

Technical documentation  
 last changed on: 2024-02-27

# ECH 242 / 244

2 / 4 Slot 19" MMS-Crate Series for iseq MMS High Voltage Power Supply Modules

- up to 4 MMS High Voltage Power Supply Modules
- 200 / 300 W power supply
- wide range of HV-modules
- compatible to CC24 / CC23 Controller boards with embedded iCS Linux Server
- vertical and horizontal desktop use (2 slot version)



## Document history

Version	Date	Major changes
2.2	2024-02-27	Remove chapter "Bypassing the internal clamping diode", Order instructions revised, New dimension drawings, CC23/CC24 controller accessories removed (part of the controller manual), Chapter "Pin assignment" added
2.1	2020-03-11	Safety information, disposal, Intended Use, Adjustment DC output power
2.0	2017-02-28	Relayouted 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

<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!

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 information

These crate devices are used for operating iseg high voltage power supply modules in a desktop compatible case. Up to 4 slots for MMS high voltage modules are provided. 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 the special Crate Controller Slot. The ECH 242 / 244 is compatible with iseg CC24 Master and CC23 Slave 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.

# 2 Package contents

Hardware	included	optional
ECH 242	Cold appliance cable 3pin	Controller
ECH 244	Cold appliance cable 3pin	Controller

Table 1: package

## 3 Technical data

### 3.1 Specification

SPECIFICATIONS	ECH 242	ECH 244
Slots	2 x MMS modules and 1 x MMS controller	4 x MMS modules and 1 x MMS controller
Rated AC mains input	100-240 VAC with PFC	100-240 VAC with PFC
AC power connector	IEC 60320 C14, for cold appliances socket (C13)	
DC module supply voltages	+24 V	
DC output power HV module supply	200 W	300 W
Cooling	Vertical, integrated fans, bottom air intake	
Operation temperature	0... 50°C ambient without derating	
Storage temperature	-20 °C ... 70 °C	
Floating PE to DC 0V	Clamped ±47 V	Clamped ±47 V
Maintenance Free Operation Time (M.F.O.T.)	Internal fans: 40°C ambient : 70,000 h, electronics: 25°C ambient : > 180,000 h	Internal fans: 40°C ambient : 70,000 h, electronics: 25°C ambient : > 200,000 h
Dimensions (L/W/H)	345 mm / 115 mm / 309.5 mm	345mm / 226.2 mm / 309.5 mm
Weight	4 kg	5.4 kg

Table 2: Technical data

### 3.2 Option

With the additional RAC option, the ECH is prepared for installation in a 19 inch system rack.

OPTION	OPTION CODE	Example	ITEM CODE HEX CODING
Rack mountable: incl. preinstalled rack mount kit	RAC	ECH 244_RAC	100

#### CAUTION!



CAUTION!

The mounted ECH 24x, with RAC option, may only be installed in a 19 inch cabinet on a device holder.

#### CAUTION!



CAUTION!

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

## 4 Operation and maintenance

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.

Turn on the mains switch on the back of the crate, 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.

An crate equipped with a CC2x controller can control the high-voltage modules. A more detailed description of the function can be found in the CC manual.

### 4.1 Replacing the fuse

The crates are equipped with user replaceable fuse-links which are accessible via the fuse holder of the mains input socket on the back.

FUSE SPECIFICATIONS	ECH 242	ECH 244
Fuse	2 x Fuse-link 5x20mm 4,0A time-lag	2x Fuse-link 5x20mm 6,3A time-lag

Table 3: Fuse specifications

### 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.

## 5 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
MMS HIGH VOLTAGE MODULES	NOTES
<b>EHS series</b> Standard and High precision, CG / CFG / FG Floating, unipolar	All series please refer controller manual <sup>(1)</sup> 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	
Notes: 1) – iseg_manual_CC2x_en.pdf, see Link in chapter 10 References	

