PU 10000 4U

Flexible, High-Performance DC Power Supplies for Advanced Applications | 30 kW

Wide Voltage and Current Range: Supports up to 2000 V and 1000 A with flexible autoranging capabilities.
High Efficiency: Achieves energy conversion efficiencies of up to 96%, minimizing power loss.
Scalable Design: Parallel operation allows up to 3840 kW of total power with up to 64 units.
Advanced Control Modes: Includes constant voltage (CV), current (CC), power (CP), and resistance (CR) modes for precision testing.
Robust Connectivity Options: Built-in USB, Ethernet, and analog interfaces, with optional CAN, Profinet, and Modbus support.

EA-PU 10000 4U 30 kW

Programmable DC Power Supply

Features

- Active Power Factor Correction, typical 0.99
- Very high efficiency of up to 96%
- High performance with up to 30 kW per unit
- Voltages from 0 - 60 V up to 0 - 2000 V
- Currents from 0 - 40 A up to 0 - 1000 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 control speed: Normal, Fast, Slow
- 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 the same type in all power classes of the 10000 series
- Command languages and drivers: SCPI and ModBus, LabVIEW, IVI

Built-in interfaces

- USB
- Ethernet
- Analog
- USB (front panel)
- 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 ±10%, 3ph AC (208 V - 240 V ±10%, 3ph AC with derating to 18 kW)
- **Frequency:** 45 - 65 Hz
- **Power Factor:** ca. 0.99
- **Leakage Current:** <10 mA
- **Phase Current:** ≤110 A @ 400 V AC
- **Overvoltage Category:** 3

DC Output (static)

- **Load Regulation CV**: ≤0.05% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Line Regulation CV:** ≤0.01% FS (380 V - 480 V +10% AC input voltage, constant load and constant temperature)
- **Stability CV:** ≤0.02% FS (during 8h of operation, after 30 minutes warm-up, at constant AC input voltage, load, and temperature)
- **Temperature Coefficient CV:** ≤30 ppm/°C (after 30 minutes warm-up)
- **Compensation (Remote Sense):** ≤5% UNominal
- **Load Regulation CC:** ≤0.1% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Line Regulation CC:** ≤0.01% FS (380 V - 480 V +10% AC input voltage, constant load and constant temperature)
- **Stability CC:** ≤0.02% FS (during 8h of operation, after 30 minutes warm-up, at constant AC input voltage, load, and temperature)
- **Temperature Coefficient CC:** ≤50 ppm/°C (after 30 minutes warm-up)
- **Load Regulation CP:** ≤0.3% FS (0 - 100% load, constant AC input voltage and constant temperature)
- **Load Regulation CR:** ≤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:** ≤10 ms
- **Fall Time 90 - 10% CV:** ≤10 ms
- **Rise Time 10 - 90% CC:** ≤2 ms
- **Fall Time 90 - 10% CC:** ≤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 rating), 1500 V DC (models from 500 V rating)

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: ≤0.2% , 0-5 V: ≤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 °C (32–122 °F)
- **Storage Temperature:** -20–70 °C (-4–158 °F)
- **Humidity:** ≤80% relative humidity, non-condensing
- **Altitude:** ≤2000 m (≤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 4U x 668 mm
- **Weight:** 50 kg (110 lbs)
- **Weight with water cooling: 56** kg (126 lbs)

Available Models

Specification	PU 10060-1000	PU 10080-1000	PU 10200-420	PU 10360-240	PU 10500-180
Voltage Range (V)	0–60 V	0–80 V	0–200 V	0–360 V	0–500 V
Ripple in CV (rms)	≤25 mV (BWL 300 kHz)	≤25 mV (BWL 300 kHz)	≤40 mV (BWL 300 kHz)	≤55 mV (BWL 300 kHz)	≤70 mV (BWL 300 kHz)
Ripple in CV (pp)	≤320 mV (BWL 20 MHz)	≤320 mV (BWL 20 MHz)	≤300 mV (BWL 20 MHz)	≤320 mV (BWL 20 MHz)	≤350 mV (BWL 20 MHz)
Current Range (A)	0–1000 A	0–1000 A	0–420 A	0–240 A	0–180 A
Power Range (W)	0–30000 W	0–30000 W	0–30000 W	0–30000 W	0–30000 W
Resistance Range (Ω)	0.003–5 Ω	0.003–5 Ω	0.0165–25 Ω	0.05–90 Ω	0.08–170 Ω
Output Capacitance (µF)	25380 µF	25380 µF	5400 µF	1800 µF	675 µF
Efficiency Sink/Source (%)	95.1%	95.5%	95.3%	95.8%	96.5%

