EBS Bipolar Distributor HV Modules
with Common Floating-GND

Operator's Manual

Contents

iseg Spezialelektronik GmbH
Bautzner Landstr. 23
D - 01454 Radeberg / Rossendorf
Email: sales@iseg-hv.de
http://www.iseg-hv.com
Germany
Phone ++ 49 (0)351 / 26 996 - 0
Fax ++ 49 (0)351 / 26 996 - 21

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 EBxxx as of 2011-06-10

1. General information

The EBS series modules are Bipolar (4 quadrant) multichannel high voltage power supplies in 6U Eurocard format. Each single channel is sourcing or sinking the nominal current. The maximum possible voltage difference between the channels one the same board is 3000 V, e.g. $V_{O\ CH0}$ = +1000 V $\Rightarrow$ $V_{O\ CHn} \geq$ -2000 V; (n= 1 to 7). This voltage is limited by the firmware.
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 Floating-GND (C-RTN), which avoids ground loops and reduces the noise level in large systems. The Common Floating-GND is insulated from the Crate-Ground (CCG) up to ±50 V (with a 60 V hardware limit).

The HV output at the module is available as a 51 pin REDEL HV connector or as isolated built-in SHV connectors.

2. Technical data

	EBS 8005	EBS F005	EBS 8030	EBS F030
HV channels per module	8	16	8	16
Output voltage $\mathbf{V_{O\ nom}}$ [kV]	±0.5	±0.5	±3	±3
Output current $\mathbf{I_{O\ nom}}$ [mA]	±1	±1	±0.5	±0.5
Resolution of voltage setting*) [mV]	5	5	10	10
voltage measurement*) [mV]	10	10	30	30
current measurement*) [nA]	50	50	100	100
*) with standard sample rate 50/s and digital filter 64				
Ripple and noise [mV_{P-P}]	20			
	if output voltage difference between channels < 600V - at max. load - f > 10 Hz			
Stability (no load/load and ΔV_{IN})	0.005%			
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% $*$ V_O + 0.02% $*$ $V_{O\ nom}$)			
Accuracy of current measurement	$\pm$ (0.1% $*$ I_O + 0.1% $*$ $I_{O\ nom}$)			
The measurement accuracy is guaranteed in the range 1% $*$ $V_{O\ nom} < V_O \leq V_{O\ nom}$ and for 1 year				
Voltage ramp up / down [V/s]	$1*10^{-6} * V_{O\ nom}$ up to $1 * V_{O\ nom}$			
Floating voltage	Common-GND to System-GND: $\leq \lvert 50\ V \rvert$			
Temperature coefficient	$< \pm 50 * 10^{-6}/_K$			
Hardware limits V_{max} / I_{max}	potentiometer per module (V_{max} / I_{max} is the same for all channels)			

	EBS 8005	EBS F005	EBS 8030	EBS F030
Interface	CAN-Interface (potential free)			
Operating mode	Full module and channel control via CAN interface in EHS mode: EDCP (Enhanced Device Control Protocol) or EHQ mode: DCP (Device Control Protocol) see manual " CAN-Interface Operator's Manual"			
Module status	green LED turns on if all channels have the status "ready"			
Protection loop (I_s) potential free (2 pin Lemo-socket and REDEL SL)	5 mA < I_s < 20 mA ⇒ module on I_s < 0.5 mA ⇒ module off			
Power requirements V_{INPUT}	8/16 ch. module ± 0.5 kV: + 24 V (< 0.8 / 1.6 A) and + 5 V (< 0.2 A) 8/16 ch. module ± 3 kV: + 24 V (< 1 / 2 A) and + 5 V (< 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) isolated built-in SHV connector (SHV)			
Operating temperature	0 ... +40 °C			
Storage temperature	-20 ... +60 °C			

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, 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 20 mA 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 "CAN-Interface Operator's Manual ", app. B).

4. Pin assignment and connector layout

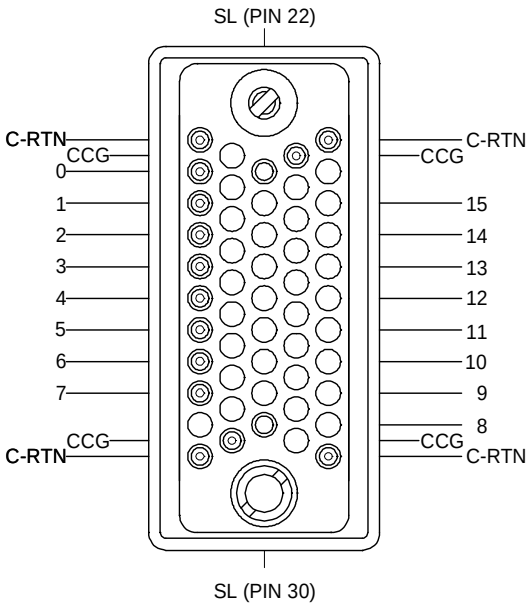
Pin assignment of the 96-pin connector according to DIN 41612:

pin		pin		pin		comment
a1	+5V	b1	+5V	c1	+5V	power supply
a2	GND	b2	GND	c2	GND	
a3	+24V	b3	+24V	c3	+24V	
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: set module address (A0 ... A5); pin connected to GND => address bit = 0 pin open => address bit = 1
a31	A2	b31	A3	c31	GND	
a32	A0	b32	A1	c32	GND	

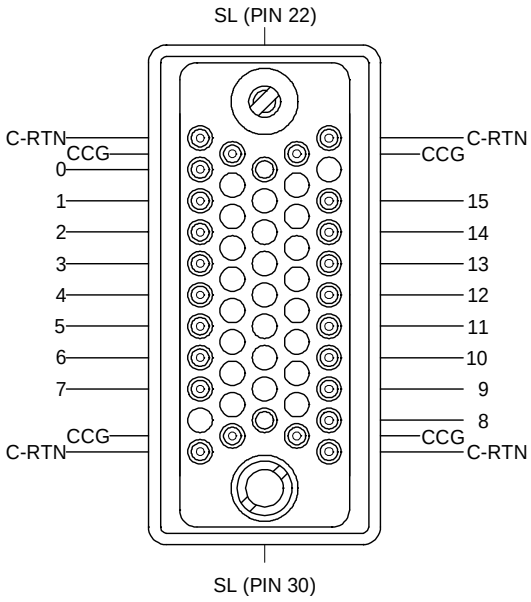
/RESET	active low; global reset of the module; HV generation is stopped immediately	
/HW_RMPDWN	pulse form:	high – low – high
	pulse-width:	1µs ... 100µs
	function:	ramp down all channels immediately with a ramp speed of V_{nom}/50s Note: after activating this signal the ramp speed is set to V_{nom}/50s

51 pin REDEL HV connector

EBS 8xxx



EBS Fxxx



CCG is connected with the Crate-GND and the shield

5. Order Information

Item Code	Type	Channels	V_{nom}	I_{nom}	HV Connector
EB080-05105R51	EBS 8005	8	±500V	1mA	REDEL)1
EB160-05105R51	EBS F005	16	±500V	1mA	REDEL)1
EB080-30105R51	EBS 8030	8	±3000V	0.5mA	REDEL)1
EB160-30105R51	EBS F030	16	±3000V	0.5mA	REDEL)1

)1 Option SHV instead of R51 => Connector SHV