

Technical documentation  
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## ECH 54A / 55A / 56A

10 Slot 19" Crate for MMS – Low and High Voltage Power Supply Modules

- Up to 10 MMS-HV or MMS-LV Power Supply Modules
- Up to 3.000 W power
- wide range of HV- and LV-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
2.2	2023-04-11	Improved documentation: new dimension drawings, description Package contents, revised chapter "Accessories", chapter "UPS maintenance.."
2.1	2020-10-23	Improved documentation: Battery disposal, UPS description
2.0	2020-09-28	Improved documentation: safety information, UPS-option
1.1	2019-10-07	Improved documentation
1.0	2019-02-27	Initial version

## Disclaimer / Copyright

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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!

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

**WARNING!**



WARNING!

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

**CAUTION!**



CAUTION!

Advices marked as “Caution!” describe actions to avoid possible damages to property.

**INFORMATION**



INFORMATION

Advices marked as “Information” give important information.



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.

**INFORMATION**



INFORMATION

Please check the compatibility with the devices used.

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# 1 General information

This crate device is used operating iseg High Voltage power supply modules in a 19" rack compatible case. Depending on version it provides module slots for up to 10 MMS LV compatible Low Voltage and also HV compatible High Voltage modules or mixed setups. Each module is connected to a backplane of the crate by a vendor specific connector, which delivers module power supply and CAN based digital interface connection.

Depending on module's 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 5xA 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 optional WiFi connectivity. Up to eight CC23 Slave controller can extend a CC24 system by using galvanically isolated CAN connections and auto addressing.

## CAUTION!



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 Package contents

Hardware	included	optional
ECH 54A	AC power line cable	Controller, Front panel (blind)
ECH 55A		
ECH 56A		

Table 1

### 3 Technical data

SPECIFICATIONS	ECH 54A	ECH 55A	ECH 56A
Slots	10 x MMS modules and 1 x MMS controller <sup>1)</sup>		
High / Low Voltage Boards	MMS HV only	MMS LV only	MMS HV and LV Boards
Rated AC mains input	100 – 240 VAC with PFC		
AC power connector	Hirschman Schuko 1x16A		
HV module supply voltages	+24 V	Not installed	+24 V
DC output power HV module supply	1,200 W (on request from 600W 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		± 50V
M.F.O.T. Maintenance Free Operation Time	Internal fans: electronics:	40°C ambient : > 65,000 h 25°C ambient : 100,000 h 40°C ambient : > 100,000 h	
Dimensions (L/W/H)	463mm / 19" / 8U		
Weight	31,5kg, (+ 10 kg with UPS option)		
Notes: <sup>1)</sup> not included			

Table 2: Technical data

### 4 Order options

OPTION	ORDER CODE
Uninterruptible power supply 1200W	UPS
Module cage reversed, module insertion from rear	HVR

Table 3

## 5 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!

### WARNING!



WARNING!

When connected to the mains, the LV-backplane is powered with potentially lethal voltage of 385V DC. Do not touch the backplane or its connectors! For safe operation of crates equipped with a LV-backplane it is recommended to cover unused module slots with blind front panels (see 8 Accessories).

### 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!

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.

## 5.1. 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 designed 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 remove the blue sticker at the bottom of the back cover (arrow at Figure 1: remove blue sticker, undo 4 screws) and proceed with unscrewing the four Phillips screws and carefully detach the lid beginning from the top side. Before completely removing the back cover it is necessary to disconnect the ribbon cable of the attached switch-circuitboard. Continue by cutting the cable tie on the handle and unplugging the internal mains wire. The back cover now may be removed completely.

