# Rack Mounted Power Distribution Panels for Row Data Centers

## Installation

PDPMIB1N-40, PDPMIB2N-20, PDPUPS1N-40, PDPUPS2N-20, PDPPDU-40

990–91537 September 2021





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## **General Information**

This manual provides instructions to install two configurations of the Power Distribution Panels (PDP) for the Easy Rack PDP System Cabinet. Each of the Maintenance Bypass Panels (MBP) and Power Distribution Panels (PDP) contain Mechanical Circuit Breakers (MCBs) that facilitate the transfer of power from the UPS to bypass operation to allow maintenance to be performed on the UPS. PDPPDU-40 also houses 8-MCBs for distributing power to load. Read these instructions carefully and observe all safety warnings and other precautions. Should you require any installation/operation service, parts, accessories, or maintenance, contact Schneider Electric Customer Support at **www.se.com**.

### Safety

#### SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be closely followed during installation, maintenance, and operation of the system. Read all safety and operating instructions before attempting to operate the system.

Adhere to all Warning labels on the unit, in this manual and in the attendant manuals for the system. Follow all operating and user instructions.

This product is not intended for use with life support or other designated "critical" devices. The maximum load must not exceed that shown on the rating label.

### 

#### HAZARD OF ARC FLASH AND ELECTRICAL SHOCK

- Remove incoming power to the system before performing any work. Because of the UPS, live power exists within the equipment when power is turned off. always use a properly rated voltage sensing device to confirm there is no voltage in the system.
- Schneider Electric does NOT recommend performing maintenance to the Maintenance Bypass Panel with Power Distribution while power is live. Perform live maintenance at your own risk.
- Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel.
- The system must be installed in accordance with the National Electrical Code and all applicable local codes. This installation must comply with the requirements of ANSI/NFPA 75 and NEC/ NFPA 79 Art. 645.
- Perform appropriate Lock Out/Tag Out procedures during equipment installation and maintenance.
- Wear appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E and follow all local codes and regulations.
- DO NOT remove the rear/side panels of the PDP, or any sheet metal not designed to be removed.

Failure to follow these instructions will result in death or serious injury.

## NOTICE

#### EQUIPMENT DAMAGE

- Follow all wiring instructions precisely.
- Do not use caustic detergents or abrasive materials to clean the sheet metal. A damp, soft cloth is usually sufficient to remove dust or debris.

Failure to follow these instructions can result in equipment damage.

### **Receiving the Equipment**

Upon receipt of the equipment, inspect for obvious signs of external damage.

**NOTE:** A thorough internal inspection should be conducted only after the unit has been positioned for installation and before making any electrical connections.

#### **Acceptable Environmental Requirements**

Ambient Temperature: -0° to 40°C (32° to 104°F)	Relative Humidity: 0–95% Non-condensing	Altitude: 0–2000 m (0–6560 ft)

#### **Storage Conditions:**

### NOTICE

#### HAZARD OF EQUIPMENT DAMAGE

- If the system will not be installed immediately, store the unit (covered) in an indoor, temperature and humidity-controlled area, free of dirt, corrosive elements or conductive contaminants.
- Leaving the equipment uncovered and exposed to the elements will cause damage and void the factory warranty.
- Leaving the equipment uncovered and exposed to the elements will cause damage and void the factory warranty. When possible, leave the equipment on the pallet until you are ready to move it to its final location.

Failure to follow these instructions can result in equipment damage.

#### **Unpacking the System Components**



Save the shipping materials for later use or dispose of them appropriately.

## 

#### HEAVY EQUIPMENT HAZARD

Use at least two people when unpacking, lifting, and assembling this equipment.

Failure to follow these instructions can result in injury or equipment damage.

