

## INSTRUCTION SHEET – Type SPD Modular Series

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The PQI Modular Series of Surge Protection Devices (SPD) is designed to provide protection to service panels, load centers or wherever the SPD is directly connected to an electronic device requiring protection. Maximum protection will only be achieved if the SPD is properly installed. Please read and carefully follow the installations that follow.



**DANGER:** Electrical shock or burn hazard. Installation of this SPD should only be made by qualified personnel. Failure to lockout electrical power during installation or maintenance can result in fatal electrocution or severe burns.



**CAUTION:** Check to make sure system voltages do not exceed the SPD voltage requirement and the correct SPD voltage/model has been selected.



**CAUTION:** This unit must be installed in accordance with the National Electrical Code (ANSI/NFPA-70) and any applicable local codes.



**CAUTION:** Ungrounded power systems are inherently unstable and can produce excessively high line-to-ground voltages during certain fault conditions. During these fault conditions any electrical equipment, including an SPD, may be subjected to voltages which exceed their designed ratings. This information is being provided to the user so that an informed decision can be made before installing any electrical equipment on an ungrounded power system.

**NOTICE:** Do not cut wires until the SPD is mounted and minimum wire lengths have been verified. All connection leads should be cut to minimum possible length; never coil or push aside excess length.

## INSTALLATION INSTRUCTIONS

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1. **Verify system voltage** by measuring L-N, L-G, L-L and N-G of the system. Confirm that the SPD is correctly rated for the system to which it is to be connected by comparing the measured voltages to the SPD voltage ratings shown on the product side rating label. The measured voltage should match the nominal operating voltage of the product, the maximum continuous operating voltage (MCOV) specifications must not be exceeded.
2. **Identify proper location for the SPD.** Locate the unit as close as physically possible to the panel being protected and as close to the electrical connection as possible to avoid excess lead lengths and the need for sharp bends in the wires. Mount top and bottom SPD flanges securely. Use appropriate cable glands to preserve the SPD/panel NEMA-4 enclosure rating.

**Suitable for use on a Circuit Capable of Delivering Not More Than 200,000V RMS symmetrical**

3. **Connect proper ground.** An insulated grounding conductor that is identical in size, insulating material and thickness to the

grounded and ungrounded circuit supply conductors, except that it is green with or without one or more yellow stripes, is to be installed as part of the circuit that supplies the unit. The unit is supplied with 914mm (3ft) long of #10AWG, in accordance with Table 250-122 of the National Electrical Code, for this purpose. The housing of the unit is bonded to the grounding conductor for equipment safety ground purposes as per National Electrical Code. The grounding conductor is to be grounded to earth at the service equipment or other acceptable building ground such as the building frame in the case of a high-rise steel-frame structure.

Attach the grounding conductor to the panel's ground bus for proper operation. Wire length should be minimized to improve performance. There is no minimum wire length requirement. Note: For isolated ground systems, bond the grounding conductor from the unit to the non-isolated equipment ground, not the isolated equipment ground.

4. **Connect neutral conductor.** The units are supplied with #10AWG leads. The white Neutral conductor is 914mm (3ft) long.

Wire length should be minimized to improve performance. There is no minimum wire length requirement. Measure and trim the neutral conductor to be as straight and short as possible. Connect the neutral conductor of the unit to the neutral lug on the panel.

5. **Connect phase conductors.** The phase wires are labeled L1, L2\*, L3. While the orientation is not critical to the operation, it ensures the indication of the unit matches the relevant phase. With the POWER OFF, connect each black phase lead. Upstream overcurrent protection is not required for the product, and overcurrent protection is integral to the product\*\*.

\* Note: SPDs connected to High Leg Delta systems may have one of the phase wires identified by a yellow marking. This lead must be connected to the High Leg phase of the power system.

The units are supplied with #10AWG leads. Phase conductors are 610mm (2ft) long. Wire length should be minimized to improve performance. There is no minimum wire length requirement.

6. **Connect Remote Monitoring.** Form C dry contacts (N/O, N/C & Common) are located behind the lower mounting plate. To make a connection to the remote contact terminals, temporarily remove the mounting plate, and install an insulated (nylon\*) conduit gland (1/2" / 12.7mm) that:

- a. Preserves the SPD/panel NEMA-4 enclosure rating\*.
- b. Does not foul the internal PCB or components.

\* conduit gland must be watertight with UL 94-V2 rating

The quick-connect remote terminals are labeled as follows:



Terminal 1 – COM  
Terminal 2 – NO  
Terminal 3 – NC

NOTE: In the "Normal" (operational state) of the unit, the relay is energized and Terminals 1 and 2 are open, and Terminals 1 and 3 are closed. In the event of a module(s) failure, loss of power to the unit or operation of a fuse(s), the relay contacts will change state – Terminal 1 will be connected to Terminal 2 and Terminals 1 and 3 will open.

Wire to alarm terminals through gland and replace mounting plate. Permissible wire size is #24-16 AWG (0.2 - 1.5mm<sup>2</sup>)

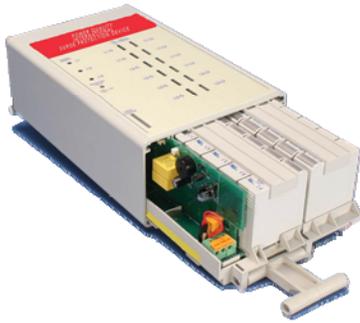
Remote Status Indicator Dry Contacts are rated at a max 30V resistive load/1.0A, max 250VAC/0.3A general use.

