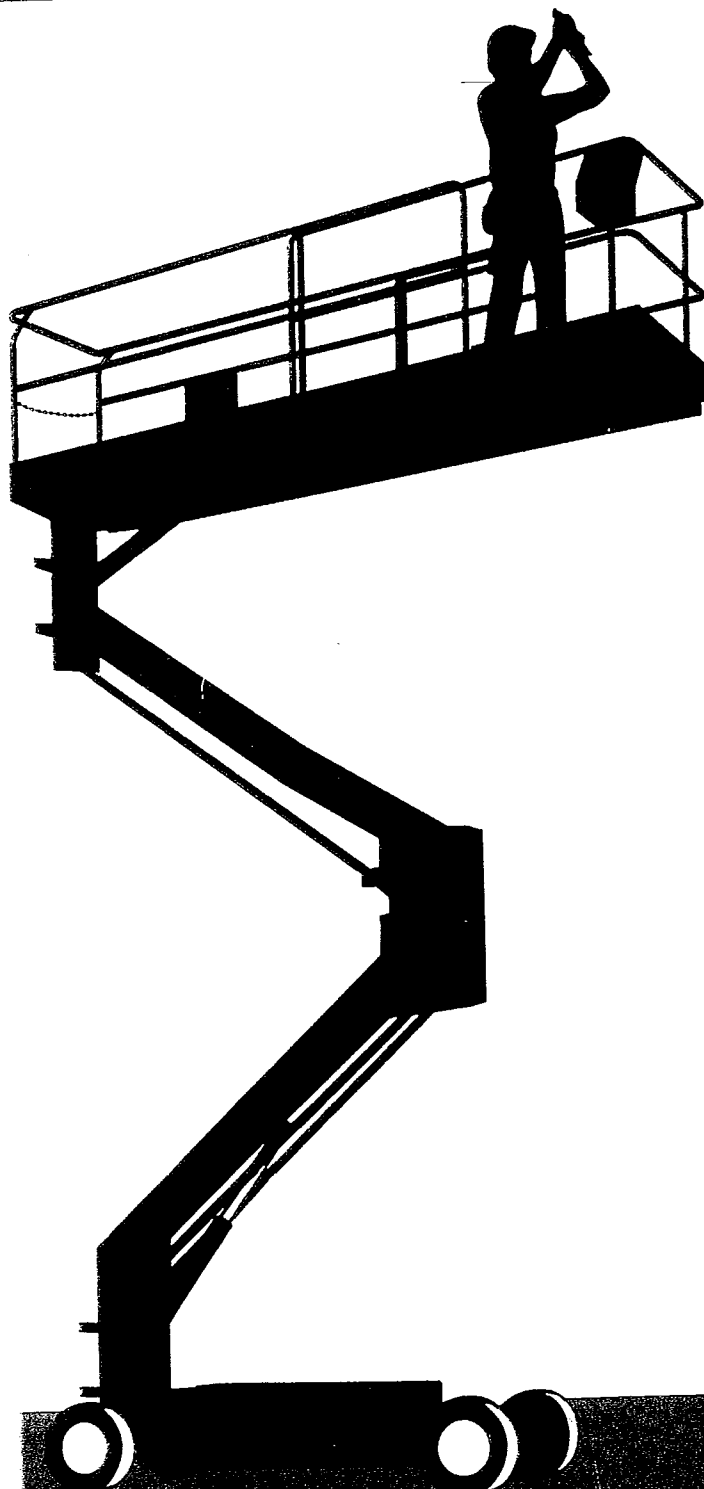


UpRight



SL 20

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.

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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.

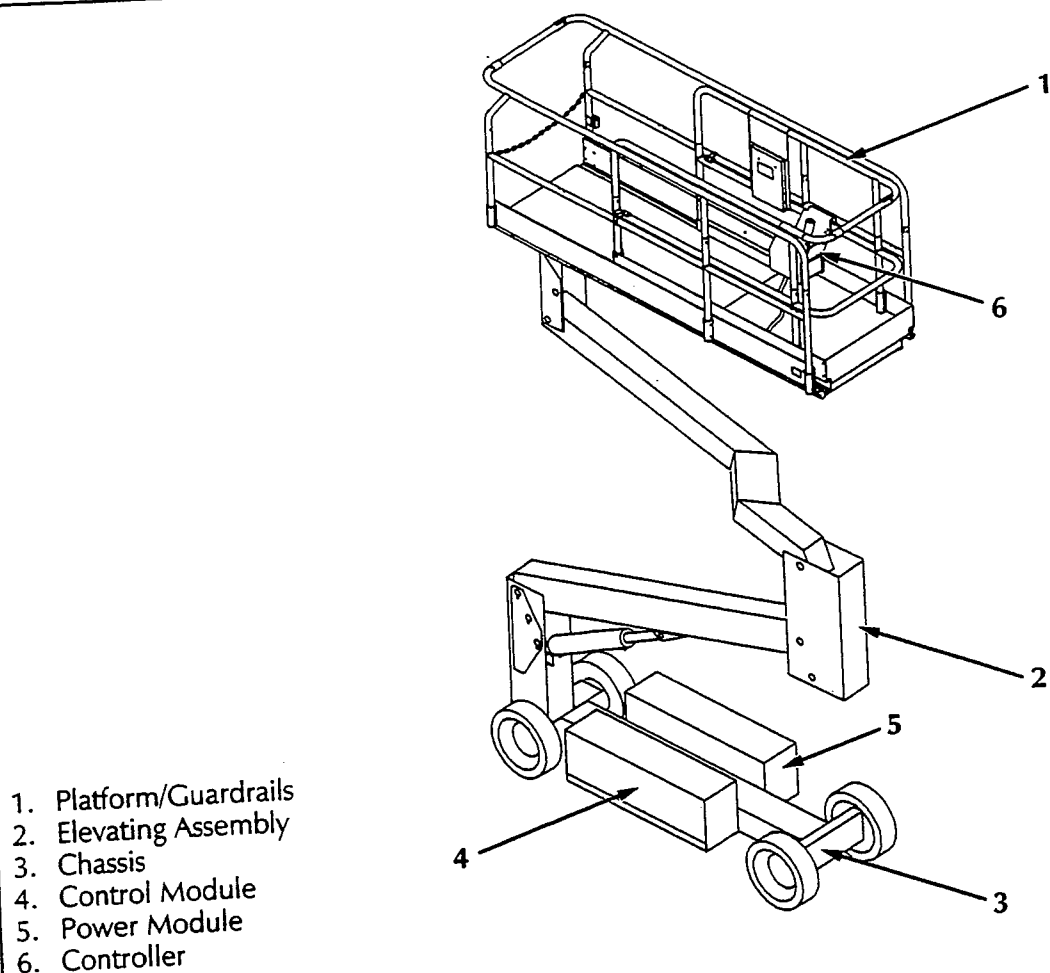


Figure 1-1: SL20 Series Work Platform

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).

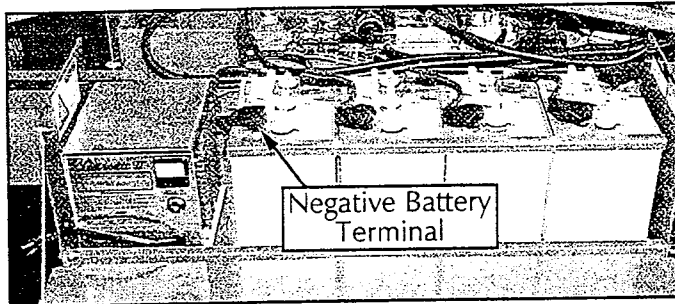


Figure 2-1: Power Module, Left Side

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).

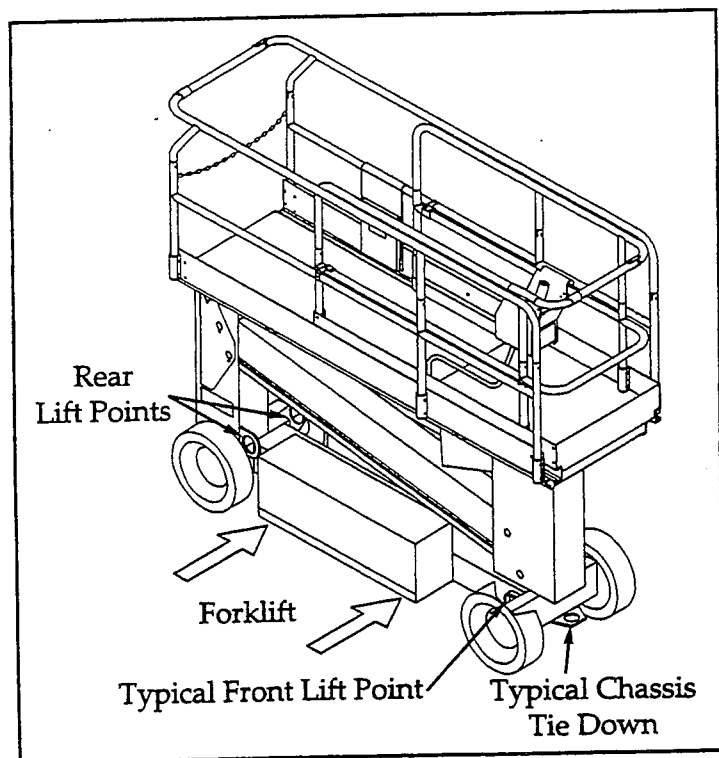


Figure 2-2: Transporting the SL20

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 oil 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

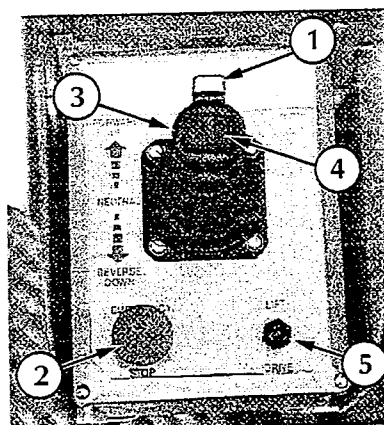
INDEX NO.	NAME	FUNCTION
1	INTERLOCK LEVER	Provides power to the controller only when depressed, preventing accidental activation of the controller.
2	EMERGENCY STOP SWITCH	Push red button to cut off power to all functions (OFF). Pull out to provide power (ON).
3	CONTROL LEVER	Move joystick forward or 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.

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

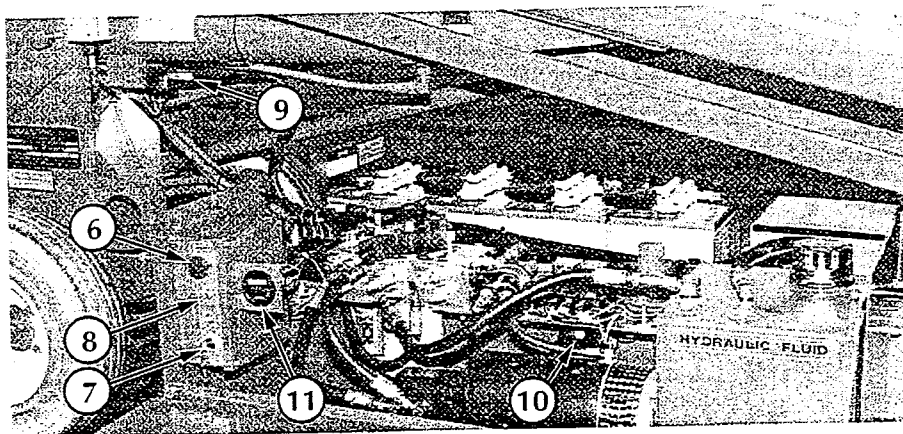
Chassis

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.).

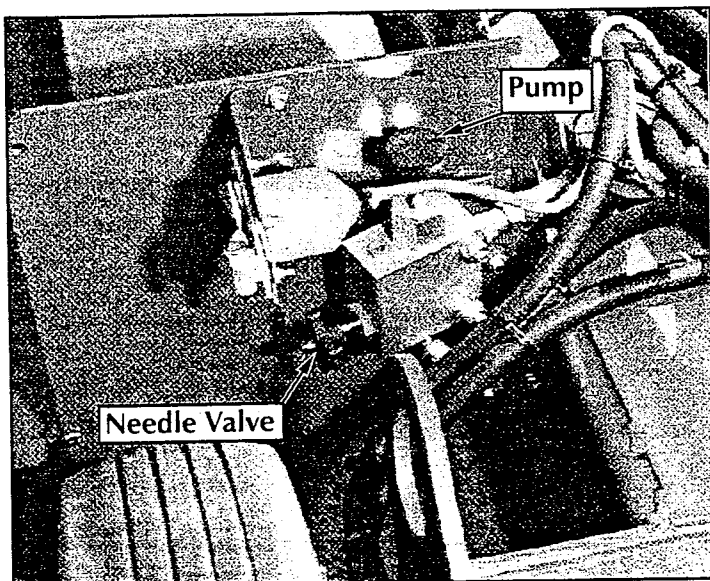


Figure 3-2: Optional Brake Release Pump

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 
<p>Before performing preventative maintenance familiarize yourself with the operation of the machine.</p> <p>Always use the elevating assembly brace whenever it is necessary to enter the elevating assembly when the platform is elevated.</p>

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

Preventative Maintenance Table Key

Interval

Daily=each shift or every day

50h/30d=every 50 hours or 30 days

250h/6m=every 250 hours or 6 months

1000h/2y=every 1000 hours or 2 years

Y=Yes/Acceptable

N=No/Not Acceptable

R=Repaired/Acceptable

Preventative Maintenance Report

Date:	_____
Owner:	_____
Model No:	_____ Serial No: _____
Serviced By:	_____
Service Interval:	_____

Table 4-1: Preventative Maintenance

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery System	Check electrolyte level	Daily			
	Check battery cable condition	Daily			
	Charge batteries	Daily			
	Check charger condition & operation	Daily			
	Check specific gravity	50h/30d			
	Clean exterior	250h/6m			
	Clean terminals	250h/6m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	250h/6m			
	Drain and replace oil (ISO #46)	1000h/2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	50h/30d			
	Check for exterior wear	50h/30d			
Emergency Hydraulic System	Open the emergency lowering valve and check for 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	⚠
<p>BEFORE entering Elevating Assembly while performing maintenance on work platform, while elevated, ensure that Elevating Assembly is properly blocked.</p> <p>DO NOT stand in Elevating Assembly area while installing or removing jack stand.</p>		

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.

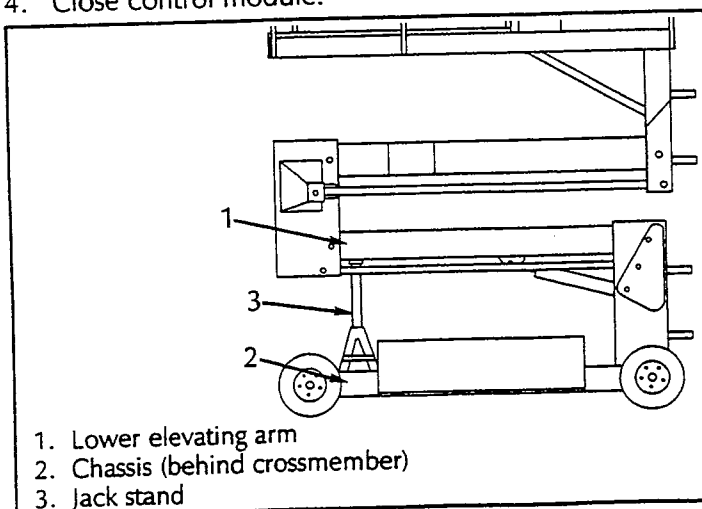


Figure 4-1: Blocking the Elevating Assembly

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	⚠
<p>Hazard of explosive gas mixture. Keep sparks, flame and smoking materials away from batteries.</p> <p>Always wear safety glasses when working with batteries.</p> <p>Battery fluid is highly corrosive. Rinse away any spilled fluid thoroughly with clean water.</p> <p>Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 62 lbs. each.</p>		

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	⚠
<p>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.</p>		

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.

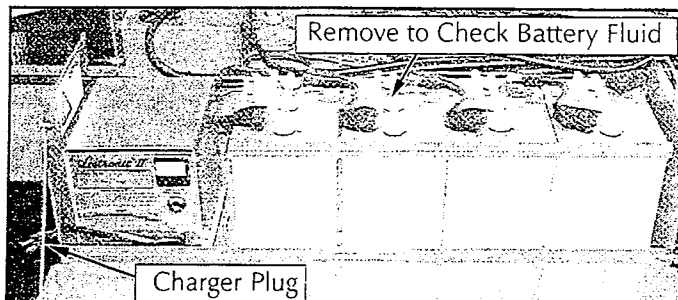


Figure 4-2: Battery Charger

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

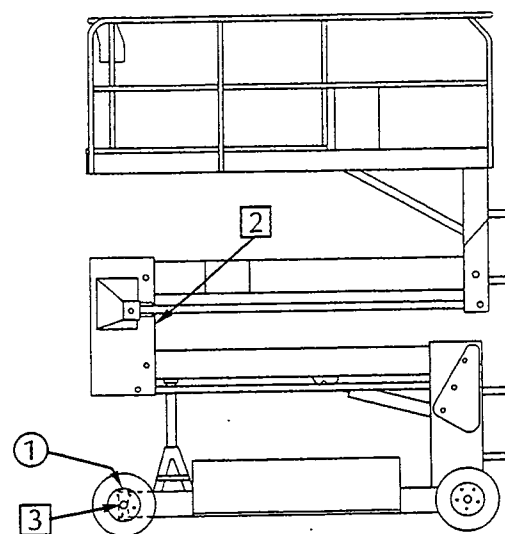


Figure 4-3: Lubrication Points

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 1.2) 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.

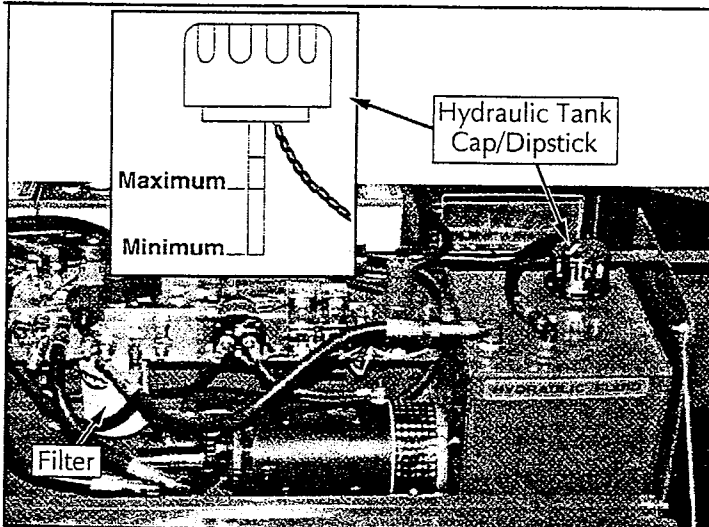


Figure 4-4: Hydraulic Oil Tank and Filter

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.

