

56125036 LITHIUM ION BASE KIT

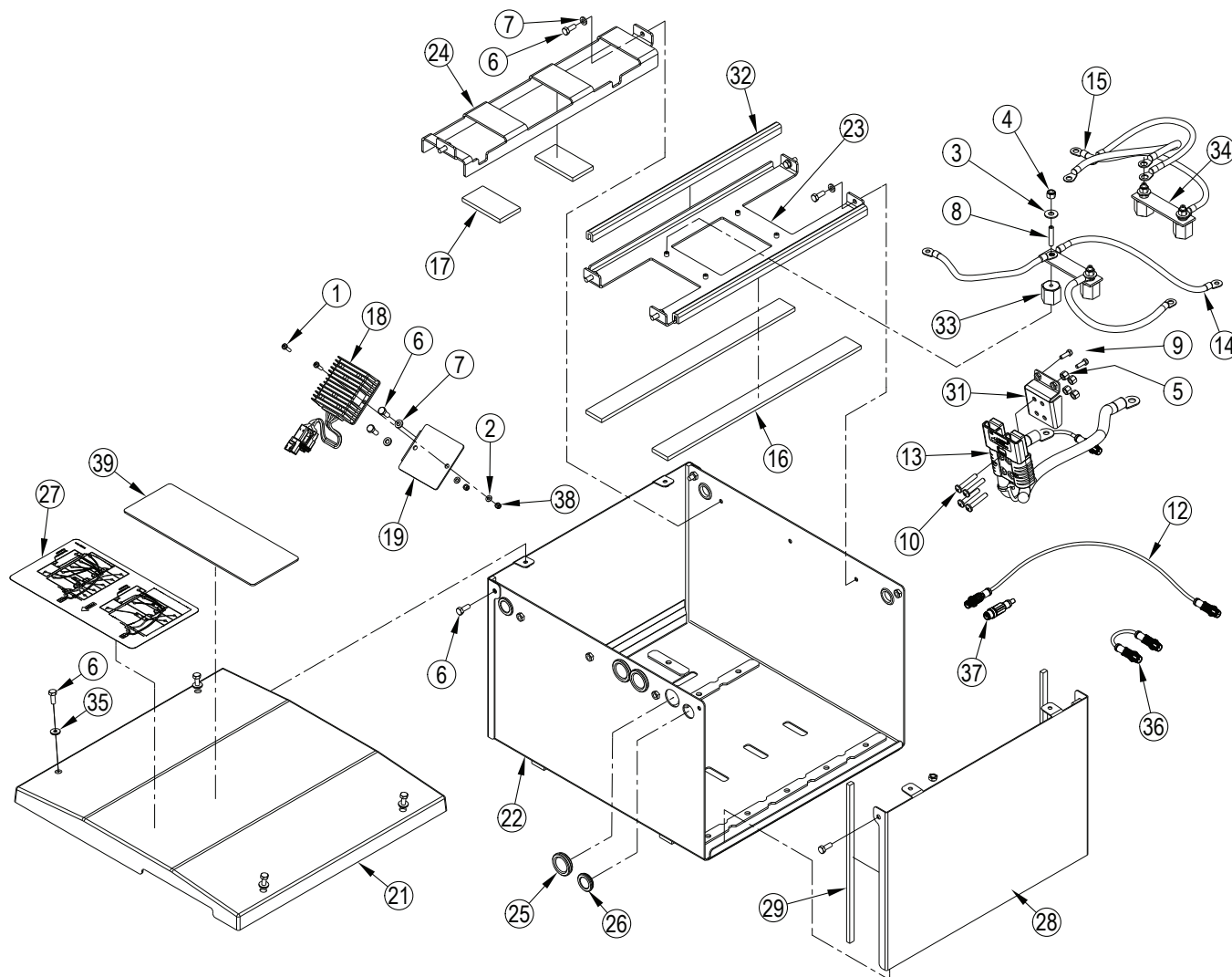
SC50 Models: After Serial Number 1000073534 (able to accept Lithium-Ion Batteries)

CONTENTS OF KIT

Item	Ref. No.	Qty	Description
[]	56090487	1	Instruction Sheet
1	964002	2	Screw, M4-.7x16mm Ph
2		2	Washer Plain M4x9 Iso7089
3	56001906	4	Wsh, Flt Std ¼
4	56002708	4	Nut, Hex Nyl Loc 1/4-20
5	56003426	4	Nut, Hex Nyl Loc Ss M6-1
6	56003441	16	Scr, Hex Loc Metric
7	56003638	8	Wsh, Flt SS 6mm
8		4	Scr, Soc Set Loc 1/4-20 X 1.25 Zinc Plated
9	56003840	2	Scr-Hex Loc SS M5-0.8 X 16mm
10	56003950	4	Scr-Pan Phil SS M6-1 X35mm
12		1	Cable Assy-Control-0.5m Long
13		1	Harn Assy-Control/Power-Batt
14		3	Cable Assy-Batt To Busbar-Neg
15		3	Cable Assy-Batt To Busbar-Pos
16		2	Foam-Vibration-395 x 32mm
17		2	Foam-Vibration-77 x 42mm
18		1	Converter-DC/DC-24V
19		1	Bracket-Regulator
21		1	Cover-Battery Box-SC50

Item	Ref. No.	Qty	Description
22		1	Battery Box Base Weldment
23		1	Battery Box Brace Assembly
24		1	Retainer-Battery Box
25		3	Grommet-Expandable-Rubber-28mm
26		4	Grommet-Expandable-Rubber-22mm
27		1	Decal-SC50-Li Ion Wiring
28		2	Side Cover Weldment
29		4	Gasket-Side Cover
31		1	Bracket-Power Cable
32		2	Trim-Edge-.18 x 15.18
33	56469858	4	Electrical Mount
34		2	Bus Bar-Ground
35		4	Washer, Sealing ¼
36		1	Cable Assy, Control
37		1	Termination Resistor
38		2	Nut Lock Hex M4 Low Iso10511
39		1	Label Warning Liion Lid

[] = Not Shown



SUMMARY

The purpose of this document is to guide you on how to install the lithium ion battery kit in an SC50 which currently has lead-acid batteries installed. The process includes, removing the existing batteries, replacing the main power connector, installing the new li-ion battery modules, and adding a new DC to DC converter.