Table 4: Compatibility lists

## 6 Dimensional drawings

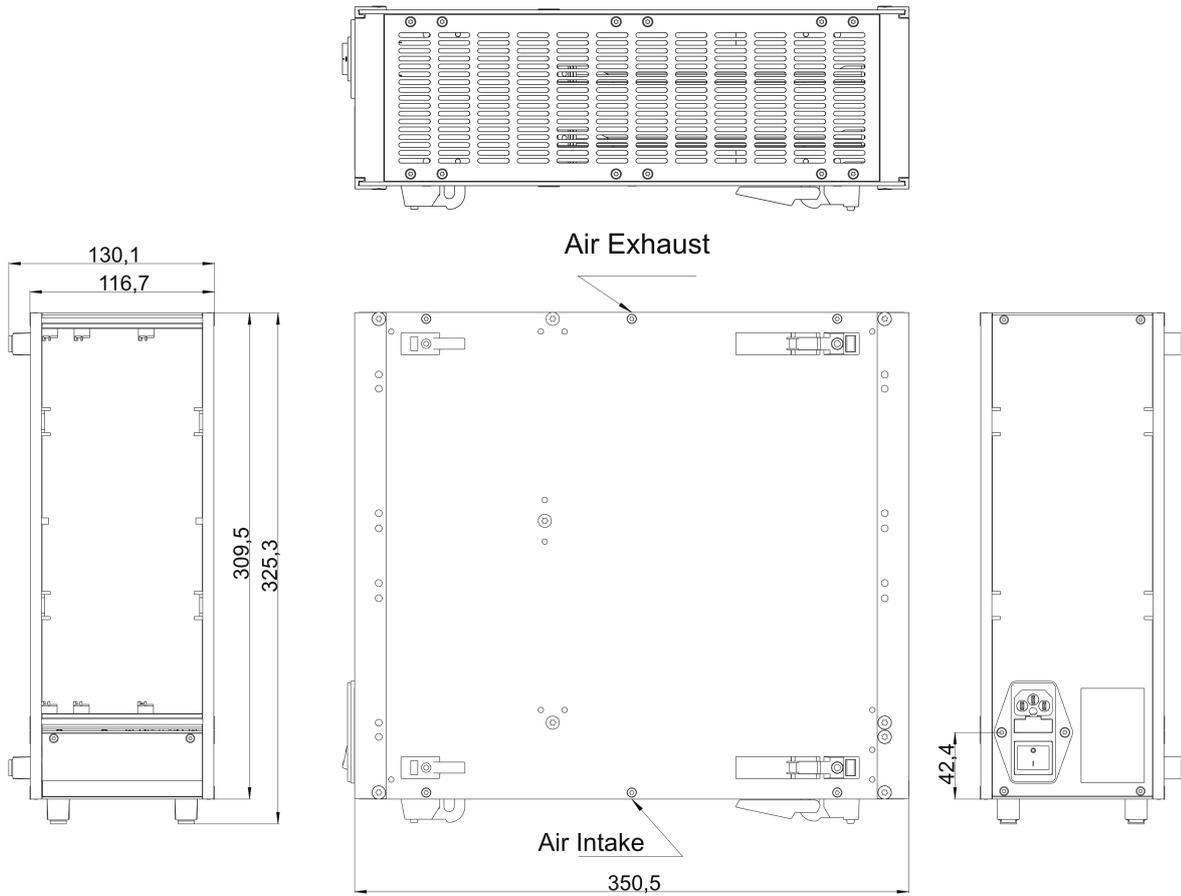


Figure 1: Dimensional drawing ECH 242 - 2 channel MMS crate

