PS/IO Circuit Board Retrofit

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July 28, 2025

Qualified Persons

⚠ WARNING

Only qualified persons knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Access Control

⚠ WARNING

The 6800 Series Automatic Switch Controls are connected to switchgear operating at primary voltage levels. High voltage may be present in the wiring to the switch control or the switch control itself during certain failures of the switchgear wiring or grounding system or because of a failure of the switch itself. For this reason, access to the switch control should be treated with the same safety precautions applied when accessing other high-voltage lines and equipment. Follow all locally approved safety procedures when working on or around this switch control.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before working on a 6800 Series Automatic Switch Control. Become familiar with the Safety Information on page 3 and Safety Precautions on page 4. The latest version of this publication is available online in PDF format at **sandc.com/en/contact-us/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of a 6800 Series Automatic Switch Control. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

⚠ WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the 6800 Series Automatic Switch Controls are listed in the ratings table in S&C Specification Bulletin 1045-31.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the product. Become familiar with these types of messages and the importance of these various signal words:

⚠ DANGER

"DANGER" identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

"WARNING" identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

"NOTICE" identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com**, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before performing a PS/IO board retrofit in a 6800 Series Automatic Switch Control.

Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ WARNING

To avoid electric shock, before attempting to access an existing switch installation, carefully check for visible or audible signs of electrical or physical malfunction (do this before touching or operating the switch control or any other part of the installation). These warning signs include such things as smoke, fire, open fuses, crackling noises, or loud buzzing. If a malfunction is suspected, treat all components of the installation, including the switch control and associated mounting hardware, as though they were elevated to primary (high) voltage.

⚠ DANGER

6800 Series Automatic Switch Control line voltage input range is 93 to 276 Vac. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS**. Access to a 6800 Series Automatic Switch Control must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.
6. **MANUALLY RECONFIGURING THE CIRCUIT.** When manually reconfiguring the circuit (for example, during repairs), follow your company's operating procedures to disable automatic operation of the IntelliTeam® SG or IntelliTeam® II Automatic Restoration System. This prevents any unexpected operation of a team member.

This document describes the procedure to install the power supply/input-output (PS/IO) circuit board in a 6800 Series Automatic Switch Control.

The PS/IO board accepts +/– 150 Vac from the sensor pre-amplifier (SPA) board if sensor power is available, and/or 120-Vac external power, if available. When both power sources are connected, the board will run on ac external power unless it drops below about 105 Volts, when sensor power will take over. The PS/IO board provides +12 Vdc for the front panel board, +/– 15 Vdc for the ASP and SPA boards, and 24-Vdc battery charging. It also connects to the battery testing resistors and provides power for the battery strip heater.

The PS/IO board accepts status inputs from the line switch(es) and provides the output control signal for operating the line switch(es). Input and output signals are processed through the X-bus converter.

Field Retrofit Kit

PS/IO Board Retrofit Kit	Catalog Number
6801 Control (for Scada-Mate® Switching Systems)	903-003052-04
6802 Control (for Overhead Source Transfer)	903-003052-03
6802 Control (for Vista® Underground Distribution Switchgear)	903-003052-05
6802 Control (for Pad-Mount Gear)	903-003052-03
6803 Control (for Pad-Mount Gear)	903-003052-03

Retrofit kits include a new harness, 007-001194-01 REV 012. See Figure 1. If a harness was connected to J7, it will be removed from the three boards and discarded in Step 4(b) on page 11. See Figure 3 on page 9, The new harness will be installed in Step 9(b) on page 14. it will be removed from the three boards and discarded in Step 4(b) on page 11. See Figure 3 on page 9. The new harness will be installed in Step 9-B2.

