

# *Hy-Brid Lifts*<sup>™</sup> by Custom Equipment



## **MAINTENANCE AND TROUBLESHOOTING MANUAL**

Hy-Brid Lifts  
Model  
HB-830CE

Self-Propelled  
Aerial Work Platform

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### Revision Table:


Revision A (06/29/2010): Initial Release  
Revision J (10/24/2012): Revised logos

*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.

 <b>DANGER</b> 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.

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

**Safety**

**Safety Symbols**

 <b>DANGER</b> 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.
 <b>WARNING</b> 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
 <b>CAUTION</b> 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 self-propelled 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.**

 <b>WARNING</b> MAINTENANCE INFORMATION IS FOR USE BY TRAINED PERSONNEL ONLY
---

 <b>WARNING</b> NEVER REACH BETWEEN SCISSORS LINKS OR PROP UP PLATFORM UNLESS MAINTENANCE PINS ARE IN PLACE.
--

### Stability Testing

The HB-830CE has been stability tested to standards EN280 or AS 14180. The most adverse stability test is the traveling forward configuration. 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-830CE, the test weight/pull force is 50.3 kg /111 lb.

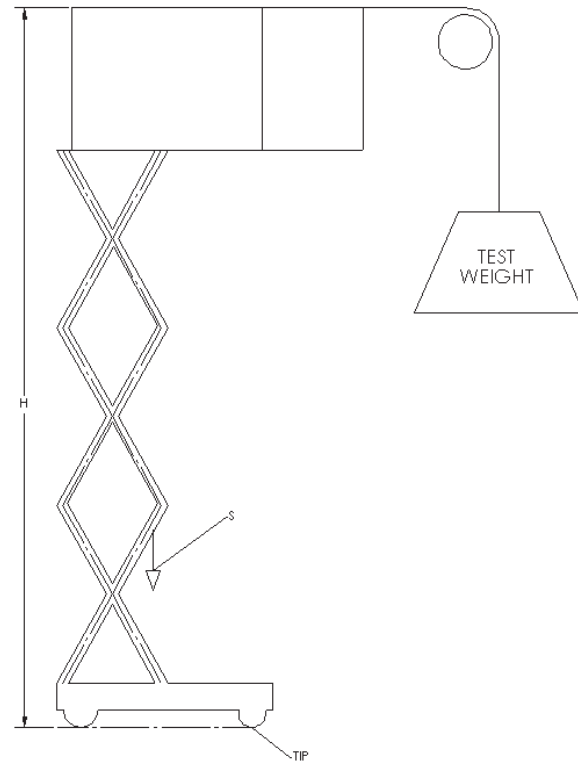


Figure 1: Stability Testing, Equivalent

### 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.

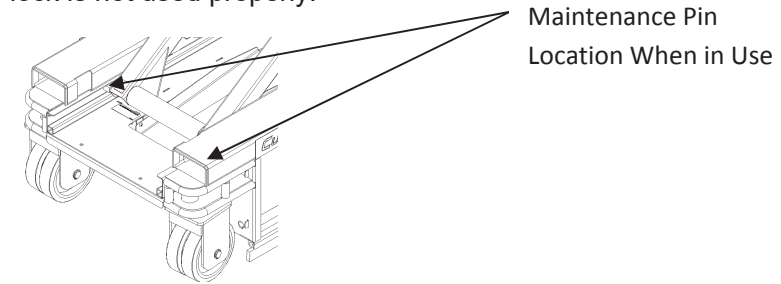


Figure 2: Maintenance Lock Pin Use

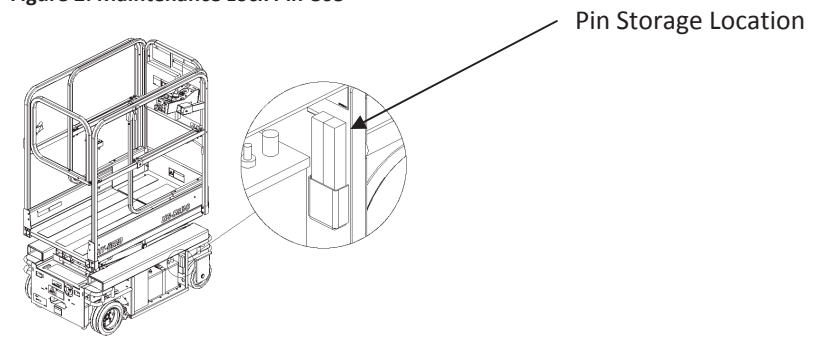


Figure 3: Maintenance Lock Pin Storage

### 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 deep cycle 12-volt batteries. 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.

- 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.

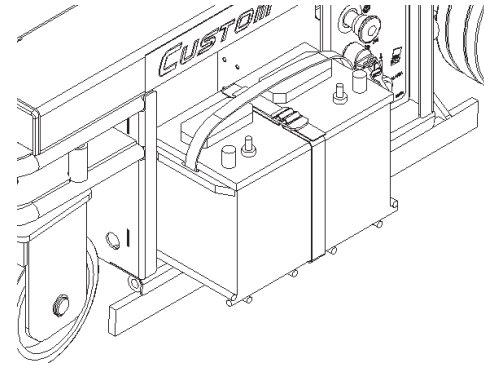


Figure 4: Battery Maintenance

**CAUTION**  
NEVER ADD ACID TO BATTERY!

### Charging the Battery

This unit is equipped with deep cycle 12-volt batteries. 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.

**WARNING**  
LEAD-ACID BATTERIES GENERATE EXPLOSIVE GASES. KEEP SPARKS AND FLAME AWAY FROM BATTERIES. DO NOT SMOKE WHILE CHARGING.

- Park the machine on a level surface.
- Plug charger into AC outlet until charged.
- Unplug charger.

The charger will not begin charging on severely discharged batteries. This will be evident by the three indicators blinking simultaneously.

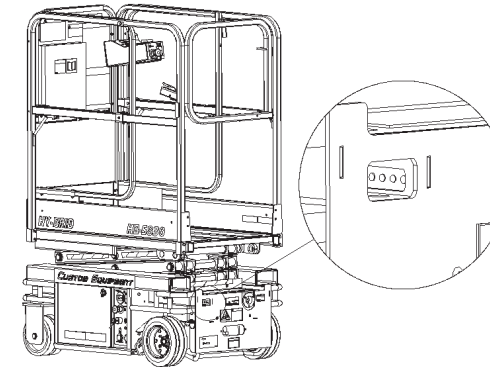


Figure 5: Battery Charger LED Display

	50%	75%	100%	GEL
<b>Charger LED Display</b>				
<b>Charging State</b>	⊙	⊙	⊙	⊙
0 to 50% charged	Blinking	Off	Off	NA
50% to 75% charged	On	Blinking	Off	NA
75% to 100% charged	On	On	Blinking	NA
100% charged	On	On	On	NA
Charge for flooded type batteries	NA	NA	NA	Off
Charge for Sealed type batteries	NA	NA	NA	On
Abnormal Cycle	Off	Off	Blinking	NA

**WARNING**  
DO NOT OPERATE UNIT WHILE CHARGING.  
DO NOT DISABLE CHARGER INTERLOCK.

**CAUTION**  
NEVER ADD ACID TO BATTERY!

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 electromagnetic 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
Monthly Battery Care:			
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.			

**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-830CE 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 wheel axle retaining rings and set screw in rear wheel are tight.			
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)			
Drive Enable (Must be activated to drive)			
Joystick (Return to neutral, drives forward, reverse, left, right)			
Lift Enable (Must be activated to elevate)			
Rocker Switch (Elevates, Lowers)			
Horn			
Tilt & Overload LED Indicators			
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)			
Hour meter (Displays Drive Hours)			
Alarms (Not damaged, sounds for descent, overload)			
LED (Flashes when overloaded)			
Wheels: Front and rear wheels rotate, pivot freely.			
Drives in slow speed when elevated.			
Brakes: Machine stops when joystick released.			
Pothole guards deploy and lock when platform is raised.			
Lift does not elevate when pothole guards are blocked.			

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 \_\_\_\_\_ 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.			
Check electrical motor brushes (every 150 hours)			
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.			
Elevated and Lowered drive speeds do not exceed specifications listed in Operators manual.			
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-830CE 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
<b>Base:</b>				<b>Decals:</b>			
Inspect roller tracks for damage				Legibility			
All frame bolts tight				Correct capacity noted			
Pump Secure				Proper placement quantity			
DC motors secure				<b>Wiring:</b>			
Battery Hold Downs Secure				Switches secure			
Batteries Fully Charged				Contactors secure			
Wheels: Snap Rings Secure				Tight on terminals (No loose wiring)			
Wheels: Bolts/Nuts Tight				<b>Functions:</b>			
Maintenance Locks: Pins in cabinet				Drive, Lift, Steer Functions Operational			
All Shields/Guards in place				Emergency Stop Breaks Circuits			
Hydraulic Oil Level 1" from top				Slow Speed limit switch Set properly			
Check all hydraulic hoses for leaks				Emergency Down Operational			
Check all hydraulic fittings for leaks				Pothole guards deploy when platform			
<b>Scissors:</b>				Pothole interlock functions correctly			
Broken Welds				<b>Brakes: Operational</b>			
Bent Beam Members				Tilt sensor Functional			
All rollers Turn Freely				Warning Horn Alarms			
Ret. Rings Secure On Pivots				Motion Alarms Functional			
Broken welds				Hour meter operational			
<b>Platform:</b>				Battery indication operational			
All rails in place/secure				Verify Overload Calibration			
No bent rails				Battery Charger Secure/Operational			
No broken welds							
110V outlet safe/working (if installed)							
Entrance gate Closes Freely							
Operator/Service Manual Included							
Cables in place/secure							
Extending platform extends freely							
Extending platform Locks in Stowed Position							
Extending platform Locks in Extended Position							
Comments:							

DATE \_\_\_\_\_ INSPECTED BY \_\_\_\_\_

**Technical References**  
**Joystick Service Flash Codes**



The amber Service Indicator LED displays diagnostic codes.

A sequence of flashes, separated by a pause, followed by a repetition of the sequence. The number of flashes indicates a condition.

Flash Code	Description	Notes
1	User Fault	Possible stall timeout or user error. Release the joystick to neutral and try again.
2	Battery Fault	Try charging batteries. Batteries may require replacing. Check batteries and cables.
3	Left Motor Fault	Check left motor, connections, and cabling
4	Right Motor Fault	Check right motor, connections, and cabling.
5	Left Park Brake Fault	Check left park brake, connections, and cabling.
6	Right Park Brake Fault	Check the right park brake, connections and cabling
7	Remote Fault	Check the Communications Bus connectors and wiring. Replace the Remote (Joystick).
8	Power Module Fault	Check the Communications Bus connectors and wiring. Replace the Power Module.
9	Communications Fault	One cause of this error is when the unit is powered down without turning off the joystick (i.e. using the emergency stop). To clear, with the machine on (using the key switch), turn the joystick off and back on (joystick on/off button).  Check that battery voltage is greater than 17V. Check the Bus Cable. Replace the Power Module. Replace the Remote (Joystick).
10	Unknown Fault	Check all connections and wiring. Contact manufacturer.
11	Incompatible Remote	The Remote is incompatible with the Power Module. Ensure that the correct part number is used.

See also "Upper Control Battery Gauge Indicator" codes listed in the Operator's Manual.



## Control Module—GP102 Help Messages

When the EZcal hand-held device is connected to the GP102 control module, the first menu available is “HELP” – just press the ENTER button to see a message describing the current status of the GP102; this can be very helpful in diagnosing problems with the system. When an EZcal is unavailable, an LED on the GP102 flashes to provide limited diagnostics (see Appendix Four).

The following messages might be displayed:

### **EVERYTHING OK**

The GP102 is in platform mode and detects no problems. If problems are being experienced with the system, use the DIAGNOSTICS menus to check for faulty sensors and/or switches. LED on steady.

