

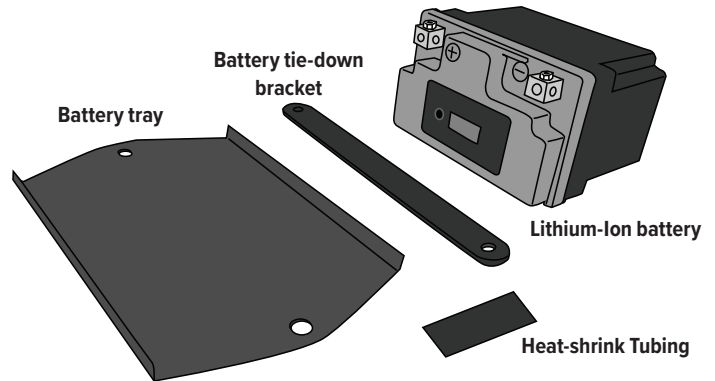
Assembly & Installation Instructions

WHAT'S INCLUDED IN THE RETROFIT KIT

- Replacement Lithium-Ion battery
- Battery tray (new base plate)
- Battery tie-down bracket (top plate)
- Heat-shrink tubing

TOOLS YOU'LL NEED

- 7/16" socket and ratcheting wrench set
- Needle-nose pliers
- Standard slip joint pliers
- Mini heat gun
- Flathead screwdriver
- Safety Glasses & Gloves
- The trickle charger from your old battery pack



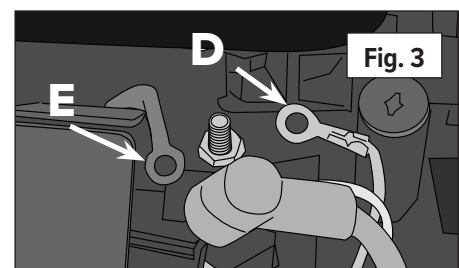
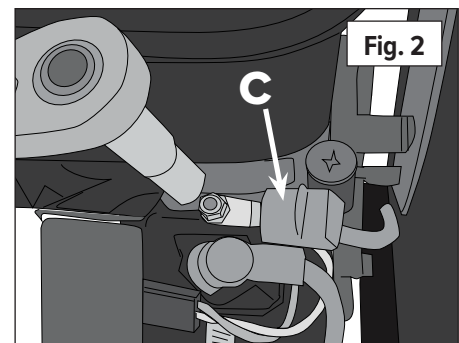
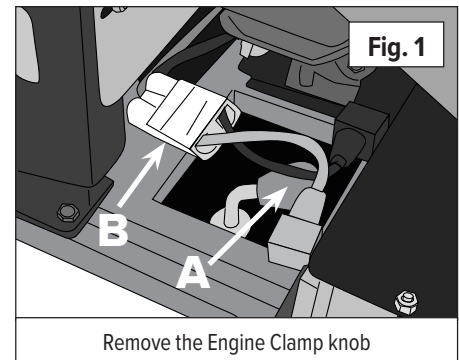
PREPARE THE ENGINE

1. Park your Cyclone Rake on a flat surface and turn the system completely off.
2. **(Fig. 1)** Remove the FRONT engine clamp knob **(A)** and then carefully unplug the gray cable connector **(B)** from the battery harness and remove the battery pack from the Cyclone Rake and set it aside.
3. Remove REAR clamp knob and then remove the Engine Unit from the Chassis.

CAUTION: The engine unit is heavy. You may need assistance.

4. **(Fig. 2)** At the **key side** of the engine, locate and push back the **red square terminal boot (C)** to reveal the **nylon lock nut** that secures the connector. Then, use the 7/16" socket to remove the lock nut and the ring terminal of the thick red wire.
6. **(Fig. 3)** Next, use the 7/16" socket to remove the **regular nut** to release the ring terminal from the **thin orange wire (D)** and then release the ring terminal of the thin **red alternator wire** that is connected under the gas tank **(E)**. **Note: the red alternator wire may be covered in black tape.**

NOTE: Save these nuts.



