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

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Original instructions written in English

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.
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Revision Log
Revision A................................................................................................................................................................. December 2013
1.1 | SAFETY SYMBOLS

**DANGER**

FAILURE TO FOLLOW THIS WARNING WILL CAUSE DEATH OR PERSONAL INJURY.

“DANGER” indicates an imminently hazardous situation, which, if not avoided, will 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, could result in death or serious injury.

**CAUTION**

FAILURE TO FOLLOW THIS WARNING MAY CAUSE INJURY OR DAMAGE TO EQUIPMENT.

“CAUTION” indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment.

1.2 | GENERAL RULES AND PRECAUTIONS

Custom Equipment, LLC designed the Hy-Brid Lift self-propelled scissors lift to be safe and reliable. It is intended for elevating personnel, along with their necessary tools and materials to overhead work locations.

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, LLC conforms to specified American National Standards Institute ANSI/SIA A92.6 Standard, it is the responsibility of the owner to instruct operators with the safety requirements made not only by Custom Equipment, LLC, but by the various safety boards in your area, as well as additional requirements set forth by ANSI A92.6. 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
NEVER REACH BETWEEN SCISSORS LINKS OR PROP UP PLATFORM UNLESS MAINTENANCE PINS ARE IN PLACE.

1.3 | 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.

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

Other Guidelines
• 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 Operation and Safety 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.
2.1 | BATTERY MAINTENANCE

Battery cycle life will vary significantly depending on the depth of discharge. The deeper the depth of discharge the fewer cycles a battery will deliver. Conversely, the shallower the depth of discharge the more cycles a battery will deliver. To optimize the health of your battery, limit discharge to 80%.

The performance and life of a battery will vary with application, usage, temperature and depth of discharge. AGM batteries tend to deliver higher than their rated capacity (up to 10-15% higher) for -30 cycles until they are “broken in” and settle at their rated capacity.

Operating batteries above 80°F (27°C) will yield runtimes above the rated capacity and operating batteries below 80°F (27°C) will yield runtimes below the rated capacity. Cold temperatures can significantly reduce battery capacity. Although higher temperatures increase the battery capacity they also accelerate corrosion and reduce overall battery life.

2.2 | CHARGING THE BATTERY

This unit is equipped with a two deep cycle 12-volt AGM maintenance-free batteries.

Batteries should be fully charged after each use. Opportunity charging can be done but the batteries should be fully charged at least every other day if they are used daily. Charge in a ventilated area as gases may be released through the pressure relief valve if the batteries are excessively over-charged.

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.

NEVER ADD ACID TO BATTERY!

To Charge:

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

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

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

<table>
<thead>
<tr>
<th>Power</th>
<th>Battery 1 Status</th>
<th>Battery 2 Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Charging</td>
<td>Ready</td>
<td></td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (OFF)</td>
<td>Green LED (OFF)</td>
<td>This display indicates that the power is on but there is no connection to a battery. The charger must see approximately five (5) volts on a battery to deliver D/C current.</td>
</tr>
<tr>
<td></td>
<td>Charging</td>
<td>Ready</td>
<td></td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (ON)</td>
<td>Green LED (OFF)</td>
<td>This display indicates that power is on and that both outputs are delivering D/C current to the batteries.</td>
</tr>
<tr>
<td></td>
<td>Charging</td>
<td>Ready</td>
<td></td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (OFF)</td>
<td>Red LED (OFF)</td>
<td>This display indicates that power is on and that both outputs are finished charging and are in a float maintenance mode.</td>
</tr>
</tbody>
</table>
2.3 | LUBRICATION

There are no components that routinely need lubrication.

2.4 | COMPONENTS REQUIRING ADJUSTMENT

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

2.5 | 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.

2.6 | SAFETY DEVICES AND SYSTEMS REQUIRING CHECKS

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

2.7 | 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.

2.8 | 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.

2.9 | OTHER PROCEDURES

Voltage Test Points
Contact technical assistance for more details.

Wire Connections
When disconnecting or reconnecting any wires, make sure the master power switch is in the OFF position.
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 included in this manual:

- Pre-Start (required before operation at each work shift)
- Frequent
- 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, 20 hours per week, 5 load cycles per hour).
### 3.1 | PRE-START INSPECTION CHECKLIST

**WARNING**

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

MODEL NUMBER: __________________ SERIAL NUMBER: __________________

Keep inspection records up-to-date.

Record and report all discrepancies to your supervisor.

A dirty machine cannot be properly inspected.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Y</th>
<th>N</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VISUAL INSPECTIONS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no loose or missing parts.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check that warning and instructional labels are legible and secure. Ensure that load capacity is clearly marked.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the platform rails and safety gate for damage.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform and base controls are not missing, damaged, or disconnected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical cables and wires are not torn, frayed, or disconnected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic hoses are not torn or loose; there are no leaks; hoses and the cables have no worn areas or chafing.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the tires for damage. Check that wheel axle retaining rings and set screw in rear wheel are tight.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check that all snap rings are secure in grooves on pivot pins.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional Tests</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate closes automatically and latches (alignment can be adjusted with screw on toe board or railing if necessary).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platform Controls: Check all switches and push buttons for proper operation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Stop (Stops all movement)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive &amp; Up/Down Mode Switch (Selects drive/steer or elevate mode)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joystick (Return to neutral, drives forward &amp; reverse, elevates &amp; lowers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive Enable Trigger (Must be activated to drive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Controls: Check all switches and push buttons for proper operation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Stop (Stops all movement)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Switch (Selects Platform Control, Ground Control, or Off)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up/Down Rocker Switch (Elevates, Lowers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm (Not damaged, sounds for descent, tile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheels: Front and rear wheels rotate freely.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drives in slow speed when elevated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brakes: Machine stops when joystick released.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pothole guards deploy and lock when platform is elevated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift does not elevate when pothole guards are blocked.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DATE ___________________________ INSPECTED BY ___________________________
3.2 | MONTHLY INSPECTION CHECKLIST

**WARNING**

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

MODEL NUMBER: ____________________  SERIAL NUMBER: ____________________

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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Y</th>
<th>N</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform all the checks on the Pre-Start Inspection Checklist.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect the condition of hydraulic fluid in reservoir. Oil should have a clear amber color.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect the entire machine for signs of damage, broken welds, loose bolts, or improper repairs. (Check for corrosion, cracking, abrasion, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check that all snap rings are secure in grooves on pivot pins.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check if tires are leaning in or out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check electrical motor brushes (every 150 hours)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DATE ____________________    INSPECTED BY ____________________
### 3.1 | PRE-DELIVERY/ANNUAL/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, WHICHEREVER 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.

