

Field Installation of FMU Power Conditioner

Description

Syntech's power conditioner (Figure 1) combines a surge diverter, isolation transformer, and power line filter to effectively eliminate the whole range of potential power quality problems. The power conditioner covered in this bulletin is the internal component of the hardwired 3-amp power conditioner covered in PB-214 - Third Party Surge Protection Equipment. Because the hardwired power conditioner must be installed indoors and in-line with the Fuel Management Unit (FMU) power wires sourced from the breaker, it does not work for all installs, particularly when the FMU does not source power from the breaker panel.

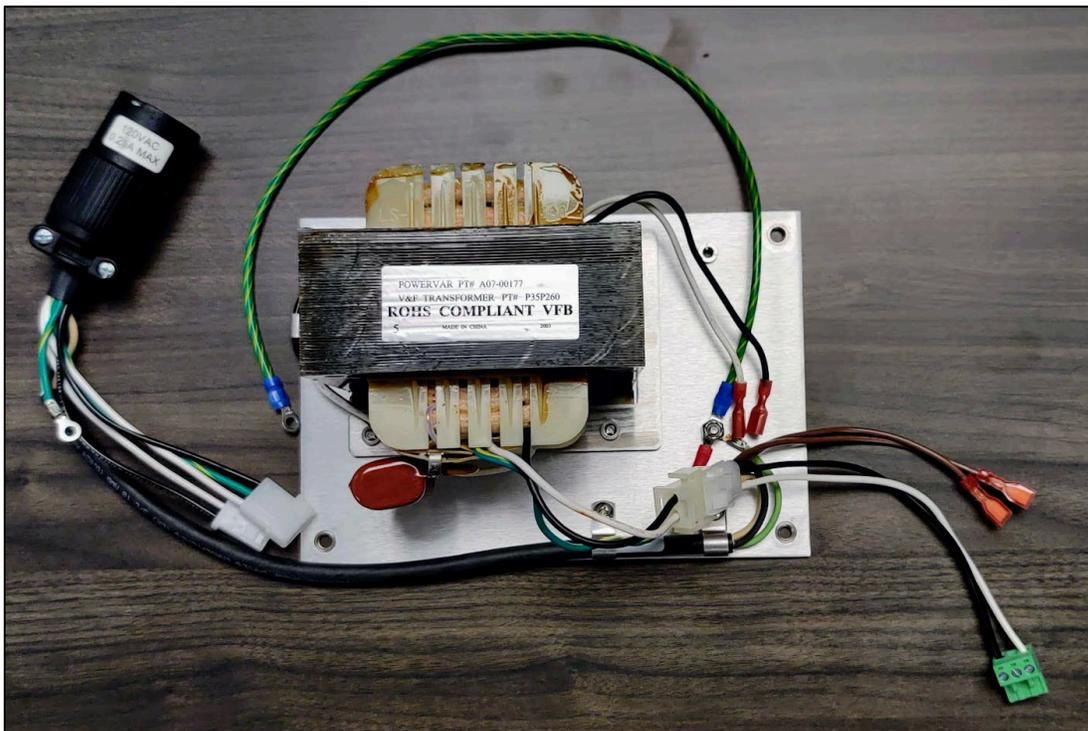


Figure 1 The FMU Power Conditioner

This product bulletin covers the field installation of the Power Conditioner Upgrade Kit (144F0250), an open frame 3-amp device. It must be installed as referenced in this product bulletin. The power conditioner supports the power requirements of all fixed mount FMUs currently in use at the time of writing. Power provided to the FMU passes through the power conditioner before any other internal FMU power connection. In addition to the field installation covered in this bulletin, the power conditioner is also available as a factory installed option with new FMU purchases.

NOTE

Installation of the device offers protection to only one FMU.

Supplied Parts

Parts included in the Power Conditioner Upgrade Kit (144F0250 Kit):

Part #	Description
144F0251	Surge/Power Conditioner Assembly
144F0255	Power Switch with Wires
931B0401-7	Universal Cable Interface Plate (with Bushing, 207896)
266026	Green Panel Indicator LED
198226B	Lower Pedestal Cover, Gray
198633D	Upper Pedestal Cover with 50A Pump Relay Assembly, Gray (if applicable)
196630E	Upper Cover for Dual Control, Gray (if applicable)
252670	#8-32 x 1/4 EXT SEMS, Stainless Steel Screw
266094	P-Type Cable Clamp, 0.312-inch inner diameter

Required Tools (other than common hand tools):