Specification	PU 10750-120	PU 10920-90	PU 11000-60	PU 11500-40	PU 12000-20
Voltage Range (V)	0-750 V	0-920 V	0-1000 V	0-1500 V	0-2000 V
Ripple in CV (rms) (mV BW 300 kHz)	≤200 mV	≤250 mV	≤300 mV	≤400 mV	≤500 mV
Ripple in CV (pp) (mV BW 20 MHz)	≤800 mV	≤1200 mV	≤1600 mV	≤2400 mV	≤3000 mV
UMin for IMax (sink) (V)	3.4 V	3.2 V	3.4 V	3.2 V	3.7 V
Current Range (A)	0-120 A	0-90 A	0-60 A	0-40 A	0-20 A
Power Range (W)	0-30000 W	0-30000 W	0-30000 W	0-30000 W	0-30000 W
Resistance Range (Ω)	0.1-185 Ω	0.125-275 Ω	0.2-325 Ω	0.4-750 Ω	0.85-1350 Ω
Output Capacitance (µF)	765 µF	465 µF	387 µF	173 µF	85 µF
Efficiency (sink/source up to, %)	96.5%	96.5%	95.8%	96.5%	96.5%
Negative DC Pole to PE (V)	±1500 V	±1500 V	±1500 V	±1500 V	

General

The PU 10000 4U series offers industry-leading performance and versatility for laboratory and industrial power supply applications. Designed for reliability and efficiency, this system is perfect for demanding environments, providing precise and stable power delivery. Its compact 4U rack format saves space while maintaining robust functionality, making it a perfect solution for engineers requiring flexible power configurations.

DC Output

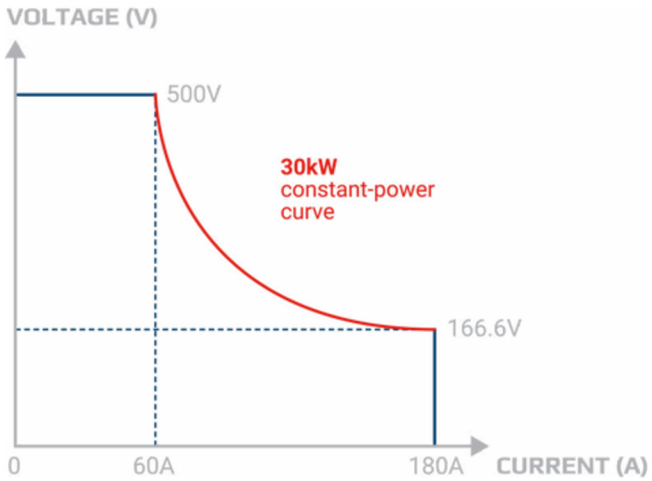
With precise voltage and current control, the PU 10000 4U delivers superior DC output performance, meeting stringent industrial and laboratory requirements. Autoranging technology allows maximum power across a wide voltage-current range, ensuring optimal flexibility for diverse applications. This feature enhances adaptability, eliminating the need for multiple power supplies.

AC Connection

Built to accommodate a wide range of input voltages, the PU 10000 4U ensures seamless integration with standard AC mains. Its highly efficient design minimizes energy losses, while advanced circuitry provides stable and clean power. This adaptability makes it ideal for global operations across varying AC input standards.

DC Connection

The PU 10000 4U supports secure and straightforward DC connections, ensuring minimal setup time. Its high-quality connectors are engineered for maximum durability and reliability, offering consistent performance even in demanding operational conditions. This robust configuration guarantees uninterrupted power delivery and simplified integration.



