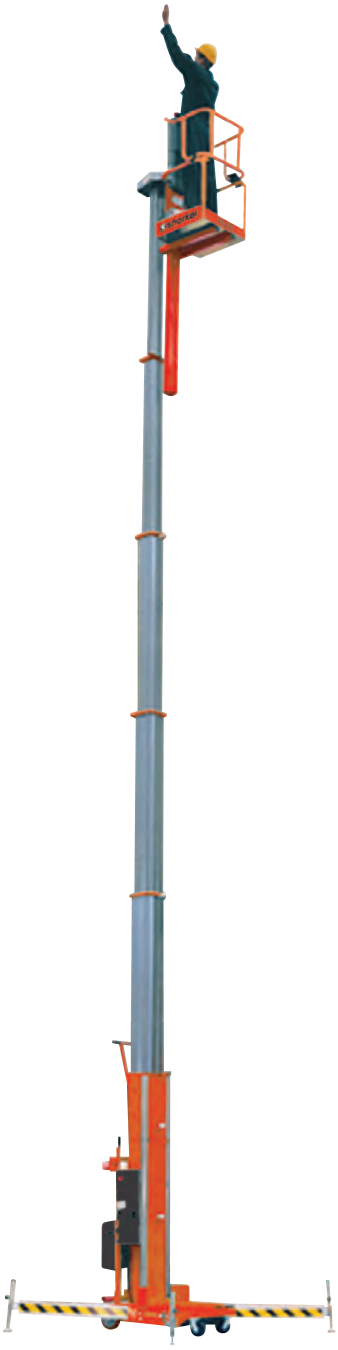
snorkel

UL40
UL32
UL25



PARTS & SERVICE
MANUAL

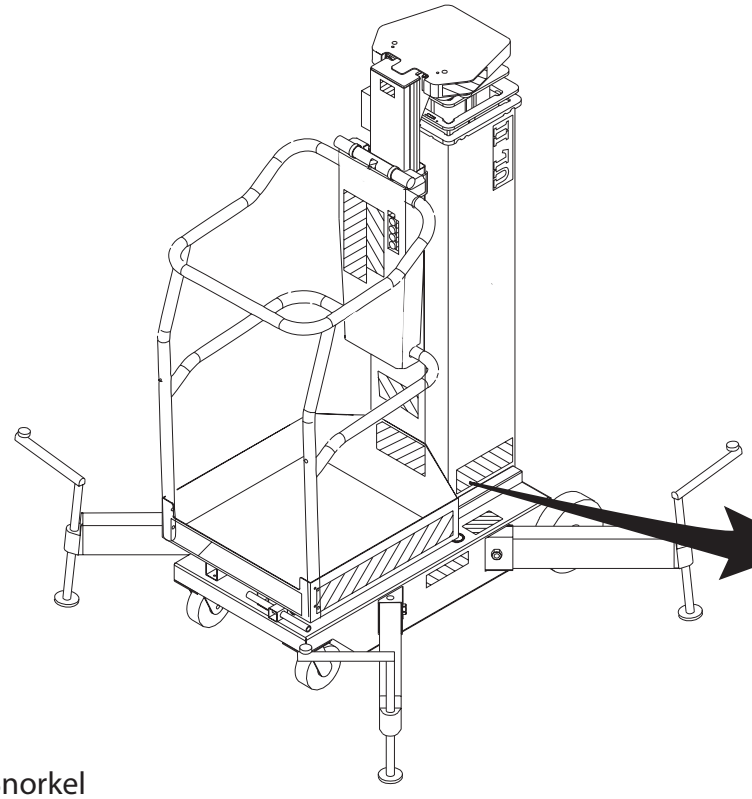
Ansi Part Number: 511128-201
MAY 2013

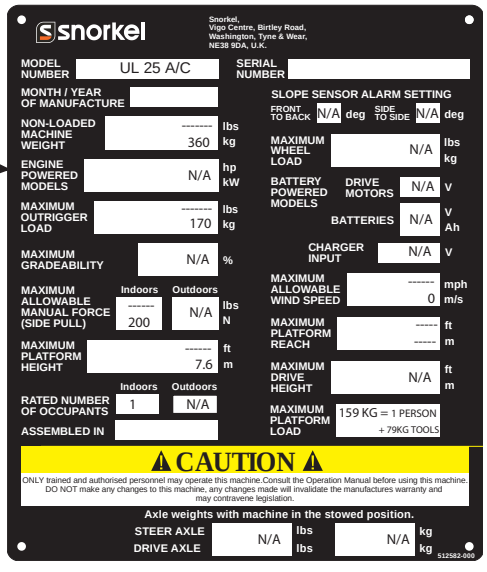
Serial Number 21691 - Current

ULII - 25/32/40

Portable Personnel Lifts

When contacting Snorkel for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate. Should the nameplate be missing, the SERIAL NUMBER is also stamped on the chassis tube on the right side of the mast.





Snorkel
Vigo Centre,
Birtley Road,
Washington,
Tyne & Wear,
NE38 9DA, U.K.
T: +44 (0)845 1557 755
F: +44 (0)845 1557 756

Contents

Table of Contents

List of Illustrations

List of Tables

UL-25/32/40 SEVICE AND PARTS MANUAL

FOREWORD

HOW TO USE THIS MANUAL

This manual is divided into six sections.

SECTION 1 INTRODUCTION

General description and machine specifications.

SECTION 2 OPERATION AND SPECIFICATIONS

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

SECTION 3 MAINTENANCE

Preventative maintenance and service information.

SECTION 4 TROUBLESHOOTING

Causes and solutions to typical problems.

SECTION 5 SCHEMATICS

Schematics and valve block diagram with description and location of components. Large schematic drawings may be located in the back of the manual.

SECTION 6 ILLUSTRATED PARTS BREAKDOWN

Complete parts lists with illustrations. Large parts drawings may be located in the back of the manual.

SPECIAL INFORMATION

⚠ DANGER ⚠

Indicates an imminently hazardous situation which, if not avoided, will result in severe injury or death.

⚠ WARNING ⚠

Indicates a potentially hazardous situation which, if not avoided, could result in severe injury or death.

⚠ CAUTION ⚠

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTE: Gives helpful information.

WORKSHOP PROCEDURES

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

⚠ CAUTION ⚠

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. Note that this manual does contain warnings and cautions against some specific service methods that 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 Snorkel, might be done, or of the possible hazardous consequences of each conceivable way, nor could Snorkel investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Snorkel must satisfy themselves thoroughly that neither personal safety nor machine safety will be jeopardized. When in doubt, contact your local distributor or Snorkel.

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 UL25/32/40 manufactured by Snorkel

This manual must be stored on the machine at all times.

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

SCOPE

The manual includes procedures for proper operation, maintenance, adjustment, and repair of the UL25/32/40 as well as recommended maintenance schedules and troubleshooting.

1.2 GENERAL DESCRIPTION

The UL25/32/40 consists of the platform, controller, elevating assembly, power / control module, and chassis.

⚠ WARNING ⚠

DO NOT use the work platform without guardrails properly assembled and in place.

Figure 1-1: UL25/32/40 Work Platform

PLATFORM

The platform has a reinforced steel floor, 1.11m (43.75 inch) high guardrails with midrail 6 inch (152 mm) toeboards, and an entrance gate at the rear of the platform.

PLATFORM CONTROLLER

The platform controller contains the controls to operate the machine. It is located at the front of the platform. A complete explanation of control functions can be found in Section 2.

ELEVATING ASSEMBLY

The platform is raised and lowered by the ele-vating assembly. The hydraulic pump, driven by an electric motor, powers the cylinder.
Solenoid operated valves control raising and lowering.

WARNING

All personnel shall carefully read, understand and follow all safety rules and operating instructions before operating or performing maintenance on any Snorkel aerial work platform.

Safety Rules

Electrocution Hazard

THIS MACHINE IS NOT INSULATED!

Tip Over Hazard

NEVER elevate the platform unless all four (4) outriggers have been properly installed.

NEVER elevate the platform without first leveling the base.

NEVER attempt to push the Snorkel Lift with people or materials on the platform or with the platform elevated.

Collision Hazard

NEVER position the platform without first checking for overhead obstructions or other hazards.

Fall Hazard

NEVER climb, stand, or sit on platform guardrails or midrail.

THIS MACHINE IS FOR INDOOR USE ONLY! Do not use out of doors.

USE OF THE AERIAL WORK PLATFORM: This aerial work platform is intended to lift persons and his tools as well as the material used for the job. It is designed for repair and assembly jobs and assignments at overhead workplaces (ceilings, cranes, roof structures, buildings etc.). All other uses of the aerial work platform are prohibited!

THIS AERIAL WORK PLATFORM IS NOT INSULATED! For this reason it is imperative to keep a safe distance from live parts of electrical equipment! DO NOT get closer than the minimum distance recommended by the “National Regulations”.

Exceeding the specified permissible maximum load **is prohibited!** See “Special Limitations” on page 4 for details.

The use and operation of the aerial work platform as a lifting tool or a crane (lifting of loads from below upwards or from up high on down) **is prohibited!**

NEVER exceed the manual force allowed for this machine. See “Special Limitations” on page 4 for details.

DISTRIBUTE all platform loads evenly on the platform.

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

OPERATE machine only on surfaces capable of supporting outriggers.

IN CASE OF EMERGENCY push EMERGENCY STOP switch to deactivate all powered functions.

Climbing up the railing of the platform, standing on or stepping from the platform onto buildings, steel or prefab concrete structures, etc., **is prohibited!**

Dismantling the entry gate or other railing components **is prohibited!** Always make certain that the entry gate is closed and securely locked!

It is prohibited to keep the entry gate in an open position (held open with tie-straps) when the platform is raised!

To extend the height or the range by placing of ladders, scaffolds or similar devices on the platform **is prohibited!**

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

INSPECT the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, loose wire connections, and damaged cables or hoses before using.

VERIFY that all labels are in place and legible before using.

NEVER use a machine that is damaged, not functioning properly, or has damaged or missing labels.

To bypass any safety equipment **is prohibited** and presents a danger for the persons on the aerial work platform and in its working range.

NEVER charge batteries near sparks or open flame. Charging batteries emit explosive hydrogen gas.

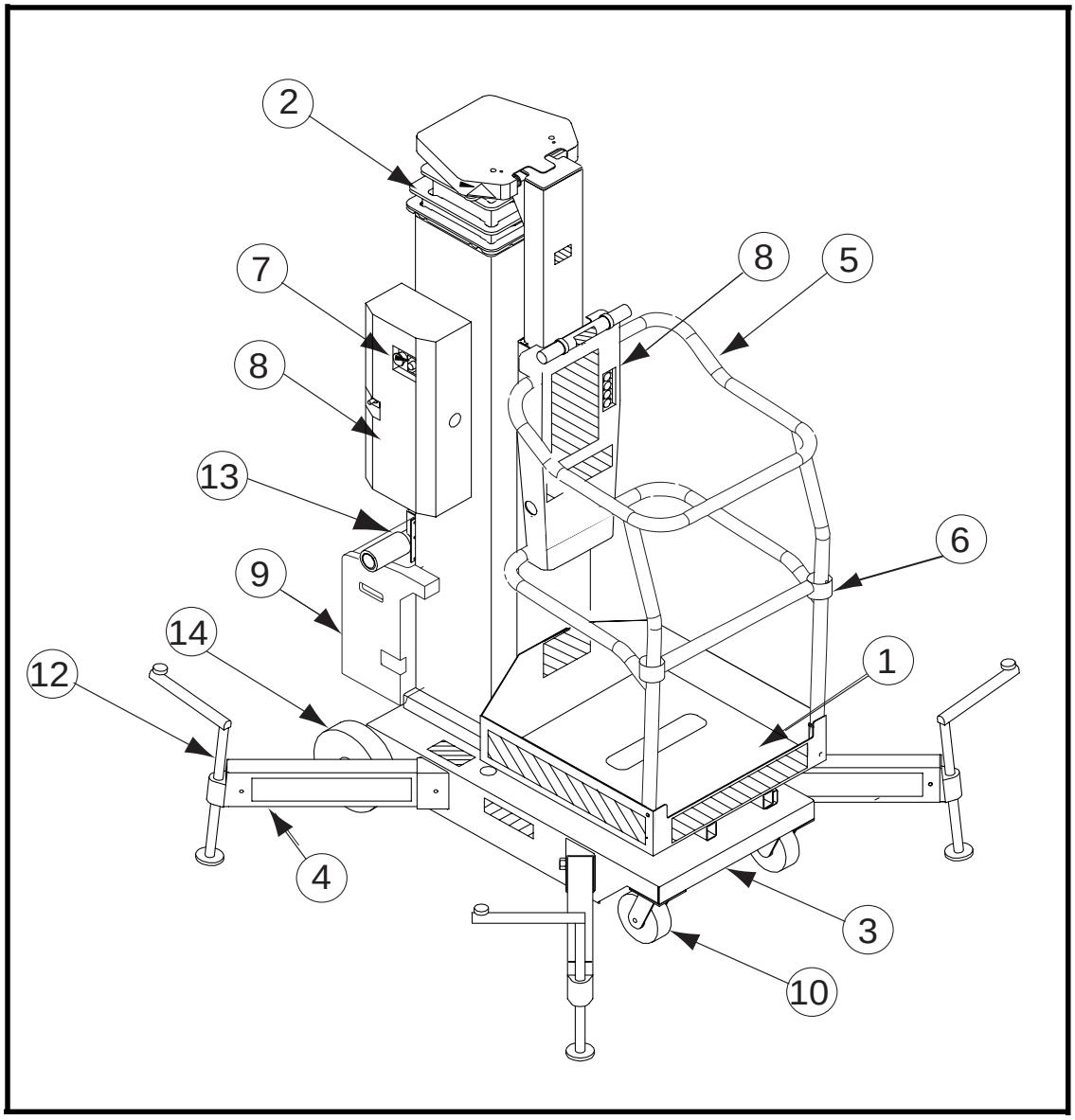
Modifications to the aerial work platform **are prohibited** or permissible only at the approval by Snorkel.

AFTER USE, secure the work platform from unauthorized use by turning keyswitches off and removing key.

CONTENTS

Figure 1-1: UL Portable Personnel Lift

Figure 1: Work Platform



1. Platform

2. Mast

3. Chassis

4. Outriggers

5. Guardrail

6. Entry Drop Bar

7. Chassis Controls

8. Power Unit

- Motor
- Hydraulic Reservoir

9. Battery Box (DC Units)

- Battery
- Battery Charger

10. Casters

11. Rear Wheels

12. Screw Jacks

13. Loader Assembly

14. Emergency Lowering Valve

SPECIAL LIMITATIONS

Elevating the Work Platform is limited to firm, level surfaces only.

All four (4) outriggers must be properly installed before operating the machine.

This machine is rated for indoor use only.

⚠ DANGER ⚠

The elevating function shall ONLY be used when the work platform is level and on a firm surface.

⚠ DANGER ⚠

***DO NOT** attempt to move this machine with the mast in an elevated position.*

⚠ DANGER ⚠

*This machine weighs in excess of 760lb (345kg) and **MUST** only be manoeuvred on firm, level ground.*

PLATFORM CAPACITY

The maximum platform capacity for the MACHINE is:

- UL 25 - 159 kg (350 lbs).
- UL 32 and UL 40 - 136 kg (300 lbs).

One person may occupy the platform .

⚠ DANGER ⚠

DO NOT exceed the maximum platform capacity or the platform occupancy limits for this machine.

MANUAL FORCE

Manual force is the force applied by the occupants to objects such as walls or other structures outside the work platform.

The maximum allowable manual force is limited to 200 N (45 lbs.) of force.

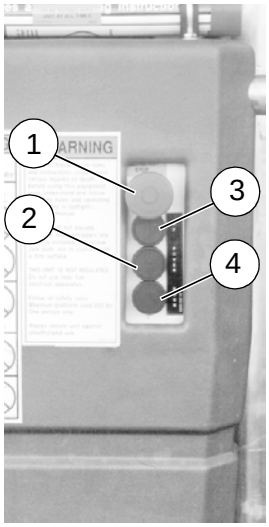
⚠ DANGER ⚠

DO NOT exceed the maximum amount of manual force for this machine.

CONTROLS AND INDICATORS

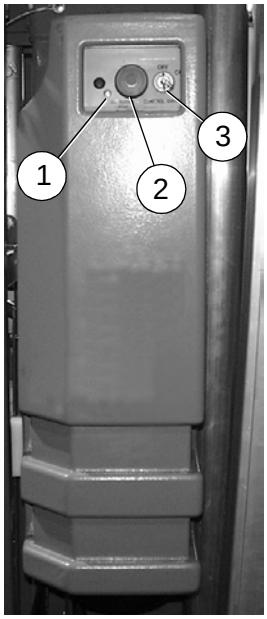
Figure 2: Controls and Indicators

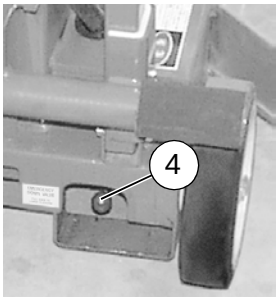
Platform Controls

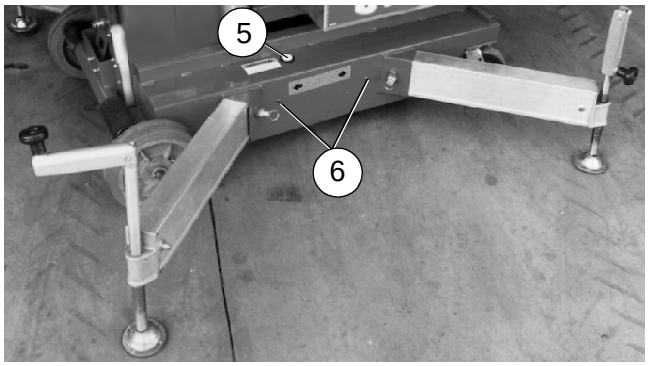


1 Emergency Stop Switch
2. Power On Button
3. Up Button
4. Down Button

Chassis Controls



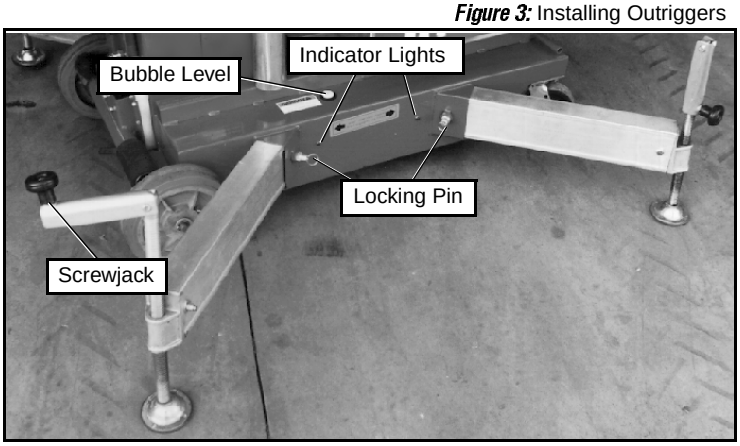




1 Power Indicator
2. Emergency Stop Switch
3. Key Switch
4. Emergency Lowering Valve
5. Orbit Level
6. Outrigger Indicator Lights

OUTRIGGER INSTALLATION

Figure 3: Installing Outriggers



1. Remove the outriggers from storage locations on the sides of the mast.
2. Insert into the outrigger socket in the base (Figure 1).
3. Push in until the locking pin engages the hole in the end of the outrigger. Pull outward on the outrigger to ensure engagement.
4. Repeat the above steps for all other outriggers. Make sure all four (4) locking pins are engaged.
5. Level the base, centering the bubble in the orbit level on the base by adjusting the screwjacks (turn clockwise) at the end of each outrigger. DO NOT release the tension (turn counterclockwise) on an outrigger to level the base.
6. All four (4) screwjack pads must be in solid contact with a firm surface and each outrigger indicator light must be lit before the platform is elevated.

SAFETY INTERLOCK TEST

⚠ DANGER ⚠

NEVER perform this test from the platform.

1. Properly install all four (4) outriggers and level the base.
2. Release the tension on one (1) outrigger by turning the screwjack counter clockwise until the indicator light is no longer lit.
3. While standing on the ground, activate the control panel to elevate the platform. **The platform should not elevate.**
4. Re-level the base.
5. Repeat steps 2, 3 and 4 until all four (4) outriggers have been tested.

⚠ DANGER ⚠

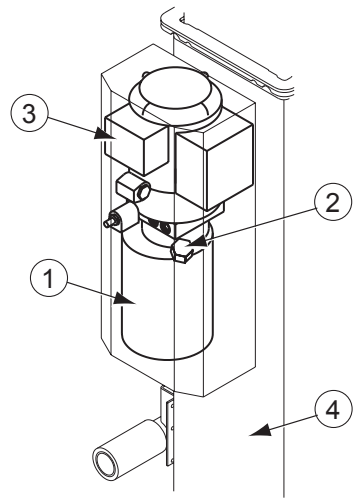
DO NOT use a machine that elevates when the tension has been released on an outrigger. The machine must be repaired before using.

Pre-Operation Safety Inspection

NOTE: Carefully read, understand and follow all safety rules, operating instructions, labels and National Safety Instructions/Requirements. Perform the following steps each day before use.

1. Check that all four (4) outriggers are properly installed.
2. Check that the base is level.
3. **AC Units:** connect the power unit plug to an approved extension cord.
4. **DC Units:** Verify that batteries are charged.
5. Perform the Safety Interlock test.
6. Check for external damage to the mast.
7. Check the level of the hydraulic fluid with the platform fully lowered:
   - Remove the reservoir cap and check the fluid level on the dipstick.
   - Add hydraulic fluid if necessary. Oil should be visible on the end of the dip stick
8. Check that fluid level in the batteries is correct. See "Battery Maintenance" on page 13.
9. Check that all guardrails are in place and all fasteners are properly tightened.
10. Inspect the machine thoroughly for cracked welds and structural damage, loose or missing hardware, hydraulic leaks, damaged control cable, and loose wire connections.

Figure 4: Hydraulic Reservoir



1 Hydraulic Reservoir
2. Reservoir Cap/Dipstick
3. Motor (AC Shown)
4. Mast

System Function Inspection

Refer to Figure 2: "Controls and Indicators," on page 5 for the locations of various controls and indicators.

⚠ WARNING ⚠

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

Check above the work platform for obstructions and electrical conductors.

NOTE: The outriggers will not elevate unless all four outriggers are properly installed with screwjack pads firmly in contact with floor and each outrigger indicator lamp lit.

Perform all tests from the ground

1. Pull the Chassis Emergency Stop Switch to the ON position.
2. Turn the Key to ON.
3. Pull the Platform Emergency Stop Switch to the ON position.
4. Push both the middle and top buttons (POWER and UP) on the Control Box at the same time to elevate the platform. Release the buttons to stop.
5. Push both the middle and bottom buttons (POWER and DOWN) at the same time to lower the platform. Release the buttons to stop.
6. Open the Emergency Lowering Valve to verify proper operation.
7. Push the Chassis Emergency Stop Switch to verify proper operation. All machine functions should be disabled. Pull out the Chassis Emergency Stop Switch to resume.
8. Push the Platform Emergency Stop Switch to verify proper operation. All machine functions should be disabled. Pull out the Platform Emergency Stop Switch to resume.

Operation

Before operating the machine, ensure that the Pre-Operation Safety Inspection has been completed and that any deficiencies have been corrected. **Never operate a damaged or malfunctioning machine.** The operator must be thoroughly trained on this machine.

NOTE: The platform will not elevate unless all four outriggers are properly installed with screwjack pads firmly in contact with floor and each outrigger indicator lamp lit.

1. **AC Units**: connect the power unit plug to an approved extension cord.
2. **DC Units:** verify that the battery charger is turned OFF and that the extension cord is removed.
3. Pull the Chassis Emergency Stop Switch to the ON position.
4. Turn the Key to ON.
5. Enter the platform by raising the drop bar.
6. Ensure the drop bar falls freely to its lowered position.

Elevating the Platform

7. Check that the area above the platform is clear before elevating the platform.
8. Pull the Platform Emergency Stop Switch to the ON position.
9. Push both the middle and top buttons (POWER and UP) on the Control Box at the same time to elevate the platform. Release the buttons to stop.
10. In the event of an emergency, push the Emergency Stop Button.
11. Visually inspect the mast assembly for cracked welds and structural damage, loose hardware, hydraulic leaks, loose wire connections, and erratic operation. Check for missing or loose parts.

Lowering the Platform

12. Check that the area below the platform is clear before lowering the platform.
13. Push both the middle and bottom buttons (POWER and DOWN) at the same time to lower the platform. Release the buttons to stop.

Emergency Lowering

Refer to Figure 2: “Controls and Indicators,” on page 5 for the location of the Emergency Lowering Valve.

⚠ WARNING ⚠

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

Stand clear of the elevating assembly while operating the Emergency Lowering Valve Knob.

Ask a person on the ground to open the Emergency Lowering Valve to lower the platform. This valve is located at the rear of the machine.

1. Pull the knob to open the valve.
2. To close the valve, release the knob.

Note: The platform will not elevate if the Emergency Lowering Valve is Open

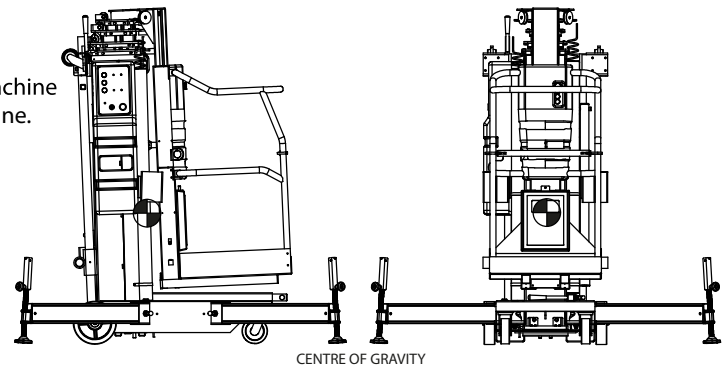
AFTER USE EACH DAY

1. Ensure that the platform is fully lowered.
2. Park the machine on a firm level surface, preferably under cover, secure against vandals children and unauthorized operation.
3. Turn the Chassis Key Switch to OFF and remove the key to prevent unauthorized operation.

TRANSPORTING THE WORK PLATFORM

⚠ CAUTION ⚠

Forklifting is for transport only. See specifications for weight of machine and be certain that forklift is of adequate capacity to lift the machine.



Forklift from the rear by lifting from fork pockets.

BY TRUCK

1. Maneuver the machine into transport position and chock wheels.
2. Secure the machine to the transport vehicle with chains or straps of adequate load capacity attached to the chassis lifting/tie down points.

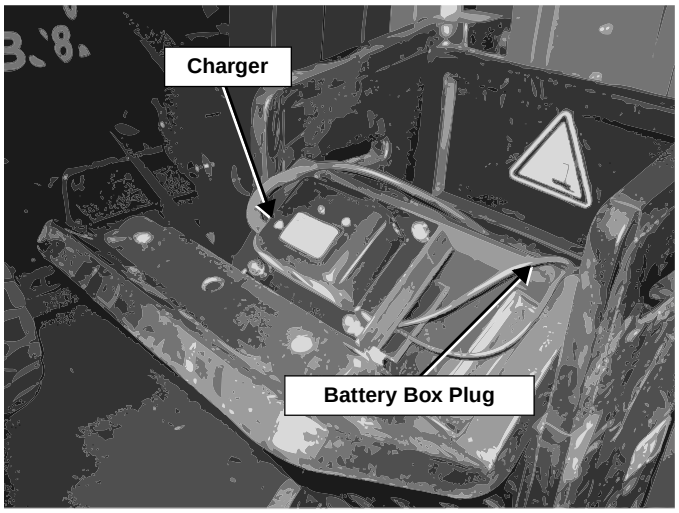
DC MODELS

Disconnect the plug from the battery box and remove the battery box from the rear of the machine.

⚠ CAUTION ⚠

*The battery box is heavy, 23,6 kg (**52 lbs.**). Lift properly to prevent back injury.*

Figure 5: Battery Box (DC Models Only)



LOADING

Refer to Figure 6: “Loading the UL for Transportation,” on page 10.

⚠ WARNING ⚠

Make sure the loader fully engages the tailgate or vehicle bed.

1. Raise the loader support brackets and engage the retaining pin in the top hole of the loader channel.
2. Secure the loader to the loader support bracket with the gravity hook.
3. Position the unit so the back of the machine comes into contact with the tailgate or vehicle bed.
4. Release the gravity hook and slide the loader down until it comes into contact with the tailgate or vehicle bed. Then reposition the loader support bracket so that the retaining pin is in the **first** available hole above the loader.
5. Release the locking pin and pull the T-handle out until the locking pin engages the hole in the end of the T-handle.
6. Lift up on the T-handle, using the loader as a pivot, until the unit rotates to a horizontal position in the vehicle bed.
7. Push the base of the unit towards the front of the vehicle bed. The machine will slide on the loader until the rear wheels are on the bed. The unit may then be rolled on the rear wheels and upper casters.
8. Return the T-handle to the stored position, making sure that the locking pin engages the T-handle.
9. Secure the unit with suitable tie straps using the forklift pockets located under the base of the unit, and either the upper caster axle on the UL25 models or the tilt back frame on the UL32 and UL40 models.

CAUTION

To prevent damage to the mast assembly, do not place rope or tie straps across the mast assembly when securing the unit for transportation.

DO NOT overtighten the rope or tie straps or damage to the machine will result.

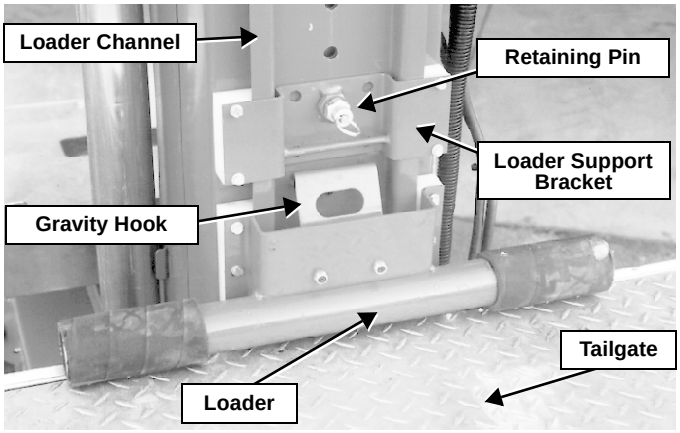
UNLOADING

1. Unsecure the unit.
2. Release the locking pin and pull the T-handle out until the locking pin engages the hole in the end of the T-handle.
3. Roll the unit back until the rear wheels are off the edge of the tailgate or vehicle bed.
4. Pull downward on the T-handle, allowing the unit to slide on the loader.
   - As the unit stops sliding on the loader, it will pivot on the loader to an upright position.
   - Gradually counterbalance the unit's weight by applying an upward force on the T-handle. This allows the unit to settle gently on the wheels, avoiding undue impact on the unit.
5. Return the T-handle to the stored position, making sure that the locking pin engages the T-handle.

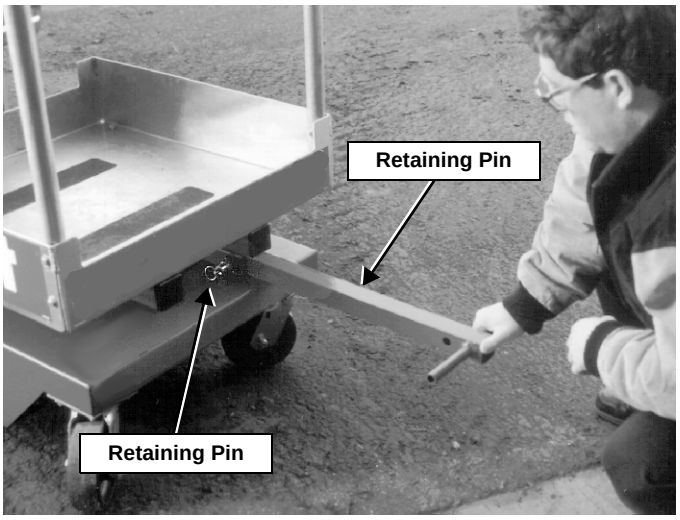
DC MODELS

Replace the battery and reconnect the battery box plug, making certain it is fully engaged.

Figure 6: Loading the UL for Transportation



Loader in Load Position



T-Handle Positioning

Tilting the Machine Onto or Off of a Vehicle

Passage Through a Doorway

The UL32 and UL40 are equipped with a castered rear Tilt Back assembly. When the unit is tilted back onto this support frame, the overall height is reduced to allow the unit to pass through a standard doorway.

