

# EEZ BB3 kit assembly instructions

## Introduction

Instructions presented in this document are related to *BB3 - Two Channel (Full) kit* offered through crowdfunding [campaign](#).

The EEZ BB3 kit is *not* an end user product. As such it was not put into any conformance testing and it may not comply with some or any technical or legal requirement that are applicable to finished products including, without limitation, directives regarding electromagnetic compatibility, recycling (WEEE), FCC, CE, or UL. Assembling and using the EEZ BB3 requires an understanding of electronic circuits and basic computer programming skills.

*If you need assistance, please contact us using this [form](#) or post your problem on the EEVblog forum [here](#). Or, feel free to open a New issue on GitHub [here](#), but please check first to see whether a similar issue already exists).*

The only tool required for kit mechanical assembly is a medium Phillips head screwdriver. Of course, a multimeter for checking the wiring and voltage at a few points during assembly is recommended.

## Before you start

We made our best effort to make your EEZ BB3 kit complete and functional. But, please note that due to limited resources kit is not completely and thoroughly tested. Basic testing were performed on modules (core and power) and cooling fan.

Modules are tested on our “testbed” but *not* with using wire harness and AC/DC modules that comes with your kit. Therefore it's highly recommended that you check visually, mechanically and with ohmmeter if cables are properly assembled before you proceed with final assembling (consult [Wire harness](#) section).

Basic testing covered communication over Ethernet, fan control, power control, touchscreen functionality, beeper, TFT display and output voltage and current programming in a whole range (i.e. up to 40 V and 5 A *with* connected load). AC/DC modules are capable of working with both 115 and 230 Vac.

## Kit assembly steps

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### 1. Package content

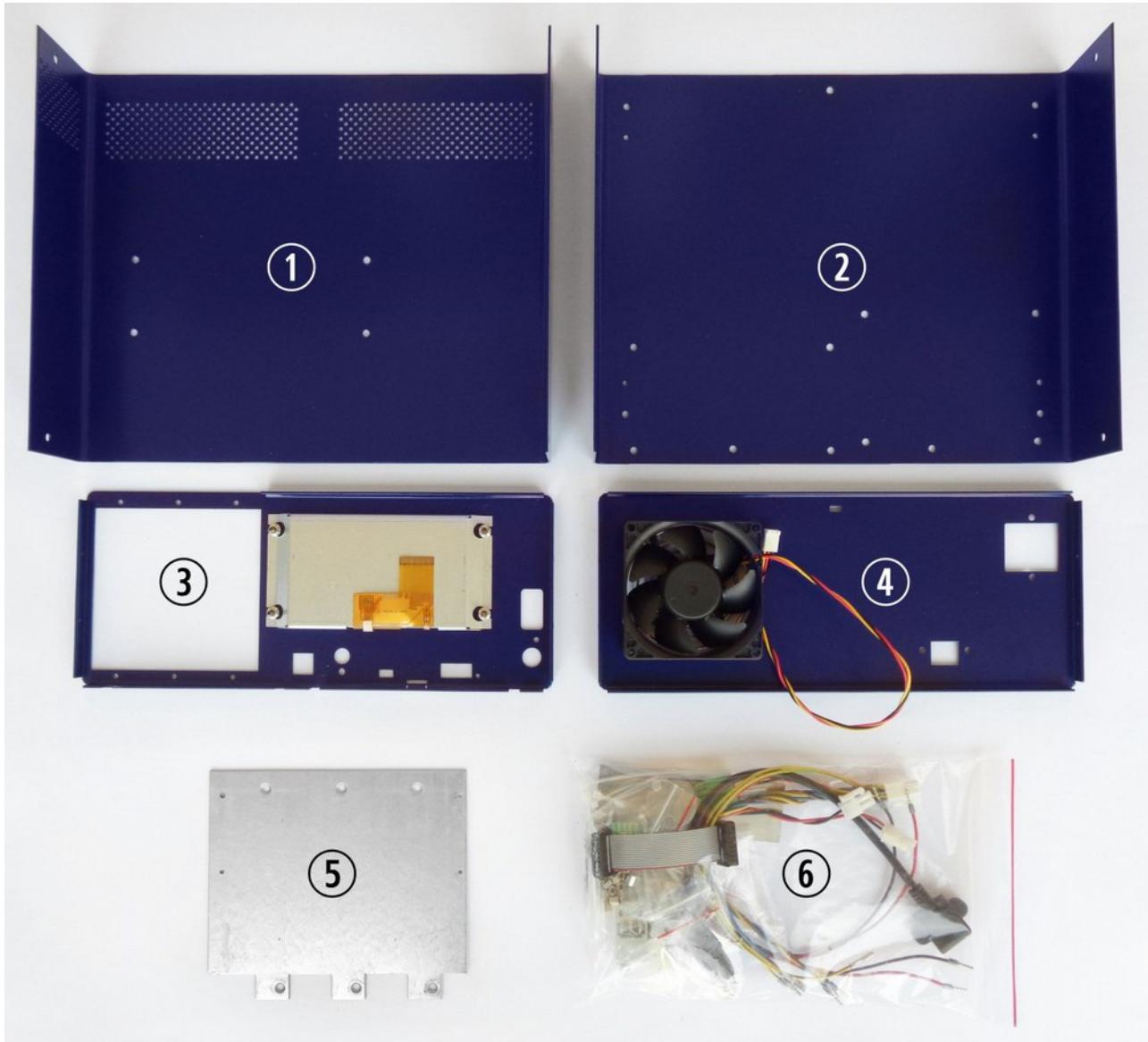
The BB3 kit consists of the following parts, as shown in Fig. 1 and Fig. 2:

Item	Description
1	Pre-drilled enclosure top plate
2	Pre-drilled enclosure bottom plate
3	Enclosure front panel with mounted 4.3" TFT touch-screen color display
4	Enclosure rear panel with mounted Ø80 mm cooling fan

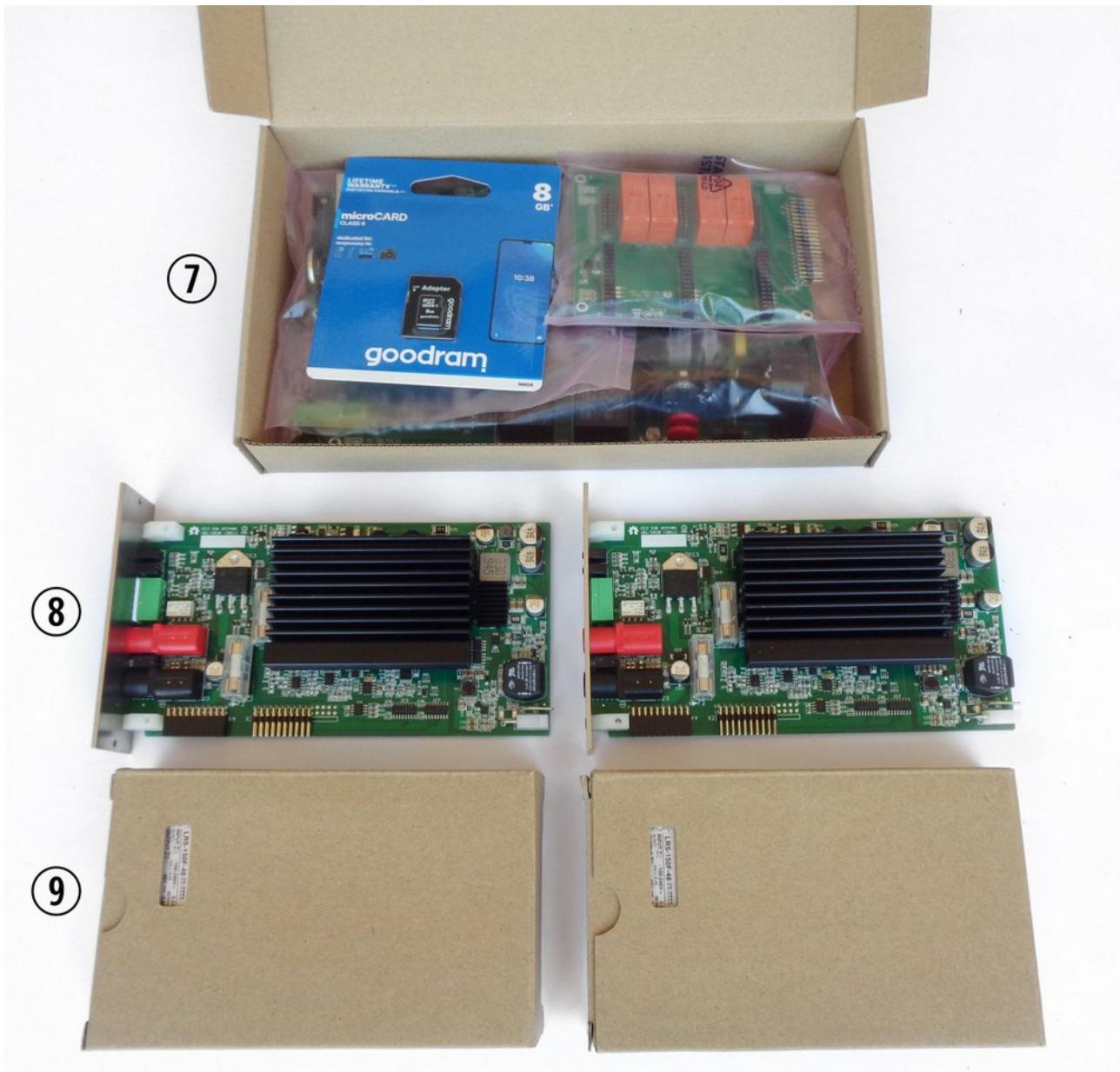
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- 5 Mean Well AC/DC converter's mounting frame
- 6 Plastic bag with wire harness and miscellaneous mounting parts
- 7 Core modules (AUX-PS, MCU and BP3C) and micro SD card
- 8 DCP405 power module x2
- 9 Mean Well 48 Vdc AC/DC converter x2

*Please note that AC power cord is not included with this kit.*



*Fig. 1: BB3 kit content*



*Fig. 2: BB3 kit content (cont.)*

## 2. Plastic bags content

Before start assembling please take some time to check if content of plastic bag (item 6) includes all what is listed below. Also familiarize with *Items* naming that will be used in the rest of the document.

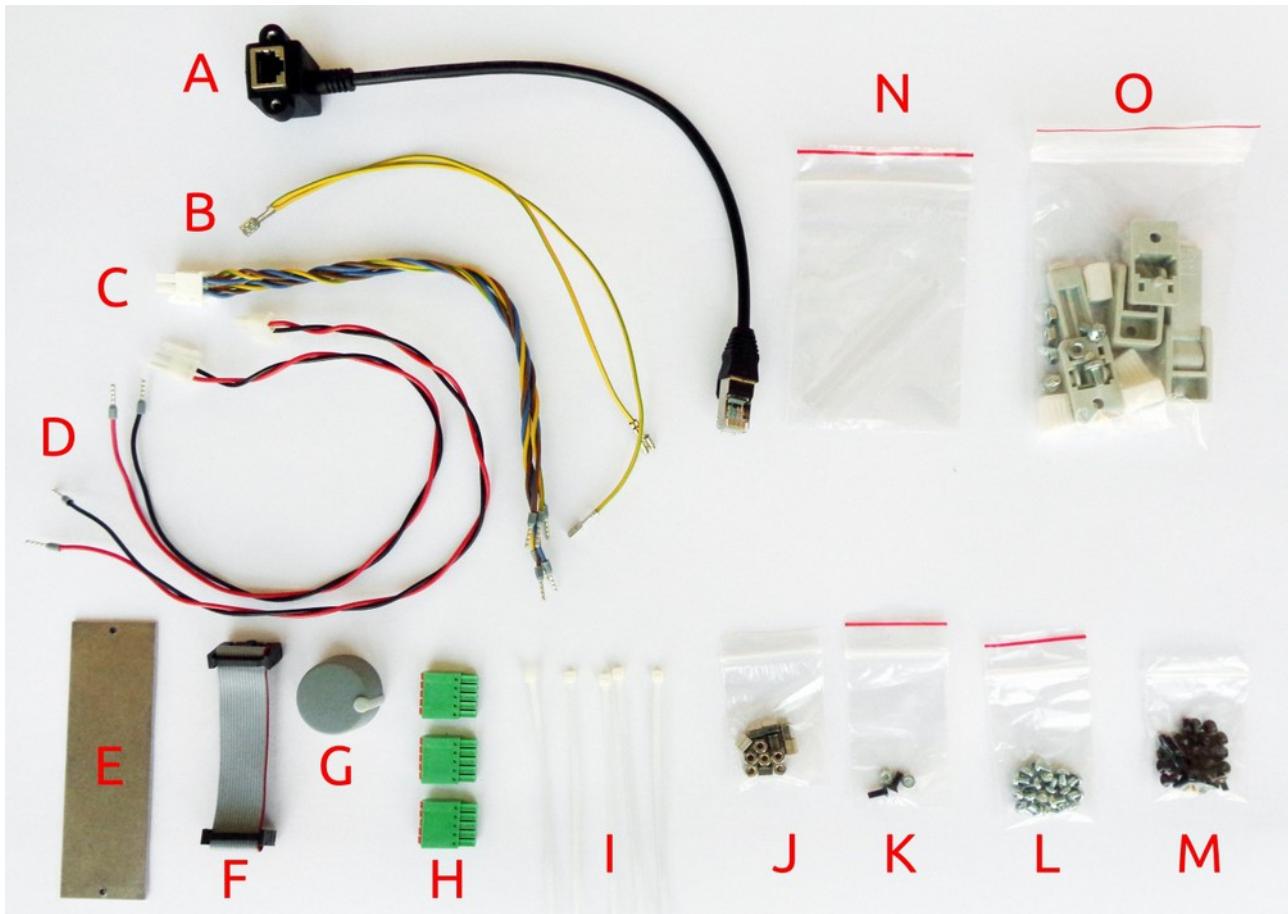


Fig. 3: Plastic bag content

Item	Description
A	Ethernet patch cable
B	Dual power module PE (Protective Earth) cable
C	Dual AC/DC power module AC input cable
D	Power module DC input cable
E	Blind module front panel
F	16-pin IDC flat cable
G	Encoder knob
H	5-pin push-in connectors
I	Cable ties
J	Hexagonal M3x6 mm metal spacers
K	Mounting set for AC power inlet
L	M3x4 mm screws
M	M3x5 mm countersunk screws
N	Mean Well terminal covers
O	Enclosure feet kit

### 3. Bottom plate

As a first step, plastic feet will be mounted. Identify feet holes on the bottom plate (Fig. 4.) and unpack the content of the bag with feet parts (**Item O**, Fig. 3.). Front foot comes with extended part that when mounted and folded out the enclosure can be set at an angle.

