



Raritan PX

This installation guide explains how to install power cords on Raritan PX products that do not come with a factory installed power cord. This type of product, such as PX2-4550XU and in-line monitors, provides the flexibility of using a power cord with the style you need.

Safety Guidelines

WARNING! These instructions are not for products with factory-installed flexible cords. Do not open a Raritan product with a factory-installed cord.

WARNING! Do not replace the cable gland. The chassis is punched for the correctly-sized gland and is not for different wiring methods such as conduit.

WARNING! These instructions must be performed by a licensed electrician.

WARNING! Raritan products must not be serviced while energized. Before servicing, (a) disconnect from power, (b) disconnect any devices plugged into the product's receptacles, and (c) disconnect all interconnect cables.

WARNING! Read and understand all sections in this guide before installing or operating this product.

WARNING! Connect this product to an AC power source whose voltage is within the range specified on the product's nameplate. Operating this product outside the nameplate voltage range may result in electric shock, fire, personal injury and death.

WARNING! Connect this product to an AC power source that is current limited by a suitably rated fuse or circuit breaker in accordance with national and local electrical codes. Operating this product without proper current limiting may result in electric shock, fire, personal injury and death.

WARNING! Connect this product to a protective earth ground. Never use a "ground lift adaptor" between the product's plug and the wall receptacle. Failure to connect to a protective earth ground may result in electric shock, fire, personal injury and death.

WARNING! This product contains no user serviceable parts. Do not open, alter or disassemble this product except as described in this manual. Failure to comply with this warning may result in electric shock, personal injury and death.

WARNING! Use this product in a dry location. Failure to use this product in a dry location may result in electric shock, personal injury and death.

WARNING! Do not rely on this product's receptacle lamps, receptacle relay switches or any other receptacle power on/off indicator to determine whether power is being supplied to a receptacle. Unplug a device connected to this product before performing repair, maintenance or service on the device. Failure to unplug a device before servicing it may result in electric shock, fire, personal injury and death.

WARNING! Only use this product to power information technology equipment that has a UL/IEC 60950-1 or equivalent rating. Attempting to power non-rated devices may result in electric shock, fire, personal injury and death.

WARNING! Do not use a Raritan product containing outlet relays to power large inductive loads such as motors or compressors. Attempting to power a large inductive load may result in damage to the relay.

WARNING! Do not use this product to power critical patient care equipment, fire or smoke alarm systems. Use of this product to power such equipment may result in personal injury and death.

WARNING! Assembly of this product's line cord and/or plug must be performed by a licensed electrician and the line cord or plugs used must be suitably rated based on the product's nameplate ratings and national and local electrical codes. Assembly by unlicensed electricians or failure to use suitably rated line cords or plugs may result in electric shock, fire, personal injury or death.

WARNING! This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

Safety Instructions

1. Installation of this product should only be performed by a licensed electrician.
2. Make sure the line cord is disconnected from power before physically mounting or moving the location of this product.
3. This product is intended to be located in an equipment rack in an information technology room. In the United States, installation must comply and be done in

accordance with NEC (2011) Article 645 *Information Technology Equipment*.

- This product is designed to be used within an electronic equipment rack. The metal case of this product is electrically bonded to the line cord ground wire. A threaded grounding point on the case may be used as an additional means of protectively grounding this product and the rack.
- Examine the branch circuit receptacle that will supply electric power to this product. Make sure the receptacle's power lines, neutral and protective earth ground pins are wired correctly and are the correct voltage and phase. Make sure the branch circuit receptacle is protected by a suitably rated fuse or circuit breaker.
- If the product is a model that contains receptacles that can be switched on/off, electric power may still be present at a receptacle even when it is switched off.

Before Installation

Read the following precautions before installing any power cord or plug on a PDU.

WARNING! DO NOT perform wiring assembly for this product unless you are an experienced, licensed electrician. Assembly or attempted assembly by inexperienced or unlicensed electricians may result in electrical shock, fire, personal injury, and death. If you are not a qualified electrician with appropriate licensing and insurance - STOP NOW. This is work you cannot and should not attempt. Raritan is not responsible for any consequential damages to equipment or loss of data due to improper installation.

FOR QUALIFIED ELECTRICIANS: Read the instructions in their entirety before starting the installation. You must follow all wiring instructions, ensure compliance with national and local safety and electrical codes, and follow all other electrical safety requirements with regard to over-current protection. STOP and contact Raritan Technical Support if you are unsure of any answers, or have additional questions.