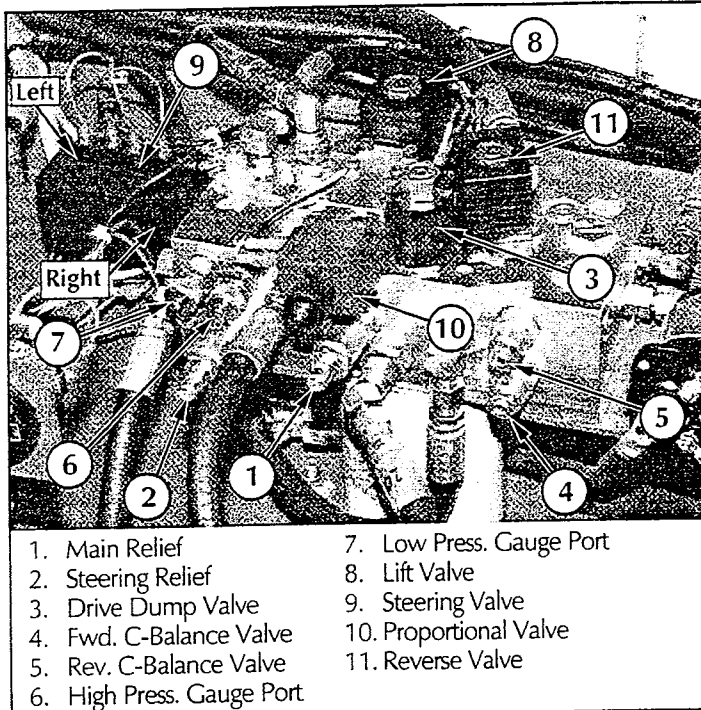


Figure 4-5: Hydraulic Manifold

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.

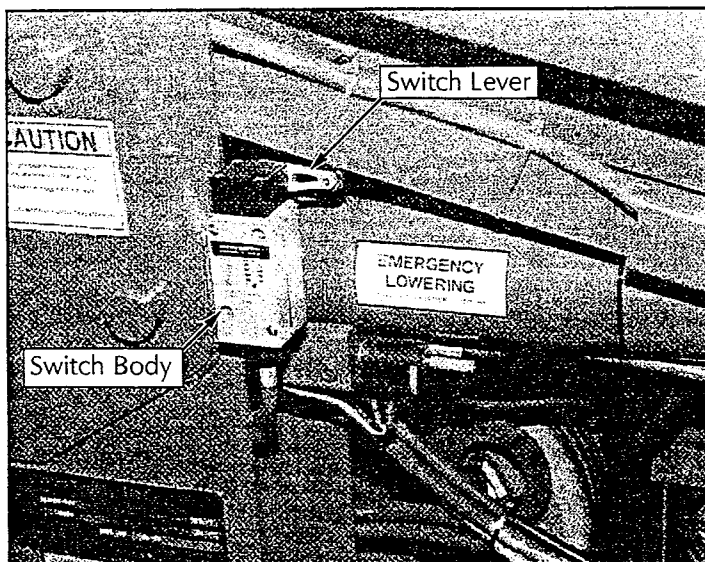


Figure 4-6: Down Limit Switch

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.

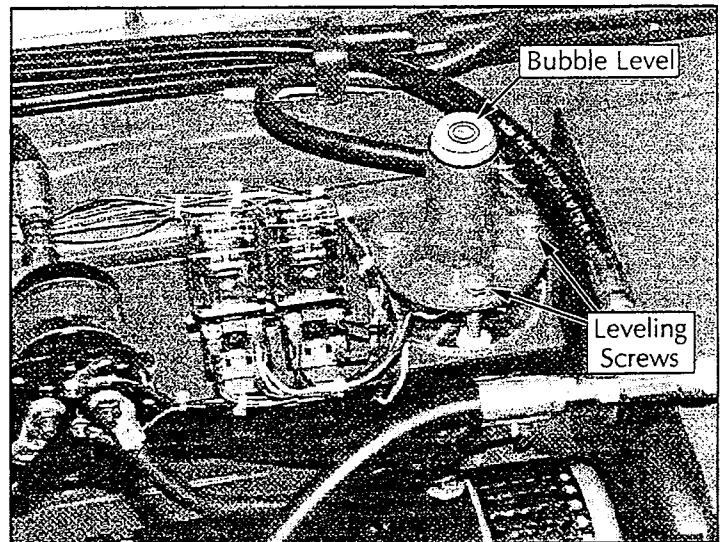


Figure 4-7: Tilt Sensor Adjustment

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.

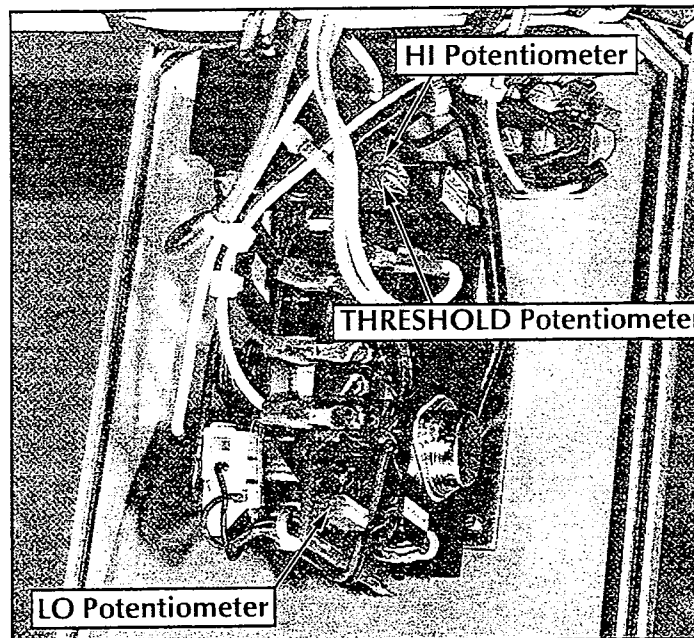


Figure 4-8: Proportional Controller Adjustment

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

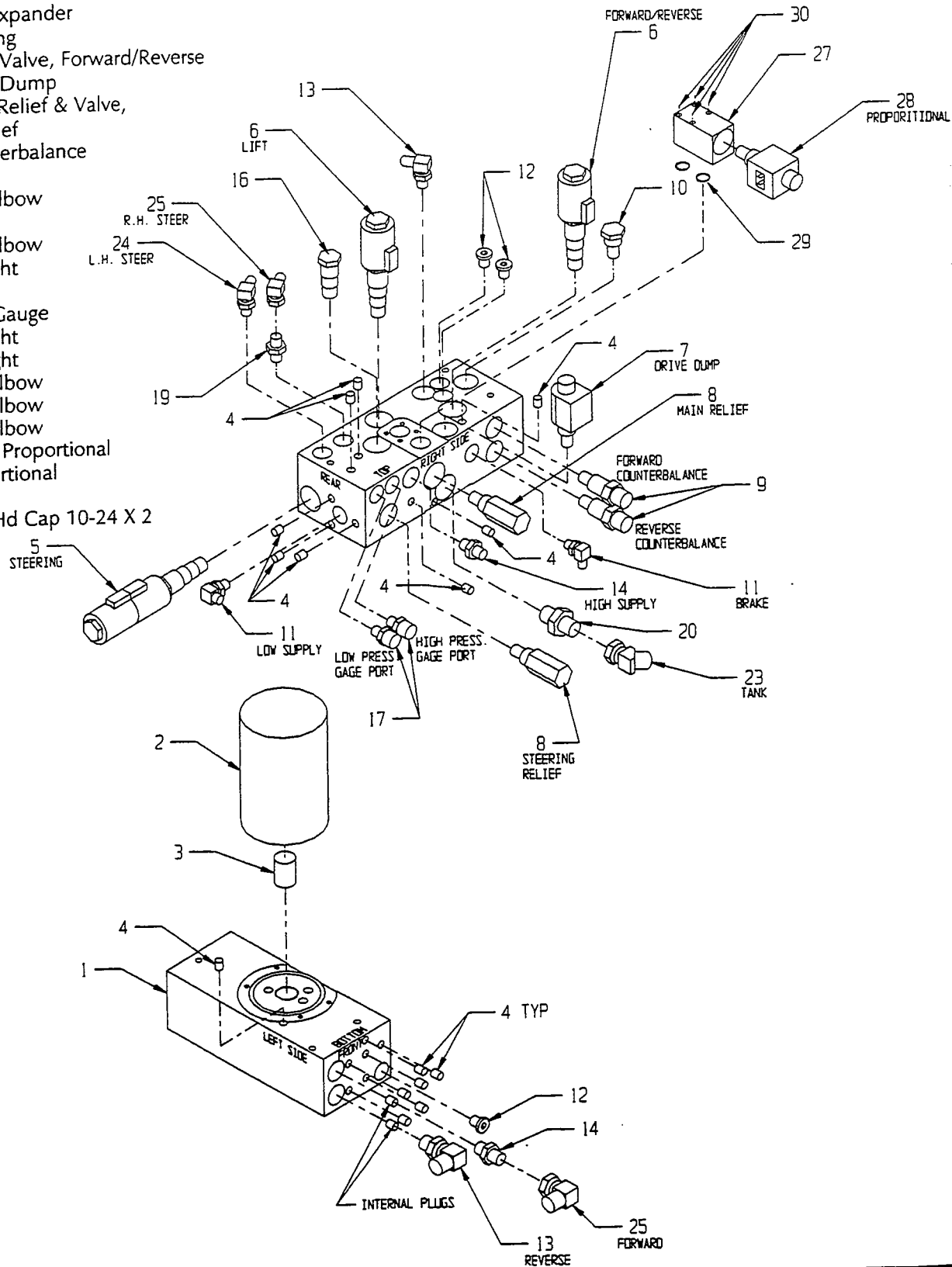


Figure 4-9: Hydraulic Manifold, Exploded View

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.

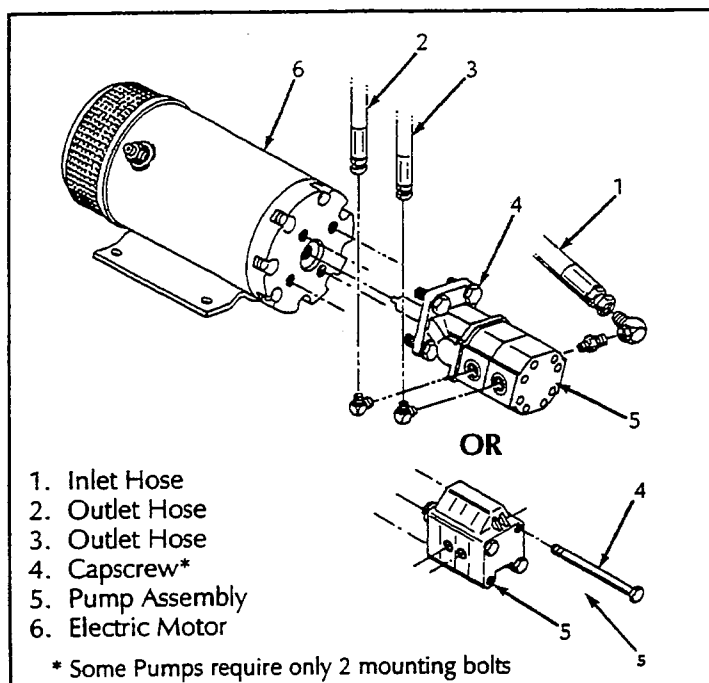


Figure 4-10: Hydraulic Pump

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.

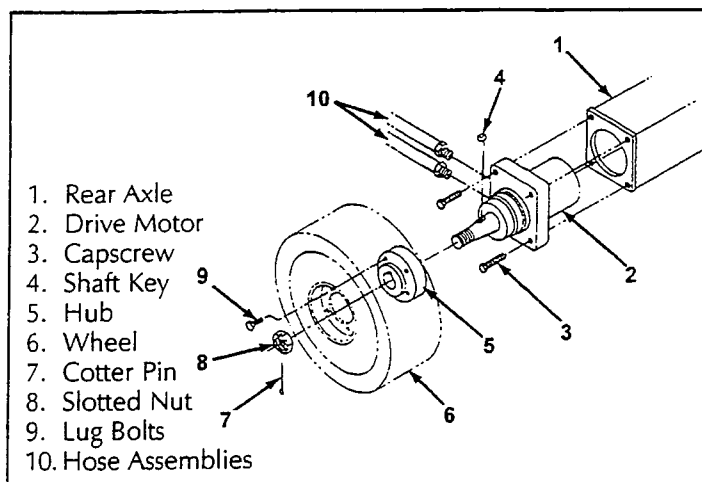


Figure 4-11: Drive Motor Installation

4.10 Wheel Bearings (Figure 4-12)

REMOVAL

1. 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.
2. Install support blocks to prevent the work platform from falling if the jack fails.
3. Remove the wheel lug nuts and the wheel.
4. Remove the dust cap.
5. Remove the cotter pin.
6. Remove the hub nut and washer.
7. Slide the entire hub assembly from the spindle and place on clean surface.
8. Remove the outside bearing cone and place on clean surface.
9. 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.
10. 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

1. 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.
2. Apply a liberal coating of multipurpose grease to the bearing surface of each cup.
3. 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.
4. Apply a thin coating of multipurpose grease to the spindle to protect the grease seal then slide the hub assembly onto the spindle.
5. Pack the outside bearing cone with multipurpose grease and slide it onto the spindle until it seats in the outer bearing cup.
6. 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.
7. Install a new cotter pin and bend the end up over the hub nut and the spindle.
8. Install the cap and wheel/tire assembly. Torque the lug nuts to 80 ft. lbs. (108 N-m).
9. Remove blocks and lower work platform to the ground.
10. Drive machine for 20 minutes and retorque wheel lug nuts and check for leaks.

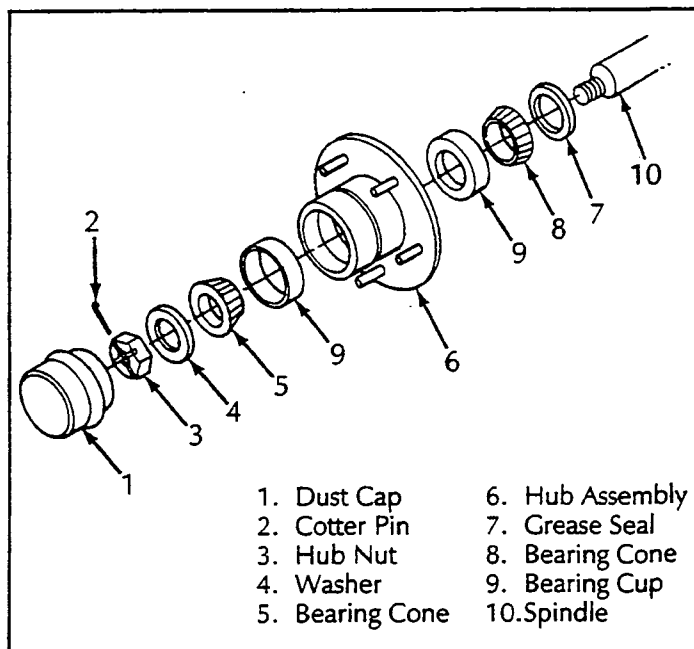


Figure 4-12: Wheel Bearings

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.

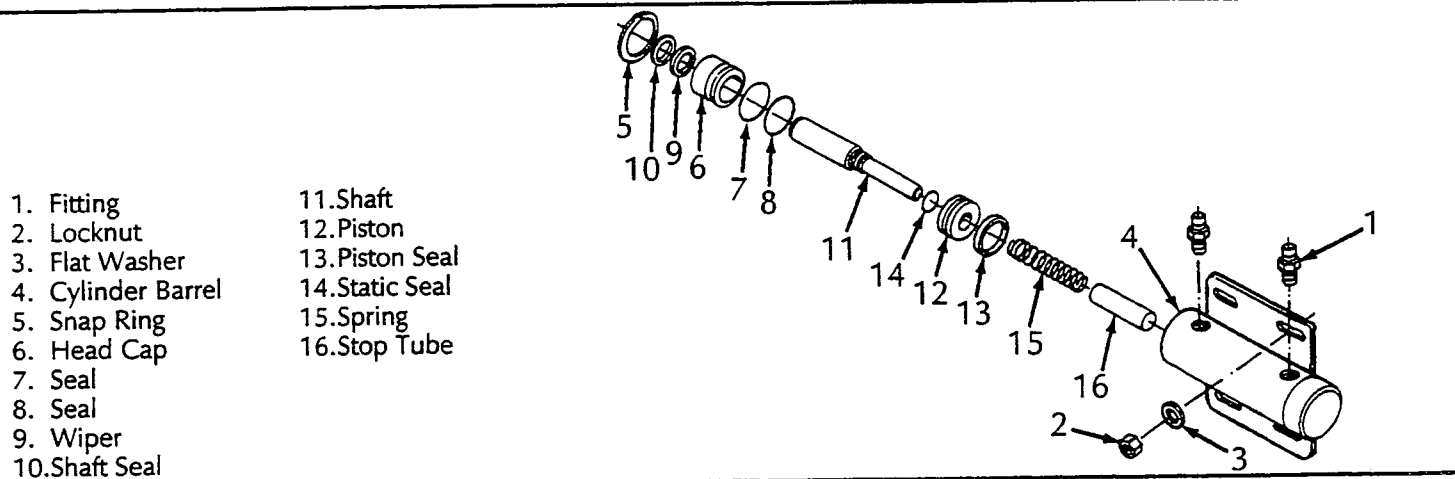


Figure 4-13: Brake Cylinder

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.

