OPUS HE WMC

Wall Mounted Charger

Installation and Startup Manual

DOC005117 Rev A
17.05.2021

Helios Power Solutions is Enedo authorized partner.
Contact our sales engineers for technical support

AU: sales@heliosps.com.au - Middle East & Asia: sales@heliosps.asia - NZ: sales@heliosps.co.nz

Enedo Finland Oy, makes no representations or warranties with respect to the contents or use of This documentation and specifically disclaims any express or implied warranties of merchantability Or fitness for any particular purpose. Further, Enedo Finland Oy reserves the right to revise this publication and to make changes to its content, at any time, without the obligation to notify any person or entity of such revisions or changes.

Further, Enedo Finland Oy makes no representations or warranties with respect to any software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Moreover, Enedo Finland Oy reserves the right to make changes to any and all parts of Enedo software, at any time, without any obligation to notify any person or entity of such changes.

This document describes the product and how to use it in as much detail as possible. However, potential errors cannot be totally excluded.

In the case of ambiguities between various language versions, the English version of this document shall prevail.

TABLE OF CONTENTS

1. INTRODUCTION 4
2. TECHNICAL DATA 4
2.1 Mechanical Data 4
2.2 Electrical Data 4
3. INSTALLATION INSTRUCTIONS 5
3.1 RECEIVING THE EQUIPMENT 5
3.2 SAFETY INSTRUCTIONS AND RECOMMENDED PRACTICES 5
3.3 MECHANICAL INSTALLATION 6
3.4 ELECTRICAL INSTALLATION 7
3.4.1 Mains Connection 8
3.4.2 Rectifier AC in and DC out protection 8
3.4.3 Load Connection 8
3.4.4 Battery Connection 8
3.4.5 Alarm relay and digital input Connections 8
3.4.6 Battery Temperature Sensor 9
3.4.7 Connection of Earth Fault Detection 9
3.4.8 Remote Interface Connections 9
4. SYSTEM START-UP 10
4.1 Power up the System 11
5. MAINTENANCE AND FAULT TRACKING 12
5.1 MHE Rectifier Module Failure 12
5.1.1 Replacing the MHE rectifier 13

Change History of this document

Rev.	Changes	Date
A	First version	2021-05-17 TRä, JSu

1. INTRODUCTION

The OPUS HE WMC is a switching mode charging rectifier system with integrated monitoring and control interface. It is designed to be used in industrial environment and typical installation is wall mounting.

This manual applies mainly to personnel responsible for installation, maintenance and service. Read first this manual before installing the system. See also OPUS Power System User's manual and MHE rectifier manual.

2. TECHNICAL DATA

2.1 Mechanical Data

- Dimensions (H*W*D): 520 mm x 400 mm x 200 mm
- Weight: App. 15kg
- Arrangement: Wall mounting
- Cabling entry: Bottom