Flexible Cord Installation Instructions

The following instructions are for Raritan products manufactured to accept user-installed flexible cords. These products are visually identified by the cable gland used to hold the flexible cord.



Important: Complete and the most updated instructions on installing a flexible cord on Raritan PDUs are included in the *Raritan PX Power Cord Installation Guide*, which is available on the Raritan website's *Support page* (<http://www.raritan.com/support>).

Flexible Cord Selection

- The preferred flexible cable is type SOOW, 600V, 90°C or 105°C. Consult Raritan before using a different flexible cable type.
- The rated ampacity of the flexible cord must be greater than or equal to the Raritan product's rated ampacity marked on its nameplate. In the United States, relevant ampacity ratings for flexible cords can be found in NEC(2011) section 400.5.
- The number of wires in the flexible cord must match the number of terminals (including the ground terminal) inside the Raritan product. See *Wiring of 3-Phase In-Line Monitors* (on page 3) for exceptions.
- If a plug is to be attached to the flexible cord, the length of the flexible cord must not exceed 4.5 meters - as specified in UL 60950-1 (2007) and NEC 645.5 (2011).
- The flexible cord may be permanently connected to power subject to local regulatory agency approval. In the United States, relevant electrical regulations can be found in NEC (2011) sections 400.7(A)(8), 400.7(B), 368.56 and table 400.4.

Plug Selection

If a plug is to be attached to the flexible cord, the plug's rated ampacity is chosen as follows:

- In the United States, as specified in UL 60950-1, the plug's rated ampacity must be 125% greater than the Raritan product's rated ampacity. In some Raritan products, such as 35A 3-phase delta wired PDUs, an exactly 125% rated plug is not available. In these cases, choose the closest plug that is more than 125%. For example, a 50A plug is the closest fit for a 35A 3-phase PDU.
- For all other locations, subject to local regulatory agency policy, the plug's rated ampacity is the same as the Raritan products rated ampacity.

Receptacle Selection

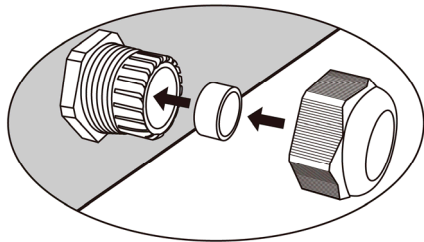
For Raritan in-line monitors, any receptacle fitted to the outlet flexible cord must have identical ratings as the plug attached to the inlet flexible cord.

Derating a Raritan Product

Lower rated plugs, receptacles and flexible cords may be connected to a Raritan product. This results in a derated (reduced) ampacity rating for the product.

► Derating guidelines:

1. Choose the plug and use its rated ampacity to determine the derated ampacity.
 - In the United States, as specified in UL 60950-1, the derated ampacity is 80% of the plug's rated ampacity. For example, a 30A plug would result in a derated ampacity of 24A.
 - In other geographic locations, subject to local regulatory agency approval, the derated ampacity is the plug's rated ampacity. For example, using a 16A plug would result in a derated ampacity of 16A.
2. The derated ampacity must be marked on the Raritan product so the new reduced rating can be easily identified.
3. For in-line monitors, the receptacles used must have the same voltage and ampacity rating as the plug chosen in step 1.
4. The flexible cord must have a rated ampacity greater than or equal to the derated ampacity. Since the new flexible cord may be smaller diameter, a check must be performed to insure the cable gland nut, when tightened, will securely hold the flexible cord so that it cannot be twisted, pulled or pushed in the cable gland. A sealing ring, for small diameter flexible cords, may have been included with the Raritan product, or one can be requested from Raritan, to reduce the inside diameter of the cable gland.



Wiring of 3-Phase In-Line Monitors

3-phase in-line monitors contain 4-pole wiring terminal blocks (L1, L2, L3, N) to monitor 5-wire (4P+PE) 3-phase wye connections. Delta wired 4-wire (3P+PE) 3-phase connections are also permitted (no wire connected to the terminal block neutral "N"). No additional hardware or firmware

configuration is required to specify whether the connection is 5-wire wye or 4-wire delta.

In-Line Monitor Unused Channels

It is not necessary to wire up all channels of multi-channel in-line monitors. The inlet and outlet openings of unused channels must be completely closed off. "Goof plugs" for this purpose may be a good choice if they are available in your country or region.