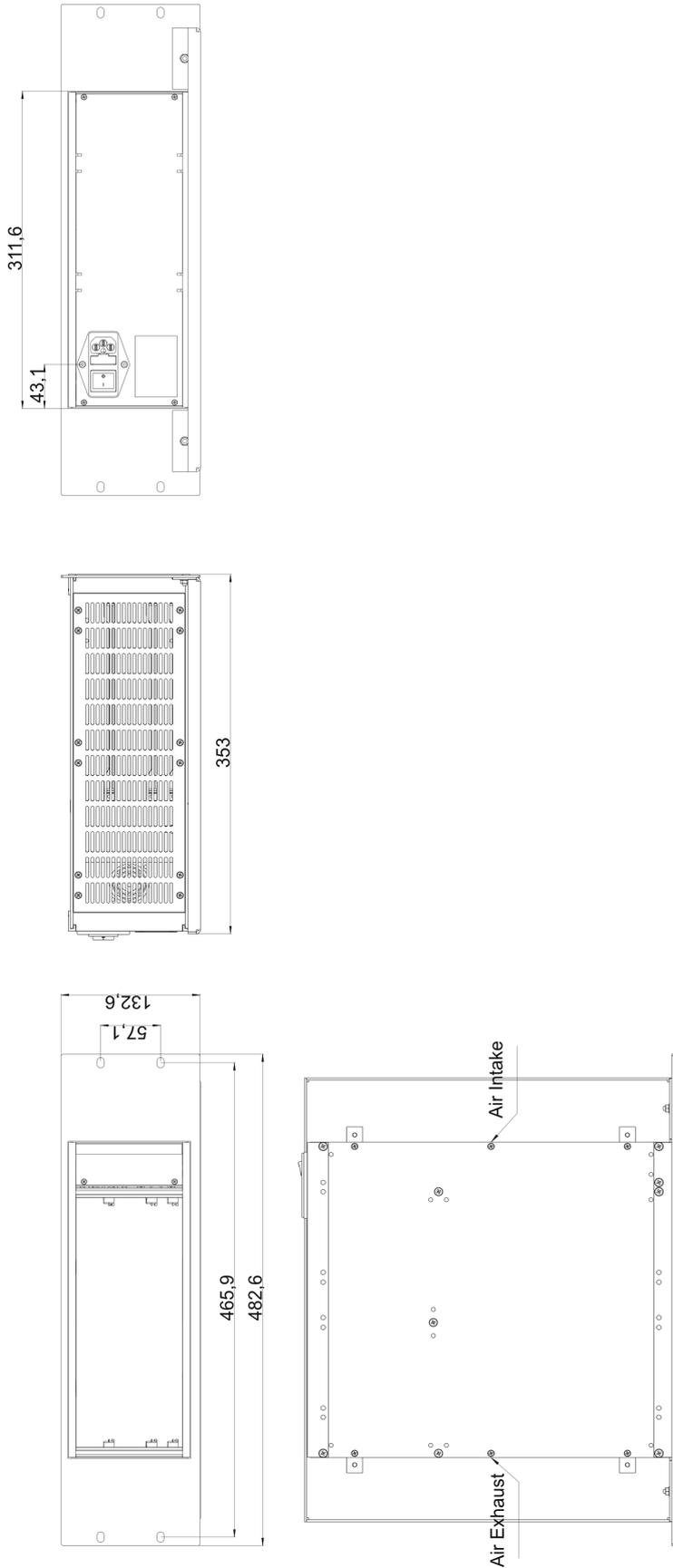


Figure 2: Dimensional drawing ECH 242 with Option RAC

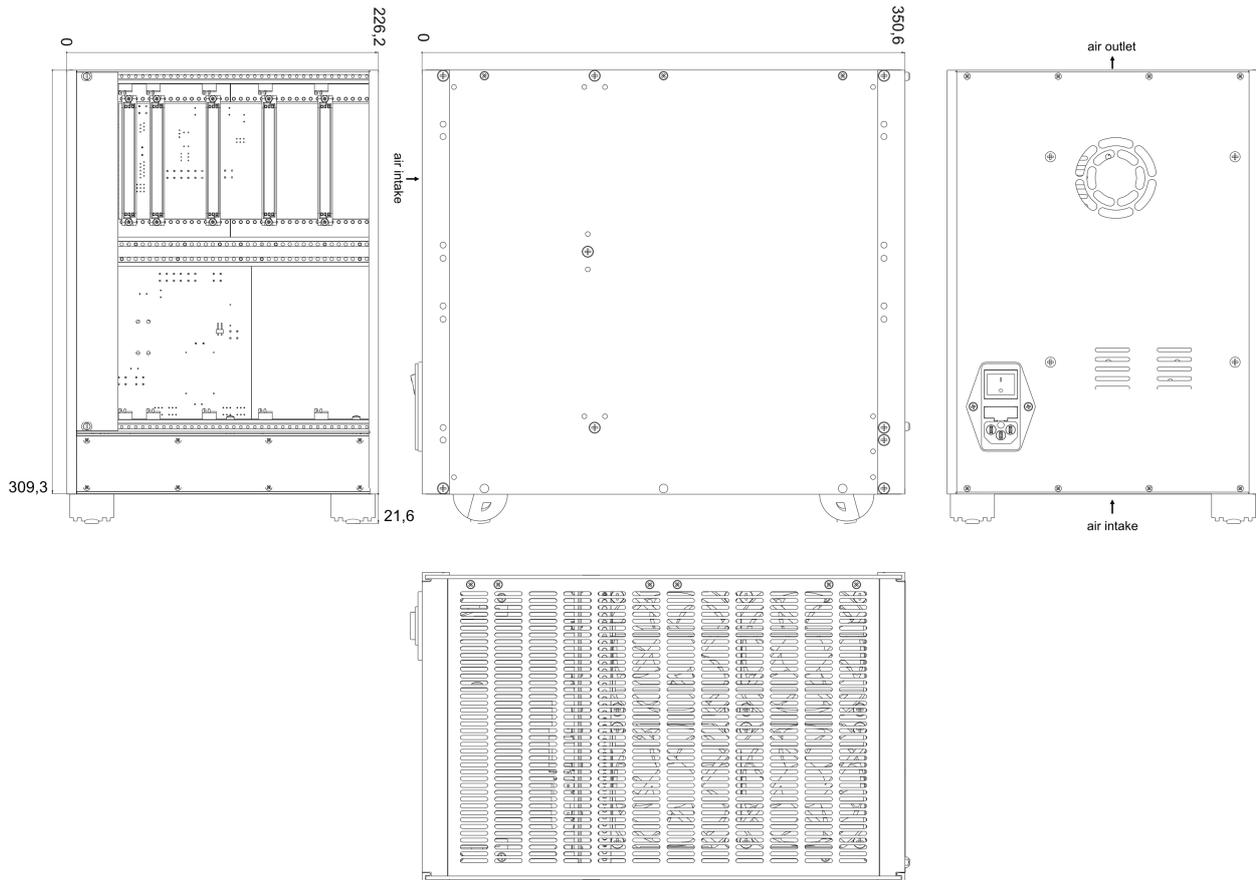


