Technical documentation
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EHS Series

Versatile High Precision High Voltage Module with multiple Floating Options

- 4 / 8 / 16 / 24 / 32 / 48 channel, 100 V – 20 kV versions
- very low ripple and noise
- hardware voltage and current limits
- voltage and current control per channel
- programmable parameters (delayed trip etc.)

Document history

Version	Date	Major changes
2.0	06.04.2017	Relayouted documentation & fixes
2.1	03.08.2017	Fixed Itemcodes EHS CFG FLEX
2.2	17.09.2018 01.10.2018	Added Pin assignments R51.44, R51.46, I50.52 Notes revised

Disclaimer / Copyright

The information in this manual is subject to change without notice. We take no responsibility for any mistake in the document. We reserve the right to make changes in the product design without reservation and without notification to the users. We decline all responsibility for damages and injuries caused by an improper use of the device.

Important security information

It is strongly recommended to read the operator´s manual before operation. To avoid injury of users it is not allowed to open the unit. There are no parts which can be maintained by users inside of the unit. Opening the unit will void the warranty.

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

WARNING!	
WARNING!	The non-observance of the advices marked as “Warning!” could lead to possible injury or death.

ATTENTION!	
ATTENTION!	Advices marked as “Attention!” describe actions to avoid possible damages to property.

INFORMATION	
INFORMATION	Advices marked as “Information” give important information.

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1 General description

ATTENTION!

ATTENTION!

The devices must only be used in combination with iseg approved crates.

1.1 EHS Standard series

EHS Standard modules are multichannel high voltage power supplies in MMS system (Eurocard format). The output voltage features a high stability, low ripple and noise and low temperature coefficient. With up to 48 channels each single channel has an independent voltage and current control. By offering different configurations and options this module perfectly covers various types of applications such as detector supply, experimental setup or lab use. The EHS Standard module is available in three floating versions, Common Floating Ground (CFG), Floating Ground (FG) and Common Ground (CG).

1.2 EHS High Precision series

The EHS High Precision modules are multichannel high voltage power supplies in MMS system (Eurocard format) with exceptionally high stability, very low temperature coefficients and very low ripple and noise characteristics. With up to 16 channels each single channel has an independent voltage and current control. Compared to a standard module the High Precision EHS is equipped with a second current measurement range to precisely meter low currents. Switching between measurement ranges is done automatically. By offering different configurations and options this module perfectly covers various types of applications such as detector supply, experimental setup or lab use. The EHS High Precision module is available in two floating versions, Common Floating Ground (CFG) and Floating Ground (FG).

2 Technical data

2.1 EHS Standard series

SPECIFICATIONS	EHS CG	EHS CFG	EHS FG
Polarity	Factory fixed, positive or negative		
Floating principle	Common Ground	Common Floating Ground	Single Floating Ground
Potential difference	none	56 V channel/GND	20 V channel/channel/GND, opt. up to 2 kV
Ripple and noise (f > 10 Hz)	< 20 mV_{p-p} I < 3-5 mV_{p-p} opt. VLN	< 10 mV_{p-p}	
Ripple and noise (f > 1 kHz)	< 2 - 3 mV		
Stablity			
Stability [Δ_{Vout} vs. Δ_{Vin}]	$< 1 \cdot 10^{-4} \cdot V_{nom}$		
Stability - [ΔV_{out} vs. ΔR_{load}]	$< 5 \cdot 10^{-4} \cdot V_{nom}$	$< 2 \cdot 10^{-4} \cdot V_{nom}$	
Long term stability (1h warmup) 24h	$< 5 \cdot 10^{-5} \cdot V_{nom}$		
Temperature coefficient	< 50 ppm / K		
Resolution - The resolution of measurable values depends on the settings of the sampling rate and the digital filter!			
Resolution voltage setting	$2 \cdot 10^{-6} \cdot V_{nom}$		$4 \cdot 10^{-5} \cdot V_{nom}$
Resolution current setting	$2 \cdot 10^{-6} \cdot I_{nom}$		$4 \cdot 10^{-5} \cdot V_{nom}$
Resolution voltage measurement	$2 \cdot 10^{-6} \cdot V_{nom}$		
Resolution current measurement	$2 \cdot 10^{-6} \cdot I_{nom}$		
Measurement accuracy - The measurement accuracy is guaranteed in the range 1% • $V_{nom} < V_{out} < V_{nom}$ and for 1 year			
Accuracy voltage measurement	$\pm (0.01\ \% \cdot V_{out} + 0.02\ \% \cdot V_{nom})$		
Accuracy current measurement	$\pm (0.02\ \% \cdot I_{out} + 0.02\ \% \cdot I_{nom})$		
Sample rates ADC (SPS)	5, 10, 25, 50, 60, 100, 500		
Digital filter averages	1, 16, 64, 256, 512, 1024		
Voltage ramp up / down	up to $0.2 \cdot V_{nom}$ /s	up to $0.2 \cdot V_{nom}$ / s | opt. up to $0.75 \cdot V_{nom}$ / s	
Hardware limits	Potentiometer per module [V_{max} and I_{max}]		
Limit monitor voltage	2.5 V		
Digital interface	CAN		
Protection	Safety loop, overload and short circuit protected (there is only one short circuit or arc per second allowed!), opt. INHIBIT per channel (ID / IU, NID / NIU)		
HV connector	R51 | SHV		
System connector	96 PIN (MMS HV compatible)		
Safety loop connector	Lemo 2pole		
Limit monitor connector	Lemo 1pole	Lemo 2pole	Lemo 1pole
Case	19" plug-in cassette		
Dimensions – L/W/H	220mm / 8HP / 6U		
Operating temperature	0 – 40 °C		
Storage temperature	-20 -60 °C		
Humidity	20 - 80 %, not condensing		

