



# 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](http://www.apc.com).

APC's Modular Data Line Surge Protection System consists of a variety of interchangeable surge suppression modules installed in either a four position "PRM4" or a 24 position "PRM24" chassis with the mounting hardware and ground wire. A list of the modules that are available, and the types of data lines they protect are provided below. The PRM4 is designed to mount inside a home wiring enclosure. The PRM24 is designed to mount in a standard 19-inch rack enclosure.

This manual provides basic installation information for the PRM4 chassis and associated modules. For PRM24 installation information, reference APC manual 990-1383A.

**Note:** Procedures provided in this document are not intended to supersede 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 the system wiring is installed properly.

### 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 of this product could be rendered inoperable if the product is improperly installed.

### 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 (1 in Figure 1) be installed using the optional mounting brackets (see Detail A, Figure 1) that are available from APC (order PRMLB). In applications where more than one PRM4 chassis is used, the chassis' can be stacked (see Figure 1), or mounted side-by-side (see Figure 2) using the joining plate (2), and the machine screws supplied with the chassis.

### Module Installation

The PRM4 chassis is designed to accommodate up to four data line or coaxial cable modules. To install a module, remove the two machine screws (3) that secure the insert plate (4) to the "U bracket" bezel holder (5). Remove one of the blank panels (6) by pulling it straight out of the chassis. Align the module, either (7) or (8), with the groove in the chassis and slide the module fully into the chassis. After installing all the required modules, replace the "U bracket" bezel holder (5), and install the insert plate. The U bracket bezel holder is provided to prevent modules from being accidentally removed from the chassis.

### Telephone or Coaxial Cable Installation

To install a data line cable (9), connect the input RJ-45 connector to the signal source, and then connect to the upper data connector on the module. Connect a data line cable from the module's lower connector to the equipment to be protected. **Note:** To accommodate four modules, the four blank panels in the center of the module must be removed.

To install coaxial cables (10), 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 module's lower connector marked **OUT** to the device to be protected (CATV, DSS, cable modem, or antenna system).

### Grounding

The chassis must be grounded to a proper protective earth ground (see Figure 3). In a typical home/office environment, this can be accomplished by grounding the chassis to the transient voltage surge suppression (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 to be used when grounding the chassis.