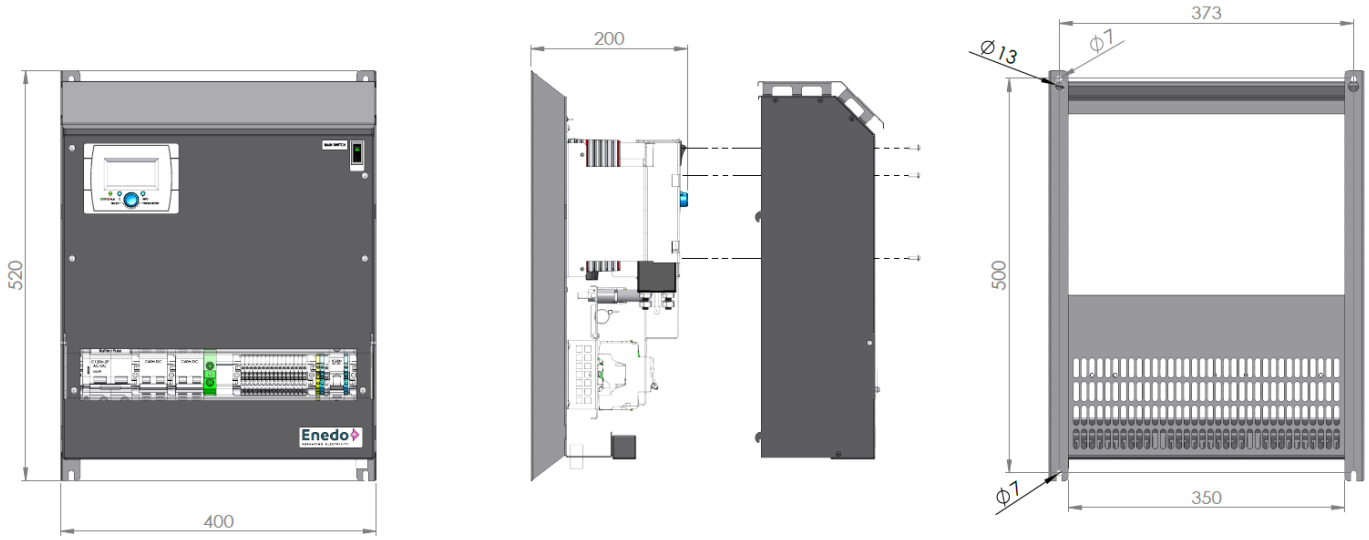


Figure 1. OPUS WMC dimensional drawing.

2.2 Electrical Data

See datasheet of OPUS HE WMC Wall Charger

www.enedopower.com/power-systems/

3. INSTALLATION INSTRUCTIONS

3.1 RECEIVING THE EQUIPMENT

If the equipment is transported in humid conditions, it must be dried in the operating environment at least 24 hours before start-up. If the equipment is not to be installed immediately, it shall be stored in a ventilated and dry room.

After removing the equipment from the boxes and packing material, perform the following actions:

- Inspect for any shipping and/or other damage
- Contact Enedo after sales service or technical support immediately if you discover any damage
- Have all the required tools, wires, cables, hardware etc. within easy reach
- Ensure as clean (free of debris, dust, foreign material, etc.) a work environment as possible
- Ensure that all AC and DC power sources are switched off and disconnected

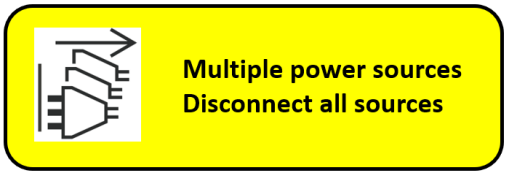
3.2 SAFETY INSTRUCTIONS AND RECOMMENDED PRACTICES

Hazardous voltage and energy levels are maintained inside the equipment, which may cause a danger of serious electric shocks or burns.

Only authorized, qualified and trained personnel should attempt to work on such equipment. Observe all local and national electrical, environmental and workplace requirements.

Means of connection to an AC mains supply shall be permanent connection. OPUS WMC is provided with the terminals for permanent connection to the AC mains supply.

For a permanent connection, a readily accessible disconnect device must be incorporated in building installation wiring.



To turn off the unit, disconnect both AC power source and battery power source.

All work affecting the device must be carried out according to the following general rules:

- For the connection or disconnection of electrical circuits, use only the proper tools.
- When working on parts bearing a hazardous voltage, use only tools intended for the work in question.
- When measuring parts with a voltage, use the proper measuring instruments.
- When the battery is connected, beware that the unit may contain a hazardous energy level.
- Follow the directives on electrical safety and other, official requirements

WARNING: Any changes or modifications to this unit without the prior approval of the party responsible for the said compliance may void the user's authority to operate this equipment.

3.3 MECHANICAL INSTALLATION

The OPUS HE WMC is intended for wall mounting indoor environment. It shall be mounted in such a way that sufficient free air flow is always provided through the system. A minimum of 100 mm free space must be left below the system.

