



操作指南
Operating Guide

PS 800 R

5000W
DC Power Supply



EA-PS 880-170R :	21 540 122
EA-PS 8200-70R :	21 540 124
EA-PS 8500-30R :	21 540 123

关于

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严禁再版、复印或部分错误地使用该操作指南，否则将承担该行为导致的法律后果。

安全说明



危险电压

注意：产品输出电压可能会升高至危险水平（> 60 VDC）！

所有带电元件必须配上护罩。产品与市电断开时，在输出端的所有操作必须结束，且只能由受过危险电流知识培训的人员执行。负载与产品（输出端）之间的任何连接都必须可防斜插。连接到电源输出端的应用设备需要配置，且以一种方式保险熔断，从而防止在使用该产品时由于过载或误操作而损坏产品。



安全说明

- 负载线的直径必须符合产品的额定输出电流。
- 请避免产品出现任何损坏，不要将金属元件插入通风槽，不要阻挡通风槽！
- 必须由专业受训人员执行市电连接。
- 只能用合适的连线，按照一般安全措施连到市电。
- 避免直接接触太阳光和湿气。
- 必须遮盖直流输出端，以免危险电压伤到人！
- 产品老化以及超负荷使用都可能导致如按钮、电位器类的产品控制件操作不稳定。

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1. 一般信息

1.1 简介

PS 800 R这一系列的产品，由微处理器控制，专门设计成墙挂式结构，用温控风扇冷却。

功能主要集中于工业用途。本产品断电后仍可按最后设定继续工作。

输出电压分三个可选范围，每个被定义成约为额定电压的1/3。

电源输出端有短路保护和过载保护。为了保护负载，产品还有过压保护（OVP）功能。出现过温（OT）时，电源输出关闭，直至温度冷却，又自动打开。

输想要正确操作本产品，需将之连接到能供400V的两相电源上。

1.2 目检

收到本产品后，请检查是否有外观受损痕迹。如有，请不要操作本产品，应立即联系您的供应商。

1.3 供应清单

1 x 电源供应器

1 x 印刷版操作指南

2 x 2脚Phoenix型（已插上）

2 x 4脚Phoenix型（已插上）

2. 安装

2.1 安装

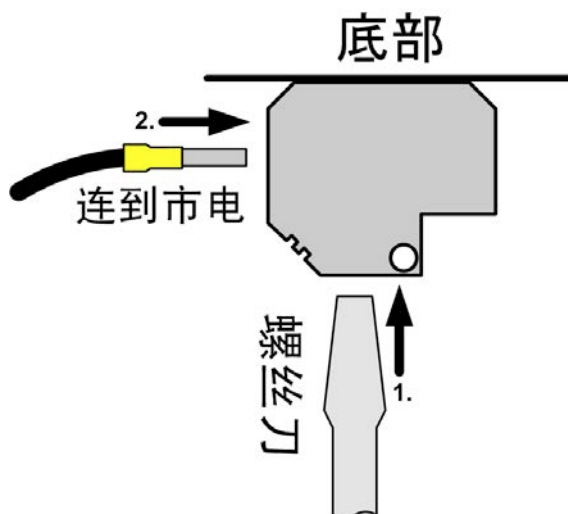
本产品设计成墙挂式结构。安装时需按空气顺着通风槽流出的方式安装。注意产品的上方和下方应保留一定空间（至少15cm），以保证足够的冷却效果。关于安装尺寸，可参考章节“4. 技术规格”，以及第8页的产品结构图。

2.2 与市电的连接

本系列所有型号可在340V至460VAC输入电压，以及50Hz或60Hz频率下工作。

连接市电时，按照丝印标识将输入电源线连到底部“Power Input”3位端子上。输入线要求为两相输电网，带L1，L2，PE线，相电压为400V，相差为120°。

连线夹紧步骤：



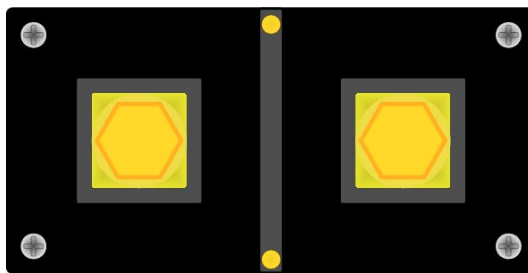
输入端的连线仅受训技术人员方可执行。主要在于选择适当直径的电源线（见典型输入电流的技术规格），以及本产品未配有电源开关。电源输入端由一标准的5x20mm保险丝保护，它装于输入端子旁边的两保险座上。

2.3 直流输出端

用合适直径的连线（建议2,5mm²）将负载连到产品顶部DC输出端。本产品可能会产生危险电压。故操作产品时应遮盖DC输出端。本系列产品配有多种类型的DC输出端：

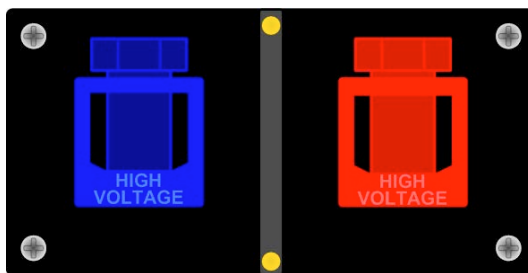
• 80V 和 200V型号：

M8的螺丝固定于塑胶直流端子
建议使用：8mm的圆形端子线



• 500V型号：

塑胶螺丝夹端子
建议使用：6mm的圆形端子线

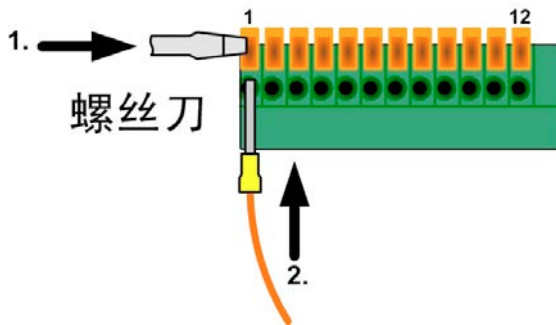


2.4 模拟接口的连接

注意！千万不要将模拟接口的地接到外部控制应用（例如PLC）的负极输出端，若连接，控制应用会与电源输出端的负极连通（形成接地回路）。于是负载电流会经过控制引线，然后损坏产品！为了避免此情况发生，需在此“弱”地线上安装一保险丝。

产品顶部的12针模拟接口也采用按压夹紧型端子。适合安装0.1mm² (26 AWG)至0.5mm² (20 AWG)直径的连接线。如果可以，线尾请套上线套。

连线夹紧步骤：



2.5 远程感测端的连接

为远程感测输入端位于产品顶部。若要用远程感测，只需将Phoenix插头插到„Sense“端子上即可。

3. 功能描述

3.1 远程感测 (Remote sense)

为补偿负载线上的压降，产品顶部有一远程感测输入端。按正确极性连线到此，可感测负载的电压。请见章节„4. 技术规格“关于远程感测可补偿的电压。

不用该感测输入端时，就让它空闲着，不用连跳线到输出端。

感测线的直径非关键条件。

3.2 过压保护 (OVP)

本系列所有型号都有过压保护电路，过压保护值为调整后的设定电压的偏移值。该偏移值为：

80V型号: 7V

200V型号: 17V

500V型号: 42V

举例：如果一台5000V的产品被设为，那么OVP在约217V时动作。

因为偏移值不可调，用户应考虑到OVP反应之前可能来自电源的增压。

如果出现过压，不论是内部不良元件还是外部因素（互感应）引起，功率输出将被关闭，该错误通过“OVP”灯以及模拟接口的引脚9指示出来。OV状态清除后，输出再次打开。

这也同样适用于经模拟接口的远程控制。

3.3 过温 (OT)