The principle of autoranging

The PU 10000 4U series incorporates cutting-edge autoranging technology, dynamically adjusting voltage and current levels to provide maximum power output across a wide operational range. This flexibility allows engineers to efficiently power various devices without needing multiple units, reducing costs and simplifying inventory.

Interfaces

Equipped with versatile communication interfaces, the PU 10000 4U ensures seamless integration with modern automation and monitoring systems. It includes Ethernet, USB, and analog control options, empowering engineers with real-time control and data collection. These features enhance compatibility and system performance across a range of applications.

High-Performance Systems

Engineered for excellence, the PU 10000 4U series supports high-precision systems requiring exceptional power stability. Its advanced cooling technology and robust design enable continuous operation under full load, ensuring reliability in critical environments. This makes it the top choice for engineers demanding peak performance.

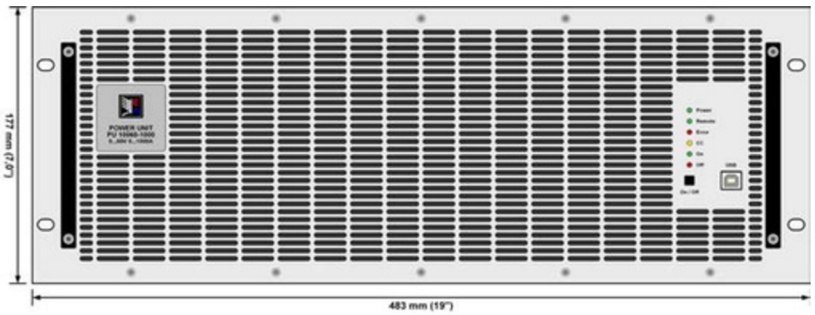
Master-Slave-Bus and Share-Bus

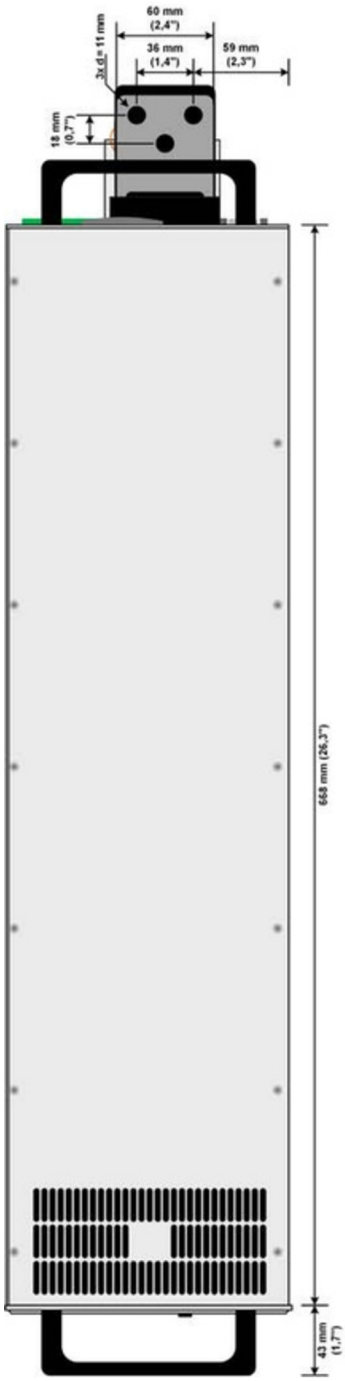
The PU 10000 4U simplifies scalability with its master-slave bus functionality. This feature allows multiple units to operate in synchronized configurations, achieving higher power or combined system control. Engineers benefit from seamless operation and efficiency in multi-unit setups, making it ideal for large-scale applications. With the innovative share bus system, the PU 10000 4U enables balanced load sharing between units, ensuring optimal performance and extending system longevity. This capability is essential for engineers managing high-power systems, providing reliability and reducing stress on individual units.

