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SurgeArrest® Panelmount Surge Protection Device

(PM 2 Series)

User's Manual

990-0523 12/00

Introduction

1 Introduction

Thank you for choosing APC's SurgeArrest PM 2 Series Panelmount Surge Protection Device!

This manual provides instructions for installing the PM 2 Series SurgeArrest Panelmount Surge Protection Device (SPD), as well as an optional Flush-Mount Kit. The PM 2 Series Panelmount SPD (Figure 1) can be mounted three ways. The preferred method of installation is to mount the SPD directly to the outside of the distribution panelboard using the integral chase nipple on the body of the SPD. It can also be installed against a panel/wall using installer-supplied hardware, or it can be installed using an optional Flush Mount Kit (p/n: FMK2). The latter two methods require use of additional conduit and hardware (not provided).

Save this manual! It includes instructions for obtaining warranty service and for returning a defective device.

Please read and understand all information in this manual prior to installation. This manual is to be used as a guide for installing the device. The procedures contained herein are not intended to supersede local or national electrical codes. **Check all applicable electrical codes to ensure compliance.** In all instances, local and national electrical code requirements are to be followed.

The PM 2 Series is a single port parallel SPD designed for service entrance and downstream panelboard applications. The PM 2 Series uses a chase nipple for installation, and offers an 80kA per phase (maximum) surge current rating.

The SPD provides protection from damaging transient voltage surges and spikes. Proper installation is imperative to maximize the effectiveness and overall performance of this device.

This device must be installed by a licensed electrician. The electrician should follow the steps outlined in this manual to insure proper installation. **A copy of the electrician's invoice detailing installation of this device is required in order to obtain warranty service for the device**.

Note: APC products are extensively tested to industry standards as set by IEEE C62.41 and C62.45, for Categories A, B, and C. The PM 2 Series is listed to UL 1449 Second Edition. This unit has passed UL 1449 Second Edition's most severe fault current test as listed in Section 37.3. The PM 2 Series is qualified for all circuit capacities.

During installation into an electrical system, the PM 2 Series must NOT be energized until the electrical system is installed, inspected and tested. All conductors must be connected and functional, including neutral (if required). The voltage rating of the device and system must always be verified before energizing the SPD.

Failure to follow the guidelines in this manual can lead to abnormally high voltage being applied to the SPD. This may cause the PM 2 Series unit to become inoperative. The warranty does not cover an incorrectly installed device.

Failure to disconnect the SPD during elevated voltage testing will result in damage to the suppression components and/or other electronic components (see Safety Information).

Installation

2 Parts List and Inspection

Items included in the package consist of the following:

- 1 PM 2 Series Panelmount SPD.
- 1 User's Manual (this document).
- Warning Labels (must be installed on or near the unit and be visible at all times).

If the Flush Mount Kit was ordered, additional parts are supplied as follows:

- 1 Flush-mount panel
- 4 Pan-head Screws

Carefully inspect each item in the package for signs of damage. If damage is found, please contact APC Customer Service (1-800-800-4APC). For more information about this product or other APC products, go to www.apc.com on the internet.

3 Safety Information

This section provides pertinent safety information that must be considered before installing the Panelmount SPD.

- Do not install this device during a lightning storm.
- For indoor use only.
- Do not install the surge protector in a hot or excessively moist location.
- Other safety considerations are as follows:

WARNING

VERIFY ALL POWER CIRCUITS ARE DE-ENERGIZED BEFORE MAKING CONNECTIONS

All electrical connections should be performed by a qualified (licensed) electrician. All wiring must comply with the National Electric Code (NEC) and applicable local codes.

WARNING

- **MAINTENANCE OF THIS SURGE PROTECTION DEVICE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL ONLY.**
- **DURING NORMAL OPERATION, HAZARDOUS VOLTAGES ARE PRESENT INSIDE THE UNIT.**
- **WHEN SERVICING THIS UNIT, BE SURE TO FOLLOW ALL ELECTRICAL SAFETY PRECAUTIONS.**
- **ALL POWER SOURCES TO THIS UNIT SHOULD BE LOCKED OFF BEFORE SERVICING. THIS WILL PREVENT THE RISK OF RECEIVING AN ELECTRICAL SHOCK.**

CAUTION

BONDING BETWEEN CONDUIT CONNECTIONS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION

CAUTION

CONDUCTING DIELECTRIC AND/OR HIGH POTENTIAL TESTING WILL CAUSE INTERNAL DAMAGE TO THE PANELMOUNT SPD UNIT. DO NOT PERFORM DIELECTRIC OR HIGH POTENTIAL TESTS WITH THE PHASE OR NEUTRAL PANELMOUNT SPD WIRES CONNECTED.

