HY-BRID LIFTS™
BY CUSTOM EQUIPMENT LLC

MAINTENANCE & TROUBLESHOOTING MANUAL

ZT-1230

MOBILE ELEVATING WORK PLATFORM

SUPO-738 | REV A

NOTES

Custom Equipment, LLC

General Information
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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.

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.

ANY MODIFICATION ON THIS MACHINE WITH OUT THE EXPRESS WRITTEN CONSENT OF THE MANUFACTURER IS PROHIBITED.

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SECTION 1 | SAFETY

1.1 | SAFETY SYMBOLS

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.

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

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

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 ANSI & OSHA, 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 and OSHA. If you come across a situation that you think might be unsafe, stop the platform and request further information from qualified sources before proceeding.

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.

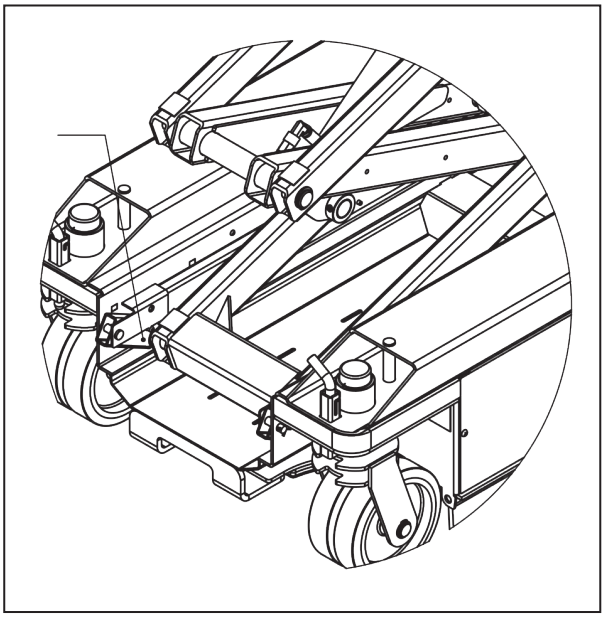

FIGURE 1: Maintenance Lock Use

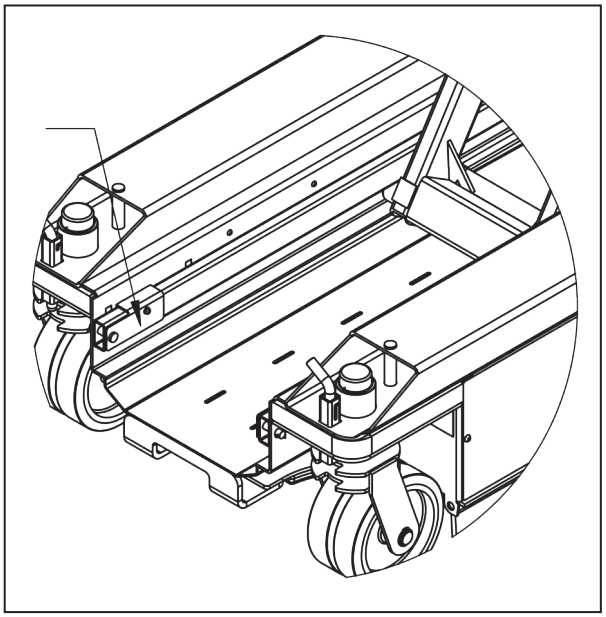

FIGURE 2: Maintenance Lock Storage

WARNING

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.

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 may include an interlock circuit. If so equipped, the unit will not operate while charging. Operating while charging will shorten battery life.

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.

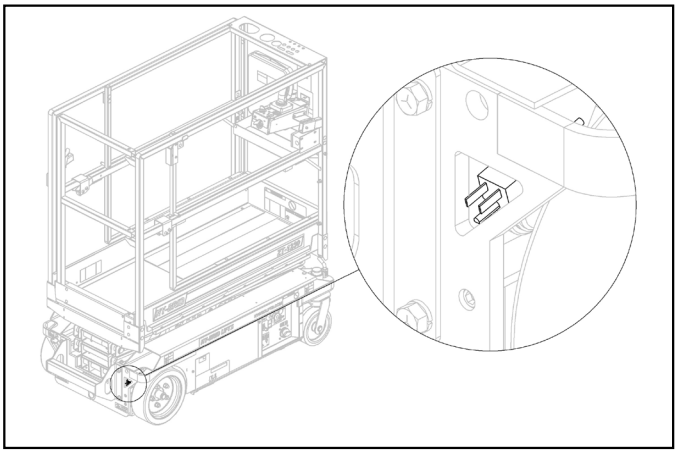

FIGURE 3: Charger Cord Location

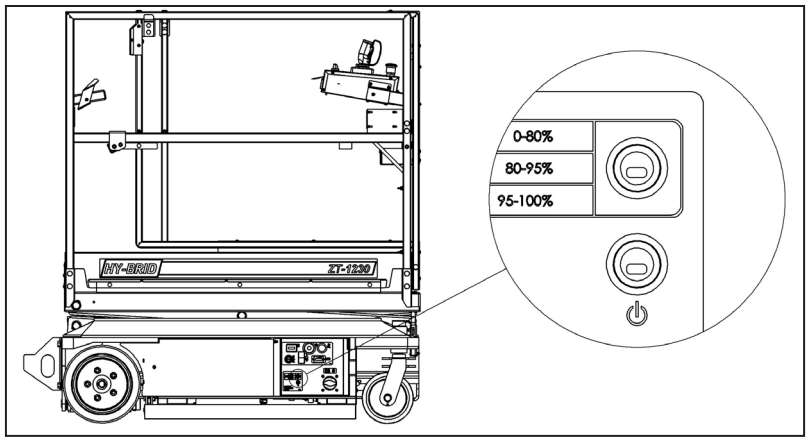

FIGURE 4: Battery Charger LED Display

WARNING

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

Standard Charge Status Lights:

CHARGE STATUS LIGHT	 (OFF)	 (FLASHING)	 (SOLID)	 (SOLID)	 (FLASHING)
POWER LIGHT	 (SOLID)	 (SOLID)	 (SOLID)	 (SOLID)	 (FLASHING)
MEANING	**Standby Mode** (Or battery /connection error	Normal Charging: Bulk Charging	Normal Charging: Absorption Stage	Charge Complete: Flat/Maintenance Mode	Charger Error

Lester SLM Charge indicators are listed below.

GREEN	RED	AMBER	DESCRIPTION
(OFF)	(OFF)	(OFF)	Charger is off and disconnected from live AC voltage
(OFF)	(OFF)	(SOLID ON)	LED Check during charge initialization which occurs for the first few seconds
(SLOW)	(OFF)	(OFF)	Start/Bulk charge cycle phase (constant power/constant current) or Plateau/Absorption charge cycle phase (constant voltage)
(FAST)	(OFF)	(OFF)	Finish charge cycle phase (constant current). (Not all charge profiles include a Finish phase.) OR Equalize/Balance charge cycle phase (constant current), which occurs when a trigger condition has been met. (Not all charge profiles include a Finish phase.) OR Post Charge phase (constant-voltage float). (Not all charge profiles include a Post Charge phase.)
(SOLID ON)	(OFF)	(OFF)	Charge Cycle Complete
(OFF)	(SLOW)	(OFF)	Charger-related fault that causes the unit to stop charging.
(OFF)	(FAST)	(OFF)	Charger-related fault that does not cause the unit to stop charging. Charging will continue but performance will be reduced.
(OFF)	(SOLID ON)	(OFF)	Battery-related fault. MIN VOLTAGE-Minimum voltage was not met after a specified time from the start of the charge cycle MAX VOLTAGE - Maximum voltage was met. PHASE-Maximum time for a particular charge cycle phase (start/bult, plateau/absorption, finish) was met. MAX TIME- Maximum time for the overall charge cycle was met.
(ALTERNATING)	(ALTERNATING)	(OFF)	Active Charge Profile DIP switch positions are invalid.

2.3 | LUBRICATION

Item	Specification	Frequency of Lubrication
Wheels	Teflon Spray	Quarterly

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, 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 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.

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

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

Pre-start Inspection (Self-Propelled Models)

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.

Y-Yes/Acceptable N-No/Unacceptable R-Repaired N/A - Not equipped with this feature	Y	N	R	N/A
VISUAL INSPECTIONS				
There are no loose or missing parts.	☐	☐	☐	☐
Check that warning and instructional labels are legible and secure. Ensure that load capacity is clearly marked.	☐	☐	☐	☐
Check the platform rails and safety gate for damage.	☐	☐	☐	☐
Platform and base controls are not missing, damaged, or disconnected.	☐	☐	☐	☐
Electrical cables and wires are not torn, frayed, or disconnected.	☐	☐	☐	☐
Hydraulic hoses are not torn or loose, and there are no leaks. Hoses and the cables have no worn areas or chafing.	☐	☐	☐	☐
Check the tires for damage. Check that wheel axle retaining rings and any set screw(s) in rear wheel are tight.	☐	☐	☐	☐
Check that all snap rings are secure in grooves on pivot pins.	☐	☐	☐	☐
FUNCTIONAL TESTS				
Gate closes automatically and latches.	☐	☐	☐	☐
Platform Controls: Check all switches and push buttons for proper operation.				
Emergency Stop (Stops all movement)	☐	☐	☐	☐
For Actuator-Steered models: Enable Switch (Does not elevate unless enable is pressed)	☐	☐	☐	☐
For Counter-Rotate Steering models: Drive & Up/Down Mode Switch (Selects drive/steer or elevate mode)	☐	☐	☐	☐
Joystick (Return to neutral, drives forward & reverse,) Enable Trigger (Must be activated for joystick-operated movement) For Actuator-Steered models: Thumb rocker steers right & left For Counter-Rotate Steering models: Elevates & lowers	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
If so equipped, horn sounds when button is pressed.	☐	☐	☐	☐
Base Controls: Check all switches and push buttons for proper operation.				
Emergency Stop (Stops all movement)	☐	☐	☐	☐
For Actuator-Steered models: Key Switch (On or Off) For Counter-Rotate Steering models: Key Switch (Selects Platform Control, Ground Control, or Off)	☐	☐	☐	☐
Up/Down Rocker Switch (Elevates, Lowers)	☐	☐	☐	☐
Descent Alarm (Not damaged, sounds for descent; may also sound for drive & elevate, if so equipped)	☐	☐	☐	☐
Tilt Alarm (Not damaged, sounds when tilted and machine elevated above designated height) If so equipped, elevating beyond this height may also be prevented.	☐	☐	☐	☐
Master Power Switch disconnects battery	☐	☐	☐	☐
Wheels: Front and rear wheels rotate freely. For Counter-Rotate Steering models: Front wheels pivot freely.	☐	☐	☐	☐
Drives in slow speed when elevated.	☐	☐	☐	☐
Brakes: Machine stops when joystick released.	☐	☐	☐	☐
Pothole guards deploy and lock when platform is elevated.	☐	☐	☐	☐
Lift does not elevate when pothole guards are blocked.	☐	☐	☐	☐

Date:_____ Inspected by:_____

3.2 | PRE-DELIVERY/ANNUAL/FREQUENT INSPECTION CHECKLIST

CAUTION

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

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.

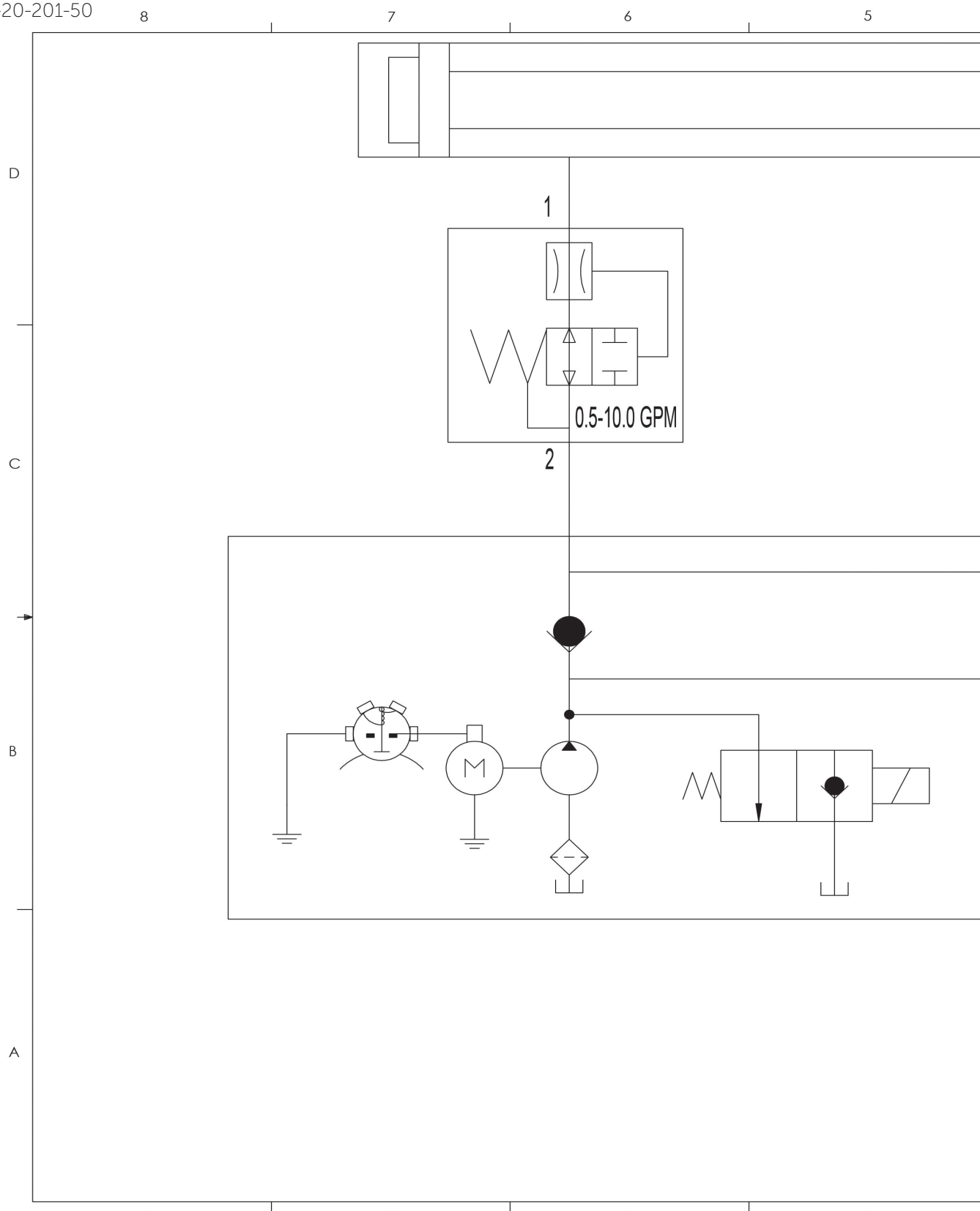
Y — Yes/Acceptable N — No/Unacceptable R — Repaired N/A — Not equipped with this feature

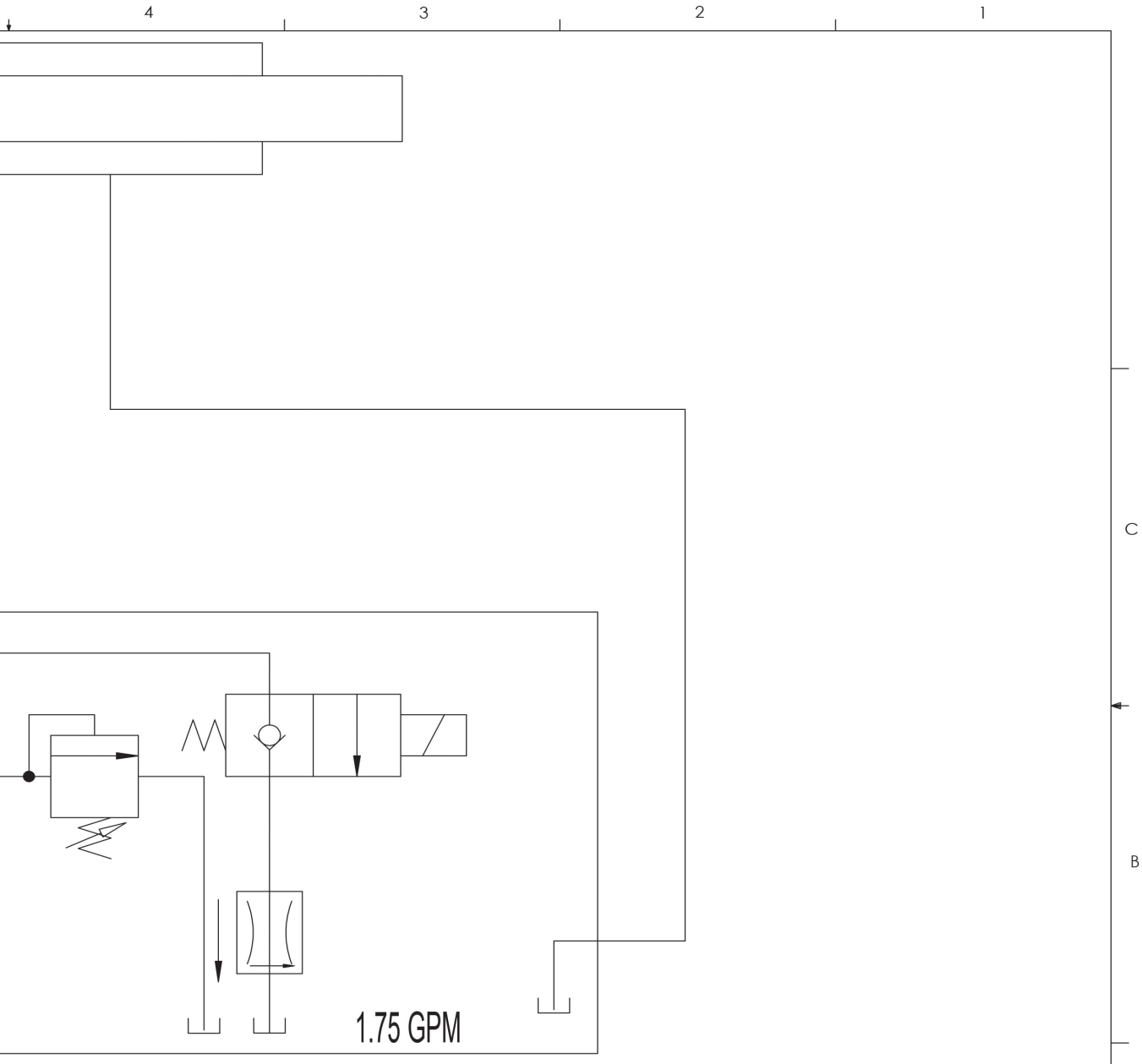
	Y	N	R	N/A		Y	N	R	N/A
Base:					**Rails/Extending platform:**				
Inspect slide tracks for damage	☐	☐	☐	☐	Extends freely	☐	☐	☐	☐
All frame bolts tight	☐	☐	☐	☐	Cables in place/secure	☐	☐	☐	☐
Pump secure	☐	☐	☐	☐	Locks in stowed position	☐	☐	☐	☐
DC motors secure	☐	☐	☐	☐	Locks in extended position	☐	☐	☐	☐
Batteries fully charged	☐	☐	☐	☐	**Functions:**				
For PS Series models: Tie rods secure	☐	☐	☐	☐	All functions (Drive,Elevate,Steer) operational (see Pre-Start Inspection for details)	☐	☐	☐	☐
Wheels:					Pothole guards deploy when platform elevated	☐	☐	☐	☐
Snap rings secure	☐	☐	☐	☐	Emergency stop breaks circuits	☐	☐	☐	☐
Bolts/nuts tight	☐	☐	☐	☐	Slow speed limit switch set properly	☐	☐	☐	☐
All shields/guards in place	☐	☐	☐	☐	Pothole interlock functions correctly	☐	☐	☐	☐
Scissors:					**Brakes:** Operational	☐	☐	☐	☐
No broken welds	☐	☐	☐	☐	Emergency Down operational	☐	☐	☐	☐
No bent beam members	☐	☐	☐	☐	**Wiring:**				
All rollers turn freely	☐	☐	☐	☐	Switches secure	☐	☐	☐	☐
Ret. rings secure on pivots	☐	☐	☐	☐	Contactor(s) secure	☐	☐	☐	☐
Maintenance locks: Stored in designated location	☐	☐	☐	☐	Tight on terminals (No loose wiring)	☐	☐	☐	☐
Platform:					**Oil:** Level 1" from top (when platform stowed)	☐	☐	☐	☐
No bent rails	☐	☐	☐	☐	Check all hose for leaks	☐	☐	☐	☐
No broken welds	☐	☐	☐	☐	Check all fittings for leaks	☐	☐	☐	☐
All rails in place/secure	☐	☐	☐	☐	Battery charger secure/operational	☐	☐	☐	☐
110V outlet safe/working (if applicable)	☐	☐	☐	☐	Tilt sensor	☐	☐	☐	☐
Entrance gate closes freely	☐	☐	☐	☐	Warning horn (if applicable)	☐	☐	☐	☐
Decals:					Hour meter operational	☐	☐	☐	☐
Legibile	☐	☐	☐	☐	Battery indication operational	☐	☐	☐	☐
Correct capacity noted	☐	☐	☐	☐	Operator's Manual is on the unit	☐	☐	☐	☐
Proper placement & quantity	☐	☐	☐	☐	**If equipped with load sensing:** Overload light & alarm sounds when overloaded	☐	☐	☐	☐

