

# EA-PS 9000 3U 3.3 kW - 15 kW



可编程高效直流电源

Programmable high efficiency DC Power supplies



EA-PS 9500-90 3U



- 多相输入电压340...460 V<sub>AC</sub>
- 效率高达95.5%
- 输出功率等级：3.3 kW, 5 kW, 6.6 kW, 10 kW, 或 15 kW
- 输出电压：0...40 V 至 0...1500 V
- 输出电流：20 A 至 510 A, 还可扩展至5100 A
- 灵活的功率调整输出级
- 各种保护功能 (OVP, OCP, OPP, OTP)
- 带按键的控制面板与液晶显示器，可显示实际值、设定值、状态与报警
- 隔离模拟接口
- 温控风扇制冷
- 40 V产品型号符合SELV标准 (EN 60950)
- 配放电电路(在10 s内U<sub>out</sub> < 60 V)
- 内置USB与以太网端口，或可选择安装IEEE/GPIB端口
- EMC符合EN 61010 等级B，且获得TÜV认证
- 支持SCPI指令语言

## 概要

EA-PS 9000 3U系列是一款由微处理器控制的高效实验室电源，其标准型号配备多种功能和特征，用户使用起来更方便、有效。

控制面板上清晰地分布有两个旋钮，六个按键，以及两个LED灯。同时还有一显示所有数值与状态的彩色TFT液晶显示器，从而简化了产品的使用。

- Multi-phase input 340...460 V<sub>AC</sub>
- High efficiency up to 95.5%
- Output power ratings: 3.3 kW, 5 kW, 6.6 kW, 10 kW or 15 kW
- Output voltages: 0...40 V up to 0...1500 V
- Output currents: 20 A up to 510 A, expandable up to 5100 A
- Auto-ranging output stage
- Various protection circuits (OVP, OCP, OPP, OTP)
- Control panel with pushbuttons and colored TFT for actual values, set values, status and alarms
- Galvanically isolated, analog interface
- Temperature controlled fans for cooling
- 40 V models according to SELV (EN 60950)
- Discharge circuit (U<sub>out</sub> < 60 V in ≤ 10 s)
- USB and Ethernet port integrated or alternatively installed IEEE/GPIB port
- EMC TÜV approved for EN 61010 Class B
- SCPI command language supported

## 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 colour TFT display for all values and status it simplifies the use of the device.

## EA-PS 9000 3U 3.3 kW - 15 kW

### AC输入

所有型号都采用主动式功率因数，专门设计成在340 V至460 V AC 的三相交流电。

### 功率级

本系列所有型号的输出功率都可灵活调整。可在较低电流时输出较高电压，或在低电压时输出较高电流，但总是维持在最大额定功率范围内。因此仅用一台产品就能覆盖广泛的应用。

### 直流输出

本系列有0...40 V和0...1500 V输出电压，0...20 A和0...510 A输出电流，0...3.3 kW，0...5 kW，0...6.6 kW，0...10 kW或0...15 kW输出功率的不同型号。输出端位于产品后面板上。

### 放电电路

额定输出电压为200 V或以上的产品，其输出电容都配有一放电电路。在空载或带小负载时，它能确保危险电压在直流输出关闭后降至60 V DC以下。该电压值被认为是对人体安全的最高电压。

### 保护功能

为保护连接设备，可给产品设定一过压保护极限值(OVP)，以及过流(OCP)与过功率(OPP)保护极限值。

一旦因故超过这三个值中的一个，直流输出会被立即切断，并在显示器与接口端发出一状态信号。

本产品还有过温保护，如果产品过热，它会关断直流输出。

### 显示器和控制键

产品所有重要信息都清晰地显示在彩色的TFT显示屏上。

通过该显示器，电压与电流的实际输出值和预设值，(CV, CC, CP)实际控制状态与其它状态，报警与设置菜单的设定，都清晰显示出来。

为了便于旋钮能调节参数，只需按一下该旋钮，就可更换数值小数点后的光标位置。所有这些特性有助于操作者的便利性。

其面板锁定功能可锁住整个面板，从而保护产品与连接负载免受意外误用。

### 远程感测

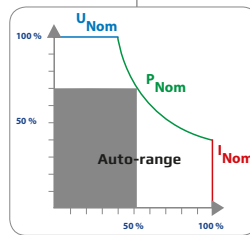
远程感测输入端可直接用线连到负载设备，以补偿连线上的部分压降。如果感测输入端已接到负载上，本电源会自动调整输出电压，以确保负载获得准确所需的电压值。

### AC input

All models are provided with an active Power Factor Correction circuit and are designed for a usage on a three-phase supply with 340 V up to 460 V AC.