## Inventory

### PDPMIB1N-40 or PDPMIB2N-20



ltem	Description	PDPMIB1N-40 Quantity	PDPMIB2N-20 Quantity
1	Cable manager	1	1
2	M6 x 12 Phillips pan head screw (in accessory bag)	14	14
3	M6 Cage nut (in accessory bag)	14	14
4	Top cable access panel	1	1
5	Grommet cover (in accessory bag)	2	2
6	Grommet (in accessory bag)	1	2
7	Cable Protector (in accessory bag)	4	4
8	Mounting brackets	2 (1 Left, 1 Right)	2 (1 Left, 1 Right)
9	M4 x 8 Flat head screw	8	8
:	Wire accessories bag	1	1

## Contents of Wire accessories bag: (not shown)

Description	PDPMIB1N-40 Quantity	PDPMIB2N-20 Quantity
MBS WIRE	1	—
MAIN OP WIRE	1 set	—
BYP OP WIRE	1 set	—
MAIN OP A WIRE	—	1 set
MAIN OP B WIRE	—	1 set

### PDPUPS1N-40 or PDPUPS2N-20



ltem	Description	PDPUPS1N-40 Quantity	PDPUPS2N-20 Quantity
1	Cable manager	1	1
2	M6 x 12 Phillips pan head screw (in accessory bag)	8	8
3	M6 Cage nut (in accessory bag)	8	8
4	Rear safety access panel (not assembled) (includes 4 cable protectors installed)	1	1
5	M4 x 8 Phillips pan head screw (in accessory bag) (for rear safety access panel assembly)	2	2
6	Mounting brackets	2 (1 Left, 1 Right)	2 (1 Left, 1 Right)
7	M4 x 8 Flat head screw	8	8
8	Wire accessories bag	1	1

## Contents of Wire accessories bag: (not shown)

Description	PDPUPS1N-40 Quantity	PDPUPS2N-20 Quantity
OP 1 WIRE	1 set	—
OP 2 WIRE	1 set	—
OP A WIRE	—	1 set
OP B WIRE	—	1 set
TERMINAL	35	25

### PDPPDU-40



8

ltem	Description	Quantity
1	Cable manager	1
2	M6 x 12 Phillips pan head screw (in accessory bag)	8
3	M6 Cage nut (in accessory bag)	8
4	Rear safety access panel (not assembled) (includes 4 cable protectors installed)	1
5	M4 x 8 Phillips pan head screw (in accessory bag) (for rear safety access panel assembly)	2
6	Mounting brackets	2 (1 Left, 1 Right)
7	M4 x 8 Flat head screw	8
8	Wire accessories bag	1

### **Power Cables**

Power cables are required to connect the PDP system to other racks in the row. Your configurator can determine which power cables are necessary for your row.



				Cable		
SKU	Applica- tion	Cable Length (m)	Current Rating (A)	Туре	Maximum Tempera- ture	Size
ER1000R	2–4 racks	5	25	H05VV-F VDE	<70°C	2.5 mm <sup>2</sup>
ER1001R	5–6 racks	7	25	H05VV-F VDE	<70°C	2.5 mm²
ER1002R	7–8 racks	9	25	H05VV-F VDE	<70°C	2.5 mm <sup>2</sup>

continued	Connector		
SKU	PDP Side Terminal Type	Rack PDU Connector Type	PDU Type
ER1000R	CE040012	IEC309 16A 3P + N + E (Female)	EPDU1216B/ EPDU1216M
ER1001R	CE040012	IEC309 16A 3P + N + E (Female)	EPDU1216B/ EPDU1216M
ER1002R	CE040012	IEC309 16A 3P + N + E (Female)	EPDU1216B/ EPDU1216M

## Installation

## **Tools Required**

### (not provided)

	Cage Nut Tool
	Pliers
	Flat tip screwdriver
	Box cutter knife
()	Phillips head screwdriver
	Wire crimping tool

### **Installing Equipment**

#### Using Cage Nuts:

- Locate the top and bottom U-space on the vertical mounting rails. Every third hole on the mounting rails is numbered to indicate the middle of a U-space.
- Install the cage nuts on the interior of the vertical mounting rail, then install the equipment.



