ProtectNet® Modular Data Line Surge Protection System

Installation Manual

Thank you for purchasing APC's Modular Data Line Surge Protection System. Please fill out the supplied Warranty Registration Card or an on-line Product Warranty Registration form at www.apc.com.

APC's Modular Data Line Surge Protection System consists of the PRM4 Chassis, mounting hardware, ground wire, and associated data line modules (PNETR5 for Network Protection, PTEL2R for Analog Telephone Protection, P232R for RS232 Protection, PDIGTR for Digital Telephone Protection, and PVR for Digital Cable Protection). The chassis was designed for desktop use, but can also be mounting in a home wiring enclosure, or in an equipment bay or rack.

This manual provides basic information necessary to install the PRM4 chassis and associated modules.

Note: Procedures provided in this document are not intended to supercede local standards or codes. Reference the Telecommunications Industries Association and Electronic Industries Alliance publication "Commercial Building, Telecommunications Cabling Standard, General Requirements" (document number TIA/EIA-568-B.1-2001) to ensure proper installation of system wiring.

Safety

Please read and save these instructions and observe the following safety precautions.

- Use the system in a protected environment only.
- Never install telephone wiring or coaxial cable during a lightning storm.
- Follow the installation instructions carefully. The current limiting feature in this product could be rendered inoperable if the product is improperly installed.

General Installation

Other Considerations

- Do not install this device in an environment where the operating temperature exceeds 0 to 40°C (32 to 104°F).
- Do not install this device where the relative humidity exceeds 95%, non-condensing.
- Do not store this device in an environment that exceeds 0 to 45°C (32 to 113°F).

Chassis Installation

APC recommends the ProtectNET PRM4 Data Line Surge Protection chassis (❶, Figure 1) can be installed using the optional mounting brackets (Detail A, Figure 1) available from APC (order PRMLB). In applications were more than one PRM4 chassis is being used, the chassis' can be stacked (Figure 1) or mounted side-by-side (Figure 2) using the joining plate ❷, and supplied machine screws.

Module Installation

The PRM4 chassis is designed to accomodate up to four data line or cable modules. To install a module, remove the two machine screws ❸ that secure the insert plate ❹ to the "U" bracket bezel holder ❺. Remove one of the blank panels ❻ by pulling it straight out of the chassis. Align module ❼ or ❽ with the groove in the chassis and slide the module fully into the chassis. After installing all required modules, replace the "U" braket bezel holder and insert plate. The "U" bracket bezel holder is provided to prevent modules from being accidently removed from the chassis.

Telephone or Coaxial Cable Installation

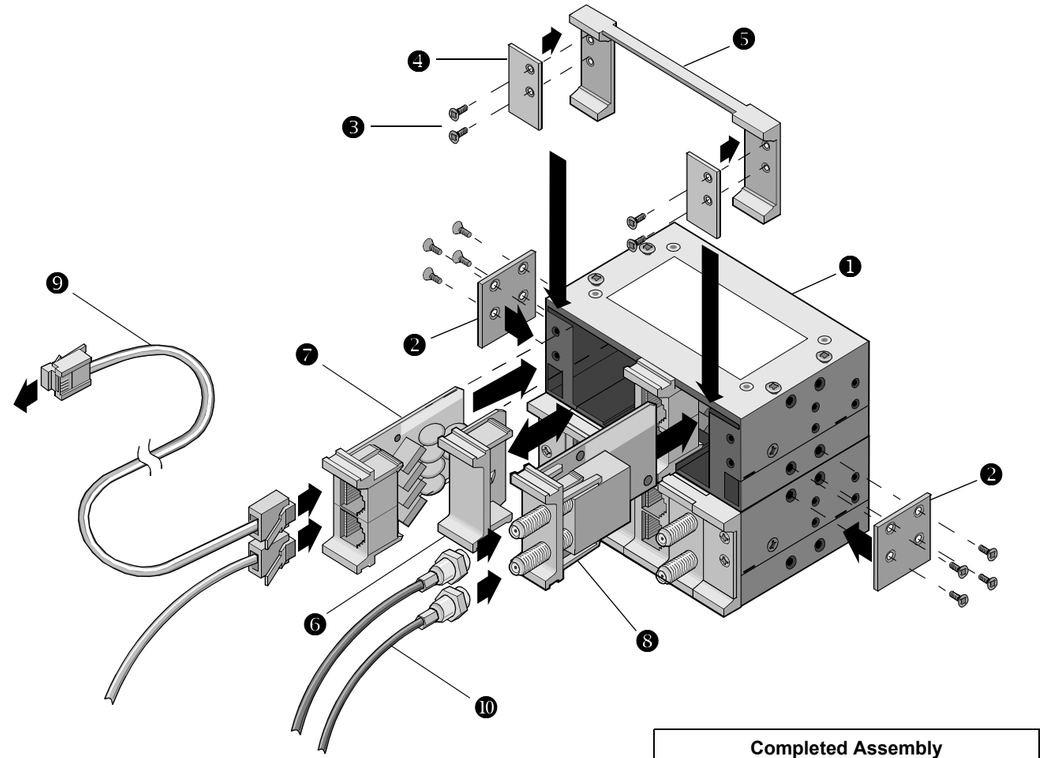
To install a data line cable ❾, connect the input RJ-45 connector to the signal source and then to the upper connector on the module. Connect a data line cable from the lower connector on the module to the equipment to be protected. Note: To accomodate four modules, the four center blank panels must be removed.

