High Voltage Power Supply EHS 86 vvx)1-F

8 HV channels with FLOATING-GND

Art. no.: EH086-60**x**)1105-F (SHV) ()1x = **p**: **+** or)1x = **n**: **-** 6 kV/ 1 mA)
EH086-40**x**)1205-F (SHV or R51) ()1x = **p**: **+** or)1x = **n**: **-** 4 kV/ 2 mA)
EH086-30**x**)1305-F (SHV or R51) ()1x = **p**: **+** or)1x = **n**: **-** 3 kV/ 3 mA)
EH086-20**x**)1405-F (SHV or R51) ()1x = **p**: **+** or)1x = **n**: **-** 2 kV/ 4 mA)
EH086-10**x**)1805-F (SHV or R51) ()1x = **p**: **+** or)1x = **n**: **-** 1 kV/ 8 mA)
EH086-05**x**)1156-F (SHV or R51) ()1x = **p**: **+** or)1x = **n**: **-** 0.5 kV/ 15 mA)

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 reservation and without notification to the users.

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

1. General information

The EHS 86vvx[)1]–F is a 8-channel high voltage power supply module in 6U Eurocard format. Each single channel is independently controllable with voltage and current control. The outputs RTN - floating GND - and HV of each channel are both floating against each other and against module GND.
The EHS 86vvx[)1] is made to be mounted into a 19" crate. The powered system crate ECH xx8 (19" rack) carries up to 8 modules. It is also possible to supply the modules separately with the necessary power. The unit is software controlled via CAN-Interface directly through a PC or similar controller in this cases. Using the w-ie-ner Mpod crate it is able to carries up to 10 modules with control via Ethernet-Interface. It is possible to create a multi-channel high voltage system of any configurable size. The HV outputs at the EHS 86vvx[)1] are equipped with SHV connectors or a REDEL Multipin HV connector. Optionally it is possible to install an hardware INHIBIT for each channel.

2. Technical data

EHS	**8605p**	**8605n**	**8610p**	**8610n**	**8620p**	**8620n**	**8630p**	**8630n**	**8640p**	**8640n**	**8660p**	**8660n**
Output voltage $\mathbf{V_{O\,nom}}$	+ 500 V	− 500 V	+ 1 kV	− 1 kV	+ 2 kV	− 2 kV	+ 3 kV	− 3 kV	+ 4 kV	− 4 kV	+ 6 kV	− 6 kV
Output per channel $\mathbf{I_{O\,nom}}$	15 mA		8 mA		4 mA		3 mA		2 mA		1 mA	
Resolution of voltage setting[)*]	20 mV		40 mV		80 mV		120 mV		160 mV		240 mV	
current setting[)*]	600 nA		320 nA		160 nA		120 nA		80 nA		40 nA	
voltage measurement[)*]	10 mV		20 mV		40 mV		60 mV		80 mV		120 mV	
current measurement[)*]	300 nA		160 nA		80 nA		60 nA		40 nA		20 nA	
[)*] **with standard sample rate 500/s, digital filter 64 and only guarantied in the setting range 2% ∗ $V_{O\,nom}$ < $V_O \le V_{O\,nom}$**												
Accuracy voltage measurement	± (0,01% ∗ V_O + 0,02% ∗ $V_{O\,nom}$ + 1 digit) (for one year) only guarantied in the setting range **2% ∗ $V_{O\,nom}$** < $V_O \le V_{O\,nom}$											
Accuracy current measurement	± (0,01% ∗ I_O + 0,02% ∗ $I_{O\,nom}$ + 1 digit) (for one year) only guarantied in the setting range **2% ∗ $V_{O\,nom}$** < $V_O \le V_{O\,nom}$											
Floating voltage	Connector RTN to GND: $\le \lvert 20\,V \rvert$ Connector HV to GND: $\le \lvert 20\,V \rvert + \lvert V_O \rvert$											
Ripple and noise (f > 10 Hz)	< 10 mV										< 30 mV	
Stability V_O	< 0,01% ∗ $V_{O\,nom}$ (no load/load and ΔV_{IN})											
Temperature coefficient V_O	< 5 ∗ 10^{-5} /K											
Hardware limits V_{max} / I_{max}	potentiometer per module (V_{max} / I_{max} is the same for all channels)											
Rate of changing output voltage	standard is 20% ∗ $V_{O\,nom}$ /s, option fast ramp up to 75% ∗ $V_{O\,nom}$ /s											
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											
Module status	green LED at channels 0-7 will work with 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											