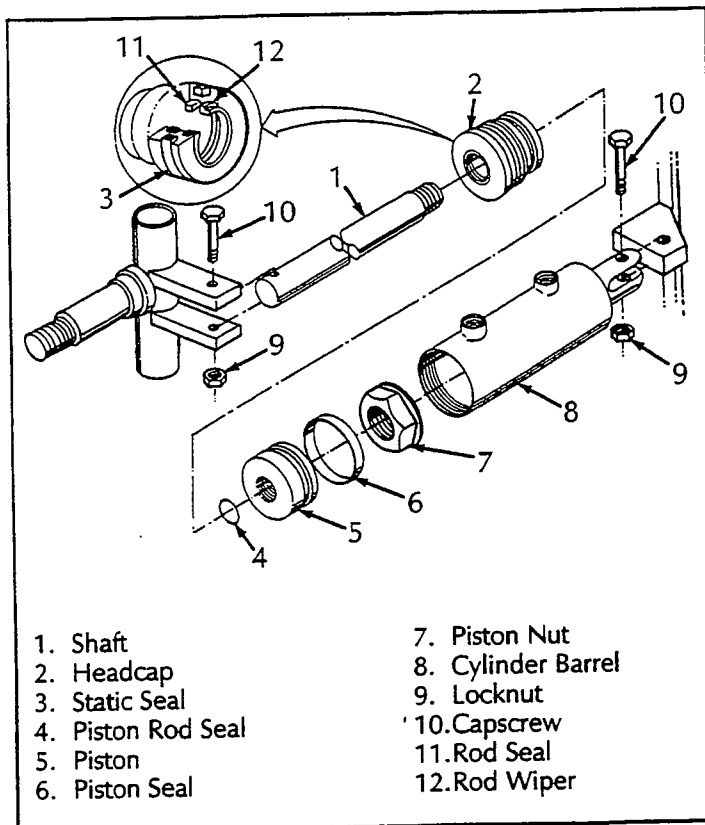


Figure 4-14: Steering Cylinder

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 $\frac{1}{4}$ 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.

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.

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.

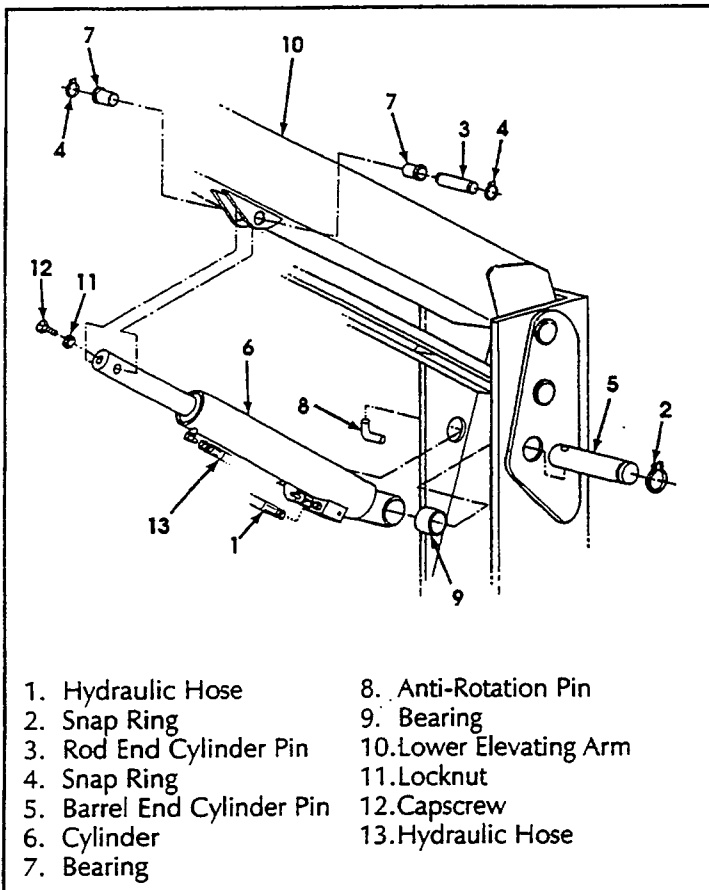


Figure 4-15: Lift Cylinder Installation

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 match-marks for exact alignment).
- Faulty armature.

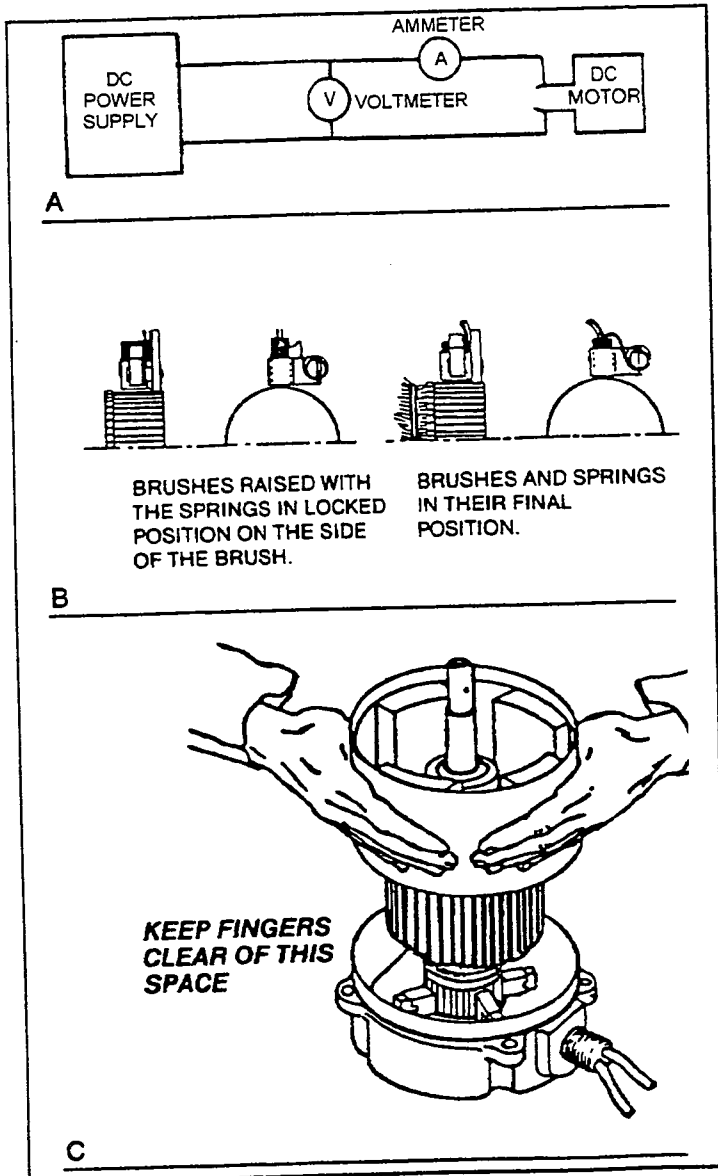


Figure 4-16: Electric Motor Service

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 <small>American National Std.-UNC (course) Grade 5</small>	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

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 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.	1. Emergency lowering/down valve (V7) partly open or faulty. 2. Leaking piston seals in lift cylinder (CYL3)	Ensure that the emergency lowering valve is completely closed. Replace the valve. Check for leakage at cylinder 'return' line, replace seals if necessary.
Platform will not lower or lowers slowly. Drive function operable.	1. Faulty down valve coil (SOL4). 2. Faulty drive/lift selector switch (S8). 3. Down valve (V7) stuck. 4. Plugged down orifice (ORF1). 5. Faulty relay (R2).	Test down valve coil. If proper voltage is present and coil is not magnetized, replace. With the drive/lift switch in the LIFT position, check continuity. Replace if faulty. Replace the down valve. Remove and clean orifice. Test relay. Replace if faulty.
Motion Alarm does not sound.	1. Faulty down alarm (ALM1).	Check voltage to down alarm . If proper voltage is present, replace the alarm.
Brake will not release.	1. Brake orifice (ORF2) plugged. 2. Faulty brake cylinder (CYL2). 3. Brake out of adjustment.	Remove and clean orifice. Check and replace seals in brake cylinder. Adjust to engage brake disc when extended only .
Brake will not lock wheel.	1. Brake orifice (ORF2) plugged. 2. Faulty brake cylinder (CYL2). 3. Brake out of adjustment.	Remove and clean orifice. Check and replace seals in brake cylinder. Adjust to engage brake disc when extended .
Operator receives static electric shocks while platform is elevated.	Machine with non-marking tires is being driven on a plastic floor or a floor with plastic sealer.	Attach a ground strap to the chassis.

NOTES

6.0 Introduction

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

The diagrams are to be used in conjunction with *Table 5-1: Troubleshooting Guide*. They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding during troubleshooting analysis.

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

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6.1 Electrical Schematic

Table 6-1: Electrical Schematic Legend

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.

LEGEND

CHASSIS CONTROL BOX TERMINAL STRIP

CONTROLLER BOX TERMINAL STRIP

VALVE COIL

RELAY CONTACT N/O

RELAY CONTACT N/C

RELAY COIL

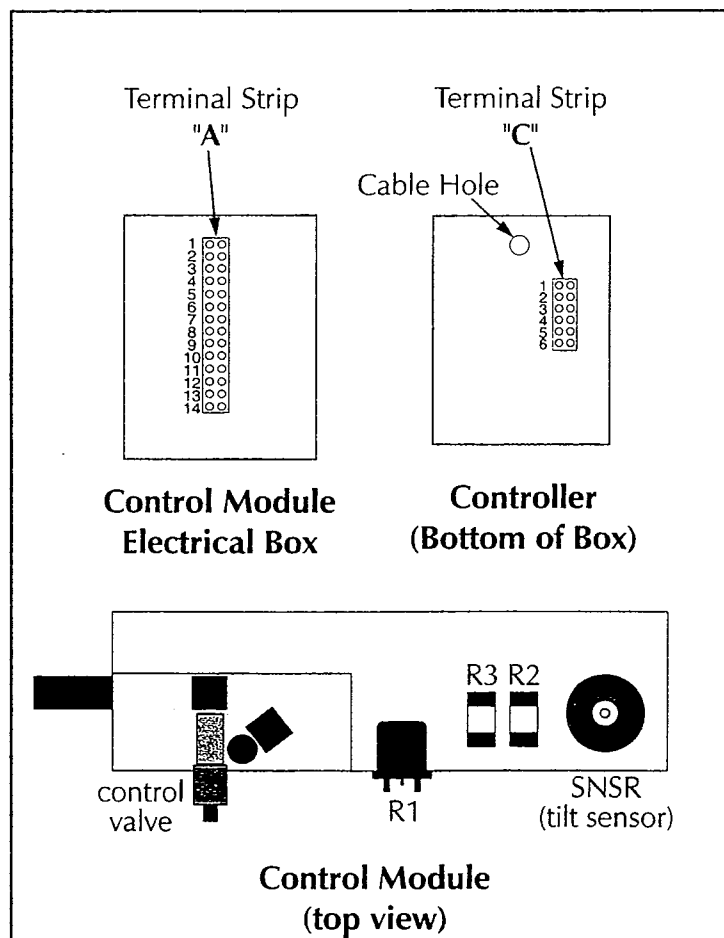


Figure 6-1: Relay and Terminal Strip Identification

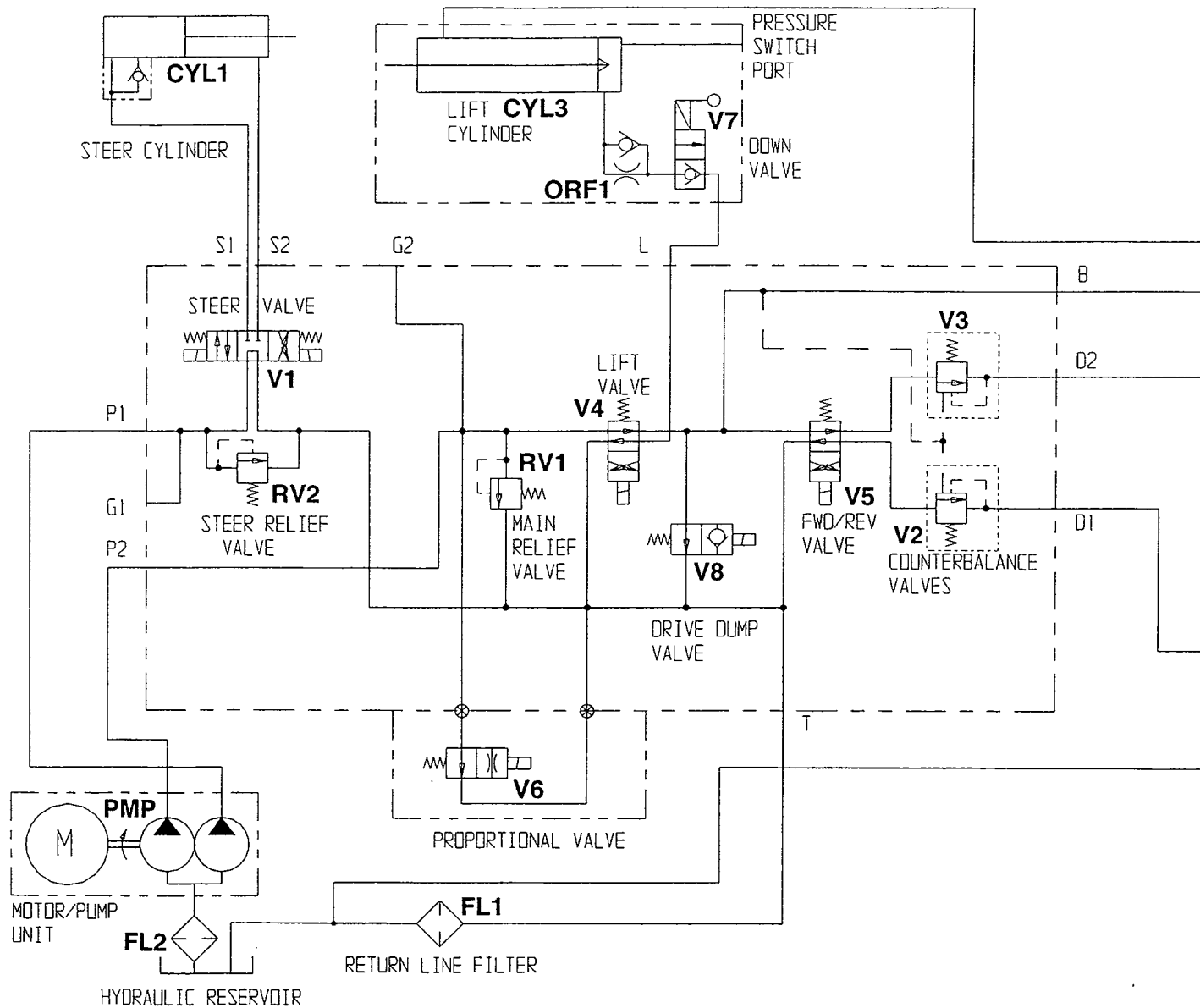


Figure 6-3: Hydraulic Schematic

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.

