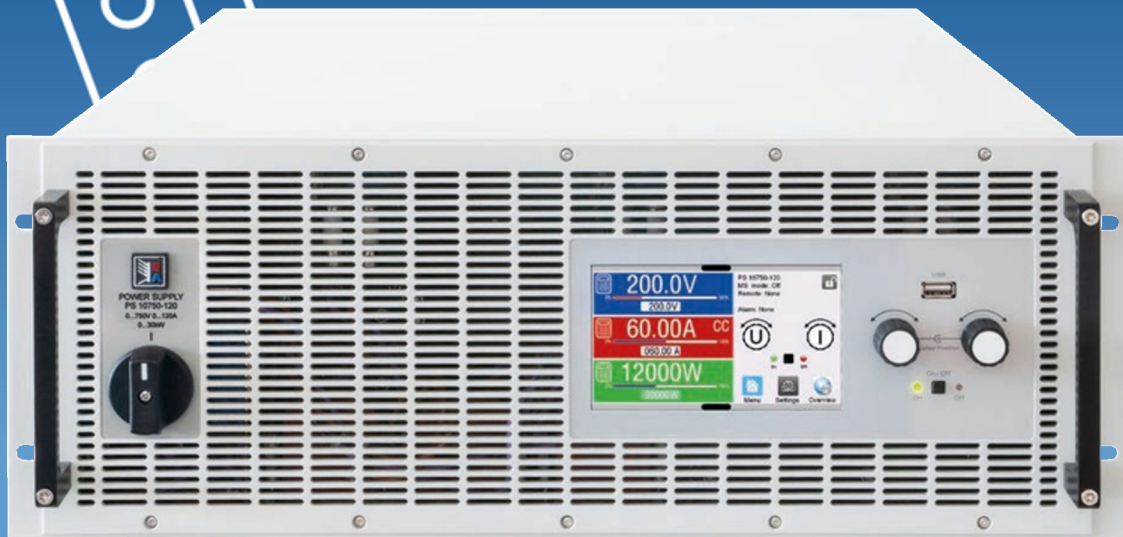




Elektro-Automatik



30 kW

PS 10000 4U

Reliable High-Power DC Power Supplies for Diverse Applications | 30 kW

High Efficiency: Achieves up to 96% energy efficiency, minimizing heat output and energy costs.

Wide Voltage and Current Ranges: Provides flexible configurations, from 0–60 V to 0–2000 V and 0–40 A to 0–1000 A.

Scalable Systems: Supports parallel operation for up to 64 units, delivering up to 1920 kW and 64,000 A.

Flexible Autoranging Output: Ensures full power delivery across a wide operational range.

Comprehensive Interfaces: Includes USB, Ethernet, and optional industrial interfaces like CAN and EtherCAT.

EA-PS 10000 4U 30 kW

Programmable DC power supply



Features

- Wide range input: 208 V - 480 V, +10%, 3ph AC
- Active Power Factor Correction, typical 0.99
- Very high efficiency of up to 96%
- High performance with 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 regulation speed: Normal, Fast, Slow
- Color 5" TFT display with touch control and intuitive user interface
- 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 (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

SPECIFICATIONS

AC Input

- **Voltage, Phases:**
 - Range 1: 208 V, $\pm 10\%$, 3ph AC (with DC output power derating to 18 kW)
 - Range 2: 380–480 V, $\pm 10\%$, 3ph AC
- **Frequency:** 45–65 Hz
- **Power Factor:** ca. 0.99
- **Leakage Current:** < 10 mA
- **Inrush Current / Phase Current:** ≤ 56 A
- **Overvoltage Category:** 2

DC Output (static)

- **Load Regulation CV:** $\leq 0.05\%$ FS (0–100% load, constant input voltage and constant temperature)
- **Line Regulation CV:** $\leq 0.01\%$ FS (208–480 V AC $\pm 10\%$ supply voltage, constant load and constant temperature)
- **Stability CV:** $\leq 0.02\%$ FS (during 8 hours of operation, after 30 minutes warm-up, at constant output voltage, load, and temperature)
- **Temperature Coefficient CV:** ≤ 30 ppm/ $^{\circ}$ C (after 30 minutes of warm-up)
- **Compensation (Remote Sense):** b
- **Load Regulation CC:** $\leq 0.1\%$ FS (0–100% load, constant output voltage and constant temperature)
- **Line Regulation CC:** $\leq 0.01\%$ FS (208–480 V AC $\pm 10\%$ supply voltage, constant load and constant temperature)
- **Stability CC:** $\leq 0.02\%$ FS (during 8 hours of operation, after 30 minutes warm-up, at constant output voltage, load, and temperature)
- **Temperature Coefficient CC:** ≤ 50 ppm/ $^{\circ}$ C (after 30 minutes of warm-up)
- **Load Regulation CP:** $\leq 0.3\%$ FS (0–100% load, constant output voltage and constant temperature)
- **Load Regulation CR:** $\leq 0.3\%$ FS + 0.1% FS current (0–100% load, constant output voltage and constant temperature)