Step by Step Flexible Cord Installation

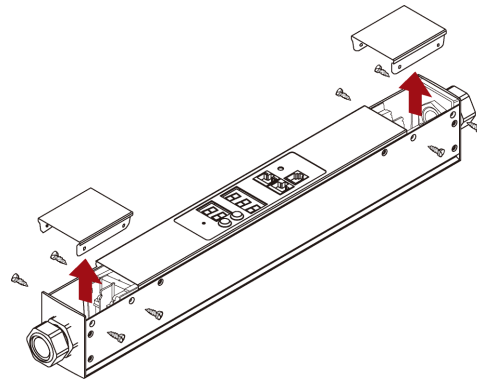
The following items are required to complete the installation:

- Flexible cord(s).
- Insulated ring terminals (one for each wire) and appropriate crimp tool.
- Plug(s) and receptacle(s) (for in-line monitors)
- Torque screwdriver, torque nut driver and torque wrench to tighten the wiring terminal block screws, ground nut and cable gland nut.

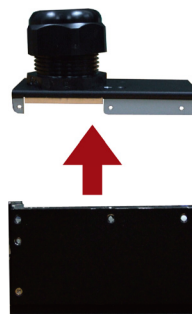
► To install a flexible cord:

1. Open the PDU's access panel (or in-line monitor top panel) to expose the power wiring terminal block(s).

One-channel in-line monitor

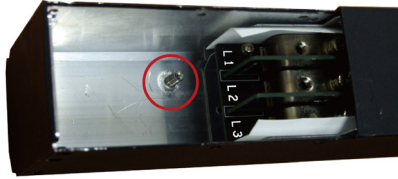


Zero U PDU

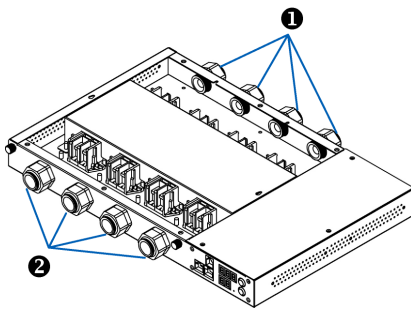


Make sure to locate the ground wire mounting stud(s). There is a separate ground wire mounting stud for each

terminal block. Each flexible cord **MUST** have its green (or green/yellow) ground wire bonded to a ground wire mounting stud.



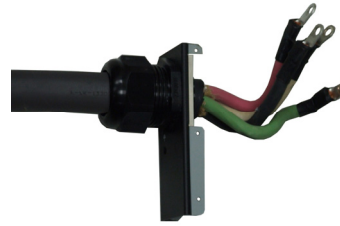
For in-line monitors, make sure to identify the inlet terminal blocks (rear of monitor) and outlet terminal blocks (front of monitor). Each inlet terminal block has a corresponding outlet terminal block.



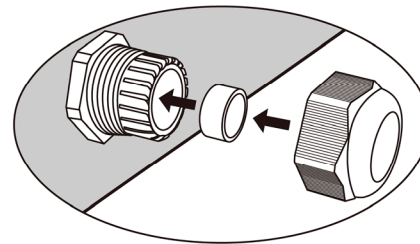
Number	Description
①	Inlets (labeled LINE)
②	Outlets (labeled LOAD)

2. Strip off the outer jacket of the flexible cord and remove any jute, paper or other fillers. Use the following to help determine how much jacket to remove:
 - In the finished assembly, the outer jacket should protrude inside the Raritan product.
 - The wires will have ring terminals crimped onto them.
 - In the finished assembly, the wires should have some slack and not be taught.
 - In the finished assembly, if the flexible cord slips in the cable gland placing a strain on the cord's wires, the ground wire must be the last wire to take the strain.
3. Crimp an insulated ring terminal onto each wire. A non-insulated ring terminal may be used for the ground wire. Inspect each crimp to insure it is secure and verify no exposed wire protrudes from the rear of an insulated ring terminal.

4. Loosen the cable gland nut and push the flexible cord assembly through the gland.



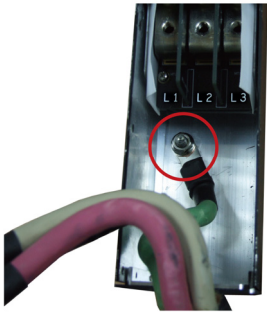
Temporarily hand tighten the gland nut and verify the cord cannot be twisted or pushed or pulled in the gland. Do not proceed if hand tightening results in a loose cord. In some models, especially in-line monitors, the flexible cord's diameter may be too small for the cable gland. A sealing ring for smaller diameter line cords may have been included with the Raritan product, or can be requested from Raritan, to reduce the inside diameter of the cable gland.