Date:_____ Inspected by:_____

4.1 | HYDRAULIC SCHEMATIC

Part No. HS-129-20-201-50



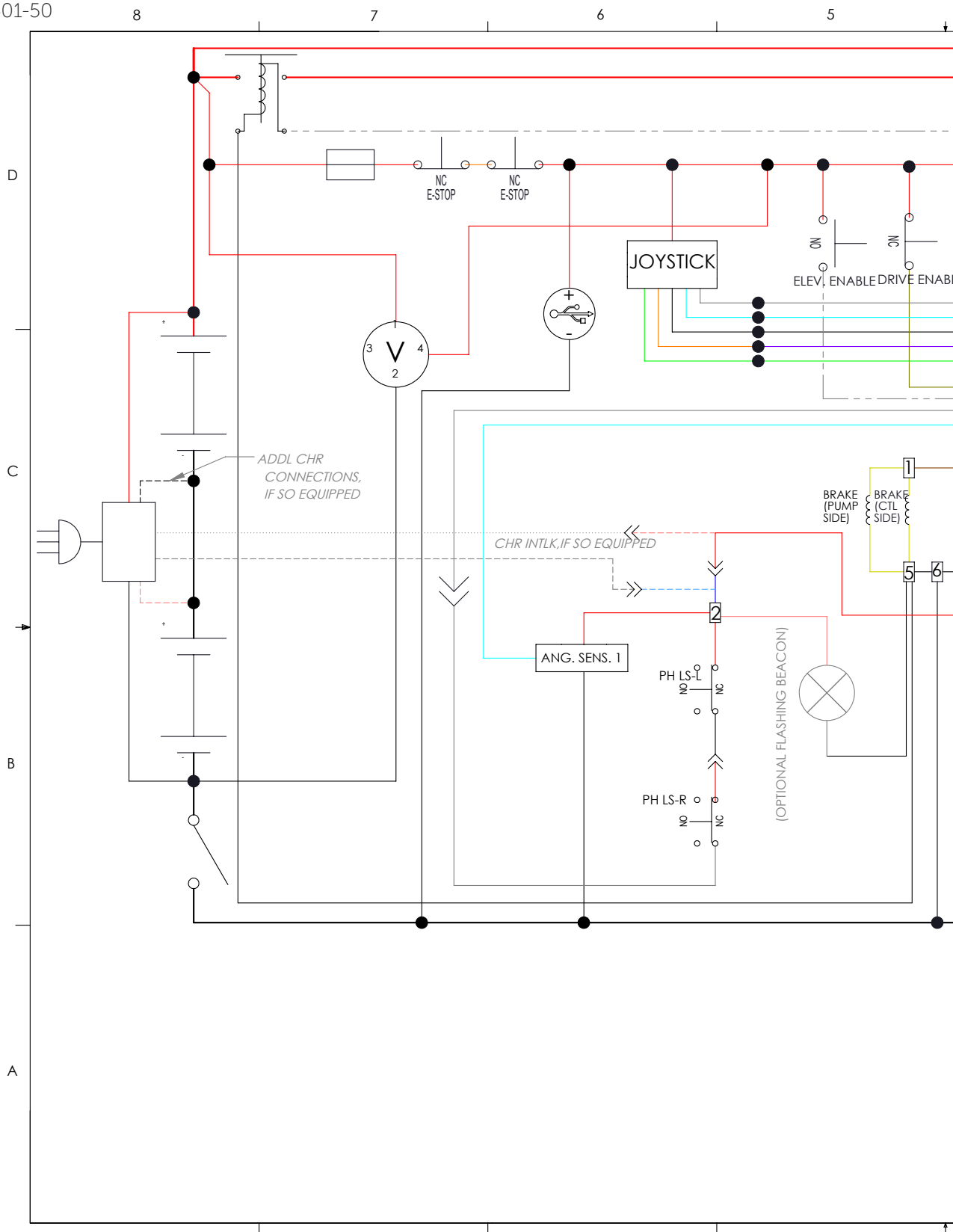


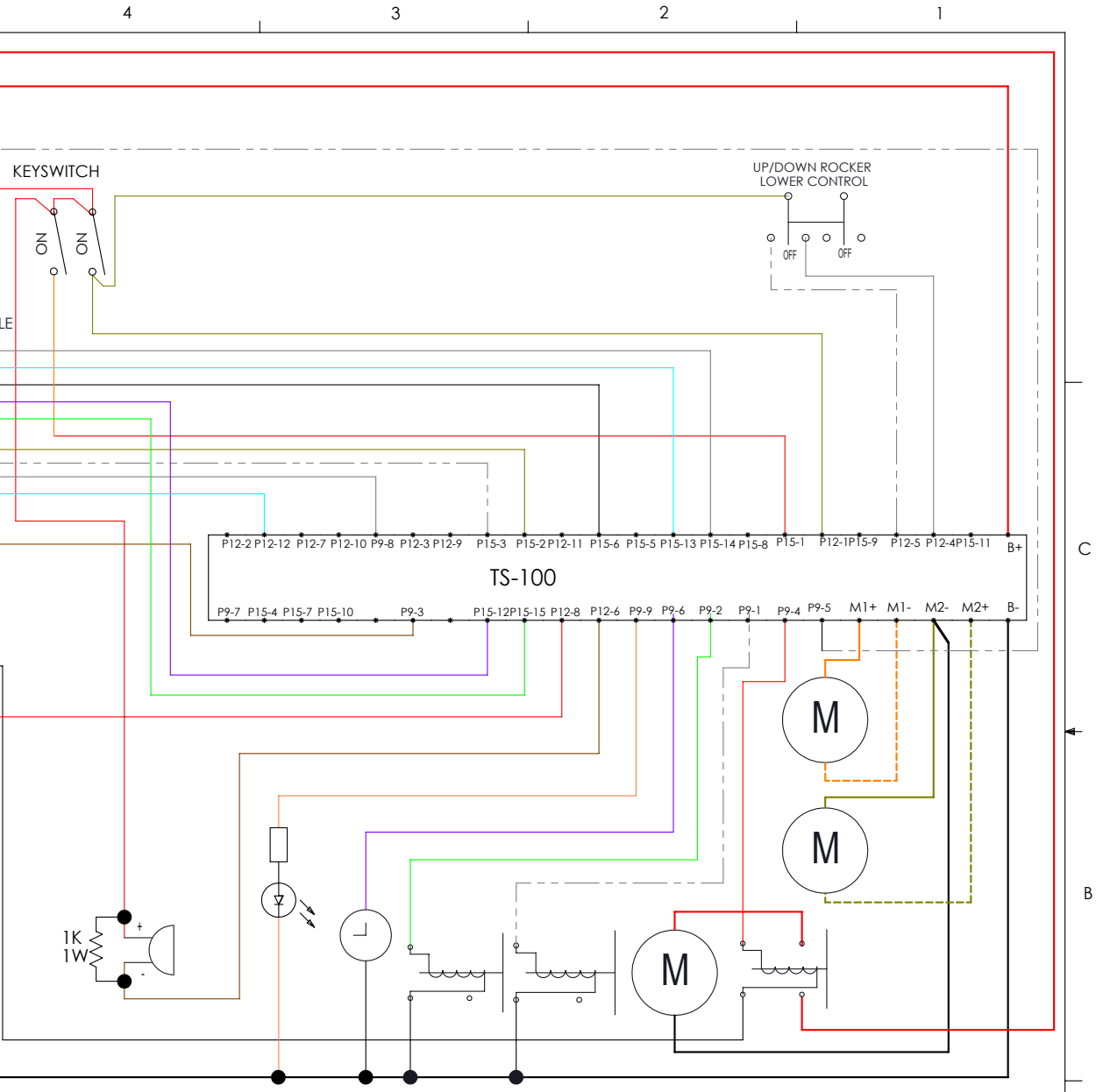
REV	DESCRIPTION OF CHANGE	ECO #	DATE	REV BY
B	1.75 GPM Flow Control was 2.5 GPM	2015-2555	05/11/2015	GLH

ORIGINALLY DRAWN BY:	DATE:
Custom Equipment, Inc.	Richfield, WI 53076 Phone: (262)644-1300
HYDR SCH,HB-830/1230 S2	
SPEC/MATL: Schematic	WEIGHT: APPROX. 0.00 LB.
DRAWING #: HS-129-20-201-50	**B**
SCALE:1:1 B-SIZE DO NOT SCALE DRAWING	SHEET 1 OF 3

4.2 | ELECTRICAL SCHEMATIC

Part No. WS-129-20-401-50





REV	DESCRIPTION OF CHANGE	ECO #	DATE	REV BY
A	INITIAL RELEASE	2019-3288	6/18/2019	GLH

ORIGINALLY DRAWN BY: | DATE:

Custom Equipment, Inc.
Richfield, WI 53076
Phone: (262)644-1300

ELEC SCH,ZT-1230 S4

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

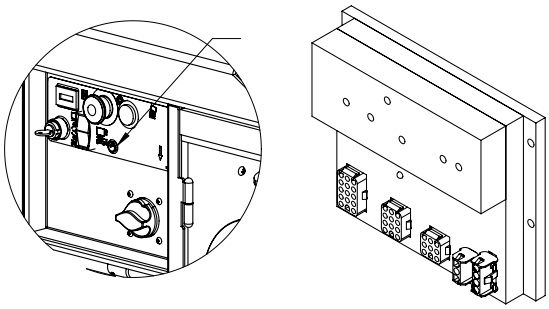
DRAWING #: WS-129-20-401-50 | **A**

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

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

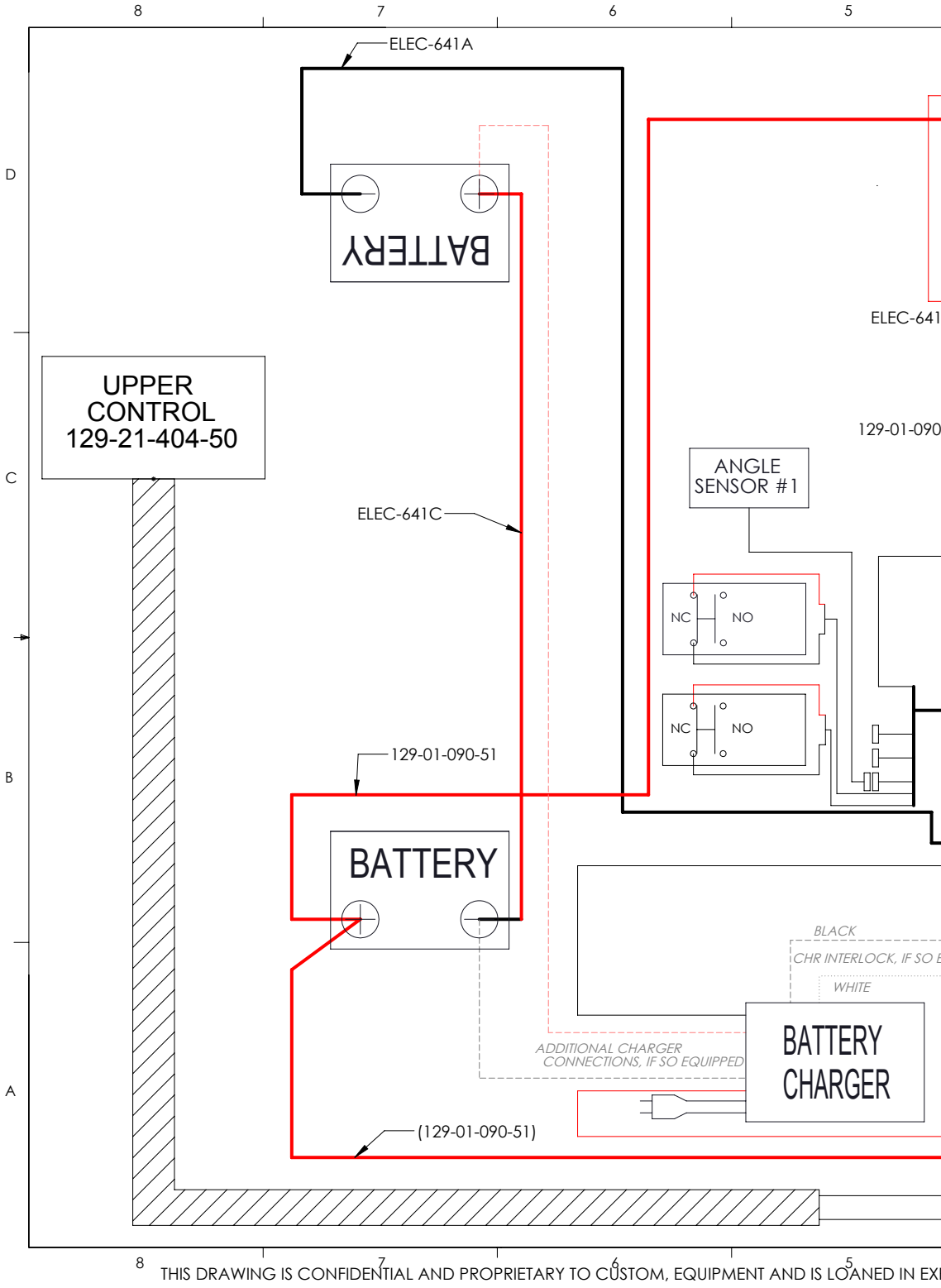


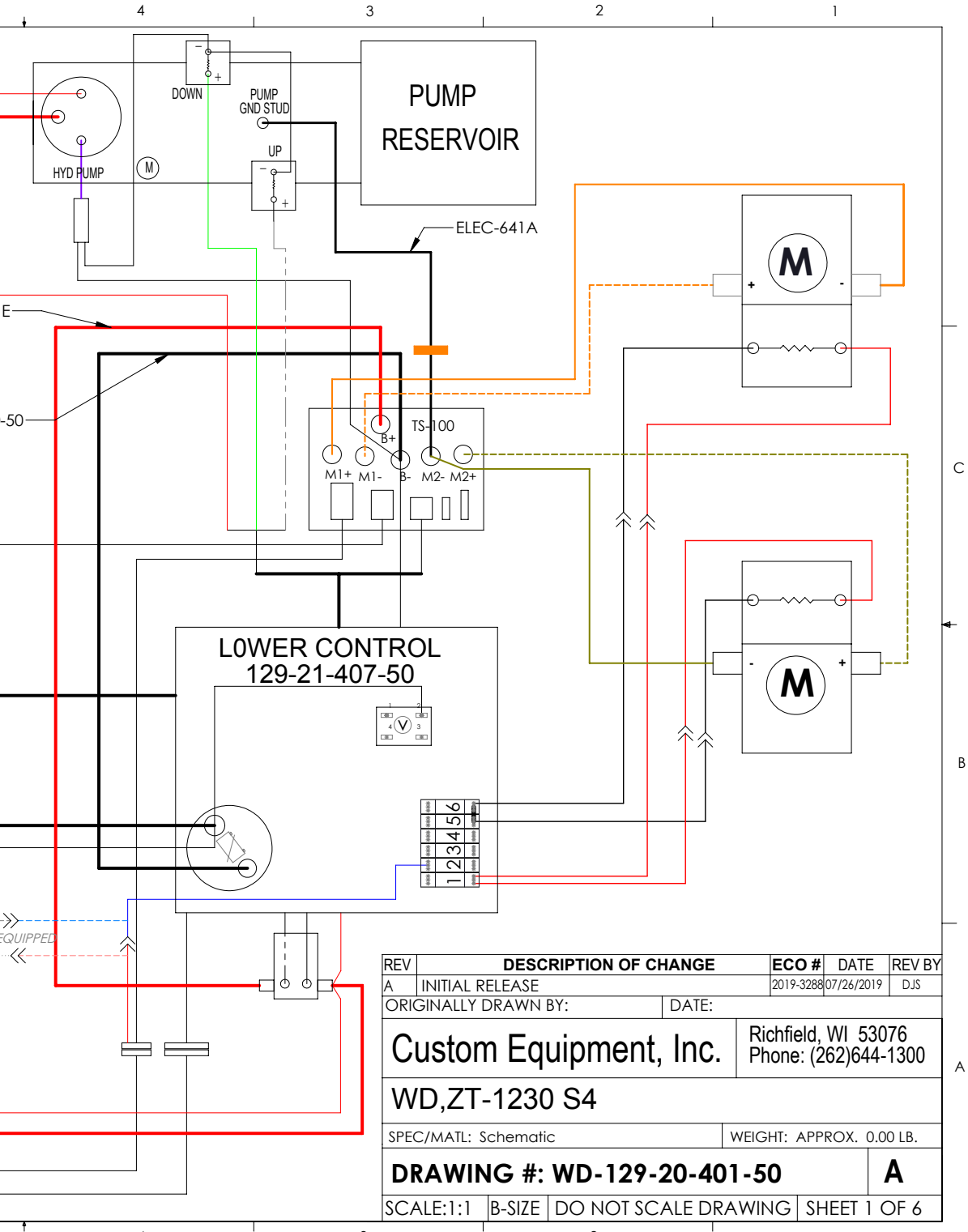
LED Code	Possible Cause
Fast Flash	Control Module is not calibrated, Do not operate unit.
Steady	Unit has just been powered on. You may need to wait for initialization, then re-select function. Ready to operate, things should be working normally. A function is selected but the enable trigger is not squeezed.
1-1	The control module is not calibrated. Do not use this unit.
2-1	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.
2-2	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.
3-x	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
3-2	Check P9 wiring. One or more signals showing outputs when all should be off.
3-3	Check B+ stud connections on controller. Voltage is too high.
3-4	There is voltage on safe pre-valve supply when there should not be. Controller may need to be replaced.
3-5	The drive brake current is too high. Motor overload. Check for a siezed motor or for power wiring to motors.
4-x	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
4-2	Functions Locked: Board is overheated. Check pump, drive motor wiring. Problem with controller internal voltage. Controller may need to be replaced.

4-3	Problem with controller internal voltage. Controller may need to be replaced.
4-4	Battery supply is too low or too high. Make sure batteries afe fully charged. Do not operate while charging.
4-5	Joystick signal problem. Wiring problem-check for short circuits, misconnection, check P15-12 connection.
6-x	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)
6-1	Problem with angle sensor or its connections
6-2	This feature does not apply on ANSI/CSA models.
6-3	Problem with elevation switch or its connections
6-6	This feature does not apply on ANSI/CSA models.
7-x	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
7-1	Motor A current too high.
7-2	Motor A current too low.
7-3	Motor B current too high.
7-4	Motor B current too low.
7-5	Check drive connections at both drives--short or multiple wiring faults.
7-7	Check B+ stud connections on controller. Voltage is too low.

5.1 | WIRING DIAGRAM

Part No. WD-129-20-401-50





REV	DESCRIPTION OF CHANGE	ECO #	DATE	REV BY
A	INITIAL RELEASE	2019-3288	07/26/2019	DJS

ORIGINALLY DRAWN BY: | DATE:

Custom Equipment, Inc.
Richfield, WI 53076
Phone: (262)644-1300

WD,ZT-1230 S4

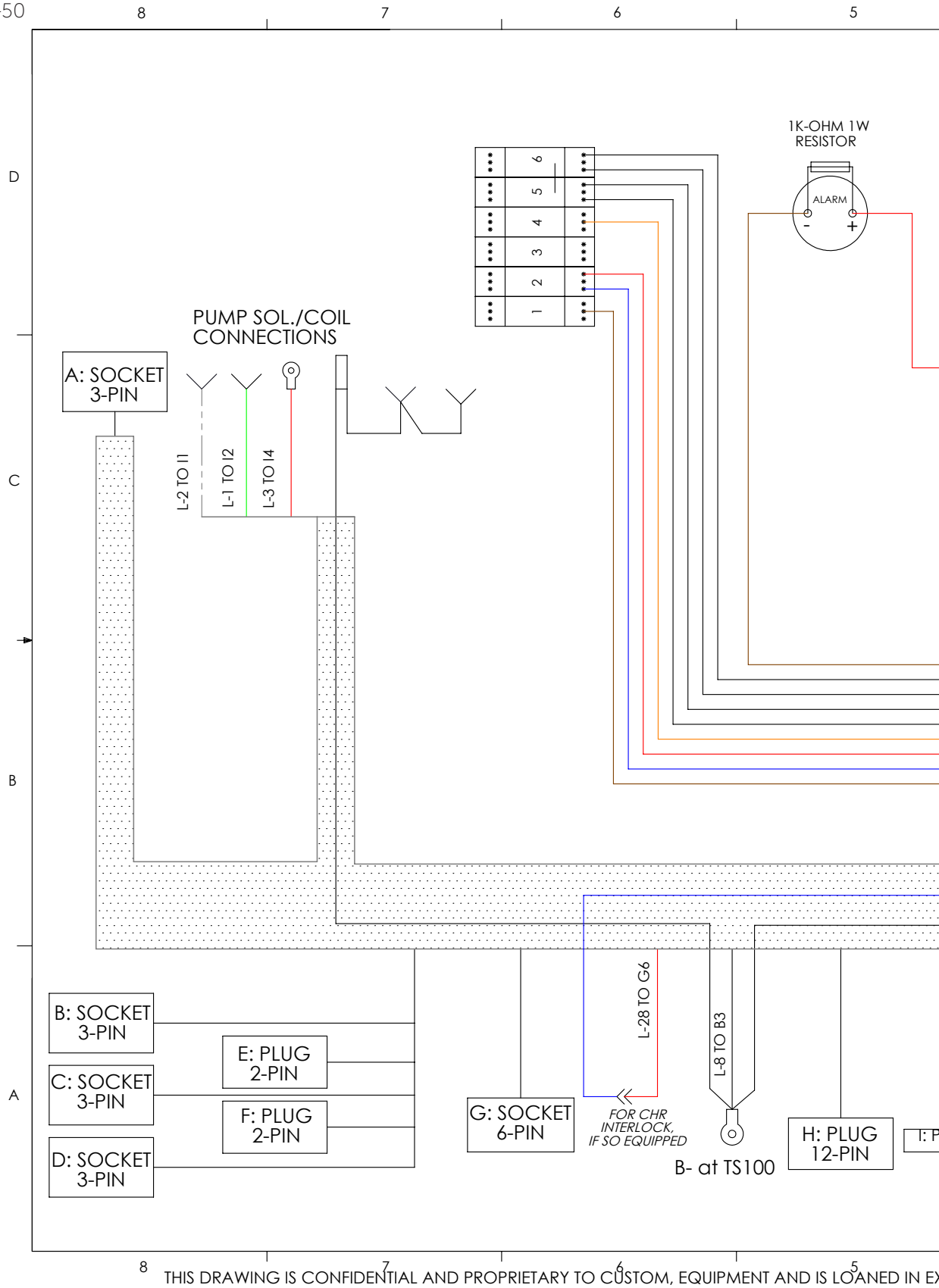
SPEC/MATL: Schematic | WEIGHT: APPROX. 0.00 LB.

