

PS 9000 3U Series

3.3 kW - 480 kW



Heavy Duty
Laboratory DC
Power Supplies

INTEPRO
SYSTEMS

THE POWER TEST EXPERTS

PS 9000 3U Series

3.3 kW - 480 kW



Product Overview

The PS 9000 3U offers an easy and effective auto-ranging DC power supply. All units are provided with an active Power Factor Correction circuit and 3.3kW models are suitable for worldwide operation as they operate on 208 and 480 VAC.

A traditional 5kW DC source with a voltage range of 500V provides 10A at full scale. At 200V, the source still only offers 10A so 2kW is actually delivered to the unit under test.

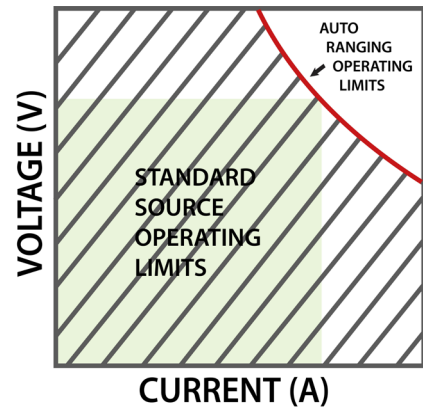
Auto-Ranging addresses this issue by automatically increasing the output current at reduced voltages. Take the PSI 9500-30 which is 5kW as an example. At 500V the source offers 10A. At 200V the source provides 25A which means the source maintains a 5kW output rating



PS 9000 3U

Auto-ranging power stage

All models 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 max. nominal output power. The power set value is adjustable with these models. Therefore, a wide range of applications can already be covered by a single unit.



Applications

The PS 9000 Series is an auto-ranging programmable DC Supply that employs state-of-the-art technology efficiently to help you power through a wide array of applications. It has been used for burn-in and EOL/Production as well as in R&D/Lab environments for Medical Device, Communications, EMC and MIL/Defense applications. The built in standard features provides for a versatile device that really stands out in just about any test environment.

DC Output

DC output voltages between 0...40 V and 0...1500 V, output currents between 0...4 A and 0...120 A and output power ratings of 0...3,300W, 5,000W, 10,000W and 15,000W are available.

Current, voltage and power can thus be adjusted continuously between 0% and 100%, no matter if manually or remotely controlled (analog or digital).

The DC output is located on the rear panel of the devices.

Featured Benefits

- *High efficiency up to 95.5%*
- *Output power ratings: 0...3.3 kW, 0...5 kW, 0...6.6 kW, 0...10 kW, 0...15 kW, expandable up to 480 kW*
- *Output voltages: 0...40 V up to 0...1500V*
- *Output currents: 0...30 A up to 0...510 A
Expandable up to 0...5100 A*
- *Auto-ranging output stage*
- *Control panel with pushbuttons and blue LCD for actual values, set values, status and alarms*
- *Galvanically isolated, analog interface with*
- *U / I / P programmable via 0...10 V or 0...5 V*
- *U / I monitoring via 0...10 V or 0...5 V*
- *Remote sensing with automatic detection*
- *Temperature controlled fans for cooling*
- *40 V models according to SELV (EN 60950)*
- *USB and Ethernet port integrated or alternatively installed IEEE/GPIB port*
- *EMC TÜV approved for IEC 61000-6-2:2006 Class B*
- *SCPI command language supported*

Protective Features

For protection of the equipment connected, it is 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 overtemperature protection, which will shut off the DC output if the device overheats.

Remote Sensing

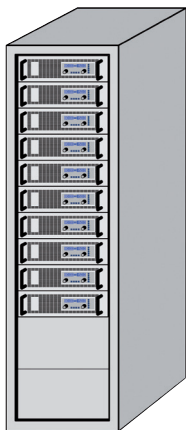
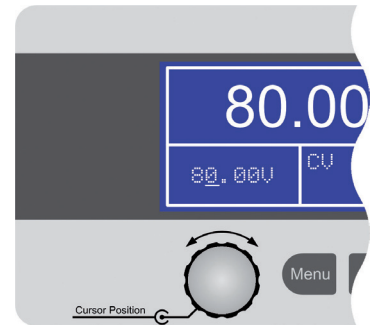
The standard sensing input can be connected directly to the load in order to compensate voltage drops along the power cables up to a certain level. If the sensing input is connected to the load, the power supply will adjust the output voltage automatically to make ensure the accurate required voltage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

Display & Controls

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

Set values of voltage, current, power or resistance can be adjusted using the rotary knobs.