<table>
<thead>
<tr>
<th>Base:</th>
<th>Y</th>
<th>N</th>
<th>R</th>
<th>Extending platform:</th>
<th>Y</th>
<th>N</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect slide tracks for damage</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Extends freely</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>All frame bolts tight</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Cables in place/secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Pump Secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Locks in Stowed Position</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>DC motors secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Locks in Extended Position</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Covers screwed on</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Functions:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
</tr>
<tr>
<td>Batteries Fully Charged</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>All Functions Operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Wheels:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
<td>Emergency Stop Breaks Circuits</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Snap Rings Secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Slow Speed limit switch Set properly</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Bolts/Nuts Tight</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Wiring:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
</tr>
<tr>
<td>Scissors:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
<td>Switches secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Broken Welds</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Contacter(s) secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Bent Beam Members</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Tight on terminals (No loose wiring)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>All rollers Turn Freely</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Pothole guards deploy when platform elevated</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Ret. Rings Secure On Pivots</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Pothole interlock functions correctly</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Emergency Down Operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Oil: Level 1” from top</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Maintenance Locks:</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Brakes: Operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Pins in cabinet</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Check all hose for leaks</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Platform:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
<td>Check all fittings for leaks</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Bent rails</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Battery charger:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
</tr>
<tr>
<td>Broken welds</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Secure/Operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>All rails in place/secure</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Tilt sensor</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>110V outlet safe/working (if applicable)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Warning Horn (if applicable)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Entrance gate Closes Freely</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Hour meter operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Decals:</td>
<td>Y</td>
<td>N</td>
<td>R</td>
<td>Battery indication operational</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Legibility</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>All Shields/Guards in place</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Correct capacity noted</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>Operator/Service Manual</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Proper placement quantity</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DATE ______________________  INSPECTED BY ______________________
4.2 | ELECTRICAL SCHEMATIC

[Diagram of electrical schematic with labels for E-STOP, JOYSTICK, BRAKE SWITCH, ANG. SENS. 1, PH LS, KEYSWITCH, etc.]

REV. DESCRIPTION DATE

D KEY SWITCH (ECO 1735) 11/12/13 DJS
E ADDED BATTERY GAUGE & Revised Motor Connections 11/15/2013

HB-1230
SUPO-646
REV A
4.3 | CONTROL BOARD DIAGNOSTICS

When using the LED for diagnosis, note that a DUAL FLASH code is indicated. The LED will flash on/off a certain number of times, pause off for a short delay, then flash on/off a second certain number of times, followed by a much longer pause off. The sequence will then repeat.

Example: The LED flash code 3-2 will look like: on/off/on/off/short-delay/on/off/on/off-long-delay/repeat

<table>
<thead>
<tr>
<th>LED Code</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Flash</td>
<td>Control Module is not calibrated. Do not operate unit.</td>
</tr>
<tr>
<td>Steady</td>
<td>Unit has just been powered on. You may need to wait for initialization, then re-select function. Ready to operate, things should be working normally. A function is selected but the enable trigger is not squeezed.</td>
</tr>
<tr>
<td>1-1</td>
<td>The control module is not calibrated. Do not use this unit.</td>
</tr>
<tr>
<td>2-1</td>
<td>The key switch selector switch indicate the mode in which the TS100 must operate. If neither input is active, or if both are active together, the TS100 does not know how to function. Check key switch and wiring to P15-1 and P12-1.</td>
</tr>
<tr>
<td>2-2</td>
<td>A safety feature is locking functions or a switch has failed. Check that platform is not overloaded, operating on a level surface, and pothole guards deploy. Check that joystick is neutral when powered on. Check that joystick trigger is not closed for too long without selecting a function. Check for failed joystick, selector switches, and up/down switches.</td>
</tr>
<tr>
<td>3-x</td>
<td>There is a problem with the drive contactor or valve wiring, or with the motor power wiring; disconnect connector P9 to see if the problem is caused by drive contactor or valve wiring (if the fault clears, check for an illegal B+ supply in to P9) Check motor power wiring; with the drive contactor open the B+ power terminals should be at 10V-15V (significantly lower than B+) If the LED is steady at power-on, and the fault (3-5) occurs after a delay when attempting to drive or lift, the motor may be stalled and causing an overload of the TS100 or there is a power wiring error like connecting the B+ cable to a motor stud</td>
</tr>
<tr>
<td>3-2</td>
<td>Check P9 wiring. One or more signals showing outputs when all should be off.</td>
</tr>
<tr>
<td>3-3</td>
<td>Check B+ stud connections on controller. Voltage is too high.</td>
</tr>
<tr>
<td>3-4</td>
<td>There is voltage on safe pre-valve supply when there should not be. Controller may need to be replaced.</td>
</tr>
<tr>
<td>3-5</td>
<td>The drive brake current is too high. Motor overload. Check for a seized motor or for power wiring to motors.</td>
</tr>
<tr>
<td>4-x</td>
<td>There is a problem with battery supply, the height and/or pressure sensors, the supply to them, or the temperature sensor inside the TS100 Check battery supply to EMS inputs P15-1 or P12-1 (relative to the B- stud); the battery supply should be between 15V and 32V Check the output from height sensor (P12-12) If the TS100 heatsink is very hot then perhaps the controller has temporarily shut down – if so, platform lowering is still allowed; wait for the controller to cool down</td>
</tr>
<tr>
<td>4-2</td>
<td>Functions Locked: Board is overheated. Check pump, drive motor wiring. Problem with controller internal voltage. Controller may need to be replaced.</td>
</tr>
<tr>
<td></td>
<td>Problem Description</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4-3</td>
<td>Problem with controller internal voltage. Controller may need to be replaced.</td>
</tr>
<tr>
<td>4-4</td>
<td>Battery supply is too low or too high. Make sure batteries are fully charged. Do not operate while charging.</td>
</tr>
<tr>
<td>6-x</td>
<td>There is a problem with the height measurements, or the elevation switch disagrees with the height sensor. Check that the output from height sensor (P12-12) is in range (between 0.5V and 4.5V)</td>
</tr>
<tr>
<td>6-1</td>
<td>Problem with angle sensor or its connections</td>
</tr>
<tr>
<td>6-2</td>
<td>This feature does not apply on ANSI/CSA models.</td>
</tr>
<tr>
<td>6-3</td>
<td>Problem with elevation switch or its connections</td>
</tr>
<tr>
<td>6-6</td>
<td>This feature does not apply on ANSI/CSA models.</td>
</tr>
<tr>
<td>7-x</td>
<td>There is a problem with the power wiring – the voltage on the B+ stud is too low. Check for a short-circuit to the B+ stud</td>
</tr>
<tr>
<td>7-1</td>
<td>Motor A current too high.</td>
</tr>
<tr>
<td>7-2</td>
<td>Motor A current too low.</td>
</tr>
<tr>
<td>7-3</td>
<td>Motor B current too high.</td>
</tr>
<tr>
<td>7-4</td>
<td>Motor B current too low.</td>
</tr>
<tr>
<td>7-5</td>
<td>Check drive connections at both drives--short or multiple wiring faults.</td>
</tr>
<tr>
<td>7-7</td>
<td>Check B+ stud connections on controller. Voltage is too low.</td>
</tr>
</tbody>
</table>
5.1 | WIRING DIAGRAM
Part No. WD-129-20-001-50

