip.
FU	Fuse, 175 AMP	Overload protection for the electric motor.	Inside right chassis door above batteries.
LSW1	Switch, Down Limit	Provides power to Platform Down Relay when Platform is down.	Mounted on left side of Tilt Sensor Box at front of Chassis.
LSW2	Switch, Up Limit	Cuts power to Lift Coil when fully elevated, preventing Lift Cylinder from 'bottoming out'.	Mounted in front of right rear scissor pivot on lower inner Scissor Assembly.
MOT	Motor, Electric	Provides power to Drive Hydraulic Pump.	Center right of Chassis Module.
MTR	Meter, Hour	Shows hours machine has operated.	Chassis Control Panel.
SNSR	Sensor, Tilt	Cuts power to Tilt Alarm Relay (CR5) when Platform is on slopes of 2° side to side and 2° fore and aft to activate Tilt Alarm.	Inside Tilt Sensor Box at front of Chassis.
SOL1*	Solenoid, Right Steer (coil)	Shifts Steer Valve to <b>RIGHT</b> turn position.	Top* end of Spool Valve mounted towards front of machine.
SOL2*	Solenoid, Left Steer (coil)	Shifts Steer Valve to <b>LEFT</b> turn position.	Bottom* end of Spool Valve mounted towards front of machine.
SOL3*	Solenoid, Drive (coil)	Shifts Drive/Lift Valve to Drive position.	Bottom* end of Spool Valve mounted towards rear of machine.
SOL4	Solenoid, Reverse (coil)	Opens Reverse Valve.	Top of Manifold Block towards front of machine.
SOL5*	Solenoid, Lift (coil)	Shifts Drive/Lift Valve to Lift position.	Top* end of Spool Valve mounted towards rear of machine.
SOL6	Solenoid, Down (coil)	Opens Down Valve.	Mounted on Lift Cylinder.

\* When Delta spool valves are used the coils are on the opposite ends.

Table 6-1: (cont'd.)

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
SOL7	Solenoid, Proportional (coil)	Opens Proportional Valve.	Left side of Manifold Block. between Drive/Lift and Steering Valves.
SW1	Switch, Chassis Emergency Stop Button.	Control Circuit shut off.	Chassis Control Panel.
SW2	Switch, Chassis Selector	Provides power to either the Chassis Controls or the Controller.	Chassis Control Panel.
SW3	Switch, Controller Emergency Stop Button	Control Circuit shut off.	Platform Controller bottom right.
SW4	Switch, Foot	Supplies power to Controller.	Platform deck.
SW5	Switch, Drive/Lift Selector	Supplies power to Drive and Reverse or Up and Down Valve coils.	Controller bottom left.
SW6	Switch, Chassis Lift	Provides power to either UP or Down circuits.	Chassis Control Panel.

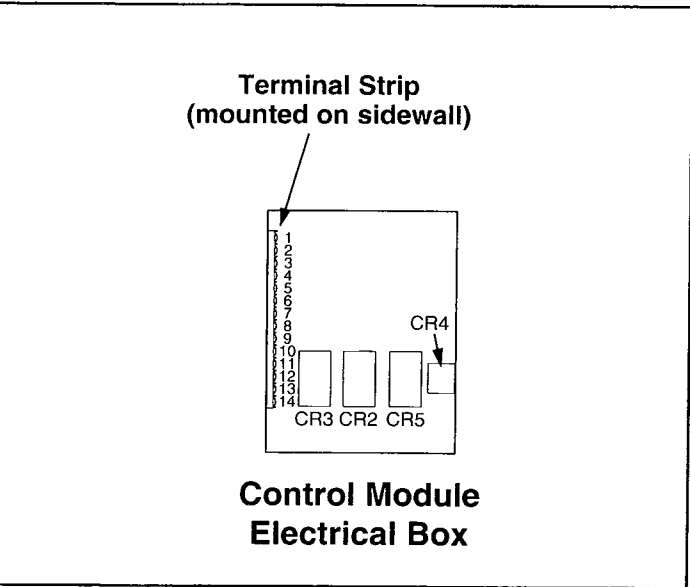


Figure 6-1: Relay and Terminal Strip Identification, for Serial Numbers 1004 to 1599

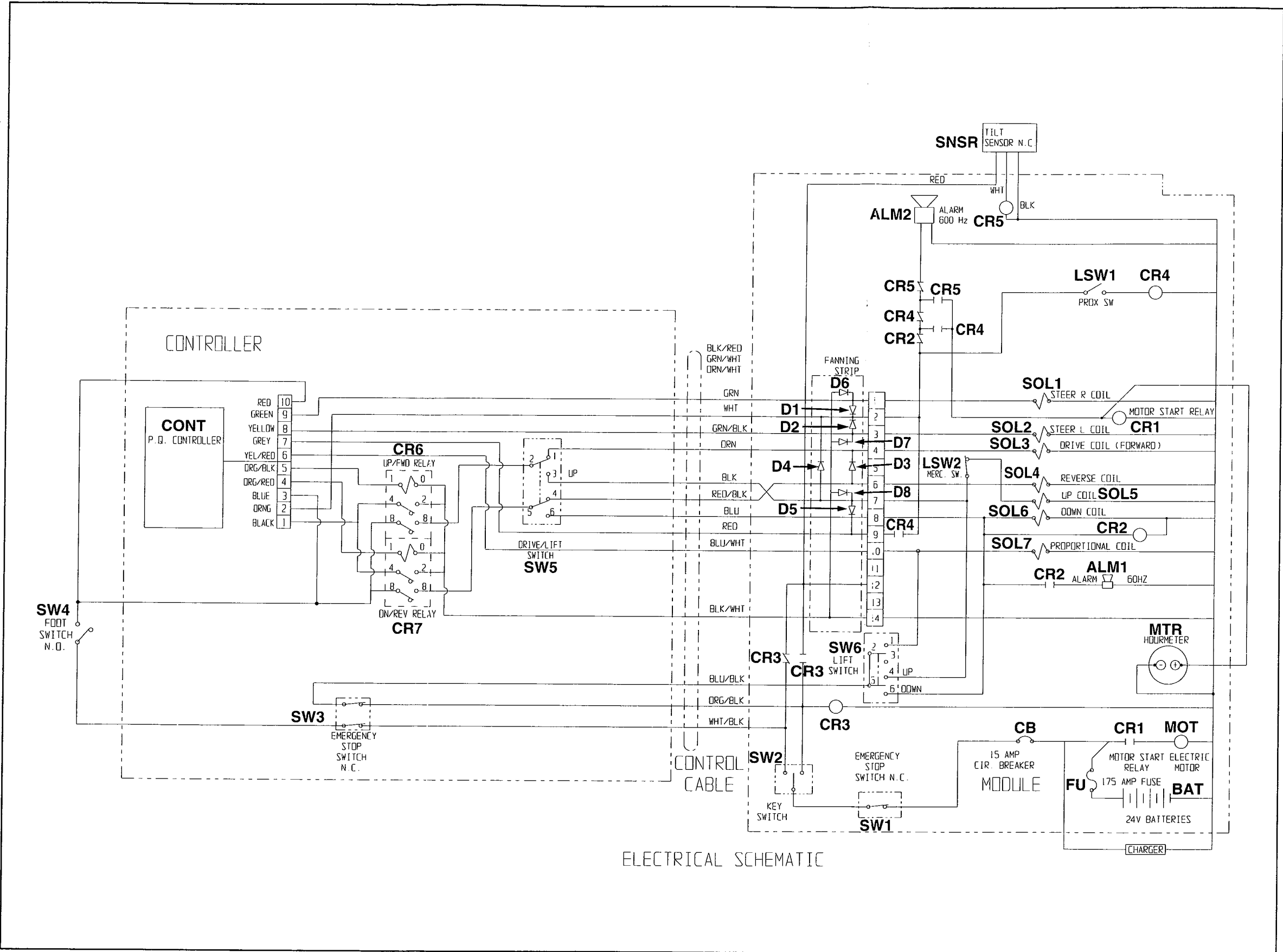


Figure 6-2: Electrical Schematic, for Serial Numbers 1004 to 1599

6.2 Hydraulic Schematic

06567-01

Table 6-2: Hydraulic Schematic Legend, Serial Numbers 1004 to 1599

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CV1	Check Valve, Low Drive	Prevents oil from high side of pump from entering low side circuit.	Under plug at upper right corner on rear of Manifold Block.
CV2	Check Valve, High Drive	Prevents oil from low side of pump from entering high side circuit.	Under plug on bottom of Manifold Block.
CV3	Check Valve, Drive Make-up	Supplies extra oil, when required by Drive Motors, during steering.	Under fitting at lower right corner on front of Manifold Block.
CYL1	Cylinder, Steering	Provides force to turn front wheels.	Under Chassis between front wheels.
CYL2	Cylinder, Brake	Stops machine from moving while parked.	Under Chassis between rear wheels.
CYL3	Cylinder, Lift	Provides force to lift Platform.	Inside the Scissor Assembly.
CYL4	Cylinder, Cushion	Provides smooth starting and stopping when driving.	Right top center of Chassis Module.
FL1	Filter	Filters oil returning to Tank.	Bottom of Manifold Block.
FL2	Suction Screen	Traps particles in Hydraulic Tank.	Inside Hydraulic Tank at outlet.
MOT1	Drive Motor	Provides tractive effort for work	On left front Steering Spindle.
MOT2	Drive Motor	Provides tractive effort for work	On right front Steering Spindle.
ORF1	Orifice, Brake	Delays the engagement of the Brake Cylinder.	Under center fitting on rear of Manifold Block.
ORF2	Orifice, Down	Controls the Platform rate of descent.	Under hose fitting on Lift Cylinder Valve Block.
ORF 3,4	Orifice, Cushion Cylinder	Controls drive cushion rate.	Inside each end of Drive Cushion Cylinder.
PMP	Duplex Pump	Supplies hydraulic oil flow for all functions.	On Electric Motor at center right of Chassis Module.

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
RV1	Valve, Lift Relief	Provides over pressure protection to high side of Pump and limits Platform lifting capacity.	Right side of Manifold Block, upper left corner.
RV2	Valve, Low Drive Relief	Provides over pressure protection to low side of Pump when driving.	Right side of Manifold Block, lower center.
RV3	Valve, Steering Relief	Provides over pressure protection to low side of Pump and steering components when steering.	Right side of Manifold Block, upper center.
V1*	Valve, Steering	Provides directional control for Steering Cylinder.	Left side of Manifold Block towards front.
V2	Valve, Forward Counterbalance	Prevents machine from running away on slopes and cushions stops.	Right side of Manifold Block, near lower right corner.
V3	Valve, Reverse Counterbalance	Prevents machine from running away on slopes and cushions stops.	Right side of Manifold Block, near upper right corner.
V4 *	Valve, Drive /Lift	Provides control of oil for Drive or Lift functions.	Left side of Manifold Block towards rear.
V5	Valve, Forward/ Reverse	Provides control of oil for Forward or Reverse drive.	Top of Manifold Block, towards front.
V6	Valve, Proportional	Controls oil flow into Drive and Lift circuits by proportionally dumping oil back to tank.	Left side of Manifold Block between Steering and Drive/Lift Valves.
V7	Valve, Down and Emergency Lowering	Allows oil to flow out of Lift Cylinder to Tank, manually operated for Emergency Lowering.	Right side of Cylinder Valve Assembly.

\* When Delta spool valves are used the coils are on the opposite ends.

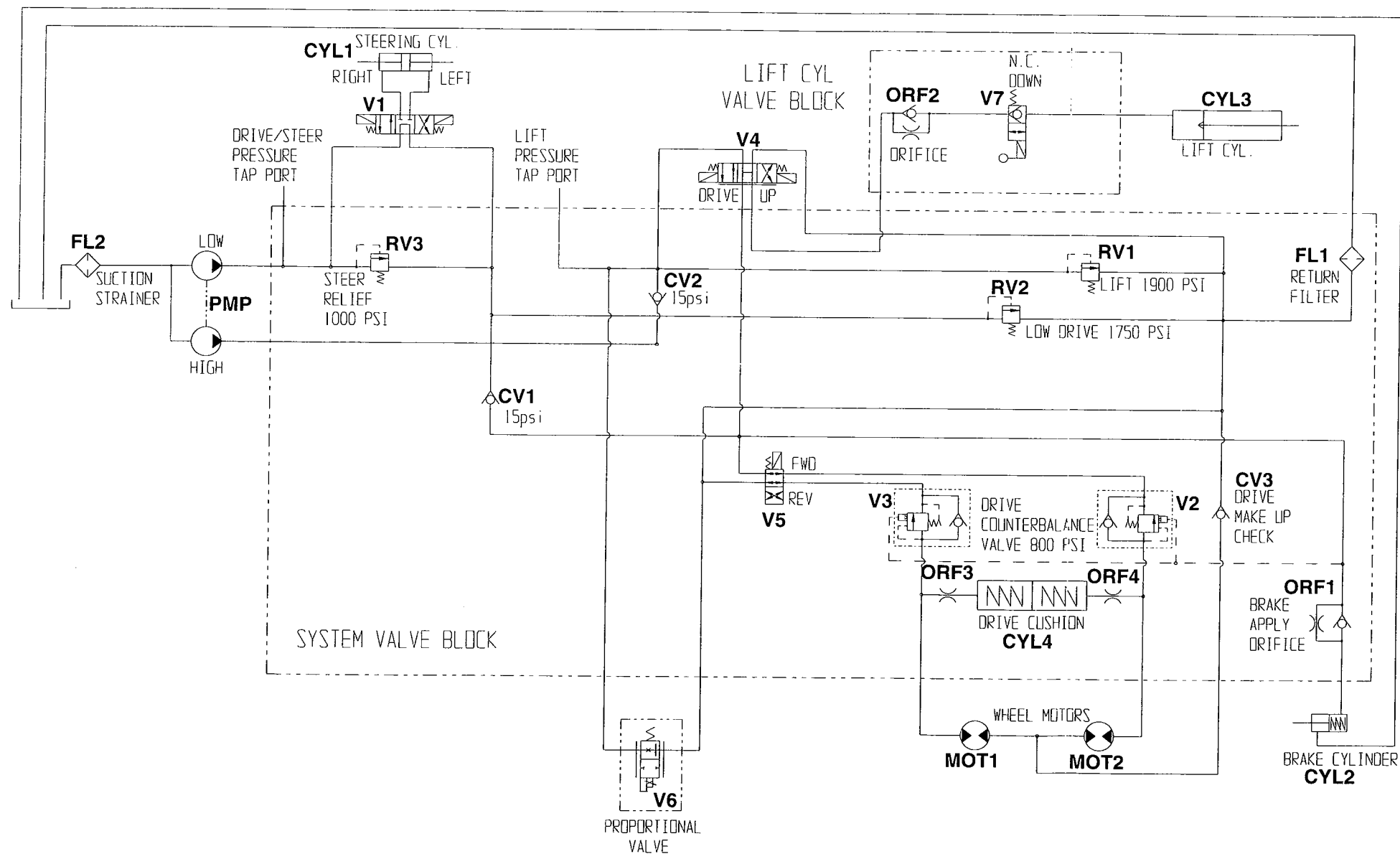


Figure 6-3: Hydraulic Schematic, for Serial Numbers 1004 to 1599

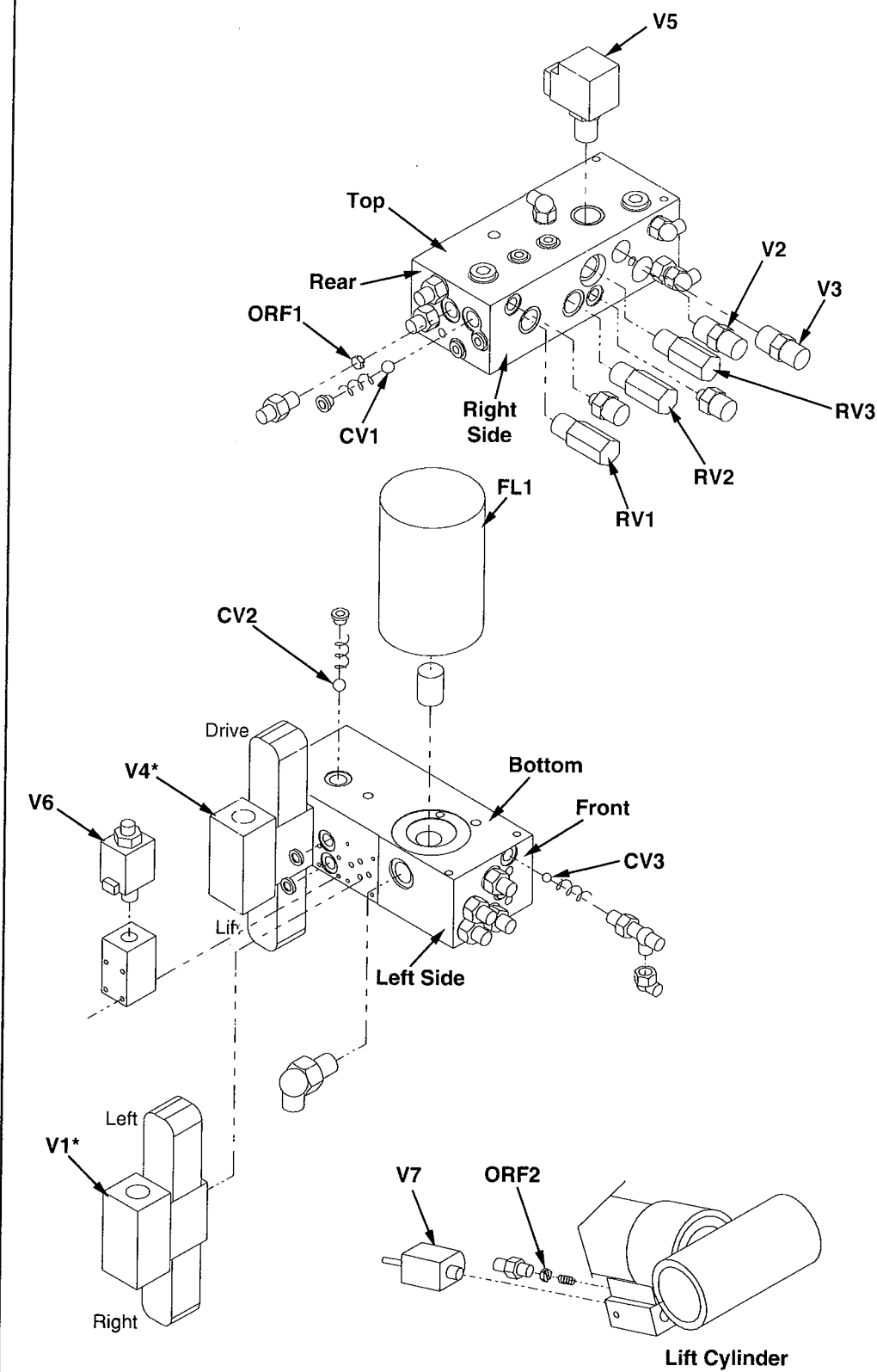


Figure 6-4: Hydraulic Manifold and Lift Cylinder, for Serial Numbers 1004 to 1599

6.3 Electrical Schematic

Table 6-3: Electrical Schematic Legend, Serial Numbers 1600 to Current

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM1	Alarm, Down	Provides warning sound (60 Hz) when the Platform is lowering.	Mounted on electrical box inside right chassis door. Red wire for 60 Hz.
ALM2	Alarm, Tilt	Provides warning sound (600 Hz) when Platform is elevated on slopes of 2° side to side and 2° fore and aft.	Mounted on electrical box inside right chassis door. White wire for 600 Hz.
BAT	Batteries (4), 6 volts each	To store energy.	Two each, inside both chassis doors.
CB	Circuit Breaker	Overload protection for the control circuit.	Chassis Control Panel.
CONT	Controller, Joystick	Supplies power to; Motor Start Relay circuit, Proportional Coil, and Up/Forward or Down/Reverse circuits. Includes switches SW4, SW5, SW6, SW7, & SW8.	Platform Controller center.
CR1	Relay, Motor Start	Connects Batteries to Motor.	Inside right Chassis Door. Mounted on electrical box.
CR2	Relay, Drive/Lift	Energized when Drive/Lift Switch is in <b>DRIVE</b> , closes Reverse and Drive Dump circuits and opens Down and Up circuits.	Middle relay in Electrical Box.
CR3	Relay, Tilt Alarm	Energized by Platform Down Relay when the Platform is down and by Tilt Sensor when Platform is elevated and machine is level, providing power to Motor Start Relay. When machine is not within 2° of level Motor Start Relay circuit opens and power is provided to Tilt alarm.	Left side of electrical box towards front of machine.
CR4	Relay, Platform Down	Energized when Platform is down, cuts power to Tilt Sensor circuit, provides power to Joystick 'R' terminal for high speed operation and to Tilt Alarm Relay.	Right side of electrical box towards rear of machine.
D1	Diode	Supplies power to Motor Start Circuit, from Steer Right Circuit.	On Controller terminal strip between C3 and C6.
D2	Diode	Supplies power to Motor Start Circuit, from Steer Left Circuit.	On Controller terminal strip between C4 and C6.
D3	Diode	Provides power to Joystick + terminal when Drive/Lift Switch is in <b>DRIVE</b> .	On Drive/Lift selector switch.

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
D4	Diode	Provides power to Tilt Sensor Circuit from Controller Circuit preventing feedback from Chassis Circuit.	Between Chassis Key Switch and terminal A12.
D5	Diode	Provides power to Tilt Sensor Circuit from Chassis Circuit preventing feedback from Controller Circuit.	Between Chassis Lift Switch and terminal A12.
D6	Diode	Provides power to Lift Circuit from Chassis Lift Switch and prevents feedback into Proportional Circuit.	Between Chassis Lift Switch and terminal A5.
D7	Diode	Provides power to Proportional Circuit from Chassis Lift Switch and prevents feedback into Lift Circuit.	Between Chassis Lift Switch and terminal A14.
D8	Diode	Provides power to Drive Dump Coil from Reverse Circuit.	On Chassis Terminal Strip between A3 and A4.
FU1	Fuse, 175 AMP	Overload protection for the electric motor.	Inside right chassis door above batteries.
FU2	Fuse, 1 AMP	Overload protection for Tilt Sensor.	Inside Tilt Sensor Box at front of Chassis.
LSW1	Switch, Down Limit	Provides power to Platform Down Relay when Platform is down.	Mounted on left side of Tilt Sensor Box at front of Chassis.
LSW2	Switch, Up Limit	Cuts power to Lift Coil when fully elevated, preventing Lift Cylinder from 'bottoming out'.	Mounted in front of right rear scissor pivot on lower inner Scissor Assembly.
MOT	Motor, Electric	Provides power to Drive Hydraulic Pump.	Center right of Chassis Module.
MTR	Meter, Hour	Shows hours machine has operated.	Chassis Control Panel.
SNSR	Sensor, Tilt	Cuts power to Tilt Alarm Relay (CR3) when Platform is on slopes of 2° side to side and 2° fore and aft to activate Tilt Alarm.	Inside Tilt Sensor Box at front of Chassis.
SOL1	Solenoid, Right Steer (coil)	Shifts Steer Valve to <b>RIGHT</b> turn position.	Rear of manifold block, solenoid closest to block.
SOL2	Solenoid, Left Steer (coil)	Shifts Steer Valve to <b>LEFT</b> turn position.	Rear of manifold block, solenoid farthest from block.
SOL3	Solenoid, Foward/Reverse (coil)	Shifts Foward/Reverse Valve to reverse position.	Bottom end of Spool Valve mounted towards rear of machine.

Table 6-3: (cont'd.)

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
SOL4	Solenoid, Down (coil)	Opens Down Valve.	Mounted on Lift Cylinder.
SOL5	Solenoid, Drive Dump (coil)	Closes Drive Dump Valve.	Top of Manifold Block towards front, next to Proportional Valve.
SOL6	Solenoid, Lift (coil)	Shifts Lift Valve from Drive to Lift position.	Top of Manifold Block towards rear, next to Proportional Valve.
SOL7	Solenoid, Proportional (coil)	Closes Proportional Valve.	Top center of Manifold Block.
SW1	Switch, Chassis Emergency Stop Button.	Control Circuit shut off.	Chassis Control Panel.
SW2	Switch, Chassis Key	Provides power to either the Chassis Lift Switch or the Controller.	Chassis Control Panel.
SW3	Switch, Controller Emergency Stop Button	Control Circuit shut off.	Platform Controller bottom left.
SW4	Switch, Interlock Lever	Provides power to Controller.	On front of Joystick.
SW5	Switch, Joystick Power	Provides power to Joystick X term. and Motor Start Relay thru Joystick circuit board.	Front switch closest to center of Joystick when Joystick is held in assembled position.
SW6	Switches, Steering	Provides power to either Right or Left Steer Valve Solenoids	Rocker actuator on top of Joystick, switch bodies inside Joystick handle.
SW7	Switch, Joystick Down/Reverse	Provides power to Joystick + term. during LIFT operation or to Down/Reverse circuit when Joystick is pulled back.	Left front switch on Joystick when Joystick is held in assembled position.
SW8	Switch, Joystick Lift/Forward	Provides power to Drive/Lift circuit when Joystick is pushed forward.	Left rear switch on Joystick when Joystick is held in assembled position.
SW9	Switch, Drive/Lift Selector	Provides power to Drive/Lift Relay, Steer Switches, Joystick + term. and Joystick R term. through Platform Down Relay contacts when in <b>DRIVE</b> . And to Joystick R term. during <b>LIFT</b> .	Controller bottom right.
SW6	Switch, Chassis Lift	Provides power to either Up or Down circuits.	Chassis Control Panel.

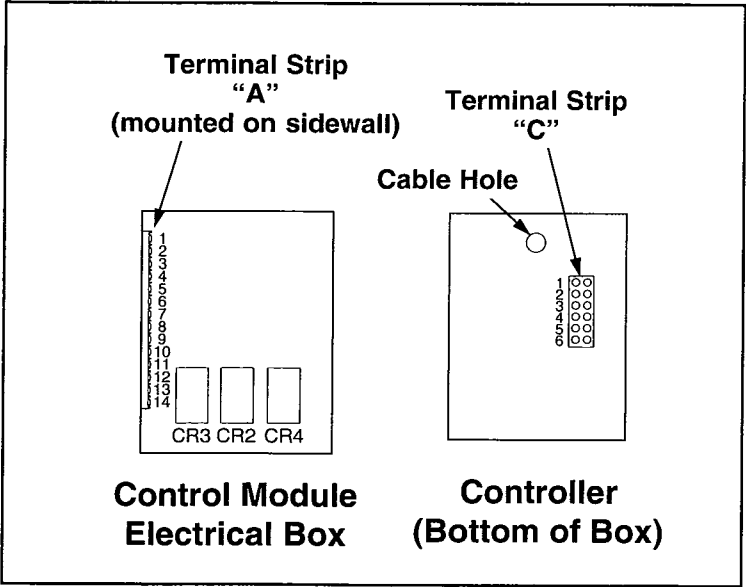
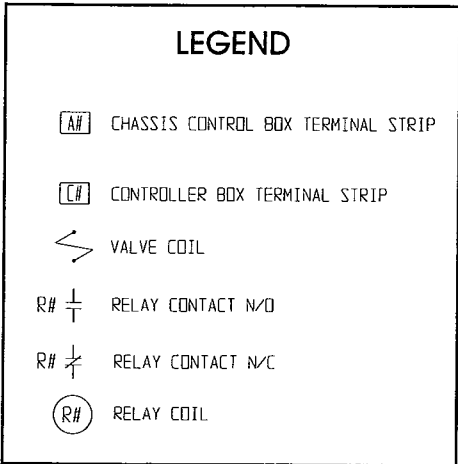


Figure 6-5: Relay and Terminal Strip Identification, for Serial Numbers 1600 to Current

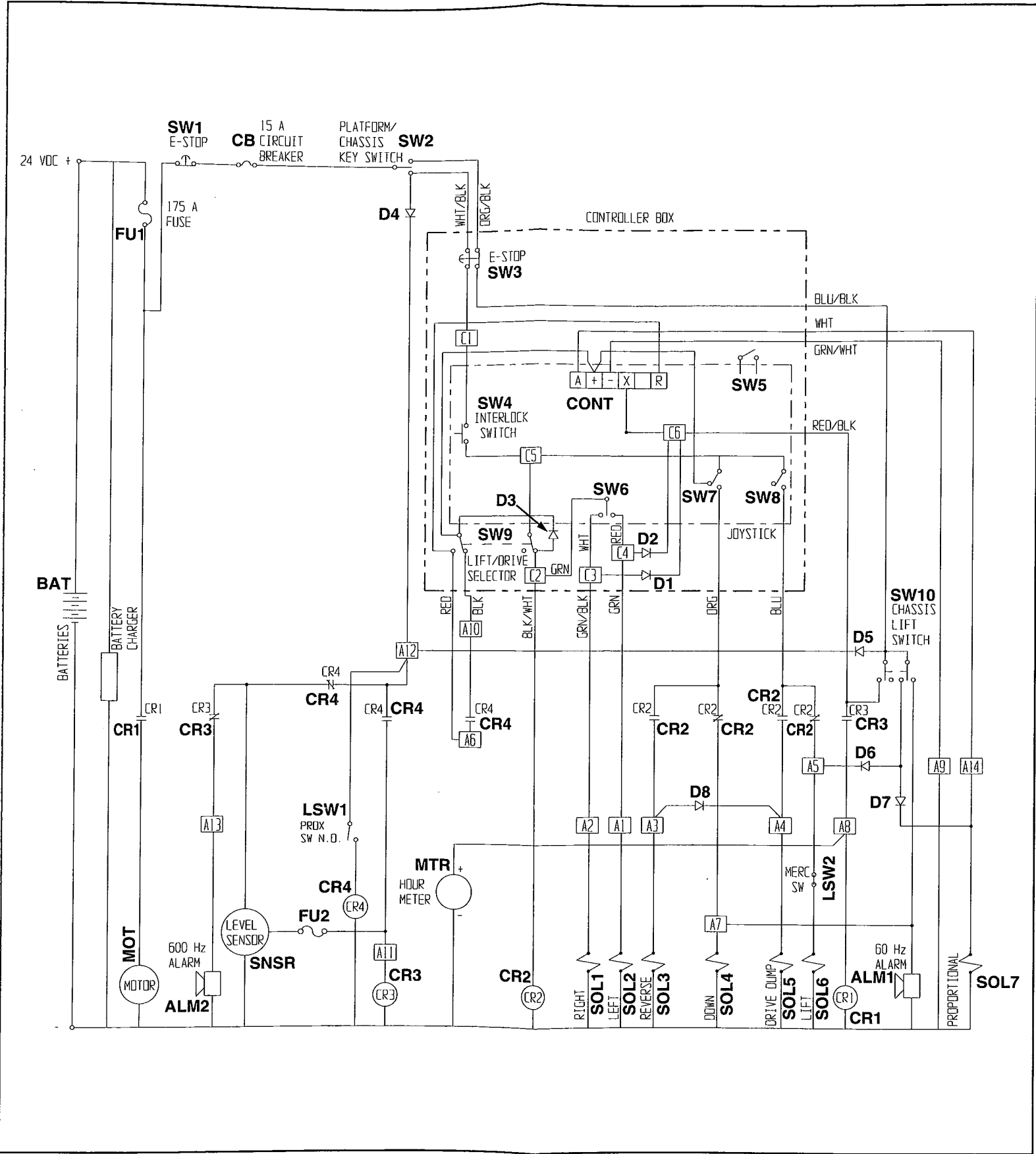


Figure 6-6: Electrical Schematic, for Serial Numbers 1600 to Current

6.4 Hydraulic Schematic

Table 6-4: Hydraulic Schematic Legend, Serial Numbers 1600 to Current

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CYL1	Cylinder, Steering	Provides force to turn front wheels.	Under Chassis between front wheels.
CYL2	Cylinder, Brake	Stops machine from moving while parked.	Under Chassis between rear wheels.
CYL3	Cylinder, Lift	Provides force to lift Platform.	Inside the Scissor Assembly.
CYL4	Cylinder, Cushion	Provides smooth starting and stopping when driving.	Right top center of Chassis Module.
FL1	Filter	Filters oil returning to Tank.	Bottom of Manifold Block.
FL2	Suction Screen	Traps particles in Hydraulic Tank.	Inside Hydraulic Tank at outlet.
MOT1	Drive Motor	Provides tractive effort to move work platform.	On left front Steering Spindle.
MOT2	Drive Motor	Provides tractive effort to move work platform.	On right front Steering Spindle.
ORF1	Orifice, Down	Controls the Platform rate of descent.	Under hose fitting on Lift Cylinder Valve Block.
ORF 2,3	Orifice, Cushion Cylinder	Controls drive cushion rate.	Inside each end of Drive Cushion Cylinder.
P1	Plug, Crossport	Directs steering return oil to tank and hi speed oil to Lift and Drive circuits.	Top of Manifold Block, to the rear of the Proportional Valve.
PMP	Duplex Pump	Supplies hydraulic oil flow for all functions.	On Electric Motor at center right of Chassis Module.
RV1	Valve, Main Relief	Provides over pressure protection to high side of Pump and limits Platform lifting capacity.	Right side of Manifold Block, upper center.

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
RV2	Valve, Steering Relief	Provides over pressure protection to low side of Pump and steering components when steering.	Right side of Manifold Block, lower left corner.
V1	Valve, Steering	Provides directional control for Steering Cylinder.	Rear of Manifold Block.
V2	Valve, Forward Counterbalance	Prevents machine from running away on slopes and cushions stops.	Right side of Manifold Block, near lower right corner.
V3	Valve, Reverse Counterbalance	Prevents machine from running away on slopes and cushions stops.	Right side of Manifold Block, near upper right corner.
V4	Valve, Lift	Provides control of oil for Drive or Lift functions.	Top of Manifold Block, towards rear.
V5	Valve, Forward/Reverse	Provides control of oil for Forward or Reverse drive.	Top of Manifold Block, closest to front.
V6	Valve, Proportional	Controls oil flow into Drive and Lift circuits by proportionally dumping oil back to tank.	Top center of Manifold Block.
V7	Valve, Down and Emergency Lowering	Allows oil to flow out of Lift Cylinder to Tank, manually operated for Emergency Lowering.	Right side of Cylinder Valve Assembly.
V8	Valve, Drive Dump	Allows oil to flow to Forward/Reverse Valve for Drive operation. During Lift, drive circuit oil is returned to tank.	Top of Manifold Block towards front, next to Proportional Valve.



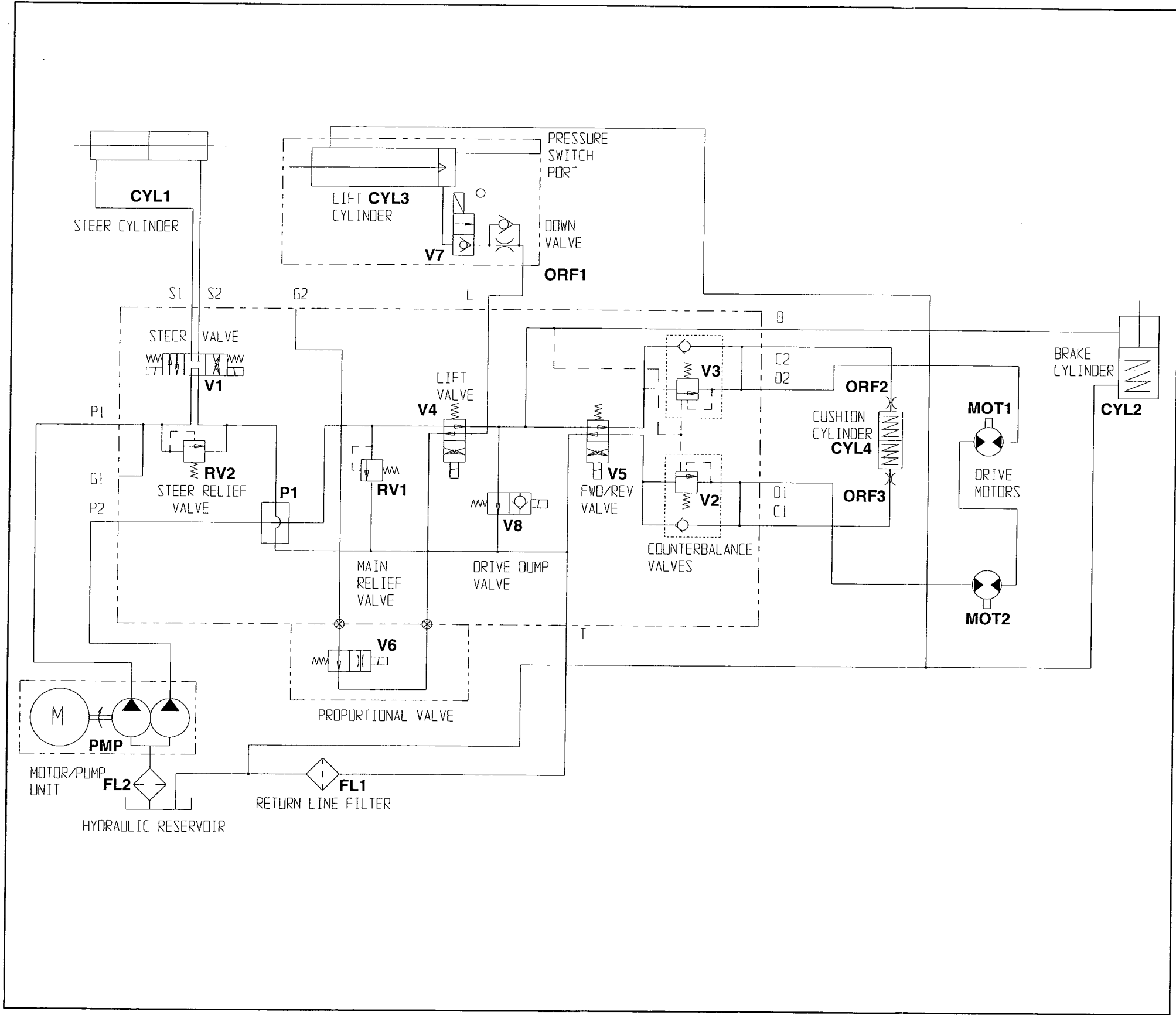


Figure 6-7: Hydraulic Schematic, for Serial Numbers 1600 to Current

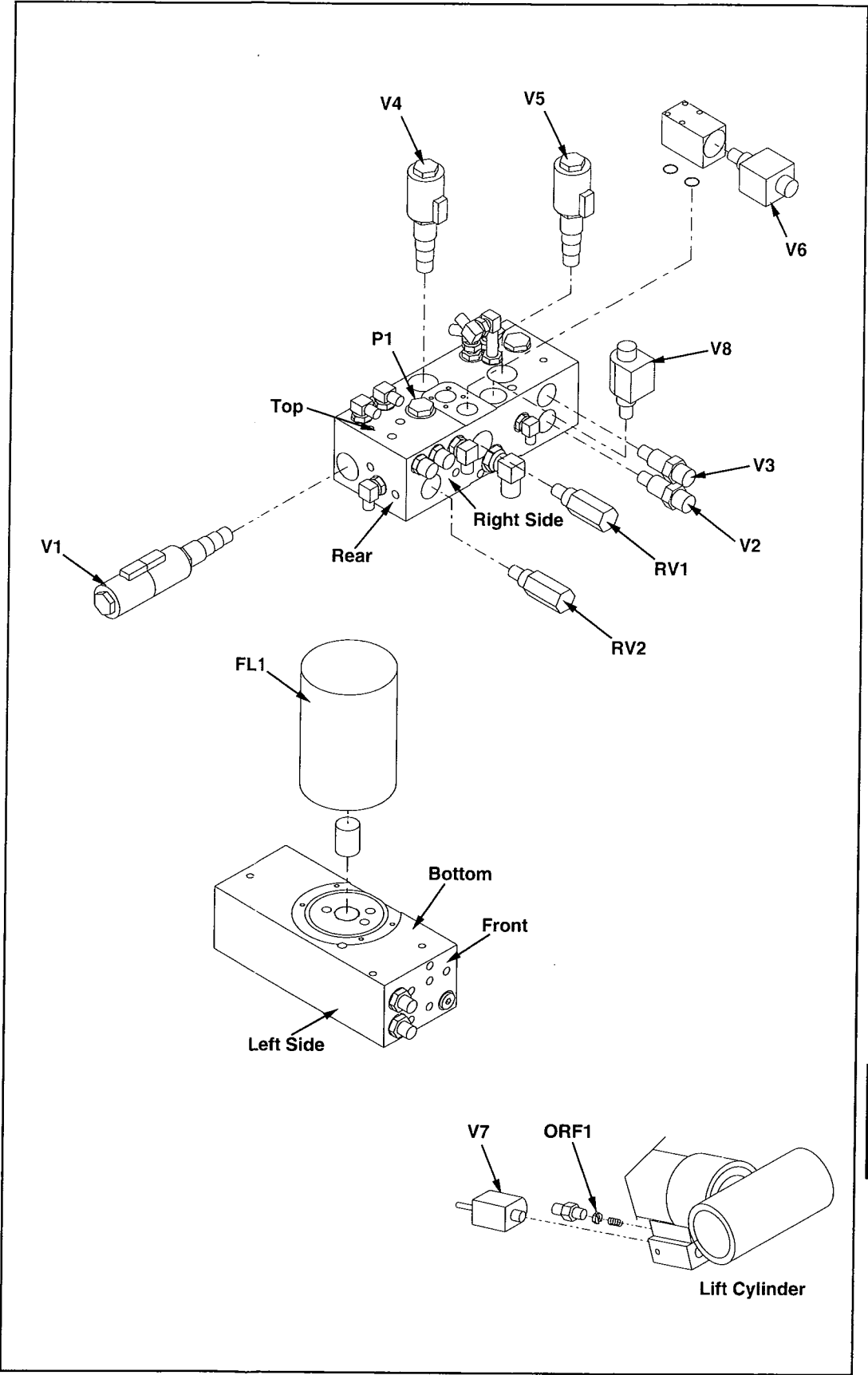


Figure 6-8: Hydraulic Manifold and Lift Cylinder, for Serial Numbers 1600 to Current

## 7.0 Introduction

This section lists and illustrates the replaceable assemblies and parts of the MX15/19 Work Platforms, as manufactured by UpRight, Inc. Each parts list contains the component parts for that assembly indented to show relationship where applicable.

