

56125037 LITHIUM ION EXPANSION KIT

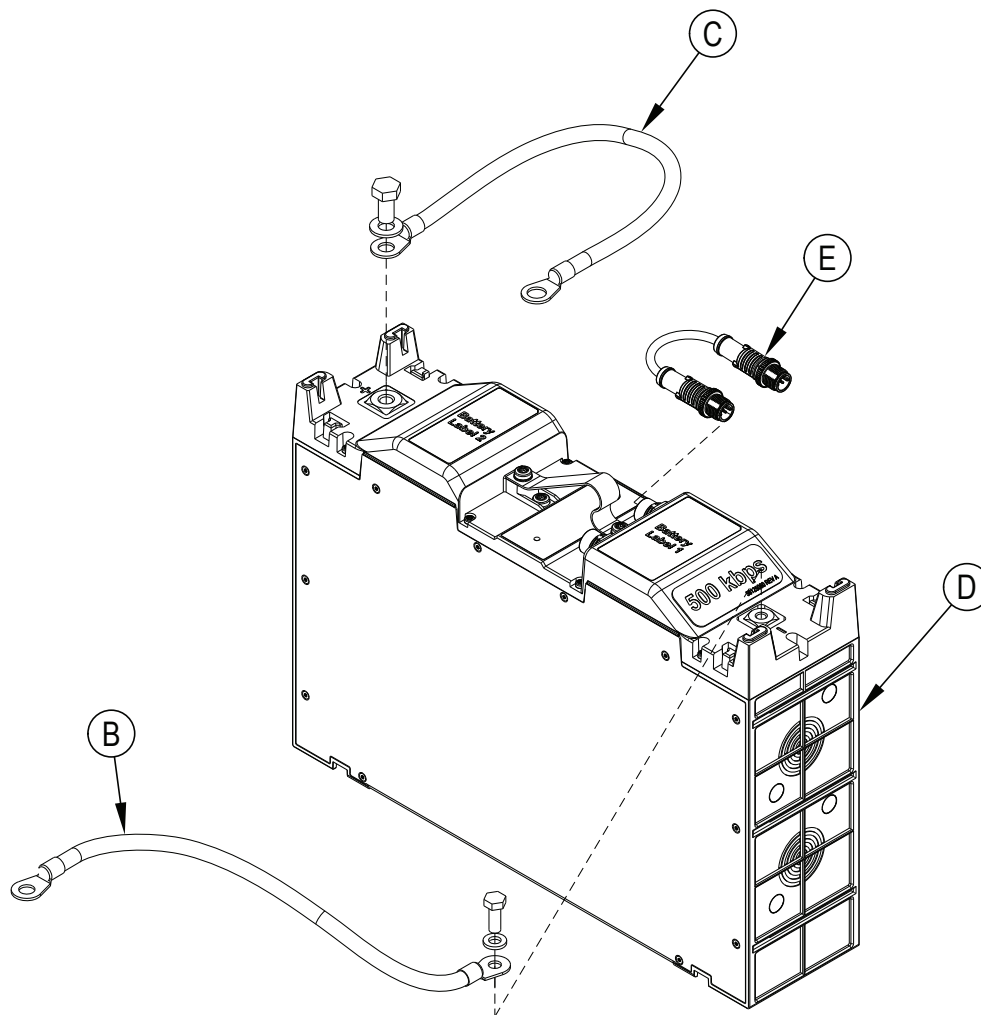
SC50 Models: Only models with Lithium Ion Base Kit installed

CONTENTS OF KIT

ITEM	PART NO.	QTY	DESCRIPTION
[A]	56090488	1	Instruction Sheet
B		1	Cable Assy-Batt To Busbar-Neg
C		1	Cable Assy-Batt To Busbar-Pos
D		1	Batt Assy-Li Ion-24v-500 Baud
E		1	Cable Assy. Control

[] = Not Shown

The purpose of this kit is to install an additional Lithium-Ion battery assembly (module).



