

Hy-Brid Lifts[™] by Custom Equipment



MAINTENANCE AND TROUBLESHOOTING MANUAL

Hy-Brid Lifts
Model
HB-P830CE

Push-Around
Aerial Work Platform

Table of Contents

Safety 5

 Safety Symbols 5

 General Rules and Precautions 5

 Stability Testing 6

 Safety Guidelines 7

 Maintenance Lock 7

Maintenance 7

 Battery Maintenance 8

 Charging the Battery 8

 Lubrication 9

 Components requiring adjustment 9

 Examination, repair, replacement of limited life components 10

 Safety devices and systems requiring checks 10

 Storage 10

 Major Alterations or Repairs 10

Inspection and Regular Maintenance Checklists 10

 Monthly Battery Care 10

 Prestart Inspection Checklist 11

 Frequent Inspection Checklist 12

 Pre-Delivery/Annual Inspection Checklist 13

Technical References 15

 Hydraulic Schematic 15

 Electrical Schematic 16

Wiring Diagrams 18

 Wiring Diagram 18

 Lower Control Wiring Diagram 20

 Upper Control Wiring Diagram 22

Replacement Parts 24

 Safety and Control Decals 24

 Main Power/Safety Circuit 25

 Elevate/Lower Circuit Parts 26

Wheels/Brakes 27

Covers/Other 27

Warranty 28

Revision Table:

Revision A (06/15/2010): Initial Release

*Revision K (11/30/2011): Revised manual based on addition of service/troubleshooting reference
(6/7/12): revised P. 3,31*


Revision L (10/24/2012): Revised logo, updated warranty statement

Original instructions are written in English

Foreword

The purpose of this Maintenance Manual is to provide qualified service personnel with information for servicing and maintaining Hy-Brid Lifts. All information in this manual must be read and understood before any attempt is made to service this machine.

The operation and safety manual is considered a part of the work platform and contains instructions and operating procedures essential to properly and safely operate the Custom Equipment Hy-Brid Lift. Users must read and understand all information in the Safety and Operations Manual before operation.

 DANGER THE OPERATION AND SAFETY MANUAL MUST BE READ AND UNDERSTOOD PRIOR TO OPERATING THE MACHINE.
--

THE USER/OPERATOR SHOULD NOT ACCEPT OPERATING RESPONSIBILITY UNTIL THE MANUAL HAS BEEN READ AND UNDERSTOOD AS WELL AS HAVING OPERATED THE LIFT UNDER SUPERVISION OF AN EXPERIENCED AND QUALIFIED OPERATOR.

BECAUSE THE MANUFACTURER HAS NO DIRECT CONTROL OVER MACHINE APPLICATION AND OPERATION, PROPER SAFETY PRACTICES ARE THE RESPONSIBILITY OF THE USER AND ALL OPERATING PERSONNEL.

 WARNING ANY MODIFICATION ON THIS MACHINE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE MANUFACTURER IS PROHIBITED.

If there is a question on application and/or operation, contact:

Custom Equipment, Inc.
2647 Hwy 175
Richfield, WI 53076
USA
Phone: 262-644-1300
Fax: 262-644-1320
www.hybridlifts.com

For additional reference and troubleshooting information, please see www.hybridlifts.com.

Safety

Safety Symbols

 DANGER FAILURE TO FOLLOW THIS WARNING WILL CAUSE DEATH OR PERSONAL INJURY.	"DANGER" indicates an imminently hazardous situation, which, if not avoided, <i>will</i> result in death or serious injury.
 WARNING FAILURE TO FOLLOW THIS WARNING MAY CAUSE DEATH OR PERSONAL INJURY.	"WARNING" indicates a potentially hazardous situation, which, if not avoided, <i>could</i> result in death or serious injury
 CAUTION FAILURE TO FOLLOW THIS WARNING MAY CAUSE INJURY OR DAMAGE EQUIPMENT	"CAUTION" indicates a potentially hazardous situation which, if not avoided, <i>could</i> result in minor or moderate injury or damage to equipment

General Rules and Precautions


Custom Equipment, Inc. designed the Hy-Brid Lift push-around scissor lift to be safe and reliable. It is intended for elevating personnel, along with their necessary tools and materials to overhead work locations.

Vibration does not create significant hazards on this machine.

An operator of any type of work platform is subject to certain hazards that cannot be protected by mechanical means. It is therefore essential that operators be competent, careful, physically and mentally fit and thoroughly trained in safe operation of this machine.

Although Custom Equipment, Inc. conforms to specified EN: 280 requirements, it is the responsibility of the owner to instruct operators with the safety requirements made not only by Custom Equipment, Inc., but by the various safety boards in your area, as well as additional requirements set forth by EN: 280 If you come across a situation that you think might be unsafe, stop the platform and request further information from qualified sources before proceeding.

 WARNING MAINTENANCE INFORMATION IS FOR USE BY TRAINED PERSONNEL ONLY
--

 WARNING NEVER REACH BETWEEN SCISSORS LINKS OR PROP UP PLATFORM UNLESS MAINTENANCE PINS ARE IN PLACE.

Stability Testing

The HB-P830CE has been stability tested to standards EN280 or AS 14180. The most adverse stability test is the stationary, lateral slope configuration for both units. The overturning moment created by the test loads and forces is equivalent to a test on an unloaded machine on a level surface, as shown in the figure below. For the HB-P830, the test weight/pull force is 24 kg /53 lb.

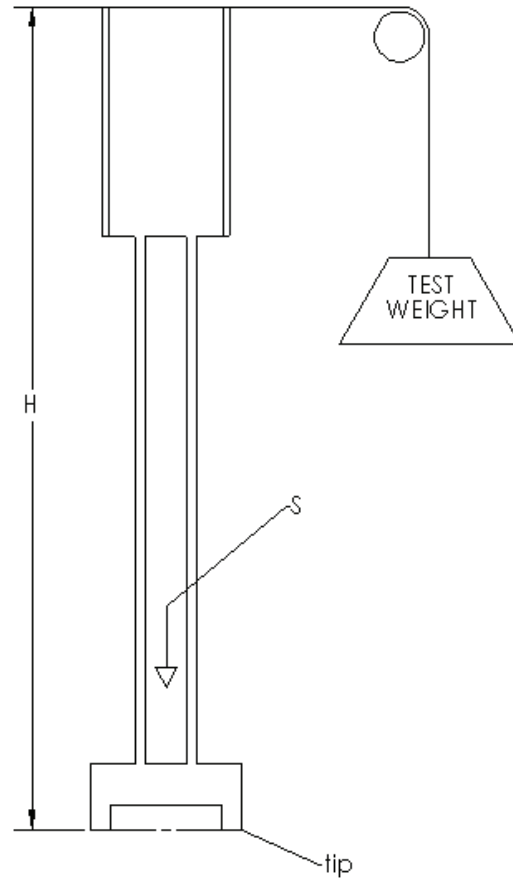
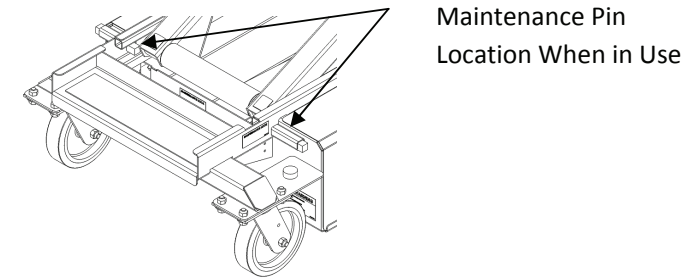


Figure 1: Stability Testing, Equivalent

Safety Guidelines

Maintenance Lock

The maintenance lock must be placed into position whenever the machine is being serviced in the raised or partially raised position. Serious injury and/or death could result if maintenance lock is not used properly.



Maintenance Pin Location When in Use

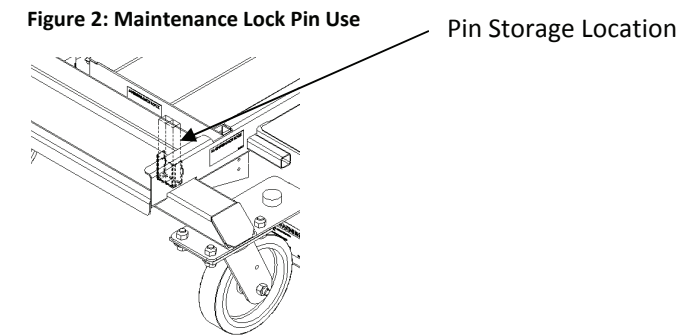


Figure 2: Maintenance Lock Pin Use

Pin Storage Location

Figure 3: Maintenance Lock Pin Storage

Maintenance

WARNING

FAILURE TO COMPLY WITH THE LISTED SAFETY PRECAUTIONS MAY RESULT IN MACHINE DAMAGE, PERSONNEL INJURY OR DEATH.

