

Technical documentation

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EBS

Bipolar 4 Quadrant High Voltage Module with Common Floating Ground (CFG)

- full 4-quadrant capabilities, usable as bipolar current sink and source
- perfect for electron optical systems and capacitive loads
- low ripple and noise
- hardware voltage and current limit
- programmable parameters (delayed trip etc.)



Document history

Version	Date	Major changes
3.7	2022-09-20	Fixed documentation, separate manual for 3UC modules only
3.6	2021-12-10	Fixed technical Data (Accuracy current measurement), new figures for dimensions and front, overview connectors
3.5	2021-03-17	Improved description, Item code revision and customization
3.4	2020-10-09	Improved description C-RTN, CCG, RTN
3.3	2020-07-13	Improved documentation (Inhibit)
3.2	2020-06-10	Figure for Jumper configuration (CG-CFG)
3.1	2020-03-26	improved documentation chapter Hardware Limit, Delayed Trip, Operation of individual channels
3.0	2019-11-25	safety information, glossary
2.3	2019-10-16	improved documentation (ADC/ SPS)
2.2	2019-07-29	improved documentation, error correction
2.1	31.05.2017 01.10.2018	Fixed Item Codes Notes revised
2.0	2017-02-16	Relayouted version

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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.




Safety

This section contains important security information for the installation and operation of the device. Failure to follow safety instructions and warnings can result in serious injury or death and property damage.

Safety and operating instructions must be read carefully before starting any operation.

We decline all responsibility for damages and injuries caused which may arise from improper use of our equipment.

Depiction of the safety instructions

DANGER!	
 DANGER!	<p>“Danger!” indicates a severe injury hazard. The non-observance of safety instructions marked as “Danger!” will lead to possible injury or death.</p>
WARNING!	
 WARNING!	<p>“Warning!” indicates an injury hazard. The non-observance of safety instructions marked as “Warning!” could lead to possible injury or death.</p>
CAUTION!	
 CAUTION!	<p>Advice marked as “Caution!” describe actions to avoid possible damages to property.</p>
INFORMATION	
 INFORMATION	<p>Advice marked as “Information” give important information.</p>



Read the manual.



Attention high voltage!

HIGH VOLTAGE



Important information.

Intended Use

The device may only be operated within the limits specified in the data sheet. The permissible ambient conditions (temperature, humidity) must be observed. The device is designed exclusively for the generation of high voltage as specified in the data sheet. Any other use not specified by the manufacturer is not intended. The manufacturer is not liable for any damage resulting from improper use.

Qualification of personnel

A qualified person is someone who is able to assess the work assigned to him, recognize possible dangers and take suitable safety measures on the basis of his technical training, his knowledge and experience as well as his knowledge of the relevant regulations.

General safety instructions

- Observe the valid regulations for accident prevention and environmental protection.
- Observe the safety regulations of the country in which the product is used.
- Observe the technical data and environmental conditions specified in the product documentation.
- You may only put the product into operation after it has been established that the high-voltage device complies with the country-specific regulations, safety regulations and standards of the application.
- The high-voltage power supply unit may only be installed by qualified personnel.

Important safety instructions

WARNING!



WARNING!

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.

WARNING!



WARNING!

The high-voltage cable must be professionally connected to the consumer/load and the connection insulated with the appropriate dielectric strength. Do not power the consumer/load outside of its specified range.

WARNING!



WARNING!

Before connecting or disconnecting HV cables or any operation on the HV output or the application, the unit has to be switched off and discharge of residual voltage has to be finished. Depending on application residual voltages can be present for long time periods.

WARNING!



WARNING!

Do not operate the unit in wet or damp conditions.

WARNING!



WARNING!

Do not operate the unit in an explosive atmosphere.

WARNING!



WARNING!

Do not operate the unit if you suspect the unit or the connected equipment to be damaged.

CAUTION!



Caution!

When installing the units, make sure that an air flow through the corresponding air inlet and outlet openings is possible.

CAUTION!



Caution!

When controlling, with software, the high voltage systems, make sure that nobody is near the high voltage or can be injured.

INFORMATION



INFORMATION

Please check the compatibility with the devices used.

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1 General description

CAUTION!



CAUTION!

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

The bipolar EBS distribution modules are multichannel high voltage power supplies in MMS system with full 4-quadrant capabilities. The EBS can be used as bipolar current sink and source, which perfectly meets the requirements of electron optical systems or capacitive loads. The EBS is built in common floating ground principle to reduce voltage noise level. With up to 24 channels each single channel has an independent voltage control up to 3 kV channel-voltage-difference. The EBS configuration of output voltage and current can be customized on request. The module is made of high precision components as 24 bit ADC and 20 bit DAC and provides comprehensive security features.