See mounting dimensions from the figure 1. Ensure that mounting screws can carry the weight of the system.

- Unscrew the four screws on the front cover (*figure 2*).
- Remove the cover.
- Fasten the two upper screws on the wall.
- Lift the system on the wall so that it is hanging on the screws.
- Screw two lower mounting holes of the equipment on the wall.
- Ensure the attachment into the wall.
- Install the system cover on after electrical installation (*figure 2*).

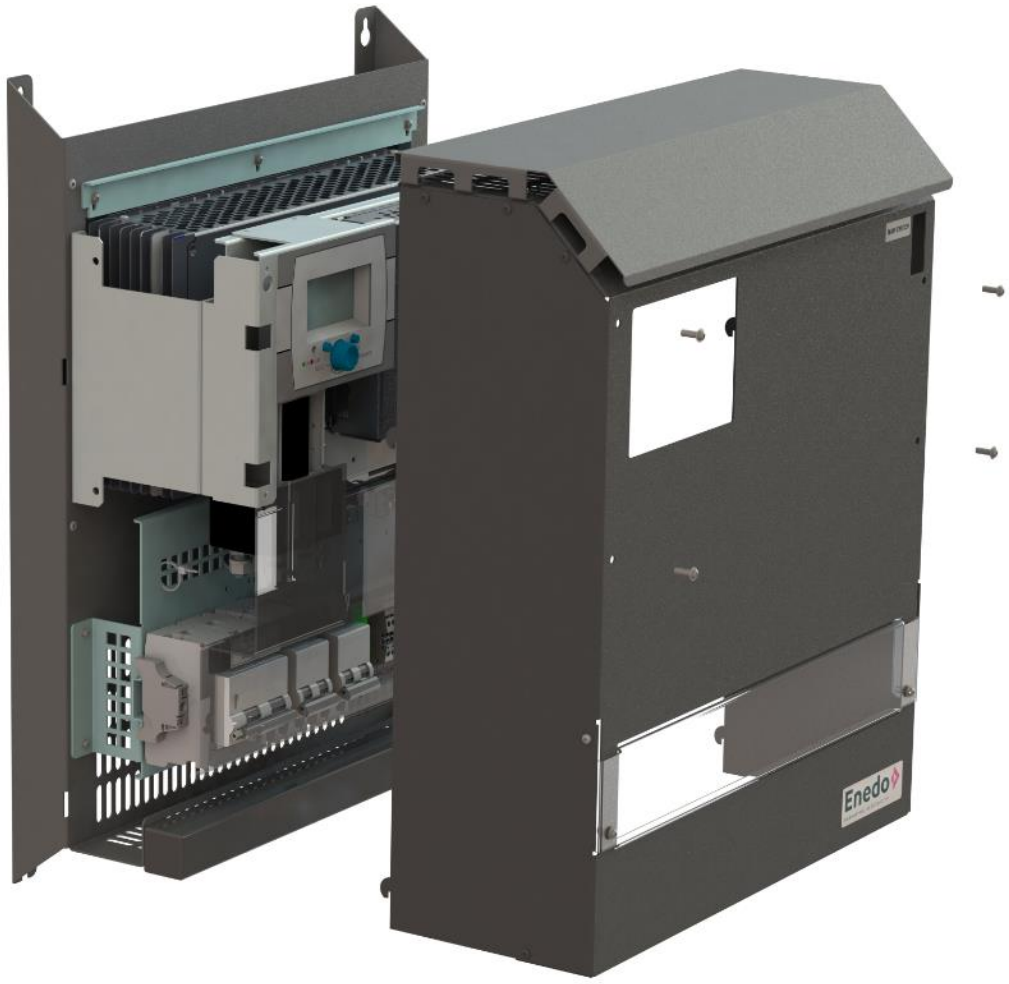


Figure 2. Mechanical installation of the system cover.