Refer to Figure 7: “Passing Through Doorways,” on page 12.

Lowering

⚠ CAUTION ⚠

Before tilting the machine onto the rear Tilt Back assembly, be sure that the retaining pin is fully inserted with the hair pin retainer installed and the cylinder assembly is fully extended.

DO NOT drop the Tilt Back frame.

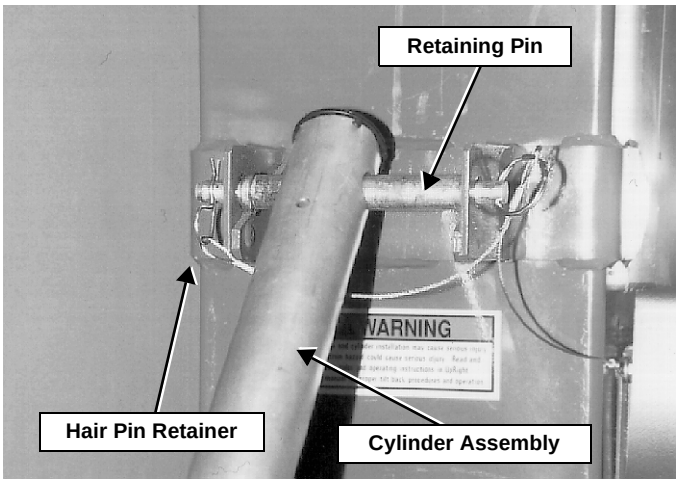
Keep out from under the Tilt Back frame and machine when tilting.

1. Be sure that the area is clear of personnel and obstructions.
2. While holding the Tilt Back frame, remove the hair pin retainer and the retaining pin.
3. Lower the Tilt Back frame until the hole in the cylinder assembly align with the upper mounting bracket pin hole. Secure the cylinder assembly to the upper mounting bracket using the retaining pin and hair pin retainer.
4. Extend the Tilt Back Handle to the tilt/lift position by releasing the locking pin and pulling the handle out of the Tilt Back assembly until the locking pin engages.
5. Push down on the Tilt Back Handle until the unit comes to rest on the Tilt Back frame.
   - As the mast tilts back, counterbalance the machine’s weight by increasing upward force on the end of the Tilt Back Handle. This allows the machine to gently come to rest on the Tilt Back casters.
6. Pull down on the handle on the back of the mast to compress the cylinder assembly.
7. Return the Tilt Back Handle to the storage position, making sure that the locking pin engages the handle.

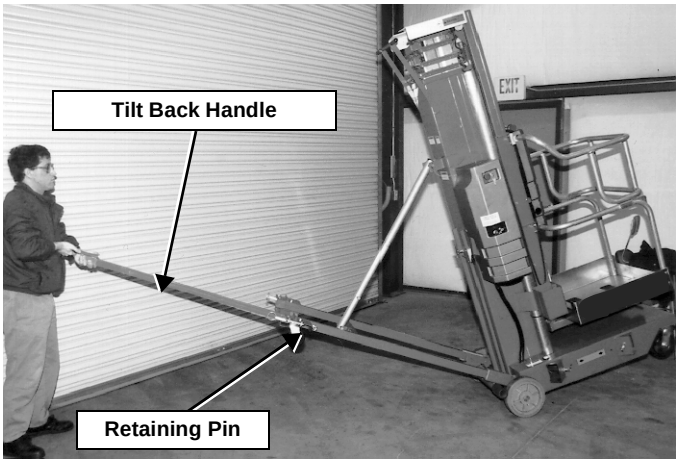
Raising

1. Lift up on the mast handle to extend the cylinder assembly.
2. Fully engage the Tilt Back Handle until the locking pin engages.
3. Lift up on the Tilt Back Handle.
   - As the mast approaches vertical, counterbalance the machine’s weight by increasing downward force on the end of the tilt Back Handle. This allows the machine to settle gently on the front casters.
4. Return the Tilt Back handle to the storage position, making sure that the locking pin engages the handle.
5. While holding the Tilt Back frame, remove the retaining pin and raise the Tilt Back assembly to the stowed position.
6. Secure with the retaining pin, making sure that the retaining pin is fully inserted, and that the hair pin retainer is installed.

Figure 7: Passing Through Doorways



Cylinder Secured with Retaining Pin



Lowering and Raising with the Tilt Back Handle

Compressing the Cylinder Assembly

MAINTENANCE

BATTERY MAINTENANCE

⚠ WARNING ⚠

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

Always wear safety glasses when working near batteries.

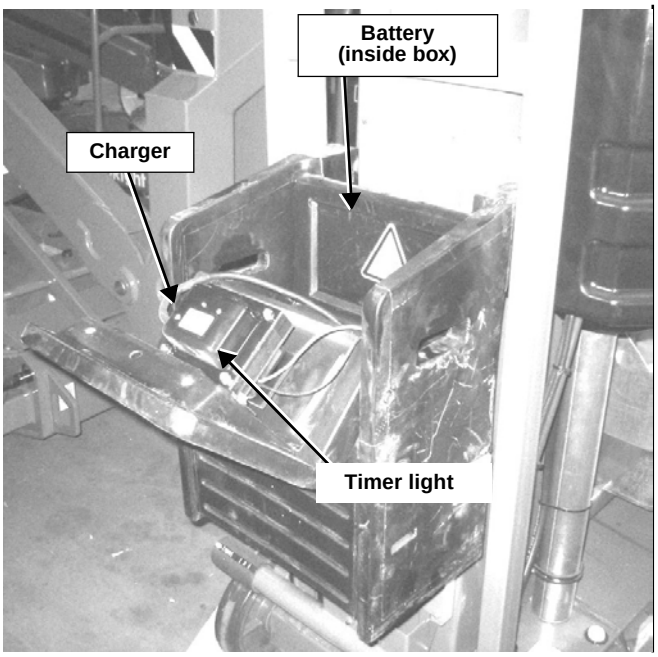
Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.

Always replace batteries with Snorkel batteries or manufacturer approved replacements weighing 22 kg (48 lbs.) each.

- Check the battery fluid level daily, especially if the work platform is being used in a warm, dry climate.
- If electrolyte level is lower than 10 mm ($^3/_8$ in.) above the plates add distilled water only. DO NOT use tap water with high mineral content, as it will shorten battery life.
- Keep the terminals and tops of the batteries clean.
- Refer to the Service Manual to extend battery life and for complete service instructions.

BATTERY CHARGING

Figure 8: Battery Charger



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

⚠ WARNING ⚠

Charge the batteries in a well ventilated area.

Do not charge the batteries when the work platform is near a source of sparks or flames.

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

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

Keep the charger dry.

1. Check the battery fluid level. If the battery fluid level is lower than 10 mm ($^3/_8$ in.) above the plates add distilled water only.
2. Verify the charger voltage switch is set to 12 volts.
3. Connect an appropriate extension cord to the charger plug. Plug the extension cord into a properly grounded outlet of proper voltage and frequency.

NOTE: The battery charger circuit must be used with a GFI (Ground Fault Interrupt) outlet.
NOTE: DO NOT operate the machine while the charger is plugged in.

HYDRAULIC FLUID

The hydraulic fluid reservoir is located under the power unit cover.
NOTE: Never add fluid if the platform is elevated.

CHECK HYDRAULIC FLUID
1. Make sure that the platform is fully lowered.
2. Open the chassis door.
3. Check the fluid level using the guage on the dipstick.
4. To add Hydraulic fluid remove Filler Cap in .
5. Add the appropriate fluid to bring the level to the end of the dipstick. See “Specifications” .

Inspection and Maintenance Schedule

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

NOTE: The frequency and extent of periodic maintenance should also take into account Local/National Regulations.

⚠ WARNING ⚠

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

Always block the elevating assembly whenever it is necessary to perform maintenance while the platform is elevated.

The daily preventative maintenance checklist has been designed for machine service and maintenance. Please photocopy the Daily Preventative Maintenance Checklist and use the checklist when inspecting the machine.

Daily Preventative Maintenance Checklist

Maintenance Table Key

Y = Yes/Acceptable

N = No/Not Acceptable

R = Repaired/Acceptable

Preventative Maintenance Report

Date: _____

Owner:_____

Model No: _____

Serial No:_____

Serviced By: _____

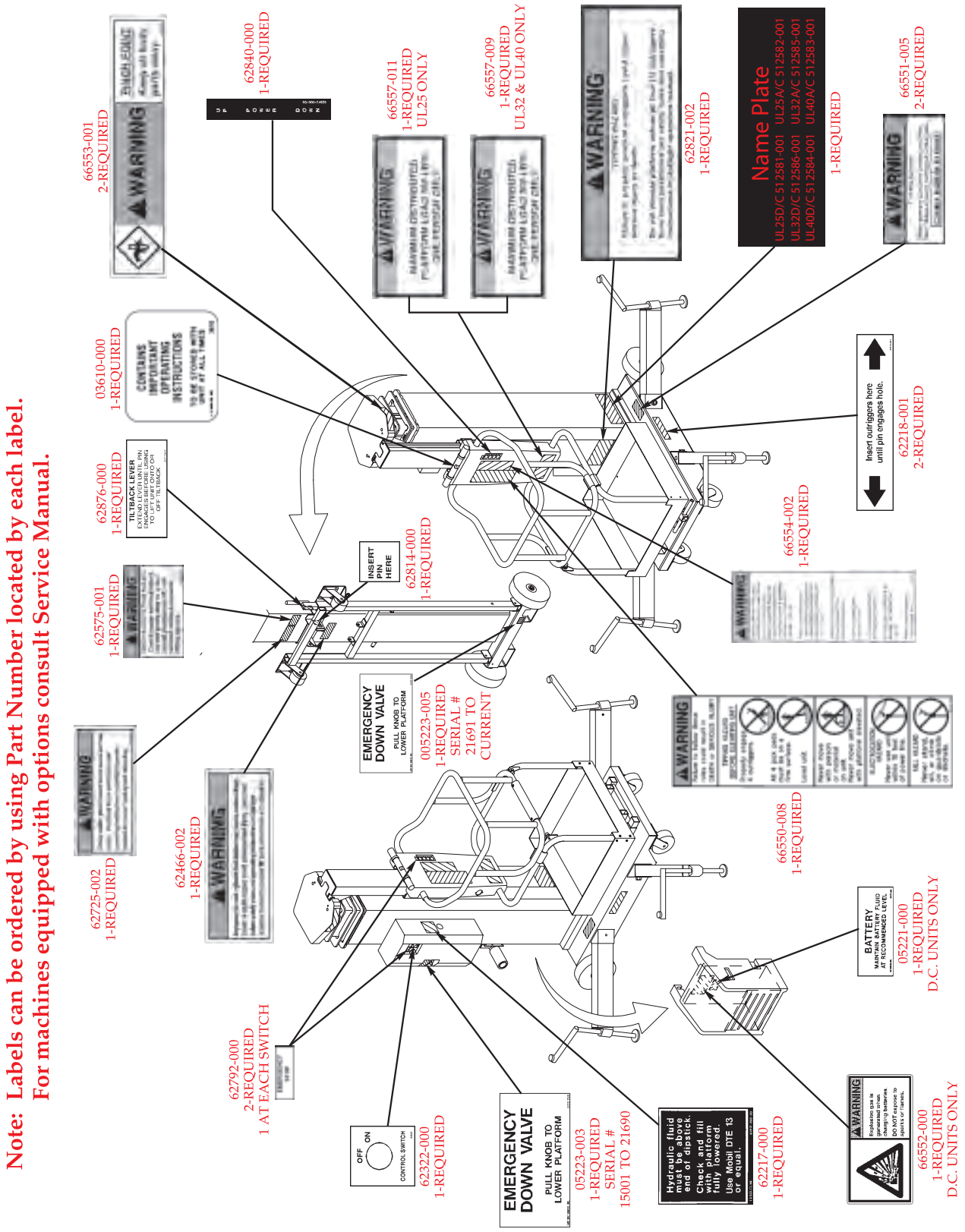
COMPONENT	INSPECTION OR SERVICES	Y	N	R
Battery	Check electrolyte level.			
	Check battery cable condition.			
Chassis	Check bubble level accuracy			
	Check operation of outrigger interlocks			
	Check casters for damage			
	Check hoses for pinch or rubbing points.			
	Check welds for cracks.			
Control Cable	Check the exterior of the cable for pinching, binding or wear.			
Controller	Check switch operation.			
Mast Assembly	Inspect for bends, cracks or loose rivets.			

COMPONENT	INSPECTION OR SERVICES	Y	N	R
Emergency Lowering System	Operate the emergency lowering valve and check for serviceability.			
Hydraulic Fluid	Check fluid level.			
Hydraulic Pump	Check for hose fitting leaks.			
Hydraulic System	Check for leaks.			
Labels	Check for peeling, missing, or unreadable labels & replace.			
Cage and Deck	Check welds for cracks.			
	Check condition of deck.			

NOTES:

LABELS

These labels shall be present and in good condition before operating the work platform. Be sure to read, understand and follow these labels when operating the work platform.



Note: Labels can be ordered by using Part Number located by each label. For machines equipped with options consult Service Manual.

UL LIFT LABEL INSTALLATION: THESE LABELS SHALL BE PRESENT AND IN GOOD CONDITION BEFORE OPERATING THE WORK PLATFORM. BE SURE TO READ, UNDERSTAND AND FOLLOW THESE LABELS WHEN OPERATING THE WORK PLATFORM.

SPECIFICATIONS

ITEM	UL 25	UL 32	UL 40
Platform Capacity	159 kg (**350 lbs.**)	136 kg (**300 lbs.**)	136 kg (**300 lbs.**)
Max. No. of occupants	1 person	1 person	1 person
Height			
Working Height	9,62 m (**31.6 ft.**)	11,75 m (**38.5 ft.**)	14,19 m (**46.6 ft.**)
Max. Platform Height	7,62 m (**25 ft.**)	9,75 m (**32 ft.**)	12,19 m (**40 ft.**)
Min. Platform Height	38 cm (**15 in.**)	38 cm (**15 in.**)	38 cm (**15 in.**)
Dimensions			
Overall Weight	390Kg (860lbs)	435Kg (960lbs)	470Kg (1040lbs)
DC Option Weight	29 kg (**64 lbs.**)	29 kg (**64 lbs.**)	29 kg (**64 lbs.**)
Overall Width (outriggers extended)	2.06m (81 in)	2.06m (81 in)	2.95m (116 in)
Overall Length (outriggers extended)	1.98m (78 in)	1,98 m (**78 in.**)	2.84m (112 in)
Stowed Dimensions			
Vertical Height	1,98 m (**78 in.**)	2.53m (100 in)	2.90m (114 in)
Width	74 cm (**29 in.**)	74 cm (**29 in.**)	74 cm (**29 in.**)
Depth	1,24 m (**49 in.**)	1.32m (52 in)	1.32m (52in)
Diagonal Storage Height	1.94m (76 in)	1.94m (76 in)	2 m (**79 in.**)
Diagonal Storage Length	2.59 m (102 in.)	2,72m (**107 in.**)	3.05m (120 in)
System Voltage			
AC Electric Motor	120 VAC 60 Hz or 220 VAC 50/60 Hz		
DC Electric Power Source	1 - 12 Volt Battery, Group 27 105 Amp/Hrs., Minimum Weight 22 kg (**48 lbs.**)		
Battery Charger	Automatic, 120 VAC 60 Hz or 220 VAC 50 Hz Output: 10 Amp, 12 Volts DC		
Hydraulic Tank Capacity	5,7 liter (**1.5 gal.**)		
Maximum Hydraulic Pressure	165 bar(**2400 PSI**)		
Hydraulic Fluid			
Normal Temperature: above 0° C [32° F]	ISO #46		
Low Temperature: below 0° C [32° F]	ISO #32		
Extreme Temperature: below -17° C [0° F]	ISO #15		
Control System	Push Button Lift and Lower, Red Mushroom EMERGENCY STOP Switch		
Guardrails	1,1 m (**43.5 in.**) High		
Toeboard	152mm (6 in) High		
Max Chassis Inclination	Zero Degrees in all directions		
Outrigger Loading	170 Kg (374lbs)		
Vibration	2.5m/sec^2		
Sound Pressure	68dB (A) at Control Station		
Operating Temperature Range	-20° C to +50° C		

*Specifications are subject to change without notice. Hot weather or heavy use may affect performance.

Refer to the Service Manual for complete parts and service information.

The UL25/32/40 meets or exceeds the requirements of ANSI A92.3 - 1990

Service and Repair

This section contains instructions for the maintenance of the Work Platform. Refer to the General Information section for information relevant to all Snorkel work platforms. Referring to the Operator Manual will aid in understanding the operation and function of the various components and systems of the work platform, and help in diagnosing and repair of the machine.
Owners of this work platform must set up a maintenance programme and have prepared a safety statement in advance as required by the relevant National Body. The frequency and extent of periodic maintenance should also take into account Local/National regulations.

⚠ WARNING ⚠

Be sure to read, understand and follow all information in the Operation Section of this manual before attempting to operate or perform service on any Work Platform.

⚠ DANGER ⚠

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

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

Table of Contents

2.0 Introduction

This section contains instructions for the maintenance of the UL-Series Lifts. Procedures for the operational check-out adjustment, scheduled maintenance, and repair/ removal are included.

Referring to the *Operator Manual* will aid in understanding the operation and function of the various components and systems of the UL-Series Lifts and help in diagnosing and repair of the machine.

SPECIAL TOOLS

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

Description	Part Number
Spanner Wrench For UL25,32,40	062521-010
Strap Wrench	062482-000
Tie Rod Tensioner (2 req'd.)	062738-000
Tensioner Bracket (2 req'd.)	062739-000

2.1 Preventative Maintenance (Table 2-1)

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

⚠ WARNING ⚠

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

Never enter the area below the Platform when the Platform is elevated.

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

Preventative Maintenance Table Key

Interval

Daily=each shift or every day
30d=every month or 30 days
3m=every 3 months
1y=every year

Y=Yes/Acceptable
N=No/Not Acceptable
R=Repaired/Acceptable

Preventative Maintenance Report

Date: _____

Owner: _____

Model No: _____ Serial No: _____

Serviced By: _____

Service Interval: _____

Table 2-1: Preventative Maintenance

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery System (DC Units only)	Check electrolyte level	Daily			
	Check battery cable condition	Daily			
	Charge batteries	Daily			
	Check charger condition & operation	Daily			
	Check specific gravity	30d			
	Clean exterior	3m			
	Clean terminals	3m			
Hydraulic Oil	Check oil level	Daily			
	Drain and replace oil (ISO #46)	1y			
Hydraulic System	Check for leaks	Daily			
	Check line connections	30d			
	Check for exterior wear	30d			
Emergency Hydraulic System	Open the emergency lowering valve and check for serviceability	Daily			
Emergency Down	Check procedure for Emergency Down batteries	3m			
Hydraulic Pump	Check for fitting leaks	Daily			
	Wipe clean	30d			
	Check for leaks at mating surfaces	30d			
	Check mounting bolts for proper torque	30d			
Controls	Check condition & operation	Daily			
Control Cable	Check the exterior of the cable for pinching, binding or wear	Daily			
Platform Deck and Rails	Check fasteners for proper torque	Daily			
	Check welds for cracks	Daily			
	Check condition of deck	Daily			
	Check entry way closure	Daily			
Elevating Assembly	Inspect for external damage, dents, loose rivets or cracks	Daily			
	Check chains and sheaves for wear	3m			
	Inspect and adjust sequence straps	30d			
Chassis	Check cables for pinch or rubbing points	Daily			
	Check welds for cracks	Daily			
	Check casters for damage	Daily			
	Check component mounting for proper torque	3m			
Lift Cylinder	Check for leaks	Daily			
	Check fitting for proper torque	30d			
Entire Unit	Perform pre-operation inspection	Daily			
	Check for and repair collision damage	Daily			
	Lubricate	3m			
	Check fasteners for proper torque	3m			
	Check for corrosion; remove and repaint	3m			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			

2.2 Lubrication

Refer to Figure 2-1 for location of items that require lubrication service. Use an aerosol chain lubricant for all components to be lubricated that require oil.

CASTERS

Using a grease gun, apply 1 or 2 shots of multi-purpose bearing grease to each zerk fitting. Swivel casters have two zerk fittings, one at the wheel bearing and one at the swivel.

CHAINS

1. Ensure that Platform is fully lowered.
2. Apply enough aerosol chain lubricant to exposed section of chain to allow lubricant to run down chain.

SCREW JACKS

Apply a moderate amount of aerosol chain lubricant to each screwjack assembly.

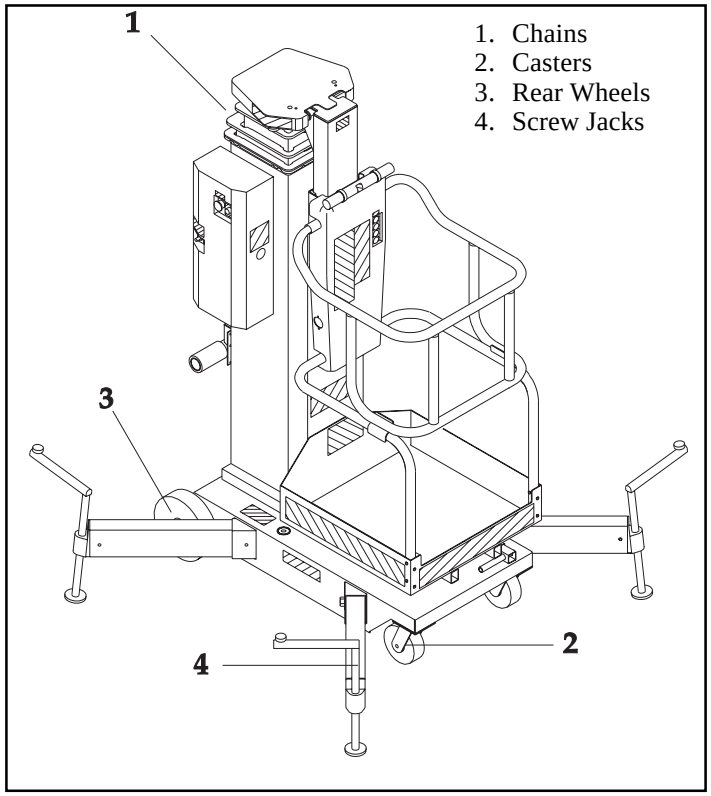


Figure 2-1: Lubrication

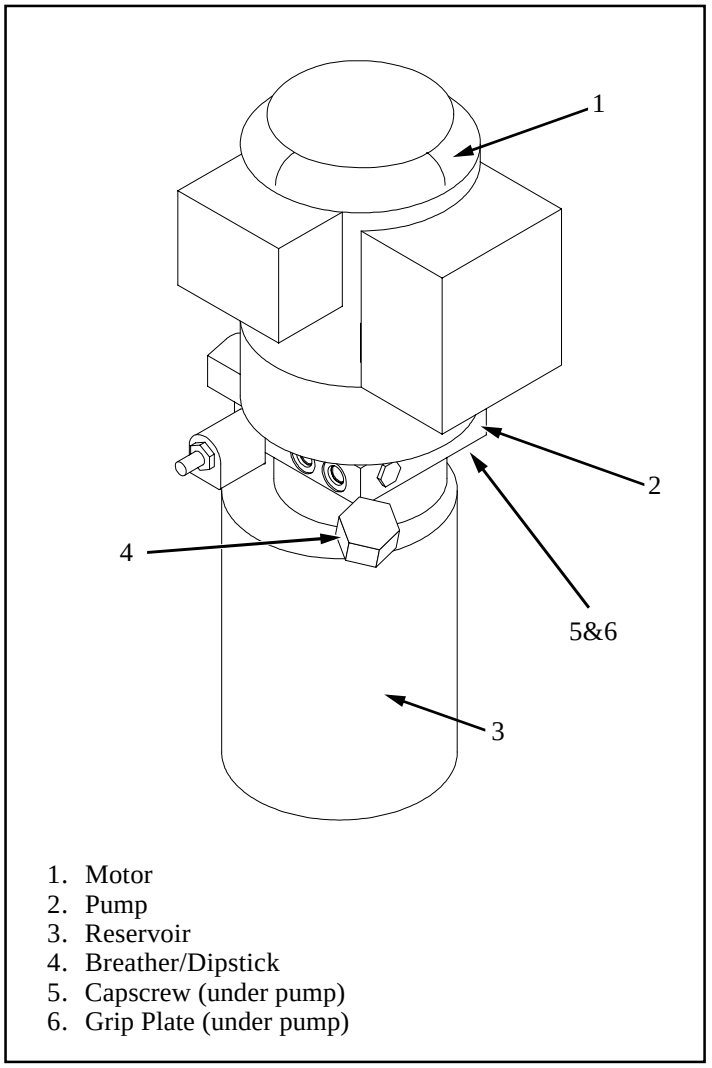


Figure 2-2: Hydraulic Power Unit

HYDRAULIC OIL RESERVOIR (Figure 2-2)

Verify that Platform is fully lowered.

1. Remove hydraulic reservoir from pump by removing four screws and four grip plates.
2. Provide a suitable container (reservoir has a 5,7 liter [1.5 U.S. gal.] capacity) and dispose of hydraulic fluid properly; contact your local oil recycler.

Note: Ensure o-ring is in place on pump when installing hydraulic reservoir.

3. Reinstall hydraulic reservoir to pump assembly with grip plates and screws.
4. Fill hydraulic reservoir through the dipstick hole with ISO #46 hydraulic fluid. Hydraulic reservoir has a 5,7 liter [1.5 U.S. gal.] capacity. Ensure that oil is visible on the end of the dipstick.

2.3 Battery Maintenance (DC units only)

Electrical energy for the motor is supplied by a 12-volt battery. Proper care and maintenance of the battery and motor will ensure maximum performance from the lift.

⚠ WARNING ⚠

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

Always wear safety glasses when working with batteries.

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

BATTERY INSPECTION AND CLEANING

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

⚠ WARNING ⚠

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

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

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

BATTERY CHARGING (Figure 2-3)

Charge battery at end of each work shift or sooner if battery has been discharged.

⚠ CAUTION ⚠

Charge battery in a well-ventilated area.

Do not charge battery when the lift is in an area containing sparks or flames.

Permanent damage to battery will result if battery is not immediately recharged after discharging.

Never leave charger operating unattended for more than two days.

Never disconnect cables from battery when charger is operating.

Keep charger dry.

When night air temperatures fall below 18°C (65°F) a battery charged in an unheated area should be placed on charger as soon after use as possible. Under such conditions a 4 hour equalize charge once a week in the early afternoon will improve state of charge and battery life.

1. Check battery fluid level. If electrolyte level is lower than 10 mm (3/8 in.) above plates add distilled water only.
2. Verify charger voltage switch is set to 12 volts.
3. The battery charger is located at the rear of the mast. Connect extension cord (1,5 mm^2 [12 gauge] conductor minimum and 15 m [50 ft.] in length maximum) to the charger plug. Connect other end of extension cord to properly grounded outlet of proper voltage and frequency.
4. Set charger control to "conventional" setting. Charger ammeter should indicate charge rate.
5. When battery is fully charged, charger automatically turns itself off. Disconnect extension cord.

BATTERY CELL EQUALIZATION

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

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

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

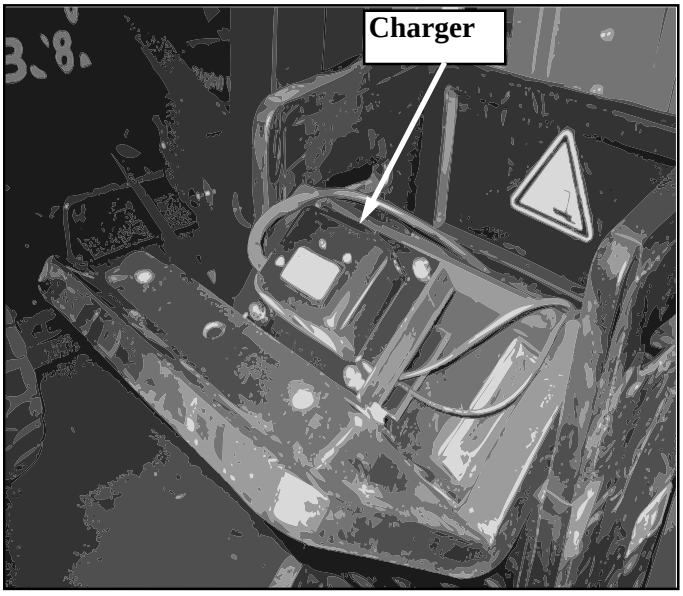


Figure 2-3: Battery Charger

2.4 Setting System Relief Valve (Figure 2-4)

Check the hydraulic system pressure whenever the pump or relief valve has been serviced or replaced.

⚠ WARNING ⚠

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

1. Install outriggers and level unit as normal, (see Operator Manual 3 for operating instructions), and operate the hydraulic system for 5-10 minutes to warm the hydraulic oil.
2. Remove Cover from Power Unit Assembly
3. Place rated load on the platform (see table 1-1 for specifications). **Do Not** use live weight for this procedure.
4. Install pressure gauge on gauge port.
5. Remove the cap from the System Relief Valve (fig. 2-4), and turn the adjustment screw counterclockwise two full turns.
6. Operate controls to elevate machine. (Machine will not raise until Relief Valve is properly adjusted.)
7. Turn the System Relief Valve Clockwise (fig. 2-4) until the machine begins to rise.
8. Elevate the platform fully and verify that the pressure does not exceed 165 bar (2400 PSI) at any time during the lift cycle.
9. Replace cap on System Relief Valve, reassemble Cover.

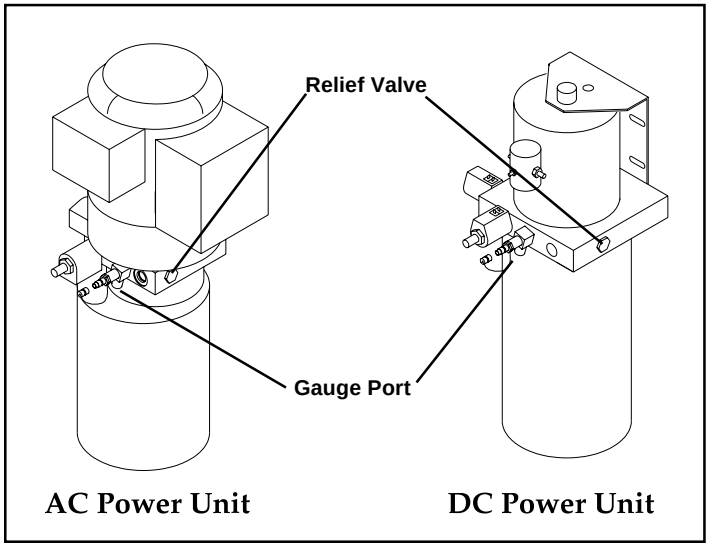


Figure 2-4: System Relief Valve

2.5 Mast Assembly (Figure 2-6,2-7) Disassembly

Using a suitable lifting device, lower the work platform into a horizontal position (Figure 2-5). If possible, place the machine onto a sturdy work table using a forklift.

⚠ WARNING ⚠

Never attempt to lower lift into a horizontal position without the use of a suitable lifting device; bodily injury or damage to the machine may result.

NOTE: Mark all components as they are removed so they can be reinstalled in the correct sequence and location.

Platform Assembly Removal (Figure 2-6)

1. Extend elevating assembly far enough to expose the eight screws attaching the cage support assembly to stage 6 by opening the emergency lowering valve and pulling on the cage guardrail.
2. Remove cover from front of platform assembly.

