ACCORRONI
Climate Technology

Patented high efficiency heat pump system with direct refrigerant / water exchange to produce domestic hot water and heating for medium users with or without solar thermal integration

HUB RADIATOR PLUS
HUB RADIATOR PLUS SOLAR

INSTALLATION MANUAL

HUB RADIATOR PLUS / PLUS SOLAR

GENERAL INFORMATIONS
HUB RADIATOR PLUS 250 - 400 SOLAR

GENERAL WARNINGS

The instruction booklet is an integral and essential part of the product and must be kept by the user.

Carefully read the warnings contained in the booklet as they provide important information regarding the safety of installation, use and maintenance.

Keep the booklet carefully for any further consultation. Installation and maintenance must be carried out in compliance with current regulations according to the manufacturer's instructions and by qualified and authorized personnel in accordance with the law.

Professionally qualified personnel means those with specific technical expertise in the sector of components of heating systems for civil use, production of hot water for sanitary use and maintenance.

The personnel must have the qualifications required by the law in force.

Incorrect installation or poor maintenance can cause damage to people, animals or things, for which the manufacturer is not responsible.

In the event of a breakdown and / or malfunction of the appliance, contact only qualified personnel in accordance with the law.

Any repairs to the products must be carried out only by personnel authorized by the manufacturer, using only original spare parts.

Failure to comply with the above may compromise the safety of the appliance.

To ensure the efficiency of the appliance and for its correct operation, it is essential to have the maintenance carried out by qualified personnel.

If the appliance is to be sold or transferred to another owner or if you have to move and leave the appliance, always make sure that the booklet accompanies the appliance so that it can be consulted by the new owner and / or by the installer.

INDEX

1.MAIN FEATURES

1.1 CLASSIFICATION OF EQUIPMENT

The fundamental elements that make up the HUB RADIATOR PLUS / PLUS SOLAR system are:

1) Electronically controlled **external moto-evaporator** defined as: "Split air-water monobloc heat pump", powered by R410A refrigerant fluid with ON - OFF compressor or INVERTER.

2) **Indoor unit** defined as a circuit accumulator radiator closed with high efficiency that keeps the technical water completely separate from the sanitary water and is made through 2 sequential accumulators with an octagonal section, inside which all the copper exchangers are positioned.
Sizes from 250 liters - 400 liters

1.2 CERTIFICATIONS - CE MARKING

The patented HUB RADIATOR PLUS / PLUS SOLAR system complies with directives 97/23 / EC and 98/37 / EEC.
They also comply with the provisions of the following directives:
73/23 / EEC, 89/336 / EEC, as amended by directive 93/68 / EEC.
The indoor unit of the HUB RADIATOR PLUS / PLUS SOLAR system has been designed to be installed only and exclusively inside buildings or on a special external niche that is thermally insulated and protected from atmospheric agents, if this indication is not respected, any type of warranty is void.

1.3 CONSTRUCTION FEATURES

All the machines are equipped with a microprocessor for controlling and adjusting the operation and safety of the units.
Thanks to the patented direct exchange condensers, the products of the HUB RADIATOR PLUS / PLUS SOLAR series are able to reach high standards of energy efficiency and SCOP.
Other construction features:

- the cabinet covering the outdoor unit is made for all models in sheet metal pre-painted with epoxy powder. The compressor compartment is completely isolated from the air / refrigerant exchanger compartment; this allows to better protect the electromechanical components.
- the compressor is of the high efficiency rotary type, operating with R 410A refrigerant, mounted on elastic anti-vibration supports, driven by a single-phase electric motor for all models;
- the air / refrigerant gas exchanger is made with copper pipes and aluminum fins blocked by mechanical expansion of the pipes, with a large heat exchange surface;
- the fan unit consists of a helical fan driven directly by single-phase asynchronous motor with internal thermal protection. The fans are equipped with a safety protection grid;
- the DHW rapid exchanger, is made of copper directly immersed in the technical water of the indoor unit with the FIRST IN - FIRST OUT method, so as to eliminate the problem of legionella;
- the refrigeration circuit and the connections between the individual components are made of copper tube specific for refrigeration. The lamination member, the cycle inversion valve and the liquid separator are part of the refrigeration circuit;
- the electrical command and control panel is directly positioned inside the cover cabinet, above the expansion tank.
- the microprocessor control system with keyboard is located on the control plate accessible directly on the front of the cover cabinet, and can be remotely operated using the appropriate remote control and command panel, available as an accessory, to be installed on the wall or recessed ;
- the indoor unit is supplied complete with all the appropriate internal copper exchangers, auxiliary auxiliary back up and emergency resistor, freon connections, DHW connections, air vent jolly valve, safety valve, filling cock, pressure gauge, diverter valve to give priority to the domestic hot water, flow switch, electronic circulator, expansion tank, temperature probes.

1.4 CONTENT OF THE PACKAGING

The device is shipped on wooden pallets, with extruded expanded polystyrene protections and wrapped in a layer of plastic fabric with air bubbles.
The identification data of the appliance are shown both on the label on the packaging and on the technical data plate applied inside the cover cabinet.
Do not remove the technical data plate for any reason, as the references it contains are necessary for any maintenance interventions.
Inside the packaging there is also an envelope containing this manual and the warranty certificate, which must be delivered to the owner of the device so that he can keep them carefully for any future use or for consultation.

1.5 STANDARD EQUIPMENT AND ACCESSORIES SUPPLIED ON REQUEST

The wide range of standard equipment and accessories available on request allow optimal use of all the functions of the machines and the system to which they are served.

1.6 FIELD OF USE

The appliances designed and manufactured for heating water in hydronic air conditioning systems and to produce DHW must be used only for this purpose, in relation to their technical specifications and performance.
The quality and dimensions of the materials used guarantee a good life time and are suitable for the operation of the devices both as a whole and in their individual components, subject to an installation carried out in a workmanlike manner and under conditions of mechanical stress. chemical and thermal corresponding to a suitable use.

WARNING! All uses not expressly indicated in this manual are considered improper and are not permitted; in particular, the use of the equipment in industrial processes and / or installation in environments with a corrosive or explosive atmosphere is not envisaged.
The manufacturer declines any responsibility for damage to people, animals or property resulting from noncompliance with the instructions in this manual, from modifications or tampering with the product, from installation, adjustment, maintenance errors and from improper use. Failure to comply with what is indicated in this manual also results in forfeiture of the warranty conditions.

1.7 SAFETY RULES

WARNING! Installation and maintenance must be carried out exclusively by specialized and specially authorized personnel.
The connection to the power supply must be carried out in accordance with current national plant standards.
During installation and maintenance operations, it is always necessary to operate in conditions of maximum safety, follow the instructions given in this manual and any warning labels applied to the product.
Respect the installation and operating limits indicated in this manual, never modify the internal electrical wiring and refrigeration pipes, do not modify or disable the safety and regulation devices.
Before any inspection or maintenance operation, o anything else involves access to the internal of the appliance, disconnect the general power supply.

Table 1 - Cable specifications HUB RADIATOR PLUS/PLUS SOLAR

Models	Cable connection indoor unit QE power supply	External unit power connection cable	Cable C-1-2	Cable Pb3	Switch magnetermic
	Section	Section	Section	Section	Section
3.0	2.5 mm² x 3	2.5 mm² x 3	1,50 mm² x 3	0,75 mm² x 4	16 A curv. D
7.8	4.0 mm² x 3	4.0 mm² x 3	4.0 mm² x 3	0,75 mm² x 4	20 A curv. D
9.0 INV.	4.0 mm² x 3	4.0 mm² x 3	4.0 mm² x 3	0,75 mm² x 4	20 A curv. D

2. CONNECTIONS U.E. / U.I.

2.1 GENERAL PROVISIONS

1) The HUB RADIATOR PLUS / PLUS SOLAR system is designed to work exclusively with the indoor unit positioned inside the building to be heated and the booster outside.
2) During the installation phase you must carefully check that the distance and the difference in height between the 2 units comply with the data shown in this manual.
3) Before installation, check that the wall is where you are chosen to position the internal accumulation to be able to withstand the weight of the accum. and the water contained in it.
4) In case of replacement of an existing generator carry out the cleaning the system and adding a special anti-algae additive.
5) The moment you choose to install the HUB system RADIATOR PLUS / PLUS SOLAR, the electrical absorption of the outdoor unit must be taken into account. Then prepare all the necessary works to adapt the electrical system (meter, cable section, magnetothermic switches, etc.) to ensure proper operation and a constant voltage between 220V and 240V in correspondence with the power cables of the outdoor unit. With voltage below 220V it is mandatory to install a voltage stabilizer capable of guaranteeing the admissible voltages indicated above, otherwise any type of guarantee is void.

2.2 ELECTRICAL CONNECTIONS

Connect the cable to the electrical panel:

1) The connection cable of the indoor and outdoor unit must to be kind H07RN-F.
2) Lift up the electrical box panel and remove the screws, then remove the cover.
3) Connect the cables according to the markings. Connect the cable to the outdoor unit:
4) Remove the cover of the outdoor unit.
5) Connect the terminal cables according to the numbers on the unit terminal block, respecting the sections shown in the table 1
6) Secure the cables so that they do not come into contact with parts electric or metal.

2.3 INSTALLING THE PIPES FOR THE REFRIGERANT R410A

The main cause of refrigerant gas leaks is due to a defect in the flare. Carry out the folders correctly, respecting the following indications:

A) Cut the pipes and the cable (Fig. 1)

- Use pipes with adequate measures for the installed unit (table 2).
- Measure the distance between the indoor and outdoor unit.
- Cut the pipes to a length slightly greater than distance measured.
- Cut the 1.5 m electric cable. longer than the length of the tube

B) Burr removal (Fig. 2)

- Completely remove all burrs from the section cross section of the tube.
- The processing must be performed with the end of the tube down so that burrs do not fall into the tube.

C) Folding (Fig. 3)

Remove the nuts fixed on the indoor and outdoor unit, insert them on the pipe and perform the flaring and removal of the burrs, as previously indicated

D) Placement of the nut

Firmly fix the copper pipe with a nut of the size indicated in table 3.

E) Securing the connection (Fig. 4)

Align the pipes. Sufficiently tighten the nut and tighten it with two wrenches as shown in the figure.

Precautions - Excessive torque can break the nut.

Table2 Diameter connections refrigerant R410A

Model	Ø LIQUID	Ø GAS
3.0	1/4”	3/8”
7.8	1/4”	5/8”
9.0 INV	3/8”	5/8”

Pipe cutting Fig. 1

Burr removal Fig. 2

Folding Fig. 3

Fixing Fig. 4

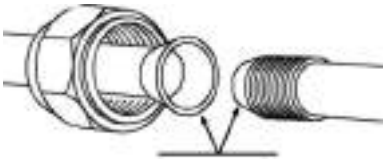


Table3 - Tightening torque

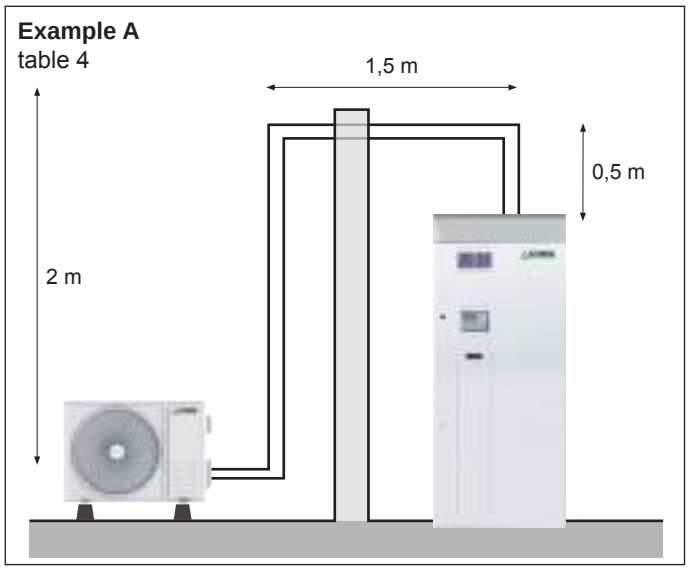
Diameter	Tightening torque (N / m)
Ø 3/8	42
Ø 5/8	65
Ø 1/4	18

Table 4 - Admissible distances U.I. - U.E.

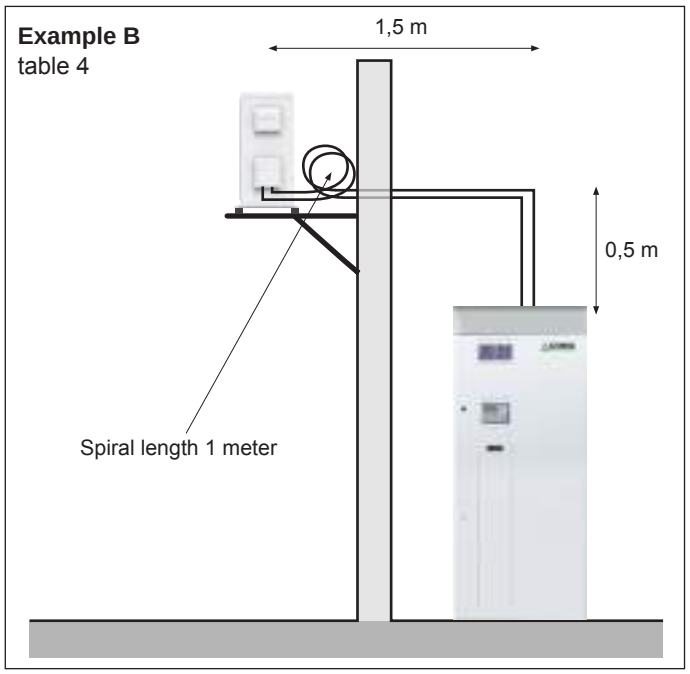
	Models	HR 3.0	HR 7.8	HR 9.0 INV
A	Maximum length allowed without adding refrigerant	5*m	5*m	5*m
B	Minimum allowed length of refrigerant gas	3*m	3*m	3*m
C	Maximum length of refrigerant gas piping	15*m	15*m	15*m
D	Maximum admissible height difference between U.E and U.I.	5*m	5*m	5*m
E	U.I. Additional refrigerant quantity over 5 meters	20*g/m	20*g/m	20*g/m

Failure to comply with this application will result in the non-ignition by the authorized assistance

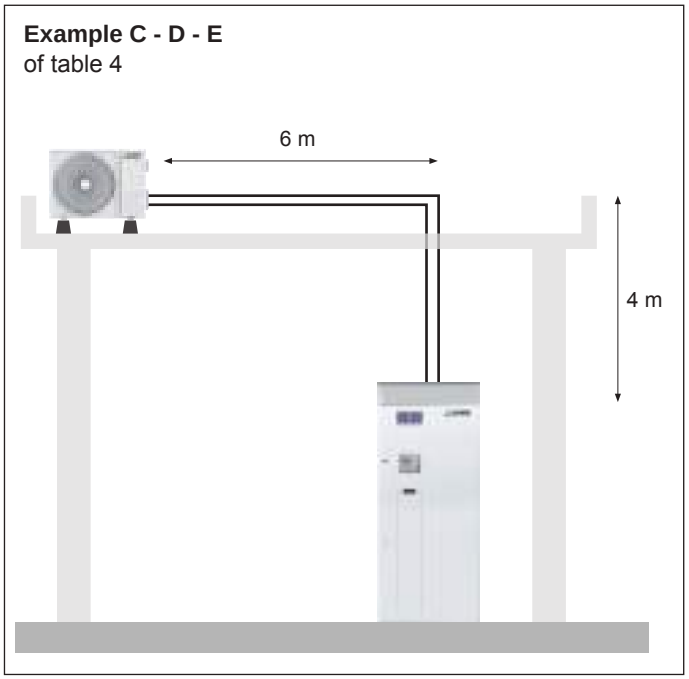
(A) INSTALLATION WITHIN 5 METERS
Example of installation without additional gas refill R410a refrigerant, distance 4 meters.



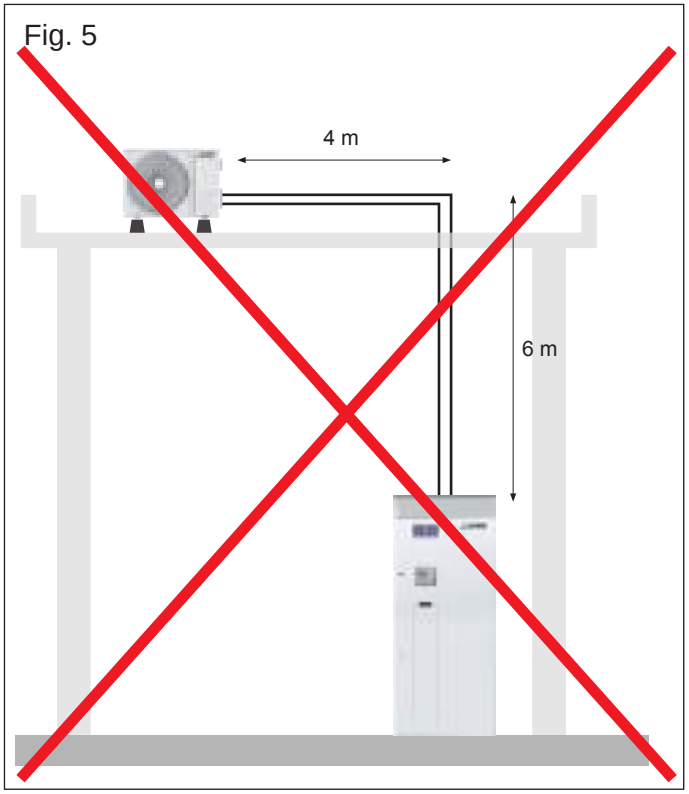
(B) INSTALLATION WITH MINIMUM PERMISSIBLE LENGTH
The distance between the Indoor Unit and Outdoor Unit is less than 3 meters (as in this case where the length of the pipes does not exceed 2 meters), the pipes must be cut to 3 meters and rolled up the final part in correspondence with the outdoor unit.



(C) MAXIMUM PIPE LENGTH
(D) MAXIMUM DIFFERENCE IN HEIGHT (between U.E and U.I.)
(E) ADDITIONAL REFRIGERANT AMOUNT (over 5 m)
configuration the effective length of the pipes is 6 m horizontally and 4 m vertically, in total 10 m. We will then add 100 grams of R410a refrigerant gas or 5 m x 20 g / m = 100 grams.



WARNING!
In fig. 5 we report an example of an inadmissible application, with a distance of 10 meters but with a difference in height of> 5 meters.



3. OUTDOOR UNIT INSTALLATION

3.1 GENERAL INDICATIONS

When choosing the installation position, carefully observe the following indications:

- Make sure that the difference in height between the U.I./U.E. OUTSIDE is not greater than 5.0 m.
- The appliance must be installed so that the influences of adjacent structures and / or the effects of particular climatic conditions (snow, wind, etc.), do not compromise the functioning of the product and / or the safety of people and goods.
- Make sure that the space in the back of the unit is greater than 30 cm. The front must have more than 60 cm. of space.
- Make sure there are no obstacles to free movement of the air through the heat exchangers:

A) do not place plants or animals directly close to the air flow;
B) avoid installation in corners where dust, leaves and anything else usually can reduce the efficiency of the exchangers by obstructing the passage of air (Fig 6).

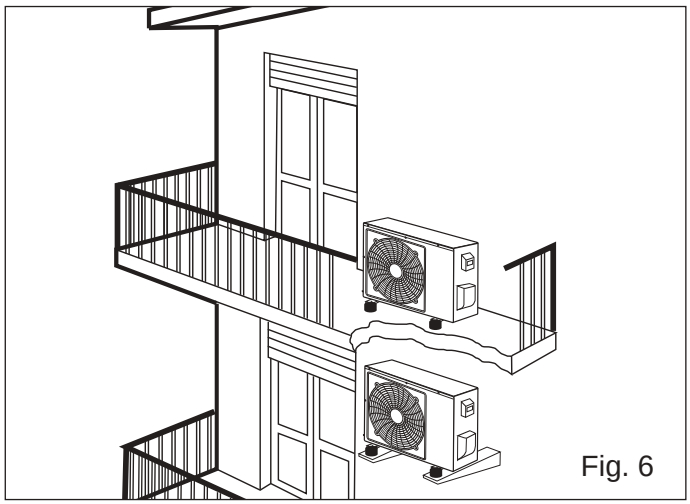


Fig. 6

- Avoid installation in bottlenecks and small shafts as acoustic reverberations could be favored. Inquire about any limits in noise emissions provided for the area of the municipal area where the appliance is installed. In case of doubt, it is advisable to consult an acoustic technician in advance, qualified for an impact assessment, in order to prevent complaints from third parties.
- Prevent the air expelled from the fans from penetrating through adjacent doors and / or windows, causing situations disturbing people.
- Install the outdoor unit on a rigid base equipped with appropriate anti-vibration bearings to avoid the increase of vibrations and noise, so as not to disturb neighbors (Fig.7).

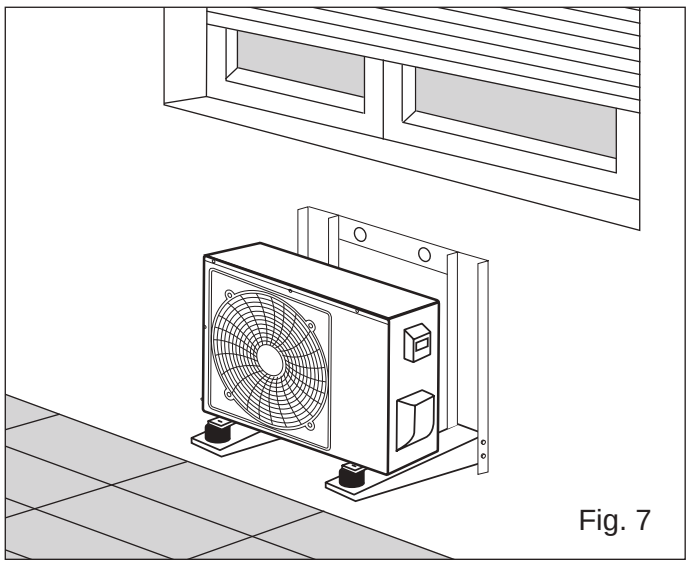


Fig. 7

- Position the air outlet so that the flow is not hindered in any way. In the case of strong wind, make sure that the fan works correctly, positioning the unit longitudinally, along a wall or using a shield.
- If the appliance is to be suspended from an external wall, the substrate must comply with the techn. specifications. The wall where the unit must be installed, it must be brick or material of similar consistency,otherwise it must be reinforced.The support brackets must be stable, resistant and with an adequate degree of protection against corrosion.

WARNING! Make sure of the load-bearing capacity of the part on which the shelves are placed and of the anchoring system to the wall itself, according to the weight of the appliance to be installed.

- Do not install the appliance near heat sources and / or fire risk areas.
- Installation in areas with a highly corrosive atmosphere not is allowed; in particular climatic conditions such as near the sea, it is mandatory to provide a shorter life span of the product and in any case a more frequent and accurate maintenance.
- In the outdoor unit, from which the water of condensation, provide for a suitable drainage and / or channeling of the same, in order to avoid dangerous situations due, for example, to the formation of ice on passage areas.
- The outdoor unit is designed to be installed outdoors and it does not require a special base, however it must be safely positioned on a horizontal support surface with adequate load-bearing capacity and equipped with special anti-vibration rubber pads.

3.2 CLEARANCE DISTANCES OUTDOOR UNIT (Fig. 8)

Respect the minimum spaces, in order to allow correct operation and all installation and maintenance operations.

