

UpRight



SL20

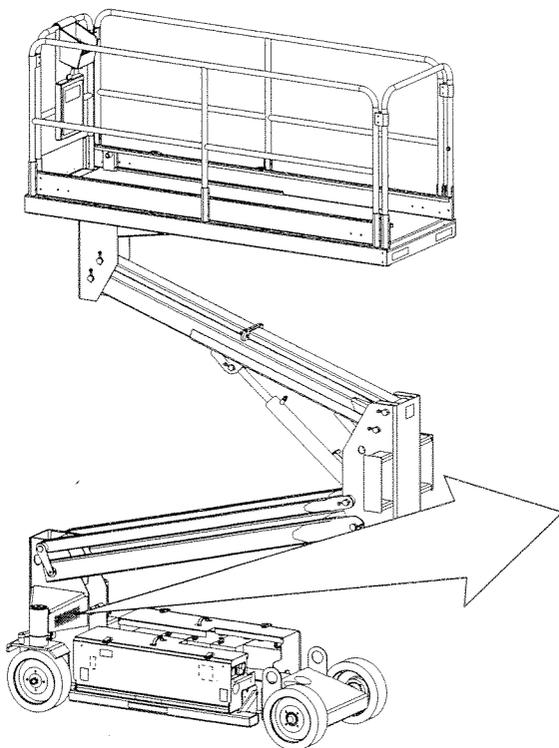
WORK PLATFORMS
European Specification
12 Volt

**Service &
Parts Manual**

SERVICE & PARTS MANUAL

SL20 Series Aerial Work Platform

Serial Numbers 8000 - 8556



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. <input type="text"/>	MAX. PLATFORM HEIGHT <input type="text"/>
SERIAL NO. <input type="text"/>	BATTERY VOLTAGE <input type="text"/>
MAX. DISTRIBUTED LOAD <input type="text"/>	<input type="text"/>
CAUTION: CONSULT OPERATOR'S MANUAL BEFORE USE. THIS PLATFORM IS NOT ELECTRICALLY INSULATED	
<small>P/N 61205-000-00</small>	

UpRight

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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

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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 the SL20 Series Work Platform manufactured by UpRight, Inc. of Selma, California.

Scope

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

1.2 GENERAL INFORMATION

Description

The SL20 Series Work Platform is a self-propelled aerial work platform designed to be used as a means of elevating personnel and equipment to provide a mobile work platform. They are designed to provide mobility with the platform in a raised or lowered position. Travel with the platform is automatically limited to the low speed range.

Purpose & Limitations

The objective of the SL20 Series Work Platform is to provide a quickly deployable, self-propelled, variable height work platform. The elevating function shall only be used when the work platform is on a firm, level work area. The work platform is intended to be self-propelled when in relatively close proximity to the work area.

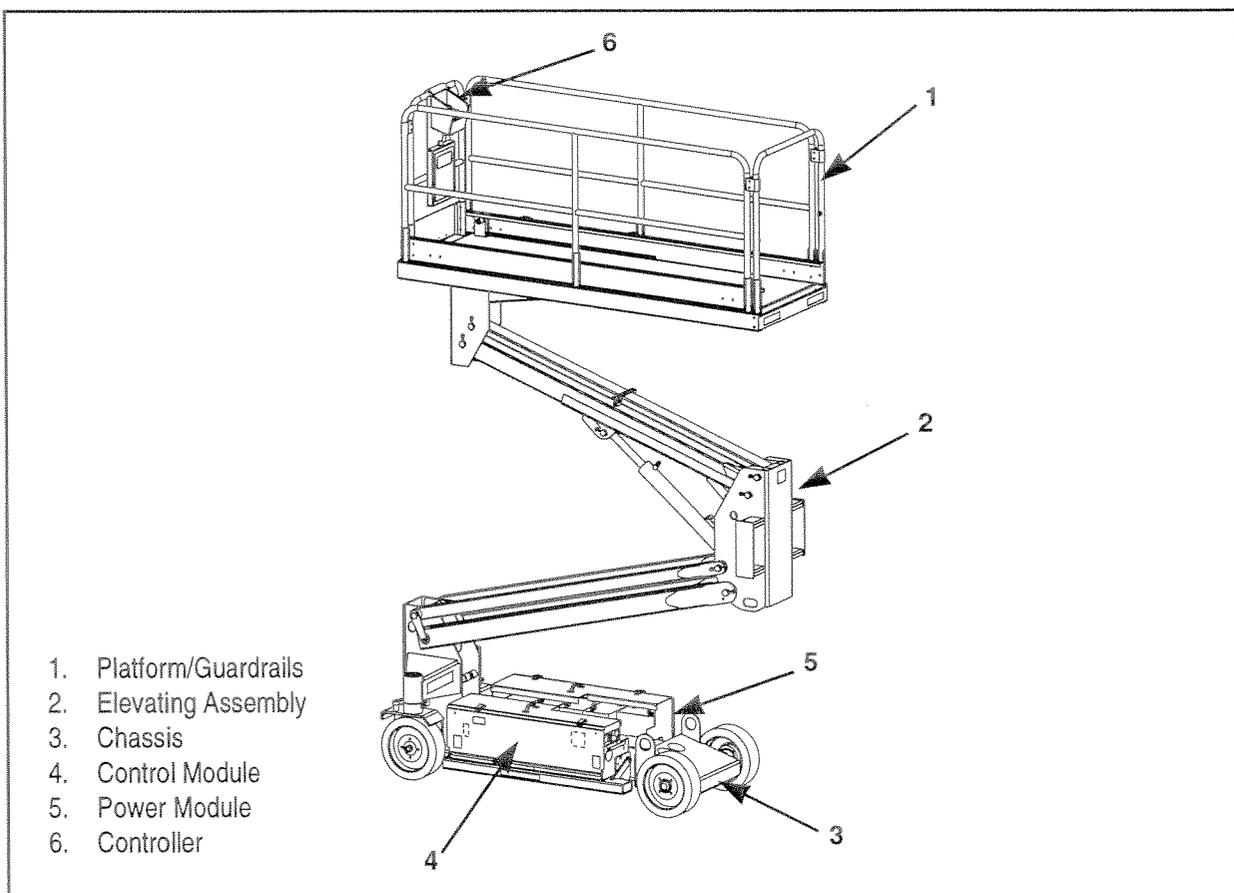


Figure 1-1: SL20 Series Work Platform

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	SL20
Platform Size (Inside toeboards)	.70 m x 2.44 m [27.75" x 96"] Inside Toeboards
Max. Platform Capacity	
Standard, w/ Deck Extension	295 kg [650 lbs.]
w/o Deck Extension	340 kg [750 lbs.]
on Extension	110 kg [250 lbs.]
Max. No. of occupants	
Standard w/ Deck Extension	2 people
w/o Deck Extension	3 people
on Extension	1 person
Height	
Working Height	7.92 m [26 ft.]
Max. Platform Height	6.10 m [20 ft.]
Drivable Height	6.10 m [20 ft.] Standard
Dimensions	
Weight	1423 kg [3,127 lbs]
Overall Width	.84 m [33 in.]
Overall Height	2.01 m [79 in.]
Overall Length	2.65 m [104.25 in.]
Surface Speed	
Platform Lowered	3.70 km/h [2.3 m.p.h.]
Platform Raised	1.13 km/h [0.7 m.p.h.]
System Voltage	12 Volt DC
Energy Source	12 Volt Battery Pack, 4 HP DC Electric Motor
Battery Charger	25 Amp
Battery Duty Cycle	25% for 8 hours
Hydraulic Tank Capacity	15.2 l [4 US Gallons]
Maximum Hydraulic System Pressure	183 bar [2000 psi]
Hydraulic Fluid	
Normal use (>32° F [0° C])	ISO #46
Low Temp. Use (<32° F [0° C])	ISO #32
Extreme Temp. Use (<0° F [-17° C])	ISO #15
Lift System	Single Lift Cylinder
Proportional Control System	Proportional Joystick Controller with Interlock Lever, Drive/Lift Switch and Red Mushroom Emergency Stop Switch
Horizontal Drive	Dual Front Wheel Hydraulic Motors
Tires	410 mm [16 in.] Diameter Solid Rubber, non-marking
Parking Brakes	Spring Applied, Hydraulic Release
Turning Radius (inside)	0.76 m [30 in.]
Maximum Gradeability	14° [25%]
Wheel Base	1.85 m [73 in.]
Guardrails	0.97 m [38 in.]
Toeboard	152 mm [6 in.]

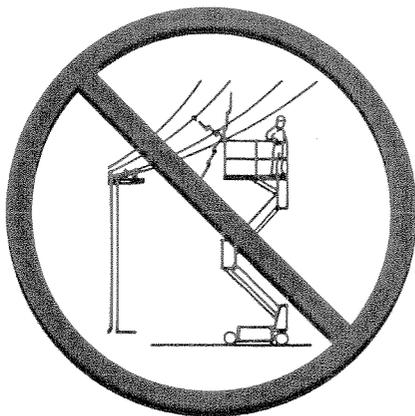
Section 2

MACHINE PREPARATION & OPERATION

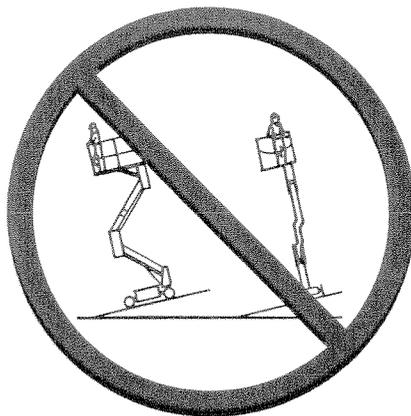
Warning

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.

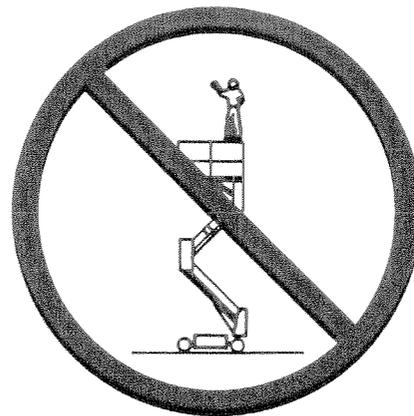
Safety Rules



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



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

2.1 INTRODUCTION

This manual covers the SL20 Work Platforms. Refer to the Operator Manual stored on the machine.

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

2.3 PREPARATION FOR SHIPMENT

1. Fully lower the platform.
2. Disconnect the negative (-) battery cable from the battery terminal (Figure 2-1).
3. Band the controller to the guardrail.
4. Band the elevating assembly to the frame just behind the front wheels

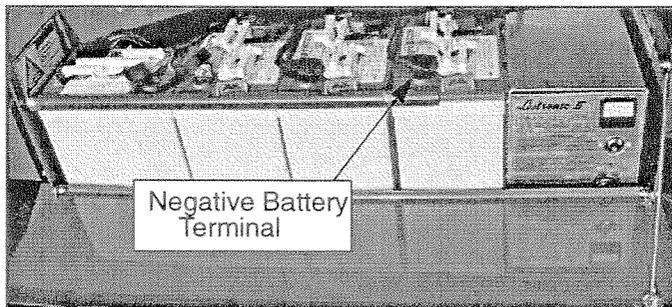


Figure 2-1: Power Module, Left Side

2.4 FORKLIFTING OF WORK PLATFORM

Note: Forklifting is for transporting only.

⚠ CAUTION ⚠

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

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

2.5 LIFTING WORK PLATFORM

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

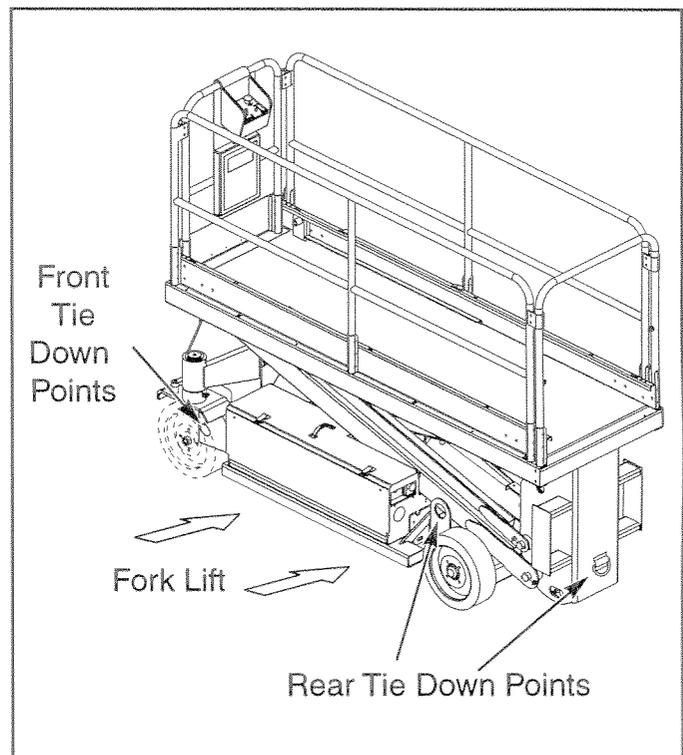


Figure 2-2: Transporting Work Platform

2.6 TRANSPORT

1. Maneuver the work platform into transport position and chock wheels.
2. Secure the work platform to the transport vehicle with chains or straps of adequate load capacity attached to the chassis tie down lugs (Figure 2-2).

⚠ CAUTION ⚠

Tie down lugs are not to be used to lift work platform.

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

2.7 STORAGE

No preparation is required for normal storage. Regular maintenance per Table 3-1 should be performed. If the work platform is to be placed in long term storage (dead storage) use the following preservation procedure.

Preservation

1. Clean painted surfaces. If the paint surface is damaged, repaint.
2. Fill the hydraulic tank to operating level **with the platform fully lowered**.
3. Coat exposed portion of extended cylinder rod with a preservative such as multipurpose grease and wrap with barrier material.
4. Coat all exposed unpainted metal surfaces with preservative.

Batteries

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

2.8 PRE-OPERATION & SAFETY INSPECTION

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

1. Open module covers and inspect for damage, oil leaks or missing parts.
2. Check the level of the hydraulic oil with the platform fully lowered. Oil should be visible to full line on tank. Add ISO #46 hydraulic oil if necessary.
3. Check that fluid level in the batteries is correct (See Battery Maintenance, Section 3.4).
4. Verify batteries are charged.
5. Check that AC extension cord has been disconnected from charger.
6. Carefully inspect the entire work platform for damage such as cracked welds or structural members, loose or missing parts, oil leaks, damaged cables or hoses, loose connections and tire damage.

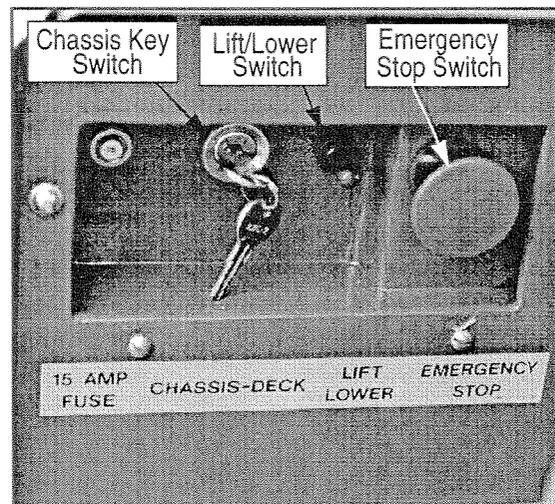


Figure 2-3: Chassis Control Module

7. Move machine, if necessary, to unobstructed area to allow for full elevation.
8. Pull out on chassis and platform emergency stop switches to turn **ON**.
9. Turn the Chassis Key Switch (Figure 2-3) to **CHASSIS**.
10. Push chassis lift switch (Figure 2-3) to **LIFT** position and fully elevate platform.
11. Visually inspect the elevating assembly, lift assembly, lift cylinder, cables and hoses for damage or erratic operation. Check for missing or loose parts.

12. Verify that pot hole protection supports have rotated into position under each module.
13. Partially lower the platform by pushing chassis/lift switch to **LOWER**, and check operation of the audible lowering alarm.

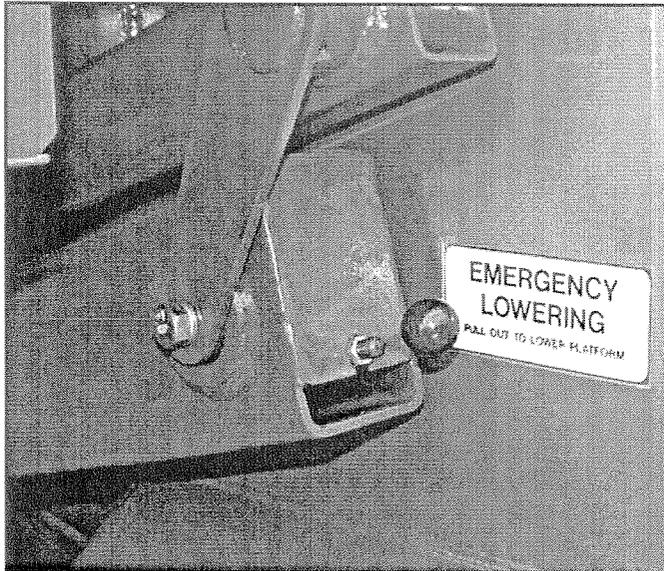


Figure 2-4: Emergency Lowering Valve Knob

14. Pull out on the Emergency Lowering Valve Knob (Figure 2-4) to check for proper operation. Once the platform is fully lowered, release the knob.
15. Turn the chassis key switch (Figure 2-3) to **PLATFORM**.
16. Close and secure module covers.
17. Check that route is clear of persons, obstructions, holes and drop-offs, level and capable of supporting the wheel loads.
18. After mounting platform latch chain across entrance.

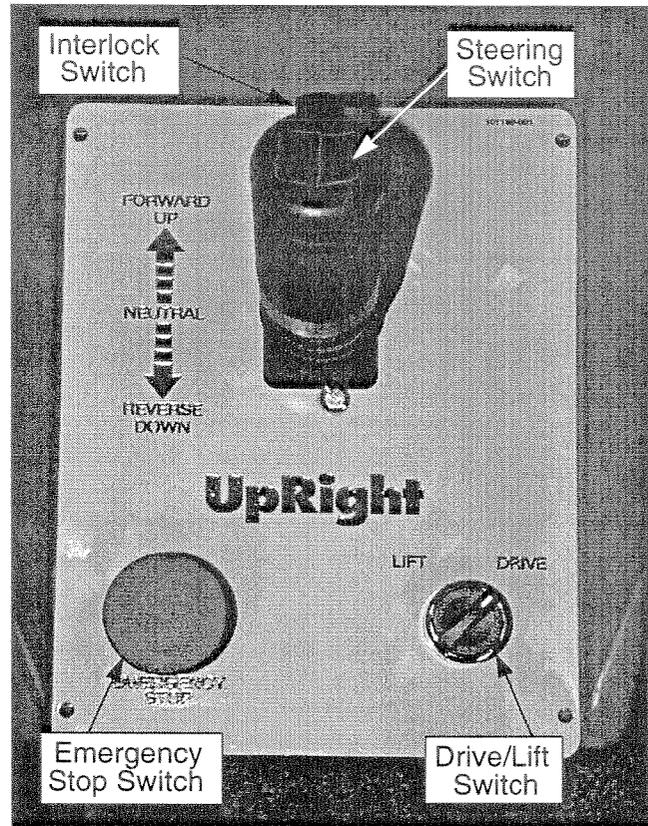


Figure 2-5: Proportional Controller

20. **PROPORTIONAL CONTROLLER** (Figure 2-5)
 - A. Position rotary selector switch to drive.
 - B. While holding in on the interlock switch, position handle **FORWARD** then **REVERSE** to check for speed and directional control.
21. Push steering switch **RIGHT** then **LEFT** to check for steering control.
22. Push the emergency stop switch button.

2.9 OPERATION

Before operating work platform ensure that pre-operation and safety inspection has been completed, any deficiencies have been corrected and the operator has been thoroughly trained on this machine. The operator must read, fully understand and follow the Operator Manual stored on the machine.

Travel With Platform Lowered

1. Check that route is clear of people, obstructions, holes and drop-offs, is level, and is capable of supporting wheel loads.
2. Verify chassis key switch is turned to **PLATFORM** and Chassis Emergency Stop Switch is **ON**, pull button out.
3. After mounting platform latch chain across entrance.
4. Check clearances above, below, and to the sides of platform.
5. Pull Controller Emergency Stop button out to ON position. When button is pushed down, emergency stop switch will automatically go to OFF position.
6. Position Drive/Lift switch to **DRIVE**.
7. **CONTROLLER** (Figure 2-5)
Holding in on the interlock switch, position handle **FORWARD** or **REVERSE** to travel in the desired direction. The machine will move faster or slower depending on the position of the handle.

Steering

1. Position rotary selector switch to **DRIVE**.
2. **CONTROLLER** (Figure 2-5)
Holding in on the interlock switch, push the steering switch to **RIGHT** or **LEFT** to turn wheels in the desired direction. Observe the tires while maneuvering the machine to ensure proper direction.

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

Elevating Platform

1. Position rotary selector switch to **LIFT**.
2. While depressing the interlock switch on proportional controller, push control switch to **UP**.
3. If the machine is not level, the tilt alarm will sound and the machine will not lift or drive. **If the tilt alarm sounds, the platform must be lowered and the machine moved to a level location before attempting to re-elevate the platform.**

Note: Pothole protection will automatically lower when platform is raised and automatically raise when machine is lowered completely and driven.

Travel With Platform Elevated

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

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

Lowering Platform

1. Position rotary selector switch to **LIFT**.
2. While depressing the interlock switch on proportional controllers, pull back on Drive/Lift.

Emergency Lowering

WARNING

*If the platform should fail to lower, **NEVER** climb down the elevating assembly.*

The Emergency Lowering Valve knob is located at the front of the chassis (Figure 2-4).

1. Open the Emergency Lowering Valve by pulling and holding the knob.
2. To close, release the knob. The platform will not elevate if the Emergency Lowering Valve is open.

After Use Each Day

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

2.10 GENERAL FUNCTIONING

Refer to the Hydraulic and Electrical Schematics, Section 5.

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

Driving

Proportional Controller

1. Pull out both Emergency Stop Switches. Turn key switch to Deck. Set Drive/Lift switch to Drive.
2. Depress interlock lever and slowly push joystick Forward or Reverse. Machine speed is regulated by the angle of the joystick.
3. Machine will drive at "creep" speed if the platform is elevated.

Steering

Proportional Controller

1. Move the Steering rocker switch (located on top of the joystick) left or right.

Raising the Platform

Proportional Controller

1. Set Drive/Lift switch to Lift.
2. Depress interlock lever and slowly push joystick UP or Down. Lift speed is regulated by the angle of the joystick.
3. During the last 15-20 cm (6-8 in.) of platform lowering, the lift cylinder internal cushion orifice will slow the platform to cushion speed.

Emergency Down Valve

Lowering the platform manually with the emergency down valve allows the oil to flow out of the lift cylinder and lower the platform, but there is no down alarm.

Design Features

The SL20 Series Work Platform has the following features:

- The drive speed is limited to creep speed when operating the work platform while the platform is elevated.
- The platform descent rate is controlled by an orifice (fixed speed). In the last 15-20 cm (6-8 inches) of platform lowering, the oils flows through the lift cylinder internal cushion orifice to slow the platform even further (cushion speed). The lift cylinder is equipped with a holding valve to prevent descent should a hose rupture.
- The chassis is equipped with active pothole protection system.
- Parking brake is automatically engaged when the machine comes to a full stop or if power is lost.
- The chassis controls and controller are equipped with an emergency stop switch for stopping all powered functions.
- Proportional Controller: The interlock lever must be depressed for the controller to function.
- The controller is guarded to prevent inadvertent operation.
- An alarm is provided to signal when the platform is lowering.
- A lift switch is located in the control module on the left side of the chassis for lifting and lowering the platform from ground level.
- The tilt alarm (600 Hz) is activated on slopes of 2 degrees side to side and fore and aft when the machine is elevated.
- An emergency lowering valve is provided at the lower left boom at the front of the machine to lower the platform in the event electrical power is lost.

2.11 SAFETY RULES & PRECAUTIONS

Note: Before using the SL20 Series Work Platform

- 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.

2.12 CONTROLS AND INDICATORS

The controls and indicators for operation of the SL20 Series Work Platform are shown in Figure 2-6. The name and function of each control and indicator are listed in Table 2-1. The index numbers

in Figure 2-6 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

CONTROLLER / PLATFORM			CHASSIS		
INDEX #	NAME	FUNCTION	INDEX #	NAME	FUNCTION
1	INTERLOCK LEVER	Provides power to the Controller powered functions, only when depressed, preventing accidental activation of the Controller	6	EMERGENCY STOP SWITCH	Push red button to cut power to all controls (OFF). Turn clockwise to provide power (ON)
2	EMERGENCY STOP SWITCH	Push red button to cut power to all controls (OFF). Turn clockwise to provide power (ON).	7	KEY SWITCH	Turn key clockwise to DECK to provide power to controller and counterclockwise to CHASSIS to provide power to chassis controls.
3	CONTROL LEVER	Move joystick forward or backwards to proportionally control Drive/Lift speeds depending on position of Drive/Lift Switch.	8	CHASSIS LIFT SWITCH	Push switch to UP to lift platform and to 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.	9	EMERGENCY LOWERING VALVE	Pull out to lower the platform in the event of powered function failure. The platform cannot be raised unless this valve is closed.
5	DRIVE/LIFT SWITCH	Selecting DRIVE allows the work platform to move forward or reverse. Selecting LIFT allows the platform to raise or lower.	10*	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.
				TILT ALARM (600 Hz)	Sounds an audible signal when the platform is elevated and on a slope of 2° side to side or fore and aft.
			11	VOLT/HOUR METER (Option)	Indicates state of battery charge and hours electric motor has been in operation (Note: Photo indicates location for optional Volt/Hour meter)

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

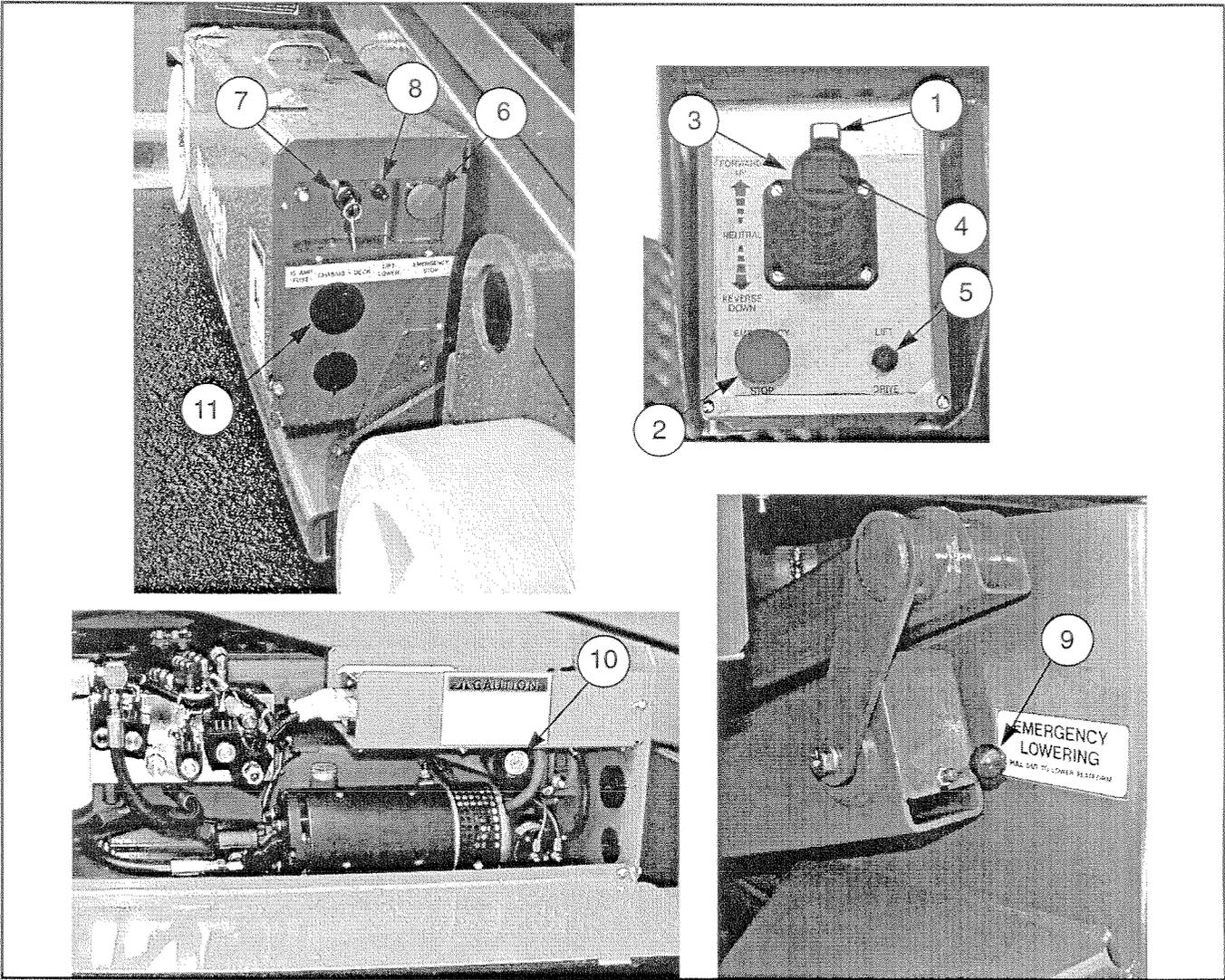


Figure 2-6: Controls & Indicators

Notes:

Section 3

MAINTENANCE

3.1 INTRODUCTION

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

Refer to Table 3-1, Preventative Maintenance Checklist, for recommended maintenance intervals.