To prevent unintentional operations, all operation controls can be locked.



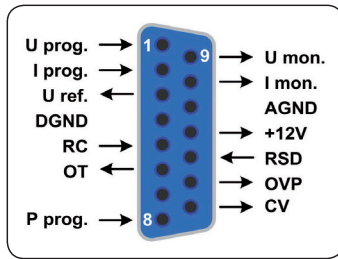
Extensibility

The single units can be combined into various configurations upon request and in cabinets of up to 42U height, in order to build parallel systems of up to 480 kW total power. Also see page 55 in the user manual.

A so-called Share bus for the parallel connection and current balancing of up to 10 units, as well as an analog interface offer multiple possible configurations.

Digital Interfaces

All models features two galvanically isolated, digital interfaces by default (standard: 1x USB & 1x Ethernet, with option 3W: 1x USB & 1x GPIB), which are located on the rear side. USB and Ethernet can be used to control and monitor the devices either with SCPI language commands or Modbus protocol, while with GPIB only SCPI is supported.



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 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 with voltage ranges of 0...10 V or 0...5 V. Also, several inputs and outputs are available for controlling and monitoring the device status.

Options

- *High speed ramping*
- *Water cooling (only for models up to 200 V)*
- *Three-way interface (3W) with a rigid GPIB port installed instead of the default Ethernet port*

Technical Data	Series PS 9000 3U
Input AC	
- Voltage standard	208VL-L; +/- 10%, 400VL-L; +/- 10%, 480VL-L; +/- 10%
- Frequency	45...66 Hz
- Power factor	>0.99
Output voltage DC	
- Accuracy	<0.1%
- Load regulation 0-100%	<0.05%
- Line regulation $\pm 10\% \Delta U_{AC}$	<0.02%
- Regulation 10-100% load	<2 ms
- Overvoltage protection	adjustable, 0...110% U_{Nom}
- No load discharge time on DC off	100% U auf / to <60 V: weniger als 10 s / less than 10 s
Output current	
- Accuracy	<0.2%
- Load regulation 0-100% ΔU_{DC}	<0.15%
- Line regulation $\pm 10\% \Delta U_{AC}$	<0.05%
Output power	
- Accuracy	<1%
Overvoltage category	2
Protection	OT, OVP, OPP, PF, OCP ⁽¹⁾
Isolation	
- Input to enclosure	2500 V DC
- Input to output	2500 V DC
- Output to enclosure (PE)	Depending on model, see tables
Pollution degree	2
Protection class	1
Display and panel	Graphics display with touch panel
Digital interfaces	
- Built-in	1x USB type B for communication, 1x GPIB (optional with option 3W)
- Slot	1x for retrofittable plug-in modules (standard models only)
Analog interface	built-in, 15-pole D-Sub, female
- Input range	0...5 V or 0...10 V (switchable)
- Accuracy U / I	0...10 V: <0.2% 0...5 V: <0.4%
- Programming resolution	see tables below
Series operation	Possible, but depending on the isolation of DC- against PE
Parallel operation	Yes, with true master-slave, up to 10 units
Standards	EN 61326, IEC 1010, EN 61010 EMC TÜV approved according to IEC 61000-6-2:2005, IEC 61000-6-3:2006 Class B
Cooling	Fans (optional: water)
Operation temperature	0...50 °C
Storage temperature	-20...70 °C
Relative humidity	<80%, n.c.
Operation altitude	<2000 m
Dimensions (W H D) ⁽²⁾	19" 3 HE / 3U 609 mm

