



操作说明书  
Instruction manual

选项/Option  
**Iso Analog**  
电源供应器用  
for Power Supplies

关于

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## 1. 第一次使用时阅读

重点！该隔离模拟接口与PS 8000系列产品上的标准非隔离模拟接口兼容，但是无参考或辅助电压输出脚。将本接口应用到现有控制应用中时请考虑此点！

## 2. 概述

可选但内置的15芯模拟接口卡插在产品后板，它具有下列功能：

- 远程控制输出电流、电压和功率
- 远程监控(OT, OVP, CC, CV)状态
- 远程监控实际值
- 远程打开/关闭输出

模拟输入脚和输出脚电压范围(0...5V或0...10V)的选择在产品设置菜单下完成。请阅读您的产品操作说明)。

使用说明：

- 用模拟电压来控制产品需用“REMOTE”(5)引脚转为远程控制模式。
- 连接控制电源的应用设备前，要保证所有线连接正确，并检查应用设备不会输入高于指定电压的电压(最大12V)。
- REM-SB(远程待机，13引脚)输入脚要优先于用来打开或关闭直流输出的ON按钮。意思是，如果该引脚定义输出状态为“off”，输出就不能打开。  
*提示：大多数产品适用于引脚为LOW级别，意味着“输出关闭”。PSI 8000系列却可选。意思是，引脚为LOW或HIGH时都可激活”输出关闭“。该引脚在内部上拉至HIGH。*
- 当选择了0...5V电压范围，输入10V以下的设定值时，那么高于5V的电压会被忽略(剪切掉)，并使输出值保持在100%范围内。