### 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 max. nominal output 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 output power ratings of 0...3.3 kW, 0...5 kW, 0...6.6 kW, 0...10 kW or 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.

### 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.

### Display and controls

All important information is clearly visualised on a colour TFT display.

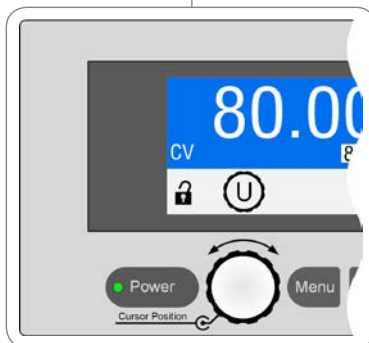
With this, information about the actual output values and set values of voltage and current, the actual control state (CV, CC, CP) and other statuses, as well as alarms and settings of the setup menu are clearly displayed.

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.

### 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.



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## 数字接口

所有型号在其后板默认有两个电隔离数字接口（标准版：1x USB & 1x Ethernet，带3W选项的：1x USB & 1x GPIB）。可通过发送SCPI语言指令或ModBus RTU协议，经USB与Ethernet接口，控制和监控产品，而GPIB仅支持SCPI语言。

## 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 RTU protocol, while with GPIB only SCPI is supported.



## 模拟接口

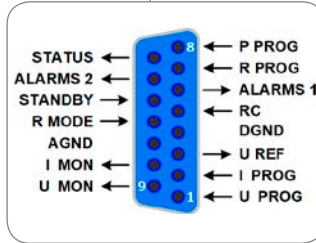
产品后板上装有一隔离模拟接口端子。它具有一模拟输入脚，接上0 V...10 V或0 V...5 V电压，可设置0...100%的输出电压、电流与功率。

要监控输出电压与电流，可给模拟输出脚接上0 V...10 V或0 V...5 V电压完成。此外，还有几个输入脚和输出脚，可用于控制和监控产品状态。

## 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 status inputs and outputs are available.



## 可选件

- 高速跃变（按需可供，也可见144）\*
- 水制冷（按需可供，也可见145）
- 还可安装带固定GPIB端口的三位接口（3 W），而非接口模块用的默认插槽

\* 并非针对所有电压--具体请咨询

## Options

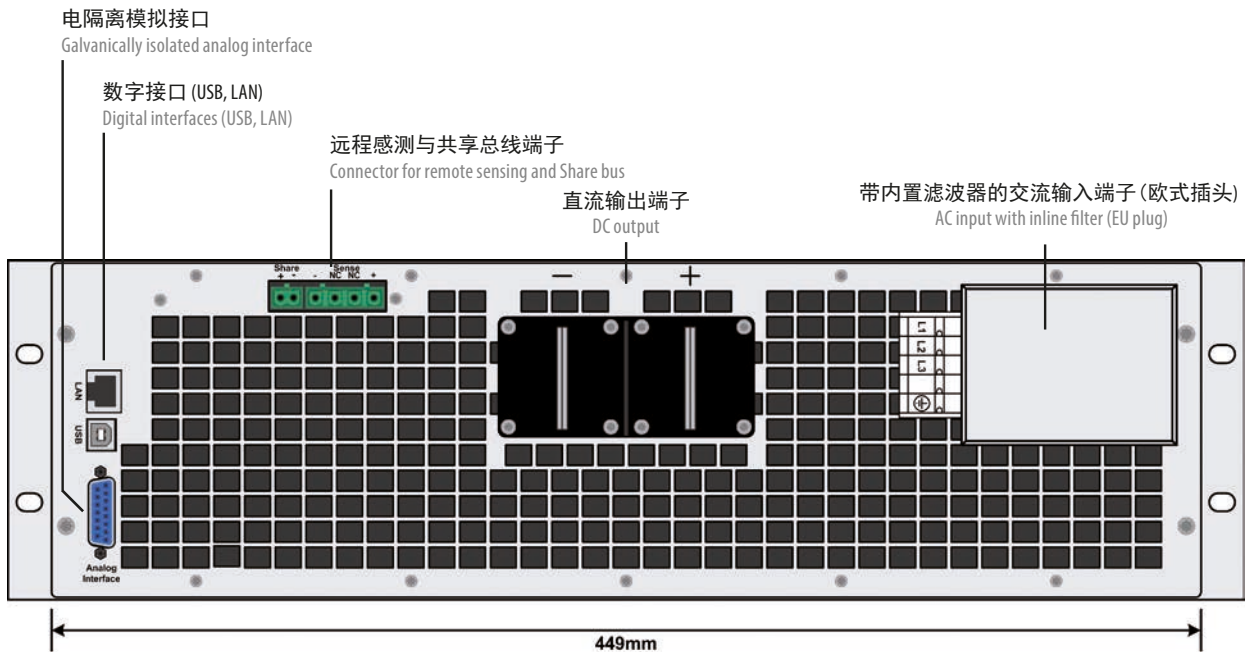
- High speed ramping (upon request, also see page 144) \*
- Water cooling (upon request, also see page 145)
- Three-way interface (3W) with a rigid GPIB port installed instead of the default Ethernet port