Special Tools

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

- Tilt Sensor Adjusting Tool (P/N 030622-000)
- Inclinometer (P/N 010119-000)
- Gauge, 0-207 bar [0-3000psi] . (P/N 014124-030)
- Small Deutsch Connector
Field Kit (P/N 030899-000)
- Large Deutsch Connector
Field Kit (P/N 030898-000)
- Fitting, Quick Disconnect (P/N 063965-002)

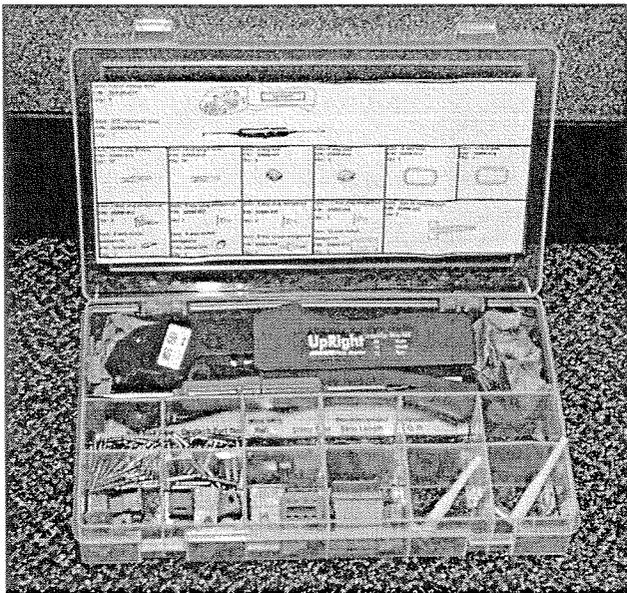


Figure 3-1: Small Deutsch Kit

3.2 PREVENTATIVE MAINTENANCE

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

⚠ 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 3-3).

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.**

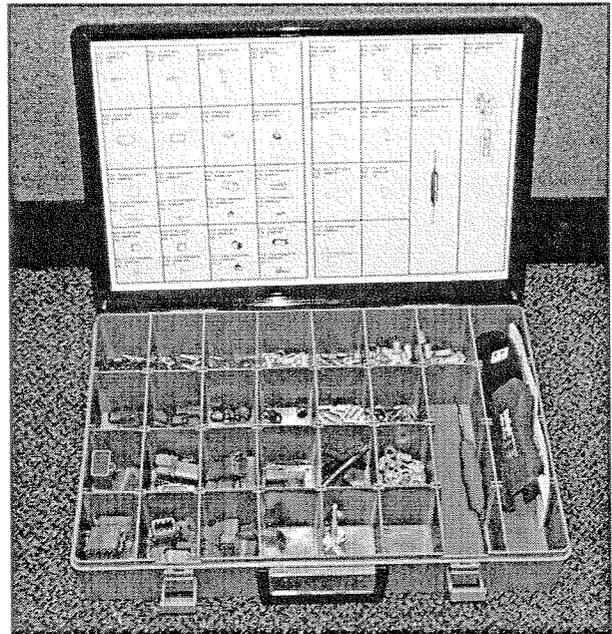


Figure 3-2: Large Deutsch Kit

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 Checklist

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery	Check electrolyte level	6m			
	Check specific gravity	6m			
	Clean exterior	6m			
	Check battery cable condition	Daily			
	Charge Batteries	Daily			
	Check charger condition & operation	Daily			
	Clean terminals	6m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	6m			
	Drain and replace oil (ISO #46)	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 entry way closure	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			
	Check mounting bolts for proper torque	30d			

Table 3-1: Preventative Maintenance Checklist

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Drive Motors	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			
Elevating Assembly	Inspect for structural cracks	Daily			
	Check pivot points for wear	30d			
	Check mounting pin pivot bolts for proper torque	30d			
Chassis	Check elevating arms for bending	6m			
	Check hoses for pinch or rubbing points	Daily			
	Check component mounting for proper torque	6m			
	Check tires for damage	Daily			
Lift Cylinder	Check welds for cracks	Daily			
	Check the cylinder rod for wear	30d			
	Check mounting pin pivot bolts for proper torque	30d			
	Check seals for leaks	30d			
	Inspect pivot points for wear	30d			
Entire Unit	Check fittings for proper torque	30d			
	Check for and repair collision damage	Daily			
	Check fasteners for proper torque	3m			
	Check for corrosion-remove and repaint	6m			
Labels	Lubricate	30d			
	Check for peeling, missing, or unreadable labels & replace	Daily			

3.3 BLOCKING ELEVATING ASSEMBLY (FIGURE 3-3)

3. Push chassis lift switch to **LOWER** position and completely lower the platform.
4. Close control module cover.

⚠ WARNING ⚠

Never perform service on the work platform in the elevating assembly area while platform is elevated without first blocking the elevating assembly.

DO NOT stand in elevating assembly area while deploying or storing brace.

DO NOT block elevating assembly with a load in the platform.

Use a wood block elevating assembly.

Installation

1. Park the work platform on firm level ground.
2. Position chassis lift switch to **LIFT** and elevate platform approximately .6 m [2 ft.].
3. Place 10 cm x 10 cm [4 in x 4 in.] wood block as shown in Figure 3-3.
4. Push chassis lift switch to **LOWER** position and gradually lower platform until boom is supported by the wood block.

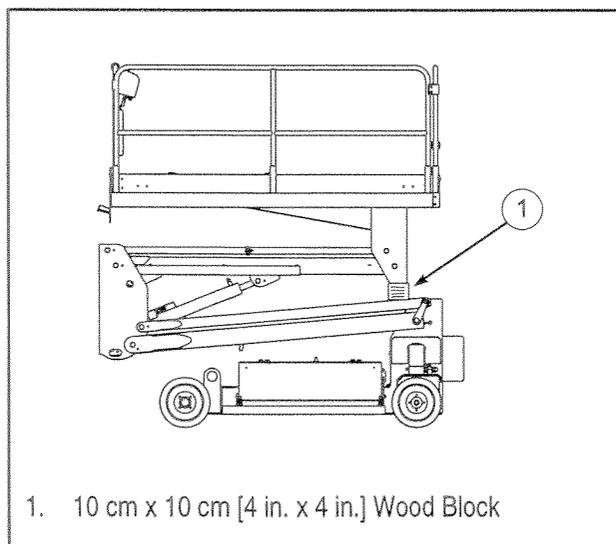


Figure 3-3: Blocking the Elevating Assembly

Removal

1. Push chassis lift switch to **LIFT** position and gradually raise platform until wood block can be removed.
2. Remove wood block.

3.4 BATTERY MAINTENANCE

Electrical energy for the motor is supplied by two 6-volt batteries wired in series for 12 volts DC. Proper care and maintenance of the batteries and motor will ensure maximum performance from the work platform.

⚠ WARNING ⚠

Hazard of explosive gas mixture. Keep sparks, flame, and smoking 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.

Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 28.12 kg [62 lbs.] each

Battery Inspection and Cleaning

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

⚠ CAUTION ⚠

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

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

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

Battery Charging (Figure 3-4)

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

⚠ CAUTION ⚠

Charge batteries in a well ventilated area.

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

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

Never leave charger operating unattended for more than two days.

Never disconnect cables from batteries when charger is operating.

Keep charger dry.

1. Check battery fluid level. If electrolyte level is lower than 10 mm [3/8 in.] above plated add **distilled water** only.
2. the plug for the battery charger is located at the right side of the power module. Connect extension cord (1.5 mm² [12 gauge] conductor minimum and 15 m [50 ft.] in length maximum) to the charger.
3. Charger turns on automatically after a short delay, the ammeter will indicate charging current.
4. Charger turns off automatically when batteries are fully charged.

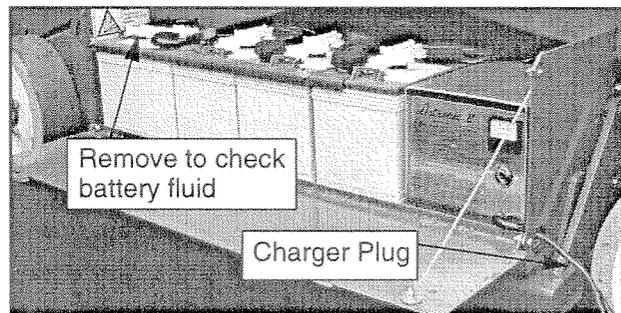


Figure 3-4: Battery Charger

3.5 LUBRICATION

The SL20 is designed with maintenance free bearings. Only the wheel bearings require lubrication. Refer to Section 3.11 for wheel bearing maintenance.

Hydraulic Oil Tank & Filter (Figure 3-5)

Fluid Level

The fluid level is visible through the label on the plastic tank. With the platform fully lowered, oil level should be at MAX. **DO NOT** fill above the upper line or when the platform is elevated.

Oil & Filter Replacement

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

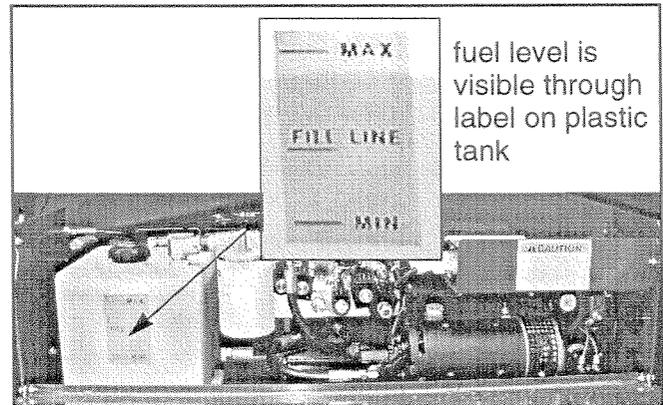


Figure 3-5: Hydraulic Oil Tank & Filter

⚠ 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. Hydraulic tank has a 15 l [4 US Gallons] capacity.
3. Remove the drain plug under the tank and allow all oil to drain.
4. Clean the magnetic drain plug and reinstall.
5. Fill the hydraulic reservoir with hydraulic oil (see Section 1.3). Hydraulic tank has a 15 l [4 US Gallons] capacity.
6. Unthread the filter.
7. Apply a thin film of clean hydraulic oil to the gasket of the replacement filter.
8. Thread the replacement filter until the gasket makes contact, then rotate the filter 3/4 of a turn further.

3.6 SETTING HYDRAULIC PRESSURES (FIGURE 3-6)

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

⚠ WARNING ⚠

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

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

Main Relief Valve

1. Operate the hydraulic system 10-15 minutes to warm the oil.
2. Loosen locknut or remove cover on the main relief valve and turn adjusting screw counterclockwise two full turns.
3. Place the maximum rated load (see Table 1-1) on the platform.
4. Turn the chassis key switch to **CHASSIS**. Position the chassis lift switch to **LIFT** position and hold it there.
5. Slowly turn the main relief valve adjusting screw clockwise to increase the pressure until the platform just begins to raise. The pressure should be approximately 190 bar [2750 psi.].
6. Release the chassis lift switch. Tighten locknut or replace main relief valve cover.

Steering Relief Valve

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Install gauge in pressure gauge port.
3. Loosen locknut or remove cover on the steering relief valve and turn adjusting screw counterclockwise two full turns.
4. While one person holds the steering switch to steer the wheels fully to the left, slowly turn the steering relief valve adjusting screw clockwise to increase the pressure until the gauge reads 69 bar [1000 psi.]
5. Tighten locknut or replace steering relief valve cover and torque to 8 Nm. [6 Ft./Lbs].
6. Remove gauge and replace cap.

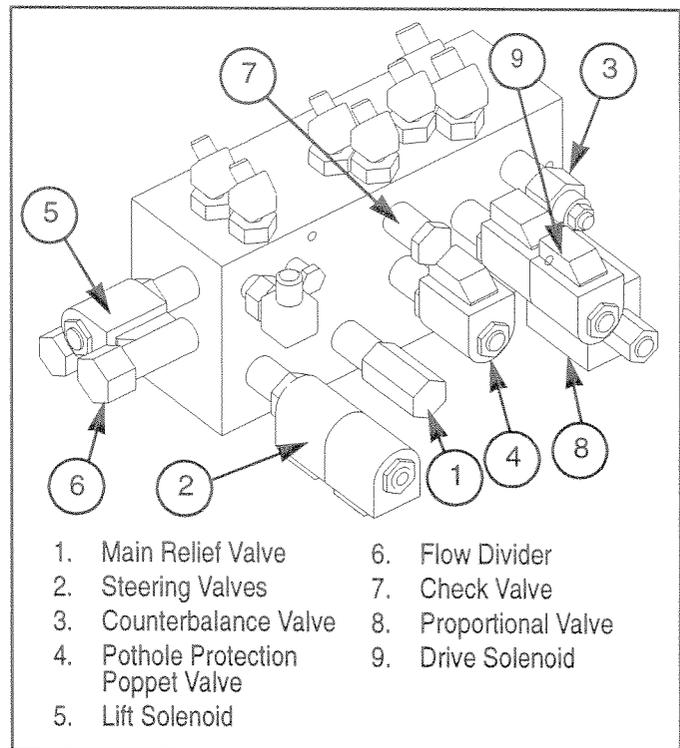


Figure 3-6: Hydraulic Manifold

Counterbalance Valves

1. Operate the work platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.
2. Remove pressure gauge port cap and install the pressure gauge assembly.
3. Disconnect proximity switch.
4. Lift work platform and block front wheels off ground.
5. Loosen the locknut on counterbalance valve.
6. With the chassis key switch on **DECK** and the drive/lift switch in **DRIVE**, depress the interlock lever and slowly pull the control lever to **REVERSE** to drive the wheels.
7. Adjust the counterbalance valve by turning the adjustment screw until the pressure gauge indicates 55 to 69 bar [800 to 1000 psi.]
8. Tighten locknut on valve to 8 Nm. [6 Ft./Lbs.]
9. Check the setting by slowly moving the control lever **FORWARD**, then **REVERSE** checking the gauge to ensure pressures are properly set. Read just as needed.
10. Remove block and lower work platform to ground.
11. Reconnect the proximity switch.
12. Remove the gauge from the gauge port and reinstall cap.
13. Check for proper operation of the drive system and brake.

3.7 SWITCH ADJUSTMENTS

Proximity (Figure 3-7)

The proximity switch is located on the left side of the chassis above the drive wheel. The sealed switch is "U" shaped and is activated by a metal tab welded to the lower boom. When the machine is lowered, and the tab is between the legs of the switch, high speed drive is available. When the machine is raised, the tab exits the switch, and the machine will only drive in creep speed.

Adjustment

1. Adjust proximity switch so machine operates at creep speed when platform is raised above 1.6 m [6 ft.].

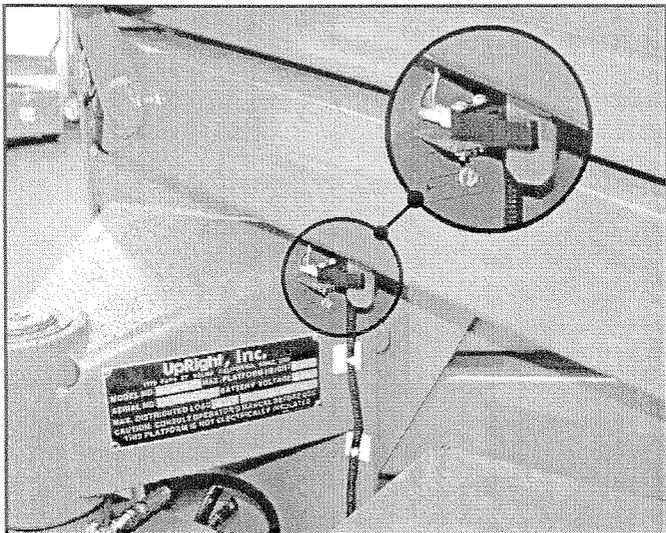


Figure 3-7: Proximity Switch

Tilt Sensor (Figure 3-8)

Introduction

The Tilt Sensor has three wires; red-power (24 v in.), black-ground, white-output (24 v out). To verify the sensor is working properly, there is a red LED under the sensor that lights up when the sensor is not level.

Adjustment

1. Place machine on firm, level surface $\pm 1/4^\circ$.
2. Use Inclinometer (P/N: 010119-000) to ensure front and rear of chassis is level $\pm 1/4^\circ$.
3. Adjust the three leveling screws until the bubble is centered in the inner circle.
4. Remove the adjusting tool.

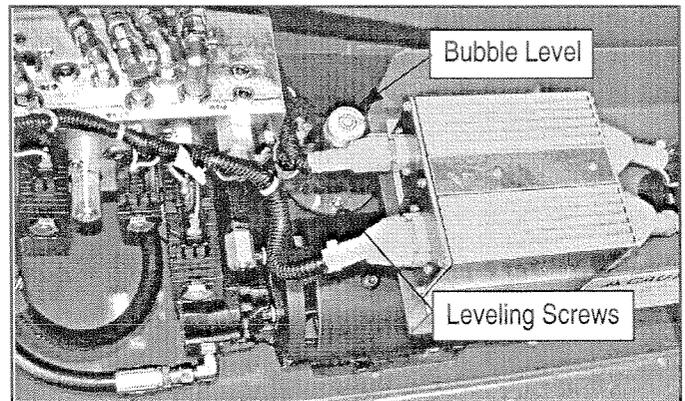


Figure 3-8: Level Sensor Adjustment

Relay Controller Adjustment

The relay control box is located in the lower controls assembly. Remove the cover plate to gain access to the four potentiometers.

Potentiometer	Adjustment
Acceleration	Clockwise to decrease acceleration. Counterclockwise to increase acceleration.
Deceleration	Clockwise to decrease deceleration. Counterclockwise to increase deceleration.
Creep	Clockwise to increase speed. Counterclockwise to decrease speed.
Start Value	Clockwise to increase start value. Counterclockwise to decrease start value.

Table 3-2: Potentiometer Adjustment

1. Turn both acceleration and deceleration pots fully clockwise. This will make the machine slow to accelerate and decelerate.
2. Adjust the start value to allow the machine to move gradually.
3. Adjust the acceleration pot to 1.2 seconds to full speed.
4. Adjust the deceleration pot to 1 second to full stop.
5. Adjust creep speed for elevated drive speed (6.1 m [20 ft.] in 18 to 22 seconds).

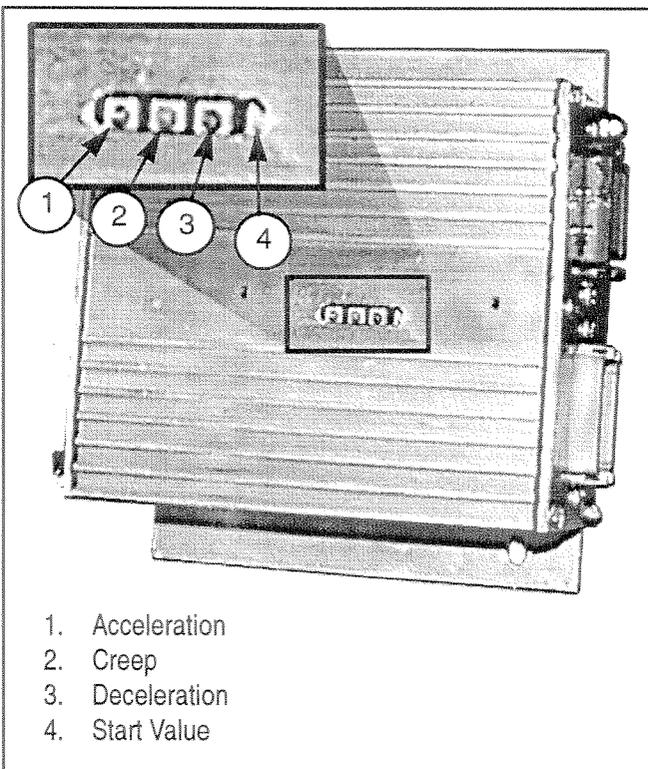


Figure 3-9: Relay Controller Adjustment

Dip Switch Setting, Proportional Controller

Dip 3 is on, all others off.

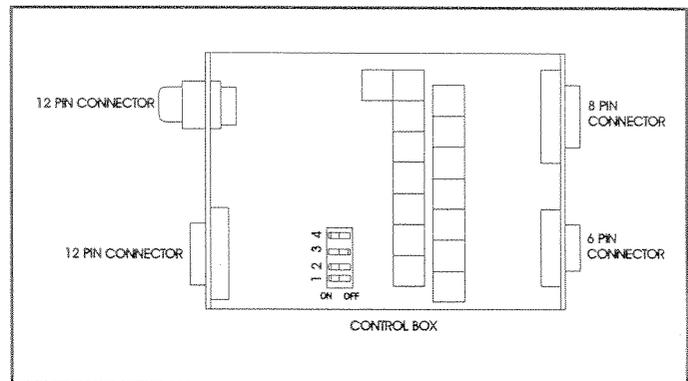
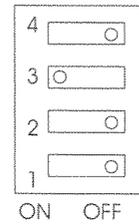


Figure 3-10: Dip Switch Location

3.8 HYDRAULIC MANIFOLD (FIGURE 3-11)

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

Removal

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

Disassembly

Note: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 3-11 often to aid in disassembly and assembly.

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

Cleaning and Inspection

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

Assembly

Note: Lubricate all O-rings before installation to prevent damage to O-rings.

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

Note: torque cartridge valves to 34 Nm. [25 ft. lbs.].

3. Install coils on solenoid valves.

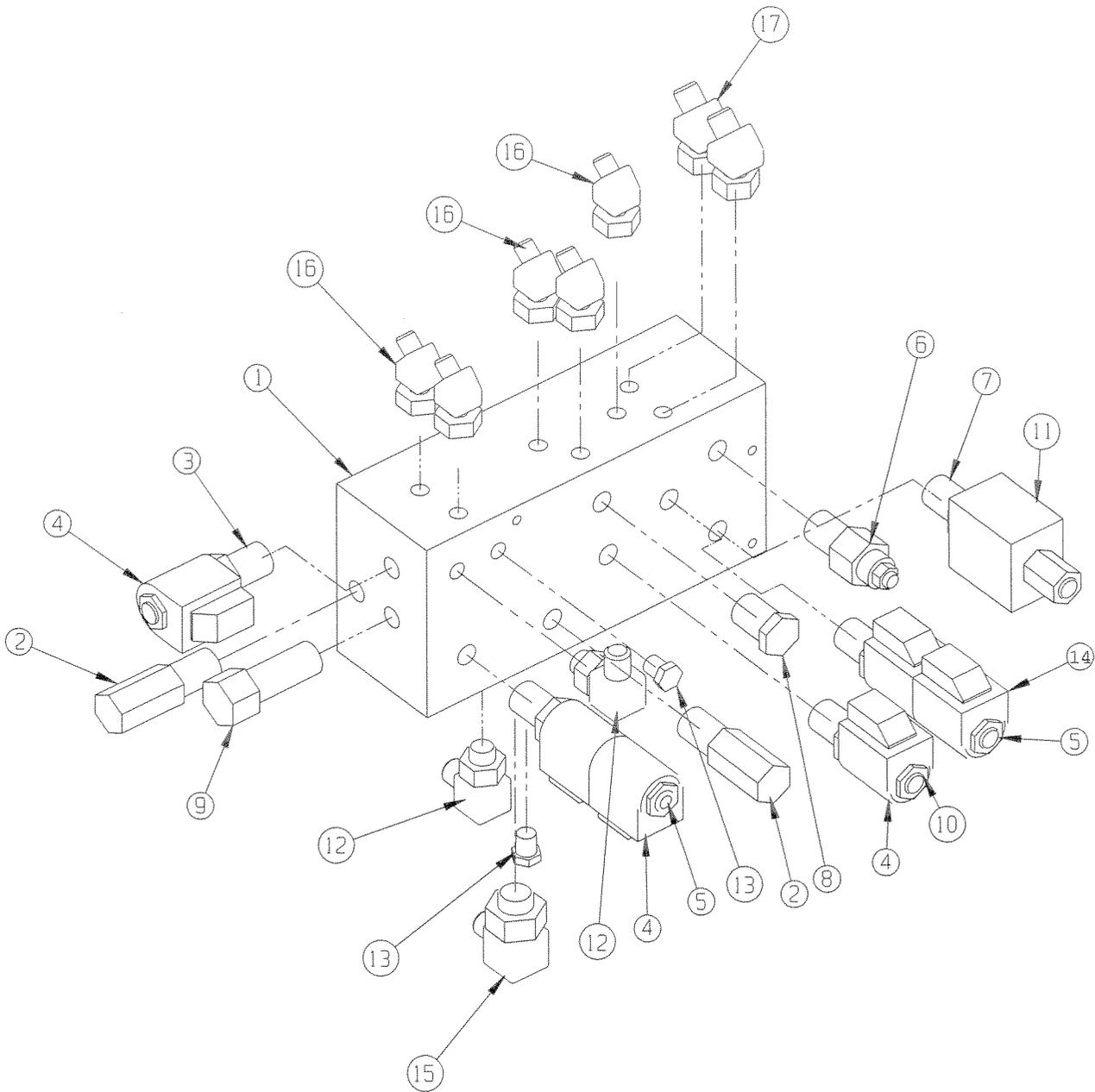
Note: torque coil retaining nuts to 5.4-6.8 Nm. [4-5 ft. lbs.] maximum.

Installation

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

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

2. Connect solenoid leads to terminal strip (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold (see Table 3-3).
4. Operate each hydraulic function and check for proper function and leaks.
5. Adjust all hydraulic pressures according to instructions in Section 3.6



- | | | |
|------------------------------|------------------------------|--------------------|
| 1. Control Valve Block | 7. Proportional Valve | 12. Elbow fitting |
| 2. Main Relief Valve | 8. Check Valve | 13. Plug Fitting |
| 3. Lift Solenoid | 9. Flow Divider | 14. Drive Solenoid |
| 4. Coil, 8 Series 10 Volt DC | 10. Pothole Protection Valve | 15. Elbow Fitting |
| 5. Steer Right/Left Solenoid | 11. Coil | 16. Elbow Fitting |
| 6. Counterbalance Valve | | 17. Elbow Fitting |

Figure 3-11: Hydraulic Manifold, Exploded View

3.9 HYDRAULIC POWER UNIT (FIGURE 3-12)

Removal

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

1. Mark, disconnect and plug the hose assemblies.
2. Loosen the capscrews and remove the power unit from the control module.

Installation

1. Place the power unit into the control module. Torque the mounting screws to 41 Nm. [30 ft.lbs.].
2. Unplug and reconnect the hydraulic hoses.
3. Check the oil level in the hydraulic tank before operating the work platform.

3.10 HYDRAULIC DRIVE MOTORS AND HUBS (FIGURE 3-13)

Removal

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

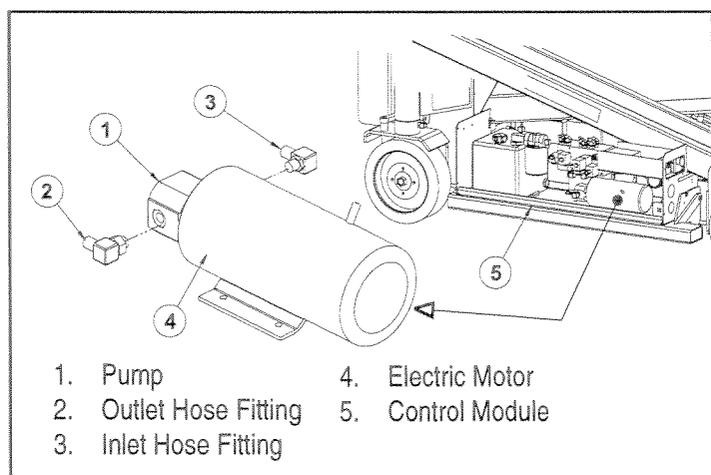


Figure 3-12: Hydraulic Power Unit

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

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

Installation

1. Referring to Figure 3-15, position the drive motor in the motor mount and secure with capscrews and locknuts. Torque to 102 Nm. [75 ft.lbs.].
2. Remove the plugs from the hose assemblies and connect to the drive motor.
3. Install the hub and slotted nut. Torque the locknut to 190-217 Nm. [140 to 160 ft. lbs.]. Install a new cotter pin, do not back-off the nut to install the cotter pin.
4. Install the wheel with lug bolts onto the hub. Torque to 108 Nm [80 ft. lbs.].
5. Remove blocks, lower the jack and remove. Operate the drive system and check for leaks.
6. Drive machine for 20 minutes and re-torque wheel lug bolts and check for leaks.