注意！请勿将模拟接口的地接到外控设备的输出端正极或负极！否则会抵消接口的电隔离特性！

图释：

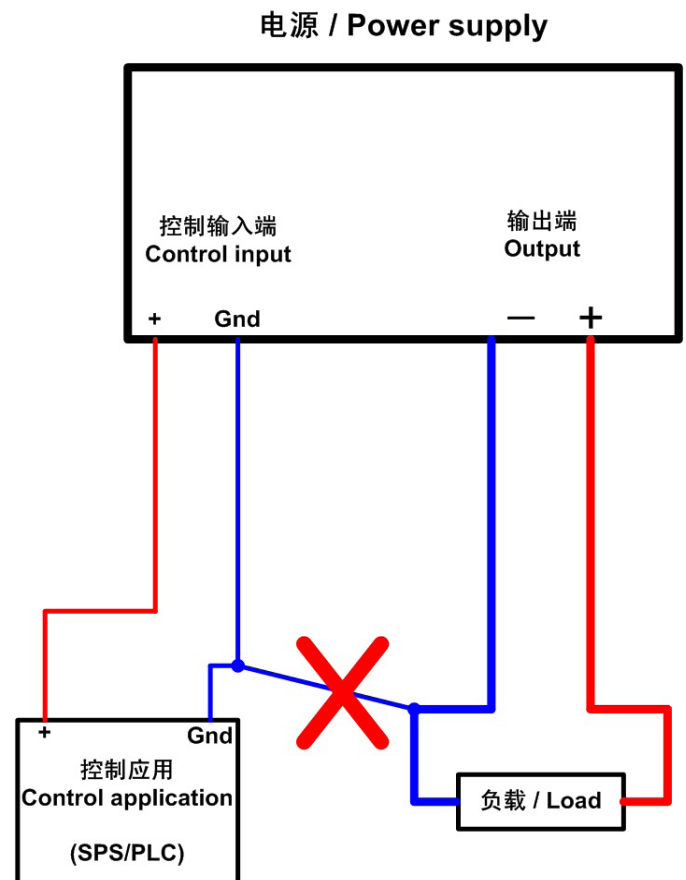


图1

## 3. 引脚分布图

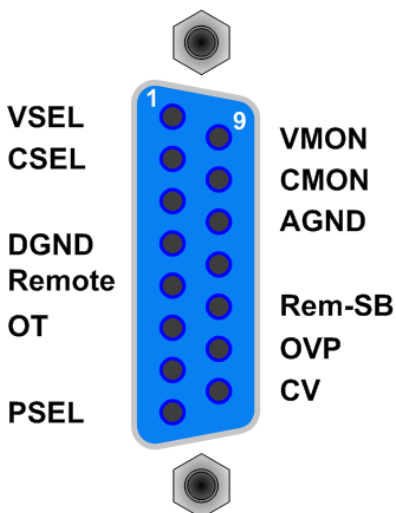
引脚	名称	类型*	描述	级别	电气参数
1	VSEL	AI	设定值: 电压	0...10V或0...5V对应0..100% of $U_{nom}$	精确度 < 0.2%
2	CSEL	AI	设定值: 电流	0...10V或0...5V对应0..100% of $I_{nom}$	阻值 $R_i > 100k$
3	N.C.				不连
4	DGND	POT	数控信号参考电位		+Vcc, 控制和状态信号
5	REMOTE	DI	在内控和外控间切换	外部 = LOW, $U_{Low} < 1V$ 内部 = HIGH, $U_{High} > 4V$ 内部 = 开	U范围 = 0 ...30V $I_{max} = +1mA$ at 5V 发送: 开集电极对DGND
6	OT	DO	过温错误 断电错误***	OT/PF = HIGH, $U_{High} > 4V$ 无错误 = LOW, $U_{Low} < 1V$	准开集电极上拉** 输出5V时, 电流最大+1mA $U_{CE} = 0.3V$ 时, $I_{max} = -10mA$ , $U_{max} = 0...30V$ , 短路保护对DGND
7	N.C.				不连
8	PSEL	AI	设定值: 功率	0...10V或0...5V对应0..100% of $P_{nom}$	精确度 < 0.5% 阻值 $R_i > 100k$
9	VMON	AO	实际值: 电压	0...10V或0...5V对应0..100% of $U_{nom}$	$I_{Max} = +2mA$ 时, 精确度 < 0.2%
10	CMON	AO	实际值: 电流	0...10V或0...5V对应0..100% of $I_{nom}$	对AGND有短路保护
11	AGND	POT	数控信号参考电位		针对-SEL, -MON信号
12	N.C.				不连
13	REM-SB	DI	输出关闭	关 = LOW, $U_{Low} < 1V$ 开 = HIGH, $U_{High} > 4V$ 开 = OPEN	U范围 = 0 ...30V $I_{max} = +1mA$ at 5V 发送: 开集电极对DGND
14	OVP	DO	过压错误	OVP = HIGH, $U_{High} > 4V$ 无OVP = LOW***, $U_{Low} < 1V$	准开集电极上拉至** 输出5V时, 电流最大+1mA
15	CV	DO	指示电压调整已激活	CV = LOW, $U_{Low} < 1V$ CC = HIGH, $U_{High} > 4V$	$U_{ce} = 0.3V$ 时, $I_{max} = -10mA$ $U_{max} = 0...30V$ , 短路保护对DGND

\*\* AI = 模拟输入脚, AO = 模拟输出脚, DI = 数字输入脚, DO = 数字输出脚, POT = 电位脚

\*\* 内部上拉电压约为 13...14V

\*\*\* 默认设定, 可在菜单设置下更改

## 3.1 Sub-D插座总图



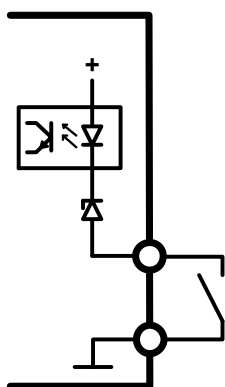
## 4. 应用举例

### 4.1 概述

提示：当产品打开直流输出，但是若未激活远程控制则不能工作。

提示：PLC或任何其它控制设备的数字输出可能不像**REMOTE**或**REM-SB**引脚那样将输入引脚下拉至LOW。这个需根据不同硬件的技术规格进行调整。

**REM-SB**输入脚和**REMOTE**引脚的原理图如下图：



### 4.2 输出关/开

提示：**REM-SB**引脚与远程控制是否激活没有关系，可以在任何时候关闭直流输出和打开输出，除非产品处于**LOCAL**模式。在**LOCAL**模式下，只能手动控制产品。