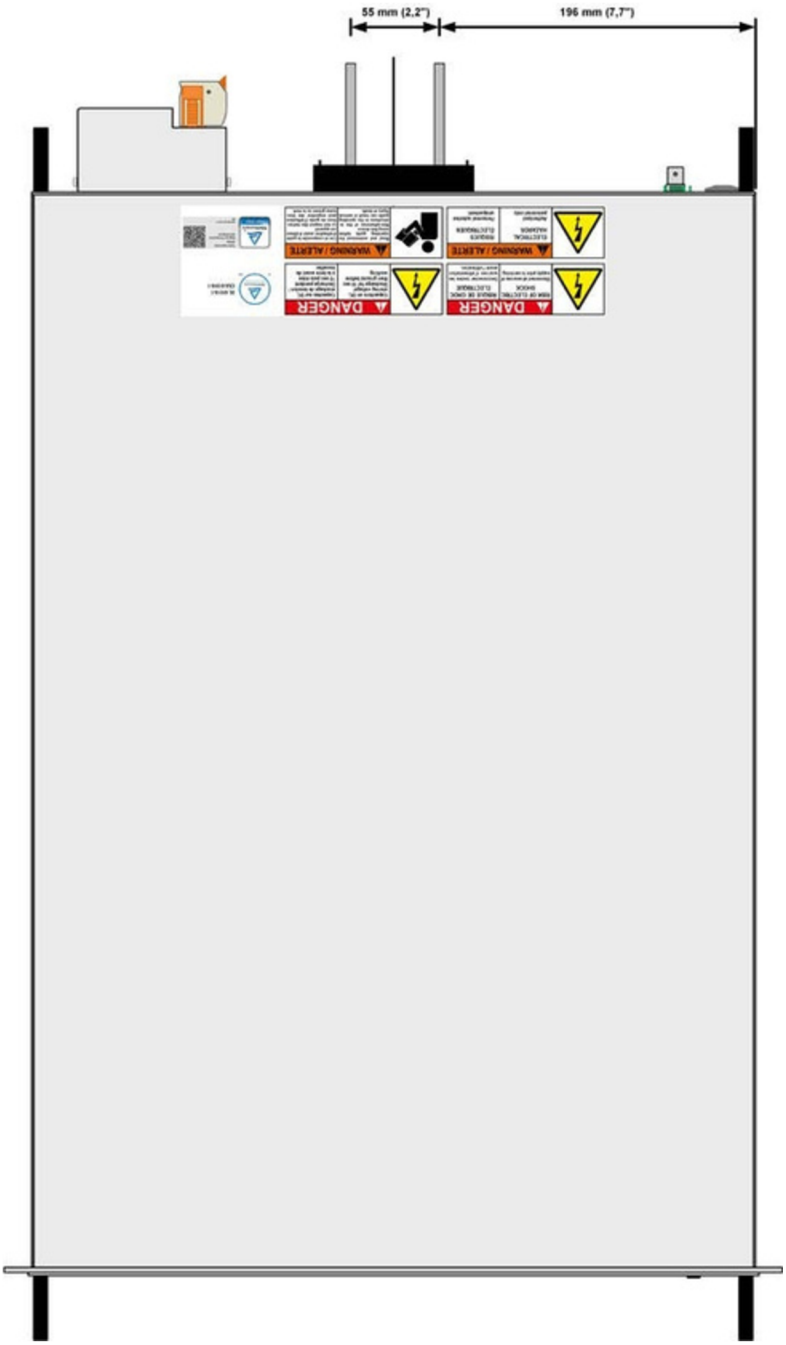
Example Representation

A fully assembled and operational 240 kW system.