- Never work under an elevated platform until maintenance locks have been engaged.
- Remove all rings, watches, and jewelry when performing any maintenance.
- Do not wear long hair unrestrained or loose fitting clothing and neckties which may become caught on or entangled in equipment.
- Observe and obey all warnings and cautions on machine and in manual.
- Keep oil, grease, water, etc. wiped from standing surfaces and handholds.
- Before making any adjustments, lubricating or performing any other maintenance, shut off all power controls.
- Battery should always be disconnected during replacement of electrical components.
- Keep all support equipment and attachments stowed in their proper place.
- Use only approved nonflammable cleaning solvents.
- After maintenance, inspect the machine as described for Pre-delivery.

Battery Maintenance

This unit is equipped with a deep cycle 12-volt Group 27 battery. The care and maintenance of your battery has much to do with how well this unit functions. Battery wiring and water level should be checked monthly. **Do not overfill.** When the cells are too full, fluid will seep out when charging. The solution is at its proper strength when the battery is manufactured. Use distilled water and keep fluid up to proper level. When required, water should be added to battery after charging, unless water level is below the plates.

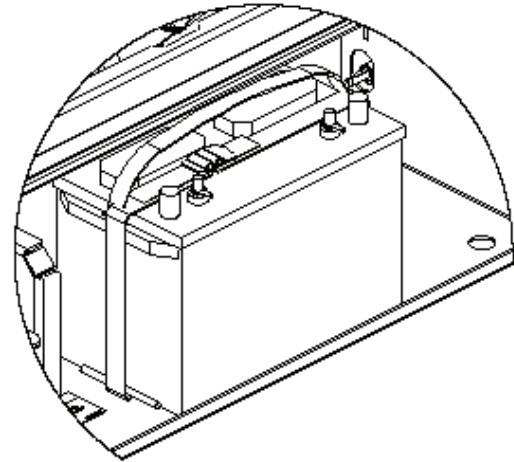


Figure 4: Battery Maintenance

- Remove battery cabinet cover.
- Remove battery caps and check fluid level.
- Fill each cell (if needed) to split ring with distilled water.
- Reinstall caps.
- Wash all dirt, debris, acid, etc., off battery whenever corrosion is detected. Use a solution of 5-tsp. baking soda per quart of warm water.
- Coat terminals with a commercially available coating.



Charging the Battery

This unit is equipped with a deep cycle 12-volt battery. The care and maintenance of your battery has much to do with how well this unit functions. Battery wiring and water level should be checked monthly. **Do not overfill.** When the cells are too full, fluid will seep out when charging.

Note: The surrounding temperature greatly affects the power reserve within a battery.

Example: A battery that is 100% charged at 80° F (27°C) drops to 65% at 32° F (0°C) At 0° F (-18°C), this battery will drop to 40% efficiency.



- Park the machine on a level surface.
- Plug charger into AC outlet until charged. (Indicated by solid lights)
- For best battery life, leave charger plugged in until machine will be used again. The charger will maintain the battery charge.

The charger will not begin charging on severely discharged batteries.

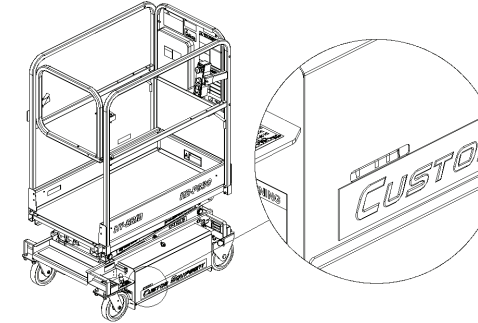
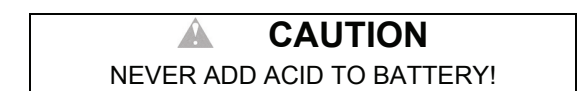
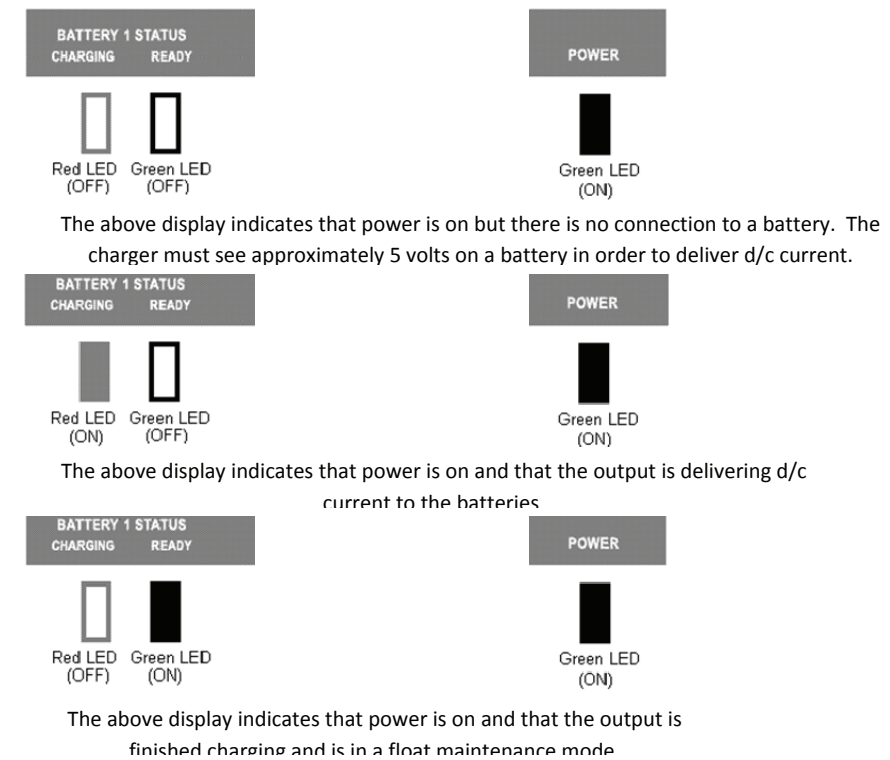


Figure 5: Battery Charger LED Display



The solution is at its proper strength when the battery is manufactured. Use distilled water and keep fluid up to proper level. When required, water should be added to battery after charging, unless water level is below the plates.

Lubrication

Item	Specification	Frequency of Lubrication
Wheels	Teflon Spray	Quarterly

Components requiring adjustment

Under normal use, no components should require adjustment. Contact the manufacturer if adjustments are required.

Examination, repair, replacement of limited life components

With proper use, battery maintenance, and regular inspection, there are no limited life components that require routine replacement.

Safety devices and systems requiring checks

Check safety functions as part of daily inspection. Check that the mechanical brakes are holding.

Storage

After periods of storage, exposure to extremes of ambient conditions-heat, cold, moisture, dust etc. inspect the machine.

Refer to the Pre-Delivery/ Frequent Inspection Checklist in the Maintenance Manual.

Major Alterations or Repairs

Any alterations must be approved by the manufacturer. Major repairs, which affect the stability, strength, or performance of the machine must also be approved by the manufacturer, recorded, and include machine inspection and testing. Never attach pipe racks, material lifting devices, or make any other alteration that is not part of the intended design of the machine.

Inspection and Regular Maintenance Checklists

CAUTION

FAILURE TO PERFORM INSPECTIONS AND PREVENTITIVE MAINTENANCE AT RECOMMENDED INTERVALS MAY RESULT IN THE UNIT BEING OPERATED WITH A DEFECT THAT MAY RESULT IN INJURY OR DEATH OF THE OPERATOR.

Regular inspection and conscientious maintenance is important to efficient economical operation of this machine. It will help to assure that equipment will perform satisfactorily with a minimum of service and repair. Make checks at the stated intervals or more frequently if required by local operating conditions. The following inspection checklists are required and included in this manual:

Pre-Start (Required before operation at each work shift)

Monthly Battery Maintenance

Frequent (Required at intervals not more than three months)

Pre-Delivery/Annual (Required at intervals not more than twelve months)

The rated life of the machine is Light Intermittent Duty (typical use 10 years, 40 weeks per year, 20h per week, 5 load cycles per h).

Monthly Battery Care

WARNING

THIS CHECKLIST MUST BE USED AT MONTHLY OR AFTER EVERY 100 HOURS OF USE. FAILURE TO DO SO COULD AFFECT THE SAFETY OF THE OPERATOR.

MODEL NUMBER _____ SERIAL NUMBER _____

1. Keep inspection records up-to-date.
2. Record and report all discrepancies to your supervisor.
3. A dirty machine cannot be properly inspected.

Y-Yes/Acceptable N-No/Unacceptable R-Repaired

Description	Y	N	R
1. Remove battery cabinet cover.			
2. Remove battery caps and check fluid level.			
3. Fill each cell (if needed) to split ring with distilled water.			
4. Reinstall caps.			
5. Wash all dirt, debris, acid, etc., off battery whenever corrosion is detected. Use a solution of 5-tsp. baking soda per quart of warm water.			
6. Coat terminals with a commercially available coating.			