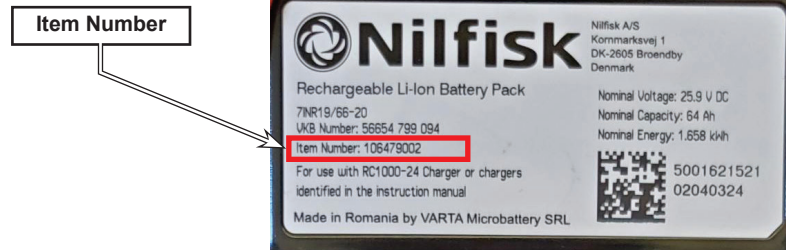
INSTALLATION INSTRUCTIONS

⚠ WARNING!

Disconnect the battery before removing or installing any machine components.

⚠ WARNING!

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



Battery Module Label

⚠ CAUTION!

Do not use a module if any abnormal features are found such as: damage or deformation of the module's casing, a smell of electrolyte, an electrolyte leakage, or other abnormalities.

⚠ 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 to prevent damage to the batteries.

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 95 %.

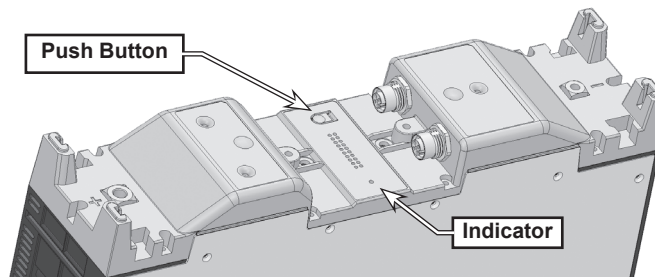
NE NETTOYEZ PAS LE SYSTÈME AVEC DES AGENTS CONTENANT DE L'ACIDE, DE LA LESSIVE OU DES SOLVANTS.

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

CHECK NEW MODULE STATUS

The top of the new Battery Module (D) contains a Push Button, used to manually start (“wake up”) and shutdown the module, and an Indicator light that shows the module’s status.

FIGURE 1



The push button on the top of a battery can be used to start, or “wake up”, the module, check current status information from the module or to shut it down. When the module’s indicator light is extinguished, the module is shutdown (and safe to handle with zero voltage at the terminals).

1. To start the module, push and hold the button for 3 to 5 seconds or until the indicator blinks. For any new or replacement module, a steady green light should appear. See the indicator table below for the meaning of the indicator blinking. (Note: A button push between 0.25 and 3 seconds will request status information but not turn on the module. In this condition the Battery Management System (BMS) is on but there is no power to the terminals.)
2. When the indicator is illuminated the battery is operational, or at least active. Push the button quickly twice, within one second, to shutdown the module. The indicator will blink in green then extinguish.

Note: For installation ensure the module is shutdown (indicator extinguished/off).

MODULE STATUS - INDICATOR TABLE

The indicator light on a battery module shows the module’s state by illuminated steady or blinking colors. The general meaning of the colors and blinking is given in the table below.

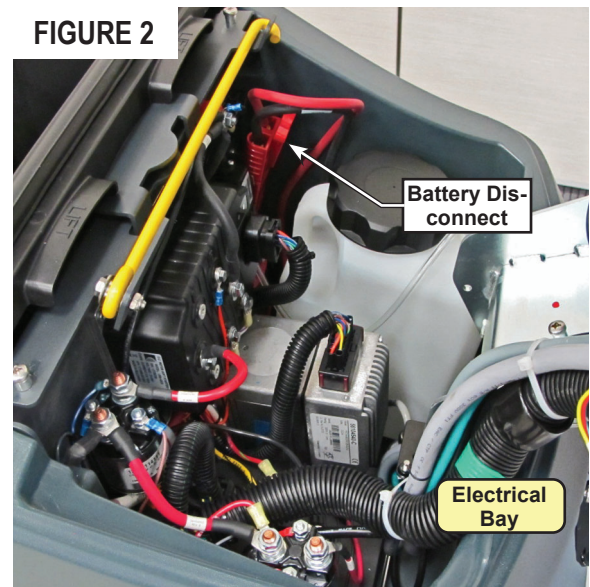
Color	Action	State
Extinguished	-	Battery is shutdown and in deep sleep mode.
Green	Blinking	Startup or shutdown in progress. Voltage is not available at the terminals. Module okay but power not at terminals.
Green	Steady	Started and ready to use or charge. Voltage is available at the terminals.
Orange	Blinking (3 blinks, pause, 3 blinks, ...)	Not configured in a block or pack (no valid, or double, node ID). Software update in progress (steady blinking)
Orange	Steady	CAN communication baud rate mismatch. Firmware update in progress.
Red	Blinking (3 blinks, pause, 3 blinks, ...)	Error due to irreversible condition. *
Red	Steady	Error due to reversible condition. See Troubleshooting section.