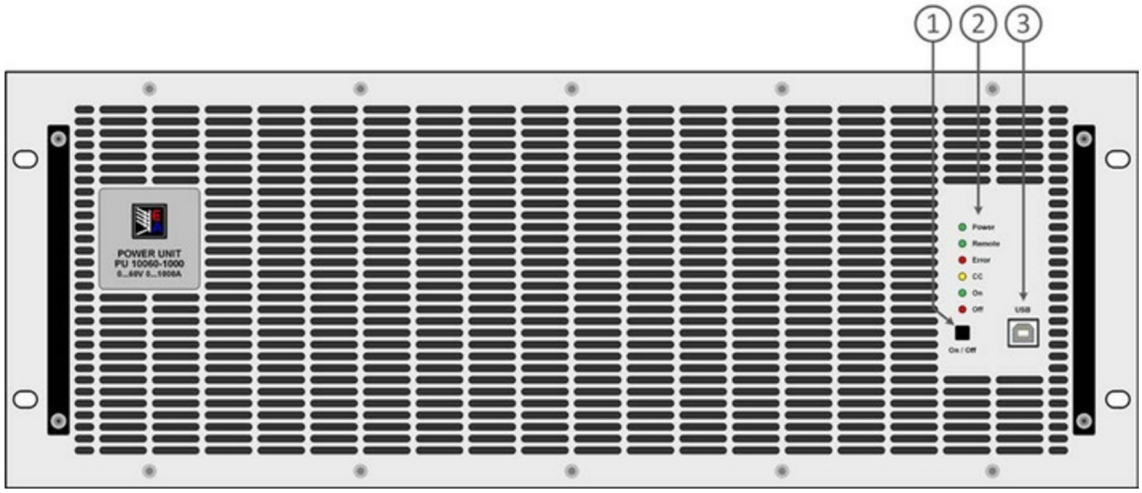
Technical drawings PU 10000 4U <200 V





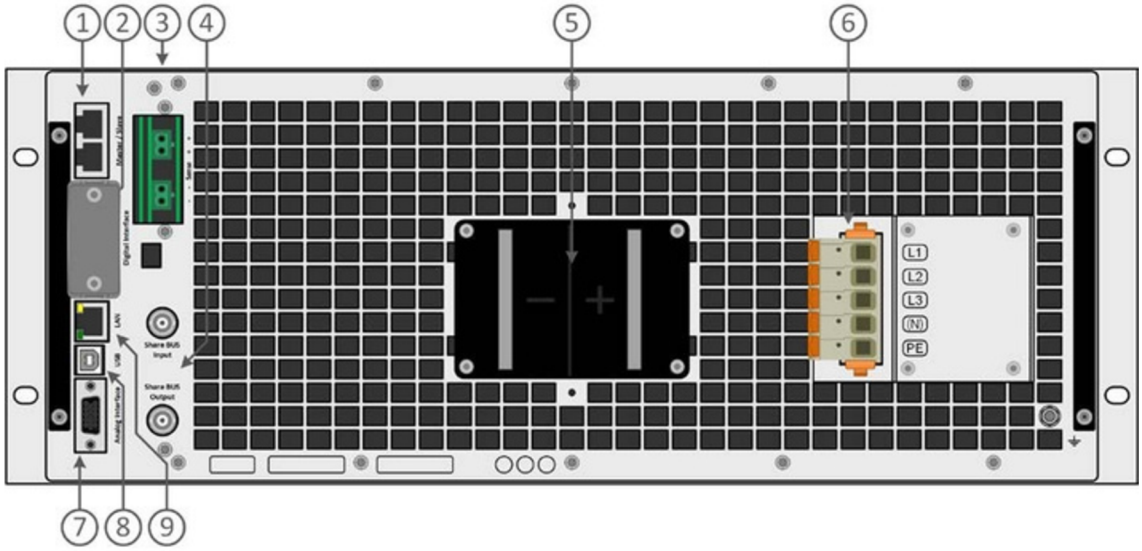


Front panel description PU 10000 4U



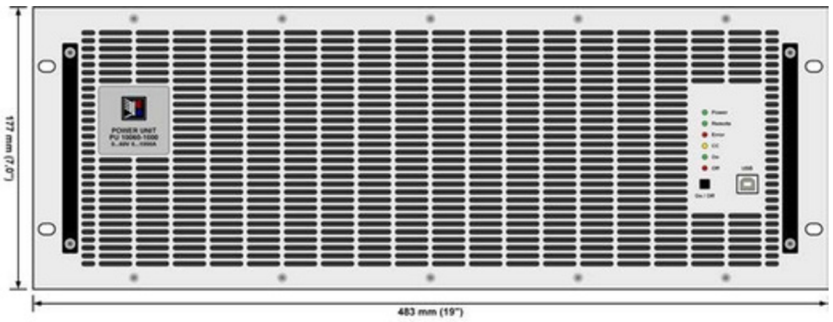
1. On / Off push-button
2. LED status display
3. USB Interface