For coaxial cables ❿, connect one end of the cable to the signal source. Connect the other end of the cable to the upper input connector of the module marked "**IN**". Connect the output cable "F" connector from the lower module connector marked "**OUT**" to the device to be protected (CATV, DSS, Cable Modem, or Antenna System).

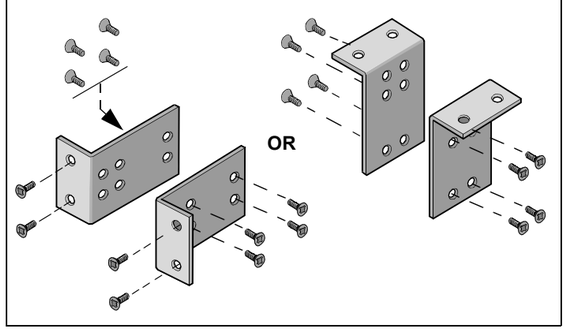
Grounding

The chassis must be grounded (Figure 3) to a proper protective earth ground. In a typical home/office environment, this can be accomplished by grounding the chassis to the Transient Voltage Surge Supression (TVSS) ground of an Uninterruptable Power Supply (UPS), or to your computer chassis. If the chassis is mounted in a structured wiring cabinet, ground the chassis to earth ground via the cabinet's earth ground connection. A ground wire, machine screw, and threaded mounting hole are provided for use when grounding the chassis.

Figure 1. Stacked Mounting and Module Installation



Detail A - PRMLB (Optional) Mounting Bracket Orientation



Completed Assembly

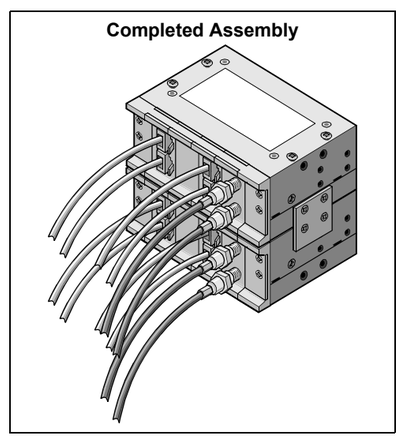
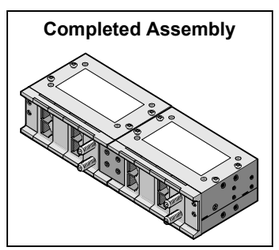
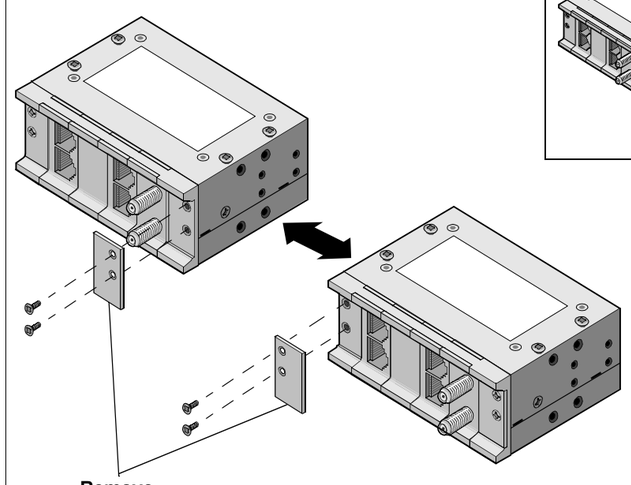
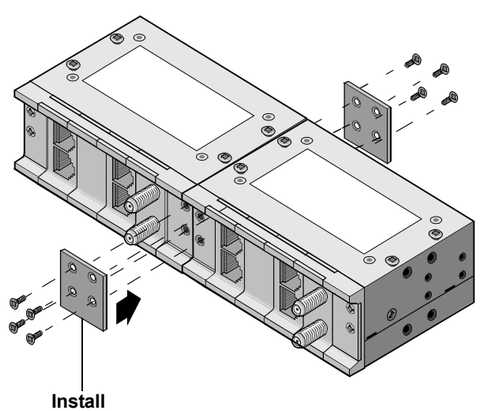