2 Technical Data

SPECIFICATIONS	EBS 6U
Polarity	bipolar
Floating principle	Common Floating Ground
Ripple and noise (f > 10 Hz)	< 20 mV _{p-p}
Stability	
Stability – [ΔV_{out} vs. ΔV_{in}]	< $1 \cdot 10^{-5} \cdot V_{nom}$
Stability – [ΔV_{out} vs. ΔR_{load}]	< $1 \cdot 10^{-4} \cdot V_{nom}$
Temperature coefficient voltage measurement	< 20 ppm / K
Temperature coefficient current measurement	< 100 ppm / K
Resolution – The resolution of measurable values depends on the settings of the sampling rate and the digital filter!	
Resolution voltage setting	< $2 \cdot 10^{-6} \cdot V_{nom}$
Resolution current setting (trip)	< $1 \cdot 10^{-4} \cdot I_{nom}$
Resolution voltage measurement ⁽¹⁾	< $2 \cdot 10^{-6} \cdot V_{nom}$
Resolution current measurement	< $1 \cdot 10^{-4} \cdot I_{nom}$
Measurement Accuracy – The measurement accuracy is guaranteed in the range $1\% \cdot V_{nom} < V_{out} < V_{nom}$ and for 1 year	
Accuracy voltage measurement	$\pm (0.01\% \cdot V_{out} + 0.02\% \cdot V_{nom})$
Accuracy current measurement	$\pm (0.2\% \cdot I_{out} + 0.2\% \cdot I_{nom})$
Sample rates ADC (SPS)	5, 10, 25, 50, 60, 100, 500 ⁽²⁾
Digital filter averages	1, 16, 64 ⁽²⁾ , 256, 512, 1024
Voltage ramp up / down	$1 \cdot 10^{-6} \cdot V_{nom} / s$ to $1 \cdot V_{nom} / s$
Hardware limits	Potentiometer per module [V_{max} / I_{max}]
Limit monitor volt	2.5 V
Digital interface	CAN
Protection	Safety loop, over load and short circuit protected (ATTENTION: there is only one short circuit or arc per second allowed!)
HV connector	Redel SHV
System connector	96-pin connector (MMS HV compatible)
Safety loop connector	Lemo 2pole (Figure 6)
Limit monitor connector	Lemo 2pole (Figure 7)
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
Notes: ¹⁾ The resolution of measurable values depends on the settings of the sampling rate and the digital filter! ²⁾ Standard factory settings	

Table 1: Technical data: Specifications

CONFIGURATIONS EBS								
Type	V _{nom}	I _{nom}	Ch	Max. voltage difference channel to channel	Max. I _{in} (A) at 24V	HV connector Standard/opt.	Item Code	Options
EBS C0 05	500 V	1 mA	12	1 kV	1.2	R51.42 , SHV	EB120005105oooccrk	SLA, SLP
EBS C0 12	1.2 kV	0.5 mA	12	2.4 kV	1.4	R51.42 , SHV	EB120012504oooccrk	SLA, SLP
EBS C0 12	1.2 kV	1 mA	12	1.2 kV	1.4	R51.42 , SHV	EB120012105oooccrk	SLA, SLP
EBS C0 30	3 kV	0.5 mA	12	3 kV	1.6	R51.42 , SHV	EB120030504oooccrk	SLA, SLP
EBS 180 05	500 V	1 mA	24	1 kV	2.2	R51.44	EB240005105oooccrk	SLA, SLP
EBS 180 12	1.2 kV	0.5 mA	24	2.4 kV	2.8	R51.44	EB240012504oooccrk	SLA, SLP
EBS 180 12	1.2 kV	1 mA	24	1.2 kV	2.8	R51.44	EB240012105oooccrk	SLA, SLP
EBS 180 30	3 kV	0.5 mA	24	3 kV	3,2	R51.44	EB240030504oooccrk	SLA, SLP

Notes:
replacement characters: o – options, c – connector, r – revision, k – customization