对于**PS 8000**系列产品

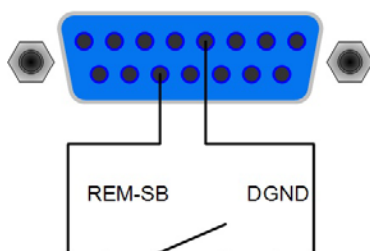
利用一低阻接触器，如开关，开集三极管或继电器，将13引脚，**REM-SB**（输入）接到地（LOW），即能关闭直流输出。再次打开该接触器，且之前没有关闭输出，则能打开它。

对于**PSI 8000**系列产品

13引脚，**REM-SB** (输入脚)的LOW或HIGH条件都可关闭产品的直流输出。这与产品设置下于模拟接口的设定有关。请参考操作说明书，菜单设置项“模拟接口”。

注意！此引脚内部上拉至HIGH。在设置菜单下为此引脚选择HIGH后，**„output off“**功能永久有效，且要求先拉至LOW，以便能手动或数字式控制输出端。

LOW条件可由低阻接触器，如开关、开集三极管或继电器来模拟。



### 4.3 激活远程控制

当要求用外部设定值控制产品时，需将产品转换到远程控制模式。

只要赋予**REMOTE**引脚相应的级别，即可激活远程控制，且不会被**LOCAL**模式中中断。

对于**PS 8000**系列产品

远程控制激活：REMOTE = LOW

远程控制停用：REMOTE = HIGH (开)

对于**PSI 8000**系列产品

远程控制激活：REMOTE = LOW | HIGH

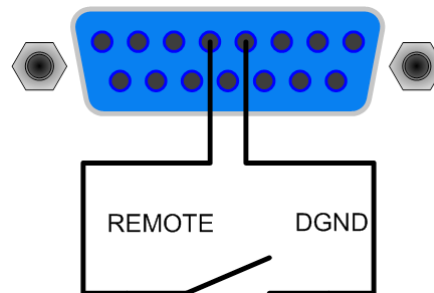
远程控制停用：REMOTE = HIGH | LOW

本系列转为远程控制的级别取决于菜单设置下**REMOTE**引脚的LOW或HIGH设定。

注意！此引脚在内部上拉至HIGH。菜单设置下选择HIGH时，**„remote“**功能永久有效，且要求拉至LOW，以便能手动或数字式控制输出端。

提示：**LOCAL**模式中中断任何远程控制。只要**LOCAL**模式被激活，只能手动设置参数和条件。一旦停用**LOCAL**，只要**REMOTE**引脚赋予相应级别，远程控制就会再次被激活。

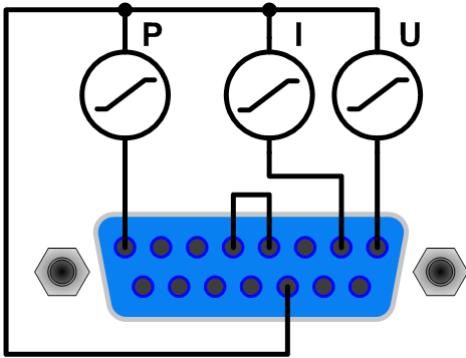
注意！在直流输出打开状态下转换到远程控制时，输出端可能会产生一个高且危险的电压，这根据模拟接口的已知设定值而定！



