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Technical Service Bulletin WSB-13 Repair Instructions

Purpose: Update the electrical system for Open Trail Motorhomes with a 12-volt operating system.

Models: 2025 & 2026 Open Trail Motorhomes

Flat rate code & Time allowed: *To file the warranty claim for payment, please use the following flat rate code.* Repaired - **8913SB00, up to 14 hours for all repairs**. Note: Some steps will require 2 technicians.

NOTE FOR UNITS WITH OWNER UPGRADES: Please verify with owners if any modifications have been completed. Some systems that have been modified will not need all repairs.

Tools Needed:

Torque Wrench (w/ 30 ft*lb. setting)
Socket set (7/16, 1/2, 9/16, 11/16)
Wire cutter/strippers and crimper
Impact Dril & 1/4" chuck
#2 square bit/phillips
Box Wrence/open end (7/16, 1/2)
T45 Torx Bit
T55 Torx Bit
Cutting blade or hole saw

Parts Needed:

1 of 5196380, 12 volt parts kit WSB-13
Electrical Tape
Zip Ties
Sealant, silicone
Sealant, expanding foam
Nut and bolt
In-line Fuse Holder
15-amp fuse

****Torque specifications listed on page 10 unless otherwise noted****

Repair instructions:

1. Turn off all power to coach.
   - Disconnect the shore power cord from coach.
   - Turn off the battery disconnect switch found in the step well.
   - Disconnect chassis battery at the battery disconnect by removing the access panel next to the accelerator pedal. Push in red or black tab and disconnect. NOTE: Wait 20 minutes after turning engine off to avoid any unintentional short circuit or engine warning lights. See Figure 1A and 1B.



Figure 1A


Figure 1B

2. Remove the cushions and the furniture access panel to access the electrical components beneath the galley seating base (options will vary).
   - Disconnect positive cable from battery and tape terminals.

Prep and remove old cables and components.