DATE _____ INSPECTED BY _____

Prestart Inspection Checklist

WARNING

THIS CHECKLIST MUST BE USED AT THE BEGINNING OF EACH SHIFT OR AFTER EVERY SIX TO EIGHT HOURS OF USE. FAILURE TO DO SO COULD AFFECT THE SAFETY OF THE OPERATOR.

MODEL HB-P830CE SERIAL NUMBER _____

1. Keep inspection records up-to-date.
 2. Record and report all discrepancies to your supervisor.
 3. A dirty machine cannot be properly inspected.
- Y-Yes/Acceptable N-No/Unacceptable R-Repaired

Description	Y	N	R
<i>Visual Inspections</i>			
Check that there are no damaged, dented, or bent structural members.			
There are no loose or missing parts.			
Check that warning and instructional labels are legible and secure. Ensure that load capacity is clearly marked.			
Check the platform rails and safety gate for damage.			
Platform and base controls are not missing, damaged, or disconnected.			
Electrical cables and wires are not torn, frayed, or disconnected.			
Hydraulic hoses are not torn or loose, and there are no leaks. Check that hoses and the cables have no worn areas or chafing.			
Check the hydraulic fluid level with the platform fully lowered.			
Check the tires for damage.			
Check that all snap rings are secure in grooves on pivot pins.			
<i>Functional Tests</i>			
Gate closes automatically and latches (alignment can be adjusted with screw on toe board or railing if necessary).			
Platform Controls: Check all switches and push buttons for proper operation. Emergency Stop (Stops all movement) Up/Down Controls (Elevates, Lowers, Enable button must be pressed)			
Base Controls: Check all switches and push buttons for proper operation. Emergency Stop (Stops all movement) Key Switch (Selects Platform Control, Ground Control, or Off) Up/Down Rocker Switch (Elevates, Lowers) Alarm (Not damaged, sounds for descent, overload) LED (Flashes when overloaded)			
Wheels: Front and rear wheels rotate freely.			
Brakes engage and hold when platform elevated.			
Platform does not elevate when overloaded.			
When overloaded, platform stops elevating when at a height between 81cm and 94 cm from the ground.			

DATE _____ INSPECTED BY _____

Frequent Inspection Checklist



WARNING

AERIAL PLATFORMS SHALL BE INSPECTED, SERVICED AND ADJUSTED TO MANUFACTURER'S REQUIREMENTS BY A QUALIFIED MECHANIC PRIOR TO EACH SALE, LEASE, OR RENTAL, AND EVERY 3 MONTHS OR 150 HOURS, WHICHEVER COMES FIRST.

MODEL NUMBER HB-P830CE SERIAL NUMBER _____

- Check each item listed below.
- Use proper operating, service, and maintenance manual for specific information and settings
- If an item is found to be unacceptable make the necessary repairs and check the "repaired" box.
- When all items are "acceptable", the unit is ready for service.

Description	Y	N	R
<i>Visual Inspections</i>			
Perform all checks on the Pre-Start Inspection Checklist.			
Inspect the condition of hydraulic fluid in reservoir. Oil should have a clear amber color.			
Inspect the entire machine for signs of damage, broken welds, loose bolts, or improper repairs. (Check for corrosion, cracking, abrasion, etc.)			
Check that all snap rings are secure in grooves on pivot pins.			
Check if tires are leaning in or out.			
Verify that bubble level is in place.			
Verify that maintenance and inspection records are up to date.			
<i>Functional Tests</i>			
Perform all checks on the Pre-Start Inspection Checklist.			
Functions operate smoothly.			
Functions operate over full range of motion.			
Emergency Lowering—Manual override functions properly.			
Ground Controls override platform controls.			
Check that the platform does not drift down with a full load.			
Wheels lubricated if needed.			
Comments:			

DATE _____ INSPECTED BY _____

Pre-Delivery/Annual Inspection Checklist



WARNING

AERIAL PLATFORMS SHALL BE INSPECTED, SERVICED AND ADJUSTED TO MANUFACTURER'S REQUIREMENTS BY A QUALIFIED MECHANIC PRIOR TO EACH SALE, LEASE, OR RENTAL, AND EVERY 12 MONTHS.

MODEL NUMBER: HB-P830CE SERIAL NUMBER _____

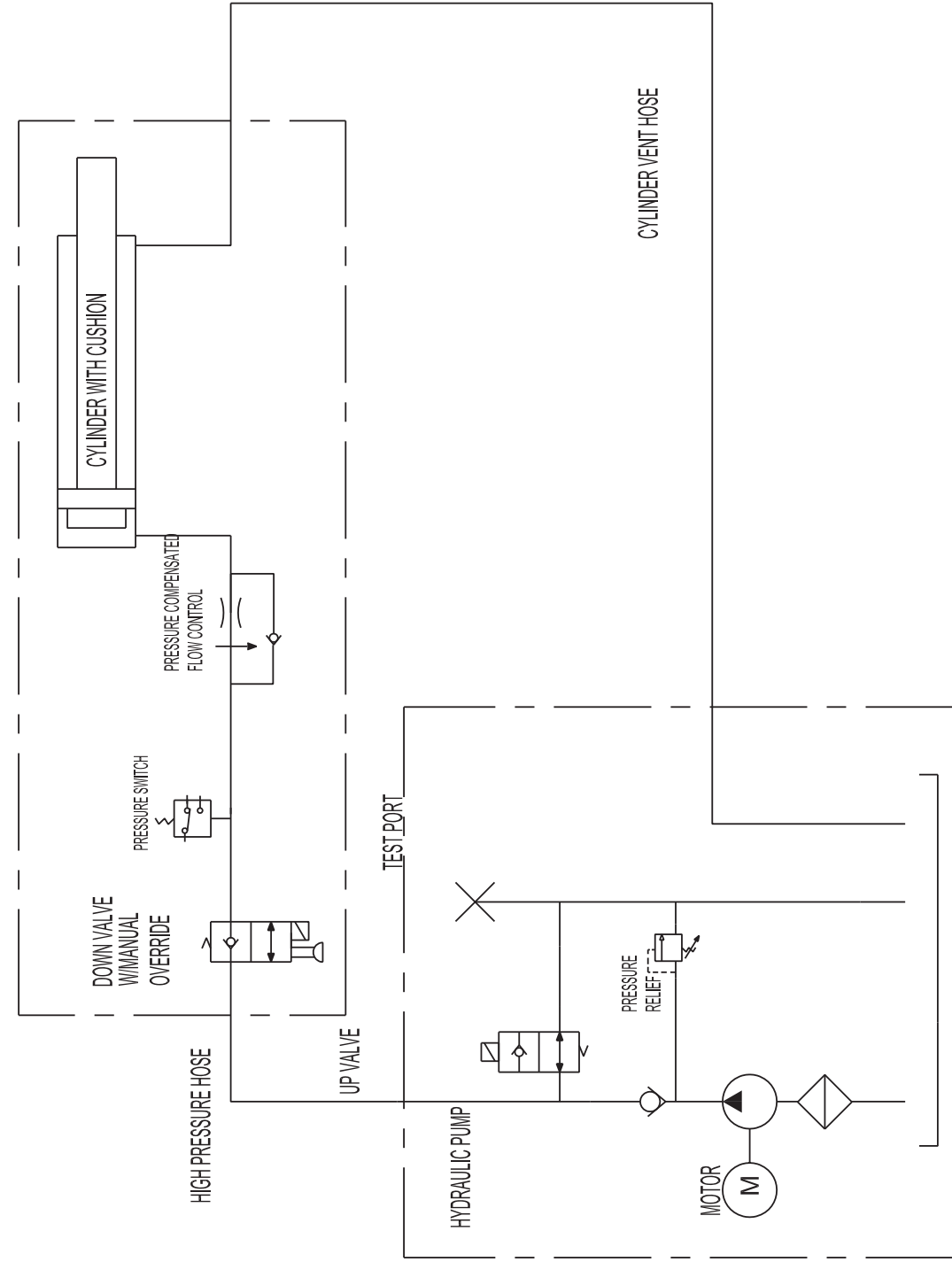
- Check each item listed below.
- Use proper operating, service, and maintenance manual for specific information and settings
- If an item is found to be unacceptable make the necessary repairs and check the "repaired" box.
- When all items are "acceptable", the unit is ready for service.

