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Saturday, Oct 21, 2023

← *RAKO STUDIOS* →

## Ryobi ZT480ex battery replacement

Replacing the four 100 Amp-hour lead-acid batteries is tricky, what with Ryobi incompetence.



The "ZT" in the model name is for "zero-turn". This 42" mower worked fine on my 1/3 acre of grass for four years and three months. I got the 100 AH model supposedly good for two acres, knowing that was BS. Some guys need new batteries after a year. I cut the grass once a week. I usually have 50% on the charge gauge when I am done. Rather than hack in lithium automotive batteries I not only stuck with lead

acid, but bought the exact brand from Home Depot, for \$239. There are cheapos that weigh about the same, but I figured to stick with OEM. I might hack in Lithium ion 100 AH LiFePO4 batteries next time. They are supposed to last longer, but you need a new charger and charge gauge on the mower. They are half the weight, but some guys had the tires slip with so much less weight.





The four 76-pound batteries slide out of a tray towards the back of the mower. It's a pretty kludgy setup, Ryobi hacked a lot of stuff.



Be sure to engage the brake. Be sure to take it off when you try the new batteries.



Slide the seat back so it tilts all the way up.



There is a cover under the seat with four tabs you can compress and lift off the cover.

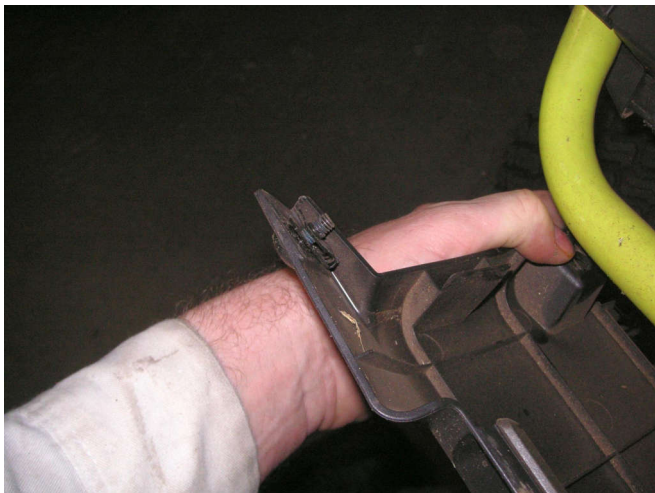


Use a T27 Torx for the four screws. These top two just ripped the J-nut out of the plastic.

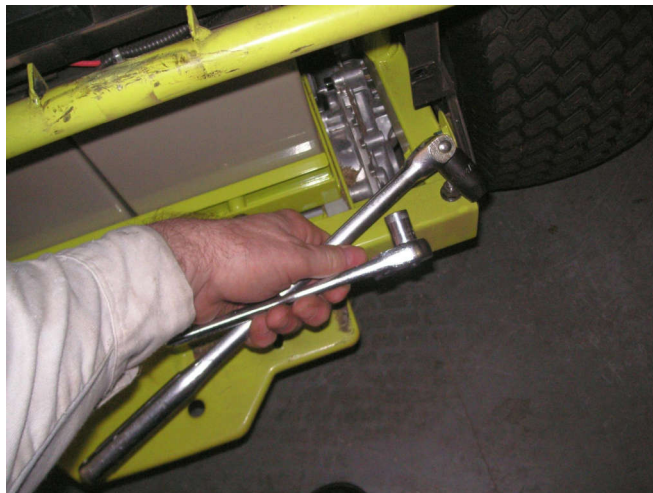


There are two more screws halfway down. I lost these J-nuts, never to be found.





Here is the top screw with the J-nut ripped out. There is so much torque on these it just rips the J-nuts out of the thin plastic where they clip.



The tow bar bolts are so tight, I had to get a breaker bar. Use 1/2" and/or 13mm. There are nuts underneath so you need two wrenches.