* A blinking red indicator means the module has an irreversible internal error which cannot be corrected. The module should be replaced in the machine.

DISCONNECT POWER & DRAIN RECOVERY TANK

3. Shut down the machine, wait at least 15 seconds after the dropoff sensors turn off, then open the recovery tank cover.
Disconnect the main Battery Disconnect (Anderson Connector) in the electrical bay (shown in Figure 2).
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.
4. Drain the recovery tank and tip it open.

FIGURE 2



MODULE INSTALLATION

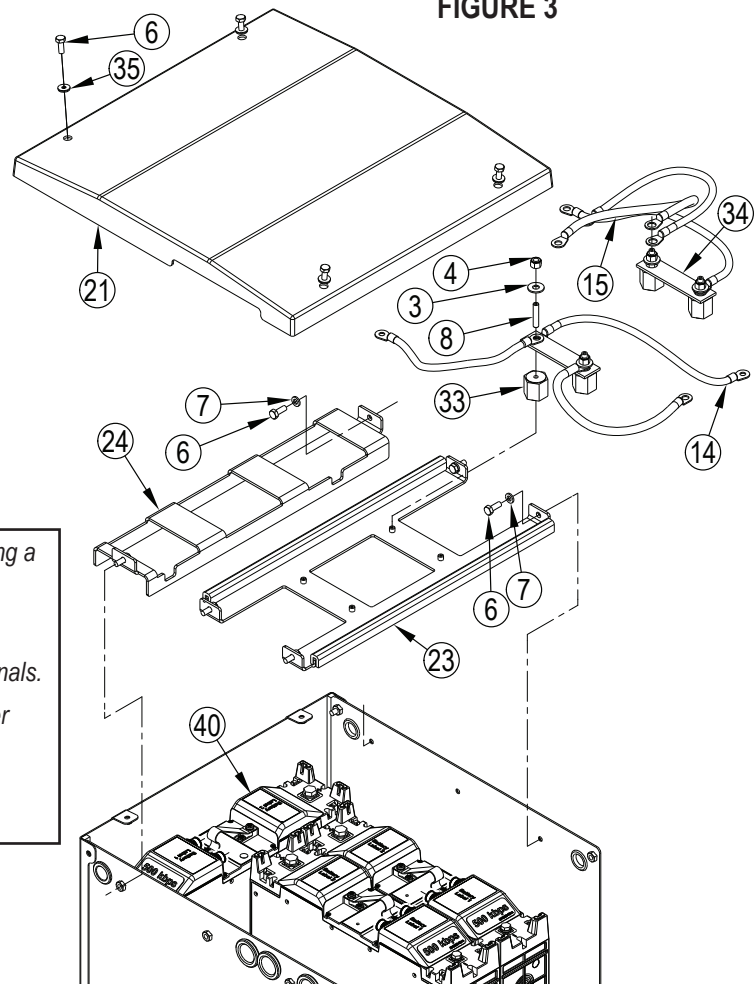
Note: Before installation, ensure the module is turned off. The module LEDs should be off (extinguished).

5. **See Figure 3.** Remove the Battery Box Cover (21), hardware items (6) & (35).
6. Remove wiring to both positive and negative busbars (34), hardware items (3) & (4) in four locations. NOTE: It is recommended to use an Allen wrench to hold the Stud (8) in place while loosening each Nut (4) or the stud will unscrew from the Mount (33).
7. Remove the Battery Box Brace Assembly (23) held in place by four Screws (6) & Washers (7).

A Note Regarding Battery Module Replacement: If you are replacing a bad battery module;

- a. Disconnect the communication cabling going to the bad module.
- b. Disconnect the positive and negative cabling at the battery terminals.
- c. If replacing the module (40) held in place by Battery Box Retainer (24), first remove the retainer secured by hardware (6) & (7).
- d. Pull the bad module out of the battery box.