TOOLS REQUIRED

- 7mm, 8mm, 10mm, 13mm, and 7/16 deep sockets and ratchet
- Metric Allen wrench set
- Phillips screwdriver
- Torque Wrench

WARNING!

The Lithium-Ion battery modules used in Nilfisk equipment must be replaced by Nilfisk-trained technicians only.

WARNING!

Replace Nilfisk Lithium-Ion battery modules with the same model only, as shown on the nameplate on the modules. Use of another battery may present a risk of fire or explosion.

Note: For any new or replacement module, press the push button and ensure a steady green light appears. A red, blinking, indicator means the module is unusable.

CAUTION!

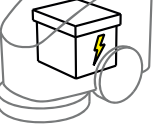
Connections to lithium-ion batteries are not the same as lead-acid batteries partly due to the CAN communication connections. Disconnect and reconnect lithium-ion battery cabling in the order given below to prevent damage to the batteries.

CAUTION!

When working on an SC50 and a battery disconnect is needed, ensure that the Autonomy Module is completely powered off before the power is pulled from the system. To verify that the Autonomy Module is completely powered down simply wait for both the safety LiDAR's and Dropoff lasers to power off, plus an additional 15 seconds after that. The best visual indication is when the 4 red laser dots on the floor in front of the machine turn off. If this procedure is not followed when disconnecting the battery, there is a chance that the Autonomy Module could be permanently damaged and would need replacement.

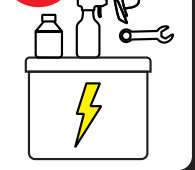


WARNING









FOR SAFE OPERATION SEE USER MANUAL.

ENTRY OF WATER OR OTHER LIQUIDS INTO THE BATTERIES COMPARTMENT MAY CAUSE POSSIBLE MORTAL DANGER AND MATERIAL DAMAGE.

DO NOT USE WATER FOR CLEANING THE BATTERY MODULE.

NEVER PUT DOWN CONTAINERS WITH FLUIDS (BEVERAGE CONTAINERS AND THE LIKE) ON ELECTRICAL SYSTEMS.

THE RELATIVE HUMIDITY INSIDE THE ROOM MUST NOT EXCEED 95%.

DO NOT CLEAN THE SYSTEM WITH AGENTS CONTAINING ACID, LYE OR SOLVENTS.

CHARGE THE BATTERY IN AN AMBIENT TEMPERATURE RANGE 0 TO 40 °C (32 TO 104 °F).

POUR UN FONCTIONNEMENT SÛR, VOIR LE MANUEL D'UTILISATION.

LA PÉNÉTRATION D'EAU OU D'AUTRES LIQUIDES DANS LE COMPARTIMENT DES BATTERIES PEUT ENTRAÎNER UN DANGER DE MORT ET DES DOMMAGES MATÉRIELS. N'UTILISEZ PAS D'EAU POUR NETTOYER LE MODULE DE BATTERIE.

NE JAMAIS DÉPOSER DE RÉCIPIENTS CONTENANT DES FLUIDES (CONTENANTS DE BOISSONS ET AUTRES) SUR LES SYSTÈMES ÉLECTRIQUES.

L'HUMIDITÉ RELATIVE À L'INTÉRIEUR DE LA PIÈCE NE DOIT PAS DÉPASSER 85 %.

NE NETTOYEZ PAS LE SYSTÈME AVEC DES AGENTS CONTENANT DE L'ACIDE, DE LA LESSIVE OU DES SOLVANTS.

CHARGEZ LA BATTERIE DANS UNE PLAGE DE TEMPÉRATURE AMBIANTE DE 0 À 40 °C (32 À 104 °F).

RECOVERY TANK REMOVAL

1. **See Figure 1 & 2:** Shut down the machine, wait at least 15 seconds after the dropoff sensors turn off, and disconnect the main battery disconnect in the electrical bay.

Note: It is important to unplug the main disconnect before removing battery cables to avoid power spikes to the control modules that otherwise are always receiving power.

2. Drain the solution and recovery tank, then remove the detergent bottle from the machine.
3. You may also want to rinse the tank and flush clean water through the hoses.
4. Disconnect the vacuum motor and float switch electrical connectors located below the left side of the machine.
5. Cut any cable ties as necessary to free the wires up to the bottom of the recovery tank.
6. Disconnect the recovery hose from the squeegee.
7. Release the drain hose from its hanger.

