

# EEZ BB3 kit assembly instructions

## Introduction

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

The EEZ BB3 kit is *not* an end-user product. As such, it has not been subjected to 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 and recycling for instance (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 the 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. However, please note that due to limited resources, the kit is not completely and thoroughly tested. Basic tests were performed on the core and power modules and the cooling fan.

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

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

## Kit assembly steps

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### 1. Package content

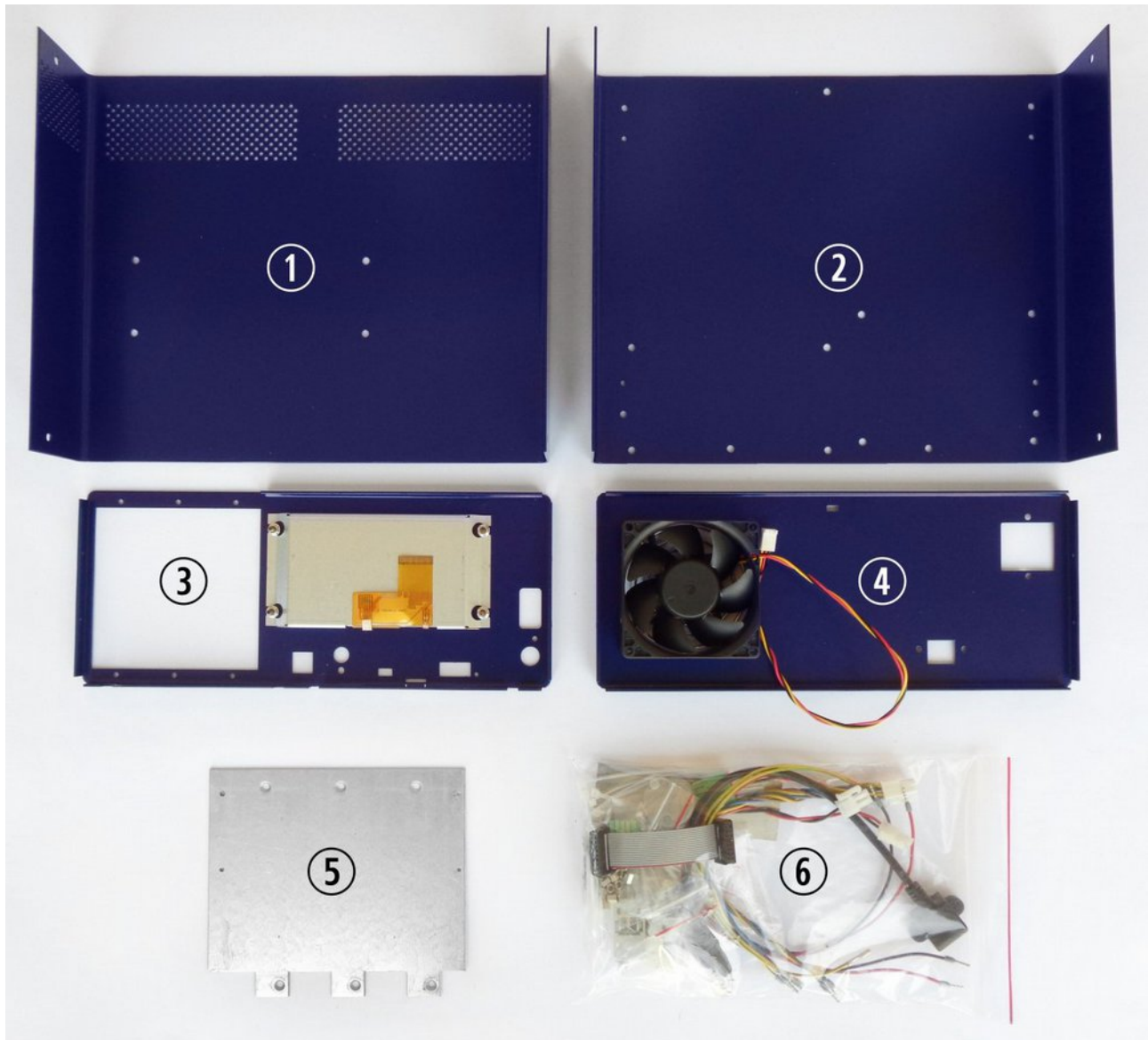
The BB3 kit consists of the following parts, as shown in Fig. 1 and Fig. 2:

Item	Description
1	Pre-drilled enclosure top cover
2	Pre-drilled enclosure bottom plate
3	Enclosure front panel with mounted 4.3” TFT touch-screen color display

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- 4 Enclosure rear panel with mounted Ø80 mm cooling fan
- 5 Mean Well AC/DC converter 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 ×2
- 9 Mean Well 48 VDC AC/DC converter ×2

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



*Fig. 1: BB3 kit content*

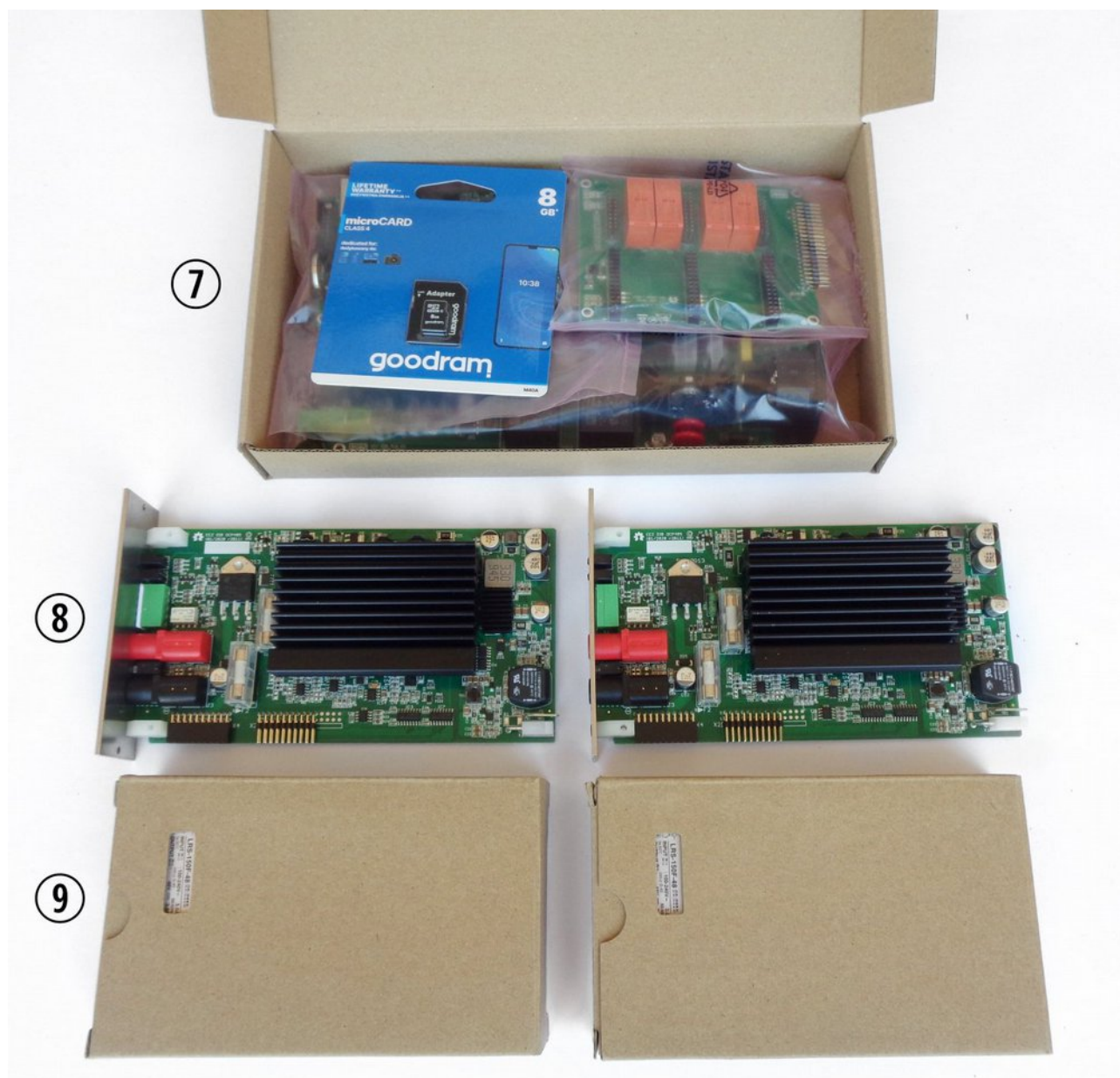


Fig. 2: BB3 kit content (cont.)

## 2. Plastic bag contents

Before start assembly please take some time to check that the contents of the plastic bag (item 6) include everything listed below. Also familiarize yourself with the *Item* naming that will be used in the rest of the document.

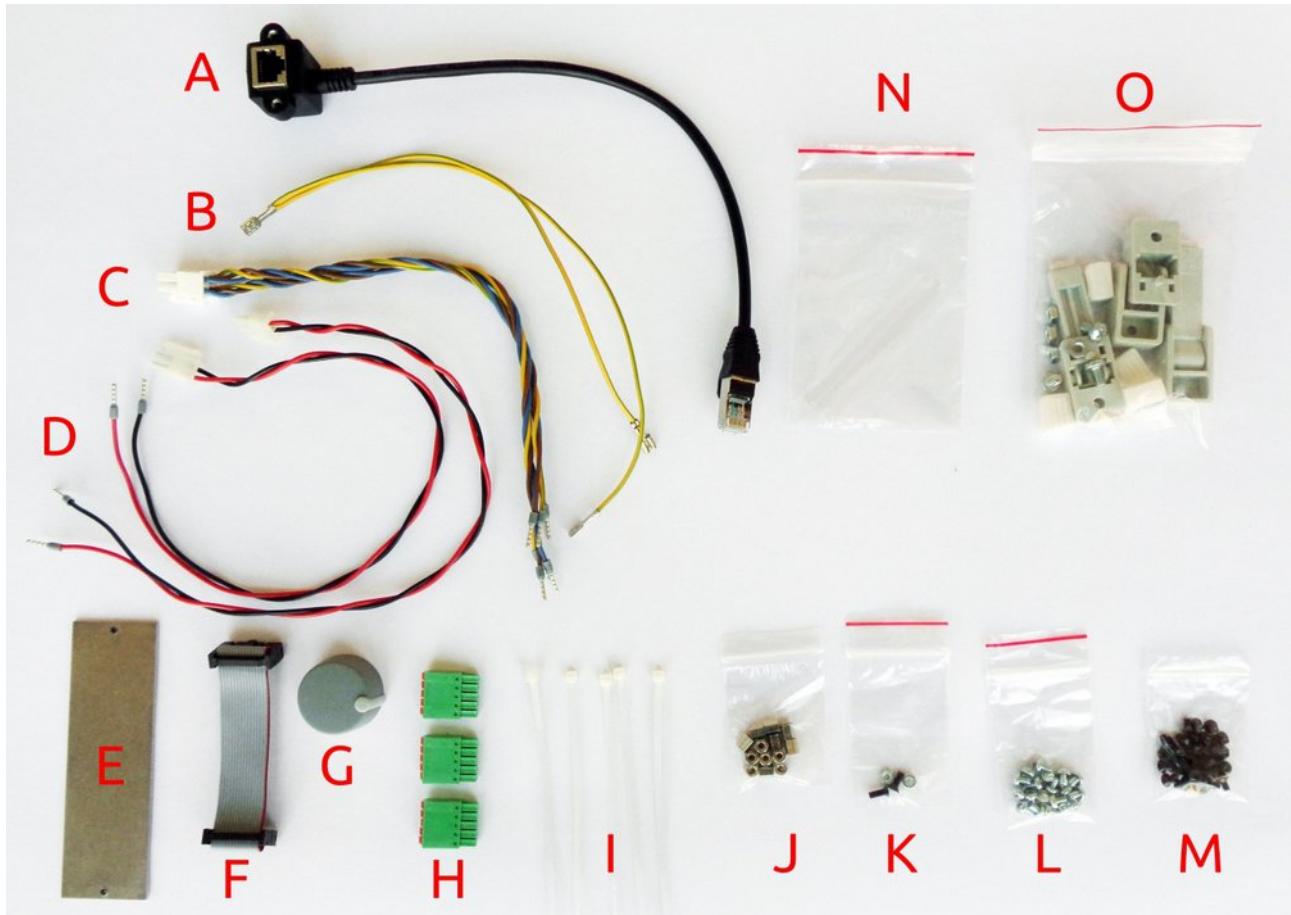


Fig. 3: Plastic bag content

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 ×6
J	Hexagonal M3×6 mm metal spacers ×13
K	Mounting set for AC power inlet
L	M3×4 mm screws ×13
M	M3×5 mm countersunk screws ×40
N	Mean Well terminal covers
O	Enclosure feet kit



### 3. Bottom plate

As a first step, mount the plastic feet. Identify the foot holes on the bottom plate (Fig. 4.) and unpack the content of the bag with the foot parts (item O, Fig. 3.). The front feet come with an extended part that, when mounted and folded out, can set the enclosure at an angle.

