EA-PS 9000 1U 1500 W / 3000 W

可编程实验室直流电源 / PROGRAMMABLE LABORATORY DC POWER SUPPLIES

U
I
P
OVP
OCP
OPP
OTP
19"
USB
LAN

EA-PS 9080-100 1U

- 宽范围输入电压100...264 V，（1500W型号）
- 效率高达 95%
- 输出功率：0..1500 W 或 0..3000 W
- 输出电压：0...40 V 至 0...750 V
- 输出电流：0...6 A 至 0...100 A
- 灵活的功率调整输出级
- 有多种保护电路（OVP, OCP, OPP, OTP）
- 四位带按钮与蓝屏的控制面板，可显示实际值，设定值，状态与报警信息
- 远程感测
- 共享总线支持并联连接
- 电隔离模拟接口
  - 通过 0...10 V或0...5 V电压可对U / I / P 编程
  - 通过 0...10 V或0...5 V电压可监控U / I
- 超低的高度，仅1 U高（44 mm）
- 温控风扇制冷
- 配放电电路(在10 s内U_{out} < 60 V)
- 内置USB与以太网端口
- EMC符合EN 550220 等级B标准
- 支持SCPI指令语言

- **Wide input range 100...264 V (1500W models)**
- **High efficiency up to 95%**
- **Output power ratings: 0..1500 W or 0...3000 W**
- **Output voltages: 0...40 V up to 0...750 V**
- **Output currents: 0...6 A up to 0...100 A**
- **Flexible, power regulated output stage**
- **Various protection circuits (OVP, OCP, OPP, OTP)**
- **Control panel with pushbuttons and blue LCD for actual values, set values, status and alarms**
- **Remote sensing**
- **Share bus for support of parallel connection**
- **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**
- **Very low height of only 1 U (44 mm)**
- **Temperature controlled fans for cooling**
- **Discharge circuit (U_{out} < 60 V in ≤ 10 s)**
- **USB and Ethernet port integrated**
- **EMC according to EN 55022 Class B**
- **SCPI command language supported**

概要

EA-PS 9000 1U系列是一款由微处理器控制，采用最新技术设计的实验室电源。其标准型号配备多种功能和特征，让用户使用起来更方便、有效。所有这些功能全部浓缩在44 mm高度的产品内。

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

AC 输入

本系列所有型号都采用**主动式**功率因数校正线路，1.5 kW以下型号可在100 V_{AC}至264 V_{AC}的输入电压范围下使用。
当输入电压降低时其功率级别会自动减少输出功率，因此1.5 kW型号在输入电压为100...1150 V_{AC}时输出功率仍然有1 kW。3 kW型号在输入电压为180...207V_{AC}时则仍可供应2.5 kW。.

General

The microprocessor controlled laboratory power supplies of series EA-PS 9000 1U offer many functions and features in their standard version, making the use of this equipment remarkably easy and most effective. All this comes in a flat design with only 44 mm of height.

The clearly arranged control panel features two rotary knobs, six pushbuttons and two LEDs. Together with an illuminated, blue LCD display for all values and status it simplifies the use of the device.

AC input

All units are provided with an active **P**ower **F**actor **C**orrection circuit and models up to 1.5 kW are even suitable for a worldwide operation on a supply from 100 V_{AC} up to 264 V_{AC}.
Both power classes reduce the output power automatically when the input supply is low, so the 1.5 kW models can still provide 1 kW power with an input supply of 100...150 V_{AC} and the 3 kW models can still provide 2.5 kW at 180...207 V_{AC}.

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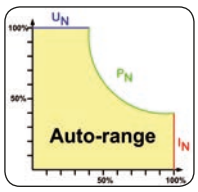
Q Q：3003 533 299
微信：y j 22225117
邮箱：info@itest.net
网址：www.itest.net
地址：深圳市龙华区民治民宝路淘景大厦1102

功率
所有型号输出功率可灵活调整。可在低电流时输出更高的电压，或在低电压时输出更大的电流，都由最大额定输出功率来限制。设定功率都可调。因此一台该产品能涵盖广范围的应用领域。



Power
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 the use of just one unit.

直流输出
本系列有多款不同型号，可选择0...80 V至0...750 V输出电压，0...6 A至0...100 A输出电流，0...1500 W至0...3000 W输出功率的类型。
可对电流、电压与功率在0%与100%之间连续调整，不论是手动调整还是远程控制（数字式或模拟式）。

直流输出端位于产品后板。

DC output
DC output voltages between 0...80 V and 0...750 V, output currents between 0...6 A and 0...100 A and output power ratings of 0...1500 W or 0...3000 W 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.

放电电路
额定输出电压为200 V或以上的产品对其输出电容配有一放电电路。在空载或带很小负载的情况下，它能保证危险的输出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身安全有危险的极限电压。

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.

