

# EA-PSI 10000 30 kW



Programmable high efficiency DC Power supplies



EA-PSI 10750-120



- Wide range 342...528 V AC supply for operation on 380 V, 400 V or 480 V grids
- US 208 V models available
- High efficiency up to 95.5%
- Output power rating: 30 kW per device, expandable up to 1920 kW
- Output voltages: 60 V up to 2000 V
- Output currents: 40 A up to 1000 A
- Flexible, power regulated output stage
- Various protection circuits (OVP, OCP, OPP, OTP)
- 5" TFT touch panel with display for values, status and notifications
- Remote sensing with automatic detection
- Galvanically isolated interfaces (USB, Ethernet, analog)
- Integrated function generator with photovoltaics array simulation, including EN 50530
- Internal resistance simulation and regulation
- 60 V models compliant to SELV
- Discharge circuit ( $U_{out} < 60 \text{ V in } \leq 10 \text{ s}$ )
- Optional, digital interface modules
- SCPI and ModBus RTU/TCP command set
- LabView VIs and control software for Windows

## General

The new high efficiency laboratory power supplies of series EA-PSI 10000 are a power extension of series EA-PSI 9000 3U, offering twice the power in a space of just 1 extra unit of height. This saves a space of 2U or one third compared to EA-PSI 9000 3U and 30 kW of power.

The also extended master-slave bus now allows for parallel operation of up to 64 units in a system that can provide up to **1920 kilowatts** of total power.

All models offer multiple functions and features in their standard version. User-friendly, interactive menu navigation makes the use of this equipment remarkably easy and most effective.

User and process profiles can be edited, saved and archived so that the reproducibility of a test or other application is improved. In order to achieve even higher output power, cabinets from 15U up to 47U size can be configured to suit the user's requirements.

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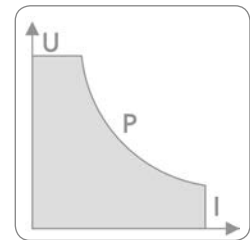
## AC supply

All models are provided with an active Power Factor Correction circuit and offer a wide range AC input that runs with **342...528 V** three-phase, covering the typical worldwide grid voltages **380 V, 400 V** and **480 V**. Regions where only 208 V three-phase is available are covered by the US 208 V models.



## Autoranging power stage

All models are equipped with a flexible autoranging output stage which provides a higher output voltage at lower output current, or a higher output current at lower output voltage, always limited to the adjustable power set value or the rated power. Therefore, a wide range of applications can already be covered by the use of just one unit.



## DC output

DC voltages between 0...60 V and 0 ...**2000 V**, current ratings between 0...40 A and 0...**1000 A** are available, all along with a power rating of 0...30kW for all standard models while the US 208 V models are rated with 0...15 kW. The DC output terminal is located on the rear panel.

## Discharge circuit

Models with a nominal output voltage of 200 V or higher include a discharge circuit for the output capacitances. For no load or low load situations, it ensures that the dangerous output voltage can sink to under 60 V DC after the DC output has been switched off. This value is considered as limit for voltages dangerous to human safety.

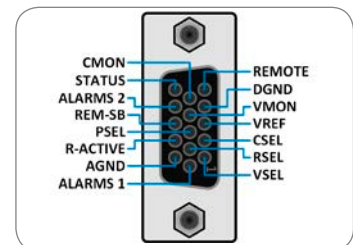
## Protective features

For protection of the equipment connected, it's possible to set an overvoltage protection threshold (OVP), as well as one for overcurrent (OCP) and overpower (OPP).

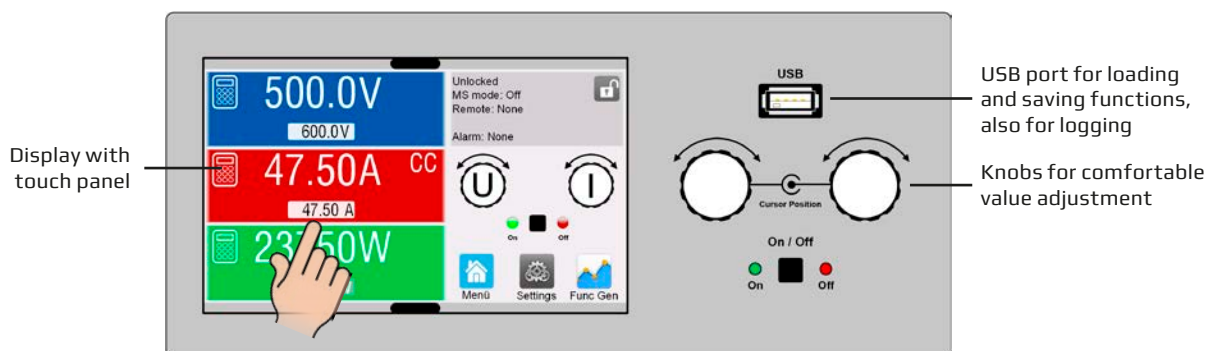
As soon as one of these thresholds is reached for any reason, the DC output will be immediately shut off and a status signal will be generated on the display and via the interfaces. There is furthermore an over-temperature protection, which will shut off the DC output if the device overheats.