### **IN GROUND MODE!**

The GP102 is in ground mode and detects no problems. IMPORTANT: Normally the overload cutout system is inhibited in ground mode. The vehicle should not be used to raise heavy loads in ground mode, in case the platform is overloaded. LED on steady.

### **ARMGUARD ACTIVE!**

The GP102 has stopped descent at the Armguard height, and is delaying to “give the operator the opportunity to see whether persons ... could be injured” (per EN 280 5.4.4). Vehicle movement will continue to be stopped after the delay until all functions are released. LED flash code 4.

### **B+ SUPPLY TOO LOW**

The GP102 is designed for use on 12V and 24V battery powered vehicles; it cannot operate with a supply below about 9V. The “BATTERY” voltage can be checked in the “SENSORS” menu (available in the “DIAGNOSTICS” menu). LED flash code 7.

### **DRIVE/LIFT SELECT INPUTS FAULTY!**

Neither the drive select (P2-7) nor the lift select (P2-8) input is active, or both are active – the GP102 cannot determine the vehicle use. All vehicle operation will be prevented until the problem is corrected. LED flash code 2.

### **ELEVATION SWITCH SHIFTED?**

The GP102 uses the elevation switch in combination with the height sensor to ensure correct functionality of both; any of the following faults may be detected:

- The elevation switch should change state near the point at which it did during load calibration All vehicle operation will be prevented until the problem is corrected. LED flash code 4.

### **ELEVATION SWITCH STUCK?**

The GP102 uses the elevation switch in combination with the height sensor to ensure correct functionality of both; any of the following faults may be detected:

- When the platform is elevated, the measured height should be above that stored during load calibration.
- When the platform is not elevated, the measured height should be below that stored during load calibration. All vehicle operation will be prevented until the problem is corrected. LED flash code 4.

### **EMS INPUTS FAULTY!**

The EMS platform (P2-1) and EMS ground (P2-2) inputs are either both active or both inactive – the GP102 cannot determine whether to be in platform or ground mode. All vehicle operation will be prevented until the problem is corrected. LED flash code 2.

### **FACTORY OVERRIDE**

To allow vehicle movement during manufacture, the GP102 is delivered in a “FACTORY OVERRIDE” state which disables all functionality. The first load calibration (even if not completed) will terminate this state. LED flash code 15.

### **FAULT: BAD TILT SENSOR**

The GP102 has detected that its integral tilt sensor is faulty – the module may need to be replaced. IMPORTANT: If the GP102 is installed incorrectly, this fault may occur erroneously. LED flash code 8.

### **HEIGHT NOT CALIBRATED**

During the first phase of load calibration (“DYNAMIC”), the GP102 calibrates the minimum and maximum output of the height sensor so that platform height can be determined. This calibration must be successfully completed! LED flash code 1.

### **IDLE TIMEOUT ACTIVE!**

If configured, the GP102 will turn off all its outputs after a set time with no vehicle functions operated; this saves battery power and silences any alarm still sounding when the vehicle was left. Any vehicle function will end the idle timeout and restore normal operation of the GP102 outputs. LED stays off.

### **INVALID HEIGHT – CHECK SENSORS**

There is a problem which prevents the vehicle height being determined; there may be a fault with the height sensor, or the vehicle may have been modified or damaged since the last calibration occurred. All vehicle operation will be prevented until the problem is corrected. LED flash code 9.

### **INVALID LOAD – CHECK SENSORS**

There is a problem which prevents the estimated load being determined; there may be a fault with the height sensor or the load sensor, or the vehicle may have been modified or damaged since the last calibration occurred. All vehicle operation will be prevented until the problem is corrected. LED flash code 6.

### **LOAD NOT CALIBRATED**

During the second and third phases of load calibration (“LOADED” and “EMPTY”), the GP102 calibrates the lift cylinder pressure at various heights corresponding to a fully loaded and unloaded platform. This calibration must be successfully completed! LED flash code 1.

### **NO LAST CALDATE!**

At the end of load calibration, the GP102 prompts for entry of the current date to aid in vehicle maintenance. A non-zero date must be entered! When load (re)calibration is begun, the last CALDATE is erased and cannot be re-entered until calibration is completed; this ensures that a partly calibrated vehicle cannot be operated. LED flash code 1.

### **P3-4 SHORT TO 0V?**

The GP102 startup tests detected that something is overloading the output on P3-4. All vehicle operation will be prevented until the problem is corrected. LED flash code 5.

### **P3-4 SHORT TO SUPPLY?**

The GP102 startup tests (or the continuous monitoring during any prevention of vehicle movement) detected that something is providing a permanent supply on P3-4 (defeating the internal cutout). All vehicle operation will be prevented until the problem is corrected. LED flash code 3.

### **P3-6 SHORT TO 0V?**

The GP102 startup tests detected that something is overloading the output on P3-6. All vehicle operation will be prevented until the problem is corrected. LED flash code 5.

### **P3-6 SHORT TO SUPPLY?**

The GP102 startup tests detected that something is providing a permanent supply on P3-6 (defeating the internal cutout). All vehicle operation will be prevented until the problem is corrected. LED flash code 3.

### **P4-1 OR P5-1 SHORT TO 0V?**

The GP102 startup tests detected that something is overloading the 5V supply provided on P4-1 or P5-1. All vehicle operation will be prevented until the problem is corrected. LED flash code 7.

### **TESTING HWFS**

When the GP102 is powered up, it carries out various tests to ensure that it is functioning safely.

### **TOO HIGH – DRIVE PREVENTED**

A drive function has been selected but the platform is raised above the “MAX DRIVE” setting. The drive function will be prevented until the platform is lowered. LED flash code 8.

### **TOO HIGH – LIFT UP PREVENTED**

The lift/up function has been selected but the platform is raised above the “MAX LIFT” setting. The lift/up function will be prevented until the platform is lowered. LED flash code 8.

### **UP/DOWN SELECT INPUTS ACTIVE TOGETHER!**

The up select (P2-3 and/or P2-5) and the down select (P2-4 and/or P2-6) are active together – the GP102 cannot determine the vehicle use. All vehicle operation will be prevented until the problem is corrected. LED flash code 2.

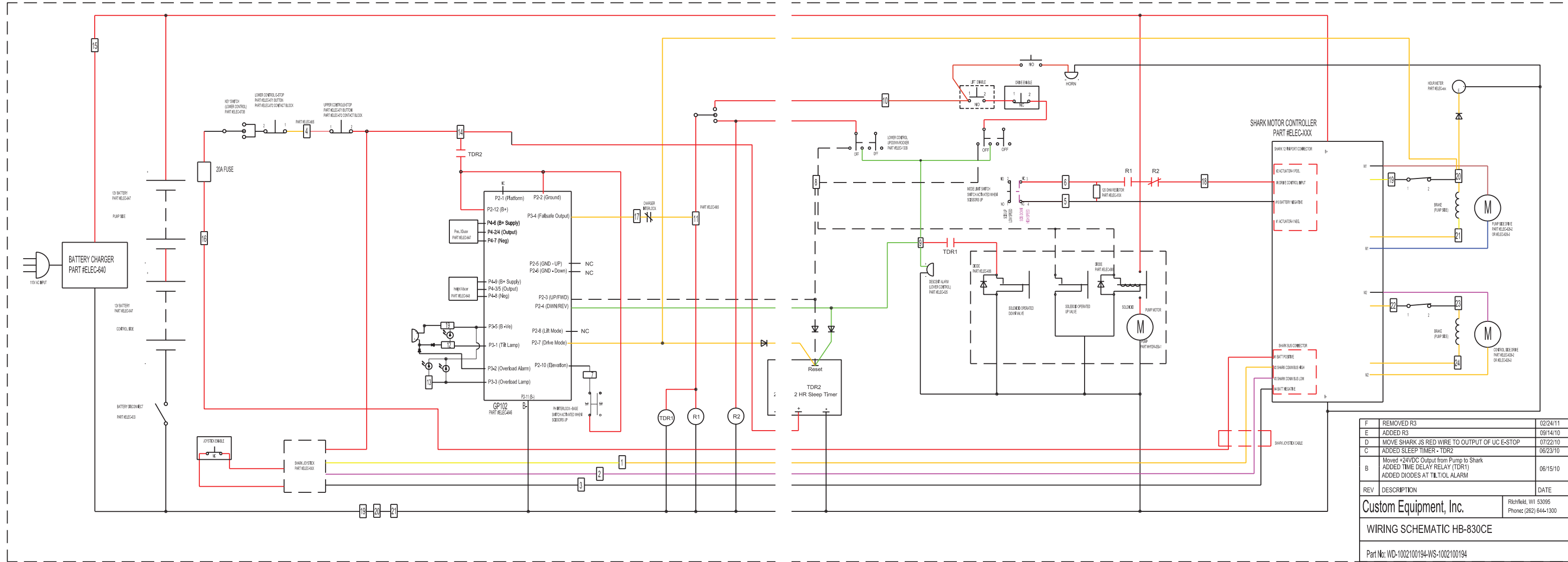
### **VEHICLE OVERLOADED**

The estimated load in the platform exceeds the “OVERLOAD AT” setting in the “ADJUSTMENTS” “LOAD” menu. The GP102 will activate the cutout to prevent vehicle operation until the platform load is reduced. LED flash code 8.