Figure 2. Side-by-Side Mounting

Completed Assembly

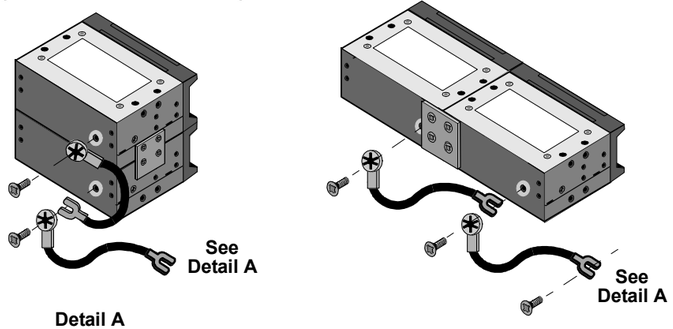




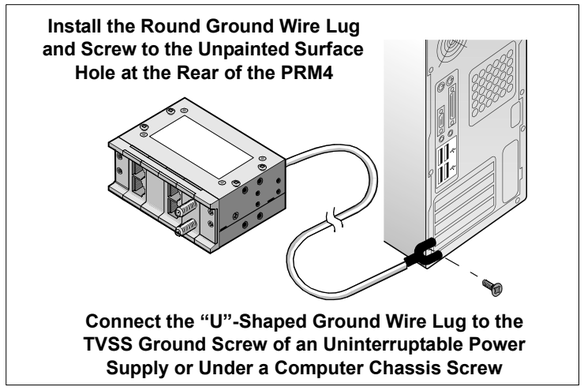


Chassis Grounding

Figure 3. Chassis Grounding



Detail A



Module Information

Model PNETR5 (Network Protection)

The PNETR5 module will protect the port of a Network Interface Card, hub or other local area network (LAN) equipment from damage caused by lightning-generated electrical transients. This module provides surge protection for 10Base-T, 100Base-T4, 100Base-TX, 100VG or Token Ring Type 3 UTP port (RJ-45), and VOIP applications. PNETR5 complies with applicable ISO/IEC Standard 8802-3 (IEEE 802.3) or 8802-5 (IEEE 802.5) requirements.

Item	Specification
Lines Protected	Pins 1-8 on RJ-45 connector
Mode of Protection	Between send/receive pairs and any signal line to ground.
Peak Voltage	± 2,000 Volts, 1.2/ 50 µs test waveform
Peak Current	150 Amps, 8/ 20 µs test waveform
Breakover (turn on) Voltage	60 V peak nominal between send/ receive pairs
Isolation	Compliant with the applicable safety isolation requirements of standards IEEE 802.3 or IEEE 802.5
Response Time	<1ns
Agency Approvals	UL 497B recognized

In applications where the network data transmission rate is high, insertion loss introduced by in-line devices is a significant consideration where cable lengths are particularly long. At the 100 Mbp/s data transmission rate, there is a small insertion loss introduced by the PNETR5. Use Table 1 to approximate the insertion loss based on cable length effectively introduced by the PNETR5 by installed cable Category level or type. The ISO/IEC 8802-3 standard specifies a maximum UTP cable length of 100 meters per segment at 10/100 Mbp/s. For Thinnet, the maximum cable length is 185 meters (607 feet).

Module Information - continued

Table 1

EIA/TIA 568 Category or Cable Type	Frequency (MHz)	Attenuation (db/100m)	Equivalent Cable Length (m)
3	10	9.8	1.0 (3.3 ft)
	16	13.1	1.10 (3.5 ft)
4	10	7.2	1.4 (4.5 ft)
	16	8.9	1.6 (5.2 ft)
5	10	6.6	1.5 (4.9 ft)
	16	8.2	1.7 (5.6 ft)
5	100	22	12.5 (41 ft)

Model PVR (Digital Cable Protection)

The PVR module protects the cable input to video/cable/modem equipment against surges and spikes caused by lightning and electrostatic discharge (ESD). It is compatible with cable television (CATV), digital satellite system (DSS), television, video cassette recorder (VCR), cable modem and TV antenna equipment. It is also compatible with many DSS units having operating voltages below 26 volts DC. The PVR is recognized by Underwriter’s Laboratories (UL®) as a secondary protector.