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Illustrated Parts Breakdown

FINAL ASSEMBLY

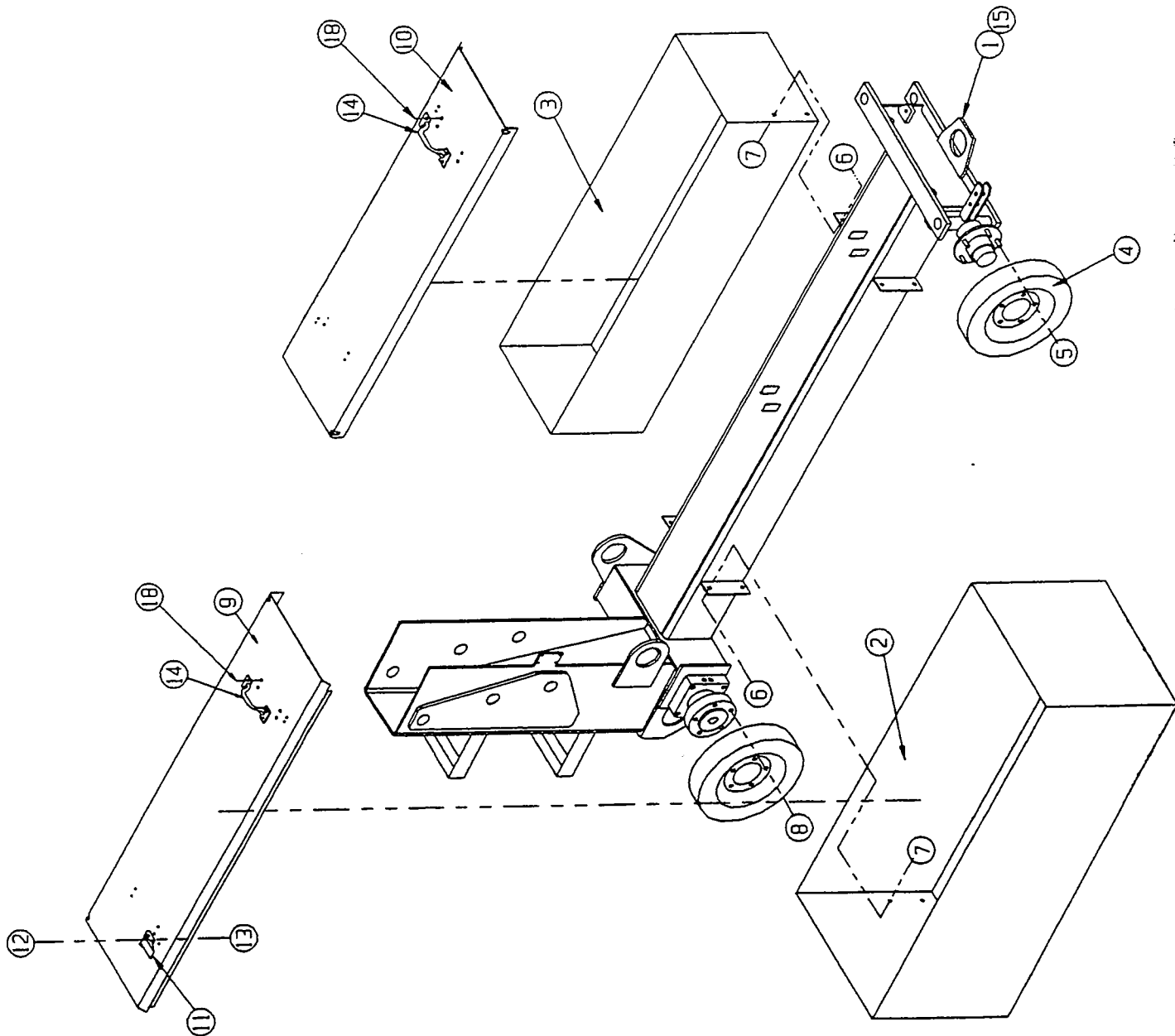
63400-006

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

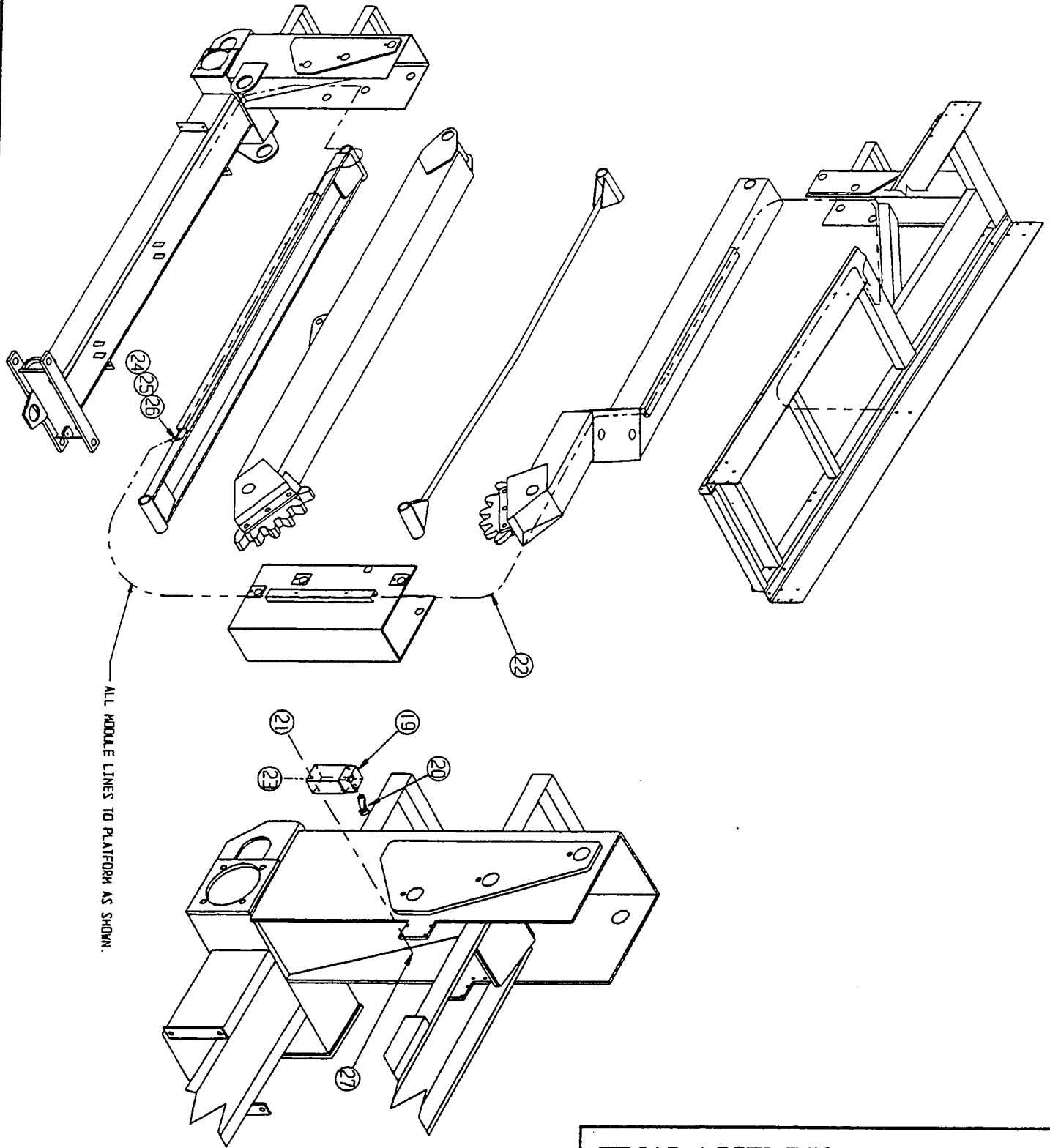


FINAL ASSEMBLY

63400-006

Drawing 1 of 4

Illustrated Parts Breakdown



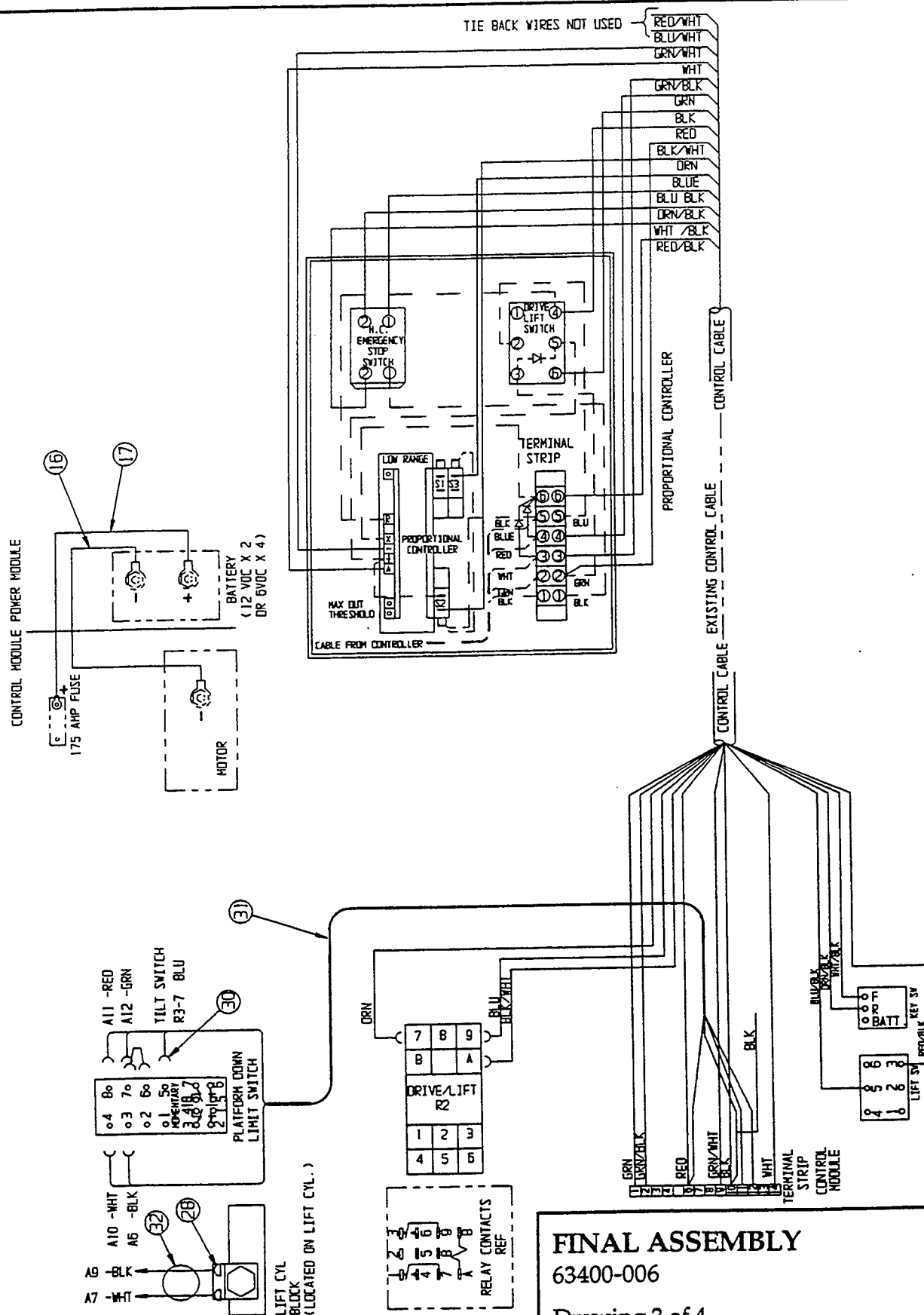
FINAL ASSEMBLY

63400-006

Drawing 2 of 4

Illustrated Parts Breakdown

Section
7.2



FINAL ASSEMBLY

63400-006

Drawing 3 of 4

ELEVATING ASSEMBLY

63401-001

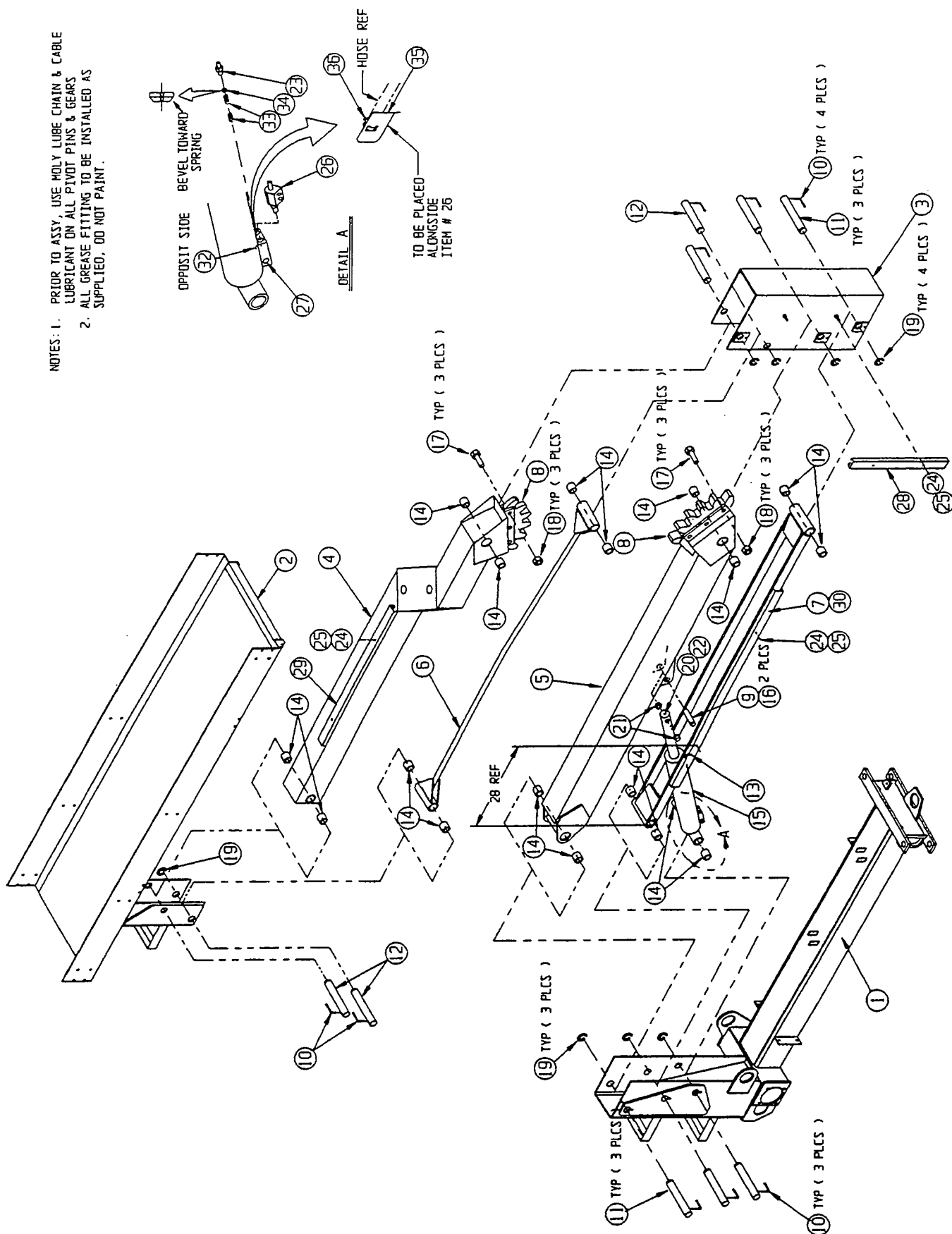
ITEM	PART	DESCRIPTION	QTY.
1	63402-004	Chassis Assy	1
2	63474-002	Weldment, Deck	1
3	63035-003	Weldment, Midlink Pivot	1
4	63044-002	Weldment, Upper Arm	1
5	63052-001	Weldment, Lower Arm	1
6	63059-000	Weldment, Upper Tension	1
7	63061-002	Weldment, Lower Tension	1
8	63085-001	Gear, Linkage	2
9	63134-001	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

Section
7.2

- 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

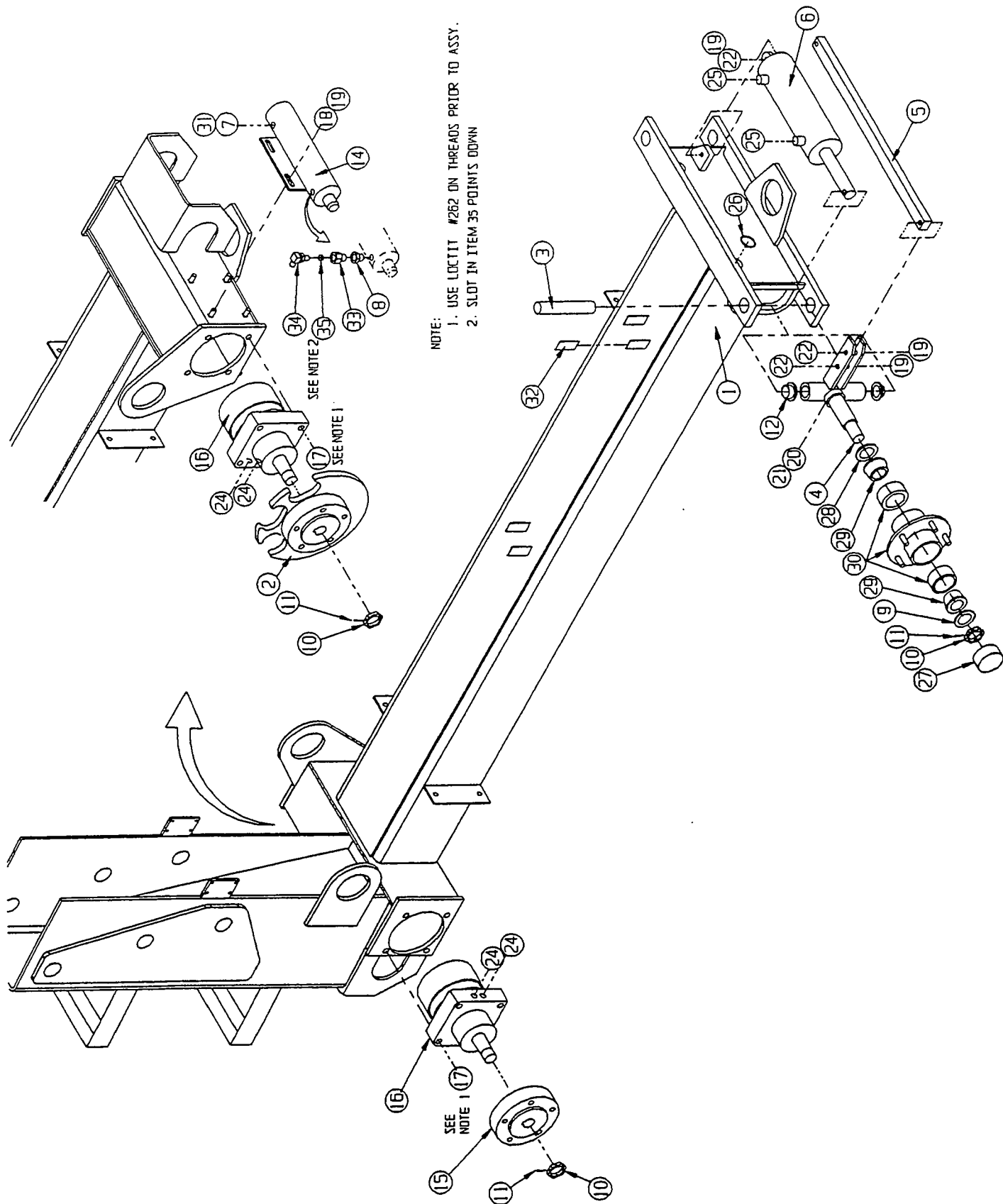
ITEM	PART	DESCRIPTION	QTY.
1	63011-003	Chassis Weldment	1
2	63075-000	Brake Hub Weldment	1
3	63077-000	King Pin	2
4	63078-000	Spindle Weldment	2
5	63089-000	Drag Link	1
6	63097-000	Steering Cylinder	1
*	63097-014	Seal Kit, Steering Cylinder	1
7	11939-010	Fitting Str	1
8	11923-003	Fitting	1
9	11239-016	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

