EA-PS 9000 3U 3.3 kW - 15 kW

Programmable high efficiency DC Power supplies

EA-PS 9500-90 3U

U | I | P | OVP | OCP | OPP | OTP | 19“

USB | LAN | Option: IEEE | WC

- **For 208 V or 400 V AC supply**
- **High efficiency of up to 95.5%**
- **Output power ratings: 3.3 kW, 5 kW, 6.6 kW, 10 kW or 15 kW**
- **Output voltages: 40 V up to 1500 V**
- **Output currents: 20 A up to 510 A**
- **Auto-ranging output stage**
- **Various protection circuits (OVP, OCP, OPP, OTP)**
- **Control panel with pushbuttons and color TFT for actual values, set values, status and alarms**
- **Galvanically isolated, analog interface**
- **Temperature-controlled fans for cooling**
- **Discharge circuit (U_{out} < 60 V in ≤ 10 s)**
- **USB and Ethernet port integrated or alternatively installed GPIB port**
- **EMC TÜV approved for EN 61010 Class B**
- **SCPI and ModBus RTU/TCP command set**
- **LabView VIs and control software for Windows**

General

The microprocessor-controlled high efficiency laboratory power supplies of series EA-PS 9000 3U offer many functions and features in their standard version, making the use of this equipment remarkably easy and most effective.
The clearly arranged control panel features two rotary knobs, six pushbuttons and two LEDs. Together with a color TFT display for all values and status it simplifies the use of the devices.

AC supply

All models are provided with an active Power Factor Correction circuit. There is a choice of two different AC supply input ranges. The standard models run with **400 V** (L-L, ±15%), while there are also models for **208 V** (L-L, ±10%) available for the US and Japan market.

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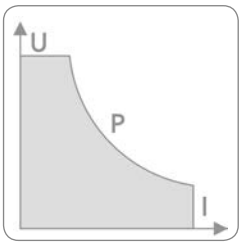


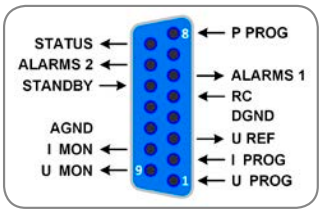
Power
The devices are equipped with a flexible auto-ranging output stage which provides a higher output voltage at lower output current, or a higher output current at lower output voltage, always limited to the rated power. Therefore, a wide range of applications can already be covered by the use of just one unit.

DC output
DC output voltages between 0...40 V and 0...1500 V, output currents between 0...20 A and 0...510 A and several output power ratings between 0...3.3 kW and 0...15 kW are available. The output terminal is located in the rear panel.

Discharge circuit
Models with a nominal output voltage of 200 V or higher include a discharge circuit for the output capacities. 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.

Display and controls
All important information is clearly visualized on a color TFT display.
With this, information about the actual output values and set values of voltage and current, the actual control state (CV, CC, CP) and other statuses, as well as alarms and settings of the setup menu are clearly displayed.
In order to ease adjusting of values by the rotary knobs, pushing them can switch between decimal positions of a value. All these features contribute to an operator friendliness.
With a panel lock feature, the whole panel can be locked in order to protect the equipment and the loads from unintentional misuse.

Digital and analog interfaces
All models features two galvanically isolated, digital interfaces by default (1x USB & 1x Ethernet), which are located on the rear side. With option 3W there will be a **GPIB** port instead of Ethernet. All three digital interfaces can be used to control and monitor the devices either with SCPI language commands or ModBus RTU/TCP protocol (not via GPIB).
There is furthermore a galvanically isolated analog interface port, also on the rear of the device. It offers analog inputs to set voltage, current and power from 0...100% through control voltages of 0...10 V or 0...5 V. To monitor the output voltage and current, there are analog outputs for voltage ranges of 0...10 V or 0...5 V. Also, several status inputs and outputs are available.



Remote sensing
The standard sensing input can be connected directly to the load in order to compensate voltage drops along the power cables. If the sensing input is connected to the load, the power supply will adjust the output voltage automatically to ensure the required voltage is available at the load.