## Analog interface

There is a galvanically isolated analog interface terminal, located on the rear of the device. It offers analog inputs to set voltage, current, power and resistance from 0...100% through control voltages of 0 V...10 V or 0 V...5 V. To monitor the output voltage and current, there are analog outputs with 0 V...10 V or 0 V...5 V. Also, several inputs and outputs are available for controlling and monitoring the device status.



## Display and control panel



Set values and actual values of output voltage, output current and output power are clearly represented on the graphic display. The color TFT screen is touch sensitive and can be intuitively used to control all functions of the device with just a finger tip.

Set values of voltage, current, power or resistance (internal resistance simulation) can be adjusted using the rotary knobs or entered directly via a numeric pad. To prevent unintentional operations, all operation controls can be locked.



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## Multilingual screen



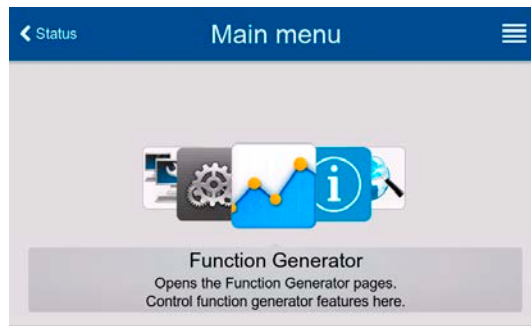
German



Chinese



Russian



English



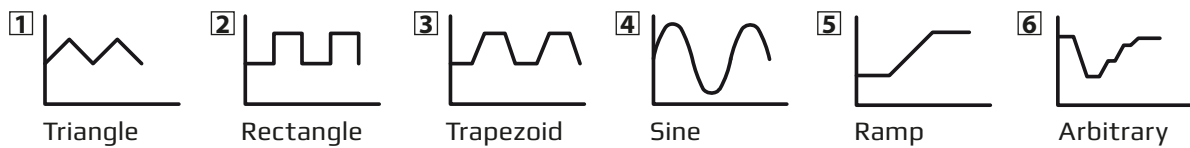
### Master-slave

All models feature a digital master-slave bus by default. It can be used to connect up to 64 units of identical models in parallel operation to a bigger system with totals formation of the actual value of voltage, current and power. The configuration of the master-slave system is either completely done on the control panels of the units or by remote control via any of digital communication interfaces. Handling of the master unit is possibly by manual or remote control (any interface).

### Function generator

All models in this series include a software based function generator which can generate typical functions, as displayed in the figure below, and apply them to either the output voltage or the output current. The generator can be completely configured and controlled by using the touch panel on the front of the device, or by remote control via one of the digital interfaces.

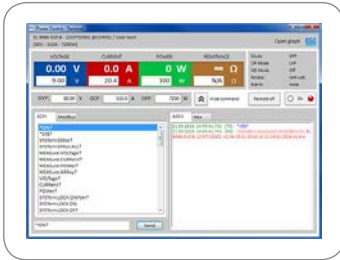
The predefined functions offer all necessary parameters to the user, such as Y offset, time / frequency or amplitude, for full configuration ability.



Additionally to the standard functions, which are all based upon a so-called arbitrary generator, this base generator is accessible for the creation and execution of complex sets of functions, separated into up to 99 sequences. Those can be used for testing purposes in development and production. The sequences can be loaded from and saved to a standard USB stick via the USB port on the front panel, making it easy to change between different test sequences.

There is furthermore an XY generator, which is used to generate other functions, such IU, which are defined by the user in form of tables (CSV file) and then loaded from USB stick. For photovoltaics related tests, a PV curve can be generated and used from user-adjustable key parameters. It also supports the european standard EN 50530.