FIGURE 1

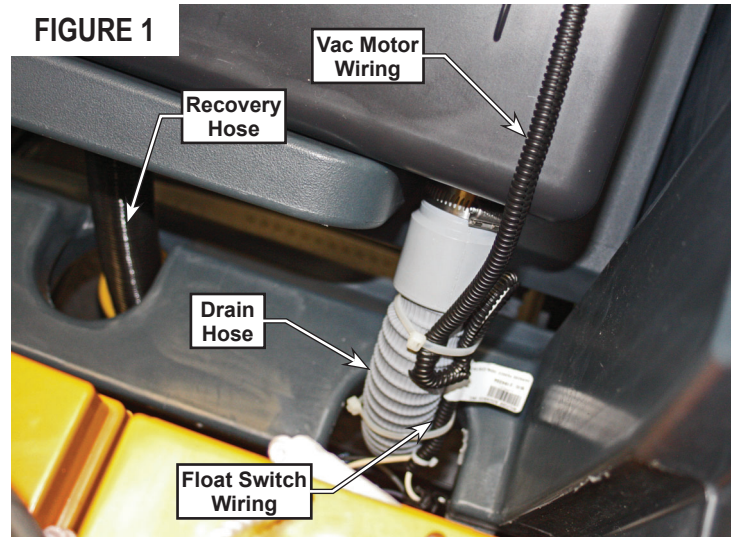
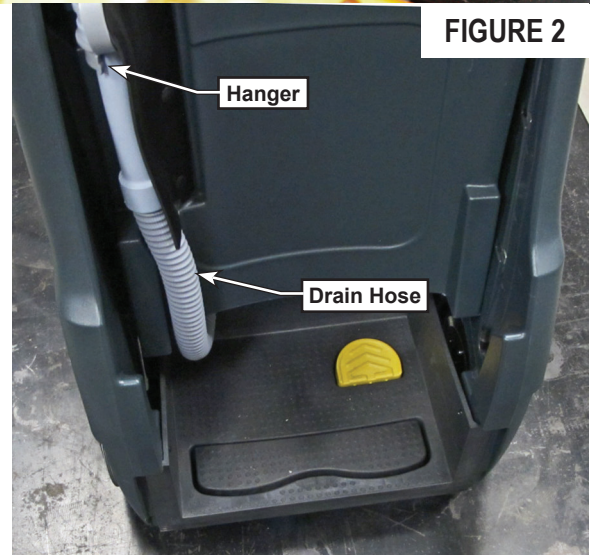
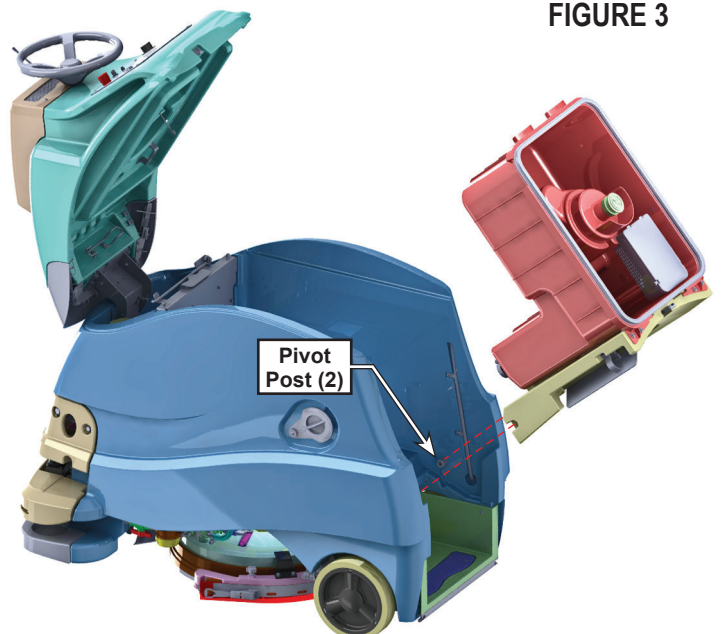


FIGURE 2



8. **See Figure 3:** Tilt the recovery tank open and lift it off the pivot posts on the solution tank.
9. Free up the suction and drain hoses as necessary to lift the recovery tank free of the machine.

FIGURE 3

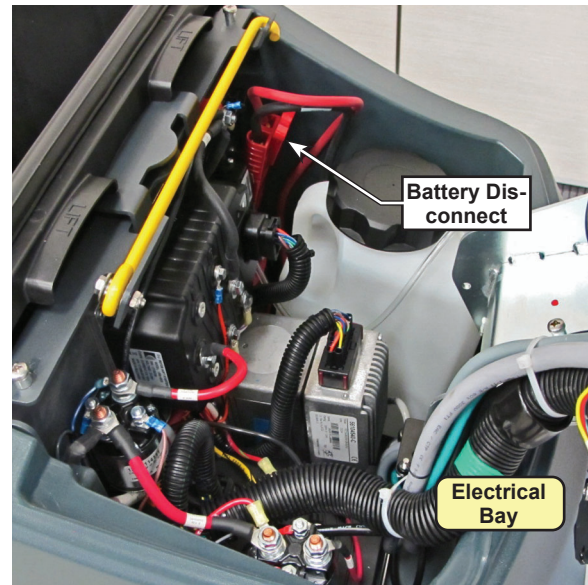


LEAD ACID BATTERY REMOVAL

⚠ CAUTION!

See Figure 4: It is important to unplug the main disconnect before removing battery cables to avoid power spikes to the control modules that otherwise are always receiving power.

FIGURE 4



10. See Figure 5 & 6: Disconnect the machine negative terminals, including
 - Main ground
11. See Figure 7: Disconnect the machine positive terminals, including:
 - F1 Fuse
 - Battery Charger
12. Disconnect the series jumpers from the remaining batteries.
13. Lift the 4 batteries out of the battery bay and set them aside. Remove the battery tray.

Note: After the lithium batteries are installed, plug the battery charger into facility power for 30 seconds to reset the CANBus communication.