- 4 mm Allen Wrench
- 9/16-inch Socket
- 11/32-inch Socket

Wiring Diagram

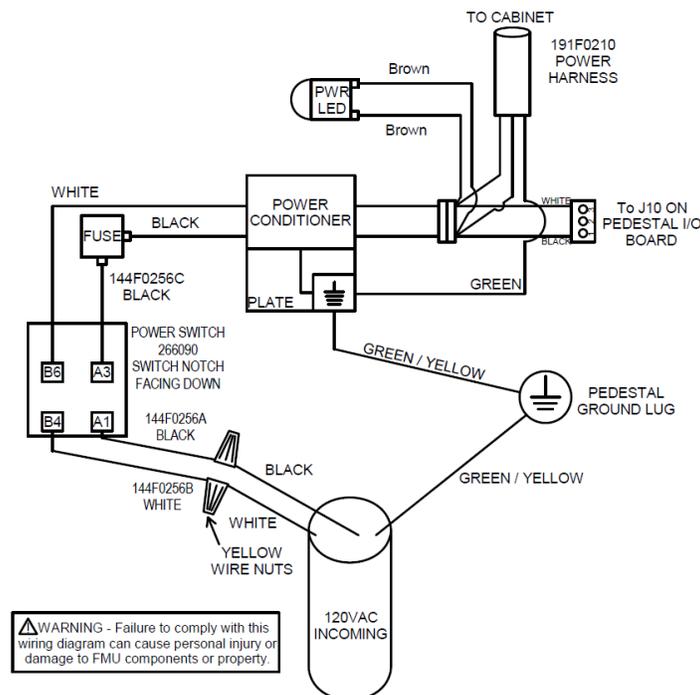


Figure 2 Power Conditioner Wiring Diagram

If any questions arise, please contact Syntech Systems, Inc.'s Customer Satisfaction Center at 1-800-888-9136, ext. 2 or email support@myfuelmaster.com.

Installation of Power Conditioner

WARNING

Any dispenser or device with its own power source, as well as one electrically controlled by the FMU, may backfeed power to the FMU. To avoid injury, remove power from all devices controlled by the FMU.

Prepare the FMU for Installation

1. Remove power from the FMU and all connected control devices (fuel dispensers, gate openers, car washes, etc.).
2. Unlock and open the FMU pedestal door.
3. Remove the upper and lower pedestal covers.
4. Disconnect the three-wire AC input power, two-wire FMU power, and four-wire phone connector (if applicable) from the Surge Panel.
5. Remove and discard the phone/printer cable (200085) highlighted in Figure 3 unless the FMU is communicating over a phone line (typical in credit card FMUs) OR using an on-site transaction printer.

NOTE

The transaction printer is not the receipt printer on the front of the pedestal.

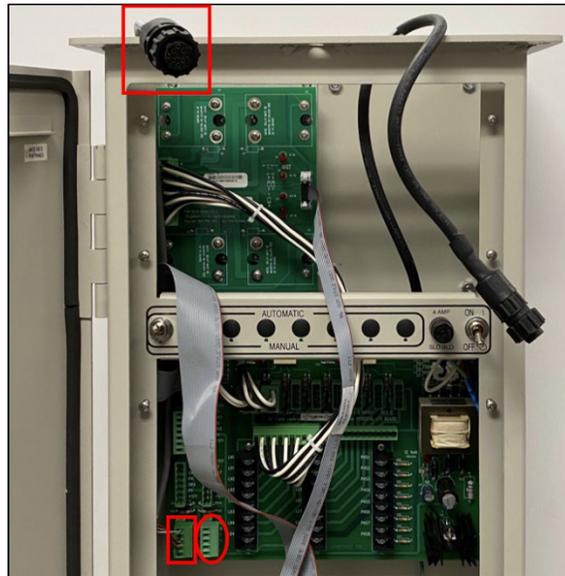


Figure 3 The Phone/Printer Cable Connection

- a. For FMUs that require a phone line, redirect the incoming phone signals. For FMUs that only need the on-site transaction printer, skip to Step iv.
 - i. Install the Communication Line Protector (CLP, STS# 262692) grounding wire to the Backplate grounding screw on the lower left side of the backplate, the Power Conditioner mounting plate ground terminal, or the pedestal earth-ground terminal.

NOTE

A CLP protecting the FMU from voltage transients entering via phone line is highly recommended. The CLP includes a grounding wire that must be installed and connected to a suitable earth/frame ground for protection.

- ii. Remove the two incoming phone line wires from the four-wire FMU phone connector previously disconnected from the Surge Panel.
- iii. Redirect the phone line wire to the CLP by connecting the two incoming phone wires to the J3 connector (circled above) located on the Sat I/O board. The phone signals connect to the two bottom terminals labeled *RED* and *BLK*.
- iv. Remove one of the bulkhead connectors (STS# 161271) installed on the original interface plate.
- v. Connect the bulkhead connector directly to the phone/printer cable (200085) (Figure 4).



Figure 4 Bulkhead Connector

Install the Power Harness

Remove the Original Power Harness (198439)

1. Remove the power switch using a 9/16-inch socket wrench (Figure 5).

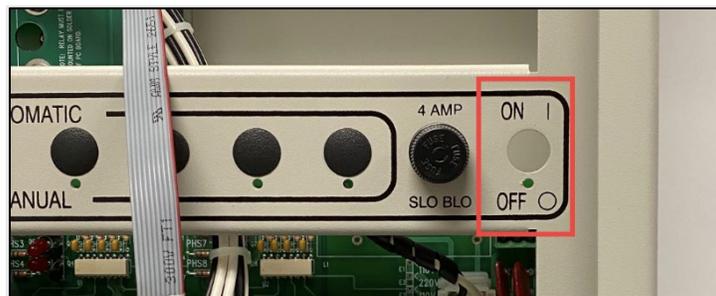


Figure 5 The Power Switch, Removed

2. Disconnect the switch from the fuse.
3. Disconnect the power harness cable from the fuse and ground lug with an 11/32-inch socket wrench so that it appears as in Figure 6.