Section
7.2



CONTROL MODULE ASSEMBLY

63403-010

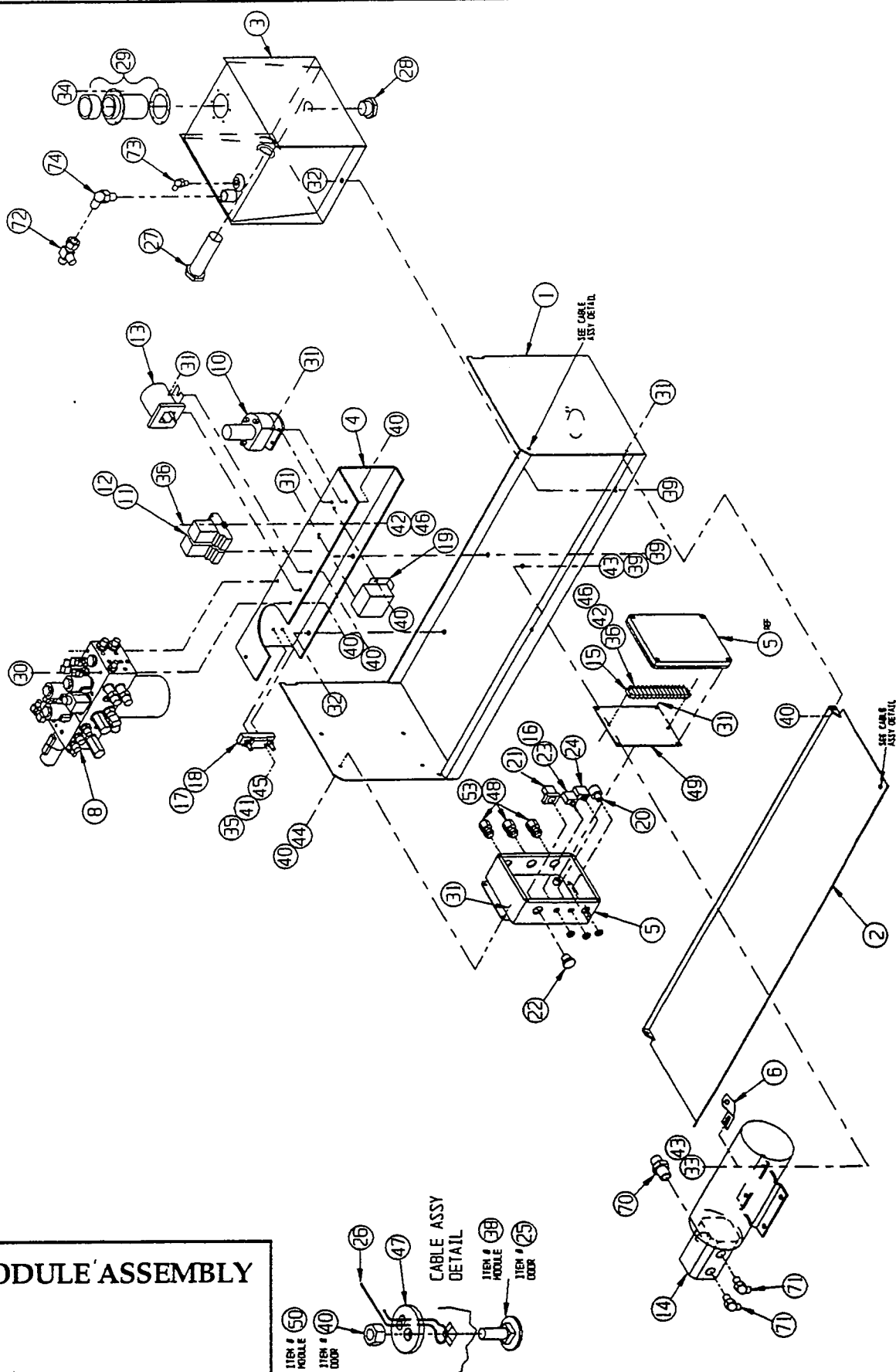
ITEM	PART	DESCRIPTION	QTY.
1	63406-002	Tray, Control Module	1
2	63394-001	Door, Control Module	1
3	63063-002	Hydraulic Tank Weldment	1
4	63387-000	Bracket, Valve Block Assembly	1
5	65845-002	Enclosure - Modified	1
6	63029-000	Buss Bar	1
8	65617-001	Valve Block Assembly	1
*	30576-009	Service Block	1
9	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

Section
7.2

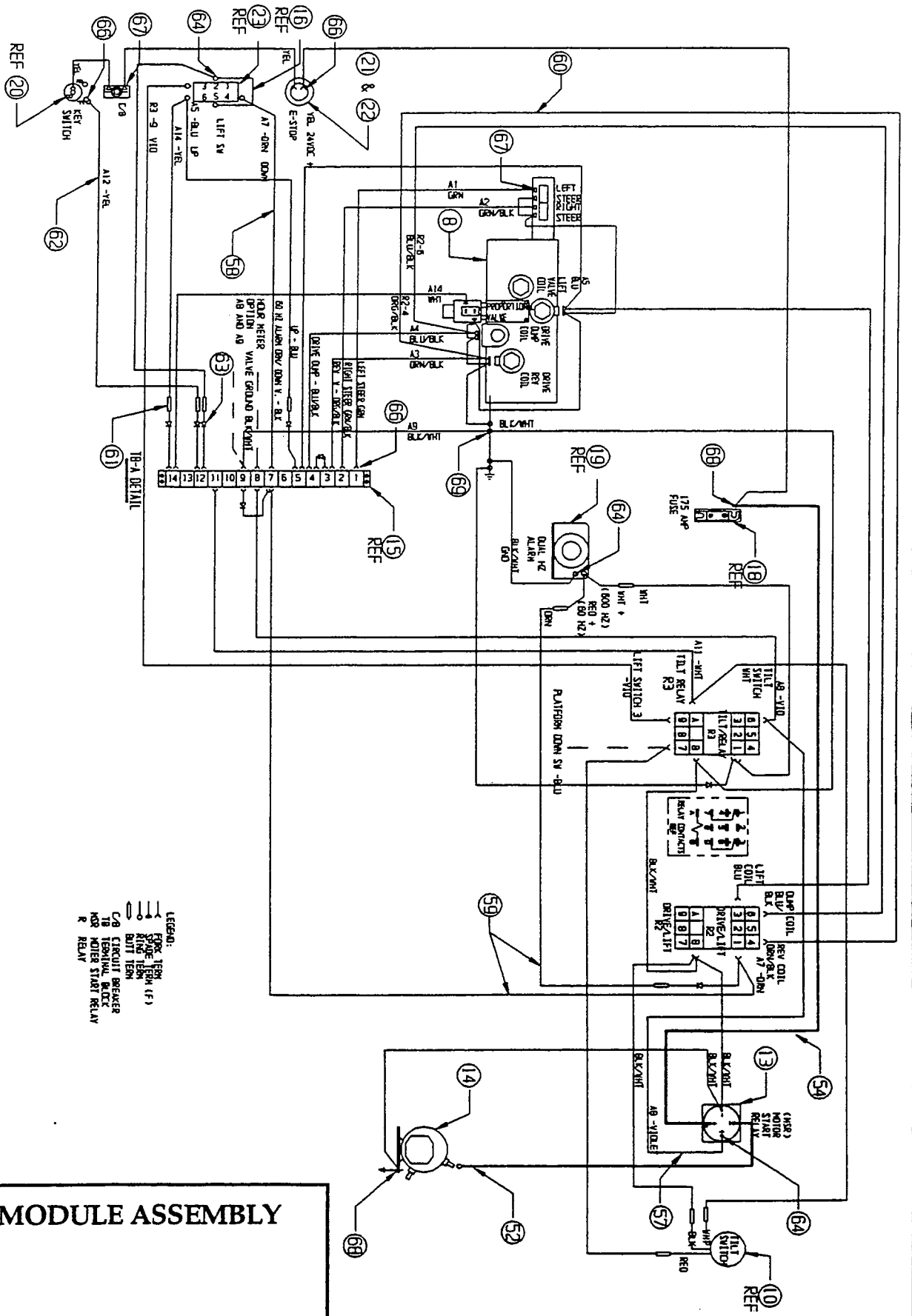


CONTROL MODULE ASSEMBLY

63403-010

Drawing 1 of 2

Illustrated Parts Breakdown



Illustrated Parts Breakdown

Section
7.2

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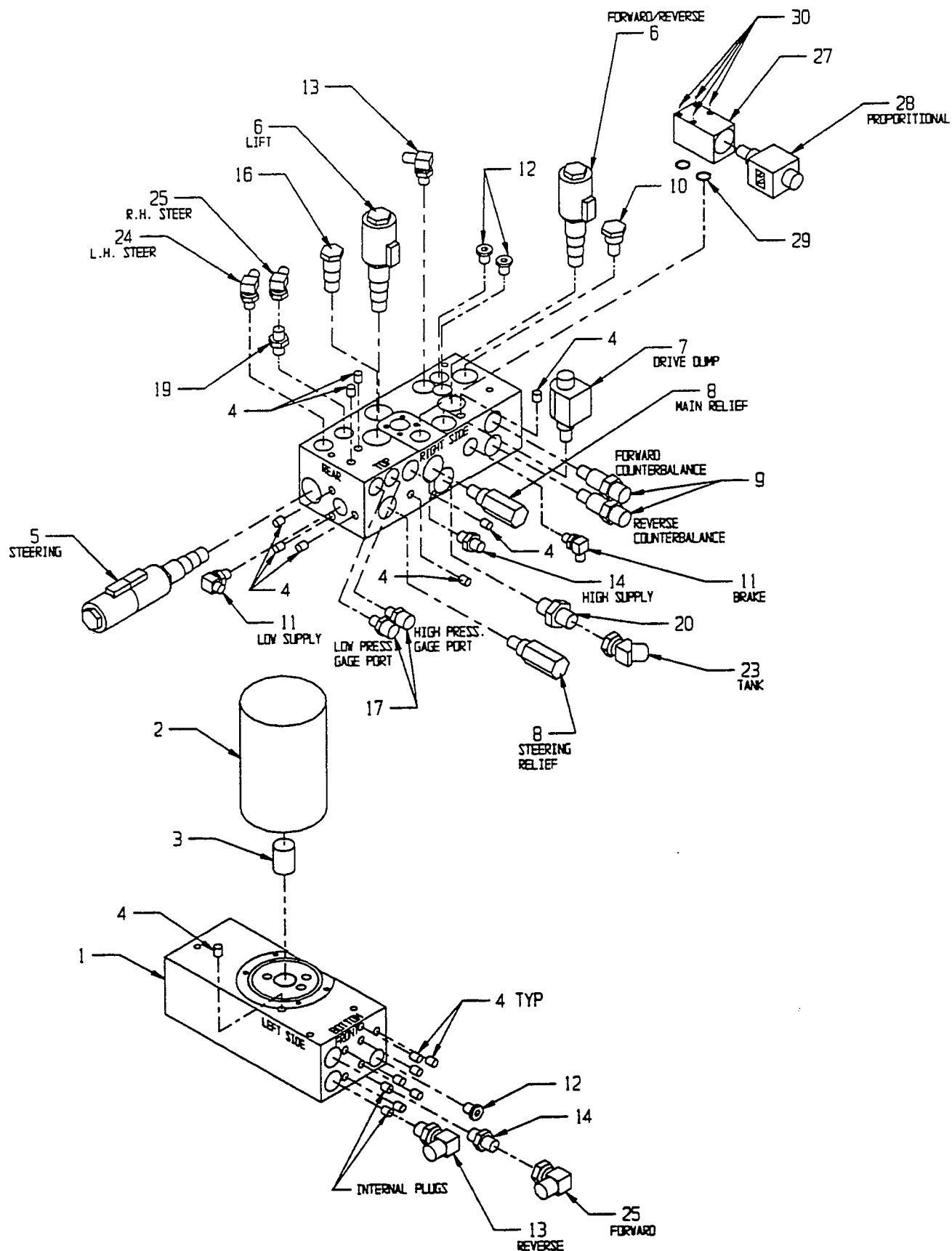
CONTROL VALVE ASSEMBLY

