Elektro-Automatik

操作说明书

Instruction Manual

EA-PS 800 R

320W / 640W

CE

EA-PS 816-20R	21 540 101
EA-PS 832-10R	21 540 102
EA-PS 865-05R	21 540 103
EA-PS 832-20R	21 540 104
EA-PS 865-10R	21 540 105
EA-PS 8160-04R	21 540 106

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安全说明

- 负载线的直径必须符合产品的额定输出电流。
- 请避免损坏产品，不要将金属元件插入通风槽，不要阻挡通风槽！
- 必匡由专业技术人员执行市电连接。
- 只能选用合适的连线，按照通用安全措施连到市电。
- 避免直接接触太阳光和湿气。

页码

1. 一般信息

1.1 简介

PS 800 R系列微处理器控制电源, 专门设计成墙挂式结构，以对流冷却器冷却。

其功能主要集中于工业用途。意思是，本产品在断电后仍可按最后设定继续工作。

输出电压在**65V以下**的型号有两组固定电压，专门适合12V，24V或48V电池用（根据产品型号）。一组电压作正常充电用，另一组则作涓充。还有第三个可选电压范围，可对0...100%的额定输出电压进行调刑。

160V或以上电压的型号，其输出电压分皞三个可选范围，每个被定义皞额定电压的1/3。

电源输出端有短路保护和过载保护。皞了保护负载，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。

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 更换内部保险丝

电源保灾丝位于产品内部。打开产品前，需将它完全与市电断开。

必匡是接受过危灾知识和安全规则训练的技术人员才可打开产品。

要替换保灾丝，需先松开前盖螺丝，小心地取下盖。保灾丝就在主板上，位于左手边。

1.4 供应清单

1 x 电源供应器

1 x 印刷版使用说明书

1 x 电源输入插头

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。也可参考第 7 页产品机械结构图。

2.2 与市电的连接

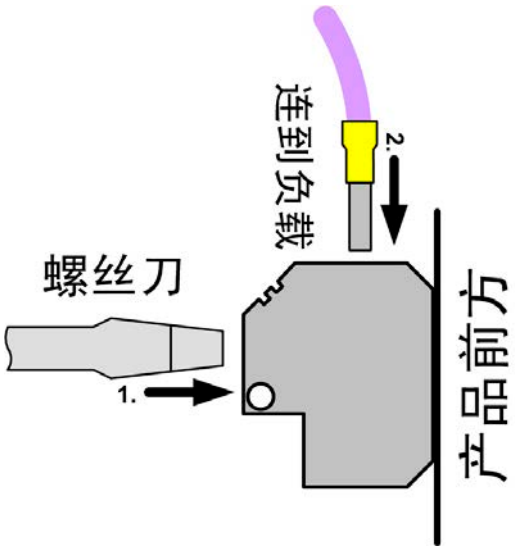
本系列所有型号都具有正向PFC (功率因素校正）和宽范围输入电压。可在90V至264VAC输入电压，以及45Hz至65Hz频率下工作。

按照前板丝印将电源线连到3位端子上（型号为：Phoenix Combicon GMSTB 2,5/3-ST-7,62）。仅受训技术人员方可执行。必匡使用适当直径的电源线，因为本产品无电源开关。电源输入端由一标准的5x20mm保险丝保护，它装于产品内部。

2.3 直流输出端和感测端的连接

直流输出和远程感测输入端位于产品前面，且相邻，为同类型端子（卡紧型），适合安装直径为0.08mm² (28 AWG)至4mm² (12 AWG)的连接线。如果可以，线尾请套上线套。

连线夹紧步骤：

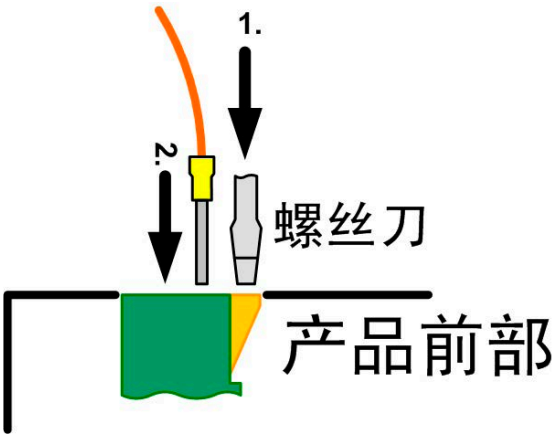


2.4 模拟接口的连接

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。

*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。*

连线夹紧步骤：



3. 功能描述

3.1 远程感测

为了补偿负载线上的压降，产品前板还配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。远程感测端可补偿多达2V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，过压保护值为当前调整的设定电压的偏移值。该偏移值为：

16V，32V，65V型号:2V

160V型号:3V

举例：如果一台160V的产品被设为100V，那么OVP在约103V时动作。

如果出现过压，不论是内部不良元件引起还是外部因素，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。

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“OVP”LED灯和模拟接口的(OT/OVP)9脚指示出来。

3.4 电池充电器模式

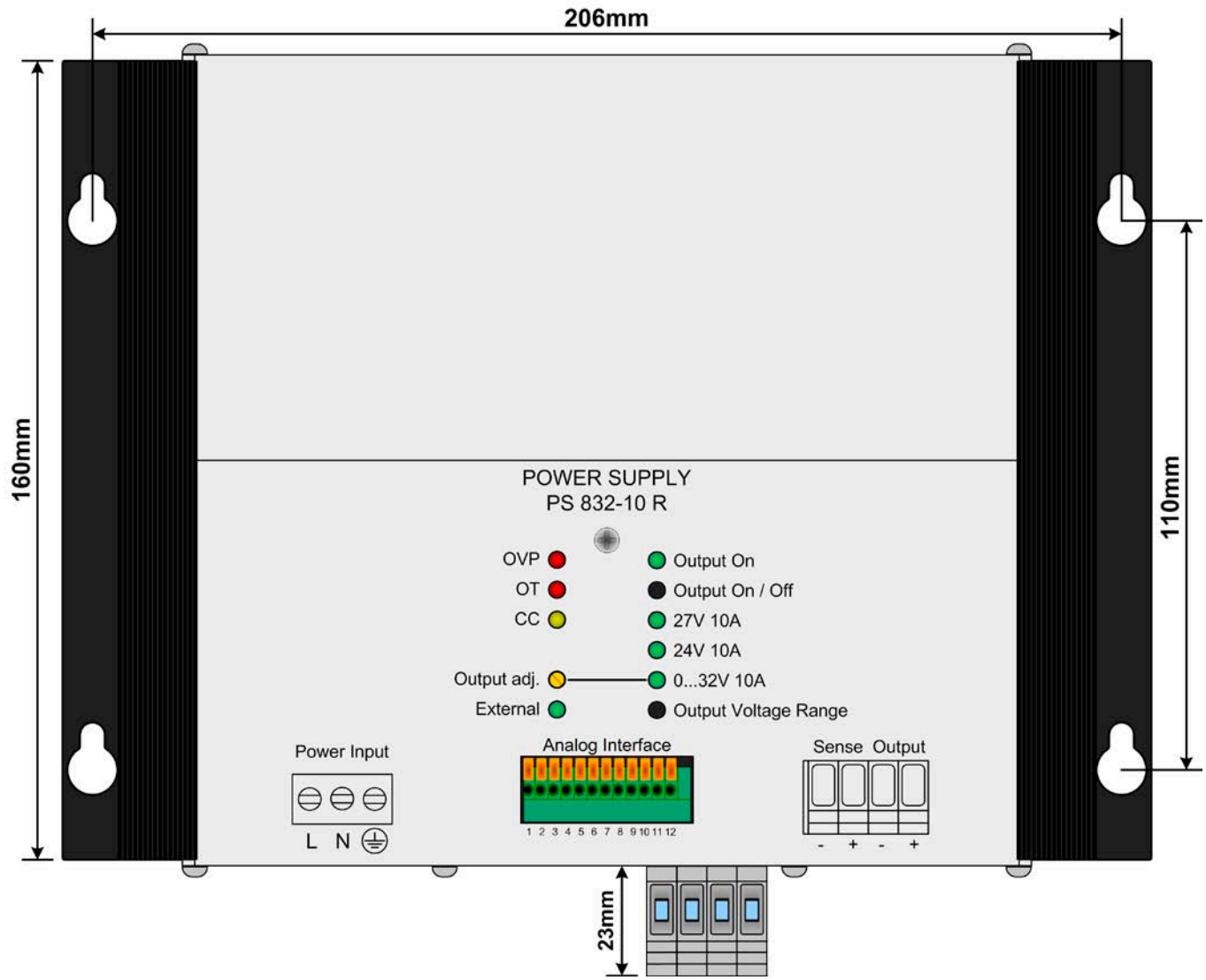
65V以下产品型号特征为，有两组固定输出电压，适合电池用。举例：型号的固定电压为12V（涓充）和13.5V（普通充）。