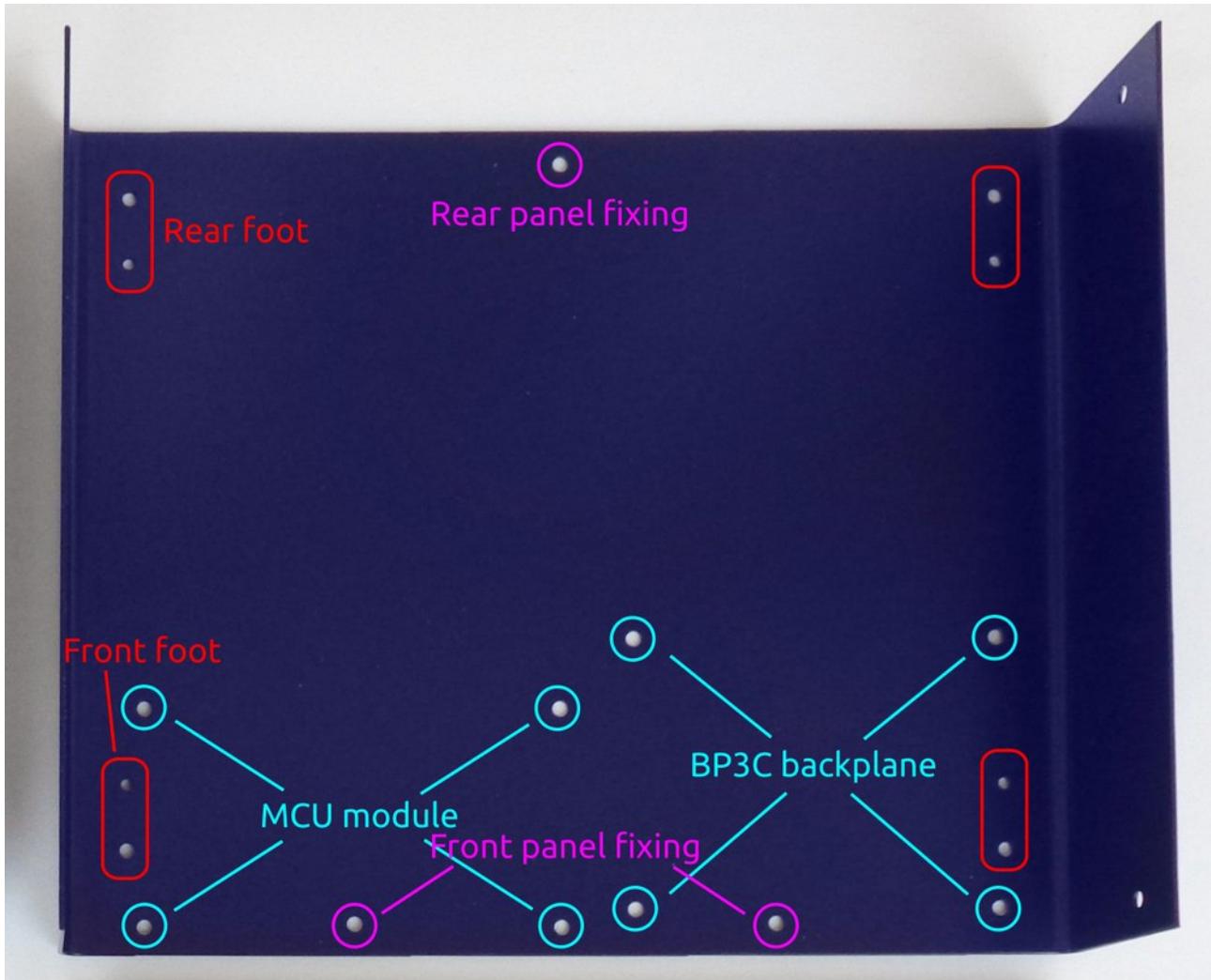


Fig. 4: Enclosure bottom plate

The M4 screw mounts into a larger hole as shown in Fig. 5. Once the foot is secured, the rubber part can be pushed in to hide the screw head.

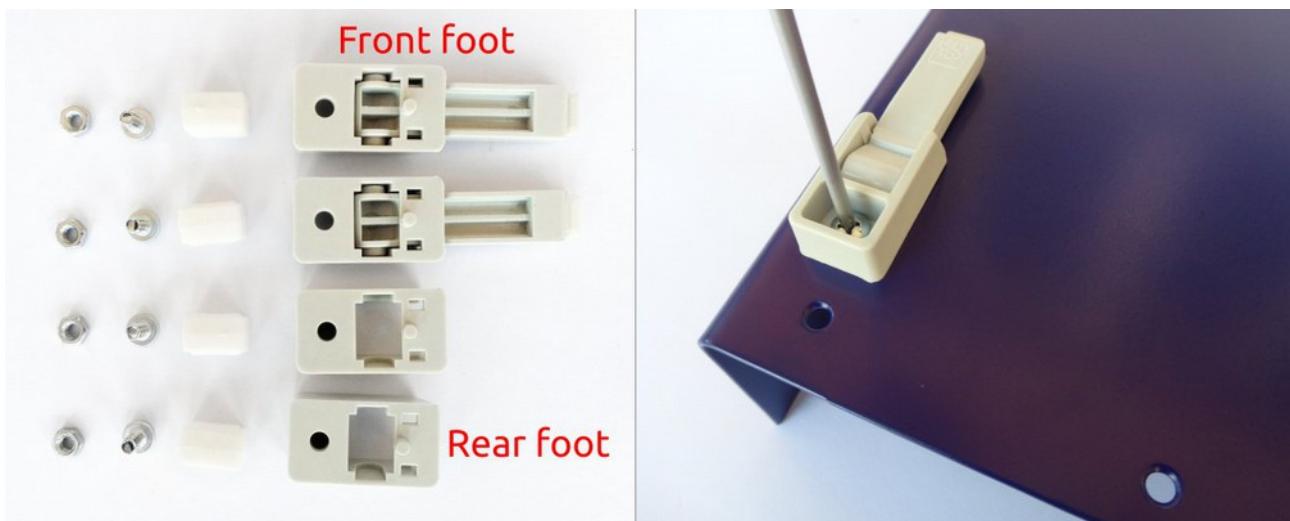


Fig. 5: Feet parts and front foot mounting



*Fig. 6: Front foot mounting completed*

*Differently inserted rubber inserts may cause the bottom plate not to be leveled. If you wish to level at this point, press carefully along the ends of the bottom panel until a satisfactory result is obtained. The final leveling can also be done after all the components have been installed and the top panel mounted. This is a recommended method because it is less likely to cause the bottom plate to deform in the process of leveling.*

#### **4. Installing MCU and BP3C**

Remove the MCU module from the package and take care not to place it on the conductive surface to avoid short circuits as it comes with a battery installed. Fig. 7 shows the parts (according to the markings in Fig. 3) required for mounting this module.

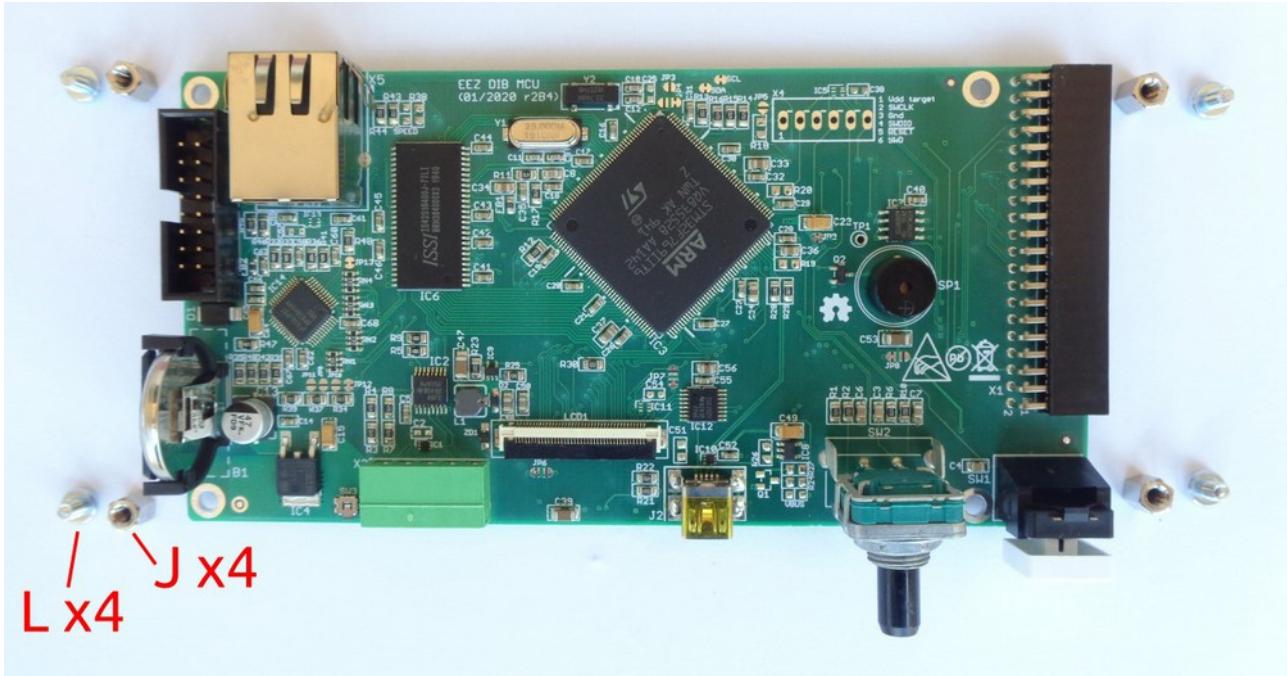


Fig. 7: MCU module with mounting parts

Attach the hexagonal metal spacers (J) using screws (L) to the four holes in the corners of the module. Repeat the same procedure on the BP3C backplane shown in Fig. 8.

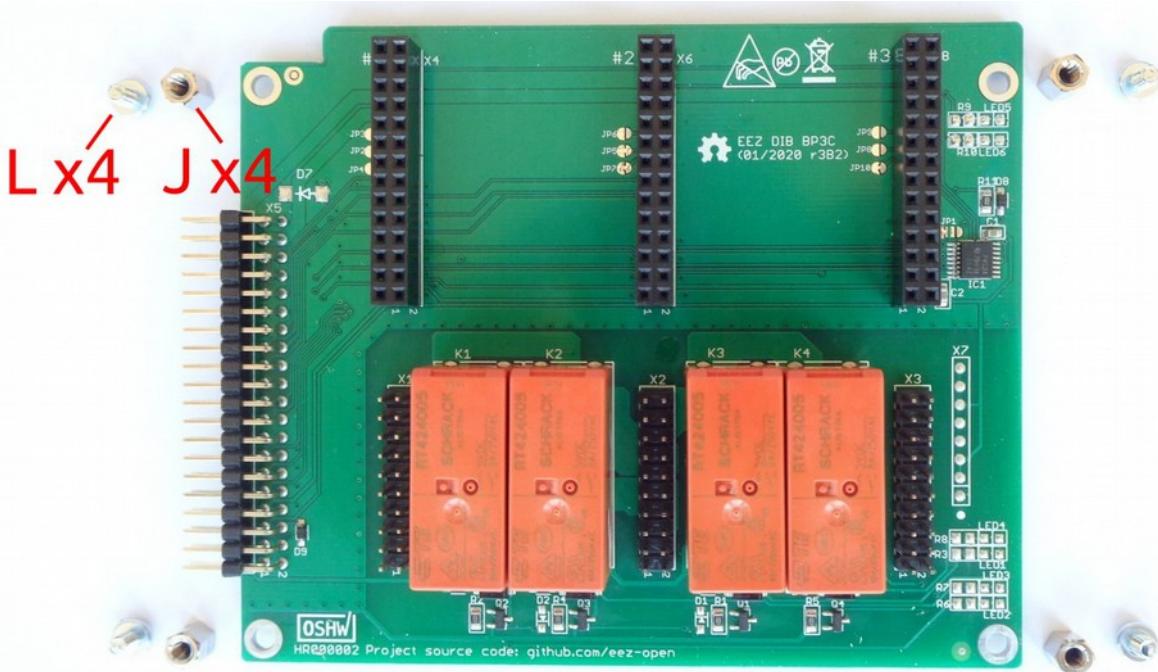


Fig. 8: BP3C backplane with mounting parts

Carefully connect the modules together (40-pin X1 socket on MCU module side and X5 header on BP3C side). You can now proceed with mounting the module to the bottom panel using screws (item M in Fig. 3) in the positions shown in Fig. 4.