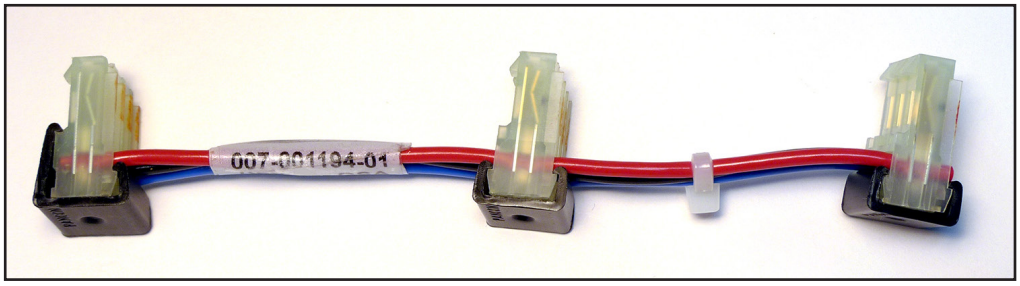

Figure 1. New harness, catalog number 007-001194-01 REV 012, that replaces the existing harness.

Retrofit kits also include extra hardware in case a part is lost in the field. There may be hardware remaining when the retrofit has been completed.

Tool List

The following tools are required:

- A #2 Phillips screw-starter screwdriver
- A small flat-blade screwdriver
- A ¼-inch nut driver
- A wire cutter

