



Elektro-Automatik



PU 10000 6U

High-Power, Scalable DC Solutions for Demanding Applications | 60 kW

High Power Density: Delivers up to 60 kW in a compact 6U chassis, maximizing performance while saving valuable rack space.

Flexible Autoranging Output: Provides dynamic voltage and current combinations, enabling full power delivery across a wide range of applications.

High Efficiency: Operates at up to 96% efficiency, reducing energy costs and minimizing heat generation.

Advanced Connectivity: Built-in USB, Ethernet, and analog interfaces, with optional CAN, Modbus, and Profinet for seamless integration.

EA-PU 10000 6U 60 kW

Programmable DC power supply



Features

- Wide range input: 380 V - 480 V, +10%, 3ph AC
- Active Power Factor Correction, typical 0.99
- Very high efficiency of up to 96%
- High performance with up to 60 kW per unit
- Voltages from 0 - 360 V up to 0 - 2000 V
- Currents from 0 - 80 A up to 0 - 480 A
- Flexible power regulated DC output stages (autoranging)
- Regulation modes CV, CC, CP, CR with fast crossover
- Digital regulation, high resolution with 16 Bit ADCs and DACs, selection of voltage controller speed
- Galvanically isolated Share-Bus for parallel operation of all power classes in the 10000 series
- Master-slave bus for parallel operation of up to 64 units of all power classes in the 10000 series
- Command languages and drivers: SCPI and ModBus, LabVIEW, IVI

Built-in interfaces

- USB
- Ethernet
- Analog
- USB Host
- Master-Slave-Bus
- Share-Bus

Optional interfaces

- CAN
- CANopen
- RS232
- Profibus
- EtherCAT
- Profinet, with one or two ports
- Modbus, with one or two ports
- Ethernet, with one or two ports

Software

- EA - Power Control



Options

- Water Cooling in stainless steel
- Function generator

SPECIFICATIONS

AC Input

- **Voltage, Phases:** 380 V - 480 V \pm 10%, 3ph AC
- **Frequency:** 45 - 65 Hz
- **Power Factor:** ca. 0.99
- **Leakage Current:** <10 mA
- **Phase Current:** \leq 110 A @ 400 V AC
- **Overvoltage Category:** 3

DC Output (static)

- **Load Regulation CV:** \leq 0.05% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Line Regulation CV:** \leq 0.01% FS (380 V - 480 V +10% AC input voltage, constant load and constant temperature)
- **Stability CV:** \leq 0.02% FS (during 8 h of operation, after 30 minutes warm-up, at constant AC input voltage, load, and temperature)
- **Temperature Coefficient CV:** \leq 30 ppm/ $^{\circ}$ C (after 30 minutes warm-up)
- **Compensation (Remote Sense):** \leq 5% UNominal
- **Load Regulation CC:** \leq 0.1% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Line Regulation CC:** \leq 0.01% FS (380 V - 480 V +10% AC input voltage, constant load and constant temperature)
- **Stability CC:** \leq 0.02% FS (during 8 h of operation, after 30 minutes warm-up, at constant AC input voltage, load, and temperature)
- **Temperature Coefficient CC:** \leq 50 ppm/ $^{\circ}$ C (after 30 minutes warm-up)
- **Load Regulation CP:** \leq 0.3% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Load Regulation CR:** \leq 0.3% FS + 0.1% FS current (0 - 100% load, constant AC input voltage and constant temperature)

Protective Functions

- **Overvoltage Protection (OVP):** Adjustable 0 - 110% UNominal
- **Overcurrent Protection (OCP):** Adjustable 0 - 110% INominal
- **Overpower Protection (OPP):** Adjustable 0 - 110% PNominal
- **Overtemperature Protection (OT):** DC output shuts down in case of insufficient cooling

DC Output (Dynamic)

- **Rise Time 10 - 90% CV:** \leq 10 ms
- **Fall Time 90 - 10% CV:** \leq 10 ms
- **Rise Time 10 - 90% CC:** \leq 2 ms
- **Fall Time 90 - 10% CC:** \leq 2 ms