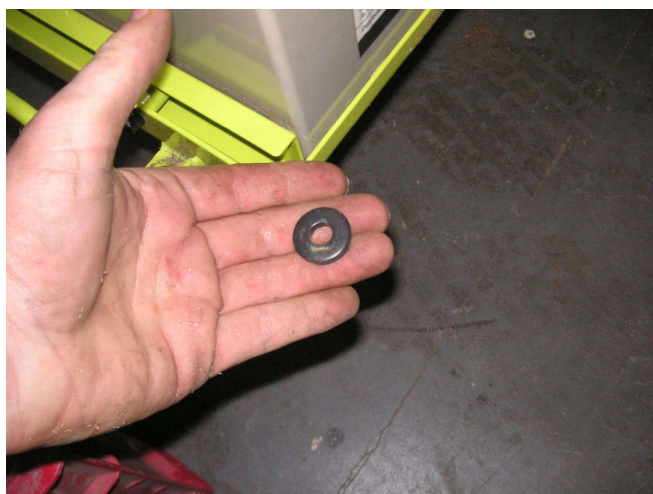
Incompetent hooks on the bottom. Just force the panel off, I could not get mine to drop down.



The battery tray is also 1/2" or 13mm. Note the black spacer washer underneath. Incompetent.

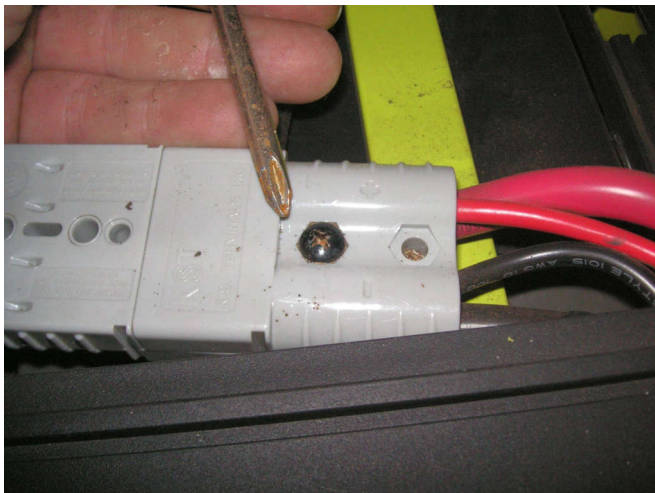


Constantly blow off the dirt as you work.



Here is one of the spacer washers.





The main power is under that cover beneath the seat area. Philips-head screw. Incompetent, they should screw down the other side.



This is a cut-out connection to disable the mower when you are charging. Incompetent, should be part of the chassis, not the tray.



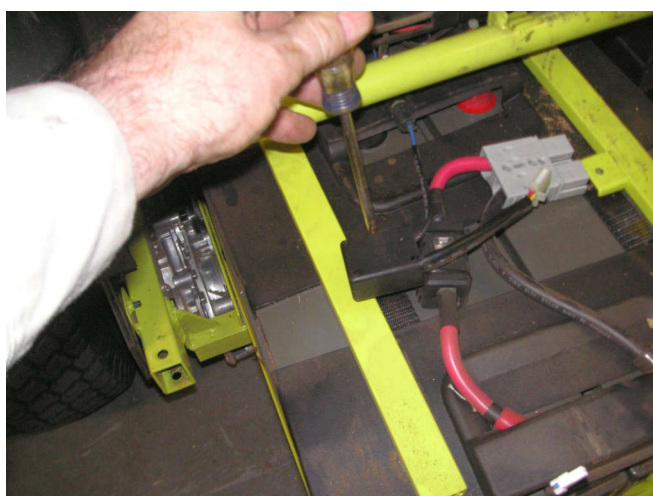
A 1/2" or 13mm takes out the center bolt so you can slide the batteries back.



White connector from thermistor to charge port.

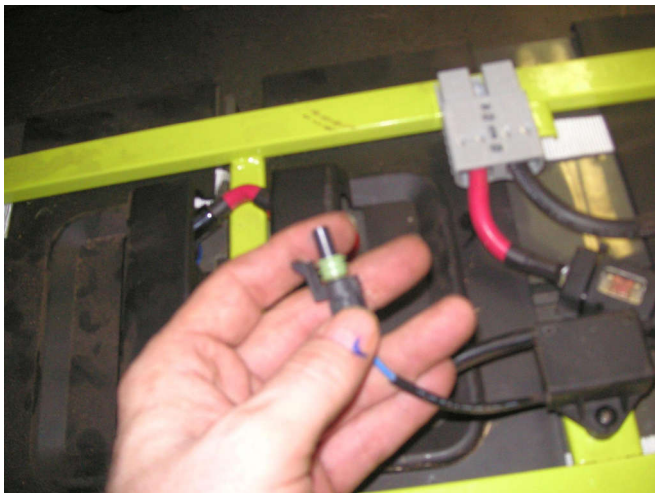


Here is the long bolt that holds down the batts.

