INSTALLATION, OPERATION, & MAINTENANCE MANUAL

PQ120(-F) & PQ240(-F) Series

SURGE PROTECTION DEVICE

The PQ120(-F) and PQ240(-F) series Surge Protective Devices (SPDs) are designed to provide protection against damaging voltage surge events (transients). Maximum protection will be achieved if the SPD is properly installed. Please carefully read this document and follow the instructions.

PQ Protection reserves the right to change specifications without prior notice.

DANGER: Electrical shock or burn hazard. Installation should only be done by qualified personnel. Failure to lockout electrical power during installation or maintenance can result in severe burns or electrocution. Panel must be de-energized prior to installation or maintenance.

WARNING: PQ Protection products shall be installed and used only as indicated in PQ Protection product instruction sheets (Installation, Operation & Maintenance Manuals) and training materials. Instruction sheets are available at www.PQProtection.com and from your PQ Protection customer service representative.

WARNING: PQ Protection 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.

WARNING: All instructions must be completely followed to ensure proper and safe installation and performance.

WARNING: Improper installation, misuse, misapplication, or other failure to completely follow PQ Protection's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void the warranty.

CAUTION: Check to make sure system voltages do not exceed the SPD voltage ratings 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 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 installer/user so that an informed decision can be made before installing any electrical equipment on an ungrounded power system.

Unpacking & Preliminary Inspection

Inspect the entire shipping container for damage or signs of mishandling. Remove packing materials and further inspect the unit for any obvious shipping damage(s). If any damage was found and is a result of shipping or handling, immediately file a claim with the shipping company and forward a copy to PQ Protection.

Storage Environment

This SPD should be stored in a clean, dry environment. Storage temperature range is -40°F (-40°C) to +140°F (+60°C). Avoid exposure to condensation.

SAFETY INSTRUCTIONS:

All governing codes and regulations and those required by the job site must be observed.

Hazardous voltages and shock hazards exist within SPDs. SPDs should never be installed or serviced when energized. Only qualified licensed electricians should install or service SPDs.

Always use appropriate safety equipment such as eye and face protection, head protection, foot protection, and gloves as appropriate to the application.

Failure to follow these instructions can result in death, serious injury, and/or equipment damage.

PRE-INSTALLATION & INSTALLATION PLANNING

All instructions must be completely followed to ensure proper and safe installation and performance.

Flush mount and side mount kits are available as options.

Operating Environment

The PQ120(-F) and PQ240(-F) units use a NEMA 4X enclosure when installed with appropriate conduit system (conduit and fittings provided by installer). The enclosure is manufactured with a 1-3/8" opening for a 1" conduit connector located on the top of the enclosure. Before installing, ensure that your enclosure type and application are appropriate regarding moisture, dirt, excessive dust, flammable materials or atmospheres, corrosive vapors, etc.

This SPD is designed for an ambient range of -40°F (-40°C) to +176°F (+80°C) with a relative humidity of 0% to 95% (non-condensing). Excessive temperature may inadvertently operate internal thermal overtemperature protectors.

Audible Noise

SPD background noise is negligible or non-existent and does not restrict the location of installation.

Lead Lengths & Maximizing SPD Performance

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 lengths; never coil or push aside excess lengths.

SPDs must be located as close to the circuit as possible to minimize let-through voltage. Use the shortest & straightest possible leads. Pre-Plan installations and ensure that the nearest breaker positions / connection points are used. If new construction, adjust breaker locations as appropriate. When longer leads are unavoidable, gently twist leads together (one to two twists per foot), or tie-wrap leads together.

Overcurrent Protection

For UL Type 1 products, no upstream overcurrent protection is required. However, it is recommended to utilize the proper sized overcurrent protection based on the amperage rating of the conductor used with respect to NFPA-70 and local regulations.

For UL Type 2 products, overcurrent protection is required and should also follow the recommendations of NFPA-70 and local regulations.

