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

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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 DATES:
REV A .................................................................................................................. April 2016
SECTION 1 | SAFETY

1.1 | SAFETY SYMBOLS

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

*WARNING* indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

*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 scissor 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 EN: 280 requirements, 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 EN: 280. If you come across a situation that you think might be unsafe, stop the platform and request further information from qualified sources before proceeding.

*WARNING* mantenance information is for use by trained personnel only

*WARNING* 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 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.
1.4 | STABILITY TESTING

This machine has been stability tested to standards EN280 or AS 14180. The most adverse stability test is the stationary, lateral slope configuration for both units.

The stability test is to be done in compliance with EN280:2013, chapter 6.1.4.2.1, or AS14180 chapter 6.5.2, on an inclination of 2.5°, with 299.5 kg (660 lb.) on the platform, located as described in the standards.

This test can be simulated on a level surface with no load on the platform, using a side pull that causes the same overturning moment as the loads and inclination described above.

This equivalent test can be done as shown in the figure below.

For the HB-1230CE S3.1 the test weight/pull force is 24.6 kg (54.3 lb.)
SECTION 2 | MAINTENANCE

2.1 | BATTERY MAINTENANCE

This unit is equipped with 12-volt AGM maintenance-free batteries.

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.

![CAUTION]

NEVER ADD ACID TO BATTERY!

2.2 | CHARGING THE BATTERY

![WARNING]

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

The charger is equipped with an interlock circuit. The unit will not operate while charging. Shortened battery life will result.

To charge:
- Park the machine on a level surface.
- Plug charger into AC outlet until charged.
- For best battery life, leave the charger plugged in until machine will be used again. The charger will maintain the battery charge.

![FIGURE 3: Battery Charger LED Display]

![WARNING]

DO NOT OPERATE UNIT WHILE CHARGING. DO NOT DISABLE CHARGER INTERLOCK.
How to read the battery displays

<table>
<thead>
<tr>
<th>Power</th>
<th>Battery 1 Status</th>
<th>Battery 2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Charging</td>
<td>Charging</td>
</tr>
<tr>
<td></td>
<td>Ready</td>
<td>Ready</td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (OFF)</td>
<td>Red LED (OFF)</td>
</tr>
<tr>
<td>Red LED (OFF)</td>
<td>Green LED (OFF)</td>
<td>Green LED (OFF)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Power</th>
<th>Battery 1 Status</th>
<th>Battery 2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Charging</td>
<td>Charging</td>
</tr>
<tr>
<td></td>
<td>Ready</td>
<td>Ready</td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (ON)</td>
<td>Red LED (ON)</td>
</tr>
<tr>
<td>Red LED (ON)</td>
<td>Green LED (OFF)</td>
<td>Green LED (OFF)</td>
</tr>
</tbody>
</table>

This display indicates that power is on and that both outputs are delivering D/C current to the batteries.

<table>
<thead>
<tr>
<th>Power</th>
<th>Battery 1 Status</th>
<th>Battery 2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Charging</td>
<td>Charging</td>
</tr>
<tr>
<td></td>
<td>Ready</td>
<td>Ready</td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (OFF)</td>
<td>Red LED (OFF)</td>
</tr>
<tr>
<td>Red LED (OFF)</td>
<td>Green LED (ON)</td>
<td>Green LED (ON)</td>
</tr>
</tbody>
</table>

This display indicates that power is on and that both outputs are finished charging and are in a float maintenance mode.

<table>
<thead>
<tr>
<th>Power</th>
<th>Battery 1 Status</th>
<th>Battery 2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Charging</td>
<td>Charging</td>
</tr>
<tr>
<td></td>
<td>Ready</td>
<td>Ready</td>
</tr>
<tr>
<td>Green LED (ON)</td>
<td>Red LED (FLASHING)</td>
<td>Red LED (FLASHING)</td>
</tr>
<tr>
<td>Red LED (FLASHING)</td>
<td>Green LED (ON)</td>
<td>Green LED (ON)</td>
</tr>
</tbody>
</table>

A flashing red light indicates there is a problem with a battery, such as low voltage or a bad cell.

