The FIRSTLINE EXTENDED RUN TIME BATTERY CABINET 10 KVA

User's Manual

301 Gaddis Boulevard • Dayton, Ohio 45403
U.S. Toll Free 866-261-1191
(937) 253-1191 • Fax: (937) 253-1723
Web site: www.stacoenergy.com

Form No.003-2359 Rev A 07/23/2010

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SECTION 1

Introduction

The FirstLine extended run time battery cabinet is used in conjunction with the FirstLine uninterruptible power supply (UPS) to prevent loss of valuable electronic information and minimize equipment downtime. During brownouts, blackouts, and other power interruptions, batteries provide emergency power to safeguard operation.

Figure 1 shows the FirstLine extended run time battery cabinet, which can be outfitted with one or two strings of batteries. See Table 1 for part numbering system.

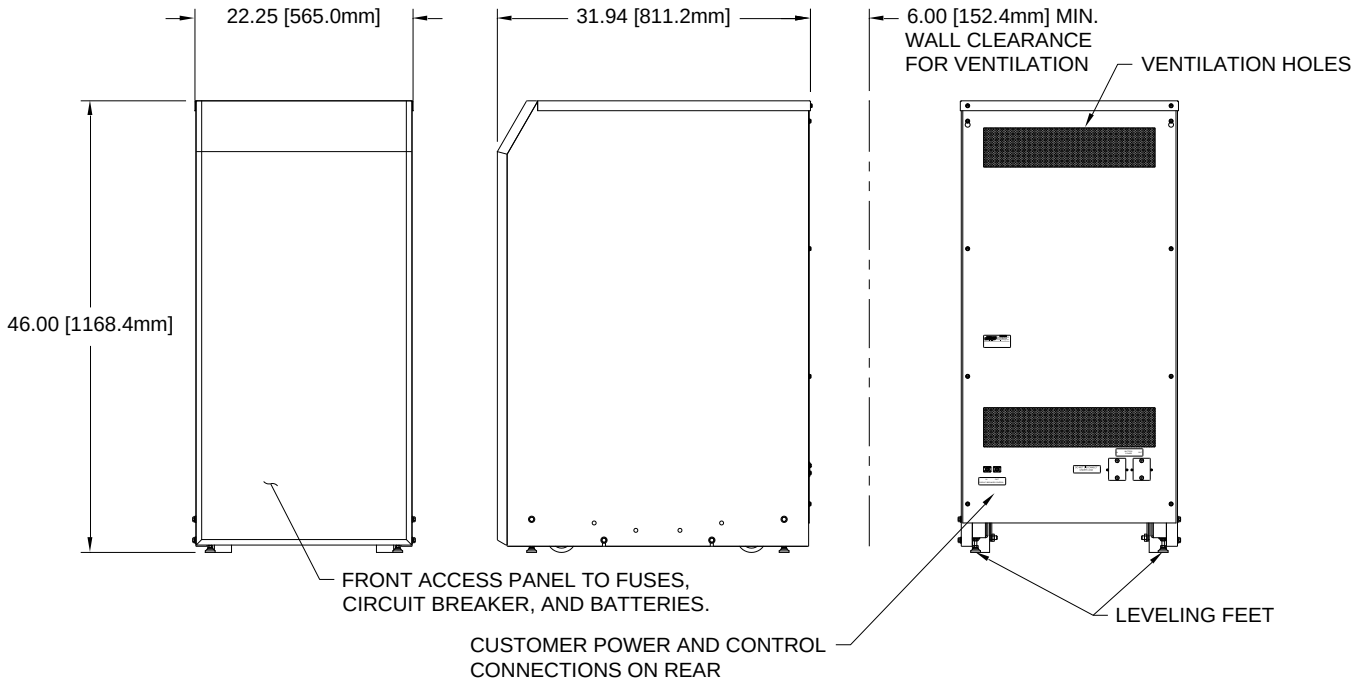

Figure 1 - The FirstLine Extended Run Time Battery Cabinet

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FirstLine Extended Run Time Battery Cabinet Part Number System

Part Number	Number of Strings	DC Bus Voltage
FLU-BAT-10-1-B	1	408 VDC
FLU-BAT-10-2-B	2	408 VDC
FLU-BAT-12-1-B	1	432 VDC
FLU-BAT-12-2-B	2	432 VDC
Note: -12 units are not part of UL Listing and are used with the FLU-10S-22 UPS models only.		

Table 1 - Part Numbering System

SECTION 2

Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

This manual contains important instructions that you should follow during installation and maintenance of the Battery Cabinet. Please read all instructions before operating the equipment and save this manual for future reference.

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

a. **Do not use outdoors.**
b. **Do not route wiring across or near hot surfaces.**
c. **Do not install near gas or electric heaters.**
d. **Use caution when servicing batteries. Battery acid can cause burns to skin and eyes. If acid is spilled on skin or in eyes, flush acid with fresh water and contact a physician immediately.**
e. **Equipment should be installed where it will not readily be subjected to tampering by unauthorized personnel.**
f. **The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.**
g. **Do not use this equipment for other than intended use.**

Table 2 - Symbols

	Danger / Risk of Electric Shock
	Caution
	Risk of Explosion
	Note
	Ground Connection
	Electrostatic Sensitive Device

DANGER

This Battery Cabinet contains LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the Battery Cabinet.

WARNING

This Battery Cabinet contains its own energy source (batteries). Hazardous voltage may be present even when the battery cabinet is not connected to a power source.

To reduce the risk of fire or electric shock, install this battery cabinet in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Do not operate near water or excessive humidity (95% maximum).

