

EHS STANDARD

VERSATILE HIGH VOLTAGE MODULE IN MULTIPLE FLOATING VERSIONS



MMS



SYSTEMS

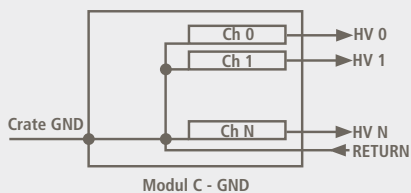
- ▶ 4 / 8 / 16 / 32 channel, 100 V - 20 kV versions
- ▶ low ripple and noise, very low noise option VLN
- ▶ hardware voltage and current limits
- ▶ voltage and current control per channel
- ▶ programmable parameters (delayed trip etc.)

EHS modules are multichannel high voltage power supplies in MMS system (Eurocard format). With up to 32 channels each single channel has an independent voltage and current control. The module is made of high-precision components such as 24 bit ADC and up to 20 bit DAC and provides comprehensive security features.

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 Ground (CG), Common Floating Ground (CFG) and Floating Ground (FG).

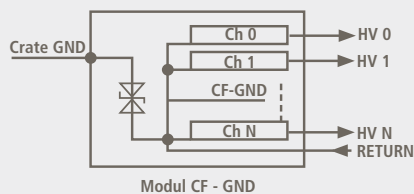


FLOATING OPTIONS



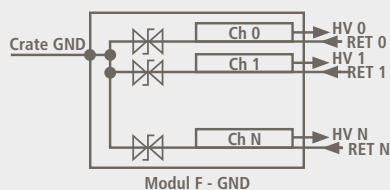
Common Ground

All channels and the processing unit are galvanically connected. Within a crate all CG modules are galvanically connected.



Common Floating Ground

All channels and the processing unit are galvanically connected. The module GND is isolated from the GND of the crate. Within a crate all modules with CFG are galvanically isolated. A protection circuit prevents differences in the potentials between the module CF-GND and the crate GND of more than 60 V.



Floating Ground

All channels are galvanically isolated from each other and from the module GND. By default a protection circuit prevents differences in the potentials between the channels and the module GND of more than 25 V. As an option this isolation can be designed to enable potential differences up to 2,000 V. With this option the user is responsible not to exceed the maximum ground potential differences!

CONFIGURATIONS / KONFIGURATIONEN

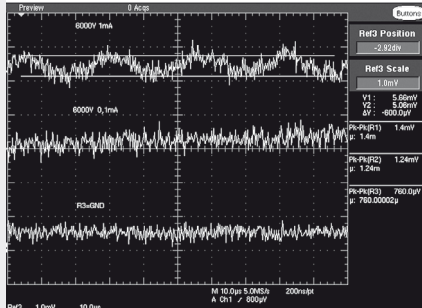
MODEL	CHANNELS	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE AND NOISE
EHS COMMON GROUND				
NEW EHS F101x-VLN	16	100 V	10 mA	3 mV
NEW EHS 20101x-VLN	32	100 V	10 mA	3 mV
EHS F1 05x	16	500 V	8 mA	10 mV
EHS 201 05x	32	500 V	8 mA	10 mV
EHS F1 10x	16	1 kV	4 mA	15 mV
EHS 201 10x	32	1 kV	4 mA	15 mV
EHS F1 20x	16	2 kV	2 mA	20 mV
EHS 201 20x	32	2 kV	2 mA	20 mV
EHS F1 30x	16	3 kV	1.3 mA	20 mV
EHS 201 30x	32	3 kV	1.3 mA	20 mV
EHS F1 40x	16	4 kV	1 mA	20 mV
EHS 201 40x	32	4 kV	1 mA	20 mV
EHS COMMON FLOATING GROUND / FLOATING GROUND				
NEW EHS 8y 01x	8	100 V	10 mA	3 mV
NEW EHS Fy 01x	16	100 V	10 mA	3 mV
EHS 8y 05x	8	500 V	15 mA	10 mV
EHS Fy 05x	16	500 V	15 mA	10 mV
EHS 8y 10x	8	1 kV	8 mA	10 mV
EHS Fy 10x	16	1 kV	8 mA	10 mV
EHS 8y 20x	8	2 kV	4 mA	10 mV
EHS Fy 20x	16	2 kV	4 mA	10 mV
EHS 8y 30x	8	3 kV	3 mA	10 mV
EHS Fy 30x	16	3 kV	3 mA	10 mV
EHS 8y 40x	8	4 kV	2 mA	10 mV
EHS Fy 40x	16	4 kV	2 mA	10 mV
EHS 8y 60x	8	6 kV	1 mA	10 mV
EHS Fy 60x	16	6 kV	1 mA	10 mV
EHS 4y 80x	4	8 kV	1 mA	10 mV
EHS 4y 100x	4	10 kV	0.7 mA	10 mV
NEW EHS 4y 150x	4	15 kV	0.5 mA	10 mV
NEW EHS 4y 200x	4	20 kV	0.4 mA	10 mV