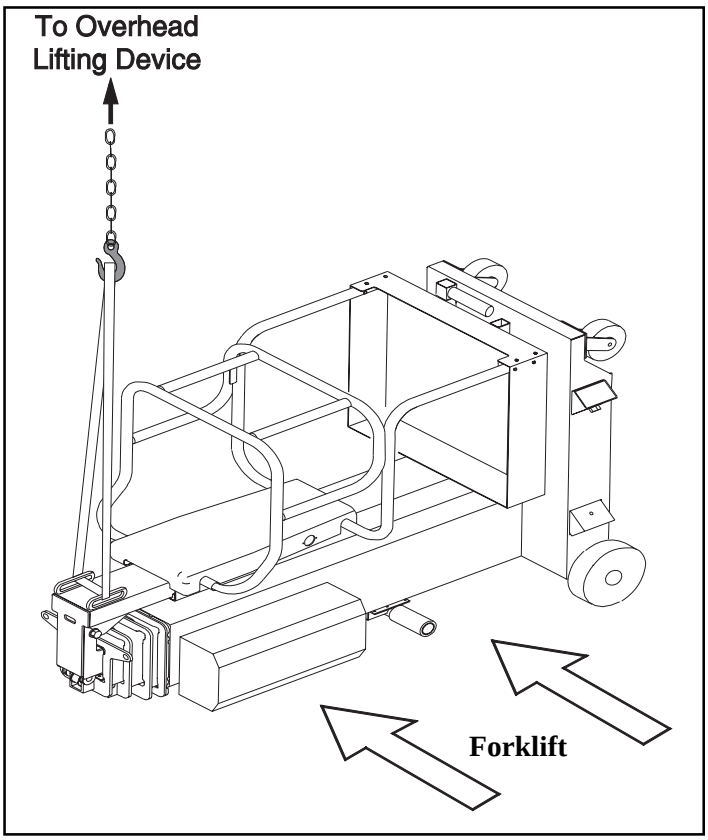


Figure 2-5: Lifting/Lowering UL Lift

3. Remove cotter pins, and drive out chain retaining pins from the top front of stage 5.
4. Loosen screws from strap retainer on stage 5 top casting. Pull strap free of retainer.
5. Remove cage support screws, slide the cage support out of the sixth stage mast and set aside. It should not be necessary to remove the pinch sheild. Be careful not to damage the control cable.

Note: to remove the platform assembly from the cage support assembly, follow steps 6-10 below.

6. Remove cable sheaves from cage support weldment, and strain reliefs from stage 5 top casting.
7. Loosen screws from strap retainer on platform assembly weldment and free strap from retainer.
8. Remove two screws and washers holding stop bracket located at top of platform assembly weldment. Remove the stop bracket.
9. Slide the cage support weldment out of the top of the platform assembly weldment.
10. Slide bearings in platform assembly may now be inspected / replaced if necessary.

#6 Mast

1. Remove sequence strap retainer on the top of #4 mast.
2. Remove the Allen head screws holding the top mast bearings between the #5 and #6 mast. Remove the top mast bearings.
3. Slide #6 mast out of #5 mast. As mast is removed, the bottom four mast bearings will fall out; note their orientation for re-assembly.
4. Disconnect chain from top of #4 mast.

#5 Mast

1. Remove sequence strap retainer on the top of #3 mast.
2. Remove the Allen head screws holding the top mast bearings between the #4 and #5 mast. Remove the top mast bearings.
3. Slide #5 mast out of #4 mast. As mast is removed, the bottom four mast bearings will fall out; note their orientation for re-assembly.
4. Disconnect chain from top of #3 mast.

#4 Mast

1. Remove sequence strap retainer on the top of #2 mast.
2. Remove the Allen head screws holding the top mast bearings between the #3 and #4 mast. Remove the top mast bearings.
3. Slide #4 mast out of #3 mast. As mast is removed, the bottom four mast bearings will fall out; note their orientation for re-assembly.

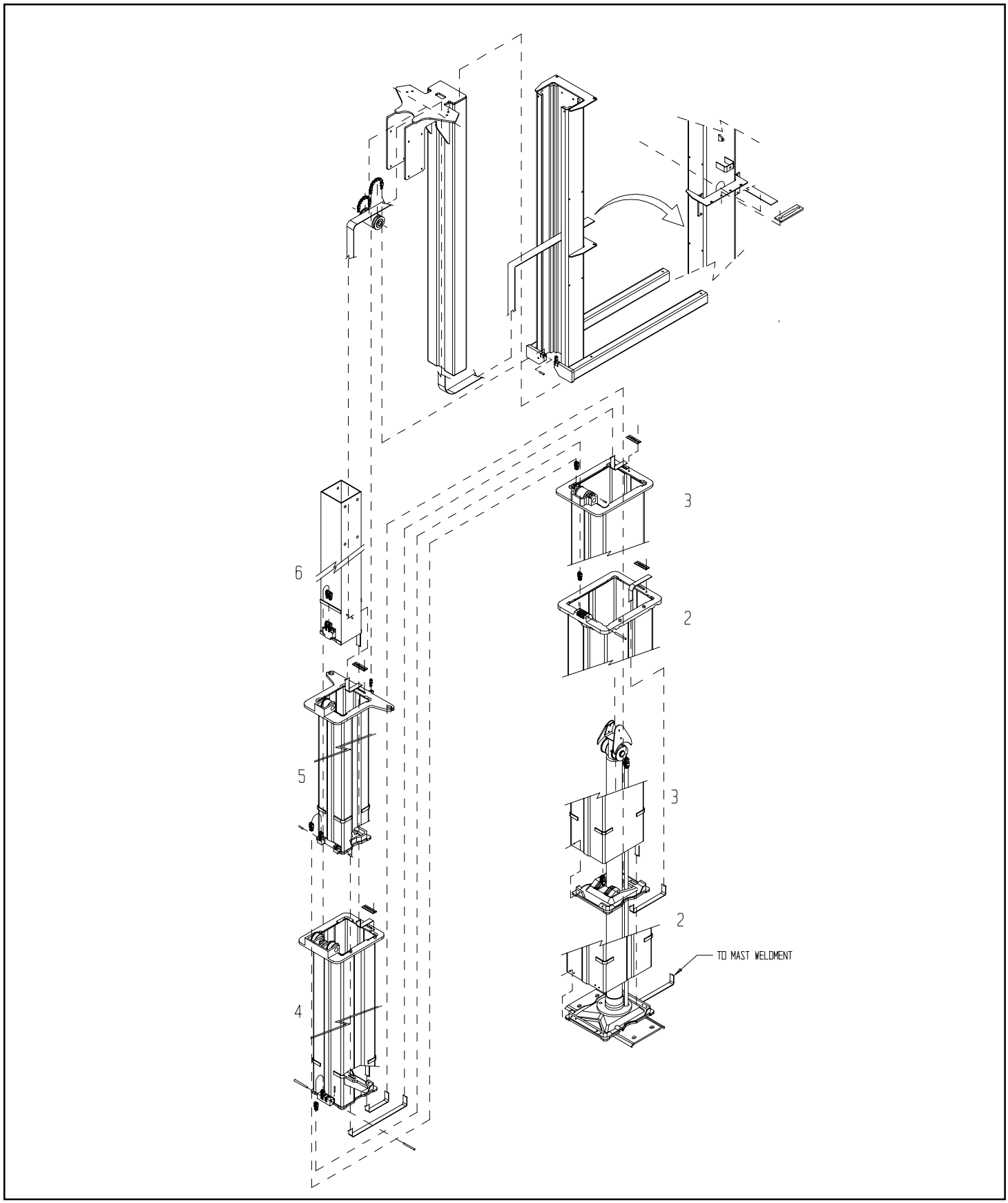


Figure 2-6: Mast Assembly, Strap and Chain Detail

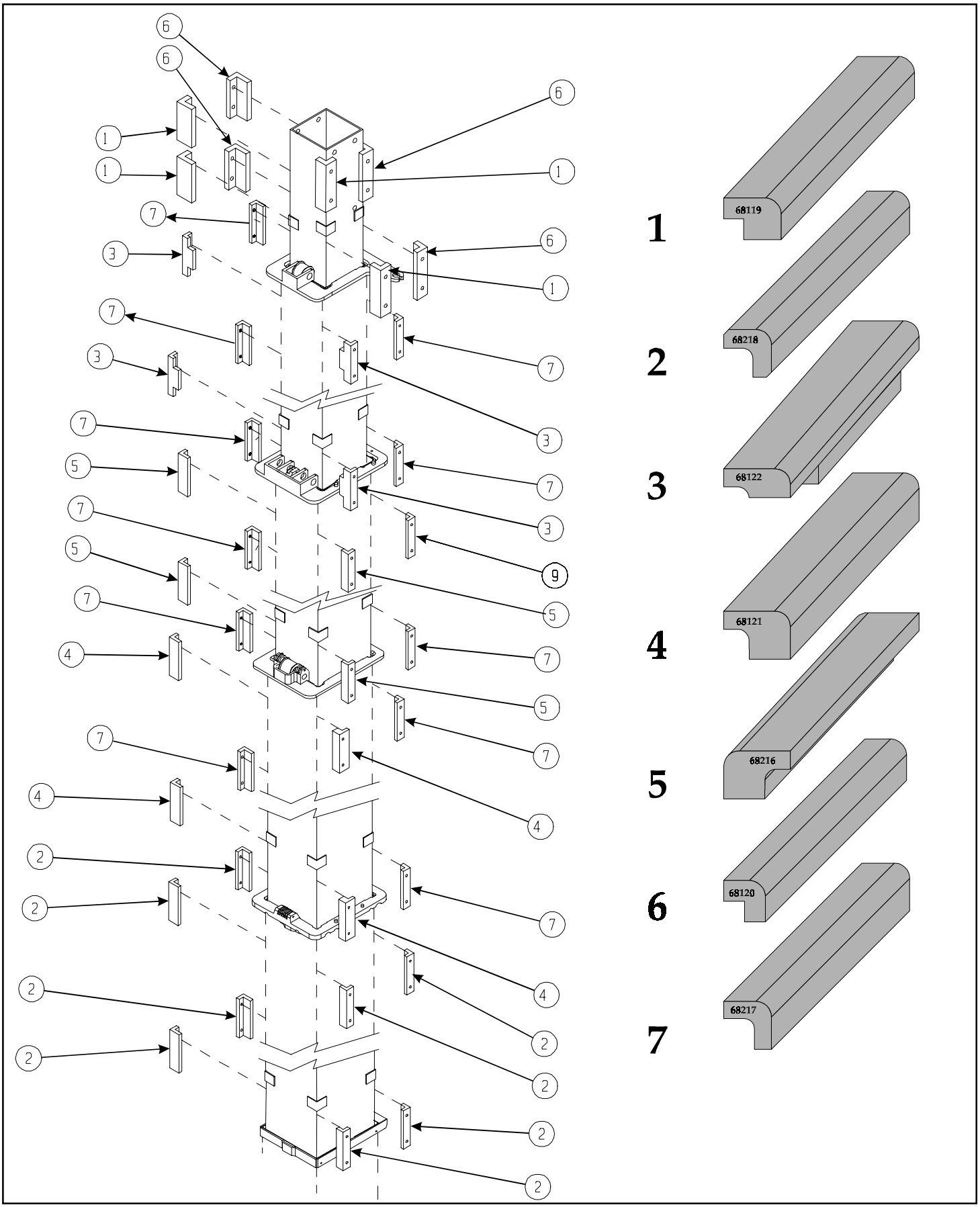


Figure 2-7: Mast Assembly, Bearing Detail

2.5 Mast Assembly (Cont.)

4. Disconnect chain from top of #2 mast.
5. Remove cylinder by following instructions in *Section 2.7.*

#3 Mast

1. Remove sequence strap retainer on the top of #1 mast.
2. Remove the Allen head screws holding the top mast bearings between the #2 and #3 mast. Remove the top mast bearings.
3. Slide #3 mast out of #2 mast. As mast is removed, the bottom four mast bearings will fall out; note their orientation for re-assembly.

#2 Mast

1. Remove the Allen head screws holding the top mast bearings between the #1 and #2 mast. Remove the top mast bearings.
2. Slide #2 mast out of #1 mast. As mast is removed, the bottom four mast bearings will fall out; note their orientation for re-assembly.

ASSEMBLY (Figure 2-7)

Note: Use WD-40 lubricant as necessary to aid in reassembly.

#2 Mast

1. Set #2 mast in place.
2. Install bottom lower bearings.
3. Install bottom upper bearings.
4. Slide #2 mast in all the way except 30 -38 cm (12-15").
5. Install top bearings and secure with retaining screws using Loctite® 242 or equivalent on the threads.
6. Slide #2 mast in completely.

#3 Mast

1. Set #3 mast in place with the sequencing strap inside.
2. Install bottom lower bearings.
3. Install bottom upper bearings.
4. Slide #3 mast in all the way except 30 -38 cm (12-15").
5. Install top bearings and secure with retaining screws using Loctite® 242 or equivalent on the threads.
6. Place a 10" (25 cm) long wood block between #3 and #2 masts, slide #3 mast down tight against block. Pull sequencing strap completely out of the bottom of assembly.
7. Install cylinder assembly by following instructions in section 2.6.

#4 Mast

1. Set #4 mast in place with the sequencing strap inside and the chains on the bottom.
2. Install bottom lower bearings.
3. Install bottom upper bearings.
4. Slide mast #4 in, make sure chains are not twisted.
5. Install top bearings and secure with retaining screws using Loctite® 242 or equivalent on the threads.
6. Install chains around #3 sheave and down through #3 casting, secure to #2 casting with new roll pins.
7. Use a center punch to dimple pin hole after roll pins are installed.

#5 Mast

1. Set #5 mast in place with the sequencing strap inside.
2. Install bottom lower bearings.
3. Install bottom upper bearings.
4. Slide #5 mast in, make sure chains are not twisted.
5. Install top bearings and secure with retaining screws using Loctite® 242 or equivalent on the threads.
6. Install chains around #4 sheaves and down through #4 casting, secure to #3 casting with new roll pins.
7. Use a center punch to dimple pin holes after all roll pins are installed.
8. Slide mast in, leaving 25 cm (10") exposed.

#6 Mast

1. Set #6 mast in place with the sequencing strap inside.
2. Run the remaining sequencing strap (from platform assembly) through the slot in the bottom of stage #6 and up through the inside. Leave just enough slack on the outside to reach the attachment point at the top of stage #5.
3. Install bottom lower bearings.
4. Install bottom upper bearings.
5. Slide #6 mast in, make sure chains are not twisted.
6. Install top bearings and secure with retaining screws using Loctite® 242 or equivalent on the threads.
7. Install #6 chain around #5 sheave and through casting, secure to #4 casting with new roll pins.
8. Use a center punch to dimple pin holes after all roll pins are installed.
9. Pull the sequencing strap attached to the bottom of mast #6 out through the bottom of the mast assembly. Be sure not to pull the strap that is attached to the top of mast #5.

2.5 Mast Assembly (Cont.)

Platform Support Assembly

1. Slide cage support weldment into the top of the platform assembly weldment.
2. Install stop bracket and retaining screws / washers.
3. Feed chains over sheave.
4. Install cable sheaves with cables to the top of cage support weldment.
5. Feed sequencing strap from inside mast #6 over sheave and out through the slot in the top of the cage support weldment.
6. Install cage support weldment to mast #6 using eight screws, tighten.
7. Attach chains to #5 casting front using new cotter pins.

Sequencing Strap Installation

When installing straps, make sure they are not twisted.

1. Feed fish tape up throug the bottom slot in cage support weldment and out through the top slot.
2. Attach strap to fish tape and pull out through bottom slot.
3. Feed fish tape down through the opening in the front of the platform support weldment and out through the bottom of the platform support weldment.
4. Attach strap to fish tape and pull out through opening. Attach strap to platform support weldment, pull tightly and secure with strap clamp and screws using Loctite® 242 or equivalent on the threads.
5. Fish #6 strap up through mast between fourth and fifth stages with fish tape.
6. Fish #5 strap up through mast between third and fourth stages with fish tape.
7. Fish #4 strap up through mast between third and second stages with fish tape.
8. Fish #3 strap up through mast between first and second stages with fish tape.
9. Install strap #6 to #4 top casting.
10. Install strap #5 to #3 top casting.
11. Install strap #4 to #2 top casting.
12. Install strap #3 to top of #1 mast weldment.
13. Install the strap clamps and retaining screws using Loctite® 242 or equivalent on the threads. Pull straps tight while tightening retaining screws.

2.6 Cylinder Assembly

SEAL REPLACEMENT (Figure 2-8)

Note: The Lift Cylinder Seal can be accessed from the bottom of the Lift without removing the Cylinder Assembly.

Using a suitable lifting device, lower the work platform into a horizontal position (Figure 2-5). If possible, place the machine onto a sturdy work table using a forklift.

⚠ WARNING ⚠

Never attempt to lower lift into a horizontal position without the use of a suitable lifting device; bodily injury or damage to the machine may result.

1. Remove cylinder mounting plate fasteners and retaining ring.
2. Remove tie rod nuts, count the number of turns required to bring the nut flush with the tie rod end and record for reference during installation. The tension on the tie rods maintains the left / right positioning of the cylinder within the mast assembly, reinstalling the nuts with the proper tension will speed up adjustment later.
3. Remove the cylinder mounting plate. Be careful not to allow the tie rods to suck back inside of the mast assembly, replace the nuts on the tie rod ends temporarily to prevent this.
4. Remove hydraulic line from the cylinder fitting and cap the cylinder fitting to prevent contaminants from entering the cylinder.

⚠ CAUTION ⚠

Marring the surface of the cylinder rod will damage cylinder seals and cause leakage. Use a strap wrench to prevent rod damage.

5. Extend cylinder rod at least twelve inches by hand. Apply heat to rod near end cap to loosen Loc-tite®.

⚠ WARNING ⚠

Wear safety glasses and heat resistant gloves when operating torch. Do not touch hot surfaces without proper protection.

6. Using a Strap Wrench, 062482-000, to secure the cylinder rod, unscrew the cylinder rod end. If necessary, thread a 9/16 x 18 bolt into end cap port to use as a lever. Remove rod end cap and orifice / bleeder tube assembly.

7. Remove the seal retainer, using the spanner wrench, 062521-010.
8. Clean all sealing surfaces with solvent. Inspect cylinder rod for excessive wear, replace if necessary.
9. Remove all seals from seal retainer, rod end cap and discard.

Note: Apply clean hydraulic fluid to new cylinder seal, threads and all sliding surfaces prior to assembly. If necessary, soften new seals with warm water (82°c [180°F]) to aid in installation.

10. Twist the pressure seal into a 'C' shape and snap into seal groove in seal retainer, making sure the lip of the seal is facing inward.
11. Using the same method, install the rod wiper into the seal retainer outer groove, making sure that the blade of the seal is facing outward from the seal retainer.
12. Replace static seals in rod end cap and seal retainer by streatching them into place. Be carefull not to cut the seal during installation.
13. Install the seal retainer onto rod using a sharp blow from a hard rubber mallet to overcome seal squeeze. Slide seal retainer into place and tighten using the spanner wrench.

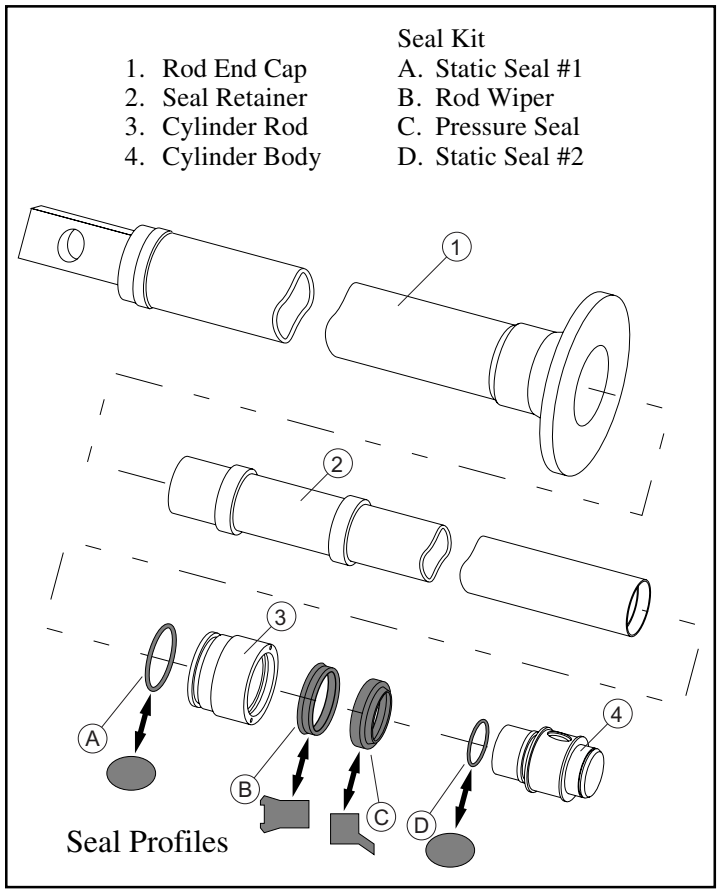


Figure 2-8: lift Cylinder

14. Rod and rod end threads must be absoloutly clean. Spray threads with Loctite® primer #7471, allow to dry for five minutes. Coat threads liberally with Loctite® #242. Thread rod end cap onto rod, tighten using strap wrench to hold rod.
15. Push rod back into cylinder for reassembly.
16. Reconnect hydraulic line.
17. Remove nuts from tie rod ends and set the cylinder mounting plate into place. Secure mounting plate with fasteners.
18. Install tie rod nuts flush with tie rod ends, torque each nut the exact number of turns used to remove it.
19. Reinstall retaining ring.
20. Using a suitable lifting device, raise the lift to its normal vertical position.
22. Bleed air from cylinder by cycling the mast to full extension several times. The cylinder is self bleeding; air will be forced out of the cylinder during the lowering cycle.
23. If necessary, remove pinch shield and check alignment of cylinder within mast assembly by peering down the mast with a flashlight. The cylinder may be moved left or right by tightening one or the other of the tie rod nuts.

⚠ CAUTION ⚠

If cylinder is not centered, mast may "hang" when lowering.

⚠ WARNING ⚠

Keep hands clear of the mast assembly when the pinch shield is removed for inspection purposes; pinching injury to hands may result .

Never operate a machine with the pinch shield removed, except for inspection.

2.6 Cylinder Assembly (Cont.)

ORIFICE VALVE CLEANING

Using a suitable lifting device, lower the work platform into a horizontal position (Figure 2-5). If possible, place the machine onto a sturdy work table using a forklift.

⚠ WARNING ⚠

Never attempt to lower lift into a horizontal position without the use of a suitable lifting device; bodily injury or damage to the machine may result.

1. Remove cylinder mounting plate fasteners and retaining ring.
2. Remove tie rod nuts, count the number of turns required to bring the nut flush with the tie rod end and record for reference during installation. The tension on the tie rods maintains the left / right positioning of the cylinder within the mast assembly, reinstalling the nuts with the proper tension will speed up adjustment later.
3. Remove the cylinder mounting plate. Be careful not to allow the tie rods to suck back inside of the mast assembly, replace the nuts on the tie rod ends temporarily to prevent this.
4. Remove hydraulic line from the cylinder fitting and cap the cylinder fitting to prevent contaminants from entering the cylinder.

⚠ CAUTION ⚠

Marring the surface of the cylinder rod will damage cylinder seals and cause leakage. Use a strap wrench to prevent rod damage.

5. Extend cylinder rod at least twelve inches by hand. Apply heat to rod near end cap to loosen Loc-tite®.

⚠ WARNING ⚠

Wear safety glasses and heat resistant gloves when operating torch. Do not touch hot surfaces without proper protection.

6. Using a Strap Wrench, 062482-000, to secure the cylinder rod, unscrew the cylinder rod end. If necessary, thread a 9/16 x 18 bolt into end cap port to use as a lever. Remove rod end cap and orifice / bleeder tube assembly.
7. Remove snap ring to release orifice / bleeder tube from rod end cap.
8. Clean orifice valve hole with a straight pin. Flush with solvent to remove any contamination that may remain in bleeder tube.
9. Reinstall orifice / bleeder tube into rod end cap and secure with snap ring.
10. Replace static seal on red end. Existing seal may have been damaged by heating rod.
11. Rod and rod end threads must be absoloutly clean. Spray threads with Loctite® primer #7471, allow to dry for five minutes. Coat threads liberally with Loctite® #242. Thread rod end cap onto rod, tighten using strap wrench to hold rod.
12. Push rod back into cylinder for reassembly.
13. Reconnect hydraulic line.
14. Remove nuts from tie rod ends and set the cylinder mounting plate into place. Secure mounting plate with fasteners.
15. Install tie rod nuts flush with tie rod ends, torque each nut the exact number of turns used to remove it.
16. Reinstall retaining ring.
17. Using a suitable lifting device, raise the lift to its normal vertical position.
18. Bleed air from cylinder by cycling the mast to full extension several times. The cylinder is self bleeding; air will be forced out of the cylinder during the lowering cycle.
19. If necessary, remove pinch shield and check alignment of cylinder within mast assembly by peering down the mast with a flashlight. The cylinder guide bearings must not be touching the inside surface of #6 mast. The cylinder may be moved left or right by tightening the left or right tie rod nuts respectively.

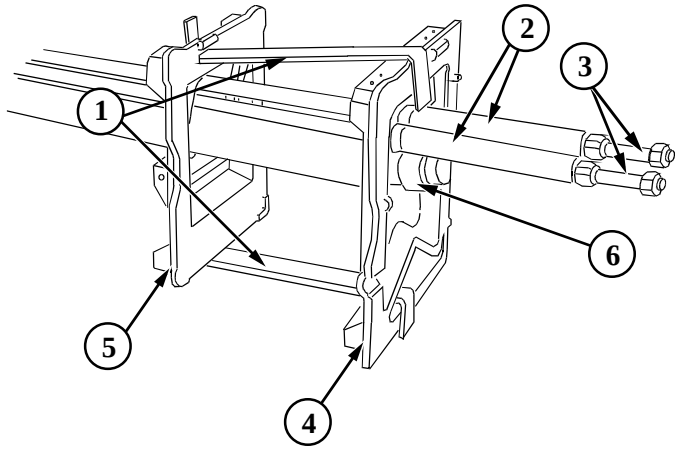
⚠ CAUTION ⚠

If cylinder is not centered, mast may "hang" when lowering.

⚠ WARNING ⚠

Keep hands clear of the mast assembly when the pinch shield is removed for inspection purposes; pinching injury to hands may result .

Never operate a machine with the pinch shield removed, except for inspection.



1.Tensioner Bracket (062739-000)
2.Tie Rod Tensioners (0 62738-000)
3.Tie Rods
4.Bottom Casting, Mast #2
5.Bottom Casting, Mast #3
6.Cylinder

Figure 2-9: Cylinder Assembly Installation

CYLINDER REMOVAL (Figure 2-9)

Using a suitable lifting device, lower the work platform into a horizontal position (Figure 2-5). If possible, place the machine onto a sturdy work table using a forklift.

⚠ WARNING ⚠

Never attempt to lower lift into a horizontal position without the use of a suitable lifting device; bodily injury or damage to the machine may result.

1. Remove cylinder mounting plate fasteners and retaining ring.
2. Remove tie rod nuts, count the number of turns required to bring the nut flush with the tie rod end and record for reference during installation. The tension on the tie rods maintains the left / right positioning of the cylinder within the mast assembly, reinstalling the nuts with the proper tension will speed up adjustment later.
3. Remove the cylinder mounting plate. Be careful not to allow the tie rods to suck back inside of the mast assembly, replace the nuts on the tie rod ends temporarily to prevent this.
4. Remove hydraulic line from the cylinder fitting and cap the cylinder fitting to prevent contaminants from entering the cylinder.
5. Remove sequence strap retainers on the top of #3 and #2 masts.
6. Remove front and rear mast access plates from the bottom of the #1 mast.
7. Remove the screws and washers, attaching the #2 and #3 bottom castings to the #2 and #3 mast assemblies.
8. While keeping tension on the tie rods, slide the cylinder and #2 and #3 bottom castings out the bottom of the UL Lift far enough to expose both castings.
9. Install cylinder Tensioner Brackets, 062739-000 on #2 and #3 bottom castings. Remove tie rod nuts and install the Tie Rod Tensioners, 062738-000. Remove all slack from the chains with the Tie Rod Tensioners.
10. Remove cylinder assembly from mast assembly.

INSTALLATION

NOTE: Cylinder assembly must have Tension Brackets, Tensioner Spacer and Tie Rod Tensioners installed to remove slack from chain.

1. Slide cylinder assembly into mast assembly until #3 bottom casting is at the bottom of the mast assembly.
2. Install the screws and washers attaching the #3 bottom casting to the #3 mast assemby.
3. Remove cylinder Tensioner Brackets from #2 and #3 bottom castings and Tie Rod Tensioners from tie rods. Install tie rod nuts finger tight.
4. While maintaining tension on the tie rods to keep slack out of the chains, slide cylinder assembly completely into the mast assembly.
5. Install the screws and washers attaching the #2 bottom casting to the #2 mast assembly.
6. Install front and rear mast cover plates on the bottom of #1 mast.
7. Fish #4 strap between #3 and #2 mast with fish tape.
8. Slide #4 strap through #2 casting.
9. Fish #3 strap between #2 and #1 mast with fish tape.
10. Install strap #4 to #2 top casting.
11. Install strap #3 to #1 top casting.
12. While maintaining tension on the sequencing straps, install strap retainers using Loctite® 242 or equivalent on the threads of the retainer screws.
13. Reconnect hydraulic line.
14. Remove nuts from tie rod ends and set the cylinder mounting plate into place. Secure mounting plate with fasteners.
15. Install tie rod nuts flush with tie rod ends, torque each nut the exact number of turns used to remove it.
16. Reinstall retaining ring.

2.6 Cylinder Assembly (Cont.)

INSTALLATION (CONT.)

17. Using a suitable lifting device, raise the lift to its normal vertical position.
18. Bleed air from cylinder by cycling the mast to full extension several times. The cylinder is self bleeding; air will be forced out of the cylinder during the lowering cycle.
19. If necessary, remove pinch shield and check alignment of cylinder within mast assembly by peering down the mast with a flashlight. The cylinder guide bearings must not be touching the inside surface of #6 mast. The cylinder may be moved left or right by tightening the left or right tie rod nuts respectively.

⚠ WARNING ⚠

Keep hands clear of the mast assembly when the pinch shield is removed for inspection purposes; pinching injury to hands may result.

Never operate a machine with the pinch shield removed, except for inspection.

2.7 Torque Specifications

HYDRAULIC COMPONENTS

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

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

Table 2-2: Hydraulic Component Torque

TYPE: SAE PART SERIES	CARTRIDGE POPPET (Ft/Lbs	Nm)	FITTINGS (Ft/Lbs	Nm)	HOSES (In/Lbs	Nm)
#4	N/A	N/A	N/A	N/A	135-145	15-16
#6	N/A	N/A	10-20	14-27	215-245	24-28
#8	25-30	34-41	25-30	34-41	430-470	49-53
#10	35-40	47-54	35-40	47-54	680-750	77-85
#12	85-90	115-122	85-90	115-122	950-1050	107-131
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

Coil nuts: 3 Nm (30 In/Lbs)

FASTENERS

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

Table 2-3: Bolt Torque

THREAD SIZE American National Standard-UNF (fine)	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	Ft/Lbs	542	Nm
1	1 1/2	600	Ft/Lbs	813	Nm

3.0 Introduction

Table 3-1 provides a logical sequence of tests that are designed to isolate problems with the Snorkel Lift. This table includes a list of probable causes and remedies.

⚠ WARNING ⚠

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

When performing any service 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

Troubleshooting should be carried out in two steps. First, thoroughly study both hydraulic and electric schematics to determine possible causes. Loose terminal connections and short circuits are always a potential cause when troubleshooting. Second, check suspect components electrically, hydraulically and mechanically to determine if they are at fault. Refer to Tables 4-1 and 4-2 for Reference Designations used in Table 3-1.

Table 3-1: Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Lift Function inoperable, electric motor does not start.	1. Extension cord too long or insufficient capacity.	Use minimum 1,5 mm² (12 ga.) cord of 16m (50 feet) or less in length.
	2. Not plugged in or faulty connection (AC only).	Check all AC plugs and cords used.
	3. No power at wall outlet (AC only).	Check power output at wall outlet.
	4. Faulty Battery Charger (DC only).	Check the voltage output of the Battery Charger. If less than 12 VDC, repair or replace.
	5. Faulty Battery (BAT).	After completely charging Battery, test Battery. Replace asrequired.
	6. Key Switch (S2), Emergency Stop Switch (S1, S3) or Push-button Switch (S4, S5) failed open.	With the switch in the ON position, check continuity across the contacts. If none, replace.
	7. Outrigger Interlock Switch (S7,S8, 9,S10).	Make sure all four outriggers are in firm contact with floor. Check continuity of interlock switches.
	8. Open circuit in cable to motor control box.	Test for continuity through cable assembly and repair or replace.
	9. Faulty Electric Motor (M1).	While operating the Lift function, check the voltage to the Electric Motor. If voltage is present (12VDC or 120/240VAC), replace the motor. In case of low AC voltage, see #1.
Lift turns on and off repeatedly.	1. Low line voltage or battery charge.	Use minimum 11,5 mm² (12 ga.) cord of 16m (50 feet) or less in length.
One or more, but not all indicator lights fail to operate	1. Indicator light damaged or faulty.	Replace indicator light.
	2. Outrigger limit switch damaged or faulty.	Replace switch.
	3. Chassis harness damaged or improperly connected.	Repair damage, insure proper connection.
Lift function inoperable, Electric Motor starts when control is activated.	1. Emergency Lowering Valve (V2) open.	Close valve.
	2. Hydraulic Reservoir Low.	Check hydraulic fluid level, top off as required.
	3. Down Valve (V2) stuck.	Check or replace Down Valve (V2).
	4. Relief Valve (RV) out of adjustment or faulty.	Adjust the Relief Valve (RV). If not adjustable, replace.
	5. Lift Valve (V1) faulty.	Check or replaceLift Valve (V1).
	6. Faulty Hydraulic Pump (P).	Check pressure and delivery of the Hydraulic Pump. Replace if required.