本系列所有型号都有内温监控功能。如遇过热，电源输出暂时关闭，直至冷却后，又自动打开。

该错误以“OT”LED灯和模拟接口的9脚 (OT/OVP) 指示出来。

3.4 模拟接口

本系列产品所有型号的前板都有一12脚模拟接口，可用来监控产品状态，以及远程打开或关闭输出，当然也可远程控制产品。也可参考章节„6. 远程控制“。

3.5 限流

产品输出电流不可调，故被限定为额定输出值。必须考虑的是，一旦产品输出端连接的是一小负载或者出现短路，将会恒定地输出最大电流。这将给连接负载造成重大损害。

3.6 可灵活变化的功率限制

本系列产品经灵活输出级限制最大输出功率为5000W。意思是，可让产品在输出较高电压时，输出相对低一点的电流，或者在输出较高电流时，输出相对低一点的电压。在这两种情况下，根据 $P = U \cdot I$ 公式，功率被限定不变。

3.7 共享总线

PS 800 R系列的共享总线端子无任何功能。

4. 技术规格

	PS 880-170 R	PS 8200-70 R	PS 8500-30 R
电源输入			
输入电压	340...460V	340...460V	340...460V
要求相数	L1, L2, PE	L1, L2, PE	L1, L2, PE
输入频率	50/60Hz	50/60Hz	50/60Hz
输入保险丝	2x T16A	2x T16A	2x T16A
输入电流	最大16A	最大16A	最大16A
功率因数值	> 0.99	> 0.99	> 0.99
输出 - 电压			
额定电压U _{Nom}	80V	200V	500V
可调范围	0V...U _{Nom}	0V...U _{Nom}	0V...U _{Nom}
市电波动范围在±10% ΔU _{IN} 时的稳定度	< 0.02%	< 0.02%	< 0.02%
带载0...100%时的稳定度	< 0.05%	< 0.05%	< 0.05%
带载100%时电压从R10至90%的上升时间	最大30ms	最大30ms	最大30ms
纹波 @ BWL 20MHz	< 100mVpp < 10mVrms	< 200mVpp < 25mVrms	< 250mVpp < 70mVrms
精确度*	≤ 0.2%	≤ 0.2%	≤ 0.2%
显示器分辨率	10mV	100mV	100mV
远程感测补偿	最大2.5V	最大6V	最大10V
输出 - 电流			
额定电流I _{Nom}	170A	70A	30A
可调范围	0...I _{Nom}	0...I _{Nom}	0...I _{Nom}
市电波动范围在±10% ΔU _{IN} 时的稳定度	< 0.05%	< 0.05%	< 0.05%
带载0...100% ΔU _{OUT} 时的稳定度	< 0.15%	< 0.15%	< 0.15%
纹波 @ BWL 20MHz	< 300mApp < 40mArms	< 44mApp < 11mArms	< 14mApp < 8mArms
精确度*	≤ 0.2%	≤ 0.2%	≤ 0.2%
显示器分辨率	100mA	10mA	10mA
负载从10...90%瞬态恢复时间	< 2ms	< 2ms	< 2ms
输出 - 功率			
额定功率P _{Nom}	5000W	5000W	5000W
精确度*	≤ 0.2%	≤ 0.2%	≤ 0.2%
显示器分辨率	0.001kW	0.001kW	0.001kW
调节分辨率	93%	95.20%	95.50%
其它			
环境温度	0...50°C	0...50°C	0...50°C
储存温度	-20...70°C	-20...70°C	-20...70°C
相对湿度	< 80%	< 80%	< 80%
外壳尺寸 (WxHxD)	180 x 530 x 171 mm	180 x 530 x 171 mm	180 x 530 x 171 mm
安装后最小尺寸 (WxHxD)	180 x 595 x 175mm	180 x 595 x 175mm	180 x 630 x 175mm
重量	12kg	12kg	12kg
冗 余	不	不	不
绝缘耐压输出对外壳	500V DC	500V DC	1000V DC
绝缘耐压输入对输出	4200V DC		
制冷	风扇制冷, 前板为入风口, 后板为排风口		
安全标准	EN 60950		
EMC标准	EN 61326, EN 55022 等级 B		
过压等级	2		
保护等级	1		
污染程度	2		
工作高度	<2000m		
并联操作			
最大并联电压	500V		
主-从操作	有, 经共享总线连接器		
模拟编程			
输入范围	0...10V		
精确度*	≤ 0.2%		
输入阻抗	53kOhm		
产品编号	21540122	21540124	21540123

* 与对应额定值有关

所有数值都为典型值

4.1 产品各视图

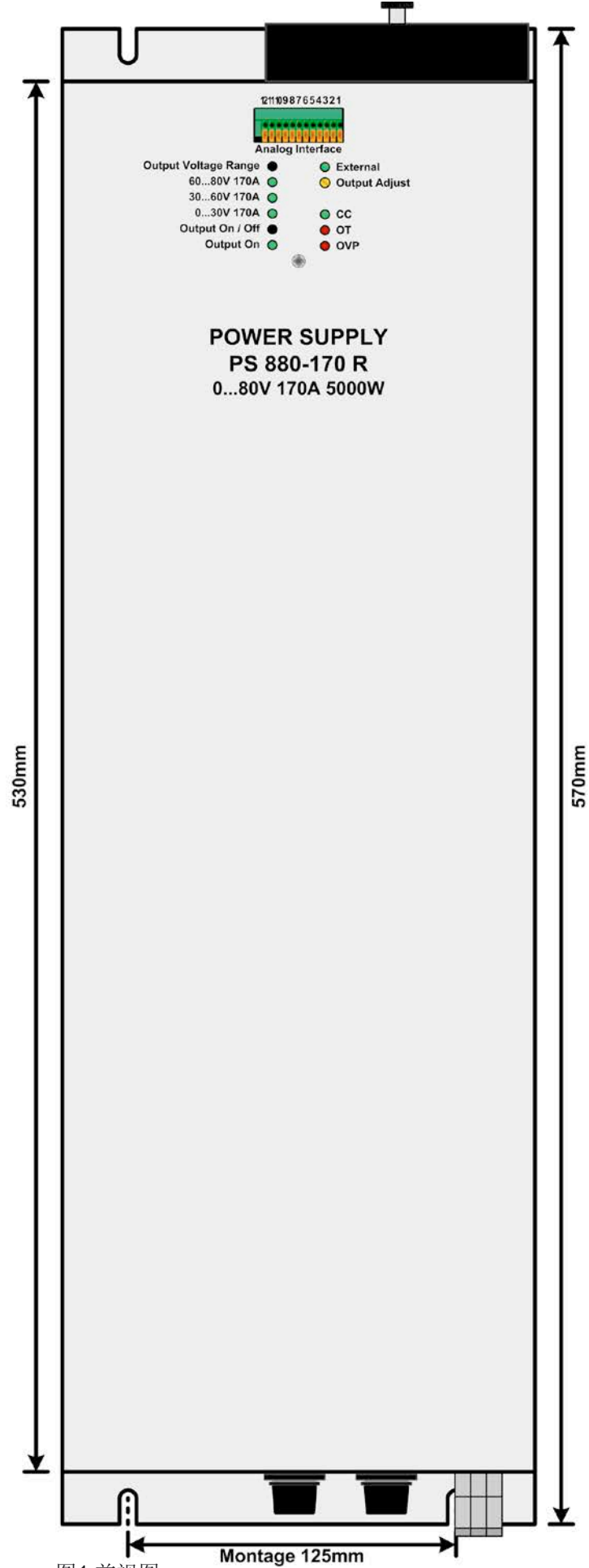


图1 显示的是型号产品的直流输出端和盖。其他型号使用不同的大尺寸输出端与盖。见“4. 技术规格”的最小安装尺寸。 .

