

UpRight



SL26/30N

Bi-Energy

WORK PLATFORMS

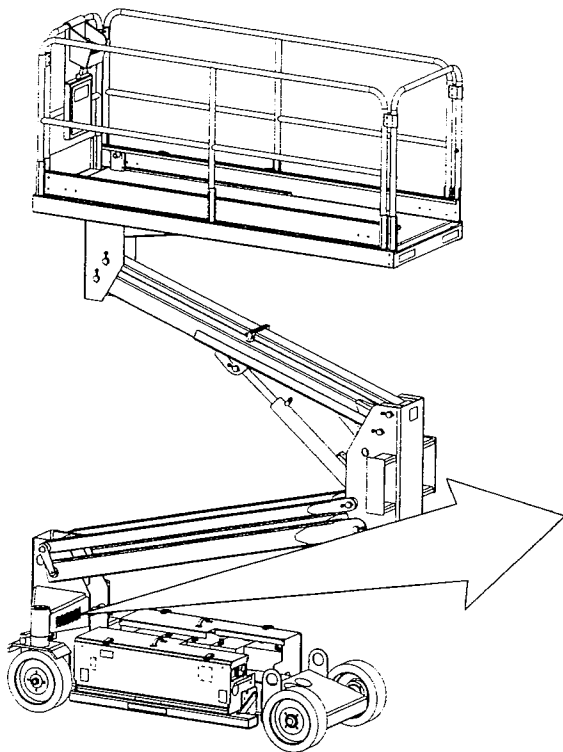
Service & Parts Manual

SERVICE & PARTS MANUAL

SL26/30N Bi-Energy

Aerial Work Platform

Serial Numbers 9600 - Current



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

UpRight, Inc.
1775 PARK ST. SELMA, CA 93662 USA
MODEL NO. MAX. PLATFORM HEIGHT
SERIAL NO. BATTERY VOLTAGE
MAX. DISTRIBUTED LOAD
CAUTION: CONSULT OPERATOR'S MANUAL BEFORE USE.
THIS PLATFORM IS NOT ELECTRICALLY INSULATED
P/N 61205-000-00

UpRight

Call Toll Free in U.S.A.

1-800-926-LIFT

Upright, Inc.

1775 Park Street

Selma, California 93662

TEL: 559/891-5200

FAX: 559/891-9012

PARTS: 1-888-UR-PARTS

PARTSFAX: 559/896-9244

P/N 060587-011

5/99 .5 K

FORWARD

HOW TO USE THIS MANUAL

This manual is divided into 6 sections. The section number printed at the top corner of each page can be used as a quick reference guide.

Special information

! DANGER !

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

! WARNING !

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

! CAUTION !

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

NOTES: Give helpful information.

WORKSHOP PROCEDURES

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

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

Introduction & Specifications

1.0

General description and machine specifications.

Machine Preparation & Operation

2.0

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

Maintenance

3.0

Preventative maintenance and service information.

Troubleshooting

4.0

Causes and solutions to typical problems.

Schematics

5.0

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

Illustrated Parts Breakdown

6.0

Complete parts lists with illustrations.

FORWARD

NOTES:

TABLE OF CONTENTS

SECTION 1

Introduction & Specifications	1-1
1.1 Introduction	1-1
Purpose	1-1
Scope	1-1
1.2 General Description	1-1
Platform	1-1
Controller	1-1
Elevating Assembly	1-1
Power Module	1-1
Control Module	1-1
Chassis	1-1
Purpose of Equipment	1-1
1.3 Specifications	1-3

SECTION 2

Machine Preparation & Operation	2-1
2.1 Preparation for Use	2-2
2.2 Forklifting Work Platform	2-2
2.3 Transporting Work Platform	2-3
2.4 Preparation for Shipment	2-3
2.5 Storage	2-3
Preservation	2-3
Battery	2-3
2.6 Design Features	2-3
2.7 The Controls and Indicators	2-4
2.8 Introduction	2-6
General Functioning	2-6
Driving	2-6
Driving with the Platform Lowered ..	2-6
Driving with the Platform Elevated ..	2-6
Steering	2-6
Raising And Lowering The Platform ...	2-6
2.9 Safety Rules and Precautions	2-7
2.10 Pre-Operation Inspection	2-7
Visual Inspection	2-7
Diesel Mode Inspection	2-7
Electric Mode Inspection	2-7
System Function Inspection	2-8
2.11 Operation	2-9
Travel With Platform Lowered	2-9
Steering	2-9
Raising and Lowering The Work Platform	2-9
Travel With Work Platform Elevated ...	2-9
Emergency Lowering	2-10
After Use Each Day	2-10
2.12 Brake Release Pump	2-10
2.13 Fold Down Guardrails	2-10
Fold down Procedure	2-10
Erection Procedure	2-11

SECTION 3

Maintenance	3-1
3.1 Introduction	3-1
3.2 Special Tools	3-1
3.3 Preventative Maintenance	3-1
Preventative Maintenance Table Key ...	3-2
Interval	3-2
Preventative Maintenance Report ...	3-2
3.4 Blocking Elevating Assembly	3-3
Installation	3-3
Removal	3-3
3.5 Battery Maintenance	3-3
Battery Inspection & Cleaning	3-3
Battery Charging	3-4
Battery Cell Equalization	3-4
3.6 Lubrication	3-5
Grease Fittings	3-5
Linkage Gears	3-5
Steering Linkage	3-5
Diesel Engine Hydraulic Pump	3-5
Hydraulic Oil Tank & Filter	3-6
Fluid Level	3-6
Oil & Filter Replacement	3-6
3.7 Setting Hydraulic Pressures	3-7
Main Relief Valve	3-7
Counterbalance Valves	3-7
Steering Relief Valve	3-8
Drive Relief Valve	3-8
Brake Pressure Reducing Valve	3-8

TABLE OF CONTENTS

3.8 Switch Adjustments	3-9	3.13 Brake Cylinder	3-16
Proportional Control Adjustment	3-9	Removal	3-16
Platform Down Limit Switch	3-10	Disassembly	3-16
Cushion Down Limit Switch	3-10	Cleaning and Inspection	3-16
Tilt Sensor	3-11	Assembly and Installation	3-16
3.9 Hydraulic Manifold	3-11	3.14 Steering Cylinder	3-17
Removal	3-11	Removal	3-17
Disassembly	3-11	Disassembly	3-17
Cleaning and Inspection	3-11	Cleaning and Inspection	3-17
Assembly	3-11	Assembly and Installation	3-17
Installation	3-11	Adjustment	3-18
3.10 Hydraulic Pumps	3-13	3.15 Lift Cylinder	3-18
Removal	3-13	Removal	3-18
Installation	3-13	Disassembly	3-18
Diesel Engine	3-13	Cleaning and Inspection	3-18
Removal	3-13	Reassembly	3-18
Installation	3-13	Installation	3-19
3.11 Hydraulic Drive Motors & Hubs ...	3-14	3.16 Electric Motor	3-19
Removal	3-14	Troubleshooting	3-19
Installation	3-14	Disassembly	3-19
3.12 Wheel Bearings	3-14	Inspection	3-20
Removal	3-14	Reassembly	3-20
Installation	3-15	3.17 Torque Specifications	3-21
		Fasteners	3-21
		Hydraulic Components	3-21

SECTION 4

Troubleshooting	4-1
Introduction	4-1
General Procedure	4-1
Upright Product Support	4-1

SECTION 5

Schematics	5-1
Introduction	5-1
5.1 Electrical Schematic	5-2
5.2 Hydraulic Schematic	5-4

SECTION 6

Illustrated Parts Breakdown	6-1
--	------------

LIST OF FIGURES

SECTION 1

Introduction & Specifications

Figure 1-1: SL26/30N Bi-Energy Work Plat. . . 1-2

SECTION 2

Machine Preparation & Operation

Figure 2-1: Batteries 2-2

Figure 2-2: Transporting Work Platform 2-2

Figure 2-3: Controls & Indicators 2-5

Figure 2-4: Brake Release Pump 2-10

Figure 2-5: Fold Down Guardrails 2-11

SECTION 3

Maintenance

Figure 3-1: Blocking Elevating Assembly 3-3

Figure 3-2: Battery Charger 3-4

Figure 3-3: Lubrication Points 3-5

Figure 3-4: Hydraulic Oil Tank & Filter 3-6

Figure 3-5: Hyd. Manifold Assy, Front View . . 3-7

Figure 3-6: Hyd. Manifold Assy, Top View . . . 3-8

Figure 3-7: Proportional Controller Adjustment 3-9

Figure 3-8: Platform Down Limit Switch Adj. 3-10

Figure 3-9: Platform Down Limit Switch Adj. 3-10

Figure 3-10: Cushion Down Limit Switch . . . 3-10

Figure 3-11: Tilt Sensor Adjustment 3-11

Figure 3-12: Hyd. Manifold, Exploded View . 3-12

Figure 3-13: Typical Hydraulic Pump 3-13

Figure 3-14: Hydraulic Pump, Diesel Engine 3-13

Figure 3-15: Drive Motor Installation 3-14

Figure 3-16: Wheel Bearings 3-15

Figure 3-17: Brake Cylinder 3-16

Figure 3-18: Steering Cylinder Assembly . . . 3-17

Figure 3-19: Lift Cylinder Assembly 3-18

Figure 3-20: Electric Motor Service 3-19

SECTION 5

Schematics

Figure 5-1: Elec. Schematic (064149-081) . . . 5-3

Figure 5-2: Hyd. Schematic (064148-023) . . . 5-5

LIST OF TABLES

SECTION 1

Introduction & Specifications

Table 1-1: Specifications	1-3
---------------------------------	-----

SECTION 2

Machine Preparation & Operation

Table 2-1: Controls and Indicators	2-4
--	-----

SECTION 3

Maintenance

Table 3-1: Preventative Maintenance Check list	3-2
Table 3-1: Torque Specifications for Fasteners	3-21
Table 3-2: Torque Specifications for Hydraulic Components	3-21

SECTION 4

Troubleshooting

Table 4-1: Electric Truth Table	4-2
Table 4-2: Hydraulic Truth Table	4-4

SECTION 5

Schematics

Table 5-1: Electrical Schematic Legend: (064149-081)	5-2
Table 5-2: Hydraulic Schematic Legend (064148-023)	5-4

Section 1

INTRODUCTION & SPECIFICATIONS

1.1 INTRODUCTION

Purpose

The purpose of this service and parts manual is to provide instructions and illustrations for the operation and maintenance of an UpRight SL26/30N Bi-Energy Work Platform manufactured by UpRight, Inc. of Selma, California.

Scope

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

1.2 GENERAL DESCRIPTION

The SL26/30N Work Platform consists of the platform, controller, elevating assembly, power module, control module, and chassis (Figure 1-1).

Platform

The platform has a reinforced wood floor, 43.5 inch (1105 mm) high guardrails with midrail, 6 inch (152 mm) toeboards and an entrance gate at the rear of the platform. The guardrails can be folded down for access through doors or for shipment.

⚠ WARNING ⚠

DO NOT use the maintenance platform without guardrails properly assembled and in place with fasteners properly torqued.

Controller

The controller contains the controls to operate the machine. It should be hung on the front, left, or right guardrail, but may be hand held if necessary. To operate the machine, the interlock lever must be depressed to operate any function. A complete explanation of control functions can be found in Section 2.

Elevating Assembly

The platform is raised and lowered by the elevating assembly, a two section arm pivoting on a gear, and powered by a single stage lift cylinder. The hydraulic pump(s) are driven by electric motors. Solenoid operated valves control raising and lowering.

Power Module

The power module contains the batteries, battery charger, battery control components, and motor/pump assemblies.

Control Module

The control module contains the hydraulic tank, hydraulic valve manifold, horn/alarms, volt/hour meter, tilt sensor, electrical terminal strips, and chassis controls. A complete explanation of the chassis control functions is found in Section 2.

Chassis

The chassis is a structural frame that supports all the components of the SL26/30N Bi-Energy Work Platform.

Purpose of Equipment

The objective of the SL26/30N Bi-Energy Work Platform is to elevate personnel and materials to overhead work areas and be driven with the platform elevated on firm, level surfaces **only**.

Note: Travel with the platform raised is limited to a creep speed range.

⚠ DANGER ⚠

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

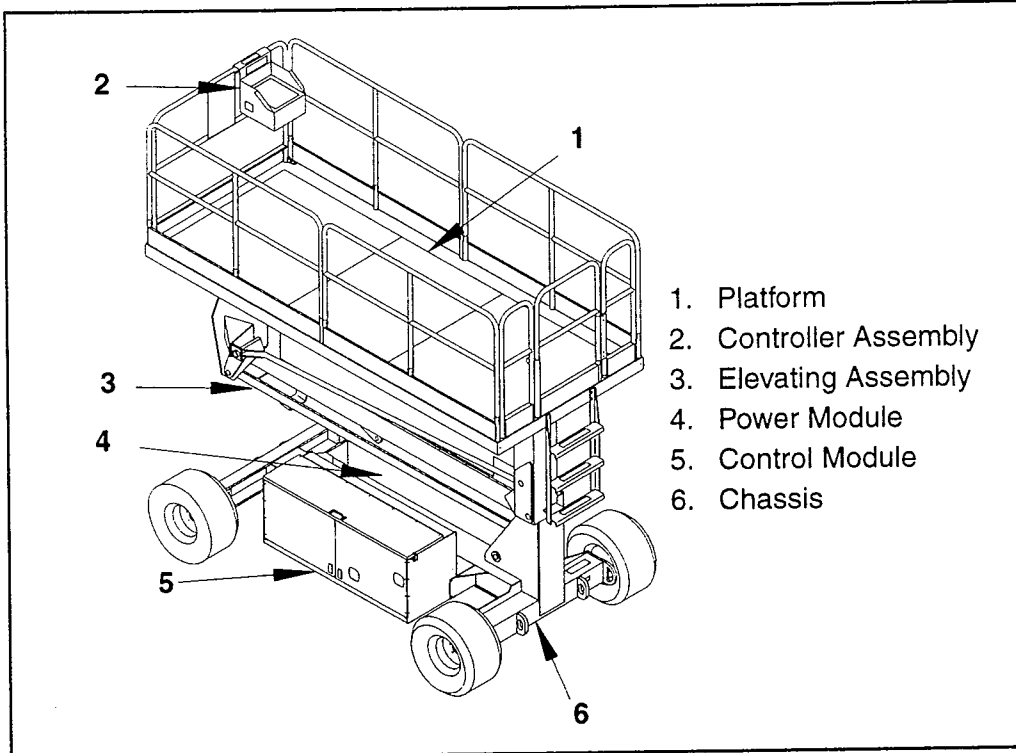


Figure 1-1: SL26/30N Bi-Energy Work Platform

1.3 SPECIFICATIONS

Table 1-1: Specifications

Specifications are subject to change without notice

Meets or exceeds all applicable requirements of OSHA and ANSI A92.6-1999

ITEM	SL26N Bi-Energy	SL30N Bi-Energy
Platform Size (Inside Toeboards)		
Standard	57.5 in. x 141.5 in. [1,46 m x 3,59 m]	57.5 in. x 166.5 in. [1,46 m x 4,22 m]
Slide Out Deck Extended	57.5 in. x 181.5 in. [1,46 m x 4,61 m]	N/A
Max. Platform Capacity		
Standard	1,250 lbs. [567 kg]	1,000 lbs. [454 kg]
w/ Extension	1,250 lbs. [567 kg]	N/A
On Extension	500 lbs. [227 kg]	N/A
Max. No. of occupants		
Standard	4 people	3 people
on Extension	2 people	N/A
Height		
Working Height	32 ft. [9,75 m]	36 ft. [10,97 m]
Max. Platform Height	26 ft. [7,93 m]	30 ft. [9,14 m]
Min. Platform Height	59 in. [1.5 m]	59 in. [1.5 m]
Max. Drive Height	32 ft. [9,75 m]	36 ft. [10,97 m]
Dimensions		
Weight	4,960 lbs. [2,247 kg]	5,272 lbs. [2,391 kg]
Overall Width, Standard	66 in. [1,68 m]	66 in. [1,68 m]
Overall Height	94.5 in. [2,4 m]	94.5 in. [2,4 m]
Overall Length, Standard	149 in. [3,79 m]	173 in. [4,39 m]
Surface Speed		
Platform Lowered	Diesel: 0 to .5 mph [0 to .8 km/h] Electric: 0 to .5 mph [0 to .8 km/h]	Diesel: 0 to .5 mph [0 to .8 km/h] Electric: 0 to .5 mph [0 to .8 km/h]
Platform Raised	Diesel: 0 to 3.8 mph [0 to 6.0 km/h] Electric: 0 to 2.7 mph [0 to 4.3 km/h]	Diesel: 0 to 3.8 mph [0 to 6.0 km/h] Electric: 0 to 2.7 mph [0 to 4.3 km/h]
System Voltage	Diesel: 12 Volt DC - Electric: 24 Volt DC	Diesel: 12 Volt DC - Electric: 24 Volt DC
Battery Charger	40 Amp, 110 Volt, 60 Hz (40 Amp, 220 V, 50 Hz, Optional)	40 Amp, 110 Volt, 60 Hz (40 Amp, 220 V, 50 Hz, Optional)
Hydraulic Tank Capacity	12 US Gallons [45.5 l]	12 US Gallons [45.5 l]
Maximum Hydraulic System Pressure	2000 psi [138 bar]	2000 psi [138 bar]
Hydraulic Fluid		
Normal use, above 32° f [0° c]	ISO #46	ISO #46
Low Temp. use, below 32° f [0° c]	ISO #32	ISO #32
Extreme Temp, below 0° f [-17° c]	ISO #15	ISO #15
Lift System	One Single Stage Lift Cylinder	One Single Stage Lift Cylinders
Lift Speed	Diesel: Raise, 22 sec./Lower, 35 sec. Electric: Raise, 37 sec./Lower 35 sec.	Diesel: Raise, 22 sec./Lower, 35 sec. Electric: Raise, 37 sec./Lower, 35 sec.
Power Source	18 HP Kubota Diesel, 3 Cylinder, Water-cooled engine and Two 24V Electric Motors, Eight 6V 220 Amp/Hour batteries	18 HP Kubota Diesel, 3 Cylinder, Water-cooled engine and Two 24V Electric Motors, Eight 6V 220 Amp/Hour batteries
Drive Control	Proportional	Proportional
Control System	Joystick Controller with Interlock Lever and Thumb Rocker Steering, Toggle Selector and Emergency Stop Switches	Joystick Controller with Interlock Lever and Thumb Rocker Steering, Toggle Selector and Emergency Stop Switches
Horizontal Drive	Dual Rear Wheel, Hydraulic Motors	Dual Rear Wheel, Hydraulic Motors
Tires (Standard)	B78-13ST Slab	B78-13ST Slab
Parking Brakes	Spring Applied, Hydraulic Release	Spring Applied, Hydraulic Release
Turning Radius (inside)	9 ft. 9 in. [2,97 m]	9 ft. 9 in. [2,97 m]
Maximum Gradeability	Diesel: 21% [12°] - Electric: 20% [12°]	Diesel: 21% [12°] - Electric: 20% [12°]
Wheel Base	100 in. [2,54 m]	100 in. [2,54 m]
Guardrails	43.5 in. [1,11 m] high, Fold Down with gate.	43.5 in. [1,11 m] high, Fold Down with gate.
Toeboard	6 in. [152 mm] High	6 in. [152 mm] High

NOTES:

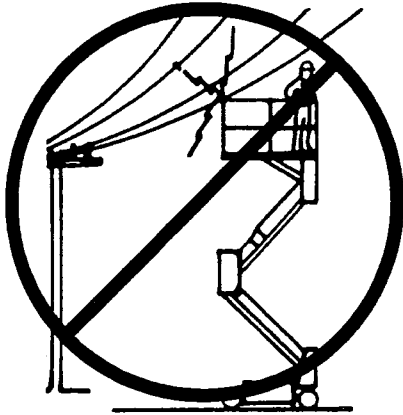
Section 2

MACHINE PREPARATION & OPERATION

Warning

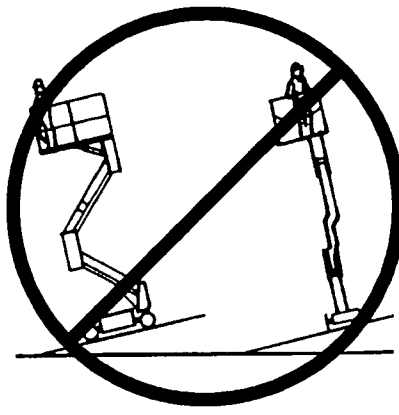
All personnel shall carefully read, understand and follow all safety rules, operating instructions, and the Scaffold Industry Association's *Manual of Responsibilities (ANSI A92.6)* before operating or performing maintenance on any Upright aerial work platform.

Safety Rules

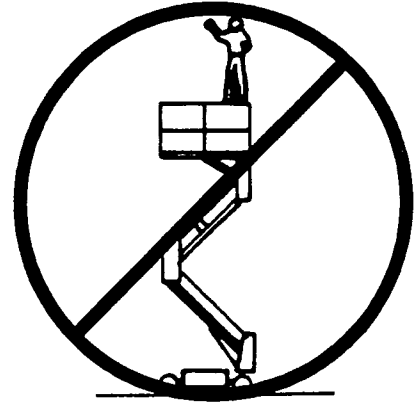


NEVER operate the machine within ten feet of power lines.

THIS MACHINE IS NOT INSULATED.



NEVER elevate the platform or drive elevated on uneven slopes or soft ground unless the platform is level.



NEVER sit, stand or climb on guardrail or midrail.

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

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

SECURE and lock gate after mounting platform.

KEEP all body parts clear of outriggers when extending or retracting (outrigger equipped machines only).

NEVER use ladders or scaffolding on the platform.

NEVER attach overhanging loads or increase platform size.

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

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

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

NEVER change operating or safety systems.

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

NEVER climb down elevating assembly with the platform elevated.

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

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

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

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

California Proposition 65 Warning

Gasoline and diesel engine exhaust and some of their constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

NOTE: Read and familiarize yourself with all operating instructions before attempting to operate the SL26/30N Bi-Energy Work Platform.

2.1 PREPARATION FOR USE

CAUTION

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 linkage.
2. Remove the banding from the control console.
3. Remove tie wraps holding guardrail gate.
4. Connect the negative (-) lead to the negative (-) battery terminals in power module.
5. Close the Emergency Lowering Valve (Figure 2-3), if necessary.

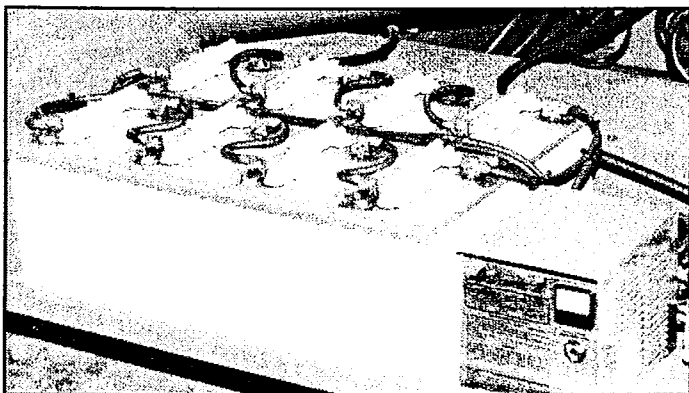


Figure 2-1: Batteries

2.2 FORKLIFTING WORK PLATFORM

Note: Forklifting is for transporting only.

WARNING

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

Forklift from sides of the platform by lifting under the modules (Figure 2-2).

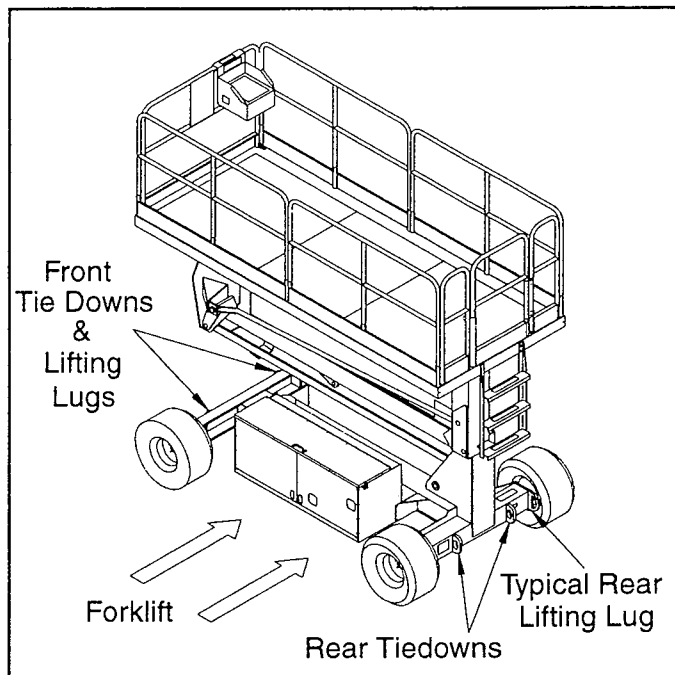


Figure 2-2: Transporting Work Platform

2.3 TRANSPORTING WORK PLATFORM

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/lifting lugs (Figure 2-2).

CAUTION

The rear chassis tie down lugs are not to be used for lifting the work platform.

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

2.4 PREPARATION FOR SHIPMENT

1. Grease all the grease fittings (see Section 3).
2. Fully lower the platform.
3. Disconnect the battery negative (-) lead from the battery terminal(s) (Figure 2-1).
4. Band the elevating linkage to the frame just behind the front wheels and at the rear wheels
5. Open the Chassis Emergency Lowering Valve.

2.5 STORAGE

No preparation for storage is required when the work platform is in normal usage. Regular maintenance procedures should continue to be performed (see Section 3).

If the work platform is to be placed in long term storage (dead storage), follow the recommended preservation procedures, below.

Preservation

1. Clean painted surfaces. If the paint is damaged, repaint.
2. Fill the hydraulic tank to operating level, fluid will be visible at the Sight Gauge. DO NOT fill the hydraulic tank while the platform is elevated.

Note: DO NOT drain the hydraulic system prior to long term storage.

3. Coat exposed portions of extended cylinder rods with a preservative such as multipurpose grease and wrap with barrier material.
4. Coat all exposed unpainted metal surfaces with preservative.
5. Service the diesel engine according to the manufacturers recommendations.

Battery

1. Disconnect the battery ground cable(s) 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.

2.6 DESIGN FEATURES

The SL26/30N Bi-Energy has the following features:

- The drive speed is limited to creep speed when operating the work platform while platform is elevated.
- The platform descent rate is controlled by an orifice (fixed speed) and is slowed further by another orifice during the last 12 in. (304 mm) of descent (cushion speed). The lift cylinder is equipped with a velocity fuse to prevent descent should the lift hose rupture.
- A parking brake is automatically engaged when the Control Lever is released and the machine comes to a full stop.
- The Controller and chassis controls are equipped with Emergency Stop Switches for stopping all powered functions.
- The Interlock Lever must be depressed for the Controller to function.
- An alarm is provided to signal when the platform is lowering.
- A lift switch is located in the Control Module on the Chassis for lifting and lowering the platform from ground level.
- An Emergency Down Valve is provided in the Control Module, to lower the platform in the event electrical power is lost.

2.7 THE CONTROLS AND INDICATORS

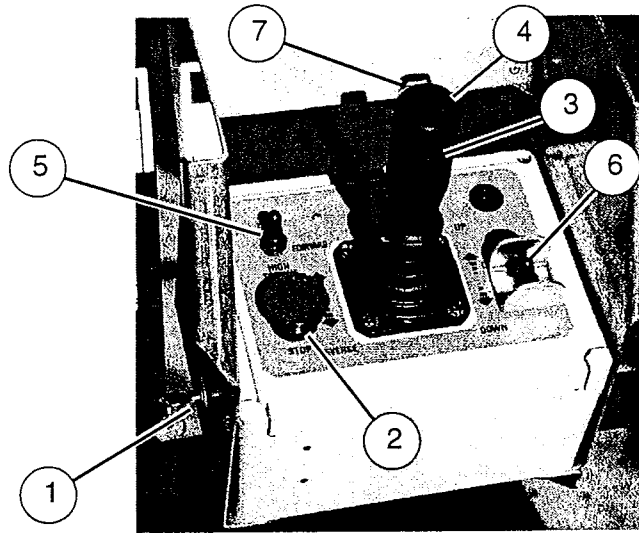
The controls and indicators for operation of the SL26/30N Bi-Energy Work Platform are shown in Figure 2-3. The name and function of each control and indicator are listed in Table 2-1. The index numbers in Figure 2-3 correspond to the index numbers in Table 2-

1. 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.

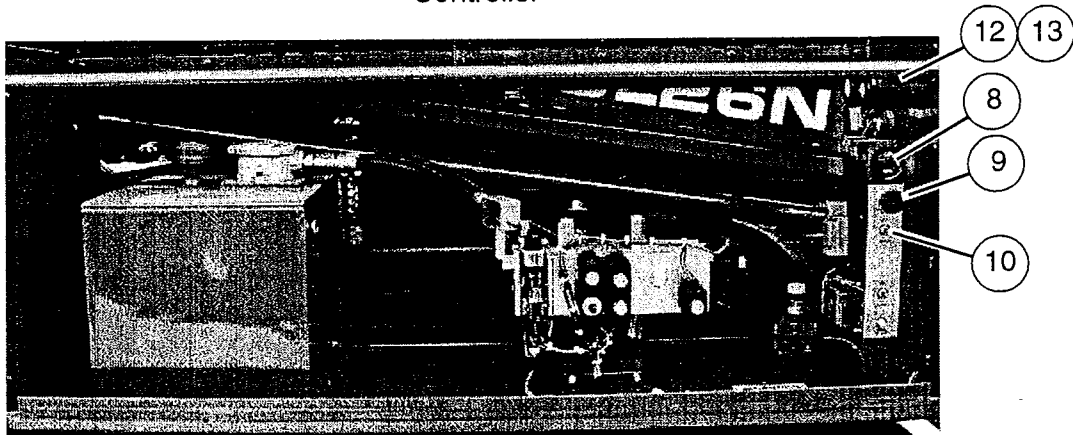
Table 2-1: Controls and Indicators

INDEX #	NAME	FUNCTION	INDEX #	NAME	FUNCTION
1	KEY SWITCH	Turn key fully clockwise to provide power to the Interlock Switch. Turn the key fully clockwise to start engine. When released, key goes to RUN to provide power to the Interlock Switch.	8	HOUR/VOLT METER	Shows state of charge of batteries and hours machine has been on.
2	EMERGENCY STOP SWITCH	Push red button to cut power to all controls (off). Turn clockwise to provide power (on).	9	EMERGENCY STOP SWITCH	Push red button to cut power to all controls (off). Turn clockwise to provide power (on).
3	CONTROL LEVER	Move joystick forward or backwards to control Drive and Lift Valves proportionally or Down Valve depending on position of Drive Lift Switch.	10	CHASSIS LIFT SWITCH	Push switch up to lift the platform and push switch down to lower the platform.
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.	11	EMERGENCY LOWERING VALVE	Push in and turn knob 1/4 turn counterclockwise, the knob will pop out and the platform will lower. To close, push in and turn knob 1/4 turn clockwise until detent engages. The platform cannot be raised until this valve is closed.
5	DRIVE SPEED/TORQUE SELECTOR SWITCH	Provides two speed/torque ranges, in forward or reverse. High Speed -low torque and High Torque -low speed.	12	DOWN ALARM (60 Hz)	Sounds an audible signal while platform is lowering during normal operation. If the Emergency Lowering Valve is used, the alarm DOES NOT sound.
6	DRIVE/LIFT SWITCH	Selecting DRIVE allows the work platform to move forward or reverse. Selecting LIFT allows the work platform to raise or lower.	13	TILT ALARM (600 Hz)	Sounds an audible signal when the platform is elevated and on a slope of 3° side to side or fore and aft.
7	INTERLOCK LEVER SWITCH	Provides power to the Controller powered functions, only when depressed, preventing accidental activation of the Controller.	14	BATTERY CHARGER	Charger turns on automatically after a short delay. The ammeter indicates when charger is operating. Charger turns off automatically when batteries are fully charged.

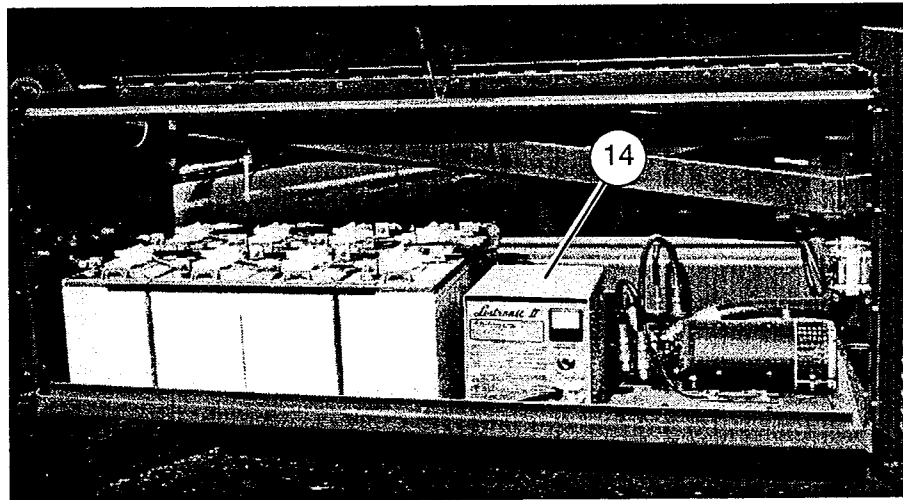
* Down Alarm and Tilt Alarm are the same unit with different inputs.



Controller



Control Module



Power Module

Figure 2-3: Controls & Indicators

2.8 INTRODUCTION

General Functioning

Either the engine or each battery powered electric motor directly drives a hydraulic pump. The pump(s) supply oil under pressure to operate all the work platform functions. The oil flow is directed to the different functions by electrically activated solenoid valves.

Driving

With the Controller Key Switch **ON** (and the engine running, dual fuel models only), both chassis and controller Emergency Stop Switches **ON**, the Interlock Lever depressed, and the Drive/Lift Switch on **DRIVE**, the machine will drive forward or reverse at a speed proportional to the angle the control lever is pushed or pulled.