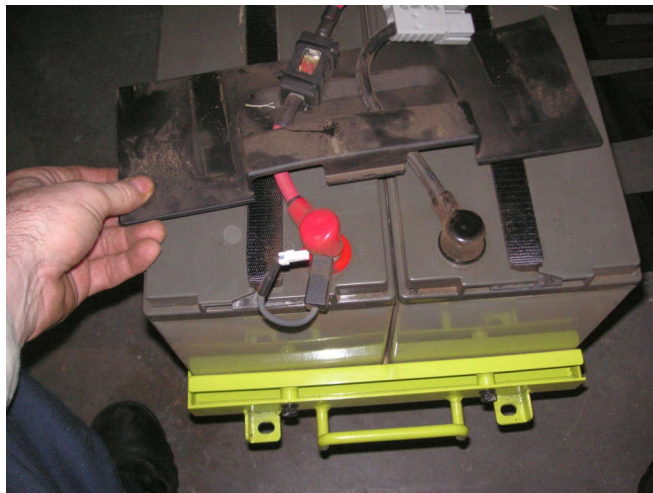


Cutout box has blue wire to connector to the charge port. It might come out sooner.





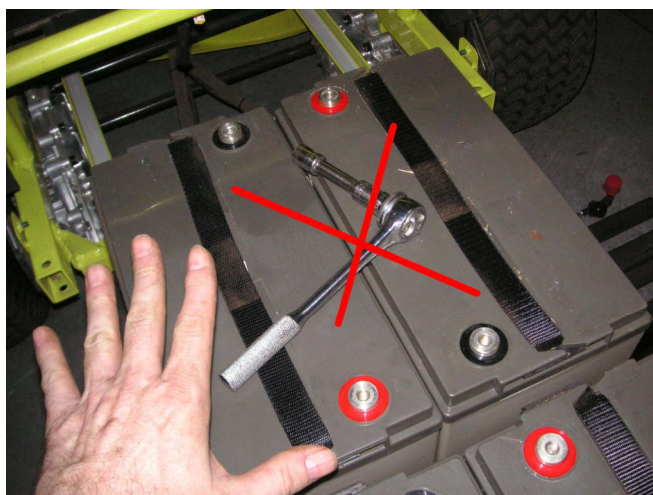
This is the connector I forgot. Not sure if you can get it out before sliding the tray.



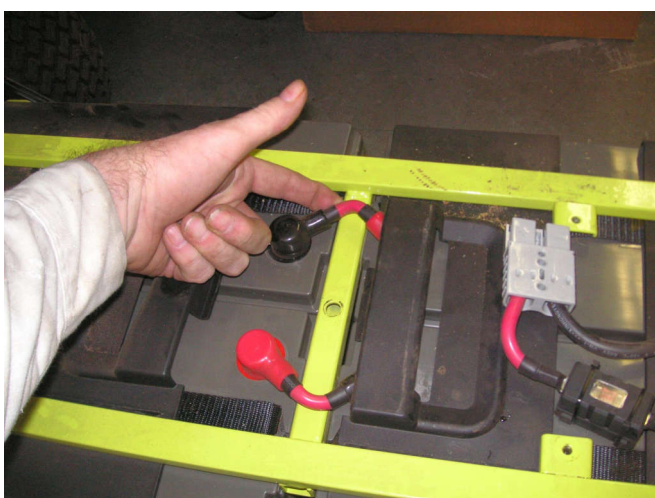
Semi-incompetence, the terminal cover captivates the cables.