Insulation

- **AC Input to DC Output:** 3750 Vrms (1 minute, creepage distance >8 mm)
- **AC Input to Case (PE):** 2500 Vrms
- **DC-Output to case (PE):** Depending on the model, see model table
- **DC Output to Interfaces:** 1000 V DC (models up to 360 V output), 1500 V DC (models from 500 V output)

Interfaces (Digital)

- **Built-in, Galvanically Isolated:** USB, Ethernet (100 MBit), USB front panel, all for communication
- **Optional, Galvanically Isolated:** CAN, CANopen, RS232, Modbus TCP, Profinet, Profibus, EtherCAT, Ethernet

Interfaces (Analog)

- **Built-in, Galvanically Isolated:** 15-pole D-Sub
- **Signal Range:** 0 - 10 V or 0 - 5 V (switchable)
- **Inputs:** U, I, P, R, remote control on/off, DC output on/off, resistance mode on/off
- **Outputs:** Monitor U and I, alarms, reference voltage, DC output status, CV/CC regulation mode
- **Accuracy (U/I/P/R):** 0-10 V: \leq 0.2%, 0-5 V: \leq 0.4%

Device Configuration

- **Parallel Operation:** Up to 64 units of any power class in the 10000 series, with Master-Slave Bus and Share Bus

Safety and EMC

- **Safety Standards:** EN 61010-1, IEC 61010-1, UL 61010-1, CSA C22.2 No 61010-1, BS EN 61010-1
- **EMC Compliance:** EN 55011 (Class A), CISPR 11 (Class A), FCC 47 CFR part 15B (Class A)
- **EN 61326-1 Includes tests:** EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6
- **Safety Protection Class:** Class 1
- **Ingress Protection:** IP20

Environmental Conditions

- **Operating Temperature:** 0–50 $^{\circ}$ C (32–122 $^{\circ}$ F)
- **Storage Temperature:** -20–70 $^{\circ}$ C (-4–158 $^{\circ}$ F)
- **Humidity:** \leq 80% relative humidity, non-condensing
- **Altitude:** \leq 2000 m (\leq 6,600 ft)
- **Pollution Degree:** 2

Mechanical Construction

- **Cooling:** Forced air flow from front to rear (temperature-controlled fans), optional water cooling
- **Dimensions (W x H x D):** 19" x 6U x 668 mm
- **Weight:** 76kg (168lb) with water cooling 82kg (180 lb)

Available Models

Specification	PU 10360-480	PU 10500-360	PU 10750-240	PU 10920-250	PU 11000-160	PU 11500-120	PU 12000-80
Voltage Range (V)	0 - 360 V	0 - 500 V	0 - 750 V	0 - 920 V	0 - 1000 V	0 - 1500 V	0 - 2000 V
Ripple in CV (rms) (mV BW 300 kHz)	≤55 mV	≤70 mV	≤200 mV	≤250 mV	≤300 mV	≤400 mV	≤500 mV
Ripple in CV (pp) (mV BW 20 MHz)	≤320 mV	≤350 mV	≤800 mV	≤1200 mV	≤1600 mV	≤2400 mV	≤3000 mV
UMin for IMax (sink) (V)	2.5 V	1.1 V	1.2 V	2 V	N/A	N/A	N/A
Current Range (A)	0 - 480 A	0 - 360 A	0 - 240 A	0 - 250 A	0 - 160 A	0 - 120 A	0 - 80 A
Power Range (W)	0 - 60000 W	0 - 60000 W	0 - 60000 W	0 - 60000 W	0 - 60000 W	0 - 60000 W	0 - 60000 W
Resistance Range (Ω)	0.025 Ω - 45 Ω	0.04 Ω - 85 Ω	0.1 Ω - 185 Ω	0.125 Ω - 275 Ω	0.2 Ω - 325 Ω	0.4 Ω - 750 Ω	0.85 Ω - 1350 Ω
Output Capacitance (μF)	3480 μF	1560 μF	765 μF	465 μF	387 μF	173 μF	85 μF
Efficiency (sink/source up to, %)	95.8%	96.5%	96.5%	96.5%	95.8%	96.5%	96.5%

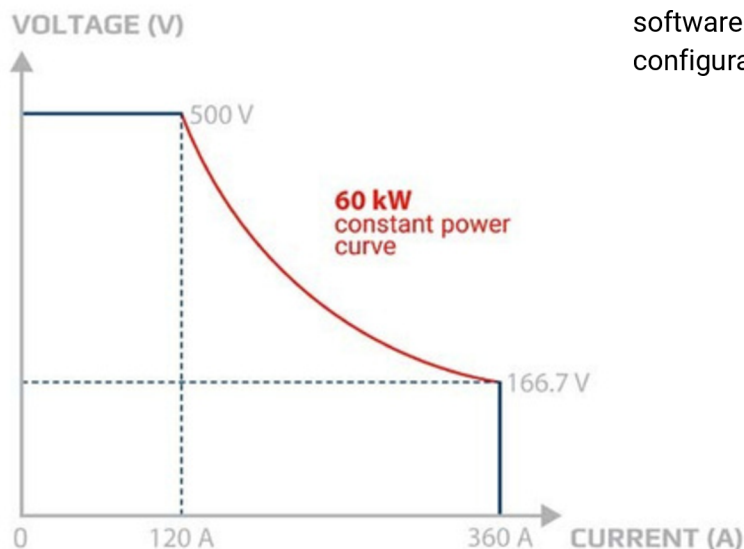


General

The PU 10000 Series by EA Elektro-Automatik delivers unparalleled performance in programmable DC power supply solutions. Designed for high-demand applications, this series efficiently converts grid energy into regulated DC voltage with remarkable efficiency, reaching over 96%. Engineered as three-phase units, the PU 10000 Series supports a wide input voltage range, ensuring compatibility with virtually all global mains. Its flexible output capabilities allow for seamless adaptability to a broad spectrum of applications, covering voltage ranges from 0–60 V to 0–2000 V and current ranges up to 1000 A in a single device.

DC Output

Engineered for precision, the DC output of the PU 10000 Series supports wide-ranging applications with voltage and current capacities tailored to the needs of engineers. Featuring constant power characteristics (autoranging), this series ensures optimal performance and flexibility while maintaining exceptional stability, even during dynamic load conditions.



The Principle of Autoranging

The PU 10000 Series revolutionizes power management with its autoranging design, enabling a wide voltage and current operating range without sacrificing power capacity. This flexibility empowers users to handle a diverse range of applications using fewer devices, reducing costs and saving valuable space.

AC Connection

The PU 10000 Series boasts a robust three-phase AC input supporting voltages from 380 V to 480 V (+10%) and operates with a power factor of 0.99, ensuring maximum grid compatibility and efficiency. This design minimizes power loss and optimizes energy use, offering reliable operation across diverse industrial and laboratory environments.

DC Connection

Designed for ease of use, the PU 10000 Series features robust galvanically isolated connections to ensure safety and reliability. Remote sensing capabilities allow for precision adjustments, compensating for voltage drops over long distances. These advanced features make it an ideal solution for complex setups requiring consistent performance.

Interfaces

Comprehensive communication options ensure seamless integration into any system. Built-in USB, Ethernet, and analog interfaces provide out-of-the-box connectivity, while optional protocols like CAN, Modbus, and Profinet expand versatility. Intuitive software tools like EA-Power Control streamline configuration and monitoring.

High-Performance Systems

The PU 10000 Series excels in high-performance environments, offering advanced parallel operation capabilities with Master-Slave Bus and Share-Bus functionalities. These features enable up to 64 units to work together seamlessly, scaling power delivery for demanding applications.

Master-Slave-Bus and Share-Bus

With the integrated Master-Slave Bus and Share-Bus, users can combine multiple units in parallel, enabling unmatched scalability and precision. These features ensure synchronized operation across all units, delivering consistent and reliable power management for even the most complex systems.