CAUTION

Batteries can present a risk of electrical shock or burn from high short circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.

Risk of explosion if batteries are replaced by an incorrect type. Replace with same type and rating only.

Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

Never dispose of batteries in a fire. Batteries may explode when exposed to flame

SECTION 3

Battery Cabinet Setup

This SECTION describes:
- Equipment inspection
- Floor loading and clearances
- Removing and replacing the cabinet panels
- Unloading the cabinet

Inspecting The Equipment

If any equipment has been damaged during shipment, keep the shipping and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment, 2) Send a copy of the damage claim within 15 days to your service representative.

Floor Loading

When planning the installation, consider the battery cabinet weight for floor loading. The strength of the installation surface must be adequate for point and distributed loading. The approximate weights are shown in the following table.

Table 3 - Model Floor Loadings

STANDARD MODEL FLOOR LOADING		
Battery Cabinet Model	Maximum Weight	Point Loading
FLU-BAT-10-1-B	757 Lbs (343 kg)	241 lb/in^2 (17 kg/cm^2)
FLU-BAT-10-2-B	1289 Lbs (585 kg)	410 lb/in^2 (29 kg/cm^2)

Clearances

The following clearances are recommended for the FirstLine Extended Run Time Battery Cabinet.

From Front of Cabinet	36” (91.4 cm) working space
From Back of Cabinet	6” (15.2 cm)
From Left Side of Cabinet to UPS*	Minimum 24” (61 cm)

* The right side of the UPS needs 24” of clearance for service access if the UPS is a -42, -44, or –I model. If the battery cabinet is placed on the left side of the UPS, no minimum clearance is required.

Unloading the Cabinet

The following tools are required for unloading the cabinet:

- Wrenches for 3/8” bolts
- Forklift (For removing the cabinet from the truck and to separate the lower pallet from the upper pallet and cabinet only. Once removed from the truck, remove the cabinet from the pallet as stated below. DO NOT move to final location by forklift.)

CAUTION

The Battery Cabinet is heavy (see Table 3). Unloading the cabinet requires at least two people to safely remove the cabinet from the pallets.

To remove the Battery Cabinet from the shipping pallets:

1. Remove all banding, wrapping, and foam protectors.
2. With a forklift, lift the cabinet and upper pallet using the forklift channels (see figure 2) from the lower pallet by 1 to 2 inches. Slide the lower pallet completely away from the cabinet. Lower the upper pallet and cabinet to the floor.
3. Remove the (12) 3/8” lag bolts securing the shipping brackets to the pallet and the (4) 3/8” lag bolts securing the front guard board in place (see figure 2).
4. Remove the guard board and 3/4” wood spacers under each of the shipping brackets.
5. Ensure that the four (4) leveling feet are raised so that they will not touch the floor when the cabinet is placed on the floor.
6. Slowly roll the cabinet forward off the pallet.
7. Once the cabinet is fully off the pallet, slide the pallet completely away from the cabinet.