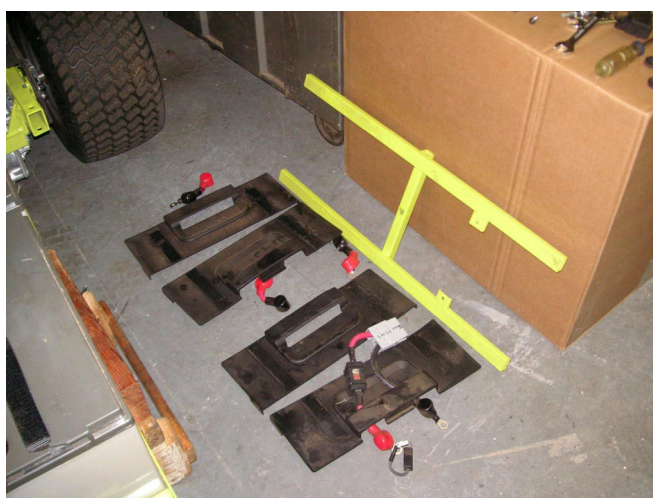
Make something the exact height to hold the batteries. Don't trust a floor jack.



**Never** get in the habit of putting metal tools on top of batteries. **Never**.

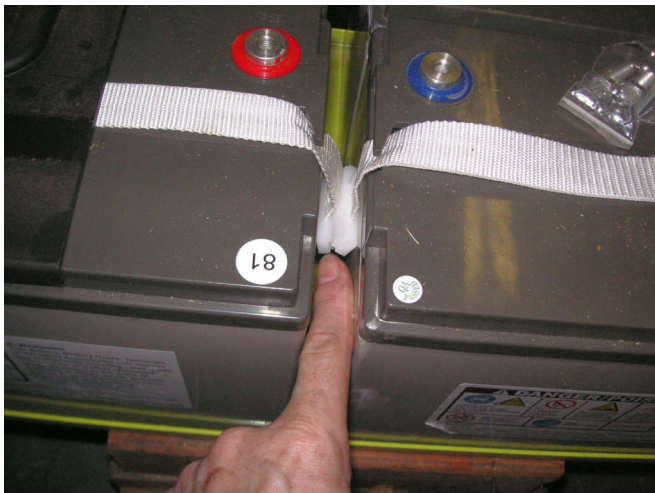


Incompetence, the battery hold-down is captivated by the cables. Don't forget.



I set the cables, covers and hold-down in order. Hold-down is not symmetric, note the two tabs.





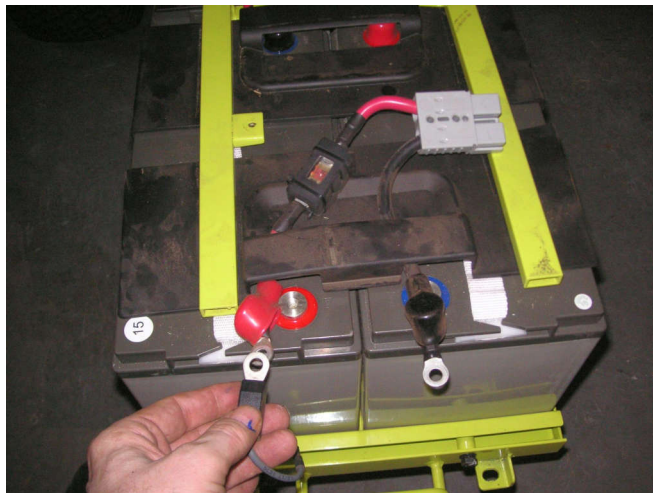
I replaced the batteries one at a time so the tray didn't tip over. Tuck the straps in like this.



Front cables on with new bolts supplied with batteries. Cover in place, straps nice and flat.



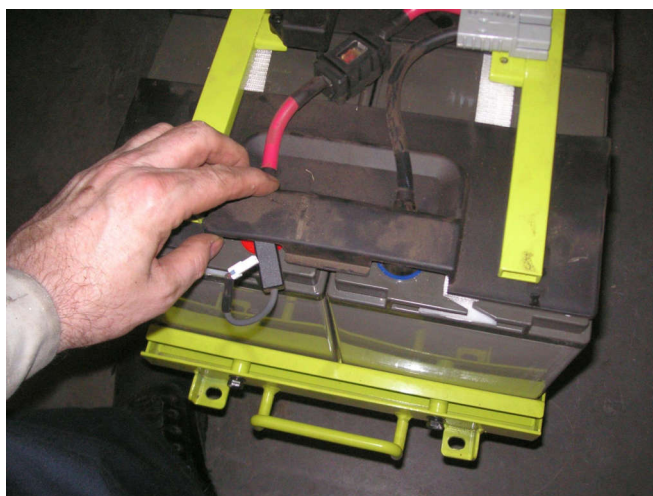
Remember, tabs to the back. Covers slid back, then the hold-down, then put on the cables.