Check	Y	N	R	Check	Y	N	R
Base:				Decals:			
Inspect slide tracks for damage				Legibility			
All frame bolts tight				Correct capacity noted			
Pump Secure				Proper placement quantity			
DC motor secure				Wiring:			
Battery Hold Downs Secure				Switches secure			
Batteries Fully Charged				Contact(s) secure			
Counterweights secured				Tight on terminals (No loose wiring)			
Wheels: Grease Casters				Functions:			
Wheels: Bolts/Nuts Tight				Elevate/Lower Operational			
Maintenance Locks: Pins in storage location				Emergency Stop Breaks Circuits			
All Shields/Guards in place				Emergency Down Operational			
Hydraulic Oil Level 1" from top				Motion Alarms Functional			
Check all hydraulic hoses for leaks				Brakes: Operational			
Check all hydraulic fittings for leaks				Bubble Level in Place			
Scissors:				When overloaded, platform stops elevating when at a height 81- 94 cm from ground			
Broken Welds				Battery Charger Secure/Operational			
Bent Beam Members							
All rollers Turn Freely				Platform:			
Ret. Rings Secure On Pivots				All rails in place/secure			
Broken welds				No bent rails			
Platform:				No broken welds			
All rails in place/secure				Platform power outlet safe/working (if installed)			
No bent rails				Entrance gate Closes Freely			
No broken welds				Operator/Service Manual Included			
Platform power outlet safe/working (if installed)				Cables in place/secure			
Entrance gate Closes Freely				Comments:			
Operator/Service Manual Included							
Cables in place/secure							

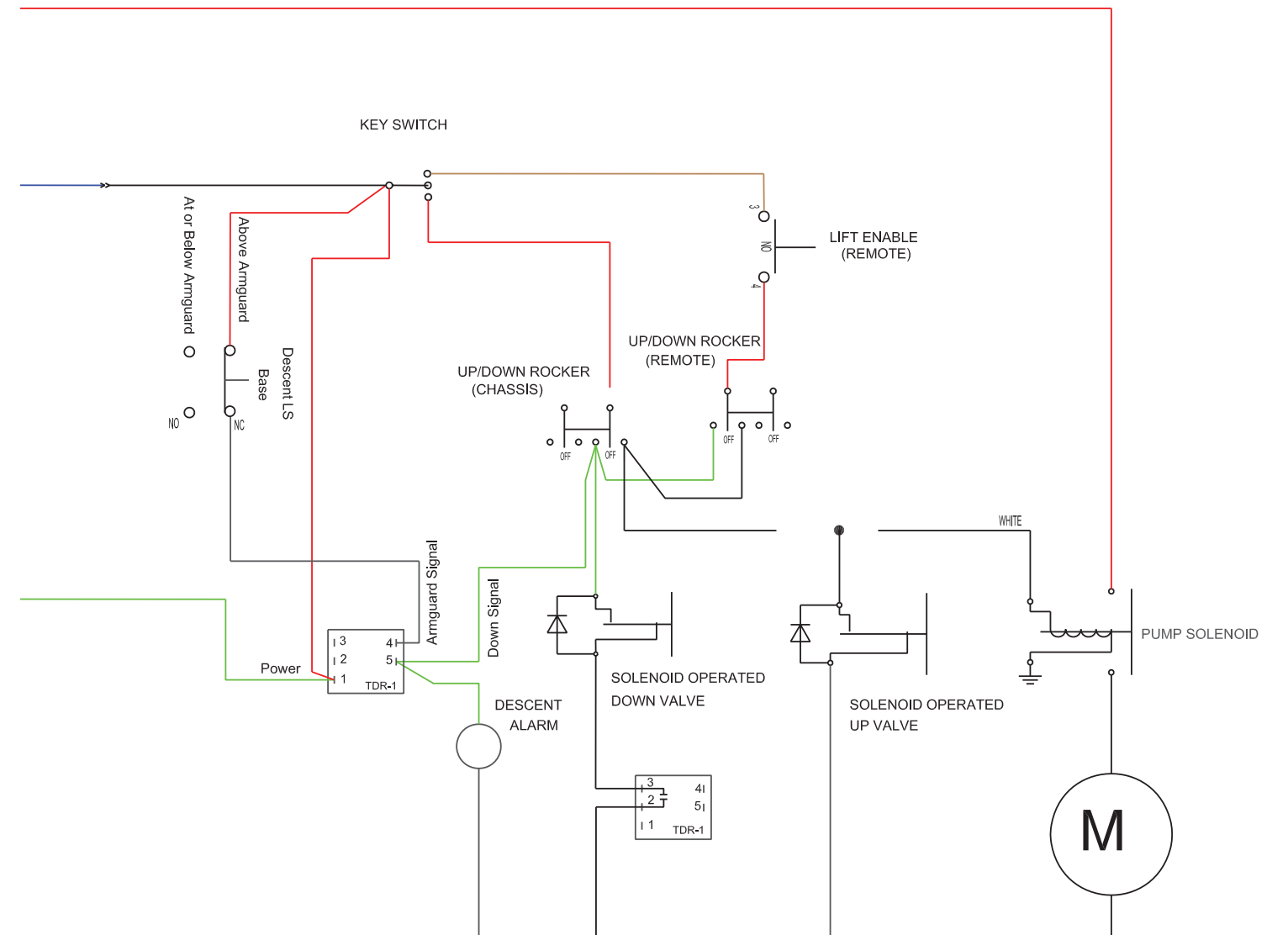
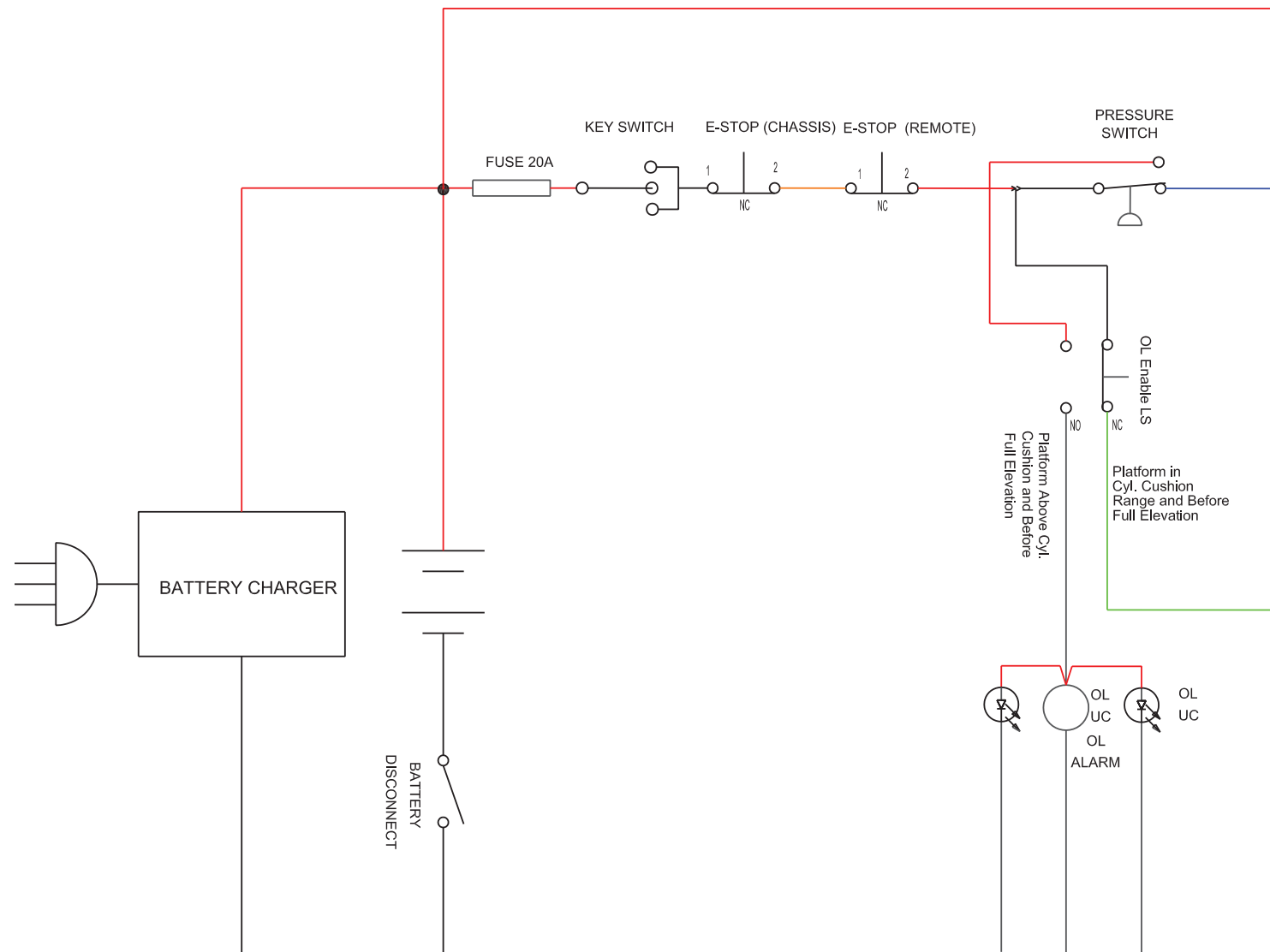
DATE _____ INSPECTED BY _____

This page intentionally left blank.