Driving with the Platform Lowered

Selecting **HIGH SPEED** with the Drive Speed Switch and moving the Control Lever forward or reverse with the platform fully lowered will energize the Drive Relay contacts (dual fuel only), the Platform Down Relay contacts, the Series/Parallel Coils, the Proportional Coil and the Forward or Reverse Coil to allow oil to flow into the Parking Brake (releasing the Brake) and serially through the Hydraulic Motors. The Proportional Valve closes or opens in proportion to the movement of the Control Lever (from center). As the Proportional Valve closes, more oil is allowed to flow to the Forward or Reverse Valve increasing drive speed.

Selecting **HIGH TORQUE** (low speed) with the Drive Speed Switch the Series/Parallel Valves are not energized, allowing the oil to divide through the Hydraulic Motors producing the high torque/low drive speed.

Driving with the Platform Elevated

Raising the platform (see *RAISING AND LOWERING THE PLATFORM*, below) opens the Platform Down Switch which cuts power to the Platform Down Relay. This prevents the Series/Parallel Coils from energiz-

ing and cuts power to the Controller high speed circuit. When raised the platform will only drive at the creep speed (motors in parallel).

Steering

On the top of the Control Lever is a momentary rocker switch for steering the machine left and right. Pressing the right or left side of the rocker switch will energize the Steering Coils and allow oil to flow through the Steering Valve to the Steering Cylinder. Releasing the rocker switch de-energizes the Steering Coils and holds the Steering Cylinder in position. **The Steering Cylinder will not automatically return to center. The Steering Switch must be activated to change the wheels direction.**

Raising And Lowering The Platform

With the Controller Key Switch **ON** (and the engine running, dual fuel models only), both chassis and controller Emergency Stop Switches **ON**, the Interlock Lever depressed, and the Drive/Lift Switch on **LIFT**, the machine will elevate at a speed proportional to the angle the Control Lever is pushed forward.

Pushing forward on the Control Lever energizes the Proportional Coil, Up Coil and Motor Relays to start the Electric Motors (electric models only). The greater the angle (from center) of the Control Lever the more the Proportional Valve closes. As the Proportional Valve closes more oil is allowed to flow through the Lift Valve to the Lift Cylinder increasing lift speed.

Lowering the platform electrically energizes the Down Alarm and the Down Coil. This allows the oil to flow out of the Lift Cylinder through an orifice, which controls the rate of descent, then back to tank. During the last 12 in. (304 mm) of lowering the Cushion Down Valve is energized forcing the oil thru another orifice slowing the platform rate of descent. 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.

2.9 SAFETY RULES AND PRECAUTIONS

Always observe the following safety rules and precautions when using the SL26/30N Bi-Energy 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.

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

CLOSE gate across entrance after mounting the platform.

NEVER use ladders or scaffolding on the platform.

NEVER attach overhanging loads or increase the size of the platform.

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

DISTRIBUTE all loads evenly on the platform. (For maximum platform load, refer to Table 1-1).

NEVER use damaged equipment. (Contact UpRight for instructions.)

NEVER change operating or safety systems.

INSPECT the machine thoroughly for cracked welds, loose hardware, hydraulic leaks, damaged control cable, loose wire connections and tire damage.

NEVER climb down elevating assembly with the platform elevated.

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

CHECK all four tires for correct inflation (50 psi).

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 the key switch off and removing the key from the key switch when leaving the machine unattended.

NEVER replace any component or part with anything other than original UpRight replacement parts without the manufacturers consent.

ALWAYS read, understand, and follow Section 8 of ANSI Standard A92.6-1990 when operating any work platform.

2.10 PRE-OPERATION INSPECTION

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

Visual Inspection

! WARNING !

***DO NOT** perform service on work platform with the platform elevated unless the elevating assembly is properly blocked.*

1. Remove module covers and inspect for damage, oil leaks or missing parts.
2. Check the level of the hydraulic oil with the platform fully lowered (see Section 3.4). Oil should be visible in the sight gauge. Add recommended ISO hydraulic oil, if necessary.
3. Check that the fluid level in the batteries is correct (see Section 3.3)
4. 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.
5. Check that all guardrails are securely in place with all fasteners properly torqued.
6. Check tire pressure; 50 psi (3.4 bar).
7. Turn the Chassis Emergency Stop Switch to the **ON** position. Turn the red knob clockwise.

Diesel Mode Inspection

1. Check fuel supply.
2. Check engine oil level with the dipstick.

Electric Mode Inspection

1. Verify batteries are charged (see Section 3.5).
2. Check that AC extension cord has been disconnected from charger.

System Function Inspection

! WARNING !

STAND CLEAR of the work platform while performing the following checks.

Before operating the work platform, survey the work area for surface hazards such as holes, drop-offs, bumps and debris.

Check in **ALL** directions, including above the work platform, for obstructions and electrical conductors.

Protect control console cable from possible damage while performing checks.

1. Unhook Controller from front guardrail. Firmly grasp Controller hanger in such a manner that the Interlock Lever can be depressed, while performing the following checks from the ground.
2. Turn the Emergency Stop Button clockwise or pull up to the ON position.
3. turn Controller Key Switch clockwise to **ON**.
4. Position Drive/Lift Switch to **DRIVE** position.
5. With the Speed Range Switch first in **HIGH TORQUE**, and then in **HIGH SPEED**, depress the Interlock Lever and slowly push the Control Lever to **FORWARD**, and then **REVERSE** positions to check for speed and directional control. The farther you push or pull the Control Lever, the faster the machine will travel.
6. Push Steering Switch **RIGHT**, then **LEFT** to check for steering control.
7. Position Drive/Lift Switch to **LIFT**, rehook Controller to front guardrail.
8. Push Chassis Lift Switch to UP position and elevate platform while pushing the Tilt Sensor off of level. The platform should only elevate about one foot (.3 m) and the Tilt Alarm should sound. If the platform continues to elevate and/or there is no alarm, **STOP** and remove the machine from service until it is repaired.
9. Release the Tilt Sensor and fully elevate platform.
10. Visually inspect the elevating assembly, lift cylinder, cables and hoses for damage or erratic operation. Check for missing or loose parts.
11. Lower the platform partially by pushing Chassis Lift Switch to **DOWN**, and check operation of the audible lowering alarm.
12. Open the Chassis Emergency Lowering Valve, push in and turn counterclockwise, to check for proper operation. Once the platform is fully lowered, close the valve, push in and turn clockwise until the detent engages.
13. Mount the platform making sure the gate has been latched.
14. Position Drive/Lift Switch to **LIFT**.
15. Slowly push Control Lever to UP to raise the platform, fully actuate the Control Lever to check proportional lift speed. Slowly pull Control Lever to **DOWN** position to lower platform. Check that Lowering Alarm sounds.
16. Start motor by turning key switch fully clockwise. Perform all functions tests again with the engine running.
17. Turn Controller Key Switch to **OFF**, push the Emergency Stop Button and dismount the platform.
18. Close and secure module covers.

! WARNING !

LOOK up and around for obstructions prior to operating the lift function.

DO NOT operate the work platform within 10 feet of any electrical power lines. **THIS MACHINE IS NOT INSULATED.**

DO NOT elevate the platform unless the work platform is on firm, level ground.

DO NOT enter the elevating assembly while the platform is elevated.

2.11 OPERATION

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

Travel With Platform Lowered

1. Verify Chassis Emergency Stop Switch is in the **ON** position.
2. After mounting platform, close and latch gate. Check that guardrails are in position and properly assembled with fasteners properly torqued.
3. check that route is clear of persons, obstructions, holes and drop-offs, and is capable of supporting the wheel loads.
4. Check clearances above, below and to the sides of the platform.
5. Turn Controller Emergency Stop Button clockwise or pull up to the **ON** position.
6. Set the Drive/Lift Switch to the **DRIVE** position and turn the Key Switch to **ON**. Start the engine if diesel power is desired.
7. Position the Drive/Lift Speed Range Switch to **HIGH TORQUE**.
8. Grasp the Control Lever so the Interlock Lever is depressed (releasing the Interlock Lever cuts the power to Controller). Slowly push or pull the Control Lever to **FORWARD** or **REVERSE** to travel in the desired direction. The farther you push or pull the Control Lever from center, the faster the machine will travel.
9. While moving, push the Drive/Lift Speed Range Switch to **HIGH SPEED** for travel on level surfaces or to **HIGH TORQUE** for climbing grades or traveling in confined areas.

Steering

1. Push the Steering Switch **RIGHT** or **LEFT** to turn the wheels. Observe the tires while maneuvering to ensure proper direction.

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

Raising and Lowering The Work Platform

⚠ WARNING ⚠

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

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

DO NOT** operate the work platform within 10 feet of any electrical lines. **THIS MACHINE IS NOT INSULATED.

***NEVER** enter the Elevating Assembly while the platform is elevated.*

1. Position the Drive/Lift Switch to **LIFT**.
2. While depressing the Interlock Lever, push the Control Lever slowly to **UP** to raise the platform. Pushing the Control Lever farther increases the lift speed. If 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.
3. When the work task is completed, position the Drive/Lift Switch to **LIFT** and lower the platform by pulling back on the Control Lever until the platform is fully lowered.

Travel With Work Platform Elevated

⚠ WARNING ⚠

*Travel with platform elevated **ONLY** on firm, level surfaces.*

Note: The work platform will travel at reduced speed when in the elevated position.

1. Check that the route is clear of persons, obstructions, holes and drop-offs and is capable of supporting the wheel loads.
2. Check clearances above, below and to the sides of platform.
3. With the platform elevated, position the Drive/Lift Switch to the **DRIVE** position.
4. Push the Control Lever to **FORWARD** or **REVERSE** for the desired direction of travel. 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.

Emergency Lowering

Note: The Emergency Lowering Valve is located on the left hand side of the chassis through the cutout in the control module cover.

1. Open the Emergency Lowering Valve by pushing in and turning approximately 1/4 turn, the knob will pop out disengaging detent (Figure 2-3).
2. Once the platform is fully lowered, be certain that Emergency Lowering Valve is closed again. The platform will not elevate if the Emergency Lowering Valve has not been closed.
3. To close the Emergency Lowering Valve, push the knob in and turn approximately 1/4 turn clockwise until the detent engages.

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.
4. Charge batteries on electric models.

2.12 BRAKE RELEASE PUMP (FIGURE 2-4)

Perform the following only when the machine will not operate under it's own power and it is necessary to move the machine or when towing the machine up a grade or 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 needle valve and verify that the cylinder rod has extended before the machine is operated.

⚠ WARNING ⚠

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

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

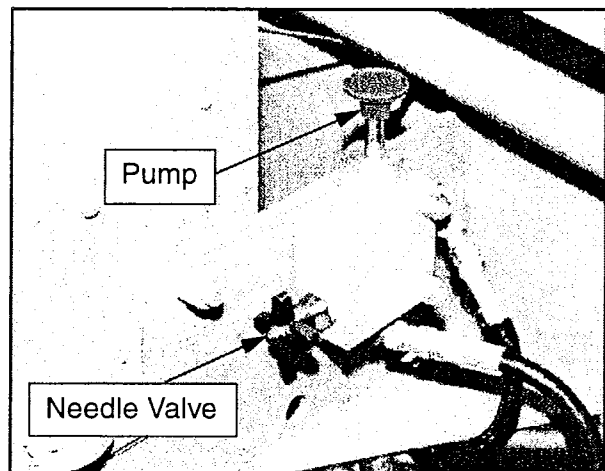


Figure 2-4: Brake Release Pump

2.13 FOLD DOWN GUARDRAILS (FIGURE 2-5)

This procedure is only for passing through doorways. Guardrails must be returned to proper position before using machine.

Fold down Procedure

Note: When performing the following procedures retain all fasteners.

1. Place Controller on deck.
2. Starting at the front of the platform, remove nuts, bolts and washers from the top of the front guardrail. Fold the front guardrail down onto the platform.
3. Close and latch gate.
4. Remove nuts, bolts and washers from the top of the rear guardrail. Fold the rear guardrail down onto the platform being careful to keep latched at all times.
5. Remove nuts, bolts and washers from the top of the side guardrails. Lift up and fold one side guardrail in so it rests on the deck. Repeat with other side guardrails.

Erection Procedure

1. Raise side guardrails.
2. Raise rear guardrail assembly, aligning holes and install bolts, washers and nuts. Tighten securely.
3. Place the Controller on the deck.
4. Raise front guardrail, aligning holes and install bolts, washers and nuts. Tighten securely.
5. Hang Controller from front guardrail.
6. Before operating work platform, check that all fasteners are in place and properly torqued.

! DANGER !

Before entering platform, guardrails must be securely fastened in their proper position.

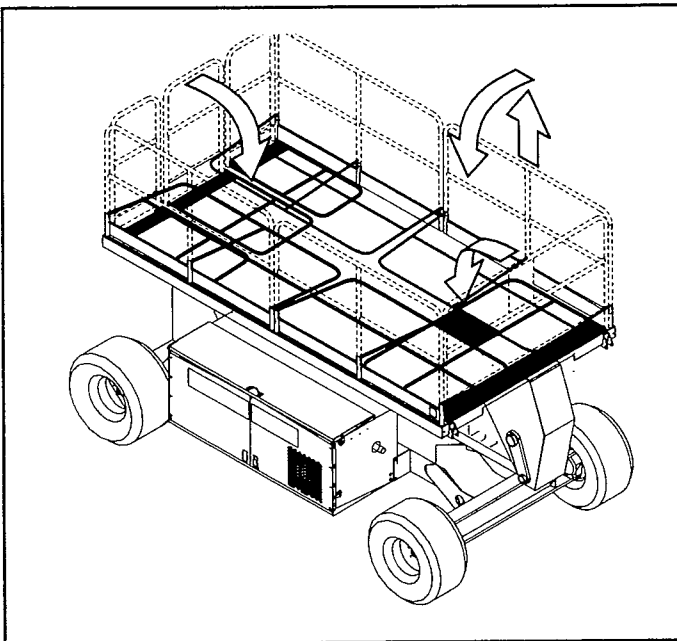


Figure 2-5: Fold Down Guardrails

NOTES:

Section 3

MAINTENANCE

3.1 INTRODUCTION

! WARNING !

Be sure to read, understand and follow all information in the Operation Section of this manual before attempting to operate or perform service on any SL26/30N Bi-Energy work platform.

Note: For information on the engine refer to your local engine dealer.

This section contains instructions for the maintenance of the SL26/30N Bi-Energy Work Platform. Procedures for the operation inspection, adjustment, scheduled maintenance, and repair/removal are included.

Referring to *Section 2* will aid in understanding the operation and function of the various components and systems of the SL26/30N Bi-Energy work platform, and help in diagnosing and repair of the machine.

Refer to "Preventative Maintenance" check list Table 3-1 for recommended maintenance intervals.

Note: Unless otherwise specified, torque all fittings according to "Torque Specifications for Fasteners" on page 3-21, and "Torque Specifications for Hydraulic Components" on page 3-21.

3.2 SPECIAL TOOLS

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

- 0-600 PSI Hydraulic Pressure Gauge (P/N 014124-006)
- 0-3000 PSI Hydraulic Pressure Gauge (P/N 014124-030)
- Inclinator (P/N 010119-000)

3.3 PREVENTATIVE MAINTENANCE (TABLE 3-1)

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.

! WARNING !

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

Always block the elevating assembly whenever it is necessary to enter the scissor assembly to perform maintenance while the platform is elevated (Figure 3-1).

The preventative maintenance table has been designed to be used primarily for machine service and maintenance repair. Please photocopy the following page and use this table as a checklist when inspecting the 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 3-1: Preventative Maintenance Check List

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery System	Check electrolyte level	6m			
	Check specific gravity	6m			
	Clean exterior	6m			
	Check battery cable condition	Daily			
	Clean terminals	6m			
Engine Oil and Filter	Check level and condition	Daily			
	Check for leaks	Daily			
	Change oil filter	00h			
Engine Fuel System	Check fuel level	Daily			
	Check for leaks	Daily			
	Replace fuel filter	6m			
	Check air cleaner	Daily			
Engine Coolant	Check coolant level (with engine cold)	Daily			
	Replace coolant	3m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	6m			
	Drain and replace oil	2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	30d			
	Check hoses for exterior wear	30d			
Emergency Hydraulic System	Operate the emergency lowering valve and check for serviceability	Daily			
Controller	Check switch 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			
Tires	Check for damage	Daily			
	Check lug nuts (torque to 90 ft. lbs.)	30d			
Hydraulic Pump	Wipe clean	30d			
	Check for leaks at mating surfaces	30d			
	Check for hose fitting leaks	Daily			
Drive Motors	Check mounting bolts for proper torque	30d			
	Check for operation and leaks	Daily			
Steering System	Check hardware & fittings for proper torque	6m			
	Grease pivot pins	30d			
	Oil king pins	30d			
	Check steering cylinder for leaks	30d			

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Elevating Assembly	Inspect for structural cracks	Daily			
	Check pivot points for wear	30d			
	Check mounting pin pivot bolts for proper torque	30d			
	Check elevating arms for bending	6m			
	Check hoses for pinch or rubbing points	Daily			
Chassis	Check component mounting for proper torque	6m			
	Check welds for cracks	Daily			
	Check the cylinder rod for wear	30d			
Lift Cylinder	Check mounting pin pivot bolts for proper torque	30d			
	Check seals for leaks	30d			
	Inspect pivot points for wear	30d			
	Check fittings for proper torque	30d			
Entire Unit	Check for and repair collision damage	Daily			
	Check fasteners for proper torque	3m			
	Check for corrosion-remove and repaint	6m			
	Lubricate	30d			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			
Wheel Bearings	Check wheel assembly for play	30d			
	Repack wheel bearings (replace wheel bearings and seals at 2000 hours).	2y			

3.4 BLOCKING ELEVATING ASSEMBLY (FIGURE 3-1)

⚠ CAUTION ⚠

DO NOT support or raise the front of the platform during any maintenance operation as this may result in damage to the tension members.

⚠ WARNING ⚠

*BEFORE performing, maintenance on work platform, while elevated, ensure that elevating assembly is properly supported.
DO NOT stand in elevating assembly area while installing or removing jackstand.*

Installation

1. Park the work platform on firm, level ground.
2. Open control module cover.
3. Turn Chassis Emergency Stop Button clockwise to the ON position.
4. Position Chassis Lift/Lower to UP and elevate platform approximately 12 inches (305 mm).
5. Place a jackstand with a minimum rating of 4000 lbs. (1814 kg) between the lower mast and chassis, just behind the front axle.
6. Push Chassis Lift Switch to DOWN position and gradually lower platform until jackstand is secured tightly between lower mast and Chassis.

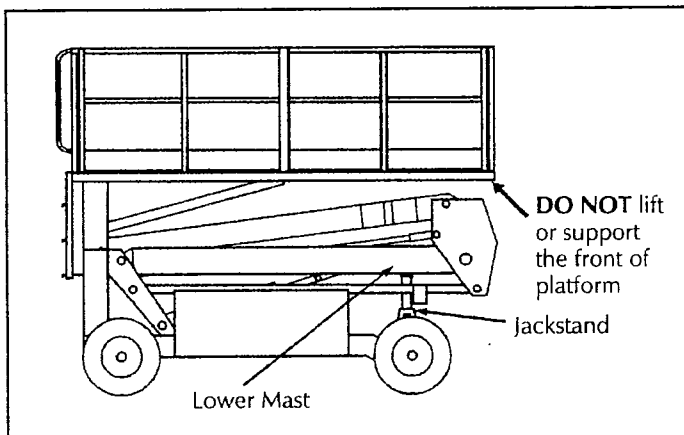


Figure 3-1: Blocking Elevating Assembly

Removal

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

3.5 BATTERY MAINTENANCE

⚠ WARNING ⚠

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

Always wear safety glasses when working with batteries.

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

Battery Inspection & Cleaning

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

⚠ CAUTION ⚠

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

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

Battery Charging (Figure 3-2)

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

! WARNING !

Charge the batteries only in a well ventilated area.

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

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

Never leave the charger unattended for more than two days.

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

Keep the charger dry.

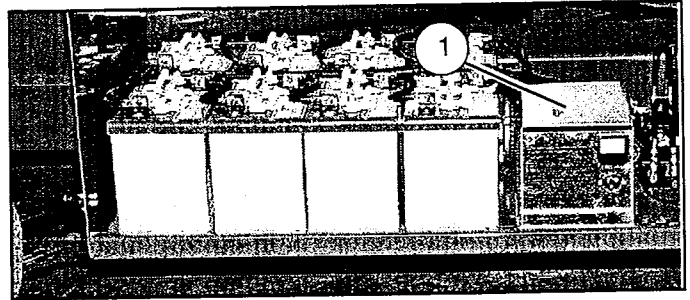


Figure 3-2: Battery Charger

Battery Cell Equalization

The specific gravity of the electrolyte in the battery cells should be equalized monthly. To do this, charge the battery as outlined in *Battery Charging*. After this initial charge, check the electrolyte level in all cells and add distilled water as necessary. Then, charge the batteries for an additional 8 hours. During this time, the charging current will be low (4 amps) as the cells are equalizing.

After equalization, the specific gravity of all cells should be checked with a hydrometer. The temperature corrected specific gravity should be 1.260. If the battery contains any cells with corrected readings below 1.230, the battery should be replaced.

Do not check the specific gravity in a cell to which water has just been added. If there is not enough electrolyte in a fully charged cell to obtain a sample for the hydrometer, add water and continue charging for 1 to 2 hours to adequately mix the water and electrolyte.

Charge the batteries as follows:

1. Check the fluid level of the batteries. If the electrolyte level is lower than 3/8 in. (10 mm) above the plates, add clean, distilled water only.
2. Connect the charger plug to a properly grounded outlet of the proper voltage and frequency.
3. The charger turns on automatically after a short delay.
4. The charger turns off automatically when the batteries are fully charged.

3.6 LUBRICATION

Refer to Table 4-1 for lubrication intervals and Figure 3-3 for location of items that require lubrication service. Refer to the appropriate sections for lubrication information on the hydraulic tank and filter and rear wheel bearings.

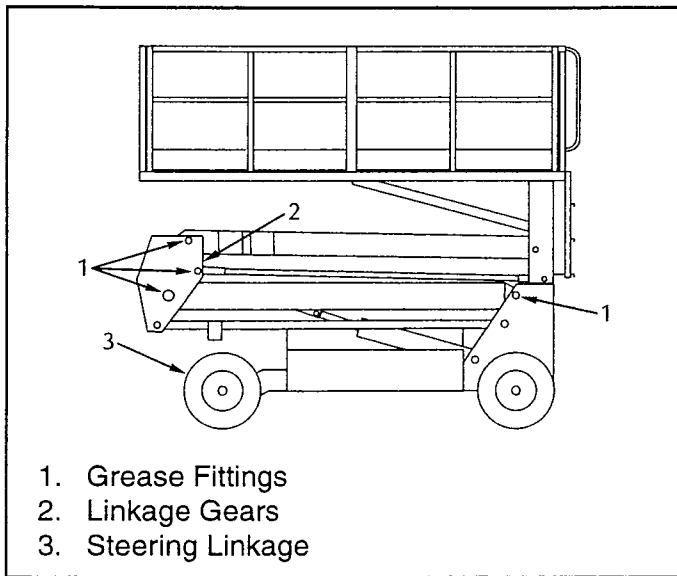


Figure 3-3: Lubrication Points

Grease Fittings

Wipe each grease fitting before and after greasing. Using multipurpose grease in a grease gun, pump the grease into the fitting until grease just begins to appear at the edges of the pivot, wipe off any excess grease.

Linkage Gears

1. Raise platform fully.
2. Using another work platform or 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.

! CAUTION !

Do not use hands to apply grease or allow any body part to enter the elevating assembly.

4. Lower the platform after greasing.

Steering Linkage

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

Diesel Engine Hydraulic Pump

Remove the capscrews that mount the pump to the engine. Remove the pump from the engine and apply high pressure molybdenum grease to the splines. Re-install the pump and secure with the capscrews.

Hydraulic Oil Tank & Filter (Figure 3-4)

Fluid Level

With the platform fully lowered, the oil should be visible in the sight gauge. If the oil is NOT visible, fill the tank until the oil can be seen. DO NOT fill above the sight gauge or when the platform is elevated.

Oil & Filter Replacement

1. Operate the work platform for five minutes to warm up the oil. To change filter only, go to step 5.

CAUTION

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

2. Provide a suitable container to catch the drained oil. The hydraulic tank has an oil capacity of 12 US Gallons (45.5 l).
3. Remove the drain plug and allow all oil to drain into the container, be sure to dispose of oil properly.
4. Reinstall the drain plug.
5. Unscrew the filter top from the filter body.
6. Lift the filter element from the filter body.
7. Remove filter cup and clean cavity, reinstall cup.

8. Insert the replacement filter into the filter body and press into position.
9. Fill the hydraulic oil tank to the level of the Sight Gauge with ISO #46 (see Table 1-1) hydraulic oil by pouring the oil into the top of the filter. Sense the oil is being filtered as it is going into the tank, it will take a while to fill the tank.

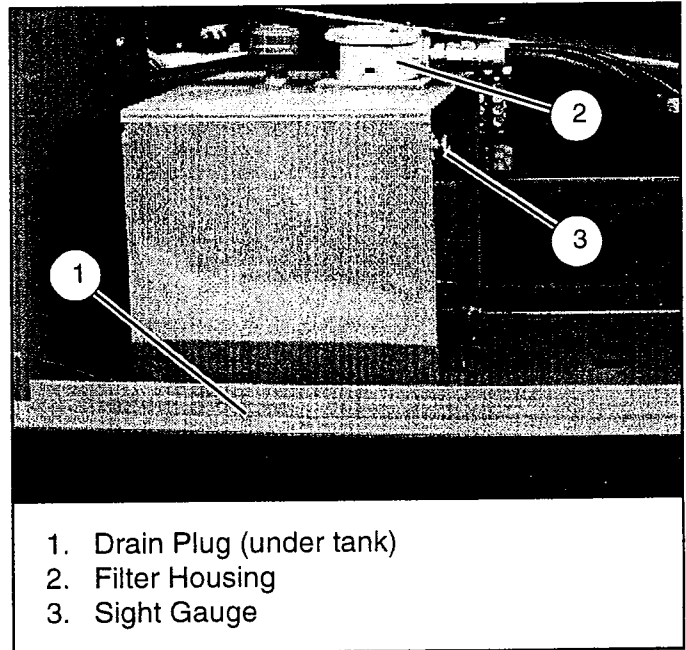


Figure 3-4: Hydraulic Oil Tank & Filter

3.7 SETTING HYDRAULIC PRESSURES

Referring to (Figure 3-12) along with the other Figures will aid in the following procedures.

Note: Check the hydraulic pressures whenever the pump, manifold, or relief valve has 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 3-5)

1. Operate the hydraulic system for five minutes.
2. Remove the gauge port plug and install a 0-3000 psi (0-250 bar) pressure gauge assembly.
3. Remove the plug in the end of the main relief valve to expose the adjusting screw.
4. Remove the hex nut holding the lift coil onto the lift valves and remove coil.
5. With the engine running, use the chassis lift switch to elevate the platform, hold until the system bypasses (approximately 2 seconds).
6. While holding the chassis lift switch in the UP position, set the pressure 10 1500 psi (103 bar) maximum by slowly turning the adjusting screw, clockwise increases pressure.
7. Reinstall the coil on the lift valve and plug in top of relief valve.
8. Remove the pressure gauge and reinstall all plugs.

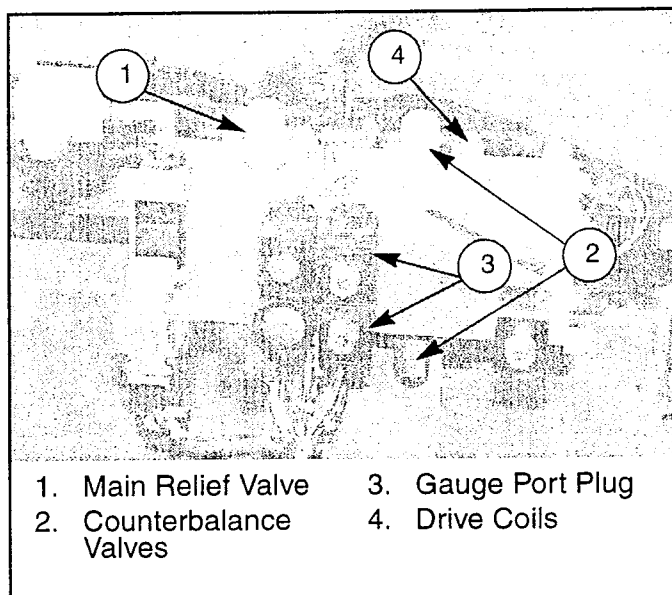


Figure 3-5: Hydraulic Manifold Assembly, Front View

Counterbalance Valves (Figure 3-5)

1. Operate the hydraulic system for five minutes to warm the oil.
2. Remove the gauge port plug and install a 0-600 psi (0-50 bar) pressure gauge assembly.
3. Exchange the top Counterbalance Valve with the Main Relief Valve.
4. Remove the plug from the end of the Counterbalance Valve to expose the adjusting screw.
5. Remove the hex nut holding the lift coil onto the lift valve and remove the coils.
6. With the engine running, use the chassis lift switch to elevate the platform, hold until the system bypasses (approximately 2 seconds).
7. While holding the chassis lift switch in the UP position, set the pressure to 900 psi (62 bar) maximum by slowly turning the adjusting screw, clockwise increases pressure.
8. Exchange the top Counterbalance Valve with the bottom Counterbalance Valve and repeat the procedure setting the bottom Counterbalance Valve to 1200 psi (83 bar).
9. Be sure to reinstall the valves to their original locations and replace all plugs when finished setting pressures.
10. Reinstall drive coils.

Steering Relief Valve (Figure 3-6)

1. Remove the top steering hose from back of the manifold and replace it with a 0-3000 psi gauge assembly.
2. Block the end of the hose with a cap fitting.
3. Remove the plug from the end of the valve to expose the adjusting screw.
4. With the engine running, push the Steering Switch **RIGHT** and set the pressure to 1100 psi (83 bar) maximum by slowly turning the adjusting screw clockwise to increase pressure.
5. Replace the valve plug.
6. Remove the gauge and reinstall the hose.

Drive Relief Valve (Figure 3-6)

1. Operate the hydraulic system for five minutes.
2. Remove the gauge port plug and install a 0-3000 psi pressure gauge assembly.
3. Exchange the Main Relief Valve with the Drive Relief Valve.
4. Remove the plug from the end of the valve to expose the adjusting screw.
5. Remove the hex nut holding the lift coil onto the lift valve and remove the coil.
6. With the engine running, use the chassis lift switch to elevate the platform, hold until the system bypasses (approximately 2 seconds).
7. While holding the chassis lift switch in the UP position, set the pressure to 2000 psi (138 bar) maximum by slowly turning the adjustment screw, clockwise increases pressure.
8. Reinstall the valves to their original locations and replace all plugs when finished setting pressure.
9. Replace the drive valve coils.

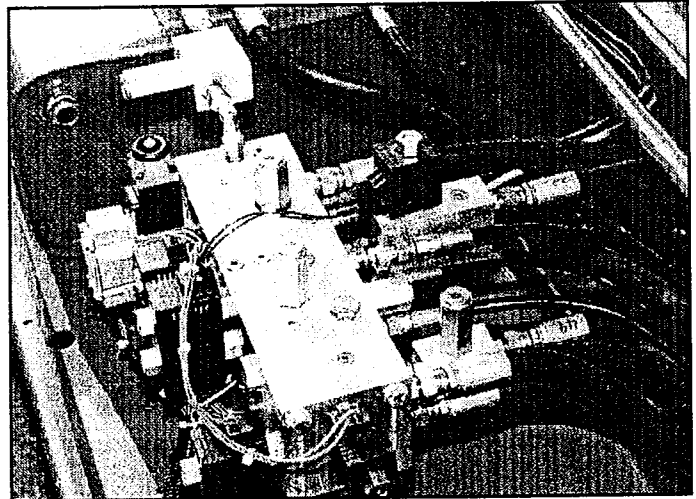


Figure 3-6: Hydraulic Manifold Assembly, Top View

Brake Pressure Reducing Valve (Figure 3-6)

1. Using two 1-ton jack stands and a 2-ton jack, jack the work platform up to raise the rear wheels off the ground and block the machine securely.
2. Remove the outlet hose from the backside of the Brake Release Pump and install a 0-600 psi gauge assembly in-line with a tee fitting.
3. Remove the plug on the end of the Brake Relief Valve.
4. With the engine running, position the Control Lever to **REVERSE** and hold.
5. While holding the Control Lever in **REVERSE**, set the pressure to 350-480 psi (24-33 bar) maximum by slowly turning the adjusting screw, clockwise to increase pressure.
6. Replace the valve plug.
7. Remove the gauge and tee fitting and reinstall the hose.
8. Remove the jack stands and lower the machine.

3.8 SWITCH ADJUSTMENTS

Proportional Control Adjustment (Figure 3-7)

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.

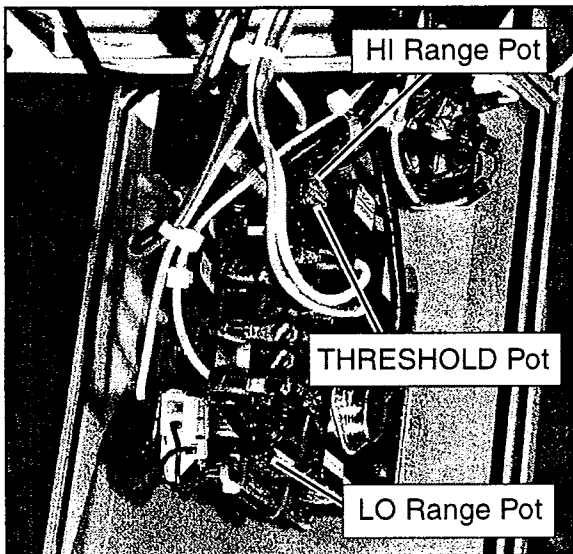


Figure 3-7: Proportional Controller Adjustment

1. Set the THRESHOLD potentiometers so that the machine is just starting to move when the controller is stroked slightly forward.
2. Mark out a 20 foot (6.1 m) course on the ground to use for step numbers 3, 4 and 5.
3. Set the HI RANGE potentiometers 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 25 to 34 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.

Platform Down Limit Switch (Figure 3-8)

The Platform Down Switch closes the circuit to the Platform Down Relay, which provides power to the Drive Relay, Cutout Relay, high speed circuit and Series/Parallel Valves and bypasses the Tilt Sensor when platform is down.