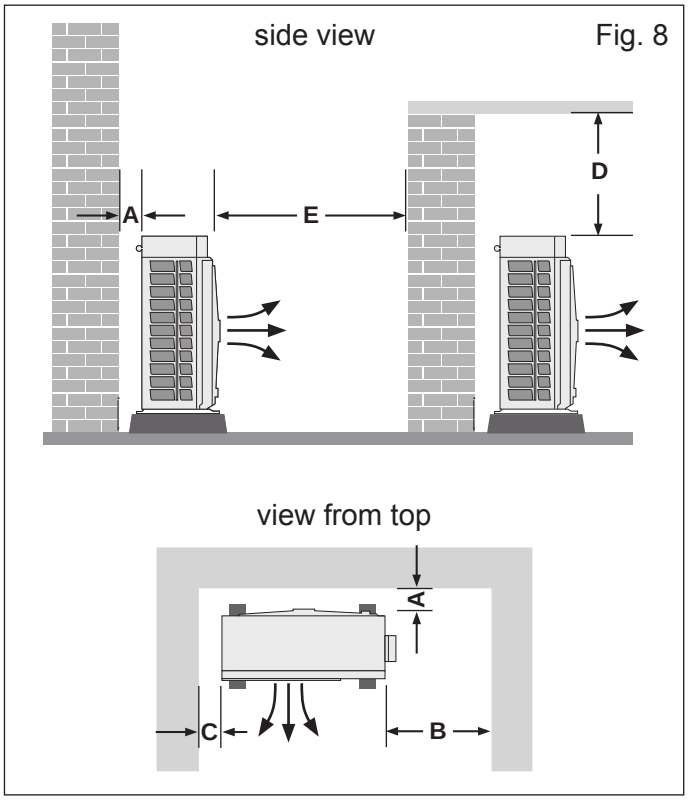


Fig. 8

LEGENDA:

(A = 15 cm) (B = 50 cm) (C = 15 cm)
(D = 60 cm) (E = 100 cm)

3.3 ROOF INSTALLATION

- If the outdoor unit is installed on a roof, be sure to level the unit. Make sure that the roof structure is appropriate for mounting the unit.
- Consult your local codes regarding mounting on the roof.
- If the outdoor unit is installed on the roof or external walls, this could cause excessive noise and vibration and be classified as an unsuitable installation for service.

3.4 ELIMINATION OF AIR WITH THE VACUUM PUMP (Fig 9)

The air and humidity in the refrigeration system can cause unwanted effects as indicated below:

- Increased pressure in the system.
- Increase in absorbed current.
- Decrease in the efficiency of the refrigerant.
- Freezing and obstruction of the capillary pipes.
- Corrosion of parts of the refrigeration system.

In order to avoid the above, the indoor assembly and the pipes, placed between the indoor and outdoor assemblies, must be tested for leaks and purged to remove non-condensing elements and moisture from the system.

Check that each pipe (both the gas and liquid side pipes) between the internal and external groups has been connected correctly and that all the wiring required for testing has been carried out.

- Remove the valve cap on the outdoor assembly.
- Make sure that at this point both gas valves and liquid remain closed.
- Check the length of the tube and relative quantity of the refrigerant, for a correct charge, check the superheat value.

The values in the table are indicative.

When changing the location of the unit, bleed with the vacuum pump.

Make sure that the refrigerant inside the air conditioner is always in a liquid state.

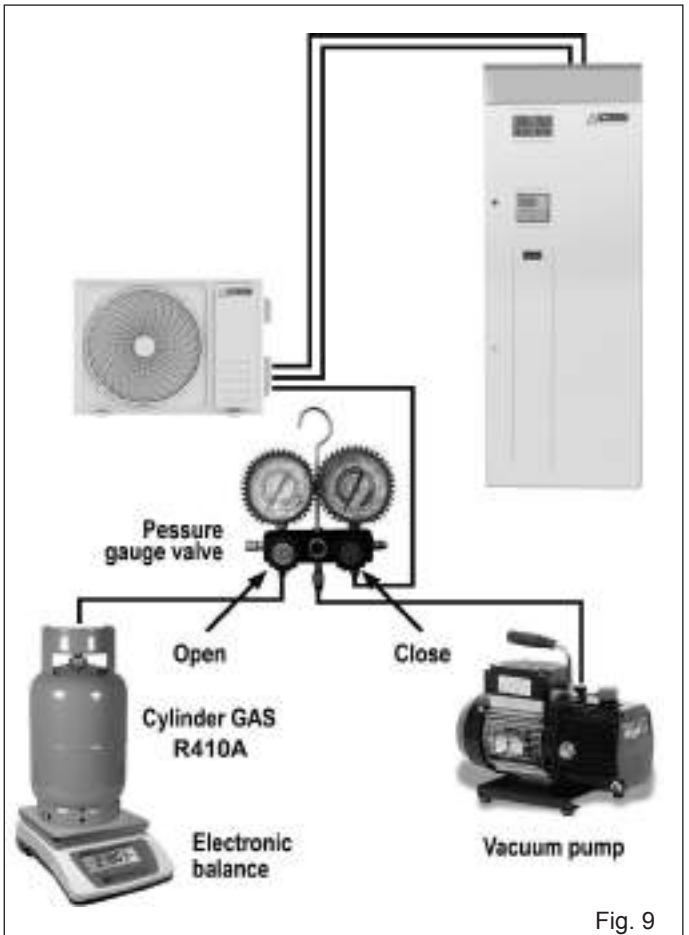


Fig. 9

The outdoor unit is supplied with a charge of R410A refrigerant gas suitable for ensuring proper operation up to a maximum distance of 5 meters from the indoor unit.

If you decide to install the 2 units at a distance greater than 5 meters, make sure to add 20 g of refrigerant gas for each additional meter of piping (Tab. 4).

For example, if there are 7 meters of piping between the outdoor and indoor units, add 40 g of R410A gas.

In any case, never exceed 15 meters.

Add only after vacuuming the pipes connecting the 2 units, as illustrated in chapter 3.4, after which you can proceed with opening the gas taps, mounted on the machine.

3.5 EVACUATION

Connect the end of the charging hose to the vacuum pump to evacuate the air from the pipes of the indoor unit.

Check that the “LO” knob of the pressure gauge valve is open. Then run the vacuum pump.

The running time varies depending on the length of the pipes and the capacity of the pump.

When the desired vacuum is reached, close the “LO” knob of the pressure gauge valve and stop the vacuum pump.

Finally, using a service valve wrench, turn the gas side valve stem counterclockwise to fully open.

Loosen the charging hose connected to the gas side service port to relieve the pressure, then remove the hose.

Replace the gas valve and service plug cover nut and tighten securely with an adjustable wrench.

This procedure is very important to avoid system leaks

Replace the service valve caps on both the gas and liquid side and tighten well.

This completes the air purge procedure with the vacuum pump, make sure that all pipes are connected correctly and that the service valves on the gas and liquid sides are completely open.

3.6 PUMP DOWN

This procedure is carried out when the unit needs to be moved or assistance is carried out on the refrigerant circuit.

Emptying allows all the refrigerant to be collected in the outdoor unit without leaks.

3.7 RECOVERY PROCEDURE

- Connect a low pressure gauge with a hose to the gas valve service socket.
- Half open the gas valve and empty the air from the pipeline pressure gauge using refrigerant gas.
- Close the liquid valve completely.
- Turn on the machine in cooling mode.
- When the pressure of the manometer goes between 0 and 0.5 kg / cm 2G (between 14.2 and 7.1 P.S.G.I)

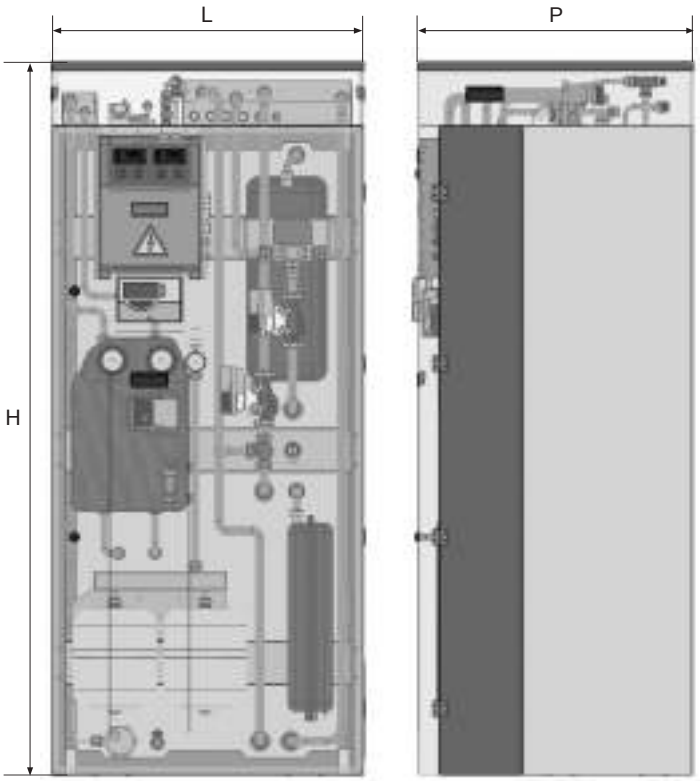
close the gas valve completely and quickly switch off the air conditioner.

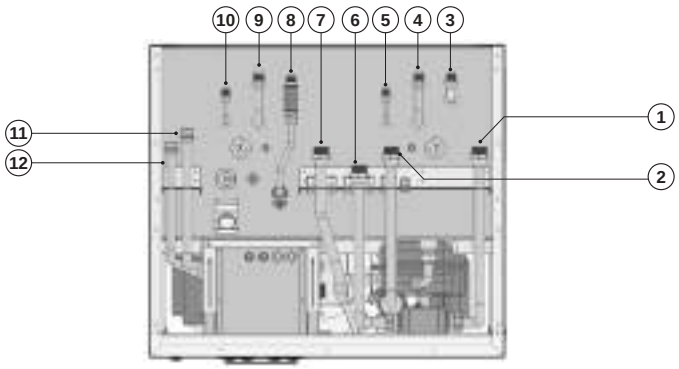
Complete recovery of the refrigerant from the outdoor unit was thus carried out.

WARNING! Be sure to perform the flushing procedure with the group in COLD MODE.

4. SECTION A - INDOOR UNIT / OUTDOOR UNIT TECHNICAL AND CONSTRUCTION FEATURES HUB RADIATOR PLUS 250 - 400 SOLAR

4.1 DIMENSIONS AND TECHNICAL CHARACTERISTICS OF THE INDOOR UNIT HUB RADIATOR PLUS / PLUS SOLAR



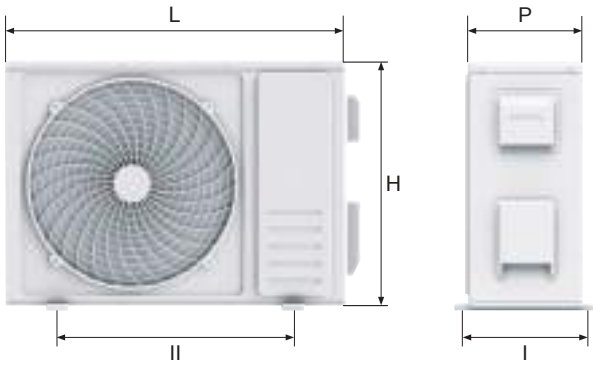


Models indoor units	**L**	**H**	**P**
	mm	mm	mm
HUB RADIATOR PLUS 250	762	1740	670
HUB RADIATOR PLUS 400	762	2240	670

1 High temperature system return (M 1”)
2 Low temperature system delivery (M 1”)
3 Domestic hot water delivery (M 1/2”)
4 Refrigerant circuit HR Booster gas line 2 (5/8” Booster 7.8 / 9.0 - 3/8” Booster 3.0)
5 Refrigerant circuit HR Booster liquid line 2 (1/4” Booster 3.0 / 7.8 - 3/8” Booster 9.0)
6 High temperature system delivery (M 1 “)
7 Low temperature system return (M 1”)
8 Water mains inlet (M 1/2”)
9 Booster HR gas line refrigeration circuit 1 (5/8” Booster 7.8 / 9.0 - 3/8” Booster 3.0)
10 Liquid line Booster HR refrigerant circuit 1 (1/4” Booster 3.0 / 7.8 - 3/8” Booster 9.0)
11 Forced circulation solar thermal collector delivery (M 3/4”)
12 Forced circulation solar thermal collector return (M 3/4”)

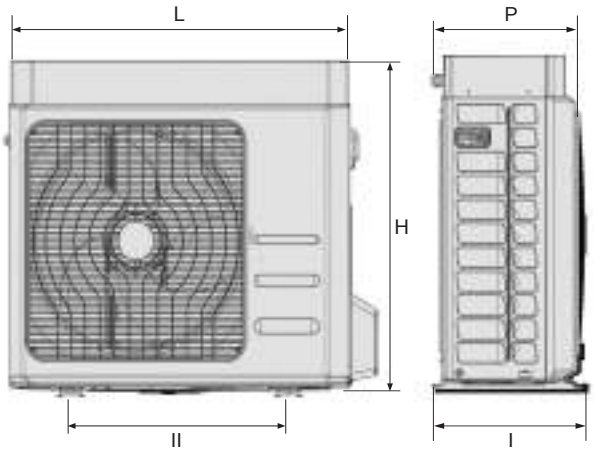
4.2 DIMENSIONS AND TECHNICAL CHARACTERISTICS OF OUTDOOR UNITS

Booster outdoor HR 3.0 - 7.8



Models outdoor unit	**L**	**H**	**P**	**I**	**II**	**Weight**
	mm	mm	mm	mm	mm	kg
Booster HR 3.0	700	552	256	275	435	33
Booster HR 7.8	902	650	307	350	620	55

Booster outdoor HR 9.0 INVERTER

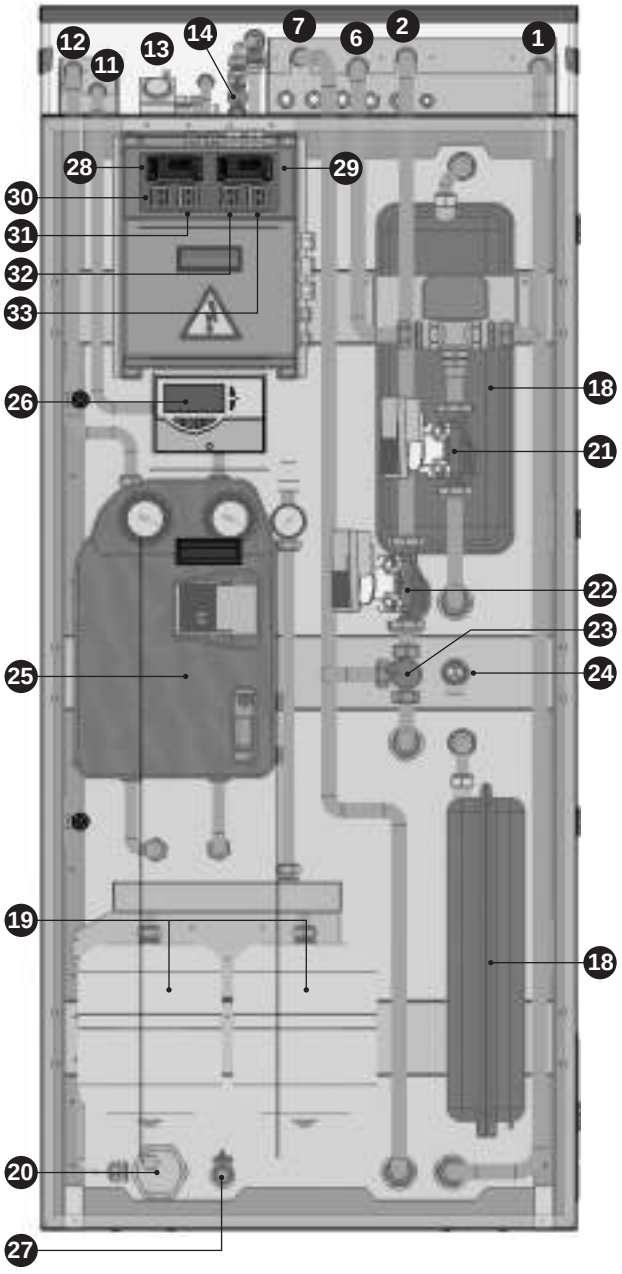


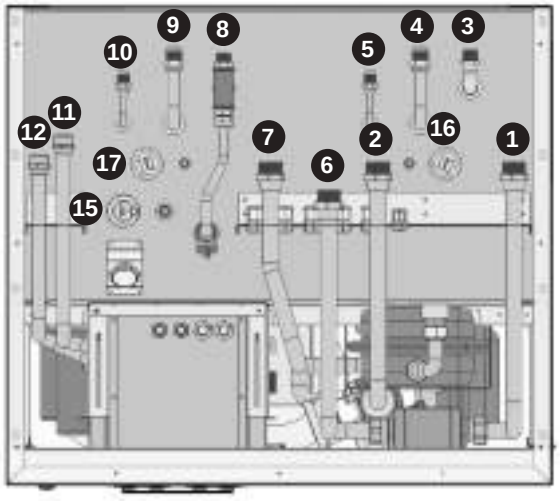
Models outdoor unit	**L**	**H**	**P**	**I**	**II**	**Weight**
	mm	mm	mm	mm	mm	kg
Booster HR 9.0 inverter	925	785	380	358	540	62

4.3 INDOOR UNIT HUB RADIATOR PLUS / PLUS SOLAR

Main components

1 High temperature system return (M 1”)
2 Low temperature system delivery (M 1”)
3 Domestic hot water delivery (M 1/2”)
4 Refrigerant circuit HR Booster gas line 2 (5/8” Booster 7.8 / 9.0 - 3/8” Booster 3.0)
5 Refrigerant circuit HR Booster liquid line 2 (1/4” Booster 3.0 / 7.8 - 3/8” Booster 9.0)
6 High temperature system delivery (M 1 “)
7 Low temperature system return (M 1”)
8 Water mains inlet (M 1/2 ”)
9 Booster gas line HR refrigeration circuit 1 (5/8” Booster 7.8 / 9.0 - 3/8” Booster 3.0)
10 Liquid line Booster HR refrigerant circuit 1 (1/4” Booster 3.0 / 7.8 - 3/8” Booster 9.0)
11 Solar thermal collector delivery with forced circulation (M 3/4”)
12 Solar thermal collector return with forced circulation (M 3/4”)
13 System technical water pressure gauge
14 System filling cock
15 Automatic jolly valve for system air vent
16 Additional heat generator water delivery
17 Additional heat generator water return
18 8 liter system expansion vessel
19 8 liter solar expansion vessel (optional)
20 Integrative electric heater 2 kW
21 Zone 1 system circulator
22 Zone 2 system circulator (optional)
23 Mix valve for radiant system (optional)
24 System safety valve 3 bar
25 UNIT 2 PLUS solar station (optional)
26 CONTROL MULTI 06 S solar control unit (optional)
27 System drain cock
28 Digital Booster 1 control unit
29 Booster 2 digital control unit
30 Integrative electric heater ON-OFF switch
31 EMERGENCY / INTEGRATION diverter integrative electrical resistance
32 System circulator/s ON-OFF switch
33 Solar control unit ON-OFF switch (optional)





4.4 PERFORMANCE CHARACTERISTICS OF THE OUTDOOR UNIT BOOSTER HR 3.0

BOOSTER HR 3.0 - THERMAL POWER DELIVERED

Thermal power delivered kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	1,96	1,93	1,88	1,80	1,67	1,51
- 9	2,.02	1,99	1,94	1,86	1,74	1,58
- 8	2,08	2,05	2,01	1,93	1,81	1,66
- 7	2,14	2,11	2,07	1,99	1,88	1,74
- 6	2,20	2,18	2,13	2,06	1,96	1,81
- 5	2,27	2,24	2,20	2,13	2,03	1,89
- 4	2,33	2,31	2,26	2,19	2,10	1,96
- 3	2,40	2,37	2,33	2,26	2,17	2,04
- 2	2,47	2,44	2,39	2,33	2,24	2,11
-1	2,54	2,51	2,46	2,40	2,31	2,18
0	2,61	2,58	2,53	2,47	2,38	2,26
1	2,69	2,65	2,60	2,54	2,45	2,33
2	2,76	2,71	2,67	2,61	2,52	2,40
3	2,84	2,80	2,74	2,68	2,59	2,47
4	2,92	2,87	2,82	2,75	2,66	2,55
5	3,01	2,95	2,89	2,82	2,73	2,62
6	3,09	3,03	2,97	2,90	2,81	2,69
7	3,18	3,11	3,05	2,97	2,88	2,77
8	3,27	3,20	3,12	3,05	2,95	2,84
9	3,36	3,28	3,20	3,12	3,03	2,91
10	3,45	3,37	3,29	3,20	3,10	2,98
11	3,55	3,46	3,37	3,28	3,18	3,06
12	3,64	3,59	3,45	3,36	3,25	3,13
13	3,75	3,64	3,54	3,44	3,33	3,20
14	3,85	3,74	3,63	3,52	3,41	3,28
15	3,95	3,83	3,72	3,60	3,48	3,35

BOOSTER HR 3.0

ABSORBED ELECTRICAL POWER kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	0,66	0,75	0,84	0,94	1,05	1,19
- 9	0,66	0,75	0,84	0,94	1,06	1,19
- 8	0,66	0,75	0,84	0,94	1,06	1,19
- 7	0,66	0,75	0,84	0,94	1,06	1,19
- 6	0,66	0,75	0,84	0,94	1,06	1,19
- 5	0,66	0,75	0,84	0,94	1,06	1,19
- 4	0,66	0,74	0,84	0,94	1,06	1,20
- 3	0,66	0,74	0,84	0,94	1,06	1,20
- 2	0,66	0,74	0,84	0,94	1,06	1,20
-1	0,66	0,74	0,84	0,94	1,06	1,20
0	0,66	0,74	0,84	0,94	1,06	1,20
1	0,66	0,74	0,84	0,94	1,06	1,20
2	0,66	0,74	0,84	0,94	1,06	1,20
3	0,66	0,74	0,84	0,94	1,06	1,20
4	0,66	0,74	0,83	0,94	1,06	1,20
5	0,65	0,74	0,83	0,94	1,06	1,20
6	0,65	0,74	0,83	0,94	1,06	1,20
7	0,65	0,74	0,83	0,94	1,06	1,20
8	0,65	0,74	0,83	0,94	1,06	1,20
9	0,65	0,73	0,83	0,94	1,06	1,20
10	0,65	0,73	0,83	0,94	1,06	1,20
11	0,65	0,73	0,83	0,94	1,06	1,20
12	0,65	0,73	0,82	0,93	1,06	1,20
13	0,64	0,73	0,82	0,93	1,06	1,20
14	0,64	0,73	0,82	0,93	1,06	1,20
15	0,64	0,72	0,82	0,93	1,05	1,20

BOOSTER HR 3.0

C.O.P. THERMAL POWER / ABSORBED POWER

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	2,96	2,59	2,25	1,91	1,59	1,27
- 9	3,04	2,67	2,32	1,98	1,65	1,33
- 8	3,14	2,75	2,39	2,05	1,71	1,39
- 7	3,23	2,81	2,47	2,11	1,78	1,46
- 6	3,32	2,92	2,54	2,19	1,84	1,52
- 5	3,42	3,01	2,62	2,26	1,91	1,58
- 4	3,52	3,10	2,70	2,33	1,97	1,64
- 3	3,63	3,19	2,78	2,40	2,04	1,70
- 2	3,74	3,28	2,86	2,47	2,10	1,76
-1	3,85	3,37	2,94	2,54	2,17	1,82
0	3,96	3,48	3,02	2,67	2,23	1,88
1	4,08	3,57	3,11	2,69	2,30	1,94
2	4,20	3,67	3,20	2,76	2,37	2,00
3	4,33	3,78	3,29	2,84	2,43	2,06
4	4,46	3,88	3,38	2,92	2,50	2,12
5	4,59	4,00	3,47	3,00	2,57	2,18
6	4,73	4,11	3,57	3,08	2,64	2,24
7	4,87	4,20	3,66	3,16	2,71	2,30
8	5,01	4,35	3,76	3,24	2,78	2,36
9	5,16	4,47	3,86	3,33	2,85	2,42
10	5,32	4,60	3,97	3,42	2,92	2,48
11	5,48	4,73	4,08	3,51	3,00	2,54
12	5,64	4,86	4,19	3,60	3,07	2,61
13	5,81	5,00	4,30	3,69	3,15	2,67
14	5,99	5,15	4,42	3,78	3,23	2,74
15	6,17	5,29	4,54	3,88	3,31	2,80