FIGURE 3



MODULE INSTALLATION - CONTINUED

8. See Figure 12 on page 8. Place the new Module (D) in the battery box in the proper location (dependent upon how many modules there are currently in the machine) with the negative terminals facing the left side of the machine. Use the dog bone mechanical connectors to fasten them together (shown in Figure 4). Note: The Module perpendicular to the others must have its negative terminal facing the front of the machine.

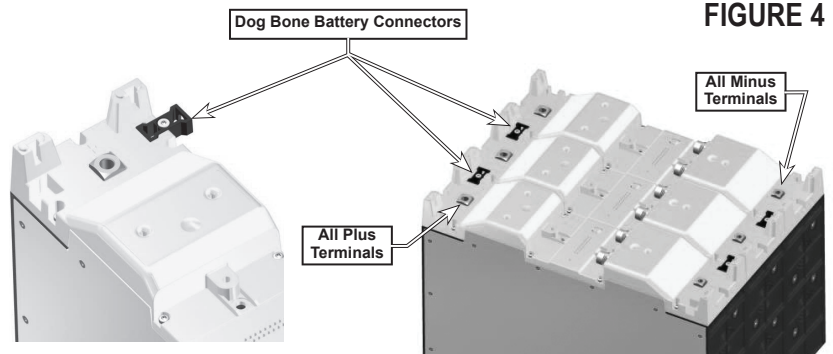


FIGURE 4

9. See Figures 5 & 6. Connect the communication cabling in the following order:

- Connect the round M12 communication cable (13c) from the Harness Assembly (13) to the first Communication Port (41) on the module furthest forward in the box.
- Connect the modules in parallel using the communication cables (36) and included communication cable (E).
- Connect the perpendicular module to the module furthest to the rear of the machine in the parallel series, using the longer Cable Assembly (12).
- Termination Resistor (37) belongs on the last port on the perpendicular module.