## 

#### FALLING EQUIPMENT HAZARD

Do NOT install cage nuts vertically with the tabs engaging the top and bottom of the square hole.

Failure to follow these instructions can result in injury or equipment damage.

- Install cage nuts horizontally, with the tabs engaging the sides of the square hole.
- Install the cage nuts on the interior of the vertical mounting rail.



#### Install a cage nut:

- 1. From the inside of the cabinet, insert the cage nut into the square hole on the vertical mounting flange.
- 2. Hook one of the tabs on the cage nut through the far side of the hole.
- 3. Place the cage nut tool into the cage nut from the other side of the vertical mounting flange and pull to snap the cage nut into position.



#### Remove a cage nut:

- 1. Remove any attached screw.
- 2. Grasp the cage nut and squeeze the tab sides. Push the cage nut through the square hole in the vertical mounting flange to release it.

### **Mounting Rails**

The PDP system is installed in an Easy Rack using Rail Kits SRVSRK1. The Rail Kits include one rail for the Left side and one rail for the Right side of the rack. The rails are clearly marked L and R. M6 cage nuts and M6 screws are included in the kit. Position the rails in the Easy Rack at the U-spaces you have pre-determined for this system.



The illustration above shows the Easy Rack with doors and side panels removed for clarity.

### **Cable Access Panel**

1. Install the cable protectors (2), grommet(s) (1), and grommet covers (4) as required for your system's configuration into the cable access panel (3).



#### 2N Configuration:



2. Install four (4) cage nuts (from the hardware bag) to the roof of the Easy Rack by inserting the cage nuts from inside the roof and pulling them through the square holes to secure them. See the instructions in the Equipment Installation section of this manual for more information.



3. Install four (4) M6 Phillips head screws (from the hardware bag) to secure the Cable Access Panel to the roof.



### **System Components**

#### Install the Brackets to the PDP System Component

Install the brackets from the hardware bag to the system components using the M4 x 8 Flat head screws included.

Eight (8) screws are required to install the brackets.



#### Install the System Components to the Rack

Install the system components on the rails intended for each starting with the PDPPDU-40 in the lowest rack position. Use the M6 cage nuts and M6 screws included in the hardware bag to secure each component to the Easy Rack.



Install all three components of the PDP system in your rack.



### Remove the Safety Cover from PDPMIB1N-40 or PDPMIB2N-20

To prepare for wiring the PDPs, remove the four (4) screws and lift the safety cover from the back of PDPMIB1N-40 or PDPMIB2N-20.



#### **Install the Cable Managers**

Use four (4) M6 cage nuts and four (4) M6 screws to install each cable manager to the Vertical Mounting Flanges at the rear of the PDPs as shown in the illustration.





### **Configurations and Wiring**

Complete wiring the PDP components using the wiring diagrams in the Power Distribution Panel Electrical Diagrams Chapter in this manual.

#### **1N Configuration**



#### Front View:



### **2N Configuration**

#### Front View:





**Rear View:** 

#### **Install the Power Cables**

Power cables (ER1000R, ER1001R, and ER1002R) are installed through the cable access panel on the roof and wired as shown in the wire diagrams in the Power Distribution Panel Electrical Diagrams Chapter in this manual.



### **Wiring Considerations**

Wiring from the UPS should be installed through the cable protectors in the back of the safety covers of the PDPUPS1N-40 or PDPUPS2N-20, and PDPPDU40. To do this, place the bottom half of the safety covers on the cable managers. Do not assemble the top half of the safety cover at this time. Do not attach the safety covers at this time.



### NOTICE

- Recommended input cable size for PDPMIB1N-40 : 2AWG
- Recommended input cable size for PDPMIB2N-20: 6AWG
- Terminal accessories are provided to assemble UPS input and output cables.