4.5 PERFORMANCE CHARACTERISTICS OF THE OUTDOOR UNIT BOOSTER HR 7.8

BOOSTER HR 7.8 - THERMAL POWER DELIVERED

Thermal power delivered kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	5,12	5,05	4,91	4,69	4,36	3,93
- 9	5,27	5,20	5,07	4,86	4,55	4,13
- 8	5,43	5,36	5,23	5,03	4,73	4,33
- 7	5,58	5,52	5,40	5,20	4,92	4,53
- 6	5,75	5,68	5,56	5,37	5,10	4,73
- 5	5,91	5,85	5,73	5,55	5,28	4,92
- 4	6,09	6,02	5,90	5,72	5,47	5,12
- 3	6,26	6,19	6,07	5,90	5,65	5,31
- 2	6,44	6,36	6,25	6,08	5,83	5,50
-1	6,63	6,54	6,43	6,26	6,02	5,70
0	6,82	6,73	6,61	6,44	6,20	5,89
1	7,01	6,91	6,79	6,62	6,39	6,08
2	7,21	7,10	6,97	6,80	6,57	6,27
3	7,42	7,30	7,16	6,99	6,76	6,46
4	7,63	7,50	7,35	7,17	6,94	6,65
5	7,84	7,70	7,55	7,36	7,13	6,84
6	8,06	7,91	7,75	7,56	7,32	7,03
7	8,29	8,12	7,95	7,75	7,51	7,22
8	8,52	8,34	8,15	7,95	7,70	7,41
9	8,76	8,56	8,36	8,15	7,90	7,60
10	9,00	8,79	8,57	8,35	8,09	7,79
11	9,25	9,02	8,79	8,55	8,29	7,98
12	9,51	8,86	9,01	8,76	8,49	8,17
13	9,77	9,50	9,24	8,97	8,69	8,36
14	10,04	9,75	9,47	9,19	8,89	8,56
15	10,32	10,00	9,70	9,40	9,09	8,75

BOOSTER HR 7.8

ABSORBED ELECTRICAL POWER kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	1,78	2,00	2,25	2,52	2,83	3,19
- 9	1,78	2,00	2,25	2,53	2,84	3,19
- 8	1,78	2,00	2,25	2,53	2,84	3,20
- 7	1,78	2,00	2,25	2,53	2,84	3,20
- 6	1,78	2,00	2,25	2,53	2,85	3,21
- 5	1,78	2,00	2,25	2,53	2,85	3,21
- 4	1,78	2,00	2,25	2,53	2,85	3,22
- 3	1,78	2,00	2,25	2,53	2,86	3,22
- 2	1,77	2,00	2,25	2,54	2,86	3,23
-1	1,77	2,00	2,25	2,54	2,86	3,23
0	1,77	2,00	2,25	2,54	2,86	3,23
1	1,77	1,99	2,25	2,53	2,86	3,23
2	1,77	1,99	2,25	2,53	2,86	3,23
3	1,76	1,99	2,24	2,53	2,86	3,23
4	1,76	1,99	2,24	2,53	2,86	3,23
5	1,76	1,98	2,24	2,53	2,86	3,23
6	1,76	1,98	2,24	2,53	2,86	3,23
7	1,75	1,98	2,23	2,52	2,86	3,23
8	1,75	1,98	2,23	2,52	2,85	3,23
9	1,75	1,97	2,23	2,52	2,85	3,23
10	1,74	1,97	2,22	2,52	2,85	3,23
11	1,74	1,96	2,22	2,51	2,85	3,23
12	1,73	1,95	2,22	2,51	2,84	3,22
13	1,73	1,95	2,21	2,50	2,84	3,22
14	1,73	1,95	2,21	2,50	2,83	3,22
15	1,72	1,95	2,20	2,49	2,83	3,21

BOOSTER HR 7.8

C.O.P. THERMAL POWER / ABSORBED POWER

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	2,87	2,52	2,18	1,91	1,54	1,23
- 9	2,96	2,60	2,25	1,98	1,60	1,29
- 8	3,05	2,68	2,33	2,05	1,67	1,35
- 7	3,14	2,76	2,40	2,05	1,73	1,41
- 6	3,23	2,84	2,47	2,19	1,79	1,47
- 5	3,32	2,92	2,55	2,26	1,85	1,53
- 4	3,42	3,01	2,62	2,33	1,92	1,59
- 3	3,53	3,09	2,70	2,40	1,98	1,65
- 2	3,63	3,18	2,78	2,47	2,04	1,71
-1	3,74	3,28	2,86	2,54	2,11	1,77
0	3,85	3,37	2,94	2,53	2,17	1,82
1	3,96	3,47	3,02	2,69	2,23	1,88
2	4,08	3,62	3,10	2,68	2,30	1,94
3	4,20	3,67	3,19	2,84	2,36	2,00
4	4,33	3,77	3,28	2,92	2,43	2,06
5	4,46	3,88	3,37	3,00	2,49	2,11
6	5,59	3,99	3,46	3,08	2,56	2,17
7	4,73	4,14	3,56	3,07	2,63	2,23
8	4,87	4,22	3,65	3,24	2,70	2,29
9	5,02	4,34	3,75	3,33	2,77	2,35
10	5,17	4,47	3,86	3,42	2,84	2,41
11	5,32	4,59	3,96	3,51	2,91	2,47
12	5,48	4,47	4,07	3,49	2,98	2,53
13	5,65	4,86	4,18	3,69	3,06	2,60
14	5,82	5,00	4,29	3,78	3,14	2,66
15	5,99	5,14	4,41	3,88	3,21	2,72

4.6 PERFORMANCE CHARACTERISTICS OF THE OUTDOOR UNIT BOOSTER HR 9.0 INVERTER

BOOSTER HR 9.0 INV. - THERMAL POWER DELIVERED

Thermal power delivered kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	5,84	5,81	5,79	5,71	5,47	4,98
- 7	6,23	6,19	6,17	6,08	5,82	5,31
- 2	6,84	6,81	6,78	6,67	6,39	5,84
2	7,34	7,31	7,28	7,15	6,85	6,28
7	8,03	8,01	8,02	7,92	7,54	6,89
12	8,84	8,82	8,78	8,62	8,27	7,63

BOOSTER HR 9.0 INVERTER

ABSORBED ELECTRICAL POWER kW

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	2,02	2,25	2,51	2,80	3,12	3,47
- 7	1,98	2,21	2,47	2,27	3,09	3,43
- 2	1,88	2,12	2,39	2,68	3,00	3,34
2	1,78	2,02	2,29	2,59	2,91	3,24
7	1,63	1,89	2,13	2,39	2,73	3,09
12	1,40	1,64	1,90	2,19	2,50	2,82

BOOSTER HR 9.0 INVERTER

C.O.P. THERMAL POWER / ABSORBED POWER

Heating water delivery temperature °C

Ta (°C)	**30**	**35**	**40**	**45**	**50**	**55**
- 10	2,89	2,58	2,31	2,04	1,75	1,44
- 7	3,15	2,81	2,50	2,20	1,89	1,55
- 2	3,64	3,22	2,84	2,49	2,13	1,75
2	4,12	3,62	3,18	2,76	2,36	1,94
7	4,91	4,24	3,76	3,31	2,76	2,23
12	6,30	5,38	4,61	3,93	3,31	2,71

4.7 TECHNICAL DATA TABLE BOOSTER HUB RADIATOR PLUS / PLUS SOLAR

DESCRIPTION	U.M.	HR 3.0	HR 7.8	HR 9.0 INVERTER
Thermal power (1)	kW	3,11	8,12	3,54 / 8,01 / 8,81*
Absorbed power (1)	kW	0,74	1,96	1,89
C.O.P. (1)	W/W	4,20	4,14	4,24
Thermal power (2)	kW	2,97	7,75	2,85 / 7,92 / 8,71*
Absorbed power (2)	kW	0,94	2,52	2,39
C.O.P. (2)	W/W	3,16	3,07	3,31
Thermal power (3)	kW	2,58	6,73	2,54 / 7,04 / 7,74*
Absorbed power (3)	kW	0,74	2,00	2,00
C.O.P. (3)	W/W	3,48	3,37	3,52
Thermal power (4)	kW	2,47	6,44	2,46 / 6,82 / 7,50*
Absorbed power (4)	kW	0,94	2,54	2,74
C.O.P. (4)	W/W	2,67	2,53	2,68
Thermal power (5)	kW	2,11	5,52	2,31 / 6,41 / 7,05*
Absorbed power (5)	kW	0,75	2,00	2,54
C.O.P. (5)	W/W	2,81	2,76	3,04
Thermal power (6)	kW	1,99	5,20	2,25 / 6,25 / 6,88*
Absorbed power (6)	kW	0,94	2,53	2,68
C.O.P. (6)	W/W	2,11	2,05	2,39
SCOP (7)	W/W	3,78	3,71	3,94
Seasonal heating efficiency (ηs)	%	153,10	150,30	159,62
Energy efficiency class (8)		A++ / A		A++ / A+++
Type of compressor		Rotation ON-OFF		Twin Rotary DC INV.
Compressors	n.	1		
Refrigerant circuits	n.	1		
Defrost method		Reverse cycle with immersion condenser		
Type of refrigerant		R410A		
Temperature technical water min/max	°C	+30 / +58		
Amount of refrigerant (pre-inserted)	kg	1,1	2,0	2,2
Min distance between outdoor and indoor unit	m	3		
Max dist. betw. outdoor/indoor unit without recharging	m	5		
Max distance between outdoor/indoor unit with recharge	m	15		
Max diff. in height between outdoor/indoor unit	m	5		
Refrigerant gas line connection R410A		3/8”	5/8”	5/8”
Coolant line connection R410A		1/4”	1/4”	3/8”
Sound power (9)	dB(A)	65,1	68,4	64,0
Sound pressure 1 m (10)	dB(A)	51,2	54,7	32,8
External temperature operating limits	°C	-15 / +45		-20 / +46
Power supply		230V/1/50Hz		
Max absorbed power	kW	0,94	2,53	4,70
Max absorbed	A	4,30	11,57	20,40
Weight	Kg	33	55	62

(1) Heating: outside air temperature 7 °C b.d. - 6 °C b.w.; inlet / outlet water temperature30/35 °C
(2) Heating: outside air temperature 7 °C b.d. - 6 °C b.w.; inlet / outlet water temperature 40/45 °C
(3) Heating: outside air temperature 0 °C b.d.; water temperature inlet/outlet 30/35 °C
(4) Heating: outside air temperature 0 °C b.d.; water temperature inlet/outlet 40/45 °C
(5) Heating: outside air temperature -7 °C b.d.; water temperature inlet/outlet 30/35 °C
(6) Heating: outside air temperature -7 °C b.d.; inlet / outlet water temperature 40/45 °C
(7) Heating: condizioni climatiche medie; temperatura acqua ingresso/uscita 30/35 °C
(8) Water 35 °C / 55°C
(9) Measurements made according to UNI EN 14511 in heating mode and boundary conditions (1)
(10) Value calculated according to ISO 3744: 2010
(*) By activating the maximum HZ function

4.8 DHW WITHDRAWAL TABLE HUB RADIATOR PLUS / PLUS SOLAR 250

DESCRIPTION	U.M.	HR 3.0	HR 7.8	HR 9.0 inverter
DHW withdrawal at 40 °C - storage at 55 °C - inlet water at 10 °C	l	202	212	212
DHW withdrawal at 40 °C - storage at 55 °C - inlet water at 15 °C	l	218	242	242
HP recovery time from 38 °C to 55 °C - Outdoor temp. 7 °C *	min	82	36	30
HP recovery time+resistance from 38 °C to 58 °C - External temp. 7 °C*	min	54	24	20
Water withdrawal at 40 °C with storage at 62 °C with inlet water at 10 °C	l	228	254	254
Water withdrawal at 40 °C with storage at 62 °C with inlet water at 15 °C	l	262	290	290
HP recovery time+resistance from 38 ° C to 62 °C - External temp. 7 °C*	min	98	44	36
Recovery time from 10 °C to 55 °C - Outdoor temp. 7 °C*	min	226	88	84

**Data calculated with the heating system off*

4.9 DHW WITHDRAWAL TABLE HUB RADIATOR PLUS / PLUS SOLAR 400

DESCRIPTION	U.M.	HR 3.0	HR 7.8	HR 9.0 inverter
DHW withdrawal at 40 °C - storage at 55 °C - inlet water at 10 °C	l	332	348	348
DHW withdrawal at 40 °C - storage at 55 °C - inlet water at 15 °C	l	358	396	398
HP recovery time from 38 °C to 55 °C - Outdoor temp. 7 °C *	min	134	58	48
HP recovery time+resistance from 38 °C to 58 °C - External temp. 7 °C*	min	88	38	32
Water withdrawal at 40 °C with storage at 62 °C with inlet water at 10 °C	l	374	416	418
Water withdrawal at 40 °C with storage at 62 °C with inlet water at 15 °C	l	430	474	476
HP recovery time+resistance from 38 ° C to 62 °C - External temp. 7 °C*	min	156	70	58
Recovery time from 10 °C to 55 °C - Outdoor temp. 7 °C*	min	362	140	134

**Data calculated with the heating system off*

4.10 ACCUMULATION UNIT TECHNICAL DATA TABLE HUB RADIATOR PLUS / PLUS SOLAR

DESCRIPTION	U.M.	250	250 SOLAR	400	400 SOLAR
Technical storage water content	l	252	243	404	395
Max flow rate electronic inverter circulator	m^3/h	3,3			
Max head electronic inverter circulator	m	6,2			
Electric absorption electronic circulator inverter	W	3 - 45			
System expansion vessel volume	l	8		8	
Number of system expansion vessels	n.	2		3	
Expansion vessel preload	bar	1			
Safety valve calibration	bar	3			
Electrical resistance of back up	W	2000			
Max number of HR 3.0 boosters that can be combined	n.	2		4	
Max number of HR 7.8 boosters that can be combined	n.	2		3	
Max numb. HR 8.0 inverter boosters to be combined	n.	2		3	
Water temperature min / max	°C	+20 / +55			
Cold water inlet and DHW outlet hydraulic connections		1/2”			
System delivery and return hydraulic connections		1”			
DHW exchanger surface in copper	m^2	3,15		4,54	
Solar flow and return hydraulic connections		-	3/4”	-	3/4”
Pressure drop in domestic hot water exchanger in copper	Pa	1,8		2,6	
Solar exchanger surface in copper	m^2	-	1,6	-	2,0
Pressure drop in copper solar exchanger	Pa	-	1,2	-	1,7
Type of insulation		High density extruded expanded polystyrene			
Insulation thickness	cm	4,5			
Power supply		230V/1/50Hz			
Internal unit accumulation heat loss	kWh/24h	1,58			
Degree of protection		IPX5D			
Shipping weight	kg	184	188	222	226
Operating weight	kg	436	440	626	621

4.11 ACCESSORIES HUB RADIATOR PLUS / PLUS SOLAR

REMOTE CONTROL AND COMMAND PANEL

ADDITIONAL LOW TEMPERATURE SYSTEM PUMP KIT WITH CLIMATIC MIXING

LOAD CONTROL RELAY FOR MANAGING THE ABSORBED POWER

MIXING VALVE FOR RADIANT SYSTEMS FOR MOD. WITH FIXED AND MOTORIZED ADJUSTMENT

ANCHORING BRACKET FOR INCLINED ROOF FOR EXTERNAL BOOSTERS MOD. HR 3.0 - 7.8 - 9.0 INCLUDING RUBBER ANTIVIBRATION

ANCHORING SHELF
FOR EXTERNAL BOOSTER
RUBBER ANTIVIBRATION MOUNTS INCLUDED

ANTI-VIBRATION FLOOR BASE IN VULCANIZED RUBBER (HEIGHT FROM THE GROUND MM 95) WITH LEVEL AND SCREWS FOR BOOSTER HR 3.0 - 7.8 - 9.0

ANTI-VIBRATION KIT FOR INSTALLATION ON SHELVES

STAINLESS STEEL SPRING ANTIVIBRATION KIT COMPLETE WITH BOLTS - WASHERS - NUTS

ADDITIONAL CONDENSER FOR BOOSTER HR ONLY HOT

1/2” DHW MIXING VALVE KIT

AUXILIARY BASIN FOR INSTALLATION UNDER SHELF EQUIPPED WITH 90 W HEATING CABLE

CONDENSATE ANTIFREEZE HEATING CABLE WITH THERMAL SENSOR, FACTORY FITTED

FLOOR SUPPORT COMPLETE WITH AUXILIARY BASIN EQUIPPED WITH 90 W HEATING CABLE

FACTORY MADE HYBRID SYSTEM ELECTRONIC MANAGEMENT KIT WITH CONNECTION SLEEVES FOR ADDITIONAL THERMAL GENERATOR

FLEXIBLE ANTI-VIBRATION JOINT KIT WITH FITTING FOLDER AND STRAIGHT UNION

FLEXIBLE ANTI-VIBRATION JOINT KIT WITH FITTING BRACKET AND 90° CURVED UNION

OPEN SHELF FOR N. 2 OUTDOOR UNITS BOOSTER MOD. HR 7.8 - 9.0 COMPLETE WITH ANTIVIBRATION

RACK 2 CABINET N. 2 OUTDOOR UNITS BOOSTER MOD. HR 3.0 - 7.8 - 9.0

5 - SECTION B
DIGITAL CONTROL UNIT
HUB RADIATOR PLUS 250 - 400 SOLAR

DIGITAL CONTROL UNIT

5.1 DISPLAY

Information available on the display:

- Primary display (red color): display configurable from parameter CF36 (PB1, PB2, PB4, Set-point (parameter value) *, Set-point real *, Hysteresis, Machine status**);

- Secondary display (yellow color) display configurable from parameter CF4 (PB1, PB2, PB3, PB4, Set-point (by parameter)*, Real set-point* Hysteresis, RTC, Machine status**);

* the display shows the chiller set when th unit is switched on in chiller mode, the heat pump set when the unit is turned on in heat pump mode, OFF with unit in stand by;
** the display shows OnC when the unit is turned on in chiller mode, OnH when the unit is switched on in heat pump OFF mode with unit in stand by.

5.2 ICON DISPLAY

Lit when the display displays a temperature or pressure	**°C -°F BAR-PSI**
Lit when the lower display displays the current time, the hours of operation of loads, etc.	
Flashing on when alarm	
On if an automatic Set-point modification function is active (Dynamic set point, function for machines without accumulation, Energy Saving); if the function is enabled but not active the icon is off	**Vset**
Lit during access to the functions menu	**menu**
On if the resistances are on (antifreeze heaters, boiler)	
On flashing during the interval count between defrosts; the icon is steady on during the phase defrost	
Flashing on if the entrance digital flow switch is active (both with pump ON and with pump OFF)	**Flow!**
On if at least one of the 2 water pumps (evaporator pump or pump capacitor) is on	
On if the fans are on	
On if the relative compressor is switched on; is flashing if the compressor is in ignition timing	**1 2**
On if the exit open collector is active	
On if the machine is on e represents the operating status Heat or Cool according to logic set in parameter CF31	
The HP icon and the LP icon are on flashing in the event of a High alarm o Low pressure active.	**LP HP**

5.3 KEY FUNCTION

FUNCTION	KEY
Pressure and release in main view: allows viewing of the chiller set point (**SetC** label) or heat pump (**SetH** label).	SET
Pressure and release 2 times in main view: if the energy saving function, dynamic set point or for machines without accumulation the icon is enabled set is on and the display displays the actual working set.	SET
Pressure for 3 seconds and release in main view: allows modification of the point set chiller / heat pump.	SET
Pressure and release in programming: allows access to the change of the selected parameter; It allows confirmation of the set value in the parameter modification phase.	SET
Press and release in the AlrM menu: allows alarm reset (if resettable) from the AlrM menu.	SET

FUNCTION	KEY
Pressure and release: from main view allows the display of the probe values configured (temperatures / pressure in the upper display and the corresponding one label in the lower display.	
Pressure and release in programming: allows scrolling of folders parameters (ST, CF, etc); allows it scrolling through the list of parameters.	
Pressure and release: from main view allows the display of the probe values configured (temperatures / pressures) in the upper display and the label corresponding in the lower display.	
Pressure and release: allows you to turn on the machine (in chiller or heat pump) or select stand-by mode.	
Pressure and release: allows you to turn on the machine (in chiller or heat pump) or select stand-by mode.	
Pressure and release: allows access to the function menu. Pressure 3 seconds and release: allows you to adjust the clock in the models in which it is intended. Pressure and release in programming: lets go out from parameter modification	menu
Simultaneous pressure of the keys for 3 seconds: allows access to programming of the parameters.	+ SET
Simultaneous pressure of the keys: 1 allows exit from parameter programming. 2 contemporary pressure prolonged keys allows entry into manual defrost.	SET +

Regarding the use of the remote terminal (indications on the display and meaning of the keys) do reference to the preceding paragraphs In air / air units, in case of terminal use remote equipped with NTC probe (VICXS610),
configuring par. CF35 = 2 the display will show the room air temperature; this probe will be used from the controller for temperature control. In case of controller / remote terminal failure or error in the wiring, the lack of communication between the instrument and the remote terminal will be signaled to display with the error message “noL” (no link).

5.4 ACCESS TO PARAMETERS

1 Press the SET and arrow keys for a few seconds downward;

2 The icons flash and the display upper displays “ALL” (generic group of parameters);

3 Scroll through the parameter groups with the and keys select the group containing the parameters to access the list of parameters contained in the group.
The lower display shows the label of the parameter and the upper display shows the value.