TROUBLE	PROBABLE CAUSE	REMEDY
Platform does not lower using electrical switches. (Will lower using emergency lowering valve.)	1. Down Valve Solenoid (SOL1) faulty.	Test for continuity across Solenoid. Repair or replace.
	2. Electrical malfunction.	Check all AC plugs and cords used (AC only). Check power output at wall outlet (AC only). With each switch (S1,S2,S3,S4,S6) in the ON position, check continuity across the contacts. If none, replace.
Platform does not lower or lowers very slowly.	1. Down Orifice (ORF) plugged.	Remove and clean Down Orifice check valve.
	2. Down Valve (V2) blocked or stuck closed.	Check function / clear blockage of Down Valve.
	2. Mechanical interference.	Inspect Mast Assembly, correct interference.
Platform continues to lower when controls are released.	1. Down Valve (V1) stuck open	Clean or replace Down Valve.

Table 3-1: Troubleshooting (cont'd)

LIFT DOES NOT TURN ON - AC

All voltages are referenced to Chassis ground. Using a voltmeter, place the negative probe directly to a clean ground source on the AC motor. If equipped with battery back up, remove back up battery before proceeding. Diconnect both chassis connector and coil cord connector. Set voltmeter for DC voltage. Plug lift into outlet.

1) Check for voltage at the power terminals of the circuit board. Turn off key switch and E-Stop switch. Power terminal is S28 and ground terminal is GND. See drawing.

1a) DC voltage at S28 is less than 11 VDC.	a) Extension harness excessive in length. b) Low line voltage. c) Damaged or faulty circuit board.
1b) Voltage is found at the ground terminal.	a) Damaged or faulty motor harness. b) Damaged or faulty circuit board.
1c) Between 11 VDC and 26 VDC found at S28. Zero volts found at GND.	a) Continue to #2.

2) Check for voltage at the terminals of the key switch. Turn the key switch on and and the E-Stop switch off.

2a) No voltage is found on either terminal.	a) Circuit board is damaged.
2b) Voltage is found only on one of the two key switch terminals.	a) Ignition key switch is faulty.
2c) Voltage is found at both sides of the key switch.	a) Continue to step 3.

3) Check voltages at the chassis harness. Turn on the ignition key and turn off the E-Stop. Disconnect the chassis harness. Check voltage of pin 6 and pin 1 of chassis connector on the circuit board.

3a) Voltage at pin 6 does not exist or is less than 11 volts DC.	a) Circuit board is damaged.
3b) Voltage at ground pin 1 is not zero.	a) Circuit board is damaged. b) Ground on motor harness damaged or connected improperly.
3c) Voltage at pin 6 is between 10 and 12 VDC, voltage at pin 1 is zero.	a) Continue to step 4.

4) Plug in Chassis harness. Turn on ignition key, turn off E-Stop switch. Check voltages at pin 1 and 6 of the chassis harness. This may require the use of a sharp probe to pierce the insulation of the corresponding wires.

4a) Pin 6 is not between 10 and 12 VDC.	a) Damaged or shorted chassis harness.
4b) Voltage found at pin 1.	a) Circuit board is damaged. b) Ground on motor harness damaged or connected improperly.

LIFT DOES NOT RAISE - AC

1) Plug lift into outlet. Make sure all outriggers are extended and raised. Turn off the E-Stop switch and turn on the ignition key. Wait five seconds for machine to turn on and outrigger lights to light.

1a) Outrigger lights do not turn on.	a) See LIFT DOES NOT TURN ON
1b) Outrigger lights tun on immediately and no five second delay is present.	b) Circuit board is damaged. Replace circuit board.
1c) Fewer than four indicator lights will operate.	a) Indicator light is damaged. b) Chassis harness damaged or incorrectly connected. c) Outrigger limit switch defective or improperly connected.
1d) All four indicator lights turn on five seconds after ignition key is turned on.	a) Continue to step 2.

2) Pull out both E-Stop switches. Activate the common and up switch on the upper control box.

2a) Motor does not run.	a) Continue to step 3.
2b) Motor runs but will not raise.	a) Hydraulic system failure. b) Damaged or improperly connected motor harness. c) Damaged pump solenoid.
2c) Motor attempts to start but machine turns off and then restarts in five seconds	a) Improperly connected or damaged motor harness. b) Improperly connected or damaged coil cord or upper control box. c) Damaged pump solenoid. d) Extension harness excessive in length. e) Low line voltage. f) Damaged pump motor.

3) Open the lid on the lower control box. Check for voltage at the E-Stop switch. Ignition key is turned on E-Stop is pulled out on both the upper and lower box.

3a) No voltage is present at either of the terminals on the E-Stop.	a) Circuit board is damaged. Replace circuit board.
3b) Voltage is present on both terminals of the E-Stop switch.	a) Check for correct operation of upper E-Stop switch. Continue to step 4.
3c) Voltage is only present at one side of the E-Stop switch.	a) Replace E-Stop switch in whole or in part.

4) Check Circuit board lift circuit. Place voltmeter probe at lift terminal S26 at the upper right hand side of the circuit board. See drawing(Page 3-5). Activate the common and up switch on the upper control box.

4a) When up button is pressed, 10-12 VDC is not present at pin S26.	a) Improperly connected or damaged coil cord or upper control control box. b) Improperly connected or damaged chassis harness. c) Damaged circuit board.
4b) When up button is pressed, 10-12 VDC is present at pin S26.	a) Continue to step 5.

5) Set voltometer for AC voltage. Place one probe of the voltometer on -120 and the other probe on motor. See drawing(Page 3-5). Plug the lift into an outlet. Set outriggers, turn on ignition key, and pull out both E-Stops. Press the common and up switches on the upper control box.

5a) Line voltage is found between -120 and motor.	a) Damaged or improperly connected motor harness. b) Damaged motor.
5b) Line voltage is not found between -120 and motor.	a) Circuit board damaged.

LIFT DOES NOT LOWER - AC

1) Lift will raise but will not lower. Turn on key switch, pull out both upper and lower E-Stops. Press the common and down push buttons on the upper control box.

1a) Lift turns off and restarts in five seconds.	a) Low line voltage. b) Extension harness excessive in length. c) Improperly connected or damaged motor harness. d) Improperly connected or damaged coil cord or upper control box. e) Damaged down solenoid.
1b) Outrigger lights turn on immediately and no five second delay is present.	a) Continue to step 2.

Table 3-1: Troubleshooting (cont'd)

2) Check circuit board for correct output. Open the lid on the lower control box. Using a voltmeter, check the voltage terminal S27 found on the upper right hand side of the circuit board. See drawing. Turn on ignition key and pull out both E-Stop switches. Depress the common and down switches on the upper control box.

2a) Motor does not run.	Continue to step 3.
2b) Motor runs but will not raise.	a) Hydraulic system failure. b) Damaged or improperly connected motor harness. c) Damaged pump solenoid.
2c) Motor attempts to start but machine turns off and then restarts in five seconds	a) Improperly connected or damaged motor harness. b) Improperly connected or damaged coil cord or upper control box. c) Damaged pump solenoid. d) Extension harness excessive in length. e) Low line voltage. f) Damaged pump motor.

LIFT DOES NOT TURN ON - DC

All voltages are referenced to Battery ground. Using a voltmeter, place the negative probe directly to the negative pole of the battery. If equipped with battery back up, remove back up battery before proceeding. Disconnect both chassis connector and coil cord connector from the control box.

1) Turn off key switch and E-Stop switch. Check power connections on circuit board S28 and GND found on the lower right hand side of the circuit board. See drawing (Page 3-5).

1a) S28 is less than battery voltage.	a) Improperly connected or damaged motor harness. b) Poor battery connections.
1b) GND is not zero volts.	a) Improperly connected or damaged motor harness.
1c) Battery voltage is found at S28 and zero volts is found on GND.	a) Battery power is present at PCB. Continue to step 2.

2) Check for voltage at the terminals of the key switch. Turn the key switch on and the E-Stop switch off.

2a) No voltage is found on either terminal.	a) Circuit board is damaged. Replace circuit board.
2b) Voltage is found only on one of the two key switch terminals.	a) Ignition key switch is faulty. Replace ignition key switch.
2c) Voltage is found at both sides of the key switch.	a) Key switch is working properly. Continue to step 3.

3) Check for voltage at the terminals of the key switch. Turn the key switch on and the E-Stop switch off.

3a) Voltage at pin 6 does not exist or is less than 11 volts DC.	a) Circuit board is damaged.
3b) Voltage at ground pin 1 is not zero.	a) Circuit board is damaged. b) Ground on motor harness damaged or connected improperly.
3c) Voltage at pin 6 is between 10 and 12 VDC, voltage at pin 1 is zero.	Continue to step 4.

4) Plug in Chassis harness. Turn on ignition key, turn off E-Stop switch. Check voltages at pin 1 and pin 6 of the chassis harness. This may require the use of a sharp probe to pierce the insulation of the corresponding wires.

4a) Pin 6 is not between 10 and 12 VDC.	a) Damaged or shorted chassis harness.
4b) Voltage at ground pin 1 is not zero.	a) Circuit board is damaged. b) Ground on motor harness damaged or connected improperly.

LIFT DOES NOT RAISE - DC

1) Does the lift turn on? Make sure all outriggers are extended and raised. Turn off the E-Stop switch and turn on the ignition key. Wait five seconds for machine to turn on and outrigger lifgts to light.

1a) Outrigger lights do not turn on.	a) See section LIFT DOES NOT TURN ON.
1b) Outrigger lights turn on immediately and five second delay is not present.	b) Circuit board is damaged. Replace circuit board.
1c) Fewer than four indicator lights operate.	a) Indicator light is damaged. b) Chassis harness damaged or incorrectly connected. c) Outrigger limit switch defective or improperly connected.
1d) All four indicator lights turn on five seconds after ignition key is turned on.	a) Continnue to step 2.

2) Pull out both E-Stop switches. Activate the common and up switch on the upper control box.

2a) Motor does not run.	a) Continue to step 3.
2b) Motor runs but will not raise.	a) Hydraulic system failure. b) Coil cord is damaged c) Damaged or improperly connected pump solenoids.
2c) Lift turns off and restarts in five seconds.	a) Improperly connected or damaged motor harness. b) Improperly connected or damaged coil cord or upper control box. c) Damaged pump solenoid or motor solenoid. d) Battery charge is low.

3) Open the lid on the lower control box. Check for voltage at the E-Stop switch. Ignition key is turned on E-Stop is pulled out on both the upper box and lower box.

3a) No voltage is present at either of the terminals on the E-Stop switch.	a) Circuit board is damaged. Replace circuit board.
3b) Voltage is present on both terminals of the E-Stop switch.	a) Check for correct operation of upper E-Stop switch. Continue to step 4.
3c) Voltage is only present at one side of the E-Stop switch.	a) Replace E-Stop switch in whole or in part.

4) Click circuit board lift circuit. Place voltmeter probe at terminal S26 at the upper right hand side of the circuit board. See drawing (Page 3-5). Activate the common and up switch on the upper control box.

4a) When button is pressed, 10-12 VDC is not present at pin S26.	a) Improperly connected or damaged coil cord or upper control box. b) Damaged circuit board.
4b) When up button is pressed, 10-12 VDC is present at pin S26.	a) Damaged or improperly wired motor harness. b) Damaged motor starter relay.

Table 3-1: Troubleshooting (cont'd)

LIFT DOES NOT LOWER - DC

1) Lift will raise but will not lower. Turn on key switch, pull out both upper and lower E-Stops. Press the common and down push buttons on the upper control box.

1a) Lift turns off and restarts in five seconds.	a) Improperly connected or damaged motor harness. b) Improperly connected or damaged coil cord or upper control box. c) Damaged down solenoid.
1b) Lift will not lower.	a) Continue to step 2.

2) Check circuit board for correct output. Open lid on the lower box. Using a voltmeter, check the voltage on terminal S27 found on the upper right hand side of the circuit board. See drawing. Turn on ignition key and pull out both E-Stop switches. Depress the common and down switches on the upper control box.

2a) Lift turns off and restarts in five seconds.	a) Improperly connected or damaged motor harness. b) Improperly connected or damaged coil cord or upper control box. c) Damaged down solenoid.
2b) Lift will not lower.	a) Continue to step 2.

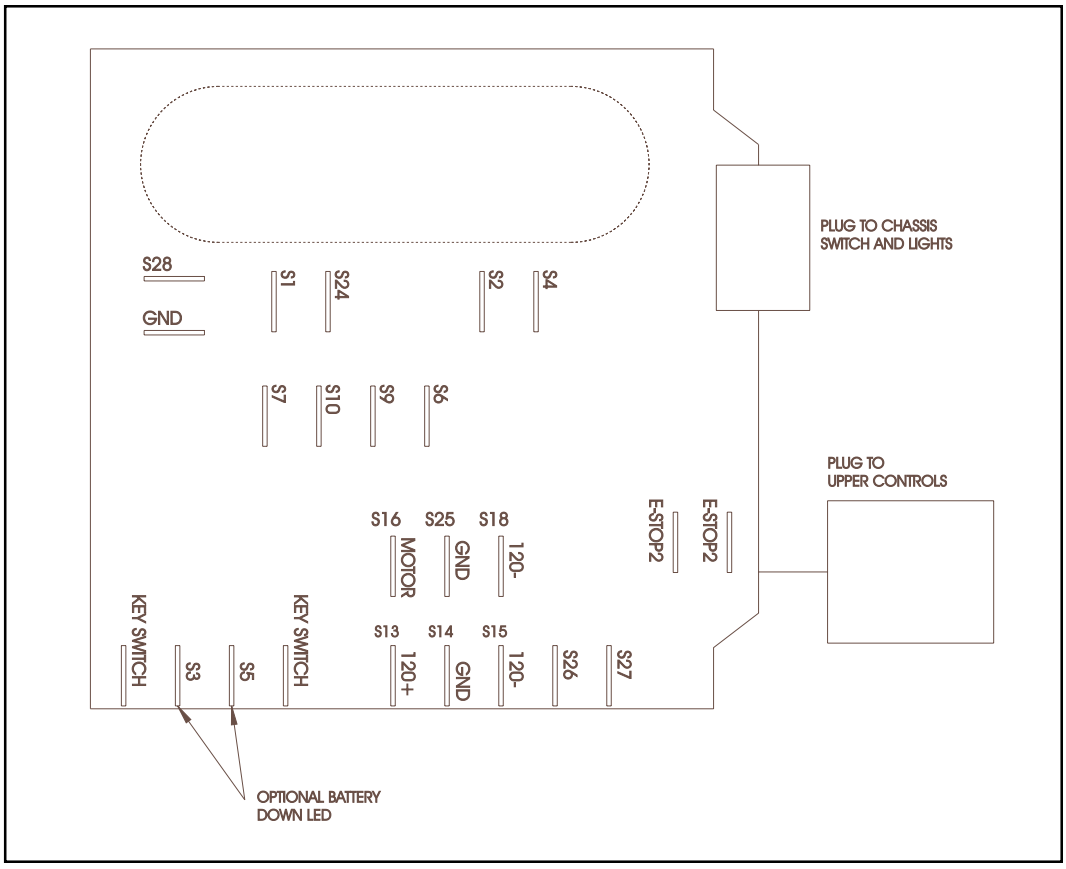


Figure 3-1: Circuit Board

NOTES:

4.0 Introduction

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

The diagrams are to be used in conjunction with *Table 3-1: Troubleshooting Guide*. They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding during troubleshooting analysis.

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

LIST OF FIGURES

4.1 Electrical Schematics

Table 4-1: Electrical Schematic Legend AC

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
BR	Bridge Rectifier	Converts AC to DC for control circuit.	In Control Box.
C1-4	Relay Contacts Norm. Open for R1-4.	Completes ground circuit to motor and Lift Valve when R1-4 are energized.	In Control Box.
L1-4	Indicator Light	Lights when Outrigger Interlock Switches are closed.	On chassis next to Outrigger socket.
M1	Electric Motor	Supplies power to drive hydraulic pump.	Upper portion of Power Unit.
R1-4	Relay Coil	When energized closes relay contacts 1-4.	In Control Box.
R5	Motor Contactor	Switches power to Electric Motor.	In Control Box.
S1	Switch, Chassis Emergency Stop	Control circuit shut off.	In Control Box.
S2	Switch, Key	Provides power to upper controls.	In Control Box.
S3	Switch, Platform Emegency Stop	Control Circuit shut off.	In Control Box.
S4	Switch. Power On	Supplies power to either Up or Down Switch.	Center button of platform controls.
S5	Switch, Lift	Supplies power to up circuit.	Upper button of platform controls.
S6	Switch, Lower	Supplies power to down circuit.	Lower button of platform controls.
S7-10	Switch, Outrigger Interlock	Supplies power to L1-L4 and R1-R4.	In Outrigger Sockets.
SOL1	Solenoid, Lower (coil)	Opens down valve.	Power Unit front.
SOL2	Solenoid, Lift (coil)	Opens Up Valve.	Power Unit left hand side.
T1	Transformer	Steps down AC voltage.	Inside electrical Control Box.

Table 4-2: Electrical Schematic Legend DC

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
BAT	Battery	Supplies current to circuit.	In Power Module.
CH	Charger	Maintains Charge level in Battery.	In Power Module.
C1-4	Relay Contacts Norm. Open for R1-4.	Completes ground circuit to motor and Lift Valve when R1-4 are energized.	In Control Box.
L1-4	Indicator Light	Lights when Outrigger Interlock Switches are closed.	On chassis next to Outrigger socket.
M1	Electric Motor	Supplies power to drive hydraulic pump.	Upper portion of Power Unit.
R1-4	Relay Coil	When energized closes relay contacts 1-4.	In Control Box.
R5	Relay, Motor	Supplies power to Motor.	Lower Power Module.
S1	Switch, Chassis Emergency Stop	Control circuit shut off.	In Control Box.
S2	Switch, Key	Provides power to upper controls.	In Control Box.
S3	Switch, Platform Emegency Stop	Control Circuit shut off.	In Control Box.
S4	Switch. Power On	Supplies power to either Up or Down Switch.	Center button of platform controls.
S5	Switch, Lift	Supplies power to up circuit.	Upper button of platform controls.
S6	Switch, Lower	Supplies power to down circuit.	Lower button of platform controls.
S7-10	Switch, Outrigger Interlock	Supplies power to L1-L4 and R1-R4.	In Outrigger Sockets.
SOL1	Solenoid, Lower (coil)	Opens down valve.	Power Unit front.
SOL2	Solenoid, Lift (coil)	Opens Up Valve.	Power Unit left hand side.

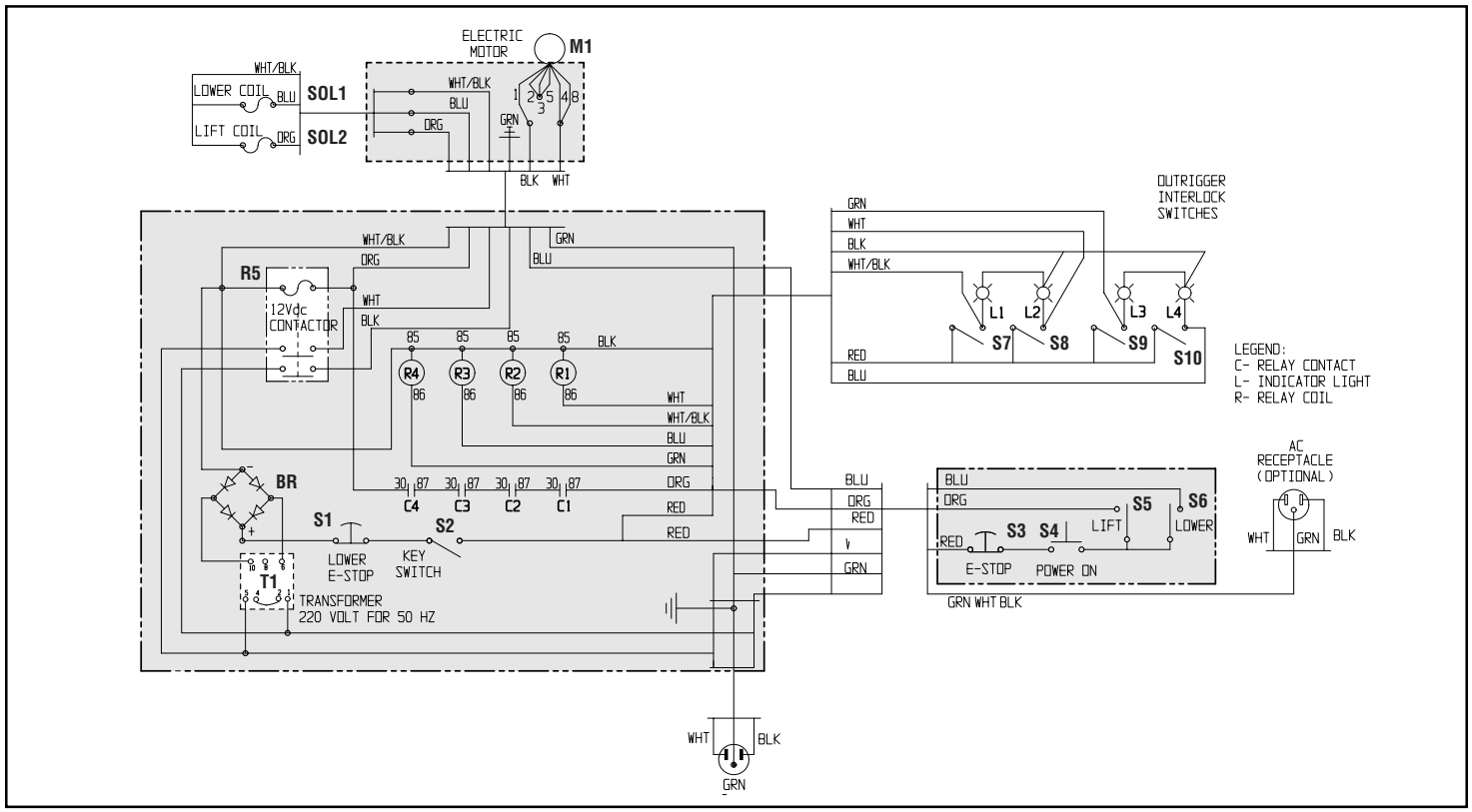


Figure 4-1: Electrical Schematic, AC Models

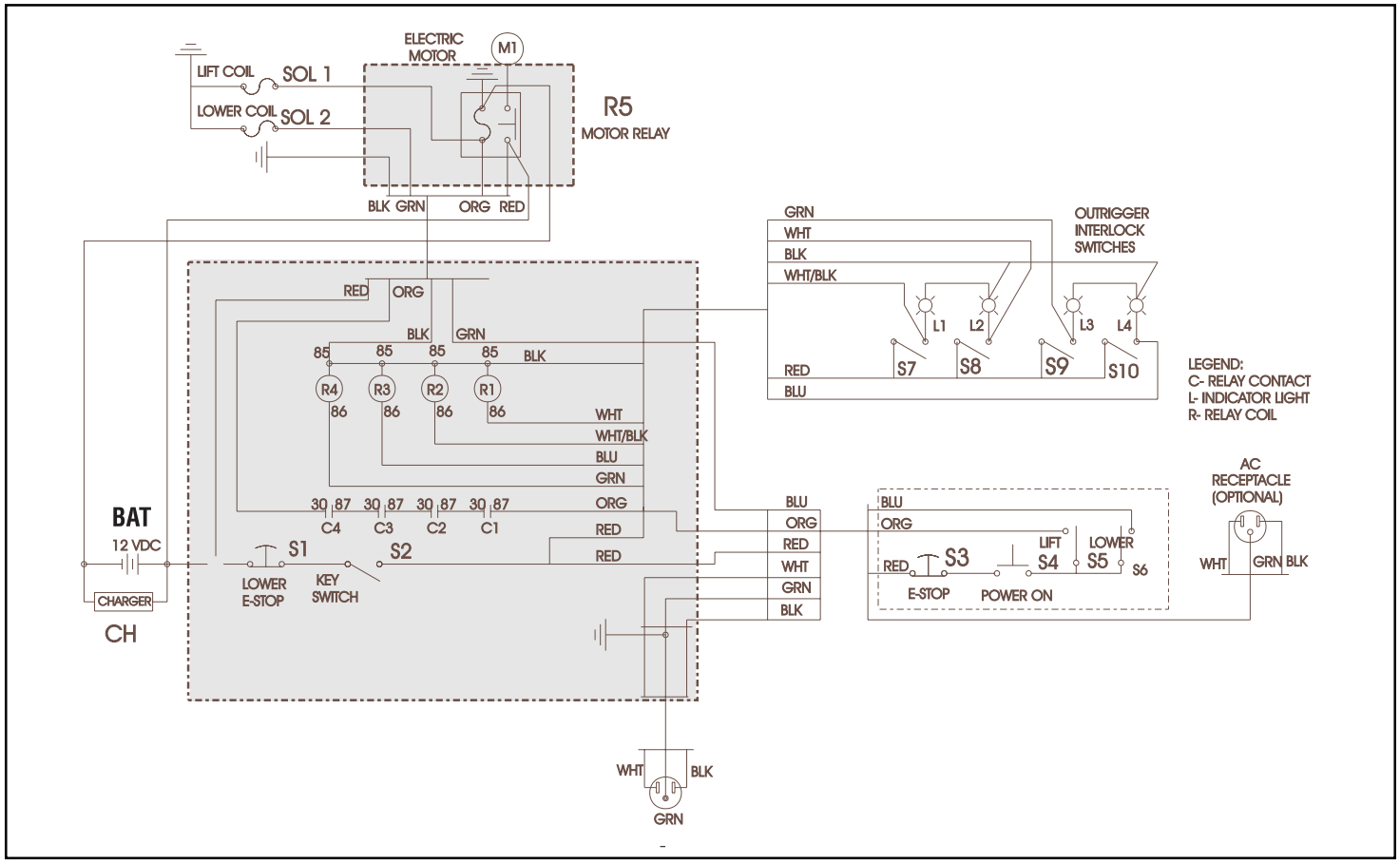


Figure 4-2: Electrical Schematic, DC Models

4.2 Hydraulic Schematic

Table 4-3: Hydraulic Scematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CV	Valve, Check	Allows flow in one direction.	Valve Block Assembly
CYL	Cylinder	Operates Lift	On lift assembly.
FLT	Filter	Seperates matter held in suspension from fluid.	Inline with Pump.
ORF	Orifice	Controls flow out of CYL.	Inline with CYL.
P	Pump	Supplies hydraulic pressure to system.	Lower Power Module.
RV	Relief Valve	Limits maximum pressure by releasing oil.	Valve Assembly Lower Power Module.
V1	Valve, Two-Way Norm. Open	Stops flow when energized.	Valve Block Assembly.
V2	Valve, Two-Way Norm. Closed	Allows flow when energized.	Lift Cylinder Assembly.

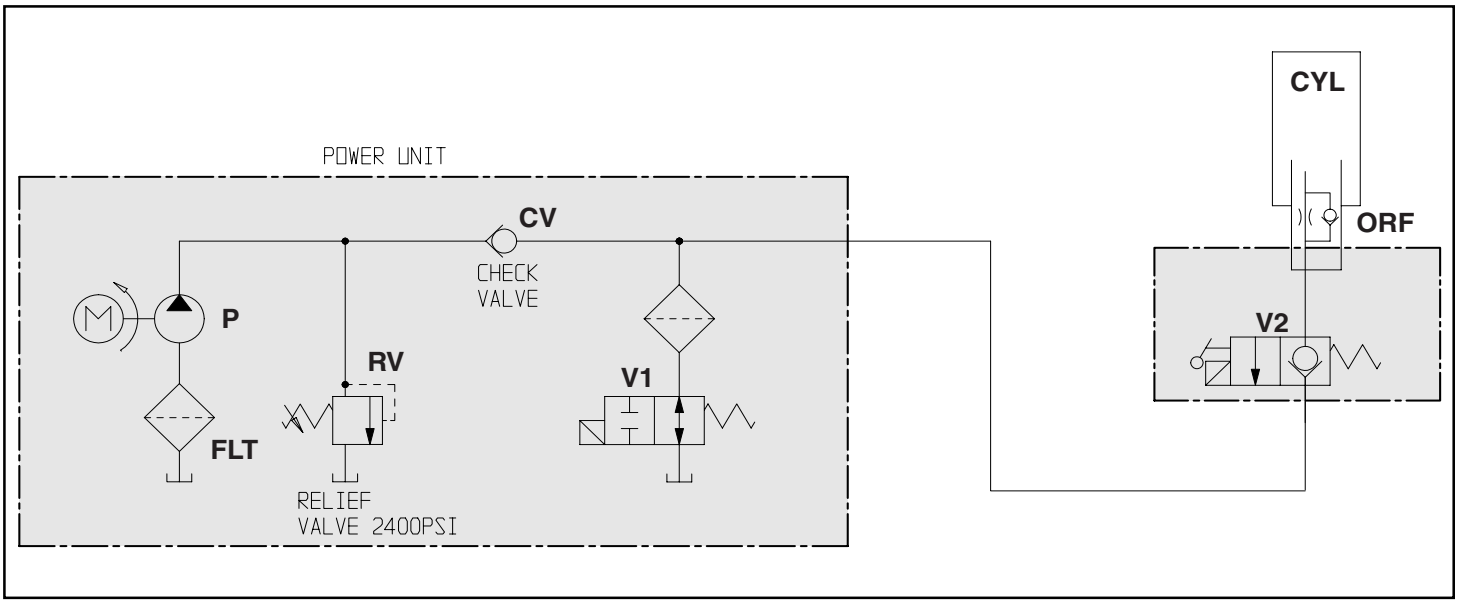


Figure 4-3: Hydraulic Schematic

Illustrated Parts Breakdown

Section 5.0

European Specifications

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

CONTENTS

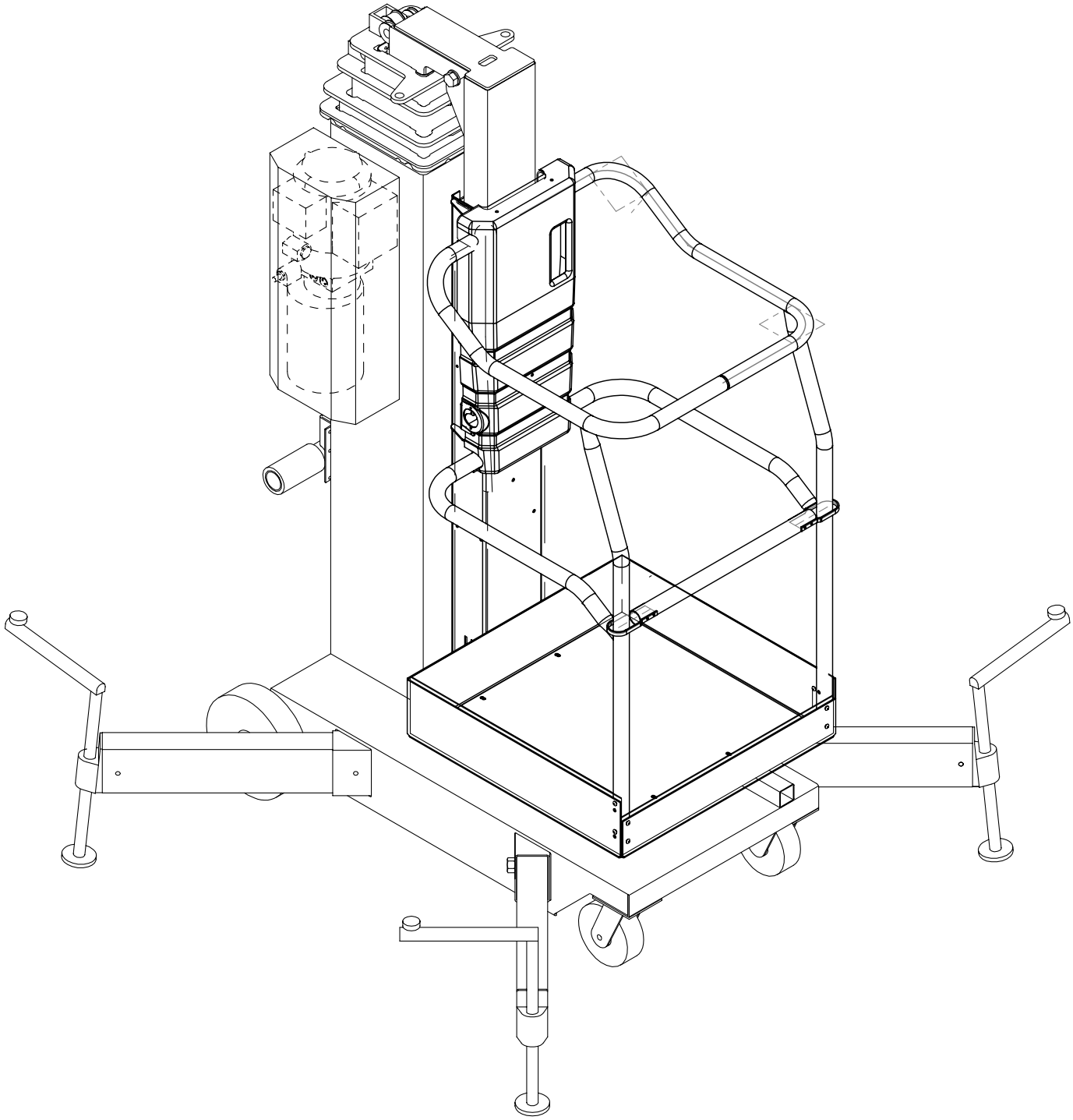
Final Assembly, ULII Series

UL25 068001-002, 068001-003,

UL32 068002-002, 068002-003,

UL40 068003-002, 068003-003

Item	Part Number	Description	UL25 AC -002	UL25DC -003	UL32AC -002	UL32DC -003	UL40AC -002	UL40DC -003
1	068006-024	BASIC ASSY	1	1				
	068006-025	BASIC ASSY			1			
	068006-026	BASIC ASSY					1	1
2	068008-011	POWER OPTION AC EUR.	1		1		1	
	068009-011	POWER OPTION DC EUR.		1		1		1
3	068013-012	LABEL KIT/INST.	1					
	068013-013	LABEL KIT/INST.		1				
	068014-012	LABEL KIT/INST.			1			
	068014-013	LABEL KIT/INST.				1		
	068015-012	LABEL KIT/INST.					1	
	068015-013	LABEL KIT/INST.						1
4	511128-000-EN	OPERATOR MANUAL	1	1	1	1	1	1
5	511128-200	PARTS & SERVICE MANUAL	1	1	1	1	1	1