⁽¹⁾ See page 13 in the user manual

⁽²⁾ Enclosure only, not overall

Technical Data	PS 9040-170 3U	PS 9080-170 3U	PS 9200-70 3U	PS 9360-40 3U
Output voltage DC	0...40 V	0...80 V	0...200 V	0...360 V
- Ripple ⁽¹⁾	<200 mV _{PP} <16 mV _{RMS}	<200 mV _{PP} <16 mV _{RMS}	<300 mV _{PP} <40 mV _{RMS}	<320 mV _{PP} <55 mV _{RMS}
-Sensing compensation	~ 1 V	~ 2 V	~ 5 V	~ 7.5 V
Isolation				
- Negative output <-> PE	±400 V DC	±400 V DC	±400 V DC	±400 V DC
- Positive output <-> PE	±400 V DC	±400 V DC	±600 V DC	±600 V DC
Output current	0...170 A	0...170 A	0...70 A	0...40 A
- Ripple ⁽¹⁾	<80 mA _{RMS}	<80 mA _{RMS}	<22 mA _{RMS}	<18 mA _{RMS}
Output power	0...3300 W	0...5000 W	0...5000 W	0...5000 W
Efficiency	~93%	~93%	~95%	~93%
Programming resolution U	≤2 mV	≤4 mV	≤9 mV	≤15 mV
Programming accuracy U	≤40 mV	≤80 mV	≤200 mV	≤360 mV
Programming resolution I	≤7 mA	≤7 mA	≤3 mA	≤2 mA
Programming accuracy I	≤340 mA	≤340 mA	≤140 mA	≤80 mA
Weight ⁽²⁾	~17 kg	~17 kg	~17 kg	~17 kg

Technical Data	PS 9500-30 3U	PS 9750-20 3U	PS 9040-340 3U	PS 9040-510 3U
Output voltage DC	0...500 V	0...750 V	0...40 V	0...40 V
- Ripple ⁽¹⁾	<350 mV _{PP} <70 mV _{RMS}	<800 mV _{PP} <200 mV _{RMS}	<320 mV _{PP} <25 mV _{RMS}	<320 mV _{PP} <25 mV _{RMS}
-Sensing compensation	~ 10 V	~ 15 V	~ 1 V	~ 1 V
Isolation				
- Negative output <-> PE	±725 V DC	±725 V DC	±400 V DC	±400 V DC
- Positive output <-> PE	±1000 V DC	±1000 V DC	±400 V DC	±400 V DC
Output current	0...30 A	0...20 A	0...340 A	0...510 A
- Ripple ⁽¹⁾	<16 mA _{RMS}	<16 mA _{RMS}	<160 mA _{RMS}	<120 mA _{RMS}
Output power	0...5000 W	0...5000 W	0...6600 W	0...10000 W
Efficiency	~95.5%	~94%	~93%	~93%
Programming resolution U	≤21 mV	≤31 mV	≤2 mV	≤2 mV
Programming accuracy U	≤500 mV	≤750 mV	≤40 mV	≤40 mV
Programming resolution I	≤2 mA	≤1 mA	≤14 mA	≤21 mA
Programming accuracy I	≤60 mA	≤40 mA	≤680 mA	≤1.1 A
Weight ⁽²⁾	~17 kg	~17 kg	~24 kg	~30 kg

(1) RMS value: measures 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

Technical Data	PS 9080-340 3U	PS 9200-140 3U	PS 9360-80 3U	PS 9500-60 3U
Output voltage DC	0...80 V	0...200 V	0...360 V	0...500 V
- Ripple ⁽¹⁾	<320 mV _{PP} <25 mV _{RMS}	<300 mV _{PP} <40 mV _{RMS}	<320 mV _{PP} <55 mV _{RMS}	<350 mV _{PP} <70 mV _{RMS}
-Sensing compensation	~ 2 V	~ 5 V	~ 7.5 V	~ 10 V
Isolation				
- Negative output <-> PE	±400 V DC	±400 V DC	±400 V DC	±725 V DC
- Positive output <-> PE	±400 V DC	±600 V DC	±600 V DC	±1000 V DC
Output current	0...340 A	0...140 A	0...80 A	0...60 A
- Ripple ⁽¹⁾	<160 mA _{RMS}	<44 mA _{RMS}	<35 mA _{RMS}	<32 mA _{RMS}
Output power	0...10000 W	0...10000 W	0...10000 W	0...10000 W
Efficiency	~93%	~95%	~93%	~95%
Programming resolution U	≤4 mV	≤9 mV	≤15 mV	≤21 mV
Programming accuracy U	≤80 mV	≤200 mV	≤350 mV	≤500 mV
Programming resolution I	≤14 mA	≤6 mA	≤4 mA	≤3 mA
Programming accuracy I	≤680 mA	≤280 mA	≤160 mA	≤120 mA
Weight ⁽²⁾	~24 kg	~24 kg	~24 kg	~24 kg
Article number ⁽³⁾	06230257	06230258	06230259	06230260