[Diagram showing wiring connections for a hybrid lift system, including battery, upper control, angle sensor #1, and various microswitches and power switches.]
SECTION 5 | WIRING DIAGRAMS

5.1 | WIRING DIAGRAM

Part No. WD-129-20-001-50

TS-100

M2+M2-B-M1-M1+

B+

BATTERY

CHARGER

UP

DOWN

PUMP

RESERVOIR

+ -

PUMP

RESERVOIR

HYD PUMP M

BATTERY

UPPER

CONTROL

129-21-006-50

654321

L0WER CONTROL

129-21-004-50

MICROSWITCH

BRAKE

M

DRIVE

REV. DESCRIPTION DATE BY

B CHARGER INTERLOCK: ECO 1707 10/24/2013 DJS

C Revised Motor Connections, added volt meter connection (ECO 1738) 11/15/2013 DJS
5.2 | LOWER CONTROLS WIRING DIAGRAM
Part No. 129-20-004-50

- SOCKET: ANGLE SENS #1
- SOCKET: ANGLE SENS #2
- SOCKET: PRESSURE SENS
- SOCKET: PH LS
- SOCKET: UPCTL TO TS-100
- PUMP SOL./COIL CONNECTIONS
- B- at TS100
- TO TS-100 SOCKET: 12-PIN
- TO TS-100 SOCKET: 9-PIN
- BATTERY GAUGE (-)
- B- PWR SOL
- CHARGER INTERLOCK
- ENABLE PWR SOL
- B+ PWR SOL

REV. DESCRIPTION DATE BY
B CHANGED TERMINAL ON P12-8: ECO 1707 10/24/2013 DJS
C CHANGED KEYSWITCH STYLE 11/12/2013 GH
D ADDED BATTERY GAUGE GROUND WIRE 11/15/2013 GH
5.3 | UPPER CONTROLS WIRING DIAGRAM
Part No. 129-20-006-50

- STEER (GRAY)
- LIFT/DRIVE (BLUE)
- JS NEG (GREEN)
- JS +5V (ORANGE)
- JS TRIG IN (RED)
- JS TRIG. OUT (BLACK)

NC

1 2

BATTERY GAUGE

BATT+BATT-

RED (4")

E-STOP

ORANGE (12")

RED (6")

DRIVE ENABLE

YELLOW (12")

LIFT ENABLE

WHITE (12")

REV. DESCRIPTION DATE BY
A INITIAL RELEASE 8/19/2013 DJS
B REVISED CONTACT BLOCKS (ECO 1703) 10/11/2013 DJS
C ADDED BATTERY GAUGE 11/15/2013 GH

BY CUSTOM EQUIPMENT LLC
5.4 | MAIN POWER/SAFETY CIRCUIT
Part Nos. WS-129-20-001-50-PWR, Part No. WD-129-20-001-50-PWR

[Diagram of the Main Power/Safety Circuit]

---

KEYS

- STOP
- JOYSTICK
- ANG. SENS. 1
- TS-100
- B+
- M1+
- M1-
- M2+
- M2-
- P15-7
- P15-10
- P15-12
- P15-9
- P15-14
- P15-13
- P15-8
- P15-6
- P15-5
- P15-15
- P15-3
- P15-11
- P15-4
- P15-2
- P15-1
- P9-9
- P9-8
- P9-6
- P9-7
- P9-5
- P9-3
- P9-4
- P9-2
- P9-1
- P12-12
- P12-11
- P12-10
- P12-9
- P12-8
- P12-7
- P12-6
- P12-5
- P12-4
- P12-3
- P12-2
- P12-1

---

REV. DESCRIPTION DATE BY

D KEY SWITCH (ECO 1735) 11/12/13 DJS
E ADDED BATTERY GAUGE & Revised Motor Connections 11/15/2013
Part Nos. WD-129-20-004-50-PWR, WD-129-20-004-50-PWR

SECTION 5 | WIRING DIAGRAMS
5.5 | DRIVE CIRCUIT

Key Switch

[Diagram of wiring connections]