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# Illustrated Parts Breakdown

## FINAL ASSEMBLY

### MX15

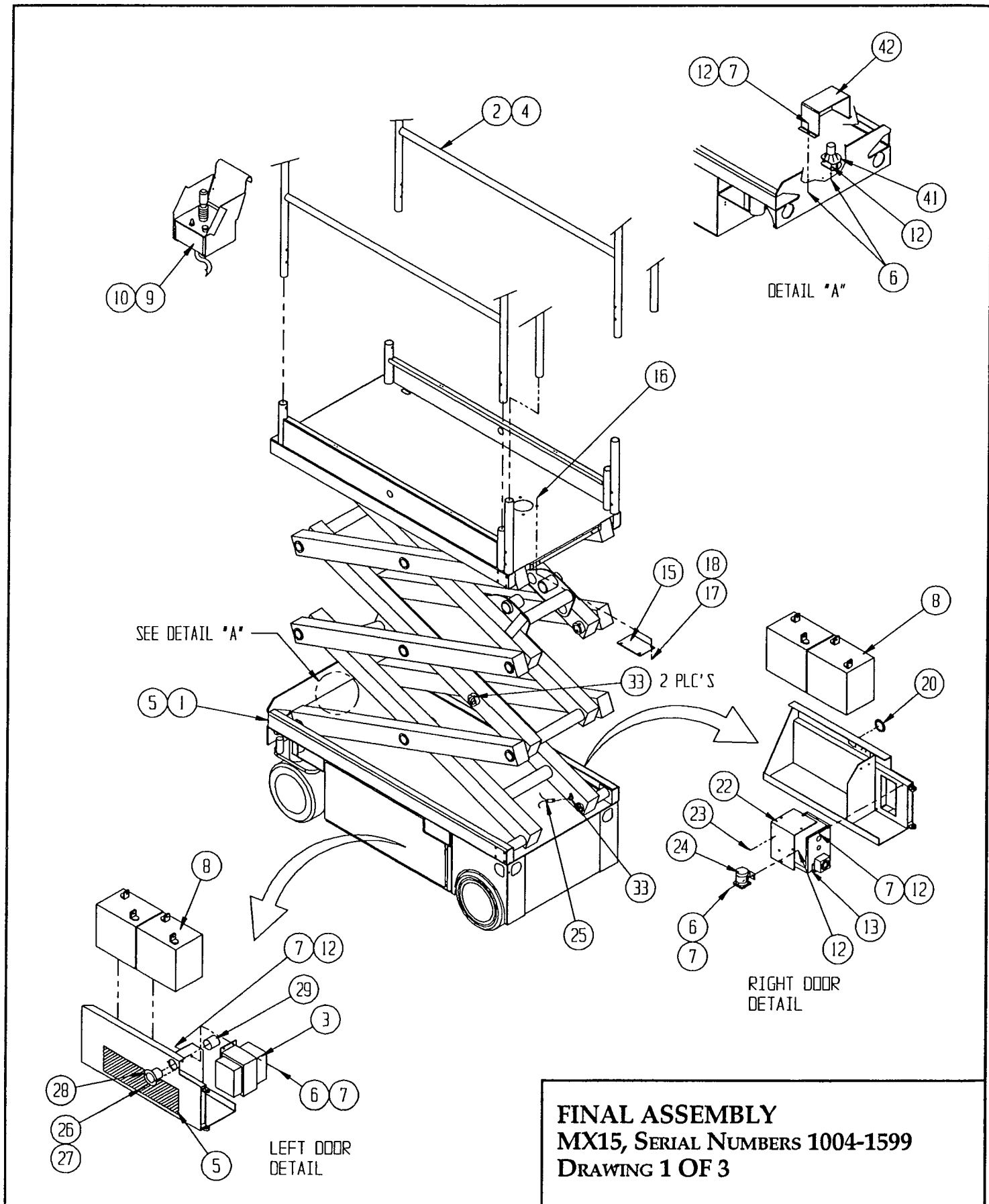
65600-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	65601-000	Basic Assy.	1
2	65614-000	Extension Deck	1
3	63944-001	Charger	1
4	65603-000	Platform Guardrail Instl.	1
5	65612-000	Decal Instl.	1
6	11248-004	Locknut, 1/4-20 Hex	10
7	11240-004	Washer, 1/4 Std Flat	16
8	15796-000	Battery, 6v	4
9	65610-000	Controller Assy.	1
10	65609-000	Control Cable Assy.	1
12	11252-006	Screw, 1/4-20UNC HHC x 3/4	12
13	65636-000	Elec. Box Assy.	1
15	65647-000	Cover Plate	1
16	11253-006	Screw, 5/16-18 HHC x 3/4	4
17	11240-005	Washer, 5/16 Std Flat	4
18	11250-005	Locknut, 5/16-18UNC Hex	4
20	66516-000	Cap, Hole Cover	1
22	65633-000	Cover	1
23	11826-004	Screw, SLFTP 10-32 x 1/2	6
24	10122-000	Solenoid	1
25	63497-001	Mercury Switch	1
26	06464-004	Screw, Rd 6-32 x 1/2	2
27	11248-047	Nut, 6-32 Hex	2
28	29961-000	Inline Plug	1
29	29961-001	Seal, Inline Plug	1
30	65611-000	Hose Kit	1
33	13919-013	Clamp	3
41	29945-011	Level Sensor	1
42	65661-000	Switch Cover	1
101	62125-052	Battery Cable Assy., 5/16 - 3/8 x 52	1
102	62125-003	Battery Cable Assy., 5/16 - 3/8 x 24	1
103	64195-018	Battery Cable Assy., 5/16 - 5/16 x 18	1
104	64195-114	Battery Cable Assy., 5/16 - 5/16 x 114	1
105	64195-014	Battery Cable Assy., 5/16 - 5/16 x 14	2
106	64195-019	Battery Cable Assy., 5/16 - 5/16 x 19	1
107	29450-099	Wire, 16 AWG Blu	6.9ft
108	29451-099	Wire, 16 AWG Wht	8.9ft
109	29452-099	Wire, 16 AWG Blk	5.5ft
110	29454-099	Wire, 16 AWG Red	4.4ft
112	29479-099	Wire, 16 AWG Wht/Blk	1ft
115	63574-099	Wire, 16 AWG Blk/Wht	7.8ft
117	64056-010	Fanning Strip Assy.	1
119	29453-099	Wire, 16 AWG Org	4.8ft
120	05487-099	Wire, 16 AWG Violet	6.6ft
121	29482-099	Wire, 16 AWG Grn/Wht	3.7ft
122	29456-099	Wire, 16 AWG Yel	2.8ft
123	29457-099	Wire, 16 AWG Grn	3.8ft
124	29475-099	Wire, 16 AWG Blu/Blk	3.7ft
125	29478-099	Wire, 16 AWG Red/Blk	5.8ft
126	29498-099	Wire, 16 AWG 4 Con	6ft
127	29496-099	Wire, 16 AWG 2 Con	18ft
130	11868-021	Bushing, Snap	2
133	10154-000	Cover, Battery Term.	10
134	29601-013	Conn., Ring #10 16-14	10
135	29610-001	Conn., Fork #6 22-18	23

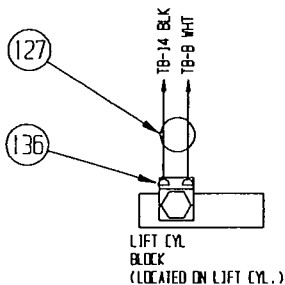
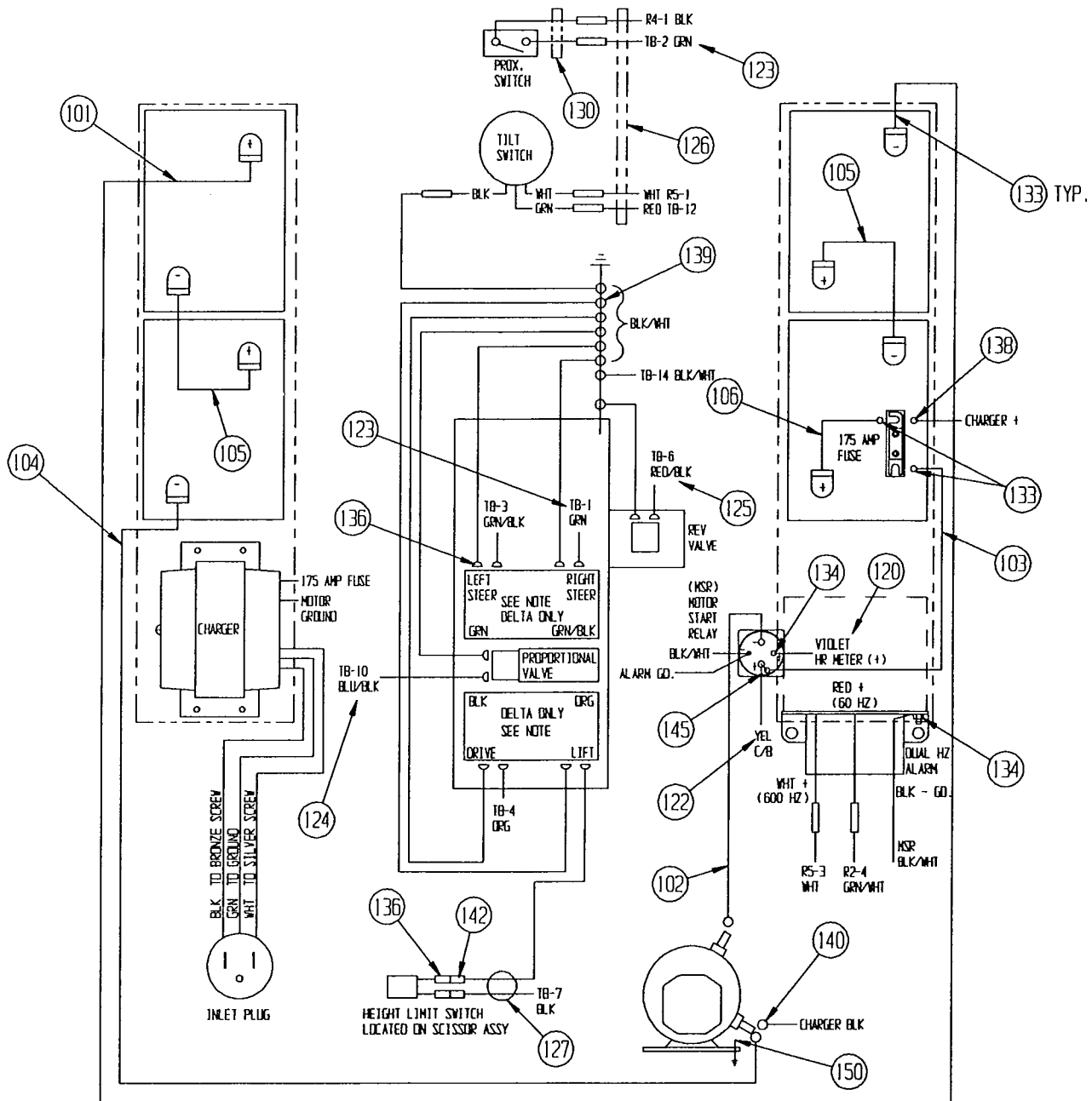
ITEM	PART	DESCRIPTION	QTY.
136	29931-003	Conn., Female Push .25 16-14	40
137	29620-002	Conn., Butt 16-14	8
138	29601-039	Conn., Ring 5/16 12-10	1
139	29601-014	Conn., Ring 1/4 16-14	8
140	29601-021	Conn., Ring 3/8 12-10	1
141	29616-001	Conn., Female Push 16-14	2
142	14914-001	Conn., Male Push 16-14	2
144	29601-019	Conn., Ring 12-10 x #10	2
145	29601-040	Conn., Ring 16-14 x 5/16	1
150	63029-000	Buss Bar	1

# Illustrated Parts Breakdown

Section  
7.2



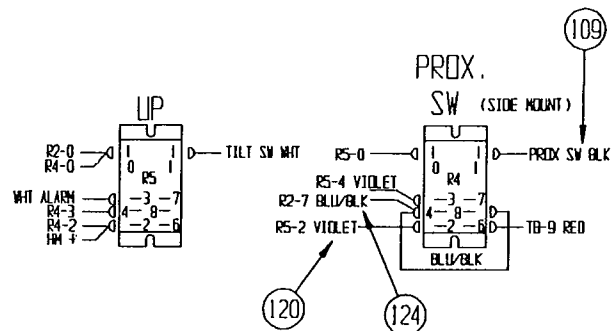
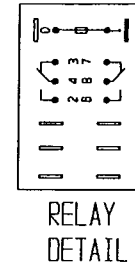
# Illustrated Parts Breakdown



NOTES:  
1. WIRING SHOWN FOR MOST 003 VALVES, SOME (IE DELTA) ARE WIRED OPPOSITE AS SHOWN

**FINAL ASSEMBLY**  
**MX15, SERIAL NUMBERS 1004-1599**  
**DRAWING 2 OF 3**

## Section 7.2



**7-5**

# Illustrated Parts Breakdown

## FINAL ASSEMBLY

### MX15

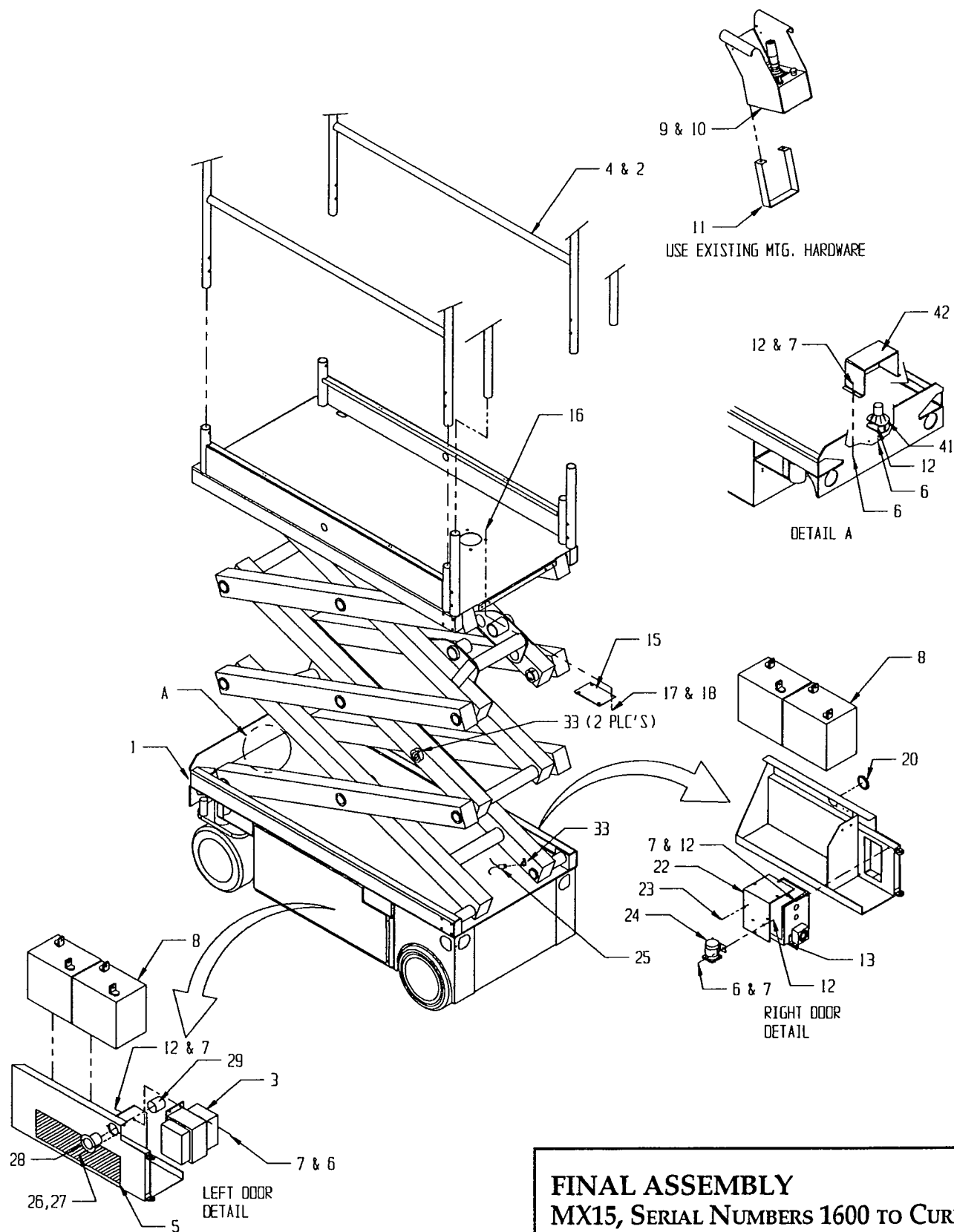
65600-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	65601-000	Basic Assy.	1
2	65614-000	Extension Deck	1
3	63944-001	Charger	1
4	65603-000	Platform Guardrail Instl.	1
5	65612-001	Decal Instl.	1
6	11248-004	Locknut, 1/4-20 Hex	10
7	11240-004	Washer, 1/4 Std Flat	16
8	15796-000	Battery, 6v	4
9	66020-000	Controller Assy.	1
11	65746-000	Controller Guide	1
10	65609-010	Control Cable Assy.	1
12	11252-006	Screw, 1/4-20UNC HHC x 3/4	12
13	65636-010	Elec. Box Assy.	1
15	65647-000	Cover Plate	1
16	11253-006	Screw, 5/16-18 HHC x 3/4	4
17	11240-005	Washer, 5/16 Std Flat	4
18	11250-005	Locknut, 5/16-18UNC Hex	4
20	66516-000	Cap, Hole Cover	1
22	65633-000	Cover	1
23	11826-004	Screw, SLFTP 10-32 x 1/2	6
24	10122-000	Solenoid	1
25	63497-001	Mercury Switch	1
26	06464-004	Screw, Rd 6-32 x 1/2	2
27	11248-047	Nut, 6-32 Hex	2
28	29961-000	Inline Plug	1
29	29961-001	Seal, Inline Plug	1
30	65611-010	Hose Kit	1
33	13919-013	Clamp	3
41	29945-011	Level Sensor	1
42	65661-000	Switch Cover	1
101	62125-052	Battery Cable Assy., 5/16 - 3/8 x 52	1
102	62125-003	Battery Cable Assy., 5/16 - 3/8 x 24	1
103	64195-018	Battery Cable Assy., 5/16 - 5/16 x 18	1
104	64195-114	Battery Cable Assy., 5/16 - 5/16 x 114	1
105	64195-014	Battery Cable Assy., 5/16 - 5/16 x 14	2
106	64195-019	Battery Cable Assy., 5/16 - 5/16 x 19	1
107	29450-099	Wire, 16 AWG Blu	6.9ft
108	29451-099	Wire, 16 AWG Wht	8.9ft
109	29452-099	Wire, 16 AWG Blk	5.5ft
110	29454-099	Wire, 16 AWG Red	4.4ft
112	29479-099	Wire, 16 AWG Wht/Blk	1ft
115	63574-099	Wire, 16 AWG Blk/Wht	7.8ft
117	64056-010	Fanning Strip Assy.	1
119	29453-099	Wire, 16 AWG Org	4.8ft
120	05487-099	Wire, 16 AWG Violet	6.6ft
121	29482-099	Wire, 16 AWG Grn/Wht	3.7ft
122	29456-099	Wire, 16 AWG Yel	2.8ft
123	29457-099	Wire, 16 AWG Grn	3.8ft
124	29475-099	Wire, 16 AWG Blu/Blk	3.7ft
125	29478-099	Wire, 16 AWG Red/Blk	5.8ft
126	29498-099	Wire, 16 AWG 4 Con	6ft
127	29496-099	Wire, 16 AWG 2 Con	18ft
130	11868-021	Bushing, Snap	2
133	10154-000	Cover, Battery Term.	10
134	29601-013	Conn., Ring #10 16-14	10

ITEM	PART	DESCRIPTION	QTY.
135	29610-001	Conn., Fork #6 22-18	23
136	29931-003	Conn., Female Push .25 16-14	40
137	29620-002	Conn., Butt 16-14	8
138	29601-039	Conn., Ring 5/16 12-10	1
139	29601-014	Conn., Ring 1/4 16-14	8
140	29601-021	Conn., Ring 3/8 12-10	1
141	29616-001	Conn., Female Push 16-14	2
142	14914-001	Conn., Male Push 16-14	2
144	29601-019	Conn., Ring 12-10 x #10	2
145	29601-040	Conn., Ring 16-14 x 5/16	1
150	63029-000	Buss Bar	1

# Illustrated Parts Breakdown

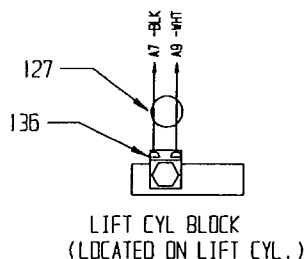
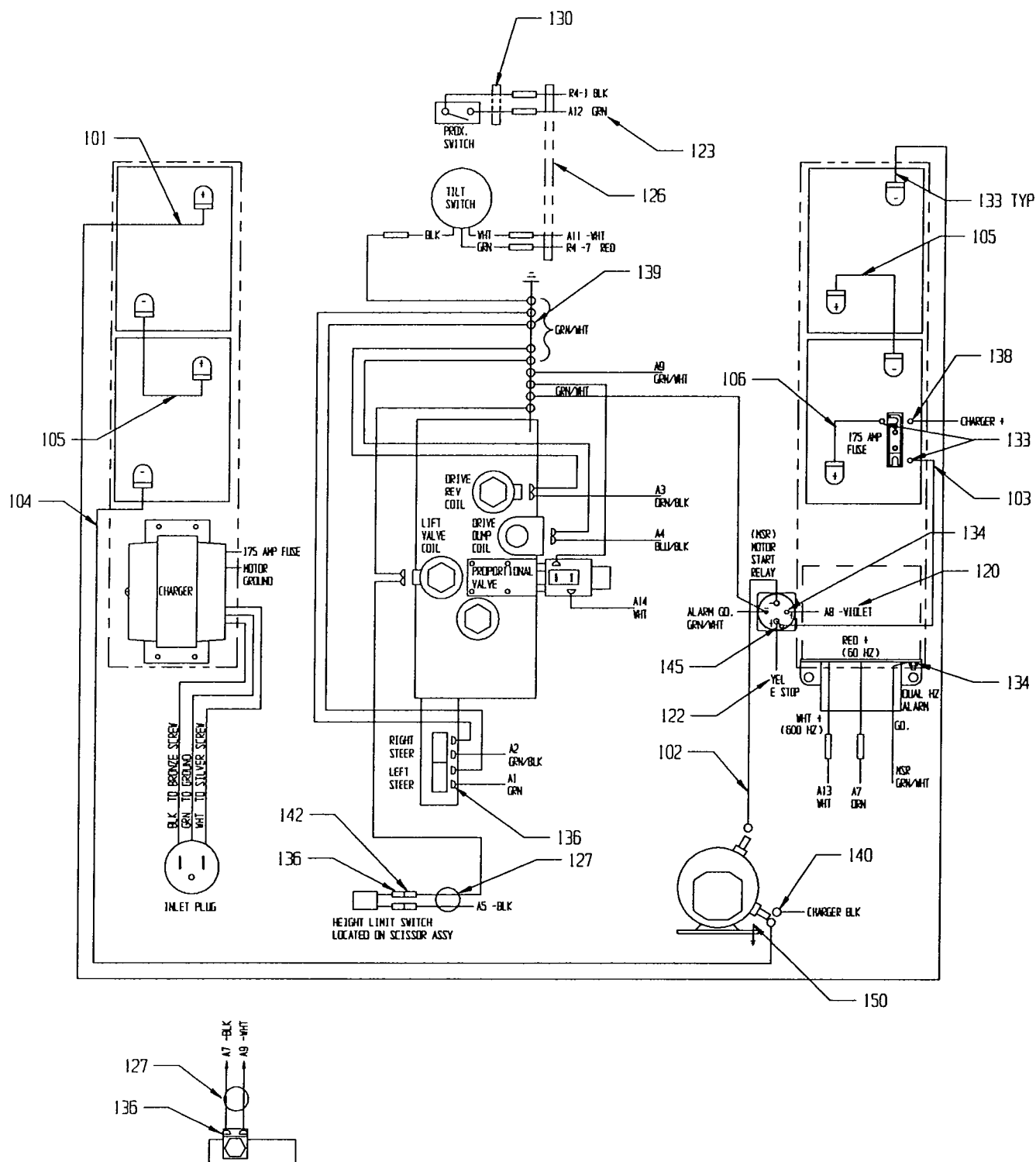
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**FINAL ASSEMBLY**  
**MX15, SERIAL NUMBERS 1600 TO CURRENT**  
**DRAWING 1 OF 3**



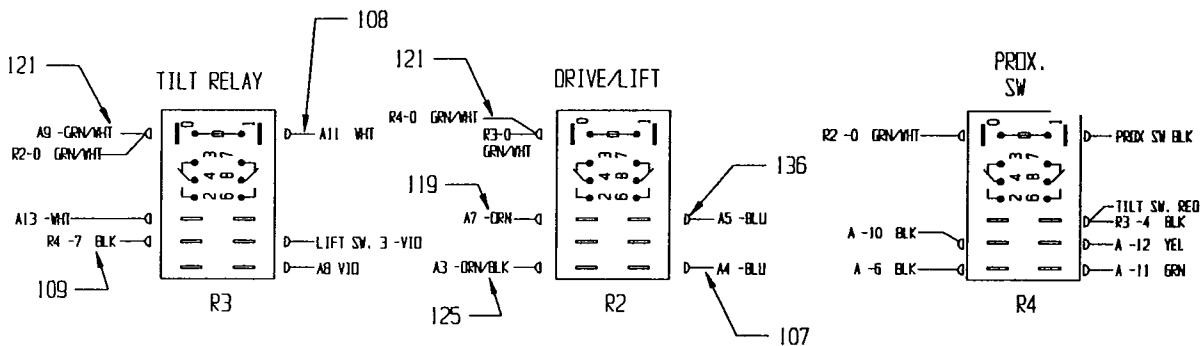
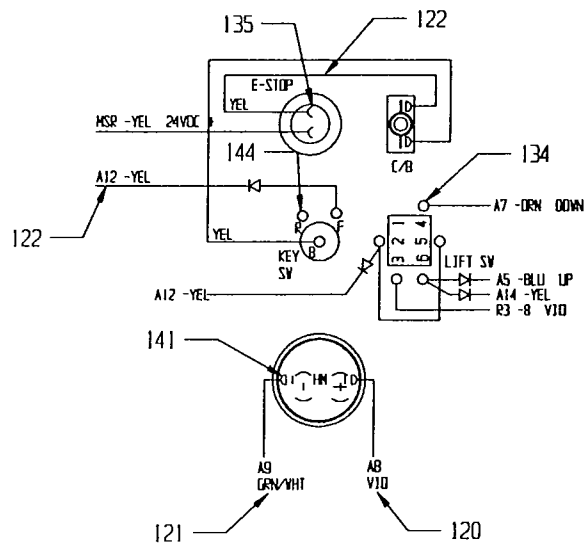
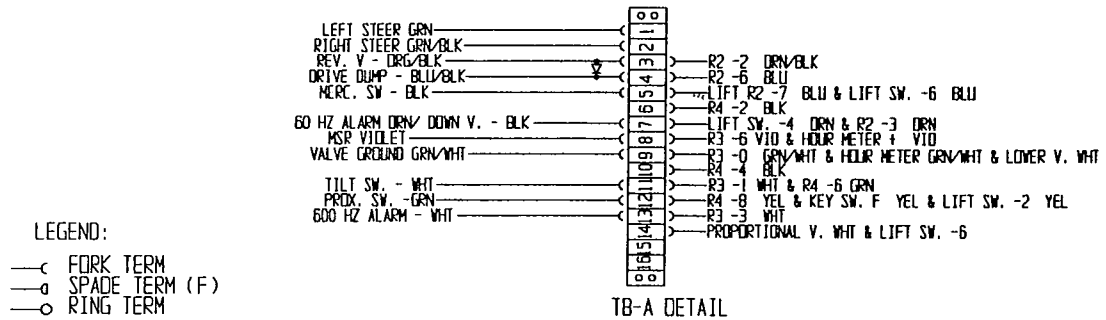
# Illustrated Parts Breakdown



**FINAL ASSEMBLY**  
MX15, SERIAL NUMBERS 1600 TO CURRENT  
DRAWING 2 OF 3

# Illustrated Parts Breakdown

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**FINAL ASSEMBLY**  
MX15, SERIAL NUMBERS 1600 TO CURRENT  
DRAWING 3 OF 3

## FINAL ASSEMBLY

## MX19

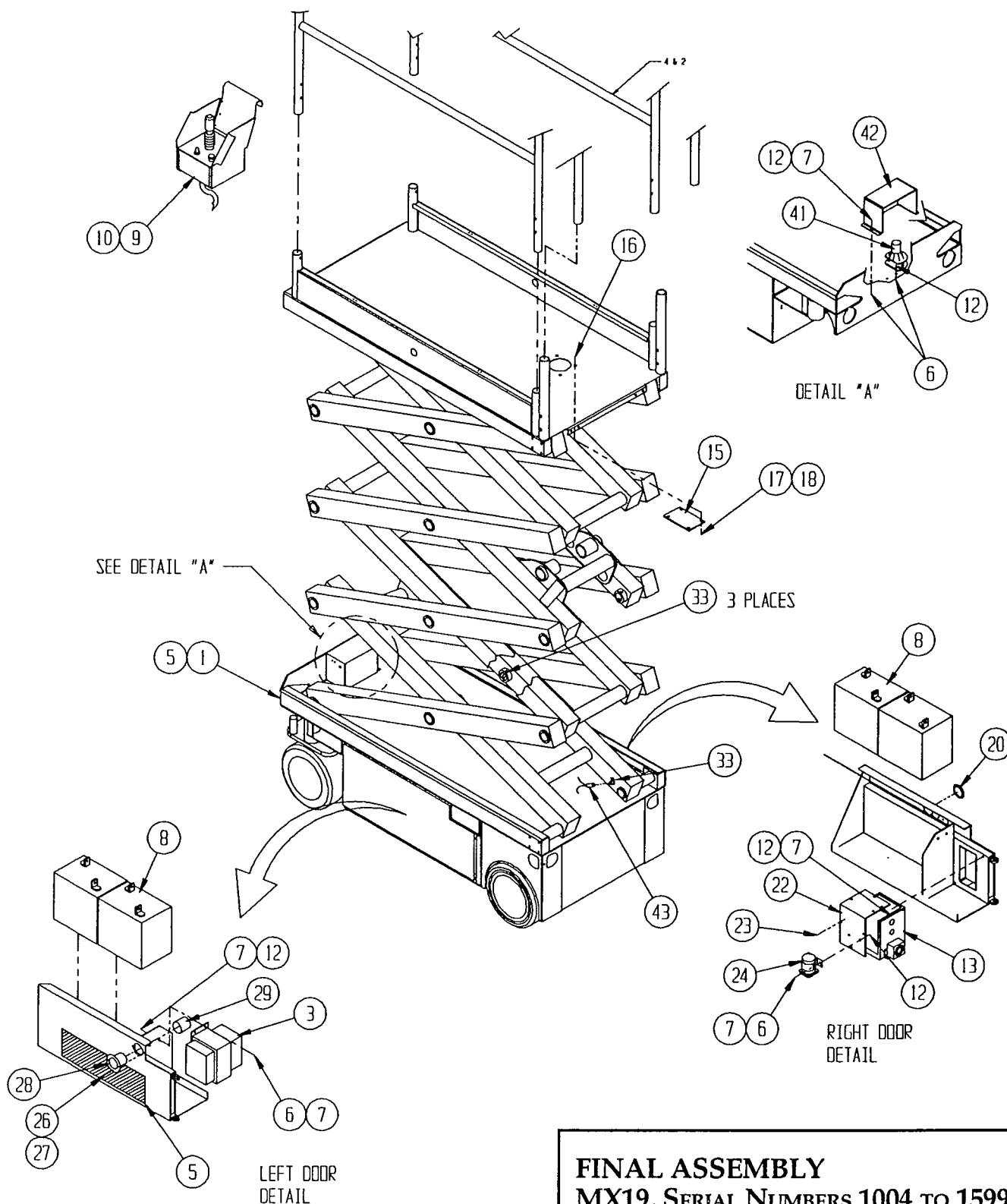
65700-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	65701-000	Basic Assy.	1
2	65614-000	Extension Deck	1
3	63944-001	Charger	1
4	65603-000	Platform Guardrail Instl.	1
5	65712-000	Decal Instl.	1
6	11248-004	Lock Nut, 1/4-20 Hex	10
7	11240-004	Washer, 1/4 Std Flat	16
8	15796-000	Battery, 6v	4
9	65610-000	Controller Assy.	1
10	65609-001	Control Cable Assy.	1
12	11252-006	Screw, 1/4-20UNC HHC x 3/4	10
13	65636-000	Elec. Box Assy.	1
15	65647-000	Cover Plate	1
16	11253-006	Screw, 5/16-18 HHC x 3/4	4
17	11240-005	Washer, 5/16 Std Flat	4
18	11250-005	Locknut, 5/16-18UNC Hex	4
20	66516-000	Cap, Hole Plug	1
22	65633-000	Cover	1
23	11252-004	Screw, 1/4-20 UNC HHC x 1/2	6
24	10122-000	Relay	1
26	06464-004	Screw, Rd 6-32 x 1/2	2
27	11248-047	Nut, 6-32 Hex	2
28	29961-000	Inline Plug	1
29	29961-001	Seal, Inline Plug	1
30	65611-000	Hose Kit	1
33	13919-013	Clamp	4
41	29945-011	Level Sensor	1
42	65661-000	Switch Cover	1
43	63497-001	Mercury Switch	1
101	62125-052	Battery Cable Assy., 5/16 - 3/8 x 52	1
102	62125-003	Battery Cable Assy., 5/16 - 3/8 x 24	1
103	64195-018	Battery Cable Assy., 5/16 - 5/16 x 18	1
104	64195-114	Battery Cable Assy., 5/16 - 5/16 x 114	1
105	64195-014	Battery Cable Assy., 5/16 - 5/16 x 14	2
106	64195-019	Battery Cable Assy., 5/16 - 5/16 x 19	1
107	29450-099	Wire, 16 AWG Blu	6.9ft
108	29451-099	Wire, 16 AWG Wht	8.9ft
109	29452-099	Wire, 16 AWG Blk	5.5ft
110	29454-099	Wire, 16 AWG Red	4.4ft
112	29479-099	Wire, 16 AWG Wht/Blk	1ft
113	29483-099	Wire, 16 AWG Red/Wht	4.7ft
115	63574-099	Wire, 16 AWG Blk/Wht	7.8ft
117	64056-010	Fanning Strip Assy.	1
119	29453-099	Wire, 16 AWG Org	4.8ft
120	05487-099	Wire, 16 AWG Violet	6.6ft
121	29482-099	Wire, 16 AWG Grn/Wht	3.7ft
122	29456-099	Wire, 16 AWG Yel	2.8ft
123	29457-099	Wire, 16 AWG Grn	3.8ft
124	29475-099	Wire, 16 AWG Blu/Blk	3.7ft
125	29478-099	Wire, 16 AWG Red/Blk	5.8ft
126	29498-099	Wire, 16 AWG 4 Con	6ft
127	29496-099	Wire, 16 AWG 2 Con	18ft
130	11868-021	Bushing, Snap	2
133	10154-000	Cover, Battery Term.	10
134	29601-013	Conn., Ring #10 16-14	10

ITEM	PART	DESCRIPTION	QTY.
135	29610-001	Conn., Fork #6 22-18	23
136	29931-003	Conn., Female Push .25 16-14	40
137	29620-002	Conn., Butt 16-14	8
138	29601-039	Conn., Ring 5/16 12-10	1
139	29601-014	Conn., Ring 1/4 16-14	8
140	29601-021	Conn., Ring 3/8 12-10	1
141	29616-001	Conn., Female push 16-14	2
142	14914-001	Conn., Male Push 16-14	2
144	29601-019	Conn., Ring 12-10 x #10	2
145	29601-040	Conn., Ring 16-14 x 5/16	1
150	63029-000	Buss Bar	1

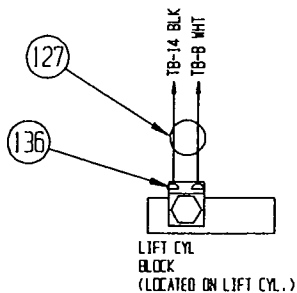
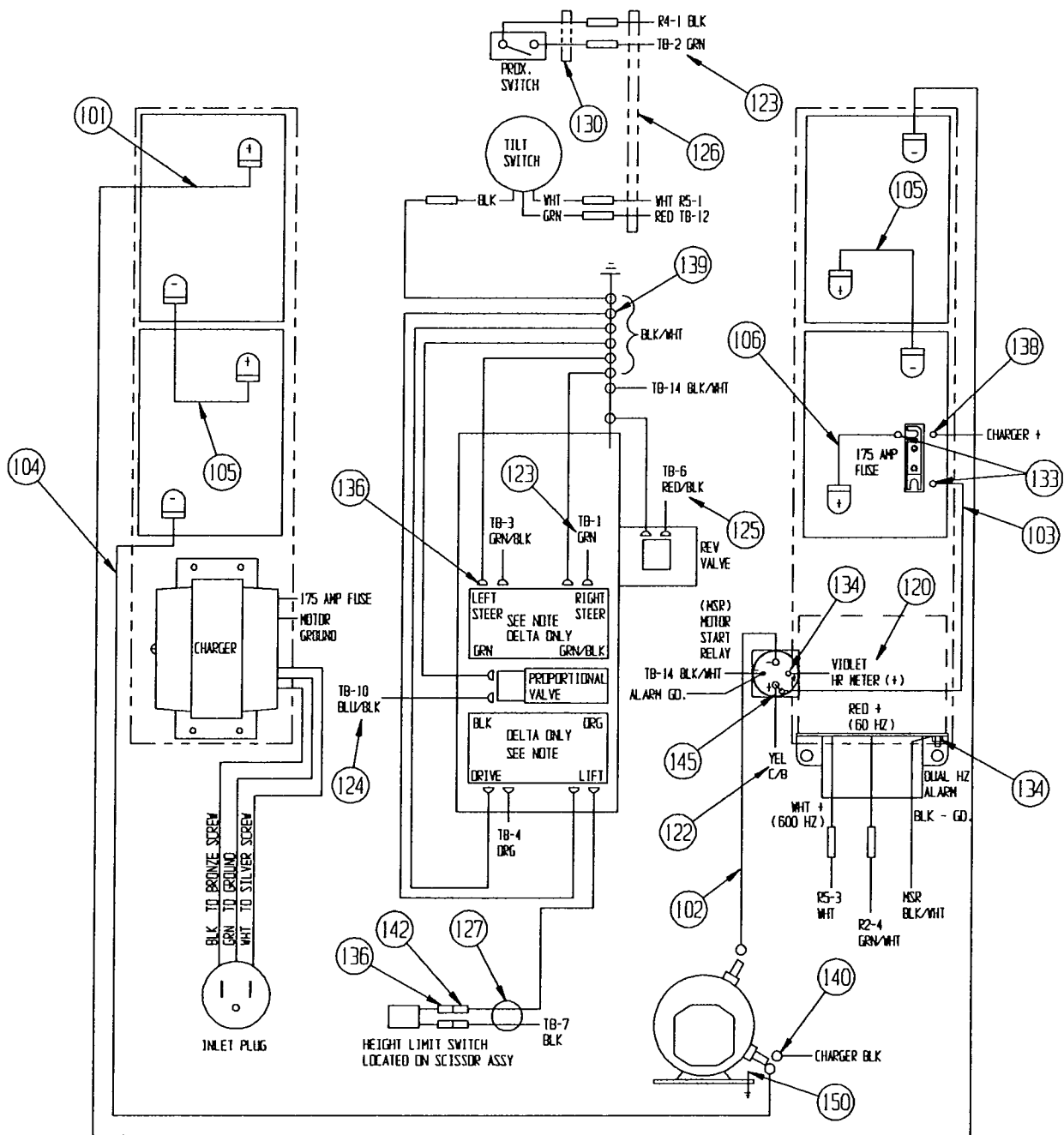
# Illustrated Parts Breakdown

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**FINAL ASSEMBLY**  
**MX19, SERIAL NUMBERS 1004 TO 1599**  
**DRAWING 1 OF 3**

