Battery Relocation/Electrical Mods 2022 T@B 320 CS-S

Parts list

12V 100AH Lithium Battery: (This was my choice. Whatever size and brand battery you want that will fit in the space) https://www.amazon.com/dp/B0CSKCM593?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1

Mini distribution bars (2 sets):
https://www.amazon.com/dp/B0D2NDXQHN?ref=ppx_yo2ov_dt_b_fed_asin_title

Cigarette Lighter Waterproof Socket:
https://www.amazon.com/dp/B0D4DJ7WF4?ref=ppx_yo2ov_dt_b_fed_asin_title

Hole saw for metal: https://www.amazon.com/dp/B076QC5BWR?ref=ppx_yo2ov_dt_b_fed_asin_title

100 foot (50 ft red/50 ft black) of 10-gauge wire that came with some inline fuse holders, connection rings, and some shrink wrap: https://www.amazon.com/dp/B0D2NR5W75?ref=ppx_yo2ov_dt_b_fed_asin_title

Heavy Duty Crimping Tool: https://www.amazon.com/dp/B0DNJDKH2F?ref=ppx_yo2ov_dt_b_fed_asin_title

Battery Tie Down Kit: https://www.amazon.com/dp/B0019LZZCM?ref=ppx_yo2ov_dt_b_fed_asin_title

Galvanized Corner Brace (to keep battery from sliding other direction from tie down):
https://www.amazon.com/dp/B0D3KZLVPL?ref=ppx_yo2ov_dt_b_fed_asin_title

Battery Cutoff Switch: https://www.amazon.com/dp/B07T288VN8?ref=ppx_yo2ov_dt_b_fed_asin_title

Ring Terminals 12-10 AWG 3/8 Inch Stud Tinned Copper Insulated Crimp Connectors UL Certified Wire Lugs Rated 600V 221°F: https://www.amazon.com/dp/B0FNW86L9C?ref=ppx_yo2ov_dt_b_fed_asin_title

RTV-516B25 Vinyl Ring Terminal (5/16" Stud, Blue 16-14 Gauge):
https://www.amazon.com/dp/B01L88IKEK?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1

RTV-516Y25 Vinyl Ring Terminal (5/16" Stud, Yellow 12-10 Gauge):
https://www.amazon.com/dp/B01L88ILN0?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1

Heat Shrink Butt Connectors 12-10 AWG, Waterproof Electrical Crimp Splice Terminal for Auto Repair, Insulated Marine Grade Connector for 12,10 Gauge Wire, Wiring Crimps Terminals, Yellow:
https://www.amazon.com/dp/B0D6B4V2LN?ref=ppx_yo2ov_dt_b_fed_asin_title

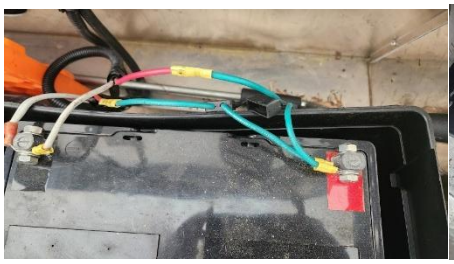
Junction Box, Reserved Holes Electrical Boxes Waterproof IP65 ABS Plastic Electrical Power Cord Enclosure Project Box Black 3.9 x 3.9 x 2.8 inch(100x100x70mm):
https://www.amazon.com/dp/B0D75Q8HKB?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1

RTV-10Y25 Vinyl Ring Terminal (#10 Stud, Yellow 12-10 Gauge):

On-hand – Shrink Wrap Heat Gun, various zip ties and colored electrical tape for marking, wire cutters, drill, various bits (drill bits, screwdriver bits, robertson bit), pen, cell phone for pictures and magnification.

