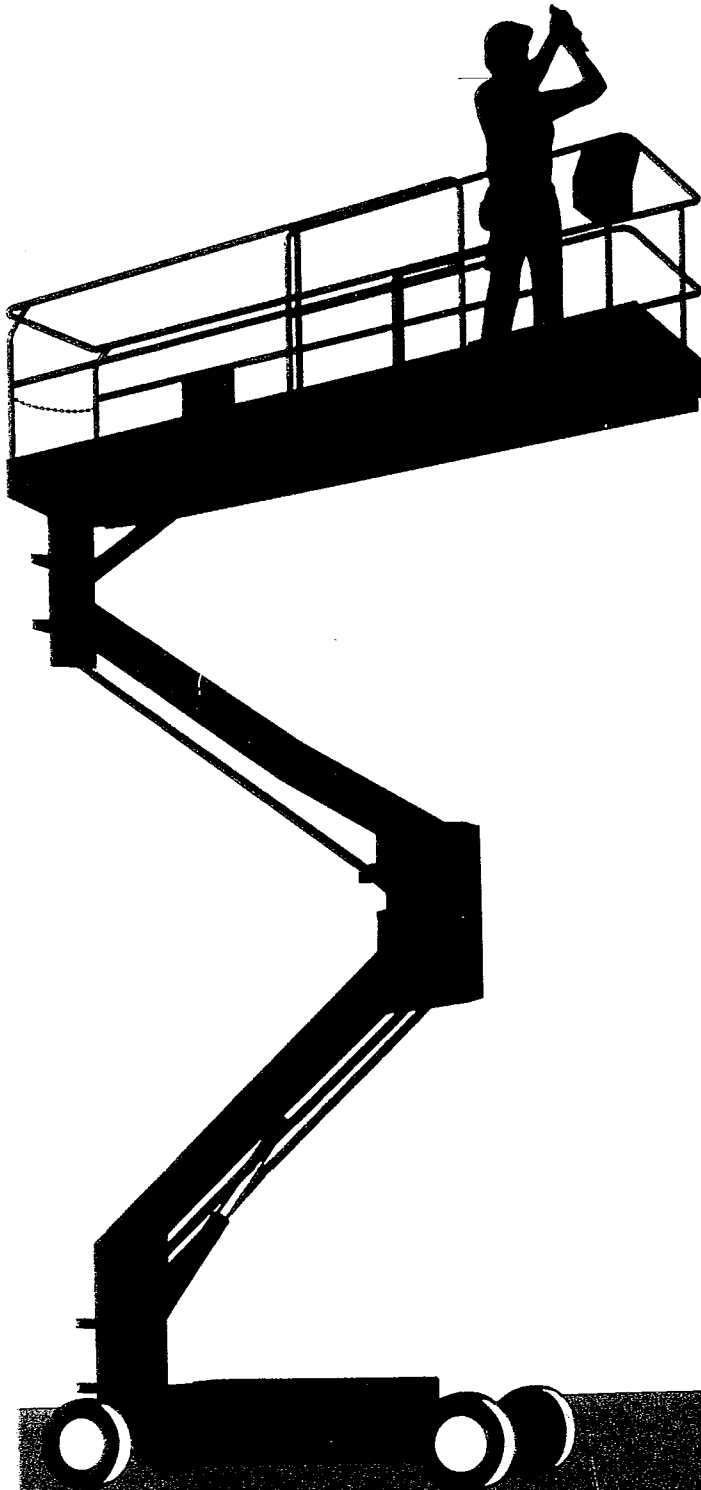


UpRight



S120

WORK PLATFORMS

**Service &
Parts Manual**



Forward



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 <i>will</i> result in severe injury or death. |

| |
|--|
|  WARNING  |
| Indicates the hazard or unsafe practice <i>could</i> result in severe injury or death. |

| |
|--|
|  CAUTION  |
| Indicates the hazard or unsafe practice could result in <i>minor</i> 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.

Forward

NOTES

Contents

Table of Contents

| Section No. | Page No. | Section No. | Page No. |
|--|----------|---|----------|
| 1.0 Introduction & Specifications | | | |
| 1.0 Introduction | 1-1 | 4.4 Lubrication | 4-5 |
| Purpose | 1-1 | Linkage Gears | 4-5 |
| Scope | 1-1 | Hydraulic Oil Tank and Filter | 4-6 |
| 1.1 General Information | 1-1 | Fluid Level | 4-6 |
| Description | 1-1 | Oil and Filter Replacement | 4-6 |
| Purpose and Limitations | 1-1 | 4.5 Setting Hydraulic Pressures | 4-6 |
| 1.2 Specifications | 1-2 | Main Relief Valve | 4-6 |
| 2.0 Machine Preparation | | Steering Relief Valve | 4-7 |
| 2.1 Preparation for Use | 2-1 | Counterbalance Valves | 4-7 |
| 2.2 Preparation For Shipment | 2-1 | 4.6 Switch Adjustments | 4-8 |
| 2.3 Forklifting Of Work Platform | 2-2 | Down Limit Switch | 4-8 |
| 2.4 Lifting Work Platform | 2-2 | Tilt Sensor | 4-8 |
| 2.5 Transport | 2-2 | Introduction | 4-8 |
| 2.6 Storage | 2-2 | Adjustment | 4-8 |
| Preservation | 2-2 | Proportional Control Adjustment | 4-9 |
| Batteries | 2-2 | 4.7 Hydraulic Manifold | 4-10 |
| 3.0 Operation | | Removal | 4-10 |
| 3.0 Introduction | 3-1 | Disassembly | 4-10 |
| General Functioning | 3-1 | Cleaning and Inspection | 4-10 |
| Driving | 3-1 | Assembly | 4-10 |
| Steering | 3-1 | Installation | 4-10 |
| Raising and Lowering the Platform | 3-1 | 4.8 Hydraulic Pump | 4-12 |
| Design Features | 3-1 | Removal | 4-12 |
| 3.1 Safety Rules and Precautions | 3-2 | Installation | 4-12 |
| 3.2 Controls and Indicators | 3-2 | 4.9 Hydraulic Drive Motors and Hubs | 4-12 |
| Platform/Controller | 3-2 | Removal | 4-12 |
| Chassis | 3-3 | Installation | 4-12 |
| 3.3 Pre-Operation Inspection | 3-4 | 4.10 Wheel Bearings | 4-13 |
| 3.4 Operation | 3-5 | Removal | 4-13 |
| Travel With Platform Lowered | 3-5 | Installation | 4-13 |
| Steering | 3-5 | 4.11 Brake Cylinder | 4-14 |
| Elevating Platform | 3-5 | Removal | 4-14 |
| Travel With Platform Elevated | 3-5 | Disassembly | 4-14 |
| Lowering Platform | 3-5 | Cleaning and Inspection | 4-14 |
| Emergency Lowering | 3-5 | Assembly and Installation | 4-14 |
| After Use Each Day | 3-6 | 4.12 Steering Cylinder | 4-14 |
| Brake Release Pump (Optional) | 3-6 | Removal | 4-14 |
| Fold Down Guardrails | 3-6 | Disassembly | 4-14 |
| Fold Down Procedure | 3-6 | Cleaning and Inspection | 4-14 |
| Erection Procedure | 3-6 | Assembly and Installation | 4-14 |
| 4.0 Maintenance | | 4.13 Lift Cylinder | 4-14 |
| 4.0 Introduction | 4-1 | Removal | 4-14 |
| Special Tools | 4-1 | Disassembly | 4-14 |
| 4.1 Preventative Maintenance | 4-1 | Cleaning and Inspection | 4-14 |
| Preventative Maintenance Table Key | 4-2 | Reassembly | 4-14 |
| Preventative Maintenance Report | 4-2 | Installation | 4-14 |
| 4.2 Blocking Elevating Assembly | 4-3 | 4.14 Electric Motor | 4-14 |
| Installation | 4-3 | Troubleshooting | 4-14 |
| Removal | 4-3 | Disassembly | 4-14 |
| 4.3 Battery Maintenance | 4-3 | Inspection | 4-14 |
| Battery Inspection and Cleaning | 4-3 | Reassembly | 4-14 |
| Battery Charging | 4-4 | 4.15 Torque Specifications | 4-14 |
| Battery Cell Equalization | 4-4 | Fasteners | 4-14 |
| | | Hydraulic Components | 4-14 |
| | | 5.0 Troubleshooting | |
| | | 5.0 Introduction | 5-1 |
| | | General Procedure | 5-1 |

Table of Contents (cont'd.)

| Section No. | | Page No. |
|-------------|-------------------------------------|----------|
| 6.0 | Schematics | |
| 6.0 | Introduction | 6-1 |
| 6.1 | Electrical Schematic | 6-2 |
| 6.2 | Hydraulic Schematic | 6-4 |
| 7.0 | Illustrated Parts Breakdown | |
| 7.0 | Introduction | 7-1 |
| 7.1 | Index | 7-1 |
| 7.2 | Illustrated Parts | |
| | Final Assembly | 7-2 |
| | Elevating Assembly | 7-6 |
| | Chassis Assembly | 7-8 |
| | Control Module Assembly | 7-10 |
| | Control Valve Assembly | 7-14 |
| | Power Module Assembly | 7-16 |
| | Guardrail Assembly | 7-18 |
| | Slideout Deck Assembly | 7-20 |
| | Controller Assembly | 7-22 |
| | Hose Kit | 7-24 |
| | Label Kit | 7-26 |
| | Air To Platform - Option | 7-28 |
| | Power To Platform - Option | 7-29 |
| | Beacon Assembly - Option | 7-30 |
| | Horn Assembly - Option | 7-32 |
| | Voltage/Hour Meter - Option | 7-33 |
| | Hour Meter - Option | 7-34 |
| | Brake Release Kit - Option | 7-35 |
| | Alarm (Fwd/Rev/Up) - Option | 7-36 |
| | Removable Controller - Option | 7-37 |
| | 800w Generator - Option | 7-38 |

List of Illustrations

| Fig. | Title | Page |
|-------|---|------|
| 1-1: | SL20 Series Work Platform | 1-1 |
| 2-1: | Power Module, Left Side | 2-1 |
| 2-2: | Transporting the SL20 | 2-2 |
| 3-1: | Controls and Indicators | 3-3 |
| 3-2: | Optional Brake Release Pump | 3-6 |
| 4-1: | Blocking the Elevating Assembly | 4-3 |
| 4-2: | Battery Charger | 4-4 |
| 4-3: | Lubrication Points | 4-5 |
| 4-4: | Hydraulic Oil Tank and Filter | 4-6 |
| 4-5: | Hydraulic Manifold | 4-7 |
| 4-6: | Down Limit Switch | 4-8 |
| 4-7: | Tilt Sensor Adjustment | 4-8 |
| 4-8: | Proportional Controller Adjustment | 4-9 |
| 4-9: | Hydraulic Manifold, Exploded View | 4-11 |
| 4-10: | Hydraulic Pump | 4-12 |
| 4-11: | Drive Motor Installation | 4-13 |
| 4-12: | Wheel Bearings | 4-13 |
| 4-13: | Brake Cylinder | 4-14 |
| 4-14: | Steering Cylinder | 4-15 |
| 4-15: | Lift Cylinder Installation | 4-16 |
| 4-16: | Electric Motor Service | 4-19 |
| 6-1: | Relay and Terminal Strip Identification | 6-3 |
| 6-2: | Electrical Schematic | 6-3 |
| 6-3: | Hydraulic Schematic | 6-5 |
| 6-4: | Hydraulic Manifold | 6-5 |

List of Tables

| Table | Title | Page |
|-------|-----------------------------------|------|
| 1-1: | Specifications | 1-2 |
| 3-1: | Controls and Indicators | 3-2 |
| 4-1: | Preventative Maintenance | 4-2 |
| 4-2: | Bolt Torque | 4-19 |
| 4-3: | Hydraulic Component Torque | 4-19 |
| 5-1: | Troubleshooting | 5-2 |
| 6-1: | Electrical Schematic Legend | 6-2 |
| 6-2: | Hydraulic Schematic Legend | 6-4 |

1.0 Introduction

PURPOSE

This manual provides illustrations and instructions for the operation and maintenance of the SL20 Series Work Platforms manufactured by UpRight, Inc. Selma, California. (See Figure 1-1).

SCOPE

This manual includes both operation and maintenance responsibilities concerning the SL20 Series Work Platform's readiness. The Maintenance Section covers scheduled maintenance, troubleshooting, repair, adjustment and replacement.

1.1 General Information

DESCRIPTION

The SL20 Series Work Platform is a self-propelled aerial work platform designed to be used as a means of elevating personnel and equipment and to provide a mobile work platform. They are designed to provide mobility with the platform 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 SL20 Series 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.

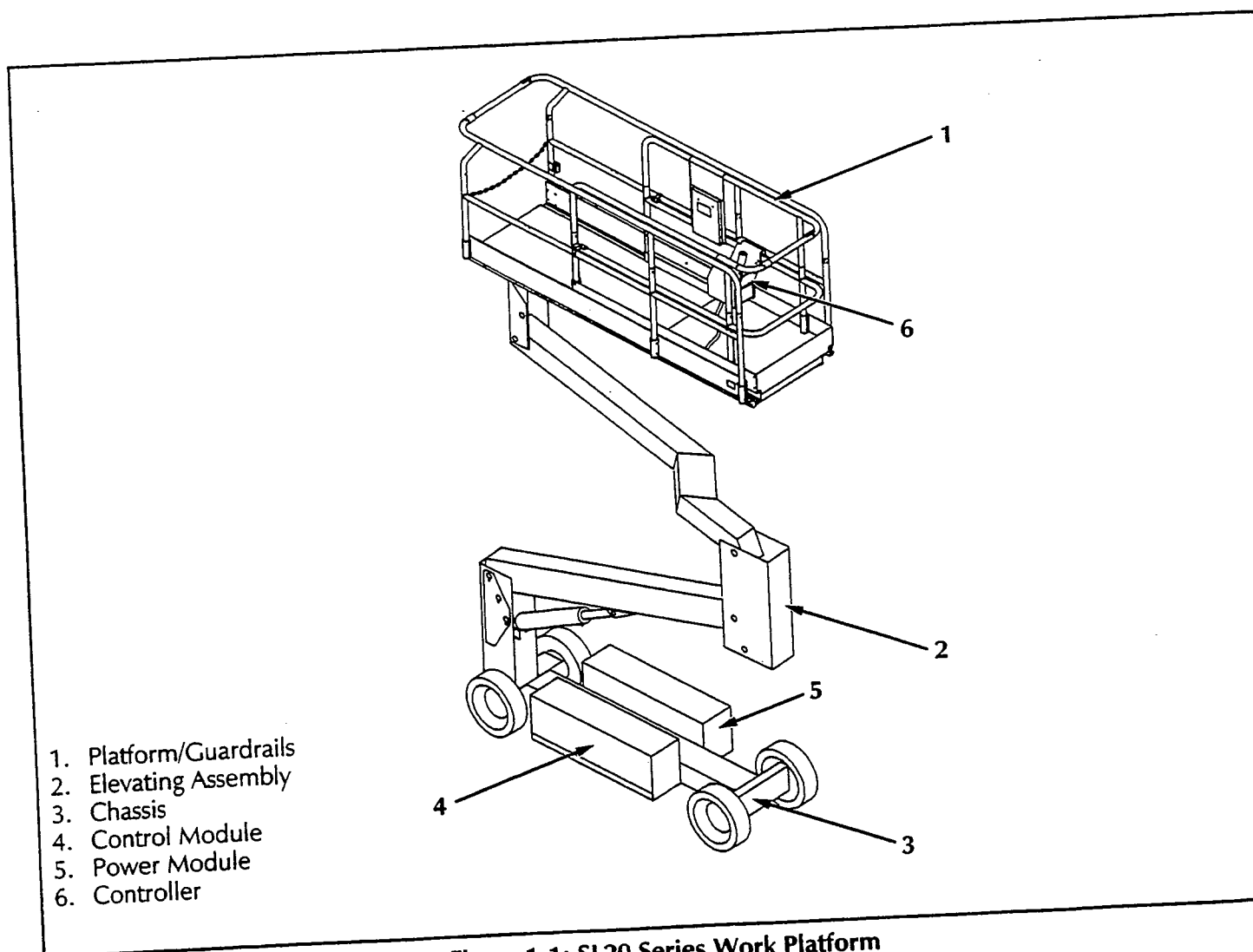


Figure 1-1: SL20 Series Work Platform

1.2 Specifications*

Table 1-1: Specifications

| ITEM | SL20 |
|--|--|
| Platform Size | 27.75" x 96" [.70 m x 2.44 m] Inside Toeboards |
| Max. Platform Capacity Standard w/ Deck Extension w/o Deck Extension on Extension | 650 lbs. [295 kg] 750 lbs. [340 kg] 250 lbs. [110 kg] |
| Max. No. of occupants Standard w/ Deck Extension w/o Deck Extension on Extension | 2 People 3 People 1 Person |
| Height Working Height Max. Platform Height | 26 ft. [7.92 m] 20 ft. [6.10 m] |
| Dimensions Weight Overall Width Overall Height Overall with guardrails folded Overall Length | 3,127 lbs. [1423 kg] 33 in. [.84 m] 92.5 in. [2.35 m] 79.5 in. [2.02 m] 104.25 in. [2.65 m] |
| Driveable Height | 20 ft. [6.10 m] Standard |
| Surface Speed-maximum Platform Lowered Platform Raised | 2.3 mph [3.70 km/h] 0.7 mph [1.13 km/h] |
| Energy Source | 24 Volt Battery Pack (4-220 Amp Hour, 6 Volt Batteries, Min. Wt. 62 lbs. each), 4 HP DC Electric Motor |
| System Voltage | 24 Volt DC |
| Battery Charger | 25 AMP |
| Battery Duty Cycle | 25% for 8 Hours |
| Hydraulic Tank Capacity | 4 Gallons [15.2 l] |
| Max. Hydraulic System Pressure | 2000 psi [183 bar] |
| Hydraulic Fluid Normal temp. (>32 °F [0 °C]) Low temp. (-10 to 32 °F [-23 to 0 °C]) | ISO #46 5W-20 Motor Oil |
| Lift System | Single Lift Cylinder |
| Drive Control | Proportional |
| Control System | Proportional Joystick Controller with Interlock Lever, Toggle Selector Switch, and Red Mushroom Emergency Stop Switch |
| Horizontal Drive | Dual Rear Wheel Hydraulic Motors |
| Tires | 16 in. [410 mm] Diameter Solid Rubber, non-marking |
| Parking Brake | Spring Applied, Hydraulic Release |
| Turning Radius | 55 in. [1.40 m] Inside |
| Maximum Gradeability | 25% [14°] |
| Wheel Base | 73 in. [1.85 m] |
| Guardrails | 44.88 in. [1.14 m] |
| Toeboard | 6 in. [152 mm] |

*Specifications subject to change without notice.

Read and familiarize yourself with all operating instructions before attempting to operate machine.

2.1 Preparation for Use

⚠ WARNING ⚠

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

1. Remove the metal banding from the module covers and elevating assembly.
2. Remove the banding from the controller.
3. Lift the front of the machine and remove banding and blocks from front wheels.
4. Lower machine.
5. Connect the negative battery cable to the terminal (Figure 2-1).

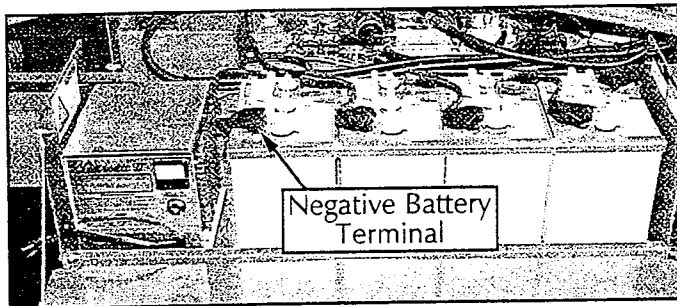


Figure 2-1: Power Module, Left Side

2.2 Preparation For Shipment

1. Lubricate machine per lubrication instructions in Section 4.0, Maintenance.
2. Fully lower the platform.
3. Disconnect the negative (-) battery cable from the battery terminal (Figure 2-1).
4. Band the controller to the guardrail.
5. Band the elevating assembly to the frame just behind the front wheels.

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 modules (Figure 2-2).

2.4 Lifting Work Platform

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

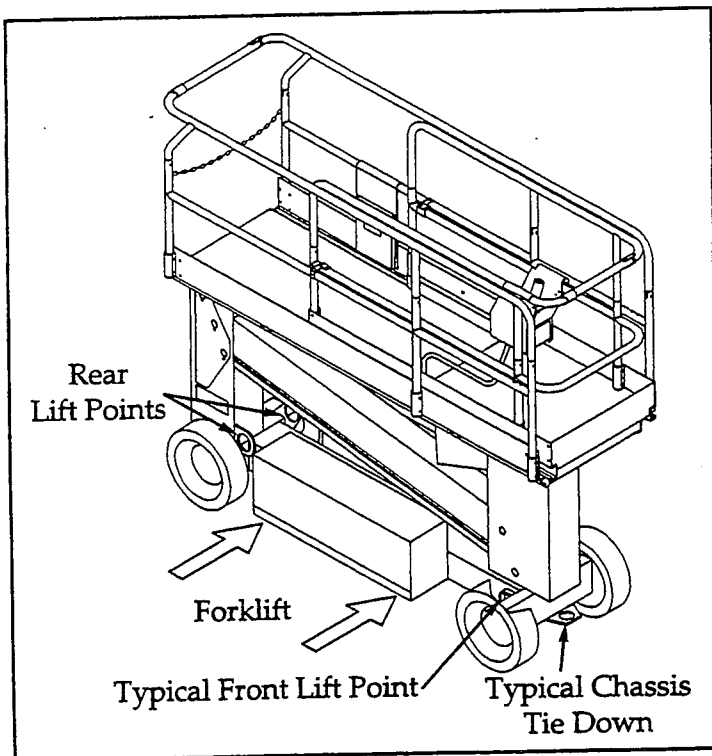


Figure 2-2: Transporting the SL20

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 lugs (Figure 2-2).

| | | |
|---|----------------|---|
| ▲ | CAUTION | ▲ |
| Tie down lugs are not to be used to lift work platform. | | |
| Overtightening of chains or straps through 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 exposed portion of extended cylinder rod with a preservative such as multipurpose grease and wrap with barrier material.
4. Coat all exposed unpainted metal surfaces with preservative.

BATTERIES

1. Disconnect the battery ground cable 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

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 out), the key switch on **DECK**, 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 R2 NO contacts and the motor start relay through R3 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 drive/lift valve to the brake cylinder and through the forward/reverse valve to the hydraulic motors through the counterbalance valves 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 joystick controller high speed enable circuit ('R' terminal) is no longer supplied with power by the down limit switch, thus limiting the machine to a lower speed. The motor start relay is still energized through R3 NO contacts as long as the machine is level but R3 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 out), 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 through R2 NC contacts and motor relay

through R3 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 6-8 in. (15-20 cm) 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 SL20 Series Work Platform has the following features:

- 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 6-8 inches (15-20 cm) of platform lowering, the oils flows through the lift cylinder internal cushion orifice to slow the platform even further (cushion speed). The lift cylinder is equipped with a holding valve to prevent descent should a hose rupture.
- The chassis is equipped with passive pothole protection system.
- Parking brake is automatically engaged when the machine comes to a full stop or if power is lost.
- The chassis controls and controller are equipped with an emergency stop switch for stopping all powered functions.
- The interlock lever must be depressed for the controller to function.
- The controller is guarded to prevent inadvertent operation.
- An alarm is provided to signal when the platform lowering.
- A lift switch is located in the control module 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 machine is elevated.
- An emergency lowering valve is provided at the base of the lift cylinder to lower the platform in the event electrical power is lost.

3.1 Safety Rules and Precautions

Before using the SL20 Series Work Platform:

- NEVER** operate the machine within ten feet of power lines. **THIS MACHINE IS NOT INSULATED.**
- NEVER** elevate the platform or drive the machine while elevated unless the machine is on a firm level surface.
- NEVER** sit, stand or climb on guardrail or midrail.
- NEVER** operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps and debris before operating machine.
- NEVER** operate the machine unless all guardrails are properly in place and secured with all fasteners in place.
- 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** perform service on or in the elevating assembly 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 manufacturer's consent.

3.2 Controls and Indicators

The controls and indicators for operation of the SL20 Series Work Platform are shown in Figure 3-1. The name and function of each control and indicator 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 | INTERLOCK LEVER | Provides power to the controller 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 out to provide power (ON). |
| 3 | CONTROL LEVER | Move joystick forward or backwards to proportionally control drive/lift speeds depending on position of drive/lift switch. |
| 4 | STEERING SWITCH | Moving the momentary rocker switch right or left steers the work platform in that direction. Although the steering switch is self centering the steering system is not. The wheels must be steered back to straight. |
| 5 | DRIVE/LIFT SWITCH | Selecting DRIVE allows the work platform to move forward or reverse. Selecting LIFT allows the platform to raise or lower. |

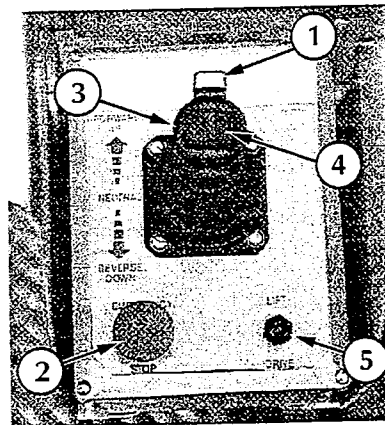
Operation

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

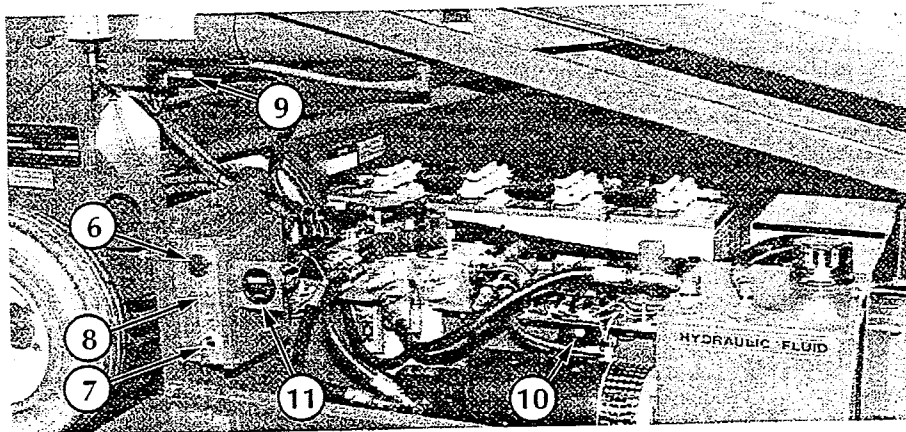
Chassis

| 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 | KEY SWITCH | Turn key clockwise to DECK to provide power to controller and counterclockwise to CHASSIS to provide power to chassis controls. |
| 8 | CHASSIS LIFT SWITCH | Push switch to UP to lift the platform and to DOWN to lower the platform. |
| 9 | EMERGENCY LOWERING VALVE | Pull knob out to lower the platform. Release knob to close valve. The platform cannot be raised unless this valve is closed. |

| INDEX NO. | NAME | FUNCTION |
|-----------|--|---|
| 10* | DOWN ALARM (60Hz) TILT ALARM (600 Hz) | Produces an audible signal when the platform is lowering during normal operation. If the emergency lowering valve is used the alarm does not sound. Produces an audible signal when the platform is elevated and on a slope of 2° side to side or fore and aft. * Both alarms are in the same unit. |
| 11 | VOLT/HOUR METER (OPTIONAL) | Indicates state of battery charge and hours electric motor has operated. |



Controller



Control Module, Right Side

Figure 3-1: Controls and Indicators

3.3 Pre-Operation Inspection

Read, understand and follow all safety rules and operating instructions and then perform the following steps each day before use.

1. Open module covers and inspect for damage, oil leaks or missing parts.
2. Check the level of the hydraulic oil with the platform fully lowered. Oil should be visible on the dipstick. Add ISO #46 hydraulic oil if necessary.
3. Check that fluid level in the batteries is correct (see *Section 4.3 Battery Maintenance*).
4. Verify batteries are charged.
5. Check that AC extension cord has been disconnected from charger.
6. Check that all guardrails are in place with fasteners properly tightened.
7. 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.
8. Move machine, if necessary, to unobstructed area to allow for full elevation.
9. Pull out on chassis and platform emergency stop buttons to turn ON (Figure 3-1).
10. Turn the chassis key switch (Figure 3-1) to **CHASSIS**.
11. Push chassis lift switch (Figure 3-1) to **LIFT** position and fully elevate platform.
12. Visually inspect the elevating assembly, lift cylinder, cables and hoses for damage or erratic operation. Check for missing or loose parts.
13. Partially lower the platform by pushing chassis lift switch to **LOWER**, and check operation of the audible lowering alarm.
14. Pull out on the chassis emergency lowering valve knob (Figure 3-1) to check for proper operation. Once the platform is fully lowered, close the valve by releasing the knob.
15. Turn the chassis key switch to **DECK**.
16. Close and secure module covers.
17. Check that route is clear of persons, obstructions, holes and drop-offs, level and capable of supporting the wheel loads.
18. After mounting platform latch chain across entrance.
19. Position drive/lift switch to **DRIVE**.
20. While depressing the interlock lever, slowly position the control lever to **FORWARD** then **REVERSE** to check for speed and directional control. The farther you push or pull the control lever from center the faster the machine will travel.
21. Push steering switch **RIGHT** then **LEFT** to check for steering control.
22. Push the emergency stop switch button.