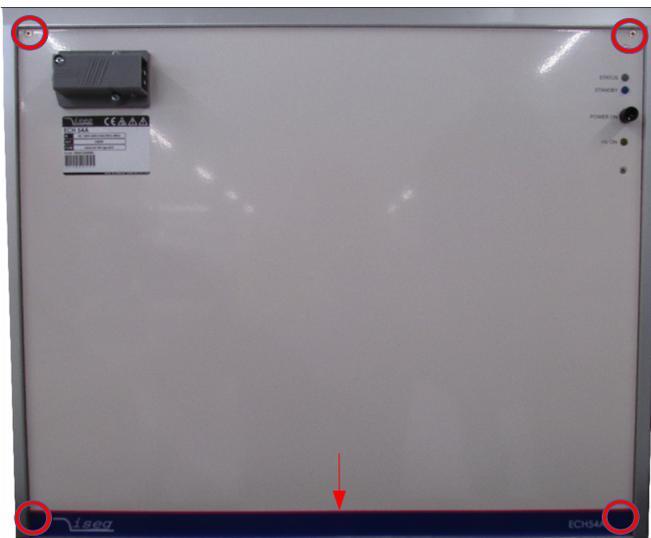


Figure 1: remove blue sticker, undo 4 screws



Figure 2: remove screws at the side panel

To remove the power supply, take the slotted-head screwdriver and unscrew the two retainers located at the side ( Figure 2: remove screws at the side panel). By pulling on the handles towards you the power supply will swing out on its support frame. Make sure to pull carefully and with a firm grip, as the power supply is heavy, especially when equipped with UPS-option. Now unscrew the two slotted-knurled screws in an alternating manor to avoid tilting the power supply inside the frame ( Figure 3: remove wire tie and loosen screws). Sometimes a firm pull is needed to completely remove the power supply from its support frame.



Figure 3: 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.

## 5.2. 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.

### 5.3. Replacing the fan tray or air filter mat

Before replacing the fan tray, set the power supply into standby-mode, disconnect from mains and wait a few minutes. Needed tool is a Phillips-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. Now the airfilter mat is accessible for service. To remove just turn the retainers to the side and pull out the sheet metal holder.

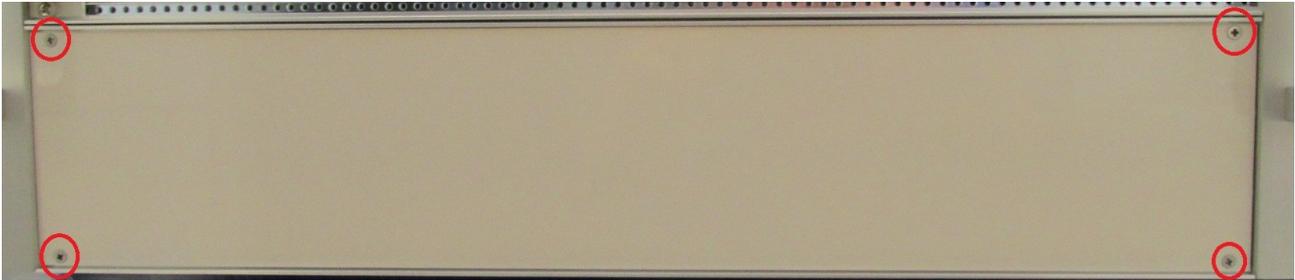


Figure 4: remove cover to replace fan tray

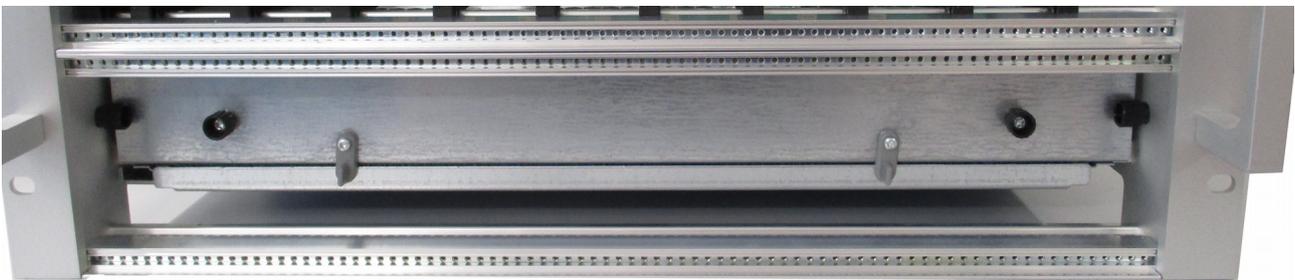


Figure 5: remove fan tray



Figure 6: pull out tray

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

## 5.4. UPS – uninterruptible power supply (OPTION)

### CAUTION!



CAUTION!