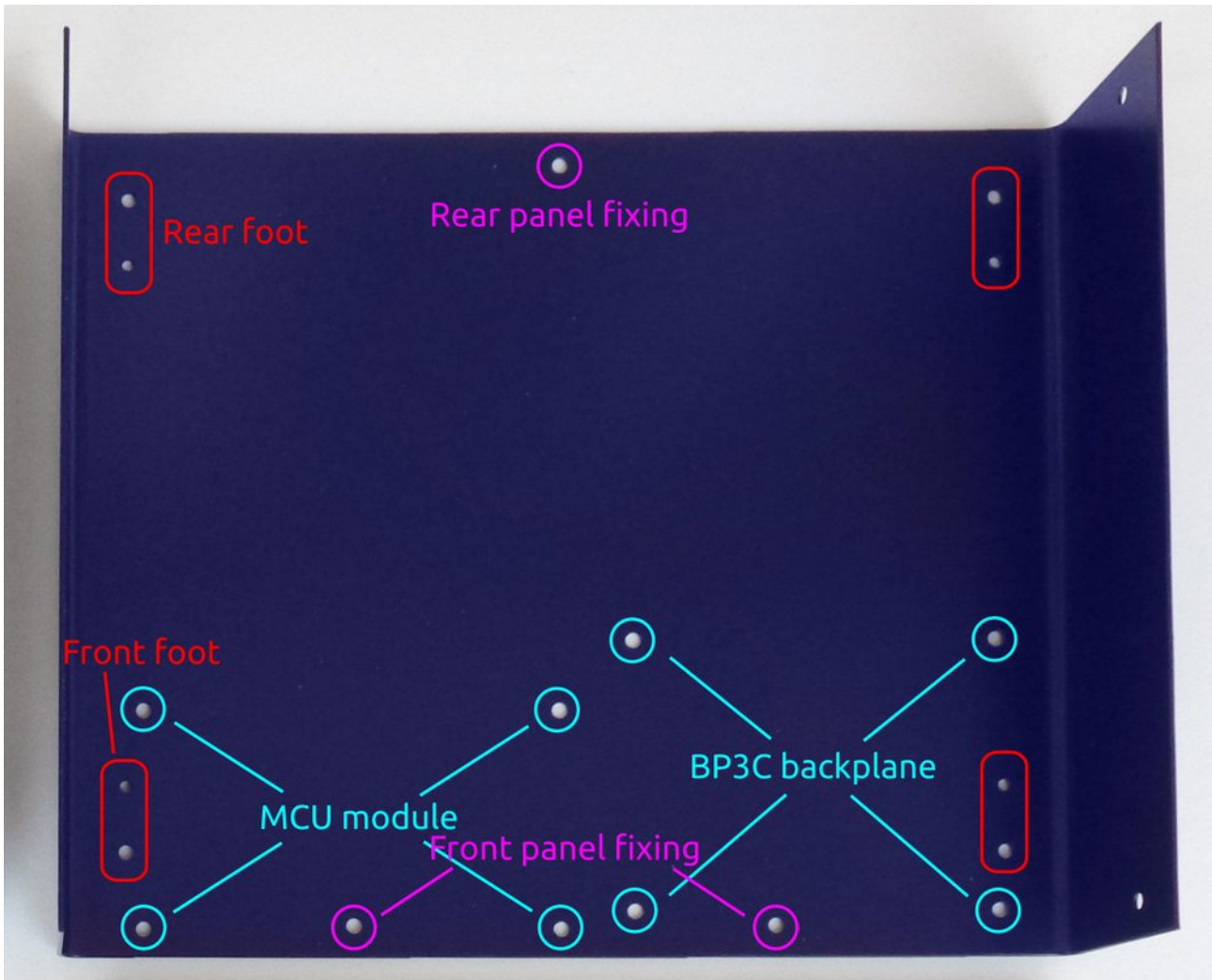


Fig. 4: Enclosure bottom plate

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

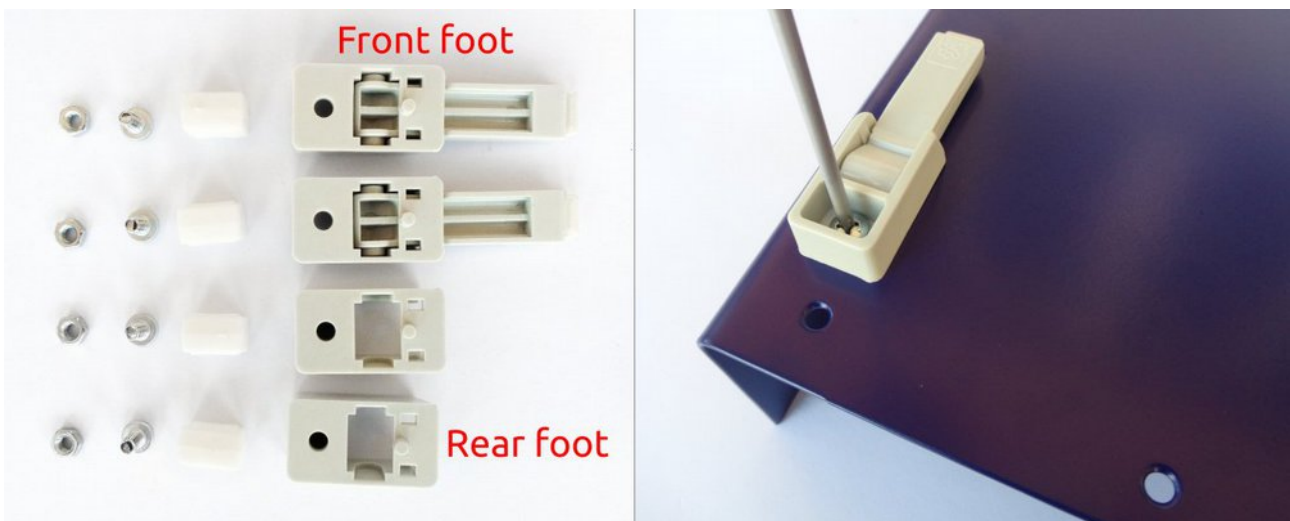


Fig. 5: Feet parts and front foot mounting



Fig. 6: Front foot mounting completed

*Rubber inserts inserted to different depths may cause the bottom plate not to be leveled. If you wish to correct the leveling now, 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 the recommended method because it is less likely to cause the bottom plate to deform during the leveling process.*

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

Remove the MCU module from the package. Since it comes with a battery installed, take care to avoid short circuits from placing it on a conductive surface. Fig. 7 shows the parts (referenced by the labels in Fig. 3) required for mounting this module.

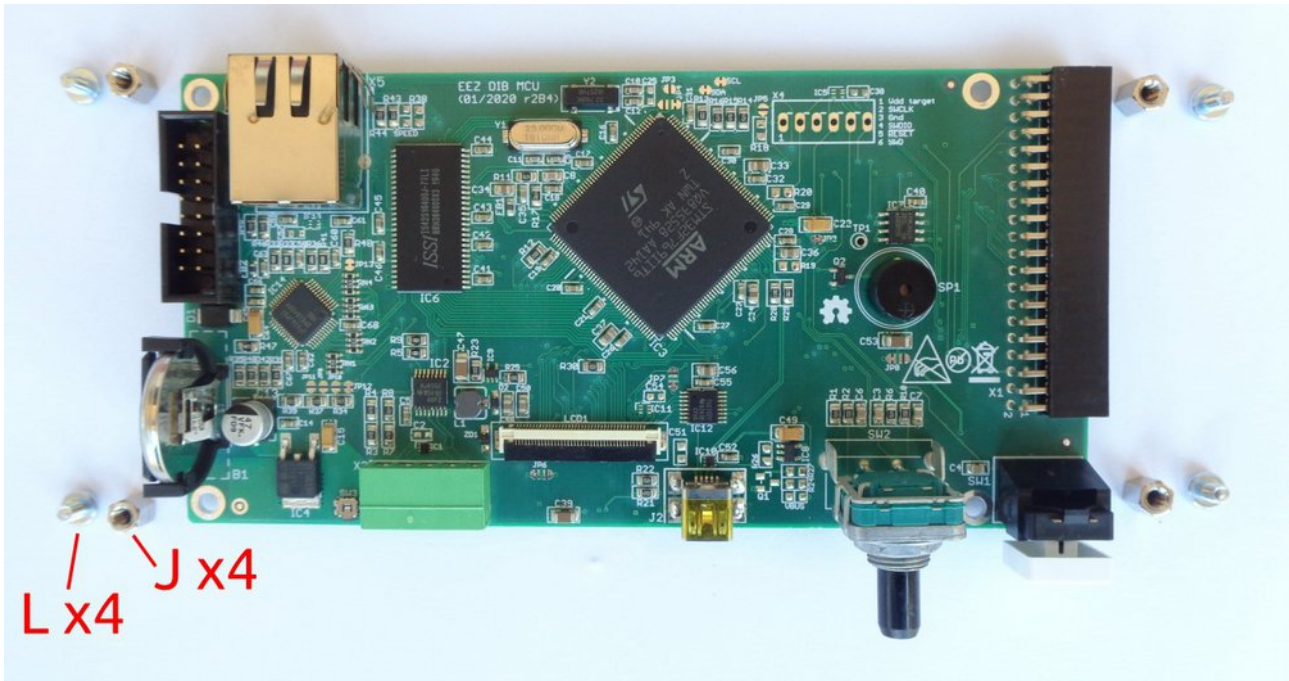


Fig. 7: MCU module with mounting parts

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

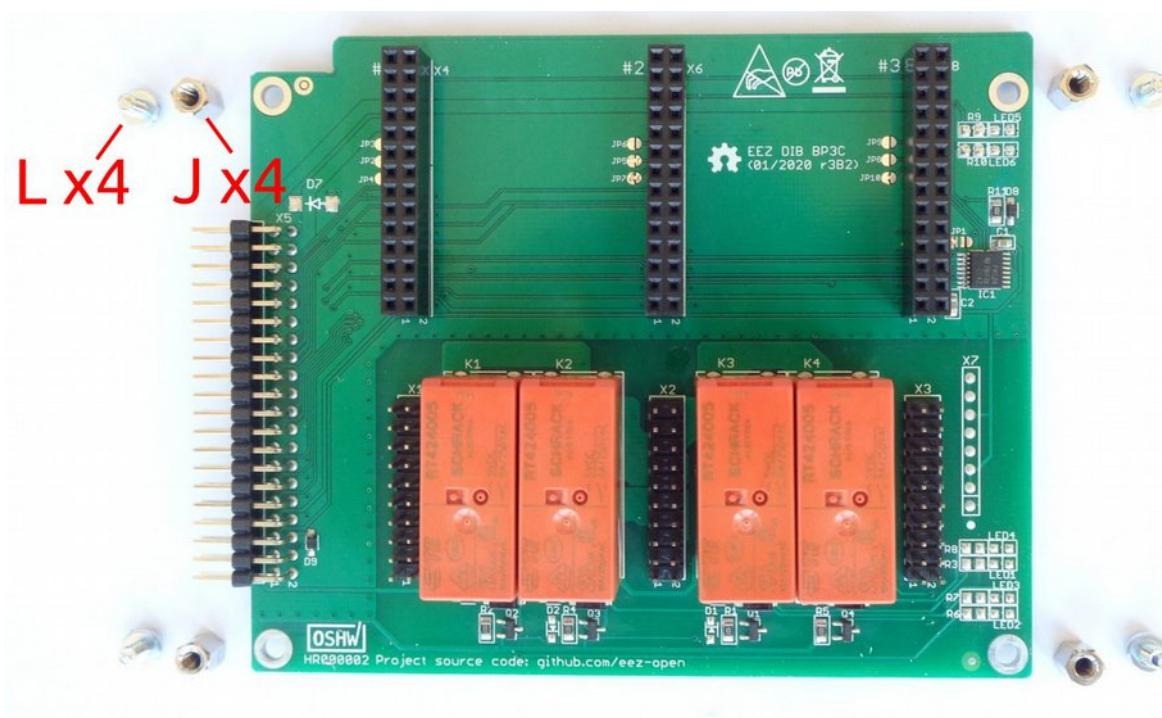


Fig. 8: BP3C backplane with mounting parts

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, so it requires extra care.