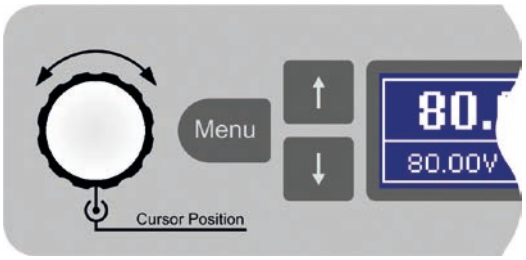
保护功能
为保护连接负载，可给产品设定一过压保护极限值(OVP)，以及过流(OCP)与过功率(OPP)保护极限值。

一旦因任何缘故超过了这三个极限值中的一个，直流输出会被立即切断，在显示器和接口端会发出一状态信号。

本产品还有过温保护功能，如果产品过热，它会关断直流输出。

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.

显示器和控制键
产品的所有重要信息都于一点阵显示器上清晰可见。
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。



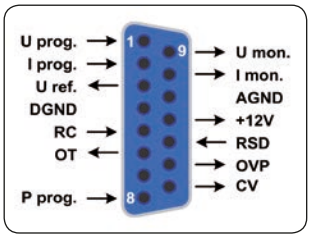
Display and controls
All important information is clearly visualised on a dot matrix display.
With this, information about the actual output values and set values of voltage and current, the actual control state (CV, CC, CP) and other statuses, as well as alarms and settings of the setup menu are clearly displayed.

为使旋钮可以调节参数，只需按一下该旋钮，就可更换数值小数点后的光标位置。所有这些功能都归功于其方便易用的操作方式。
其面板锁定功能可以锁定整个面板，从而避免产品与连接负载出现误操作。

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.

模拟接口
产品后面板上装有一隔离模拟接口。它提供模拟接口输入脚，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。

模拟输出脚接上0 V...10 V或0 V...5 V电压，可监控输出电压与电流。此外，还有几个输入脚和输出脚，可用来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 V...10 V or 0 V...5 V.
To monitor the output voltage and current, there are analog outputs with voltage ranges of 0 V...10 V or 0 V...5 V. Also, several inputs and outputs are available for controlling and monitoring the device status.

电话：400-186-5117 | 0755-2222 5117 | 138 2359 4841
Q Q：3003 533 299
微信：y j 22225117
邮箱：info@itest.net
网址：www.itest.net
地址：深圳市龙华区民治民宝路淘景大厦1102

数字接口卡

本系列所有型号标配有两个电隔离数字端口。分别是1x USB & 1x Ethernet。可通过发送SCPI语言指令或Modbus协议经它们控制和监控产品，GPIB仅支持SCPI语言。

产品的远程控制可由所供软件EA Power Control或者客户定制应用来完成，我们提供有编程文档，以及LabView™ Virtual Instruments (VIs)。.

Digital interfaces

All models features two galvanically isolated, digital interfaces by default. These are 1x USB and 1x Ethernet. Both can be used to control and monitor the devices with SCPI language commands or Modbus protocol.

Remote control of a device can be done either by the included software EA Power Control or by a custom application, which is supported by a programming documentation, as well as LabView™ Virtual Instruments (VIs).