Example Representation

A fully assembled and operational 240 kW system.

Applications

Fuel Cell Simulation

The PU 10000 Series replicates real-world fuel cell behavior with precision, offering fine control over voltage and current outputs. This makes it an indispensable tool for development and testing in renewable energy and transportation sectors.

Power Supply for Electrolysis

The high efficiency and precision of the PU 10000 Series make it ideal for electrolysis processes, delivering stable and regulated DC output essential for hydrogen production and similar applications.

Electric Car Components

From batteries to power electronics, the PU 10000 Series supports the rigorous testing of electric vehicle components, offering reliable, high-performance solutions tailored for automotive innovation.

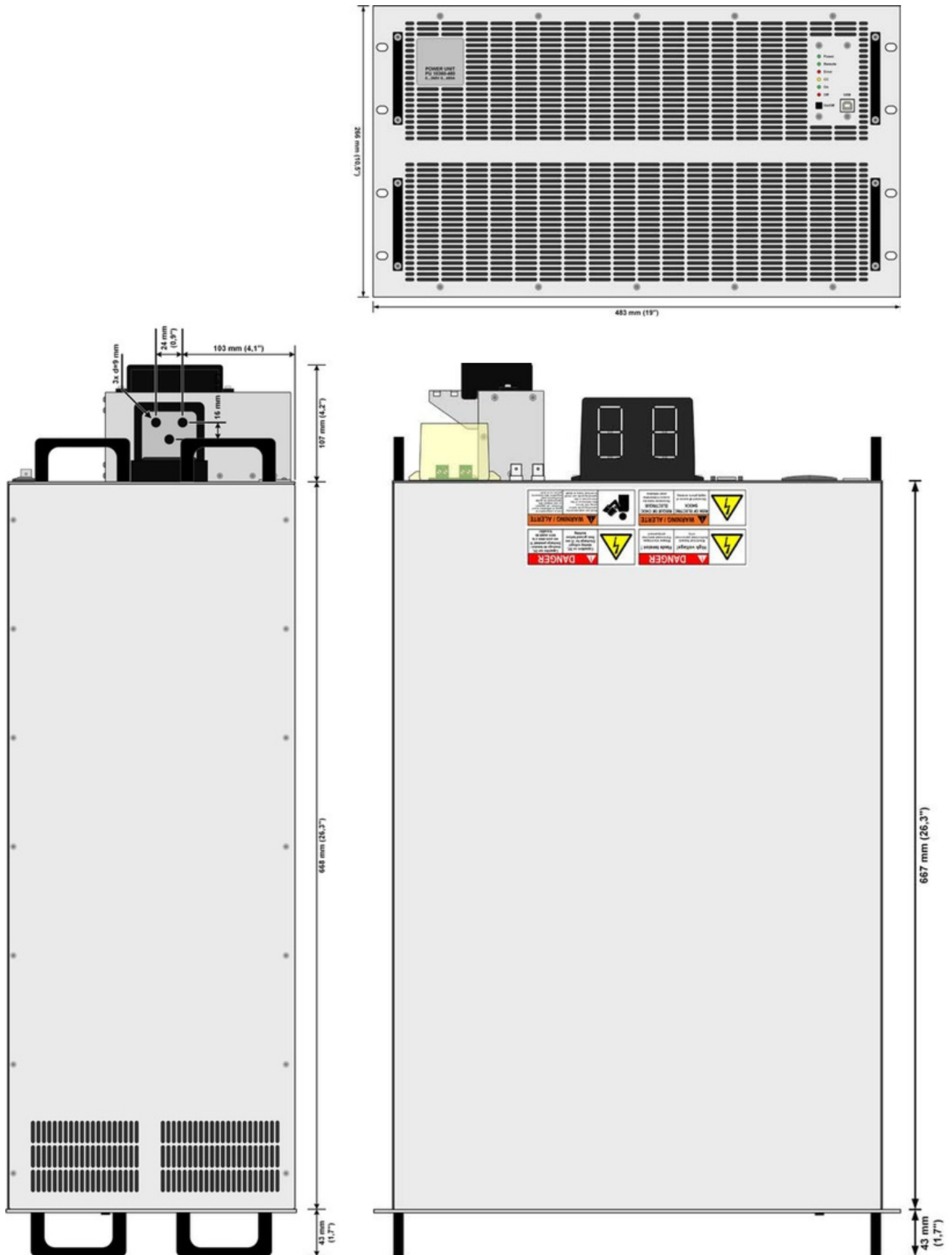
Solar Array Simulation

Optimized for renewable energy research, the PU 10000 Series simulates solar array characteristics with remarkable accuracy, enabling engineers to test and validate performance under variable conditions.

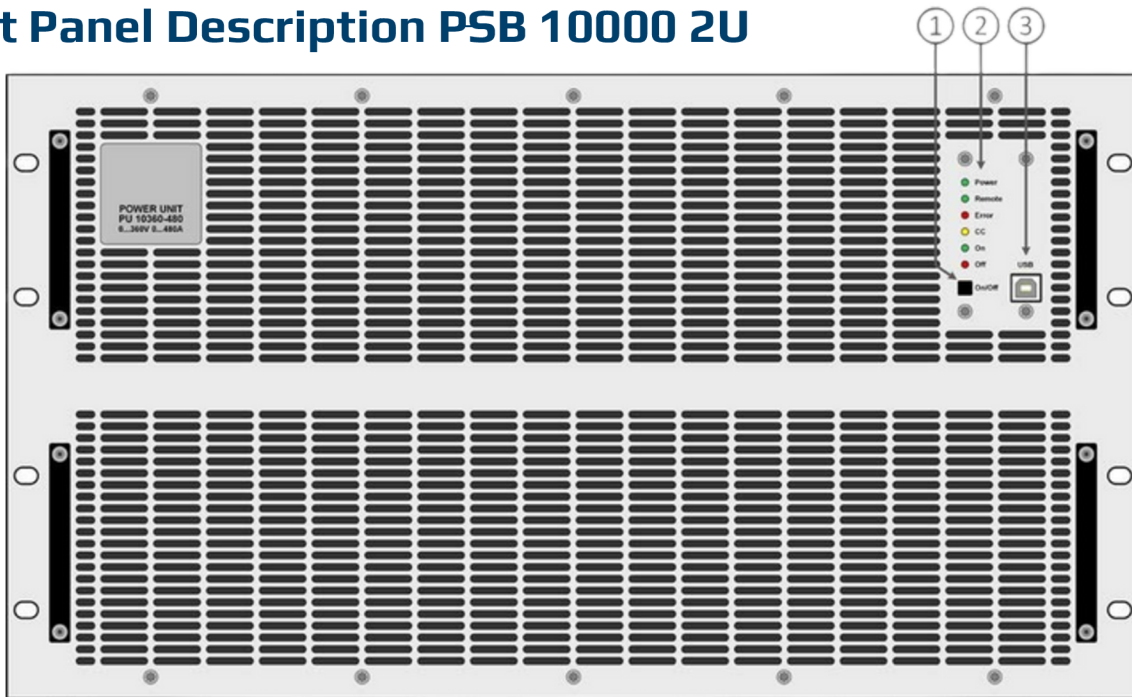
Relay Test in Production

Ensure the reliability of relays with the precise control and dynamic capabilities of the PU 10000 Series, delivering consistent results for production line testing.