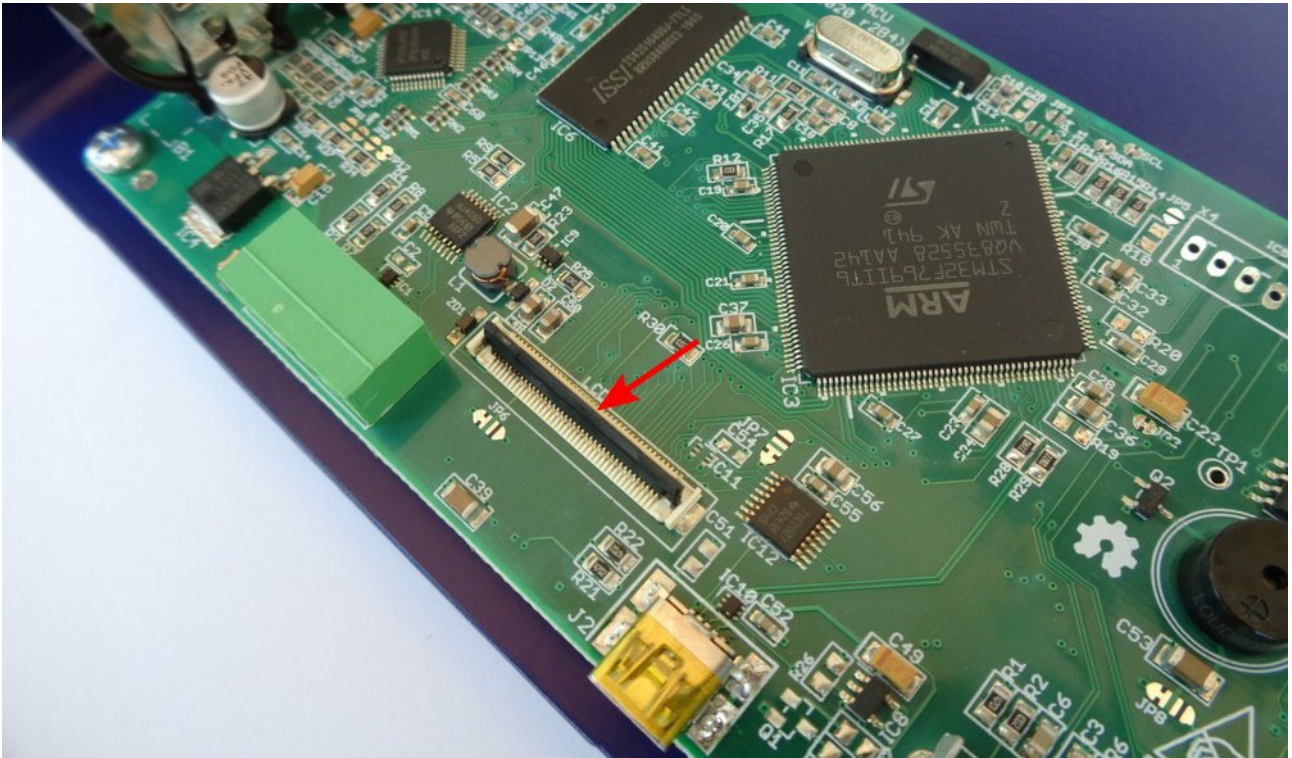


Fig. 9: 40-pin FFC display connector

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 (FFC) to enter smoothly.

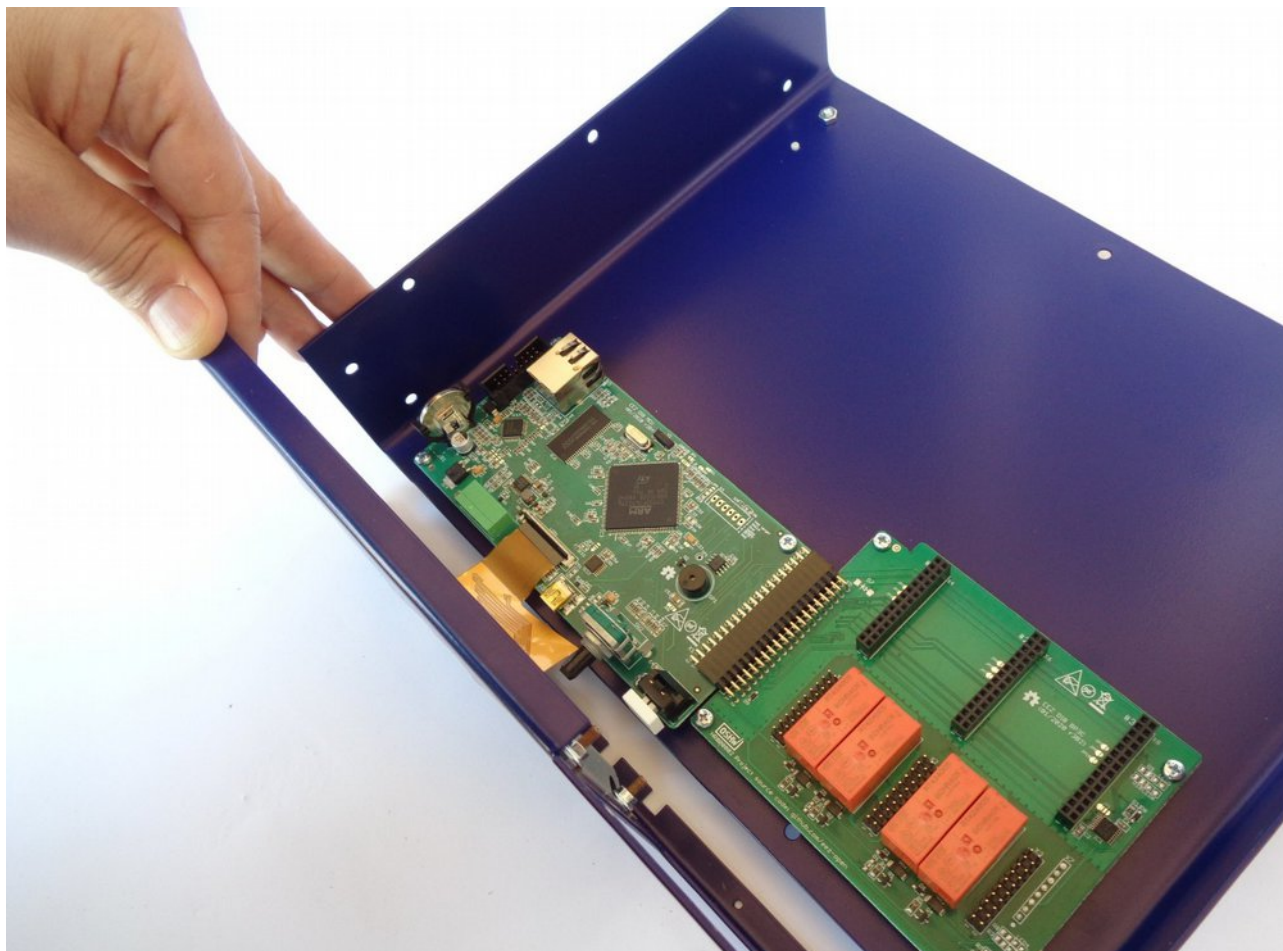
*Do not power on the MCU module without the display connected or with a loosely connected flexible display cable. Doing so may damage the power supply of the display backlight located on the MCU module.*

## 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 to fix 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); that it is not pinched and that it can be depressed.

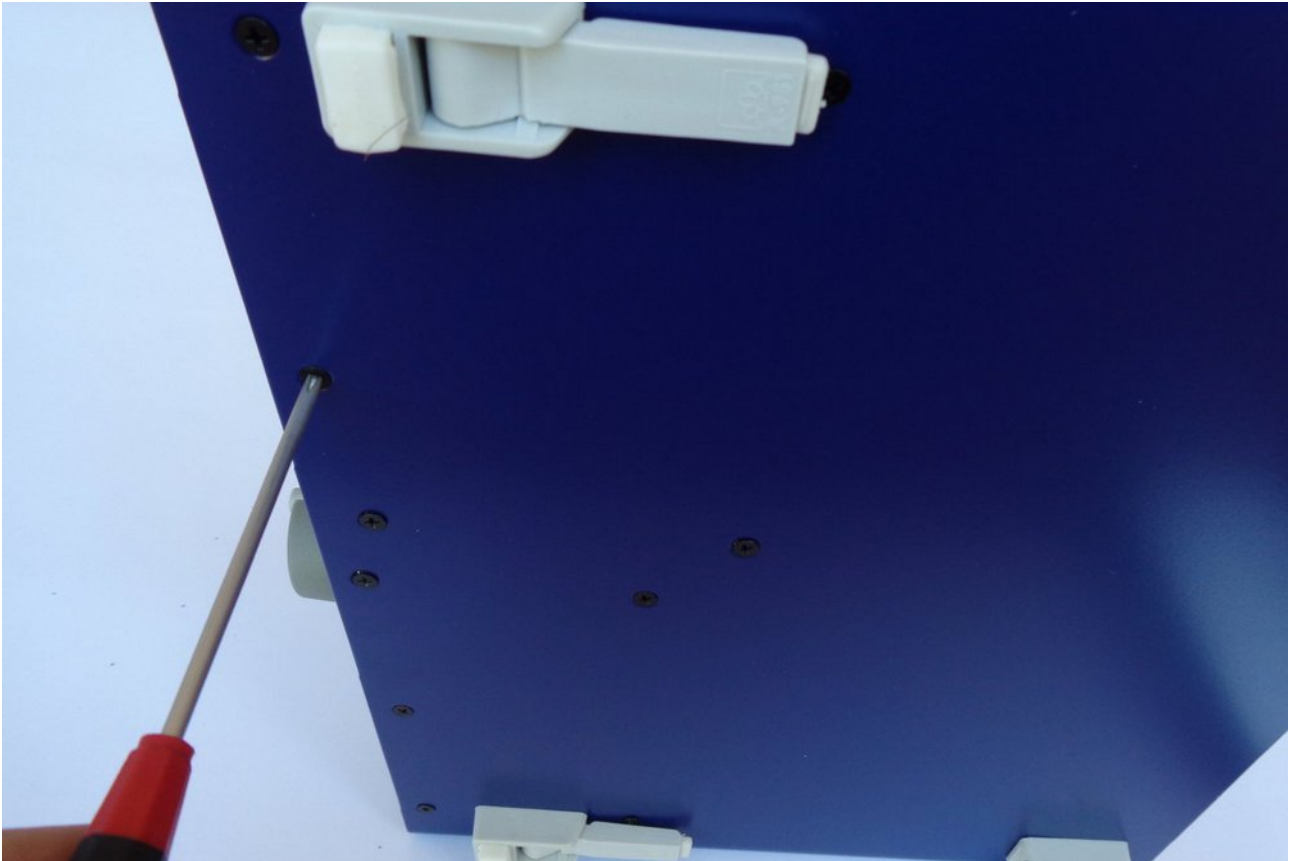


Fig. 12: Checking that the encoder shaft and user switch are in place

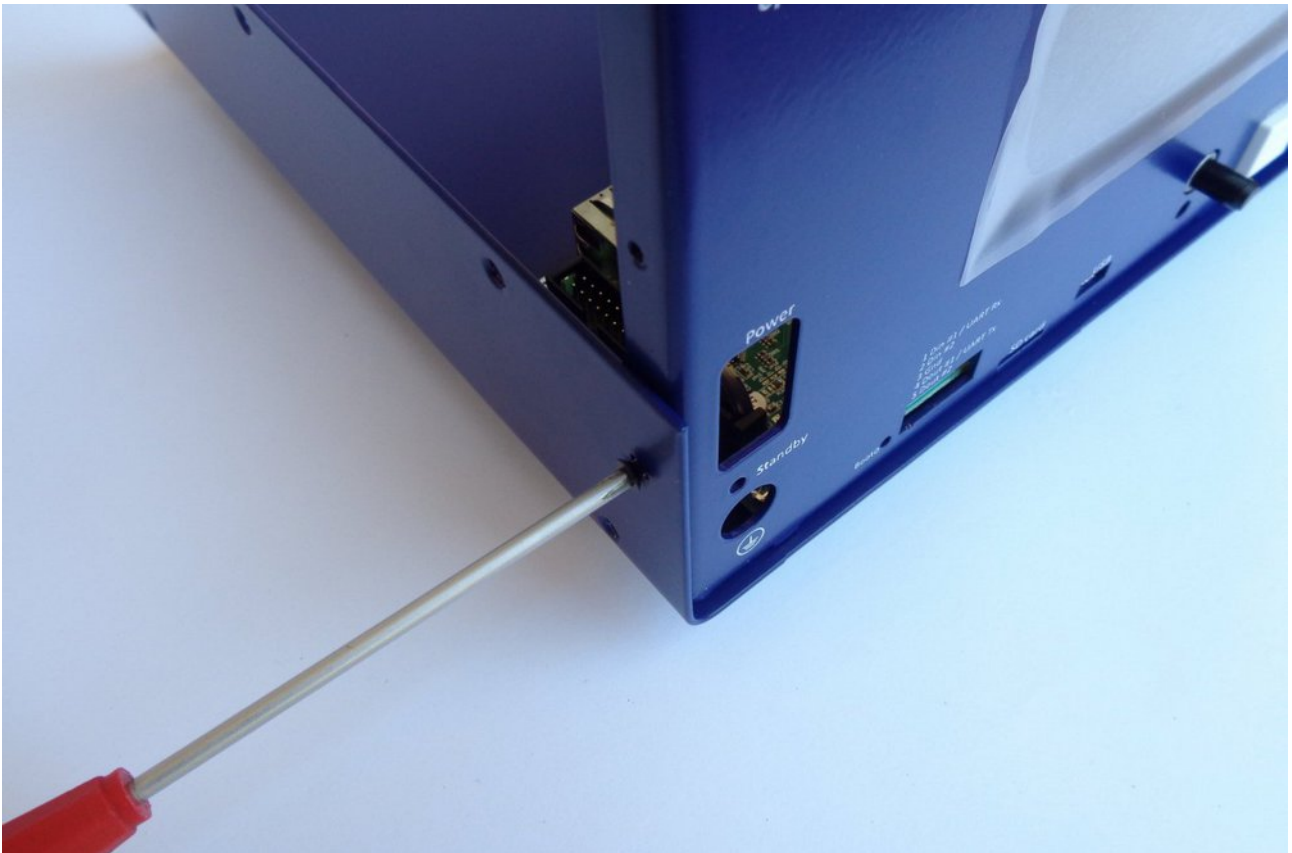


Fig. 13: Checking that the user switch works (that it is not pinched)





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



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

Fix the front panel to the bottom plate (Fig. 14) with two M3 screws (item M, Fig. 3.) 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, Fig. 3.) as shown in Fig. 15. Check again that the user switch is work-

ing and then tighten the 8 screws that hold the MCU and BP3C to the bottom plate.