Table 1: Technical data: Specifications EHS Standard

CONFIGURATIONS EHS STANDARD SERIES									
Type	**V_{nom}**	**I_{nom}**	**Ch**	**Max. I_{in} (A)** at 24V	**Ripple (mV_{p-p})** >1kHz | 10Hz-1kHz		**HV connector** **Standard**/opt.	**Item Code**	**Options**
Common Ground									
EHS F1 01x	100 V	10 mA	16	1.5	3	10	**R51.43**	EH161001x1060004300	SLA, SLP, VLN, ID, IU
EHS 201 01x	100 V	10 mA	32	3	3	10	**R51.45**	EH321001x1060004500	SLA, SLP, VLN, ID, IU
EHS F1 05x	500 V	8 mA	16	4	3	10	**R51.43**	EH161005x8050004300	SLA, SLP, VLN, ID, IU
EHS 201 05x	500 V	8 mA	32	8	3	10	**R51.45**	EH321005x8050004500	SLA, SLP, VLN, ID, IU
EHS F1 10x	1 kV	4 mA	16	4	2	15	**R51.43**	EH161010x4050004300	SLA, SLP, VLN, ID, IU
EHS 201 10x	1 kV	4 mA	32	8	2	15	**R51.45**	EH321010x4050004500	SLA, SLP, VLN, ID, IU
EHS F1 20x	2 kV	2 mA	16	4	2	20	**R51.43**	EH161020x2050004300	SLA, SLP, VLN, ID, IU
EHS 201 20x	2 kV	2 mA	32	8	2	20	**R51.45**	EH321020x2050004500	SLA, SLP, VLN, ID, IU
EHS F1 30x	3 kV	1.3 mA	16	4	2	20	**R51.43**	EH161030x1350004300	SLA, SLP, VLN, ID, IU
EHS 201 30x	3 kV	1.3 mA	32	8	2	20	**R51.45**	EH321030x1350004500	SLA, SLP, VLN, ID, IU
EHS F1 40x	4 kV	1 mA	16	4	3	20	**R51.43**	EH161040x1050004300	SLA, SLP, VLN, ID, IU
EHS 201 40x	4 kV	1 mA	32	8	3	20	**R51.45**	EH321040x1050004500	SLA, SLP, VLN, ID, IU
EHS F1 01x-VLN	100 V	10 mA	16	1.5	3	3	**R51.43**	EH161001x1060104300	SLA, SLP, ID, IU
EHS 201 01x-VLN	100 V	10 mA	32	3	3	3	**R51.45**	EH321001x1060104500	SLA, SLP, ID, IU
EHS F1 05x-VLN	500 V	8 mA	16	4	3	3	**R51.43**	EH161005x8050104300	SLA, SLP, ID, IU
EHS 201 05x-VLN	500 V	8 mA	32	8	3	3	**R51.45**	EH321005x8050104500	SLA, SLP, ID, IU
EHS F1 10x-VLN	1 kV	4 mA	16	4	2	5	**R51.43**	EH161010x4050104300	SLA, SLP, ID, IU
EHS 201 10x-VLN	1 kV	4 mA	32	8	2	5	**R51.45**	EH321010x4050104500	SLA, SLP, ID, IU
EHS F1 20x-VLN	2 kV	2 mA	16	4	2	5	**R51.43**	EH161020x2050104300	SLA, SLP, ID, IU
EHS 201 20x-VLN	2 kV	2 mA	32	8	2	5	**R51.45**	EH321020x2050104500	SLA, SLP, ID, IU
EHS F1 30x-VLN	3 kV	1.3 mA	16	4	2	5	**R51.43**	EH161030x1350104300	SLA, SLP, ID, IU
EHS 201 30x-VLN	3 kV	1.3 mA	32	8	2	5	**R51.45**	EH321030x1350104500	SLA, SLP, ID, IU
EHS F1 40x-VLN	4 kV	1 mA	16	4	3	5	**R51.43**, SHV	EH161040x1050104300	SLA, SLP,, ID, IU
EHS 201 40x-VLN	4 kV	1 mA	32	8	3	5	**R51.45**	EH321040x1050104500	SLA, SLP, ID, IU
Common Floating Ground									
EHS 80 01x	100 V	10 mA	8	1	3	5	**SHV**, R51.41	EH080001x1060000200	SLA, SLP, VCT, ID, IU
EHS F0 01x	100 V	10 mA	16	2	3	5	**SHV**, R51.43	EH160001x1060000200	SLA, SLP, VCT, ID, IU
EHS 80 05x	500 V	15 mA	8	4	3	10	**SHV**, R51.41	EH080005x1560000200	SLA, SLP, VCT, ID, IU
EHS F0 05x	500 V	15 mA	16	8	3	10	**SHV**, R51.43	EH160005x1560000200	SLA, SLP, VCT, ID, IU
EHS 80 10x	1 kV	8 mA	8	4	3	10	**SHV**, R51.41	EH080010x8050000200	SLA, SLP, VCT, ID, IU
EHS F0 10x	1 kV	8 mA	16	8	3	10	**SHV**, R51.43	EH160010x8050000200	SLA, SLP, VCT, ID, IU
EHS 80 20x	2 kV	4 mA	8	4	3	10	**SHV**, R51.41	EH080020x4050000200	SLA, SLP, VCT, ID, IU
EHS F0 20x	2 kV	4 mA	16	8	3	10	**SHV**, R51.43	EH160020x4050000200	SLA, SLP, VCT, ID, IU
EHS 80 30x	3 kV	3 mA	8	4	3	10	**SHV**, R51.41	EH080030x3050000200	SLA, SLP, VCT, ID, IU
EHS F0 30x	3 kV	3 mA	16	8	3	10	**SHV**, R51.43	EH160030x3050000200	SLA, SLP, VCT, ID, IU
EHS 80 40x	4 kV	2 mA	8	4	3	10	**SHV**, R51.41	EH080040x2050000200	SLA, SLP, VCT, ID, IU
EHS F0 40x	4 kV	2 mA	16	8	3	10	**SHV**, R51.43	EH160040x2050000200	SLA, SLP, VCT, ID, IU
EHS 80 60x	6 kV	1 mA	8	3	3	10	**S08**	EH080060x1050000300	SLA, SLP, VCT, ID, IU
EHS F0 60x	6 kV	1 mA	16	6	3	10	**S08**	EH160060x1050000300	SLA, SLP, VCT, ID, IU
EHS 40 80x	8 kV	1 mA	4	2.2	3	10	**S08**	EH040080x1050000300	SLA, SLP, VCT, ID, IU
EHS 40 100x	10 kV	0.7 mA	4	2.2	3	10	**S10**	EH040100x7540000400	SLA, SLP, VCT, ID, IU

Type	V_{nom}	I_{nom}	Ch	Max. I_{in} (A) at 24V	Ripple (mV_{p-p}) >1kHz	10Hz-1kHz	HV Connector **Standard**/opt.	Item code	Options
EHS 40 150x	15 kV	0.5 mA	4	2.2	3	10	**C15**, S20	EH040150x5040002300	SLA, SLP, VCT, ID, IU
EHS 40 200x	20 kV	0.4 mA	4	2.2	3	10	**S20**	EH040200x4040000500	SLA, SLP, VCT, ID, IU
Floating Ground									
EHS 86 01x	100 V	10 mA	8	1.5	3	5	**SHV**, R51.47	EH086001x1060000200	SLA, SLP, F02, F20, ID, IU
EHS F6 01x	100 V	10 mA	16	3	3	5	**SHV**, R51.48	EH166001x1060000200	SLA, SLP, F02, F20, ID, IU
EHS 86 05x	500 V	15 mA	8	4.5	3	10	**SHV**, R51.47	EH086005x1560000200	SLA, SLP, F02, F20, ID, IU
EHS F6 05x	500 V	15 mA	16	9	3	10	**SHV**, R51.48	EH166005x1560000200	SLA, SLP, F02, F20, ID, IU
EHS 86 10x	1 kV	8 mA	8	4.5	3	10	**SHV**, R51.47	EH086010x8050000200	SLA, SLP, F02, F20, ID, IU
EHS F6 10x	1 kV	8 mA	16	9	3	10	**SHV**, R51.48	EH166010x8050000200	SLA, SLP, F02, F20, ID, IU
EHS 86 20x	2 kV	4 mA	8	4.5	3	10	**SHV**, R51.47	EH086020x4050000200	SLA, SLP, F02, F20, ID, IU
EHS F6 20x	2 kV	4 mA	16	9	3	10	**SHV**, R51.48	EH166020x4050000200	SLA, SLP, F02, F20, ID, IU
EHS 86 30x	3 kV	3 mA	8	4.5	3	10	**SHV**, R51.47	EH086030x3050000200	SLA, SLP, F02, F20, ID, IU
EHS F6 30x	3 kV	3 mA	16	9	3	10	**SHV**, R51.48	EH166030x3050000200	SLA, SLP, F02, F20, ID, IU
EHS 86 40x	4 kV	2 mA	8	4.5	3	10	**SHV**, R51.47	EH086040x2050000200	SLA, SLP, F02, F20, ID, IU
EHS F6 40x	4 kV	2 mA	16	9	3	10	**SHV**, R51.48	EH166040x2050000200	SLA, SLP, F02, F20, ID, IU
EHS 86 60x	6 kV	1 mA	8	3.5	3	10	**S08**	EH086060x1050000300	SLA, SLP, F02, F20, ID, IU
EHS F6 60x	6 kV	1 mA	16	7	3	10	**S08**	EH166060x1050000300	SLA, SLP, F02, F20, ID, IU
EHS 46 80x	8 kV	1 mA	4	2.5	3	10	**S08**	EH046080x1050000300	SLA, SLP, F02, F20, ID, IU
EHS 46 100x	10 kV	0.7 mA	4	2.5	3	10	**S10**	EH046100x7540000400	SLA, SLP, F02, F20, ID, IU
EHS 46 150x	15 kV	0.5 mA	4	2.5	3	10	**C15**, S20	EH046150x5040002300	SLA, SLP, F02, F20, ID, IU
EHS 46 200x	20 kV	0.4 mA	4	2.5	3	10	**S20**	EH046200x4040000500	SLA, SLP, F02, F20, ID, IU
Common Floating Ground – (EHS FLEX)									
EHS F5 01x	100 V	10 mA	16	1	3	5	**SHV**	EH165001x1060000200	SLA, SLP
EHS 185 01x	100 V	10 mA	24	1.5	3	5	**R51.44**	EH245001x1060004400	SLA, SLP
EHS 305 01x	100 V	10 mA	48	3	3	5	**R51.46**, I52	EH485001x1060004600	SLA, SLP
EHS F5 05x	500 V	6 mA	16	3	3	10	**SHV**	EH165005x6050000200	SLA, SLP
EHS 185 05x	500 V	6 mA	24	4.5	3	10	**R51.44**	EH245005x6050004400	SLA, SLP
EHS 305 05x	500 V	6 mA	48	9	3	10	**R51.46**, I52	EH485005x6050004600	SLA, SLP
EHS F5 10x	1 kV	3 mA	16	3	3	10	**SHV**	EH165010x3050000200	SLA, SLP
EHS 185 10x	1 kV	3 mA	24	4.5	3	10	**R51.44**	EH245010x3050004400	SLA, SLP
EHS 305 10x	1 kV	3 mA	48	9	3	10	**R51.46**, I52	EH485010x3050004600	SLA, SLP
EHS F5 20x	2 kV	1.5 mA	16	3	3	10	**SHV**	EH165020x1550000200	SLA, SLP
EHS 185 20x	2 kV	1.5 mA	24	4.5	3	10	**R51.44**	EH245020x1550004400	SLA, SLP
EHS 305 20x	2 kV	1.5 mA	48	9	3	10	**R51.46**, I52	EH485020x1550004600	SLA, SLP
EHS F5 30x	3 kV	1 mA	16	3	3	10	**SHV**	EH165030x1050000200	SLA, SLP
EHS 185 30x	3 kV	1 mA	24	4.5	3	10	**R51.44**	EH245030x1050004400	SLA, SLP
EHS 305 30x	3 kV	1 mA	48	9	3	10	**R51.46**, I52	EH485030x1050004600	SLA, SLP