2.3 | LUBRICATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
<th>Frequency of Lubrication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>Teflon Spray</td>
<td>Quarterly</td>
</tr>
</tbody>
</table>

2.4 | COMPONENTS REQUIRING ADJUSTMENT

Under normal use, no components should require adjustment.
- If a pump is replaced contact your dealer for pump relief setting.
- If the load sensing calibration is not functioning correctly, contact your dealer for calibration.

2.5 | EXAMINATION, REPAIR, REPLACEMENT OF LIMITED LIFE COMPONENTS

With proper use, regular battery charging, 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 brakes are holding.
2.7 | STORAGE

After periods of storage, exposure to extremes of ambient conditions-heat, cold, moisture, dust etc. inspect the machine. Batteries will need to be charged. Refer to the Pre-Delivery/ Frequent Inspection Checklist in this 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.
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)
- Pre-Delivery/Frequent/Annual (Required every 3 months, after periods of storage, and after any alterations or repairs)

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

**CAUTION**

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: ____________________  Serial Number: ____________________

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

<table>
<thead>
<tr>
<th>Y-Yes/Acceptable</th>
<th>N-No/Unacceptable</th>
<th>R-Repaired</th>
<th>N/A - Not equipped with this feature</th>
<th>Y</th>
<th>N</th>
<th>R</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VISUAL INSPECTIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no loose or missing parts.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</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>
<td>□</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>
<td>□</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>
<td>□</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>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic hoses are not torn or loose, and there are no leaks. Hoses and the cables have no worn areas or chafing.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the tires for damage. Check that wheel axle retaining rings and any set screw(s) in rear wheel are tight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</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>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FUNCTIONAL TESTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate closes automatically and latches.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</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>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Stop (Stops all movement)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Actuator-Steered models: Enable Switch (Does not elevate unless enable is pressed)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Counter-Rotate Steering models: Drive &amp; Up/Down Mode Switch (Selects drive/steer or elevate mode)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joystick (Return to neutral, drives forward &amp; reverse.) Enable Trigger (Must be activated for joystick-operated movement) For Actuator-Steered models: Thumb rocker steers right &amp; left For Counter-Rotate Steering models: Elevates &amp; lowers</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If so equipped, horn sounds when button is pressed.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</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>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Stop (Stops all movement)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Actuator-Steered models: Key Switch (On or Off) For Counter-Rotate Steering models: Key Switch (Selects Platform Control, Ground Control, or Off)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up/Down Rocker Switch (Elevates, Lowers)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descent Alarm (Not damaged, sounds for descent; may also sound for drive &amp; elevate, if so equipped)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilt Alarm (Not damaged, sounds when tilted and machine elevated above designated height) If so equipped, elevating beyond this height may also be prevented.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master Power Switch disconnects battery</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheels: Front and rear wheels rotate freely. For Counter-Rotate Steering models: Front wheels pivot freely.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drives in slow speed when elevated.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brakes: Machine stops when joystick released.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</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>
<td>□</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>
<td>□</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date: ____________________  Inspected by: ____________________

---

**HY-BRID LIFTS**

MAINTENANCE & TROUBLESHOOTING
HB-1230CE

SUPO-717  REV A
Model: __________________________ 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.
- 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.

Y — Yes/Acceptable      N — No/Unacceptable     R — Repaired     N/A — Not equipped with this feature

<table>
<thead>
<tr>
<th>Y</th>
<th>N</th>
<th>R</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Base:

- **Inspect slide tracks for damage**
  - □ □ □ □
- **All frame bolts tight**
  - □ □ □ □
- **Pump Secure**
  - □ □ □ □
- **DC motors secure**
  - □ □ □ □
- **Batteries Fully Charged**
  - □ □ □ □
- **For actuator-steered models:**
  - **Tie rods secure**
    - □ □ □ □
- **Wheels:**
  - **Snap Rings Secure**
    - □ □ □ □
- **Scissors:**
  - **No Broken Welds**
    - □ □ □ □
  - **No Bent Beam Members**
    - □ □ □ □
- **Maintenance Locks:**
  - **Stored in designated location**
    - □ □ □ □