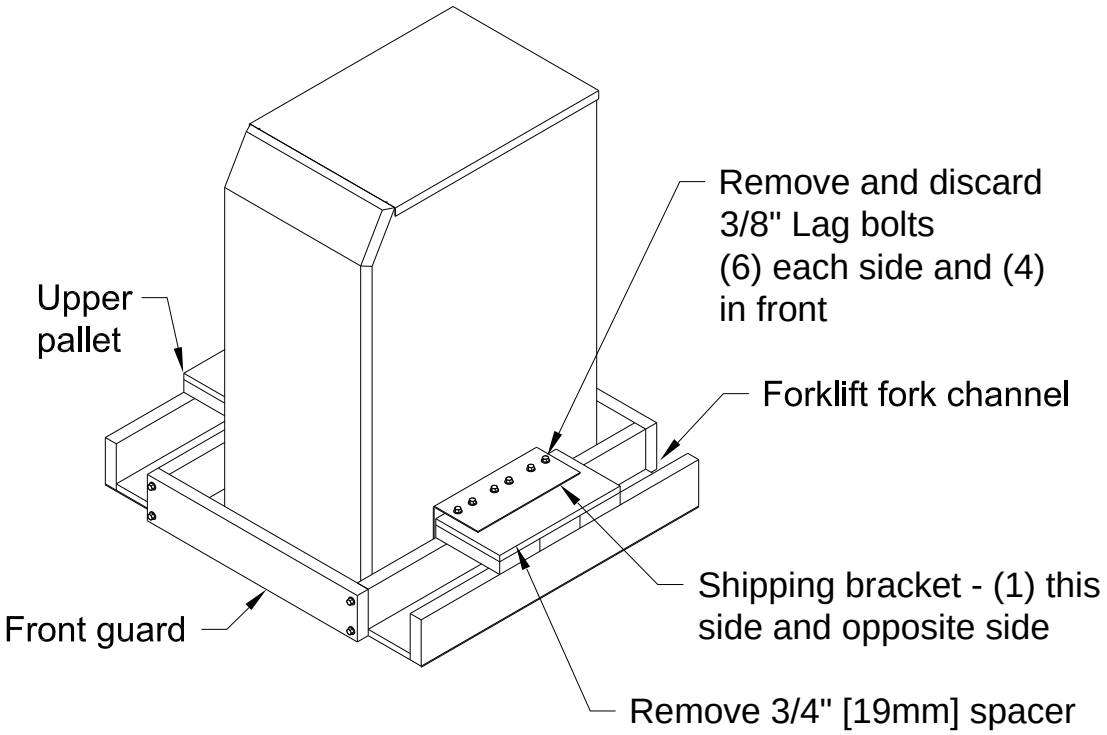


Figure 2 - Extended Run Time Battery Cabinet

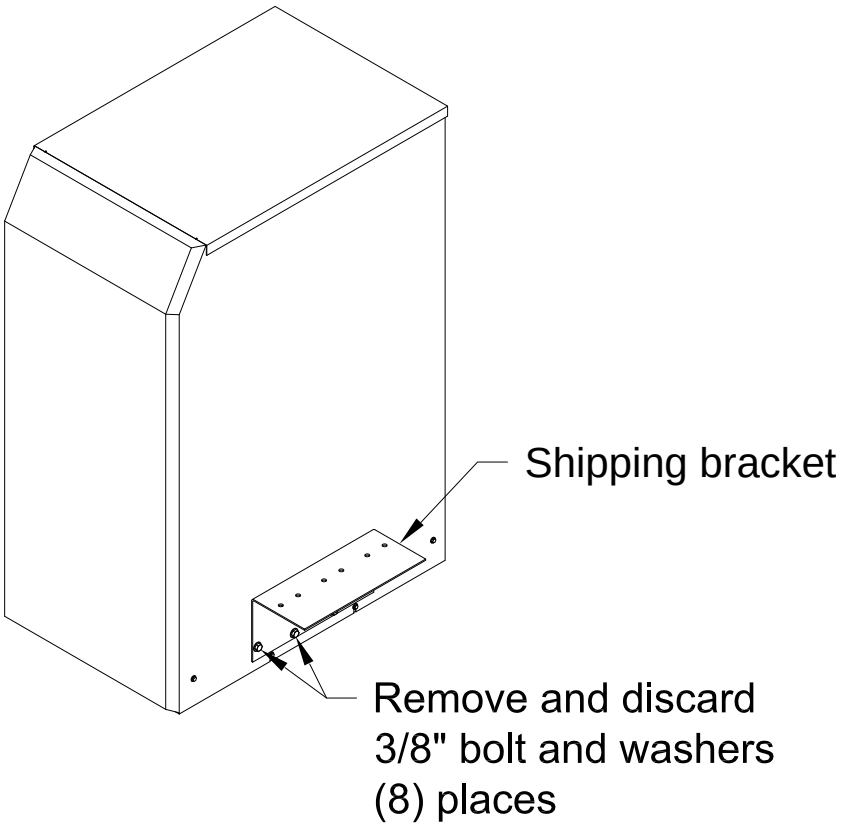


Figure 3 - Shipping Bracket

8. Remove the (8) 3/8” bolts mounting the shipping brackets to the cabinet and remove the brackets (see figure 3).
9. Roll the cabinet to the desired location
10. **Do not move the cabinet to another location by forklift, as the cabinet is heavy and may fall.**

Placing The Cabinet

Once the cabinet has been rolled into position, remove the front panel to access the front leveling feet by lifting the panel up and off the cabinet (see figure 5). Adjust the leveling feet as shown in figure 4.

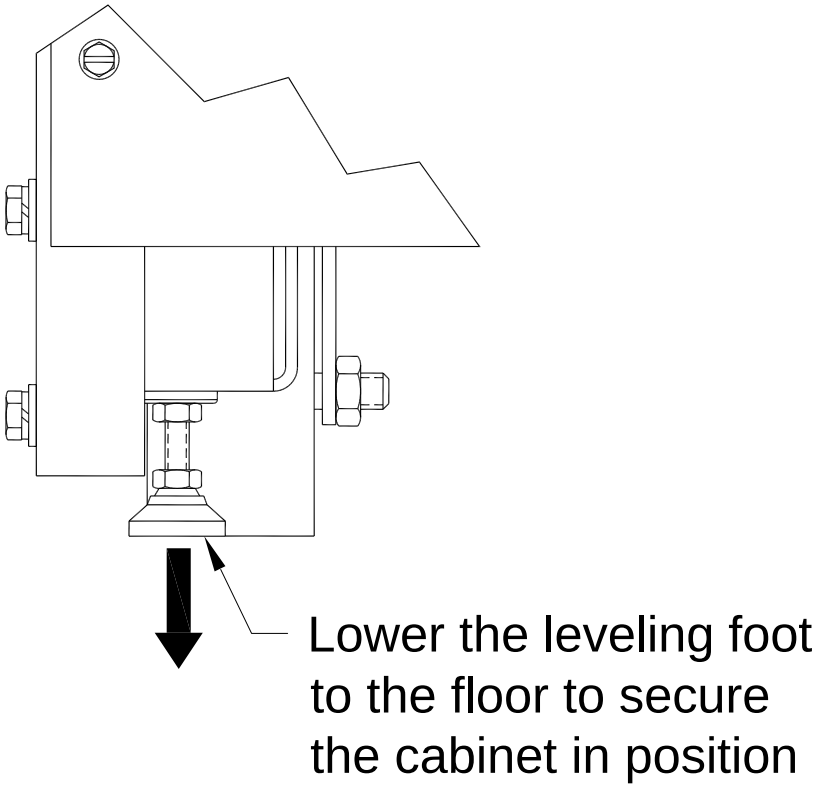


Figure 4 - Leveling foot being adjusted down to the floor

SECTION 4

Electrical Installation

WARNING

Only qualified service personnel (such as a licensed electrician) should perform the Battery Cabinet installation and initial startup. Risk of electrical shock.

Wiring Preparation

To begin wiring the Battery Cabinet:

1. Verify that the electrical connections to the installation site have been properly installed.

2. Wire the FirstLine UPS per the User's Manual, form number 003-2258.

3. Switch off utility power to the distribution point where the UPS is connected. Be absolutely sure there is no power.

4. Removing and replacing the front panel, see figure 5:
   Lift the panel up and off the cabinet.

   To replace the panel:

   - Lower the shoulder screws on the rear of the panel into the keyhole slots on the cabinet.