Table 2: Technical data: Configurations of Standard / Flex series

2.2 Technical data: EHS High Precision series

SPECIFICATIONS	EHS HP CFG	EHS HP FG
Polarity	Factory fixed, positive or negative	
Floating principle	Common Floating Ground	Single Floating Ground
Potential difference	56 V channel/GND	20 V channel/channel/GND, opt. up to 2 kV
Ripple and noise (f > 10 Hz)	< 3 - 10 mV_{p-p}	
Ripple and noise (f > 1 kHz)	< 1 - 2 mV_{p-p}	
Ripple and noise (f > 10 Hz – 0.1 Hz)	< 5 - 30 mV_{p-p}	
Stablity		
Stability [ΔV_{out} vs. ΔV_{in}]	$< 1 \cdot 10^{-5} \cdot V_{nom}$	
Stability - [ΔV_{out} vs. ΔR_{load}]	$< 1 \cdot 10^{-4} \cdot V_{nom}$	
Long Term Stability (1h Warmup) 24h	$< 2 \cdot 10^{-5} \cdot V_{nom}$	
Temperature coefficient	< 30 ppm / K | < 10 ppm / K (option TC)	
Resolution - The resolution of measurable values depends on the settings of the sampling rate and the digital filter!		
Resolution voltage setting	$2 \cdot 10^{-6} \cdot V_{nom}$	
Resolution current setting [I_{out} > 20 µA]	$2 \cdot 10^{-6} \cdot I_{nom}$	
Resolution voltage measurement	$1 \cdot 10^{-6} \cdot V_{nom}$	
Resolution current measurement [I_{out} > 20 µA]	$1 \cdot 10^{-6} \cdot I_{nom}$	
Resolution current measurement [I_{out} < 20 µA]	50pA	
Measurement accuracy - The measurement accuracy is guaranteed in the range 1% • Vnom < Vout < Vnom and 1 year		
Accuracy voltage measurement	$\pm (0.01\ \% \cdot V_{out} + 0.01\ \% \cdot V_{nom})$	
Accuracy current measurement [I_{out} > 20 µA]	$\pm (0.01\ \% \cdot I_{out} + 0.02\ \% \cdot I_{nom})$	
Accuracy current measurement [I_{out} < 20 µA]	$\pm (0.01\ \% \cdot I_{out} + 4\ nA)$	
Sample rates (SPS)	5, 10, 25, 50, 60, 100, 500	
Digital filter averages	1, 16, 64, 256, 512, 1024	
Voltage ramp	$1*10^{-6} \cdot V_{nom}$ up to $0.2 \cdot V_{nom}$	
Hardware limits	Potentiometer per module [V_{max} / I_{max}]	
Limit Monitor voltage	2.5 V	
Digital Interface	CAN	
System connector	96 PIN	
Protection	Safety loop, opt. INHIBIT / ch. (ID / IU, NIU / NID)	
HV connector	R51 | SHV	
Safety loop connector	Lemo 2pole	
Limit monitor connector	Lemo 2pole	Lemo 1pole
Case	19 inch plug-in cassette	
Dimensions – L/W/H	220mm / 8HP / 6U	
Operating temperature	0 – 40 °C	
Storage temperature	-20 -60 °C	
Humidity	20 - 80 %, not condensing	

Table 1: Technical data: Specifications EHS High Precision

CONFIGURATIONS EHS HIGH PRECISION SERIES										
Type	**V_{nom}**	**I_{nom}**	**Ch**	**Max. I_{in}** (A) at 24V	**Ripple (mV_{pp})** >1kHz | 10Hz-1kHz | 0.1-10Hz			**HV Connector** **Standard**/opt.	**Item Code**	**Options**
Common Floating Ground										
EHS 82 01x	100 V	10 mA	8	1	2	3	5	**SHV,** R51.41	EH082001x1060000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 01x	100 V	10 mA	16	2	2	3	5	**SHV,** R51.43	EH162001x1060000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 05x	500 V	10 mA	8	4	2	5	5	**SHV,** R51.41	EH082005x1060000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 05x	500 V	10 mA	16	8	2	5	5	**SHV,** R51.43	EH162005x1060000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 10x	1 kV	8 mA	8	4	2	5	5	**SHV,** R51.41	EH082010x8050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 10x	1 kV	8 mA	16	8	2	5	5	**SHV,** R51.43	EH162010x8050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 20x	2 kV	4 mA	8	4	2	5	5	**SHV,** R51.41	EH082020x4050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 20x	2 kV	4 mA	16	8	2	5	5	**SHV,** R51.43	EH162020x4050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 30x	3 kV	3 mA	8	4	2	5	10	**SHV,** R51.41	EH082030x3050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 30x	3 kV	3 mA	16	8	2	5	10	**SHV,** R51.43	EH162030x3050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 42x	4 kV	2 mA	8	4	2	5	10	**SHV**	EH082040x2050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 42x	4 kV	2 mA	16	8	2	5	10	**SHV**	EH162040x2050000200	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 82 60x	6 kV	1 mA	8	3	2	10	15	**S08**	EH082060x1050000300	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS F2 60x	6 kV	1 mA	16	6	2	10	15	**S08**	EH162060x1050000300	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 42 82x	8 kV	1 mA	4	2.2	2	5	10	**S08**	EH042080x1050000300	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 42 100x	10 kV	0.7 mA	4	2.2	2	5	20	**S10**	EH042100x7540000400	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 42 150x	15 kV	0.5 mA	4	2.2	2	5	30	**C15**, S20	EH042150x5040002300	SLA, SLP, T10, VCT, 1CB, ID, IU
EHS 42 200x	20 kV	0.4 mA	4	2.2	2	7	30	**S20**	EH042200x4040000500	SLA, SLP, T10, VCT, 1CB, ID, IU
Common Floating Ground L										
EHS 82 01x	100 V	100 µA	8	0.4	1	1	5	**SHV,** R51.41	EH082001x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 01x	100 V	100 µA	16	0.8	1	1	5	**SHV,** R51.43	EH162001x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 05x	500 V	100 µA	8	0.4	1	5	5	**SHV,** R51.41	EH082005x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 05x	500 V	100 µA	16	0.8	1	5	5	**SHV,** R51.43	EH162005x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 10x	1 kV	100 µA	8	0.4	1	5	5	**SHV,** R51.41	EH082010x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 10x	1 kV	100 µA	16	0.8	1	5	5	**SHV,** R51.43	EH162010x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 20x	2 kV	100 µA	8	0.4	1	5	5	**SHV,** R51.41	EH082020x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 20x	2 kV	100 µA	16	0.8	1	5	5	**SHV,** R51.43	EH162020x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 30x	3 kV	100 µA	8	0.4	1	5	10	**SHV,** R51.41	EH082030x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 30x	3 kV	100 µA	16	0.8	1	5	10	**SHV,** R51.43	EH162030x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 42x	4 kV	100 µA	8	0.5	1	5	10	**SHV**	EH082040x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS F2 42x	4 kV	100 µA	16	1	1	5	10	**SHV**	EH162040x1040000200	SLA, SLP, T10, VCT, ID, IU
EHS 82 60x	6 kV	100 µA	8	0.5	1	5	10	**S08**	EH082060x1040000300	SLA, SLP, T10, VCT, ID, IU
EHS F2 60x	6 kV	100 µA	16	1	1	5	10	**S08**	EH162060x1040000300	SLA, SLP, T10, VCT, ID, IU
EHS 42 82x	8 kV	100 µA	4	0.5	1	5	10	**S08**	EH042080x1040000300	SLA, SLP, T10, VCT, ID, IU
EHS 42 100x	10 kV	100 µA	4	0.5	1	5	20	**S10**	EH042100x1040000400	SLA, SLP, T10, VCT, ID, IU
EHS 42 150x	15 kV	100 µA	4	0.8	1	5	30	**C15**, S20	EH042150x1040002300	SLA, SLP, T10, VCT, ID, IU
EHS 42 200x	20 kV	100 µA	4	1	1	5	30	**S20**	EH042200x1040000500	SLA, SLP, T10, VCT, ID, IU
Floating Ground										
EHS 84 01x	100 V	10 mA	8	1,5	2	3	5	**SHV,** R51.47	EH084001x1060000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 01x	100 V	10 mA	16	3	2	3	5	**SHV,** R51.48	EH164001x1060000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU

Type	V_{nom}	I_{nom}	Ch	Max. I_{in} (A) at 24V	Ripple (mV_{pp}) >1kHz | 10Hz-1kHz | 0.1-10Hz			HV Connector **Standard**/opt.	Item Code	Options
EHS 84 05x	500 V	10 mA	8	4.5	2	5	5	**SHV,** R51.47	EH084005x1060000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 05x	500 V	10 mA	16	9	2	5	5	**SHV,** R51.48	EH164005x1060000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 84 10x	1 kV	8 mA	8	4.5	2	5	5	**SHV,** R51.47	EH084010x8050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 10x	1 kV	8 mA	16	9	2	5	5	**SHV,** R51.48	EH164010x8050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 84 20x	2 kV	4 mA	8	4.5	2	5	5	**SHV,** R51.47	EH084020x4050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 20x	2 kV	4 mA	16	9	2	5	5	**SHV,** R51.48	EH164020x4050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 84 30x	3 kV	3 mA	8	4.5	2	5	10	**SHV,** R51.47	EH084030x3050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 30x	3 kV	3 mA	16	9	2	5	10	**SHV,** R51.48	EH164030x3050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 84 40x	4 kV	2 mA	8	4.5	2	5	10	**SHV**	EH084040x2050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 40x	4 kV	2 mA	16	9	2	5	10	**SHV**	EH164040x2050000200	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 84 60x	6 kV	1 mA	8	3.5	2	10	15	**S08**	EH084060x1050000300	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS F4 60x	6 kV	1 mA	16	7	2	10	15	**S08**	EH164060x1050000300	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 44 80x	8 kV	1 mA	4	2.5	2	5	10	**S08**	EH044080x1050000300	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 44 100x	10 kV	0.7 mA	4	2.5	2	5	20	**S10**	EH044100x7540000400	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 44 150x	15 kV	0.5 mA	4	2.5	2	5	30	**C15**, S20	EH044150x5040002300	SLA, SLP, T10, 1CB, F02, F20, ID, IU
EHS 44 200x	20 kV	0.4 mA	4	2.5	2	7	30	**S20**	EH044200x4040000500	SLA, SLP, T10, 1CB, F02, F20, ID, IU
Floating Ground L										
EHS 84 01x	100 V	100 µA	8	0.8	1	1	5	**SHV,** R51.47	EH084001x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 01x	100 V	100 µA	16	1.5	1	1	5	**SHV,** R51.48	EH164001x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 05x	500 V	100 µA	8	0.8	1	5	5	**SHV,** R51.47	EH084005x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 05x	500 V	100 µA	16	1.5	1	5	5	**SHV,** R51.48	EH164005x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 10x	1 kV	100 µA	8	0.8	1	5	5	**SHV,** R51.47	EH084010x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 10x	1 kV	100 µA	16	1.5	1	5	5	**SHV,** R51.48	EH164010x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 20x	2 kV	100 µA	8	0.8	1	5	5	**SHV,** R51.47	EH084020x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 20x	2 kV	100 µA	16	1.5	1	5	5	**SHV,** R51.48	EH164020x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 30x	3 kV	100 µA	8	0.8	1	5	10	**SHV,** R51.47	EH084030x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 30x	3 kV	100 µA	16	1.5	1	5	10	**SHV,** R51.48	EH164030x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 40x	4 kV	100 µA	8	1	1	5	10	**SHV**	EH084040x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 40x	4 kV	100 µA	16	2	1	5	10	**SHV**	EH164040x1040000200	SLA, SLP, T10, F02, F20, ID, IU
EHS 84 60x	6 kV	100 µA	8	1	1	5	10	**S08**	EH084060x1040000300	SLA, SLP, T10, F02, F20, ID, IU
EHS F4 60x	6 kV	100 µA	16	2	1	5	10	**S08**	EH164060x1040000300	SLA, SLP, T10, F02, F20, ID, IU
EHS 44 80x	8 kV	100 µA	4	0.8	1	5	10	**S08**	EH044080x1040000300	SLA, SLP, T10, F02, F20, ID, IU
EHS 44 100x	10 kV	100 µA	4	0.8	1	5	10	**S10**	EH044100x1040000400	SLA, SLP, T10, F02, F20, ID, IU
EHS 44 150x	15 kV	100 µA	4	1	1	5	10	**C15**, S20	EH044150x1040002300	SLA, SLP, T10, F02, F20, ID, IU
EHS 44 200x	20 kV	100 µA	4	2	1	5	10	**S20**	EH044200x1040000500	SLA, SLP, T10, F02, F20, ID, IU

Table 2: Technical data: Configurations High Precision series

2.3 Options

OPTIONS	OPTION CODE	EXAMPLE	ITEM CODE HEX CODING
POLARITY	Positive: **x = p**, negative **x = n**	EHS 82 05**p**	
VERY LOW NOISE (EHS Standard Series)	**VLN**		010
SINGLE CHANNEL INHIBIT - down	**ID**		400
SINGLE CHANNEL INHIBIT - up	**IU**		800
NEGATED LOGIC INHIBIT ID, IU	**N**		80
VOLTAGE CORRECTION by TEMPERATURE	**VCT**		008
LOWER TEMPERATURE COEFFICIENT	**TC**	T10	004
ACTIVE SAFETY LOOP	**SLA**		001
INTERNALLY POWERED SAFETY LOOP	**SLP**		002
ONLY ONE CURRENT RAGE FOR HIGH PRECISION MODULES	**1CR**		020
200 V ISOLATION FOR FLOATING GND	**F02**		100
2,000 V ISOLATION FOR FLOATING GND	**F20**		200
LOWER OUTPUT CURRENT	**L** (I_{nom} = 100 µA)		--

Table 3: Technical data: Options and order information

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 physical address of the module, determined by the slot position in the crate, is also accessible via this connector

Modules and crate controllers with different settings of bit rate do not work on the same CAN-Line.