图1.前视图

前视图

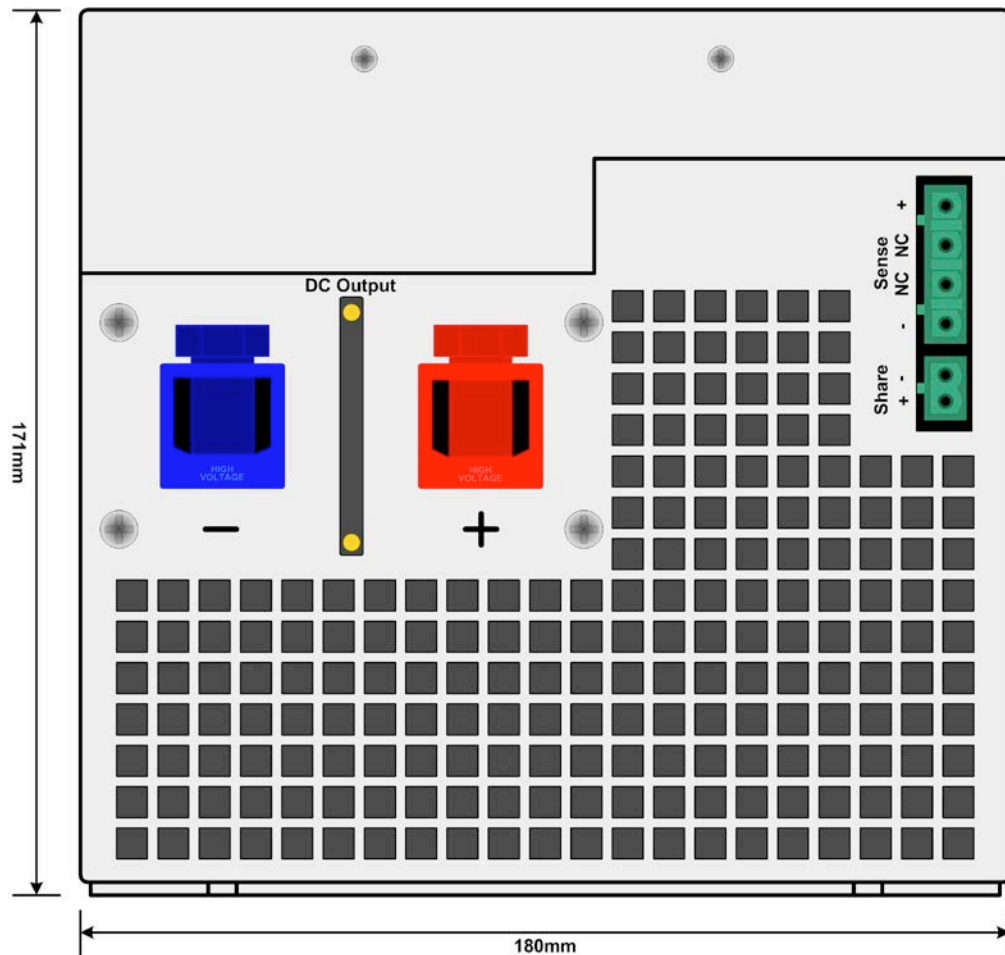


图2. 直流输出端（此图为500V型号）与共享总线/感测端的顶部图

前视图

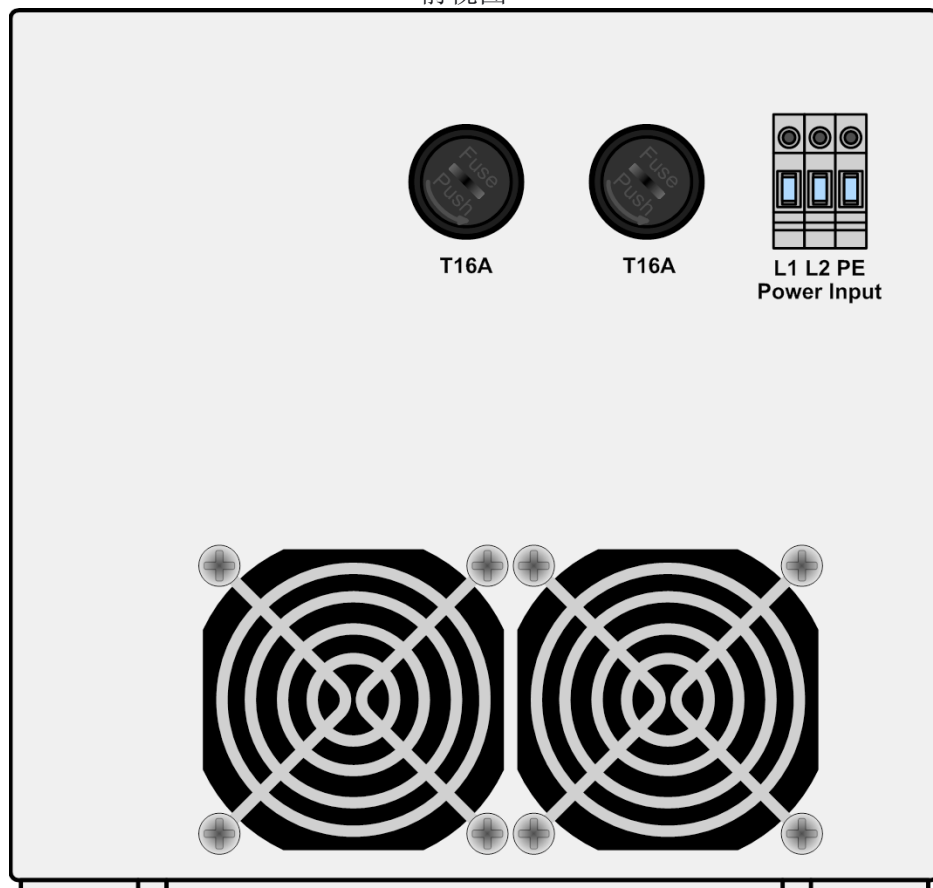


图3. 直流交流输入端和保险座的底部图

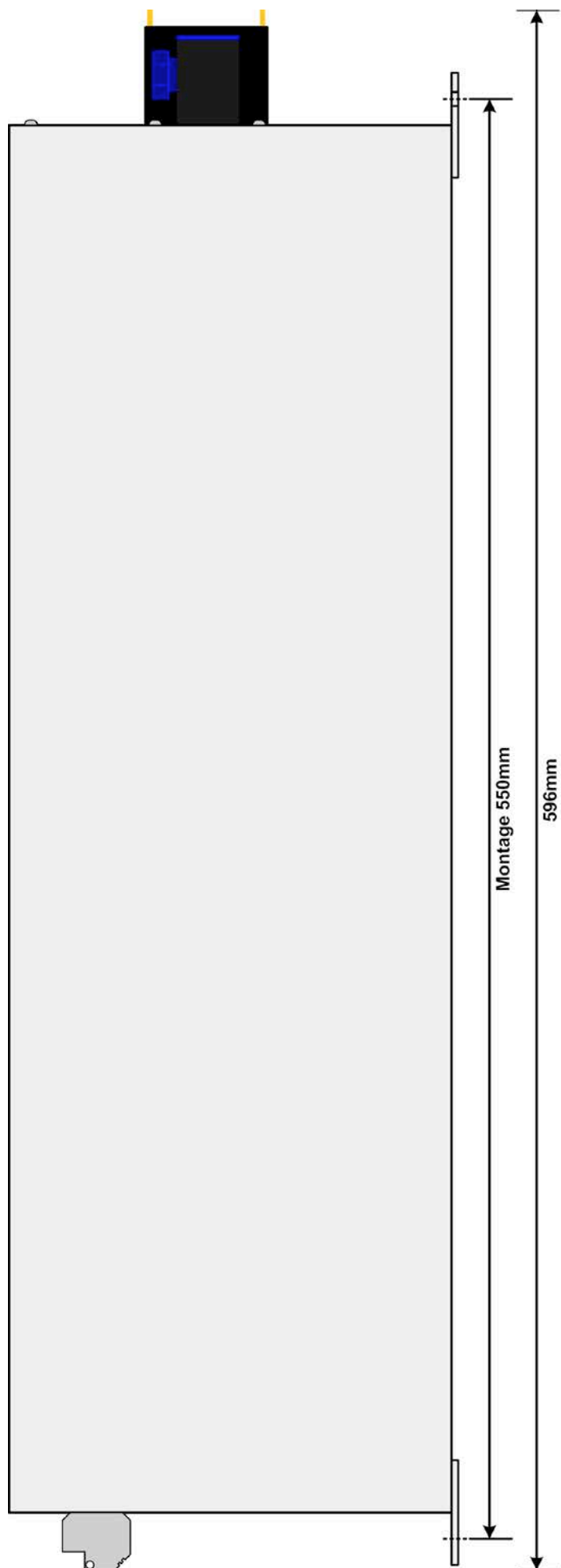


图4. 侧视图

5. 手动控制

5.1 给产品供电

产品与市电连接后，不会形成电源开关的功能，而立即准备工作。

关闭产品后将存储最后状态（选定模式，输出条件），以便下次启动时自动恢复。因此在遇断电等这样的中断并恢复后，可继续工作。

5.2 调节输出电压

额定输出电压分三个可选范围，每个范围约为额定电压的1/3。详见“4. 技术规格”。

“Output adjust”内置电位器为10圈电位器，从最左至最右旋转10圈对应选定电压范围。

注意：当下调输出电压时输出端未接负载，电压可能会很缓慢地下降。建议慢慢旋转或等每一圈调节电压稳定后再调节。

5.3 打开或关闭输出

如未出现错误（OVP或OT）或产品未受控于远程模式，用“Output On/Off”按钮可打开或关闭电源输出。通过电位器可立刻设定输出电压。

也可通过模拟接口的“Rem-SB”引脚8，随时关闭输出和再次打开。

注意！Rem-SB引脚优先于“Output On/Off”按钮。

打开输出时，“CC”灯会指示恒流操作（灯亮）或恒压操作（灯灭）。

警示！无负载或者连接了很小负载时关闭输出，输出端仍有电压。根据电源型号不同，电压下降到0V可能要用多至60s。故危险电压仍然存在！

5.4 选择电压范围

“Output Voltage Range”按钮用于选择三组输出电压范围中的一组。选贼前必须关闭功率输出。选择一不同范围后再打开输出，将立即设定所选范围内电位器对应的输出电压。

注意！输出电压随之可能上升至危险水平，从而损坏连接负载。

6. 远程控制

可经VSEL（设定电压值）和CSEL（设定电流值）引脚，利用0...10V外部模拟电压输入设定值。

电源输出值可当0...10V范围内的VMON（实际电压）和CMON（实际电流）监控信号送出。

若要远程控制设定值，需先激活“Remote”控制脚，即下拉“Remote”引脚7（用跳线，继电器，低阻开关，开集三极管）。

必须将设定电压和电流都设置进去。如有需求，将其中一设定值桥接至为VREF脚的10V参考电压，故其范围为100%电压。

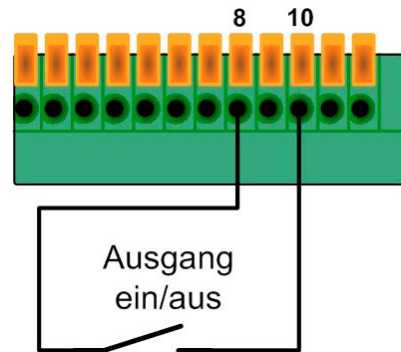
远程控制模式以“External”灯指示。

模拟接口的引脚分布见下页。

6.1 模拟接口举例

6.1.1 远程开/关输出

输入脚：REM-SB (8)



该输入脚可随时关闭产品输出。关闭后，只有断开该触点或开关才能再次打开。

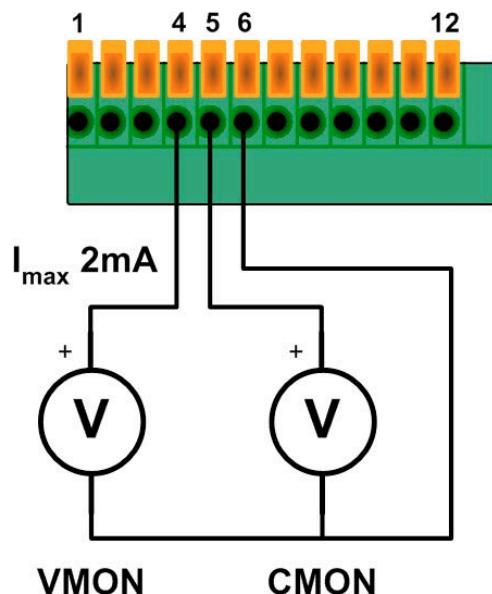
引脚8的触点/开关优先于“Output On/Off”按钮。意思是，引脚8“强迫”关闭输出后，用推动开关也不可打开。

