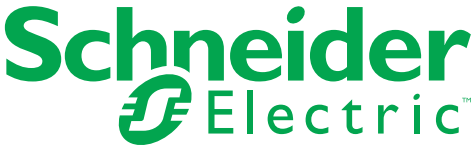
# NetShelter™ Power Supply Unit

## User Guide

**SENVPSU5K5B2X6**
**SENVPSU5K5B2**
**SENVPS33KB2**

**JPT36043A**
**Release date: 06/2026**





www.se.com

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# General Information

## Important Safety Instructions

SAVE THESE INSTRUCTIONS - This manual contains important instructions that should be followed during installation and maintenance of the Power Supply Unit (PSU).



This is the “Read user manual” symbol. Read the user documentation to become familiar with the equipment.

Read the instructions carefully and look at the equipment to become familiar with the device before trying to install and operate it.

The following special messages may appear throughout this document or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol either to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

**⚠ DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

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

**⚠ WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**⚠ CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

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

***NOTICE***

**NOTICE** is used to address practices not related to physical injury.

**Failure to follow these instructions can result in equipment damage.**

## Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by APC Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Always abide strictly by local laws and regulations in force in the place of installation.

## EMC Note

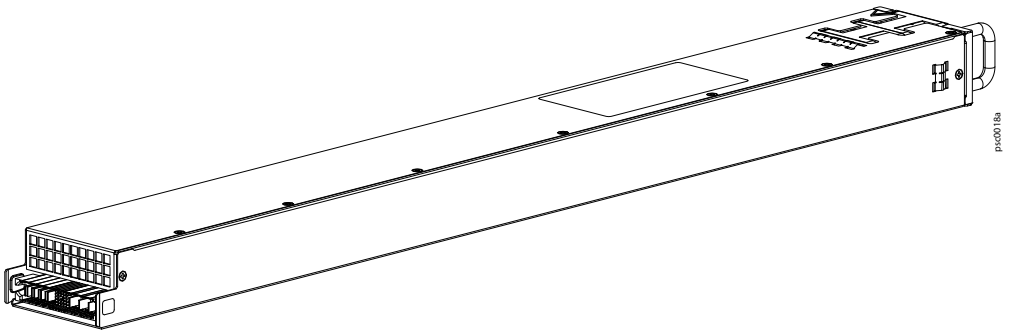
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

# Introduction




A powershelf Power Supply Unit (PSU) is a rack-mountable chassis that aggregates multiple hot-swappable power supply modules (often “rectifiers” for AC-to-48VDC converters) to feed a centralized DC busbar–typically 48–54V–serving servers, routers, storage, and AI accelerators.

For higher load capacity, multiple rectifier modules or PSUs can be connected in parallel. The system also supports the addition of an independent monitoring module to enable intelligent control and enhanced system management.

The PSU is a power-on swappable component designed for seamless integration with standard racks and cabinets.

# Product Features

## Environmental Characteristics

| Parameter | Configuration specification |
|---|---|
| Working Temperature | –10 °C to +45 °C |
| Storage Temperature | –40 °C to +85 °C |
| Relative Humidity | 5% to 95% (No condensation) |
| Altitude | ≤ 3080 m |

## Electrical Characteristics

### Input Characteristic Indicators

| Parameter | Specification |
|---|---|
| Working Voltage | 180 Vac to 305 Vac |
| Frequency Range | 47 Hz to 63 Hz |
| Input Current | ≤ 30 A @ 200 Vac |
| Power Factor (PF) | ≥ 0.98 (at 100% load) |
| Total Harmonic Distortion (THD) | ≤ 5% (at 30% to 100% load) |

### Output Characteristic Indicators

| Parameter | Specification |
|---|---|
| Output Voltage | 50 V DC |
| Rated output power | 5500 W |
| Voltage stabilization accuracy | ≤ ±0.6% Vo |
| Ripple | ≤ 500 mVp-p (Bandwidth ≤ 20 MHz) |
| Startup time | 5 seconds |
| Output hold-up time | > 20 ms |

## Mechanical characteristics

| Parameter | Specification |
|---|---|
| External Dimensions | 40 mm (H) × 68 mm (W) × 640 mm (D) |
| Weight (excluding packaging) | < 3.3 kg |

Note: For detailed slot design, contact www.se.com to obtain the 3D model of the module.