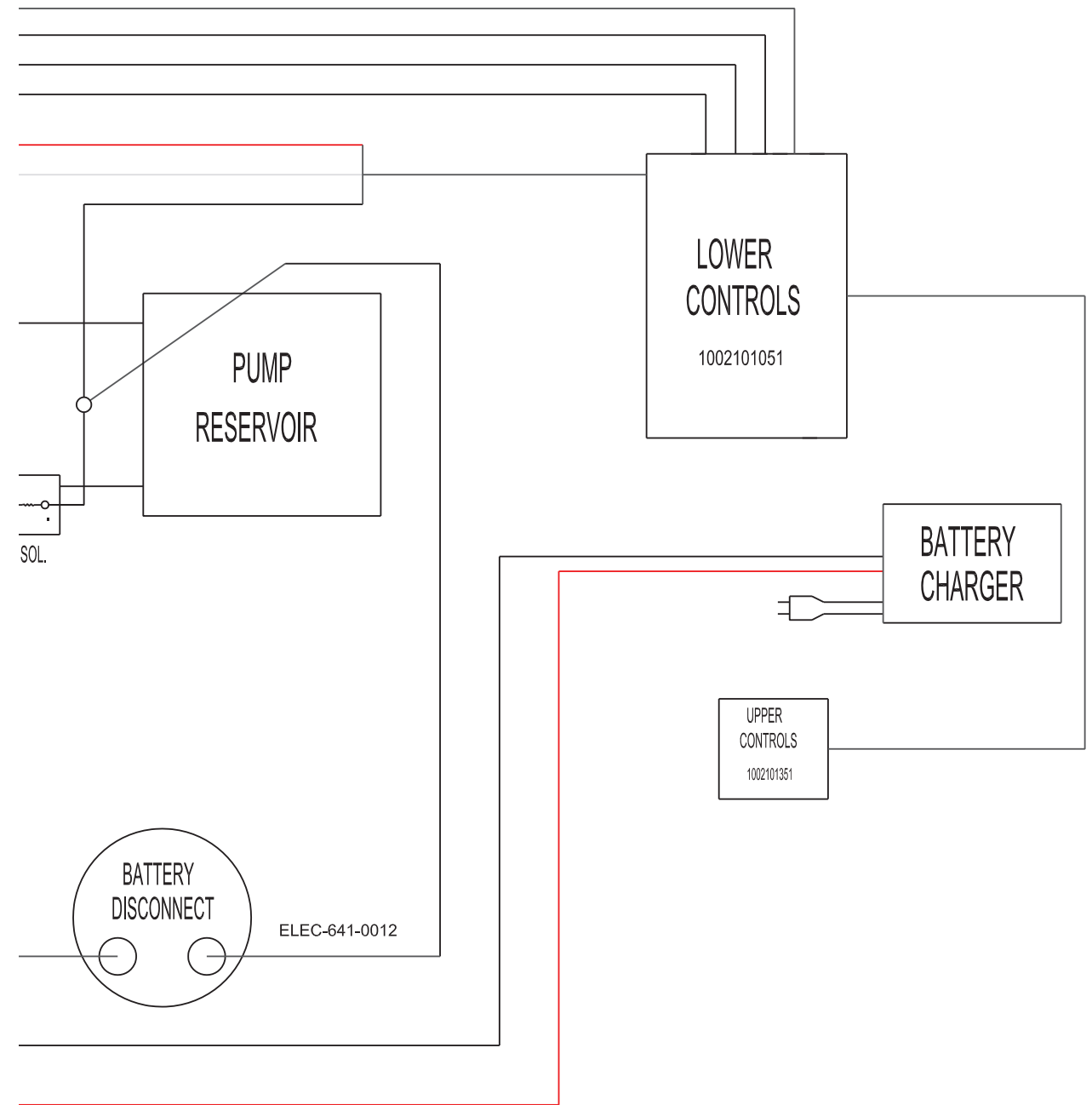
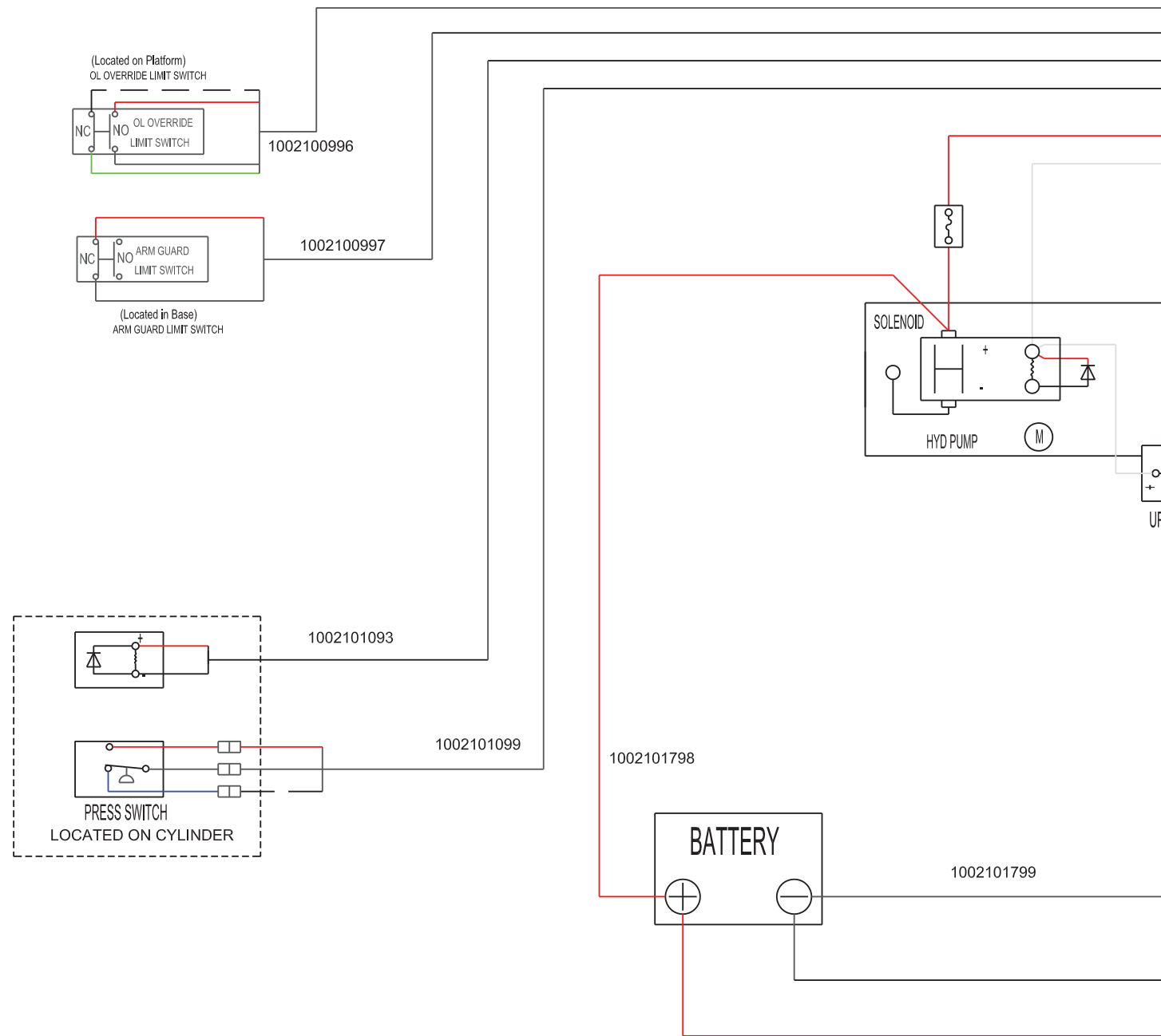
Hydraulic Schematic: HB-P830CE, Revision A