\* Not available for all voltages - please quote for availability



## 产品视图

## Product views



# EA-PS 9000 3U 3.3 kW - 15 kW

技术参数	Technical Data	Series PS 9000 3U / 系列
交流：供电	AC: Supply	
- 电压	- Voltage	340...460 V, 2ph/3ph
- 频率	- Frequency	45...66 Hz
- 功率因数	- Power factor	>0.99
直流：电压	DC: Voltage	
- 精确度	- Accuracy	<额定值的0.1% / <0.1% of rated value
- 0-100%的负载调整率	- Load regulation 0-100%	<额定值的0.05% / <0.05% of rated value
- ±10% ΔU <sub>AC</sub> 线性调整率	- Line regulation ±10% ΔU <sub>AC</sub>	<额定值的0.02% / <0.02% of rated value
- 带载10-100%调整需时	- Regulation 10-100% load	<2 ms
- 带载10-90%上升时间	- Rise time 10-90%	最大 / Max. 30 ms
- 过压保护	- Overvoltage protection	可调, 0...110% U <sub>Nenn</sub> / Adjustable, 0...110% U <sub>Nom</sub>
直流关闭时空载放电时间	- No load discharge time on DC off	100% U 降至 / to <60 V: 少于 10 s / less than 10 s
直流：电流	DC: Current	
- 精确度	- Accuracy	<额定值的0.2% / <0.2% of rated value
- 1-100% ΔI <sub>DC</sub> 的负载调整率	- Load regulation 1-100% ΔU <sub>DC</sub>	<额定值的0.15% / <0.15% of rated value
- ±10% ΔU <sub>AC</sub> 的线性调整率	- Line regulation ±10% ΔU <sub>AC</sub>	<额定值的0.05% / <0.05% of rated value
直流：功率	DC: Power	
- 精确度	- Accuracy	<额定值的1% / <1% of rated value
过压类别	Overvoltage category	2
保护功能	Protection	OTP, OVP, OCP, OPP, PF <sup>(1)</sup>
隔离耐压	Insulation	
- 交流输入对外壳	- AC input to enclosure	2500 V DC
- 交流输入对直流输出	- AC input to DC output	2500 V DC
- 直流输出对外壳 (PE)	- DC output to enclosure (PE)	取决于具体型号, 见各型号规格表 / Depending on models, see tables
污染等级	Degree of pollution	2
保护等级	Protection class	1
显示器与面板	Display and panel	彩色显示器, 调节旋钮与按钮 / Colour display, knobs and pushbuttons
数字接口	Digital interfaces	
- 内置	- Built-in	1x 通讯用B类USB端口, 1x Ethernet / 1x USB type B for communication, 1x Ethernet 可选: 1x GPIB (针对3W选项功能) / optional: 1x GPIB (with option 3W)
模拟接口	Analog interface	内置15-针D-Sub母插, 电隔离 / Built in, 15-pole D-Sub (female), galvanically isolated
- 信号范围	- Signal range	0...5V 或 0...10V (可切换) / 0...5V or 0...10V (switchable)
- 输入脚	- Inputs	U, I, P, 远程开-关, 直流输出开-关 / U, I, P, Remote on-off, DC output on-off
- 输出脚	- Outputs	U / I, 过压, 报警, 参考电压 / U / I, Overvoltage, alarms, reference voltage
- U / I / P精确度	- Accuracy U / I / P	0...10V: <0.2%   0...5 V: <0.4%
并联操作	Parallel operation	可实现 / Possible
- 主-从	- Master-Slave	无 / No
安规标准	Standards	EN 61010-1:2010 EMC通过了TÜV认证, 符合 / EMC TÜV approved according to IEC 61000-6-2:2005 IEC 61000-6-3:2006 Class B / 等级 B
制冷方式	Cooling	温控风扇 (可选: 水冷) / Temperature controlled fans (optional: water)
工作温度	Operation temperature	0...50 °C
储存温度	Storage temperature	-20...70 °C
湿度	Humidity	<80%, 无凝露 / non-condensing
工作高度	Operation altitude	<2000 m
尺寸 (宽 高 深) <sup>(2)</sup>	Dimensions (W H D) <sup>(2)</sup>	19" x 3 HE/U x 609 mm

