SOLAR KERBEROS

INSTALLATION MANUAL

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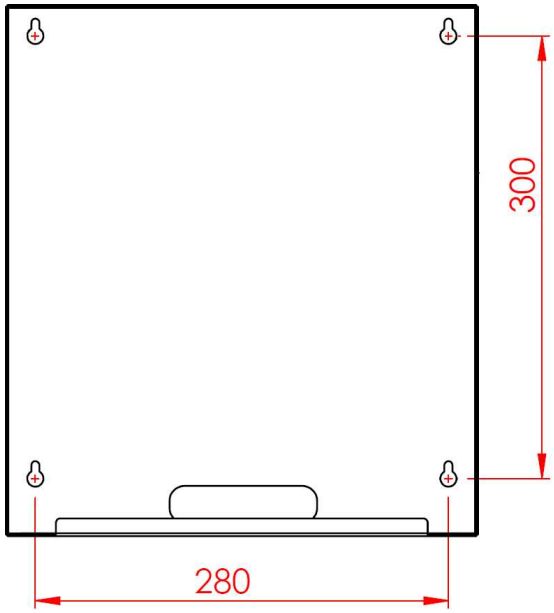
The current version of the manual can be found at : http://www.solar-kerberos.com

1. MOUNTING

When mounting SOLAR Kerberos it is necessary to respect working conditions in which it can operate, see the chapter on the Technical Parameters from the user manual.
It is also necessary to count with the sound of the converter, especially the cooling fan so that it would not disturb the user.

SOLAR KERBEROS



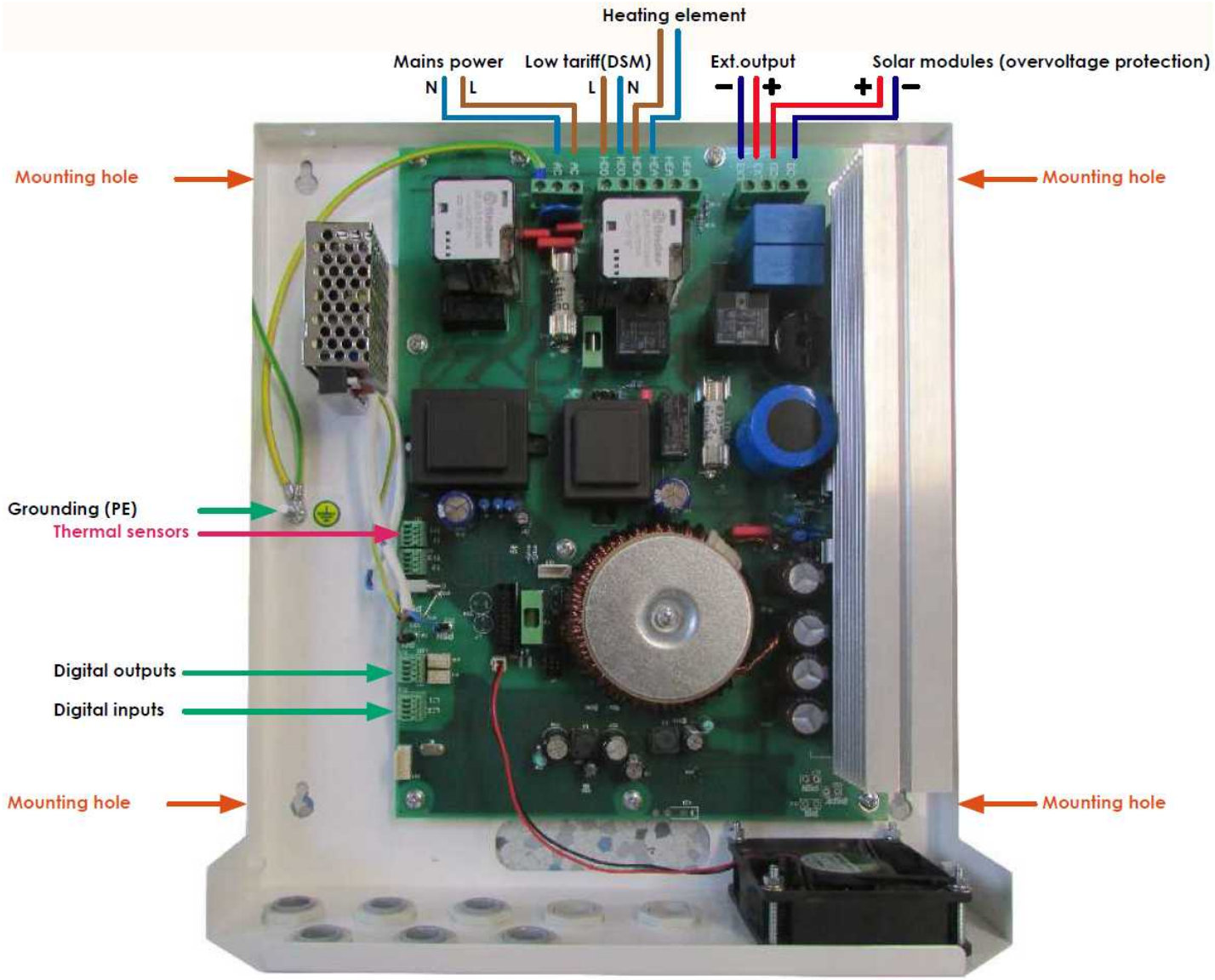
When you work around SOLAR KERBEROS (installation of ledges) cover KERBEROS with plastic packaging in which was delivered.

Drilling template manipulation description:
- attach drilling template to the spot on the wall where you would like to hang SOLAR KERBEROS
- mark the spots for drilling holes for screws according to the template
- drill the holes and insert screw anchors there
- screw the screws into anchors - not entirely, leave 1cm of the screws outside
- hang SOLAR KERBEROS on the screws
- carefully tighten the screws

WARNING allowed unevenness of the wall is ± 2 mm!