INFORMATION	
INFORMATION	Note: For proper operation the module must be configured with the correct CAN bitrate, which meets the configuration of the crate controller, the module will be used with. The delivery condition is shown on the modules typeplate (side plate of the module). Typically newer iseg crate controllers (CC24, CC23, CC238) are delivered with 250kBits/s standard. Wiener M-POD Controller and older iseg hardware is set on 125 kBit/s standard bitrate.

3.2 Module status

The module status is displayed by two LEDs on the front panel

green LED „OK“ on	all channels have the status “OK“
green LED „OK“ off	an error occured: safety loop is possibly not closed or the power supplies are out of tolerance or the threshold of V_{max}, I_{max}, I_{set} or I_{trip} (see function descriptions for details) has been exceeded LED will be switched off until the error has been fixed and the corresponding status bit has been erased via software interface.
yellow LED on	one or more channels voltage on output is more than 56V
Green LED blinking slow	prepares firmware update
Green LED blinking fast	Firmware update is stored into flash, do not switch of power supply, crate etc.

Table 4: Module status information

3.3 Hardware Limit

The maximum output voltage for all channels (hardware voltage limit) is defined by the position of the corresponding potentiometer V_{max}. The maximum output current for all channels (hardware current limit) is defined by the position of the corresponding potentiometer I_{max} . The highest 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_{nom} and 102 ± 2% I_{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.

3.4 Safety Loop

A safety loop can be implemented by the safety loop socket (SL) on the front panel and between the SLcontacts (Pin 22 and PIN 30) at the REDEL-connector, if equipped. If the safety loop is active a high voltage generation in any channel is only possible 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 front panel SL input must be shortened.) If the safety loop is opened during the operation the output voltages will be shut off without ramp and the corresponding bits in the ModuleStatus and ModuleEventStatus are cancelled (see "*CAN_EDCP_Programmers-Guide.pdf* "). 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. By factory setup the safety loop is not active (the corresponding bits are always set). The loop can be activated by removing the jumper "SL-disable" on the rear side of the module.

3.5 Delayed Trip

3.5.1 Operating principle

The function "*Delayed Trip*" provides a user-configurable, time-delayed response to an increased output current (I_{out}) higher than the set current (I_{set}). The response to this kind of event can be, for example, to ramp down the channel with the programmed ramp. A detailed description for the configuration can be found in the manual **CAN_EDCP_Programmers-Guide.pdf (see appendix).**

By a programmable timeout with one millisecond resolution, the trip can be delayed up to four seconds. During this time, the output current is limited to the value of I_{set} (constant current mode).

The hardware regulation signals, constant voltage (CV) or constant current (CC), are sampled every millisecond by the microprocessor. Once the constant current mode is active, the programmed timeout counter is decremented. If the HV channel returns to constant voltage mode before timeout (i.e. $I_{out} < I_{set}$), the counter will be reset. So this process can be restarted if the current rises again.

3.5.2 Limitations

For some older types of HV modules with single-channel floating GND the current set value cannot be set exactly to zero (e.g., due to an uncompensatable offset). For these modules, the limitation of the output current to very low values (< 0.5 % I_{nom}) is not guaranteed.

For all recent EHS models the value of the set current can be continuously adjusted with the type-specific resolution down to zero.

To guarantee a sufficient resolution for the current set values, a nominal current adequate to the application should be selected. iseg offers HV modules with nominal currents reduced to 100 µA or 10 µA in all voltage classes. These are designated e.g. for semiconductor detectors, which only require a few microampere operating current.

3.5.3 Modules with two current measurement ranges

High Precision HV modules with two current ranges are a particular case. In these HV modules the high current output is combined with a picoampere resolution in the low current measurement range. The range switching is done by the microprocessor depending on I_{meas}:

High measuring range: $I_{nom\text{-}low} < I_{meas} < I_{nom}$

Low measuring range: $0 < I_{meas} < I_{nom\text{-}low}$

The typical value for $I_{nom\text{-}low}$ is 20 µA.

As long as a set current in the high measuring range is used, everything is working as described above. If a set current in low measuring range is specified, the current limitation is set to 120 % of the low measuring range.

Example: $I_{nom\text{-}low}$ = 20 µA → current limitation is set to 24 µA if I_{set} = 10 µA

Now the channel operates in the low measuring range only. A software comparison of set current I_{set} and measured current I_{meas} is performed in addition to the described hardware CC and CV signals sampling.

With this principle, two requirements are met:

- the output current will not exceed 24 microamps even during fast changes and
- the delayed trip function is extended into the region of very small currents (picoampere) for these HV modules.

For the software comparison, a delay between 80 milliseconds and 1 second must be expected. This depends on the modules ADC (Analog-to-digital-converter) configuration.

This time can be adjusted by changing the ADC sample rate to meet the requirements of the application. Higher ADC sample rates lead to shorter delays but also reduce the resolution.

If the *Delayed Trip* function is activated the voltage ramp should be limited to 1 % of V_{nom} before. Higher values could trigger a trip by internal charge balancing during a ramp, even though the output current does not exceed the set value I_{set}.

If the connected load contains capacities or if I_{set} is very small, it might be necessary to further reduce the ramp speed. Alternatively, the *Delayed Trip* can be activated only after the completion of the ramp.

INFORMATION	
INFORMATION	An activated KillEnable feature disables the Delayed Trip function.

An active *KillEnable* function disables the *Delayed Trip* function. If *KillEnable* is active and a trip occurs, the channel is shut down without ramp at the fastest hardware response time (smaller than 1 ms). However, the actual discharge time strongly depends on the connected load.

4 Options

4.1 VCT (for EHS CFG) – voltage correction by temperature

This option allows a temperature dependent correction of the output voltage. The temperatures are measured with a distinct sensor for each channel. An user-adjustable VCT-coefficient allows to specify a linear relationship between the measured temperature and the output voltage. As an option one sensor per module can be orded.

4.1.1 Technical data

Sensor type	EPCOS B57867S0502F140
Temperature range	-40 ... 80°C
Accuracy of temperature measurement	±0.5 K (0 ... 60°C)
Resolution of temperature measurement	1 mK (0 ... 60°C)
Temperature update rate	15 updates/min

Table 5: Technical data VCT sensor

4.1.2 Operation

The connector of the temperature sensor must be plugged in the slot of the corresponding channel on the VCT-connector at the

front panel of the HV-module. The direction of the male connector does not matter.

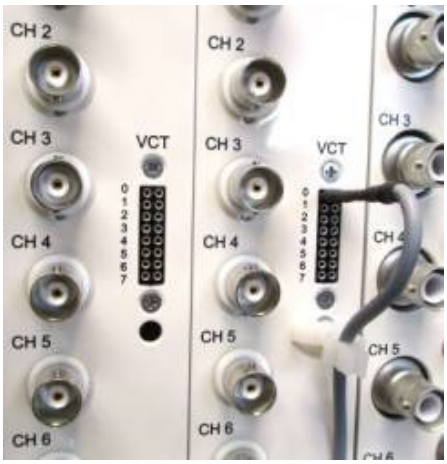


Figure 1: VCT modul

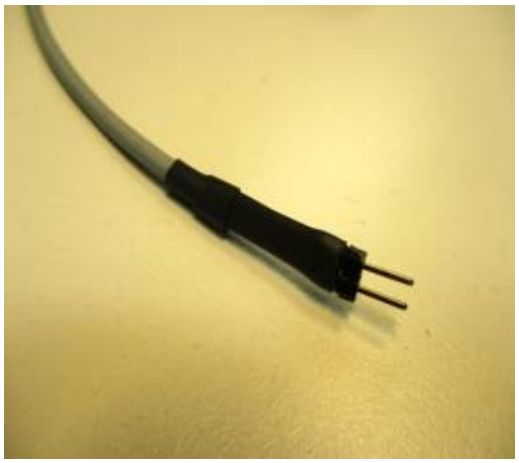


Figure 2: VCT

A programmable VCT-coefficient for each channel defines the rate and the direction of the voltage correction. The temperatures, measured at the sensors can be read out from the module.

