

Third-Party Surge Protection Equipment

Following is third party surge protection equipment which has been bench and field tested with positive results and recommendations. Equipment inventoried by Syntech has been assigned a Syntech part number. This bulletin will be revised as new equipment or procedures are identified.

The equipment listed here is for different applications: Power Line Protection, UPS/Backup Power with Protection, RS232/RS422 Communication Line Protection, Phone Line Protection, and Cat 5/6 Network Cable Protection. Other equipment is being pursued and tested. Following are installation instructions:

Power Line Protection

This is protection against surges attacking the FMU through incoming power lines. The Powervar power conditioners provide surge protection as well as power conditioning. FMUs draw 2.75 amps. The Powervar 3-amp power conditioner is best suited for FMUs. EIUs (Equipment Interface Units) draw 0.15 amps. The smallest power conditioner available from Powervar is 1.5 amps. If one FMU and one EIU were powered from the same source, one 3-amp power conditioner could fulfill the power requirements for both.

If the FMU is drawing power from a breaker panel, and not more than 600 feet of power wire are routed from the breaker panel to the FMU, the hardwire power conditioner (Figure 1) mounted near the breaker panel, out of the weather, is a good solution. If the FMU is drawing power from another source such as a fuel dispenser, or if the power wires leading to the FMU are over 600 feet in length, a power conditioner mounted in the FMU should be used. A power conditioner suitable for mounting in the FMU is being developed, but is currently not available.



Figure 1. Powervar Hardwire Power Conditioner with Cover Installed

NOTE The cover must be removed to make or remove wire connections. There are four cover screws on each side. Provide sufficient clearance when mounting to permit cover screw installation and removal.

Hardwired Power Conditioner

The dimensions and physical appearance of the 3.0-amp and 1.5-amp power conditioners are the same. Specifications and warranty information may be reviewed at:

http://www.powervar.com/configurator/products/pdf/181_A03-00070.pdf

Syntech part numbers for available hardwired power conditioners:

Part #	Part Description
262684	3.0 amp for FMU and FMU with connected EIU
262676	1.5 amp for standalone EIU

A hardwired Powervar power conditioner with the cover installed is shown in Figure 1. Figure 2 illustrates the same power conditioner with the cover removed. Figure 3 illustrates the INPUT and OUTPUT connection points, and the knockouts which may be removed for the installation of ½ inch strain reliefs or conduit fittings. In some cases, it may be necessary to add neutral or ground wires to complete all terminations. Do not omit any neutral or ground connections.

On the same end of the power conditioner as the knockouts is an ON/OFF switch. The ON/OFF switch is also a circuit breaker, and will disconnect if it detects an incorrect or overcurrent input.

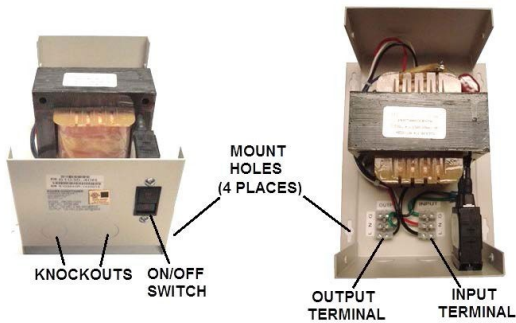


Figure 2. Closeup of Wire Terminals

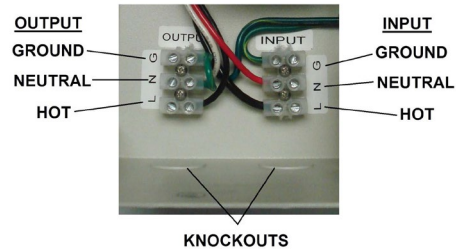


Figure 3. Closeup of Wire Knockouts

UPS/Backup Power with Protection

See Figure 4. This is a UPS (Uninterruptible Power Supply) with built- in surge protection. Powervar has tested the ABCEG601-11 to surges of 6000V@200 amps. It may be ordered through Syntech. This UPS offers a 600 VoltAmp power rating and has a 5-year warrantee. Specifications and warranty information may be reviewed at: http://www.powervar.com/configurator/productspdf/115_SM1202-C-Case-RevG.pdf.