3.4 Operation

Before operating work platform ensure that pre-operation and safety inspection has been completed, any deficiencies have been corrected and the operator has been thoroughly trained on this machine. The operator must read, fully understand and follow this Operator Manual and the Scaffold Industry Association's Manual of Responsibilities of ANSI A92.6-1990.

TRAVEL WITH PLATFORM LOWERED

1. Check that route is clear of people, obstructions, holes and drop-offs, is level and is capable of supporting wheel loads.
2. Verify chassis key switch is turned to **DECK** and chassis emergency stop switch is ON, pull button out.
3. After mounting platform latch chain across entrance.
4. Check clearances above, below and to the sides of platform.
5. Pull controller emergency stop button out to ON position. When button is pushed down emergency stop switch will go to OFF position.
6. Position drive/lift switch to **DRIVE**.
7. While depressing the interlock lever, slowly push or pull the control lever to **FORWARD** or **REVERSE** position to travel in the desired direction. The farther you push or pull the control lever from center the faster the machine will travel.

STEERING

1. Position drive/lift switch to **DRIVE**.
2. While depressing the interlock lever, push the steering switch 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

1. Position drive/lift switch to **LIFT**.
2. While depressing the interlock lever, push control lever forward to **UP**, the farther you push the control lever the faster the platform will elevate.
3. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. If the tilt alarm sounds the platform must be lowered and the machine moved to a level location before attempting to re-elevate the platform.

TRAVEL WITH PLATFORM ELEVATED

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

1. Check that route is clear of persons, obstructions, holes and drop-offs, is level and capable of supporting the wheel loads.
2. Check clearances above, below and to the sides of platform.
3. Position drive/lift switch to **DRIVE** position.
4. While depressing the interlock lever, push control lever to **FORWARD** or **REVERSE** for desired direction of travel.
5. If the machine is not level the tilt alarm will sound and the machine will not lift or drive. If the tilt alarm sounds the platform must be lowered and the machine moved to a level location before attempting to re-elevate the platform.

LOWERING PLATFORM

1. Position drive/lift switch to **LIFT**.
2. While depressing the interlock lever, pull back on the control lever.

EMERGENCY LOWERING

WARNING

If the platform should fail to lower, **NEVER** climb down the elevating assembly. The emergency lowering valve knob is located at the base of the lift cylinder (Figure 3-1).

1. Open the emergency lowering valve by pulling and holding the knob.
 2. To close, release the knob.
- The platform will not elevate if the emergency lowering valve is open.

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** and remove the key to prevent unauthorized operation.

**BRAKE RELEASE PUMP
(OPTIONAL) (FIGURE 3-2)**

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. Close the needle valve by turning the knob clockwise.
2. Pump the brake release pump until the parking brake cylinder rod clears the wheel rotor.
3. The machine will now roll when pushed or pulled.
4. Be sure to open the needle valve and verify that the cylinder rod has extended before the machine is operated.

**WARNING**

Never operate work platform with the parking brake released. Serious injury or damage could result.

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

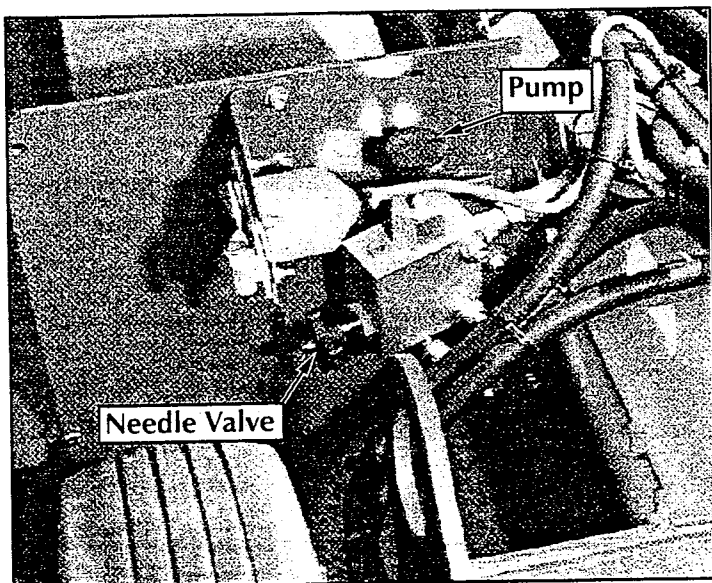


Figure 3-2: Optional Brake Release Pump

FOLD DOWN GUARDRAILS

This procedure is only for the purpose of passing through doorways. Guardrails must be returned to proper position before using the work platform.

Fold Down Procedure

1. Remove controller from guardrail and lay it on the platform deck.
2. Remove retaining pin securing the top crossbars at the front and rear of the platform and rotate the crossbars towards the right guardrail.
3. Pull up on right deck guardrail (or platform guardrail if not equipped with a deck extension) and fold down.
4. Repeat step 3 for the remaining guardrails

Erection Procedure

1. Raise the left platform guardrail and push down securing the guardrail in the vertical position.
2. Repeat step 1 for the remaining guardrails
3. Rotate the top front-crossbar into place across the platform and pin to top left guardrail.
4. Repeat step 3 for top rear crossbar.
5. Place controller at front corner of platform.

4.0 Introduction

This section contains instructions for the maintenance of the SL20 Series 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 SL20 Series Work Platforms and help in diagnosing and repair of the machine.



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 |
|----------------------------|--------------|
| Tilt Sensor Adjusting Tool | 30622-000-00 |
| 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.

|  WARNING  | |
|--|--|
| Before performing preventative maintenance familiarize yourself with the operation of the machine. | |
| Always use the elevating assembly brace whenever it is necessary to enter the elevating assembly when the platform is elevated. | |

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 proper operation | 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 retaining rings | 50h/30d | | | |
| | Lubricate linkage gears | 50h/30d | | | |
| | Check elevating assembly 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 hardware | 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)

⚠ WARNING ⚠

BEFORE entering Elevating Assembly while performing maintenance on work platform, while elevated, ensure that Elevating Assembly is properly blocked.

DO NOT stand in Elevating Assembly area while installing or removing jack stand.

INSTALLATION

1. Park the work platform on firm level ground.
2. Verify platform emergency stop switch is ON.
3. Open the control module.
4. Turn chassis key switch to **CHASSIS**.
5. Position chassis lift switch to **UP** and elevate platform approximately four feet (1.2 m).
6. Place the jack stand between the lower elevating arm and chassis just behind the front crossmember. Be careful not to place it on a hydraulic hose.
7. Push chassis lift switch to **DOWN** position and gradually lower platform until lower boom is supported by the jack stand.

REMOVAL

1. Push chassis lift switch to **UP** position and gradually raise platform until jack stand can be removed.
2. Remove jack stand.
3. Push chassis lift switch to **DOWN** position and completely lower platform.
4. Close control module.

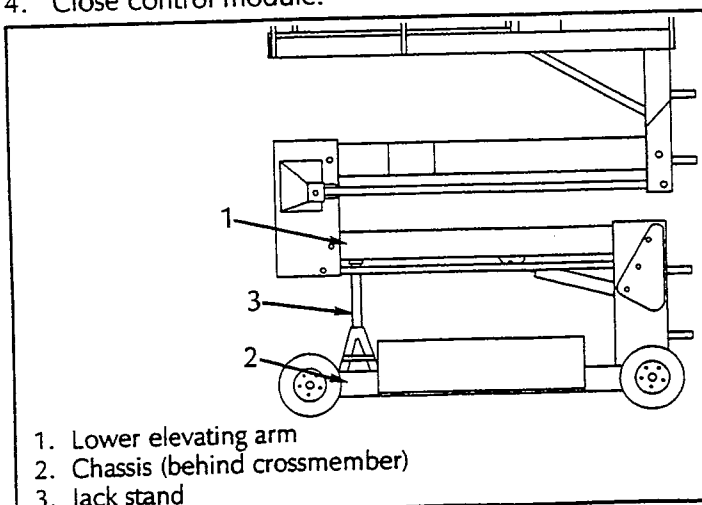


Figure 4-1: Blocking the Elevating Assembly

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.

Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 62 lbs. each.

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.

1. Check battery fluid level. If electrolyte level is lower than $\frac{3}{8}$ in. (10mm) above plates add distilled water only.
2. The plug for the battery charger is located at the left side of the power module. Connect extension cord (12 gauge (1.5 mm²) conductor minimum and 50 ft. (15 m) in length maximum) to the charger plug. Connect other end of extension cord to properly grounded outlet of proper voltage and frequency.
3. Charger turns on automatically after a short delay, the ammeter will indicate charging current.
4. Charger turns off automatically when batteries are fully charged.

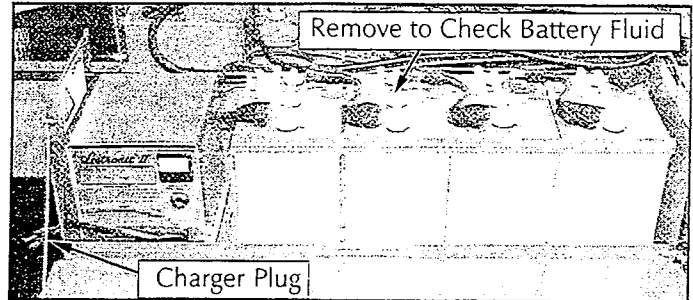


Figure 4-2: Battery Charger

4.4 Lubrication

Refer to Figure 4-3 for location of items that require lubrication service. Refer to the appropriate sections for lubrication information on the hydraulic oil tank and filter and front wheel bearings.

LINKAGE GEARS

1. Raise platform fully.
2. Using another work platform or a free standing ladder get up high enough to comfortably reach gears.
3. Use a long handled brush to apply multipurpose grease to the face of the gears.

| |
|--|
| ▲ WARNING ▲ |
| DO NOT use hands to apply grease or allow any body part to enter elevating assembly. |

4. Lower platform after greasing.

KING PINS

Apply one or two drops of motor oil to each king pin bearing.

- Grease
 - Oil
1. King Pin Bearings
 2. Linkage Gears
 3. Front Wheel Bearings

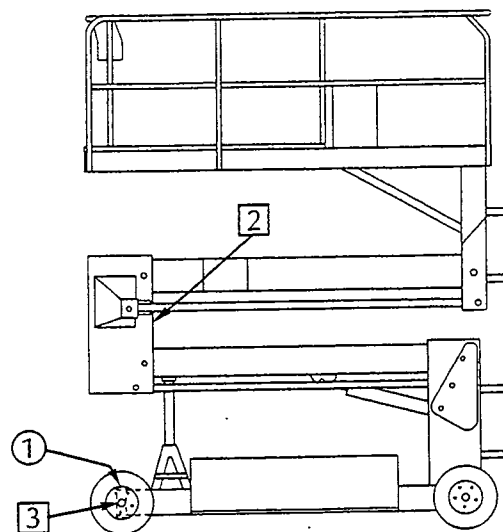


Figure 4-3: Lubrication Points

HYDRAULIC OIL TANK AND FILTER (Figure 4-4)

Fluid Level

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

Oil and Filter Replacement

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

⚠ 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 4 gallon (15 l) capacity.
3. Remove the drain plug under the tank and allow all oil to drain.
4. Clean the magnetic drain plug and reinstall.
5. Fill the hydraulic reservoir with hydraulic oil (see Section 7.2) until the oil is visible on the dipstick, do not fill above the lower line on the dipstick. Hydraulic tank has a 4 gallon (15 l) capacity.
6. Unthread the filter from the bottom of the valve block.
7. Apply a thin film of clean hydraulic oil to the gasket of the replacement filter.
8. Thread the replacement filter onto the valve block until the gasket makes contact, then rotate the filter 3/4 of a turn further.

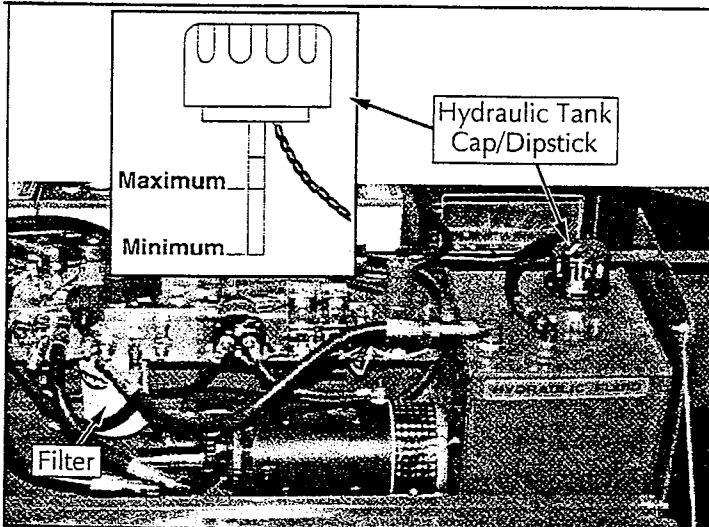


Figure 4-4: Hydraulic Oil Tank and Filter

4.5 Setting Hydraulic Pressures (Figure 4-5)

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

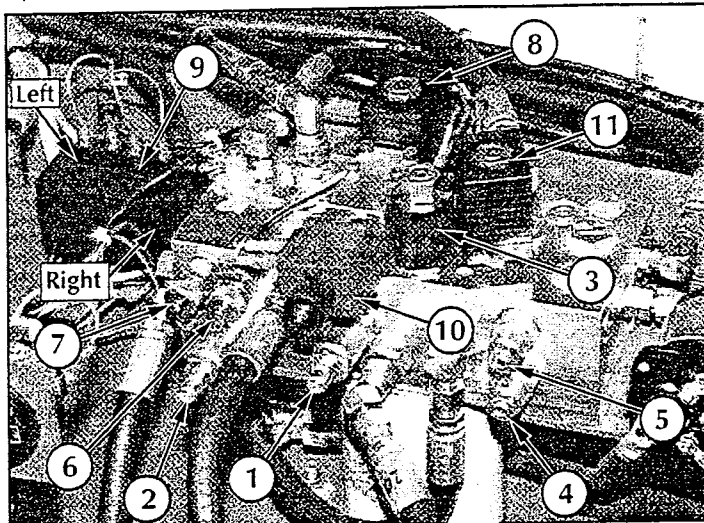
⚠ WARNING ⚠

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 RELIEF VALVE (Figure 4-5)

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 **LIFT** 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. The pressure should be approximately 2000 psi (138 bar).
6. Release the chassis lift switch. Tighten locknut or replace main relief valve cover.



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

Figure 4-5: Hydraulic Manifold

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 the wheels fully to the **left**, slowly turn the steering relief valve adjusting screw clockwise to increase the pressure until the gauge reads 750 psi (51.7 bar).
5. Tighten locknut or replace steering relief valve cover and torque to 6 Ft/Lbs (8 Nm).
6. Remove gauge and replace cap.

COUNTERBALANCE VALVES

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Remove high pressure gauge port cap and install the pressure gauge assembly.
3. 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 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 350 psi (24 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 350 psi (24 bar).
10. Tighten locknuts on valves to 6 Ft/Lbs (8 Nm).
11. Check the settings by slowly moving the control lever **FORWARD**, then **REVERSE** checking the gauge to ensure pressures are properly set. Readjust as needed.
12. Remove blocks and lower work platform to ground.
13. Reconnect the red control cable wire to terminal #A6.
14. Remove the gauge from the gauge port and reinstall cap.
15. Check for proper operation of the drive system and brake.

4.6 Switch Adjustments

DOWN LIMIT SWITCH (Figure 4-6)

The down limit switch is actually three sets of contacts in the same switch body. Contacts 3-4, normally open, provide power to the controller 'R' terminal for high speed operation only when the platform is down. Contacts 5-6, normally closed, provide power to the tilt sensor when the platform is elevated. Contacts 7-8, normally open, provide power to relay R3 when the platform is down.

All contacts open/close at the same time, so it is necessary to only adjust one set of contacts.

1. Remove the cover from the chassis control box.
2. Disconnect the white wire from terminal A10 and the black wire from terminal A6 (see Section 6.1) and connect an ohmmeter or continuity tester.
3. Raise the platform until the circuit just opens. The platform should be 6-12 in. (15-30 cm) from fully lowered.
4. To adjust the switch loosen the screw on the switch lever and rotate the lever. Tighten the lever adjustment screw.
5. Raise and lower the platform to confirm the adjustment.
6. Reconnect the wires to the proper terminals, replace the chassis control box cover and module covers.

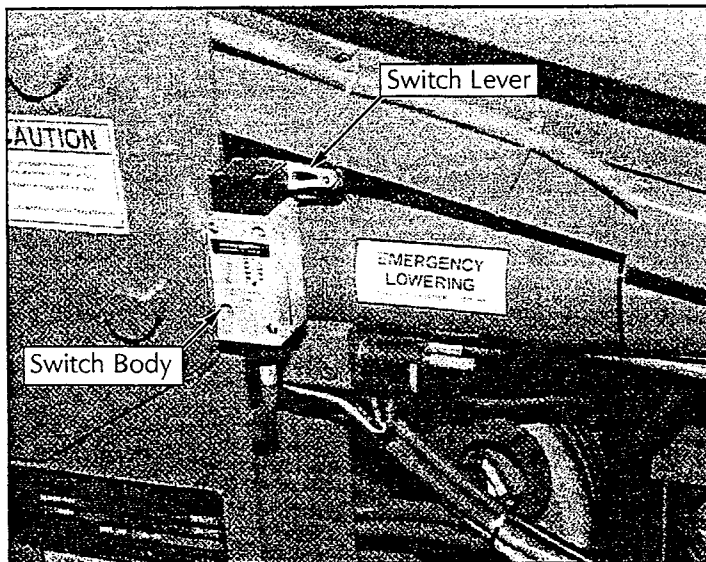


Figure 4-6: Down Limit Switch

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 is a red LED under the sensor that lights up when the sensor is not level.

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. Open control module covers and determine if the tilt sensor is equipped with a bubble level. If not, place the tilt sensor adjusting tool (P/N: 30622-000-00) on the tilt sensor.
4. Adjust the three leveling screws until the bubble is centered in the inner circle.
5. Remove the adjusting tool and close the module covers.

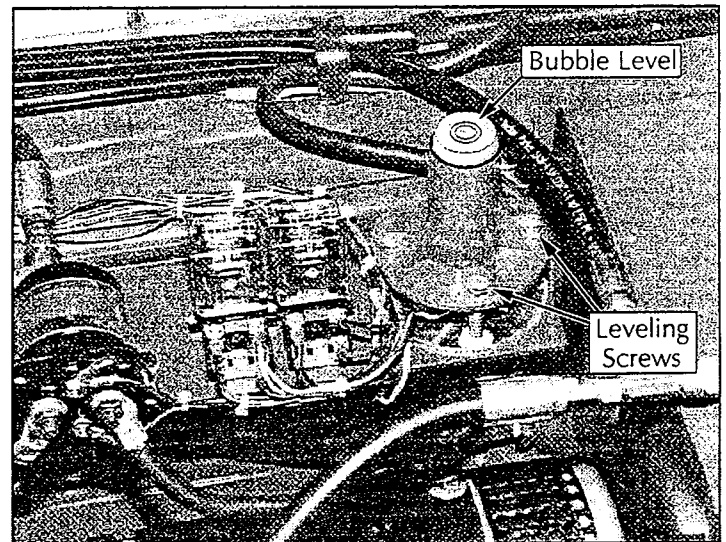


Figure 4-7: Tilt Sensor Adjustment

PROPORTIONAL CONTROL ADJUSTMENT (Figure 4-8)

To perform the adjustment, the 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 potentiometer adjustment screws if necessary.

Please follow the exact sequence outlined below when making controller adjustments. It is possible that making an adjustment to one setting could affect another so please verify that all speeds are correct before completing the adjustment procedure. For all potentiometers, clockwise movement will increase, and counterclockwise movement will decrease the speed of that function.

1. Set the THRESHOLD potentiometer so that the machine is just starting to move when the controller is stroked slightly forward.
2. Mark out a 20 ft. (6.1 m) course on the ground to use for step numbers 3, 4 and 5.
3. Set the HI RANGE potentiometer so that the machine will travel 20 ft. (6.1 m) in 5 to 7 seconds at full controller deflection.

Note: the machine should be running full speed before crossing the starting line, and should run perfectly straight through the course.

4. Elevate the machine until the lower tension member clears the limit switch lever. Set the LO RANGE potentiometer so that the machine will travel 20 ft. (6.1 m) in 18 to 22 seconds at full controller deflection.

Note: the machine should be running full speed before crossing the starting line, and should run perfectly straight through the course.

5. Repeat the speed trials for verification and readjust as necessary.

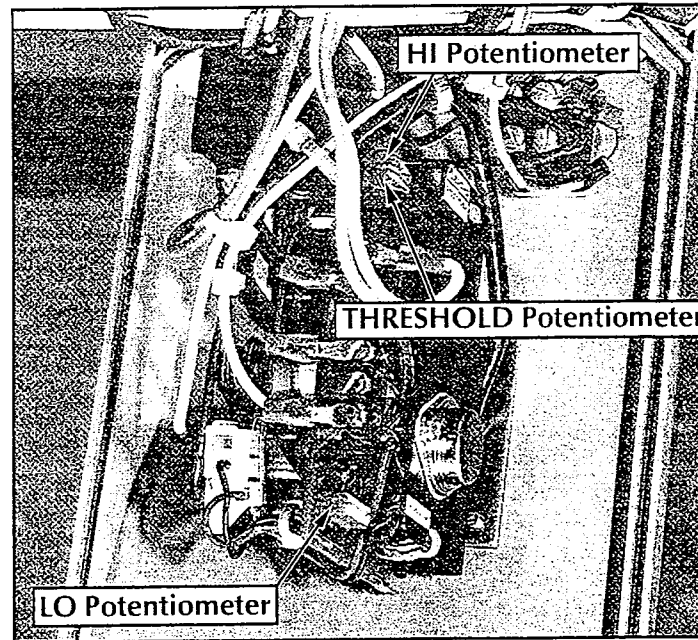


Figure 4-8: Proportional Controller Adjustment

4.7 Hydraulic Manifold (Figure 4-9)

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

DISASSEMBLY

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 4-9 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove solenoid valves, relief valves and counterbalance valves.
3. Remove fittings, plugs, and springs.

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, plugs, and springs.
2. Install counterbalance valves, main relief valve, steering relief valve, and solenoid valves.

Note: torque cartridge valves to 25 ft. lbs. (34 N-m).

3. Install coils on solenoid valves.

Note: torque coil retaining nuts to 4-5 ft. lbs. (5.4-6.8 N-m) maximum.

INSTALLATION

1. Attach manifold assembly to mounting plate with bolts, washers, jam nut and locknuts.

Note: Bolt at the left end of the valve is installed from the bottom and is secured with the jam nut. Secure all ground wires with locknut to this bolt.

2. Connect solenoid leads to terminal strip (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold (see Table 4-2).
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. Filter
3. Filter Adapter
4. Plug, 9MM Expander
5. Valve, Steering
6. Valve, Lift & Valve, Forward/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° Elbow
14. Fitting, Straight
16. Plug, Cavity
17. Connector, Gauge
19. Fitting, Straight
20. Fitting, Straight
23. Fitting, 45° Elbow
24. Fitting, 90° Elbow
25. Fitting, 90° Elbow
27. Valve Block, Proportional
28. Valve, Proportional
29. O-Ring
30. Screw, Soc Hd Cap 10-24 X 2

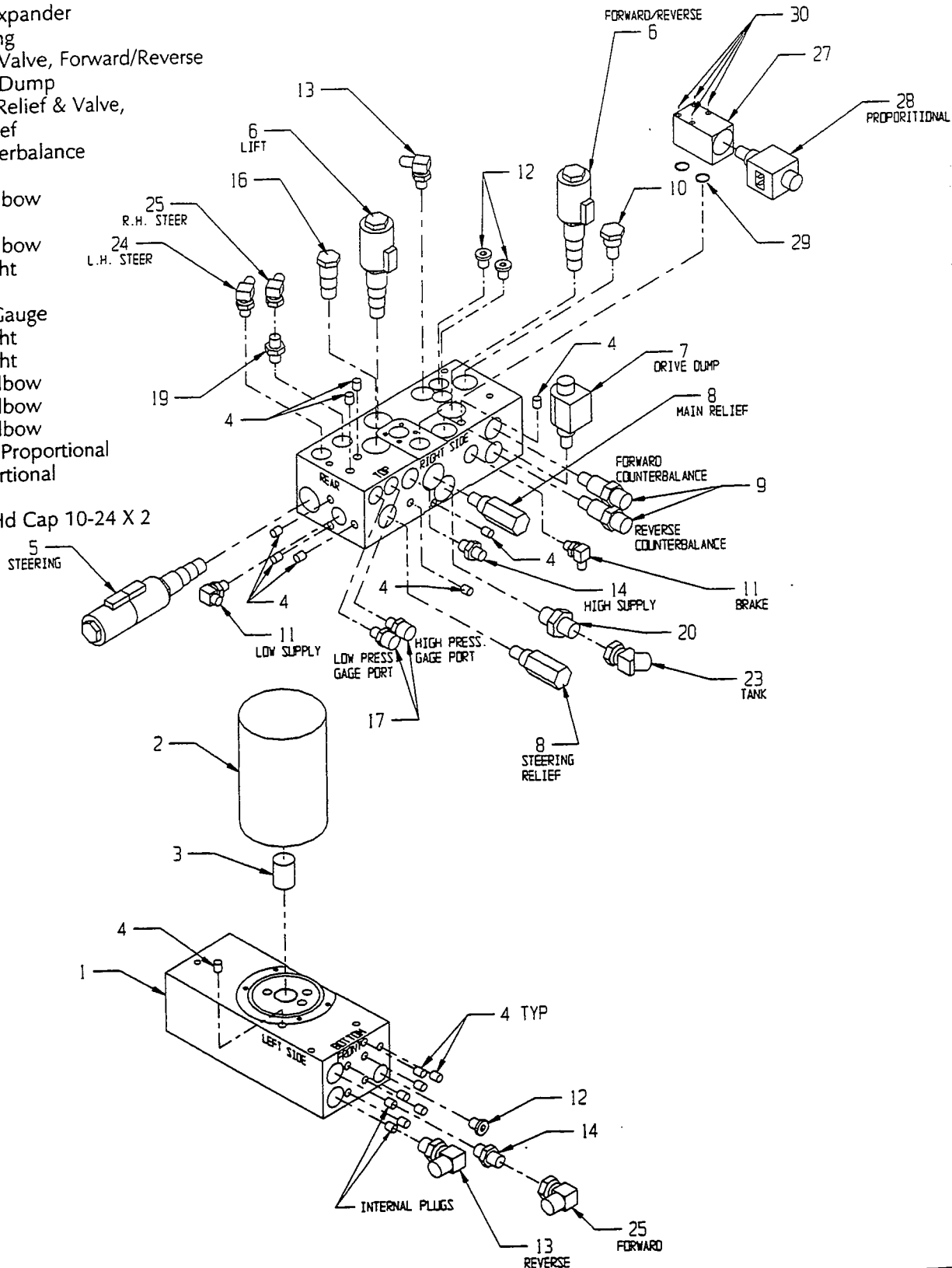


Figure 4-9: Hydraulic Manifold, Exploded View

4.8 Hydraulic Pump (Figure 4-10)

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 N-m).
3. Unplug and reconnect the hydraulic hoses.
4. Check the oil level in the hydraulic tank before operating the work platform.

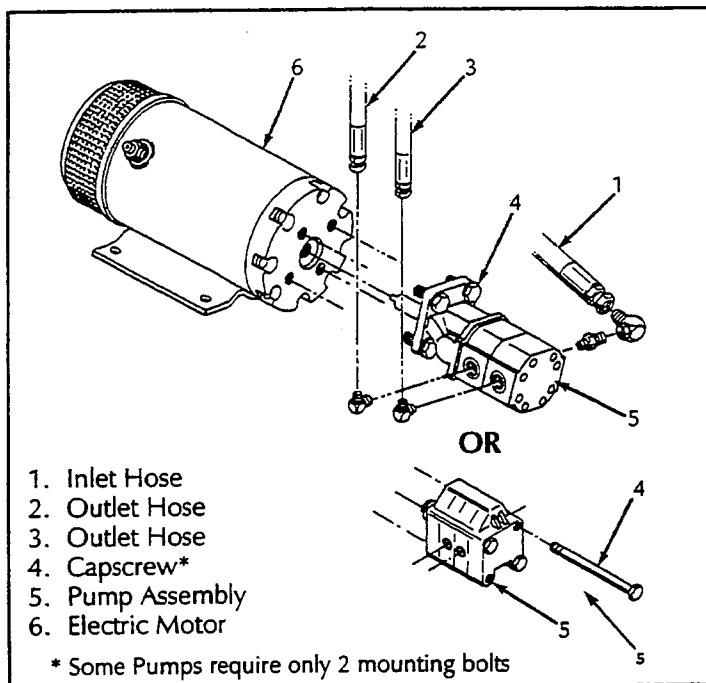


Figure 4-10: Hydraulic Pump

4.9 Hydraulic Drive Motors and Hubs (Figure 4-11)

REMOVAL

1. Park the work platform on firm level ground then block the wheels to prevent the work platform from rolling.
2. Loosen the wheel lug bolts on the rear corner to be raised.
3. Use a 1.5 ton capacity jack to raise the desired rear corner. Position blocks under the raised corner to prevent the work platform from falling if the jack fails.
4. Remove the wheel lug bolts and wheel.
5. Remove the cotter pin, locknut, hub and the shaft key. If necessary use a wheel puller to remove hub.