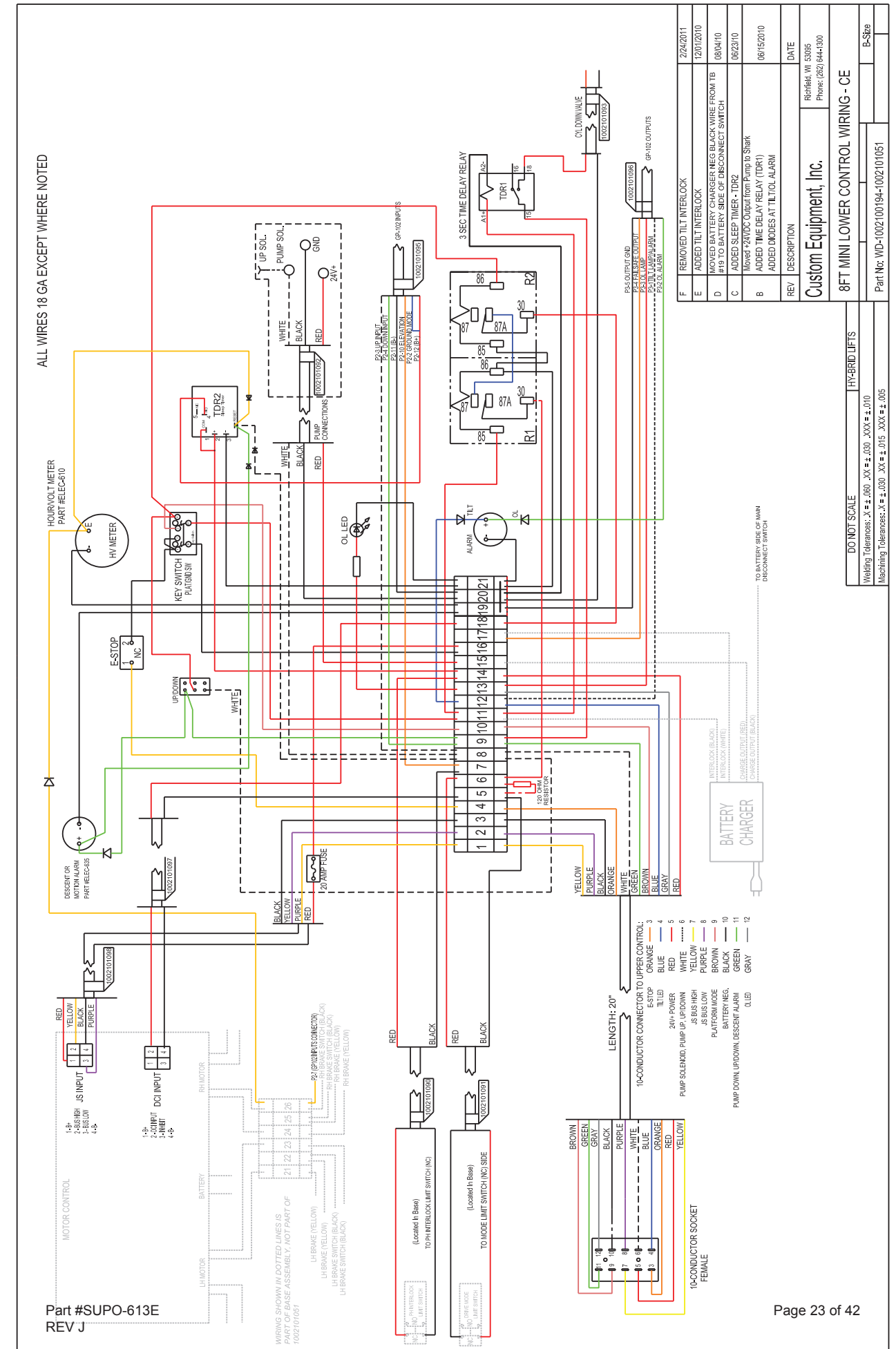
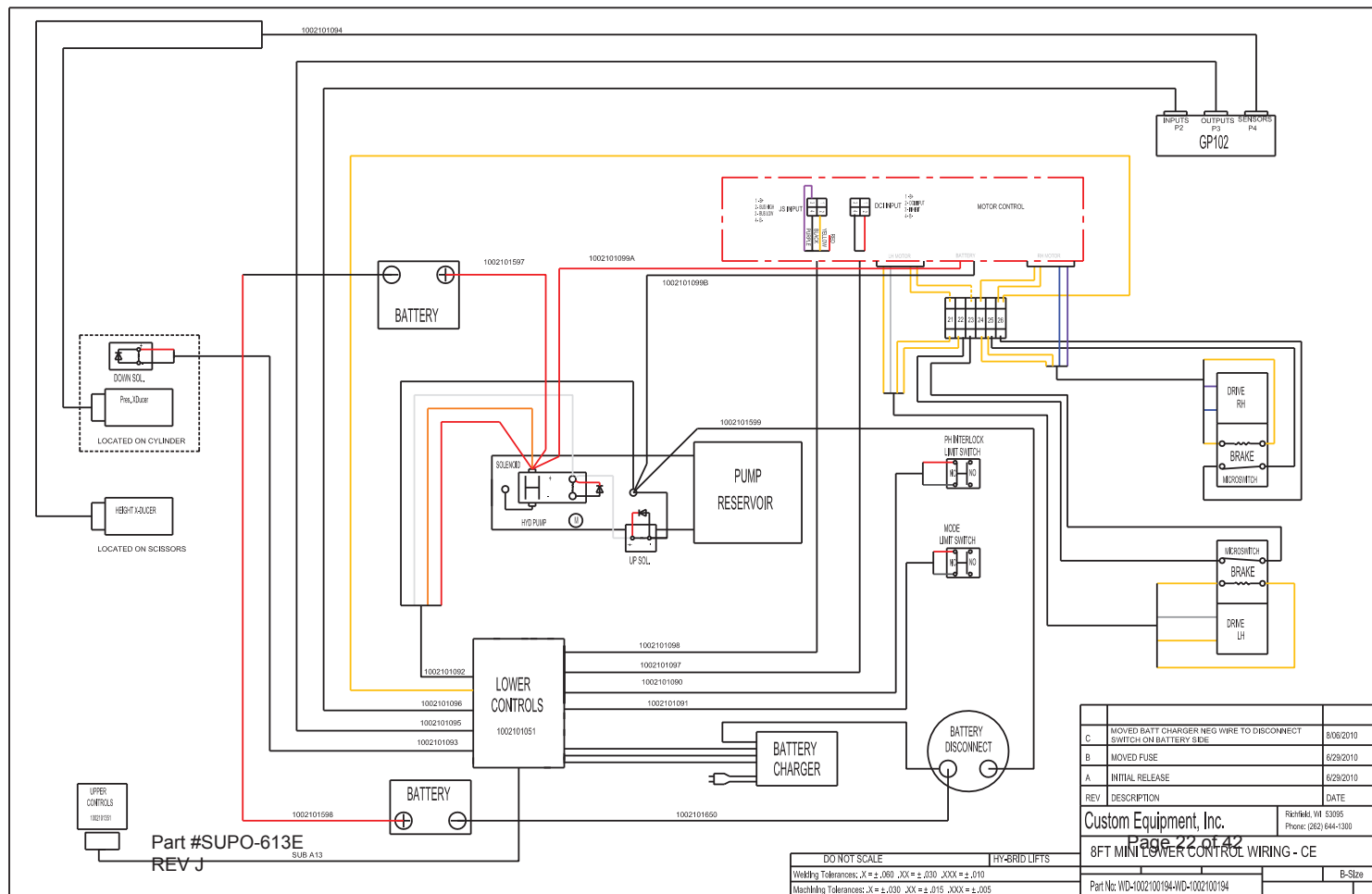
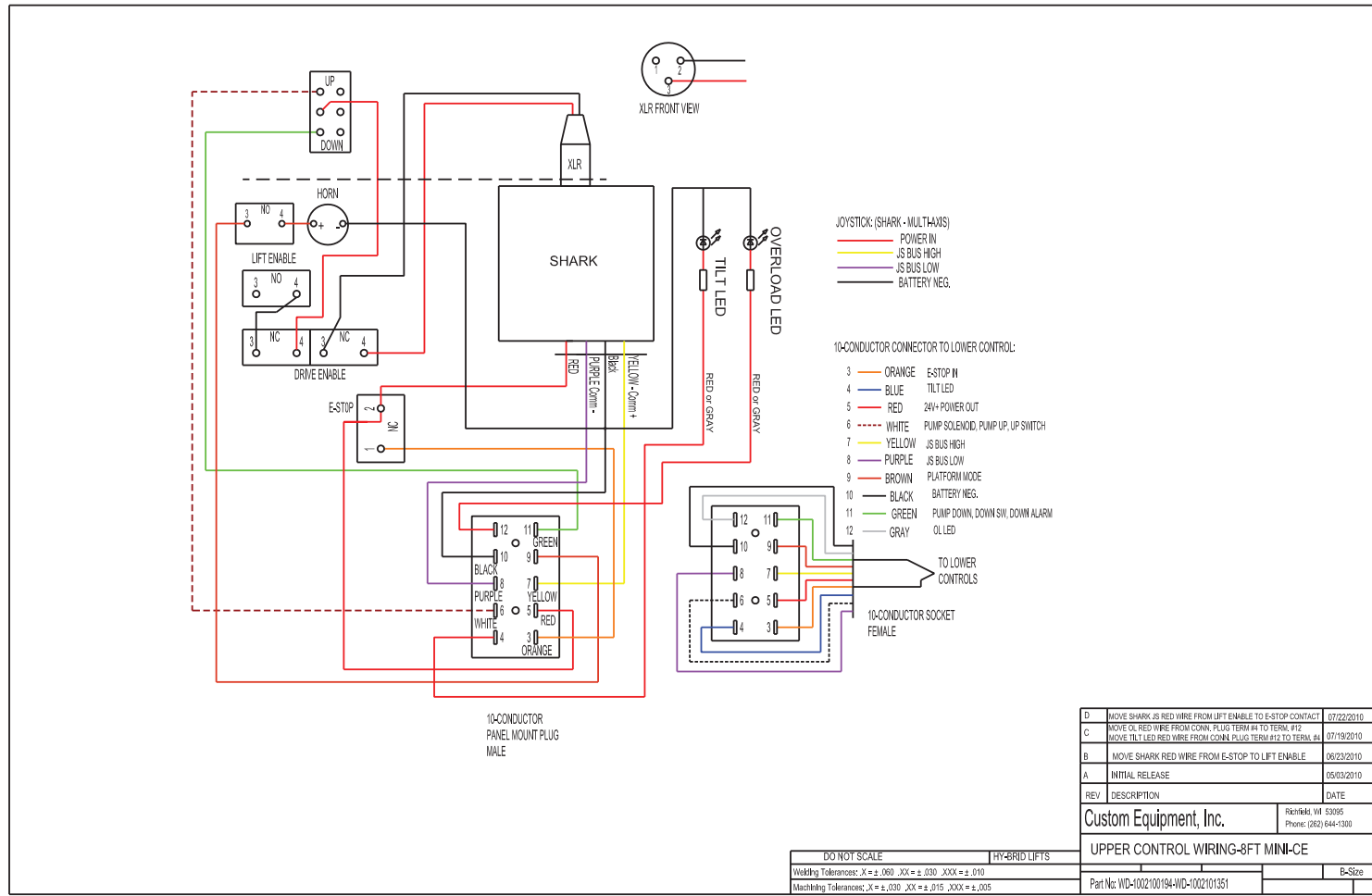
### **VEHICLE TILTED**

Either the “X” or “Y” tilt (measured by the GP102 integral tilt sensor) exceeds the “X TRIP” or “Y TRIP” setting in the “ADJUSTMENTS” “TILT” menu. LED flash code 8.

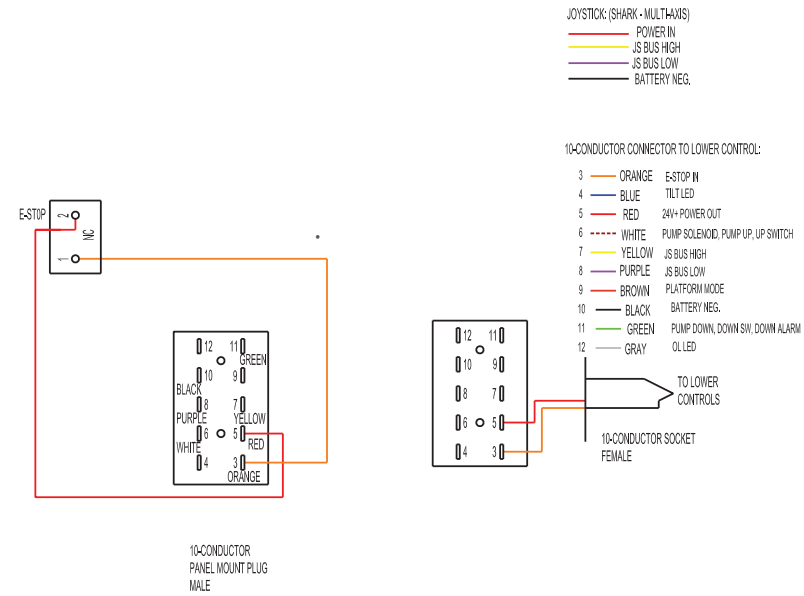




F	REMOVED R3	02/24/11
E	ADDED R3	09/14/10
D	MOVE SHARK JS RED WIRE TO OUTPUT OF UC E-STOP	07/22/10
C	ADDED SLEEP TIMER - TDR2	06/23/10
B	Moved +24VDC Output from Pump to Shark ADDED TIME DELAY RELAY (TDR1) ADDED DIODES AT TILT/OIL ALARM	06/15/10
REV	DESCRIPTION	DATE
<b>Custom Equipment, Inc.</b> WIRING SCHEMATIC HB-830CE		Richfield, WI 53095 Phone: (262) 644-1300
Part No: WD-1002100194-WS-1002100194		