EHS STANDARD

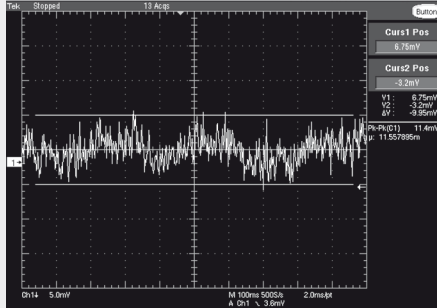
VERSATILE HIGH VOLTAGE MODULE IN MULTIPLE FLOATING VERSIONS



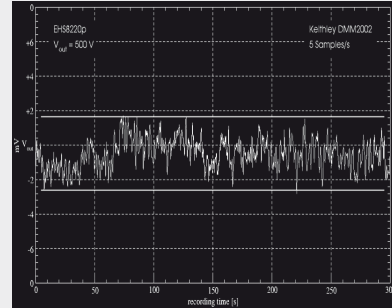
RIPPLE AND NOISE CLASSES



10 µs / DIV
 R1 EHS 8060: 6000 V/1 mA | $V_{p,p} = 1.4$ mV
 R2 EHS 8060: 6000 V/0.1 mA | $V_{p,p} = 0.4$ mV
 R3 Ground noise of the oscilloscope 0.8 mV



100 ms / DIV
 EHS 8060: 6000 V/1 mA | $V_{p,p} = 11$ mV



50 s / DIV
 EHS 8220p | $V_{out} = 500$ V | $V_{p,p} = 4$ mV

LOW NOISE	$V_{p,p} < 5$ mV [f > 1 kHz] $V_{p,p}$ typ. < 20 mV / $V_{p,p}$ max. 30 mV	[1 kHz > f > 10 Hz]
VERY LOW NOISE	$V_{p,p} < 1$ mV [f > 1 kHz] $V_{p,p}$ typ. < 3 mV / $V_{p,p}$ max. 5 mV	[1 kHz > f > 10 Hz]
ULTRA LOW NOISE	$V_{p,p} < 1$ mV [f > 1 kHz] $V_{p,p}$ typ. < 3 mV / $V_{p,p}$ max. 5 mV	[1 kHz > f > 0.1 Hz]

SPECIFICATIONS / SPEZIFIKATION

	EHS CG	EHS CFG	EHS FG
Polarity		factory fixed, positive or negative	
Potential difference	-	56 V channel/GND	20 V channel/channel/GND, opt. up to 2 kV
Ripple and noise [f > 10 Hz]	< 20 mV < 3-5 mV **		< 10 mV
Temperature coefficient		50 ppm / K	
Resolution voltage setting		$2 \cdot 10^{-6} \cdot V_{nom}$	
Resolution current setting		$2 \cdot 10^{-6} \cdot I_{nom}$	
Resolution voltage measurement		$2 \cdot 10^{-6} \cdot V_{nom}$	
Resolution current measurement		$2 \cdot 10^{-6} \cdot I_{nom}$	
Accuracy* voltage measurement		$\pm (0.01 \% \cdot V_{out} + 0.02 \% \cdot V_{nom})$	
Accuracy* current measurement	$\pm (0.02 \% \cdot I_{out} + 0.02 \% \cdot I_{nom})$		$\pm (0.01 \% \cdot I_{out} + 0.02 \% \cdot I_{nom})$
Rate of voltage change	up to $0.2 \cdot V_{nom} / s$		up to $0.2 \cdot V_{nom} / s$ opt. up to $0.75 \cdot V_{nom} / s$
HV connector	R51		R51 SHV
Case		6U cassette, width 8 HP	
Protection		Safety loop, opt. INHIBIT per channel (ID / IU)	
*) All specifications guaranteed from $1\% \cdot V_{nom} < V_{out} < V_{nom}$			
**) With option VLN			