FIGURE 5

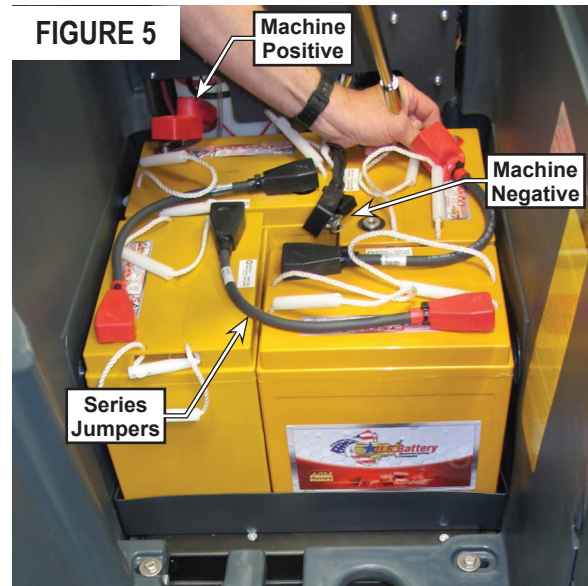


FIGURE 6

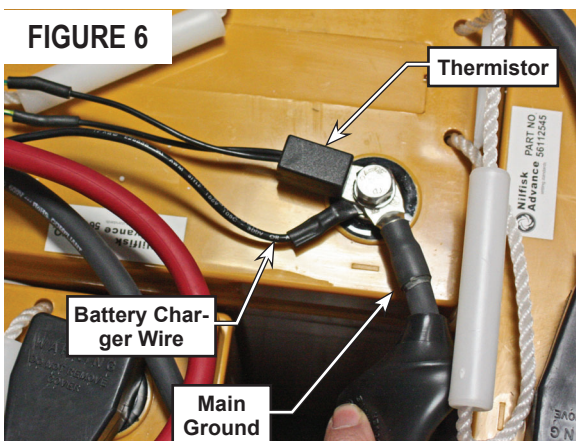
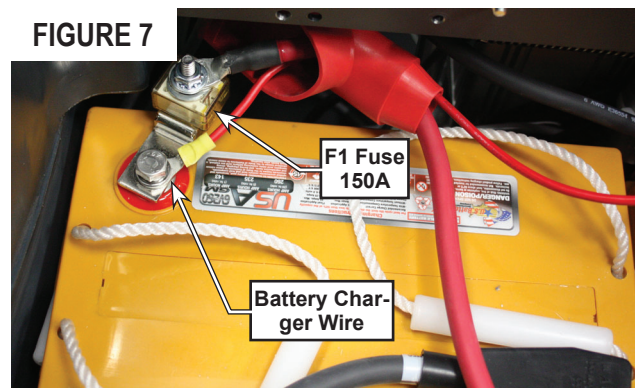


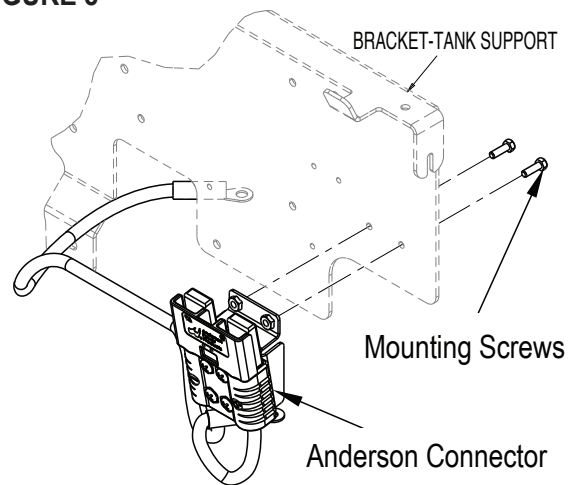
FIGURE 7



LEAD ACID BATTERY REMOVAL - CONTINUED

14. See Figure 8. Before installing any lithium-ion batteries, remove the existing Anderson connection and mounting bracket by removing the two mounting screws.

FIGURE 8



MODULE INSTALLATION

15. See Figure 9. Secure the four Side Cover Gaskets (29) to the Side Cover Weldments (28) as shown. The gaskets should be flush with the ends of the side covers.
16. Attach the Side Covers (28) to the Battery Box Base (22) using the accompanying screws (6). The Flange (22a) on the Base (22) fits in between the baffles of the Covers (28).
17. Punch a <6mm diameter hole in all 3 of Expandable Grommets (25) to allow the wires to pass through. Note: A slit works instead, but a round hole is preferred. Insert the Expandable Grommets (25 & 26) in the holes of the battery box as shown.
18. Place the Battery Box Base (22) into the machine, in the battery bay (the expandable grommets face towards the front of the machine).
19. See Figure 10. If installing only three modules, place two Modules (B) beside each other with their negative terminals facing the left side of the machine in the locations shown. Use the dog bone mechanical connectors to fasten them together. Place the third Module perpendicular to the other two with its negative terminal facing the front of the machine. If installing 4 or 5 modules see below for proper location in the battery box.

FIGURE 9

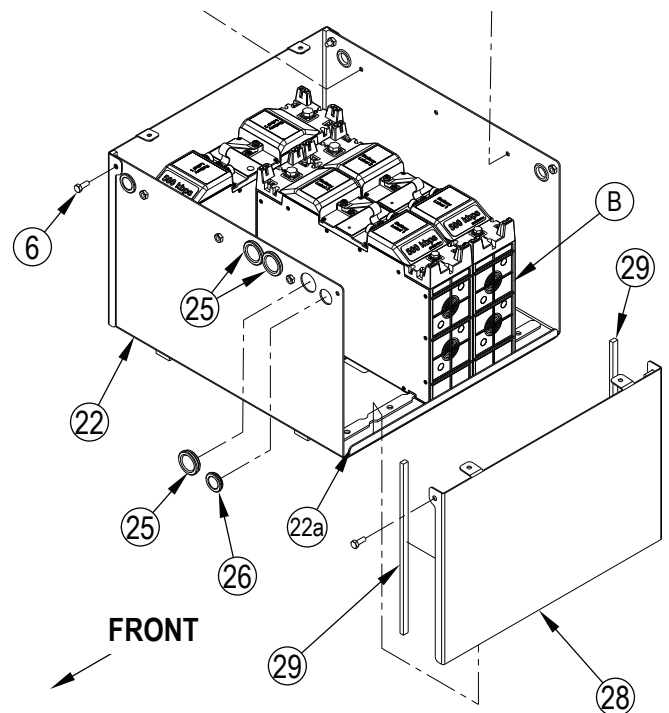
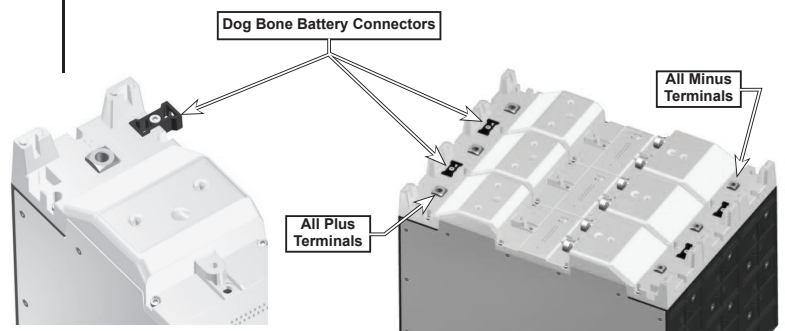
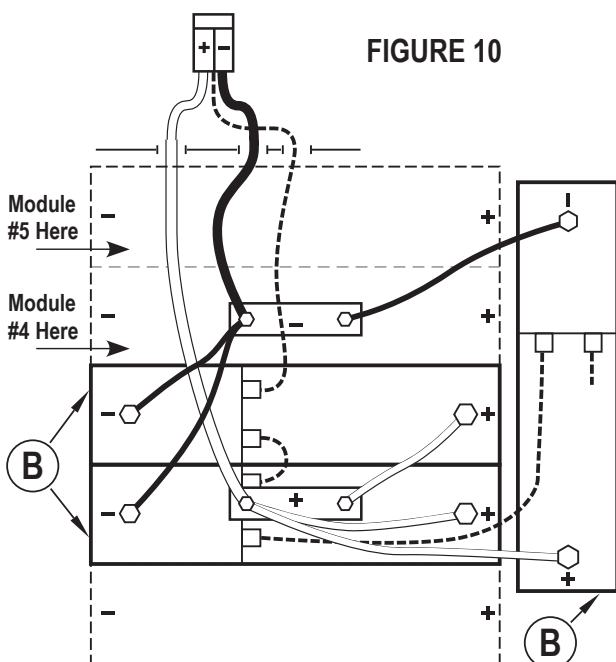


