

# EA-PSI 9000 2U 1000 W - 3000 W



## 可编程实验室直流电源 Programmable laboratory DC Power supplies



EA-PSI 9080-120 2U



- 宽范围输入电压90...264 V，带主动式PFC
- 效率高达 93%
- 输出功率：0...1000 W 至0...3000 W
- 输出电压：0...40 V 至 0...750 V
- 输出电流：0...4 A 至 0...120 A
- 灵活的功率调整输出级
- 各种保护功能 (OVP, OCP, OPP, OTP)
- 直观的TFT触摸屏可显示数值、状态与通知
- 远程感测端
- 隔离模拟接口
- 内置函数发生器
- 光伏方阵模拟功能
- 内阻模拟与调整
- 40 V产品型号符合SELV标准 (EN 60950)
- 配放电电路(在10 s内 $U_{out} < 60 V$ )
- 内置USB端口
- 可选数字接口模块，或选择安装IEEE/GPIB端口
- 支持SCPI指令语言

### 概要

EA-PSI 9000 2U系列是一款由微处理器控制的实验室电源。它立足于用户友好的交互式操作概念，配备一套完整的标准功能。其输出参数、监控功能与其它设定都可配置，而且可更换式数字接口模块极其智能且操作舒适。所有输出参数的监控功能可帮助用户减少测试设备，几乎可不用安装外部监控硬件与软件。

- Wide input voltage range 90...264 V with active PFC
- High efficiency up to 93%
- Output power ratings: 0...1000 W up to 0...3000 W
- Output voltages: 0...40 V up to 0...750 V
- Output currents: 0...4 A up to 0...120 A
- Flexible, power regulated output stage
- Various protection circuits (OVP, OCP, OPP, OTP)
- Intuitive TFT touch panel with display for values, status and notifications
- Remote sensing
- Galvanically isolated, analog interface
- Integrated function generator
- Photovoltaics array simulation
- Internal resistance simulation and regulation
- 40 V models compliant to SELV (EN 60950)
- Discharge circuit ( $U_{out} < 60 V$  in  $\leq 10 s$ )
- USB port integrated
- Optional, digital interface modules or alternatively installed IEEE/GPIB port
- SCPI command language supported

### General

The microprocessor controlled laboratory power supplies of series EA-PSI 9000 2U offer a user-friendly, interactive handling concept, along with a remarkable set of standard features, which can facilitate operating them. Configuration of output parameters, supervision features and other settings, as well as the replaceable digital interface modules is smart and comfortable. The implemented supervision features for all output parameters can help to reduce test equipment and make it almost unnecessary to install external supervision hardware and software.

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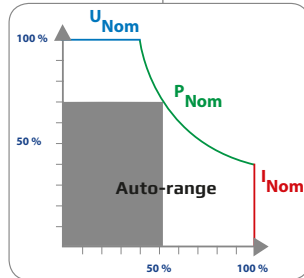
由两旋钮，一个按键，两个LED以及TFT彩色触摸屏组成的控制面板，显示所有关键数值与状态，用户只需轻轻一点手指，就可轻松操作本设备。若要集成到半自动与远程控制的自动化测试系统中，在其背面提供有一组接口（模拟与数字）。

The clear control panel with its two knobs, one pushbutton, two LEDs and the touch panel with colour TFT display for all important values and status enable the user to handle the device easily with a few touches of a finger. For the integration into semi-automatic and remotely controlled test and automation systems, the devices offer a set of interfaces (analog and digital) on their rear side.



### 功率级自动调整

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。它们的设定功率都可调，因此仅用一台产品就能覆盖广泛的应用。



### 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 maximum 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.

### 交流输入

本系列采用主动式功率因数，1.5 kW以下型号的输入电压为90 V<sub>AC</sub>至264 V<sub>AC</sub>，适合全球范围内使用。1.5 kW的型号在供电电压<150 V<sub>AC</sub>时，输出功率自动减少到1 kW，3 kW的<205 V<sub>AC</sub>时，则减少到2.5 kW。

### AC input

All units are provided with an active Power Factor Correction circuit and models up to 1.5 kW are suitable for a worldwide usage on a mains supply from 90 V<sub>AC</sub> up to 264 V<sub>AC</sub>. With the 1.5 kW models, the output power is automatically reduced to 1 kW if the supply voltage is <150 V<sub>AC</sub> and with the 3 kW models is reduced to 2.5 kW at <205 V<sub>AC</sub>.