Figure 3: Dimensional drawing ECH 244 - 4 channel MMS HV crate

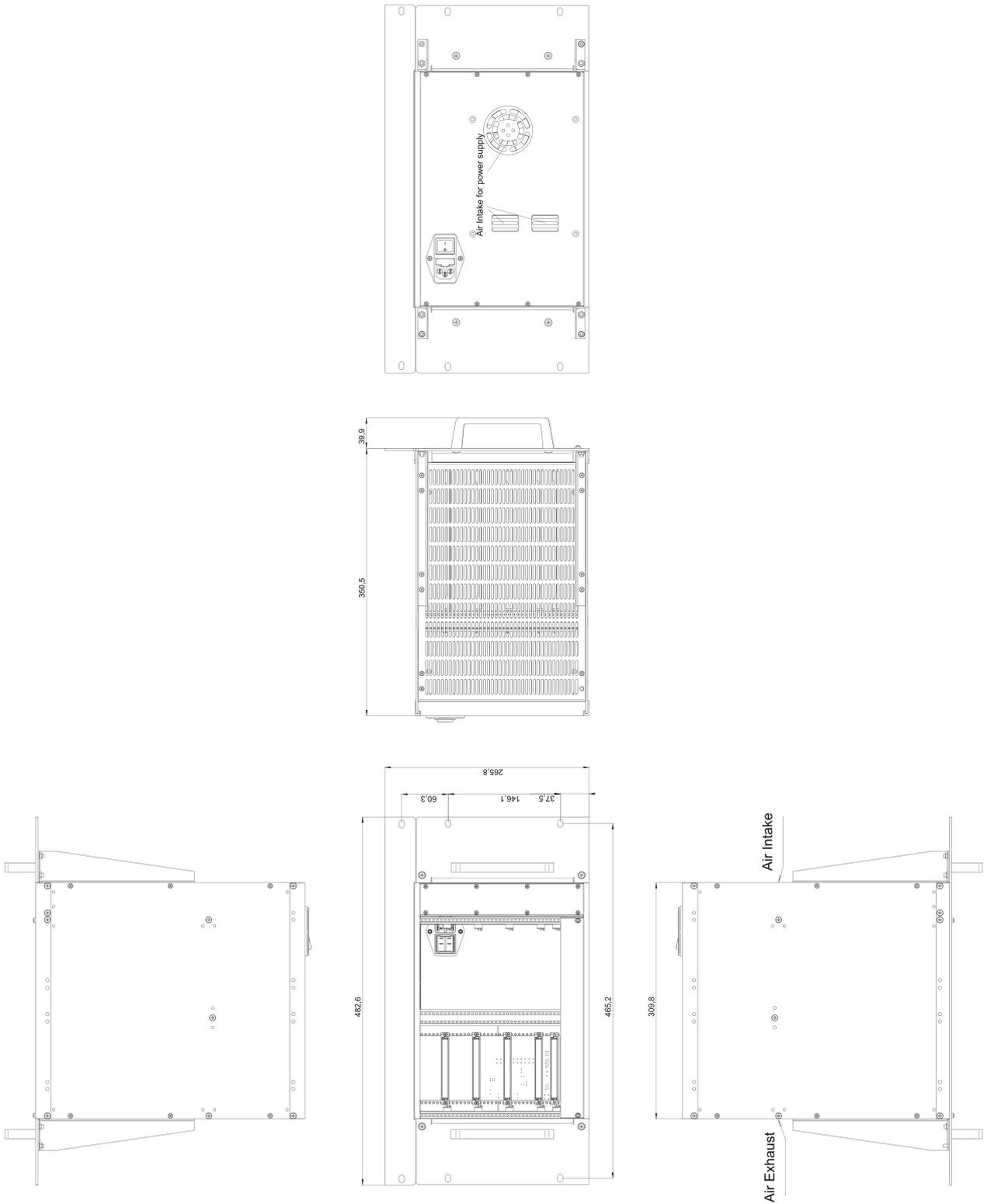
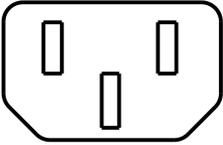