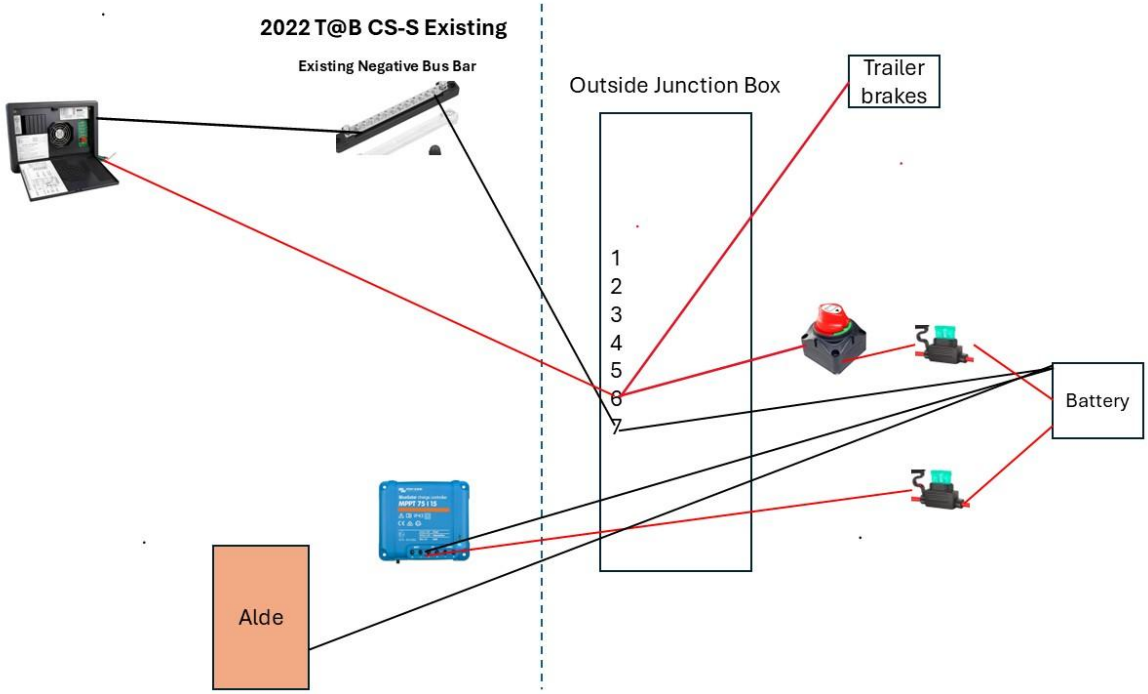
Electric task light with extension cord – Working inside the T@B with all the power disconnected inside a garage was a bit dark in there.

Step 1: Disconnect 30-amp power, turn off circuit breakers in converter, turn off battery switch, remove old battery and box from tongue box. Mark the set of wires going to the battery cutoff switch.