*Do not completely tighten these screws before installing the front panel.*

## 5. Connecting TFT display

In order to mount the front panel to the bottom panel, it will be necessary to connect the TFT display to the MCU module, first. This is the most delicate operation in the entire EEZ BB3 assembly procedure,

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so it requires extra care.

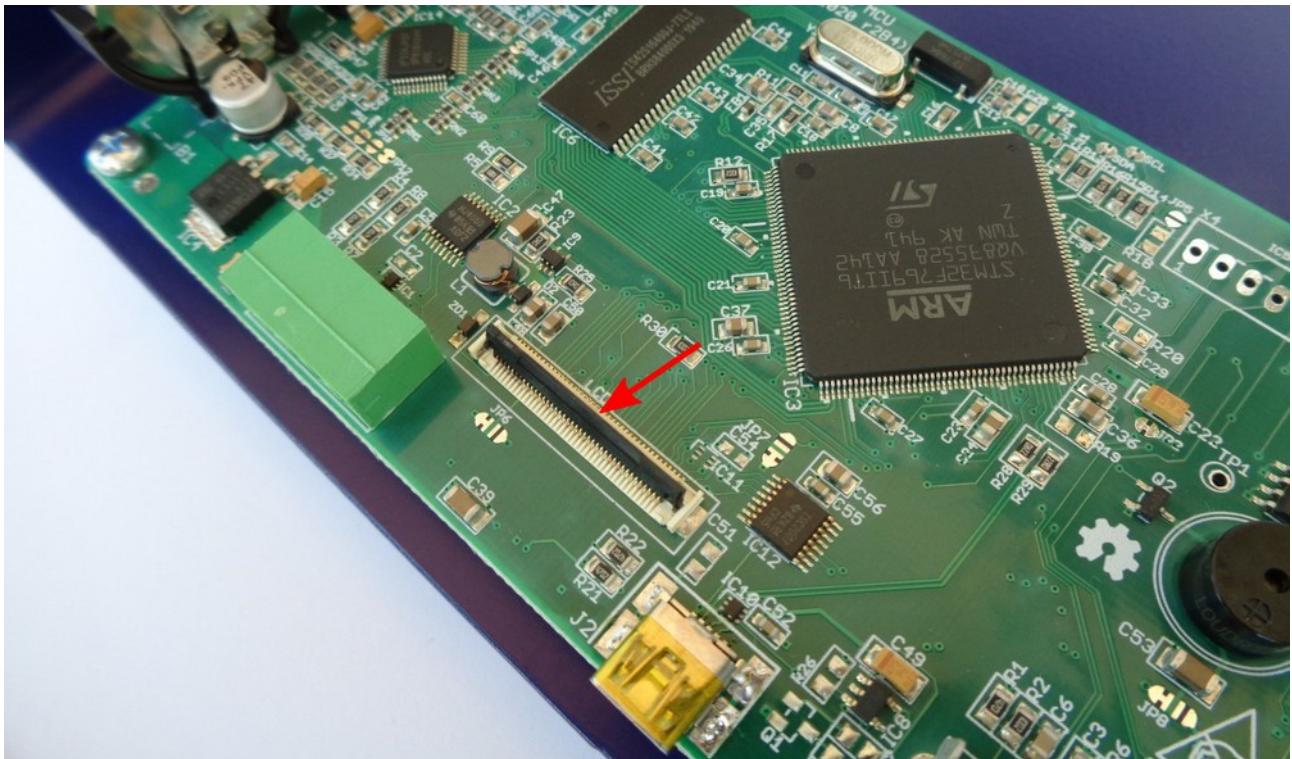


Fig. 9: 40-pin FFC display connector

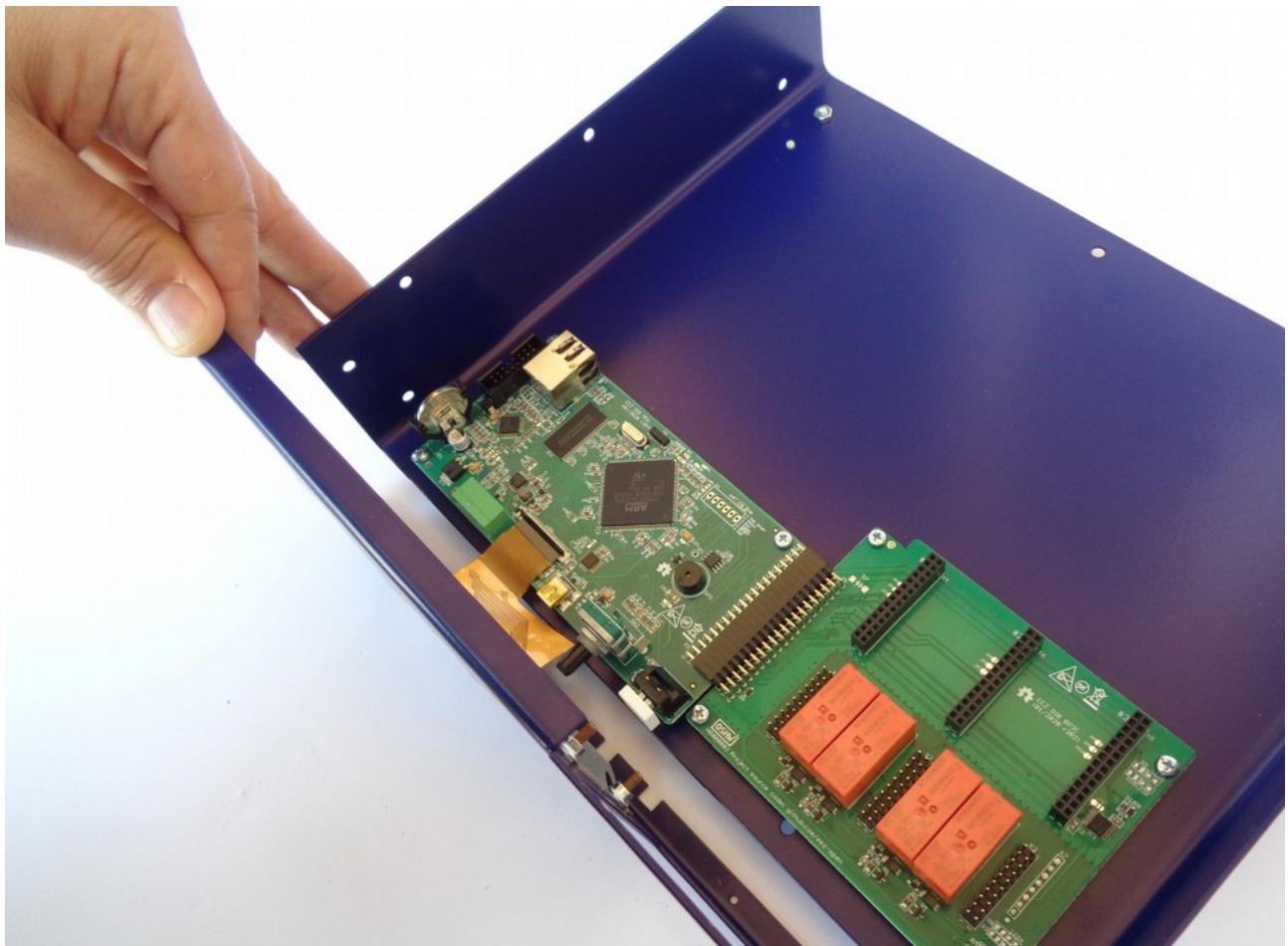
First, identify the connector position on the MCU module and carefully place the black plastic lever in the up position (Fig. 9) to allow the display flat flexible cable to enter smoothly.

*Do not power on the MCU module without the display connected or with a loosely connected flexible display cable. Doing so may damage the power supply of the display backlight located on the MCU module.*

### 6. Front panel mounting

Carefully bend the display cable so that it is in line with the FFC connector and slowly insert it (Fig. 10). When the flexible display cable is in place, lower the black lever to lock the cable (Fig. 11).

*Do not force the flexible cable into the FFC connector as it may damage the cable and the connector.*



*Fig. 10: Inserting display flexible cable into 40-pin FFC connector*



*Fig. 11: 40-pin FFC connector in lock position*

Before proceeding with fixing the front panel to the bottom plate check that the encoder shaft and user switch are in place (Fig. 12). Additionally check that the User switch is functional (Fig. 13) i.e. that it can be pressed (that it is not pinched).