Figure 4. Powervar UPS

RS232, RS422 Communication Line Protection

See Figure 5. This is protection against surges through RS232 or RS422 communication lines such as FMU Master-Satellite communication lines, Master-Tank Monitor communication lines, and Master-Transaction Printer communication lines.



Figure 5. EDCO PC624 and PCB1B

The EDCO PC642 series surge protective devices plug into a PCB1B (Syntech 264628) base which is wired in-line with the communications lines. If the PC642 device is damaged by a surge greater than it can handle, the damaged device may be unplugged and a new device plugged into the base.

The PC642C-008LC (Syntech 264620) is for lower powered RS422. The PC642C-036LC (Syntech 264622) is for RS232. Both devices plug into the PCB1B.

When used with FuelMaster FMUs, do not connect the ground terminal to earth ground as depicted in the installation instructions. Connect the ground terminal as shown in the wiring diagrams on page 4. This has been approved with EDCO Tech Support for the same warranty coverage. Ground points 1 and 10 are jumpered together in the PCB1B.

On the PCB1B, even number terminals are the protected side, and odd number terminals are the unprotected side. Position the even number terminals toward the device you want to protect.

There is a keying pin in the PCB1B that properly orients the PC642 for proper installation. Do not remove the keying pin.

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.

Electronics Side to Field Side terminal matchings are: 2-3, 4-5, 6-7, 8-9, and 1-10 (ground).

If all the terminals are not used, as with RS232, which uses only 3 conductors: transmit, receive, and ground, use the following pairs (see Figure 8 for example):

Input to 2&4 for Output to 3&5, Or

Input to 6&8 for Output to 7&9, (Ground Only) Input to 10 = Output to 1

Figures 6, 7, 8, and 9 illustrate how the EDCO devices should be installed for the various applications. The converter side of Figure 7 shows the different pin descriptions between the Patton and B&B Electronics RS232/422 converters: Patton to the left, B&B to the right. Figures 8 and 9 illustrate the options for RS232. The inputs from IN+ and OUT- may be input to pins 2 and 4 instead of 6 and 8. NOTE: the Patton Electronics 222N RS232/422 converter functions properly with connections + to -, and - to +. This disagrees their guidance and other converters which call for + to +, and - to -.

Specifications and warranty information for the EDCO PC642 protectors can be found at:

http://www.emersonnetworkpower.com/documentation/en-US/Products/SurgeProtection/Documents/IO-50105_EdcoPC642.pdf