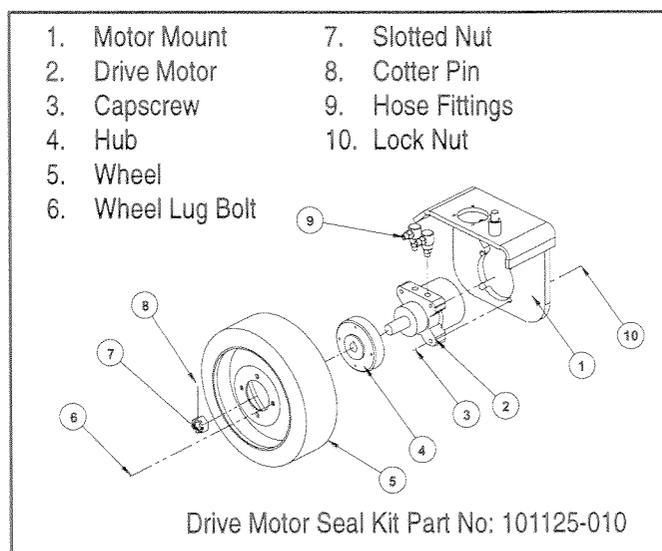


Figure 3-13: Hydraulic Drive Motor

3.11 WHEEL BEARINGS (FIGURE 3-14)

Removal

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

Installation

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

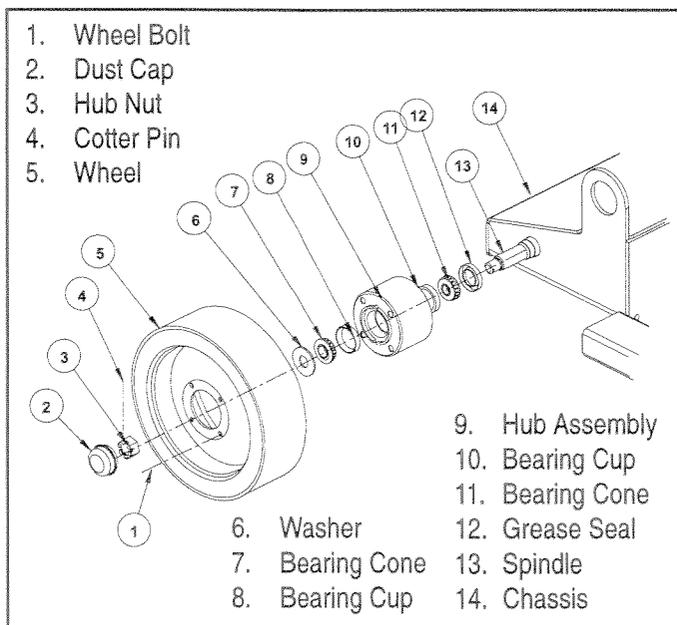


Figure 3-14: Wheel Bearings

3.12 BRAKE CYLINDER (FIGURE 3-15)

Removal

1. Block the wheels to prevent the work platform from rolling.
2. Loosen the wheel lug nuts then, using a 1.5 ton capacity jack, raise the work platform until the tire to be worked on is off the ground.
3. Install support blocks to prevent the work platform from falling if the jack fails.
4. Remove the wheel lug nuts and the wheel.
5. Disconnect the hose assemblies from the drive motor and brake cylinder and cap the openings to prevent foreign material from entering.

NOTE: The motor mount assembly is heavy. The use of a support device is recommended.

6. Remove the retaining ring and brake retaining washer from the top of the brake cylinder.
7. Slowly lower the motor mount assembly and guide the brake cylinder out of the brake cylinder mount. The spindle thrust washer will come off with the brake cylinder.
8. Lay the motor mount assembly on its side to access the brake cylinder mounting screws.
9. Remove the mounting screws and remove the cylinder from the motor mount.

Installation

1. Install the brake cylinder assembly onto the motor mount assembly. Apply Loctite 242 and torque the cap screws to 41 Nm. [30 ft.lbs.].
2. Place the spindle thrust washer onto the spindle of the brake cylinder assembly.
3. Raise the motor mount and brake cylinder assembly into the brake cylinder mount.
4. When the brake cylinder is almost fully inserted into the brake cylinder mount, align the steering arm with the steering arm spindle.
5. Raise the unit until it is fully inserted into the brake cylinder mount.
6. Install the brake cylinder retaining washer and secure with snap ring.
7. Connect the hose assemblies.
8. Install the wheel with lug bolts onto the hub. Torque to 108 Nm. [80 ft. lbs.].
9. Remove blocks, lower the jack and remove. Operate the brakes and drive system and check for leaks.
10. Drive machine for 20 minutes and re-torque wheel lug bolts and check for leaks.
11. Operate the drive circuit and check that the shaft retracts and clears the wheel. Check for leaks.

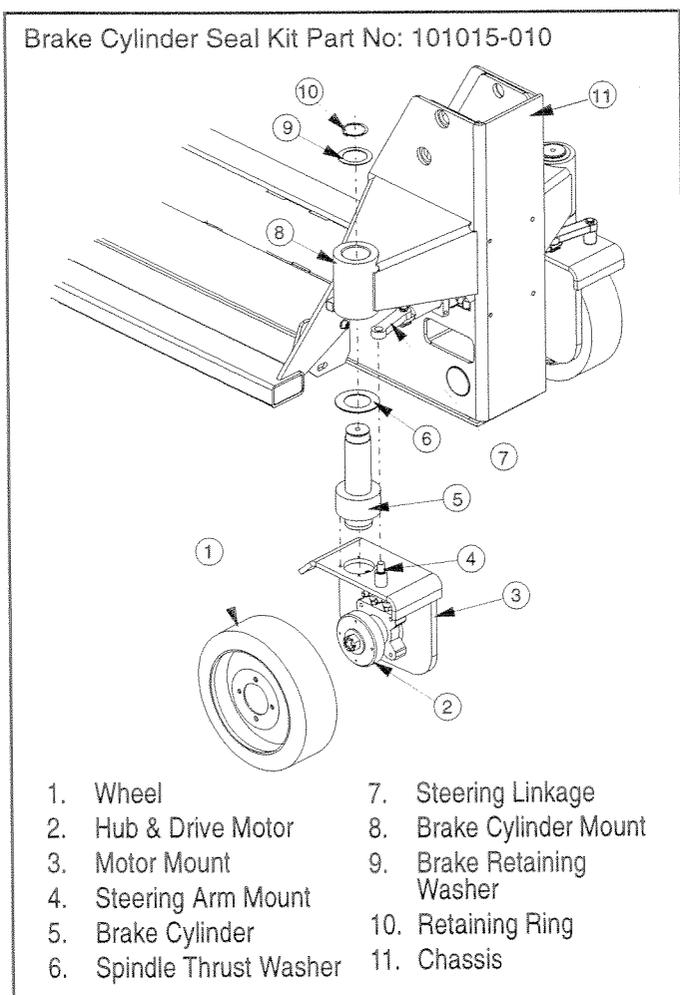


Figure 3-15: Brake Cylinder

3.13 STEERING CYLINDER (FIGURE 3-16)

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 retaining rings and the steering pins from both ends of the steering cylinder.
3. Remove the steering arms from both ends of the steering cylinder.
4. Remove the locknuts and capscrews from the steering bearing flanges.
5. Slide the steering cylinder out of the chassis.

Disassembly

1. Unscrew heads from cylinder.
2. Pull rod from cylinder.
3. Remove seal kit components from head and piston.

Cleaning and Inspection

1. Wash all the metal parts in cleaning solvent and blow dry with filtered compressed air.

2. Inspect all the threaded components for stripped or damaged threads.
3. Check the inside surface of the cylinder barrel for scoring or excessive wear.
4. Check the piston and headcap for scoring or excessive wear.
5. Inspect the surface of the shaft for scoring or excessive wear.

Assembly and Installation (Figure 3-17)

1. Lubricate and install new rod seal, rod wiper, backup ring and o-ring on the headcaps.
2. Lubricate and install the seal and wear ring in the piston.
3. Lubricate the piston seal with clean hydraulic fluid and install the rod assembly in the cylinder barrel.
4. Screw headcaps into cylinder barrel.

Installation

1. Installation is reverse of removal.
2. Cycle steering cylinder several times to remove air from the system.
3. Check cylinder for proper operation and check all connections for leaks.

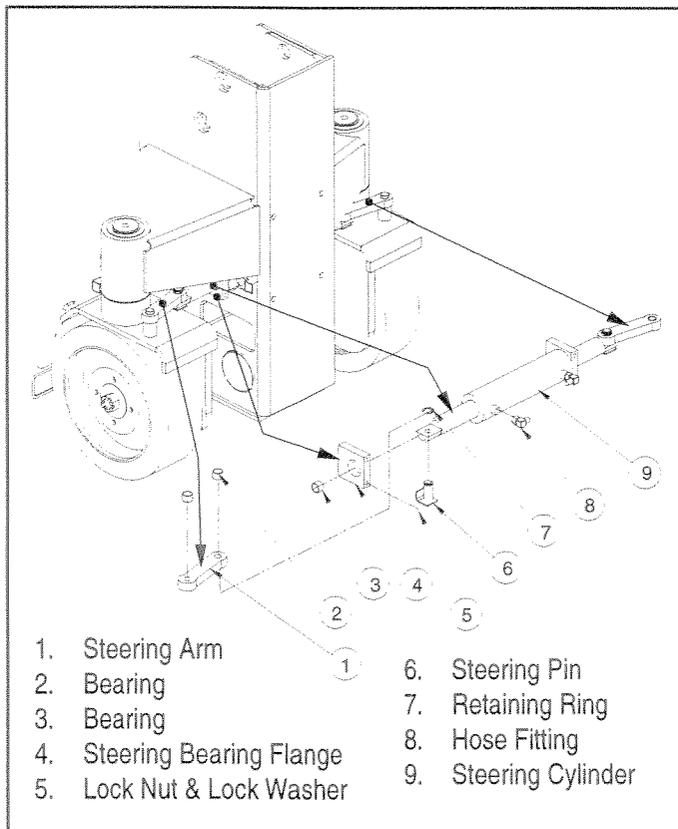


Figure 3-16: Steering Cylinder Installation

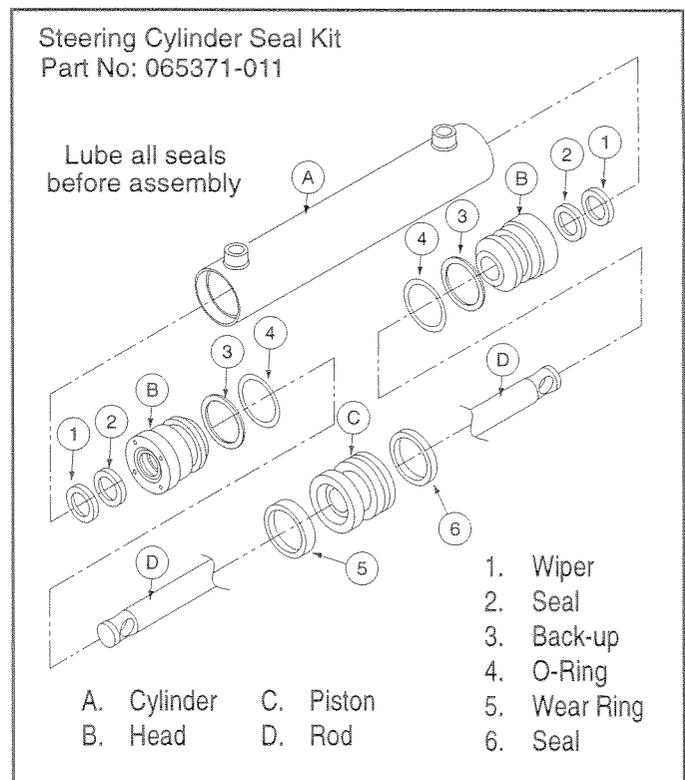


Figure 3-17: Steering Cylinder Assembly

MAINTENANCE

Section
3.13

NOTES:

3.14 LIFT CYLINDER (FIGURE 3-19)**Removal**

1. Block Elevating Assembly (Figure 3-3).
2. Provide a suitable container to catch the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove the set screw from end of cylinder rod.
4. Place a 61 cm [2 ft.] long plank, at least 25 mm [1 in.] thick, across the top of the modules.
5. Support rod end of cylinder and remove rod end cylinder pin and let cylinder down to rest on the plank.
6. Support the lower tension links.
7. Attach a suitable hoisting device and sling to the cylinder.
8. Support the cylinder so the barrel end cylinder pin can be removed, then remove the cylinder from the machine with the hoisting device.
9. Move cylinder to a prepared work area.

Disassembly (Figure 3-19)

1. Remove set screw which secures cylinder head.
2. Unscrew head from cylinder.
3. Pull rod assembly out of cylinder.
4. Remove seal kit components from head and piston.
5. Check end bearing for wear. Remove and replace if necessary.

Cleaning and Inspection

1. Clean all metal parts in solvent and blow dry with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring or excessive wear.
4. Replace any parts found unserviceable.

Reassembly

1. Lubricate and install wear rings and seal on piston.
2. Lubricate and install static seal rod seal and rod wiper on head.
3. Carefully slide rod assembly into cylinder.
4. Screw head into cylinder and secure using set screw.

Installation (Figure 3-18)

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

1. Place two 61 cm [2 ft.] long planks, at least 25 mm [1 in.] thick, across the top of the modules.
2. Place the lift cylinder on the planks across the modules.
3. Lift the lower tension links into position.
4. Lift the barrel end of the cylinder into place and push the cylinder pin in until approximately 38 mm [1 in.] is still exposed.

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

5. Install anti-rotation pin into cylinder pin aligning with hole in the lower tension link and push the cylinder pin completely in. Secure with set screw.
6. Lift rod end of cylinder into place and insert pin. Install anti-rotation pin into rod-end pin aligning with hole in the upper boom and push the cylinder pin completely in. Secure with set screw.
7. Cycle lift cylinder several times.
8. Test with weight at rated platform load to check system operation.

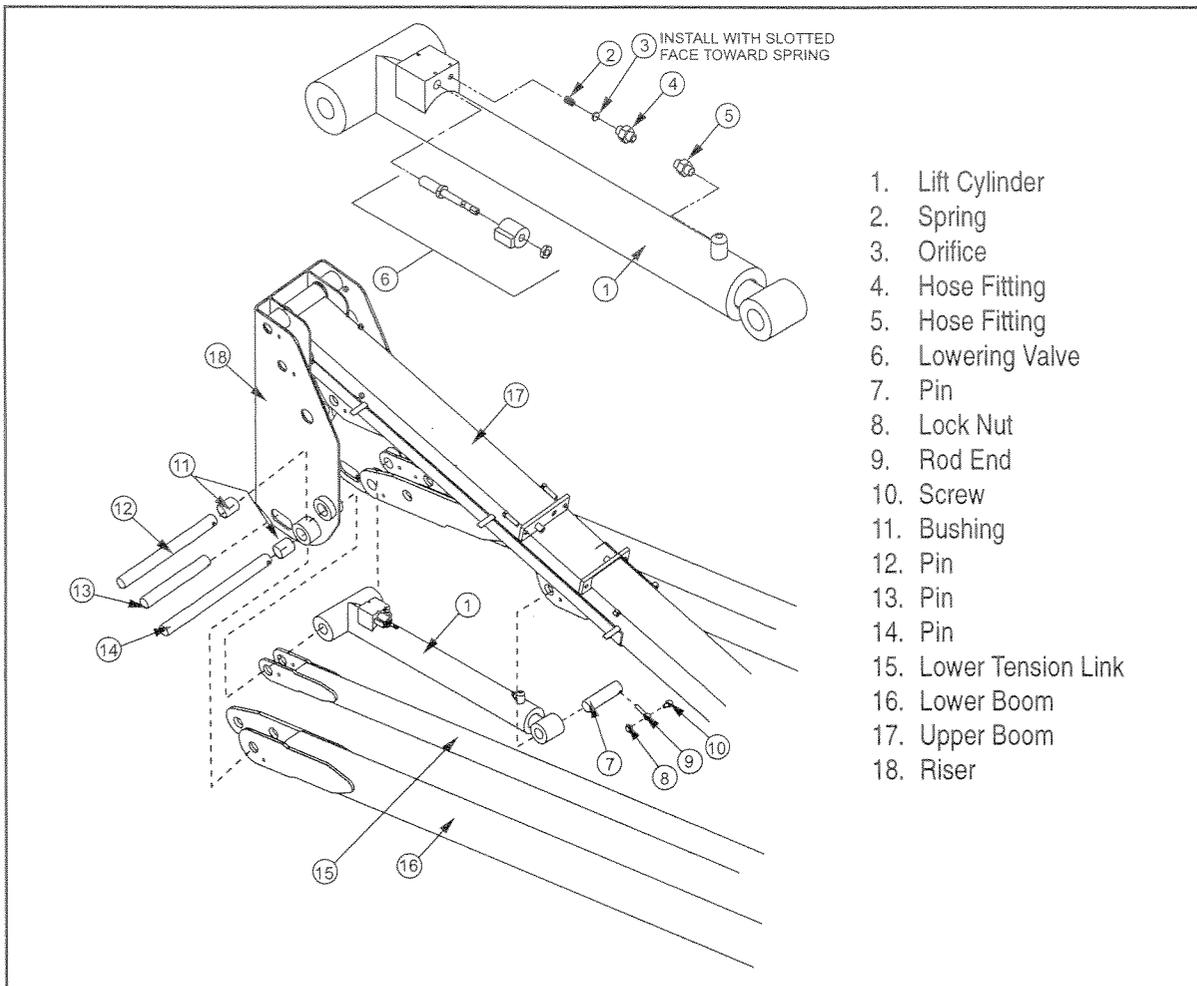


Figure 3-18: Lift Cylinder Installation

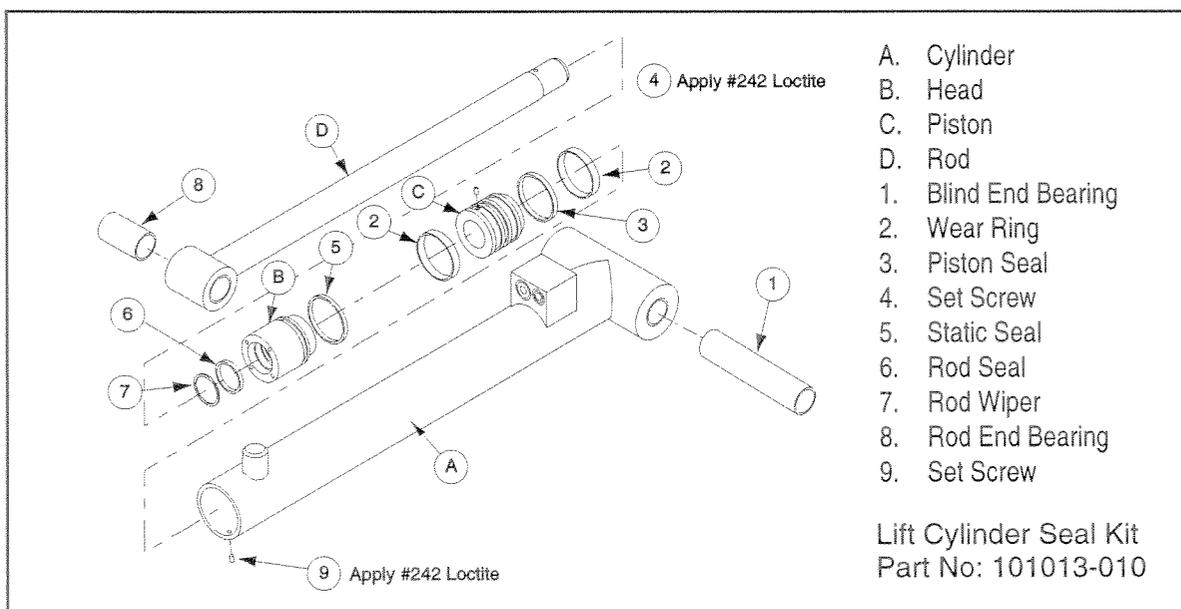


Figure 3-19: Lift Cylinder Assembly

**3.15 POTHOLE CYLINDER
(FIGURE 3-20)**

Removal

1. Mark and disconnect the hose assemblies from the fittings and immediately cap the openings to prevent foreign material from entering.
2. Support the pot hole tube weldments on both sides.
3. Remove the cotter pin and the pot hole pine weldment from both ends of the pothole cylinder.
4. Lift the cylinder out of the unit and move to a prepared work area.

Disassembly (Figure 3-21)

1. Unscrew head from cylinder.
2. Pull rod assembly from cylinder.
3. Remove seal kit components from head and piston.

Cleaning and Inspection

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

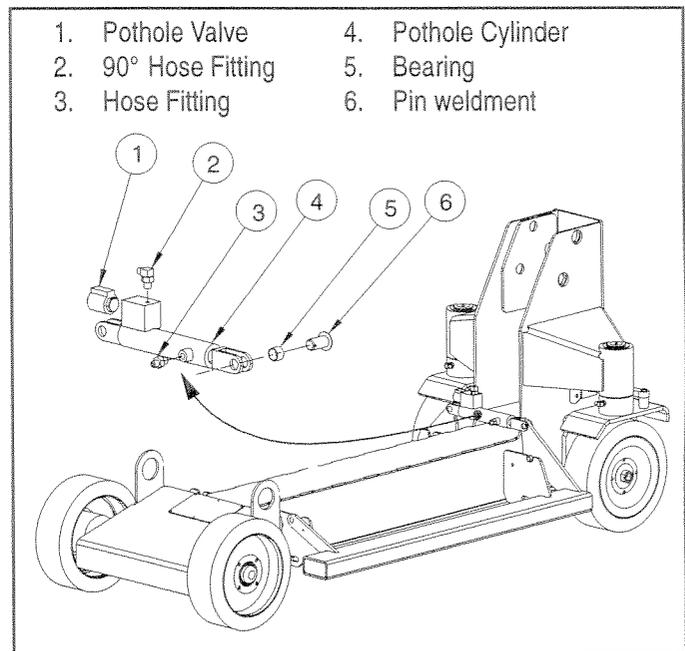


Figure 3-20: Pothole Cylinder Installation

Assembly

1. Lubricate and install seal on piston.
2. Lubricate and install rod wiper, rod seal and static seal onto head.
3. Carefully push rod assembly into cylinder.
4. Screw head into cylinder.

Installation

1. Installation is reverse of removal.
2. Cycle cylinder several times to remove air from system.
3. Check all connections for leaks.

Pothole Protection System Adjustment

1. Place machine on firm level surface $\pm 1/4^\circ$.
2. Raise the machine for access to level sensor.
3. Center level sensor bubble by turning adjustment screws on level sensor (Figure 3-8).
4. Set proximity switch to de-activate at 1.6 m [6 ft.] platform height (Figure 3-7).
5. Check that pothole protectors are fully deployed before limit switch de-activates when lifting.
 - a. Machine should not elevate above 1.6 m [6 ft.] while on a 2° slope.
 - b. Machine should have low speed drive when limit switch is de-activated and machine is level.
 - c. Machine should have high speed drive when limit switch is activated.
 - d. Tilt alarm should sound when platform is elevated above 1.6 m [6 ft.] and machine is off level by 2°
7. Adjust stops so that it allows $3/4^\circ$ ($\pm 1/16^\circ$) ground clearance.

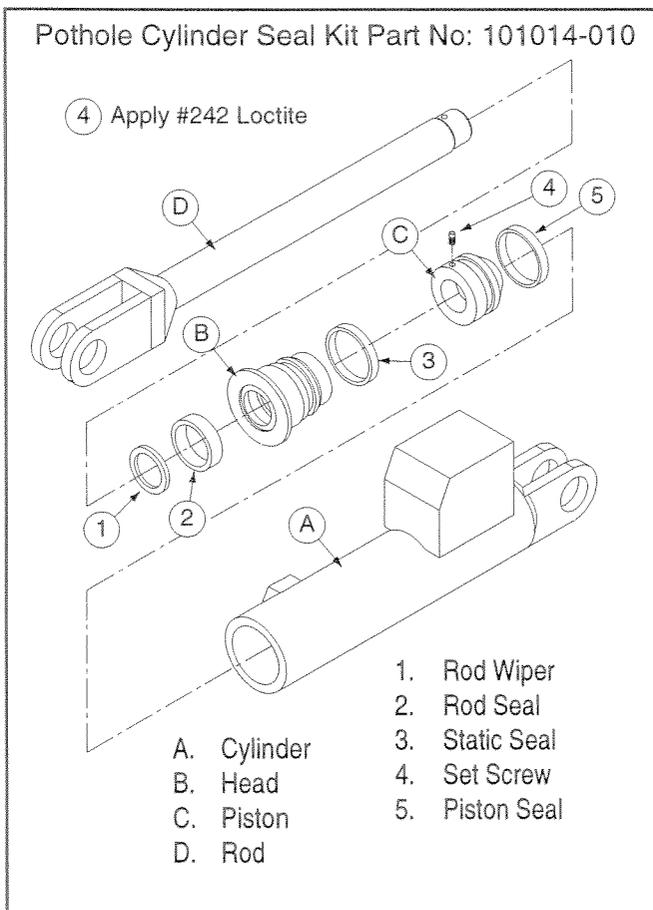


Figure 3-21: Pothole Cylinder Assembly

**3.16 ADJUSTABLE COMPRESSION TUBE
(FIGURE 3-22)**

Support platform using an overhead hoist. Add shims as required to level platform $\pm 75^\circ$ (1 1/4").

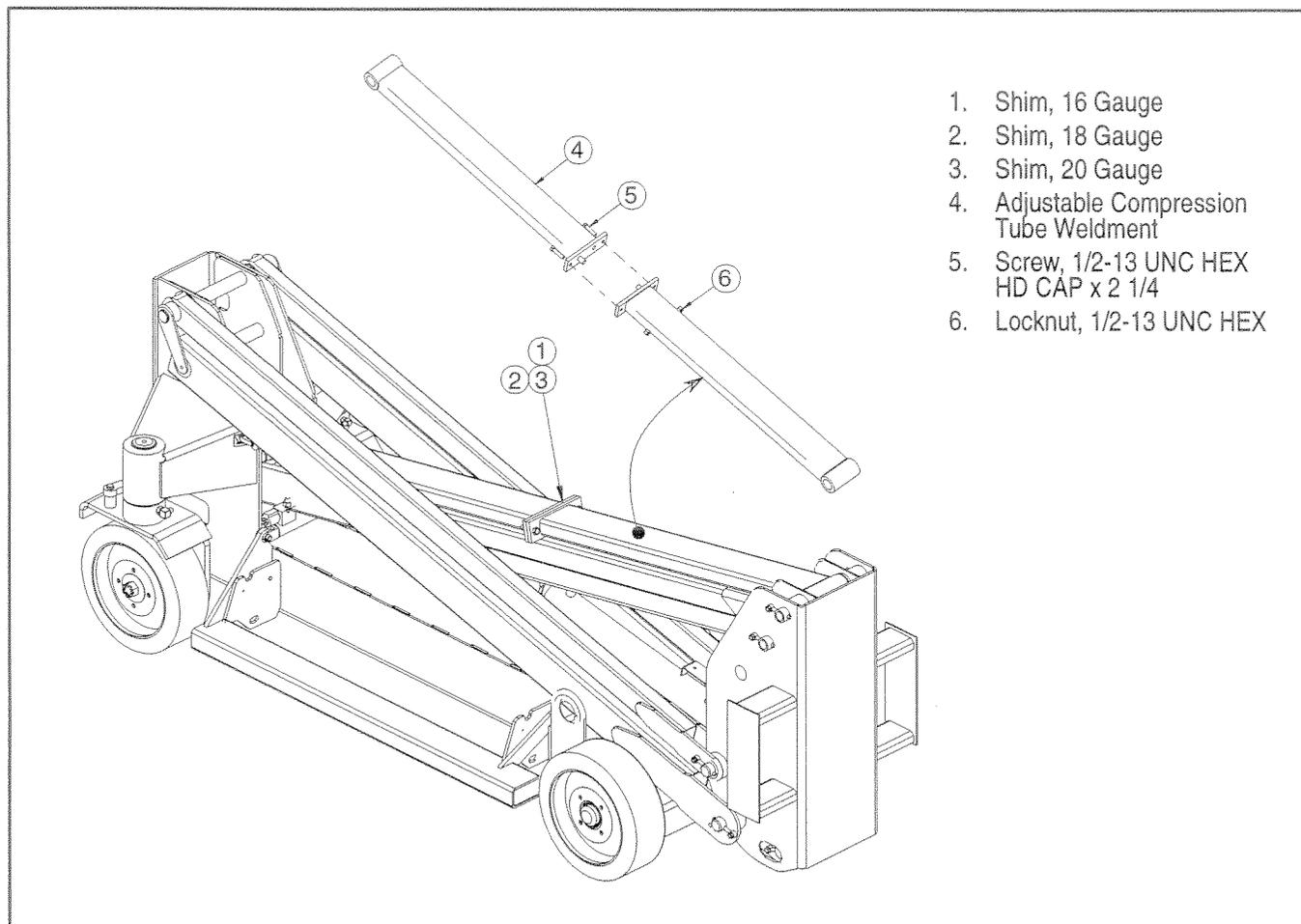


Figure 3-22: Compression Tube Assembly

3.17 ELECTRIC MOTOR (FIGURE 3-23)

Troubleshooting

1. Read the nameplate to become familiar with the motor, especially the rated voltage.
2. Try to turn the shaft by hand. Keep motor leads separated while doing this. If the shaft turns freely go to step 3. If the shaft won't turn, proceed to step 2A.
- 2A. The shaft could be tight for a number of reasons, this check is to determine if the tightness is of a temporary nature only. Obtain power to produce the nameplate voltage. Do Not make a permanent connection. First touch the motor leads quickly to the power supply just long enough to observe if the shaft runs. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to step 3. If the motor sounds noisy, it should be taken apart as described in the disassembly section.