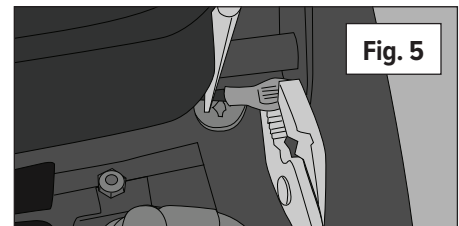
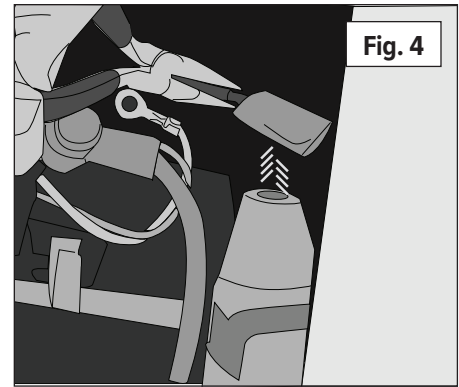
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7. Next, use the needle-nose pliers to hold the red alternator wire so you can see the ring terminal. Slide the piece of heat shrink tubing onto the ring terminal **MAKING SURE TO COVER ALL METAL ON THE END OF THE WIRE.**
 8. **(Fig. 4)** Using the mini heat gun, heat both sides of the heat shrink tubing to shrink the tube around the metal ring terminal. Be sure that the tubing is **completely covering the ring terminal.**
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- IMPORTANT: DO NOT USE AN OPEN FLAME to shrink the tubing.**
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9. **(Fig. 5)** Use the standard slip-joint pliers to crimp the hot shrink tube onto the ring terminal to ensure the heat activated adhesive comes in contact with the wire and ring terminal. Let it cool for a few minutes.
 10. Reconnect the ring terminal of the thin orange wire and secure it with the 7/16" **regular nut.**
 11. Reconnect the ring terminal of the thick red wire and secure with the 7/16" **nylon lock nut.** Now you can slide the red rubber terminal boot into position to cover the terminal.
 12. Finally, tuck the thin red alternator wire behind the starter. Make sure it's out of the way.

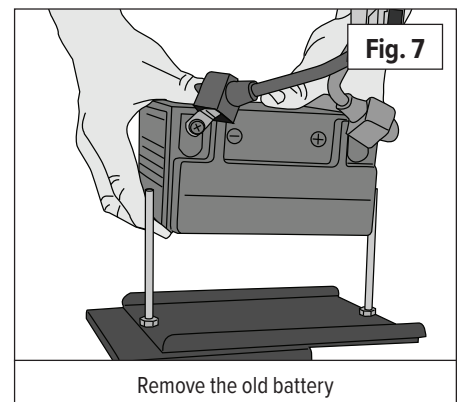
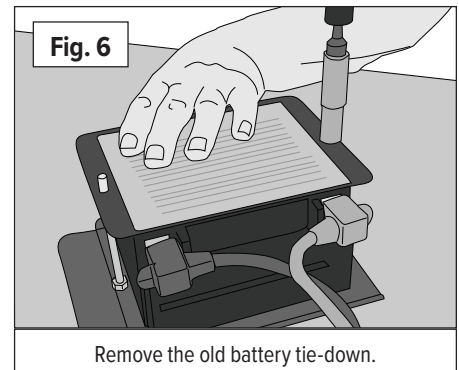


DISASSEMBLING THE OLD BATTERY PACK

13. **(Fig. 6)** Use the 7/16" wrench or socket to loosen and remove the two nuts holding the current battery tie-down bracket in place.

NOTE: Save these nuts.

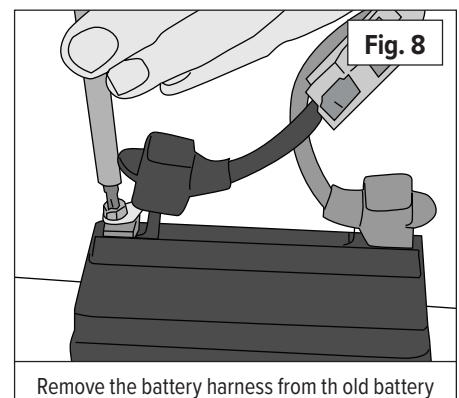
14. Remove the tie-down bracket and set it aside.
15. **(Fig. 7)** Lift the old battery straight up and out of the tray.



REMOVE THE BATTERY WIRING HARNESS

16. Pull back the red and black rubber terminal covers to expose the terminal connectors.
17. **(Fig. 8)** Using the phillips head screwdriver, **unscrew the negative (black) terminal first.** Then, unscrew the positive (red) terminal.
18. Set the old battery aside.

NOTE: Follow local guidelines for battery recycling/disposal.



INSTALL THE NEW BATTERY TRAY

19. Locate the nuts securing the old battery tray to the base.
20. **(Fig. 9)** Remove the nuts and slide off the old tray.
Leave the long base screws in place.
21. **(Fig. 10)** Position the new battery tray over the screws.
22. Re-install the nuts and snug them down. Use two wrenches (one to hold the bolt, one to tighten the nut) for a secure fit.

PREPARE THE NEW BATTERY

23. Remove both battery terminal screws.
24. **(Fig. 11)** Attach the wiring harness to the new battery:
 - Connect the **black wire to the negative (-)** terminal.
 - Connect the **red wire to the positive (+)** terminal.
 - Secure with screws through the ring connectors.
25. Confirm the connections are tight and properly oriented.

MOUNT THE NEW BATTERY

26. Place the new battery into the new tray, with the terminals facing upward.
27. The battery may sit slightly elevated; this is normal with the new tray design.
28. Position the tie-down bracket over the top of the battery.
Center it so it holds evenly.
29. **(Fig. 12)** Secure the new battery tie-down bracket with the provided nuts.

CHARGING THE LITHIUM-ION BATTERY

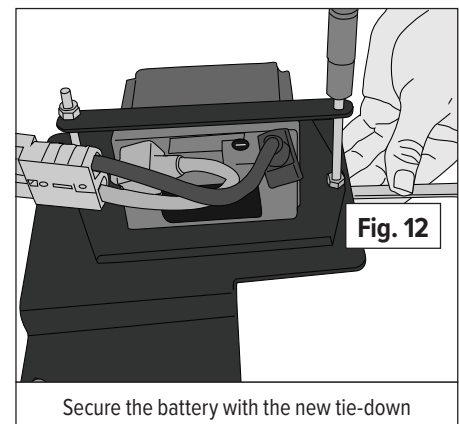
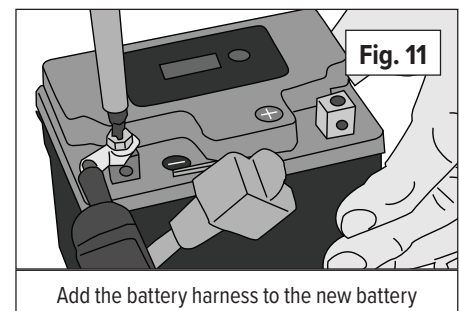
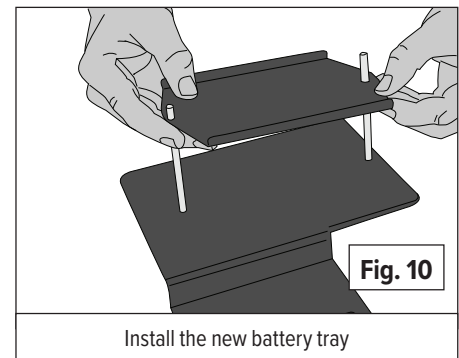
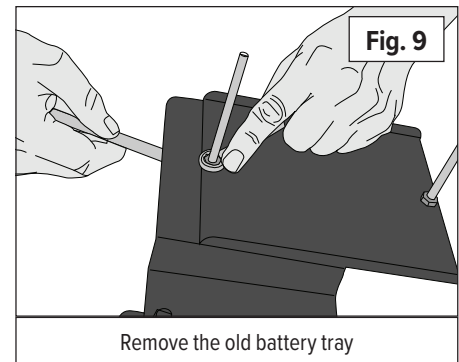
IMPORTANT - CHARGE FIRST: Before installing the lithium-ion battery on to your Cyclone Rake—or after seasonal storage—fully charge it with the Cyclone Rake approved charger from your old battery pack.