### 直流输出

本系列有0...40 V和0...750 V输出电压，0...4 A和0...120 A输出电流，0...1000 W和0...3000 W输出功率的不同型号。不管是手动控制还是远程控制（模拟或数字），都可在0%至100%之间连续调节电流、电压与功率。输出端位于产品后面板上。

### DC output

DC output voltages between 0...40 V and 0...750 V, output currents between 0...4 A and 0...120 A and output powers between 0...1000 W and 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 output terminal is located on the rear panel of the devices.

### 放电电路

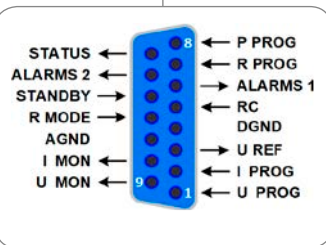
额定输出电压为200 V或以上的产品，其输出电容都配有一放电电路。在空载或带小负载时，它能确保危险电压在直流输出关闭后降至60 V DC以下。该电压值被认为是对人体安全的最高电压。

### 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.

### 内置模拟接口

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、功率与内阻。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电压来完成。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。



### Built-in 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.

### 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。

### 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.



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## 远程感测

远程感测输入端可直接连到负载设备，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。

## Remote sensing

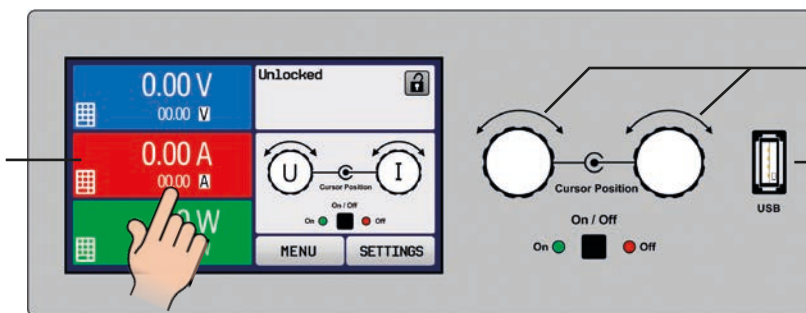
The standard sensing input can be connected directly to the load in order to compensate for voltage drops along the power cables, up to a certain level. Once the sensing input is connected to the load, the power supply will adjust the output voltage automatically to ensure the accurate required voltage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



## 显示器与控制面板



触摸屏显示器  
Display with touch panel



参数调节用旋钮  
Knobs for comfortable value adjustment

上载和保存函数用  
USB端口  
USB port for loading and saving functions

设定与实际输出电压、电流与功率都清晰显示于图形显示器上。彩色的TFT屏幕为点触式，用一个手指就能控制所有功能。

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

通过旋钮或者数字键盘直接输入参数，也可调节设定电压、电流、功率或阻值（内阻模拟）。

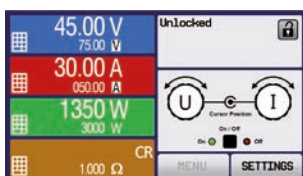
Set values of voltage, current, power or resistance (internal resistance simulation) can be adjusted using the rotary knobs or entered directly via a numeric pad.

若想防止意外操作，可锁定所有操作键。

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

## 多语言控制面板

## Multi-language control panel



英文 / English



中文 / Chinese



俄文 / Russian



德文 / German

## 函数发生器

本系列所有型号都具有一可形成如下典型函数的真实函数发生器，并能将它们应用于输出电压或输出电流上。发生器可通过前板的触摸屏设置，或经某一数字接口远程配置。

## Function generator

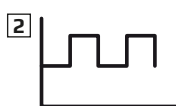
All models within this series include a true function generator which can generate typical functions, as displayed in the figure below, and apply them to either the output voltage or the output current. The generator can be completely configured and controlled by using the touch panel on the front of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

预设函数会为用户提供所有必须的参数，如Y偏差值，时间/频率或幅度，整套配置完成。

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



三角形  
Triangle



矩形  
Rectangle



梯形  
Trapezoid



正弦  
Sine



阶跃  
Ramp

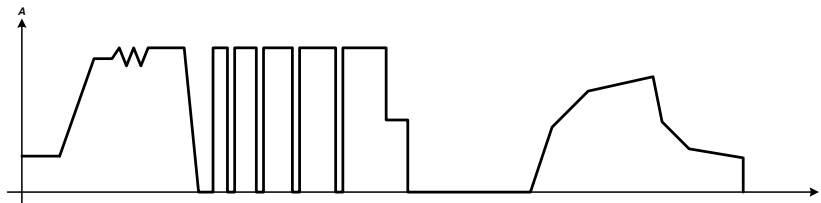


DIN 40839

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除了基于任意发生器产生的标准函数外，它还可形成某些复杂的函数，并能分成多达99组序列。这些可用于研发和生产的测试。通过前板的USB端口可将这些序列上载使用或存储于标准U盘上，这样可方便更换不同的测试序列。

下图是任意发生器可实现的由40个序列组成的复杂曲线，仅为虚构范例。可以在产品外或者于产品上创建函数，然后上载或保存：



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 flash drive via the USB port on the front panel, making it easy to change between different test sequences.

Fictional example of a complex function (40 sequences) as it can be realised with the arbitrary generator. The function can be created on the device or externally and then loaded or saved:

此外还有一个XY发生器，能产生如UI或IU这类的函数，用户一般以表格（CSV文档）形式创建，然后从U盘上上传。针对光伏相关的测试，还可形成PV曲线，作为用户可调关键参数。通过后续的固件升级，可安装更多的曲线特性，供用户选择。

### 主-从操作

所有产品标配有一个数字式主-从总线。通过它可并联最多16台同型号产品，将实际电压、电流与功率汇总，形成更大的系统。经产品上的控制面板，或经任意数字通讯接口的远程控制，可完成主-从系统的全部配置。主机的操作也手动控制，也可远程控制（任意接口）。

### 控制软件

本产品还配有适合Windows系统下操作的控制软件，可以远程控制多台同型号产品，甚至不同型号产品。它有一个清晰的主界面，显示所有设定值与实际值，SCPI与ModBus RTU指令的直接输入模式，固件升级特性，以及被称为“排序”的半自动化控制表格。

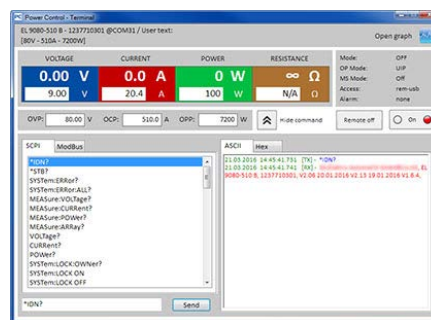
There is furthermore a XY generator, which is used to generate other functions, such as UI or IU, which are defined by the user in form of tables (CSV file) and then loaded from USB drive. For photovoltaics related tests, a PV curve can be generated and used from user-adjustable key parameters. Even more characteristics can be installed for user selection by applying future firmware updates.

### Master-slave

All models feature a digital master-slave bus by default. It can be used to connect up to 16 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).

### Control software

Included with the device is a control software for Windows PC, 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".