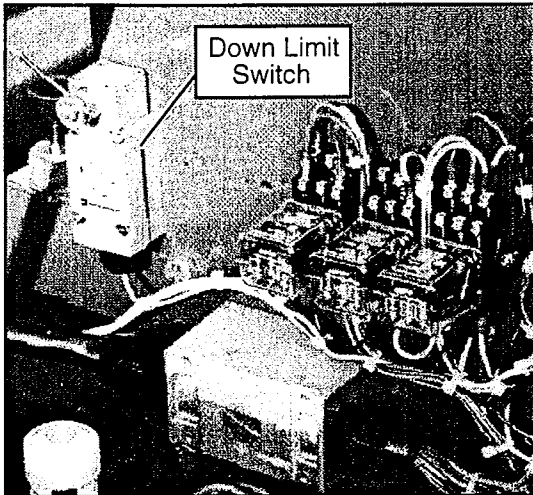


Figure 3-8: Platform Down Limit Switch Adjustment

1. Raise platform until mid link weldment rest is:
2 inches (51 mm) for SL26
3.5 inches (89 mm) for SL30
from top of front axle ().
2. Disconnect the black wire on the small terminal block and the white wire connected to the 'A' terminal of the Platform Down Relay (Figure 3-8). Connect an ohmmeter or continuity tester to the wires.
3. Adjust switch to just open by loosening hex nut and moving the actuating arm. Raise and lower platform to verify adjustment and tighten hex nut.
4. Disconnect ohmmeter and reconnect wires.
5. Lower platform.

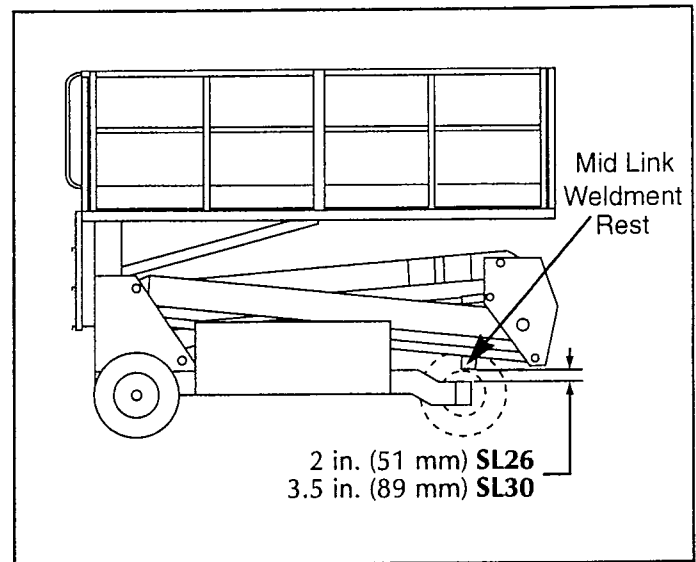


Figure 3-9: Platform Down Limit Switch Adjustment

Cushion Down Limit Switch (Figure 3-10)

The Cushion Down Limit Switch is a mercury switch that provides power to energize the Cushion Valve during the last 6 inches (15 cm) of platform lowering.

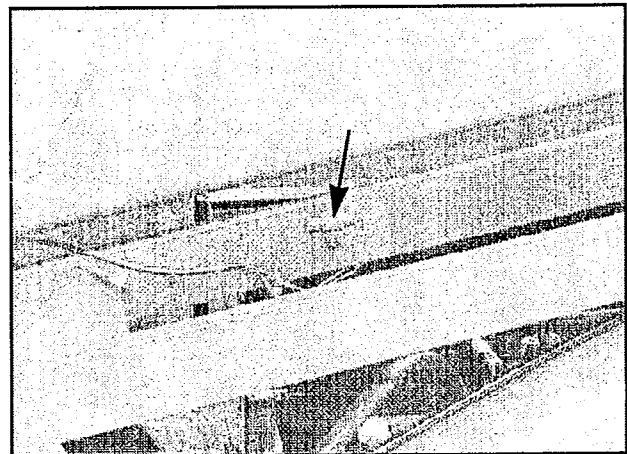


Figure 3-10: Cushion Down Limit Switch

1. Raise the platform 6 in. (15 cm) from its fully lowered position.
2. Disconnect the wires at the mercury switch and connect an ohmmeter or continuity tester.
3. Rotate the switch until it just closes. If necessary tighten the locknut that mounts the switch.
4. Raise and lower the platform to verify the adjustment.
5. Disconnect ohmmeter and reconnect wires.
6. Lower platform.

Tilt Sensor (Figure 3-11)

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

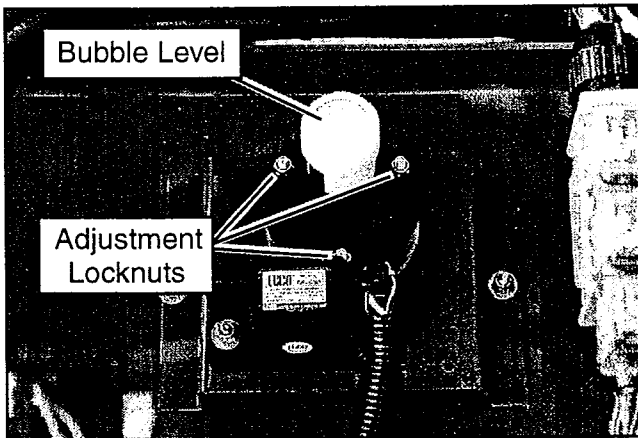


Figure 3-11: Tilt Sensor Adjustment

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

3.9 HYDRAULIC MANIFOLD (FIGURE 3-12)

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

Removal

1. Disconnect the battery ground cable.
2. Tag and disconnect the solenoid valve leads from the terminal strip.
3. Tag, disconnect and plug hydraulic hoses.
4. Remove the 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 3-12 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove spool valve covers and spool valves.
3. Remove solenoid valves, main relief valve, counterbalance valves and emergency lowering valves.
4. Remove fittings, plugs, springs, balls and orifices.

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. Seat all balls in manifold block by lightly tapping on the ball with a brass drift.

1. Install fittings, plugs, balls and orifices. Use one drop of Locktite #242 on each screw-in orifice.
2. Install emergency lowering valve, counterbalance valves, main relief valve, brake pressure reducing valve, solenoid valves and spool valves.
3. Install coils on solenoid valves.

Installation

1. Attach manifold assembly to mounting plate with bolts.

Note: Longer bolt goes in hole nearest the front of the module.

2. Attach Steering Relief valve block.
3. Attach Drive Relief valve block.
4. Connect Solenoid leads to terminal strip (as previously tagged).
5. Connect hydraulic hoses. Be certain to tighten hoses to manifold.
6. Operate each hydraulic function and check for proper operation and leaks.
7. Adjust all hydraulic pressures according to instructions in Section 3.7.

1. Manifold
2. Manifold Block
3. Steering Block
4. Three Way Valves
5. Steering Flow Divider
6. Flow Divider
7. Spacer
8. Brake Pressure Reducing Valve
9. Lowering Valve
10. Lift Check Valve
11. Relief Valve
12. Ball, 5/16" Dia.
13. Steering Valve Block
14. Ball, 1/2" Dia.
15. Spring
16. Spring
17. Seat, Ball
18. Piston
19. Proportional Valve
20. Fitting Adapter
21. Fitting Adapter Elbow
22. Plug - SAE #4
23. Plug - SAE #6
24. Plug - SAE #8
25. Lift Valve
26. Screw, 3/4"
27. Washer, 3/8"
28. O-ring
29. O-ring
30. Fitting Adapter
31. Fitting Adapter
32. Lowering Orifice
33. Cable Connector
34. Fitting Adapter
35. Cushion Valve
36. Screw, 10-24
37. Fitting Adapter
38. Fitting Adapter
39. Relief Valve
40. Relief Valve
41. Relief Valve
42. Spacer

1. NOTCH IN ITEM #32 TO FACE OUTWARD.
2. SEAT ALL BALLS INTO BLOCK OR BALL SEAT ON ASSY.
3. TORQUE CARTRIDGE VALVES TO 35 ± 5 FT.LB.
4. TORQUE COIL NUTS TO 8 ± 1 IN.LB.
5. SECURE BALL SEAT ITEM # 17 WITH LOCKTITE HYDRAULIC SEALANT OR EQUIVALENT.

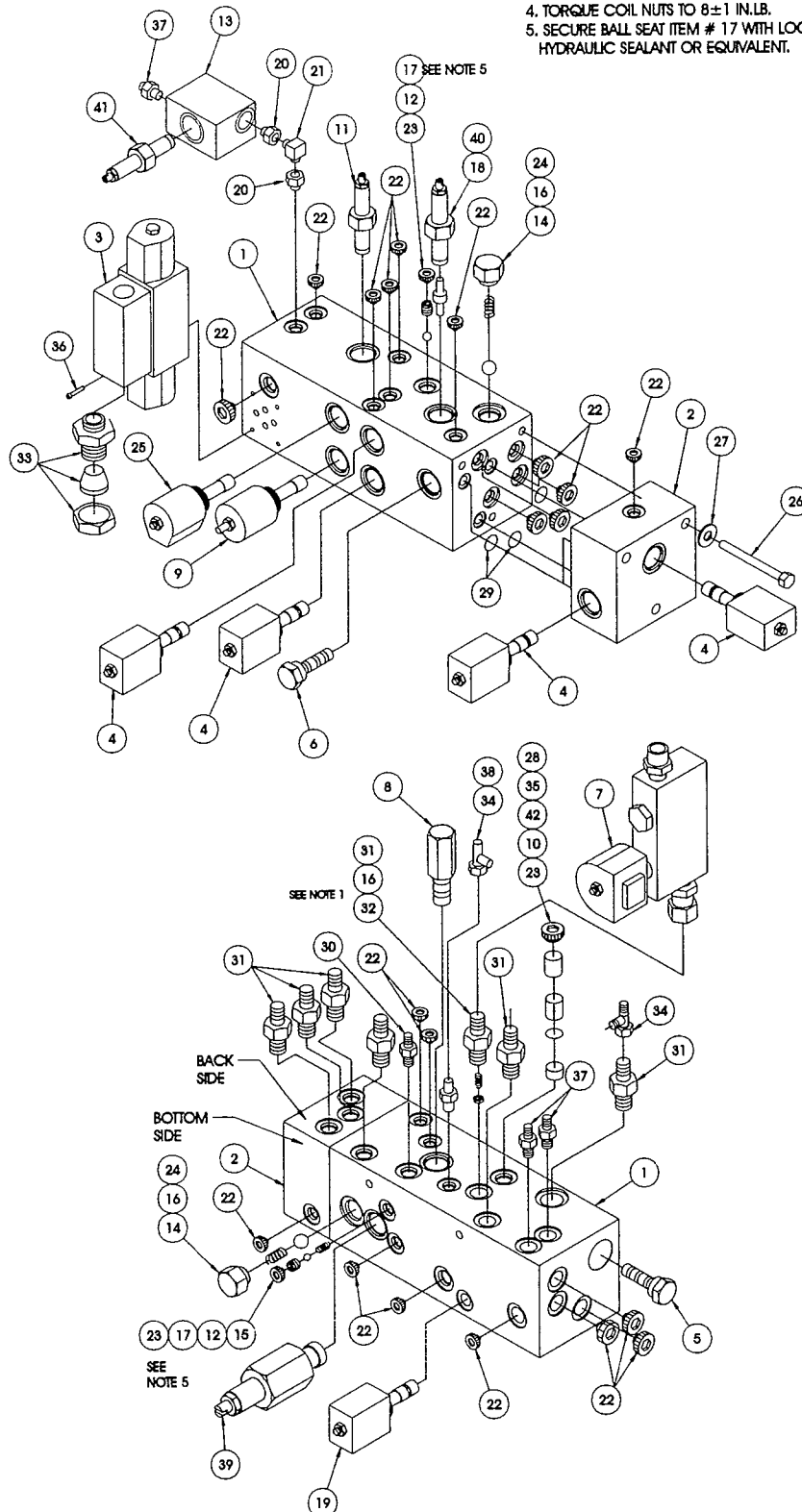


Figure 3-12: Hydraulic Manifold, Exploded View

3.10 HYDRAULIC PUMPS

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

Removal

1. Mark, disconnect and plug the hose assemblies.
2. Disconnect the fittings between the two pumps.
3. Loosen the capscrews and remove the pump assemblies from the motor.

Installation

1. Lubricate the pump shaft with general purpose grease and attach the pumps to the motors with capscrews.
2. Using a criss-cross pattern, torque each capscrew a little at a time until all four capscrews are torqued to 20 ft. lbs. (27 Nm).
3. Install the motor/pump assemblies and secure with the capscrews.
4. Reconnect the cables to the motors.
5. Install the fittings between the two motors.
6. Unplug and reconnect the hydraulic hoses.
7. Check the oil level in the hydraulic tank before operating the work platform.

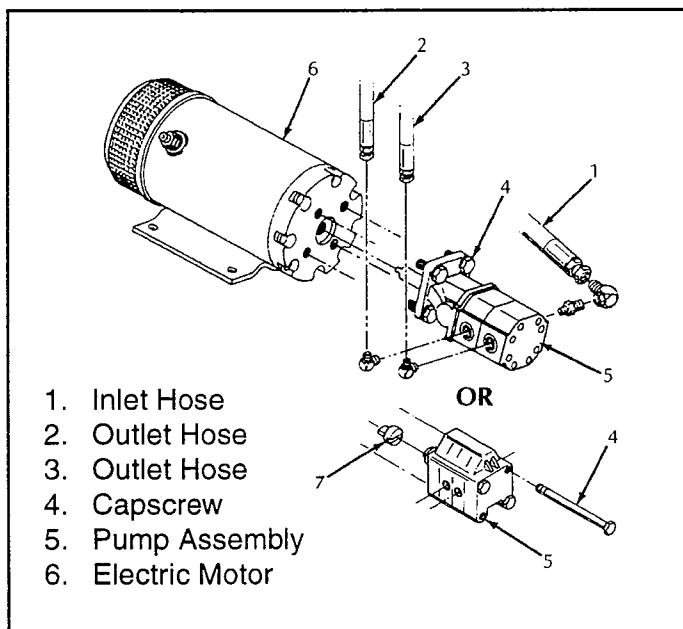


Figure 3-13: Typical Hydraulic Pump

Diesel Engine (Figure 3-14)

Removal

1. Mark, disconnect and plug the hose assemblies.
2. Disconnect the fittings between the two pumps.
3. Loosen the capscrews and remove the pump assemblies from the motor.

Installation

1. Lubricate the pump shaft with extreme high pressure molybdenum grease and attach the pump to the engine with the capscrews.
2. Torque each capscrew a little at a time until both capscrews are torqued to 20 ft. lbs. (27 Nm).
3. Unplug and reconnect the hydraulic hoses.
4. Check the oil level in the hydraulic tank before operating the work platform.

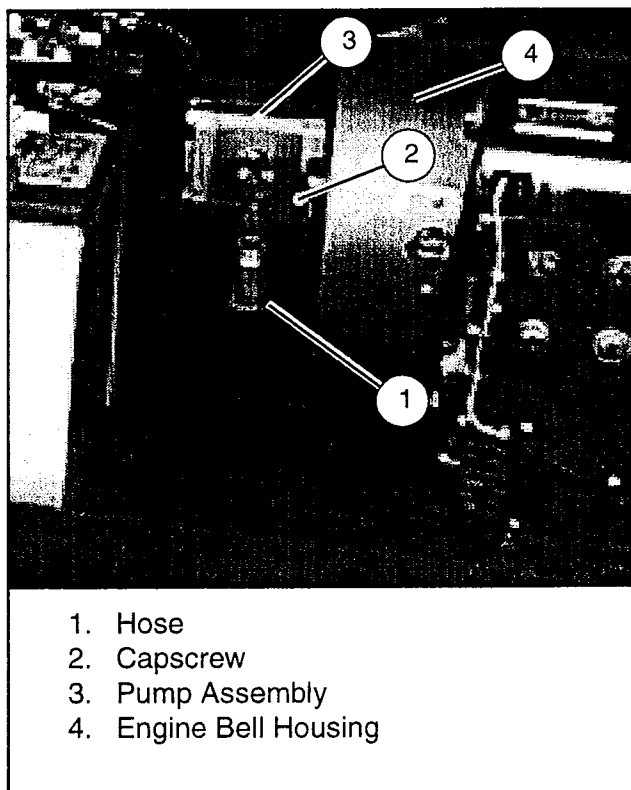


Figure 3-14: Hydraulic Pump, Diesel Engine

3.11 HYDRAULIC DRIVE MOTORS & HUBS (FIGURE 3-15)

Removal

1. Park the work platform on firm, level ground and block the wheels to prevent the work platform from rolling.
2. Loosen the wheel lug bolts on the motor to be removed.
3. Raise the rear of the work platform using a 2-ton jack.
4. Position jack stands under the rear axle to prevent the work platform from falling if the jack fails.
5. Remove the wheel lug bolts and wheel.
6. Remove the cotter pin, nut, hub, and shaft key.

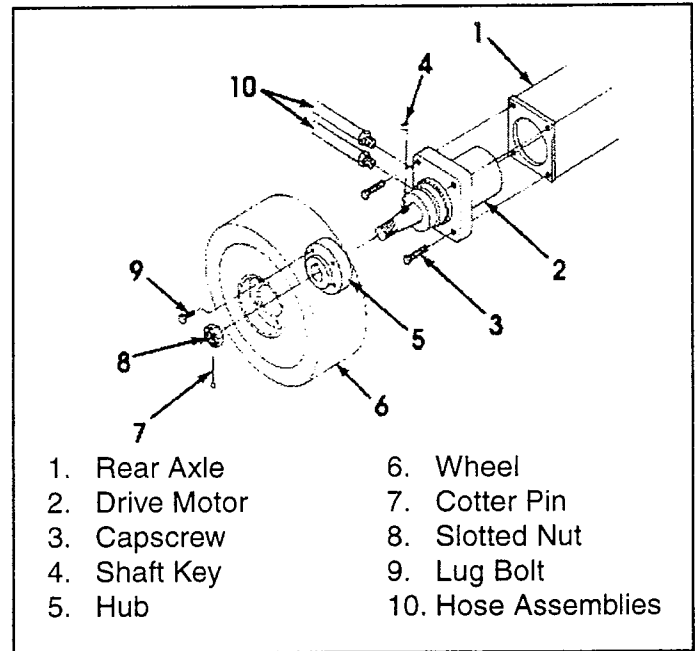


Figure 3-15: Drive Motor Installation

CAUTION

ONLY use a wheel puller to remove the hub. Using any other method of removal may damage the drive motor housing or shaft and void the warranty.

Clean all fittings before disconnecting the hose assemblies.

Plug all port holes and hose assemblies IMMEDIATELY to prevent contamination from dust and debris.

7. Tag and disconnect the hose assemblies.
8. Remove the capscrews, lockwashers and drive motor assembly from the rear axle.

Installation

1. Position the drive motor in the rear axle and secure with lockwashers and capscrews.
2. Reinstall the hose assemblies.
3. Thoroughly clean the motor shaft and hub bore of all grease, paint and foreign material.
4. Reinstall the shaft key, hub, and nut. Torque each wheel hub nut to 478 N-m (350 ft. lbs.). Align the slot in the nut with the hole in the shaft and insert the cotter pin. DO NOT back off the nut to align.
5. Reinstall the wheel and lug bolts onto the hub. Torque the lug bolts to 123 N-m (90 ft. lbs.).
6. Remove the jack stands used to block the wheels. Lower the jack and remove.
7. Operate the drive system to check for leaks and proper function.

3.12 WHEEL BEARINGS (FIGURE 3-16)

Removal

1. Loosen the wheel lug nuts then, using a 2 ton capacity jack, raise the work platform until the wheel to be worked on is off the ground.
 2. Install jack stands 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.

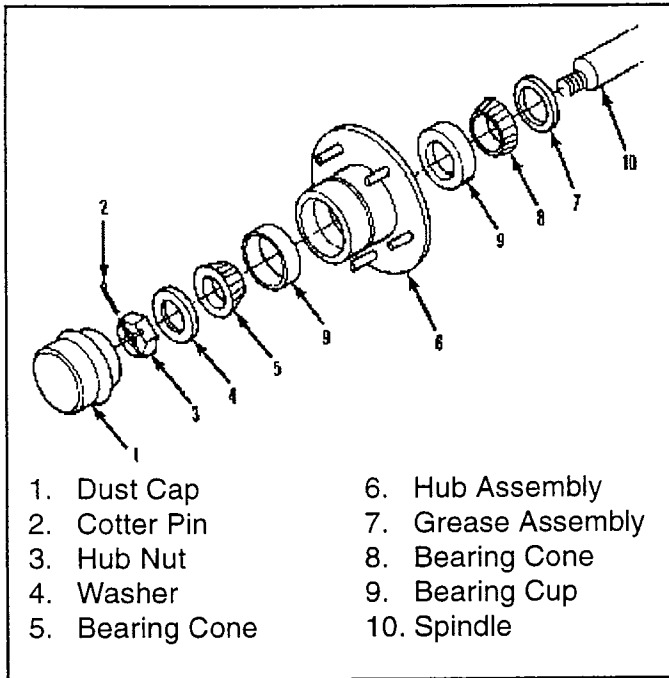


Figure 3-16: Wheel Bearings

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 multi purpose grease to the bearing surface of each cup.
3. Pack the inside bearing cone with multi purpose grease and position it within the rear bearing cup in the hub assembly. Install the new grease seal.
4. Apply a thin coating of multi purpose grease to the spindle to protect the grease seal then slide the hub assembly onto the spindle.
5. Pack the outside bearing cone with multi purpose 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 dust cap and wheel/tire assembly. Torque the lug nuts to 123 N-m (90 ft. lbs.).
9. Remove jack stands and lower work platform to the ground.

3.13 BRAKE CYLINDER (FIGURE 3-17)

Removal

1. Block the wheels to prevent the work platform from rolling when the brake is removed.
2. Tag then disconnect the hose assemblies and cap the openings to prevent foreign material from entering.
3. Remove the locknuts 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 locknuts and washers.
9. Connect the hose assemblies.
10. Operate the brake retract circuit and check that the shaft clears the brake disc. Check for leaks.

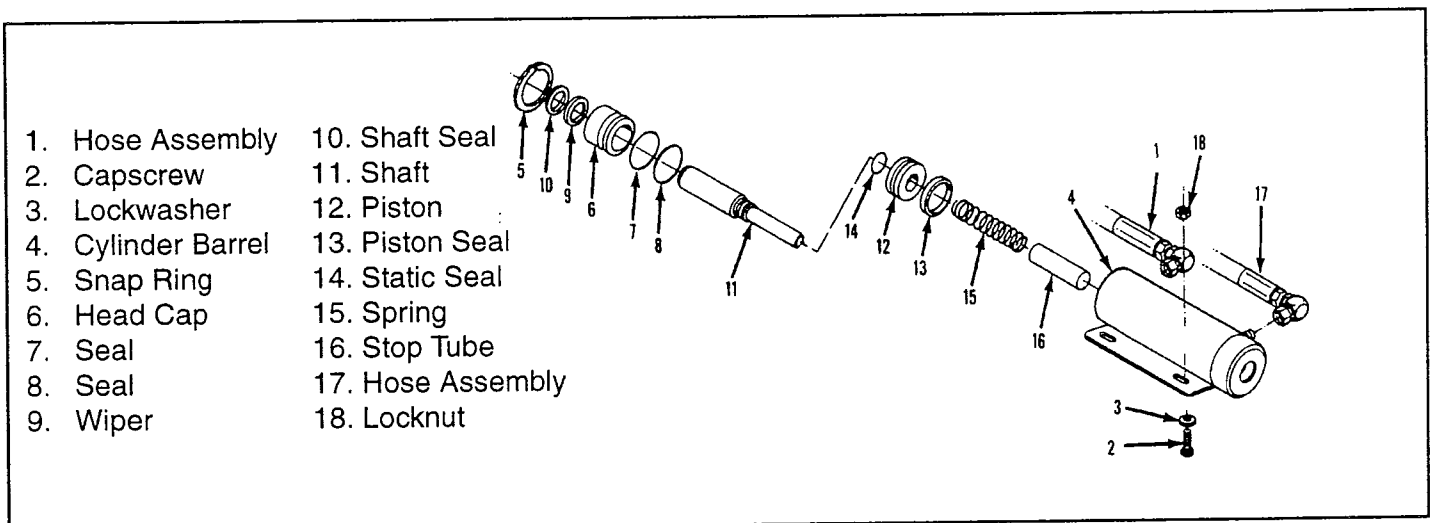


Figure 3-17: Brake Cylinder

3.14 STEERING CYLINDER

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 capscrews securing the rod ends to the steering linkage.
3. Loosen the nut and bolt in front of the Steering Cylinder that goes through the frame.
4. Remove the capscrews and locknuts that fasten the cylinder assembly to the chassis.
5. Remove the cylinder from the chassis.

Disassembly (Figure 3-18)

1. Remove the fittings from both ends of the cylinder.
2. Remove rod ends from cylinder rods, mark position of rod ends.
3. Remove the headcaps from the barrel tube.
4. Withdraw the entire shaft assembly from either end of the barrel tube.
5. Remove the rod wipers, rod seals and static O-rings from the headcaps.
6. Discard all the seals.
7. Unscrew the No. 1 shaft from the No. 2 shaft and remove the piston.
8. Remove the piston seal and static O-ring from the piston and discard.

Cleaning and Inspection

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

Assembly and Installation (Figure 3-18)

1. Install a new piston seal and static O-rings.
2. Install the piston on the No. 1 shaft.
3. Thread the No. 2 shaft onto the No. 1 shaft and tighten securely.

4. Lubricate the piston seal with clean hydraulic fluid and install the shaft assembly in the barrel tube.
5. Lubricate and install new rod seals and static O-rings on the headcaps.
6. Lubricate and install new rod wipers in the headcaps.
7. Install headcaps in the barrel tube and tighten until the mounting holes are in-line.
8. Install the fittings in the ends of the cylinder.
9. Position the cylinder assembly in the chassis and install the capscrews and locknuts, but do not tighten.
10. Tighten the nut and bolt in front of the cylinder that goes through the frame and then tighten the cylinder mounting capscrews.
11. Install the cylinder rod ends.
12. Connect the hose assemblies to the fittings.
13. Operate the steering circuit several times throughout its entire range of travel to expel trapped air and check for leaks.

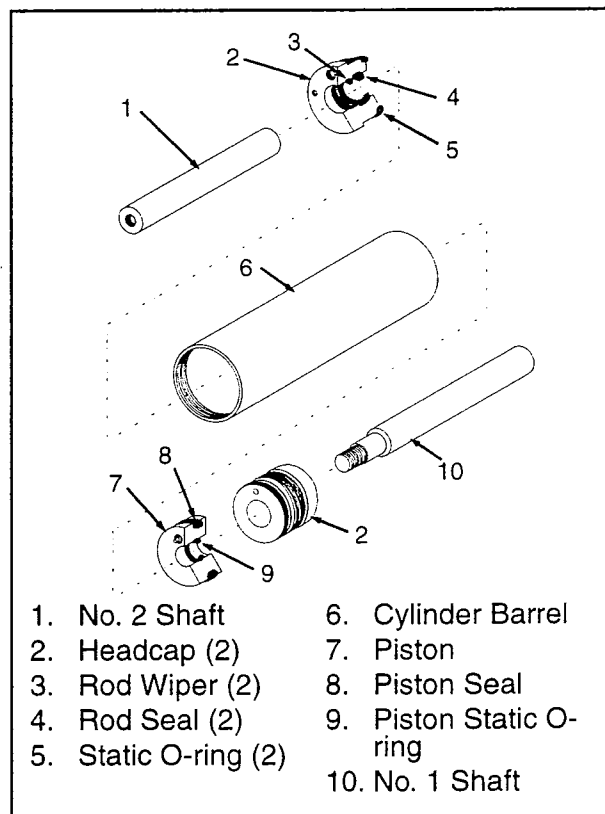


Figure 3-18: Steering Cylinder Assembly

Adjustment

1. Disconnect the cylinder rod ends (if connected).
2. Operate steering so that both ends of the cylinder rod are equal length (.8 mm, ±1/32 inch).
3. Position both tires so they are parallel with the frame and with each other.
4. Adjust the rod ends until they align with the holes on the steering linkage bars.
5. Reinstall the bolts through the steering linkage bars and rod ends. Tighten the jam nuts on the rod ends and all hardware.
6. When properly adjusted, the wheels must turn the same amount in each direction.

3.15 LIFT CYLINDER

Note: DO NOT support or raise the front of the platform during any maintenance operation as this might result in damage to the tension members.

Removal

1. Raise and block the front of the elevating assembly approximately 12 inches (305 mm) above the chassis. Support with a jackstand with a minimum rating of 4000 lbs. (1814 kg.).
2. Open Emergency Lowering Valve to be sure all pressure is off the Lift Cylinder.
3. Remove and cap both hoses and fittings.
4. Support the Lift Cylinder to prevent falling.
5. Remove the set screw from the end of the cylinder rod.
6. Remove the retaining ring from the upper cylinder pin. Remove the upper cylinder pin by tapping out using a soft punch.
7. Remove the retaining bolt from the lower cylinder pin and remove the pin using a soft punch.
8. Remove the cylinder by sliding it out of the front of the machine.

Disassembly (Figure 3-19)

1. Unscrew the head cap from the cylinder barrel.
2. Remove the piston and rod assembly from the cylinder barrel.
3. Unscrew the piston nut and remove piston and head cap from the piston rod.
4. Remove the piston static O-ring from the cylinder rod and discard.
5. Remove the piston seal from the piston and discard.

6. Remove the static O-ring, rod seal and rod wiper.
7. Remove the rod end breather.
8. Do not remove the velocity fuse unless replacement is necessary.

Cleaning and Inspection (Figure 3-19)

1. Clean all the metal parts in cleaning solvent and blow dry with filtered compressed air.
2. Check the working surfaces of the piston head cap, cylinder barrel and rod for excessive wear or scoring.
3. Replace parts found to be unserviceable.
4. Replace all seals, O-rings and wipers.

Reassembly (Figure 3-19)

1. Lubricate the static O-ring, rod seal and rod wiper and then install in the head cap.
2. Install the piston seal on the piston.
3. Install the head cap, piston static seal, piston and piston nut on the cylinder rod. Torque nut to 70 ft. lbs. (96 Nm).

Note: The head cap should be installed from the piston end of the cylinder rod. Sliding the head cap over the pivot pin hole may damage the rod seal and rod wiper.

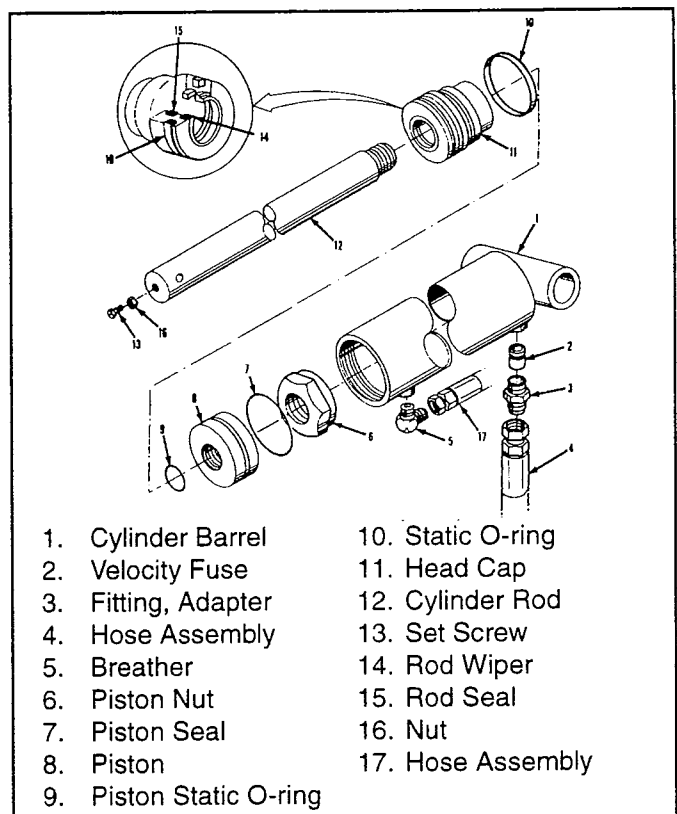


Figure 3-19: Lift Cylinder Assembly

4. Lubricate and piston seal and install the piston and rod assembly into the cylinder barrel.
5. Screw the head cap into the cylinder barrel hand tight and then turn 1/4 turn further.

Installation

Note: Before installing the cylinder, check the pins and bearings for excessive wear. Replace if necessary.

1. Place the cylinder in position taking care to support the cylinder to prevent falling.
2. Install the lower pin and retaining bolt.
3. Install the upper pin and retaining ring.
4. Install both hoses.
5. Raise the machine and check for leaks.

3.16 ELECTRIC MOTOR (FIGURE 3-20)

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 a power source to produce the nameplate voltage. **Do Not Make A Permanent Connection.** First touch the motor leads quickly to the power supply just long enough to observe if the shaft runs. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to step 3. If the motor sounds noisy, it should be taken apart as described in the disassembly section.
3. If the motor turned freely, connect an ammeter in the circuit as shown in Figure 3-20A. 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.
5. 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.

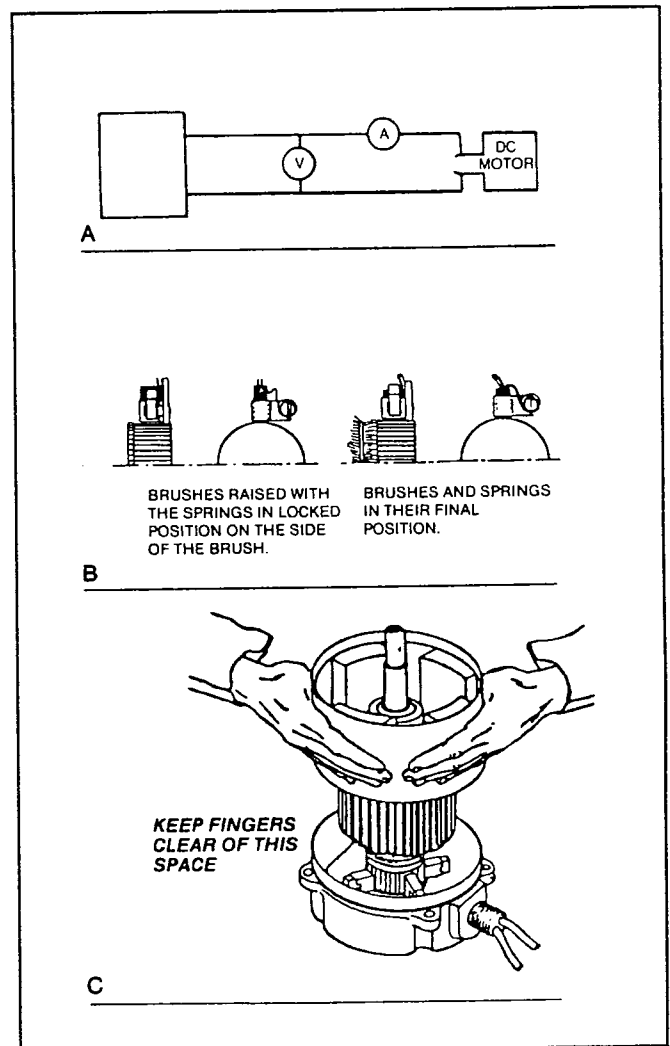


Figure 3-20: Electric Motor Service

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 3-20B 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 3-20B.
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.