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

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

INSTALLATION

1. Referring to Figure 4-12, position the drive motor in the axle and secure with capscrews and locknuts.
2. Remove the plugs from the hose assemblies and connect to the drive motor.
3. Install the shaft key, hub and slotted nut. Torque the locknut to 140 to 160 ft. lbs. (190-217 N-m). Install a new cotter pin, **DO NOT** back-off the nut to install the cotter pin.
4. Install the wheel with lug bolts onto the hub. Torque to 80 ft. lbs. (108 N-m).
5. Remove blocks, lower the jack and remove. Operate the drive system and check for leaks.
6. Drive machine for 20 minutes and retorque wheel lug bolts and check for leaks.

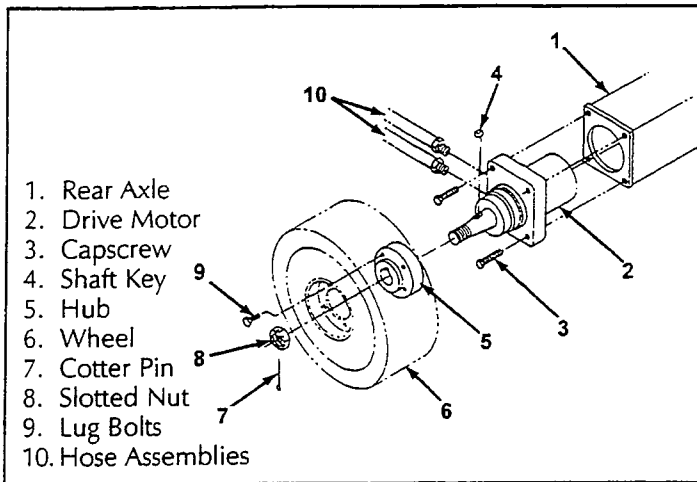


Figure 4-11: Drive Motor Installation

4.10 Wheel Bearings (Figure 4-12)

REMOVAL

- Loosen the wheel lug nuts then, using a 1.5 ton capacity jack, raise the work platform until the tire to be worked on is off the ground.
- Install support blocks to prevent the work platform from falling if the jack fails.
- Remove the wheel lug nuts and the wheel.
- Remove the dust cap.
- Remove the cotter pin.
- Remove the hub nut and washer.
- Slide the entire hub assembly from the spindle and place on clean surface.
- Remove the outside bearing cone and place on clean surface.
- Remove the grease seal and the inside bearing cone. Examine the bearing cups. If they are smooth, shiny and free of pits or any surface irregularities, **DO NOT** remove them.
- If the cups need replacement, remove them by tapping around the circumference of the inside surface of the cups from the opposite side using a long drift.

INSTALLATION

- Position the replacement bearing cup over the opening in the hub assembly then position the worn cup over the replacement so that the bearing surfaces face each other. Use the old bearing cone as a drift to work the replacement into position by tapping evenly around the circumference.
- Apply a liberal coating of multipurpose grease to the bearing surface of each cup.
- Pack the inside bearing cone with multipurpose grease and position it within the rear bearing cup in the hub assembly. Install the new grease seal.
- Apply a thin coating of multipurpose grease to the spindle to protect the grease seal then slide the hub assembly onto the spindle.
- Pack the outside bearing cone with multipurpose grease and slide it onto the spindle until it seats in the outer bearing cup.
- Install the washer and hub nut. Tighten the hub nut while rotating the assembly, until the hub drags then back the nut to the first slot that aligns with the cotter pin hole in the spindle.
- Install a new cotter pin and bend the end up over the hub nut and the spindle.
- Install the cap and wheel/tire assembly. Torque the lug nuts to 80 ft. lbs. (108 N-m).
- Remove blocks and lower work platform to the ground.
- Drive machine for 20 minutes and retorque wheel lug nuts and check for leaks.

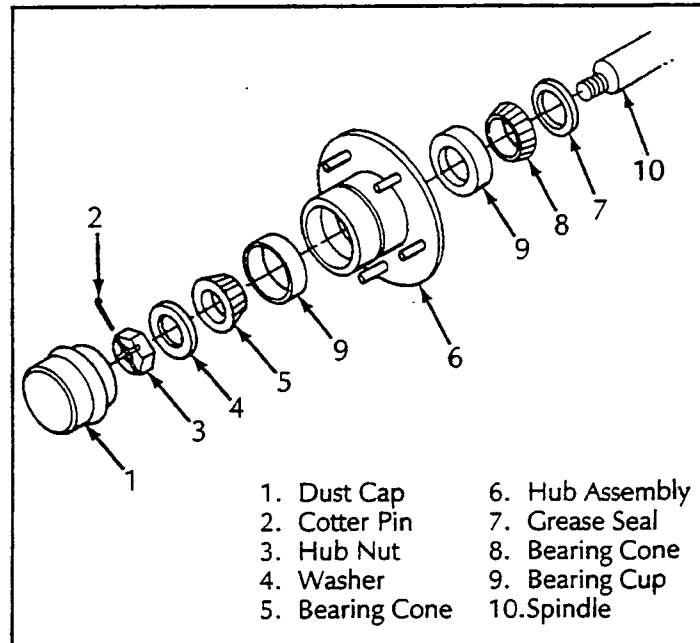


Figure 4-12: Wheel Bearings

4.11 Brake Cylinder (Figure 4-13)

REMOVAL

1. Block the wheels to prevent the work platform from rolling when the brake is removed.
2. Disconnect the hose assemblies and cap the openings to prevent foreign material from entering.
3. Remove the capscrews and lockwashers that mount the cylinder to the chassis.

DISASSEMBLY

NOTE: Prepare a clean work area on which to service the internal parts.

1. Remove fittings from cylinder barrel.
2. Remove the snap ring and withdraw the shaft and all attached components from the cylinder barrel.
3. Remove the head cap from the shaft then remove the wiper, shaft seal and seals from the head cap.
4. Unscrew the piston from the shaft and remove the static seal. Remove the piston seal from the piston.
5. Remove the spring and stop tube from the 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, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring or excessive wear.
4. Check the spring for cracks.
5. Replace any parts found unserviceable.
6. Discard all seals.

ASSEMBLY AND INSTALLATION

1. Install the piston seal on the piston then assemble the static seal, shaft and piston.
2. Position the spring and stop tube on the shaft assembly.
3. Lubricate the piston seal with clean hydraulic fluid, then install the shaft assembly in the cylinder barrel.
4. Lubricate the seals with clean hydraulic fluid and install on the head cap.
5. Install the shaft seal and wiper within the head cap.
6. Lubricate entire assembly's seals and the shaft seal and wiper with clean hydraulic fluid then install the head cap onto the shaft and into the cylinder barrel.
7. Secure with snap ring.
8. Position the brake cylinder assembly on the chassis so that the shaft fully engages the brake disc, however the shaft must clear the brake disc once retracted. Secure with capscrews and lockwashers.
9. Connect the hose assemblies.
10. Operate the drive circuit and check that the shaft retracts and clears the brake disc. Check for leaks.

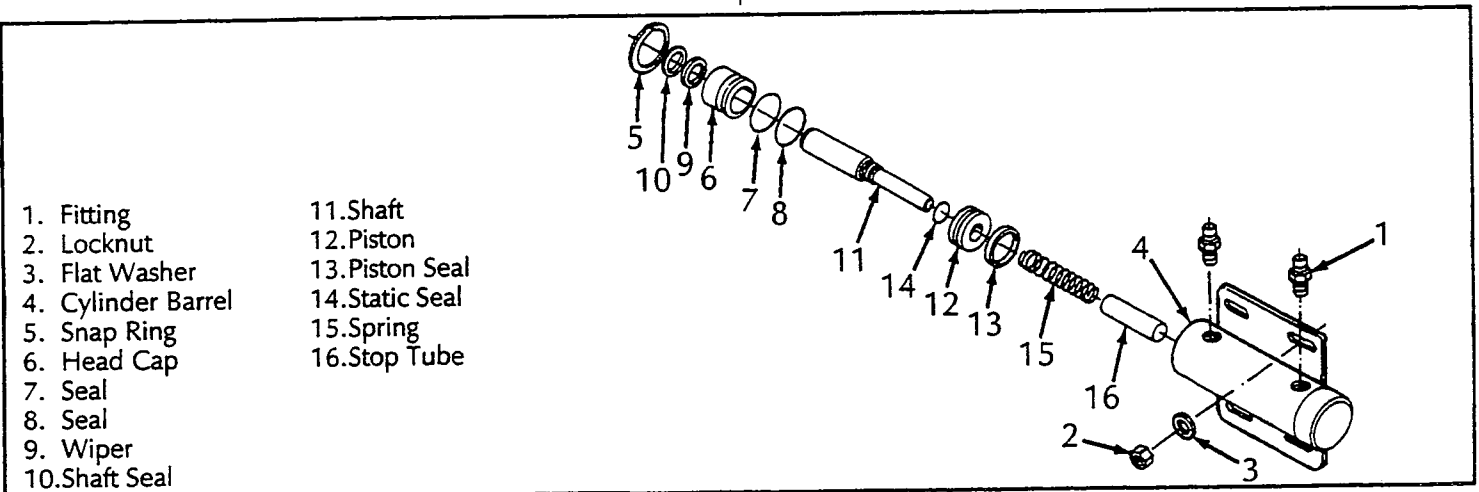


Figure 4-13: Brake Cylinder

4.12 Steering Cylinder (Figure 4-14)

REMOVAL

1. Mark and disconnect the hose assemblies from the fittings and immediately cap the openings to prevent foreign material from entering.
2. Remove the locknuts and capscrews that secure the cylinder assembly.

DISASSEMBLY

1. Remove the headcap from the barrel tube.
2. Withdraw the piston and shaft assembly from the barrel tube.
3. Remove the piston nut, piston and headcap.
4. Remove the rod wiper, rod seal, and static seal from the headcap and discard the seals.
5. Remove the piston seal and piston rod seal 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 headcap for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

ASSEMBLY AND INSTALLATION

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
2. Install the headcap onto the shaft from the piston end.

Note: installing the headcap over the pivot hole in the shaft could damage the seals.

3. Install a new piston seal and piston rod seal on the piston.
4. Install the piston on the shaft and secure with the piston nut, torque to 150 in. lbs. (16.95 N-m).
5. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the cylinder barrel.
6. Screw headcap into cylinder barrel hand tight then turn ¼ turn further.
7. Position the cylinder assembly on the chassis and secure with capscrews and locknuts.
8. Connect the hose assemblies to the fittings.
9. Operate the steering circuit several times throughout its entire range of travel to expel trapped air and check for leaks.

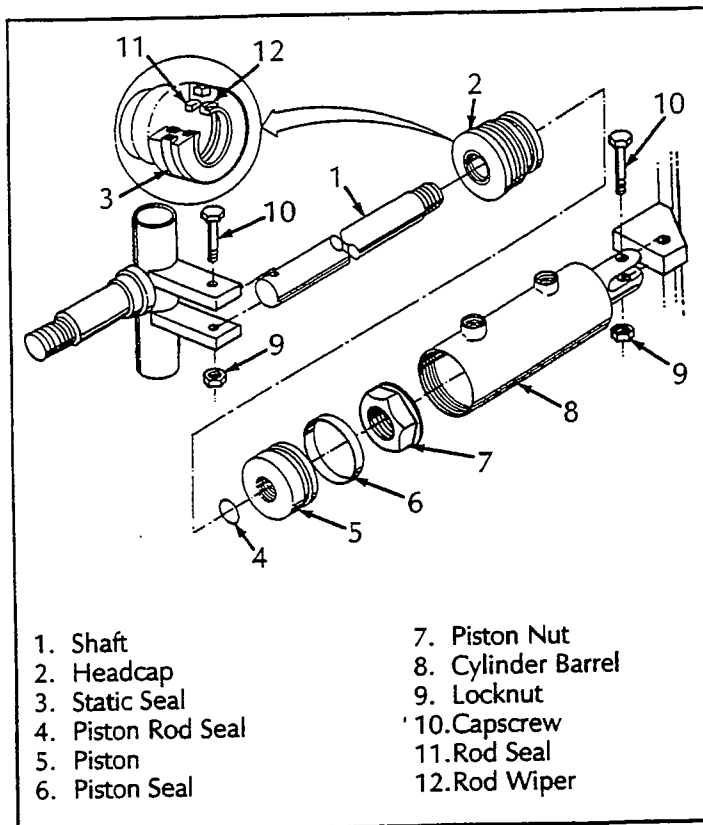


Figure 4-14: Steering Cylinder

4.13 Lift Cylinder (Figure 4-15)

REMOVAL

1. Block Elevating Assembly (Section 4.2).
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 snap rings from cylinder pins and set screw from end of cylinder rod.
4. Place a 2 ft. (61 cm) long plank, at least one inch (25 mm) thick, across the top of the modules.
5. Support rod end of cylinder and remove rod end cylinder pin and let cylinder down to rest on the plank.
6. Attach a suitable hoisting device and sling to the cylinder.
7. Support the cylinder so the barrel end cylinder pin can be removed, then remove the cylinder from the machine with the hoisting device.
8. Move cylinder to a prepared work area.

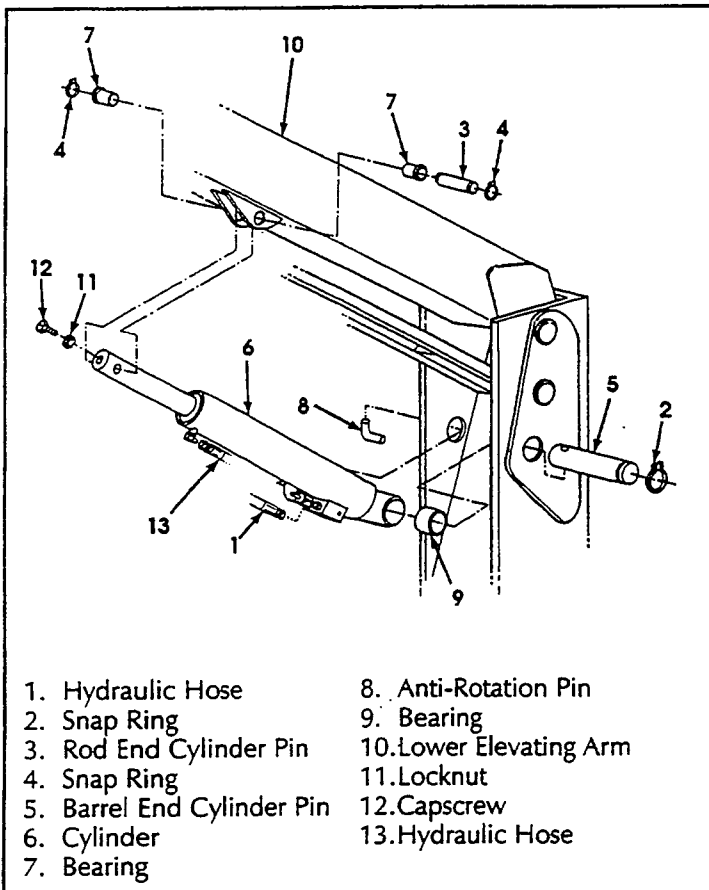


Figure 4-15: Lift Cylinder Installation

DISASSEMBLY

1. Compress the internal snap ring and withdraw the headcap, rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static o-ring from the cylinder rod.
4. Remove the piston seal from the piston. It is not necessary to remove the cast iron ring.
5. Remove the rod seal, rod wiper, static seal and backup ring from the headcap.
6. Remove the down valve and fittings from the 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 headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring or excessive wear.
4. Replace any parts found unserviceable.

REASSEMBLY

1. Lubricate and install new rod seal, rod wiper, static seal and backup ring on the headcap.

Note: Multipurpose lubricant should be used.

2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder rod from the piston end.

Note: be very careful not to damage the seals when installing the headcap over the pivot hole in the shaft.

4. Install a new piston static o-ring, the piston and piston nut on the cylinder rod. Torque nut to 450 ft. lbs. (610 N-m).
5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Secure the headcap into the barrel tube with the internal snap ring.
7. Install the fittings, down valve and down orifice.

Note: install down orifice with bevel in, towards the spring.

INSTALLATION (Figure 4-15)

Note: before installing Lift Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Place two 2 ft. (61 cm) long planks, at least one inch (25 mm) thick, across the top of the modules.
2. Place the lift cylinder on the planks across the modules.
3. Lift the barrel end of the cylinder into place and push the cylinder pin in until approximately 1½ in. (38 mm) is still exposed.

Note: take care in aligning the holes so that the pin can be pushed in by hand. If holes are not properly aligned and the pin is forced in, the bearings will be damaged.

4. Install anti-rotation pin into cylinder pin aligning with hole in the mast and push the cylinder pin completely in and secure with the snap ring.
5. Install rod end bearings in lower elevating arm bracket (if removed).
6. Lift rod end of cylinder into place and insert pin. Rotate pin so hole in center aligns with set screw hole in cylinder rod end.
7. Install snap rings and set screw.
8. Test with weight at rated platform load to check system operation.

4.14 Electric Motor (Figure 4-16)

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 4-16A. 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.

3. Brushes should be checked for wear and to ensure that they are free in the brush holders.

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

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

REASSEMBLY

1. Install new brushes and be sure they are free in the holder. Install brush with the lead wires positioned as when received. Raise all brushes to the locked position. (See Figure 4-16B and step 3 in the Inspection section).
2. Place commutator cover on a work bench with brush assembly facing upward.
3. Place the bearing spring into the bearing bore.
4. Take a complete armature assembly, including bearings, and insert commutator end bearing into the bearing bore.

Note: Do not 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.

5. Set the brushes to final position as shown in Figure 4-16B.
6. Place the complete stator down over the vertical armature, and into position on the commutator cover.
7. The stator assembly must be placed in a definite relationship with the commutator covers in order to obtain a neutral brush setting. There is a match-mark on both items. **These two marks must line up exactly. Rotate until they do.**
8. Assemble the pulley end cover in the proper relationship. Insert mounting bolts and tighten alternately to ensure a good mechanical alignment.

9. Spin the shaft by hand to see if it is free. Be sure motor leads (if used) are not touching together. If the leads are touching, a generator action will give the effect of friction in the motor. A no-load test can now be performed. At rated voltage, observe the no-load current. It should be less than 20% of the nameplate full load current. Anything higher indicates:

- Brushes are not on neutral setting (check matchmarks for exact alignment).
- Faulty armature.

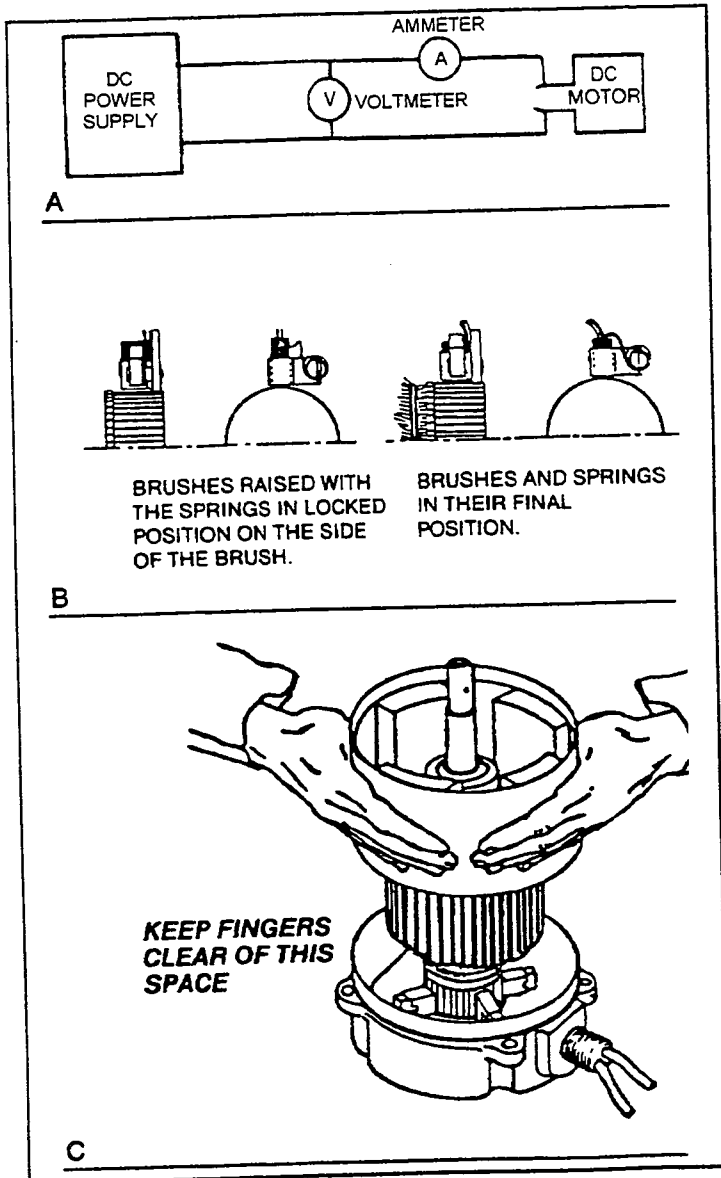


Figure 4-16: Electric Motor Service

4.15 Torque Specifications (Table 4-2)

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 4-2: Bolt Torque

| THREAD SIZE American National Std.-UNC (course) Grade 5 | WIDTH ACROSS FLATS | TORQUE VALUE | |
|--|--------------------|--------------|---------|
| | | ENGLISH | METRIC |
| 1/4 | 7/16 | 110 In/Lbs | 12 N·m |
| 5/16 | 1/2 | 190 In/Lbs | 22 N·m |
| 3/8 | 9/16 | 30 Ft/Lbs | 41 N·m |
| 7/16 | 5/8 | 50 Ft/Lbs | 68 N·m |
| 1/2 | 3/4 | 75 Ft/Lbs | 102 N·m |
| 5/8 | 1 5/16 | 150 Ft/Lbs | 203 N·m |
| 3/4 | 1 1/8 | 250 Ft/Lbs | 339 N·m |
| 7/8 | 1 15/16 | 400 Ft/Lbs | 542 N·m |
| 1 | 1 1/2 | 600 Ft/Lbs | 813 N·m |

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 4-3: Hydraulic Component Torque

| TYPE: SAE PART SERIES | CARTRIDGE POPPET | | FITTINGS | | HOSES | |
|-----------------------------|---------------------|---------|----------|---------|-----------|---------|
| | (Ft/Lbs) | (Nm) | (Ft/Lbs) | (Nm) | (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 |

Coil nuts: 30 IN/Lbs (3 Nm)

NOTES

Large empty rectangular area for notes.

5.0 Introduction

Table 5-1 provides a logical sequence of tests that are designed to isolate problems with SL20 Series 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"> 1. Open control circuit circuit breaker (CB). 2. Blown electric motor fuse (FU1). 3. Faulty battery charger. 4. Faulty battery(ies) (BAT). 5. Faulty electric motor (MOT). 6. Faulty motor relay (R1). 7. Emergency stop switch (S5, S7) failed open. | <p>Check control 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> |
| All functions inoperable. Electric motor starts when control is actuated. | <ol style="list-style-type: none"> 1. Hydraulic reservoir low. 2. Faulty hydraulic pump (PMP). 3. Faulty controller (CONT). 4. Proportional Valve (V6). | <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 (R1) contacts fused together. | With 0 voltage at the coil terminals of the motor relay (R1) 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"> 1. Faulty steering switch (S9,S10). 2. Mechanical damage. 3. Steering valve (V1) stuck. 4. Steering cylinder (CYL1) piston seal leaking. 5. Steering relief valve. | <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"> 1. Faulty steering switch. 2. Faulty diode (D1). 3. Faulty steer right solenoid (SOL1). | <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"> 1. Faulty steering switch. 2. Faulty diode (D2). 3. Faulty steer left solenoid (SOL2). | <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"> 1. Faulty drive/lift selector switch. 2. Faulty drive/lift valve (V4). 3. Faulty drive dump valve (V8). 4. Mechanical failure. 5. Worn drive motors (MOT1, MOT2). 6. Faulty relay (R2). | <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"> 1. Faulty down limit switch (LS1). 2. Faulty proportional coil/valve (SOL7/V6). | <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"> 1. Faulty counterbalance valves (V2, V3). | Check pressure of counterbalance valves. Replace or reset valves as required. |
| No drive forward but drives in reverse. No lift function. | <ol style="list-style-type: none"> 1. Faulty relay (R2). 2. Faulty controller switch (S3). | <p>Test relay contacts continuity. 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"> 1. Faulty diode (D8). 2. Faulty reverse coil (SOL3). 3. Faulty counterbalance valves (V2, V3). | <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"> 1. Faulty relay (R2). 2. Faulty controller switch (S2). | <p>Test relay contacts continuity. Replace if faulty.</p> <p>Check operation of controller switch. Replace if required.</p> |
| Platform will not elevate or elevates slowly. | <ol style="list-style-type: none"> 1. Emergency down valve (V7) open. 2. Platform overloaded. 3. Faulty relay (R2). 4. Faulty lift valve coil. 5. Faulty drive/lift selector switch (S8). 6. Lift/main relief valve (RV1) out of adjustment or faulty. 7. Drive/lift valve (V4) sticking. 8. Faulty controller switch (S2). 9. Faulty controller (CONT). | <p>Close emergency down valve.</p> <p>Observe maximum load rating (See Table 1-7).</p> <p>Test relay contacts continuity. 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 switch, replace if faulty.</p> <p>Check operation of controller. Replace if required.</p> |

Troubleshooting

Table 5-1: Troubleshooting

| TROUBLE | PROBABLE CAUSE | REMEDY |
|--|---|--|
| Platform drifts down after being elevated. | <ol style="list-style-type: none"> Emergency lowering/down valve (V7) partly open or faulty. Leaking piston seals in lift cylinder (CYL3) | <p>Ensure that the emergency lowering valve is completely closed. Replace the valve.</p> <p>Check for leakage at cylinder 'return' line, replace seals if necessary.</p> |
| Platform will not lower or lowers slowly. Drive function operable. | <ol style="list-style-type: none"> Faulty down valve coil (SOL4). Faulty drive/lift selector switch (S8). Down valve (V7) stuck. Plugged down orifice (ORF1). Faulty relay (R2). | <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 LIFT 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"> Faulty down alarm (ALM1). | <p>Check voltage to down alarm . If proper voltage is present, replace the alarm.</p> |
| Brake will not release. | <ol style="list-style-type: none"> Brake orifice (ORF2) plugged. Faulty brake cylinder (CYL2). Brake out of adjustment. | <p>Remove and clean orifice.</p> <p>Check and replace seals in brake cylinder.</p> <p>Adjust to engage brake disc when extended only.</p> |
| Brake will not lock wheel. | <ol style="list-style-type: none"> Brake orifice (ORF2) plugged. Faulty brake cylinder (CYL2). Brake out of adjustment. | <p>Remove and clean orifice.</p> <p>Check and replace seals in brake cylinder.</p> <p>Adjust to engage brake disc when extended .</p> |
| Operator receives static electric shocks while platform is elevated. | <p>Machine with non-marking tires is being driven on a plastic floor or a floor with plastic sealer.</p> | <p>Attach a ground strap to the chassis.</p> |

NOTES

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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.