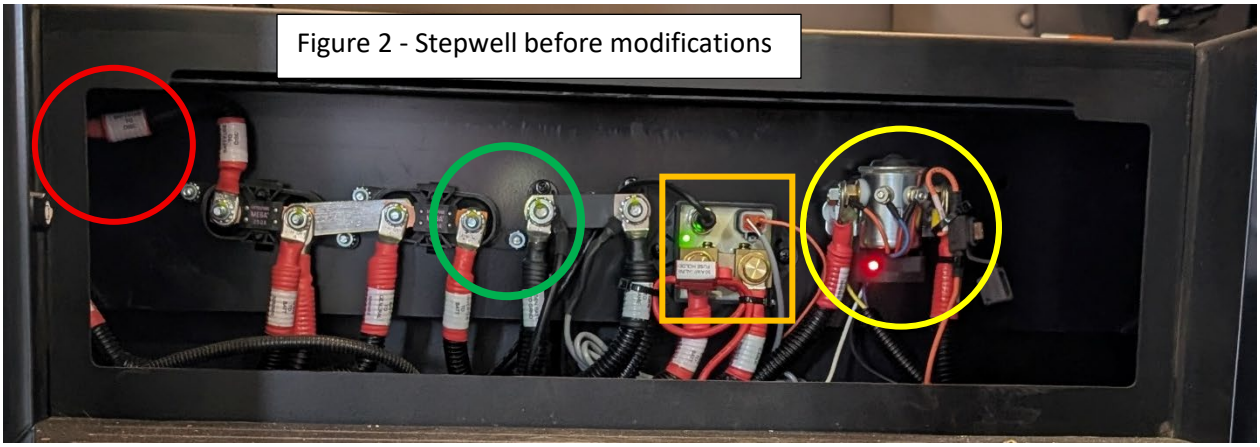


Figure 2 - Stepwell before modifications

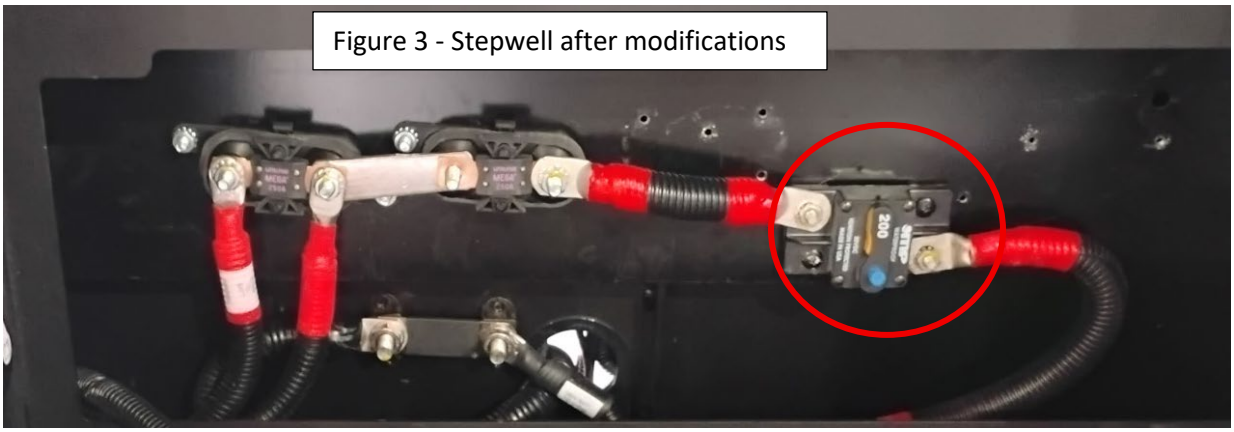
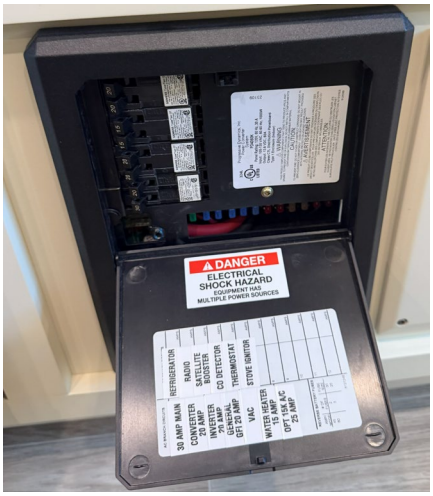


Figure 3 - Stepwell after modifications

3. Open step well area to access wire connections.
4. Smart solenoid, figure 2 yellow circle
   - Disconnect wires from smart solenoid, roll up as needed to discard later as other wires are disconnected and removed.
   - Open chassis battery compartment in drivers floorboard and remove and discard cable labeled "Battery to Solenoid".
   - Discard smart solenoid.
5. Spyder True State module, figure 2 orange square.
   - Remove and discard cable that connected the smart solenoid to the Spyder true state module.
   - Remove the battery cables with 9/16" socket and discard.
   - Unplug Spyder RVC cable, will move to electrical box.
   - Disconnect battery sense wire, will move to electrical box.
   - Disconnect solar wire, will move to disconnect switch.
   - Remove the True State module and keep to reinstall in the electrical box.
6. Battery charging cables, green circle figure 2.
   - Remove and discard, they are connected to the existing inverter.
7. Resettable breaker, red circle figure 2.
   - Remove and discard cables.
   - Relocate breaker to be easily accessible as shown in figure 3, red circle.

8. Inverter (Model in electrical box may vary, see figure 4)
    - Disconnect the Molex connectors.
    - Remove cover and disconnect cables.
    - Remove screws securing inverter to floor of electrical box and remove inverter.
    - Remove 10-2 wire with Molex connections from old inverter and keep to install on new inverter, wrapping ends as needed with electrical tape for safety purposes.
    - Discard inverter
9. Remove and discard all existing 2-gauge wires from the charging circuit.
10. Remove all cable connections from battery in electrical box.
11. Add venting to the electrical box.
    - Locate vent at bottom of bench/sofa.
    - Using the cutting blade or a hole saw, add vents to electrical box near sofa vents.
    - Use caution to avoid damaging the sofa.
12. Remove WFCO converter from breaker panel.
    - Open breaker panel located on passenger side and turn off the breaker for the converter.
    - Remove the center screw, then remove the outside frame and breaker cover.
    - Remove the green, black, and white wires from the breaker area.
    - Disconnect the black and white wire below fuse panel.
    - Remove the bottom screw and slide out the converter. Discard converter.
    - Reinstall breaker cover.





Installing New Components and Wires

Figure 4 - Electrical box before modifications- inverter model may vary.

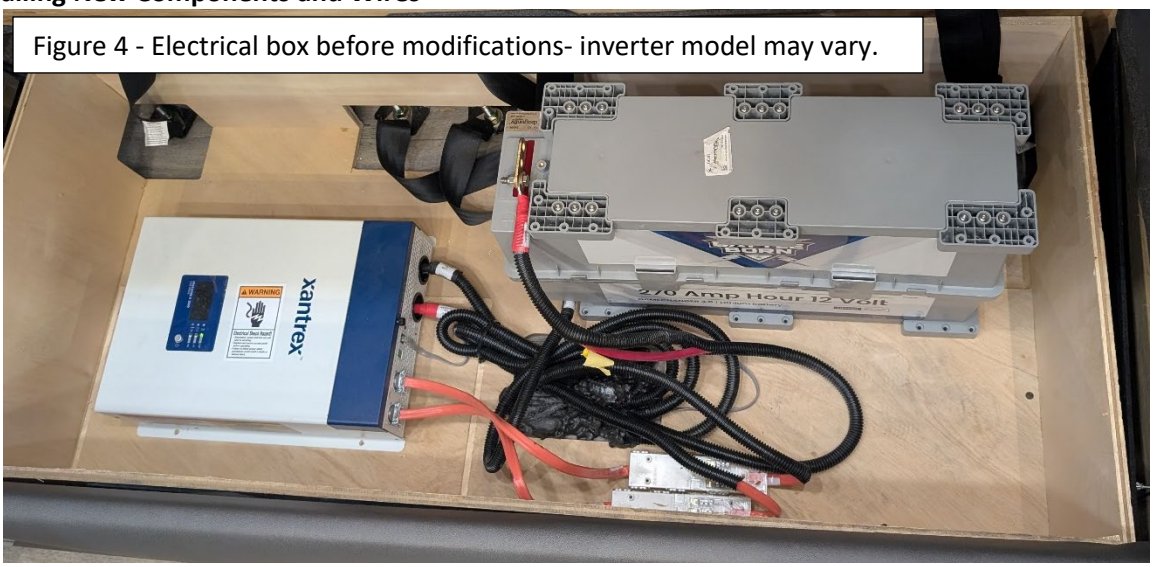
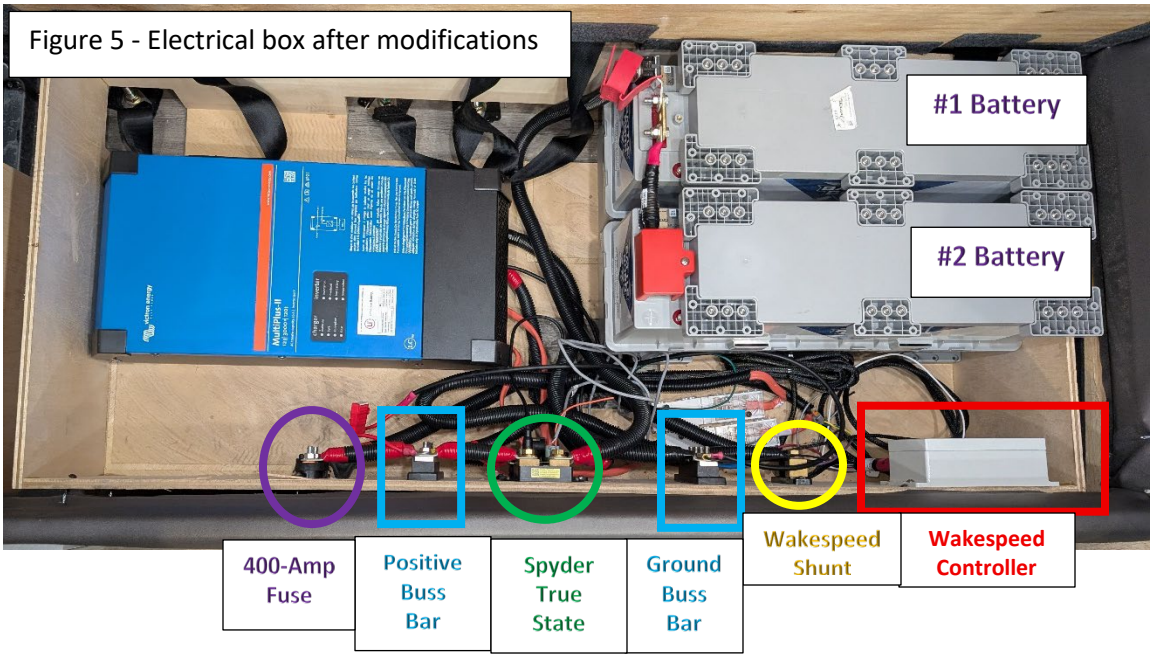