Key Switch (ECO 1735) 11/12/13 DJS

Added Battery Gauge & Revised Motor Connections 11/15/2013

Charger Interlock: ECO 1707 10/24/2013 DJS

Revised Motor Connections, added volt meter connection (ECO 1738) 11/15/2013 DJS

Maintenance & Troubleshooting
HB-1230
SUPO-646
REV A
### 5.6 | ELEVATE/LOWER CIRCUIT

Part Nos. WS-129-20-001-50-ELV, WD-129-20-001-50-ELV

---

**UPPER CONTROL**
129-21-006-50

**LOWER CONTROL**
129-21-004-50

- **PUMP RESERVOIR**
- **TS-100**
- **B %+ M2+ M2-B-M1-M1-**
- **UP**
- **DOWN**
- **PUMP**
- **RESERVOIR**
- **HYD PUMP M**
- **UPPER CONTROL** 129-21-006-50
- **LOWER CONTROL** 129-21-004-50
- **B CHARGER INTERLOCK: ECO 1707**
- **REV. DESCRIPTION DATE BY**
- **DJS**
- **C Revised Motor Connections, added volt meter connection (ECO 1738)**
- **11/15/2013**
- **D KEY SWITCH (ECO 1735)**
- **11/12/13**
- **E ADDED BATTERY GAUGE & Revised Motor Connections 11/15/2013**
- **CUSTOM EQUIPMENT LLC**

---

**MAINTENANCE & TROUBLESHOOTING**

**HB-1230**

**SUPO-646**

**REV A**

**SECTION 5 | WIRING DIAGRAMS**

---

**KEY SWITCH**

**TO TS-100 SOCKET 12 PIN**

**TO TS-100 SOCKET 9 PIN**

---

**HY-BRID LIFTS**

MAINTENANCE & TROUBLESHOOTING

HB-1230

SUPO-646

REV A
6.1 | MAIN POWER/SAFETY CIRCUIT

Flowchart: HB-830/ 1230-Power
Troubleshooting Step 1: Main Power

Does the machine have any function: (Drive, Elevate/Lower)

- No
  - Is the battery charger plugged in?
    - Yes
    - Unplug the charger. Machine cannot be operated while battery is charging.
    - No
      - Is the master power switch turned off or the key missing?
        - Yes
        - Turn the master power switch to the "ON" position.
        - No
          - Is key switch turned on in the desired selection? (may select upper controls or lower controls)
            - Yes
            - Turn key switch on.
            - No
              - No Light

- Yes
  - Are batteries fully charged?
    - Yes
    - Charge batteries.
    - No
      - Are the batteries connected?
        - Yes
        - No
          - Is short protection fuse blown?
            - Yes
            - Replace with 20 Amp AGC Fuse.
            - No
              - Yes Light
                - Visually inspect wire harness from lower controls to upper.
        - No
          - No

Yes, but some function(s) are not working properly

WARNING
Any modification on this machine without the express consent of the manufacturer is prohibited.
**Troubleshooting Flowcharts--General Notes:**
Inspect parts for visible damage as they are encountered. After each step, check if a problem has been identified and/or resolved. If so, make the recommended fix or refer to a referenced document. If not, continue troubleshooting. If a part has been identified as needing replacement, refer to the Parts View to identify the part number to order. If any wiring or components have been altered from the original manufacture, problems may not be identifiable.

**WARNING**
Failure to comply with safety precautions may result in damage, injury, or death. Refer to the Maintenance Manual for complete warnings.