技术参数	Technical Data	Series EA-PS 9000 1U / 系列	
AC输入	**Input AC**		
- 电压	- Voltage	100...264 V, 1ph+N (Models 1500 W / 型号), 180...264 V, 1ph+N (Models 3000 W / 型号)	
- 频率	- Frequency	45...65 Hz	
- 功率因数	- Power factor	>0.99	
- 功率降额	- Derating	型号 / Models 1500 W: < 150 V AC 至 / to $P_{out\ max}$ 1000 W 型号 / Models 3000 W: < 207 V AC 至 / to $P_{out\ max}$ 2500 W	
输出：DC电压	**Output: Voltage DC**		
- 精确度	- Accuracy	<0.1%	
- 0-100% 的负载调整率	- Load regulation 0-100%	<0.05%	
- ±10% Δ U_{AC}的线性调整率	- Line regulation ±10% ΔU_{AC}	<0.02%	
- 10%-100%负载调整时间	- Regulation 10-100% load	<2.2 ms	
- 从10-90%上升需时(CV)	- Rise time 10-90% (CV)	最长15 ms	
输出：电流	**Output: Current**		
- 精确度	- Accuracy	<0.2%	
- 0-100% ΔI的负载调整率	- Load regulation 0-100% ΔI	<0.15%	
- ±10% ΔU_{AC}的线性调整率	- Line regulation ±10% ΔU_{AC}	<0.05%	
输出：功率	**Output power**		
- 精确度	- Accuracy	<1%	
过压类别	**Overvoltage category**	2	
保护功能	**Protection**	OTP, OVP, OCP, OPP, PF (1	
隔离耐压	**Isolation**		
- 输入对外壳	- Input to enclosure	2500 V DC	
- 输入对输出	- Input to output	2500 V DC	
- 输出对外壳(PE)	- Output to enclosure (PE)	负极：最大为400 V DC，正极：最大为400 V DC + 输出电压 / Negative: max. 400 V DC, positive: max. 400 V DC + output voltage	
污染等级	**Pollution degree**	2	
保护级别	**Protection class**	1	
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	
- 输入范围	- Input range	0...5 V 或 0...10 V (可转换) / 0...5 V or 0...10 V (switchable)	
- U / I 的精确度	- Accuracy U / I	0...10 V: <0.1%	0...5 V: <0.2%
串联操作	**Series operation**	可实现(任意直流负极端对PE有最大400 V DC的电压转移) / Possible (with max. potential of all negative outputs 400 V DC against PE)	
- 主-从（Master-Slave）	- Master-Slave	无 / No	
并联操作	**Parallel operation**	可实现，通过共享总线操作或模拟接口 / Possible, via Share Bus operation or via analog interface	
- 主-从（Master-Slave）	- Master-Slave	受限 / Restricted	
安全标准	**Standards**	EN 60950, EN 61326, EN 55022 等级 B / Class B	
制冷方式	**Cooling**	风扇 / Fan(s)	
操作温度	**Operation temperature**	0...50 °C	
储存温度	**Storage temperature**	-20...70 °C	
湿度	**Humidity**	<80%	
使用高度	**Operation altitude**	<2000 m	
机械特性	**Mechanics**	1500 W	3000 W
- 重量 (2	- Weight (2	≈10.5 kg	11 kg
- 产品尺寸（宽x高x长） (3	- Dimensions (W H D) (3	19“ 1 HE/U 463 mm	19“ 1 HE/U 463 mm

(1 见152页 / See page 152
(2 标准型号，带选项功能的则会不同 / Standard version, models with options may vary
(3 标准型号的外壳尺寸，非整体尺寸，带选项功能的还会有不同 / Enclosure of the standard version and not overall size, versions with options may vary

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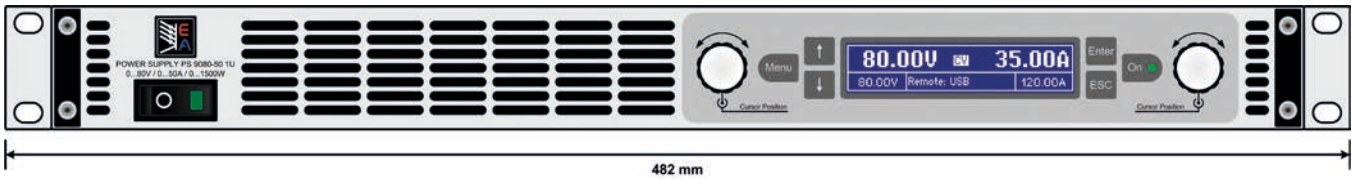
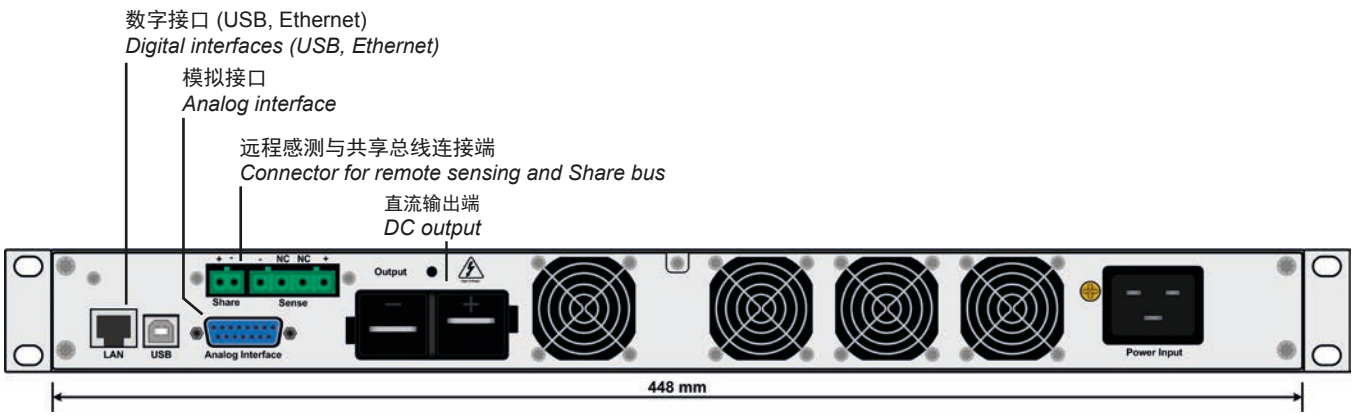
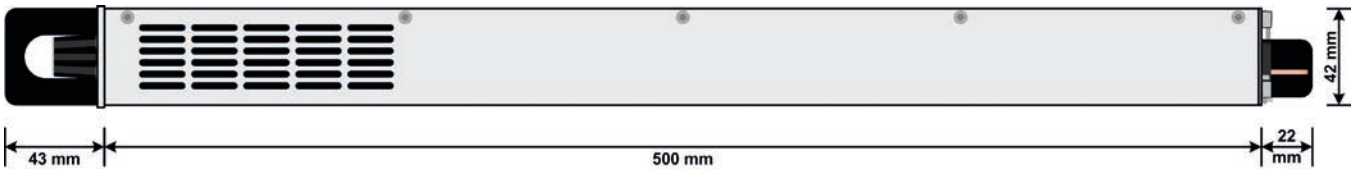
型号	电压	电流	功率	效率	U最大时的纹波(2	I最大时的纹波(2	编程 / Programming (1		订购编号
Model	Voltage	Current	Power	Efficiency	Ripple U max.	Ripple I max.	U (typ.)	I (typ.)	Ordering number
PS 9080-50 1U	0...80 V	0...50 A	0...1500 W	≤91%	100 mV_{PP} / 5.2 mV_{RMS}	4 mA_{RMS}	3 mV	2 mA	06230400
PS 9200-25 1U	0...200 V	0...25 A	0...1500 W	≤93%	293 mV_{PP} / 51 mV_{RMS}	8 mA_{RMS}	8 mV	1 mA	06230401
PS 9360-15 1U	0...360 V	0...15 A	0...1500 W	≤94%	195 mV_{PP} / 33 mV_{RMS}	1.6 mA_{RMS}	14 mV	0.6 mA	06230402
PS 9500-10 1U	0...500 V	0...10 A	0...1500 W	≤94%	293 mV_{PP} / 63 mV_{RMS}	1.4 mA_{RMS}	20 mV	0.4 mA	06230403
PS 9750-06 1U	0...750 V	0...6 A	0...1500 W	≤95%	260 mV_{PP} / 40 mV_{RMS}	0.6 mA_{RMS}	30 mV	0.25 mA	06230404
PS 9080-100 1U	0...80 V	0...100 A	0...3000 W	≤92%	76 mV_{PP} / 4.2 mV_{RMS}	6 mA_{RMS}	3 mV	4 mA	06230405
PS 9200-50 1U	0...200 V	0...50 A	0...3000 W	≤93%	234 mV_{PP} / 40 mV_{RMS}	10 mA_{RMS}	8 mV	2 mA	06230406
PS 9360-30 1U	0...360 V	0...30 A	0...3000 W	≤93%	156 mV_{PP} / 26 mV_{RMS}	1.9 mA_{RMS}	14 mV	1.5 mA	06230407
PS 9500-20 1U	0...500 V	0...20 A	0...3000 W	≤93%	234 mV_{PP} / 50 mV_{RMS}	1.9 mA_{RMS}	20 mV	0.8 mA	06230408
PS 9750-12 1U	0...750 V	0...12 A	0...3000 W	≤93%	260 mV_{PP} / 40 mV_{RMS}	0.7 mA_{RMS}	30 mV	0.5 mA	06230409

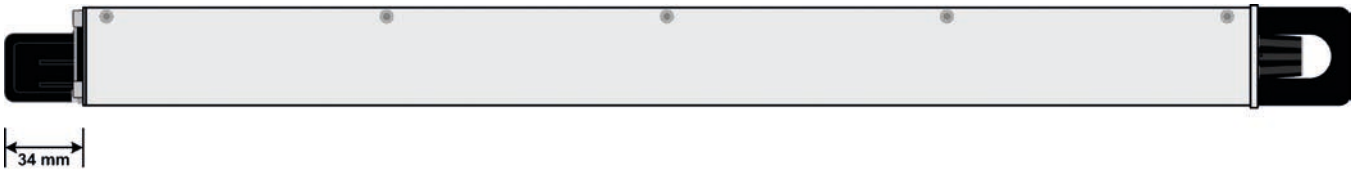
(1 无产品错误时的可编程分辨率 / Programmable resolution without device error
(2 RMS值：在BWL 300KHz下测量的LF值, PP值：在BWL 20MHz下测量的HF值 / RMS value: measures at LF with BWL 300kHz, PP value: measured at HF with BWL 20MHz







右视图 View from the right side



左视图，带直流端子盖 View from the left side, with DC cover