   - Press the panel downward until the panel is firmly mounted in place.

5. Switch the circuit breaker to the "Off" position.

6. Remove the inner front cover by removing the (8) eight screws mounting it to the enclosure.

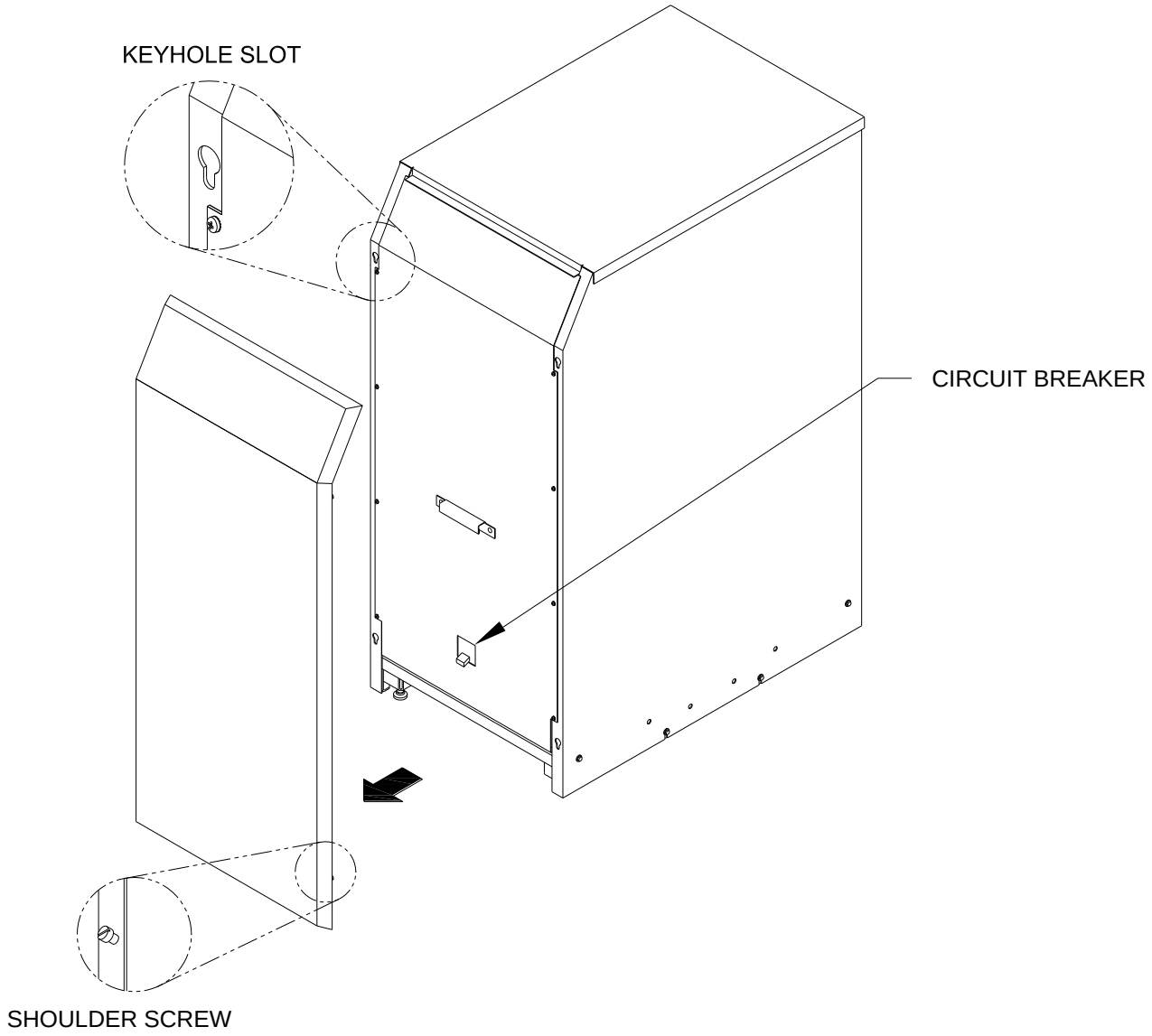


Figure 5 - Removing the Cabinet Front Panel

Connecting To The FirstLine Battery Cabinet

To be performed by authorized service personnel:

1. Inspect battery trays for signs of damage. Verify that all terminal connections are sound. See figure 6.

2. Use a voltmeter to verify that the battery string is above 408 VDC at the battery input connector shown in figure 7.

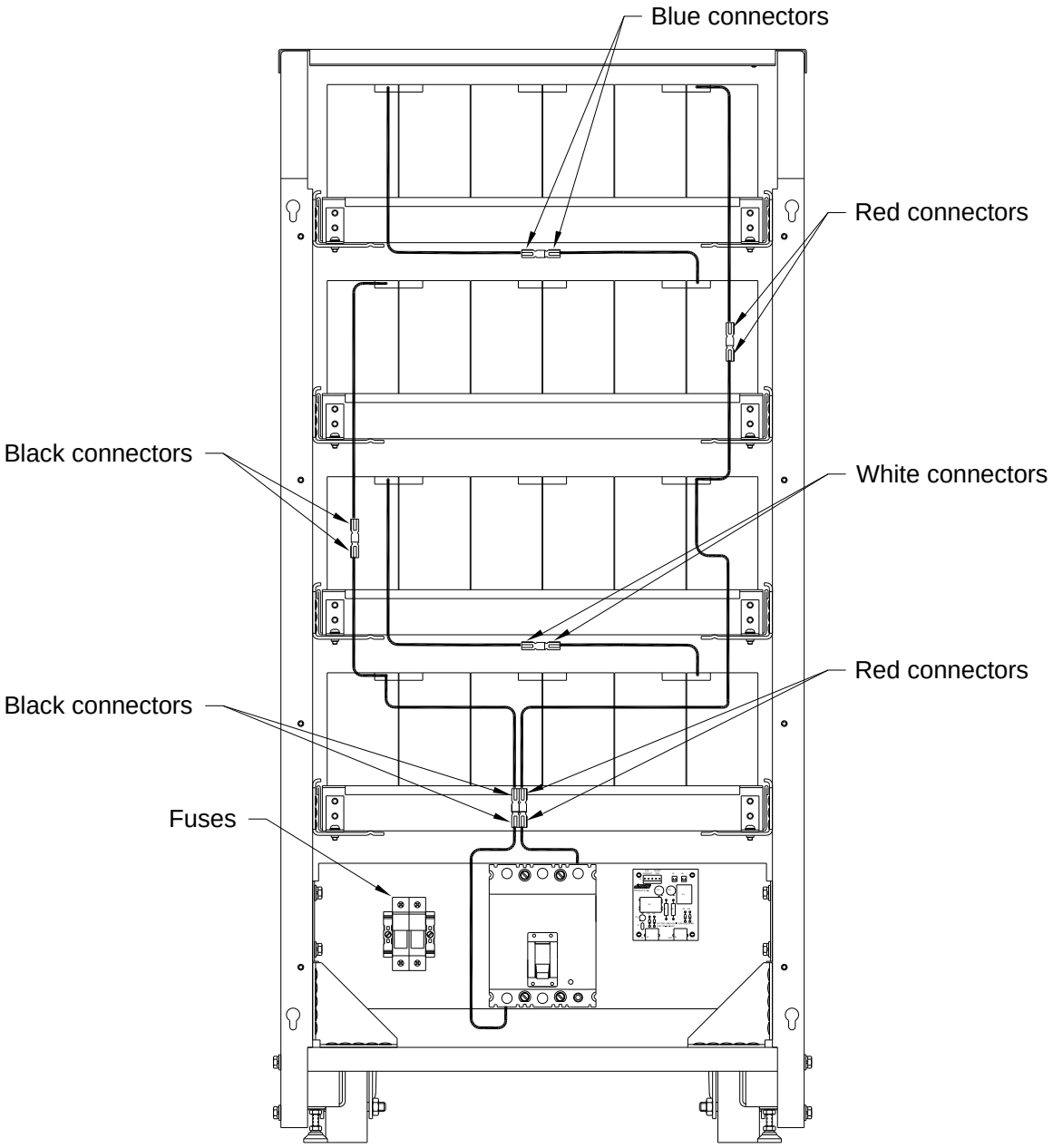


Figure 6 - Batteries

3. Remove the top screw holding the left (input) connector cover on the rear panel and loosen the bottom screw of this cover. Rotate the cover down. Replace the top screw and tighten both screws as shown in figure 7.

4. With the supplied 10 foot long power cable (**Staco part number 817-0368**), connect from the left (input) battery power terminals on the rear of the cabinet to the similar connector on the rear of the UPS. Ensure that the positive red connector of the cable connects to the positive red connector on the rear of the cabinets.
See figure 7.

Never connect the positive (red) to the negative (black). Severe damage and injury could result.

5. Once the power cable is connected, place the connector clamping brackets over the connectors as shown in figure 7 and lock in place with the #6-32 screws.

6. With the supplied 10 foot long 6 pin Mini-DIN cable (**Staco part number 273-0413**), connect from the left (input) circuit breaker control connector on the rear of the cabinet to the similar connector on the rear of the UPS. See figure 8.

7. Switch the circuit breaker to the “On” position.

8. Replace the front panel of the battery cabinet.

CAUTION: If the circuit breaker trips, the internal batteries of the UPS are still connected and providing power to the UPS.

9. Additional battery cabinets connect to the “Battery Power Out” connector on the first (or previous) battery cabinet instead of the UPS. Similarly, the “Circuit Breaker Control Out” connection is made from the first (or previous) battery cabinet to the “Circuit Breaker Control In” of the next (or following) cabinet.