Basic Assembly

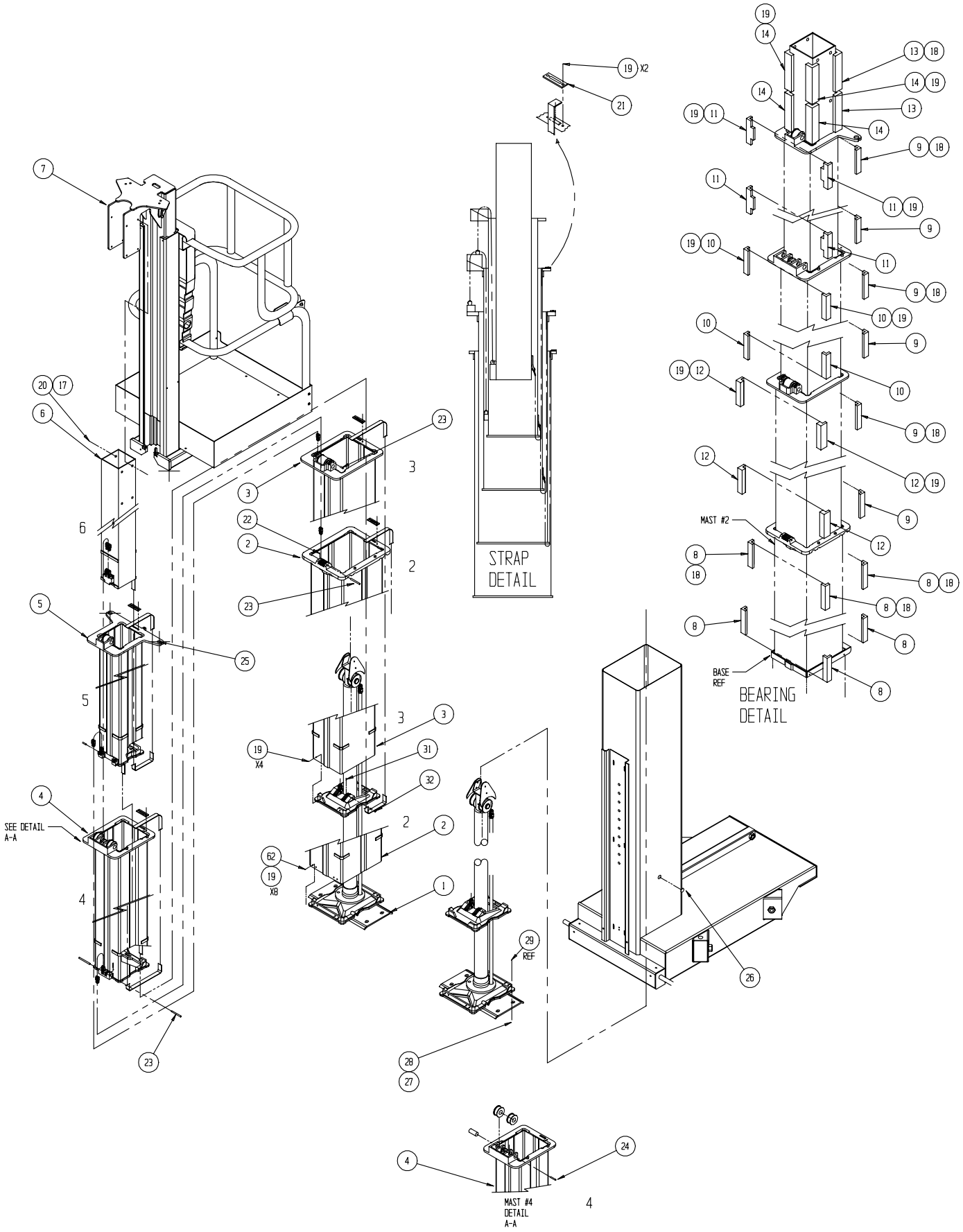
UL25 068006-024

UL32 068006-025

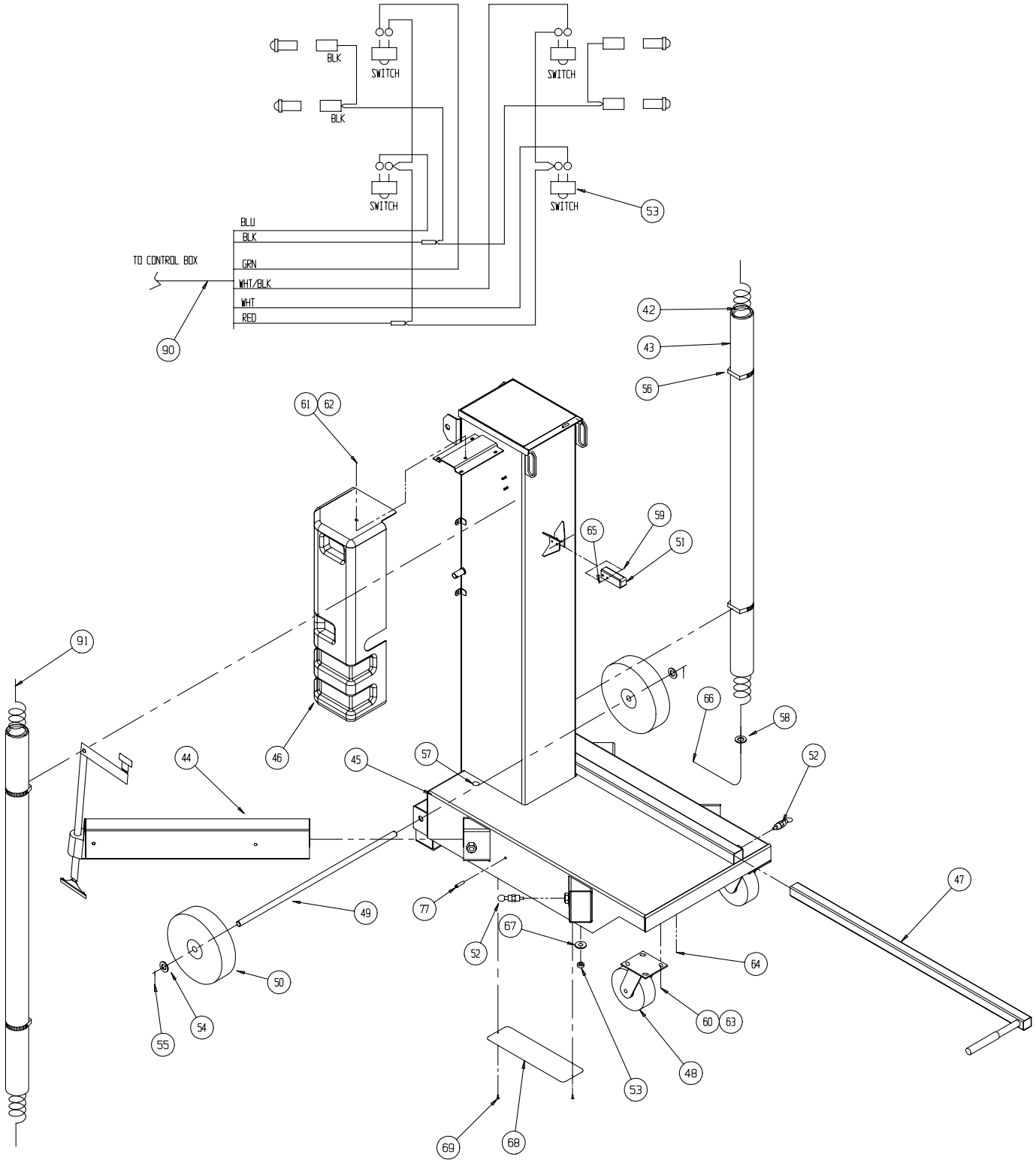
UL40 068006-026

Item	Part Number	Description	UL25 -024	UL32 -025	UL40 -026
1	512805-000	LIFT CYLINDER ASSY	1		
	512789-000	LIFT CYLINDER ASSY		1	
	512806-000	LIFT CYLINDER ASSY			1
2	068050-001	2 ND STAGE MAST ASSY	1		
	068050-002	2 ND STAGE MAST ASSY		1	
	068050-003	2 ND STAGE MAST ASSY			1
3	068056-001	3 RD STAGE MAST ASSY	1		
	068056-002	3 RD STAGE MAST ASSY		1	
	068056-003	3 RD STAGE MAST ASSY			1
4	068061-001	4 TH STAGE MAST ASSY	1		
	068061-002	4 TH STAGE MAST ASSY		1	
	068061-003	4 TH STAGE MAST ASSY			1
5	068066-001	5 TH STAGE MAST ASSY	1		
	068066-002	5 TH STAGE MAST ASSY		1	
	068066-003	5 TH STAGE MAST ASSY			1
6	068070-001	6 TH STAGE MAST ASSY	1		
	068070-002	6 TH STAGE MAST ASSY		1	
	068070-003	6 TH STAGE MAST ASSY			1
7	068160-009	CAGE SUPPORT ASSY	1		
	068160-010	CAGE SUPPORT ASSY		1	
	068160-011	CAGE SUPPORT ASSY			1
8	068218-000	MAST BEARING	8	8	8
9	068217-000	MAST BEARING	12	12	12
10	068216-000	MAST BEARING	4	4	4
11	068122-000	MAST BEARING	4	4	4
12	068121-000	MAST BEARING	4	4	4
13	068120-000	MAST BEARING	4	4	4
14	068119-000	MAST BEARING	4	4	4
17	011238-006	WASHER SPLIT 3/8	8	8	8
18	012553-005	SCREW SOC HD 1/4-20UNC X 5/8	12	12	12
19	012553-006	SCREW SOC HD 1/4-20UNC X 3/4	22	22	22
20	011823-005	SCREW BUTT HD 3/8-16 X 5/8	8	8	8
21	062129-000	STRAP RETAINER	5	5	5
22	011735-020	ROLL PIN	2	2	2
23	068145-000	PIN LEAF CHAIN	4	4	4
24	068141-000	PIN CHAIN	2	2	2
25	029925-002	CABLE CONNECTOR	2	2	2
26	066516-010	PLUG	1		
27	011256-014	SCREW 1/2-13 UNC X 1 3/4	4	4	4
28	011240-008	WASHER 1/2 STD FLAT	4	4	4
29	011248-008	NUT HEX ESNA 1/2-13 UNC	4	4	4
30	063926-007	PLUG	2	2	2
31	011735-020	ROLL PIN	2	2	2
32	068140-000	PIN	2	2	2
40	068194-000	LOADER ASSY	1		

Item	Part Number	Description	UL25 -024	UL32 -025	UL40 -026
41	068200-003	TILTBACK ASSY	1		
	068200-000	TILTBACK ASSY		1	
	068200-001	TILTBACK ASSY			1
42	062945-001	RETRACTILE CORD	1		
	062945-003	RETRACTILE CORD		1	
	062945-004	RETRACTILE CORD			1
43	062226-002	CABLE STORAGE TUBE	2		
	062226-003	CABLE STORAGE TUBE		2	
	062226-004	CABLE STORAGE TUBE			2
44	068157-000	OUTRIGGER ASSY	4		
	068157-001	OUTRIGGER ASSY		4	
	068157-002	OUTRIGGER ASSY			4
45	068020-001	CHASSIS WELDMENT	1		
	068021-001	CHASSIS WELDMENT		1	
	068022-001	CHASSIS WELDMENT			1
46	068215-000	MOTOR COVER	1	1	1
47	067995-000	LIFTING ARM ASSEMBLY	1	1	1
48	068221-000	CASTER	2	2	2
49	068645-000	AXLE SHAFT	1	1	1
50	068222-000	WHEEL 10 X 2 1/2	2	2	2
51	068158-000	#1 SECTION SLIDE	1	1	1
52	003570-000	RETAINING PIN	5	5	5
53	062881-000	SWITCH	4	4	4
54	011240-012	WASHER FLAT 3/4	2	2	2
55	068646-000	ROLL PIN	2	2	2
56	020398-024	CLAMP	4	4	4
57	011868-032	GROMMET	1	1	1
58	011868-019	GROMMET	2	2	2
59	011252-010	SCREW HHC 1/4-20UNC X 1 1/4	4	4	4
60	011254-006	SCREW HHC 3/8-16 X 3/4	8	8	8
61	011825-004	SCREW MRH 1/4-20	3	3	3
62	011240-004	WASHER 1/4 STD FLAT	20	20	20
63	011240-006	WASHER 3/8 STD FLAT	16	16	16
64	014252-006	NUTZERT 3/8-16UNC	8	8	8
65	011248-004	NUT HHC 1/4-20UNC	8	8	8
66	011868-011	BUSHING	1	1	1
67	064350-010	SHIM 5/8 ID X 1" OD X .031 STL	4	4	4
68	068728-000	COVER, CHASSIS	2	2	2
69	005503-003	SCREW, #6 SELF TAPPING	4	4	4
79	014066-004	SCREW HWH SLFTP 1/4 X 1/2	4	4	4
90	067987-000	WIRE HARNESS	1	1	1
91	067988-006	RETRACTILE CORD	1		
	067988-007	RETRACTILE CORD		1	
	067988-008	RETRACTILE CORD			1



Drawing # 1 of 2

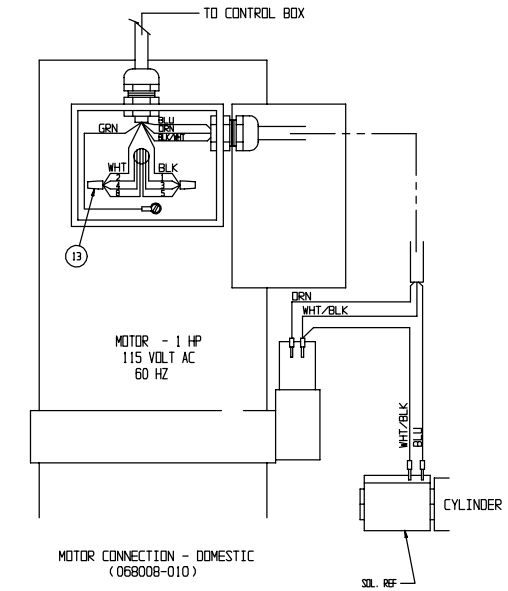


Drawing # 2 of 2

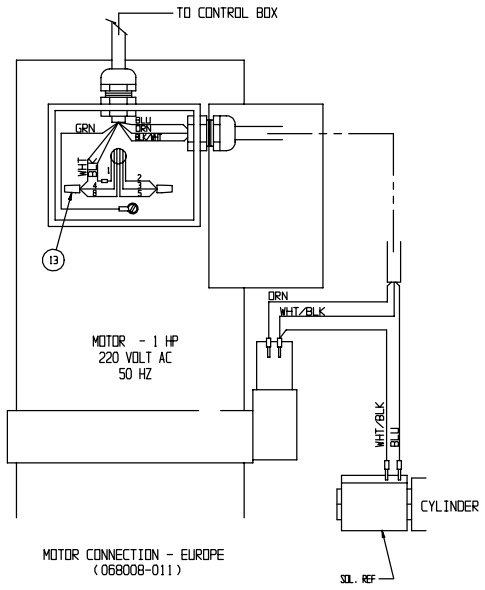
AC Power Option

068008-011

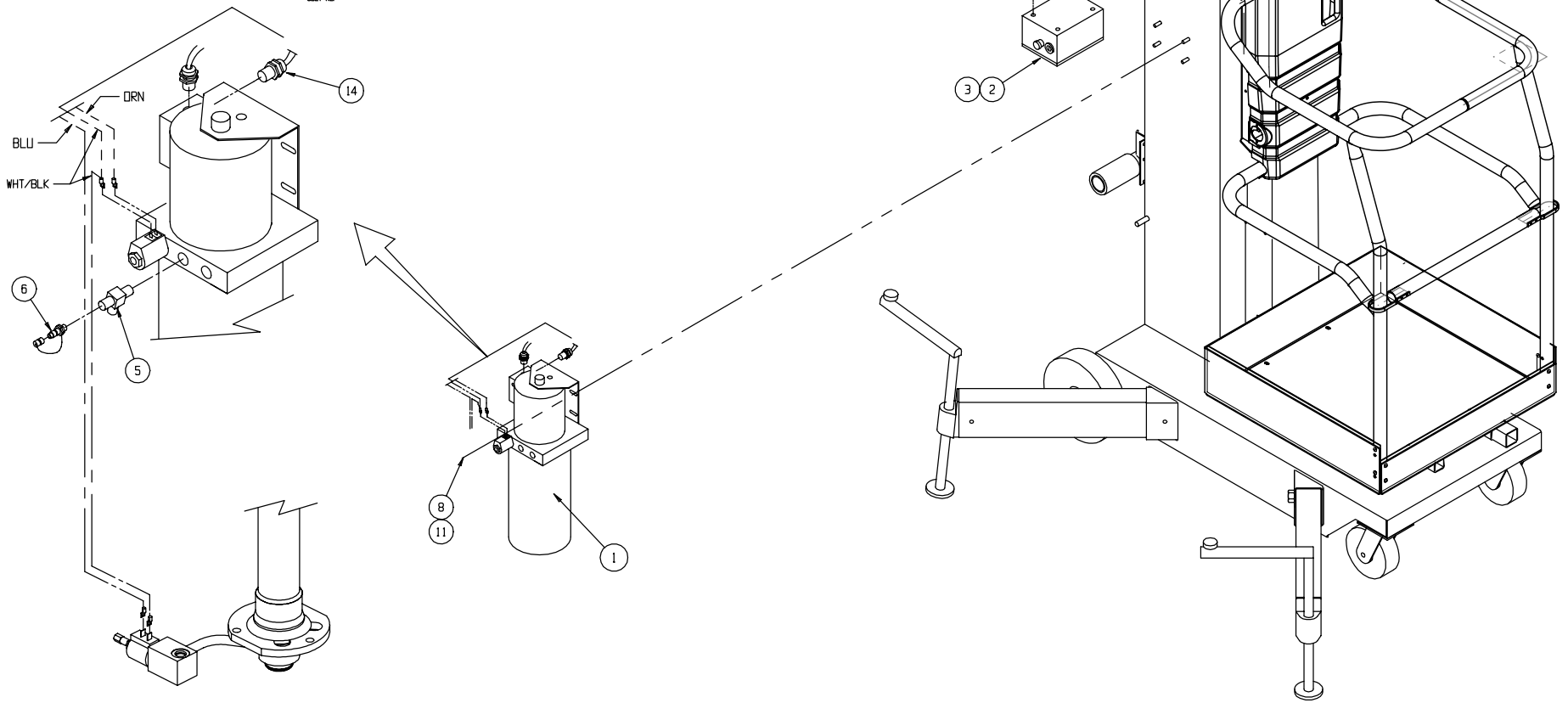
Item	Part Number	Description	Qty
1	068115-001	POWER UNIT	1
	068115-011	VALVE, LOAD	
	068115-012	PUMP	
	068115-013	SEAL KIT	
	068115-015	MOTOR	
3	068007-021	CONTROL BOX W/ELECT DOWN	1
5	020809-001	FITTING, TEE 6MJ-6MB-6FJX	1
6	063965-003	GAGE PORT	1
8	011240-005	WASHER 5/16 FLAT	4
9	011240-004	WASHER 1/4 FLAT	4
10	011252-004	SCREW HHC 1/4-20 X 1/2	4
11	011248-005	NUT 5/16-18 ESNA	4
13	013540-001	WIRE NUT 12-10	2
14	011868-019	CONN CABLE	1



MOTOR CONNECTION - DOMESTIC
(068008-010)



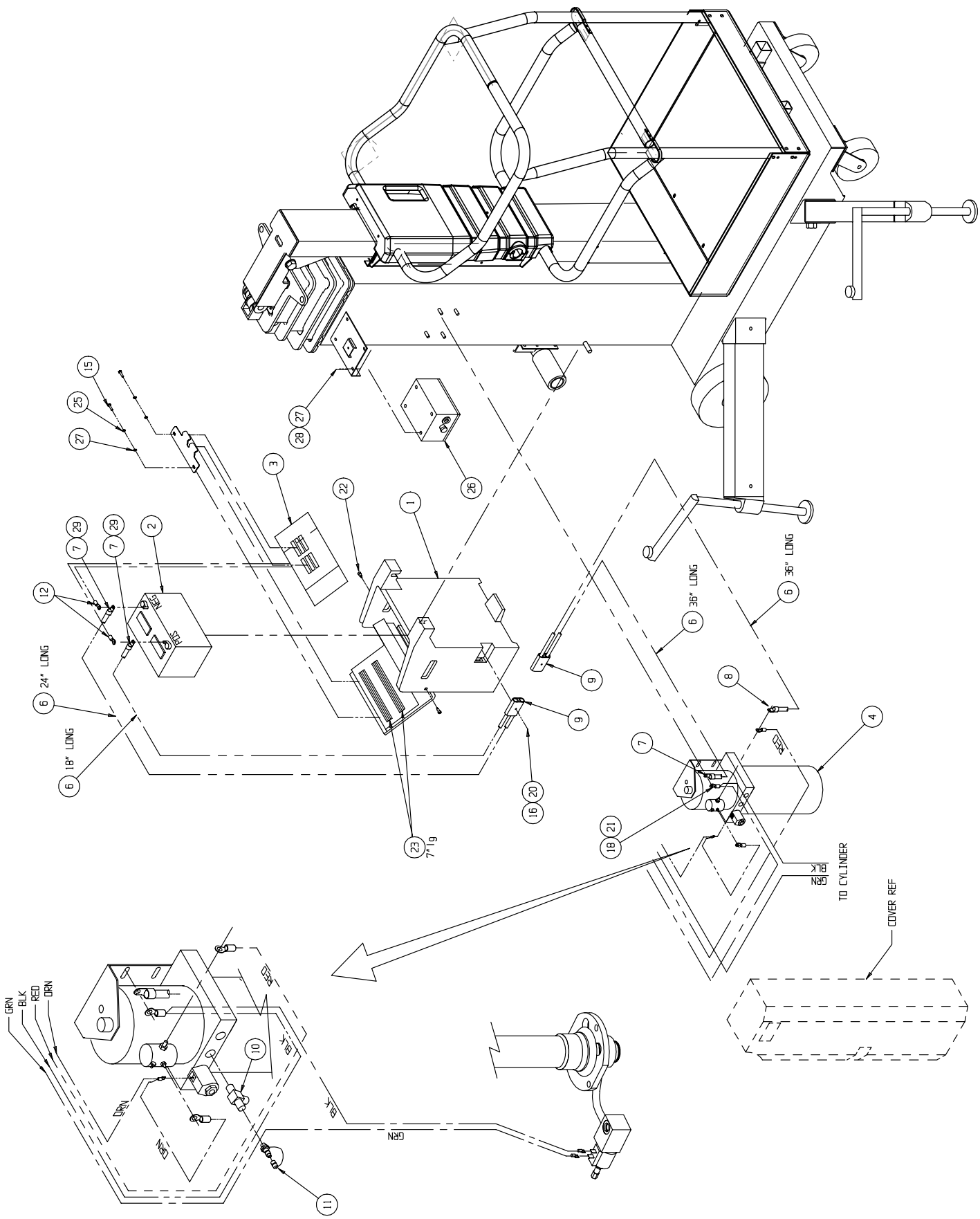
MOTOR CONNECTION - EUROPE
(068008-011)



DC Power Option

068009-011

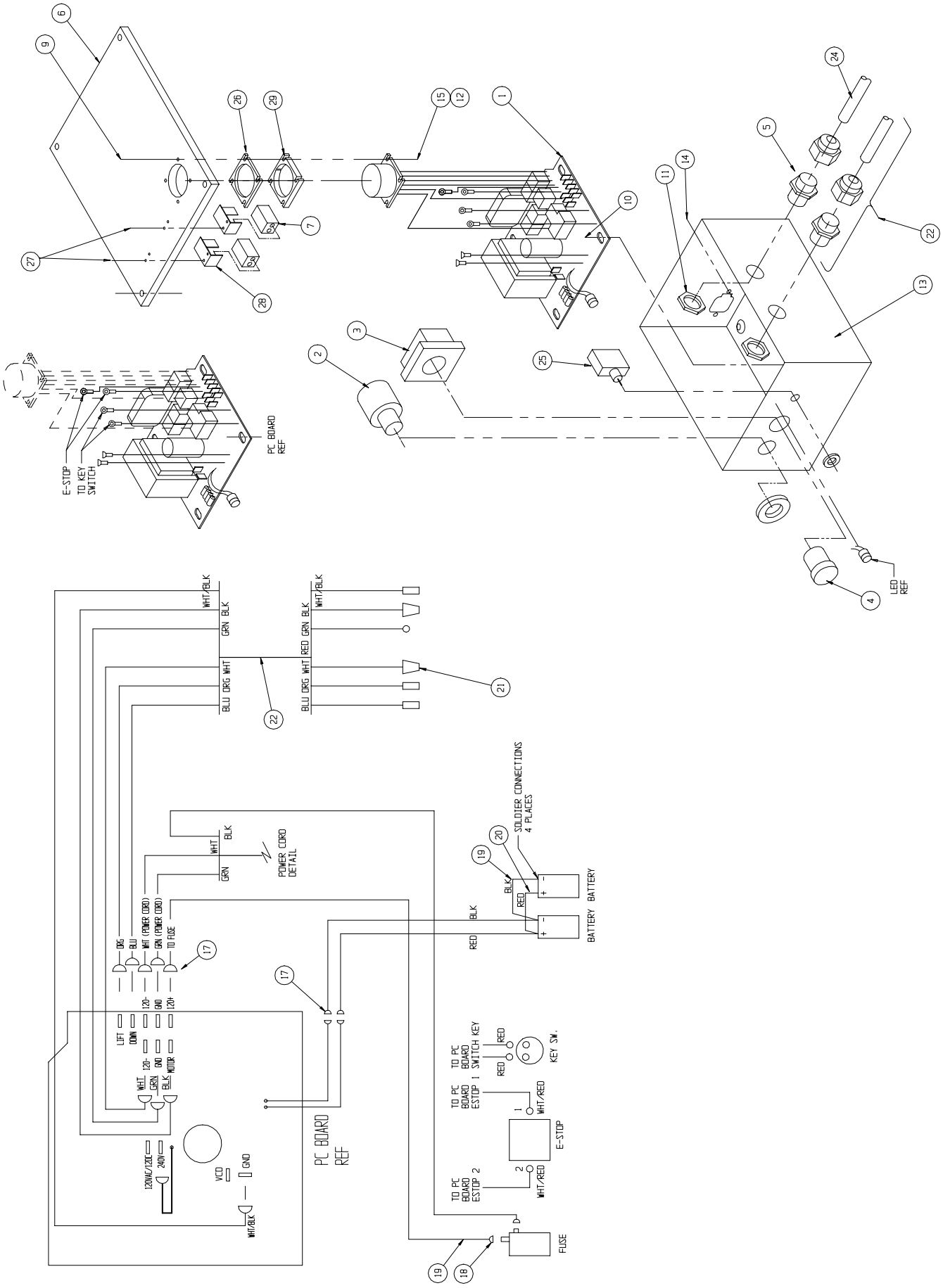
Item	Part Number	Description	Qty
1	068214-000	BATTERY BOX	1
2	062299-001	BATTERY	1
	062299-004	BATTERY DRY	
3	062782-000	CHARGER	1
4	068116-001	POWER UNIT	1
	068117-012	PUMP	
	068117-013	SEAL KIT	
	068116-013	START SOLENOID	
	068116-014	MOTOR	
	068116-015	BRUSHES	
6	029431-099	CABLE, #2 AWG WELDING	FT 10
7	029602-025	RING TERM #2 - 5/16 DIA	3
8	029602-026	RING TERM #2 - 3/8 DIA	1
9	029902-000	CONN 175 AMP	2
10	015961-006	FITTING, TEE 6MJ-6MB-6MJT	1
11	063965-003	GAGE PORT	1
13	029620-002	CONN BUTT 16-14	1
15	011252-008	SCREW HHC 1/4-20 X 1	2
16	011252-012	SCREW HHC 1/4-20 X 1 1/2	2
18	011240-005	WASHER 5/16 FLAT	4
20	011248-004	NUT 1/4-20 ESNA	2
21	011248-005	NUT 5/16-18 ESNA	4
22	062946-005	SCREW SOC HD SHOULDER 1/4 X 5/8	2
26	068007-023	CONTROL BOX W/ELECTRIC DOWN	1
27	011240-004	WASHER 1/4 FLAT	4
28	011252-004	SCREW HHC 1/4-20 X 1/2	4
29	010154-000	COVER BATTERY	2


15
25
27
27
28
26
3
22
1
29
7
29
7
2
12
RED
GRN
6 24" LONG
6 18" LONG
6 36" LONG
6 36" LONG
6 36" LONG
9
9
8
4
7
16
20
21
18
23
7"lg
BLK
GRN
TO CYLINDER
COVER REF
GRN
BLK
RED
ORN
10
BLK
GRN
ORN
RED
11