#### 4.4 设定值的远程控制

提示：远程控制期间，总是需要设置U、I和P的设定值。如果设定功率未知，产品就不能输出电压。

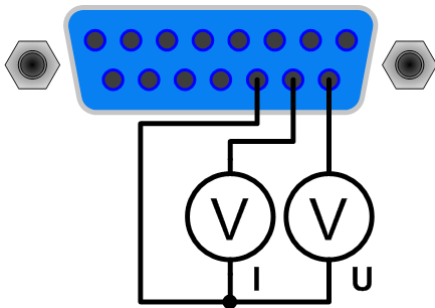
输入引脚VSEL (电压-U)，CSEL (电流-I) 和PSEL (功率-P，可调) 的参数必须从外部模拟接口设定。直流输出端0...100% 的输出值需通过这些引脚上0...5V或0...10V的输入电压设定。



#### 4.5 测量实际值

测量监控输出脚的实际值与远程控制模式无关。因为没有功率监控输出，只能测量到电压和电流监控。VMON与CMON引脚的参数通过0...10V或0...5V代表0...100%的实际直流输出值。

使用外部模拟倍增器，可以计算出功率监控输出。



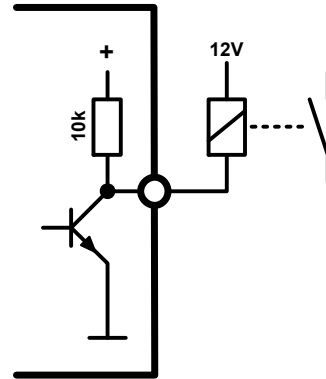
#### 4.6 提示

模拟接口的特点是，它具有更多输出引脚，如OVP或CV，能告知用户报警信息或状态（见„3. 引脚分布图“表）

Die这些输出脚从内部经一高阻值电阻拉至电压源，不能驱动LED或灯泡。主用作用是通过一外部继电器或类似装置的操作来吸收电流，从而驱动LED, 灯泡或其它指示器。

相应地，这些输出脚能连到逻辑IC的输入脚。

举例：



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## 1. Before first use

**Important! This isolated analogue interface is compatible to the standard non-isolated analogue interface of the PS 8000 series, but does not feature reference or auxiliary voltage outputs. This has to be considered when using an existing control application on this interface!**

## 2. General

The optional but built-in, 15 pole isolated analogue interface is located on the rear of the device and offers following features:

- Remote control of output current, voltage and power
- Remote monitoring of status (OT, OVP, CC, CV)
- Remote monitoring of actual values
- Remotely switching the output on/off

The selection of the voltage range of the analogue inputs and output to be either 0...5V or 0...10V for 0...100% values is done in the device setup. Please refer to the instruction manual of your device for further information.

Usage instructions:

- I. Controlling the device with analogue voltages requires to switch it to remote control with pin **REMOTE (5)**.
- II. Before connecting the application that is used to control the power supply, make sure to wire all leads correctly and check if the application is unable to put in voltages higher than specified (max. 12V).
- III. The input **REM-SB** (remote standby, pin 13) overrides the pushbutton on the device which is used to switch the DC output on or off. It means, the output can not be switched on by the button if the pin defines the output state as „off“.
 

*Note: with most device types it applies that LOW level on the pin means „output off“. With series PSI 8000 this is selectable. It means, that „output off“ can be achieved with LOW or HIGH on the pin, depending on the settings in the device setup. The pin is internally pulled up to HIGH.*
- IV. Putting in set values up to 10V while the 0...5V range is selected will ignore any voltage above 5V (clipping) and keep the output value at 100%.