转至远程控制不需用到引脚7。

远程控制时，REM-SB引脚也可用于确认，以及通过将该引脚拉至LOW(=off)可重设OVP错误。

6.1.2 监控电压和电流

模拟输出脚：VMON (4) 和 CMON (5)

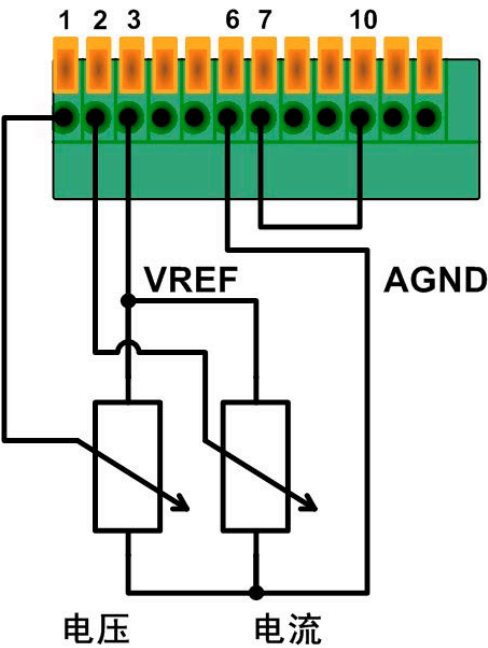


模拟监控输出脚VMON和CMON输出0...10V电压，对应实际电压与电流的0...100%。

测量这些输出值需使用高阻抗仪表或带高阻抗输入的测量线路，因为这些输出脚仅能驱动有限的电流。

6.1.3 调节设定值1

模拟输入脚：VSEL(1) 和 CSEL(2)



这个例子显示如何用参考电压（10V，VREF）和设定值输入脚上的电位器来调节设定值。

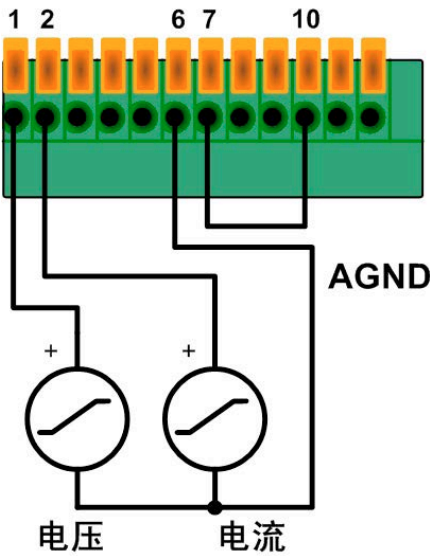
引脚7与10之间的跳线可将产品转至要求的远程控制模式。该跳线可用以低阻开关代替。

如果仅需调节两设定值中的一个，应将另一个接到VREF脚。

电位器阻值应分别为10kΩ或更高。

6.1.4 调节设定值2

模拟输入脚：VSEL(1) 和 CSEL(2)



这个例子显示如何通过外部电压源控制电压和电流。也可见例1。

注意！严禁将>12V的电压连至这些输入脚！

>10V的设定值会被内部限定为100%额定值。

模拟接口的引脚分布和技术规格：

引脚	名称	类型 ¹⁾	描述	电平	电器参数
1	VSEL	AI	设定值：电压	0... 10V对应0... 100%的 U_{nom}	精确度 <0.5%， $U_{max} = 12V$ ，输入阻抗 >100k
2	CSEL	AI	设定值：电流	0... 10V对应0... 100%的 I_{nom}	
3	VREF	A0	参考电压	10V	$I_{max} = 5mA$ 时，精确度<0.5%
4	VMON	A0	实际值：电流	0... 10V对应0... 100%的 U_{nom}	$I_{max} = +2mA$ 时精确度为0.2%，对AGND有短路保护
5	CMON	A0	实际值：电压	0... 10V对应0... 100%的 I_{nom}	
6	AGND		模拟信号地		CMON，VMON用
7	Remote	DI	激活外部控制	外部 = Low ($U_{Low}<1V$)， 内部 = High ($U_{High}>4V$)	$U_{max} = 30V$ $I_{out} = <1mA$ ，5V时
8	Rem-SB	DI	电源输出关闭	关 / 启动 = Low ($U_{Low}<1V$)， 开 / 停止 = High ($U_{High}>4V$)	$I_{out} = 2mA$ typ. 0V时
9	OT / OVP	D0	过温OT / 过压OVP	Low = 无错误 ($U_{Low}<1V$)，High = 出错 ($U_{High}>4V$)	$U_{max} = 30V$ ， $I_{max} = 20mA$ ；准集电极上拉至+15V
10	DGND		数字信号地		用来控制和监控信号
11	Reserved	X	不能连		
12	Reserved	X	不能连		