Protective Functions

- **Overvoltage Protection (OVP):** Adjustable 0 - 110% $U_{Nominal}$
- **Overcurrent Protection (OCP):** Adjustable 0 - 110% $I_{Nominal}$
- **Overpower Protection (OPP):** Adjustable 0 - 110% $P_{Nominal}$
- **Overtemperature Protection (OT):** DC output shuts down in case of insufficient cooling

DC Input (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

Display Accuracy

- **Voltage:** $\leq 0.05\%$ FS
- **Current:** $\leq 0.1\%$ FS

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: $\leq 0.2\%$, 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 B), CISPR 11 (Class B), FCC 47 CFR part 15B (Class B)
- **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:** ≤ 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 4U x 668 mm
- **Weight:** 50 kg (110 lbs)
- **Weight with water cooling:** 56 kg (126 lbs)

Available Models

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

Parameter	PS 10750-120	PS 10920-125	PS 11000-80	PS 11500-60	PS 12000-40
Voltage Range	0 - 750 V	0 - 920 V	0 - 1000 V	0 - 1500 V	0 - 2000 V
Ripple in CV (rms)	≤200 mV (BW 300 kHz)	≤200 mV (BW 300 kHz)	≤300 mV (BW 300 kHz)	≤400 mV (BW 300 kHz)	≤500 mV (BW 300 kHz)
Ripple in CV (pp)	≤800 mV (BW 20 MHz)	≤800 mV (BW 20 MHz)	≤1600 mV (BW 20 MHz)	≤2400 mV (BW 20 MHz)	≤3000 mV (BW 20 MHz)
Current Range	0 - 120 A	0 - 125 A	0 - 80 A	0 - 60 A	0 - 40 A
Power Range	0 - 30000 W	0 - 30000 W	0 - 30000 W	0 - 30000 W	0 - 30000 W
Resistance Range	0.2 Ω - 370 Ω	0.25 Ω - 550 Ω	0.4 Ω - 650 Ω	0.8 Ω - 1500 Ω	1.7 Ω - 2700 Ω
Output Capacitance	450 μF	100 μF	200 μF	75 μF	50 μF
Efficiency	96.5%	96.5%	95.8%	96.5%	96.5%

General

The PS 10000 4U series offers industry-leading programmable DC power supply solutions tailored for laboratory and industrial environments. Designed for maximum efficiency and reliability, it delivers up to 30 kW per unit with wide voltage and current ranges from 0–60 V to 0–2000 V and 0–40 A to 0–1000 A. With its advanced autoranging technology, the PS 10000 4U ensures full power delivery across a broad operating spectrum, simplifying workflows and reducing equipment needs. Whether for energy storage, renewable energy, or automotive testing, the PS 10000 4U adapts seamlessly to the most demanding applications.

DC Connection

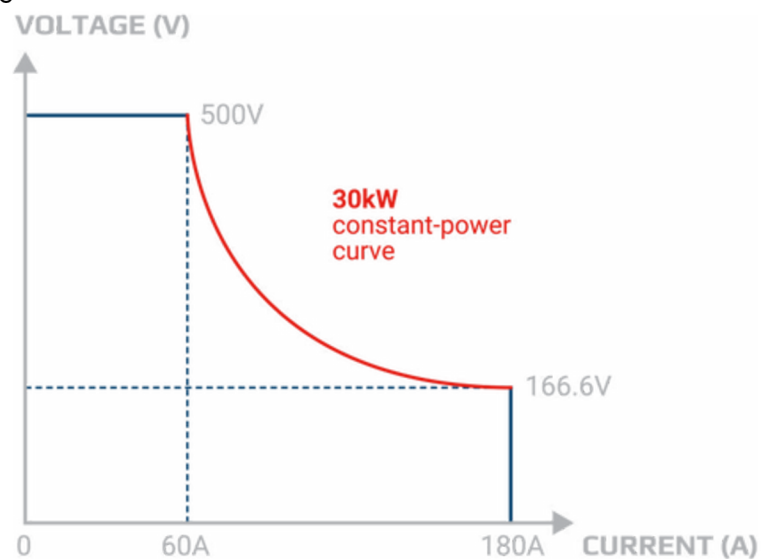
The PS 10000 4U features a robust DC connection system, designed for scalability and reliability. Rear-mounted copper rails provide secure, high-performance connections, while optional parallel configurations enable systems with significantly higher power outputs. Safety is enhanced through protective covers, ensuring reliable and secure operations even in demanding environments.