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### Control software

Included with the devices is a control software for Windows PCs, which allows for the remote control of multiple identical or even different types of devices. It has a clear interface for all set and actual values, a direct input mode for SCPI and ModBus RTU commands, a firmware update feature and the semi-automatic table control named "Sequencing". Also see page 146. Further features which can be unlocked by a purchasable license:

- Graphical visualization of the actual values
- Full function generator configuration and control with function like standard PV, PV EN 50530, Sandia and SAS
- **Multi Control** - an app to control up to 20 units at once, including Sequencing and Function Generator

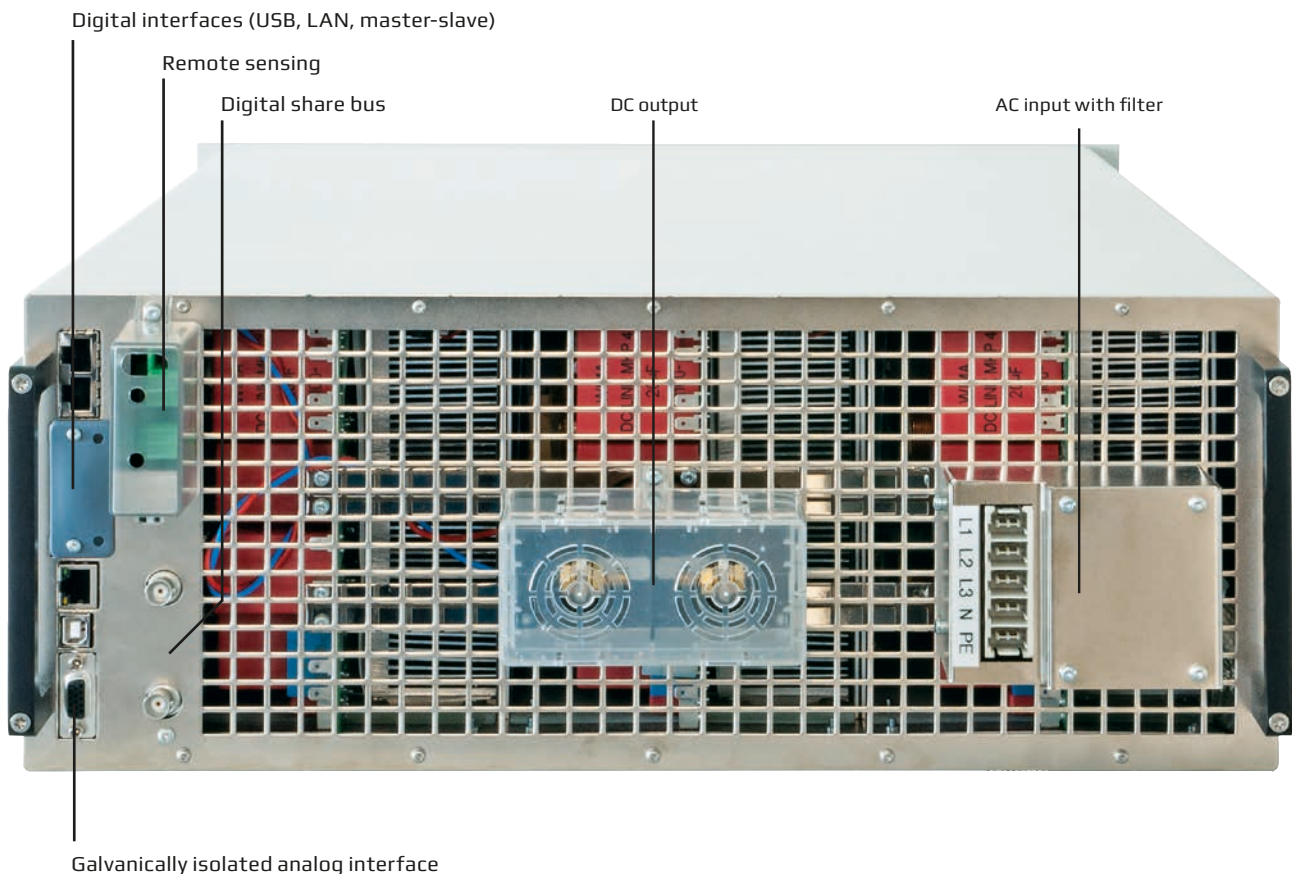
### Water-cooling

While standard water-cooling systems use an air flow-through engaged by fans in order to cool internal electronic components like an auxiliary power supply, this series premieres a new water-cooling system where no additional heat is exhausted anymore. All internal heat is dissipated into the water. This can help to cut down on additional, expensive exhaust systems for cabinets or rooms. Furthermore, this option will be available for all voltage classes.