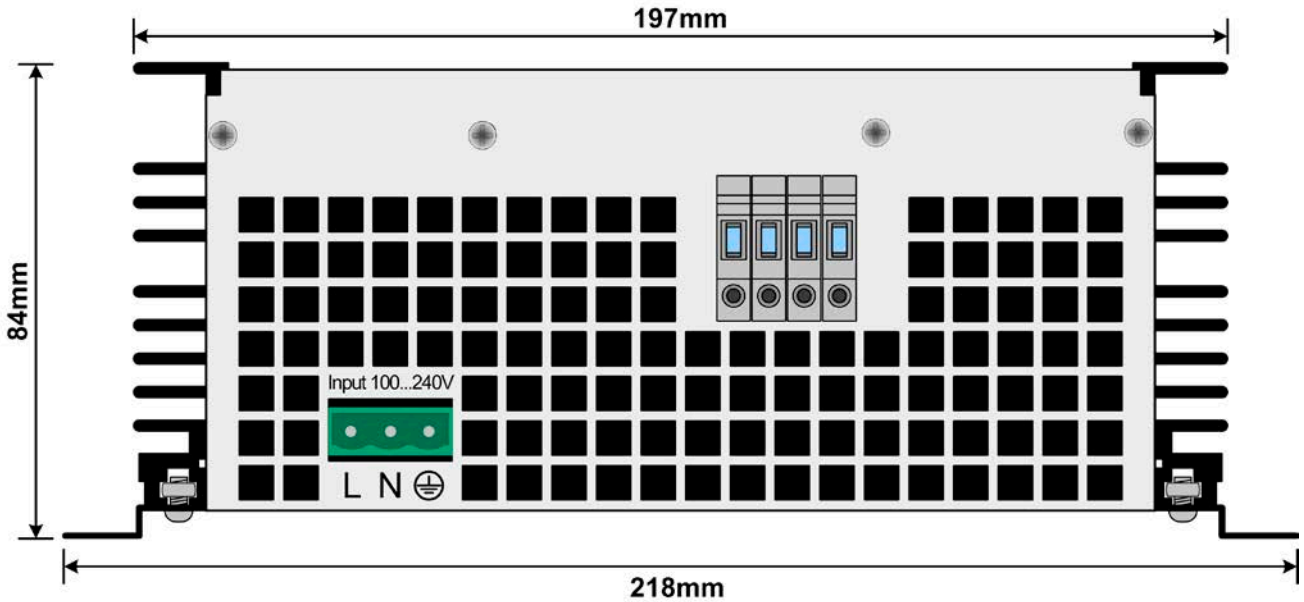
3.5 模拟接口

本系列产品前板有一12脚模拟接口，可用来监控产品状态，以及远程打开/关闭输出，控制/监控输出电压和/或输出电流。也可参考“5.6 远程控制”章节。

	PS 816-20R	PS 832-10R	PS 865-05R	PS 832-20R	PS 865-10R	PS 8160-04R
电源输入						
输入电压	90…264V	90…264V	90…264V	90…264V	90…264V	90…264V
输入频率	45…65Hz	45…65Hz	45…65Hz	45…65Hz	45…65Hz	45…65Hz
功率因数值	>0.99	>0.99	>0.99	>0.99	>0.99	>0.99
230V时输入电流	1.6A	1.6A	1.6A	3.2A	3.4A	3.2A
输入保险丝	M6.3A	M6.3A	M6.3A	T10A	T10A	T10A
输出 - 电压						
额定电压 U_{Nom}	16V	32V	65V	32V	65V	160V
电压范围 1	0…. U_{Nom}	0…. U_{Nom}	0…. U_{Nom}	0…. U_{Nom}	0…. U_{Nom}	0…60V
电压范围 2	12V	24V	48V	24V	48V	60V…120V
电压范围 3	13.5V	27V	54V	27V	54V	120V…160V
带载10…90%时的稳定度	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%
市电波动范围在±10% ΔU_{IN}时的稳定度	<0.02%	<0.02%	<0.02%	<0.02%	<0.02%	<0.02%
纹波	<40mV$_{PP}$ <4mV$_{RMS}$	<100mV$_{PP}$ <10mV$_{RMS}$	<150mV$_{PP}$ <20mV$_{RMS}$	<100mV$_{PP}$ <8mV$_{RMS}$	<150mV$_{PP}$ <10mV$_{RMS}$	<120mV$_{PP}$ <20mV$_{RMS}$
带载10-100%的调整	<2ms	<2ms	<2ms	<2ms	<2ms	<2ms
远程感测补偿	max. 2V	max. 2V	max. 2V	max. 2V	max. 2V	max. 2V
输出 - 电流						
额定电流	20A	10A	5A	20A	10A	4A
带载0…100% ΔU_{OUT}时的稳定度	<0.15%	<0.15%	<0.15%	<0.15%	<0.15%	<0.15%
市电波动范围在±10% ΔU_{IN}时的稳定度	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%
纹波	<10mA$_{RMS}$	<7mA$_{RMS}$	<3mA$_{RMS}$	<10mA$_{RMS}$	<3mA$_{RMS}$	<1mA$_{RMS}$
输出 - 功率						
额定功率	320W	320W	325W	640W	650W	640W
其它						
工作温度	0…50° C	0…50° C	0…50° C	0…50° C	0…50° C	0…50° C
储存温度	-20…70° C	-20…70° C	-20…70° C	-20…70° C	-20…70° C	-20…70° C
相对湿度	<80%	<80%	<80%	<80%	<80%	<80%
尺寸 (WxHxD)	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm
重量	2.1kg	2.1kg	2.1kg	2.1kg	2.1kg	2.1kg
产品编号	21540101	21540102	21540103	21540104	21540105	21540106
安全标准	EN 60950					
EMC标准	EN 61204, EN 55022 等级 B					
过压等级	等级 II					
保护等级	等级 I					

4. 1 产品结构图


206mm
160mm
110mm
POWER SUPPLY
PS 832-10 R
OVP
OT
CC
Output adj.
External
Output On
Output On / Off
27V 10A
24V 10A
0...32V 10A
Output Voltage Range
Power Input
L N
Analog Interface
1 2 3 4 5 6 7 8 9 10 11 12
Sense Output
- + - +
23mm


197mm
84mm
Input 100...240V
L N
218mm

5. 操作

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，而是立即工作。

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 给电池充电

要给电池充电，需用到“Output Voltage Range”按钮，用它选择一组固定电压，此时输出关闭。举例：32V产品，选择24V作涓充，27V作普通充。本系列中65V以上型号的额定电压也可用来给典型铅酸电池充电，但是在链接电池之前，先需通过调节电位器与外部万用表手动调整充电电压。

充电一般以恒压或恒流进行，但无温度补偿和充电曲线。故建议用来给普通铅性电池充电。

如果要求限制充电电流，需经模拟接口远程控制产品。模拟接口的CSEL输入脚可控制0...100%的输出电流，而VSEL引脚定义充电电压。

注意！仅能连接电池电压与产品固定电压或调节后电压匹配的电池。

注意！充电时以满电流操作！仅能通过模拟接口利用远程控制限制电流。

注意！仅当输出关闭时方可连接电池！本产品无反接保护。反接电池会损坏产品。

5.3 调节输出电压

65V以下产品，其输出电压有一特点，即电压范围可选，用内置电位器可调节。该电位器为10圈电位器，从最左至最右旋转一整圈对应0...100%的额定电压。

65V以上产品的输出电压分三个可选范围，每个范围约为额定电压的。详情见“4. 技术规格”。

内置10圈电位器从最左至最右旋转，对应选定电压范围。

5.4 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”按钮可打开或关闭电源输出。65V以下产品通过电位器或选定的固定电压，可立刻设定输出电压。只要输出被打开，“CC”灯会指示恒流操作（灯亮）或恒压操作（灯灭）。