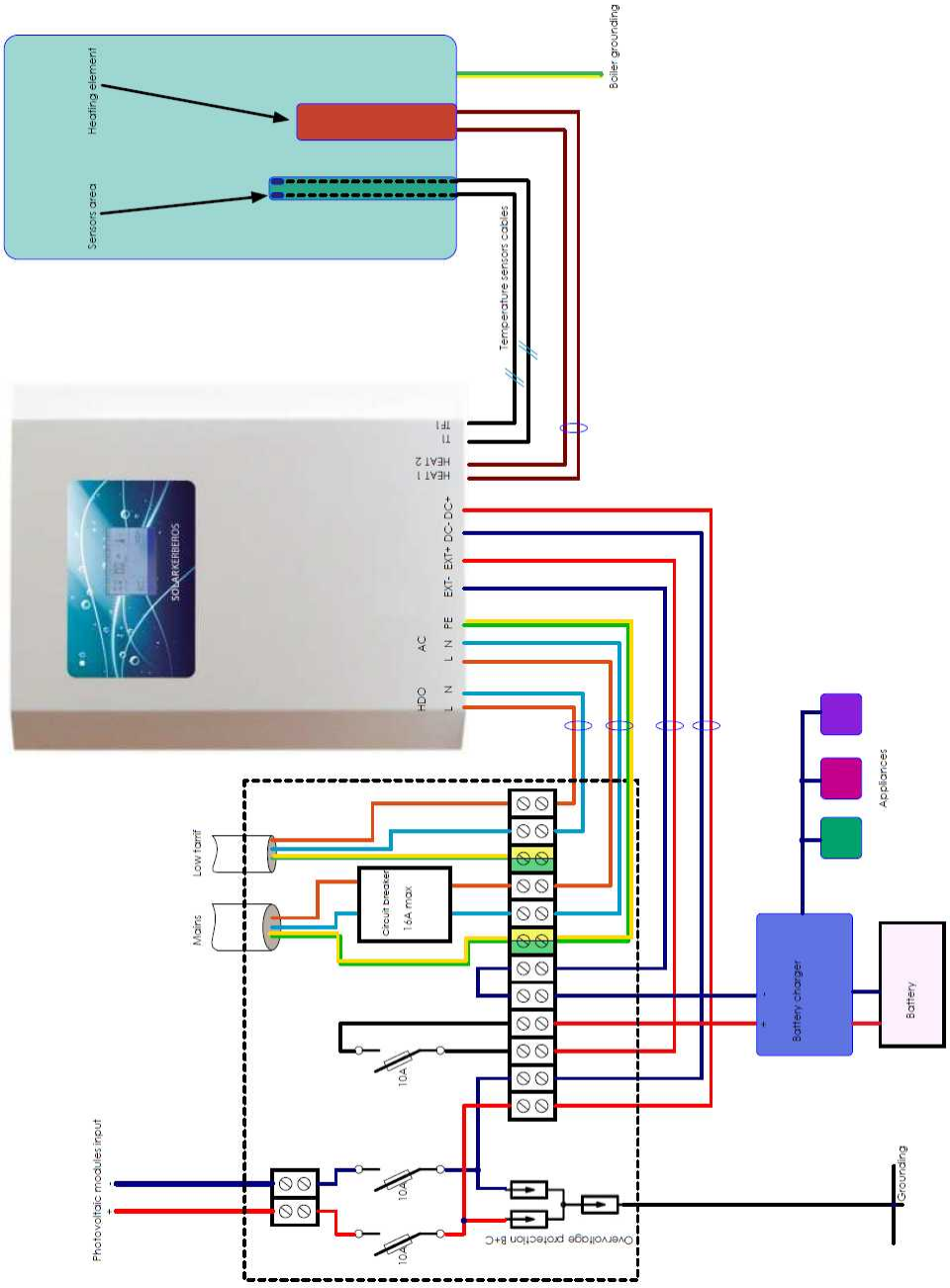
CAUTION Do not install in rooms with condensing humidity (see chapter Technical Parameters of the user manual)!