EHS	**EHS 86 vvx)1-F**								
Optional INHIBIT per channel	about Sub-D-9 connector INHIBIT (TTL level)								
INHIBIT 0-7 / Channel	0	1	2	3	4	5	6	7	GND
Sub-D-9 connector / PIN	1	2	3	4	5	6	7	8	9
Power requirements V_{INPUT}	+ 24 V (< 3,5 A) and + 5 V (< 0,2 A)								
Packing	8-channels in 6U Euro cassette (40,64 mm wide and 220 mm deep)								
Connector on the rear	96-pin connector according to DIN 41612								
HV connector	SHV connectors or REDEL Multipin HV connector (only up to 4 kV)								
Operating temperature	0 ... +40 °C								
Storage temperature	-20 ... +60 °C								

3. Handling

The supply voltages and the CAN interface is connected to the module via a 96-pin connector on the rear side of the module.

The module will be controlled in the chosen CAN operating mode, factory setting is “EHS mode”.

The maximum output voltage for the channels 0 to 7 is defined through the position of the corresponding potentiometer V_{max} .
The maximum output current for the channels 0 to 7 is defined through the position of the corresponding potentiometer I_{max} .
The greatest possible set value of voltage or current follows from V_{max} – 2% resp. I_{max} – 2%.
It is possible to measure the hardware voltage and current limit, which have been set with reference to the maximum possible voltage and current at the socket below. 102 % V_{max} and 102 % I_{max} corresponds to 2,5 V.
The output voltage and current will be limited to the setting value after it exceeds the threshold and the corresponding green LED on the front panel is ‘OFF‘.

The safety loop is including the SL-contact Pin 22 and PIN 30 at the REDEL-connector and the safety loop socket (SL) on the front panel. If the safety loop is active then output voltage on all channels 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 flowing into the loop. If the safety loop is opened during operation then the output voltages are shut off without ramp and the corresponding bit in the ‘ModuleStatus’ (see manual CAN interface 5.5.2.1) and ModuleEventStatus (see manual CAN interface 5.5.2.3) will be cancelled. After the loop will be closed again the ModuleEventStatus (see manual CAN interface 5.5.2.3) must be restored and the channels must be switched ‘ON’. The pins of the loop are potential free, the internal voltage drop is ca. 3 V. Coming from the factory the safety loop is not active (the corresponding bits are always set). By removing of the internal jumper the loop will become active (see operator’s manual CAN-Interface, app. C).

Optionally it is possible to install an INHIBIT for each channel (n= 0 to 15) via the Sub-D connectors INHIBIT 0-7 and INHIBIT 8-15 (only with REDEL HV connector).
When the INHIBIT contact pin (n) will be connected to GND or TTL-LOW potential then the HV-PS on this channel will be switched OFF without ramp permanently and the green LED on front panel is off.

The INHIBIT active time (LOW potential) has to be minimal 100 ms!

When the INHIBIT is no longer active (TTL-HIGH potential or not connected), then the INHIBIT flag has to be erased before the voltage can switched ON again (see manual CAN interface 5.5.1.3).

Optional it is also possible that INHIBIT is active in case of Low-TTL or PIN-open. Corresponding channel is switched of in case of TTL-Low or if INHIBIT cable is disconnected then.

Pin assignment 96-pin connector according to DIN 41612:

PIN		PIN		PIN		Data
a1 a3 a5		b1 b3 b5		c1 c3 c5		+5V +24V GND
a11		b11		c11		@CAN_GND @CANL @CANH } potential free
a13		b13				RESET OFF with ramp (e.g. 10s after power fail)
a30 a31 a32	A4 A2 A0	b30 b31 b32	A5 A3 A1	 c31 c32	 GND GND	} Address field module address (A0 ... A5)

The hardware signal “OFF with ramp” (Pulse High-Low-High, pulse width ≤ 100 µs) on pin b13 will be shut off the output voltage for all channels with a ramp analogue to the Group access “Channel ON/**OFF”**. The ramp speed is defined to V_{Onom} / 50 s. This is the actually module ramp speed after “OFF with ramp”.

With help of the Group access “Channel **ON**/OFF**”** all channels are switched “ON” again.

With the address field a30/b30 ..... a32/b32 the module address will be coded.

Connected to GND ⇒ A(n) = 0 ; contact open ⇒ A(n) = 1

Pin assignment REDEL HV connector

See the drawing on the right side.