也可通过模拟接口的“Rem-SB”引脚8，随时关闭输出和再打开它。

注意！引脚8优先于“Output On”按钮。

5.5 选择电压范围

“Output Voltage Range”按钮用于选择输出电压范围。输出必须关闭才可选择电压范围。

5.6 远程控制

可经模拟接口（产品顶部）的VSEL和CSEL引脚，以及0...10V模拟电压从外部输入设定值。

电源输出值可当0...10V范围内的VMON和CMON监控信号送出。

要远程控制设定值，先需激活“Remote”控制，即下拉“Remote”7引脚到低水平。还需用CSEL和VSEL引脚定义两组设定电压和电流。如需要，可将其中一设定值连到VREF参考电压引脚，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及规格请见章节5.6.2。

注意：使用或数字输入脚时需用到一低阻接触片（可为开关，继电器，开集三极管）。如PLC样的控制器的数字输出脚可能在这不够用。请先联系您的供货商咨询控制器的技术文件。

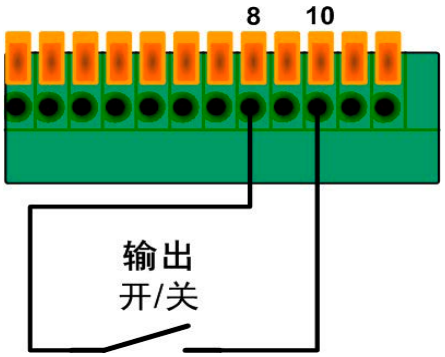
注意：使用模拟接口时，输出电压与电流的精确度跟手动调节相比要低一些。请参考5.6.2章节关于模拟接口精确度详细参数。

5.6.1 模拟接口举例

在进行任何连接前，请阅读章节“2.4 模拟接口的连接”的内容！

远程开/关输出

输入脚：REM-SB

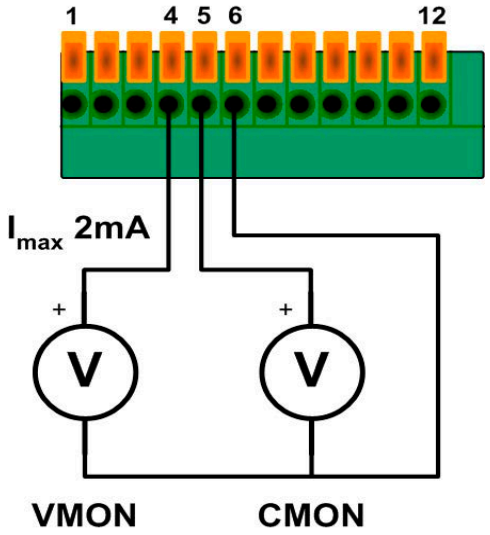


该输入脚可随时关闭产品。关闭后，只有断开此触点或开关才能再次打开。

- 引脚8上的触点/开关功能凌驾于„Output On“按钮之上。
- 不需利用引脚7将产品转至远程控制。
- 远程控制操作时，如果将REM-SB输入脚拉至LOW (=off)，也可用作确认和删除错误。

监控电压和电流

模拟输出脚：VMON和CMON

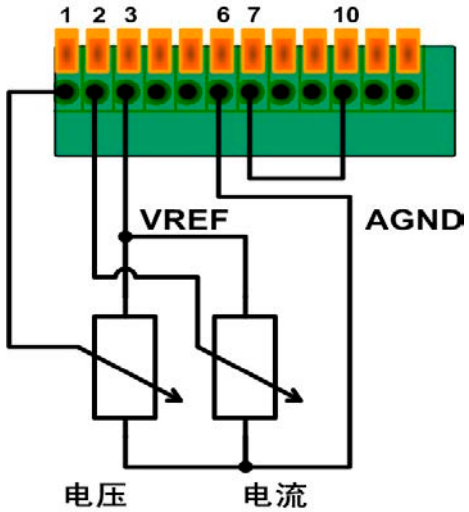


模拟监控输出脚输出0...10V电压，对应额定电压的0...100%。

参考脚为模拟地（AGND）。

调节设定值1

输入脚：VSEL 和 CSEL



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控制设定值。

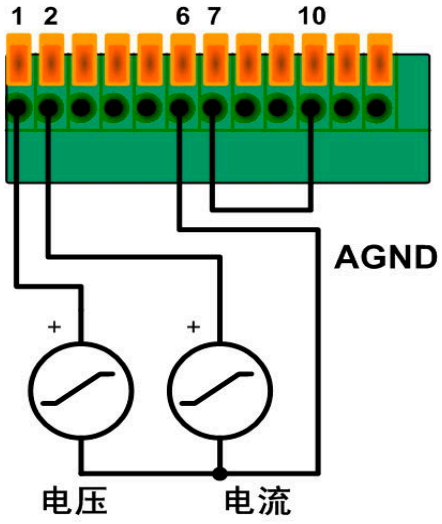
引脚7与10间的桥接器可将产品转至所需远程控制模式。该桥接器可用低阻开关代替。

如果只需调节两个设定值中的一个，另外一个则应并到VREF引脚。

电位器阻值应为10kOhm或更高。

调节设定值2

输入脚：VSEL 和 CSEL



这个例子显示如何通过外部电压源控制电压和电流。

注意！严禁连接>12V的电压至这些输入脚！

>10V的设定值会被内部限定为100%额定值。

5.6.2 模拟接口各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	AO	参考电压	10V	I_{max} = 5mA时，精确度<0.5%
4	VMON	AO	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	AO	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 I_{out} = 2mA typ. 0V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）	
9	OT / OVP	DO	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		

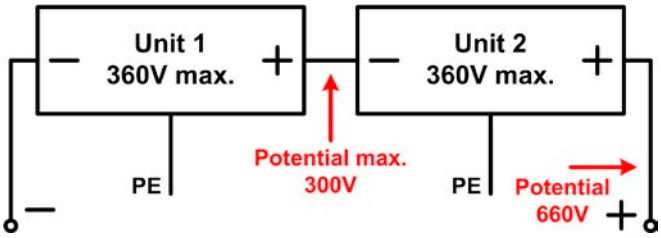
[1] AO = 模拟输出，DI = 数字输入(非TTL/CMOS脚)，DO = 数字输出(非TTL/CMOS脚)

6. 其它应用

6.1 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。
- 任何负载电流连线的直径必须与产品的最大额定输出电流对应。
- 任何一台产品直流输出负极对地(PE)电压不可>300V。



6.2 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

- 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.