AC Control Box

068007-021

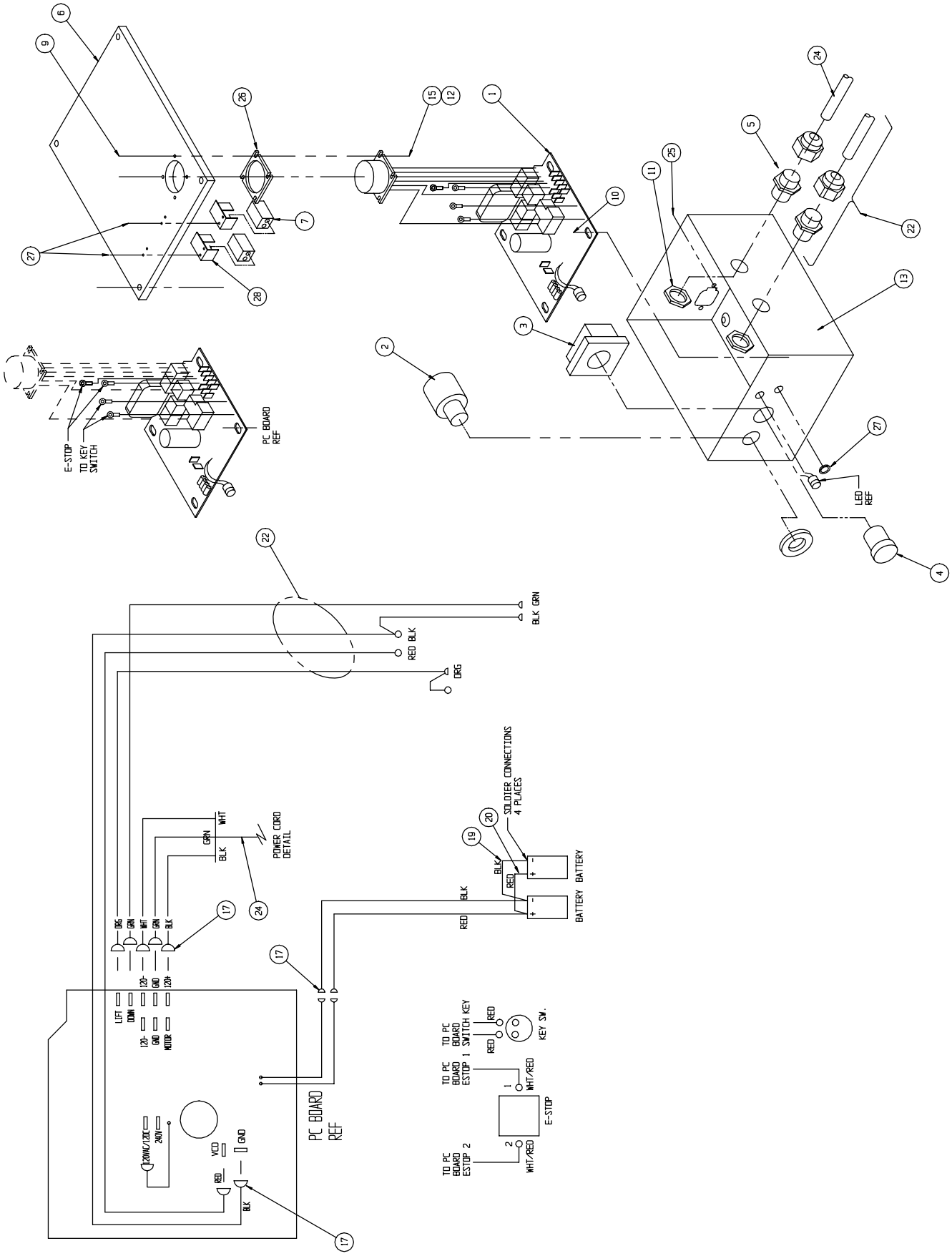
Item	Part Number	Description	Qty
1	068274-011	PC BOARD	1
2	005440-000	KEY SWITCH	1
	005442-000	KEY	
3	067028-000	CONTACT BLOCK	1
4	062799-008	SWITCH PUSH	1
5	029925-000	CONN CABLE	2
6	067985-001	CONTROL BOX COVER	2
6	067985-001	CONTROL BOX COVER	1
7	067958-001	BATTERY 9V	2
8	011709-004	SCREW 10-24 X 1/2	4
9	011721-006	SCREW 4-40UNC X 3/4	4
10	011703-006	SCREW HEX STSOC 1/4-20UNC X 3/8	4
11	029939-002	LOCKNUT 1/2 NPT	2
12	011248-049	NUT HEX ESNA 4-40UNC	4
13	067986-000	ENCLOSURE MODIFIED	1
14	026525-003	SCREW SLFTP #8 X 3/8	2
15	011240-001	WASHER FLAT #6	4
17	029931-003	CONN FM PUSH 14-16	3
18	029931-004	CONN FM PUSH 14-16	2
19	029452-099	WIRE 16AWG BLK	FT 1
20	029454-099	WIRE 16AWG RED	FT 1
21	013540-001	WIRE NUT 12-10	2
22	068644-002	ULII WIRE LOOM AC	1
24	062179-000	POWER CORD	1
25	029868-007	CIRCUIT BREAKER	1
26	067984-002	GASKET	1
27	026551-004	RIVET POP	4
28	067155-001	BATTERY HOLDER 9V	2
29	068643-000	SPACER HD10 SERIES	1


E-STOP
TO KEY SWITCH
PC BOARD REF
LED REF
WHT/BLK
GRN BLK
BLU ORG WHT
RED GRN BLK
POWER CORD DETAIL
SOLDIER CONNECTIONS 4 PLACES
BATTERY
DOG
BLU
WHT (POWER CORD)
GRN (POWER CORD)
TO FUSE
LIFT DOWN
120-
GND
120+
WHT
GRN
BLK
MOTOR
120VAC/120DC
240V
VCD
GND
TO PC BOARD SWITCH KEY
KEY SW.
TO PC BOARD ESTOP 1
TO PC BOARD ESTOP 2
E-STOP
FUSE

DC Control Box

068007-023

Item	Part Number	Description	Qty
1	068274-013	PC BOARD	1
2	005440-000	KEY SWITCH	1
	005442-000	KEY	
3	067028-000	CONTACT BLOCK	1
4	062799-008	SWITCH PUSH	1
5	029925-000	CONN CABLE	2
6	067985-001	CONTROL BOX COVER	1
7	067958-001	BATTERY 9V	2
8	011709-004	SCREW 10-24 x 1/2	4
9	011721-006	SCREW 4-40UNC X 3/4	4
10	011703-006	SCREW HEX STSOC 1/4-20UNC X 3/8	4
11	029939-002	LOCKNUT 1/2 NPT	2
12	011248-049	NUT HEX ESNA 4-40UNC	4
13	067986-000	ENCLOSURE MODIFIED	1
15	011240-001	WASHER FLAT #6	4
17	029931-003	CONN FM PUSH 14-16	2
19	029452-099	WIRE 16 GA BLK	FT 1
20	029454-099	WIRE 16 GA RED	FT 1
22	068644-003	ULII WIRE LOOM DC	1
24	062179-000	POWER CORD	1
25	026525-003	SCREW SLFTP #8 X 3/8	2
26	067984-002	GASKET	1
27	066516-008	PLUG	1
29	067155-001	BATTERY HOLDER 9V	2
30	026551-004	POP RIVET	1


E-STOP
TO KEY SWITCH
PC BOARD REF
LED REF
BLK GRN
RED BLK
ORG
POWER CORD DETAIL
SOLDIER CONNECTIONS 4 PLACES
BATTERY
BATTERY
PC BOARD REF
TO PC BOARD SWITCH KEY
KEY SW.
TO PC BOARD ESTOP 1
TO PC BOARD ESTOP 2
E-STOP
LIFT
DOWN
MOTOR
VCC
GND

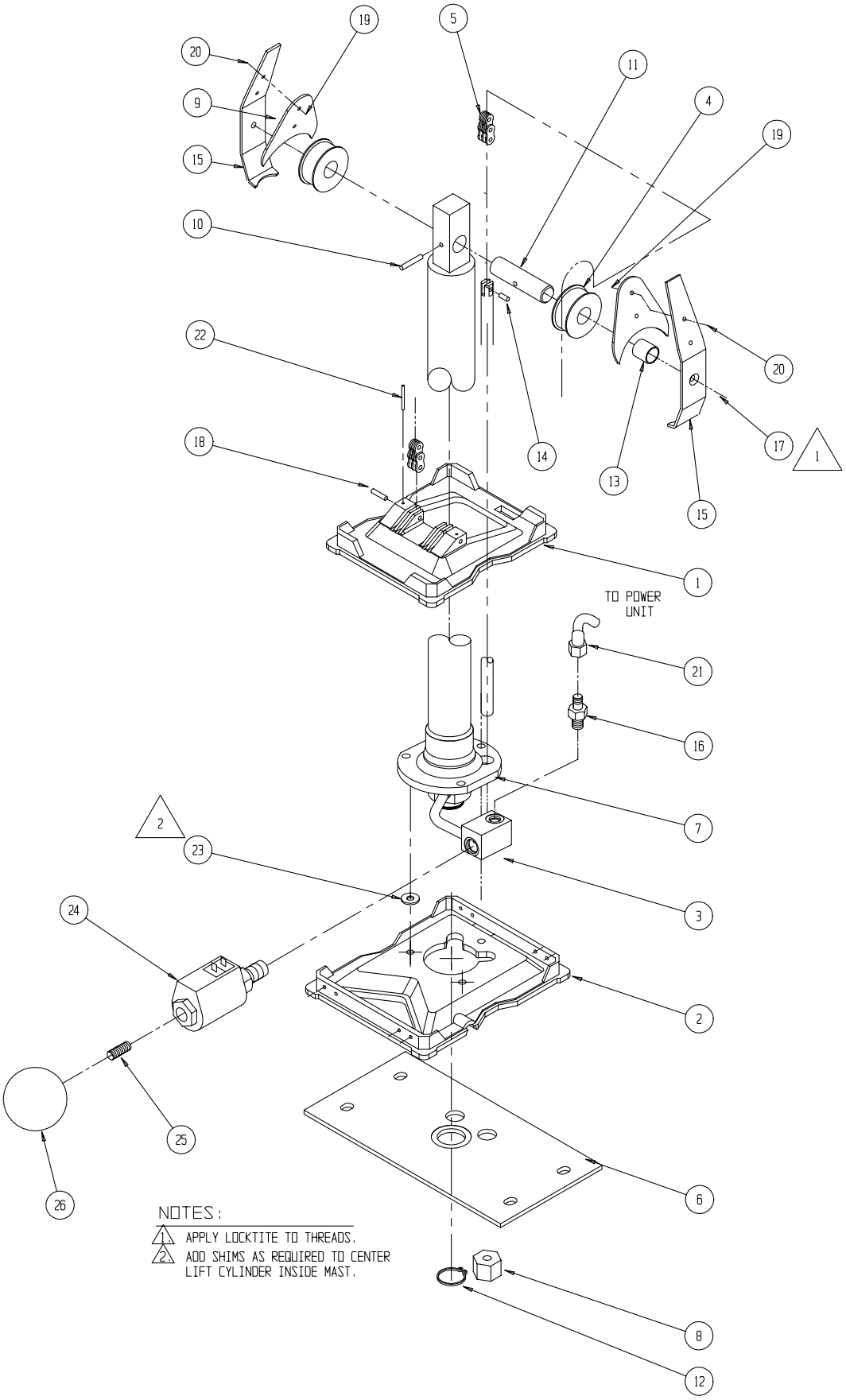
Lift Cylinder

UL25 068074-020

UL32 068074-021

UL40 068074-022

Item	Part Number	Description	UL25 -020	UL32 -021	UL40 -022
1	068129-000	3 RD STAGE BOTTOM CASTING	1	1	1
2	068128-000	2 ND STAGE BOTTOM CASTING	1	1	1
3	068113-006	LIFT CYLINDER	1		
	068113-007	LIFT CYLINDER		1	
	068113-008	LIFT CYLINDER			1
	068113-010	SEAL KIT			
4	068076-000	CYLINDER SHEAVE	2	2	2
5	062164-000	CHAIN	2		
	062164-123	CHAIN		2	
	062164-149	CHAIN			2
6	068089-000	CYLINDER MOUNT	1	1	1
7	068080-001	TIE RODS	2		
	068080-002	TIE RODS		2	
	068080-003	TIE RODS			2
8	011248-010	LOCKNUT 5/8-11 UNC	2	2	2
9	068079-000	CYLINDER GUIDE BEARING	2	2	2
10	011737-010	ROLLPIN	1	1	1
11	068081-000	PIN CYLINDER	1	1	1
12	011764-023	RETAINING RING	1	1	1
13	062642-022	BEARING 16DU16	2	2	2
14	062169-004	MASTER LINK	2	2	2
15	062655-001	CHAIN GUARD	2	2	2
16	011941-005	FITTING ST O RING 6MB - 6MJ	1	1	1
17	011828-006	SCREW FLAT HD SOCKET 1/4-20 X 3/4	2	2	2
18	068143-000	CHAIN PIN	2	2	2
19	011240-002	WASHER #8 FLAT	4	4	4
20	026553-008	RIVET 3/16	4	4	4
21	060861-115	HYD HOSE	1		
	060861-011	HYD HOSE		1	
	060861-011	HYD HOSE			1
22	011737-010	ROLLPIN 1/4 X 1-1/4	1	1	1
23	063988-006	SHIM		A/R	A/R
24	066179-001	VALVE, LOWERING	1	1	1
25	069040-000	THREADED STUD 1/4-28 X 1	1	1	1
26	069041-000	KNOB - RED	1	1	1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NOTES:
1. APPLY LOCKTITE TO THREADS.
2. ADD SHIMS AS REQUIRED TO CENTER
LIFT CYLINDER INSIDE MAST.

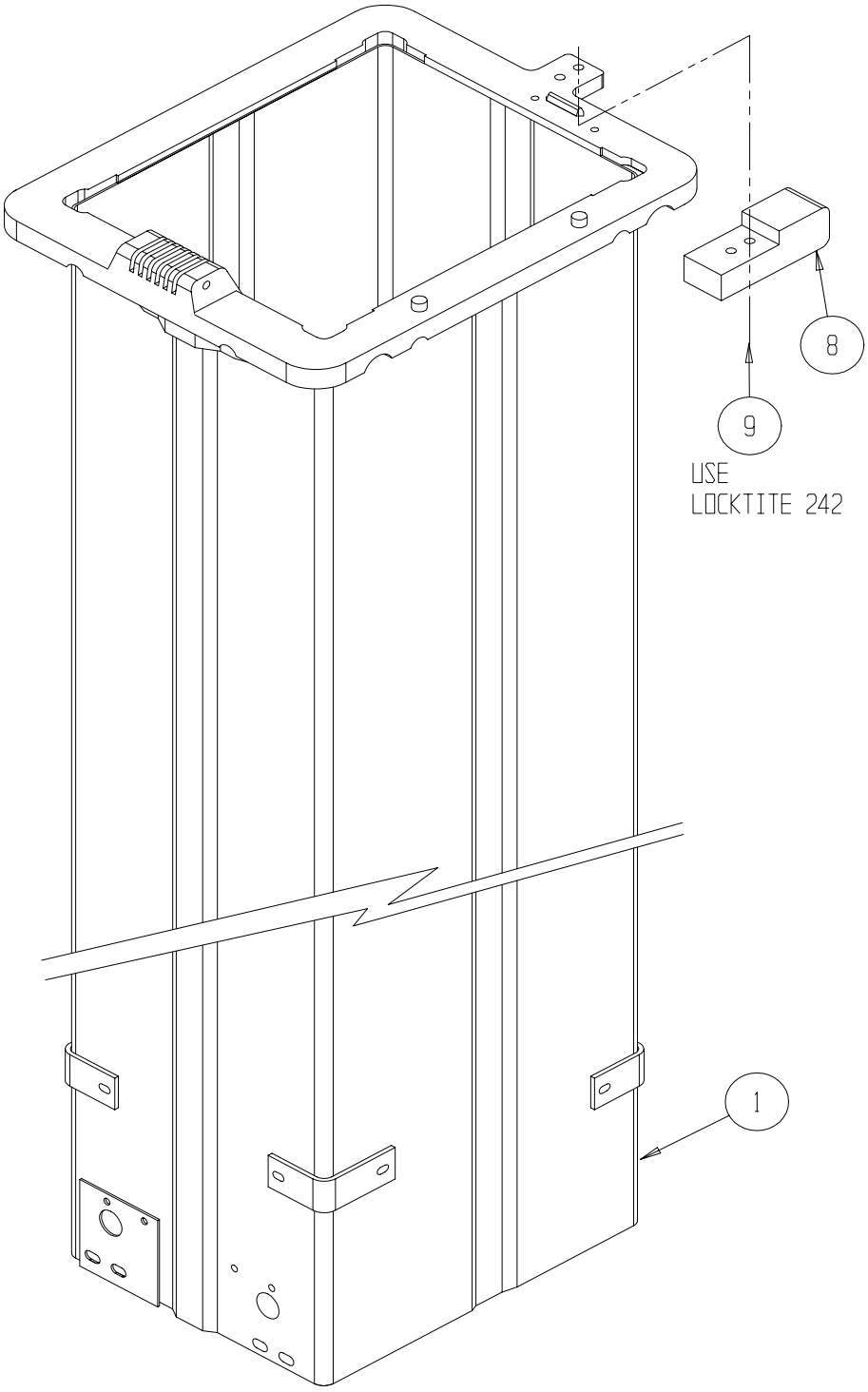
2nd Stage Mast Assembly

UL25 068050-001

UL32 068050-002

UL40 068050-003

Item	Part Number	Description	Qty
1	068055-001	2 ND STAGE MAST ASSY UL25	1
	068055-002	2 ND STAGE MAST ASSY UL32	1
	068055-003	2 ND STAGE MAST ASSY UL40	1
8	068053-000	#2 SECTION SLIDE	1
9	011703-016	SCREW SOCKET HEX SET 1/4-20UNC X 1	2



3rd Stage Mast Assembly

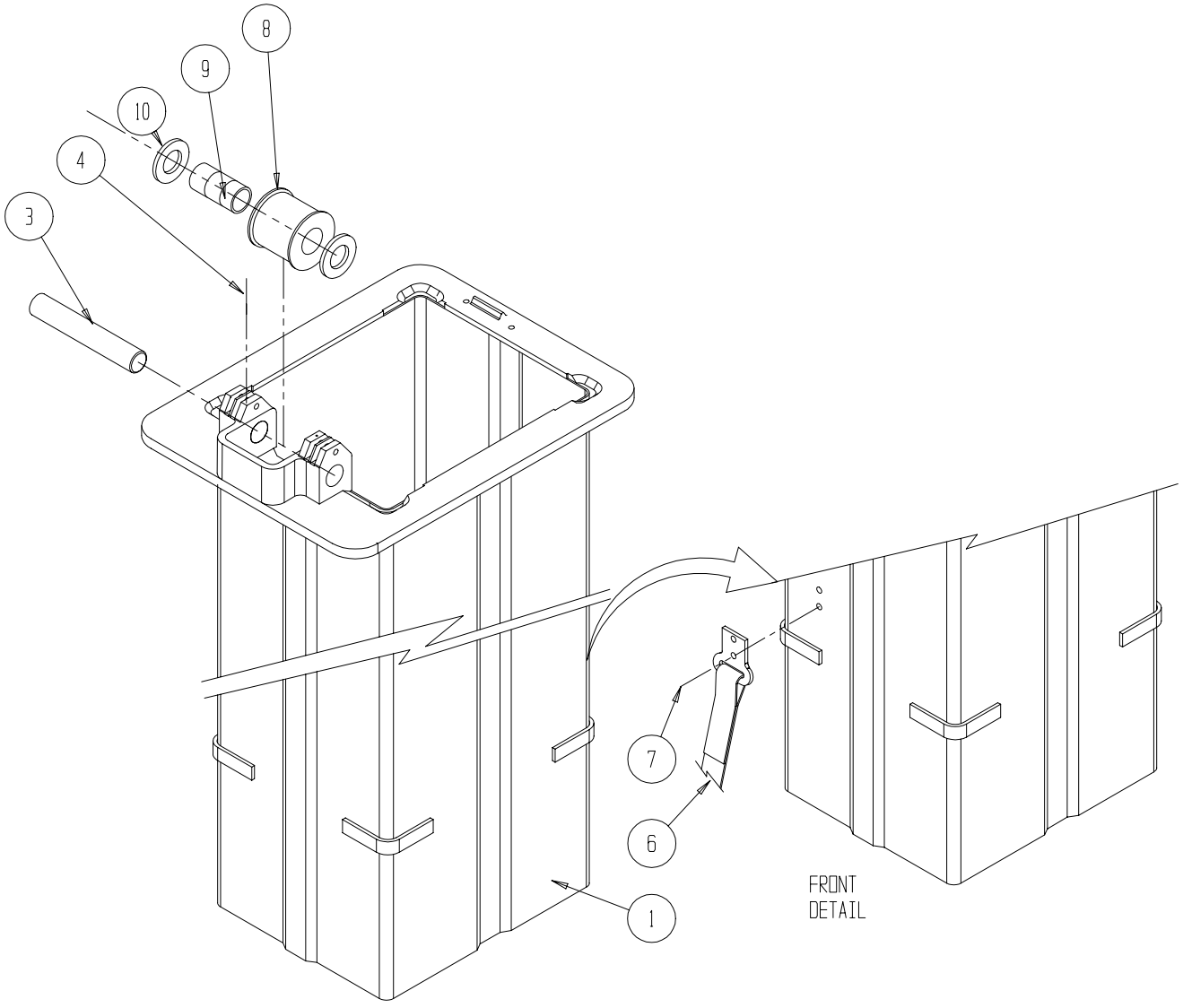
UL25 068056-001

UL32 068056-002

UL40 068056-003

Item	Part Number	Description	Qty
1	068060-001	3RD STAGE MAST ASSY UL25	1
	068060-002	3RD STAGE MAST ASSY UL32	1
	068060-003	3RD STAGE MAST ASSY UL40	1
3	068139-000	SHAFT	1
4	011735-012	PIN	1

Item	Part Number	Description	Qty
6	062753-000	STRAP ASSY	1
7	026553-002	RIVET 3/16	2
8	068137-000	SHEAVE	1
9	062642-010	BEARING	3
10	011786-005	MAC. BUSHING	2



4th Stage Mast Assembly

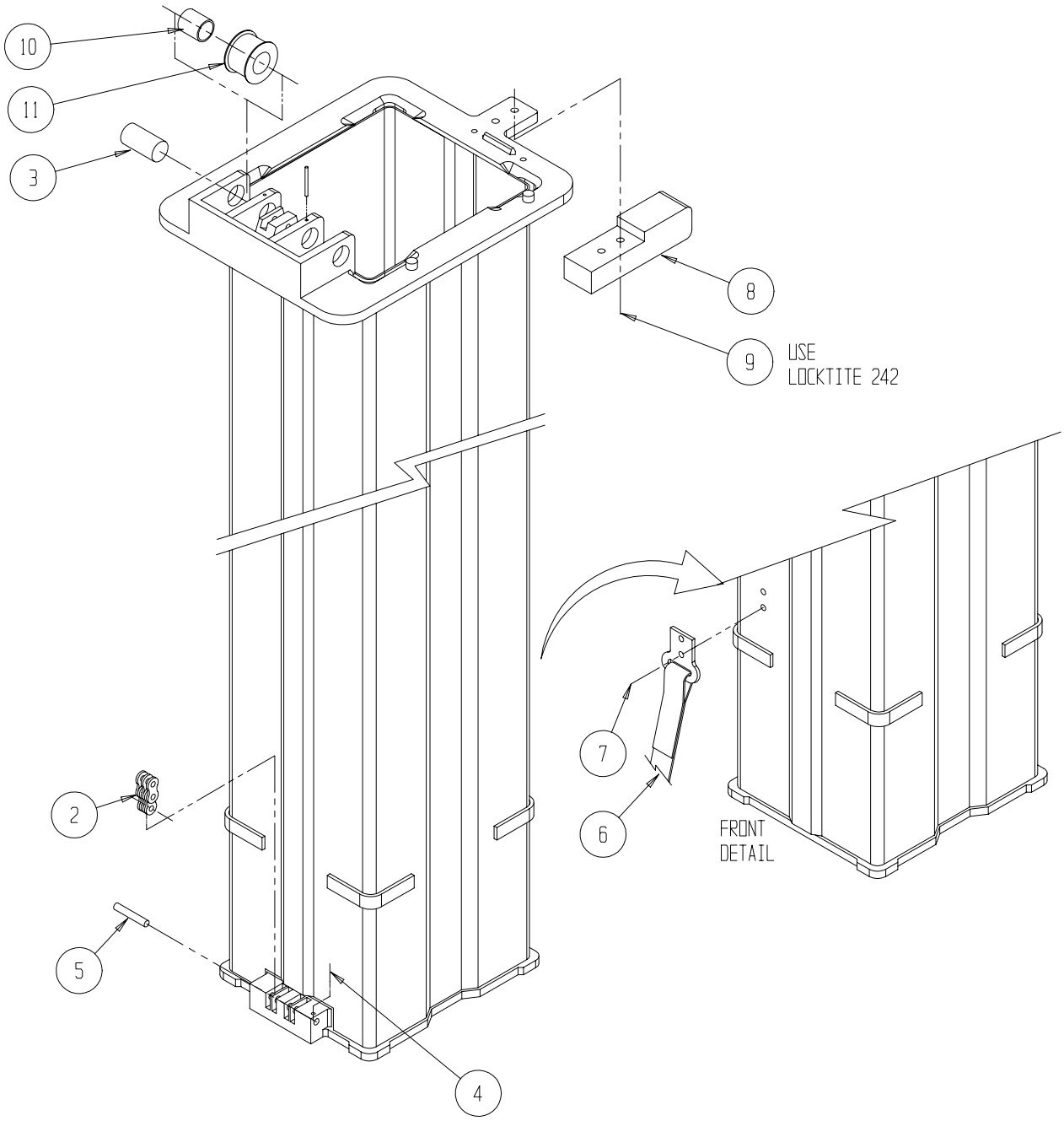
UL25 068061-001

UL32 068061-002

UL40 068061-003

Item	Part Number	Description	Qty
1	068064-001	4 TH STAGE MAST ASSY UL25	1
	068064-002	4 TH STAGE MAST ASSY UL32	1
	068064-003	4 TH STAGE MAST ASSY UL40	1
2	062168-111	CHAIN	2
2	062168-137	CHAIN	2
2	062168-163	CHAIN	2
3	068138-000	SHAFT	2
4	011753-020	SHAFT	2

Item	Part Number	Description	Qty
5	068146-000	PIN	2
6	062753-000	STRAP ASSY	1
7	026553-002	RIVET 3/16	2
8	068065-000	#4 SECTION SLIDE	1
9	012553-008	SCREW SOCKET HED CAP 1/4-20UNC X 1	2
10	062642-016	BEARING	2
11	068136-000	SHEAVE	2



5th Stage Mast Assembly

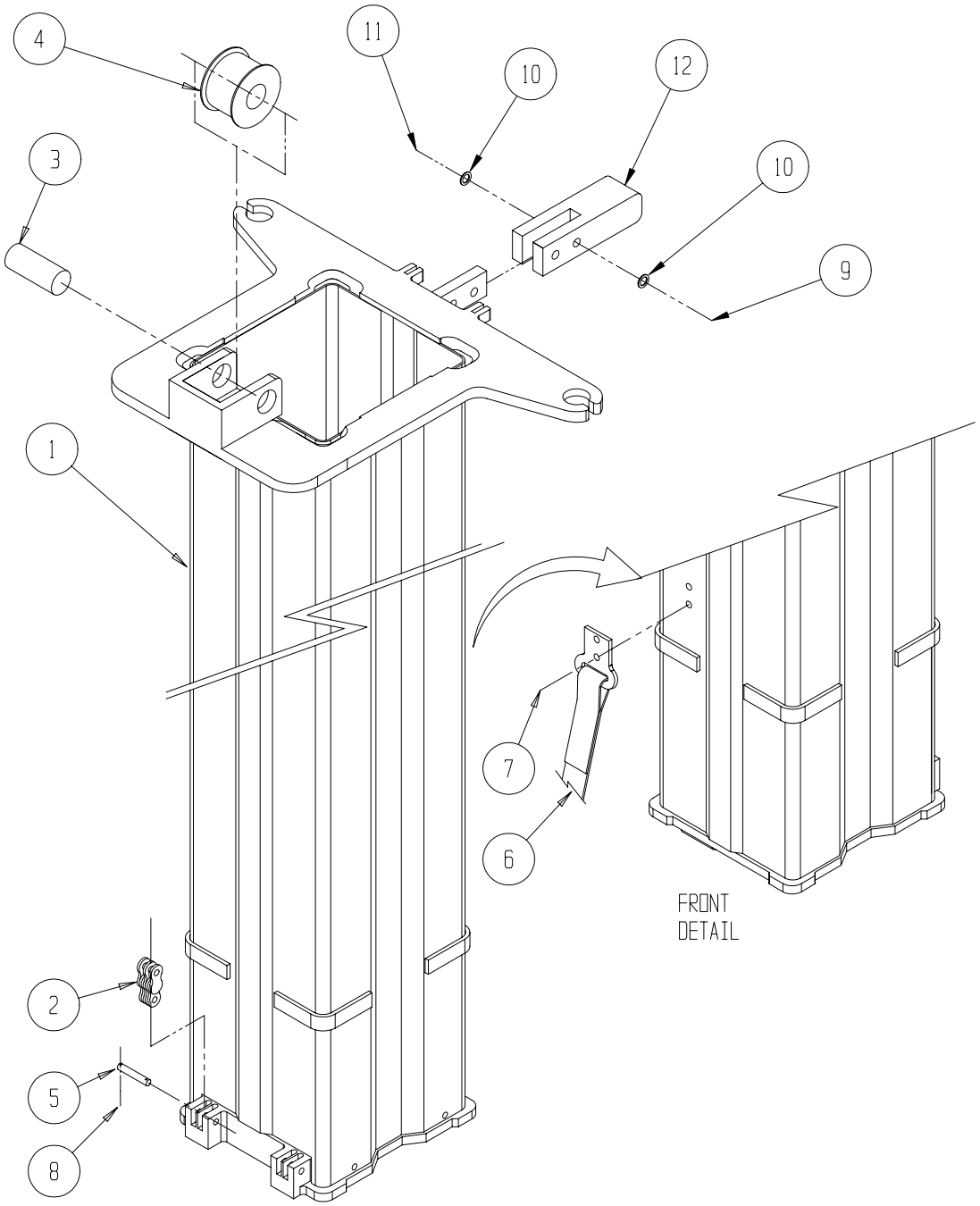
UL25 068066-001

UL32 068066-002

UL40 068066-003

Item	Part Number	Description	Qty
1	068069-001	5 TH STAGE MAST ASSY UL25	1
	068069-002	5 TH STAGE MAST ASSY UL32	1
	068069-003	5 TH STAGE MAST ASSY UL40	1
2	062167-141	CHAIN	2
2	062167-173	CHAIN	2
2	062167-205	CHAIN	2
3	068138-001	SHAFT	1
4	068135-000	SHEAVE, 5 STAGE TOP	1

Item	Part Number	Description	Qty
5	068140-000	PIN	2
6	062753-000	STRAP ASSY	1
7	026553-002	RIVET 3/16	2
8	011751-004	PIN, COTTER 1/16 X 1/2	4
9	011252-016	SCREW HHC 1/4-20 X 2	2
10	011240-004	WASHER 1/4 STD FLAT	4
11	011248-004	NUT 1/4-20 UNC ESNA	2
12	068097-000	5TH STAGE GUIDE	1