Options
- High speed ramping (upon request)
- Water-cooling (upon request)
- Three-way interface (3W) with a rigid GPIB port installed instead of the default Ethernet port

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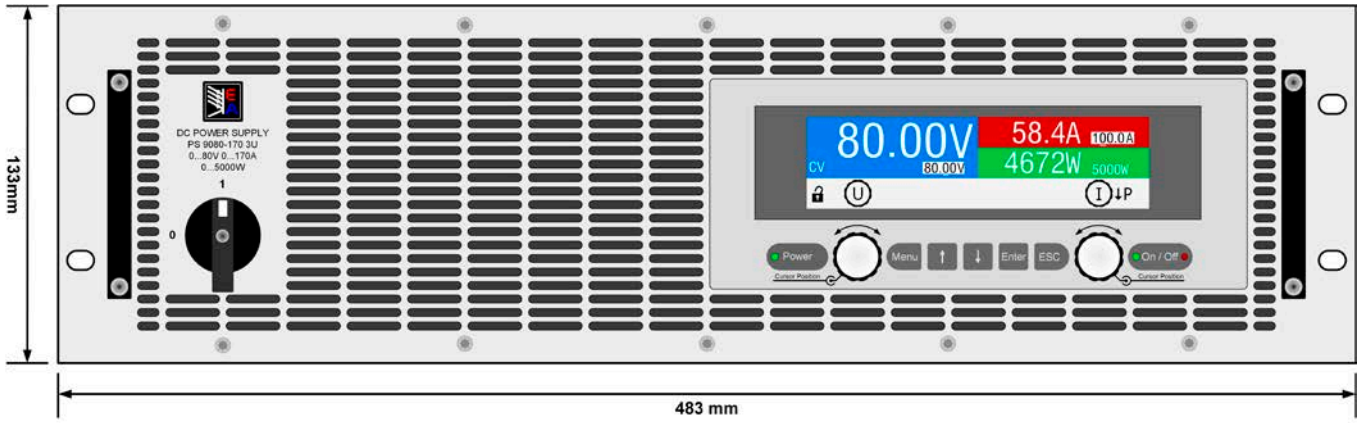
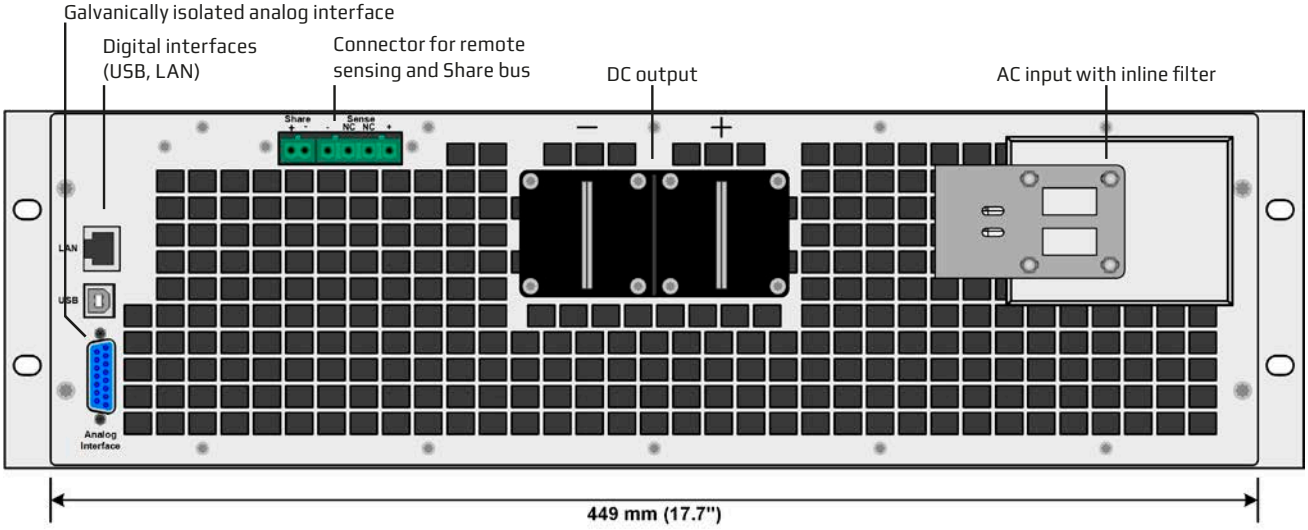
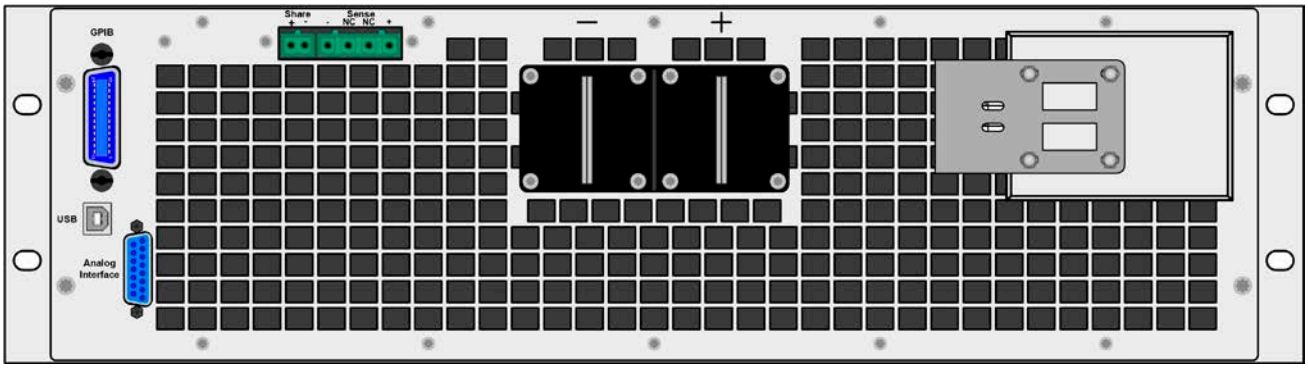
Views