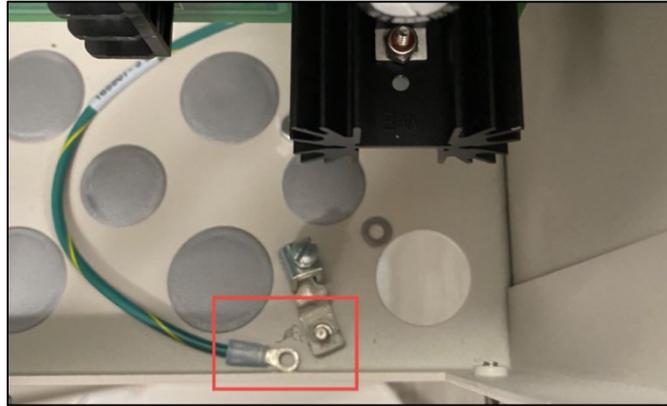


Figure 6 The Disconnected Power Harness Cable

4. Unplug the three-pin green connector that plugs into the Pedestal I/O board.
5. Remove and discard the original power harness.

Install the New Power Switch

1. Insert the switch from the backside with the switch notch facing down and short black wire on top (Figure 7).
2. From the front, install the locking ring, lock washer and nut.

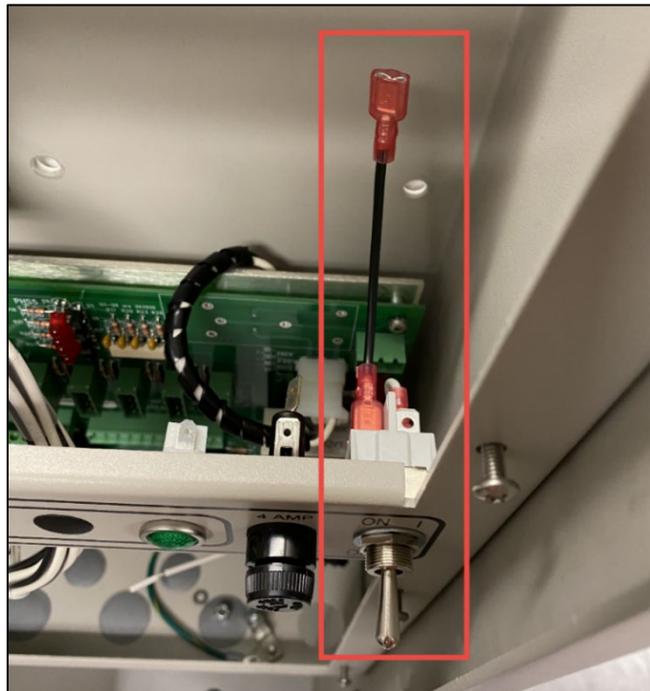


Figure 7 Inserting the New Switch

3. Tighten down the locking ring using a 9/16-inch socket wrench.
4. Connect the short black wire to the back of the 4-amp fuse (Figure 8).



Figure 8 Connecting the Black (Hot) Wire

WARNING

To prevent shock, do not connect the longer black and white wires to incoming AC power until all pedestal work is complete.

Install the Green Indicator LED

1. Determine which pedestal you have:
 - a. If using an older pedestal, remove the circular black plug from manual mode switch eight (Figure 9).

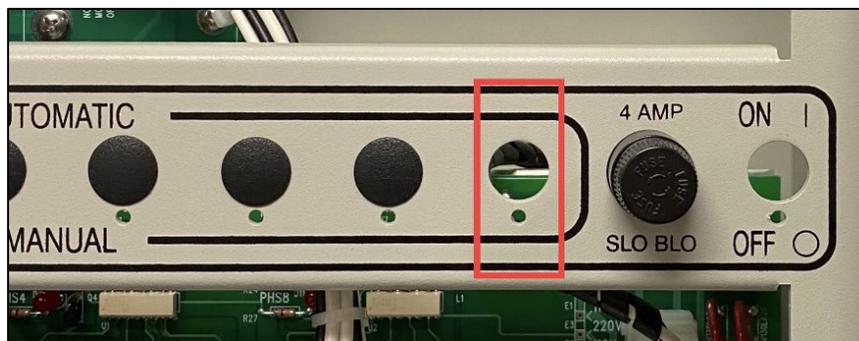


Figure 9 Removing the Eighth Position's Plug

NOTE

If you have an FMU with eight hoses, drill a half-inch hole somewhere in the vicinity of switch eight. The distance is limited by the brown power cable coming from the power conditioner. This hole can be installed in the top or bottom pedestal cover if care is taken when removing the panels. Alternatively, you can hang the LED behind the pedestal covers, but one of the covers would need to be removed to see the LED.