You can lift the hold-down a little and slide in the cover-terminal captivated assembly. The thermistor box goes on the main output terminal. Make all the cable bolts pretty tight.

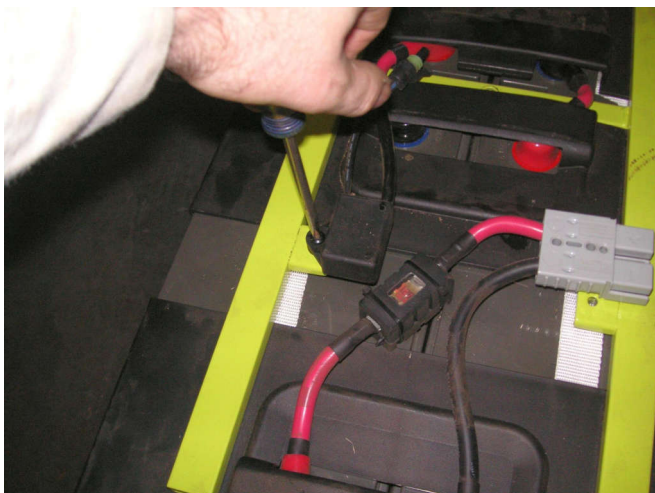


I twisted it to drop down into groove on batt.

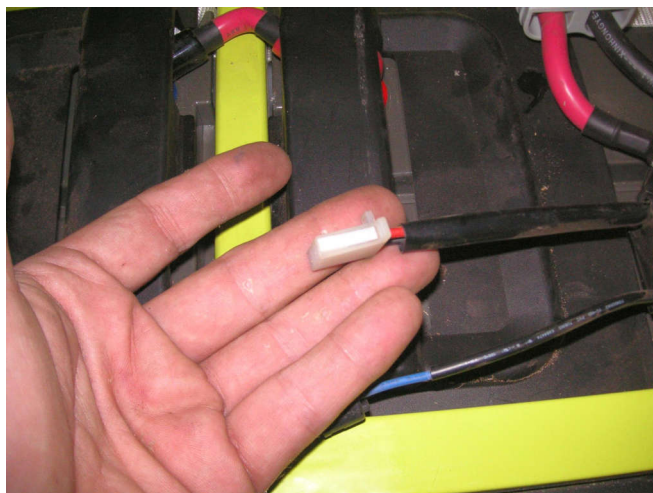


Now you can slide the cover forward.





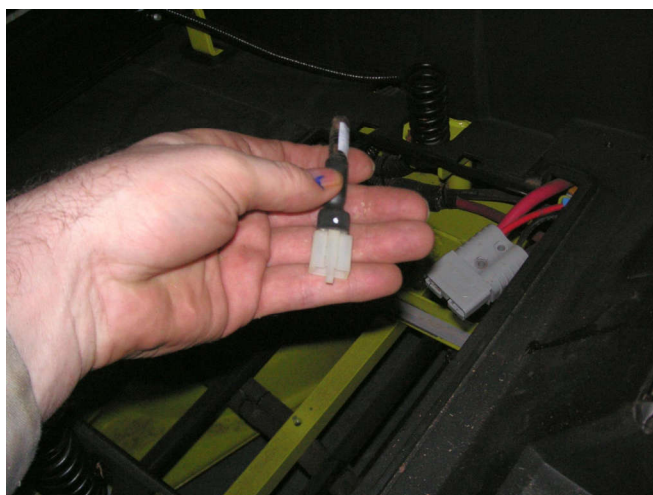
Philips-head screw holds in the cutout box to the left tab. It might go in after tray is in.