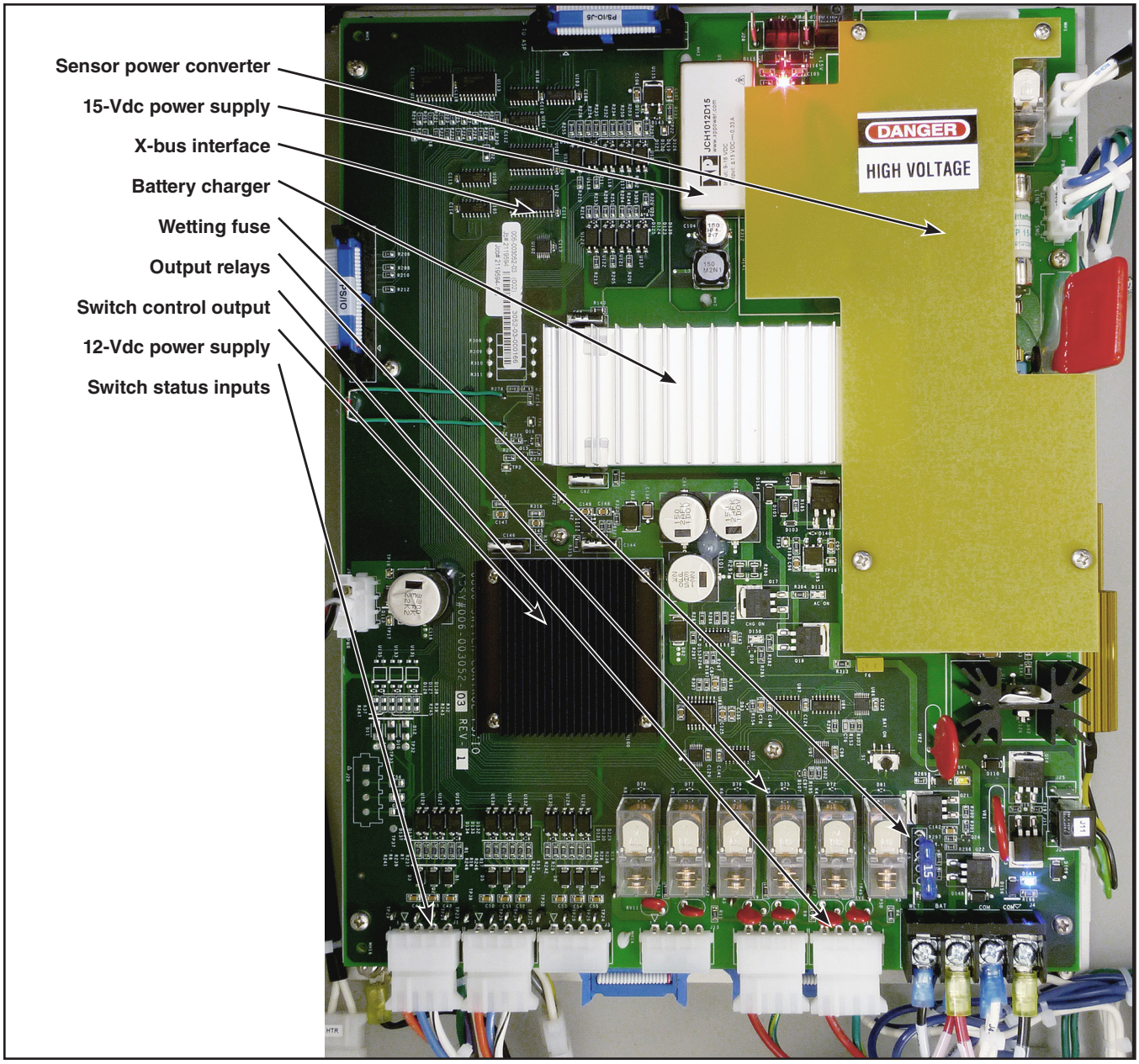

Figure 2. New series PS/IO board components.

PS/IO board connectors. See Figure 3 on page 9:

J1 Switch 1 status
J2 Switch 2 status
J3 Switch 3 status
J4 Battery terminals
J5 Ribbon to ASP board
J6 Battery heater
J7 Power to ASP and SPA boards
J8 Power from SPA board
J9 Front panel power
J11 Battery test
J12 Ribbon to front panel
J13 Operate Switch 3
J14 Operate Switch 2
J15 Operate Switch 1
J17 120-Vac control power
J20 Auxiliary inputs
J27 Power to ASP and SPA boards
(J27 is a duplicate spare)

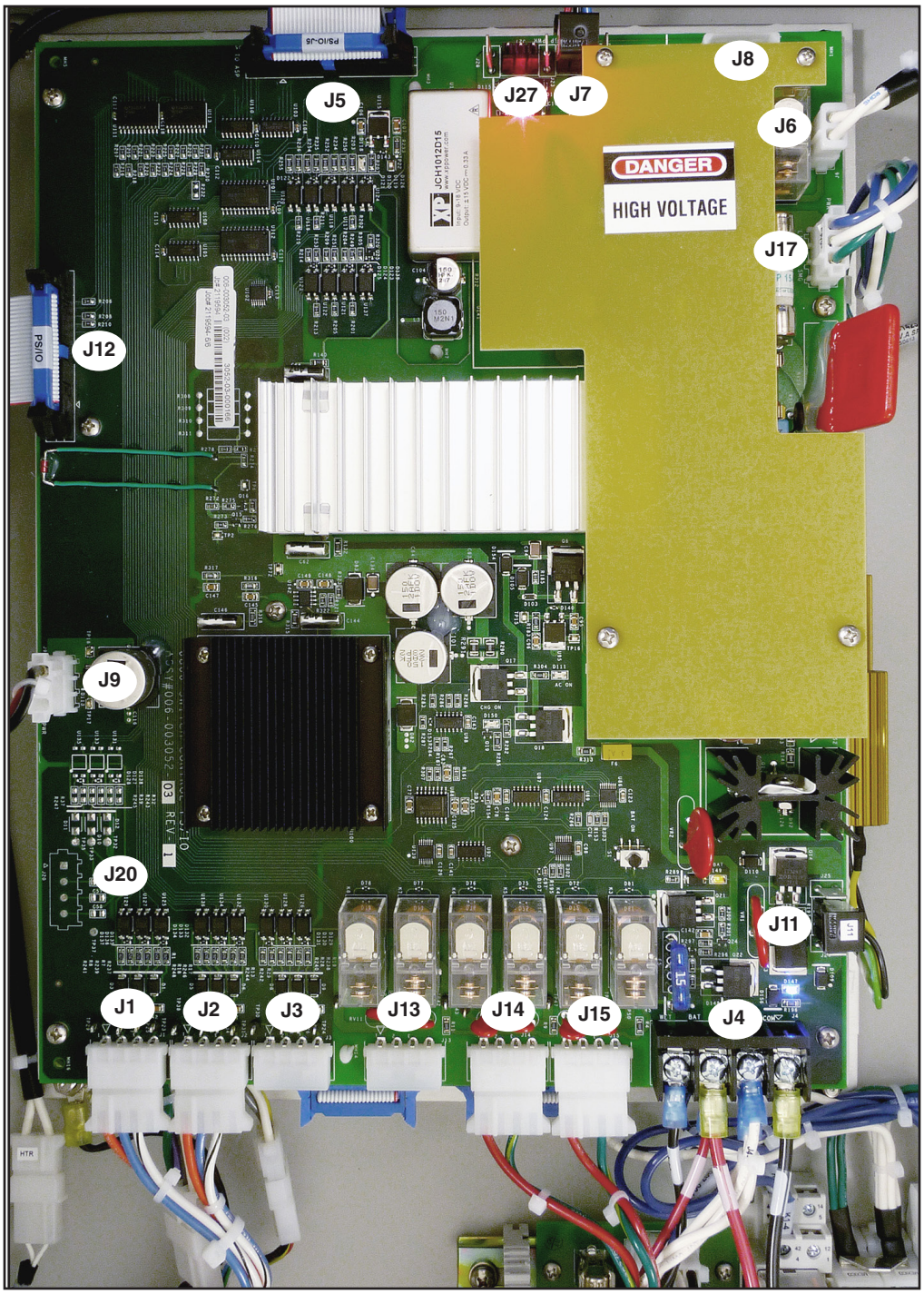

Figure 3. New series PS/IO board connector locations.

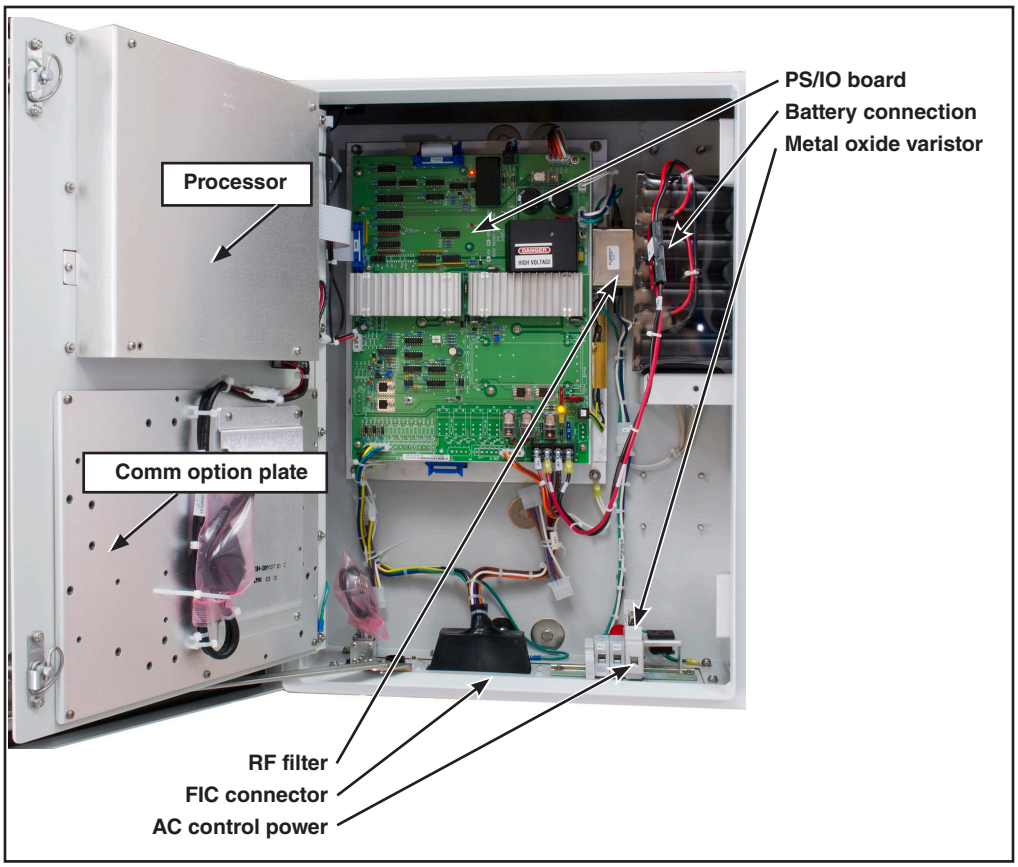

Figure 4. Component location, original PS/IO board in 6800 Series controls.