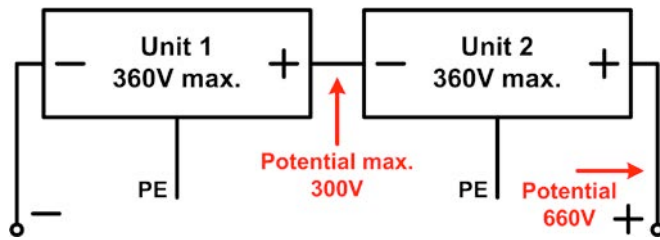
¹⁾ A0 = 模拟输出，DI = 数字输入(非TTL/CMOS脚)，DO = 数字输出(非TTL/CMOS脚)

7. 其它应用

7.1 串联

如果遵循下列规则，可将多台同型号设备串联在一起：

- 不作主-从操作
- 模拟接口地不允许相互连接。模拟接口的其它信号也适用。如需远程控制，可利用隔离放大器，并联控制所有设备。
- 远程感测端子不可接线！
- Share Bus端子不可接线！
- 任何一台产品直流输出负极对地(PE)电压不可 >300V



7.2 并联

可将多台同型号产品并联连接并操作，但非全部支持。因为过压保护限制了可调输出电压，故不可使用模拟接口建立主从类型的系统。

About

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Safety instructions



Dangerous voltage

Caution: The output voltage can rise to dangerous levels (> 60 VDC)!

All live parts have to be covered. All actions at the output terminals have to be done while the unit is disconnected from the mains and may only be executed by personnel which is instructed about the hazards of electrical current. Any connection between the load and the unit (at the output terminals) have to be scoop-proof. Applications connected to the power output must be configured and fused in a way that prevents the use of these to cause a damage to the unit by overload or malfunction.



Safety instructions

- The cross section of the load leads has to match the nominal current of the device.
- Avoid any damage to the device, do not insert metal parts through the slots, do not obstruct the slots!
- Mains connection must only be done by trained technical personnel.
- Mains connection only with appropriate leads and under adherence of common safety measures.
- Avoid direct sunlight and humidity.
- The DC output must be covered in order to prevent injury by dangerous voltages!
- Aging of the device, as well heavy use may result in unpredictable behaviour of control elements like pushbuttons and trimmers.

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1. General

1.1 Introduction

The microprocessor controlled power supplies of the PS 800 R series are designed for wall mount and are cooled by a temperature-controlled fan.

The functionality focuses industrial power supply. The device will continue operation after a blackout with the last settings.

The output voltage is separated into three selectable ranges, where each one is defined as approximately 1/3 of the nominal voltage.

The power output is short-circuit-proof and overload-proof. For protection of the loads, the device also features an overvoltage protection (OVP). During an overtemperature (OT) event, the power output will be switched off until the unit has cooled down and automatically switched on again.

The device requires a two-phase supply with 400V for correct operation.

1.2 Visual check

After receipt, the unit has to be checked for signs of physical damage. If any damage is found, the unit may not be operated. Also contact your dealer immediately.

1.3 Scope of delivery

- 1 x Power supply unit
- 1 x Printed operating guide
- 1 x Phoenix plug, 2 pole, plugged
- 1 x Phoenix plug, 4 pole, plugged

2. Installation

2.1 Mounting

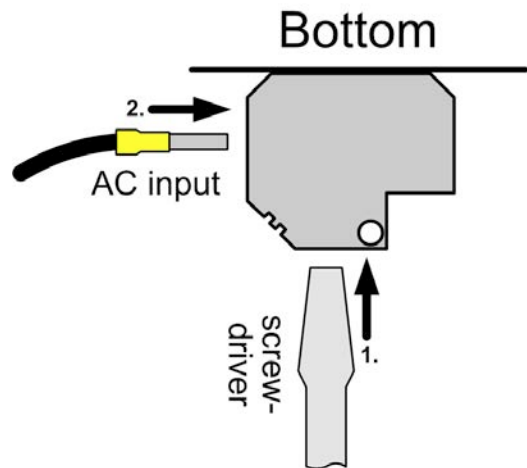
The device is designed for vertical wall mount. It is required to mount it in a way that allows unimpeded air flow through the ventilation slots. Take care for plenty of space (at least 15cm) below and above the device in order to ensure proper cooling. For the installation dimensions see section „4. Technical specifications“ and the drawing from page 20 on.

2.2 Mains connection

The device can be operated at AC input voltages from 340V to 460V and input frequencies of 50Hz or 60Hz.

The input connection is done at the 3pole WAGO clamp terminal „Power Input“ at the bottom side and according the print. **The input requires a two-phase grid with L1, L2, PE, 120° phase rotation and 400V between the phases.**

Clamping procedure:

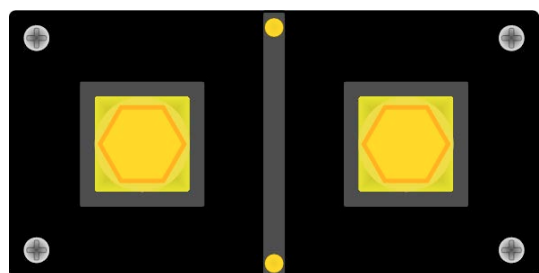


The input wiring must only be done by trained technical personnel. Main focus lies on an appropriate cross section of the mains lead (see technical specifications for typical input current), as well as the fact that the device does not feature a power switch. The input is fused by two standard 6.3x32mm T16A fuses, which are located in the two fuseholders next to the input connector.

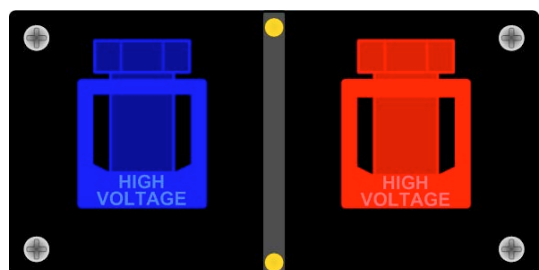
2.3 DC output connection

The load is connected to the DC output terminals on the top side, using leads with appropriate cross section (rec'd 2.5mm²). The device can produce dangerous voltages. Thus the output must be covered with the included cover when working with the device. There are different DC terminal types:

- **80V and 200V models:**
Screw fastening M8 on a plastic DC terminal
Recommendation: ring cable lugs 8mm



- **500V model:**
Screw-clamp terminal, plastic
Recommendation: ring cable lugs 6mm

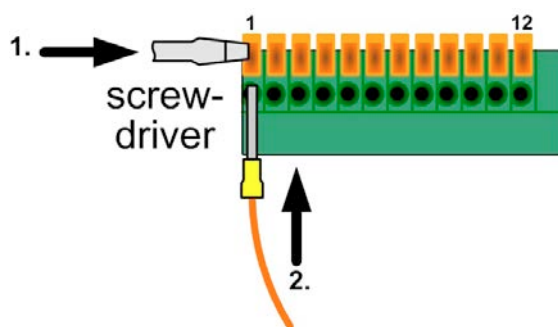


2.4 Analogue interface connection

The 12 pole analogue interface on the front is of type press & clamp. It is eligible for cable cross sections of 0.1mm² (26 AWG) to 0.5mm² (20 AWG). If possible, use cable end sleeves.

Attention! Never connect grounds of the analogue interface to minus (negative) output of an external control application (PLC etc.), if that control application is already connected to the negative power supply output (ground loop). Load current may flow over the control leads and damage the device! In order to avoid this a fuse can be integrated in the „weak“ ground line.

Clamping procedure:



2.5 Remote sense connection

The remote sense inputs are located on the top of the device. If remote sense is going to be used, the connection is easily done using the included Phoenix plug on connector „Sense“.