4 How to Install the PM 2 Series Panelmount SPD

To install the SPD to the distribution panelboard, proceed as follows:

1. Ensure power to the panelboard has been removed.
2. Remove the screws securing the outer panelboard cover to the distribution panelboard (panelboard) (see Figures 1 and 2).
3. Select the location where the SPD will be mounted (should be based on the internal configuration of the panelboard and the physical surroundings outside the panelboard). Note that the SPD's lead length must be minimized to achieve maximum performance. Once the location has been determined, drill or punch a 7/8" diameter hole in the top, bottom or side surface of the panelboard. The ideal mounting location will also allow the SPD to be secured to the wall or panel, in addition to using the chase nipple.
4. Screw one of the conduit nuts onto the chase nipple until it bottoms out. Note: bonding of the conduit connections to the panelboard is not automatic, and must be provided as part of the installation (remove paint from the panelboard surface prior to installing the SPD and chase nipple.
5. Push the leads from the SPD through the 7/8" diameter hole toward the inside of the panelboard. Push the leading part of the chase nipple through the hole and secure the SPD using a second conduit nut (sandwiching the metal wall of the panelboard between the two conduit nuts.
6. If possible, to provide extra rigidity in the installation, attach the SPD to the wall or panel using installer-supplied hardware.
7. Trim the leads from the SPD as short as possible, but still allowing the following connections to be made (see Figure 3):
   - Black wires (two or three in number) go to the nearest free circuit breaker. In all installations, it is not critical which black wire goes to the positions on the circuit breaker. The phase of each lead is marked with a white band and letter designator (A, B, or C). Connect the SPD leads to the appropriate phases.
   - Connect the white Neutral wire to the neutral bar using a set screw (in some applications, this connection may not be required).
   - Connect the green Ground wire to the panelboard ground.
8. Install the panelboard cover. Note: Conducting dielectric and/or high potential testing will cause internal damage to the panelmount SPD unit. Do not perform dielectric or high potential tests with the phase or neutral panelmount SPD wires connected.
9. Install any included warning labels near the panelmount SPD. Ensure the labels are placed where they will be visible at all times.
10. Apply power to the panelboard. Depending on the PM 2 model, either 2 (split-phase applications) or 3 (3 phase applications) LEDs will illuminate on the SPD. If any connected phase LED on the SPD does not light, remove power, check all connections and test again. If any connected phase LED still does not illuminate, contact APC Customer Service at 1-800-800-4APC or APC Technical Support at www.apc.com on the internet.

