

Technical documentation

Last changed on: 2025-11-13

Break Out Box

Connected to the according multichannel module via REDEL connector on multiwire HV cable

- 16,24,32 or 48 channel
- Redel to SHV
- max. 4kV
- Common Floating Ground (CFG)
- Compact or 19" rack-mountable version



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Document history

Version	Date	Major changes
1.0	2025-11-13	Initial version

Disclaimer / Copyrights

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This document is under copyright of iseg Spezialelektronik GmbH, Germany. It is forbidden to copy, extract parts, duplicate for any kind of publication without a written permission of iseg Spezialelektronik GmbH. This information has been prepared for assisting operation and maintenance personnel to enable efficient use.

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 safety instructions

DANGER!



"Danger!" indicates a severe injury hazard. The non-observance of safety instructions marked as "Danger!" will lead to possible injury or death.

WARNING!



"Warning!" indicates an injury hazard. The non-observance of safety instructions marked as "Warning!" could lead to possible injury or death.

CAUTION!



Advices marked as "Caution!" describe actions to avoid possible damages to property

INFORMATION



Advices marked as "Information" give important information.

Description of the symbols in the manual



Warning of dangerous high voltage



Read the manual.



Warning of danger spots



Important information.



The crossed bin symbol indicates that the device shall not be disposed with regular.

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 to control and communicate with iseg high voltage devices 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 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.

1. General description

The break out box is used to convert REDEL multipin connectors into individual SHV connectors for each HV channel. The HV-Input connector is connected to the according multichannel module via REDEL connector on multiwire HV cable. The HV-Output connector consists of SHV connectors for each individual channel.

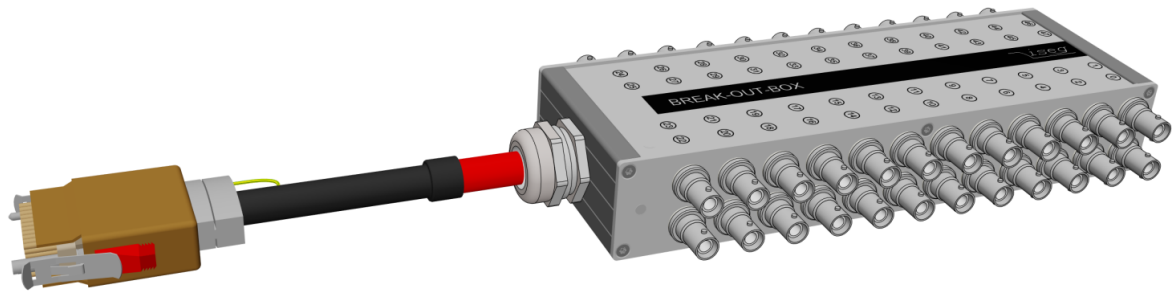


Figure 1: Break Out Box - compact version

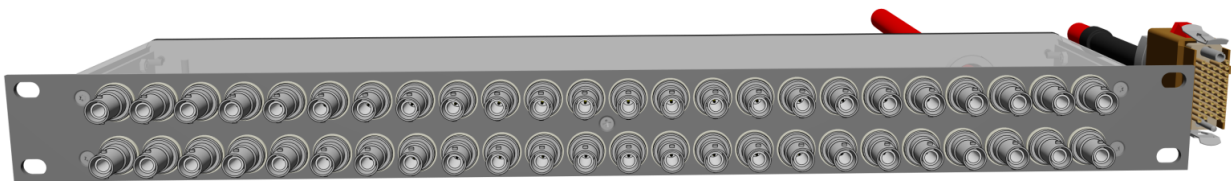


Figure 2: Break Out Box - 19" rack-mountable version

2. Technical Data

SPECIFICATIONS	
Maximum input voltage	4 kV
HV input connector	Redel
HV output connector	SHV
Operating temperature	0 – 40 °C
Dimensions compact version	85mm/42mm/250mm (W/H/L)
Dimensions rack version	95mm/44mm/483mm (W/H/L)
Storage temperature	-20 – 60 °C

Table 1: Technical data: Specifications

3. Order guides

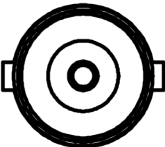
CONFIGURATIONS					
Type	Input connector	Output connector	Maximum voltage	Floating	Order Code <i>LLL = length in m ¹⁾</i> <i>XXX = form factor ²⁾</i> <i>00 = product revision</i>
Break Out Box Compact Version					
BO-Box R51.43 to 16x-SHV	R51.43	16xSHV	4 kV	Common Floating-GND	RG43_LLL_SHV16_XXX00
BO-Box R51.44 to 24x-SHV	R51.44	24xSHV	4 kV	Common Floating-GND	RG44_LLL_SHV24_XXX00
BO-Box R51.45 to 32x-SHV	R51.45	32xSHV	4 kV	Common Floating-GND	RG45_LLL_SHV32_XXX00
BO-Box R51.46 to 48x-SHV	R51.46	48xSHV	4 kV	Common Floating-GND	RG46_LLL_SHV46_XXX00
BO-Box R51.48 to 16x-SHV	R51.48	16xSHV	4 kV	Floating-GND	RG48_LLL_SHV16_XXX00

Table 2: Technical data: Configurations for Break Out Box

1) Length building examples: 10cm → 0.1, 2.5m → 2.5, 12m → 012, 999m → 999

2) BOX = compact version, RAC = 19" rack mountable version

4. Connectors & PIN assignments

HV CONNECTOR		PART NUMBERS (manufacturer code / iseg accessory parts item code)	
SHV			
 <i>Figure 3</i>	BREAK OUT BOX OUTPUT CONNECTOR		CABLE SIDE
	Socket	R317.580.000	Connector iseg

4.1. Redel – R51.43

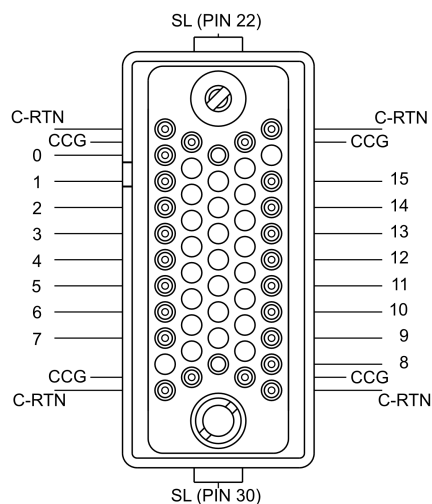


Figure 4

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
2	Ch0	Output Channel 0	50	Ch8	Output Channel 8	1	C-RTN	Common Return
3	Ch1	Output Channel 1	49	Ch9	Output Channel 9	11	C-RTN	Common Return
4	Ch2	Output Channel 2	48	Ch10	Output Channel 10	41	C-RTN	Common Return
5	Ch3	Output Channel 3	47	Ch11	Output Channel 11	51	C-RTN	Common Return
6	Ch4	Output Channel 4	46	Ch12	Output Channel 12	12	CCG	Common Crate Ground
7	Ch5	Output Channel 5	45	Ch13	Output Channel 13	21	CCG	Common Crate Ground
8	Ch6	Output Channel 6	44	Ch14	Output Channel 14	31	CCG	Common Crate Ground
9	Ch7	Output Channel 7	43	Ch15	Output Channel 15	40	CCG	Common Crate Ground
						22 ¹⁾	SL	Safety Loop
						30 ¹⁾	SL	Safety Loop

Notes:

1) Internally connected - an active safety loop would be interrupted if the Break-Out-Box is disconnected from the HV-module

Table 3: pin assignment, Redel – R51.43

4.2. Redel – R51.44

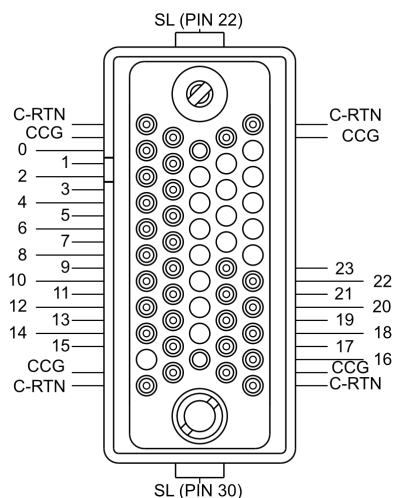


Figure 5

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 ¹⁾	SL	Safety Loop
49	Ch18	Output Channel 18	38	Ch19	Output Channel 19	30 ¹⁾	SL	Safety Loop
48	Ch20	Output Channel 20	37	Ch21	Output Channel 21			
47	Ch22	Output Channel 22	36	Ch23	Output Channel 23			

Notes:
1) Internally connected - an active safety loop would be interrupted if the Break-Out-Box is disconnected from the HV-module

Table 4: pin assignment, Redel – R51.44

4.3.Redel – R51.45

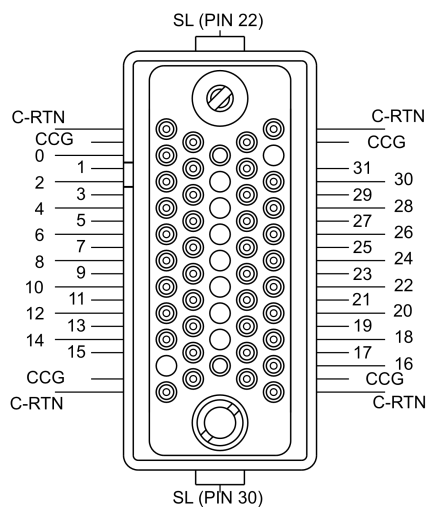


Figure 6

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 ¹⁾	SL	Safety Loop
49	Ch18	Output Channel 18	38	Ch19	Output Channel 19	30 ¹⁾	SL	Safety Loop
48	Ch20	Output Channel 20	37	Ch21	Output Channel 21			
47	Ch22	Output Channel 22	36	Ch23	Output Channel 23			
46	Ch24	Output Channel 24	35	Ch25	Output Channel 25			
45	Ch26	Output Channel 26	34	Ch27	Output Channel 27			
44	Ch28	Output Channel 28	33	Ch29	Output Channel 29			
43	Ch30	Output Channel 30	32	Ch31	Output Channel 31			

Notes:

1) Internally connected - an active safety loop would be interrupted if the Break-Out-Box is disconnected from the HV-module

Table 5: pin assignment, Redel – R51.45

4.4. Redel – R51.46

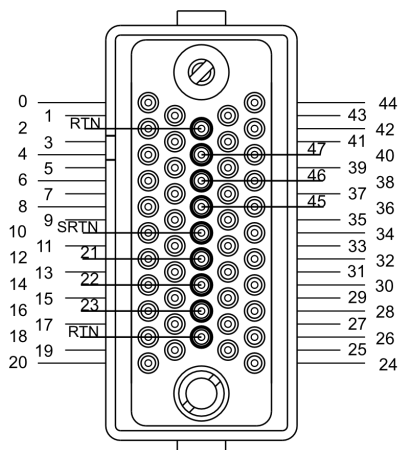


Figure 7

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	Ch0	Output Channel 0	12	Ch1	Output Channel 1	44	Ch38	Output Channel 38
2	Ch2	Output Channel 2	13	Ch3	Output Channel 3	33	Ch39	Output Channel 39
3	Ch4	Output Channel 4	14	Ch5	Output Channel 5	43	Ch40	Output Channel 40
4	Ch6	Output Channel 6	15	Ch7	Output Channel 7	32	Ch41	Output Channel 41
5	Ch8	Output Channel 8	16	Ch9	Output Channel 9	42	Ch42	Output Channel 42
6	Ch10	Output Channel 10	17	Ch11	Output Channel 11	31	Ch43	Output Channel 43
7	Ch12	Output Channel 12	18	Ch13	Output Channel 13	41	Ch44	Output Channel 44
8	Ch14	Output Channel 14	19	Ch15	Output Channel 15	25	Ch45	Output Channel 45
9	Ch16	Output Channel 16	20	Ch17	Output Channel 17	24	Ch46	Output Channel 46
10	Ch18	Output Channel 18	21	Ch19	Output Channel 19	23	Ch47	Output Channel 47
11	Ch20	Output Channel 20	27	Ch21	Output Channel 21	22	RTN	Return
28	Ch22	Output Channel 22	29	Ch23	Output Channel 23	26 ¹⁾	SRTN	Safety Return
51	Ch24	Output Channel 24	40	Ch25	Output Channel 25	30	RTN	Return
50	Ch26	Output Channel 26	39	Ch27	Output Channel 27			
49	Ch28	Output Channel 28	38	Ch29	Output Channel 29			
48	Ch30	Output Channel 30	37	Ch31	Output Channel 31			
47	Ch32	Output Channel 32	36	Ch33	Output Channel 33			
46	Ch34	Output Channel 34	35	Ch35	Output Channel 35			
45	Ch36	Output Channel 36	34	Ch37	Output Channel 37			

Notes:
1) Internally connected to RTN

Table 6: pin assignment, Redel – R51.46

4.5. Redel – R51.48

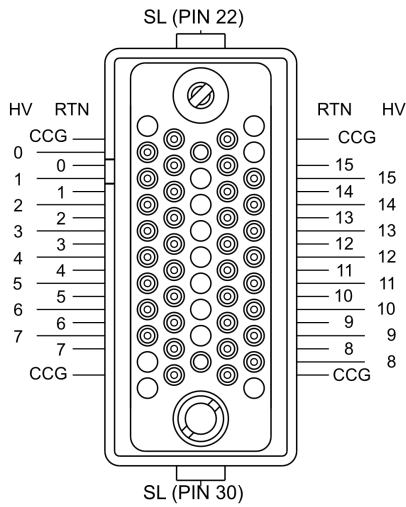


Figure 8

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
2	Ch0	Output Channel 0	13	Ch0	Return Channel 0	12	CCG	Common Crate Ground
3	Ch1	Output Channel 1	14	Ch1	Return Channel 1	21	CCG	Common Crate Ground
4	Ch2	Output Channel 2	15	Ch2	Return Channel 2	22 ¹⁾	SL	Safety Loop
5	Ch3	Output Channel 3	16	Ch3	Return Channel 3	30 ¹⁾	SL	Safety Loop
6	Ch4	Output Channel 4	17	Ch4	Return Channel 4	31	CCG	Common Crate Ground
7	Ch5	Output Channel 5	18	Ch5	Return Channel 5	40	CCG	Common Crate Ground
8	Ch6	Output Channel 6	19	Ch6	Return Channel 6			
9	Ch7	Output Channel 7	20	Ch7	Return Channel 7			
50	Ch8	Output Channel 8	39	Ch8	Return Channel 8			
49	Ch9	Output Channel 9	38	Ch9	Return Channel 9			
48	Ch10	Output Channel 10	37	Ch10	Return Channel 10			
47	Ch11	Output Channel 11	36	Ch11	Return Channel 11			
46	Ch12	Output Channel 12	35	Ch12	Return Channel 12			
45	Ch13	Output Channel 13	34	Ch13	Return Channel 13			
44	Ch14	Output Channel 14	33	Ch14	Return Channel 14			
43	Ch15	Output Channel 15	32	Ch15	Return Channel 15			

Notes:

1) Internally connected - an active safety loop would be interrupted if the Break-Out-Box is disconnected from the HV-module

Table 7: pin assignment, Redel – R51.48

5. Dimensional Drawings

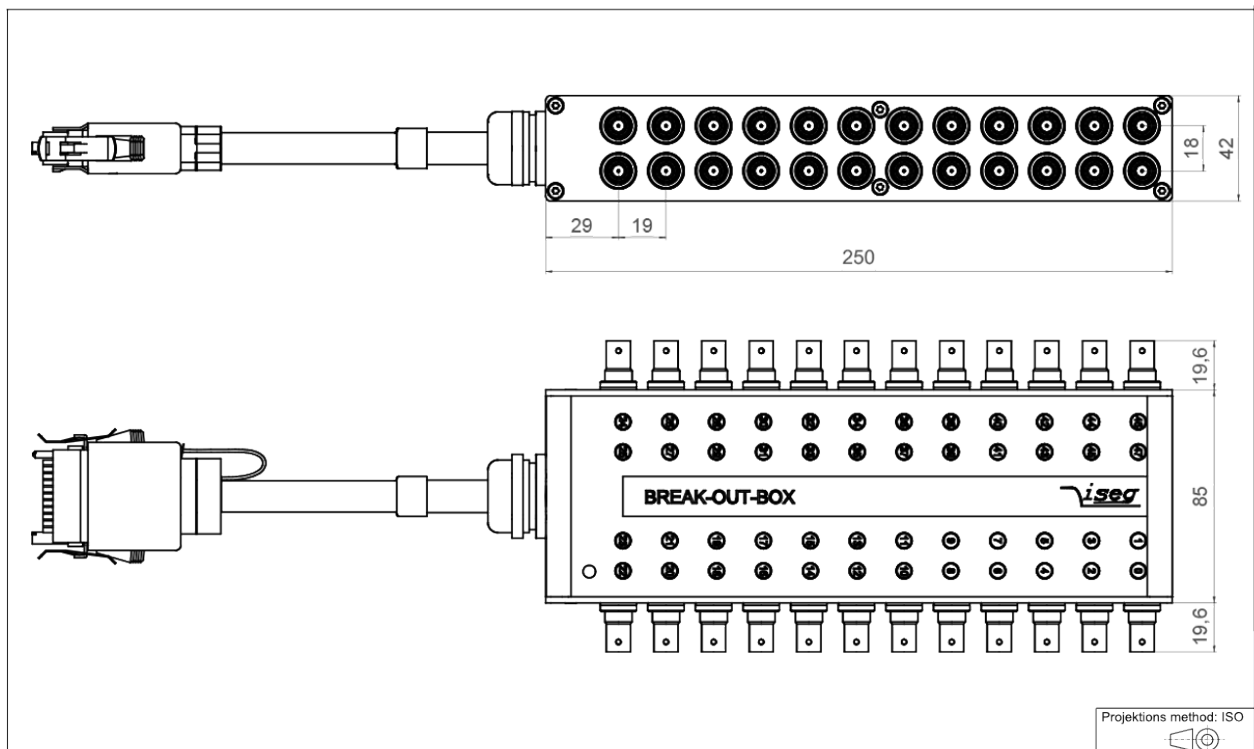


Figure 9: Dimensional drawing Break Out Box, compact version

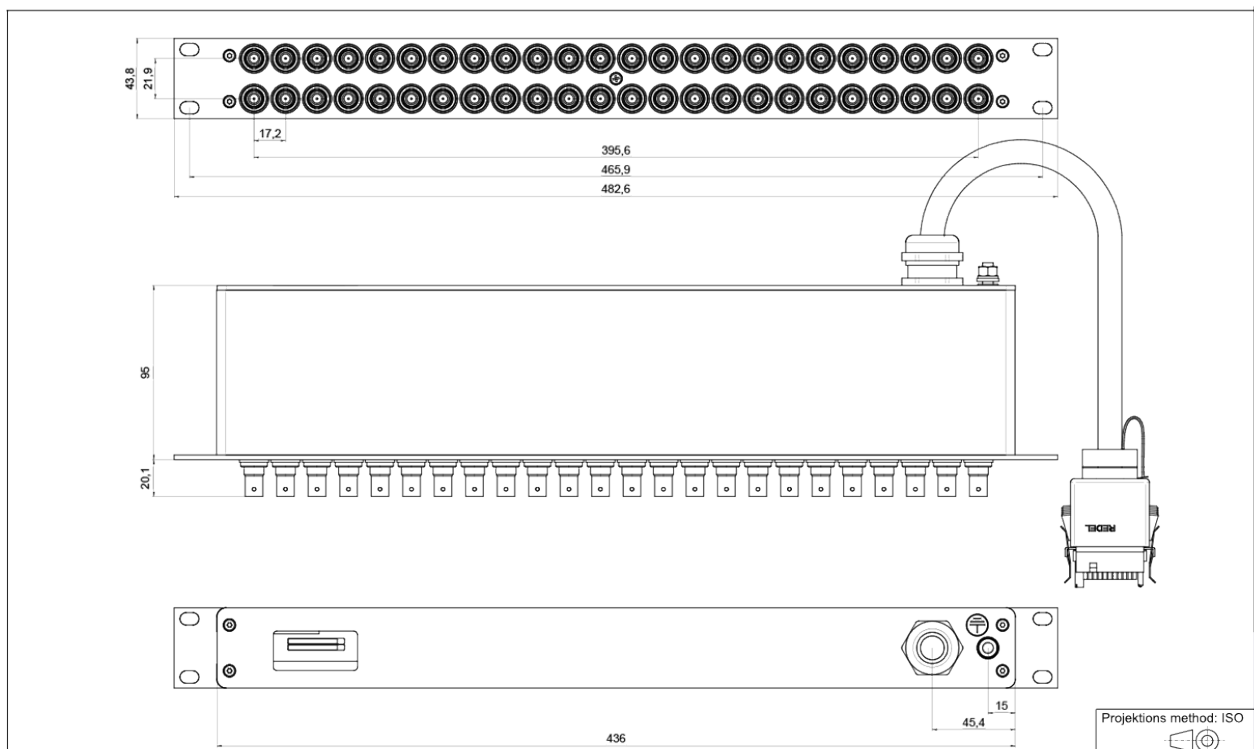


Figure 10: Dimensional drawing Break Out Box, 19" rack mountable version

6. Appendix

For more information please use the following download links:

This document
http://kb.iseq-hv.com/books/break-out-box/export/pdf

7. 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!



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

8. Disposal

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.

This device is only intended for professional use or as an built-in component for devices in the research/development sector and is sold exclusively B2B (only to commercial end customers). The device may only be disposed of properly and not in normal household waste.

As an alternative to proper self-disposal, we offer a free disposal option for the device. Before sending in the device, please send an email to recycling@iseq-hv.de stating the device article and serial number to receive further information on the process.

Further information can be found at <https://iseq-hv.com/en/support/recycling>.

9. Manufacturer contact

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