## Equipment characteristics

### Protective Characteristics

**Input Overvoltage and Undervoltage Protection/Recovery Indicators**

| Input Parameters | Note | Minimum Value | Nominal Value | Maximum Vaule | Unit |
|---|---|---|---|---|---|
| **UVLO Brown In** | | 173 | 176 | 179 | Vac |
| **UVLO Brown Out** | 5 ms delay | 153 | 156 | 159 | Vac |
| **UVLO Brown Out** | 25 ms delay | 164 | 167 | 171 | Vac |
| **OVLO Brown In** | | 306 | 309 | 312 | Vac |
| **OVLO Brown Out** | 50 ms | 310 | 313 | 316 | Vac |

| Input Parameters | Note | Minimum Value | Nominal Value | Maximum Vaule | Unit |
|---|---|---|---|---|---|
| **OVLO**<br>**Brown Out** | 20 ms | 327 | 330 | 333 | Vac |

**Output Overvoltage Protection Indicators**

| Parameters | Minimum Value | Nominal Value | Maximum Vaule | Unit |
|---|---|---|---|---|
| **Output overvoltage (50V)** | | 52.5 | 55 V | Shut down the machine immediately and lock it |
| **Output overvoltage (12V)** | | | 14.5 | Hiccups restart |

**Output current-limiting protection Indicators**

| Parameters | Minimum Value | Nominal Value | Maximum Vaule | Unit | Annotation |
|---|---|---|---|---|---|
| **Output overcurrent alarm and current limiting** | 102 | 107 | 112 | % full load | |
| **Output current limiting (50V)** | 115 | 120 | 125 | % full load | Delay > 10 seconds |
| **Output current limiting (50V)** | 125 | 130 | 135 | % full load | After burping five times, it locked up |
| **Output current limiting (50V)** | 150 | 155 | 160 | % full load | Delay >100 ms |
| **Output current limiting (50V)** | 178 | 183 | 188 | % full load | After burping five times, it locked up |
| **Output current limiting (12V)** | | | 220 | % full load | Delay >50 ms |

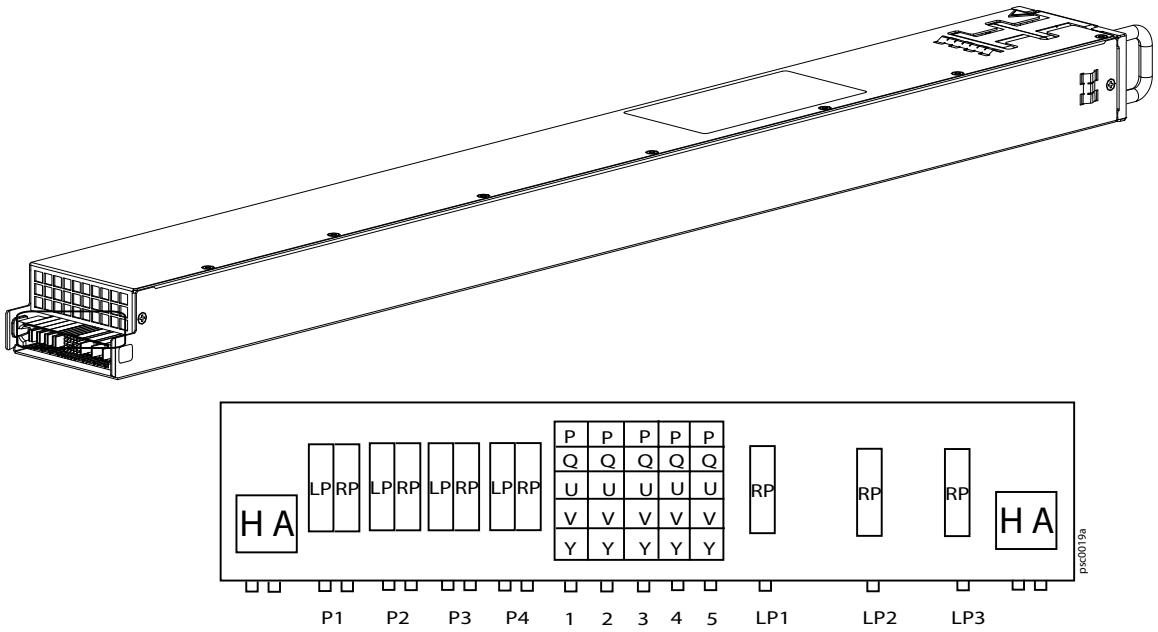
**Other Protective Characteristics**

| Protection Type | Description |
|---|---|
| Output Short-Circuit Protection | Shuts down the unit immediately and locks the system. |
| Over-Temperature Protection | Includes automatic over-temperature protection. |