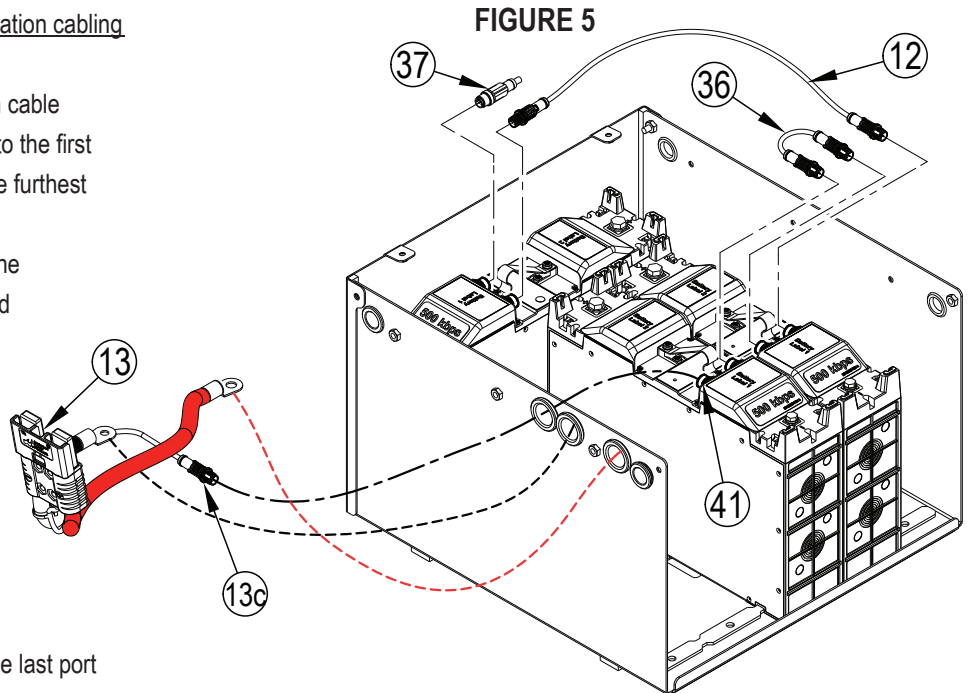
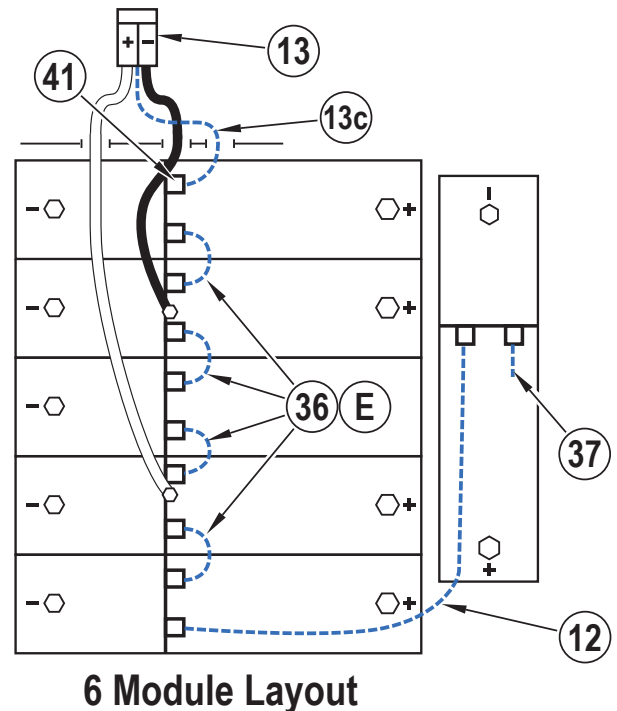
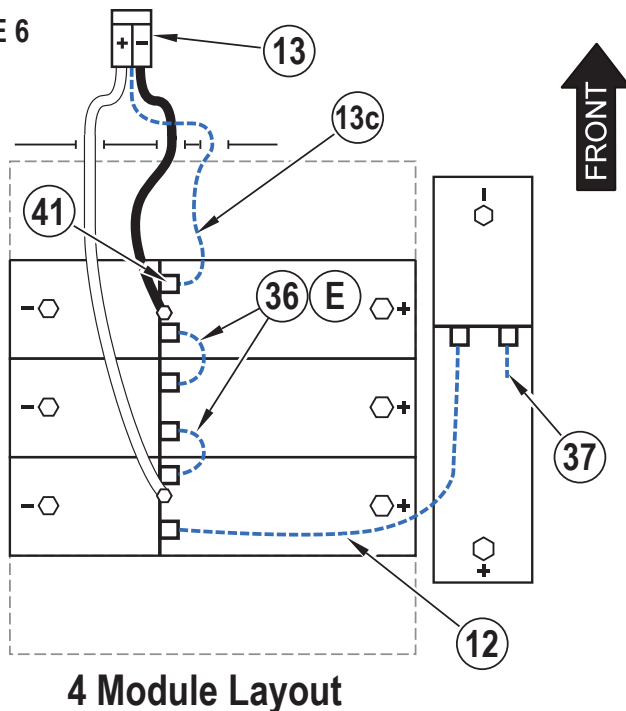


FIGURE 5

FIGURE 6



MODULE INSTALLATION - CONTINUED

10. See Figure 7. Reinstall the Battery Box Brace Assembly (23) four sets of hardware items (6) & (7).
11. See Figure 12 on page 8 for wiring layout. Reconnect the negative cabling (14) and new Negative Cable (B) to the terminals on the Negative Busbar (34-). Use a wrench to tighten the terminal Hex Nuts (4), washer (3), while using an Allen wrench to hold Stud (8) from turning. Torque to 80 in-lbs [9.0Nm].
12. See Figure 8. Secure the Negative Cable (B) to the negative terminal on the new Module (D) with included M6 bolt and washer. Use a torque wrench to tighten the negative (-) module terminal M6 bolt to 34.8 in-lbs (3.9 Nm).
13. See Figure 12 on page 8 for wiring layout. Reconnect the positive cabling (15) and new Positive Cable (C) to the terminals on the Positive Busbar (34+). Use a wrench to tighten the terminal Hex Nuts (4), washer (3), while using an Allen wrench to hold Stud (8) from turning. Torque to 80 in-lbs [9.0Nm].
14. See Figure 8. Secure the Positive Cable (C) to the positive terminal on the new Module (D) with included M8 bolt and washer. Use a torque wrench to tighten the positive (+) module terminal M8 bolt to 79.2 in-lbs (8.9 Nm).
15. See Figure 2 on Page 4. Re-connect the Battery Disconnect (Anderson Connector).
16. See Figure 9. Some early models have Switch (1) under the cover (attached to the bracket that retains the onboard charger power cord). This switch is used to reset the battery modules. If your machine has this switch make sure it is in the ON position.
17. Ensure the battery modules are all turned on (indicators solid green, not flashing). **Note:** If there is not a solid green indicator on all modules please contact Nilfisk Technical Service.
18. Secure the battery box cover (21) with Screws (6) and Washers (35).
19. Close the recovery tank and tank cover.
20. Check to see that the machine will power on. Continue to next page to configure machine for correct number of modules.