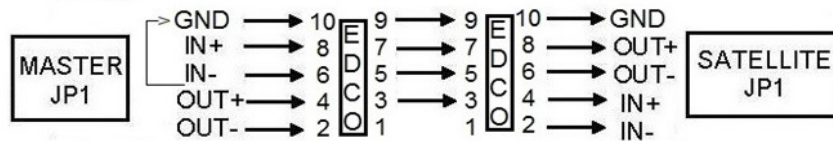


Figure 6. RS-422 Master-Satellite Communications Wiring

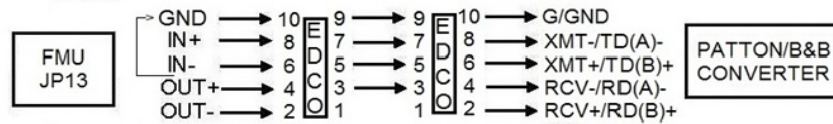


Figure 7. FMU to RS232/422 Converter Wiring

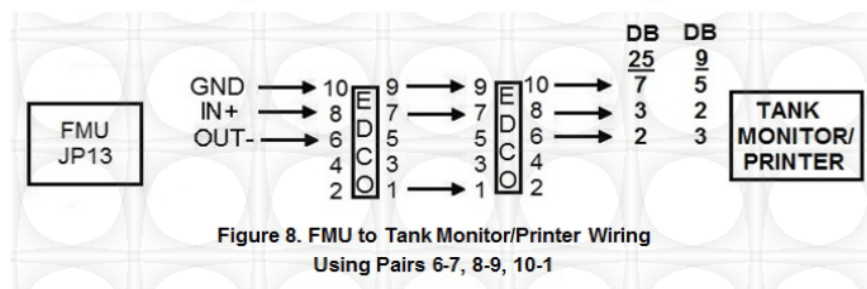


Figure 8. FMU to Tank Monitor/Printer Wiring Using Pairs 6-7, 8-9, 10-1

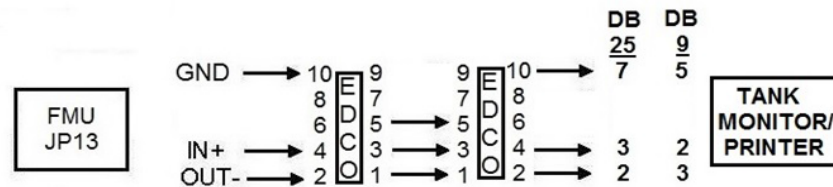


Figure 9. FMU to Tank Monitor/Printer Wiring Using Pairs 2-3, 4-5, 10-1

Phone Line Protection

This protection was sought to protect the fuses in the FMU surge panel. When the phone line fuses failed, communications to the FMU through the phone lines was lost. We tested an ONEAC NJ-27-14 Communication Line Protector (Figure 12, Syntech part number 262692). It was a good option, and easy to install, and provided good protection. During bench testing we discovered $\frac{3}{4}$ amp slo-blo fuses inserted in the FMU surge panel in place of the standard $\frac{1}{2}$ amp fast-blo fuses offered protection as good as the ONEAC device for the FMU.

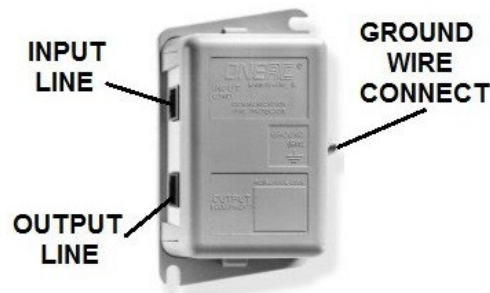


Figure 10 ONEAC NJ-27-14

CAUTION Phone line protection will not be afforded if the ground wire is not connected to a suitable earth ground.

The ONEAC NJ-27-14 is a good option for other applications requiring phone line protection. It is provided with a patch cable with RJ11 connectors, and a grounding wire. The patch cable may be cut in half to splice into your phone lines, and have connectors to plug into the NJ-27-14. The grounding wire must be installed and connected to a suitable earth/frame ground to assure protection.

The FMU Surge Panel will have the standard $\frac{1}{2}$ amp fast-blo fuses replaced with $\frac{3}{4}$ amp slo-blo fuses. Field upgrades are covered in Product Bulletin 219. Customers who order replacement fuses will receive the $\frac{3}{4}$ amp slo-blo fuse, and a new label to place over the old $\frac{1}{2}$ amp fuse label. New FMU orders will receive the $\frac{3}{4}$ amp fuses.