# Illustrated Parts Breakdown



NOTE:  
1. WIRING SHOWN FOR MOST 003 VALVES, SOME (IE DELTA) ARE WIRED OPPOSITE AS SHOWN

**FINAL ASSEMBLY**  
**MX19, SERIAL NUMBERS 1004 TO 1599**  
**DRAWING 2 OF 3**



# Illustrated Parts Breakdown

## FINAL ASSEMBLY

### MX19

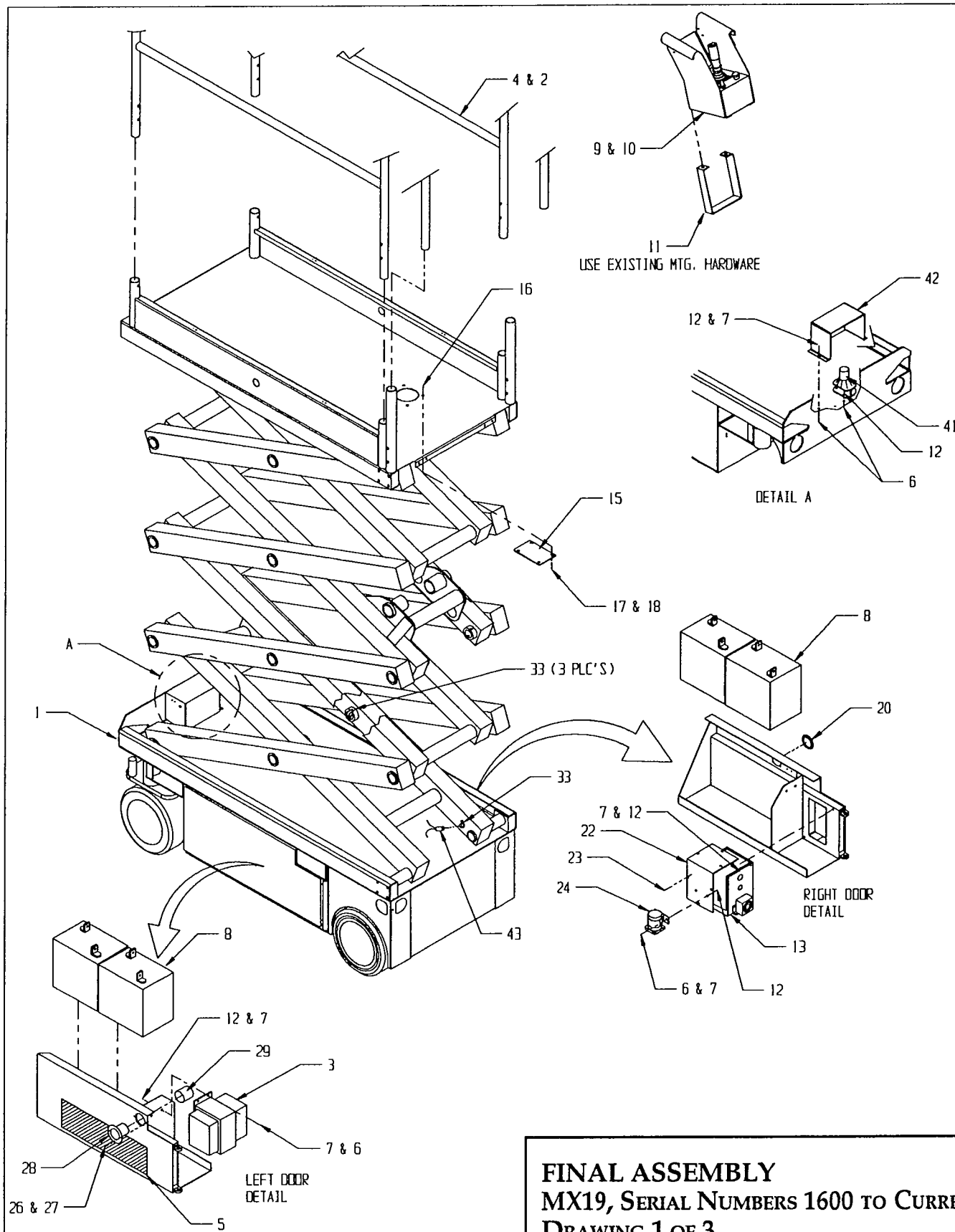
65700-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	65701-000	Basic Assy.	1
2	65614-000	Extension Deck	1
3	63944-001	Charger	1
4	65603-000	Platform Guardrail Instl.	1
5	65712-010	Decal Instl.	1
6	11248-004	Lock Nut, 1/4-20 Hex	10
7	11240-004	Washer, 1/4 Std Flat	16
8	15796-000	Battery, 6v	4
9	66020-000	Controller Assy.	1
10	65609-011	Control Cable Assy.	1
11	65746-000	Controller Guide	1
12	11252-006	Screw, 1/4-20UNC HHC x 3/4	10
13	65636-010	Elec. Box Assy.	1
15	65647-000	Cover Plate	1
16	11253-006	Screw, 5/16-18 HHC x 3/4	4
17	11240-005	Washer, 5/16 Std Flat	4
18	11250-005	Locknut, 5/16-18UNC Hex	4
20	66516-000	Cap, Hole Plug	1
22	65633-000	Cover	1
23	11252-004	Screw, 1/4-20 UNC HHC x 1/2	6
24	10122-000	Relay	1
26	06464-004	Screw, Rd 6-32 x 1/2	2
27	11248-047	Nut, 6-32 Hex	2
28	29961-000	Inline Plug	1
29	29961-001	Seal, Inline Plug	1
30	65611-010	Hose Kit	1
33	13919-013	Clamp	4
41	29945-011	Level Sensor	1
42	65661-000	Switch Cover	1
43	63497-001	Mercury Switch	1
101	62125-052	Battery Cable Assy., 5/16 - 3/8 x 52	1
102	62125-003	Battery Cable Assy., 5/16 - 3/8 x 24	1
103	64195-018	Battery Cable Assy., 5/16 - 5/16 x 18	1
104	64195-114	Battery Cable Assy., 5/16 - 5/16 x 114	1
105	64195-014	Battery Cable Assy., 5/16 - 5/16 x 14	2
106	64195-019	Battery Cable Assy., 5/16 - 5/16 x 19	1
107	29450-099	Wire, 16 AWG Blu	6.9ft
108	29451-099	Wire, 16 AWG Wht	8.9ft
109	29452-099	Wire, 16 AWG Blk	5.5ft
110	29454-099	Wire, 16 AWG Red	4.4ft
112	29479-099	Wire, 16 AWG Wht/Blk	1ft
113	29483-099	Wire, 16 AWG Red/Wht	4.7ft
115	63574-099	Wire, 16 AWG Blk/Wht	7.8ft
117	64056-010	Fanning Strip Assy.	1
119	29453-099	Wire, 16 AWG Org	4.8ft
120	05487-099	Wire, 16 AWG Violet	6.6ft
121	29482-099	Wire, 16 AWG Grn/Wht	3.7ft
122	29456-099	Wire, 16 AWG Yel	2.8ft
123	29457-099	Wire, 16 AWG Grn	3.8ft
124	29475-099	Wire, 16 AWG Blu/Blk	3.7ft
125	29478-099	Wire, 16 AWG Red/Blk	5.8ft
126	29498-099	Wire, 16 AWG 4 Con	6ft
127	29496-099	Wire, 16 AWG 2 Con	18ft
130	11868-021	Bushing, Snap	2
133	10154-000	Cover, Battery Term.	10

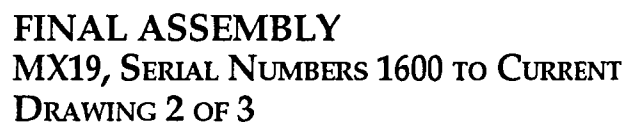
ITEM	PART	DESCRIPTION	QTY.
134	29601-013	Conn., Ring #10 16-14	10
135	29610-001	Conn., Fork #6 22-18	23
136	29931-003	Conn., Female Push .25 16-14	40
137	29620-002	Conn., Butt 16-14	8
138	29601-039	Conn., Ring 5/16 12-10	1
139	29601-014	Conn., Ring 1/4 16-14	8
140	29601-021	Conn., Ring 3/8 12-10	1
141	29616-001	Conn., Female push 16-14	2
142	14914-001	Conn., Male Push 16-14	2
144	29601-019	Conn., Ring 12-10 x #10	2
145	29601-040	Conn., Ring 16-14 x 5/16	1
150	63029-000	Buss Bar	1

# Illustrated Parts Breakdown

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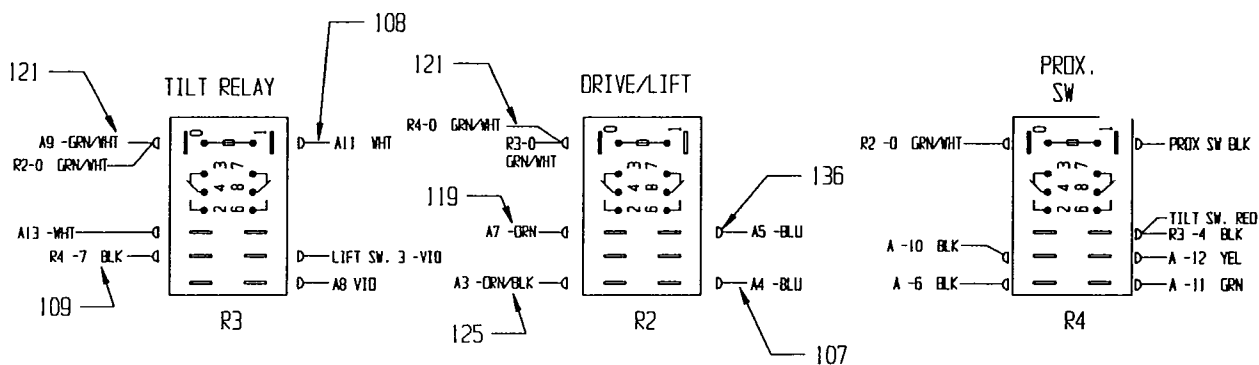
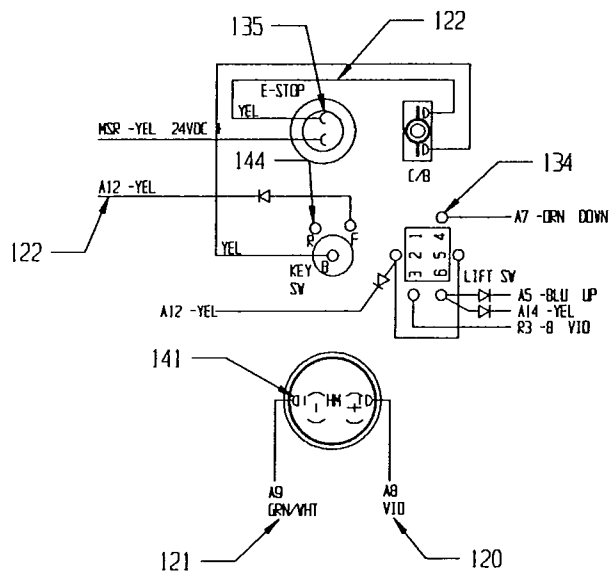
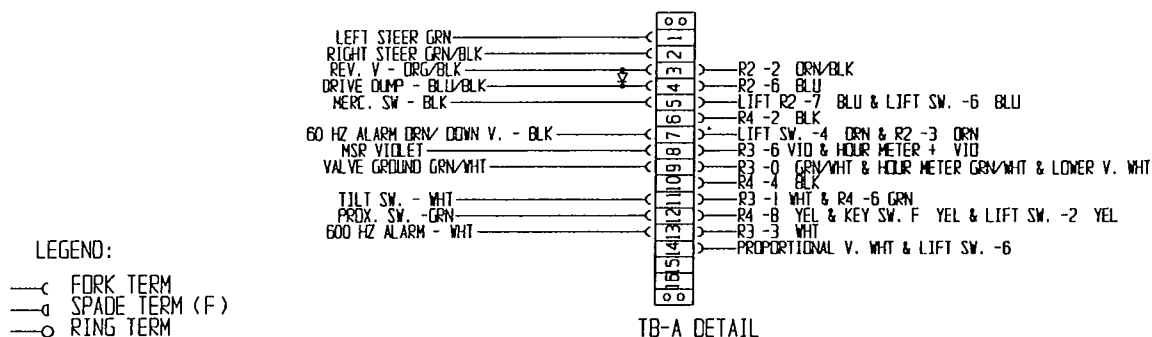






# Illustrated Parts Breakdown

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**FINAL ASSEMBLY**  
MX19, SERIAL NUMBERS 1600 TO CURRENT  
DRAWING 3 OF 3

## BASIC ASSEMBLY

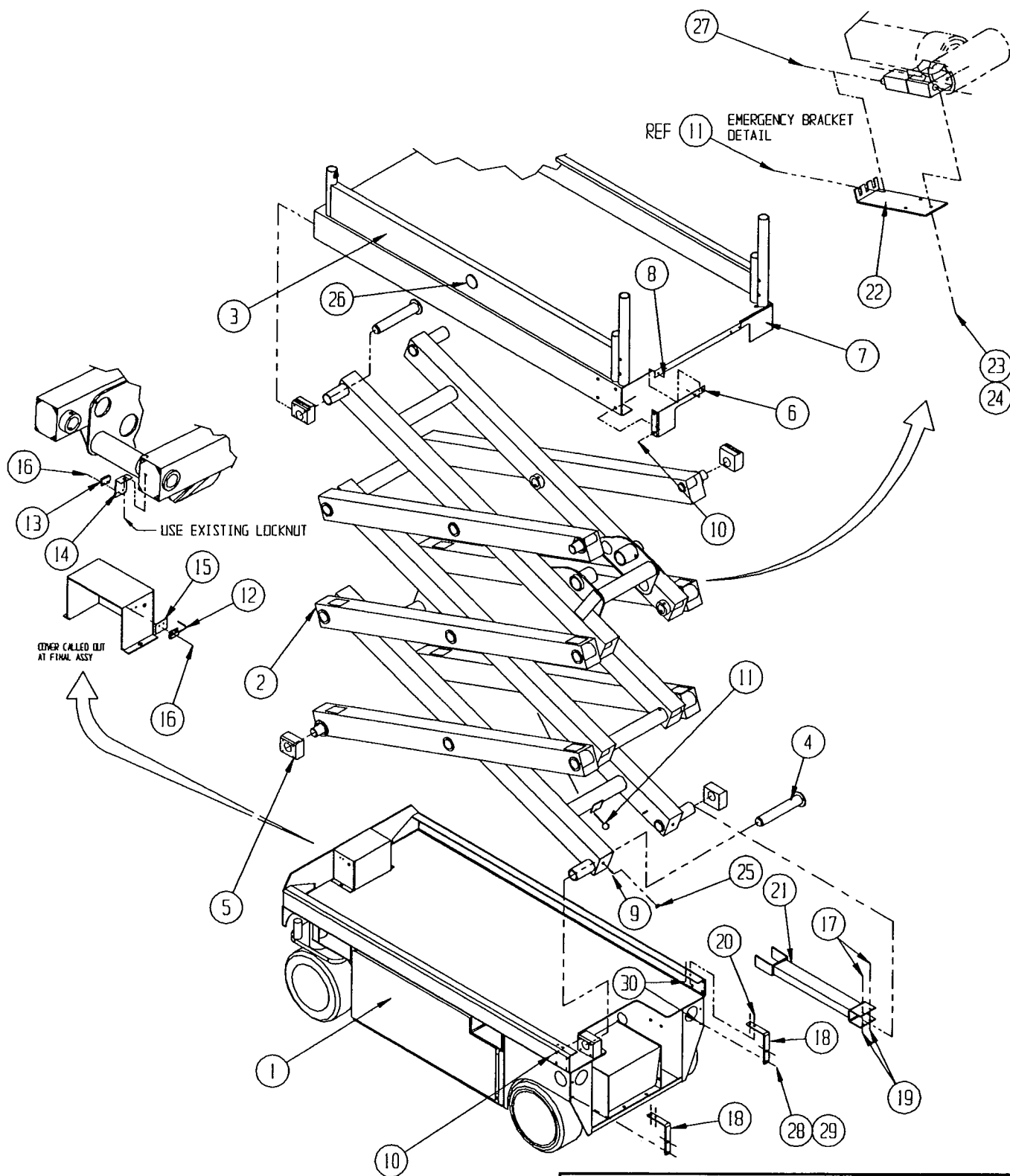
## MX15

65601-000

ITEM	PART	DESCRIPTION	QTY.
1	65602-000	Chassis Assy.	1
2	65605-000	Scissor Arm Assy.	1
3	66250-001	Platform Weldment	1
4	65698-000	Lower Pivot Pin Weldment	4
5	65726-000	Slide Pad	8
6	65728-000	Deck Bracket, L.H.	1
7	65727-000	Deck Bracket, R.H.	1
8	14027-006	Screw, HHD SLFTP 1/4-28 x 3/4	4
9	11739-016	Rollpin, 3/8 Dia. x 2	4
10	14066-008	Screw, SLFTP 1/4-AB x 1	16
11	65754-000	Emergency Lowering Cable	1
12	65373-001	Switch	1
13	65373-002	Switch Magnet	1
14	65763-000	Angle Mount (Switch)	1
15	65519-000	Switch Pad - 1/16 Thk Alum	1
16	26551-005	Pop Rivet, 1/8 x 1/4 Grip	4
17	11252-022	Screw, HHC 1/4-20 x 2-3/4	2
18	30788-003	Bearing Retention Angle	2
19	11248-004	Lock Nut, Hex 1/4-20	2
20	11254-008	Screw 3/8-16 UNC x 1 HHC	4
21	65764-000	Scissor Chock Weldment	1
22	65770-000	Cable Brkt, Emer. Lower	1
23	11252-004	Screw, HHC 1/4-20 x 1/2	3
24	11238-004	LockWasher, 1/4	3
25	64462-002	Cap Plug, 1/2 Dia.	4
26	66587-000	Plug, 1 3/8 Dia. Hole	2
27	13913-014	Spring, Comp.	1
28	11254-014	Screw 3/8-16 UNC x 1 3/4 HHC	4
29	11240-006	Washer 3/8 Std Flat	4
30	11248-006	Nut Hex ESNA 3/8-16 UNC	8

# Illustrated Parts Breakdown

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**BASIC ASSEMBLY  
MX15**

## BASIC ASSEMBLY

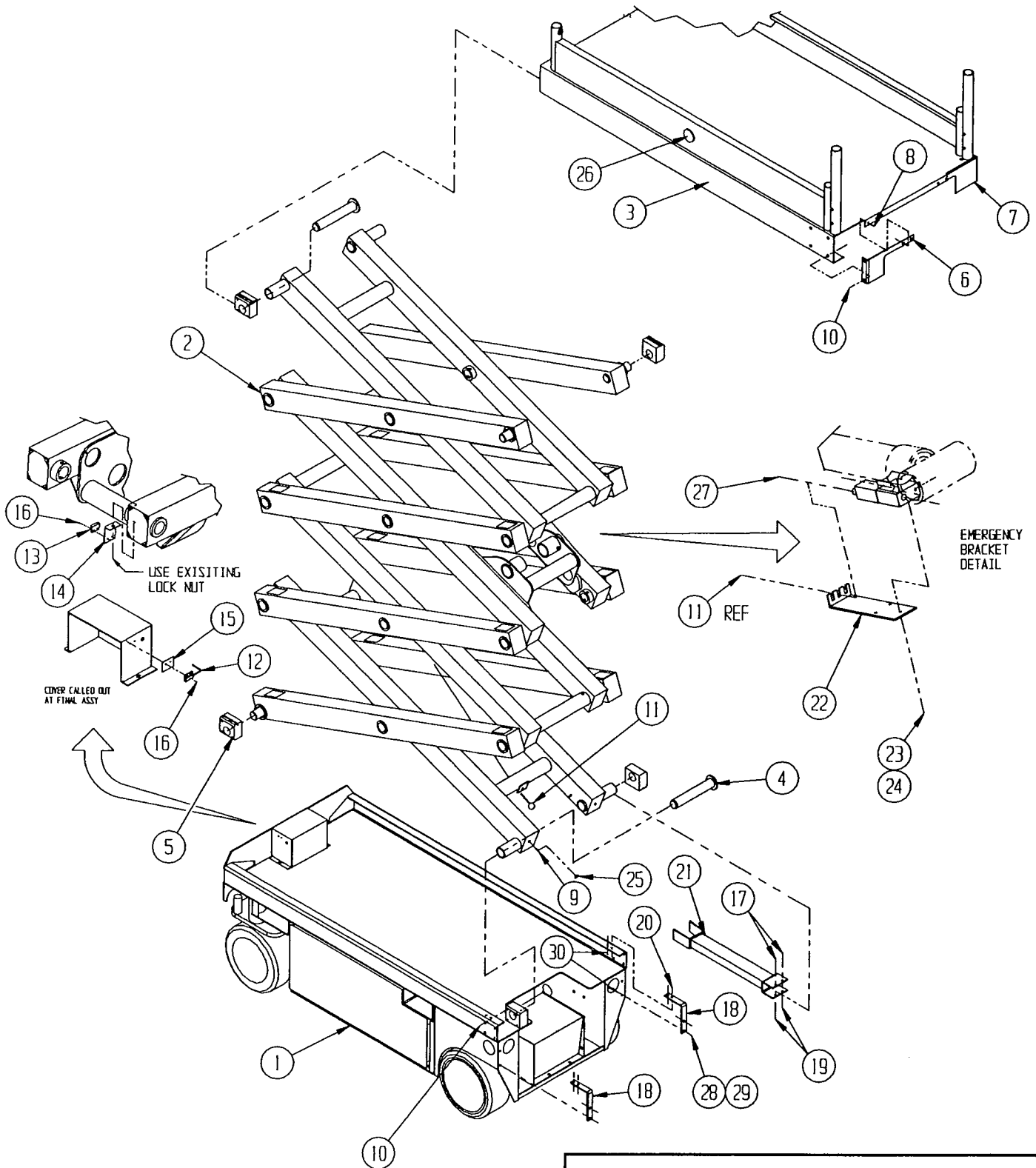
MX19

65701-000

ITEM	PART	DESCRIPTION	QTY.
1	65602-000	Chassis Assy.	1
2	65705-000	Scissor Arm Assy.	1
3	66250-001	Platform Weldment	1
4	65698-000	Lower Pivot Pin Weldment	4
5	65726-000	Slide Pad	8
6	65728-000	Deck Bracket, L.H.	1
7	65727-000	Deck Bracket, R.H.	1
8	14027-006	Screw, HHD SLFTP 1/4-28 x 3/4	4
9	11739-016	Rollpin, 3/8 Dia. x 2	4
10	14066-008	Screw, SLFTP 1/4-ab x 1	16
11	65754-000	Emergency Lowering Cable	1
12	65373-001	Switch	1
13	65373-002	Switch Magnet	1
14	65763-000	Angle Mount	1
15	65519-000	Switch Pad - 1/16 Thk Alum.	1
16	26551-005	Pop Rivet, 1/8 x 1/4 Grip	4
17	11252-022	Screw, HHC 1/4-20 x 2-3/4	2
18	30788-003	Bearing Retention Angle	2
19	11248-004	Lock Nut, Hex 1/4-20	2
20	11254-008	Screw 3/8-16 UNC x 1 HHC	4
21	65764-000	Scissor Chock Weldment	1
22	65770-000	Cable Brkt., Emer. Lower	1
23	11252-004	Screw, HHC 1/4-20 x 1/2	3
24	11238-004	LockWasher, 1/4	3
25	64462-002	Cap Plug, 1/2 Dia.	4
26	66587-000	Plug, 1 3/8 Dia. Hole	2
27	13913-014	Spring, Comp.	1
28	11254-014	Screw 3/8-16 UNC x 1 3/4 HHC	4
29	11240-006	Washer 3/8 Std Flat	4
30	11248-006	Nut Hex ESNA 3/8-16 UNC	8

# Illustrated Parts Breakdown

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**BASIC ASSEMBLY  
MX19**

## CHASSIS ASSEMBLY

MX15/19

65602-000

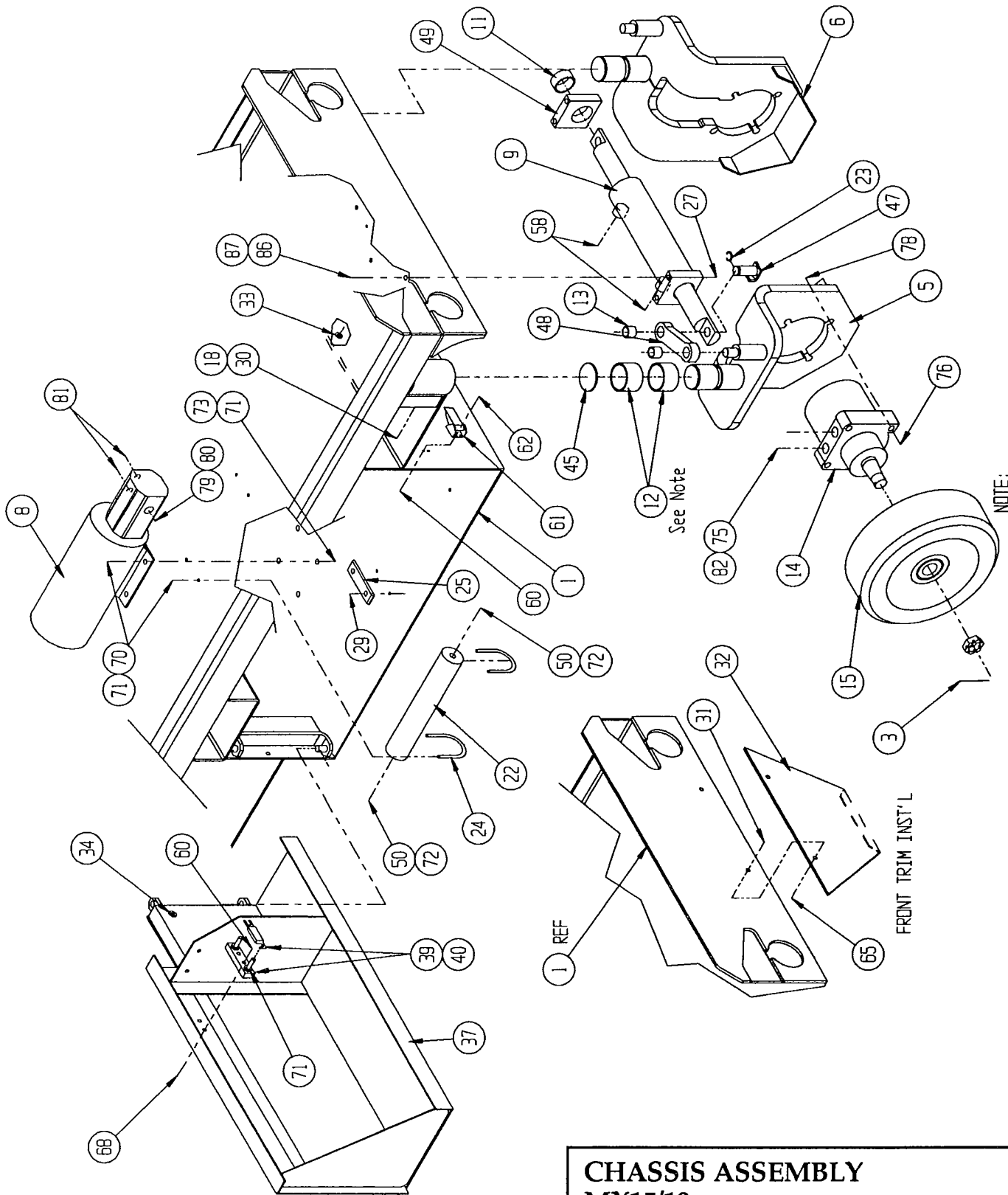
ITEM	PART	DESCRIPTION	QTY.
1	65620-000	Chassis Weldment	1
2	65678-000	Brake Pivot Weldment	1
3	11753-012	Cotter Pin, 1/8 x 1 1/2	2
4	65685-000	Brake Actuator Weldment	2
5	65690-000	Yoke Weldment, R.H.	1
6	65691-000	Yoke Weldment, L.H.	1
7	65637-000	Hydraulic Tank Ass'y	1
8	15797-000	Power Unit	1
-	15797-010	Pump	1
-	15797-011	Motor	1
*	10145-001	Brushes (8), Motor	1
9	65371-000	Steering Cylinder	1
*	65371-010	Kit, Seal	1
10	11781-020	Bearing	4
11	27931-072	Bearing	2
12	27931-059	Bearing	4
13	27931-022	Bearing	4
14	61817-002	Motor Drive	2
-	61817-011	Nut, Slotted	1
*	61817-015	Key, Shaft	1
*	61817-010	Kit, Seal	1
15	65743-000	Drive Wheel	2
16	65744-000	Idler Wheel	2
17	11254-008	Screw, HHC 3/8-16 x 1	2
18	11273-006	Nut, Hex 3/8-16 Jam	2
19	65657-000	Tray Weldment, L.H.	1
20	66604-000	Brake Cylinder	1
*	66604-010	Kit, Seal	1
21	27931-071	Bearing	2
22	65396-000	Cushion Cylinder	1
23	13315-010	Ring, Retaining "e"	2
24	14924-007	U-bolt	2
25	63728-001	Slide Block	4
27	11254-032	Screw, HHC 3/8-16 x 4	4
28	14027-006	Screw, HHD SLFTD 1/4-28 x 3/4	6
29	26553-004	Rvt Pop 3/16 Dia. .25-.38 Grip	8
30	11287-008	Screw, Set 3/8-16 x 1	2
31	11252-008	Screw, HHC 1/4-20 x 1	4
32	65756-000	Front Trim Cover	1
33	12956-010	Crommet	1
34	14252-004	Insert, 1/4-20	2
36	65604-000	Valve Block Assy, Serial Numbers 1004 to 1599	1
	65617-000	Valve Block Assy, Serial Numbers 1600 to current	1
37	65650-000	Tray Weldment, R.H. x15/19	1
39	10149-000	Fuse Block	1
40	10148-001	Fuse, 175 Amp	1
41	65735-000	Wheel Cover, R.H.	1
42	65736-000	Wheel Cover, L.H.	1
44	65737-000	Forklift Pocket	1
45	65733-000	Thrust Pad, 1/4 UHMW	2
47	65800-000	Weldment, Steer Pin	2
48	65731-000	Steer Link	2
49	65732-000	Steer Guide	2
50	65556-000	Cushion Cylinder Orifice	2
52	66322-000	Cylinder Link	1

ITEM	PART	DESCRIPTION	QTY.
53	65742-000	Valve Bracket, Serial Numbers 1004 to 1599	1
	65742-001	Valve Bracket, Serial Numbers 1600 to current	1
54	65742-000	Valve Bracket, Serial Numbers 1004 to 1599	1
	65742-002	Valve Bracket, Serial Numbers 1600 to current	1
55	66096-016	Screw, 1/2-13UNC Sq Hd x 2	1
58	11934-001	Fitting	2
60	11248-002	Lock Nut, 8-32	6
61	05299-000	Latch, Toggle	2
62	11708-004	Screw, Mach Rd Hd 8-32 x 1/2	4
64	11246-005	Locknut, Thin 5/16-18	1
65	11248-004	Lock Nut, 1/4-20	6
66	11240-004	Washer, Flat Std 1/4	4
67	11252-006	Screw, HHC 1/4-20 x 3/4	1
68	11709-008	Screw, Mach Hd Rd 10-24 x 1	2
70	11248-005	Lock Nut, 5/16-18	12
71	11240-005	Washer, Flat Std 5/16	18
72	11934-003	Fitting 90°	4
73	11253-008	Screw, HHC 5/16-18 x 1	8
75	11941-013	Fitting	4
76	11256-026	Screw, HHC 1/2-13 x 3-1/4	8
78	11248-008	Lock Nut, 1/2-13	8
79	11941-012	Fitting	1
80	11937-007	Fitting 90°	1
81	11934-004	Fitting 90°	2
82	11932-003	Fitting 45°	2
83	15945-016	Nut, Hex 1-14 UNF	2
85	11757-010	Cotter Rue Ring	2
84	11754-012	Cotter Pin, 5/32 x 1-1/2	4
86	11240-006	Washer, Flat Std 3/8	4
87	11248-006	Lock Nut, 3/8-16	8
89	11254-020	Screw, HHC 3/8-16 x 2-1/2	2
91	11848-041	Clevis Pin, 3/4 x 2	1
92	63329-008	Washer, Flat 1" I.D. 2" O.D.	2
94	11273-008	Nut, 1/2-13 Jam Hex	1
95	11252-030	Screw, HHC 1/4-20 x 3-3/4	1
98	11252-032	Screw, HHC 1/4-20 x 4	1
99	63559-006	Shldr Bolt, 3/8 x 2 - 5/16-18 Thd	1

\*Not Shown

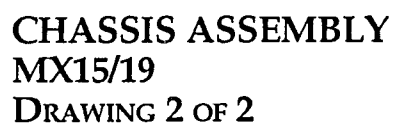
# Illustrated Parts Breakdown

Section  
7.2



**CHASSIS ASSEMBLY**  
**MX15/19**  
**DRAWING 1 OF 2**



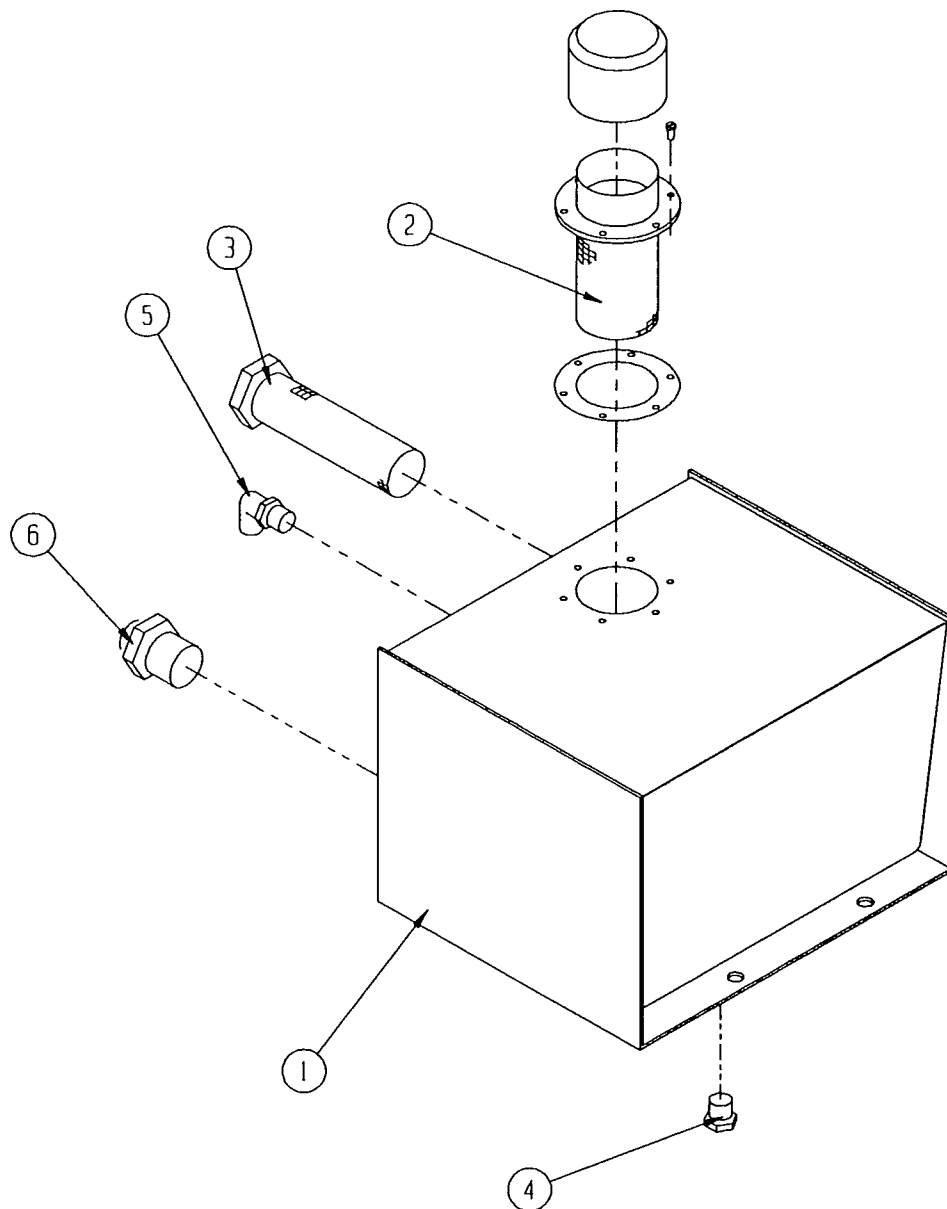


# Illustrated Parts Breakdown

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7.2

## HYDRAULIC TANK ASSEMBLY MX15/19 65637-000

ITEM	PART	DESCRIPTION	QTY.
1	65699-000	Hydraulic Tank Weldment	1
2	05963-001	Filler Cap & Neck	1
-	05963-010	Gasket	1
3	61818-000	Suction Screen	1
4	21305-006	Plug, Magnetic	1
5	11940-004	Fitting 90°	1
6	11939-015	Fitting	1



**HYDRAULIC TANK ASSEMBLY  
MX15/19**

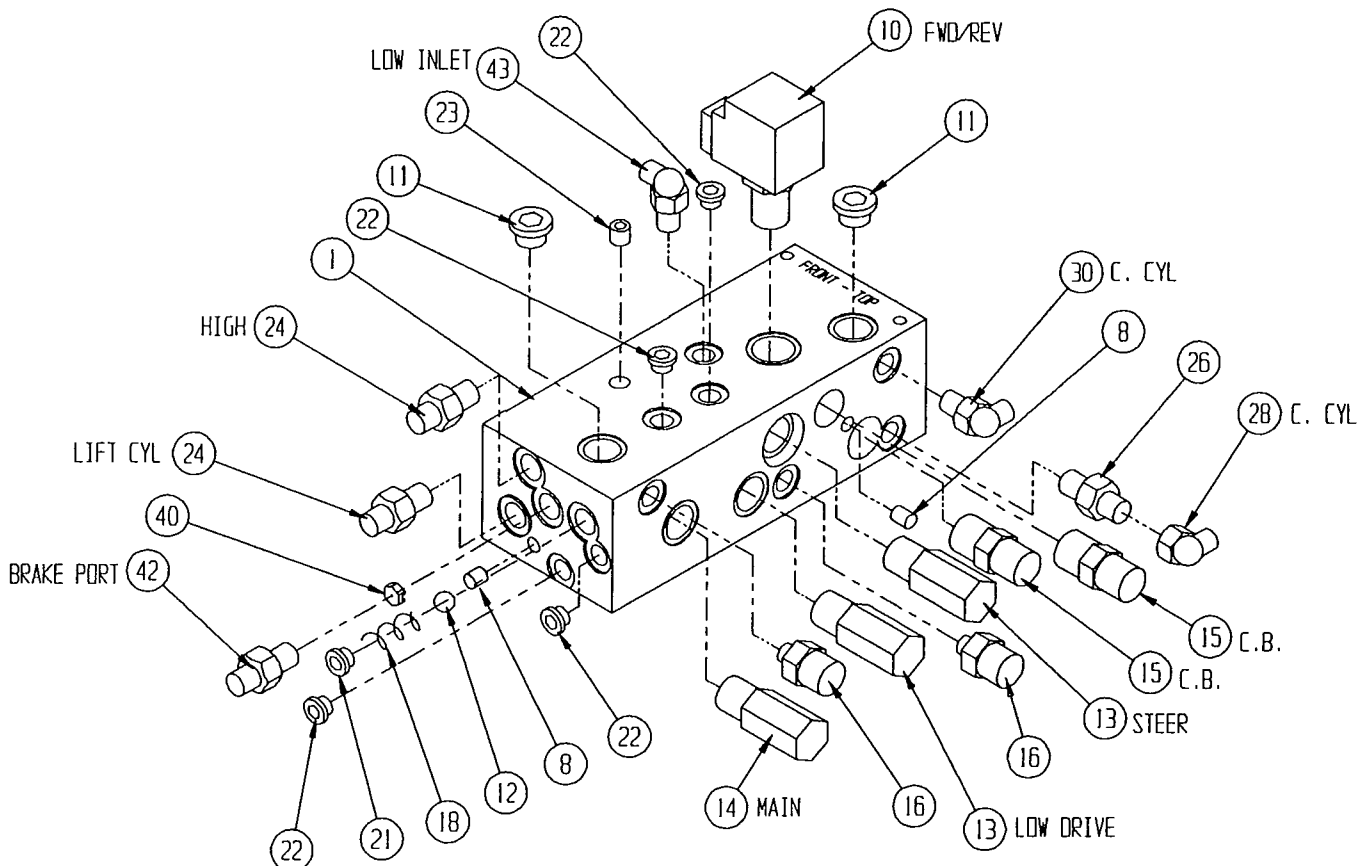
# Illustrated Parts Breakdown

## CONTROL VALVE ASSEMBLY MX15/19 65604-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	65549-000	Valve Block Mast Lift	1
4	65169-000	Filter Adapter	1
5	65374-000	Valve Block, Proportional	1
7	63986-002	Valve, Proportional	1
8	63977-001	Plug, 9mm	6
9	63928-004	Valve, Dir.	1
*	13888-007	O-Ring	4
10	63923-006	Valve, Sol	1
11	63955-008	Plug, Cavity	2
12	61827-000	Ball, 7/16	2
13	60390-008	Valve, Relief	2
14	60390-007	Valve, Relief	1
15	15900-000	Valve, C.B.	2
16	63965-001	Conn., Gage	2
17	63977-002	Plug, 10mm	1
18	15799-000	Spring	2
19	15763-000	Valve, Sol	1
*	13888-007	O-Ring	4
20	13987-008	Spring	1

ITEM	PART	DESCRIPTION	QTY.
21	12004-006	Plug, #6	2
22	12004-004	Plug, #4	5
23	11920-002	Plug, Soc Hd 1/4-18 NPTF	1
24	11941-005	Fitting	4
26	11941-001	Fitting, St	3
27	11937-003	Fitting, 90°	1
28	11937-001	Fitting, 90°	1
29	11941-010	Fitting, St	1
30	11934-001	Fitting, 90°	1
31	11937-004	Fitting, 90°	1
32	20733-002	Fitting, Tee	1
33	05154-002	Filter	1
34	05135-000	Ball, 5/16	1
36	11979-008	O-ring	2
40	15919-004	Orifice, #824	1
42	11941-004	Fitting, St	1
43	11934-026	Fitting, 90°	1
44	11941-002	Fitting, Str	1
46	14412-016	Screw, Soc Hd Cap 10-24 x 2	4

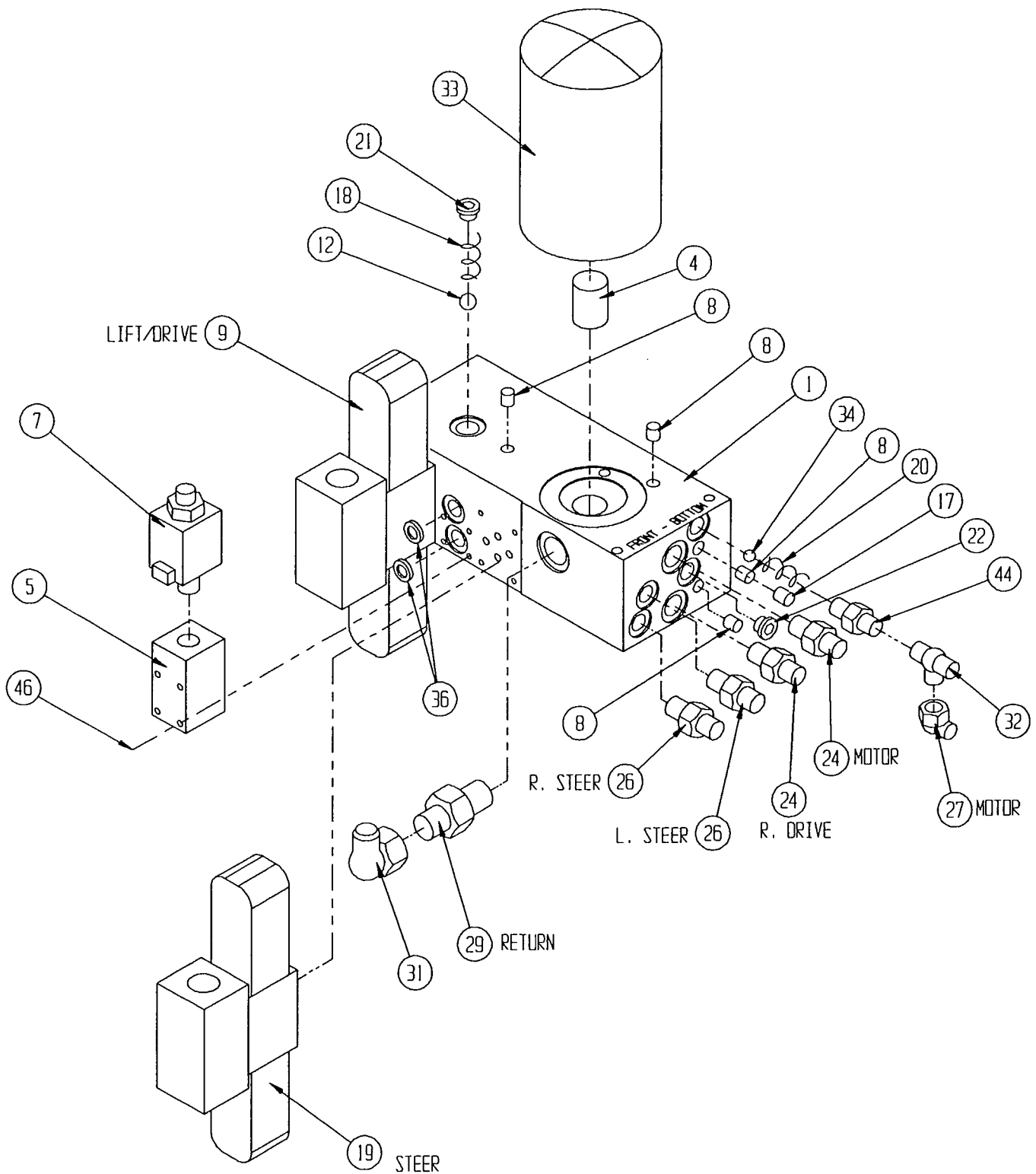
\*Not Shown



**CONTROL VALVE ASSEMBLY  
MX15/19, SER. Nos. 1004 to 1599  
DRAWING 1 OF 2**

# Illustrated Parts Breakdown

Section  
7.2

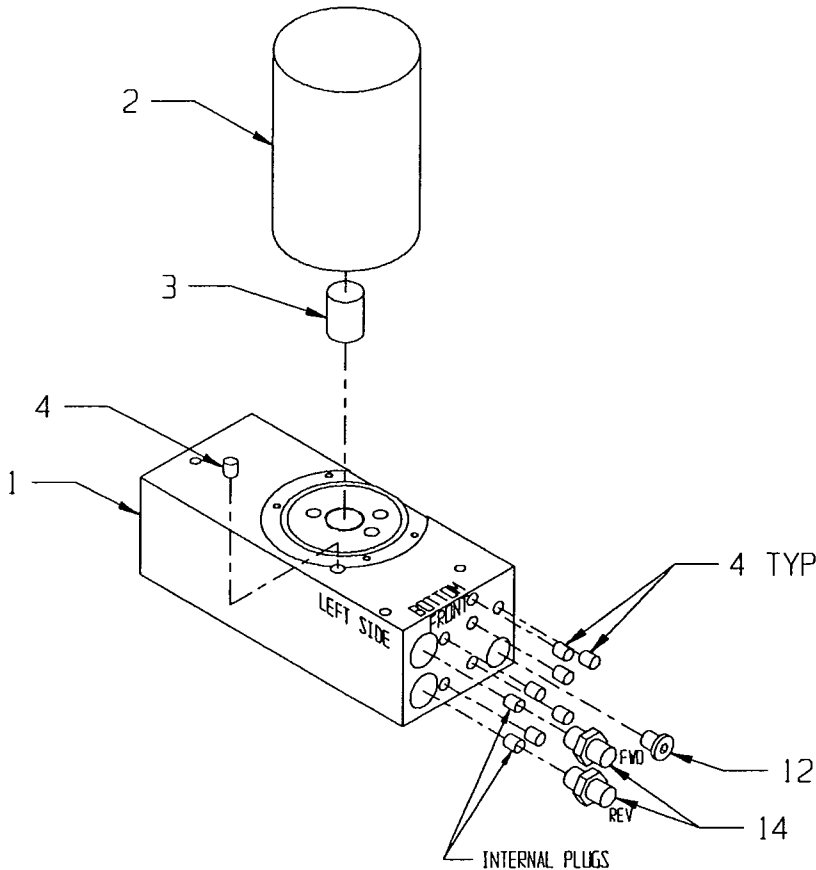


**CONTROL VALVE ASSEMBLY**  
MX15/19, SER. NOS. 1004 TO 1599  
DRAWING 2 OF 2

## CONTROL VALVE ASSEMBLY MX15/19 65617-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	66099-000	Valve Block	1
*	30576-009	Valve Block, Service	1
2	05154-002	Filter Cartridge	1
3	65169-000	Filter Adapter	1
4	63977-001	Plug, 9mm	17
5	63923-007	Cartridge Valve 4 Way 3 Pos. Tandem	1
6	63923-006	Cartridge Valve 4 Way 2 Pos.	2
7	63923-005	Cartridge Valve 2 Way	1
8	12877-007	Valve, Relief	2
9	15900-000	Valve, Counter Balance	2
10	63955-008	Plug, Cavity	1
11	11934-001	Fitting, 90°	3
12	12004-004	Plug, #4	1

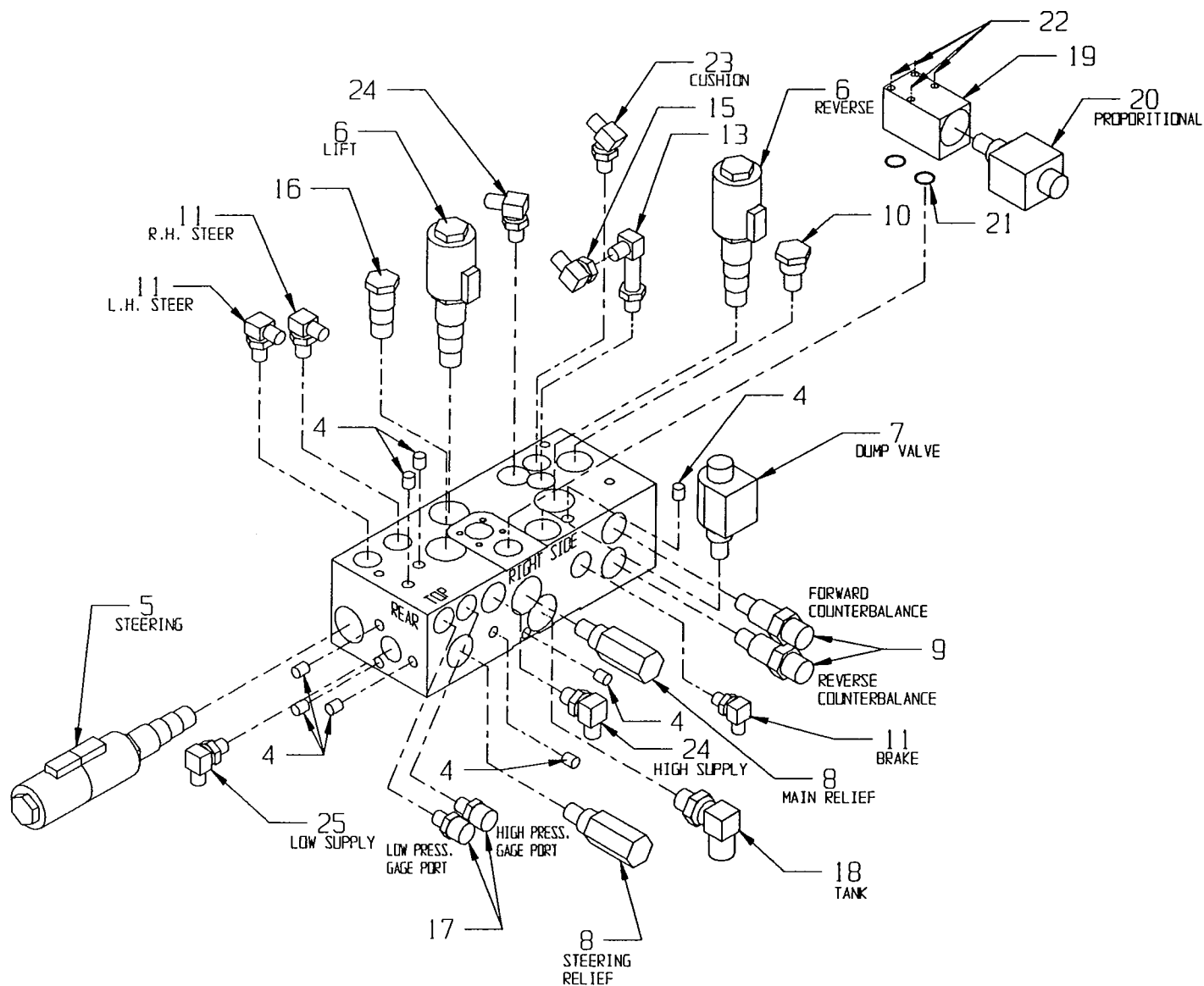
ITEM	PART	DESCRIPTION	QTY.
13	15736-001	Fitting, 90° Long	1
14	11941-005	Fitting, St.	2
15	11937-001	Fitting, 90°	1
16	63955-003	Plug, Cavity 10-4 Modified	1
17	63965-001	Conn., Gage	2
18	11934-008	Fitting, 90°	1
19	65374-000	Valve Block, Proportional	1
20	63986-002	Valve, Proportional	1
21	11979-008	O-ring	2
22	14412-016	Screw, Soc Hd Cap 10-24 x 2	4
23	11935-001	Fitting, 45°	1
24	11934-004	Fitting, 90°	2
25	11934-026	Fitting, 90°	1



**CONTROL VALVE ASSEMBLY  
MX15/19, SER. NOS. 1600 TO CURRENT  
DRAWING 1 OF 2**

# Illustrated Parts Breakdown

Section  
7.2



**CONTROL VALVE ASSEMBLY**  
**MX15/19, SER. NOS. 1600 TO CURRENT**  
**DRAWING 2 OF 2**

# Illustrated Parts Breakdown

## ELECTRICAL BOX ASSEMBLY MX15/19 65636-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	65634-000	Electrical Box	1
2	63778-000	Dual Hz/Alarm 12-24 VDC	1
3	29863-009	Relay, 24 VDC	4
4	29928-006	Terminal Block	1
5	64056-010	Fanning Strip	1
*	29825-002	Diode	8
6	10155-000	Keyswitch	1
*	10155-001	Key	1
7	29868-007	Circuit Breaker	1
8	63667-002	Switch, Contact Block	1
9	12798-001	Switch, Toggle	1
10	63667-001	Switch Head, Mushroom	1

ITEM	PART	DESCRIPTION	QTY.
11	15752-000	Hour Meter	1
12	29925-001	Connector, Cable	2
13	11252-006	Screw, HHC 1/4-20 x 3/4	2
14	11248-004	Locknut, Hex 1/4-20	2
15	11715-006	Mach Screw, Rd Hd 6-32 x 3/4	2
16	11248-047	Locknut, Hex 6-32	10
17	29939-003	Locknut, 3/4 NPT	2
18	29872-000	Boot, Switch Cover	1
19	11239-004	Washer, 1/4 Flat Std	2
20	11715-004	Mach Screw, Rd Hd 6-32 x 1/2	8
21	11240-001	Washer, #6 Flat Std	6
22	29932-002	Jumper	1

\*Not Shown

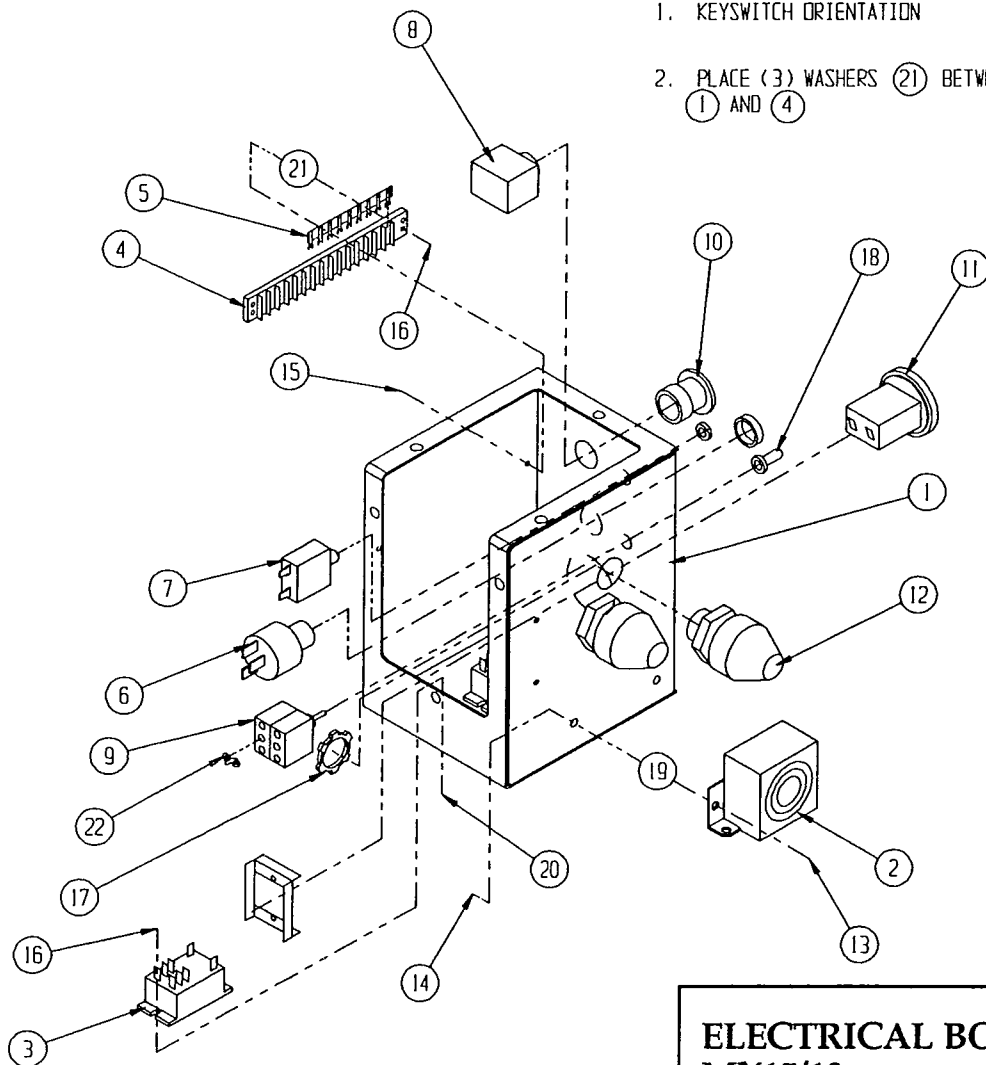
### NOTE:

1. KEYSWITCH ORIENTATION



CHASSIS  
OFF  
DECK

2. PLACE (3) WASHERS (21) BETWEEN  
(1) AND (4)



**ELECTRICAL BOX ASSEMBLY  
MX15/19,  
SERIAL NUMBERS 1004 TO 1599**

# Illustrated Parts Breakdown

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7.2

## ELECTRICAL BOX ASSEMBLY MX15/19

65636-010, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	65634-000	Electrical Box	1
2	63778-000	Dual Hz/Alarm 12-24 VDC	1
3	29863-009	Relay, 24 VDC	3
4	29928-006	Terminal Block	1
5	64056-010	Fanning Strip	1
*	29825-002	Diode	8
6	10155-000	Keyswitch	1
*	10155-001	Key	1
7	29868-007	Circuit Breaker	1
8	63667-002	Switch, Contact Block	1
9	12798-001	Switch, Toggle	1
10	63667-001	Switch Head, Mushroom	1

ITEM	PART	DESCRIPTION	QTY.
11	15752-000	Hour Meter	1
12	29925-001	Connector, Cable	2
13	11252-006	Screw, HHC 1/4-20 x 3/4	2
14	11248-004	Locknut, Hex 1/4-20	2
15	11715-006	Mach Screw, Rd Hd 6-32 x 3/4	2
16	11248-047	Locknut, Hex 6-32	8
17	29939-003	Locknut, 3/4 NPT	2
18	29872-000	Boot, Switch Cover	1
19	11239-004	Washer, 1/4 Flat Std	2
20	11715-004	Mach Screw, Rd Hd 6-32 x 1/2	6
21	11240-001	Washer, #6 Flat Std	6
22	29932-002	Jumper	1

\*Not Shown

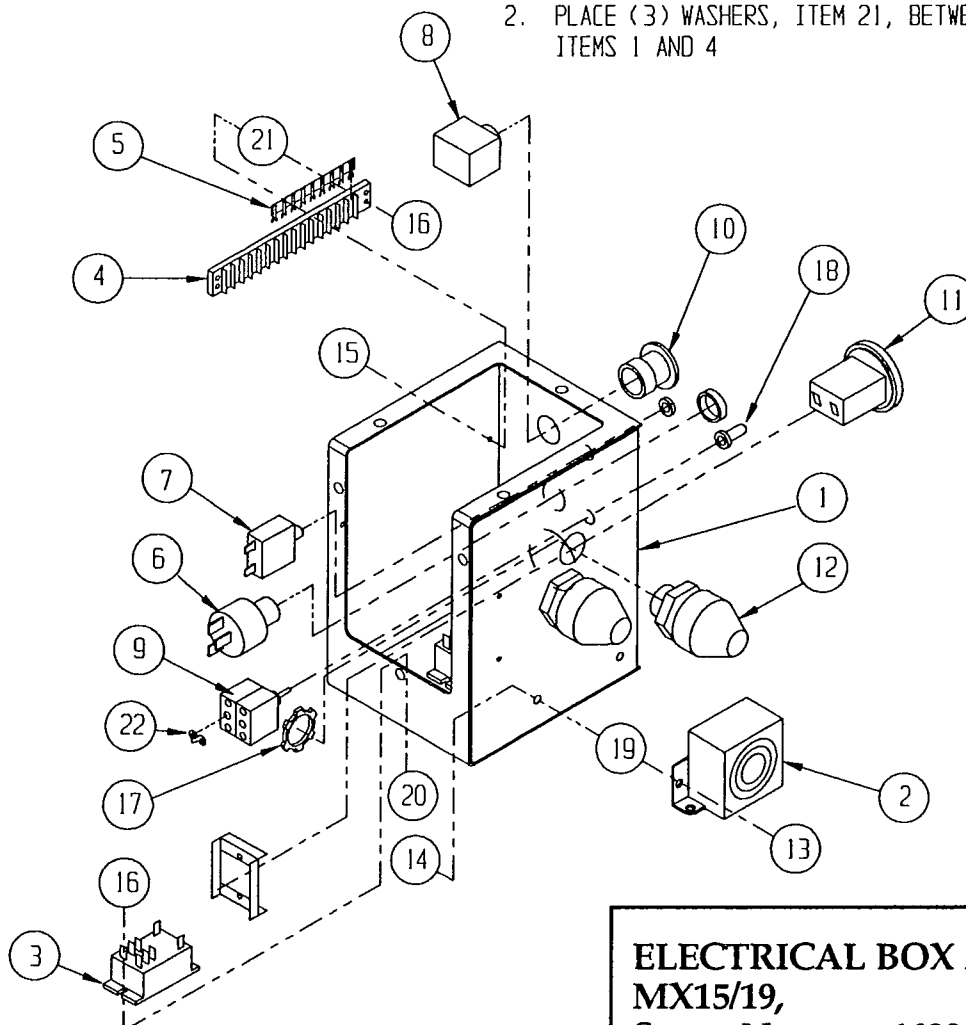
NOTE:

1. KEYSWITCH ORIENTATION



CHASSIS  
OFF  
DECK

2. PLACE (3) WASHERS, ITEM 21, BETWEEN  
ITEMS 1 AND 4



**ELECTRICAL BOX ASSEMBLY  
MX15/19,  
SERIAL NUMBERS 1600 TO CURRENT**



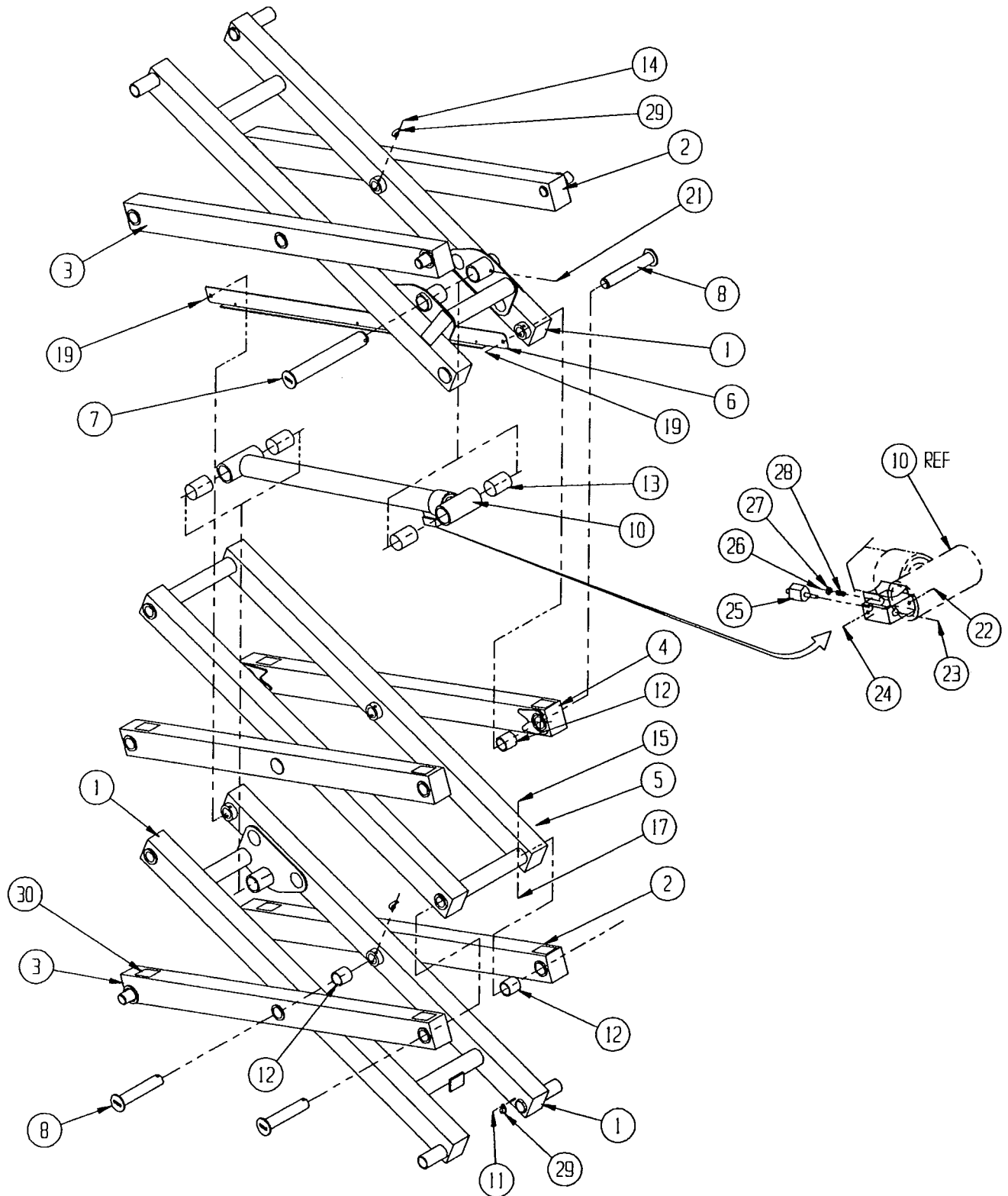
## SCISSOR ARM ASSEMBLY

MX15

65605-000

ITEM	PART	DESCRIPTION	QTY.
1	65640-000	Inner Arm Weldment	2
2	65671-000	Outer Beam Weldment, R.H.	2
3	65672-000	Outer Beam Weldment, L.H.	2
4	65675-001	Outer Beam Weldment	2
5	65677-000	Inner Center Beam Weldment	1
6	65687-000	Cable Guide	1
7	65696-000	Cylinder Pin Weldment	2
8	65697-000	Pin Keeper Weldment	14
10	65372-000-98	Lift Cylinder w/ Bearings	1
*	65372-010	Kit, Seal	1
11	11248-004	Locknut, 1/4-20UNC Hex	1
12	66183-002	Bushing	14
13	66183-001	Bushing, Cyl.	4
14	11253-024	Screw, 5/16-18UNC HHC x 3	3
15	11253-022	Screw, 5/16-18UNC HHC x 2 3/4	11
16	11254-026	Screw, 3/8-16UNC HHC x 3 1/4	2
17	11248-005	Locknut, 5/16-18UNC Hex	16
19	65688-000	Guard Rivet	2
21	11248-006	Locknut, 3/8-16UNC Hex	2
22	12004-004	Plug, #4	1
23	12004-006	Plug, #6	1
24	11920-002	Plug, Pipe 1/4	1
25	66179-000	Valve	1
26	11941-005	Fitting, St	1
27	15919-001	Orifice, #840	1
28	05133-000	Spring	1
29	13919-009	Clamp	3
30	66520-099	Tape, Pressure Sensitive .060 x 2	3ft

\*Not Shown



**SCISSOR ARM ASSEMBLY  
MX15**

## SCISSOR ARM ASSEMBLY

MX19

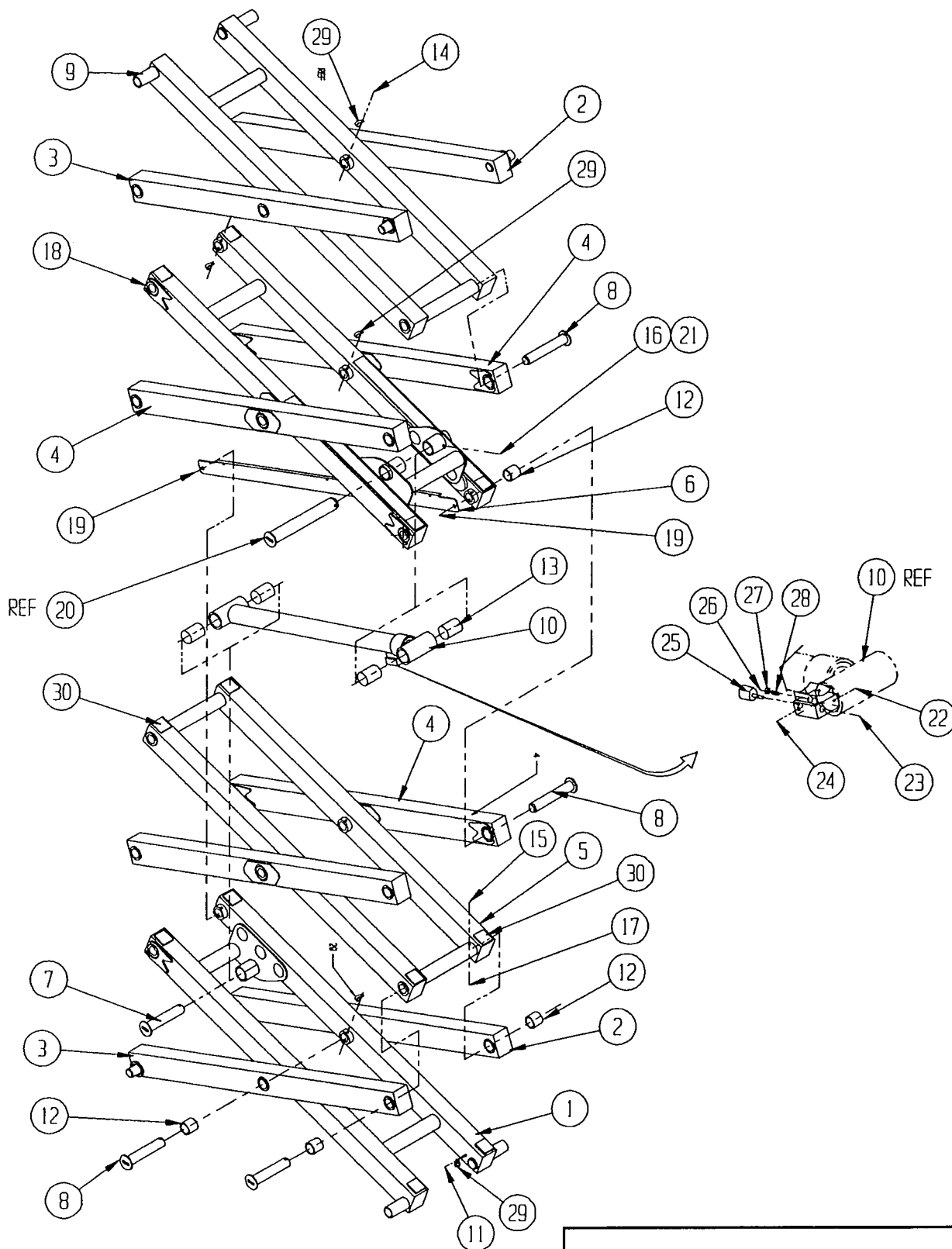
65705-000

ITEM	PART	DESCRIPTION	QTY.
1	65640-001	Inner Arm Weldment	1
2	65671-000	Outer Beam Weldment, R.H.	2
3	65672-000	Outer Beam Weldment, L.H.	2
4	65675-000	Outer Beam Weldment	4
5	65677-000	Inner Center Beam Weldment	1
6	65687-000	Cable Guide	1
7	65696-000	Cylinder Pin Weldment	1
8	65697-000	Pin Keeper Weldment	20
9	65721-000	Upper Beam Weldment	1
10	65372-001-98	Lift Cylinder w/ Bearings	1
*	65372-011	Kit, Seal	1
11	11248-004	Locknut, 1/4-20UNC Hex	1
12	66183-002	Bushing	20
13	66183-001	Bushing, Cyl.	4
14	11253-024	Screw, 5/16-18UNC HHC x 3	4
15	11253-022	Screw, 5/16-18UNC HHC x 2 3/4	16
16	11254-026	Screw, 3/8-16UNC HHC x 3 1/4	2
17	11248-005	Locknut, 5/16-18UNC Hex	20
18	65722-000	Inner Beam Weldment	1
19	65688-000	Guard Rivet	2
20	65750-000	Cylinder Pin Weldment	1
21	11248-006	Locknut, 3/8-16UNC Hex	2
22	12004-004	Plug, #4	1
23	12004-006	Plug, #6	1
24	11920-002	Plug, Pipe 1/4	1
25	66179-000	Valve	1
26	11941-005	Fitting, St	1
27	15919-001	Orifice	1
28	05133-000	Spring	1
29	13919-009	Clamp	4
30	66520-099	Tape Pressure Sensitive	3ft

\*Not Shown

# Illustrated Parts Breakdown

Section  
7.2



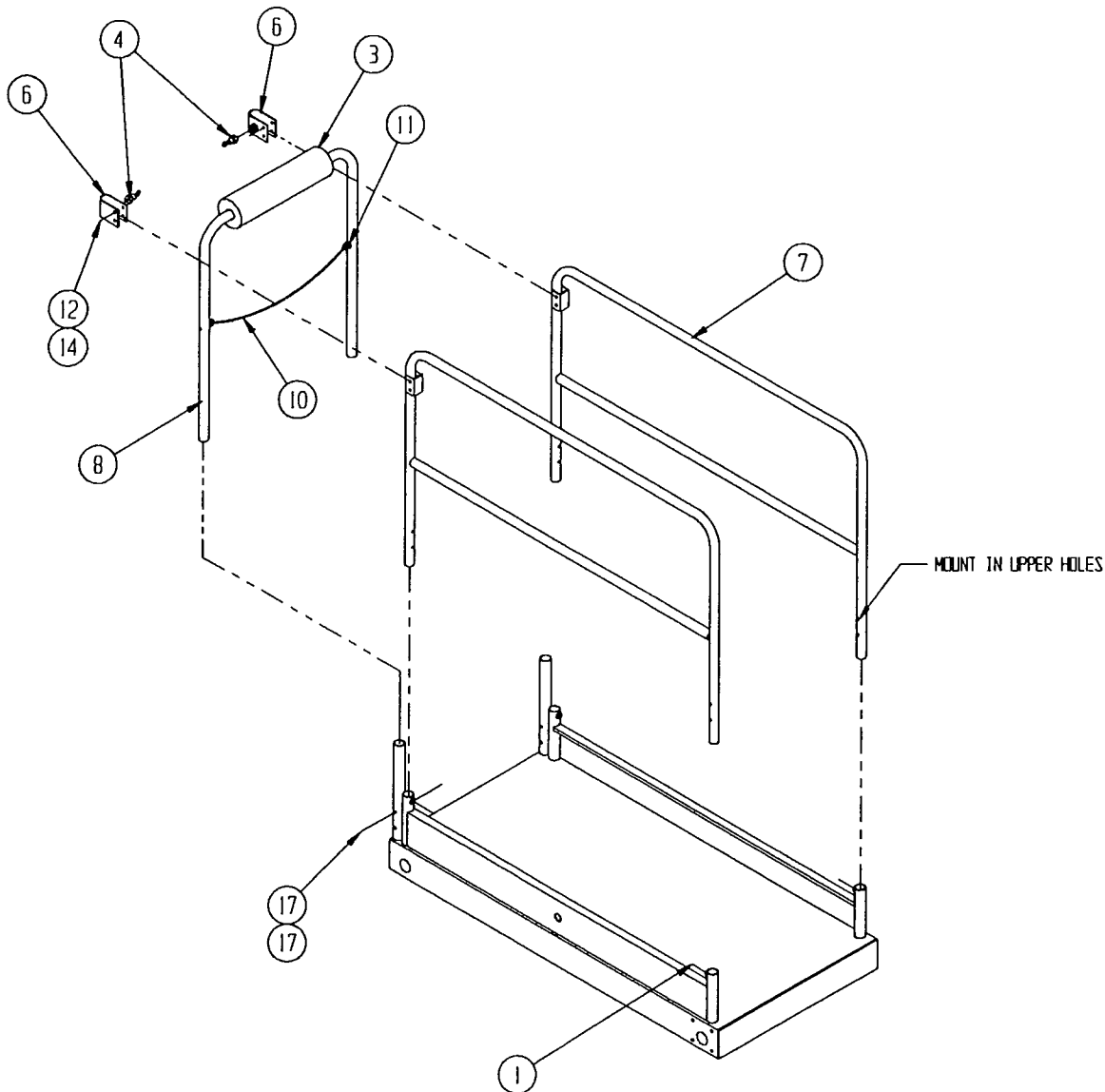
**SCISSOR ARM ASSEMBLY  
MX19**

# Illustrated Parts Breakdown

## PLATFORM GUARDRAIL INSTALLATION MX15/19 65603-000

ITEM	PART	DESCRIPTION	QTY.
1	66171-003	Cap Screw, 3/8-16 x 2 1/4 (Full Thread)	4
3	10191-001	Foam Tube	1
4	03570-000	Retaining Pin Assy	2
6	66498-000	Weldment, Gate Latch	2
7	66257-001	Weldment, Side Rail	2
8	66261-001	Weldment, End Rail	1

ITEM	PART	DESCRIPTION	QTY.
10	63133-003	Chain Assy.	1
11	15748-002	Repair Link	1
12	11248-005	Nut, 5/16-18	4
14	11253-018	Screw, 5/16-18 HHC x 2 1/4	4
17	11254-018	Screw, 3/8-16 HHC x 2 1/4	2
20	11248-006	Nut, 3/8-16 Hex	2



**PLATFORM GUARDRAIL INSTL  
MX15/19**

# Illustrated Parts Breakdown

Section  
7.2

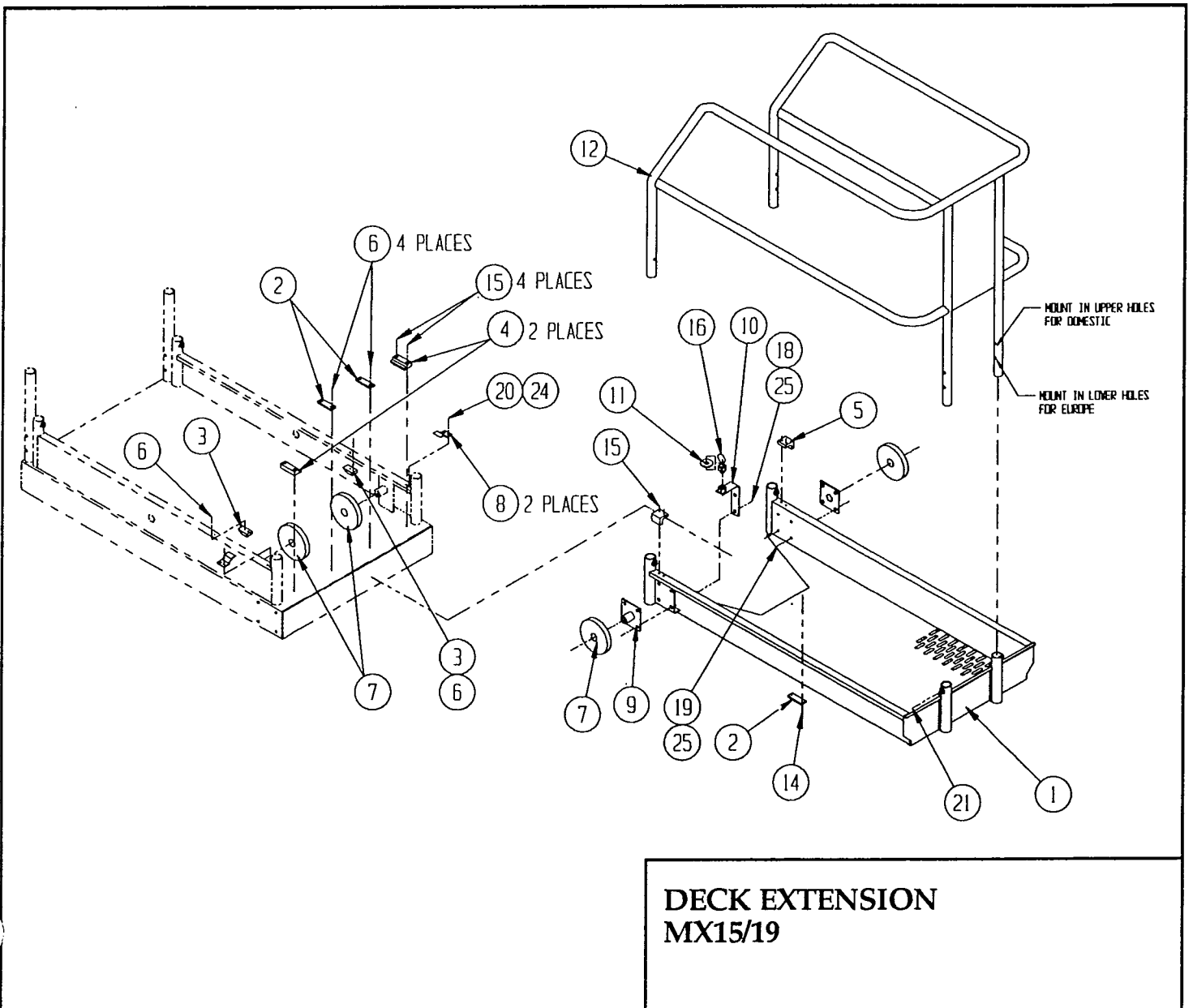
## DECK EXTENSION

MX15/19

65614-000

ITEM	PART	DESCRIPTION	QTY.
1	66251-001	Weldment, Deck Ext.	1
2	66198-000	Wear Pad	3
3	66193-000	Stop	2
4	66176-000	Wear Pad	2
5	66170-000	Wear Pad	2
6	26553-002	Rivet, 3/16 Dia x .126-.250 Grip	4
7	66195-000	Platform Roller	4
8	66407-000	Bracket	2
9	66256-000	Weldment, Roller Mount	2
10	66410-000	Weldment, Deck Stop	1
11	15924-020	Washer, 2" Fender	1

ITEM	PART	DESCRIPTION	QTY.
12	66260-001	Weldment, Ext. Rail x15	1
14	26553-004	Rivet, 3/16 Dia x 3/8 Grip	2
15	26553-008	Rivet, 3/16 Dia x 1/2 Grip	12
16	03570-000	Retaining Pin Assy.	1
18	11254-014	Screw, HHC 3/8-16 x 1 3/4	2
19	11254-012	Screw, HHC 3/8-16 x 1 1/2	6
20	11252-006	Screw, HHC 1/4-20 x 3/4	4
21	66171-003	Bolt Tap, 3/8-16UNC x 2 1/4	4
24	11240-004	Washer, 1/4 Flat	12
25	11238-006	Washer, 3/8 Lock	8



# Illustrated Parts Breakdown

## CONTROLLER ASSEMBLY

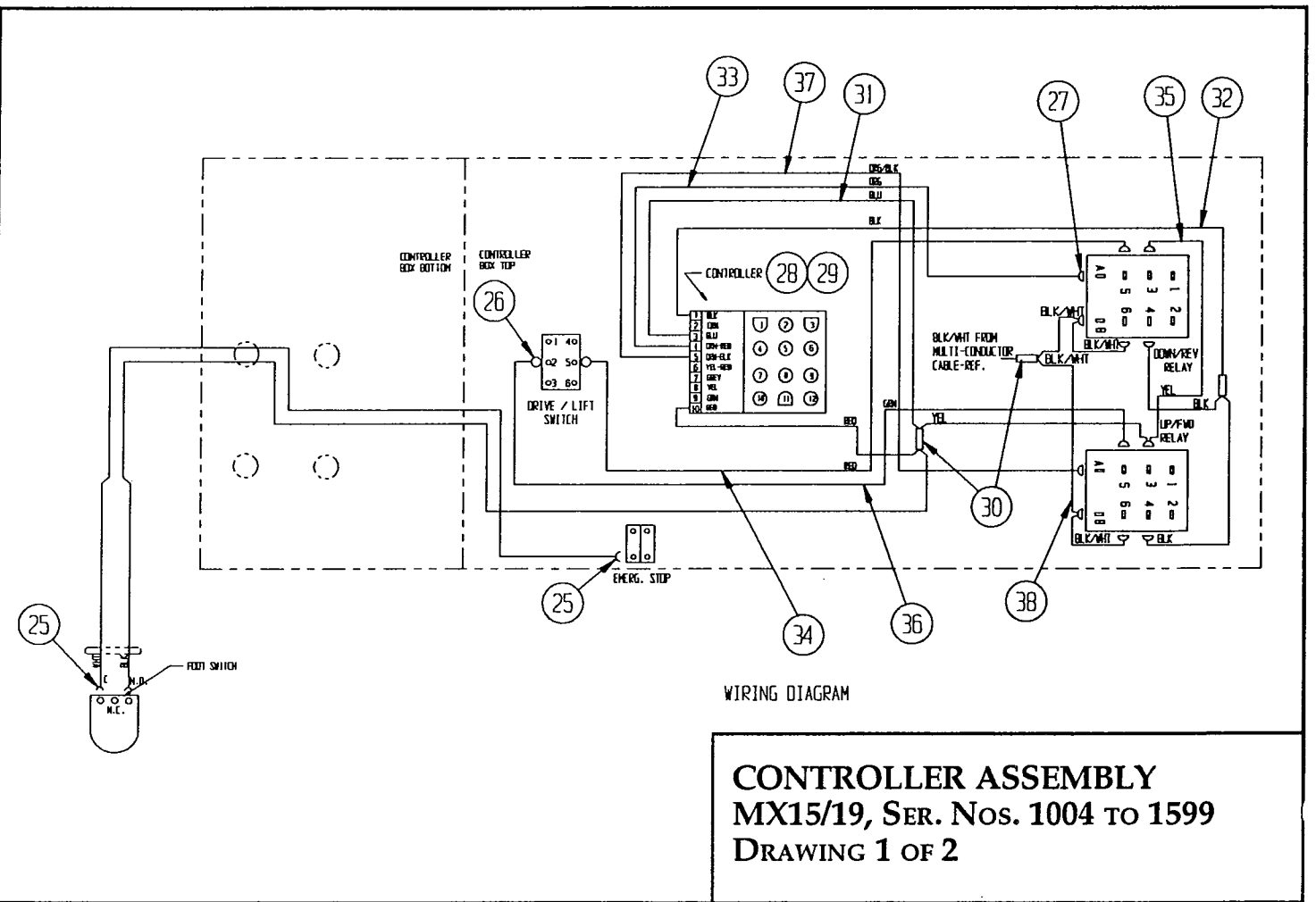
MX15/19

65610-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	11248-047	Locknut, 6-32 UNC	4
2	11715-004	Screw, 6-32 UNC Mach Rd Hd x 1/2	4
3	11811-006	Screw, 10-32 SLFTP x 3/4	2
4	11253-004	Screw, 5/16 HH x 1/2	4
5	15941-001	Switch	1
6	63368-000	Box Enclosure	1
7	29872-000	Boot	1
8	29925-000	Connector	1
9	29939-002	Locknut, Conduit	1
10	63906-000	Switch, Foot	1
11	63951-002	Relay	2
12	63975-000	Controller	1
*	66544-014	Switch, Steering	2
*	63953-001	Boot, Steering Switch	1
*	63953-002	Boot, Joystick Shaft	1
*	63975-003	Elec. Assy, Controller	1
*	63975-004	Gear/Pot Assy., Controller	1
13	63667-001	Switch, E-stop	1
14	63611-000	Controller Wing	1
15	63612-000	Controller Wing	1
16	63613-001	Controller Hanger	1

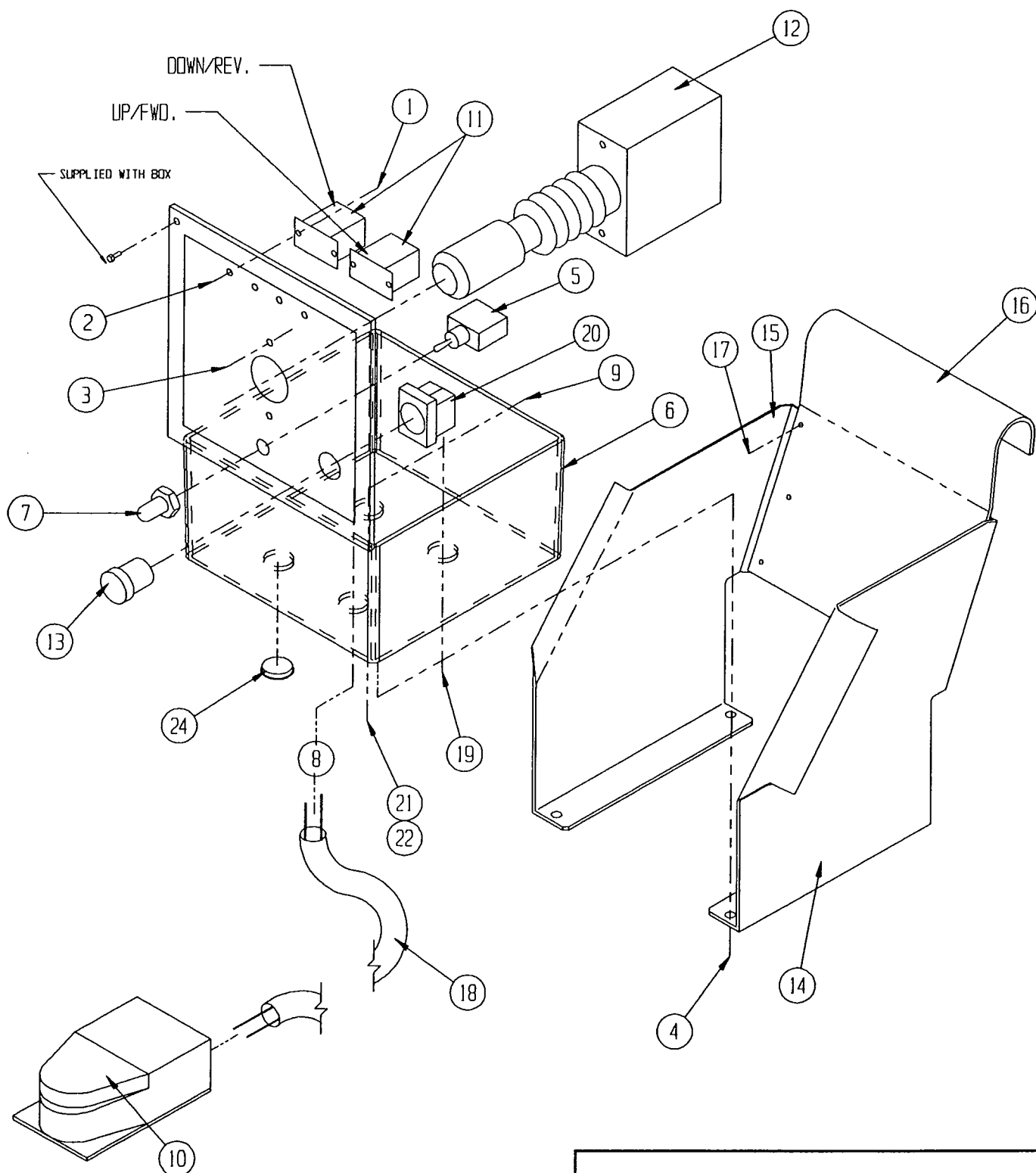
ITEM	PART	DESCRIPTION	QTY.
17	26551-007	Rivet, 1/8 Dia x 1/4-5/16 Grip	6
18	29490-099	Wire, 16 AWG 2 Cond	6ft
19	64462-009	Caplugs, 1 1/16	1
20	63667-003	Contact Block, 2 NC	1
21	29925-010	Connector	1
22	29939-003	3/4 NPT Locknut	1
24	64462-007	Caplugs, 7/8	1
25	29610-002	Connector, Fork Term.	3
26	29601-013	Connector, Ring Term.	2
27	29616-001	Connector, Spade Term.	12
28	63956-003	Plug, Conn	1
29	63956-002	Pin, Conn	5
30	29620-003	Conn., Butt 12-10	2
31	29450-099	Wire, 16 AWG Blu	1ft
32	29452-099	Wire, 16 AWG Blk	1ft
33	29453-099	Wire, 16 AWG Org	1ft
34	29454-099	Wire, 16 AWG Red	1ft
35	29456-099	Wire, 16 AWG Yel	1ft
36	29457-099	Wire, 16 AWG Grn	1ft
37	29477-099	Wire, 16 AWG Org/Blk	1ft
38	63574-099	Wire, 16 AWG Blk/Wht	1ft

\*Not Shown



# Illustrated Parts Breakdown

Section  
7.2



**CONTROLLER ASSEMBLY**  
**MX15/19, SER. NOS. 1004 TO 1599**  
**DRAWING 2 OF 2**



## CONTROLLER ASSEMBLY

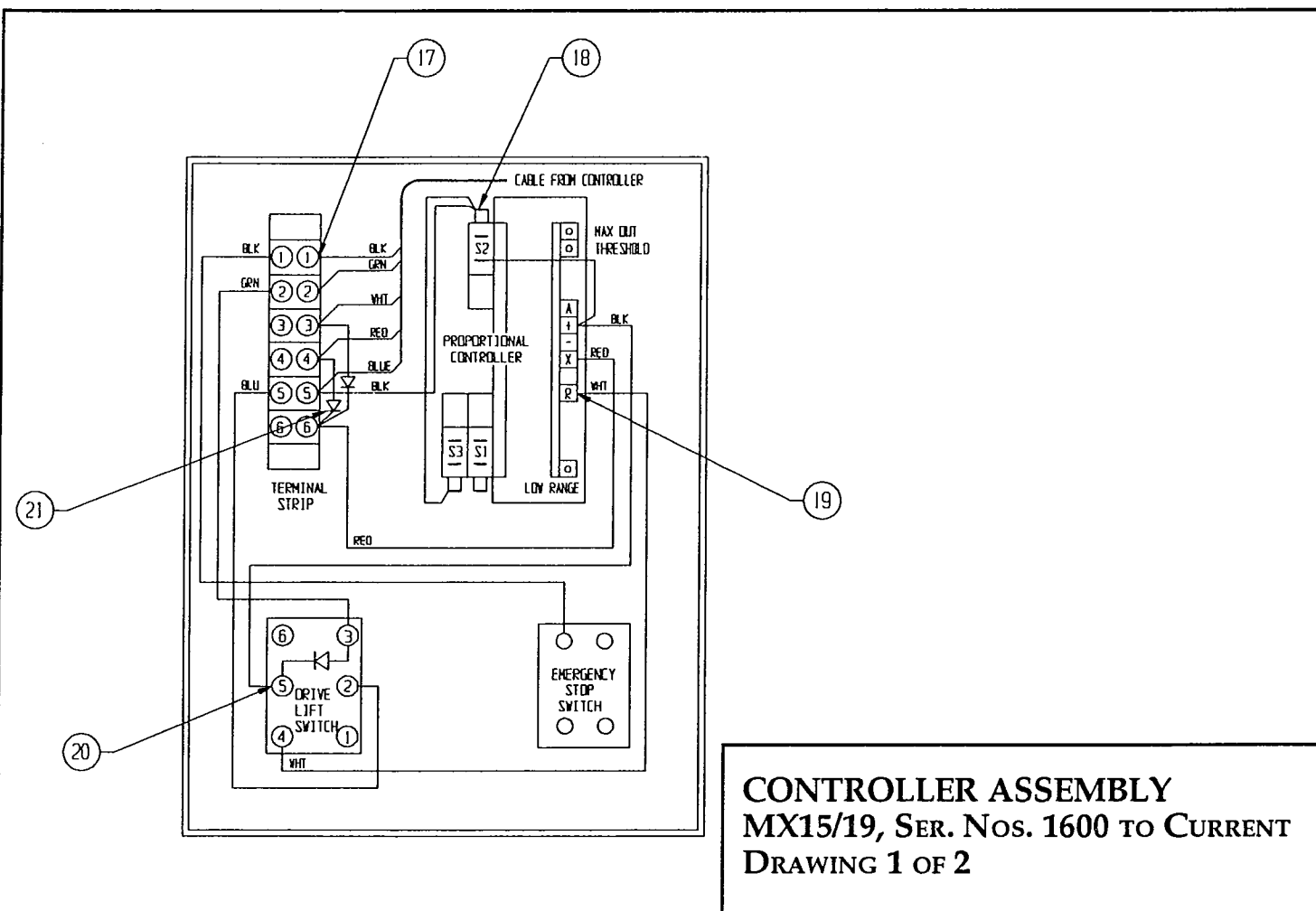
MX15/19

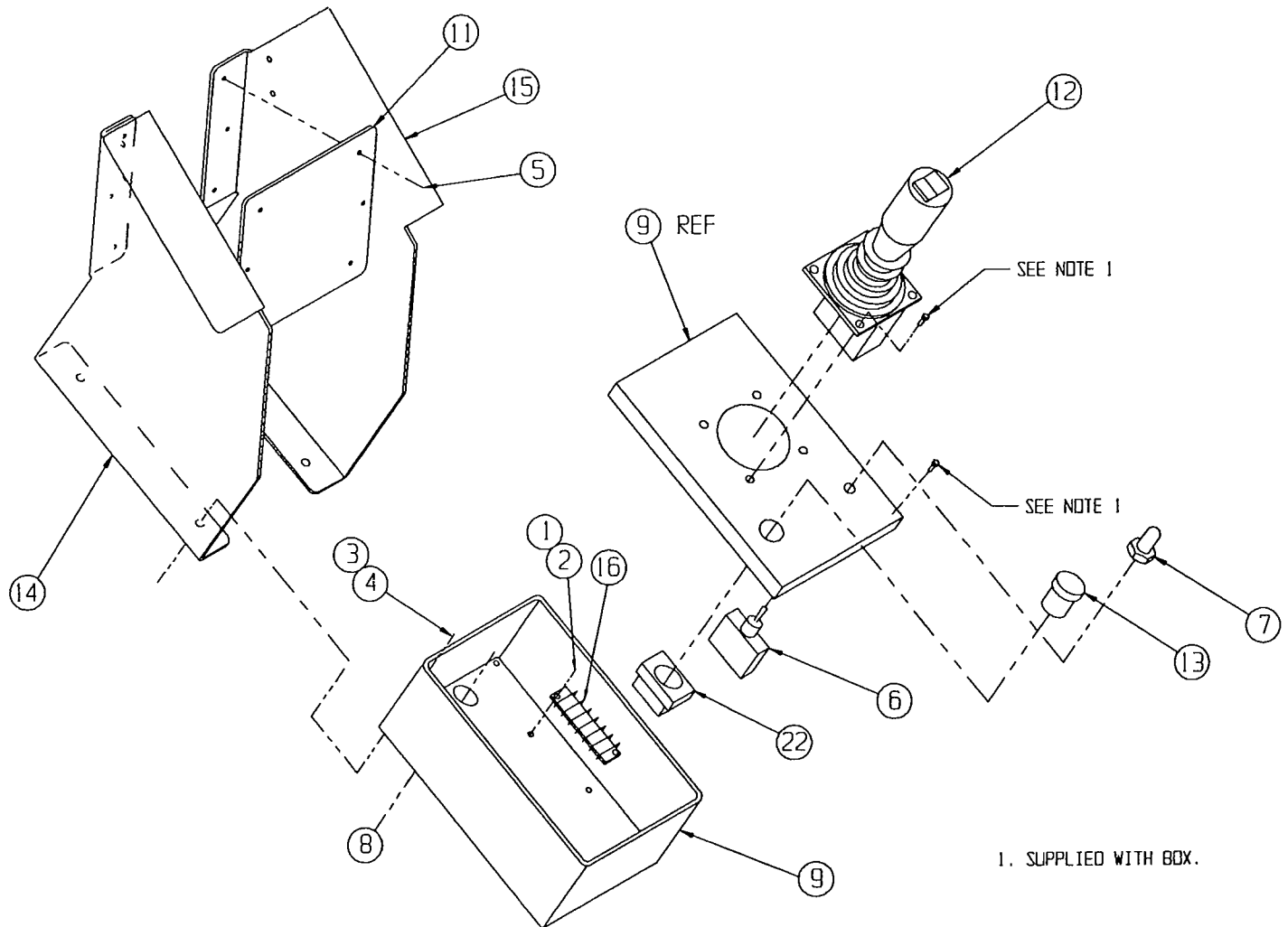
66020-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	11715-004	Screw, 6-32 UNC Mach Rd Hd x 1/2	2
2	11248-047	Locknut, 6-32 UNC	2
3	11252-004	Screw, 1/4-20 UNC HHC x 1/2	4
4	11238-004	Washer, 1/4 Lock	4
5	26551-007	Rivet, 1/8 Dia x 1/4-5/16 Grip	6
6	15941-001	Switch	1
7	29872-000	Boot	1
8	29925-000	Connector, Cable	1
9	66175-001	Box Enclosure	1
11	66092-000	Panel, Controller, Rear	1
12	66544-000	Controller, Joystick, Proportional	1
*	66544-014	Switch, Steering	2
*	63913-003	Boot, Steering Switch	1
*	63913-001	Boot, Joystick Shaft	1

ITEM	PART	DESCRIPTION	QTY.
13	63667-001	Switch, E-stop	1
14	66094-000	Panel, Controller, L.H.	1
15	66095-000	Panel, Controller, R.H.	1
16	29928-003	Terminal Block	1
17	29610-002	Connector, Fork Term., 14-16 Ga. #8	17
18	29615-002	Connector, Push, 14-16 Ga. #8	3
19	29601-011	Connector, Ring Term., 14-16 Ga. #6	4
20	29601-013	Connector, Ring Term., 14-16 Ga. #10	4
21	29825-002	Diode	3
22	63667-003	Contact Block, 2 NC	1
23	29450-099	Wire, 16 AWG Blu	1ft
24	29451-099	Wire, 16 AWG Blk/Wht	1ft
25	29452-099	Wire, 16 AWG Blk	2ft
26	29454-099	Wire, 16 AWG Red	1ft
27	29457-099	Wire, 16 AWG Grn	1ft

\*Not Shown





**CONTROLLER ASSEMBLY**  
**MX15/19, SER. NOS. 1600 TO CURRENT**  
**DRAWING 2 OF 2**

# Illustrated Parts Breakdown

## HOSE KIT

MX15/19

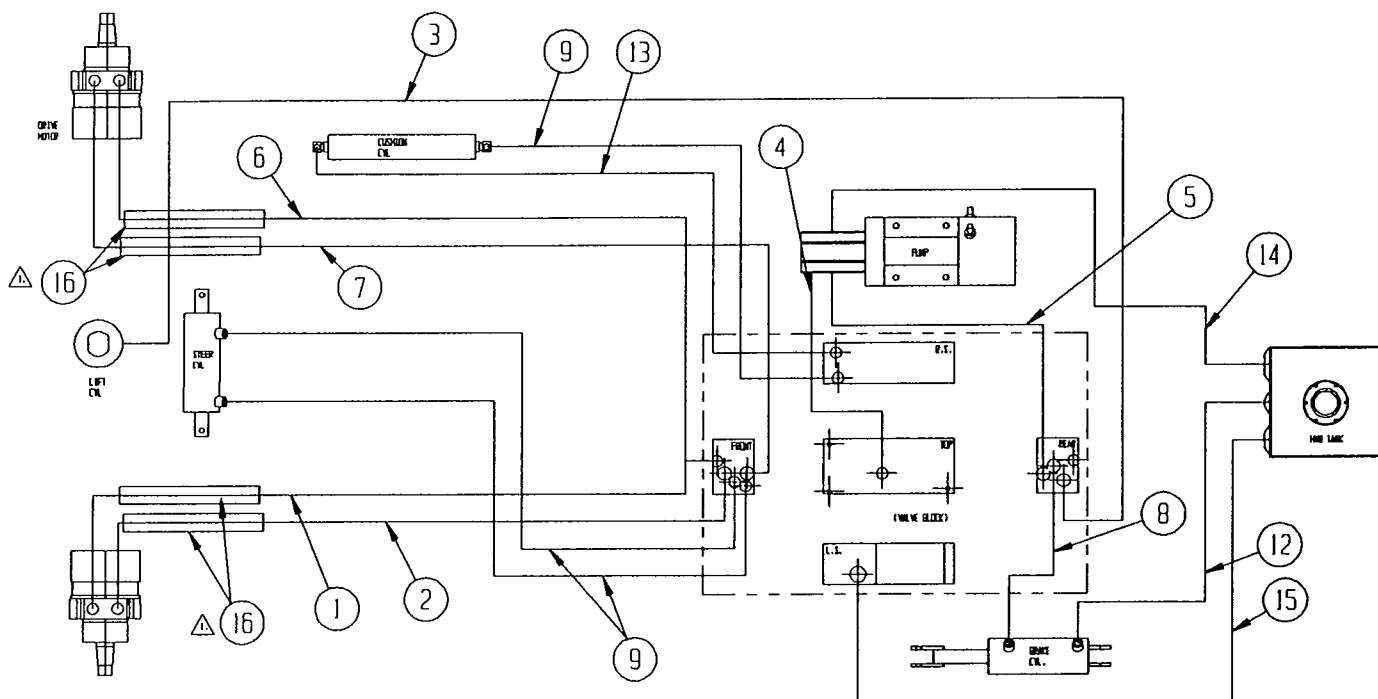
65611-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	60861-063	Hose Assy., 3/8 X 25	1
2	60861-048	Hose Assy., 3/8 X 24	1
3	60861-053	Hose Assy., 3/8 X 144	1
4	65234-018	Hose Assy., 1/4 X 18	1
5	60861-051	Hose Assy., 3/8 X 13	1
6	60861-036	Hose Assy., 3/8 X 23	1
7	60861-007	Hose Assy., 3/8 X 27	1

ITEM	PART	DESCRIPTION	QTY.
8	61351-025	Hose Assy., 1/8 X 40	1
9	61351-044	Hose Assy., 1/8 X 12	3
12	61351-037	Hose Assy., 1/8 X 15	1
13	61351-022	Hose Assy., 1/8 X 30	1
14	61789-017	Hose Assy., 3/4 X 17	1
15	64156-037	Hose Assy., 1/2 X 37	1
16	65369-099	Hose Guard, Nylon X 10	4

NOTE:

1. MUST USE SAFETY KEY FIRST ONLY FOR MOTOR MOUNTING. THOSE ①②③④⑤⑥⑦



**HOSE KIT**  
**MX15/19,**  
**SERIAL NUMBERS 1004 TO 1599**

# Illustrated Parts Breakdown

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7.2

## HOSE KIT

MX15/19

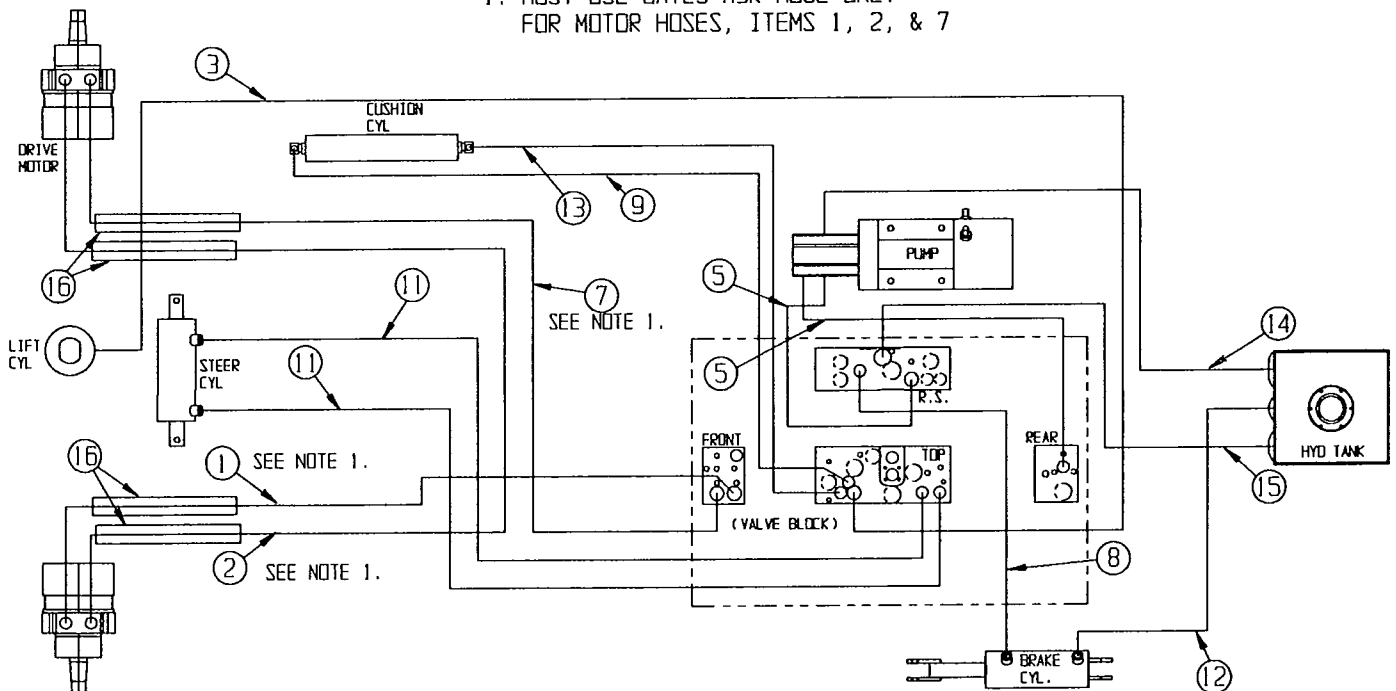
65611-010, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	60861-016	Hose Assy., 3/8 X 36 1/2	1
2	60861-048	Hose Assy., 3/8 X 24	1
3	60861-093	Hose Assy., 3/8 X 152	1
5	60861-024	Hose Assy., 3/8 X 17	2
7	60861-007	Hose Assy., 3/8 X 27	1
8	61351-021	Hose Assy., 1/8 X 46 1/2	1
9	61351-045	Hose Assy., 1/8 X 13	1

ITEM	PART	DESCRIPTION	QTY.
11	61351-023	Hose Assy., 1/8 X 29	2
12	61351-037	Hose Assy., 1/8 X 15	1
13	61351-053	Hose Assy., 1/8 X 27	1
14	61789-017	Hose Assy., 3/4 X 17	1
15	64156-037	Hose Assy., 1/2 X 37	1
16	65369-099	Hose Guard, Nylon X 10	4

### NOTE:

1. MUST USE GATES M3K HOSE ONLY FOR MOTOR HOSES, ITEMS 1, 2, & 7



**HOSE KIT**  
**MX15/19,**  
**SERIAL NUMBERS 1600 TO CURRENT**

# Illustrated Parts Breakdown

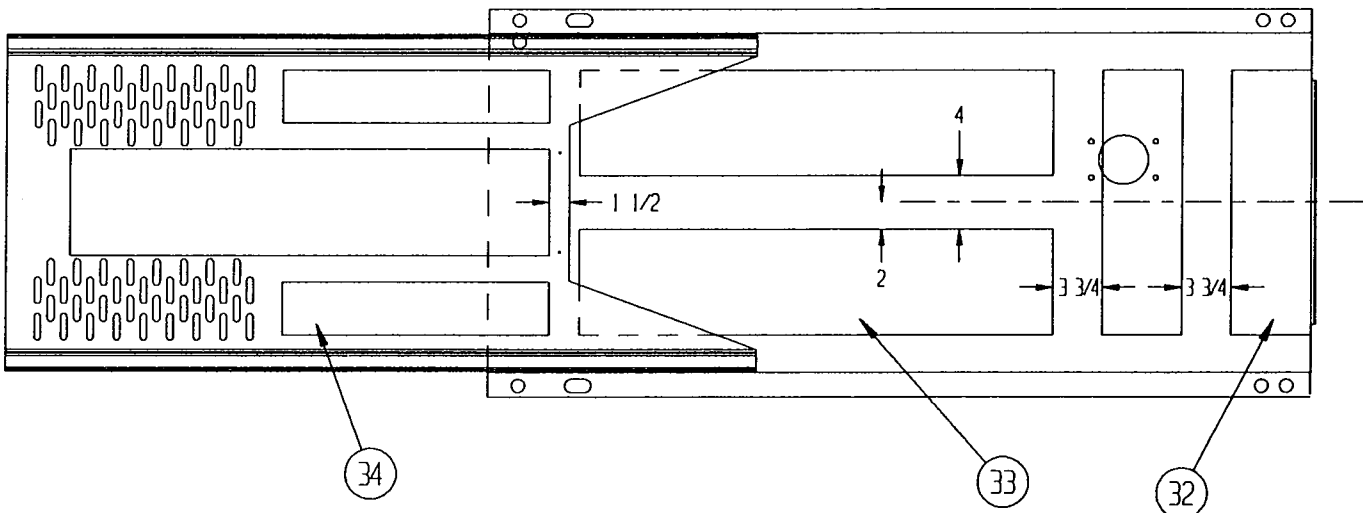
## LABEL INSTALLATION

### MX15

65612-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	61683-004	Label, UpRight	3
2	61684-022	Label, MX15	2
3	61683-005	Label, UpRight	2
4	66550-000	Label, Danger	1
5	65648-000	Label Holder, Guardrail	1
6	10076-000	Manual Case	1
7	60570-000	User Manual	1
8	11248-004	Locknut, 1/4-20UNC Hex	4
9	11252-006	Screw, 1/4-20UNC HHC x 3/4	4
10	11240-004	Washer, 1/4 Std Flat	4
11	65768-000	Label, Controls	1
12	66551-000	Label, Danger	1
13	66552-000	Label, Warning	2
14	66553-000	Label, Warning Keep Clear	2
15	66554-000	Label, Caution	1
16	66555-000	Label, Caution	1
17	66556-000	Label, Caution	1
18	66557-002	Label, Max Load 550 lbs	2

ITEM	PART	DESCRIPTION	QTY.
19	66558-000	Label, Emerg. Lowering	1
20	63369-000	Label, Controller	1
21	65772-000	Angle, Clamp	1
22	05221-000	Label, Battery	2
23	14222-003-99	Label, Fork Lift Here	5
24	60197-000	Label, Hyd Fluid	1
25	63255-001	Label, Scissor Brace	1
26	10076-001	Label, Inst.	1
27	61220-001	Label, ANSI	1
28	60907-000	Safety Walk	2
29	61205-000	Name Plate	1
30	65368-000	Tack	4
31	64444-000	Label, USA	4
32	60830-003	Safety Walk, 6 x 20	2
33	60830-002	Safety Walk, 8 x 36	3
34	60830-001	Safety Walk, 4 x 20	2
35	62562-001	Label, Danger	2

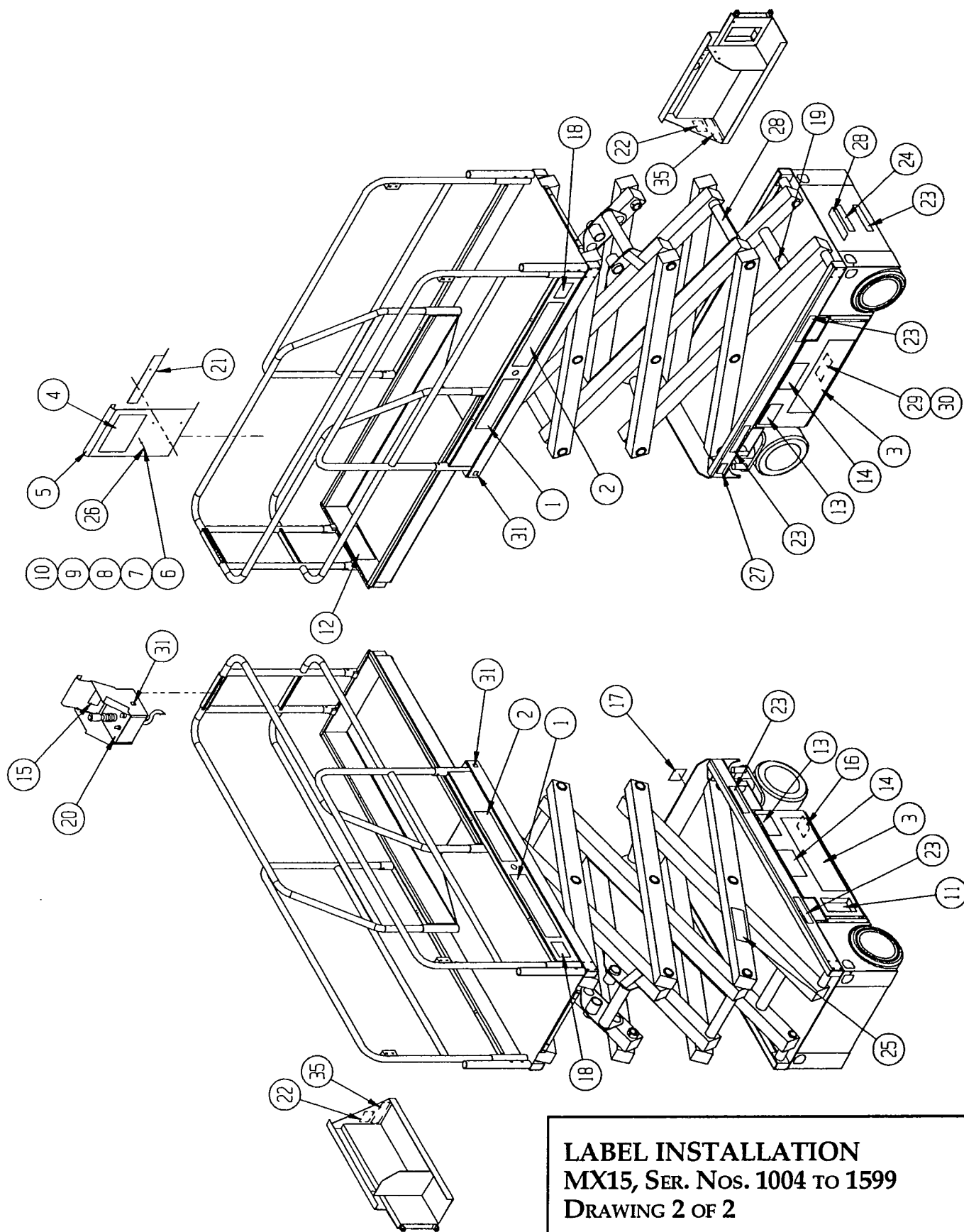


SAFETY TREAD FOR ROLL OUT DECK

**LABEL INSTALLATION**  
**MX15, SER. NOS. 1004 TO 1599**  
**DRAWING 1 OF 2**

# Illustrated Parts Breakdown

Section  
7.2



**LABEL INSTALLATION**  
MX15, SER. NOS. 1004 TO 1599  
DRAWING 2 OF 2

# Illustrated Parts Breakdown

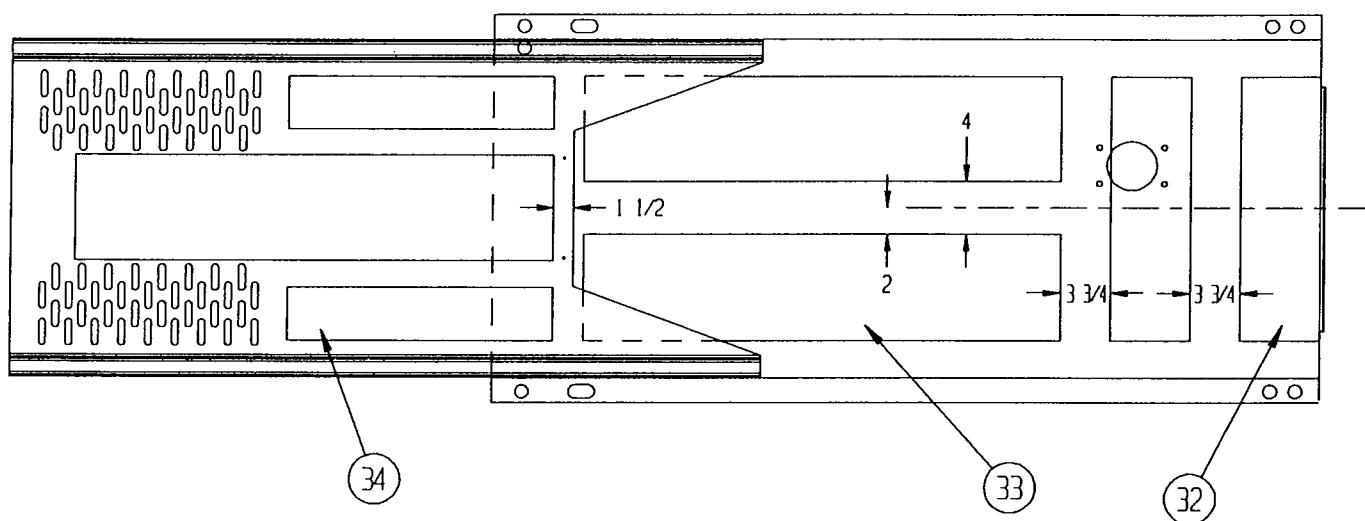
## LABEL INSTALLATION

### MX15

65612-009, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	61683-004	Label, UpRight	3
2	61684-022	Label, MX15	2
3	61683-005	Label, UpRight	2
4	66550-000	Label, Danger	1
5	65648-000	Label Holder, Guardrail	1
6	10076-000	Manual Case	1
7	60570-001	User Manual	1
8	11248-004	Locknut, 1/4-20UNC Hex	4
9	11252-006	Screw, 1/4-20UNC HHC x 3/4	4
10	11240-004	Washer, 1/4 Std Flat	4
11	65768-000	Label, Controls	1
12	66551-000	Label, Danger	1
13	66552-000	Label, Warning	2
14	66553-000	Label, Warning Keep Clear	2
15	66554-000	Label, Caution	1
16	66555-000	Label, Caution	1
17	66556-000	Label, Caution	1
18	66557-002	Label, Max Load 550 lbs	2

ITEM	PART	DESCRIPTION	QTY.
19	66558-000	Label, Emerg. Lowering	1
20	66560-000	Label, Controller	1
21	65772-000	Angle, Clamp	1
22	05221-000	Label, Battery	2
23	14222-003-99	Label, Fork Lift Here	5
24	60197-000	Label, Hyd Fluid	1
25	63255-001	Label, Scissor Brace	1
26	10076-001	Label, Inst.	1
27	61220-001	Label, ANSI	1
28	60907-000	Safety Walk	2
29	61205-000	Name Plate	1
30	65368-000	Tack	4
31	64444-000	Label, USA	4
32	60830-003	Safety Walk, 6 x 20	2
33	60830-002	Safety Walk, 8 x 36	3
34	60830-001	Safety Walk, 4 x 20	2
35	62562-001	Label, Danger	2
36	66522-000	Label, Battery Charger	1

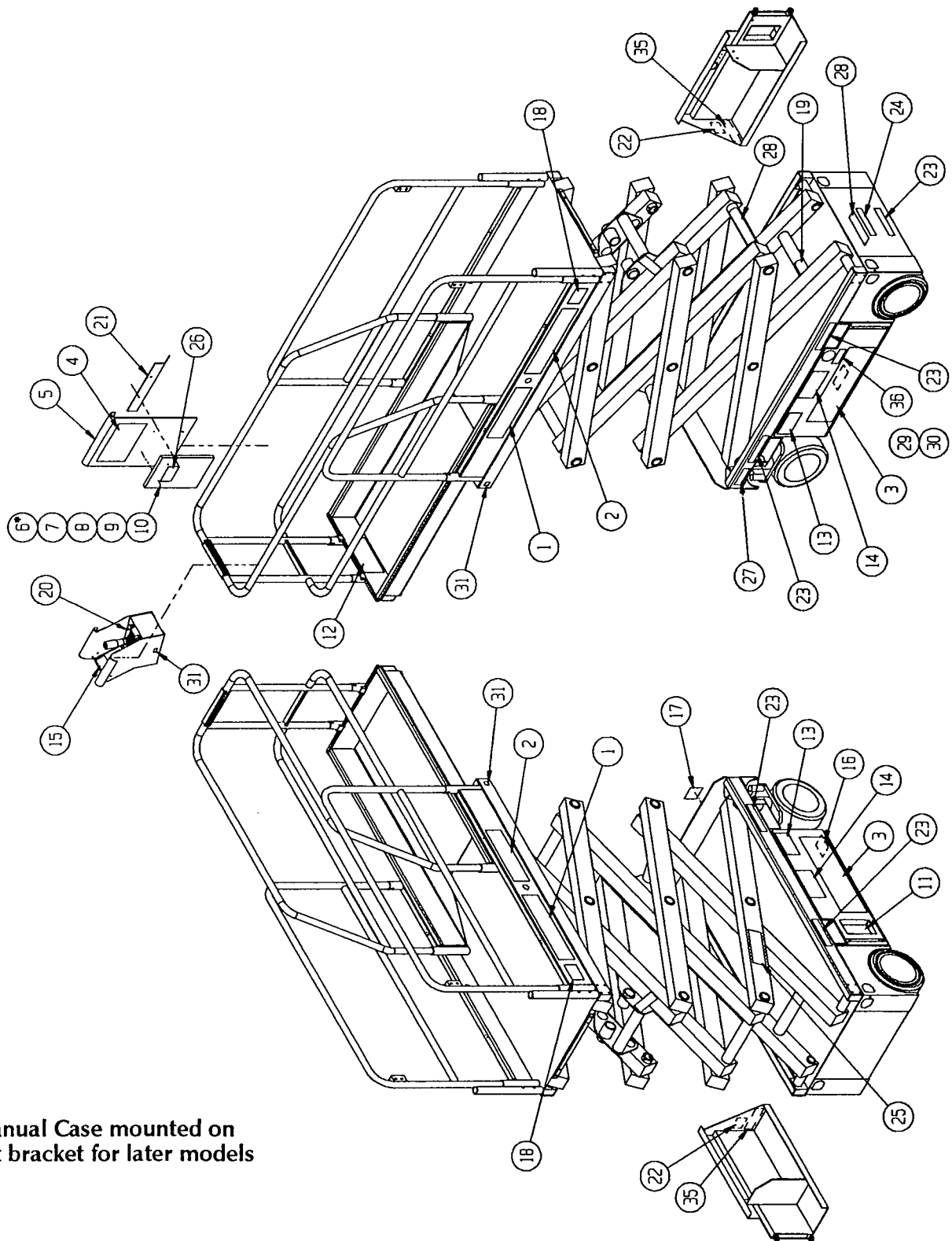


SAFETY TREAD FOR ROLL OUT DECK

**LABEL INSTALLATION**  
**MX15, SER. NOS. 1600 TO CURRENT**  
**DRAWING 1 OF 2**

# Illustrated Parts Breakdown

Section  
7.2



\* Manual Case mounted on front bracket for later models

**LABEL INSTALLATION**  
MX15, Ser. Nos. 1600 TO CURRENT  
DRAWING 2 OF 2



# Illustrated Parts Breakdown

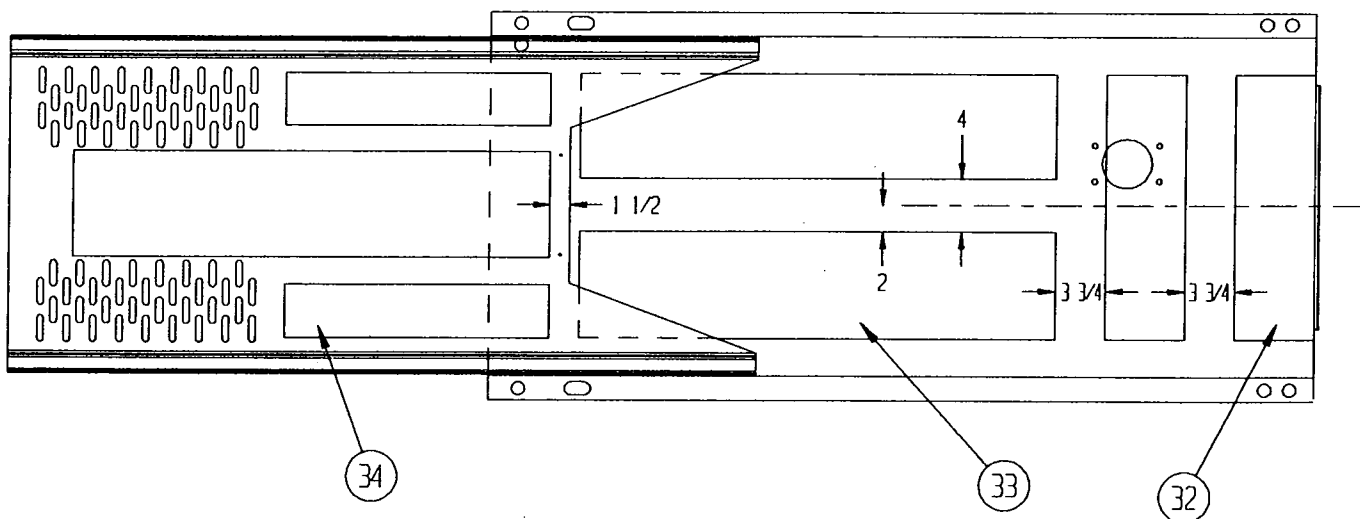
## LABEL INSTALLATION

### MX19

65712-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	61683-004	Label, UpRight	3
2	61684-023	Label, MX 19	2
3	61683-005	Label, UpRight	2
4	66550-000	Label, Danger	1
5	65648-000	Label Holder, Guardrail	1
6	10076-000	Manual Case	1
7	60570-000	User Manual	1
8	11248-004	Locknut, 1/4-20UNC Hex	4
9	11252-006	Screw, 1/4-20UNC HHC x 3/4	4
10	11240-004	Washer, 1/4 Std Flat	4
11	65768-000	Label, Controls	1
12	66551-000	Label, Danger Max Load	1
13	66552-000	Label, Warning	2
14	66553-000	Label, Warning Keep Clear	2
15	66554-000	Label, Caution	1
16	66555-000	Label, Caution	1
17	66556-000	Label, Caution	1
18	66557-001	Label, Max Load 500 lbs	2