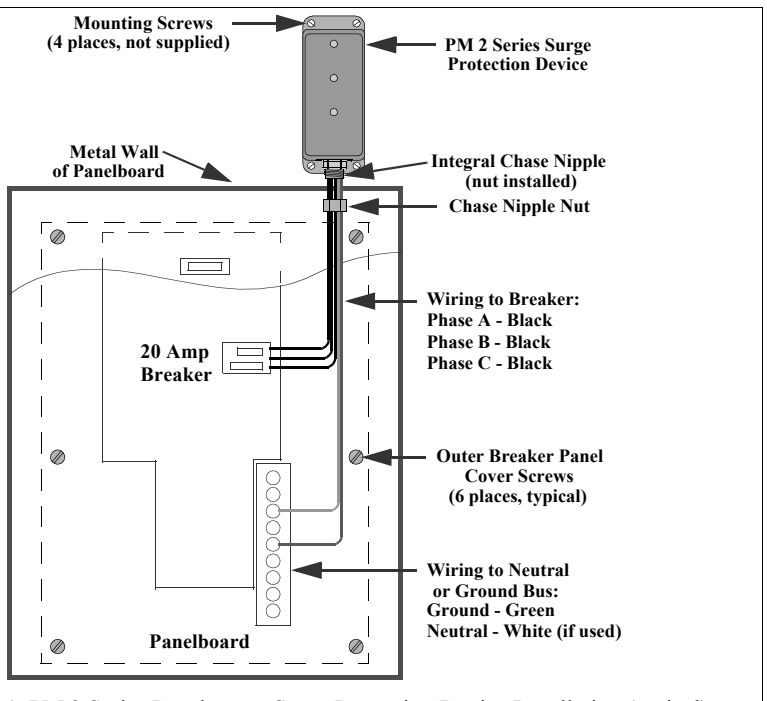

Figure 1. PM 2 Series Panelmount Surge Protection Device Installation (typical)

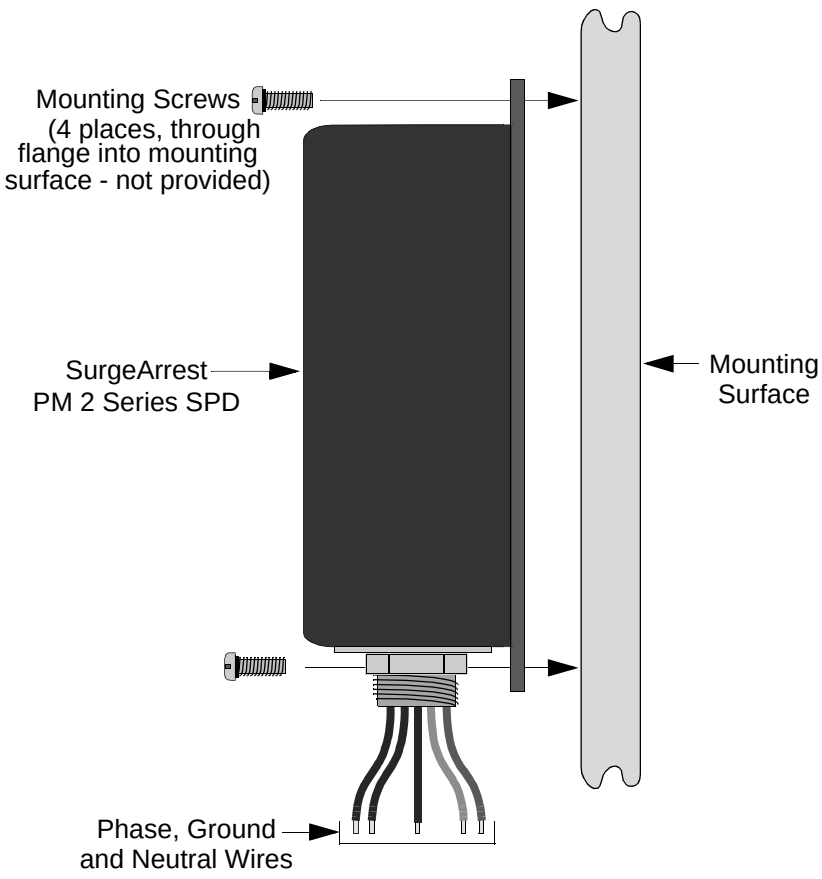

Figure 2. PM 2 Series SPD Installation
(side view, typical)