Failure to follow these instructions can result in equipment damage.

### NOTICE

- Recommended UPS Input and Output cable size is 10 mm<sup>2</sup> (not provided).
- Use the Accessory MBS Wire to make the connection from the MBS Port on PDPMIB1N-40 to the UPS MBS Port on the UPS.
- Refer to the UPS Installation manual for complete instructions.
- Failure to follow these instructions can result in equipment damage.

#### MBS Wire for PDPMIB1N-40



#### PDP and UPS MBS Ports



### **Install the Safety Covers**

## 

#### SHOCK HAZARD

Do not operate this equipment with safety covers removed.

Failure to follow these instructions will result in death or serious injury.

All three safety covers must be installed to the rear of the PDPs.

The the bottom halves of the safety covers for PDPUPSN1–40, PDPUPSN2–20, and PDPPDU-40 are attached to the back of the PDPs with 2 screws and tabs that fit into slots in the back of the PDPs. See ① in the illustration below.



The top halves of the safety covers are now installed. Position the top half to the bottom half **2**. Use the three screws (provided) to attach the top half to the bottom half of the safety cover **3**.



Install the safety cover to PDPMIB1N-40 or PDPMIB2N-20. Insert the tabs on the safety covers into the slots in the back of the PDP then use the four (4) screws (provided) to secure the safety cover to the rear of the PDP.



## **System Startup**

### **System Cabinet Preparations**

- 1. Ensure the PDPs are properly installed in the rack. Refer to the installation instructions.
- 2. Ensure the PDP power cables have been properly installed. See the wiring and terminal allocation drawing.
- 3. Ensure the UPS and External Battery Packs have been properly installed in the rack. Refer to the UPS installation manual for installation instructions.
- Ensure the Cooling System is properly installed and cooling power input cables are connected to the assigned power terminals. Refer to the wiring and terminal allocation drawing.
- 5. Ensure the PDU cables have been properly installed to the assigned power terminals. See the PDP wiring and terminal allocation drawing.
- 6. Connect the PDP Main Input Cable to the assigned terminals and the Main Utility Distribution Panel. See the PDP wiring and terminal allocation drawing.

### **System Inspection**

- 1. Check, measure, and confirm that the upstream mains voltage and frequency are normal. Ensure there are no wiring errors or anomalies.
- Check, measure, and confirm that the distribution cables of the UPS and PDP are correctly connected.
- 3. Check that the air conditioner is charged with refrigerant.
- 4. Check that all the communication cables are connected correctly according to the wiring diagram.
- 5. Check that the air conditioner pipes are properly connected and that there are no leaks.
- 6. Verify that the power terminal connections are connected properly and the screws are torqued to the correct rating.

### **Startup and Commissioning**

- 1. Close the Main Utility Power Distribution Breaker. Check that the PDP1 light is ON.
- 2. Close the UPS External Battery Circuit Breaker.
- 3. Close the UPS INPUT MCB. Power ON the UPS. Then, check that the UPS output voltage and frequency is normal without any fault indicator.
- 4. Close all UPS OUTPUT MCBs. Close all PDU MCBs and verify all output voltages are within normal operating range.
- 5. Close all Indoor and Outdoor Cooling MCBs and verify successful Cooling System Start-up.
- 6. Verify Cooling Performance.

## **Maintenance Bypass Procedure**

### **1N Maintenance Bypass Procedure**

This procedure is for the UPS system in the maintenance bypass-operating mode (System is on External Maintenance Bypass) with 1N input wiring configuration.