Table 2: Technical data: Configurations

OPTIONS	OPTION CODE	EXAMPLE	ITEM CODE HEX CODING
ACTIVE SAFETY LOOP	SLA		001
INTERNALLY POWERED SAFETY LOOP	SLP		002

Table 3: Technical data: Options and order information

3 Handling

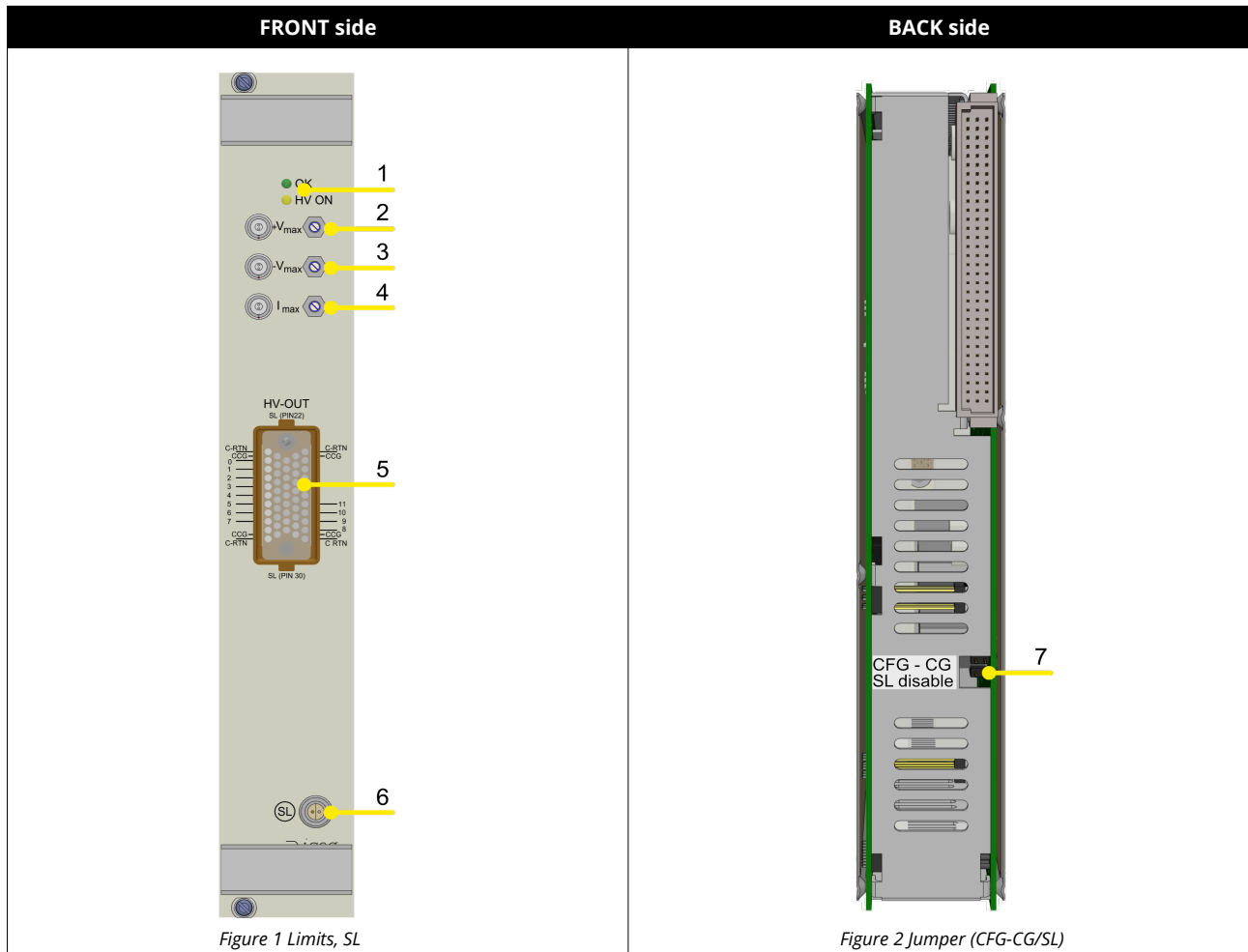


Figure 1 Limits, SL

Figure 2 Jumper (CFG-CG/SL)

Number	Description	Detailed explanation in chapter	
[1]	LED	Module Status	3.2 Module status, 3.3 Hardware Limit
[2]	+V _{max}	Limit potentiometers	3.3 Hardware Limit
[3]	-V _{max}	Limit potentiometers	3.3 Hardware Limit
[4]	I _{max}	Limit potentiometers	3.3 Hardware Limit
[5]	HV-OUT	HV connectors (example REDEL)	7 Connectors assignments, 2 Technical Data
[6]	SL	Safety Loop connector	3.4 Safety Loop
[7]	Jumper (BLUE)	Common Floating Ground / Common Ground Jumper	3.1 Connection
	Jumper (RED)	Safety Loop Jumper	3.4 Safety Loop

Table 4

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

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.