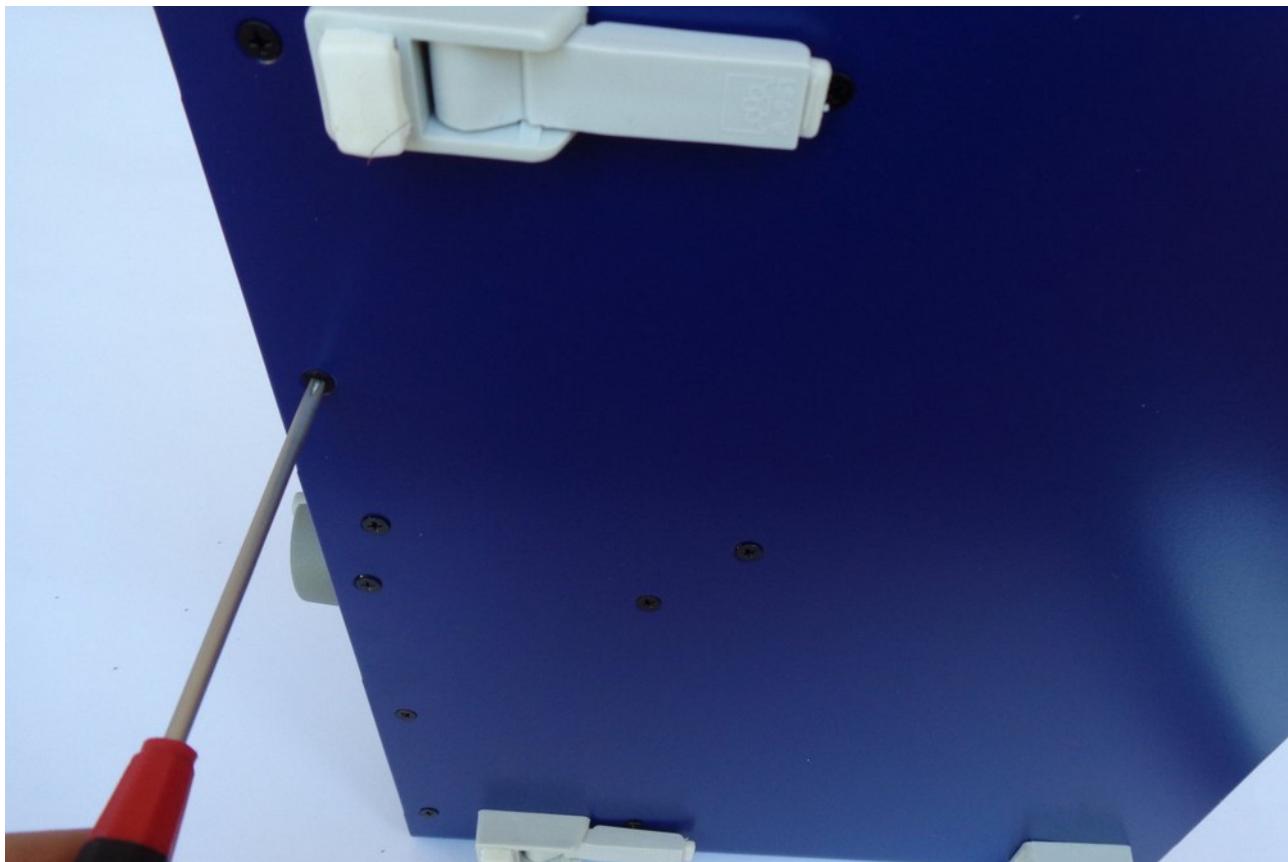


Fig. 12: Checking that the encoder shaft and user switch are in place

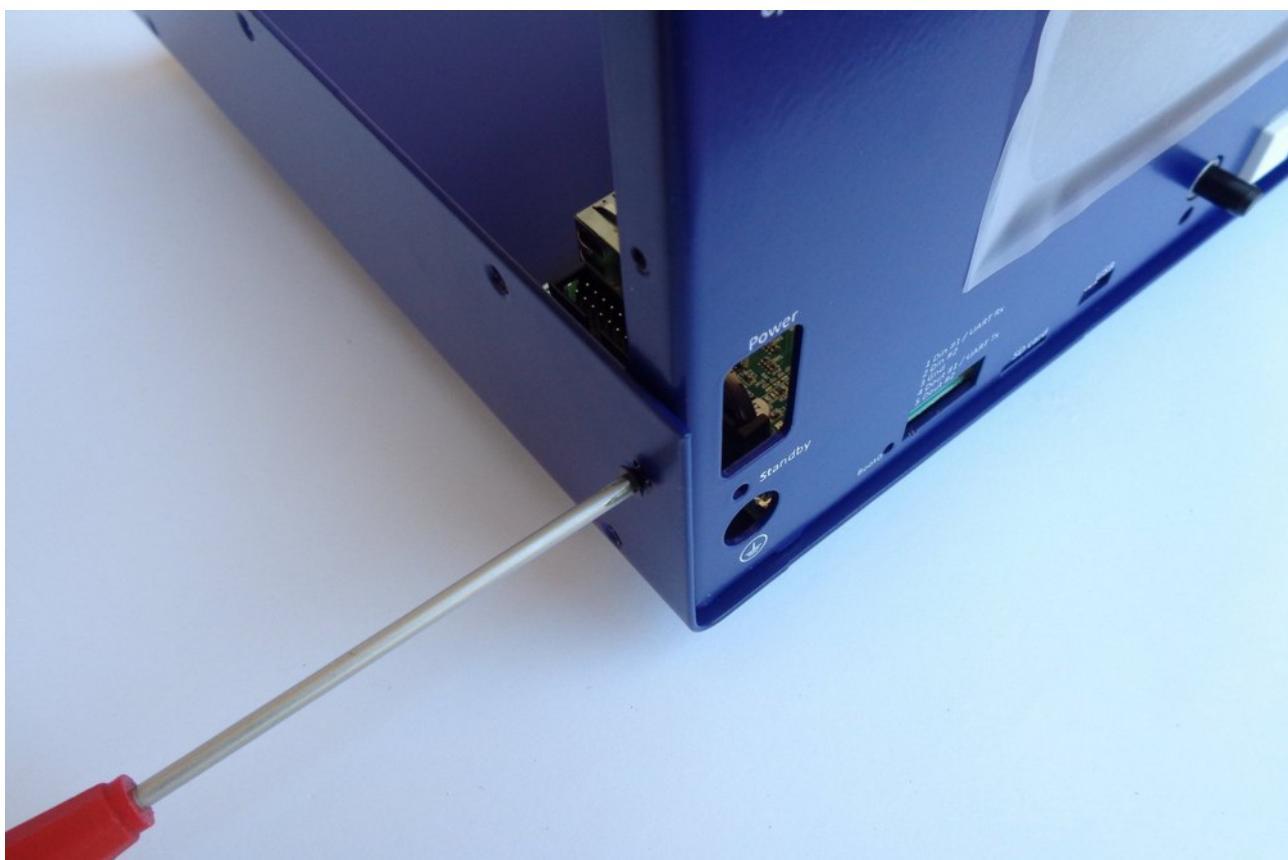


Fig. 13: Checking that the user switch works (that it is not pinched)

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*Fig. 14: Fixing the front panel from below to the bottom plate*



*Fig. 15: Fixing the front panel from side to the bottom plate*

Finally fix the front panel to the bottom plate (Fig. 14) with two M3 screws (item M) in the positions shown in Fig. 4. Continue the installation by fixing the front panel to the sides of the bottom plate with

another two M3 screws (item M) as shown in Fig. 15. Check again that the user switch is working and then you can tighten the 8 screws that hold the MCU and BP3C to the bottom plate.

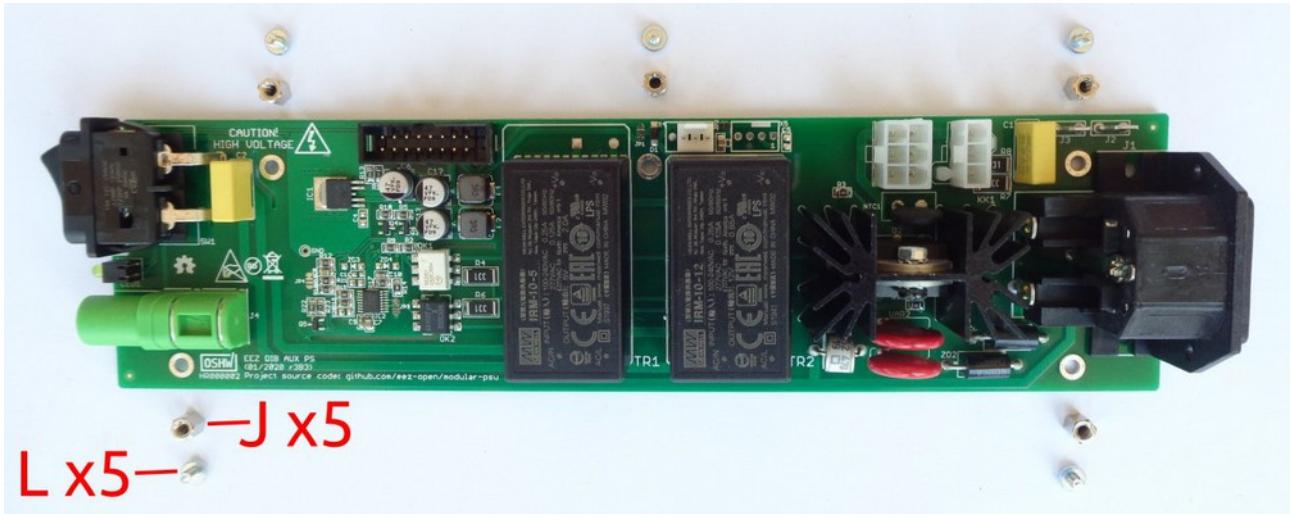


*Fig. 16: Encoder knob before mounting*

The encoder knob now can be mounted. Take care of the notch on the encoder shaft when inserting the knob (Fig. 16).

## 7. Installing AUX-PS module

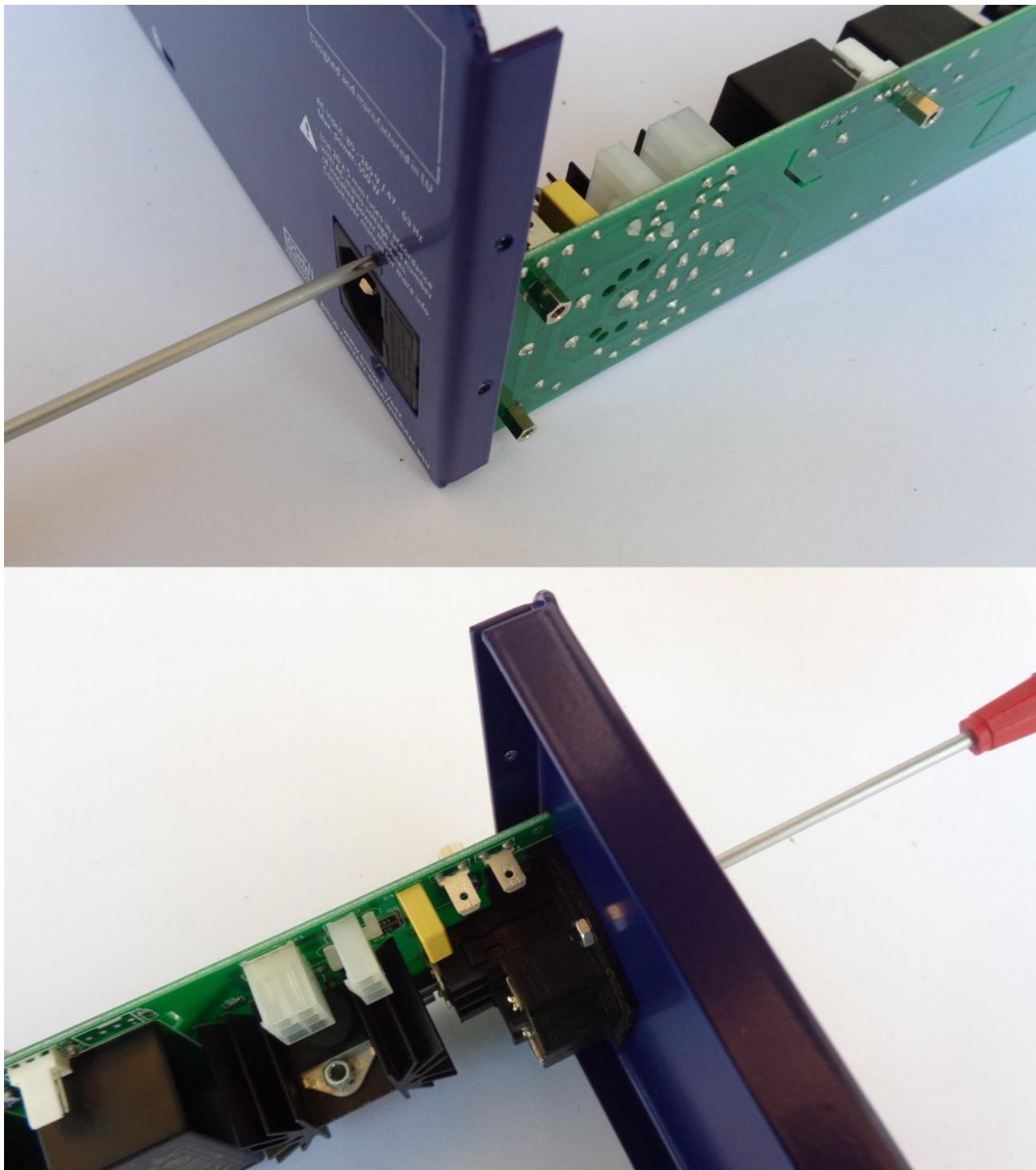
Remove the AUX-PS module from the package and attach the hexagonal metal spacers (J) using screws (L) to the five holes of the module.



*Fig. 17: AUX-PS module with mounting parts*

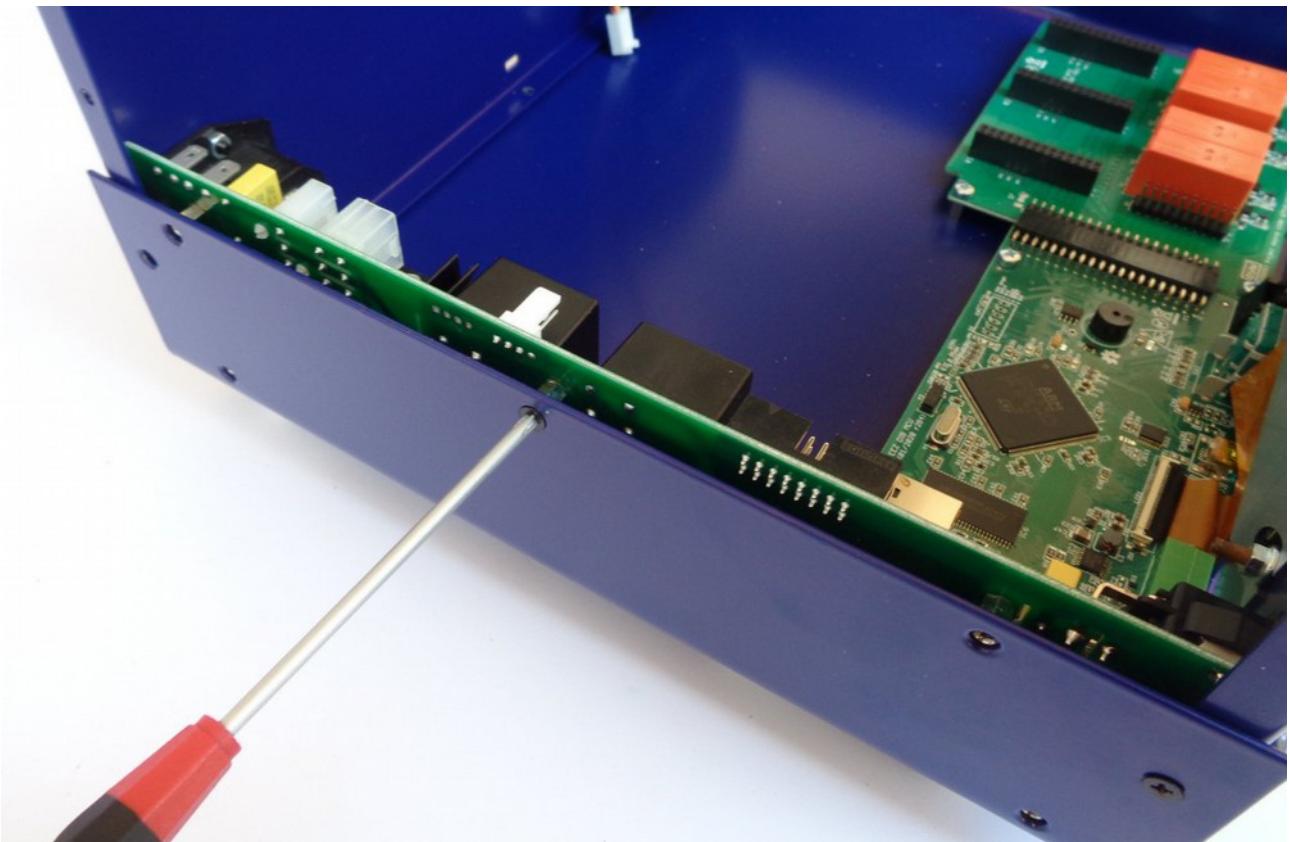
The AUX-PS module should be attached to the rear panel with two screws and nuts (content of bag K in Fig. 3). This is easiest to do before the AUX-PS is mounted on the bottom plate because it makes it easier to access the nuts during mounting (Fig. 18).