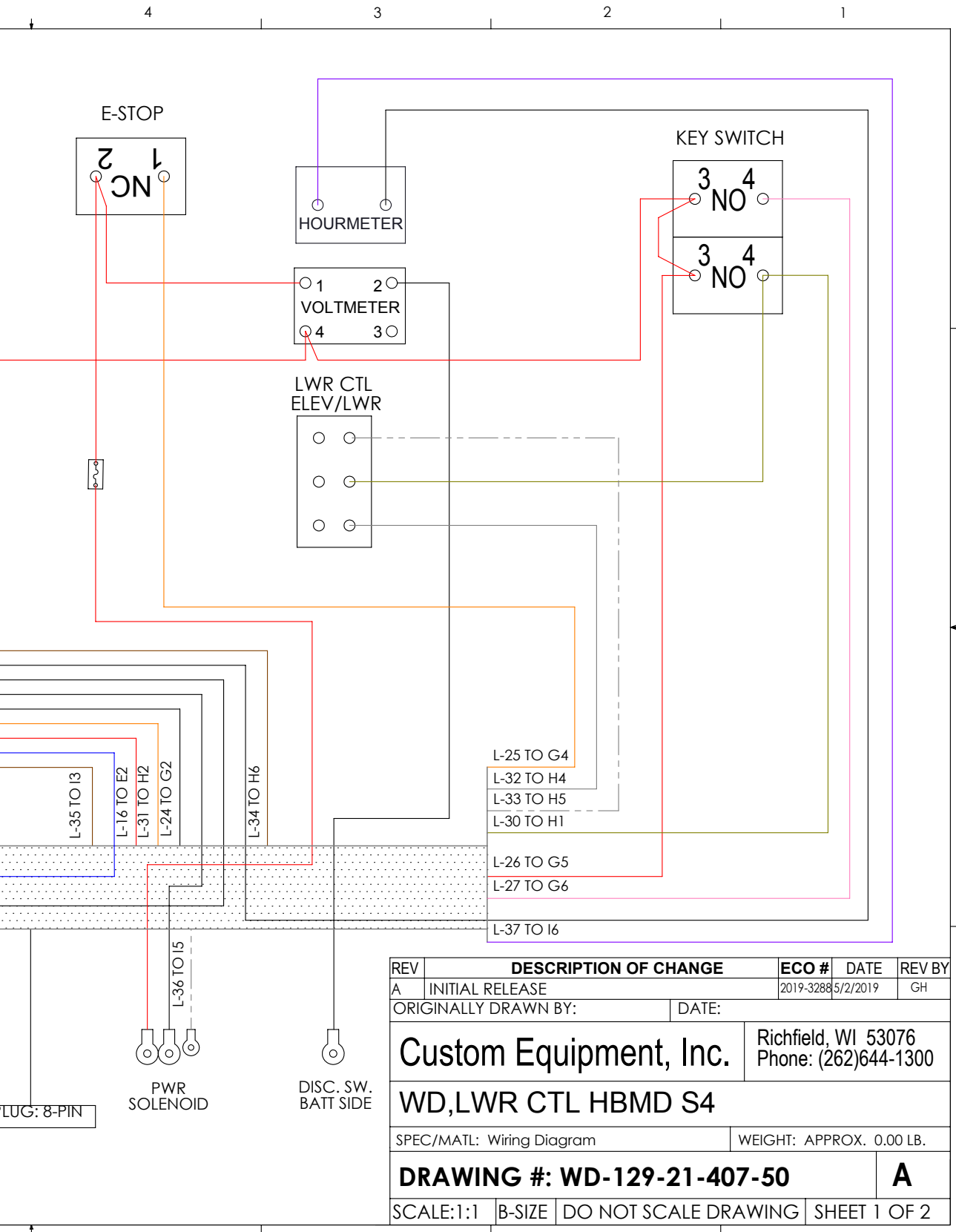
DRAWING #: WD-129-20-401-50 | **A**

SCALE:1:1 | B-SIZE | DO NOT SCALE DRAWING | SHEET 1 OF 6

5.2 | LWR CTL WIRING DIAGRAM

Part No. WD-129-21-407-50





REV	DESCRIPTION OF CHANGE	ECO #	DATE	REV BY
A	INITIAL RELEASE	2019-3288	5/2/2019	GH

ORIGINALLY DRAWN BY: | DATE:

Custom Equipment, Inc.
Richfield, WI 53076
Phone: (262)644-1300

WD,LWR CTL HBMD S4

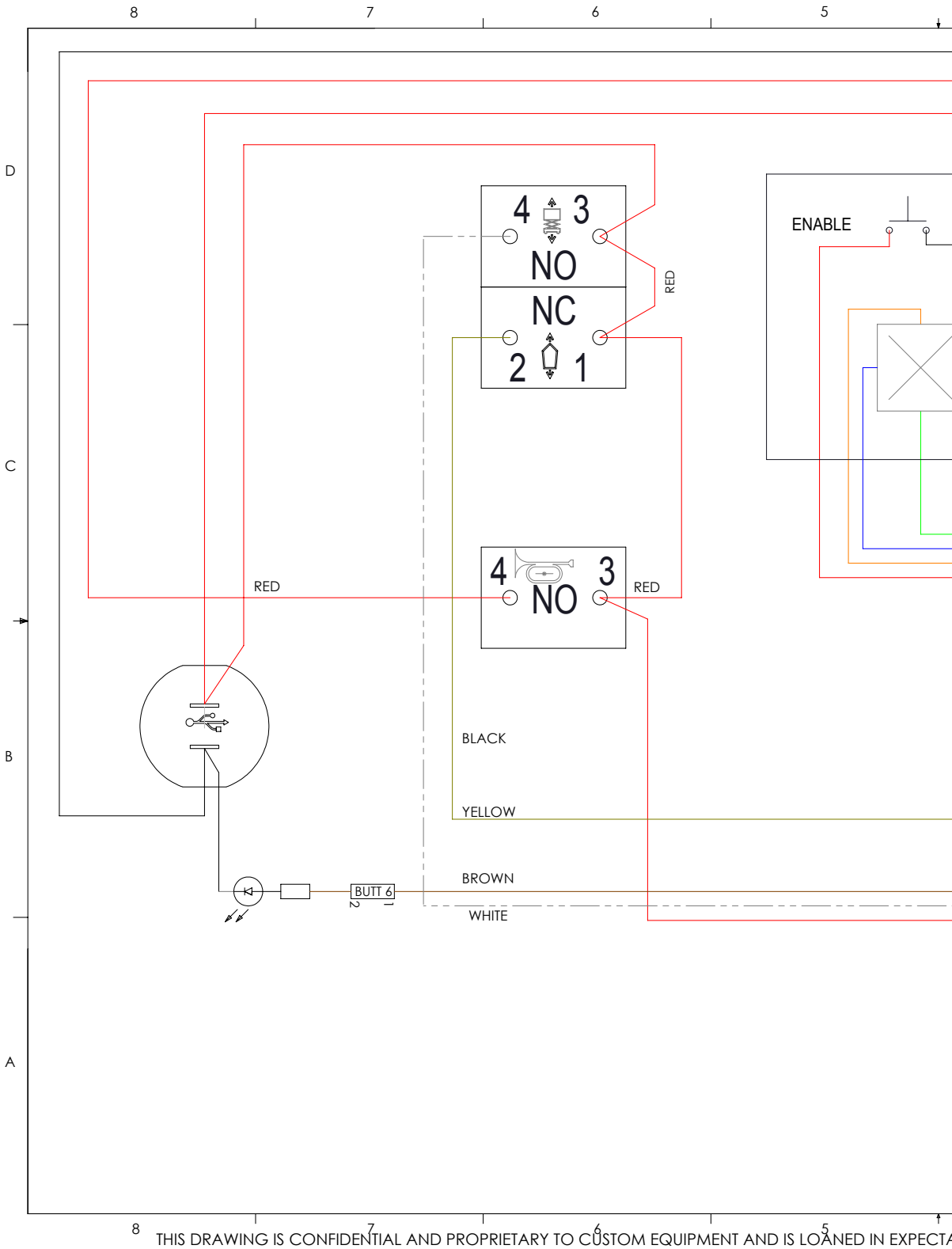
SPEC/MATL: Wiring Diagram | WEIGHT: APPROX. 0.00 LB.

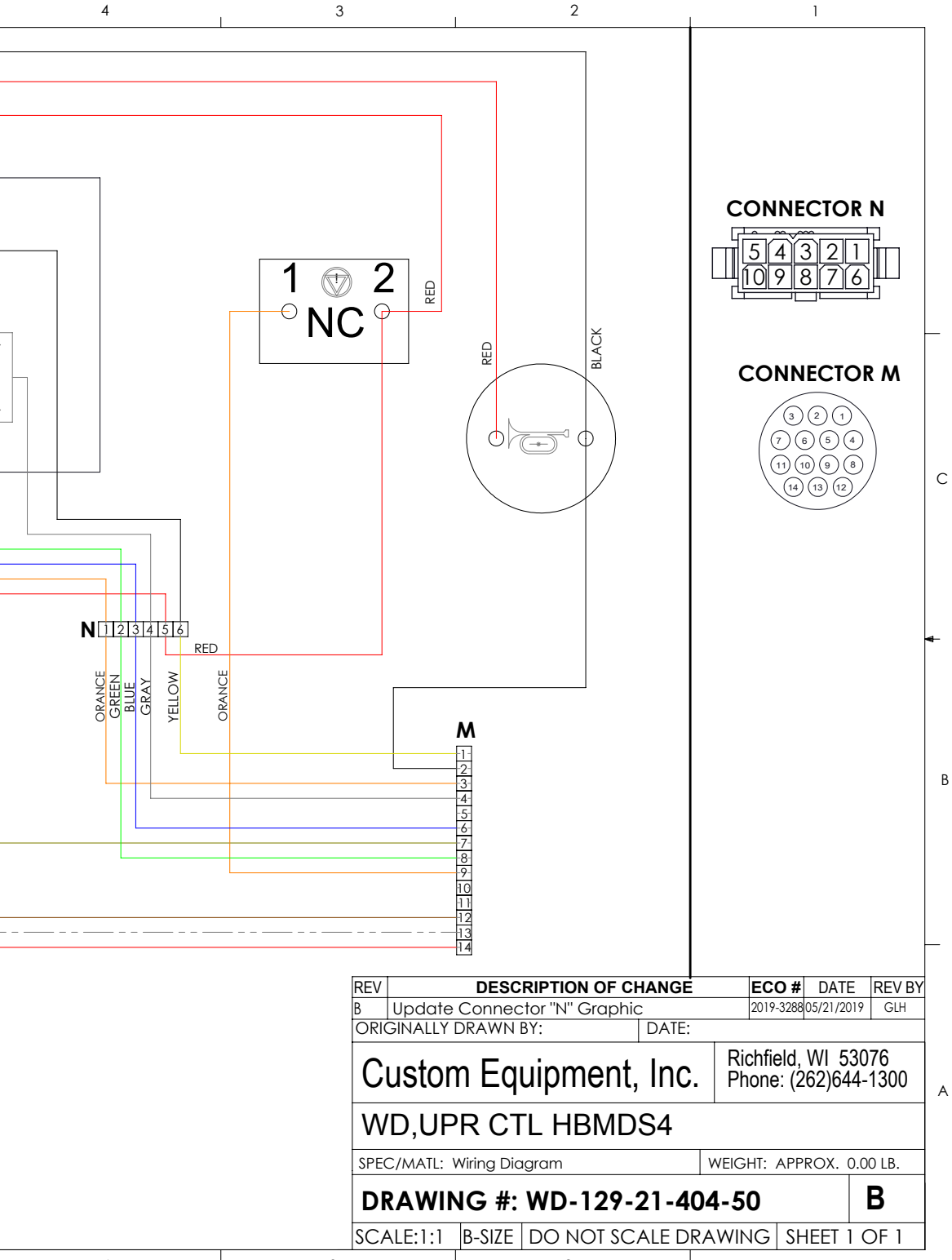
DRAWING #: WD-129-21-407-50 **A**

SCALE:1:1 | B-SIZE | DO NOT SCALE DRAWING | SHEET 1 OF 2

5.3 | UPPER CONTROLS WIRING DIAGRAM

Part No. 129-21-404-50





REV	DESCRIPTION OF CHANGE	ECO #	DATE	REV BY
B	Update Connector "N" Graphic	2019-3288	05/21/2019	GLH

ORIGINALLY DRAWN BY: | DATE:

Custom Equipment, Inc. | Richfield, WI 53076 Phone: (262)644-1300

WD,UPR CTL HBMDS4

SPEC/MATL: Wiring Diagram | WEIGHT: APPROX. 0.00 LB.

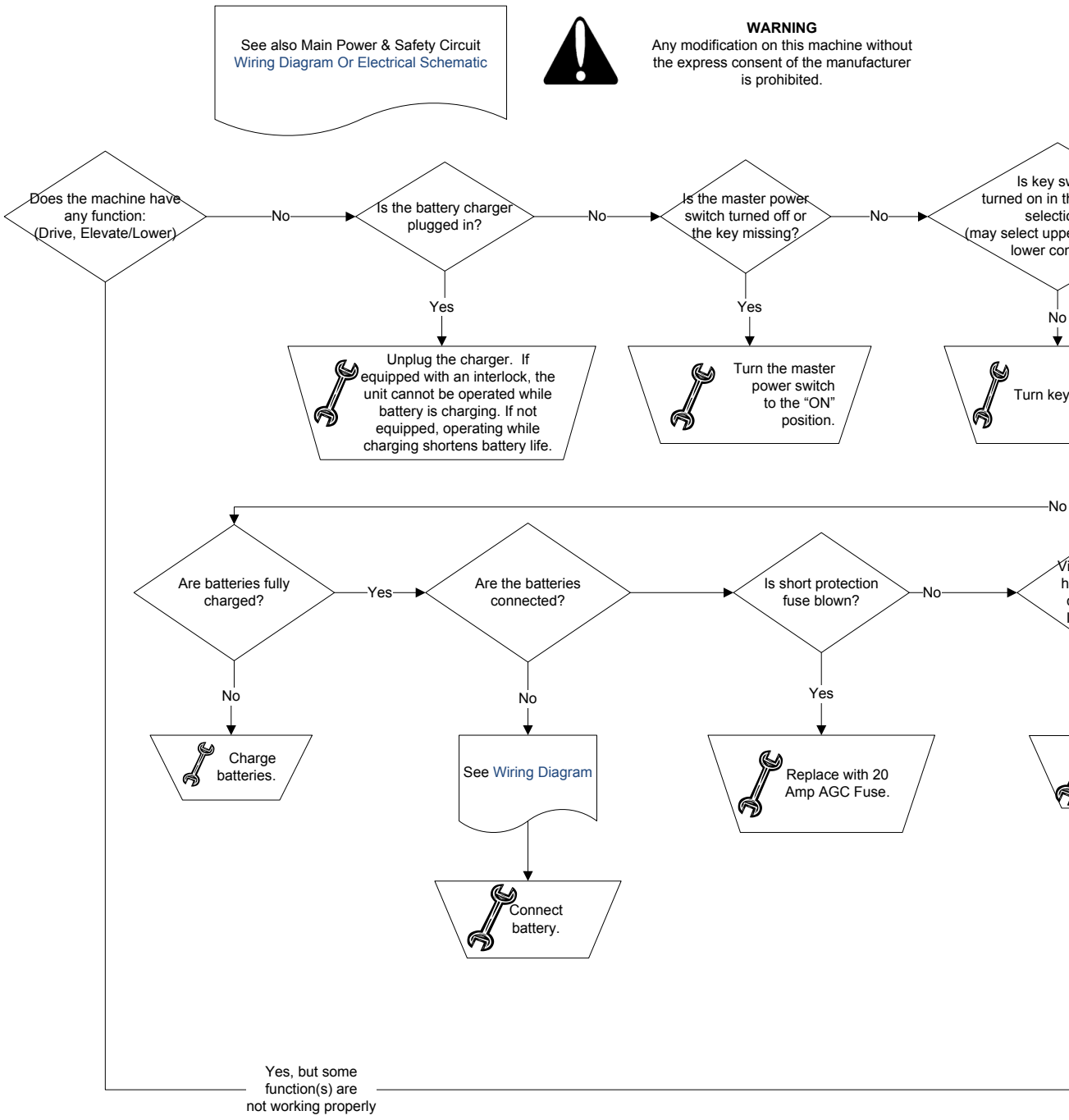
DRAWING #: WD-129-21-404-50 | **B**

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

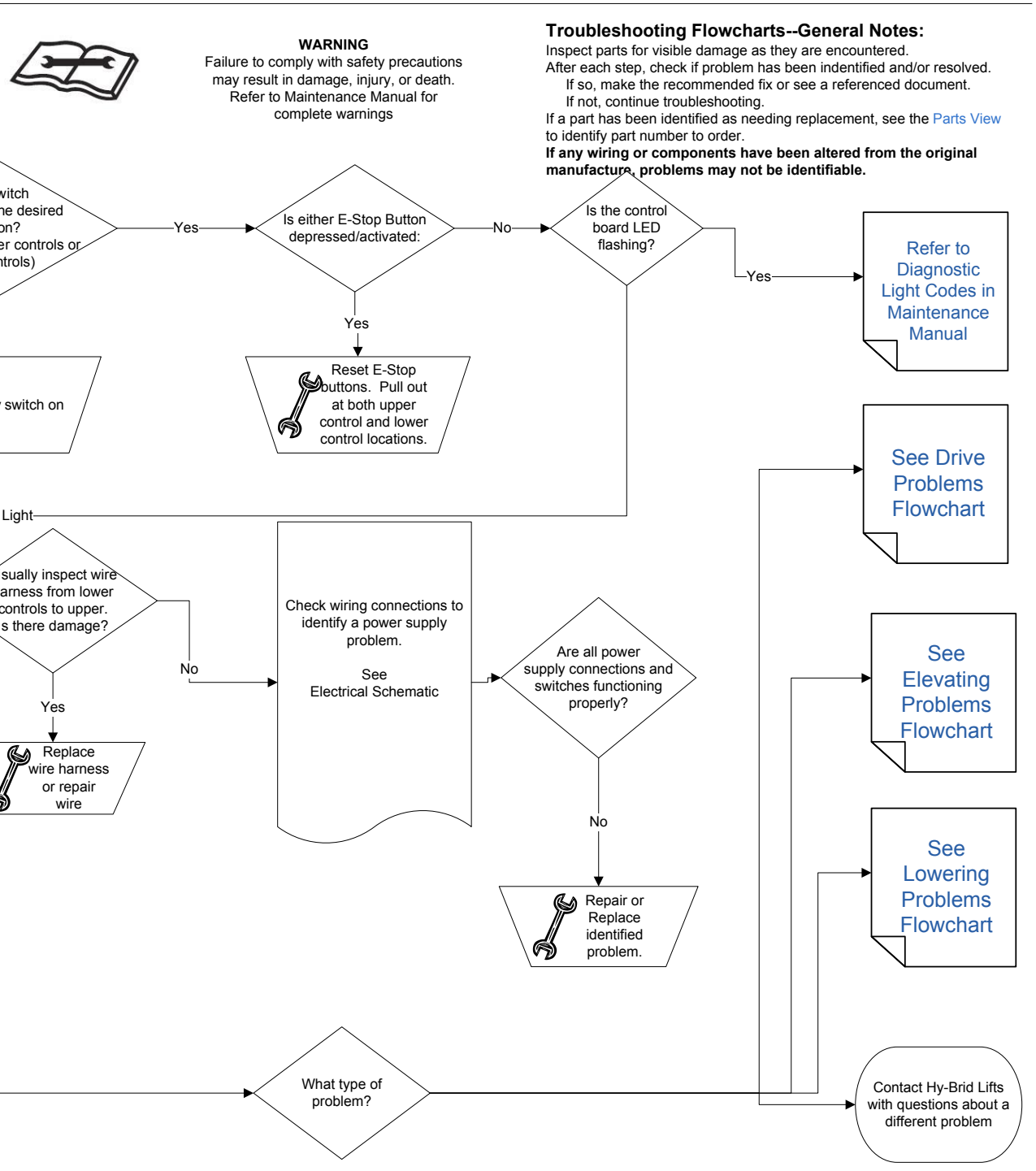
6.1 | MAIN POWER/SAFETY CIRCUIT

Flowchart: HB1230-Power

Troubleshooting Step 1: Main Power



Reference Revision A

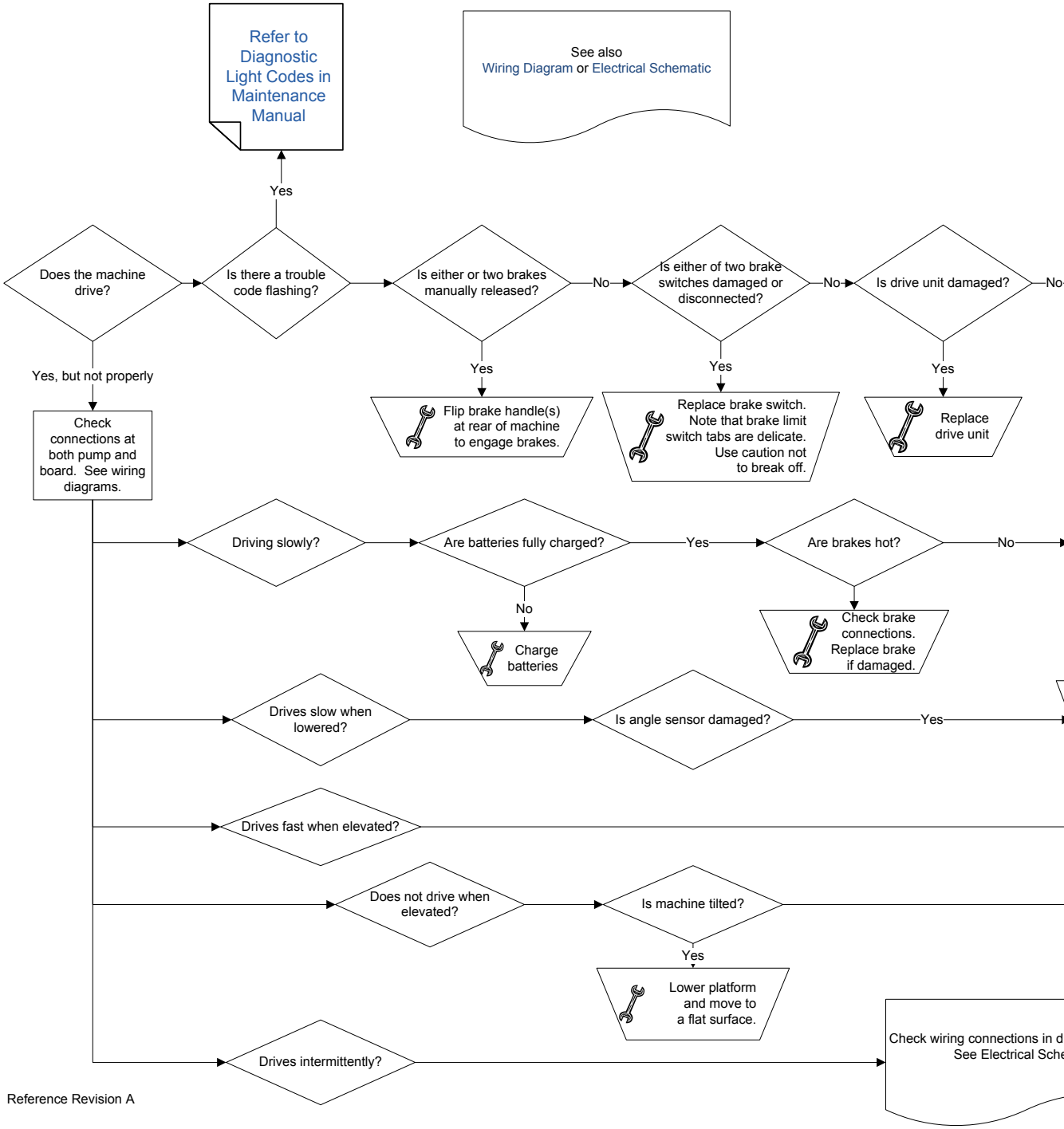


Reference Revision A

6.2 | DRIVE CIRCUIT

Flowchart-HB-1230-Drive

Troubleshooting Step 2: Drive

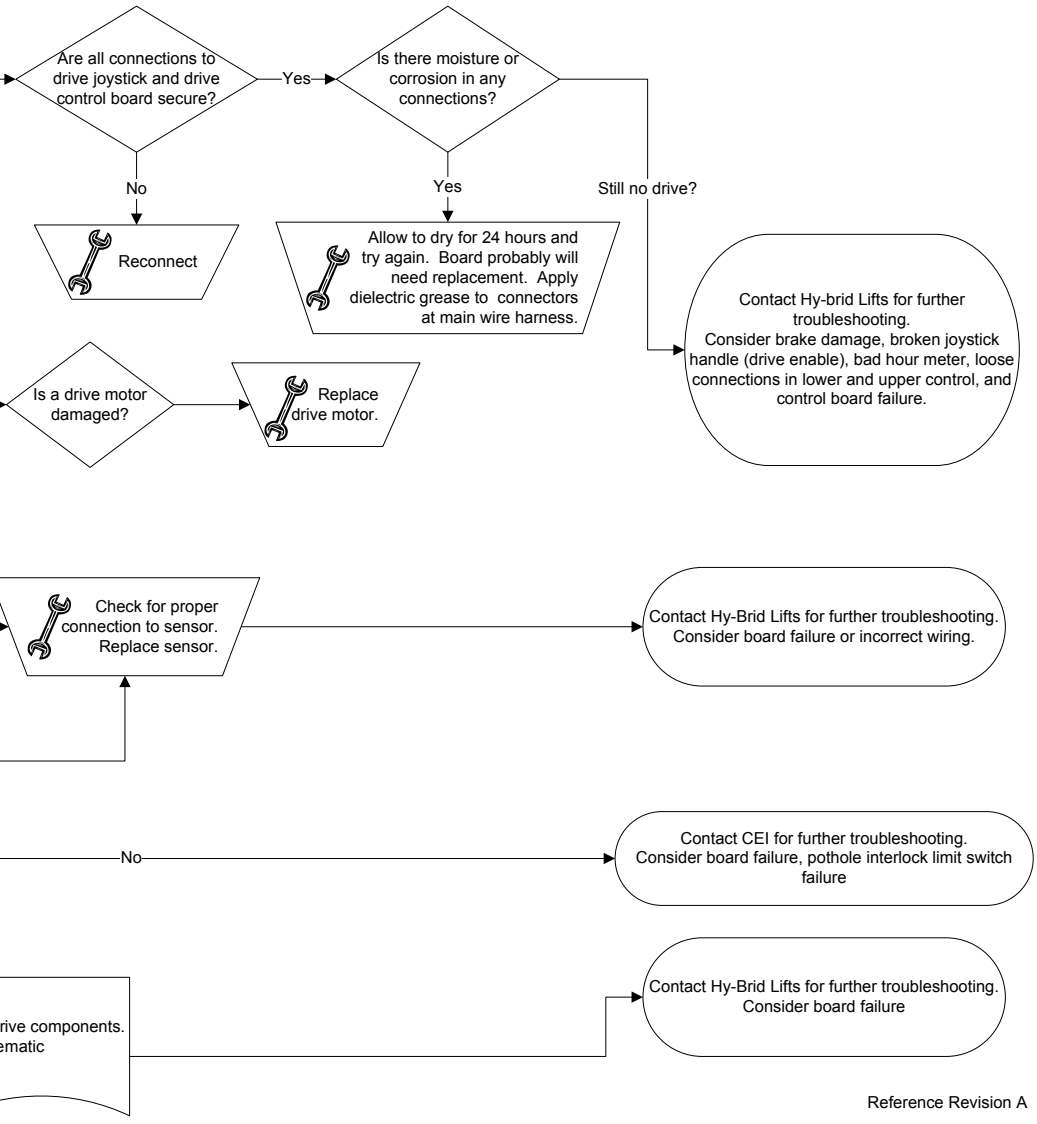


WARNING
Any modification on this machine without the express consent of the manufacturer is prohibited.

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 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.