## Reliability

| | |
|---|---|
| **C-MTBF** | > 600K hours @45 °C 240 Vac 100% load condition (without fan) |
| **D-MTBF** | > 300K hours @25 °C 240 Vac 100% load condition (without fan) |

## PSU Interface




### PSU Output Terminal Pin Configuration

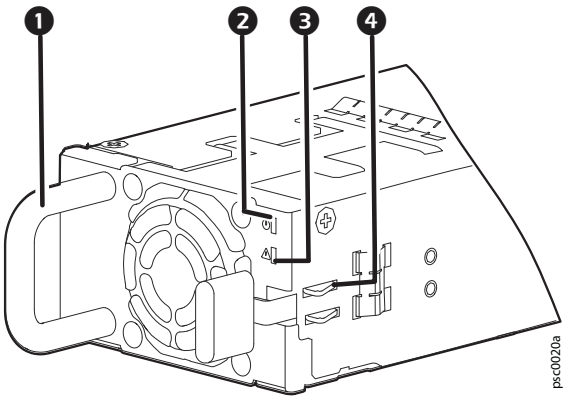
| Pin Number | Signal | Comment |
|---|---|---|
| P1 | VOUT_POS | Mate Last |
| P2 | VOUT_POS | Mate Last |
| P3 | VOUT_RTN | Mate First |
| P4 | VOUT_RTN | Mate First |
| LP1 | PE | Mate First |
| LP2 | AC Phase_1 | Mate Last |
| LP3 | AC Phase_2 | Mate Last |

### Signal Pin Definition

| PSU Pinout | Signal Name | Type | Function |
|---|---|---|---|
| P1 | PSU_A0 | Input | Address 0 – PSU ID A0 |
| P2 | PSU_A1 | Input | Address 1 – PSU ID A1 |
| P3 | PSU_A2 | Input | Address 2 – PSU ID A2 |
| P4 | BUSBAR_CLIP_TEMP_P | Input | Busbar clip + contact temperature sensor |
| P5 | BUSBAR_CLIP_TEMP_N | Input | Busbar clip – contact temperature sensor |
| Q1 | Ground | | |
| Q2 | PMBALERT_N | Ground | Low: Fault Event Detected<br>High: OK |
| Q3 | RESET_LATCH_FAULT | Input / Active high | Low: Default, No reset<br>High for 1-2s: Clear detected faults and start PSU if not operating due to a detected fault. |
| Q4 | 12V_STANDBY | Power | Always-on auxiliary power supply used to power the PSC.<br>Includes protection against detected faults and backfeeding. |
| Q5 | ISENSE_P | Output | Fast ORed current monitoring signal<br>Diode contained within each module to OR onto a common bus. |
| U1 | OVERCURRENT_N | | Reserved for future feature<br>When PSU current passes programmed threshold acts as fast path to trigger PSC for power regulation. |

| PSU Pinout | Signal Name | Type | Function |
|---|---|---|---|
| U2 | AC_LOSS_N | Output | Detect loss of AC<br>Low: AC ok<br>High: AC loss |
| U3 | PSKILL (Short Pin) | Input / Active High | Quick shut down Output to mitigate hot unplug arcing.<br>Low: Output turn on<br>High: Output turn off |
| U4 | CANH | | CANH |
| U5 | CANL | | CANL |
| V1 | PRESENT_N | | |
| V2 | PMBUS_I2C_SDA | | PMBus I2C Data |
| V3 | PMBUS_I2C_SCL | | PMBus I2C Clock |
| V4 | Ground | Ground | PMBus I2C ground |
| V5 | ISHARE_N | Analog | Reserved for possibility of differential current sharing bus. |
| Y1 | ISHARE_P | Analog | Main Output current share bus. |
| Y2 | SYNC_STOP_N | BI | Not planning on using presently<br>Synchronizing turn-off main output |
| Y3 | SYNC_START_N | BI | Synchronizing turn-on main output |
| Y4 | ISENSE_N | Output | Fast ORed current monitoring signal<br>Diode contained within each module to OR onto a common bus. |
| Y5 | Ground | Ground | |
| **Note**:_N indicates that the low level is valid. | | | |

## Front Panel




| Item no. | Description |
|---|---|
| ❶ | Handle |
| ❷ | Power indicator light |
| ❸ | Alarm indicator light |
| ❹ | Latch |

## LED Status

Two indicator lights are provided on the module panel to indicate the module's operating status. The detailed LED status descriptions are listed below.

| Type/condition | Green LED | Amber LED |
|---|---|---|
| Blinking | Sync Start State, PSU is ready to turn on and awaiting the sync Start signal | Firmware loading |
| Solid State | 50 V ON and available | 50 V Fault detected |
| OFF State | 50 V OFF | 50 V Normal |

# Installation of the PSU

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK**

- Do not place your hands inside the module slots.
- Only qualified personnel are allowed to plug, unplug, or replace the rectifier module when the system is powered on.