(1) 见第146页 / See page 146  
(2) 为标准版的外壳尺寸, 非整体尺寸, 带选项功能的则不同 / Enclosure of the standard version and not overall size, versions with options may vary





# EA-PS 9000 3U 3.3 kW - 15 kW



技术参数	Technical Data	PS 9040-170 3U	PS 9080-170 3U	PS 9200-70 3U	PS 9360-40 3U
额定电压&范围	Rated voltage & range	0...40V	0...80V	0...200V	0...360V
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<200 mV <sub>PP</sub> <16 mV <sub>RMS</sub>	<200 mV <sub>PP</sub> <16 mV <sub>RMS</sub>	<300 mV <sub>PP</sub> <40 mV <sub>RMS</sub>	<320 mV <sub>PP</sub> <65 mV <sub>RMS</sub>
- 感测补偿电压	-Sensing compensation	~1V	~2V	~5V	~7.5V
隔离耐压	Insulation				
- 直流负极 <-> PE	- Negative DC pole <-> PE	±400V DC	±400V DC	±400V DC	±400V DC
- 直流正极 <-> PE	- Positive DC pole <-> PE	±400V DC	±400V DC	±600V DC	±600V DC
额定电流&范围	Rated current & range	0...170A	0...170A	0...70A	0...40A
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<80 mA <sub>RMS</sub>	<80 mA <sub>RMS</sub>	<22 mA <sub>RMS</sub>	<18 mA <sub>RMS</sub>
额定功率&范围	Rated power & range	0...3300W	0...5000W	0...5000W	0...5000W
效率	Efficiency	~93%	~93%	~95%	~93%
U的编程分辨率	Programming resolution U	≤2 mV	≤4 mV	≤9 mV	≤15 mV
I的编程分辨率	Programming resolution I	≤7 mA	≤7 mA	≤3 mA	≤2 mA
重量 <sup>(2)</sup>	Weight <sup>(2)</sup>	~17 kg	~17 kg	~17 kg	~17 kg
订购编号-欧版 <sup>(3)</sup>	Ordering number EU model <sup>(3)</sup>	06230250	06230251	06230252	06230253
订购编号-美版 <sup>(3)</sup>	Ordering number US model <sup>(3)</sup>	06238250	06238251	06238252	06238253