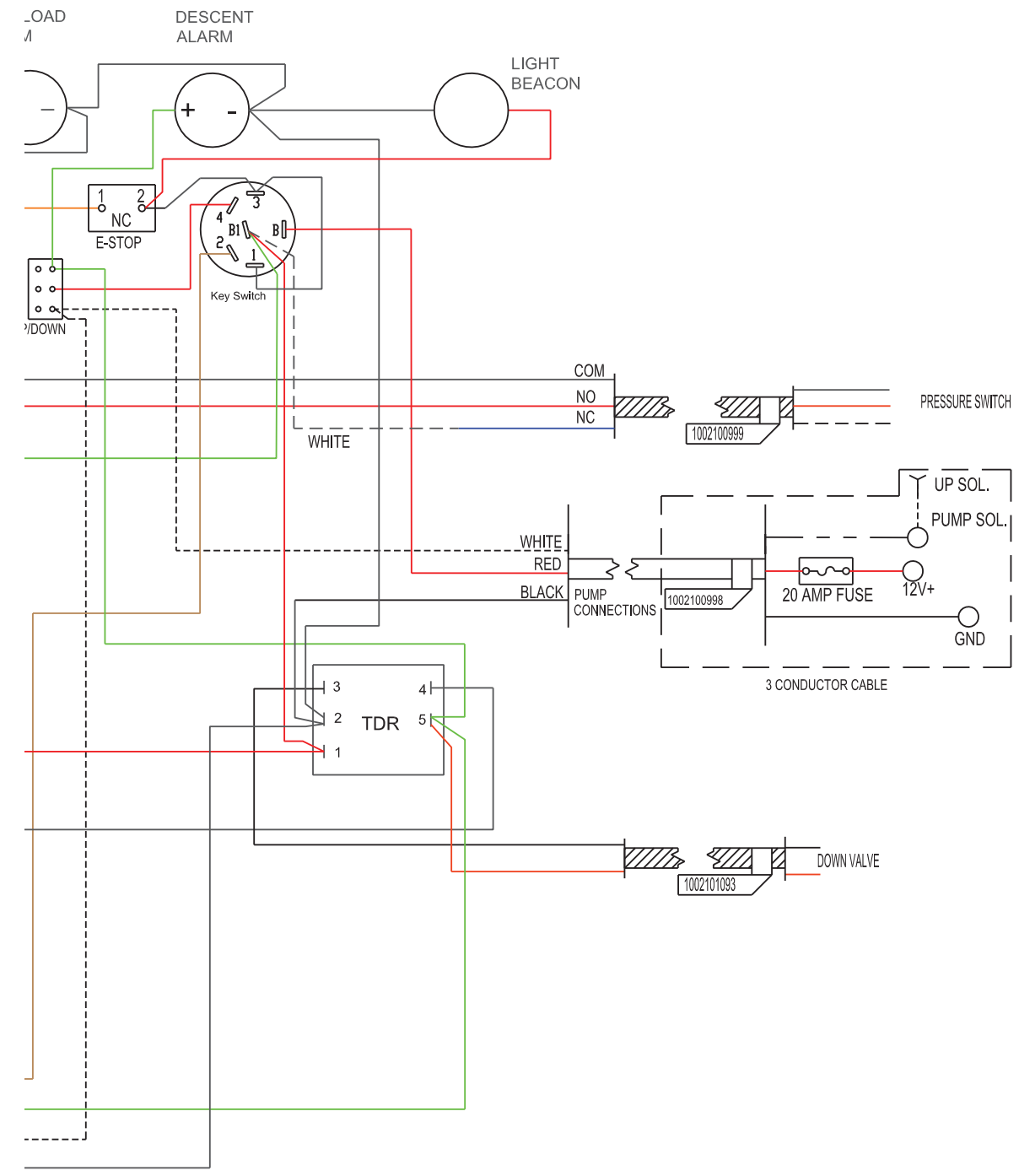
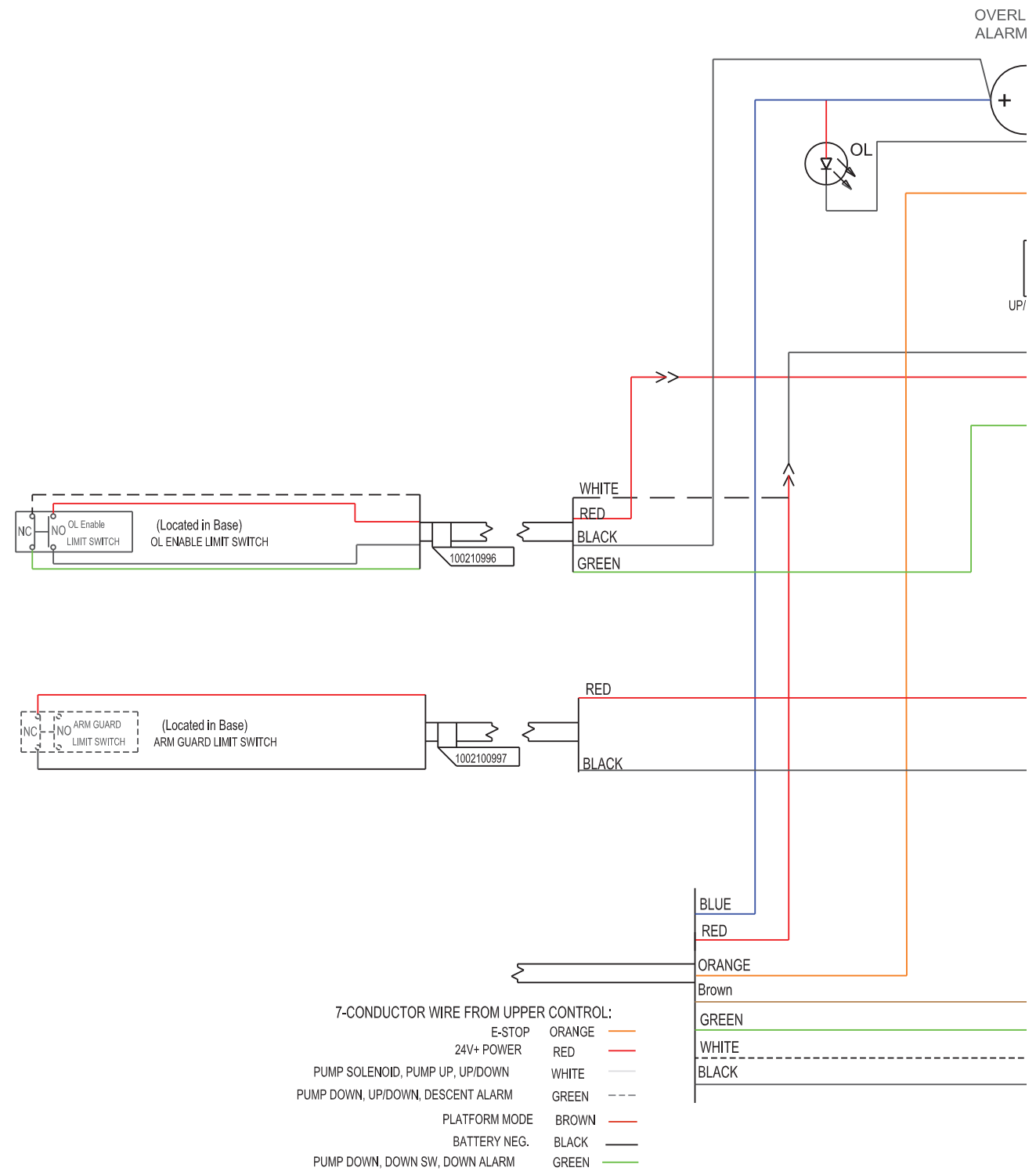
Electrical Schematic: HB-P830CE, Revision D



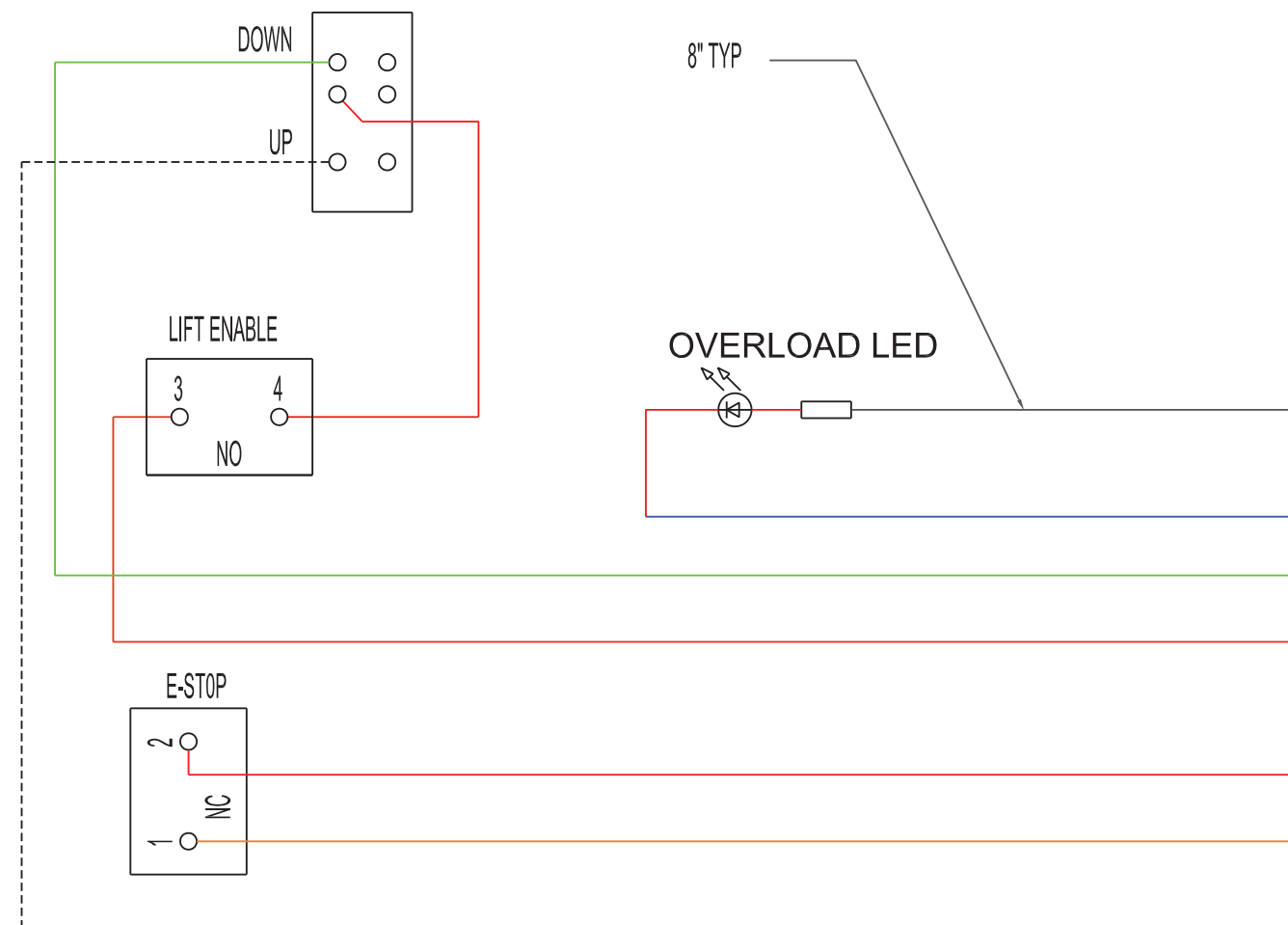
Wiring Diagram, Overall: HB-P830CE Revision D