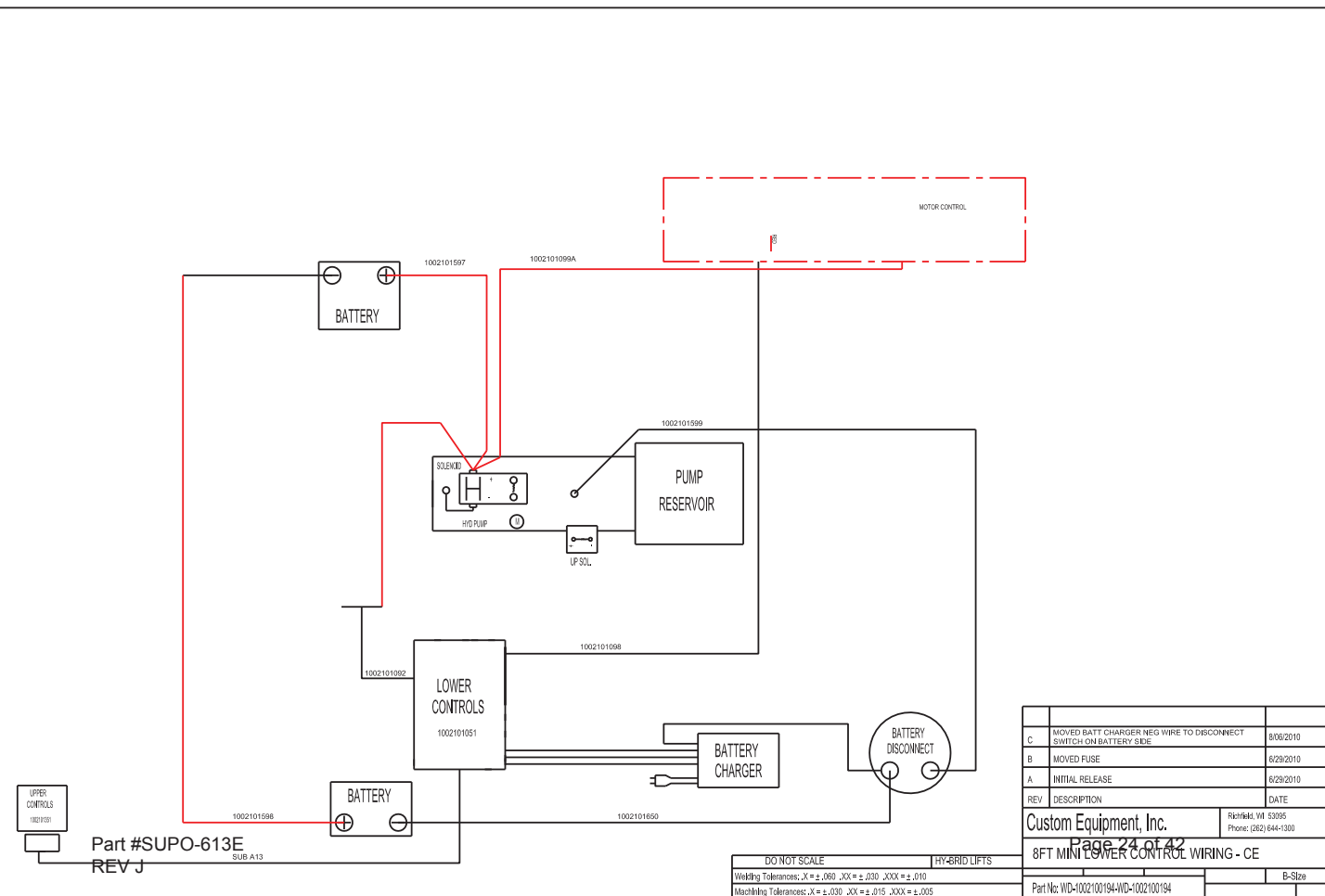


# WIRING DIAGRAM MAIN POWER/SAFETY CIRCUIT



D	MOVE SHARK JS RED WIRE FROM LIFT ENABLE TO E-STOP CONTACT	07/22/2010
C	MOVE O/L RED WIRE FROM CONN. PLUS TERM #4 TO TERM #12 MOVE TILT LED RED WIRE FROM CONN. PLUS TERM #12 TO TERM #4	07/19/2010
B	MOVE SHARK RED WIRE FROM E-STOP TO LIFT ENABLE	06/23/2010
A	INITIAL RELEASE	05/03/2010
REV	DESCRIPTION	DATE
<b>Custom Equipment, Inc.</b> Richfield, WI 53085 Phone: (262) 644-1300		
UPPER CONTROL WIRING-8FT MINI-CE		B-Size
Part No: WD-1002100194-WC-1002101351		

DO NOT SCALE HY-BRID LIFTS  
 Welding Tolerances: X = ±.060 XX = ±.030 XXX = ±.010  
 Machining Tolerances: X = ±.000 XX = ±.015 XXX = ±.005

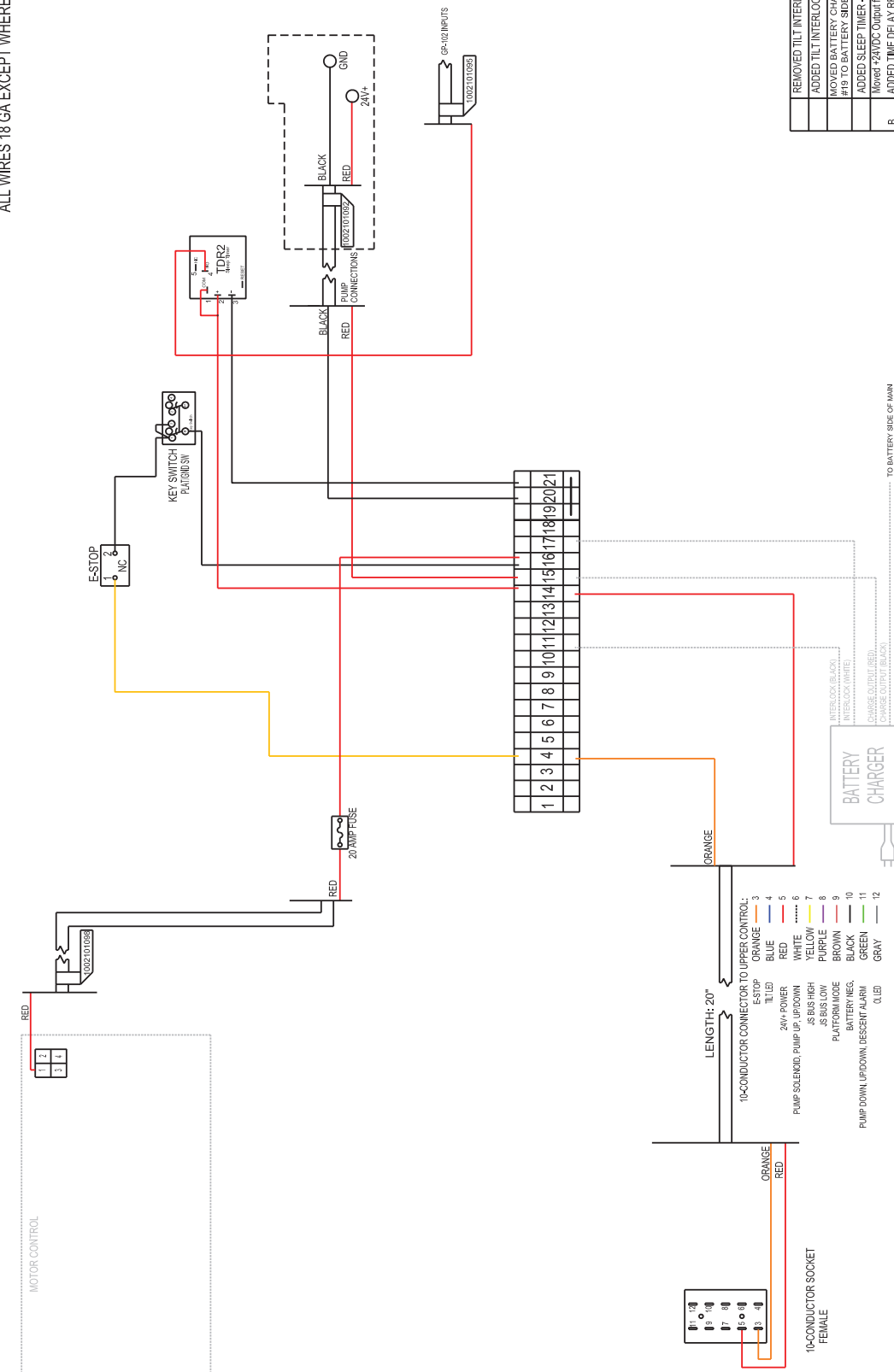


C	MOVED BATT CHARGER NEG WIRE TO DISCONNECT SWITCH ON BATTERY SIDE	8/06/2010
B	MOVED FUSE	6/29/2010
A	INITIAL RELEASE	6/29/2010
REV	DESCRIPTION	DATE
<b>Custom Equipment, Inc.</b> Richfield, WI 53085 Phone: (262) 644-1300		
8FT MINI LOWER CONTROL WIRING - CE		B-Size
Part No: WD-1002100194-WC-1002100194		

DO NOT SCALE HY-BRID LIFTS  
 Welding Tolerances: X = ±.060 XX = ±.030 XXX = ±.010  
 Machining Tolerances: X = ±.000 XX = ±.015 XXX = ±.005

# WIRING DIAGRAM MAIN POWER/SAFETY CIRCUIT

ALL WIRES 18 GA EXCEPT WHERE NOTED



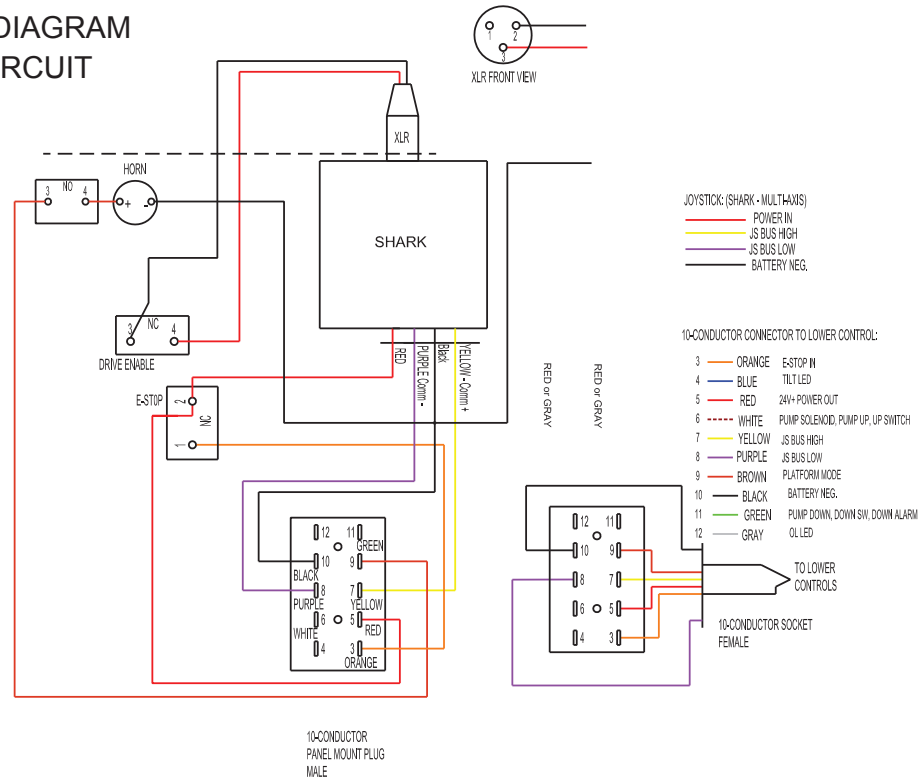
REMOVED TILT INTERLOCK	2/24/2011	
ADDED TILT INTERLOCK	12/01/2010	
MOVED BATTERY CHARGER NEG BLACK WIRE FROM TB #19 TO BATTERY SIDE OF DISCONNECT SWITCH	08/04/10	
ADDED SLEEP TIMER - TDR2	06/23/10	
MOVED +24VDC Output from Pump to Shark	06/15/2010	
ADDED TIME DELAY RELAY (TDR1)		
ADDED DIODES AT TILT ALARM		
REV	DESCRIPTION	DATE
<b>Custom Equipment, Inc.</b> Richfield, WI 53085 Phone: (262) 644-1300		
8FT MINI LOWER CONTROL WIRING - CE		B-Size
Part No: WD-1002100194-WC-1002101051		