ORDER & OPTIONS / BESTELLINFORMATIONEN

OPTION	ORDER INFO	EXAMPLE
POLARITY	positive: x = p , negative: x = n	EHS 80 05p
FLOATING	common floating ground CFG: y = 0 , floating ground: y = 6	EHS 86 05p F
SINGLE CHANNEL INHIBIT - down	ID	
SINGLE CHANNEL INHIBIT - up	IU	
VERY LOW NOISE (EHS standard)	VLN	

MODULES

EDS SERIES



EHS SERIES



EBS SERIES



ESS SERIES



MPV SERIES



CRATES

ECH 44A



ECH 242 / 244 / 224 / 238



MPOD / MPOD-MIX



MPOD MINI / MICRO / MICRO-2



ALSO AVAILABLE: EHS HIGH PRECISION



- ▶ 4 / 8 / 16 channel, 100 V - 20 kV versions
- ▶ ultra low ripple and noise
- ▶ hardware voltage and current limits
- ▶ second current measurement range 20 μ A for high resolution
- ▶ voltage and current control per channel
- ▶ programmable parameters (delayed trip etc.)
- ▶ options low temp. coeff. (TC), INHIBIT down/up (ID / IU), voltage correction by temp. (VCT), lower output current (L)



iseq Spezialelektronik GmbH

Bautzner Landstr. 23
01454 Radeberg
Germany

phone: +49 351 26996-0
Fax: +49 351 26996-21
e-mail: info@iseq-hv.com

iseq is a manufacturer of very precise and stable High Voltage Power Supplies with focus on physics and industrial applications. The product portfolio includes AC/ DC, DC/DC and modular High Voltage systems. The company was founded in 1995. Continuous growth and innovation strengthened the company's market position. iseq is well known for the development of outstanding custom specific solutions for various special applications.



EHS HIGH PRECISION

VERSATILE HIGH PRECISION HV MODULE IN MULTIPLE FLOATING VERSIONS



MMS

ULN

CFG

FG

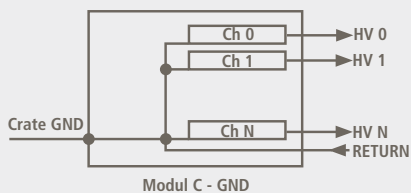
SYSTEMS

- ▶ 4 / 8 / 16 channel, 100 V - 20 kV versions
- ▶ extreme high stability, low temperature coefficient
- ▶ very low ripple and noise
- ▶ second current measurement range 20 μ A for high resolution
- ▶ hardware voltage and current limits
- ▶ voltage and current control per channel
- ▶ programmable parameters (delayed trip etc.)

The EHS High Precision modules are multichannel high voltage power supplies in MMS system (Eurocard format) with best stability, 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 of 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).

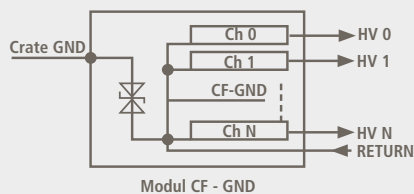


FLOATING OPTIONS



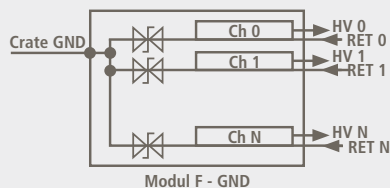
Common Ground

All channels and the processing unit are galvanically connected. Within a crate all CG modules are galvanically connected.



Common Floating Ground

All channels and the processing unit are galvanically connected. The module GND is isolated from the GND of the crate. Within a crate all modules with CFG are galvanically isolated. A protection circuit prevents differences in the potentials between the module CF-GND and the crate GND of more than 60 V.



Floating Ground

All channels are galvanically isolated from each other and from the module GND. By default a protection circuit prevents differences in the potentials between the channels and the module GND of more than 25 V. As an option this isolation can be designed to enable potential differences up to 2,000 V. With this option the user is responsible not to exceed the maximum ground potential differences!

CONFIGURATIONS / KONFIGURATIONEN

MODEL	CHANNELS	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT C. OPTION L	RIPPLE AND NOISE
NEW EHS 8y 01x	8	100 V	10 mA	100 µA	3 mV
NEW EHS Fy 01x	16	100 V	10 mA	100 µA	3 mV
EHS 8y 05x	8	500 V	10 mA	100 µA	3 mV / CFG: 5mV
EHS Fy 05x	16	500 V	10 mA	100 µA	3 mV / CFG: 5mV
EHS 8y 10x	8	1 kV	8 mA	100 µA	3 mV / CFG: 5mV
EHS Fy 10x	16	1 kV	8 mA	100 µA	3 mV / CFG: 5mV
EHS 8y 20x	8	2 kV	4 mA	100 µA	5 mV
EHS Fy 20x	16	2 kV	4 mA	100 µA	5 mV
EHS 8y 30x	8	3 kV	3 mA	100 µA	5 mV
EHS Fy 30x	16	3 kV	3 mA	100 µA	5 mV
EHS 8y 40x	8	4 kV	2 mA	100 µA	5 mV
EHS Fy 40x	16	4 kV	2 mA	100 µA	5 mV
EHS 8y 60x	8	6 kV	1 mA	100 µA	5 mV
EHS Fy 60x	16	6 kV	1 mA	100 µA	5 mV
EHS 4y 80x	4	8 kV	1 mA	100 µA	5 mV
EHS 4y 100x	4	10 kV	0.7 mA	100 µA	5 mV
NEW EHS 4y 150x	4	15 kV	0.5 mA	100 µA	5 mV
NEW EHS 4y 200x	4	20 kV	0.4 mA	100 µA	10 mV

ORDER & OPTIONS / BESTELLINFORMATIONEN

OPTION	ORDER INFO	EXAMPLE
POLARITY	positive: x = p , negative: x = n	EHS 82 05p
FLOATING	common floating ground CFG: y = 2 floating ground FG: y = 4	EHS 82 05p EHS 84 05p F
LOWER TEMPERATURE COEFFICIENT	TC	
SINGLE CHANNEL INHIBIT - down	ID	
SINGLE CHANNEL INHIBIT - up	IU	
VOLTAGE CORRECTION by TEMPERATURE	VCT	
LOWER OUTPUT CURRENT	L (lower nominal output current)	



SI-PMT / APD SOLUTIONS, CATALOG P. 74



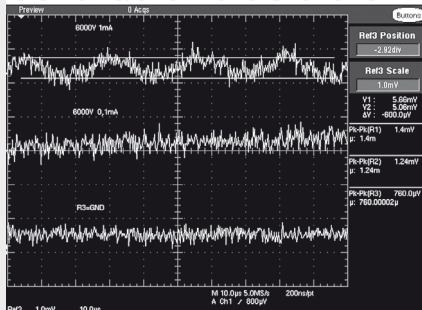
- ▶ voltage correction by temperature (VCT)
- ▶ low output current versions (L)

EHS HIGH PRECISION

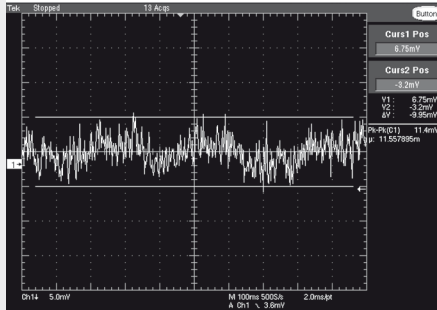
VERSATILE HIGH PRECISION HV MODULE IN MULTIPLE FLOATING VERSIONS



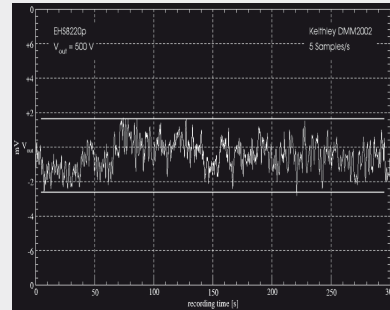
RIPPLE AND NOISE CLASSES



10 µs / DIV
 R1 EHS 8060: 6000 V/1 mA | $V_{p,p} = 1.4$ mV
 R2 EHS 8060: 6000 V/0.1 mA | $V_{p,p} = 0.4$ mV
 R3 Ground noise of the oscilloscope 0.8 mV