### Rails/Extending platform:

- **Extends freely**
  - □ □ □ □
- **Cables in place/secure**
  - □ □ □ □
- **Locks in Stowed Position**
  - □ □ □ □
- **Locks in Extended Position**
  - □ □ □ □
- **Functions:**
  - **All Functions (Drive,Elevate,Steer) Operational**
    - (see Pre-Start Inspection for details)
    - □ □ □ □
- **Pothole guards Deploy when platform elevated**
  - □ □ □ □
- **Emergency Stop Breaks Circuits**
  - □ □ □ □
- **Slow Speed limit switch Set properly**
  - □ □ □ □
- **Pothole interlock functions correctly**
  - □ □ □ □
- **Emergency Down Operational**
  - □ □ □ □

### Brakes:

- **Operational**
  - □ □ □ □

### Wiring:

- **Switches secure**
  - □ □ □ □
- **Contactor(s) secure**
  - □ □ □ □
- **Tight on terminals (No loose wiring)**
  - □ □ □ □

### Platform:

- **Oil: Level 1” from top (when platform stowed)**
  - □ □ □ □
- **Check all hose for leaks**
  - □ □ □ □
- **Check all fittings for leaks**
  - □ □ □ □
- **Battery Charger Secure/Operational**
  - □ □ □ □
- **Tilt sensor**
  - □ □ □ □
- **Warning Horn (if applicable)**
  - □ □ □ □

### Decals:

- **Hour meter operational**
  - □ □ □ □
- **Battery indication operational**
  - □ □ □ □
- **Operator’s Manual is on the unit**
  - □ □ □ □
- **If equipped with load sensing:**
  - **Overload light & alarm sounds when overloaded**
    - □ □ □ □

Date: __________________________ Inspected by: __________________________
4.1 | HYDRAULIC SCHEMATIC
Part No. HS-129-20-201-51

1300 psi
8960 kPa
3.78 L/min

TEST PORT
SAEORM #4
HEX SOCKET 3/16

TEST PORT
SAEORM #4
HEX SOCKET 3/16

THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY TO CUSTOM, EQUIPMENT AND IS LOANED IN EXPECTATION THAT IT WILL BE KEPT CONFIDENTIAL AND USED ONLY FOR THE PURPOSE FOR WHICH IT IS LOANED.
4.2 | ELECTRICAL SCHEMATIC
Part No. WS-129-20-316-51
SECTION 4 | TECHNICAL REFERENCES

CUSTOM EQUIPMENT, INC.
Richfield, WI 53076
Phone: (262) 644-1300

ELEC SCH, HB-1230CE S3

SPEC/MATL: Schematic
WEIGHT: APPROX. 0.00 LB.

DRAWING #: WS-129-20-316-51

SCALE: 1:1
B-SIZE
DO NOT SCALE DRAWING
SHEET 1 OF 1

EXPECTATION THAT IT WILL BE KEPT CONFIDENTIAL AND USED ONLY FOR THE PURPOSE FOR WHICH IT IS LOANED.
4.3 | CONTROL BOARD DIAGNOSTIC

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/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>Section</td>
<td>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, load 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>Problem with the pressure sensor</td>
</tr>
<tr>
<td>6-3</td>
<td>Problem with elevation switch or its connections</td>
</tr>
<tr>
<td>6-6</td>
<td>Problem with the pressure sensor</td>
</tr>
<tr>
<td>7-x</td>
<td>There is a problem with the power wiring—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>
5.3 | UPPER CONTROLS WIRING DIAGRAM

Part No. WD-129-21-308-51

Steer (Gray)

Lift/Drive (Blue)

Js Neg (Green)

Js +5V (Orange)

Js Trig In (Red)

Js Trig. Out (Black)

Joystick

NO

1 2

NC

2 1

Drive Enable

Lift Enable

NO

1 2

1 2

NC

DrivE Enable

N: Terminal Connection

D: Main Connection

This drawing is confidential and proprietary to Custom, Equipment and is loaned in expectation that it will be kept confidential and used only for the purpose for which it is loaned.
6.1 | MAIN POWER/SAFETY CIRCUIT

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

See also Main Power & Safety Circuit
Wiring Diagram: WD-129-20-201-51
Or
Schematic: WS-129-20-201-51

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

No

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

Yes

Is the battery charger plugged in?

Turn the master power switch to the “ON” position

No

Is the master power switch turned on in the desired position?
(may select upper or lower controls)

Unplug the charger.
Machine cannot be operated while battery is charging

No Light

Are batteries fully charged?

Yes

Are the batteries connected?

Is short protection fuse blown?

No

No

Charge batteries.