DO NOT SCALE HY-BRID LIFTS  
 Welding Tolerances: X = ±.060 XX = ±.030 XXX = ±.010  
 Machining Tolerances: X = ±.000 XX = ±.015 XXX = ±.005

Part #SUPO-613E  
REV J

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# WIRING DIAGRAM DRIVE CIRCUIT



D	MOVE SHARK JS RED WIRE FROM LIFT ENABLE TO E-STOP CONTACT	07/22/2010
C	MOVE O/L RED WIRE FROM CONN. PLUS TERM #4 TO TERM #12	07/19/2010
B	MOVE TILT RED WIRE FROM CONN PLUS TERM #12 TO TERM #4	06/23/2010
A	INITIAL RELEASE	06/03/2010

REV DESCRIPTION DATE

Custom Equipment, Inc. Richfield, WI 53085 Phone: (262) 644-1300

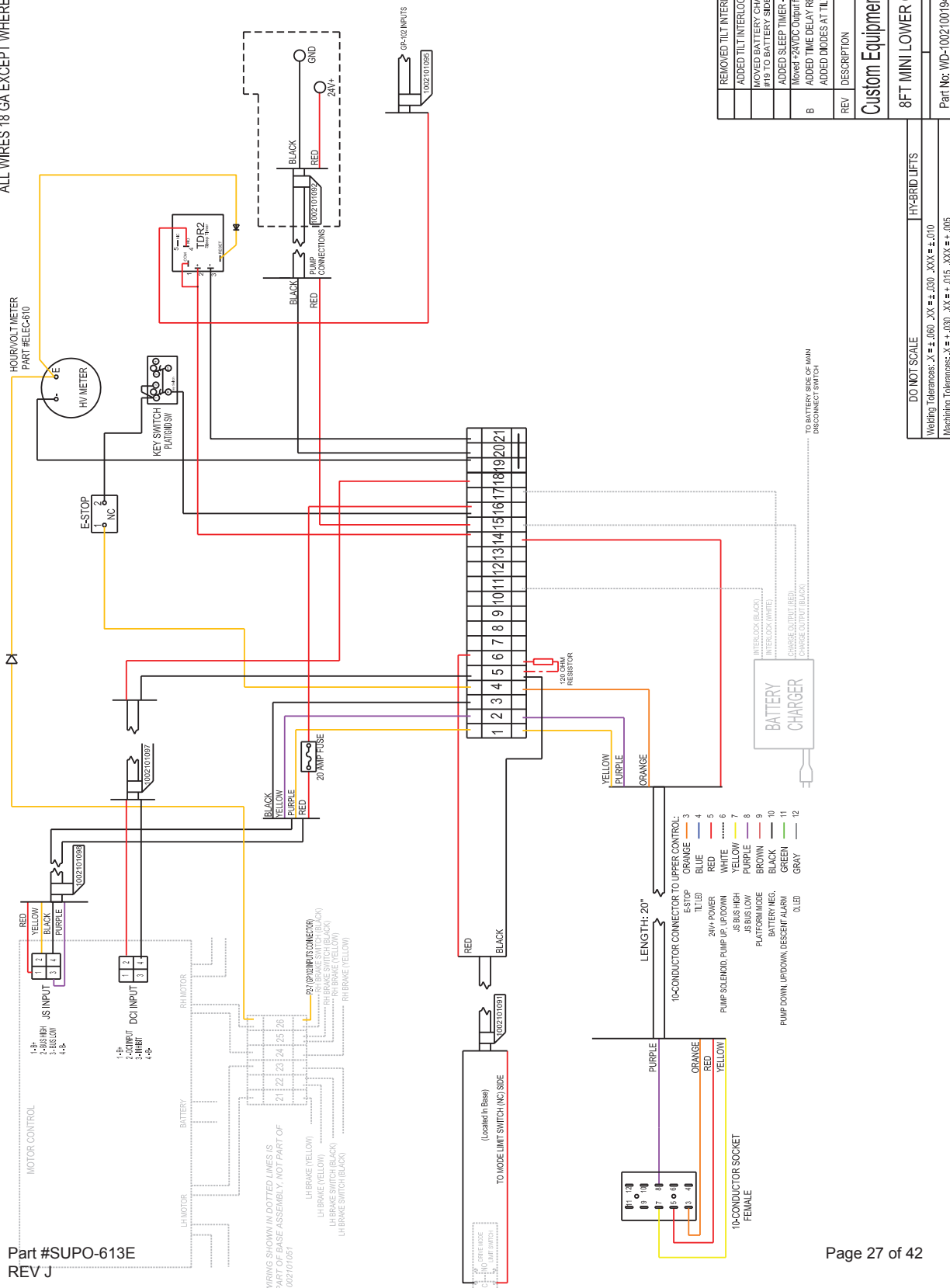
Part No: WD-1002100194-WC-1002101351

DO NOT SCALE HY-BRID LIFTS

Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.000, XX = ±.015, XXX = ±.005

# WIRING DIAGRAM DRIVE CIRCUIT

ALL WIRES 18 GA EXCEPT WHERE NOTED



REMOVED TILT INTERLOCK	2/24/2011
ADDED TILT INTERLOCK	12/01/2010
MOVED BATTERY CHARGER NEG BLACK WIRE FROM TB #19 TO BATTERY SIDE OF DISCONNECT SWITCH	08/04/10
ADDED SLEEP TIMER - TDR2	06/23/10
MOVED 24VDC Output from Pump to Shark	06/15/2010
ADDED TIME DELAY RELAY (TDR1)	
ADDED DIODES AT TILT ALARM	

REV DESCRIPTION DATE

Custom Equipment, Inc. Richfield, WI 53085 Phone: (262) 644-1300

Part No: WD-1002100194-002101051

DO NOT SCALE HY-BRID LIFTS

Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.000, XX = ±.015, XXX = ±.005

Part #SUPO-613E  
REV J

DO NOT SCALE HY-BRID LIFTS

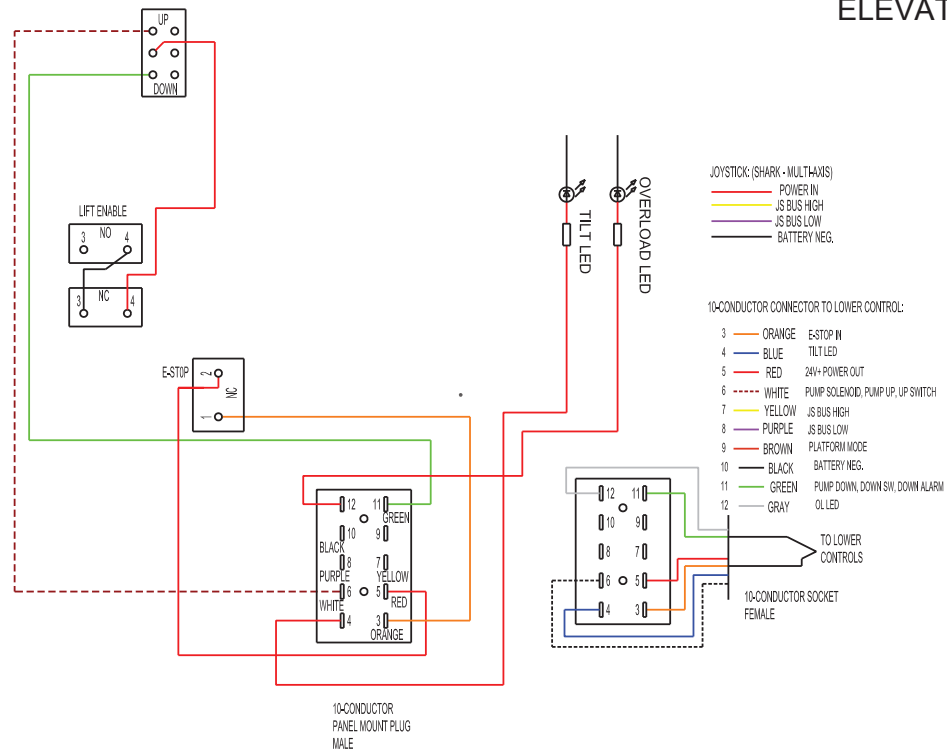
Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.000, XX = ±.015, XXX = ±.005

Part No: WD-1002100194-WC-1002101351

Part #SUPO-613E  
REV J

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### WIRING DIAGRAM ELEVATE/LOWER CIRCUIT



D	MOVE SHARK JS RED WIRE FROM LIFT ENABLE TO E-STOP CONTACT	07/22/2010
C	MOVE O/L RED WIRE FROM COIN, PLUS TERM #4 TO TERM #12	07/19/2010
B	MOVE SHARK RED WIRE FROM E-STOP TO LIFT ENABLE	06/23/2010
A	INITIAL RELEASE	06/03/2010
REV	DESCRIPTION	DATE

Custom Equipment, Inc.     Richfield, WI 53095  
Phone: (262) 644-1300

UPPER CONTROL WIRING-8FT MINI-CE

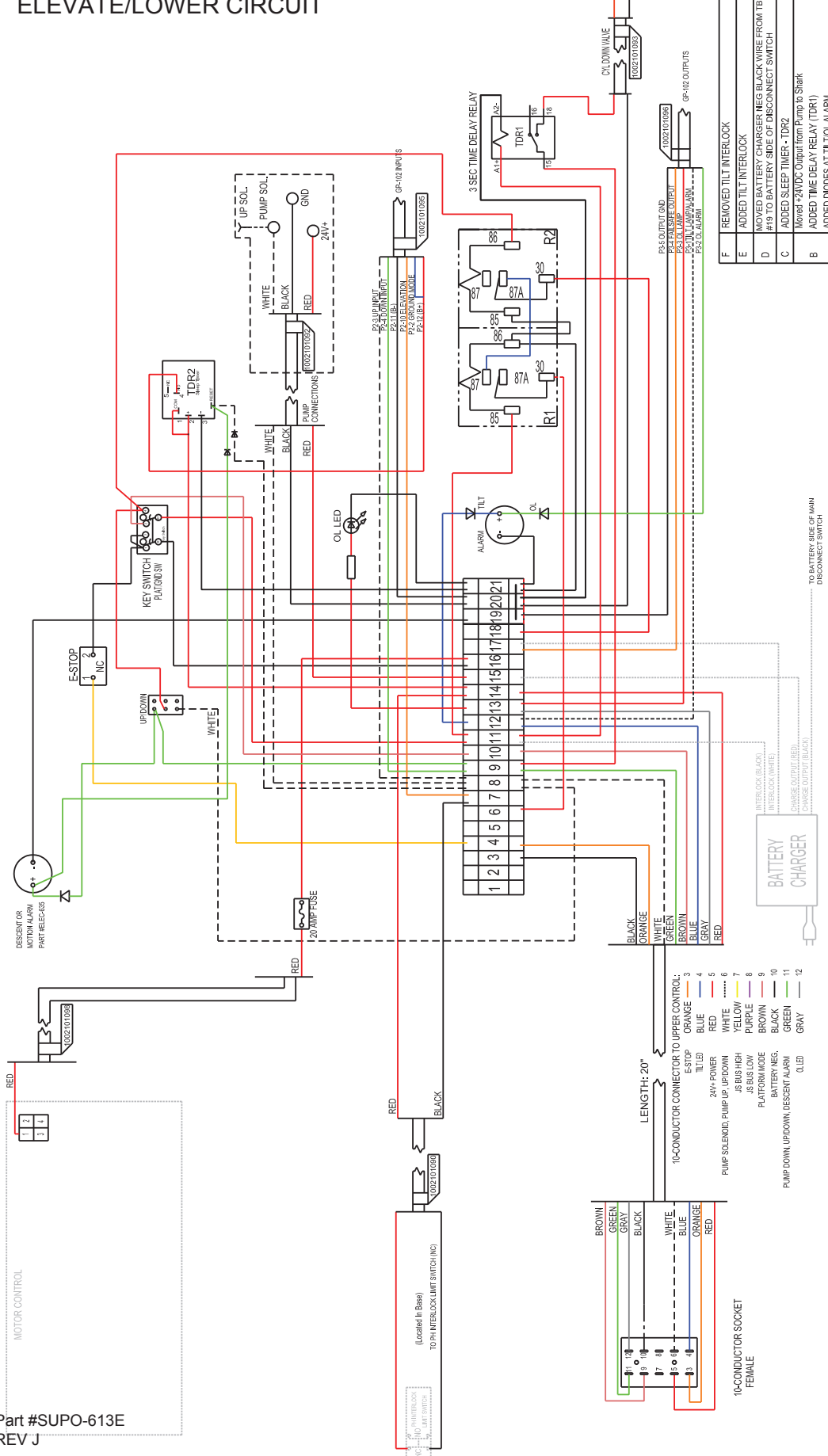
Part No: WD-1002100194-WC-1002101351

DO NOT SCALE     HY-BRID LIFTS

Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.030, XX = ±.015, XXX = ±.005