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

The ECH 5XA can be optionally equipped with a battery driven uninterruptible power supply (UPS, see chapter 4 Order options) for the HV-module power rail. Its purpose is to provide emergency power to the HV-modules and CC24 / CC23 controller boards 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. In the event of a power failure, the UPS takes over the supply for a certain time to allow the entire system to continue operating. After 10 seconds a check is made to see if a power failure still exists. If the power failure still exists, the ramp-down is triggered by XIRQ and the high voltage modules are shut down.

## 5.5. 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 must be replaced. In this case, please contact iseg 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 batteries inside are heavy, handle with care as they are sensitive to mechanical damage!

### CAUTION!



CAUTION!

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

## 5.6. 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).

## 5.7. 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 5.1 Replacing the power supply for detaching the case lid. Insert the fuse firmly in the slot next to the mains connector labeled „ACCU-Fuse“.

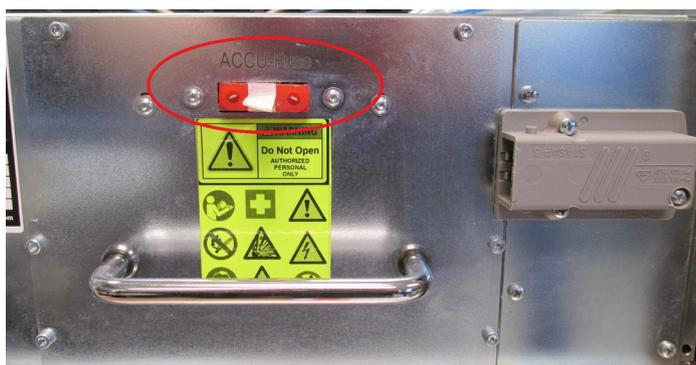


Figure 7: replace battery fuse

### 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 4: Compatibility lists

# 7 Dimensional drawing

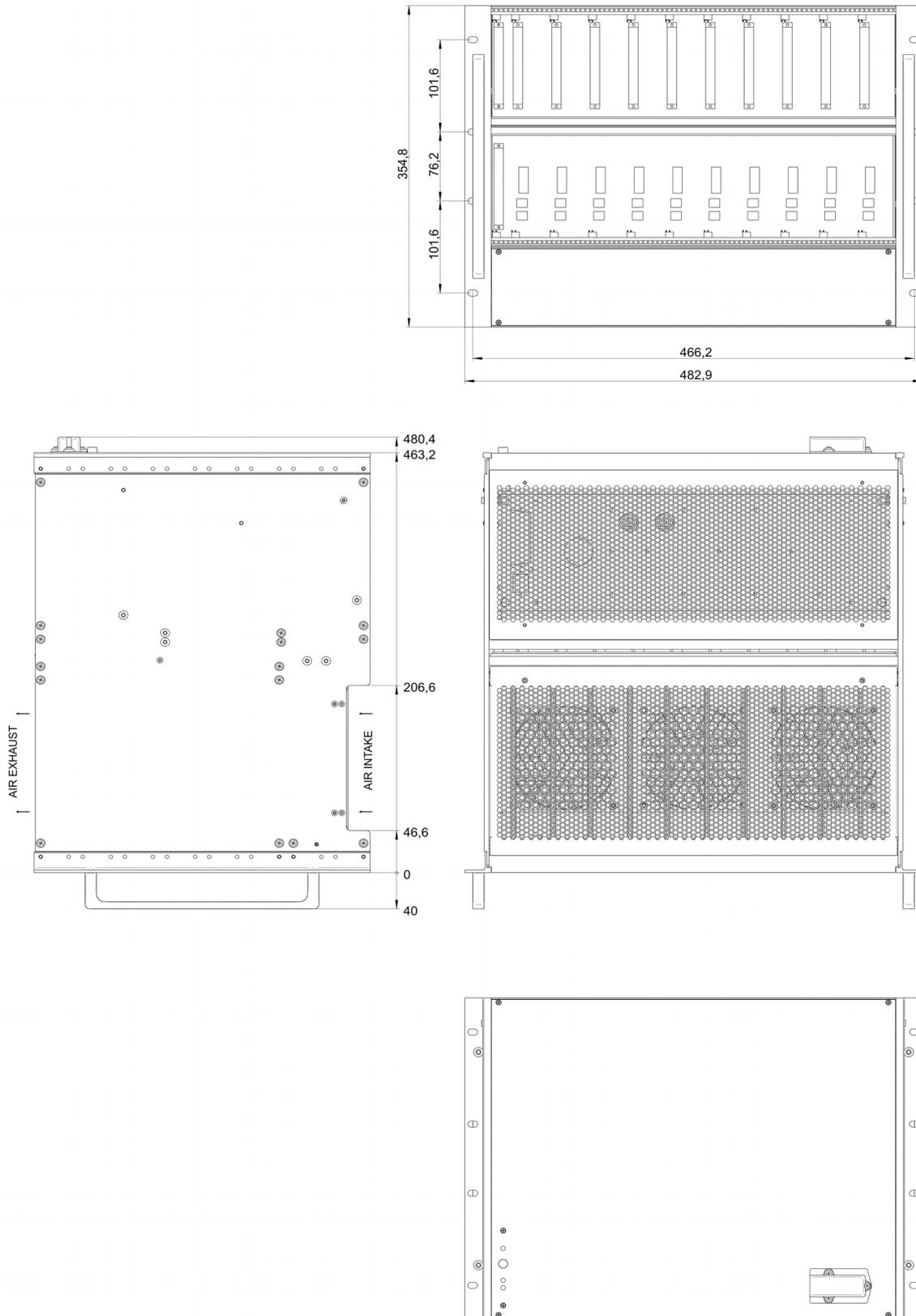


Figure 8: ECH 5xA

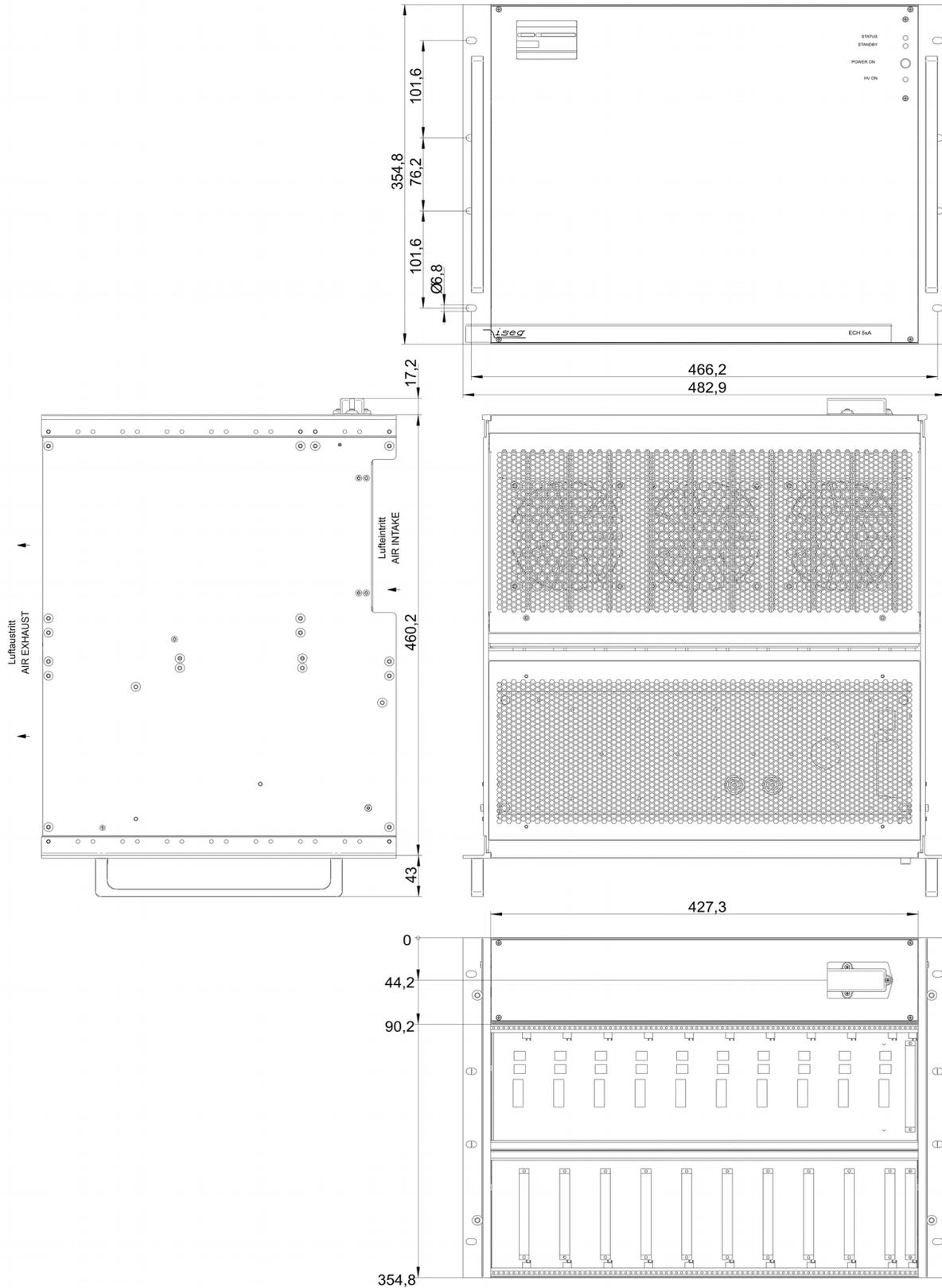


Figure 9: ECH 5xA with HVR

## 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 5: Accessories

## 9 Order guides

CONFIGURATION ORDER GUIDE (item code parts)						
G	5	4	A	122	000	00
Type	System height	System modules	Number of available inserts	Output Power	Option (hex)	Customized Version
Crate	5 = 8U	MMS System for: 4 = for HV-modules 5 = for LV-modules 6 = for LV- and HV-modules	one significant digits  For Example: A = 10 Slot	two significant digits • exponent  For Example: 122 = $12 \cdot 10^2$ [W] = 1200W	001 = UPS 400 = HVR	00 = none

Table 6: Order guides

## 10 Appendix

For more information please use the following download links:

<b>This document</b>
<a href="http://download.iseg-hv.com/SYSTEMS/MMS/ECH/iseg_manual_ECH5xA_en.pdf">http://download.iseg-hv.com/SYSTEMS/MMS/ECH/iseg_manual_ECH5xA_en.pdf</a>
<b>Crate Controller CC24/23 manual</b>
<a href="http://download.iseg-hv.com/SYSTEMS/MMS/CC/iseg_manual_CC2x_en.pdf">http://download.iseg-hv.com/SYSTEMS/MMS/CC/iseg_manual_CC2x_en.pdf</a>

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

## 12 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.

## 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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01454 Radeberg / OT Rossendorf

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