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*Fig. 18: Mounting AUX-PS module to the rear panel*

Continue installing the AUX-PS module by carefully inserting it from the back making sure that the Standby LED and power switch enter its holes in the front panel. When the AUX-PS module is inserted, you can secure it with 5 screws (item M) on the side of the bottom plate (Fig. 19).



*Fig. 19: Fixing the AUX-PS module on the bottom plate*

## **8. Rear panel mounting and cable connection**

Attach the rear panel to the bottom plate. This will require three screws (item M).



*Fig. 20: Rear panel mounting*

Ethernet connection will require a patch cable (item A) and two screws (item M) as shown in Fig. 21.

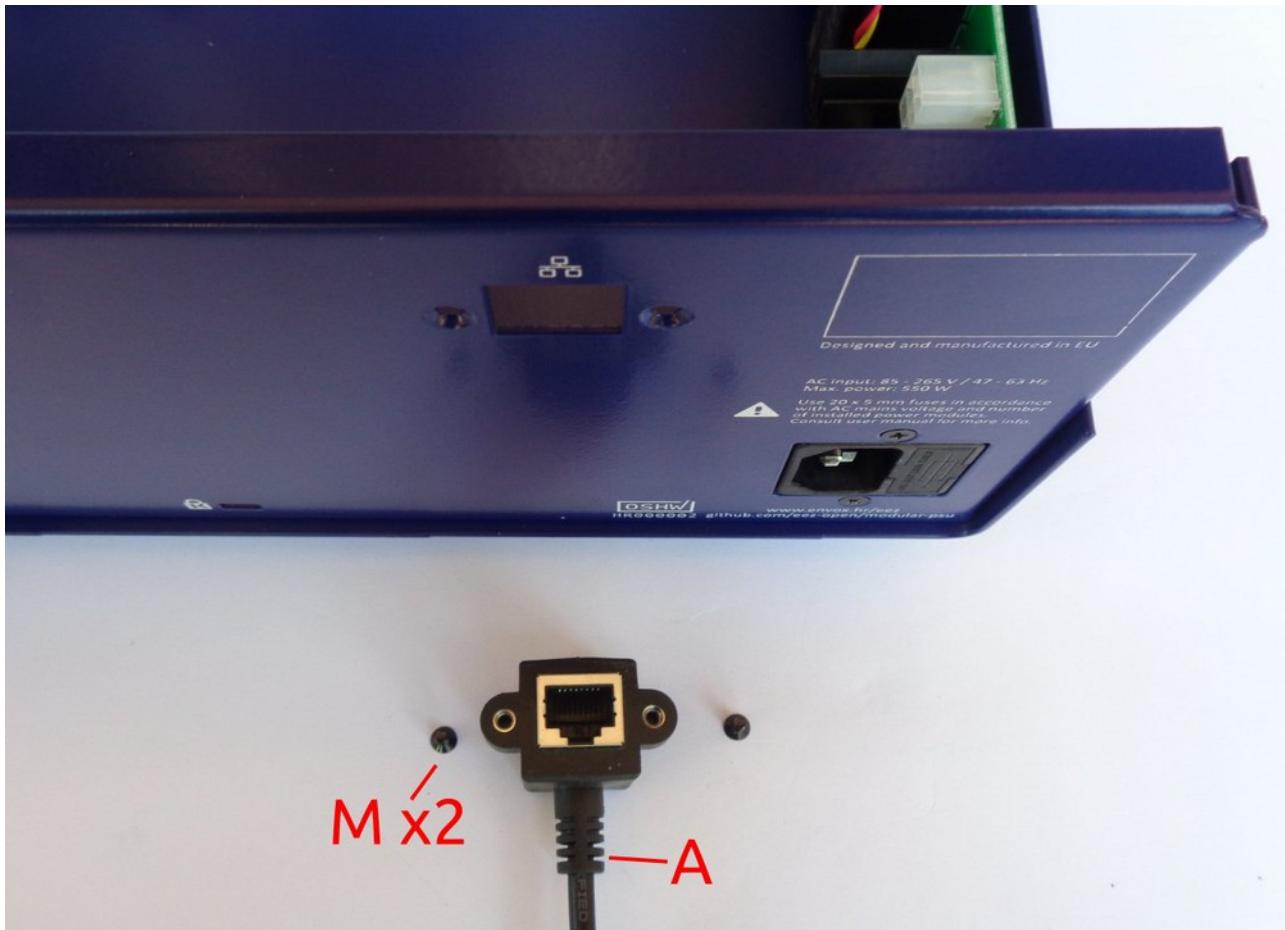


Fig. 21: Ethernet connection mounting parts

First, carefully plug one end of the Ethernet patch cable into the MCU module and then you can continue to secure the other end to the rear panel. You can now also connect the cooling fan connector to the AUX-PS module as shown in Fig. 22. Fig. 23 shows the mounted Ethernet patch cable.

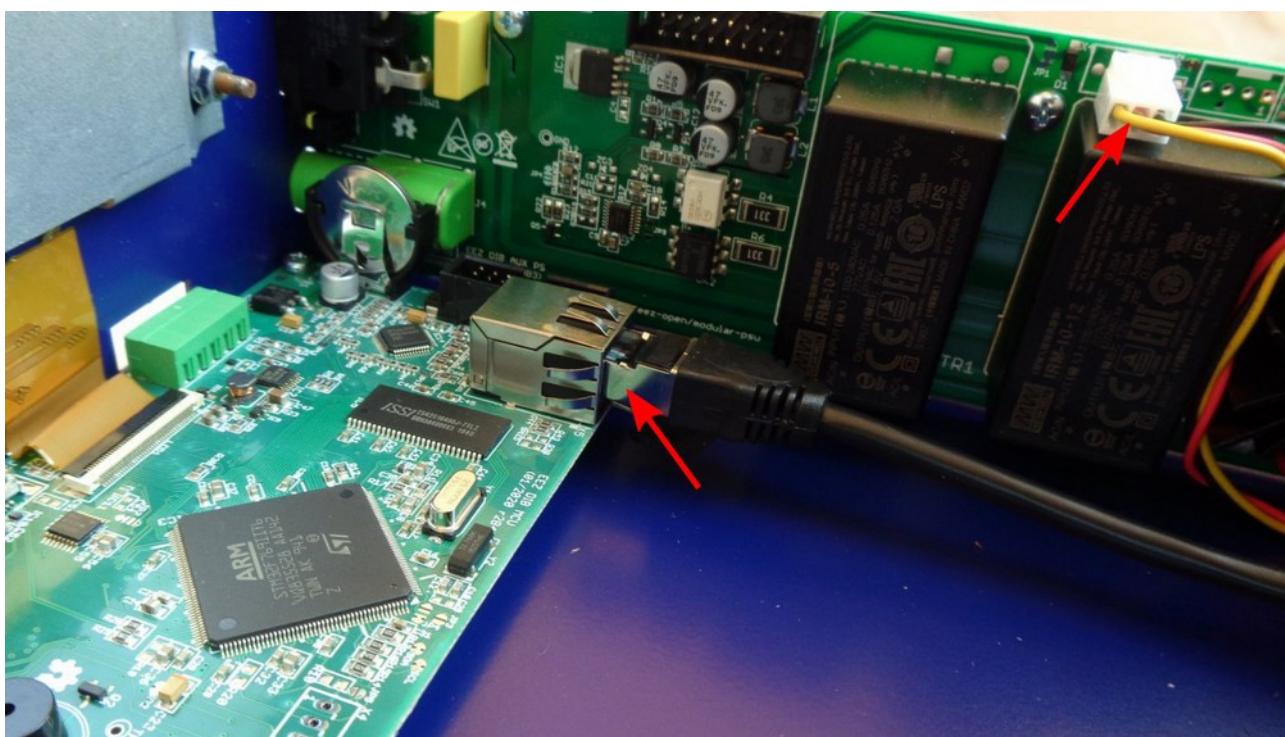
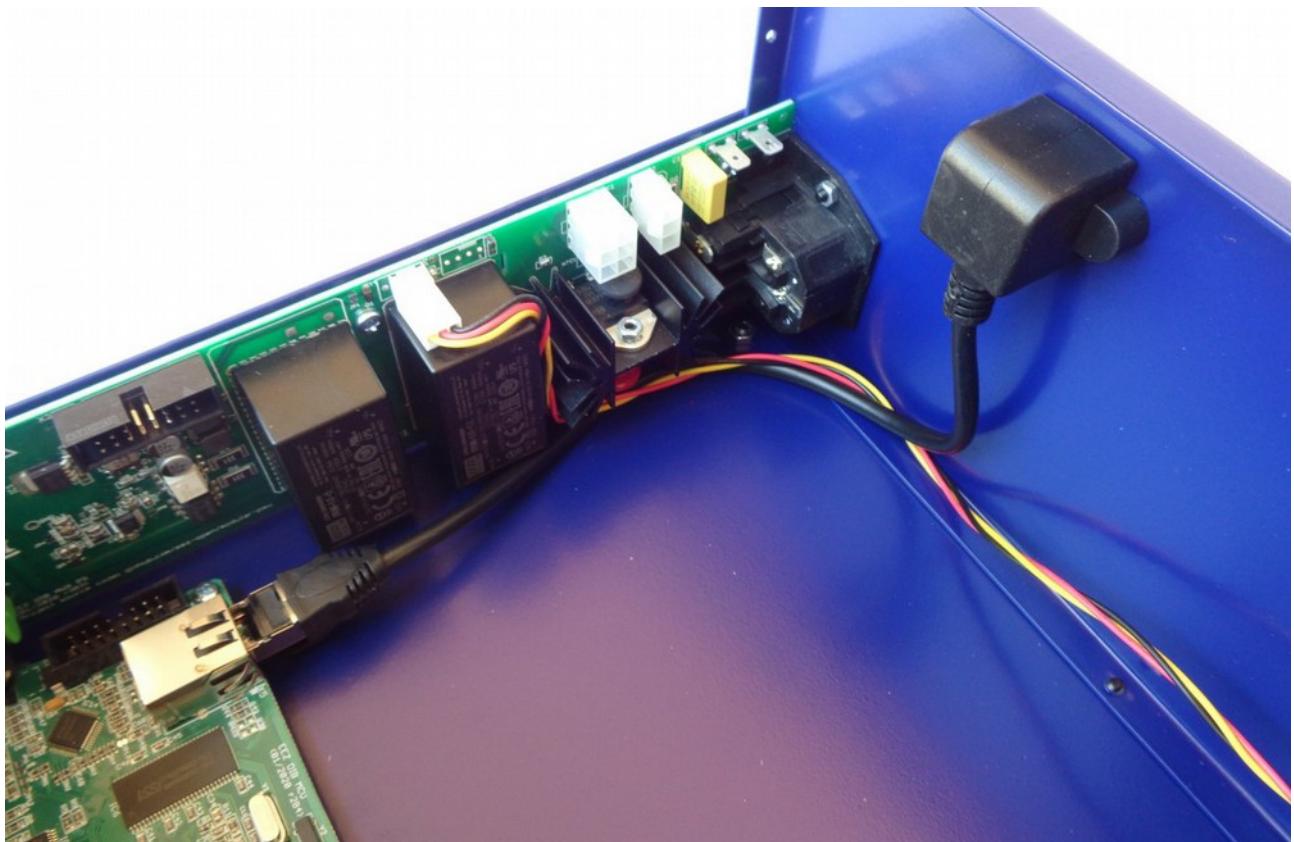
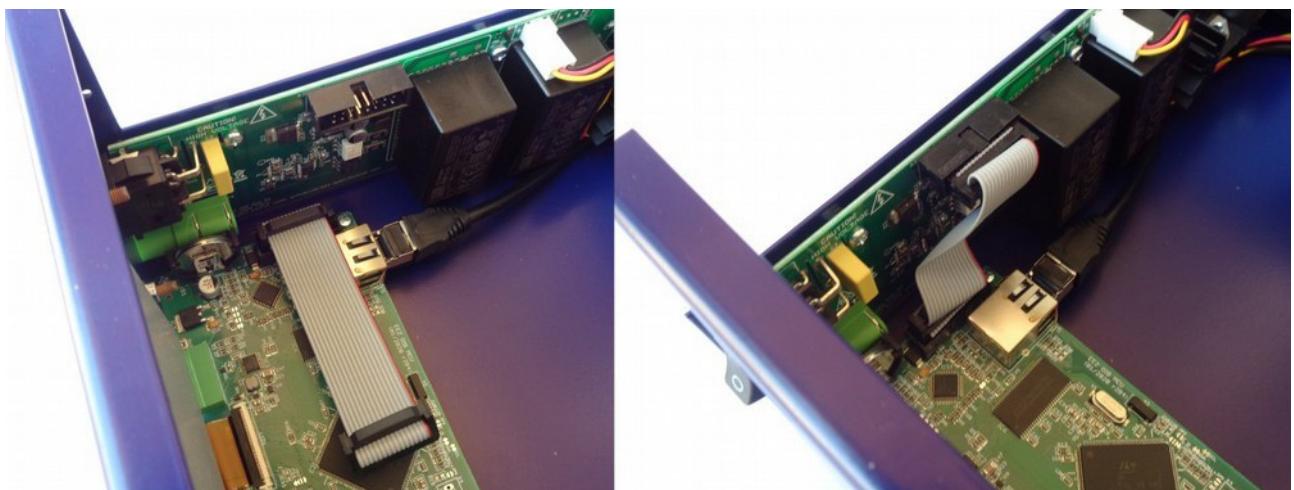


Fig. 22: Connecting Ethernet and cooling fan cables



*Fig. 23: Mounted Ethernet patch cable*

Finally, you can connect the AUX-PS and MCU module with a 16-pin IDC flat cable (item F) as shown in Fig. 24.