### WIRING DIAGRAM ELEVATE/LOWER CIRCUIT

ALL WIRES 18 GA EXCEPT WHERE NOTED



F	REMOVED TILT INTERLOCK	2/24/2011
E	ADDED TILT INTERLOCK	12/01/2010
D	MOVED BATTERY CHARGER NEG BLACK WIRE FROM TB #19 TO BATTERY SIDE OF DISCONNECT SWITCH	08/04/10
C	ADDED SLEEP TIMER - TDR2	06/23/10
B	Added 24VDC Output from Pump to Shark ADDED TIME DELAY RELAY (TDR1) ADDED DIODES AT TILT ALARM	06/15/2010
REV	DESCRIPTION	DATE

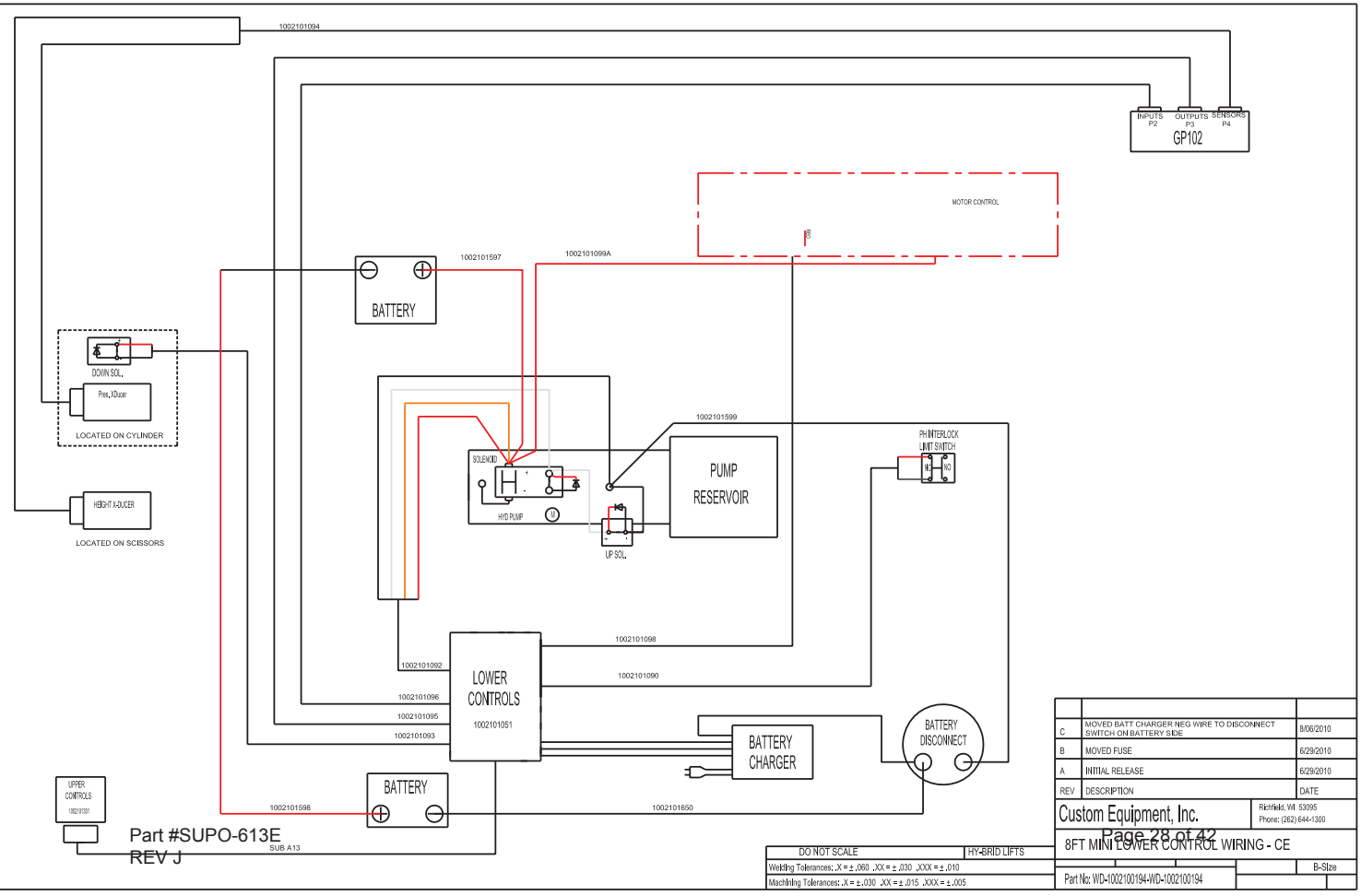
Custom Equipment, Inc.     Richfield, WI 53095  
Phone: (262) 644-1300

8FT MINI LOWER CONTROL WIRING - CE

Part No: WD-1002100194-002101051

DO NOT SCALE     HY-BRID LIFTS

Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.030, XX = ±.015, XXX = ±.005



C	MOVED BATT CHARGER NEG WIRE TO DISCONNECT SWITCH ON BATTERY SIDE	8/06/2010
B	MOVED FUSE	6/29/2010
A	INITIAL RELEASE	6/29/2010
REV	DESCRIPTION	DATE

Custom Equipment, Inc.     Richfield, WI 53095  
Phone: (262) 644-1300

8FT MINI LOWER CONTROL WIRING - CE

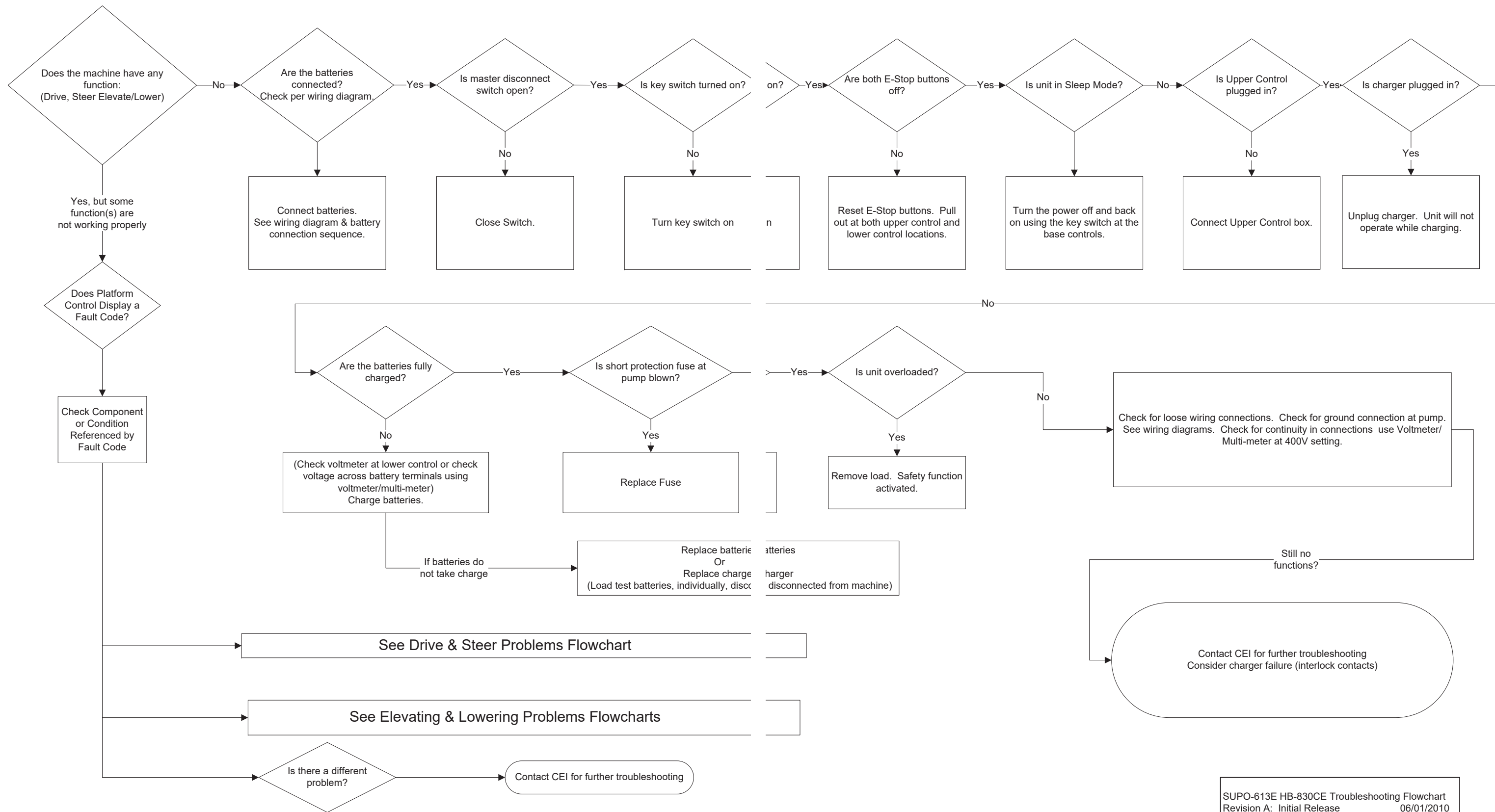
Part No: WD-1002100194-WC-1002100194

DO NOT SCALE     HY-BRID LIFTS

Welding Tolerances: X = ±.060, XX = ±.030, XXX = ±.010  
Machining Tolerances: X = ±.030, XX = ±.015, XXX = ±.005