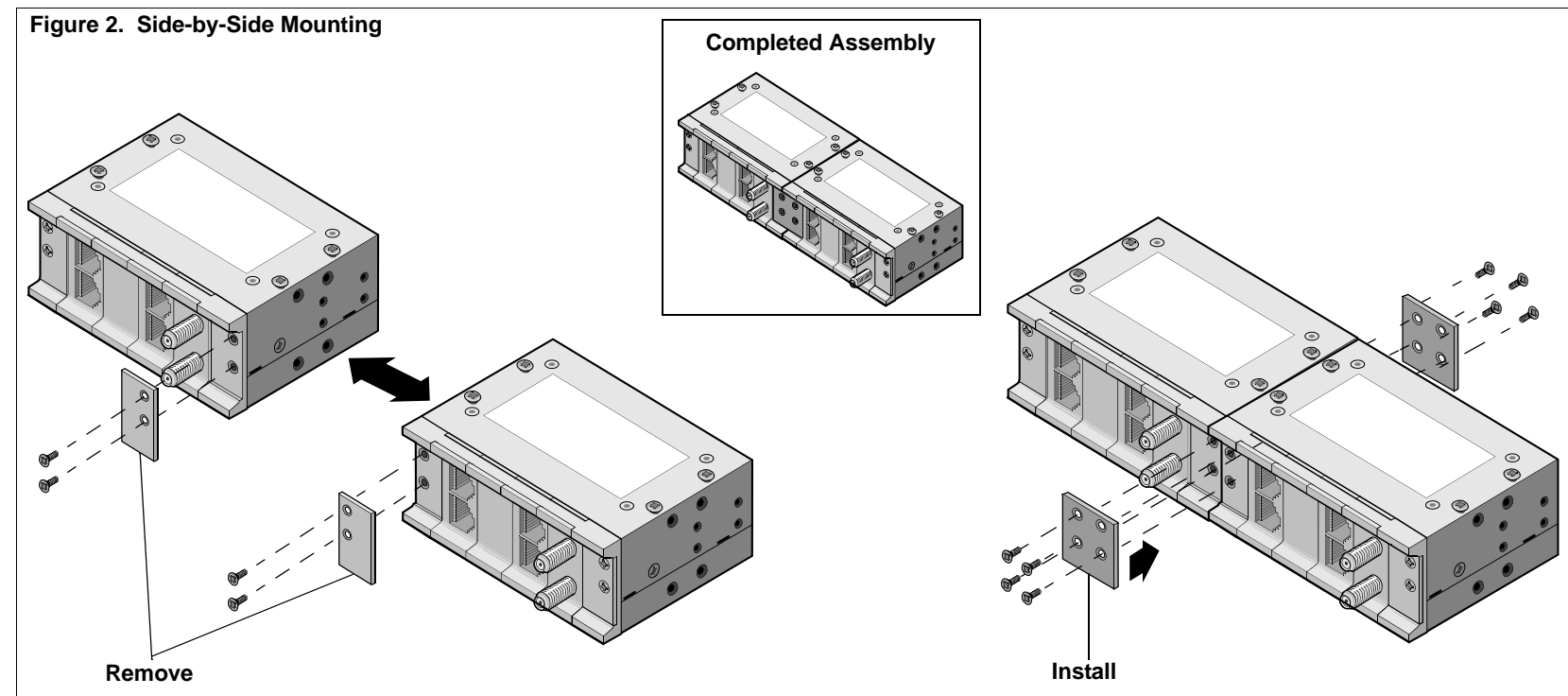


Figure 1. Stacked Mounting and Module Installation

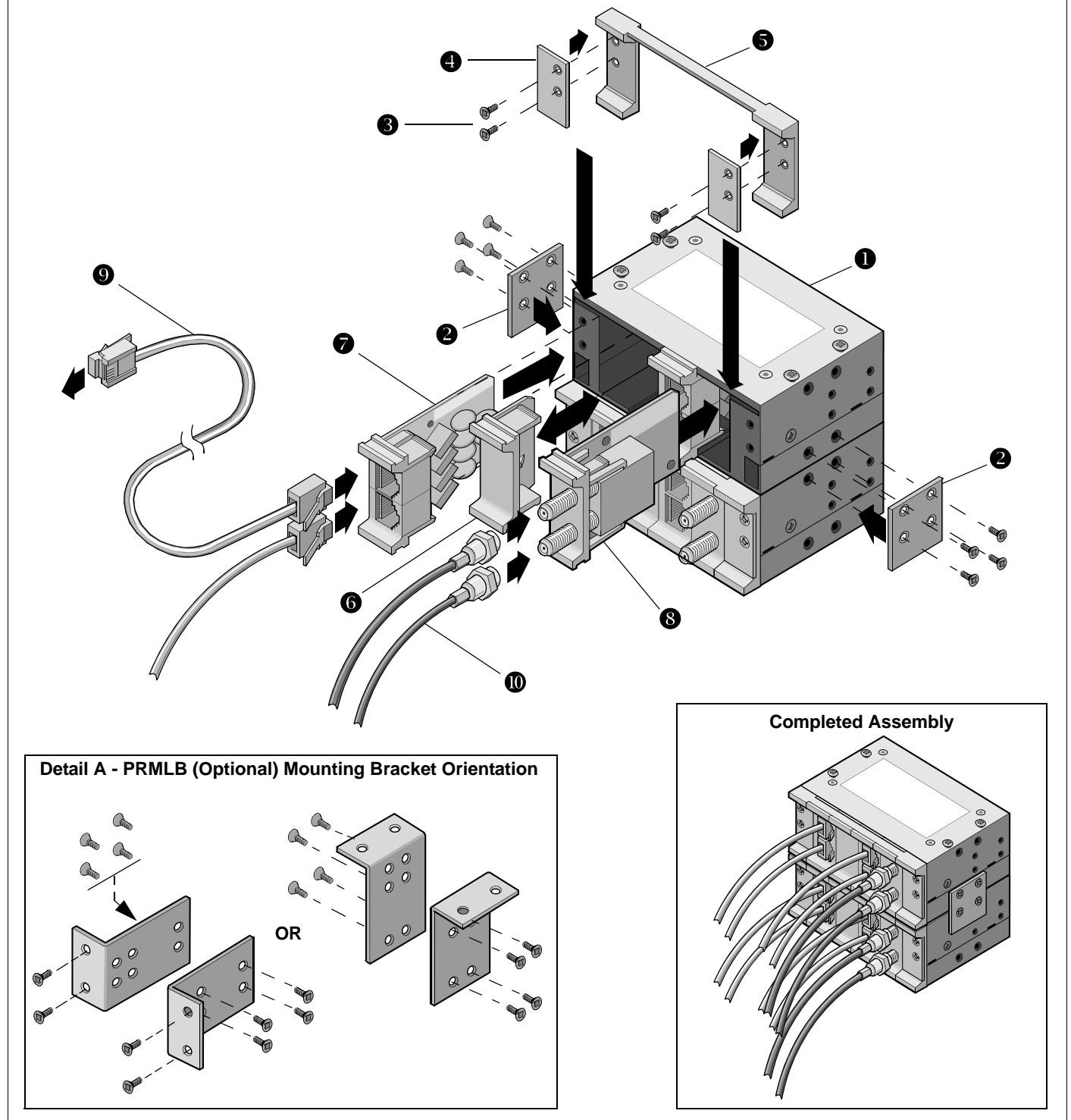
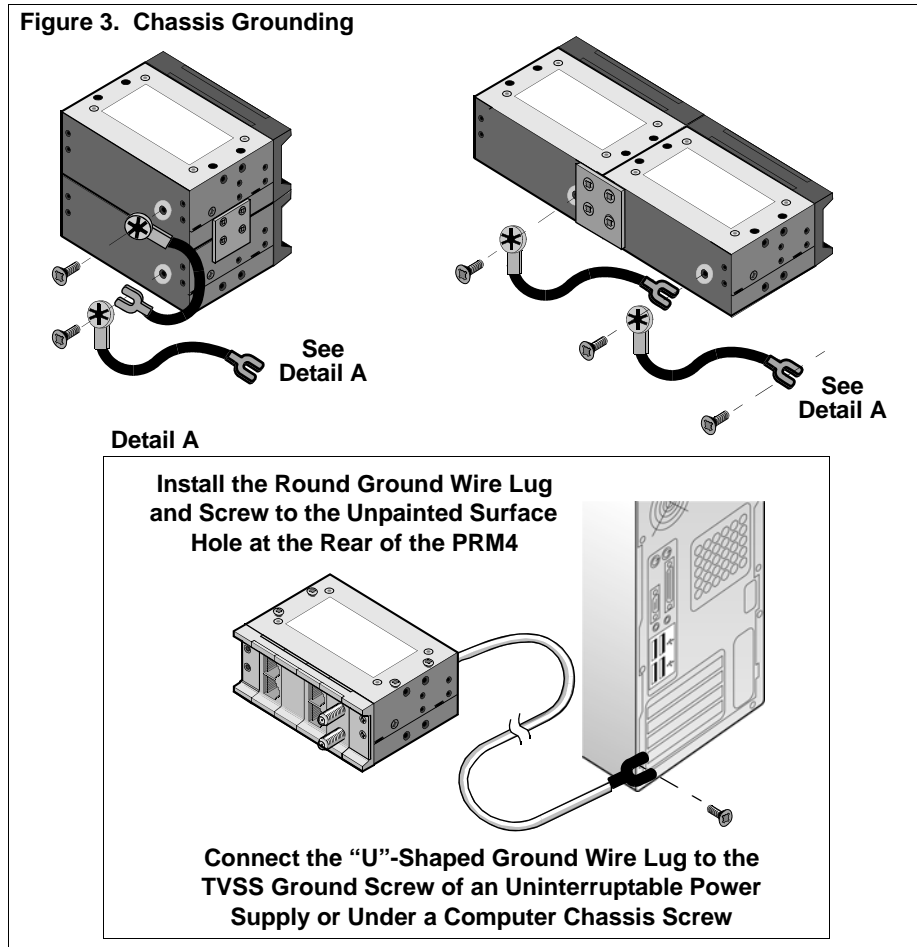


Figure 3. Chassis Grounding



**Model PNETR6** - Applications where the network data transmission rate is high and cable lengths are long, an insertion loss is introduced by in-line devices. At 250 Mbp/s there is a small insertion loss introduced by the PNETR6. Use Table 1 to approximate the insertion loss based on the installed cable type. The ISO/IEC 8802-3 standard specifies a 150 meter maximum UTP cable length per segment at 250 Mbp/s.