Figure 5 - Electrical box after modifications



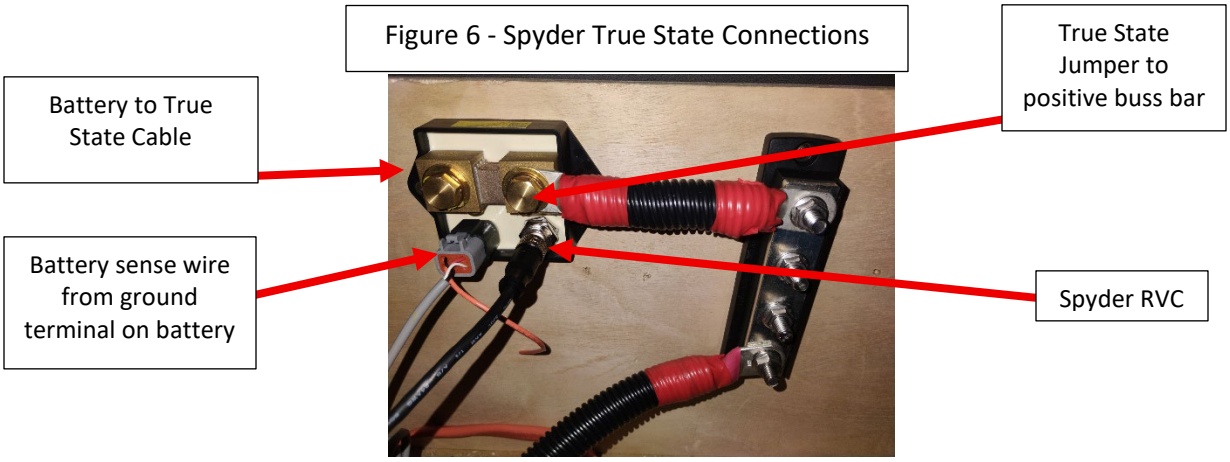
13. 400-amp fuses, see figure 5 purple circle
    - Install one (1) fuse holder part 5001843 and fuse part number 5049265, see figure 5, purple circle.
    - Install one (1) fuse holder part 5001843 and fuse part number 5049265 **below** the Spyder True State, see figure 5 green circle.
14. 4 lug buss bars, part 5176552, see figure 5, blue rectangles.
    - Install ground buss bar between green and yellow circles.
    - Install positive buss bar between purple and green circles.
15. Wakespeed Controller, part number 5149451, to battery box wall, see figure 5, red rectangle.
16. Battleborn battery, part number 5157166, in electrical box, see figure 5 for reference.
    - NOTE: Leaving batteries in an upright position initially will make it easier to tie in wire connections.
17. Battery jumper cable kit part # 5160217 to batteries.
    - Positive connection on the top of the batteries.

- Ground connection on the bottom of the batteries.
- 600-amp fuse holder, part 5079799 and 600-amp fuse, part 5068275 to positive side of #1 battery.

18. Wakespeed shunt, part 5160785, to battery compartment as shown figure 4, yellow circle.
19. Spyder True State (from stepwell), figure 5, green circle
    - Matching the orientation shown in figure 6.
    - Install part 5195335, from True State to positive buss bar.
    - Install the battery sense wire (from step 5), from True State to the #2 battery ground terminal.
20. Install harness 5195719 (400A to alternator)
    - To the 400-amp fuse (shown purple circle figure 5)
    - Route through the hole in the electrical box to the engine compartment
    - Follow the path of existing cables so they are routed correctly and secure as needed.
21. Install harness # 5195729 (ground buss to battery)
    - Connect from the ground buss bar to the negative terminal on #2 battery.
22. Install harness 5195720 for battery disconnect switch.
    - from the bottom lug on the positive buss bar to battery side of disconnect switch
    - Route from the electrical box to the step well, taking care to route away from exhaust.
    - Secure new wire with zip ties as needed.
23. Solar wires
    - Connect the solar wire in stepwell, originally connected to the Spyder TruState, to the battery side of the disconnect switch.
24. Install harness 5195721 in stepwell.
    - Install to common side of battery disconnect switch to the resettable 200-amp breaker.
25. Install harness 5195718 in stepwell.
    - Install from house 250-amp fuse to the resettable 200-amp breaker.
26. Install harness 5195734 in stepwell.
    - Install to house buss bar in stepwell.
    - Route to the electrical box to connect to the ground buss bar, securing as needed.

*****For reference only, the correct set up for the True State connections are shown in figure 5. Do not connect the Spyder True State to battery until all work has been completed!!****