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

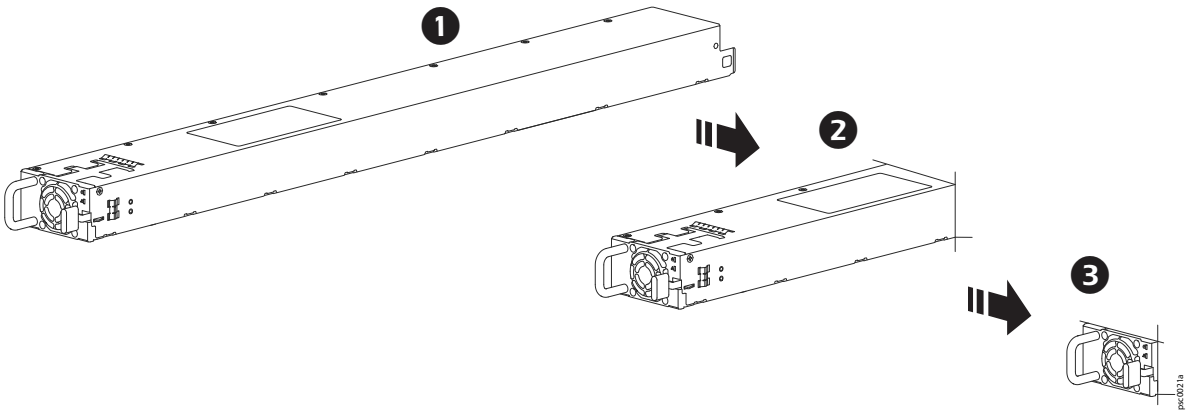
***NOTICE***

**HAZARD OF EQUIPMENT DAMAGE**

- Power on the rectifier module within seven days after unpacking. If not possible, store it indoors in a dry, non-corrosive environment.
- Do not operate the power shelf without a UPS in unstable power environment
- Secure the module to the slot with panel fixing screws immediately after installation.

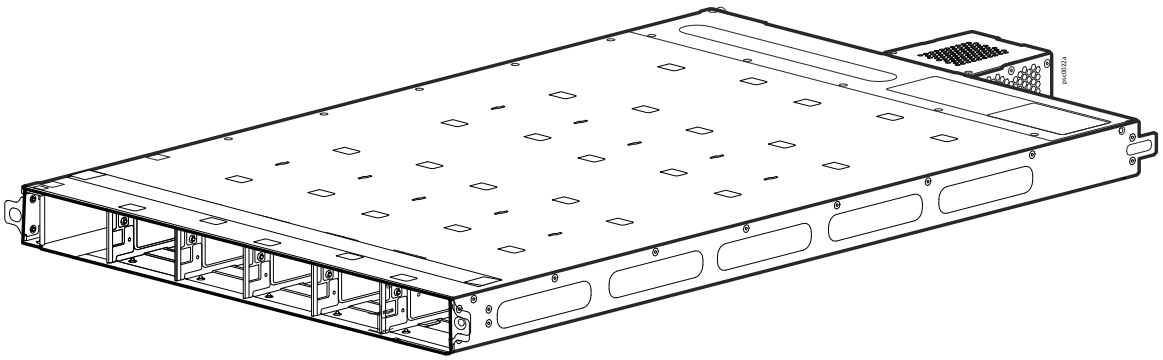
**Failure to follow these instructions can result in equipment damage.**

## Installation




1. Remove the PSU module from the packaging box.
2. Hold the handle on the front panel and support the module with your other hand. Securely slide the module into the slot.
3. Continue to push the module forward until the front panel is flush with the distribution frame panel. You should hear a click indicating that the latch is locked.