Technical drawings PU 10000 6U

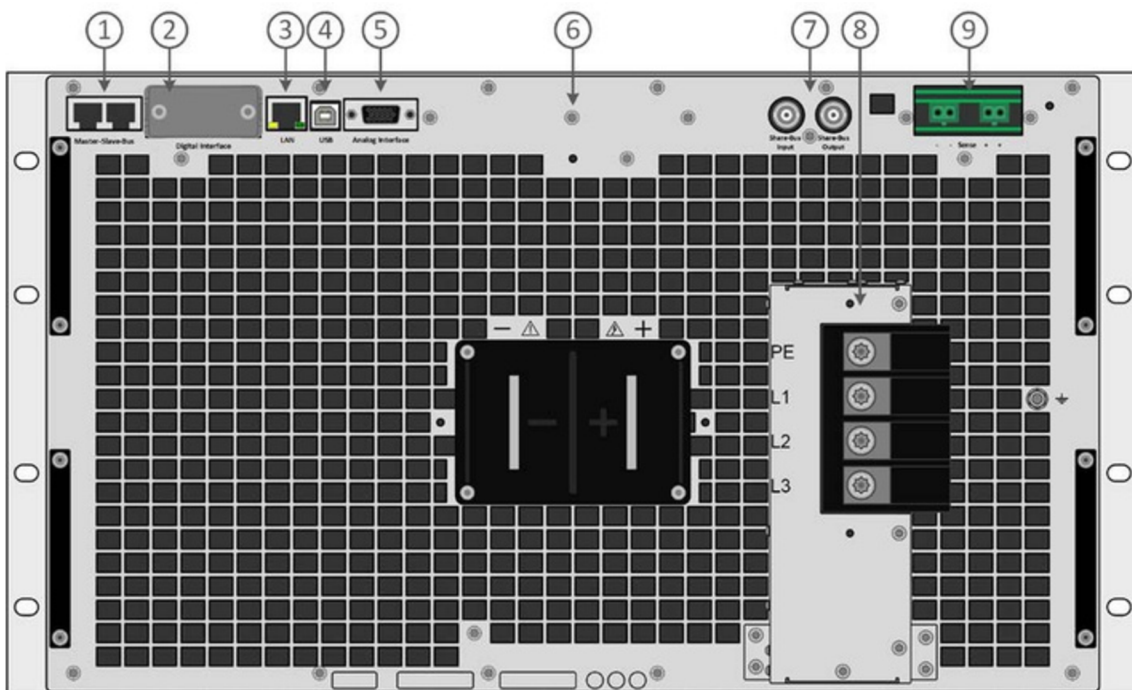


Front Panel Description PSB 10000 2U



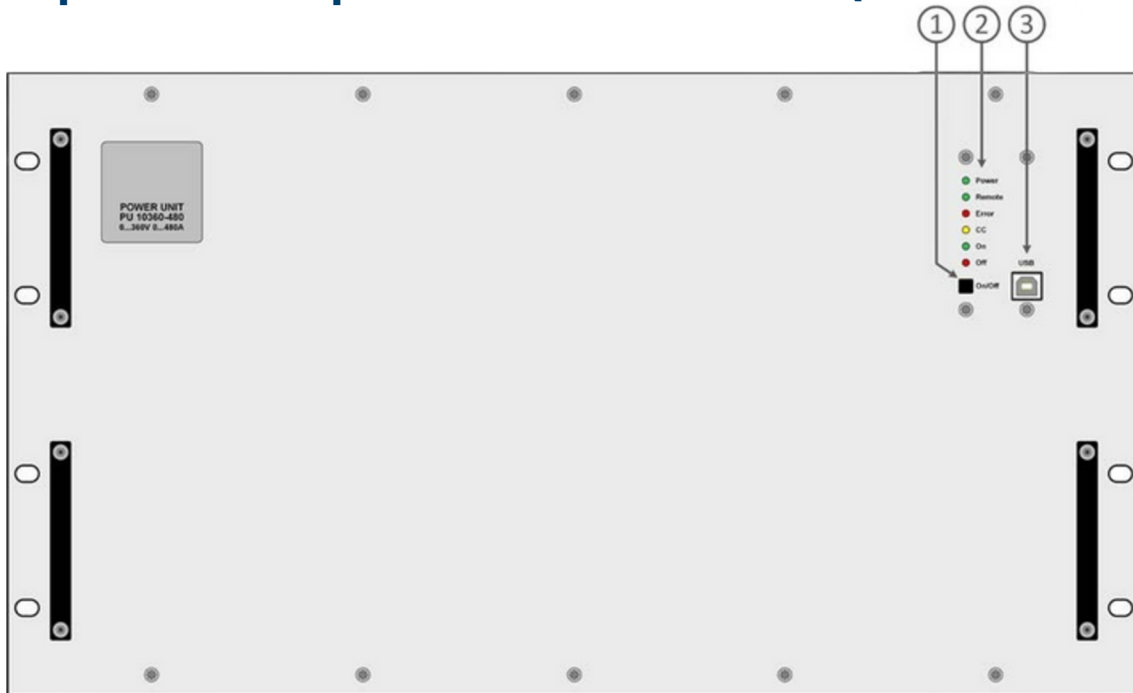
1. On / Off push-button
2. LED status display
3. USB Interface