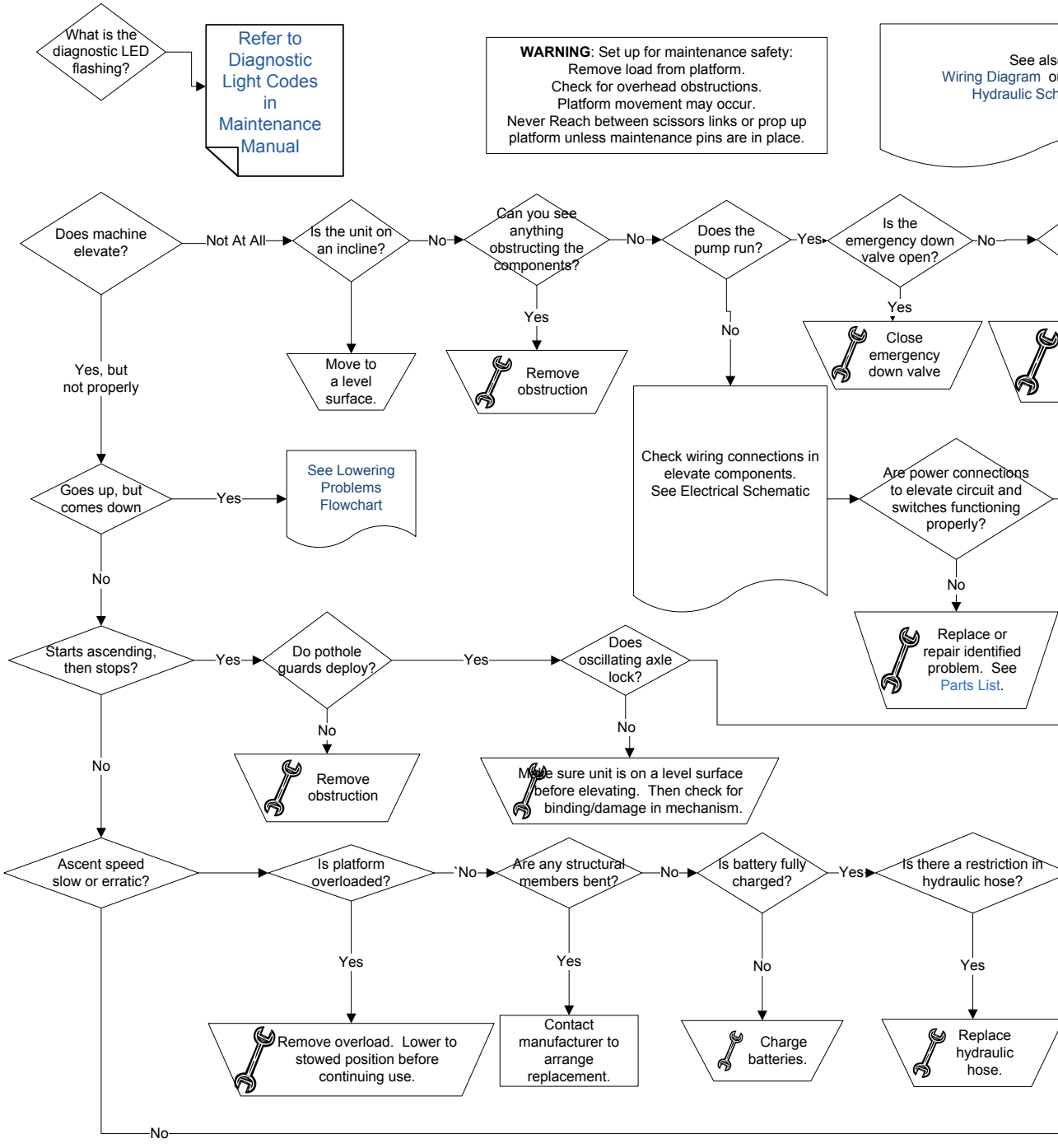


Reference Revision A

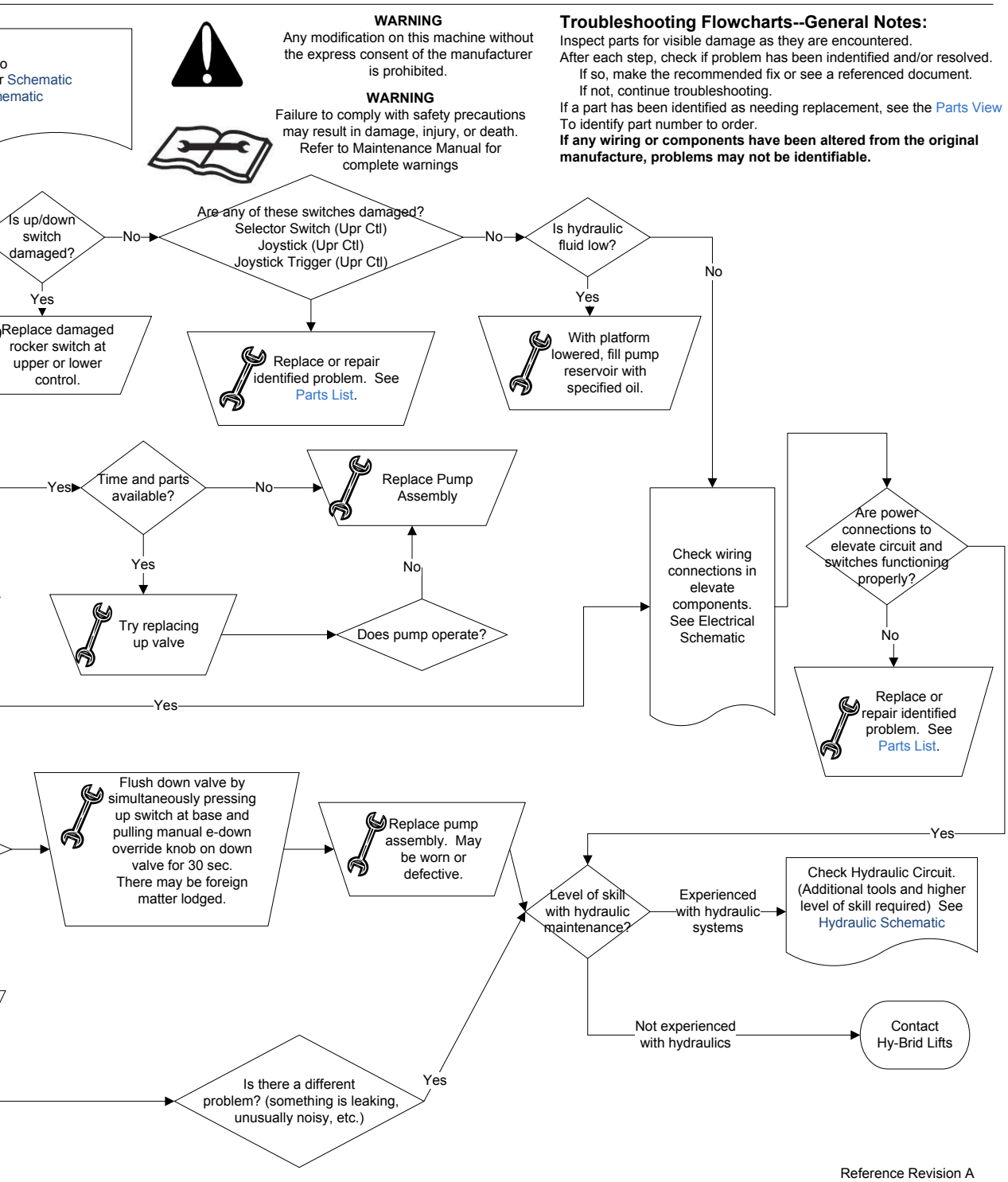
6.3 | ELEVATE CIRCUIT

Flowchart-HB-1230-Elevating

Troubleshooting Step 3A: Elevating



Reference Revision A


WARNING
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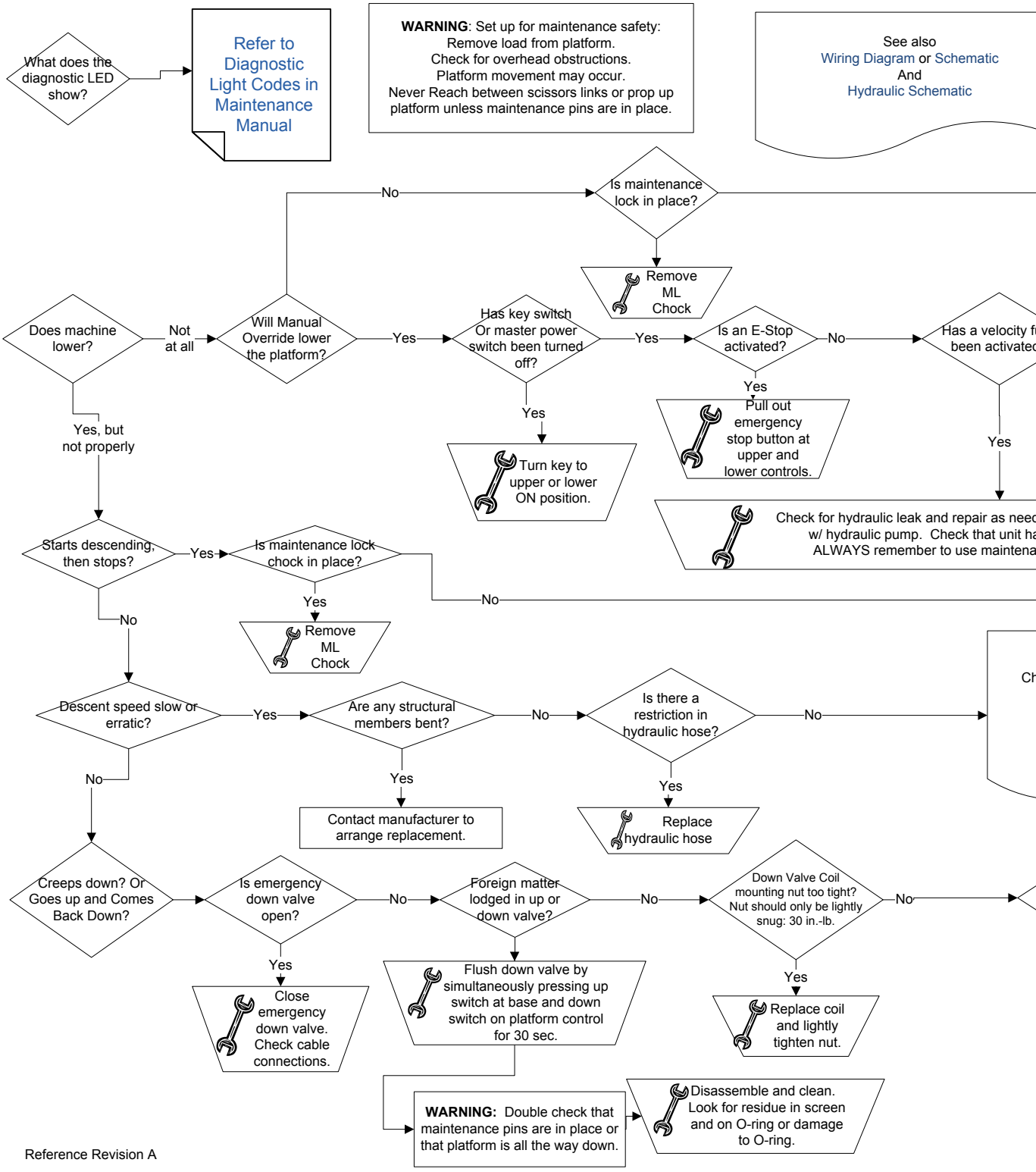
WARNING
Failure to comply with safety precautions may result in damage, injury, or death. Refer to Maintenance Manual for complete warnings
Troubleshooting Flowcharts--General Notes:
Inspect parts for visible damage as they are encountered.
After each step, check if problem has been indentified and/or 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.
Schematic
Is up/down switch damaged?
No
Are any of these switches damaged?
Selector Switch (Upr Ctl)
Joystick (Upr Ctl)
Joystick Trigger (Upr Ctl)
No
Is hydraulic fluid low?
No
Yes
Yes
Replace damaged rocker switch at upper or lower control.
Replace or repair identified problem. See Parts List.
With platform lowered, fill pump reservoir with specified oil.
Yes
Time and parts available?
No
Replace Pump Assembly
Yes
No
Try replacing up valve
Does pump operate?
Check wiring connections in elevate components. See Electrical Schematic
Are power connections to elevate circuit and switches functioning properly?
No
Yes
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.
Level of skill with hydraulic maintenance?
Experienced with hydraulic systems
Check Hydraulic Circuit. (Additional tools and higher level of skill required) See Hydraulic Schematic
Not experienced with hydraulics
Contact Hy-Brid Lifts
Is there a different problem? (something is leaking, unusually noisy, etc.)
Yes
Reference Revision A

6.4 | LOWER CIRCUIT

Flowchart: HB-1230-Lowering

Troubleshooting Step 3B: Lowering



Reference Revision A

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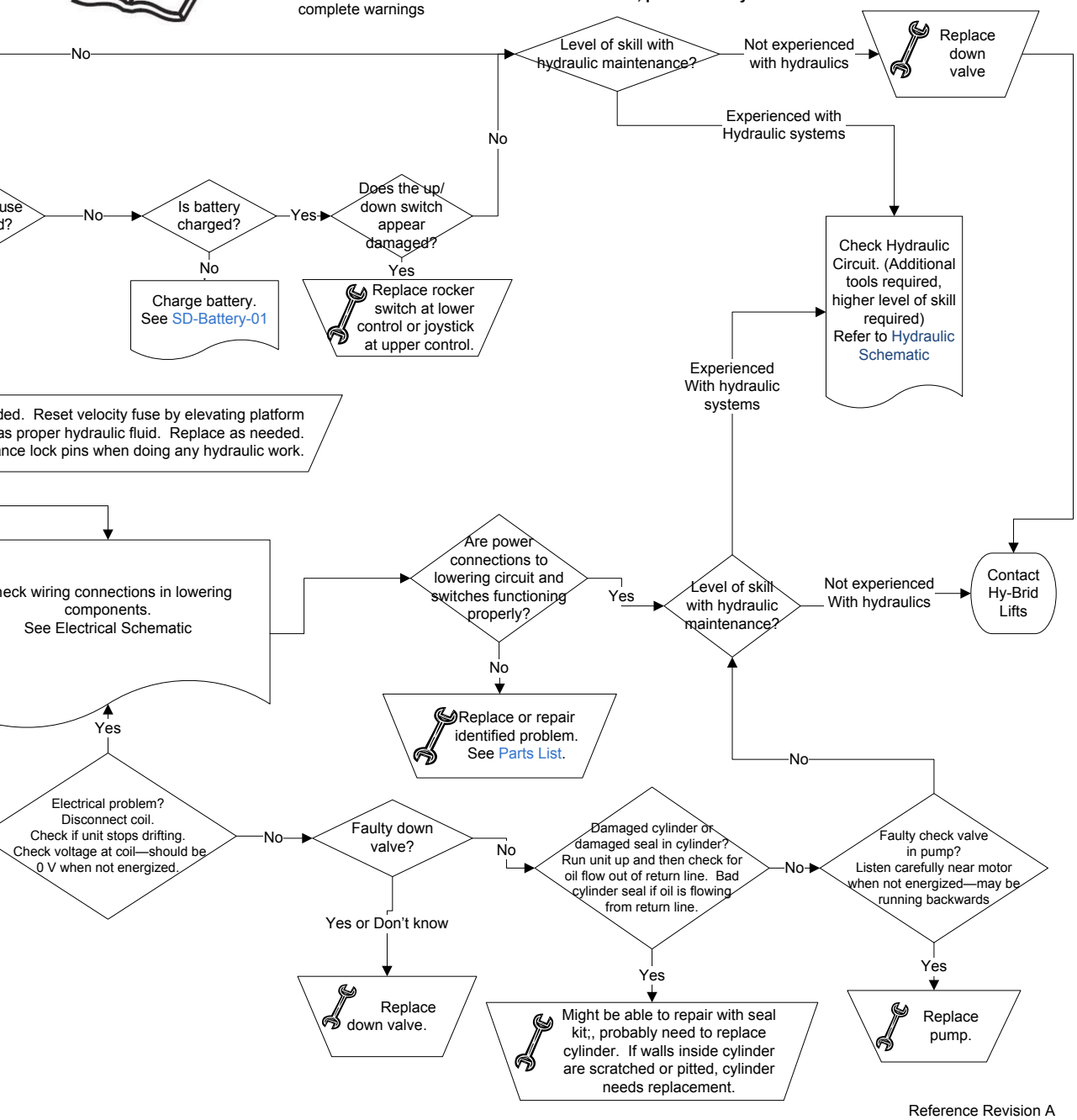
WARNING
Failure to comply with safety precautions may result in damage, injury, or death. Refer to Maintenance Manual for complete warnings

Troubleshooting Flowcharts--General Notes:

Inspect parts for visible damage as they are encountered.
After each step, check if problem has been 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.



Reference Revision A

CAUTION

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

DANGER