⚠ WARNING

Electric shock hazard. Disconnect ac control power, sensor power, and battery before proceeding. **Electric shock can result in serious personal injury or death if instructions are not followed.**

⚠ WARNING

Electric shock hazard. Wear high-voltage gloves when handling the FIC connector and cable. **Electric shock can result in serious personal injury or death if instructions are not followed.**

Three circuit boards are mounted inside the control. The power supply/input output (PS/IO) board at the top, and the analog signal processing (ASP) board are screwed to a frame attached to the rear mounting plate by four screws in key-hole slots. The third, the sensor pre-amplifier (SPA) board, is screwed directly to the rear mounting plate under the ASP board. Circuit boards in a pad-mount or Vista switchgear enclosure are mounted differently, but the PS/IO board is still the board on top.

The 2-inch (51-mm) x 5-inch (127-mm) connector on the bottom of an overhead control is called the field interface connector (FIC). It connects the line-switch cable to the control. Pad-mount and Vista switchgear controls have circular connectors for connecting each line switch.

Follow these steps to replace the PS/IO board:

STEP 1. Disable the IntelliTeam SG system by pressing the Automatic Restoration CHANGE faceplate button to select "PROHIBITED" on the faceplate of any active 6800 Series control of the team to be disabled.

STEP 2. Electrostatic discharge (ESD) protection:

(a) Make sure the control is properly grounded.

(b) At a minimum, touch a grounded surface prior to handling each circuit board.

(c) Never touch solder terminals on the back of a circuit board.

(d) A circuit board must always be mounted in a control, kept in an anti-static bag, or placed on an ESD-protected grounding mat. Never set down a board without anti-static protection. For convenience, use a second anti-static ESD bag so a removed board can be immediately put into an ESD bag before the new board is removed from its bag.

STEP 3. Remove all power sources:

(a) De-energize and disconnect external ac power, if present.

(b) Disconnect the FIC connector at the bottom of the enclosure.

(c) Disconnect the battery.

STEP 4. Disconnect all cables from the PS/IO board. See Figure 3 on page 9:

(a) Disconnect these from the left side of the PS/IO board:

- J12 ribbon cable to front panel
- J9 power supply to front panel
- J20 cable to auxiliary contact inputs (if present)

(b) Disconnect these from the top of the PS/IO board:

- J5 ribbon cable to ASP board
- J7 power supply to ASP and SPA boards (Remove this harness from all three boards, and discard it. It will be replaced by a new harness. See Figure 1 on page 6.)
- J8 power input from SPA board (if present)

(c) Disconnect these from the right side of the PS/IO board:

- J6 battery heater (if present)
- J17 120-Vac control power (if present)
- J11 battery test resistors

(d) Disconnect these from the bottom of the PS/IO board:

- J1 cable to the FIC (also J2 and J3 if present)
- J15 cable to the FIC (also J13 and J14 if present)

(e) Disconnect these wires from the terminal strip, left to right:

- (WET) red wire going to the FIC, (BAT) red wire going to the battery
- (COM) black wire going to the FIC, (COM) black wire going to the battery

STEP 5. Remove the PS/IO board:

(a) Remove the 10 Phillips screws holding in the PS/IO board in the frame. Some boards have a high-voltage cover held with four standoffs. If so, remove eight Phillips screws holding the board in the frame and the two Phillips screws holding the bottom of the cover to the standoffs. Then, remove the bottom two standoffs using a ¼-inch nut driver.

(b) Release the three locator pins:

- Gently lift the bottom of the board.
- Using a small screwdriver, compress the tab on the bottom locator pin to release the board from the pin.
- Repeat with the middle and the upper locator pin.

(c) Remove the board from the frame.

(d) Put the board into an anti-static bag.

STEP 6. Install the new PS/IO board:

(a) Place the PS/IO board over the three locator pins.