Front view



Rear view (standard version)



Rear view (with option 3W)

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Technical Data	General	
AC: Supply		
Voltage	208V models: 188...229 V, 2ph/3ph 400 V models: 340...460 V, 2ph/3ph	
Frequency	45...66 Hz	
Power factor	>0.99	
DC: Voltage		
Accuracy	≤0.1% of rated value	
Load regulation 0-100%	≤0.05% of rated value	
Line regulation ±10% ΔU_{AC}	≤0.02% of rated value	
Regulation 10-100% load	≤2 ms	
Rise time 10-90%	Max. 30 ms	
Overvoltage protection	Adjustable, 0...110% U_{Nom}	
No load discharge time on DC off	100% U to ≤60 V: less than 10 s	
DC: Current		
Accuracy	≤0.2% of rated value	
Load regulation 1-100% ΔU_{DC}	≤0.15% of rated value	
Line regulation ±10% ΔU_{AC}	≤0.05% of rated value	
DC: Power		
Accuracy	≤1% of rated value	
Overvoltage category	2	
Protection	OTP, OVP, OCP, OPP, PF	
Insulation		
AC input to enclosure	2500 V DC	
AC input to DC output	2500 V DC	
DC output to enclosure (PE)	Depending on model, see tables	
Degree of pollution	2	
Protection class	1	
Display and panel	Color display, knobs and pushbuttons	
Digital interfaces		
Built-in	1x USB type B for communication, 1x Ethernet Optional: 1x GPIB (with option 3W)	
Analog interface	Built in, 15 pole D-Sub (female), galvanically isolated	
Signal range	0...5 V or 0...10 V (switchable)	
Accuracy U / I / P	0...10 V: ≤0.2%	0...5 V: ≤0.4%
Inputs	U, I, P, remote control on-off, DC output on-off	
Outputs	U, I, overvoltage, alarms, reference voltage	
Parallel operation	Possible	
Master-Slave	No	
Standards	IEC 61010-1:2010 EMC TÜV approved according to IEC 61000-6-2:2005 and IEC 61000-6-3:2006 Class B	
Cooling	Temperature-controlled fans (optional: water)	
Operation temperature	0...50 °C	
Storage temperature	-20...70 °C	
Humidity	≤80%, non-condensing	
Operation altitude	≤2000 m (6562 ft)	
Dimensions (W x H x D) [1]	208 V models: 19" x 3U x 683 mm (26.9") 400 V models: 19" x 3U x 609 mm (24") WR models: 19" x 3U x 669 mm (26.3")	