Connect battery.

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

1. Is either E-Stop Button depressed/activated?
   - Yes: Reset E-Stop buttons. Pull out at both upper control and lower control locations.
   - No:
     - Yes: Refer to Diagnostic Light Codes in Maintenance Manual
     - No:
       - Yes: See Drive Problems Flowchart
       - No:
         - Yes: See Elevating Problems Flowchart
         - No:
           - Yes: See Lowering Problems Flowchart
           - No: Contact Hy-Brid Lifts with questions or different problem

2. What type of problem?
Flowchart-HB-830CE/1230CE-Drive
Troubleshooting Step 2: Drive

Refer to Diagnostic Light Codes in Maintenance Manual

Yes

Does the machine drive?

Is there a trouble code flashing?

Is either or two brakes manually released?

No

Is either of two brake switches damaged or disconnected?

No

Is drive unit

Yes, but not properly

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

Driving slowly?

Are batteries fully charged?

Yes

Are brakes hot?

No

Charge batteries

Check brake connections. Replace brake if damaged.

Driving slowly?

Drives slow when lowered?

Is angle sensor damaged?

Yes

Drives fast when elevated?

Does not drive when elevated?

Is machine tilted?

Yes

Lower platform and move to a flat surface.

Drives intermittently?

See Elevator Manual

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

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

Reference Revision A
**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.

**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.

---

**Flowchart: Troubleshooting Flowcharts**

- **damaged?**
  - No
  - Are all connections to drive joystick and drive control board secure? **Yes**
  - Is there moisture or corrosion in any connections? **Yes**
    - Still no drive?
      - Allow to dry for 24 hours and try again. Board probably will need replacement. Apply dielectric grease to connectors at main wire harness.
      - 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.
  - Replace drive unit

- **No**
  - is a drive motor damaged?
    - **No**
      - Replace drive motor.
    - **Yes**
      - Check for proper connection to sensor. Replace sensor.

- **No**
  - Contact Hy-Brid Lifts for further troubleshooting.
    - Consider board failure or incorrect wiring.

- **No**
  - Contact CEI for further troubleshooting.
    - Consider board failure, pothole interlock limit switch failure.

  Contact Hy-Brid Lifts for further troubleshooting.
  Consider board failure.
### 6.3 | ELEVATE CIRCUIT

**Flowchart-HB-830CE/1230CE-Elevating**

Troubleshooting Step 3A: Elevating

- **What is the diagnostic LED flashing?**

  - Refer to Diagnostic Light Codes in Maintenance Manual

- **Does machine elevate?**

  - Yes, but not properly
  - Move to a level surface.
  - Goes up, but comes down
  - Starts ascending, then stops

- **Ascent speed slow or erratic?**

  - Is platform overloaded?

- **Does the pump run?**

  - Yes
  - See Lowering Problems Flowchart
  - No

- **Is the emergency down valve open?**

  - Yes
  - Close emergency down valve
  - No

- **Check wiring connections in elevate components.**

  - See Electrical Schematic WS-129-20-001-51

- **Are power connections to elevate circuit and switches functioning properly?**

  - Yes
  - Replace or repair identified problem. See Parts List.
  - No

- **Is battery fully charged?**

  - Yes
  - Replace hydraulic hose.
  - No

- **Is there a restriction in hydraulic hose?**

  - Yes
  - Contact manufacturer to arrange replacement.
  - No
  - Charge batteries.

**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 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.

Is up/down switch damaged?
Yes
Replace damaged rocker switch at upper or lower control.

Is any of these switches damaged?
Selector Switch (Upr Ctl)
Joystick (Upr Ctl)
Joystick Trigger (Upr Ctl)

No

Is hydraulic fluid low?
Yes
With platform lowered, fill pump reservoir with specified oil.

No

Replace or repair identified problem. See Parts List.

Are any of these switches damaged?

Time and parts available?
Yes
Try replacing up valve

No

Replace Pump Assembly

Does pump operate?

No

Check wiring connections in elevate components. See Electrical Schematic WS-129-20-201-51

Are power connections to elevate circuit and switches functioning properly?

Yes

Replace or repair identified problem. See Parts List.

No

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.