- b. Newer pedestals have a designated spot marked by the letters PWR. Remove the circular black plug from this hole (Figure 10).



Figure 10 The Power LED Plug

2. Insert the LED into the designated hole (Figures 11 and 12).

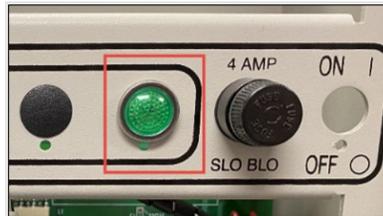


Figure 11 The LED in the Eighth Position

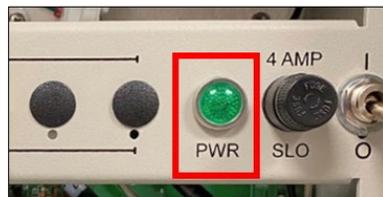


Figure 12 The LED in its PWR Socket

Install the Power Conditioner

1. Remove four screws using a 4mm Allen wrench from the upper left side of the back of the FMU as highlighted in Figure 13. If the FMU controls 2-4 hoses, these screws only attach to nuts. If the FMU controls more than this, these screws attach to the second pump control board.



Figure 13 The Relay Board Screws

- Slide the Power Conditioner through the top of the FMU and attach with the screws from Step 1 (Figure 14).

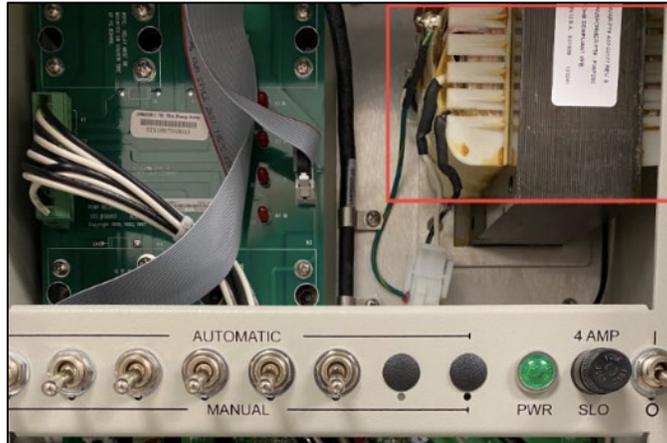


Figure 14 Inserting the Power Conditioner

- Plug the Power Conditioner's white quick-connect into the back of the new power switch (Figure 15).