2. WIRING

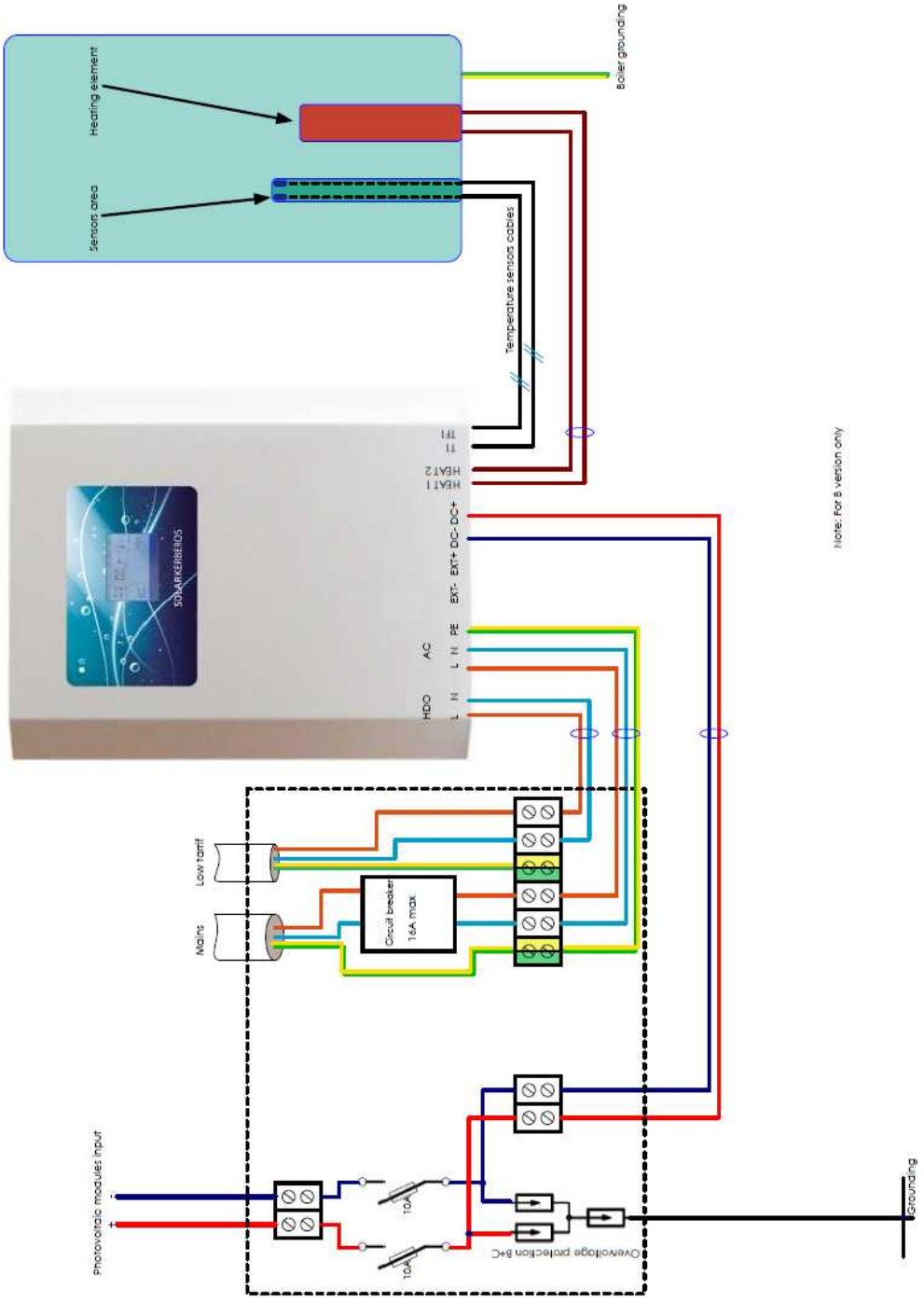


Installation should be performed by qualified personnel only (a specialized company) in compliance with all safety regulations

Version **315.C** connection example:

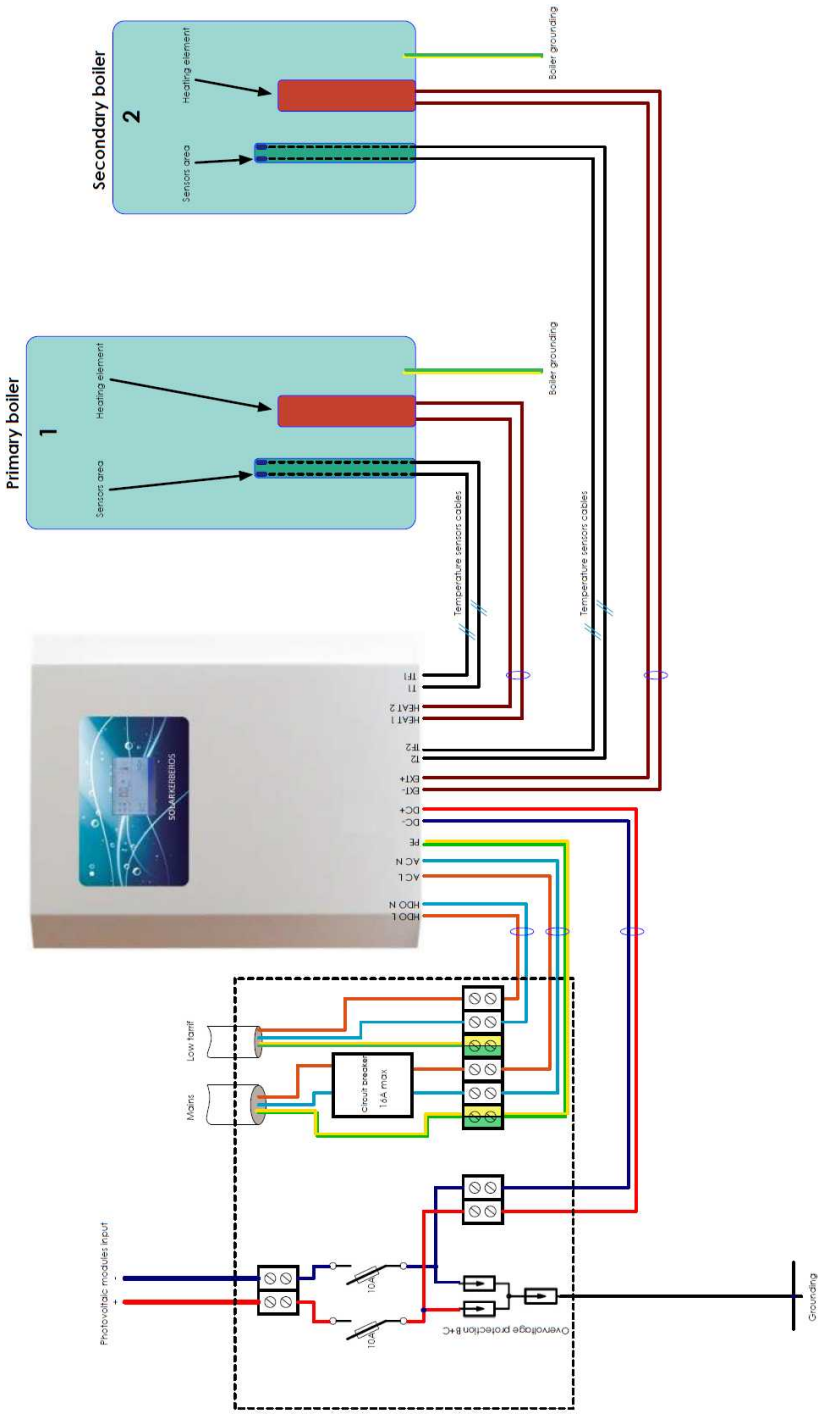


Version **315.B, 320.B** connection example:

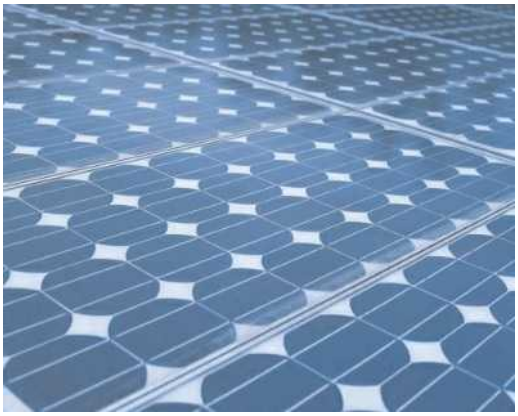


Version **315.H**, **320.H** connection example:

SOLAR KERBEROS



3. INSTALLATION

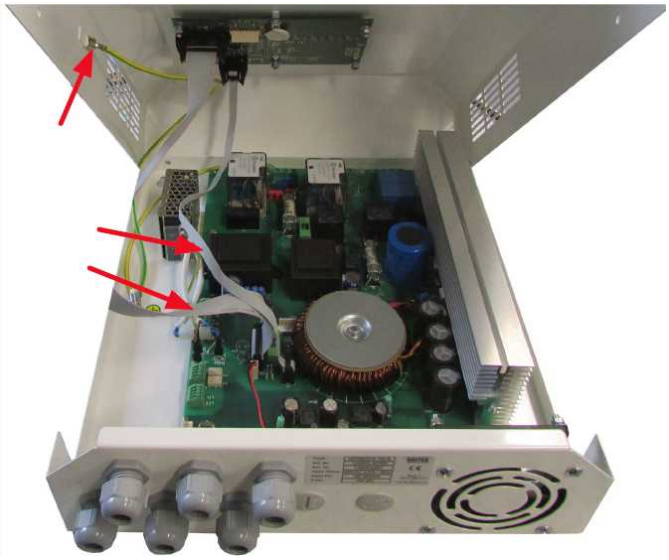


PV panel intake (DC input) must be protected by a fuse and overvoltage protection of type B+C+D and it must be performed in accordance with valid norms. System includes disconnectors with fuses for protection of DC intake. Mains intake has to be protected by circuit breaker with tripping characteristics B and nominal value max. 16 A, performed according to relevant norms for installation of water heaters, min. cross section area 2,5 mm^2.

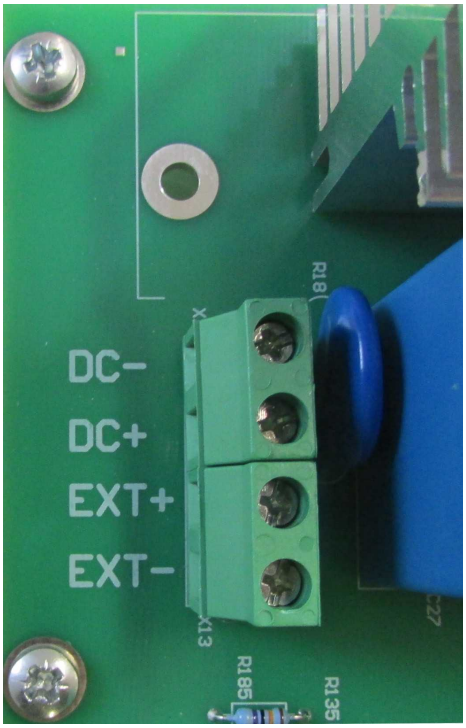
WARNING any pole of photovoltaic panels must NOT be earthed! In case of using external output for charging the battery, it is necessary to bear in mind that the external output's negative pole is connected to the negative pole of the photovoltaic panels!

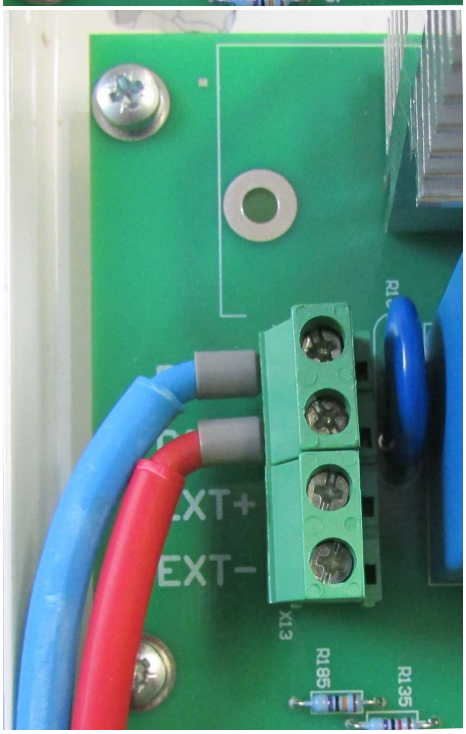
2. Unscrew two M4 screws holding the cover.

Before installation make sure that solar panels and mains are disconnected and protected against accidental turning on.



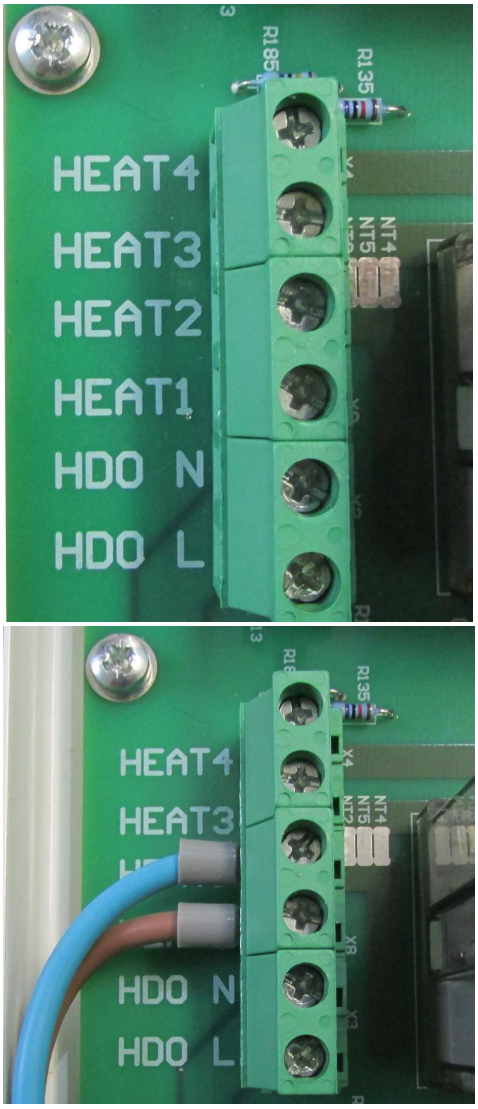
3. Carefully lift the cover, disconnect grounding conductor from the cover and both flat cables from the main board and put aside the cover.