*Fig. 24: 16-pin IDC cable mounting*

## 9. First power up and installation of power modules



Fig. 25: Test power up without peripheral modules and micro SD card

The MCU module comes with the firmware installed. It is now possible to do a trial power up. Take the power cord used in your country (not part of this kit) and turn on the unit using the front panel power switch. If everything is connected properly, a welcome message will appear on the display. You can tap the red colored icon at the bottom right of the status bar to see that the micro SD card is not installed. You can now insert the micro SD card as well, carefully remove it from the package and insert it as shown in Fig. 26 (pins must face up).



*Fig. 26: Inserting micro SD card*

Turn off the unit and unplug the power cord before continuing.

Power modules (Item 8, Fig. 2) require 48 VDC. Mean Well AC / DC converters are used for this purpose (Item 9, Fig. 2). Fig. 27 shows the connecting cables and terminal covers. Note that the dual AC power cable has two arms of different lengths (Fig. 28). The shorter cable goes to Mean Well, which will be closer to the AUX-PS module as shown in Fig. 29.

First, carefully connect the cables as shown in Fig. 28. Take care of the colors of the wires. When cables are connected, the terminal covers (item N) can be mounted.



**AC Line**  
**AC Neutral**  
**Protective Earth (PE)**



**Vout-**  
**Vout+**

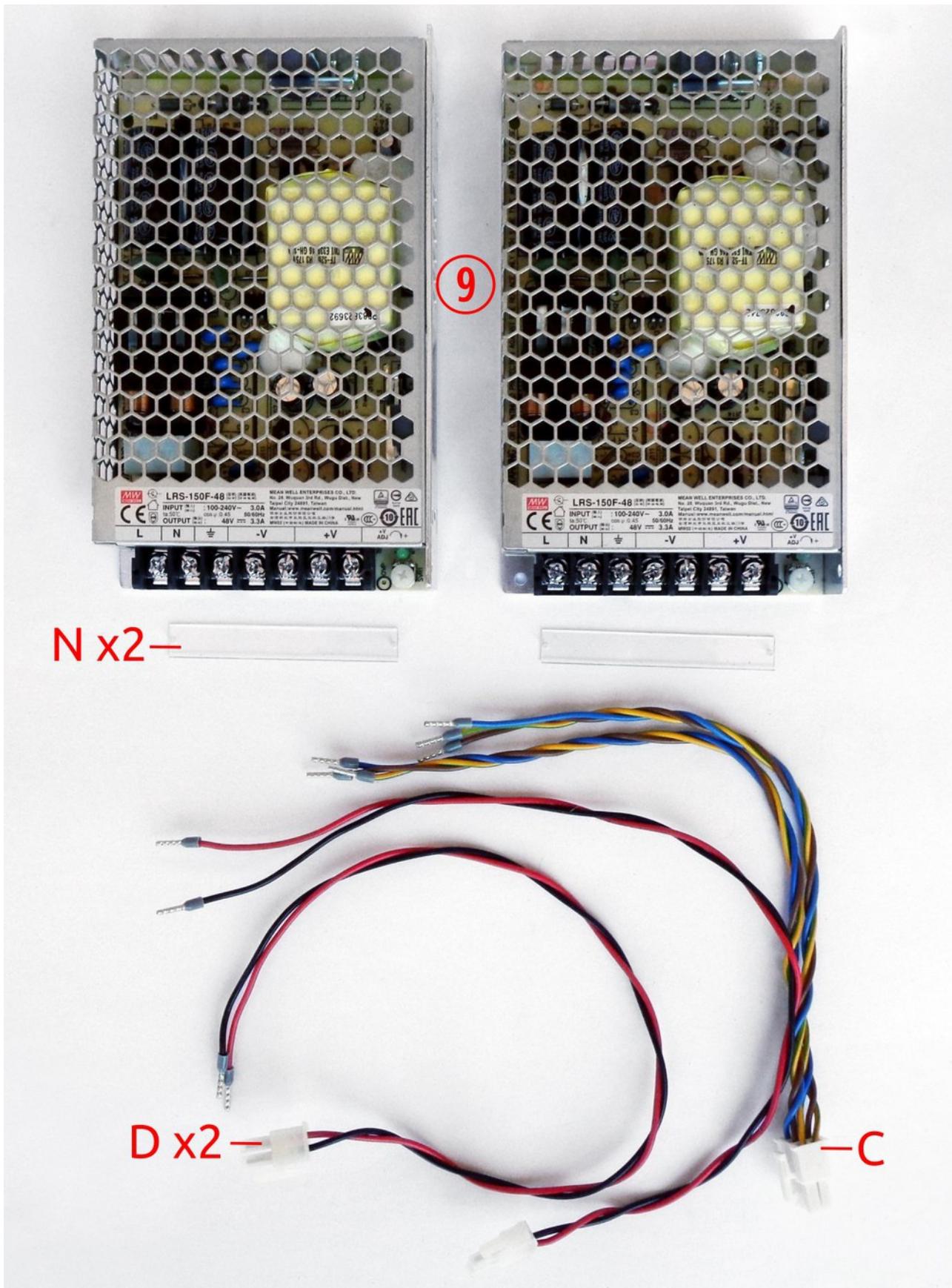


Fig. 27: Mean Well AC/DC converters and related wiring

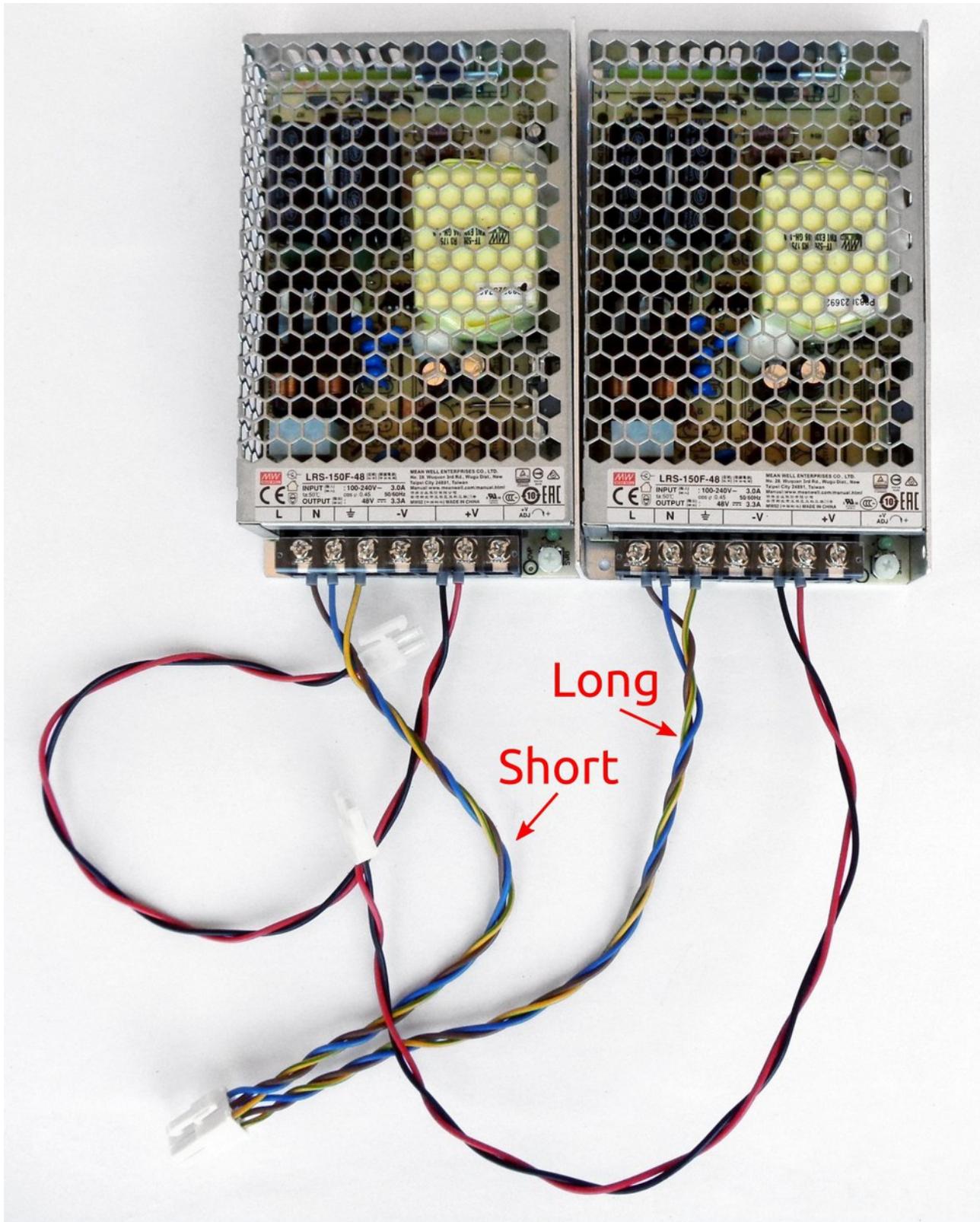


Fig. 28: Mean Well AC/DC converters with installed terminal covers and cables

Mean Well converters are mounted on top cover. The mounting frame (item 5) is used for this. Each converter is attached to the mounting frame with two screws (item M) as shown in Fig. 29. As mentioned above, the converter with the shorter AC power cable should be mounted to the far left position.

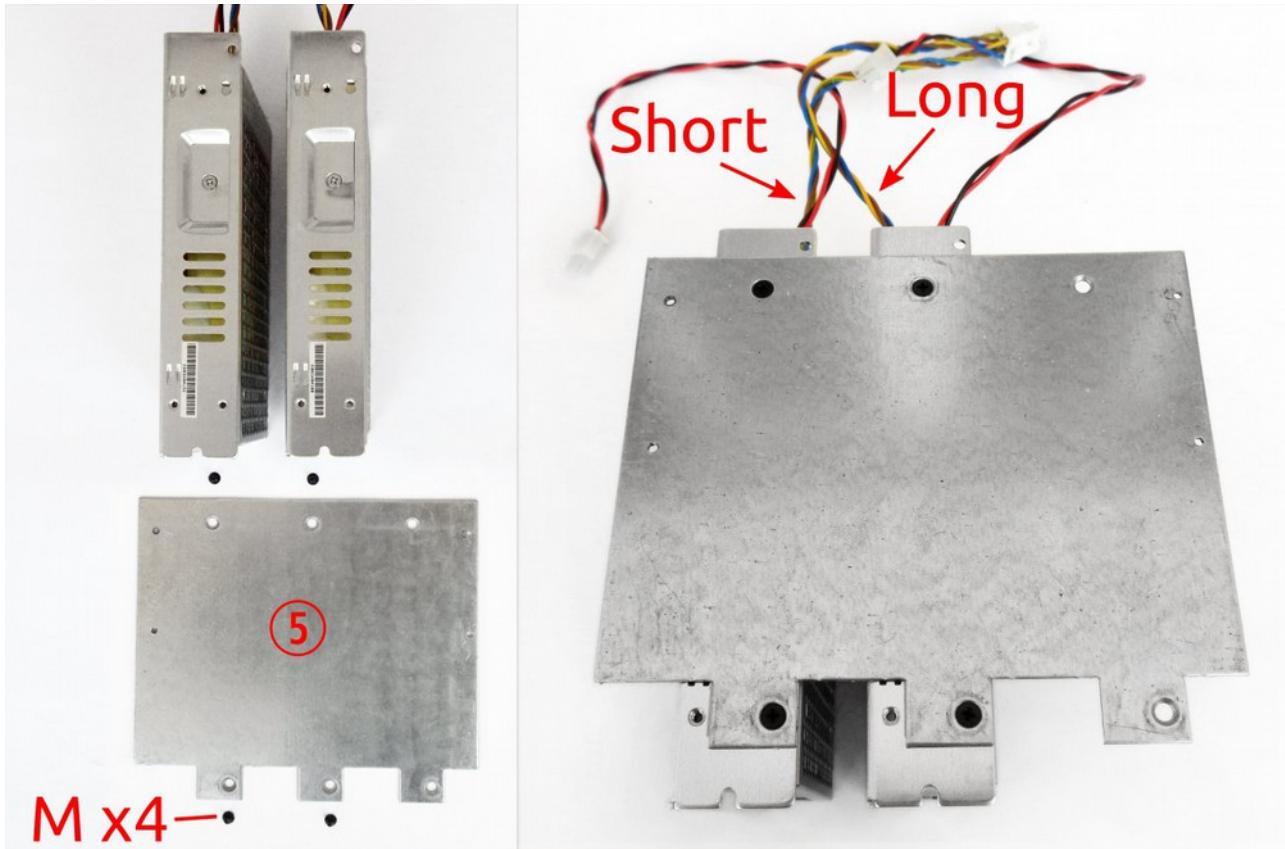


Fig. 29: Mean Well AC/DC converters with mounting frame

When the converters are attached to the mounting frame, the top cover should be placed over them as shown in Fig. 30. Secure it with four screws (item M).

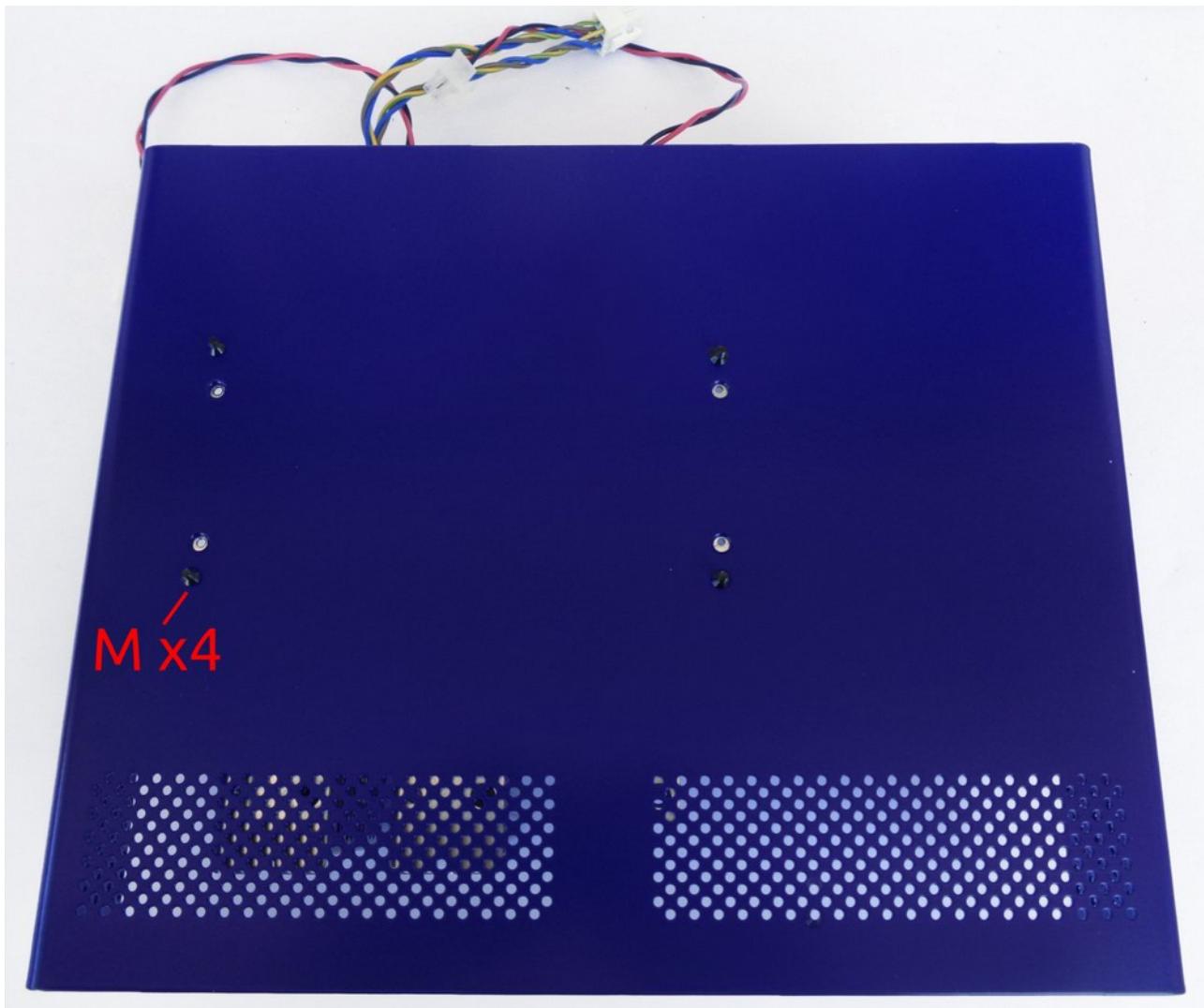
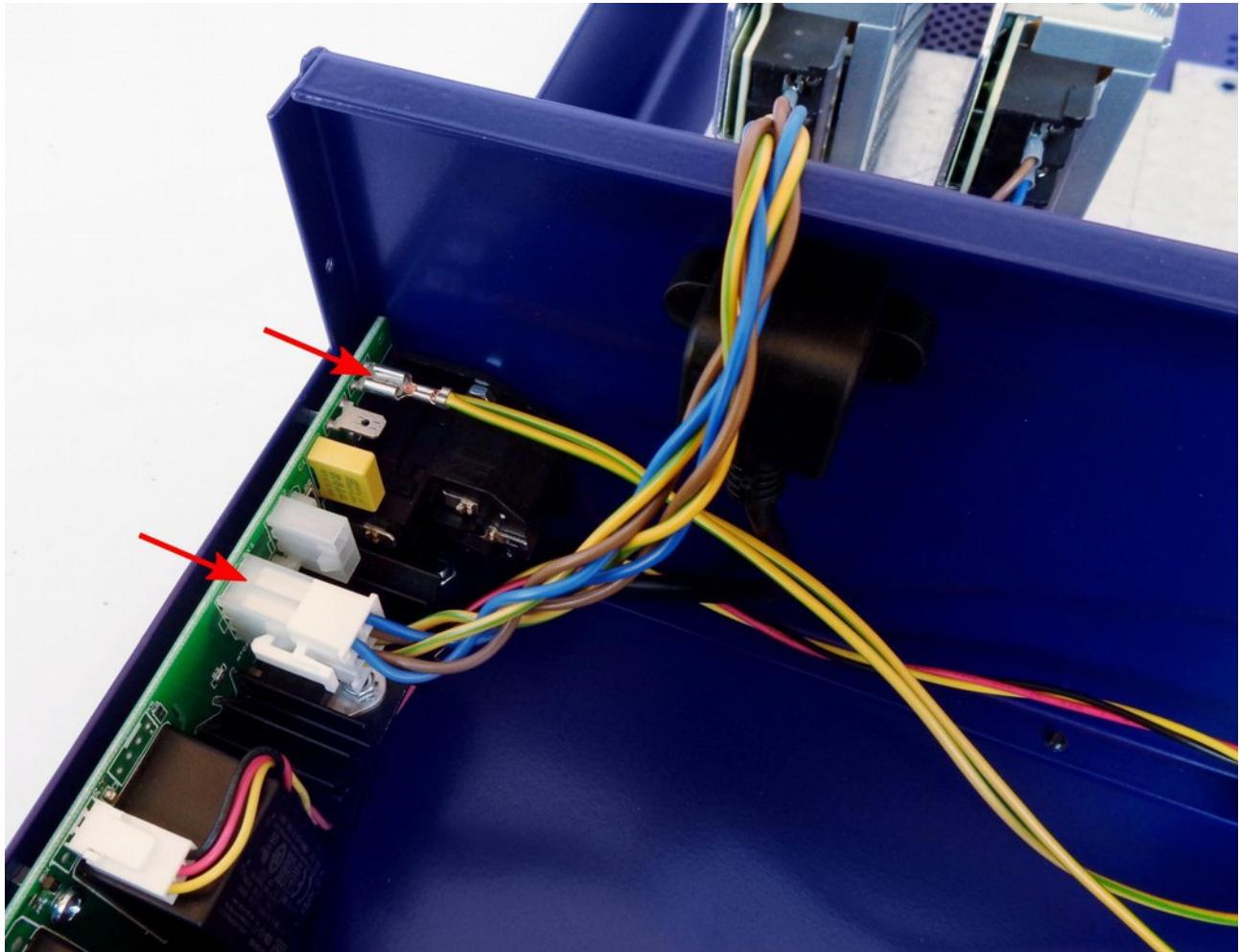


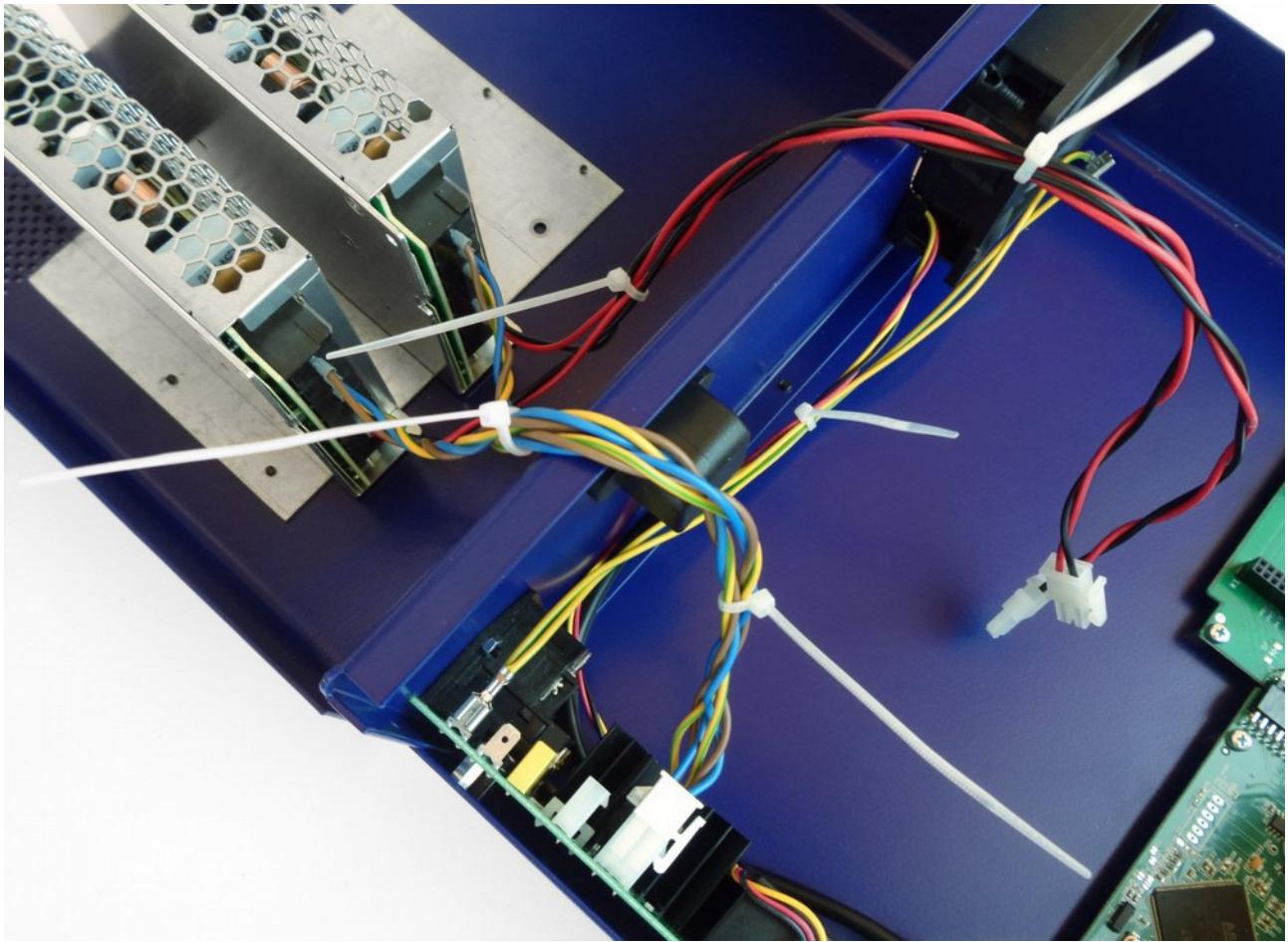
Fig. 30: Top plate placed on top of AC / DC converters

Place the top cover with the mounted converters behind the rear panel and plug the AC power connector into the AUX-PS module as shown in Fig. 31. You can now also attach the PE cable to the corresponding place (item B, Fig. 3).



*Fig. 31: AC power input and PE connections*

Use cable ties (item I, Fig. 3) to secure the cables. An example is shown in Fig. 32.



*Fig. 32: Cable ties*

To install the power module, we will need screws (two for each module). The blind front panel (item E) will be used to close the third slot (Fig. 33).

The power module (item 8, Fig. 2) should be connected with the DC cable (item D) coming out of the Mean Well converter and the PE cable (item B) that we connected to the AUX-PS module as shown in Fig. 34.