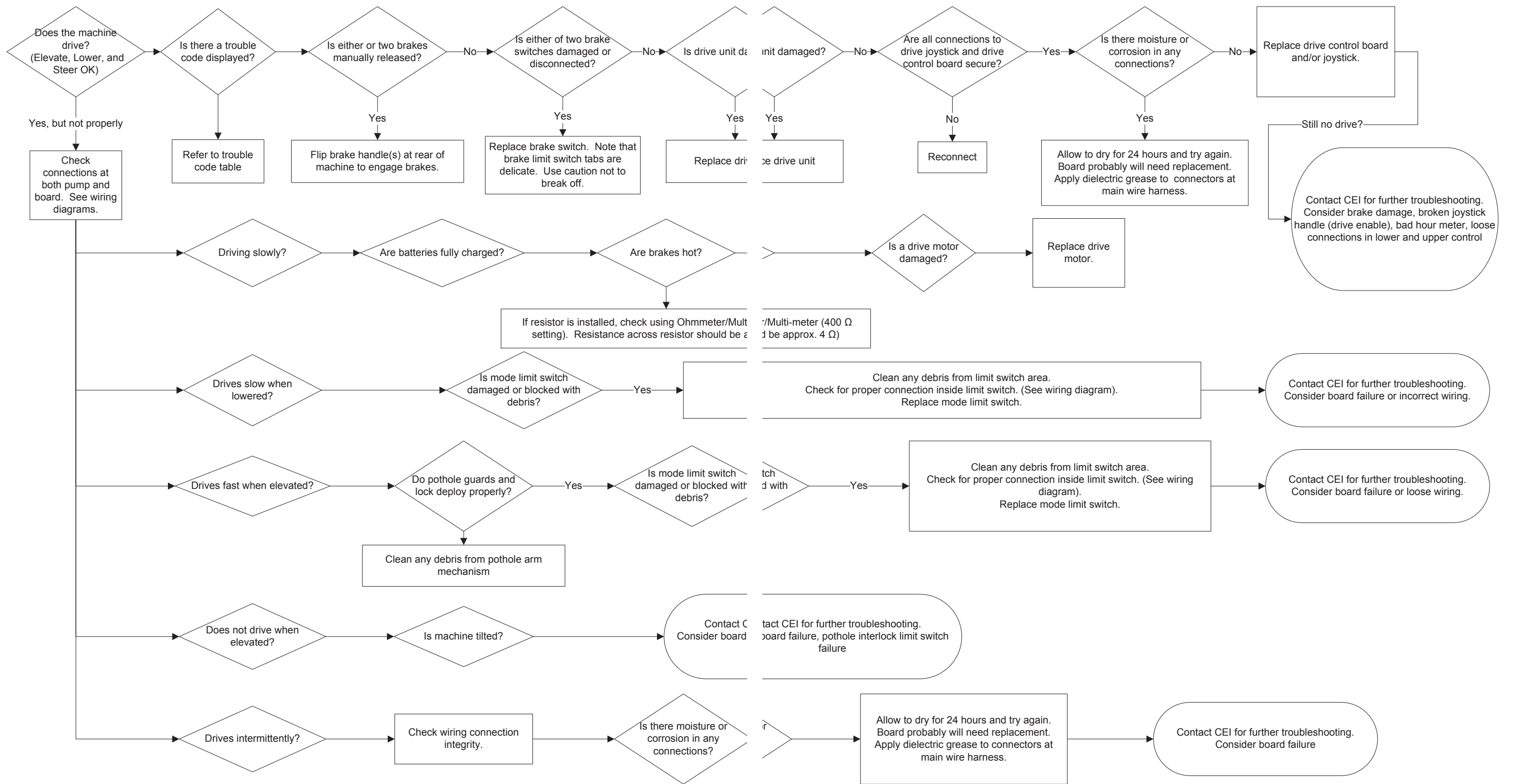
Part #SUPO-613E  
REV J

Part #SUPO-613E  
REV J

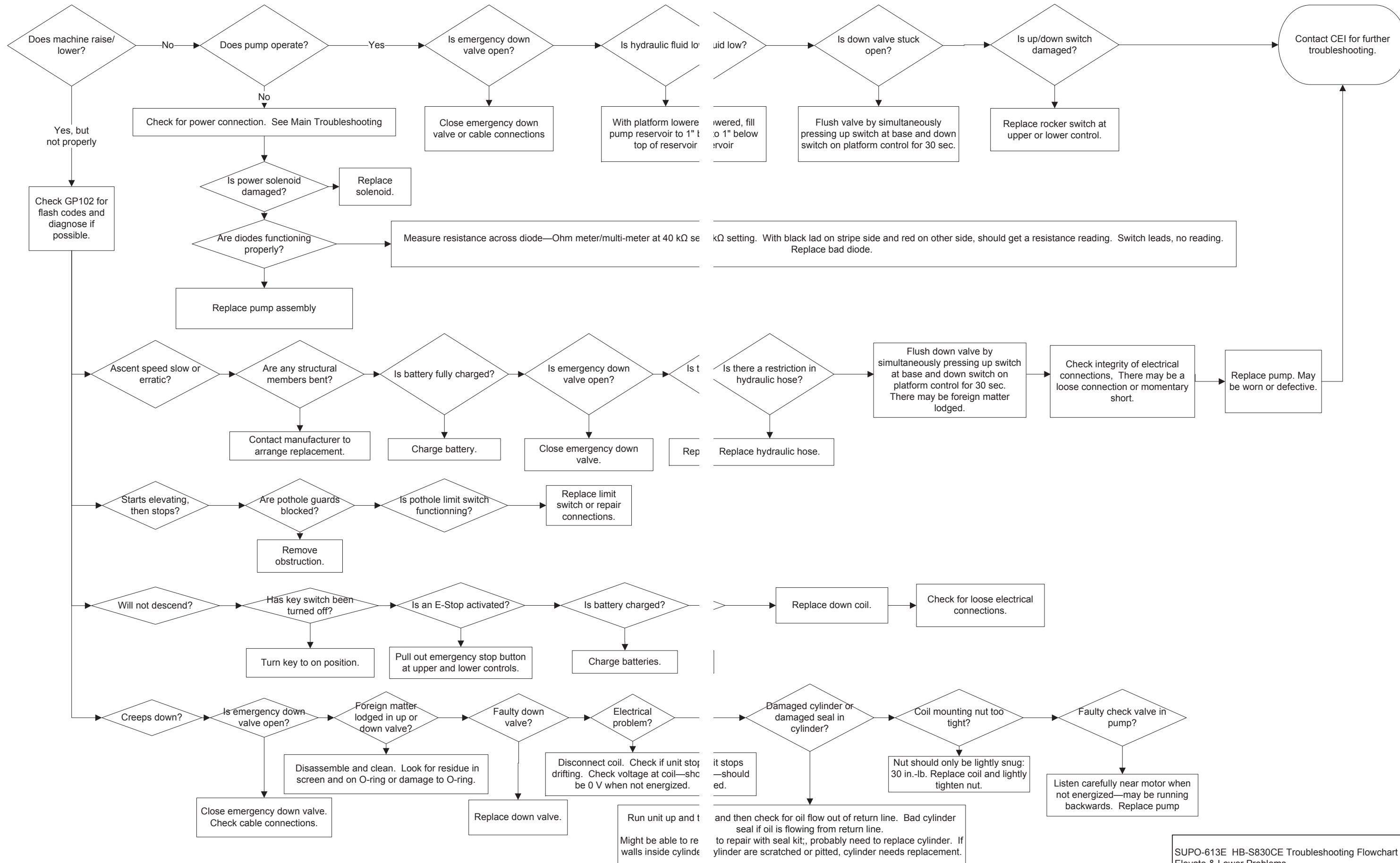


SUPO-613E HB-830CE Troubleshooting Flowchart  
 Revision A: Initial Release 06/01/2010  
 Revision B: Added Sleep Timer 06/29/2010





SUPO-613E HB-S830CE Troubleshooting Flowchart Drive Problems Revision A: Initial Release 06/01/2010



## Replacement Parts

### CAUTION

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

### DANGER

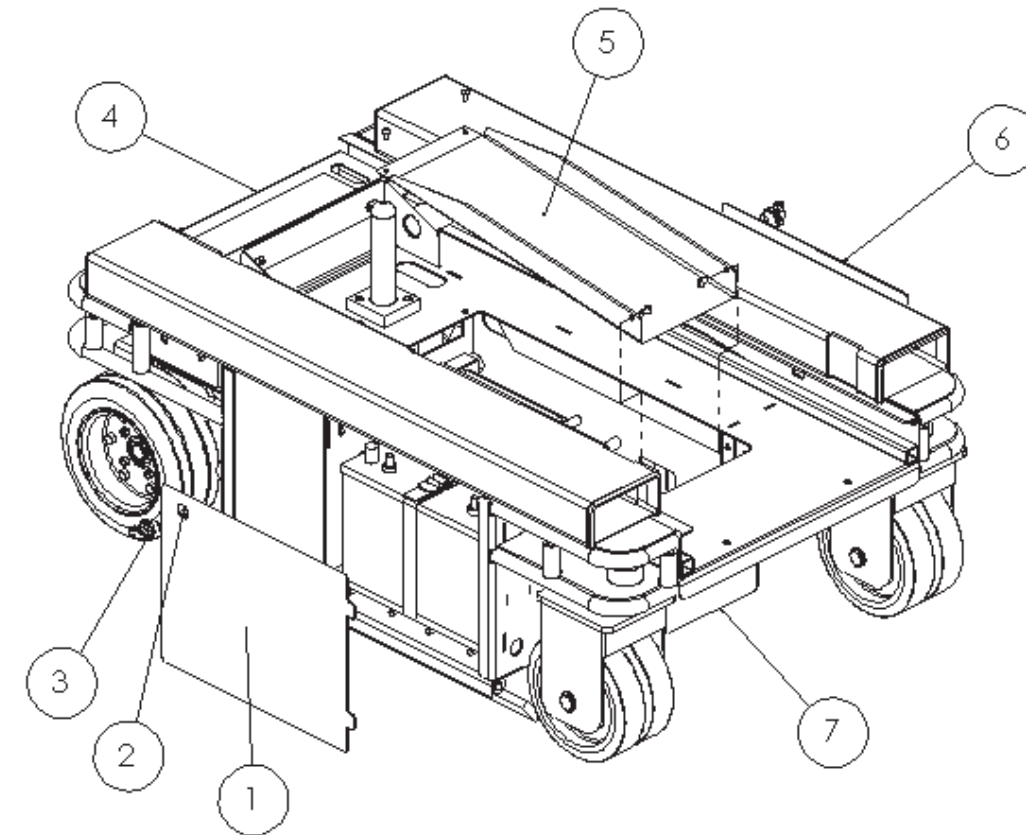
REPLACEMENT OF THE FOLLOWING COMPONENTS WILL AFFECT THE STRENGTH, STABILITY, OR SAFETY FUNCTION OF THE UNIT: BATTERY, HYDRAULIC CYLINDER, JOYSTICK AND CONTROL MODULES, AND ALL STRUCTURAL COMPONENTS.

Listed below are replacement parts that may be available and listed for reference. These represent current revisions. Refer to our website, [www.hybridlifts.com](http://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

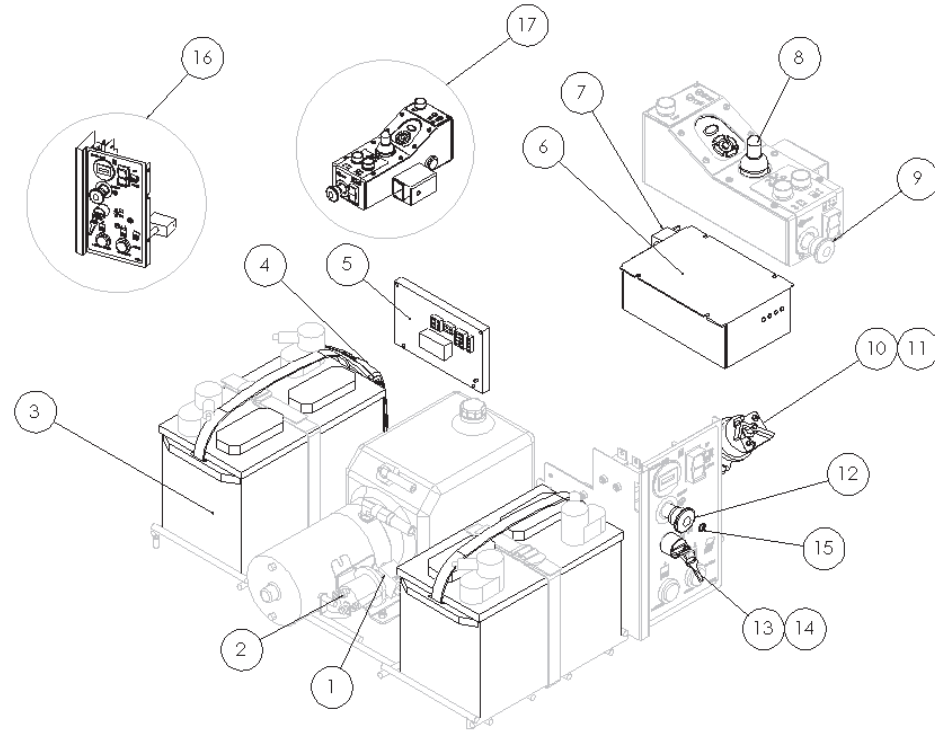
Refer to Operator's Manual for decal part numbers and locations.