4. Intakes from the solar panels (from overvoltage protection and fuses) connect into their respective terminals on the PCB (positive pole into DC + and negative pole into DC -)

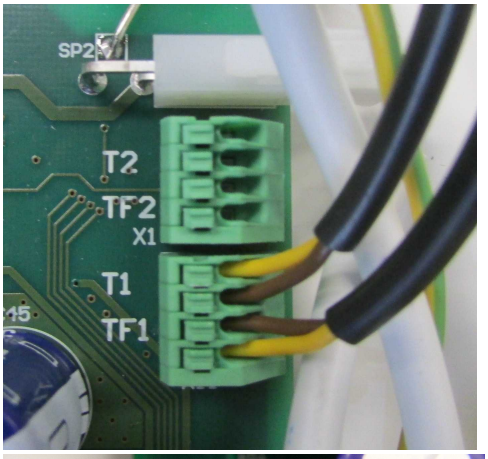
Look before you leap! Converter may be destroyed by reversing polarity!



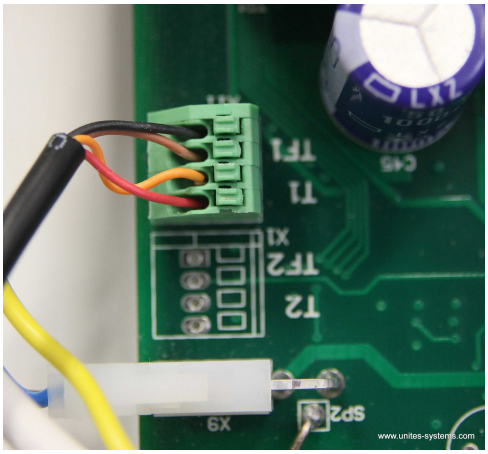
5. Remove all regulation elements from the boiler (thermostat, thermal fuse) and connect both conductors with cross section area of min. 2,5 mm^2 directly on the heater. Bring these conductors into the terminals HEAT1 and HEAT2 (in the picture).

Caution! It is absolutely necessary to make sure that there are not any regulatory elements in this circuit (**they cannot work with DC current)! Some heating elements have integrated thermostat, which must be inactivated.**

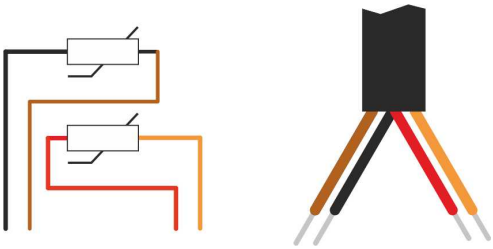
6. Connect thermal sensor of the fuse (TF1) and of the thermostat (T1) to the terminals (in the picture). Supplied sensors (or one double - sensor) are 2,5 m long and it is possible to extend them to max 10 m. The thermal sensor cables should not be situated in parallel with the power cables!

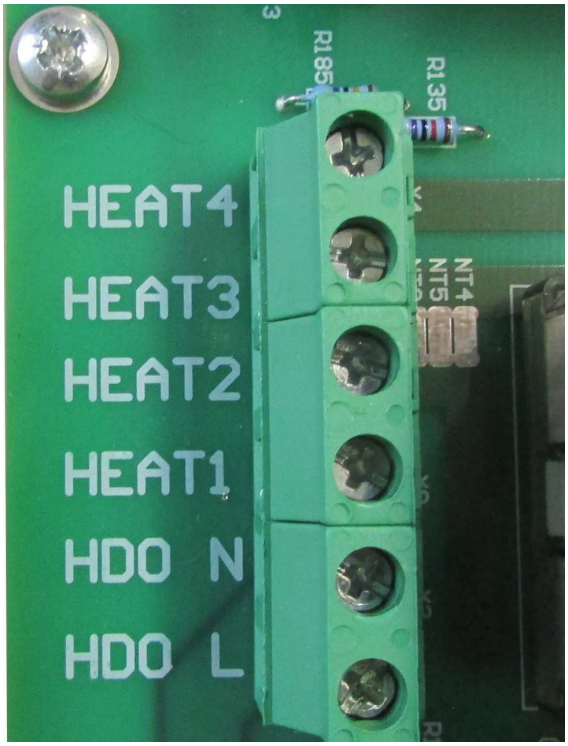


320.H and 315.H version, connect the next pair of sensors to terminals T2 and TF2.