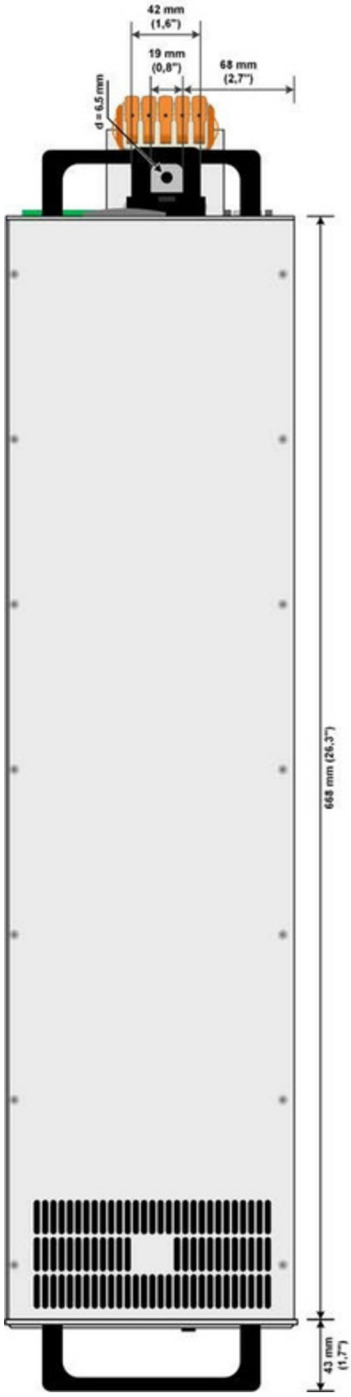
Rear panel description PU 10000 4U <200 V