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

Section
7.2



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

Section 7.2



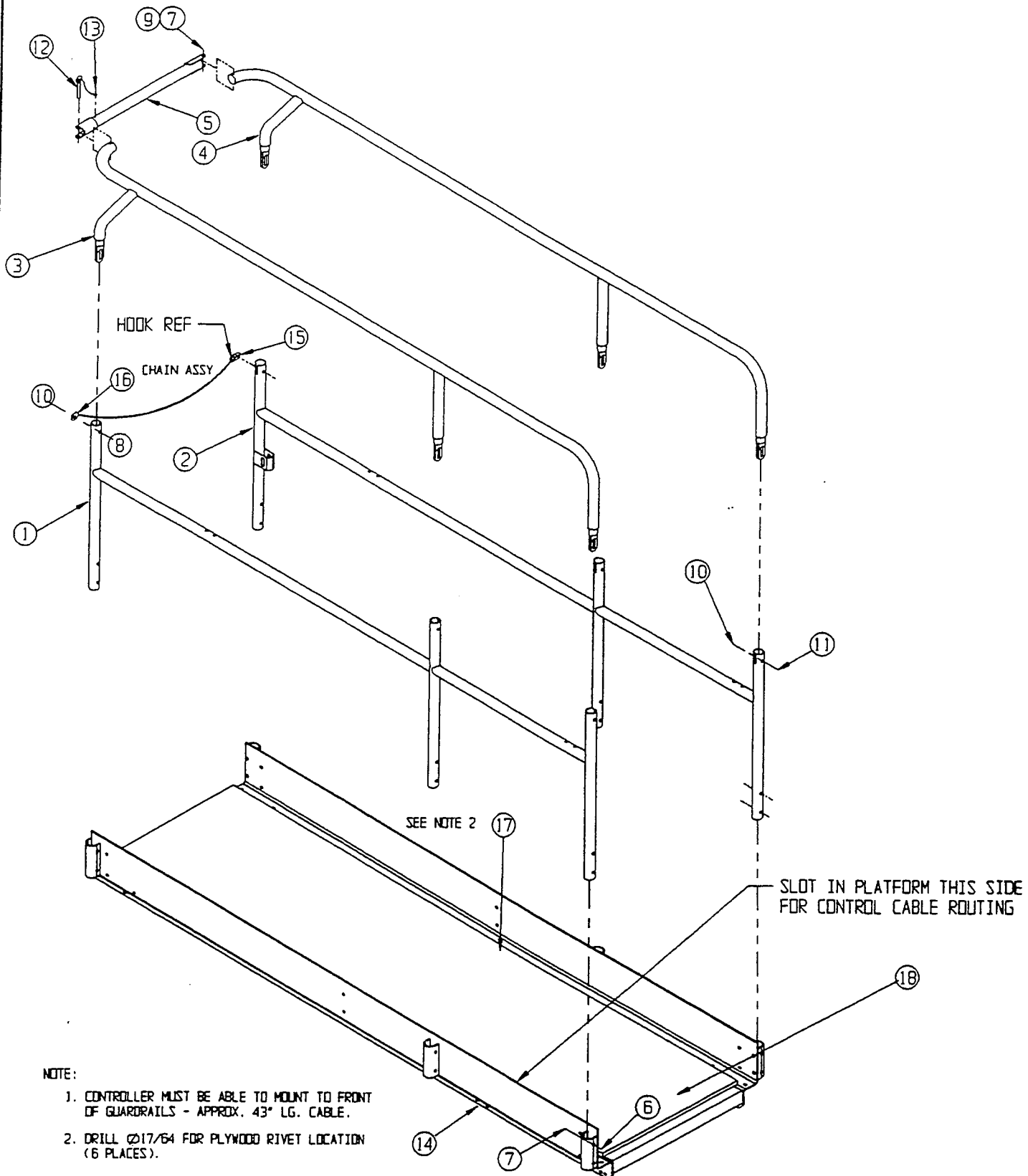
GUARDRAIL ASSEMBLY

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

Section
7.2



SLIDEOUT DECK ASSEMBLY

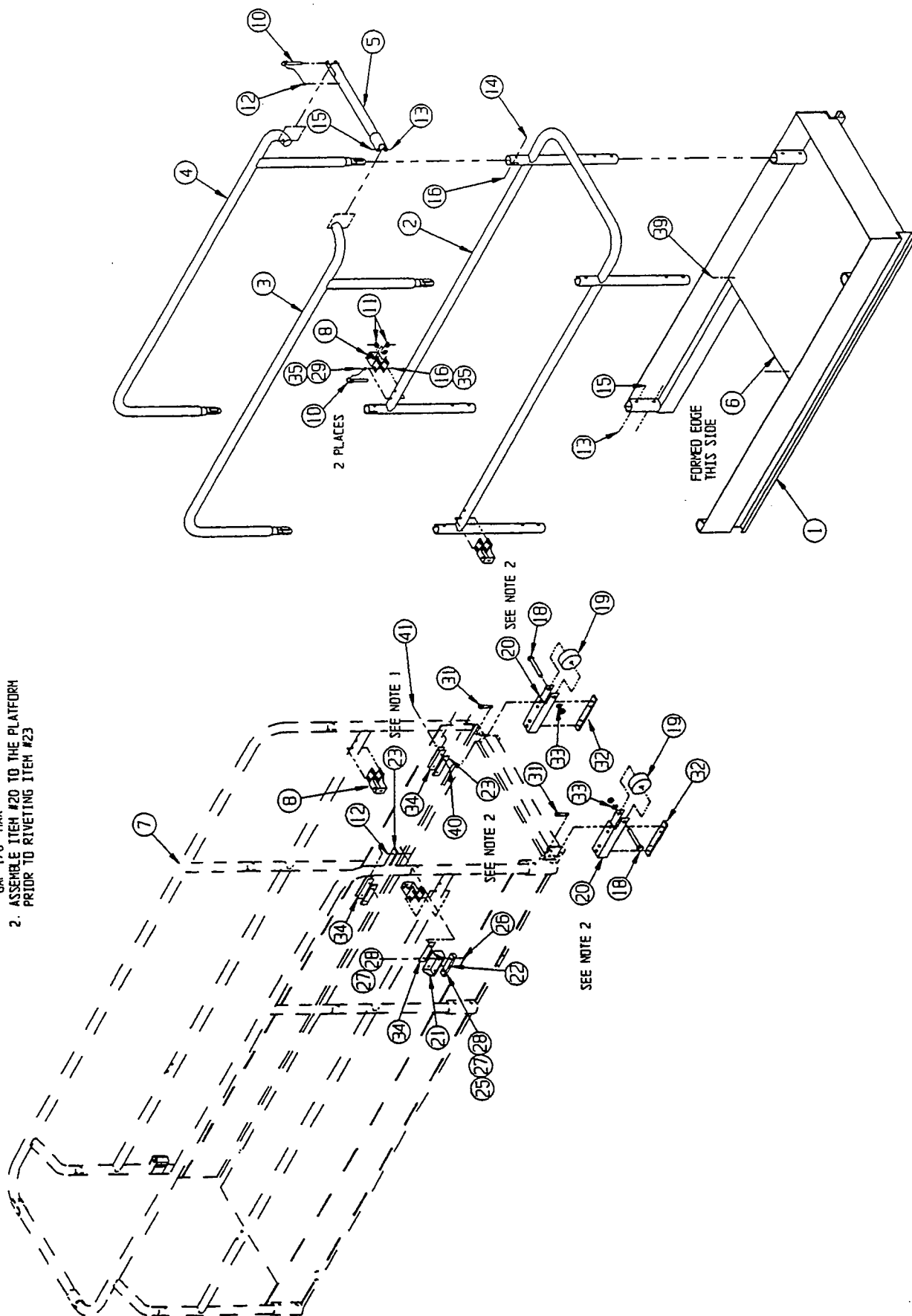
63575-003

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

Section
7.2

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

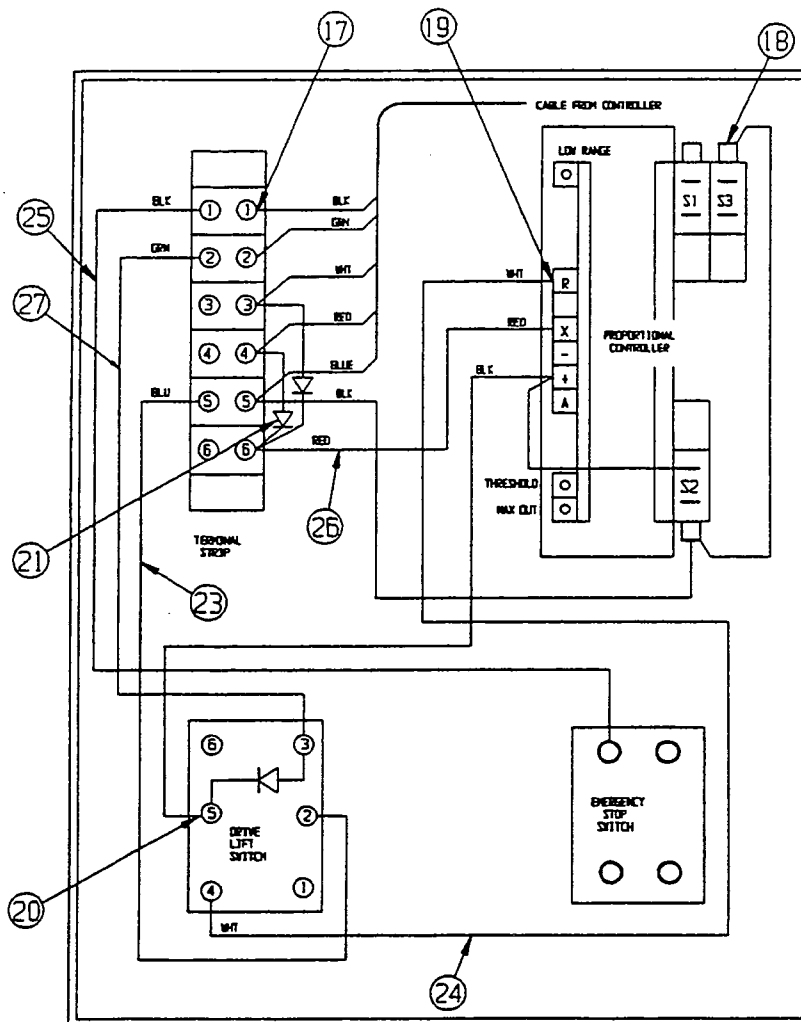
CONTROLLER ASSEMBLY

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

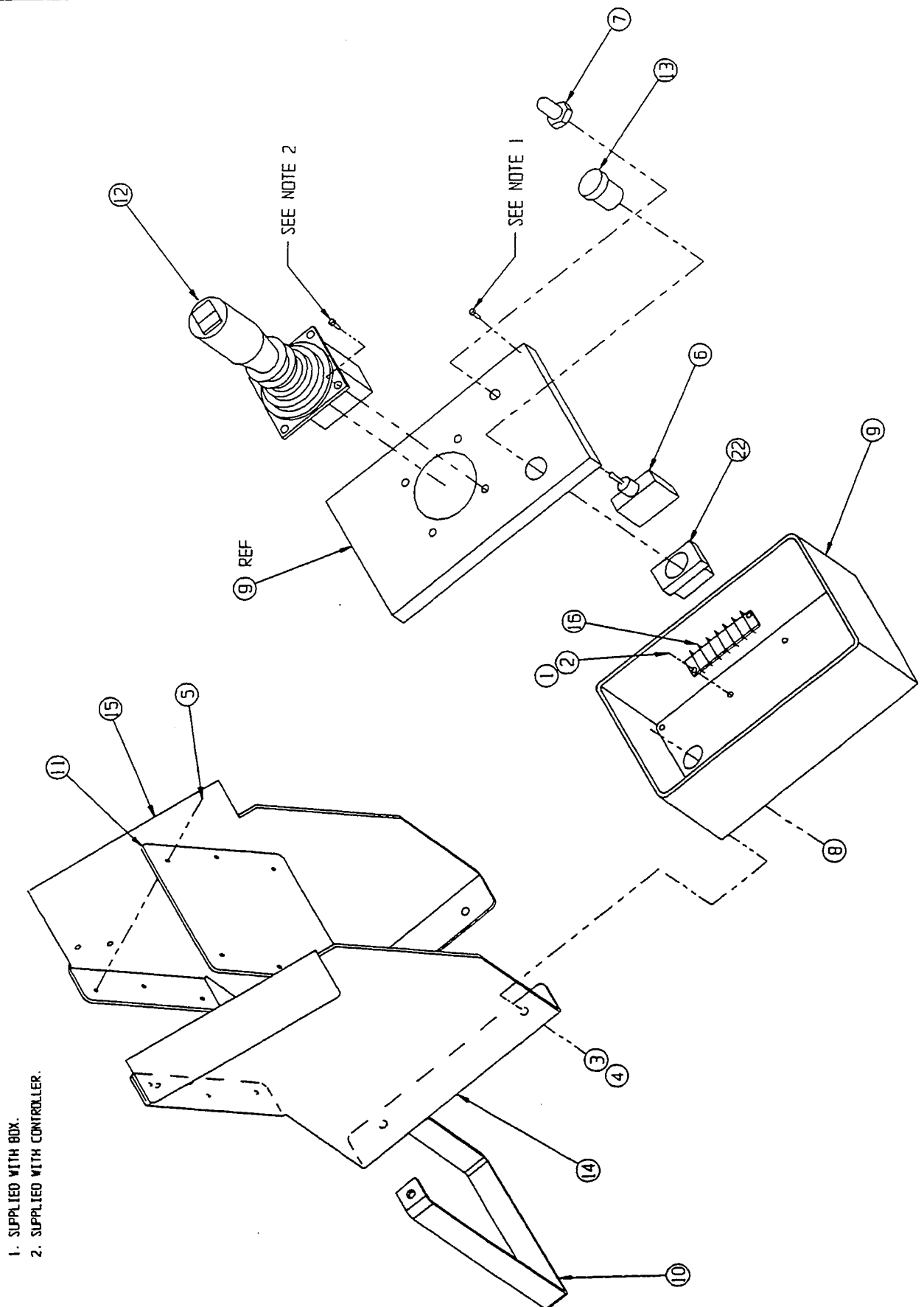
ITEM	PART	DESCRIPTION	QTY.
13	63667-001	Push Button	1
14	66094-000	Panel, Controller L.H.	1
15	66095-000	Panel, Controller R.H.	1
16	29928-003	Terminal Block (6 Contacts)	1
17	29610-002	Conn Fork 14-16 Ga #8	17
18	29615-002	Conn Push 14-16 Ga #8	3
19	29601-011	Conn #6 Ring 16-14 Ga	4
20	29601-013	Conn #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	1'
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

Section
7.2



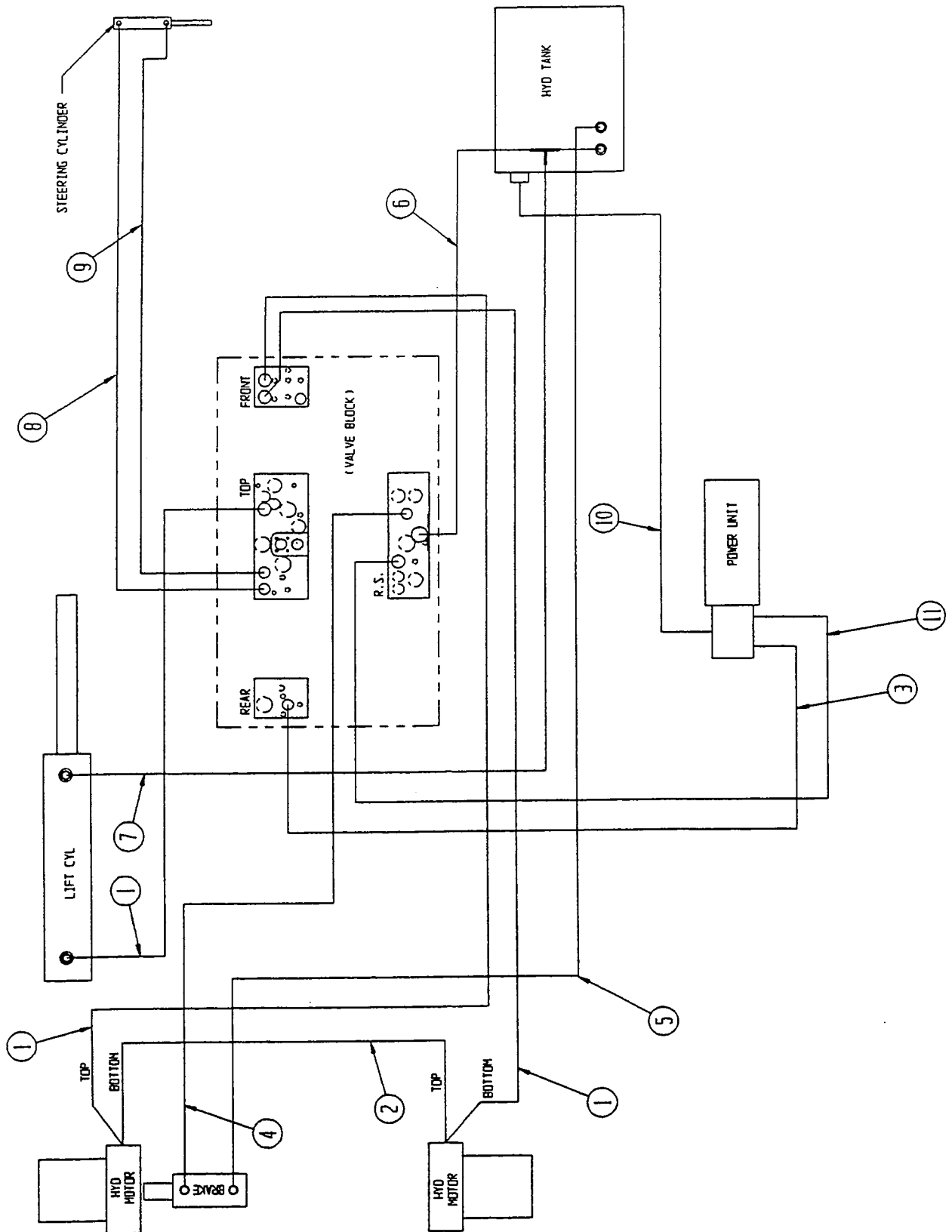
HOSE KIT

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

Section
7.2



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, SL20	4

Section 7.2



Illustrated Parts Breakdown

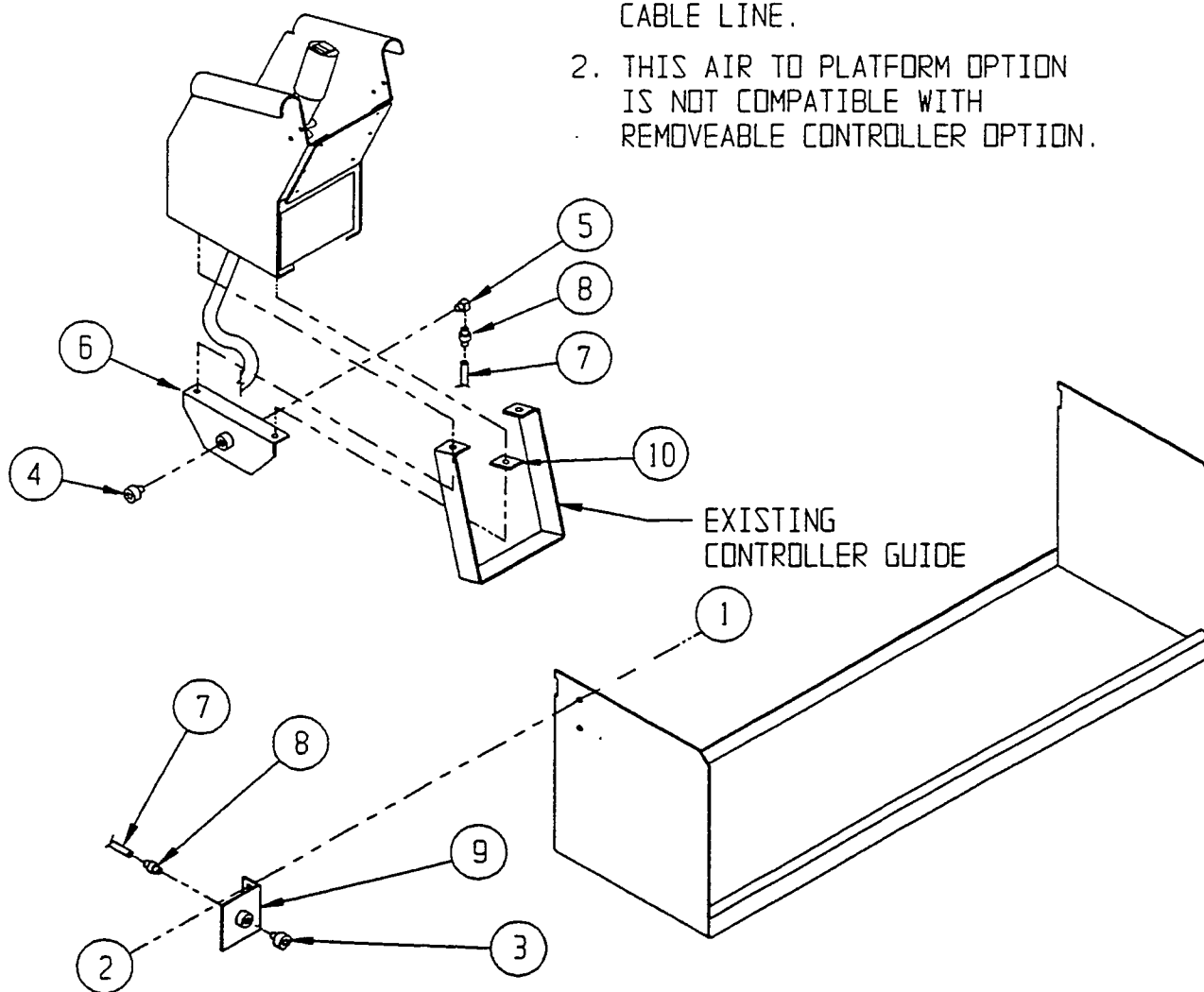
AIR TO PLATFORM - OPTION

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	Bracket 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.

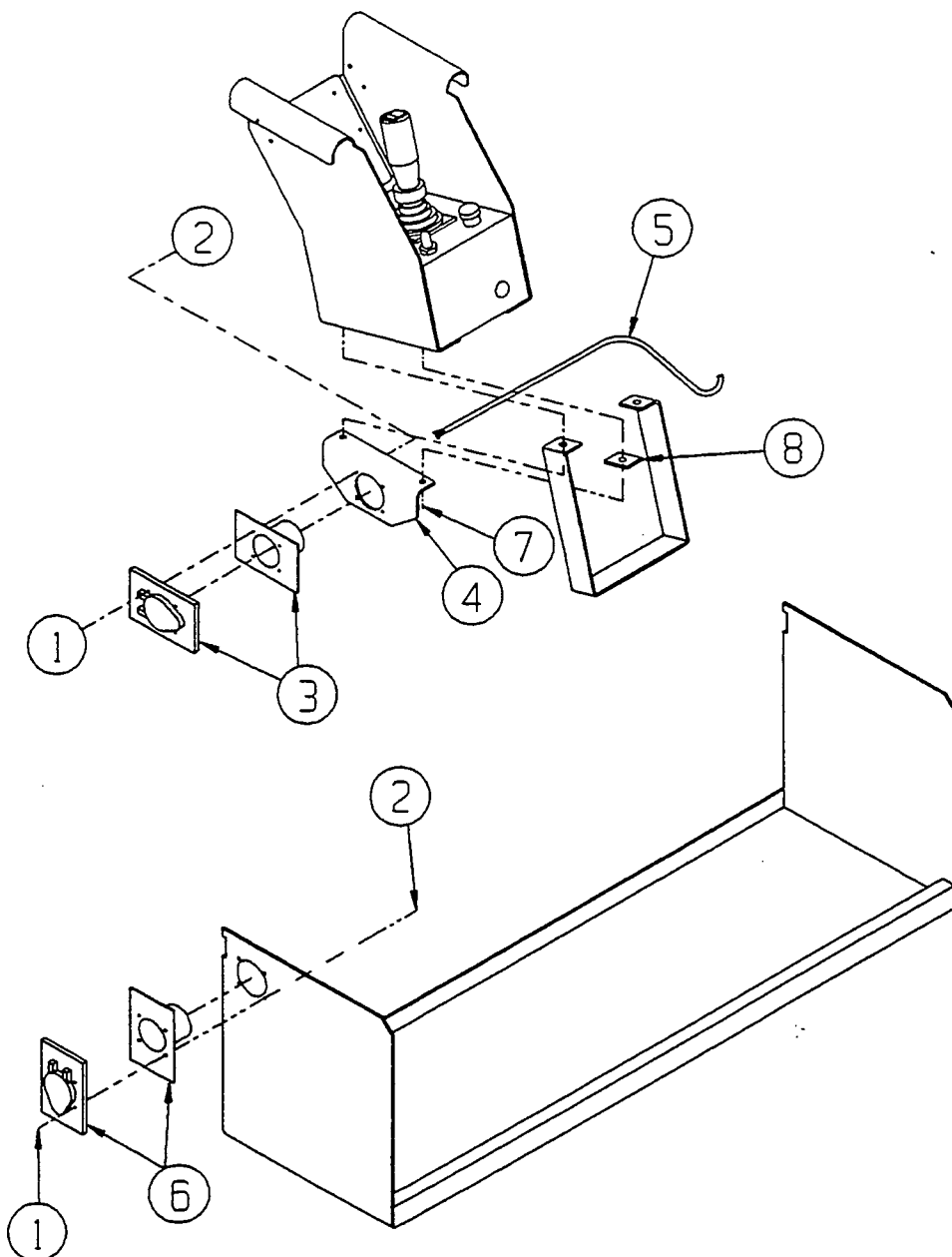


Illustrated Parts Breakdown

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POWER TO PLATFORM - OPTION 65713-001