INFORMATION



INFORMATION

EBS modules with Common Floating Ground (CFG) will be delivered with a jumper, which connects the module-GND with the crate-GND. To operate in CFG configuration the jumper (CFG-CG) on the module back must be removed, see *Figure 2 Jumper (CFG-CG/SL)*.

3.2 Module status

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

Status	Description
green LED „OK“ on	all channels have the status “OK”
green LED „OK“ off	an error occurred: 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 have status “HV ON” or voltage on output is greater than 56V.
Green LED blinking	Firmware update is stored into flash, do not switch off power supply, crate etc.

Table 5: 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 6U versions are equipped with two independent potentiometers (see *Figure 1 Limits, SL*) for the positive [2] and negative [3] voltage limit. The maximum output current for all channels (hardware current limit) is defined by the position of the corresponding potentiometer I_{max} [4]. 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 $(102 \pm 2)\% V_{nom}$ and $(102 \pm 2)\% I_{nom}$. The output voltage is limited to the specified value. If the current exceeds the hardware current limit (about 30% above the current limit value set by the limit potentiometer) the channel will be shut off without delay and ramp. In both cases 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 [6], see Figure 1 Limits, SL) on the front panel and between the SL contacts (Pin 22 and PIN 30) at the REDEL-connector [5], 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 ("CAN EDCP Programmers-Guide", see chapter 10 Appendix). 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. 3V. 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, see Figure 2 Jumper (CFG-CG/SL).

3.5 Delayed Trip

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", see chapter 10 Appendix.

By a programmable timeout with one millisecond resolution, the trip can be delayed up to four seconds. If the measured current exceeds the set current the programmed timeout counter is decremented, keeping the output voltage. If the current returns to a value $< I_{set}$ before timeout the counter will be reset. So this process can be restarted if the current rises again.

Note that the actual current is acquired approximately every 150ms, which can lead to delays in the detection of an exceeded or again reduced current.

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.

If the current at any time exceeds the hardware current limit (about 30% above the current limit value set by the limit potentiometer) the channel will be shut off without delay and 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. However, the actual discharge time strongly depends on the connected load.

3.6 Operation of individual channels

If a channel is switched off (after power on, but also due to shut down with hardware current limit exceeded or after switching off with KillEnable) and if the maximum voltage in any active channel is greater 2000V (in any polarity), the output voltage can be different from 0V. The deviation can be up to 10% of the maximum set voltage. Compliance with the V_{set} value (also 0V) is only guaranteed if the channel is switched on.

4 Options

4.1 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.

4.2 SLP – Internally powered safety loop

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

5 Front panel versions

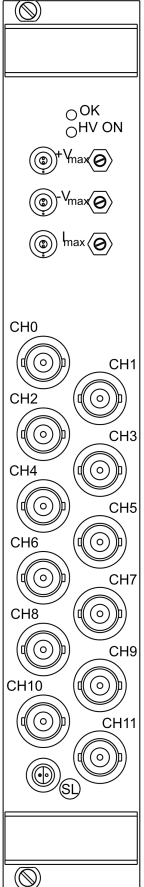
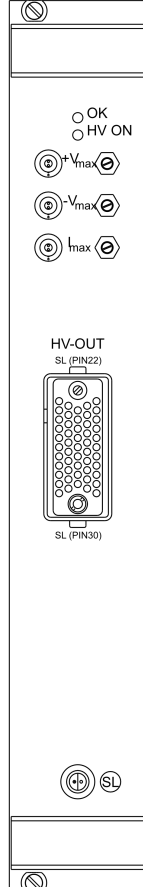
FRONT PANELS		
Channels	12	12 / 24
Floating	CFG	CFG
HV Connector	SHV	R51
Options	-	-
Figure	 <p>Diagram of the front panel for the 12 channels version. It features a vertical array of 12 channels labeled CH0 through CH11. Above the channels are three pairs of terminals for V_{max} and I_{max}, and two indicator lights for OK and HV ON. At the bottom, there is an SL terminal and a connector labeled SL (PIN30).</p>	 <p>Diagram of the front panel for the 12 / 24 channels version. It features a vertical array of 12 channels. Above the channels are three pairs of terminals for V_{max} and I_{max}, and two indicator lights for OK and HV ON. A large connector labeled HV-OUT SL (PIN22) is positioned in the middle, and an SL (PIN30) terminal is at the bottom.</p>

Table 6: Front panel versions

6 Dimensional drawings

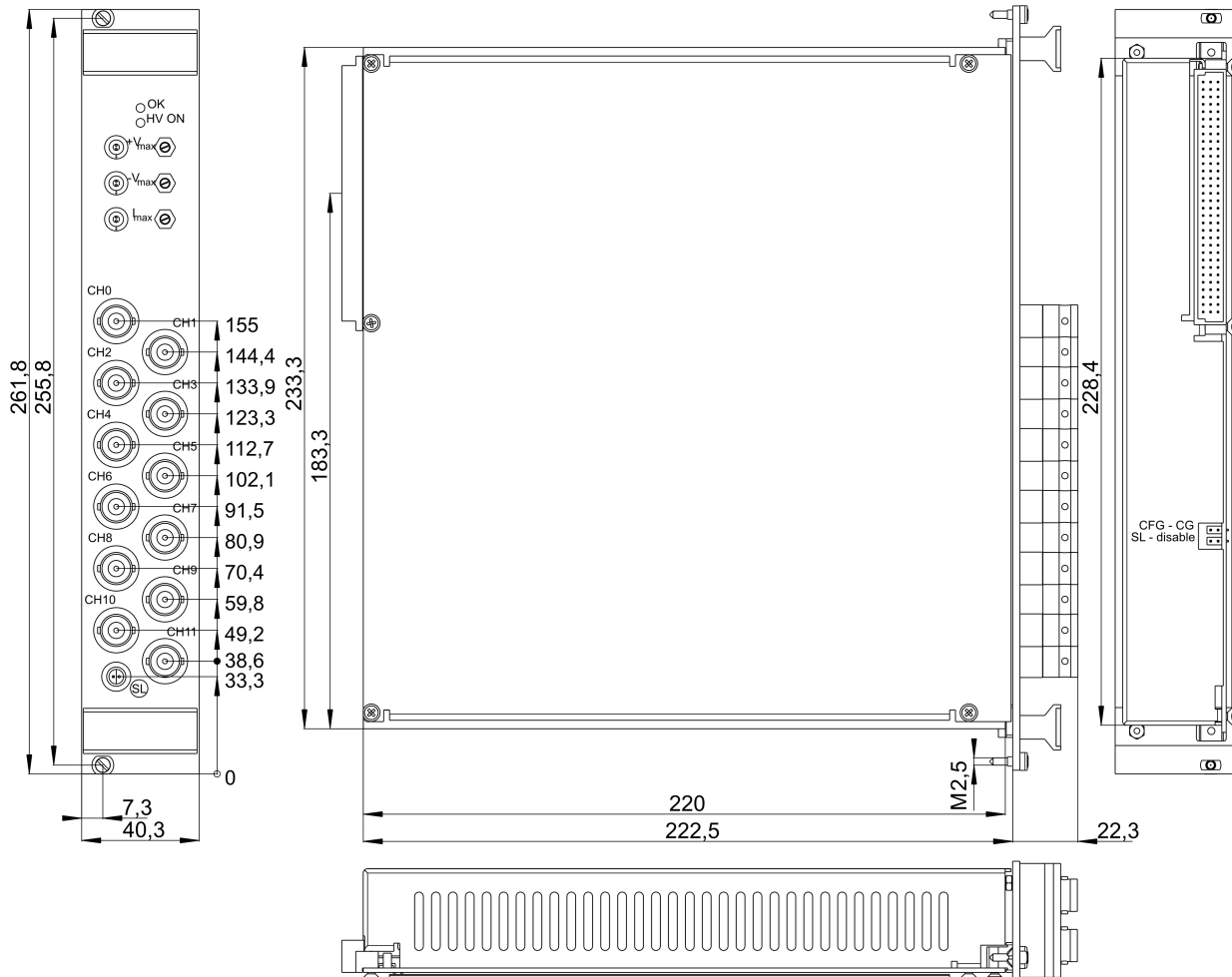


Figure 3: dimensional drawing 12ch with SHV

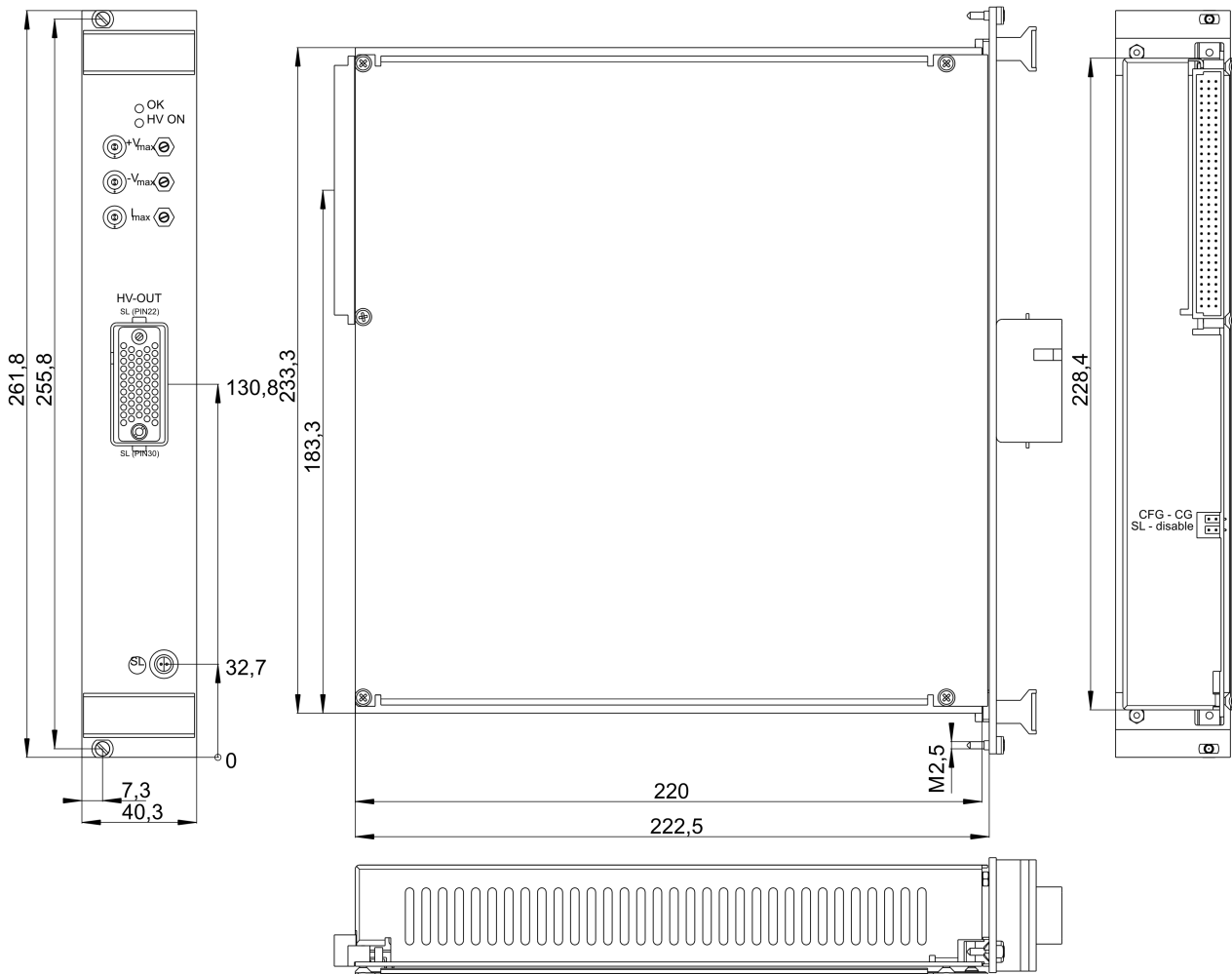


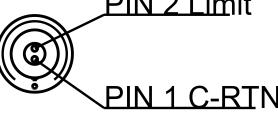
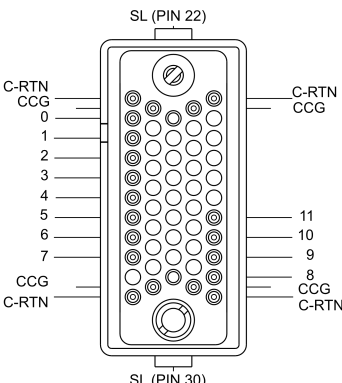


Figure 4: dimensional drawing 12ch/ 24ch with REDEL

7 Connectors assignments

CONNECTORS – POWER SIDE		PART NUMBERS (manufacturer code / iseg accessory parts item code)	
SHV		CABLE SIDE	
 Figure 5	part number R317.005.000 manufacturer Radiall iseg part number Z592474		
Safety Loop socket		CABLE SIDE	
1 2 PIN  Figure 6	part number FFA.05.302.CLAC manufacturer LEMO Elektronik GmbH iseg part number Z592312		
Limit monitor socket 2pol		CABLE SIDE	
 Figure 7	part number FGG.00.302.CLAD30 manufacturer LEMO Elektronik GmbH iseg part number Z201466		
R51.42 Redel		CABLE SIDE	
 Figure 8	Straight plug with key and cable collet Connector contacts (female) Contacts Safety Loop (female) manufacturer LEMO Elektronik GmbH	connector SAG.H51.LLZBG ERA.05.403.ZLL1 EGG.3B.665.ZZM LEMO Elektronik GmbH	iseg part number Z200325 Z592263 Z592262
Notes:		SL: Safty Loop	C-RTN: Common Return
			CCG: Common Crate Ground

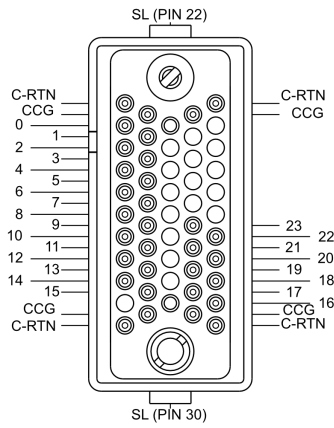

CONNECTORS – POWER SIDE		PART NUMBERS (manufacturer code / iseg accessory parts item code)		
R51.44	Redel	CABLE SIDE		
 <p>Figure 9</p>		connector	iseg part number	
		Straight plug with key and cable collet	SAG.H51.LLZBG	Z200325
		Connector contacts (female)	ERA.05.403.ZLL1	Z592263
		Contacts Safety Loop (female)	EGG.3B.665.ZZM	Z592262
		manufacturer	LEMO Elektronik GmbH	
Notes:				
SL: Safty Loop	CCG: Common Crate Ground	C-RTN: Common Return		

Table 7: Connectors part number information

CAUTION!



Only use genuine iseg parts like power cables, CAN cables and terminators for stable and safe operation.

CAUTION!

8 PIN assignments

8.1 Safety loop

PIN	NAME	DESCRIPTION
1	Safety loop	Safety loop
2	Safety loop	Safety loop

8.2 Limit

PIN	NAME	DESCRIPTION
1	Limit	Limit (I_{max} or V_{max})
2	GND	Ground

8.3 Redel – R51.42

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
2	Ch0	Output Channel 0	48	Ch10	Output Channel 10	1	C-RTN	Common Return
3	Ch1	Output Channel 1	47	Ch11	Output Channel 11	11	C-RTN	Common Return
4	Ch2	Output Channel 2				41	C-RTN	Common Return
5	Ch3	Output Channel 3				51	C-RTN	Common Return
6	Ch4	Output Channel 4				12	CCG	Common Crate Ground
7	Ch5	Output Channel 5				21	CCG	Common Crate Ground
8	Ch6	Output Channel 6				31	CCG	Common Crate Ground
9	Ch7	Output Channel 7				40	CCG	Common Crate Ground
50	Ch8	Output Channel 8				22	SL	Safety Loop
49	Ch9	Output Channel 9				30	SL	Safety Loop

Table 8: Redel – R51.42

8.4 Redel – R51.44

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
2	Ch0	Output Channel 0	13	Ch1	Output Channel 1	1	C-RTN	Common Return
3	Ch2	Output Channel 2	14	Ch3	Output Channel 3	11	C-RTN	Common Return
4	Ch4	Output Channel 4	15	Ch5	Output Channel 5	41	C-RTN	Common Return
5	Ch6	Output Channel 6	16	Ch7	Output Channel 7	51	C-RTN	Common Return
6	Ch8	Output Channel 8	17	Ch9	Output Channel 9	12	CCG	Common Crate Ground
7	Ch10	Output Channel 10	18	Ch11	Output Channel 11	21	CCG	Common Crate Ground
8	Ch12	Output Channel 12	19	Ch13	Output Channel 13	31	CCG	Common Crate Ground
9	Ch14	Output Channel 14	20	Ch15	Output Channel 15	40	CCG	Common Crate Ground
50	Ch16	Output Channel 16	39	Ch17	Output Channel 17	22	SL	Safety Loop
49	Ch18	Output Channel 18	38	Ch19	Output Channel 19	30	SL	Safety Loop
48	Ch20	Output Channel 20	37	Ch21	Output Channel 21			
47	Ch22	Output Channel 22	36	Ch23	Output Channel 23			