INDEX

| Figure | Page |
|--|------|
| 6-1: Relay and Terminal Strip Identification | 6-3 |
| 6-2: Electrical Schematic | 6-3 |
| 6-3: Hydraulic Schematic | 6-5 |
| 6-4: Hydraulic Manifold | 6-5 |

6.1 Electrical Schematic

Table 6-1: Electrical Schematic Legend

| REFERENCE DESIGNATION | NAME | FUNCTION | LOCATION |
|-----------------------|-----------------------------|---|--|
| ALM1 | Alarm, Down | Provides warning sound (60 Hz) when the platform is lowering. | Mounted behind motor/pump, under relays R2 & R3. Red wire, 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 behind motor/pump, under relays R2 & R3. White wire, 600 Hz. |
| BAT | Batteries (4), 6 volts each | To store energy. | Inside power module. |
| 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 S1, S2, S3, & S4. | Platform controller center. |
| 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 DRIVE . | On drive/lift selector switch. |
| 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. |
| D9 | Diode | Prevents feedback into down circuit. | Connected in-line to down alarm red wire. |
| D10 | Diode | Prevents voltage spikes from damaging down alarm. | Connected between Terminals A9 and A7. |

| REFERENCE DESIGNATION | NAME | FUNCTION | LOCATION |
|-----------------------|----------------------------------|---|---|
| D11 | Diode | Prevents voltage spikes from damaging tilt alarm. | Connected between R3 and ground. |
| FU1 | Fuse, 175 AMP | Overload protection for the electric motor. | Mounted under control valve. |
| LS1 | Switch, Platform Down Limit | Contacts 3,4: provides power to controller 'R' terminal for high speed drive when platform is down. Contacts 4,5: provides power to tilt sensor and tilt alarm thru R3 normally closed contacts when platform is elevated. Contacts 7,8: provides power to platform down relay when platform is down. | Mounted on left side of chassis, next to lift cylinder. |
| MOT | Motor, Electric | Provides power to drive hydraulic pump. | Front of control module. |
| MTR | Meter, Hour (optional) | Shows hours machine has operated. | Right of chassis control panel. |
| R1 | Relay, motor start | Connects batteries to motor. | Mounted next to control valve in control module. |
| R2 | Relay, Drive/Lift | Energized when drive/lift switch is in DRIVE , closes reverse and drive dump circuits and opens down and lift circuits. | Mounted next to tilt sensor in control module. |
| R3 | Relay, Tilt Alarm | Energized by platform down switch 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. | Mounted between relays R1 & R2 in control module. |
| SNSR | Sensor, Tilt | Cuts power to tilt alarm relay when platform is on slopes of 2° side to side and 2° fore and aft to activate tilt alarm. | Next to hydraulic tank in control module. |
| SOL1 | Solenoid, Right Steer (coil) | Shifts steer valve to RIGHT turn position. | Rear of manifold block, solenoid closest to block. |
| SOL2 | Solenoid, Left Steer (coil) | Shifts steer valve to LEFT turn position. | Rear of manifold block, solenoid farthest from block. |
| SOL3 | Solenoid, Forward/Reverse (coil) | Shifts forward/reverse valve to reverse position. | Top of manifold block, closest to front end. |

Table 6-1: (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 front, next to proportional valve. |
| SOL7 | Solenoid, Proportional (coil) | Closes proportional valve. | Top center of manifold block. |
| S1 | Switch, Joystick Power | Provides power to joystick circuit board. | Front switch closest to center of joystick when joystick is held in assembled position. |
| S2 | 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. |
| S3 | 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. |
| S4 | Switch, Interlock Lever | Provides power to controller. | On front of joystick. |
| S5 | Switch, Chassis Emergency Stop Button. | Control circuit shut off. | Chassis control panel. |
| S6 | Switch, Chassis Key | Provides power to either the chassis lift switch or the controller. | Chassis control panel. |
| S7 | Switch, Controller Emergency Stop Button | Control circuit shut off. | Platform controller bottom left. |
| S8 | Switch, Drive/Lift Selector | Provides power to drive/lift relay, steer switches, joystick '+' term. and joystick 'R' term. through platform down limit switch when in DRIVE. And to joystick 'R' term. during LIFT. | Controller bottom right. |
| S9, S10 | Switches, Steering | Provides power to either right or left steer valve solenoids. | Rocker actuator on top of joystick, switch bodies inside joystick handle. |
| S11 | Switch, Chassis Lift | Provides power to either up or down circuits. | Chassis control panel. |

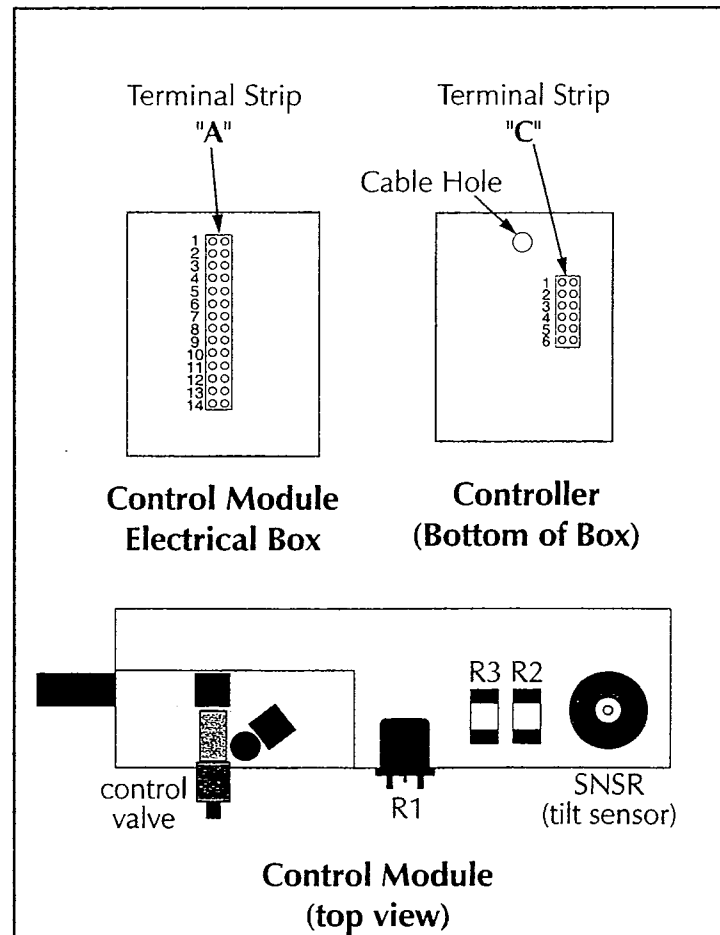
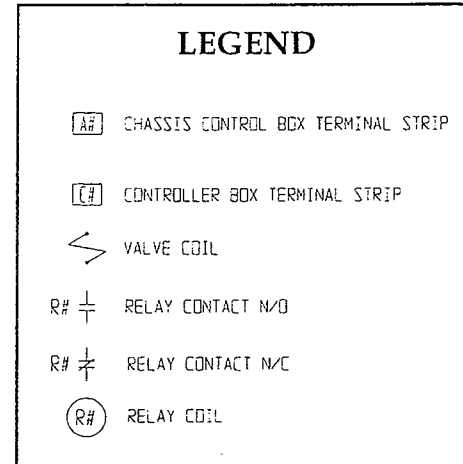


Figure 6-1: Relay and Terminal Strip Identification

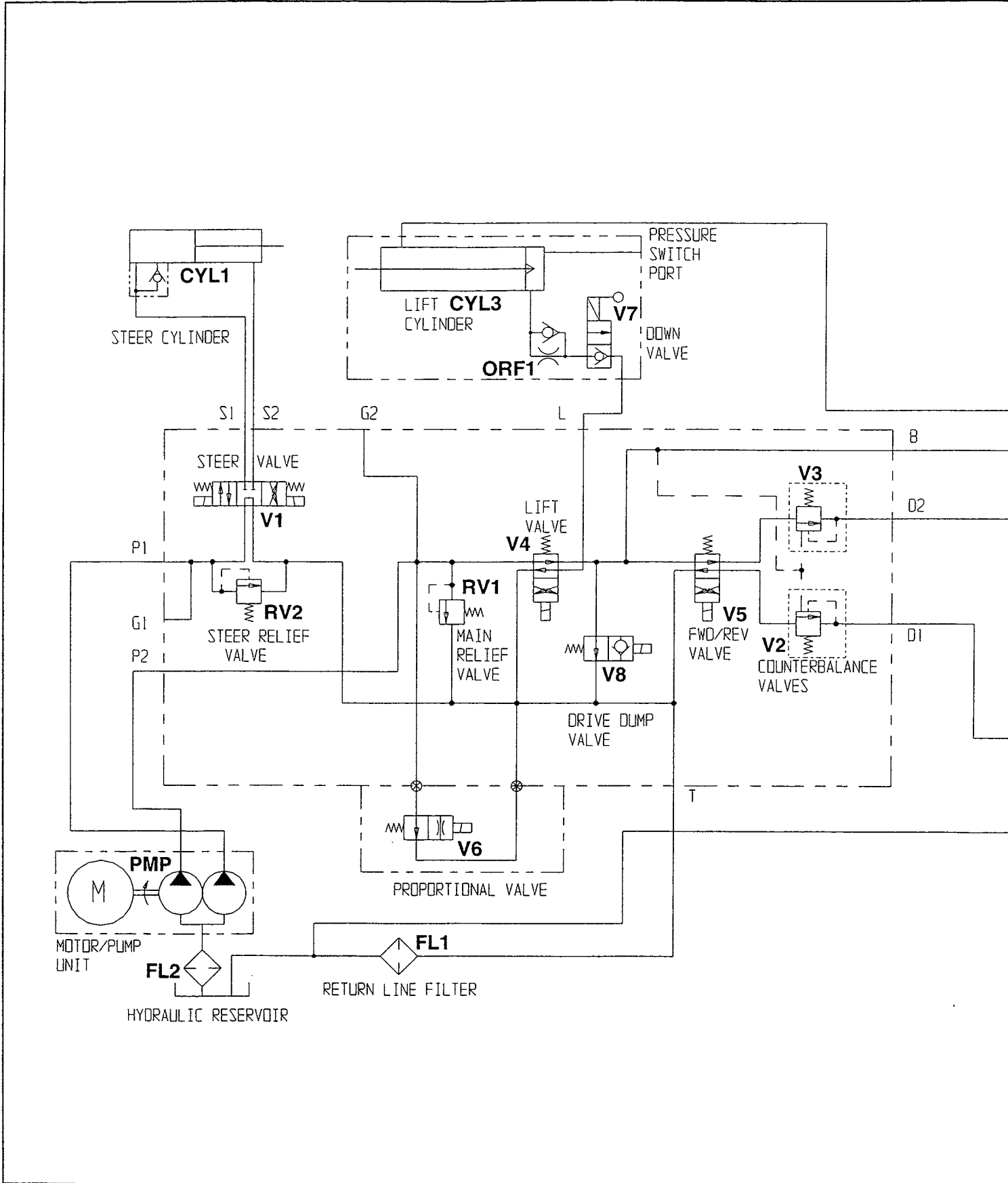


Figure 6-3: Hydraulic Schematic

NOTES

Blank area for notes.

7.0 Introduction

This section lists and illustrates the replaceable assemblies and parts of the SL20 Series Work Platform, as manufactured by Upright, Inc.

Each parts list contains the component parts for that assembly indented to show relationship where applicable.

7.1 Index

| Assembly | Page |
|-------------------------------------|------|
| Final Assembly | 7-2 |
| Elevating Assembly | 7-6 |
| Chassis Assembly | 7-8 |
| Control Module Assembly | 7-10 |
| Control Valve Assembly | 7-14 |
| Power Module Assembly | 7-16 |
| Guardrail Assembly | 7-18 |
| Slideout Deck Assembly | 7-20 |
| Controller Assembly | 7-22 |
| Hose Kit | 7-24 |
| Label Kit | 7-26 |
| Air To Platform - Option | 7-28 |
| Power To Platform - Option | 7-29 |
| Beacon Assembly - Option | 7-30 |
| Horn Assembly - Option | 7-32 |
| Voltage/Hour Meter - Option | 7-33 |
| Hour Meter - Option | 7-34 |
| Brake Release Kit - Option | 7-35 |
| Alarm (Fwd/Rev/Up) - Option | 7-36 |
| Removable Controller - Option | 7-37 |
| 800w Generator - Option | 7-38 |

Illustrated Parts Breakdown

FINAL ASSEMBLY

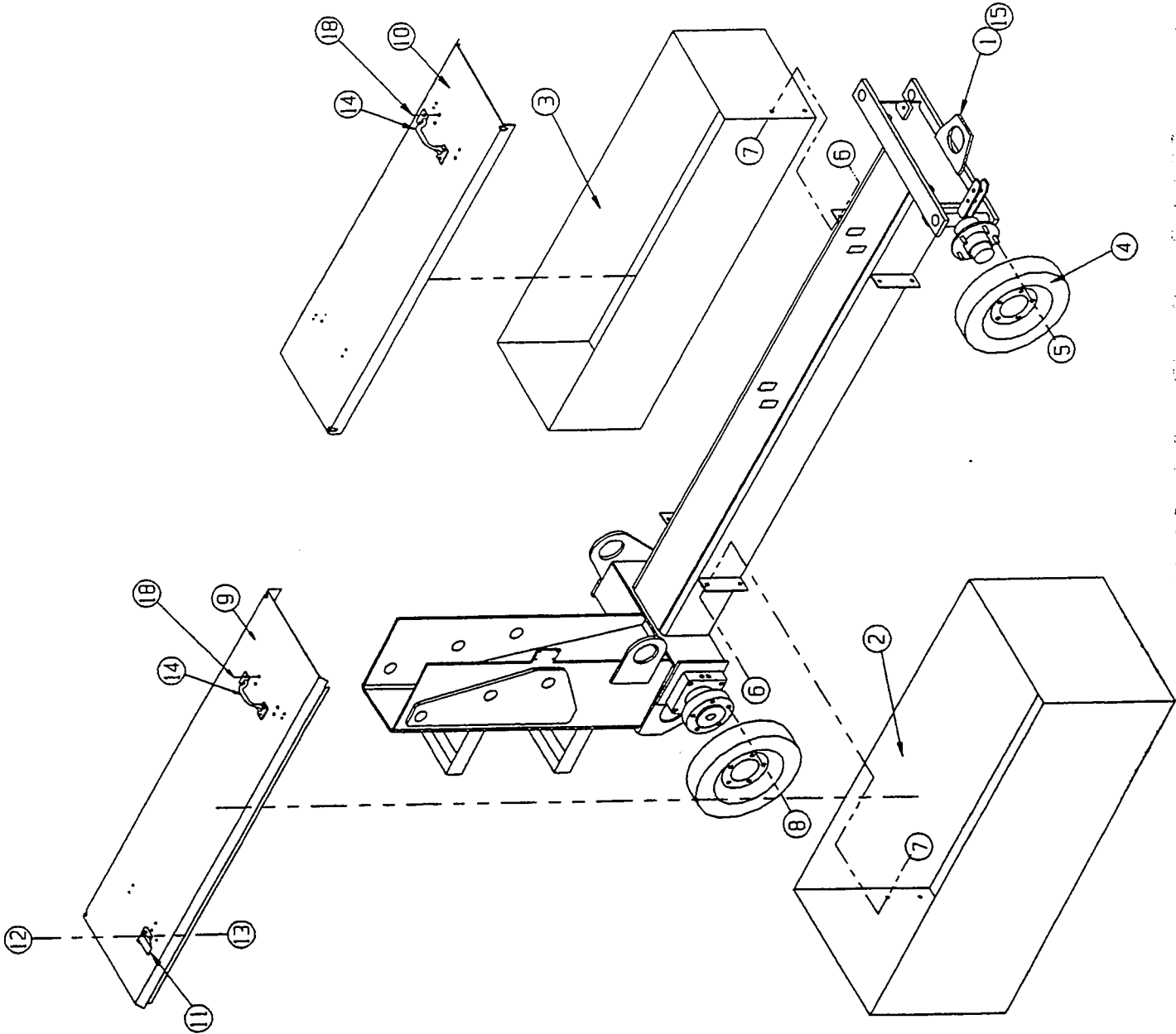
63400-006

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|--------------------------|------|
| 1 | 63401-001 | Elevating Assy | Ref |
| 2 | 63403-010 | Control Module | 1 |
| 3 | 63453-001 | Power Module | 1 |
| 4 | 30469-001 | Wheel Assy | 4 |
| 5 | 05105-000 | Wheel Nut | 10 |
| 6 | 11248-006 | Locknut 3/8-16 UNC Hex | 8 |
| 7 | 11254-008 | Screw 3/8-16 UNC HHC X 1 | 8 |
| 8 | 14122-001 | Bolt Wheel | 10 |
| 9 | 63397-001 | Cover Control Module Top | 1 |
| 10 | 63399-000 | Cover Power Module Top | 1 |
| 11 | 05299-000 | Latch Toggle | 4 |
| 12 | 11708-004 | Screw 8-32 UNC X 1/2 | 8 |
| 13 | 11248-002 | Locknut 8-32 Hex | 8 |
| 14 | 25427-002 | Handle | 4 |
| 15 | 63402-004 | Chassis Assy | 1 |
| 16 | 25427-002 | Battery Cable X 35 Lg | 1 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|--------------------------|------|
| 17 | 25427-002 | Battery Cable X 22 Lg | 1 |
| 18 | 25427-002 | Rivet 1/8 X 1/4-3/8 Grip | 16 |
| 19 | 15793-011 | Switch Limit | 1 |
| 20 | 15793-013 | Switch Lever | 1 |
| 21 | 11709-016 | Screw 10-24 UNC X 2 | 2 |
| 22 | 65609-010 | Control Cable | 1 |
| 23 | 29925-000 | Connector | 1 |
| 24 | 63557-000 | Hose Support | 1 |
| 25 | 15963-099 | Tie Strap | .66 |
| 26 | 15964-000 | Strap Head | 1 |
| 27 | 11248-003 | Lock Nut 10-24 | 2 |
| 28 | 29931-003 | Term FM Push 16-14 .25 | 2 |
| 29 | 14914-001 | Term M Push 16-14 .25 | 2 |
| 30 | 29610-001 | Conn Fork #6 22-18 | 9 |
| 31 | 29488-099 | Cable 6 Cond | 4' |
| 32 | 29496-099 | Cable 2 Cond | 10' |

Illustrated Parts Breakdown

Section
7.2

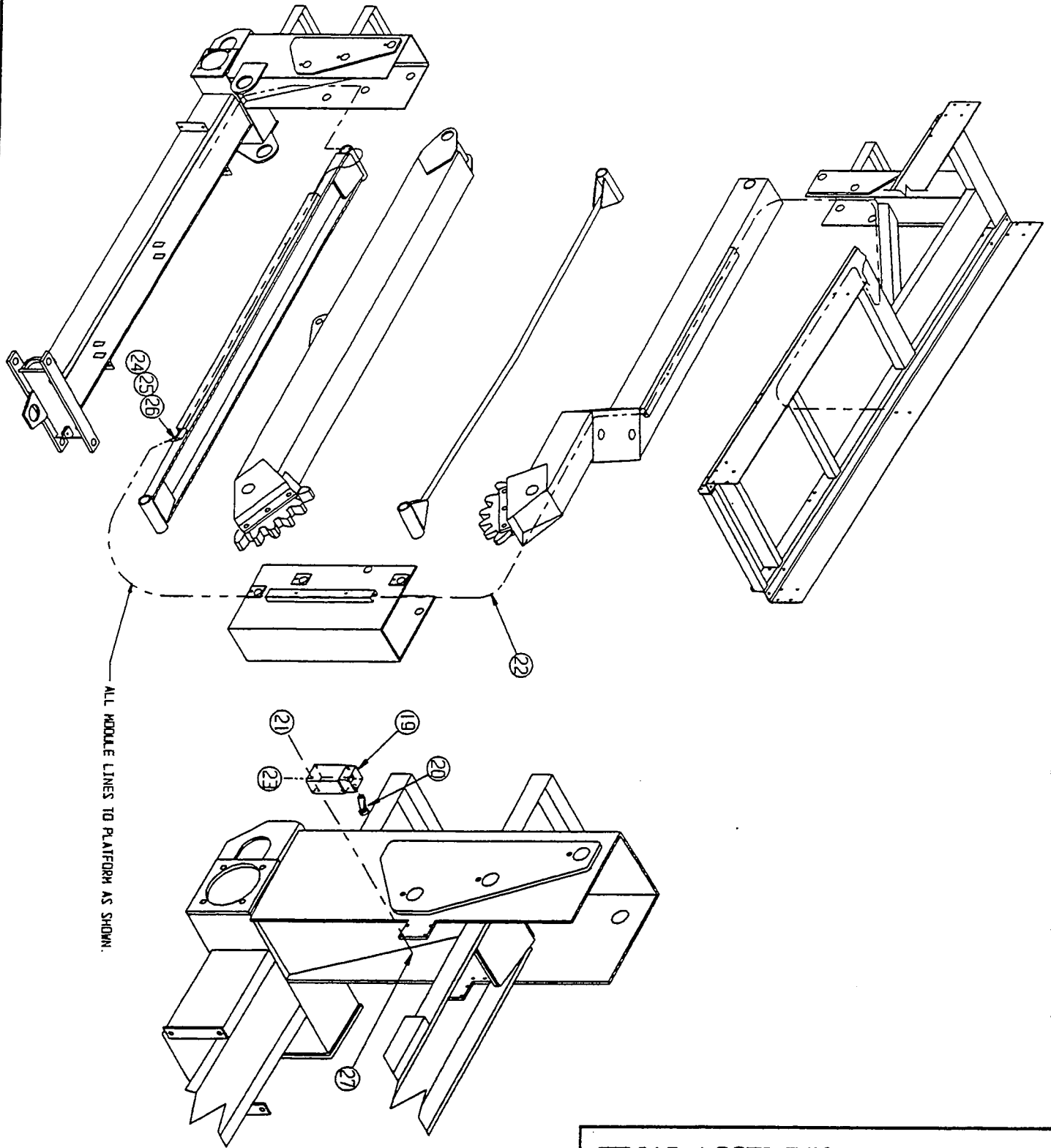


FINAL ASSEMBLY

63400-006

Drawing 1 of 4

Illustrated Parts Breakdown

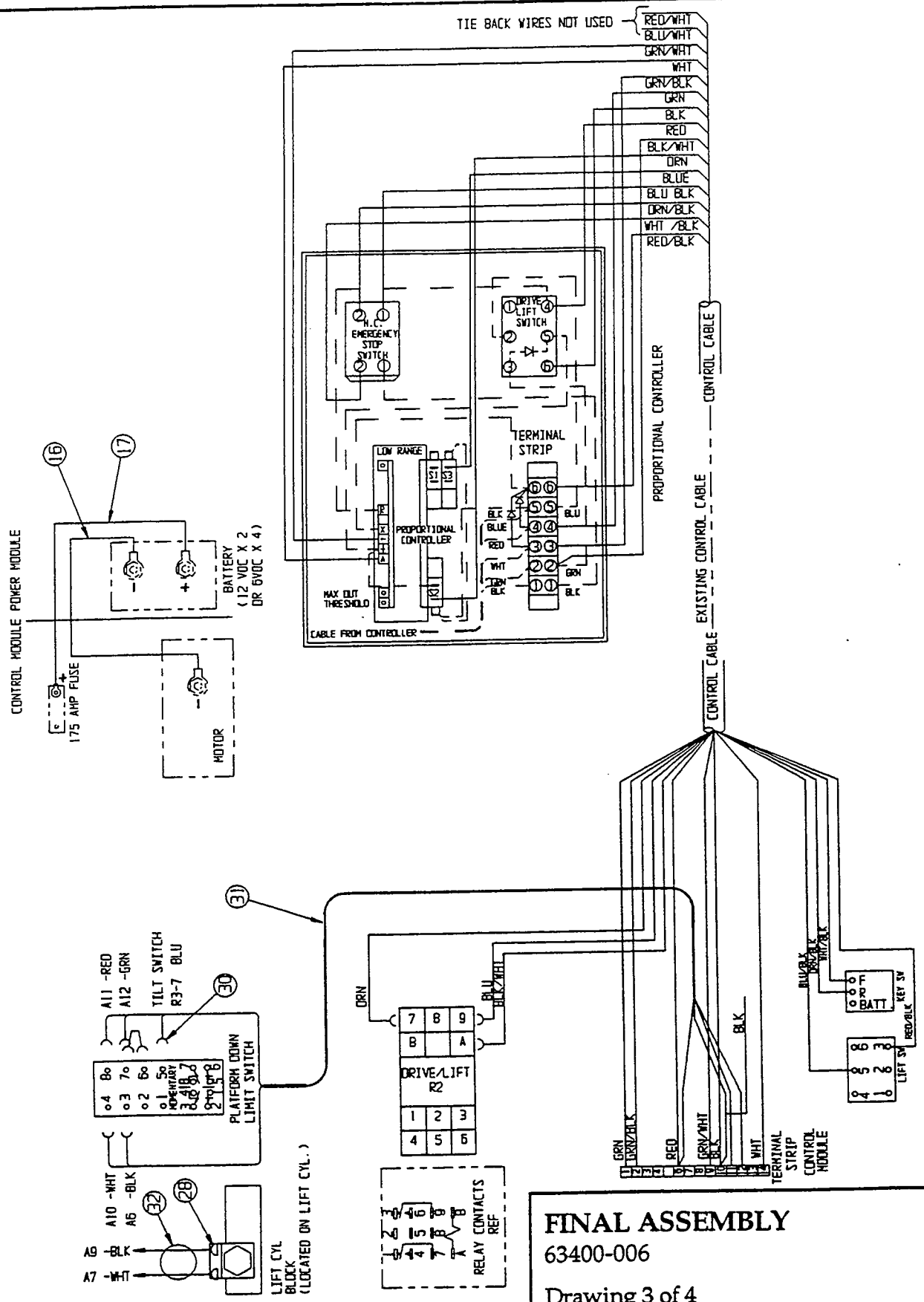


FINAL ASSEMBLY

63400-006

Drawing 2 of 4

Illustrated Parts Breakdown



FINAL ASSEMBLY
63400-006
Drawing 3 of 4

ELEVATING ASSEMBLY

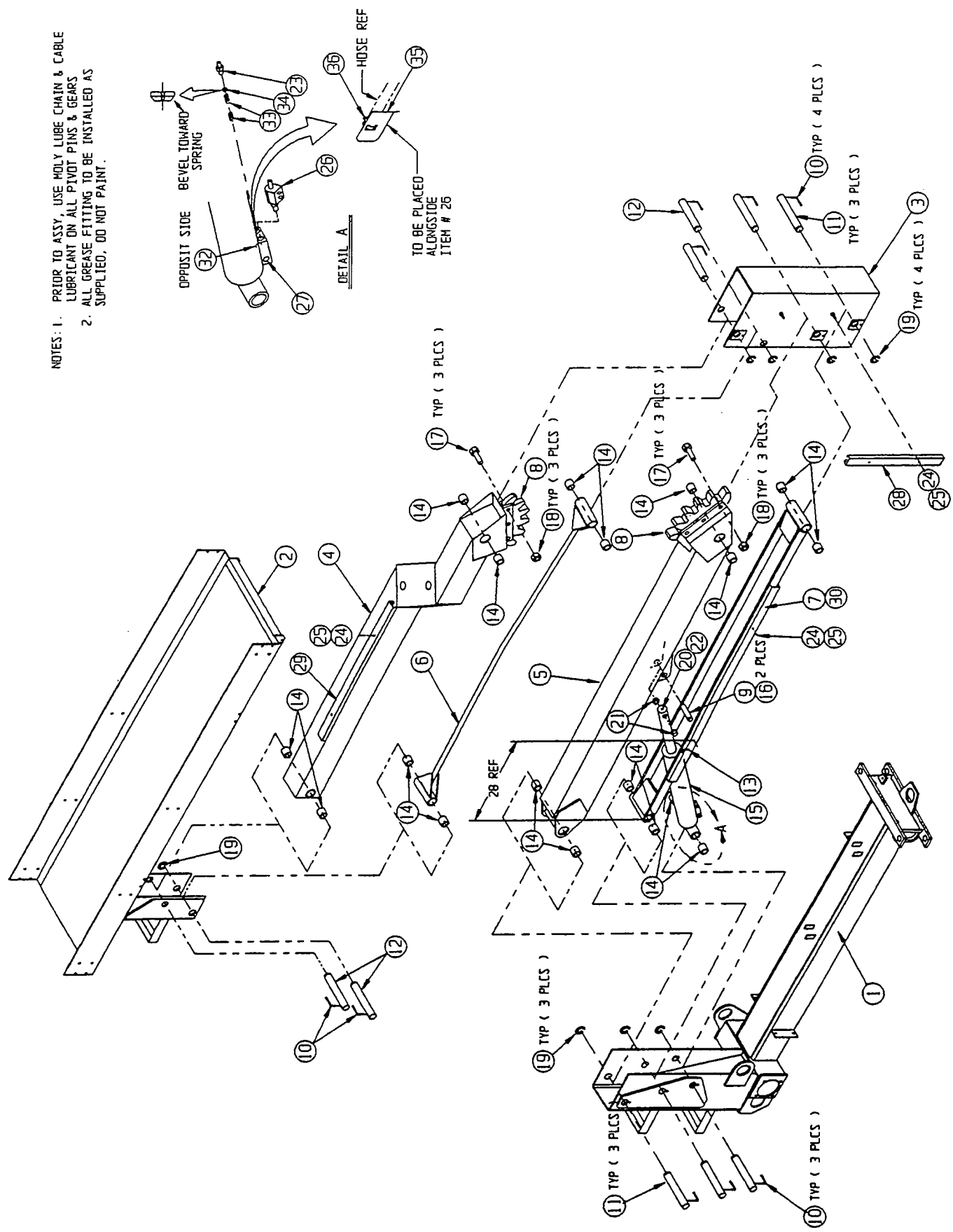
63401-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|---|------|
| 1 | 63402-004 | Chassis Assy | 1 |
| 2 | 63474-002 | Weldment, Deck | 1 |
| 3 | 63035-003 | Weldment, Midlink Pivot | 1 |
| 4 | 63044-002 | Weldment, Upper Arm | 1 |
| 5 | 63052-001 | Weldment, Lower Arm | 1 |
| 6 | 63059-000 | Weldment, Upper Tension | 1 |
| 7 | 63061-002 | Weldment, Lower Tension | 1 |
| 8 | 63085-001 | Gear, Linkage | 2 |
| 9 | 63134-001 | Pin, Cyl. Rod | 1 |
| 10 | 63087-000 | Locking Pin | 9 |
| 11 | 63090-000 | Pivot Pin, Long | 6 |
| 12 | 63091-000 | Pivot Pin, Short | 3 |
| 13 | 11940-006 | Fitting, Elbow | 1 |
| 14 | 63095-001 | Bearing, Pivot | 18 |
| 15 | 63096-002 | Lift Cylinder | 1 |
| * | 63096-016 | Seal Kit, Lift Cyl.-For Ser. Nos. 6095 to current | 1 |
| * | 63096-015 | Seal Kit, Lift Cyl.-For Ser. Nos. 5800 thru 6094 | 1 |
| 16 | 11764-016 | Retaining Ring | 2 |
| 17 | 14099-036 | Screw, HHC 3/4-10 X 4 1/2 Lg | 6 |
| 18 | 11248-012 | Locknut 3/4-10 Hex | 6 |
| 19 | 11764-023 | Retaining Ring | 9 |
| 20 | 13925-016 | Screw, Set SCPT 3/8-16 X 1 Lg | 1 |
| 21 | 62649-001 | Flanged Bearing | 2 |
| 22 | 11273-006 | Nut, Jam 3/8-16 | 1 |
| 23 | 11941-005 | Fitting, Adaptor | 1 |
| 24 | 11240-004 | Washer 1/4 Dia Flat | 6 |
| 25 | 11248-004 | Locknut 1/4-20 UNC Hex | 6 |
| 26 | 66179-000 | Valve | 1 |
| 27 | 11920-004 | Plug 1/4 NPT | 1 |
| 28 | 63666-001 | Wire Channel X 24 | 1 |
| 29 | 63666-002 | Wire Channel X 40 | 1 |
| 30 | 63666-003 | Wire Channel X 57 | 1 |
| 32 | 12004-004 | Plug 1/4 SAE | 1 |
| 33 | 05133-000 | Spring | 1 |
| 34 | 15919-001 | Orifice #840 | 1 |
| 35 | 65850-000 | Guard, Emergency Lowering | 1 |
| 36 | 20541-006 | Hose Clamp | 1 |

*Not Shown

Illustrated Parts Breakdown

- NOTES: 1. PRIOR TO ASSY, USE MOLY LUBE CHAIN & CABLE LUBRICANT ON ALL PIVOT PINS & GEARS.
2. ALL GREASE FITTING TO BE INSTALLED AS SUPPLIED, DO NOT PAINT.