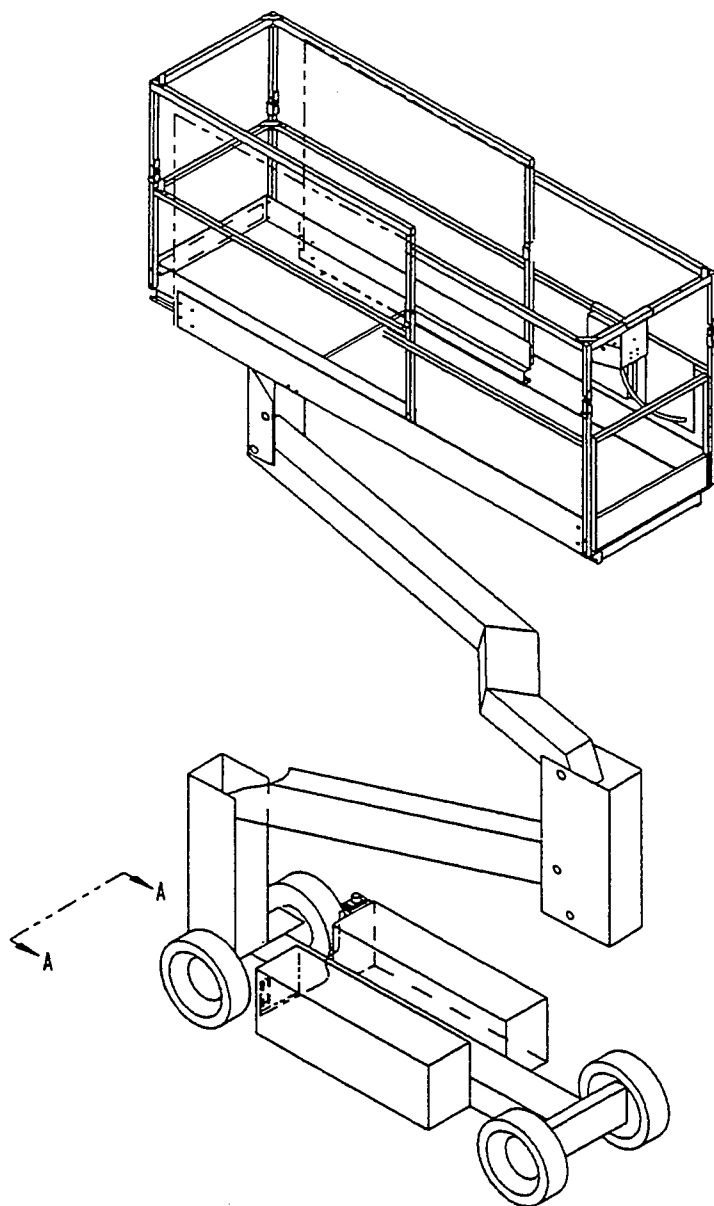
ITEM	PART	DESCRIPTION	QTY.
1	11715-004	Screw, Rd. Hd. #6-32 X 1/2 Lg.	8
2	11248-047	Nut, ESNA #6-32	8
3	08942-001	Outlet, AC, Female	1
4	66505-000	Bracket	1
5	29495-099	Wire, 14ga 3 Cond.	37'
6	08942-002	Outlet, AC, Male	1
7	11252-006	Screw, HHC 1/4 X 3/4 Lg.	2
8	65682-000	Spacer	1



BEACON ASSEMBLY - OPTION

63140-000

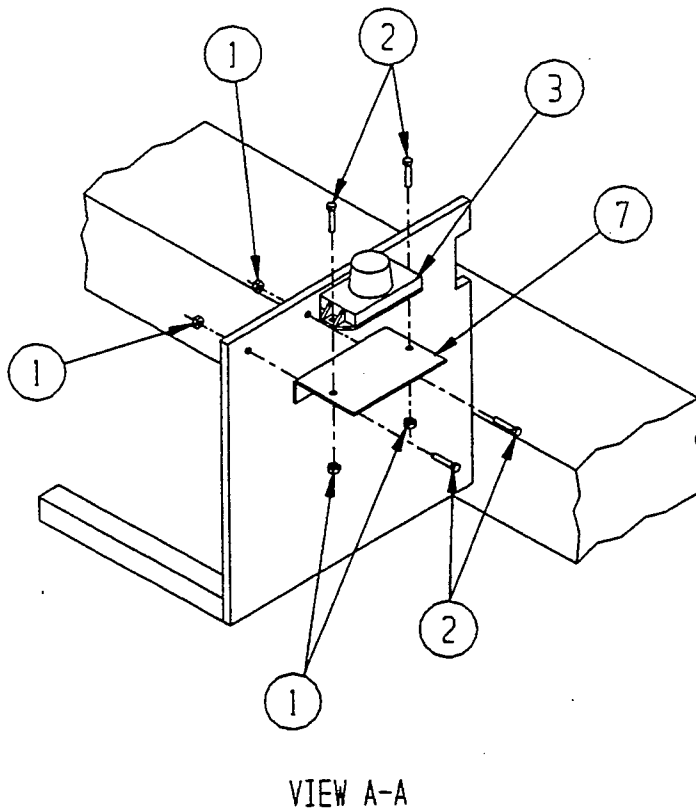
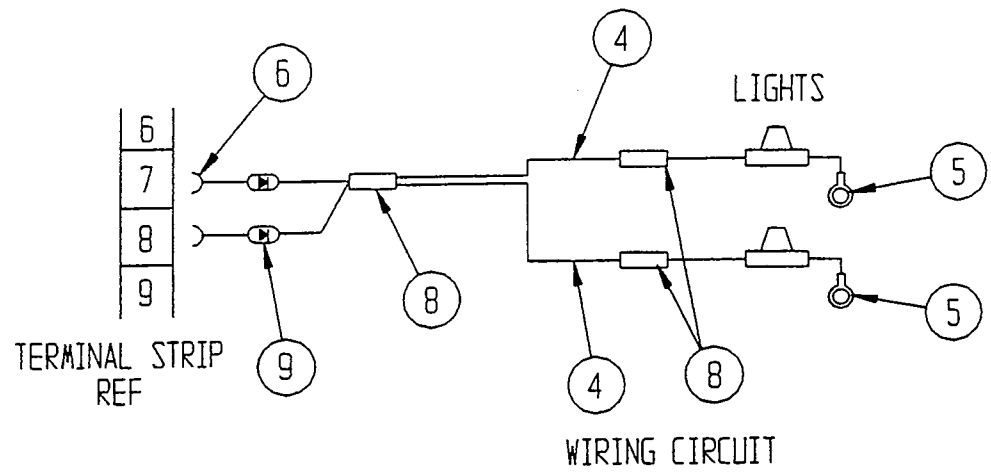
ITEM	PART	DESCRIPTION	QTY.
1	11249-003	Nut, #10-32 Lock	8
2	11826-008	Screw, #10-32 Rd Hd Mach X 1 Lg	8
3	12848-004	Light	2
4	29451-099	Wire, 16 AWG Copper White	9'
5	29601-013	Conn., Ring Term	2
6	29610-002	Conn., Fork Term	3
7	63193-000	Bracket, Light Mount	2
8	29620-002	Conn., Butt	5
9	29825-002	Diode,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



Illustrated Parts Breakdown

Section
7.2

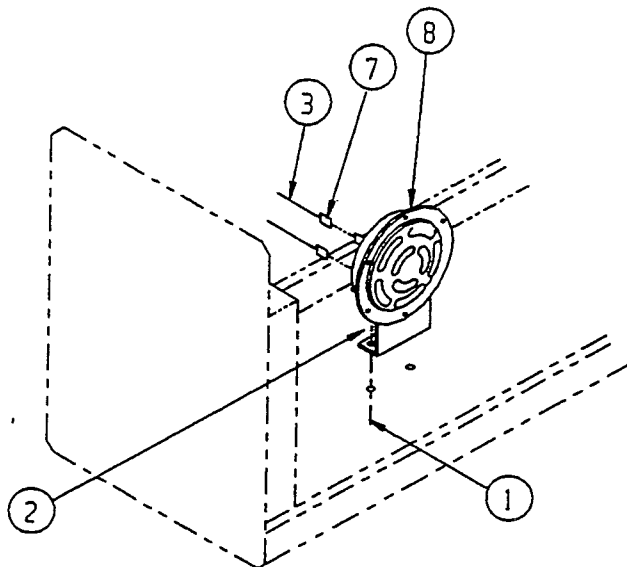
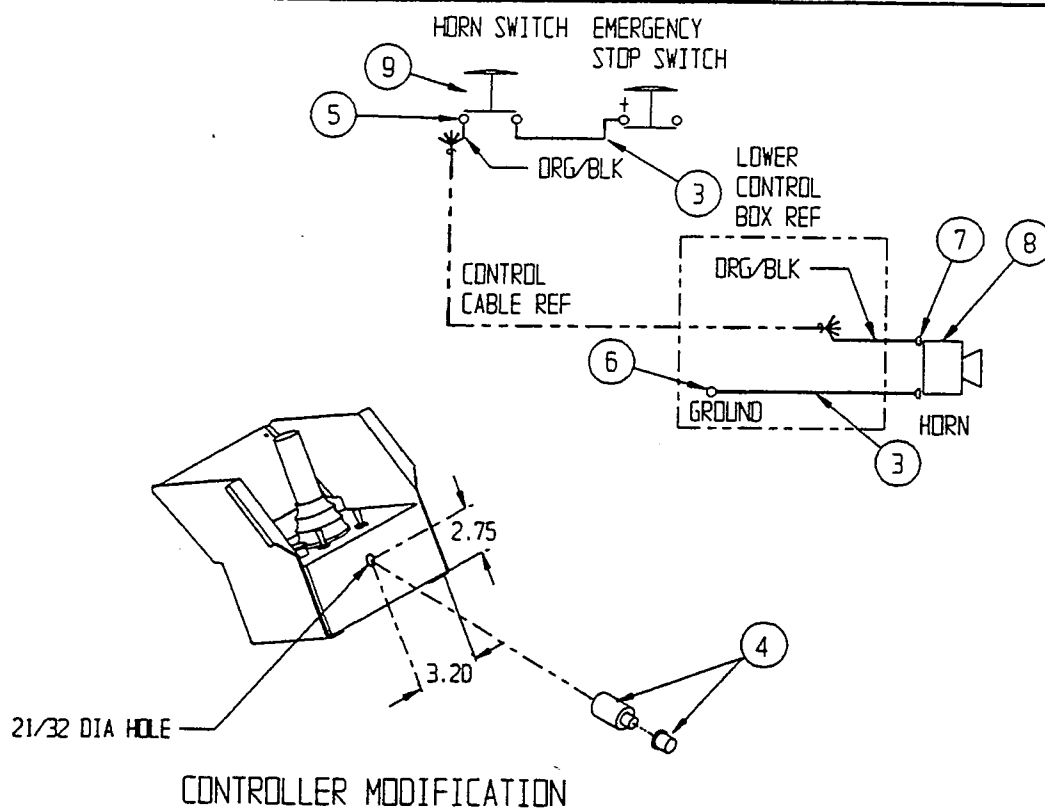
NOTE:
1. INSULATE ALL DIODE WIRES.