6th Stage Mast Assembly

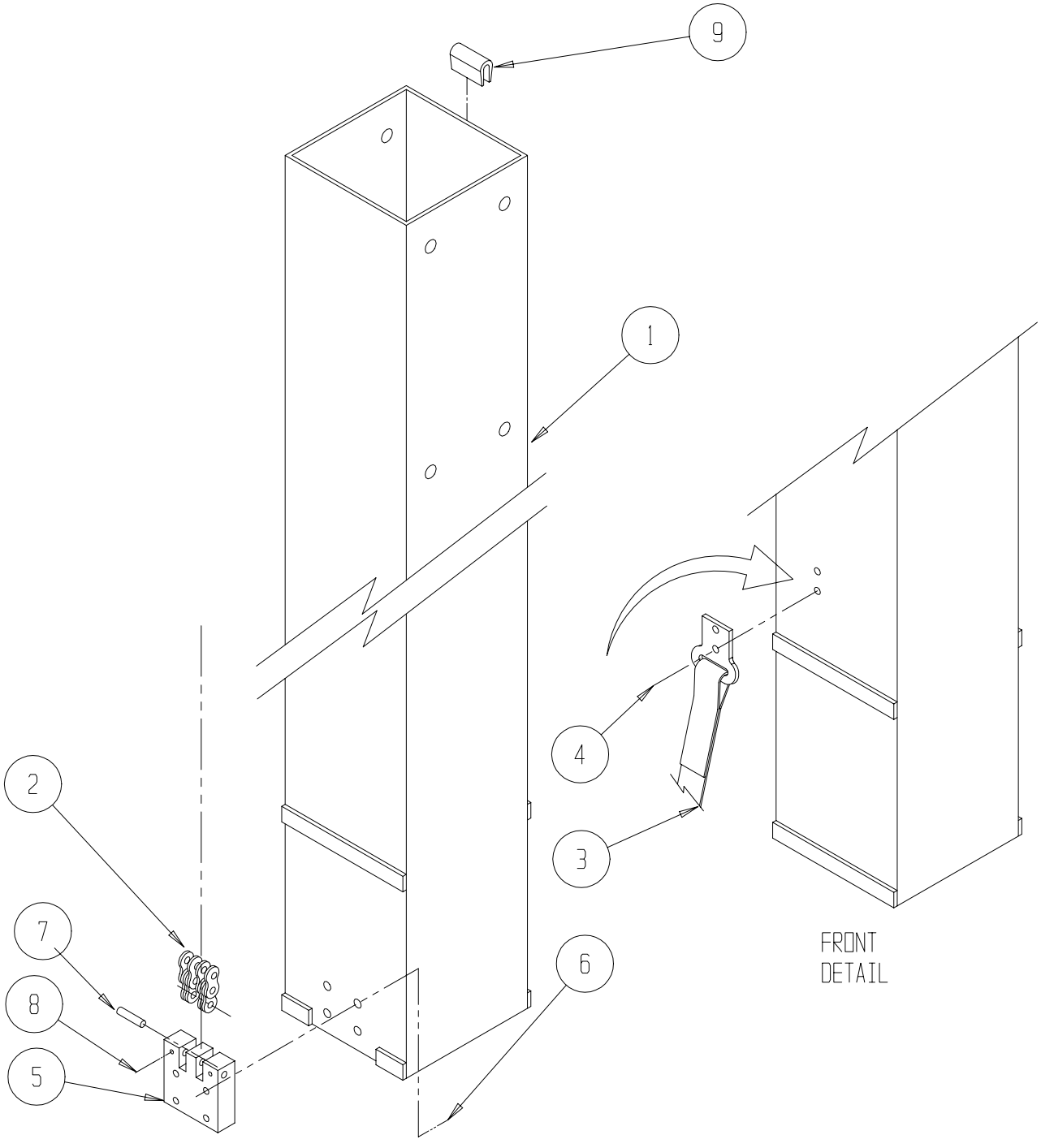
UL25 068070-001

UL32 068070-002

UL40 068070-003

Item	Part Number	Description	Qty
1	068071-001	6 TH STAGE WELDMENT UL25	1
	068071-002	6 TH STAGE WELDMENT UL32	1
	068071-003	6 TH STAGE WELDMENT UL40	1
2	062166-139	CHAIN	2
2	062166-171	CHAIN	2
2	062166-203	CHAIN	2
3	062753-000	STRAP ASSY	1

Item	Part Number	Description	Qty
4	026553-006	RIVET 3/16 .375-.500 GRIP	2
5	068073-000	CHAIN BLOCK	1
6	011821-005	SCREW BUTT HD 1/4-20UNC	4
7	068144-000	CLEVIS PIN 6B	2
8	011735-005	ROLL PIN 1/8 DIA X 5/8 LG	2
9	068219-099	UHMW WEAR STRIP X 1 1/2	FT .25



NOTES:

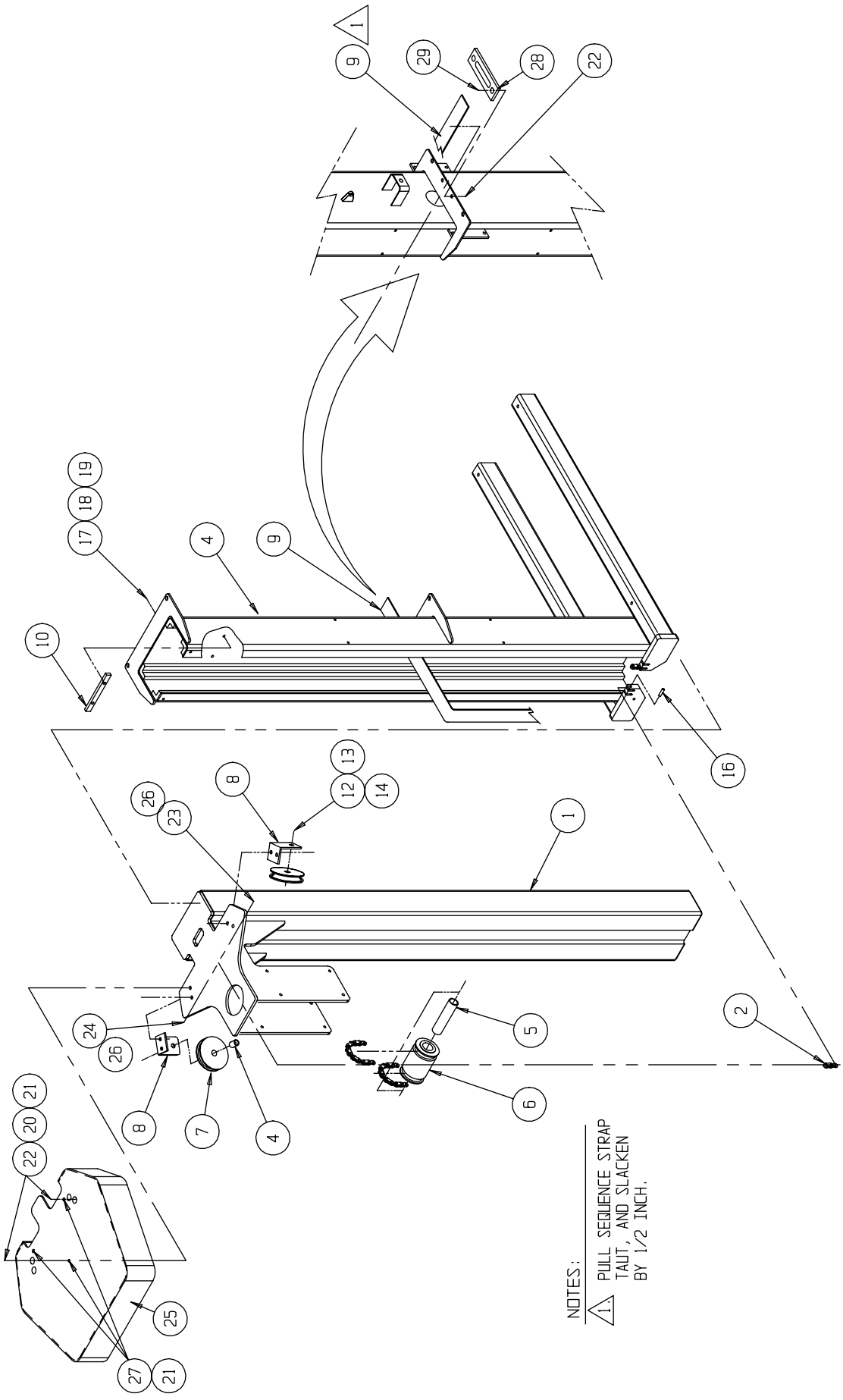
Cage Support Assembly

UL25 068160-009

UL32 068160-010

UL40 068160-011

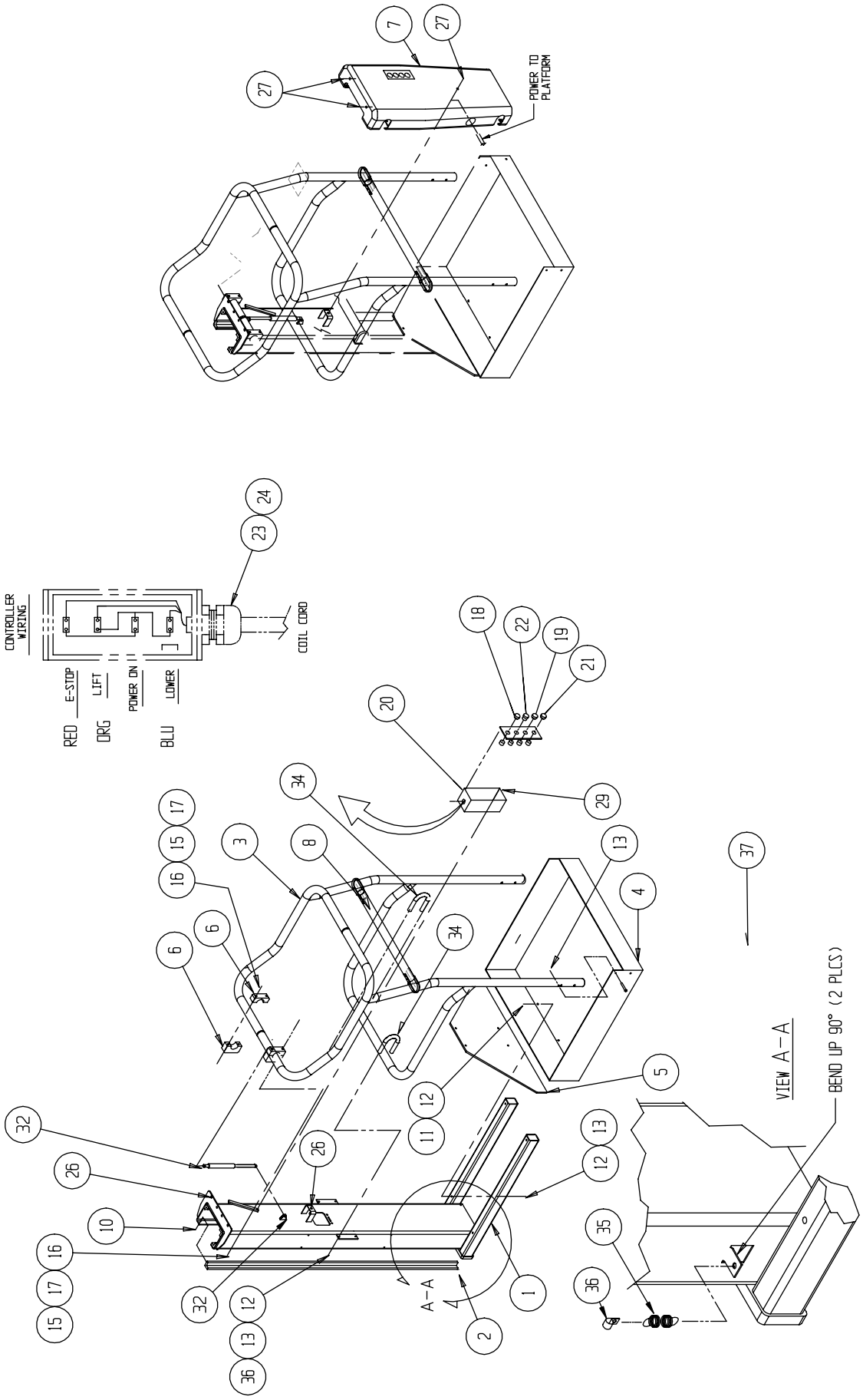
Item	Part Number	Description	UL25 -009	UL32 -010	UL40 -011
1	068163-005	CAGE SUPPORT WELDMENT	1		
	068163-006	CAGE SUPPORT WELDMENT		1	
	068163-007	CAGE SUPPORT WELDMENT			1
2	062165-133	CHAIN	2		
	062165-169	CHAIN		2	
	062165-201	CHAIN			2
3	068179-003	PLATFORM ASSY	1		
	068179-004	PLATFORM ASSY		1	1
4	017301-005	TUBE 1/2OD X 18GA WALL X 7/8	2	2	2
5	068092-000	SLEAVE SPANNER TUBE	1	1	1
6	068093-000	ROLLER CHAIN	1	1	1
7	068094-001	CONTROL CABLE SHEAVE	2	2	2
8	068162-000	CONTROL CABLE SHEAVE BKT.	2	2	2
9	062753-001	STRAP ASSY	1	1	1
10	068049-000	CONTROL BRACKET	1	1	1
12	011254-010	SCREW HHC 3/8-16UNC X 1 1/4	2	2	2
13	011240-006	WASHER 3/8 STD FLAT	2	2	2
14	011250-006	NUT HEX ESNA 3/8-16UNC	2	2	2
16	068142-000	CHAIN PIN	2	2	2
17	011253-006	SCREW HHC 5/16-18UNC X 3/4	2	2	2
18	011240-005	WASHER 5/16 STD FLAT	2	2	2
19	011250-005	NUT HEX ESNA 5/16-18UNC	2	2	2
20	011252-008	SCREW HHC 1/4-20UNC X 1	4	4	4
21	011240-004	WASHER 1/4 STD FLAT	11	11	11
22	011248-004	NUT HEX ESNA 1/4-20UNC	6	6	6
23	014099-044	SCREW HHC 3/4-10UNC X 5 1/2	1	1	1
24	011248-012	NUT HEX ESNA 3/4-10UNC	1	1	1
25	068231-000	TOP COVER	1	1	1
26	011240-012	WASHER STD FLAT 3/4	2	2	2
27	011252-003	SCREW HHC 1/4-20 UNC X 3/8	3	3	3
28	062129-000	STRAP RETAINER	1	1	1
29	012553-005	SCREW SOC HD 1/4-20UNC X 5/8	2	2	2


NOTES:
1. PULL SEQUENCE STRAP TAUT, AND SLACKEN BY 1/2 INCH.

Platform Assembly, UL25

068179-003

Item	Part Number	Description	Qty
1	068082-001	CAGE SUPPORT WELDMENT	1
2	068123-000	SLIDE ANGLE	4
3	506275-001	RAIL WELDMENT	1
4	068149-002	CAGE PAN	1
5	068276-000	SHEAR GUARD	1
6	068096-000	RAIL BEARING TOP	4
7	068147-000	FRONT COVER	1
8	057524-001	DROP BAR ASSY	1
10	026525-003	SCREW SLFTP #8 HWH X 3/8	16
11	011252-022	SCREW HHC 1/4-20UNC X 2 3/4	4
12	011240-004	WASHER 1/4 STD	10
13	011248-004	NUT HEX ESNA 1/4-20UNC	12
14			
15	011264-022	SCREW HHC 5/16-18UNC X 2 3/4	4
16	011240-005	WASHER 5/16 STD	4
17	011246-010	NUT HEX ESNA 5/16-18UNC	4
18	510524-000	SWITCH, PUSH PULL	1
19	510542-000	PUSH BUTTON ENABLE	1
20	062799-011	ENCLOSURE BOX & COVER	1
21	0120804	PUSH BUTTON DOWN	1
22	0120803	PUSH BUTTON UP	1
23	029925-000	CONNECTOR	1
24	029939-002	LOCKNUT 1/2 NPT	1
25	068277-000	LATCH	1
26	014252-004	NUT SERT 1/4-20UNC	3
27	011825-006	SCREW RND HD 1/4-20UNC X 3/4	5
28	063650-012	GAS SPRING	1
29	011708-003	SCREW RD HD MACH #8-32 X 1/2	2
30	068277-010	STRIKER BOLT	1
31	011252-014	SCREW HHC 1/4-20UN X 1 3/4	4
32	015936-004	SCREW 3/8 X 1/2 SHOULDER	2
34	014924-008	U-BOLT	2
35	068630-000	EXTENSION SPRING ÿÿ.055 WIRE	2
36	013919-009	CLAMP, 5/8 DIA.	4
37	026551-007	RIVET 1/8 .251-.312 GRIP	4
38			


POWER TO PLATFORM
CONTROLLER WIRING
E-STOP
LIFT
POWER ON
LOWER
RED
ORG
BLU
COIL CORD
A-A
VIEW A-A
BEND UP 90° (2 PLCS)

Platform Assembly, UL32/UL40

068179-004

Item	Part Number	Description	Qty
1	068082-001	CAGE SUPPORT WELDMENT	1
2	068123-000	SLIDE ANGLE	4
3	506275-001	RAIL WELDMENT	1
4	068149-002	CAGE PAN	1
6	068096-000	RAIL BEARING TOP	4
7	068147-000	FRONT COVER	1
8	057524-001	DROP BAR ASSY	1
10	026525-003	SCREW SLFTP #8 HWH X 3/8	16
11	011252-022	SCREW HHC 1/4-20UNC X 2 3/4	4
12	011240-004	WASHER 1/4 STD	10
13	011248-004	NUT HEX ESNA 1/4-20UNC	12
14		-	
15	011264-022	SCREW HHC 5/16-18UNC X 2 3/4	4
16	011240-005	WASHER 5/16 STD	4
17	011246-010	NUT HEX ESNA 5/16-18UNC	4
18	062799-008	SWITCH, PUSH PULL	1
19	067028-000	CONTACT BLOCK	1
20	062799-011	ENCLOSURE BOX & COVER	1
21	062799-002	SWITCH OPERATOR COVER	3
22	062799-003	CONTACT BLOCK N.O.	3
23	029925-000	CONNECTOR	1
24	029939-002	LOCKNUT 1/2 NPT	1
25	068277-000	LATCH	1
26	014252-004	NUT SERT 1/4-20UNC	3
27	011825-006	SCREW RND HD 1/4-20UNC X 3/4	5
28	063650-012	GAS SPRING	1
29	011708-003	SCREW RD HD MACH #8-32 X 1/2	2
30	068277-010	STRIKER BOLT	1
31	011252-014	SCREW HHC 1/4-20UN X 1 3/4	4
32	015936-004	SCREW 3/8 X 1/2 SHOULDER	2
34	014924-008	U-BOLT	2
35	068630-000	EXTENSION SPRING ÿÿ.055 WIRE	2
36	013919-009	CLAMP, 5/8 DIA.	4
37	026551-007	RIVET 1/8 .251 - .312 GRIP	4
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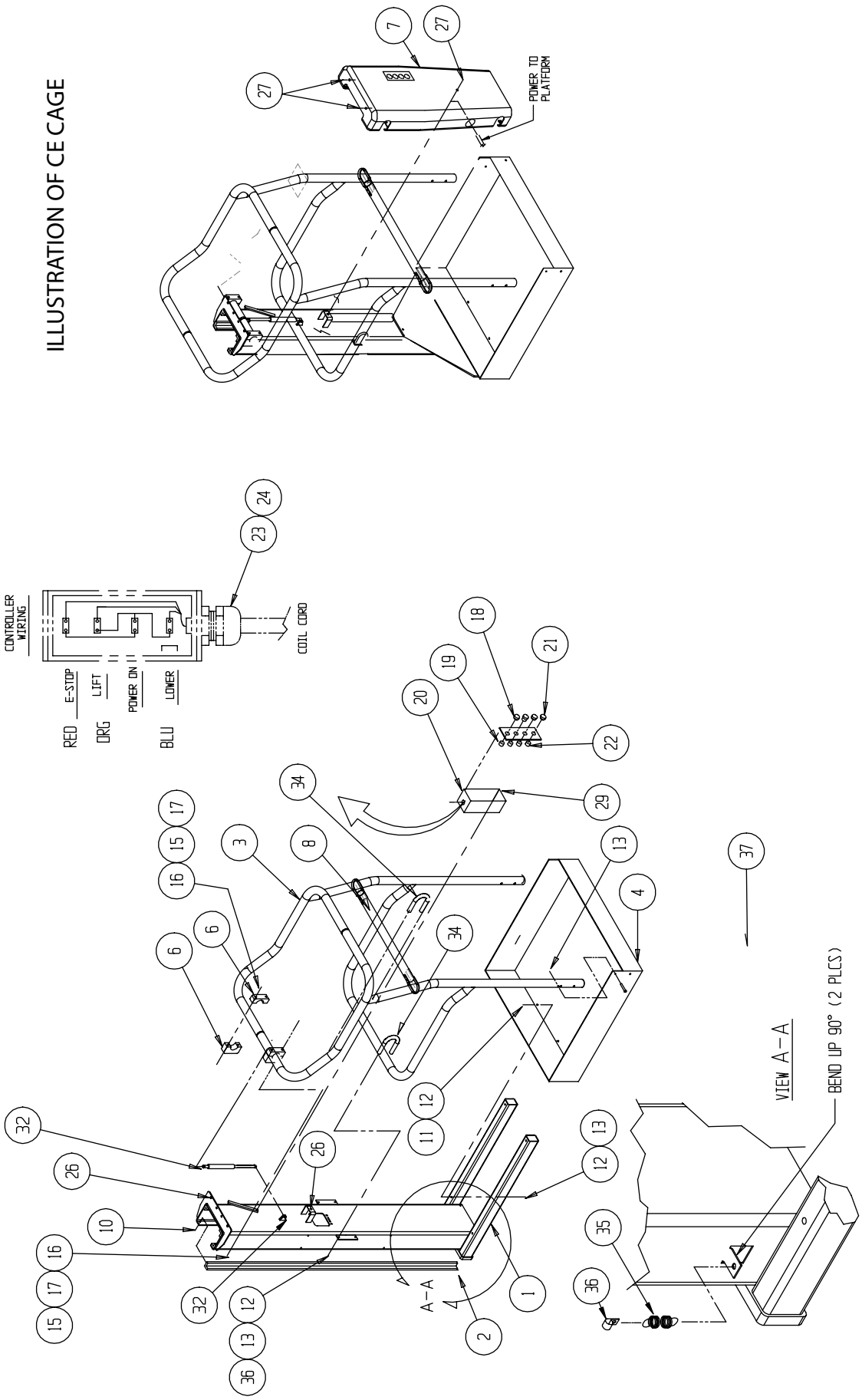
39			2

ILLUSTRATION OF CE CAGE

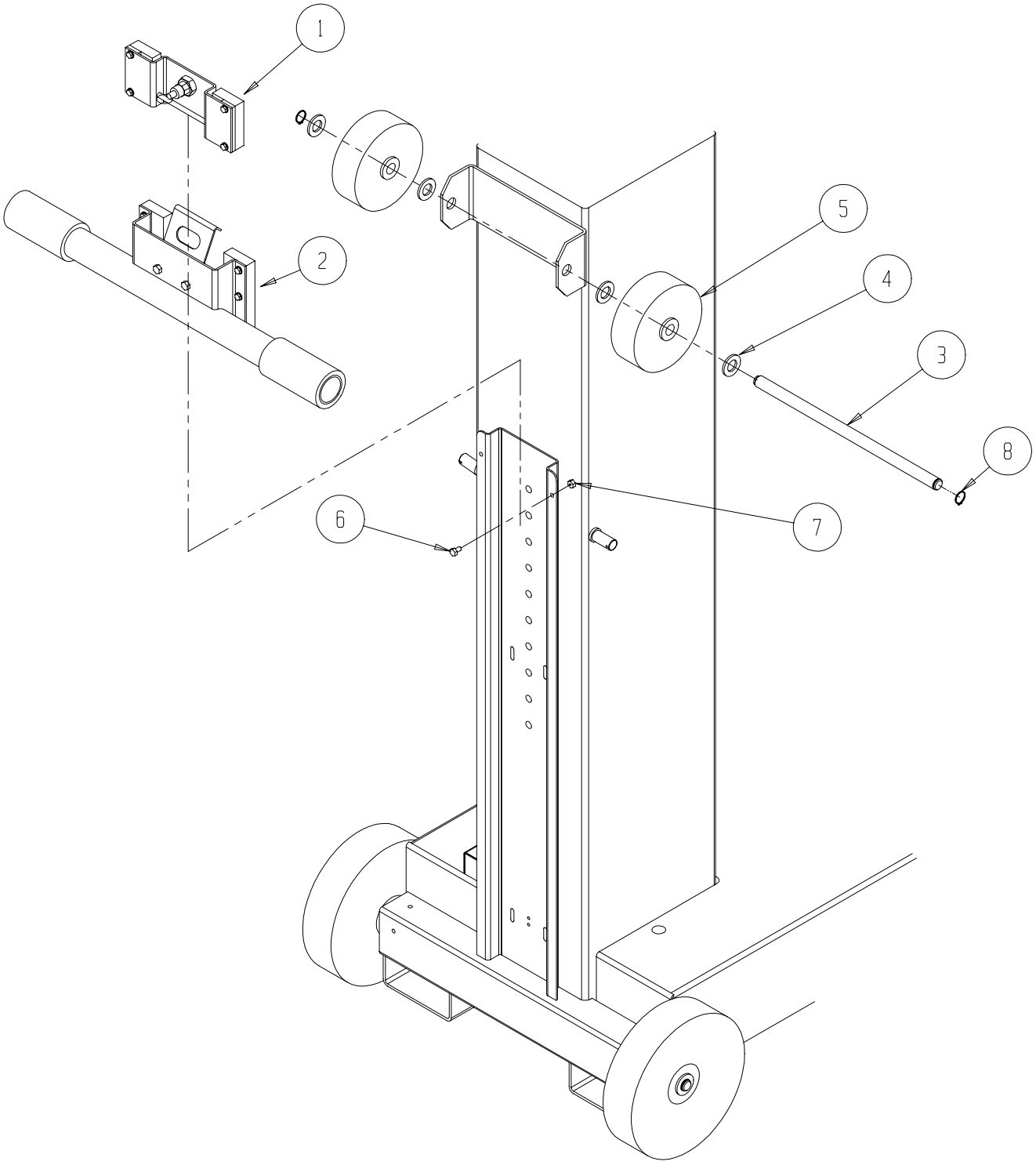


Loader Assembly, UL25

068194-000

Item	Part Number	Description	Qty
1	068190-000	LOADER STOP BRACKET ASSY	1
2	068186-000	LOADER BAR ASSY	1
3	068197-000	SHORT AXLE SHAFT	1
4	011240-012	FASHER FLAT 3/4	4

Item	Part Number	Description	Qty
5	068220-000	WHEEL	2
6	011252-004	SCREW HHC 1/4-20UNC X 1/2	2
7	011248-004	NUT HEX ESNA 1/4-20UNC	2
8	011764-012	RETAINING RING	2

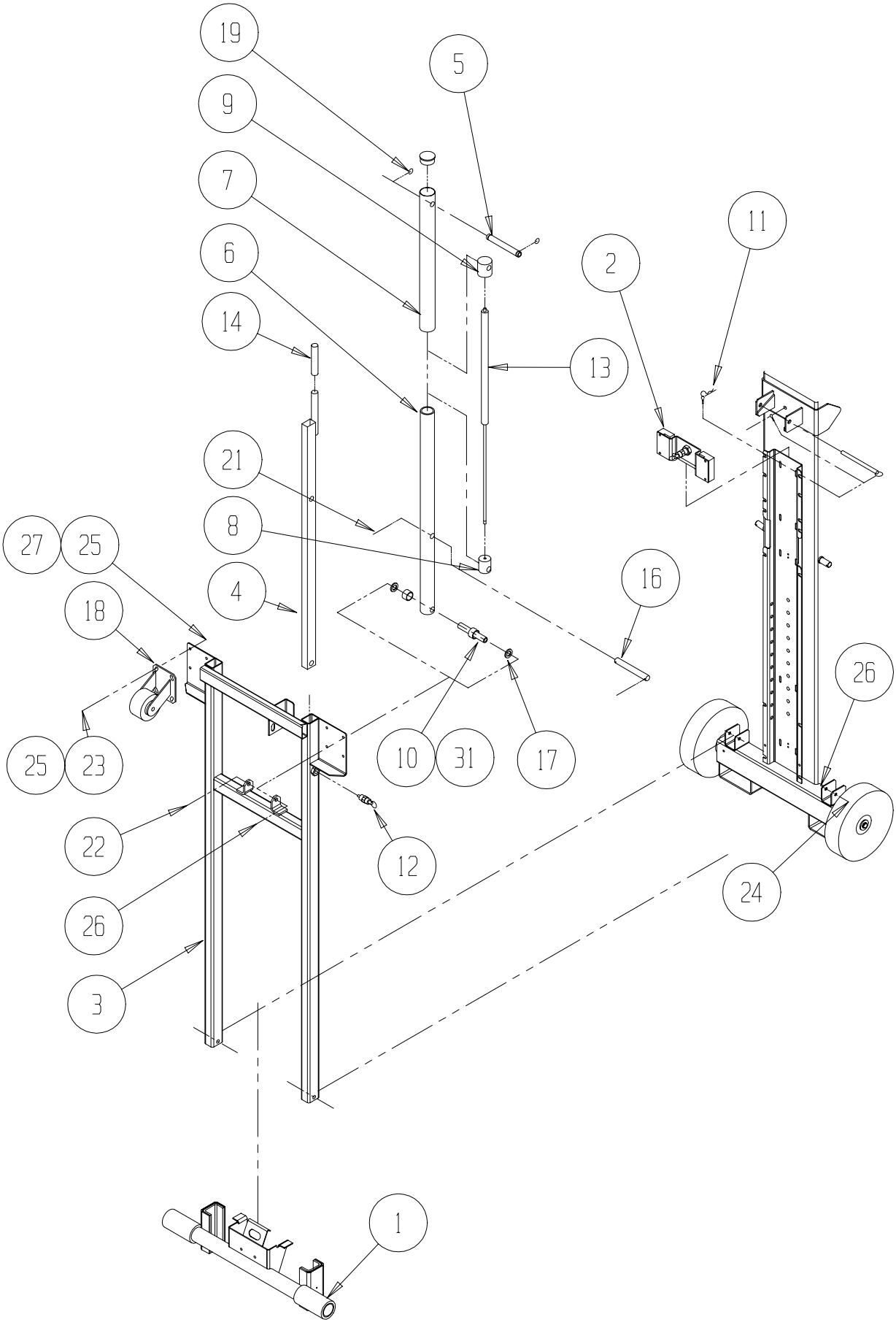


NOTES:

Tilt Back Assembly, UL32

068200-000

Item	Part Number	Description	Qty
1	068180-000	LOADER BAR ASSY	1
2	068190-000	LOADER STOP BRACKET ASSY	1
3	068201-000	TILT BACK WELDMENT 32-40	1
4	062844-000	TILTBAR WELDMENT	1
5	062846-001	TUBE CYLINDER MOUNT	1
6	068196-000	INNER TUBE 32	1
7	062884-002	TUBE CYLINDER OUTER	1
8	062885-001	FITTING CYLINDER END	1
9	062886-000	FITTING CYLINDER END	1
10	062887-001	PIN CYLINDER MOUNT	1
11	062891-001	LANYARD ASSY	1
12	003570-000	PIN RETAINING	1
13	063650-003	CYLINDER GAS SPRING	1
14	062843-001	GRIP	1
15	063926-004	CAPLUG	1
16	062888-003	PIN 3/4 X 2 1/2	1
17	011786-005	BUSHING	2
18	062784-004	CASTER	2
19	011764-012	RING RETAINING	2
21	011753-012	PIN COTTER 1/8 X 1/2	2
22	011256-008	SCREW HHC 1/2-13 X 1 1/2	2
23	011253-008	SCREW HHC 5/16-18 X 1	8
24	011256-022	SCREW HHC 1/2-13 2 3/4	2
25	011240-005	WASHER 5/16 FLAT	16
26	011238-008	NUT HEX ESNA 1/2-13	4
27	011248-005	NUT HEX ESNA 5/16-18	8
31	016590-001	PIPE 3/4 SCHED 40 ALUM X 3/8	2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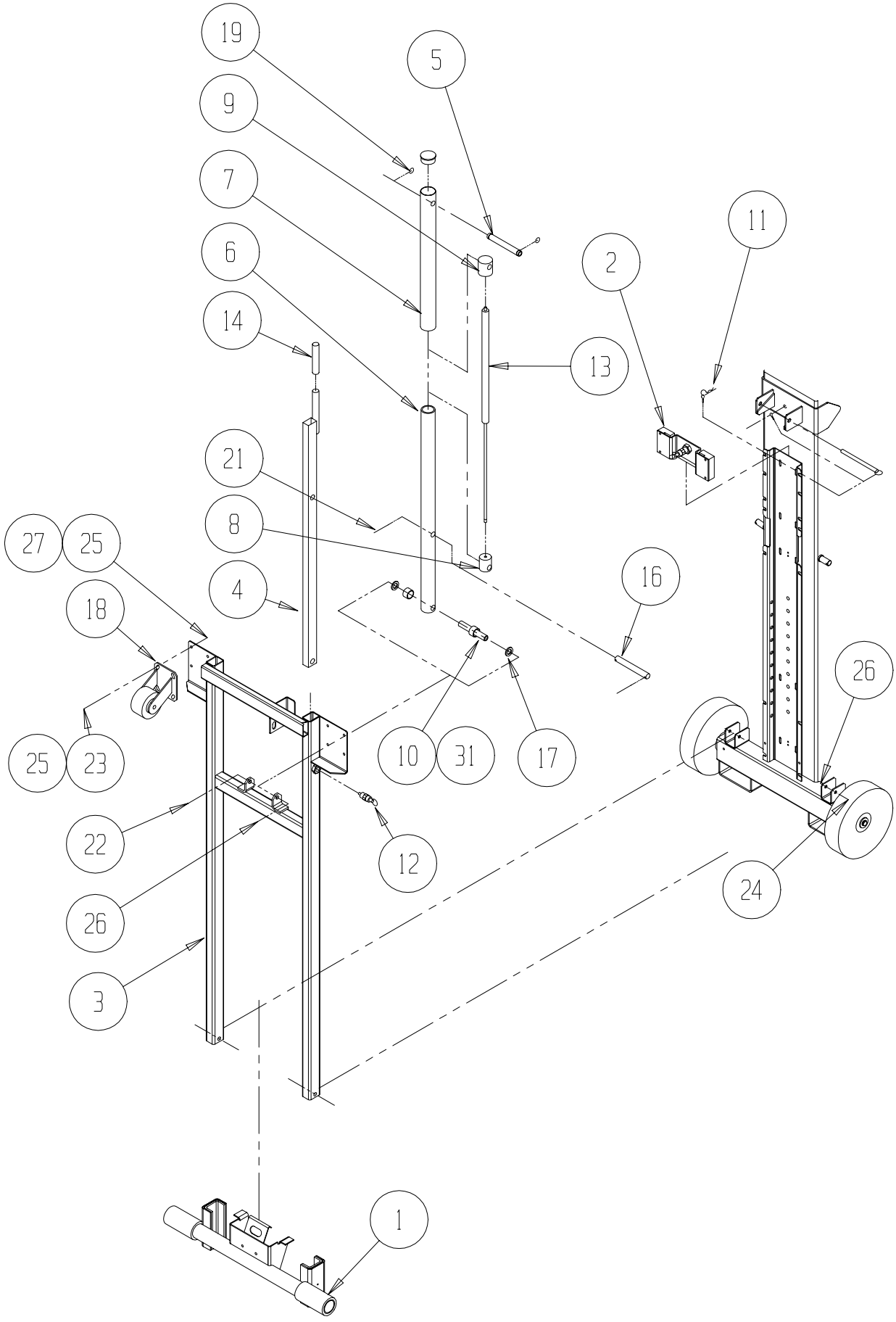
Tilt Back Assembly, UL40