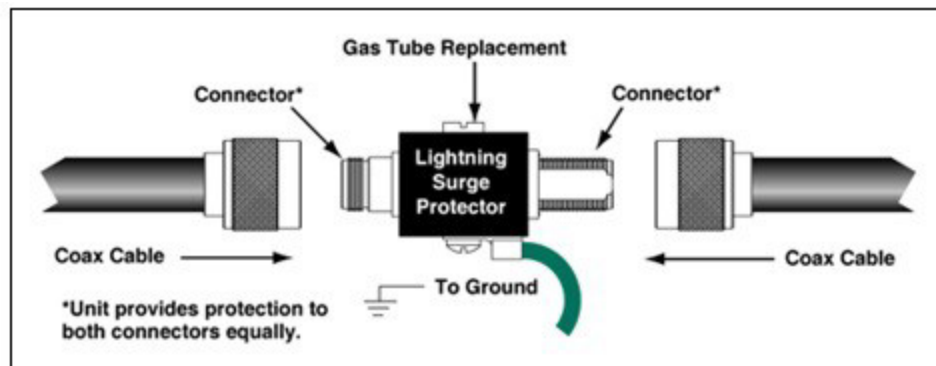


Figure 11 Antenna Cable Protector

Antenna Cable Protection

We found a device for protection of coax antenna cables. It was originally purchased to provide protection for FMUs utilizing remote AIM2 antennas. It has a BNC male connector on one side, and

a BNC female connector on the other side, and provides equal protection to both connections. It has a replaceable gas tube. Syntech part number is 257540. It is an L-Com product with part number AL-BMBFB-9. L-Com offers other coax cable protectors with different types of connectors.

Cat5/5e/6 Network Cable Protection

NOTE Something to note for new construction, network cable protection will not be necessary when wireless or fiber optic are used to transmit the network signal.

There are a number of inline Cat5, 5e, and 6 network cable protectors on the market. We've inspected some we didn't like. Of those we tested, the best product we found was an L-COM BT-CAT5-P1 (Syntech 264624), suitable for Cat5, 5e, and 6. L-COM part number BT-CAT5-P1J-4848 (Syntech 264626) is the same device with a power supply which provides added protection for POE (Power over Ethernet) applications. The power supply is only necessary when working with POE.



Figure 12 L-COM BT-CAT5-P1

The engineer who evaluated this device recommended a change to the wiring suggested by L-COM (see Figure 15). His suggestion was to not connect anything to the ground screw on the top of the device. This was recommended to prevent ground loops between the FMU and the origin of the network cable.

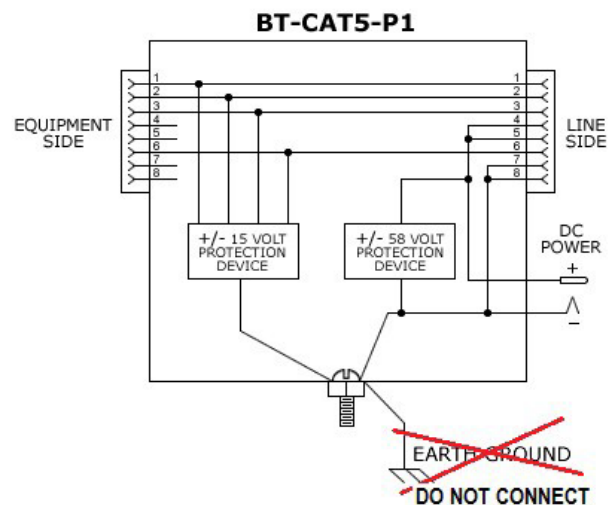


Figure 13 L-COM BT-CAT5-P1 Wiring

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 Log

Date	Description
2/17/2015	Original
4/8/2015	Revision On page 6, added Cat5/5e/6 Network Cable Protection paragraphs, and Figures 14 and 15.
7/17/2015	Revision Added Syntech part numbers Page 3, added Syntech 264628 for EDCO PCB1B Page 3, added Syntech 264620 for EDCO PC642C-008LC o Page 3, added Syntech 264622 for EDCO PC642C-036LC o Page 6, added Syntech 264624 for L-COM BT-CAT5-P1 Page 6, added Syntech 264626 for L-COM BT-CAT5-P1J-4848
1/8/2021	Reformatted/rebranded