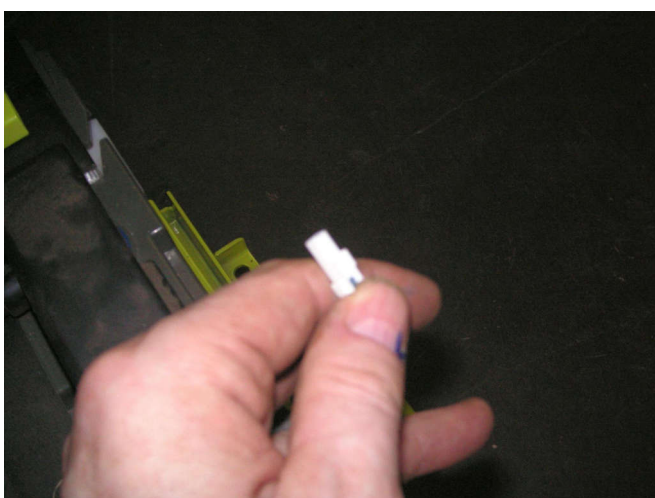
This is the cable that goes to the cutout box. I think I might have taken this out before moving the tray.



The charge port has a black connector for cutout sensing, a white one for the thermistor.



Here is cutout connector cable under the seat.



This is the white connector coming off the thermistor box on the battery output terminal.

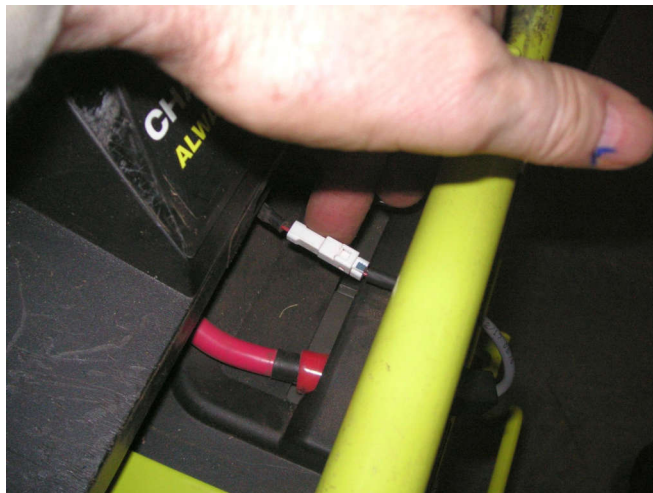


I picked the tray up and started in the slides. Be sure to clean so the tray slides all the way in.





This is where I hooked up the black round connector between the charge port and cutout.



With the tray almost in, I connect the thermistor to the charge port wire.



I mess with the connection here.



I connect the other cutout box wire to the cable.

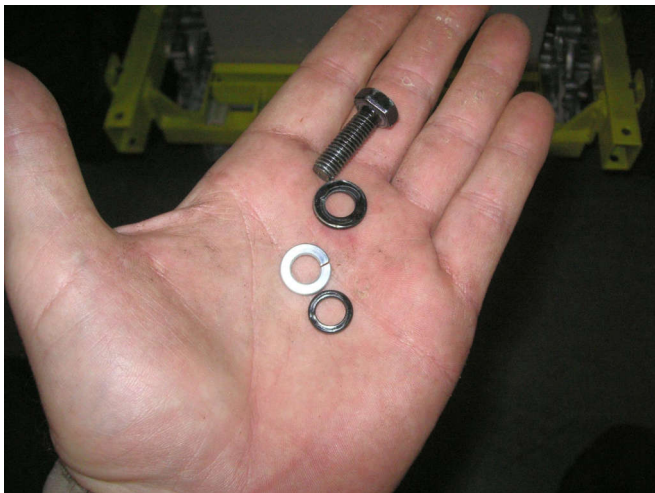


The cutout box barely slips under the cover. This is why I think I was supposed to leave the box off until the tray was all the way in.