068200-001

Item	Part Number	Description	Qty
1	068180-000	LOADER BAR ASSY	1
2	068190-000	LOADER STOP BRACKET ASSY	1
3	068201-000	TILT BACK WELDMENT 32-40	1
4	062844-000	TILTBAR WELDMENT	1
5	062846-001	TUBE CYLINDER MOUNT	1
6	068196-000	INNER TUBE 40	1
7	062884-001	TUBE CYLINDER OUTER	1
8	062885-001	FITTING CYLINDER END	1
9	062886-001	FITTING CYLINDER END	1
10	062887-001	PIN CYLINDER MOUNT	1
11	062891-001	LANYARD ASSY	1
12	003570-000	PIN RETAINING	1
13	063650-002	CYLINDER GAS SPRING	1
14	062843-001	GRIP	1
15	063926-004	CAPLUG	1
16	062888-003	PIN 3/4 X 2 1/2	1
17	011786-005	BUSHING	2
18	062784-004	CASTER	2
19	011764-012	RING RETAINING	2
21	011753-012	PIN COTTER 1/8 X 1/2	2
22	011256-008	SCREW HHC 1/2-13 X 1 1/2	2
23	011253-008	SCREW HHC 5/16-18 X 1	8
24	011256-022	SCREW HHC 1/2-13 2 3/4	2
25	011240-005	WASHER 5/16 FLAT	16
26	011238-008	NUT HEX ESNA 1/2-13	4
27	011248-005	NUT HEX ESNA 5/16-18	8
31	016590-001	PIPE 3/4 SCHED 40 ALUM X 3/8	2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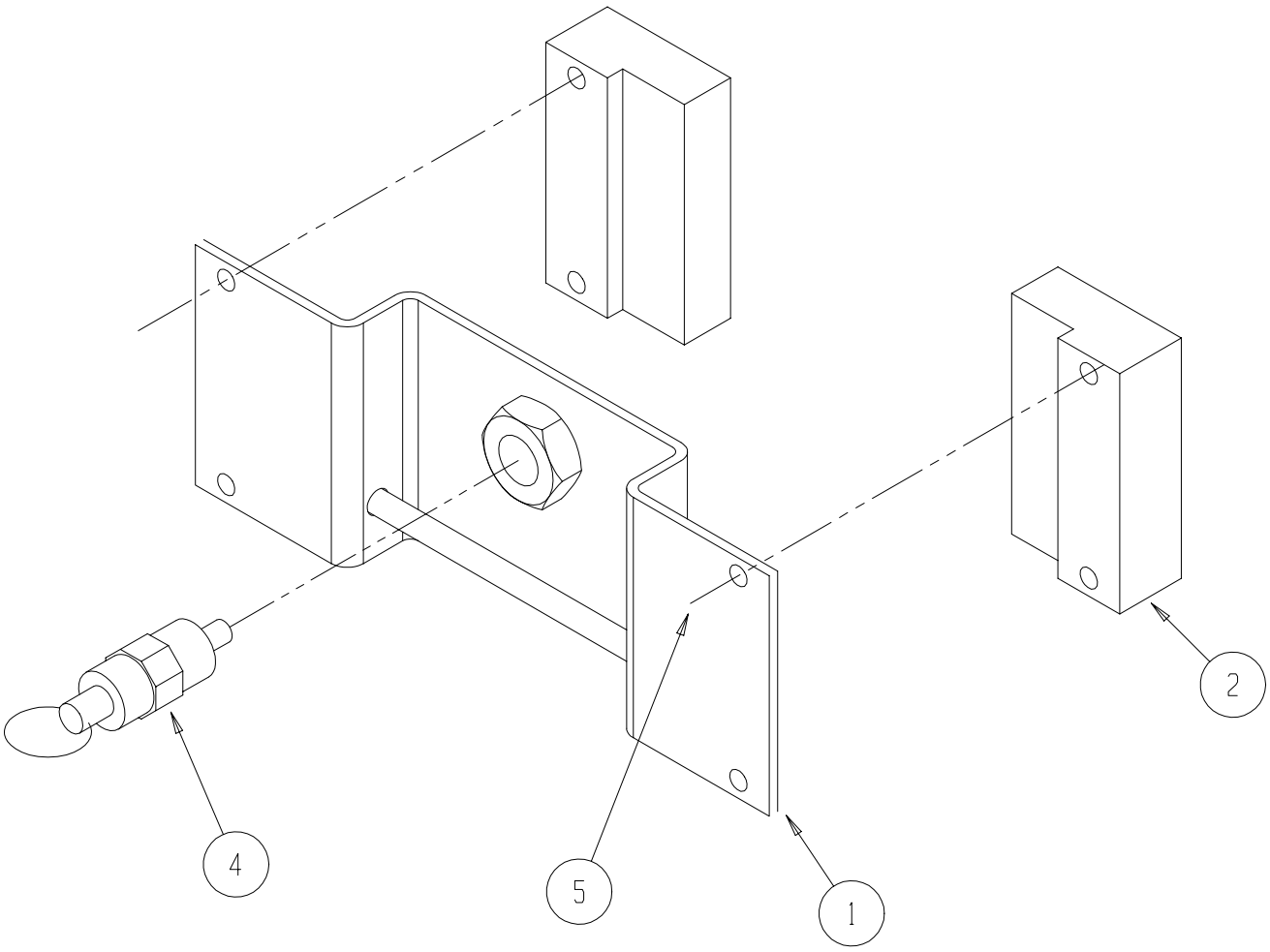
Loader Stop Bracket Assembly

068190-000

Item	Part Number	Description	Qty
1	068191-000	LOADER STOP BRACKET WELDMENT	1
2	068193-000	SLIDE PAD - LOADER STOP	2
4	03570-000	RETAINING PIN ASSY	1
5	014066-006	SCREW 1/4 SELF TAPPING X 3/4	4

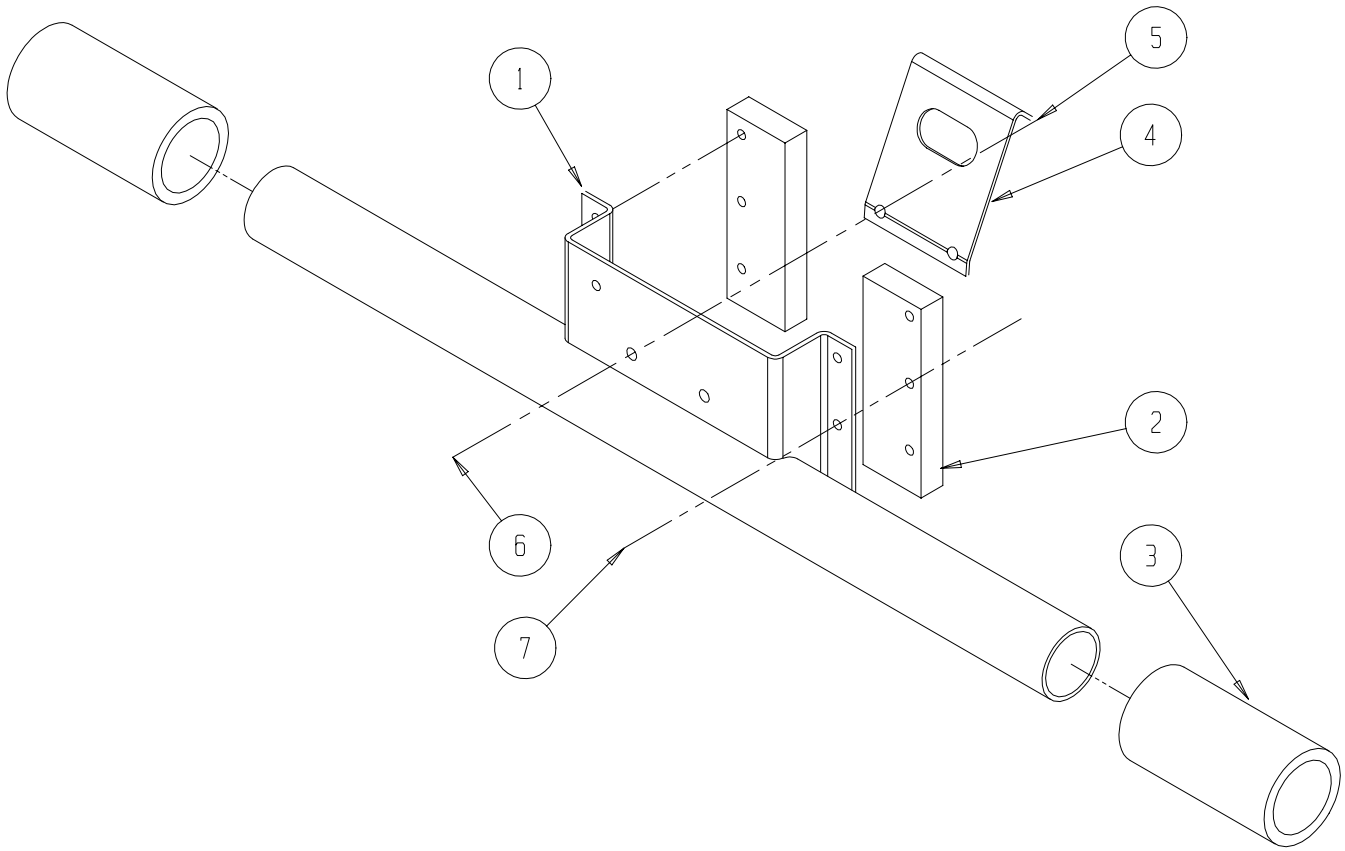


Drawing #

Loader Bar Assembly

068186-000

Item	Part Number	Description	Qty
1	068187-000	LOADER BAR WELDMENT	1
2	068188-000	SLIDE PAD	2
3	061694-005	HOSE 2 5/8 OD X 2 ID X 5	2
4	062923-000	LOADER HANGER	1
5	015936-004	BOLT SHOULDER 3/8 X 1/2	2
6	011248-005	NUT HEX ESNA 5/16-18UNC	2
7	014066-006	SCREW HWH SLFTP 1/4-AB X 3/4	6



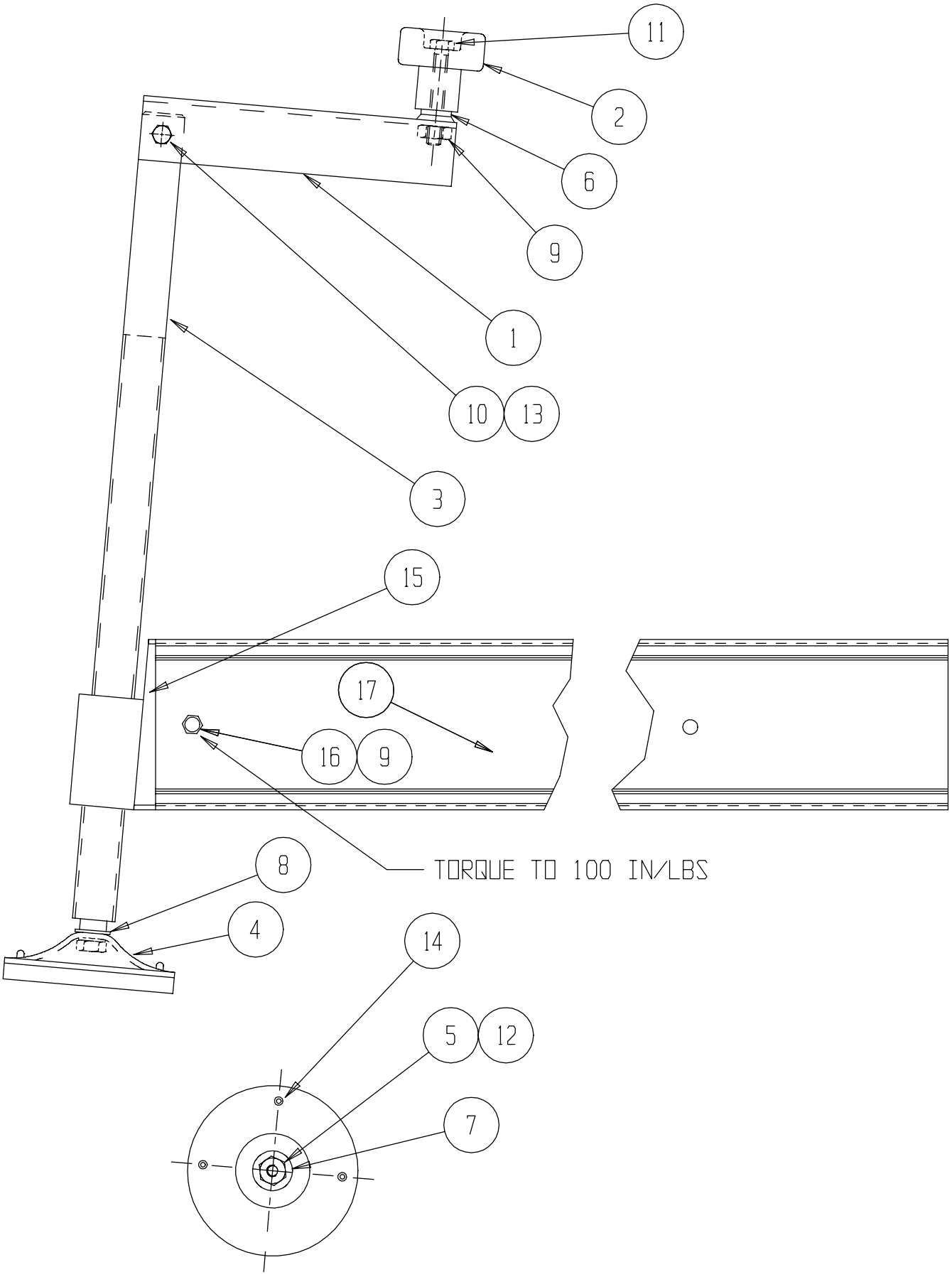
Outrigger Assembly

UL25 068157-000

UL32 068157-001

UL40 068157-002

Item	Part Number	Description	Qty
1	03471-000	HANDLE ARM	1
2	03508-000	KNOB	1
3	062636-000	SCREW	1
4	03532-000	PAD ASSEMBLY	1
5	011238-005	WASHER SPLIT LOCK 5/16	1
6	011240-004	WASHER 1/4 FLAT	2
7	011240-005	WASHER 5/16 FLAT	1
8	014996-010	WASHER 5/8 SAE FLAT	1
9	011248-004	NUT HEX ESNA 1/4-20UNC	2
10	011248-005	NUT HEX ESNA 5/16-18UNC	1
11	011252-018	SCREW HHC 1/4-20UNC X 2 1/4	1
12	011253-008	SCREW HHC 5/16-18UNC X 1	1
13	011253-014	SCREW HHC 5/16-18UNC X 1-3/4	1
14	026553-005	RIVET POP 3/16 X 3/8	4
15	068148-000	SCREW CASTING	1
16	011252-024	SCREW HHC 1/420UNC X 3	1
17	068102-000	OUTRIGGER TUBE UL25	1
	068102-001	OUTRIGGER TUBE UL32	1
	068102-002	OUTRIGGER TUBE UL40	1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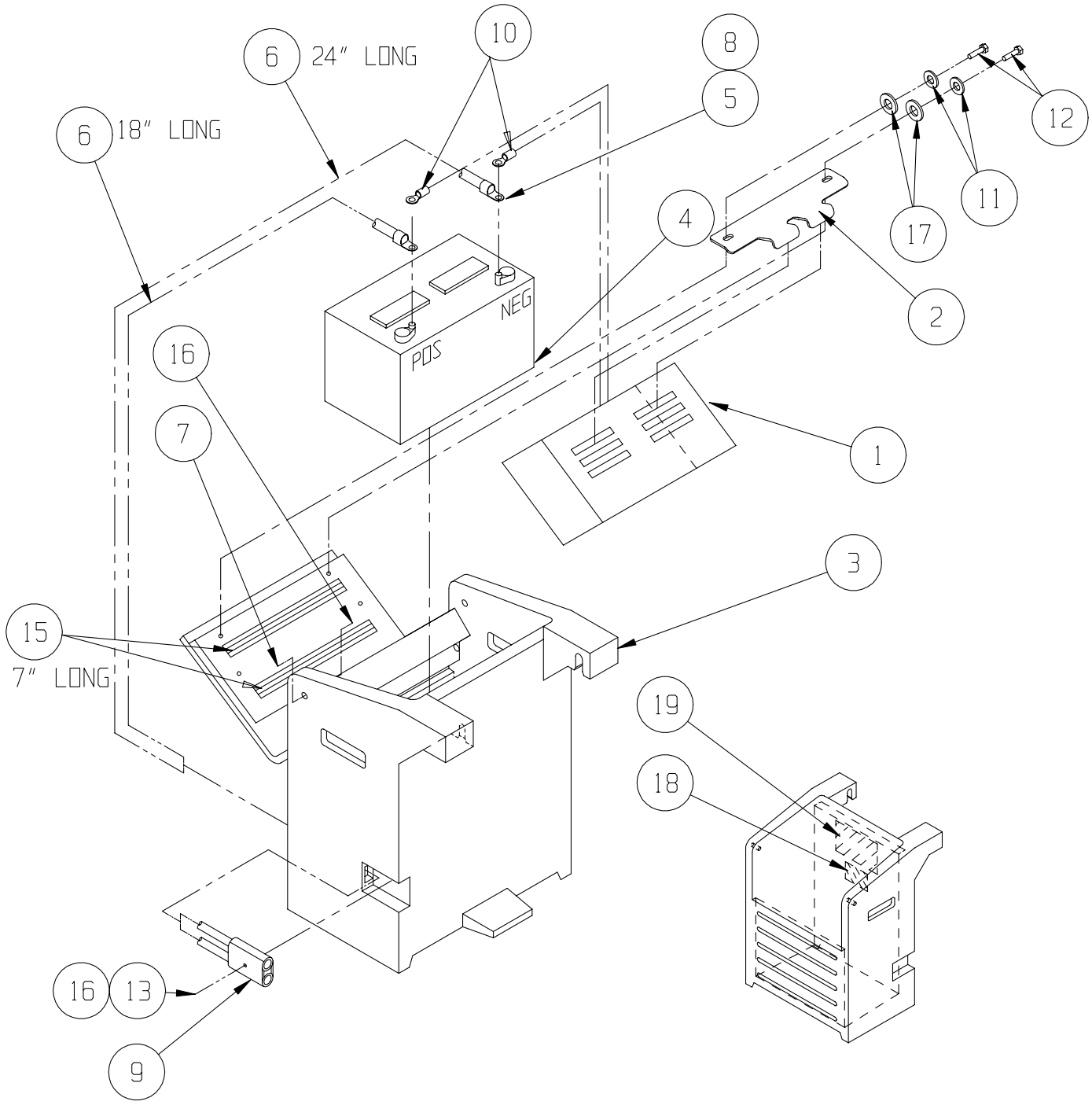
14
5
12
7

Power Pack Option

068100-001

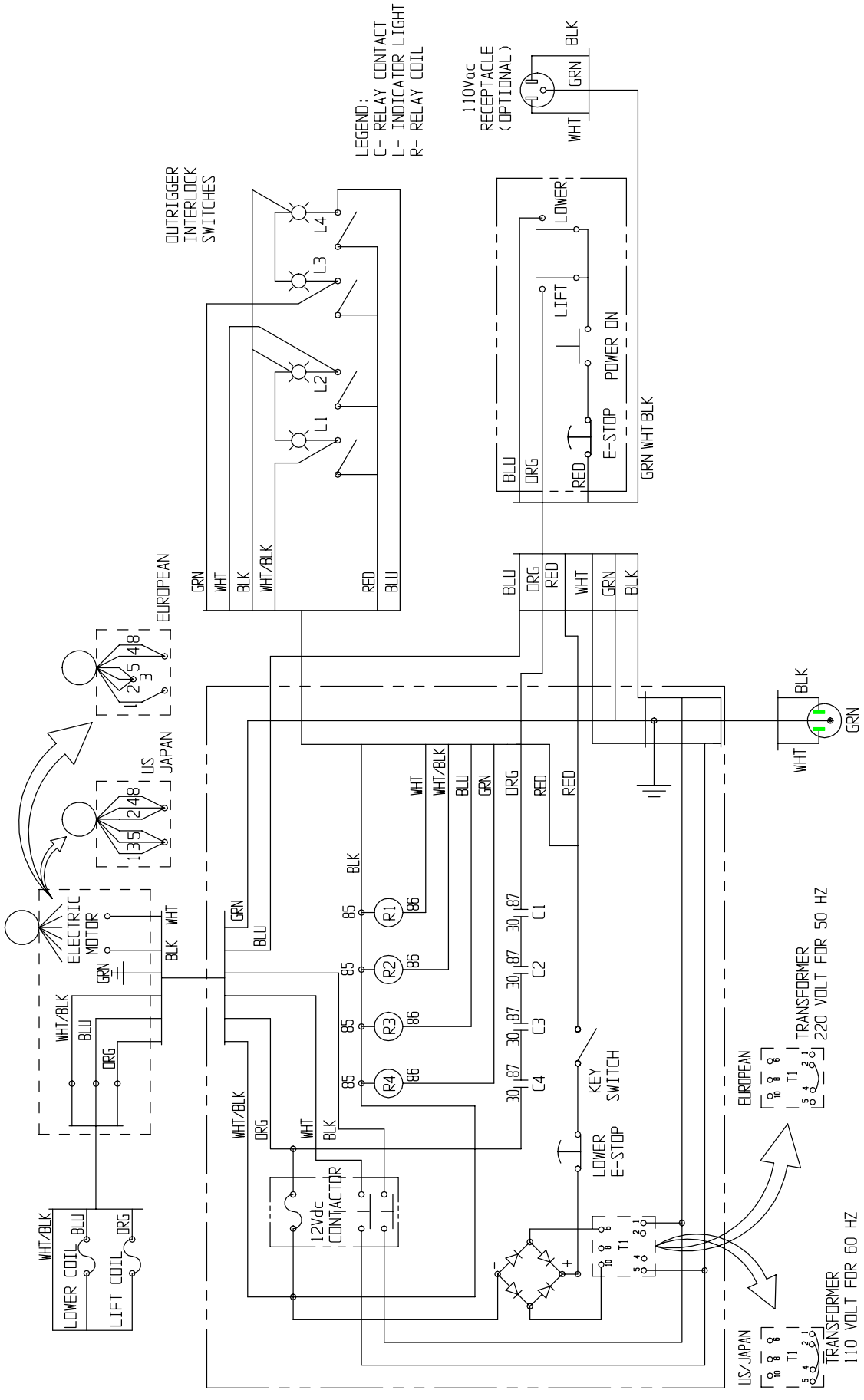
Item	Part Number	Description	Qty
1	062782-000	CHARGER	1
3	068214-000	BATTERY BOX	1
4	062299-004	BATTERY	1
5	010154-000	COVER BATTERY	2
6	029431-099	CABLE, #2 AWG WELDING	FT 3.5
7	015966-005	SCREW, HEX, SHOULDER, 5/16 X 5/8	2
8	029602-025	RING TERM #2 - 5/16 DIA	2

Item	Part Number	Description	Qty
9	029902-000	CONN 175 AMP	1
10	029601-015	CONN RING TERM 3/8 DIA 16-14	2
12	011252-008	SCREW HHC 1/4-20 X 1	2
13	011252-012	SCREW HHC 1/4-20 X 1 1/2	2
16	011248-004	NUT 1/4-20 ESNA	4
18	005221-000	LABEL BATTERY FLUID	1
19	066552-000	LABEL WARNING HYDROGEN GAS	1



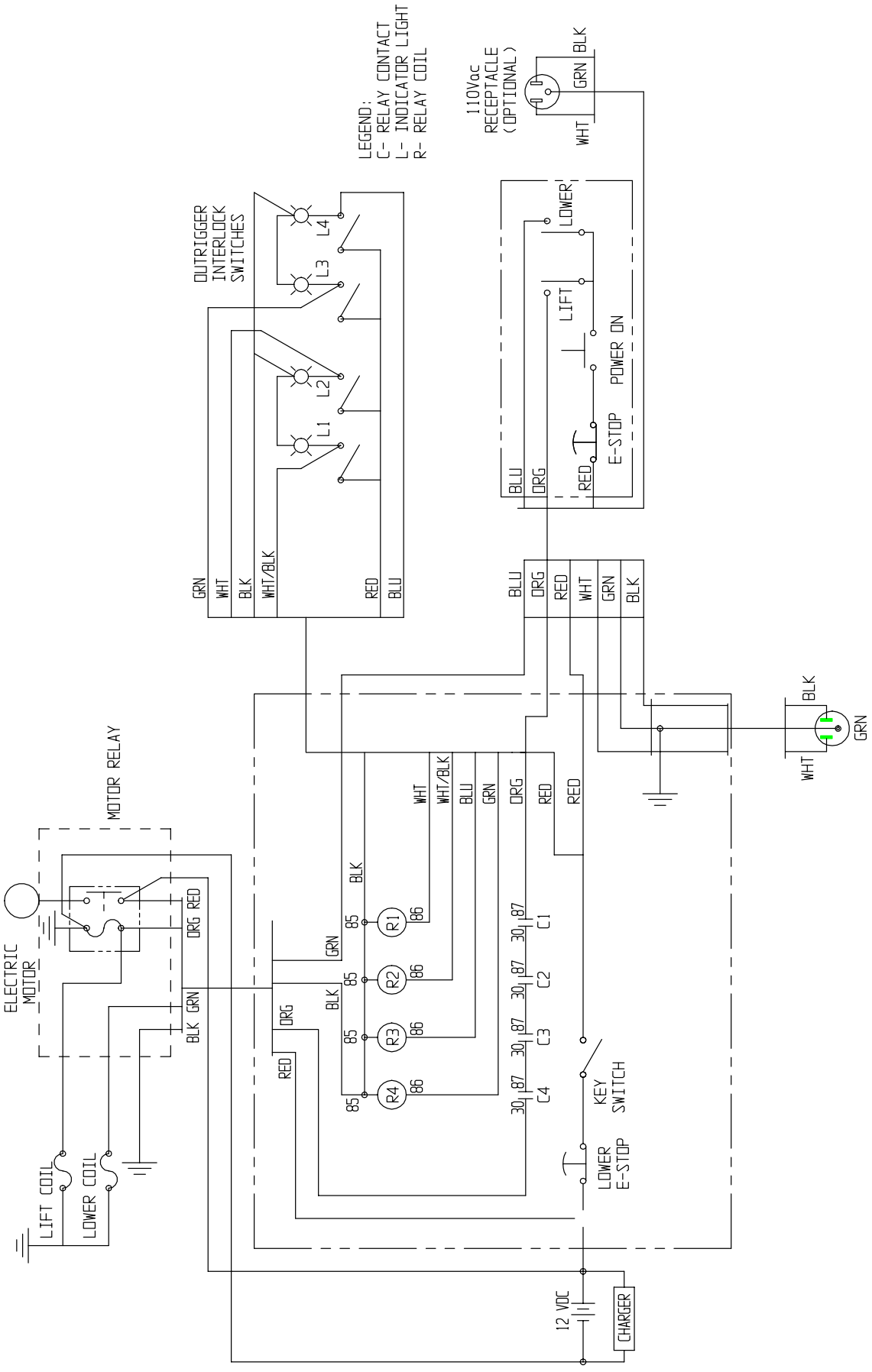
Electrical Schematic, AC

068010-000



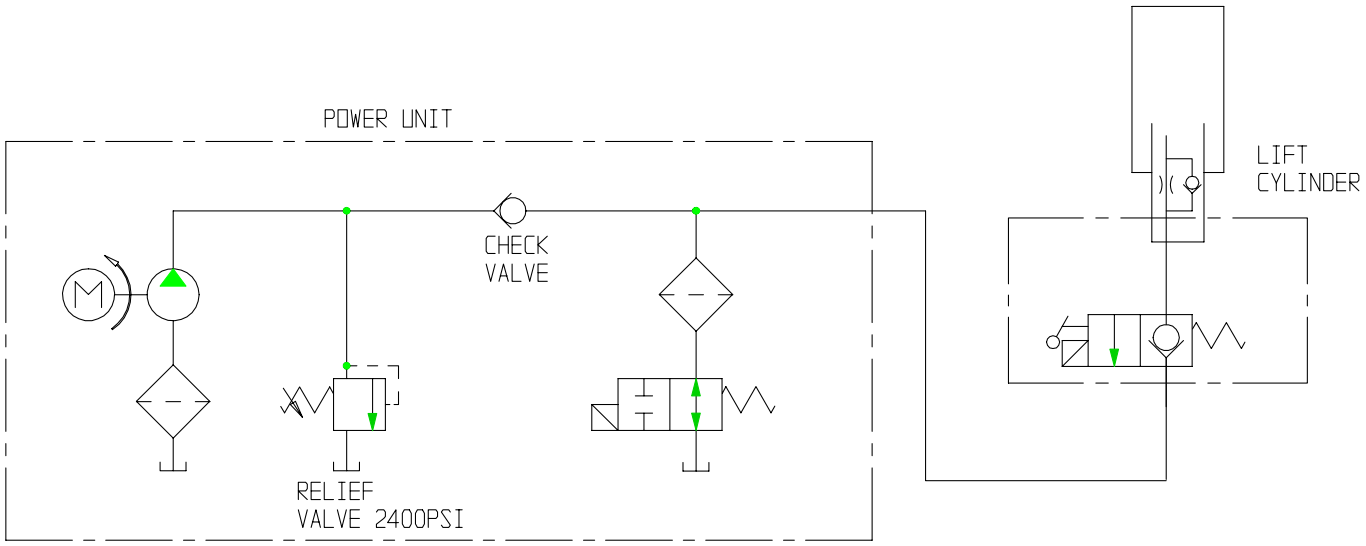
Electrical Schematic, DC

068010-001



Hydraulic Schematic

068011-002



Local Distributor / Lokaler Vertiebshändler / Distributeur local
El Distribuidor local / Il Distributore locale

EUROPE, MIDDLE EAST
AFRICA & ASIA
PHONE: +44 (0) 845 1550 057
FAX: +44 (0) 845 1557 756

NORTH & SOUTH AMERICA
PHONE: +1 785 989 3000
TOLL FREE: +1 800 225 0317
FAX: +1 785 989 3070

AUSTRALIA
PHONE: +61 2 9725 4000
FAX: +61 2 9609 3057

NEW ZEALAND
PHONE: +64 6 3689 168
FAX: +64 6 3689 164

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www.snorkellifts.com