Figure 6 - Spyder True State Connections



Prep new inverter

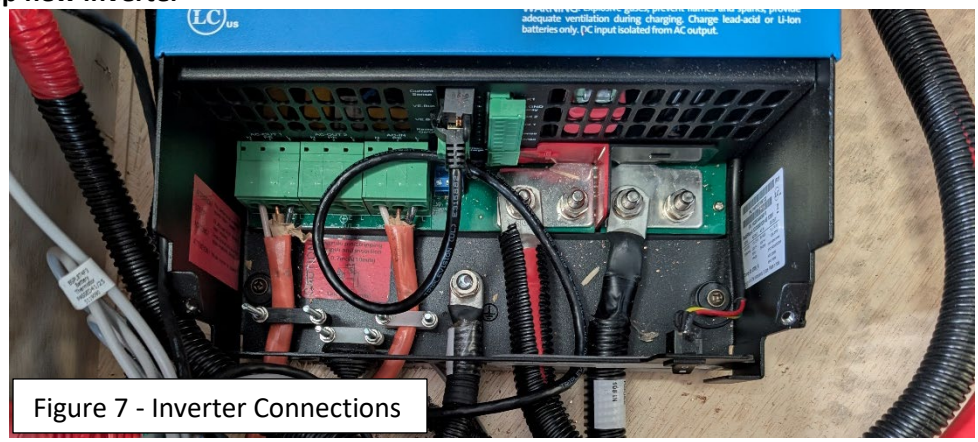


Figure 7 - Inverter Connections

27. Remove covers from inverter, part 5191200.
28. Install the 10-2 wire with Molex connectors.
    - Verify labeling on wire to the correct location for inverter in and inverter out.
    - Route cables through rubber grommets to clamps, securely but do not overtighten.
29. Secure the base of the inverter to the battery box, see figure 7.
30. Install ground inverter wire for inverter to chassis frame.
    - Use scrap 2-gauge wire previously removed from charging circuit, eyelet connectors are needed.
    - Connect the ground lug to the inverter.
    - Route to the chassis frame through electrical box access to chassis.
    - Attach wire to chassis frame with nut and bolt.
31. Reconnect inverter Molex to coach side Molex.
    - Verify labeling on wire to connect inverter in/out cable to the inverter in/out connector.
    - Wrap Molex connectors with electrical tape to secure and secure with screws to bottom of box.
32. Install harness 5195337, to a positive cable lug connection on inverter.
    - Connect to **400-amp fuse found below** Spyder True State module.
33. Install harness 5195731, (inverter to buss)
    - Install from ground buss bar to a ground cable lug on inverter.

Wakespeed Connections

34. Install harness, part 5149452, to Wakespeed controller.
    - The alternator branch of the harness is 27 feet long. Route alternator connection through the hole in the electrical box to secondary alternator bracket.
    - Install an inline fuse holder with a 15-amp fuse into the red wire and connect the wire with an eyelet to the positive buss bar.
    - Install an eyelet to the black wire and connect that to ground buss bar.
    - Yellow/green wire temperature sensor for AGM batteries is not needed, zip tie together.
    - Connect brown ignition wire to the yellow ignition wire in the electrical box with butt connectors.
        - If ignition wire from MB chassis is not present in the box, install 14-gauge wire using butt connectors to the blue and white wire in drivers side floorboard chassis battery compartment.
        - Verify engine wire is routed through the MB installed grommet to chassis battery.
    - Connect the purple and grey wire to the shunt with ring connector as shown in figure 8.

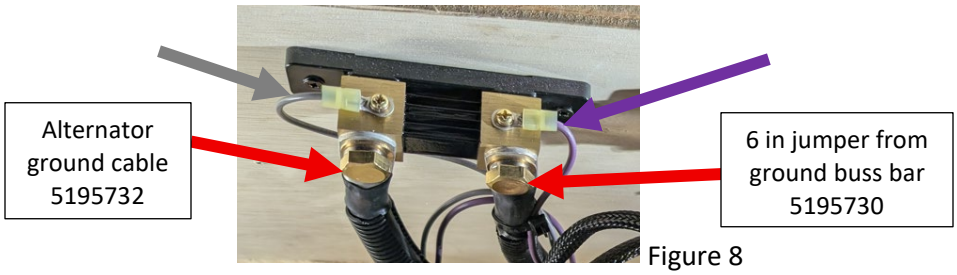
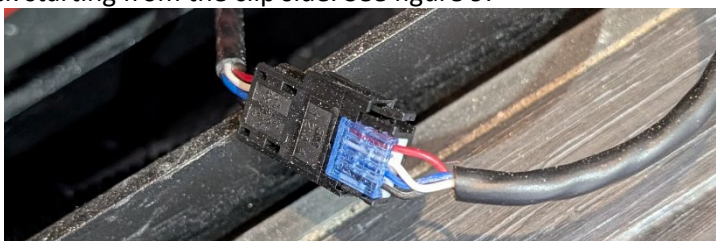


Figure 8

35. Install harness #5195730.
    - Connect from the Wakespeed shunt lug under the purple wire to the ground buss bar.
36. Install harness 5195732 (ground buss to alternator)
    - Connect to the Wakespeed shunt lug under the grey wire.
    - Route through the hole in the electrical box to the engine compartment to connect to alternator.
    - Follow the path of existing cables so they are routed correctly and secure as needed.
37. Install Wakespeed temp sense wire, part # 5186527, to the ground terminal on the #2 battery, and connect to blue temp sensor in Wakespeed harness.

Spyder True State

38. Connect Spyder RVC to the Spyder TruState, see figure 6.
    - Route from the electrical box to the step well and secure as needed.
    - Trim excess wire and install new Spyder connector part 5066157 to RVC, wire sequence red, white, blue, and black starting from the clip side see figure 9.
    - Install new Spyder connector part 5066158 to existing Spyder cable in the step well, Red, white, blue, black starting from the clip side. See figure 9.