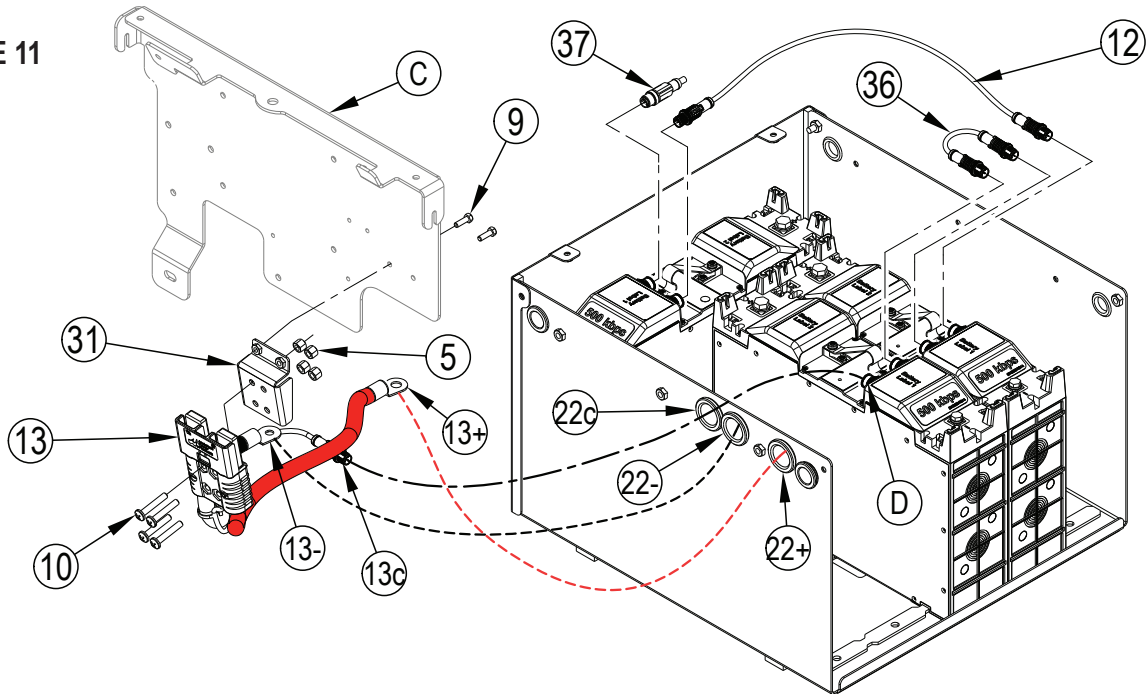
FIGURE 10



HARNESS ASSEMBLY INSTALLATION

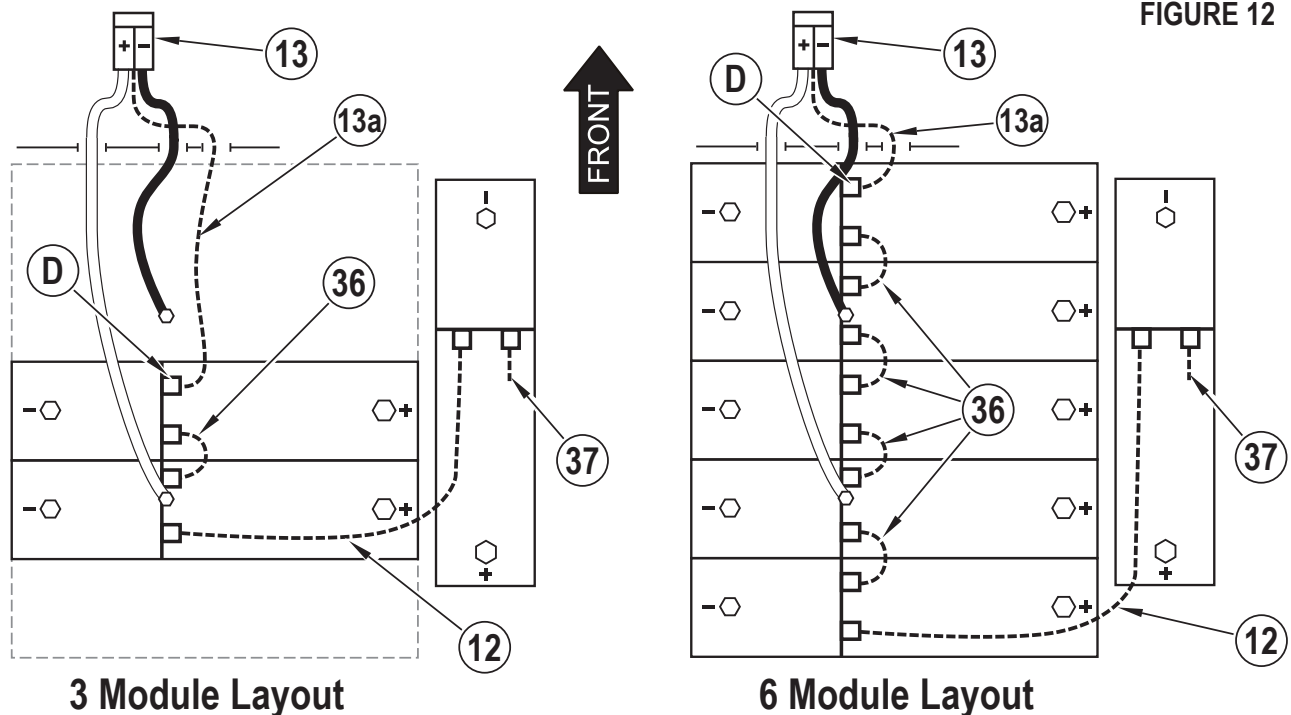
20. See Figure 11. Attach the Harness Assembly (13) to the Power Cable Bracket (31) using Screws (10) and Nuts (5). Attach the Power Cable Bracket to the Tank Support Bracket (C) with the Screws (9).
21. See Figures 11 & 12. Insert round M12 communication cable (13c) into the battery box through opening (22c). Connect the communication cable to the First Communication Port (D) on the first battery in the box.