3. If the motor turned freely, connect an ammeter in the circuit as shown in Figure 3-23A. With rated voltage applied and the shaft running free, the ammeter should read less than 20% of the nameplate full load current. If the motor meets the above conditions then it can be assumed the original problem is external to the motor.

Disassembly

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

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

Inspection

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

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

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

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

Reassembly

1. Install new brushes and be sure they are free in the holder. Install brush with the lead wires positioned as when received. Raise all brushes to the locked position. (See Figure 3-23B 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.

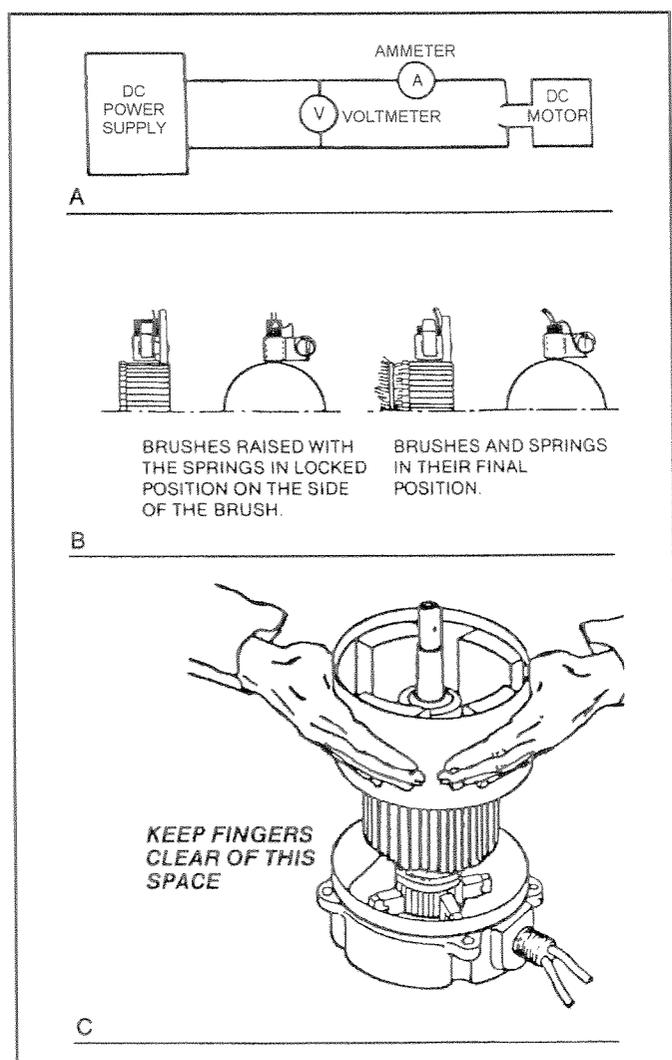


Figure 3-23: Electric Motor Service

- Take a complete armature assembly, including bearings, and insert commutator end bearing into the bearing bore.

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

- Set the brushes to final position as shown in Figure 3-23B.
- Place the complete stator down over the vertical armature, and into position on the commutator cover.
- The stator assembly must be placed in a definite relationship with the commutator covers in order to obtain a neutral brush setting. There is a match-mark on both items. **These two marks must line up exactly. Rotate until they do.**
- Assemble the pulley end cover in the proper relationship. Insert mounting bolts and tighten alternately to ensure a good mechanical alignment.
- Spin the shaft by hand to see if it is free. Be sure motor leads (if used) are not touching together. If the leads are touching, a generator action will give the effect of friction in the motor. A no-load test can now be performed. At rated voltage, observe the no-load current. It should be less than 20% of the nameplate full load current. Anything higher indicates:
 - Brushes are not on neutral setting (check match-marks for exact alignment).
 - Faulty armature.

3.18 TORQUE SPECIFICATIONS (TABLE 3-3)

Fasteners

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

Table 3-3: Bolt Torque

Thread Size American National Standard -UNF (line)	Width Across Flats	Torque Value	
		English	Metric
1/4	7/16	110 in./lbs	12 Nm
5/16	1/2	190 in./lbs	22 Nm
3/8	9/16	30 ft./lbs	41 Nm
7/16	5/8	50 ft./lbs	68 Nm
1/2	3/4	75 ft./lbs	102 Nm
5/8	15/16	150 ft./lbs	203 Nm
3/4	1 1/8	250 ft./lbs	339 Nm
7/8	1 5/16	400	542 Nm
1	1 1/2	600 ft./lbs	813 Nm

Hydraulic Components (Table 3-4)

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 3-4: Hydraulic Component Torque

Type: SAE Part Series	Cartridge Poppet		Fittings		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

Coil Nuts: 30 In/Lbs (3 Nm)

Section 4

TROUBLESHOOTING

INTRODUCTION

This section contains troubleshooting Truth Tables for the 12 Volt SL20 Series Work Platform.

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, ensure that all four (4) outriggers are properly installed.

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

GENERAL PROCEDURE

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

UPRIGHT USA

TEL: 1-559-891-5200

FAX: 1-559-896-9244

UPRIGHT IRELAND

TEL: 353-1-202-4100

FAX: 353-1-202-4105

Table 4-1: Electric Truth Table, Proportional

COMPONENT		FUNCTION	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	LIFT	DRIVE FORWARD	CREEP	STEER LEFT	STEER RIGHT	BATTERY CHARGE	DOWN	DRIVE REVERSE	POTHOLE EXTEND	POTHOLE RETRACT	BRAKES
ALM	ALARM										X				
BAT	BATTERIES		X	X	X	X	X	X	X	X	X	X	X	X	X
CB	CIRCUIT BREAKER (15 AMP)		X	X	X	X	X	X	X		X	X	X	X	X
CHG	BATTERY CHARGER									X					
CONT1	JOYSTICK CONTROLLER		X		X	X	X	X	X		X	X			
CONT2	RELAY CONTROLLER		X	X	X	X	X	X	X		X	X	X	X	X
CR1	MOTOR START RELAY		X	X	X	X	X	X	X				X	X	X
CR1	RELAY CONTACT (N.O.)		X	X	X	X	X	X	X		X		X	X	X
CR1	RELAY CONTACT (N.C.)									X					
FU1	FUSE (175 AMP)		X	X	X	X	X	X	X		X	X	X	X	X
MOT	MOTOR		X	X	X	X	X	X	X			X	X	X	X
MTR	HOURLY METER (OPTIONAL)				X	X	X	X	X			X			
S1	POWER TO JOYSTICK		X		X	X	X					X			
S2	DOWN / REVERSE										X	X			
S3	LIFT / FORWARD				X	X									
S4	SELECTOR: LIFT / DRIVE		X		X	X	X	X	X		X	X			
S5	PLATFORM EMERGENCY STOP		X	X	X	X	X	X	X		X	X			
S6	ROCKER SWITCH (STEERING)							X	X						
S7	INTERLOCK SWITCH		X		X	X	X	X	X		X	X			
S8	UP / DOWN SWITCH			X	X						X				
S9	KEY SWITCH		X	X	X	X	X	X	X		X	X	X	X	X
S10	CHASSIS EMERGENCY STOP		X	X	X	X	X	X	X		X	X	X	X	X
S11	PROXIMITY SWITCH													X	
SNSR	TILT SENSOR		X	X	X	X	X	X	X			X			
SOL1	PROPORTIONAL SOLENOID		X		X	X	X					X			
SOL2	FORWARD SOLENOID					X									
SOL3	REVERSE SOLENOID											X			
SOL4	LIFT SOLENOID				X								X		
SOL5	POTHOLE EXTEND SOLENOID												X		
SOL6	STEER LEFT SOLENOID							X							
SOL7	STEER RIGHT SOLENOID								X						
SOL8	DOWN SOLENOID										X				
SOL9	POTHOLE RETRACT SOLENOID													X	

TROUBLESHOOTING

Section 4

Table 4-2: Hydraulic Truth Table

COMPONENT		FUNCTION	LIFT	DRIVE FORWARD	CREEP	STEER LEFT	STEER RIGHT	DOWN	DRIVE REVERSE	POTHOLE EXTEND	POTHOLE RETRACT	BRAKES
CV1	CHECK VALVE									X	X	
CYL1	STEER CYLINDER					X	X					
CYL2	BRAKE CYLINDER			X	X				X			X
CYL 3	LIFT CYLINDER		X									
CYL4	POTHOLE CYLINDER									X	X	
FD1	FLOW DIVIDER		X	X	X	X	X		X	X	X	X
FL1	RETURN FILTER		X	X	X	X	X	X	X	X	X	
FL2	TANK FILTER (SCREEN)		X	X	X	X	X		X	X	X	
MOT1	LEFT DRIVE MOTOR			X	X				X			
MOT2	ROGHT DRIVE MOTOR			X	X				X			
ORF1	DOWN ORIFICE							X				
ORF2	UP ORIFICE		X									
PMP	PUMP		X	X	X	X	X		X	X	X	X
RV1	MAIN RELIEFE VALVE		X									
RV2	STEERING RELIEF VALVE					X	X					
V1	STEERING VAVLE					X	X					
V2	COUNTERBALANCE VALVE			X	X				X			X
V3	LIFT VALVE		X	X					X	X		
V4	FORWARD / REVERSE VALVE		X						X			
V5	PROPORTIONAL VALVE		X	X	X				X			
V6	DOWN VALVE							X				
V7	POTHOLE EXTEND VALVE		X							X		
V8	POTHOLE RETRACT VALVE			X							X	

TROUBLESHOOTING

NOTES:

Section 5

SCHEMATICS

5.1 INTRODUCTION

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

The diagrams are to be used in conjunction with the *Troubleshooting Truth Tables* in *Section 4*. They allow understanding of the makeup and functions of the systems for checking, tracing, and fault-finding 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	5-3
Hydraulic Schematic	5-5
Hydraulic Manifold	5-5

Table	Page
5-1: Electrical Schematic	5-2
5-2: Hydraulic Schematic	5-4

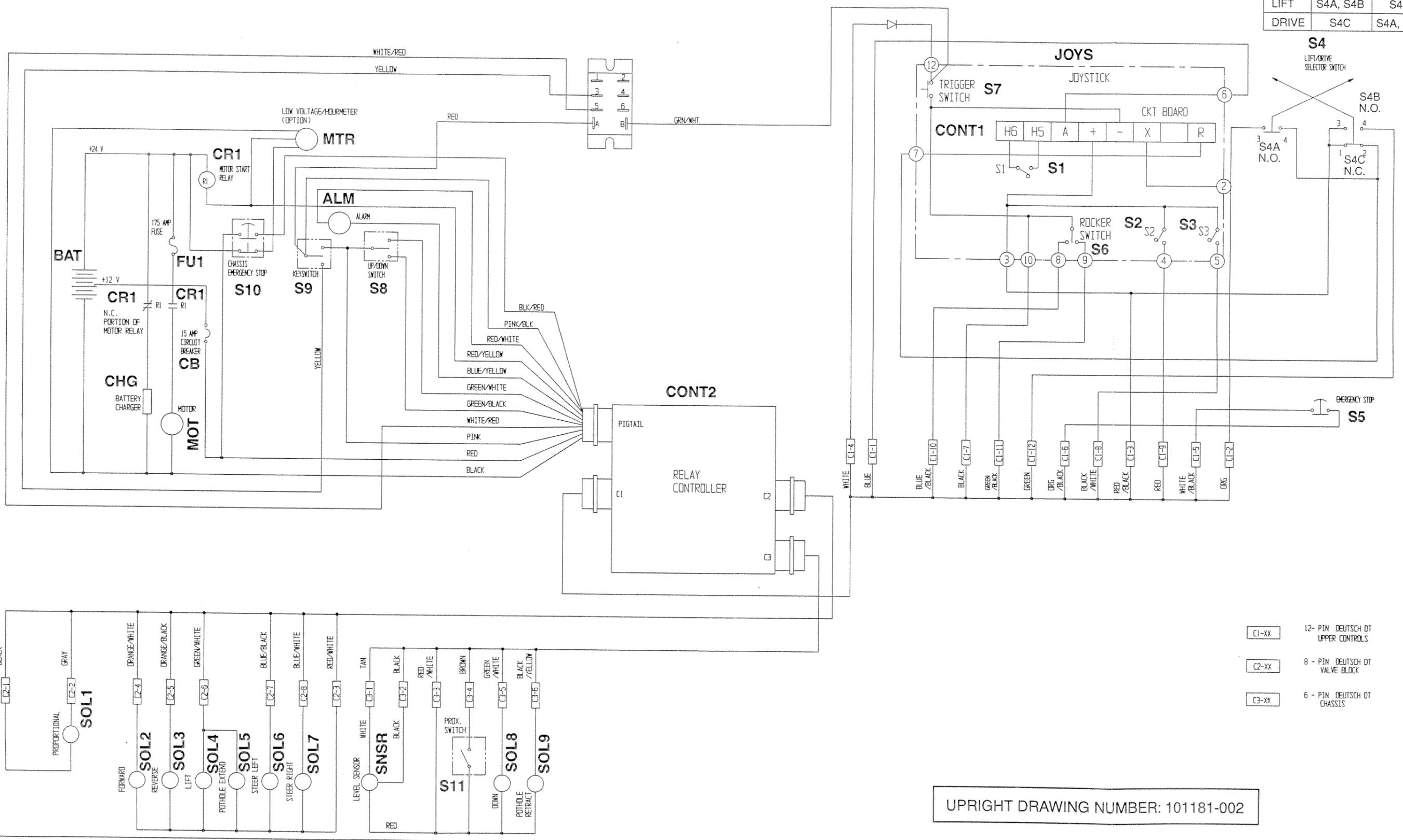
5.2 ELECTRICAL SCHEMATIC, PROPORTIONAL CONTROLS

Table 5-1: Electrical Schematic Legend for Standard Toggle Controls

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM	Alarm, Down/Tilt	Provides warning sound (60 Hz) when the platform is lowering. Provides warning sound (600Hz) when platform is elevated on slopes of 2° side to side and 2° fore and aft.	Bottom of lower control box
BAT	Batteries (4), 6 volts each.	To store energy.	Inside Power Module
CB	Circuit Breaker	Overload protection.	Chassis Control Panel
CHG	Battery Charger	Charge Batteries.	Inside Power Module
CONT1	Joystick Controller	Logic for Joystick Functions.	Upper Control Box
CONT2	Controller	Logic for machine functions.	Control Module
CR1	Relay, Motor Start	Starts Motor.	Bottom of Lower Control Box
CR1 (N.O.)	Relay, Contact	Starts Motor.	Lower Control Box
CR1 (N.C.)	Relay, Contact	Disconnects Battery Charger.	Lower Control Box
FU1	Fuse, 175 AMP	Overload protection for the electric motor.	Lower Control Box
JOYS	Joystick	Activate Proportion Lift/Drive.	Upper Controller
MOT	Motor, Electric	Provides power to drive hydraulic pump.	Control Module
MTR	Meter, Hour (option)	Shows hours machine has operated.	Lower Control Box
S1	Switch, Joystick	Provides power to Joystick "+" terminal and Motor Start Relay through Joystick Circuit Board.	Front switch closest to center of joystick when joystick is held in assembled position
S2	Switch, Joystick Down/Reverse	Provides power to Drive/Lift circuit when joystick is pushed forward.	Left front switch on joystick when joystick is held in assembled position
S3	Switch, Joystick Lift/Forward	Provides power to Drive/Lift circuit when joystick is pushed forward.	Left rear switch on joystick when joystick is held in assembled position
S4	Switch, Lift - Drive Selector	Activates Lift - Drive functions.	Platform Controller
S5	Switch, Controller Emergency Stop Button	Control circuit cutoff.	Platform Controller
S6	Switch, Steering	Provides power to either right or left steer valve solenoids.	Rocker actuator on top of joystick
S7	Switch, Interlock Lever	Provides power to controller.	Platform Controller, in front of joystick
S8	Switch, Up/Down	Provides power to Up/Down Circuit.	Lower Control Box
S9	Switch, Chassis Key	Power on. Power to Chassis/Platform functions.	Lower Control Box
S10	Switch, Chassis Emergency Stop	Stops all machine functions.	Lower Control Box
S11	Switch, Proximity	Controls drive speed.	Behind front left wheel
SNSR	Sensor, Tilt	Activate tilt alarm. Disable all machine functions except Platform Lower when machine is more than 2° off level.	Control module
SOL1	Solenoid, Proportional	Controls Proportional Valve.	Manifold Block
SOL2	Solenoid, Forward	Shifts Forward/Reverse Valve to forward position.	Manifold Block
SOL3	Solenoid, Reverse	Shifts Forward/Reverse Valve to reverse position.	Manifold Block
SOL4	Solenoid, Lift	Raise Platform.	Manifold Block
SOL5	Solenoid, Pothole Extend	Extend Pothole Cylinder.	Manifold Block
SOL6	Solenoid, Steer Left	Shifts Steer Valve to Left Turn position.	Manifold Block
SOL7	Solenoid, Steer Right	Shifts Steer Valve to Right Turn position.	Manifold Block
SOL8	Solenoid, Down	Lowers Platform.	Lift Cylinder
SOL9	Solenoid, Pothole Retract	Retract Pothole Cylinder.	Pothole Cylinder

SCHEMATICS

S4	OPEN	CLOSED
LIFT	S4A, S4B	S4C
DRIVE	S4C	S4A, S4B



- C1-XX 12-PIN DEUTSCH DT UPPER CONTROLS
- C2-XX 8-PIN DEUTSCH DT VALVE BLOCK
- C3-XX 6-PIN DEUTSCH DT CHASSIS

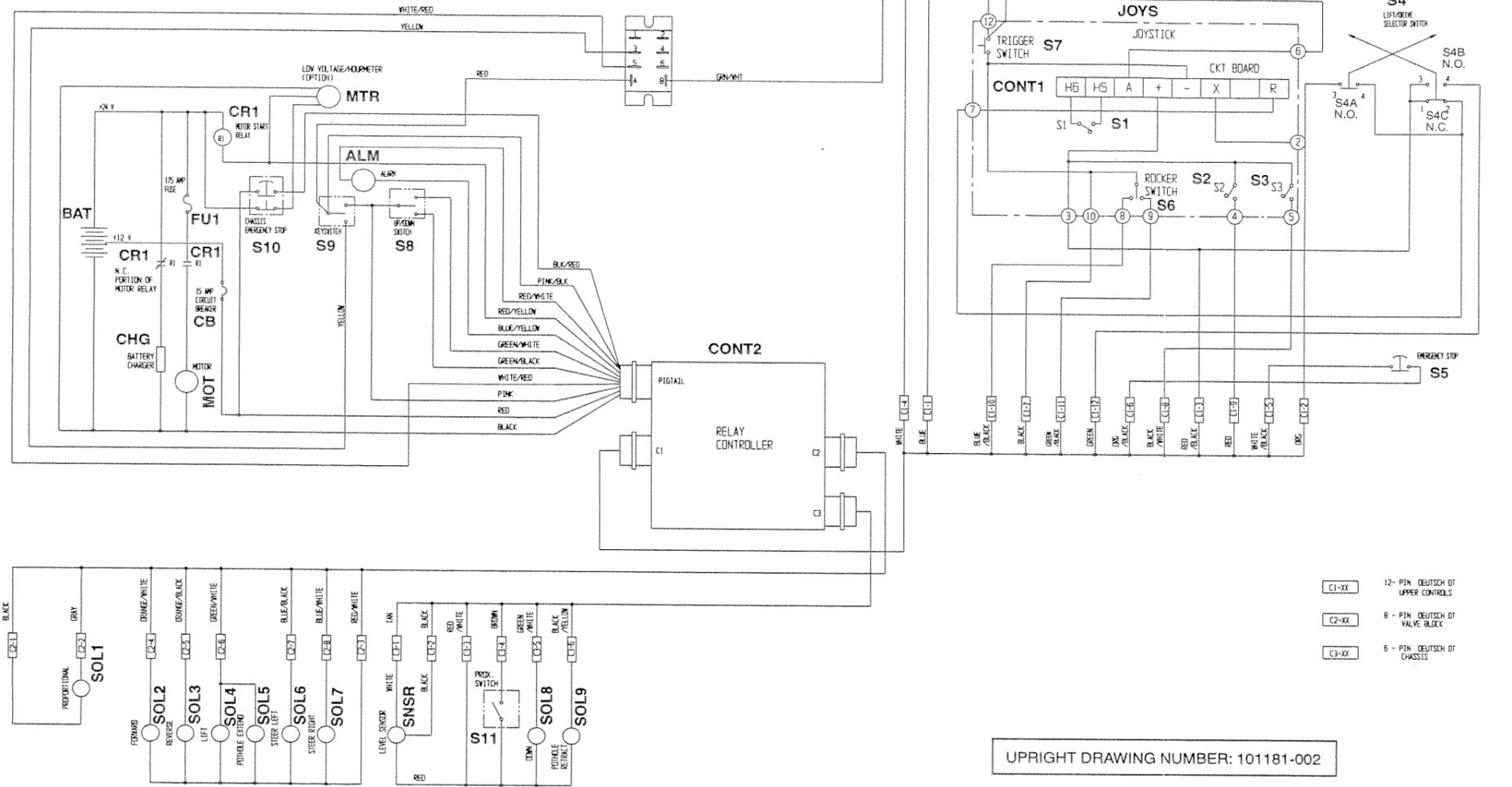
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5.3 HYDRAULIC SCHEMATIC

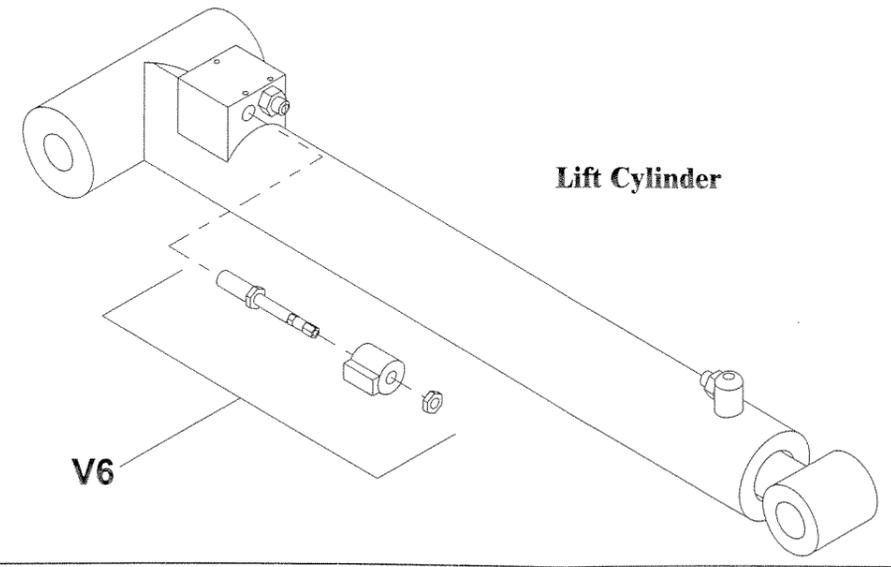
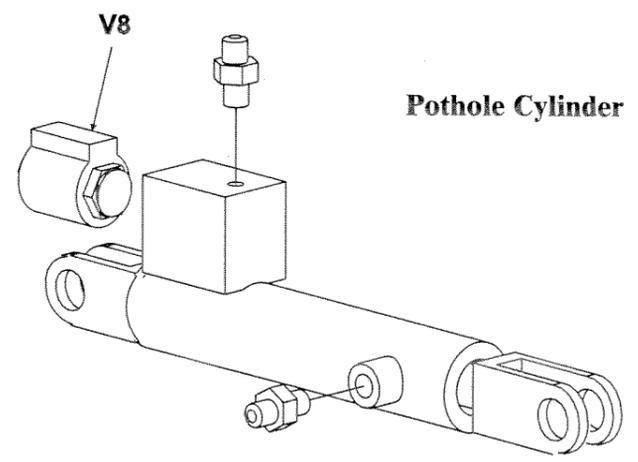
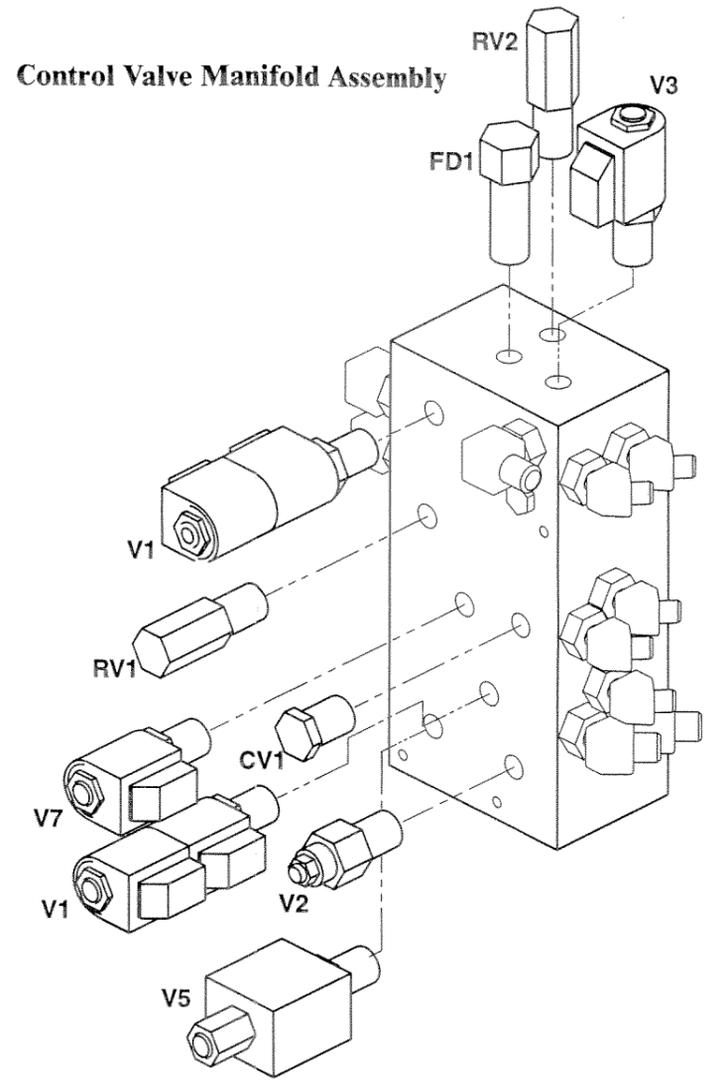
Table 5-2: Hydraulic Schematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CV1	Check Valve, Pothole Protection	Allows Pothole Cylinder to retract	Manifold Block.
CYL1	Cylinder, Steering	Provides force to turn front wheels.	Front of Chassis above front tires.
CYL2	Cylinder, Brake	Stops machine from moving while parked.	Front of Chassis above tires.
CYL3	Cylinder, Lift	Provides force to lift platform	Mounted under boom weldment.
CYL4	Cylinder, Pothole Protection	Extend/Retract PHP Bar.	In front of Hydraulic Tank.
FL1	Filter	Filters oil returning to tank.	Back of Hydraulic Tank.
FL2	Suction Screen	Traps particles in Hydraulic Tank.	Inside Hydraulic Tank at outlet.
FD1	Flow Divider	Provides priority oil flow to steering.	Manifold Block.
MOT1	Drive Motor	Provides power to left drive wheel.	At left front motor mount.
MOT2	Drive Motor	Provides power to right drive wheel.	At right front motor mount.
PMP	Pump	Supplies hydraulic oil flow for all functions.	On Electric Motor in Control Module.
RV1	Main Relief Valve	Provides over pressure protection to pump and limits platform lifting capacity.	Manifold Block
RV2	Steering Relief Valve	Provides over pressure protection to pump and steering components when steering.	Manifold Block.
V1	Steering Valve	Provides directional control for steering cylinder.	Manifold Block.
V2	Counterbalance Valve	Prevents machine from running away on slopes, and cushions stops.	Manifold Block.
V3	Lift Valve	Provides control of oil for drive or lift functions.	Manifold Block.
V4	Forward/Reverse Valve	Provides control of oil flow for forward or reverse drive.	Manifold Block
V5	Proportional Valve	Controls oil flow into drive and lift circuits by proportionally dumping oil back into tank.	Manifold Block.
V6	Valve, Down and Emergency Lowering	Allows oil to flow out of lift cylinder into tank. Manually operate for emergency lowering.	Lift Cylinder.
V7	Pothole Extend Valve	Provides control of oil for Pothole Protection Bar.	Manifold Block.
V8	Pothole Retract Valve	Provides control of oil for Pothole Protect Bar.	Pothole Protection Cylinder.

HYDRAULIC SCHEMATIC



Control Valve Manifold Assembly



UPRIGHT DRAWING NUMBER: 101181-002

NOTES:

SECTION 6

ILLUSTRATED PARTS BREAKDOWN

Introduction

This section lists and illustrates the replaceable assemblies and parts of the XRT Work Platform, as manufactured by UpRight, Inc.