Figure 9

    - Connect Spyder cable connectors together.
39. Run the sense wire from the Spyder True State to ground terminal of #2 battery.

Inverter Controller

40. Install part number 5190147, inverter controller.
    - Remove Xantrex controller found in the cabinet above the entry door and discard.
    - Tape up wires, they will not be used.
    - Install cover, part 5196405 to cover hole in cabinet above entry door.
    - Use mounting bracket for controller as template for access in the stepwell side of galley cabinet.
    - Install mounting bracket to cabinet.
    - Cut access hole in floor under cabinet to run wire for inverter.
    - Run CAT-6 cable, part 5035944 from the inverter to the controller.
    - Connect one side of CAT-6 cable to inverter "VE Bus" terminal.
    - Connect other side of CAT-6 cable to port on back of controller.

Transfer switch

41. Verify the wiring from the shore power to the inverter.
    - Connect shore power cord to the motorhome but **DO NOT** plug into the power outlet.
    - Check for continuity on the house harness labeled inverter in
    - If continuity is present, the transfer switch must be rewired.
42. Correct wiring on transfer switch
    - Use sealed junction box, part # 5035742, with Wago connectors, part # 5085443 to connect the breaker box wire to the inverter wire.
    - Secure the junction box to the chassis rail, behind the transfer switch compartment.
    - Connect smart plug cable to "Shore In" breaker on transfer switch.
    - Verify wiring from generator is connected to the "Gen In" breaker on transfer switch.
    - Connect cable removed from smart plug connect to "Power Out" on transfer switch.
43. Verify by plugging in the shore/smart cord and the top breaker should latch.

Refrigerator, # 5191225

****** Clearance in motorhome is exceedingly small. Use protection on floor and extra caution not to damage walls, doors or cabinets while moving refrigerator******

44. Open refrigerator access panel on the exterior of the coach.
    - Disconnect the 110 plug and move the plug behind the cabinet, it will not be reused.
    - Cut the 12 Volt wires connecting the fridge to the coach.
    - Remove condensation line.
45. Remove doorknob from bathroom door for clearance.
46. Disassemble refrigerator doors.
    - Remove top hinge plate from the existing fridge.
    - remove the freezer door.
    - Open fridge door on one side and remove hinge pin.
    - Open fridge door on the other side and pull it out.
    - Remove bottom hinge plate.
    - Remove fridge door.
    - Remove the cover plate and the mounting hardware between the fridge and freezer area.
    - Remove the screw covers and screws on the inside of the fridge and freezer area securing it to the cabinet. Keep screws to reinstall the new fridge.
    - Remove refrigerator from motorhome.
47. Prep new fridge for installation by removing doors and mounting hardware in the same process step 44.
48. Install the new fridge.
    - Be careful to avoid any wire harnesses or plumbing routed through the back of the cabinet.
    - Connect 12-volt power wires to the 12-volt wire terminal on the back of the new refrigerator.
    - Reinstall the condensation line.
    - Secure new refrigerator in place with the screws and install screw covers.
    - Reinstall mounting hardware and doors.

Secondary Alternator Tensioner Pulley and Bracket Installation, if required

49. Install bracket, 5195469 using screws, 5195470, as shown in figure 11 and torque bolts to 15 ft lbs.
50. Install belt pulley, 5197011, as shown in figure 11, #1.
    - Remove existing pulley and keep mounting bolts to reinstall new belt pulley.

- Install new pulley and tighten mounting bolts to 36.9 ft lbs (50 Nm).
- Secure bolts by a quarter turn working in a star pattern, repeat x3.

51. Install the tensioner pulley, 5195418, as shown in figure 11, #4, but do not tighten.

Secondary Alternator installation

52. Install secondary alternator, part # 5176949. Torque bolts to 37 ft/lbs. See figure 10 and 11.
    - Connect positive cable, 5195719 and torque to 18 ft-lbs.
    - Connect ground cable, 5195732 and torque to 18 ft-lbs.
    - Locate blue and yellow (stator) wire connection in the Wakespeed harness and connect to alternator blue and yellow wire connection, making sure to match colors when connecting.