### Options

- Digital interface modules for RS232, CAN, CANopen, ModBus TCP, Profibus, Profinet or EtherCAT (also see page 144).
- Water-cooling (also see page 150)

### Product views





## EA-PSI 10000 30 kW

Technical Data	PSI 10060-1000 4U	PSI 10080-1000 4U	PSI 10200-420 4U
Rated voltage & range	0...60 V	0...80 V	0...200 V
Voltage ripple <sup>(1)</sup>	≤480 mV <sub>pp</sub> / ≤37 mV <sub>RMS</sub>	≤480 mV <sub>pp</sub> / ≤37 mV <sub>RMS</sub>	≤450 mV <sub>pp</sub> / ≤60 mV <sub>RMS</sub>
Insulation			
- DC- to PE	±500 V DC	±500 V DC	±725 V DC
- DC+ to PE	+600 V DC	+600 V DC	+1000 V DC
Rated current & range	0...1000 A	0...1000 A	0...420 A
Rated power & range	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )
Efficiency	Up to 94%	Up to 94%	Up to 94.2%
Weight <sup>(2)</sup>	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)
Ordering number (standard)	06230800	06230801	06230802
Ordering number (WC) <sup>(3)</sup>	06250800	06250801	06250802
Ordering number (US208V)	06238800	06238801	06238802
Ordering number (US208V + WC)	06258800	06258801	06258802

Technical Data	PSI 10360-240 4U	PSI 10500-180 4U	PSI 10750-120 4U
Rated voltage & range	0...360 V	0...500 V	0...750 V
Voltage ripple <sup>(1)</sup>	≤480 mV <sub>pp</sub> / ≤83 mV <sub>RMS</sub>	≤525 mV <sub>pp</sub> / ≤105 mV <sub>RMS</sub>	≤1200 mV <sub>pp</sub> / ≤300 mV <sub>RMS</sub>
Insulation			
- DC- to PE	±1500 V DC	±1500 V DC	±1500 V DC
- DC+ to PE	+2000 V DC	+2000 V DC	+2000 V DC
Rated current & range	0...240 A	0...180 A	0...120 A
Rated power & range	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )
Efficiency	Up to 94.6%	Up to 95.3%	Up to 95.5%
Weight <sup>(2)</sup>	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)
Ordering number (standard)	06230803	06230804	06230805
Ordering number (WC) <sup>(3)</sup>	06250803	06250804	06250805
Ordering number (US208V)	06238803	06238804	06238805
Ordering number (US208V + WC)	06258803	06258804	06258805

Technical Data	PSI 11000-80 4U	PSI 11500-60 4U	PSI 12000-40 4U
Rated voltage & range	0...1000 V	0...1500 V	0...2000 V
Voltage ripple <sup>(1)</sup>	≤2400 mV <sub>pp</sub> / ≤450 mV <sub>RMS</sub>	≤3600 mV <sub>pp</sub> / ≤600 mV <sub>RMS</sub>	≤3600 mV <sub>pp</sub> / ≤600 mV <sub>RMS</sub>
Insulation			
- DC- to PE	±1500 V DC	±1500 V DC	±1500 V DC
- DC+ to PE	+2000 V DC	+2000 V DC	+2000 V DC
Rated current & range	0...80 A	0...60 A	0...40 A
Rated power & range	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )	0...30 kW (0...15 kW <sup>(4)</sup> )
Efficiency	Up to 94.6%	Up to 95.3%	Up to 95.5%
Weight <sup>(2)</sup>	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)	≈ 50 kg (110 lb)
Ordering number (standard)	06230806	06230807	06230808
Ordering number (WC) <sup>(3)</sup>	06250806	06250807	06250808
Ordering number (US208V)	06238806	06238807	06238808
Ordering number (US208V + WC)	06258806	06258807	06258808

(1) RMS value: measured at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz

(2) Weight of the base version, models with option(s) may vary

(3) Ordering number of the base version, models with option(s) may vary

(4) US 208 V version