3. Functional description

3.1 Remote sense

In order to compensate voltage drops along the load leads, the device features remote a sense input on the top side. Here the sensed voltage from the load is connected with correct polarity. See „4. Technical specifications“ about how much voltage drop remote sense can compensate.

When not using the sense inputs, they just remain open. It is not required to bridge them to the output.

The cross section of the sense leads is non-critical.

3.2 Overvoltage protection (OVP)

All models feature an overvoltage protection circuit which follows the adjusted voltage set value with an offset. This offset is:

80V model: 7V

200V model: 17V

500V model: 42V

If, for example, the 500V model is set to 200V, then the OVP would act at around 217V.

Because the offset is not adjustable, the user has to consider possible voltage incrementals coming from the power supply before the OVP reacts.

In case of an overvoltage condition, whether caused by an internal defect or by external reasons (mutual induction), the power output is switched off and the error is indicated by the LED „OVP“ and also by pin 9 of the analogue interface. After the OV condition is gone, the output can be switched on again.

The same applies for remote control via the analogue interface.

3.3 Overtemperature (OT)

All models also feature an internal temperature supervision. In case of overheating, the power output will be temporarily switched off until the device has cooled down, and then automatically switched on again.

The condition is indicated by the LED „OT“ and by pin 9 (OT/OVP) of the analogue interface.

3.4 Analogue interface

All models feature a 12 pin analogue interface on the front of the device. It can be used to monitor the device condition, as well as remotely switch the output on or off and, of course, to remotely control the device. Also see section „6. Remote control“.

3.5 Current limitation

The output current of the device is not adjustable and thus limited to the nominal output current. It always has to be considered that in case of a very small load or short-circuit at the output the device will constantly deliver the maximum current. This can damage the connected load.

3.6 Flexible power limitation

The device has a maximum output power of 5000W which is limited by a flexible output stage. It means, it can provide either high voltage with comparably low current or high current with comparably low voltage. In either case, the power is limited according to the formula $P = U \cdot I$.

3.7 Share bus connection

The Share-Bus connector at models of series PS 800 R is without function.

4. Technical specifications

	PS 880-170 R	PS 8200-70 R	PS 8500-30 R
Mains input			
Input voltage range	340...460V	340...460V	340...460V
Required phases	L1, L2, PE	L1, L2, PE	L1, L2, PE
Input frequency	50/60Hz	50/60Hz	50/60Hz
Input fuse	2x T16A	2x T16A	2x T16A
Input current	max. 16A	max. 16A	max. 16A
Power factor	> 0.99	> 0.99	> 0.99
Output - Voltage			
Nominal voltage U _{Nom}	80V	200V	500V
Adjustable range	0V...U _{Nom}	0V...U _{Nom}	0V...U _{Nom}
Stability at mains fluctuation ±10% ΔU _{IN}	< 0.02%	< 0.02%	< 0.02%
Stability at 0...100% load	< 0.05%	< 0.05%	< 0.05%
Ramp-up time 10...90% at 100% load	max. 30ms	max. 30ms	max. 30ms
Ripple @ BWL 20MHz	< 100mVpp < 10mVrms	< 200mVpp < 25mVrms	< 250mVpp < 70mVrms
Accuracy*	≤ 0.2%	≤ 0.2%	≤ 0.2%
Resolution of display	10mV	100mV	100mV
Remote sense compensation	max. 2.5V	max. 6V	max. 10V
Output - Current			
Nominal current I _{Nom}	170A	70A	30A
Adjustable range	0...I _{Nom}	0...I _{Nom}	0...I _{Nom}
Stability at mains fluctuation ±10% ΔU _{IN}	< 0.05%	< 0.05%	< 0.05%
Stability at 0...100% ΔU _{OUT}	< 0.15%	< 0.15%	< 0.15%
Ripple @ BWL 20MHz	< 300mApp < 40mArms	< 44mApp < 11mArms	< 14mApp < 8mArms
Accuracy*	≤ 0.2%	≤ 0.2%	≤ 0.2%
Resolution of display	100mA	10mA	10mA
Transient recovery time 10...90% load	< 2ms	< 2ms	< 2ms
Output - Power			
Nominal power P _{Nom}	5000W	5000W	5000W
Accuracy*	≤ 0.2%	≤ 0.2%	≤ 0.2%
Resolution of display	0.001kW	0.001kW	0.001kW
Efficiency	93%	95.20%	95.50%
Miscellaneous			
Ambient temperature	0...50°C	0...50°C	0...50°C
Storage temperature	-20...70°C	-20...70°C	-20...70°C
Humidity rel.	< 80%	< 80%	< 80%
Dimensions of enclosure (WxHxD)	180 x 530 x 171 mm	180 x 530 x 171 mm	180 x 530 x 171 mm
Dimensions of installation (WxHxD), min.	180 x 595 x 175mm	180 x 595 x 175mm	180 x 630 x 175mm
Weight	12kg	12kg	12kg
Redundancy	no	no	no
Isolation output to enclosure	500V DC	500V DC	1000V DC
Isolation input to output	4200V DC		
Cooling	by fans, air inlet on the front, air exhaust on the rear		
Safety	EN 60950		
EMC standards	EN 61326, EN 55022 Class B		
Overvoltage class	2		
Protection class	1		
Pollution degree	2		
Operational altitude	<2000m		
Parallel operation			
Max. parallel connection voltage	500V		
Master-Slave	yes, via Share bus		
Analogue programming			
Input range	0...10V		
Accuracy	≤ 0.2%		
Input impedance	53kOhm		
Article number	21540122	21540124	21540123

* Related to the corresponding nominal value

All values are typical values

[illegible]