技术参数	Technical Data	PS 9500-30 3U	PS 9750-20 3U	PS 9040-340 3U	PS 9040-510 3U
额定电压&范围	Rated voltage & range	0...500V	0...750V	0...40V	0...40V
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<350 mV <sub>PP</sub> <70 mV <sub>RMS</sub>	<800 mV <sub>PP</sub> <200 mV <sub>RMS</sub>	<320 mV <sub>PP</sub> <25 mV <sub>RMS</sub>	<320 mV <sub>PP</sub> <25 mV <sub>RMS</sub>
- 感测补偿电压	-Sensing compensation	~10V	~15V	~1V	~1V
隔离耐压	Insulation				
- 直流负极 <-> PE	- Negative DC pole <-> PE	±725V DC	±725V DC	±400V DC	±400V DC
- 直流正极 <-> PE	- Positive DC pole <-> PE	±1000V DC	±1000V DC	±400V DC	±400V DC
额定电流&范围	Rated current & range	0...30A	0...20A	0...340A	0...510A
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<16 mA <sub>RMS</sub>	<16 mA <sub>RMS</sub>	<160 mA <sub>RMS</sub>	<120 mA <sub>RMS</sub>
额定功率&范围	Rated power & range	0...5000W	0...5000W	0...6600W	0...10000W
效率	Efficiency	~95.5%	~94%	~93%	~93%
U的编程分辨率	Programming resolution U	≤21 mV	≤31 mV	≤2 mV	≤2 mV
I的编程分辨率	Programming resolution I	≤2 mA	≤1 mA	≤14 mA	≤21 mA
重量 <sup>(2)</sup>	Weight <sup>(2)</sup>	~17 kg	~17 kg	~24 kg	~30 kg
订购编号-欧版 <sup>(3)</sup>	Ordering number EU model <sup>(3)</sup>	06230254	06230255	06230256	06230263
订购编号-美版 <sup>(3)</sup>	Ordering number US model <sup>(3)</sup>	06238254	06238255	06238256	06238263

技术参数	Technical Data	PS 9080-340 3U	PS 9200-140 3U	PS 9360-80 3U	PS 9500-60 3U
额定电压&范围	Rated voltage & range	0...80V	0...200V	0...360V	0...500V
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<320 mV <sub>PP</sub> <25 mV <sub>RMS</sub>	<300 mV <sub>PP</sub> <40 mV <sub>RMS</sub>	<320 mV <sub>PP</sub> <65 mV <sub>RMS</sub>	<350 mV <sub>PP</sub> <70 mV <sub>RMS</sub>
- 感测补偿电压	-Sensing compensation	~2V	~5V	~7.5V	~10V
隔离耐压	Insulation				
- 直流负极 <-> PE	- Negative DC pole <-> PE	±400V DC	±400V DC	±400V DC	±725V DC
- 直流正极 <-> PE	- Positive DC pole <-> PE	±400V DC	±600V DC	±600V DC	±1000V DC
额定电流&范围	Rated current & range	0...340A	0...140A	0...80A	0...60A
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<160 mA <sub>RMS</sub>	<44 mA <sub>RMS</sub>	<35 mA <sub>RMS</sub>	<32 mA <sub>RMS</sub>
额定功率&范围	Rated power & range	0...10000W	0...10000W	0...10000W	0...10000W
效率	Efficiency	~93%	~95%	~93%	~95%
U的编程分辨率	Programming resolution U	≤4 mV	≤9 mV	≤15 mV	≤21 mV
I的编程分辨率	Programming resolution I	≤14 mA	≤6 mA	≤4 mA	≤3 mA
重量 <sup>(2)</sup>	Weight <sup>(2)</sup>	~24 kg	~24 kg	~24 kg	~24 kg
订购编号-欧版 <sup>(3)</sup>	Ordering number EU model <sup>(3)</sup>	06230257	06230258	06230259	06230260
订购编号-美版 <sup>(3)</sup>	Ordering number US model <sup>(3)</sup>	06238257	06238258	06238259	06238260

(1) RMS值: 在BWL 300 kHz时测量的LF值, PP值: 在BWL 20MHz时测量的HF值 / RMS value: measures at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz

(2) 为标准版的重量, 带选项功能的则不同 / Weight of the base version, models with option(s) may vary

(3) 为标准版的订购编号, 带选项功能的则不同 / Ordering number of the base version, models with option(s) installed have different ordering numbers