3.17 TORQUE SPECIFICATIONS

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.

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 3-1: Torque Specifications for Fasteners

AMERICAN STANDARD CAP SCREWS									METRIC CAP SCREWS								
SAE GRADE	5				8				METRIC GRADE	8.8				10.9			
Cap Screw Size (inches)									Cap Screw Size (millimeters)	 				 			
	TORQUE				TORQUE					TORQUE				TORQUE			
	Ft./Lbs.		Nm.		Ft./Lbs.		Nm.			Ft./Lbs.		Nm.		Ft./Lbs.		Nm.	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13	M6 x 1.00	6	8	8	11	9	11	12	15
1/4 - 28	8	9	11	12	10.5	12	14	16	M8 x 1.25	16	20	21.5	27	23	27	31	36.5
5/16 - 18	14	15	19	20	18.5	20	25	27	M10 x 1.50	29	35	39	47	42	52	57	70
5/16 - 24	17.5	19	23	26	23	25	31	34	M12 x 1.75	52	62	70	84	75	91	102	123
3/8 - 16	26	28	35	38	35	37	47.5	50	M14 x 2.00	85	103	115	139	120	146	163	198
3/8 - 24	31	34	42	46	41	45	55.5	61	M16 x 2.50	130	158	176	214	176	216	238	293
7/16 - 14	41	45	55.5	61	55	60	74.5	81	M18 x 2.50	172	210	233	284	240	294	325	398
7/16 - 20	51	55	69	74.5	68	75	92	102	M20 x 2.50	247	301	335	408	343	426	465	577
1/2 - 13	65	72	88	97.5	86	96	116	130	M22 x 2.50	332	404	450	547	472	576	639	780
1/2 - 20	76	84	103	114	102	112	138	152	M24 x 3.00	423	517	573	700	599	732	812	992
9/16 - 12	95	105	129	142	127	140	172	190	M27 x 3.00	637	779	863	1055	898	1098	1217	1488
9/16 - 18	111	123	150	167	148	164	200	222	M30 x 3.00	872	1066	1181	1444	1224	1496	1658	2027
5/8 - 11	126	139	171	188	168	185	228	251									
5/8 - 18	152	168	206	228	203	224	275	304									
3/4 - 10	238	262	322	355	318	350	431	474									
3/4 - 16	274	302	371	409	365	402	495	544									
7/8 - 9	350	386	474	523	466	515	631	698									
7/8 - 14	407	448	551	607	543	597	736	809									
1 - 8	537	592	728	802	716	790	970	1070									
1 - 14	670	740	908	1003	894	987	1211	1337									

NOTE: These values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used

Table 3-2: Torque Specifications for Hydraulic Components

Type: SAE Part Series	Cartridge Poppet		Fillings		Hoses	
	Ft/Lbs	Nm	Ft/Lbs	Nm	Ft/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	107-119
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

NOTES:

Section 4

TROUBLESHOOTING

4.0 Introduction

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

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

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. Secondly, 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.

⚠ WARNING ⚠

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

When performing any service which requires the platform to be raised, the elevating assembly must be blocked.

Disconnect the battery(ies) ground cable when replacing or testing the continuity of any electrical component.

FOR SERVICE ASSISTANCE, IN THE U.S.A., CALL:

1-800-926-LIFT

FROM OUTSIDE THE USA, CALL 1-209-891-5200

4.1 Troubleshooting Guide

Table 4-1: Troubleshooting Guide

PROBLEM	PROBABLE CAUSE	REMEDY
All functions inoperable, Electric Motor or Engine does not start.	1. Blown Control Circuit Fuse.	Check 15 amp Control Circuit Fuse. Replace if blown.
	2. Faulty Battery Charger.	Check the voltage output of the Battery Charger. If less than 24 VDC, repair or replace.
	3. Faulty Battery(ies).	After completely charging Batteries, test each Battery. Replace as required.
	4. Faulty Electric Motor.	While operating the steering function, check voltage across the Electric Motor terminals. If 24 VDC is present, replace the Motor.
	5. Faulty Motor Relay(s).	While operating the steering, check voltage across the coil terminals of Motor Relays. If no voltage is present, proceed with step 6. If 20 VDC or more, check continuity across the contact terminals of Motor Relay while still operating the steering function. If there is no continuity, replace the defective Motor Relay.
	6. Emergency Stop Switch failed open.	With the Emergency Stop Switch in the ON position, check continuity across the contacts. If none, replace.
	7. Key Switch.	Replace switch if inoperative.
All functions inoperable. Engine starts. Electric motor starts when control is actuated.	1. Hydraulic Reservoir low.	Check hydraulic fluid level, top off as required.
	2. Faulty Hydraulic Pump.	Check pressure and delivery of the Hydraulic Pump. Replace if required.
	3. Damaged drive coupling	Remove pump(s) from motor(s) or engine and check coupling.
	4. Proportional Valve.	Check operation. Replace if required.
	5. Faulty Proportional Controller.	Check operation. Adjust or replace if required.

Table 4-1: Troubleshooting Guide (Cont.)

PROBLEM	PROBABLE CAUSE	REMEDY
Electric Motor continues to run after controls are returned to the OFF position.	Motor Relay contacts fused together.	With 0 voltage at the coil terminals of the Motor Relay check continuity across the contact terminals. If there is continuity, replace the Motor Relay.
Engine fails to start. Does not crank or cranks slowly.	1. Battery terminals corroded or loose.	Check and tighten terminals.
	2. Discharged battery.	Check condition of battery. If serviceable, recharge battery. If defective, replace battery.
	3. Starter Solenoid.	Replace the starter solenoid.
	4. Starter Motor.	Repair or replace starter.
	5. Key Switch.	Replace the switch.
	6. Main fuse.	Check fuse and replace if required.
	7. Emergency Stop Switch.	Replace switch if inoperative.
Engine cranks but will not start.	1. Out of fuel	Fill tank.
	2. Blocked fuel line.	Remove obstruction.
	3. Fuel Filter clogged.	Clean or replace filter.
	4. Air leaks in the fuel system.	Tighten all fuel line fittings or damp.
	5. Water in fuel system.	Drain water separator and tank if necessary to remove all water.
	6. Fuel Pump defective/damaged.	Replace the pump.
Engine starts then stops.	1. Low fuel level.	Fill fuel tank.
	2. Fuel filter clogged.	Clean or replace the filter element.
	3. Air leaks in the fuel system.	Tighten all fuel line connections and clamps.
	4. Water in the fuel.	Drain the filter separator and tank if necessary to remove all water.
	5. Fuel pump defective/damaged.	Replace the pump.
	6. Clogged air filter.	Clean or replace air filter.
	7. Key Switch.	Switch defective or damaged. Replace the switch.
Engine smokes (white).	1. Oil level too high in crankcase.	Drain oil to proper level.
	2. Piston rings worn or sticking.	Replace rings.
Loss of power	1. Clogged Air Filter.	Clean or replace the filter.
	2. Clogged Fuel Filter.	Replace the filter.
	3. Incorrect fuel.	Drain and refill tank with proper fuel.
	4. Incorrect valve clearance.	Adjust to proper clearance.
	5. Fuel pump defective/damaged.	Replace the pump.

PROBLEM	PROBABLE CAUSE	REMEDY
Engine stops.	1. Fuel Tank empty.	Refill tank and prime system as required.
	2. Water in fuel.	Drain fuel system to remove all water and refill with fresh fuel.
Hourmeter does not register.	1. Electrical connections loose or connected improperly.	Tighten and/or correct the connections.
	2. Hourmeter failure.	Replace the meter.
All Controller functions inoperative.	1. Blown fuse.	Find short. Replace fuse.
	2. Key Switch.	Replace switch if inoperative.
	3. Faulty Interlock Switch.	Check Interlock Switch for continuity, replace if faulty.
	4. Control Cable.	Test cable and replace if damaged.
Platform will not elevate.	1. Emergency Lowering Valve open.	Close valve.
	2. Platform overloaded.	Observe maximum load rating.
	3. Ruptured hydraulic hose.	Replace the hose and check relief valve setting.
	4. Lift Valve Solenoid.	Test solenoid and replace if inoperable.
	5. Main Relief Valve stuck open.	Replace the relief valve.
	6. Drive/Lift Switch.	Test the switch, replace if inoperable.
	7. Lift Valve.	Repair or replace valve.
	8. Hydraulic Pump.	Check for pressure and delivery. Repair or replace if inoperative.
	9. Down Valve stuck open.	Remove and inspect the valve for sticky operation or damaged o-rings. Repair or replace if unserviceable.
	10. Proportional Coil.	Test solenoid and replace if inoperable.
	11. Proportional Controller.	Test controller, replace if inoperable.
	12. Lift/Drive Relay.	Check for contact continuity and closure when energized. If no continuity or contacts do not close, replace the relay.
Unit will not steer. (Lift function operative.)	1. Steering Valve Coils (right and left).	Test coils, replace if inoperative.
	2. Open circuit in Control Cable.	Test cable for continuity, replace if defective.
	3. Steering Valve.	Test valve, replace if not serviceable.
	4. Mechanical damage.	Replace damaged parts.
	5. Steering Switch.	Replace steering switch.
	6. Diode (D10, D11).	Test diodes. Replace if faulty.

TROUBLESHOOTING

Table 4-1: Troubleshooting Guide (cont'd.)

PROBLEM	PROBABLE CAUSE	REMEDY
Unit will not drive.	1. Drive/Lift Switch.	Position switch in DRIVE position. Test switch and replace if inoperative.
	2. Forward or Reverse Solenoid Valve.	Test solenoid and replace if inoperative.
	3. Control Cable.	Test cable and replace if damaged.
	4. Ruptured hydraulic hose.	Replace hose.
	5. Proportional Controller.	Test controller and replace if inoperative.
	6. Main pressure Relief Valve.	Test relief valve and replace if not serviceable.
	7. Hydraulic Pump.	Test pump pressure and delivery. Replace if not serviceable.
	8. Hydraulic Motors.	Test hydraulic pressure at drive circuit. If normal, replace motors.
	9. Lift/Drive Relay.	Check for contact continuity and closure when energized. If no continuity or contacts do not close, replace the relay.
	10. Shuttle Valve not seating.	Check for contaminants and reseal ball in Valve Block.
	11. Drive Relay.	Check for contact continuity and closure when energized. If no continuity or contacts do not close, replace the relay.
Unit will not drive full speed.	1. Series/Parallel Valve solenoids.	Test solenoid and replace if inoperative.
	2. Proportional Controller.	Test the control and replace if inoperative.
	3. Hydraulic Motors worn.	Inspect the motors and replace if not serviceable.
	4. Hydraulic Pump worn.	Check pump pressure and delivery. Replace if not serviceable.
	5. Main pressure Relief Valve stuck open.	Check relief valve and replace if inoperative.
	6. Torque Selector/ Drive Speed Switch.	Replace switch.
	7. Platform Down Relay.	Check for contact closure when energized. If contacts do not close, replace the relay.
	8. Platform Down Switch.	Check for continuity, replace if faulty.
	9. Steering Relief Valve.	Check relief valve pressure, Replace if not serviceable.
	10. Leaking break Cylinder.	Check and replace if not serviceable.
	11. Leaking Break Shuttle Valve.	Check and clean

PROBLEM	PROBABLE CAUSE	REMEDY
No drive FWD but drives in REV. Lift function operable.	1. Faulty Lift/Drive Relay.	Test Lift/Drive Relay contacts for continuity. Replace if faulty.
	2. Faulty diode.	Test diode. Replace if faulty.
	3. Faulty Forward Coil.	Test Forward Coil if proper voltage is present and coil is not magnetized, replace.
	4. Faulty Drive Valve.	Inspect Drive Valve, if spool is sticking replace.
	5. Faulty Counterbalance Valves.	Check pressure of Counterbalance Valves. Replace or reset valves as required.
	6. Shuttle Valve.	Check for contaminants and reseal ball in Valve Block.
	7. Faulty Drive Relay.	Test Drive Relay contacts for continuity. Replace if faulty.
No drive FWD but drives in REV. No lift function.	1. Faulty Up/Fwd Switch.	Test Up/Fwd Switch, replace if required.
	2. Faulty Proportional Controller.	Check operation of Proportional Controller. Adjust as necessary. Replace if required.
No drive REV but drives in FWD. Lift function operable.	1. Faulty Lift/Drive Relay.	Test Lift/Drive Relay contacts for continuity. Replace if faulty.
	2. Faulty diode.	Test diode. Replace if faulty.
	3. Faulty REV Coil.	Test REV Coil, if proper voltage is present and coil is not magnetized, replace.
	4. Faulty Drive Valve.	Inspect Drive Valve, if spool is sticking replace.
	5. Faulty Counterbalance Valves.	Check pressure of Counterbalance Valves. Replace or reset valves as required.
	6. Shuttle Valve.	Check for contaminants and reseal ball in Valve Block.
	7. Faulty Drive Relay.	Test Drive Relay contacts for continuity. Replace if faulty.
No drive REV but drives in FWD. No lift function.	1. Faulty Down/Rev Switch.	Test Down/Rev Switch, replace if required.
	2. Faulty Proportional Controller.	Adjust Proportional Controller, replace if required.
Platform drifts down.	1. Emergency Lowering Valve partly open or faulty.	Ensure that the Emergency Lowering Valve is completely closed. If the platform still drifts down, replace the valve.
	2. Leaky Down Valve cartridge.	Replace the Down Valve.
	3. Faulty Lift Cylinder.	Check and replace O-rings on cylinder piston, replace cylinder if not serviceable.
Platform will not lower.	1. Down Valve Solenoid Coil.	Test coil and replace if inoperative.
	2. Control Cable.	Check cable and replace if damaged.
	3. Proportional Controller.	Test control and replace if inoperative.
	4. Faulty diode.	Test diode. Replace if faulty.
	5. Lift/Drive Relay.	Check relay contacts for continuity. Replace if faulty.

* Electric models only.

Table 4-1: Troubleshooting Guide (Cont.)

PROBLEM	PROBABLE CAUSE	REMEDY
Electric Motor continues to run after controls are returned to the OFF position.	Motor Relay contacts fused together.	With 0 voltage at the coil terminals of the Motor Relay check continuity across the contact terminals. If there is continuity, replace the Motor Relay.
Engine fails to start. Does not crank or cranks slowly.	1. Battery terminals corroded or loose.	Check and tighten terminals.
	2. Discharged battery.	Check condition of battery. If serviceable, recharge battery. If defective, replace battery.
	3. Starter Solenoid.	Replace the starter solenoid.
	4. Starter Motor.	Repair or replace starter.
	5. Key Switch.	Replace the switch.
	6. Main fuse.	Check fuse and replace if required.
	7. Emergency Stop Switch.	Replace switch if inoperative.
Engine cranks but will not start.	1. Out of fuel	Fill tank.
	2. Blocked fuel line.	Remove obstruction.
	3. Fuel Filter clogged.	Clean or replace filter.
	4. Air leaks in the fuel system.	Tighten all fuel line fittings or dams.
	5. Water in fuel system.	Drain water separator and tank if necessary to remove all water.
	6. Fuel Pump defective/damaged.	Replace the pump.
Engine starts then stops.	1. Low fuel level.	Fill fuel tank.
	2. Fuel filter clogged.	Clean or replace the filter element.
	3. Air leaks in the fuel system.	Tighten all fuel line connections and dams.
	4. Water in the fuel.	Drain the filter separator and tank if necessary to remove all water.
	5. Fuel pump defective/damaged.	Replace the pump.
	6. Clogged air filter.	Clean or replace air filter.
	7. Key Switch.	Switch defective or damaged. Replace the switch.
Engine smokes (white).	1. Oil level too high in crankcase.	Drain oil to proper level.
	2. Piston rings worn or sticking.	Replace rings.
Loss of power	1. Clogged Air Filter.	Clean or replace the filter.
	2. Clogged Fuel Filter.	Replace the filter.
	3. Incorrect fuel.	Drain and refill tank with proper fuel.
	4. Incorrect valve clearance.	Adjust to proper clearance.
	5. Fuel pump defective/damaged.	Replace the pump.

PROBLEM	PROBABLE CAUSE	REMEDY
Engine stops.	1. Fuel Tank empty.	Refill tank and prime system as required.
	2. Water in fuel.	Drain fuel system to remove all water and refill with fresh fuel.
Hourmeter does not register.	1. Electrical connections loose or connected improperly.	Tighten and/or correct the connections.
	2. Hourmeter failure.	Replace the meter.
All Controller functions inoperative.	1. Blown fuse.	Find short. Replace fuse.
	2. Key Switch.	Replace switch if inoperative.
	3. Faulty Interlock Switch.	Check Interlock Switch for continuity, replace if faulty.
	4. Control Cable.	Test cable and replace if damaged.
Platform will not elevate.	1. Emergency Lowering Valve open.	Close valve.
	2. Platform overloaded.	Observe maximum load rating.
	3. Ruptured hydraulic hose.	Replace the hose and check relief valve setting.
	4. Lift Valve Solenoid.	Test solenoid and replace if inoperative.
	5. Main Relief Valve stuck open.	Replace the relief valve.
	6. Drive/Lift Switch.	Test the switch, replace if inoperative.
	7. Lift Valve.	Repair or replace valve.
	8. Hydraulic Pump.	Check for pressure and delivery. Repair or replace if inoperative.
	9. Down Valve stuck open.	Remove and inspect the valve for sticky operation or damaged o-rings. Repair or replace if unserviceable.
	10. Proportional Coil.	Test solenoid and replace if inoperative.
	11. Proportional Controller.	Test controller, replace if inoperative.
	12. Lift/Drive Relay.	Check for contact continuity and closure when energized. If no continuity or contacts do not close, replace the relay.
Unit will not steer. (Lift function operative.)	1. Steering Valve Coils (right and left).	Test coils, replace if inoperative.
	2. Open circuit in Control Cable.	Test cable for continuity, replace if defective.
	3. Steering Valve.	Test valve, replace if not serviceable.
	4. Mechanical damage.	Replace damaged parts.
	5. Steering Switch.	Replace steering switch.
	6. Diode (D10, D11).	Test diodes. Replace if faulty.

Section 5

SCHEMATICS

Introduction

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

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

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

Schematic	Page
Electrical Schematic (064149-081)	5-2
Hydraulic Schematic (064148-023)	5-4
Table	Page
Electrical Schematic Legend	5-3
Hydraulic Schematic Legend	5-5

5.1 ELECTRICAL SCHEMATIC, SL26/30N BI-ENERGY

Table 5-1: Electrical Schematic Legend: (064149-081)

DESIGNATION	NAME	FUNCTION	LOCATION
ALM1	Alarm, Tilt	Sounds audible warning when slope of machine exceeds 3°	Control Module
ALM2	Alarm, Down	Provides warning sound when deck is lowered.	Control Module
ALT	Alternator	Maintains battery charge	Power Module
BAT1-8	Batteries	Supply power	Power Module
CB1	Circuit Breaker, 15 Amp	Protects lower controls from overcurrent.	Control Module
CB2	Circuit Breaker, 15 Amp	Protects lower controls from overcurrent.	Control Module
CH	Battery Charger	Charges Batteries	Power Module
D1	Diode	Drive isolation	Upper Controls
D2	Diode	Protects Glow Plug Switch S6.	Upper Controls
D3-11	Diodes	Spike protection	Control Module
D12	Diode	Protects Down Alarm ALM2	Control Module
D13	Diode	Protects Tilt Alarm ALM1	Control Module
F1	Fuse, 175 Amp	Protects Motor Relay R9 & Motor MOT1	Control Module
F2	Fuse, 175 Amp	Protects Motor Relay R10 & Motor MOT2	Control Module
HM	Hour Meter	Tracks hours machine has been in operation.	Control Module
MOT1	Drive Motor	Powers wheel	Control Module
MOT2	Drive Motor	Powers wheel	Control Module
PS1	Oil Pressure Switch	Cuts power to engine when oil pressure falls to dangerous levels	Power Module
R1	Relay, Platform Down	Switches power to Down Solenoid	Control Module
R2	Relay, Cutout	Cuts power to lift function if machine slope is greater than 3°	Control Module
R3	Relay, Drive/Lift	Directs power from Forward & Reverse switches to either Forward/Reverse or Up/Down Relays.	Control Module
R4	Relay, Control	Switches power to Motor Relays	Control Module
R5	Relay, Drive	Powers Forward Solenoid	Control Module
R6	Relay, Throttle	Switches power to Throttle Solenoid	Power Module
R7	Relay, Starter	Provides Starter with power	Power Module
R8	Relay, Glow Plug	Provides power to Glow Plug.	Power Module
R9	Relay, Motor	Provides Motor MOT1 with power	Control Module
R10	Relay, Motor	Provides Motor MOT2 with power	Control Module
S1	Switch, Micro	Supplies power to controller	Upper Controls
S2	Switch, Reverse Micro	Supplies power to Drive/Lift Relay, Forward/Up contacts.	Upper Controls
S3	Switch, Forward Micro	Supplies power to Drive/Lift Relay, Reverse/Down contacts.	Upper Controls
S4	Switch, Joystick Interlock	Interrupts power to control when not engaged.	Upper Controls

DESIGNATION	NAME	FUNCTION	LOCATION
S5	Switch, Steering Micro	Controls steering functions	Upper Controls
S6	Switch, Glow Plug	Supplies power to Glow Plug Relay	Upper Controls
S7	Switch, Lift/Drive	Supplies power to Steering Micro Switch or to Drive/Lift Relay.	Upper Controls
S8	Switch, Torque	Supplies power to Series/Parallel Relay.	Upper Controls
S9	Switch, Ignition	Supplies power to upper controls and Motor Relays.	Upper Controls
S10	Switch, Emergency Stop (Upper)	Cuts power to Controller and Motors.	Upper Controls
S12	Switch	Provides power to Cushion Down Solenoid.	Control Module
S13	Switch, Platform Down	Provides power to Platform Down Relay.	Control Module
S14	Switch, Start/Glow	Supplies power to Starter and Glow Plug	Control Module
S15	Switch, Lift	Supplies power to Lift/Drive Relay	Control Module
S16	Switch, Emergency Stop (Lower)	Cuts power to all control functions	Control Module
SEN1	Sensor, Level	Provides power to Cutout Relay when machine is level.	Control Module
SOL1	Solenoid, Steer Right	Controls Steer Right Valve when steering right.	Control Module
SOL2	Solenoid, Proportional	Controls Proportional valve	Control Module
SOL3	Solenoid, Steer Left	Controls Steer Left Valve when steering left.	Control Module
SOL4	Solenoid, Forward	Controls Forward Valve	Control Module
SOL5	Solenoid, Up	Controls Lift Valve	Control Module
SOL6	Solenoid, Reverse	Controls Reverse Valve	Control Module
SOL7	Solenoid, Down	Controls Down Valve	Control Module
SOL8	Solenoid, Cushion	Controls Cushion Down Valve	Control Module
SOL9,10	Solenoids, Series/Parallel	Controls Series/Parallel Valves	Control Module
SOL11	Solenoid, Throttle	Provides power to Throttle Relay	Power Module
SOL12	Solenoid, Run	Control fuel valve	Power Module
SOL13-15	Solenoids, Glow Plug	Provides power to Glow Plug Relay	Power Module
STR	Starter	Starts engine	Power Module

Section 6

ILLUSTRATED PARTS BREAKDOWN

Introduction

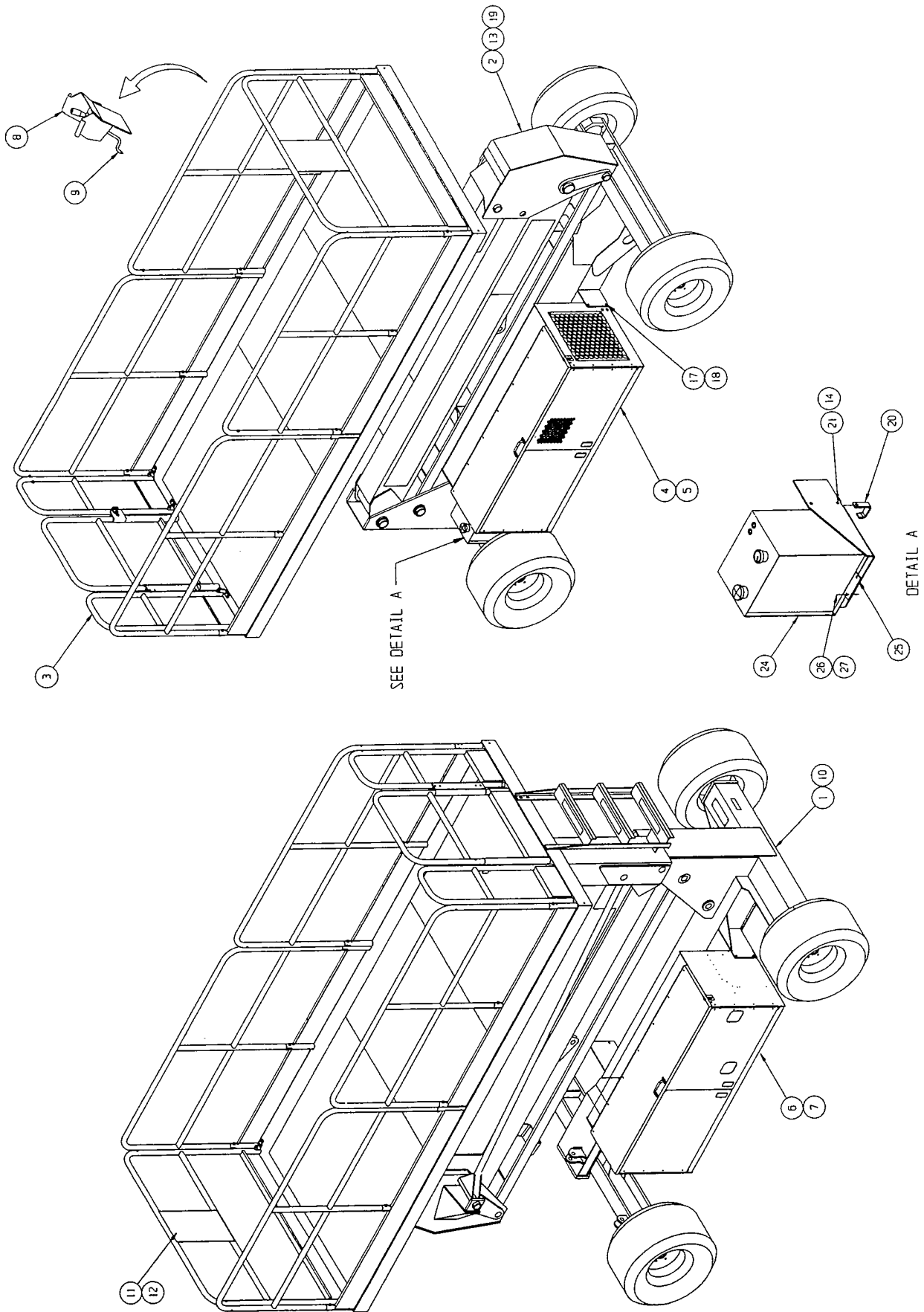
This section lists and illustrates the replaceable assemblies and parts of this product, as manufactured by UpRight, Inc. Each parts list contains the component parts for that assembly.

CONTENTS

Final Assembly, SL26N Bi-Energy 064406-010	6 - 2	Platform/Guardrail Installation, SL26N Bi-Energy 064678-001	6 - 26
Final Assembly, SL30N Bi-Energy 064606-010	6 - 4	Platform/Guardrail Installation, SL26N Bi-Energy 064678-001	6 - 28
Chassis Assembly, SL26/30N Bi-Energy 064001-033	6 - 6	Platform/Guardrail Installation, SL30N Bi-Energy 064678-002	6 - 30
Linkage Assembly, SL26N Bi-Energy 064677-001	6 - 8	Platform/Guardrail Installation, SL30N Bi-Energy 064678-002	6 - 32
Linkage Assembly, SL30N Bi-Energy 064677-002	6 - 10	Label Kit, SL26N Bi-Energy 064006-092	6 - 34
Power Module, SL26/30N Bi-Energy 064002-026	6 - 12	Label Kit, SL30N Bi-Energy 064006-093	6 - 36
Power Module, SL26/30N Bi-Energy 064002-026	6 - 14	Valve Manifold Assembly, SL26/30N 064004-017	6 - 38
Power Module, SL26/30N Bi-Energy 064002-026	6 - 16	Optional Rollout Deck, SL26N Only 064554-000	6 - 40
Control Module SL26/30N Bi-Energy 064003-068	6 - 18	Poly-Filled Tires B78-13ST 064250-000	6 - 42
Control Module, SL26/30N Bi-Energy 064003-068	6 - 20	Poly-Filled Tire Option, Soft Trac 063997-000	6 - 43
Controller Assembly, SL26/30N Bi-Energy 064411-029	6 - 22	Poly-Filled Tire Option, Rough Terrain 063998-001	6 - 43
Control Cable Assembly, SL26/30N Bi-Energy 064007-010	6 - 24		
Hose Kit Installation, SL26/30N Bi-Energy 064008-005	6 - 25		

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**FINAL ASSEMBLY,
SL30N BI-ENERGY**

064606-010

ITEM	PART NO.	DESCRIPTION	QTY.
1	064001-033	CHASSIS ASSEMBLY	1
2	064677-002	LINKAGE INSTALLATION	1
3	064678-002	PLATFORM/GUARDRAIL INSTALLATION	1
4	064002-026	POWER MODULE ASSEMBLY	1
6	64003-068	CONTROL MODULE ASSEMBLY	1
8	064411-029	CONTROLLER ASSEMBLY	1
9	064007-010	CONTROL CABLE	1
10	064008-005	HOSE KIT	1
11	064006-093	LABEL KIT	1
14	064149-081	ELECTRICAL SCHEMATIC	REF
16	064148-023	HYDRAULIC SCHEMATIC	REF
17	011256-010	SCREW HHC 1/2-13 UNC X 1-1/4	7
18	011248-008	NUT HEX 1/2-13 UNC ESNA	8
20	064657-000	HOSE BRACKET	1
21	011256-012	SCREW HHC 1/2-13 UNC X 1-1/2	1
22	029940-099	SHRINK TUBING 3/4 DIA	2.7FT


ITEM	PART NO.	DESCRIPTION	QTY.
23	029976-099	SHRINK TUBING 1/2 DIA	2FT
24	064646-000	FUEL TANK ASSY	1
25	064039-000	MOUNTING TAB, FUEL TANK	1
26	011254-008	SCREW HHC 3/8-16 UNC X 1	2
27	011248-006	NUT HEX 3/8-16 UNC ESNA	2
28	064629-000	WIRE HARNESS	1
29	064195-086	BATTERY CABLE ASSY X 86	2
30	064195-108	BATTERY CABLE ASSY X 108	2

NOTES:

- HYDRAULIC PRESSURE SETTING
 MAIN RELIEF-2000 PSI
 FORWARD COUNTER BALANCE-900 PSI
 REVERSE COUNTER BALANCE-1200 PSI
 DRIVE CROSS RELIEF-1500 PSI
 BRAKE 350-480 PSI.
 STEERING 1200 PSI

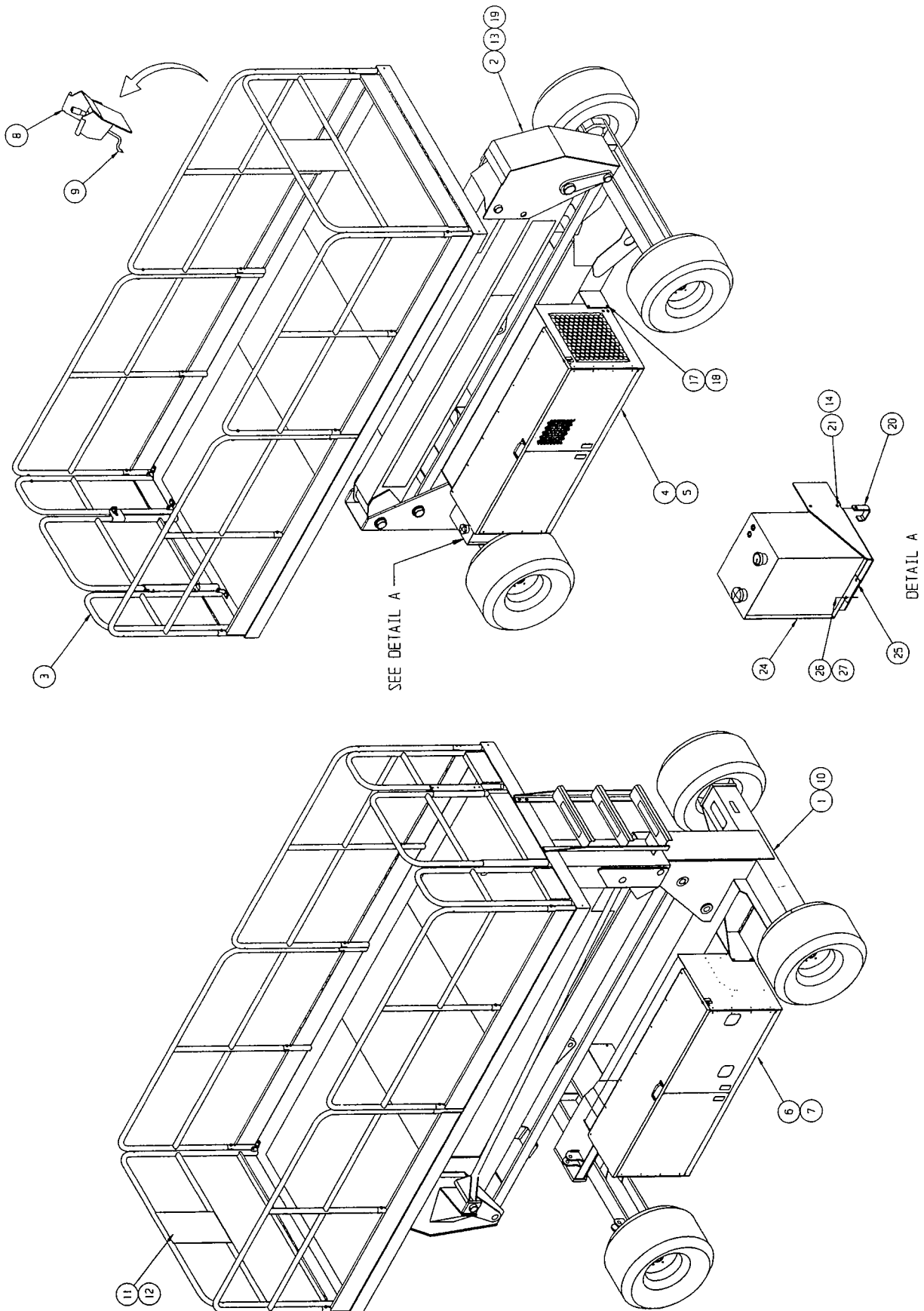
- | | | |
|-----------------|---------------|-------------|
| 2. ENGINE SPEED | FULL THROTTLE | IDLE |
| DIESEL | 3000±100 RPM | 1350±50 RPM |

- | | | |
|----------------------|---------------------|-----------------------|
| 3. DRIVE SPEED (MPH) | LOW | HIGH |
| DIESEL | .4-.5(.587-.739FPS) | 3.6-3.8(5.28-5.75FPS) |
| ELECTRIC | .4-.5(.587-.739FPS) | 2.6-2.7(3.81-4.11FPS) |
- LIFT SPEED (SECONDS) HIGH UP DOWN
 DIESEL 18-22 30-35
 ELECTRIC 31-37 30-35
 - RATED LOAD 1300 LBS - (600 Kg)
 - GRADABILITY: DIESEL - 21% (1225# DRAWBAR PULL)
 ELECTRIC 20% (1170# DRAWBAR PULL)

 CUT SHRINK TUBE INTO APPROX 4 IN LENGTHS AND INSTALL OVER CABLE SUPPORT BRACKETS ON LINKAGE ASSEMBLY.