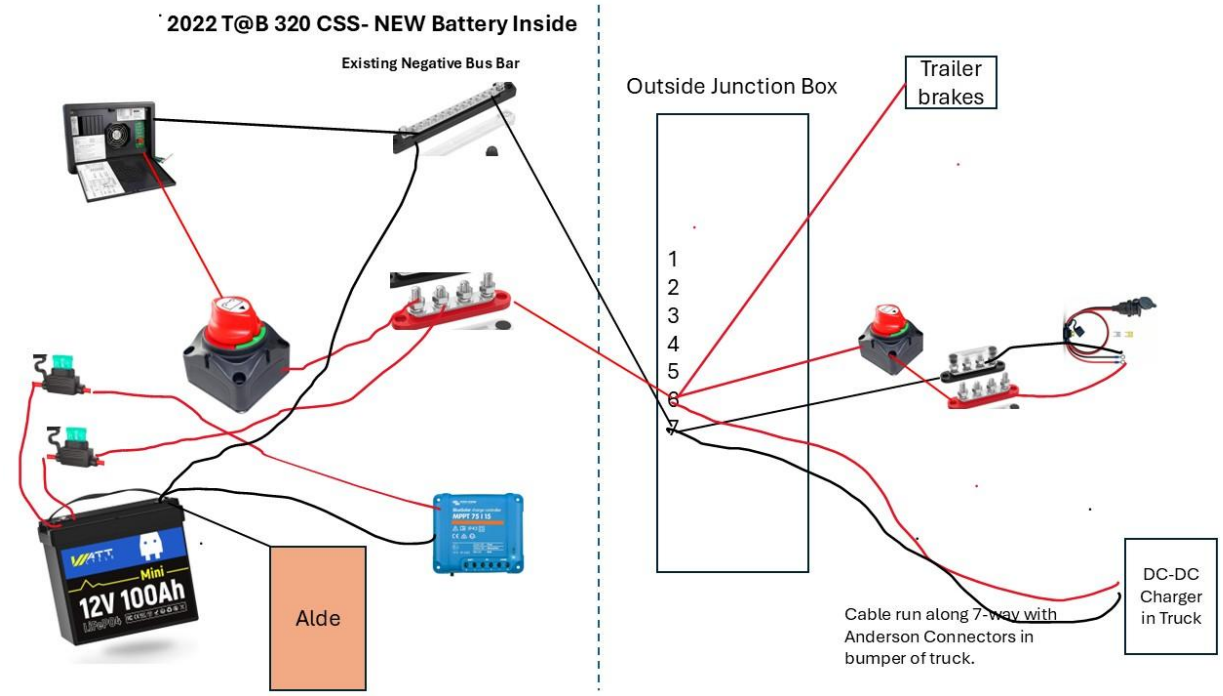




Step 2: Consult forums, and determine final wiring plan.

(Original wiring from factory)



(New) (Straight Lines are existing or relocated. Curvy lines are new wires)



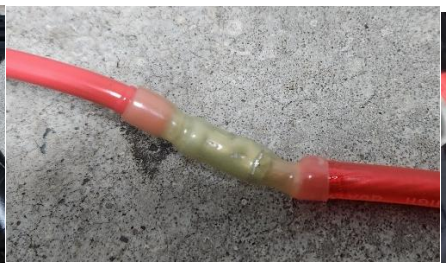
Step 3: Determine new battery location and secure (Under door side bench):

Step 4: Lay out wire lengths and cut

Step 5: Strip wires, connect, and crimp ring connectors. The ring connectors for the battery cutoff are bigger than the ring connectors for the distribution bars and battery. (make sure you put a piece of shrink wrap on the wire before crimping).


Step 6: Strip wires, connect, and crimp butt connectors.

Step 7: Use Heat Gun for shrink wrap and butt connectors.


Step 8: Remove Victron Charge Controller from wall (four screws)

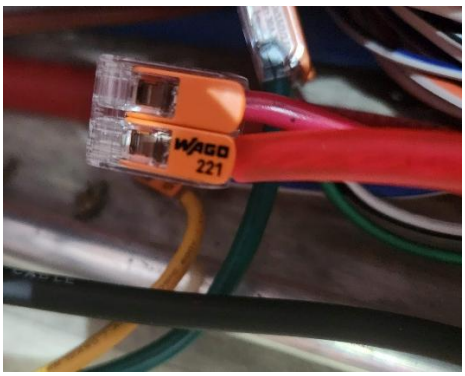
Step 9: Remove Existing BATT wires from Victron Charge Controller. (You need a tiny flat head screwdriver)

Step 10: Drill hole in driver side bench cabinet to run wires to new Battery Cutoff (or any desired location)

Step 11: Install small distribution bar (red) in floor of T@B

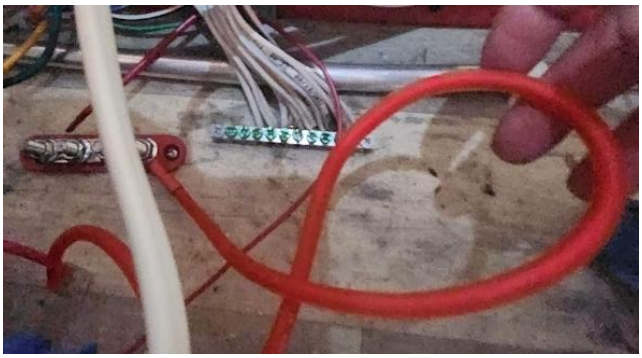
Step 12: Remove existing quick-connect from Red Wire coming from converter

Step 13: Add extra wire length with battery cutoff ring one the other end using same quick connect. (My hands are not strong enough to crimp a butt connector in that small space.) (I tried it twice and it pulled loose mid-crimp each time).