5.5 DISPLAY AND MODIFY THE SET POINT

Pressing and releasing the SET key allows the display of the set point.
The prolonged pressing of the SET key allows the its modification

1 Press the SET button for at least 3 seconds;

2 The set point will be displayed flashing;

3 To change the value, use the and keys and

4 Save the new set point by pressing the key SET or wait for the time out time to exit from the program.

User interface

Remote terminal

5.6 MAIN ALARMS

Cod.	Meaning	Cause	Action	Reset
P1	Probe alarm PB1	Probe faulty or resistive value out of range	Activate open output collector / alarm relay Activate buzzer Flashing icon generic alarm Code on display	**Automatic** if the value is within the expected range
P2	Probe alarm PB2	Probe faulty or resistive value out of range	Activate open output collector / alarm relay Activate buzzer Flashing icon generic alarm Code on display	**Automatic** if the value is within the expected range
P3	Probe alarm PB3	Sonda guasta o valore resistivo fuori range	Activate open output collector / alarm relay Activate buzzer Flashing icon generic alarm Code on display	**Automatic** if the value is within the expected range
P4	Probe alarm PB4	Sonda guasta o valore resistivo fuori range	Activate open output collector / alarm relay Activate buzzer Flashing icon generic alarm Code on display	**Automatic** if the value is within the expected range correct defrost cycle
A12	Defrost error alarm	End defrost for maximum time	Code on display reporting only	**Automatic** if the value is within the expected range correct defrost cycle
A09	Compressor thermal alarm	Condensation start temperature of 110 °C	Activate open output collector / alarm relay Activate buzzer Flashing icon generic alarm Code on display	**Automatic** if the value is within the expected range correct defrost cycle
ALOC	Low or high voltage alarm or higher than 256 V	Supply voltage less than 202 V Attivate buzzer	Activate open output collector / relè allarme defrost Flashing icon generic alarm Code on display	**Automatic** it becomes manual after AL20 interventions now **Manual** Deactivation: entrance digital not active for continuous time >AL22
E01	Refrigerant circuit high pressure alarm	refrigerant circuit pressure higher than 42 bar	Activate open output collector / Flashing generic alarm icon	**Manual**
E02	Refrigerant circuit high pressure alarm	refrigerant circuit pressure higher below 2,7 bar	Activate open output collector / Flashing generic alarm icon	**Manual**

5.7 TABLE OF TROUBLESHOOTING CAUSES

Alarm code	Failure	Meaning	Cause	Remedy
P1	Probe alarm PB1	technical water Probe	1) Probe interrupted 2) Probe shorted 3) Control unit faulty	1) Technical water probe replacement 2) Control unit replacement
P2	Probe alarm PB2	External temperature probe	1) Probe interrupted 2) Probe shorted 3) Q.E. probe connection interrupted	1) External probe replacement 2) Replacement of the external probe connection cable 3) Replacement control unit
P3	Probe alarm PB3	External temperature probe	1) Probe interrupted 2) Probe shorted 3) Q.E. probe connection interrupted	1) External probe replacement 2) Replacement of the external probe connection cable 3) Replacement control unit
A09	Compressor thermal alarm	High temperature thermostat contact open	1) Faulty thermostat 2) Exhaust Booster 3) Q.E. thermostat connection	1) Thermostat replacement 2) External Booster Charging 3) Replacement of Q.E. thermostat connection cable
A12	Defrost error alarm	End defrost for maximum time	1) Lack of refrigerant gas 2) Extreme outdoor conditions 3) Condensate drain blocked 4) PB3 probe out of range	1) External Booster Charging 2) Change of parameters DF03 and DF04 3) Make sure that condensation flow out regularly 4) PB3 probe replacement
ALOC	Low or high voltage alarm	Power supply voltage out of safety range	1) Power supply below 220 V 2) Power supply above 253 V	Contact the electricity supplier to have the exact voltage values restored
E01	High pressure refrigerant gas alarm	Refrigerant gas pressure above 42 bar	Accumulation of drained technical water	Fill the accumulation with technical water
E02	Low pressure alarm for refrigerant gas circuit	Gas pressure below 2,7 bar	1) Faulty evaporator fan 2) Exhaust Booster 3) Presence of evaporator ice	1) Replace the evaporator fan 2) Charge refrigerant gas in the Booster 3) Oncheck defrost parameters

6. PARAMETER TABLES

6.1 SUBMENU SELECTION

LABEL	MEANING
ALL	Visualizza tutti i parametri
ST	Visualizza solo i parametri di termoregolazione
CF	Visualizza solo i parametri di configurazione
SD	Visualizza solo i parametri Del set point dinamico
ES	Visualizza solo i parametri energy saving
CO	Visualizza solo i parametri compressori
FA	Visualizza solo i parametri ventilazione
Ar	Visualizza solo i parametri resistenza antigelo
DF	Visualizza solo i parametri sbrinamento
AL	Visualizza solo i parametri allarmi

6.2 CONFIGURATION PARAMETERS

Thermoregulation parameters					
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
ST01	Set point estate	ST05	ST06	°C/°F	dec/int
ST02	Differenziale estate	0.0 0	25.0 45	°C °F	Dec int
ST03	Set point inverno	ST07	ST08	°C/°F	dec/int
ST04	Differenziale inverno	0.0 0	25.0 45	°C °F	Dec int
ST05	Set minimo estate	-50.0 -58	ST01	°C °F	Dec int
ST06	Set massimo estate	ST01	110 230	°C °F	Dec int
ST07	Set minimo inverno	-50.0 -58	ST03	°C °F	Dec int
ST08	Set massimo inverno	ST03	110 230	°C °F	Dec int
ST09	Banda di regolazione	0.0 0	25.0 45	°C °F	Dec int
Function without accumulation					
Parameter	**Description**	**min**	**max**	**udm**	**Risoluzione**
ST10	Funzione unità chiller senza accumulo 0= disabilitata 1= abilitata	0	1		
ST11	Set point minima temperatura acqua in uscita unità senza accumulo in funzionamento chiller	-50.0 -58	110 230	°C °F	Dec int
ST12	Set point massima temperatura acqua in uscita unità senza accumulo in funzionamento p.d.c.	-50.0 -58	110 230	°C °F	Dec int
ST13	Delta set point in funzionamento chiller / p.d.c.	0.0 0	25.0 45	°C °F	Dec int
ST14	Delta differenziale in funzionamento chiller / p.d.c.	0.0 0	25.0 45	°C °F	Dec int
ST15	Tempo funzionamento compressore superato il quale viene decrementato il delta set point e il delta differenziale in funzionamento chiller / p.d.c.	0	250	Sec	10 sec
ST16	Costante per il calcolo del valore set point e differenziale in funzionamento chiller / p.d.c.	0	250		
ST17	Tempo di ritardo modifica del set point di lavoro	1	250	Sec	10 sec
Geothermal chiller function					
Parameter	**Description**	**min**	**max**	**udm**	**Risoluzione**
ST18	Set point ambiente in chiller	ST20	ST21	°C/°F	dec/int
ST19	Differenziale ambiente in chiller	0.0 0	25.0 45	°C °F	Dec int
ST20	Set minimo ambiente in chiller	-50.0 -58	ST18	°C °F	Dec int
ST21	Set massimo ambiente in chiller	ST18	110 230	°C °F	Dec int
ST22	Set point ambiente in p.d.c.	ST24	ST25	°C/°F	dec/int
ST23	Differenziale ambiente in p.d.c.	0.0 0	25.0 45	°C °F	Dec int
ST24	Set minimo ambiente in p.d.c.	-50.0 -58	ST22	°C °F	Dec int
ST25	Set massimo ambiente in p.d.c.	ST22	110 230	°C °F	Dec int
Pr2	Password	0	999		

Parametri Configurazione					
Parametro	**Descrizione**	**min**	**max**	**udm**	**Risoluzione**
CF01	Tipo di unità: 0= Chiller aria / aria 1= Chiller aria / acqua 2= Chiller acqua / acqua 3= Chiller acqua / acqua con con inversione ciclo lato acqua	0	3		
CF02	Motocondensante 0= No 1= Si	0	1		
CF03	Sonda di regolazione 0= Regola sulla sonda PB1 1= Regola sulla sonda PB2 2= Regola sulla sonda PB2 e abilita il funzionamento con set utente sulla sonda PB1	0	2		
CF04	Configurazione PB1 0= Sonda assente 1= Temperatura NTC ingresso evaporatore 2= Ingresso digitale richiesta termoregolatore 3= Ingresso digitale richiesta freddo	0	3		
CF05	Configurazione PB2 0= Sonda assente 1= Temperatura NTC uscita evaporatore 2= Ingresso digitale allarme antigelo 3= Ingresso digitale richiesta caldo 4= Temperatura aria esterna	0	4		
CF06	Configurazione PB3 0= Sonda assente 1= Temperatura NTC controllo condensazione 2= Ingresso 4..20ma per controllo condensazione 3= Ingresso 4..20ma per set point dinamico 4= Sonda di temperatura NTC per termoregolazione e allarme antigelo in unità acqua/acqua con inversione lato acqua (unità con p.d.c.) 5= Sonda NTC alta temperatura acqua ingresso impianto 6= ingresso 0..5V per controllo condensazione	0	6		
CF07	Configurazione PB4 0= sonda assente 1= Temp. NTC controllo Condensazione 2= Ingresso digitale multifunzione 3= Temperatura aria esterna 4= Temperatura NTC allarme antigelo (unità acqua/acqua) 5= Temperatura NTC sbrinamento combinato 6= Sonda di temperatura NTC per termoregolazione e allarme antigelo in unità acqua/acqua con inversione lato acqua (unità con p.d.c.) 7= Sonda NTC alta temperatura acqua ingresso impianto	0	7		
CF08	Configurazione ID1 0= Termica compressore 1 1= Termica ventilatore di condensazione 2= Flussostato evaporatore 3= On/off remoto 4= chiller / pompa di calore remoto 5= Termica compressore 2 6= Richiesta 2 compressore / gradino 7= Fine sbrinamento 8= Energy saving 9= Allarme antigelo 10= Termica compressori 1 e 2 11= Allarme generico segnalazione / blocco 12 = Allarme termica pompa acqua evaporatore / termica ventilatore di mandata 13= Allarme termica pompa acqua condensatore 14= Flussostato condensatore 15= Disabilitato	0	15		

CF09	Configurazione ID2 0= Termica compressore 1 1= Termica ventilatore di condensazione 2= Flussostato evaporatore 3= On/off remoto 4= chiller / pompa di calore remoto 5= Termica compressore 2 6= Richiesta 2 compressore / gradino 7= Fine sbrinamento 8= Energy saving 9= Allarme antigelo 10= Termica compressori 1 e 2 11= Allarme generico segnalazione / blocco 12 = Allarme termica pompa acqua evaporatore / termica ventilatore di mandata 13= Allarme termica pompa acqua condensatore 14= Flussostato condensatore 15= Disabilitato	0	15		
CF10	Configurazione ID5 0= Termica compressore 1 1= Termica ventilatore di condensazione 2= Flussostato evaporatore 3= On/off remoto 4= chiller / pompa di calore remoto 5= Termica compressore 2 6= Richiesta 2 compressore / gradino 7= Fine sbrinamento 8= Energy saving 9= Allarme antigelo 10= Termica compressori 1 e 2 11= Allarme generico segnalazione / blocco 12 = Allarme termica pompa acqua evaporatore / termica ventilatore di mandata 13= Allarme termica pompa acqua condensatore 14= Flussostato condensatore 15= Disabilitato	0	15		
CF11	Configurazione PB4 se selezionato come ingresso digitale 0= Termica compressore 1 1= Termica ventilatore di condensazione 2= Flussostato 3= On/off remoto 4= chiller / pompa di calore remoto 5= Termica compressore 2 6= Richiesta 2 compressore / gradino 7= Fine sbrinamento 8= Energy saving 9= Allarme antigelo 10= Termica compressori 1 e 2 11= Allarme generico segnalazione / blocco 12 = allarme termica pompa acqua evaporatore / termica ventilatore di mandata 13= allarme termica pompa acqua condensatore 14= flussostato condensatore 15= disabilitato	0	15		
CF12	Polarità ID1 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF13	Polarità ID2 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF14	Polarità ID3 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF15	Polarità ID4 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF16	Polarità ID5 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF17	Polarità PB1 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF18	Polarità PB2 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF19	Polarità PB4 0= Attivo contatto chiuso 1= Attivo contatto aperto	0	1		
CF20	Configurazione RL4 0 = relè allarme 1 = parzializzazione compressore n° 1 2 = compressore n° 2 3 = ON/OFF ventilazione 4 = valvola di inversione 5 = resistenza antigelo / appoggio n°1 6 = solenoide lato acqua 7 = solenoide lato acqua solo in pompa di calore 8= resistenza antigelo / appoggio n° 2 9 = pompa acqua evaporatore / ventilatore di mandata (macchine aria / aria) 10= pompa acqua condensatore	0	10		
CF21	Configurazione RL5 0 = relè allarme 1 = parzializzazione compressore n° 1 2 = compressore n° 2 3 = ON/OFF ventilazione 4 = valvola di inversione 5 = resistenza antigelo / appoggio n°1 6 = solenoide lato acqua 7 = solenoide lato acqua solo in pompa di calore 8= resistenza antigelo / appoggio n° 2 9 = pompa acqua evaporatore / ventilatore di mandata (macchine aria / aria) 10= pompa acqua condensatore	0	10		
CF22	Valore di pressione a 4mA / 0,5V	0.0 0	50.0 725	Bar Psi	Dec int
CF23	Valore di pressione a 20mA / 5V	0.0 0	50.0 725	Bar Psi	Dec int
CF24	Offset PB1	-12.0 -21	12.0 21	°C °F	Dec int
CF25	Offset PB2	-12.0 -21	12.0 21	°C °F	Dec int
CF26	Offset PB3	-12.0 -21 -12.0 -174	12.0 21 12.0 174	°C °F Bar Psi	Dec int dec int
CF27	Offset PB4	-12.0 -21	12.0 21	°C °F	Dec int
CF28	Selezione chiller / pompa di calore 0= chiller e pompa con selezione da tastiera 1= chiller e pompa con selezione da ingresso digitale 2= chiller e pompa con selezione da sonda 3= solo chiller 4= solo pompa di calore	0	4		
CF29	Set Change Over Automatico	-50.0 -58	110 230	°C °F	Dec int
CF30	Differenziale selezione modo funzionamento	0.1 0	25.0 45	°C °F	Dec int
CF31	Logica di funzionamento 0= chiller / pdc 1= chiller / pdc	0	1		
CF32	Selezione °C o °F 0= °C / °BAR 1= °F / °psi	0	1		
CF33	Selezione frequenza rete 0= 50 Hz 1= 60 Hz 2 = l'uscita PWM può pilotare un relè allarme esterno	0	2		
CF34	Indirizzo seriale	1	247		
CF35	Terminale remoto 0= non utilizzato 1= modello senza sonda a bordo 2= modello con sonda NTC a bordo	0	2		
CF36	Default visualizzazione display superiore 0 = PB1 1 = PB2 2 = Niente 3 = PB4 4 = Setpoint reale unità 5 = Stato unità 6 = Niente 7 = Niente 8 = Differenziale di lavoro 9= Setpoint unità (valore fisso del parametro)	0	9		
CF37	Release firmware				
CF38	Mappa parametri EEprom				
CF39	Configurazione RL2 0 = relè allarme 1 = parzializzazione compressore n° 1 2 = compressore n° 2 3 = ON/OFF ventilazione 4 = valvola di inversione 5 = resistenza antigelo / appoggio n°1 6 = solenoide lato acqua 7 = solenoide lato acqua solo in pompa di calore 8= resistenza antigelo / appoggio n° 2 9 = pompa acqua evaporatore / ventilatore di mandata (macchine aria / aria) 10= pompa acqua condensatore	0	10		
CF40	Configurazione RL3 0 = relè allarme 1 = parzializzazione compressore n° 1 2 = compressore n° 2 3 = ON/OFF ventilazione 4 = valvola di inversione 5 = resistenza antigelo / appoggio n°1 6 = solenoide lato acqua 7 = solenoide lato acqua solo in pompa di calore 8= resistenza antigelo / appoggio n° 2 9 = pompa acqua evaporatore / ventilatore di mandata (macchine aria / aria) 10= pompa acqua condensatore	0	10		
CF41	Configurazione uscita open collector 0 = relè allarme 1 = parzializzazione compressore n° 1 2 = compressore n° 2 3 = ON/OFF ventilazione 4 = valvola di inversione 5 = resistenza antigelo / appoggio n°1 6 = solenoide lato acqua 7 = solenoide lato acqua solo in pompa di calore 8= resistenza antigelo / appoggio n° 2 9 = pompa acqua evaporatore / ventilatore di mandata (macchine aria / aria) 10= pompa acqua condensatore	0	10		
CF42	Tempo di inversione valvola su fermo compressore	0	250	Sec	
CF43	Default visualizzazione display inferiore 0 = PB1 1 = PB2 2 = PB3 3 = PB4 4 = Setpoint reale unità 5 = Stato unità 6 = Orologio 7 = Niente 8 = Differenziale di lavoro 9= Setpoint unità (valore fisso del parametro)	0	9		

CF44	Default visualizzazione display superiore terminale remoto 0 = PB1 1 = PB2 2 = Niente 3 = PB4 4 = Setpoint reale unità 5 = Stato unità 6 = Niente 7 = Niente 8 = Differenziale di lavoro 9= Setpoint unità (valore fisso del parametro)	0	9		
CF45	Default visualizzazione display inferiore terminale remoto 0 = PB1 1 = PB2 2 = PB3 3 = PB4 4 = Setpoint reale unità 5 = Stato unità 6 = Orologio 7 = Niente 8 = Differenziale di lavoro 9= Setpoint unità (valore fisso del parametro)	0	9		
CF46	Visualizzazione in STD-BY 0 = visualizza le grandezze della visualizzazione normale (impostate con parametri CF36 e CF43) 1 = visualizza la label "OFF" 2 = visualizza la label "StbY"	0	2		
CF47	Visualizzazione in STD-BY terminali remoti 0 = visualizza le grandezze della visualizzazione normale (impostate con parametri CF36 e CF43) 1 = visualizza la label "OFF" 2 = visualizza la label "StbY"	0	2		
CF48	Configurazione uscita analogica 4..20mA / 0..10V 0 = uscita 4..20mA 1 = uscita 0..10V	0	1		
Pr2	Password	0	999		
	Set Point Dinamico				
Parametro	**Descrizione**	**min**	**max**	**udm**	**Risoluzione**
Sd01	Set point dinamico 0= Non abilitato 1= Abilitato	0	1		
Sd02	Offset max setpoint d. estate	-30.0 -54	30.0 54	°C °F	Dec int
Sd03	Offsett max setpoint d. inverno	-30.0 -54	30.0 54	°C °F	Dec int
Sd04	Set temp. Aria esterna setpoint d. estate	-50.0 -58	110 230	°C °F	Dec int
Sd05	Set temp. Aria esterna setpoint d. inverno	-50.0 -58	110 230	°C °F	Dec int
Sd06	Differenziale temp. Aria esterna setpoint d. estate	-30.0 -54	30.0 54	°C °F	Dec int
Sd07	Differenziale temp. Aria esterna setpoint d. inverno	-30.0 -54	30.0 54	°C °F	Dec int
Pr2	Password	0	999		
	Energy Saving				
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
ES01	Inizio (0÷24)	0	23.50	Min	10 min
ES02	Fine (0÷24)	0	23.50	Min	10 min
ES03	Lunedì 0 = Non abilitato 1= Abilitato	0	1		
ES04	Martedì 0 = Non abilitato 1= Abilitato	0	1		
ES05	Mercoledì 0 = Non abilitato 1= Abilitato	0	1		
ES06	Giovedì 0 = Non abilitato 1= Abilitato	0	1		
ES07	Venerdì 0 = Non abilitato 1= Abilitato	0	1		
ES08	Sabato 0 = Non abilitato 1= Abilitato	0	1		
ES09	Domenica 0 = Non abilitato 1= Abilitato	0	1		
ES10	Incremento set energy saving chiller	-30.0 -54	30.0 54	°C °F	Dec int
ES11	Differenziale energy saving chiller	0.1 0	25.0 45	°C °F	Dec int
ES12	Incremento set energy saving p.d.c.	-30.0 -54	30.0 54	°C °F	Dec int
ES13	Differenziale energy saving p.d.c.	0.1 0	25.0 45	°C °F	Dec int
Pr2	Password	0	999		
	Compressor parameters				
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
CO01	Tempo minimo accensione	0	250	Sec	10Sec
CO02	Tempo minimo spegnimento	0	250	Sec	10Sec
CO03	Ritardo accensione tra i due compressori / parzializzazione	1	250	Sec	
CO04	Ritardo spegnimento tra i due compressori / parzializzazione	0	250	Sec	
CO05	Ritardo all' accensione compressori da power ON	0	250	Sec	10Sec
CO06	Ritardo ON compressore dalla partenza pompa / ventilatore di mandata	1	250	Sec	
CO07	Ritardo OFF pompa / ventilatore di mandata dallo spegnimento compressore	0	250	Sec	
CO08	Rotazione compressori 0= Abilitata 1= Sequenza fissa	0	1		
CO09	Tempo di ritardo disattivazione valvola lato acqua da OFF compressore	0	250	Sec	
CO10	Polarità valvola di parzializzazione 0=. Parzializzazione. ON 1=. Parzializzazione. OFF	0	1		
CO11	Modo operativo pompa / ventilatore di mandata 0= Assente 1= Funzionamento continuo in uscita ON/OFF 2= Funzionamento su chiamata del compressore 3= Funzionamento continuo in uscita 4÷20mA 4= Funzionamento su chiamata del compressore 4÷20mA	0	4		
CO12	Compressore 1 0 = Abilitato 1 = OFF	0	1		
CO13	Compressore 2 / parzializzazione. 0 = Abilitato 1= OFF	0	1		
CO14	SET Contaore compressore 1	0	999	Hr	10 Hr
CO15	SET Contaore compressore 2	0	999	Hr	10 Hr
CO16	SET Contaore pompa acqua / ventilatore di mandata (unità aria/aria)	0	999	Hr	10 Hr
	Unloading evaporator				
CO17	Set point attivazione unloading evaporatore	-50.0 -58	110 230	°C °F	Dec int
CO18	Differenziale attivazione unloading evaporatore	0.1 0	25.0 45	°C °F	Dec int
CO19	Ritardo attivazione unloading evaporatore	0	250	Sec	10 Sec
CO20	Tempo massimo di permanenza in funzionamento unloading comp da alta temp. ingresso evaporatore	0	250	Sec	10 Sec
	Unloading capacitor				
CO21	Set point unloading compressore pressione in funzionamento chiller	0.0 0	50.0 725	Bar Psi	Dec int
CO22	Differenziale unloading compressore pressione in funzionamento chiller	0.0 0	12.0 174	Bar Psi	Dec int
CO23	Set point unloading compressore pressione in funzionamento pompa di calore	0.0 0	50.0 725	Bar Psi	Dec int
CO24	Differenziale unloading compressore pressione in funzionamento pompa di calore	0.0 0	12.0 174	Bar Psi	Dec int
CO25	Tempo massimo di unloading condensatore	0	250	Sec	10 Sec
	Condenser water pump				
CO26	Modo operativo pompa acqua condensatore 0= Assente 1= Funzionamento continuo 2= Funzionamento su chiamata del compressore	0	2		
CO27	Ritardo OFF pompa acqua condensatore dallo spegnimento compressore	0	250	Sec	
CO28	SET Conta ore pompa acqua condensatore	0	999	Hr	10 Hr
	Compressor function in tandem				
CO29	Tempo massimo di funzionamento continuativo compressore	0	250	Min	
CO30	Tempo di ritardo avviamento compressore dalla richiesta valvola solenoide lato acqua.	0	250	sec	10 Sec
	Modulating evaporator water pump				
CO31	Tempo di spunto pompa impianto alla massima velocità da richiesta termoregolazione	0	250	sec	
CO32	Minima velocità % in funzionamento con compressore attivo (Chiller)	30	100	%	
CO33	Minima velocità % in funzionamento con compressore attivo (Pompa di calore)	30	100	%	
CO34	Velocità % pompa impianto con compressore Spento	30	100	%	
CO35	Set point controllo velocità pompa in funzione della temperatura acqua uscita (PB2) in modalità chiller	-50.0 -58	110 230	°C °F	Dec int
CO36	Banda di controllo temperatura acqua mandata in chiller	0.0 0	25.0 45	°C °F	Dec int
CO37	Tempo ritardo spegnimento comp. da termoregolazione con pompa acqua < 100 % in funzionamento chiller	0	250	sec	
CO38	Set point controllo velocità pompa in funzione della temperatura acqua mandata (PB2) in modalità Pompa di calore	-50.0 -58	110 230	°C °F	Dec int
CO39	Banda di controllo temperatura acqua mandata in pdc	0.0 0	25.0 45	°C °F	Dec int
CO40	Tempo ritardo spegnimento comp. da termoregolazione con pompa acqua < 100 % in funzionamento p.d.c.	0	250	sec	
Pr2	Password	0	999		
	Ventilation parameters				
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
FA01	Uscita ventilatori 0= Assente 1= Presente	0	1		
FA02	Regolazioni ventole 0= Accese con compressore acceso 1= Regolazione ON / OFF 2= Regolatore proporzionale di velocità	0	2		
FA03	Modo funzionamento ventole 0= Dipendenti dal compressore 1= Indipendenti dal compressore	0	1		
FA04	Tempo di spunto ventole max velocità dopo ON	0	250	Sec	
FA05	Sfasamento ventole	0	20	Micro Sec	250÷s
FA06	Non adoperato				
FA07	Preventilazione in cooling prima di ON compressore	0	250	Sec	
FA08	Minima velocità ventole in estate	30	100	%	