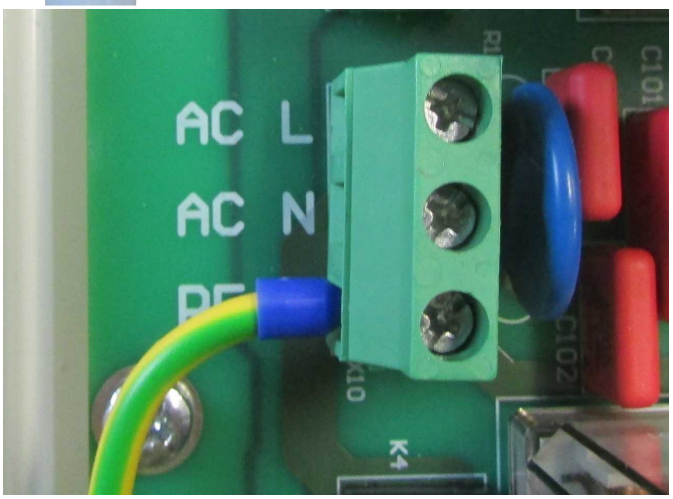
Double sensor wiring



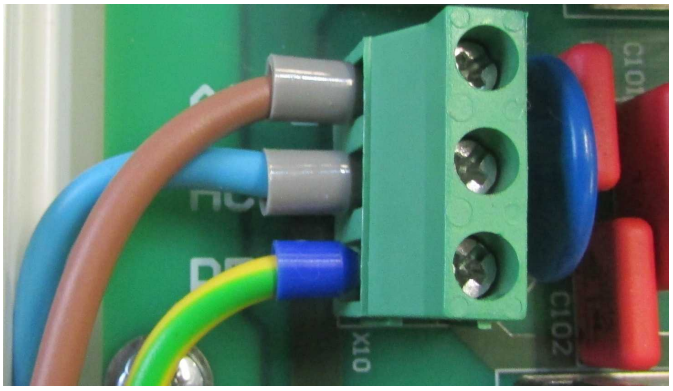


7. If you want to use low tariff DSM lead the disconnecting phase with the middle conductor to the terminals HDO N and HDO L (see. picture).

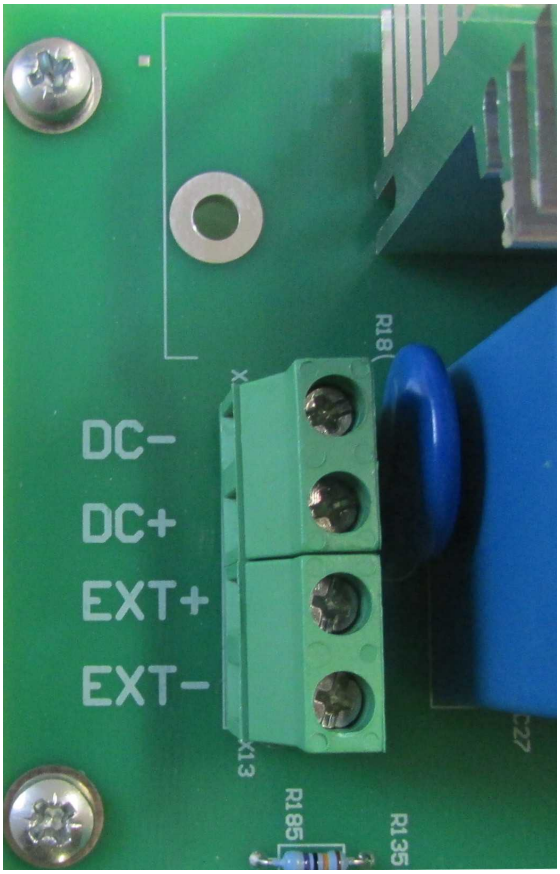
8. Lead mains supply conductors into the terminals AC L and AC N in the picture. Minimal cross section area of the conductor is 2,5 mm^2.Before connecting, thread an enclosed ferrite cylinder on the three wires L, N, and PE.



Mains intake must be secured by 16A circuit breaker and before its connection make sure that it is turned off and protected against accidental turning on.



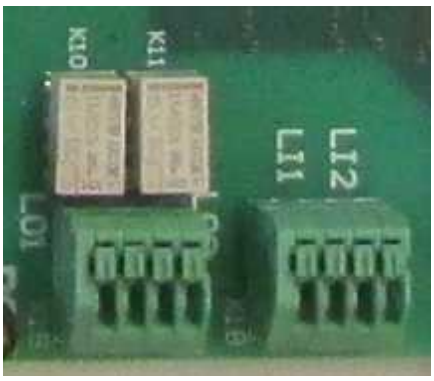
9. Connect the grounding wire with a cable lug to the grounding screw as shown in the picture on the left . Do not forget to ground the boiler itself!



10. If we want to use external output to charge accumulator (version 315.C only), connect positive pole from charging regulator to EXT+ and negative pole bring to the EXT- terminal.

For 320.H and 315.H version we will engage the second boiler(storage tank) heating element to terminals EXT+ and EXT-.

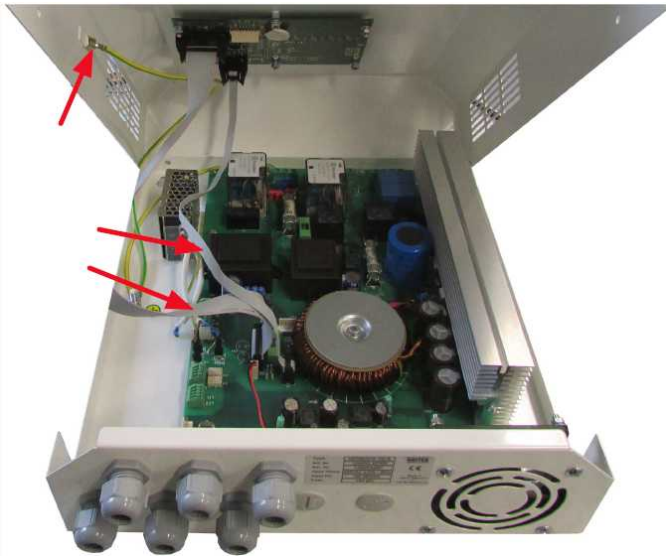
WARNING any pole of the photovoltaic panels must NOT be earthed! In case of usage of the external output for charging the battery, the external output's negative pole is connected to the negative pole of the photovoltaic panels!



11. If you use the inputs / outputs for communicating with another system (such as PLCs), it is necessary to take into account its load capability.
Control voltage for LI1 and LI2 inputs is 12-24V, maximal load of the LO1 and LO2 outputs is 24V 0.2A.

ATTENTION: LI1,2 inputs and LO1,2 outputs are galvanically isolated, however, it is only operational

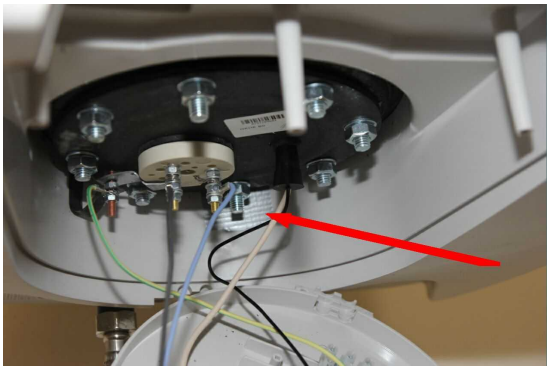
insulation, not reinforced.