AC Connection

Equipped with active power factor correction (PFC), the PS 10000 4U optimizes energy usage, achieving power factors of up to 0.99. Its wide input voltage range, spanning 208–480 V AC across three phases, ensures compatibility with global power standards. This flexibility reduces setup complexity, enabling seamless integration into diverse environments without the need for additional equipment.

DC Output

With its versatile DC output capabilities, the PS 10000 4U supports applications requiring precise voltage and current control. Offering a power range of up to 30 kW, its autoranging output stage dynamically adjusts voltage and current to provide optimal power delivery for varying loads. This adaptability is essential for industries that demand precision and efficiency, from battery testing to power electronics development.



The Principle of Autoranging

Autoranging technology in the PS 10000 4U eliminates the constraints of fixed output ranges, allowing the device to deliver full power across a broad range of voltage and current settings. This innovation simplifies the testing process, reduces equipment requirements, and offers unmatched flexibility for a wide variety of applications. With autoranging, engineers can maximize efficiency and streamline operations, tackling complex tasks with ease.

Interfaces

The PS 10000 4U supports large-scale, high-power systems through its Master-Slave Bus and Share Bus capabilities. By connecting up to 64 units in parallel, it enables configurations delivering up to 1920 kW and 64,000 A. These features ensure efficient load distribution, streamlined operations, and scalable performance for even the most demanding power applications.

High-Performance Systems

The PS 10000 4U supports large-scale, high-power systems through its Master-Slave Bus and Share Bus capabilities. By connecting up to 64 units in parallel, it enables configurations delivering up to 1920 kW and 64,000 A. These features ensure efficient load distribution, streamlined operations, and scalable performance for even the most demanding power applications.

Master-Slave-Bus and Share-Bus

The Master-Slave Bus functionality in the PS 10000 4U enables multiple units to operate seamlessly as a single, synchronized system. This advanced feature consolidates total power and current data across all connected units, displaying them on the master device for easy monitoring and control. It also manages alarms and warnings, ensuring consistent operation across the system. With support for up to 64 units, the Master-Slave Bus provides unparalleled scalability, making it ideal for high-power applications requiring precise coordination and efficiency. This functionality simplifies large-scale setups, reducing complexity and enhancing system reliability.



Example Representation

A fully assembled and operational 240 kW system.