Technical Data	PS 9750-40 3U	PS 91000-30 3U	PS 9080-510 3U	PS 9200-210 3U
- Ripple ⁽¹⁾	<800 mV _{PP} <200 mV _{RMS}	<1600 mV _{PP} <350 mV _{RMS}	<320 mV _{PP} <25 mV _{RMS}	<300 mV _{PP} <40 mV _{RMS}
- Sensing compensation	~15 V	~20 V	~2.5 V	~6 V
Isolation				
- Negative output <-> PE	±725 V DC	±725 V DC	±400 V DC	±400 V DC
- Positive output <-> PE	±1000 V DC	±1000 V DC	±400 V DC	±600 V DC
Output current	0...40 A	0...30 A	0...510 A	0...210 A
- Ripple ⁽¹⁾	<32 mA _{RMS}	<22 mA _{RMS}	<240 mA _{RMS}	<66 mA _{RMS}
Output power	0...10000 W	0...10000 W	0...15000 W	0...15000 W
Efficiency	~94%	~95%	~93%	~95%
Programming resolution U	≤31 mV	≤41 mV	≤4 mV	≤9 mV
Programming accuracy U	≤750 mV	≤1 V	≤80 mV	≤200 mV
Programming resolution I	≤2 mA	≤2 mA	≤21 mA	≤9 mA
Programming accuracy I	≤80 mA	≤60 mA	≤1.1 A	≤420 mA
Weight ⁽²⁾	~24 kg~24 kg	~24 kg	~30 kg	~30 kg
Article number ⁽³⁾	06230261	06230262	06230264	06230265

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

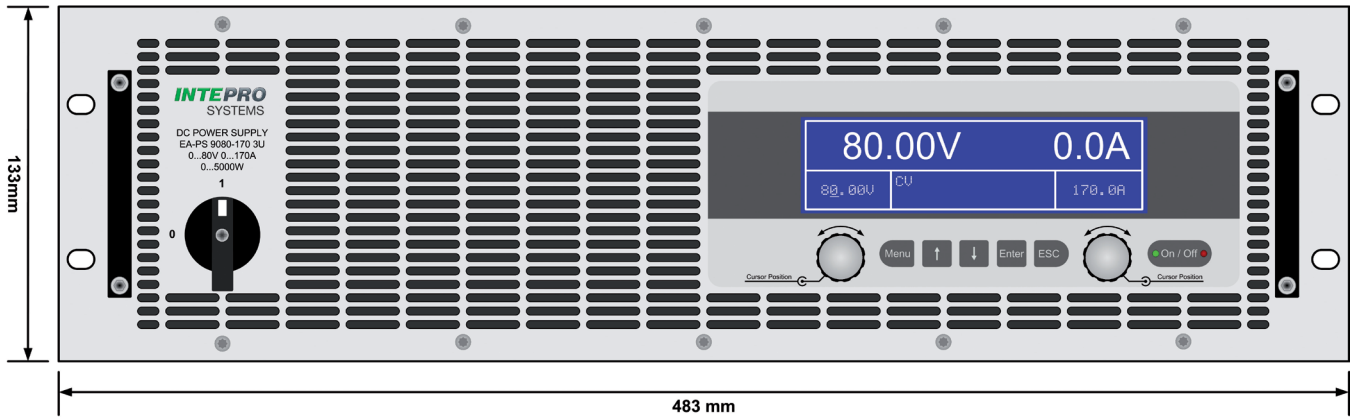
(2) Weight of the standard version, models with options may vary

(3) Article number of the standard version, models with option 3W installed have different article numbers