Illustrated Parts Breakdown

CHASSIS ASSEMBLY

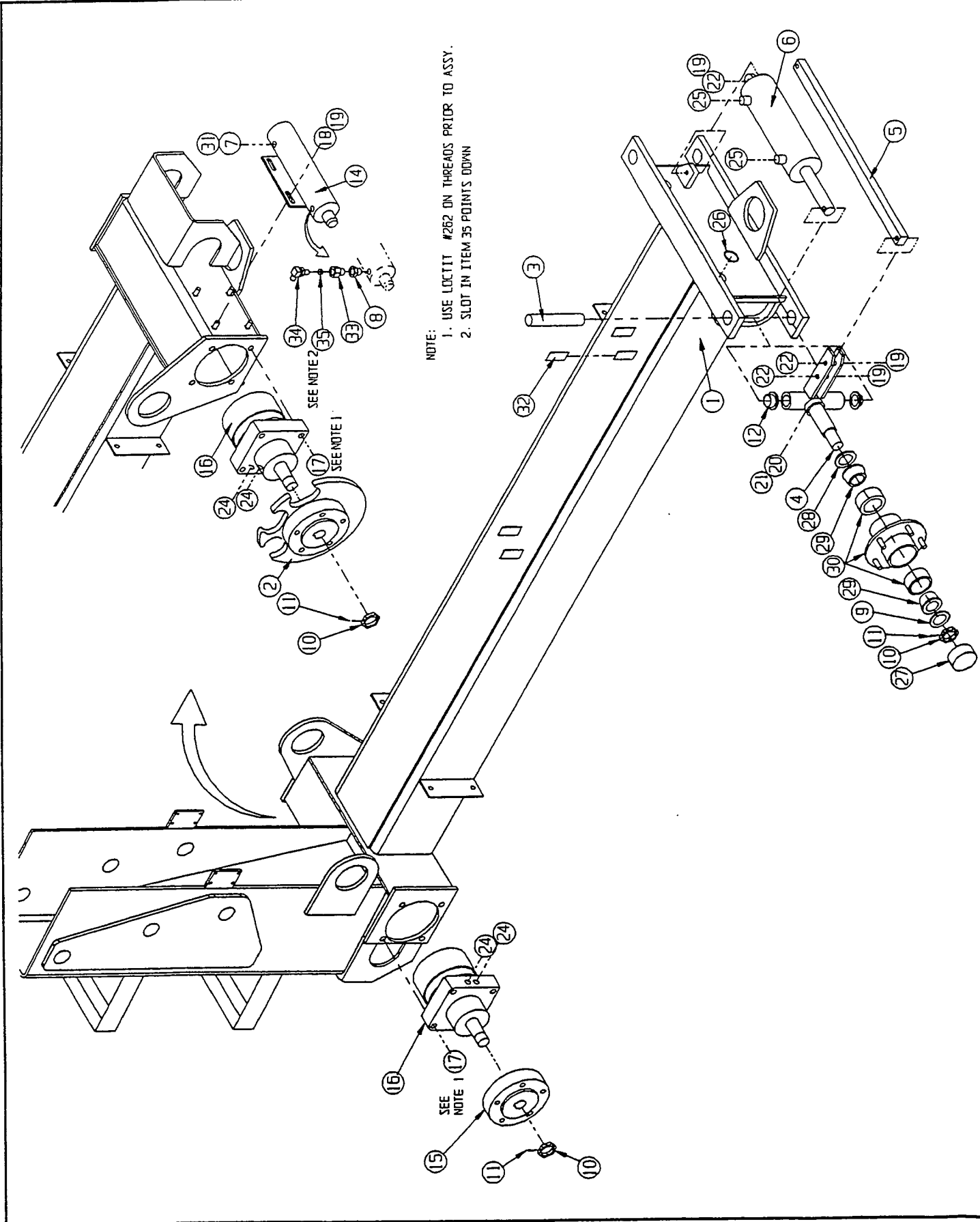
63402-004

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-----------------------------|------|
| 1 | 63011-003 | Chassis Weldment | 1 |
| 2 | 63075-000 | Brake Hub Weldment | 1 |
| 3 | 63077-000 | King Pin | 2 |
| 4 | 63078-000 | Spindle Weldment | 2 |
| 5 | 63089-000 | Drag Link | 1 |
| 6 | 63097-000 | Steering Cylinder | 1 |
| * | 63097-014 | Seal Kit, Steering Cylinder | 1 |
| 7 | 11939-010 | Fitting Str | 1 |
| 8 | 11923-003 | Fitting | 1 |
| 9 | 11239-016 | Washer 1 Dia Flat ASTM | 2 |
| 10 | 11274-016 | Nut 1-14 UNF Slotted Hex | 4 |
| 11 | 11753-012 | Pin Cotter 1/8 X 1 1/2 | 4 |
| 12 | 11781-014 | Bearing Flanged | 4 |
| 14 | 60479-000 | Brake Cylinder | 1 |
| * | 60211-014 | Seal Kit, Brake Cylinder | 1 |
| 15 | 60737-000 | Hub | 1 |
| 16 | 61817-001 | Motor Hyd | 2 |
| * | 61817-010 | Seal Kit, Hyd. Motor | 1 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|------------------------------|------|
| 17 | 11256-018 | Screw 1/2-13 UNC HHC X 2 1/4 | 8 |
| 18 | 11240-006 | Washer 3/8 Dia | 4 |
| 19 | 11248-006 | Locknut 3/8-16 UNC Hex | 8 |
| 20 | 11273-006 | Nut 3/8-16 UNC Hex Jam | 2 |
| 21 | 11254-010 | Screw 3/8-16 UNC HHC X 1 1/4 | 2 |
| 22 | 11254-016 | Screw 3/8-16 UNC HHC X 2 | 4 |
| 24 | 11941-013 | Fitting St | 4 |
| 25 | 11940-006 | Fitting 90° | 2 |
| 26 | 12956-010 | Grommet | 2 |
| 27 | 05078-000 | Cap Dust | 2 |
| 28 | 05104-000 | Seal Grease | 2 |
| 29 | 11775-011 | Cone Bearing | 4 |
| 30 | 63102-001 | Hub Assy | 2 |
| 31 | 11932-003 | Fitting 45° | 1 |
| 32 | 29940-099 | Tube Heatshrink 3/4 Dia | .67' |
| 33 | 63980-003 | Fitting St | 1 |
| 34 | 11934-006 | Fitting 90° | 1 |
| 35 | 15919-000 | Orifice | 1 |

*Not Shown

Illustrated Parts Breakdown



CONTROL MODULE ASSEMBLY

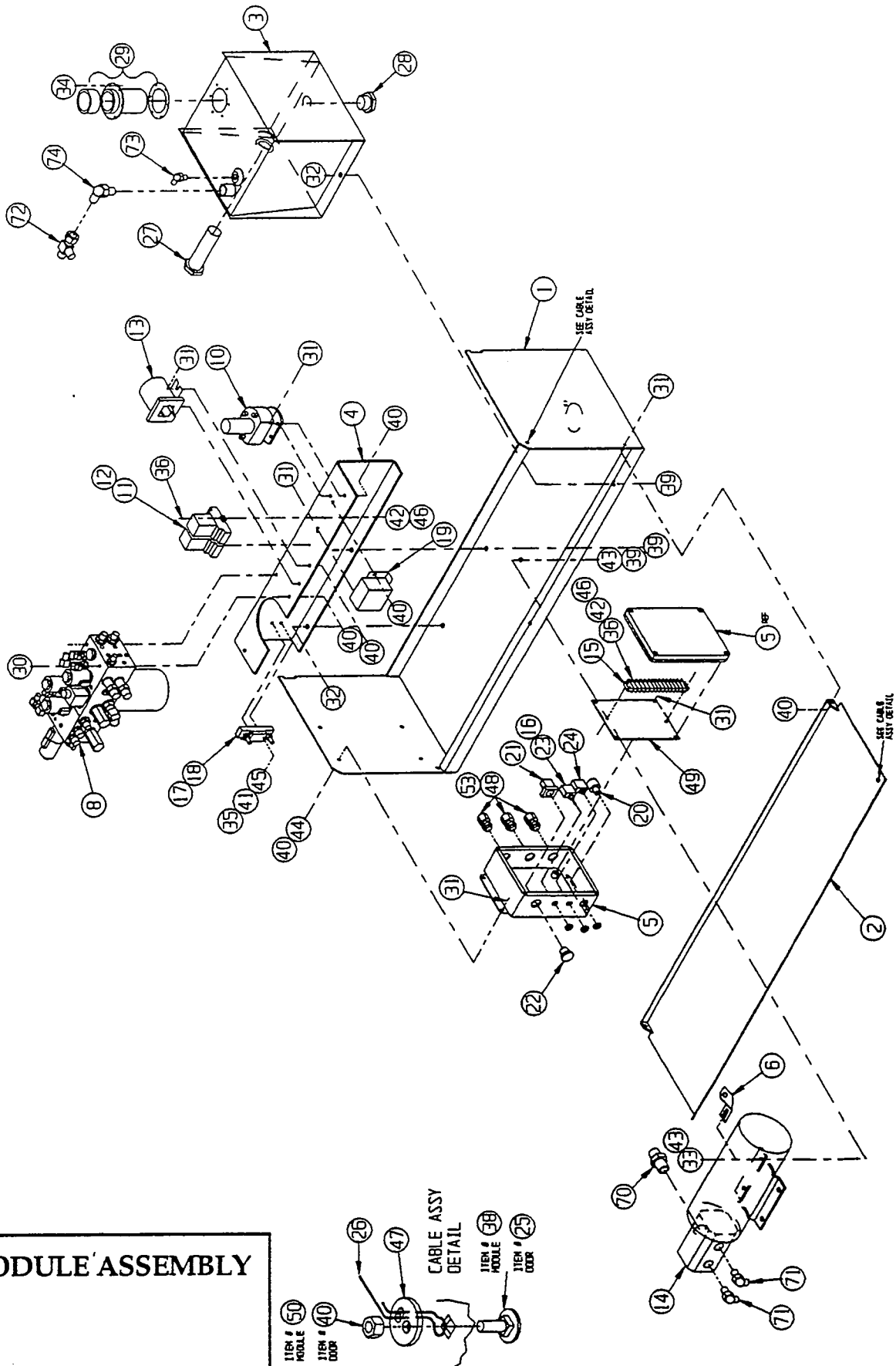
63403-010

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|------------------------------------|------|
| 1 | 63406-002 | Tray, Control Module | 1 |
| 2 | 63394-001 | Door, Control Module | 1 |
| 3 | 63063-002 | Hydraulic Tank Weldment | 1 |
| 4 | 63387-000 | Bracket, Valve Block Assemblv | 1 |
| 5 | 65845-002 | Enclosure - Modified | 1 |
| 6 | 63029-000 | Buss Bar | 1 |
| 8 | 65617-001 | Valve Block Assembly | 1 |
| * | 30576-009 | Service Block | 1 |
| 9 | 65609-010 | Control Cable Assembly | Ref |
| 10 | 29945-006 | Level Sensor | 1 |
| 11 | 27963-000 | Relay Socket | 2 |
| 12 | 27962-002 | Relay, 24v | 2 |
| 13 | 10122-000 | Solenoid, 24v | 1 |
| 14 | 15797-000 | Power Unit | 1 |
| * | 15797-010 | Pump | 1 |
| * | 15797-011 | Motor | 1 |
| * | 10145-001 | Brush Set, Motor | 2 |
| 15 | 29928-004 | Terminal Block | 1 |
| 16 | 29932-002 | Term, Jumper | 1 |
| 17 | 10149-000 | Fuse Block | 1 |
| 18 | 10148-001 | Fuse, 175 Amp | 1 |
| 19 | 63778-000 | Alarm, Dual Range | 1 |
| 20 | 10155-000 | Key Switch | 1 |
| * | 10155-001 | Key | 1 |
| 21 | 63667-002 | Contact Block N.C. | 1 |
| 22 | 63667-001 | Push Button | 1 |
| 23 | 12798-001 | Toggle Switch | 1 |
| 24 | 29868-007 | Circuit Breaker 15 Amp | 1 |
| 25 | 11829-006 | Carriage Bolt, 1/4-20 UNC X 3/4 Lg | 2 |
| 26 | 64466-015 | Cable, Vinyl Covered Assembly X 15 | 2 |
| 27 | 61818-000 | Fitting, Suction Screen | 1 |
| 28 | 21305-006 | Plug, Magnetic | 1 |
| 29 | 05963-001 | Filler, Breather | 1 |
| 30 | 12553-032 | Screw, Soc Hd, 1/4-20 UNC X 4 Lg | 3 |
| 31 | 11252-006 | Screw, HHC, 1/4-20 UNC X 3/4 Lg | 12 |
| 32 | 11254-008 | Screw, HHC, 3/8-16 UNC X 1 Lg | 3 |
| 33 | 11252-010 | Screw, HHC, 3/8-16 UNC X 1 1/4 | 2 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|---|------|
| 34 | 11811-006 | Screw, Self Tapping, 10-32 UNF X 1/2 Lg | 6 |
| 35 | 66695-008 | Screw, Flat Hd, 10-24 UNC X 1 Lg | 2 |
| 36 | 11715-006 | Screw, Machine, 6-32 UNC X 3/4 Lg | 4 |
| 38 | 11275-008 | Screw HHC 10-32 X 1 Lg | 2 |
| 39 | 11248-006 | Nut, ESNA, 3/8-16 UNC | 5 |
| 40 | 11248-004 | Nut, ESNA, 1/4-20 UNC | 17 |
| 41 | 11248-003 | Nut, ESNA, 10-24 UNC | 2 |
| 42 | 11248-047 | Nut, ESNA, 6-32 UNC | 4 |
| 43 | 11240-006 | Washer, Flat, 3/8 | 4 |
| 44 | 11240-004 | Washer, Flat, 1/4 | 4 |
| 45 | 14996-003 | Washer, Flat, #10 SAE | 4 |
| 46 | 11240-001 | Washer, Flat, #6 | 4 |
| 47 | 64464-000 | Cable Retainer | 2 |
| 48 | 29925-011 | Cable Connector 3/4 | 2 |
| 49 | 65848-000 | Panel | 1 |
| 50 | 11261-003 | Nut, ESNA, 10-32 UNF | 2 |
| 52 | 62125-007 | Battery Cable X 7 Lg | 1 |
| 53 | 29939-003 | Locknut NPT | 3 |
| 54 | 64195-014 | Battery Cable X 14 Lg | 1 |
| 57 | 05487-099 | Wire, 16 Ga, Violet | 5' |
| 58 | 29452-099 | Wire, 16 Ga, Blk | 5' |
| 59 | 29453-099 | Wire, 16 Ga, Org | 8' |
| 60 | 29477-099 | Wire, 16 Ga, Orn/Blk | 6' |
| 61 | 29620-002 | Conn Butt 16-14 | 12 |
| 62 | 29456-099 | Wire, 16 Ga, Yel | 3' |
| 63 | 29825-002 | Diode 3amp | 8 |
| 64 | 29601-013 | Ring Terminal 14-16 Ga X #10 | 12 |
| 66 | 29610-002 | Conn Fork #6 16-14 | 38 |
| 67 | 29931-003 | Terminal, Push, Female 14-16 Ga X 1/4 | 14 |
| 68 | 29601-008 | Conn Ring 5/16 22-18 | 1 |
| 69 | 29601-014 | Conn Ring 1/4 16-14 | 4 |
| 70 | 11941-012 | Fitting Str | 1 |
| 71 | 11934-004 | Fitting O Ring Boss 90° | 2 |
| 72 | 20733-002 | Fitting Tee | 1 |
| 73 | 11940-004 | Fitting 90° | 1 |
| 74 | 11940-010 | Fitting 90° | 1 |

*Not Shown

Illustrated Parts Breakdown

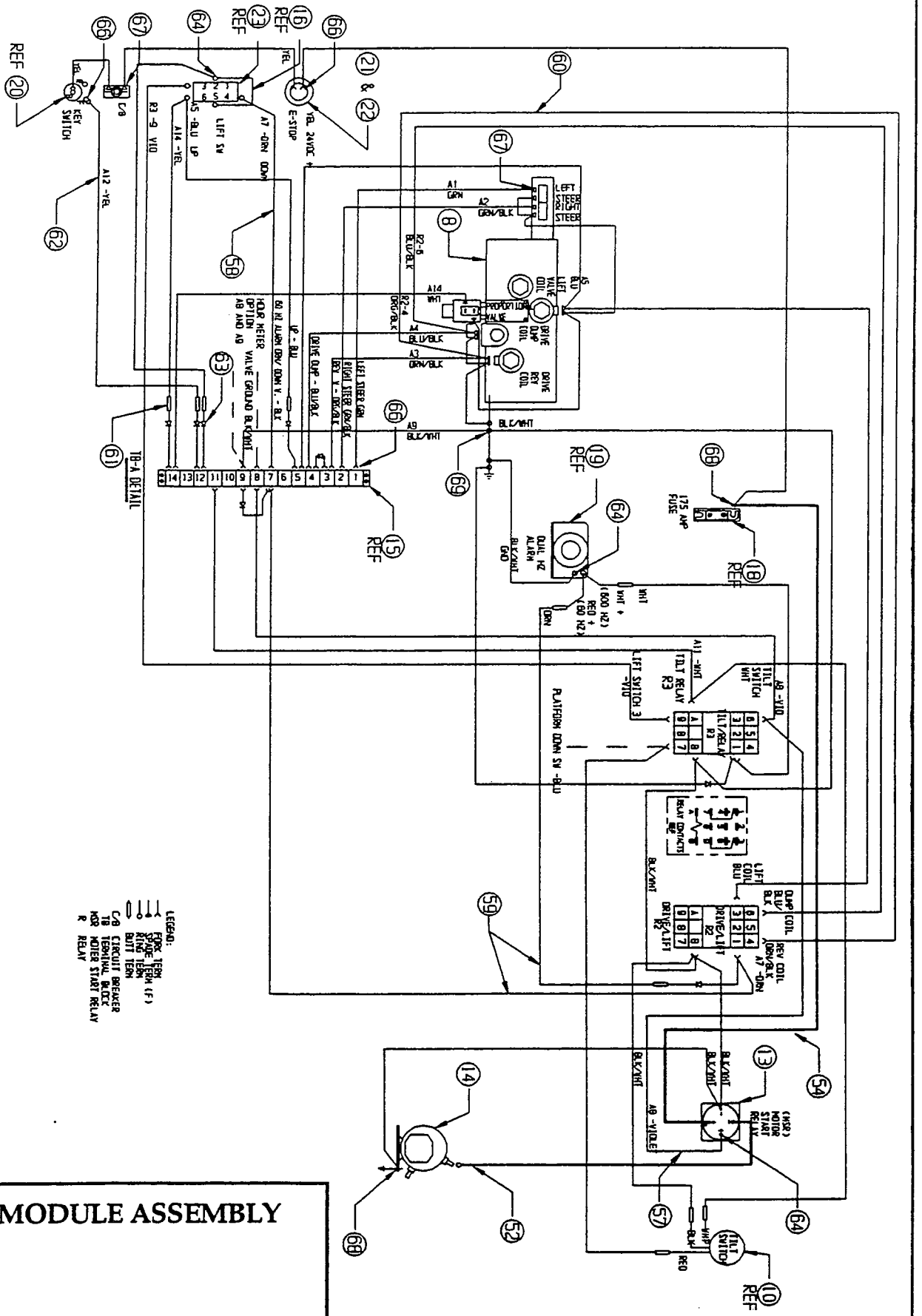


CONTROL MODULE ASSEMBLY

63403-010

Drawing 1 of 2

Illustrated Parts Breakdown



CONTROL MODULE ASSEMBLY
63403-010
Drawing 2 of 2

Illustrated Parts Breakdown

Section
7.2

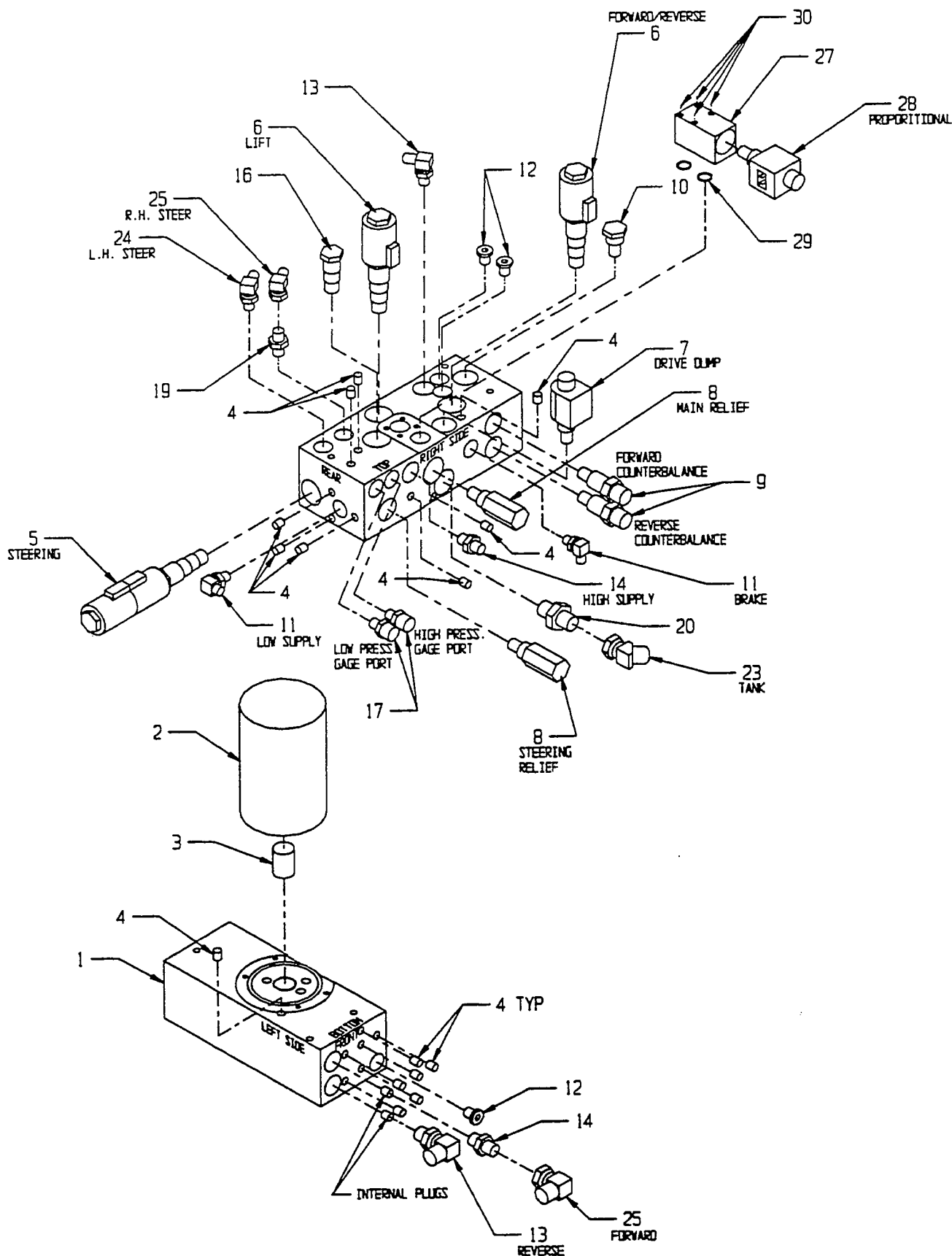
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CONTROL VALVE ASSEMBLY

65617-001

| 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 | 9mm Expander Plug | 17 |
| 5 | 63923-007 | Cartridge Valve 4 Way 3 Pos Tandem | 1 |
| 6 | 63923-006 | Cartridge Valve 4 Way 2 Pos Rev. | 2 |
| 7 | 63923-005 | Cartridge Valve 2 Way | 1 |
| 8 | 12877-007 | Relief Valve Direct Acting Adjstbl. | 2 |
| 9 | 15900-000 | Counterbalance Valve | 2 |
| 10 | 63955-008 | Cavity Plug -8 X 2 Way | 1 |
| 12 | 12004-004 | Plug SAE-4 | 3 |
| 13 | 11934-004 | Elbow 90° | 2 |
| 14 | 11941-005 | Adapter Str. | 2 |
| 16 | 63955-003 | Cavity Plug 10-4 Modified | 1 |
| 17 | 63965-001 | Test Fittings ISO | 2 |
| 19 | 11941-004 | Adapter Str | 1 |
| 20 | 11941-009 | Adapter Str | 1 |
| 23 | 11932-003 | Adapter 45° | 1 |
| 24 | 11934-026 | Elbow 90° | 3 |
| 25 | 11937-003 | Adapter 90° | 2 |
| 27 | 65374-000 | Proportional Valve Block | 1 |
| 28 | 63986-002 | Proportional Valve | 1 |
| 29 | 11979-008 | O-Ring | 2 |
| 30 | 14412-016 | 10-24 X 2 Soc Hd Bolt | 4 |

Illustrated Parts Breakdown



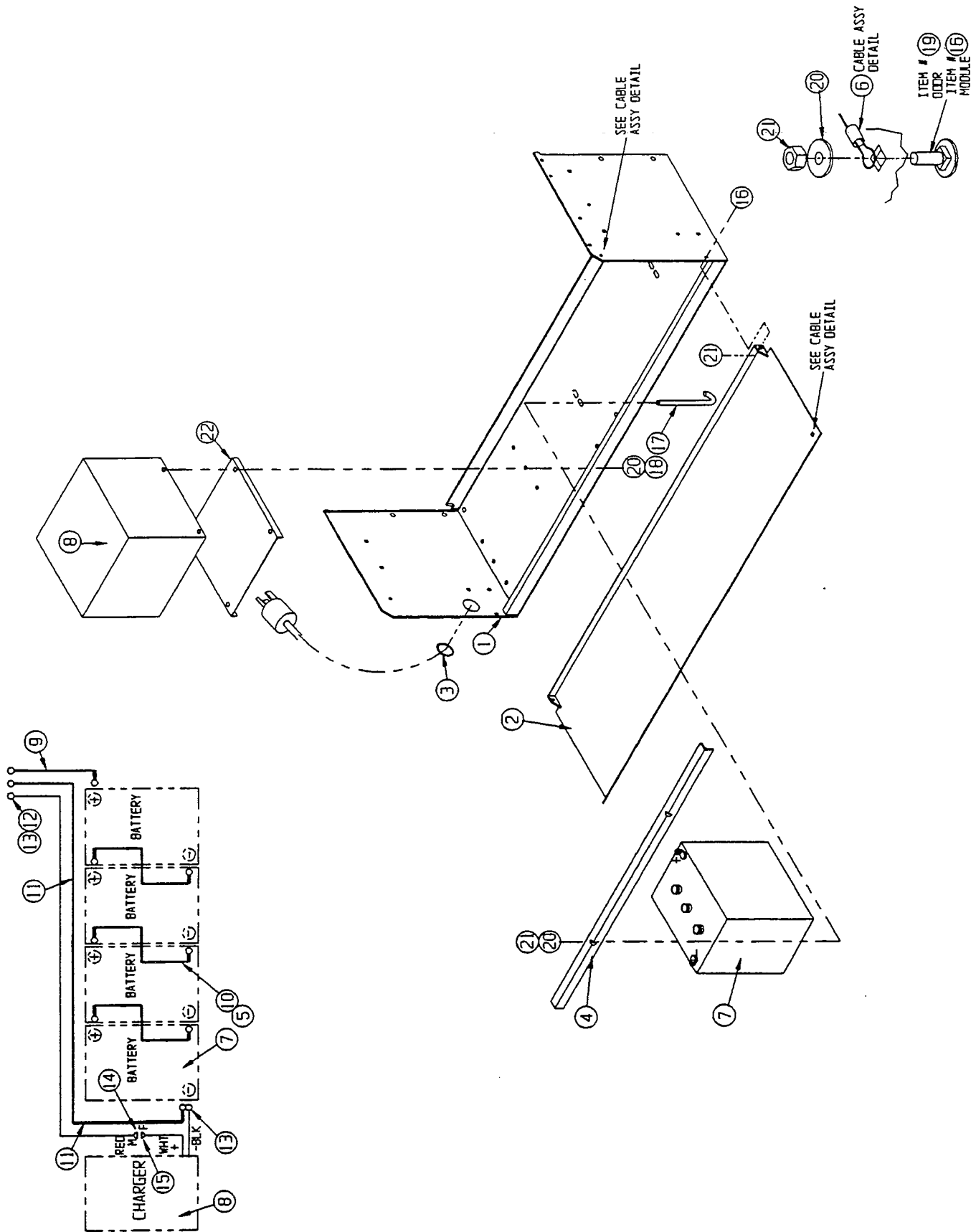
Illustrated Parts Breakdown

POWER MODULE ASSEMBLY

63453-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-----------------------------|------|
| 1 | 63552-001 | Module Tray | 1 |
| 2 | 63395-000 | Cover Weldment L.H. | 1 |
| 3 | 61796-099 | Grommet | .33' |
| 4 | 63083-000 | Angle, Battery Hold down | 1 |
| 5 | 10154-000 | Terminal Cover | 8 |
| 6 | 64466-015 | Cable Assy | 1 |
| 7 | 15796-000 | Battery 6 VDC | 4 |
| 8 | 63944-011 | Charger, Battery | 1 |
| 9 | 62125-010 | Cable Assy X 36 | 1 |
| 10 | 62125-008 | Cable Assy X 8 | 3 |
| 11 | 64195-024 | Cable Assy X 24 | 1 |
| 12 | 29470-099 | Wire, 12 AWG Red | 6' |
| 13 | 29601-039 | Conn, Ring 12-10 X 5/16 | 2 |
| 14 | 14914-002 | Conn, M Push X .25 | 1 |
| 15 | 29931-005 | Conn, FM Push X .25 | 1 |
| 16 | 11252-006 | Screw, 1/4-20 UNC HHC X 3/4 | 3 |
| 17 | 63082-000 | Bolt, J | 2 |
| 18 | 11252-012 | Screw, 1/4-20 UNC X 1 1/2 | 2 |
| 19 | 11829-006 | Bolt, Carr 1/4-20 UNC X 3/4 | 1 |
| 20 | 11240-004 | Washer, 1/4 Dia Flat | 6 |
| 21 | 11248-004 | Locknut, 1/4-20 Hex | 4 |
| 22 | 63386-000 | Charger Spacer | 1 |