Figure 4: Dimensional drawing ECH 244 with Option RAC

## 7 Connectors assignments

AC POWER	CABLE SIDE	
 <p>Figure 5</p>	connector	IEC 60320-C13
	manufacturer	different producers
	iseq part number	Z592069

## 8 Accessories

CAUTION!	
 <p>CAUTION!</p>	Only use genuine iseq parts like power cables, CAN cables and terminators for stable and safe operation.

ACCESSORY ITEM	ORDER ITEM CODE
Cold appliance cable 3pin (IEC C13)	Z592069
Front panel (blind) RAL9001 6U/8HP	Z514569

Table 5: Accessory items

## 9 Order guides

CONFIGURATION ORDER GUIDE (item code parts)						
G	2	4	2	022	000	00
Type	System height	System modules	Number of available inserts	Output Power	Option (hex)	Customized Version
Crate	2 = 2U	2 = for 2 HV-modules 4 = for 4 HV-modules MMS System	one significant digits  For Example: 2 = 2 Slot	two significant digits • exponent  For Example: 022 = $2 \cdot 10^2$ [W] = 200W	100 = RAC	00 = none

Table 6: order guide

## 10 References

For more information please use the following download links:

<p><b>This document</b></p> <p><a href="http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseg_manual_ECH24x_en.pdf">http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseg_manual_ECH24x_en.pdf</a></p>
<p><b>ECH Series</b></p> <p><a href="https://iseg-hv.com/de/products/detail/MMS%20Crates">https://iseg-hv.com/de/products/detail/MMS%20Crates</a></p>
<p><b>archive</b></p> <p><a href="https://iseg-hv.com/download/?dir=SYSTEMS/MMS/ECH/archive/">https://iseg-hv.com/download/?dir=SYSTEMS/MMS/ECH/archive/</a></p>
<p><b>Crate Controller CC24/23 manual</b></p> <p><a href="http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseg_manual_CC2x_en.pdf">http://download.iseg-hv.com/SYSTEMS/MMS/EHS/iseg_manual_CC2x_en.pdf</a></p>
<p><b>MMS SYSTEM</b></p> <p><a href="https://iseg-hv.com/de/products/systems#SYSTEM-MMS">https://iseg-hv.com/de/products/systems#SYSTEM-MMS</a></p>

Table 7: references

# 11 Glossary

SHORTCUT	MEANING
$V_{nom}$	nominal output voltage
$V_{out}$	output voltage
$V_{set}$	set value of output voltage
$V_{mon}$	monitor voltage
$V_{meas}$	digital measured value of 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 $V_{out}$ dep. on variation of supply voltage
$\Delta V_{out} - [\Delta R_{load}]$	deviation of $V_{out}$ dep. 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](http://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

### 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)