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**CHASSIS ASSEMBLY,
SL26/30N BI-ENERGY**

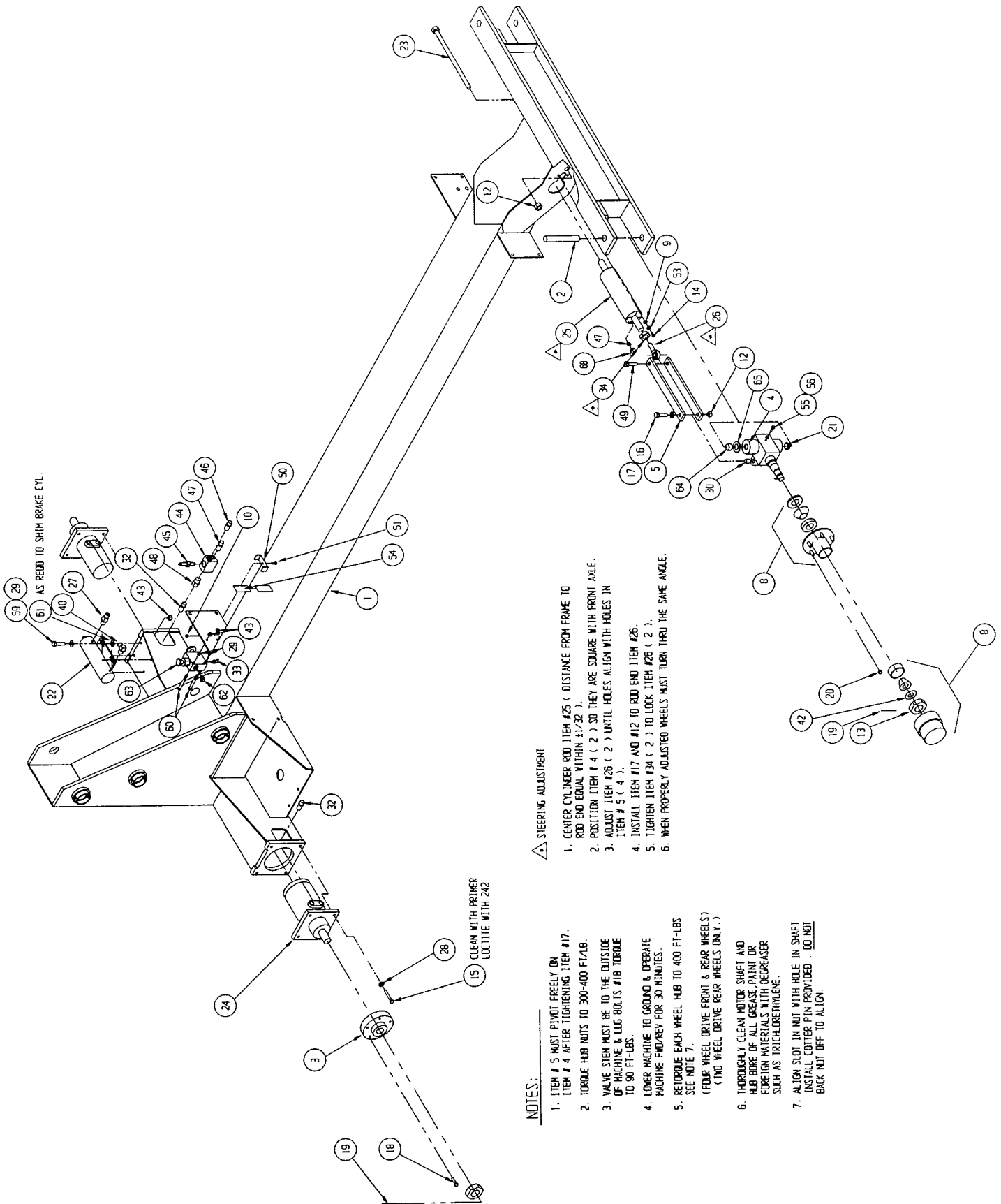
064001-033

ITEM	PART NO.	DESCRIPTION	QTY.
1	064010-002	CHASSIS WELDMENT BI-ENERGY	1
2	064161-000	STEERING PIN	2
3	064029-001	HUB DRIVE MOTOR	2
4	064487-000	STEERING PIVOT WELDMENT	2
5	064033-002	STEERING LINKAGE	4
8	063911-000	HUB ASSY	2
9	011239-005	WASHER 5/16 DIA ASTM FLAT	4
10	011248-004	LOCKNUT 1/4-20 UNC HEX	1
12	011248-010	LOCKNUT 5/8-11 UNC HEX	5
13	015945-016	NUT 1-14 UNF SLOTTED HEX	2
14	011253-006	SCREW 5/16-18 UNC HHC X 3/4	4
15	011266-020	SCREW 1/2-20 UNF HHC X 2 1/2	8
16	011240-010	WASHER 5/8 FLAT	2
17	064150-000	SERRATED BOLT	2
18	014122-003	WHEEL BOLT 60°	10
19	011754-012	COTTER PIN 5/32 DIA X 1 1/2	4
20	05105-000	NUT LUG	10
21	062649-002	BEARING GARLOCK #16FDU16	2
22	060479-000	BRAKE	1
23	010181-096	SCREW 5/8-11 UNC GRADE 2 HHC X 12	1
24	063903-006	MOTOR HYD	2
25	063905-000	CYLINDER,STEERING	1
26	063927-001	ROD END 5/8	2
27	011939-008	FITTING ADAPTER	1
28	011238-008	LOCKWASHER 1/2 DIA SPLIT	8
29	011240-006	WASHER 3/8 FLAT	12
30	062642-001	BEARING GARLOCK # 10DU12	2
32	011935-005	FITTING ADAPTER	4
33	011934-001	FITTING ADAPTER	3
34	020495-010	NUT 5/8-18 UNF JAM HEX	2
40	011940-008	FITTING ADAPTER 90°	1

ITEM	PART NO.	DESCRIPTION	QTY.
42	063329-008	WASHER 1-ID X 1-1/2 OD X .093	2
43	011248-006	LOCKNUT 3/8-16 UNC	6
44	064169-000	VALVE BLOCK	1
45	060390-000	RELIEF VALVE	1
46	011941-006	FITTING ADAPTER	1
47	011941-001	FITTING ADAPTER	3
48	064170-005	FITTING ADAPTER	1
49	011257-024	SCREW 5/8-11 UNC HHC X 3	1
50	064036-000	HOSE CLAMP	1
51	011252-014	SCREW 1/4-20UNC HHC X 1 3/4	1
53	011238-005	LOCKWASHER 5/16 DIA SPLIT	4
54	029976-099	TUBE ØØ1/2 SHRINK	.17FT
55	011705-024	SCREW 3/8-16 UNC SOC HD X 1 1/2	2
56	011273-006	NUT 3/8-16 UNC HEX JAM	2
59	011254-010	SCREW 3/8-16 UNC HHC X 1 1/4	4
60	011254-020	SCREW 3/8-16 UNC HHC X 2 1/2	2
61	063988-006	WASHER SHIM 3/8ID X 5/8OD X.015	A/R
62	011934-003	FITTING ADAPTER	1
63	063978-000	HAND PUMP	1
64	062642-020	BEARING	2
65	064279-000	THRUST WASHER	2
68	011937-001	FITTING 90 4FJX-4MJ	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**LINKAGE ASSEMBLY,
SL26N Bi-ENERGY**

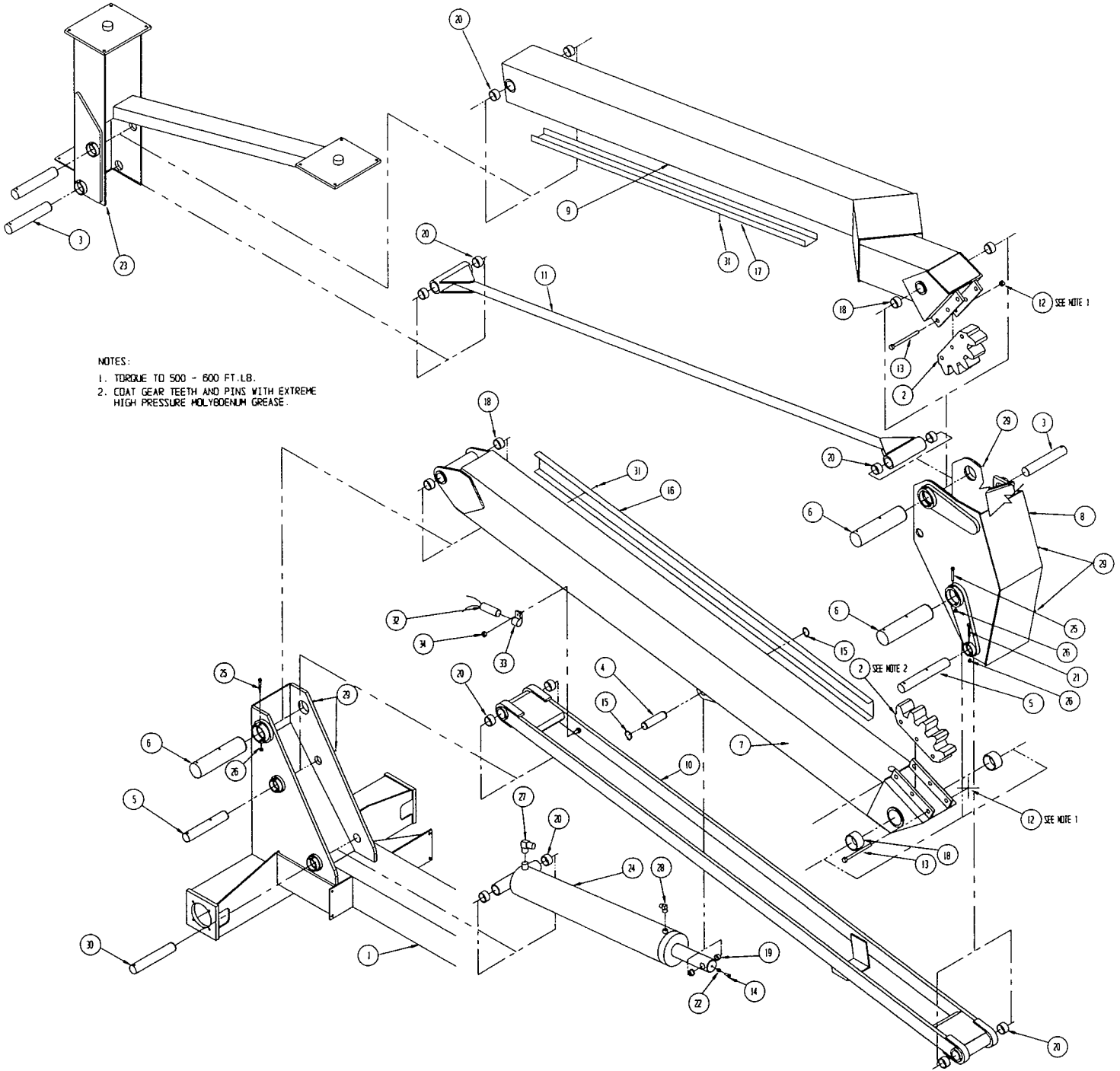
064677-001

ITEM	PART NO.	DESCRIPTION	QTY.
1	REF	CHASSIS ASSY	REF
2	064089-000	LIFT GEAR	2
3	064090-000	PIVOT PIN 1.75 X 11.45	3
4	064093-000	CYLINDER PIN	1
5	064094-000	PIVOT PIN 1.75 X 13.11	2
6	064095-000	PIVOT PIN 2.75 X 13.27	3
7	064060-002	LOWER BOOM WELDMENT	1
8	064070-002	MID-LINKAGE WELDMENT	1
9	064078-002	UPPER BOOM WELDMENT	1
10	064084-002	LOWER TENSION WELDMENT	1
11	064087-000	UPPER TENSION WELDMENT	1
12	011248-016	LOCKNUT 1-8 UNC HEX	6
13	014918-056	SCREW 1-8 UNC HEX HEAD CAP X 7	6
14	011705-020	SCREW 3/8-16 UNC SET HEXSOC X 1-1/4	1
15	011764-020	RET RING TRUARC #5100-125	2
16	064450-000	WIRE COVER	1
17	064451-000	WIRE COVER	1
18	062642-030	BEARING GARLOCK #44DU32	6
19	062649-010	BEARING GARLOCK #20FDU16	2
20	062649-020	BEARING GARLOCK #28FDU24	12
21	011254-024	SCREW 3/8-16 UNC HHC X 3	6

ITEM	PART NO.	DESCRIPTION	QTY.
22	011273-006	NUT 3/8-16 UNC JAM HEX	1
23	064111-001	PEDESTAL WELDMENT	1
24	063904-000	LIFT CYL	1
25	011254-030	SCREW 3/8-16 UNC HHC X 3 3/4	3
26	011248-006	LOCKNUT 3/8-16 UNC HEX	9
27	011934-013	FITTING ADAPTER	1
28	011940-006	FITTING ADAPTER	1
29	013336-001	GREASE FITTING	5
30	064092-000	PIN (1 3/4)	1
31	011246-006	LOCKNUT 3/8-16UNC THIN	4
32	063497-001	MERCURY SWITCH	1
33	013919-013	CLAMP	1
34	011248-004	LOCKNUT 1/4-20 UNC	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



NOTES:

- 1. TORQUE TO 500 - 600 FT.LB.
- 2. COAT GEAR TEETH AND PINS WITH EXTREME HIGH PRESSURE MOLYBDENUM GREASE.

SEE NOTE 1

SEE NOTE 2

SEE NOTE 1

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

LINKAGE ASSEMBLY, SL30N BI-ENERGY

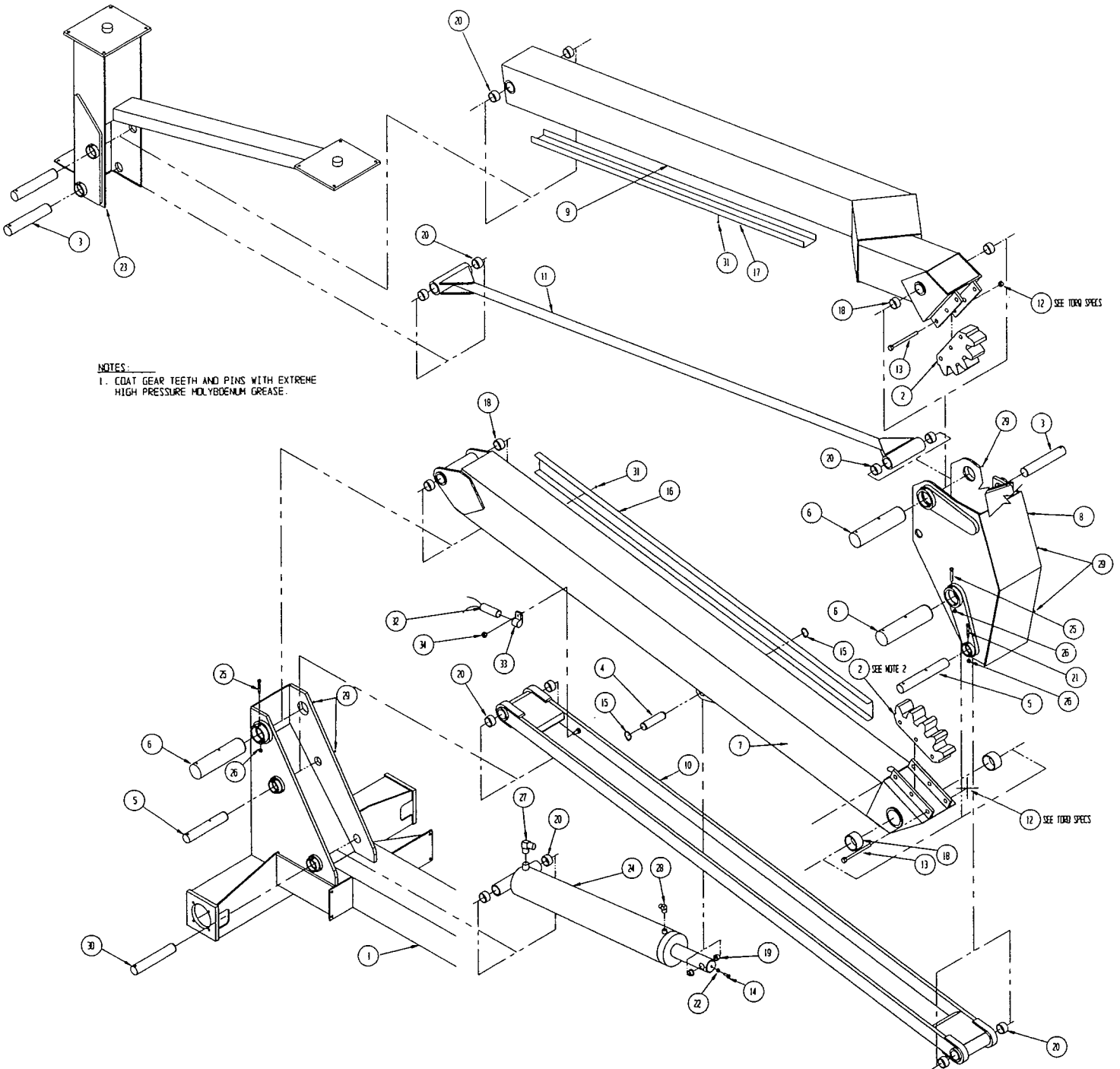
064677-002

ITEM	PART NO.	DESCRIPTION	QTY.
1	REF	CHASSIS ASSY	REF
2	064089-000	LIFT GEAR	2
3	064090-000	PIVOT PIN 1.75 X 11.45	3
4	064093-000	CYLINDER PIN	1
5	064094-000	PIVOT PIN 1.75 X 13.11	2
6	064095-000	PIVOT PIN 2.75 X 13.27	3
7	064530-001	LOWER BOOM WELDMENT	1
8	064070-002	MID-LINKAGE WELDMENT	1
9	064521-000	UPPER BOOM WELDMENT	1
10	064531-001	LOWER TENSION WELDMENT	1
11	064536-000	UPPER TENSION WELDMENT	1
12	011248-016	NUT HEX ESNA 1-8 UNC	6
13	014918-056	SCREW HHC GR5 1-8 UNC X 7	6
14	011705-020	SCREW ST HEXSOC 3/8-16 UNC X 1-1/4	1
15	011764-020	RET RING TRUARC #5100-125	2
16	064542-000	WIRE COVER - LOWER	1
17	064538-000	WIRE COVER - UPPER	1
18	062642-030	BEARING GARLOCK #44DU32	6
19	062649-010	BEARING GARLOCK #20FDU16	2
20	062649-020	BEARING GARLOCK #28FDU24	12
21	011254-024	SCREW HHC GR5 3/8-16 UNC X 3	6

ITEM	PART NO.	DESCRIPTION	QTY.
22	011273-006	NUT HEX JAM 3/8-16 UNC	1
23	064111-001	PEDESTAL WELDMENT	1
24	063904-000	LIFT CYL	1
25	011254-030	SCREW HHC GR5 3/8-16 UNC X 3 3/4	3
26	011248-006	NUT HEX ESNA 3/8-16 UNC	9
27	011934-013	FITTING 90 12MB-8MJ	1
28	011940-006	FITTING 90 4MP-6MJ	1
29	013336-001	GREASE FITTING	5
30	064092-000	PIN (1 3/4)	1
31	011246-006	NUT HEX THIN 3/8-16UNC	4
32	063497-001	MERCURY SWITCH	1
33	013919-013	CLAMP	1
34	011248-004	NUT HEX ESNA 1/4-20 UNC	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



NOTES:
1. COAT GEAR TEETH AND PINS WITH EXTREME HIGH PRESSURE MOLYBDENUM GREASE.

12 SEE TUBS SPECS

2 SEE NOTE 2

12 SEE TUBS SPECS

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**POWER MODULE,
SL26/30N BI-ENERGY**

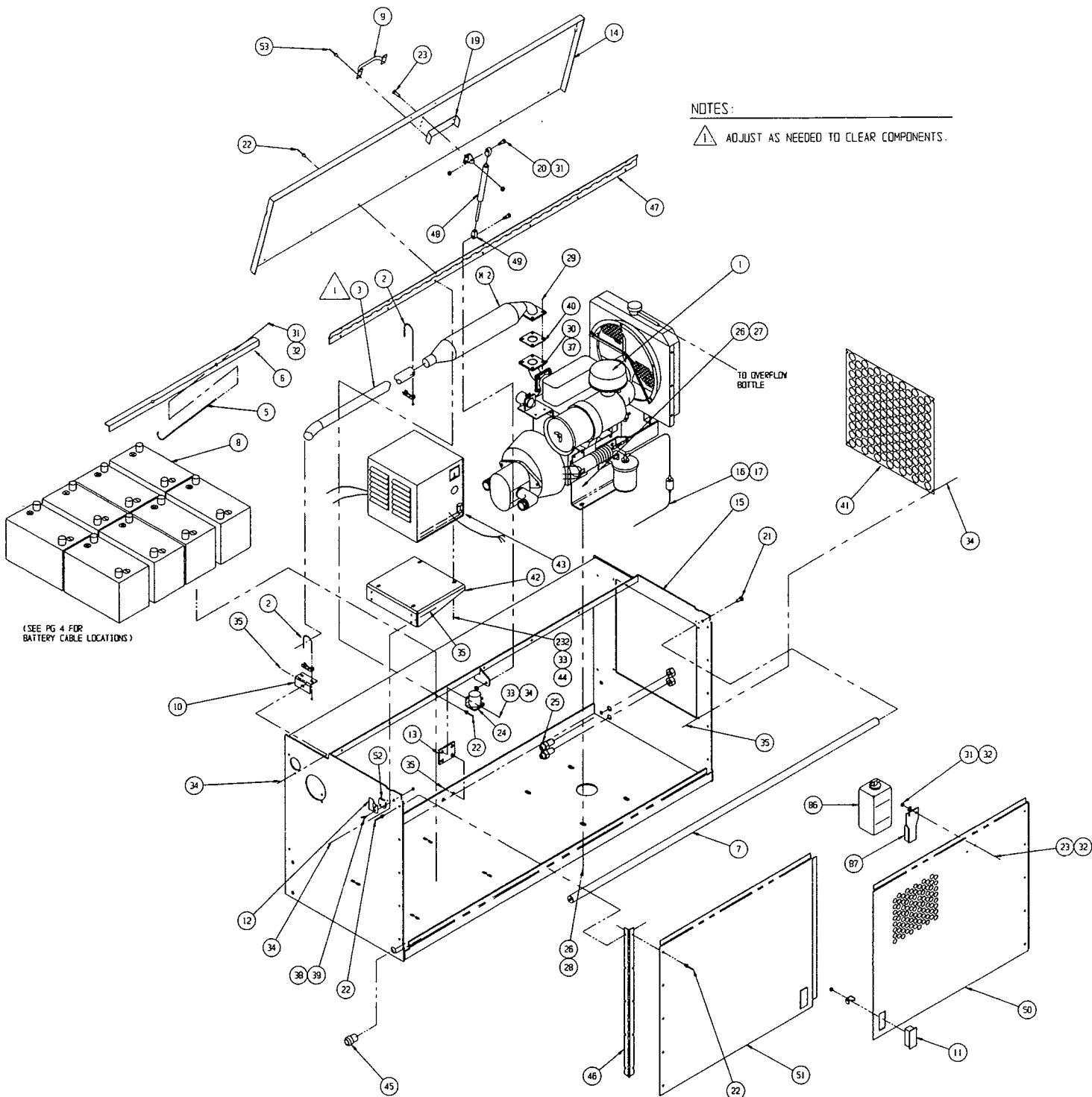
064002-026

ITEM	PART NO.	DESCRIPTION	QTY.
1	REF	ENGINE ASSY KUBOTA DIESEL	1
2	013259-006	MUFFLER CLAMP 1-1/2"	2
3	065914-001	EXHAUST TUBE	1
5	063082-000	BATTERY HOLD DOWN ROD	4
6	063083-000	ANGLE, BATTERY HOLD DOWN	2
7	064726-000	STIFFINER BAR WELDMENT	1
8	015796-000	BATTERY 6 VDC	8
9	025427-002	HANDLE	1
10	065917-000	EXHAUST BRACKET	1
11	067629-000	LATCH, FLUSH	2
12	05299-000	LATCH, TOGGLE	2
13	064269-000	RELAY PLATE	1
14	064742-000	COVER, MODULE	1
15	064722-000	MODULE WELDMENT, BI-ENERGY	1
16	020541-001	HOSE CLAMP	9
17	012736-099	HOSE, 3/16" I.D.	FT. 8
18	012733-099	HOSE, 5/16" I.D.	FT. 5
19	064798-000	DOOR BRACKET	1
20	015936-004	SCREW, SHOULDER 3/8 X 1/2	2
21	011254-006	SCREW HHC 3/8-16 UNC X 3/4	2
22	026554-002	RIVET, POP 1/4 DIA (.251-.375 GRIP)	34
23	011253-008	SCREW HHC 5/16-18 UNC X 1	2
24	064667-000	STARTER SOLENOID DC	3
25	010150-005	FITTING STR BULKHD 8MJ-8MJ	2
26	011240-006	WASHER, 3/8 FLAT STD	10
27	011254-010	SCREW 3/8-16UNC HHC X 1 1/4	8
28	011248-006	NUT 3/8-16 ESNA	9
29	011253-010	SCREW 5/16-18UNC X 1 1/4	4
30	011238-005	LOCKWASHER 5/16 SPLIT	5
31	011248-005	NUT 5/16-18UNC ESNA	2

ITEM	PART NO.	DESCRIPTION	QTY.
32	011240-005	WASHER 5/16 FLAT STD	3
33	011240-004	WAHER 1/4 FLAT STD	8
34	011252-006	SCREW 1/4-20UNC HHC X 3/4	15
35	011248-004	NUT 1/4-20UNC ESNA	17
36	011254-008	SCREW 3/8-16UNC HHC X 1	1
37	011250-005	NUT 5/16-18UNC	4
38	011708-006	SCREW 8-32 RD HD X 3/4	4
39	011248-002	NUT 8-32 HEX ESNA	4
40	063936-024	GASKET, MUFFLER KUBOTA	1
41	065918-000	RADIATOR GRILL SL26/30	1
42	064671-000	BRACKET, BATTERY CHARGER WELDMENT	1
43	063944-000	CHARGER, BATTERY	1
44	011238-004	WASHER, SPLIT LOCK 1/4	4
45	011868-011	STRAIN RELIEF - HEYCO	1
46	064740-000	HINGE, DOOR	2
47	064741-000	HINGE, MODULE COVER	1
48	063650-013	GAS SPRING	1
49	067648-008	END FITTING, GAS SPRING	2
50	064745-000	DOOR, RIGHT	1
51	064744-000	DOOR, LEFT	1
52	064754-000	SPACER	2
53	010128-008	RIVET 3/16 X 1/2 AL	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Power Module
SL26/30N Bi-Energy**
Drawing 1 of 3

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**POWER MODULE.
SL26/30N BI-ENERGY**

064002-026

ITEM	PART NO.	DESCRIPTION	QTY.
201	067614-000	KUBOTA DIESEL ENGINE (D905)	1
202	065912-000	EXHAUST ELBOW WELDMENT (90°)	1
204	067850-000	BRACKET, SOLENOID/GLOW	1
205	011932-007	FITTING ADAPTER 16FJX-16MJ 45°	1
206	011941-028	FITTING ADAPTER 16MB-16MJ	1
207	063902-014	PUMP, FIXED DISPLACEMENT	1
208	011934-010	FITTING ADAPTER 10MB-8MJ 90°	1
209	067617-010	KTR BELL HOUSING KIT	1
210	064183-000	SPACER, ENGINE	2
211	064180-001	ENGINE MOUNT BRACKET	2
214	012739-099	HOSE, 1/4 I.D.	FT. 4.5
215	067668-000	SOLENOID, THROTTLE (W/BOSCH THROTTLE RELAY)	1
216	067859-000	BRACKET, AIR CLEANER	1
217	064423-000	INLINE SWIVEL 1/4	1
218	011760-004	ROD END BEARING 1/4-28	1
219	011253-008	SCREW 5/16-18 X 1 HHC	1
220	067870-000	BRACKET, DIESEL FUEL FILTER	1
221	064636-000	ALTERNATOR 24V 42A	1
222	064661-000	BRACKET, ALTERNATOR	1
223	064665-000	SPACER, ALTERNATOR	1
224	064635-000	STARTER, 24V DC	1
225	064637-000	PULLEY, ALTERNATOR	1
226	064638-001	V-BELT	1
227	063961-020	SCREW, 8MM X 1.25 X 20MM	5
228	011254-024	SCREW 3/8-16 X 3"	1
229	011253-008	SCREW, 5/16-18 X 1"	1
230	011256-016	SCREW, 1/2-13 X 2"	1

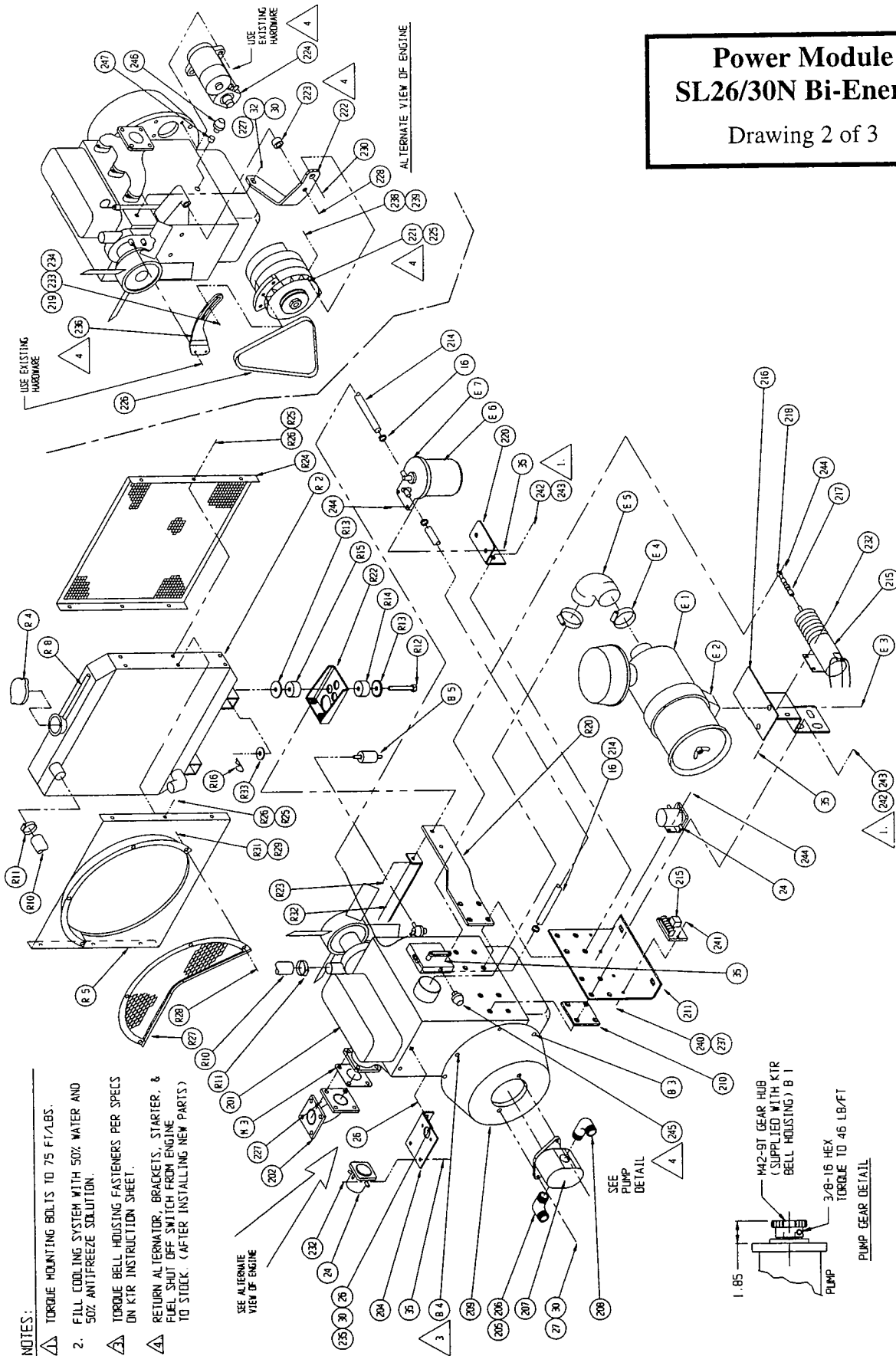
ITEM	PART NO.	DESCRIPTION	QTY.
232	011252-004	SCREW 1/4-20UNC HHC X 1/2	8
233	011238-005	WASHER, 5/16 SPLIT LOCK	1
234	011240-005	WASHER, 5/16 FLAT STD	2
235	067672-010	SCREW HHC M8 X 1.25 X 10MM	2
236	064662-000	BRACKET, ALTERNATOR UPPER	1
237	011248-003	NUT HEX 10-24 ESNA	2
238	02578-000	NUT, 1/2 ESNA	1
239	011240-008	WASHER, 1/2 FLAT STD	1
240	011240-003	WASHER #10 FLAT STD	2
241	011709-010	SCREW 10-24UNC RD HD X 1 1/4	2
242	011240-007	WASHER 7/16 FLAT STD	14
243	063946-030	SCREW HHC M10 X 1.25 X 30MM	16
244	011252-008	SCREW 1/4-20UNC HHC X 1	2
245	064640-001	FUEL SHUTOFF SOLENOID	1
246	063945-001	OIL PRESSURE SWITCH	1
247	03142-001	FITTING	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