Page

1. General

1.1 Introduction

The microprocessor controlled power supplies of the PS 800 R series are designed for wall mount and work with a convectional cooling.

The functionality focuses industrial power supply. It means, the device will automatically continue to work with the last settings after a blackout.

Models **up to 65V** output voltage feature two fixed voltages which are dedicated to load batteries with 12V, 24V or 48V (depending on the model). One of the fixed voltages is for normal charging, the other for trickle charging. A third selectable voltage range offers a trimmer to adjust the output voltage within 0...100% nominal value.

At models **with 160V or higher**, the output voltage is seperated into three selectable ranges, where each 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 devices also feature an overvoltage protection (OVP). At an overtemperature (OT) event, the power output will be switched off until the unit has cooled down and automatically switch on again.

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 Replacing the internal fuse

The main fuse is located inside the device. Before opening the device, completely disconnect it from mains.

Working on the open device must only be done by trained technical personnel which is instructed about the dangers and safety regulations.

In order to replace the fuse, unscrew the front cover plate and remove it precautiously. The fuse is located on the main PCB, on the left-hand side.

1.4 Scope of delivery

1 x Power supply unit

1 x Printed user manual

1 x AC Input plug

2. Installation

2.1 Mounting

The device is designed for 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. Also see mechanical drawing on page 15.

2.2 Mains connection

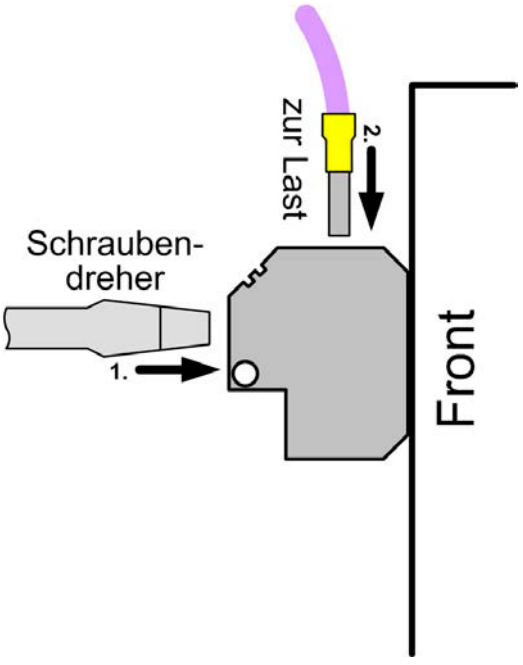
All models are equipped with an active PFC (power factor correction) and a wide range input. It can be operated at AC input voltages from 90V to 264V and mains frequencies of 45Hz up to 65Hz.

The connection is done with the included 3pole plug (Phoenix Combicon GMSTB 2,5/3-ST-7,62) and according to the print on the front plate. It must only be carried out by trained technical personnel. Main focus lies on an appropriate cross section of the mains lead, as well as the fact that the device does not feature a power switch. The mains input is fused by a standard 5x20mm fuse which is located inside the unit.

2.3 DC output and sense connection

The DC output and the remote sense inputs are located on the front of the device next to each other and are of same type (press & clamp). Cable cross section goes from 0.08mm² (28 AWG) to 4mm² (12 AWG). If possible, use cable end sleeves.

Clamping procedure:

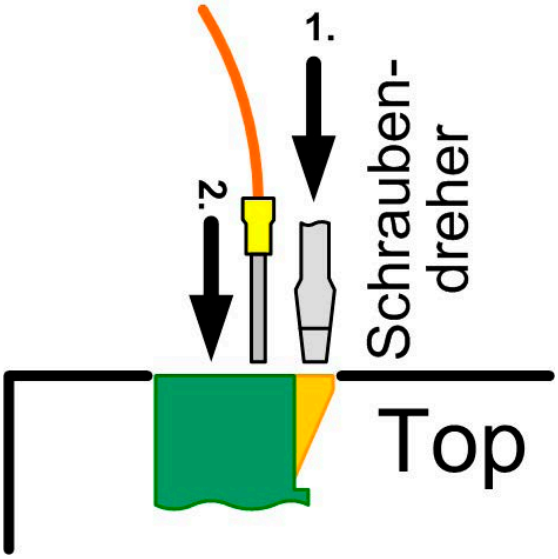


2.4 Analogue interface connection

The 12 pole analogue interface on the top side 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, for example), if that control application is otherwise 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:



3. Functional description

3.1 Remote sense

In order to compensate voltage drops along the load leads, the device features remote sense inputs on the front. Here the sensed voltage from the load is connected with correct polarity. Remote sense can compensate up to 2V.

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 currently adjusted voltage set value with an offset. This offset is:

16V, 32V, 65V models: 2V

160V model: 3V

If, for example, a 160V model is set to 100V, then the OVP would react at approx. 103V.

In case of an overvoltage condition, whether caused by an internal defect or by external reasons, 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.

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 switch on again.

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

3.4 Battery charger mode

Models up to 65V output voltage feature two fixed voltages to charge batteries. For example, at a 16V model these fixed voltage are 12V (for trickle charge) and 13.5V (for normal charge).