Do Not Hi-Pot Test SPDs

Any factory or on-site testing of power distribution equipment that exceeds normal operating voltage such as high-potential insulation testing, or any other tests where the suppression components will be subjected to voltage higher than the Maximum Continuous Operating Voltage (MCOV) rating must be conducted with the SPD disconnected from the power source.

For 4-wire systems, the neutral connection at the SPD must also be disconnected prior to performing high-potential testing. Failure to disconnect SPD and associated components during elevated voltage testing will damage the SPD and will void the warranty.

INSTALLATION INSTRUCTIONS

Verify system voltage

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/Uc) specifications must not be exceeded.

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. PQ120(-F) and PQ240(-F) enclosures are suitable for indoor use with included fittings. To achieve IP65/NEMA 4X enclosure rating for indoor or outdoor location, an UL approved raintight compression connector or similar and appropriate conduit should be utilized.

Panel must be de-energized prior to installation or maintenance.

Remove lid for wire installation

Remove external screws (4 for PQ120(-F) and 8 for PQ240(-F)) using a 1/8" hex drive. Set lid and screws aside during installation of wires. Take care not to disturb or damage the exposed OLED display. Reinstall the cover as soon as possible to protect the OLED display.

Connect proper ground

Attach an appropriately sized grounding conductor (#14 - #6 AWG) to the ground stud (1/4”-20 thread) in the PQ120(-F) and PQ240(-F) housing. The housing of the PQ120(-F) and PQ240(-F) unit is bonded to the grounding terminal 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. 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.

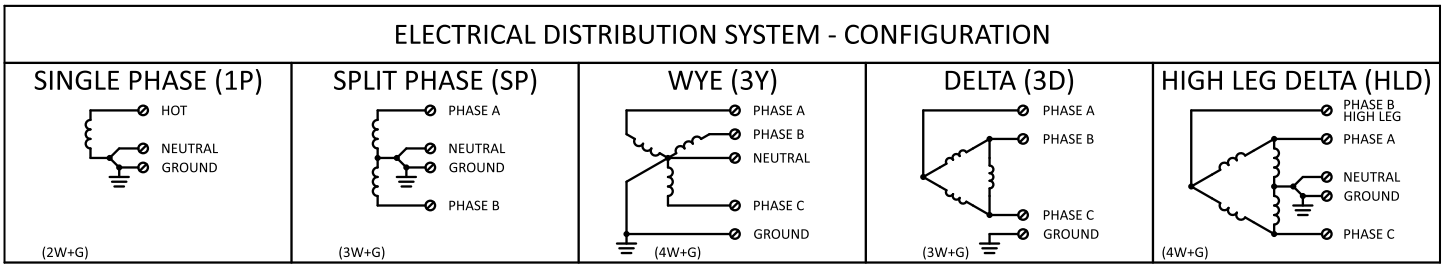
NOTE: For isolated ground systems, bond the grounding conductor from the PQ120(-F) and PQ240(-F) unit to the non-isolated equipment ground, not the isolated equipment ground.

Connect neutral conductor

Terminate an appropriately sized conductor (#14 - #6 AWG) to the Neutral (N) terminal. The wire insulation should be stripped back 0.5 in. before terminating. Tighten set screw to 19.5 in-lb. Wire length should be minimized to improve performance. Connect the neutral conductor of the PQ120(-F) and PQ240(-F) to the neutral lug on the panel.