(b) Push the board onto the pins. The tab of each pin should pop-out above the board.

(c) Lift and raise the bottom of the high-voltage cover and install the two standoffs under the cover using a ¼-inch nut driver. See Figure 6 on page 13.

(d) Install eight Phillips screws in the board and two screws through the high-voltage cover in the standoffs.

STEP 7. If the switch control has an RF filter (the 2½-inch silver cube at the right of the PS/IO board):

(a) Make sure J17 is disconnected from the PS/IO board.

(b) Disconnect the inline connector RF1 on the RF filter cable. See Figure 5 on page 13.

(c) Connect the new supplied cable between the powered end of RF1 and J17 on the PS/IO board. Install the cable clip if there is room, and secure the new cable. See Figure 6 on page 13.

(d) The disconnected cables attached at the top and bottom of the RF filter may be cut off and discarded, or leave them uncut and unattached.

STEP 8. Remove the metal oxide varistor (MOV), the 1-inch red disc behind the ac external power terminals:

(a) Use a small flat-blade screwdriver to loosen the line and neutral screws at the rear of the terminal block. See Figure 7 on page 13.

(b) Pull out the varistor and the other wires inserted with it from the terminal block.

(c) Use a wire cutter and cut the varistor off the other wires. Discard the varistor.

(d) Reinsert the wires into the terminal block, and tighten the two screws.

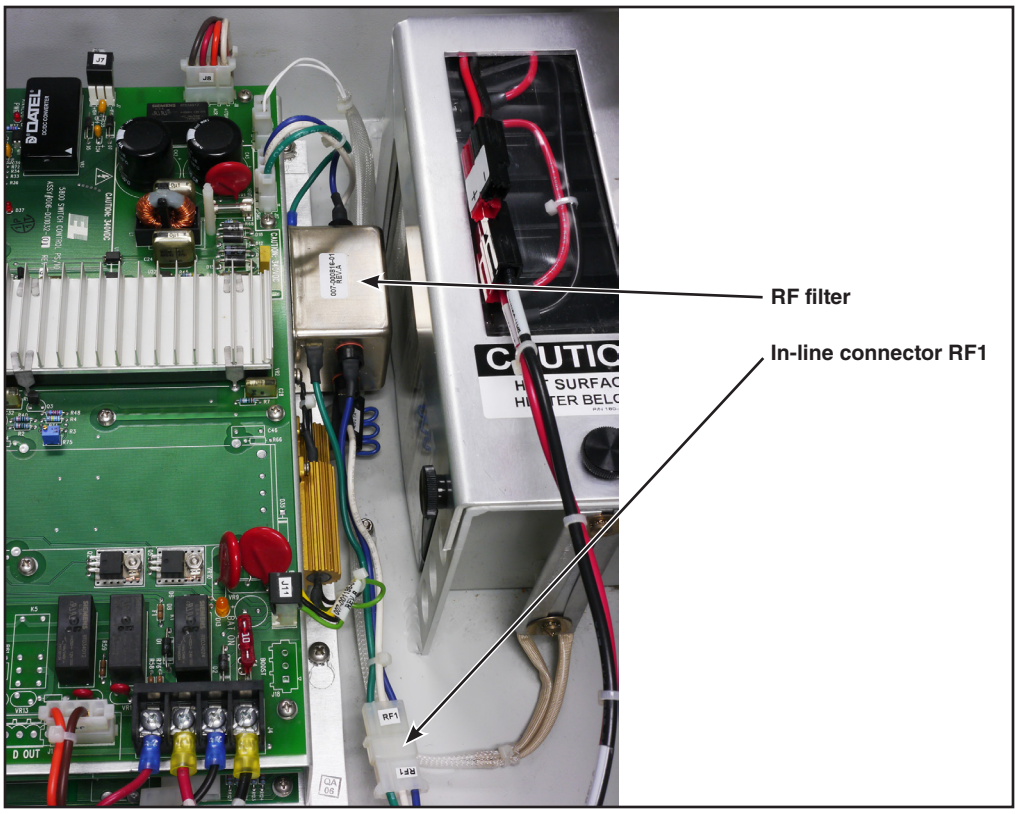

Figure 5. RF filter connected to the PS/IO board and to the battery with connector RF1.