Applications

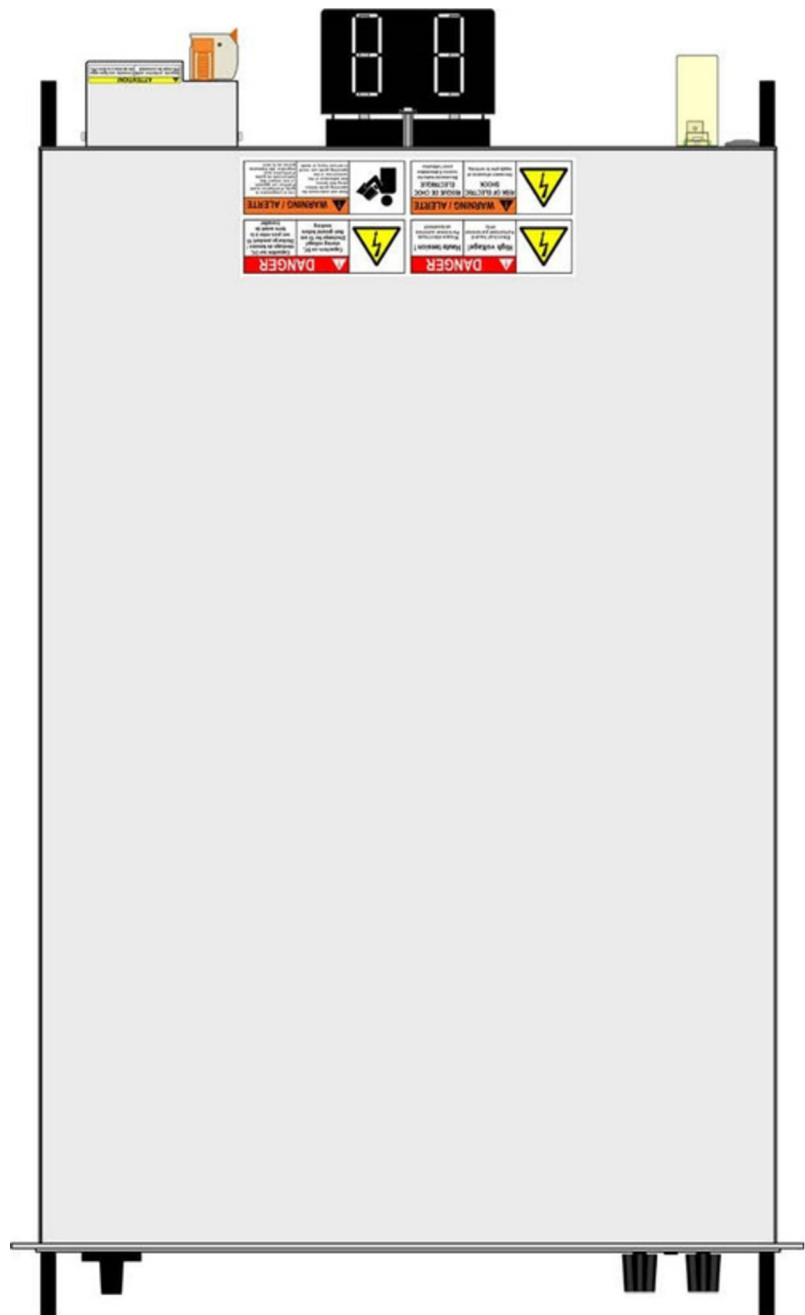
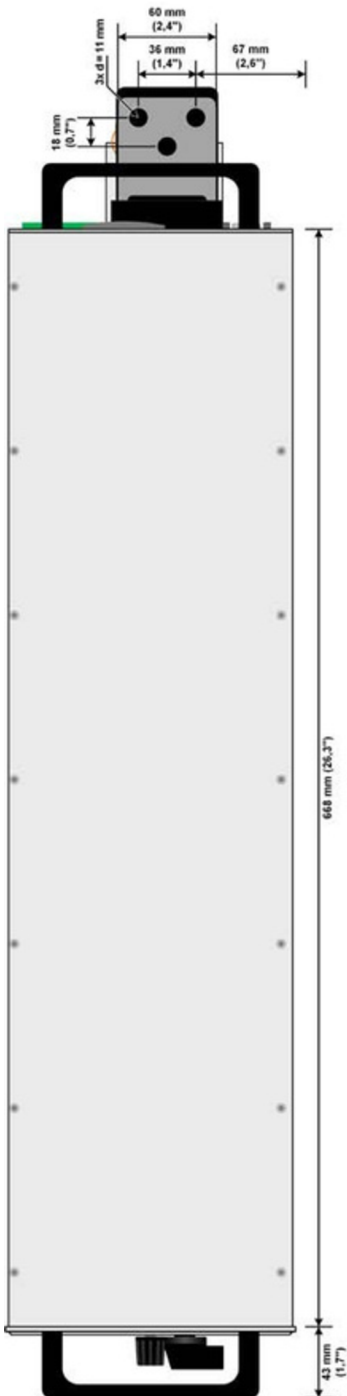
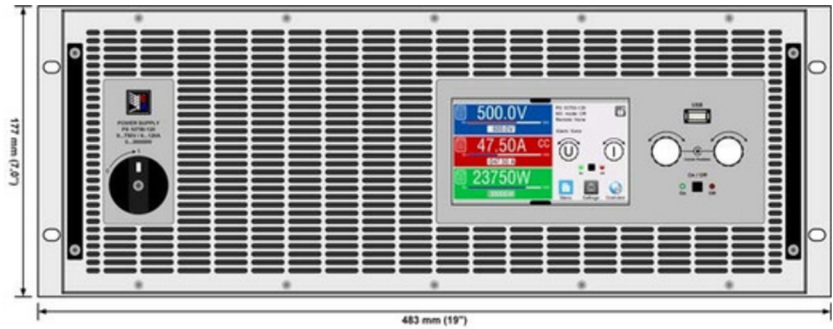
Relay Test in Production

Relay manufacturers require precise testing during production to ensure the quality and reliability of their products. The PS 10000 4U series provides exact, dynamic control of voltage, current, power, and resistance, delivering optimal parameters for coil and contact tests. Key performance indicators, such as operating, holding, and decay current, along with voltage consistency and disconnect thresholds, can be accurately measured and documented. With diverse interface options, these devices integrate seamlessly into automated test systems, eliminating the need for additional measuring equipment while producing high-quality, reproducible results.

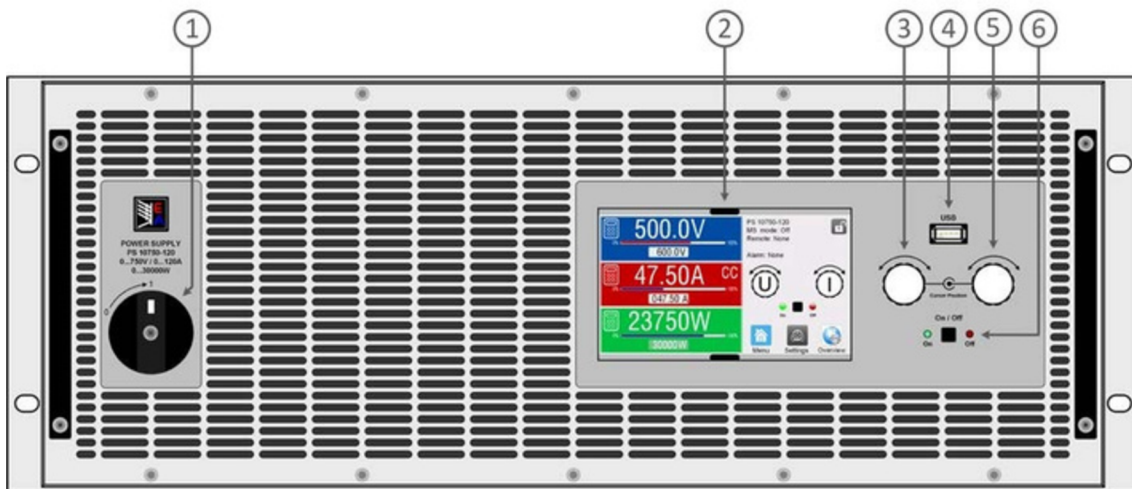
On-Board Charger Test

On-board chargers (OBCs) require flexible, precise test systems to evaluate their electrical features under various conditions. The PS 10000 4U, combined with the EA-Power Control software, supports sequencing and logging functions, enabling dynamic and highly accurate testing. Adjustable voltage regulation speeds—Normal, Fast, and Slow—prevent conflicts between the testing device and the device under test (DUT), ensuring smooth operation. For complete evaluations, pairing the PS 10000 4U with an ELR 10000 series electronic DC load creates a comprehensive source-and-sink test system, tailored to meet rigorous automotive testing standards.