---

**Flowchart: HB-1230**

1. **Is the machine having any function:**
   - Drive, Elevate/Lower
      - **Yes**: Are the batteries connected?
        - **Yes**: Are batteries fully charged?
          - **Yes**: Is short protection fuse blown?
            - **Yes**: Is key switch turned on in the desired selection?
              - **May select upper controls or lower controls**
                - **Yes**: Is either E-Stop Button depressed/activated?
                  - **Yes**: Contact Hy-Brid Lifts with questions about a different problem
                    - **Yes, but some function(s) are not working properly**: Refer to Revision A
                      - **Is the battery charger plugged in?:**
                        - **No**: Are all power supply connections and switches functioning properly?
                          - **Yes**: No
                          - **No**: No
                            - **Yes**: No
                              - **Yes**: Repair or replace identified problem.
                                - **No**: Replace with 20 Amp AGC Fuse.
                                  - **Yes**: Repair or replace identified problem.
                                    - **No**: Replace wire harness or repair wire.
                                      - **Yes**: Reconnect battery.
                                        - **Yes**: See Elevating Problems Flowchart.
                                          - **No**: See Lowering Problems Flowchart.
                                            - **No**: See Drive Problems Flowchart.
                                              - **Yes**: Refer to Diagnostic Light Codes in Maintenance Manual.
                                                - **Yes**: See Elevating Problems Flowchart.
                                                  - **No**: See Lowering Problems Flowchart.
                                                    - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                      - **Yes**: Replace wire harness or repair wire.
                                                        - **Yes**: Reconnect battery.
                                                          - **Yes**: See Elevating Problems Flowchart.
                                                            - **No**: See Lowering Problems Flowchart.
                                                              - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                - **Yes**: Replace wire harness or repair wire.
                                                                  - **Yes**: Reconnect battery.
                                                                    - **Yes**: See Elevating Problems Flowchart.
                                                                      - **No**: See Lowering Problems Flowchart.
                                                                        - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                          - **Yes**: Replace wire harness or repair wire.
                                                                            - **Yes**: Reconnect battery.
                                                                              - **Yes**: See Elevating Problems Flowchart.
                                                                                - **No**: See Lowering Problems Flowchart.
                                                                                  - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                      - **Yes**: Replace wire harness or repair wire.
                                                                                         - **Yes**: Reconnect battery.
                                                                                           - **Yes**: See Elevating Problems Flowchart.
                                                                                             - **No**: See Lowering Problems Flowchart.
                                                                                               - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                 - **Yes**: Replace wire harness or repair wire.
                                                                                                   - **Yes**: Reconnect battery.
                                                                                                     - **Yes**: See Elevating Problems Flowchart.
                                                                                                       - **No**: See Lowering Problems Flowchart.
                                                                                                         - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                           - **Yes**: Replace wire harness or repair wire.
                                                                                                              - **Yes**: Reconnect battery.
                                                                                                                - **Yes**: See Elevating Problems Flowchart.
                                                                                                                   - **No**: See Lowering Problems Flowchart.
                                                                                                                     - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                                       - **Yes**: Replace wire harness or repair wire.
                                                                                                                          - **Yes**: Reconnect battery.
                                                                                                                             - **Yes**: See Elevating Problems Flowchart.
                                                                                                                               - **No**: See Lowering Problems Flowchart.
                                                                                                                                  - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                                                    - **Yes**: Replace wire harness or repair wire.
                                                                                                                                       - **Yes**: Reconnect battery.
                                                                                                                                             - **Yes**: See Elevating Problems Flowchart.
                                                                                                                                                - **No**: See Lowering Problems Flowchart.
                                                                                                                                                    - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                                                                       - **Yes**: Replace wire harness or repair wire.
                                                                                                                                                        - **Yes**: Reconnect battery.
                                                                                                                                                             - **Yes**: See Elevating Problems Flowchart.
                                                                                                                                                            - **No**: See Lowering Problems Flowchart.
                                                                                                                                                               - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                                                                                - **Yes**: Replace wire harness or repair wire.
                                                                                                                                                                                                                    - **Yes**: Reconnect battery.
                                                                                                                                                                                                                    - **Yes**: See Elevating Problems Flowchart.
                                                                                                                                                                                                                    - **No**: See Lowering Problems Flowchart.
                                                                                                                                                                                                                    - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                                                                                         - **No**: No
                                              - **Yes**: Repair or replace identified problem.
                                                    - **No**: Replace wire harness or repair wire.
                                                      - **Yes**: Reconnect battery.
                                                    - **Yes**: See Elevating Problems Flowchart.
                                                  - **No**: See Lowering Problems Flowchart.
                                                - **No**: See Drive Problems Flowchart.
                                              - **Yes**: Refer to Diagnostic Light Codes in Maintenance Manual.
                                            - **Yes**: See Elevating Problems Flowchart.
                                          - **No**: See Lowering Problems Flowchart.
                                        - **No**: Replace wire harness or repair wire.
                                - **Yes**: Reconnect battery.
                        - **Yes**: No
                          - **Yes**: No
                            - **Yes**: Repair or replace identified problem.
                              - **No**: Replace wire harness or repair wire.
                                - **Yes**: Reconnect battery.
                      - **Yes**: See Elevating Problems Flowchart.
                    - **Yes**: See Lowering Problems Flowchart.
                  - **No**: Replace wire harness or repair wire.
          - **Yes**: No
            - **Yes**: No
              - **Yes**: Repair or replace identified problem.
                - **No**: Replace wire harness or repair wire.
                  - **Yes**: Reconnect battery.
                    - **Yes**: See Elevating Problems Flowchart.
                      - **No**: See Lowering Problems Flowchart.
                        - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                          - **Yes**: Replace wire harness or repair wire.
                            - **Yes**: Reconnect battery.
                              - **Yes**: See Elevating Problems Flowchart.
                                - **No**: See Lowering Problems Flowchart.
                                  - **No**: Contact Hy-Brid Lifts with questions about a different problem.
                                    - **Yes**: Replace wire harness or repair wire.
                                      - **Yes**: Reconnect battery.
                                        - **Yes**: See Elevating Problems Flowchart.
                                          - **No**: See Lowering Problems Flowchart.
                                            - **No**: Contact Hy-Brid Lifts with questions about a different problem.
6.2 | DRIVE CIRCUIT

Flowchart-HB-1230-Drive
Troubleshooting Step 3: Drive

Refer to Diagnostic Light Codes in Maintenance Manual

Does the machine drive?

Yes

Is there a trouble code flashing?

Yes, but not properly

Check connections at both pump and board. See wiring diagrams.

No

Is there a trouble code flashing?

Is either or two brakes manually released?

Yes

Flip brake handle(s) at rear of machine to engage brakes.

No

Is either of two brake switches damaged or disconnected?

Yes

Replace brake switch. Note that brake limit switch tabs are delicate. Use caution not to break off.

No

Is drive unit damaged?

Yes

Replace drive unit.

No

Are all connections to drive joystick and drive control board secure?

Yes

No

Is there moisture or corrosion in any connections?

Yes

Contact Hy-Brid Lifts for further troubleshooting.

No

Are batteries fully charged?

Yes

Are brakes hot?

No

drivers slowly?

Driving slowly?

Is angle sensor damaged?

Yes

Replace sensor.

No

Check wiring connections in drive components. See Electrical SchematicWS-129-20-001-50-DRV

No

Drives fast when elevated?

Drives slow when lowered?

Some models have tilt interlock installed. Lower platform and move to a flat surface.

Drives intermittently?

Yes

Check wiring. See Electrical SchematicWS-129-20-001-50-DRV

No

Reference Revision A

HY-BRID LIFTS

MAINTENANCE & TROUBLESHOOTING
HB-1230

SUPO-646
REV A
Troubleshooting Flowcharts--General Notes:
Inspect parts for visible damage as they are encountered. After each step, check if problem has been identified and/or resolved. If so, make the recommended fix or see a referenced document. If not, continue troubleshooting. If a part has been identified as needing replacement, see the Parts View To identify part number to order. If any wiring or components have been altered from the original manufacture, problems may not be identifiable.

**WARNING**
Any modification on this machine without the express consent of the manufacturer is prohibited.

**WARNING**
Failure to comply with safety precautions may result in damage, injury, or death. Refer to Maintenance Manual for complete warnings.

---

**Drive Circuit**
Flowchart-HB-1230-Drive

Troubleshooting Step 3: Drive

**Troubleshooting Flowcharts**

- Inspect parts for visible damage as they are encountered.
- After each step, check if problem has been identified and/or resolved.
- If so, make the recommended fix or see a referenced document.
- If not, continue troubleshooting.
- If a part has been identified as needing replacement, see the Parts View To identify part number to order.
- If any wiring or components have been altered from the original manufacture, problems may not be identifiable.

---

**Check**

- Connections at both pump and board. See wiring diagrams.
- Connections at main wire harness.

**Yes**

- Contact Hy-Brid Lifts for further troubleshooting.
- Consider brake damage, broken joystick handle (drive enable), bad hour meter, loose connections in lower and upper control, and control board failure.

**No**

- Contact CEI for further troubleshooting.
- Consider board failure, pothole interlock limit switch failure

---

**Are all connections to drive joystick and drive control board secure?**

- Yes
- Are there moisture or corrosion in any connections?
  - Yes
  - Allow to dry for 24 hours and try again. Board probably will need replacement. Apply dielectric grease to connectors at main wire harness.
  - No
  - Replace drive unit
  - Yes
  - Contact Hy-Brid Lifts for further troubleshooting.
  - Consider brake damage, broken joystick handle (drive enable), bad hour meter, loose connections in lower and upper control, and control board failure.

- No
  - Replace brake switch.
  - Note that brake limit switch tabs are delicate. Use caution not to break off.
  - Replace drive unit
  - Reconnect
  - Allow to dry for 24 hours and try again. Board probably will need replacement. Apply dielectric grease to connectors at main wire harness.

---

**Is a drive motor damaged?**

- Yes
- Contact Hy-Brid Lifts for further troubleshooting.
- Consider board failure or incorrect wiring.
- No
- Replace drive motor.
- Check for proper connection to sensor.
- Replace sensor.

---

**Do pothole guards and lock deploy properly?**

- Yes
- Contact Hy-Brid Lifts for further troubleshooting.
- Consider board failure or loose wiring.
- No
- Contact CEI for further troubleshooting.
- Consider board failure, pothole interlock limit switch failure
- Clean any debris from pothole arm mechanism.

---

**Contact CEI for further troubleshooting.**

- Consider board failure, pothole interlock limit switch failure
- Clean any debris from pothole arm mechanism.

---

**Reference Revision A**
6.3 | ELEVATE CIRCUIT

Flowchart-HB-830/1230-Elevating
Troubleshooting Step 2A: Elevating

What is the diagnostic LED flashing?

Refer to Diagnostic Light Codes in Maintenance Manual

WARNING: Set up for maintenance safety: Remove load from platform. Check for overhead obstructions. Platform movement may occur. Never Reach between scissors links or prop up platform unless maintenance pins are in place.

Does machine elevate?

Not At All

Yes

No

Yes, but not properly

No

starts ascending, then drifts back down?

No

Yes

See Lowering Problems Flowchart

Can you see anything obstructing the components?

No

Yes

Remove obstruction

Does the pump run?

Yes

No

Yes

Close emergency down valve

Is the emergency down valve open?

No

Yes

Replace dam rocker switch upper or lower control.

Are power connections to elevate circuit and switches functioning properly?

No

Yes

Replace or repair identified problem. See Parts List.

Ascent speed slow or erratic?

No

Yes

Is platform overloaded?

No

Yes

Replace Switch

Are any structural members bent?

No

Yes

Is pump run?

Yes

No

Check wiring connections in elevate components. See Electrical Schematic WS-129-20-001-50 or Pictorial Schematic WSP-129-20-001-50

And instruction Circuit Check-129-20-001-50-Elevate

Is pothole limit switch operating?

No

Yes

Is pothole limit switch damaged?

No

Yes

Is there a restriction in hydraulic hose?

No

Yes

Is battery fully charged?

No

Yes

Replace or repair identified problem. See Parts List.

Does pothole guards deploy?

No

Replace pump

Remove overload. Lower to slowed position before continuing use.

Contact manufacturer to arrange replacement.

With platform operating?

Yes

No

Check Hydraulic Circuit.

Maintenance & Troubleshooting

HY-BRID LIFTS

Reference Revision A
**Troubleshooting Flowcharts--General Notes:**
Inspect parts for visible damage as they are encountered. After each step, check if problem has been identified and/or resolved. If so, make the recommended fix or see a referenced document. If not, continue troubleshooting. If a part has been identified as needing replacement, see the Parts View to identify part number to order. If any wiring or components have been altered from the original manufacture, problems may not be identifiable.

**WARNING**
Any modification on this machine without the express consent of the manufacturer is prohibited.

**Failure to comply with safety precautions may result in damage, injury, or death.**
Refer to Maintenance Manual for complete warnings.

**Are any of these switches damaged?**
- Selector Switch (Upr Ctl)
- Joystick Trigger (Upr Ctl)

**Is hydraulic fluid low?**
- Yes
  - Replace or repair identified problem. See Parts List.
- No

**With platform lowered, fill pump reservoir with specified oil.**

**Check wiring connections in elevate components.**
See Electrical Schematic WS-129-20-001-50 Or Pictorial Schematic WSP-129-20-001-50 And instruction Circuit Check-129-20-001-50-Elevate

**Are power connections to elevate circuit and switches functioning properly?**
- No
  - Replace or repair identified problem. See Parts List.
- Yes

**Flush down valve by simultaneously pressing up switch at base and pulling manual e-down override knob on down valve for 30 sec. There may be foreign matter lodged.**

**Replace pump assembly.**
- May be worn or defective.

**Check Hydraulic Circuit.**
(Additional tools and higher level of skill required) See Hydraulic Schematic HS-129-20-001-50

**Is there a different problem?**
- (something is leaking, unusually noisy, etc.)

Reference Revision A
6.4 | LOWER CIRCUIT

Flowchart: HB-830/ 1230-Lowering
Troubleshooting Step 2B: Lowering

WARNING: Set up for maintenance safety:
Remove load from platform.
Check for overhead obstructions.
Platform movement may occur.
Never reach between scissors links or prop up platform unless maintenance pins are in place.

What does the diagnostic LED show?

Is maintenance lock in place?

Does machine lower? Not at all

Starts descending then stops?

Descent speed slow or erratic?