Figure 6. New standoffs and cable clip.

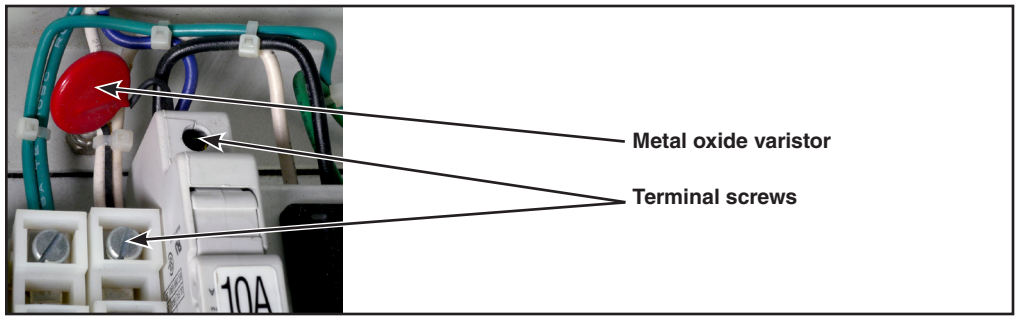

Figure 7. The MOV connected at the back of the ac terminals.

STEP 9. Reconnect all cables to the PS/IO board. See Figure 3 on page 9:

(a) Reconnect these at the left side of the PS/IO board:
- J12 ribbon cable to front panel
- J9 power supply to front panel
- J20 cable to auxiliary contact inputs (if present)

(b) Reconnect these at the top of the PS/IO board:
- J5 ribbon cable to ASP board
- J7 power supply to ASP and SPA boards (Replace the discarded harness with the supplied catalog number 007-001194-01 REV 12 harness. See Figure 1 on page 6.)
- J8 power input from SPA board (if present)

(c) Reconnect these to the right side of the PS/IO board:
- J6 battery heater (if present)
- J17 120-Vac control power (if present)
- J11 battery test resistors

(d) Reconnect these to the bottom of the PS/IO board:
- J1 cable to the FIC (also J2 and J3, if present)
- J15 cable to the FIC (also J13 and J14, if present)

(e) Reconnect these wires to the terminal strip, left to right:
- (WET) red wire going to the FIC, (BAT) red wire going to the battery
- (COM) black wire going to the FIC, (COM) black wire going to the battery

STEP 10. Restore all available power sources:

(a) Connect and energize external ac power, if present.

(b) Reconnect the FIC connector at the bottom of the enclosure.

(c) Reconnect the battery.

STEP 11. ***If restarting a control on battery power only:*** The control will start when sensor power or external ac power is connected. ***If the control is powered only from the battery:*** The black BAT ON button on the PS/IO board must be pushed to start the control.

STEP 12. If the original board malfunctioned, it may have generated errors in the status point log, such as setting the **Temperature Trouble** status point to "Active." After installing the new PS/IO board, connect to the control and execute the **Clear Electronics Bad** command. This command is on the *Operation* screen in IntelliLink software version 6 and on the *Setup>General* screen in IntelliLink software version 5. See Figure 8.

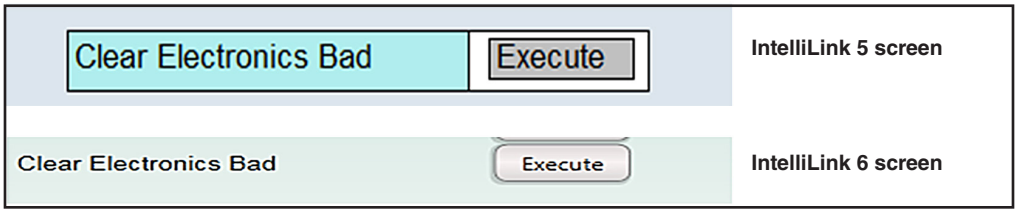

Figure 8. The Clear Electronics Bad command.