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

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101000-001	2	101120-000	22
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Chassis Assembly, SL20 12V		Label Kit, SL20 12V	
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101007-001	12	101021-00	28
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101005-000	16	101195-000	30
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101154-000	20	101190-000	32
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101179-000	21	101193-000	34

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ILLUSTRATED PARTS BREAKDOWN

Final Assembly, SL20 12V

101000-001

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101001-000	BASIC ASSEMBLY	1
2	101003-001	POWER MODULE ASSEMBLY	1
3	101005-000	CONTROL MODULE ASSEMBLY	1
4	011715-006	SCREW, #6-32 RD HD MACH X 3/4 LG	2
5	011240-001	WASHER, #6 STD FLAT	2
6	011248-047	LOCKNUT, #6-32 HEX	2
7	101155-000	CONTROLLER ASSEMBLY	1
8	063951-001	RELAY, DPDT 12 VDC	1
9	101010-000	PIN - PLATFORM	2
10	065214-000	ROD END	2
11	101007-001	PLATFORM/GUARDRAIL ASSY, EURO	1
12	011254-012	SCREW, HHC GR5 3/8-16 UNC X 1 1/2	8
13	011254-006	SCREW, HHC GR5 3/8-16 UNC X 3/4	2
14	101229-000	WIRE HARNESS, PROPORTIONAL RELAY	1
15	101180-000	HYDRAULIC SCHEMATIC	REF
16	101181-001	ELECTRICAL SCHEMATIC	REF
17	101179-000	HOSE KIT / INSTALLATION	1
18	101009-001	LABEL KIT / INSTALLATION	1
19	101021-000	CONTROL CABLE ASSEMBLY	1
20	101162-000	WIRE HARNESS ASSY, VEHICLE	1
21	101028-000	SHIM, 16GA	AR
23	064195-059	CABLE ASSEMBLY X 59	1
24	064195-028	CABLE ASSEMBLY X 28	1
25	064195-001	CABLE ASSEMBLY X 12	3
26	062125-011	CABLE ASSEMBLY X 9	1
27	064195-004	CABLE ASSEMBLY X 4	1
28	029461-099	WIRE, 14GA BLACK	10FT

ITEM NO.	PART NO.	DESCRIPTION	QTY.
29	029620-002	CONNECTOR, BUTT 16-14GA	4
30	010154-000	COVER BATTERY TERMINAL	8
31	029601-015	CONNECTOR, RING 16-14GA 3/8 DIA.	3
33	013919-013	CLAMP, HOSE	1
34	014418-005	STUD, WELD 1/4-20 X 1.0 UNC	1
35	011248-004	NUT HEX ESNA 1/4-20 UNC	1
36	101174-000	LADDER WELDMENT - EURO	1
37	029620-003	CONNECTOR, BUTT 12-10GA INSL.	1
38	011248-006	NUT HEX ESNA 3/8-16 UNC	4
39	030768-001	LABEL, CE	1
40	030768-002	LABEL, GS	1
41	101212-000	CAP, TAMPER PROOF	2
42	063965-001	CONNECTOR, GAGE	1
43	029419-099	WIRE, 12AWG RED/GRN	5FT
44	029601-021	CONNECTOR, RING 12-10GA 3/8 DIA.	4
45	101028-001	COMPRESSION SHIM, 18GA	2
46	101028-002	COMPRESSION SHIM, 20GA	3
47	029610-002	CONNECTOR, FORK 16-14GA #8	8
48	029610-018	CONNECTOR, FORK 12-10GA #8	1
49	029615-002	CONNECTOR, F PUSH 14-16GA	4
50	029470-099	WIRE, 12AWG RED	5FT
51	029454-099	WIRE, 16AWG RED	2FT
52	029456-099	WIRE, 16AWG YELLOW	.6FT
53	101220-000	TILT BRACKET, PQ	1
54	029461-099	WIRE, BLK 14 AWG	.5FT
58	065369-099	HOSE GUARD	8FT

ILLUSTRATED PARTS BREAKDOWN

Section
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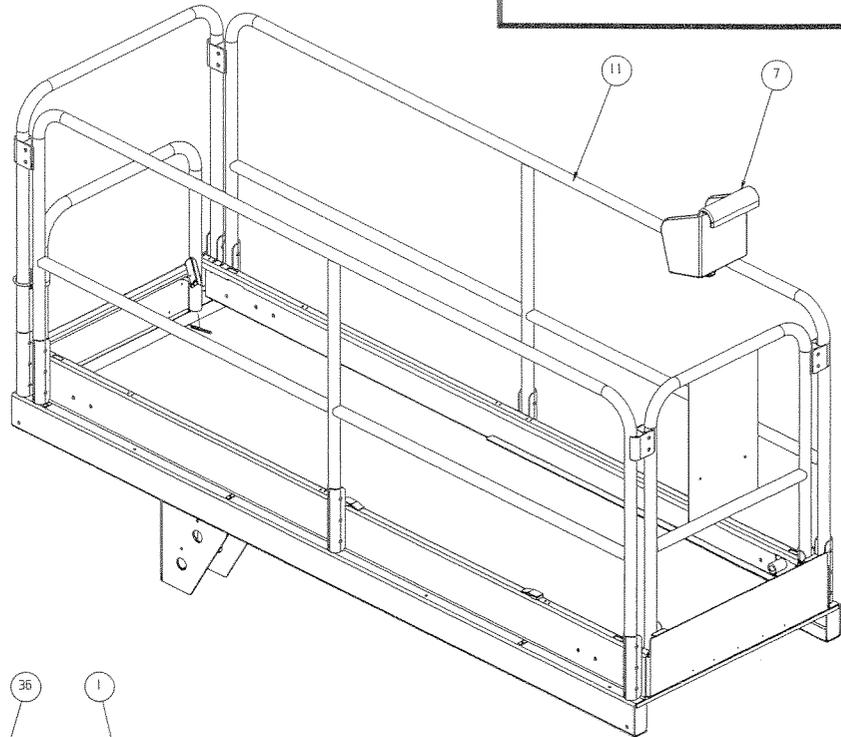
Final Assembly

101000-001

Drawing 1 of 3

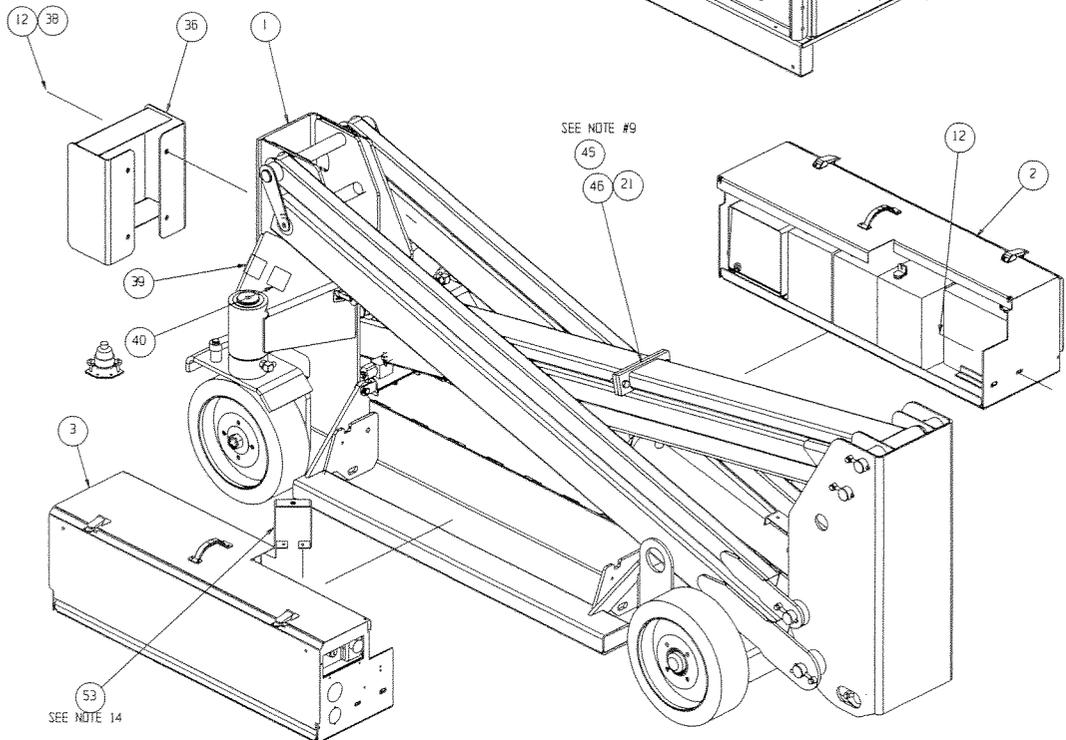
NOTES:

1. HYDRAULIC PRESSURE:
SETTING MAIN RELIEF - SET TO 2750 PSI ± 50 -0
COUNTERBALANCE VALVE - SET TO 800 - 1000 PSI
STEERING RELIEF - SET TO 1000 PSI
2. DRIVE SPEED:
LOW - 20 FT IN 20 - 30 SEC. MINIMUM
HIGH - 20 FT IN 7 - 9 SEC. MAXIMUM
RAMP - DECELERATION IN HIGH SPEED SHOULD BE SET SO THAT
MACHINE STOPS WITHIN 12" OF TOGGLE RELEASE.
3. LIFT SPEED:
UP - 20-30 SEC.
DOWN - 30-40 SEC.
4. PROOF LOAD: 1125 LBS.
5. RATED LOAD: 750 LBS.
6. GRADABILITY EMPTY: 14 DEG. MINIMUM
7. BRAKE:
SET TO HOLD ON 14 DEG. SLOPE WITH MACHINE FACING UP SLOPE,
AND NO LOAD.
8. OIL: ISO #46 HYDRAULIC OIL OR SHOP EQUIVALENT.
9. SHIM AS REQUIRED TO LEVEL PLATFORM!
10. SET HEIGHT CUT-OUT AT 19' 6" \pm 1"
11. INSTALL ITEM 41, TAMPER PROOF CAPS ON BOTH RELIEF VALVES AFTER
UNIT HAS BEEN TESTED AND RELIEF VALVES PROPERLY SET.
12. ADD ITEM 42, GAGE PLUG ON PORT 61 AFTER UNIT HAS
BEEN TESTED AND RELIEF VALVES PROPERLY SET.
13. CONTROL CABLE LENGTH FROM THE GUARDRAIL KICKBOARD TO
THE UPPER CONTROLLER SHOULD BE 5' \pm 10"
14. INSTALL ITEM #53 TO TILT SENSOR DURING CONTROL MODULE ASSEMBLY.



POTHOLE PROTECTION SYSTEM ADJUSTMENT

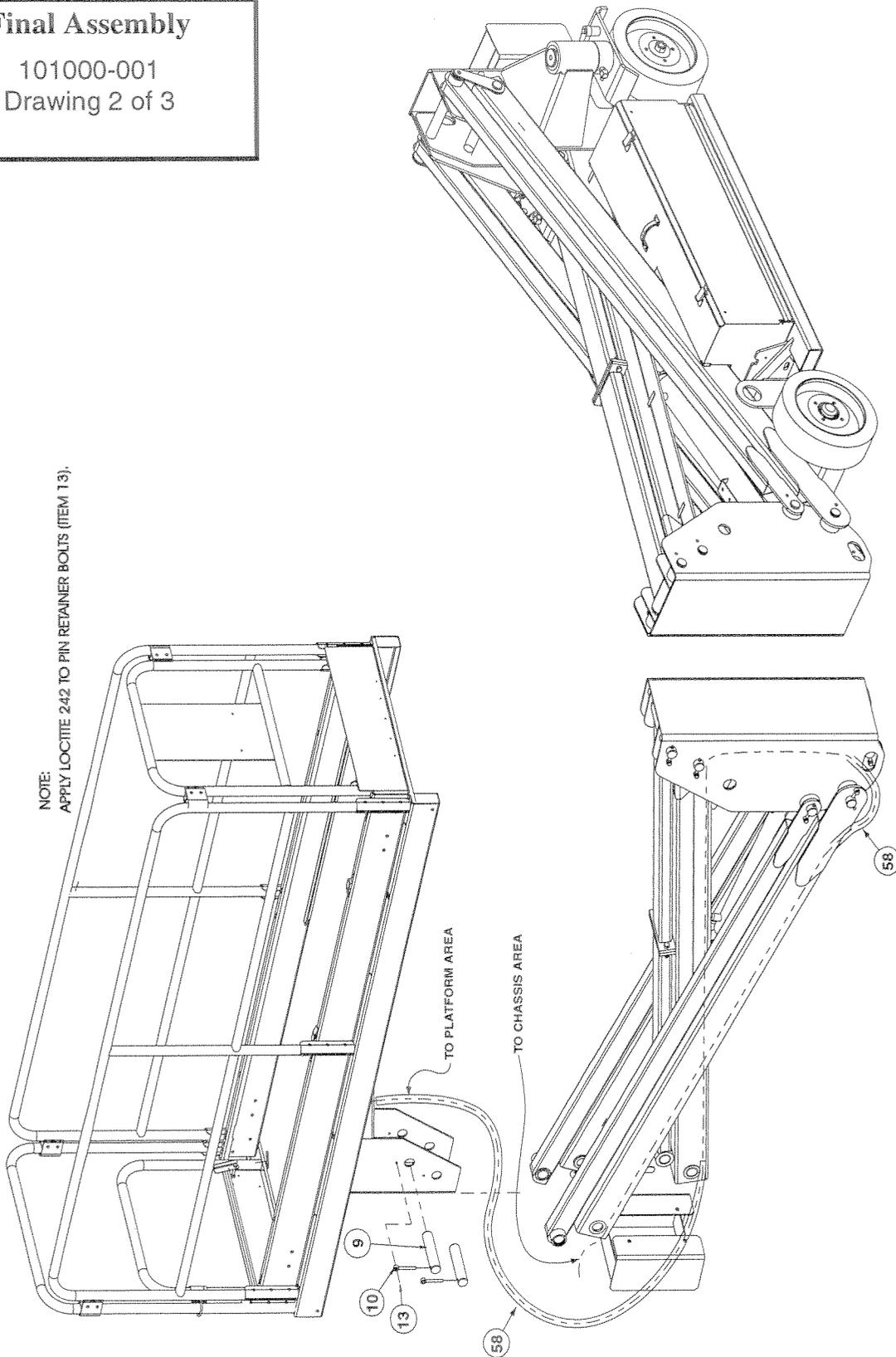
1. PLACE MACHINE ON LEVEL SURFACE $\pm 1/4"$
2. RAISE MACHINE FOR ACCESS TO LEVEL SENSOR
3. CENTER LEVEL SENSOR BUBBLE BY TURNING ADJUSTMENT
SCREWS ON LEVEL SENSOR.
4. SET "DOWN" LIMIT SWITCH TO DE-ACTIVATE AT 6 FT
PLATFORM HEIGHT.
5. CHECK THAT POTHOLE PROTECTORS ARE FULLY DEPLOYED
BEFORE LIMIT SWITCH DE-ACTIVATES - WHEN LIFTING.
6. CHECK POTHOLE PROTECTION SYSTEM OPERATION.
 - A. MACHINE SHOULD NOT ELEVATE ABOVE 6 FT WHILE ON
A 2 DEG. SLOPE
 - B. MACHINE SHOULD HAVE LOW SPEED DRIVE WHEN LIMIT
SWITCH IS DE-ACTIVATED AND MACHINE IS LEVEL
 - C. MACHINE SHOULD HAVE HIGH SPEED DRIVE WHEN LIMIT
SWITCH IS ACTIVATED
 - D. TILT ALARM SHOULD SOUND WHEN PLATFORM IS
ELEVATED ABOVE 6 FT AND MACHINE IS OFF LEVEL BY
2 DEG.
7. ADJUST STOPS SO THAT IT ALLOWS 3/4" ($\pm 1/16"$) GROUND
CLEARANCE.



ILLUSTRATED PARTS BREAKDOWN

Final Assembly

101000-001
Drawing 2 of 3



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ILLUSTRATED PARTS BREAKDOWN

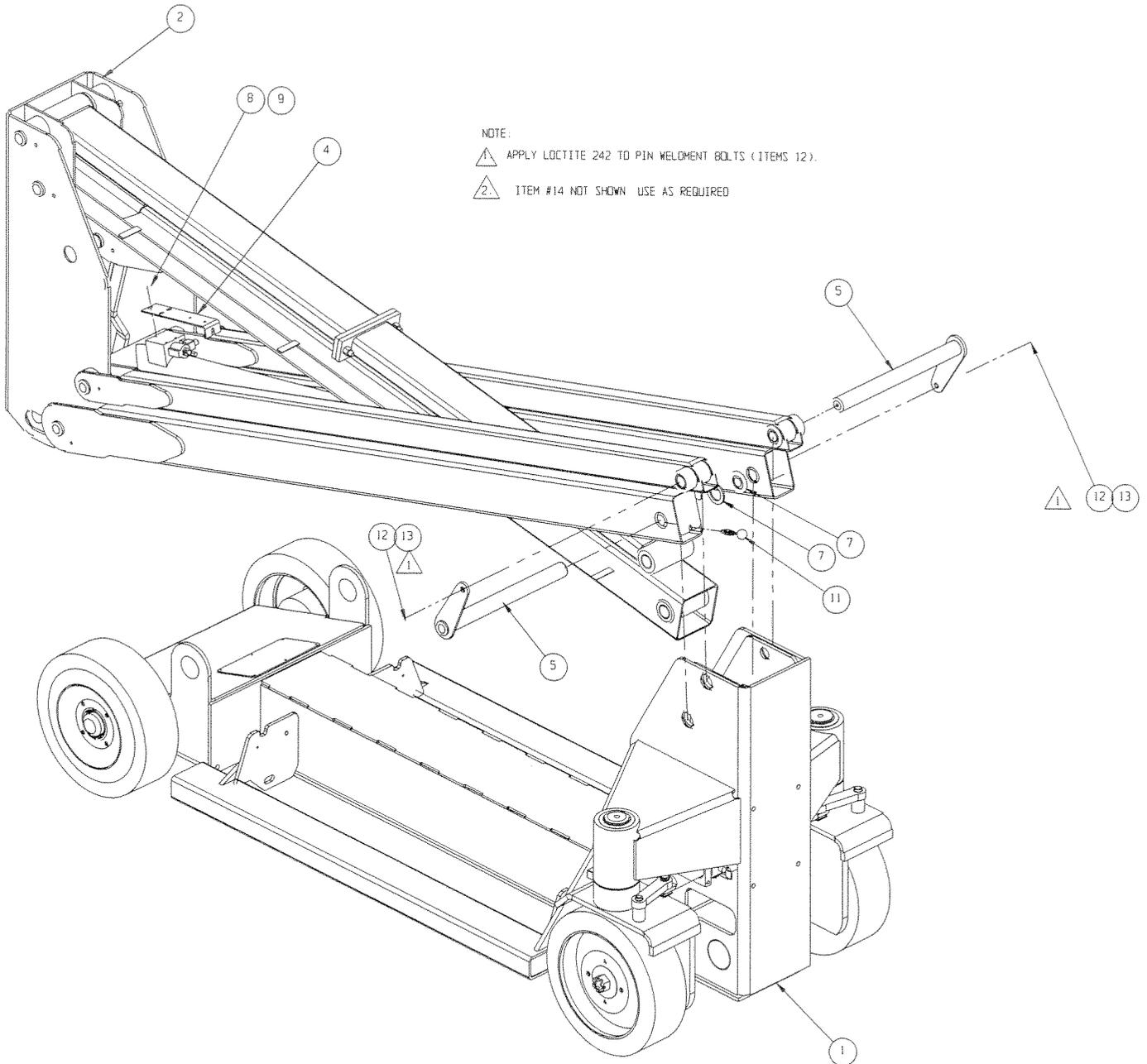
Basic Assembly, SL20 12V

101001-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101002-000	CHASSIS ASSEMBLY	1
2	101004-000	LINKAGE ASSEMBLY	1
4	065770-000	BRACKET, CABLE	1
5	101042-000	PIN WELDMENT	2
7	101224-000	SHIM	2
8	011252-004	SCREW, 1/4-20 UNC HEX HD CAP X 1/2	3
9	011238-004	LOCKWASHER, 1/4 DIA SPLIT	3
11	065754-005	CABLE, EMERGENCY DOWN X 12'	-
12	011256-008	SCREW, 1/2-13 UNC HEX HD CAP X 1	2
13	011238-008	LOCKWASHER, 1/2 DIA SPLIT	2

ILLUSTRATED PARTS BREAKDOWN

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ILLUSTRATED PARTS BREAKDOWN

Chassis Assembly, SL20 12V

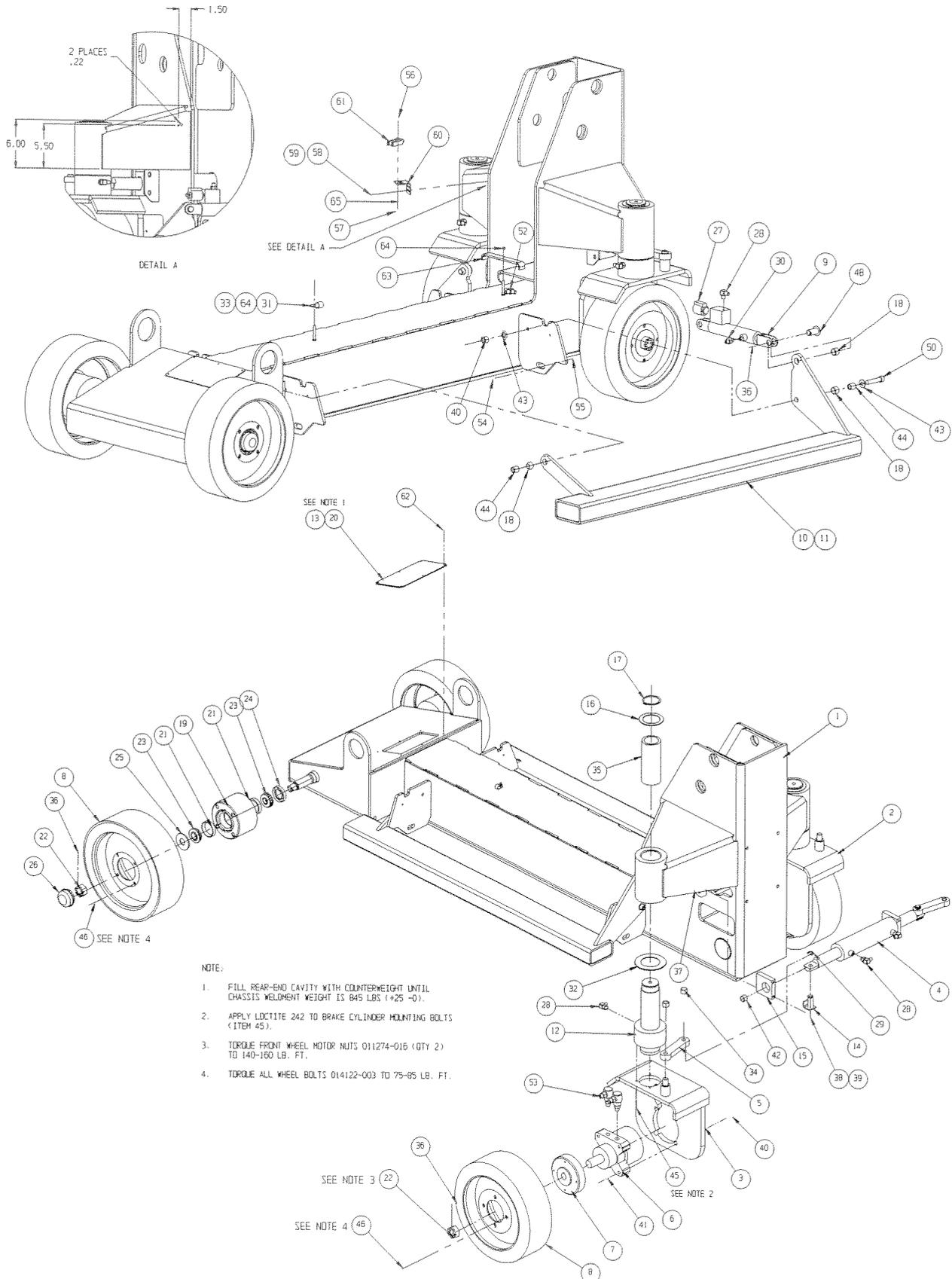
101002-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101072-000	CHASSIS WELDMENT	1
2	101065-000	MOTOR MOUNT WELDMENT R.H.	1
3	101066-000	MOTOR MOUNT WELDMENT L.H.	1
4	065371-000	STEERING CYLINDER	1
5	101089-000	STEERING ARM	2
6	101125-000	DRIVE MOTOR	2
7	066325-000	HUB, FRONT	2
8	061846-001	RIM ASSEMBLY	4
9	101014-000	POTHOLE CYLINDER	1
10	101083-000	POTHOLE TUBE WELDMENT R.H.	1
11	101084-000	POTHOLE TUBE WELDMENT L.H.	1
12	101015-000	BRAKE CYLINDER	2
13	063109-099	COUNTERWEIGHT	LBS 280
14	065800-000	STEERING PIN	2
15	065732-000	STEERING BEARING FLANGE	2
16	101157-000	BRAKE RETAINING WASHER	2
17	011764-038	RETAINING RING	2
18	066183-003	BEARING, 3/4 I.D. X 7/8 O.D. X 1/2 LG	6
19	066773-000	HUB ASSEMBLY	2
20	101216-000	COVER, WEIGHT HOLE	1
21	011776-004	CUP, BEARING	4
22	011274-016	NUT, SLOTTED HEX	4
23	011775-011	CONE, BEARING	4
24	005104-000	SEAL, GREASE	2
25	011239-016	WASHER, 1 DIA FLAT ASTM	2
26	005078-000	DUST CAP	2
27	063973-003	POTHOLE VALVE 10VDC	1
28	011934-001	FITTING, ELBOW	5
29	013315-010	RETAINING RING	2
30	011941-001	FITTING, STRAIGHT	1
31	013919-012	HOSE CLAMP	1
32	101128-000	SPINDLE THRUST WASHER	2

ITEM NO.	PART NO.	DESCRIPTION	QTY.
33	011240-004	WASHER, 1/4-20 STD FLAT	1
34	027931-022	BEARING	4
35	101127-000	SPINDLE BEARING	2
36	011753-012	COTTER PIN, 1/8 X 1 1/2	6
37	011254-032	SCREW, 3/8-16 UNC HEX HD CAP X 4	4
38	011240-006	WASHER, 3/8 DIA STD FLAT	4
39	011248-006	LOCKNUT, 3/8-16 UNC HEX	4
40	011248-008	LOCKNUT, 1/2-13 UNC HEX	16
41	011256-026	SCREW, 1/2-13 UNC HEX HD CAP X 3 1/4	8
42	027931-072	BEARING	2
43	011240-008	WASHER, 1/2 DIA STD FLAT	8
44	018081-008	POTHOLE SPACER (TUBE,.75 O.D.X.120 W X 1 1/2)	4
45	011254-012	SCREW, 3/8-16 UNC HEX HD CAP X 1 1/2	8
46	014122-003	BOLT, WHEEL	16
48	101051-000	PIN WELDMENT, POTHOLE CYLINDER	2
49	011752-010	PIN, COTTER 3/32 X 1 1/4LG	2
50	012030-024	SCREW, 1/2-13 UNC SOC HD ALLOY OR(GR 8)X 3	4
52	020032-001	FITTING, TEE	1
53	068885-001	FITTING, SWIVEL ELBOW	4
54	011258-016	SCREW, 3/4-10 UNC HEX HD CAP X 2	4
55	011248-012	LOCKNUT, 3/4-10 UNC HEX	4
56	011709-008	SCREW, 10-24 UNC RD HD MACH X 1	2
57	011248-003	LOCKNUT, 10-24 UNC HEX	2
58	026554-004	RIVET, POP 1/8	2
59	011240-003	WASHER, #10 STD FLAT	2
60	101201-000	PROXIMITY BRACKET	1
61	101151-000	PROXIMITY SWITCH	1
62	026554-003	RIVET, POP 1/4	6
63	068706-000	CLAMP HOSE	1
64	011248-004	LOCKNUT, 1/4-20 UNC HEX	2
65	013949-004	WASHER 1/4 EXT STAR	2

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
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ILLUSTRATED PARTS BREAKDOWN

Linkage Assembly, SL20 12V

101004-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101036-000	PIN	1
2	101037-000	PIN	2
3	101039-000	PIN	1
4	101040-000	PIN	2
5	101030-000	LOWER BOOM WELDMENT L.H.	1
6	101023-000	ADJUSTABLE COMPRESSION TUBE WELDMENT	2
7	101035-001	LOWER TENSION LINK WELDMENT L.H.	1
8	101031-000	LOWER BOOM WELDMENT R.H.	1
9	101016-001	BUSHING- 3" LG	7
10	101059-000	UPPER BOOM WELDMENT	1
11	101048-000	RISER WELDMENT	1
12	101053-000	TENSION LINK WELDMENT	1
13	101013-000	LIFT CYLINDER	1
14	101016-000	BUSHING- 2" LG	16
15	065214-000	ROD END	7
16	011254-012	SCREW, 3/8-16 UNC HEX HD CAP X 1 1/2	7

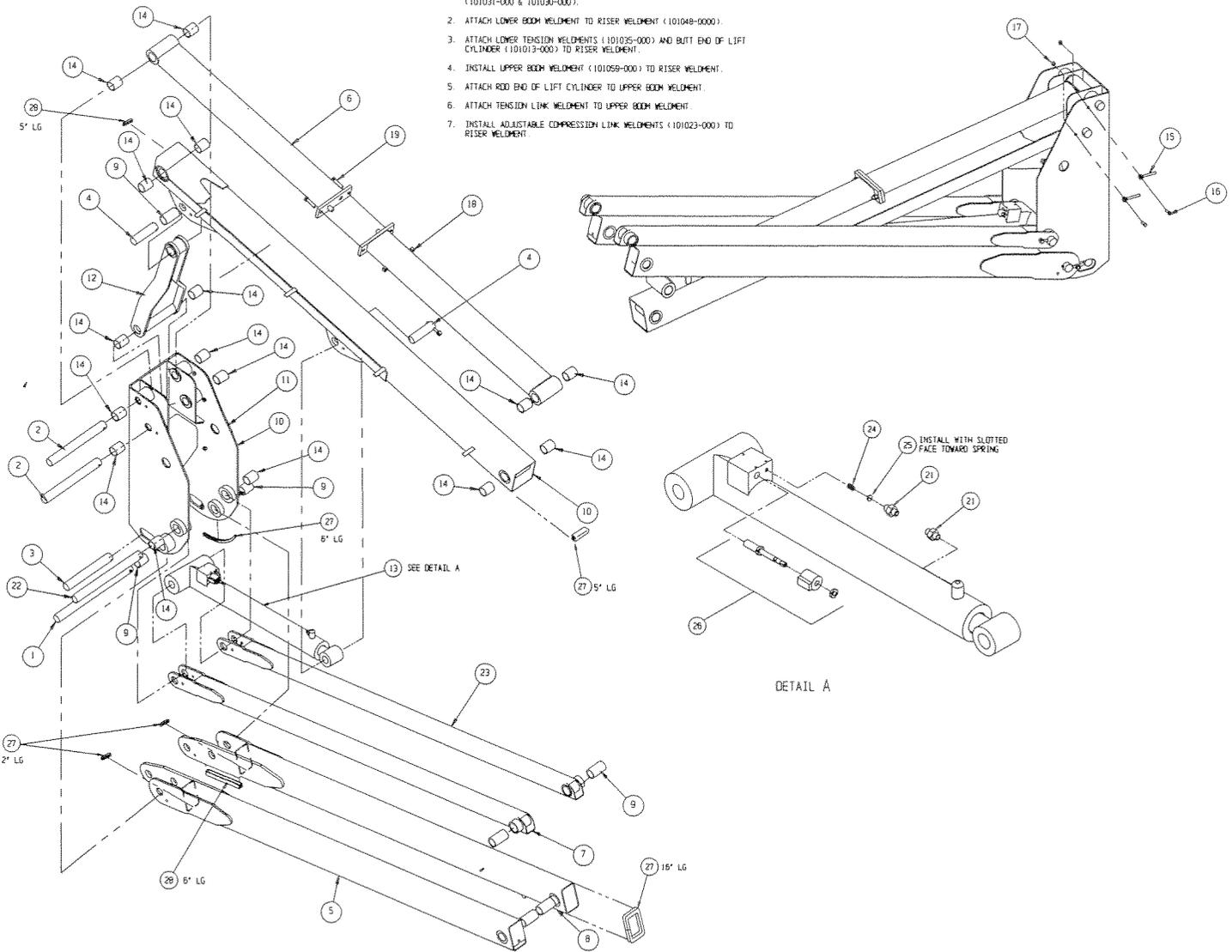
ITEM NO.	PART NO.	DESCRIPTION	QTY.
17	011248-006	LOCKNUT, 3/8-16 UNC HEX	7
18	011248-008	LOCKNUT, 1/2-13 UNC HEX	2
19	011256-018	SCREW, 1/2-13 UNC HEX HD CAP X 2 1/4	2
21	011941-005	FITTING, STRAIGHT	2
22	101204-000	PIN	1
23	101035-000	LOWER TENSION LINK WELDMENT R.H.	1
24	013987-010	SPRING	1
25	015919-000	ORIFICE (Ø .0465)	1
26	066179-001	VALVE, LOWERING 10 VDC	1
27	061692-099	EDGE TRIM 3/16	FT 2.6
28	067805-099	EDGE TRIM 1/4-1/2	FT .90

ILLUSTRATED PARTS BREAKDOWN

Section 6.1

LINKAGE ASSEMBLY PROCEDURE

1. INSTALL TENSION LINK WELDMENT (101053-000) TO LOWER BODY WELDMENTS (101031-000 & 101030-000).
2. ATTACH LOWER BOOM WELDMENT TO RISER WELDMENT (101048-0000).
3. ATTACH LOWER TENSION WELDMENTS (101025-000) AND BUTT END OF LIFT CYLINDER (101013-000) TO RISER WELDMENT.
4. INSTALL UPPER BOOM WELDMENT (101059-000) TO RISER WELDMENT.
5. ATTACH ROD END OF LIFT CYLINDER TO UPPER BOOM WELDMENT.
6. ATTACH TENSION LINK WELDMENT TO UPPER BOOM WELDMENT.
7. INSTALL ADJUSTABLE COMPRESSION LINK WELDMENTS (101023-000) TO RISER WELDMENT.



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ILLUSTRATED PARTS BREAKDOWN

Platform Assembly. SL20 12V

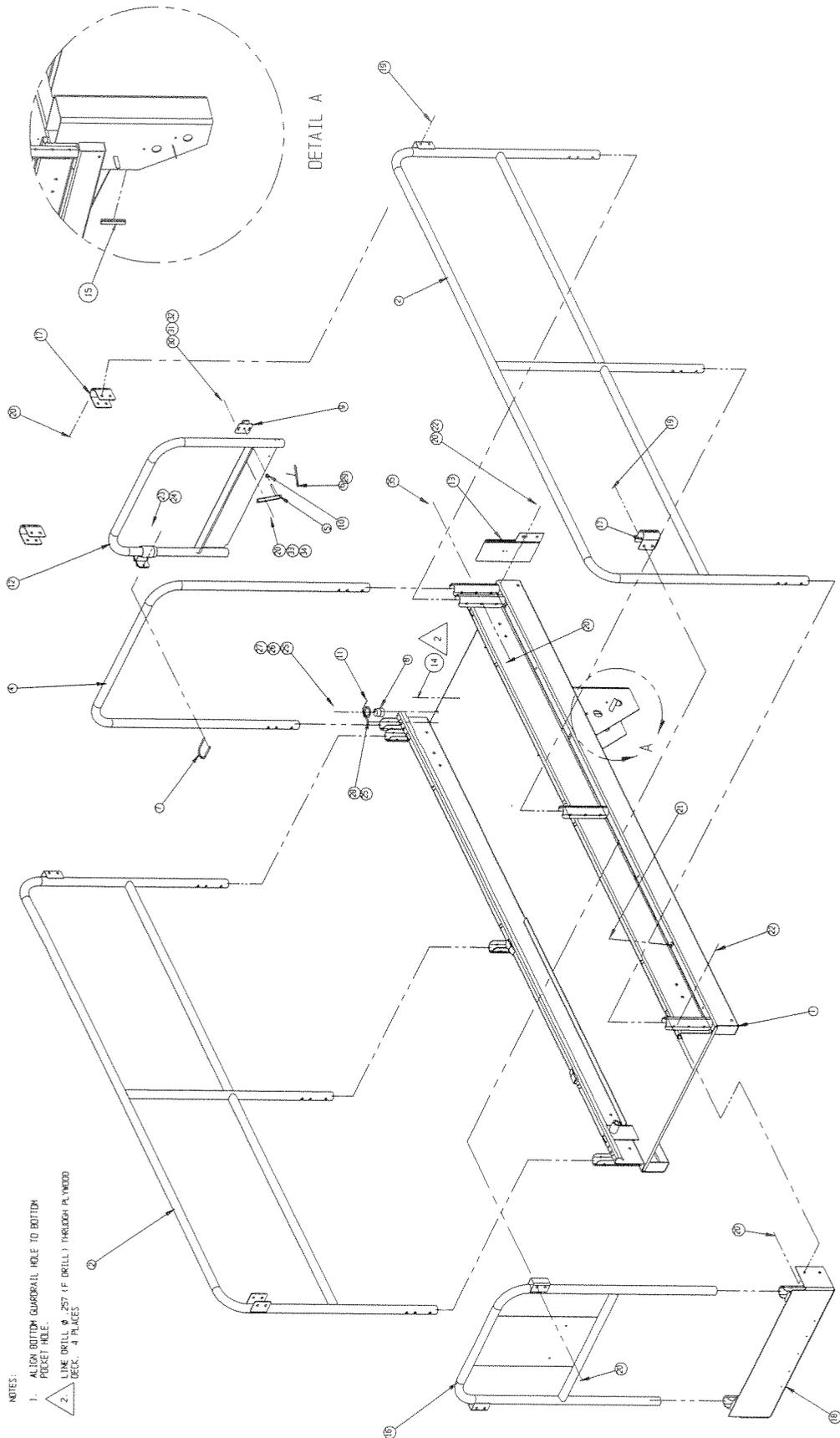
101007-001

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101006-001	PLATFORM WELDMENT	1
2	101101-000	SIDE RAIL WELDMENT	2
3	024611-033	DECK, PLYWOOD	1
4	101102-000	END RAIL	1
5	030745-002	ACTUATOR WELDMENT	1
6	012097-018	SPRING	1
7	027899-000	U-BOLT	1
8	065784-000	DOOR SLIDE	1
9	062791-000	SLAM LATCH	1
10	063947-008	NUT, M8 X 1.25 HEX	1
11	066526-001	SPRING	1
12	101119-000	GATE WELDMENT	1
13	101124-000	GATE STOP	1
14	026554-004	RIVET, 1/4 DIA X .501-.625 GRIP	4
15	067805-099	EDGE TRIM, 1/4 - 1/2	FT .34
16	101170-000	FRONT-END GUARDRAIL WELDMENT	1
17	101115-000	LATCH, GATE	4
18	101168-000	KICKRAIL WELDMENT, BOLT ON	1
19	011254-018	SCREW, 3/8-16 UNC HEX HD CAP X 2 1/4	20
20	011248-006	LOCKNUT, 3/8-16 UNC HEX	29
21	011252-004	SCREW, 1/4-20 UNC HEX HD CAP X 1/2	6
22	011254-008	SCREW, 3/8-16 UNC HEX HD CAP X 1	4
23	011248-004	LOCKNUT, 1/4-20 UNC HEX	2
24	011240-004	WASHER, 1/4 DIA STD FLAT	2

ITEM NO.	PART NO.	DESCRIPTION	QTY.
25	011248-005	LOCKNUT, 5/16-18 UNC HEX	2
26	011240-005	WASHER, 5/16 DIA STD FLAT	2
27	011253-016	SCREW, 5/16-18 UNC HEX HD CAP X 2	2
28	011253-006	SCREW, 5/16-18 UNC HEX HD CAP X 3/4	1
29	011753-006	PIN, COTTER 1/8 X 3/4	2
30	011275-004	SCREW, #10-32 UNF HEX HD CAP X 1/2	2
31	011240-003	WASHER, #10 STD FLAT	2
32	011249-003	LOCKNUT, #10 -32 UNF HEX	2
33	011254-020	SCREW, 3/8-16 UNC HEX HD CAP X 2 1/2	1
34	011273-006	NUT, 3/8-16 UNC HEX JAM	1
35	011254-040	SCREW, 3/8-16 UNC HEX HD CAP X 5	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



- NOTES:
1. ALIGN BOTTOM GUARDRAIL HOLE TO BOTTOM POKET HOLE.
 2. LINE DRILL $9/32"$ (IF DRILL) THROUGH PLYWOOD DECK - 4 PLACES.

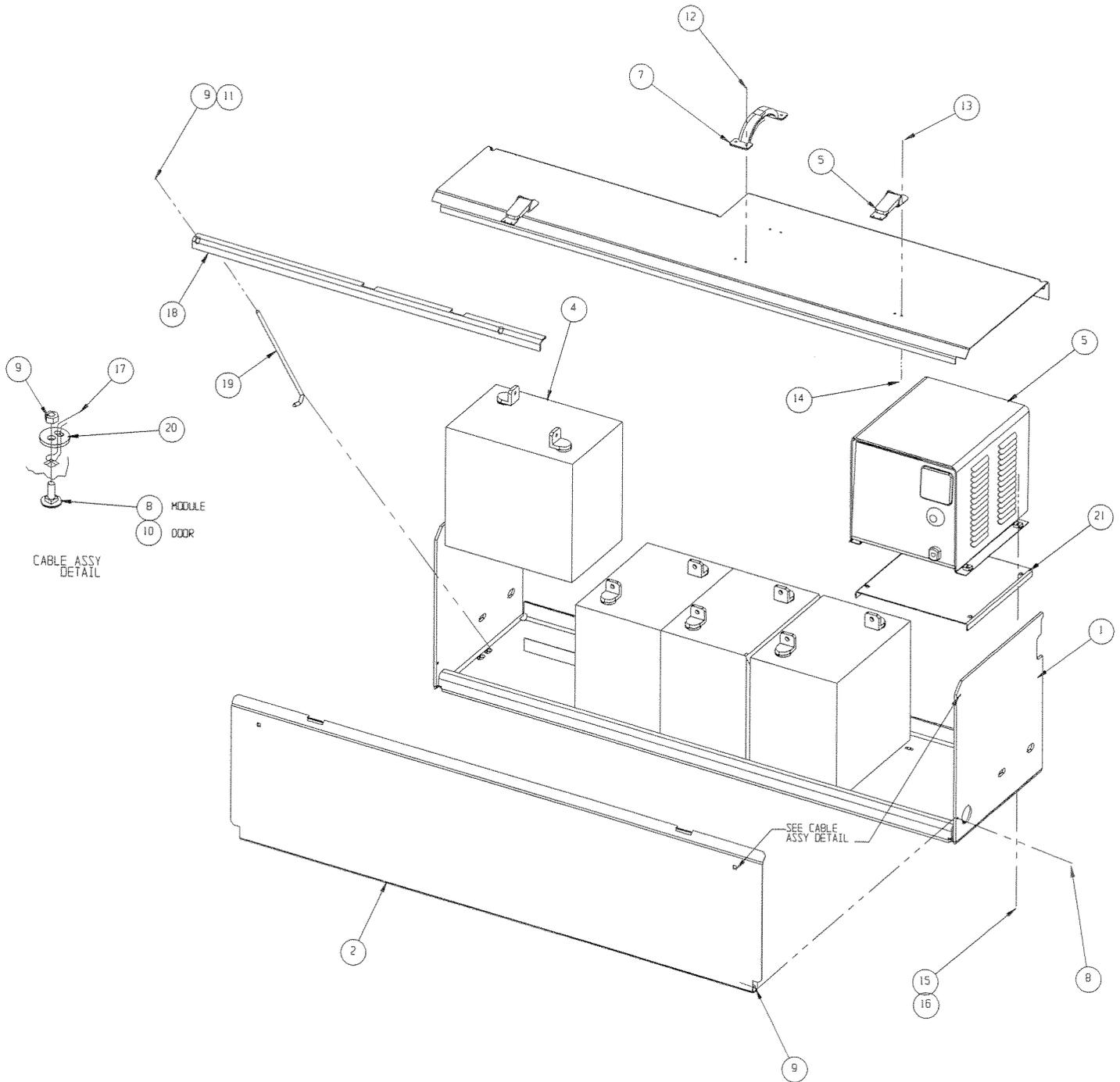
**Section
6.1****ILLUSTRATED PARTS BREAKDOWN****Power Module, SL20 12V**

101003-001

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101215-000	POWER MODULE TRAY WELDMENT	1
2	101141-000	MODULE COVER WELDMENT	1
3	101143-000	POWER MODULE TOP	1
4	015796-000	BATTERY,	4
5	063948-011	CHARGER	1
6	005299-000	LATCH, TOGGLE	2
7	025427-002	HANDLE	1
8	011252-006	SCREW, 1/4-20 UNC HEX HD CAP 3/4	2
9	011248-004	LOCKNUT, 1/4-20 UNC HEX	6
10	011829-006	BOLT, 1/4-20 UNC CARRIAGE X 3/4	1
11	011240-004	WASHER, 1/4 DIA STD FLAT	2
12	026553-004	RIVET, 1/8 1/4-3/8 GRIP	4
13	011708-004	SCREW, #8-32 UNC RD HD MACH X 1/2	8
14	011248-002	LOCK NUT #8-32 UNC HEX	8
15	011238-004	LOCKWASHER, 1/4 DIA SPLIT	4
16	011252-010	SCREW, 1/4-20 UNC HEX HD CAP 1 1/4	4
17	064466-015	CABLE ASSEMBLY	1
18	101214-000	HOLD DOWN, BATTERY	1
19	063082-000	J-BOLT	2
20	064464-000	CABLE RETAINER	1
21	063386-000	CHARGER SPACER	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
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ILLUSTRATED PARTS BREAKDOWN

Control Module Assembly, SL20 12V

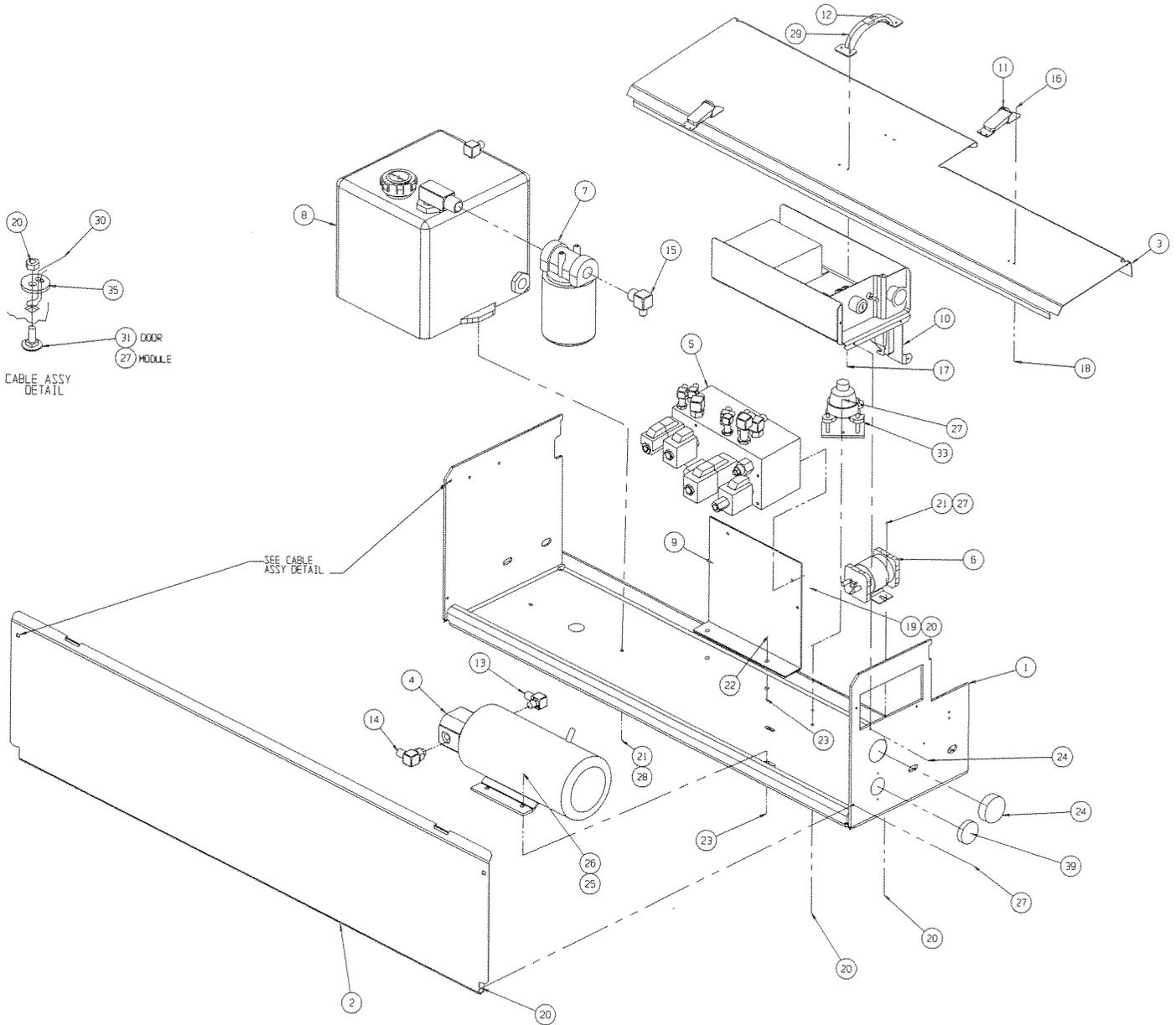
101005-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101146-000	CONTROL MODULE TRAY	1
2	101141-000	MODULE COVER WELDMENT	1
3	101145-000	CONTROL MODULE TOP	1
4	101126-000	POWER UNIT	1
5	101120-000	CONTROL VALVE	1
6	010122-001	RELAY, DPDT	1
7	005154-001	FILTER	1
8	101152-000	HYDRAULIC TANK ASSEMBLY	1
9	101153-000	BRACKET, VALVE BLOCK	1
10	101154-000	LOWER CONTROLS ASSEMBLY	1
11	005299-000	LATCH, TOGGLE	2
12	025427-002	HANDLE	1
13	101227-000	FITTING, 45° ELBOW	1
14	011934-004	FITTING, ELBOW	1
15	011940-034	FITTING, ELBOW	1
16	011708-004	SCREW, #8-32 UNC RD HD MACH X 1/2	8
17	011248-003	LOCKNUT, #10-24 UNC HEX	6
18	011248-002	LOCKNUT, #8-32 UNC HEX	8
19	011252-030	SCREW, 1/4-20 UNC HEX HD CAP X 3 3/4	3

ITEM NO.	PART NO.	DESCRIPTION	QTY.
20	011248-004	LOCKNUT, 1/4-20 UNC HEX	15
21	011240-004	WASHER, 1/4 STD FLAT	7
22	011254-008	SCREW, 3/8-16 UNC HEX HD CAP X 1	2
23	011248-006	LOCKNUT, 3/8-16 UNC HEX	6
24	011709-006	SCREW, #10-24 UNC RD HD MACH X 3/4	4
25	011254-010	SCREW, 3/8-16 UNC HEX HD CAP X 1 1/4	4
26	011240-006	WASHER, 3/8 STD FLAT	4
27	011252-006	SCREW, 1/4-20 UNC HEX HD CAP X 3/4	6
28	011252-008	SCREW, 1/4-20 UNC HEX HD CAP X 1	2
29	026553-004	RIVET, 1/8 X 1/4-3/8 GRIP	4
30	064466-015	CABLE ASSEMBLY	1
31	011829-006	BOLT, 1/4-20 UNC CARRIAGE X 3/4	1
32	101163-000	WIRE HARNESS, VALVE BLOCK	1
33	029945-011	TILT SENSOR	1
34	066516-000	PLUG, 2.09-2.125	1
35	064464-000	CABLE RETAINER	1
39	066516-002	PLUG, 1.75	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



**Section
6.1**

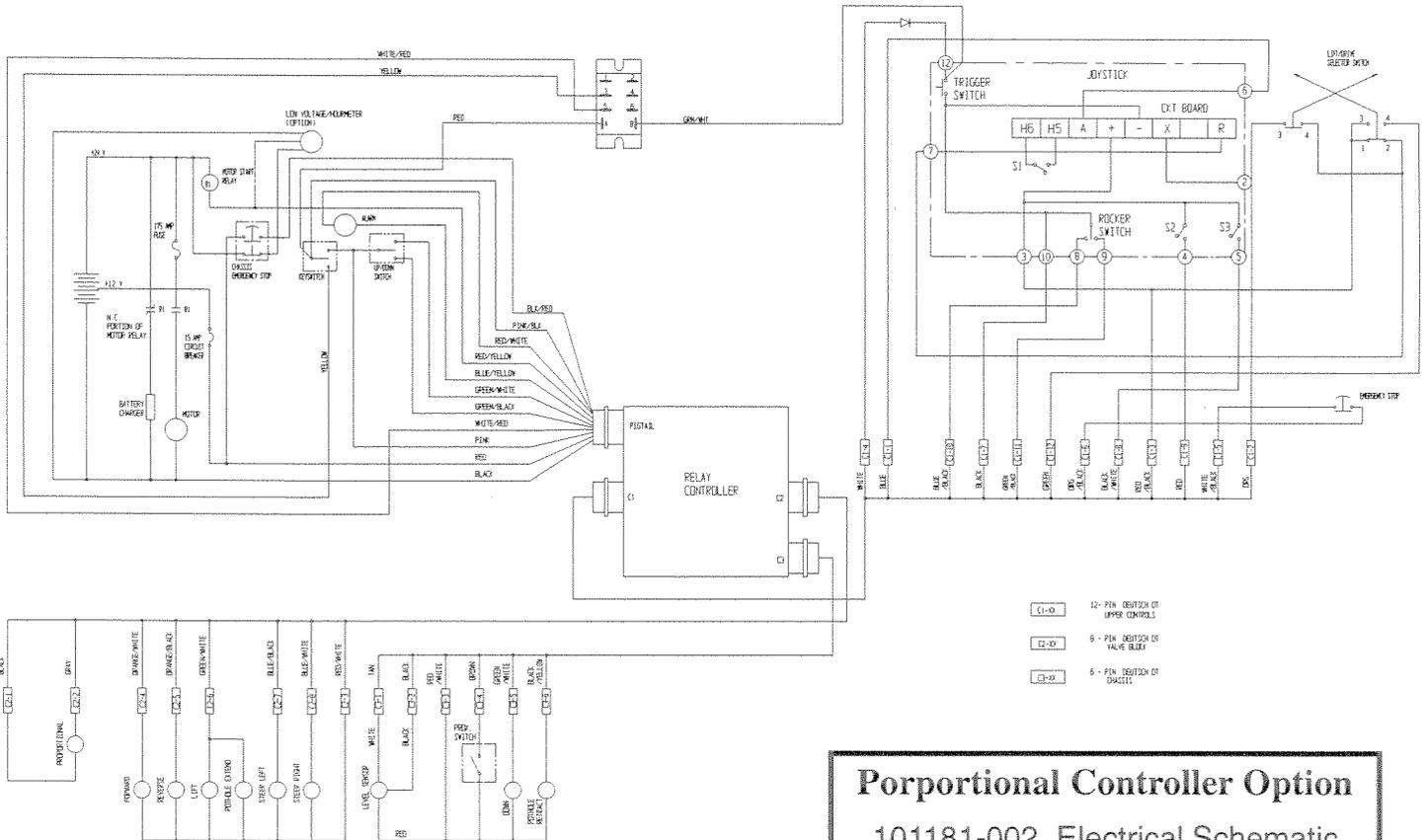
ILLUSTRATED PARTS BREAKDOWN

Proportional Controller Assembly, SL20 12V

101194-000

ITEM	PART NO.	Description	Qty.
1	101188-000	BOX, PROPORTIONAL CONTROLLER	1
2	101223-000	COVER, PROPORTIONAL CONTROLLER	1
3	066805-002	SWITCH, SELECTOR	1
4	066805-006	SWITCH, PUSH BUTTON	1
5	066805-011	CONTACT	1
6	066805-012	CONTACT	1
7	101205-000	CONTROLLER PROPORTIONAL 12VDC	1
8	101222-000	LABEL, PROPORTIONAL CONTROL	1
9	101158-099	O-RING 3/32	1
10	029610-002	CONN FORK TERM 16-14 GA. #8	8
11	011709-004	SCREW # 10-24 UNC RD HD MACH X 1/2 LG	4
12	011238-002	LOCKWASHER, #10 SPLIT	4
13	066805-010	CONTACT, N.O.	1
14	029620-002	CONN BUTT 16-14 GA. INSL	1

ITEM	PART NO.	Description	Qty.
15	029620-003	CONN BUTT 12-10 GA. INSL	1
16	029925-010	CONN, CABLE	1
17	029939-003	LOCKNUT, 3/4 NUT CONNECTOR	1
18	101181-002	ELECTRICAL SCHEMATIC	REF
19	065746-000	CONTROLLER GUIDE	1
20	011252-006	SCREW, 1/4-20 UNC HEX HD CAP X 3/4	2
21	011248-004	LOCKNUT, 1/4-20 UNC HEX	2
22	063956-003	CONN, 12 PIN	1
23	063956-010	CONN, PIN MALE	9
25	029825-002	DIODE, 5 AMP 400 V	1
26	029478-099	WIRE, 16 AWG, RED/BLK	FT 2
27	029455-099	WIRE, 16 AWG, BROWN	FT 1.5
28	029452-099	WIRE, 16 AWG, BLACK	FT .5



Porportional Controller Option
101181-002, Electrical Schematic
Drawing 1 of 2

**Section
6.1**

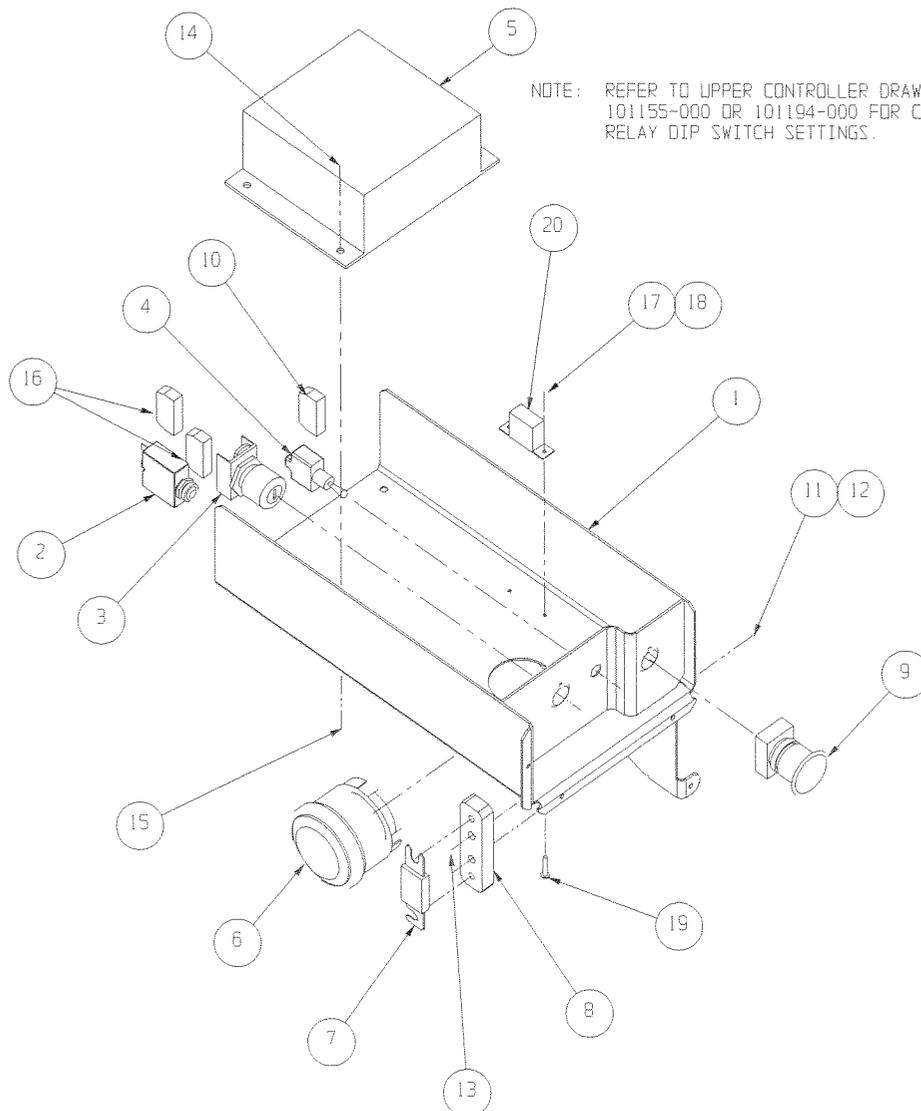
ILLUSTRATED PARTS BREAKDOWN

Lower Controls Assembly, SL20 12V

101154-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101147-000	LOWER CONTROLS WELDMENT	1
2	029868-007	CIRCUIT BREAKER	1
3	101221-000	SWITCH, KEY	1
4	012798-000	SWITCH, TOGGLE	1
5	101129-002	CONTROL RELAY, 12 VDC	1
6	066807-001	ALARM	1
7	010148-001	FUSE, 175 AMP	1
8	010149-000	FUSE BLOCK	1
9	066805-006	SWITCH, PUSH BUTTON	1
10	066805-011	CONTACT BLOCK, N.C.	1

ITEM NO.	PART NO.	DESCRIPTION	QTY.
11	011248-003	LOCKNUT, #10-24 UNC HEX	2
12	014996-003	WASHER, #10 DIA FLAT SAE	2
13	066695-008	SCREW, #10-24 UNC FLAT HD	2
14	011252-006	SCREW, 1/4-20 UNC HEX HD CAP X 3/4	2
15	011248-004	LOCKNUT, 1/4--20 UNC HEX	2
16	066805-010	CONTACT BLOCK, N.O.	2
17	011240-001	WASHER, FLAT STD #6	2
18	011248-047	NUT LOCK HH ESNA 6-32 UNC	2
19	011715-006	SCREW MACH RD HD 6-32 UNC X 3/4	2
20	063951-001	RELAY DPDT 12VDC	1



ILLUSTRATED PARTS BREAKDOWN

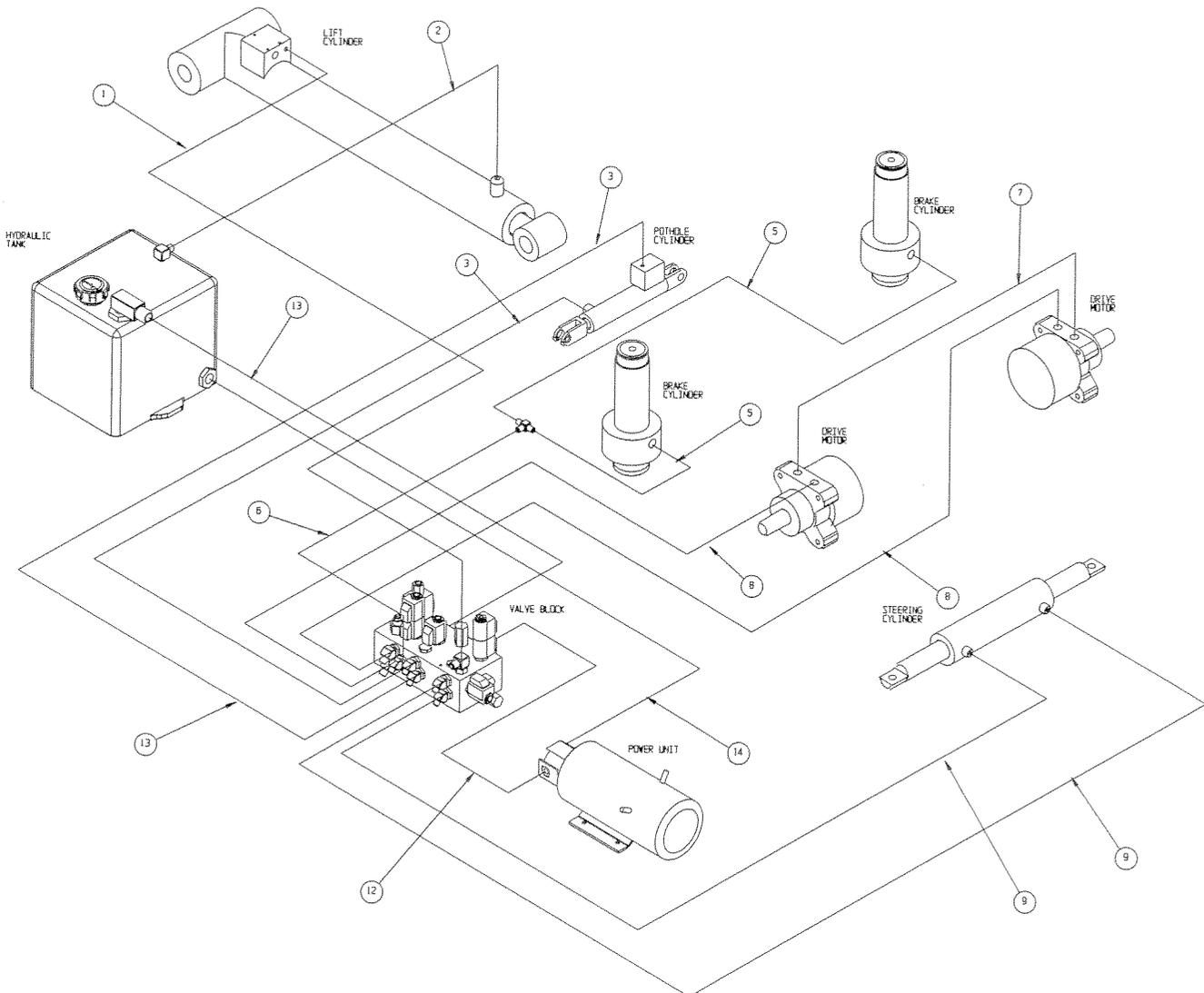
Section 6.1

Hose Kit, SL20 12V

101179-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	060861-115	HOSE ASSEMBLY, 3/8 DIA X 200	1
2	060861-210	HOSE ASSEMBLY, 3/8 DIA X 210	1
3	065234-033	HOSE ASSEMBLY, 1/4 DIA X 22 1/2	2
5	065234-021	HOSE ASSEMBLY, 1/4 DIA X 21	2
6	062192-047	HOSE ASSEMBLY, 1/4 DIA X 38	1
7	060861-049	HOSE ASSEMBLY, 3/8 DIA X 28	1

ITEM NO.	PART NO.	DESCRIPTION	QTY.
8	060861-099	HOSE ASSEMBLY, 3/8 DIA X 48	2
9	065234-042	HOSE ASSEMBLY, 1/4 DIA X 42	2
12	060861-022	HOSE ASSEMBLY, 3/8 DIA X 14	1
13	060861-021	HOSE ASSEMBLY, 3/8 DIA X 12	1
14	101213-012	HOSE ASSEMBLY, 3/4 DIA X 12 1/2	1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

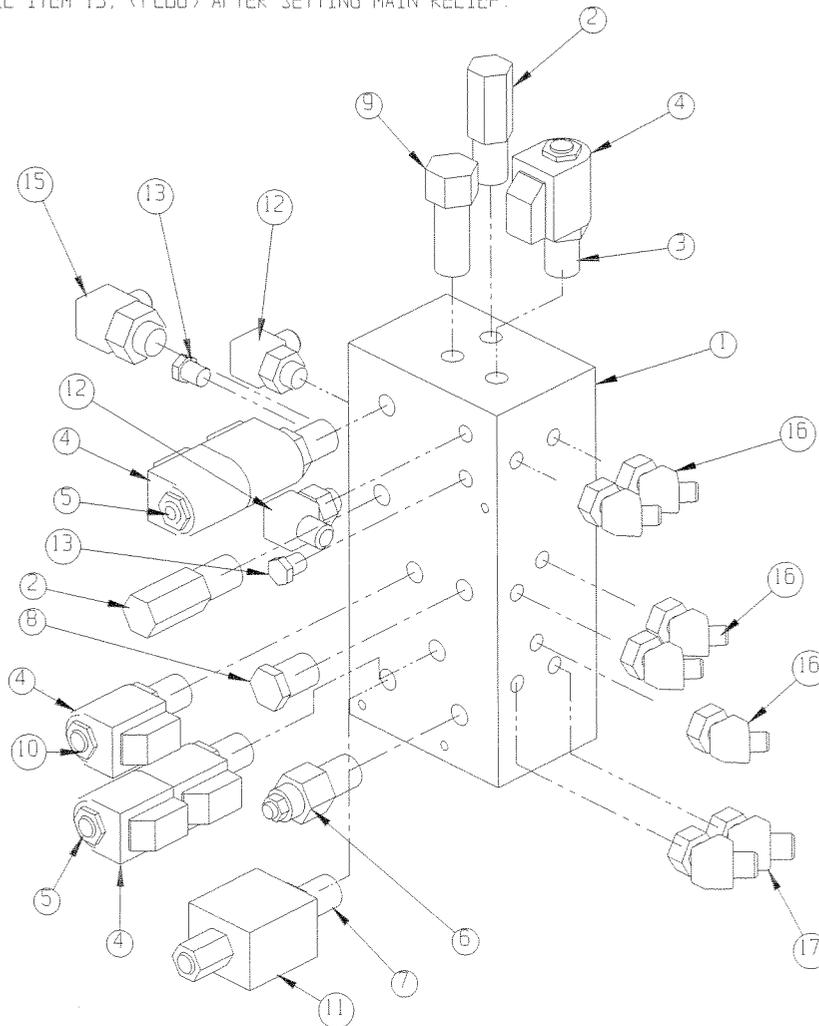
Control Valve Assembly, SL20 12V

101120-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	REF	CONTROL VALVE BLOCK	1
2	101120-001	STEERING RELIEF	2
3	101120-002	2 POS - 4 WAY SOLENOID	1
4	101120-003	COIL, 8 SERIES 10 VOLT DC	6
5	101120-004	3 POS - 4 WAY SOLENOID (STEERING VALVE)	2
6	101120-005	COUNTERBALANCE VALVE	1
7	101120-006	PROPORTIONAL VALVE	1
8	101120-007	CHECK VALVE	1

ITEM NO.	PART NO.	DESCRIPTION	QTY.
9	101120-008	FLOW DIVIDER	1
10	101120-009	2 POS POPPET VALVE (PHP VALVE)	1
11	101120-010	COIL, 8 SERIES 12 VOLT DC	1
12	011934-004	FITTING, ELBOW 6MB-6MJ 90°	2
13	020021-004	FITTING, PLUG 4MB	2
15	011934-007	FITTING, ELBOW 90° 8MB-6MJ	1
16	011935-001	FITTING, ELBOW 45° 4MB-4MB 45°	5
17	011935-003	FITTING, ELBOW 45° 6MB-6MB 45°	2

NOTE:
INSTALL ITEM 13. (PLUG) AFTER SETTING MAIN RELIEF.



ILLUSTRATED PARTS BREAKDOWN

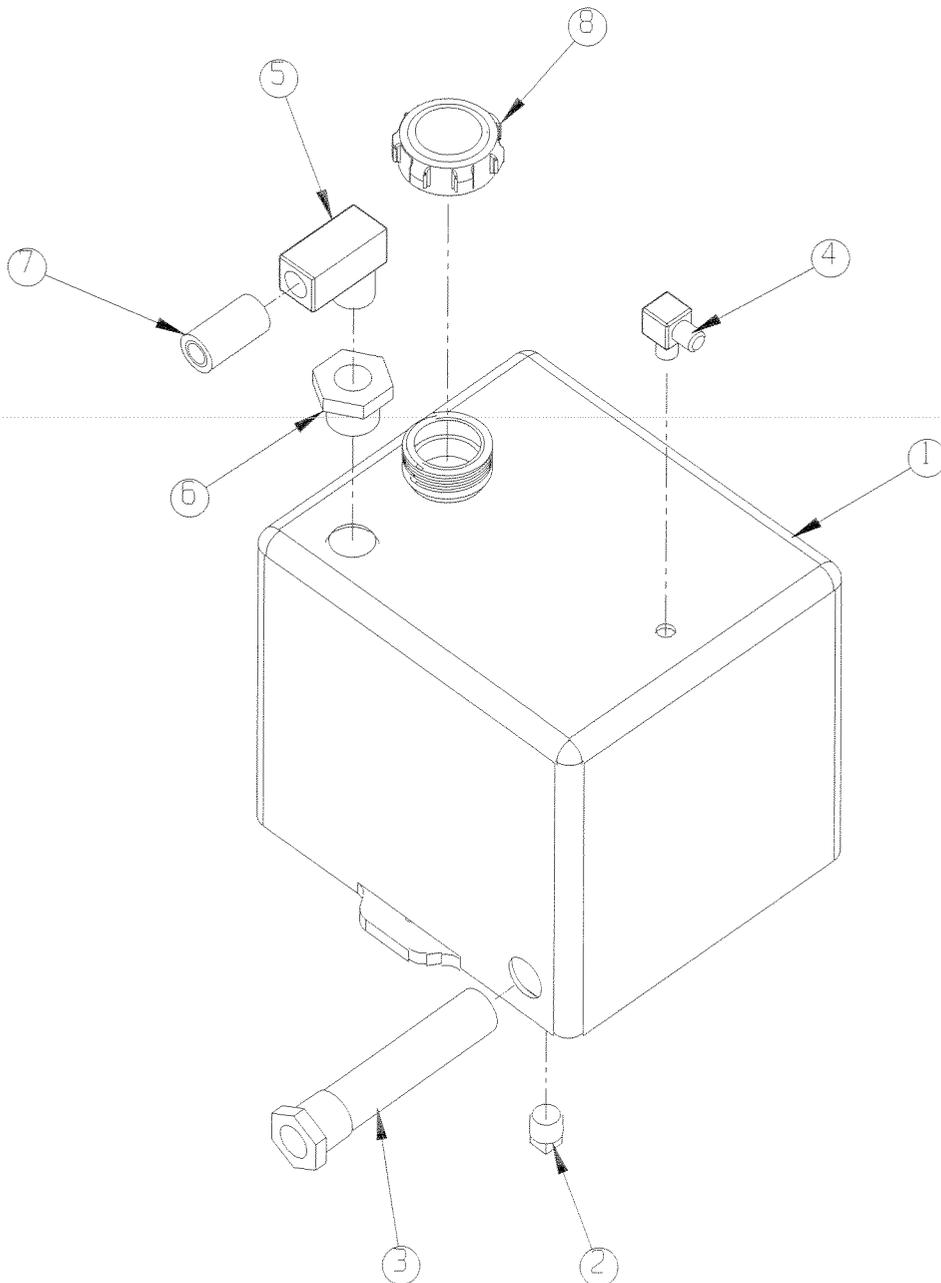
Section
6.1

Hydraulic Tank Assembly

101152-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101056-000	TANK, HYDRAULIC	1
2	021305-006	PLUG, MAGNETIC	1
3	061818-000	STRAINER, SUCTION	1
4	011940-006	FITTING, ELBOW	1
5	011917-012	FITTING, ELBOW	1

ITEM NO.	PART NO.	DESCRIPTION	QTY.
6	011923-012	FITTING, REDUCER	1
7	012467-004	NIPPLE 3/4 NPT X 2 LG.	1
8	068982-001	CAP, HYDRAULIC FLUID	1



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

Label Kit, SL20 12V

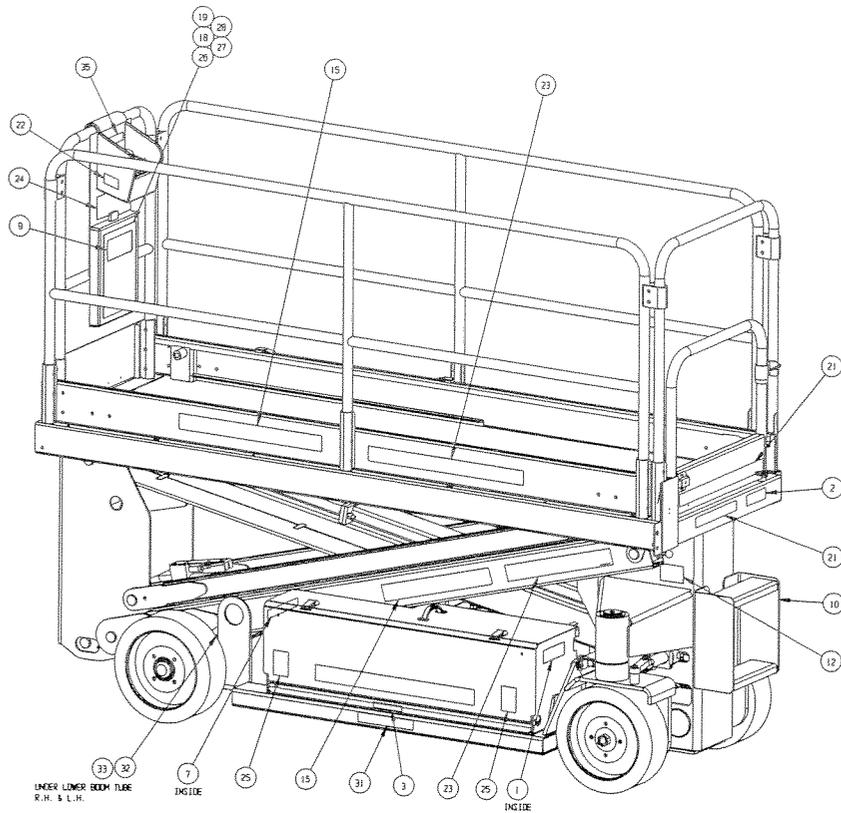
101009-001

ITEM #	PART NO.	DESCRIPTION	QTY.
1	005221-000	LABEL, BATTERY FLUID	1
2	066557-014	LABEL, MAX LOAD 750 LBS	2
3	014222-003-099	LABEL, FORK LIFT HERE	2
4	065368-000	TACK	4
5	061205-003	NAME PLATE	1
6	101206-000	LABEL, WARNING (VBG 125)	1
7	101210-000	LABEL, WARNING (VBG 125)	1
9	010076-001	LABEL, ATTENTION	1
10	027966-006	SAFETY WALK, 6 X 12	2
11	066559-000	LABEL, CONTROLS	1
12	066558-001	LABEL, EMERGENCY LOWERING	1
13	030768-001	LABEL, CE	1
14	030768-002	LABEL, GS	1
15	061683-013	LABEL, UP-RIGHT	6
16	101218-000	GUARD BRACKET, EURO	1
17	101222-000	LABEL, PROPORTIONAL CONTROLLER OPTION	1
18	101198-020	USER MANUAL SL20 EURO	1

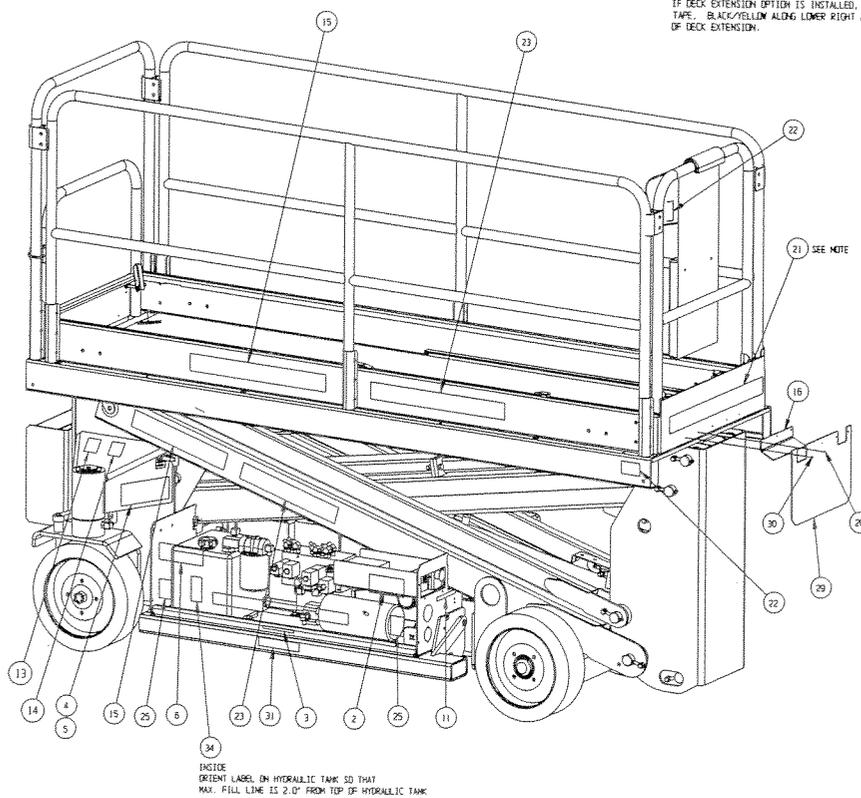
ITEM #	PART NO.	DESCRIPTION	QTY.
20	026551-009	LABEL, WARNING PINCH POINT	3
21	064936-099	TAPE, BLACK/YELLOW	8 FT
22	064444-000	LABEL, USA	4 FT
23	061684-028	LABEL, SL20	4
24	066550-006	LABEL, DANGER	1
25	101209-000	LABEL, WARNING (VBG 125)	4
26	011252-006	SCREW, 1/4-20 UNC HEX HD CAP X 3/4	2
27	011248-004	LOCKNUT, 1/4-20 UNC HEX	2
28	010076-000	MANUAL CASE	1
29	101140-000	GUARD RUBBER	1
30	026551-005	RIVET, 1/8 .188-.25 GRIP	2
31	101208-000	LABEL, WARNING (VBG 125)	2
32	065929-099	TAPE, DOUBLE SIDED	2 FT
33	066520-099	TAPE, UHMW	2 FT
34	101203-000	LABEL, FILL LINE	1
35	101207-000	LABEL, EMERGENCY LOWERING	1

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



NOTE:
IF DECK EXTENSION OPTION IS INSTALLED, ADD (ITEM 21),
TAPE, BLACK/YELLOW ALONG LOWER RIGHT AND LEFT SIDE
OF DECK EXTENSION.



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

Deck Assembly Installation, SL20 12V

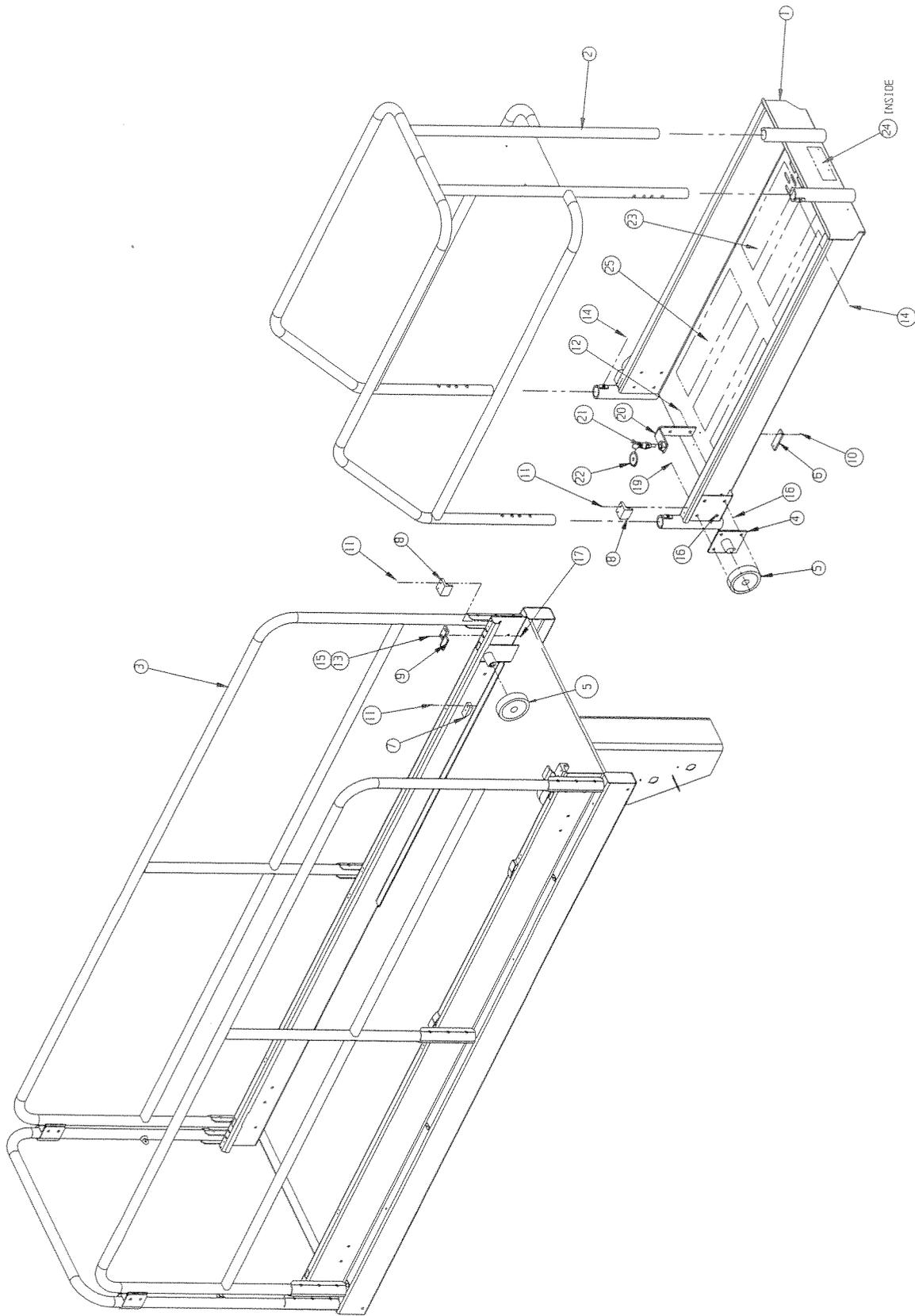
101008-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101130-000	DECK EXTENTION WELDMENT	1
2	101132-000	MAIN GUARDRAIL WELDMENT	1
3	101007-000	PLATFROM ASSEMBLY	REF
4	066256-000	ROLLER MOUNT WELDMENT	2
5	101106-000	ROLLER	4
6	066198-000	WEAR PAD	1
7	066193-000	STOP	4
8	066170-000	WEAR PAD	4
9	066407-000	BRACKET	2
10	026553-004	RIVET, 3/16 DIA X 3/8 GRIP	2
11	026553-008	RIVET, 3/16 DIA X .50 GRIP	16
12	011254-014	SCREW, 3/8-16 UNC HEX HD CAP X 1 3/4	2
13	011252-006	SCREW, 1/4-20 UNC HEX HD CAP X 3/4	4

ITEM NO.	PART NO.	DESCRIPTION	QTY.
14	066171-003	BOLT, 3/8-16 UNC TAP X 2 1/4	4
15	011240-004	WASHER, 1/4 DIA STD FLAT	4
16	011238-006	WASHER, 3/8 DIA SPLIT LOCK	8
17	011248-004	LOCKNUT, 1/4-20 UNC HEX	4
19	011254-012	SCREW, 3/8-16 UNC HEX HD CAP X 1 1/2	6
20	066410-000	DECK STOP WELDMENT	1
21	003570-001	RETAINING PIN	1
22	015924-020	WASHER, 2" FENDER	1
23	027966-006	SAFETY WALK, 6 X 12	2
24	066557-008	LABEL, MAX LOAD 250 LBS	1
25	027966-005	SAFETY WALK, 6 X 24	4