3.4 ELECTRICAL INSTALLATION

Means of connection to an AC mains supply shall be permanent connection. For a permanent connection, a readily accessible disconnect device must be incorporated in the building installation wiring. Recommended external mains fuse is 16A and minimum mains feed cable size diameter is 2.5 mm^2.

All electrical installations are made in the lower part of the system (see *Figure* 3). Cabling entry is from bottom. Electrical circuit description is given in the OPUS WMC main circuit diagram.

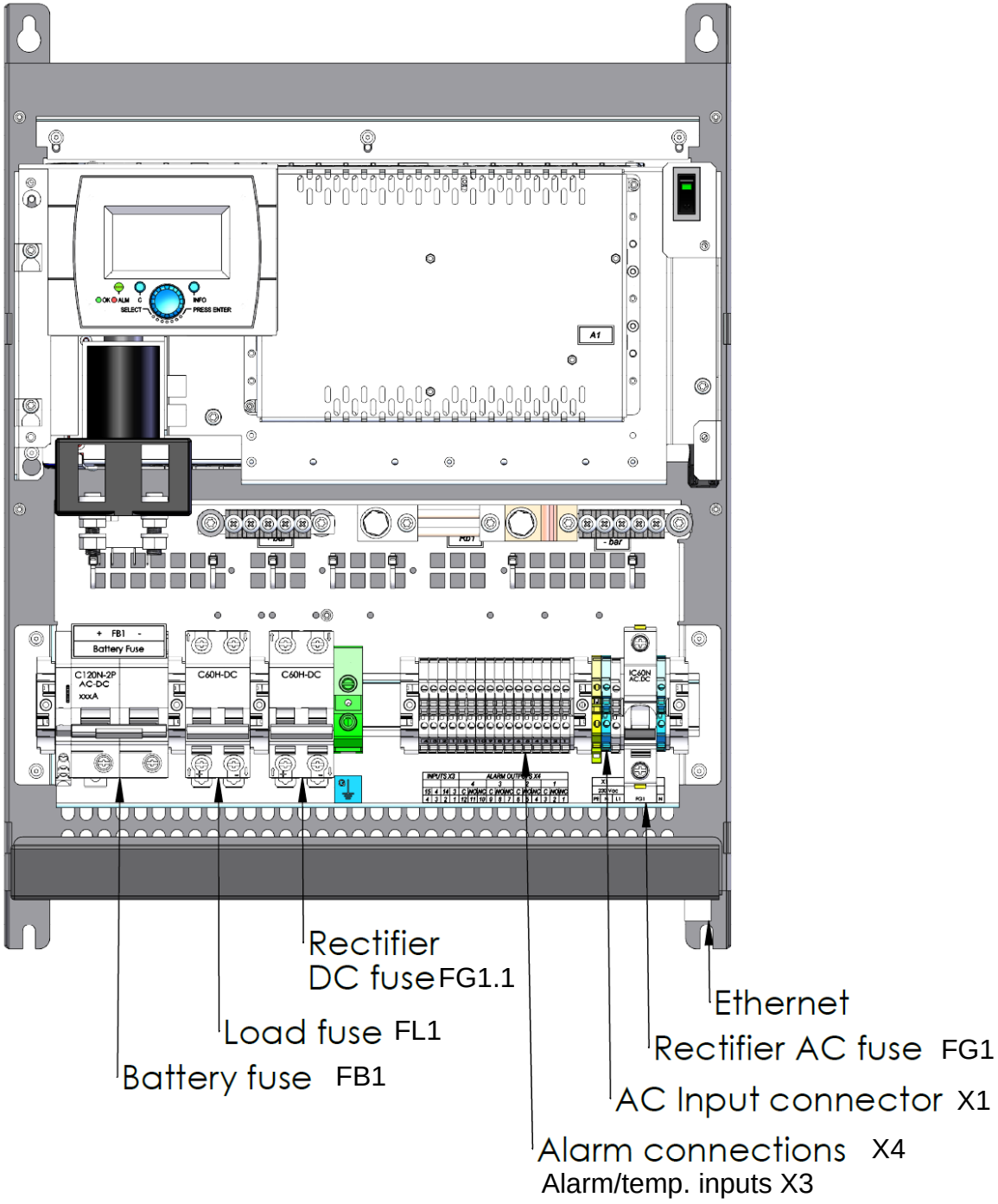


Figure 3. Component location and internal connections.