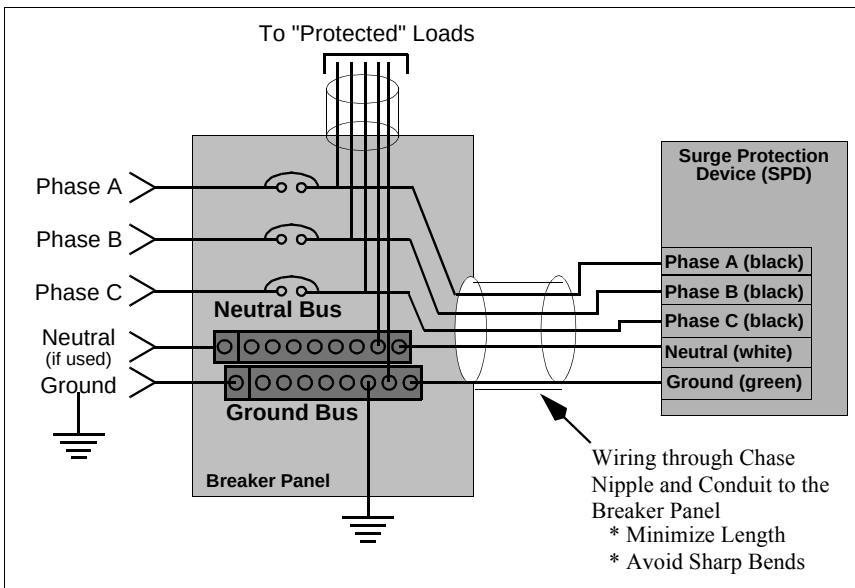

Figure 3. Typical Parallel Connections

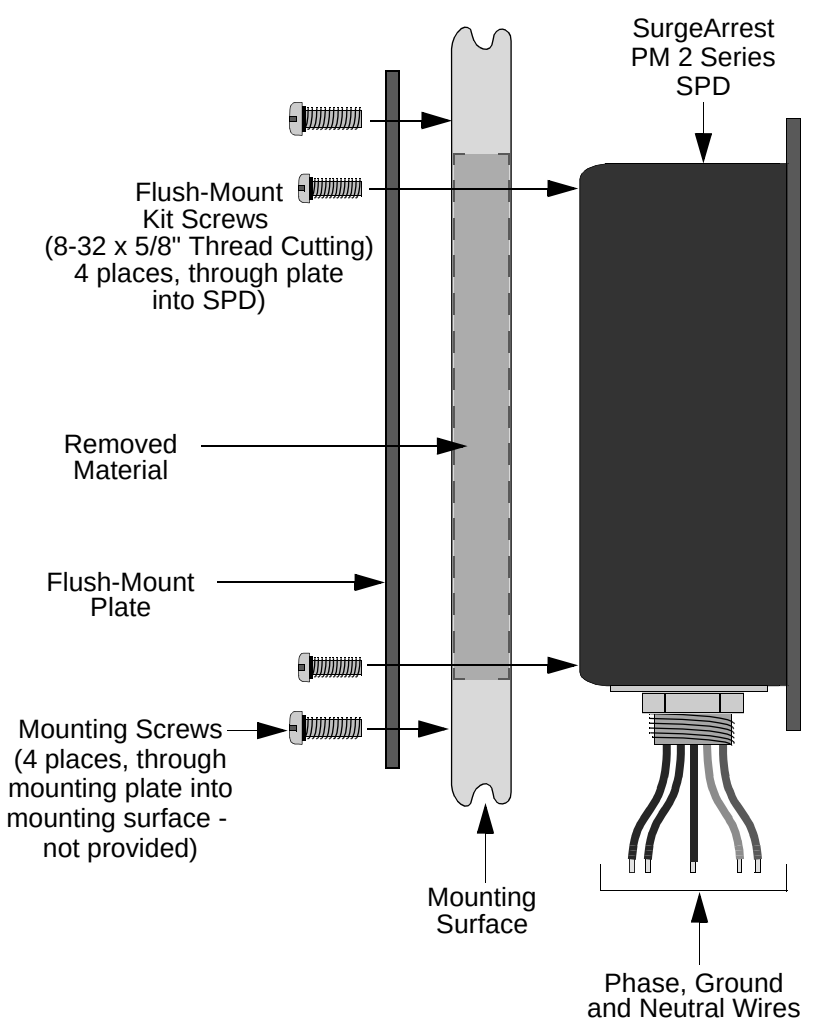

Figure 4. PM 2 Series SPD Flush-Mount Kit Installation
(side view, typical)

5 How to Install the SPD and Flush Mount Kit (p/n: FMK2)

The panelmount SPD can be flush-mounted when the application requires a more aesthetic installation. To install the SPD using the FMK2, proceed as follows:

1. Ensure power to the panelboard has been removed.
2. Remove the screws securing the outer panelboard cover to the distribution panelboard (panelboard) (see Figure 1).
3. Select the location where the SPD and Flush Mount Kit (FMK2) will be mounted. The location should be based on the internal configuration of the panelboard and the physical surroundings outside the panelboard). Note that the SPD's lead length must be minimized to achieve maximum performance. Aesthetics may have to be sacrificed in order to achieve maximum surge protection.
4. Place the Flush Mount Kit panel where it will be mounted and trace the center hole and mounting holes. Cut this shape into the mounting surface and mount the FMK2 panel to the mounting surface.
5. Install the panelmount SPD to the backside of the Flush Mount Kit panel using the four 8-32 x 5/8" Thread Cutting Screws (provided with the FMK2).
6. Drill or punch a 7/8" hole in the top, side or bottom surface of the panelboard in accordance with the location of the FMK2.
7. Push the leads from the panelmount SPD through the 7/8" diameter hole toward the inside of the panelboard.
8. Trim the leads from the SPD as short as possible, but still allowing the following connections to be made (***Note:*** Black wires go to the first 20 amp circuit breaker):
   - Black wires (two or three in number) go to the nearest free circuit breaker. In all installations, it is not critical which black wire goes to the positions on the circuit breaker. The phase of each lead is marked with a white band and letter designator (A, B, or C). Connect the SPD leads to the appropriate phase.
   - Connect the white Neutral wire to the neutral bar using a set screw (in some applications, this connection may not be required).
   - Connect the green Ground wire to the panelboard ground.
9. Install the panelboard cover. Note: Conducting dielectric and/or high potential testing will cause internal damage to the SPD unit. Do not perform dielectric or high potential tests with the phase or neutral SPD wires connected.
10. Install any included warning labels near the panelmount SPD. Ensure the labels are placed where they will be visible at all times.
11. Apply power to the panelboard. Depending on the PM 2 model, either 2 (split-phase applications) or 3 (3 phase applications) LEDs will illuminate on the SPD. If any connected phase LED on the SPD does not light, remove power, check all connections and test again. If any connected phase LED still does not illuminate, contact APC Customer Service at 1-800-800-4APC or APC Technical Support at www.apc.com on the internet.

Specifications

Item	Specification
Voltage Rating	PMP2X = 120/240V Split Phase. PMF2X = 120/208V Three Phase, WYE. PMG2X = 277/480V Three Phase, WYE.
Temperature - Operating Temperature - Storage	-40° C (-40° F) to +60° C (+140° F). -55° C (-67° F) to +60° C (+140° F).
Audible Noise	None
Service Clearance	36 inches (94.1 cm) in front of the unit.
Installation Type	Chase Nipple
Wire Length vs. Response Time and Let-Through Voltage	1 foot (31.7 cm) of wire = 1 nanosecond. 175 volts per foot (6kV/3kA, 8/20 microseconds) are added to the clamp voltage.
Wire Size and Installation Torque	Wire Size = #12 AWG, Torque to 18 in. lbs.
Circuit Breaker Connection	20 amp
System Grounding	Per IEEE STD 142-1991. For sensitive electronics/computer systems, the recommended ground impedance is 25 ohms or less.

Warranty and Service

APC warrants its Panelmount SPD products against defects in workmanship and materials for 5 years from the date of original purchase. The panelmount SPD must be installed by a qualified and licensed electrician in order to qualify for warranty protection.

Liability is limited to the replacement of the defective product. A Return Material Authorization (RMA) must be given by APC prior to the return of any product (see Technical Support and Customer Service). A copy of the invoice from the installer (electrician or electrical service company) must accompany the defective device being returned. If the return of a device is authorized by APC, APC will immediately ship a replacement unit to the customer. Along with the replacement unit, APC will include a pre-paid shipping tag for the return of the originally defective unit. The replacement unit will not be warranted unless the defective unit is received by APC.

Under no circumstance is APC responsible for the cost of removal or installation of any panelmount SPD.

The company specifically disclaims all other warranties, expressed or implied. Additionally, the company will not be responsible for incidental or consequential damages resulting from any defect in any product or component thereof.

Technical Support and Customer Service

United States and Canada: 1-800-800-4APC

This manual, as well as information about the entire APC product line are available on the internet at: www.apc.com. Prior to calling APC for technical assistance or ordering parts, please have the following information available:

Model Number of unit: _____

Serial Number of unit: _____

Manufacture Date: _____

Purchase Date: _____

Your Order Number: _____

Return Shipment Address: American Power Conversion Corporation
1600 Division Road
Dock 25
West Warwick, Rhode Island 02893 USA
Attn: RMA#_____

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