Power Module SL26/30N Bi-Energy

Drawing 2 of 3



NOTES:

1. TORQUE MOUNTING BOLTS TO 75 FT/LBS.
2. FILL COOLING SYSTEM WITH 50% WATER AND 50% ANTIFREEZE SOLUTION.
3. TORQUE BELL HOUSING FASTENERS PER SPECS ON KTR INSTRUCTION SHEET.
4. RETURN ALTERNATOR, BRACKETS, STARTER, & FUEL SHUT OFF SWITCH FROM ENGINE TO STOCK (AFTER INSTALLING NEW PARTS)

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**POWER MODULE,
SL26/30N BI-ENERGY**

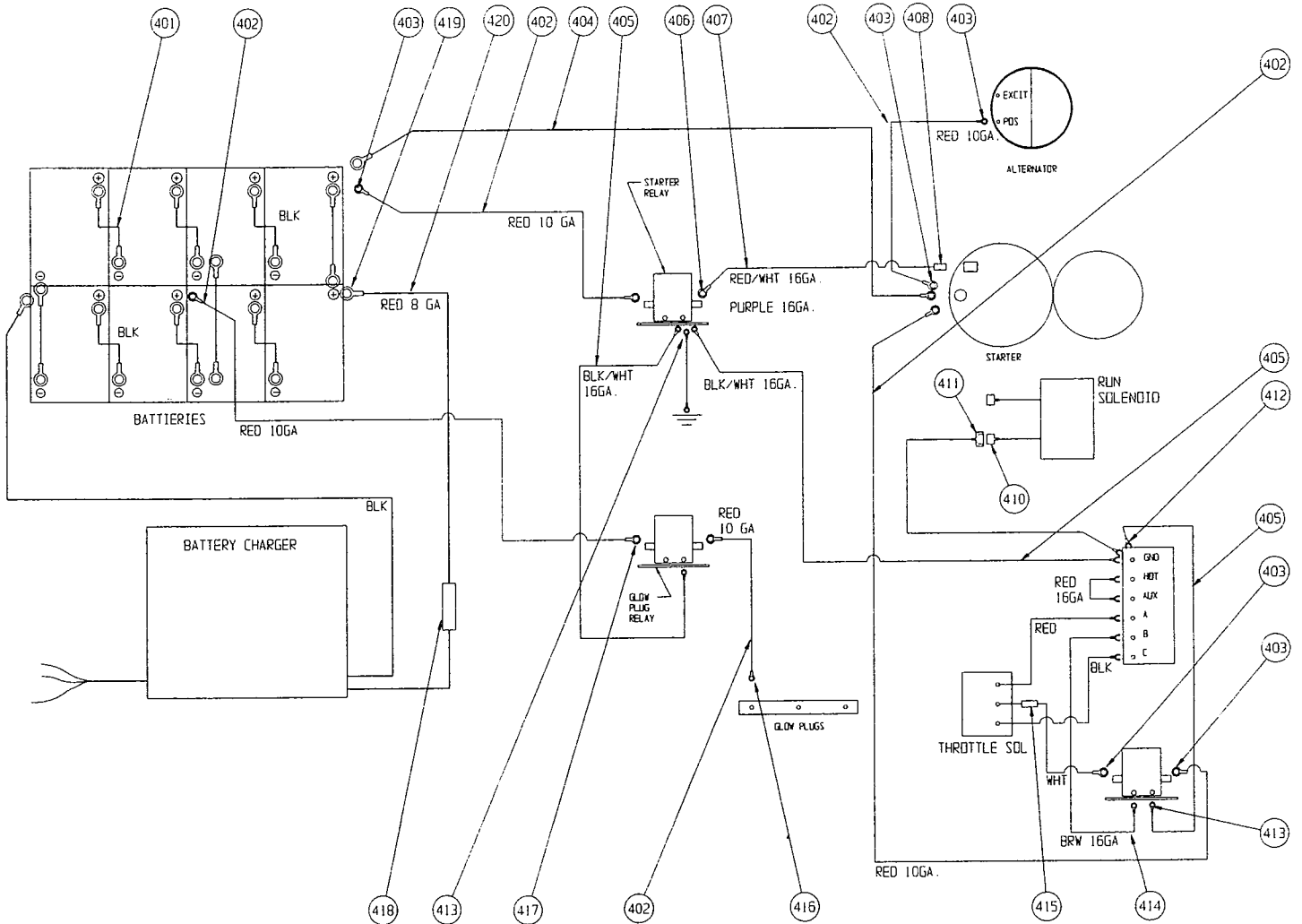
064002-026

ITEM	PART NO.	DESCRIPTION	QTY.
401	064195-009	BATTERY CABLE ASSY X 9	8
402	029480-099	WIRE 10 AWG RED	FT. 18.5
403	029601-039	CONN RING 12-10GA 5/16	9
404	064195-050	BATTERY CABLE ASSY X 50	1
405	063574-099	WIRE 16 AWG BLK/WHT	FT. 6
406	029601-019	CONN RING 12-10 #10	6
407	029616-002	CONN FORK 16-14 1/4	3
408	064207-002	WIRING HARNESS - DIESEL KUBOTA	REF
410	029617-002	CONN PUSH M 16-14GA 1/4	2
411	029931-003	CONN PUSH F 16-14GA 1/4	2
412	029610-002	CONN FORK 16-14GA #8	8
413	029601-013	CONN RING 16-14GA #10	6
414	029455-099	WIRE 16 AWG BROWN	FT. 1
415	029620-002	CONN BUTT 16-14GA	1
416	029601-019	CONN RING 10-12GA #10	6
417	029601-021	CONN RING 10-12GA 3/8 DIA	3
418	029620-004	CONN BUTT 8 GA	1
419	029601-025	CONN RING 8 GA 5/16 DIA	2
420	029484-099	WIRE 8 AWG RED	FT. 2
B 1	-	M42 - 9T GEAR HUB	1
B 2	-	M10 X 1.25 X 30 SOCKET HEAD CAPSCREW	3
B 3	-	M8 X 30	4
B 4	-	M10 X 1.25 X 35	2
B 5	-	INLINE FUEL FILTER	1
B 6	-	OVERFLOW (RADIATOR) BOTTLE	1
B 7	-	OVERFLOW BOTTLE BRACKET	1
B 8	-	SCREW, FLAT HEAD PHILLIPS	2
B 9	-	NUT, HEX	2
E 1	-	AIR CLEANER HOUSING	1
E 2	-	AIR CLEANER SUPPORT CLAMP	1
E 3	-	SCREW, AIR CLEANER HOUSING ANCHOR	2
E 4	-	CLAMP, AIR CLEANER HOSE	2
E 5	-	HOSE, AIR CLEANER	1
E 6	-	FUEL FILTER, SPIN ON TYPE	1
E 7	-	HOUSING, FUEL FILTER	1

ITEM	PART NO.	DESCRIPTION	QTY.
M 1	-	MUFFLER KIT	1
M 2	-	MUFFLER, EXHAUST	1
M 3	-	EXHAUST GASKET	2
M 4	-	MUFFLER CLAMP	1
M 5	-	EXHAUST PIPE	1
R 2	-	RADIATOR	1
R 3	-	DRAIN COCK (NOT SHOWN)	1
R 4	-	RADIATOR CAP	1
R 5	-	FAN SHROUD	1
R 8	-	HOSE, WATER OVERFLOW	1
R 9	-	HOSE, LOWER RADIATOR (NOT SHOWN)	1
R10	-	HOSE, UPPER RADIATOR	1
R11	-	CLAMP, RADIATOR HOSE	4
R12	-	BOLT, RADIATOR MOUNT	2
R13	-	WASHER	4
R14	-	RUBBER MOUNT, LOWER	2
R15	-	RUBBER MOUNT, UPPER	2
R16	-	HAIR CLIP, RADIATOR MOUNT	2
R20	-	RADIATOR SUPPORT RIGHT	1
R21	-	RADIATOR SUPPORT LEFT	1
R22	-	RADIATOR SUPPORT BRACKET	2
R23	-	SCREW, RADIATOR STAY	2
R24	-	SCREEN RADIATOR FRONT	1
R25	-	SCREW	12
R26	-	WASHER	12
R27	-	FAN GUARD	1
R28	-	SCREW (GUARD TO SHROUD)	4
R29	-	NUT	4
R31	-	WASHER - SPLIT LOCK	4
R32	-	RADIATOR STAY BRACE	1
R33	-	WASHER, TOP	2

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Power Module
SL26/30N Bi-Energy**
Drawing 3 of 3

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

CONTROL MODULE SL26/30N BI-ENERGY

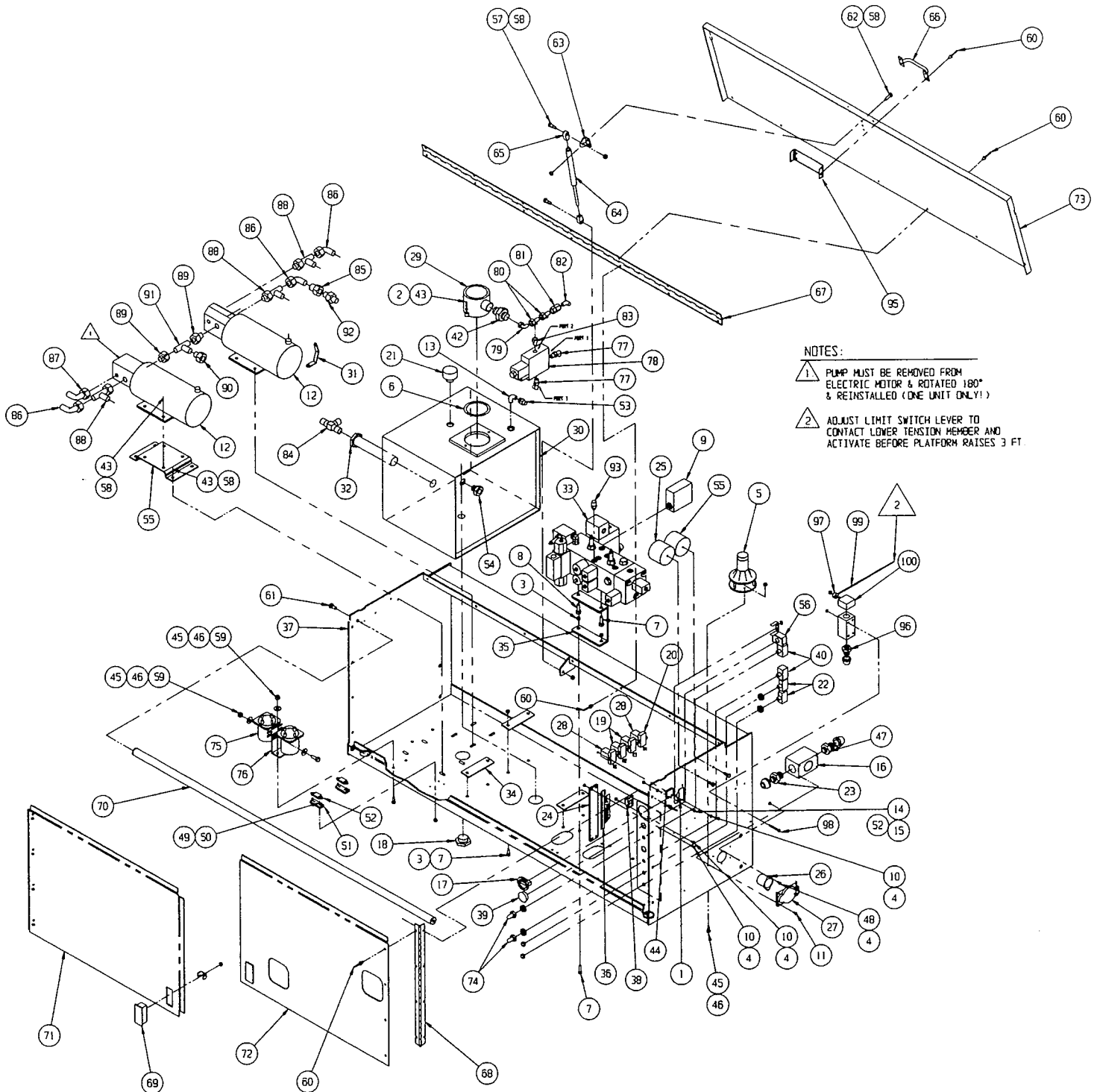
064003-068

ITEM	PART NO.	DESCRIPTION	QTY.
1	05299-000	LATCH, TOGGLE	2
2	011238-005	LOCKWASHER, SPLIT 5/16 DIA	2
3	011248-006	LOCKNUT, HEX 3/8-16 UNC	8
4	011248-047	LOCKNUT, HEX 6-32 UNC	14
5	029945-011	TILT SENSOR	1
6	063962-001	BACKUP RING	1
7	011254-008	SCREW, HHC 3/8-16 UNC X 1	9
8	011254-010	SCREW, HHC 3/8-16 UNC X 1 1/4	1
9	064670-000	VALVE, CHECK ASSY	1
10	011715-006	SCREW, RH 6-32 UNC X 3/4	12
11	011715-008	SCREW, RH 6-32 UNC X 1	10
12	015797-000	POWER UNIT	2
13	011940-006	FITTING ADAPTER	1
14	011708-006	MACH SCREW, RD HD 8-32 UNC X 3/4	4
15	011248-002	LOCKNUT, HEX 8-32 UNC	4
16	015915-000	BOX, ELECTRICAL, BELL	1
17	015752-000	HOUR METER	1
18	021305-006	MAGNET PLUG	1
19	027962-001	RELAY 2-POLE 24V	2
20	027963-000	SOCKET	4
21	063930-001	CAP, FILLER / VENT	1
22	029868-007	CIRCUIT BREAKER, 15 AMP	2
23	029925-001	CONNECTOR, CABLE	1
24	029928-000	TERMINAL BLOCK	1
25	066807-001	ALARM 600 Hz (TILT)	1
26	029961-000	INLET FLANGE	1
27	029962-000	ELEC BOX COVER	1
28	027962-002	RELAY 3-POLE 24V	2
29	063919-001	FILTER HYD	1
30	064642-000	TANK, HYDRAULIC	1
31	063029-000	BUSS BAR	1
32	063935-000	SUCTION SCREEN	1
33	064004-017	CONTROL VALVE ASSY	1
34	064039-000	FUEL TANK MOUNTING TAB	3
35	064045-000	MOUNT - MANIFOLD	1
36	064056-014	FANNING STRIP ASSY SL26/30	1
37	064721-000	CONTROL MODULE WELDMENT	1
38	029928-009	TERMINAL BLOCK 2-141	1
39	063968-001	PUSH BUTTON	1
40	012798-001	SWITCH, TOGGLE	2
41	015793-007	SWITCH BODY	1
42	011939-019	FITTING ADAPTER	1
43	014334-008	SCREW, SOC HD 5/16-18 UNC X 1	14

ITEM	PART NO.	DESCRIPTION	QTY.
44	064754-000	SPACER	2
45	011252-006	SCREW, HHC 1/4-20 UNC X 3/4	8
46	011248-004	LOCKNUT, HEX 1/4-20 UNC	8
47	029925-011	CONNECTOR, CABLE	1
48	011715-004	SCREW, RD HD 6-32 UNC X 1/2	2
49	011248-003	LOCKNUT, HEX 10-24 UNC	6
50	011709-008	SCREW, RD HD 10-24 UNC X 1	4
51	010149-000	FUSE BLOCK	2
52	010148-001	FUSE, 175 AMP	2
53	020733-002	FITTING ADAPTER TEE	1
54	063979-006	SIGHT GLASS	1
55	064656-000	MOUNT, POWER UNIT	1
56	063968-002	CONTACT BLOCK	1
57	015936-004	SCREW, SHOULDER 3/8 X 1/2	2
58	011248-005	LOCKNUT, HEX 5/16-UNC	16
59	011240-004	WASHER, 1/4 STD FLAT	6
60	026554-002	RIVET, POP 1/4 DIA (.251-.375 GRIP)	34
61	011254-006	SCREW, HHC 3/8-16 UNC X 3/4	2
62	011253-008	SCREW, HHC 5/16-18 UNC X 1	2
63	067902-000	BRACKET, GAS SPRING	1
64	063650-012	GAS SPRING	1
65	067648-008	END FITTING, GAS SPRING	2
66	025427-002	HANDLE	1
67	064731-000	HINGE, MODULE COVER	1
68	064730-000	HINGE, DOOR	2
69	067629-000	LATCH, FLUSH	2
70	064725-000	STIFFENER BAR WELDMENT	1
71	064734-000	DOOR, LEFT	1
72	064735-000	DOOR, RIGHT	1
73	064732-000	COVER, CONTROL MODULE	1
74	029872-000	BOOT, SWITCH	2
75	010122-000	STARTER RELAY	2
76	064194-000	BRACKET, STARTER	1
77	011934-003	FITTING, 90° ELBOW	2
78	063923-003	VALVE, SOLENOID	1
79	011937-004	FITTING, 90° ELBOW	1
80	020733-003	FITTING, TEE	2
81	014048-002	FITTING, STRAIGHT	1
82	011940-008	FITTING, 90° ELBOW	1
83	064170-004	FITTING, STRAIGHT	1
84	011928-011	FITTING ADAPTOR TEE 16MP-16MJ	1
85	014048-003	FITTING ADAPTOR 8FP-6FJ	1
86	011937-003	FITTING ADAPTOR EL 6FJ-6MJ	3

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



NOTES:

- 1 PUMP MUST BE REMOVED FROM ELECTRIC MOTOR & ROTATED 180° & REINSTALLED (ONE UNIT ONLY!)
- 2 ADJUST LIMIT SWITCH LEVER TO CONTACT LOWER TENSION MEMBER AND ACTIVATE BEFORE PLATFORM RAISES 3 FT.

Control Module SL26/30N Bi-Energy

Drawing 1 of 2

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**CONTROL MODULE,
SL26/30N BI-ENERGY**

064003-068

ITEM	PART NO.	DESCRIPTION	QTY.
87	011934-004	FITTING ADAPTOR EL 6MB-6MJ	1
88	015961-006	FITTING ADAPTOR TEE 6MB-6MJ	1
89	015959-004	FITTING ADAPTOR 16FP-8MJ	2
90	011939-022	FITTING ADAPTOR STR 12MJ-16MP	1
91	015960-006	FITTING ADAPTOR TEE, 12MP-12MP-12FP	1
92	011939-015	FITTING ADAPTOR, 8MP-8MJ	1
93	063965-001	CONNECTOR, GAGE PORT	1
94	066807-003	ALARM 60 Hz (LOWER/MOTION)	1
95	064798-000	DOOR BRACKET	1
96	029925-000	CONNECTOR, CABLE	1
97	015793-003	LEVER	1
98	011709-016	SCREW, MACH RDHD 10-24 UNC X 2	2
99	019000-099	ROD, 1/8 DIA	1
100	015793-002	SWITCH HEAD	1
201	029452-099	WIRE 16 AWG THHN STRD COP BLACK	FT 6
202	029455-099	WIRE 16 AWG THHN STRD COP BRN	FT 3
203	029450-099	WIRE 16 AWG THHN STRD COP BLU	FT 3
204	029451-099	WIRE 16 AWG THHN STRD COP WHT	FT 5
205	029453-099	WIRE 16 AWG THHN STRD COP ORG	FT 5
206	029456-099	WIRE 16 AWG THHN STRD COP YEL	FT 5
207	029454-099	WIRE 16 AWG THHN STRD COP RED	FT 5
208	029457-099	WIRE 16 AWG THHN STRD COP GRN	FT 5
209	029458-099	WIRE 16 AWG THHN STRD COP VIO	FT 4
210	029478-099	WIRE 16 AWG THHN STRD COP RED/BLK	FT 4
211	029620-002	CONN BUTT 16-14	13
212	029610-002	CONN FORK 16-14 #8	51
213	029932-002	TERMINAL JUMPER	2
214	029931-003	CONN FEMALE PUSH 16-14 1/4	6

ITEM	PART NO.	DESCRIPTION	QTY.
215	029477-099	WIRE 16 AWG THHN STRD COP ORG/BLK	FT 4
216	029483-099	WIRE 16 AWG THHN STRD COP RED/WHT	FT 3
217	029601-013	CONN RING 16-14 #10	6
218	029825-002	DIODE	2
219	029601-014	CONN RING 16-14 1/4 DIA	9
220	029475-099	WIRE 16 AWG THHN STRD COP BLU/BLK	FT 3
221	029496-099	WIRE 16 AWG 2-COND.	FT 6
222	029476-099	WIRE 16 AWG THHN COP YEL/BLK	FT 4
223	029479-099	WIRE 16 AWG THHN COP WHT/BLK	FT 4
224	029459-099	WIRE 16 AWG THHN COP BLU/WHT	FT 4
225	029482-099	WIRE 16 AWG THHN COP GRN/WHT	FT 4
226	05491-099	WIRE 16 AWG THHN COP GRN/BLK	FT 4
228	064195-006	CABLE ASSY 6"	1
229	064195-009	CABLE ASSY 9"	1
230	05416-006	CABLE ASSY 15"	1
231	064195-020	CABLE ASSY 20"	1

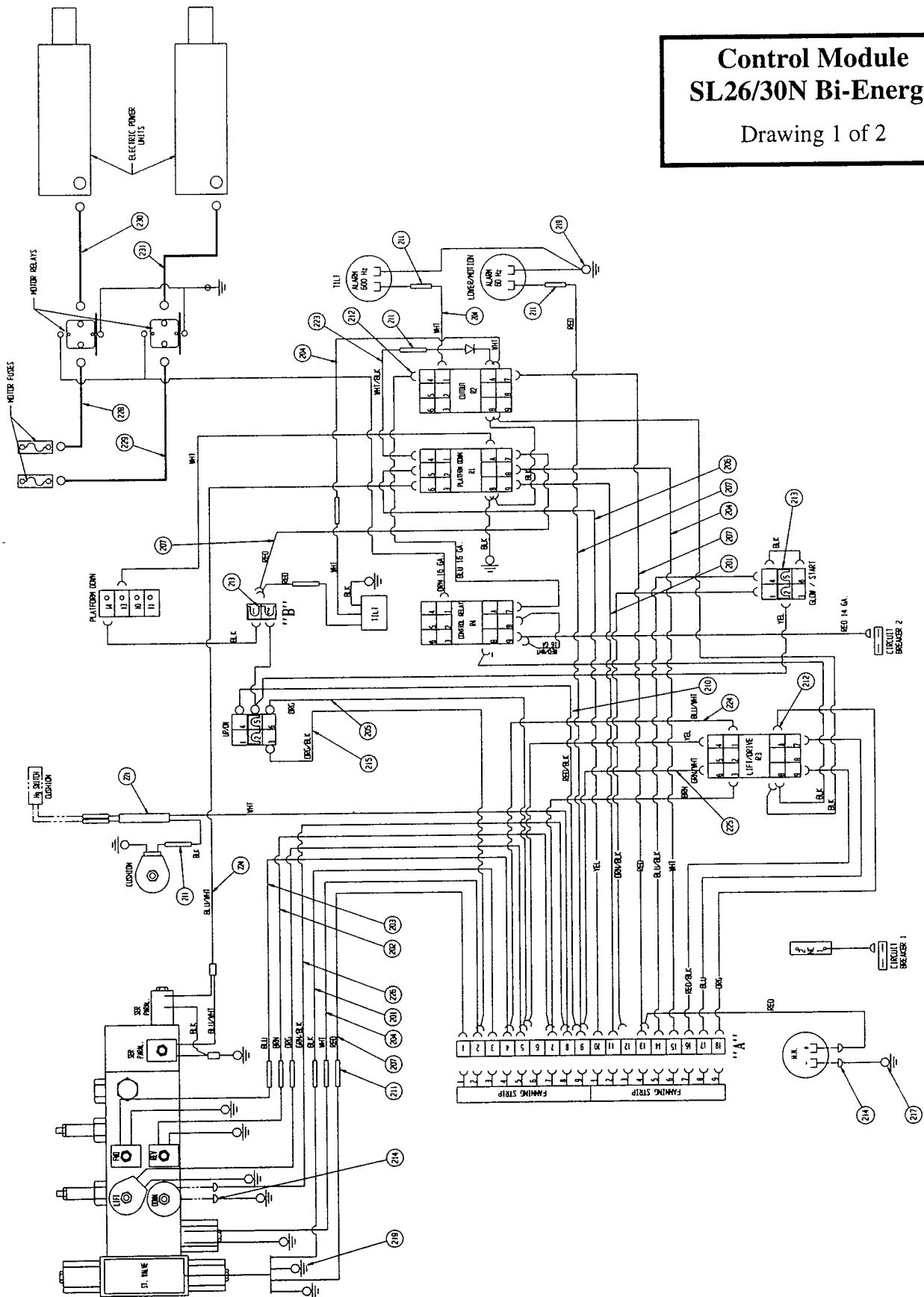
Continued from previous page

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

Control Module SL26/30N Bi-Energy

Drawing 1 of 2



Section
6.1

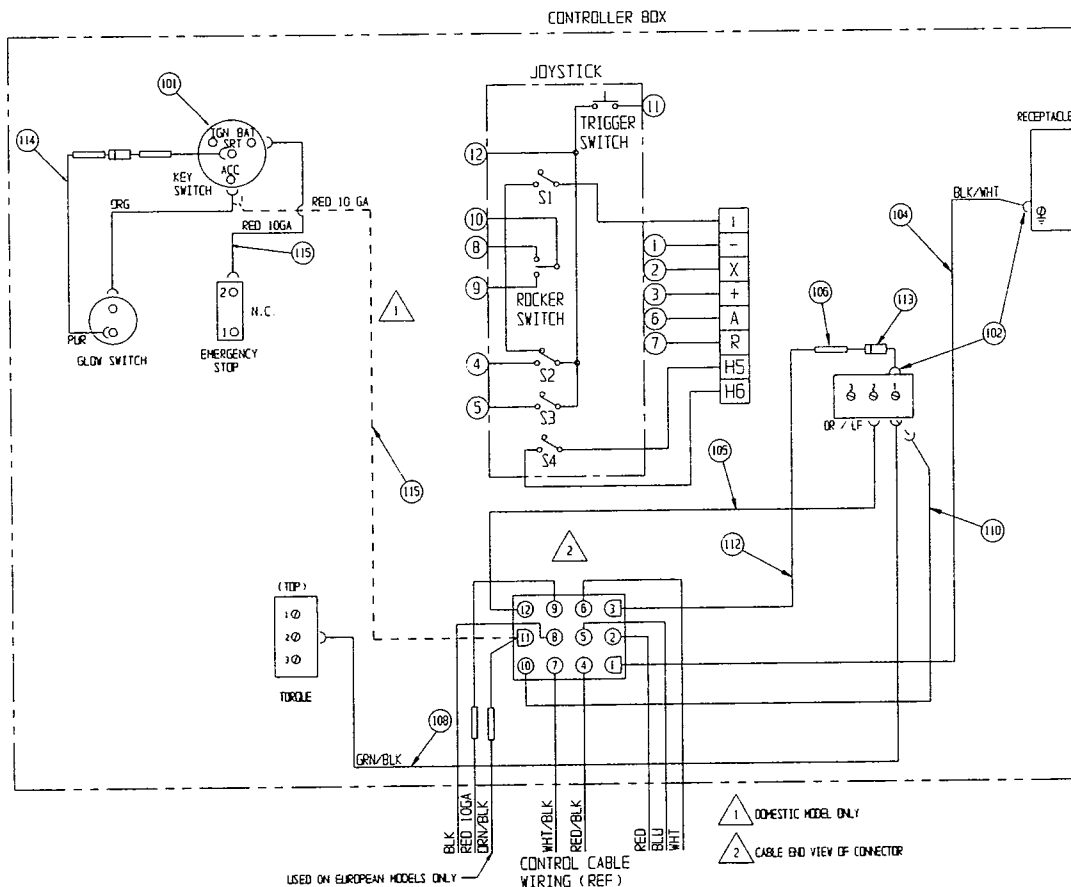
ILLUSTRATED PARTS BREAKDOWN

CONTROLLER ASSEMBLY, SL26/30N BI-ENERGY

064411-029

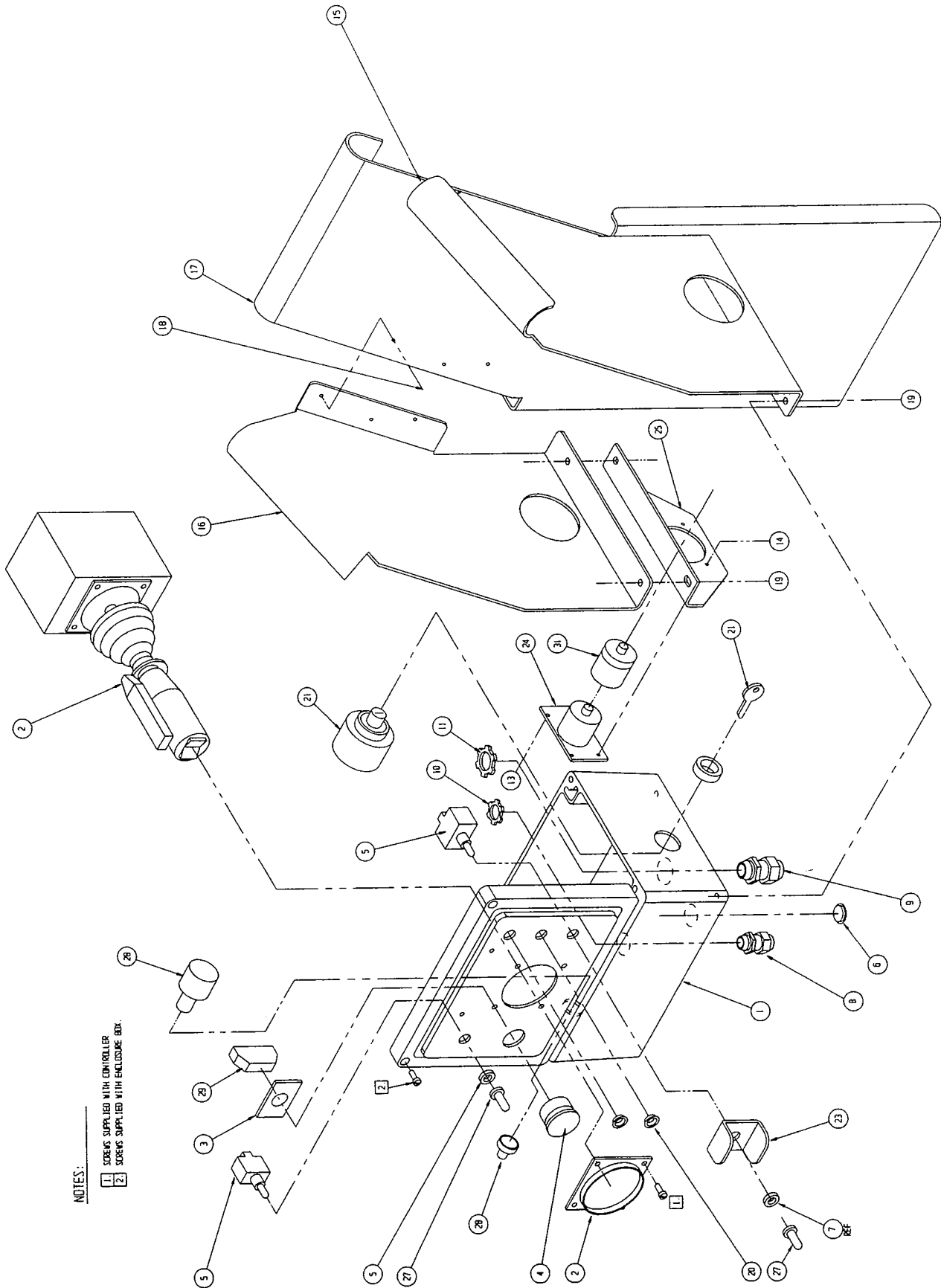
ITEM	PART NO.	DESCRIPTION	QTY.
1	063368-003	ENCLOSURE BOX	1
2	066786-000	CONTROLLER, PROPORTIONAL 24V	1
3	064417-001	MOUNTING LATCH	1
4	064446-003	EMERGENCY STOP PUSH BUTTON	1
5	012797-000	SWITCH SPDT	2
6	064462-007	CAPLUG, 7/8 DIA.	1
8	029925-000	CABLE CONNECTOR 1/2"	1
9	029925-011	CABLE CONNECTOR 3/4"	1
10	029939-002	CONDUIT NUT - 1/2"	1
11	029939-003	CONDUIT NUT - 3/4"	1
13	011715-006	SCREW, RD HD 6-32UNC X 3/4	4
14	011248-047	LOCKNUT 6-32 UNC	4
15	066095-001	HANGER, RH	1
16	066094-001	HANGER, LH	1
17	067889-000	HANGER, REAR PLATE	1
18	026551-007	RIVET 1/8 DIA. X 1/4-5/16 GRIP	6
19	011253-004	SCREW, HHC 5/16-18UNC X 1/2	4
20	064462-002	CAPLUG 1/2 DIA.	2
21	064666-000	KEY SWITCH, W/ LOCKOUT	1

ITEM	PART NO.	DESCRIPTION	QTY.
22	063956-003	CONN 12 PIN	1
23	08271-000	SWITCH GUARD	1
24	08942-001	OUTLET, HUBBELL	1
25	064520-000	110 POWER BRACKET	1
26	063956-010	CONN PIN MALE	12
27	029872-000	BOOT, SWITCH	2
28	063917-000	SWITCH, GLOW PLUG	1
29	064443-002	CONTACT BLOCK N.C.	1
31	029961-001	SEAL, INLET PLUG	1
101	029610-004	CONNECTOR FORK TERM 12-10 GA. #10	3
102	029610-002	CONNECTOR FORK TERM 16-14 GA. #8	10
104	063574-099	WIRE 16 GA. BLACK/WHITE	FT 1
105	029450-099	WIRE 16 GA. BLUE	FT 3
106	029620-002	CONNECTOR, BUTT 16-14 GA.	3
108	05491-099	WIRE 16 GA. GREEN/BLACK	FT 1
110	029454-099	WIRE 16 GA. RED	FT 1
112	029401-099	WIRE 16 GA. YELLOW	FT 1
113	029825-002	DIODE	2
115	029480-099	WIRE 10 GA. RED	FT 1



ILLUSTRATED PARTS BREAKDOWN

Section 6.1



NOTES:
1. SCREWS SUPPLIED WITH CONTROLLER.
2. SCREWS SUPPLIED WITH ENCLOSURE BOX.

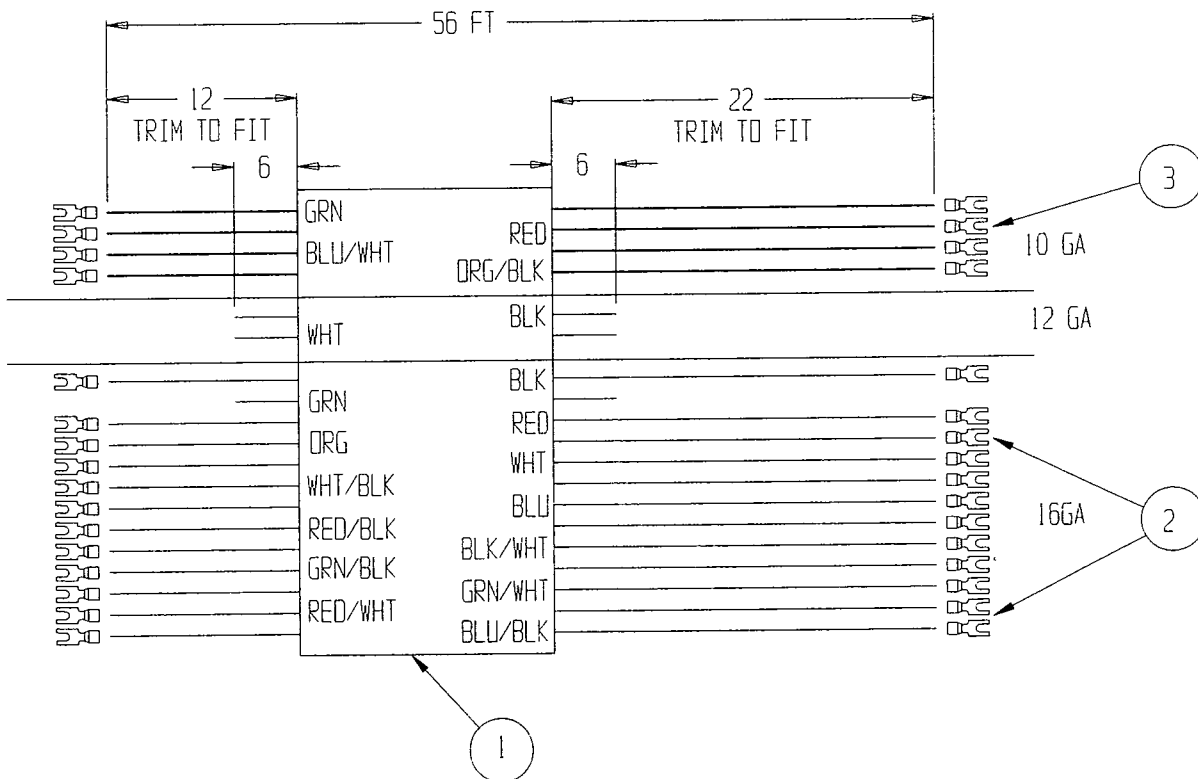
**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

CONTROL CABLE ASSEMBLY, SL26/30N BI-ENERGY

064007-010

ITEM	PART NO.	DESCRIPTION	QTY.
1	064253-099	WIRE CABLE	56 FT
2	029610-002	CONN FORK 16-14 #8	24
3	029610-003	CONN FORK 12-10 #6	8



ILLUSTRATED PARTS BREAKDOWN

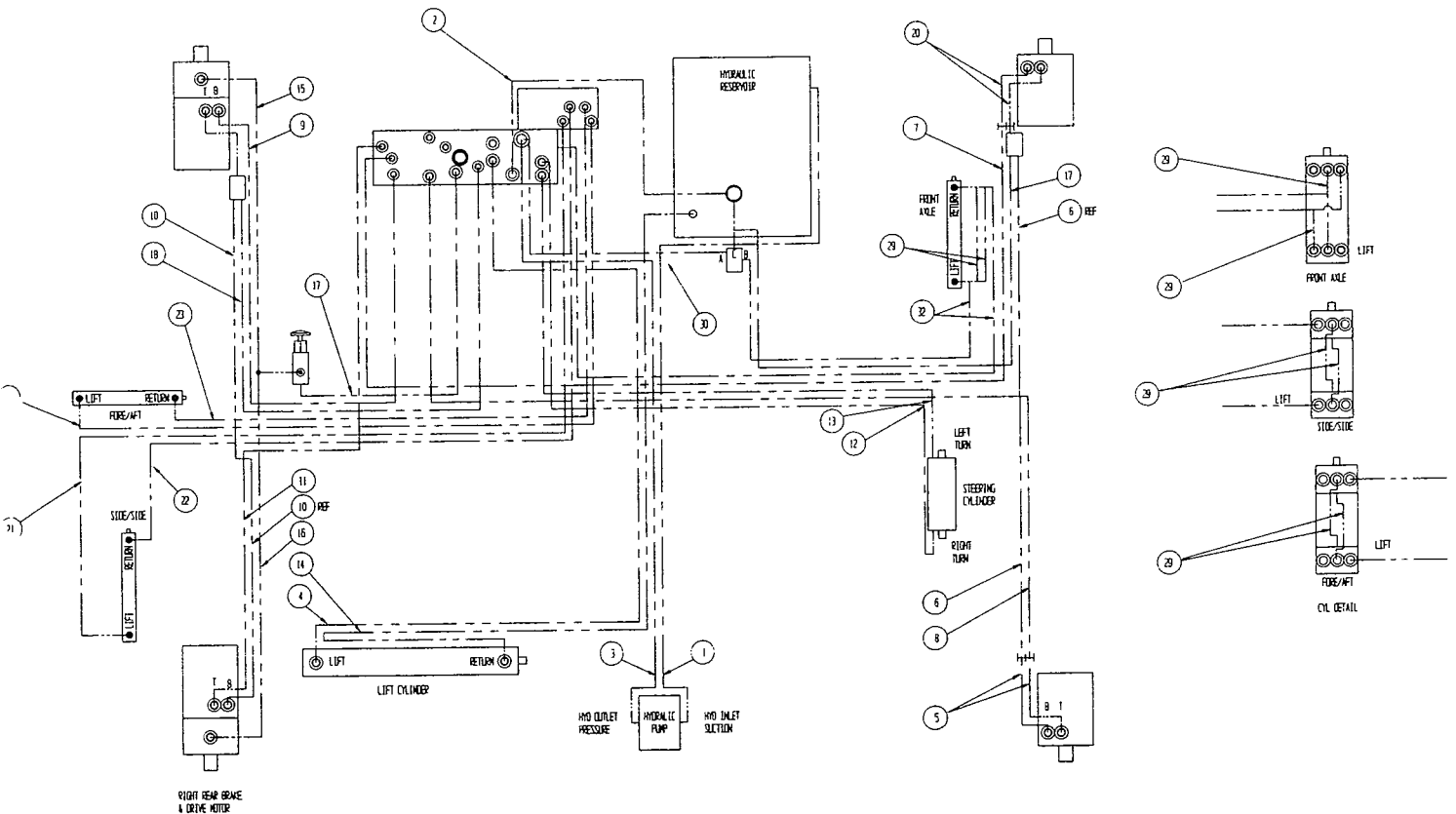
Section 6.1

HOSE KIT INSTALLATION, SL26/30N BI-ENERGY

064008-005

ITEM	PART NO.	DESCRIPTION	QTY.
1	064157-006	HOSE ASSY X 41 D/F	1
2	064156-002	HOSE ASSY X 23	1
3	064156-019	HOSE ASSY X 67 D/F	1
4	064156-028	HOSE ASSY X 63	1
5	064156-032	HOSE ASSY X 30	2
6	064156-021	HOSE ASSY X 42	1
7	064156-022	HOSE ASSY X 54	1
8	064156-023	HOSE ASSY X 78	1
9	064156-024	HOSE ASSY X 52	1
10	064156-019	HOSE ASSY X 67	1
11	064156-025	HOSE ASSY X 75	1
12	061131-010	HOSE ASSY X 83 1/2	1
13	061131-007	HOSE ASSY X 64	1
14	061132-007	HOSE ASSY X 103	1

ITEM	PART NO.	DESCRIPTION	QTY.
15	061351-022	HOSE ASSY X 30	1
16	061351-006	HOSE ASSY X 53	1
17	061351-008	HOSE ASSY X 41	2
18	061351-015	HOSE ASSY X 56	1
20	064156-017	HOSE ASSY X 33	2
21	060460-008	HOSE ASSY X 84	1
22	060460-009	HOSE ASSY X 90	1
23	060460-010	HOSE ASSY X 93	1
24	060460-011	HOSE ASSY X 89	1
29	061351-016	HOSE ASSY 1/8 SYNFLX X 8	6
30	061351-018	HOSE ASSY X 16	1
32	060460-012	HOSE ASSY X 66	2



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**PLATFORM/GUARDRAIL INSTALLATION,
SL26N BI-ENERGY**

064678-001

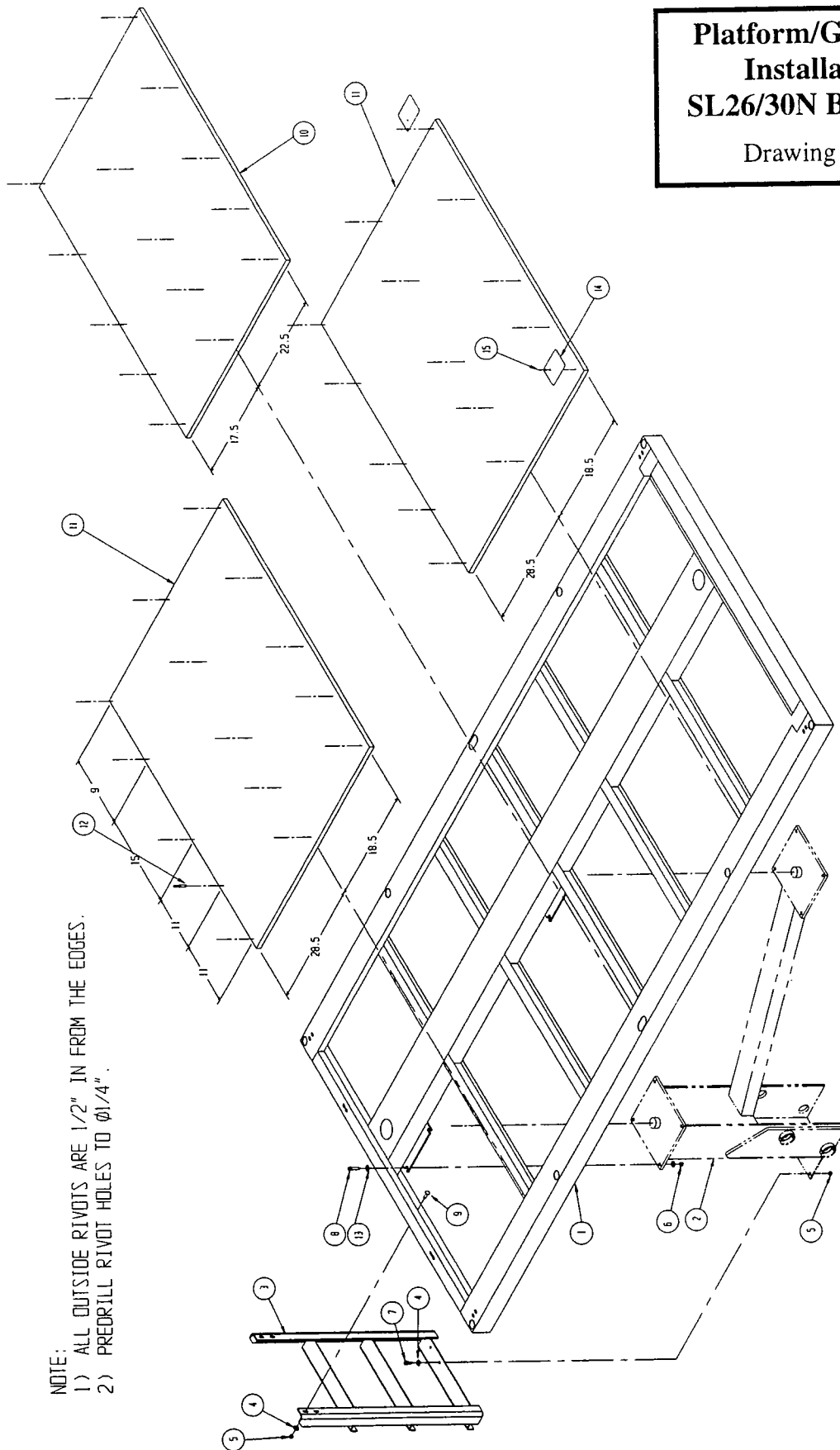
ITEM	PART NO.	DESCRIPTION	QTY.
1	064100-010	DECK WELDMENT	1
2	REF	PEDESTAL WELDMENT	REF
3	064119-000	LADDER WELDMENT	1
4	011240-006	WASHER STD FLAT 3/8 DIA	6
5	011248-006	NUT HEX ESNA 3/8-16 UNC	6
6	011248-008	NUT HEX ESNA 1/2-16 UNC	8
7	011254-010	SCREW HHC GR5 3/8-16 UNC X 1 1/4	2
8	011256-016	SCREW HHC GR5 1/2-13 UNC X 2	8
9	011831-008	BOLT CARRGE 3/8-16 UNC X 1	4
10	026505-016	PLYWOOD 3/4 A/C EXT 41 X 48	1
11	026505-015	PLYWOOD 3/4 A/C EXT 48 X 48	2
12	026554-006	RVT POP 1/4 DIA .751-.875 GRIP	43
13	011240-008	WASHER STD FLAT 1/2 DIA	16
14	064424-000	COVER PLATE	2
15	026526-006	SCREW SLFTP #10 AB SLOT HD X 3/4	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

Platform/Guardrail Installation, SL26/30N Bi-Energy

Drawing 1 of 2



NOTE:
1) ALL OUTSIDE RIVOTS ARE 1/2" IN FROM THE EDGES.
2) PREDRILL RIVOT HOLES TO $\phi 1/4"$.

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

PLATFORM/GUARDRAIL INSTALLATION, SL26N BI-ENERGY

064678-001

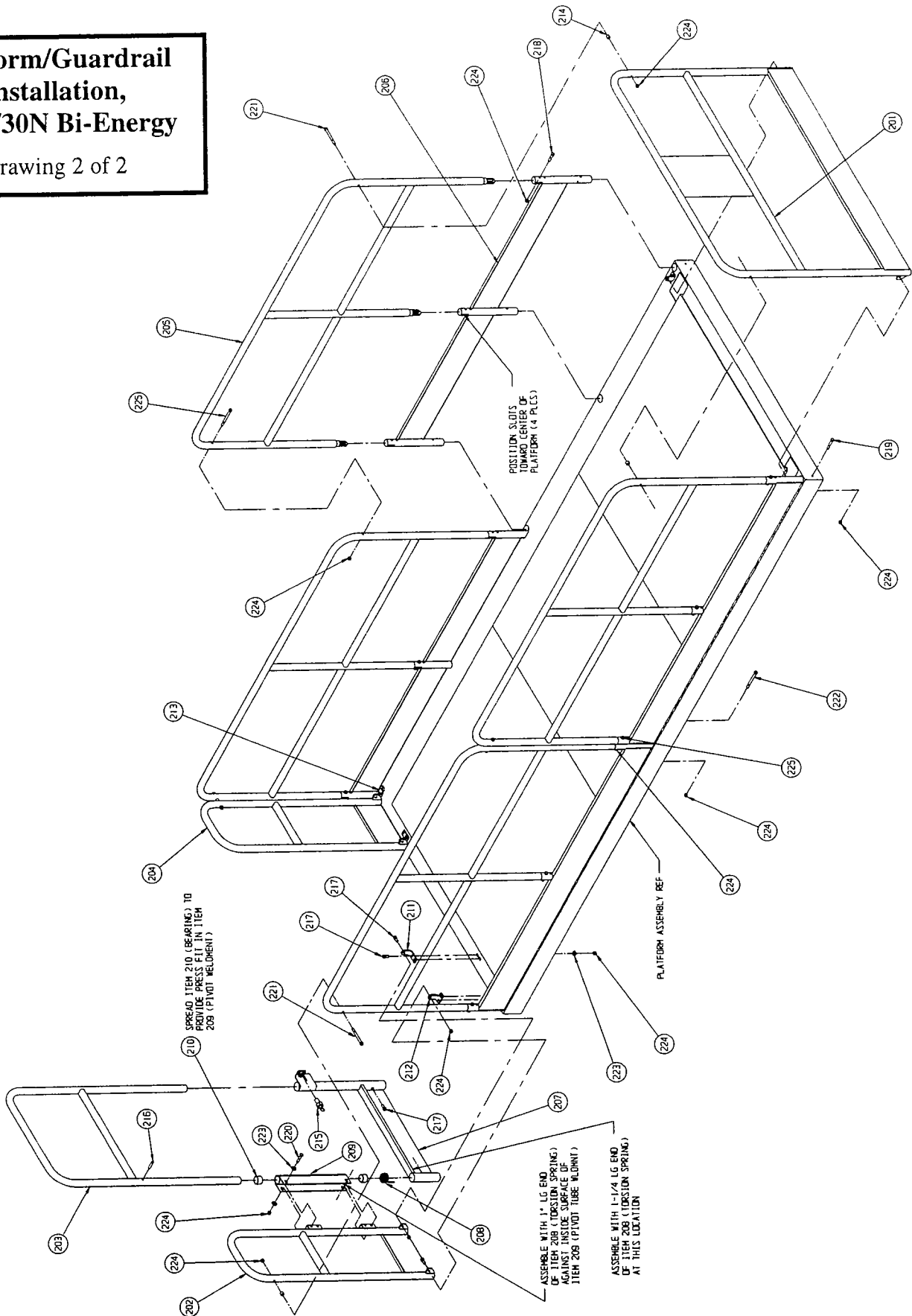
ITEM	PART NO.	DESCRIPTION	QTY.
201	064699-000	END RAIL WELDMENT, NARROW	1
202	064701-001	REAR GUARDRAIL WELDMENT, R.H.	1
203	067883-000	GATE WELDMENT	1
204	064701-002	REAR GUARDRAIL WELDMENT, L.H.	1
205	064697-000	GUARDRAIL WELDMENT, SL26	4
206	064695-000	KICK RAIL WELDMENT, SL26	4
207	067764-001	GATE KICK RAIL WELDMENT	1
208	066526-002	TORSION SPRING	1
209	067712-000	PIVOT TUBE WELDMENT	1
210	062642-026	BEARING	2
211	064046-000	RAIL MOUNTING BRACKET	2
212	064688-002	BRACKET, TOEBOARD PIVOT, L.H.	2
213	064688-001	BRACKET, TOEBOARD PIVOT, R.H.	2
214	067695-000	SPACER	4
215	003570-000	RETAINING PIN ASSEMBLY	1
216	011739-014	ROLLPIN, 3/8 DIA X 1 3/4	1
217	011254-010	SCREW, 3/8-16 HHC X 1 1/4	19
218	011254-016	SCREW, 3/8-16 HHC X 2	8
219	011254-018	SCREW, 3/8-16 HHC X 2 1/4	8
220	011254-022	SCREW, 3/8-16 HHC X 2 3/4	2
221	011254-032	SCREW, 3/8-16 HHC X 4	4
222	011254-030	SCREW, 3/8-16 HHC X 3 3/4	2
223	011240-006	WASHER, 3/8 STD FLAT	16
224	011248-006	NUT, 3/8-16 HEX, ESNA	47
225	011254-028	SCREW, 3/8-16 HHC X 3 1/2	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

Platform/Guardrail Installation, SL26/30N Bi-Energy

Drawing 2 of 2



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

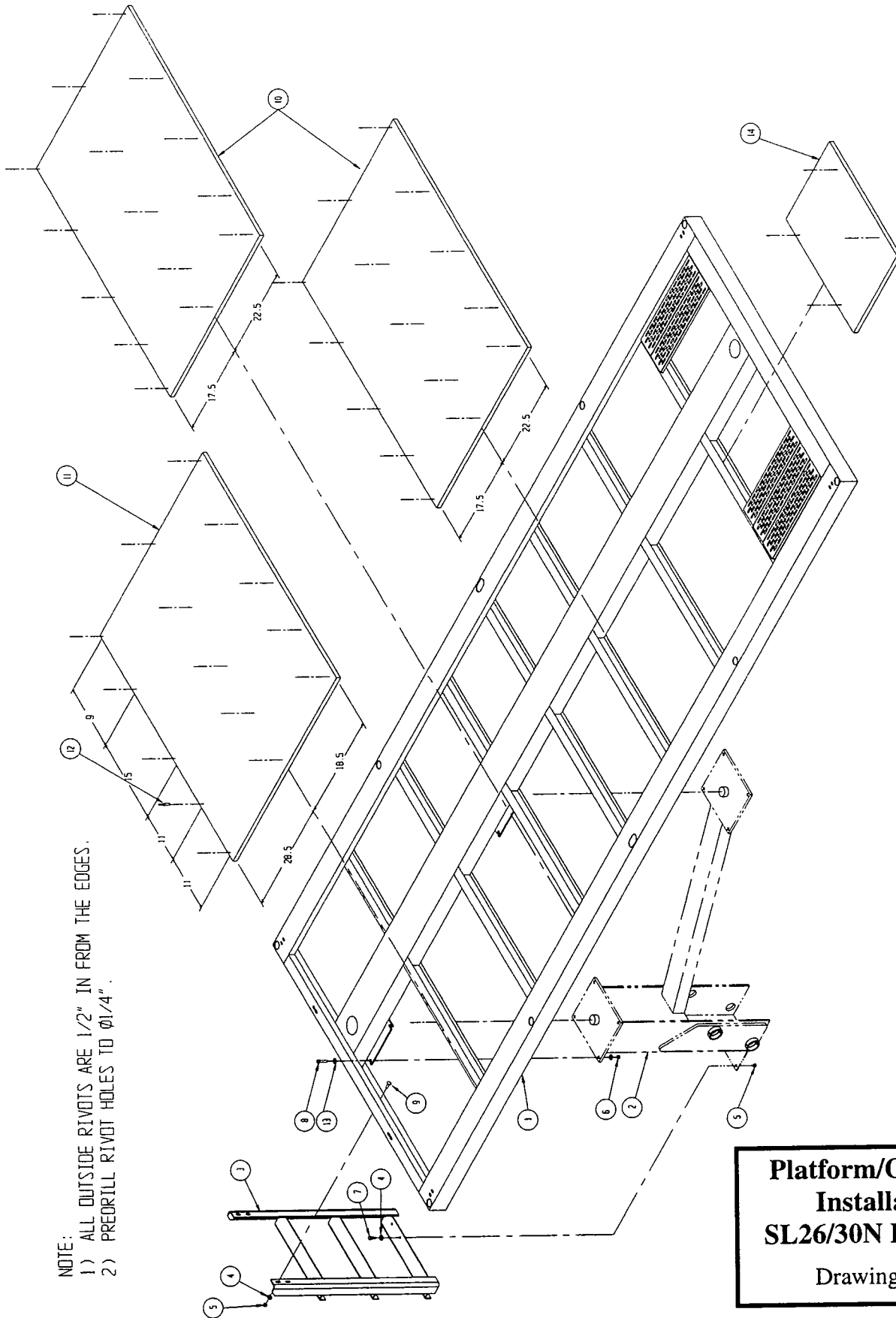
**PLATFORM/GUARDRAIL INSTALLATION,
SL30N BI-ENERGY**

064678-002

ITEM	PART NO.	DESCRIPTION	QTY.
1	064540-010	DECK WELDMENT	1
2	REF	PEDESTAL WELDMENT	REF
3	064119-000	LADDER WELDMENT	1
4	011240-006	WASHER STD FLAT 3/8 DIA	6
5	011248-006	NUT HEX ESNA 3/8-16 UNC	6
6	011248-008	NUT HEX ESNA 1/2-16 UNC	8
7	011254-010	SCREW HHC GR5 3/8-16 UNC X 1 1/4	2
8	011256-016	SCREW HHC GR5 1/2-13 UNC X 2	8
9	011831-008	BOLT CARRGE 3/8-16 UNC X 1	4
10	026505-016	PLYWOOD 3/4 A/C EXT 41 X 48	2
11	026505-016	PLYWOOD 3/4 A/C EXT 48 X 48	1
12	026554-006	RVT POP 1/4 DIA .751-.875 GRIP	49
13	011240-008	WASHER STD FLAT 1/2 DIA	16
14	026505-017	PLYWOOD 3/4 A/C EXT 18 X 31	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Platform/Guardrail
Installation,
SL26/30N Bi-Energy**
Drawing 1 of 2

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

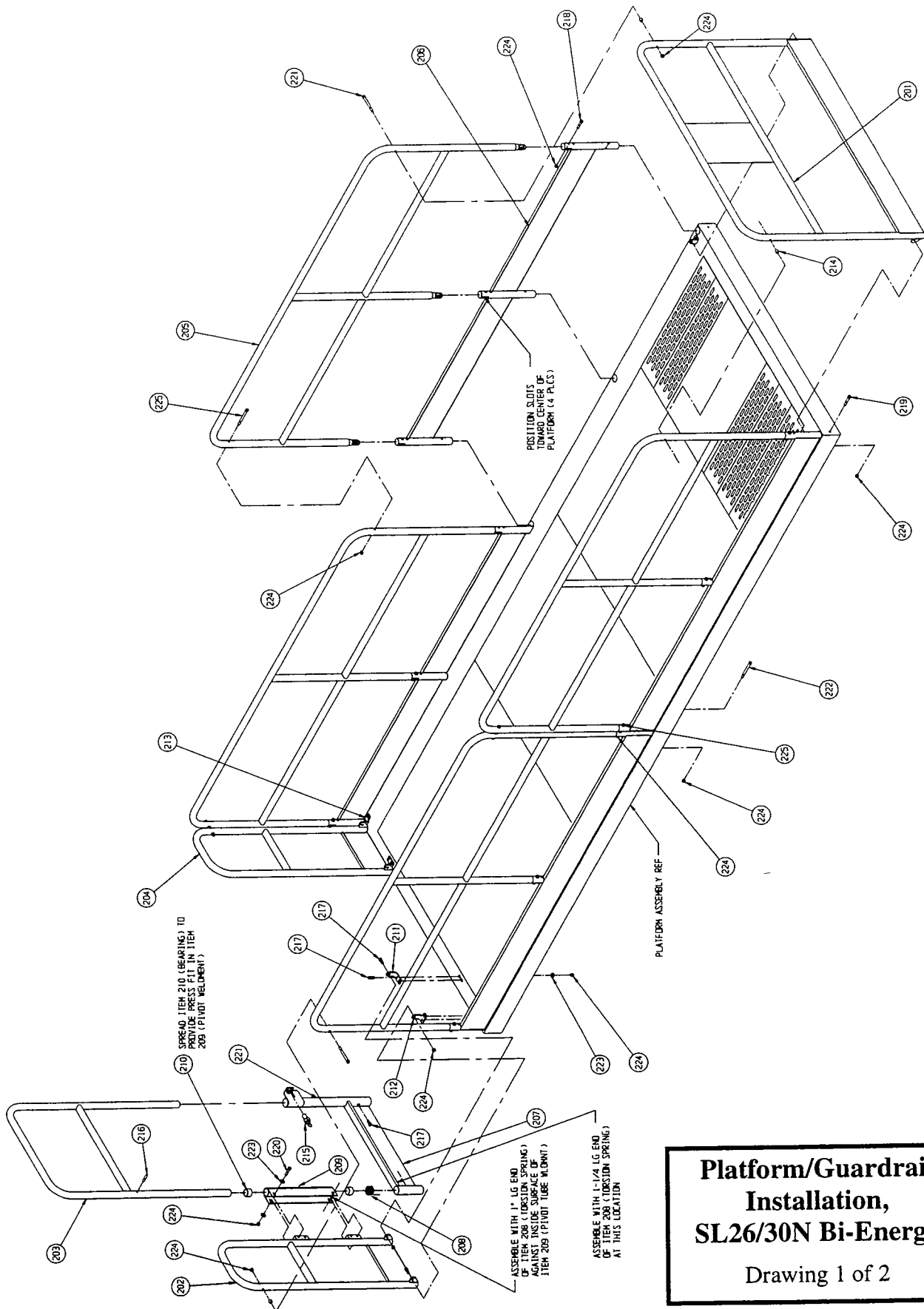
**PLATFORM/GUARDRAIL INSTALLATION,
SL30N BI-ENERGY**

064678-002

ITEM	PART NO.	DESCRIPTION	QTY.
201	064699-000	END RAIL WELDMENT, NARROW	1
202	064701-001	REAR GUARDRAIL WELDMENT, R.H.	1
203	067883-000	GATE WELDMENT	1
204	064701-002	REAR GUARDRAIL WELDMENT, L.H.	1
205	064698-000	GUARDRAIL WELDMENT, SL30	4
206	064696-000	KICK RAIL WELDMENT, SL30	4
207	067764-001	GATE KICK RAIL WELDMENT	1
208	066526-002	TORSION SPRING	1
209	067712-000	PIVOT TUBE WELDMENT	1
210	062642-026	BEARING	2
211	064046-000	RAIL MOUNTING BRACKET	2
212	064688-002	BRACKET, TOEBOARD PIVOT, L.H.	2
213	064688-001	BRACKET, TOEBOARD PIVOT, R.H.	2
214	067695-000	SPACER	4
215	03570-000	RETAINING PIN ASSEMBLY	1
216	011739-014	ROLLPIN, 3/8 DIA X 1-3/4 LG	1
217	011254-010	SCREW, 3/8-16 HHC X 1 1/4	19
218	011254-016	SCREW, 3/8-16 HHC X 2	8
219	011254-018	SCREW, 3/8-16 HHC X 2-1/4 LG	8
220	011254-022	SCREW, 3/8-16 HHC X 2 3/4	2
221	011254-032	SCREW, 3/8-16 HHC X 4 LG	4
222	011254-030	SCREW, 3/8-16 HHC X 3 3/4	2
223	011240-006	WASHER, 3/8 STD FLAT	16
224	011248-006	NUT, 3/8-16 HEX, ESNA	47
225	011254-028	SCREW, 3/8-16 HHC X 3 1/2	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



Platform/Guardrail Installation, SL26/30N Bi-Energy
Drawing 1 of 2

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

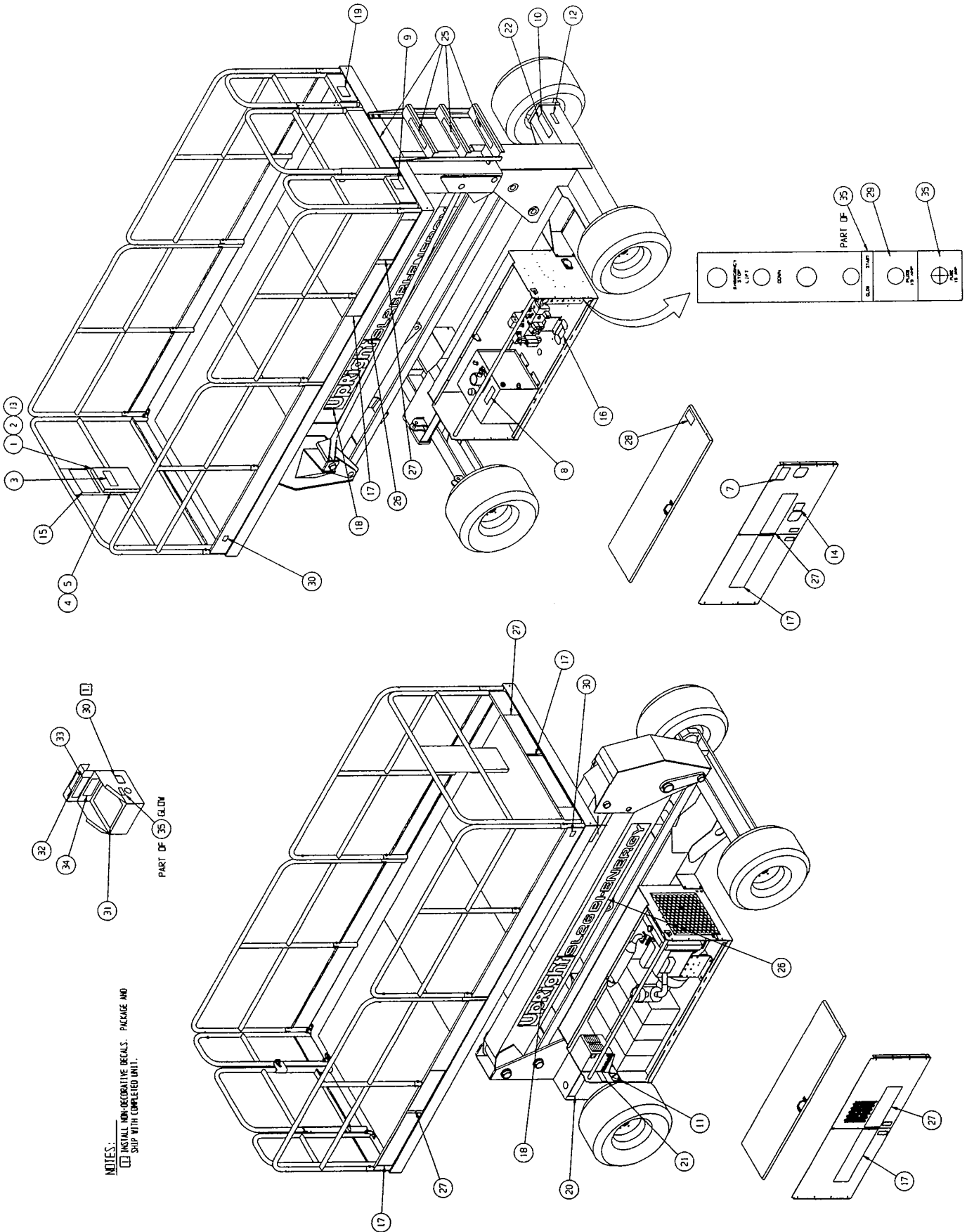
**LABEL KIT,
SL26N BI-ENERGY**

064006-092

ITEM	PART NO.	DESCRIPTION	QTY.
1	064672-001	MANUAL, USER, SL26/30N BI-ENERGY	1
2	010076-000	MANUAL CASE	1
3	010076-001	LABEL - SAFETY RULES	1
4	011248-004	LOCKNUT 1/4-20 UNC HEX	2
5	011252-008	SCREW 1/4-20 UNC HHC X 1	2
7	066568-000	LABEL - LOWER PLATFORM	1
8	060197-000	LABEL - HYDRAULIC FLUID	1
9	066557-006	LABEL - LOAD 1250 LBS	1
10	061205-000	LABEL - NAME PLATE	1
11	066552-000	LABEL - DANGER HYDROGEN GAS	1
12	061220-001	LABEL - ANSI REQUIREMENT	1
13	060577-000	ANSI MANUAL	1
14	062524-001	LABEL - EMERGENCY LOWERING	1
15	066550-004	LABEL - DANGER INSTRUCTIONS	1
16	066555-000	LABEL - CAUTION RELIEF VALVE	1
17	061683-005	LABEL - UPRIGHT 4 1/2	5
18	061683-007	LABEL - UPRIGHT 5 1/2	2
19	066562-000	LABEL - TIRE PRESSURE 50 P.S.I.	1
20	027898-000	LABEL - DIESEL FUEL	1
21	05221-000	LABEL - BATTERY LEVEL	1
22	065368-000	TACK	4
25	060830-000	SAFETY WALK	4
26	067770-012	LABEL - SL26 BIENERGY, 7 X 55	2
27	067770-000	LABEL - SL26N	5
28	063423-000	LABEL - BRAKE RELEASE	1
29	064414-000	LABEL - CONTROLS	1
30	064444-000	LABEL - USA (SEE NOTE-1)	4
31	065791-001	LABEL - CONTROLLER	1
32	061515-000	LABEL - LIFT HERE	1
33	066554-000	LABEL - READ	1
34	064645-000	LABEL, OPER. INST.	1
35	064644-000	LABEL, CONTROLS	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