**Attention! Never connect any ground of the analogue interface to minus (negative) output of the device, because this will neutralise the galvanic isolation of the interface!**

Clarification:

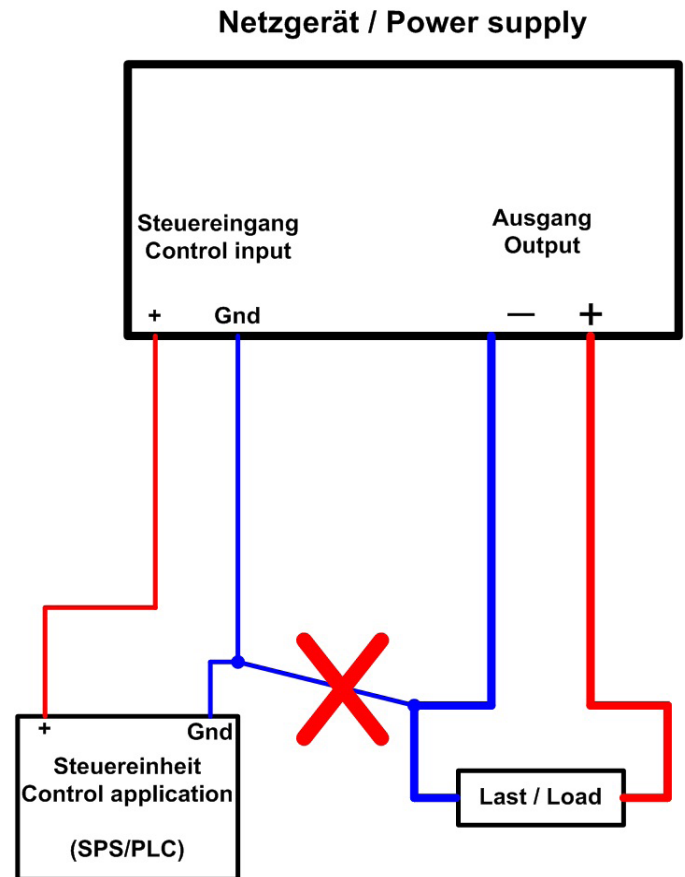


Figure 1

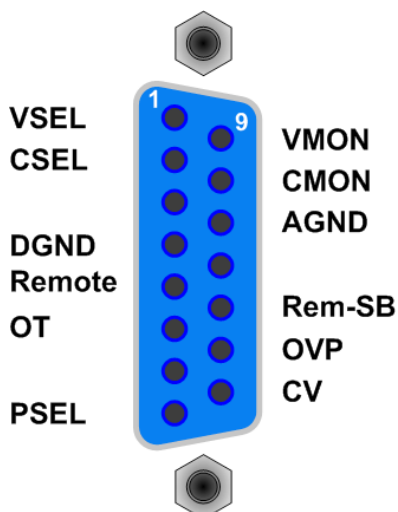
### 3. Pin specification

Pin	Name	Type*	Description	Level	Electrical specification
1	VSEL	AI	Set value: voltage	0...10V or 0...5V correspond to 0..100% of $U_{Nom}$	Accuracy < 0,2%
2	CSEL	AI	Set value: current	0...10V or 0...5V correspond to 0..100% of $I_{Nom}$	Impedance $R_i > 100K$
3	N.C.				Not connected
4	DGND	POT	Reference potential for digital control signals		For +Vcc, control and status signals
5	REMOTE	DI	Toggle between internal or external control	External = LOW, $U_{Low} < 1V$ Internal = HIGH, $U_{High} > 4V$ Internal = open	U range = 0 ...30V $I_{Max} = +1mA$ at 5V Sender: Open collector against DGND
6	OT/PF	DO	Overtemperature error Power fail error ***	OT/PF = HIGH, $U_{High} > 4V$ no error = LOW, $U_{Low} < 1V$	Quasi open collector with pull-up to Vcc ** At 5V at the output there will be max.+1mA $I_{Max} = -10mA$ at $U_{CE} = 0.3V$ $U_{Max} = 0...30V$ Short-circuit-proof against DGND
7	N.C.				Not connected
8	PSEL	AI	Set value: power	0...10V or 0...5V correspond to 0..100% of $P_{Nom}$	Accuracy < 0.5% Impedance $R_i > 100K$
9	VMON	AO	Actual value: voltage	0...10V or 0...5V correspond to 0..100% of $U_{Nom}$	Accuracy < 0.2% at $I_{Max} = +2mA$ Short-circuit-proof against AGND
10	CMON	AO	Actual voltage: current	0...10V or 0...5V correspond to 0..100% of $I_{Nom}$	
11	AGND	POT	Reference potential for analogue signals		For -SEL, -MON signals
12	N.C.				Not connected
13	REM-SB	DI	Output off	off = LOW, $U_{Low} < 1V$ on = HIGH, $U_{High} > 4V$ on = OPEN	U range = 0...30V $I_{Max} = +1mA$ at 5V Sender: Open-Collector against DGND
14	OVP	DO	Overvoltage error	OVP = HIGH, $U_{High} > 4V$ no OVP = LOW, $U_{Low} < 1V$	Quasi open collector with pull-up to Vcc ** At 5V at the output there will be max.+1mA $I_{Max} = -10mA$ at $U_{ce} = 0.3V$ $U_{Max} = 0...30V$ Short-circuit-proof against DGND
15	CV	DO	Indication of voltage regulation active	CV = LOW, $U_{Low} < 1V$ CC = HIGH, $U_{High} > 4V$	