FIGURE 11



22. Insert Positive Cable (13+) into battery box through opening (22+). Insert Negative Cable (13-) into battery box through opening (22-).
23. Connect the remaining communication cabling in the following order:
 - a. Connect the modules in parallel using the communication cable(s) (36).
 - b. Connect the perpendicular module to the last in the parallel series using the longer Cable Assembly (12).
 - c. Install the Termination Resistor (37) to the last port on the perpendicular module.

FIGURE 12



BATTERY BOX ASSEMBLY

24. See Figure 13. Secure the Vibration Foam (16) to the underside, and the Edge Trim (32) to the sides, of the Battery Box Brace Assembly (23). Then attach the Battery Box Brace Assembly (23) to the Battery Box Base (22) using four Screws (6) and Washers (7).
25. Secure the Vibration Foam (17) to the underside of the Battery Box Retainer (24). Then attach the Battery Box Retainer (24) to the battery box using two Screws (6) and Washers (7).
26. Install the four Electrical Mounts (33) onto the threaded studs on Battery Box Brace (23). Then use a hex wrench to thread the four Socket Head Screws (8) into the electrical mounts. Place the Bus Bars (34) onto the Screws (8) as shown.

BATTERY CABLING

⚠ CAUTION!

Electrically connect only same-voltage modules and only in parallel. Never connect them in a series.

Note: the ring terminals on power cables should be split evenly between the two studs for each polarity. There can be no more than 4 ring terminals per stud (including the ones to the Anderson connector).

27. The positive and negative ends of the Harness Assembly (13) should be inside the battery box (Step 22). Place the negative wire on the forward bus bar and the positive wire on the rear bus bar as seen in Figure 14.

28. See Figure 14. Connect the Negative Battery Cables (14) to Negative Bus Bar and negative terminal of each Module (B). Use a wrench to tighten the terminal Hex Nut (4) with Washer (3) at the bus bar. Use a torque wrench to tighten the negative Module terminal M6 bolts to 2.9 lbf-ft (3.9 Nm).

29. See Figure 14. Connect the Positive Battery Cables (15) to the Positive Bus Bar and to positive terminal of each Module (B). Use a wrench to tighten the terminal Hex Nut (4) with Washer (3) at the bus bar. Use a torque wrench to tighten the positive Module terminal M8 bolts to 6.6 lbf-ft (8.9 Nm).