Terminals marked "NO" (Normally Open) and "C" (Common) are switched together while the unit is operating with full capacity. Terminals "NC" (Normally Closed) and "C" are switched together if power is removed or the SPD displays reduced surge capacity.

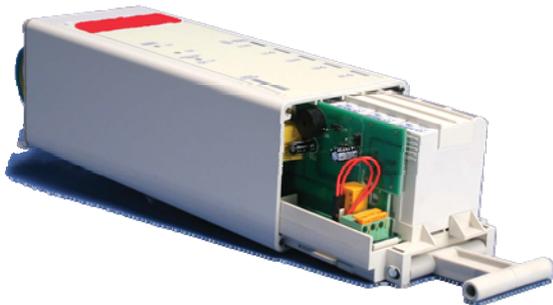
7. **Nearby Attachment-Plug Receptacles.** Any attachment-plug receptacles near the unit are to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to earth ground at the service equipment or other acceptable building earth ground such as the building frame in the case of a high-rise steel-frame structure.
8. **Connector and Lugs.** Pressure terminals or pressure splicing connectors and soldering lugs used in the installation of the unit shall be identified as being suitable for the material of the conductors. Conductors of dissimilar metals shall not be intermixed in a terminal or splicing connector where physical contact occurs between dissimilar conductors unless the device is identified for the purpose and conditions of use.
9. **Activate unit.** When the power is applied, the RED diagnostic lights will indicate that the unit is operational and protection is being provided. If the status lights do not illuminate, please recheck any supply fuse as well as the phase, neutral and ground connections.
10. **Flush Panel Mounting.** For flush panel mounting, please order the flush cover plate and follow the instructions supplied (SPD 100M or SPD 200M).
11. **Alarm Conditions.** The "Protection Status" indicator LED will extinguish and the audible alarm will sound if the surge capacity is reduced.

This may also occur if power is lost to a particular phase. Please check the individual protection modules, power connections and supply fuses if this condition occurs. If power is being correctly supplied to all phases and the alarm condition remains, certain field replaceable modules need immediate attention.

Step 1: Remove power from the product, and temporarily remove the end mounting plate.



Step 2: Slide out the internal “tray” using the handle located behind the end mounting plate. Replace any failed surge protection module with the correct module type. (Note: must replace with identical part number and voltage rating. Contact your local PQI representative for replacement module ordering advice.)



Step 3: Check condition of the internal cartridge fuses, located under the internal “tray” as shown in Note 13.

Continuity can be checked with a simple multi-meter, it is not necessary to remove the fuse to test. If fuse shows an “open-circuit” condition, please replace, as shown over page, using fuse type part number SPD FUSE. (Note: must replace with identical part number and voltage rating. Contact your local PQI representative for replacement part ordering advice.)



Step 4: Slide in the internal “tray”, and reattach the end mounting plate.

12. **Problem Diagnostics.** If problems continue after checking the electrical connections, internal cartridge fuses, or field replacement modules, contact your local PQI representative.

### 13. Fuse Removal



Step 1: Open the unit and remove the tray.



Step 2: Turn over, and remove the four screws holding the fuse cover in place. These screws are tight – use correct screwdriver size to avoid damaging screw head.



Step 3: Use a large flat blade screwdriver to turn the appropriate fuse ejector a quarter turn (90 degrees).



Step 4: The screw ejector lifts one end of the fuse, which may now be removed. Use of screw ejector mechanism avoids damaging the plastic tray.

**Replacement Fuse.** Replacement fuse for UL Listed models, type fuse, part number SPD FUSE must be used, contact your local PQI representative for replacement part ordering advice

## DANGER

ELECTRICAL SHOCK OR BURN HAZARD. HAZARDOUS VOLTAGES EXIST INTERNAL TO THE UNIT. THIS UNIT SHOULD BE INSTALLED AND SERVICED ONLY BY QUALIFIED PERSONNEL IN CONFORMANCE WITH ALL GOVERNING CODES AND INSTRUCTIONS. FAILURE TO LOCKOUT ELECTRICAL POWER DURING INSTALLATION OR MAINTENANCE CAN RESULT IN FATAL ELECTROCUTION, SEVERE BURNS, OR OTHER INJURIES. BEFORE WORKING WITH OR MAKING ANY CONNECTIONS TO THIS DEVICE, BE SURE THAT POWER HAS BEEN REMOVED FROM ALL ASSOCIATED WIRING, ELECTRICAL PANELS, AND OTHER ELECTRICAL EQUIPMENT.

1. The power supply to the unit should always be turned (and locked) OFF before the unit is accessed for any reason.
2. Prior to installation, ensure that the unit is of the correct voltage, current, phasing, and frequency for the applicable rating of the power distribution system.
3. Diagrams are for reference

## WARNING

1. PQI products shall be installed and used only as indicated in PQI product instruction sheets and training materials. Instruction sheets are available at [www.powerqualityinternational.com](http://www.powerqualityinternational.com) and from your PQI customer service representative.
2. PQI products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.