3.4.1 Mains Connection

Connect the single phase mains cable to the block terminal X1 according to *Figure 3*. Protective earth (PE) must be connected first to the green-yellow terminal of X1. Then connect the neutral (N) connector to the blue terminal and line (L) to the grey terminal. Ensure the mains cable with the cable tie.

3.4.2 Rectifier AC in and DC out protection

Rectifier AC input MCB FG1 and output MCB FG1.1 are installed in Factory, see figure 3. No field installation needed.

3.4.3 Load Connection

At first, verify that the rated OPUS WMC system voltage corresponds to the nominal battery voltage. Ensure that load MCB FL1 is switched off. Then connect the DC load to the terminals of FL1 (see *Figure* 3). Always connect the positive (+) wire of the load cable to the + terminal and the negative (-) wire to the – terminal.

3.4.4 Battery Connection

- See figure 3, FB1 battery fuse
- Check that battery blocks are correctly connected.
- Check the system grounding.
- Ensure that battery circuit breaker FB1 is switched off.
- Connect the negative battery cable (-) to the negative terminal and the positive (+) battery cable to the positive terminal of the circuit breaker FB1.

3.4.5 Alarm relay and digital input Connections

All alarm contact conditions can be configured in the system controller. See more details from the *Enedo OPUS Power System User's manual.*

Maximum of 1.5 mm^2 wires should be used for alarm connections.

3.4.5.1 External / Digital Inputs

Two external/digital alarm inputs can be connected to the terminal block X3:1-2 or X3:3-4 (Alarm/Temp inputs). Inputs are powered internally and therefore potential free alarm contacts must be used.

3.4.5.2 Digital Outputs

Outgoing alarms are potential free changeover contacts available from terminal block X4. Max ratings for the relay contacts are 60VDC / 30 W. The terminals for the outputs are marked NC, NO and C. The meaning of marking is:

- NC: normally connected contact
- NO: normally open contact
- C: common connection point

3.4.6 Battery Temperature Sensor

If battery temperature sensor is included in the system, it can be connected directly to the digital input X3:1-2 or X3:3-4.

3.4.7 Connection of Earth Fault Detection

Earth fault detection circuit is ready connected in the OPUS WMC systems. Detection is done by measuring leak resistance from the system DC bus bars (positive and negative) to the protective earth of the system (the PE ground). If the leak resistance is below the selected alarm threshold, the earth fault alarm is activated. The alarm indicates whether the fault is between the positive or negative bus bar and the PE ground.

Earth fault detection parameter configuration can be set through the system controller. If necessary, earth fault detection can be disabled. See more instructions from the *Enedo OPUS Power System User's manual*.

3.4.8 Remote Interface Connections

The OPUS WMC system controller (VIDI) provides two hardware ports for remote connections: Ethernet (10/100 Mbps) and RS-232 serial port. Both ports are isolated. Location of the ports is presented below (see *Figure 4*). The VIDI controller unit is placed behind the front panel support structure, under the display unit.

A standard RJ-45 modular jack connector is used for the Ethernet communication. For the RS-232 port a four-pin Molex Micro-Fit™ connector is provided. Adapter cable that provides the standard 9-pin D-sub connector is available from Enedo as an optional item.