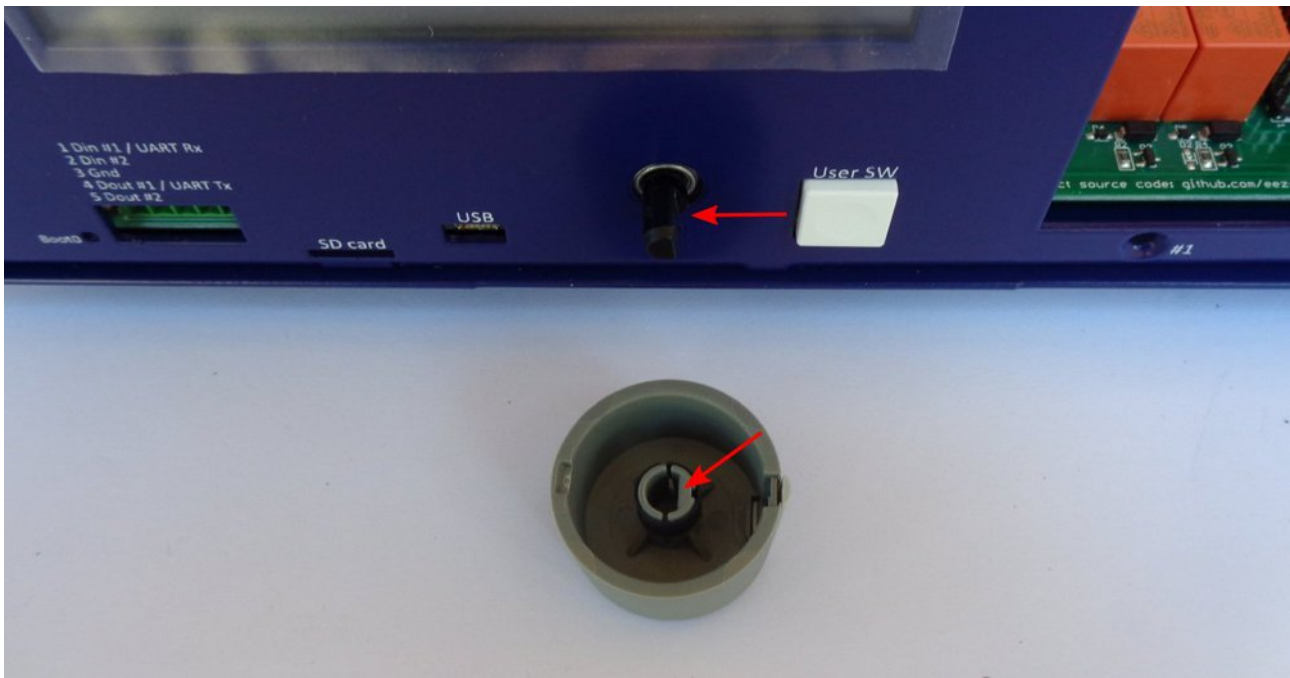


Fig. 16: Encoder knob before mounting

The encoder knob now can be mounted. Be sure to align the flat on the encoder shaft with the flat in the encoder knob recess when mounting 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) in the five holes of the module.

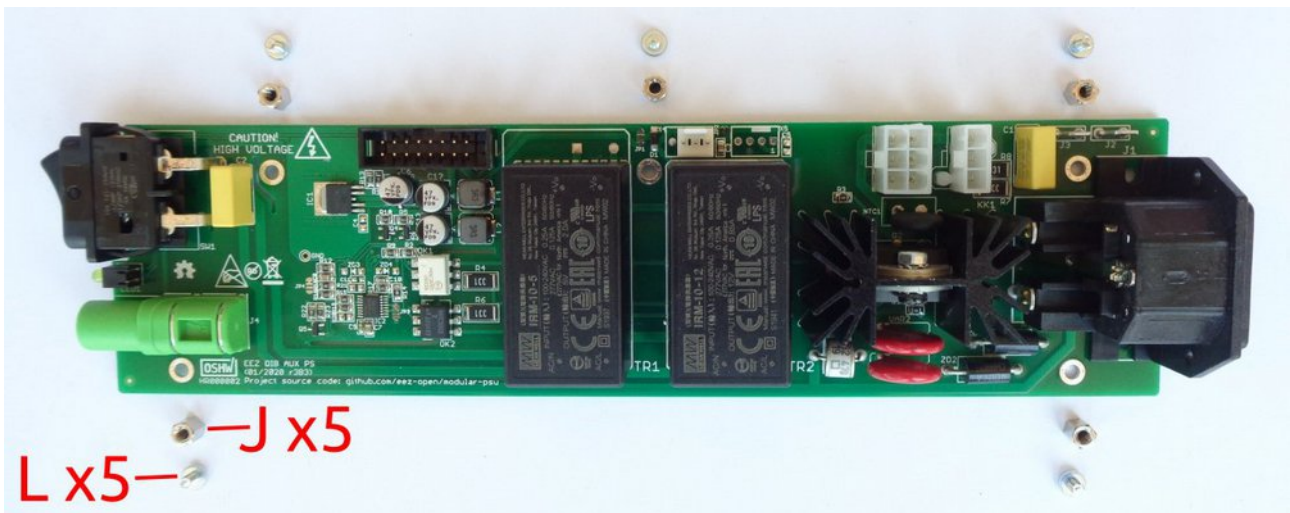
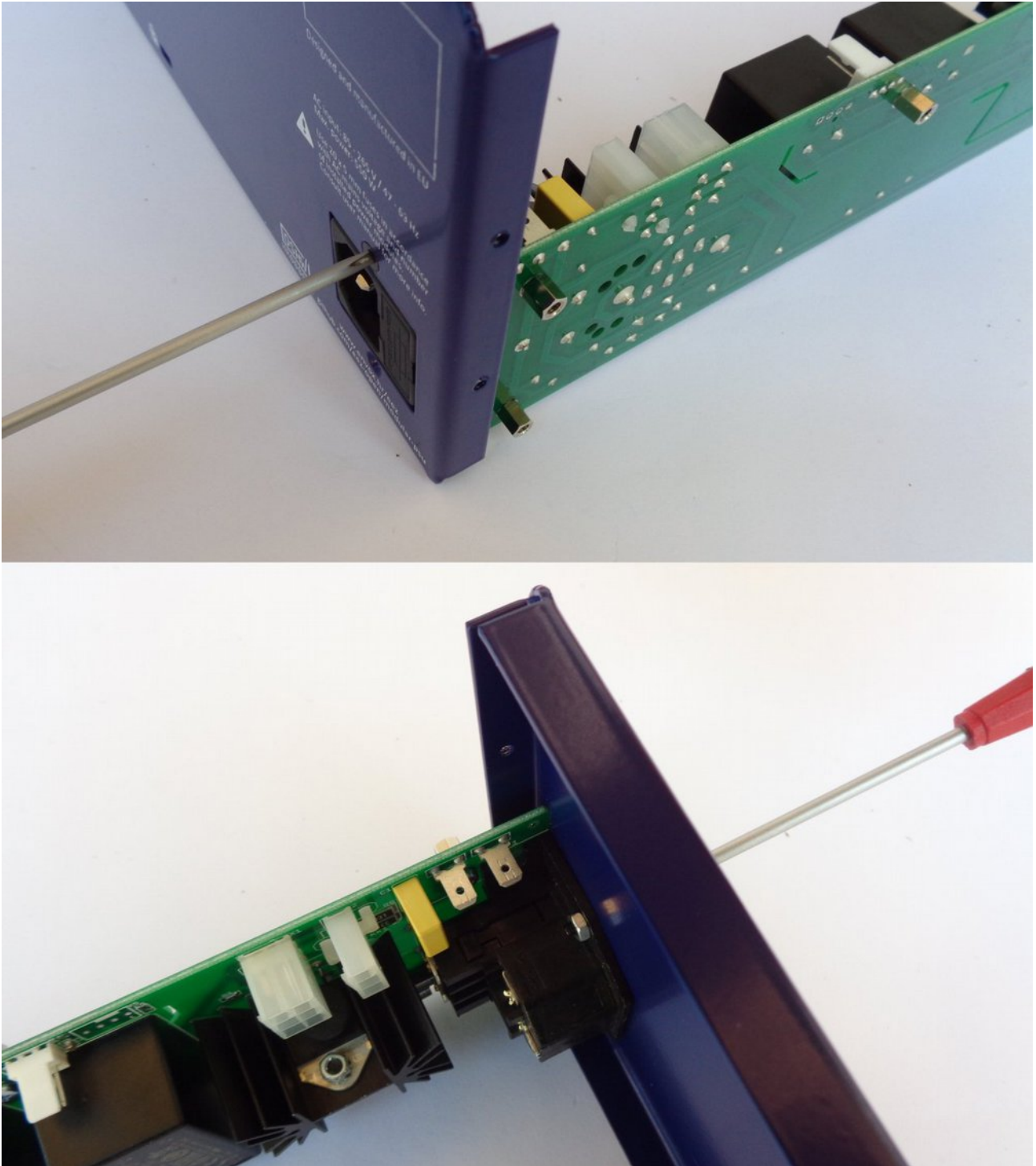


Fig. 17: AUX-PS module with mounting parts

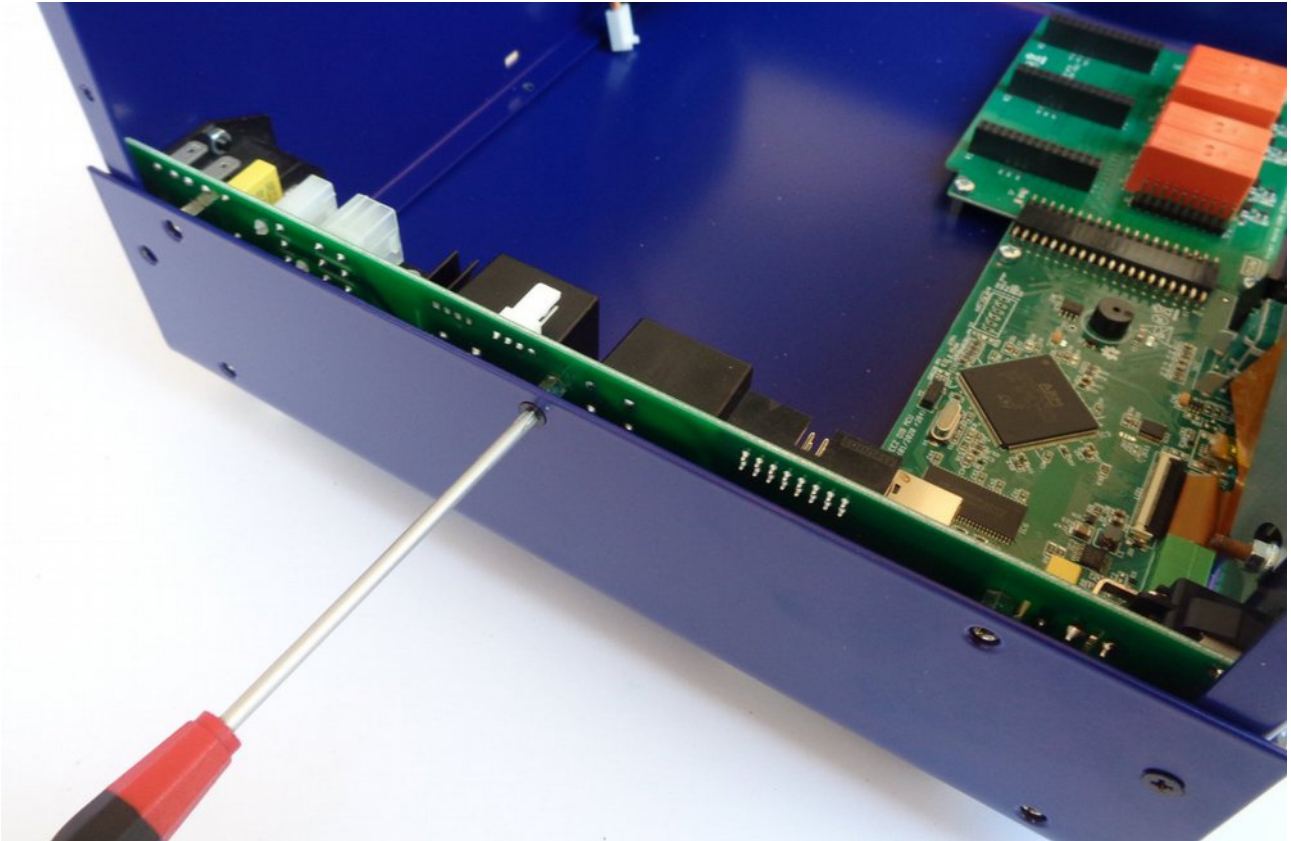
The AUX-PS module should be attached to the rear panel with two screws and nuts (contents of bag K in Fig. 3). It is best to do this before the AUX-PS is mounted on the bottom plate so that the nuts are easier to access during mounting (Fig. 18).



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

Continue to install the AUX-PS module by carefully inserting it from the back, making sure that the standby LED and power switch locate in their holes in the front panel. When the AUX-PS module is inserted, secure it with 5 screws (item M, Fig. 3.) to 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. 3).



*Fig. 20: Rear panel mounting*

The Ethernet connection will require a patch cable (item A, Fig. 3) and two screws (item M, Fig. 3) as shown in Fig. 21.