(1 Enclosure of the standard version and not overall size, versions with options may vary

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Technical Data	PS 9040-170 3U	PS 9060-170 3U	PS 9080-170 3U	PS 9200-70 3U
Rated voltage & range	0...40 V	0...60 V	0...80 V	0...200 V
Ripple (1	≤200 mV_{PP} / ≤16 mV_{RMS}	≤200 mV_{PP} / ≤16 mV_{RMS}	≤200 mV_{PP} / ≤16 mV_{RMS}	≤300 mV_{PP} / ≤40 mV_{RMS}
Insulation (DC- to PE)	±400 V	±400 V	±400 V	±400 V
Insulation (DC+ to PE)	±400 V	±400 V	±400 V	±600 V
Rated current & range	0...170 A	0...170 A	0...170 A	0...70 A
Rated power & range	0...3300 W	0...5000 W	0...5000 W	0...5000 W
Efficiency	≈ 93%	≈ 93%	≈ 93%	≈ 95%
Weight (2	≈ 18 kg (39.7 lb)	≈ 18 kg (39.7 lb)	≈ 18 kg (39.7 lb)	≈ 18 kg (39.7 lb)
Order nr. (208 V model)	not available	not available	06238251	06238252
Order nr. (400 V model)	06230250	not available	06230251	06230252

Technical Data	PS 9360-40 3U	PS 9500-30 3U	PS 9750-20 3U	PS 9040-340 3U
Rated voltage & range	0...360 V	0...500 V	0...750 V	0...40 V
Ripple (1	≤550 mV_{PP} / ≤65 mV_{RMS}	≤350 mV_{PP} / ≤70 mV_{RMS}	≤800 mV_{PP} / ≤200 mV_{RMS}	≤320 mV_{PP} / ≤25 mV_{RMS}
Insulation (DC- to PE)	±400 V	±725 V	±725 V	±400 V
Insulation (DC+ to PE)	±600 V	±1000 V	±1000 V	±400 V
Rated current & range	0...40 A	0...30 A	0...20 A	0...340 A
Rated power & range	0...5000 W	0...5000 W	0...5000 W	0...6600 W
Efficiency	≈ 93%	≈ 95.5%	≈ 94%	≈ 93%
Weight (2	≈ 18 kg (39.7 lb)	≈ 18 kg (39.7 lb)	≈ 18 kg (39.7 lb)	≈ 25 kg (55.1 lb)
Order nr. (208 V model)	not available	06238254	06238255	not available
Order nr. (400 V model)	06230253	06230254	06230255	06230256

Technical Data	PS 9040-510 3U	PS 9060-340 3U	PS 9080-340 3U	PS 9200-140 3U
Rated voltage & range	0...40 V	0...60 V	0...80 V	0...200 V
Ripple (1	≤320 mV_{PP} / ≤25 mV_{RMS}	≤320 mV_{PP} / ≤25 mV_{RMS}	≤320 mV_{PP} / ≤25 mV_{RMS}	≤300 mV_{PP} / ≤40 mV_{RMS}
Insulation (DC- to PE)	±400 V	±400 V	±400 V	±400 V
Insulation (DC+ to PE)	±400 V	±400 V	±400 V	±600 V
Rated current & range	0...510 A	0...340 A	0...340 A	0...140 A
Rated power & range	0...10000 W	0...10000 W	0...10000 W	0...10000 W
Efficiency	≈ 93%	≈ 93%	≈ 93%	≈ 95%
Weight (2	≈ 31 kg (68.3 lb)	≈ 25 kg (55.1 lb)	≈ 25 kg (55.1 lb)	≈ 25 kg (55.1 lb)
Order nr. (208 V model)	not available	not available	06238257	06238258
Order nr. (400 V model)	06230264	not available	06230257	06230258