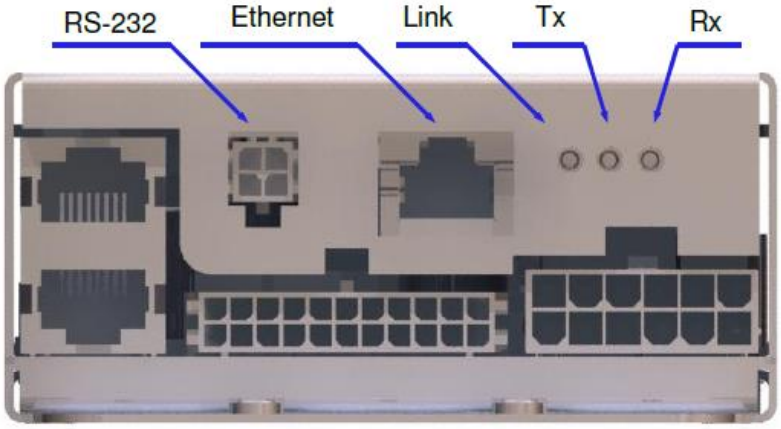


Figure 4. Remote interface connection ports in VIDI controller inside the OPUS HE WMC. Ethernet port is available also in bottom side of the WMC, see figure 3

4. SYSTEM START-UP

Before starting up the system install the system cover:

Figure 5. Normal operating mode, system cover installed, operational switches and local UIF display available

Make sure that all switches and fuses (MCBs) are off:

- Mains switch is turned off
- Rectifier AC MCB is off
- Rectifier DC MCB is off
- Battery MCB is switched off
- Load MCB is switched off
- Secure all connections and check that they are performed properly
- Check that the polarity of the battery is correct

The OPUS WMC controller has preset default values that are safe to power up the system. However, it is strongly recommended to check all system and battery parameters during the system start-up.

4.1 Power up the System

See *Enedo OPUS Power System User's manual* when operating the system controller, setting parameters and changing system configurations.

Start the system by operating switches and fuses through the small operating window on the charger

- Turn on the main switch.
- Turn on the rectifier AC MCB.
- Turn on the rectifier DC MCB.
- Wait until the display module is starting.
- Check that display measures correspond to real values.
- Connect the battery by switching on the battery MCB.
- Check from the controller that the system voltage is correct and corresponds to the specifications provided by the battery manufacturer.
- Check all controller settings and system parameters that they correspond to required functions and make necessary changes.
- Check the alarm inputs, outputs and their configurations.
- Switch on the load MCB.

5. MAINTENANCE AND FAULT TRACKING

The OPUS WMC system contains some user serviceable modules that can be changed on the site. A faulty system controller module (VIDI) and the display unit (UIF) can be replaced with a new unit without power interruption. Faulty MHE rectifier module can be replaced with the new unit in the field.

The following fault tracing instructions are solely for the elimination of any external conditions which might prevent the proper operation of the system.

5.1 MHE Rectifier Module Failure

- **The internal MHE rectifier module does not start and no signal light is on:**
  - Check that the mains connector is properly inserted.
  - Check that the mains voltage is OK.
  - Check that the external mains fuse is OK.

- **The Red LED is on:**
  - Disconnect the PowerCAN bus
  - Disconnect the mains connector
  - Disconnect the load connector
  - Reconnect the mains connector
  - Check that the unit is starting up (green LED blinking)
  - Reconnect the load connector
  - If the red LED is on, rectifier is faulty and it must be replaced with the new one.

- **The Red LED is blinking – a temporary failure has been detected:**
  - Check that the mains voltage and mains fuse are OK
  - If the red LED is still blinking, disconnect the mains
  - Disconnect the PowerCAN bus
  - Disconnect the load
  - Reconnect the mains
  - Reconnect the load
  - Check that the internal temperature of the unit is not on
  - Check that the unit is starting up (green LED blinking)
  - Reconnect the PowerCAN bus

- **The Amber LED is on:**
  - The MHE is in test mode – return to normal operation mode (use VIDI system controller)

- **The Green LED is blinking:**
  - Communication error – check that the PowerCAN bus is connected

- **Output voltage of the rectifier or system is wrong:**
  - Check the rectifier's voltage settings.
  - Check that the rectifier pararmeters are correct.
  - Check that the internal temperature limit of rectifier is not on.
  - Replace broken unit with a new one.