\* AI = Analogue input, AO = Analogue output, DI = Digital input, DO = Digital output, POT = Potential \*\* Internal Vcc = 13.8

\*\*\* Power fail (input or PFC), only with PS 8000 3U and only with firmware 6.01 or up

#### 3.1 Overview Sub-D socket



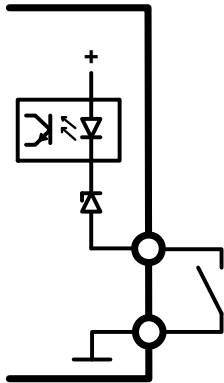
## 4. Example applications

### 4.1 General

Note: Switching the DC output on when it is initially off does not work if remote control is not active.

Note: A digital output of a PLC or any other controlling application may not be able to pull inputs like **REMOTE** or **REM-SB** to LOW. Refer to the technical specifications of the particular hardware for details.

Principle view of input REM-SB and REMOTE:



### 4.2 Output off/on

Note: Pin **REM-SB** is not depending on remote control being active and can switch off the DC output at any time resp. inhibit to switch it on, except the device is in LOCAL mode. During LOCAL mode the device can only be controlled manually.

#### With models of the series PS 8000

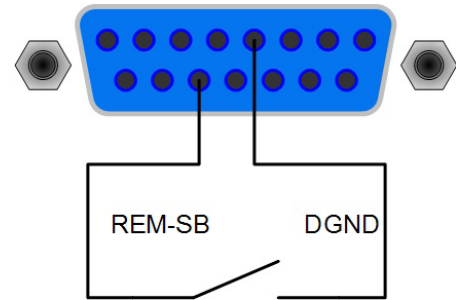
Switching the DC output off can be done by connecting pin 13, **REM-SB** (input) to ground (LOW) by means of a low-resistive contact like a switch, open collector transistor or relay. By opening the contact again, the output is switched on again if not otherwise switched to off before.

#### With models of the serie PSI 8000

Switching the DC output of the device off is either done with LOW or HIGH level on the pin 13, **REM-SB** (inout). This depends on the settings related to the analogue interface in the device setup. See device instruction manual, setup menu item „Analogue interface“.

*Attention! This pin is internally pulled up to HIGH. When selecting HIGH in the setup menu for this pin, the function „output off“ would be permanent and would require to pull the pin to LOW first, in order to be able to manually or digitally control the DC output.*

Condition LOW can be achieved by using a low-resistive contact like a switch, open collector transistor or relay.



### 4.3 Activate remote control

Switching to remote control is required as soon as the device is going to be controlled with external set values.

Remote control is active as long as pin REMOTE is given the corresponding level and remote control is not interrupted by LOCAL mode.