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### 选项

- 适合RS232、CAN、CANopen、ModBus TCP、Profibus、Profinet、EtherCAT或Ethernet的绝缘数字接口模块。接口插槽位于产品后板（仅针对标准型号），方便用户插上新模块或替换当前模块。产品会自动检测接口，并提示需要进行少许的配置或不用配置。也可参考134。
- 还可安装带固定GPIB端口的三位接口（3 W），代替接口模块用的默认插槽。

### Options

- Isolated digital interface modules for RS232, CAN, CANopen, ModBus TCP, Profibus, Profinet, EtherCAT or Ethernet. The interface slot is located on the rear panel (standard models only), making it easy for the user to plug in a new interface or to replace an existing one. The interface will be automatically detected by the device and requires no or only little configuration. Also see page 134.
- Three-way interface (3W) with a rigid GPIB port installed instead of the default slot for retrofittable interface modules



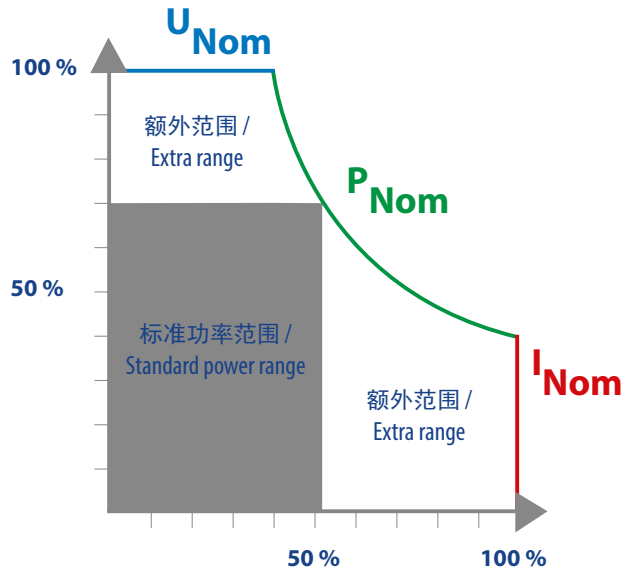
### 数字接口模块

### Digital interface modules



### 自动调整原理

### Auto-ranging principle





## EA-PSI 9000 2U 1000 W - 3000 W



型号	电压	电流	功率	效率	U的纹波 <sup>(2)</sup>	I的纹波 <sup>(2)</sup>	编程 <sup>(1)</sup>		订购编号 <sup>(3)</sup>
Model	Voltage	Current	Power	Efficiency	Ripple U <sup>(2)</sup>	Ripple I <sup>(2)</sup>	U (typ.)	I (typ.)	Ordering number <sup>(3)</sup>
PSI 9040-40 2U	0...40 V	0...40 A	0...1000 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	3.7 mA <sub>RMS</sub>	~1.5 mV	~1.5 mA	06230319
PSI 9080-40 2U	0...80 V	0...40 A	0...1000 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	3.7 mA <sub>RMS</sub>	~3 mV	~1.5 mA	06230304
PSI 9200-15 2U	0...200 V	0...15 A	0...1000 W	≤93%	164 mV <sub>pp</sub> / 34 mV <sub>RMS</sub>	2.2 mA <sub>RMS</sub>	~7.6 mV	~0.6 mA	06230305
PSI 9360-10 2U	0...360 V	0...10 A	0...1000 W	≤93%	210 mV <sub>pp</sub> / 59 mV <sub>RMS</sub>	1.6 mA <sub>RMS</sub>	~13.7 mV	~0.4 mA	06230306
PSI 9500-06 2U	0...500 V	0...6 A	0...1000 W	≤93%	190 mV <sub>pp</sub> / 48 mV <sub>RMS</sub>	0.5 mA <sub>RMS</sub>	~19 mV	~0.23 mA	06230307
PSI 9750-04 2U	0...750 V	0...4 A	0...1000 W	≤93%	212 mV <sub>pp</sub> / 60 mV <sub>RMS</sub>	0.3 mA <sub>RMS</sub>	~28.6 mV	~0.15 mA	06230308
PSI 9040-60 2U	0...40 V	0...60 A	0...1500 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	5.6 mA <sub>RMS</sub>	~1.5 mV	~2.3 mA	06230320
PSI 9080-60 2U	0...80 V	0...60 A	0...1500 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	5.6 mA <sub>RMS</sub>	~3 mV	~2.3 mA	06230309
PSI 9200-25 2U	0...200 V	0...25 A	0...1500 W	≤93%	164 mV <sub>pp</sub> / 34 mV <sub>RMS</sub>	3.3 mA <sub>RMS</sub>	~7.6 mV	~1 mA	06230310
PSI 9360-15 2U	0...360 V	0...15 A	0...1500 W	≤93%	210 mV <sub>pp</sub> / 59 mV <sub>RMS</sub>	2.4 mA <sub>RMS</sub>	~13.7 mV	~0.6 mA	06230311
PSI 9500-10 2U	0...500 V	0...10 A	0...1500 W	≤93%	190 mV <sub>pp</sub> / 48 mV <sub>RMS</sub>	0.7 mA <sub>RMS</sub>	~19 mV	~0.4 mA	06230312
PSI 9750-06 2U	0...750 V	0...6 A	0...1500 W	≤93%	212 mV <sub>pp</sub> / 60 mV <sub>RMS</sub>	0.5 mA <sub>RMS</sub>	~28.6 mV	~0.23 mA	06230313
PSI 9040-120 2U	0...40 V	0...120 A	0...3000 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	11 mA <sub>RMS</sub>	~3 mV	~4.6 mA	06230321
PSI 9080-120 2U	0...80 V	0...120 A	0...3000 W	≤92%	114 mV <sub>pp</sub> / 8 mV <sub>RMS</sub>	11 mA <sub>RMS</sub>	~1.5 mV	~4.6 mA	06230314
PSI 9200-50 2U	0...200 V	0...50 A	0...3000 W	≤93%	164 mV <sub>pp</sub> / 34 mV <sub>RMS</sub>	6.5 mA <sub>RMS</sub>	~7.6 mV	~1.9 mA	06230315
PSI 9360-30 2U	0...360 V	0...30 A	0...3000 W	≤93%	210 mV <sub>pp</sub> / 59 mV <sub>RMS</sub>	5 mA <sub>RMS</sub>	~13.7 mV	~1.2 mA	06230316
PSI 9500-20 2U	0...500 V	0...20 A	0...3000 W	≤93%	190 mV <sub>pp</sub> / 48 mV <sub>RMS</sub>	1.5 mA <sub>RMS</sub>	~19 mV	~0.8 mA	06230317
PSI 9750-12 2U	0...750 V	0...12 A	0...3000 W	≤93%	212 mV <sub>pp</sub> / 60 mV <sub>RMS</sub>	0.9 mA <sub>RMS</sub>	~28.6 mV	~0.5 mA	06230318

(1) 忽略产品错误时的可编程分辨率 / Programmable resolution disregarding device errors

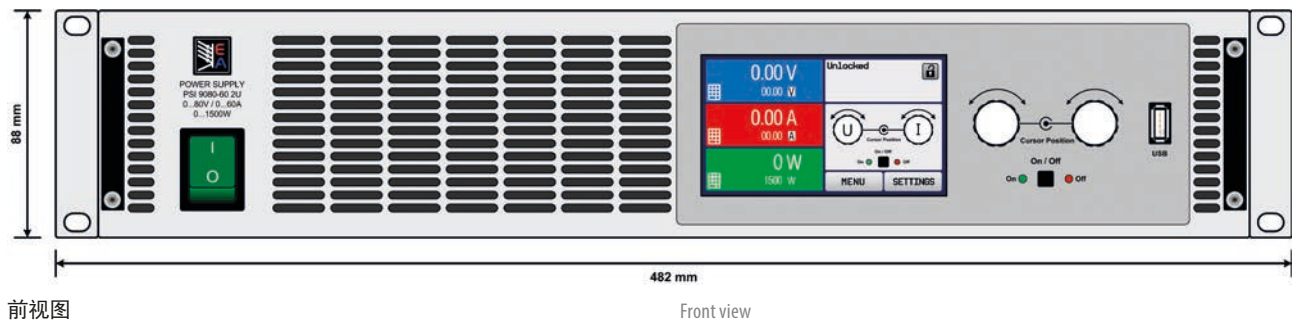
(2) RMS值: 在BWL 300 kHz时测量的LF值, PP值: 在BWL 20MHz时测量的HF值 / RMS value: measures at LF with BWL 300 kHz, PP value: measured at HF with BWL 20MHz