Illustrated Parts Breakdown



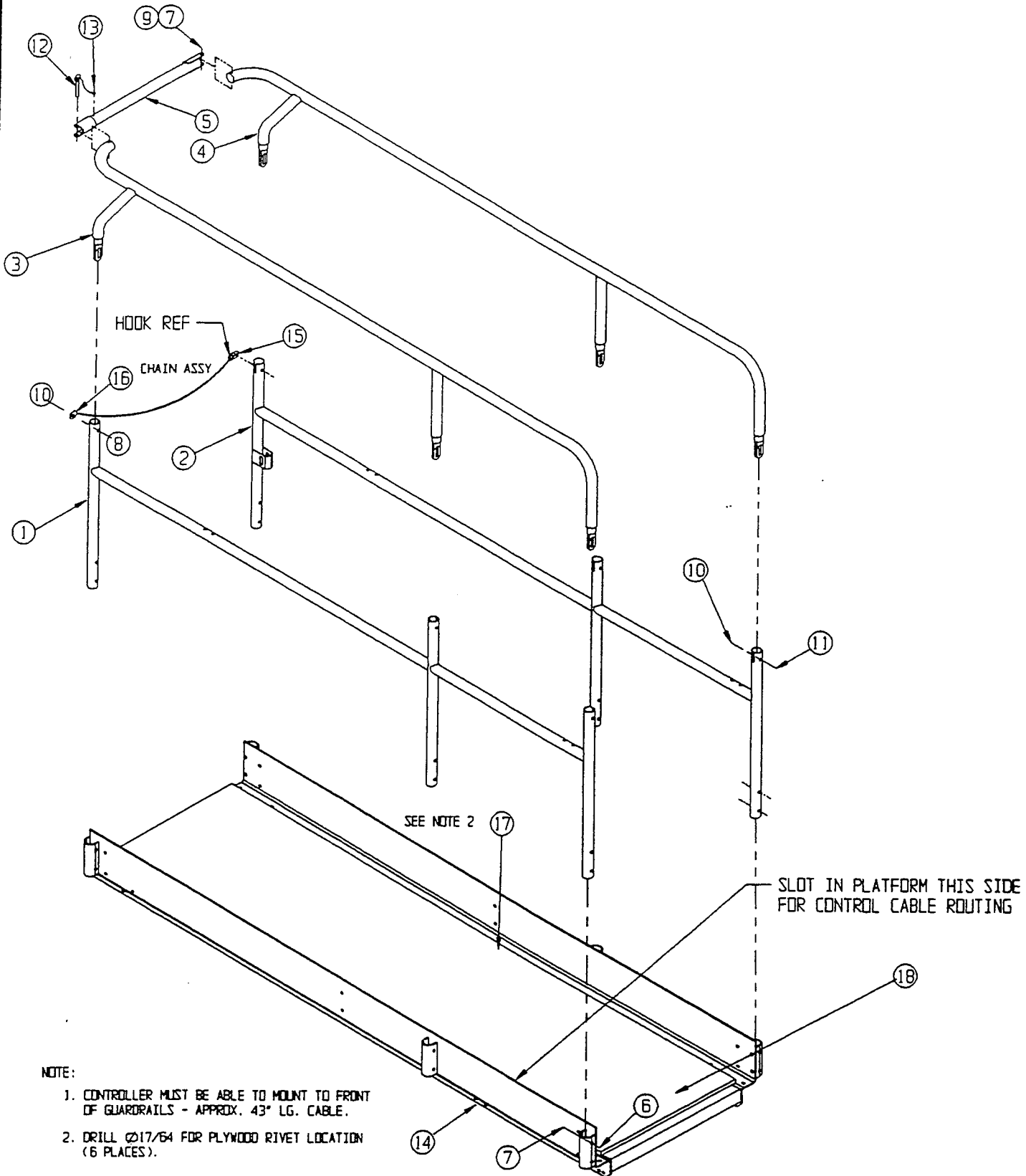
Illustrated Parts Breakdown

GUARDRAIL ASSEMBLY

63476-004

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-------------------------------|------|
| 1 | 65813-000 | Lower Guardrail Weldment R.H. | 1 |
| 2 | 65814-000 | Lower Guardrail Weldment L.H. | 1 |
| 3 | 65815-000 | Upper Guardrail Weldment R.H. | 1 |
| 4 | 65816-000 | Upper Guardrail Weldment L.H. | 1 |
| 5 | 65805-001 | Toprail Swing Arm Weldment | 1 |
| 6 | 11252-018 | Screw HHC 3/8-16 UNC X 2 1/4 | 12 |
| 7 | 11248-006 | Nut Hex ESNA 3/8-16 UNC | 13 |
| 8 | 11253-016 | Screw HHC 5/16-18 UNC X 2 | 2 |
| 9 | 11254-018 | Screw HHC 3/8-16 UNC X 2 1/4 | 1 |
| 10 | 11248-005 | Nut Hex ESNA 5/16-18 UNC | 6 |
| 11 | 11253-014 | Screw HHC 5/16-18 UNC X 1 3/4 | 4 |
| 12 | 10414-003 | Locking Pin Assy 10 Lg | 1 |
| 13 | 26553-004 | Rivet 3/16 Dia | 1 |
| 14 | 63474-002 | Platform Weldment | Ref |
| 15 | 65840-000 | Bar, Chain Gate | 1 |
| 16 | 65841-000 | Assembly, Chain Gate | 1 |
| 17 | 26554-006 | Rivet Pop 1/4 .75-.87 Grip | 6 |
| 18 | 63321-005 | plywood Deck | 1 |

Illustrated Parts Breakdown

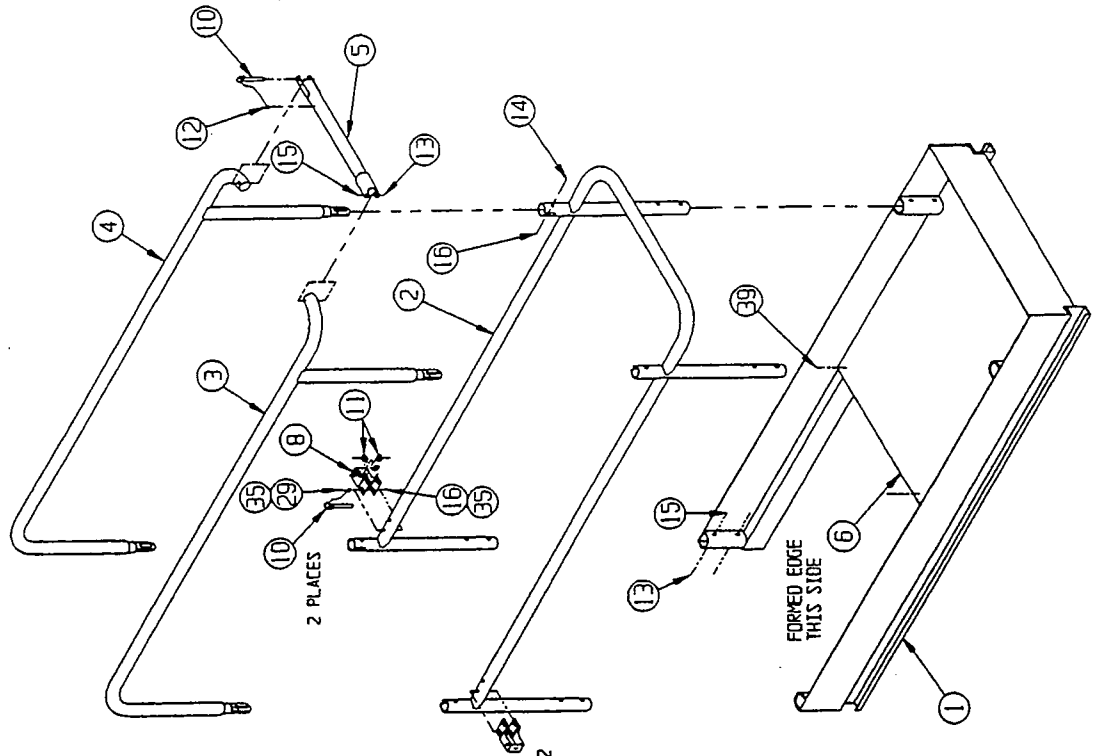


SLIDEOUT DECK ASSEMBLY

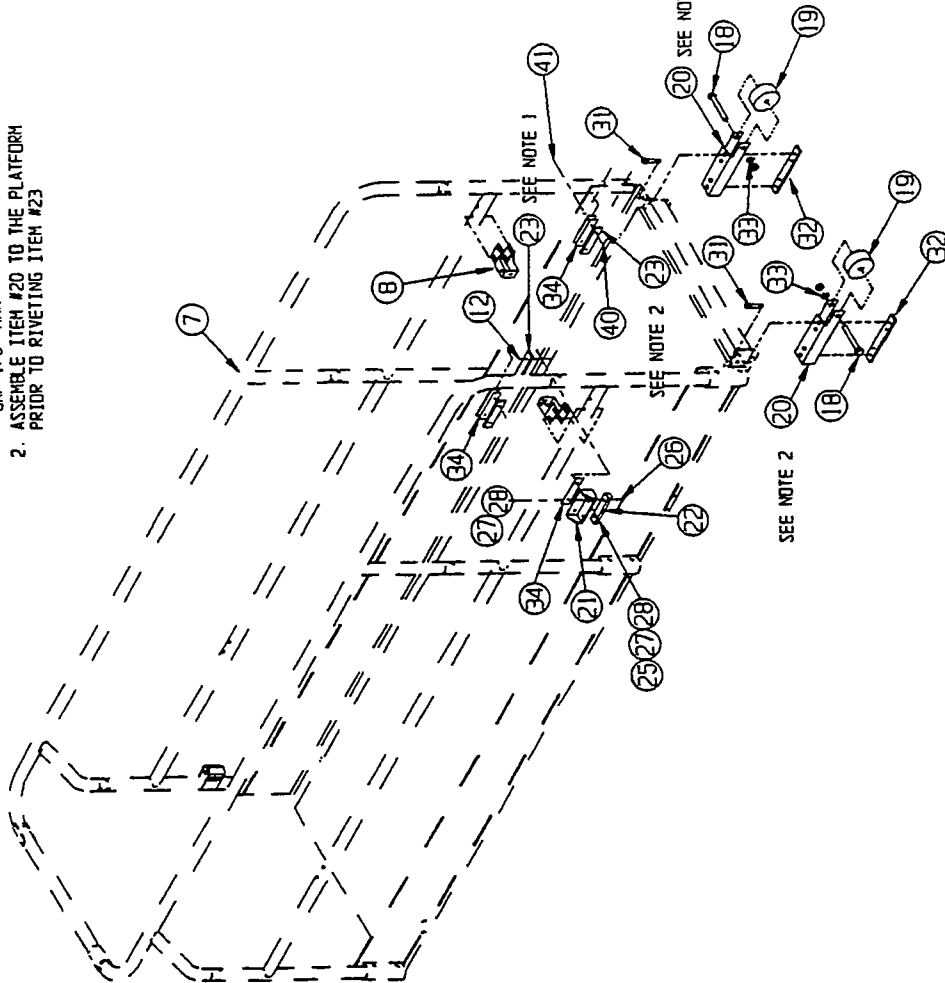
63575-003

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-------------------------------|------|
| 1 | 63478-001 | Deck Weldment | 1 |
| 2 | 65802-000 | Lower Guardrail Weldment | 1 |
| 3 | 65803-000 | Upper Guardrail Weldment R.H. | 1 |
| 4 | 65804-000 | Upper Guardrail Weldment L.H. | 1 |
| 5 | 65805-000 | Top Rail Swing Arm Weldment | 1 |
| 6 | 63492-000 | Diamond Tread Floor | 1 |
| 7 | 63476-000 | Guardrail Assy. | Ref |
| 8 | 63729-001 | Guardrail Clip | 4 |
| 10 | 10414-003 | Locking Pin Assy | 3 |
| 11 | 10080-006 | Tree Clip | 12 |
| 12 | 26553-004 | Pop Rivet 3/16 X 3/8 Grip | 5 |
| 13 | 11254-018 | Screw HHC 3/8-16 UNC X 2 1/4 | 9 |
| 14 | 11253-014 | Screw HHC 5/16-18 UNC X 1 3/4 | 4 |
| 15 | 11248-006 | Nut Hex ESNA 3/8-16 UNC | 9 |
| 16 | 11248-005 | Nut Hex ESNA 5/16-18 UNC | 12 |
| 18 | 63990-001 | Axle | 2 |
| 19 | 63989-001 | Wheel | 2 |
| 20 | 63490-000 | Wheel Mounting Bracket | 2 |
| 21 | 63726-000 | Slide Bracket | 2 |
| 22 | 63727-000 | Slide Block | 2 |
| 23 | 63728-000 | Slide Block | 6 |
| 25 | 11252-006 | Screw Hex Hd Cap 1/4-20 X 3/4 | 4 |
| 26 | 12553-008 | Screw Socket Hd 1/4-20 X 1 | 4 |
| 27 | 11248-004 | ESNA Nut 1/4-20 | 8 |
| 28 | 11240-004 | Washer Flat 1/4 | 8 |
| 29 | 11253-018 | Screw HHC 5/16-18 UNC X 2 1/4 | 8 |
| 31 | 11254-008 | Screw Hex Hd Cap 3/8-16 X 1 | 4 |
| 32 | 63578-000 | Retaining Block | 2 |
| 33 | 11240-008 | Washer Flat 1/2 | 2 |
| 34 | 63571-001 | Spacer | 4 |
| 35 | 11240-005 | Washer Flat 5/16 | 16 |
| 39 | 26553-007 | Pop Rivet 3/16 X 1/2 Grip | 4 |
| 40 | 11709-006 | Screw #10-24 UNC X 3/4 | 8 |
| 41 | 11248-003 | Locknut #10-24 UNC Hex | 8 |

Illustrated Parts Breakdown



- NOTE: 1. SHIM AS REQUIRED TO MINIMIZE
GAP 1/8" MAX
2. ASSEMBLE ITEM #20 TO THE PLATFORM
PRIOR TO RIVETING ITEM #23



Illustrated Parts Breakdown

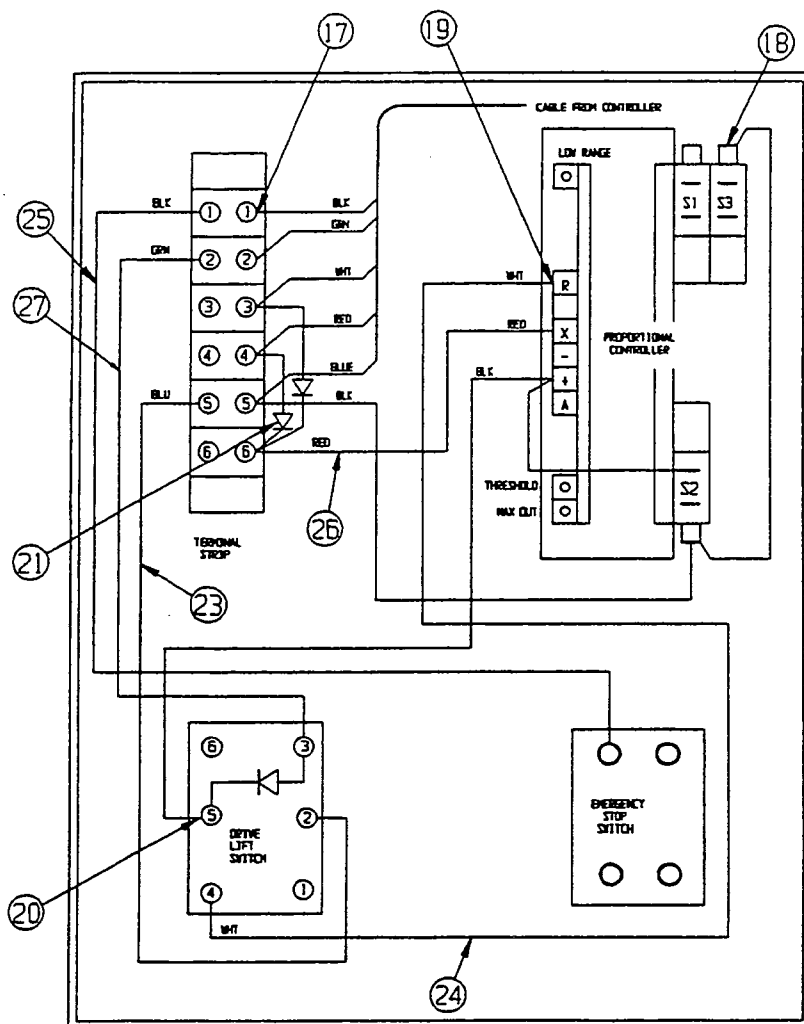
CONTROLLER ASSEMBLY

66020-000

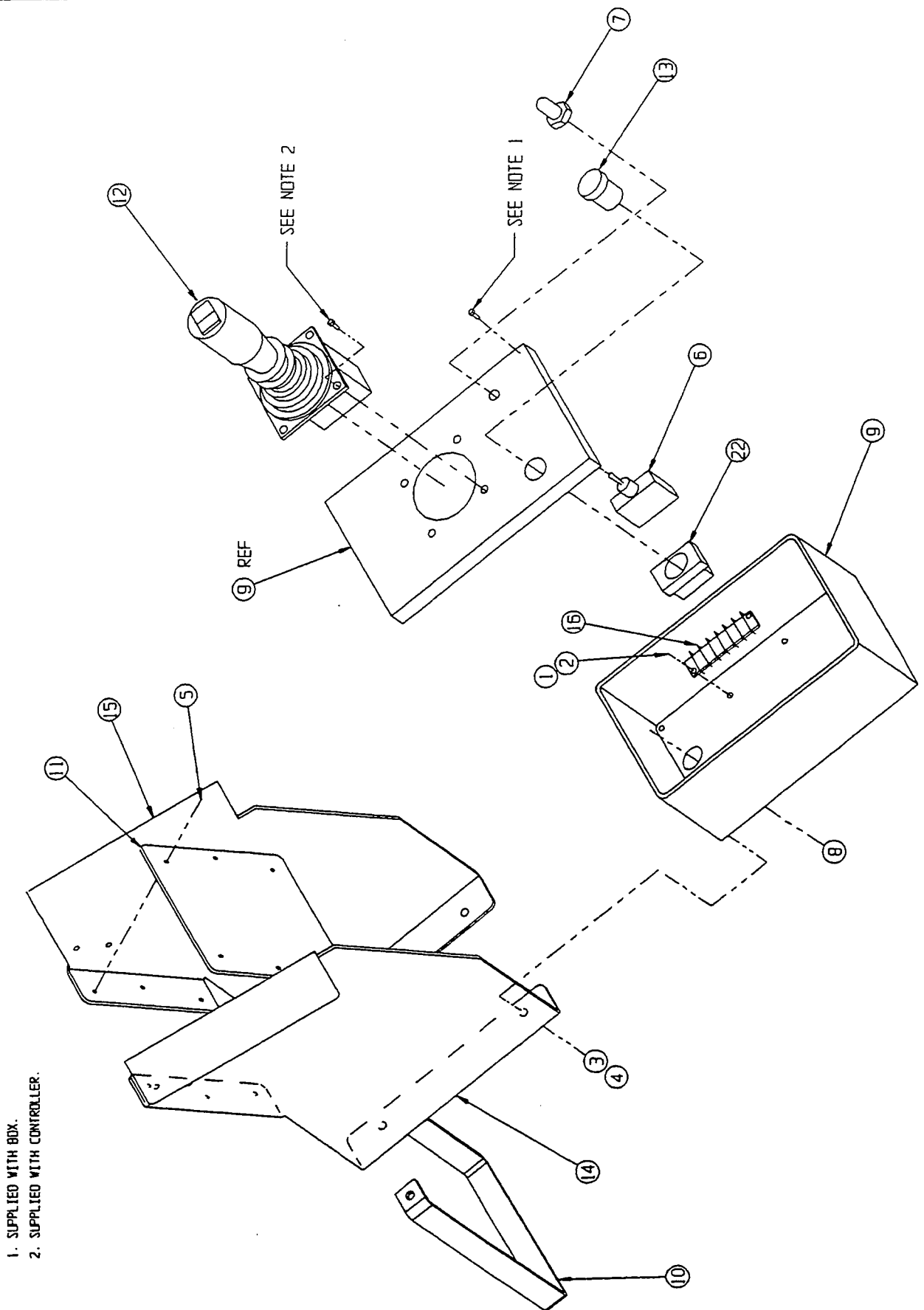
| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-----------------------------------|------|
| 1 | 11715-006 | Screw 6-32 UNC Mach Rd Hd X 3/4 | 2 |
| 2 | 11248-047 | Hex Nut 6-32 UNC | 2 |
| 3 | 11252-004 | Screw 1/4-20 UNC HHC X 1/2 | 4 |
| 4 | 11238-004 | Washer 1/4 Lock | 4 |
| 5 | 26551-007 | Rivet 1/8 Dia X 1/4-5/16 Grip | 6 |
| 6 | 15941-001 | Switch | 1 |
| 7 | 29872-000 | Boot | 1 |
| 8 | 29925-000 | Conn Cable | 1 |
| 9 | 66175-001 | Box Enclosure | 1 |
| 10 | 65746-000 | Guide, Controller | 1 |
| 11 | 66092-000 | Panel, Controller | 1 |
| 12 | 66544-000 | Controller, Proportional Joystick | 1 |
| * | 15772-001 | Switch | 3 |
| * | 66544-014 | Switch, Steering | 2 |
| * | 63913-003 | Boot, Steering Switch | 1 |
| * | 63913-004 | Rocker Assembly, Steering | 1 |
| - | 66544-010 | Handle, 2 piece | 1 |
| - | 66544-011 | Lever, Interlock | 1 |
| * | 66544-012 | Switch, Interlock | 1 |
| - | 66544-013 | Boot, Joystick Shaft | 1 |

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

*Not Shown



Illustrated Parts Breakdown

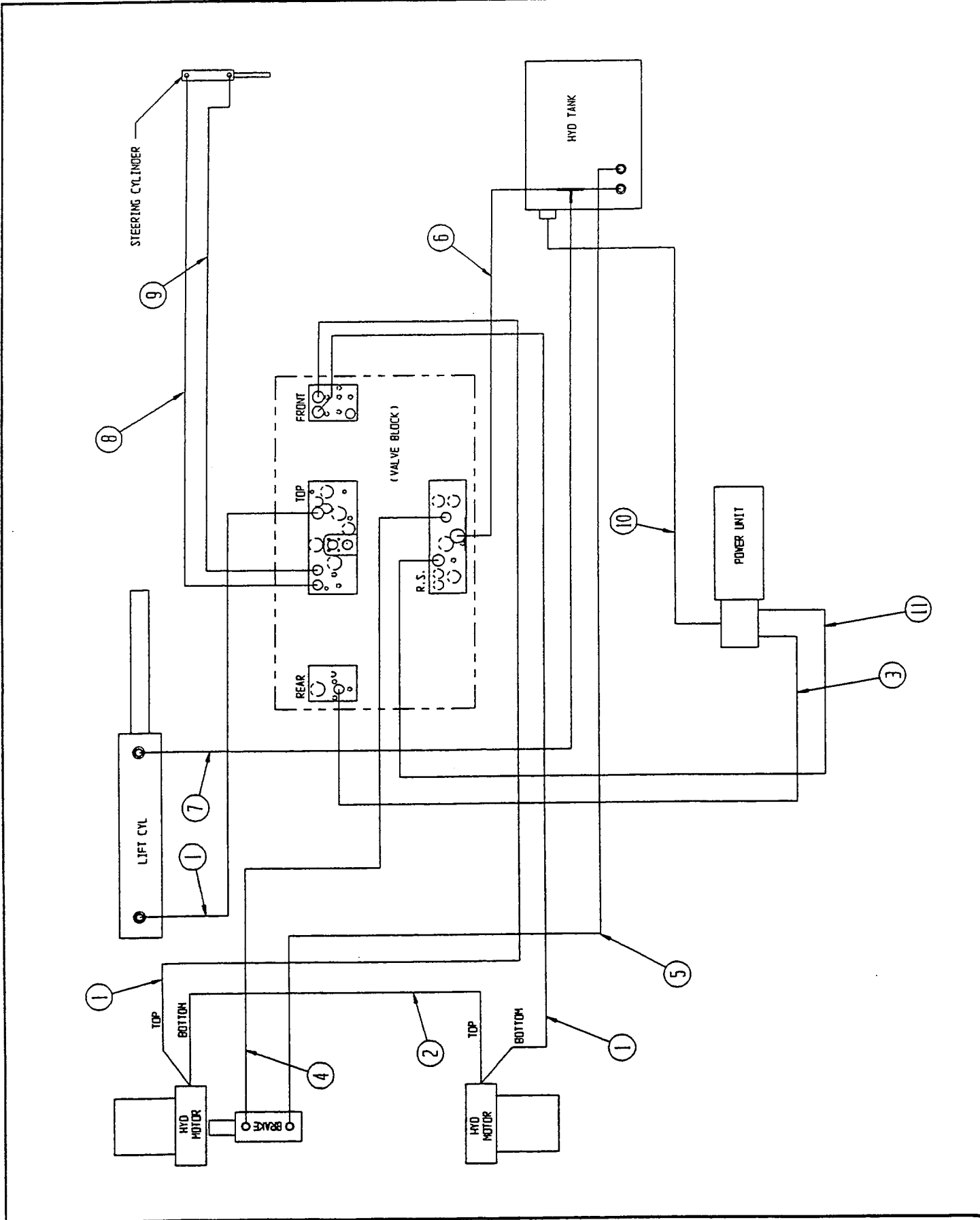


HOSE KIT

63003-004

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|----------------------------|------|
| 1 | 60861-020 | Hose Assy 3/8 Dia X 44 1/2 | 3 |
| 2 | 60861-008 | Hose Assy 3/8 Dia X 29 1/2 | 1 |
| 3 | 60861-022 | Hose Assy 3/8 Dia X 14 | 1 |
| 4 | 60861-099 | Hose Assy 3/8 Dia X 48 | 1 |
| 5 | 60861-056 | Hose Assy 3/8 Dia X 64 | 1 |
| 6 | 60861-010 | Hose Assy 3/8 Dia X 20 | 1 |
| 7 | 62192-030 | Hose Assy 1/4 Dia X 89 | 1 |
| 8 | 62192-031 | Hose Assy 1/4 Dia X 68 | 1 |
| 9 | 62192-032 | Hose Assy 1/4 Dia X 65 | 1 |
| 10 | 61789-018 | Hose Assy 3/4 Dia X 18 | 1 |
| 11 | 60861-051 | Hose Assy 3/8 Dia X 13 | 1 |