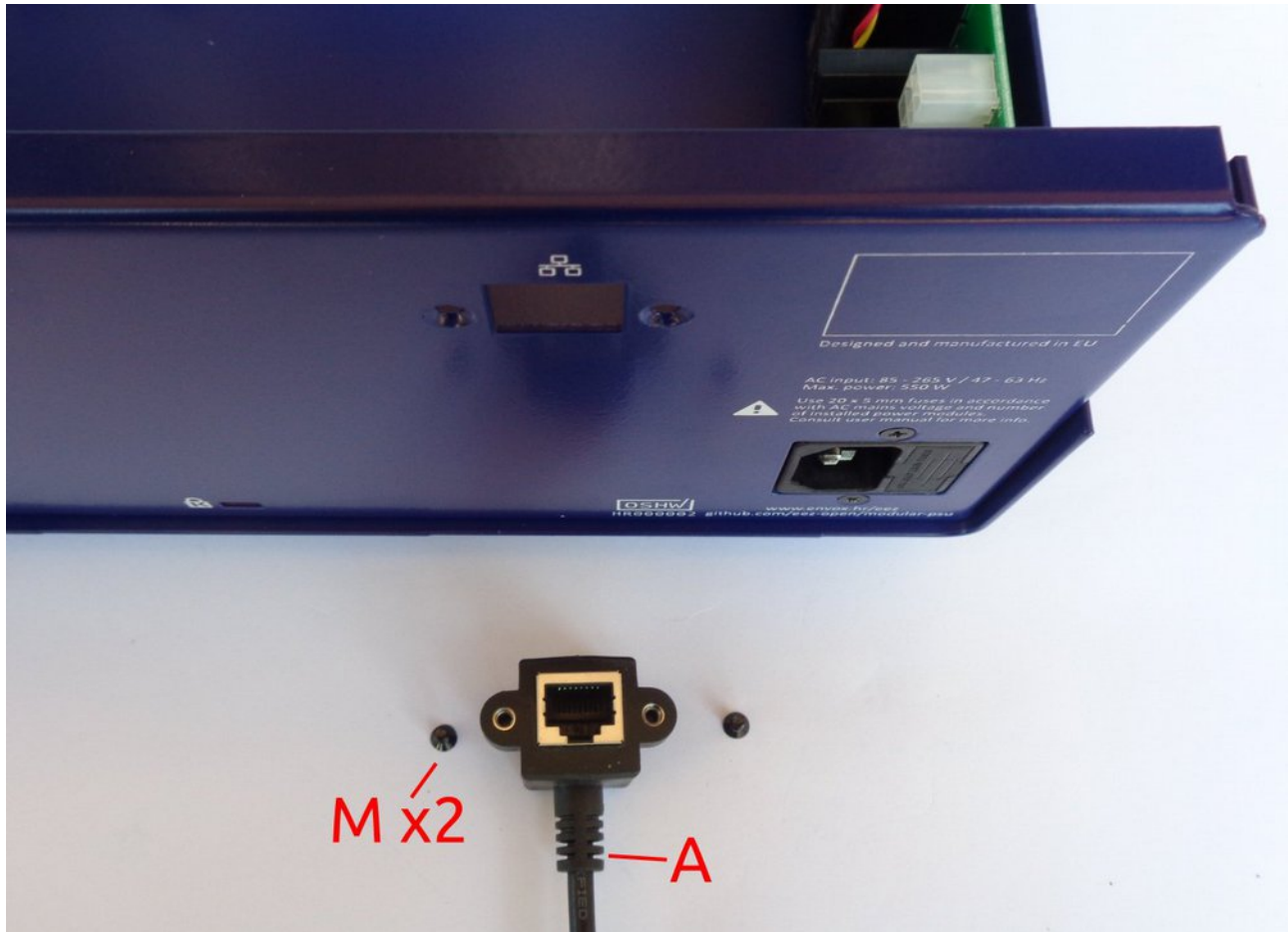


Fig. 21: Ethernet connection mounting parts

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



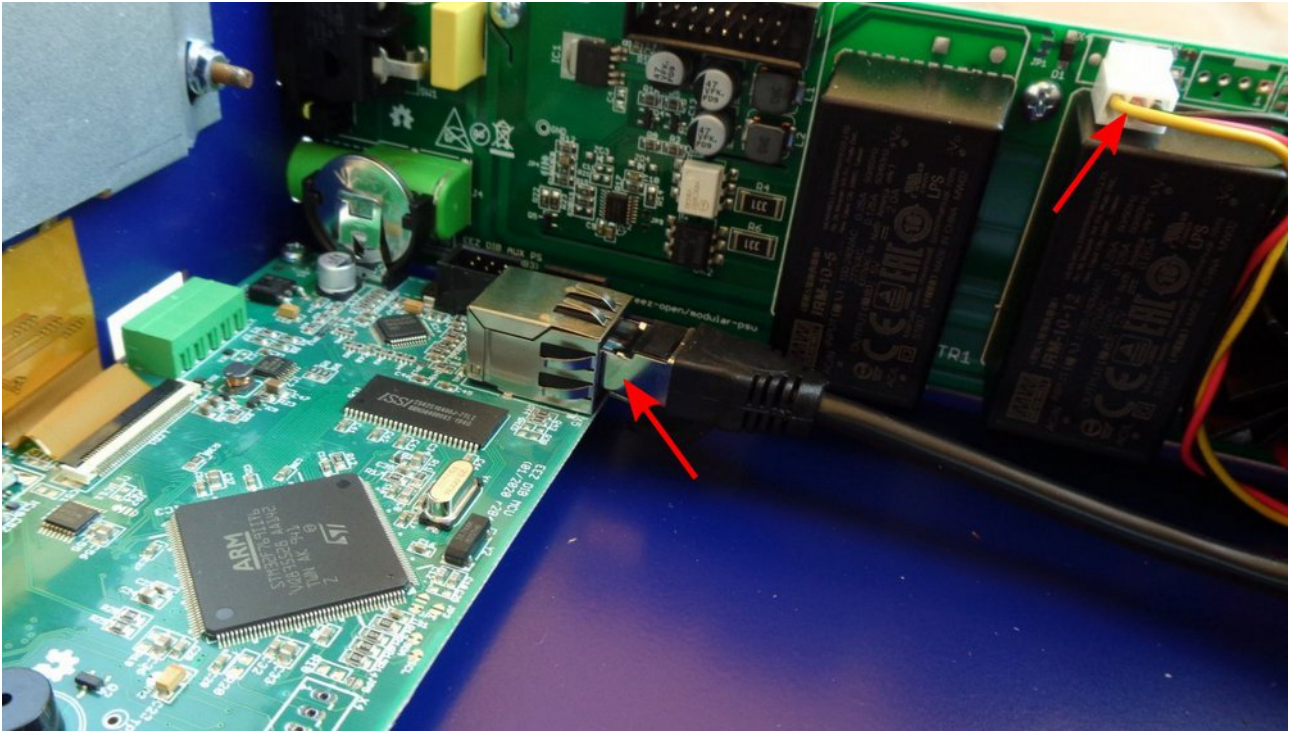


Fig. 22: Connecting Ethernet and cooling fan cables

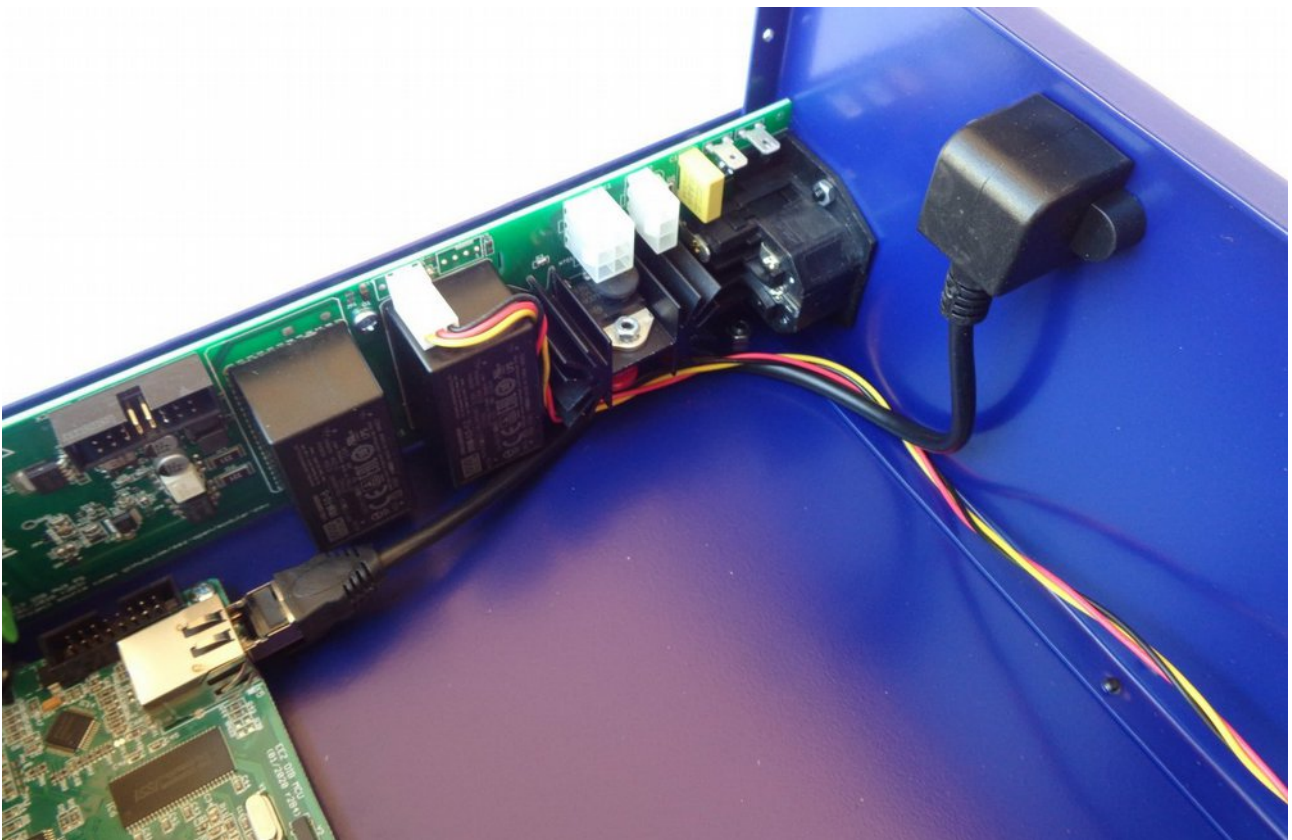


Fig. 23: Mounted Ethernet patch cable

Finally, connect the AUX-PS and MCU module with a 16-pin IDC flat cable (item F, Fig. 3) as shown in Fig. 24.



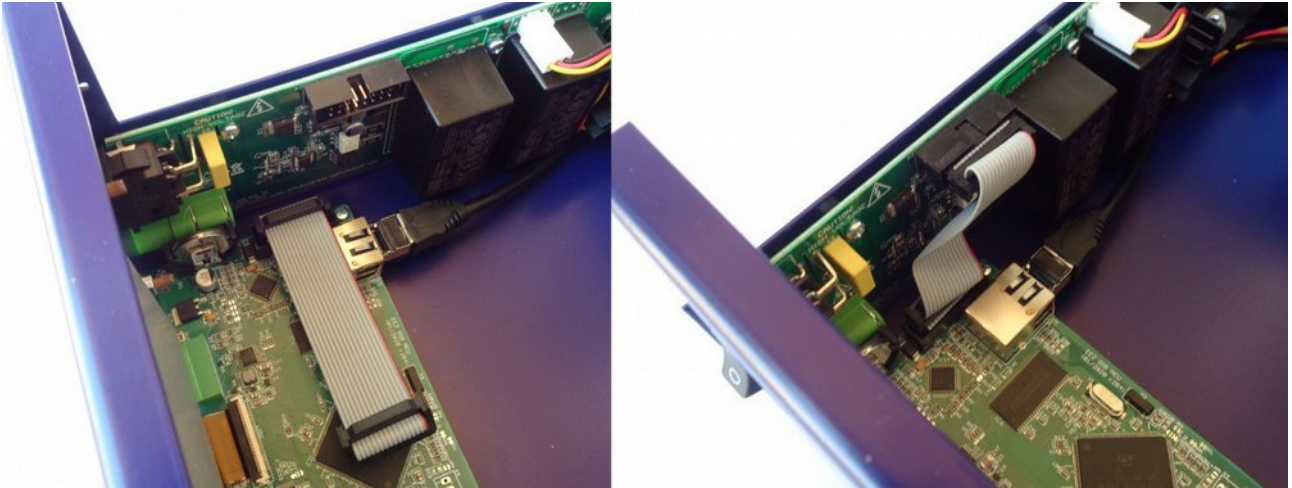


Fig. 24: 16-pin IDC cable mounting

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



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

The MCU module comes with the firmware installed. It is now possible to do a trial power-up. Connect the power cord used in your country (not included in 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, carefully remove it from the package and insert it as shown in Fig. 26 with the pins facing up.






Fig. 26: Inserting micro SD card

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

The 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 the Mean Well converter that is closer to the AUX-PS module as shown in Fig. 29.

First, carefully connect the cables as shown in Fig. 28 taking note of the wire colors. When the cables are connected, the terminal covers (item N, Fig. 3) can be mounted.