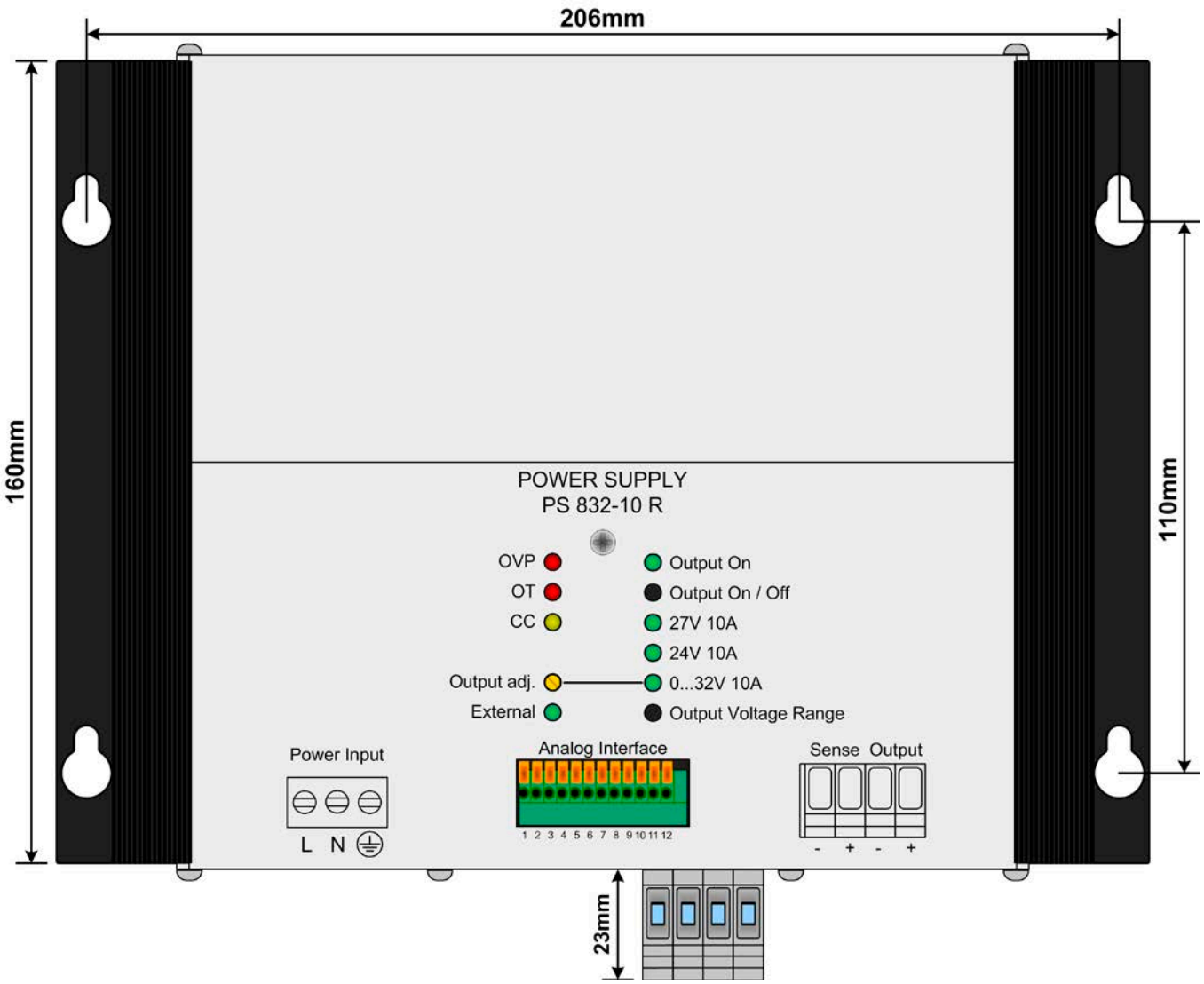
3.5 Analogue interface

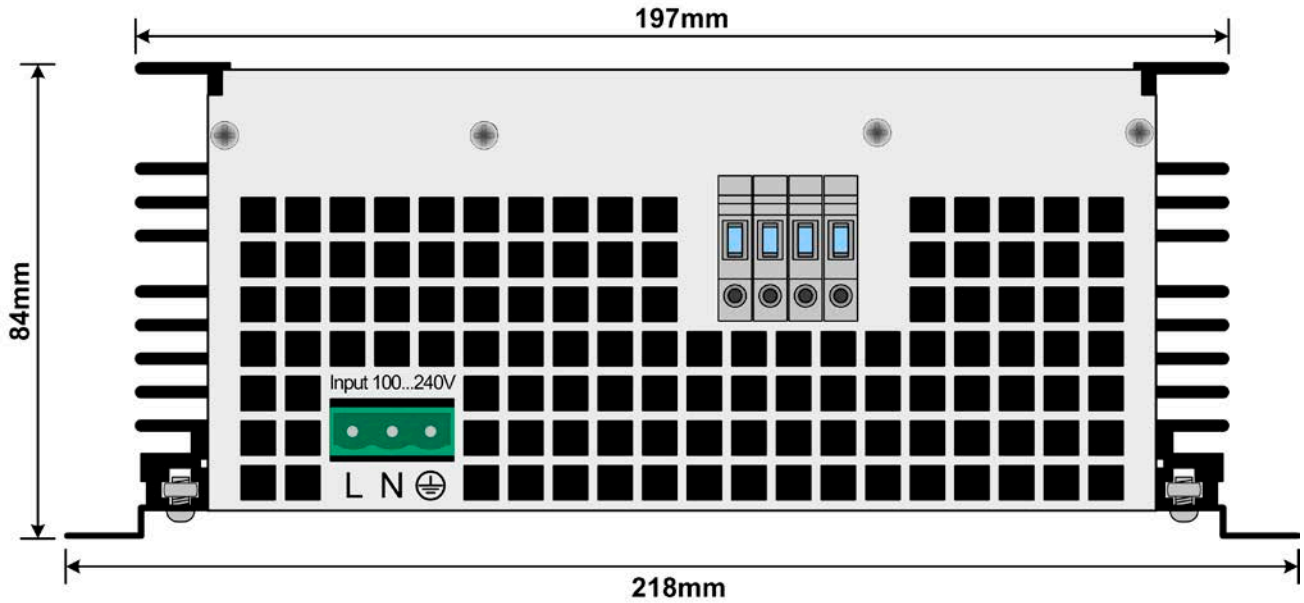
All models feature a 12 pin analogue interface on the front of the device. It can be used to monitor the device condition, as well as remotely switch the output on or off and to control/monitor output voltage and/or output current. Also see section „5.6 Remote control".