Figure 1. Front view

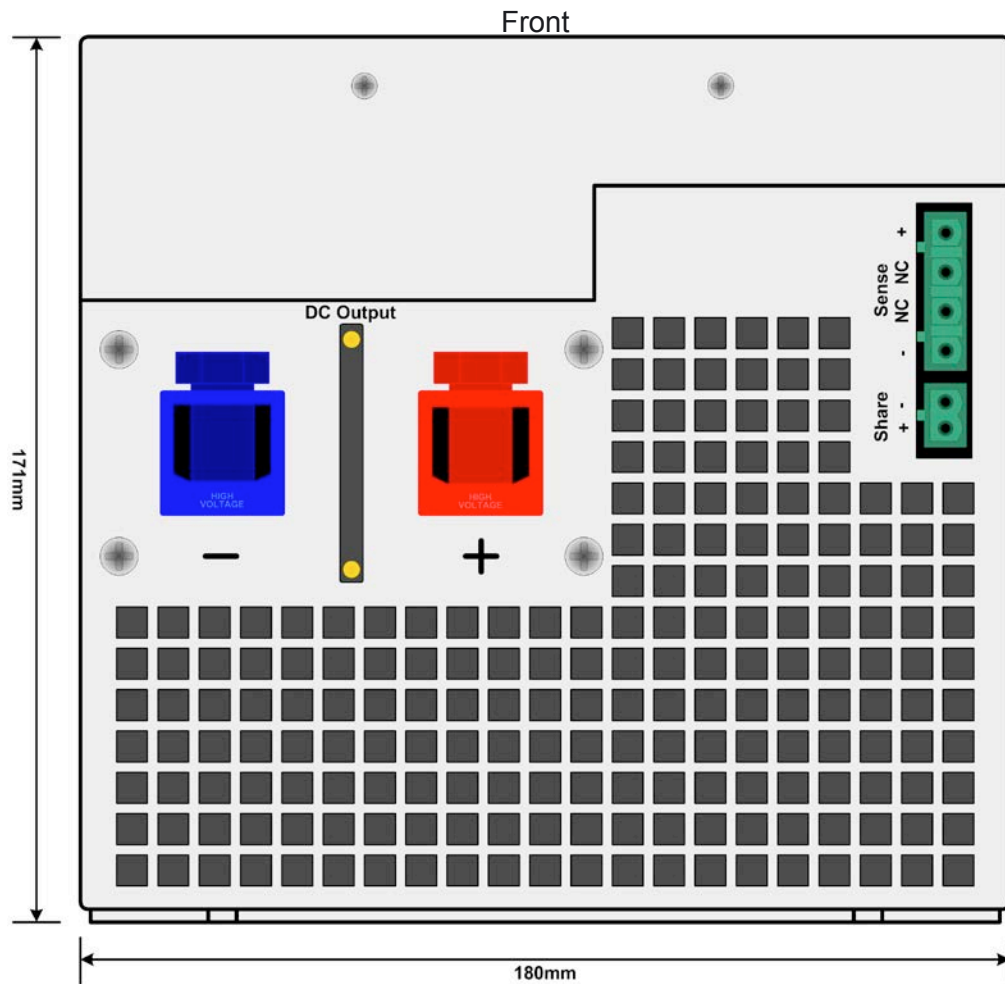


Figure 2. Top view with DC output (here: 500V model) and Share bus / Sense

Front

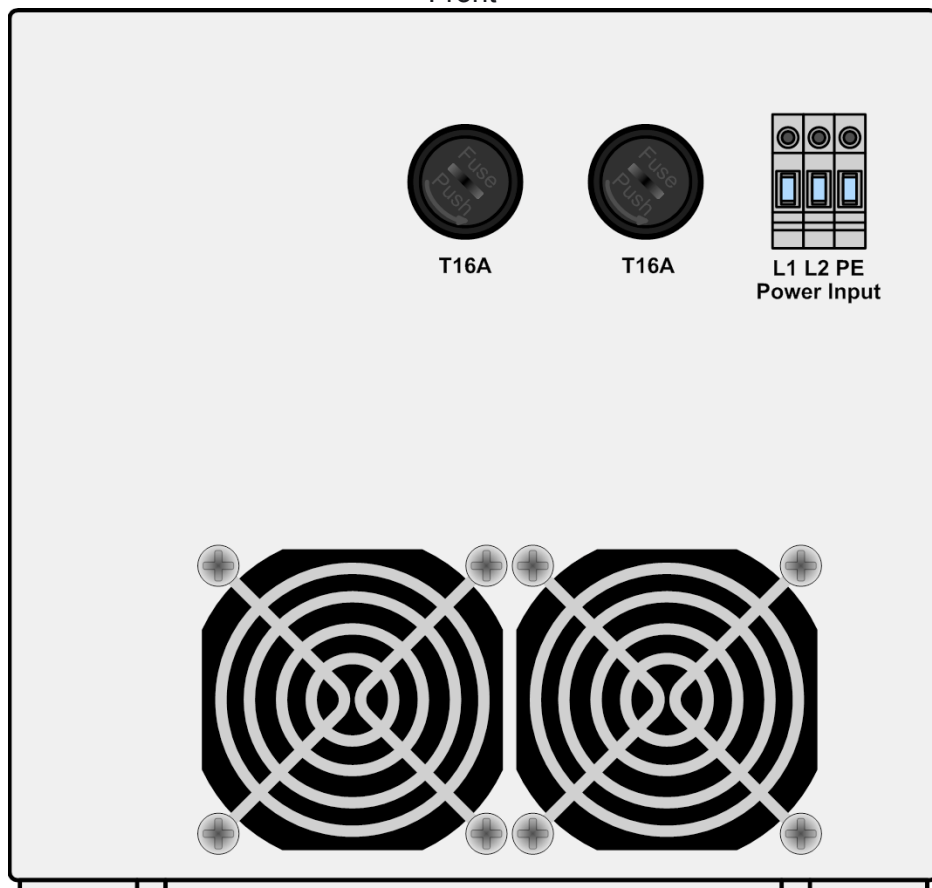


Figure 3. Bottom view with AC input and fuseholders

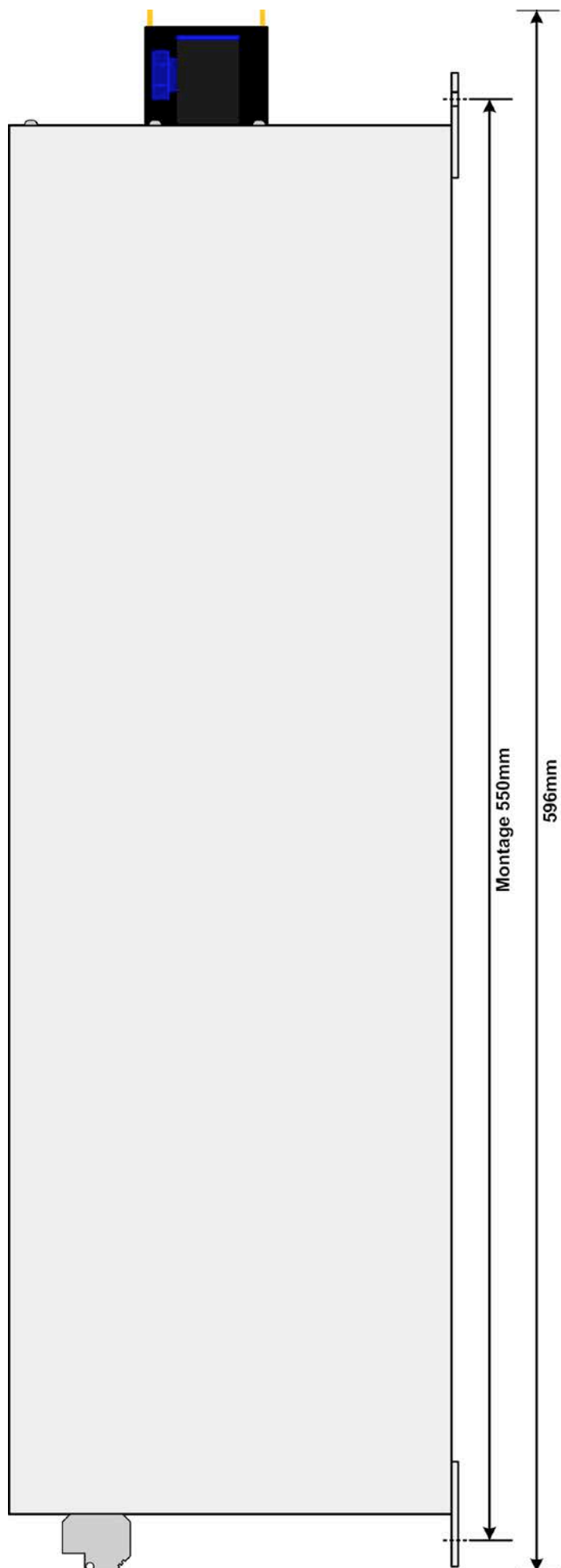


Figure 4. Side view

5. Operation

5.1 Powering the device

The device does not feature a power switch. When connecting it to mains, it is immediately ready to work.

After switching mains off, the device stores the last state (selected mode, output condition) in order to restore it automatically with the next start. Thus it can continue to work after an interruption like a blackout etc.

5.2 Adjusting the output voltage

The nominal output voltage is separated into three selectable voltage ranges, each approximately 1/3 of the nominal voltage. For details see the „4. Technical specifications“.

The built-in trimmer „Output adjust“ is a 10-turn type and the approximate 10 rotations from left stop to right stop correspond to the selected range.

The device has no voltage or current display and thus an external measuring device has to be used when adjusting the output voltage.

Note: if the output is not loaded when adjusting the output voltage down, the voltage may only sink slowly. It is advised to adjust only with slow rotations or wait after each turn for the voltage to settle.

5.3 Switching output on or off

The pushbutton „Output On/Off“ is used to switch the power output on or off, if not inhibited by any error (OVP or OT) or the device being in remote control. The voltage set by the trimmer will then be put out immediately.

The output can also be switched off at any time via pin 8 „Rem-SB“ of the analogue interface and then on again.

Attention! The pin REM-SB overrides the pushbutton „Output On/Off“.

When the output is switched on, the LED „CC“ will indicate constant current operation (LED is on) or constant voltage operation (LED is off).

Caution! When switching the output off with no load or only small load connected, there will still be voltage at the output. Voltage sinking down to 0V can take up to 60s, depending on the power supply model. Dangerous voltage still present!

5.4 Selecting a voltage range

The pushbutton „Output Voltage Range“ is used to select one of the three voltage ranges. In order to select one, the power output has to be switched off first. Selecting a different range and subsequently switching the output on again will immediately set the output voltage that corresponds to the position of the trimmer within the select range.