Creeps down? Or Goes up and Comes Back Down?

Will Manual Override lower the platform?

Has key switch been turned off?

Is there a restriction in hydraulic hose?

Is there a hydraulic leak anywhere?

Is maintenance lock in place?

Is an E-Stop activated?

Pull out emergency stop button at upper and lower controls.

Check for hydraulic leak anywhere w/ hydraulic pump. 
ALWAYS remember to O-ring.

Remove ML Chock

Remove ML Chock

Remove ML Chock

Remove ML Chock

Is maintenance lock in place?

Are any structural members bent?

Contact manufacturer to arrange replacement.

Replace hydraulic hose

Replace rockers

Replace rocker

Replace hydraulic hose

Flush down valve by simultaneously pressing up switch at base and down switch on platform control for 30 sec.

Close emergency down valve.
Check cable connections.

Flush down valve by simultaneously pressing up switch at base and down switch on platform control for 30 sec.

Does machine lower? Not at all

Starts descending then stops?

Descent speed slow or erratic?

Creeps down? Or Goes up and Comes Back Down?

Will Manual Override lower the platform?

Has key switch been turned off?

Is there a restriction in hydraulic hose?

Is there a hydraulic leak anywhere?

Is maintenance lock in place?

Is an E-Stop activated?

Pull out emergency stop button at upper and lower controls.

Check for hydraulic leak anywhere w/ hydraulic pump. 
ALWAYS remember to O-ring.

Remove ML Chock

Remove ML Chock

Remove ML Chock

Remove ML Chock

Is maintenance lock in place?

Are any structural members bent?

Contact manufacturer to arrange replacement.

Replace hydraulic hose

Replace rockers

Replace rocker

Replace hydraulic hose

Flush down valve by simultaneously pressing up switch at base and down switch on platform control for 30 sec.

Close emergency down valve.
Check cable connections.

Flush down valve by simultaneously pressing up switch at base and down switch on platform control for 30 sec.

Close emergency down valve.
Check cable connections.

WARNING: Double check that maintenance pins are in place or that platform is all the way down.

WARNING: Set up for maintenance safety:
Remove load from platform.
Check for overhead obstructions.
Platform movement may occur.
Never reach between scissors links or prop up platform unless maintenance pins are in place.
Troubleshooting Flowcharts—General Notes:
Inspect parts for visible damage as they are encountered. After each step, check if problem has been indentified and/or resolved. If so, make the recommended fix or see a referenced document. If not, continue troubleshooting. If a part has been identified as needing replacement, see the Parts View To identify part number to order. If any wiring or components have been altered from the original manufacture, problems may not be identifiable.

MAINTENANCE & TROUBLESHOOTING
HB-1230
41
Listed in the following section are diagrams for parts that may be available for replacement and for reference. These represent current model 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.

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

7.1 | SAFETY AND CONTROL DECALS

Refer to the Hy-Brid Lifts Operation and Safety Manual for decal part numbers and locations.

REPLACEMENT OF THE FOLLOWING COMPONENTS WILL AFFECT THE STRENGTH, STABILITY, OR SAFETY FUNCTION OF THE UNIT: BATTERY (ELEC-047-6), HYDRAULIC CYLINDER (HYDR-012 OR HYDR-013), CONTROL BOARD (129-21-010-50), AND ALL STRUCTURAL COMPONENTS.
### 7.2 | MAIN POWER/SAFETY CIRCUIT

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<thead>
<tr>
<th>Item #</th>
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<tbody>
<tr>
<td>1</td>
<td>129-21-004-50</td>
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<td>2</td>
<td>129-21-006-50</td>
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<td>ELEC-639-3</td>
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<td>4</td>
<td>ELEC-047-6</td>
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<td>ELEC-073D-KIT</td>
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<td>ELEC-073EKEY</td>
<td>Spare Keys</td>
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<td>ELEC-610-2</td>
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<td>8</td>
<td>ELEC-071-KIT</td>
<td>Emergency Stop Switch</td>
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<td>9</td>
<td>ELEC-635-4</td>
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<td>12</td>
<td>129-21-007-50</td>
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<td>ELEC-641C</td>
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*NOT PICTURED:*

- 129-01-090-50
- 129-01-90-51
- ELEC-641A
- ELEC-641C
### 7.3 | DRIVE CIRCUIT

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<td>ELEC-626-5R</td>
<td>Drive Motor (Left)</td>
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<td>Drive/Elevate Selector Switch</td>
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<td>5</td>
<td>ELEC-606</td>
<td>Joystick</td>
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<td>6</td>
<td>WHEE-714-05</td>
<td>Swivel Caster Hub</td>
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<td>7</td>
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<td>HARD-021</td>
<td>1” Retaining Ring</td>
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7.4 | ELEVATE / LOWER CIRCUIT
(Continued on next page)
## Elevate / Lower Circuit (continued)

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<td>Hydraulic Pump</td>
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<td>129-01-040-04</td>
<td>Pothole Spring Sleeve</td>
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<td>21</td>
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<td>129-01-045-02</td>
<td>Pothole Lock</td>
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<td>129-01-029-02</td>
<td>Pothole Pick-Up Arm</td>
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<td>HARD-022</td>
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<td>MISC-007-01-KIT</td>
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### 7.5 | COVERS

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<td>Cover, Switch</td>
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<td>129-05-009-01</td>
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### 7.6 | RAILINGS

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LIMITED WARRANTY
Warranty Statement—North America Only

1. Limited Warranties
   Subject to the terms, conditions and limitations set forth herein, Custom Equipment, LLC (the
   “Company”) warrants to the first end-user (“Buyer”) that:

   a. Limited Product Warranty
      For a period of 12 months from the date that a new product manufactured by the Company
      (“Product”) is delivered to the Buyer, the Product will (i) conform to the specifications published by the
      Company for such Product as of the date of delivery; and (ii) be free of any defect in material and/or
      workmanship under normal use and maintenance; and

   b. Extended Structural and Chassis Warranty
      For a period of 60 months from the date that the Product is delivered to the Buyer, the chassis
      and other structural components of such Product will be free from defects in material and/or
      workmanship under normal use and maintenance.