- 1. Remove the cover on the **Maintenance Bypass MCB**. This will force the UPS to automatically switch to operate in Static Bypass Mode. Check and ensure that the UPS is operating in Static Bypass Mode.
- 2. Turn ON the Maintenance Bypass MCB.
- 3. Turn OFF the UPS INPUT MCB and UPS OUTPUT MCB.
- 4. Turn OFF the UPS and disconnect the Input and Output wiring in the PDP rear panel.
- 5. Turn OFF all External Battery Pack Circuit Breakers.
- 6. Disconnect the UPS Battery Cable.
- 7. Allow a service engineer to replace or repair the UPS.
- 8. Install the UPS and connect the Input and Output wiring to the PDP rear panel.
- 9. Install the UPS External Battery Pack Cable.
- 10. Verify that all wiring installations are connected properly.
- 11. Turn ON External Battery Pack MCB.
- 12. Turn ON the UPS INPUT MCB and Power ON the UPS.
- 13. Set the UPS to bypass mode. Follow the instructions in your UPS manual.
- 14. Turn ON the UPS OUTPUT MCB.
- 15. Turn OFF the Maintenance Bypass MCB and install the cover.
- 16. Turn ON the UPS and verify that the UPS operation and the Output voltage is within normal operating range.

### **2N Maintenance Bypass Procedure**

This procedure is for placing the UPS system in the Maintenance Bypass-Operating Mode (the System is on External Maintenance Bypass) in systems with the 2N input wiring configuration.

- 1. Turn OFF the UPS INPUT MCB and the UPS OUTPUT MCB.
- 2. Turn OFF the UPS.
- 3. Turn OFF all External Battery Pack Circuit Breakers.
- 4. Disconnect the Input and Output wiring in the PDP rear panel.
- 5. Disconnect the UPS Battery Cable.
- 6. Allow a service engineer to repair or replace the UPS.
- 7. Install the UPS and connect the Input and Output wiring to the PDP rear panel.
- 8. Install UPS External Battery Pack Cable.
- 9. Verify that all wiring installations are connected properly.
- 10. Turn ON the External Battery Pack MCB.
- 11. Turn ON the UPS INPUT MCB and Power ON the UPS.
- 12. Turn ON the UPS OUTPUT MCB.
- 13. Turn ON the UPS and verify the UPS operation and the Output Voltage is within normal operating range.

## Troubleshooting

Problem	Possible Cause	Solution
Ambient high temperature alarm	Cooling unit does not supply cold air	Ensure no alarms are indicated on the cooling unit's Web UI or display. If there are no alarms, call the Schneider Electric service hotline.
	System overload	Confirm that the actual load is over the rated power. If an overload situation exists, call the Schneider Electric service hotline.
	The rack doors are not properly closed, causing the cooling leakage.	Check the rack doors and confirm that all doors are closed properly.
	Excessively high external ambient temperature.	Confirm the high-temperature alarm threshold of the temperature sensor is reasonable and the ambient temperature is exceeding the threshold setting. Call the Schneider Electric service hotline.
Door sensor alarm	The sealed doors of the rack are not closed.	Close all the doors properly. If closing the doors does not eliminate the alarm call the Schneider Electric service hotline.
Interior light does not illuminate when the door is opened.	The door sensor is out of position to make contact.	Check that no cables or equipment in the rack are interfering with the door sensor. If no interference is detected, and the light is still off, call the Schneider Electric service hotline.
	Power cable to the interior light is disconnected or loose.	Ensure that the cable is properly connected. If the cable connection is secure and the light is still off, call the Schneider Electric service hotline.
No power on the PDU Breaker	The UPS is not turned on.	Check the UPS display to ensure the UPS is turned on. If not, turn the UPS on.
	The Main PDP1 and UPS MCB is not closed.	Close the Main PDP1 and UPS MCB.
	Power cable connection to the PDP is loose.	Secure the power cable connection to the PDP.
Emergency door opening does not activate during an overtemperature protection event.	Temperature sensor or door sensor error.	Check the temperature and door sensors. Replace the sensors.
	Emergency door power supply or cable error.	Ensure the emergency door power supply and cable assembly are properly connected and functioning properly. If the power supply or cable assembly are not functioning, call the Schneider Electric service hotline.
Cooling alarm	Internal alarm event	Call the Schneider Electric service hotline.