	<b>AC Line</b>
	<b>AC Neutral</b>
	<b>Protective Earth (PE)</b>
	<b>Vout-</b>
	<b>Vout+</b>



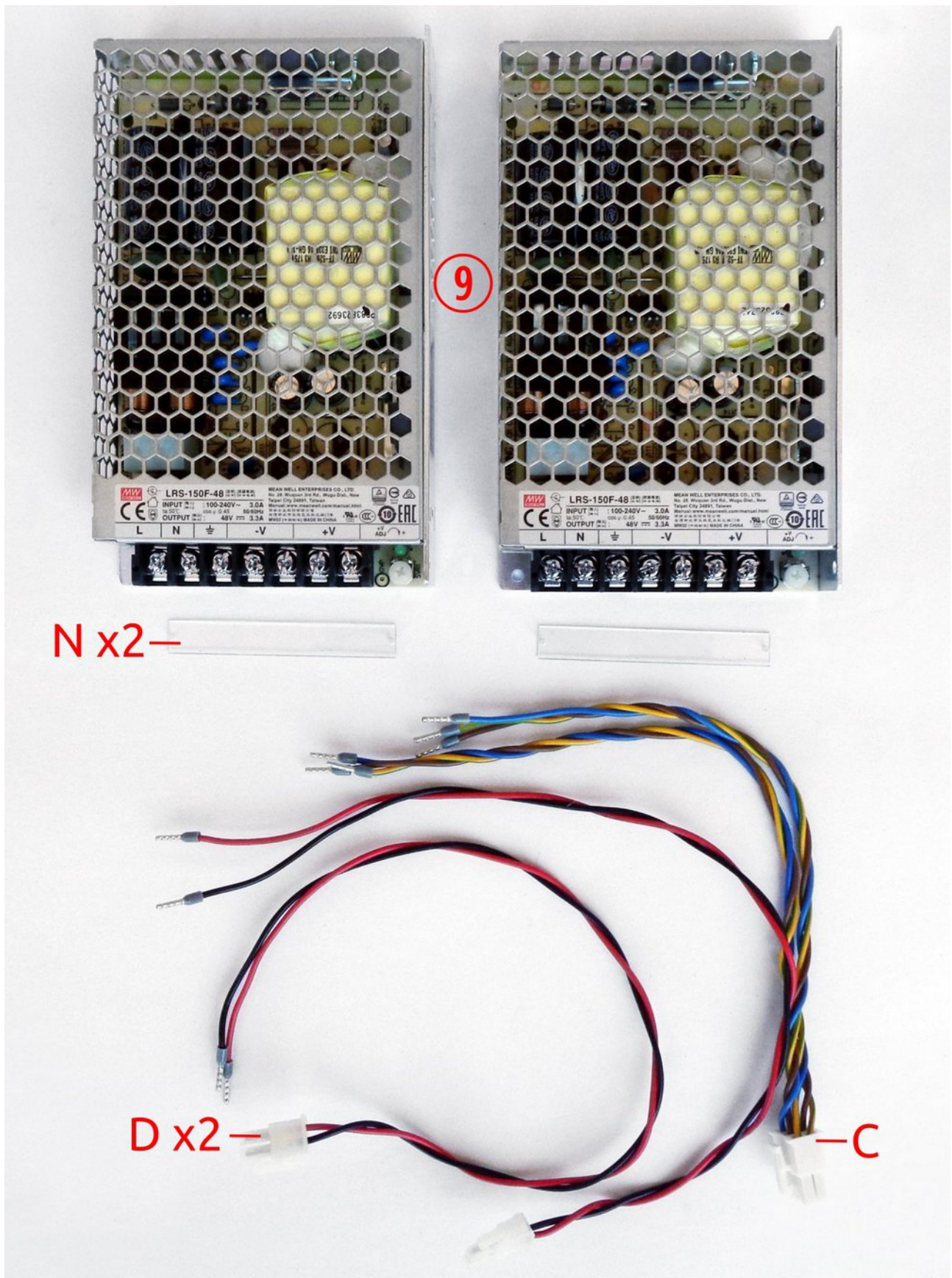


Fig. 27: Mean Well AC/DC converters and related wiring



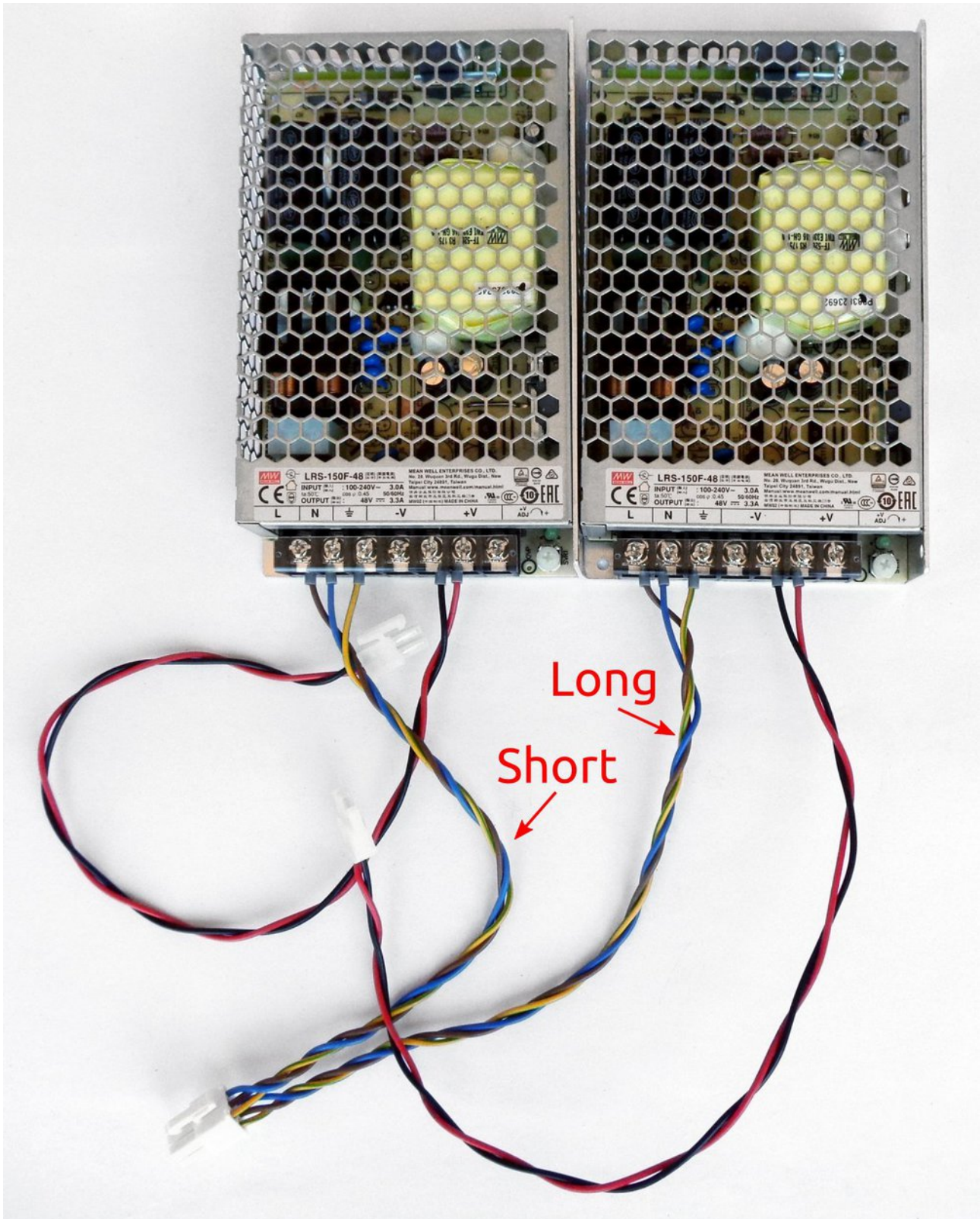
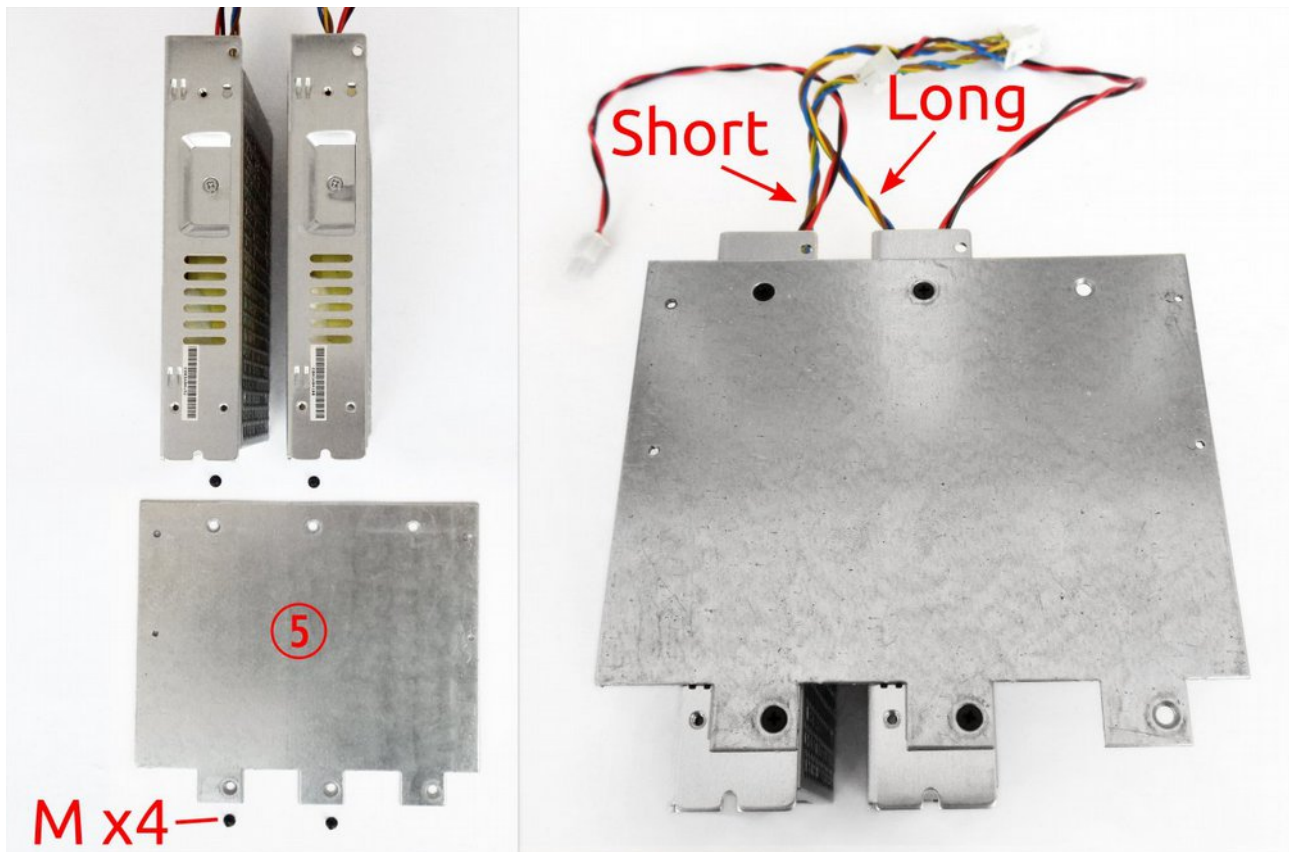


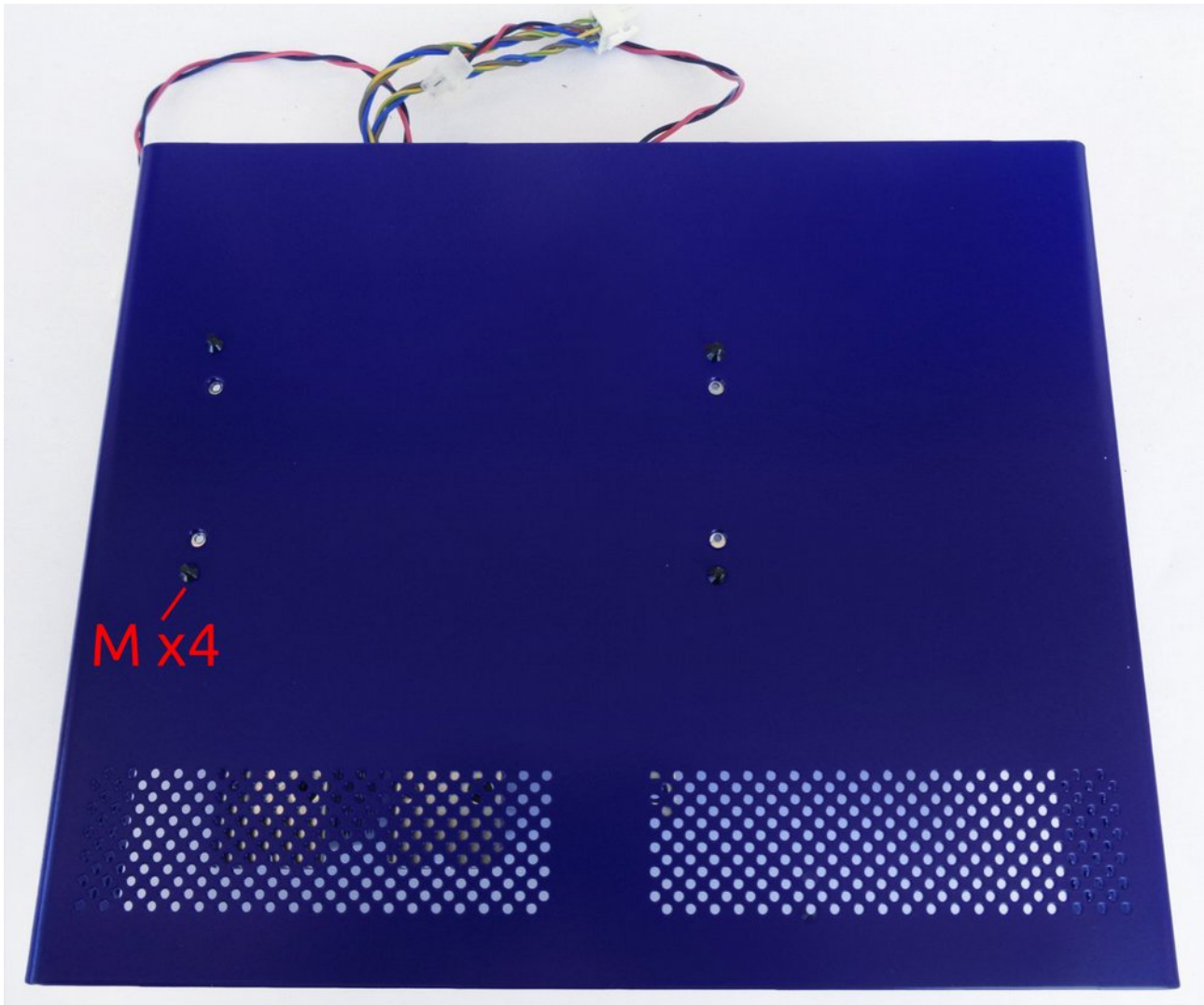
Fig. 28: Mean Well AC/DC converters with installed terminal covers and cables