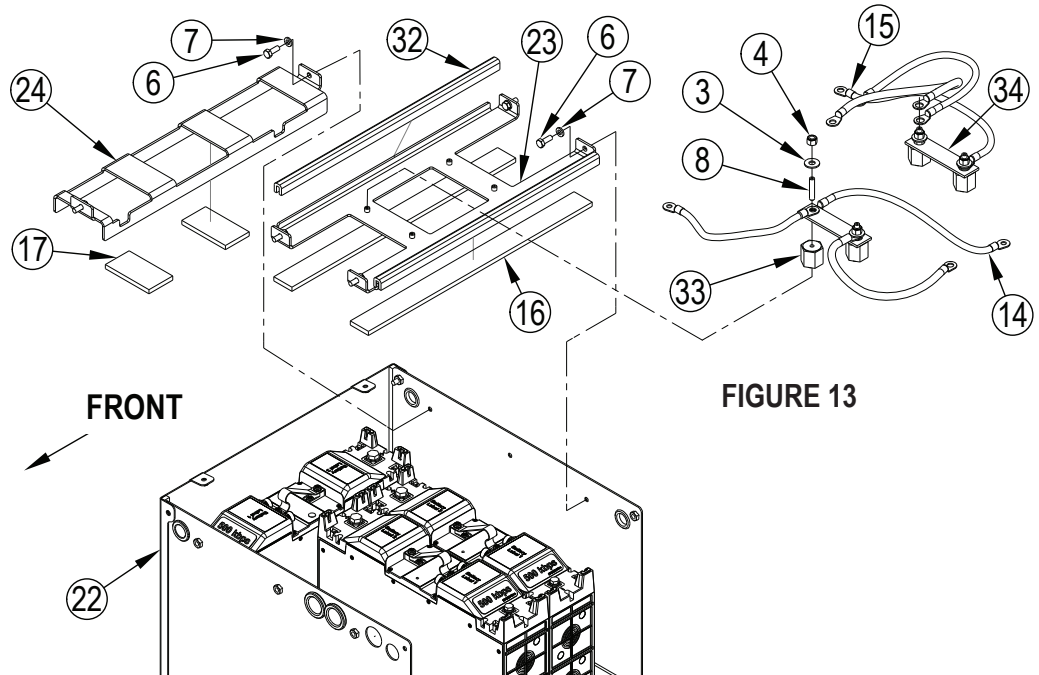


FIGURE 13

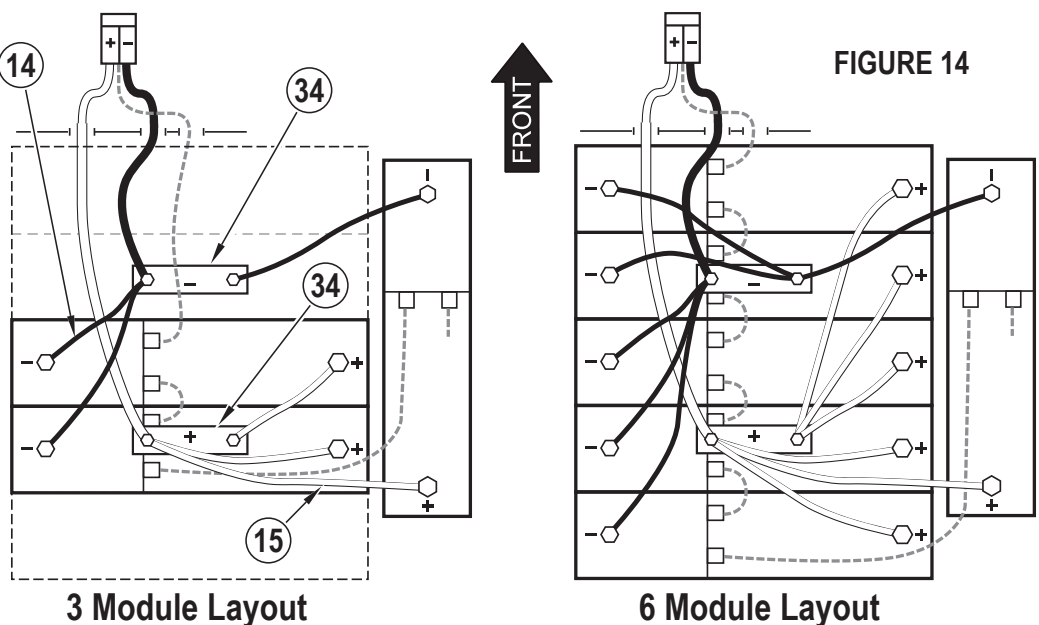


FIGURE 14

3 Module Layout

6 Module Layout

INSTALL DC/DC CONVERTER

30. **See Figure 15.** Close the Control Panel Housing (E). Remove the 4 Screws (F) that secure the autonomy Cover (G) over the autonomy bay (H), and remove the cover.
31. **See Figures 16 & 17.** Secure the DC/DC Converter (18) to the Regulator Bracket (19) with the accompanying screws (1), Washers (2), and Nuts (38). Attach the Regulator Bracket (19) to the steel plate inside the autonomy bay with the accompanying Screws (6) and Washers (7).
32. **See Figure 18.** Locate the connector on the two white wires going to the Autonomy Module main harness connector. Disconnect this wiring connector. The DC/DC Converter (18) electrical harness has two connectors. Plug one end into each of the connectors (white wires).
33. Reinstall Cover (G) using Screws (F).