(3) 为标准版的订购编号, 带3W选项功能的型号则为不同 / Ordering number of the standard version, models with option 3W installed have different ordering numbers

# EA-PSI 9000 2U 1000 W - 3000 W

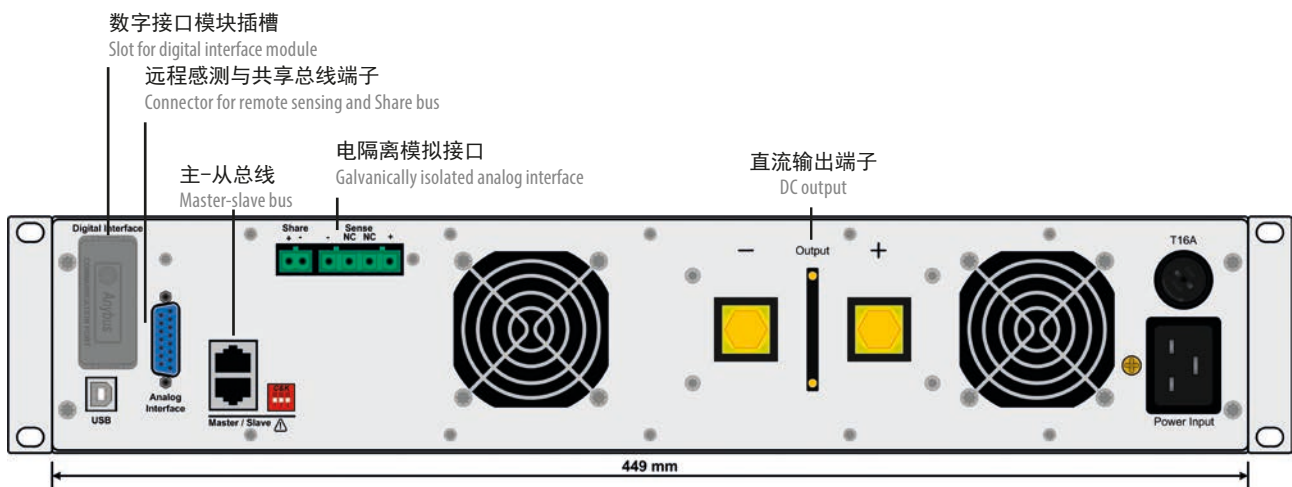
产品图片

Product views



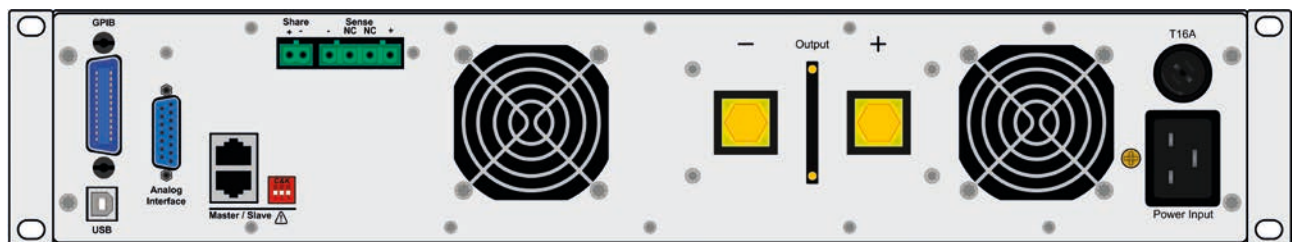
前视图

Front view



标准版后视图

Rear view of base model



带3W选项的后视图

Rear view with option 3W