Illustrated Parts Breakdown



Illustrated Parts Breakdown

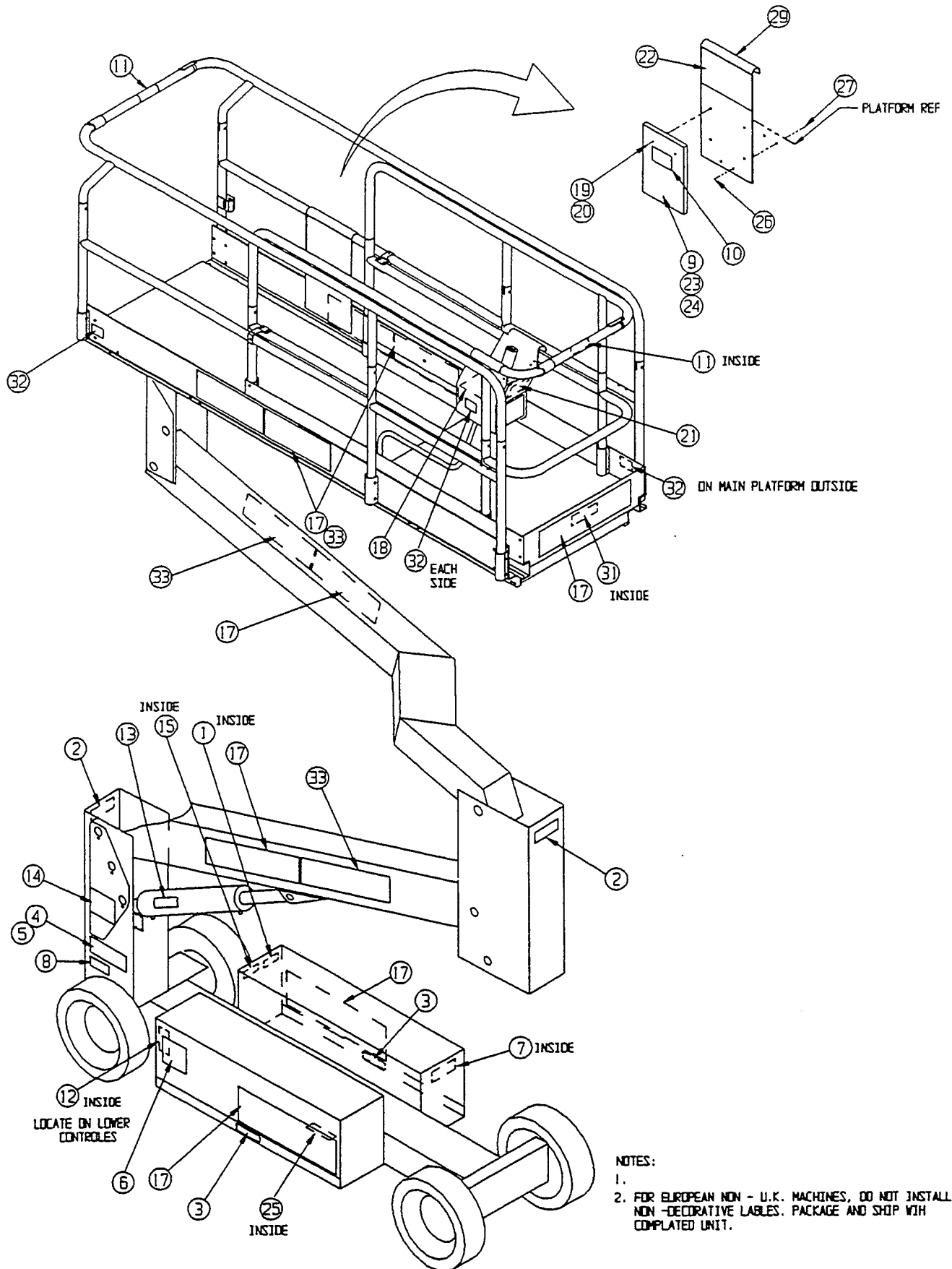
LABEL KIT

63008-006

| ITEM | PART | DESCRIPTION | QTY. |
|------|--------------|-----------------------------|------|
| 1 | 05221-000 | Label, Battery Fluid | 1 |
| 2 | 66557-003 | Label, Max Load 660 Lb | 2 |
| 3 | 14222-003-99 | Label, Fork Lift Here | 2 |
| 4 | 65368-000 | Tack | 4 |
| 5 | 61205-001 | Name Plate | 1 |
| 5 | 61205-000 | Name Plate | 1 |
| 6 | 66568-000 | Label, Lower Platform | 1 |
| 7 | 66552-000 | Label, Danger Hydrogen Gas | 1 |
| 8 | 61220-001 | Label, ANSI Req. | 1 |
| 9 | 10076-000 | Manual Case | 1 |
| 10 | 10076-001 | Label, Attention | 1 |
| 11 | 61787-001 | Label, Danger Guardrail | 2 |
| 12 | 63419-002 | Label, Controls | 1 |
| 13 | 66558-000 | Label, Emergency Lowering | 1 |
| 14 | 66555-000 | Label, Caution Relief Valve | 1 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|--------------------------------|------|
| 15 | 62562-001 | Label, Danger Batteries | 1 |
| 17 | 61683-005 | Label, UpRight | 7 |
| 18 | 66560-000 | Label, Controller | 1 |
| 19 | 11248-004 | Locknut 1/4-20 UNC | 2 |
| 20 | 11252-006 | Screw 1/4-20 UNC HHC X 3/4 | 2 |
| 21 | 66554-000 | Label, Before Operating | 1 |
| 22 | 66550-006 | Label, Danger Ins. | 1 |
| 23 | 60577-000 | ANSI Manual | 1 |
| 24 | 63098-005 | User Manual | 1 |
| 25 | 60197-000 | Label, Hydraulic Fluid | 1 |
| 26 | 66097-004 | Screw Flat Hd #10-24 UNC X 1/2 | 2 |
| 27 | 11250-003 | Nut #10-24 UNC | 2 |
| 29 | 65648-001 | Mount, Label | 1 |
| 31 | 66557-008 | Label, Max Load 250 Lb | 1 |
| 32 | 64444-000 | Label, USA | 4 |
| 33 | 61684-024 | Label, S120 | 4 |

Illustrated Parts Breakdown



- NOTES:
- 1.
 2. FOR EUROPEAN NON - U.K. MACHINES, DO NOT INSTALL NON -DECORATIVE LABELS. PACKAGE AND SHIP WITH COMPLETED UNIT.

Illustrated Parts Breakdown

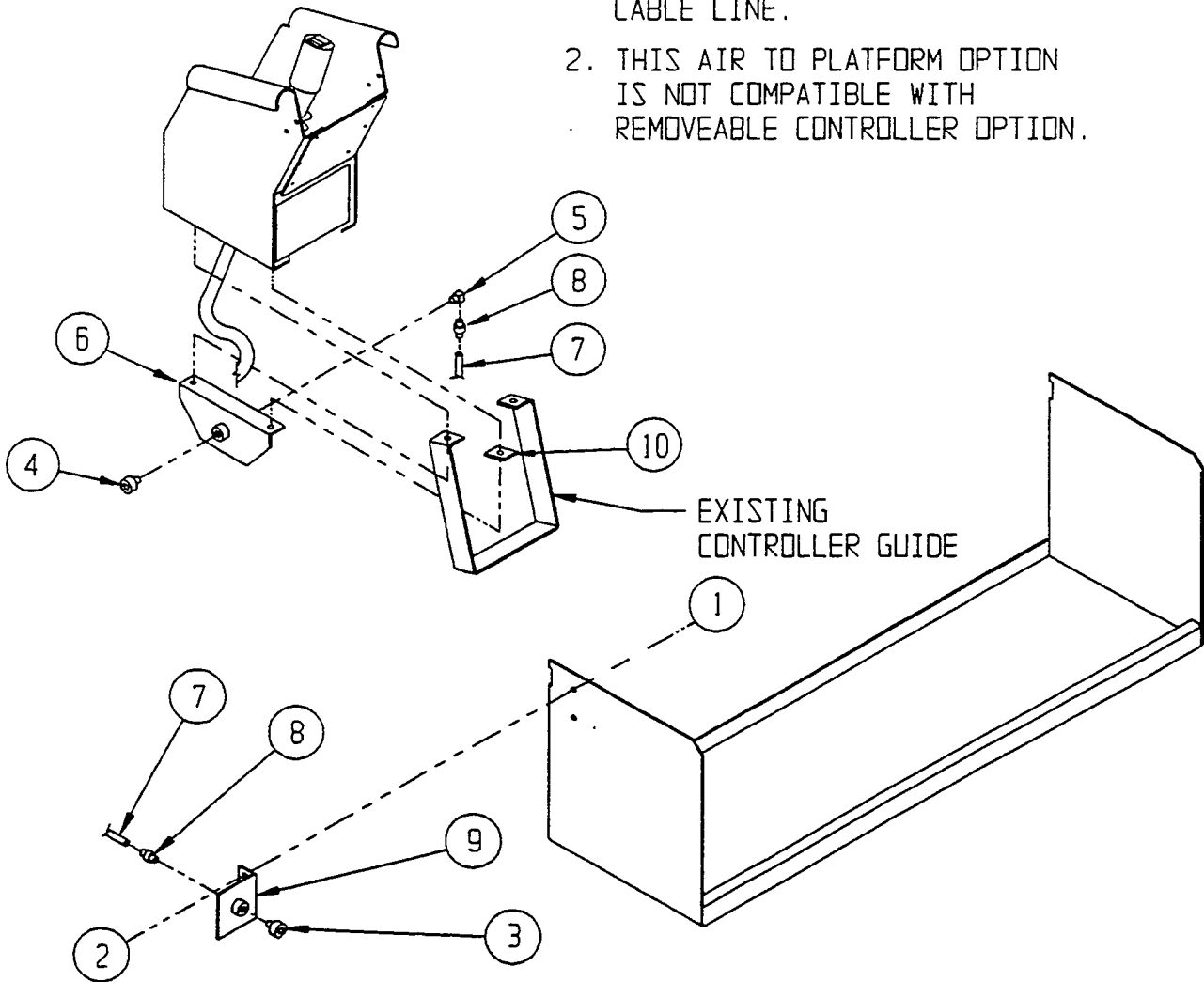
AIR TO PLATFORM - OPTION

66629-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|--------------------------|------|
| 1 | 11249-003 | Lock Nut ESNA Hex #10-32 | 2 |
| 2 | 11826-008 | Screw Rd.Hd. Mach #10-32 | 2 |
| 3 | 12728-000 | Coupling M Air | 1 |
| 4 | 12729-003 | Coupling M Air | 1 |
| 5 | 11917-007 | Fitting 90° | 1 |
| 6 | 63594-001 | Bucket Weldment | 1 |
| 7 | 15770-099 | Hose 3/8 Synflex | 50' |
| 8 | 64274-002 | Fitting Hose | 2 |
| 9 | 63191-000 | Bracket | 1 |
| 10 | 65682-000 | Spacer | 1 |

NOTE:

1. ROUTE AIR LINE ALONG CONTROL CABLE LINE.
2. THIS AIR TO PLATFORM OPTION IS NOT COMPATIBLE WITH REMOVEABLE CONTROLLER OPTION.

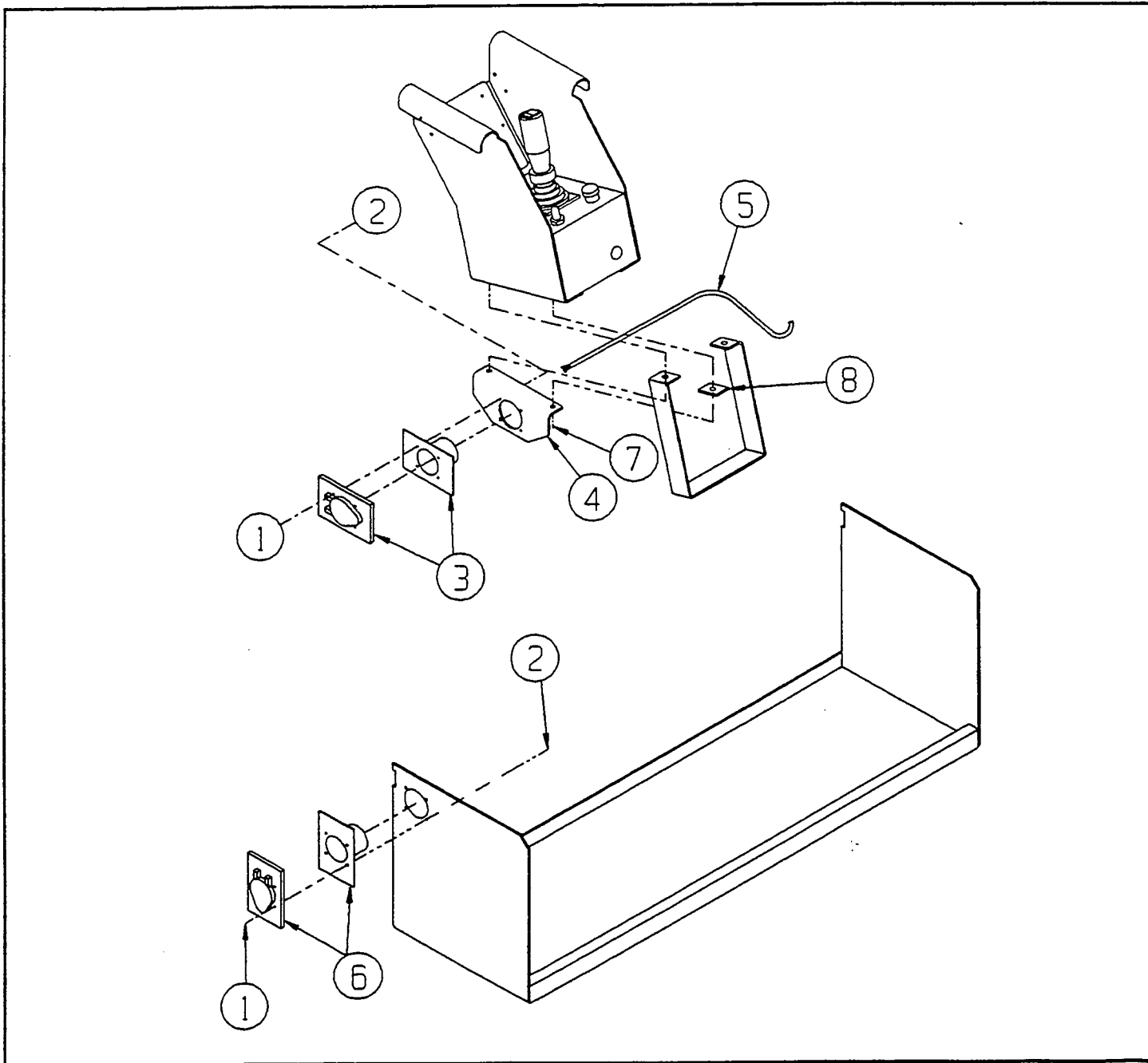


Illustrated Parts Breakdown

POWER TO PLATFORM - OPTION

65713-001

| 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 |
| 7 | 11252-006 | Screw, HHC 1/4 X 3/4 Lg. | 2 |
| 8 | 65682-000 | Spacer | 1 |

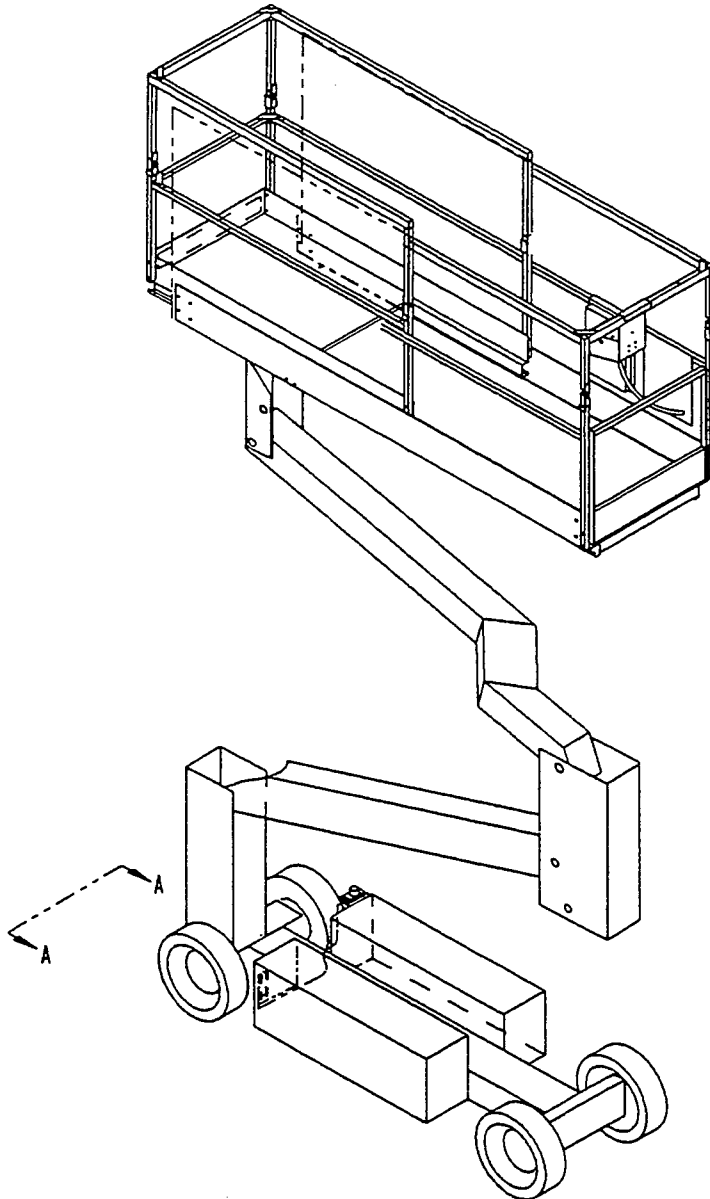


Illustrated Parts Breakdown

BEACON ASSEMBLY - OPTION

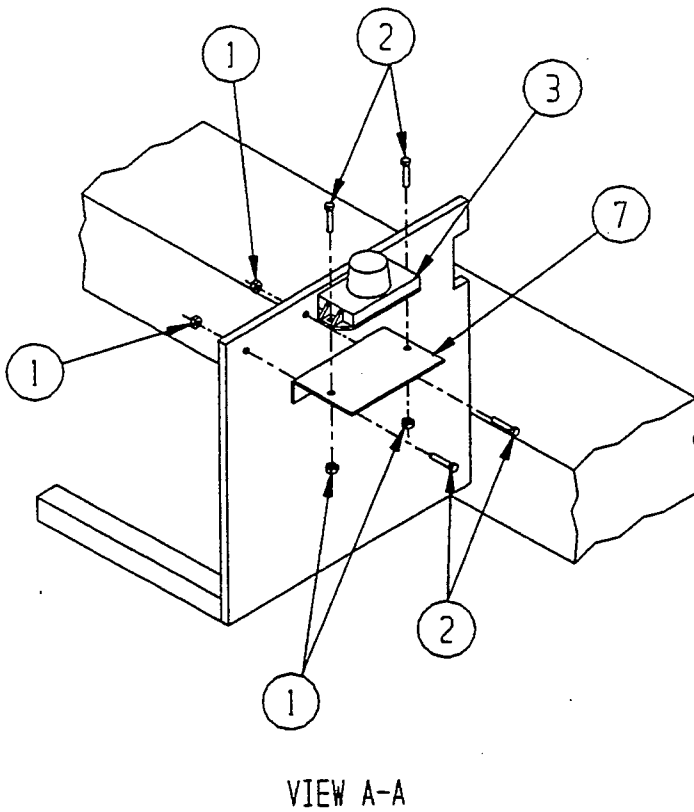
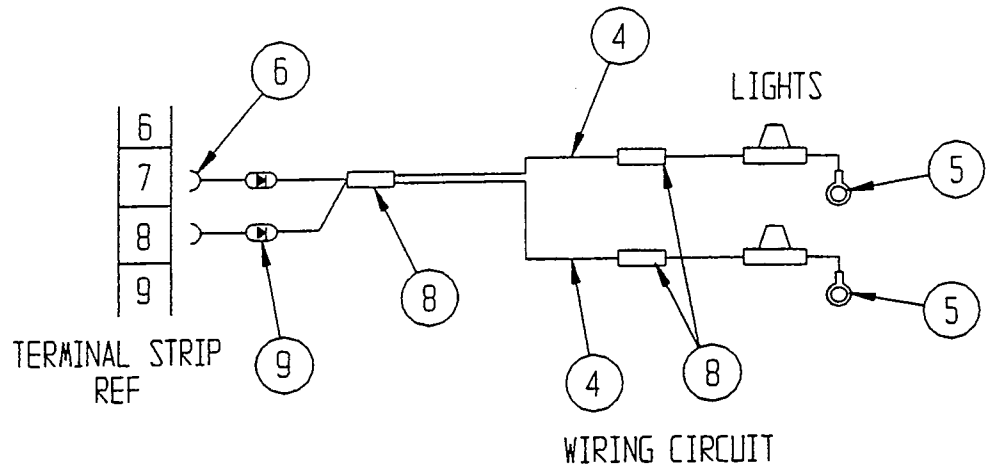
63140-000

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|---------------------------------|------|
| 1 | 11249-003 | Nut, #10-32 Lock | 8 |
| 2 | 11826-008 | Screw, #10-32 Rd Hd Mach X 1 Lg | 8 |
| 3 | 12848-004 | Light | 2 |
| 4 | 29451-099 | Wire, 16 AWG Copper White | 9' |
| 5 | 29601-013 | Conn., Ring Term | 2 |
| 6 | 29610-002 | Conn., Fork Term | 3 |
| 7 | 63193-000 | Bracket, Light Mount | 2 |
| 8 | 29620-002 | Conn., Butt | 5 |
| 9 | 29825-002 | Diode, 3 Amp | 2 |



Illustrated Parts Breakdown

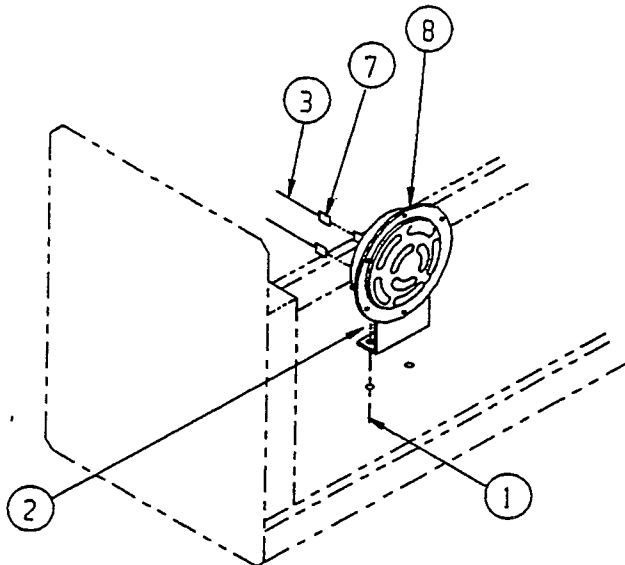
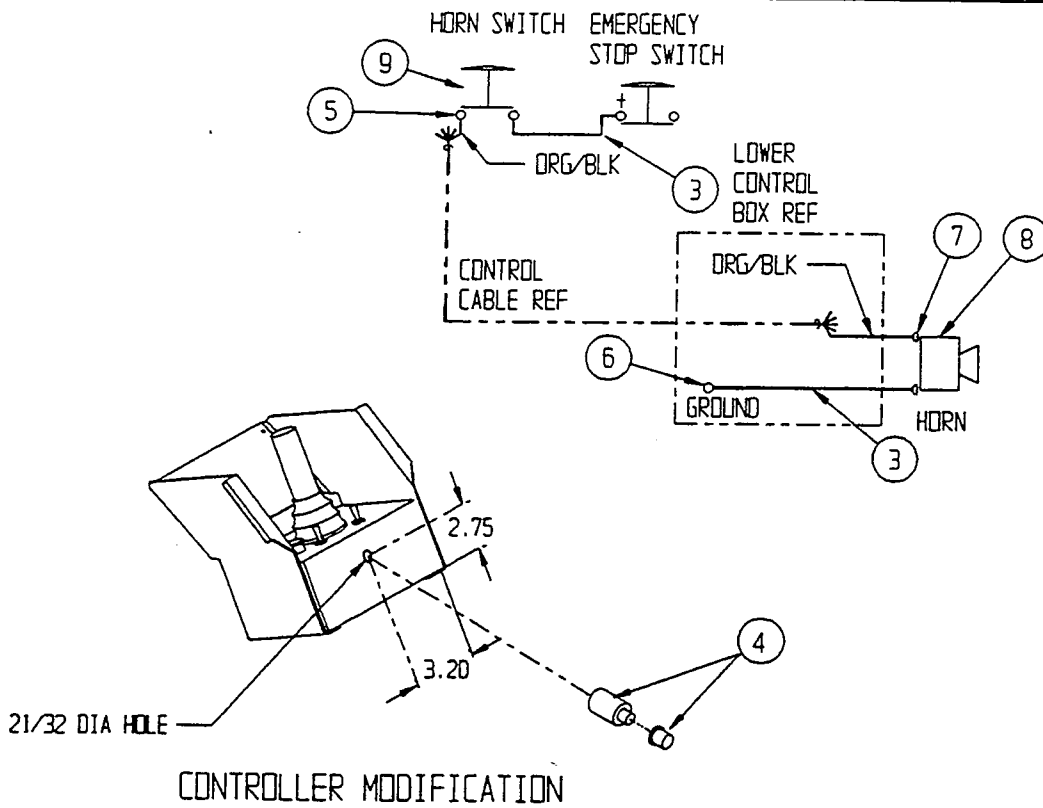
NOTE:
1. INSULATE ALL DIODE WIRES.