(1 RMS value: measured at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz
(2 Weight of the standard version, models with options may vary

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Technical Data	PS 9360-80 3U	PS 9500-60 3U	PS 9750-40 3U	PS 91000-30 3U
Rated voltage & range	0...360 V	0...500 V	0...750 V	0...1000 V
Ripple (1	≤550 mV_{PP} / ≤65 mV_{RMS}	≤350 mV_{PP} / ≤70 mV_{RMS}	≤800 mV_{PP} / ≤200 mV_{RMS}	≤1600 mV_{PP} / ≤350 mV_{RMS}
Insulation (DC- to PE)	±400 V	±725 V	±725 V	±725 V
Insulation (DC+ to PE)	±600 V	±1000 V	±1000 V	±1500 V
Rated current & range	0...80 A	0...60 A	0...40 A	0...30 A
Rated power & range	0...10000 W	0...10000 W	0...10000 W	0...10000 W
Efficiency	≈ 93%	≈ 95%	≈ 94%	≈ 95%
Weight (2	≈ 25 kg (55.1 lb)	≈ 25 kg (55.1 lb)	≈ 25 kg (55.1 lb)	≈ 25 kg (55.1 lb)
Order nr. (208 V model)	not available	06238260	06238261	06238262
Order nr. (400 V model)	06230259	06230260	06230261	06230262

Technical Data	PS 9060-510 3U	PS 9080-510 3U	PS 9200-210 3U	PS 9360-120 3U
Rated voltage & range	0...60 V	0...80 V	0...200 V	0...360 V
Ripple (1	≤320 mV_{PP} / ≤25 mV_{RMS}	≤320 mV_{PP} / ≤25 mV_{RMS}	≤300 mV_{PP} / ≤40 mV_{RMS}	≤550 mV_{PP} / ≤65 mV_{RMS}
Insulation (DC- to PE)	±400 V	±400 V	±400 V	±400 V
Insulation (DC+ to PE)	±400 V	±400 V	±600 V	±600 V
Rated current & range	0...510 A	0...510 A	0...210 A	0...120 A
Rated power & range	0...15000 W	0...15000 W	0...15000 W	0...15000 W
Efficiency	≈ 93%	≈ 93%	≈ 95%	≈ 93%
Weight (2	≈ 31 kg (68.3 lb)	≈ 31 kg (68.3 lb)	≈ 31 kg (68.3 lb)	≈ 31 kg (68.3 lb)
Order nr. (208 V model)	not available	06238264	06238265	not available
Order nr. (400 V model)	not available	06230264	06230265	06230266

Technical Data	PS 9500-90 3U	PS 9750-60 3U	PS 91500-30 3U
Rated voltage & range	0...500 V	0...750 V	0...1500 V
Ripple (1	≤350 mV_{PP} / ≤70 mV_{RMS}	≤800 mV_{PP} / ≤200 mV_{RMS}	≤2400 mV_{PP} / ≤400 mV_{RMS}
Insulation (DC- to PE)	±400 V	±725 V	±725 V
Insulation (DC+ to PE)	±400 V	±1000 V	±1800 V
Rated current & range	0...90 A	0...60 A	0...30 A
Rated power & range	0...15000 W	0...15000 W	0...15000 W
Efficiency	≈ 95%	≈ 94%	≈ 95%
Weight (2	≈ 31 kg (68.3 lb)	≈ 31 kg (68.3 lb)	≈ 31 kg (68.3 lb)
Order nr. (208 V model)	06238267	06238268	06238269
Order nr. (400 V model)	06230267	06230268	06230269

(1 RMS value: measured at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz
(2 Weight of the standard version, models with options may vary