Level of skill with hydraulic maintenance?
Experienced with hydraulic systems

Not experienced with hydraulics

Check Hydraulic Circuit. (Additional tools and higher level of skill required) See Hydraulic Schematic HS-129-20-201-51

Contact Hy-Brid Lifts

Not experienced with hydraulics

Reference Revision A
6.4 | LOWER CIRCUIT

Flowchart: HB-830S2/1230S2-Lowering
Troubleshooting Step 3B: Lowering

What does the diagnostic LED show?

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.

Is maintenance lock in place?

Does machine lower?
- Not at all
- Yes, but not properly
- Starts descending, then stops

Will Manual Override lower the platform?

Has key switch or master power switch been turned off?

Is an E-Stop activated?

Pull out emergency stop button at upper and lower controls.

Turn key to upper or lower ON position.

Descent speed slow or erratic?

Are any structural members bent?

Is there a restriction in hydraulic hose?

Contact manufacturer to arrange replacement.

Replace hydraulic hose.

Down Valve Coil mounting nut too tight? Nut should only be lightly snug 30 in.-lb.

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.

Disassemble and clean. Look for residue in screen and on O-ring or damage to O-ring.
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.

1. Is battery charged?
   - Yes
   - No
     - Charge battery. See SD-Battery-01

2. Does the up/down switch appear damaged?
   - Yes
     - Replace rocker switch at lower control or joystick at upper control.
   - No
     - Level of skill with hydraulic maintenance?
       - Yes
         - Not experienced with hydraulics
         - Replace down valve
       - No
         - Experienced with Hydraulic systems
           - Check for hydraulic leak and repair as needed. Check that unit has proper hydraulic fluid. Replace as needed. ALWAYS remember to use maintenance lock pins when doing any hydraulic work.

3. Are power connections to lowering circuit and switches functioning properly?
   - Yes
     - Level of skill with hydraulic maintenance?
       - Yes
         - Not experienced with hydraulics
         - Contact Hy-Brid Lifts
       - No
         - Experienced with hydraulic systems
           - Check Hydraulic Circuit. (Additional tools required, higher level of skill required) Refer to Hydraulic Schematic HS-129-20-201-51
           - Level of skill with hydraulic maintenance?
             - Yes
               - Not experienced with hydraulics
               - Contact Hy-Brid Lifts
             - No
               - Faulty check valve in pump?
                 - Yes
                   - Listen carefully near motor when not energized—may be running backwards
                 - No
                   - Faulty check valve in pump?
                     - Yes
                       - Replace pump
                     - No
                       - Damaged cylinder or damaged seal in cylinder?
                         - Yes
                           - Might be able to repair with seal kit, probably need to replace cylinder. If walls inside cylinder are scratched or pitted, cylinder needs replacement.
                          - No
                            - Run unit up and then check for oil flow out of return line. Bad cylinder seal if oil is flowing from return line.

4. Faulty down valve?
   - Yes or Don’t know
     - Replace down valve.
   - No

Reference Revision A
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.

REPLACEMENT OF THE FOLLOWING COMPONENTS WILL AFFECT THE STRENGTH, STABILITY, OR SAFETY FUNCTION OF THE UNIT: BATTERY (ELEC-047-5), HYDRAULIC CYLINDER, CONTROL BOARD (129-21-267-51), AND ALL STRUCTURAL COMPONENTS.

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

In addition to the decals listed in the Operation and Safety Manual, a partial list of replacement parts is included in this manual. These represent current model revisions. A full parts manual is available from