Table 1

| EIA/TIA 568 Category or Cable Type | Frequency (MHz) | Attenuation (db/100m) | Equivalent Cable Length (m) |
|------------------------------------|-----------------|-----------------------|-----------------------------|
| 3                                  | 10              | 9.8                   | 1.0 (3.28 ft)               |
|                                    | 16              | 13.1                  | 1.10 (3.5 ft)               |
|                                    | 16*             | 0.1*                  | 1.0 (3.28 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)                |
| 5e                                 | 100*            | 2.2*                  | 10 (32.8 ft.)               |
| 6                                  | 250*            | 5.8*                  | 17.1 (56.1 ft.)             |

Note: Entries marked with an asterisk ( \* ) are only valid for PNETR6.

**Model PVR (Digital Cable Protection)**

The PVR module provides digital cable protection for video/cable/modem equipment against surges and spikes caused by lightning and electrostatic discharge (ESD). It is compatible with cable television (CATV), a digital satellite system (DSS), television, video cassette recorder (VCR), cable modem and TV antenna equipment. It is also compatible with many DSS units that have 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 devices, including telephones, ADSL, ISDN2, voice mail, automated answering systems, fax machines and modems, from damage caused by lightning-generated electrical transients. Each PTEL2R module 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 Volts peak nominal between tip and ring                      |
| Overload Protection   | Solid-state, self-resetting fuse                                 |
| Response Time   | <1 ns  |
| Agency Approvals  | UL 497A recognized   |
| <b>Warning:</b> Disconnect module wires before removing module. Do not put fingers or objects inside the chassis. |  |

**Model P232R (RS232 Protection)**

The P232R module is used for RS232 communications (RS232 multiports, asynchronous multiplexers, asynchronous printer spoolers) using 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 Volts nominal between send/receive pairs              |
| Response Time               | <1 ns  |

**Model PDIGTR (Digital Telephone Protection)**

The PDIGTR module is only designed to be used in T1, CSU, DSU, ISDN, DDS and Digital Leased Line telecommunication equipment, and TNV-1 or SELV circuits. Insertion loss introduced by in-line devices is a major consideration.

| 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 (maximum 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 immediately.

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 esupport@apcc.com  
 West Kingston, RI 01892 USA

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 that 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 the 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 that 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.

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Module Information

**Models PNETR5 and PNETR6 (Cat 5 and Cat 6 Network Protection)**

The PNETR5 and PNETR6 modules protect the ports of network interface cards (NICs), hubs or other local area network (LAN) equipment from damage caused by electrical transients over a Cat5 or Cat6 data line. Both the PNETR5 and PNETR6 are compatible with 10Base-T, 100Base-T4, 100Base-TX, 100VG, Token Ring Type 3 UTP port (RJ-45), and VoIP standards and applications. Both modules comply with IEEE 802.3 and IEEE 802.5. PNETR6 is also compatible with 1000Base-T/Cat6 and IEEE 802.12 Ethernet standard, Category 5 and 6. PNETR5 and PNETR6 key specifications are listed below.

| Item                               | Specification  |
|------------------------------------|--|
| PNETR5/PNETR6 Lines Protected      | Pins 1 - 8 on RJ-45 connector  |
| PNETR5/PNETR6 Mode of Protection   | Between send/receive pairs and any signal line to ground.  |
| PNETR5/PNETR6 Peak Voltage         | ± 2,000 Volts, 1.2/ 50 µs test waveform  |
| PNETR5 Peak Current                | 150 Amps, 8/20 µs test waveform  |
| PNETR6 Peak Current                | 250 Amps, 8/20 µs test waveform  |
| PNETR5 Breakover (turn on) Voltage | 60 V peak nominal between send/receive pairs   |
| PNETR6 Breakover (turn on) Voltage | 60 Vdc nominal   |
| PNETR5/PNETR6 Isolation            | Both comply with applicable safety isolation requirements of IEEE 802.3 and 802.5. PNETR6 complies with 802.12 Ethernet Cat5, 6. |
| PNETR5/PNETR6 Response Time        | <1ns   |
| Agency Approvals                   | UL 497B recognized   |

**Model PNETR5** - In applications where the network data transmission rate is high and cable lengths are long, insertion loss introduced by in-line devices is a major consideration. 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 introduced by the PNETR5 based on your installed cable type. The ISO/IEC 8802-3 standard specifies a maximum UTP cable length of 150 meters per segment at 10 and 100 Mbp/s. For Thinnet, maximum cable length is 185 meters (607 ft.).