*Fig. 33: Power modules mounting parts*

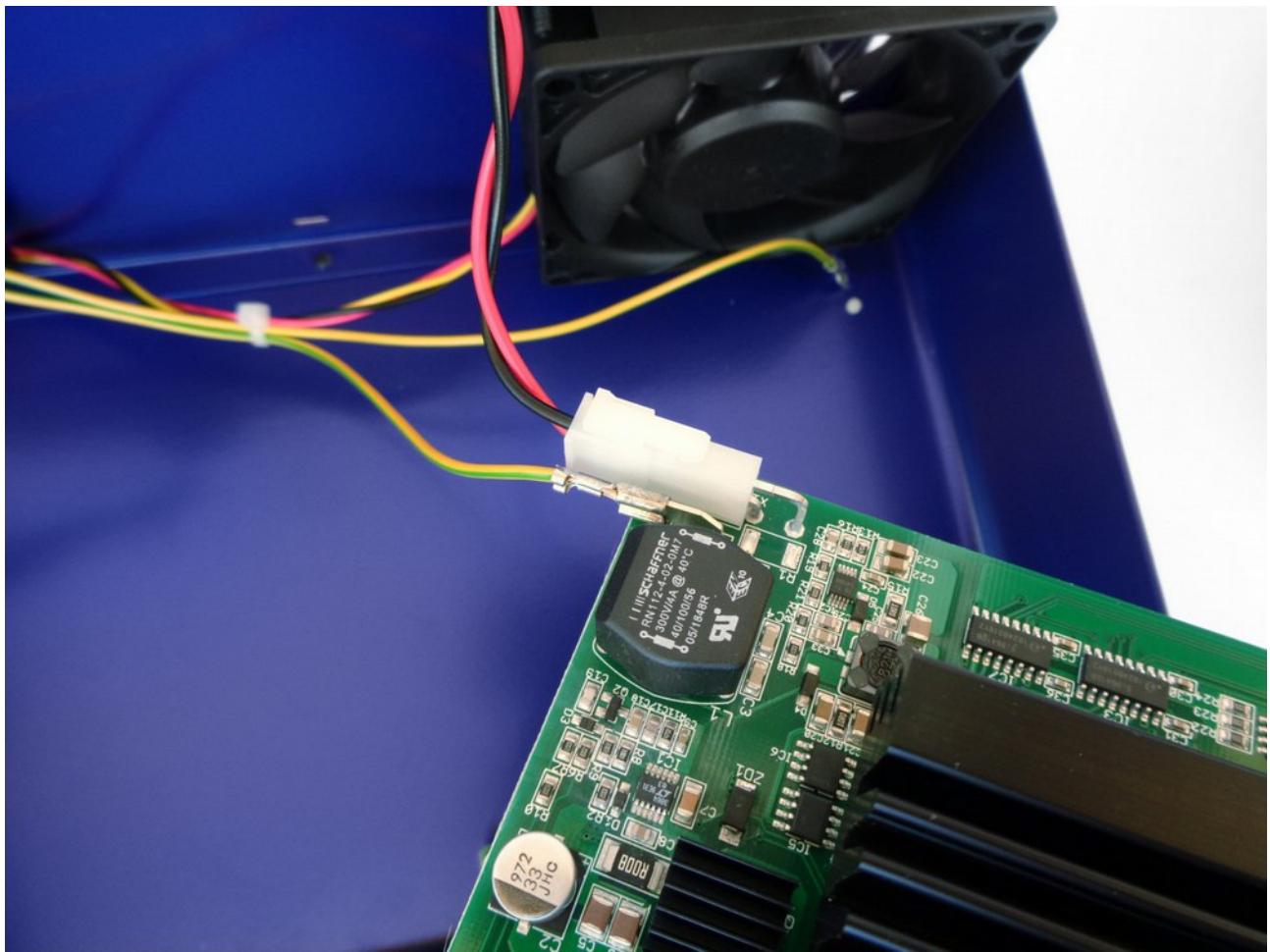
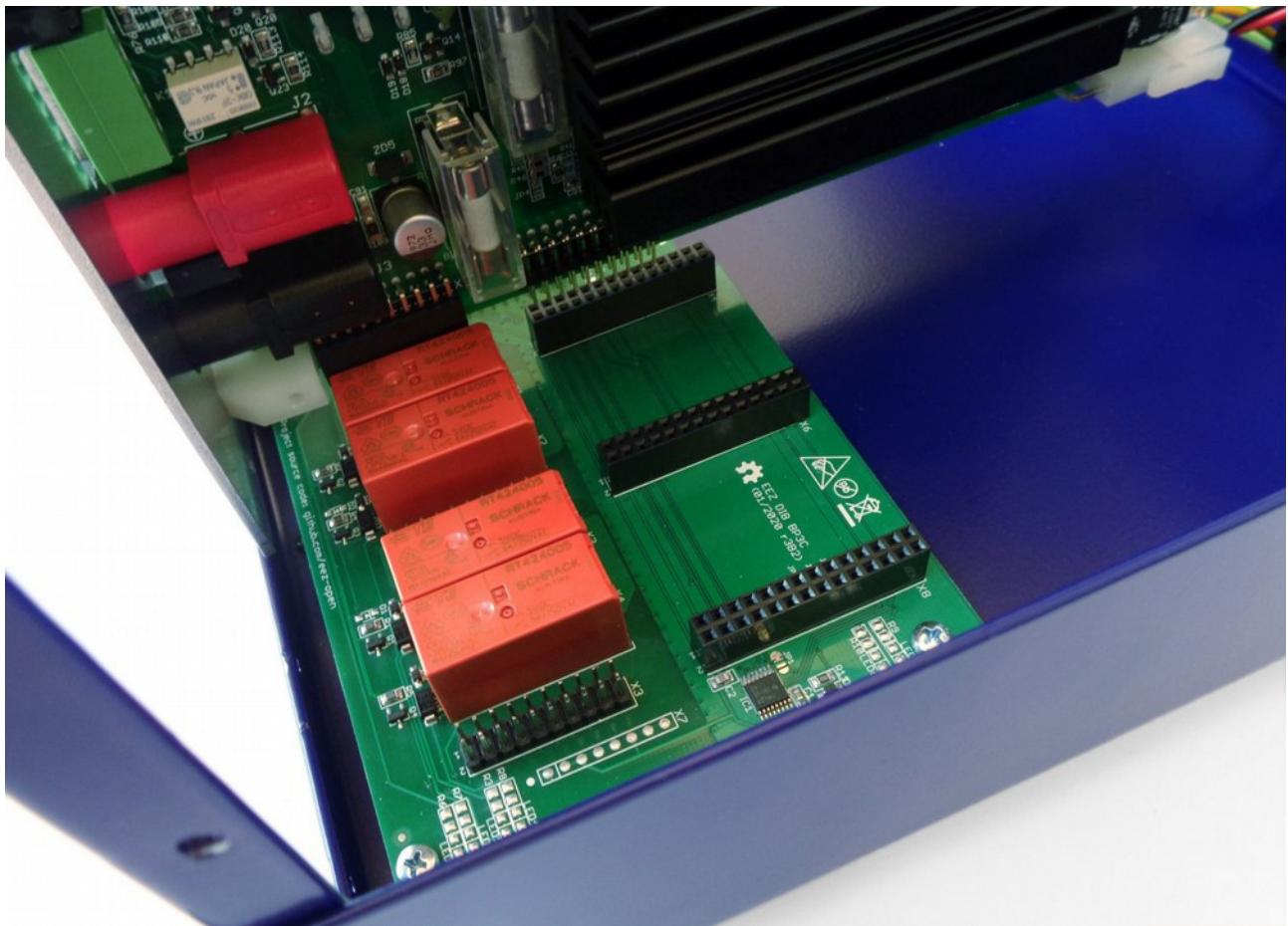


Fig. 34: Power module input connections

After connecting the power and the PE cable, we can continue with inserting the module into the BP3C backplane (Fig. 35)



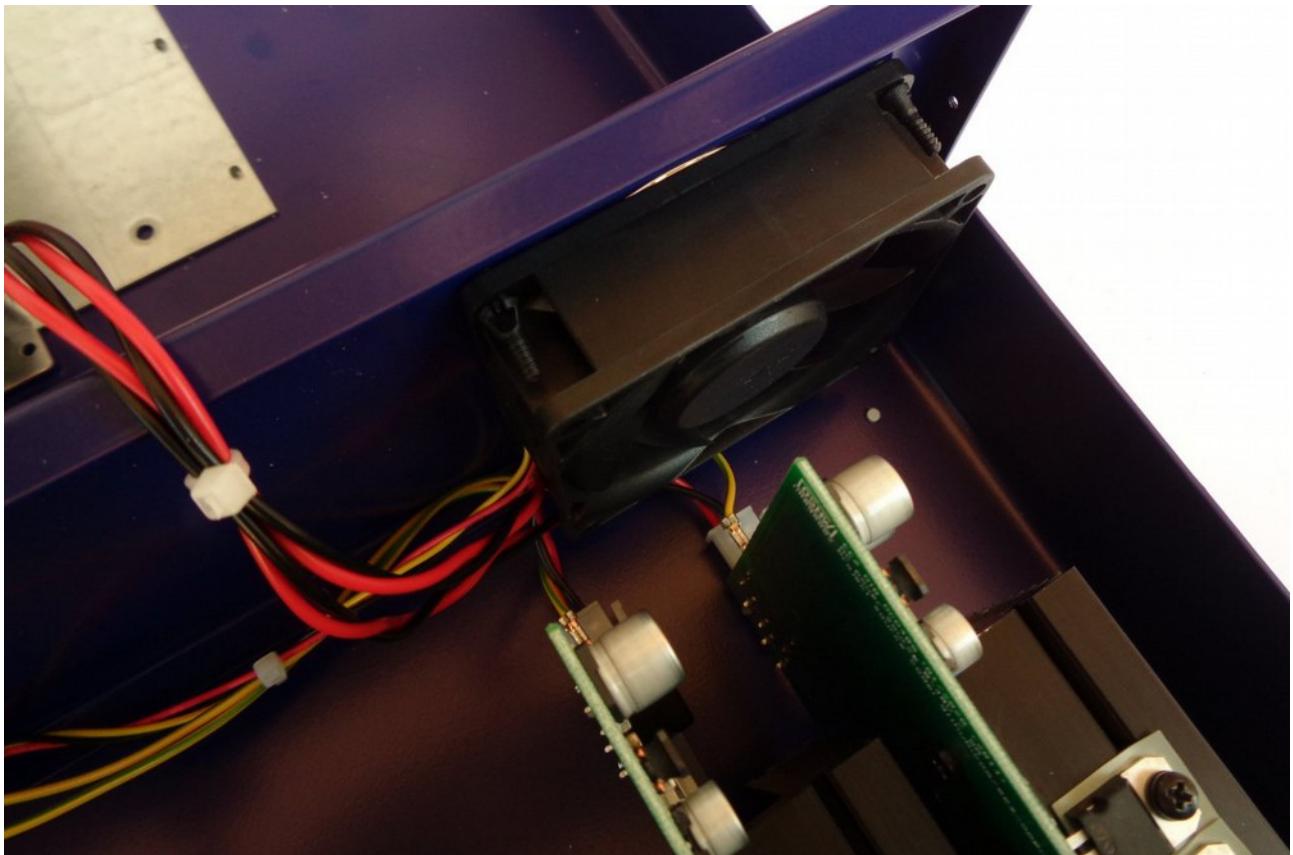
*Fig. 35: Power module insertion*

Once the power module is securely inserted into the backplane slot it should be fixed with two screws. First install the screw into the lower hole and then into the upper hole.



*Fig. 36: Power module fastening*

Before closing the enclosure, make sure that the power module's connecting cables do not interfere with the cooling fan (Fig. 37).



*Fig. 37: Power module wiring check*

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Carefully fold the cables coming from the Mean Well converter and place the top cover on the enclosure. Secure it with four screws (item M): first on the rear panel and then on the front panel.



Fig. 38: Securing the top cover

## 10. User manual and firmware update

Turn on the power with the power switch on the front panel and if the self-test procedure is successfully completed, the start page will be displayed as in Fig. 39.

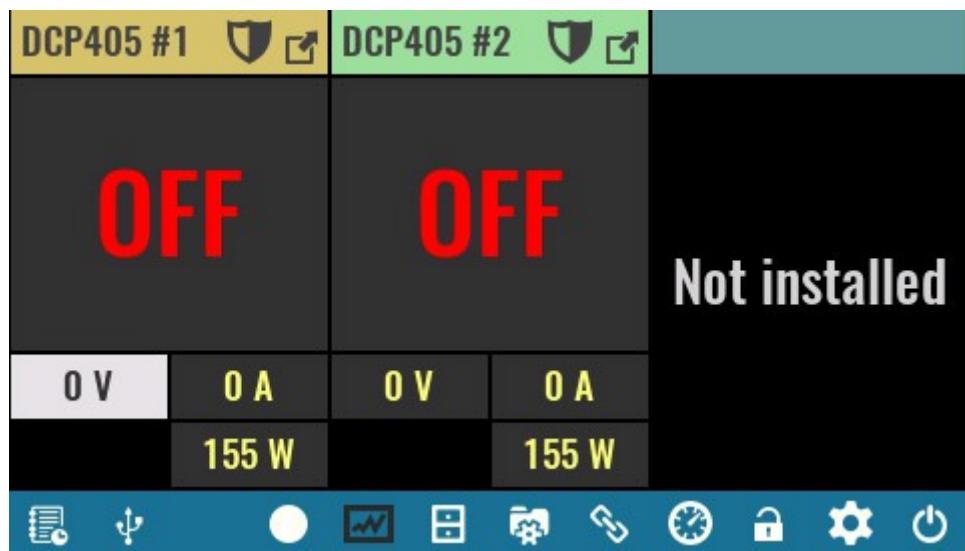


Fig. 39: Home page with two power modules initiated

The EEZ BB3 User manual is available [online](#) as well as in downloadable PDF format. For advanced users, the SCPI programming guide is also available [online](#).

We are constantly working on firmware, removing bugs and improving it. There is a chance that the

firmware that was shipped is not the last released version. Upgrading to the latest version is recommended. You can find information about the installed version on the [System Information](#) page or by sending \*IDN? SCPI query. You can find information about the latest released version on the [Firmware](#) page.