Item	Specification
EN 50083-4, Attenuation and Return Loss	<6 dB from 54-550 MHz and <8 dB 550-1002 MHz
Ingress Susceptance EIA 23	(-26) dBmV
Radiated Emissions	15 dBmV 360 degree
Frequency Range	1 MHz though 2.0 GHz
Insertion Loss	0 dB to 3.0 dB over rated frequency range
Agency Approvals	UL 497B, FCC 47 CFR 15, CLB-47 CFR Part 15 Subpart C

Model PTEL2R (Analog Telephone Protection)

The PTEL2R module protects analog telephones, ADSL, ISDN2, voice mail and automated answering systems, fax machines and modems from damage caused by lightning-generated electrical transients. Each PTEL2R protects up to 2 lines.

Item	Specification
Lines Protected	Pins 3 & 4 / 5 & 6 on RJ-45 connector; accepts RJ-45/RJ-11 plugs
Mode of Protection	Metallic (Tip - Ring) and longitudinal (Tip + Ring - Ground)
Peak Voltage	± 2,000 Volts, 1.2/50 µs test waveform
Peak Current	150 Amps, 8/ 20 µs test waveform
Breakover (turn on) Voltage	270 V peak nominal between tip and ring
Overload Protection	Solid-state self-resetting fuse
Response Time	<1 ns
Agency Approvals	UL 497A recognized

Warning: Disconnect module wires before removing any module. Do not put fingers or any object inside the chassis.

Model P232R (RS232 Protection)

The P232R module is for use with RS232 communication equipment (RS232 multiports, asynchronous multiplexers, asynchronous printer spoolers, etc.) comprised of unshielded, twisted-pair wiring with RJ-45 connectors. It protects up to four ports per unit.

Item	Specification
Lines Protected	Pins 1-8 on RJ-45 connector
Mode of Protection	Between send/receive pairs and any signal line to ground
Peak Voltage	± 2,000 Volts, 1.2/50 µs test waveform
Peak Current	150 Amps, 8/ 20 µs test waveform
Breakover (turn on) Voltage	19 V nominal between send/receive pairs
Response Time	<1 ns

Model PDIGTR (Digital Telephone Protection)

The PDIGTR module is only for use in T1, CSU, DSU, ISDN, DDS and Digital Leased Line telecommunication equipment, TNV-1 or SELV circuits only.

Item	Specification
Lines Protected	Pins 1-8 on RJ-45 connector
Mode of Protection	Between send/receive pairs and any signal line to ground
Peak Voltage	± 2,000 Volts, 1.2/50 µs test waveform
Peak Current	100A (max with 10X 1000 µs waveform
Operating Current	150 mA Maximum
Breakover (turn on) Voltage	Metallic (line-to-line): 60VDC Nominal
Response Time	<1 ns
Regulatory Approval / Classification	UL 497A recognized, FCC

Service

If the device arrived damaged, notify the carrier.

If the device requires service, do not return it to the dealer. The following steps should be taken:

1. Go to http://www.apc.com/support/.
2. Have the model number, serial number and date of purchase available. Be prepared to troubleshoot the problem with an APC Technical Support representative. If this is not successful, APC will issue a Return Merchandise Authorization (RMA) number and a shipping address.

Limited Lifetime Warranty

APC warrants its products to be free from defects in materials and workmanship under normal use and service for the lifetime of the original purchaser. Its obligation under this warranty is limited to repairing or replacing, at its sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from APC or an APC Service Center. Product must be returned to APC or an APC Service Center with transportation charges pre-paid and must be accompanied by a brief description of the problem and proof of date/place of purchase. This warranty applies only to the original purchaser.

Customer Service / Technical Support

For information please call APC Customer Service Center at:

American Power Conversion 1-401-789-5735 or 1-800-800-4APC (4272)
132 Fairgrounds Road http://www.apc.com/support or
West Kingston, RI 01892 USA esupport@apcc.com

Federal Communications Commission (FCC) Notice

This equipment contains an FCC compliant RJ-45 modular jack. It is designed to be connected to the telephone network or premises wiring using compatible modular plugs and cabling which comply with the requirements of FCC Part 68 rules. The Ringer Equivalence Number (REN) is used to determine the number of devices which may be connected to the telephone line. An excessive REN may cause the equipment to not ring in response to an incoming call. In most areas, the sum of RENs of all equipment on a line should not exceed five (5).

In the unlikely event that this equipment causes harm to the telephone network, the telephone company can temporarily disconnect your service. The telephone company will try to warn you in advance of any such disconnection, but if advance notice isn’t practical, it may disconnect the service first and notify you as soon as possible afterwards. In the event such a disconnection is deemed necessary, you will be advised of your right to file a complaint with the FCC.

From time to time, the telephone company may make changes in its facilities, equipment, or operations which could affect the operation of connected equipment. If this occurs, the telephone company is required to provide you with advance notice so you can make the modifications necessary to maintain uninterrupted service. This product is not serviceable by the user.