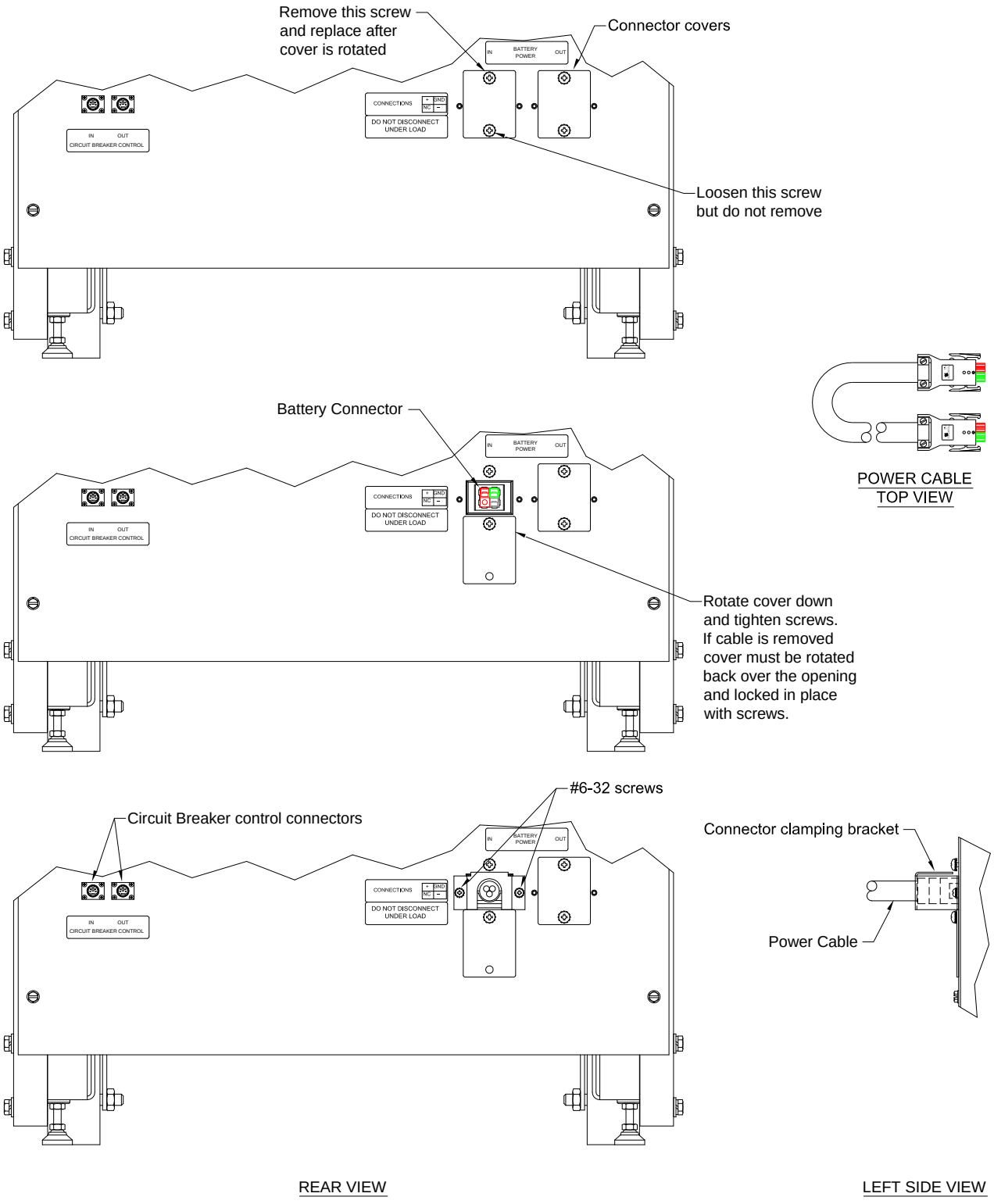


Figure 7 - Connectors

The following FirstLine UPS models are to be used with this battery cabinet:

FirstLine UPS Part Number System

Table 4 - FirstLine UPS Part Numbering System

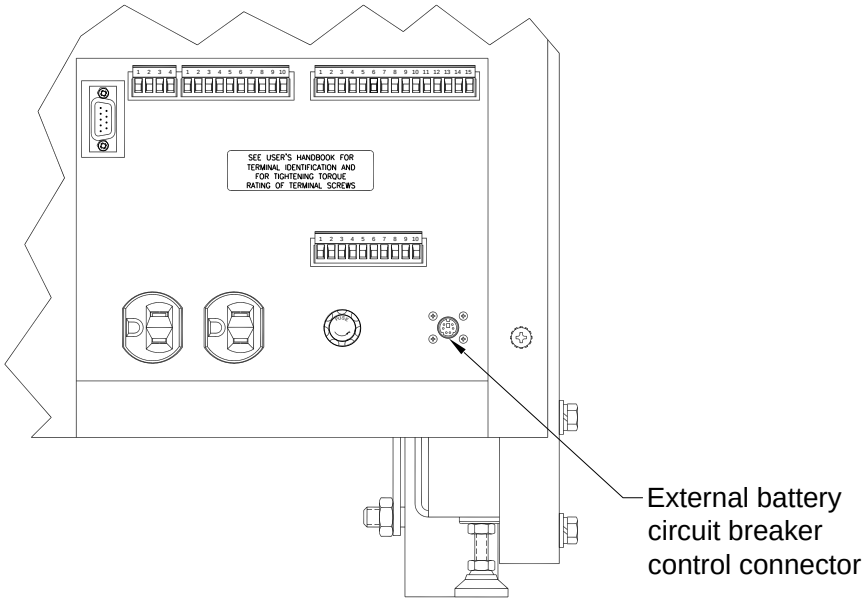
			Full Part Number		
kVA	**Input Voltage**	**Output Voltage**	**Basic Part No.**	**Battery Option**	**Other Options**
10	480	208Y/120	FLU-10S-42	-1	-I
	480	480Y/277	FLU-10S-44	-1	-I
	208Y/120	208Y/120	FLU-10S-20	-2	
	208Y/120	208Y/120	FLU-10S-20	-1	-I
	220Y/127	220Y/127	FLU-10S-22	-1	
	220Y/127	220Y/127	FLU-10S-22	-2	

Battery Option

-1 = 1 string
-2 = 2 string
-0 = Without Batteries

Other Options	Suffix	Notes
Isolation Transformer	-I	Isolation transformer required for use with delta (3-wire) input. Standard is K20 rated.

220V Models are not listed to UL, CUL, or CSA.