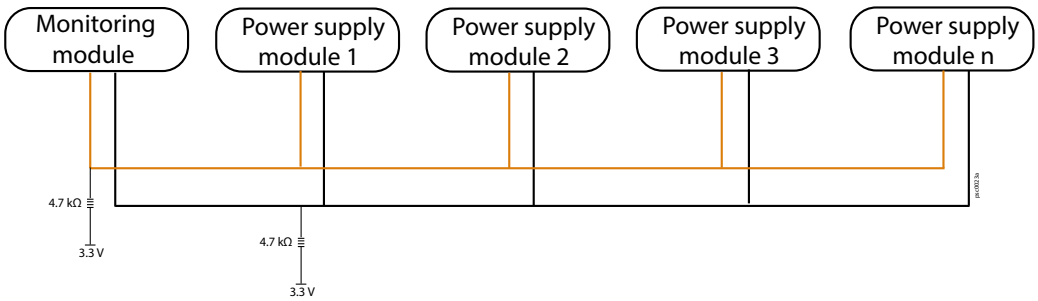
## PSU Module Mounting and Slot Requirements



If the design or processing tolerances of the module slots are not properly controlled, the module may not be able to to operate correctly or may become damaged.

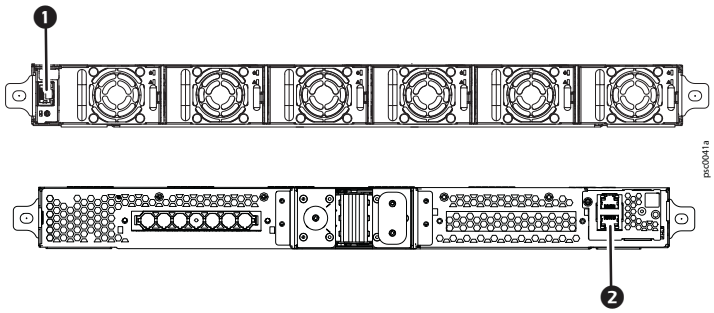
# Operation

## PMBUS bus communication



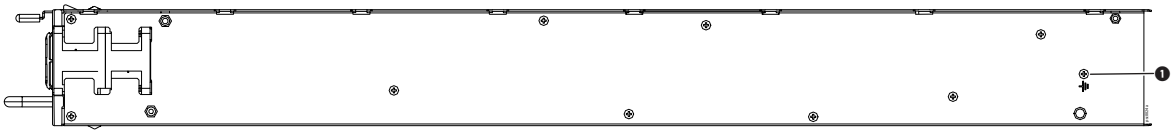

- For reliable power communication, the PMBus should use T-type wiring. Star wiring is not recommended.
- Install a 4.7 kΩ pull-up resistor to 3.3 V on both the SDA and SCL lines.

### Shelf Communication Setup




- Front side: one RJ45 Ethernet Port ❶.
- Rear side: two RJ45 Ethernet Port ❷. Each connector uses two RJ45 Ethernet ports, with all pins internally tied together within the shelf. This design enables daisy chaining of shelves for communication and power management.

## Withstand Voltage Test




- Locate the internal surge protection circuit with gas discharge tubes connected between input (L and N) and ground.
- Before performing the withstand voltage test, remove the ground screw (❶) of the surge (lightning protection) circuit.
- Make sure the screw is completely removed. otherwise, the test will not succeed.
- Perform the withstand voltage test as specified.
- After completing the withstand voltage test, reinstall the screw (❶).
- If the screw is not reinstalled, the module may experience surge voltage at the input, which could lead to damage.

## Ventilation Requirements

- The power module must be installed in a well-ventilated area to ensure that its airflow path is unobstructed.
- The power module should be at least 50 mm of space between the front and rear of the module to ensure ventilation.
- Keep the ambient temperature, especially the front side of the Powershelf, between -5 °C and 45 °C.

# Replacing the PSU Module

**⚠ DANGER**

**HAZARD OF HOT SURFACE**

Do not touch surface of the module when it is in operation.

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

**⚠ CAUTION**

**HAZARD OF EQUIPMENT DAMAGE**

- Make sure the handle is in the open position before pushing the module into the frame.
- The lock frame of the rectifier module is installed on the right side of the PSU.

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

**NOTE:** Removing a PSU or rectifier module from an active system will trigger a system alarm. After installing the replacement module, reset the system monitoring module.

The PSU or rectifier module can be unloaded or installed when the power system is in operation, which is convenient for installation and maintenance.

To replace,

1. Move the plastic latch on the front panel sideways to unlock, then gently pull the handle and slowly slide the module out of the slot while supporting it with your hand to prevent sudden drops.
2. Once the module is fully removed, place it back into the original packaging box for proper protection.

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