FA09	Massima velocità ventole in estate	30	100	%	
FA10	Set temperatura / pressione minima velocità ventole in estate	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA11	Set temperatura / pressione massima velocità ventole in estate	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA12	Banda proporzionale ventilatori in estate	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA13	Differenziale CUT-OFF estate	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA14	Over ride CUT-OFF estate	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA15	Tempo ritardo CUT-OFF	0	250	Sec	
FA16	Velocità night function estate	30	100	%	
FA17	Minima velocità ventole in inverno	30	100	%	
FA18	Massima velocità ventole in inverno	30	100	%	
FA19	Set temperatura / pressione minima velocità ventole in inverno	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA20	Set temperatura / pressione massima velocità ventole in inverno	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA21	Banda proporzionale ventole in inverno	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA22	Differenziale CUT-OFF inverno	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA23	Over ride CUT-OFF inverno	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
FA24	Velocità night function inverno	30	100	%	
Hot Start function					
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
FA25	Set point hot start	-50.0 -58	110 230	°C °F	Dec int
FA26	Differenziale hot start	0.1 0	25.0 45	°C °F	Dec int
Pr2	Password	0	999		
Antifreeze / Stand Resistance Parameters					
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
Ar01	Set point minimo antigelo	-50.0 -58	Ar03	°C °F	Dec int
Ar02	Setpoint massimo antigelo	Ar03	110 230	°C °F	Dec int
Ar03	Set allarme antigelo in chiller	Ar01	Ar02	°C /°F	Dec/int
Ar04	Differenziale allarme antigelo in chiller	0 0	25.0 45	°C °F	Dec int
Ar05	Ritardo allarme antigelo	0	250	Sec	
Ar06	Numero max interventi ora antigelo	0	16		
Ar07	Ritardo allarme antigelo alla partenza in p.d.c.	0	250	Sec	
Ar08	Set point resistenze antigelo in chiller	-50.0 -58	110 230	°C °F	Dec int
Ar09	Set point resistenze antigelo in p.d.c	-50.0 -58	110 230	°C °F	Dec int
Ar10	Set point resistenze antigelo esterne (unità acqua/acqua)	-50.0 -58	110 230	°C °F	Dec int
Ar11	Differenziale resistenze antigelo in chiller	0.1 0	25.0 45	°C °F	Dec int
Ar12	Differenziale resistenze antigelo in p.d.c.	0.1 0	25.0 45	°C °F	Dec int
Ar13	Attivazione resistenze antigelo 0= Attivazione con termoregolatore 1= Attivazione con termoregolatore e in sbrinamento	0	1		
Ar14	Regolazione resistenze antigelo in chiller 0= OFF in chiller 1= ON in chiller	0	1		
Ar15	Regolazione resistenze antigelo in p.d.c 0= OFF in p.d.c. 1= ON in p.d.c.	0	1		
Ar16	Termoregolazione resistenze antigelo in chiller 0= Regola su PB1 1= Regola su PB2 2= Regola su PB3 3= Regola su PB4	0	3		
Ar17	Termoregolazione resistenze antigelo in p.d.c. 0= Regola su PB1 1= Regola su PB2 2= Regola su PB3 3= Regola su PB4	0	3		
Evaporator water pump operation					
Ar18	Regolazione pompa acqua evaporatore / resistenze antigelo in OFF-stand-by 0= Disattivata 1= Attivata 2= Regolazione pompa acqua / resistenze antigelo su sonda PB4 configurata come sonda ambiente 3 = Regolazione pompa acqua / resistenze antigelo su sonda PB4 configurata come sonda ambiente con set separati	0	3		
Ar19	Attivazione pompa acqua / resistenze antigelo in caso di guasto sonda 0= Spente con guasto sonda 1= Accese con guasto sonda	0	1		
Boiler function					
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
Ar20	Funzione boiler 0= Controllo in integrazione 1= Controllo in riscaldamento	0	1		
Ar21	Set point aria esterna attivazione resistenze boiler	-50.0 -58	110 230	°C °F	Dec int
Ar22	Differenziale resistenze boiler	0.1 0	25.0 45	°C °F	Dec int
Ar23	Tempo ritardo attivazione funzione boiler	0	250	Min	
Ar24	Tempo ritardo attivazione resistenza n° 2 boiler	0	250	Min	
Ar25	Set point aria esterna disattivazione compressori	-50.0 -58	110 230	°C °F	Dec Int
Ar26	Differenziale aria esterna attivazione compressori	0.1 0	25.0 45	°C °F	Dec int
Antifreeze alarm in heat pump					
Ar27	Set allarme antigelo in funzionamento p.d.c.	Ar01	Ar02	°C /°F	Dec/int
Ar28	Differenziale allarme antigelo in p.d.c.	0 0	25.0 45	°C °F	Dec int
Evaporator / condenser water pump operation on room probe					
Ar29	Set attivazione pompa acqua evaporatore / condensatore su sonda ambiente	-50.0 -58	110 230	°C °F	Dec int
Ar30	Differenziale attivazione pompa acqua evaporatore / condensatore su sonda ambiente	0.1 0	25.0 45	°C °F	Dec int
Condenser water pump operation					
Ar31	Regolazione pompa acqua condensatore/ resistenze antigelo in OFF-stand-by 0= Disattivata 1= Attivata 2= Regolazione pompa acqua / resistenze antigelo su sonda PB4 configurata come sonda ambiente 3 = Regolazione pompa acqua / resistenze antigelo su sonda PB4 configurata come sonda ambiente con set separati.	0	3		
Ar32	Attivazione pompa acqua condensatore in caso di guasto sonda 0= Spente con guasto sonda 1= Accese con guasto sonda	0	1		
Pr2	Password	0	999		
Defrost parameters					
Parameter	**Description**	**min**	**max**	**udm**	**Resolution**
dF01	Esecuzione sbrinamento 0= No 1= Si	0	1		
dF02	Modalità di sbrinamento 0= Temperatura / pressione 1= Tempo 2= Contatto esterno	0	2		
dF03	Temperatura pressione inizio sbrinamento	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
dF04	Temperatura pressione fine sbrinamento	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
dF05	Tempo minimo di attesa prima di uno sbrinamento forzato	0	250	Sec	
dF06	Durata minima sbrinamento	0	250	Sec	
dF07	Durata massima sbrinamento	0	250	min	
dF08	Tempo di attesa in OFF compressore prima dello sbrinamento	0	250	Sec	
dF09	Tempo di attesa in OFF compressore dopo lo sbrinamento	0	250	Sec	
dF10	Tempo di attesa minimo tra 2 sbrinamenti successivi	1	99	MIN	
dF11	Set temperatura inizio ciclo sbrinamento combinato dopo conteggio par. DF10	-50.0 -58	110 230	°C °F	Dec int
dF12	Set temperatura fine ciclo di sbrinamento combinato	-50.0 -58	110 230	°C °F	Dec int
dF13	Forzatura in ON secondo compressore in sbrinamento 0= Disabilitata 1= Abilitata	0	1		
dF14	Abilitazione ON ventilazione durante lo sbrinamento / gocciolamento 0= Disabilitata 1= Abilitata solo sbrinamento 2= Abilitata sbrinamento, gocciolamento (dF09)	0	2		
dF15	Set pressione / temperatura forzatura regolazione ventilazione di condensazione in sbrinamento	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
dF16	Allarme di minima in sbrinamento 0= Non abilitato 1= Abilitato	0	1		
dF17	Ritardo allarme di minima all'inversione della valvola 4 vie	0	250	Sec	

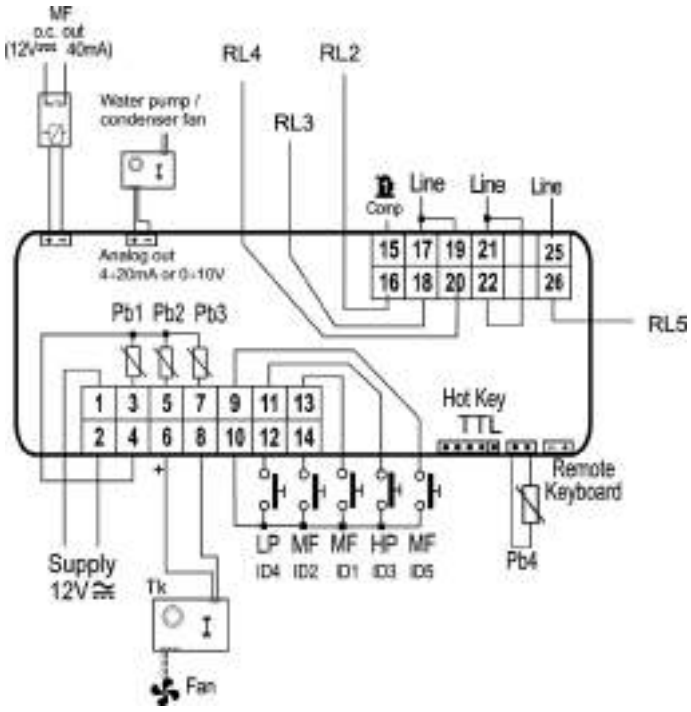
dF18	Valvola 4 vie di inversione ciclo 0= ON in cooling 1= ON in heating	0	1		
dF19	Set temperatura / pressione forzatura ciclo di sbrinamento	-50.0 -58 0.0 0	110 230 50.0 725	°C °F bar psi	Dec int Dec int
dF20	Differenziale forzatura ciclo di sbrinamento	0.0 0 0.0 0	25.0 45 50.0 725	°C °F Bar psi	Dec Int Dec Int
dF21	Blocco ventilatori in sbrinamento	0	1		
Pr2	Password	0	999		

Alarm parameters

Parameter	Description	min	max	udm	Resolution
AL01	Ritardo pressostato bassa pressione	0	250	Sec	
AL02	Numero massimo interventi ora bassa pressione	0	16		
AL03	Allarme bassa pressione con compressore spento 0= Non attivo a compressore spento 1= Attivo a compressore spento	0	1		
AL04	Ritardo allarme flussostato / termica vent. di mandata (unità aria/aria) da attivazione pompa / ventilatore	0	250	Sec	
AL05	Tempo massimo permanenza allarme flussostato prima di trasformarsi in manuale e bloccare, se in moto, la pompa dell'acqua	0	250	Sec	
AL06	Durata ingresso flussostato / termica vent. di mandata attivo	0	250	Sec	
AL07	Durata ingresso flussostato / termica vent. di mandata non attivo	0	250	Sec	
AL08	Ritardo allarme termica compressore 1-2 alla partenza	0	250	Sec	
AL09	Numero massimo interventi ora termica compressori 1-2	0	16		
AL10	Numero massimo di interventi ora allarme alta temperatura / pressione di condensazione	0	16		
AL11	Set point allarme alta temperatura / pressione di condensazione	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
AL12	Differenziale alta temperatura / pressione	0 0 0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
AL13	Ritardo allarme bassa pressione ingresso analogico	0	250	Sec	
AL14	Set point allarme bassa pressione ingresso analogico	-50.0 -58 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int
AL15	Differenziale bassa temperatura / pressione	0 0 0 0	25.0 45 50.0 725	°C °F Bar Psi	Dec int Dec int
AL16	Numero massimo interventi ora allarme bassa pressione ingresso analogico	0	16		
AL17	Abilita uscita buzzer e relè allarme in OFF o stand-by 0= Uscita buzzer e relè allarme abilitata 1= Uscita buzzer e relè allarme non abilitata	0	1		
AL18	Polarità relè allarme/uscita open collector 0= Uscita senza tensione in condizioni normali, con tensione in presenza di allarme 1= Uscita con tensione in condizioni normali, senza tensione in presenza di allarme	0	1		
AL19	Sonda per allarme antigelo: 0= Legato ai parametri Ar16 in chiller - Ar17 in p.d.c. 1= Su sonda Pb1 2= Su sonda Pb2 3= Su sonda Pb3 4= Su sonda Pb4	0	4		
AL20	Numero massimo di interventi ora allarme generico blocco unità	0	16		
AL21	Tempo di ritardo allarme generico blocco unità con ingresso digitale attivo	0	250	Sec	
AL22	Tempo di ritardo allarme generico blocco unità con ingresso digitale non attivo	0	250	10 sec	10 sec
AL23	Funzionamento allarme generico 0 = solo segnalazione non dipende da AL20 (relè allarme e buzzer attivati) sempre riarmo automatico 1= l'allarme blocca l'unità il reset dell'allarme dipende dal valore del parametro AL20	0	1		
AL24	Set point allarme alta temperatura acqua ingresso impianto	-50.0 -58	110 230	°C °F	Dec int
AL25	Differenziale allarme alta temperatura acqua in ingresso	0.1 0	25.0 45	°C °F	Dec int
AL26	Ritardo allarme alta temperatura acqua in ingresso	0	250	10 sec	10 sec
AL27	Numero massimo di interventi ora allarme alta temperatura acqua ingresso impianto	0	16		
AL28	Ritardo allarme flussostato lato caldo da attivazione / spegnimento pompa acqua	0	250	Sec	
AL29	Tempo massimo permanenza allarme flussostato lato caldo prima di trasformarsi in manuale e bloccare, se in moto, la pompa dell'acqua	0	250	Sec	
AL30	Durata ingresso flussostato lato caldo attivo (pompa non funzionante)	0	250	Sec	
AL31	Durata ingresso flussostato lato caldo non attivo (pompa funzionante)	0	250	Sec	
AL32	Funzionamento flussostato lato caldo 0= disabilitato 1= abilitato solo chiller 2= abilitato solo p.d.c. 3= abilitato chiller e p.d.c.	0	3		
Pr2	Password	0	999		

6.3 DIGITAL CONTROL UNIT ELECTRICAL DIAGRAM

MF ID1, MF ID2, MF ID5 = multifunction digital inputs
HP ID3 = high pressure digital input
LP ID4 = low pressure digital input
MF RL2, MF RL3, MF RL4, MF RL5 = multifunction relay
Trigger signal out TK = output for connection to external module for condensing fan control (phase cut)
Pb1, Pb2, Pb3, Pb4 = NTC analog inputs
ingressi digitali **Pb3** = ratiomentric pressure translator 0.5 Vcc
MF o.c. out = configurable open collector output for connection to external relay



7/8 - SECTION C
FLAT SOLAR COLLECTORS SELECTIVE H+ - HX+
HUB RADIATOR PLUS 250 - 400 SOLAR

FLAT SOLAR COLLECTORSSELECTIVE H+ - HX+

7.1 GENERAL INFORMATION AND SYMBOLS USED IN THE MANUAL

When reading this manual, particular attention must be paid to the parts marked by the symbols represented:

DANGER!
Serious danger to safety and life

WARNING!
Possible dangerous situation for the product and the environment

NOTE!
Tips for users

APPROPRIATE USE OF THE APPLIANCE

The device was built on the basis of the current level of technology and recognized technical safety rules.
Nevertheless, following improper use, dangers could arise for the safety and life of the user or other people or damage to theì device or other objects.
The device is designed for operation in heating systems, hot water circulation and domestic hot water production.
Any other use is considered improper.
For any damage resulting from improper use, the manufacturer assumes no responsibility; in this case the risk is completely borne by the user.
Use according to the intended purposes also requires that the instructions in this manual are strictly followed.

WATER TREATMENT

In the presence of water with a hardness greater than 15 ° f, the use of anti-limescale devices is recommended, the choice of which must be based on the characteristics of the water.

INFORMATION TO BE PROVIDED TO THE USER

The user must be instructed on the use and operation of his solar system, in particular:

- Deliver these instructions to the user, as well as the others documents relating to the device inserted in the envelope contained in the packaging. The user must keep this documentation in order to have it available for any further consultation.
- Remember that in compliance with the regulations in force, the control and the maintenance, must be carried out in accordance with prescriptions and with the intervals indicated by the manufacturer.
- If the device were to be sold or transferred to a other owner or if you move and leave the appliance, always make sure that the booklet accompanies the appliance so that it can be consulted by the new owner and / or installer. In case of damage or loss, request another copy from the manufacturer.

The solar collectors must be intended for the use intended by the manufacturer for which they were made.
In the event of damage to people, animals and things deriving from failure to observe the instructions contained in this manual, the manufacturer cannot be held responsible.

SAFETY WARNINGS ATTENTION!

The installation, adjustment and maintenance of the appliance must be performed by professionally qualified personnel in accordance with the Ministerial Decree 37/08 at the end of the installation activities, a “DECLARATION OF CONFORMITY”

which certifies that the work has been carried out in a workmanlike manner, in accordance with the rules and regulations in force. Incorrect installation can cause damage to people, animals and things, for which the manufacturer cannot be held responsible in any way.
Therefore, to install the panels it is necessary to follow the instructions provided by the manufacturer in the instruction booklet supplied with the appliance.

DANGER!
NEVER try to carry out maintenance work or repairs on the system on your own initiative.
Any intervention must be carried out by professionally qualified personnel, it is advisable to stipulate a maintenance contract.
Poor or irregular maintenance can compromise the operational safety of the system and cause damage to people, animals and things for which the manufacturer cannot be held responsible.

CHANGES TO PARTS CONNECTED TO THE EQUIPMENT
Do not make changes to the following elements:
- to the water and electricity supply lines
- construction elements that affect safety operating device

The use of untested or unsuitable connection and safety devices or materials for use in solar systems (eg expansion vessels, pipes, insulation) is prohibited

It is forbidden to disperse or leave packaging material within the reach of children as it is a potential source of danger.
Do not leave tanks of antifreeze liquid unattended as, if accidentally ingested, it can be toxic.
Use the antifreeze liquid only and exclusively as a heat carrier inside the solar collectors, diluted according to the design instructions.
Some parts of the solar collector can reach high temperatures and cause burns, make sure they cannot accidentally come into contact with people, animals and objects sensitive to high temperatures.
For the assembly of the solar collectors, before starting the work, the safety regulations in the workplace must be strictly observed and all the protective structures provided for by them such as fall protection, safety nets for scaffolding, must be implemented. coveralls with tie-down or restraint belts, etc.
The equipment used must also comply with current legislation.
During work it is mandatory to wear protective goggles, safety shoes, cut-resistant work gloves and a helmet.

After removing the packaging, ensure the integrity and completeness of the supply and in case of non-compliance, contact the supplier company that sold the collectors.

TECHNICAL DATA PLATE
The technical data plate is placed on the side wall of the appliance.
Tampering, removal, lack of identification plates or anything else that does not allow the safe identification of the product, makes any installation and maintenance operation difficult.

"MOTHER COMPANY"

NAME Made in_____	MATR
	Anno_____
solar collector ***"MODELLO"***	
DIMENSIONS OF THE COLLECTOR	xxx mt
GROSS COLLECTOR SURFACE	xxx mq
EMPTY WEIGHT	xxx kg
VOLUME OF THE EAT TRANSFER FLUID	xxx lt
STAGNESS TEMPERATURE (1000 W/mq 30 °C)	xxx °C
MAXIMUN WORKING PRESSURE	xxx bar

PROTECTIVE FILM
The manifolds relating to the SELECTIVE H + and SELECTIVE HX + series are supplied with a protective film adhering to the glass.
This film has the function of protecting the most sensitive components of the collector (eg: glass gasket, pipe guide, ...) if it is installed on the roof, without starting the system with theì relative load of antifreeze liquid solution.
This situation can represent a rather critical condition because the heat absorbed by the collector has no possibility of being transferred through the heat transfer fluid to the water accumulation, located in the technical room or nearby.
The film therefore has the function of temporary protection of the collector and must be removed as soon as the system comes into operation.
The film has been tested for a duration of 1 month; therefore it is recommended to remove it within this period.
A longer period of permanence can cause the film to lose its adhesive characteristics or deteriorate, making it difficult to remove.
Removal takes place with a simple tearing gesture, starting from one corner.
The film is made of low density polyethylene, with the visible surface in white color; the adhesive part is made of rubber.
Below is the adhesive label that is applied to the film, in order to clearly inform the installer about the above information.

PROTECTIVE COVER TO BE REMOVED WITHIN MAXIMUM 1 MONTH OF INSTALLATION

AS PER SPECIFICATIONS IN THE MANUAL

LIGHTNING AND OVER VOLTAGE PROTECTION
If there is a lightning protection system in the building, the collector system must be connected to this system.
For integration, an electrical connection must be established via copper cable (minimum section 10 mm2) between the mounting frames and the piping.
The pipes must be electrically connected to the main equipotential connection by means of a cable with a minimum section of 10 mm^2.
Observe local lightning protection regulations.
A lightning equipotential bonding must be made in each system according to the ENV 61024-1 standard and the VDE 0185 standard.

MAXIMUM SNOW AND WIND LOAD
The collectors have been tested at 2400 Pa

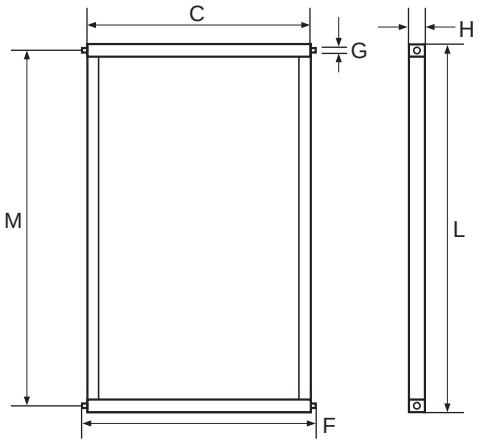
TRANSPORT AND HANDLING
Do not use a ladder to transport the material and collectors to the roof. Protect yourself from falling from the roof.
Do not use the manifold fittings as a transport aid.
Use the following aids: carrying strap, 3-point suction cup, special roof ladder, forklift, scaffold. Dispose of the transport packaging according to the recycling procedure most compatible with the environment.

TECHNICAL FEATURES
This flat solar collector is at the forefront of the market for quality and yield, and also for the use of low environmental impact materials.
The collector is tested by qualified institutes.
The heart of the solar panel is the TITAN absorbent plate, it determines the yield curve: the higher the absorption and the lower the emission, the better the yield curve.
The TITAN surface treatment allows the highest yield in the world for flat glazed solar collectors.

7.2 Technical data table SELECTIVE flat-plate solar collector

DESCRIPTION	U.M.	SELECTIVE H+	SELECTIVE HX+
Weight	kg	32,0	42,0
Case color		Grey	
Case material		Alluminum	
Isulation thiskness	mm	45	
Glass type		Extra Clear, AR, Hardened 3.2 mm anti-reflective	
Net absorbent surface	m^2	1,82	2,40
Coefficient of loss	W/m^2k	3,53	3,18
Total collector area	m^2	1,95	2,52
Absorbent plate material		Alluminum	
Surface treatment		Selective TITAN (titanium oxide)	
Efficiency (opening) η0		0,759	0,797
Glass transparency	%	93,8	
Glass thickness	mm	3,2	
Recommended load / panel	l/h	100	130
Collector water capacity	l	1,42	1,70
Maximum working pressure	bar	6	
Stagnation temperature	°C	204	

7.3 Solar collector dimensions SELECTIVE

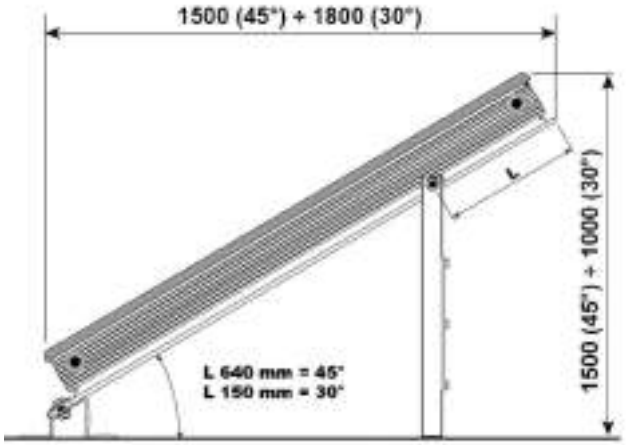


	SELECTIVE H+	SELECTIVE HX+
L	1987	1987
C	984	1270
H	100	100
M	1876	1876
G	22	22
F	1050	1340

Values in mm

7.4 DIMENSIONS AND DISTANCES FOR FORCED CIRCULATION ROOF INSTALLATION
For roof installation, the overall dimensions to be considered are those relating to the dimensions of the collector to be installed (SELECTIVE H +, HX +) as the fixing frame is smaller than that of the collector.