At the time a HV-channel is switched on or the output voltage is set by the user, the module registers the temperature of the corresponding sensor and the set voltage as reference values.

If the temperature at the sensor changes, the output voltage is automatically adjusted according to the formula:

$$V = V_{ref} + a*(T-T_{ref}) \qquad \text{(a...VCT-coefficient)}$$

Example: A channel is set to 60V. At the time it is switched on a temperature of 25°C is measured. The VCT-coefficient is set to +1V/K. If the temperature now increases to 26°C the output voltage will increase to 61V. (For channels with a negative output voltage the voltage changes from –60V to –61V).

A VCT-coefficient of -1V/K would decrease the voltage to 59V.

Notes:

- During operation the values for V_{set} are adjusted. If a channel is switched off the adjusted set value will be kept, not the original value set by the user.
- If the VCT-coefficient if modified during operation, V_{ref} and T_{ref} are reset to the present values to prevent a sudden voltage change.
- If the temperature sensor is dis- and reconnected during operation, V_{ref} and T_{ref} are reset to the present values to prevent a sudden voltage change.
- The temperature dependent voltage correction can be deactivated by setting the VCT-coefficient to 0 or by disconnecting the temperature sensor. If this is done during operation, the channel will keep the actual voltage set.
- If the temperature sensor is disconnected a temperature of -273.15°C is shown for that channel.
- The VCT data points are described in the reference manual "**CAN EDCP Programmers-Guide**" ***(see appendix)*** and in the manual "**iseg Hardware Abstraction Layer**" ***(see appendix).***

4.2 Single Channel Inhibit (IU, ID, NIU, NID)

INFORMATION	
INFORMATION	INHIBIT is an external signal, that switches off the high voltage for the device or a specific channel

Optionally it is possible to equip modules with an *INHIBIT* for each channel via a Sub-D connector. Channel 0 to 7 corresponds to Pin 1 to 8 at the Sub-D connector, Pin 9 is connected to GND.

KILL-enable = 1: Voltage is switched off permanently without ramp. ChannelEventStatus flag 'EEINH' is set. The green LED at the front panel turns off.

KILL-enable = 0: ChannelStatus flag 'isEINH' and ChannelEventStatus flag EEINH are set. The action of the HV channel can be defined via the Monitoring group. The green LED at the front panel turns off.

The *INHIBIT* active time (LOW potential) must be at least 100 ms! When the INHIBIT is no longer active (TTL-HIGH potential or not connected), the INHIBIT flag must be reset before the voltage can be switched ON again.

4.2.1 Logic / Signal Level Standard

The INHIBIT - signal has negative logic, which means it is LOW-active. When applying a TTL-low-level on INHIBIT input the signal will be rated as ACTIVE, the high voltage generation will be switched off. *(see chapter connectors and pin assignment)*

Default state = state at non wired signal input: By applying of Pull-Up or Pull-Down resistors (approx. 10 kΩ) the Default-State will be defined.

Case 1 - IU

INHIBIT: Default inactive (=> high voltage is generated):

=> signal input has HIGH - level => pull-up resistor after V_{cc}

Switch off the HV by applying 0V on signal input

Case 2 - ID

INHIBIT: Default active (=> high voltage is not been generated):

=> signal input has LOW - level => pull-down resistor after 0V

Switch on the HV by applying V_{cc} on signal input

4.2.2 Logic / Signal Level Negated

The INHIBIT signal has positive logic, that means it is HIGH-active. By applying of TTL-High-Level on INHIBIT input the signal will be rated as ACTIVE, the high voltage generation will be switched off.

Default-State = state at non wired signal input:

Case 3 - NID

INHIBIT: Default inactive (=>high voltage is generated):

=> Signal input as LOW - level => Pull-Down resistor after 0V

Switch off the HV by applying of V_{cc} (5V) on signal input

Case 4 - NIU

INHIBIT: Default active (=>high voltage is not been generated):

=> Signal input has HIGH - level => Pull-Up resistor after V_{cc} (5V)

Switch on the HV by applying of 0V on signal input

4.3 SLA – Active safety loop

Actively opens the Safety loop in case of a trip or a delayed trip. This option allows to shut down other modules and devices by interrupting the SL when a trip is detected.

4.4 SLP – Internally powered safety loop

Internal current source for the Safety Loop (no galvanic isolation of the SL and the crate GND).

4.5 1CR – One current measurement range only (HP)

Only one current measurement range for High Precision Modules

4.6 F02 – High floating voltage

200 V isolation for Modules with FG

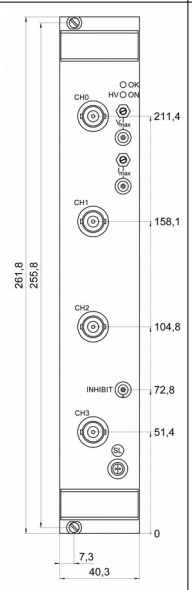
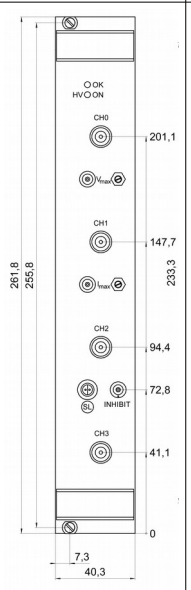
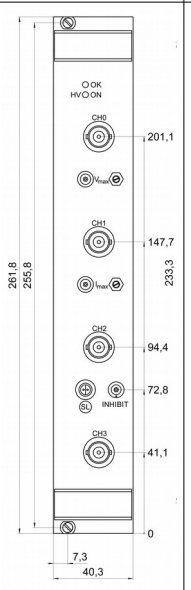
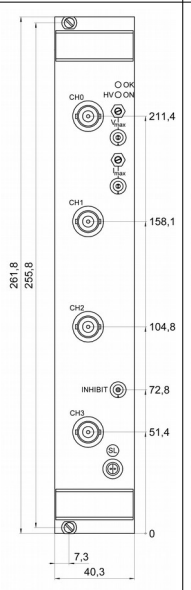
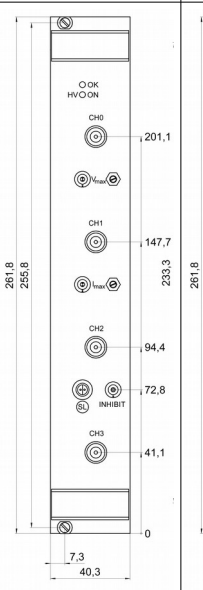
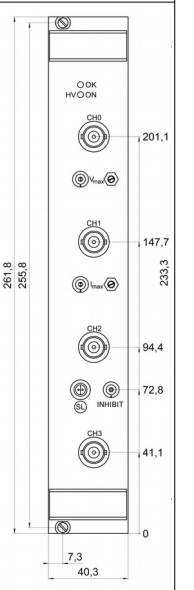
4.7 F20 – Very high floating voltage

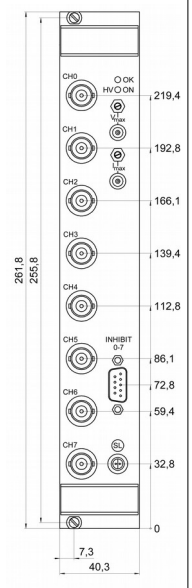
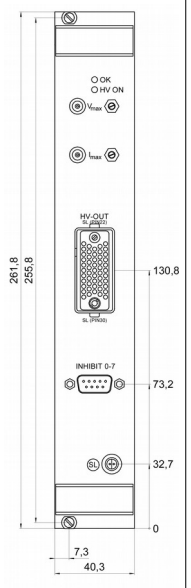
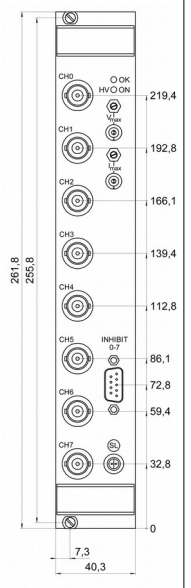
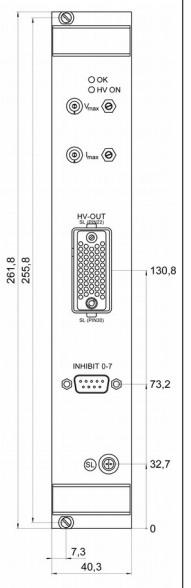
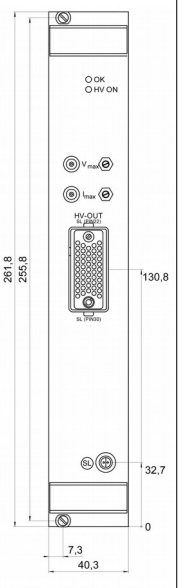
2.000 V isolation for Modules with FG

4.8 T10 – Lower temperature coefficient

Improved temperature coefficient of 10ppm/K

5 Front panel versions

FRONT PANELS						
Channels	4	4	4	4	4	4
Floating	FG	FG	FG	CFG	CFG	CFG
HV Connector	SHV / S10	S15	S20	SHV / S10	S15	S20
Options	INHIBIT	INHIBIT	INHIBIT	INHIBIT	INHIBIT	INHIBIT
Figure						

FRONT PANELS						
Channels	8	8	8	8		32
Floating	FG	FG	CFG	CFG		CG
HV Connector	SHV	R51	SHV	R51		R51
Options	INHIBIT	INHIBIT	INHIBIT	INHIBIT		-
Figure						

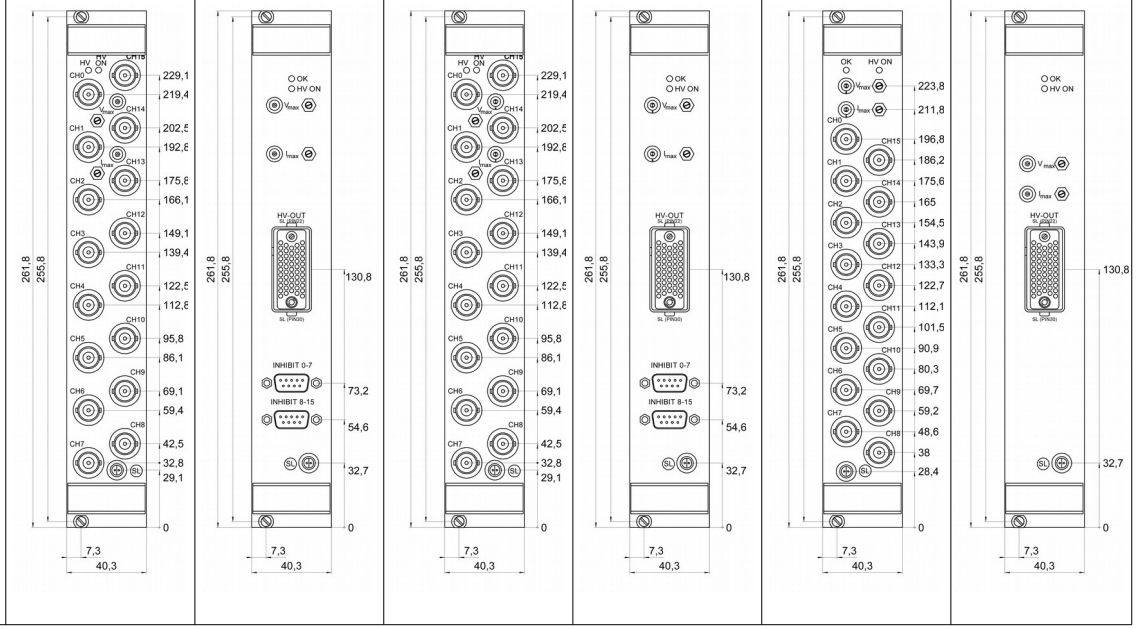
FRONT PANELS						
Channels	16	16	16	16	16	16
Floating	FG	FG	CFG	CFG	CFG	CG
HV Connector	SHV	R51	SHV	R51	SHV	R51
Options	-	INHIBIT	-	INHIBIT	3W	-
Figure						

Table 6: Front panel versions

6 Dimensional Drawings

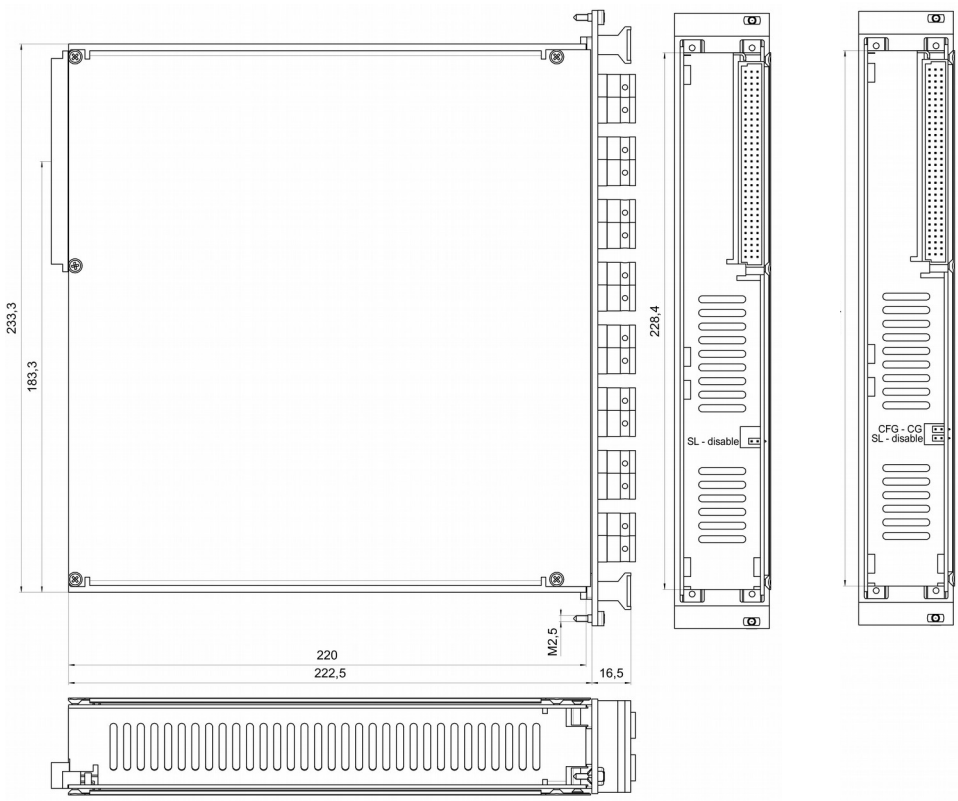
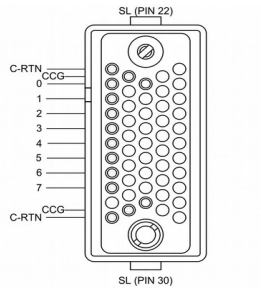
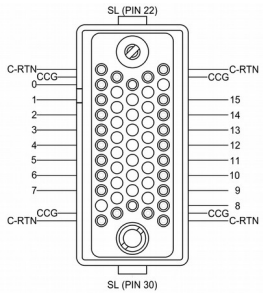
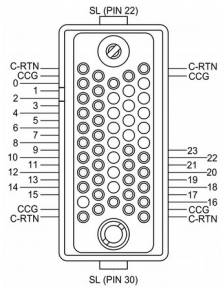
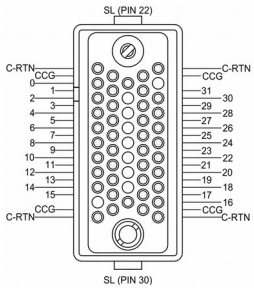
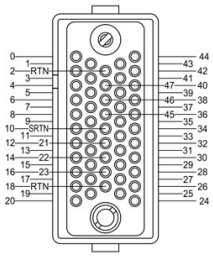
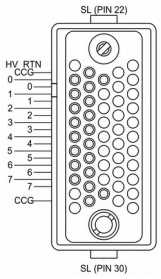
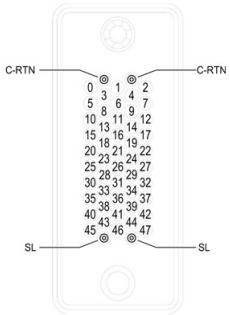
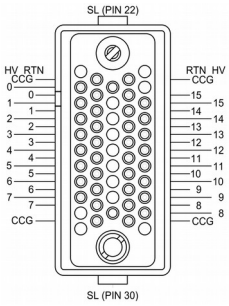
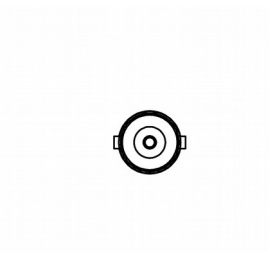