#### With models of the series PS 8000

Remote control active: REMOTE = LOW

Remote control inactive: REMOTE = HIGH (open)

#### With models of the serie PSI 8000

Remote control active: REMOTE = LOW | HIGH

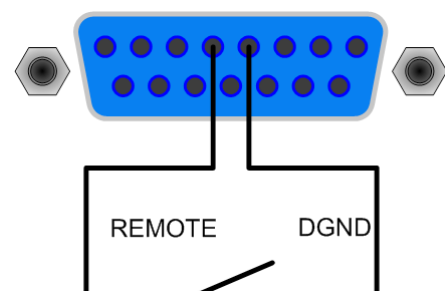
Remote control inactive: REMOTE = HIGH | LOW

With this series, the level to switch the device to remote control depends on the setting LOW or HIGH, given for this pin in the device setup.

*Attention! This pin is internally pulled up to HIGH. When selecting HIGH in the setup menu for this pin, the function „remote“ would be permanent and would require to pull the pin to LOW first, in order to be able to manually or digitally control the device.*

*Note: LOCAL mode interrupt any remote control. As long as LOCAL is active, values and condition can only be set manually on the device. As soon as LOCAL is deactivated, the remote control becomes active again, if pin REMOTE still gives.*

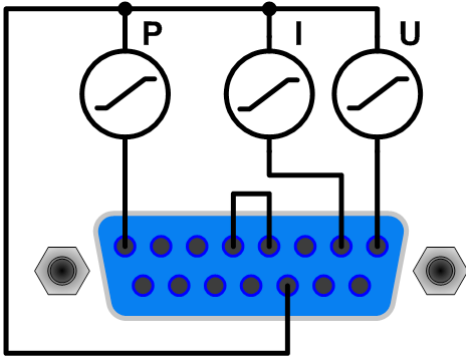
*Attention! When switching to remote control while the DC output is on, there might be a higher, dangerous output voltage on the output, depending on the given set values on the analogue interface!*



#### 4.4 Remote control of set values

*Note: During remote control, it is always required to give all set values (U and I). Models with power adjustment additionally require to give the power set value. If the power set value is not given, the device won't put out voltage.*

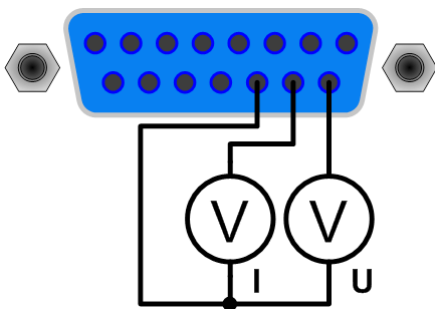
The inputs VSEL (voltage U), CSEL (current I) and PSEL (power P, where adjustable) have to be given with external, analogue voltages. For 0...100% value on the DC output it requires either 0...5V or 0...10V input voltage on these inputs.



#### 4.5 Measuring actual values

Measuring the monitor outputs of the actual values is independent from remote control. Since there is no power monitor output, only voltage and current monitor can be measured. The pins VMON and CMON represent the actual DC output values with either 0...10V or 0...5V for 0...100%.

By using an external analogue multiplier, the power monitor could be calculated.



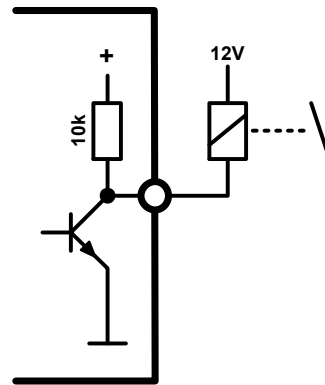
#### 4.6 Notifications

The analogue interface features further outputs like OVP or CV to notify the user of alarms or conditions (see table in „3. Pin specification“).

These outputs are internally pulled to a voltage source via a high resistor and can not drive a LED or lamp. They're intended for current intake by switching an external relay or similar, which can drive LED, lamps or other indicators.

Alternatively, these outputs can be connected to inputs of logic ICs.

Example:





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