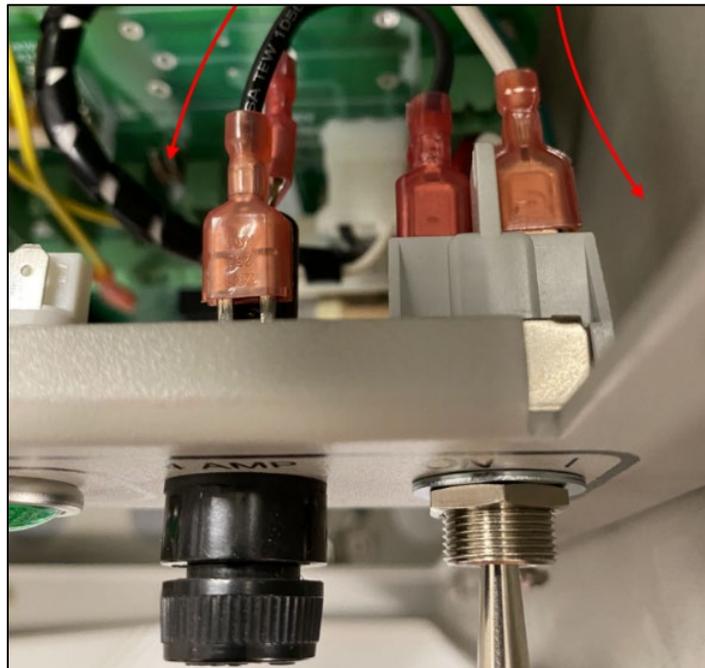


Figure 15 Inserting the Quick-Connect

4. Plug the Power Conditioner's black quick-connect into the back of the fuse (Figure 16).

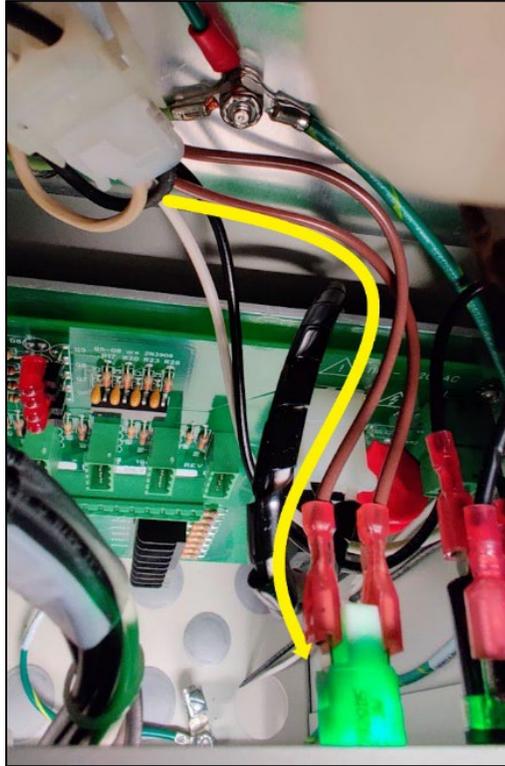


Figure 16 Connecting the Brown Wires, Above View

5. Plug the Power Conditioner's brown wires into the back of the new green LED (Figure 17). The brown wires can go to either terminal; there is no polarity. The following images show the connection from above and below.

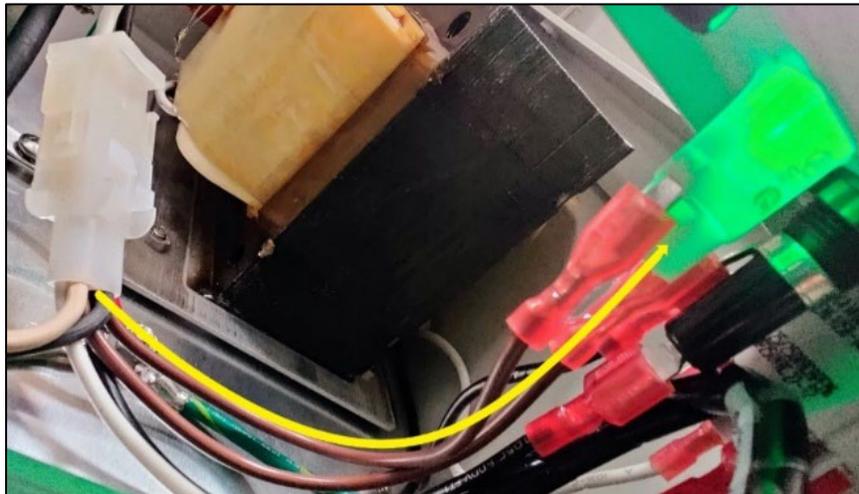


Figure 17 Connecting the Brown Wires, Below View

6. Attach the Power Conditioner's green earth-ground wire to the pedestal ground lug. After confirming the incoming earth-ground is attached to the ground lug, reattach the nut using a 11/32-inch socket wrench (Figure 18).

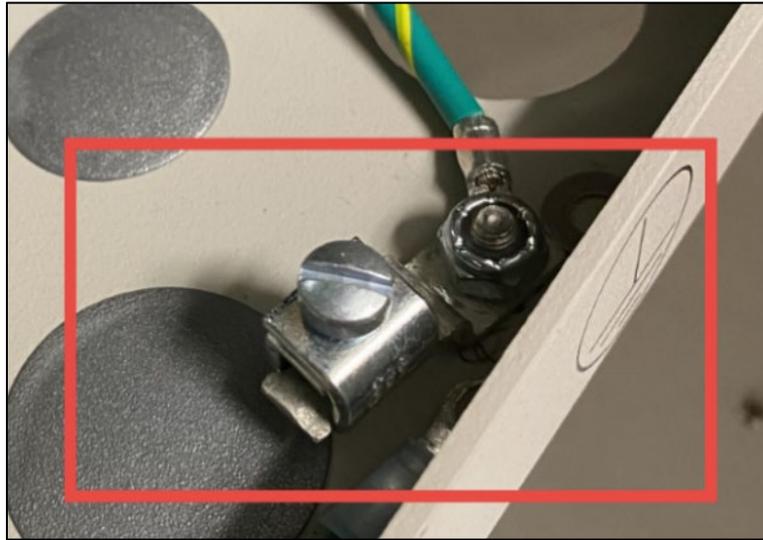


Figure 18 Grounding the Power Conditioner

7. Remove the existing black and white power wires from the green connector.
8. If you have a receipt printer, take the ends of the printer's black and white power wires and twist them around the ends of the black and white wires extending from the power conditioner to the Pedestal I/O connector.
9. Connect the wires into the Pedestal (Ped) I/O Connector. The correct orientation will depend on the Revision of the Ped I/O (Figure 19).



Figure 19 Ped I/O Revision Level

- a. For a Ped I/O that's Revision F or older:
 - i. Connect the white wire bundle into the left terminal and tighten.
 - ii. Connect the black wire bundle into the right terminal and tighten.