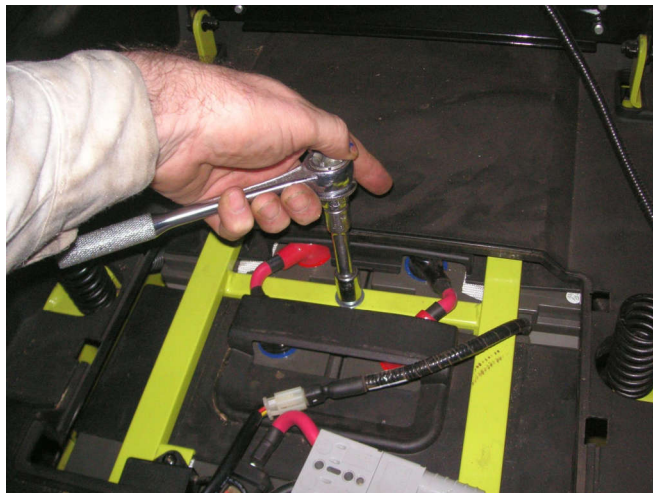


Philips-head screw secures the main power. If they screwed in the other side, it would be secure as you slide it out, but might not fit.

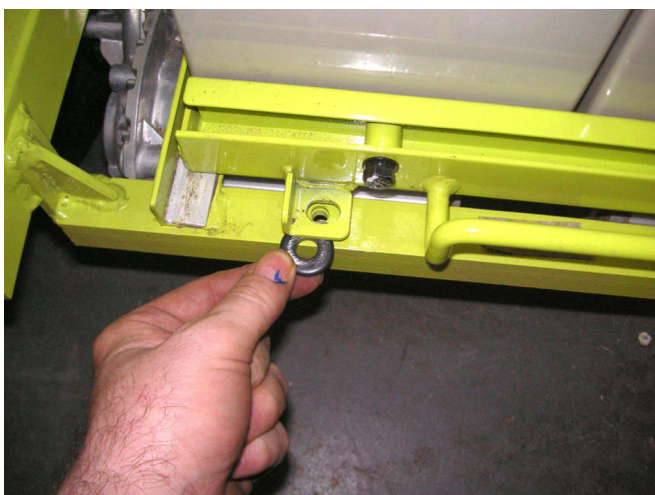




I used 1/4-20 lock-washers to replace the wimpy Chinese lock-washers..



The center hold-down bolt went in easier than I thought it would.



Clean the front of the tray so it slides forward, these bolts went in half cross-threaded.



I pre-charged the batteries with a [12-V charger](#). The gauge is 100% and ready to go. I did top them off with the 48V charger.



For the long bolt, I used 1/4-20 lock-washer and a decent washer to spread the load.

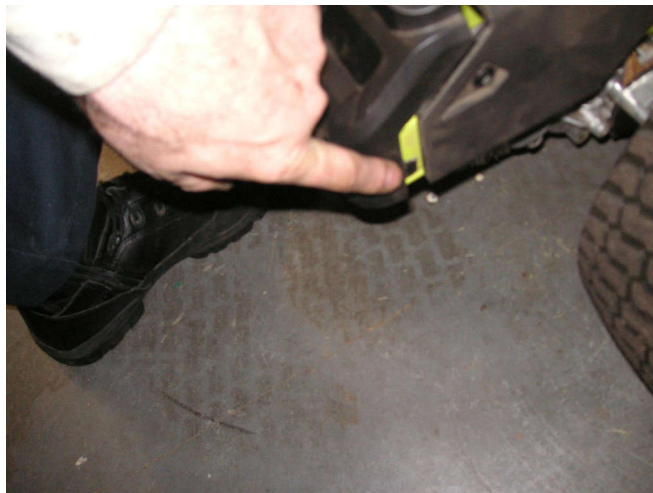


Tow bar goes back in with two wrenches.