Technical drawings PS 10000 4U <200 V

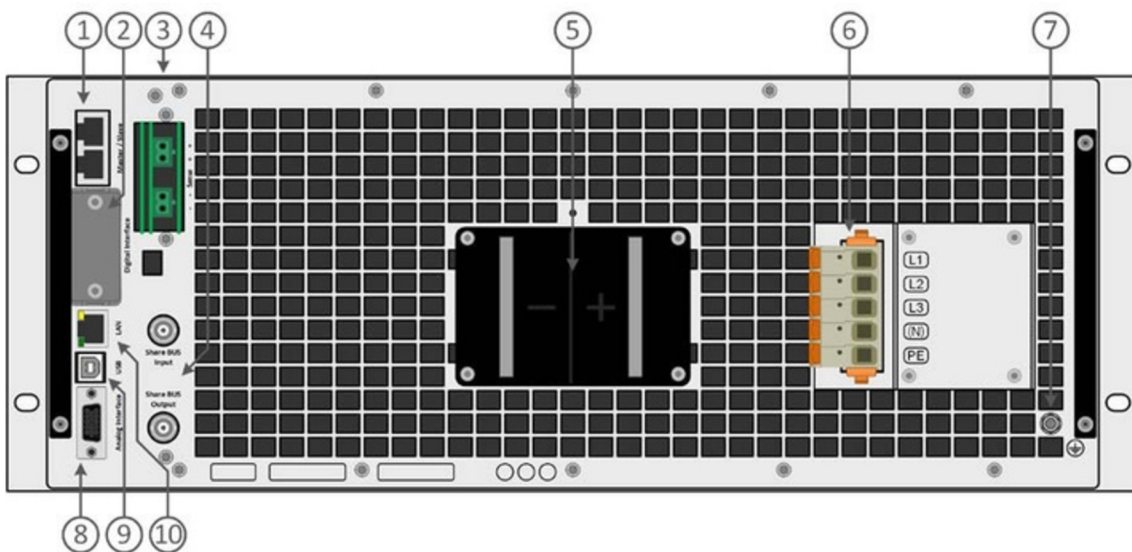


Front panel description PS 10000 4U



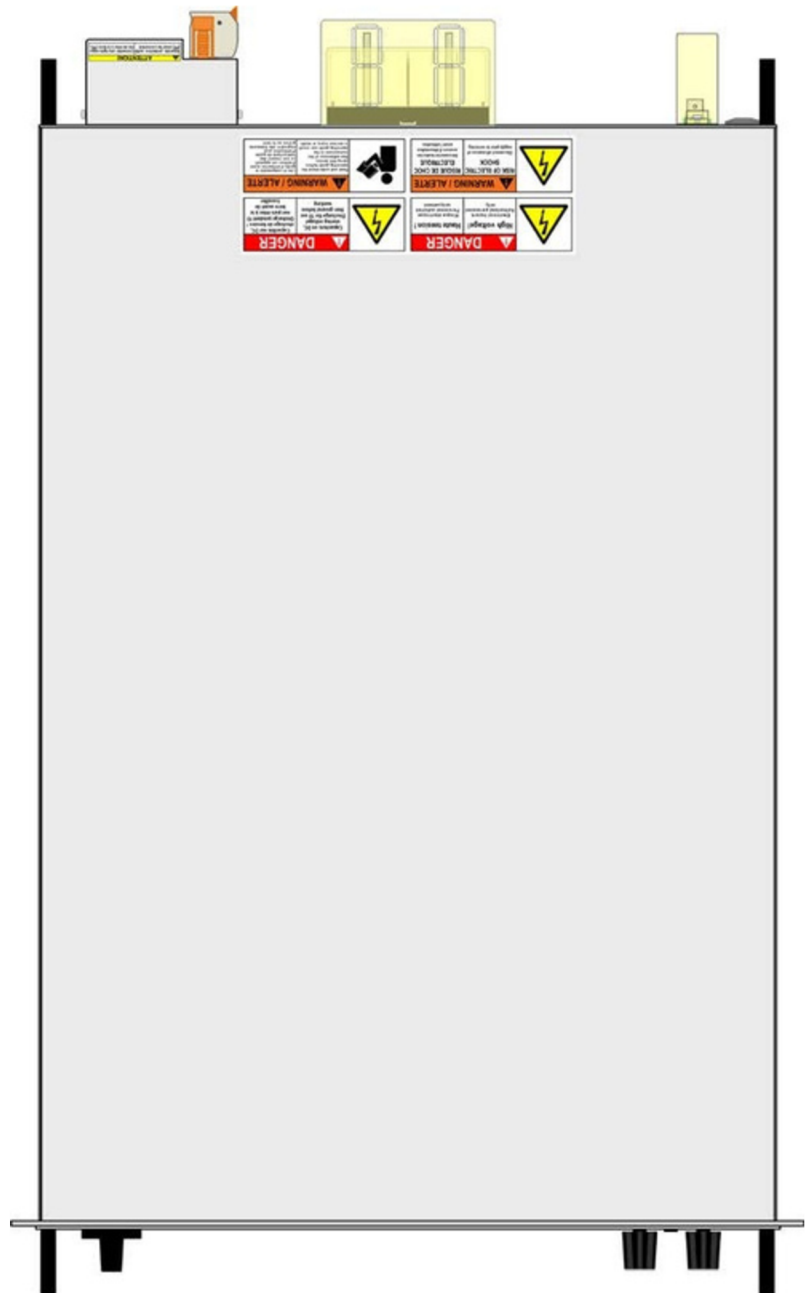
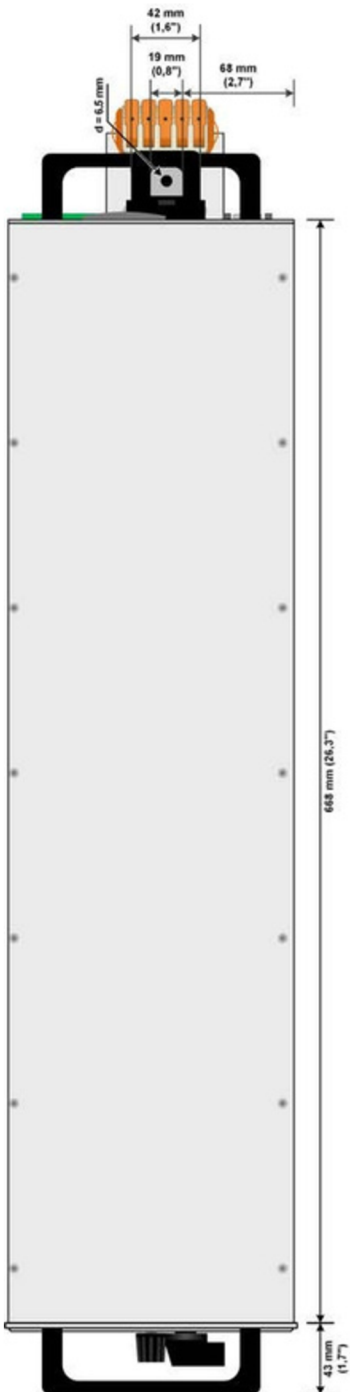
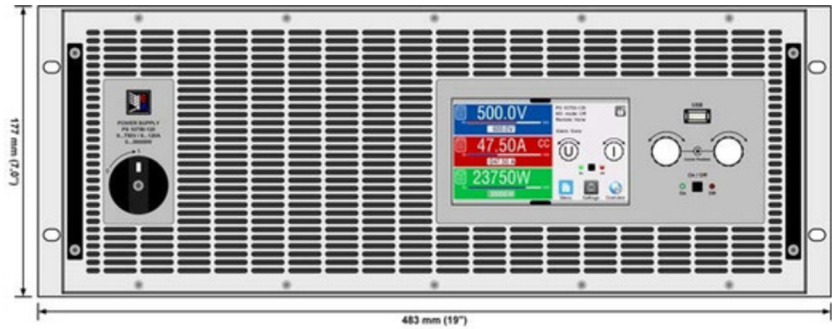
1. Power switch
2. TFT control interface, interactive operation and display
3. Rotary knob with push-button action, for settings and control
4. USB host, uses USB sticks for data logging and sequencing
5. Rotary knob with push-button action, for settings and control
6. On / Off push-button with LED status display