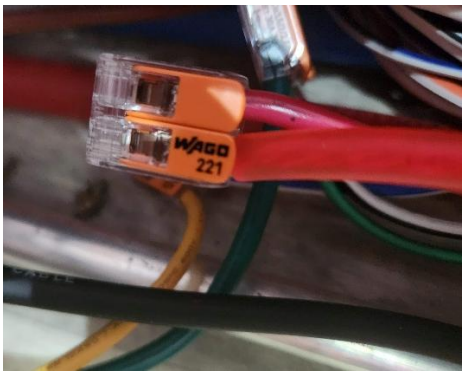
Step 13: Connect to new Battery Cutoff.

Step 15: Install new wire from Battery Cutoff to small distribution bar.



Step 16: Secure battery cutoff to bench wall. (or desired location)


Step 17: Install original red battery wire going to front junction box to small distribution bar. I added a bit of an extension using a Wago connector. (My hands are not strong enough to crimp a ring connector in that tight space).

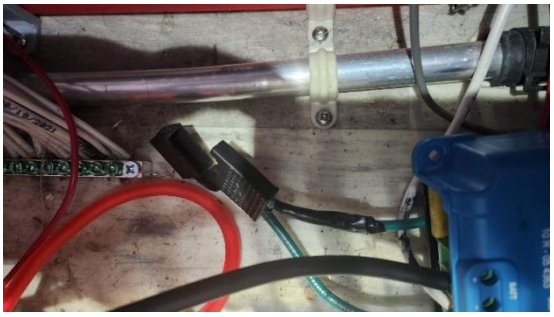


(NOTE: On the below steps, don't connect wires to the battery yet, just route them to the vicinity of the battery)

Step 18: Install new positive battery line on the small distribution bar, route to positive battery terminal with inline fuse connector near battery.

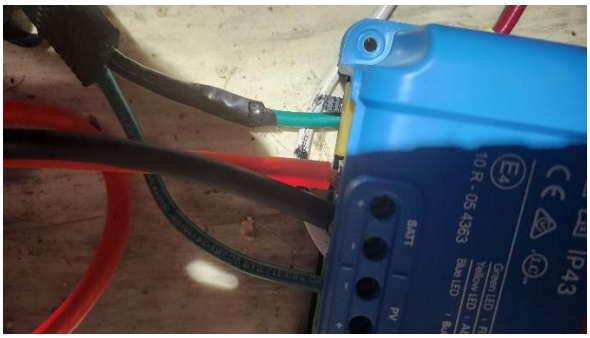
Step 19: Install new negative battery line on existing negative ground bus bar, route to negative battery terminal.

Step 20: Remove inline fuse from “PV” connection on Victron Solar controller.



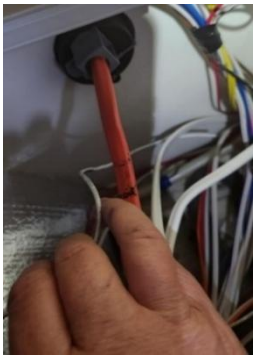
Step 21: Install negative line on BATT connection on Victron Solar controller, route to negative battery terminal

Step 22: Install positive line on BATT connection on Victron Solar controller with inline fuse near the battery, route to positive battery terminal. Pull and replace 20 Amp fuse in the bottom of the solar controller before mounting back on the wall. (Mine had actually blown, and I had to pull the controller off the wall “again” and found the blown fuse).



Step 23: Secure Victron Solar controller back to wall.

Step 24: Cut negative from Alde going to old battery. (I traced the wire all the way to the area where it went through the wall and cut it there)



Step 25: Shorten Alde negative wire as needed. Add ring connector with shrink wrap to Alde negative wire. Route negative from Alde to negative terminal on new battery.

Step 26: Pull negative wire in the front bin that used to go directly to the Alde through the wire chase and cut. (It pulled quite easily. If it had not, I would have just cut it)

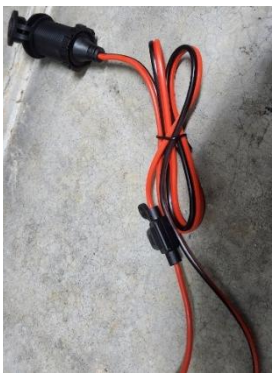
Step 27: Reinstall front bin.

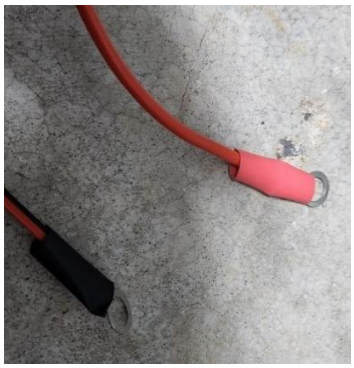
Step 28: (Optional) enclose old wires from solar controller in a small waterproof electrical box in back of front bin just to keep them out of the way, and not contacting with anything. I had to cut off the inline fuse connector, but just dropped that in the box also. Seal off the other end of the old solar wires inside the trailer with shrink wrap, and secure out of the way. If you want to add an SAE connection to your front bin for portable solar panels, leaving those wires to add another controller may be beneficial.

Step 29: Install positive and negative distribution bars in bottom of front bin.

Step 30: Install original negative battery wire to negative (black) distribution bar. Install original positive battery wire to positive (red) distribution bar.

Step 31: Cut small rings off 12V socket, add new larger rings to 12V socket. Heat up shrink wrap.





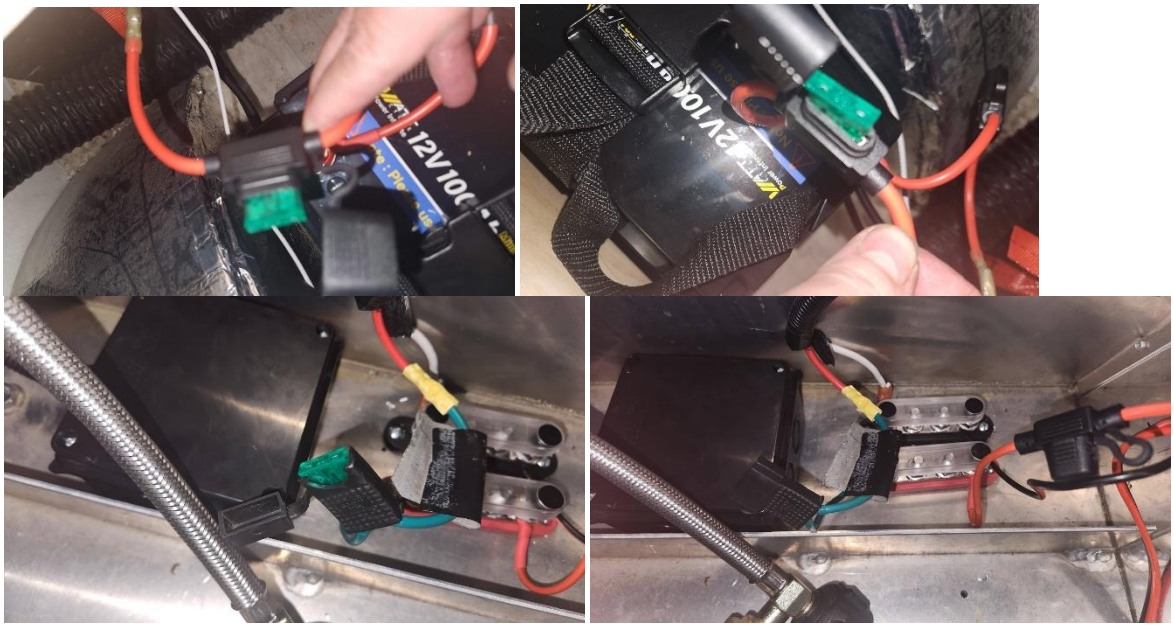
Step 32: Drill a 1” hole in desired location of the front bin to accommodate the 12V socket and secure.




