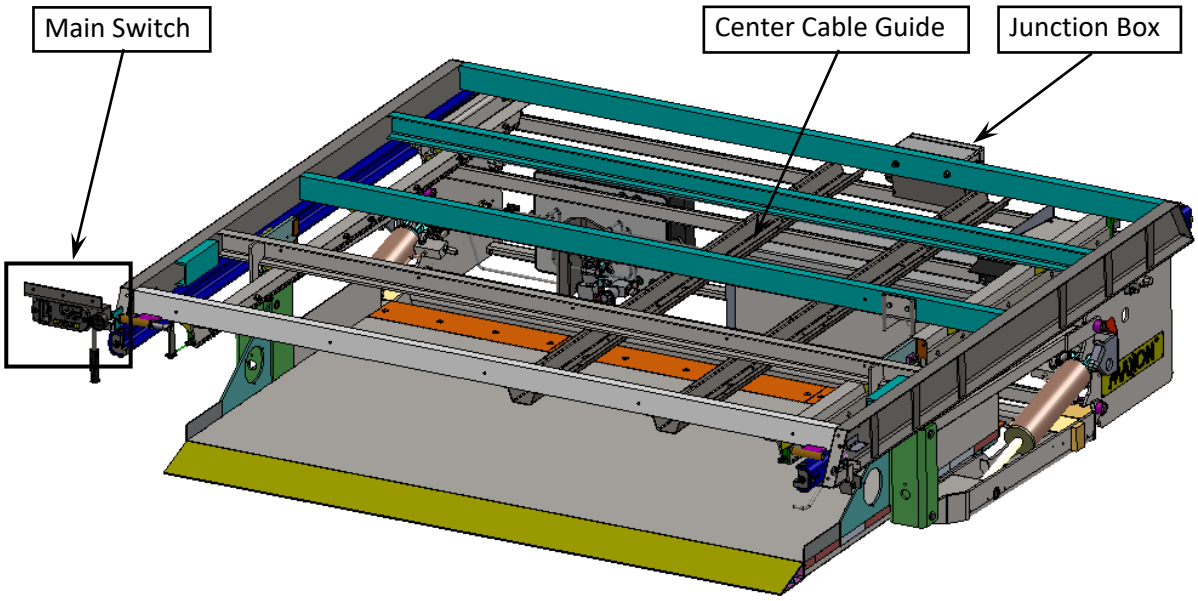
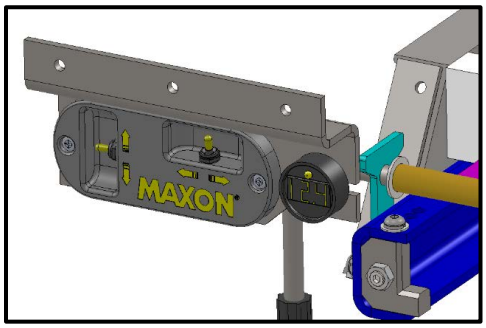
M-21-08
REV. C
DECEMBER 2021

RA-45 INSTALLATION SUPPLEMENT
Domino's Specification, 289905-01-200





General Notes:

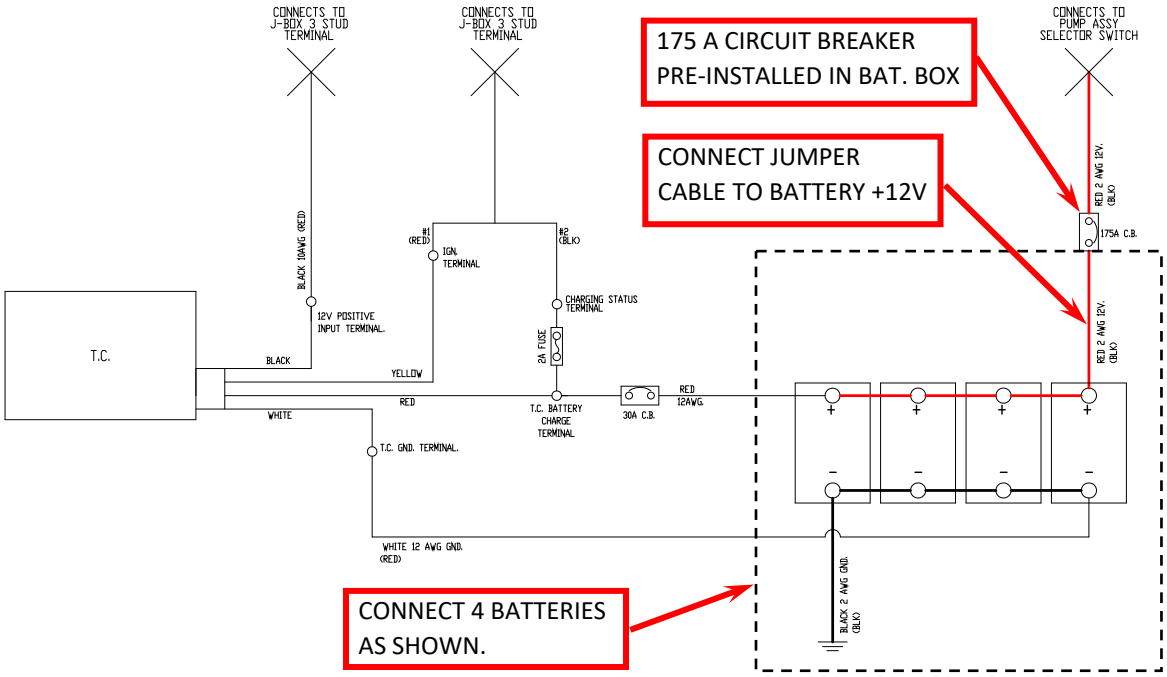
- Use the standard RA installation manual for structural mounting instructions.
- Use this supplement for electrical installation and wiring.
- Make sure cables are protected from sharp edges with loom and grommets.
- Secure all cables and harnesses to prevent movement.
- **Do not** attach anything to the liftgate moving harness. Make all connections in Junction Box.

Installation Supplement

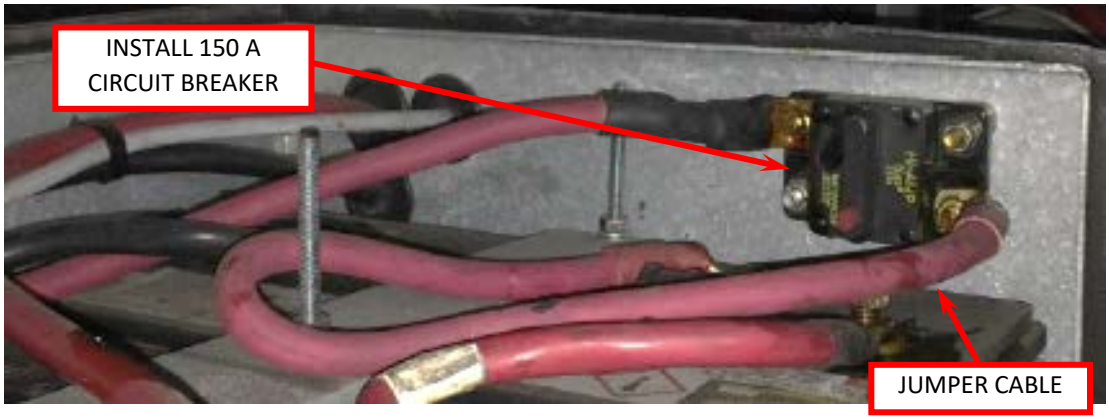
Substitution for STEP 3.1 in RA Installation Manual

Note: Main Control switch is pre-wired to Junction Box.

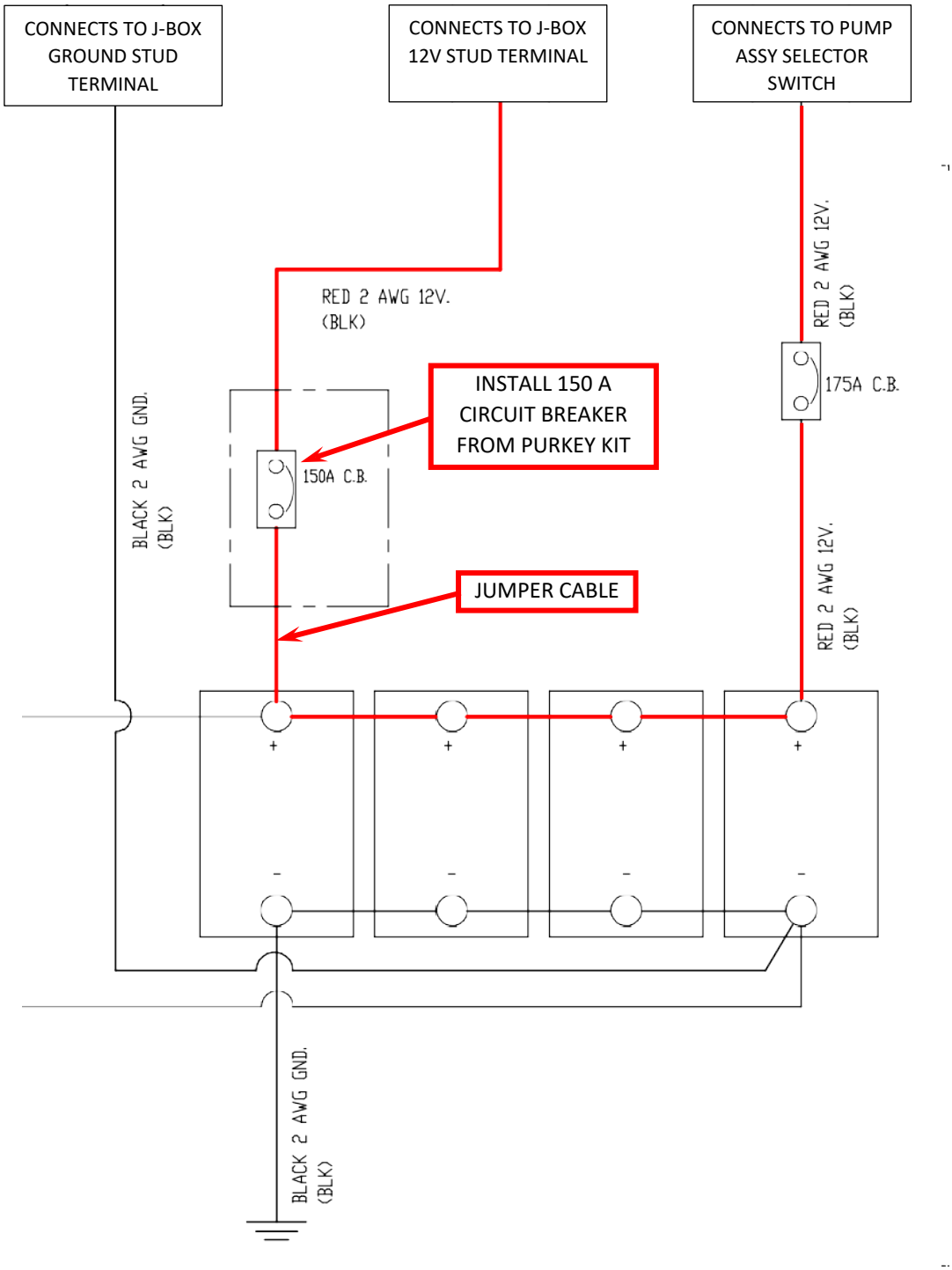
1. Connect batteries as shown below to allow running of the liftgate for installation positioning before welding to trailer cross-members.



2. Install 150 A circuit breaker provided in Purkey's Severe Service Charge Line kit in Liftgate battery box as shown below.

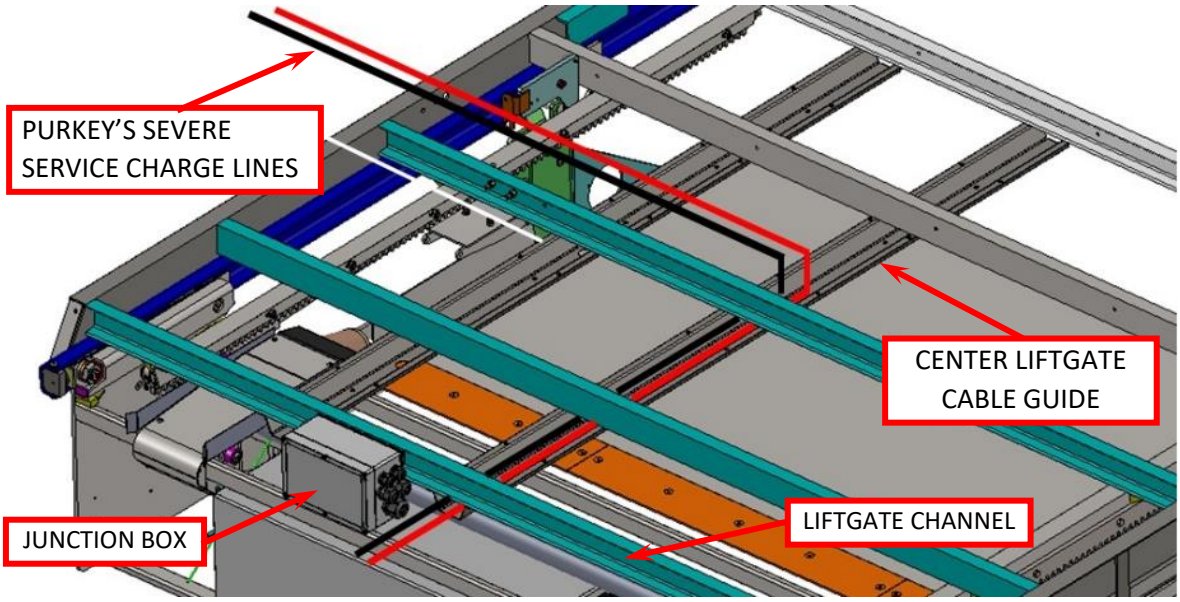


Purkey's Severe Service Charge Line Connections in Battery Box

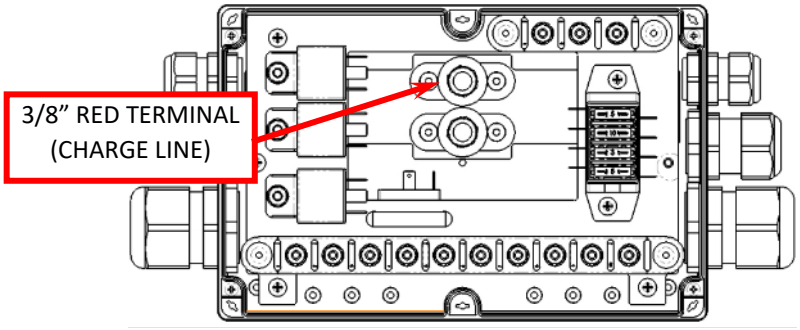


3. After fully welding the liftgate, disconnect +12v cables from selector switch to battery and charge line in the battery box to remove power while making Junction Box connections.

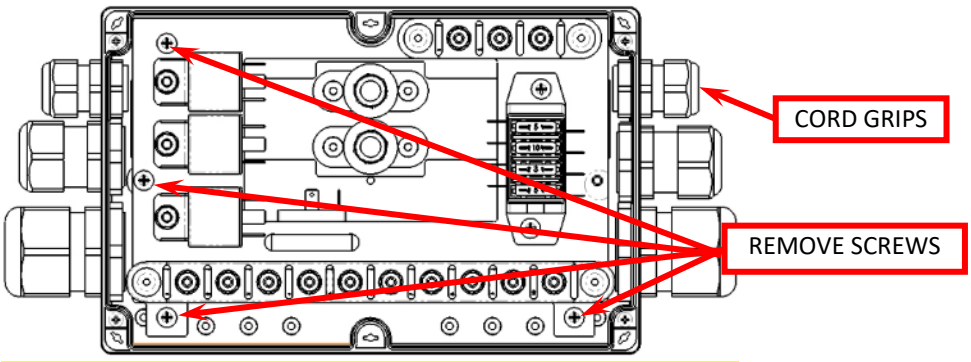
4. Run loomed Purkey's Severe Service Charge Lines from the nose of trailer to center Liftgate Cable Guide. Route Charge Lines in Cable Guide towards Junction Box. Route under Liftgate Channel to Junction Box as shown.



5. Remove Junction Box cover. Use a multimeter to confirm there is no power on the 3/8" red terminal.

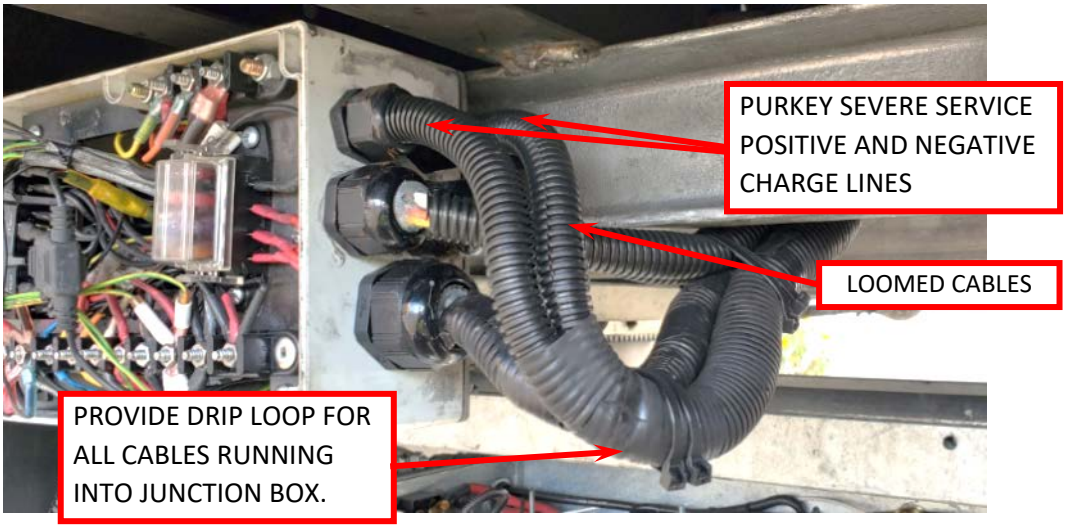


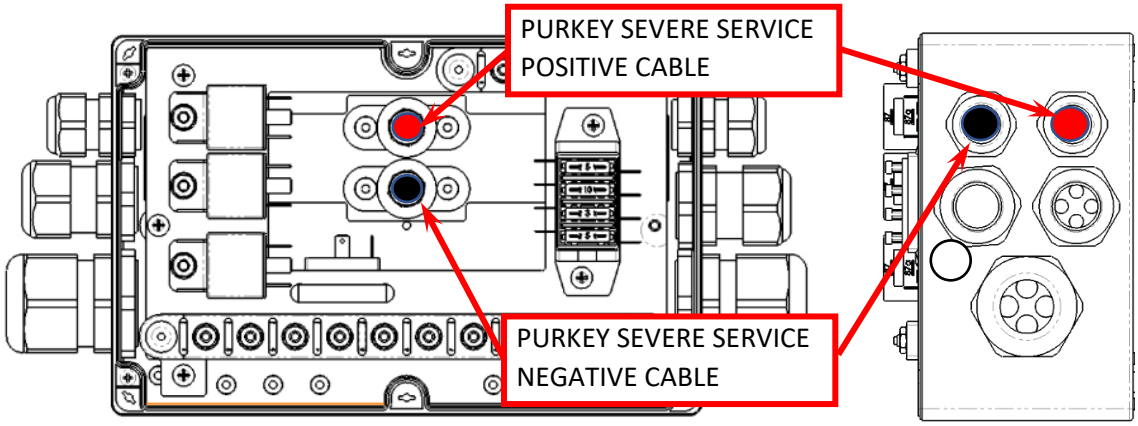
6. Remove the four screws and spacer tubes attaching the backing plate to Junction Box.



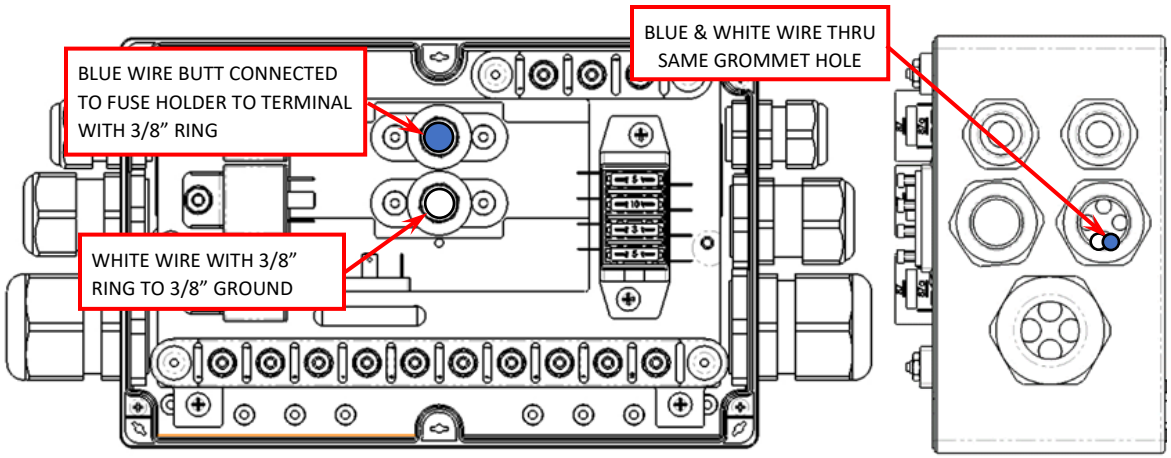
7. The backing plate can now be rotated to improve access to cord grips and wires.

8. Run Purkey Severe Service positive and negative charge lines through top two cord grips and install into Junction Box. Crimp 2-gauge battery lugs onto cables and heat shrink. Connect cables as shown below and tighten cord grip outer nuts to compress and seal grommet on cables.
   - Provide drip loop for all cables running into Junction Box.

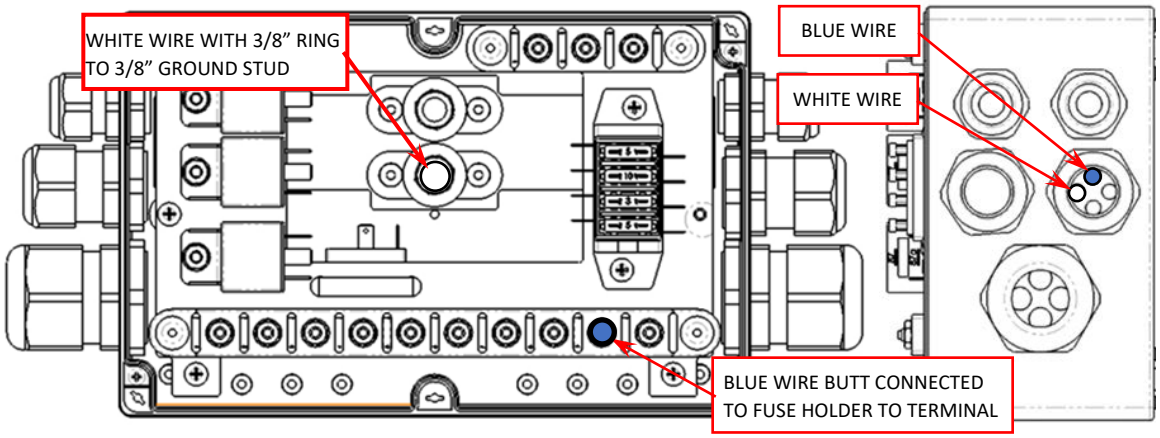




9. Run loomed trailer DOME light wires (BLUE & WHITE) in Cable Guide towards Junction Box. Route wires into Junction Box through a single cord grip grommet hole as shown below. Crimp 3/8” ring terminal to the white wire. Heat shrink terminal and connect to 3/8” ground stud. Crimp installer supplied fuse holder to the blue wire and connect to 3/8” positive stud as shown below.



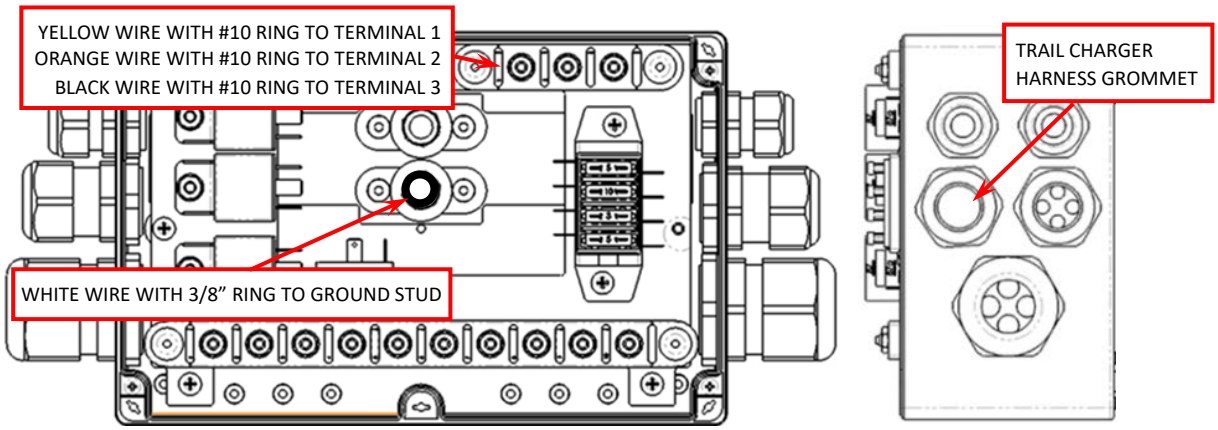
10. Run loomed trailer OVERHEAD PLATFORM LIGHT wires (BLUE & WHITE) in center Cable Guide towards Junction Box. Route wires into Junction Box through the two cord grip grommet holes shown below. Crimp 3/8” ring terminal to the white wire. Heat shrink terminal and connect the white wire to 3/8” ground stud. Crimp fuse holder to the blue wire and connect to terminal 9 as shown below.

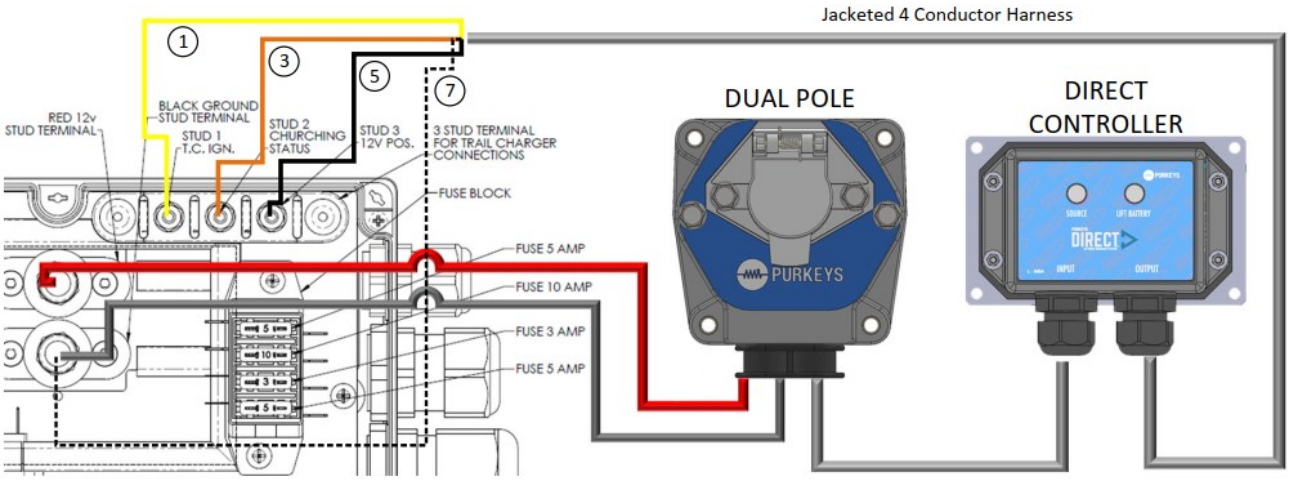


- Tighten cord grip outer nut to compress and seal grommet on all four wires.
- Provide drip loop for all cables running into Junction Box.

11. Run Purkey's Direct Trail Charger Harness from the nose of the trailer to Center Liftgate Cable Guide. Route Purkey's Direct Trail Charger Harness in center Liftgate Cable Guide towards Junction Box.

12. Route into Junction Box through single hole cord grip shown below. Cut approximately 6" off the jacketed portion of the four-wire harness. Crimp and heat-shrink ring terminals to wires and connect as shown below. Tighten cord grip outer nut to compress and seal grommet to harness.
    - Provide drip loop for all cables running into Junction Box.

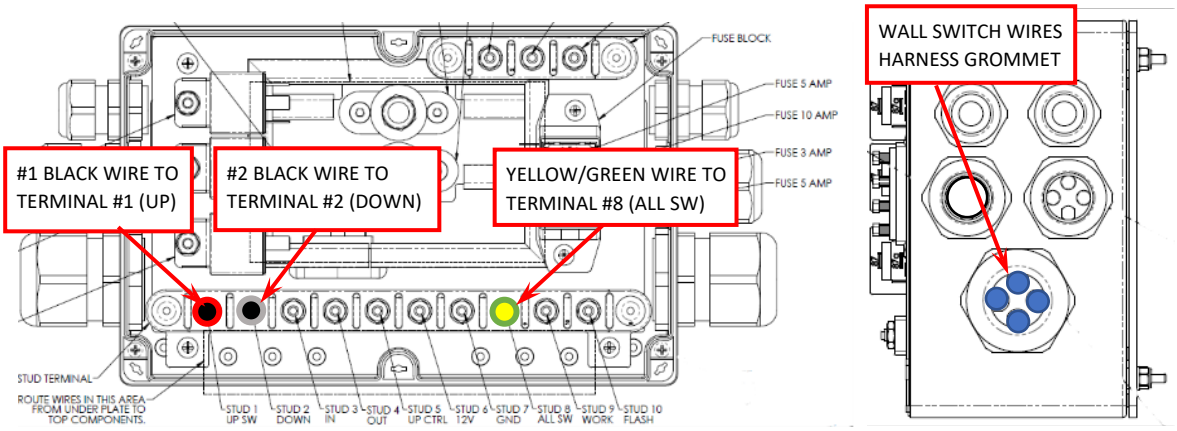




13. Install wall switches, two outside and two inside, per customer specifications. Route all four loomed Liftgate Wall Switches along cross members, through grommeted cross member holes exiting at the center Liftgate Cable Guide. Secure switch cables to cross members as shown. Route wall switch harnesses in center Cable Guide towards Junction Box.

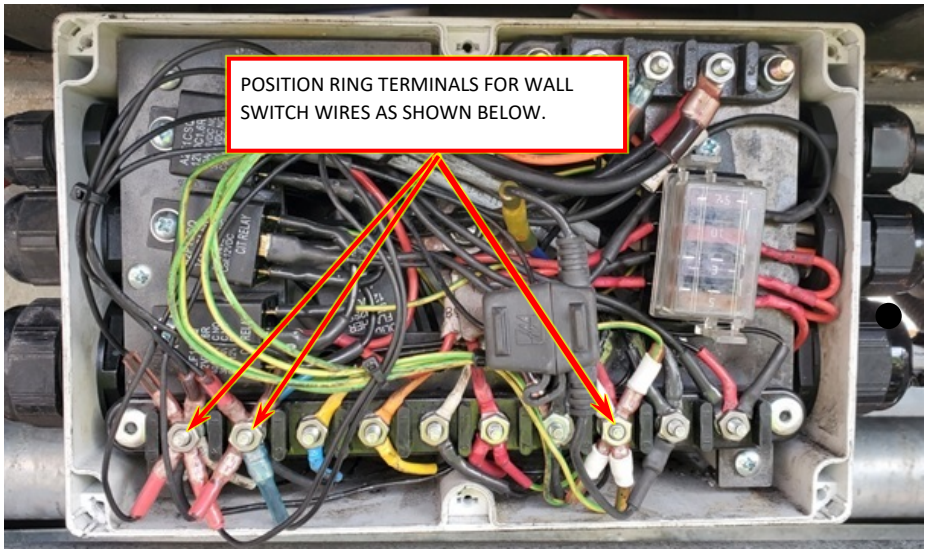
<u>NOTE: If MAX SOL Solar System is being installed, go to Addendum A (page 11) for instructions on installing Solar Box and wall switch wiring. Continue with step 14 if not installing MAX SOL Solar System.</u>

14. Route 4 wall switch cables into Junction Box through the lower four-hole cord grip as shown below.
    - Reinstall backing plate to Junction Box with four screws and spacers removed in step 5.
    - Cut off the excess cable. Cut approximately 4” off the jacketed portion of the three-wire harness. Crimp and heat shrink #10 ring terminals to wires and connect as shown below.



- Tighten cord grip outer nut to compress and seal grommets.
- Provide drip loop for all cables running into Junction Box.

