![iseg Spezialelektronik GmbH logo]

Spezialelektronik GmbH

EHS Standard HV Modules
16 or 24 Channels with Common-GND

Operator's Manual

Contents

Attention!

-It is not allowed to use the unit if the covers have been removed.

-We decline all responsibility for damages and injuries caused by an improper use of the module. It is highly recommended to read the manual before any kind of operation.

Note

The information in this manual is subject to change without notice. We take no responsibility for any error in the document. We reserve the right to make changes in the product design without notification to the users.

Filename EH181xx as of 2011-10-19

1. General information

The EHS modules of this series are Standard multichannel high voltage power supplies in 6U Eurocard format. The output voltage features a high stability, low ripple and noise and low temperature coefficient. Each single channel has an independent voltage and current control. The data for set and measure values are given in a format of Floating Point Single Precision values. The modules are equipped with 24 bit ADC and 20 bit DAC circuits.
The channels share a Common-GND, which is connected to the internal Crate-Ground.

The HV output at the module is available as a 51 pin REDEL HV connector or as a 201311-3 AMP connector.

2. Technical data

	EHS F1 00x[)1]	EHS 181 10x[)1]	EHS F1 25x[)1]	EHS 181 25x[)1]	EHS F1 40x[)1]	EHS 181 40x[)1]
HV channels per module	16	24	16	24	16	24
Output voltage $V_{O\ nom}$ [kV]	1	1	2.5	2.5	4	4
Output current $I_{O\ nom}$ [mA]	4	4	0.5	0.5	1	1
Resolution of voltage setting[*)] [mV]	5	5	10	10	10	10
current setting[*)] [nA]	40	40	20	20	10	10
voltage measurement[*)] [mV]	5	5	10	10	10	10
current measurement[*)] [nA]	40	40	20	20	10	10
[*)] with standard sample rate 500/s and digital filter 64						
Ripple and noise [mV$_{P-P}$]	< 5					
	- at max. load and $\lvert V_O \rvert$ > 1% $\ast$ $V_{O\ nom}$ - f > 10 Hz					
Stability (no load/load and ΔV_{IN})	0.05%$\ast$ $V_{O\ nom}$					
Sample rates [samples/s]	5, 10, 25, 50, 60, 100, 500					
Digital filter averages	1, 16, 64, 256, 512, 1024					
The resolution of measurable values depends on the settings of the sampling rate and the digital filter!						
Accuracy of voltage measurement	$\pm (0.01\% \ast V_O + 0.02\% \ast V_{O\ nom})$					
Accuracy of current measurement	$\pm (0.02\% \ast I_O + 0.02\% \ast I_{O\ nom})$					
The measurement accuracy is guaranteed in the range 1% $\ast$ $V_{O\ nom}$ < $V_O \leq V_{O\ nom}$ and for 1 year						
Voltage ramp up / down [V/s]	$1\ast10^{-6} \ast V_{O\ nom}$ up to 0.2 $\ast$ $V_{O\ nom}$					
Temperature coefficient	$< \pm 50 \ast 10^{-6}/_K$					
Hardware limits V_{max} / I_{max}	potentiometer per module (V_{max} / I_{max} is the same for all channels)					

[)1] x=p polarity positive, x=n polarity negative

	EHS F110x[1]	EHS 18110x[1]	EHS F125x[1]	EHS 18125x[1]	EHS F140x[1]	EHS 18140x[1]
Interface	CAN-Interface (potential free)					
Operating mode	Full module and channel control via CAN interface in EHS mode: EDCP (Enhanced Device Control Protocol)					
Module status	green LED turns on if all channels have the status "Ready"					
	yellow LED turns on if one or more channels have the status "HV ON"					
HV output protection	Overload, short-circuit and arc protection; only one short-circuit or arc per second allowed.					
Protection loop (I_s) potential free (2 pin Lemo-socket and REDEL SL)	5 mA < I_s < 20 mA $\Rightarrow$ module on I_s < 0.5 mA $\Rightarrow$ module off					
Power requirements V_{INPUT} +24 V	4 A	6 A	1.6 A	2.3 A	4 A	6 A
Power requirements V_{INPUT} +5 V	0.1 A	0.2 A	0.1 A	0.2 A	0.1 A	0.2 A
Packing	6U Euro cassette (40.64 mm wide and 220 mm deep)					
Connector on the rear	96-pin connector according to DIN 41612					
HV connector	51 pin REDEL HV connector (R51)					
Operating temperature	0 ... +40 °C					
Storage temperature	-20 ... +60 °C					

[1] x=p polarity positive, x=n polarity negative

3. Handling

3.1 Connection

The supply voltages and the CAN interface are connected to the module via a 96-pin connector on the rear side of the module.
The module is controlled in the selected CAN operating mode (EHS or EHQ),, the factory setting is "EHS mode".

3.2 Limits

The maximum output voltage for all channels (hardware voltage limit) is defined through the position of the corresponding potentiometer V_{max} .
The maximum output current for all channels (hardware current limit) is defined through the position of the corresponding potentiometer I_{max} .
The greatest possible set value for voltage and current is given by $V_{max} – 2\%$ and $I_{max} – 2\%$, respectively.
It is possible to measure the hardware voltage and current limits at the sockets below the potentiometer. The socket voltages are proportional to the relative limits, where 2.5 V corresponds to 102 ± 2 % $V_{O\ nom}$ and 102 ± 2 % $I_{O\ nom}$.
The output voltage and current are limited to the specified value. If a limit is reached or exceeded in any channel the green LED on the front panel turns off.

3.3 Safety Loop

A safety loop can be implemented via the safety loop socket (SL) on the front panel and between the SL-contacts (Pin 22 and PIN 30) at the REDEL-connector if equipped. If the safety loop is active then an output voltage in any channel is only present if the safety loop is closed and an external current in a range of 5 to 20mA of any polarity is driven through the loop. (For modules with a REDEL-connector the other SL input must be closed.) If the safety loop is opened during the operation the output voltages are shut off without ramp and the corresponding bits in the 'ModuleStatus' (see manual "Operator's Manual CAN-Interface" 5.5.2.1 ModuleStatus) and ModuleEventStatus (5.5.2.3 ModuleEventStatus) are cancelled. After closing the loop again the ModuleEventStatus has to be reset and the channels have to be switched ON.

The loop connectors are potential free, the internal voltage drop is approx. 3 V. In the factory setup the safety loop is not active (the corresponding bits are always set). The loop can be activated by removing the internal jumper. (see operator's manual for the CAN-Interface, app. B).

4. Pin assignment and connector layout

Pin assignment of the 96-pin connector according to DIN 41612:

pin		pin		pin		comment
a1	+5V	b1	+5V	c1	+5V	
a3	+24V	b3	+24V	c3	+24V	power supply
a5	GND	b5	GND	c5	GND	
a11	@CAN_GND	b11	@CAN_L	c11	@CAN_H	CAN bus interface, potential free
a13	/RESET	b13	/HW_RMPDWN			external control signals
a30	A4	b30	A5			address field:
a31	A2	b31	A3	c31	GND	set module address (A0 ... A5); connected to GND => address bit = 0
a32	A0	b32	A1	c32	GND	open => address bit = 1

/RESET		active low; global reset of the module; HV generation is stopped immediately	
/HW_RMPDWN	pulse form:	high – low – high	
	pulse-width:	1µs … 100µs	
	function:	ramp down of all channels immediately, with a ramp speed of V_{nom}/50s	
		Note: after activating this signal the ram speed is set to V_{nom}/50s	