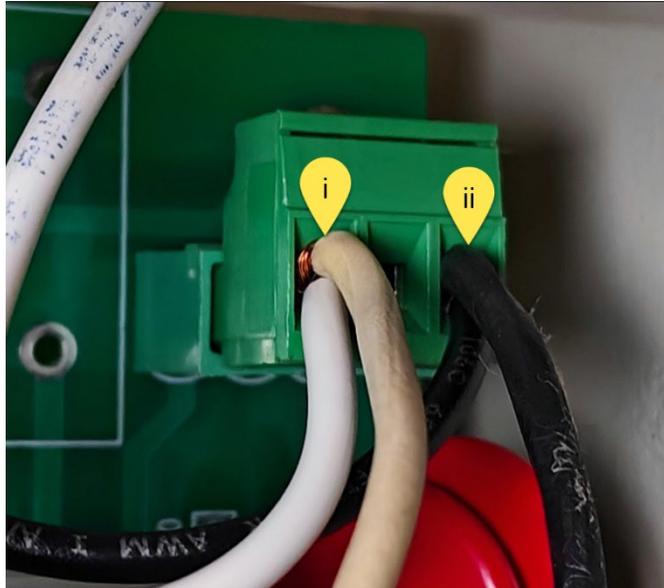


Figure 20 Connecting the Wires to a Rev F Ped I/O

- b. For a Ped I/O that's Revision G or newer:
 - i. Connect the black wire bundle into the left terminal and tighten.
 - ii. Connect the white wire bundle into the right terminal and tighten.

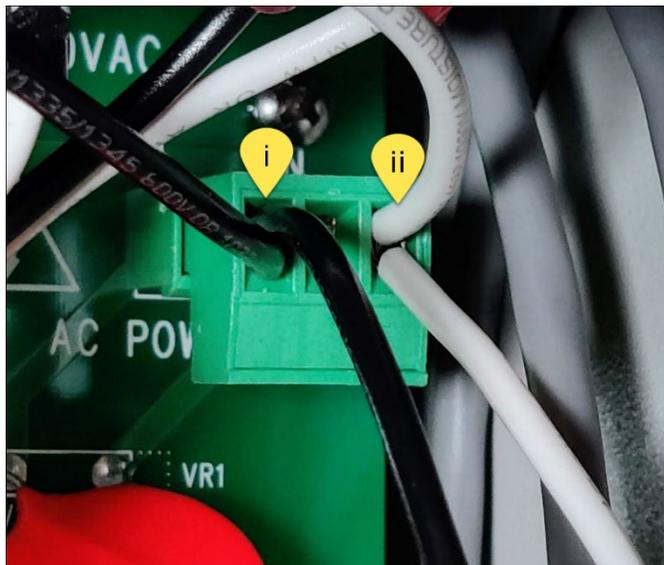


Figure 21 Connecting the Wires to a Rev G Ped I/O

10. Plug the green Ped I/O connector into the J10 connector of the Ped I/O.
11. If installing with a cold-weather kit, attach the kit's power to the 2-pin white connector.

12. Use the twist-on wire connector to attach black and white wires from the power switch to the incoming AC power.

WARNING

Before moving on to the next step, confirm that site's incoming earth-ground wire and Power Conditioner's earth-ground wire are both connected tightly to the pedestal ground lug. This is crucial for user safety and for the FMU to function correctly.

Reassemble the FMU

1. Place the upper cabinet on top of the pedestal (Figure 22).



Figure 22 Replacing the Upper Cabinet

2. Install the new interface plate and attach the cabinet to the pedestal with six screws (Figure 23).

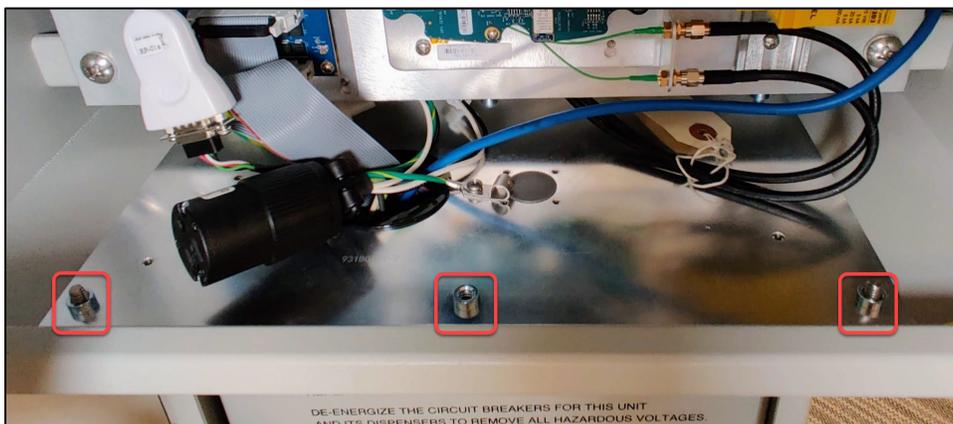


Figure 23 Installing the Interface Plate

3. Run the cable through the hole and attach the cable and green/yellow striped ground wire to the interface plate using the P-clamp as in Figure 24.