Step 33: Connect 12V socket to positive and negative distribution bars.


Step 34: Go back to the battery connection steps and connect the positive and negative wires to the battery terminals.

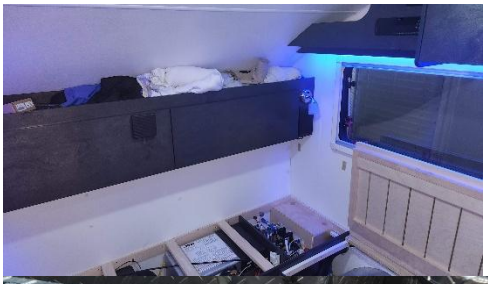

Step 35: Install 30 Amp fuses into inline connectors near battery, and 30 Amp fuse into inline connector at the front junction bars. Install the 10 Amp fuse provided with the 12Vsocket.



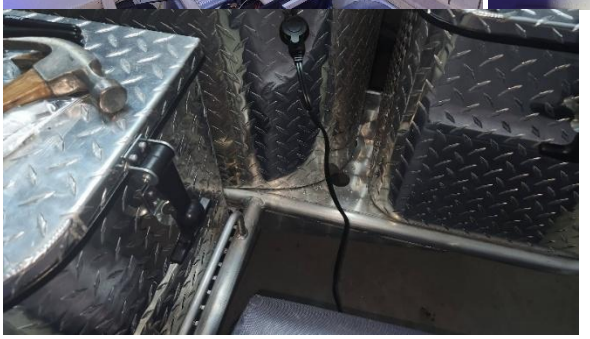
Step 37: Turn on battery disconnect switches.

Step 38: Check on your Victron app that it can “see” the charge controller. Go into the settings under battery, and change the battery profile to LifePo4 Lithium.

Step 39: Everything 12V should work now. (The solar panels are purposely still disconnected via the fuse on the “PV” line due to recommended connection/startup order).

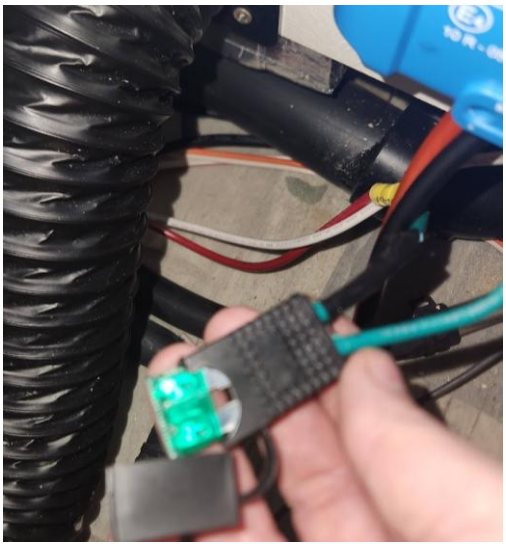




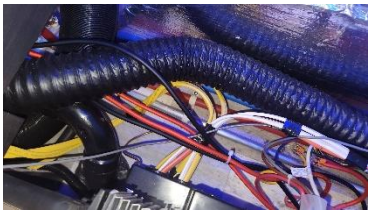


Step 40: To allow the WFCO 8735 AD converter to recognize that you have a lithium battery, run some lights and maybe the fridge, and allow the battery to drop to 10%, then connect shore power to charge the battery. (Turn on circuit breakers in converter if you had turned them off) (Do this for 2-3 cycles.) If that doesn’t work, you can request a “jumper” from WFCO to force the converter to work with Lithium.

Step 41: Put the inline fuse back in at the Victron Charge controller. The solar panels should now work if you are outside in sunny weather.



Step 42: Use zip ties, wire chases, and loop tie downs to bundle, clean up, and organize wires as desired.



Step 43: Test everything on battery, shore power, and move outside if not already to test solar charging, etc.

Step 44: Clean up as needed, put bench lids back down and put in cushions/bedding, etc.