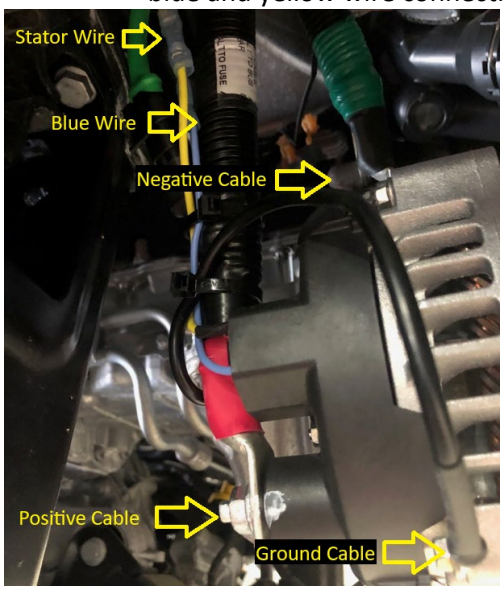
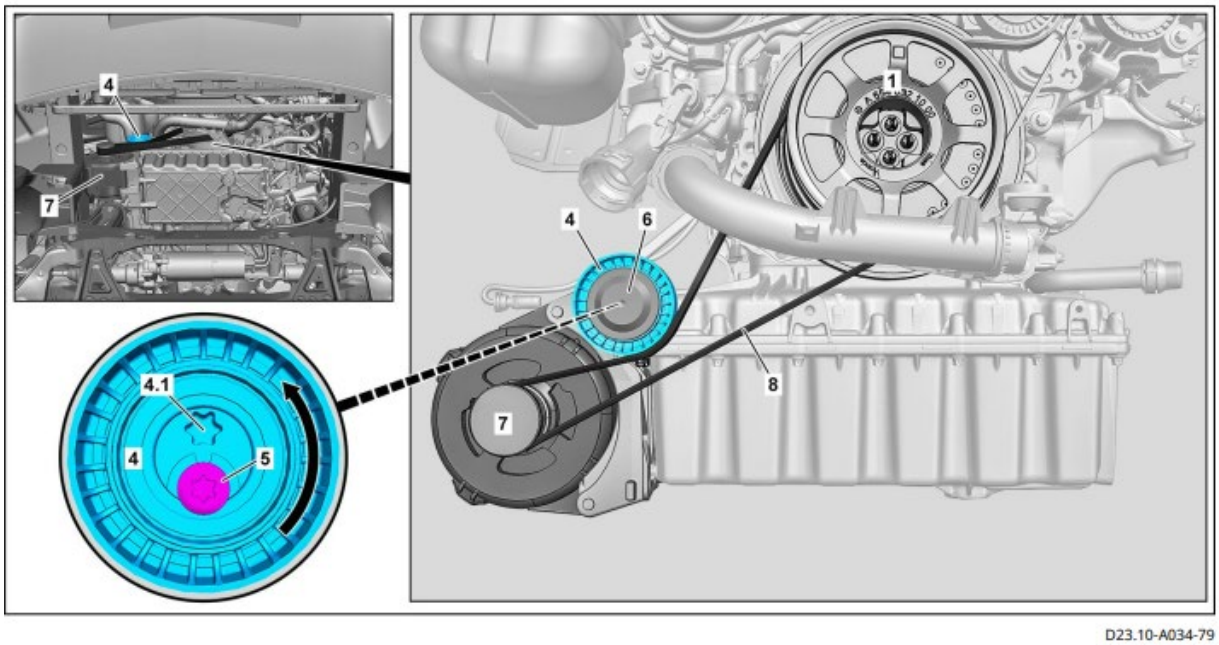


Figure 10



1	Belt pulley	5	Screw	7	Alternator
4	Tensioner pulley	6	Cover	8	Poly-V-belt
4.1	Cutout				

Figure 11

53. Install alternator belt 5152905, reference figure 11.
    - Loosen bolt (5/T45) if screw is tightened.
    - Install poly-V-belt by Positioning the poly-V-belt (8), as shown, on the belt pulley (1), the tensioner pulley (4), and belt pulley of the alternator (7). The belt pulley (1), tensioner pulley (4), and belt pulley of the alternator (7) must be clean and free of grease. This prevents damage and malfunctions. Do not use belt wax or similar products. This avoids malfunctions.
    - Tighten screw (5) to specified torque (initial torque). Ensure correct installation position of poly-V-belt (8). Otherwise, belt drive can be damaged.
54. Swivel tensioner pulley (4) on the cutout (4.1) clockwise (in the opposite direction of the arrow) until the T55 socket is aligned to the **2 o'clock position** and hold. **Do not** tension poly-V-belt (8) too tightly or too loosely. Otherwise, belt drive can be damaged.
55. Tighten screw (5) to 22 ft lbs.