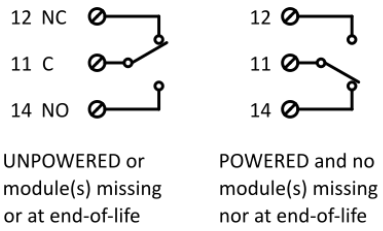
Connect phase conductors*

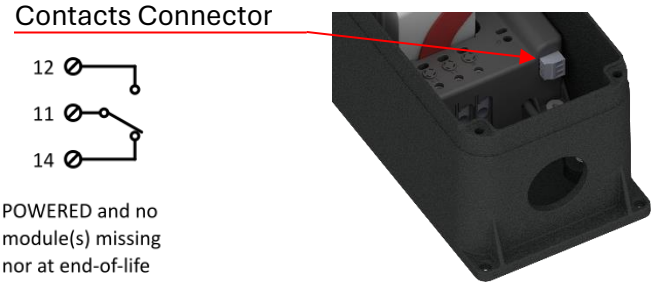
Terminate appropriately sized conductors (#14 - #6 AWG) to the Line (L1, L2, & L3*) terminals. The wire insulation should be stripped back 0.5 in. before terminating. Tighten set screw(s) to 19.5 in-lb. Wire length should be minimized to improve performance. With the POWER OFF, connect each phase lead.
***Note:** For High Leg Delta systems, the L3 terminal is marked with a RED cap. The conductor terminating into this terminal must be connected to the High Leg phase of the power system.



Remote Monitoring Contacts

The SPD has a form C contact for remote indication of protection status. Use 28 - 16 AWG wires to connect to the contact terminals. The contacts will change state during end-of-life module conditions.





ANSI TIA/EIA RS-485 interface

Please refer to the PQ120(-F) and PQ240(-F) RS-485 IOM available on the PQ Protection website.

Attach lid and install screws

Ensure the O-ring is properly seated in the cover. Torque all screws (4 for PQ120(-F) and 8 for PQ240(-F)) to 10 ft-lb (13.5 N-m).

Activate unit

Energize and confirm proper operation of indicators and/or options. If Audible Alarm cycles, de-energize and contact PQ Protection for assistance.

UL 1283 7th Ed. required language concerning the installation of EMI Filters:

a) An insulated grounding conductor that is identical in size and insulation 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 filter. Reference should be made to Table 250-122 of the National Electrical Code regarding the appropriate size of the grounding conductor.

b) The grounding conductor mentioned in item a is to be grounded to earth 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.

c) Any attachment-plug receptacles in the vicinity of the filter 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.

d) Pressure terminal or pressure splicing connectors and soldering lugs used in the installation of the filter 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.

OPERATION

LED Notification

Each SPD contains two LEDs (one green and one red). When the NORMAL STATUS (green) LED is illuminated, complete protection is present. Upon module end-of-life conditions or phase loss, the ALARM STATUS (red) LED will become illuminated. For diagnostics, refer to below:

Green LED	Red LED	Audible	OLED Display	Status / Action
ON	OFF	OFF	Surge/TOV Count	The SPD is operational
OFF	OFF	OFF	OFF	No power to the unit
OFF	ON	ON	Phase Loss	Check line voltages
OFF	FLASHING	OFF	Phase Loss	Alarm has been silenced; Check line voltages
OFF	ON	ON	Replace Module(s)	Replace Module(s)
OFF	FLASHING	OFF	Replace Module(s)	Alarm has been silenced; Replace module(s)

Module End-of-Life Condition

Along with the LED notifications, each module has a visual indicator flag that provides feedback on the status of each module. Under normal operation, the flag will be green. Once the module reaches end-of-life, the flag will change to red, and the module will need to be replaced. Remove power from the SPD and unfasten the lid using the external screws. Once the lid is removed, use the red lever(s) to lift the module(s) out of place and set the failed module(s) aside. Replace any failed module(s) with the correct module type.



OLED Display

When the SPD is in NORMAL STATUS, the OLED display will show the current Surge and TOV (Temporary Overvoltage) counts.

When module(s) require replacement, the OLED display will show a “REPLACE X MODULE” – “X” being the quantity of modules to replace.

Surge/TOV counter reset

The Surge/TOV counter can be reset by holding down the alarm shut-off button for 60 seconds.

Audible Alarm

The Audible Alarm will sound upon module end-of-life conditions and phase loss. The Audible Alarm may be silenced by pushing the alarm shut-off button on the outside of the enclosure.

MAINTENANCE

SPDs require minimal maintenance:

- We recommend periodic inspection of diagnostic indicators to ensure proper operation.
- We also recommend keeping the SPD clean as appropriate.

TROUBLESHOOTING & SERVICE

Please contact PQ Protection for any service-related issues.