12. Check if wiring is correct, terminals are tightened and then you can cover SOLAR KERBEROS. Take the upper cover, connect both flat cables and grounding conductor.

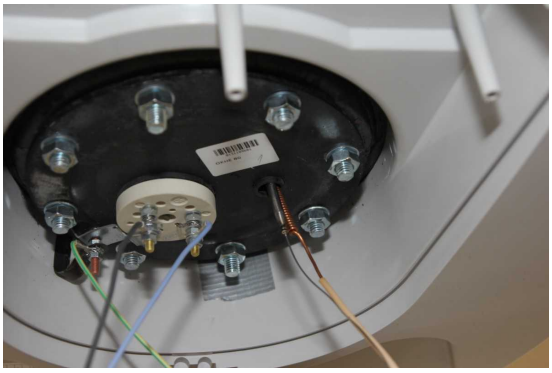
13. Screw both M4 screws which hold the cover.

4. BOILER SENSORS INSTALLATION



14. After uncovering technological part of the boiler, you can see capillaries from thermostat and thermal fuse connected to measuring tank.

Always make sure that the boiler, the mains is disconnected before you connect anything.

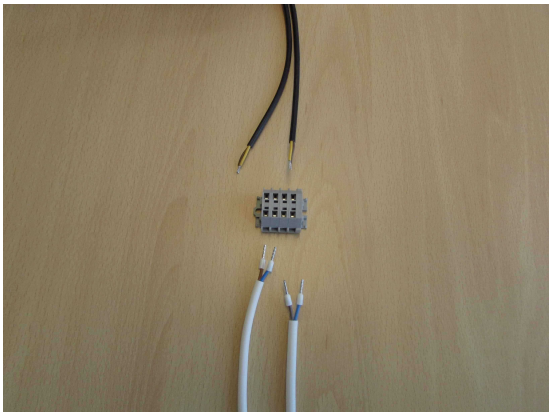


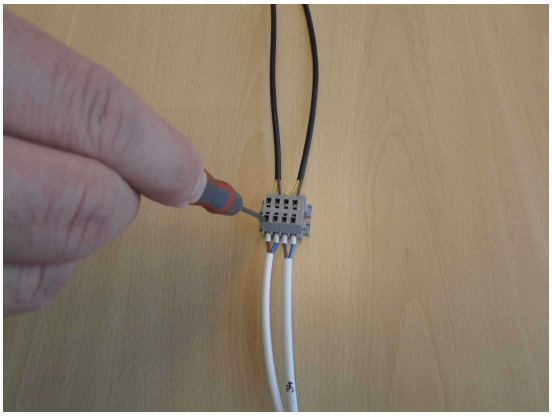
15. Pull out safety plug and pull out sensors.

16. Insert both Solar Kerberos sensors (or one double-sensor) parallelly all the way on the plug´s and sensor´s spots and secure them against ejection.

In the H version of Kerberos, sensor must not be swapped.

Boiler that has a heating element terminals HEAT1 and HEAT2 must have the T1 and TF1 sensors. The second boiler is connected to the EXT + and EXT and has the T2 and TF2 sensors.

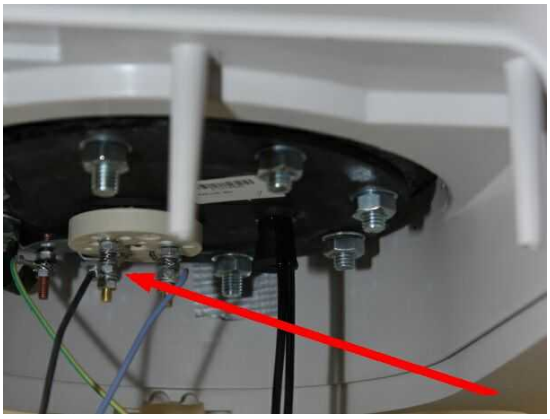




17. Sensor cables can be extended by enclosed terminal. Connect sensor conductors to one side of the terminal and connect the extension conductors to the other side. Maximum cable length is 10 m.

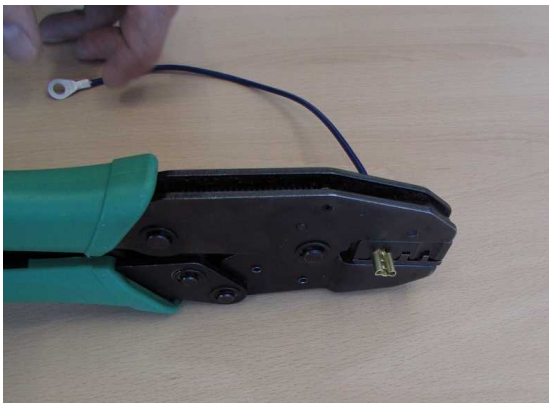
18. For another type of heater (storage tanks, etc.) we proceed analogically - the sensor is inserted into the measuring well and is secured against accidental ejection.

5. HEATING ELEMENT CONNECTION

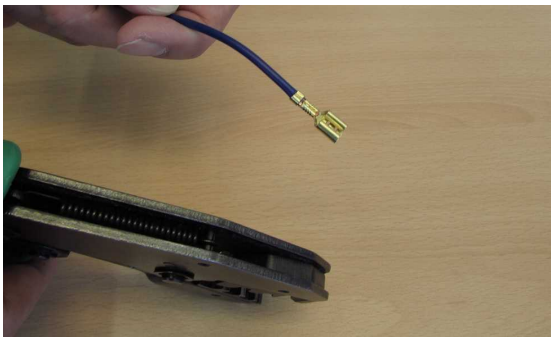


Connect heating element directly to the SOLAR KERBEROS terminals. Screw the cover back.

Always make sure that boiler is reliably disconnected from mains, before you connect anything.



Heating element intake can be made by crimping. Insert exposed end of conductor into a faston or loop (according to the type of heating element). Then insert faston or loop to the crimping pliers.



By pressing the pliers, permanent connection between the conductor and the connector is made.

Other types of heater are connected similarly - terminals are connected to HEAT1 and HEAT2.

The connected heater must not be damaged and must not leak! Please, follow recommendations of the manufacturer of the tank about material and mechanic parametres of the heater!

Warning:

In the H version of Kerberos, sensor must not be swapped.

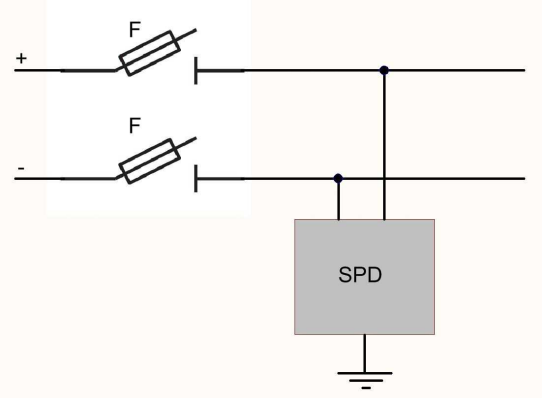
Boiler that has a heating element terminals HEAT1 and HEAT2 must have the T1 and TF1 sensors. The second boiler is connected to the EXT + and EXT and has the T2 and TF2 sensors.

6. SAFETY PRECAUTIONS

Electric installation must be done in accordance with valid electrical norms. Power Distribution Network must have elements for disconnection from AC and DC network. Electric installation must meet requirements and regulations of the country of its usage. After installation, revision needs to be done

appropriately qualified person.
These safety precautions are recommended for installation of photovoltaic system:

SPD type 1 lightning current arrester
Maximal operating voltage SPD must fulfill: UCPV ≥ 1,2× UOC STC. Considering the available assortment, the closest existing arrester of voltage will probably be 500 V (for example FLP-PV500 V/U - manufacturer Saltek). Choice of the arrester must respect risk classification of the object, which SPD type 1 is for.



DC Circuit breaker
This circuit breaker must be designed according to panels properties. Maximum value of protection is stated by manufacturer in photovoltaic panels parameters. If it is supposed to work as a switch too, it has to be enabled by the manufacturer.

Thermal fuse
Kerberos contains a thermal fuse which, in case of failure of the main thermostat, ensures disconnection of the heater in both poles, for alternating heating as well as heating from the photovoltaic panels.To ensure proper run of the thermal fuse, it is necessary to have both sensors in the measuring well positioned properly, so they do not get out.

If Kerberos announces thermal fuse activation (two exclamation marks instead

of data about temperature), it does not have to mean it is overheated (for example during turn on after installation). False sensor connection is indicated the same way - short circuit, disconnection of conductor, etc.

In case of thermal fuse activation, its reset is performed as follows:
- switch off the Kerberos
- flip open the upper cover with display and remove fuse from the black fuse holder (in the middle of board)
- fold the cover an switch power on for 5 minutes
- switch power off
- flip open the cover and take the fuse back to its holder
- fold and screw cover back
- thermal fuse is now reset

ATTENTION, before reseting the fuse, it is necessary to remove the cause of his activation!

ATTENTION, boiler must have the safety overpressure valve (it is recommended to check it periodically)!

ATTENTION, set set only such temperature that scalding would not be a threat! We recommend to equip the boiler with thermostatic valve that always maintains safe temperature.

ATTENTION, boiler must have the overpressure valve, which must be periodically tested. The usual testing period is once a week. Malfunctioning overpressure valve must be replaced immediately.

WARNING! No pole of the photovoltaic panels may be earthed!

CAUTION! (version 315.C) The negative pole of the charge output during charging is connected to the negative pole of the photovoltaic modules, as well as connected components (charge controller, battery or appliance), it is

therefore necessary to ensure safety as well as for handling the voltage directly from the solar panels!

In the H version of Kerberos, sensor must not be swapped.

Boiler that has a heating element terminals HEAT1 and HEAT2 must have the T1 and TF1 sensors. The second boiler is connected to the EXT + and EXT and has the T2 and TF2 sensors.

7. CONDUCTORS CROSS SECTION AREAS

Minimal conductors cross section areas	
PV panels	2.5 mm^2
DSM network	0.5 mm^2
Heating element	2.5 mm^2
Mains	2.5 mm^2
Sensor extension	0,25 mm^2
Ground	4 mm^2

8. FUSES

Used types of fuses in the device	
DCDC converter fuse FX1/4	10x38 10A gPV
Heating element fuse FX2/3	10x38 16A gG
Thermal fuse F2	5x20 F32mA 250V
Mains power supply F1	5x20 T250mA 250V

ATTENTION, ruptured fuse should be always replaced by a fuse of the same value and characteristics!

Before replacing a fuse, it is necessary to identify and eliminate the cause of her rupture.

9. PUTTING INTO OPERATION

Solar Kerberos does not require any special start-up. The system is preset to typical values and nothing needs to be set for its basic function.

After all wiring is finished, the power can be turned on. After a moment the power indicator starts lighting or blinking.

If Solar Kerberos is connected to the mains and the temperature in the boiler is lower than the temperature set for mains heating then Kerberos heats the water to this temperature of the mains. After that it goes to the heating from solar modules according to the set solar temperature.

If there is no mains power available, the power indicator will be blinking until the power of solar panels is tested (about 5 minutes). After that the heating from solar modules will begin according to the required solar temperature.

If the system shows two exclamation marks on display instead of water temperatures during commissioning, it is usually a mistake in connecting the sensors. It may be a short circuit or wire breakage, which can occur when implementing an extension of sensors cables.

Kerberos H version must be connected to all (4pcs) sensors. If you have Kerberos H and you can not connect a secondary boiler, leave all sensors connected and set the temperature 2 (bottom row of icons in the middle) to the lowest setting.