The following materials require special means of disposal:
HYDR-032: Hydraulic fluid: Do not dispose in a drain to water source. Take to a recycling center.
ELEC-047-5: Batteries: Take to a recycling center.
<table>
<thead>
<tr>
<th>Description</th>
<th>Part #</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM, CONTINUOUS</td>
<td>ELEC-635-4</td>
<td></td>
</tr>
<tr>
<td>BOARD, DRIVE/LIFT CTL HB-MID</td>
<td>129-21-267-51</td>
<td>BEGINNING WITH SERIAL #E08-35000</td>
</tr>
<tr>
<td>BUTTON, PUSH/PULL RED E-STOP</td>
<td>ELEC-071-KIT</td>
<td></td>
</tr>
<tr>
<td>CHARGER, 24V</td>
<td>ELEC-747</td>
<td></td>
</tr>
<tr>
<td>CORD, NEMA 515/IEC C13,36</td>
<td>ELEC-639-3</td>
<td></td>
</tr>
<tr>
<td>CTL, ASM LWR</td>
<td>129-21-307-51</td>
<td></td>
</tr>
<tr>
<td>CTL, ASM UPR</td>
<td>129-21-308-51</td>
<td></td>
</tr>
<tr>
<td>CTL, WIRE HARNESS MAIN HB-1230</td>
<td>129-21-311-50</td>
<td></td>
</tr>
<tr>
<td>DECALS, HB-1230 S3 CEI</td>
<td>129-21-315-51-K</td>
<td></td>
</tr>
<tr>
<td>DRIVE MOTOR, 24VELE, HB DUM, HT</td>
<td>ELEC-759-KIT</td>
<td>WHITE-YEL STRIPE/YEL LEADS BEGINNING WITH SERIAL #E08-35000</td>
</tr>
<tr>
<td>DRIVE MOTOR, 24VELE, HB DUM, HT</td>
<td>ELEC-758-KIT</td>
<td>ORANGE/VIOLET LEADS BEGINNING WITH SERIAL #E08-35000</td>
</tr>
<tr>
<td>DRIVE MOTOR, BRAKE</td>
<td>ELEC-627-5L</td>
<td></td>
</tr>
<tr>
<td>DRIVE MOTOR, BRAKE</td>
<td>ELEC-627-5R</td>
<td></td>
</tr>
<tr>
<td>HYDRAULIC OIL</td>
<td>HYDR-032</td>
<td>Not available as a replacement part. Replace with Flornite #150, Dexron II, Mobil-DTE 2 or equivalent.</td>
</tr>
<tr>
<td>KEY, SPARE</td>
<td>ELEC-073EKEY</td>
<td></td>
</tr>
<tr>
<td>MANUAL BOX</td>
<td>HARD-603</td>
<td></td>
</tr>
<tr>
<td>METER, HOUR</td>
<td>ELEC-610-2</td>
<td></td>
</tr>
<tr>
<td>METER, VOLT, 24V</td>
<td>ELEC-610-4</td>
<td></td>
</tr>
<tr>
<td>ORING, 0.25 X 5</td>
<td>HARD-606-2</td>
<td></td>
</tr>
<tr>
<td>SWITCH KNOB, MASTER DISCONNECT</td>
<td>ELEC-633-5</td>
<td></td>
</tr>
<tr>
<td>SWITCH KEY, 3-POS MAINTAINED</td>
<td>ELEC-073D-KIT</td>
<td></td>
</tr>
<tr>
<td>SWITCH, LIMIT, LVR MICRO</td>
<td>ELEC-627-6</td>
<td></td>
</tr>
<tr>
<td>SWITCH, LIMIT, ROT LVR, NO/NC PO</td>
<td>ELEC-123-5</td>
<td></td>
</tr>
<tr>
<td>SWITCH, MASTER DISCONNECT</td>
<td>ELEC-633-4</td>
<td></td>
</tr>
<tr>
<td>SWITCH, ROTARY MAINTAINED</td>
<td>ELEC-133B</td>
<td></td>
</tr>
<tr>
<td>SWITCH, ROCKET DPDT</td>
<td>ELEC-002C-KIT</td>
<td></td>
</tr>
<tr>
<td>WHL, 12X4 NM RUBBER W/HUB</td>
<td>WHEE-618-KIT</td>
<td></td>
</tr>
<tr>
<td>WHL, 8X2, GREY NM RUBBER</td>
<td>WHEE-706-KIT</td>
<td></td>
</tr>
<tr>
<td>ASM, SCISSOR CYL, HB12-CE</td>
<td>129-21-316-51-K</td>
<td></td>
</tr>
<tr>
<td>MANUAL, PARTS HBMD S3CE</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>
LIMITED WARRANTY
Warranty Statement—International

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:

Limited Product Warranty
For a period of 24 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

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.

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.

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. Buyer shall retain all defective Products or parts, components or assemblies thereof for a minimum period of six (6) months. 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.

EXCLUSIVE WARRANTY REMEDIES
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, remanufactured 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 necessary to remedy such defect. Buyer shall be responsible for payment of any costs or fees due to the authorized dealer to perform any warranty service.

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.

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 1.15.16
## Section 9 | Inspection and Repair Log

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