A/C Soft Start

****CAUTION: Follow proper safety precautions to access the roof of the motorhome******

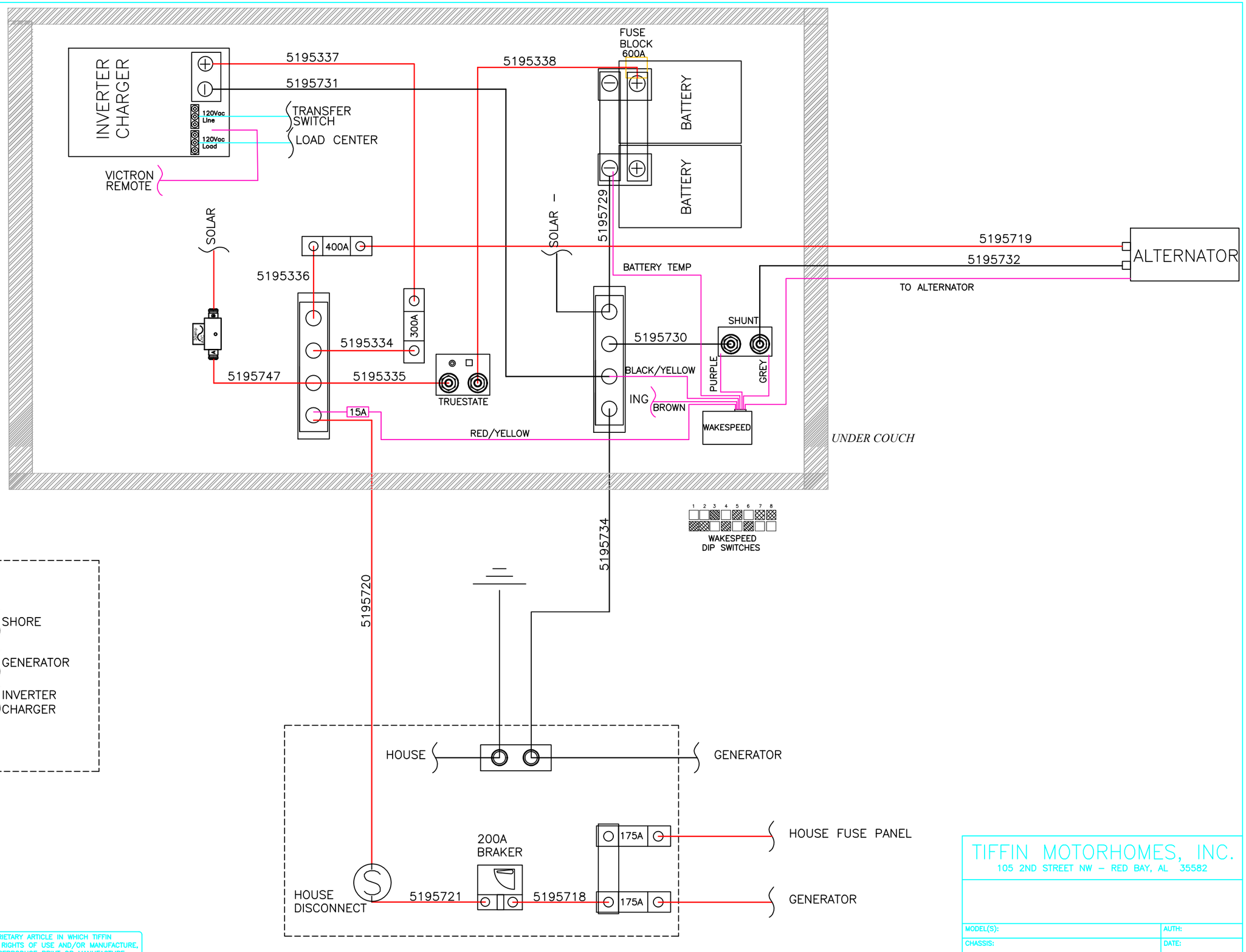
56. Remove cover of A/C unit to verify if a soft start is installed or not.
57. If soft start is needed, install part # 5174989, following the instructions included in the box.

Final Steps

58. Connect the Spyder True state to the battery using part # 5195338.
59. Verify all components are working as designed **after allowing the batteries to fully charge overnight** so that all systems are working correctly.
60. Use expanding foam to seal the electrical box access to the chassis and use silicone sealant as needed to seal any holes.

Description		**Torque (in-lbs.)**
Battery Connection to Inverter	M8	106
Fuse Holder Terminal		110
Circuit Breaker/Disconnect		75
Ground Stud (5/16" - 18)		115
4-Lug Bus bar Terminals		115
Electrical Connections for Bolt Size		110
(Use Only If Not Specified)		110
¼ inch: 50 – 75 (6-8 Nm)		110
3/8 inch: (20-25 Nm)		110
½ inch: (28-40 Nm)		110
BMS Stud Mounting		110
Bolt		110
Battery Terminals		105
Battery Disconnect Switch Terminals		96 (8' -lbs.)
Starter Terminals	M12	240 (20'-lbs.)
	M6	30
Starter Terminals	M12	240 (20'-lbs.)
	M5	36





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REV#	DATE	ECN#	DESCRIPTION	BY
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TIFFIN MOTORHOMES, INC.
105 2ND STREET NW – RED BAY, AL 35582

MODEL(S):		AUTH:
CHASSIS:		DATE:
MAT'L#	DWG# –	STATUS:
		SHT# 01 REV#