Rear panel description PS 10000 4U <200 V

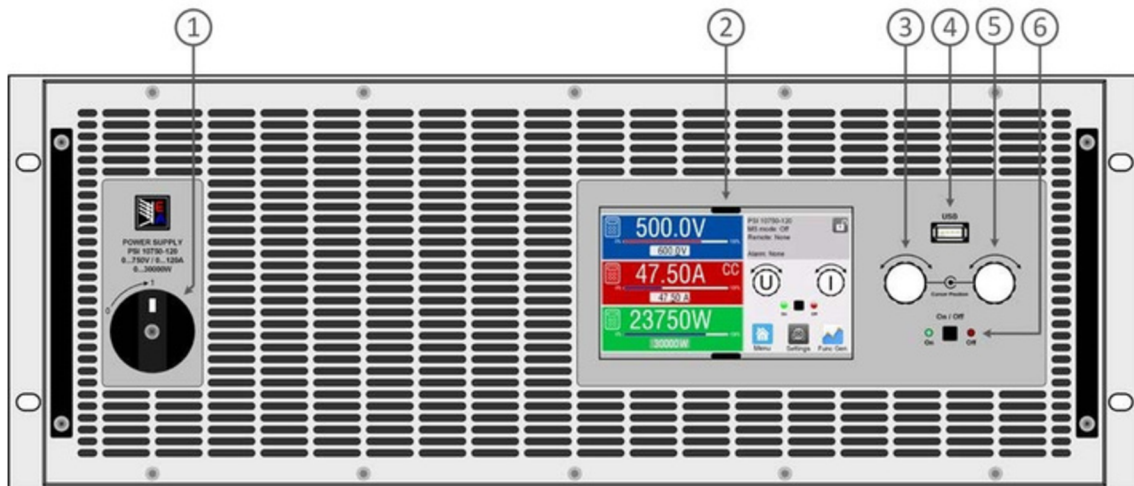


1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Remote sense connectors
4. Share bus connectors to set up a system for parallel connection
5. DC output connector (copper blades)
6. AC input connector
7. Grounding connection screw (PE)
8. Connector (DB15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