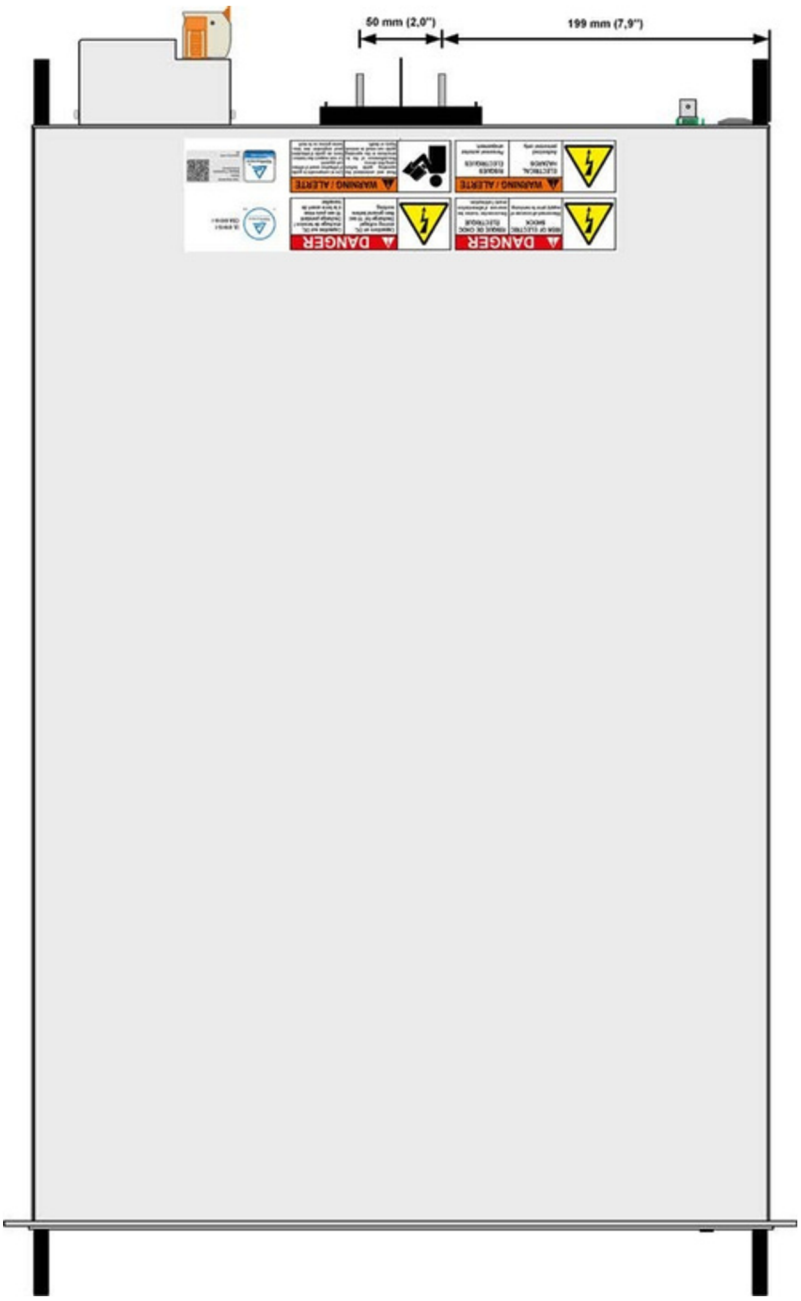


1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Remote sense connectors
4. Share bus connectors to set up a system for parallel connection
5. DC output connector (copper blades)
6. AC input connector
7. Connector (DB15 female) for isolated analog programming,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