ILLUSTRATED PARTS BREAKDOWN

Section 6.1



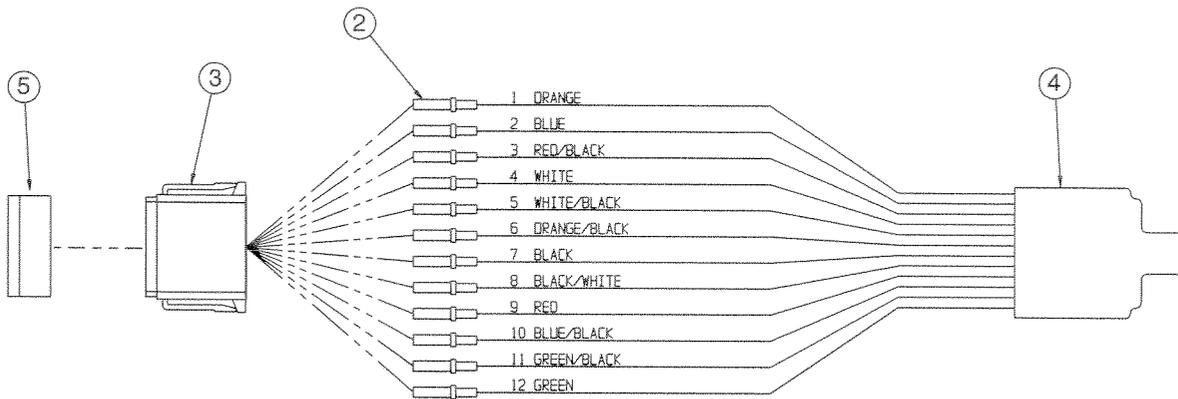
**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

Control Cable Assembly, SL20 12V

101021-00

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	010131-099	CABLE, 16 AWG, 12 COND	37 FT.
2	068762-001	SOCKET, PLUG	12
3	068760-000	PLUG	1
4	068908-000	BOOT, RECEPTACLE	2
5	068761-001	LOCKING WEDGE	1



ILLUSTRATED PARTS BREAKDOWN

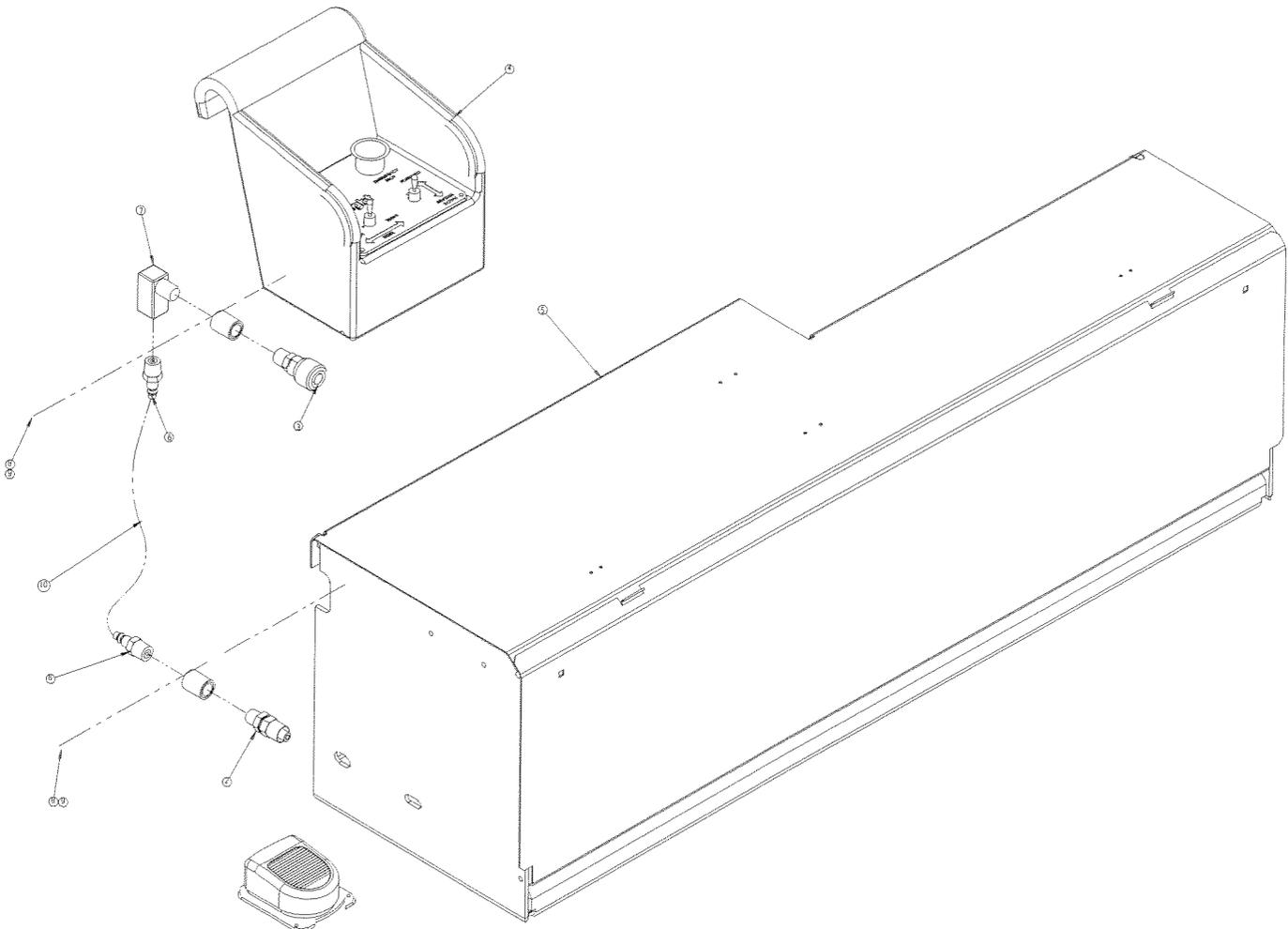
Section
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Air To Platform Option, SL20 12V

101197-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	063191-000	BRACKET WELDMENT	2
2	012728-000	COUPLING	1
3	012729-003	COUPLING	1
4	101155-000	TOGGLE CONTROLLER ASSEMBLY	REF
5	101005-000	CONTROL MODULE ASSEMBLY	REF
6	064274-002	HOSE FITTING	2

ITEM NO.	PART NO.	DESCRIPTION	QTY.
7	011917-007	FITTING, ELBOW	1
8	011249-003	LOCKNUT, #10-32 UNF HEX	4
9	011826-008	SCREW, #10-32 UNF RND HD MACH X 1	4
10	015770-099	HOSE, 3/8 AIR	50 FT



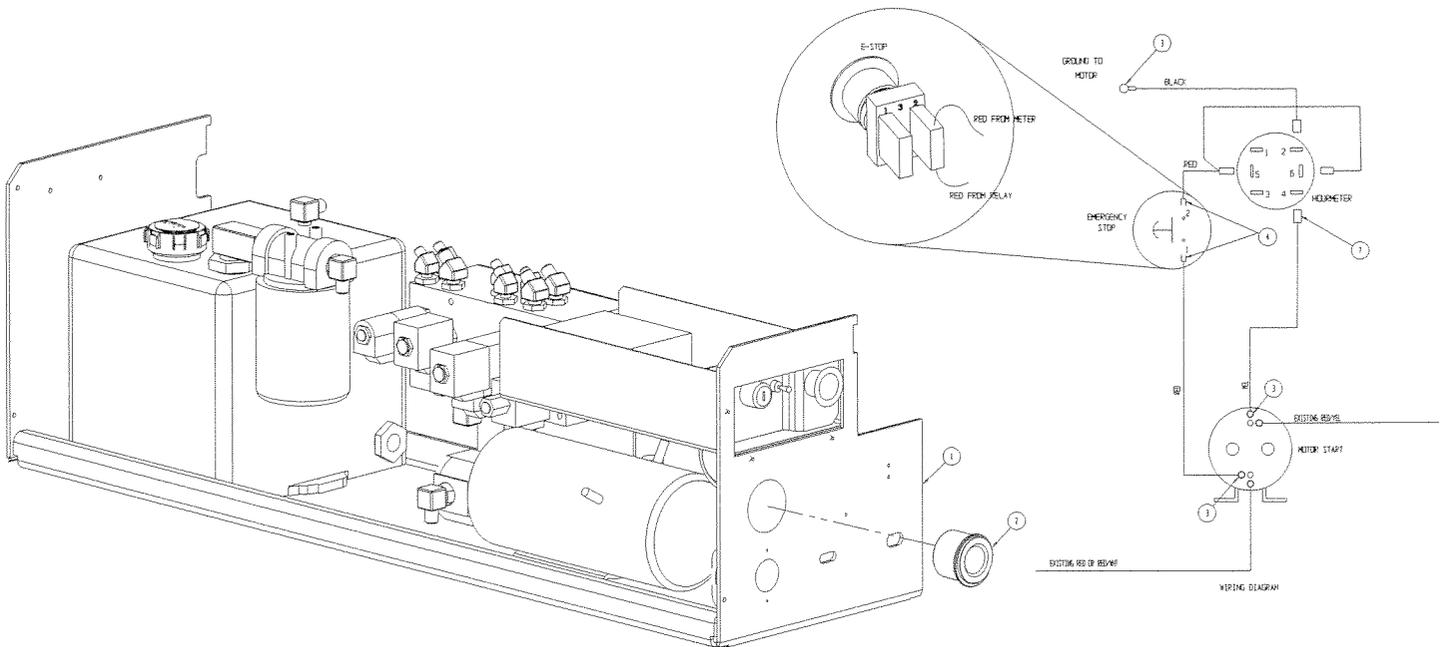
**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

Voltage/Hourmeter Option, SL20 12V

101195-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101005-000	CONTROL MODULE ASSEMBLY	REF
2	029959-000	VOLTAGE/HOURMETER	1
3	029601-013	CONNECTOR, RING TERMINAL	3
4	029610-002	CONNECTOR, FORK TERMINAL	2
5	029454-099	WIRE 16 AWG RED	1'
6	029456-099	WIRE 16 AWG YELLOW	1.33'
7	029931-003	CONNECTOR, PUSH TERMINAL	4
8	029452-099	WIRE 16 AWG BLACK	2'
9	066805-011	CONTACT BLOCK, N.C.	1



ILLUSTRATED PARTS BREAKDOWN

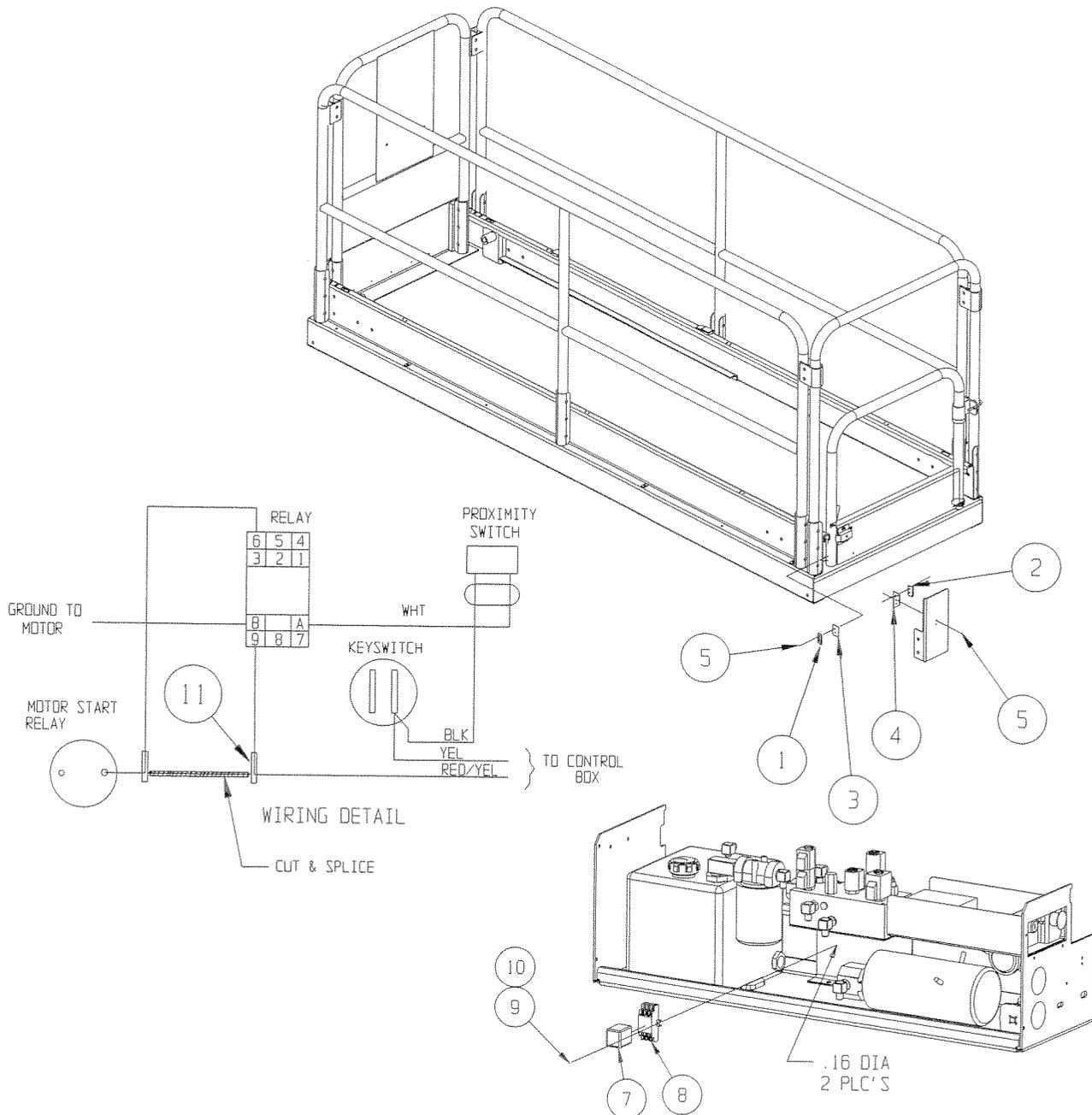
Section 6.1

Gate Interlock Option, SL20 12V

101249-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	065373-005	MAGNET, SWITCH	1
2	065373-006	SWITCH	1
3	065519-000	SWITCH PAD	1
4	065785-000	DOOR ANGLE	1
5	026551-005	RIVET, POP 1/8 X 1/4 GRIP	6
6	029496-099	CABLE, 16 AWG 2 COND	34FT

ITEM NO.	PART NO.	DESCRIPTION	QTY.
7	027962-000	RELAY, 12 VDC	1
8	027963-000	SOCKET, RELAY	1
9	011715-006	SCREW, #6-32 UNC HEX HD MACH X 3/4	2
10	011250-001	NUT, #6-32 UNC HEX	2
11	029620-002	CONNECTOR, BUTT	2



**Section
6.1**

ILLUSTRATED PARTS BREAKDOWN

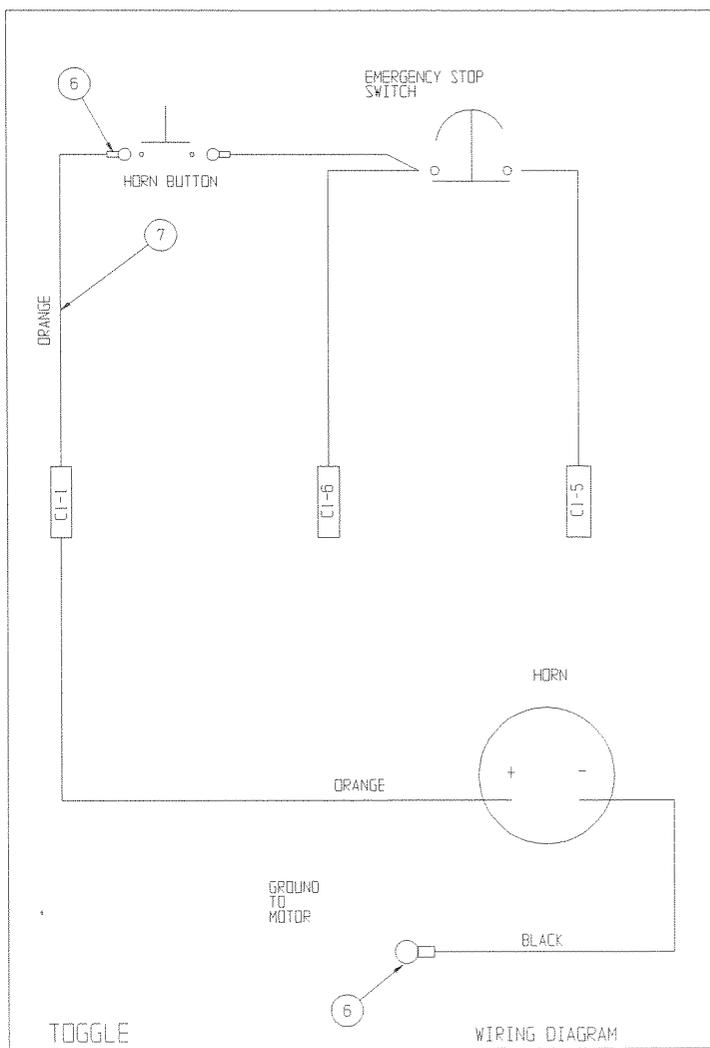
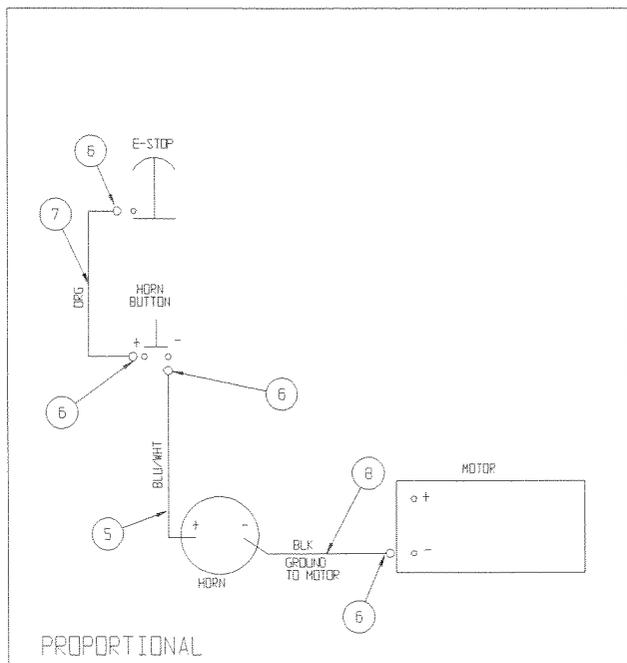
Operator Horn Assembly, SL20 12V

101190-000

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	101005-000	CONTROL MODULE ASSEMBLY	REF
1	101005-001	CONTROL MODULE ASSEMBLY	REF
2	066807-002	HORN, 24 VDC	1
3	063917-000	SWITCH, PUSH BUTTON	1
5	029354-099	WIRE, 16 GA BLU/WHT	43 FT
6	029601-013	CONNECTOR, RING TERMINAL	4
7	029453-099	WIRE, 16 AWG ORANGE	2 FT
8	029452-099	WIRE, 16 AWG BLACK	4 FT

**Operator Horn Assembly
SL20 12 Volt
101190-000
Drawing 1 of 2**

NOTES:
 REQUIRED ON UNITS WITH PROPORTIONAL (JOYSTICK) CONTROLS HAVING 12 CONDUCTOR CONTROL CABLE.

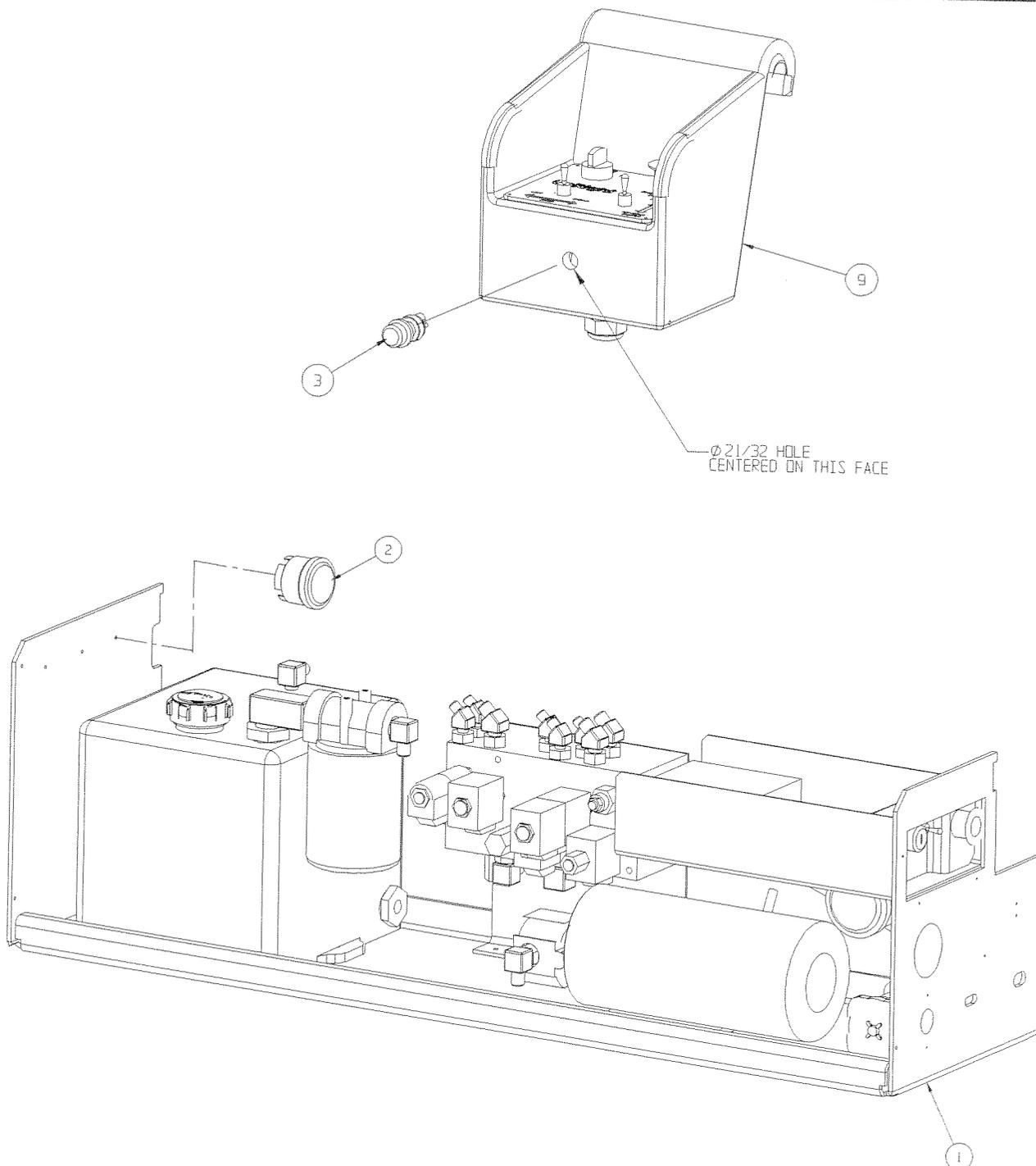


(12V OR 24V)

ILLUSTRATED PARTS BREAKDOWN

Section
6.1

Operator Horn Assembly
SL20 12 Volt
101190-000
Drawing 2 of 2

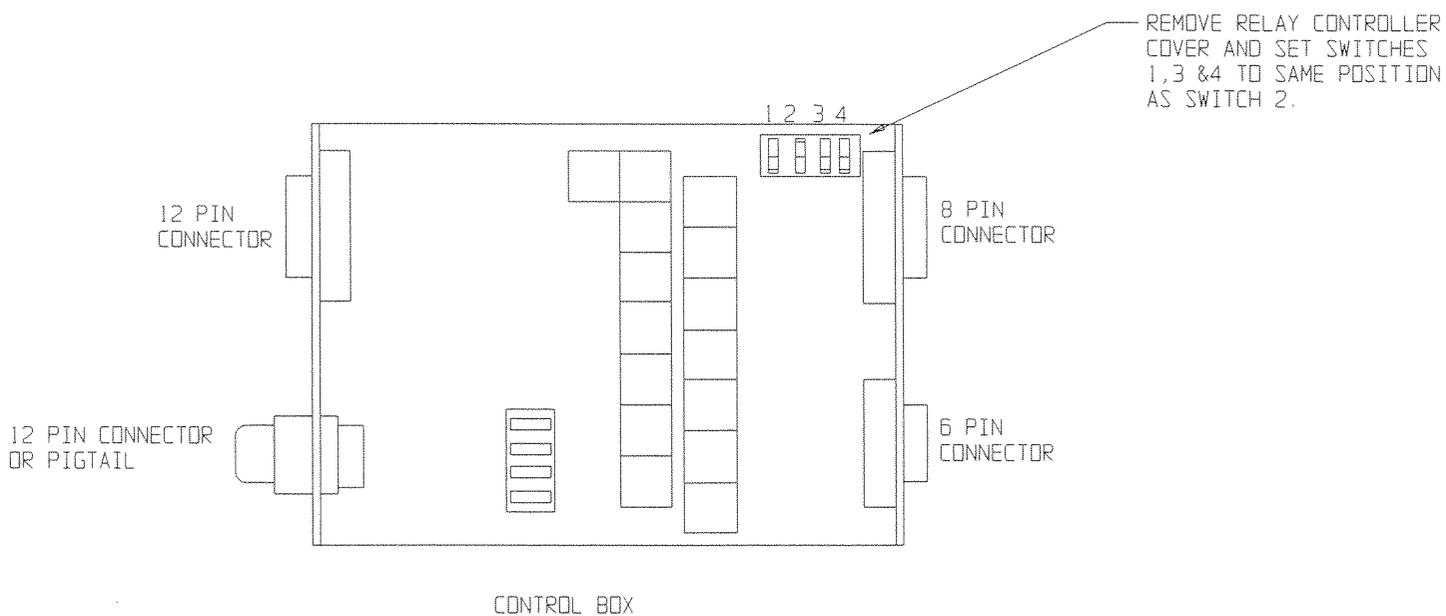


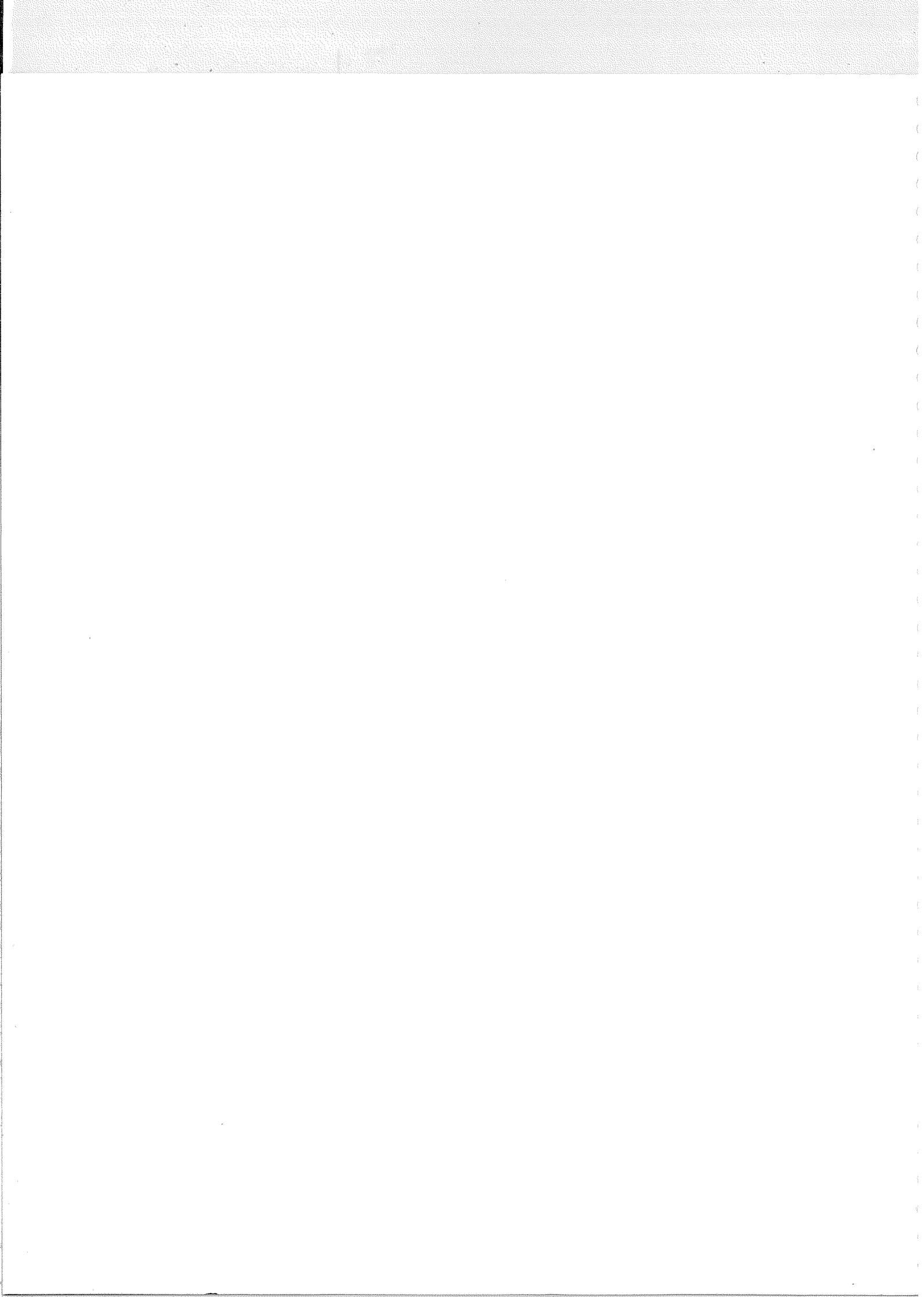
Section
6.1

ILLUSTRATED PARTS BREAKDOWN

Motion Alarm Option, SL20 12V

101193-000





UpRight

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