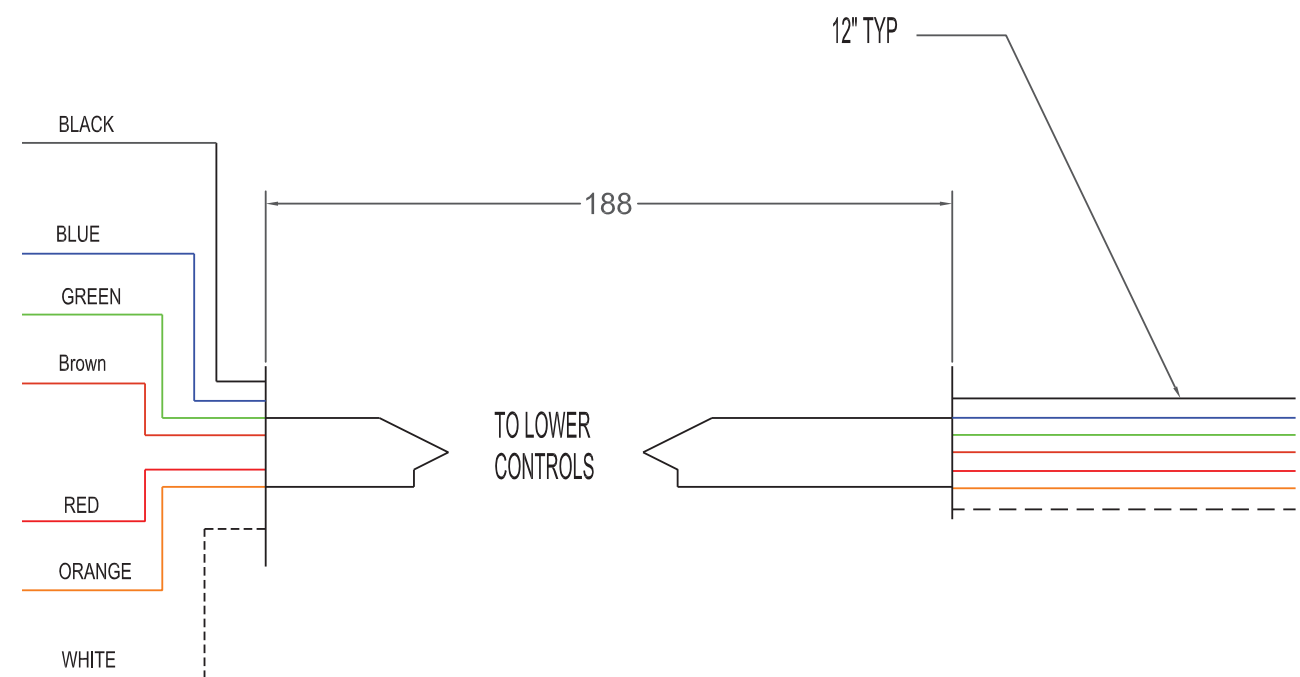
Wiring Diagram, Lower Control: HB-P830CE Revision G



Wiring Diagram, Upper Control: HB-P830CE Revision A



7-CONDUCTOR



Replacement Parts

CAUTION

USE ONLY MANUFACTURER APPROVED REPLACEMENT PARTS. USE OF NON-OEM PARTS WILL VOID WARRANTY.

DANGER

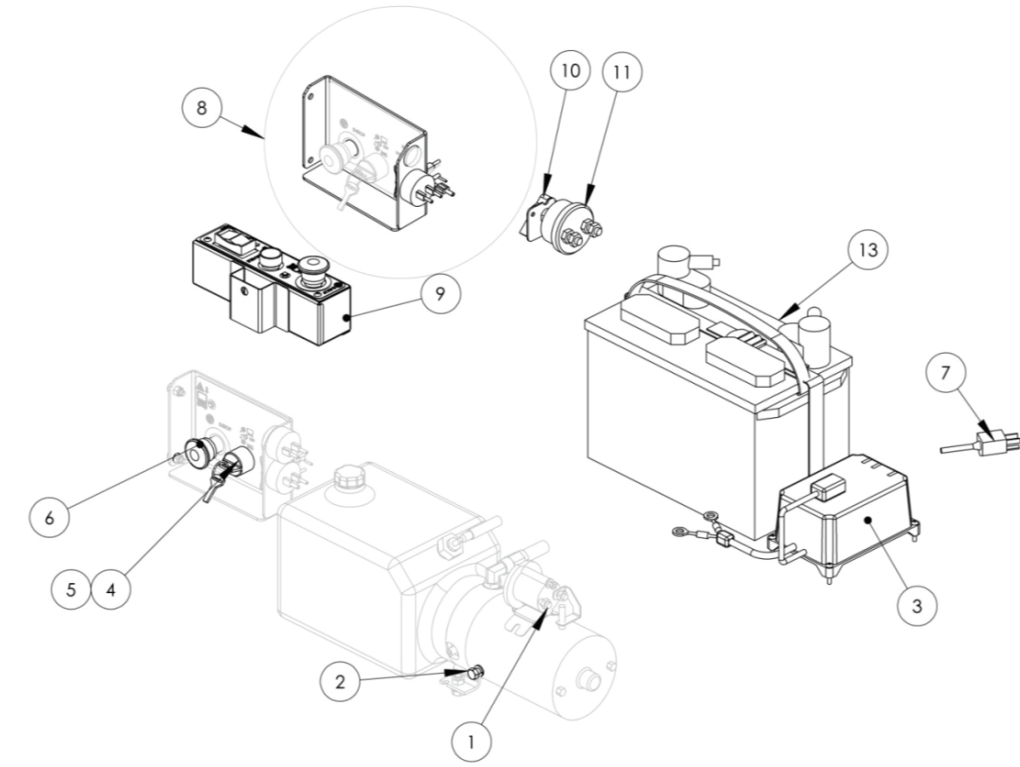
REPLACEMENT OF THE FOLLOWING COMPONENTS WILL AFFECT THE STRENGTH, STABILITY, OR SAFETY FUNCTION OF THE UNIT: BATTERY, HYDRAULIC CYLINDER, AND ALL STRUCTURAL COMPONENTS.

Listed below are replacement parts that may be available and listed for reference. These represent current revisions. Refer to our website, www.hybridlifts.com for more complete part listings and earlier revisions. Several parts are model, serial number, or manufacture date specific. Contact your dealer for replacement part availability and pricing.