FIGURE 15

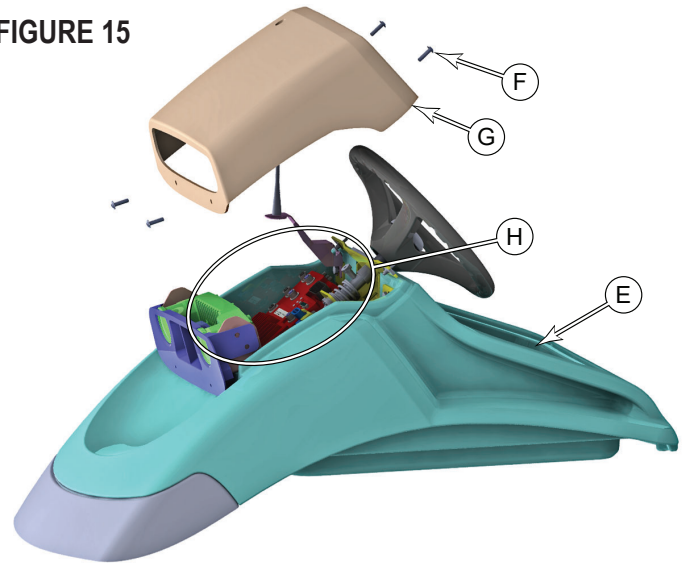


FIGURE 16

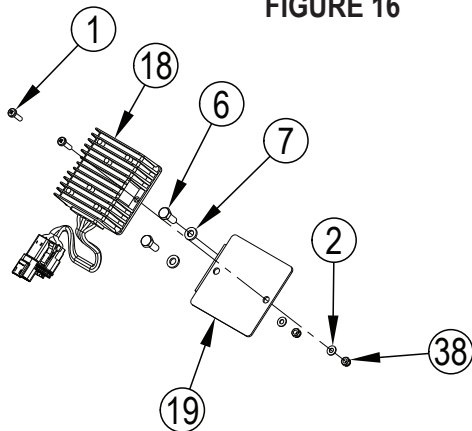


FIGURE 17

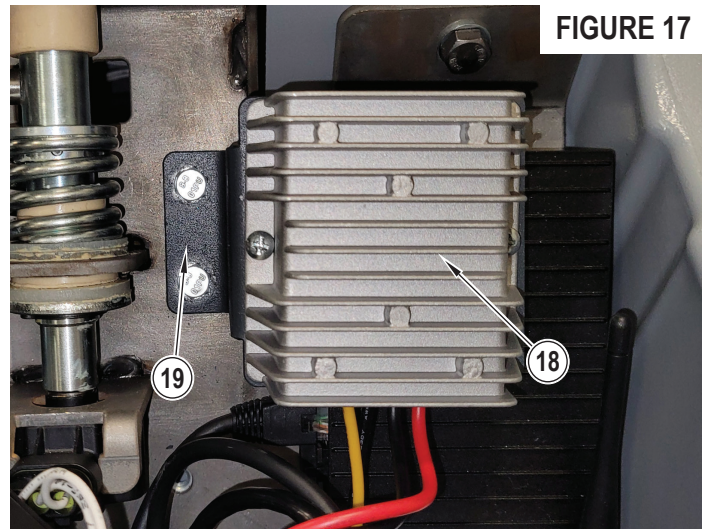
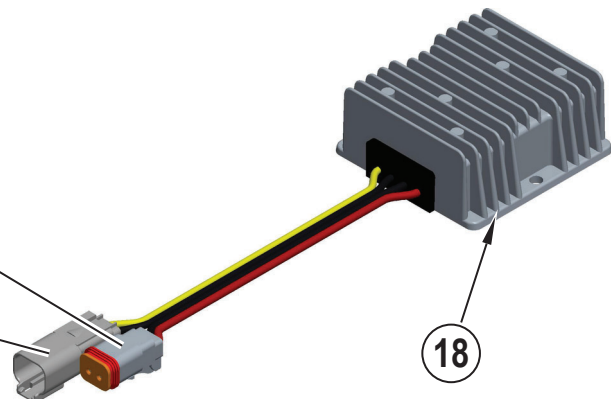
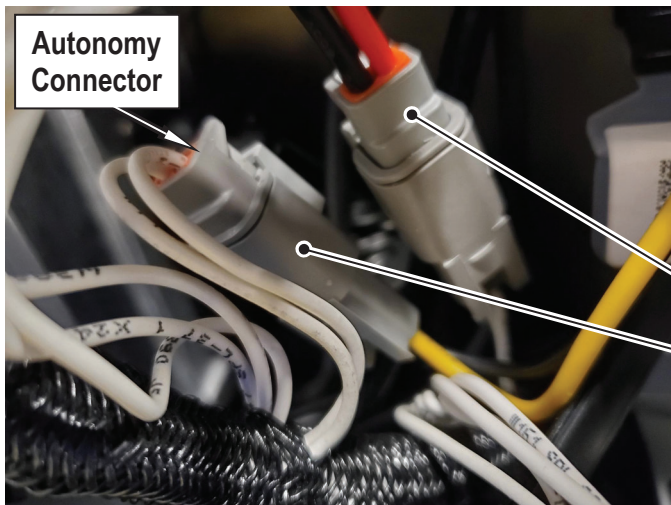
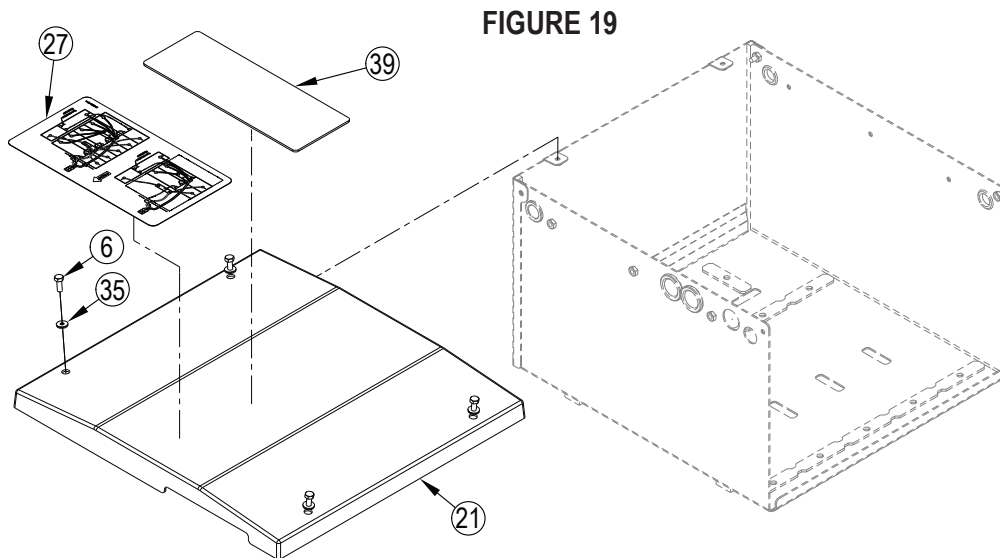


FIGURE 18



CONNECT MAIN POWER

34. Open the Control Panel Housing to access battery compartment.
35. Connect the machine main power connector (Anderson Connector).
36. When complete, verify the Module's indicators all display a steady green light. **Note:** It may take several seconds for the lights to stop flashing.
37. **See Figure 19.** Apply Decals (27) & (39) to the top of Battery Box Cover (21) orientated as shown. Secure the Battery Box Cover (21) to the battery box with the four Screws (6) and four Sealing Washers (35).



CONFIGURE THE MACHINE

38. **See Figure 20.** Power ON the machine with Service Mode access.
 - a. Press and hold the Scrub (M1) and Vacuum (M2) switches.
 - b. Press and release the power switch (M3).
 - c. When the display illuminates and the machine begins its boot-up process, you may release the Scrub and Vacuum buttons.
39. **See Figure 21.** Press the Information Switch (Y). Using the arrow keys (Y1) scroll down and select "Configuration".
40. In the Configuration Menu is an option for batteries. A typical setup for AGM batteries will be displayed as installed.
41. Select the "Battery" option and change it to "Lithium."

Note: An option listed as "Charger Algo" should automatically change to "339" when the Battery option is updated to Lithium.

FIGURE 20

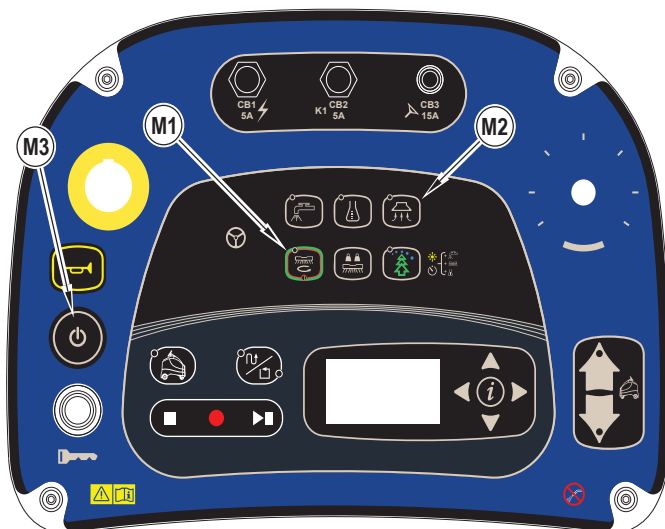


FIGURE 21