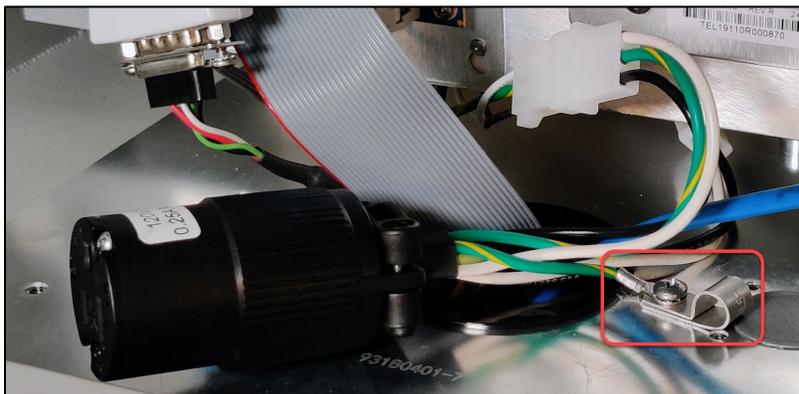


Figure 24 Grounding the AC Outlet

4. Plug in the white 3-pin power connector (Figure 23).
5. Connect the gray ribbon cables to the Sat I/O board (Figure 25). Units controlling 2-4 hoses will connect the 10-pin connector to PRB1. If controlling more, the second 10-pin connector will connect to PRB2.

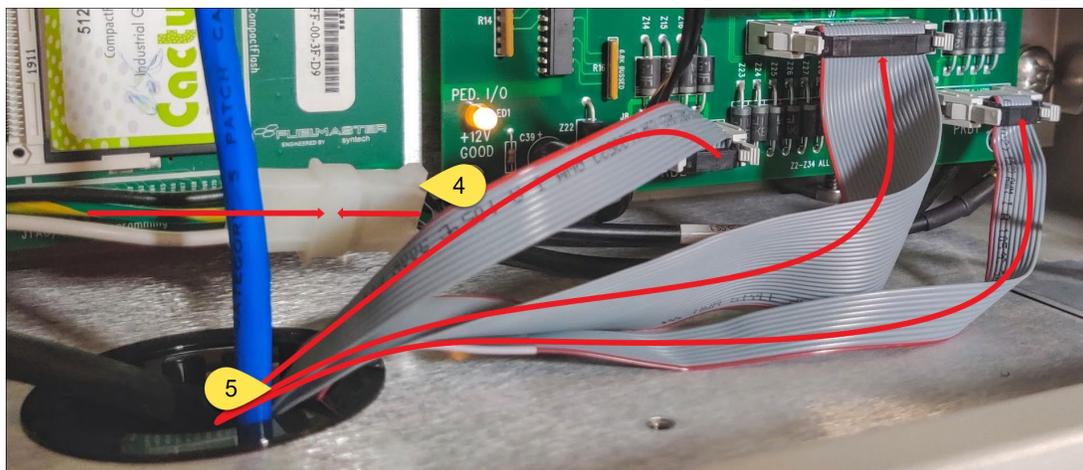


Figure 25 Reinstalling Head Connections

6. Reconnect the communications cables:
 - a. If Phone Line, reconnect the phone line from the Cable Interface Plate or the CLP into the top jack of the FMU Modem Board.
 - b. If Wired Network, connect the incoming Ethernet cable into the LINE side of the Ethernet SPD, if present. Otherwise, connect the Ethernet cable into the mainboard or NIC for a Legacy FMU or to the top jack of the EAPro if FMLive. If an Ethernet SPD is present, connect an Ethernet cable from the EQUIP side to the mainboard or NIC for a Legacy FMU or to the top jack of the EAPro if FMLive.
 - c. If Wireless Network, there are no communication cables to reconnect.

7. If controlling 2-4 hoses, skip to Step 9. If more, remove the original cables from the previous second pump control board.
 - a. For a 50A relay system, the new cover plate includes a replacement pump relay board (Figure 26). Return the original pump control board to Syntech for credit.



Figure 26 Installing the New Relay Board

- b. For a dual control board, remove the board from its mounting plate (Figure 27) and attach it to the new upper pedestal plate (Figure 28). Reconnect the original cables.



Figure 27 Dual Control Assembly Mounting Position

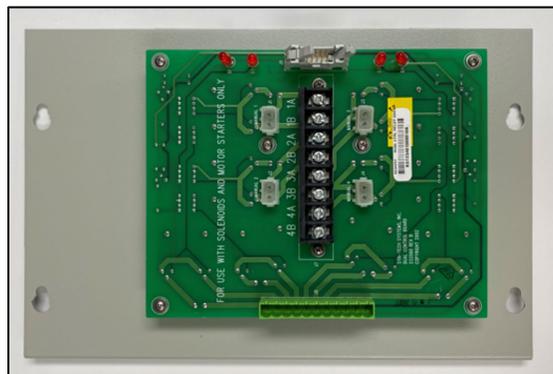


Figure 28 Dual Control Assembly, Mounted

- c. Connect the black and white control (198730) to J9 on the Pedestal I/O board.