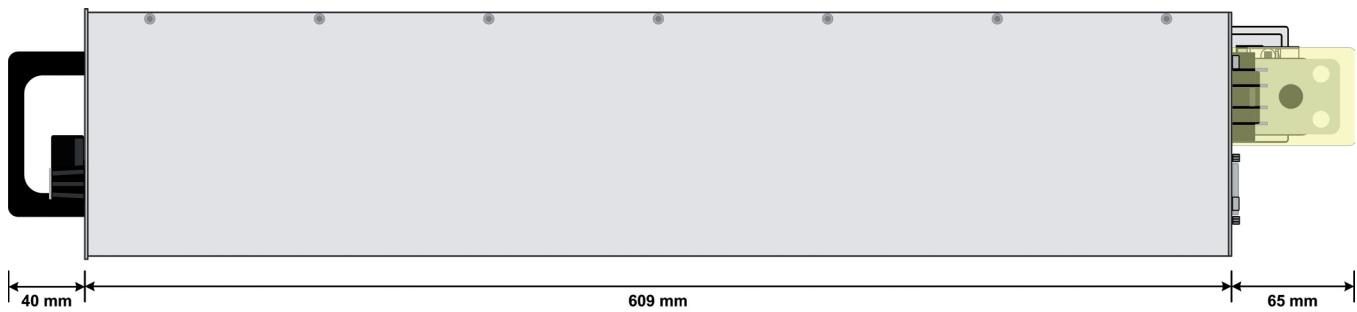
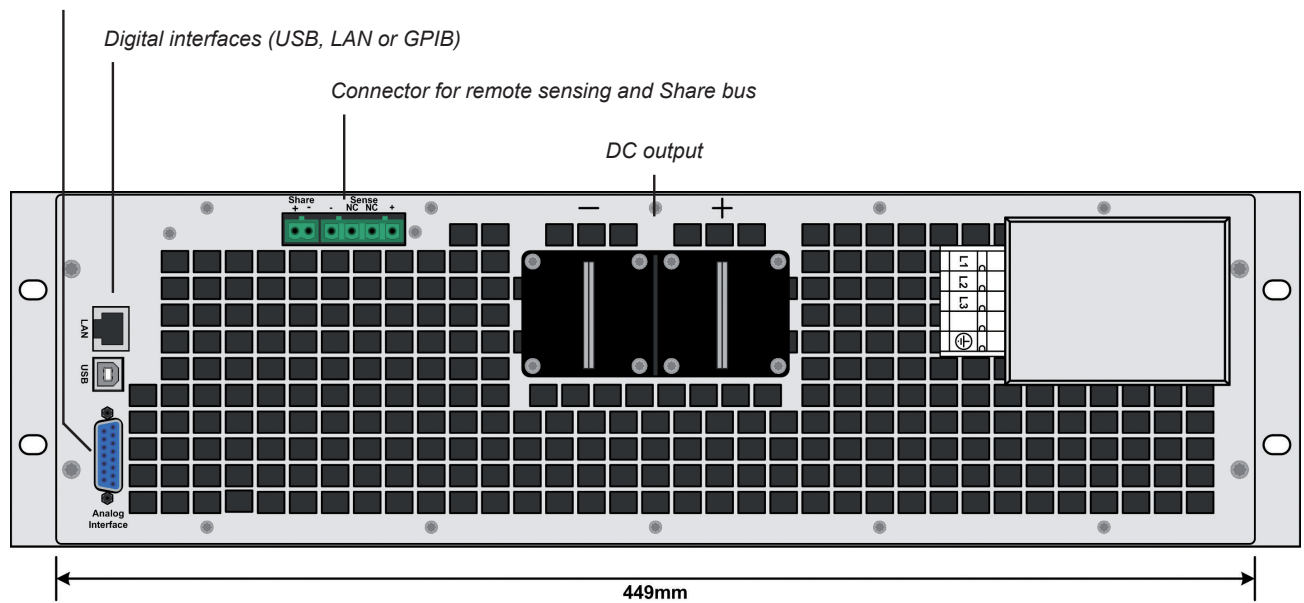
Technical Data	PS 9360-120 3U	PS 9500-90 3U	PS 9750-60 3U	PS 91500-30 3U
Output voltage DC	0...360 V	0...500 V	0...750 V	0...1500 V
- Ripple ⁽¹⁾	<320 mV _{PP} <55 mV _{RMS}	<350 mV _{PP} <70 mV _{RMS}	<800 mV _{PP} <200 mV _{RMS}	<2400 mV _{PP} <400 mV _{RMS}
-Sensing compensation	~7.5 V	~10 V	~15 V	~30 V
Isolation				
- Negative output <-> PE	±400 V DC	±725 V DC	±725 V DC	±725 V DC
- Positive output <-> PE	±600 V DC	±1000 V DC	±1000 V DC	±1500 V DC
Output current	0...120 A	0...90 A	0...60 A	0...30 A
- Ripple ⁽¹⁾	<50 mA _{RMS}	<48 mA _{RMS}	<48 mA _{RMS}	<26 mA _{RMS}
Output power	0...15000 W	0...15000 W	0...15000 W	0...15000 W
Efficiency	~93%	~95%	~94%	~95%
Programming resolution U	≤15 mV	≤21 mV	≤31 mV	≤61 mV
Programming accuracy U	≤350 mV	≤500 mV	≤750 mV	≤1.5 V
Programming resolution I	≤5 mA	≤4 mA	≤3 mA	≤2 mA
Programming accuracy I	≤240 mA	≤180 mA	≤120 mA	≤60 mA
Weight ⁽²⁾	~30 kg	~30 kg	~30 kg	~30 kg

(1) RMS value: measures 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



Analog interface



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