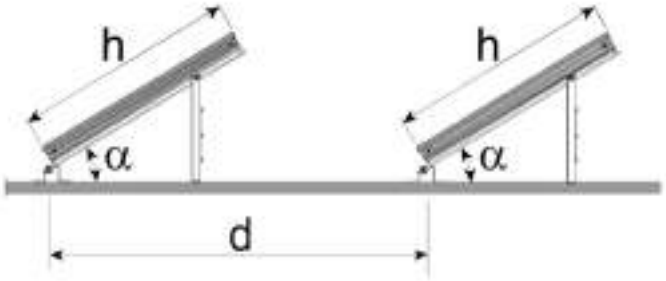
INSTALLATION ON RAISED FRAME

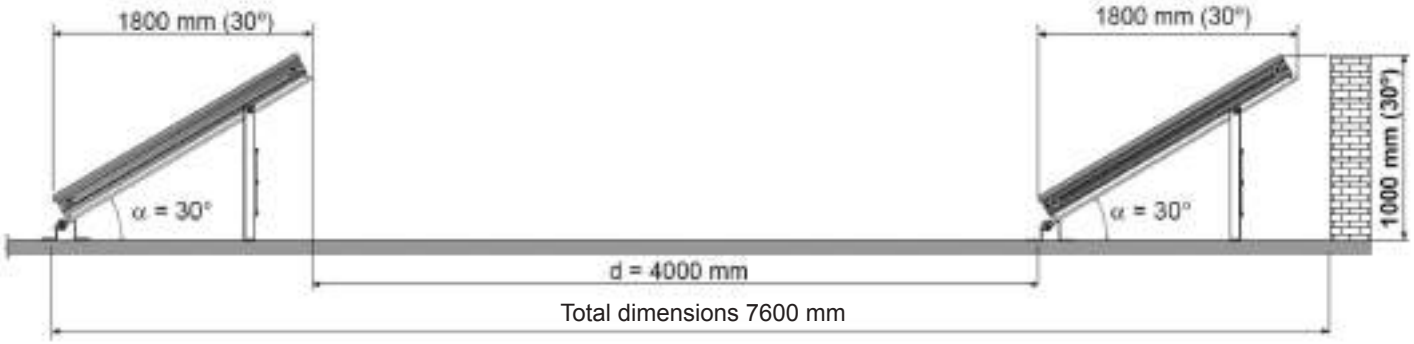


NUMBER OF PANELS	U.M.	TOTAL DIMENSION
1	mm	1160
2	mm	2200
3	mm	3260
4	mm	4320

DISTANCES “D”

The minimum recommended distance “D” between two rows of collectors installed on a raised frame depends on the latitude of the place and therefore also on the mounting inclination.
The distances refer to an annual use of the collector.





INCLINATION	MINIMUM DISTANCE - ANNUAL USE	MINIMUM DISTANCE - SUMMER USE
30°	5,2 metri	4 metri
45°	6,4 metri	4,4 metri
60°	7 metri	6 metri

7.5 HYDRAULIC CIRCUIT

The connections of the delivery and return of the collectors do not have an imposed direction of circulation. This means both connection diagrams represented in the two figures 10 and 11 of this page are admissible. Obviously, in the installation of several collectors in series and / or in parallel, once a direction of circulation has been chosen for a collector, it must be the same for all the other collectors in the system.

Fig. 10

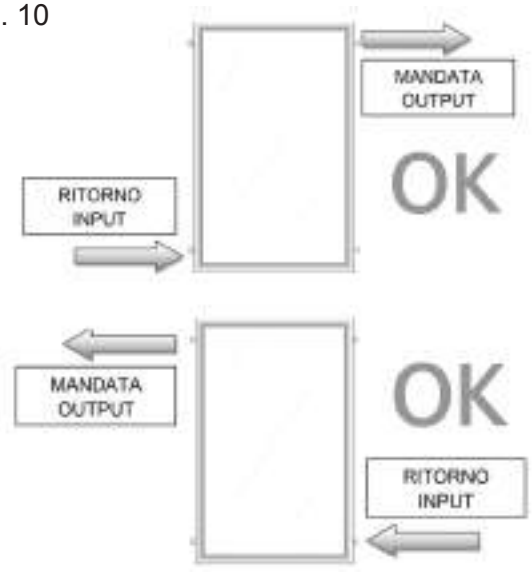
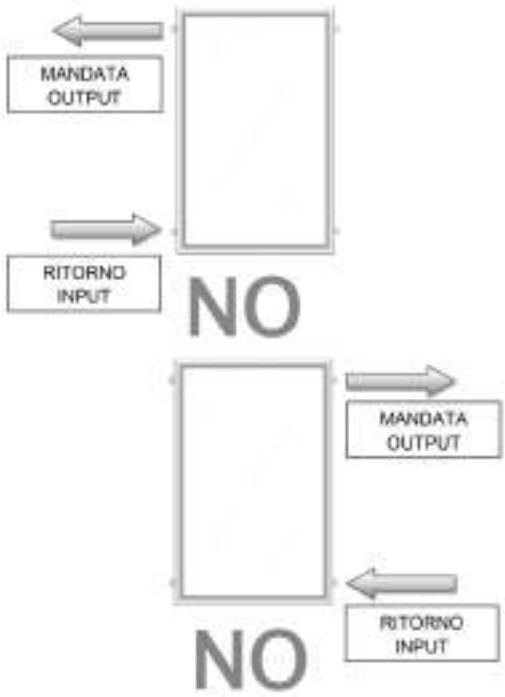


Fig. 11



8. INSTRUCTIONS FOR THE INSTALLER

GENERAL WARNINGS

Any modification to the products (Panel, Frame, Kettle, Fittings, etc.) is not allowed. The manufacturer assumes no liability of any kind for modified products.

WARNING!

This appliance must only be used for the use for which it was expressly intended. Any other use is to be considered improper and therefore dangerous.
This appliance uses the solar thermal fluid to heat water to a temperature below boiling point at atmospheric pressure.

Before connecting the appliance, have professionally qualified personnel carry out a thorough washing of all the system pipes to remove any residues or impurities that could compromise the proper functioning of the appliance.

WARNING!

The appliance must be installed by a qualified technician in possession of the technical-professional requirements according to the Ministerial Decree 37/08 which, under its own responsibility, guarantees compliance with the rules according to the rules of good practice.

GENERAL DANGER INSTRUCTIONS

IN GENERAL

The solar system must be assembled and operated in compliance with the recognized technical rules.
Observe the applicable accident prevention and protection regulations, especially for work on the roof.
Observe the accident prevention regulations of the Institute for Insurance against accidents at work.

DANGER OF OVER VOLTAGE

Ground the solar circuit for equipotential bonding as surge protection.
Apply hose clamps with grounding screws to the solar circuit pipes to be connected with a 16 mm2 copper cable to a potential equalization bar.

CORRECT USE OF THE SUPPORT LADDER

The
ladders must be placed on safe points at an angle between 65° and 75°; respect a stair protrusion of at least 1 m from the climb over point to pass over the roof.
The stairs must also be secured against slipping, tipping and sagging.
Finally, use ladders only to overcome differences in height of max. 5m.

PROTECTION FROM FALLING OBJECTS

The passageways or workstations that are located under the affected area must be protected from objects that can fall, slide or roll off the roof.
Marking, delimiting and barring areas that represent a danger to people.

SCAFFOLDING FOR FALL PROTECTION

For work on sloping roofs (from 20° to 60°) fall protection is required starting from a height of 3 m.
Roof fall protection scaffolding is a solution. The vertical distance between the workplace and the guard it must be a maximum of 5 m.
With an inclination of the roof greater than 45 ° it is necessary to create special workstations.

FALL PROTECTION WALL

A further possibility of protection for works on sloping roofs (up to 60°) starting from a fall height of 3 m are the roof protection walls.
The vertical distance between the work station and the guard must be a maximum of 5 m.
The protective walls must protrude laterally by at least 2 m.

FALL SAFETY EQUIPMENT

If the scaffolding or the roof protection wall are not suitable, it is possible to use fall safety equipment.
Apply the roof safety hook to solid construction parts, possibly above the user.

DANGER OF FALL

Do not use the hooks on the roof! The safety equipment must only be used in combination with the special safety hooks against falling from the roof.

DANGERS OF BURNS

To prevent burns due to parts of the collector at high temperatures, take the following measures: install the collector only on cloudy days; on sunny days it is preferable to work early in the morning or in the evening, or after having carefully covered the collector.

RULES FOR INSTALLATION

UNI 8477-1 (May 1983) Solar energy.
Calculation of contributions for building applications.
Evaluation of the radiant energy received.
UNI 8477-2 (December 1985) Solar energy.
Calculation of contributions for building applications.
Evaluation of the contributions obtainable through active or passive systems.
PrEN ISO 9488 Solar thermal systems and their components, terminology (ISO / DIS 9488,1995) EN 12975-1-2 Solar thermal systems and their components; solar collectors
- Part 1: General requirements - Part 2:
Test methods EN 12977-1-2 Thermal solar systems and their components Installations assembled on specification - Part 1:
General requirements - Part 2: Control verification UNI ENV 1991-2-3-4 Eurocode 1 - Calculation bases and actions on structures - Part 2-3-4: Actions on structures - snow loads - wind actions.
ENV 61024-1 ENV 12977-2 Protection of structures against lightning - Part 1: General principles (IEC 1024-1: 1990; modified)
UNI 9711 Thermal systems using solar energy.
Data for the offer, ordering and testing.
Law n. 10: “Rules for the implementation of the National Energy Plan on the rational use of energy, energy saving and development of renewable energy sources”;
Presidential Decree n. 412: “Regulations laying down rules for the design, installation, operation and maintenance of thermal systems in buildings”; Law n. 46: “Rules for the safety of installations”; Presidential Decree n. 447: “Regulation for the implementation of law no. 46 of 5 March 1990, on the subject of plant safety”; D.L. 2 April 1998 of the Ministry of Industry, Commerce and Crafts “Methods of certifying the characteristics and energy performance of buildings and systems connected to them” Legislative Decree 311: Implementation of EC directives relating to energy performance in buildings.

PACKAGING

The solar collectors are supplied assembled and accompanied by the ordered assembly kit (inclined or raised roof).
After removing the appliance from the packaging, make sure that the supply is complete and undamaged.
The packaging elements (cardboard box, straps, plastic bags, pallets etc.) **must not be left within the reach of children as they are potential sources of danger**.

The manufacturer declines all responsibility in the event of damage caused to persons, animals or things arising as a result of failure to comply with the above.
In addition to the appliance, the packaging also includes:
- Instruction booklet for the installer and maintenance technician
- Guarantee

PRELIMINARY OPERATIONS

Before installation, keep the collector away from possible sources of damage, therefore accidental bumps and falls.

ATTENTION: Before installing, never leave the collector upside down to avoid possible damage caused by water infiltration in case of rain; Before filling the circuit, never leave the solar collector empty exposed directly to solar radiation; it is advisable to cover the collector.

ATTENTION: Before connecting the panel to the system, carefully clean the pipes with a suitable product, in order to eliminate metal residues from processing and welding, oil and grease that may be present and which, reaching the boiler, could alter its operation.
Do not use solvents to wash the system, as their use could damage the system and / or its components.
Failure to follow the instructions in this manual can cause damage to people, animals and things, for which the manufacturer cannot be held responsible. Before filling the solar circuit, provide a pressure reducer if the network pressure exceeds 6 bar.

POSITIONING

When choosing the place to install the appliance, follow the following safety instructions:
- Place the appliance in places where it is possible to prevent access by children as a potential source of danger to their safety.
- Make sure that the fixing is carried out as illustrated in this manual.
- Make sure there are no high temperature parts that they can come into contact with people, animals or objects sensitive to high temperatures. The solar collector must be positioned in a place where the breakage of any of the elements supplied cannot cause any damage to people or things.

WARNING!

Respect the correct direction of installation;

ORIENTATION

Position the solar collectors so that the capturing surface is exposed to the south or in any case in the east-south-west quadrant, avoiding shaded areas.
DO NOT place panels facing north. Exposure affects the performance of the collectors. Maximum orientation recommended = 30° South / East - 30° South / West

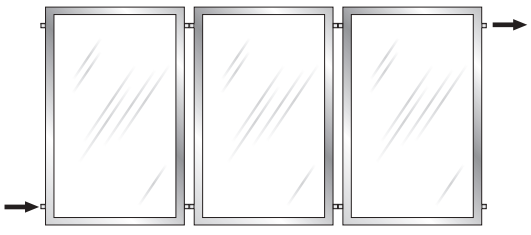
INCLINATION

When choosing the inclination of the collector (when not required due to an inclined roof installation) take into account: the variation in the inclination of the sun's rays during the year;
the place of installation; the type of plant; it is recommended to use the inclination suggested in the table shown below.

CITY	INCLINATION - YEAR USE	INCLINATION - SUMMER USE	INCLINATION - WINTER USE
Bolzano	46°	31°	61°
Milano	45°	30°	60°
Bologna	44°	29°	59°
Roma	42°	27°	57°
Napoli	40°	26°	56°
Catania	37°	22°	52°

8.1 EXAMPLES OF CONNECTIONS FOR FORCED CIRCULATION

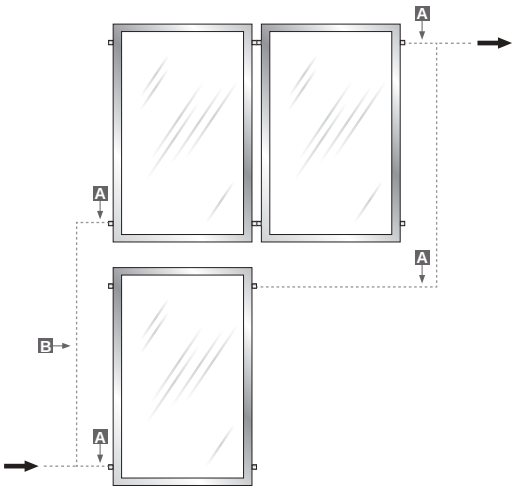
SERIES CONNECTION



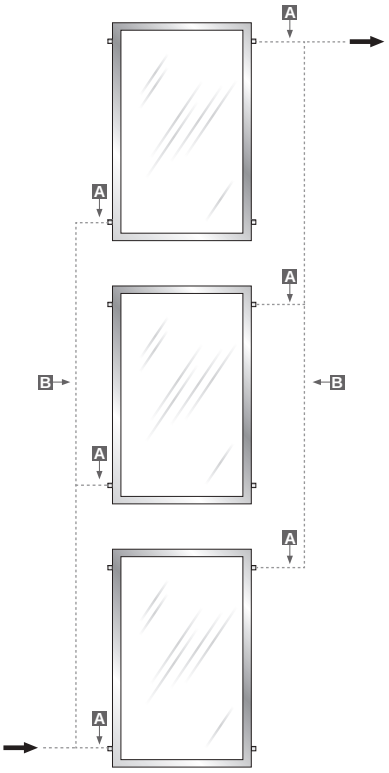
It is not recommended to connect more than n. 7 collectors in series

The components with the same letter must have the same length, the number of collectors in each series must be the same as the other series in the parallel

PARALLEL CONNECTION



PARALLEL CONNECTION *(Other examples)*



The components with the same letter must have the same length, the number of collectors in each series must be the same as the other series in the parallel

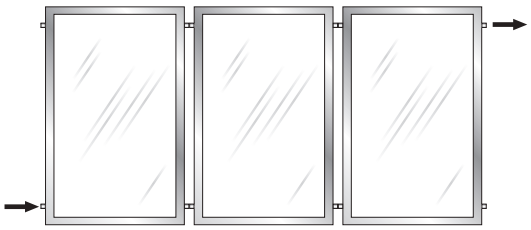
RECOMMENDED PIPES

Example of solar collectors in series:

N. 3 manifolds

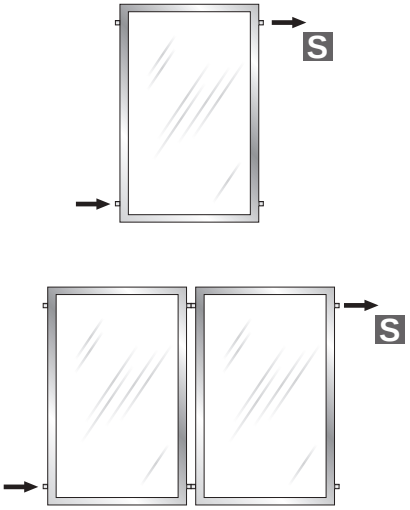
Diameter 18 mm

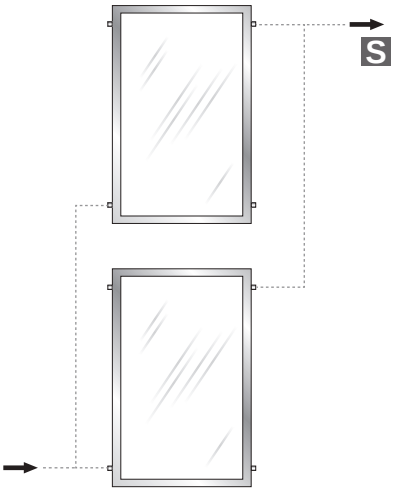
This connection is recommended for 2 to 7 collectors



For correct insertion of the probe carry out the following operations:

- Locate the probe holder well in the panel fittings kit
- Insert the sensitive element of the probe in the relative well probe holder





8.2 PROBE INSTALLATION (FORCED CIRCULATION)

THE PROBE MUST BE INSERTED ON THE DELIVERY SIDE OF THE MANIFOLD, THAT IS, ON THE SIDE OF THE HOT WATER OUTLET.

IN A SERIES CONNECTION ON A ROW, THE PROBE MUST BE INSERTED ON THE LAST MANIFOLD, ON THE SIDE OF THE DELIVERY.

IF THERE ARE MORE FILE OF MANIFOLDS, THE PROBE MUST BE INSERTED IN THE LAST MANIFOLD OF THE ROW NEAREST TO THE SYSTEM DELIVERY PIPE

8.3 SIZING OF EXPANSION VESSELS (FORCED CIRCULATION)

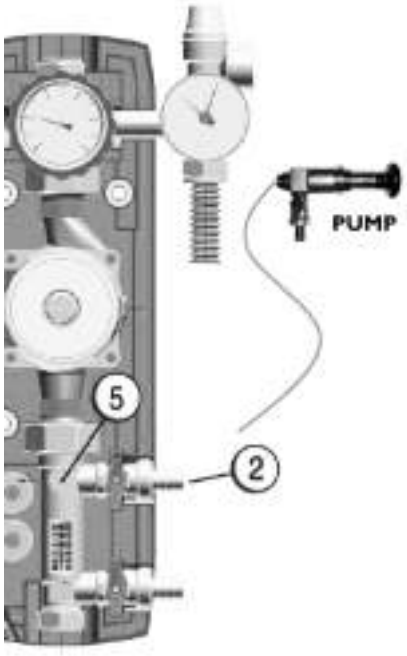
The recommended expansion vessels for vacuum systems vary according to the number of collectors installed.

the table below shows the recommended values for the expansion vessels to be included in the system.

Description	Dimension
Till a 3 collectors	12 liters
Till a 5 collectors	18 liters
Till a 8 collectors	24 liters
Till a 12 collectors	2 x 24 liters

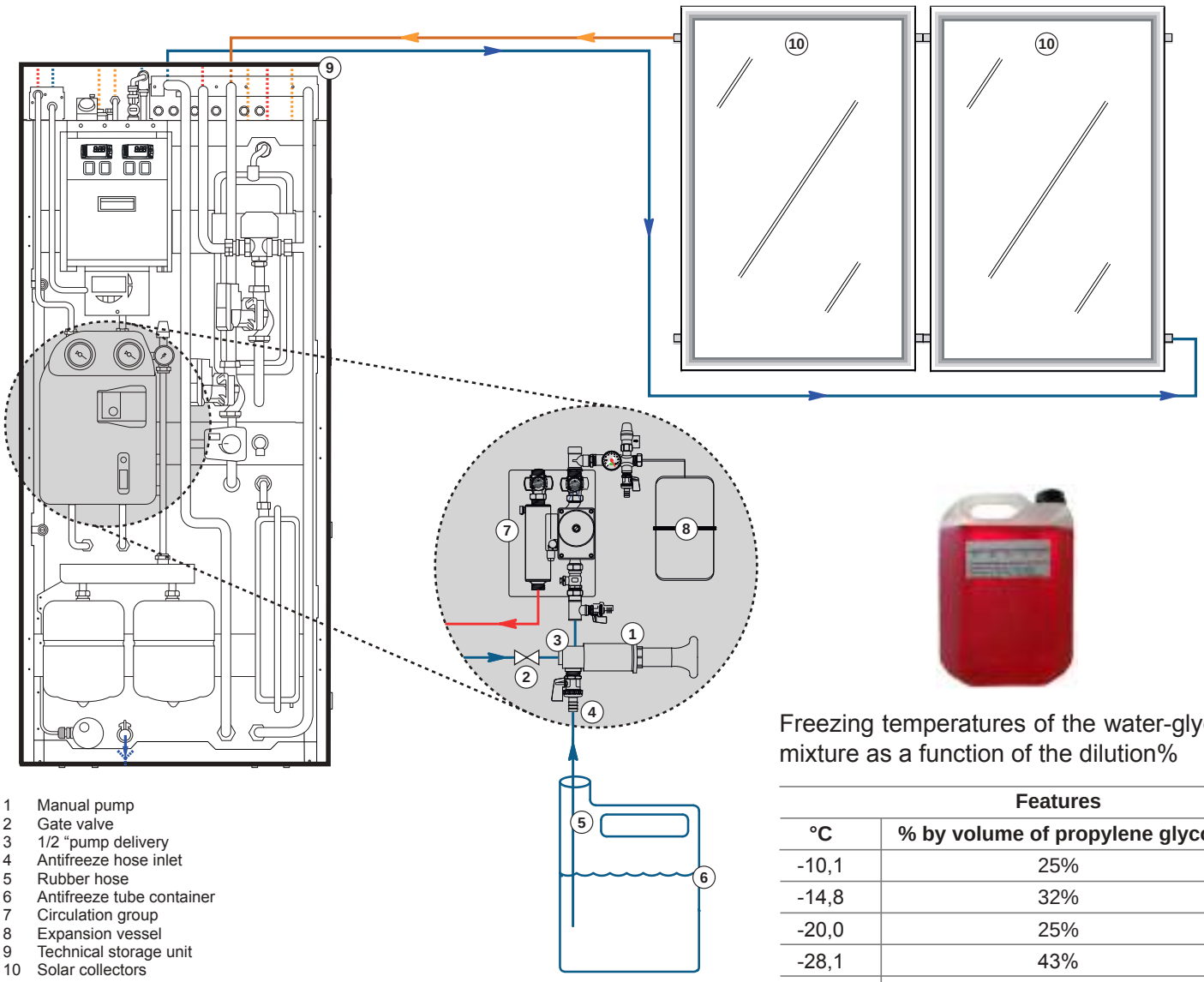
8.4 COMMISSIONING OF THE FORCED CIRCULATION SYSTEM

- Place the circulation group near the solar tank e higher than the exchanger to avoid air in the circuit.
- Connect the PUMP hand pump in point 2, for allow the air to escape into the circuit itself.
- Connect the hot flow of the manifolds to the top of the solar coil (located at the bottom of the boiler).
- Connect the return from the bottom of the coil to the bottom of the solar collector. This cold return pipe passes through the solar circulator.
- Connect the expansion vessels in the return.
- Connect the electrical circuit by placing the boiler probe on center of the solar coil and the integration probe at the top of the boiler.
- Adjust the flow rate of the closed circuit by acting on the regulator flow rate (5) and / or on the speed of the solar pump, until the value indicated in the table below is reached.



	U.M.	FLOW ADJUSTMENT					
Panels	N.	1	2	3	4	5	6
Flow	l/min	1,7	3,3	5	6,7	8,3	10

8.5 WIRING DIAGRAM FOR PRESSURE RESET



1 Manual pump
2 Gate valve
3 1/2 “pump delivery
4 Antifreeze hose inlet
5 Rubber hose
6 Antifreeze tube container
7 Circulation group
8 Expansion vessel
9 Technical storage unit
10 Solar collectors

Freezing temperatures of the water-glycol mixture as a function of the dilution%

Features	
°C	% by volume of propylene glycol
-10,1	25%
-14,8	32%
-20,0	25%
-28,1	43%
-32,0	47%
-44,9	56%
-50,1	60%

8.6 SYSTEM INSPECTION AND MAINTENANCE
FORCED CIRCULATION

The solar collector does not require particular maintenance, it is essential to carry out a periodic visual check of the collector itself (cleaning or absence of damage or breakages) and a check of the fixings and fittings.
In case of accidental leaks from the collector, the repair can bedone with a normal copper welding (contact the manufacturer for advice).
Periodically check that the system pressure remains constant during normal operation.
Check every year (at the beginning of winter) the concentration of antifreeze liquid with the appropriate tool that the limit value of -26 °C is not exceeded.
Check the pH of the antifreeze solution every year (it must be pH> 7.0).
In any case, the antifreeze fluid must be replaced every 5 years.
If there are noises inside the circuit, check and eliminate anyì residual air present.
Check the integrity of the anti-corrosion anode in the boiler.
Pump operation: check that the pump starts running in the night / day passage (presence of solar radiation) and that it stops in the reverse passages.
If there is a difference between delivery and return of the circuit greater than 60 °C, adjust the pump flow rate.
Never fill the circuit with water only.

Failed inspections and maintenance can cause damage to the system and to people, animals or things for which the manufacturer cannot be held responsible.
The checks must be carried out by an authorized technician during the annual checks.

ACTIONS ABSOLUTELY FORBIDDEN
FORCED CIRCULATION

The automatic filling of cold water into the circuit is absolutely forbidden to avoid breakage due to freezing.
There is no warranty coverage.
It is absolutely forbidden to intercept expansion vessels, solar collectors and safety valves with valves.
It is absolutely forbidden to operate the solar circulator manually at night or empty, as it causes condensation or problems in the circulator.
It is absolutely forbidden to install the system yourself without the help of a qualified installer.
It is absolutely forbidden not to adequately fix the frame to the underlying structure.
It is absolutely forbidden to put outside or to the elements anything that is not specifically suitable for the outside, such as: kettles, electrical equipment, expansion vessels, etc ...

8.7 LIST OF ANOMALIES FOR FORCED CIRCULATION SYSTEMS

ELENCO ANOMALIE	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Loss of pressure in the manifold circuit	Loss of any jolly valves present Water leakage in the circuit due to broken fittings / pipes. Anomalous leakage of fl uid from the safety valve	Replace the jolly valves with manual relief valves. Replace the safety valves
Abnormal fluid leaks from the safety valve	Insufficient or damaged expansion vessels Incorrect pre-charge pressure in the expansion vessel Incorrect sizing of the collector circuit flow rate Safety valve failure	Replace or increase the expansion vessels Remove pressure in the system and put the vessels back under pressure Replace the safety valve
Failure of the pump	No mains voltage Reaching limit temperature of the storage tank or collector Breakage of collector or storage tank temperature probe	Check the electronic control unit The control unit manages the limit temperature, everything will be reset when the temperatures have dropped. Probes replacement
No hot fluid arriving from the manifold but the pump is running	Shut-off valves and / or non-return valves closed Presence of air in the collector circuit Steam formation in the collector circuit (pump start delay or fluid flow too low)	Exhaust by means of the manual air vent. With cold circuit, remove air
Pump start-up delay	Wrong electronic control unit settings. Inversion of the probes during assembly	Check the settings of the electronic control unit again
Excessive kettle cooling	Non-return valve faulty, the boiler heat rises to the panel) DHW recirculation pump always running (where it exists) Kettle not properly insulated	Check the non-return valve. Set the recirculation usage time less frequently (Kettle not supplied by the parent company), isolate the kettle
Condensation in the panels	Check valve not working, the boiler heat rises to the panel Pump on also at night	Reset the operation of the solar circulator to automatic and not manual.

9 - SECTION D
SOLAR STATION UNIT 2 PLUS
HUB RADIATOR PLUS 250 - 400 SOLAR

9.1 MAIN PARTS OF THE COMBINED CIRCULATION GROUP FOR SYSTEMS SOLARI UNIT 2 PLUS

Round trip system

1 Ball valve on the delivery branch
(Thermometer with red ring and scale 0-120 °C)
with VNR (non-return valve) “Solar”

2 Ball valve on the return branch
(Thermometer with blue ring and scale 0-120 °C) with VNR (non-return valve) “Solar”

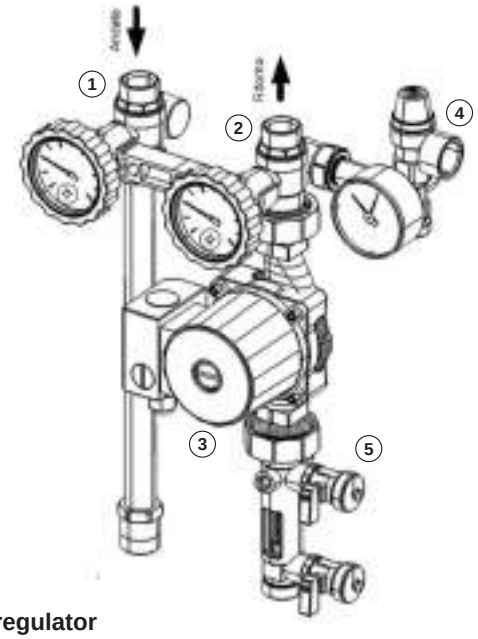
The “Solar” non-return valve inserted in the ball valve both on the flow and return branches guarantees tightness and low pressure drops.
To exclude the non-return valve, for example in case of system emptying, turn the knob 45° clockwise.

Circulator

3 Manually adjustable 3-speed circulator.
Thanks to the tightness of the ball valves upstream and downstream of the circulator, it can be removed without emptying the system.

Security group

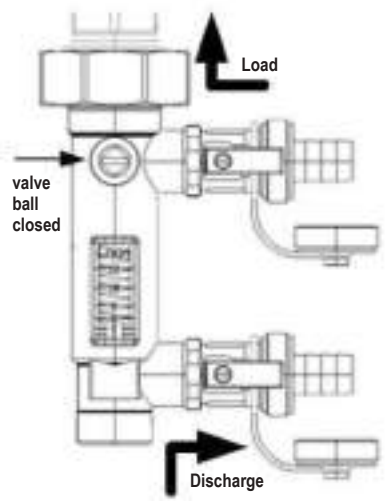
4 The CE and TUV certified safety safety group protects the system from overpressures. It is calibrated at 6 bar beyond which the group intervenes, and is also equipped with a pressure gauge and connection to the expansion tank via an optional 3/4 “flexible kit

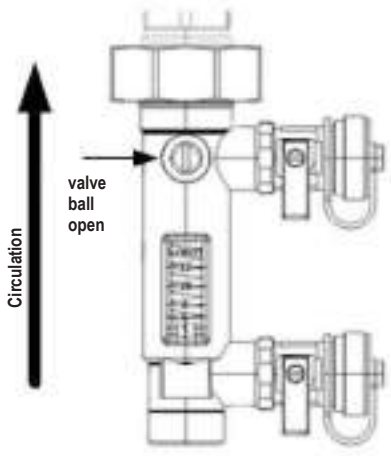


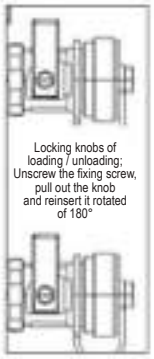
Flow regulator

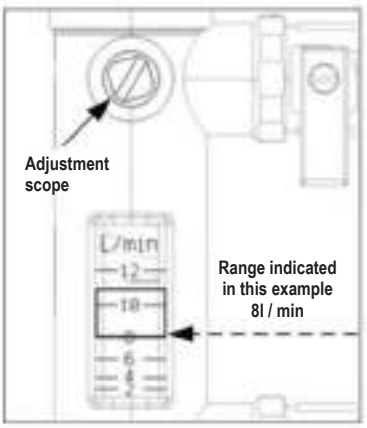
5 The regulator allows you to adapt the flow rate to your needs of the system through a 3-way ball valve.
When the valve is in the closed position, normal circulation is interrupted and it is possible to use the side tap to load the system. There is a second side tap for draining. The proximity of the 2 taps facilitates operations by minimizing the section between loading and unloading.
The flow rate is indicated by the appropriate sliding cursor: the feedback is immediate thanks to the proximity to the regulating valve

9.2 Instructions for using the flow regulator when loading the system









(1) Loading operations on the system:
Remove the cap from the side valves and insert the hose holder.
Close the ball valve and open the side loading and unloading valves.

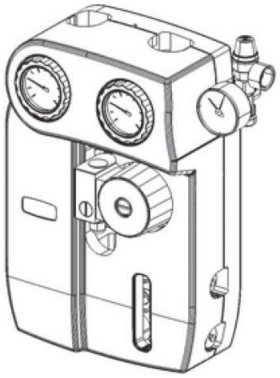
(2) System commissioning:
Open the ball valve and close the side loading and unloading valves. Remove the hose no longer used and screw the caps back on.
To avoid accidental opening of the side taps, it is advisable to lock the knobs in the closed position as shown on the side.

(3) Adjust the flow rate by acting on the adjustment rod until the desired flow rate is reached.

(NB) *the flow rate is indicated by pressing the lower profile of the sliding cursor as a reference (see figure).*

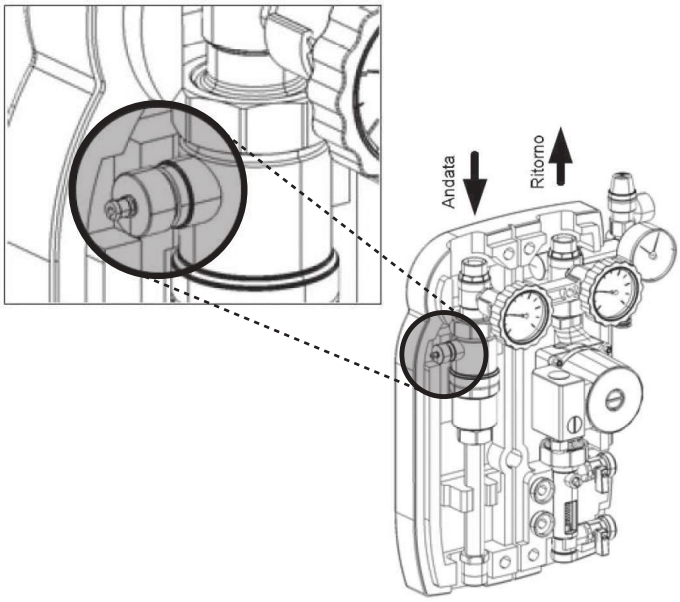
9.3 EPP INSULATION BOX UNIT 2 PLUS

- Dimensions 277x425x150 mm
- Side opening on the base for the safety group
- Internal joints for housing the 22 mm tube
- A special opening allows you to read and adjust the flow rate without removing the cover
- Rear fixing bracket



9.4 VERSION EQUIPPED WITH DEAERATOR

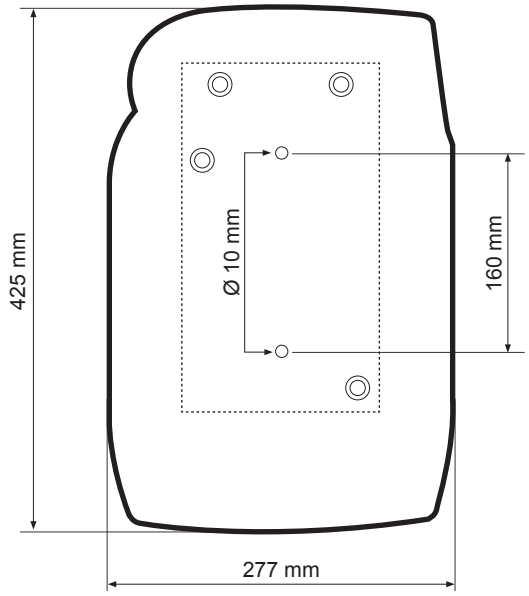
The deaerator is a device that continuously separates the air that is possibly in circulation together with the fluid.
The air is collected in the upper area of the deaerator tube and can be eliminated through the appropriate purge during the operation of the system.
Unscrew the knurled ring no more than half a turn.
This operation must be done occasionally.



DANGER OF BURNS

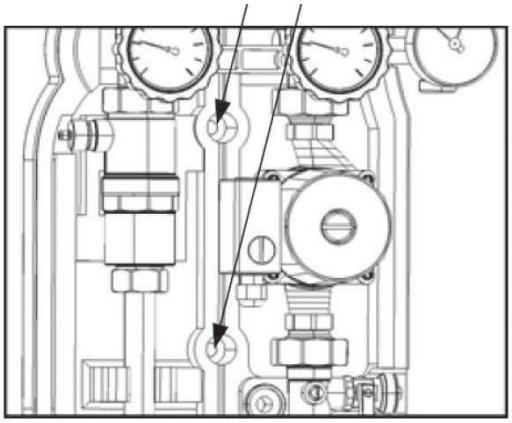
to avoid direct leakage of the liquid, given the high operating temperature it is advisable to connect a tube to the appropriate end of the drain.

9.5 SOLAR STATION DIMENSIONS UNIT 2 PLUS



9.6 FIXING HOLES ON THE REAR BRACKET

Special insulation passages allow fixing without having to disassemble the unit



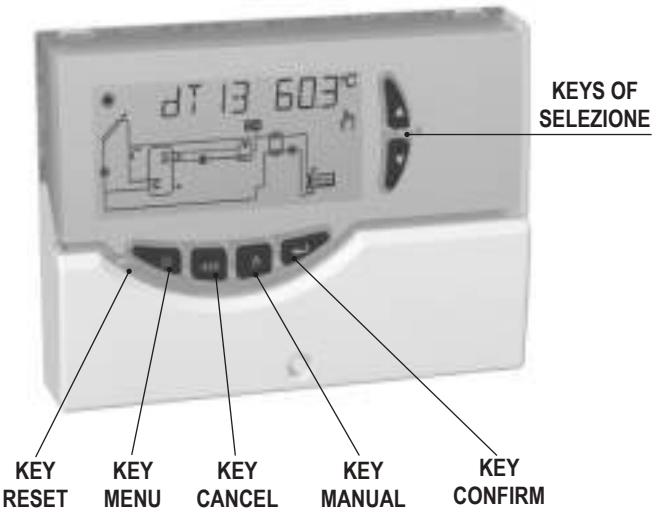
10 - SECTION E
SOLAR CONTROL UNIT CONTROL MULTI 06 S
HUB RADIATOR PLUS 250 - 400 SOLAR

SOLAR CONTROL UNIT CONTROL MULTI 06 S

10.1 GENERAL

This device is a control unit for the control of solar thermal systems.
Equipped with 5 outputs (4 load relays + 1 alarm relay), two PWM outputs, and 4 inputs (probes) it is able to configure and manage up to 20 different types of solar systems.
By selecting one of the 20 system schemes, the control unit will automatically manage the outputs and inputs relating to the type of system selected.
In addition, on the backlit LCD display it will be possible to view the configuration of the system's hydraulic diagram, the status of the outputs, the status of the probes and other numerous information and data.
The control unit allows you to restore the default data set in the factory; for more information see parameter P11 'UNIT'.

10.2 DESCRIPTION OF THE COMMANDS



10.3 TECHNICAL FEATURES

Power supply:	230V~ 50Hz
Absorption:	4 VA
Type of sensors:	4 x Pt1000 Class B DIN
Sensor operation limits:	-50 °C .. +200 °C (collector)
	-50 °C .. +110 °C (Boyler)
Temperature reading field:	-40,0 °C .. 260,0 °C
Precision:	± 1¡C
Risolution:	0,1°C (0,2 °F)
Offset:	on S1: ±5.0 °C
	on S2: ±5.0 °C
	on S3: ±5.0 °C
	on S4: ±5.0 °C
Installer password:	0000 .. 9999 (default 0000)
Acoustic signals:	On/Off (default On)
Back light switch-off:	20 sec from last press
logic Rel OUT2:	NOR=N.A. REV=N.C.
	non-modifiable logic for schemes
	with 2 manifolds (default N.A.)
Logic Rel OUT3:	NOR=N.A. REV=N.C.
	(default N.A.)
Logic Rel OUT4:	NOR=N.A. REV=N.C.
	(default N.A.)

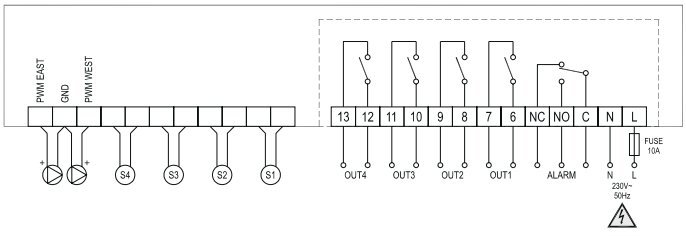
Output relay contacts capacity:	
OUT1 - OUT2 - OUT3 - OUT4:	4x2(1)A max 230V~(SPST)
	voltage free contacts
Alarm relay contact capacity:	4(1) A max 230V~(SPDT)
voltage free contacts:	Amplitude: 10V±15%
Frequency:	1KHz
Current:	15mA max.
Resolution:	0.5%
Max allowable length of	
PWM cable:	< 5m.
Degree of protection:	IP 40
Type of action:	1
Overvoltage category:	II
Degree of pollution:	2
Index of Tracking (PTI):	175
Protection class	
against electric shock:	II ⧈
Rated impulse voltage:	2500V
Number of manual cycles:	50000
Number of automatic cycles:	100000
Software class:	A
EMC test voltage:	230V~ 50Hz
EMC test current:	34mA
Distance tolerance exclusion	
'short' fault mode:	±0,15mm
Ball test temperature:	75 °C
Operating temperature:	0 °C .. 40 °C
Storage temperature:	-10 °C .. +50 °C
Humidity limits:	20% .. 80% RH
non-condensing	
Container: Material:	ABS V0 self-extinguishing Signal
Color:	white (RAL 9003)
Dimensions:	156 x 108 x 47 (W x H x D)
Weight:	~ 723 gr. (version with probes)
	~ 553 gr. (version without probes)
Fixing:	Wall mounted.

CLASSIFICATION ACCORDING TO REGULATION 2013.811.CE

Class:	not applicable
Contribution to energy efficiency:	not applicable

10.4 ELECTRICAL CONNECTIONS

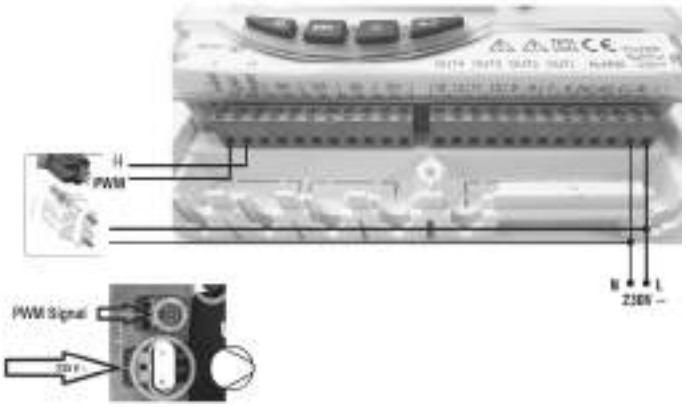
Make the electrical connections, following the diagram below



WARNING! Before making any connections, make sure that the power supply is disconnected.

WARNING!
S1, S2, S3 and S4 are Pt1000 temperature sensors.
For sensor S1 a probe with a range of -50 ° C .. + 200¡C must be used (probe supplied with gray cable), while for the other

probes probes with range -50 ° C .. + 110 ° C can be used (probes supplied with blue cable).
If systems with 2 solar panels are created, the probes corresponding to S1 and S4 must be exclusively with a range of -50 °C .. +200 °C.
The relay outputs relating to loads 1, 2, 3 and 4 are voltage free (230V ~); the output of the auxiliary alarm relay is a voltage free changeover contact.
It is advisable to insert a 10A 250V ~ fuse on the power supply line of the control unit, which intervenes in the event of shortì circuits on the loads.
TO VERIFY CORRECT OPERATION OF THE DEVICE IT IS NECESSARY THAT THE LOADS ARE CONNECTED.
EARTH TERMINAL BLOCK: On the base of the control unit there is a brass terminal block to connect the earth protection conductors of the various devices connected to the control unit.
EXAMPLE OF CONNECTION ONLY FOR CIRCULATORS COMPLYING WITH THE ErP 2015 DIRECTIVE, WITH EXTERNAL PWM SIGNAL



10.5 START-UP
ON AND OFF
To turn the control unit on or off, hold down the 'esc' button for at least 3 seconds.
When switched on, the control unit will carry out a diagnosis of the internal circuit to verify its correct functioning and the red LED will emit three flashes.
If the control unit does not detect any anomalies, the red LED will remain on, otherwise the LED will continue to flash quickly and the type of error will be shown on the display.

BACKLIGHT
Pressing any key activates the backlighting of the display which will turn off automatically after about 20 seconds.

ACOUSTIC SIGNALS
The control unit has an internal buzzer that allows it to emit acoustic signals each time the keys are pressed or in the event of an alarm or fault.
The acoustic signals can be excluded by setting the appropriate 'Installer Parameter'.

CONNECTED LOADS TEST FUNCTION
Through this function, which can be activated from the installer parameter

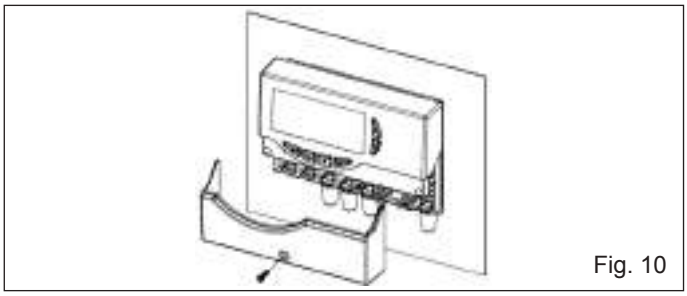


Fig. 10

in fig. 10, there is an example of the closing of the control unit
WARNING! When closing the control unit, make sure that the removable terminal blocks have been inserted correctly (the screws of the terminal blocks must be facing upwards).
P7, the control unit activates the connected loads in order to allow the installer to verify the correctness of the connections made.
10.6 DISPLAY OF TEMPERATURE, SPEED AND ENERGY PRODUCED
The control unit will normally show on the alphanumeric display the temperature detected by the connected probes, the speed (in%) of the collector pumps connected to the PWM outputs (E and W) and the quantity of energy produced.
The speed of the EAST manifold PWM pump is shown on the display with% EFX, while that of the WEST manifold is shown on the display with% WFX.
The energy display will be expressed in KWh + MWh. The KWh count, when it reaches 1000 KWh, will reset to zero and the MWh counter will increase by 1.
The total energy produced will be given by the sum of the two meters (for example 815 KWh + 12 MWh = 12.815 MWh).
The display of the temperatures detected and the speed of the PWM pumps is contextual to the hydraulic diagram set in the installer parameter P1.
By pressing the '▲' or '▼' keys, you can cyclically select the data whose value you want to view:
➔ S_1 ➔ S_2 ➔ S_3 ➔ S_4 ➔ %EFX➔ %WFX ➔ KWh ➔ MWh

ATTENTION
The calculation of the energy produced is carried out on thebasis of the pumps controlled with the ON / OFF type command.
If PWM pumps are connected, the calculation remains valid, but the value is calculated with an approximation up.

10.7 SUN / ANTIFREEZE DISPLAY
In normal operation, the 'SUN' icon will always be on on the display.
When the control unit detects a condition that activates the collector pump, the 'SUN' icon will flash.
When the Antifreeze function is activated, in addition to the 'SUN' icon, the 'SNOW' icon will also light up; when the control unit detects a temperature such as to activate the antifreeze, the 'SNOW' icon will also flash.

AUTOMATIC OPERATION / ABC (Automatic Boiler Control)
The control unit can manage the selected system in 2 different ways:
AUTOMATIC (Normal operation of the control unit)
In this mode the control unit automatically manages and controls the operation of the system according to the set data.

ABC (Automatic Boiler Control)
By pressing the key '☝' it is possible to activate or deactivate the ABC function of the control unit.
If the 'ABC' function is activated, the icon will light up on the display '☝'.
The conditions that cause the collector pump to activate are indicated below EST:

S_1≥TABC+Hysteresis value
and
S_1≥S_2+ Hysteresis value

The following are the conditions that cause the collector pump to shut down:

S_1<TABC
or
S_1<S_2

The conditions that cause the WEST manifold pump to activate are as follows:

S_4≥TABC+Hysteresis value
e
S_4≥S_2+Hysteresis value

The following are the conditions that cause the collector pump to shut down:

S_4<TABC
or
S_4<S_2

Where is it:
S_1: Temperature detected by the collector probe (EST).
S_2: Temperature detected by the boiler probe.
S_4: Temperature detected by the collector probe (WEST).
TABC: Temperature set in installer parameter P2. ABC function hysteresis value: 3.0 ° C (fixed not modifiable)
The only active controls will be those relating to maximum temperatures and safety.

RESET
To reset the device, press the button indicated with 'RESET' located under the removable door; DO NOT USE NEEDLES.