- **Rectifier is constantly starting up and shutting down:**
  - Check that the mains voltage is not too low.
  - Check that the load is not too high.

- **Rectifier does not supply enough current:**
  - Check that all cables are properly connected.

- Check that the internal temperature limit of the rectifier is not on.
- Check that the current limit and power limit parameters are correct (use VIDI system controller).
-

5.1.1 Replacing the MHE rectifier

- Turn off the main switch.
- Turn off all MCBs (rectifier AC, rectifier DC, battery, load, options) through operating window
- Remove the front cover (see instructions from the mechanical installation section).
- Disconnect all cables from the MHE rectifier module.
- Remove the top support bar by unscrewing two screws (see figure 8).
- Lift up the MHE rectifier module and replace it with the new one.
- Screw the top support bar back to its place.
- Connect the DC cable.
- Connect the mains cable.
- Connect PowerCAN cable.
- Power up the system according to instructions given in the section 4.1.

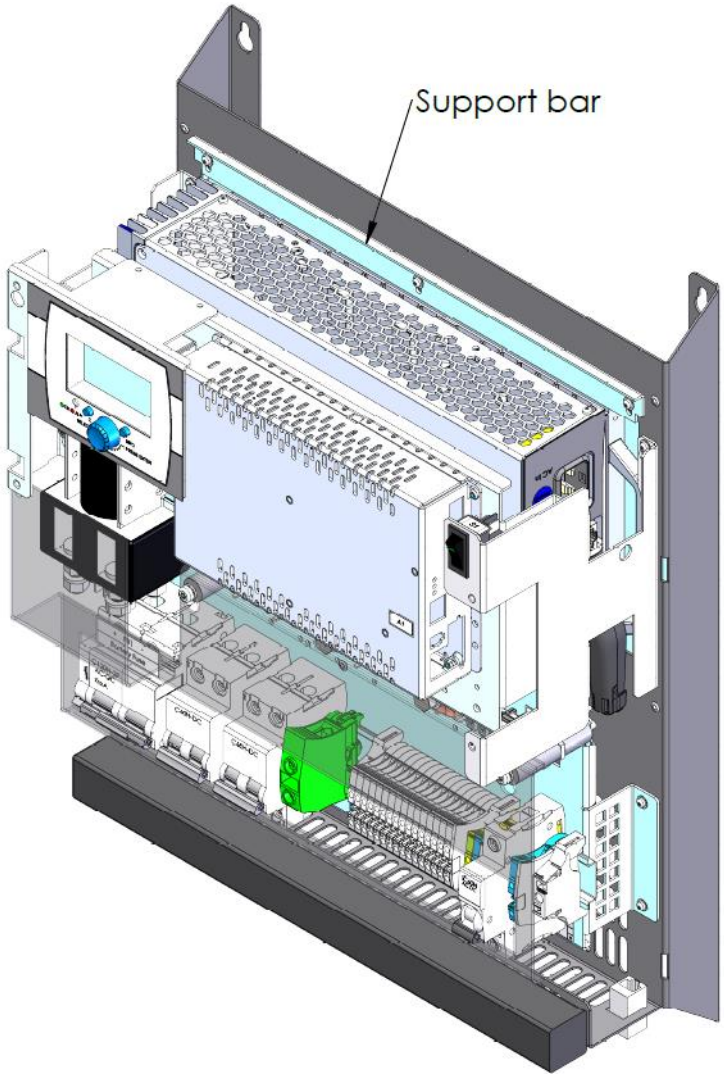


Figure 6. MHE rectifier connections and mechanical support.