Attention! The output voltage can hereupon rise up to dangerous levels which can damage the connected load.

6. Remote control

Set values can be put in externally via the pins VSEL (voltage set values) and CSEL (current set value) and with analogue voltages of 0...10V.

The power output values are put out as monitor signals VMON (actual voltage) and CMON (actual current) in a range of 0...10V.

In order to control the set values remotely, remote control has to be activated first. This is done by pulling pin 7 „Remote“ to low (bridge, relais, low resistive switch, open collector transistor).

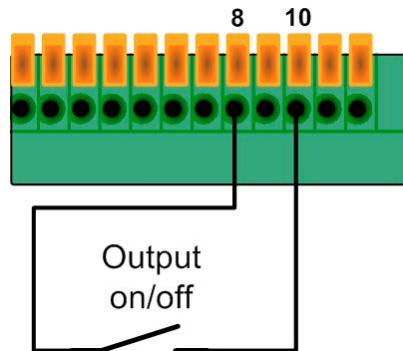
It is always necessary to put in both, voltage and current set values. If required, one of the set values can be bridged to the 10V reference pin VREF and will thus be 100%.

Remote control is indicated by the LED „External“. For pin assignment of the analogue interface see table below.

6.1 Examples for the analogue interface

6.1.1 Remotely switching output on / off

Input : REM-SB (8)



The input can be used to switch off the device output at any time. After this, switching it on again is only possible by releasing the contact or switch.

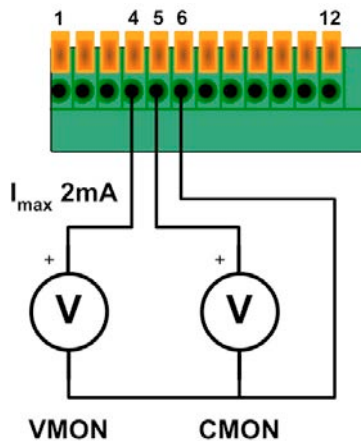
The contact/switch on pin 8 overrides the pushbutton „Output On/Off“. It means, if pin 8 „forces“ the output to be off, it can not be switched on by the pushbutton.

Switching to remote control by pin 7 is not required.

During remote control, this input REM-SB is also used to acknowledge and reset an OVP error by pulling the pin to LOW (=off).

6.1.2 Monitoring voltage and current

Analogue outputs: VMON (4) and CMON (5)



The analogue monitoring outputs VMON and CMON put out 0...10V, which corresponds to 0...100% of the actual values of voltage and current.

Measuring those output should be done with high-impedance meters or a high-impedance input of a measuring circuit, because those outputs can only drive limited current.

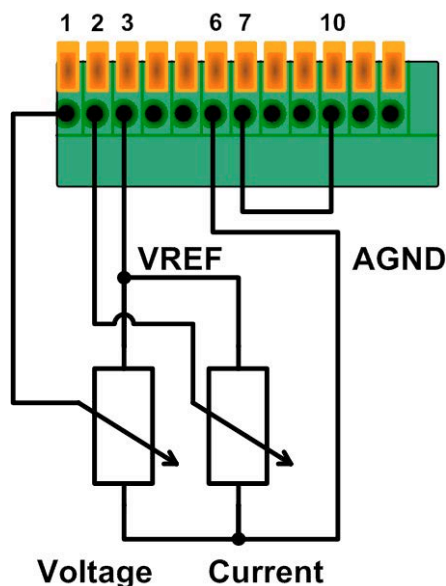
Pin assignment and technical specifications of the analogue interface:

Pin	Name	Type ¹	Description	Level	Electrical specifications
1	VSEL	AI	Set value: Voltage	0...10V correspond to 0...100% of U_{nom}	Accuracy <0.5%, $U_{max} = 12V$
2	CSEL	AI	Set value: Current	0...10V correspond to 0...100% of I_{nom}	Input impedance >100k
3	VREF	AO	Reference voltage	10V	Accuracy <0.5% at $I_{max} = 5mA$
4	VMON	AO	Actual value: current	0...10V correspond to 0...100% of U_{nom}	Accuracy 0.2% at $I_{max} = +2mA$
5	CMON	AO	Actual value: voltage	0...10V correspond to 0...100% of I_{nom}	Short-circuit-proof against AGND
6	AGND		Reference for analogue signals		For CMON, VMON
7	Remote	DI	Activate external control	External = Low ($U_{low} < 1V$), Internal = High ($U_{high} > 4V$)	$U_{max} = 30V$ $I_{out} = < 1mA$ at 5V $I_{out} = 2mA$ typ. at 0V
8	Rem-SB	DI	Power output off	Off = Low ($U_{low} < 1V$), On = High ($U_{high} > 4V$)	
9	OT / OVP	DO	Overtemperature OT / Overvoltage OVP	Low = No error ($U_{low} < 1V$) High = Error ($U_{high} > 4V$)	$U_{max} = 30V$, $I_{max} = 20mA$ Quasi Open Collector with pull-up to +15V
10	DGND		Reference for digital signals		For control and monitoring signals
11	Reserved	X	must not be connected		
12	Reserved	X	must not be connected		

¹⁾ AO = Analogue output, DI = digital input (no TTL/CMOS), DO = digital output (no TTL/CMOS)

6.1.3 Adjust set values 1

Analogue inputs: VSEL(1) and CSEL(2)



This example shows how the set values can be adjusted using the reference voltage (10V, VREF) and potentiometers on the set value inputs.

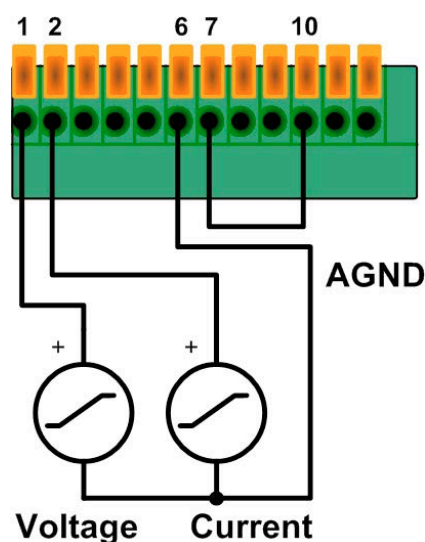
The bridge between pin 10 and Pin 7 switches the device to the required remote control mode. This bridge can be substituted by a low resistive switch.

In case only one of both set values shall be adjusted, the other one should be tied to pin VREF.

The potentiometer should be 10kΩ each or higher.

6.1.4 Adjust set values 2

Analogue inputs: VSEL(1) and CSEL(2)



The example shows how to control voltage and current by means of external voltage sources. Also see example 1.

Attention! Never connect voltages >12V to these inputs!

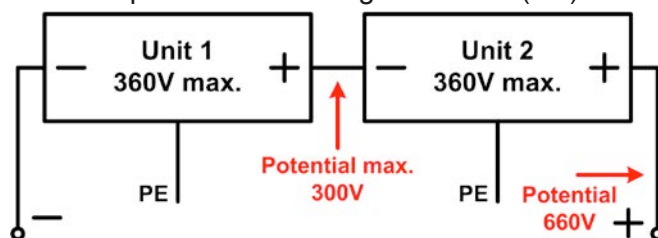
Set values >10V are internally clipped to 100% nominal value. Other applications

7. Other applications

7.1 Series connection

It is possible to connect multiple units of preferably the same type to a series connection if these rules are followed:

- No master-slave operation
- The grounds of the analogue interfaces **MUST NOT** be connected to each other. This also applies for any other signal on the analogue interfaces. If remote control is required, it can be done using galvanic isolation amplifiers and by controlling on or all units in parallel.
- The remote sense terminal must not be wired!
- The Share Bus terminal must not be wired!
- No negative DC output pole of any device may have a potential >300V against earth (PE).



7.2 Parallel connection

The parallel connection and operation of multiple identical units is basically possible, but not explicitly supported. Due to the overvoltage protection level that follows the adjusted output voltage, it is not possible to use the analog interface to create a master-slave-like system or to use the Share Bus for load current distribution.



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