5. Fasten the ring terminal of the green (or green/yellow) ground wire to the chassis's threaded ground stud in this order:
 - a. Place the lock washer on the stud.
 - b. Place the ground wire ring terminal on the stud.
 - c. Place the nut on the stud and tighten with a torque wrench. The appropriate torque settings vary according to the nut size.

Nut size	Torque setting (N·m)	Tolerance
M3	0.49	10%
M4	1.27	8%
M5	1.96	5%
M6	2.94	3.5%
M8	4.9	2%

- d. Check the ground wire connection. It should be secure and not move or rotate.

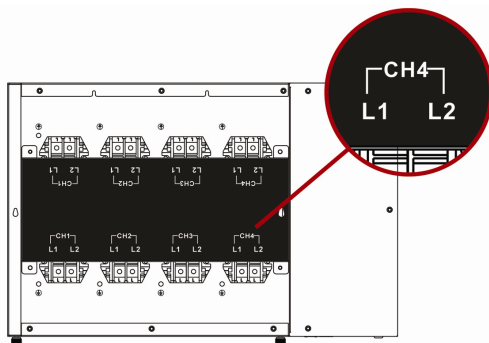


6. Fasten the ring terminals of all remaining wires to the terminal block and tighten each using a torque screwdriver. The appropriate torque settings vary according to the screw size.

Screw size	Torque setting (N·m)	Tolerance
M3	0.49	10%
M4	1.27	8%
M5	1.96	5%
M6	2.94	3.5%
M8	4.9	2%

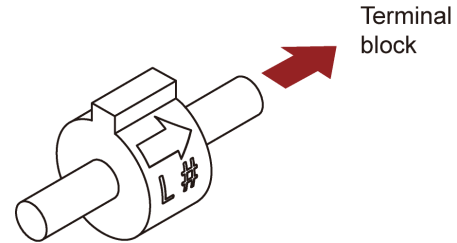
Make sure each ring terminal is firmly fastened and cannot be twisted by hand. Use the following guidelines to help terminal block wiring.

- In single-phase Raritan products with world-wide ratings, the terminals are labeled L1 and L2. L1 is the phase wire. L2 is either the neutral (120/230V installations) or another phase wire (208V installations).



- In all 3-phase products, L1 is phase A, L2 is phase B, L3 is phase C and N is neutral.
- If your PDU is inlet metered, such as PDU models PX2-1nnn and PX2-2nnn (where n is a number), you must pass each line cord wire through the correct CT in the correct direction. Each CT is labeled and contains a direction arrow. Push the ring terminal

end of the line cord through the CT in the direction indicated by the arrow. For example, push the L1 line cord wire through the CT labeled L1 and then connect it to the L1 terminal block.



- For Raritan in-line monitors, where there is a one to one correspondence between plug and receptacle, maintain the same wire colors for inlet and outlet flexible cords.
7. Make final adjustments to the cable gland and verify the jacket of the flexible cord extends into the Raritan product. Hand tighten the gland nut and finish tightening with a torque wrench. Appropriate torque settings vary according to the cable gland size.

Cable gland size	Torque setting (N·m)
M12x1.5	0.7 to 0.9
M16x1.5	2.0 to 3.0
M20x1.5	2.7 to 4.0
M25x1.5	5.0 to 7.5
M32x1.5	7.5 to 10.0
M40x1.5	7.5 to 10.0
M50x1.5	7.5 to 10.0
M63x1.5	7.5 to 10.0

Note: The cable gland size is marked on the cable gland body.

After tightening, examine the flexible cord and cable gland for the following:

- Make sure you can see a few remaining threads between the cable gland body and cable gland nut. The gland nut must not bottom out on the gland body.
 - Make sure the flexible cord does not move in the cable gland when it is twisted, pushed or pulled.
8. Re-install the PDU wiring access panel or in-line monitor cover plate. This completes internal wiring of the Raritan product.
 9. For in-line monitors, fasten the receptacles to the outlet flexible cords following the manufacturer's instructions.
 10. Complete the wiring of the inlet flexible cord by performing one of these steps:

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- Assemble the plug following the manufacturer's instructions.
- Permanently attach and strain relief the flexible cord to a junction box following applicable electrical codes.