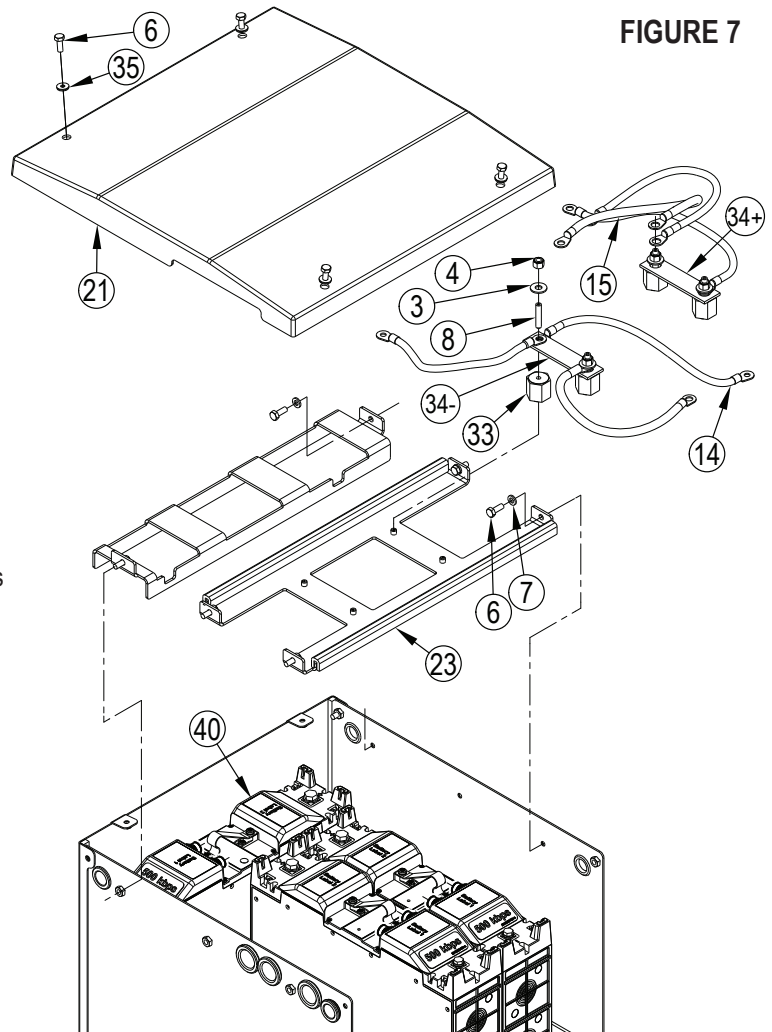


FIGURE 7

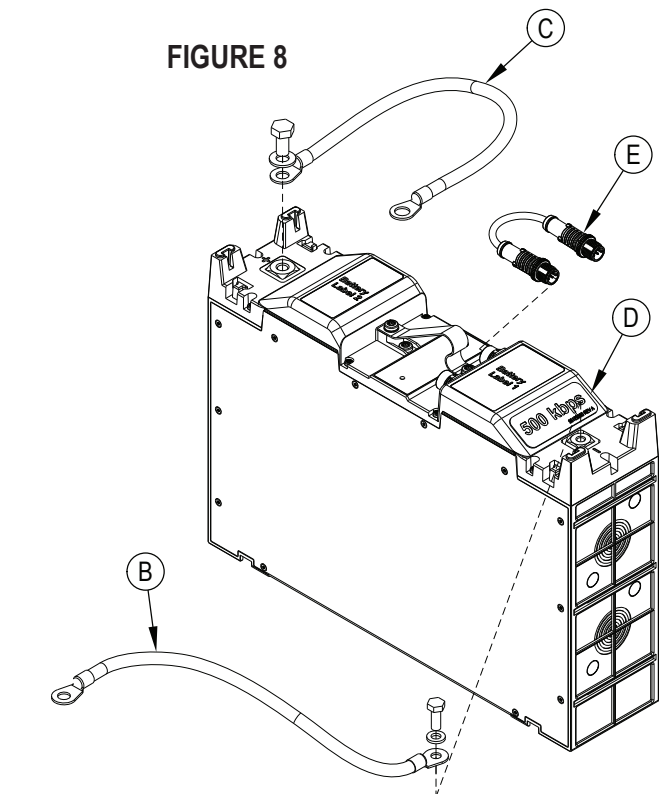
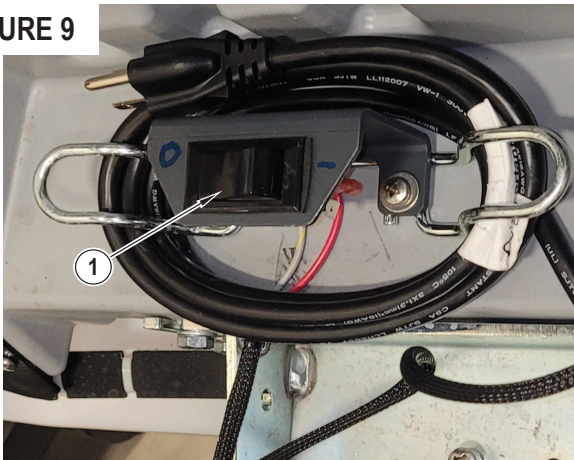


FIGURE 8

FIGURE 9



CONFIGURE THE MACHINE - Edit The Number Of Lithium Ion Batteries

21. See Figure 10. 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.
22. See Figure 11. Press the Information Switch (Y). Using the arrow keys (Y1) scroll down and select "Configuration".
23. In the Configuration Menu select "Batteries Installed".
24. Use the arrow keys (Y1) to scroll up or down and highlight the correct number of battery modules now in your machine (values from 3 to 6).
25. Press Information Switch (Y) to "save" and exit. This completes the installation and configuration.