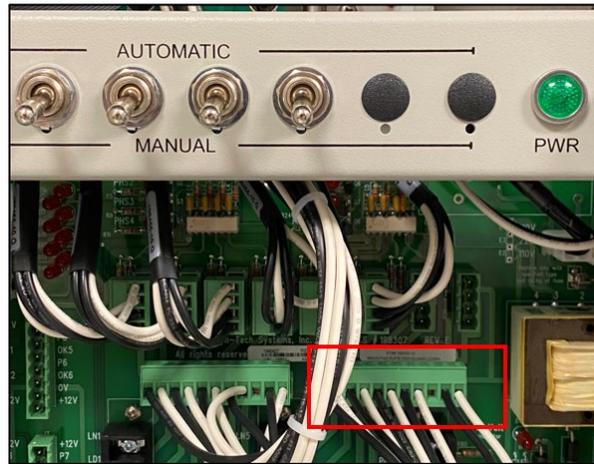


Figure 29 Reconnecting the Black and White Cable Bundle

- d. Run the ribbon cable through the interface plate's hole and connect to PBR2 on the Sat I/O board.
8. Reinstall the FMU's upper pedestal cover plate.



Figure 30 Replacing the Upper Pedestal Cover Plate

9. Install the new lower pedestal plate. This plate does not have a surge panel.
10. Turn the FMU and all connected control devices (fuel dispensers, gate openers, car washes, etc.) back on. Once turned on, the green LED should illuminate. If not, turn off power and check all connections as well as the fuse.
11. Once powered, the FMU should initialize and display:

****FUELMASTER FUEL ACCOUNTING SYSTEM****

****INSERT KEY, HOLD 1 SECOND TO BEGIN****

NOTE For comprehensive startup and shutdown sequences, please see [Power ON / Startup Sequence](#) and [Power OFF / Shutdown Sequence](#).

FM*Live* Power ON / Startup Sequence

1. Apply Power. There is a three to five second delay before power is supplied to the EAPro and mainboard.

NOTE Once booted, the EAPro will sound four short beeps followed by a long beep.

2. Check the Mainboard for the following:
 - a. All LEDs Flash except the *Halted* LED (D13).
 - b. The *Battery Good* LED (D4) should be lit.
 - c. The *Heartbeat* (D6) and *voltage* (D8 to D11) LEDs all light up solid Green.
 - d. The *Heartbeat* LED (D6) will start to flash after a few seconds.
 - e. The FMU will go through its boot sequence, then display the main prompt unless it needs configuration data.

NOTE If the unit needs configuration data, the FMU will beep periodically and display the message *Requesting Configuration* until received.

3. Check the Supercap for the following:
 - a. LED (D4) turns red (Charging) when power is applied.
 - b. LED (D4) turns green (Normal) after a minute or two, indicating the Supercap is charged.
4. Check the EAPro for the following:
 - a. System Status LED (D17) will be solid green during the boot process and will start blinking once the EAPro has finished booting.

IMPORTANT Gen 3 EAPros require Syntux 4. If a uSD card configured with Syntux 3 is installed, the EAPro will function incorrectly, as indicated by a solid red System Status LED. This must be addressed immediately.

- Power off the unit.
- Remove and reinsert the uSD card, ensuring it is pushed all the way in.
- Power on the unit.
- If the red LED re-appears, power down the unit.
- Contact Syntech Customer Satisfaction Center.

- b. Power LED (D12) will be solid green.
- c. Bottom ETH LINK/ACT LED (D16) should begin blinking, indicating successful communication with the mainboard.

FM Live Power OFF / Shutdown Sequence

1. Power down the FMU. The following will occur:
 - a. The Supercap's Discharging LED (D5) will turn blue, initiating EAPro shutdown.
 - b. The System Status LED (D17) will change from flashing green to flashing red and begin beeping every 2 seconds.
 - c. The unit will transition to a series of very short flashes and beeps before shutdown completes.
 - d. The point in time at which the unit may be serviced depends on the version of the EAPro:
 - i. Gen1/Gen2 EAPro: The solid green System Status LED will turn off briefly; then, come back on until the Supercap completely discharges, and the LED goes off. Once this happens, the unit may be serviced.
 - ii. Gen3 EAPro (indicated by label): Unit may be serviced immediately after the beeping ends.

NOTE

Gen3 EAPros do not completely discharge the Supercap immediately upon shutdown and may take hours for Supercap to turn off the blue LED.

CAUTION

If you must disconnect the Supercap from the EAPro, do so only after FMU power is OFF. When reconnecting the Supercap, also ensure that FMU power is OFF to avoid damage to the Supercap and EAPro.

TIP

If any questions arise, contact Syntech Systems, Inc.'s Customer Satisfaction Center (CSC) at 1-800-888-9136, ext. 2, or email support@myfuelmaster.com.

Change History

Date	Description
01/14/2020	Originally published.
06/14/2022	Added Power ON / Startup Sequence and Power OFF / Shutdown Sequence .
08/26/2022	Updated Power ON / Startup Sequence and Power OFF / Shutdown Sequence to incorporate change of beep behavior for Gen3 EAPros.
07/11/2023	Added steps regarding receipt printer connection, new Cable Interface Plate, and cold-weather kit.
08/23/2024	Added picture and verbiage for difference between Ped I/O Boards at Rev F or lower and ones Rev G or newer.