4. Technical specifications

	PS 816-20R	PS 832-10R	PS 865-05R	PS 832-20R	PS 865-10R	PS 8160-04R
Mains input						
Input voltage	90…264V	90…264V	90…264V	90…264V	90…264V	90…264V
Frequency	45…65Hz	45…65Hz	45…65Hz	45…65Hz	45…65Hz	45…65Hz
Power factor correction	>0.99	>0.99	>0.99	>0.99	>0.99	>0.99
Input current at 230V	1.6A	1.6A	1.6A	3.2A	3.4A	3.2A
Fuse	M6.3A	M6.3A	M6.3A	T10A	T10A	T10A
Output - Voltage						
Nominal voltage U_{Nom}	16V	32V	65V	32V	65V	160V
Voltage range 1	0…U_{Nom}	0…U_{Nom}	0…U_{Nom}	0…U_{Nom}	0…U_{Nom}	0…60V
Voltage range 2	12V	24V	48V	24V	48V	60V…120V
Voltage range 3	13.5V	27V	54V	27V	54V	120V…160V
Stability at 10-90% load	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%
Stability at ±10% Δ U_{In}	<0.02%	<0.02%	<0.02%	<0.02%	<0.02%	<0.02%
Ripple	<40mV_{PP} <4mV_{RMS}	<100mV_{PP} <10mV_{RMS}	<150mV_{PP} <20mV_{RMS}	<100mV_{PP} <8mV_{RMS}	<150mV_{PP} <10mV_{RMS}	<120mV_{PP} <20mV_{RMS}
Regulation 10-100% load	<2ms	<2ms	<2ms	<2ms	<2ms	<2ms
Remote sense compens.	max. 2V	max. 2V	max. 2V	max. 2V	max. 2V	max. 2V
Output - Current						
Nominal current	20A	10A	5A	20A	10A	4A
Stability at 0-100% Δ U_{Out}	<0.15%	<0.15%	<0.15%	<0.15%	<0.15%	<0.15%
Stability at ±10% Δ U_{In}	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%	<0.05%
Ripple	<10mA_{RMS}	<7mA_{RMS}	<3mA_{RMS}	<10mA_{RMS}	<3mA_{RMS}	<1mA_{RMS}
Output - Power						
Nominal power	320W	320W	325W	640W	650W	640W
Miscellaneous						
Operation temperature	0…50°C	0…50°C	0…50°C	0…50°C	0…50°C	0…50°C
Storage temperature	-20…70°C	-20…70°C	-20…70°C	-20…70°C	-20…70°C	-20…70°C
Humidity	<80%	<80%	<80%	<80%	<80%	<80%
Dimensions (WxHxD)	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm	218x84x163mm
Weight	2.1kg	2.1kg	2.1kg	2.1kg	2.1kg	2.1kg
Article No.	21540101	21540102	21540103	21540104	21540105	21540106
Safety	EN 60950					
EMC standards	EN 61204, EN 55022 Class B					
Overvoltage category	Class II					
Protection class	Class I					

4.1 Mechanical drawings





5. Handling

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 at the next start. Thus it can continue to work after an interruption like a blackout etc.

5.2 Charging a battery

In order to use battery charging, the pushbutton „Output Voltage Range“ is used to select one of the fixed voltages while the output is switched off. For example, at a 32V model the 24V selection is dedicated to trickle charge and the 27V to normal charge. Models of this series with >65V nominal voltage can also be used to charge a typical lead acid battery, but they require to adjust the charging voltage manually with the trimmer and by means of an external multimeter, before connecting a battery

Charging works with either constant voltage or with constant current, but without temperature compensation and without a charging profile. Thus it is only recommended for common lead batteries.

In case it is required to limit the charging current, the device has to be controlled remotely via the analogue interface. The CSEL input can control the output current within 0...100%, while VSEL defines the charging voltage.

Attention! *Only connect batteries whose battery voltage matches the fixed voltage ranges or the adjusted voltage of the device.*

Attention! *Charging is done with full output current! The current can only be limited using remote control via the analogue interface.*

Attention! *Only connect batteries when the output is switched off! There is no false polarity protection. Connecting batteries with false polarity will damage the device.*

5.3 Adjusting the output voltage

Models with **up to 65V** output voltage feature a selectable voltage range, that is adjustable with the built-in trimmer. This is a 10-turn trimmer and a complete rotation from left stop to right stop corresponds to 0...100% nominal voltage.

At models with **more than 65V** the output voltage is seperated into three selectable voltage ranges, each approximately 1/3 of the nominal voltage. For details see the „4. Technical specifications“.

The built-in trimmer is a 10-turn type and a complete rotation from left stop to right stop corresponds to the selected range.