**LABEL KIT,
SL30N BI-ENERGY**

064006-093

ITEM	PART NO.	DESCRIPTION	QTY.
1	064672-001	MANUAL, USER, SL26/30N BI-ENERGY	1
2	010076-000	MANUAL CASE	1
3	010076-001	LABEL - SAFETY RULES	1
4	011248-004	LOCKNUT 1/4-20 UNC HEX	2
5	011252-008	SCREW 1/4-20 UNC HHC X 1	2
7	066568-000	LABEL - LOWER PLATFORM	1
8	060197-000	LABEL - HYDRAULIC FLUID	1
9	066566-000	LABEL - LOAD 1000 LBS	1
10	061205-000	LABEL - NAME PLATE	1
11	066552-000	LABEL - DANGER HYDROGEN GAS	1
12	061220-001	LABEL - ANSI REQUIREMENT	1
13	060577-000	ANSI MANUAL	1
14	062524-001	LABEL - EMERGENCY LOWERING	1
15	066550-004	LABEL - DANGER INSTRUCTIONS	1
16	066555-000	LABEL - CAUTION RELIEF VALVE	1
17	061683-005	LABEL - UPRIGHT 4 1/2	5
18	061683-007	LABEL - UPRIGHT 5 1/2	2
19	066562-000	LABEL - TIRE PRESSURE 50 P.S.I.	1
20	027898-000	LABEL - DIESEL FUEL	1
21	05221-000	LABEL - BATTERY LEVEL	1
22	065368-000	TACK	4
25	060830-000	SAFETY WALK	4
26	067770-013	LABEL - SL30 BIENERGY, 7 X 55	2
27	067770-003	LABEL - SL30N	5
28	063423-000	LABEL - BRAKE RELEASE	1
29	064414-000	LABEL - CONTROLS	1
30	064444-000	LABEL - USA (SEE NOTE-1)	4
31	065791-001	LABEL - CONTROLLER	1
32	061515-000	LABEL - LIFT HERE	1
33	066554-000	LABEL - READ	1
34	064645-000	LABEL, OPER. INST.	1
35	064644-000	LABEL, CONTROLS	1

**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

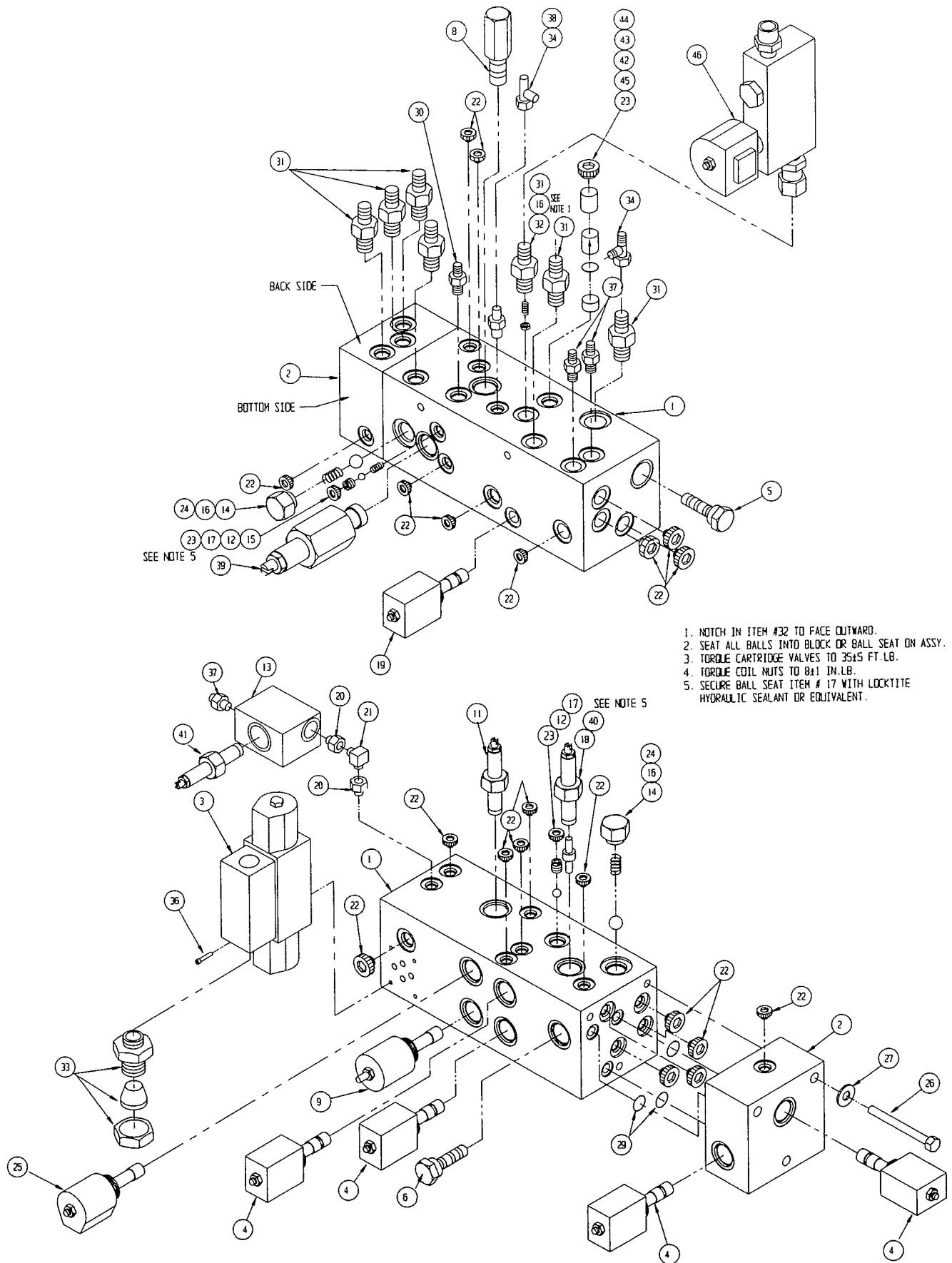
VALVE MANIFOLD ASSEMBLY, SL26/30N

064004-017

ITEM	PART NO.	DESCRIPTION	QTY.
1	064050-002	MANIFOLD - SL - 26 PROPORTIONAL	1
2	064051-000	MANIFOLD BLOCK	1
3	015763-000	STEERING VALVE 24VDC	1
4	061797-000	3-WAY VALVE	4
5	063924-001	FLOW REGULATOR	1
6	063924-003	FLOW DIVIDER-COMBINER	1
8	063922-001	PRESSURE REDUCING	1
9	063925-002	LOWERING VALVE	1
11	060390-000	RELIEF VALVE - PRESET 2000 PSI	1
12	05135-000	BALL 5/16 DIA STL	2
13	064223-000	VALVE BLOCK	1
14	08998-000	BALL 1/2 DIA STL	2
15	015799-000	SPRING	1
16	05133-000	SPRING	3
17	061728-000	SEAT BALL	2
18	063920-000	PISTON	1
19	063952-002	PROPORTIONAL VALVE	1
20	015959-001	FITTING ADAPTER	2
21	013963-002	FITTING ADAPTER ELBOW	1
22	012004-004	PLUG - SAE#4	20
23	012004-006	PLUG - SAE#6	3
24	020021-008	PLUG - SAE#8	2
25	015764-000	VALVE - SOL. NC-24V	1
26	011254-022	SCREW 3/8-16 UNC HHC X 2 3/4	3
27	011240-006	WASHER 3/8 DIA STD FLAT	3
29	013888-044	O RING	3
30	011941-004	FITTING ADAPTER	1

ITEM	PART NO.	DESCRIPTION	QTY.
31	011941-006	FITTING ADAPTER	7
32	015919-003	ORIFICE LOWER	1
33	029925-000	CONN CABLE T&B #2535 3/4	1
34	020733-003	FITTING ADAPTER	1
36	014412-016	SCREW 10-24 UNC SOC HD X 2	4
37	011941-005	FITTING ADAPTOR	3
38	011941-001	FITTING ADAPTOR	2
39	060390-005	RELIEF VALVE - PRESET 1200 PSI	1
40	060390-004	RELIEF VALVE - PRESET 900 PSI	1
41	060390-002	RELIEF VALVE - PRESET 1100 PSI	1
42	064281-000	SPACER	1
43	013888-007	O-RING	1
44	03391-002	LIFT CHECK VALVE	1
45	064278-000	SPACER	1
46	064559-000	CUSHION VALVE ASS'Y 24V	1

ILLUSTRATED PARTS BREAKDOWN



1. NOTCH IN ITEM #32 TO FACE OUTWARD.
2. SEAT ALL BALLS INTO BLOCK OR BALL SEAT ON ASSY.
3. TORQUE CARTRIDGE VALVES TO 35±5 FT.LB.
4. TORQUE COIL NUTS TO 8±1 IN.LB.
5. SECURE BALL SEAT ITEM # 17 WITH LOCKTITE HYDRAULIC SEALANT OR EQUIVALENT.

**Section
6.1**

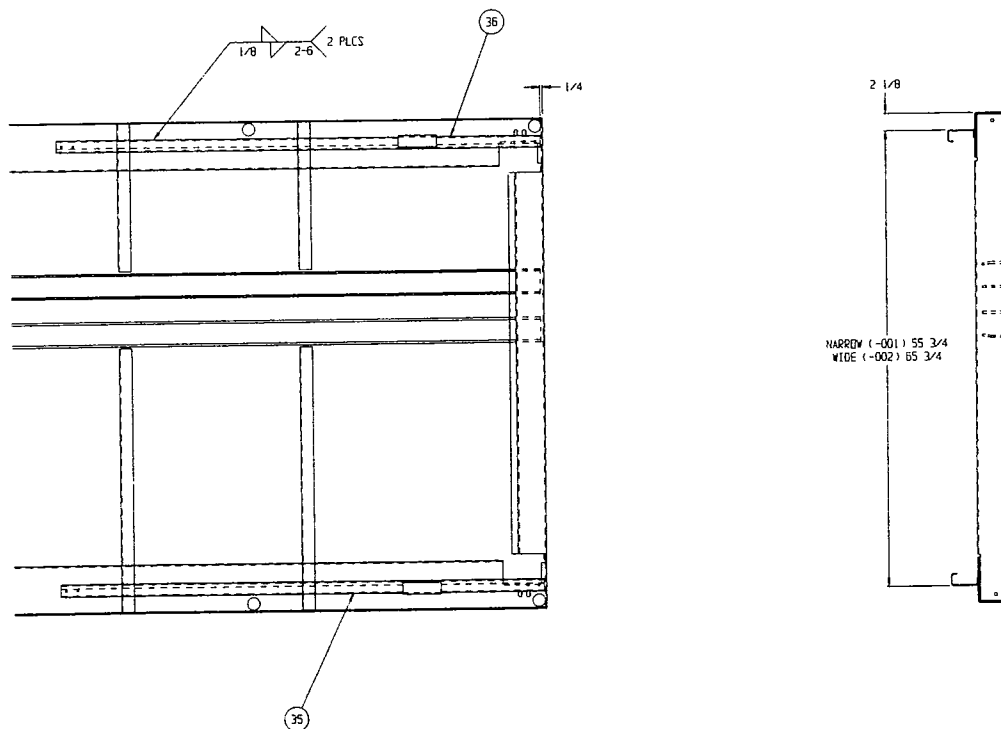
ILLUSTRATED PARTS BREAKDOWN

OPTIONAL ROLLOUT DECK, SL26N ONLY

064554-000

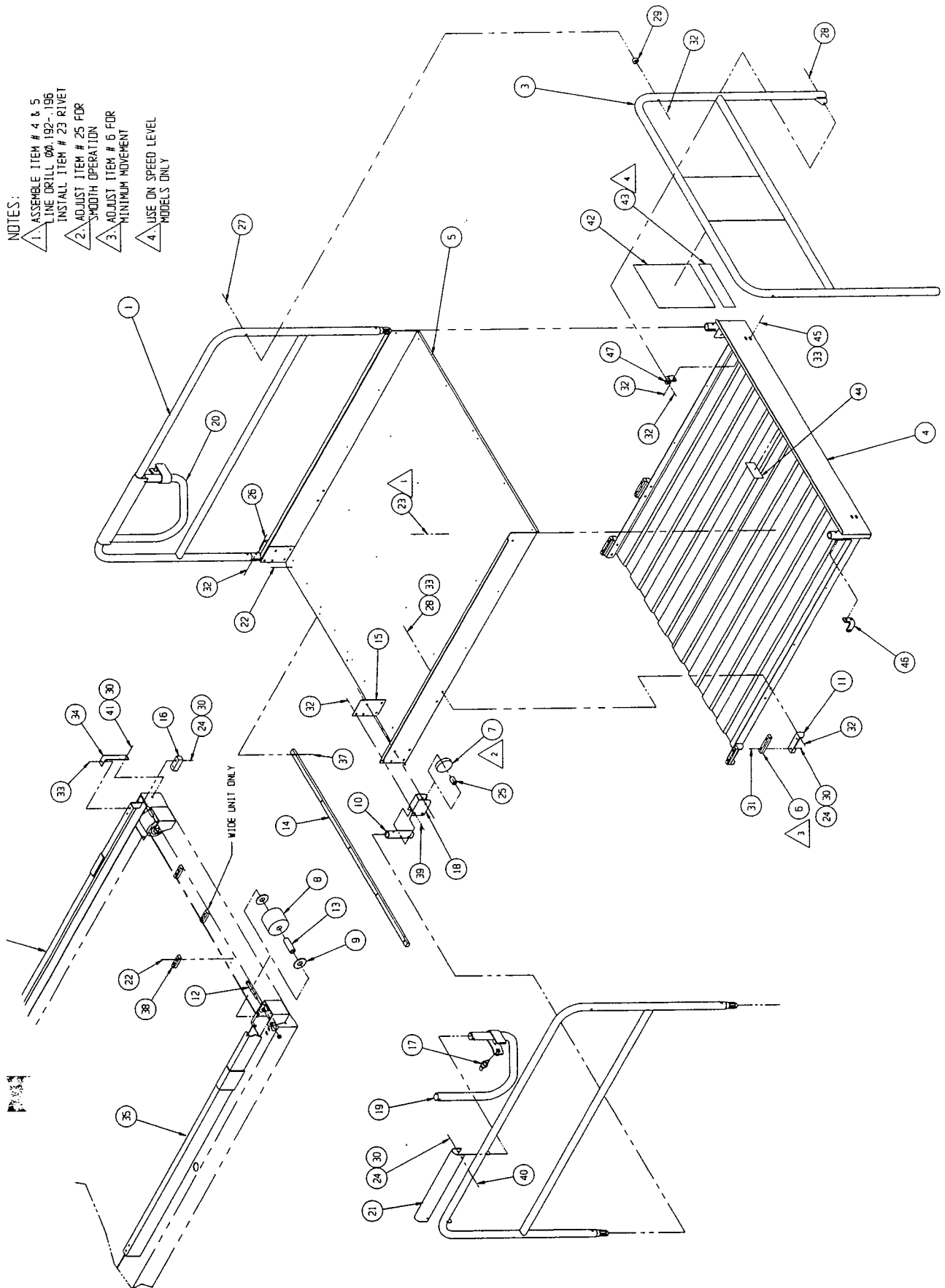
ITEM	PART NO.	DESCRIPTION	QTY.
1	064785-000	WELDMENT - SIDE RAIL	2
3	064777-000	WELDMENT - FRONT RAIL	1
4	064762-000	DECK WELDMENT	1
5	064760-000	FLOOR - DIAMOND ALUMINUM	1
6	063727-000	BLOCK	4
7	064233-000	WHEEL	2
8	064234-000	WHEEL	2
9	064235-000	WASHER	4
10	064776-000	TUBE, RAIL SUPPORT	2
11	064425-000	WELDMENT SLIDE BRACKET	4
12	063990-003	AXLE	2
13	064249-000	BUSHING - SPANNER	2
14	064256-001	BEARING STRIP	1
15	064795-000	GUSSET PLATE	2
16	064267-000	BUMPER PAD	4
17	03570-001	RETAINING PIN ASSY	2
18	064774-000	BRACKET - ROLLER	2
19	064769-001	HANDLE WELDMENT, R.H.	1
20	064769-002	HANDLE WELDMENT, L.H.	1
21	064773-000	HANDLE BRACKET	2
22	026553-008	RIVET - POP 3/16 DIA 1/2-5/8 GRIP	9
23	026553-002	RIVET - POP 3/16 DIA 1/8-1/4 GRIP	28

ITEM	PART NO.	DESCRIPTION	QTY.
24	011240-004	WASHER 1/4 STD FLAT	16
25	064240-001	BUSHING	2
26	011254-018	SCREW - CAP 3/8-16 X 2 1/4	4
27	011254-032	SCREW - CAP 3/8-16 X 4	2
28	011254-010	SCREW - CAP 3/8-16 X 1 1/4	10
29	067695-000	SPACER	2
30	011248-004	LOCKNUT 1/4-20	14
31	011252-014	SCREW 1/4-20UNC HEX HD X 1 3/4	4
32	011248-006	LOCKNUT 3/8-16	16
33	011240-006	WASHER 3/8 STD FLAT	16
34	064775-000	FRONT ANGLE	2
35	064788-001	ROLLER WELDMENT R.H.	1
36	064788-002	ROLLER WELDMENT L.H.	1
37	011240-002	WASHER #8	5
38	064247-000	GUIDE SLIDE	2
39	011254-020	SCREW - CAP 3/8-16 X 2 1/2	6
40	011252-016	SCREW - CAP 1/4-20 X 2	4
41	011252-006	SCREW 1/4-20 HEX HD X 3/4	2
42	066550-004	DECAL DANGER	1
44	066557-001	DECAL CAUTION 500 LBS CAP	1
45	011254-008	SCREW 3/8-16 HEX HD X 1	2
47	064688-002	BRACKET, TOEBOARD PIVOT, LH	1



ILLUSTRATED PARTS BREAKDOWN

- NOTES:
- 1. ASSEMBLE ITEM # 4 & 5
LINE DRILL Ø.0192-.196
 - 2. INSTALL ITEM # 23 RIVET
 - 3. ADJUST ITEM # 25 FOR
SMOOTH OPERATION
 - 4. ADJUST ITEM # 6 FOR
MINIMUM MOVEMENT
 - 5. USE ON SPEED LEVEL
MODELS ONLY



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

POLY-FILLED TIRES

B78-13ST

064250-000

ITEM	PART NO.	DESCRIPTION	QTY.
1	64052-000-00	POLY FILL TIRE & WHEEL ASSY	3
2	64052-001-00	POLY FILL TIRE & WHEEL ASSY L/H REAR	1

Use 60° Wheel Bolts & Wheel Nuts

As Required For Installation.

Ref. P/n 05105-000 & 14122-003.

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

POLY-FILLED TIRE OPTION, SOFT TRAC

063997-000

1	064186-002	POLY FILL TIRE & WHEEL ASSY R/H REAR	1
2	064186-003	POLY FILL TIRE & WHEEL ASSY L/H REAR W/ BRAKE BLOCKS	1
3	064186-001	POLY FILL TIRE & WHEEL ASSY FRONT	2
5	011932-004	FITTING 45° SWIVEL JIC	4
6	014122-001	WHEEL BOLT 1/2-20 X 1 LG 90°	10
7	011469-003	LUG NUT 1/2-20 90°	10

POLY-FILLED TIRE OPTION, ROUGH TERRAIN

063998-001

1	064187-001	POLY FILL TIRE & WHEEL ASSY R/H REAR	1
2	064187-005	POLY FILL TIRE & WHEEL ASSY L/H REAR W/ BRAKE BLOCKS	1
3	064187-003	POLY FILL TIRE & WHEEL ASSY R/H FRONT	1
4	064187-004	POLY FILL TIRE & WHEEL ASSY L/H FRONT	1
5	011932-004	FITTING 45° SWIVEL JIC	4
6	014122-001	WHEEL BOLT 1/2-20 X 1 LG 90°	10
7	011469-003	LUG NUT 1/2-20 90°	10

1. Relocate Brake Cylinder To Inner Set Of Mounting Holes To Allow Clearance For Proper Cylinder Operation.
2. Add Item-5 Fitting Onto Existing Motor Fittings To Allow Hoses To Clear Rims Of Tires.
3. Use 90° Wheel Bolts & Wheel Nuts As Required For Installation.

ILLUSTRATED PARTS BREAKDOWN

NOTES:

UpRight

Call Toll Free in U.S.A.

1-800-926-LIFT

Upright, Inc.

1775 Park Street

Selma, California 93662

TEL: 559/891-5200

FAX: 559/891-9012

PARTS: 1-888-UR-PARTS

PARTSFAX: 559/896-9244

P/N 060587-011

5/99 .5 K

SCHEMATICS

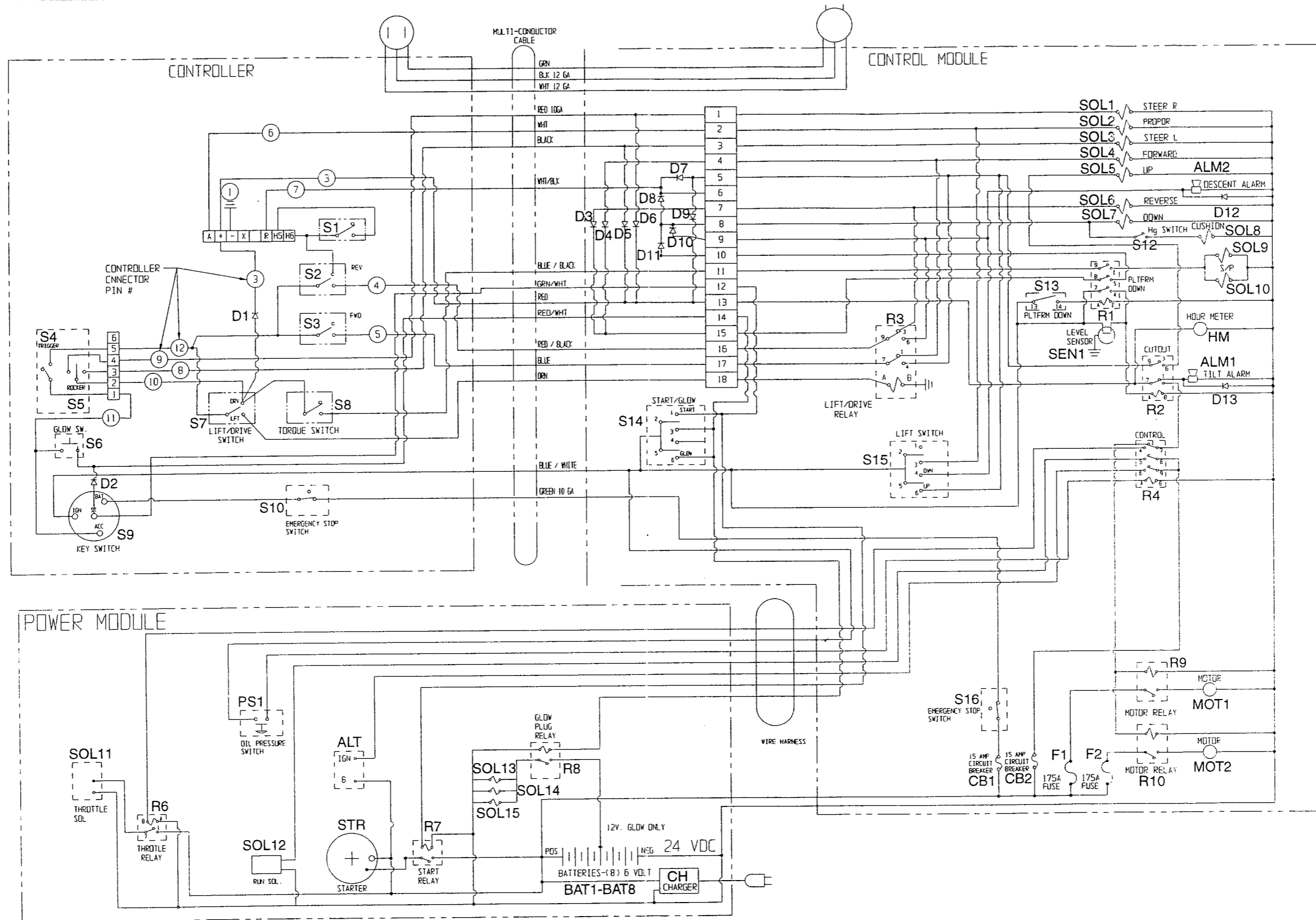


Figure 5-1: Electrical Schematic - SL26/30N Bi-Energy (064149-081)

5.2 HYDRAULIC SCHEMATIC, SL26/30N BI-ENERGY

Table 5-2: Hydraulic Schematic Legend (064148-023)

DESIGNATION	NAME	FUNCTION	LOCATION
CV1	Check Valve	Allows oil to flow in one direction only.	Inline to Pumps P1 and P2.
CV2	Check Valve	Supplies Lift Valve with oil	Below Lift Valve
CV3	Check Valve	Allows oil to flow to brakes	Brake Valve
CV4	Check Valve	Allows oil to flow in one direction only.	Inline to Pump P3
CYL1	Cylinder, Lift	Actuates scissor linkage to elevate platform.	Scissor assembly
CYL2	Cylinder, Steering	Actuates steering linkage to steer front wheels	Front Axle assembly
CYL3	Cylinder, Brake	Parking Brake, spring applied.	Rear Axle assembly
F1	Filter	Filters oil returning to tank.	Bottom of Manifold
F2	Filter, Suction Screen	Traps particles in hydraulic tank at outlet.	Inside hydraulic tank, at outlet.
M1	Motor, Drive	Drives rear wheels	Rear Axle assembly
M2	Motor, Drive	Drives rear wheels	Rear Axle assembly
ORF1	Orifice Check Valve	Restricts the flow of oil in one direction and allows free flow in the other direction.	Cushion Valve
ORF2	Orifice, Down	Limits the descent speed of the platform	Beneath Down Valve
P1	Pump	Provides fluid power for hydraulic system	Power Module
P2	Pump	Provides fluid power for hydraulic system	Power Module
P3	Pump	Provides fluid power for hydraulic system	Power Module
P4	Pump, Brake Release	Used to manually release brakes for towing	Rear Axle assembly
RV1	Relief Valve	Limits maximum oil pressure	Valve Manifold
RV2	Relief Valve, Steering Bypass	Provides overpressure protection to steering components	Valve Manifold
RV3	Relief Valve, Bi-Directional	Allows oil flow to bypass drive motors when turning on tight radius	Rear Axle assembly
SV1	Drive Shuttle Valve	Allows oil pressure from drive to release brakes.	Not Serviceable
V1	Valve, Steering Flow Divider Relief	Divides flow from pumps to steering and to drive	Valve Manifold
V2	Valve, Steer Left	Controls oil flow to Steering Cylinder	Steering Cylinder
V3	Valve, Steer Right	Controls oil flow to Steering Cylinder	Steering Cylinder
V4	Valve, Lift	Allows oil to flow to Lift Cylinder	Valve Manifold
V5	Valve, Down	Holds oil in Lift Cylinder when deck is elevated. Allows oil to flow out of Cylinder when lowering.	Base of Lift Cylinder
V6	Valve, Cushion	Regulates oil flow when platform is lowering to slow descent the last 12 inches.	Lift Cylinder
V7	Valve, Proportional	Regulates oil flow to lift and drive functions	Valve Manifold

DESIGNATION	NAME	FUNCTION	LOCATION
V8	Valve, Forward	Allows oil to drive system forward.	Valve Manifold
V9	Valve, Reverse	Allows oil to drive system in reverse	Valve Manifold
V10	Valve, Down	Allows oil to flow out of Lift Cylinder	Base of Lift Cylinder
V11	Valve, Forward Counterbalance	Provides dynamic braking for machine in reverse and prevents runaway on slopes.	Valve Manifold
V12	Valve, Reverse Counterbalance	Provides dynamic braking for machine in reverse and prevents runaway on slopes.	Valve Manifold
V13	Valve, Divider/Combiner	Equalizes oil flow from front and rear drive motors when deck is lowered	Valve Manifold
V14,15	Valves, Series/Parallel	Directs oil flow to drive motors in either series (for higher speed) or parallel (for higher torque).	Valve Manifold
V16	Valve, Brake	Allows oil to flow to Brake Cylinder	Brake Cylinder

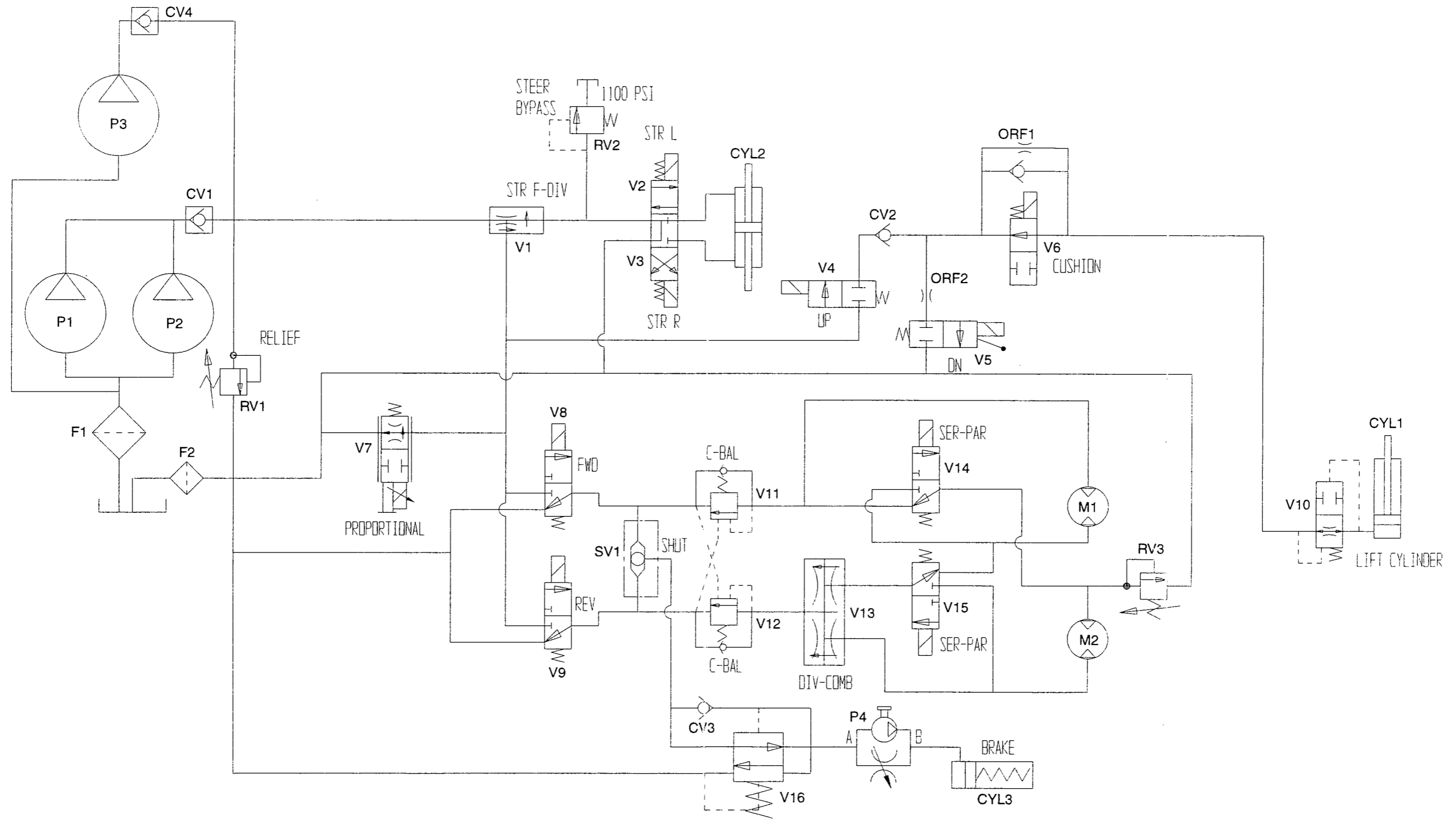


Figure 5-2: Hydraulic Schematic (064148-023)

NOTES: