# 16-channel High Voltage Bipolar Power Supply EBS 8005

## $V_O$ = - 500V to + 500V / 1 mA

## Operators Manual

**(Device with SN: 71xxx)**

## 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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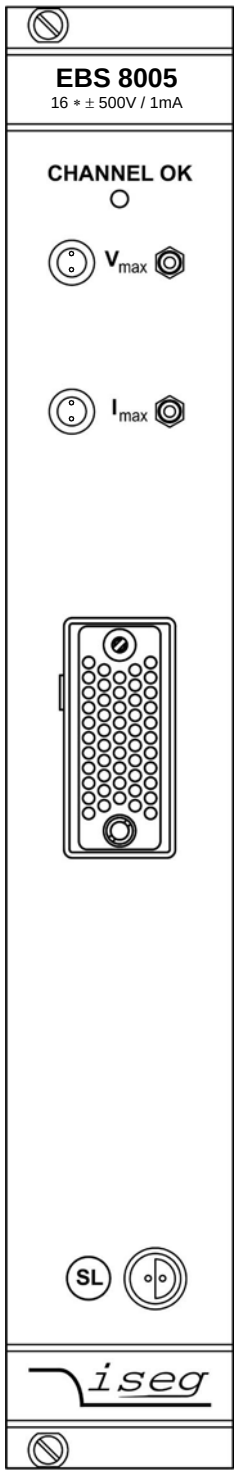
# 1. General information

The EBS 8005 is a 8-channel high voltage bipolar (4 quadrant) power supply in 6U Eurocard format. Each single channel is also independently controllable. The channels share a Floating Common-GND (C-RTN). This floating ground is insulated from the Common Crate Ground (CCG) of the crate and the metal box of the module with a 56 V hardware limit. The EBS 8005 is made ready for mounting into a 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 device is software controlled via CAN-bus directly through a PC or a similar controller. Using the w-ie-ner Mpod crates 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.

# 2. Technical data

| | EBS 8005 |
|---|---|
| Output current $I_O$ | - 1mA to + 1 mA |
| per channel at $V_O$ | -500 V to + 500 V |
| Ripple and noise *) | f = 10 Hz to 100 MHz: typ. 10 mV, max. 50 mV (under all load conditions) |
| Hardware current trip | Potentiometer $I I_{max} I$ for 8 channels |
| Hardware voltage limit | Potentiometer $I V_{max} I$ for 8 channels |
| Interface | CAN interface, potential free |
| Data format | floating-point single precision (setting and measurement) |
| Voltage setting *) | Resolution better than 20 mV |
| Voltage measurement *) | Resolution: better than 20 mV |
| | Accuracy: $\pm$ (0,01% $*$ $V_O$ + 0,02% $*$ $V_{nom}$) for one year<br>Temperature coefficient $< 5 * 10^{-5}/_K$ |
| Current measurement *) | Resolution better than 200 nA |
| | Accuracy: $\pm$ (0,1% $*$ $I_O$ + 0,4% $*$ $I_{nom}$) for one year<br>Temperature coefficient $< 2 * 10^{-3}/_K$ |
| )* - with standard sample rate 500/s and digital filter 64 | |
| Stability $V_O$ | $< 5 * 10^{-5}$ (no load/load and $\Delta V_{IN}$) |
| Rate of voltage change | up to 500 V/s via software |
| Operating mode | Full module and channel control via CAN interface in<br>EHS mode: EDCP (Enhanced Device Control Protocol)<br>see manual CAN interface |
| Module status | green LED at channels 0-7 will work with status ready |
| Protection loop ($I_s$)<br>(2 pin Lemo-socket) | 5 mA < $I_s$ < 20 mA $\Rightarrow$ module on<br>$I_s$ < 0,5 mA $\Rightarrow$ module off |
| Power requirements $V_{IN}$ | + 24 V ( 1,5 A) and + 5 V ( 0,1 A) |
| Packing | 16-channels in 6U Euro cassette (W/D: 40,64 / 220 mm) |
| Connector | 96-pin connector according to DIN 41612 |
| HV connectors | 51-pin Redel Multipin-Connector for channel 0 to 7<br>8 pins HV-out, ch**0** to ch**7**<br>4 pins Floating Common-GND, **C-RTN**<br>4 pins Common Crate Ground, **CCG** (connected to the metal box, the grounded guidings of the connector and to the HV cable shield)<br>2 pins Safety Loop, **SL PIN 22**, **SL PIN 30** |



# 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 maximum output current and voltage for the channels 0 to 7 are defined through the position of the corresponding potentiometer $I_{max}$ resp. $V_{max}$.
It is possible to measure the hardware limits, which has been set with reference to the maximum possible current resp. voltage at the according 2-pin socket. 100 % $I_{max}$ resp. $V_{max}$ corresponds to 2,5 V. The output current and voltage will be limited to the setting value after it exceeds the threshold and the corresponding green LED on the front panel is 'OFF'.
At the bottom on the right side of the front panel is the 2-pin LEMO socket for the safety loop. This connector is installed in-line with the upper (SL PIN 22) and lower SL contacts (SL PIN 30) on the HV connector (see the pin designation on the front panel or in the pin assignment). The safety loop will be closed by connection of the load with help of a connection between PIN 22 and 30 on the HV cable side of the connector. If the safety loop is active then output voltage on all channels is present only if a current of any polarity is flowing in a range of 5 to 20 mA (i.e. safety loop closed). If the safety loop is opened during operation then the output voltages on all channels are shut off without ramp and the corresponding bit in the 'Status module' will be cancelled. After the loop will be closed again the channels must be switched 'ON' and a new set voltage must be given before it is able to offer an output voltage.
The pins of the loops are potential free, the internal voltage drop is ca. 3 V. Coming from the factory the safety loops are not active (the corresponding bit is always set). Removing of an internal jumper on the rear side of the unit makes the loops active.
(s. App. B "Operator's Manual CAN-Interface").

Pin assignment 96-pin connector according to DIN 41612:

| PIN | | PIN | | PIN | | Data |
|---|---|---|---|---|---|---|
| a1<br>a3<br>a5 | | b1<br>b3<br>b5 | | c1<br>c3<br>c5 | | +5V<br>+24V<br>GND |
| a11 | | b11 | | c11 | | @CAN_GND ⎫<br>@CANL ⎬ potential free<br>@CANH ⎭ |
| a13 | | | | | | RESET |
| | | b13 | | | | OFF with ramp (e.g. at power fail) |
| a30<br>a31<br>a32 | A4<br>A2<br>A0 | b30<br>b31<br>b32 | A5<br>A3<br>A1 | c30<br>c31<br>c32 | GND<br>GND<br>GND | ⎫<br>⎬ Address field<br>⎭ 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 $V_{OUTmax}$ / 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.
(see item 4.4, description 11bit-Identifier).
Connected to GND ⇒ A(n) = 0 ; contact open ⇒ A(n) = 1

Pin assignment Multipin Redel HV connector: