

Technical documentation  
created on: 2023-04-06

# ECH 44A

10 Slot 19" Crate for MMS - High Voltage Power Supply Modules

- Up to 10 MMS-HV Power Supply Modules
- Up to 3,000 W power
- wide range of HV-modules
- compatible to CC24 / CC23 Controller boards with integrated iCS Linux Server or Wiener Mpod Controller
- optional UPS
- robust mechanics, module front and back reversible



## Document history

Version	Date	Major changes
2.1	2023-04-06	Revision of the chapters Safety, Intended Use, Accessoires and Disposal, Reference to controller manual updated
2.0	2017-02-28	Relayouted version

## Disclaimer / Copyright

Copyright © 2023 by iseg Spezialelektronik GmbH / Germany. All Rights Reserved.

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 the safety instructions

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



Read the manual.



HIGH VOLTAGE

Attention 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

### DANGER!



DANGER!

This device is part of a high voltage supplying systems. High voltages are dangerous and may be fatal.

USE CAUTION WHILE WORKING WITH THIS EQUIPMENT. BE AWARE OF ELECTRICAL HAZARDS.

Always follow at the minimum these provisions:

- High voltages must always be grounded
- Do not touch wiring or connectors without securing
- Never remove covers or equipment
- Always observe humidity conditions
- Service must be done by qualified personnel only

### 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!

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.

**WARNING!**



WARNING!

The protective conductor connection must be ensured by an appropriate mains cable. Before connecting to the local power supply, check whether the nominal voltage of the devices corresponds to the mains voltage.

**WARNING!**



WARNING!

Risk of death due to electric shock!  
Disconnect the appliance from the mains before carrying out any work. Do not open the housing of the unit!

**WARNING!**



WARNING!

The mains connection is made with basic insulation and protective conductor. The device may only be operated with the protective earth conductor (PE) connected!  
The protective conductor connections must be checked for proper function after installation.

**CAUTION!**



CAUTION!

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

**CAUTION!**



CAUTION!

Risk of injury due to the weight of the device  
Incorrect lifting and transport of the device can cause injuries.

- Transport and lift the device carefully. Pay attention to the weight of the product.
- Wear suitable personal protective equipment for all work on the product.
- Use suitable transport and lifting equipment.

**INFORMATION**



INFORMATION

Please check the compatibility with the devices used.

# Table of contents

Document history	2
Disclaimer / Copyright	2
<b>Safety</b>	<b>3</b>
Depiction of the safety instructions	3
Intended Use	4
Qualification of personnel	4
General safety instructions	4
<b>Important safety instructions</b>	<b>5</b>
<b>1 General information</b>	<b>8</b>
<b>2 Technical data</b>	<b>8</b>
<b>3 Order options</b>	<b>8</b>
<b>4 Operation and maintenance</b>	<b>9</b>
4.1 Replacing the power supply	9
4.2 Forced air cooling	10
4.3 Replacing the fan tray	10
<b>5 UPS – uninterruptible power supply (optional)</b>	<b>11</b>
5.1 UPS maintenance and security advice	11
5.2 Storage and transport	12
5.3 Replacing the battery fuse	12
<b>6 Compatibility lists</b>	<b>13</b>
<b>7 Dimensional drawing</b>	<b>14</b>
<b>8 Accessories</b>	<b>15</b>
<b>9 Appendix</b>	<b>15</b>
<b>10 Warranty &amp; service</b>	<b>16</b>
<b>11 Battery disposal</b>	<b>16</b>
<b>12 Disposal</b>	<b>16</b>
<b>13 Manufacturer´s contact</b>	<b>16</b>

# 1 General information

This crate device is used operating iseg High Voltage power supply modules in a 19" rack compatible case. It provides module slots for up to 10 MMS HV compatible High Voltage modules. Each module is connected to the backplane of the crate by a vendor specific 96 pin connector, which delivers module power supply and CAN based digital interface connection. Depending on modules features further digital and analog signals are provided by the connector (safety loop, thermal sensors etc.).

For control and network communication of the MMS modules a crate controller needs to be plugged into a special Crate Controller Slot. The ECH 44A is compatible with iseg CC24 Master, CC23 Slave Controller and Wiener MPOD controller. The CC24 Master controller is equipped with integrated Linux server hardware running iseg iCS System, ethernet and WiFi connectivity. Up to eight CC23 Slave controller can extend a CC24 system by using galvanically isolated CAN connections and auto addressing.

## CAUTION!



It is not allowed to use the unit if the covers have been removed!

ISEG declines 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.

# 2 Technical data

SPECIFICATIONS	ECH 44A
Slots	10 x MMS modules and 1 x MMS Controller
Rated AC mains input	100-240 VAC with PFC
AC power connector	Hirschman Schuko 1x16A
HV module supply voltages	+24 V
DC output power	1,200 W (opt. up to 3,000 W)
Cooling	Vertical, integrated fans, bottom air intake
Operation temperature	0... 50°C ambient without derating
Storage temperature	-30 °C ... +85 °C ( +55°C with UPS option)
Stability	10 mV or 0.1% / 24 hours, 25 mV or 0,3 % / 6 month under constant conditions
Floating DC Power Supply	+ - 50V
M.F.O.T. Maintenance Free Operation Time	Internal fans: 40°C ambient : > 65,000 h, 25°C ambient : 100,000 h electronics: 40°C ambient : > 100,000 h
Dimensions (L/W/H)	600mm / 19" / 8U
Weight	34kg, (+ 10 kg with UPS option)

Table 1

# 3 Order options

OPTION	ORDER CODE
Uninterruptible power supply 1200W	-UPS



## 4 Operation and maintenance

### WARNING!



WARNING!

When connected to mains, the unit is powered permanently! All on- / off-signals or power switches only operate as secondary DC on / off only and not as a mains breaker!

### CAUTION!



CAUTION!

There is no mains fuse inside the crate!  
A circuit breaker for overcurrent protection 16A, type B or C (EN / IEC 60898, VDE 0641), has to be installed externally!

### CAUTION!



CAUTION!

For UPS option only:  
Before operating the first time, please make sure the battery fuse is inserted into the power supply!

Before operation and connecting to mains please make sure, that all cables are connected and airflow is not impeded. The case must not be covered and installed properly. The crate controller and modules must be plugged in, depending on module hotplugging is possible or not.

By connecting the crate to the mains, the controller will start up in standby mode and now is able to switch and monitor the power supply for the inserted Modules. During this start up, the internal fans will begin spinning, the crate now is ready for operation.

### 4.1 Replacing the power supply

#### WARNING!



WARNING!

When connected to mains, the unit is powered permanently! All on- / off-signals or power switches only operate as secondary DC on / off only and not as a mains breaker!  
Before starting any kind of work inside the crate, disconnect it from mains and wait a couple of minutes with your activities.

The power supply is build to be user replaceable. A Phillips- and a slotted-head screwdriver, a side cutter and a replacement cable tie are needed. Begin with setting the crate into standby-mode, disconnect it from mains and wait a few minutes, now pull off the cap of the „POWER ON“-button and proceed with removing the four Phillips screws and detach the lid.



Figure 1: Remove back cover to replace power supply

You now see the power supply, cut loose the cable tie and unplug the mains cable. Take the slotted-head screwdriver and unscrew the two slotted-knurled screws in an alternating manor to avoid tilting the power supply inside the frame. Sometimes a firm pull is needed to completely remove the power supply from the crate.

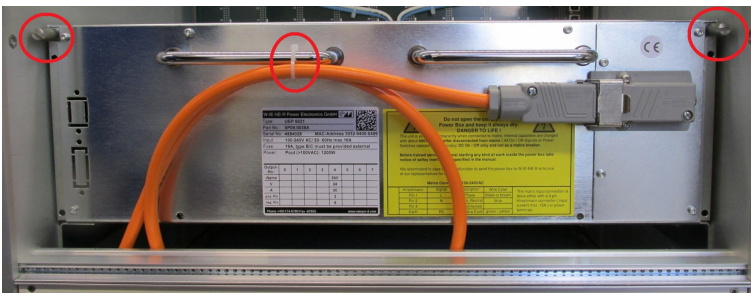


Figure 2: remove wire tie and loosen screws

Now replace the power supply and reassemble in reverse order, tie down the internal mains cable on the handle like seen in the picture.

## 4.2 Forced air cooling

The crate offers an internal forced air cooling with temperature dependent speed regulation by the crate controller. The fresh air intake is on the bottom, for proper ventilation it needs to be sure that the airflow is not blocked. Further it is recommended to cover unused module slots with blind front panels to provide optimal airflow and cooling performance.

## 4.3 Replacing the fan tray

Before replacing the fan tray, set the power supply into standby-mode, disconnect from mains and wait a few minutes. Needed tools are a Phillips- and an Allen-head ( size three) screw driver. Begin with removing the blue sticker on the module side of the crate, unscrew the four Phillips-head screws and detach the lid.

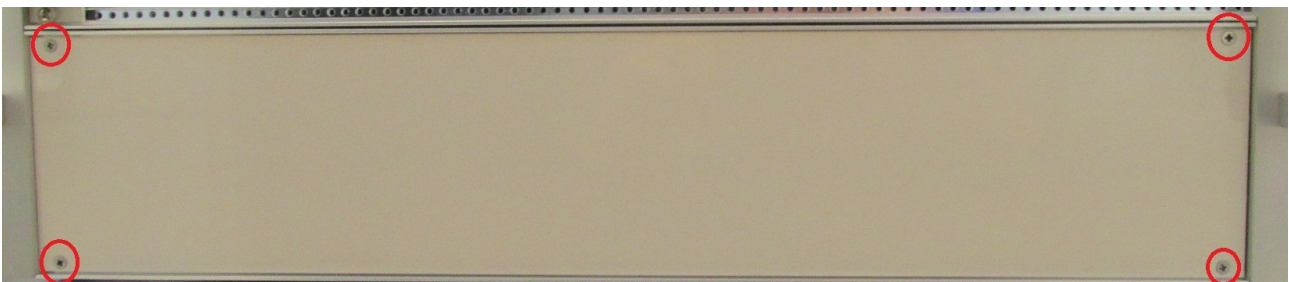


Figure 3: remove cover to replace fan tray

After removing the case lid, use the Allen-head screw driver to unscrew the two tray retainers and pull out the fan tray on the handle in the middle. Reassemble in reverse order.

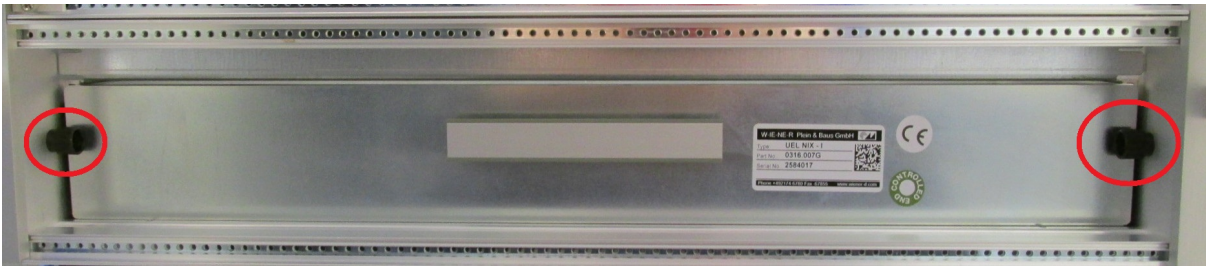


Figure 4: - remove fan tray

## 5 UPS – uninterruptible power supply (optional)

The ECH 44A can be optionally equipped with a battery driven uninterruptible power supply (UPS). Its purpose is to provide emergency power to the crate in case the mains power is failing. The battery backup is intended to securely shut the running system down, to prevent damage on the high voltage source- and load-side.

### 5.1 UPS maintenance and security advice

The valve regulated lead acid batteries used inside the UPS-option power supply are free from any maintenance during their operational lifespan of 5 years. After this time the batteries need to be replaced, in this case, please contact the iseq support for further information.

#### WARNING!



WARNING!

The electrolyte inside the batteries is highly corrosive! At normal working condition a contact with the electrolyte is impossible. If the batteries get damaged do not touch any exposed electrolyte!

#### WARNING!



WARNING!

When changing the UPS-option power supply:  
The batteries inside are heavy, handle with care as they are sensitive to mechanical damage!

#### CAUTION!



CAUTION!

Do not dispose a UPS-option power supply in the normal household wastes, as the contained batteries have to be collected and recycled separately!  
Please Manufacturer´s contact or a local and authorized waste management company for recollection.

## 5.2 Storage and transport

To store or decommission a UPS-option power supply for a longer period of time the batteries inside should be fully charged, for that connect the power supply for at least 8h to mains. Store in upright position inside a dry and frost-free room.

### WARNING!



WARNING!

It is not allowed to transport the crate with the battery fuse installed. Make sure the fuse is removed to guarantee a safe handling of the product.

### CAUTION!



CAUTION!

If the crate is not in use for more than 6 months, it needs to be connected to mains for at least 8 hours to make sure, the batteries are charged to full capacity again.

### INFORMATION



INFORMATION

There are no restrictions for rail, road, sea and air transportation (IATA, DGR clause A67).

## 5.3 Replacing the battery fuse

The batteries inside the power supply are fused to prevent damage in case of failure as they can deliver very high currents. The fuse needs to be inserted by the user, if you operate the crate for the first time. **Also it is mandatory to remove the fuse for transportation, to comply with the safety regulations!** The fuse is accessible on the back of the power supply unit, follow the steps described in 4.1 Replacing the power supply for detaching the case lid. Insert the fuse firmly in the slot next to the mains connector labelled „ACCU-Fuse“.

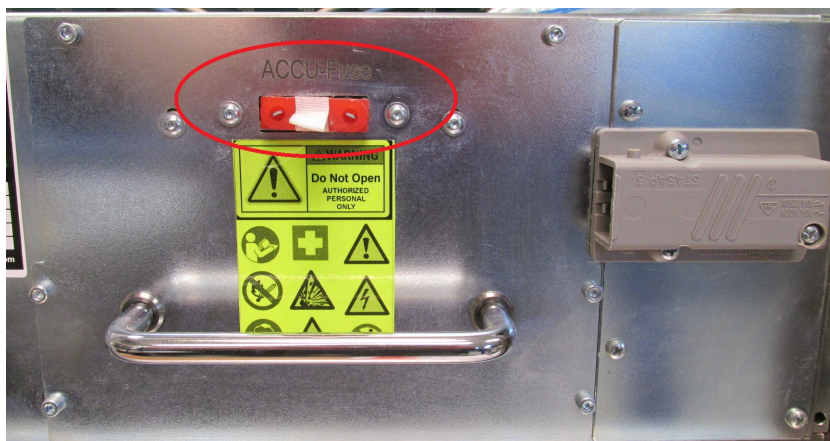


Figure 5: Figure 5 - replace battery fuse

### Fuse specification

Automotive blade fuse, size MAXI, rated 32VDC, 50A, time delay

## 6 Compatibility lists

MMS CRATE CONTROLLERS		NOTES
<b>CC24 – Master controller</b> with Linux and iCS2, Ethernet and WiFi, 2 Slave CAN Lines		All series
<b>CC23 – Slave controller</b> Slave controller for use with CC24 system		All series
<b>Wiener MPOD Controller</b>		MPOD Controller built since 2016
MMS HIGH VOLTAGE MODULES		NOTES
<b>EHS series</b> Standard and High precision, CG / CFG / FG Floating, unipolar		All series please refer controller manual for firmware requirements
<b>EDS series</b> Cost effective distributor module. CFG, unipolar		
<b>EBS series</b> Bipolar 4 quadrant module, CFG, bipolar,		
<b>ESS series</b> High power 2 quadrant module, sink and source, FG, unipolar		

Table 2

## 7 Dimensional drawing

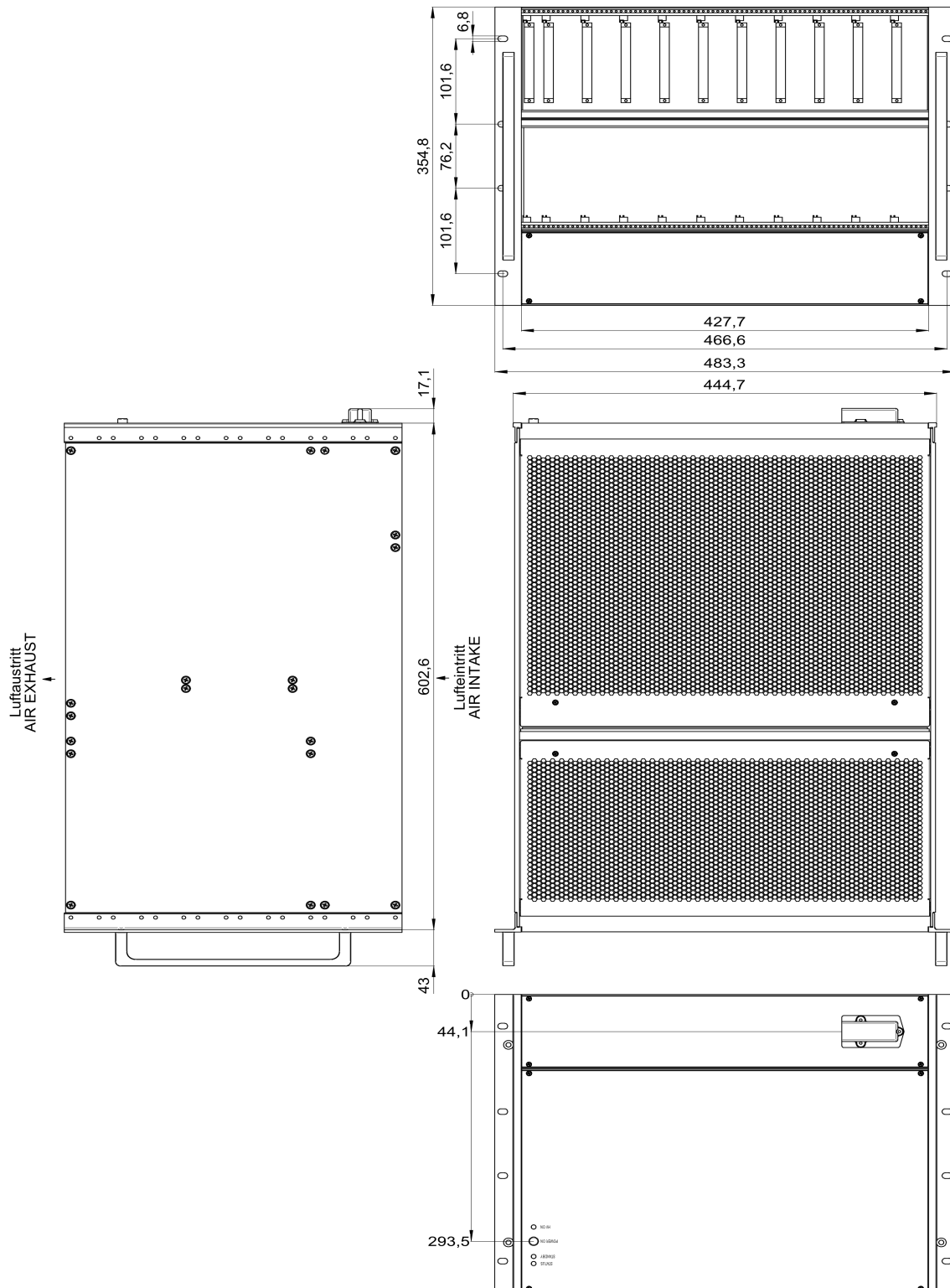


Figure 6

## 8 Accessories

### CAUTION!



CAUTION!

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

ACCESSORY ITEM	ORDER ITEM CODE
Front panel (blind) RAL9001 6U/8HP	Z514569

Table 3

## 9 Appendix

For more information please use the following download links:

<b>This document</b>
<a href="http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseq_manual_ECH44A_en_2.0.pdf">http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseq_manual_ECH44A_en_2.0.pdf</a>
<b>Crate Controller CC24/23 manual</b>
<a href="https://iseq-hv.com/files/media/iseq_manual_CC2x_en.pdf">https://iseq-hv.com/files/media/iseq_manual_CC2x_en.pdf</a>



## 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).

### 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](http://www.iseg-hv.com/en/support/rma)

## 11 Battery disposal

### INFORMATION



**Pb** - Battery  
contains lead

Batteries and rechargeable batteries do not dispose in regular residual waste. You are legally obliged to return used batteries and rechargeable batteries to a municipal collection point or to local retailers. Used batteries may contain harmful substances that can harm the environment or your health if not stored or disposed of properly.

## 12 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.

## 13 Manufacturer's contact

### iseg Spezialelektronik GmbH

Bautzner Landstr. 23

01454 Radeberg / OT Rossendorf

GERMANY

FON: +49 351 26996-0 | FAX: +49 351 26996-21

[www.iseg-hv.com](http://www.iseg-hv.com) | [info@iseg-hv.de](mailto:info@iseg-hv.de) | [sales@iseg-hv.de](mailto:sales@iseg-hv.de)