Technical drawings PS 10000 4U >360 V

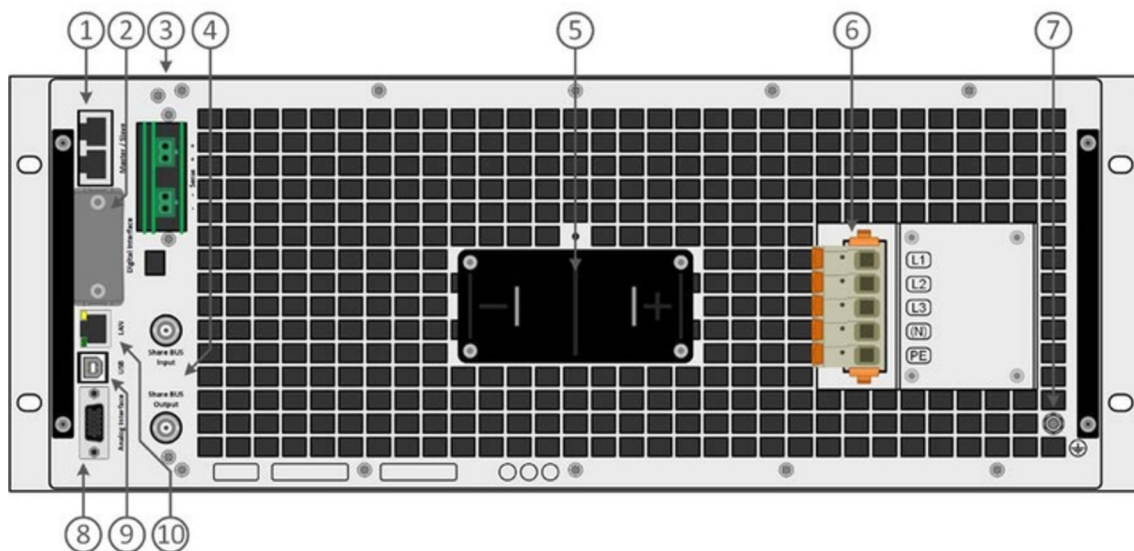


Front panel description PS 10000 4U



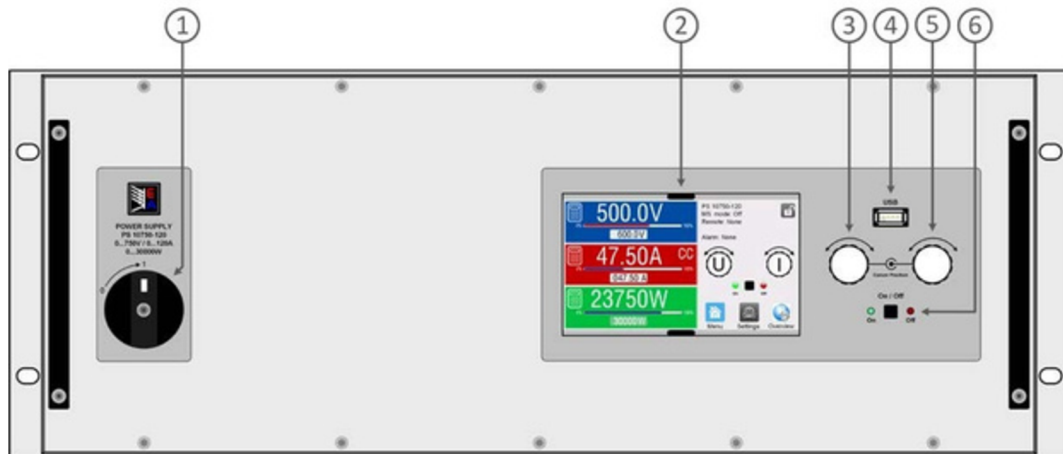
1. Power switch
2. TFT control interface, interactive operation and display
3. Rotary knob with push-button action, for settings and control
4. USB host, uses USB sticks for data logging and sequencing
5. Rotary knob with push-button action, for settings and control
6. On / Off push-button with LED status display

Rear panel description PS 10000 4U >360 V



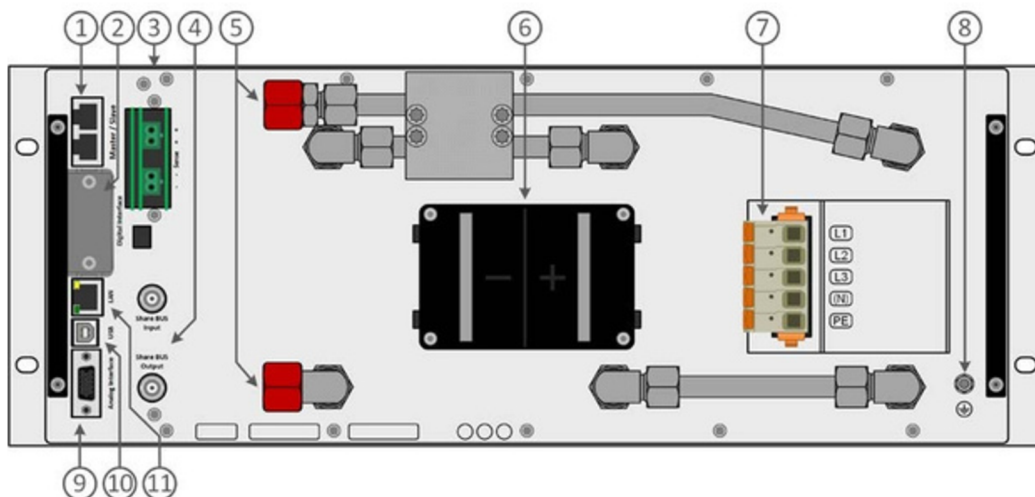
1. Master-Slave-Bus connectors to set up a system for parallel connection
2. Slot for interfaces
3. Remote sense connectors
4. Share bus connectors to set up a system for parallel connection
5. DC output connector (copper blades)
6. AC input connector
7. Grounding connection screw (PE)
8. Connector (DB15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

Front panel description PS 10000 4U with Water Cooling option



1. Power switch
2. TFT control interface, interactive operation and display
3. Rotary knob with push-button action, for settings and control
4. USB host, uses USB sticks for data logging and sequencing
5. Rotary knob with push-button action, for settings and control
6. On / Off push-button with LED status display

Rear panel description PS 10000 4U with 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 connector (copper blades)
7. AC input connector
8. Grounding connection screw (PE)
9. Connector (DB15 female) for isolated analog programming, monitoring and other functions
10. USB interface
11. Ethernet interface

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