The Mean Well converters are mounted on the top cover. The mounting frame (item 5) is used for this. Each converter is attached to the mounting frame with two screws (item M, Fig. 3) 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*

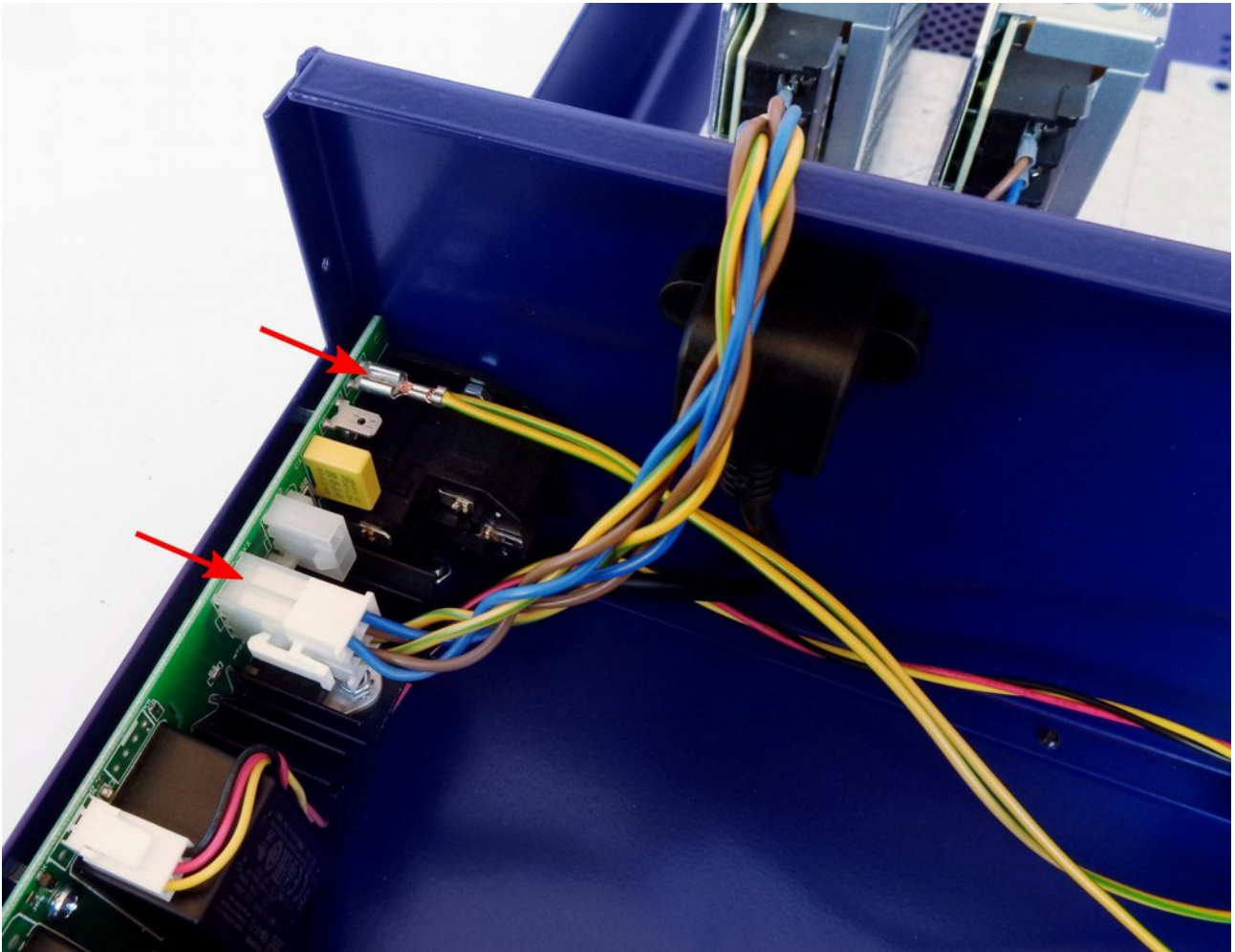
When the converters are attached to the mounting frame, the top cover should be placed over them as shown in Fig. 30. Secure it with four screws (item M, Fig. 3).



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

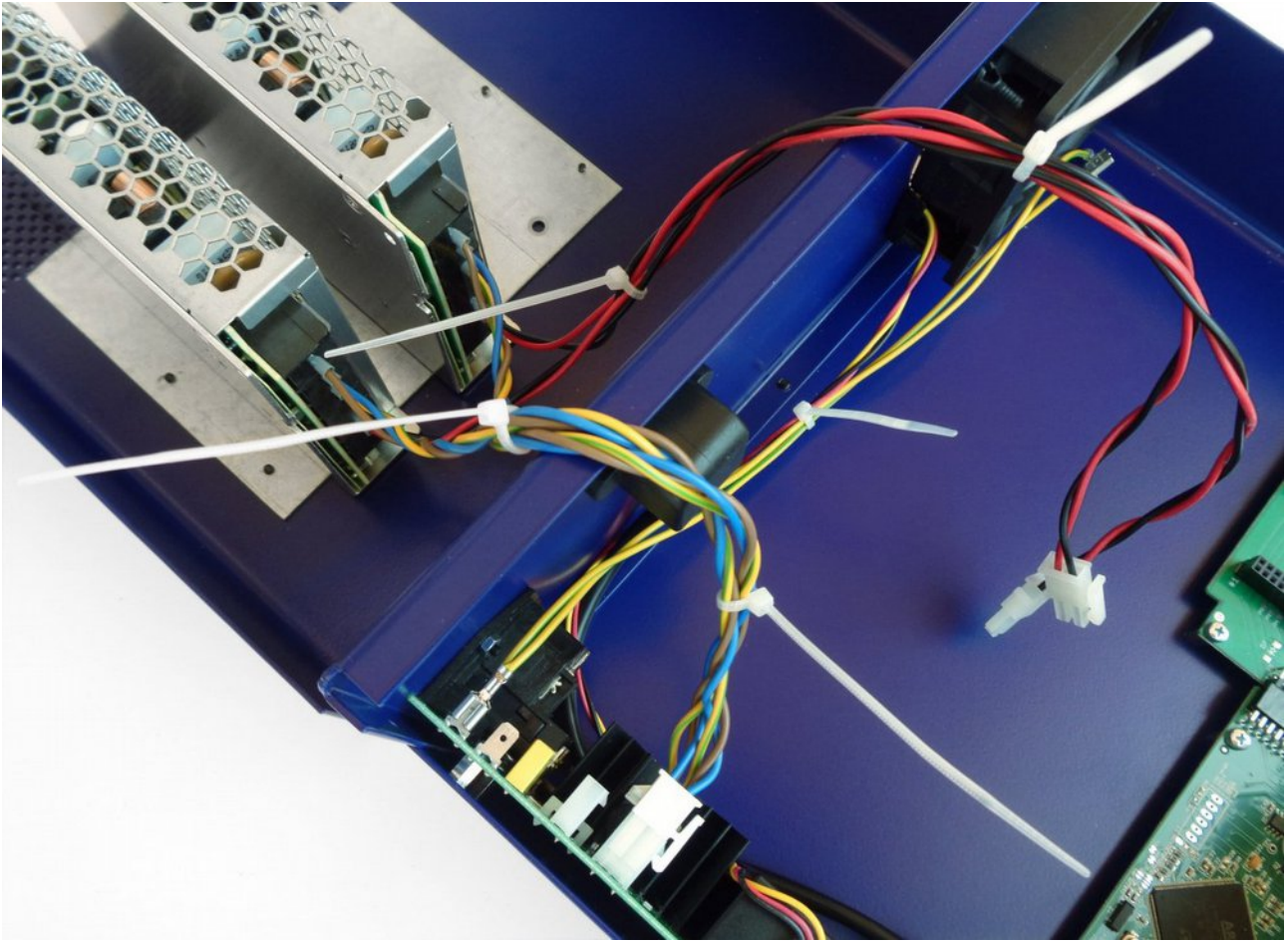
Place the top cover with the mounted converters behind the rear panel and plug the AC power connector into the AUX-PS module as shown in Fig. 31. You can now also attach the PE cable to the corresponding connector (item B, Fig. 3).





*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, four screws will be required (two for each module). Unless you have also purchased a third module, the blind front panel (item E, Fig. 3) 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, Fig. 3) coming out of the Mean Well converter and the PE cable (item B, Fig. 3) connected to the AUX-PS module as shown in Fig. 34.