5.4 Switching output on or off

The pushbutton „Output On“ is used to switch the power output on or off, if not inhibited by an error (OVP or OT) or the device being in remote control. The voltage set by the trimmer, or by the selected fixed voltage with models of up to 65V, will then be put out immediately. As long as the output is switched on, the LED „CC“ will indicate constant current operation (LED is on) or constant voltage operation (LED is off).

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 overrides button „Output On“.*

5.5 Selecting a voltage range

The pushbutton „Output Voltage Range“ is used to select the output voltage ranges. The output has to be off in order to select the voltage range.

5.6 Remote control

Set values can be put in externally via the pins VSEL and CSEL and with analogue voltages of 0...10V.

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

In order to control the set values remotely, the „remote“ control has to be activated first. This is done by pulling pin 7 „Remote“ to low. It is furthermore required to define the two set values of voltage and current with the CSEL and VSEL pins. If required, one of the set values can be bridged to the reference voltage VREF and will thus be 100%.

Remote control is indicated by the LED „External“.

For pin assigment of the analogue interface specifications in section 5.6.2.

Note*: Using the digital inputs „Remote“ or „REM-SB“ requires to use a low-resistive contact (switch, relay, open collector transistor). A digital output of a control application like a PLC might not be sufficient here. Please consult the technical documentation of your control application first.*

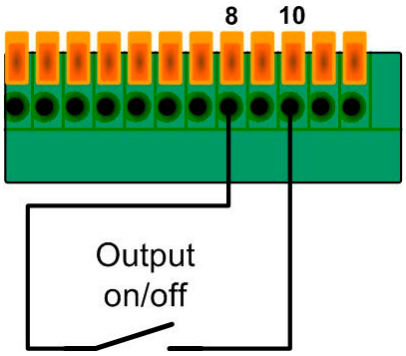
Note*: the accuracy of the output values of voltage and current is lower when using the analogue, compared to manual adjustment. Refer to section 5.6.2 for details about accuracy of the analogue interface.*

5.6.1 Examples for the analogue interface

Please read section „2.4 Analogue interface connection“ before connecting anything!

Remotely switching output on / off

Input: REM-SB

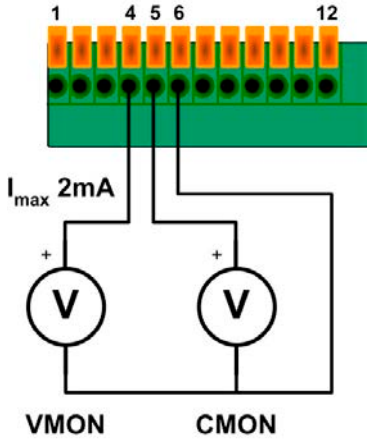


The input can be used to switch off the device output at any time. After this, switching it on again is only possible by releasing the contact or switch.

- The contact/switch on pin 8 overrides button „Output On“.
- Switching to remote control by pin 7 is not required.
- During remote control, this input REM-SB is also used to acknowledge and delete an OVP error by pulling the pin to LOW (=off).

Monitoring voltage and current

Outputs: VMON and CMON

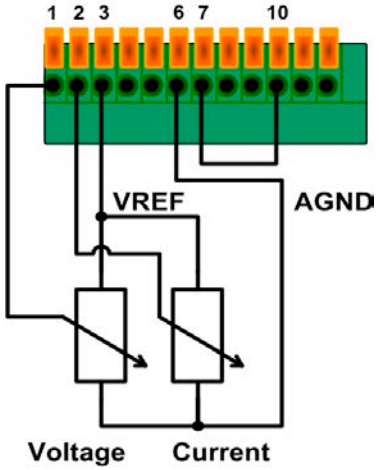


The analogue monitoring outputs put out 0...10V, which corresponds to 0...100% of the nominal values.

Reference is analogue ground (AGND).

Adjust set values 1

Inputs: VSEL and CSEL



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

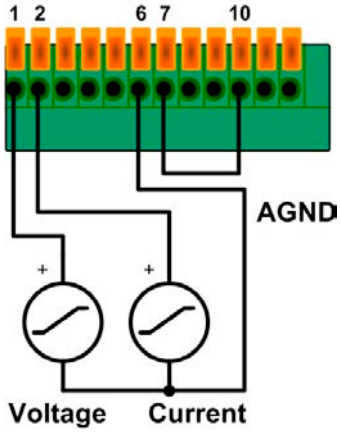
The bridge between pin 10 and pin 7 switches the device to the required remote control mode. This bridge can be substituted by a low resistive switch.

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

The potentiometer should be 10kOhm each or higher.

Adjust set values 2

Inputs: VSEL and CSEL



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.

5.6.2 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		

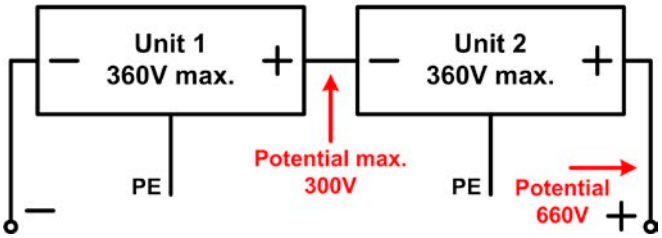
[1] AO = Analogue output, DI = digital input (no TTL/CMOS), DO = digital output (no TTL/CMOS)

6. Other applications

6.1 Series connection

It is possible to connect multiple units of 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 all units in parallel.
- Any load current leading conductor must be dimensioned for the maximum output current of the unit with the highest nominal output current.
- No negative DC output pole of any device may have a potential >300V against earth (PE).



6.2 Parallel connection

The parallel connection and operation of multiple identical units is basically possible, but not explicitely 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.

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