Illustrated Parts Breakdown

HORN ASSEMBLY - OPTION 66614-000

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|----------------------|------|
| 1 | 11252-008 | Screw HHC 1/4-20 X 1 | 2 |
| 2 | 11248-004 | Nut Hex 1/4-20 | 2 |
| 3 | 29452-099 | Wire 16 Ga Black | 1' |
| 4 | 63917-000 | Switch Pushbutton | 1 |
| 5 | 29610-002 | Connector Fork | 3 |
| 6 | 29601-014 | Connector Ring | 1 |
| 7 | 29615-002 | Conector Push | 2 |
| 8 | 29958-000 | Horn 24v | 1 |

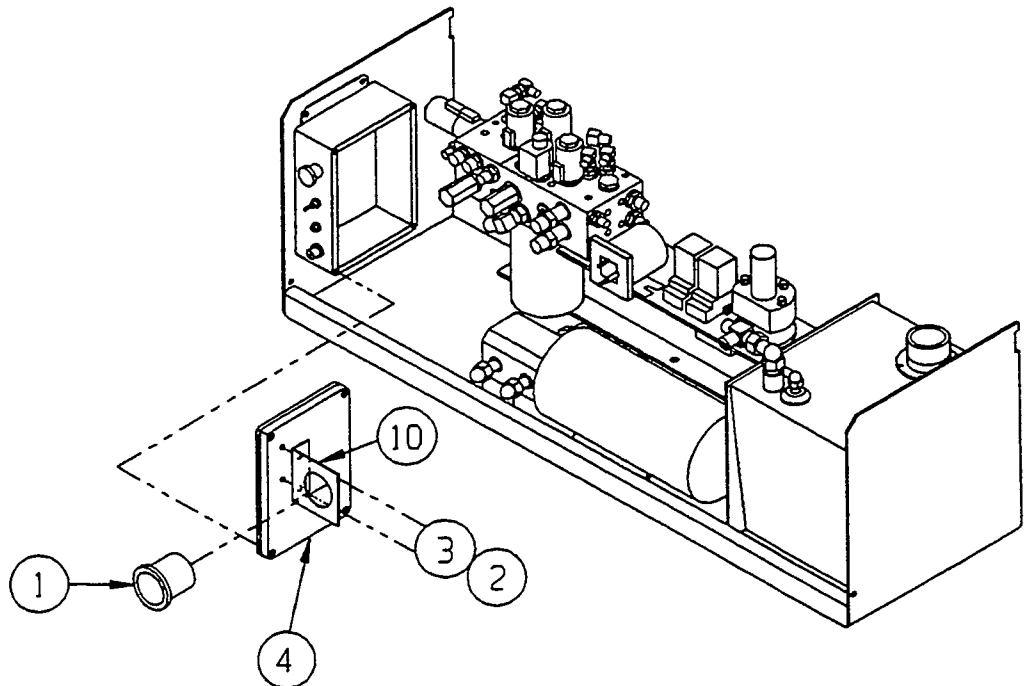
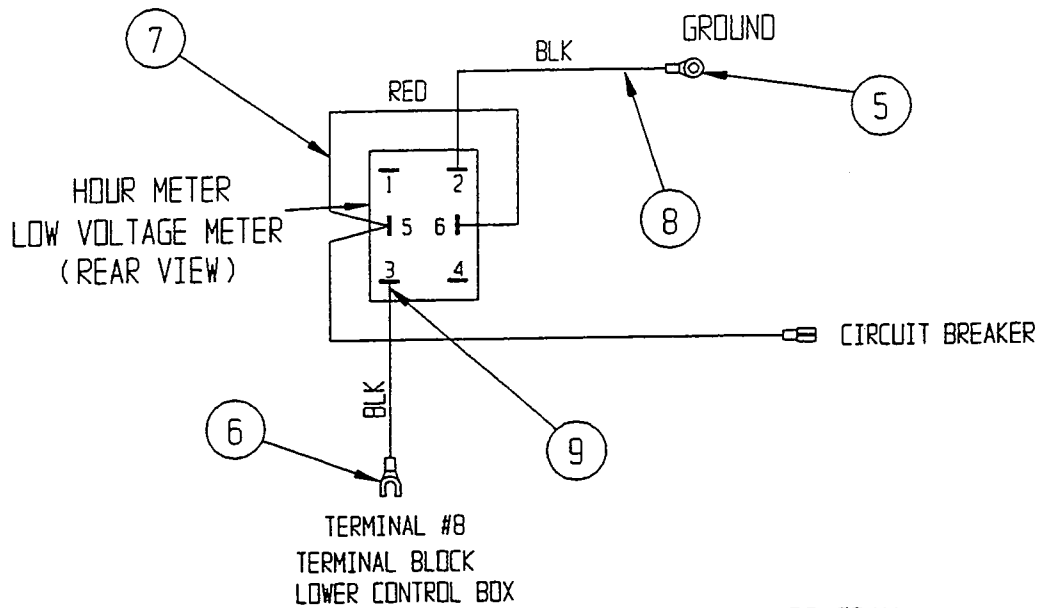


Illustrated Parts Breakdown

VOLTAGE/HOUR METER - OPTION 66613-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|----------------------------|------|
| 1 | 29959-000 | Hr/Low Voltage Ind. | 1 |
| 2 | 11248-004 | Nut ESNA 1/4-20 UNC | 2 |
| 3 | 11252-006 | Screw HHC 1/4-20 UNC X 3/4 | 2 |
| 4 | 65845-001 | Enclosure, Modified | 1 |
| 5 | 29601-013 | Conn Ring Term | 1 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-----------------------------|------|
| 6 | 29610-002 | Conn Fork Term | 1 |
| 7 | 29454-099 | Wire 16 Ga Red X 12" | 1' |
| 8 | 29456-099 | Wire 16 Ga Yel X 15" | 1.33 |
| 9 | 29931-003 | Conn Push Term | 4 |
| 10 | 61647-001 | Bracket Low Volt/Hour Meter | 1 |



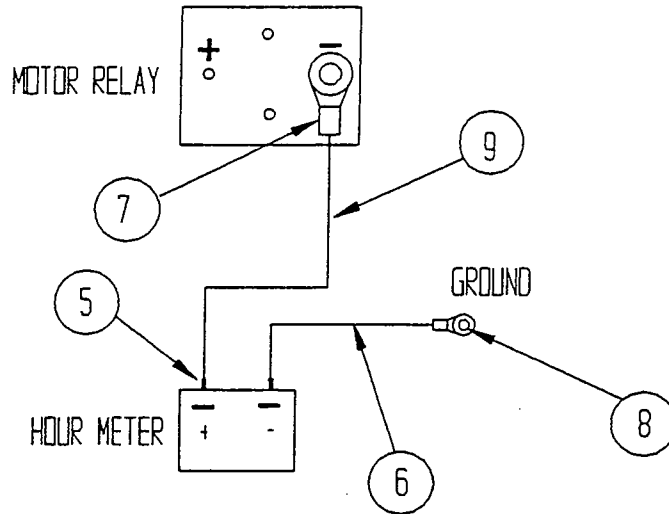
Illustrated Parts Breakdown

HOUR METER - OPTION

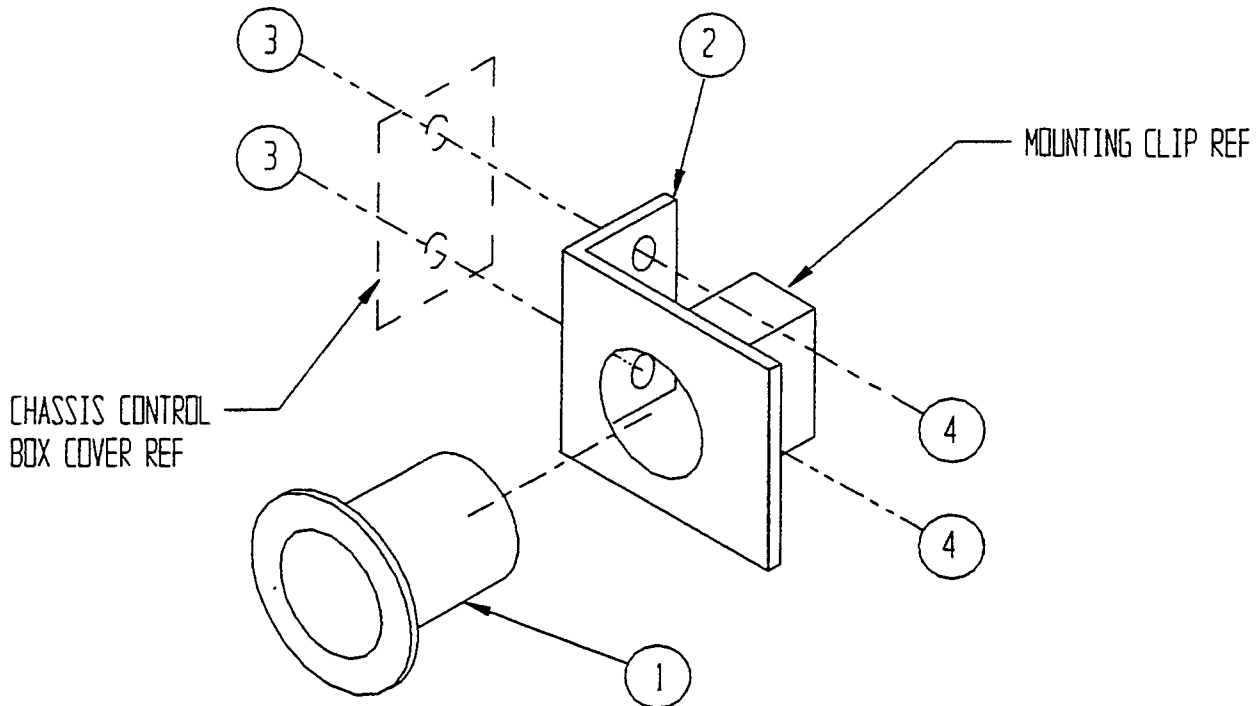
61584-000

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-----------------------|------|
| 1 | 15752-000 | Hourmeter | 1 |
| 2 | 61647-000 | Bracket, Indicator | 1 |
| 3 | 11248-004 | Nut, ESNA 1/4-20 | 2 |
| 4 | 11252-008 | Screw, HHC 1/4-20 X 1 | 2 |
| 5 | 29931-003 | Conn, Push Term | 2 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-------------------|------|
| 6 | 29452-099 | Wire, 16 Ga Black | .33' |
| 7 | 29601-040 | Conn, Ring Term | 1 |
| 8 | 29601-014 | Conn, Ring Term | 1 |
| 9 | 29454-099 | Wire, 16 Ga Red | 2.5' |



WIRING DIAGRAM

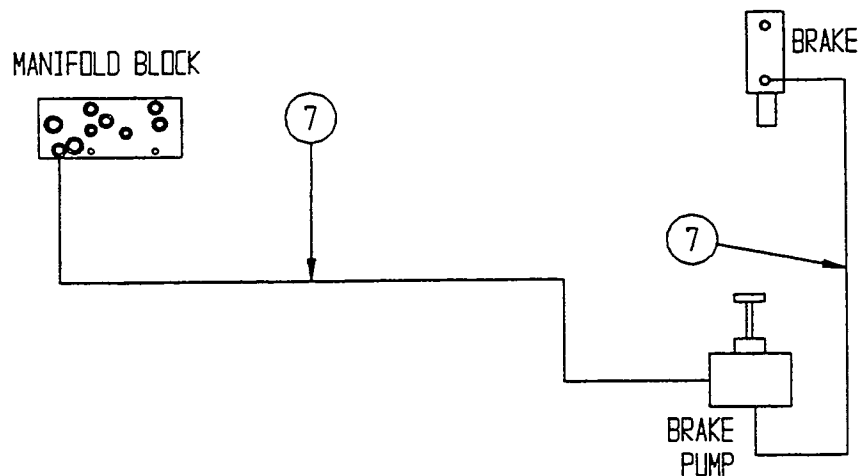
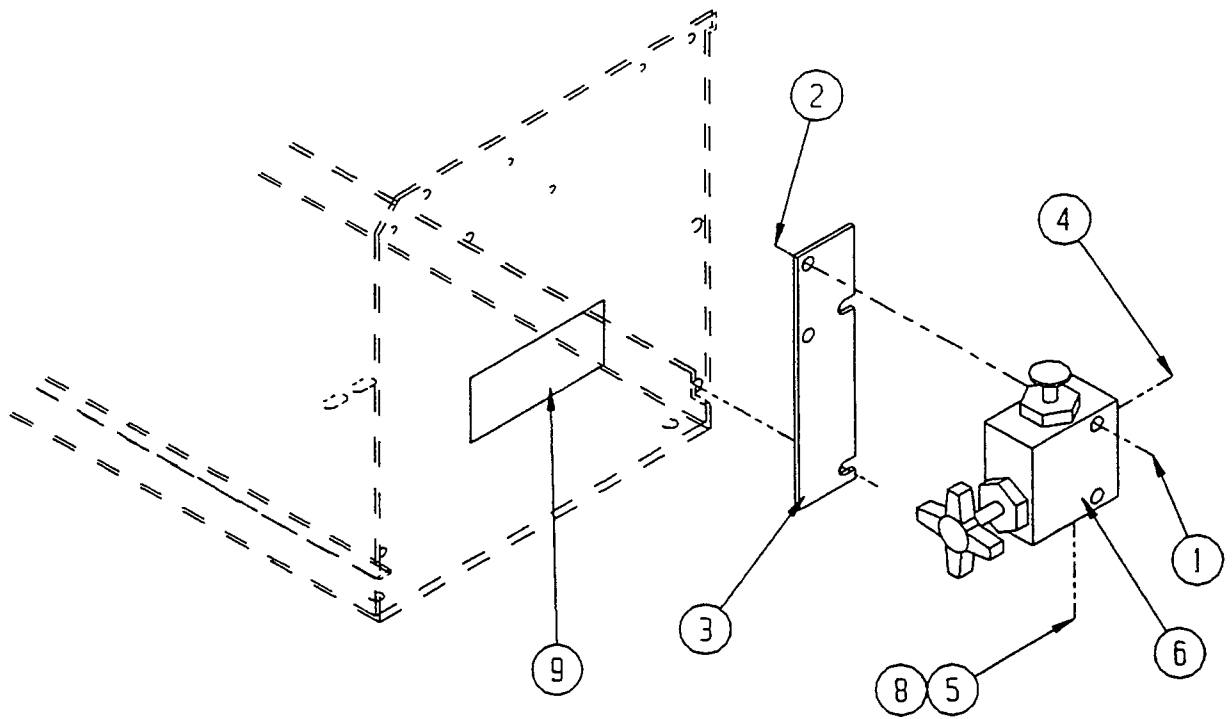


Illustrated Parts Breakdown

BRAKE RELEASE KIT - OPTION

63629-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|------------------------------|------|
| 1 | 11248-006 | Locknut 3/8-16 UNC Hex | 2 |
| 2 | 11254-020 | Screw 3/8-16 UNC HHC X 2 1/2 | 2 |
| 3 | 63472-000 | Mtg. Bracket Brake Pump | 1 |
| 4 | 11941-005 | Fitting Str. | 1 |
| 5 | 11934-026 | Fitting 90° | 1 |
| 6 | 63978-000 | Hand Pump, Brake | 1 |
| 7 | 60861-007 | Hose Assembly 3/8 Dia X 27 | 2 |
| 8 | 11937-003 | Fitting 90° | 1 |
| 9 | 63423-000 | Brake Release Decal | 1 |

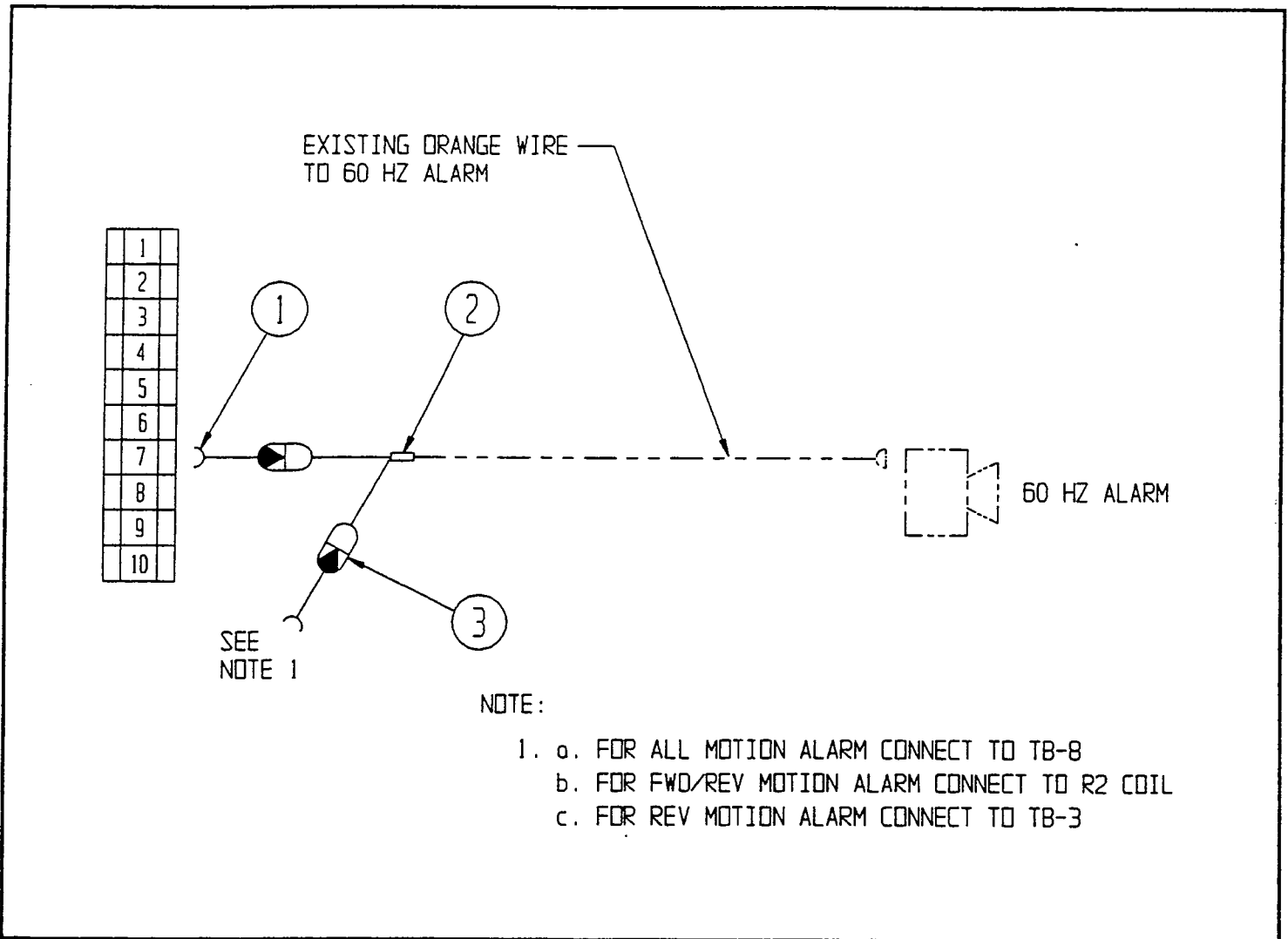


Illustrated Parts Breakdown

ALARM (FWD/REV/UP) - OPTION

65715-001

| 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 |



Illustrated Parts Breakdown

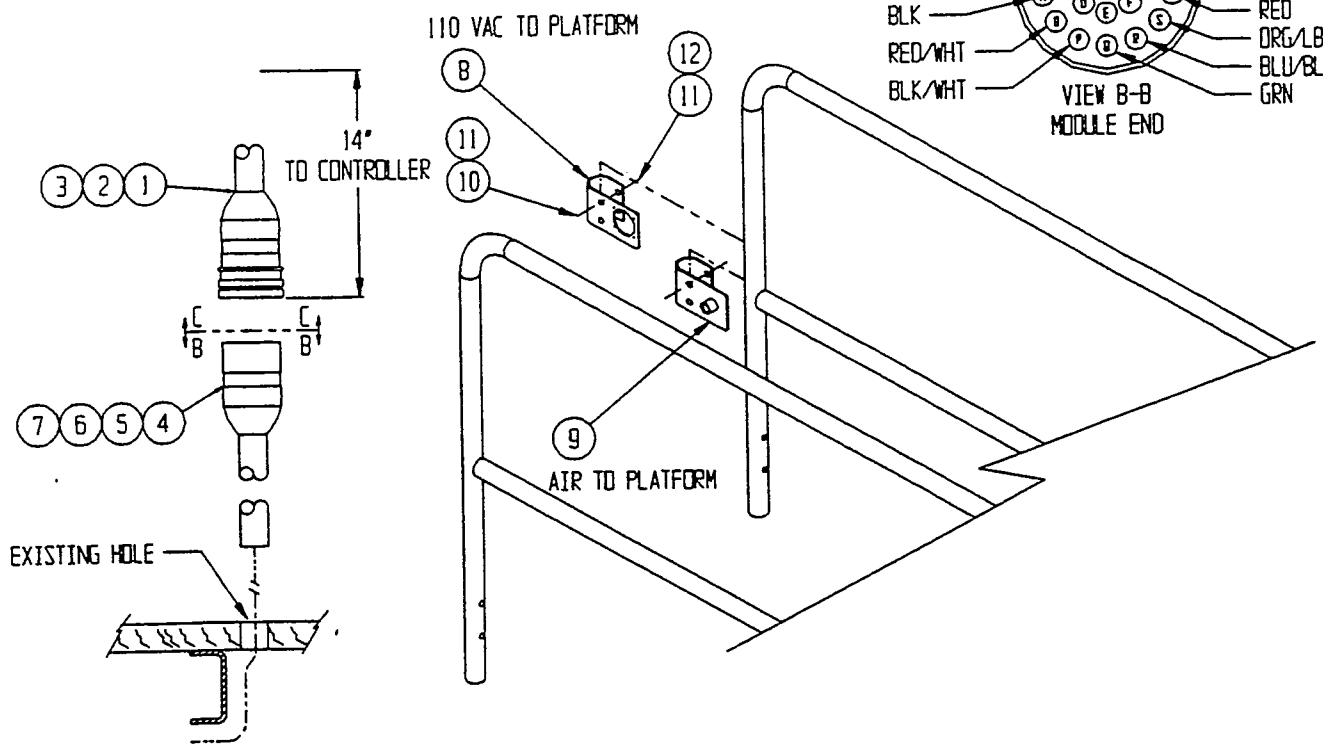
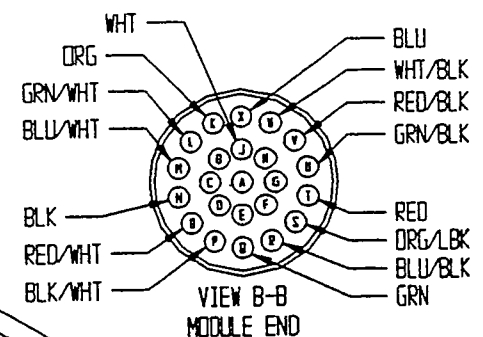
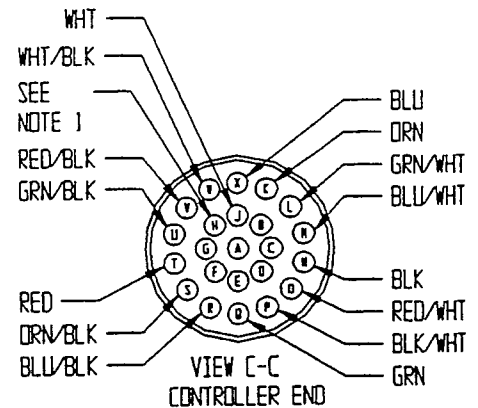
Section
7.2

REMOVABLE CONTROLLER - OPTION 61898-001

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-------------------------------|------|
| 1 | 28800-003 | Plug Connector | 1 |
| 2 | 28800-004 | Pin Contact | 12 |
| 3 | 28800-015 | Plug Sealing | 11 |
| 4 | 28800-016 | Receptacle Connector W/ Clamp | 1 |
| 5 | 28800-005 | Socket Contact | 12 |
| 6 | 28800-013 | Nut Panel | 1 |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|------------------------------------|------|
| 7 | 28800-014 | Lockwasher | 1 |
| 8 | 30719-001 | 110 VAC Bracket | 1 |
| 9 | 30719-002 | Air Bracket Weldment | 1 |
| 10 | 11254-020 | Screw HHC Grd 5 3/8-16 UNC X 2 1/2 | 4 |
| 11 | 11240-006 | Washer 3/8 Std Flat | 8 |
| 12 | 11248-006 | Nut Hex ESNA 3/8-16 | 4 |

- CUT OFF CONTROL CABLE 14 INCHES BELOW STRAIN RELIEF ON CONTROLLER.
- CUT OUTER CABEL COVER OF LINKAGE CABEL BACK APPROXIMATELY 1-1/2 INCH AND STRIP APPROXIMATELY 1/4 INCH OF EACH END.
- CRIMP SOCKETS (28800-005) ONTO WIRE ENDS AND INSERT INTO CONNECTOR (28800-016). REF. VIEW B-B.
- CUT OUTER CABEL COVER OF CONTROLLER END BACK APPROXIMATELY 1-1/2 INCH AND STRIP APPROXIMATELY 1/4 INCH OF EACH END.
- SLIDE BOOT AND CLAMP ONTO CABLE.
- CRIMP PINS (28800-004) ONTO WIRE ENDS AND INSERT INTO CONNECTOR (28800-003). REF. VIEW C-C.
- CLAMP BOOT TO CONNECTOR.
- CONNECT CONTROLLER AND TEST MACHINE FOR PROPER FUNCTION.
- USE TERMINAL "H" FOR HORN OPTION OR IF AUX WIRE IS REQUIRED.
- ITEM #8 THRU 11 REQD ONLY FOR 110 VAC AND/OR AIR TO PLATFORM.



Section
7.2

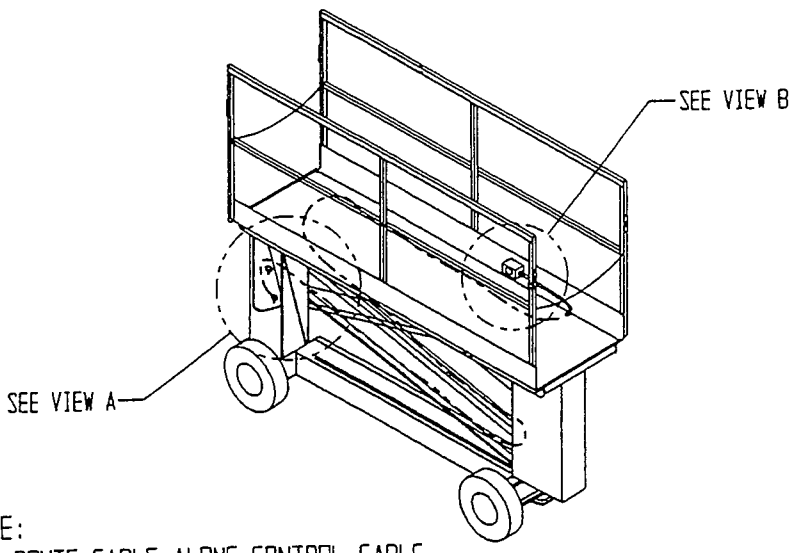
Illustrated Parts Breakdown

800W GENERATOR - OPTION 61392-001

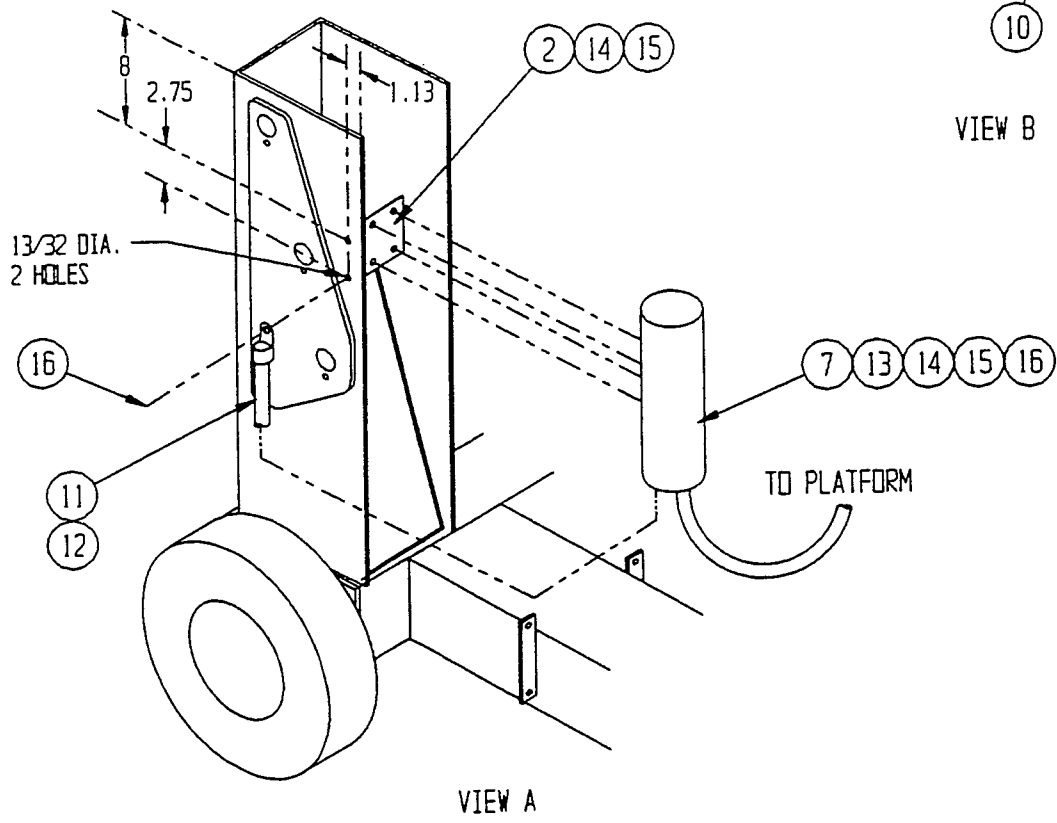
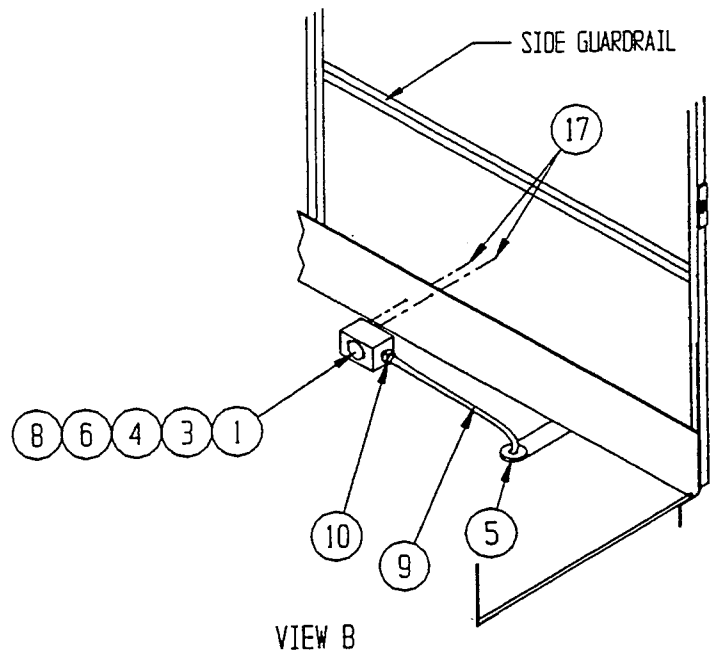
| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|-------------------------|------|
| 1 | 08942-000 | Receptacle | 1 |
| 2 | 61690-000 | Bracket, Gen. Mtg. | 1 |
| 3 | 11248-047 | Locknut, Hex 6-32 | 2 |
| 4 | 11715-004 | Screw, Rd Hd 6-32 X 1/2 | 2 |
| 5 | 12956-010 | Grommet | 1 |
| 6 | 15769-000 | Junction Box | 1 |
| 7 | 26461-000 | Generator | 1 |
| 8 | 26611-002 | Cover, Junction Box | 1 |
| 9 | 29495-099 | Wire, 14 Ga. 3 Cond | 40' |

| ITEM | PART | DESCRIPTION | QTY. |
|------|-----------|---------------------------|------|
| 10 | 29925-003 | Connector, Cable | 1 |
| 11 | 29431-099 | Cable, #2 Ga | 5' |
| 12 | 29602-025 | Ring Terminal | 4 |
| 13 | 29938-000 | Cord Cap | 1 |
| 14 | 11240-006 | Washer, Flat 3/8 | 6 |
| 15 | 11248-006 | Locknut, Hex 3/8-16 | 6 |
| 16 | 11254-012 | Screw, HHC 3/8-16 X 1 1/2 | 6 |
| 17 | 11811-006 | Screw, Slftp. 10-32 X 3/4 | 2 |

Illustrated Parts Breakdown



NOTE:
1. ROUTE CABLE ALONG CONTROL CABLE.







UpRight

Call Toll Free in U.S.A.

1-800-926-LIFT

UpRight, Inc.

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Selma, California 93662

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FAX: 559/896-9012

PARTS: 1-888-UR-PARTS

PARTSFAX: 209/896-9244

P/N 063099-003
063099-0039802-2-MC