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

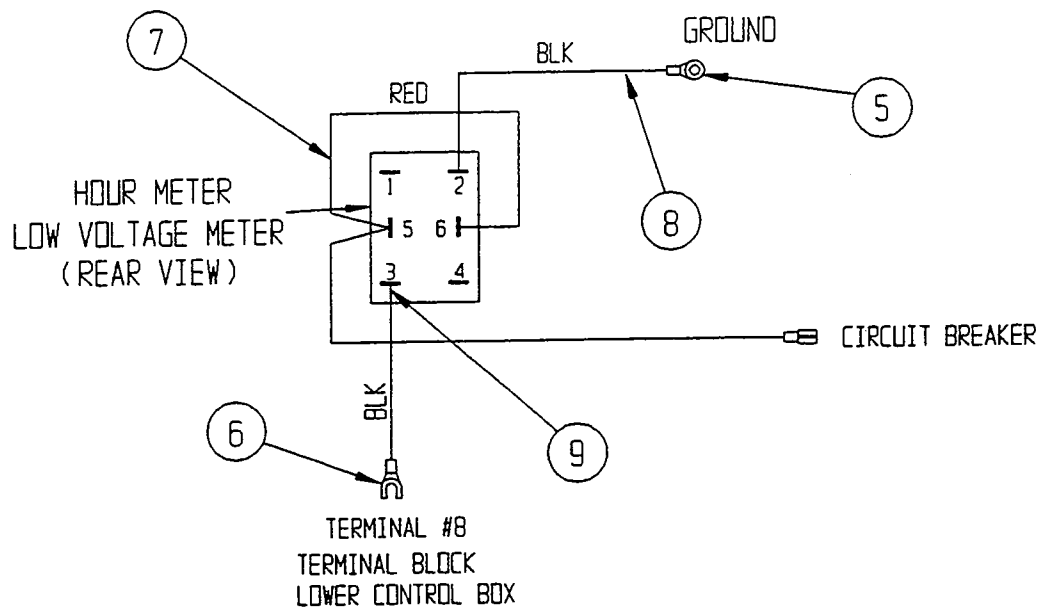
Section
7.2

VOLTAGE/HOUR METER - OPTION

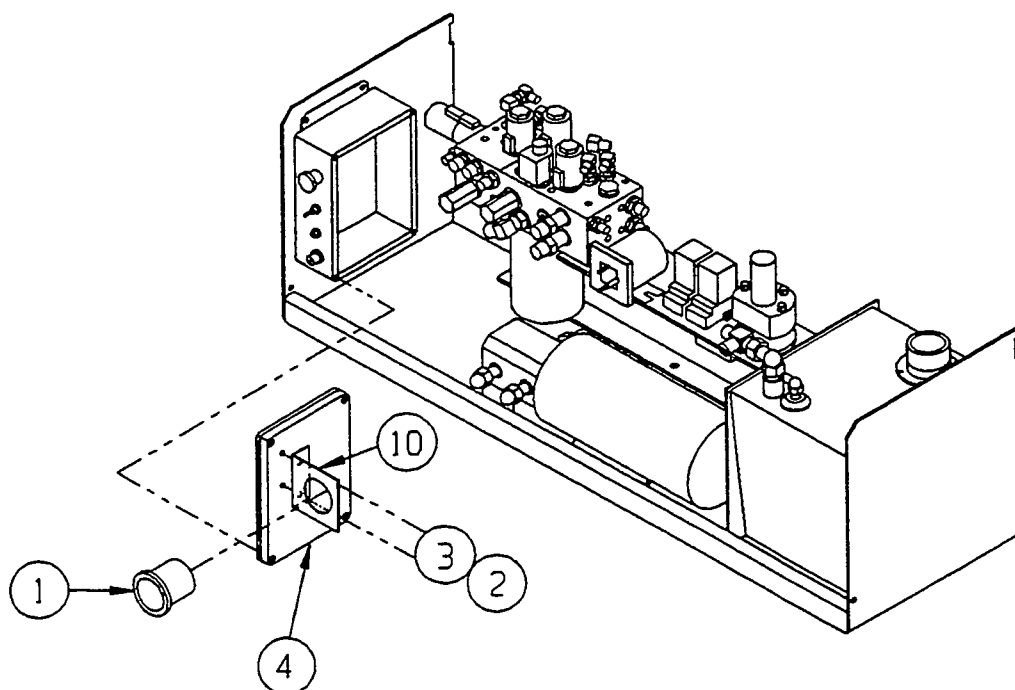
66613-001

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



WIRING DIAGRAM



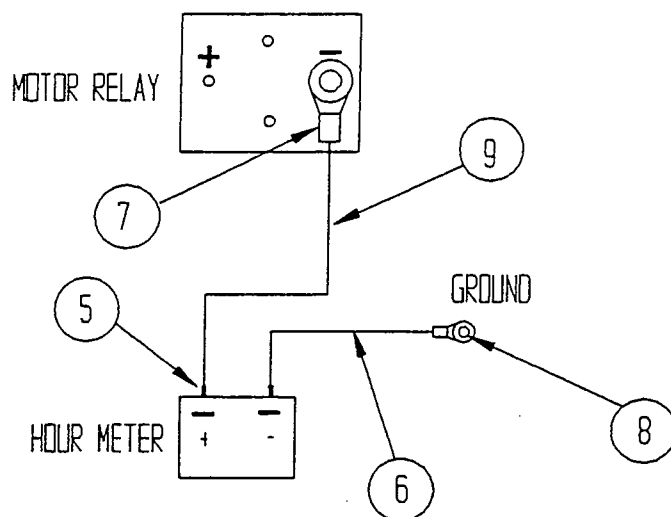
Illustrated Parts Breakdown

HOUR METER - OPTION

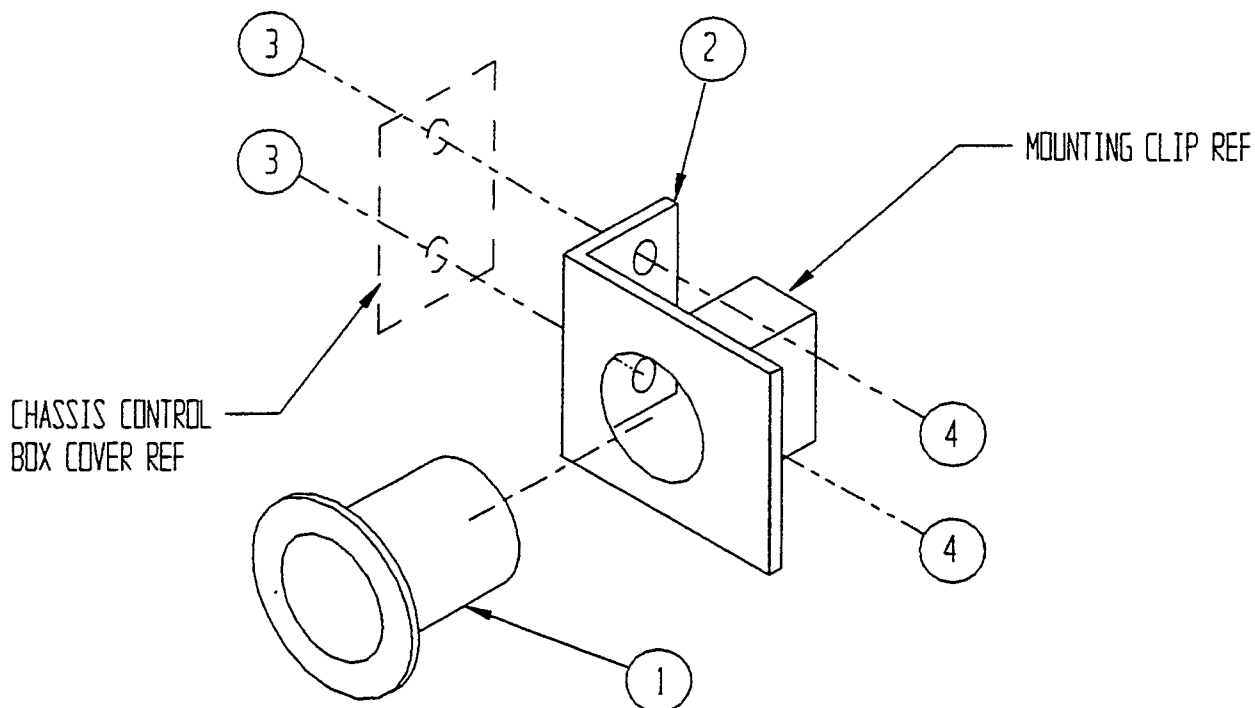
61584-000

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



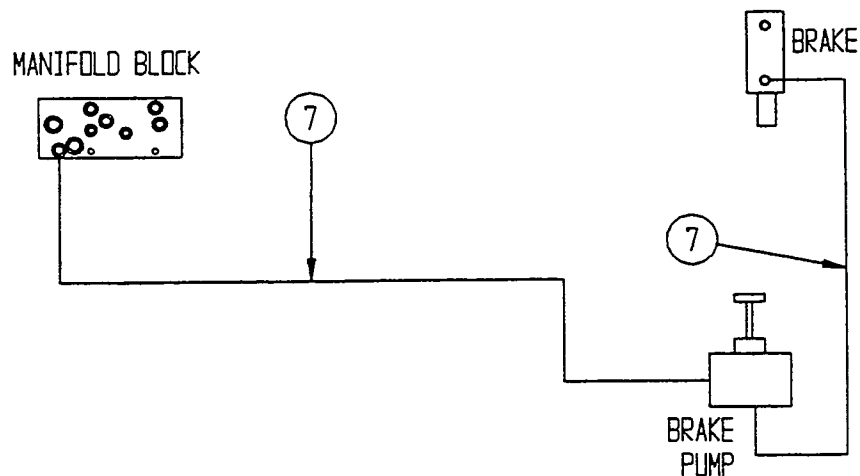
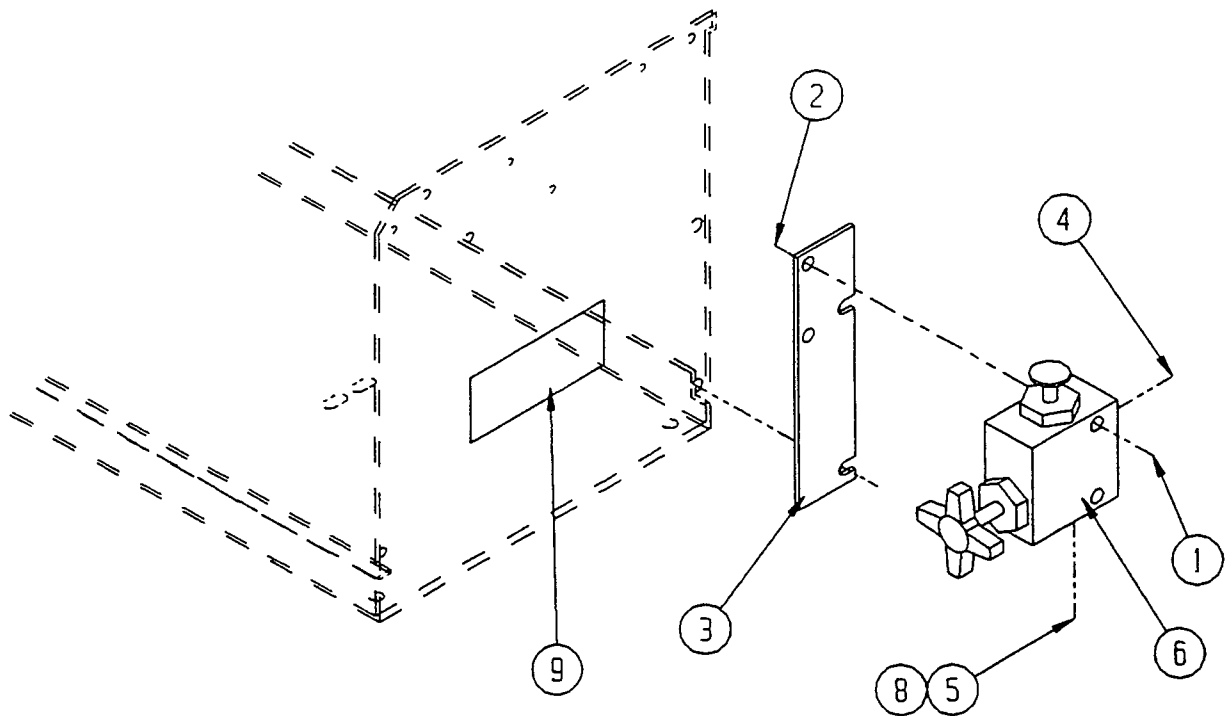
Illustrated Parts Breakdown

Section
7.2

BRAKE RELEASE KIT - OPTION

63629-001

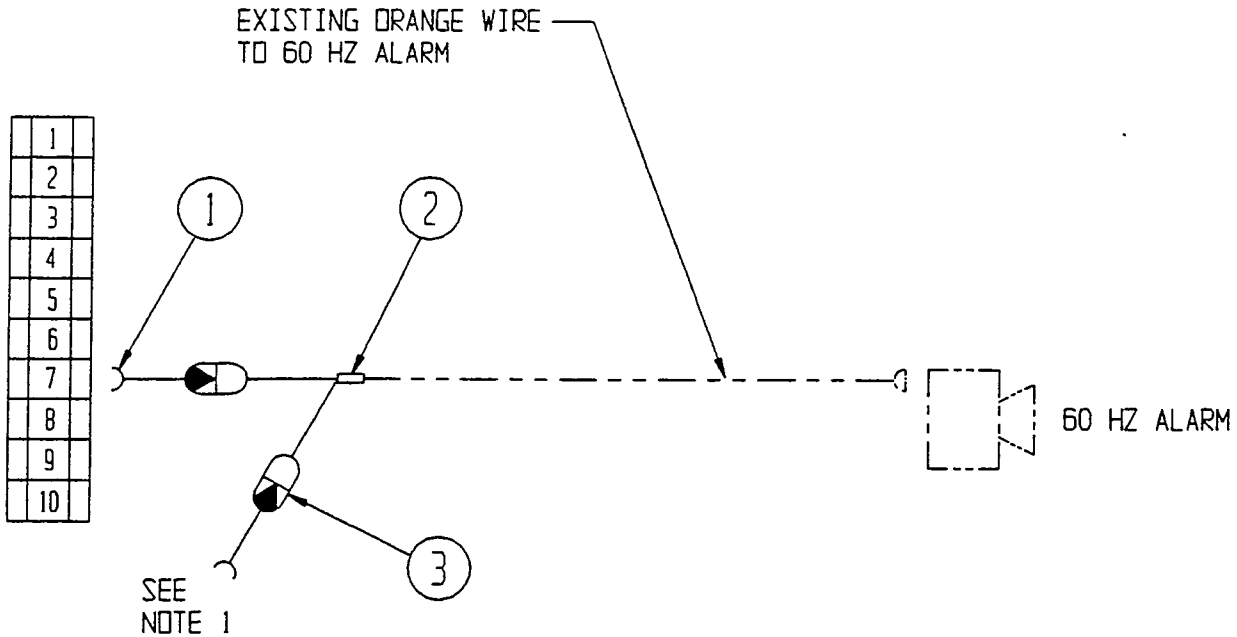
ITEM	PART	DESCRIPTION	QTY.
1	11248-006	Locknut 3/8-16 UNC Hex	2
2	11254-020	Screw 3/8-16 UNC HHC X 2 1/2	2
3	63472-000	Mtg. Bracket Brake Pump	1
4	11941-005	Fitting Str.	1
5	11934-026	Fitting 90°	1
6	63978-000	Hand Pump, Brake	1
7	60861-007	Hose Assembly 3/8 Dia X 27	2
8	11937-003	Fitting 90°	1
9	63423-000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



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



NOTE:

1. a. FOR ALL MOTION ALARM CONNECT TO TB-8
- b. FOR FWD/REV MOTION ALARM CONNECT TO R2 COIL
- c. FOR REV MOTION ALARM CONNECT TO TB-3

Illustrated Parts Breakdown

Section
7.2

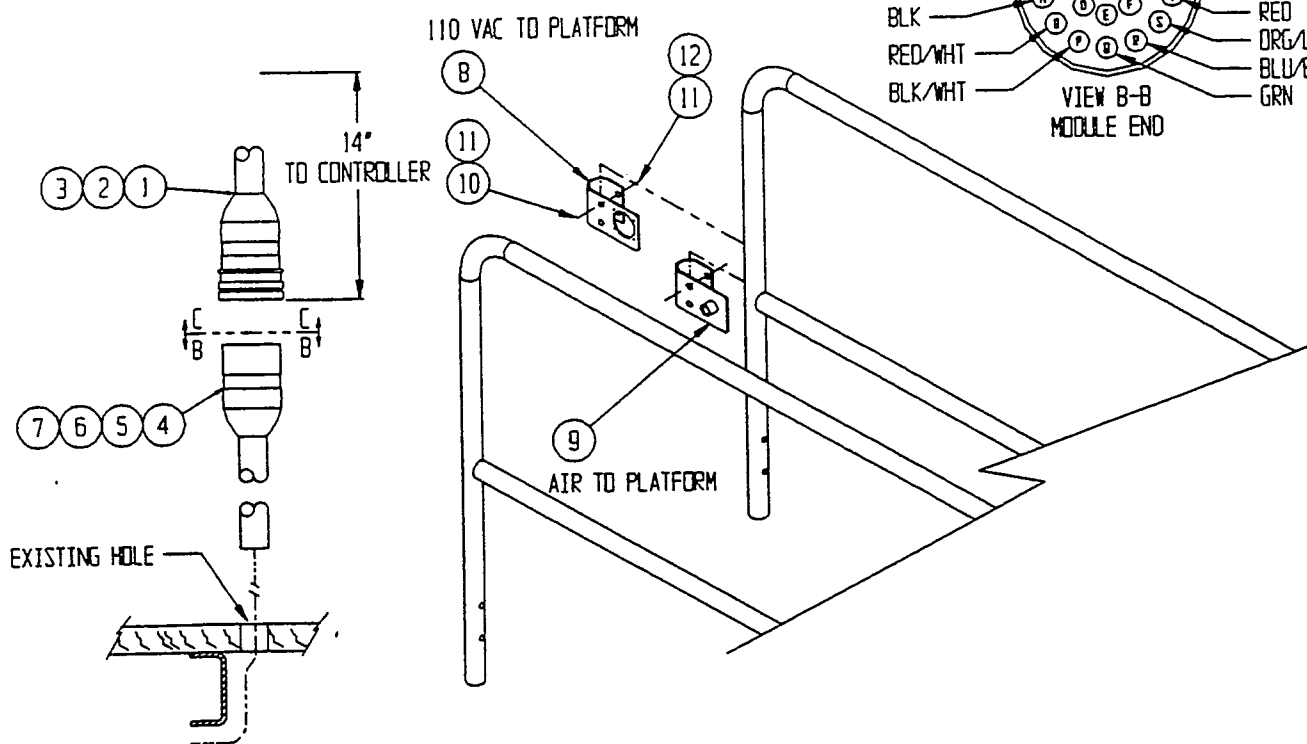
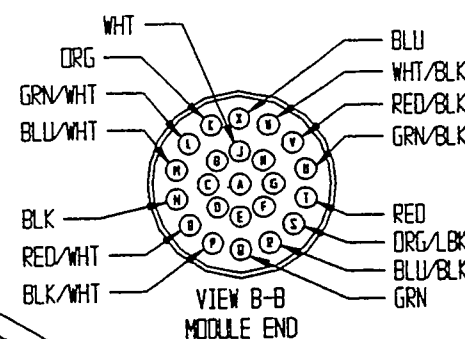
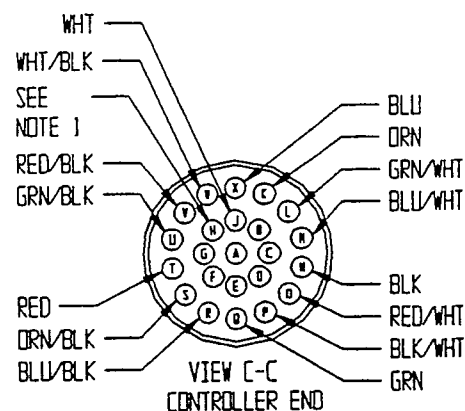
REMOVABLE CONTROLLER - OPTION

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

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



Illustrated Parts Breakdown

800W GENERATOR - OPTION

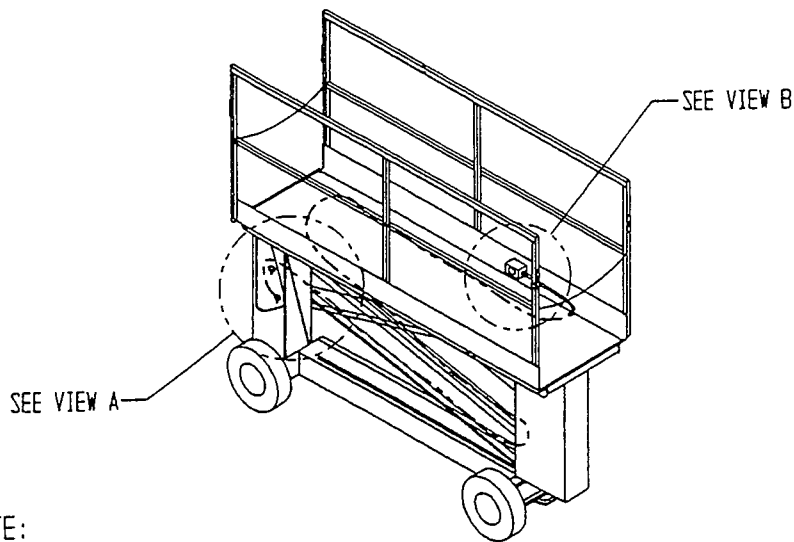
61392-001

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'

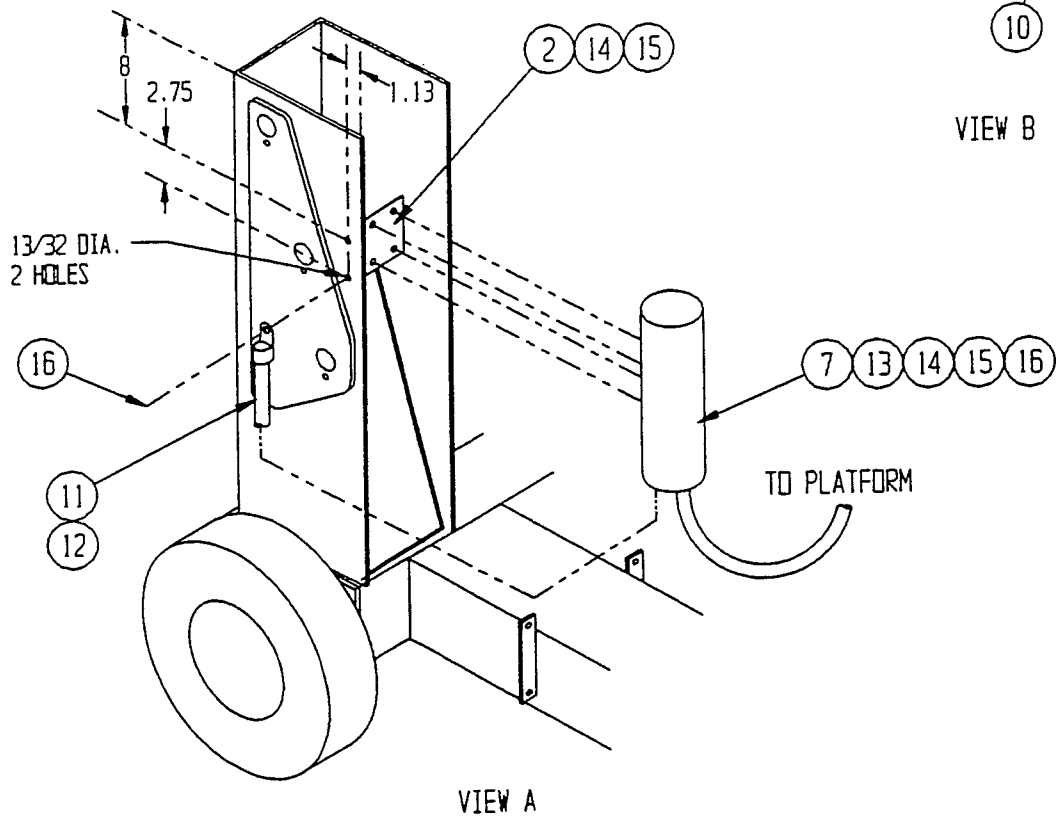
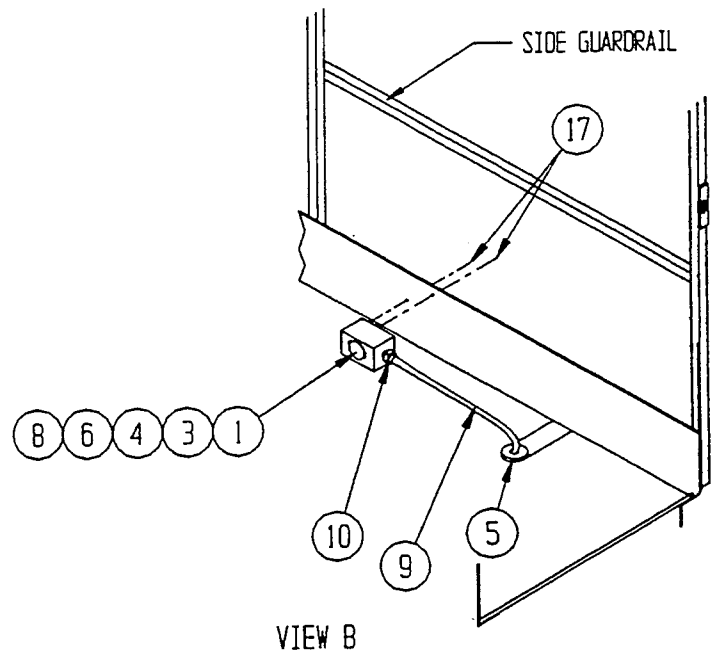
ITEM	PART	DESCRIPTION	QTY.
10	29925-003	Connector, Cable	1
11	29431-099	Cable, #2 Ga	5'
12	29602-025	Ring Terminal	4
13	29938-000	Cord Cap	1
14	11240-006	Washer, Flat 3/8	6
15	11248-006	Locknut, Hex 3/8-16	6
16	11254-012	Screw, HHC 3/8-16 X 1 1/2	6
17	11811-006	Screw, Slftp. 10-32 X 3/4	2

Illustrated Parts Breakdown

Section
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NOTE:
1. ROUTE CABLE ALONG CONTROL CABLE.





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