2. Exclusions / What Is Not Covered
   • The following items are NOT covered under this Limited Warranty:
     • Defects in, and damage or loss relating to, any batteries incorporated by the Company into or made
       a part of the Product. Any such defects, damage or loss shall be exclusively covered by the battery
       manufacturer’s warranty, if any. For more information regarding the battery warranty, the Buyer
       should contact the battery manufacturer using the contact information shown on the battery;
     • Damage or loss resulting from or caused by carrier handling;
     • Damage or loss resulting from or caused by normal wear and tear, weathering, lack of use or use
       with incompatible equipment or software;
     • Damage resulting from or caused by improper maintenance, improper handling or storage,
       improper use, abuse, neglect, operation beyond rated capacity, or operation after discovery of
       defective or worn parts;
     • Any part, component or assembly altered or modified in any way not approved in writing by the
       Company;
     • Damage to any equipment or parts not manufactured by the Company; and
     • Acts of God, accidents or any other causes beyond the Company’s reasonable control.

3. Making a Warranty Claim
   As a prerequisite to making any claim under this Limited Warranty, Buyer must give the Company written
   notice of any suspected defect promptly after discovery. Such notice shall specifically identify the
   suspected defect, the original delivery date and complete Buyer identification and location information.
   The Company will not accept any Product for warranty service without receiving Buyer’s written notice
   and issuing a return goods authorization. If requested by the Company, Buyer shall return the defective
   Product, or parts, components or assemblies thereof, to the Company, F.O.B, Company’s designated
   location. All returned Products or parts, components or assemblies thereof that are replaced under this
   Limited Warranty shall become the property of the Company. The Company reserves the right to review
   Buyer’s maintenance and operation records and procedures to determine if the alleged defect(s) were
   due to any of the items listed in Sections 2 of this Limited Warranty. The Company shall not be liable for
   any claim under this Limited Warranty if Buyer fails to satisfy the conditions set forth in this Section.

4. Exclusive Warranty Remedies
   a. Exclusive Repair or Replace Remedy
      The Company’s sole obligation and Buyer’s exclusive remedy with respect to any defect in the
      Product occurring during the warranty periods set forth in Section 1 of this Limited Warranty shall be
      for the Company, at its option, to repair or replace (or have one of its designated authorized dealers
repair or replace) the Product or part, component or assembly thereof that contains a defect in materials or workmanship. The Company reserves the right, at its discretion, to use new, re-manufactured or refurbished replacement parts. Notwithstanding anything in this Limited Warranty to the contrary, the Company shall not be obligated to replace the entire Product if a covered defect can be remedied by the repair or replacement of a defective part, component or assembly. The Company shall be responsible for the cost of all parts and labor charges, up to the Maximum Labor Amount determined in accordance with Section 4(b) of this Limited Warranty, necessary to remedy such defect.

b. Labor Charges
If field repairs or parts replacement are necessary on any Product covered by this Limited Warranty, the Company will reimburse its designated authorized dealer for those direct labor costs incurred to perform such field repairs or parts replacement up to the maximum amount specified in the Company’s current Field Service Rate (hereinafter, the “FSR”) or in any ‘Flat Rate Guides’ or similar agreement established with the authorized dealer (such maximum amount shall be referred to in this Limited Warranty as the “Maximum Labor Amount”). Current versions of the Company’s FSR and Flat Rate Guides are incorporated by reference into this Limited Warranty. For a current copy of the Company’s FSR and Flat Rate Guides, Buyer should contact the Company at 1-866-334-0756. Buyer shall be responsible for any costs or fees due to the authorized dealer in excess of the Maximum Labor Amount.

5. Disclaimer of Other Express and Implied Warranties
EXCEPT FOR THE LIMITED WARRANTIES SET FORTH IN SECTION 1 ABOVE, THE COMPANY MAKES NO OTHER REPRESENTATIONS OR WARRANTIES AND HEREBY DISCLAIMS ALL EXPRESS OR IMPLIED REPRESENTATIONS OR WARRANTIES REGARDING THE PRODUCT, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT OF PROPRIETARY OR THIRD-PARTY RIGHTS OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. No employee or representative of the Company or any of its authorized dealers is authorized to modify any term, condition or limitation in this Limited Warranty unless such modification is made in writing and signed by an officer of the Company.

6. Limitation of Liability
NOTWITHSTANDING ANYTHING IN THIS WARRANTY TO THE CONTRARY, IN NO EVENT SHALL THE COMPANY OR ANY OF ITS AFFILIATES OR SUBSIDIARIES BE LIABLE TO BUYER FOR ANY INDIRECT, SPECIAL, EXEMPLARY, PUNITIVE OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS, LOST REVENUE, DOWN TIME, LOSS OF BUSINESS OPPORTUNITY OR OTHER ECONOMIC LOSSES), WHETHER IN AN ACTION IN CONTRACT OR TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE, EVEN IF THE COMPANY HAS BEEN SPECIFICALLY ADVISED OF THE POSSIBILITIES OF SUCH DAMAGES.

Version of 2.1.13
The following section lists important documents and information related to your Hy-Brid Lift. For smartphone users, simply scan the QR codes with your smartphone to access the documents on your mobile device. For desktop access, please use the URLs provided (shortened “bit.ly” URLs have been used for your convenience. These URLs will direct you to the specified document on our website).

### General Lift Information

- **Family Brochure**
  - QR Code

- **HB-1230 Brochure**
  - URL: [http://bit.ly/1eBXvg0](http://bit.ly/1eBXvg0)
  - QR Code

- **Operations Manual**
  - QR Code

### Technical References

- **Diagrams**
  - QR Code

- **Decals**
  - QR Code

- **Checklists**
  - QR Code

### Parts Diagrams

- **Main Power Circuit**
  - QR Code

- **Drive Circuit**
  - QR Code

- **Covers / Other**
  - QR Code

- **Railings**
  - QR Code

- **Elevate / Lower Circuit**
  - QR Code