100 ms / DIV
 EHS 8060: 6000 V/1 mA | $V_{p,p} = 11$ mV



50 s / DIV
 EHS 8220p | $V_{out} = 500$ V | $V_{p,p} = 4$ mV

- LOW NOISE** $V_{p,p} < 5$ mV [f > 1 kHz] | $V_{p,p}$ typ. < 20 mV / $V_{p,p}$ max. 30 mV [1 kHz > f > 10 Hz]
- VERY LOW NOISE** $V_{p,p} < 1$ mV [f > 1 kHz] | $V_{p,p}$ typ. < 3 mV / $V_{p,p}$ max. 5 mV [1 kHz > f > 10 Hz]
- ULTRA LOW NOISE** $V_{p,p} < 1$ mV [f > 1 kHz] | $V_{p,p}$ typ. < 3 mV / $V_{p,p}$ max. 5 mV [1 kHz > f > 0.1 Hz]

SPECIFICATIONS / SPEZIFIKATION

	EHS HP CFG	EHS HP FG
Polarity		factory fixed, positive or negative
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
Temperature coefficient		30 ppm/K 10 ppm/K (option TC)
Resolution voltage setting		$2 \cdot 10^{-6} \cdot V_{nom}$
Resolution current setting [$I_{out} > 20 \mu A$]		$2 \cdot 10^{-6} \cdot I_{nom}$
Resolution voltage measurement		$1 \cdot 10^{-6} \cdot V_{nom}$
Resolution current measurement [$I_{out} > 20 \mu A$]		$1 \cdot 10^{-6} \cdot I_{nom}$
Resolution current measurement [$I_{out} < 20 \mu A$]		50 pA
Accuracy* voltage measurement		$\pm (0.01 \% \cdot V_{out} + 0.01 \% \cdot V_{nom})$
Accuracy* current measurement [$I_{out} > 20 \mu A$]		$\pm (0.01 \% \cdot I_{out} + 0.02 \% \cdot I_{nom})$
Accuracy* current measurement [$I_{out} < 20 \mu A$]		$\pm (0.01 \% \cdot I_{out} + 4 \text{ nA})$
Rate of voltage change		up to $0.2 \cdot V_{nom} / s$ opt. up to $0.75 \cdot V_{nom} / s$
HV connector		R51 SHV
Case		6U cassette, width 8 HP
Protection		Safety loop, opt. INHIBIT per channel (ID / IU)

*All specifications guaranteed from $1\% \cdot V_{nom} < V_{out} < V_{nom}$

MODULES

EDS SERIES



EHS SERIES



EBS SERIES



ESS SERIES



MPV SERIES



CRATES

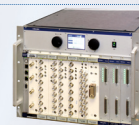
ECH 44A



ECH 242 / 244 / 224 / 238



MPOD / MPOD-MIX



MPOD MINI / MICRO / MICRO-2



ALSO AVAILABLE: EHS STANDARD



- ▶ 4 / 8 / 16 / 32 channel, 100 V - 20 kV versions
- ▶ low ripple and noise, very low noise option VLN
- ▶ hardware voltage and current limits
- ▶ voltage and current control per channel
- ▶ programmable parameters (delayed trip etc.)
- ▶ options very low noise (VLN), INHIBIT down/up (ID / IU)



iseg is a manufacturer of very precise and stable High Voltage Power Supplies with focus on physics and industrial applications. The product portfolio includes AC/DC, DC/DC and modular High Voltage systems. The company was founded in 1995. Continuous growth and innovation strengthened the company's market position. **iseg** is well known for the development of outstanding custom specific solutions for various special applications.