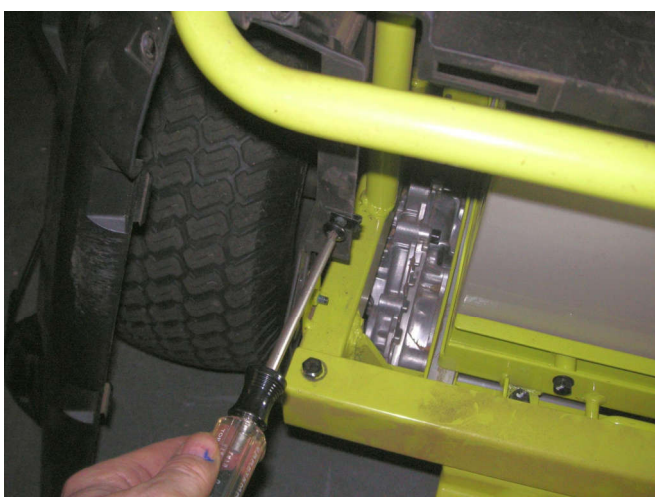




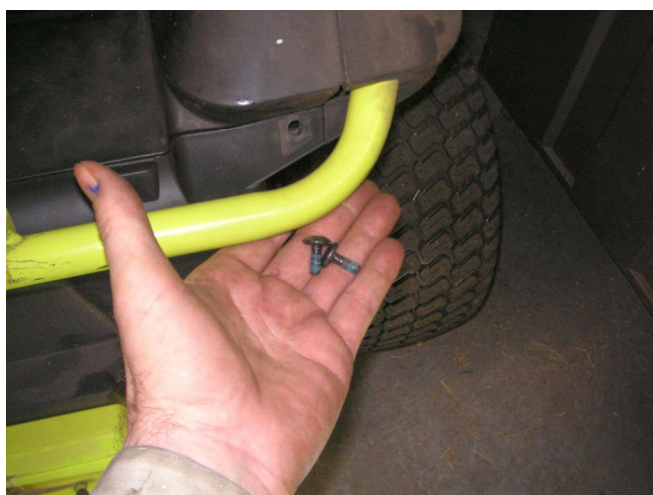
Rear cover misery. I get the two J-nuts off. They just ripped out the thin plastic.



This is the cut tab where it goes into the panel.



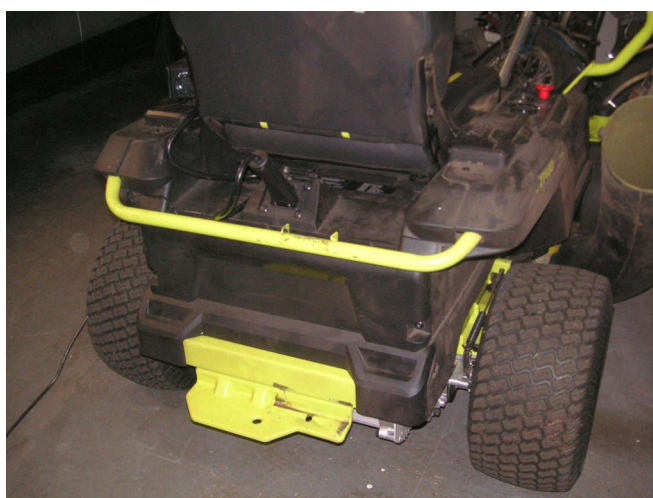
I lost the lower J-nuts, so used the top one, and pre-tried them since they were hard to start.



I never did use the top two screws. I lost two of the J-nuts and was never sure I could get them to hold on the broken plastic anyway.



That goofy J-hook on the bottom of the rear cover would not go in, so I broke it off.



All buttoned up ready to get the bagger. The job went pretty fast, about three hours.





The aftermath. Way more tools than I thought I needed, and a Makita flood-light to see.



The mower with the bagger, ready to cut the lawn. Note [Henschel Aussie mesh breezer hat](#).



I went to cut the grass and the mower would not drive. I forgot to take off the brake.



Here are the four old batteries. The mower charger stopped working after I dropped it, so I got [an aftermarket one from Amazon](#). Batteries go to the dump for recycling.

I figure to run these for four years, and then maybe try lithium. The mower would have the blades stop for no reason, and then the mower would die until I cycled power. That happened once, even though the aftermarket charger seemed to work, though it would not terminate. I figure four years is pretty good for lead-acid batteries.

I was disappointed in my first cut with the new batteries. The state-of-charge got to 60%. I have had it as good as 65%. We shall see after a few cycles. Even when the factory charger would work, it would only charge to 70%. I read to disconnect and re-connect a day before, and then I could get the gauge to read 100%.

The nice thing was the 48V aftermarket charger terminated and said "Full" when I topped off the batteries. This only took a few minutes since the batteries were pre-charged. I used a [2A NOCO gang charger](#), but it would not terminate the 100 AH batteries. It is rated for 40AH max, though they don't tell you in the Amazon listing. That is why I did not set up the mower to gang charge the batteries individually.