Safety and Control Decals

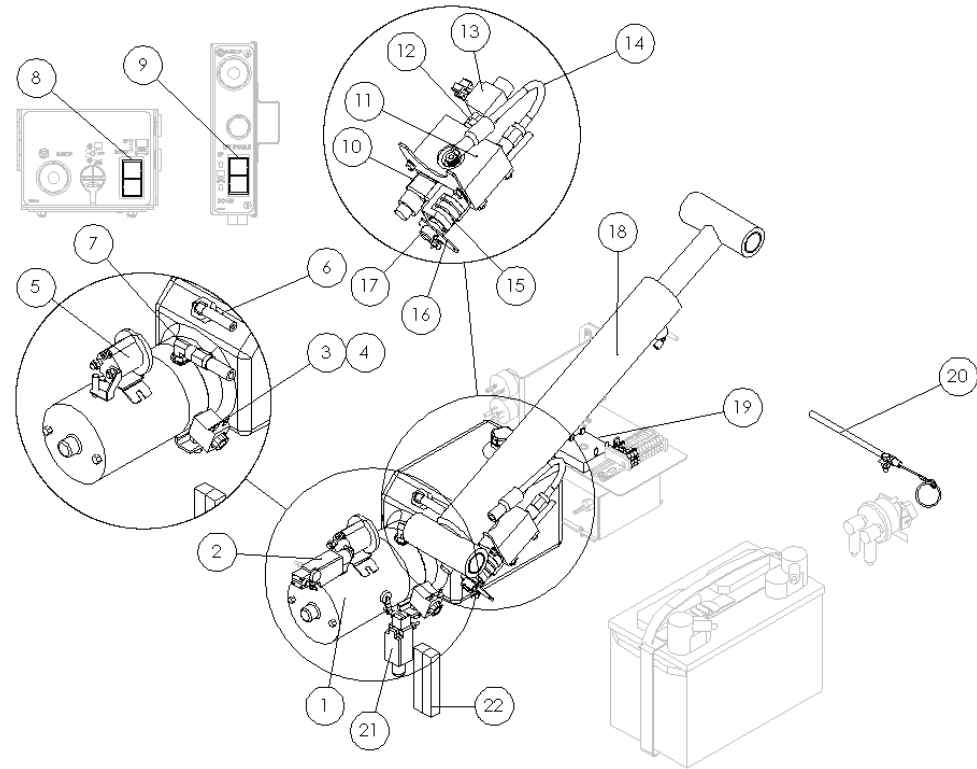
Refer to Operator's Manual for decal part numbers and locations

Main Power/Safety Circuit



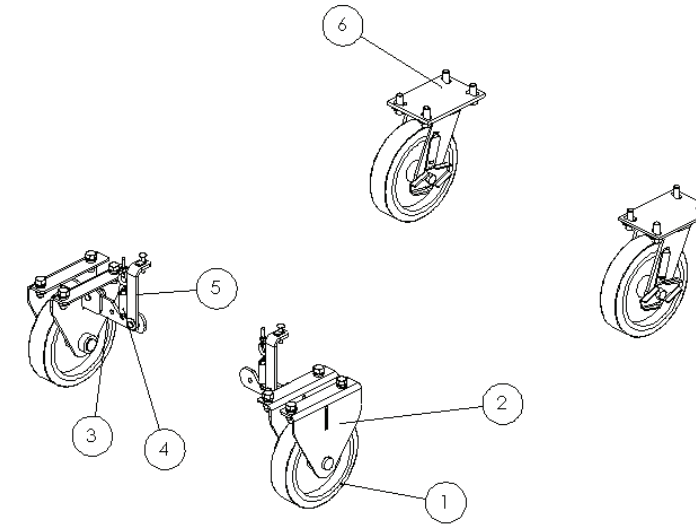
Item #	Part #	Description
1	NA	B+ Power Connection Location on Pump
2	NA	B-"Ground" Connection Location on Pump
3	ELEC-746	Battery Charger
4	ELEC-073E	Key Switch
5	ELEC-073-1	Spare Key
6	ELEC-071-KIT	Emergency Stop Button with Contact Block
7	ELEC-639-1	Charger Cord (NEMA 5-15P/IEC-320 C-13)
8 & 9	1002102651	Lower & Upper Control Assembly
10	ELEC-633-1	Battery Disconnect Lever
11	ELEC-633-KIT	Master Power Switch
12	ELEC-071-KIT	Emergency Stop Button with Contact Block
13	(ELEC-047)	Not available as a replacement part. Replace battery with 12V, Group 27 Deep Cycle Marine Battery. Replacement weight must be minimum 50 lb.
(Not Pictured)	ELEC-641-001	Battery Cable Kit
(Not Pictured)	ELEC-670-2	20A AGC Fuse

Elevate/Lower Circuit Parts



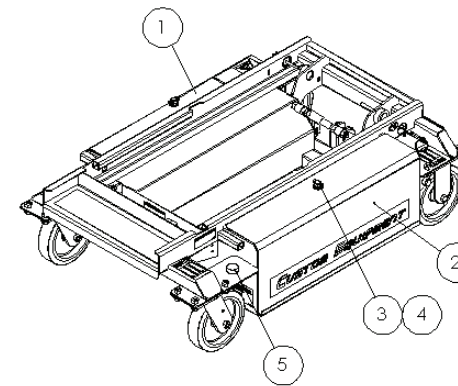
Item #	Part #	Description
1	HYDR-050-4	Hydraulic Pump
(Not Pictured)	(HYDR-032)	Hydraulic Fluid: Not available as a replacement part. Replace with Flomite #150, Dexron II, Mobil-DTE 2, or equivalent.
2	ELEC-123-5	Armguard Switch
3	HYDR-665	Up Valve
4	HYDR-673	Up Valve Coil
5	HYDR-674	Start Solenoid (12 V)
6	HYDR-022-3	Low Pressure Hydraulic Line
7	HYDR-600-5	Hydraulic Hose
8	ELEC-133B	Rocker Switch
9	ELEC-133B	Rocker Switch
10	HYDR-044-FL3	Hirschmann Connector with Diode
11	(HYDR-627)	Pressure Compensated Flow Control: Not sold for replacement. Order manifold block assembly 1002100397.
12	HYDR-672	Hydraulic Fitting
13	HYDR-671	Pressure Switch
14	HYDR-600-5	Hydraulic Hose
15	HYDR-007-2F	Down Valve & Coil
15	HYDR-007-2E-5	Down Valve
15	HYDR-007-2E-6	Down Valve Coil (12V)
16	1000200204	Emergency Down Lever
17	HARD-650	1/16 Shaft Collar
18	1002100352-KIT	Hydraulic Cylinder
19	ELEC-632	Time Delay Relay
20	HARD-644	Emergency Down Cable
21	ELEC-123-5	Overload Limit Switch
22	1000114318	ML Pins
(Not Pictured)	HARD-022	Retaining Ring, 1.25"

Wheels/Brakes



Item #	Part #	Description
1	WHEE-706-KIT	Wheel (8"), Raceway, & DU Bearing
2	1000114707&12/1000116207&12	Caster Sides
3	1000115802	Brake Weldment
4	HARD-668	Spring
5	1000116002	Brake Actuator
6	1002100580 (Left) 1002100581 (Right) WHEE-701 (Wheel Only)	Swivel 8" Caster with brake

Covers/Other



Item #	Part #	Description
1	1000510401	Cover, Left
2	1000510301	Cover, Right
3	HARD-633B	Cabinet Latch Handle
4	HARD-633E	Cabinet Latch Cam
5	HARD-086	Level

Warranty

LIMITED WARRANTY – Warranty Statement --Outside North America

Custom Equipment, Inc. (the "Company") warrants that all new units of equipment manufactured and sold by it conform to the Company's latest published specifications. Also, that all purchased components and sub-assembled parts and assemblies shall be free from defect in material and/or workmanship for a period of 24 months from the date a new unit is placed into service, with the exception of batteries which are covered by the battery manufacturer for a period of ninety (90) days (pro-rated for one (1) year) on batteries. Further, that all structural components manufactured, purchased, and installed by Custom Equipment, Inc. shall be free of any defect in material and/or workmanship for a period of 60 months from the date a new unit is placed into service.

If the equipment owner/end-user experiences a failure or deficiency within the specified warranty period they must promptly notify an authorized Dealer service repair facility. Custom Equipment's warranty policy requires that ALL warranty claims parts be held for inspection for up to six months or returned to us in a timely fashion if requested. Parts will be requested when we will be returning these parts to our vendor fore credit.

During the Warranty period, Custom Equipment, Inc. reserves the right to replace, repair, exchange, or to provide a new, used, or rebuilt component, assembly, sub-assembly, or weldment at their discretion, dependent upon circumstance, situation, and/or availability. For battery warranty, call the number listed on the battery for further instructions.

This Warranty Policy does NOT cover damage caused by; shipment, misuse of unit (includes operation beyond Factory established limits, loads, and/or specifications), failure to properly service and maintain the unit in accordance with the Company's manuals or Factory Service Bulletins. Custom Equipment, Inc. DOES NOT accept any responsibility for alterations or modifications to the unit, or, damages caused by any natural disasters (such as fire, flood, wind and lightning).

THE PREVIOUS WARRANTY STATEMENT IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

In no event shall the Company be liable for any indirect, incidental, consequential, or special damage (including without limitation to loss of profits, loss of revenue, cost of capital, cost of substitute equipment, downtime, examination fees, claims of third parties, and injury to person or property) based upon any claim of breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory. This limited warranty statement recognizes the risks and limitations of product failure between Custom Equipment, Inc. and the Buyer.

This written warranty is also understood to be the complete and exclusive agreement between the parties, superseding all prior agreements, oral or written and all other communications between the parties relating to the subject matter of this warranty. No employee, agent or distributor of the Company, or any other person is authorized to state or imply any additional warranties on behalf of the Company, nor assume for the Company any other liability in connection with any of its products, unless made in writing, dated, and signed by an officer of the Company.