15. Reconnect +12V cables to Liftgate battery and charge line that were disconnected in step 3.
    - Check each switch for proper operation. If the switch function does not match the switch decal, swap #1 wire and #2 wire for that switch.



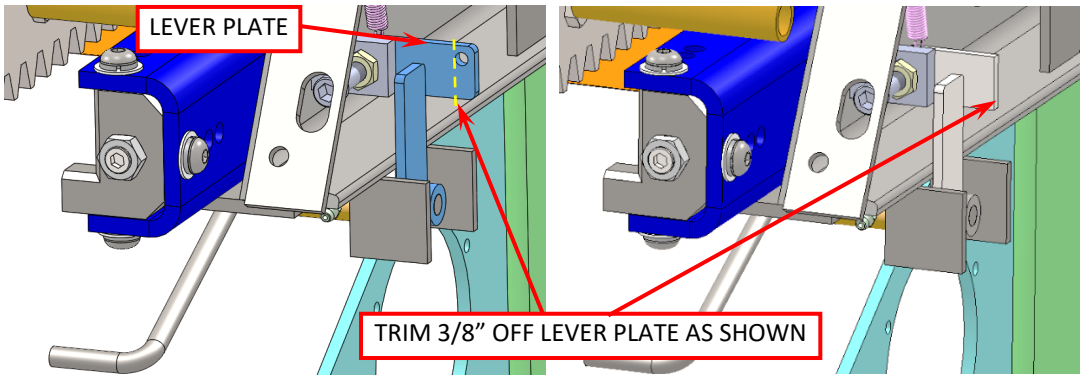
16. Attach main switch bracket to trailer side rail as shown.

17. Check all switches and lights for correct operation.

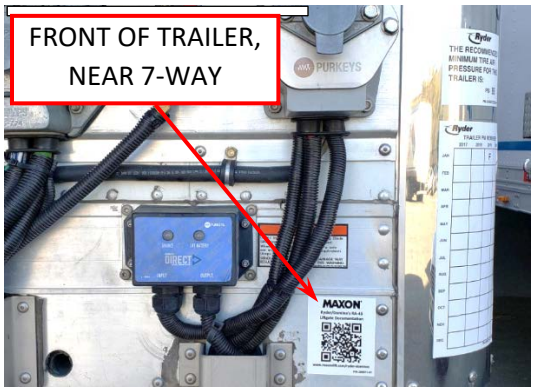
    - ☐ Main switch – All functions (UP, DOWN, IN, OUT) work properly.
    - ☐ Exterior wall switches - All functions work properly, and operation matches switch decal.
    - ☐ Interior wall switches - All functions work properly, and operation matches switch decal.
    - ☐ Overhead platform light turns on when the platform is extended.
    - ☐ Red light on trailer front driver side corner post turns on when the platform is extended.
    - ☐ Overhead platform light turns off when the platform is fully stored.
    - ☐ Red light on trailer front driver side corner post is off when the platform is fully stored.
    - ☐ Interior dome lights turn on.

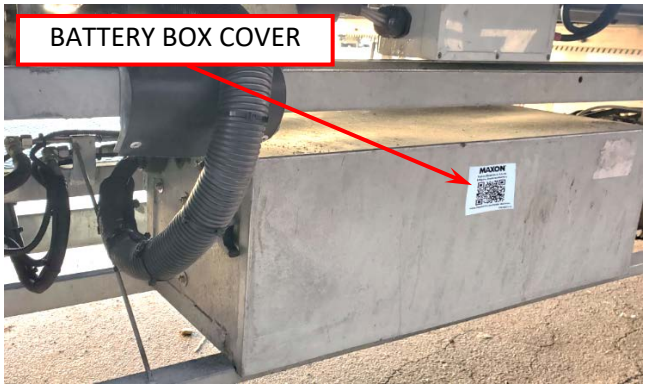
18. When all connections in Junction Box are complete and checked, spray terminal studs with a conformal coating.
19. Reinstall Junction Box Cover.

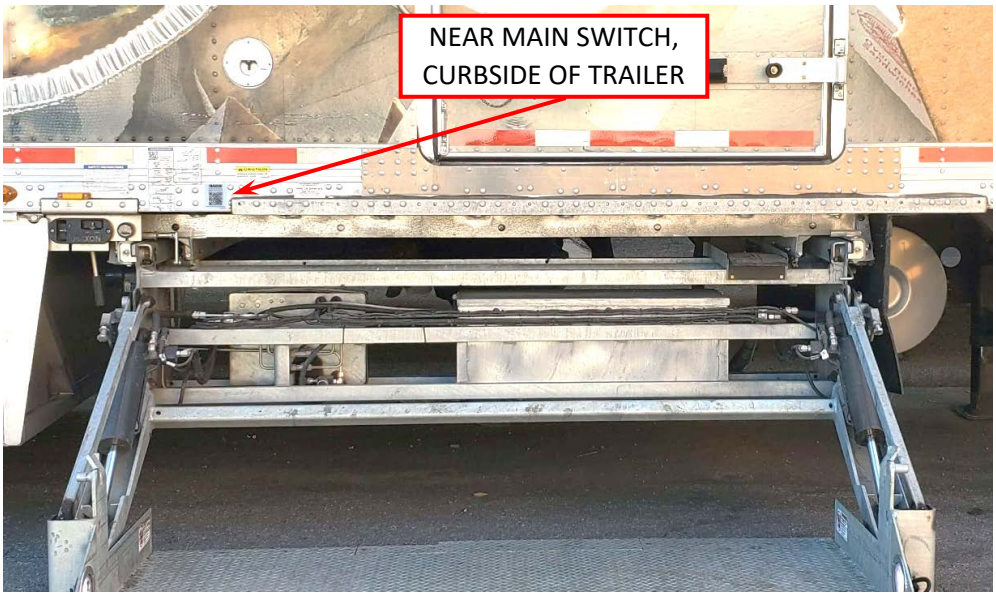
20. Trim 3/8” off lever plate on the right-hand side of lift frame to eliminate interference with mud flap.



21. Install QR Code decal in 3 places
    - Near 7-way nose box, front driver’s side of the trailer.
    - On battery box cover, driver’s side of the trailer.
    - Near the main switch, on the curbside of the trailer.

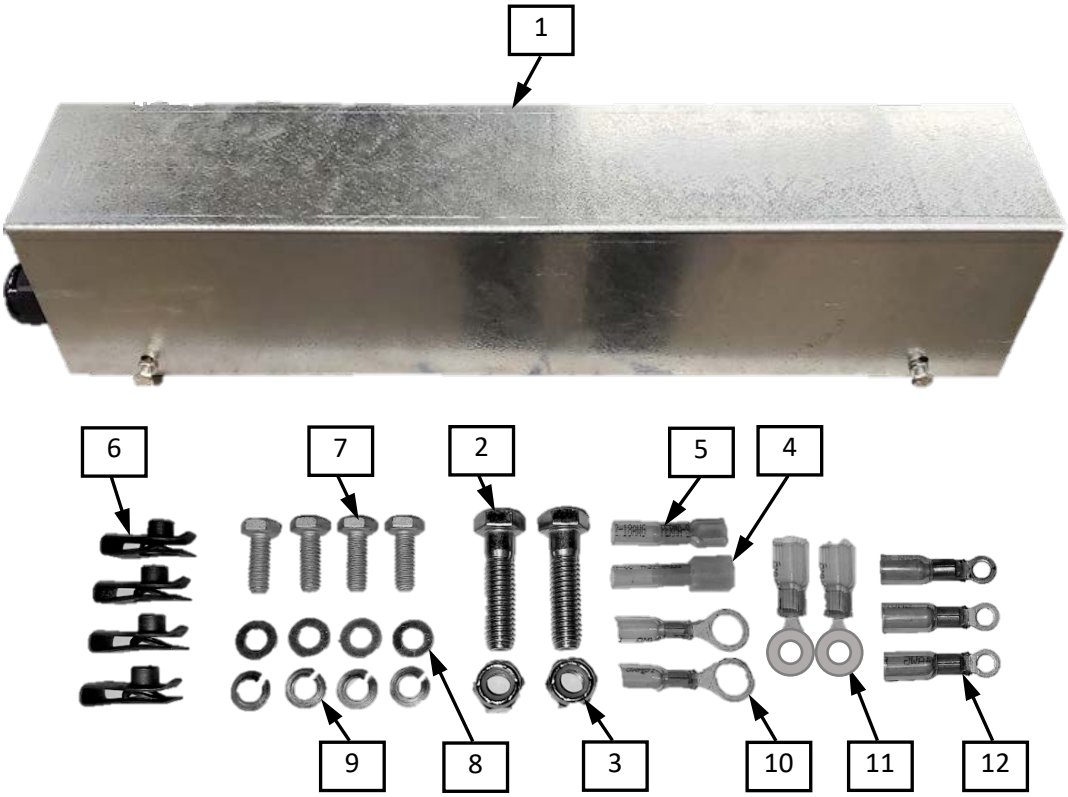






Addendum A

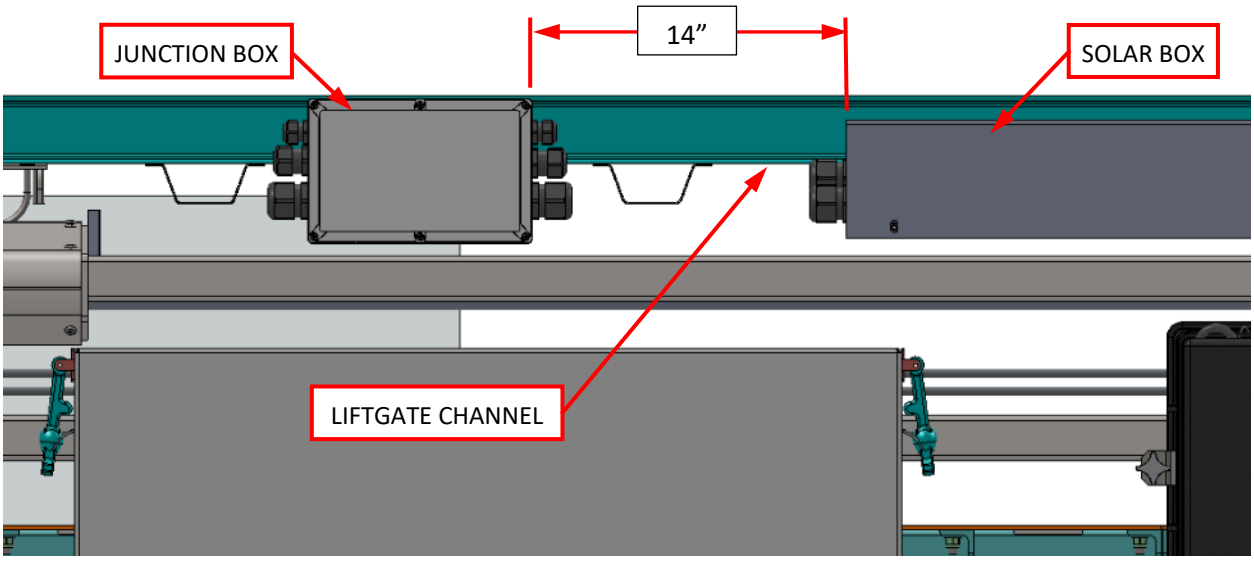
MAX SOL add on Solar Box for Domino's RA-45



Parts in Solar Box add-on kit

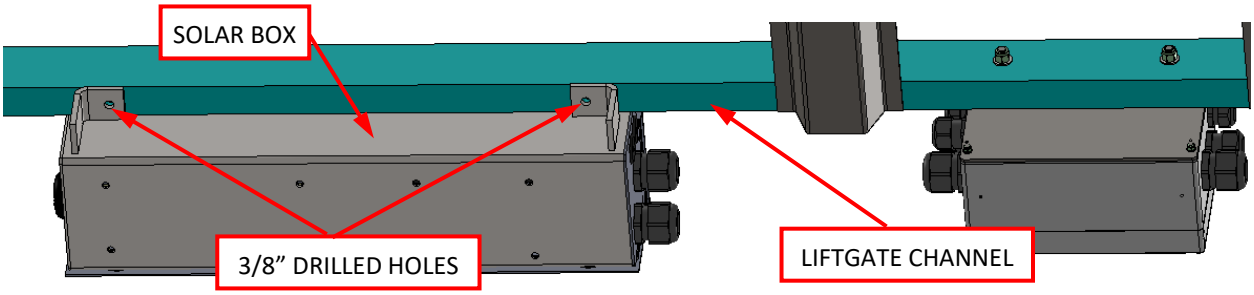
Item	Description	Qty	Where Used
1	Solar Box Assembly	1	Step 1. Solar Box to Lift Frame Channel.
2	Bolt, 3/8-16 x 1-1/2" GR8	2	Step 1. Solar Box to Lift Frame Channel.
3	Locknut, 3/8-16	2	Step 1. Solar Box to Lift Frame Channel.
4	Quick disconnect, ¼ male, fully insulated, red	1	Step 2. WAYPOINT to Charge Controller
5	Quick disconnect, ¼ female, fully insulated, red	1	Step 2. WAYPOINT to Charge Controller
6	Clip on barrel nut, ¼-20	4	Step 3. Charge Controller.
7	Bolt, ¼"-20 x ¾"	4	Step 4. Charge Controller to Solar Box.
8	Washer, ¼"	4	Step 4. Charge Controller to Solar Box.
9	Lock washer, ¼"	4	Step 4. Charge Controller to Solar Box.
10	Ring terminal, 3/8", 18-22 ga.	2	Step 10. WAYPOINT to J-box
11	Ring terminal, 3/8", 8 ga.	2	Step 11. Charge Controller B+, B- to J-Box
12	Ring terminal, #10, 18-22 ga.	3	Step 12. Wall switch harness to J-Box

1. Attach Solar Box to Liftgate Channel.
   a. Position Solar Box 14” to the right of the liftgate Junction Box.



   b. Using the Solar Box as a guide, drill two 3/8” holes into Liftgate Channel. Note: Liftgate can be slid out approximately 24” to drill holes from the bottom of the Solar Box.

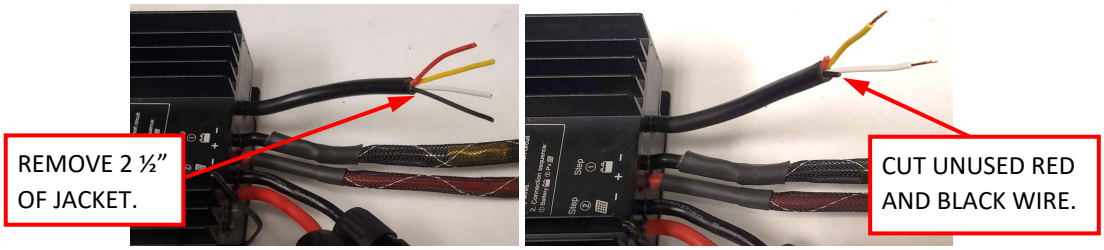
BOTTOM VIEW



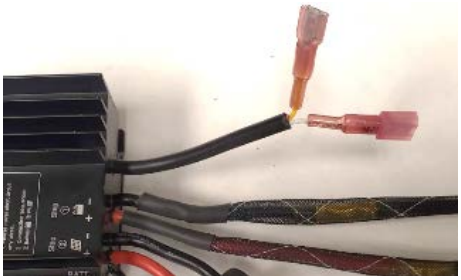
   c. Bolt Solar Box to liftgate channel with 3/8” x 1.5” grade bolts and locknuts. Tighten to 30 lb-ft.

2. If Solar Box contains an Optio3/WAYPOINT monitoring system, prepare Charge Controller to connect to WAYPOINT.
   - Cut off data connector on Charge Controller

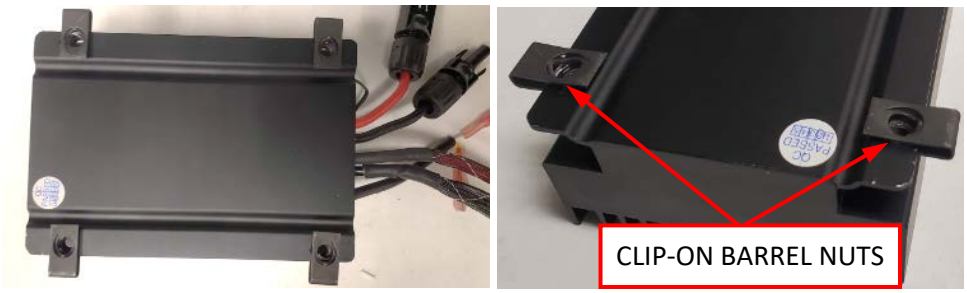
- Remove 2 ½” of jacket portion off on the 4 wires. Cut off unused red and black wire.



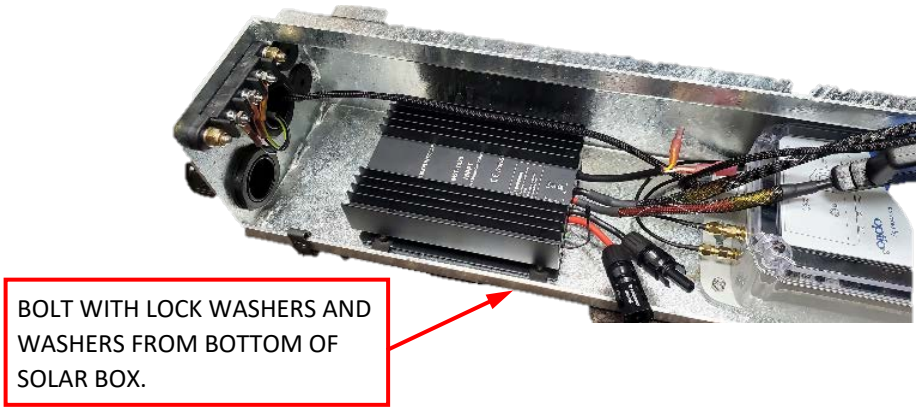
- Strip 3/8” of insulation off the wire and crimp ¼” female insulated quick connect to the yellow wire. Heat shrink terminal to wire.
- Strip 3/8” of insulation off the wire and crimp ¼” male insulated quick connect to the white wire. Heat shrink terminal to wire.



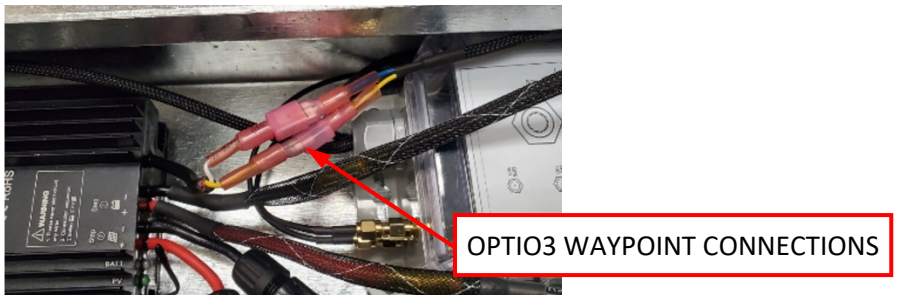
3. Place 4 pcs of clip-on barrel nut onto Charge Controller as shown.



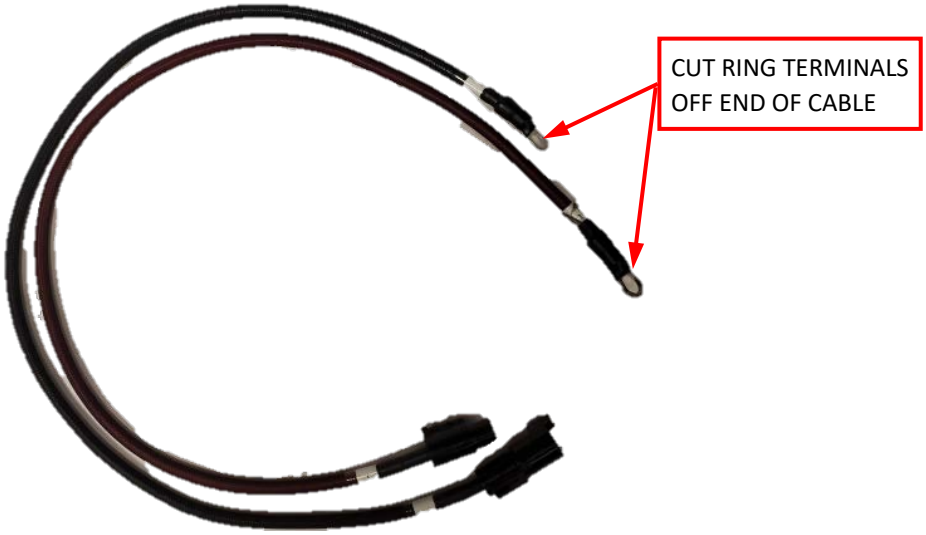
4. Install Charge Controller in Solar Box with four ¼”-20 x ¾” long bolts, ¼” washers, and ¼” lock washers.



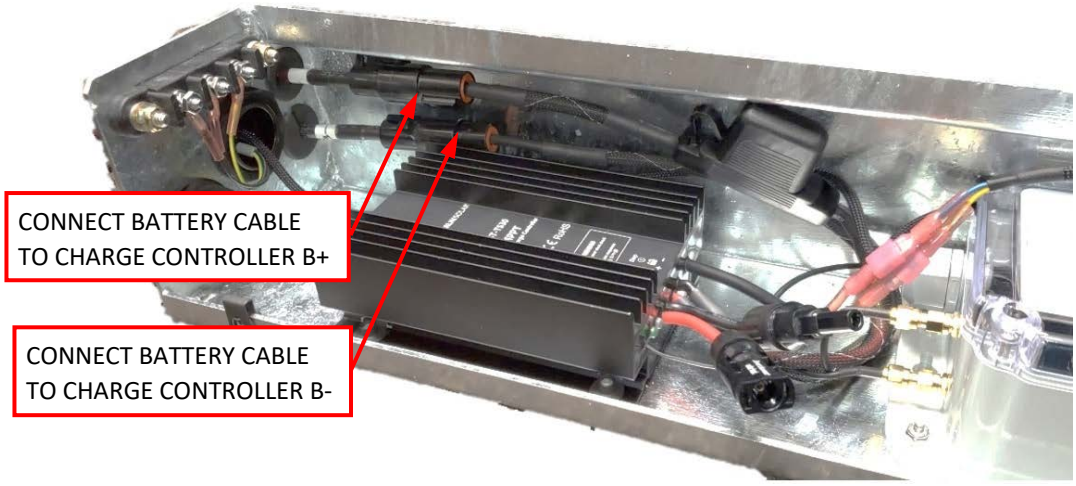
5. Connect Charge Controller data wires to Optio3 WAYPOINT.
   WHITE wire to BLUE wire and YELLOW wire to YELLOW wire.



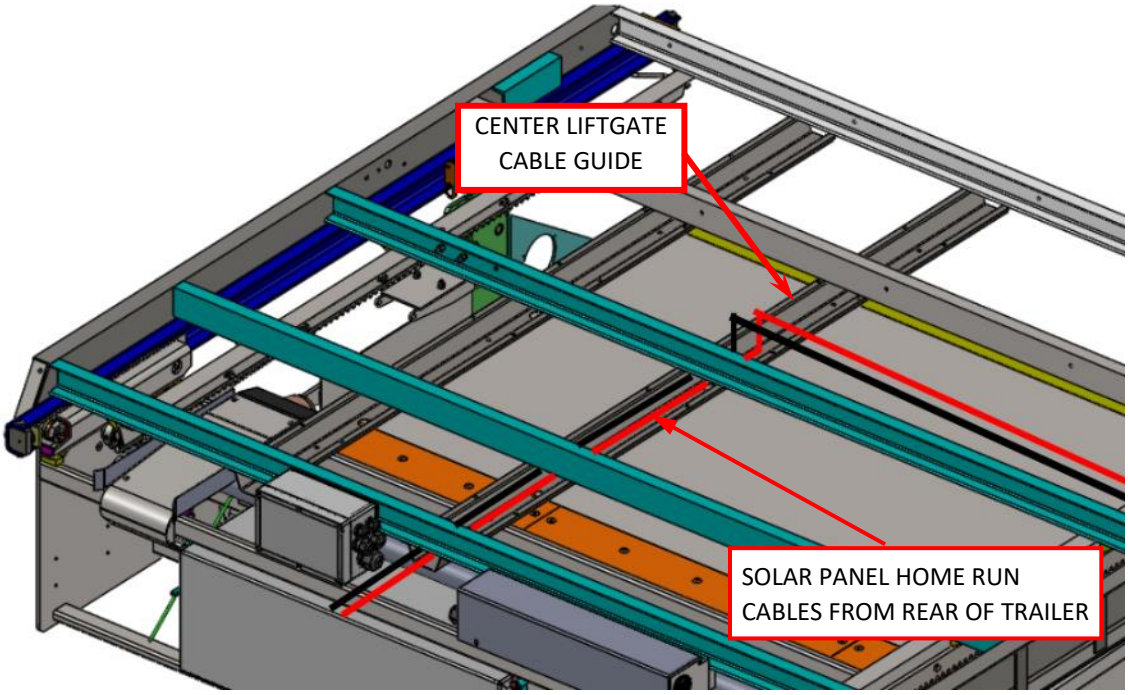
6. Cut ring terminal ends off 3 ft long Charge Controller battery cables.



7. Route Charge Controller battery cables through rear grommets as shown. Connect fused B+ cable from Charge Controller to B+ battery cable. Connect B- cable from Charge Controller to B- battery cable.

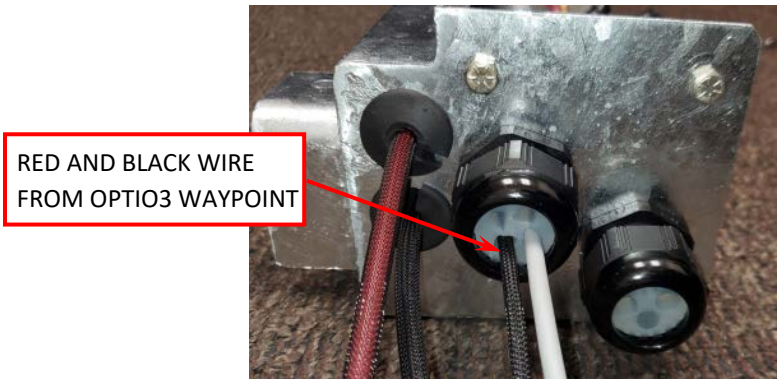


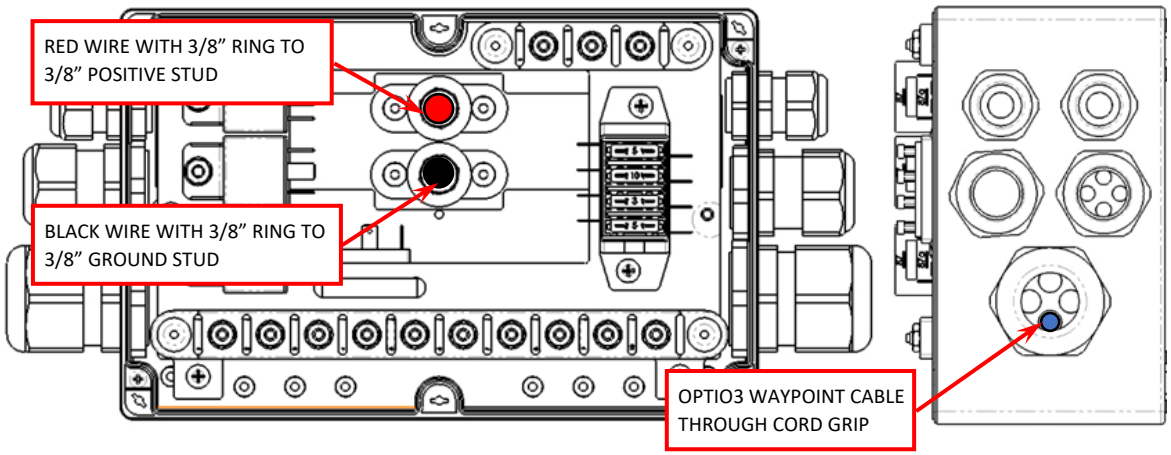
8. Follow MAX SOL installation instructions (M-20-17) only for mounting solar panel and routing solar panel Home Run cables (PV+ and PV-) into Solar Box. All other MAX SOL connections are covered in this Addendum. The solar panel Home Run cables will be routed in the Liftgate Channel Guide to the Solar Box, as shown below.



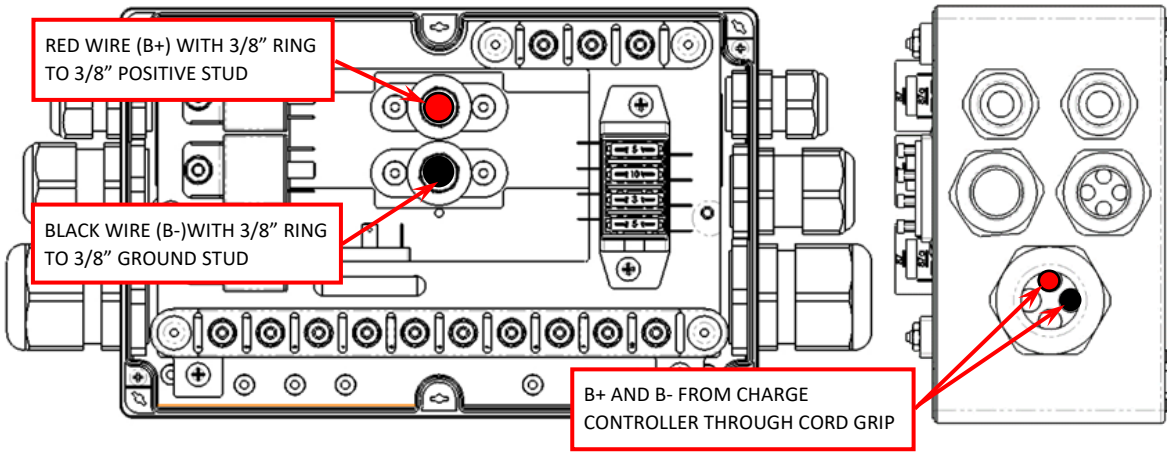
9. Cut Home Run cables approximately 4” from the connector. Run solar panel Home Run cables (PV+ and PV-) into Solar Box through the center cord grip holes as shown below. Insert cut end of the cable through center cord grip and trim excess cable. Use the 8-gauge butt splices provided to splice and heat shrink connector ends to trimmed Home Run cables.

10. Route RED and BLACK wires from Optio3 WAYPOINT through cord grip in the Junction Box. Crimp and heat shrink 3/8” ring terminals to wires and connect as shown below.

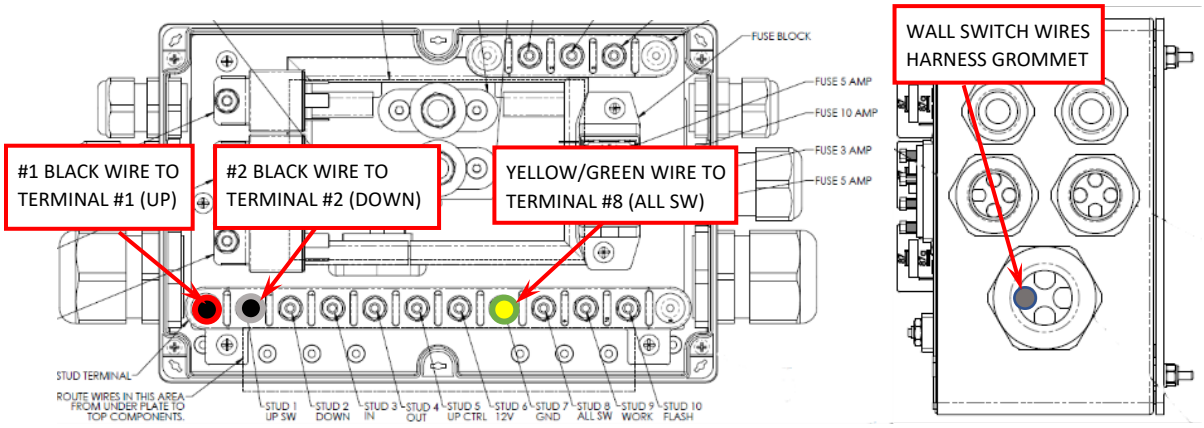




11. Route RED wire (B+) and BLACK wire (B-) from Charge Controller through cord grip in the Junction Box. Crimp and heat shrink 3/8” ring terminals to wires and connect as shown below.



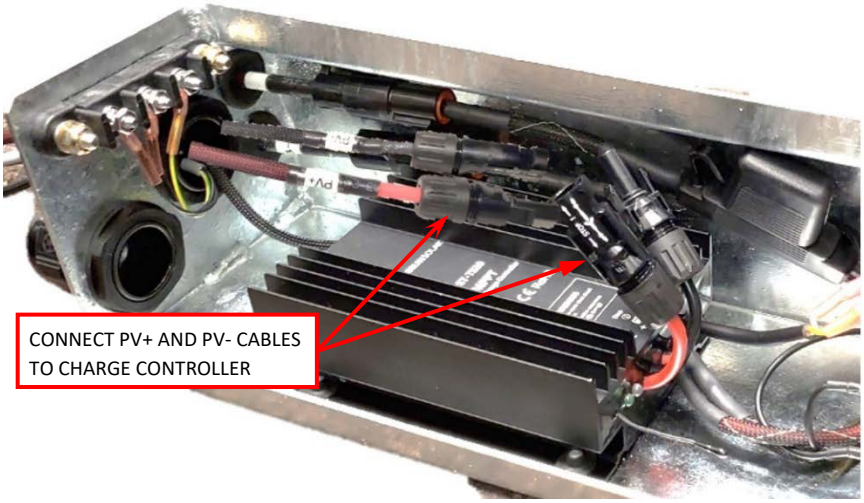
12. Route 3 wire gray cable from Solar Box through cord grip in the Junction Box.
    - Reinstall backing plate to Junction Box with four screws and spacers removed in step 5.
    - Crimp and heat shrink #10 ring terminals to wires and connect as shown below.



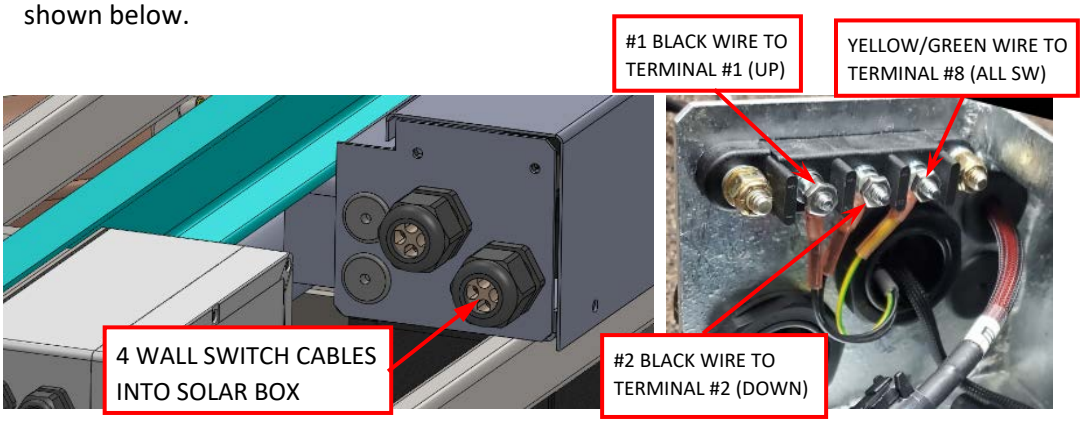
13. Tighten cord grip outer nut to compress and seal grommets.

14. Provide drip loop for all cables running into the Junction Box.

15. Connect PV+ and PV- connectors in Solar Box to Charge Controller.



16. Route 4 wall switch cables into Solar Box through the lower four-hole cord grip as shown below.
    - Cut off the excess switch harness. Cut approximately 4” off the jacketed portion of the three-wire harness. Crimp and heat shrink #10 ring terminals to wires and connect as shown below.



17. When all connections in Solar Box are complete and checked, spray terminal studs with a conformal coating.

18. Tighten cord grip outer nut to compress and seal grommets.

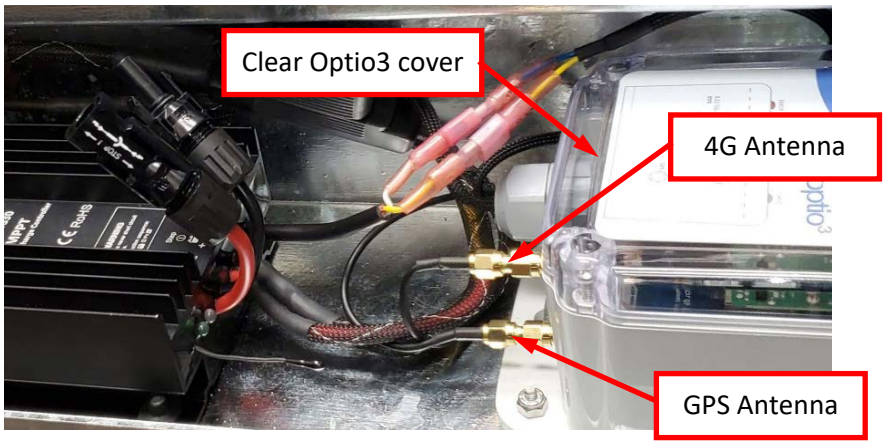
19. Record Optio3 WAYPOINT S/N #, Trailer number, Liftgate Serial # and e-mail to engineeringsupport@maxonlift.com

WAYPOINT S/N:_____ **Trailer #:**_____

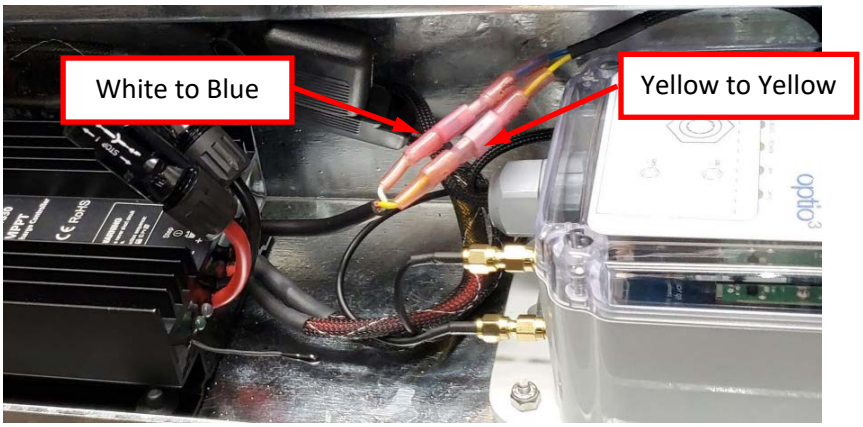
Liftgate Serial #:_____

Verify Optio3 WAYPOINT Operation:

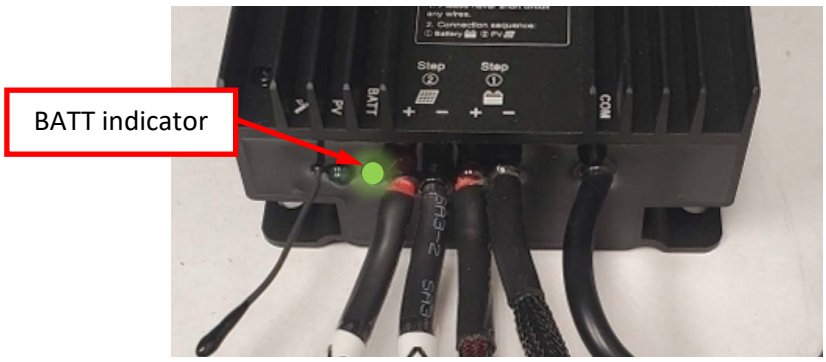
20. Confirm antenna connections are tight and connected as shown. The antenna wires are labeled on the wire near the connector. The 4G/LTE antenna is on the terminal closest to the clear Optio3 cover and the GPS antenna is on the terminal closest to the box bottom.



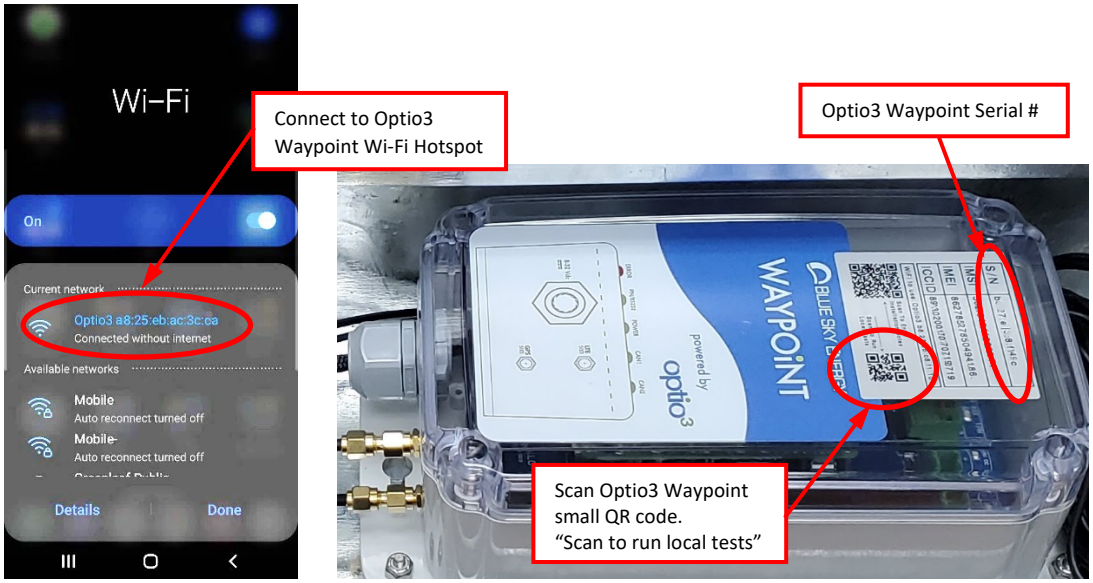
21. Check data connection to Solar Controller. Connections must match colors as shown below. Yellow to Yellow and White to Blue.



22. Confirm that the BATT LED on the controller is solid green. Liftgate battery voltage should be 12.5V minimum while setting up the Optio3 WAYPOINT connections.

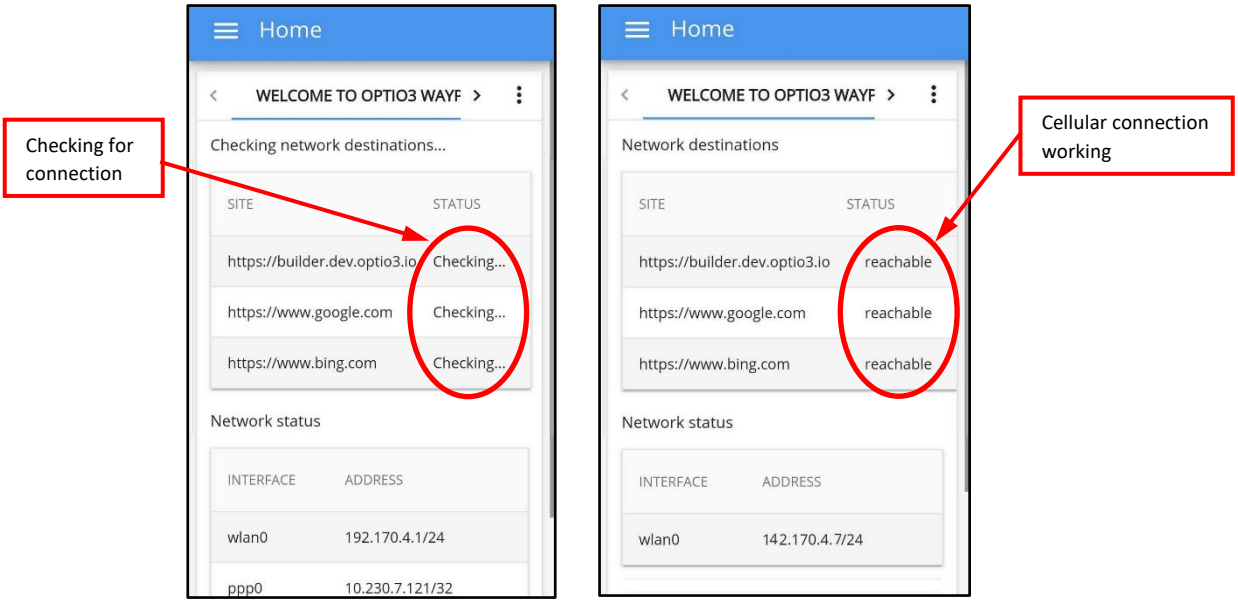


23. Use a smartphone or tablet to connect to the Optio3 WAYPOINT Wi-Fi hotspot. Connect to the Optio3 Waypoint Wi-Fi hotspot that matches Optio3 WAYPOINT serial number you are working on. When you are connected, it will show "Connected without Internet." You are now ready to scan the small QR code labeled "Scan to run local tests." If the QR code is difficult to scan, enter http://192.170.4.1 directly into the web browser to access the local test webpage.

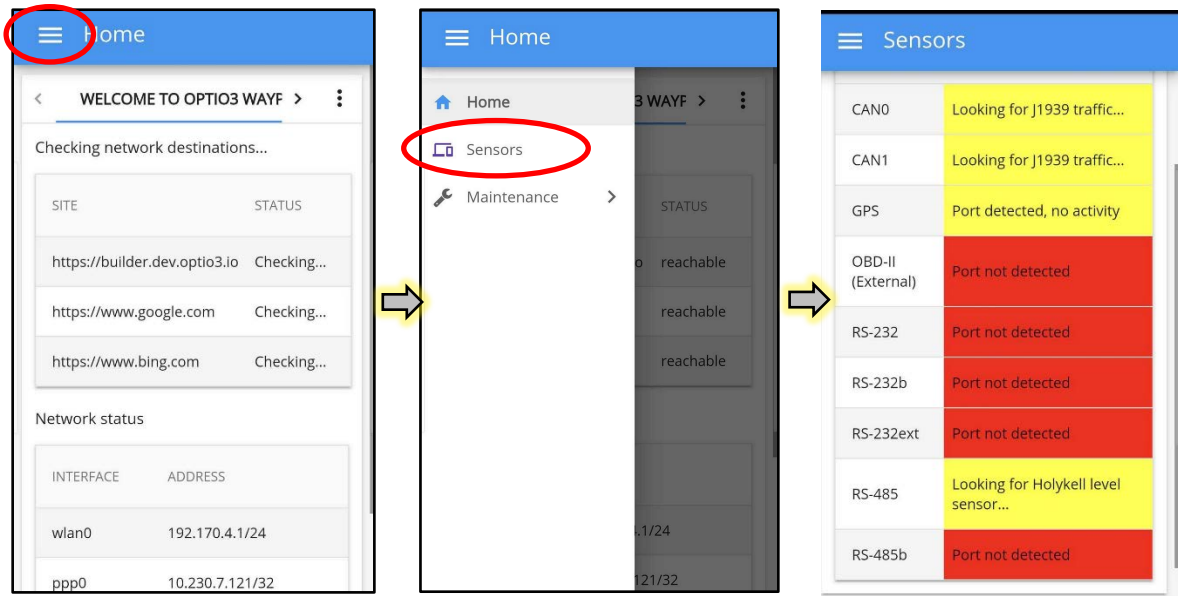


24. Select the link shown from scanning the QR code. It will open a webpage, as shown below.

25. When the webpage first opens, it will show the SITE STATUS as "Checking…". When the SITE STATUS shows the sites as "reachable," the cellular connection is working correctly.
Note: Depending on the cellular coverage and position of the vehicle/antenna, the time to connect will vary.

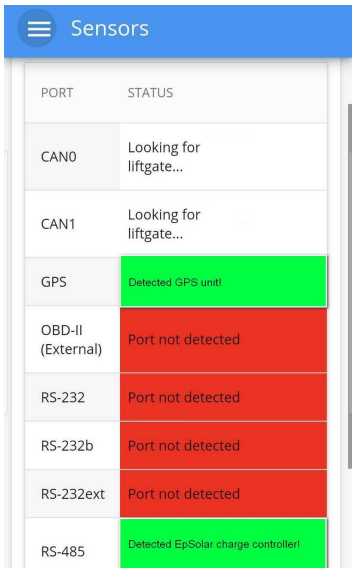


26. After the cellular connection is confirmed, verify the sensors are detecting local connectivity with the GPS and Charge Controller.
    a. Tap the menu button, then select “Sensors” from the menu to start scanning for connections.
    b. After approximately 2 minutes, the RS-485 port should highlight green and display “Detected EpSolar charge controller!”
    c. Typically, GPS location lock may take 10 minutes or more. The time may vary due to location, weather, and obstacles around you. (Note: GPS may not be detected when indoors.)



27. When your Optio3 Waypoint is correctly connected to your hardware, it will look similar to the screenshot below. The only ports that need to be highlighted green are GPS and RS-485, as shown below.

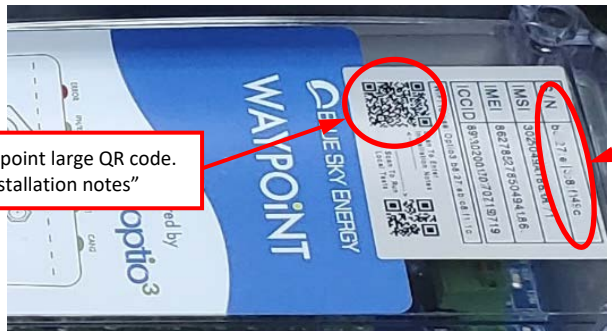
Note: If your hardware is not detected, check the Optio3 WAYPOINT connections, blue and yellow wires, to the Charge Controller. Also confirm the GPS antenna and 4G antenna connections are tight and attached to the correct antenna port as shown in steps 20 and 21.



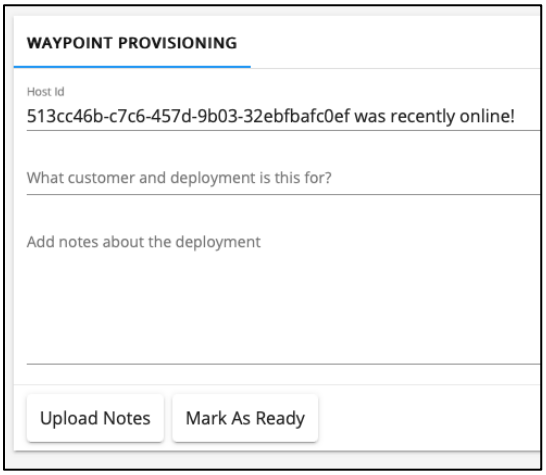
28. Marking the Optio3 Waypoint as ready:

    a. Disconnect from the Optio3 Waypoint local Wi-Fi, go back to the label, and scan the large QR code on the left. If the QR code is difficult to scan, enter https://builder.dev.optio3.io/#/provision?hostId= **<Replace with Optio3 WAYPOINT S/N>** directly into the web browser to access the webpage.

    Example: https://builder.dev.optio3.io/#/provision?hostId=**b8:27eb:c1:h6:6a**



29. Select the link shown from scanning the large QR code. It will open a webpage, as shown below.



30. In the notes section, enter the customer's name, trailer #, and liftgate serial #.

31. Select "Mark as Ready" to complete the setup. This will let the Optio3 team know that the Optio3 WAYPOINT is ready to collect data!

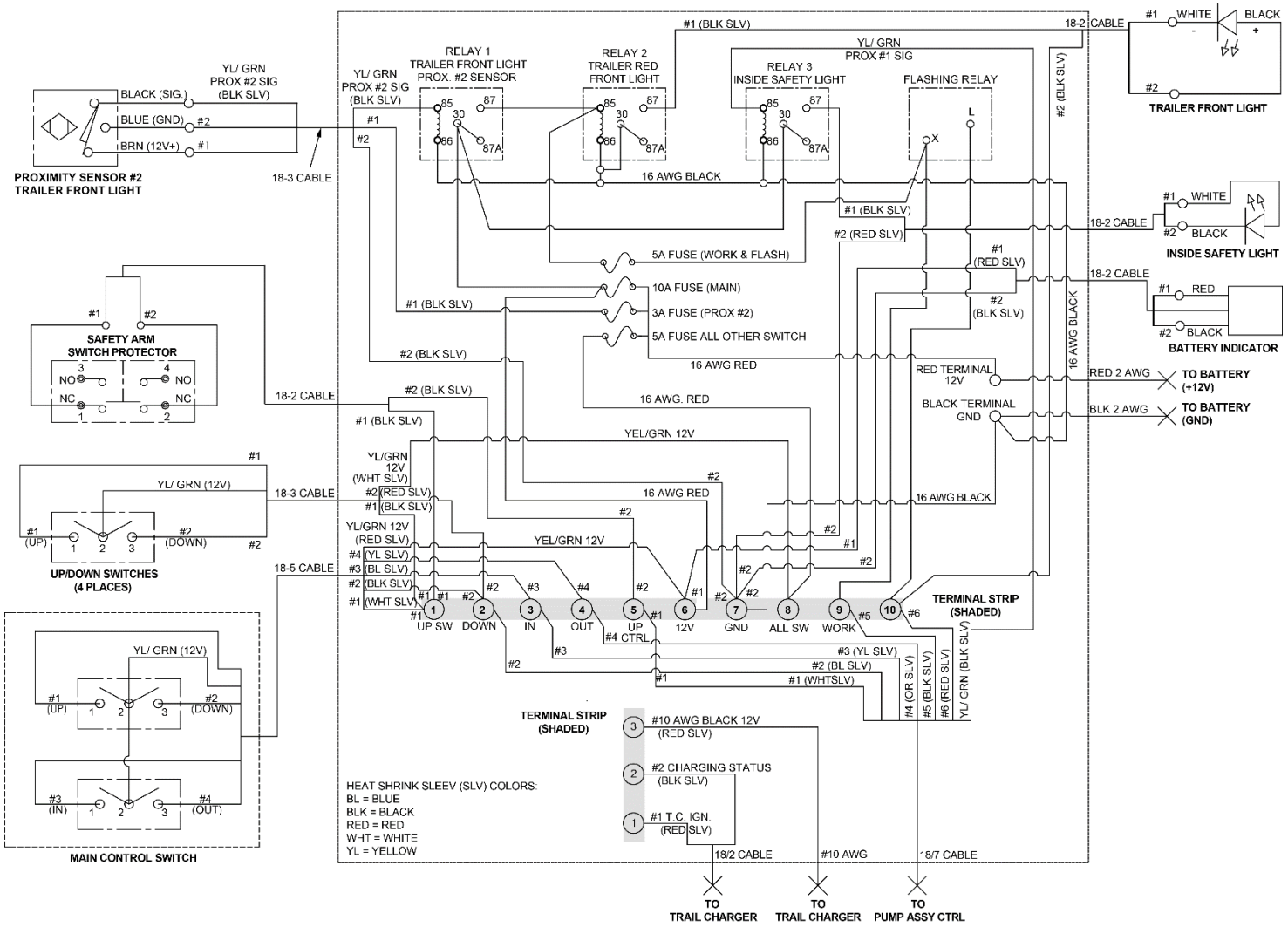
32. If you are having trouble verifying Optio3 WAYPOINT cellular please contact support@optio3.com for further assistance

33. Attach the cover to Solar Box with two ¼"-20 x ¾" bolts, ¼" washers, and ¼" lock washers.

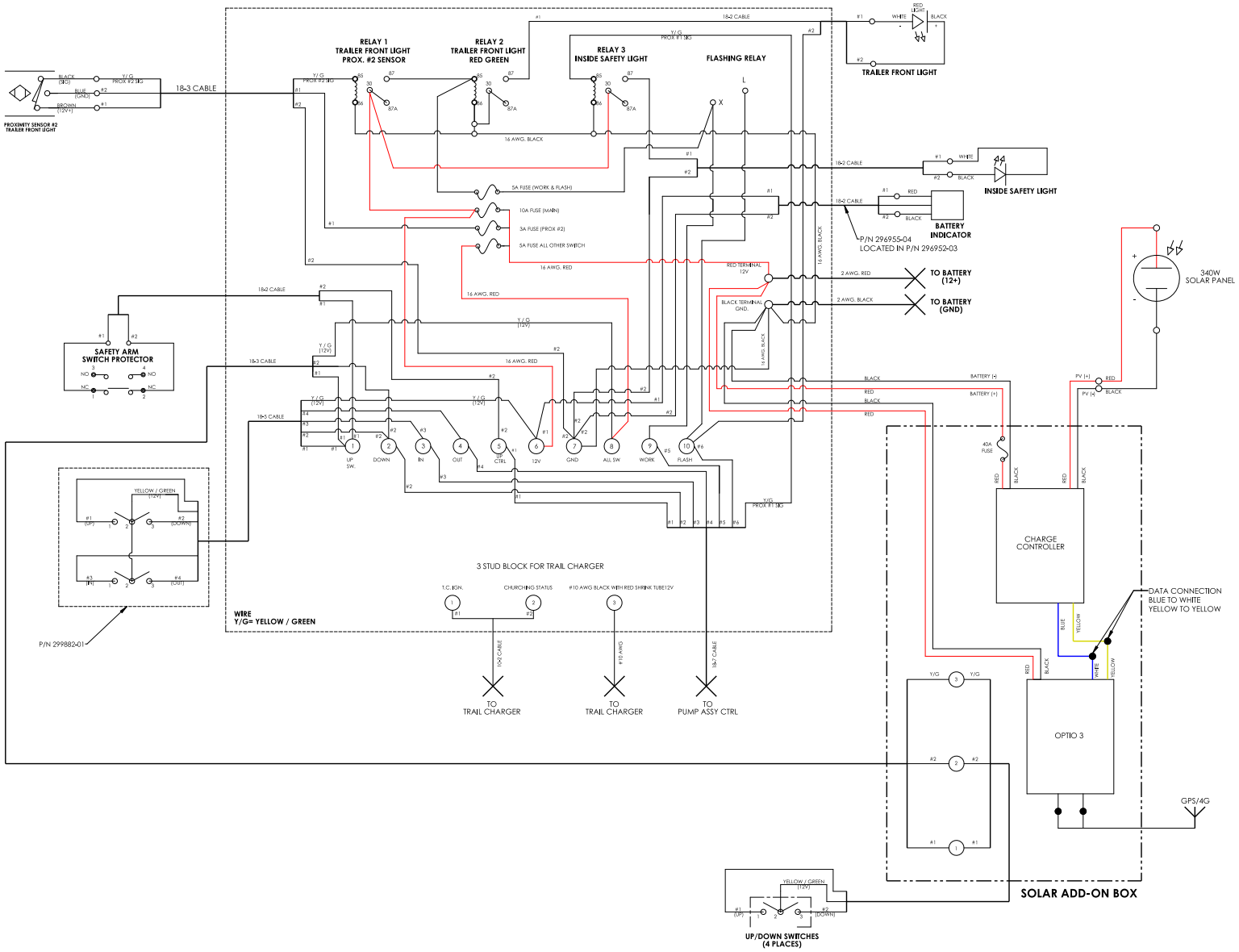
34. **Continue with STEP 16 on page 9 of the RA-45 INSTALLATION SUPPLEMENT DOMINO'S SPECIFICATION 289905-01-200.**

Schematics and Troubleshooting

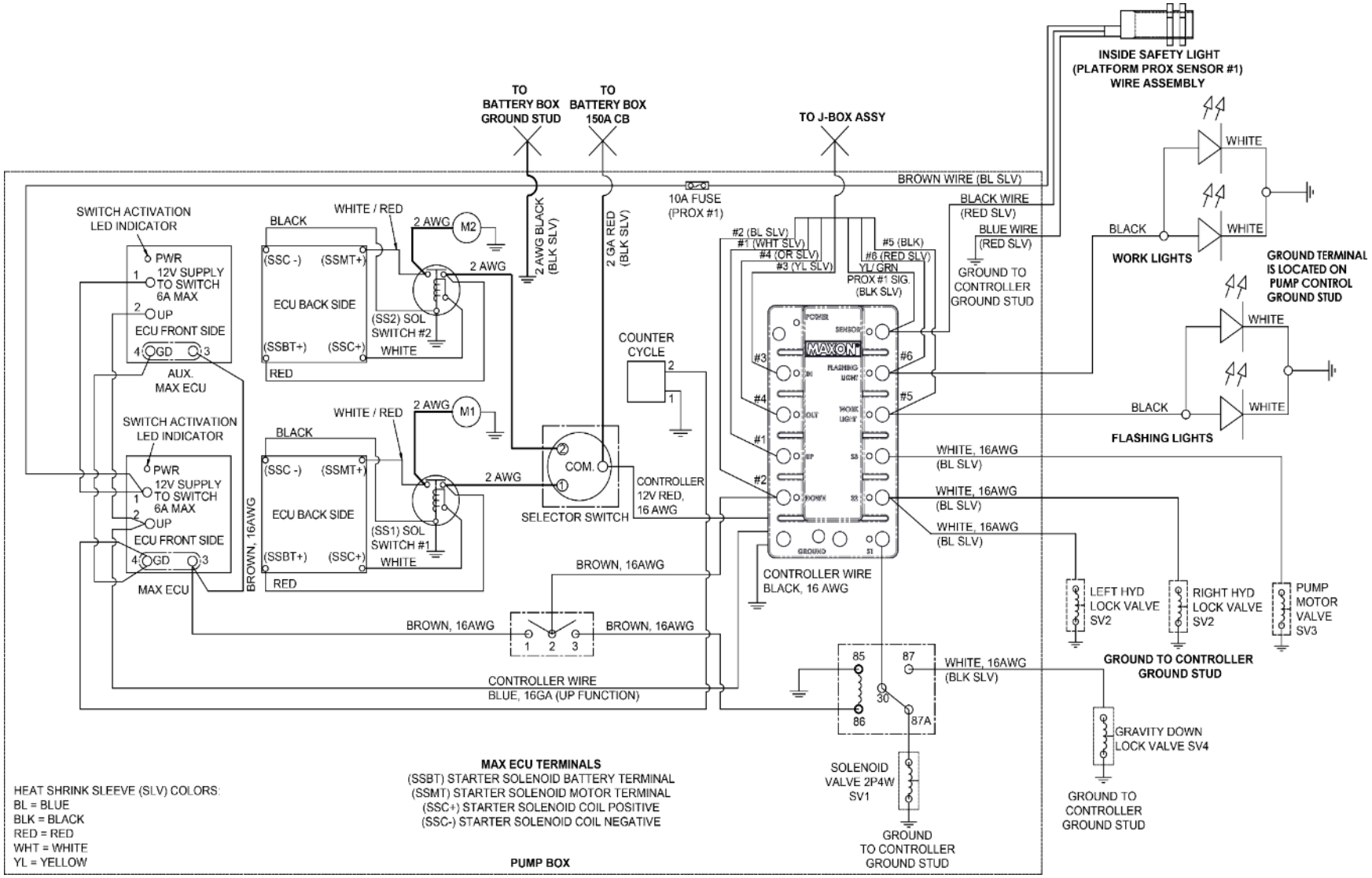
System Wiring Schematic – J-Box, Control, Indicators & Lights



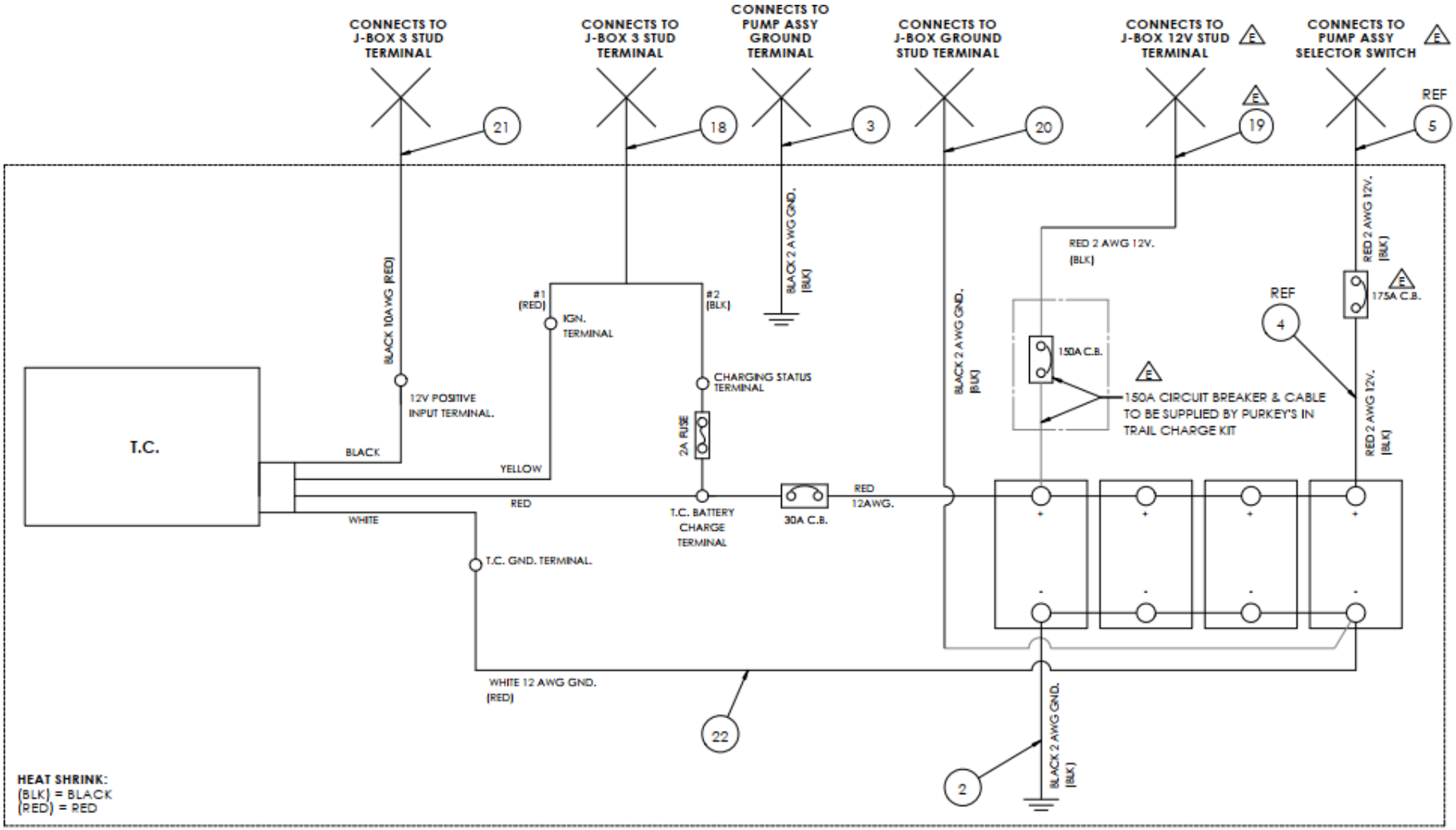
System Wiring Schematic – J-Box, Control, Indicators & Lights – with Solar Panel



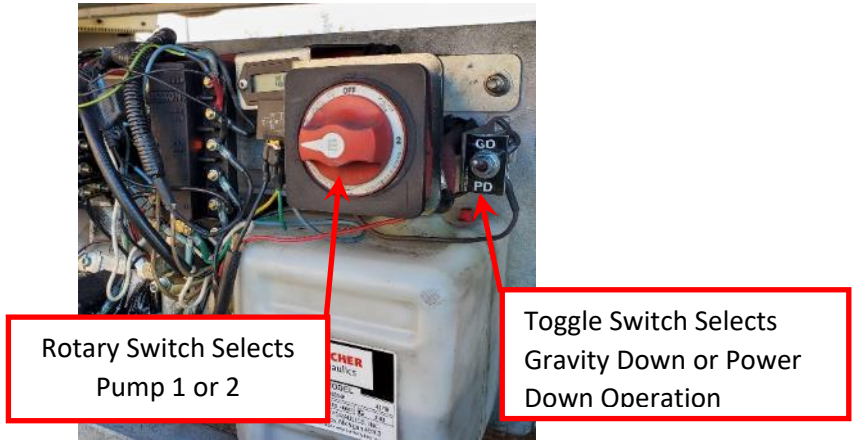
System Wiring Schematic – Pump Assembly & Lights



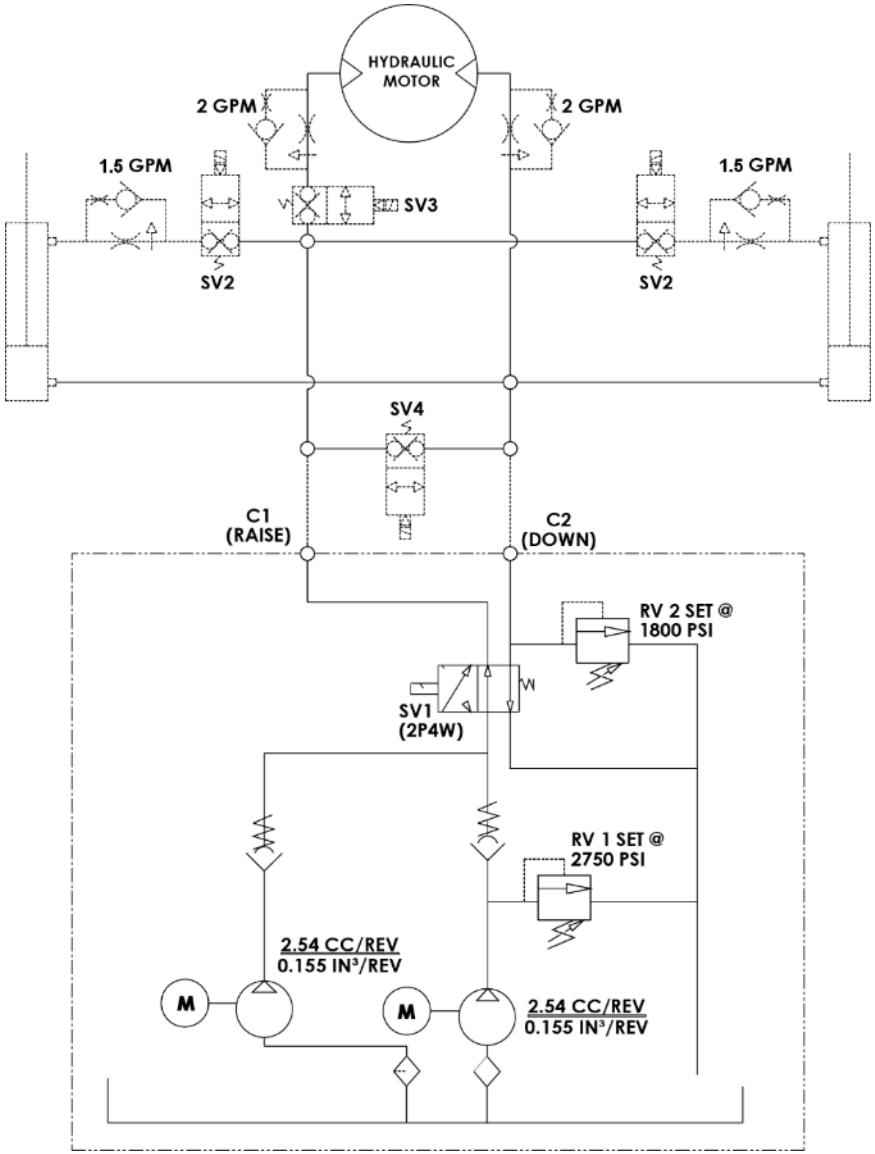
System Wiring Schematic – Battery Assembly



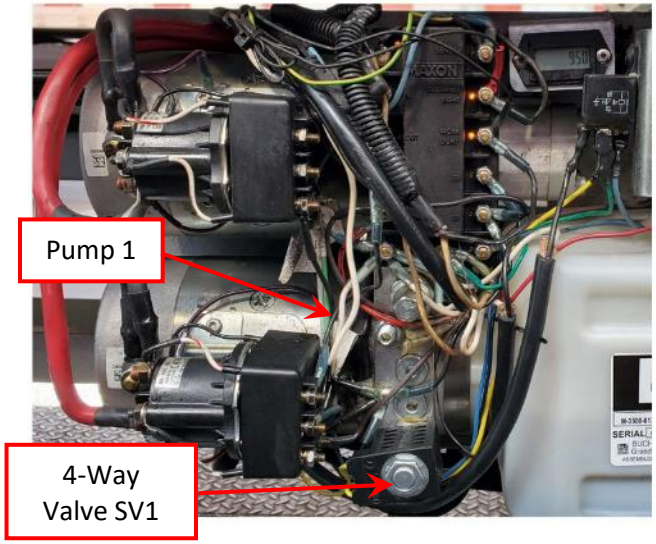
Hydraulics: Schematic

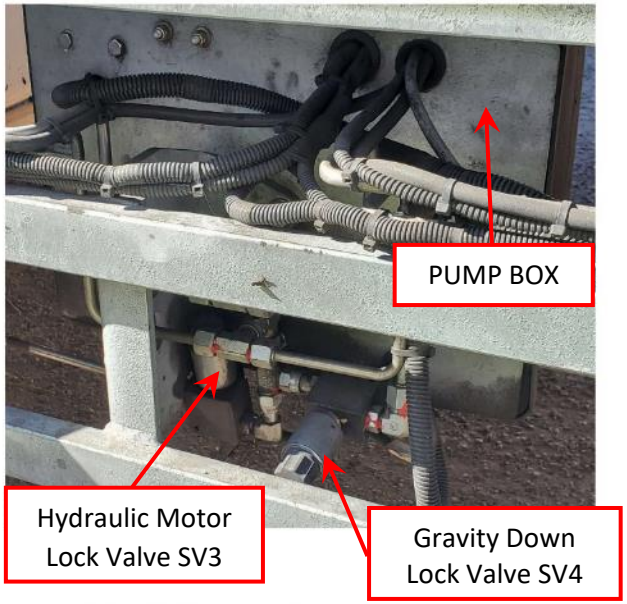


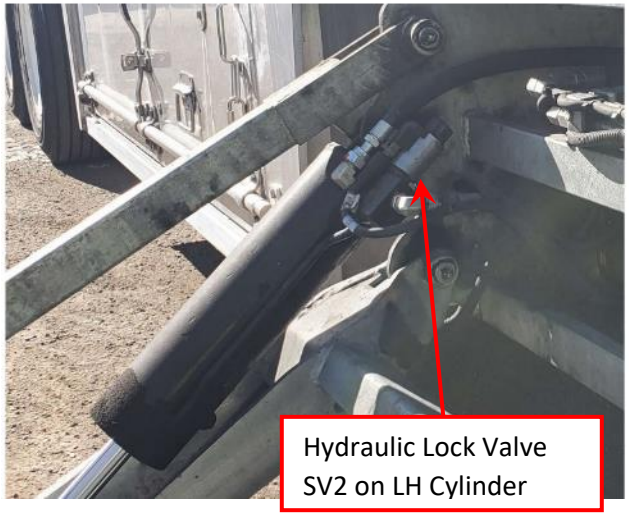
Power Unit and Valves Working Diagram					
FUNCTION	SS1/SS2 SOLENOID DRIVER	SV1 4-WAY VALVE	SV2 LOCK VALVE	SV3 HYDRAULIC MOTOR VALVE	SV4 G/D LOCK VALVE
UP	Energized	-	Energized	-	-
GD	-	-	Energized	-	Energized
PD	Energized	Energized	Energized	-	-
IN	Energized	-	-	Energized	-
OUT	Energized	Energized	-	Energized	-
Refer to Valves on Power Unit Hydraulic Schematic					



Hydraulics: Valve Locations







Hydraulic Hose Fitting Torque & Electrical Values, Power Unit

JIC 37°

Size		Thread	FFWR Method	ft-lb	Nm
-4	1/4"	7/16-20	2	13	18
-6	3/8"	9/16-18	1-1/2	22	30
-8	1/2"	3/4-16	1-1/2	42	57

ORFS (O-ring face seal)

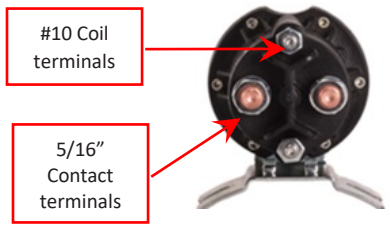
Size		Thread	FFWR Method	ft-lb	Nm
-4	1/4"	9/16-18	1/2 to 3/4	19	26
-6	3/8"	11/16-16	1/2 to 3/4	31	42
-8	1/2"	13/16-16	1/2 to 3/4	42	57

FFWR = Flats From Wrench Resistance

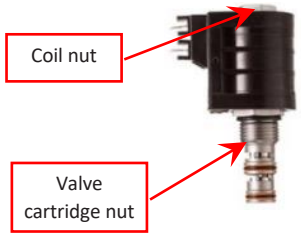
Flats Method Tighten the nut lightly with a wrench (approximately 30 in.lb.), clamping the tube flare between the fitting nose and the sleeve. This is considered the Wrench Resistance (WR) position. Starting from this position, tighten the nut further by the number of flats from Tables above. A flat is referred to as one side of the hexagonal tube nut and equates to 1/6 of a turn.

Motor Solenoid Switch	
Coil Resistance:	5.4Ω @70ºF. ±15%
Ampere: (Across #10 coil terminal studs)	2.2A @ 12.5V
#10 Coil terminal torque: 5/16" Contact terminal torque:	10-15 lb.-in max. 30-35 lb.-in max.
Hyd. Solenoid Valves (SV1)	
Coil Resistance: (Across male quick connects)	4.0Ω @ 70ºF. ±15%
Ampere:	3.1A @ 12.5V / 2.5A @10V
Coil nut torque: Valve cartridge torque:	15-45 lb-in 25-30 lb.-ft max.
Hyd. Sol. Lock Valves (SV2, SV3, SV4)	
Coil Resistance:	8.0Ω @ 70ºF. ±15%
Ampere:	1.5A @ 12.5V
Coil nut torque: Valve cartridge torque:	3-4.5 lb-ft 18.5-22 lb-ft max.
Relays (5 pin)	
Coil Resistance: (Across terminals 85 & 86)	90Ω @70ºF. ±10%
Ampere:	133mA @ 12V

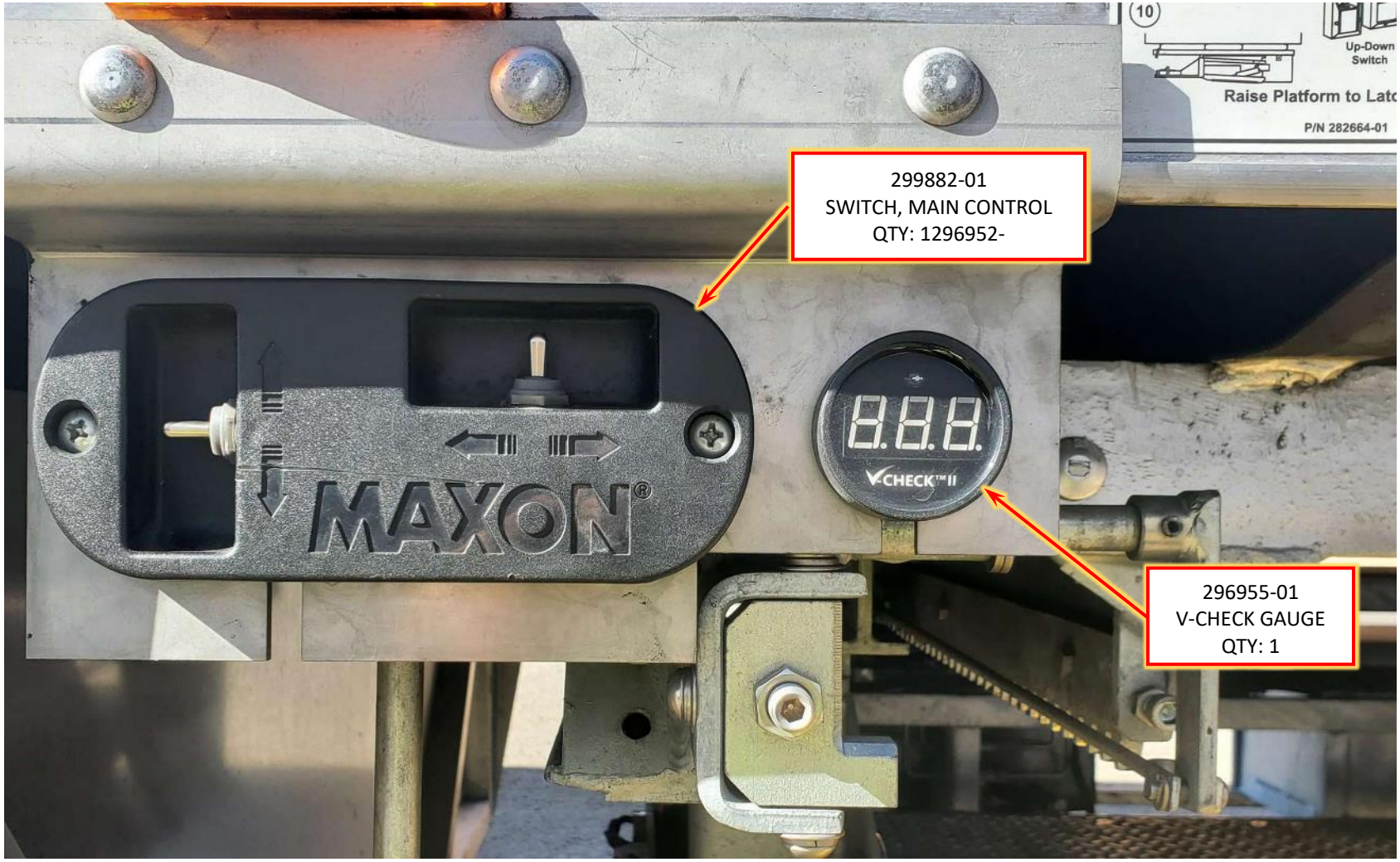
Motor Starter Switch



Hyd. Solenoid Lock Valve



Parts: Main Switch and V-Check



Parts: Junction Box

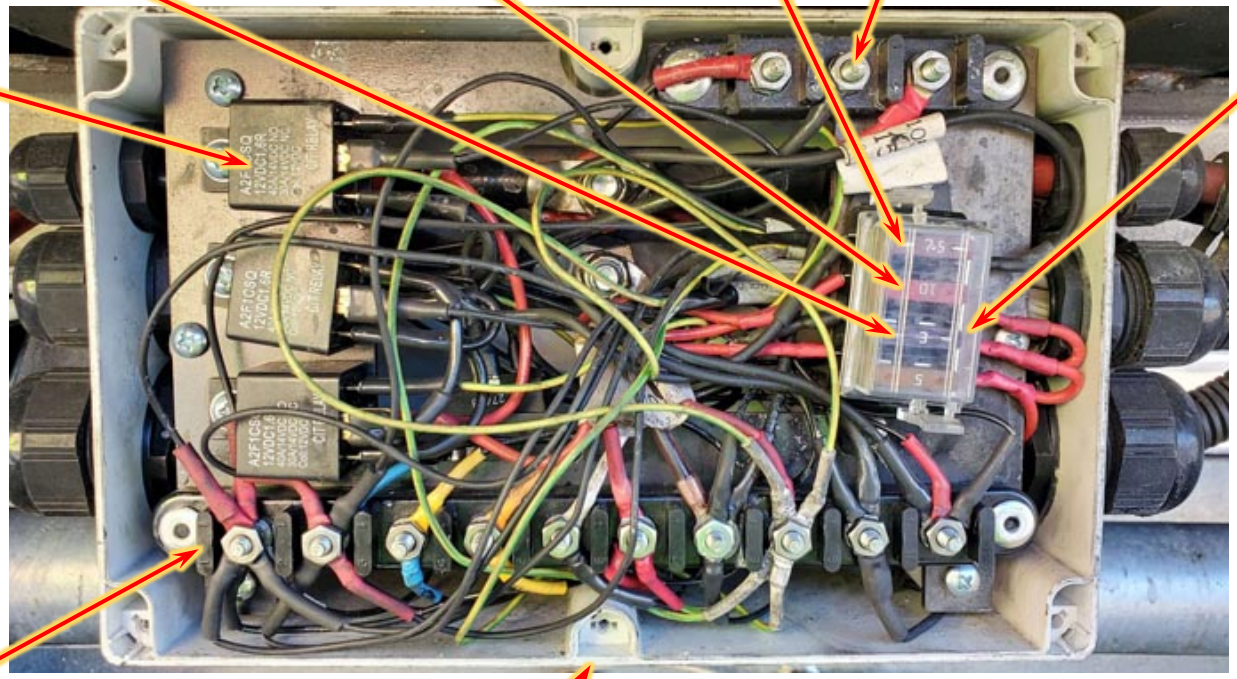
906580-04
FUSE, 3 A
QTY: 1

906580-01
FUSE, 10 A
QTY: 1

906580-05
FUSE, 5 A
QTY: 2

906616-04
JNCT BLOCK, 3 STUD
QTY: 1

906578-01
RELAY, 5 PIN
QTY: 3



907469-01
FUSE BLOCK, 80A
QTY: 1

906616-03
JNCT BLK 10 STUD
QTY: 1

299343-01
JCT BOX ENCLOSURE
QTY: 1

Parts: Pump Box, Cycle Counter & Selector Switches

210019-01
CONTROLLER, DUAL PUMP
QTY: 1

297269-01
DIGITAL CYCLE COUNTER
QTY: 1

906578-01
RELAY, 12VDC, 5 PIN
QTY: 1

288102-01
PUMP SELECTOR SWITCH
QTY: 1

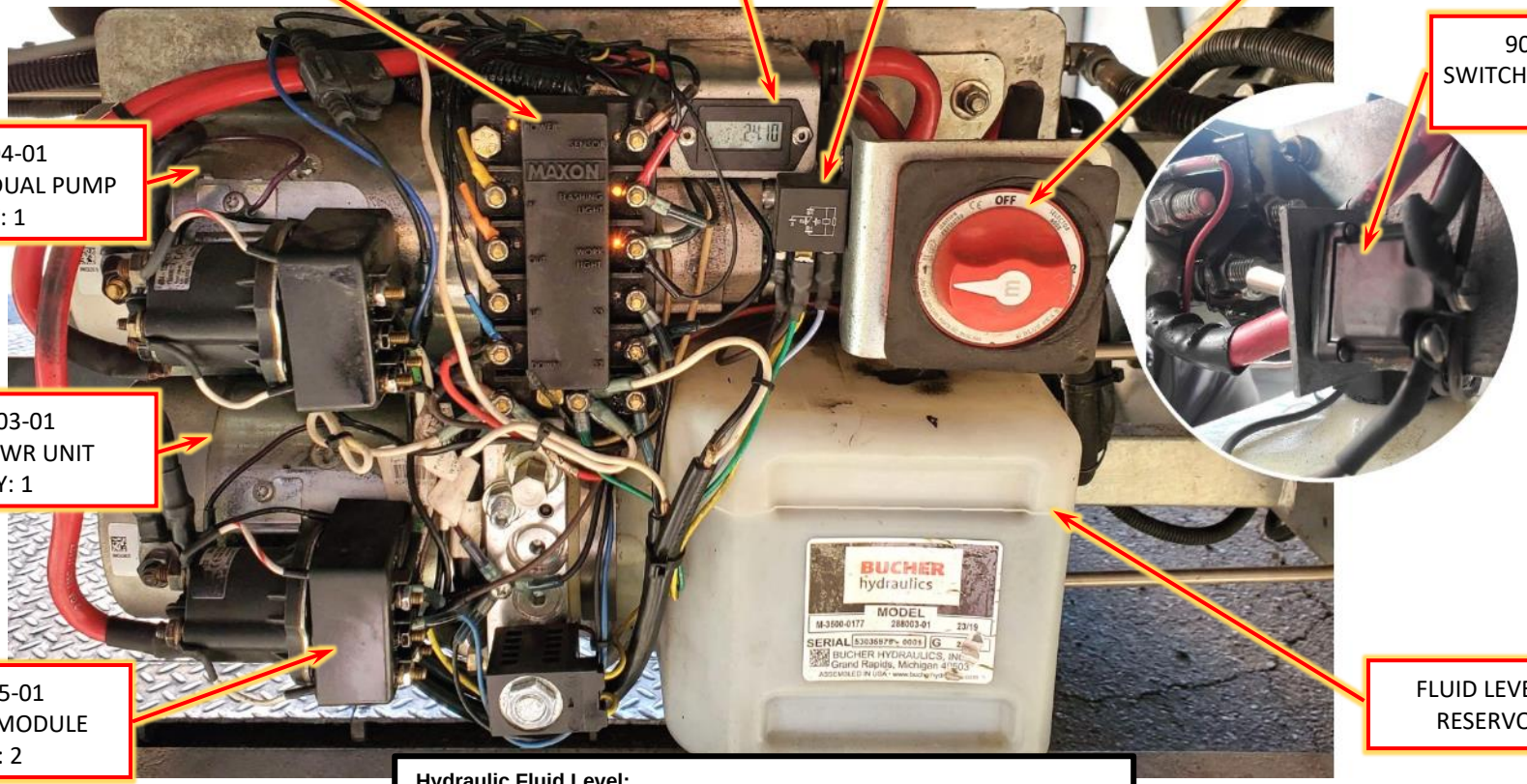
9072907-01
SWITCH 2 POS (GD/ PD)
QTY: 1

288004-01
PWR UNIT, DUAL PUMP
QTY: 1

288003-01
12 VDC PWR UNIT
QTY: 1

297135-01
MAX ECU MODULE
QTY: 2

FLUID LEVEL IN
RESERVOIR

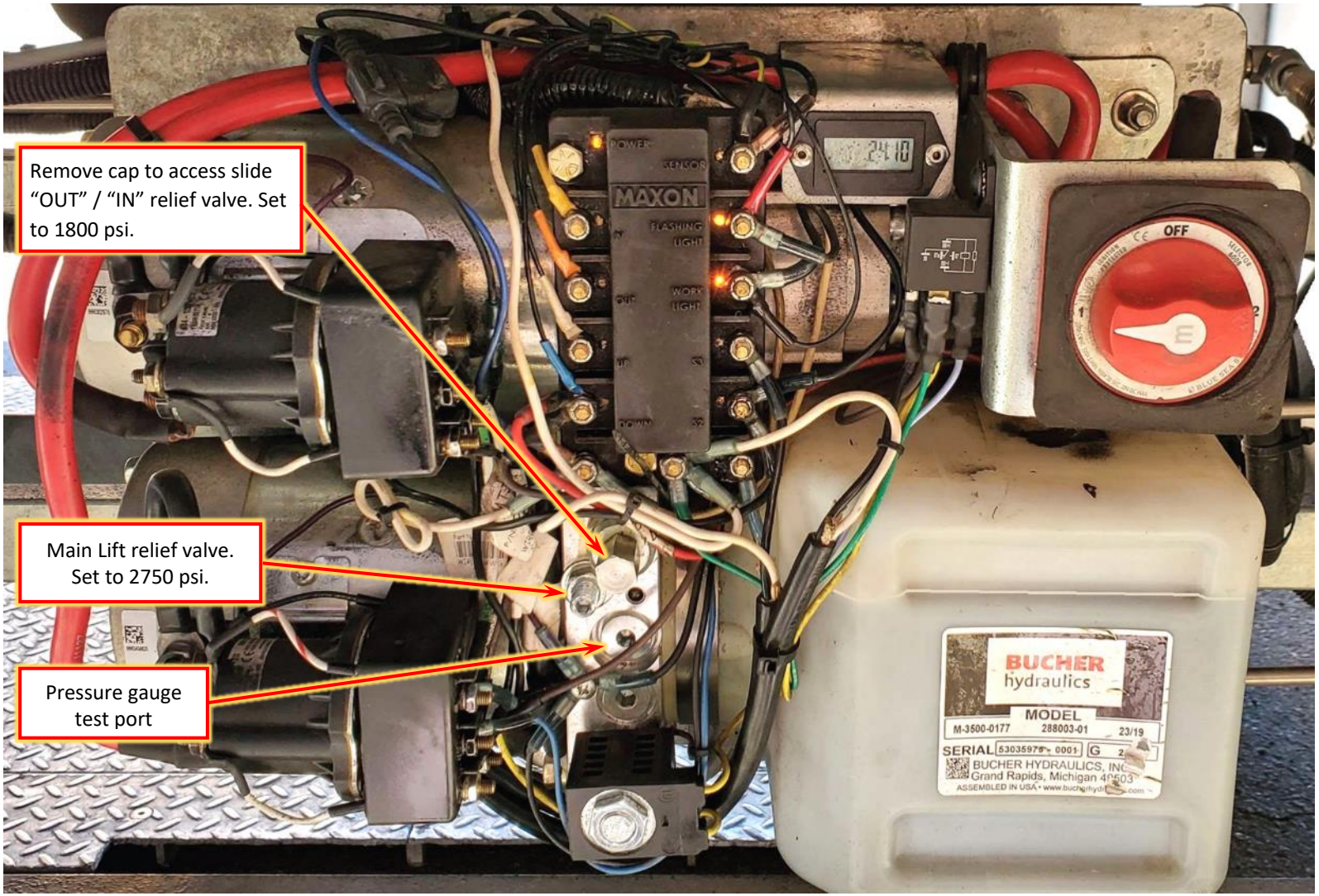


Hydraulic Fluid Level:

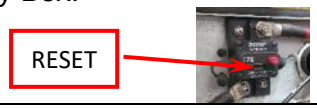
Check hydraulic fluid level in reservoir with Liftgate platform stowed. Top level of fluid should be visible at 3-3/4" above bottom of the reservoir.

Note: Liftgate is supplied with Exxon Univis HVI 13 from the factory.
See oil table in Maintenance manual for compatible ISO 15 hydraulic oils.

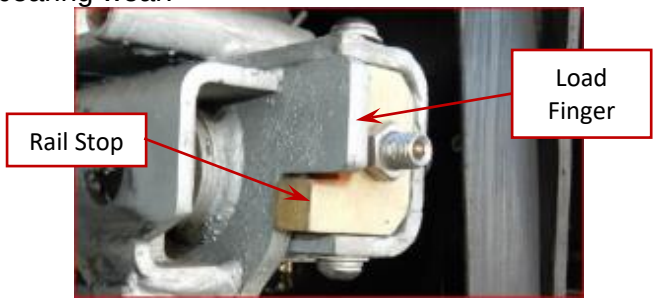
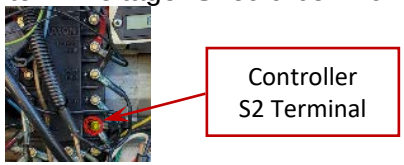
Hydraulics: Pressure Relief Valve Location and Settings



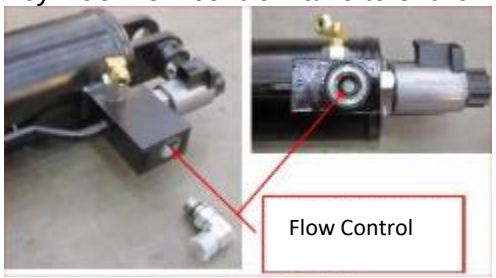
Troubleshooting Chart

Problem	Possible Cause	Correction
Platform will not raise, lower, or move in & out, and motor will not run.	1. Power shut off switch in "OFF" position.	Set power shut-off switch to "1+2" position. 
	2. 175 A Circuit Breaker tripped.	Reset yellow lever on 175 A circuit breaker in Battery Box. 
	3. Battery voltage low.	Tighten power and ground connections. Charge batteries and check charging system.
	4. Motor solenoid not working.	Set pump selector switch to other pump. 
	5. Blown fuse on control circuit.	Check wall switches for short circuits. Tighten connections at switch and protect switch terminals. Wall switches can be spaced out with ¼" spacer if needed. Replace 15A ATC fuse in battery box, #1 position on terminal block.
Platform will only lower, motor runs.	Limit switch lever / limit switch stuck.	Clear obstruction blocking lever/limit switch movement. Grease lever hinge point. 
Platform not going in or out, motor runs.	1. Battery voltage low. Solenoids not activating.	Tighten power and ground connections. Charge batteries and check charging system. Battery voltage should be > 12.2 V.

Troubleshooting Chart

Problem	Possible Cause	Correction
	2. SV3 (in) valve not shifting. SV1 & SV3 (out) valves not shifting.	Check electrical connections at valve. Remove and clean valve if needed.
	3. Low pump pressure.	Adjust in/out pressure relief valves. 1800 psi for out, 2400 psi for in.
	4. Damaged/worn roller bearing.	With platform at the "out" position check if Load Finger is not resting Rail Stop. This is sign roller bearing wear.  Replace rollers.
Platform not going up or down, motor runs.	1. Battery voltage low. Solenoids not activating.	Tighten power and ground connections. Charge batteries and check charging system. Battery voltage should be > 12.2 V.
	2. SV2 valve not shifting.	Check controller S2 term. voltage. Should be >10v.  Check electrical connections at valve. Remove and clean valves if needed.

Troubleshooting Chart

Problem	Possible Cause	Correction
Platform not going up or down, motor runs. - Continued	3. Cylinder flow control valves blocking port.	Tighten cylinder flow control valve to 5 ft-lb. 
Red/Green stow lights at from of trailer not working.	1. Tractor 7-way plug not connected to trailer.	Connect 7-way plug.
	2. No power to 7-way aux pin	Check tractor 7-way fuse. Replace if needed.
	3. Proximity sensor out of adjustment.	Check metal target on platform is within 3/8" of sensor with platform stored.
	4. Proximity sensor not working.	Check that proximity sensor is getting >11.5V. Proximity sensor has a LED lit when it is active. Place metal within 3/8" sensor. If LED goes out sensor is working. Replace sensor if needed.
Flashing lights and work lights on platform not working.	1. Wiring short circuit. Possible damage to light wiring.	Repair damaged wiring and replace 5 A fuse in Junction Box.
	2. Proximity sensor near storage latch not working.	Check that proximity sensor is getting >11.5V. Proximity sensor has a LED lit when it is active. Place metal within 3/8" sensor. If LED goes out sensor is working. Replace sensor if needed.