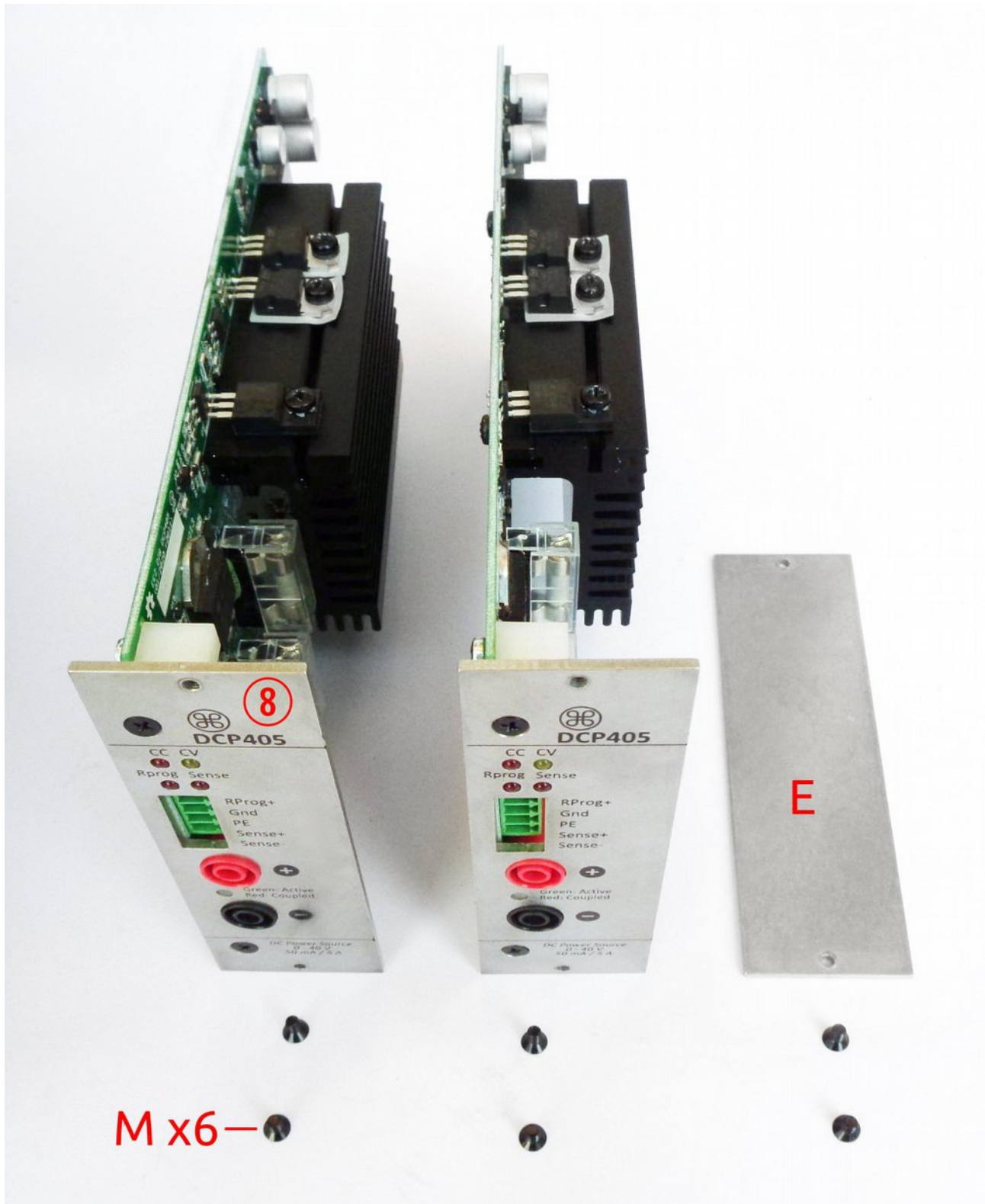
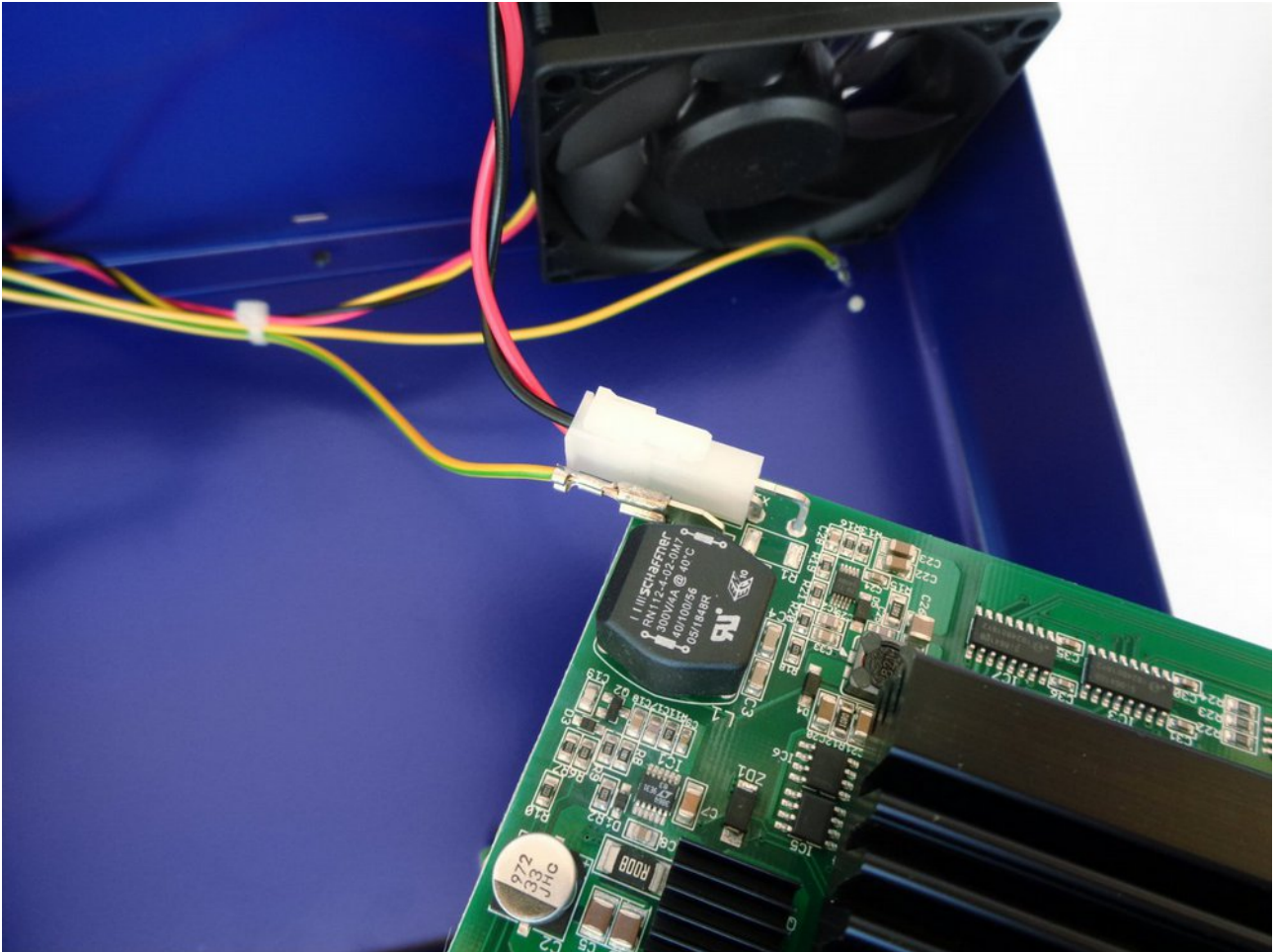


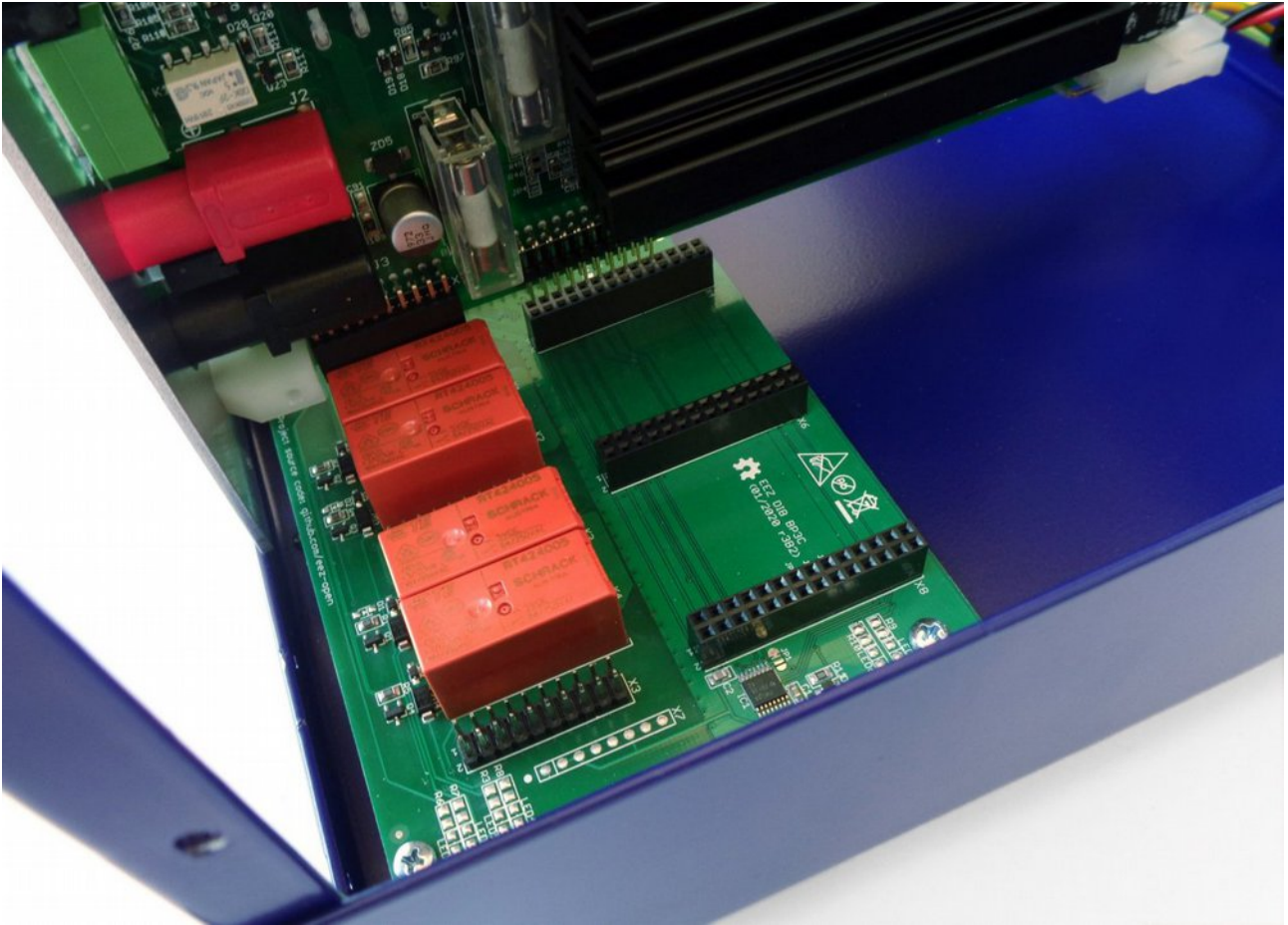
Fig. 33: Power modules mounting parts





*Fig. 34: Power module input connections*

After connecting the power and the PE cable, insert 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 in the lower hole, and then a second screw 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).

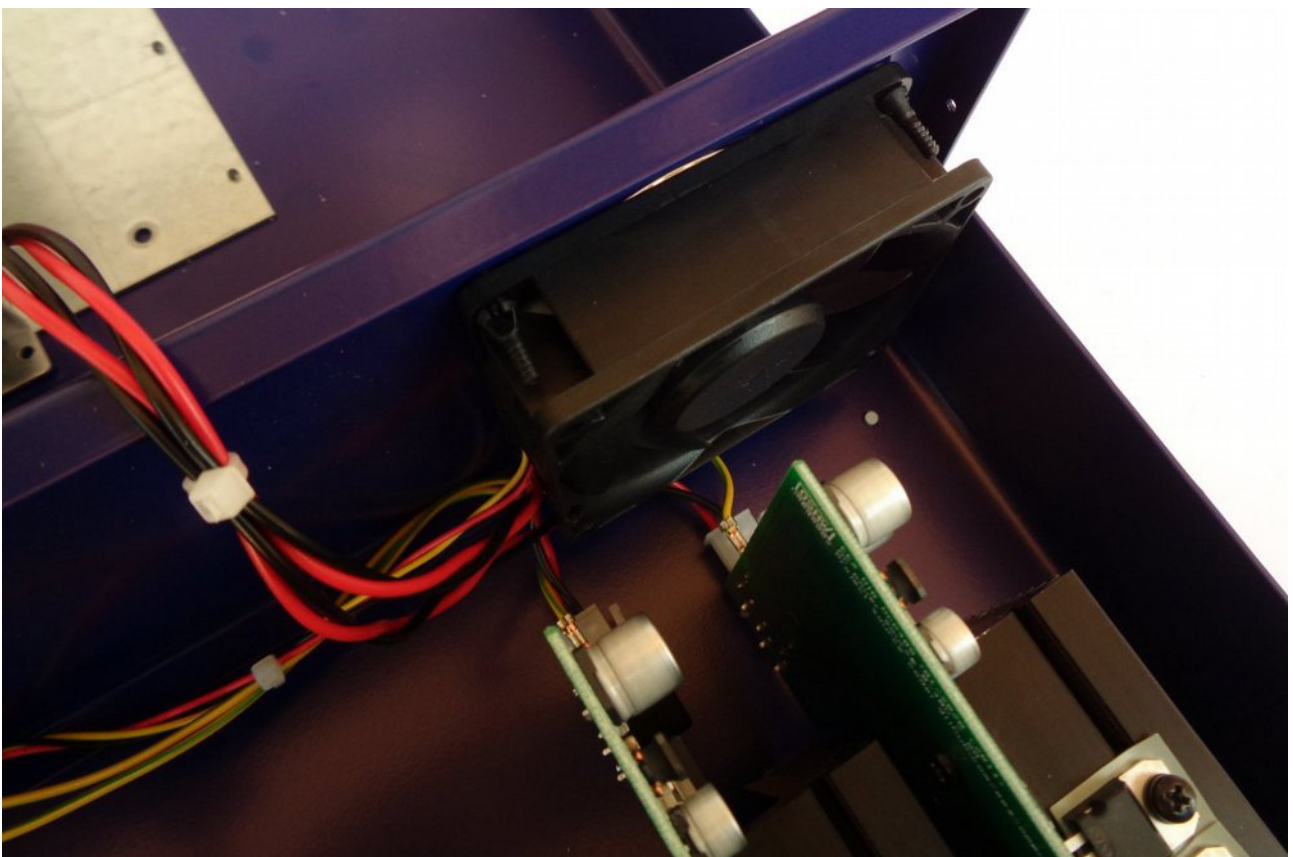


Fig. 37: Power module wiring check



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, Fig. 3): first to the rear panel and then to 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.

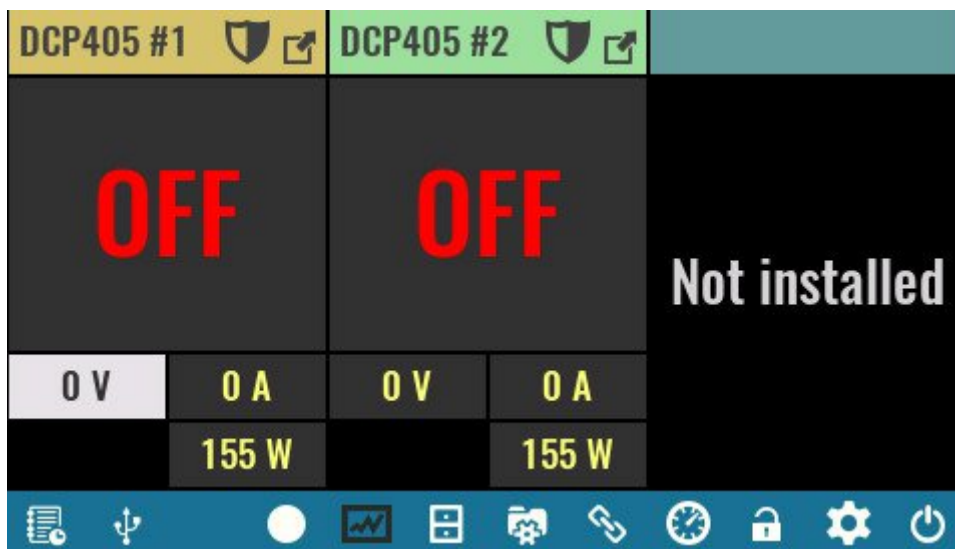


Fig. 39: Home page with two power modules initiated

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 most recent 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 a \*IDN? SCPI query. You can find information about the most recent released version on the [Firmware](#) page.