FIGURE 10



FIGURE 11

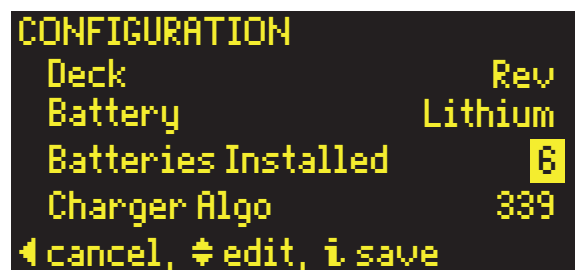
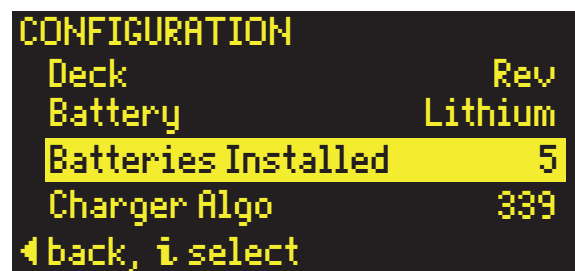
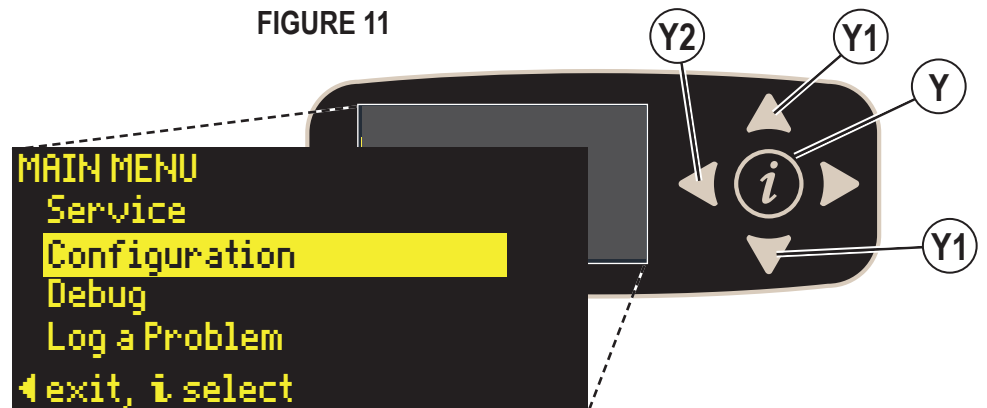
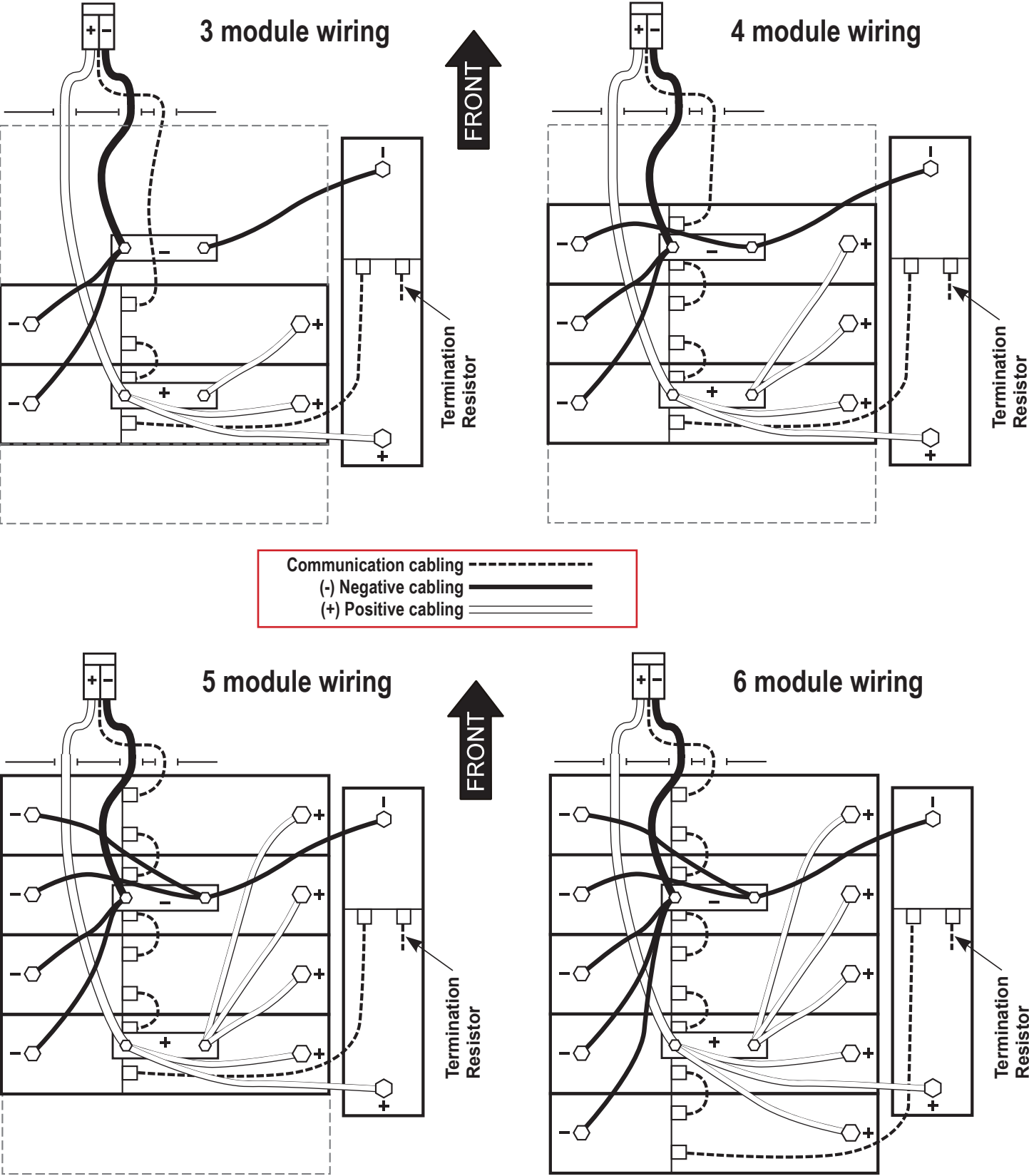


FIGURE 12



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