## EA-PS 9000 3U 3.3 kW - 15 kW

技术参数	Technical Data	PS 9750-40 3U	PS 91000-30 3U	PS 9080-510 3U	PS 9200-210 3U
额定电压&范围	Rated voltage & range	0...750 V	0...1000 V	0...80 V	0...200 V
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<800 mV <sub>PP</sub> <200 mV <sub>RMS</sub>	<1600 mV <sub>PP</sub> <350 mV <sub>RMS</sub>	<320 mV <sub>PP</sub> <25 mV <sub>RMS</sub>	<300 mV <sub>PP</sub> <40 mV <sub>RMS</sub>
- 感测补偿电压	- Sensing compensation	~15 V	~20 V	~2.5 V	~6 V
隔离耐压	Insulation				
- 直流负极 <-> PE	- Negative DC pole <-> PE	±725 V DC	±725 V DC	±400 V DC	±400 V DC
- 直流正极 <-> PE	- Positive DC pole <-> PE	±1000 V DC	±1000 V DC	±400 V DC	±600 V DC
额定电流&范围	Rated current & range	0...40 A	0...30 A	0...510 A	0...210 A
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<32 mA <sub>RMS</sub>	<22 mA <sub>RMS</sub>	<240 mA <sub>RMS</sub>	<66 mA <sub>RMS</sub>
额定功率&范围	Rated power & range	0...10000 W	0...10000 W	0...15000 W	0...15000 W
效率	Efficiency	~94%	~95%	~93%	~95%
U的编程分辨率	Programming resolution U	≤31 mV	≤41 mV	≤4 mV	≤9 mV
I的编程分辨率	Programming resolution I	≤2 mA	≤2 mA	≤21 mA	≤9 mA
重量 <sup>(2)</sup>	Weight <sup>(2)</sup>	~24 kg	~24 kg	~30 kg	~30 kg
订购编号-欧版 <sup>(3)</sup>	Ordering number EU model <sup>(3)</sup>	06230261	06230262	06230264	06230265
订购编号-美版 <sup>(3)</sup>	Ordering number US model <sup>(3)</sup>	06238261	06238262	06238264	06238265

技术参数	Technical Data	PS 9360-120 3U	PS 9500-90 3U	PS 9750-60 3U	PS 91500-30 3U
额定电压&范围	Rated voltage & range	0...360 V	0...500 V	0...750 V	0...1500 V
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<320 mV <sub>PP</sub> <65 mV <sub>RMS</sub>	<350 mV <sub>PP</sub> <70 mV <sub>RMS</sub>	<800 mV <sub>PP</sub> <200 mV <sub>RMS</sub>	<2400 mV <sub>PP</sub> <400 mV <sub>RMS</sub>
- 感测补偿电压	- Sensing compensation	~7.5 V	~10 V	~15 V	~30 V
隔离耐压	Insulation				
- 直流负极 <-> PE	- Negative DC pole <-> PE	±400 V DC	±725 V DC	±725 V DC	±725 V DC
- 直流正极 <-> PE	- Positive DC pole <-> PE	±600 V DC	±1000 V DC	±1000 V DC	±1500 V DC
额定电流&范围	Rated current & range	0...120 A	0...90 A	0...60 A	0...30 A
- 纹波 <sup>(1)</sup>	- Ripple <sup>(1)</sup>	<50 mA <sub>RMS</sub>	<48 mA <sub>RMS</sub>	<48 mA <sub>RMS</sub>	<26 mA <sub>RMS</sub>
额定功率&范围	Rated power & range	0...15000 W	0...15000 W	0...15000 W	0...15000 W
效率	Efficiency	~93%	~95%	~94%	~95%
U的编程分辨率	Programming resolution U	≤15 mV	≤21 mV	≤31 mV	≤61 mV
I的编程分辨率	Programming resolution I	≤5 mA	≤4 mA	≤3 mA	≤2 mA
重量 <sup>(2)</sup>	Weight <sup>(2)</sup>	~30 kg	~30 kg	~30 kg	~30 kg
订购编号-欧版 <sup>(3)</sup>	Ordering number EU model <sup>(3)</sup>	06230266	06230267	06230268	06230269
订购编号-美版 <sup>(3)</sup>	Ordering number US model <sup>(3)</sup>	06238266	06238267	06238268	06238269

(1) RMS值: 在BWL 300 kHz时测量的LF值, PP值: 在BWL 20MHz时测量的HF值 / RMS value: measures at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz

(2) 为标准版的重量, 带选项功能的则不同 / Weight of the base version, models with option(s) may vary

(3) 为标准版的订购编号, 带选项功能的则不同 / Ordering number of the base version, models with option(s) installed have different ordering numbers

### 产品视图

### Product views