UPS REAR VIEW

Figure 8 - UPS Connections

SECTION 5

Special Considerations for Connecting Batteries to the FirstLine UPS, including Extended Run Time Battery Cabinets

It is never safe to work within either the UPS or the extended battery cabinet while the UPS is powered. The batteries produce a lethal voltage whether or not the UPS is powered or running. Always work with extreme caution. No service work should be performed unless the personnel are properly trained and appropriate tools and equipment are available.

All batteries must be connected to the UPS prior to starting the rectifier. The rectifier runs whenever the UPS is on. If a battery is disconnected while the rectifier is running (for example, if the circuit breaker on an extended battery cabinet is opened while the UPS is running), it must not be closed without first stopping the rectifier. Connecting a battery while the rectifier is running will cause equipment damage that is not covered by the equipment warranty. See the procedure, below, for stopping the rectifier.

Before connecting the cables between the UPS and the Extended Run Time Battery Cabinet, the UPS must be powered down. On the Extended Run Time Battery Cabinet, the front outer panel must be removed and the circuit breaker placed in the “Off” position. See Section 4, “Connecting to the FirstLine Battery Cabinet” to connect the cables.

Stopping the Rectifier in the UPS

Before connecting any batteries to the UPS, the rectifier must be stopped. The rectifier is stopped whenever the UPS is OFF. All breakers should be closed when the UPS is started. Generally, the only reason to open any of the battery disconnect devices is to perform service, which requires that the UPS be turned off. It is best to close the disconnect devices before starting the UPS and leave them closed during operation. In the event of an emergency condition that requires opening a disconnect device, it will be necessary to stop the rectifier in order to restore the system to normal configuration.

The simplest way to stop the rectifier is to turn off the UPS by pressing the power ("line-circle") button on the front panel. This will remove power from the load. Once the battery breaker(s) has (have) been closed, the UPS can be restarted by pressing the power button.

If the UPS is connected to the load using a Maintenance Bypass Switch (MBS), the load can be maintained when the UPS is turned OFF.

To transfer to MBS:

1. Verify that the bypass source is available (Bypass lamp on UPS mimic display is green).

2. Perform a manual transfer to bypass mode on the UPS by pressing and holding the ESC key while simultaneously pressing the UP-ARROW key.

3. Verify that the UPS output is ON BYPASS by observing that the lamp associated with the bypass line at the static switch block on the mimic display is green and that the lamp associated with the inverter is not lit.

4. Operate the MBS to put it in bypass mode.

It is now safe to turn off the UPS and close the battery breaker(s). Restart the UPS. To transfer back to normal mode:

1. Verify that the UPS is still ON BYPASS by observing the mimic display. If not, perform a manual transfer to bypass as described, above.

2. Operate the MBS to put it in normal mode.

3. Enable automatic transfer by pressing and holding the ESC key while simultaneously pressing the DOWN-ARROW key. After a few seconds, the mimic display should show that the static switch has transferred the load to inverter.

CAUTION: The battery cabinet circuit breaker must be closed before starting the UPS. Switch the circuit breaker “On” while the UPS is operating can cause equipment damage that is not covered by the equipment warranty.

SECTION 6

Battery Removal, Installation, and Service

The batteries must only be serviced by authorized service personnel.

Before any battery service is attempted, the batteries must be disconnected by unplugging the cables to the battery trays. Before removing the cables, the connections should be marked in a way that no confusion will exist when it is time to reconnect the cables (see Figures 6 and 10). The batteries are mounted in slide out trays that permit access to the battery to battery connections when the trays are withdrawn from the cabinet.

If batteries are being replaced, only use the same manufacturer and battery type and rating as the battery removed.

It is very important that only one tray at a time be extended from the cabinet. If more than one tray is extended, the cabinet can become unstable and topple over.

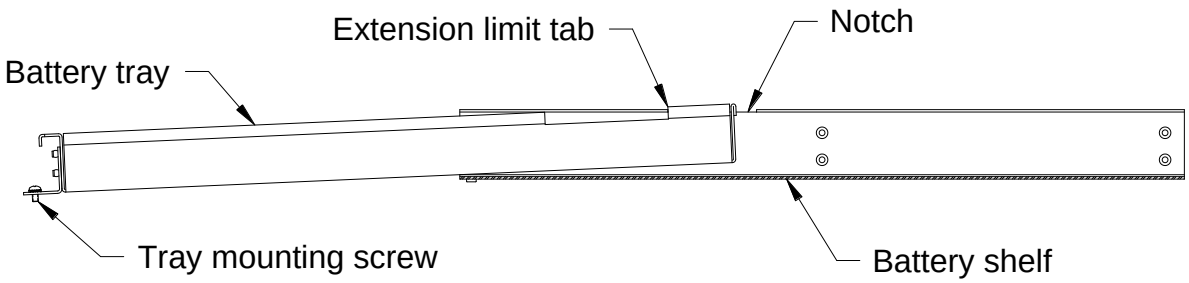
After each tray is installed or serviced, it must be fully inserted and secured using the supplied threaded fasteners before attempting to install or service another tray.

If the trays are to be removed, always remove the highest tray first. The battery trays are very heavy and it will be necessary to use a lifting device to support the trays as they are removed. When the trays are to be reinstalled, use the procedure in the following paragraph.

The battery trays are very heavy and it will be necessary to use a lifting device to support the trays as they are installed. Do not take away the external support until the extension limit tabs on the upper sides of the battery tray are inserted past the notches on the upper edge of the battery shelf (see figure 9). Always install the lowest battery tray first. After it is inserted fully into the support shelf, secure the tray with the supplied threaded fasteners. After all of the trays are reinstalled and secured, reconnect the cables using the markings as a guide.