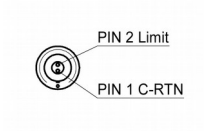
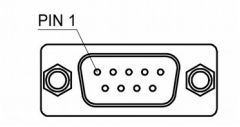
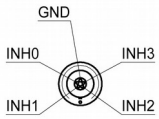
Figure 3: Dimensional drawing (ex. SHV 16ch /CG) , right: CFG versions

7 Connectors and PIN assignments

HV CONNECTOR ASSIGNMENTS				
Name	R51.41	R51.43	R51.44	R51.45
Figure				
	R51.46	R51.47	I52	
				

HV CONNECTOR ASSIGNMENTS			
Name	R51.48	SHV / S08	
Figure			

HV CONNECTOR ASSIGNMENTS				
Name	S10	S20	C15	
Figure				

SAFETY LOOP		LIMIT MONITOR	
Name	Safety Loop socket	Limit monitor socket CFG	Limit monitor socket CG/F
Figure			
INHIBIT			
Name	INHIBIT connector- DSUB9	INHIBIT connector- DSUB9	INHIBIT connector - LEMO
Figure			

PIN	INHIBIT 1	INHIBIT 2
1	CHANNEL 0	CHANNEL 8
2	CHANNEL 1	CHANNEL 9
3	CHANNEL 2	CHANNEL 10
4	CHANNEL 3	CHANNEL 11
5	CHANNEL 4	CHANNEL 12
6	CHANNEL 5	CHANNEL 13
7	CHANNEL 6	CHANNEL 14
8	CHANNEL 7	CHANNEL 15
9	GND	GND

Table 7: Connector and pin assignments

CONNECTORS PART NUMBERS (manufacturer code / iseg accessory parts item code)			
POWER SUPPLY SIDE		**CABLE SIDE**	
R51 (REDEL 51 PINS)			
Socket	SLG.H51.LLZG	Connector	SAG.H51.LLZBG / Z200325
Socket contacts (male)	FFA.05.403.ZLA1 / Z592189	Connector contacts (female)	ERA.05.403.ZLL1 / Z592263
Contacts Saf. Loop (male)	FGG.2B.565.ZZC / Z592261	Contacts Saf. Loop (female)	EGG.3B.665.ZZM / Z592262
		Socket Load Side	SLA.H51.LLZBG / Z201035
I52 (RADIALL 52 PINS)			
Socket	691803004	Connector	691802002
Socket Contacts	691804200	Contacts	691804300
Socket Contacts Safety Loop	691804230	Connector contacts (SL)	691804300
SHV (ROSENBERGER)			
Socket	57S501-200N3	Connector	57K101-006N3 / Z590162
S08 (RADIALL)			
Socket	R317.580.00	Connector	R317.0500 / Z592474
S10 (KINGS)			
Socket	1064-1 QD	Connector	1065-1 QD / Z592512
S20 (KINGS)			
Socket	1764-1	Connector	1765-1 / Z592668
C15 (CPE)			
Socket	23.100.151-046	Connector	23.100.052-045 / Z592717
Safety Loop (LEMO)			
Socket	ERA.0S.302.CLL	Connector	FFA.0S.302.CLAC / Z592312
Limit monitor 1pol. (LEMO)			
Socket	ERN.00.250.CTL	Connector	FFA.00.250.CTAC31 / Z200793

Limit monitor 2pol. (LEMO)			
Socket	EGG.00.302.CLL	Connector	FGG.00.302.CLAD
INHIBIT 5pol. (LEMO)			
Socket	EGG.00.305.CLL	Connector	FGG.00.305.CLAD35 / Z592723

Table 8: Connectors part number information

8 Order guides

CABLE ORDER GUIDE				
POWER SUPPLY SIDE CONNECTOR	**CABLE CODE**	**CABLE DESCRIPTION**	**LOAD SIDE CONNECTOR**	**ORDER CODE** ***LLL = length in m*** [*]
R51.41-G	07	HV cable 6kV Kerpen SL-v2YCeHI 37xAWG26/7red	R51.41-A	R41G_C07-*LLL*_R41A
R51.43-G	07	HV cable 6kV Kerpen SL-v2YCeHI 37xAWG26/7red	R51.43-A	R43G_C07-*LLL*_R43A
R51.45-G	08	HV cable 6kV Kerpen SL-v2YCeHI 56xAWG26/7red	R51.45-A	R54G_C08-*LLL*_R45A
R51.47-G	07	HV cable 6kV Kerpen SL-v2YCeHI 37xAWG26/7red	R51.47-A	R47G_C07-*LLL*_R47A
R51.48-G	08	HV cable 6kV Kerpen SL-v2YCeHI 56xAWG26/7red	R51.48-A	R48G_C08-*LLL*_R48A
SHV	04	HV cable shielded 30kV (HTV-30S-22-2)	open	SHV_1C04-*LLL*
S08	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S08_1C04-*LLL*
S10	04	HV cable shielded 30kV (HTV-30S-22-2)	open	S10_1C04-*LLL*
S20	02	Lemo HV cable shielded 30kV (Lemo 130660)	open	S20_1C02-*LLL*
C15	12	HV cable Prev3864L for 15 kV CPE connectors	open	C15_1C12-*LLL*
[*] *Length building examples: 10cm => 0.1, 2.5m => 2.5, 12m => 012 , 999m => 999*				

Table 9: Guideline for cable ordering

CONFIGURATION ORDER GUIDE (item code parts)								
EH	**16**	**0**	**030**	**P**	**305**	**000**	**02**	**00**
High Voltage, Distinct Source	Numbers of channels	Class	V_{nom}	Polarity	I_{nom} (nA)	Option (hex)	HV-Connector	Customized Version
		0 = Standard 1 = Low Cost 2 = HP CFG 4 = HP Floating 5 = LC var. Channels 6 = Standard Floating	three significante digits *100V For Examle: 030 = 3000V	p = positive n = negative	two significante digits + number of zeros For Examle: 305 = 3mA	Sum of the hex codes (s. table 3) For Example: IU + TC = 804	02 = SHV 5kV 03 = SHV 8kV 04 = SHV10kV 05 = SHV 20kV 23 = CPE 15kV 41 to 48 = Redel Multipin (s. Table 4) 17 = Radiall Multipin	00 = none

Table 10: Item code parts for different configurations

9 Appendix

For more information please use the following download links:

This document
http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseg_datasheet_EHS_en_2.0.pdf
CAN EDCP Programmers-Guide
http://download.iseg-hv.com/SYSTEMS/MMS/CAN_EDCP_Programmers-Guide.pdf
iseg Hardware Abstraction Layer
http://download.iseg-hv.com/SYSTEMS/MMS/isegHardwareAbstractionLayer.pdf

10 Warranty & service

This device is made with high care and quality assurance methods. The factory warranty is up to 36 months, starting from date of issue (invoice). Within this period a 5 years warranty extension can be ordered at additional charge. Please contact iseg sales department.

ATTENTION

Repair and maintenance may only be performed by trained and authorized personnel.

For repair please follow the RMA instructions on our website: www.iseg-hv.com/en/support/rma

11 Manufacturer´s contact

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