ITEM	PART	DESCRIPTION	QTY.
19	66558-000	Label, Emerg. Lowering	1
20	63369-000	Label, Controller	1
21	65772-000	Angle, Clamp	1
22	05221-000	Label, Battery	2
23	14222-003-99	Label, Fork Lift Here	5
24	60197-000	Label, Hyd Fluid	1
25	63255-001	Label, Scissor Brace	1
26	10076-001	Label, Inst.	1
27	61220-001	Label, ANSI	1
28	60907-000	Safety Walk, 4x9	2
29	61205-000	Name Plate	1
30	65368-000	Tack	4
31	64444-000	Label, USA	4
32	60830-003	Safety Walk, 6 x 20	2
33	60830-002	Safety Walk, 8 x 36	3
34	60830-001	Safety Walk, 4 x 20	2
35	62562-001	Label, Danger	2

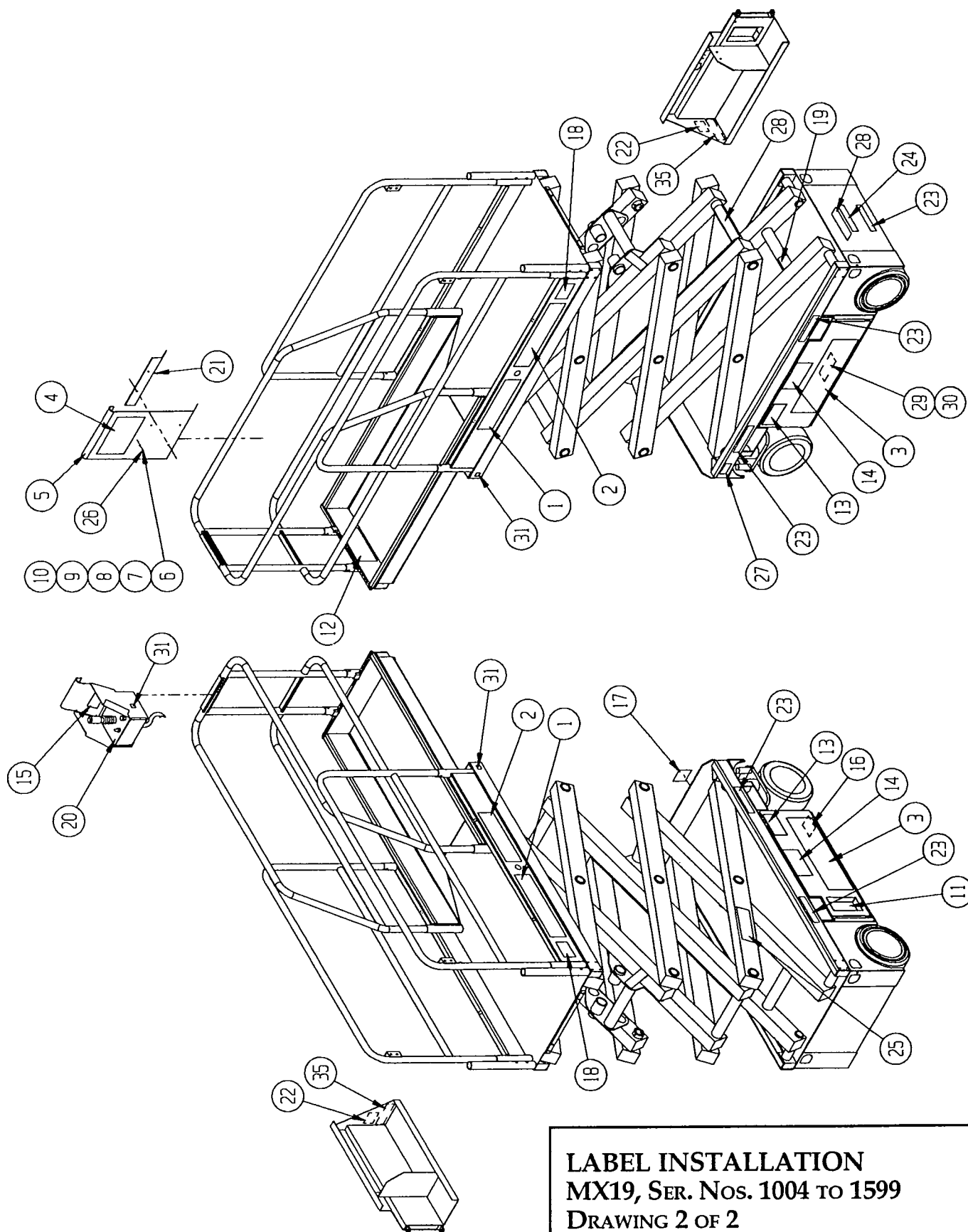


SAFETY TREAD FOR ROLL OUT DECK

**LABEL INSTALLATION**  
**MX19, SER. NOS. 1004 TO 1599**  
**DRAWING 1 OF 2**

# Illustrated Parts Breakdown

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7.2



**LABEL INSTALLATION**  
MX19, SER. NOS. 1004 TO 1599  
DRAWING 2 OF 2

# Illustrated Parts Breakdown

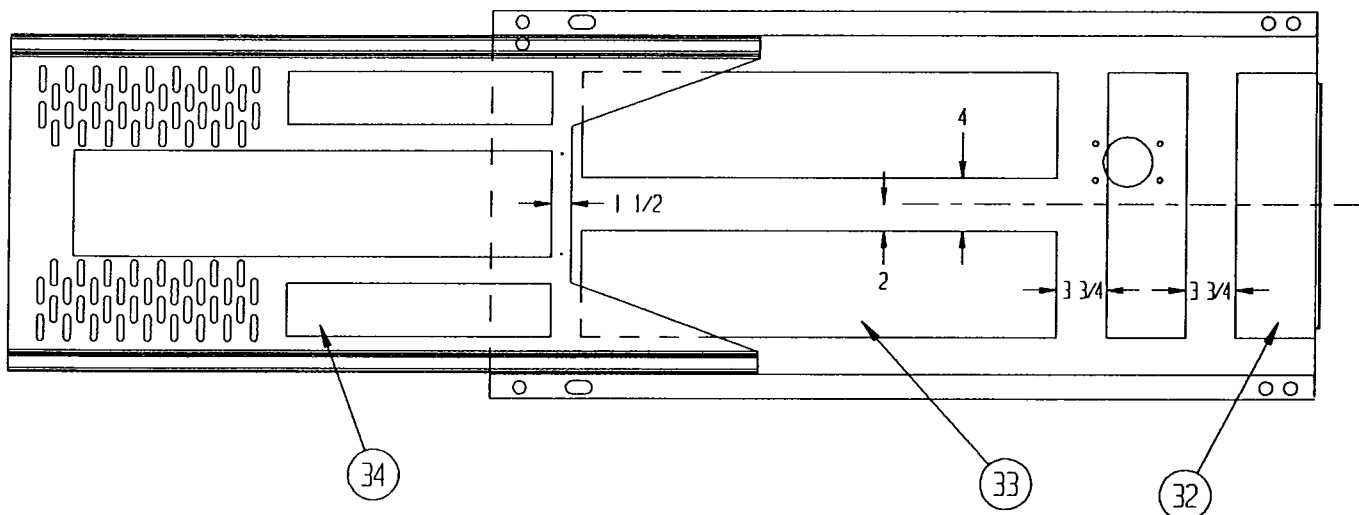
## LABEL INSTALLATION

### MX19

65712-010, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	61683-004	Label, UpRight	3
2	61684-023	Label, MX 19	2
3	61683-005	Label, UpRight	2
4	66550-000	Label, Danger	1
5	65648-000	Label Holder, Guardrail	1
6	10076-000	Manual Case	1
7	60570-000	User Manual	1
8	11248-004	Locknut, 1/4-20UNC Hex	4
9	11252-006	Screw, 1/4-20UNC HHC x 3/4	4
10	11240-004	Washer, 1/4 Std Flat	4
11	65768-000	Label, Controls	1
12	66551-000	Label, Danger Max Load	1
13	66552-000	Label, Warning	2
14	66553-000	Label, Warning Keep Clear	2
15	66554-000	Label, Caution	1
16	66555-000	Label, Caution	1
17	66556-000	Label, Caution	1
18	66557-001	Label, Max Load 500 lbs	2

ITEM	PART	DESCRIPTION	QTY.
19	66558-000	Label, Emerg. Lowering	1
20	66560-000	Label, Controller	1
21	65772-000	Angle, Clamp	1
22	05221-000	Label, Battery	2
23	14222-003-99	Label, Fork Lift Here	5
24	60197-000	Label, Hyd Fluid	1
25	63255-001	Label, Scissor Brace	1
26	10076-001	Label, Inst.	1
27	61220-001	Label, ANSI	1
28	60907-000	Safety Walk, 4x9	2
29	61205-000	Name Plate	1
30	65368-000	Tack	4
31	64444-000	Label, USA	4
32	60830-003	Safety Walk, 6 x 20	2
33	60830-002	Safety Walk, 8 x 36	3
34	60830-001	Safety Walk, 4 x 20	2
35	62562-001	Label, Danger	2
36	66522-000	Label, Battery Charger	1

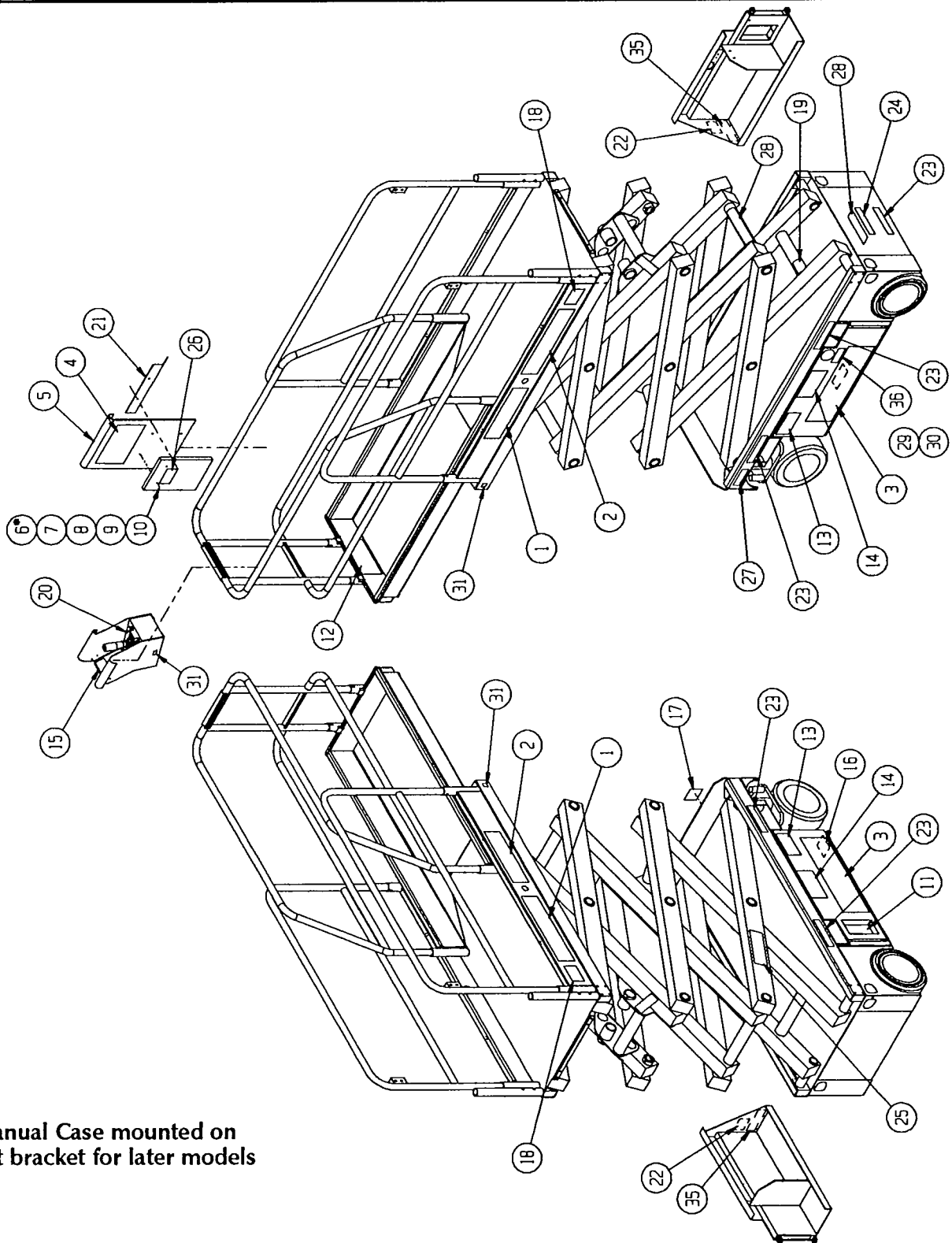


SAFETY TREAD FOR ROLL OUT DECK

**LABEL INSTALLATION**  
**MX19, SER. NOS. 1600 TO CURRENT**  
**DRAWING 1 OF 2**

# Illustrated Parts Breakdown

Section  
7.2



\* Manual Case mounted on front bracket for later models

**LABEL INSTALLATION**  
MX19, SER. NOS. 1600 TO CURRENT  
DRAWING 2 OF 2

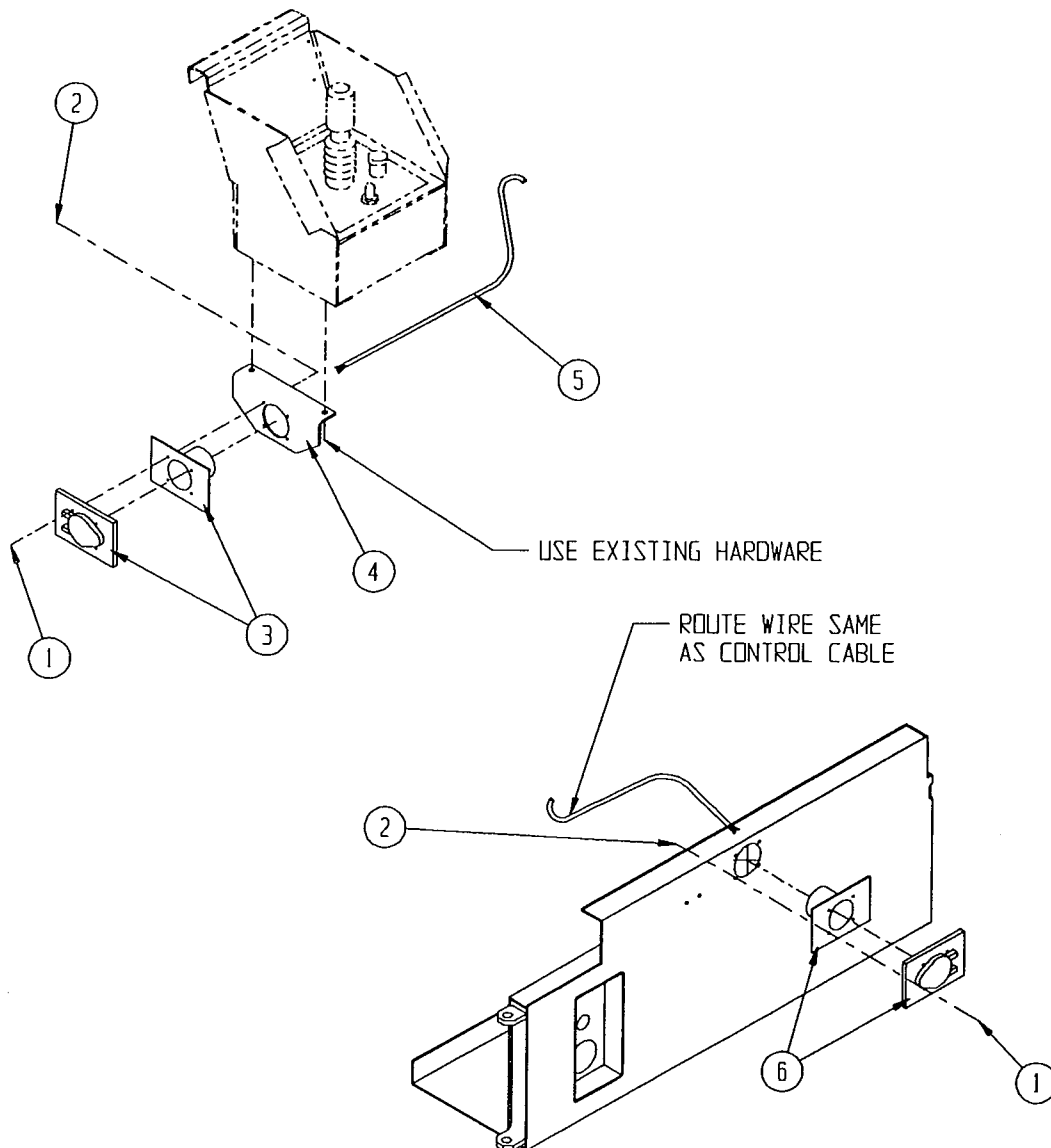
# Illustrated Parts Breakdown

## POWER TO PLATFORM OPTION

### MX15/19

65713-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	11715-004	Screw, Rd. Hd. #6-32 x 1/2 Lg.	8
2	11248-047	Nut, ESNA #6-32	8
3	08942-001	Outlet, AC, Female	1
4	64520-000	Bracket	1
5	29495-099	Wire, 14ga 3 Cond.	37'
6	08942-002	Outlet, AC, Male	1



**POWER TO PLATFORM OPT  
MX15/19,  
SERIAL NUMBERS 1004 TO 1599**

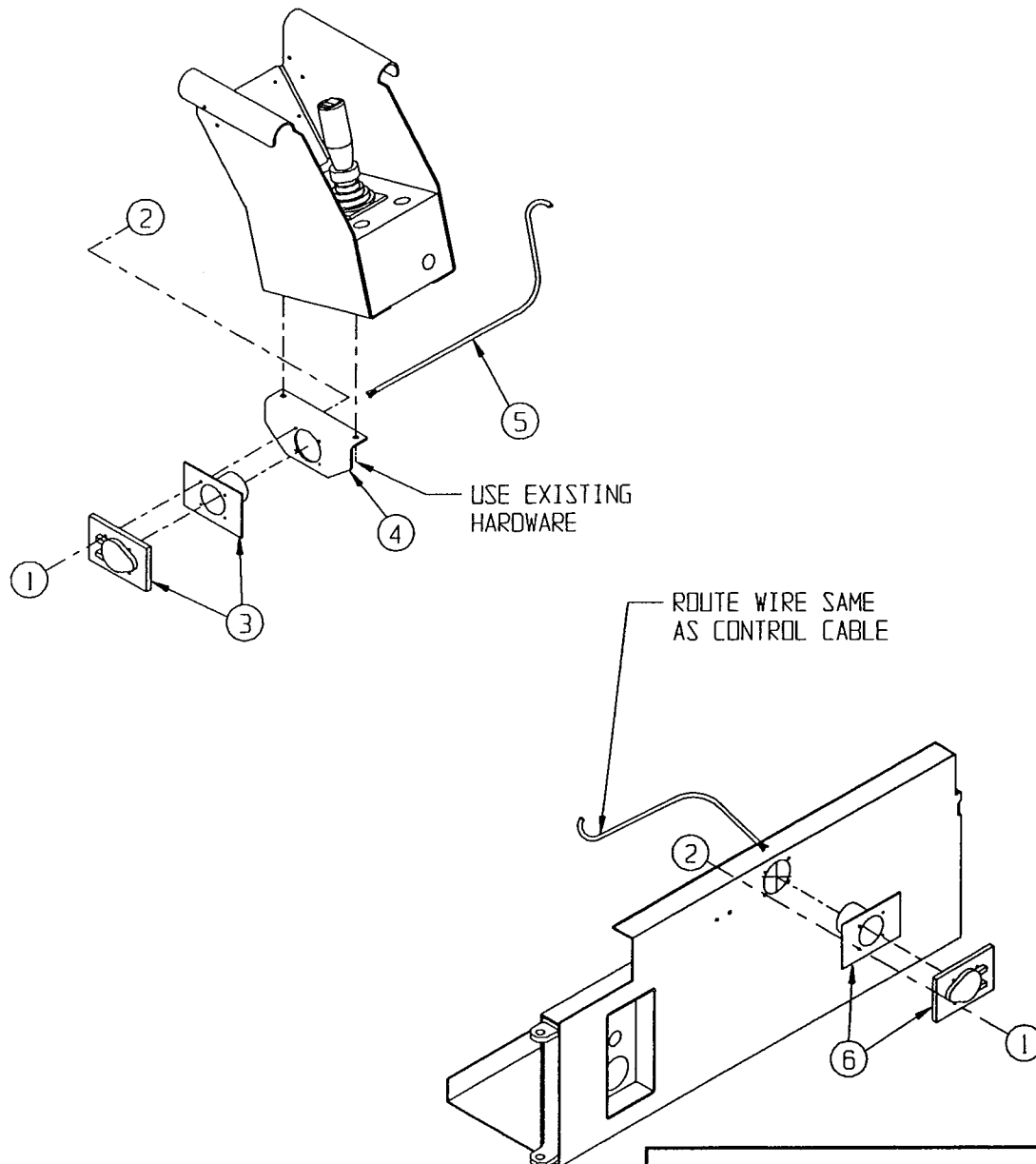
# Illustrated Parts Breakdown

Section  
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## POWER TO PLATFORM OPTION MX15/19

65713-001, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	11715-004	Screw, Rd. Hd. #6-32 x 1/2 Lg.	8
2	11248-047	Nut, ESNA #6-32	8
3	08942-001	Outlet, AC, Female	1
4	66505-000	Bracket	1
5	29495-099	Wire, 14ga 3 Cond.	37'
6	08942-002	Outlet, AC, Male	1



**POWER TO PLATFORM OPT  
MX15/19,  
SERIAL NUMBERS 1600 TO CURRENT**

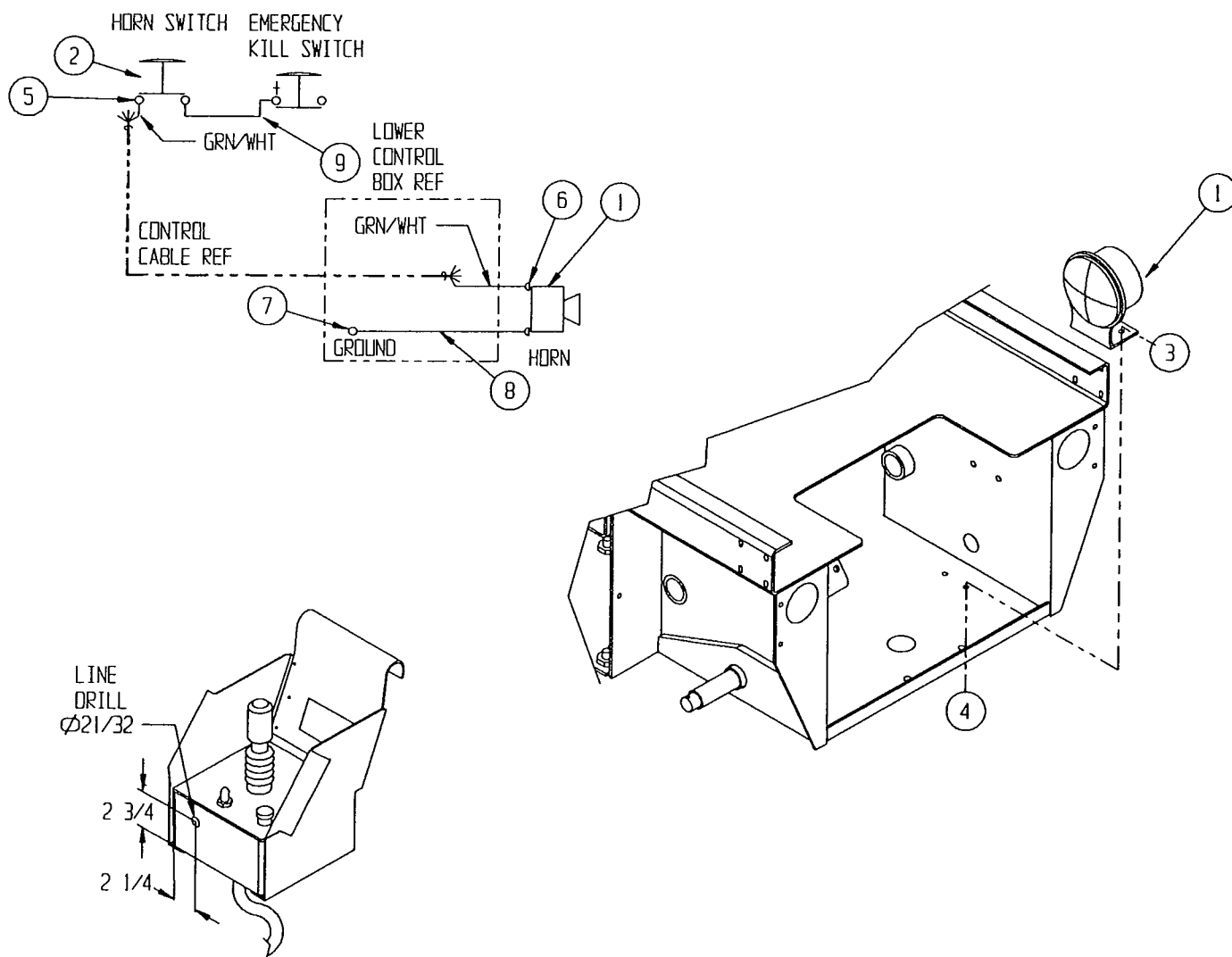
# Illustrated Parts Breakdown

## HORN OPTION

MX15/19

65714-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	29958-000	Horn	1
2	63917-000	Switch, Pushbutton	1
3	11248-004	Nut, Hex ESNA 1/4-20 UNC	2
4	11252-008	Screw, HHC 1/4-20 UNC x 1	2
5	29601-013	Conn., Ring 16-14 #10	3
6	29615-002	Conn., Fm Push 16-14 3/16	2
7	29601-014	Conn., Ring 16-14 1/4	1
8	29456-099	Wire, 16 AWG Yel	.66ft
9	29454-099	Wire, 16 AWG Red	3ft



**HORN OPTION**  
**MX15/19,**  
**SERIAL NUMBERS 1004 TO 1599**

# Illustrated Parts Breakdown

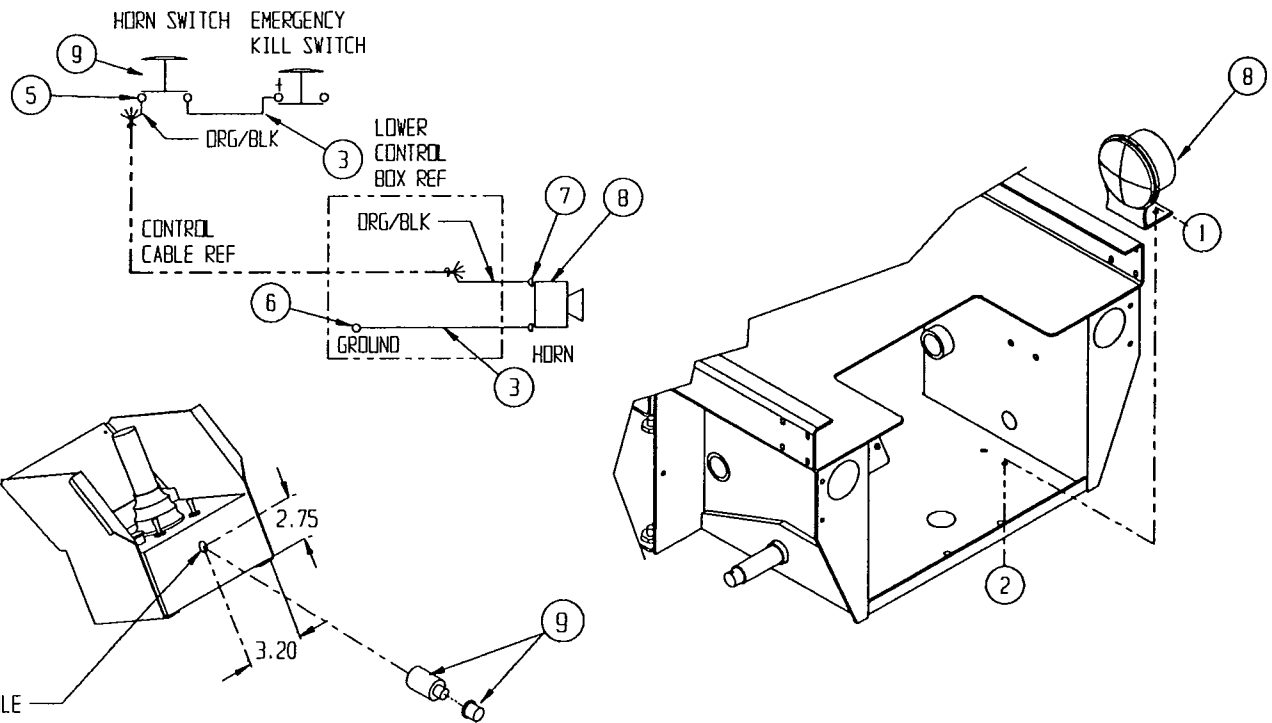
Section  
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## HORN OPTION

MX15/19

66614-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	11252-008	Screw, HHC 1/4-20 UNC x 1	2
2	11248-004	Nut, Hex ESNA 1/4-20 UNC	2
3	29452-099	Wire, 16 AWG Blk	1ft
5	29610-002	Conn., Fork 16-14	3
6	29601-014	Conn., Ring 16-14 1/4	1
7	29615-002	Conn., Fm Push 16-14 3/16	2
8	29958-000	Horn	1
9	63917-000	Switch, Pushbutton	1



CONTROLLER MODIFICATION

**HORN OPTION**  
**MX15/19,**  
**SERIAL NUMBERS 1600 TO CURRENT**

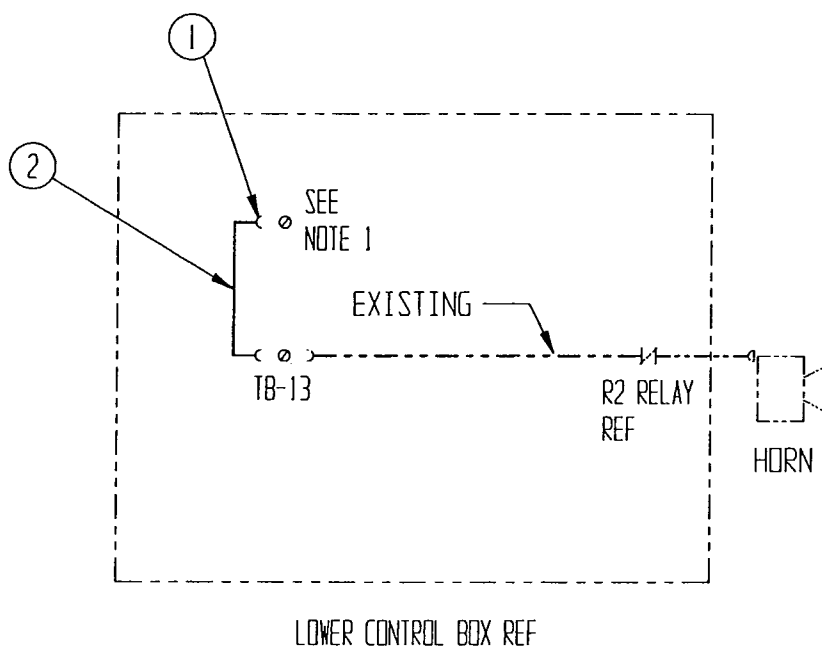


## MOTION ALARM OPTION

MX15/19

65715-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	29610-002	Conn., Fork 16-14 #8	2
2	29457-099	Wire, 16 AWG Grn	1ft



### NOTE:

1. a. FOR ALL MOTION ALARM CONNECT JUMPER WIRE BETWEEN TB-2 AND TB-13.
- b. FOR FWD/REV MOTION ALARM CONNECT JUMPER WIRE BETWEEN TB-4 AND TB-13.
- c. FOR REV MOTION ALARM CONNECT JUMPER WIRE BETWEEN TB-6 AND TB-13.

**MOTION ALARM OPTION  
MX15/19,  
SERIAL NUMBERS 1004 TO 1599**

# Illustrated Parts Breakdown

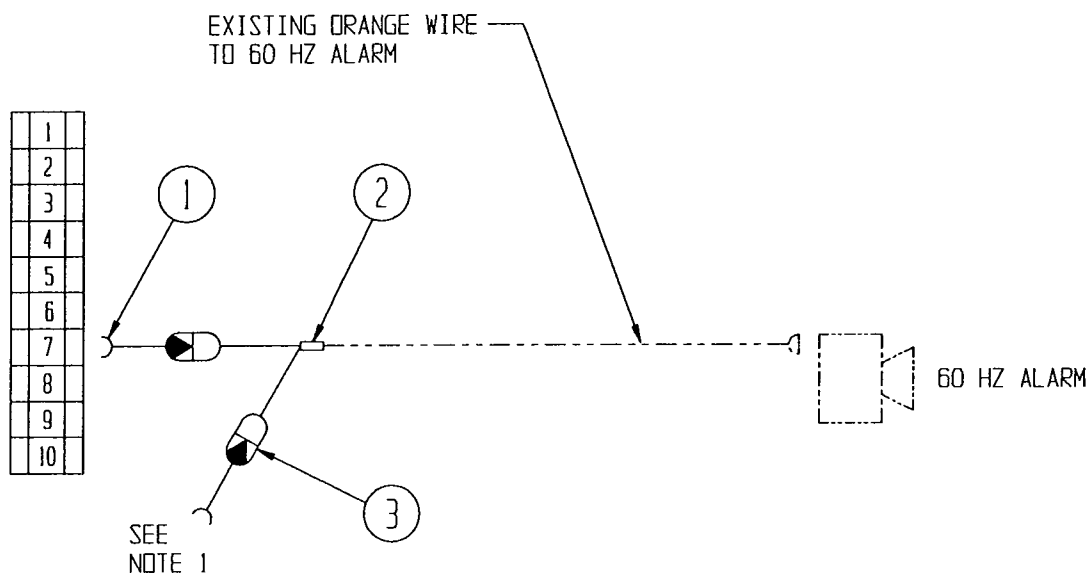
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## MOTION ALARM OPTION

MX15/19

65715-001, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	29610-002	Conn., Fork 16-14 #8	2
2	29620-002	Conn., Butt 16 Ga	1
3	29825-002	Diode, 3 Amp	2



### NOTE:

- FOR ALL MOTION ALARM CONNECT TO TB-8
- FOR FWD/REV MOTION ALARM CONNECT TO TB-4
- FOR REV MOTION ALARM CONNECT TO TB-3

MOTION ALARM OPTION  
MX15/19,  
SERIAL NUMBERS 1600 TO CURRENT

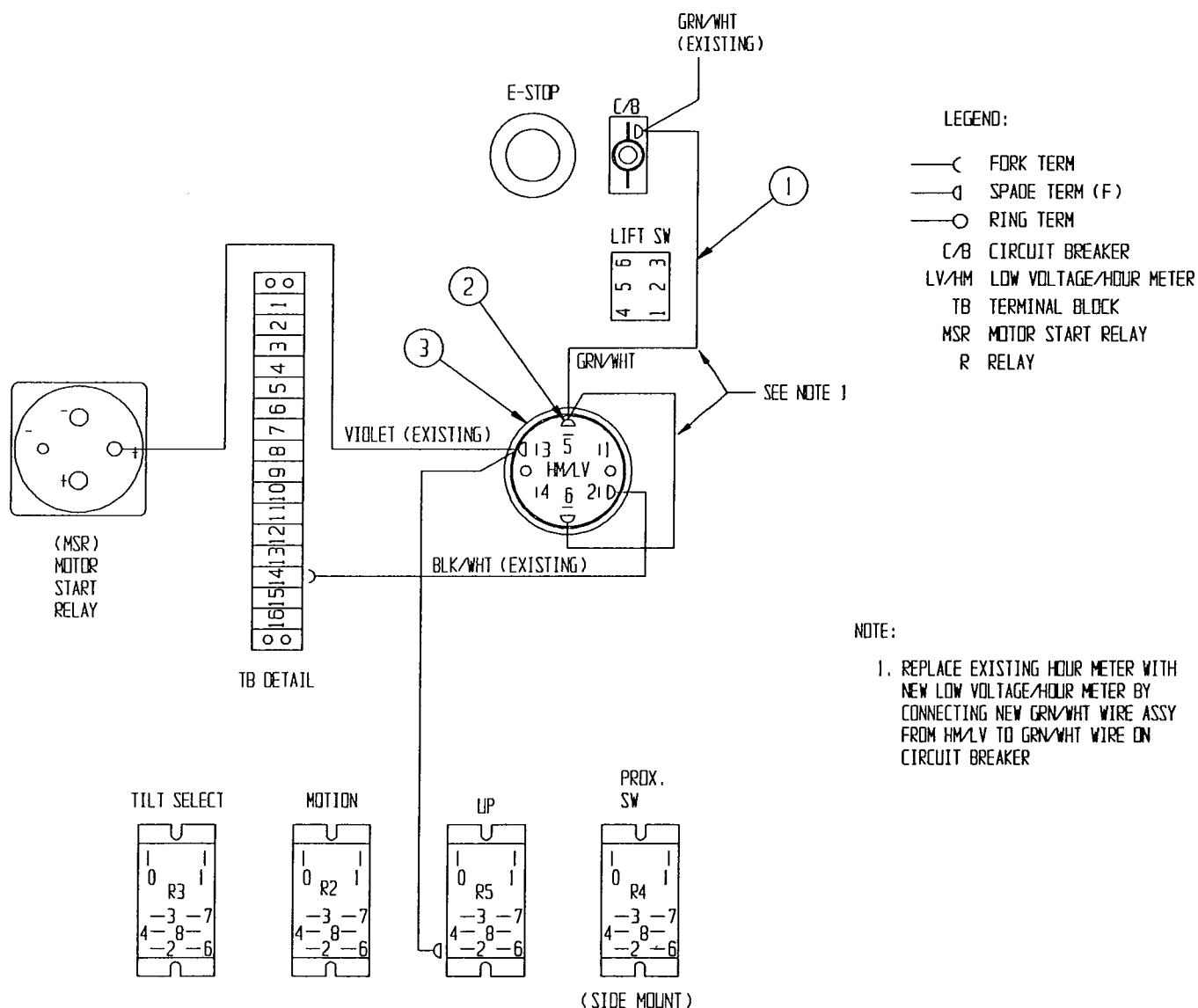
## Illustrated Parts Breakdown

## LOW VOLTAGE/HOUR METER OPTION

MX15/19

65716-000, Serial Numbers 1004 to 1599

ITEM	PART	DESCRIPTION	QTY.
1	29482-099	Wire, 16 AWG Grn/Wht	1ft
2	29931-003	Conn., F Push 16-14	3
3	29959-000	Low Volt/Hour Meter	1