## Covers/Other



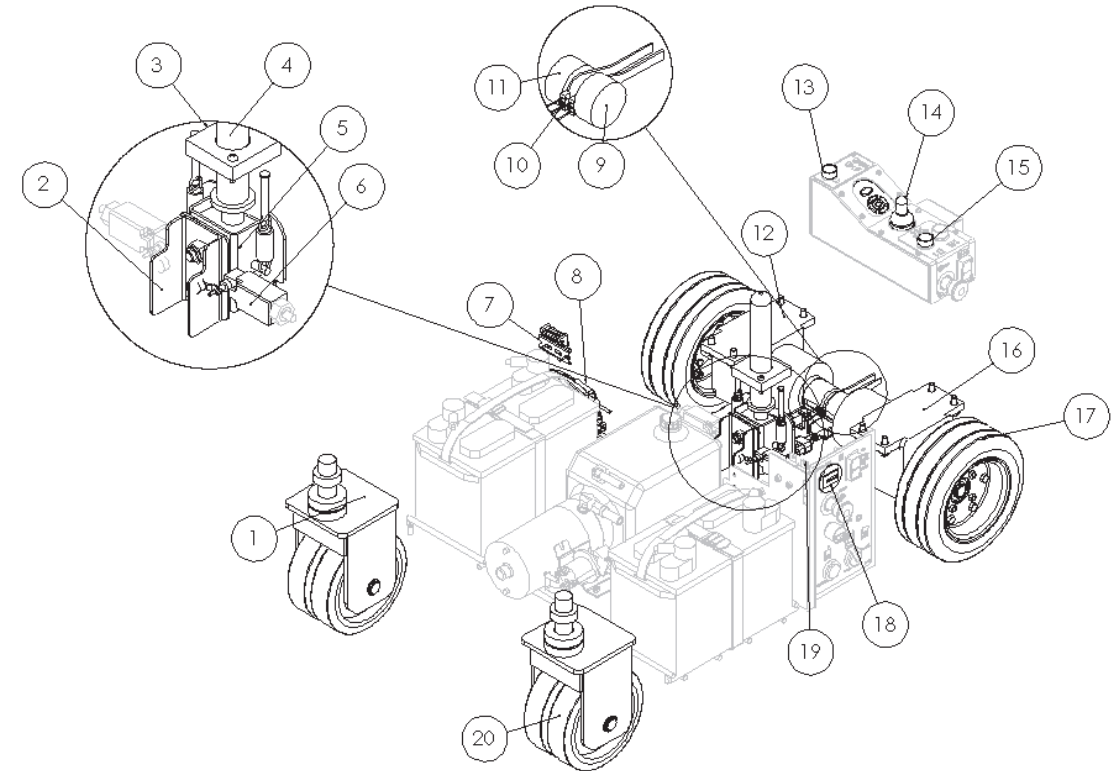
Item #	Part #	Description
1	1000500201	Cover, Side
2	HARD-633C	Cabinet Latch Cam
3	HARD-633B	Cabinet Latch Handle
4	1000103001	Step
5	1000500701	Cover, Pump Top
6	1000500201	Cover, Side
7	1000500601	Cover, Pump End

### Main Power/Safety Circuit



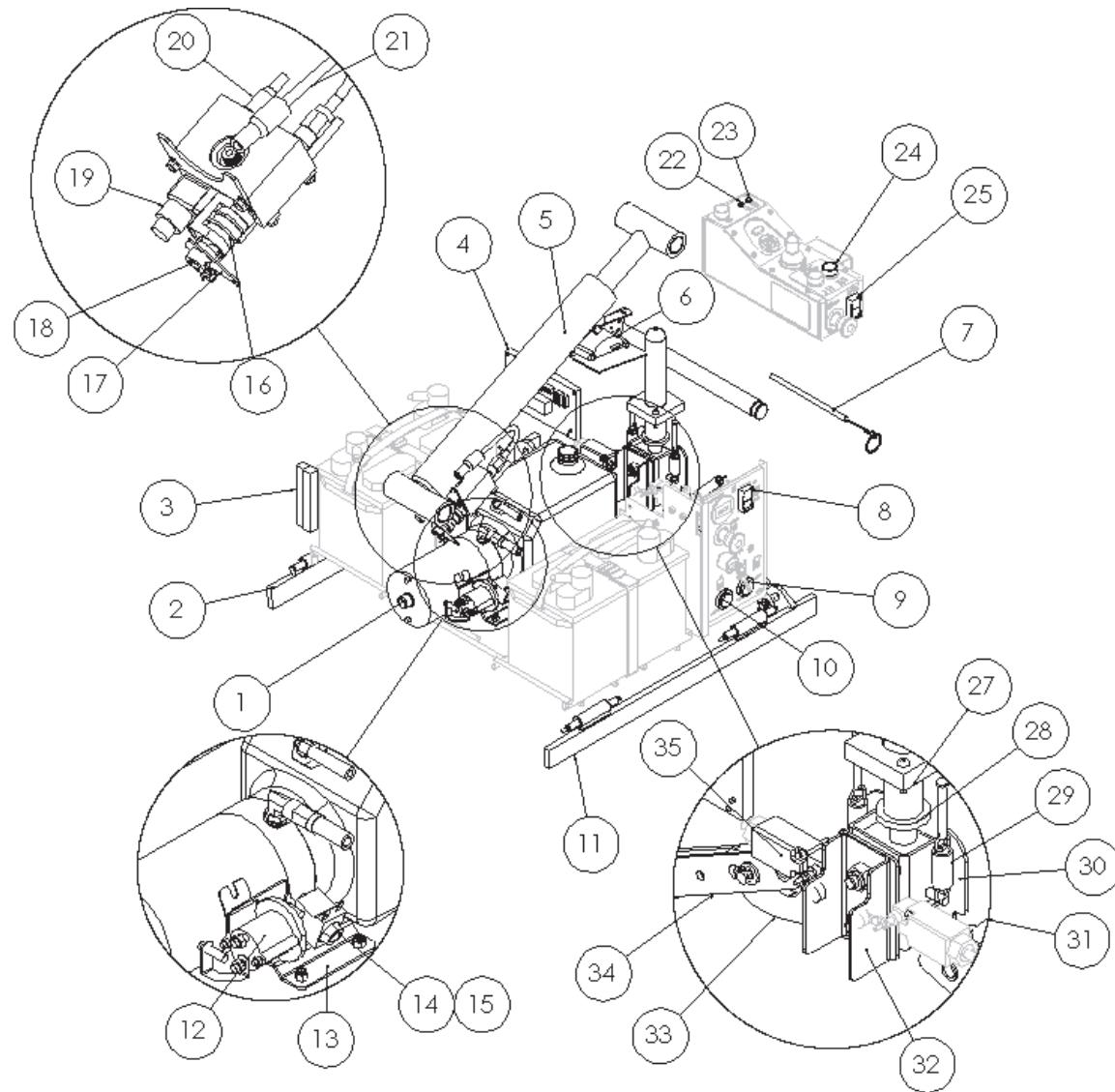
Item #	Part #	Description
1	NA	B- "Ground" Connection on Pump
2	NA	B+ Power Connection on Pump
3	(ELEC-047)	Not available as a replacement part. Replace with 12V, Group 27 Deep Cycle Marine Battery. Replacement weight must be minimum 50 lb.
4	1000106550	Drive Control Module, Program Specific to this Model/Series Only
5	1000106450	Load Control Module (GP102), Program Specific to this Model/Series Only
6	ELEC-645	Battery Charger
7	ELEC-639-1	Charger Cord (NEMA 5-15-P/IED-320 C13)
8	ELEC-551	Joystick
9	ELEC-071-KIT	Emergency Stop Button with Contact Block
10	ELEC-633-1	Master Power Switch Lever
11	ELEC-633	Master Power Switch
12	ELEC-071-KIT	Emergency Stop Button with Contact Block
13	ELEC-073E	Key Switch
14	ELEC-073E-1	Spare Key
15	ELEC-819	Sleep Timer Relay
16	1002101051	Lower Control Assembly
17	1002101351	Upper Control Assembly
Not Pictured	SUB A13	Main Cable
Not Pictured	ELEC-670-2	20 A AGC Fuse
Not Pictured	1002100193	Battery Cable Kit
Not Pictured	1002101099	Drive Power Cable Kit

### Drive Circuit Parts



Item #	Part #	Description
1	1000108202	Caster
2	1000106302	Limit Switch Plate
3	HB-PH-13	Guide Block
4	1000102004	Retaining Sleeve
5	HB-PH-7-P	PH Lock
6	ELEC-123-2	Limit Switch
7	NA	Brake Connection Terminals
8	1000106450	Drive Control Board (specific to this model/series only)
9	ELEC-627-3R	Brake (Left)
10	ELEC-627-4	Brake Micro switch
11	ELEC-627-3L	Brake (Right)
12	ELEC-826-3R	Electric Drive Motor (Right Side)
13	ELEC-604 & ELEC-871	Horn Button & Contact Block/Base
14	ELEC-551	Joystick
15	ELEC-602 & ELEC-072	Drive Enable Button & Contact Blocks
16	ELEC-826-3L	Electric Drive Motor (Left Side)
17	WHEE-707	Wheel, 10"
18	ELEC-610-2	Hour Meter
19	ELEC-631	Relay
20	WHEE-706 & HARD-001-2	Wheel, 8" & Bearing
(Not Pictured)	ELEC-809	120 Ohm Resistor

**Elevate/Lower Circuit Parts**



Item #	Part #	Description
1	HYDR-050-3	Hydraulic Pump
2	1000101701	Pothole Bar-R
3	HB-M215-P	Maintenance Lock Pin
4	1000106450	Load Control Module (GP102), Program Specific to this Model/Series Only
5	1002100351	Hydraulic Cylinder Assembly
6	ELEC-647	Angle Transducer
7	HARD-644	Low Friction Cable (E-Down)
8	ELEC-133B	Up/Down Rocker Switch
9	ELEC-635-3	Alarm, Overload
10	ELEC-635	Alarm, Descent
11	1000101601	Pothole Bar-L
12	HYDR-666-1	24V Solenoid
13	1000104401	Pump Mount Plate
14	HYDR-664	18 V Coil
15	HYDR-665	Up Valve
16	HYDR-007-2E	Down Valve with Coil
16	HYDR-007-2E-1	Coil, 24V
16	HYDR-007-2E-2	Down Valve
17	LAS-M115-P	E-Down Valve Actuator
18	HARD-650	Shaft Collar, 7/16
19	HYDR-044-FL-3	Hirschmann Connector with Diode
20	ELEC-648	Pressure Transducer
21	HYDR-600-5	High Pressure Hydraulic Hose
22	ELEC-636	Tilt indicator LED
23	ELEC-636	Overload Indicator LED
24	ELEC-602 & ELEC-871	Lift Enable Button & Contact Blocks
26	ELEC-133B	Up/Down Rocker Switch
27	HB-PH-13	Guide Block
28	1000102004	PH Retaining Sleeve
29	HARD-702	Spring
30	HB-PH-7-P	PH Lock
31	HARD-701	Spring
32	1000106302	LS Plate
33	1000105902	PH Pick-Up Arm
34	LAS-M220-P	PH Arm
35	ELEC-123-2	Limit Switch
(Not Pictured)	(HYDR-032)	Hydraulic Fluid Not available as a replacement part. Replace with Flomite #150, Dexron II, Mobil-DTE 2, or equivalent.
(Not Pictured)	HYDR-625	Pressure Compensated Flow Control Valve
(Not Pictured)	HARD-022	Retaining Ring
(Not Pictured)	ELEC-816	Time Delay Relay

## 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.