WARNING

Never connect the two cables from a battery tray or from a battery string (two trays) together as severe damage will occur, resulting in fire and/or injury. Battery connections should only be made by a person wearing eye and hand protection. It is advised that eye wash be available. If there are any doubts about the proper connections, do not proceed.



Cutaway side view of battery tray
batteries not shown for clarity

Figure 9 - Battery Tray

Maintenance

The FirstLine Extended Run Time Battery Cabinet is designed to be virtually user maintenance free, requiring only the occasional wipe with a damp cloth or non-abrasive cleaner.

Spare kits are available for the FirstLine Battery Cabinet series, please contact Staco Energy Products Co. service center for details.

For maximum availability of the UPS, the batteries should be replaced as part of a comprehensive preventive maintenance program:

REPLACEMENT BATTERY		
Manufacturer	**Cat. Number**	**Quantity Required**
China Storage Battery	HRL1280W	34 per string[1]
China Storage Battery	HR1290W	34 Per string[1]
REPLACEMENT BATTERY Suitable for computer-room applications		
Manufacturer	**Cat. Number**	**Quantity Required**
China Storage Battery	HR1280WFR	34 Per string[1]
China Storage Battery	HR1290WFR	34 Per string[1]

RECOMMENDED REPLACEMENT INTERVALS	
Batteries	2 to 5 years[2]

Note: Batteries suitable for computer rooms are good for all applications.

[1] FLU-BAT-12 Battery cabinet contains 36 batteries per string. Note: -12 units are not part of UL listing.

[2] Battery life is highly dependent on the ambient temperature and the number and depth of discharge cycles. A discharged battery should be recharged as soon as possible. If the battery is left in a discharged state, irreversible sulfation occurs, reducing the capacity (run-time) of the battery.

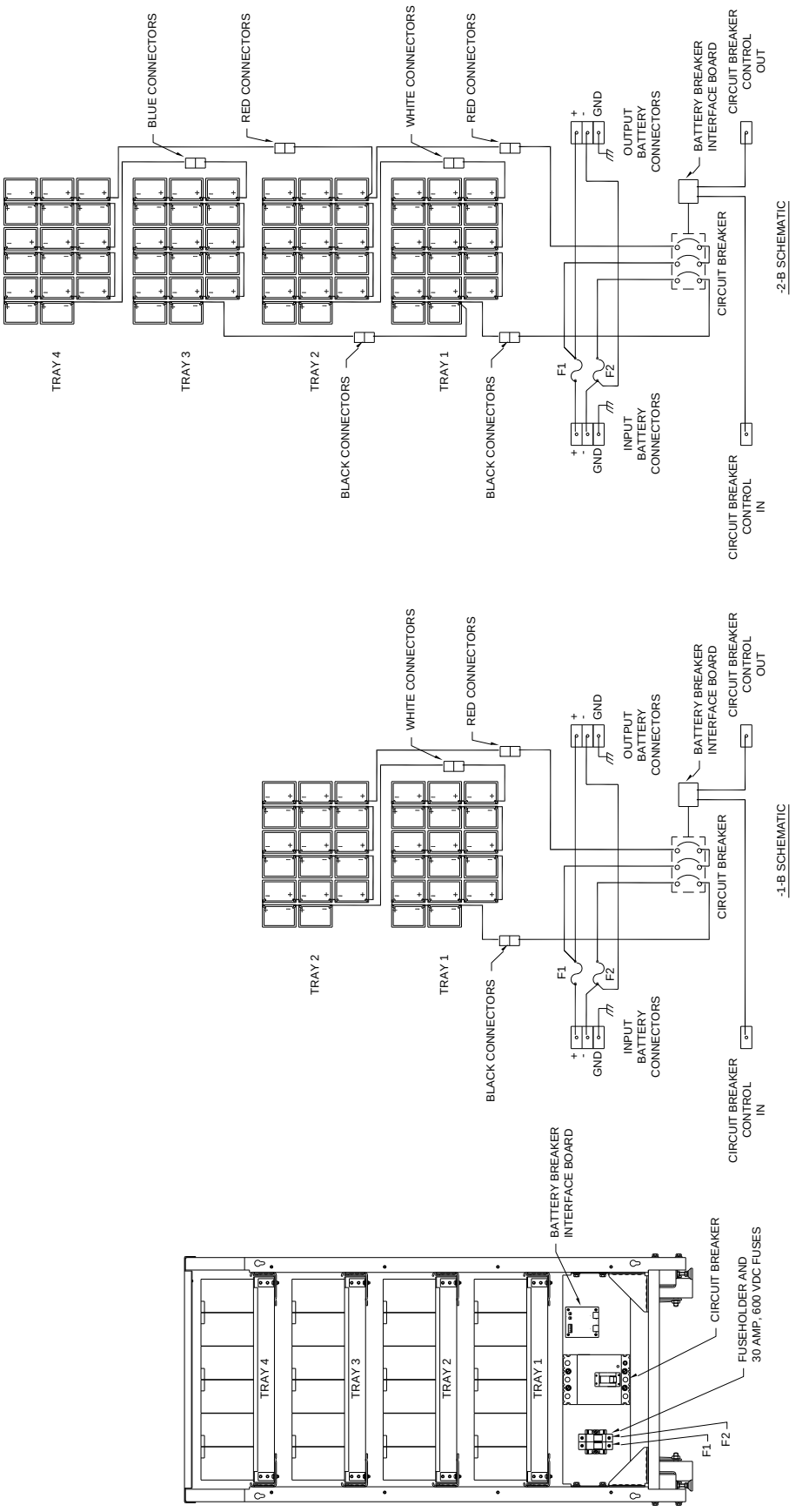


Figure 10 - Battery Wiring Schematic