Rear panel description PU 10000 6U



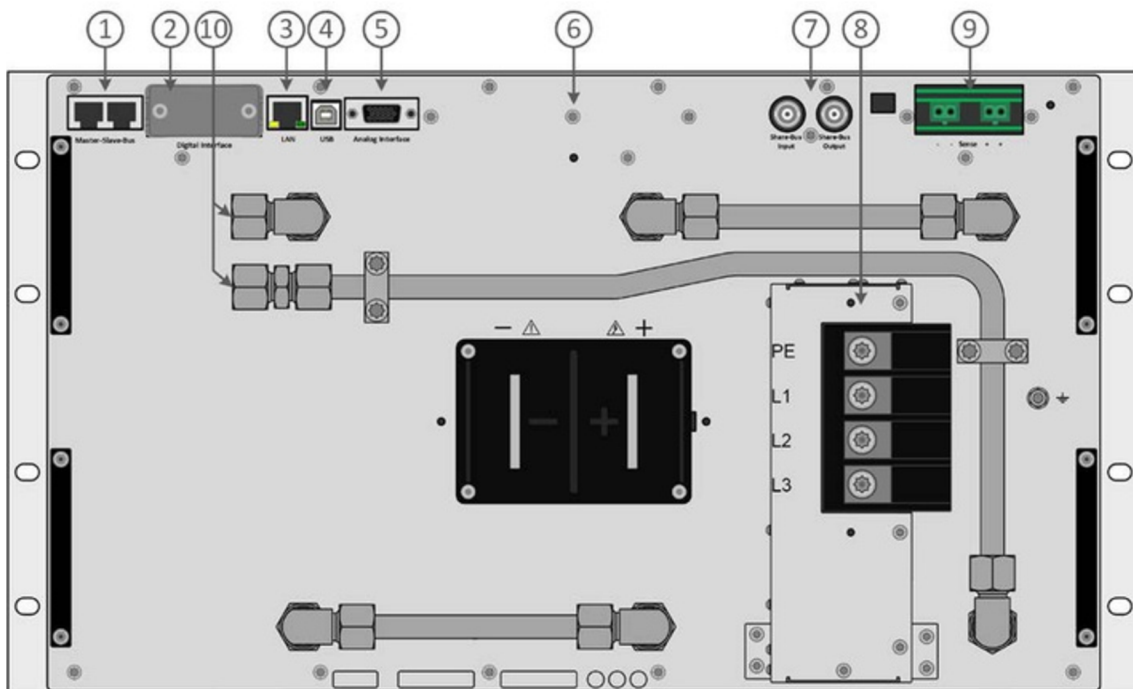
1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Ethernet interface
4. USB interface
5. Connector (DB15 female) for isolated analog programming, monitoring and other functions
6. DC output connector (copper blades)
7. Share-Bus connectors to set up a system for parallel connection
8. AC input connector
9. Remote sense connectors

Front panel description PU 10000 6U WC (water cooling option)



1. On / Off push-button
2. LED status display
3. USB Interface

Rear panel description PU 10000 6U WC (water cooling option)



1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Ethernet interface
4. USB interface
5. Connector (DB15 female) for isolated analog programming, monitoring and other functions
6. DC output connector (copper blades)
7. Share-Bus connectors to set up a system for parallel connection
8. AC input connector
9. Remote sense connectors
10. Water inlet and outlet

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