## LOW VOLT./HOUR METER OPTION MX15/19, SERIAL NUMBERS 1004 TO 1599

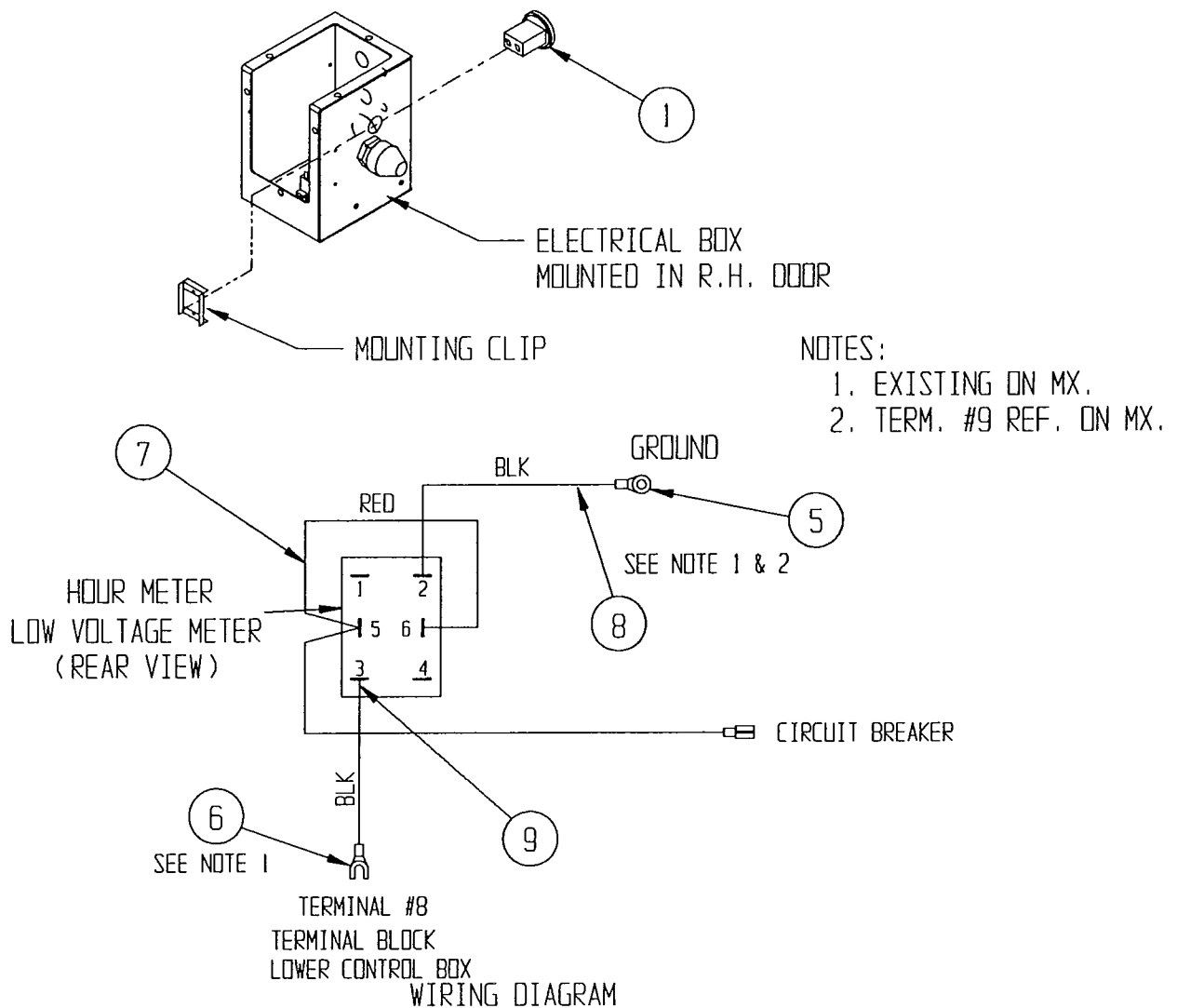
# Illustrated Parts Breakdown

Section  
7.2

## LOW VOLTAGE/HOUR METER OPTION MX15/19

66613-000, Serial Numbers 1600 to Current

ITEM	PART	DESCRIPTION	QTY.
1	29959-000	Low Volt/Hour Meter	1
2	29601-013	Conn., Ring Term.	1
3	29610-002	Conn., Fork Term.	1
4	29454-099	Wire, 16 AWG Red x 12"	1ft
5	29456-099	Wire, 16 AWG Yel x 15"	1.3ft
6	29931-003	Conn., F Push 16-14	4



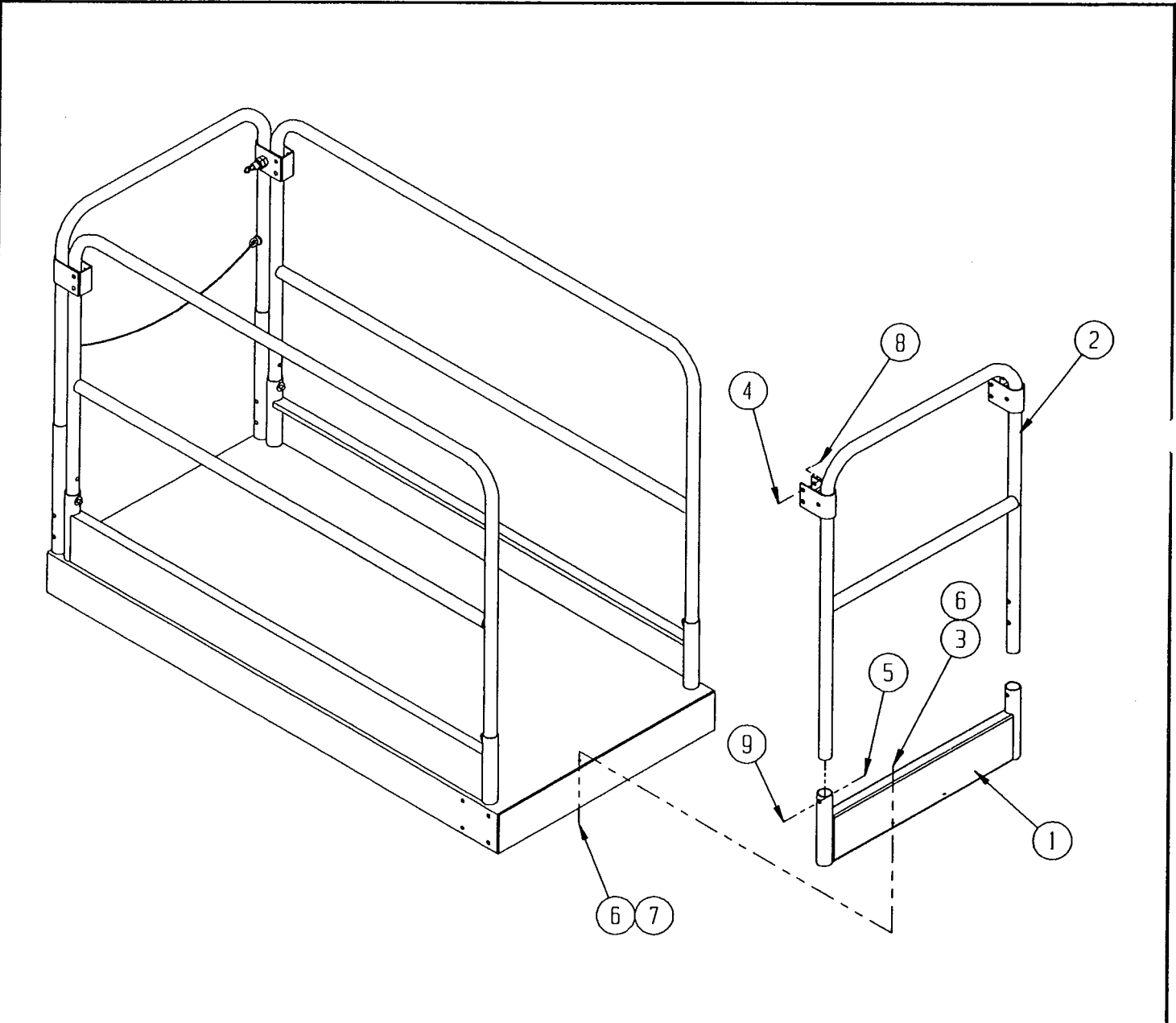
**LOW VOLT/HOUR METER OPTION  
MX15/19,  
SERIAL NUMBERS 1600 TO CURRENT**

# Illustrated Parts Breakdown

PLATFORM W/O DECK EXT. OPTION  
MX15/19  
65787-000

ITEM	PART	DESCRIPTION	QTY.
1	65774-000	Toeboard Weldment	1
2	65773-000	Front Guardrail Weldment	1
3	11252-006	Screw, 1/4-20 HHC x 3/4 GR5	2
4	11253-018	Screw, 5/16-18 HHC x 2 1/4 GR5	4
5	11254-020	Screw, 3/8-16 HHC x 2 1/2 GR5	2

ITEM	PART	DESCRIPTION	QTY.
6	11240-004	Washer, 1/4 Std Flat	4
7	11248-004	Locknut, 1/4-20 Hex ESNA	2
8	11248-005	Locknut, 5/16-18 ESNA	4
9	11248-006	Locknut, 3/8-16 Hex ESNA	2



PLATFORM W/O DECK EXT. OPTION  
MX15/19

# Illustrated Parts Breakdown

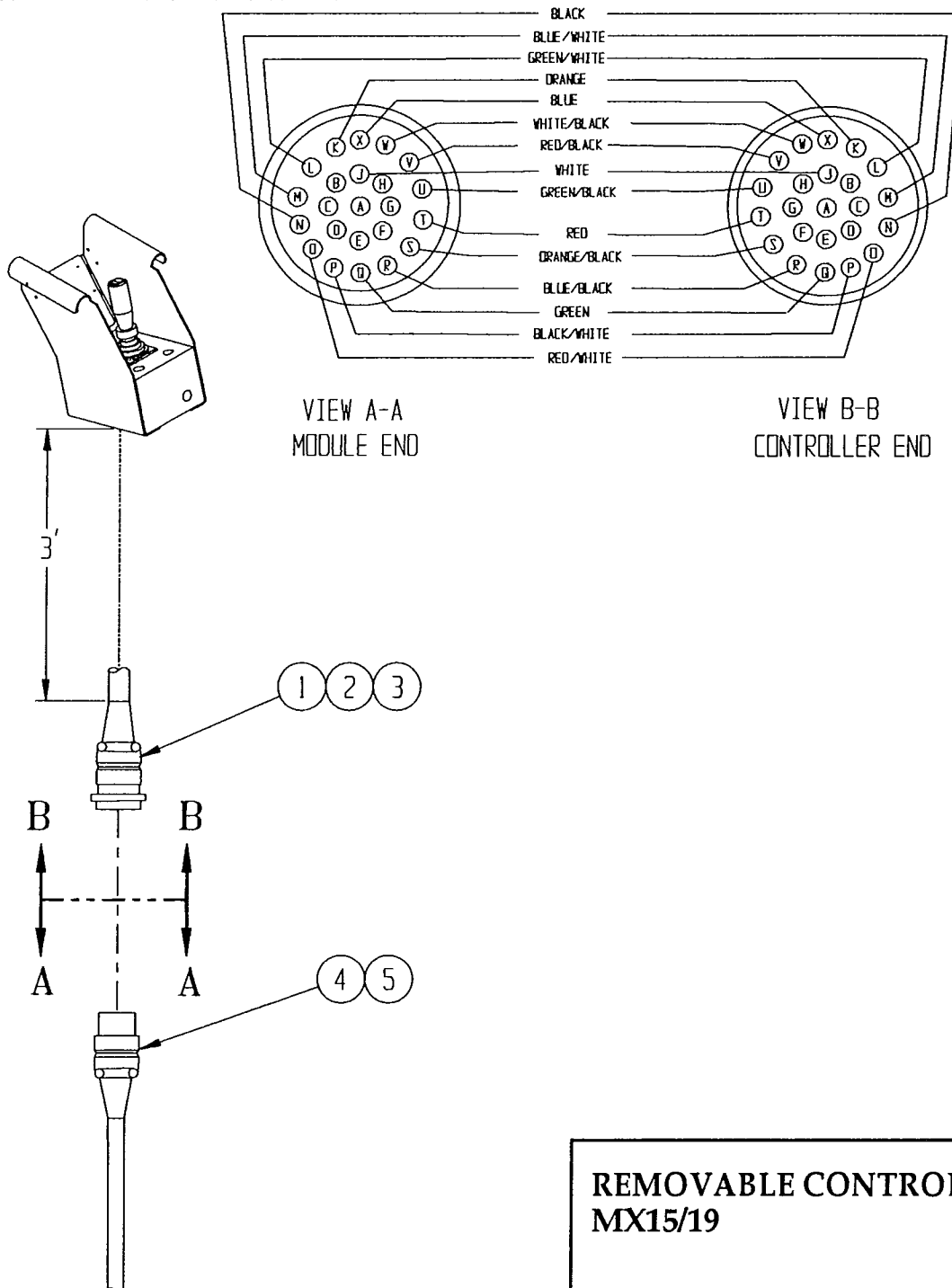
Section  
7.2

## REMOVABLE CONTROLLER OPTION

MX15/19

61898-000

ITEM	PART	DESCRIPTION	QTY.
1	28800-003	Plug Connector with Clamp	1
2	28800-004	Pin, Contact	15
3	28800-015	Sealing Plug	1
4	28800-016	Receptacle Connector with Clamp	1
5	28800-005	Socket, Contact	15



REMOVABLE CONTROLLER OPTION  
MX15/19

## NOTES

## 4.11 Steering Cylinder (Figure 4-17)

### REMOVAL

1. Turn the wheels to the straight position.
2. Elevate the Platform and block the Elevating Assembly with the Brace (see page 4-3).
3. Tag and disconnect the hose assemblies from the cylinder fittings and immediately cap the openings to prevent foreign material from entering.
4. Remove the retaining rings from the pivot pins.
5. Remove the locknuts, washers and capscrews, while supporting the cylinder. Remove the cylinder.

### DISASSEMBLY

1. Unscrew the internal head caps from the barrel, removing one head cap assembly from the rod.
2. Withdraw the other head cap, piston and shaft assembly from the barrel tube.

3. Remove the snap rings from the piston washers and remove the piston washers, piston, O-ring and head cap.
4. Remove the rod wiper, u-cup, O-ring and backup ring from the headcap and discard the seals.
5. Remove the piston ring and O-ring from the piston and discard.

### CLEANING AND INSPECTION

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcaps for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

### ASSEMBLY

1. Lubricate and install new rod wiper, u-cup, O-ring and backup ring on the headcaps.
2. Install one headcap onto the shaft.
3. Install the new piston rings and O-ring on the piston.
4. Install the O-ring, piston and piston washers on the shaft. Secure piston washers with snap rings.
5. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the cylinder barrel.
6. Install the other head cap into cylinder barrel and tighten both head caps.

### INSTALLATION

1. Position the cylinder assembly in the chassis and secure with capscrews, washers and locknuts.
2. Insert pivot pins and secure with retaining rings.

**NOTE:** On some machines the pivot pins do not have the anti-rotation tab welded on the bottom and require bonding to the steering cylinder shaft with Loctite 609®.

3. Connect the hose assemblies to the fittings.
4. Operate the steering circuit several times throughout its entire range of travel to expel trapped air and check for leaks.

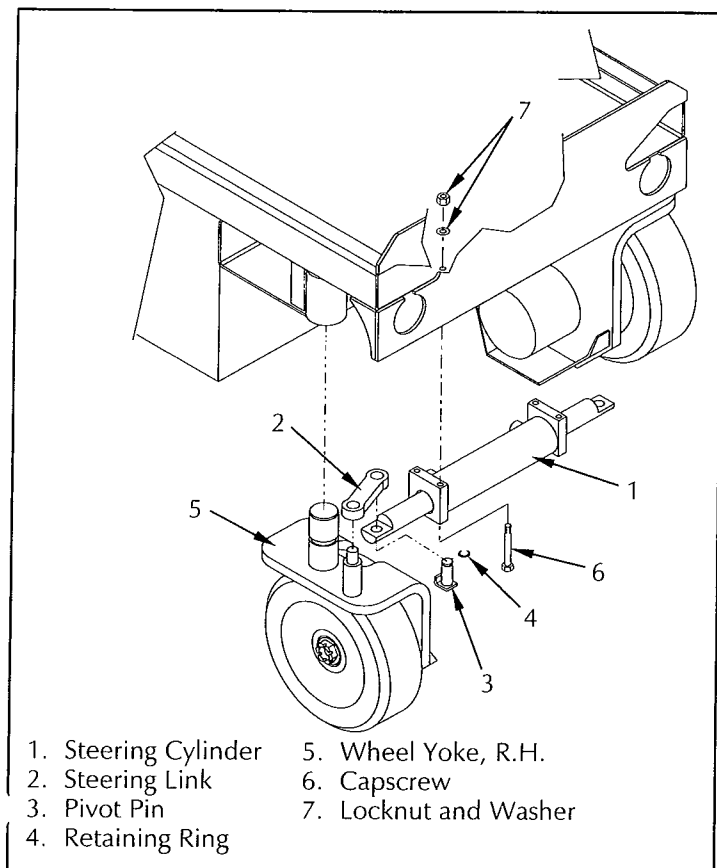


Figure 4-17: Steering Cylinder Installation



# UpRight

Call Toll Free in U.S.A.

**1-800-926-LIFT**

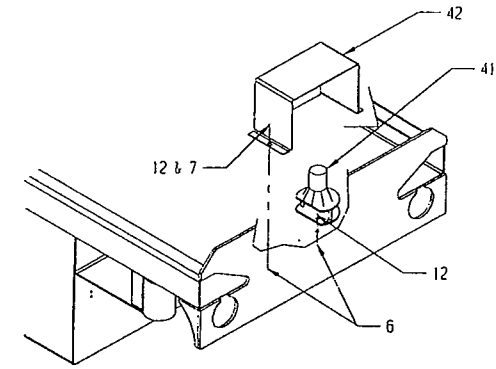
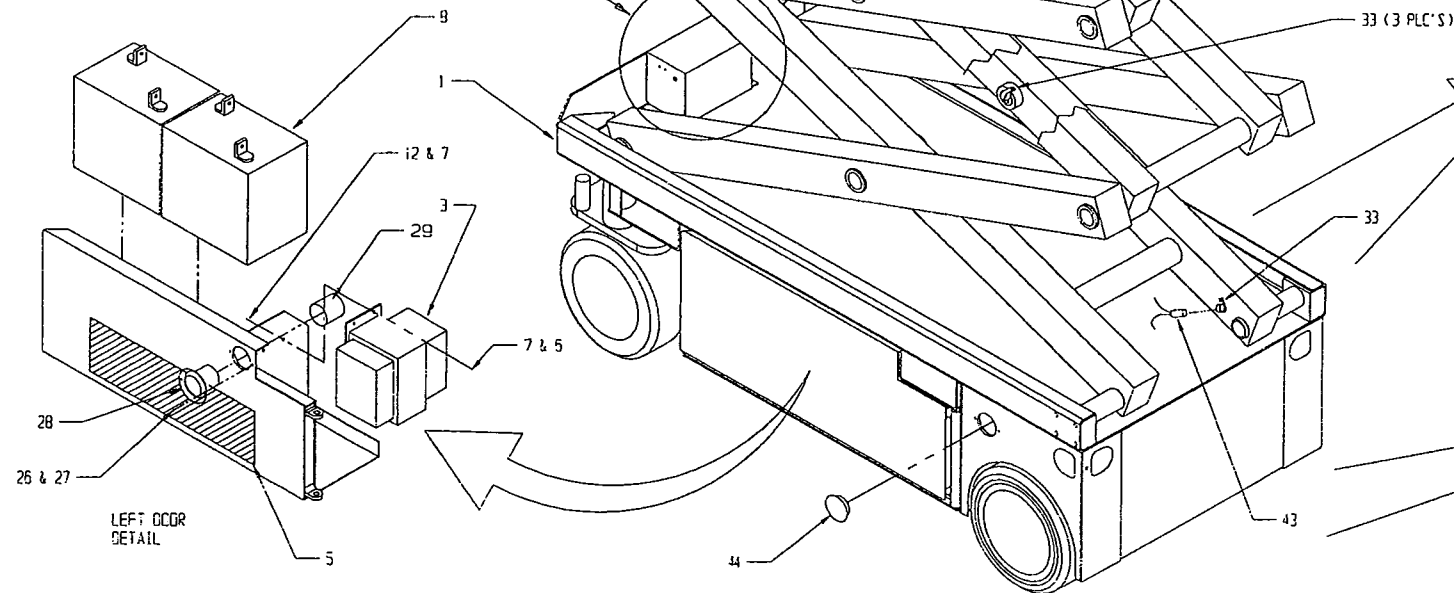
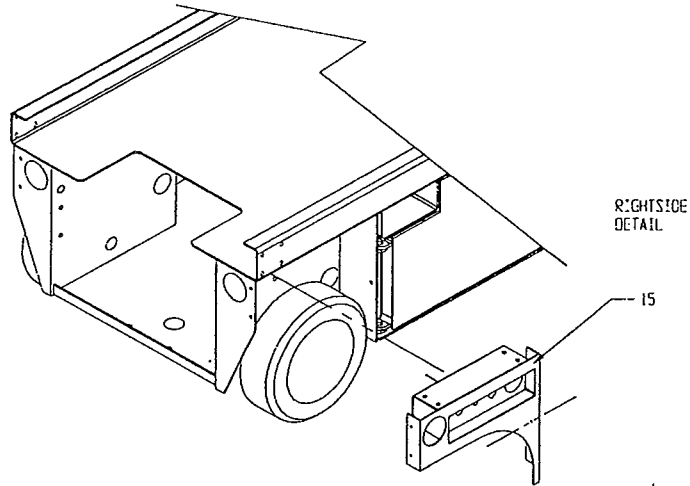
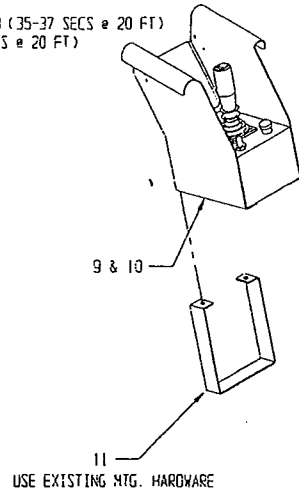
**UpRight, Inc.**  
1775 Park Street  
Selma, California 93662  
TEL: 209/891-5200  
FAX: 209/896-9012  
PARTSFAX: 209/896-9244

**UpRight, Europe**  
(Europe, Africa & Middle East)  
Pottery Road  
Dun Laoire, Ireland  
TEL: 353/1/285-3333  
FAX: 353/1/284-0015

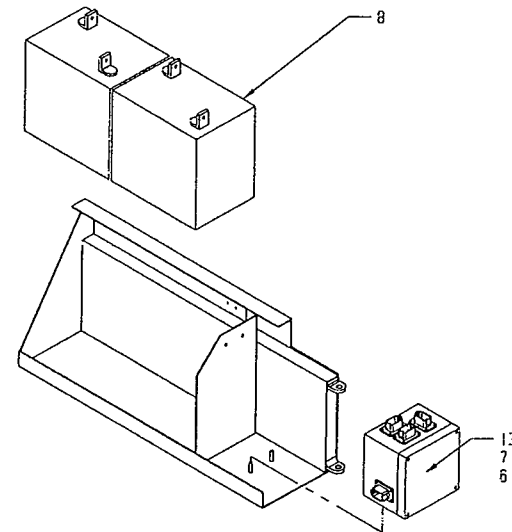
# NOTES:

1. SET LIFT RELIEF AT RATED LOAD (250 KG) 550 LBS
2. PROOF LOAD (375 KG) 825 LBS.
3. GRADABILITY 25% MIN.
4. SET COUNTERBALANCE VALVE 800 PSI  $\pm$  5 PSI
5. DRIVE LOW SPEED .37-.39 KMPH / .37-.39 MPH (35-37 SECS @ 20 FT)  
HIGH SPEED 3.66 KMPH / 2.27 MPH (6 SECS @ 20 FT)

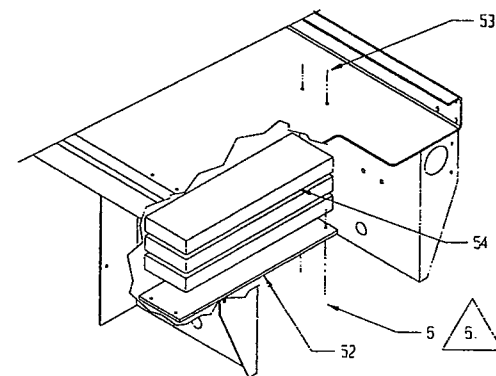
6. INSTALL BELTS FLUSH AGAINST ENDS OF BAR BEFORE TIGHTENING.



DETAIL A



RIGHT SIDE  
DETAIL

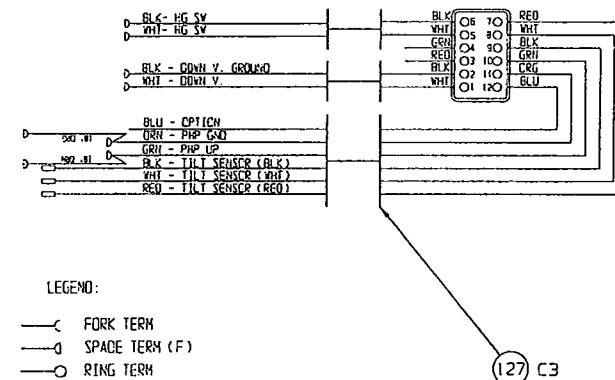
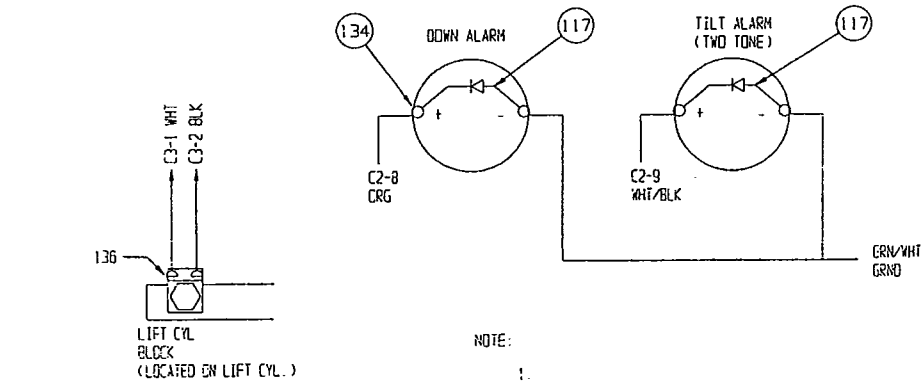


REVISIONS			
DESCRIPTION	DATE	CHKD.	BY
1			

55			
54	19775-017	BAR	3
53	11252-048	SCREW 1/4-20 HHC X 6	4
52	65798-000	MOUNTING PLATE, BALLAST	1
51			
50			
49			
48			
47			
46	65616-020	ELECTRICAL SCHEM.	REF
45	65615-020	HYDRAULIC SCHEM.	REF
44	66516-002	HOLE PLUG 1.75 DIA	1
43			
42	65661-000	SWITCH COVER	1
41	29945-011	LEVEL SENSOR	1
40			
39			
38	11248-006	NUT HEX ESNA 3/8-16	8
37	11240-006	WASHER 3/8 STD FLAT	16
36	11254-008	SCREW HHC 3/8-16 X 1	8
35	30714-001	LADDER ANGLE	2
34	66307-000	LADDER WELDMENT	1
33	20541-013	CLAMP	3
32			
31			
30	65611-020	HOSE KIT ( NOT SHOWN )	1
29	29961-001	SEAL, INLINE PLUG	1
28	29961-000	INLINE PLUG	1
27	11248-047	NUT, 6-32 HEX	2
26	11715-004	SCREW RD HD 6-32 X 1/2	2
25	63497-001	MERCURY SWITCH	1
24			
23			
22			
21			
20			
19			
18			
17			
16			
15	65980-000	WHEEL COVER ASS'Y	1
14			
13	67346-000	ELEC. BOX	1
12	11252-006	SCREW 1/4-20UNC HHC X 3/4	4
11	65746-000	CONTROLLER GUIDE	1
10	65609-014	CONTROLLER CABLE ASSY	1
9	66020-014	CONTROLLER ASSY	1
8	15796-000	BATTERY 6V	4
7	11240-004	WASHER 1/4 STD FLAT	14
6	11248-004	LOCK NUT 1/4-20 HEX	14
5	65612-020	LABEL INSTL.	1
4	65603-004	PLATFORM GUARDRAIL INSTL.	1
3	36944-001	CHARGER	1
2	65614-000	EXTENSION DECK	1
1	65601-010	BASIC ASSY	1
ITEM	PART NO.	PART / MATERIAL DESCRIPTION	QTY

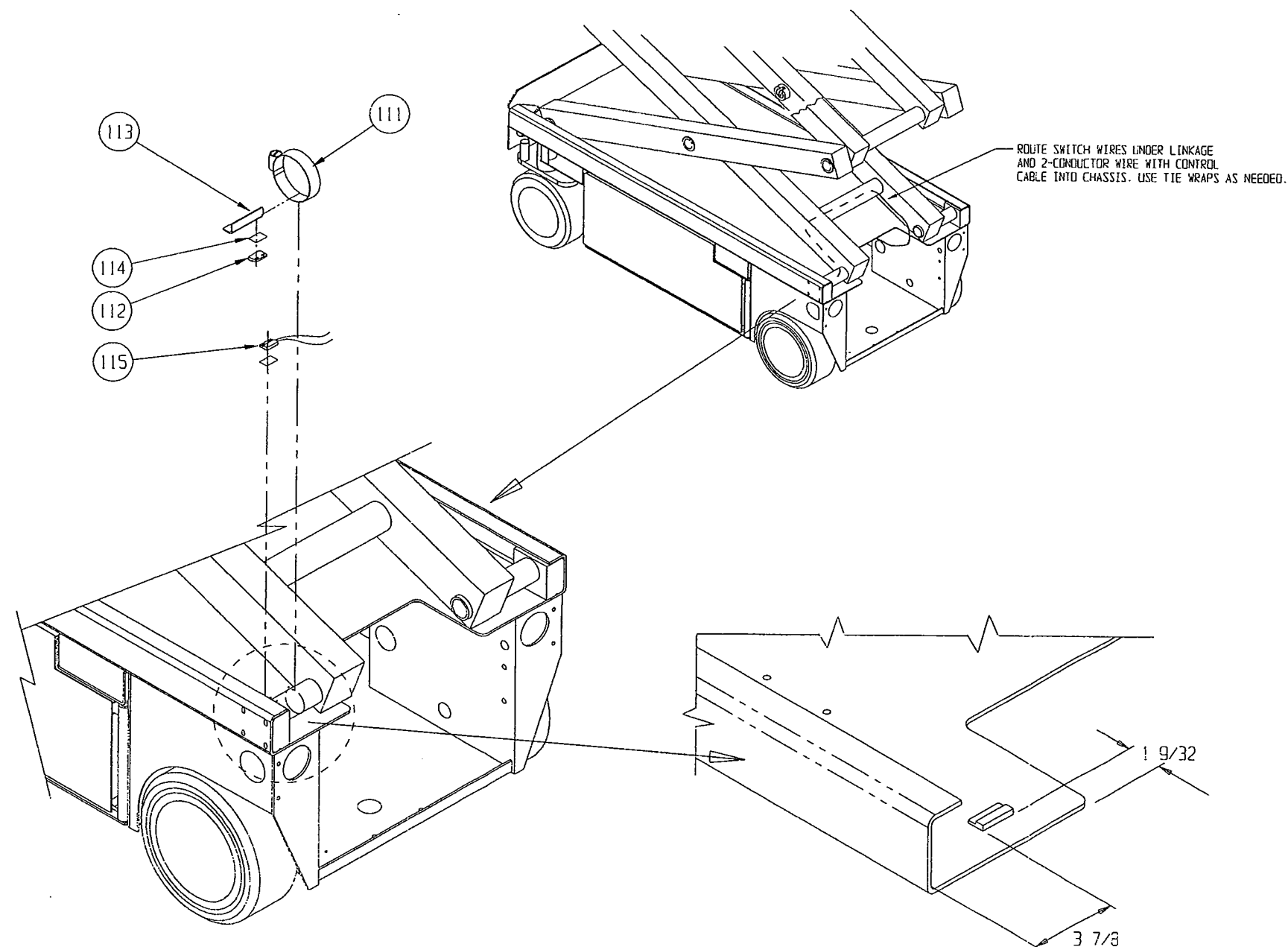
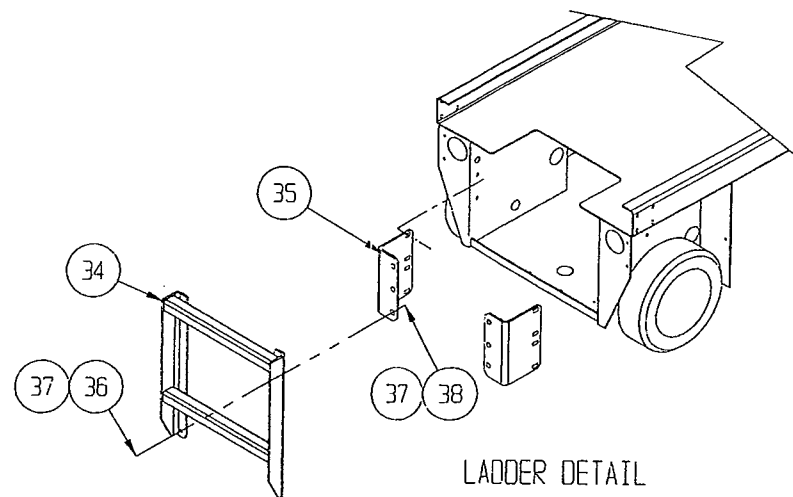
UP-RIGHT, INC.

PART NAME			
FINAL ASSY MX15 DDM			
DWG. SIZE	CHG BY	DATE	APPRO BY
3	JHM	3/10/98	
SCALE	PART NO.	SHEET 1 OF 3	
1/8	065600-010		

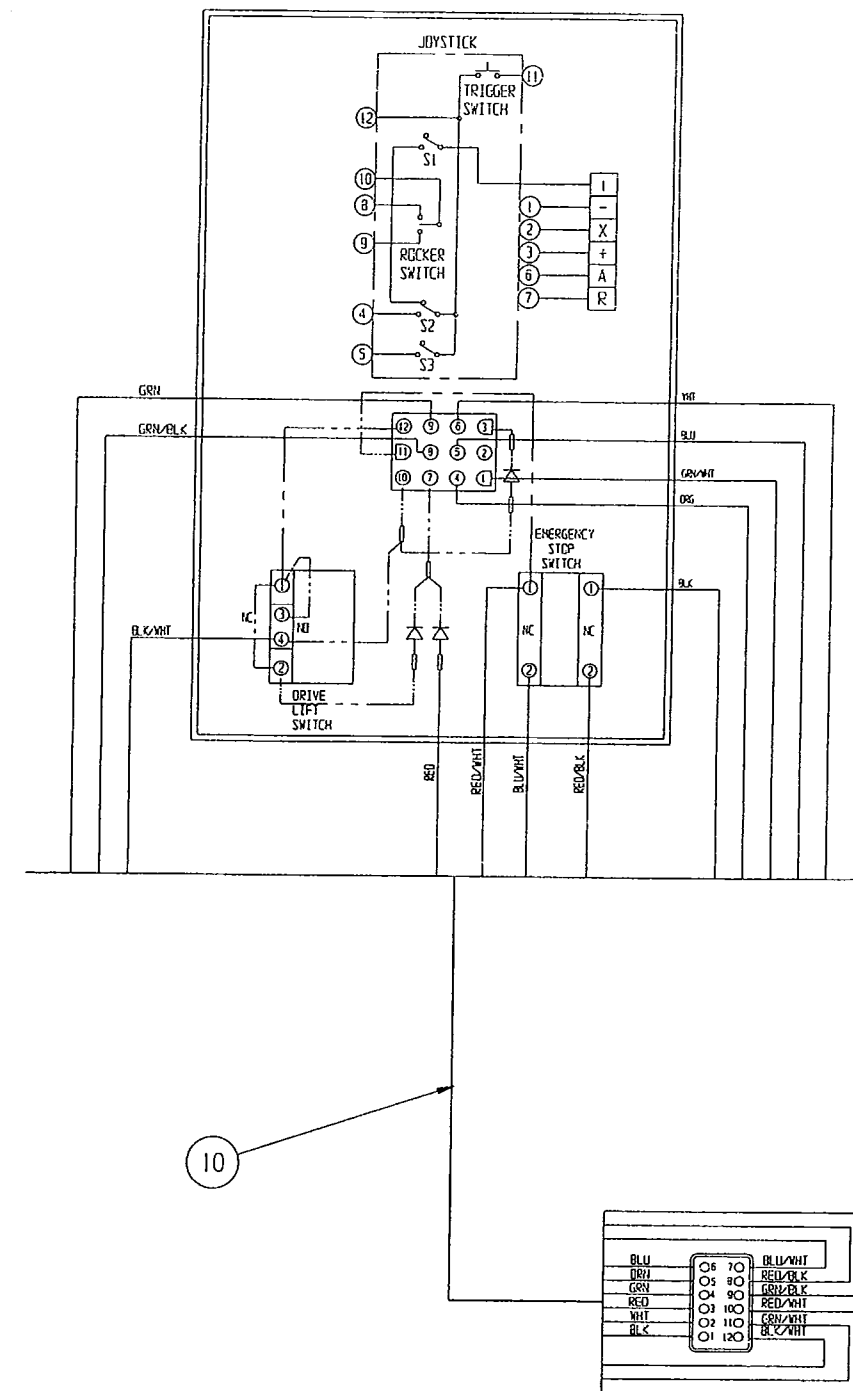


UP-RIGHT, INC.							
PART NAME		FINAL ASSY MX15					
		DOM					
QTY.	DATE	DATE	DATE	DATE	DATE	DATE	DATE
SIZE	0	QTY BY	SH	DATE	8/4/54	QTY BY	SH
SCALE: 1/4		PART NO. 65600-010				SHEET 2 OF 3	

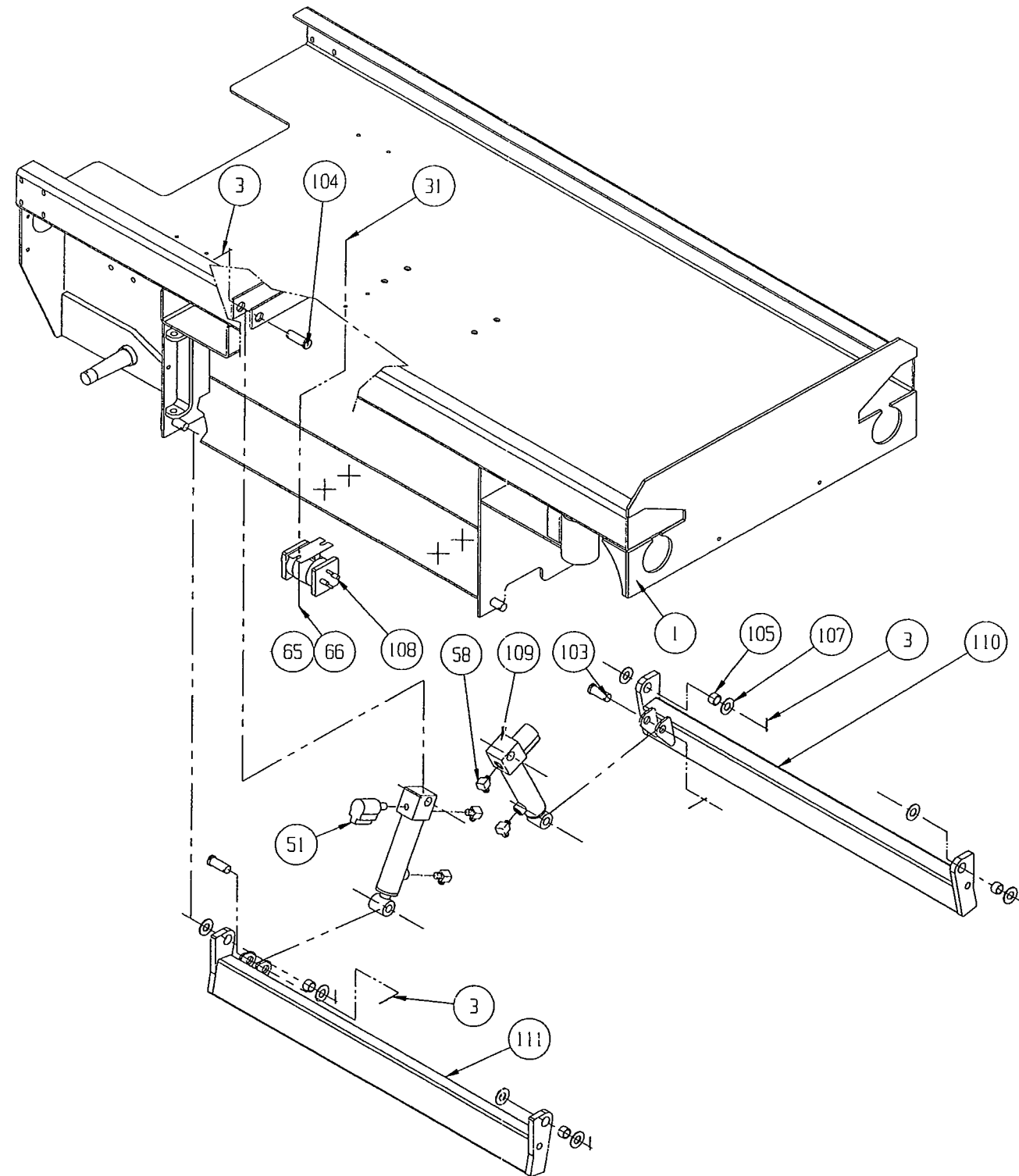
NOTES:



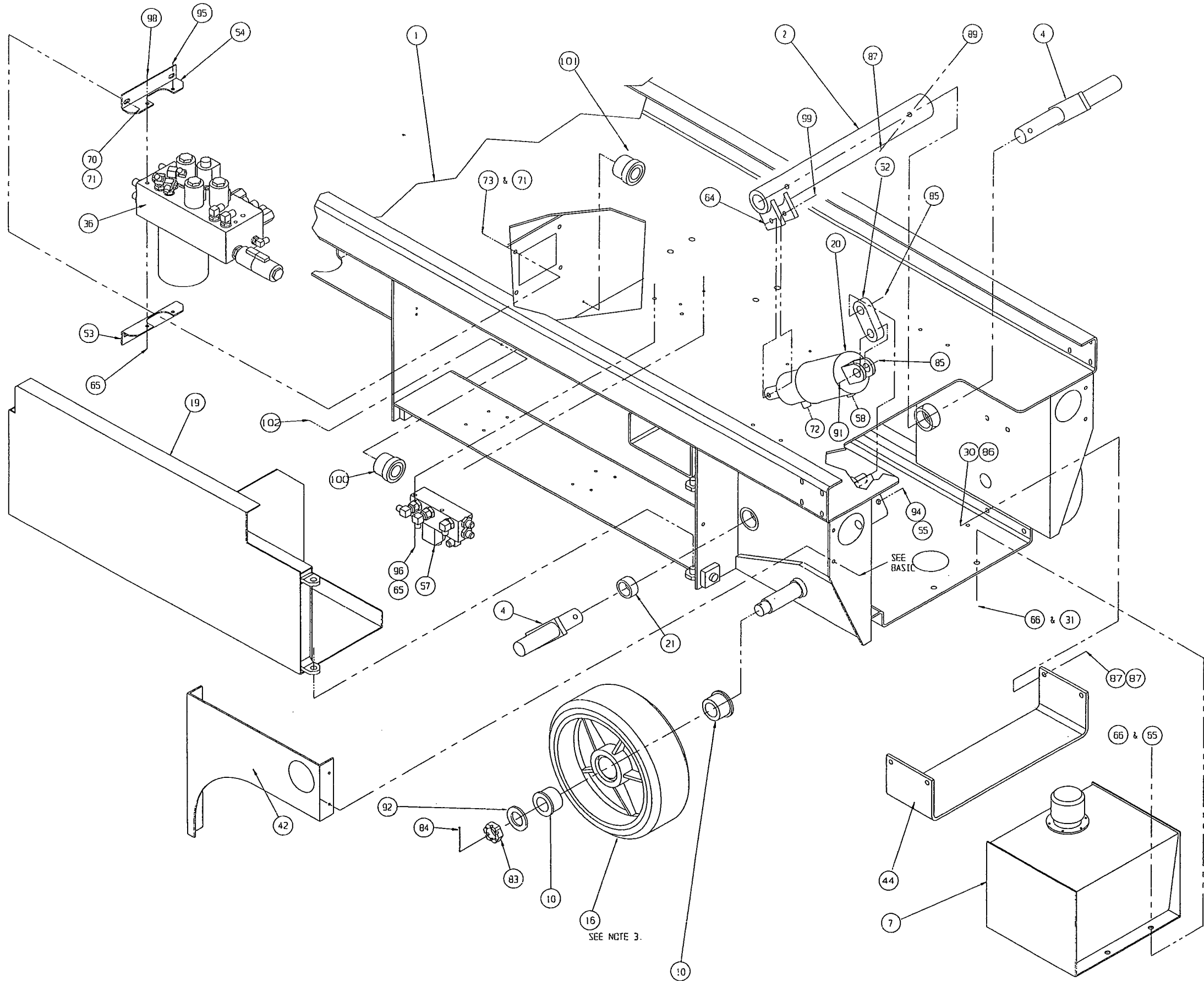
# CABLE CONNECTIONS



UP-RIGHT, INC.							
PART NAME							
FINAL ASSY MX15 DOM							
DATE	BY	DATE	BY	DATE	BY	DATE	BY
3/10/98	JAN	3/10/98	JAN				
SCALE 1/10 PART NO 065600-010 SHEET 3 OF 3							



UPRIGHT, INC.							
PART NAME		CHASSIS ASSY MX15/19					
ENG.	Q	OWN BY:	JHM	DATE:	3/17/98	APVD BY:	
SIZE				DATE:		CHKD BY:	
SCALE	3/16	PART NO: 065602-010			SHEET 3 OF 3		



120	-	-	-
119	-	-	-
118	-	-	-
117	-	-	-
116	-	-	-
115	-	-	-
114	-	-	-
113	-	-	-
112	-	-	-
111	65971-001	POTHOLE RAIL WELDMENT R.H.	1
110	65971-000	POTHOLE RAIL WELDMENT L.H.	1
109	65970-001	CYLINDER POT HOLE	2
108	10122-001	SOLENOID	1
107	11240-010	WASHER 5/8 SOT FLAT	8
106	-	-	-
105	11780-040	BEARING 5/8 X 13/16 X 1/2 LG	4
104	11848-019	CLEVIS PIN 3/4 X 2 1/2	2
103	11848-036	CLEVIS PIN 5/8 X 2 1/4	2
102	11252-006	SCREW RD HD 6-32 X 3/4	2
101	66807-001	ALARM DUAL TONE	1
100	66807-003	ALARM DOWN	1
99	63559-006	SHOULDER BOLT 3/8 X 2 X 5/16-18 THD	1
98	11252-032	SCREW HHC 1/4-20 X 4	1
97	-	-	-
96	11252-020	SCREW HHC 1/4-20 UNC X 2 1/2	2
95	11252-030	SCREW HHC 1/4-20 X 3-3/4	1
94	11273-008	NUT 1/2-13 JAM HEX	1
93	-	-	-
92	63329-008	WASHER, FLAT 1" I.D. 2" O.D.	2
91	11848-041	CLEVIS PIN 3/4 X 2	1
90	-	-	-
89	11254-020	SCREW HHC 3/8-16 X 2-1/2	2
88	-	-	-
87	11248-006	LOCK NUT 3/8-16	10
86	11240-006	WASHER FLAT STD 3/8	12
85	11757-010	COTTER RING	2
84	11754-012	COTTER PIN 5/32 X 1-1/2	2
83	11261-017	NUT HEX 1-14 UNF	2
82	-	-	-
81	11934-004	FITTING 90 6MBH-6MJ	2
80	11937-007	FITTING 90 12FJX-12MJ	1
79	11941-012	FITTING 8MB-12MJ	1
78	11248-008	LOCK NUT 1/2-13	8
77	11240-008	WASHER FLAT STD 1/2	8
76	11256-026	SCREW HHC 1/2-13 X 3-1/4	8
75	11941-013	FITTING 10MB-6MJ	4
74	-	-	-
73	11253-008	SCREW HHC 5/16-18 X 1	8
72	11934-003	FITTING 90 6MBH-4MJ	3
71	11240-005	WASHER FLAT STD 5/16	22
70	11248-005	LOCK NUT 5/16-18	12
69	11248-003	LOCK NUT 10-24	2
68	11709-008	SCREW MACH RD HD 10-24 X 1	2
67	11252-006	SCREW HHC 1/4-20 X 3/4	3
66	11240-004	WASHER FLAT STD 1/4	6
65	11248-004	LOCK NUT 1/4-20	10
64	11246-005	LOCK NUT 5/16-18	1
63	-	-	-
62	11708-004	SCREW MACH RD HD 8-32 X 1/2	4
61	05299-000	LATCH TOGGLE	2
60	11248-002	LOCK NUT 8-32	6
59	-	-	-
58	11934-001	FITTING 4MBH-4MJ	7
57	66802-001	VALVE ASSY	1
56	18183-058	TUBE 1-3/8 O.D. X 1/8 WALL X 5/8 LG	1
55	66096-016	SCREW 1/2-13UNC SO HD X 2	1
54	65742-002	VALVE BRACKET X15/19	1
53	65742-001	VALVE BRACKET X15/19	1
52	66322-000	CYLINDER LINK	1
51	63973-001	VALVE N.C.	2
ITEM	PART NO.	PART / MATERIAL DESCRIPTION	QTY

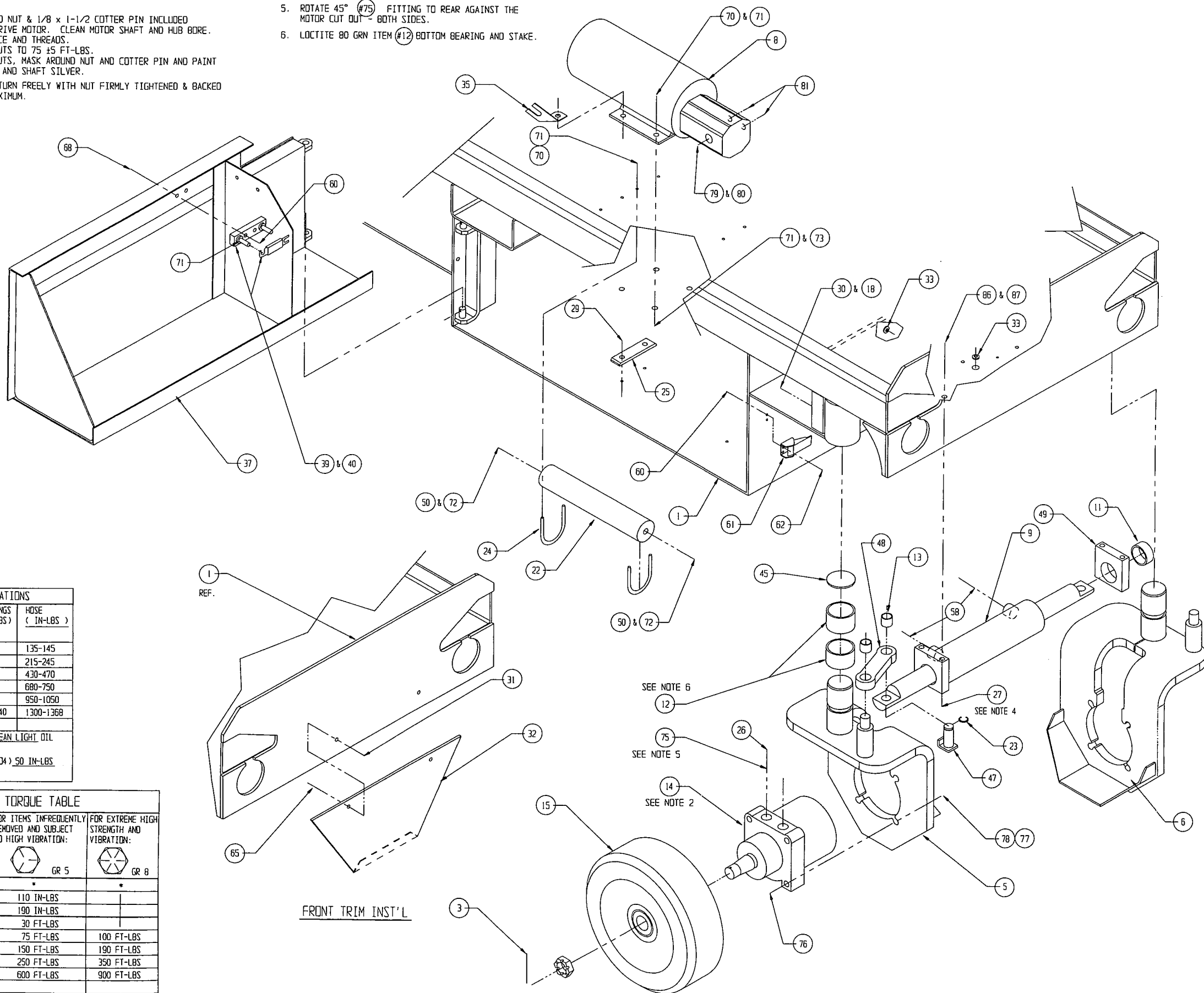
UPRIGHT, INC.

PART NAME					
CHASSIS ASS'Y X15 / 19					
DWG. SIZE	0	OWN BY	JHM	DATE	2/25/98
SCALE	1/4	PART NO.	065602-010	SHEET	2 OF 3

NOTES:

- 1-20 UNEF SLOTTED NUT & 1/8 x 1-1/2 COTTER PIN INCLUDED WITH ITEM (14) DRIVE MOTOR. CLEAN MOTOR SHAFT AND HUB BORE. LUBRICATE NUT FACE AND THREADS. TORQUE SLOTTED NUTS TO 75 ±5 FT-LBS. AFTER TORQUING NUTS, MASK AROUND NUT AND COTTER PIN AND PAINT NUT, COTTER PIN, AND SHAFT SILVER.
- WHEEL (16) MUST TURN FREELY WITH NUT FIRMLY TIGHTENED & BACKED OFF 1-2 SLOTS MAXIMUM.

- INSTALL AS SHOWN TO REDUCE HYDRAULIC HOSE DAMAGE.
- ROTATE 45° (#75) FITTING TO REAR AGAINST THE MOTOR CUT OUT - BOTH SIDES.
- LOCTITE 80 GRN ITEM (#12) BOTTOM BEARING AND STAKE.



TORQUE SPECIFICATIONS			
TYPE SERIES SAE PART	CARTRIDGE POCKET (FT-LBS)	FITTINGS (FT-LBS)	HOSE (IN-LBS)
#4	NA	NA	135-145
#6	NA	10-20	215-245
#8	25-30	25-30	430-470
#10	35-40	35-40	680-750
#12	85-90	85-90	950-1050
#16	130-140	130-140	1300-1368

\* LUBRICATE THREADS WITH CLEAN LIGHT OIL PRIOR TO INSTALLATION  
 \*\* SUBPLATE HARDWARE: 001 (004) 50 IN-LBS  
 \*\*\*COIL NUTS: 30 IN-LBS

FASTENER TORQUE TABLE			
FASTENER GRADE	FOR ITEMS WHICH MUST BE REMOVED FREQUENTLY:	FOR ITEMS INFREQUENTLY REMOVED AND SUBJECT TO HIGH VIBRATION:	FOR EXTREME HIGH STRENGTH AND VIBRATION:
	GR 5	GR 5	GR 8
SIZE:	*	*	*
1/4	75 IN-LBS	110 IN-LBS	
5/16	125 IN-LBS	190 IN-LBS	
3/8	20 FT-LBS	30 FT-LBS	
1/2	50 FT-LBS	75 FT-LBS	100 FT-LBS
5/8	100 FT-LBS	150 FT-LBS	190 FT-LBS
3/4	175 FT-LBS	250 FT-LBS	350 FT-LBS
1	400 FT-LBS	600 FT-LBS	900 FT-LBS

\* VALUES FOR BOLT & NUT WITH WASHERS UNDER BOLT HEAD & NUT.

REVISIONS			
REV	DESCRIPTION	DATE	CHGD. BY
1			

SEE NEXT PAGE

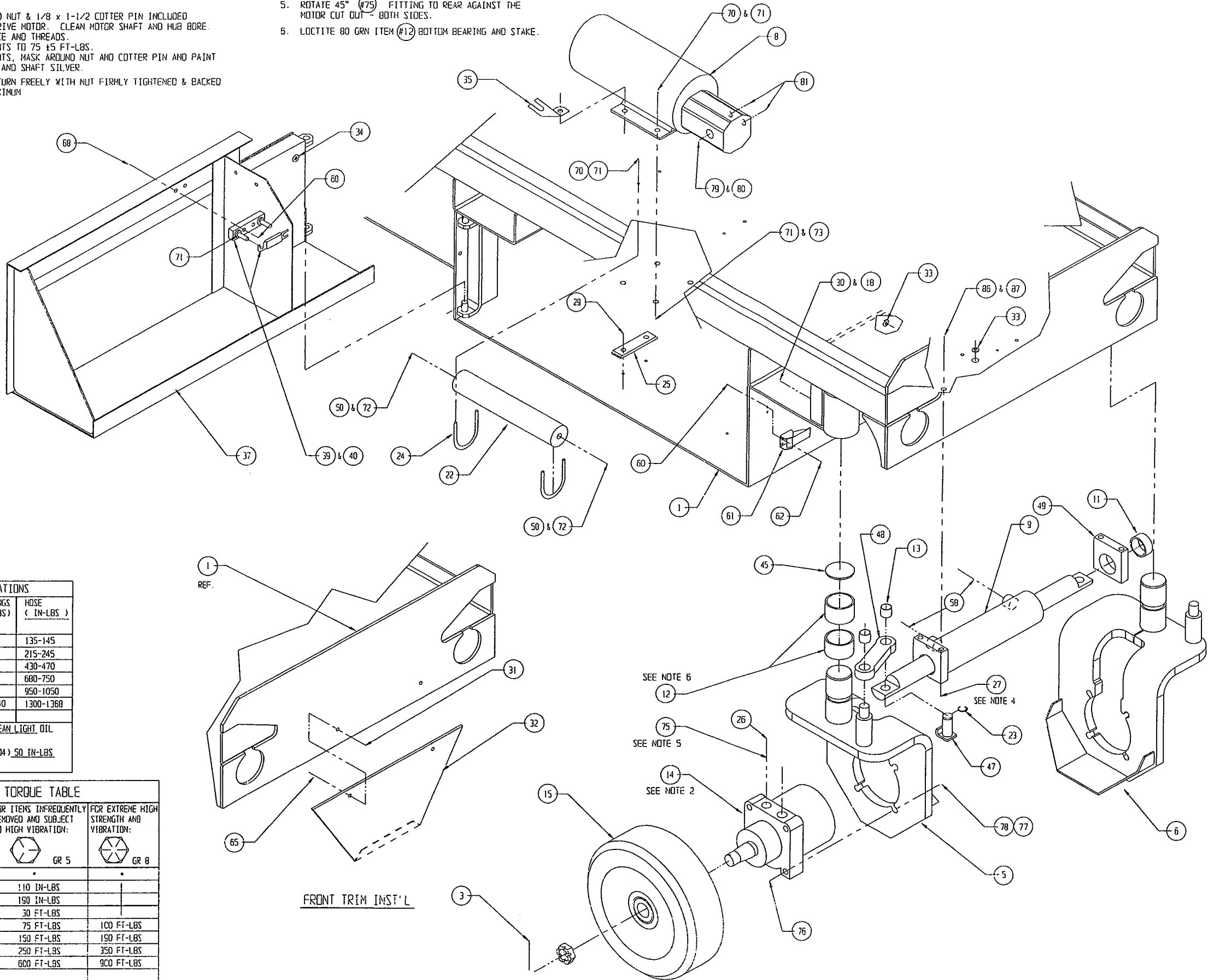
50	65556-000	CUSHION CYLINDER DRIFICE	2
49	65732-000	STEER GUIDE	2
48	65731-000	STEER LINK X15/19	2
47	65800-000	WELDMENT, STEER PIN	2
46			
45	65733-000	THRUST PAD 1/4 UHW	2
44	65737-001	FORKLIFT POCKET	1
43			
42	65736-000	WHEEL COVER L.H. X15/19	1
41			
40	10148-001	FUSE 175 AMP	1
39	10149-000	FUSE BLOCK	1
38			
37	65650-001	TRAY WELDMENT R.H. X15/19	1
36	65617-010	VALVE BLOCK ASS'Y	1
35	63029-000	BUS BAR	1
34			
33	12956-010	GROMMET	2
32	65756-000	FRONT TRIM COVER	1
31	11252-008	SCREW HHC 1/4-20 x 1	6
30	11287-008	SCREW SET 3/8-16 x 1	6
29	26553-004	RVT POP 3/16 DIA. .25-.38 GRIP	8
28			
27	11254-032	SCREW HHC 3/8-16 x 4	4
26	11932-003	FITTING, 45° 6FJX-6MJ	4
25	63728-001	SLIDE BLOCK	4
24	14924-007	U-BOLT	2
23	13315-010	RING, RETAINING "E"	2
22	65396-000	CUSHION CYLINDER	1
21	27931-071	BEARING	2
20	66604-000	BRAKE CYLINDER	1
19	65657-001	TRAY WELDMENT L.H.	1
18	11273-006	NUT HEX 3/8-16 JAM	2
17			
16	65744-000	TOLER WHEEL	2
15	65743-000	DRIVE WHEEL	2
14	61817-002	MOTOR DRIVE	2
13	27931-022	BEARING	4
12	27931-059	BEARING	4
11	27931-072	BEARING	2
10	11781-020	BEARING	4
9	65371-000	STEERING CYLINDER	1
8	15797-000	POWER UNIT	1
7	65637-000	HYDRAULIC TANK ASS'Y X15	1
6	65691-000	YOKE WELDMENT L.H. X15	1
5	65690-000	YOKE WELDMENT R.H. X15	1
4	65685-000	BRAKE ACTUATOR WELDMENT	2
3	11753-012	COTTER PIN 1/8 x 1 1/2	12
2	65678-000	BRAKE PIVOT WELDMENT	1
1	65620-010	CHASSIS WELDMENT X15	1

ITEM	PART NO.	PART / MATERIAL DESCRIPTION	QTY
UP-RIGHT, INC.			
PART NAME CHASSIS ASSY MX15 / 19			
OWN. SIZE 0	OWN BY: JHN	DATE: 2/25/98	APVD BY: DATE:
SCALE: 1/4	PART NO: 065602-010	SHEET 1	OF 3

NOTES:

1. 1-20 UNEF SLOTTED NUT & 1/8 x 1-1/2 COTTER PIN INCLUDED WITH ITEM (14) DRIVE MOTOR. CLEAN MOTOR SHAFT AND HUB BORE. LUBRICATE NUT FACE AND THREADS. TORQUE SLOTTED NUTS TO 75 ±5 FT-LBS. AFTER TORQUING NUTS, MASK AROUND NUT AND COTTER PIN AND PAINT NUT, COTTER PIN, AND SHAFT SILVER.
3. WHEEL (16) MUST TURN FREELY WITH NUT FIRMLY TIGHTENED & BACKED OFF 1-2 SLOTS MAXIMUM

4. INSTALL AS SHOWN TO REDUCE HYDRAULIC HOSE DAMAGE.
5. ROTATE 45° (75) FITTING TO REAR AGAINST THE MOTOR CUT OUT - BOTH SIDES.
6. LOCTITE 80 GRN ITEM (12) BOTTOM BEARING AND STAKE.



TORQUE SPECIFICATIONS			
TYPE	CARTRIDGE POPPET (FT-LBS)	FITTINGS (FT-LBS)	HOSE (IN-LBS)
SERIES SAE PART			
#4	NA	NA	135-145
#6	NA	10-20	215-245
#8	25-30	25-30	430-470
#10	35-40	35-40	680-750
#12	85-90	85-90	950-1050
#16	130-140	130-140	1300-1360

\* LUBRICATE THREADS WITH CLEAN LIGHT OIL PRIOR TO INSTALLATION  
\*\* SUBPLATE HARDWARE: 001 (004) 50 IN-LBS  
\*\*\* COIL NUTS: 30 IN-LBS

FASTENER TORQUE TABLE			
FASTENER GRADE	FOR ITEMS WHICH MUST BE REMOVED FREQUENTLY:	FOR ITEMS INFREQUENTLY REMOVED AND SUBJECT TO HIGH VIBRATION:	FOR EXTREME HIGH STRENGTH AND VIBRATION:
	GR 5	GR 5	GR 8
SIZE:			
1/4	75 IN-LBS	110 IN-LBS	
5/16	125 IN-LBS	190 IN-LBS	
3/8	20 FT-LBS	30 FT-LBS	
1/2	50 FT-LBS	75 FT-LBS	100 FT-LBS
5/8	100 FT-LBS	150 FT-LBS	190 FT-LBS
3/4	175 FT-LBS	250 FT-LBS	350 FT-LBS
1	400 FT-LBS	600 FT-LBS	900 FT-LBS

\* VALUES FOR BOLT & NUT WITH WASHERS UNDER BOLT HEAD & NUT

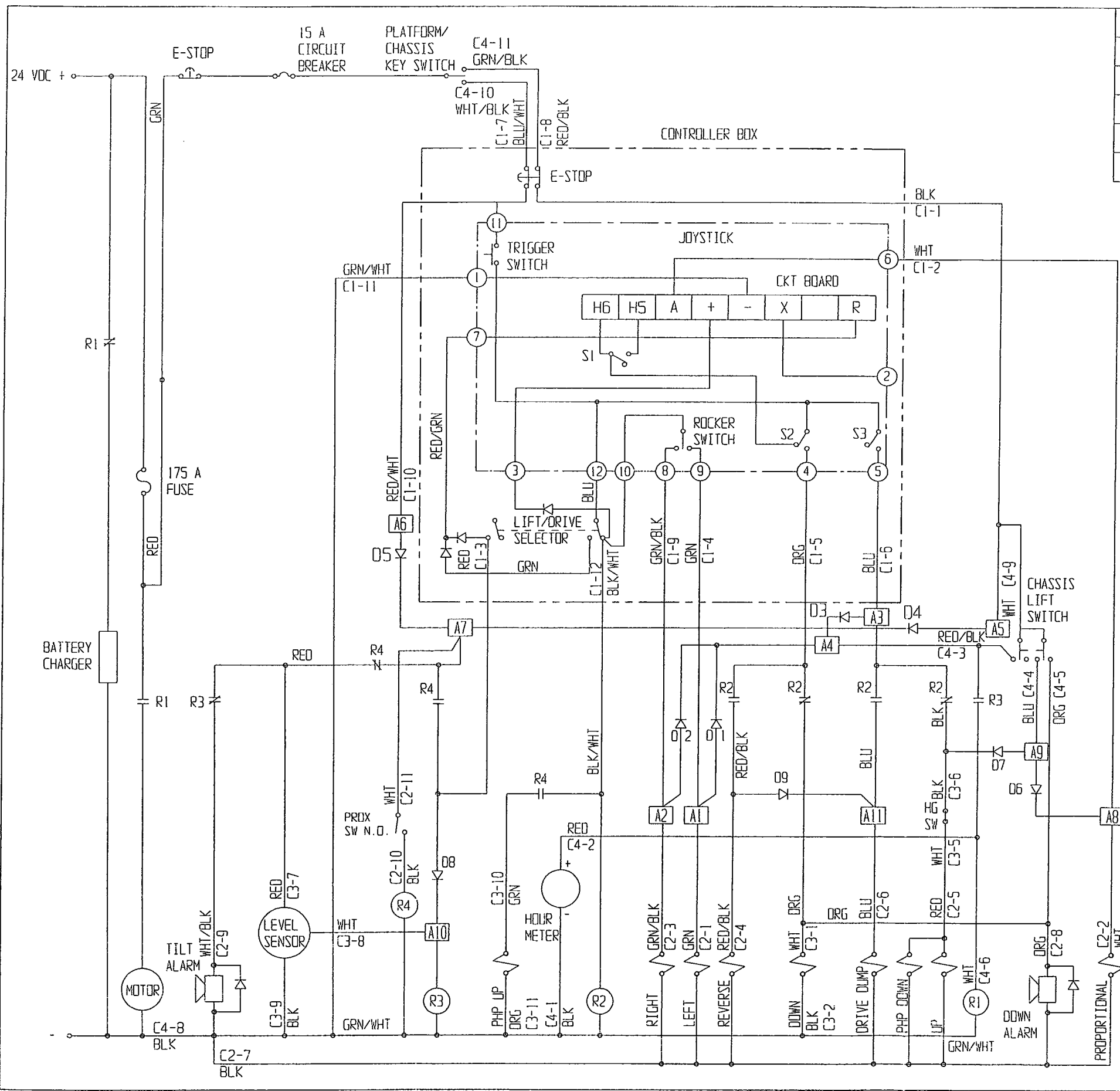
REVISIONS			
REV	DESCRIPTION	DATE	CHGO. BY
1	DELETE P/N 65730-000 & NOTE #1 - ADD P/N 65900-000	04/19/94	RDN
2	DELETE 65604-000 - ADD 65617-000, 65742-001, 65742-002	06/29/94	RDN
3	11754-12 2 EA WAS 4 EA, ADD 11757-10, DELETE 14027-06	08/21/95	JHM
4	ADD 11932-003 QTY 2	1/12/96	GPS
5	ADD 66807-001, 66807-003, 11252-004 & 11240-004	2/18/97	RDN
6	ADD 63029-00	08/11/97	JHM
7	11240-004 QTY 4 WAS 6, DELETED 66807-001, 66807-003 11252-004	12/1/97	P.G.

50	65556-000	CUSHION CYLINDER ORIFICE	2
49	65732-000	STEER GUIDE	2
48	65731-000	STEER LINK X15/19	2
47	65800-000	WELDMENT, STEER PIN	2
46			
45	65733-000	THRUST PAD 1/4 UHMW	2
44	65737-000	FORKLIFT POCKET	1
43			
42	65736-000	WHEEL COVER L.H. X15/19	1
41	65735-000	WHEEL COVER R.H. X15/19	1
40	10148-001	FUSE 175 AMP	1
39	10149-000	FUSE BLOCK	1
38			
37	65650-000	TRAY WELDMENT R.H. X15/19	1
36	65617-000	VALVE BLOCK ASS'Y	1
35	63029-000	BUS BAR	1
34	14252-004	INSERT 1/4-20	2
33	12956-010	GROMMET	2
32	65756-000	FRONT TRIM COVER	1
31	11252-008	SCREW HHC 1/4-20 x 1	4
30	11287-008	SCREW SET 3/8-16 x 1	2
29	26553-004	RVT PDP 3/16 DIA. .25-.38 GRIP	8
28			
27	11254-032	SCREW HHC 3/8-16 x 4	4
26	11932-003	FITTING, 45° 6FJX-6MJ	4
25	63728-001	SLIDE BLOCK	4
24	14924-007	U-BOLT	2
23	13315-010	RING, RETAINING 'E'	2
22	65396-000	CUSHION CYLINDER	1
21	27931-071	BEARING	2
20	66604-000	BRAKE CYLINDER	1
19	65657-000	TRAY WELDMENT L.H.	1
18	11273-006	NUT HEX 3/8-16 JAM	2
17	11254-008	SCREW HHC 3/8-16 x 1	2
16	65744-000	ISLER WHEEL	2
15	65743-000	DRIVE WHEEL	2
14	61817-002	MOTOR DRIVE	2
13	27931-022	BEARING	4
12	27931-059	BEARING	4
11	27931-072	BEARING	2
10	11781-020	BEARING	4
9	65371-000	STEERING CYLINDER	1
8	15797-000	POWER UNIT	1
7	65637-000	HYDRAULIC TANK ASS'Y X15	1
6	65691-000	YOKE WELDMENT L.H. X15	1
5	65690-000	YOKE WELDMENT R.H. X15	1
4	65685-000	BRAKE ACTUATOR WELDMENT	2
3	11753-012	COTTER PIN 1/8 X 1 1/2	2
2	65678-000	BRAKE PIVOT WELDMENT	1
1	65620-000	CHASSIS WELDMENT X15	1

ITEM	PART NO.	PART / MATERIAL DESCRIPTION	QTY
LIP-RIGHT, INC.			
PART NAME			
CHASSIS ASSY MX15 / 19			
DRG. NO.	0	OWN BY:	JHM
DATE:	11/29/93	APPRO BY:	
DATE:		CHKD BY:	
DATE:			
SCALE	1/4	PART NO.	65602-000
		SHEET	1 OF 2







REVISIONS			
REV	DESCRIPTION	DATE	CHGD. BY
1			

NOTE:

1. TERMINAL X AND THE BOARD IS ENERGIZED WHEN S1 IS ACTIVATED.
2. COLORS SHOWN NEXT TO CONNECTOR NUMBER REFER TO THE CABLE WIRES EXTERNAL TO THE LOWER BOX.

### LEGEND

[A#] CHASSIS CONTROL BOX TERMINAL STRIP

C#-# CHASSIS CONTROL BOX CONNECTOR DESIGNATION. FIRST # IS THE CONNECTOR NUMBER - SECOND # IS THE PIN NUMBER.

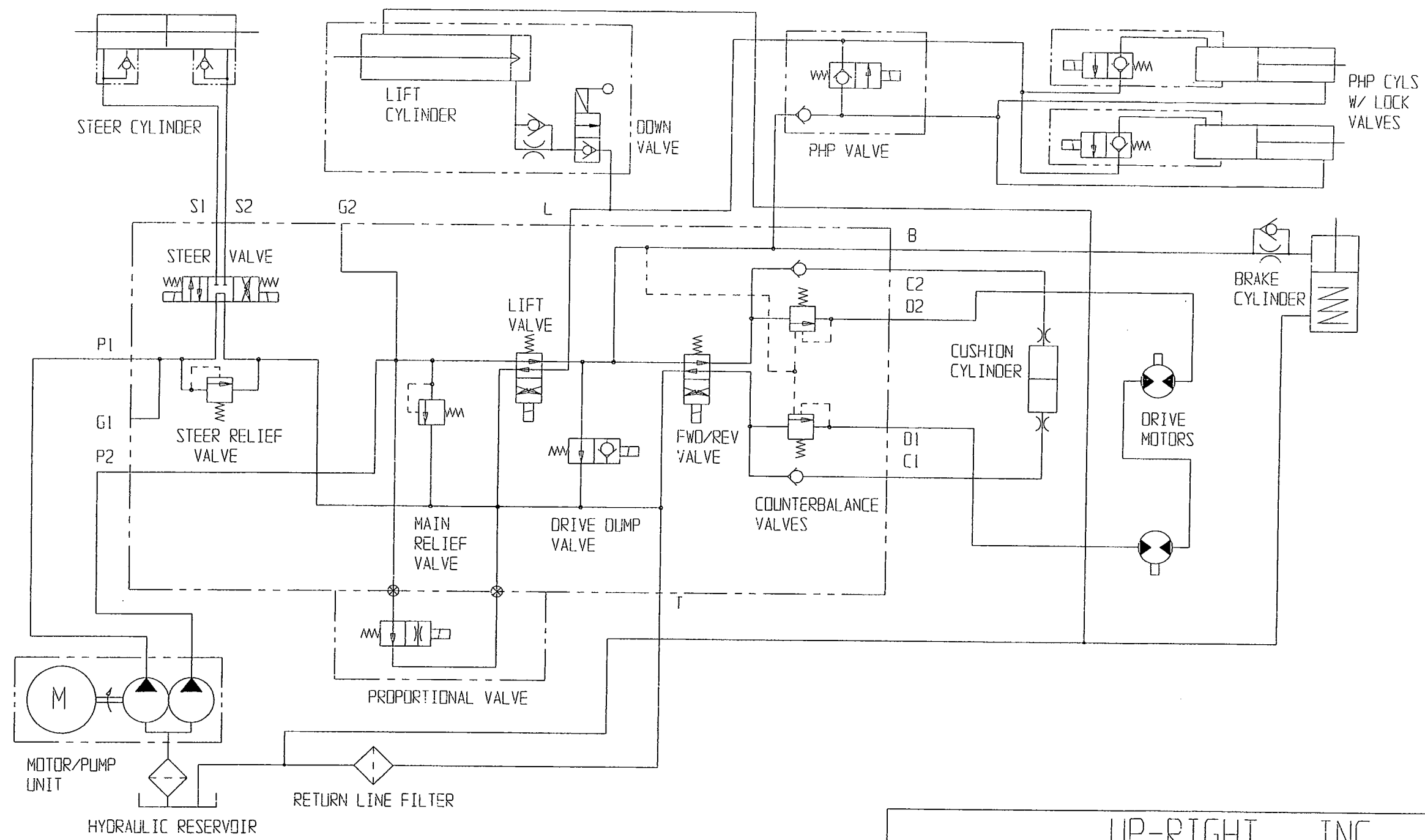
VALVE COIL

R# RELAY CONTACT N/O

R# RELAY CONTACT N/C

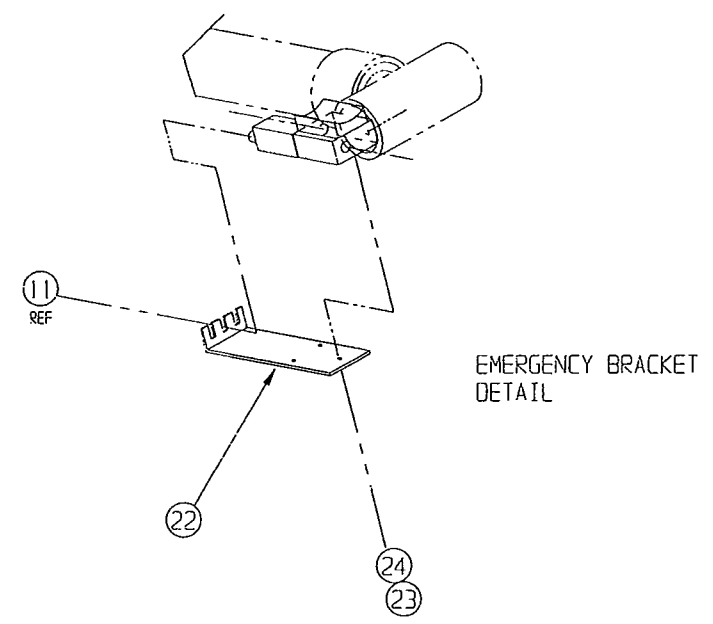
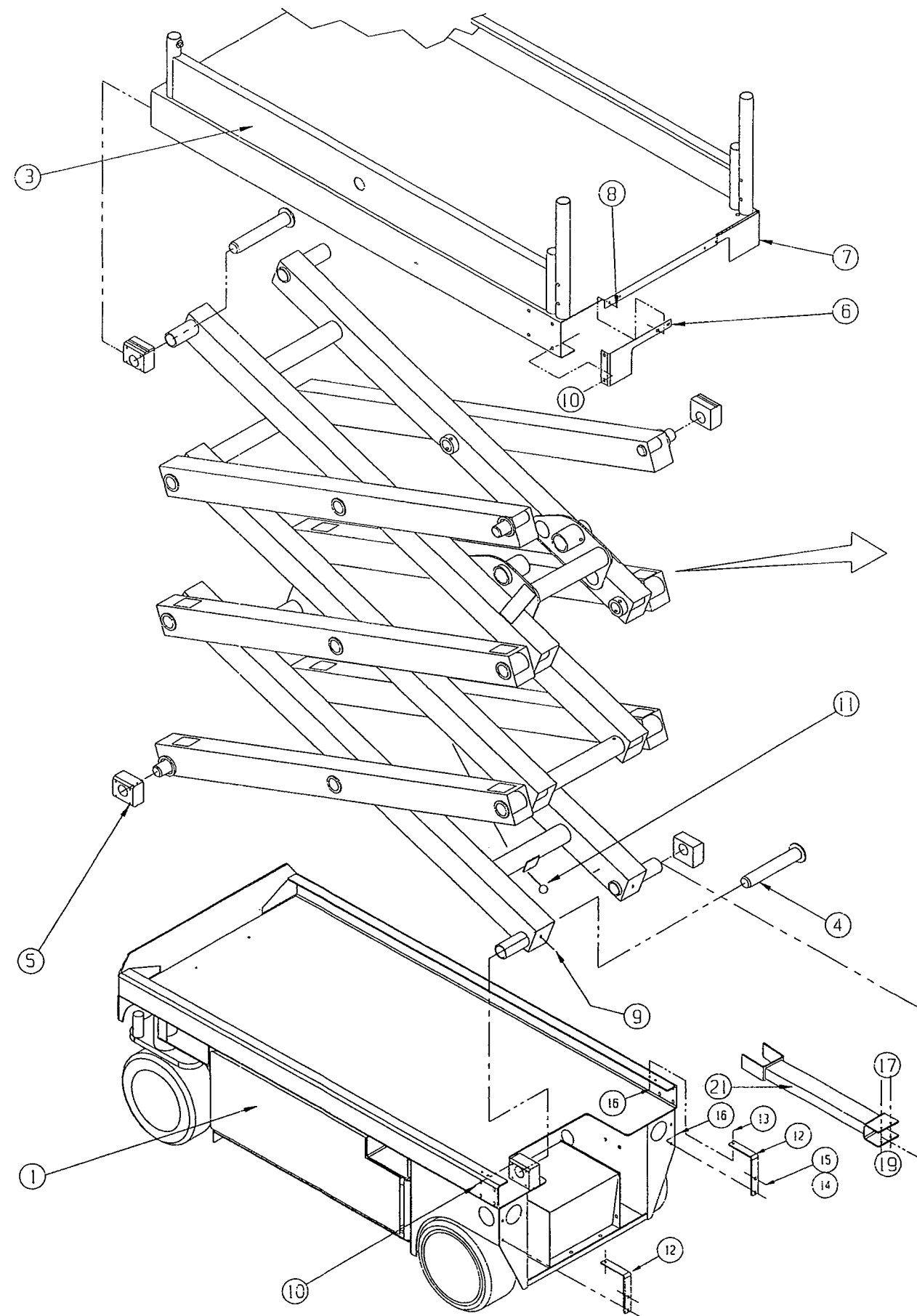
(R#) RELAY COIL

UP-RIGHT, INC.						
PART NAME		ELECTRICAL SCHEMATIC				
		PROPORTIONAL VALVE BLOCK - X15 X19 DOMESTIC				
DWG. SIZE	DWN BY:	DATE:	APVD BY:	DATE:	CHKD BY:	DATE:
B	RDN	5/10/94				
SCALE: 1/4		PART NO: 65616-020		SHEET 1 OF 1		



REVISIONS			
REV	DESCRIPTION	DATE	CHGD. BY

UP-RIGHT, INC.						
PART NAME						
HYDRAULIC SCHEMATIC MX 15/19 DOM/EURO						
DWG. SIZE	B	OWN BY:	RDN	DATE:	5/25/94	APVD BY:
SCALE:	1/2	PART NO.	65615-020-00	DATE:		CHKD BY:
				DATE:		
			SHEET	1	OF	1



REVISIONS			
REV	DESCRIPTION	DATE	CHG. BY
1			

28			
27			
26			
25			
24	11238-004	LOCKWASHER 1/4	3
23	11252-004	SCREW HHC 1/4-20 x 1/2	3
22	65770-000	CABLE BRKT EMER LOWER	1
21	65764-000	SCISSOR CHOCK WELDMENT X15/19	1
20			
19	11248-004	LOCK NUT HEX 1/4-20	2
18			
17	11252-022	SCREW HHC 1/4-20 x 2-3/4	2
16	11248-006	NUT HEX ESNA 1/4-20UNC	8
15	11240-006	WASHER 3/8 STD FLAT	4
14	11254-014	SCREW HHC 3/8-16UNC X 1 3/4	4
13	11254-034	SCREW HHC 3/8-16UNC X 4 1/4	2
12	65937-001	BEARING RETENTION ANGLE	2
11	65754-000	EMERGENCY LOWERING CABLE	1
10	14066-008	SCREW SLFTP 1/4-AB x 1	16
9	11739-020	ROLLPIN 3/8 DIA. x 2 1/2	4
8	14027-006	SCREW HHD SLFTP 1/4-28 x 3/4	4
7	65727-000	DECK BRACKET R.H.	1
6	65728-000	DECK BRACKET L.H.	1
5	65726-000	SLIDE PAD	8
4	65698-000	LOWER PIVOT PIN WELDMNT	4
3	66250-001	PLATFORM WELDMNT	1
2	65605-000	SCISSOR ARM ASS'Y X15	1
1	65602-010	CHASSIS ASS'Y	1

FASTENER TORQUE TABLE			
FASTENER GRADE	FOR ITEMS WHICH MUST BE REMOVED FREQUENTLY: GR 5	FOR ITEMS INFREQUENTLY REMOVED AND SUBJECT TO HIGH VIBRATION: GR 5	FOR EXTREME HIGH STRENGTH AND VIBRATION: GR 8
SIZE:			
1/4	75 IN-LBS	110 IN-LBS	
5/16	125 IN-LBS	190 IN-LBS	
3/8	20 FT-LBS	30 FT-LBS	
1/2	50 FT-LBS	75 FT-LBS	100 FT-LBS
5/8	100 FT-LBS	150 FT-LBS	190 FT-LBS
3/4	175 FT-LBS	250 FT-LBS	350 FT-LBS
1	400 FT-LBS	600 FT-LBS	900 FT-LBS

ITEM NO.		PART NO.	PART / MATERIAL DESCRIPTION	QTY
Upright				
PART NAME				
BASIC ASSEMBLY MX15				
OWN BY:	DATE:	APPRO BY:	DATE:	CHKD BY: DATE:
JHM	1/26/98			
SCALE:	1/8	DWG SIZE:	D	PART NO: 065601-010 SHEET 1 OF 1