	-	-
UPS alarm	Internal alarm event	Call the Schneider Electric service hotline.
UPS overload alarm	The load exceeds the maximum power threshold setting.	Check and confirm that the actual total power load does not exceed the threshold setting. If the power load exceeds the threshold setting, call the Schneider Electric service hotline.

## **Power Distribution Panel Electrical Diagrams**

### PDPMIB1N-40



### PDPMIB2N-20



PDP2/MIB2N-20 Power Distribution Panel Electrical Diagram

### PDPUPS1N-40



### PDPUPS2N-20



Power Distribution Panel Electrical Diagram

PDP5/UPS2N-20





### PDPPDU-40



## **Specifications**

### PDPMIB1N-40

AC Nominal Input Voltage	3ф 5–Wire	400 VAC
AC Input Voltage Range		380–415 VAC
Power Rating		40 kW
Maximum Input Breaker Current	Input Voltage = 3¢ 380 V	80 A
Input Frequency Range		50/60 Hz
Power Input Redundancy		Single Input
System Load Redundancy		N, N+1
Main Input Breaker	4 Poles	80 A
UPS Maintenance Bypass Switch	4 Poles	80 A
SPD Breaker	4 Poles	40 A
SPD	3 Poles + N	40 A

### PDPMIB2N-20

AC Nominal Input Voltage	3¢ 5–Wire	400 VAC
AC Input Voltage Range		380–415 VAC
Power Rating		20 kW
Maximum Input Breaker Current		40 A
Input Frequency Range		50/60 Hz
Power Input Redundancy		Dual Input
System Load Redundancy		N + N
Main Input Breaker Input 1	4 Poles	40 A
Main Input Breaker Input 2	4 Poles	40 A
SPD Breakers (Qty 2)	4 Poles	40 A
SPD (Qty 2)	3 Poles + N	40 A

### PDPUPS1N-40

AC Nominal Input Voltage	3ф 5–Wire	400 VAC
AC Input Voltage Range		380–415 VAC
Power Rating		40 kW
Maximum Input Breaker Current		80 A
Input Frequency Range		50/60 Hz
Power Input Redundancy		Single Input
System Load Redundancy		1N, N+1
UPS Breakers (Qty 6)	3 Poles IN = 3, OUT = 3	40 A

1PH Indoor Cooling Breakers (Qty 3)	1 Pole + N	32 A
1PH Indoor Cooling Breakers (Qty 3)	1 Pole + N	32 A

### PDPUPS2N-20

AC Nominal Input Voltage	3¢ 5–Wire	400 VAC
AC Input Voltage Range		380–415 VAC
Power Rating		20 kW
Maximum Input Breaker Current		40 A
Input Frequency Range		50/60 Hz
Power Input Redundancy		Dual Input
System Load Redundancy		N + N
UPS Breakers (Qty 4)	3 Poles IN = 2, OUT = 2	40 A
1PH Indoor Cooling Breakers (Qty 6)	1 Pole + N	32 A
1PH Indoor Cooling Breakers (Qty 6)	1 Pole + N	32 A

### PDPPDU-40

AC Nominal Input Voltage	3¢ 5–Wire	400 VAC
AC Input Voltage Range		380–415 VAC
Power Rating		40 kW
Maximum Input Current		80 A
Input Frequency Range		50/60 Hz
Power Input Redundancy		Dual Input
System Load Redundancy		N + N
PDU Breakers (Qty 8)	3 Poles	25 A

## **Two-Year Factory Warranty**

for PDPMIB1N-40, PDPMIM2N-20, PDPUPS1N-40, PDPUPS2N-20, PDPPDU-40

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Schneider Electric warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. The obligation of Schneider Electric under this warranty is limited to repairing or replacing, at its sole discretion, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory-remanufactured.

### Non-transferable warranty

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990-91537