Table 9: Redel – R51.45

9 Order guides

CABLE ORDER GUIDE					
POWER SUPPLY SIDE CONNECTOR	V _{max}	CABLE CODE	CABLE DESCRIPTION	LOAD SIDE CONNECTOR	ORDER CODE <i>LLL = length in m⁽¹⁾</i>
R51.42-G	≤ 4 kV	07	HV cable 6kV Kerpen SL-v2YCeHI 37xAWG26/7red	R51.42-A	RG42_C07-LLL_RA42
R51.44-G	≤ 4 kV	07	HV cable 6kV Kerpen SL-v2YCeHI 37xAWG26/7red	R51.44-A	RG44_C07-LLL_RA44
SHV	≤ 5 kV	04	HV cable shielded 30kV (HTV-30S-22-2)	open	SHV_C04-LLL
Notes					
¹⁾ Length building examples: 10cm → 0.1, 2.5m → 2.5, 12m → 012, 999m → 999					

Table 10: Guideline for cable ordering

CONFIGURATION ORDER GUIDE (item code parts)								
EB	24	0	030	504	000	02	0	0
High Voltage Bipolar Distributor	Numbers of channels	Class	V _{nom}	I _{nom} (nA)	Option (hex)	HV-Connector	Revision	Customized Version
	12 or 24 channel	0 = Standard	three significant digits • 100V For Example: 030 = 3000V	two significant digits + number of zeros For Example: 504 = 500μA	Sum of the hex codes (see Table 3: Technical data: Options and order information) For Example: SLP = 002	02 = SHV 42 = R51.42 44 = R51.44 see 8 PIN assignments	one digit 0 = no revision For Example: A = first revision B = second revision	one digit 0 = no customization

Table 11: Item code parts for different configurations

10 Appendix

For more information please use the following download links:

This document
http://download.iseq-hv.com/SYSTEMS/MMS/EBS/iseq_datasheet_EBS_en.pdf
Website
https://iseq-hv.com/de/products/detail/EBS
CAN EDCP Programmers-Guide
http://download.iseq-hv.com/SYSTEMS/MMS/CAN_EDCP_Programmers-Guide.pdf
iseq Hardware Abstraction Layer
http://download.iseq-hv.com/SYSTEMS/MMS/iseqHardwareAbstractionLayer.pdf

Manufacturers website (connectors)	
LEMO Elektronik GmbH	https://www.lemo.com/
Radiall	https://www.radiall.com/

11 Glossary

SHORTCUT	MEANING
V_{nom}	nominal output voltage
V_{out}	output voltage
V_{set}	set value of output voltage
V_{mon}	monitor voltage of output voltage
V_{meas}	digital measured value of output voltage
V_{p-p}	peak to peak ripple voltage
V_{in}	input / supply voltage
V_{type}	type of output voltage (AC, DC)
V_{ref}	internal reference voltage
V_{max}	limit (max.) value of output voltage
$\Delta V_{out} - [\Delta V_{in}]$	deviation of V_{out} depending on variation of supply voltage
$\Delta V_{out} - [\Delta R_{load}]$	deviation of V_{out} depending on variation of output load
V_{bounds}	Voltage bounds, a tolerance tube $V_{set} \pm V_{bounds}$ around V_{set} .
I_{nom}	nominal output current
I_{out}	output current
I_{set}	set value of output current
I_{mon}	monitor voltage of output current
I_{meas}	digital measured value of current
I_{trip}	current limit to shut down the output voltage
I_{in}	input / supply current
I_{max}	limit (max.) value of output current
I_{limit}	Current Limit.
I_{bounds}	Current bounds, a tolerance tube $I_{set} \pm I_{bounds}$ around I_{set} .
P_{nom}	nominal output power
P_{in}	input power
P_{in_nom}	nominal input power
T	temperature
T_{REF}	reference temperature
ON	HV ON/OFF
/ON	HV OFF/ON
CH	channel(s)
HV	high voltage
LV	low voltage
GND	signal ground
INH	Inhibit
POL	Polarity
KILL	KillEnable

12 Warranty & Service

This device is made with high care and quality assurance methods. The standard factory warranty is 36 months. Please contact the iseg sales department if you wish to extend the warranty.

CAUTION!



CAUTION!

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

13 Disposal

INFORMATION



INFORMATION

All high-voltage equipment and integrated components are largely made of recyclable materials. Do not dispose the device with regular residual waste. Please use the recycling and disposal facilities for electrical and electronic equipment available in your country.

14 Manufacturer contact

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