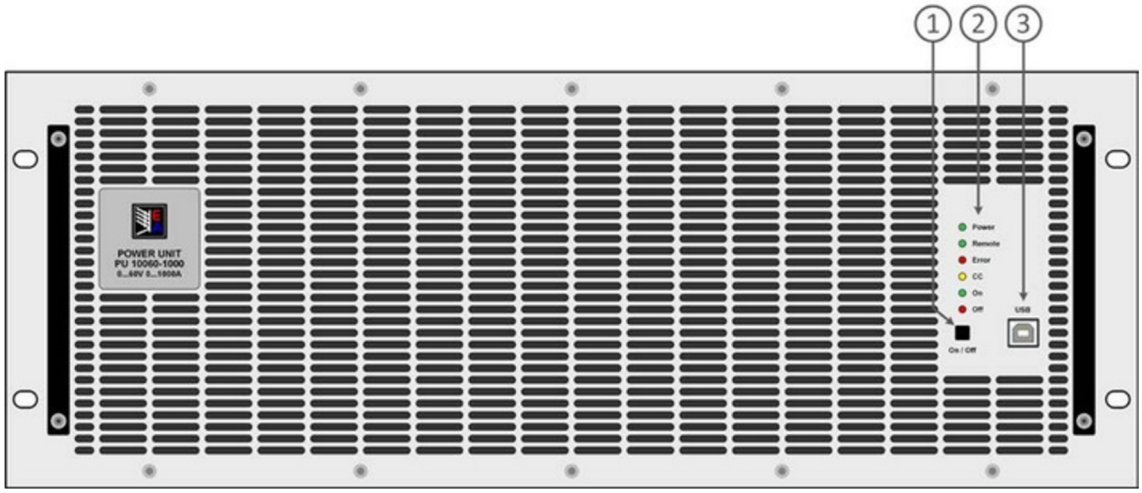
Technical drawings PU 10000 4U >360 V





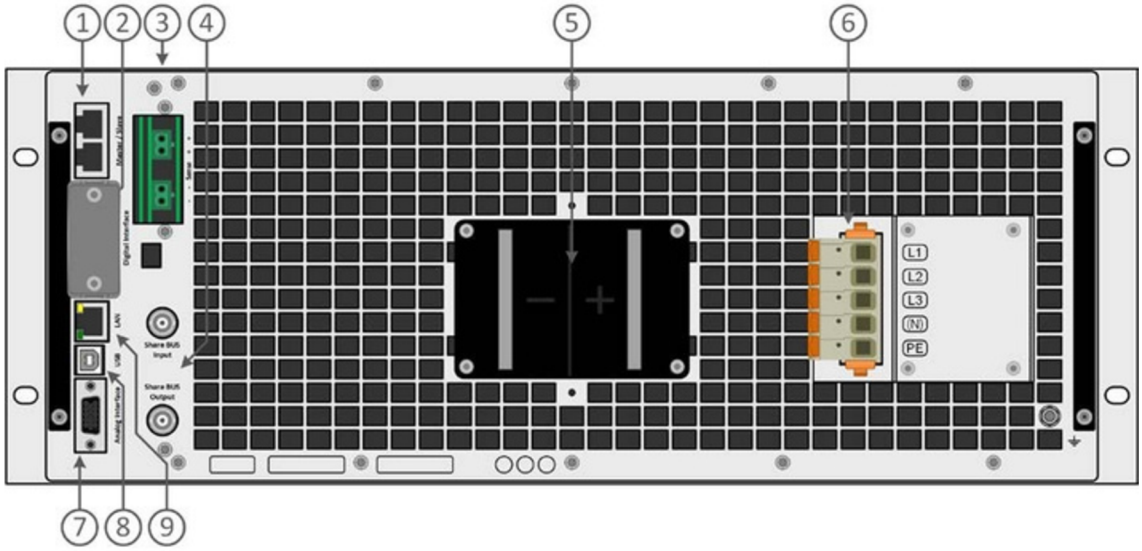


Front panel description PU 10000 4U



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

Rear panel description PU 10000 4U >360 V

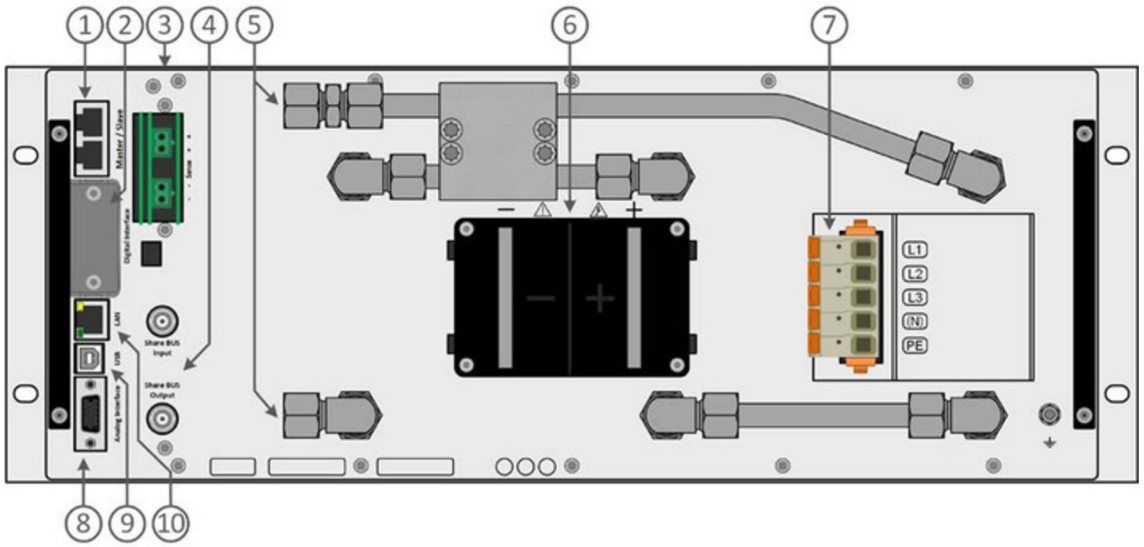


1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Remote sense connectors
4. Share bus connectors to set up a system for parallel connection
5. DC output connector (copper blades)
6. AC input connector
7. Connector (DB15 female) for isolated analog programming,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

Front panel description PU 10000 4U WC (water cooling option)

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

Rear panel description PU 10000 4U WC (water cooling option)



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

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