Always remove the battery from the engine/blower unit before charging.
DO NOT charge the battery on the engine!

30. Locate your Cyclone Rake approved battery charger.
31. Slide the rubber covers off the battery terminals and connect the charger's alligator clips to the terminals—**RED to RED (+), BLACK to BLACK (-)**. **DO NOT reverse the clips.**
You do not need to remove the battery cable leads.
32. Plug the charger into a wall socket. The LED will be **RED** while charging and turn **GREEN** when the battery is about 95% charged. You may use the battery at GREEN; allow extra time to reach 100% if desired.

NOTE: The engine does not recharge the lithium-ion battery during use.
Recharge with the charger whenever cranking slows.

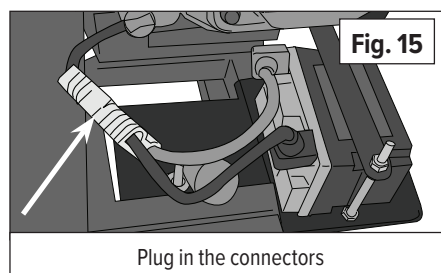
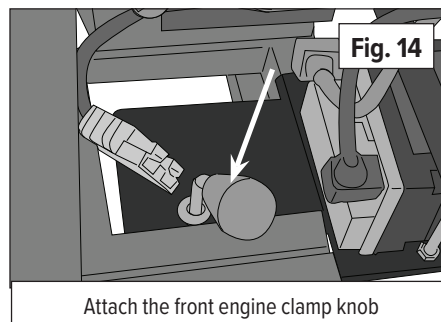
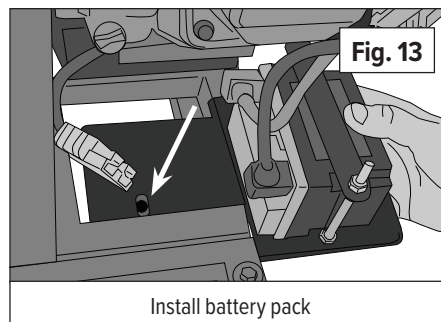
PERFORMANCE NOTE: A full charge typically provides up to **100 starts** in our testing in both hot and cold conditions. Actual results vary with temperature.
If cranking slows, recharge with the supplied charger.



RE-INSTALL ENGINE & THE BATTERY PACK

33. Lift the engine back onto the Chassis and secure it with the REAR clamp knob with the rubber washer.
34. **(Fig. 13)** Install the battery pack by *sliding it on to the engine frame making sure the holes in the battery plate line up with the holes in the engine frame* as shown.
35. **(Fig. 14)** Install the FRONT engine clamp knob and rubber washer then tighten.
36. **(Fig. 15)** Plug the battery harness connector into the engine harness connector.
37. Test the system by starting your Cyclone Rake to confirm the new battery functions correctly.

The Cyclone Rake is now ready to use with its new retrofit battery pack.



BEST PRACTICES

- *Charge in a dry, well-ventilated area away from gasoline, solvents, or open flame.*
- *Inspect cables and clips before use. Do not use if insulation is damaged.*
- *If the battery was stored in very cold conditions, allow it to warm to room temperature before charging for best performance.*
- *Keep terminal covers on when not charging to prevent accidental contact.*