REPLACEMENT OF THE FOLLOWING COMPONENTS WILL AFFECT THE STRENGTH, STABILITY, OR SAFETY FUNCTION OF THE UNIT: BATTERY (ELEC-047-5), HYDRAULIC CYLINDER (129-21-002-90-K), CONTROL BOARD (129-21-422-50-K), 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 . These represent current model revisions. A full parts manual, part# SUPO-746 is available from Hy-Brid Lifts.

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.

Description	Part Number	Notes
ALARM, CONTINUOUS	ELEC-635-4	
BOARD,DRIVE/LIFT CTL ZERO-TURN S4	129-20-422-50-K	
BUTTON,PUSH/PULL RED E-STOP	ELEC-071-KIT	
BUTTON,PUSH/TWIST RED E-STOP	**ELEC-065**	**USED ON SOME UPPER CONTROLS**
CHARGER,24V	ELEC-795	
CORD,NEMA 5-15P/5-15R,12.0	ELEC-639	
CTL,ASM LWR	129-21-407-50	
CTL,ASM UPR	129-21-404-50	
CTL,WIRE HARNESS MAIN HB-1230	129-21-311-50	
DECALS,ZT-1230 S4 ANSI	129-21-416-50-K	
DRIVE MOTOR,24VELE,HB AUB	ELEC-790	
HYDRAULIC OIL	HYDR-032	Not available as a replacement part. Replace with Flomite #150, Dexron II, Mobil-DTE 2 or equivalent.
KEY,SPARE	ELEC-073EKEY	
MANUAL BOX	HARD-603	

Description	Part Number	Notes
METER,HOUR	ELEC-610-2	
METER,VOLT,24V	ELEC-610-4	
SWITCH KNOB,MASTER DISCONNECT	ELEC-633-5	
SWITCH,KEY,3-POS MAINTAINED	ELEC-073D-KIT	
SWITCH,LIMIT,ROT LVR,NO/NC PO	ELEC-123-5	
SWITCH,MASTER DISCONNECT	ELEC-633-4	
SWITCH,ROCKER DPDT	ELEC-133B	
SWITCH,ROTARY MAINTAINED	ELEC-002C-KIT	
SWITCH,ROTARY MAINTAINED	**ELEC-068**	**USED ON SOME UPPER CONTROLS**
WHL,12X4 NM RUBBER W/HUB	WHEE-623-KIT	
WHL,8X2,GREY NM RUBBER	WHEE-706-KIT	
ASM,SCISSOR CYL HB12-ANSI	129-21-002-90-K	
MANUAL,PARTS ZERO-TURN SERIES 4	SUPO-746	

SECTION 8 | WARRANTY

LIMITED WARRANTY

Warranty Statement—Two Year Agreement

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. 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, 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.

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.

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

Date	Comments

Date	Comments

HY-BRID LIFTS™
BY CUSTOM EQUIPMENT LLC

Self-Propelled Mobile Elevated Work Platform
Maintenance and Troubleshooting Manual
ZT-1230

2647 Highway 175
Richfield, WI 53076
U.S.A.
Tel. +1-262-644-1300
Fax: +1-262-644-1320
www.hybridlifts.com
service@customequipmentlifts.com

These machines comply with ANSI/SIA A92.6

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