10.8 INSTALLER PARAMETERS
To access the installer parameters press '↵'.

Password entry
The display will show 'PWD 0000' with the first digit on the left flashing to indicate the password request. The keys are used to enter the 4-digit password '▲'
or'▼'; press key '↵ ' as well as confirming the digit entered, you will pass to the selection of the second digit and so on up to the last.
By confirming the last digit, using the '8' key, you will access the installer parameters.
The control unit leaves the factory with the password '0000'.

Modify Password
If you want to change the stored password, after pressing the key '↵ ', proceed as follows:
PRESS KEY 'MENU'.

PRESS 'MENU'.
▼
PUT THE ACTUAL PASSWORD.
(same procedure described previously)
▼
DISPLAY SHOWS 'PWDN0000'.
▼
INSERT NEW PASSWORD.
▼
DISPLAY SHOWS 'PWDC0000'.
▼
DISPLAY SHOWS 'PWDN0000'.
▼
INSERT NEW PASSWORD.
▼
THE CONTROL UNIT STORES THE NEW PASSWORD AND ACCESSES THE INSTALLER PARAMETERS.
▼

WARNING!
In "installer parameters" mode all the outputs are disabled. All the default values indicated are to be considered indicative as they may vary according to the version and without notice.

PRESS KEY ' ↵ ' FROM THE HOME SCREEN.
▼
THE DISPLAY SHOWS 'PWD 0000'.
▼
ENTER THE CURRENT PASSWORD.
▼
THE FIRST 'INSTALLER PARAMETER' IS DISPLAYED.
▼

THROUGH THE ARROWS '▲' o '▼' IT IS POSSIBLE TO SCROLL CYCLICALLY BETWEEN THE INSTALLER PARAMETERS:

P1: SYSTEM TYPE SELECTION	**'SCH'**
P2: THERMAL DATA SETTING	**'DATA'**
P3: MANAGE OF ANTI-FREEZE PARAMETERS	**'O AF'**
P4: ACOUSTIC SIGNAL MANAGEMENT	**'BEEP'**
P5: RELAY LOGIC SELECTION	**'ACT'**
P6: ACCOUNTING HOURS OF INTEGRATION	**'C AH'**
P7: TEST LOADS CONNECTED	**'TEST'**
P8: ACCOUNTING ENERGY PRODUCED	**'SEM'**
P9: RECOOLING FUNCTION	**'REF'**
P10: PERIODIC ACTIVATION OF LOADS	**'PVK'**
P11: UNIT OF MEASURE	**'UNITÀ'**
P12: LIMIT TEMP. MINIMUM COLLECTOR 'MTL'	
P13: SETTING OF PWM 'ERP' OUTPUTS	
P14: 'SAFE' COLLECTOR RESET TEMPERATURE	
P15: VACUUM TUBES	**'VTC'**
P16: ANTI-LEGIONELLA	**'LEG'**

▼
PRERSS KEY ' ↵ ' TO ENTER IN MODIFICATION OF THE SELECTED PARAMETER.
▼
CONFIGURE THE DATA RELATING TO EACH SINGLE PARAMETER AS SHOWN BELOW.
▼
PRESS THE 'esc' KEY TO RETURN TO THE SELECTION OF INSTALLER PARAMETERS.
▼
WAIT 20 SECONDS OR PRESS THE 'esc' KEY TO EXIT THE INSTALLER MODE.
▼

P1: SYSTEM TYPE SELECTION
By pressing the keys '▲' o '▼' all feasible systems will be shown (if for the selected system one of the probes has a problem or is not connected, this probe will flash on the display).
To confirm the desired system, press the key '↵ ' the control unit will memorize the choice and will return to showing the list of parameters.
To cancel the selection, press the 'esc' key, in this case the control unit will abandon the modification made and will return to showing the list of parameters.
The parameters that influence the adjustment of the selected scheme are listed below and can be modified using the second installer parameter.

WARNING!
Entering parameter P1, the control unit resets the maximum temperatures (TM) recorded up to that moment. By exiting this parameter, the control unit resets the temperature display on probe S_1.
The display of the thermal data to be set contextual to the selected scheme, i.e. the control unit displays only the thermal data actually active for the hydraulic scheme selected.

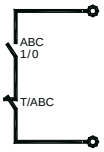
Legend of any thermal data to be set:

PARAMETERS	DESCRIPTION
TS1-TS2-TS3-TS4	Safety temperature on the probes
TS1-TS2-TS3-TS4	Safety temperature on the probes
ΔT 12	Differential between the probes S1-S2
ΔT 13	Differential between the probes S2-S3
ΔT 14	Differential between the probes S1-S4
ΔT 34	Differential between the probese S3-S4
ΔT 42	Differential between the probes S4-S2
ΔT 43	Differential between the probes S4-S3
MTC	Temp setting minimum of collector
MTEN	Enabling / disabling limitation
	minimum temperature
TM2	Max temperature on the probe S2
TM3	Max temperature on the probe S3
TM4	Max temperature on the probe S4
TAH	Integration temperature on the probe S3
MOD	How the integration works
TEC	Economy temperature on the probe S3
HY12	Hysteresis of the ΔT 12
HY13	Hysteresis of the ΔT 13
HY14	Hysteresis of the ΔT 14
HY34	Hysteresis of the ΔT 34
HY42	Hysteresis of the ΔT 42
HY43	Hysteresis of the ΔT 43
HYT	Thermostats hysteresis
HYTS	Safety thermostats hysteresis

▼

10.9 OPERATING LOGICS
ATTENTION: The following control logics must be applied to all the diagrams illustrated below.

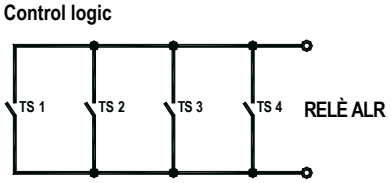
CONTROL LOGIC IN ABC



The control logic relating to the 'ABC' function commands replaces the differential control.
The controls relating to the Maximum and Safety temperatures are always active.
The supplementary source in ABC mode is switched off.
It will automatically re-arm when the above mode is deactivated.

SAFETY THERMOSTAT CONTROL LOGIC If an alarm occurs due to the exceeding of a safety temperature, the alarm relay will be activated, while the outputs relating to the loads continue to operate according to the relative logics.
In these conditions the control unit will emit an acoustic signal with an alarm beep and the display will light up in the icon is flashing “ ”. ⚠
The control is not active with the control unit in the “OFF” state (the display shows the word OFF).

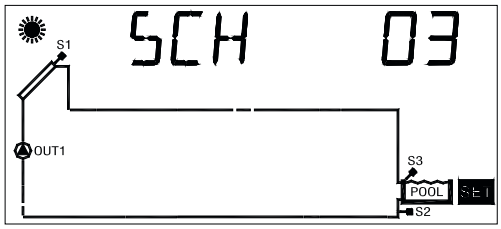
Alarm relay activation condition
The operating logic of the alarm relay, always present on any selected scheme, follows the conditions below: TX. ≥ TS. = Alarm relay ON
TX. ≤ (TS. - Hysteresis) = Rel Alarm OFF
Where is it:
TX .: Temperature detected by the connected probes (S1 .. S4).
TS .: Safety temperature relative to the probes (S1 .. S4).



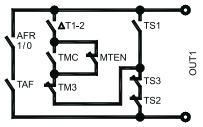
Alarm relay activation condition

SELECTABLE DIAGRAMS

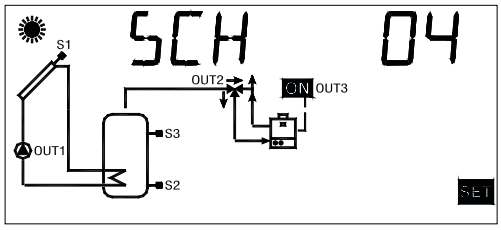
Scheme 3
Solar pool heating system.



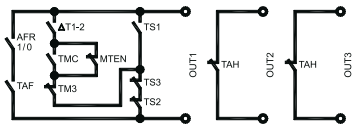
Control logic



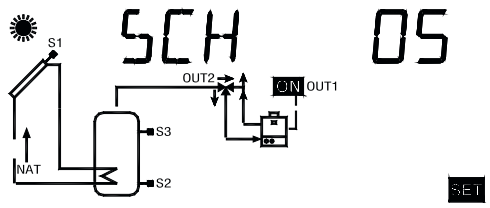
Scheme 4
Solar heating system with 1 tank, direct integration via valve logic.



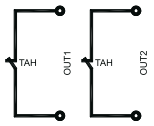
Control logic



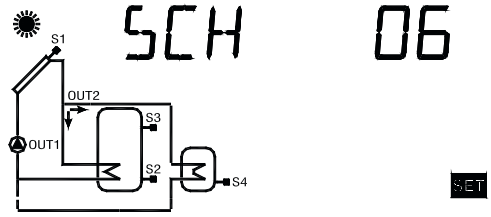
Scheme 5
Natural circulation solar heating system with 1 tank and direct integration via valve logic.



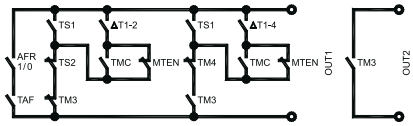
Control logic



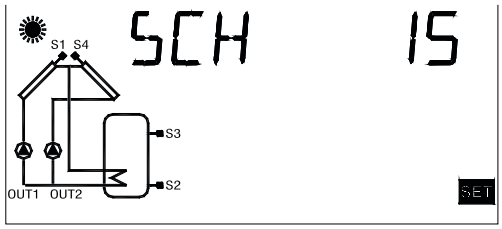
Scheme 06
Solar heating system with 2 tanks, valve logic control, integration excluded.



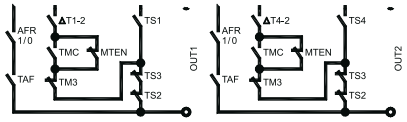
Control logic



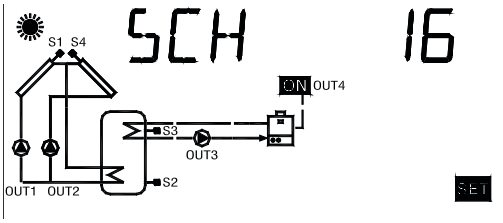
Scheme 15
EAST / WEST solar heating system, 1 tank and supplementary heating excluded.



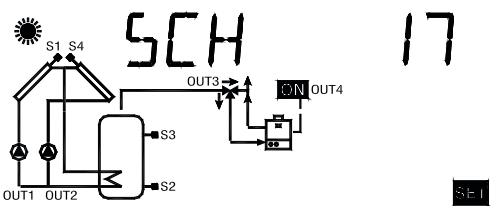
Control logic



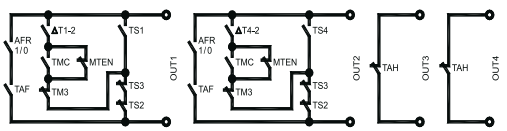
Scheme 16
EAST / WEST solar heating system, 1 tank and supplementary heating excluded.



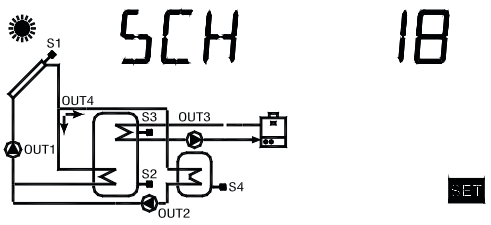
Scheme 17
EAST / WEST solar heating system, 1 tank, direct integration via valve logic.



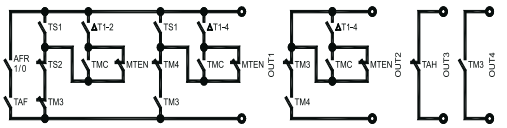
Control logic



Scheme 18
Solar heating system with 2 tanks, valve logic, supplementary heating, additional pump on the 2nd boiler.



Control logic



P2: THERMAL DATA SETTING
Using this parameter, you can set the thermal data relating to the selected system:
The control unit is supplied with pre-set thermal data for optimal operation.
The modification of these values must be carried out by qualified personnel.

SELECTED PARAMETER P2
PRESS THE KEY ' ↵ '

▼

THROUGH THE ARROWS '▲' or '▼' IT IS POSSIBLE TO SCROLL CYCLICALLY BETWEEN THERMAL DATA - Safety temperatures
- Differentials
- Differential hysteresis
- Hysteresis of the safety thermostats -
Hysteresis of the thermostats
- Offset
- Maximum temperatures
- Integration temperature on probe S3
- How the integration works
- Economy temperature on probe S3
- ABC temperature (automatic boiler control)

▼

PRESS KEY ' ↵ ' TO ENTER IN MODIFICATION OF THE SELECTED THERMAL DATA;
THE DATA STARTS TO FLASH.

▼

The adjustment fields relating to each single data are listed below.

WARNING!

The display of the thermal data to be set contextual to the selected scheme, i.e. the control unit displays only the thermal data actually active for the hydraulic scheme selected.

Safe temperatures		
Data	**Adjustment range**	**Default**
TS1	0.5 .. 240.0 °C	140.0 °C
TS2	40.0 .. 90.0 °C	90.0 °C
TS3	40.0 .. 90.0 °C	90.0 °C
TS4 [1]	40.0 .. 90.0 °C	90.0 °C
TS4 [2]	60.0 .. 240.0 °C	140.0 °C

WARNING!

If the selected scheme has only one collector, the defaultì value of the TS4 safety temperature will be equal to 90 °C (1), while if the selected scheme has two collectors, the default value of the TS4 safety temperature will be automatically set to 140 °C (2).

In case you switch from a two-collector scheme to a scheme with one collector and the maximum temperature TM4 greater than or equal to 85 °C, the TS4 safety temperature will be automatically limited to the TM4 value + 5 °C.

Non è possibile impostare il valore della Temperatura di Sicurezza TS2, TS3, TS4 ad un valore inferiore alla relativa Temperatura Massima, poichè il valore della Temperatura di Sicurezza è vincolato al valore della Temperatura Massima +5°C.

In case you want to decrease the temperature value safety, you must first decrease the value of the maximum temperature and then act on safety temperature.

If the Safety Temperature is displayed but not the relative Maximum Temperature, then the Safety Temperature will be limited based on the highest Maximum Operating Temperature in the current diagram (for example, in diagram no. 6 the TS2 safety temperature value will be limited based on the value of the maximum temperature TM3 if this is higher than TM4).

If the hydraulic scheme is changed, having previously activated "Scheme 5", all the Safety and Maximum Temperatures will be reset to the default values set in the factory.

Differentials		
Data	**Adjustment range**	**Default**
ΔT12	1.0 .. 25.0 °C	8.0 °C
ΔT14	1.0 .. 25.0 °C	6.0 °C
ΔT34	1.0 .. 25.0 °C	6.0 °C
ΔT43	1.0 .. 25.0 °C	6.0 °C
ΔT42	1.0 .. 25.0 °C	8.0 °C
ΔT13	1.0 .. 25.0 °C	6.0 °C

WARNING!

It is not possible to set the value of the differential below that of the relative hysteresis because the value of the differential is limited to the value of the hysteresis + 1 ° C.

If you want to decrease the value of the differential, you must first 'Lower' the hysteresis value.

Differential hysteresis		
Data	**Adjustment range**	**Default**
HY12	0.5 .. 25.0 °C	4.0 °C
HY14	0.5 .. 20.0 °C	2.0 °C
HY34	0.5 .. 25.0 °C	2.0 °C
HY43	0.5 .. 25.0 °C	2.0 °C
HY42	0.5 .. 25.0 °C	4.0 °C
HY13	0.5 .. 25.0 °C	2.0 °C

WARNING!

It is not possible to set the Hysteresis (HY) to a value higher than that of the relative Differential (ΔT), since the value of the Hysteresis is bound to the value of the Differential decreased by 1 °C.

If you want to increase the hysteresis value, you must first 'Increase' the value of the Differential (ΔT).

Safety temperature hysteresis		
Data	**Adjustment range**	**Default**
HYTS	1.0 .. 15.0 °C	2.0 °C

Hysteresis of the thermostats		
Data	**Adjustment range**	**Default**
HYT	1.0 .. 15.0 °C	2.0 °C

Probe offset		
Data	**Adjustment range**	**Default**
0S1	5.0 .. +5.0 °C	0.0 °C
0S2	5.0 .. +5.0 °C	0.0 °C
0S3	5.0 .. +5.0 °C	0.0 °C
0S4	5.0 .. +5.0 °C	0.0 °C

Maximum temperature of the probes		
Data	**Adjustment range**	**Default**
TM2	20.0 .. 90.0 °C	70.0 °C
TM3	20.0 .. 90.0 °C	70.0 °C
TM4	20.0 .. 90.0 °C	70.0 °C

WARNING!

It is not possible to set the value of the Maximum temperature (TM) to a value higher than that of the relative Safety temperature, as the value of the Maximum temperature is limited to the value of the Safety temperature (TS) decreased by 5 °C.

If you want to increase the value of the Maximum temperature, first you have to 'Increase' the value of the Safety temperature.

Integration temperature (After Heating) on probe S3		
Data	**Adjustment range**	**Default**
TAH	(TEC + 3) / 20 °C .. (TM3·5) °C	50.0 °C

WARNING!

If the parameter relating to the setting of the MOD integration operating mode has been set to nOr, it will not be possible to set the value of the TAH integration temperature to a value higher than that of the Maximum Temperature TM3 minus 5 °C.

While, if the parameter relating to the setting of the MOD integration operating mode has been set on ECO, it will not be possible to set the value of the TAH integration temperature to a value lower than that of the Economy TEC temperature plus 3 °C and to a value higher than that of the Maximum Temperature TM3 minus 5 °C.

Since the TAH integration temperature value is bound to the value of the maximum temperature TM3 minus 5 °C and to the value of the Economy temperature plus 3 °xC (if MOD set on ECO), in case you want to decrease the value of the maximum temperature TM3 to below the value of the TAH integration temperature set, first decrease the value of the TAH integration temperature and then act on the Maximum Temperature TM3.

The same consideration must be made if you want to increase the value of the Economy TEC temperature above the value of the TAH integration temperature set, you must first increase the value of the TAH integration temperature and then act on the Economy TEC temperature.

How the integration works		
Data	**Adjustment range**	**Default**
MOD	n0r .. ECO	ECO

WARNING!
- The MOD parameter is only visible if one has been set hydraulic scheme that includes a supplementary source.
- If the hydraulic scheme is changed, the parameters of the integration function will be reset to default values.
- By setting the parameter on ECO, the control unit will adjust the integration source according to the economy mode:

S3 ≥	**TAH**	**OUT 2 is OFF**
TEC <	**S3 < TAH**	**OUT 2 is OFF if OUT 1 on ON. OUT 2 is ON if OUT 1 on OFF for at least 5 minutes.**

In this case the control unit will enable a preset timer on 5 minutes (not modifiable), which will allow the activation of the supplementary source in the TAH .. TEC range, only if 5 minutes have elapsed from the deactivation of the collector pump. The Timer is necessary in order to uniform the temperature inside the Boiler, following the heat input provided by the solar panels through the collector pump.

S3 ≤	**TEC**	**OUT 2 is ON If OUT 1 is on OFF reset timer 5 min.**

If the temperature detected by probe S3 falls below the value set for the TEC economy temperature, and the collector pump is OFF, then the 5-minute timer relating to the activation delay of the integrative source is reset.
The reset is carried out in order to avoid oscillations of the regulation temperature around the TEC value and to reach the desired regulation value TAH.

Economy temperature on probe S3		
Data	**Adjustment range**	**Default**
TEC	20 °C .. TAH· 3°C	40 °C

WARNING!
- The TEC parameter can only be set if the MOD been set to ECO; otherwise it will not be possible to access the parameter and dashes will appear instead of the numerical value.
- It will not be possible to set the Temperature value of Economy TEC at a value higher than that of TAH integration temperature minus 3 ° C.

Since the value of the Economy TEC temperature is bound to the value of the integration temperature TAH minus 3 ° C, if you want to decrease the value of the integration temperature TAH below the value of the Economy TEC temperature set, you will first have to decrease the value of the Economy TEC temperature and then act on the integration temperature TAH.

ABC (Auto Boiler Control) temperature on probe S3		
Data	**Adjustment range**	**Default**
TABC	20 °C .. 80.0 °C	30 °C

P3: MANAGEMENT OF ANTI-FREEZE PARAMETERS
With this parameter you can set the data to manage the antifreeze function.

ATTENTION
The control unit is supplied with pre-set antifreeze data for optimal operation.
The modification of these values must be carried out by qualified personnel.

SELECTED THE PARAMETER P3
PRESS KEY ' ↵ '

▼

IT IS POSSIBLE TO SCROLL CYCLICALLY THROUGH THE DATA ANTIFREEZE USING THE ARROWS '▲' or '▼'
- Antifreeze temperatures 'TAF'
- Manifold pump on interval 'P ON'
- Collector pump off interval 'P OF'
- Duration tel Antifreeze test 'TMR'

▼

PRESS KEY ' ↵ ' TO ENTER IN MODIFICATION OF THE SELECTED THERMAL DATA;
THE DATA STARTS TO FLASH.

▼

USING THE ARROWS '▲' or '▼' SET THE DESIRED NUMERICAL VALUE

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

PRESS ' ↵ ' AFTER CHANGING THE DATA RELATING TO THE DURATION OF THE ANTI-FREEZE TEST, THE CONTROL UNIT CONFIRMS THE DATA AND PERFORM THE ANTI-FREEZE TEST

▼

The adjustment fields relating to each single data are listed below.

Antifreeze temperature		
Data	**Adjustment range**	**Default**
TAF	10 °C .. + 5.0 °C	4.0 °C

Manifold pump ignition interval		
Data	**Adjustment range**	**Default**
P ON	5 .. 60 sec.	10 sec.

Collector pump shutdown interval		
Data	**Adjustment range**	**Default**
P OF	1 .. 60 sec.	20 min.

Duration of the antifreeze test		
Data	**Adjustment range**	**Default**
TMR	5 .. 60 sec.	10 sec.

P4: ACOUSTIC SIGNAL MANAGEMENT
With this parameter it is possible to activate or deactivate the acoustic signals of the control unit (keypad tones, alarms and diagnostics).
The adjustment fields relating to each single data are listed below.

Activation / Deactivation of acoustic signals		
Data	**Adjustment range**	**Default**
BEEP	Off .. On	On

Note: with 'Off' the signals are deactivated, while with 'On' they are activated.

P5: RELAY LOGIC SELECTION
Through this parameter it is possible to invert the control logic of the relays, or to transform the output from Normally Open (N.O.) to Normally Closed (N.C.) and vice versa.
It will be possible to modify only the logic of the outputs that the selected scheme foresees as active.
By changing the scheme using parameter 1, all the output logics will be reset to the N.O. (default).
If the parameter is not active in the selected scheme, the display will show 'NONE'.

SELECTED PARAMETER P5
PRESS THE BUTTON ' ↵ '

▼

THROUGH THE ARROWS '▲' or '▼' YOU CAN SCROLL THE ACTIVE OUTPUTS

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

The outputs whose logic can be changed are a maximum of 3 and are listed below.

Logic output OUT 2		
Data	**Adjustment range**	**Default**
OUT 2	0 .. 1	1

Logic output OUT 3		
Data	**Adjustment range**	**Default**
OUT 3	0 .. 1	1

Logic output OUT 4		
Data	**Adjustment range**	**Default**
OUT 4	0 .. 1	1

Note: '0' logic means NC relay, while '1' logic means NO relay.

P6: ACCOUNTING HOURS OF INTEGRATION
With this parameter it is possible to view and reset the hours of actual activation of the integration source.

SELECTED PARAMETER P6
PRESS THE BUTTON' ↵ '

▼

THE DISPLAY SHOWS 'H' AND THE ACTUAL HOURS OF ACTIVATION OF THE INTEGRATION SOURCE

▼

PRESS ' ↵ ' DISPLAY SHOWS ' H' FLASHING

▼

PRESS ' ↵ '
THE COUNTER IS RESET BY PRESSING INSTEAD 'esc' YOU RETURN TO DISPLAY OF THE CURRENT HOURS

▼

The count of the integration activation hours is between 0000 .. 9999.
When the maximum value is reached, the count will stop.

P7: TEST CONNECTED LOADS
Through this parameter it is possible to carry out the functional test of the loads connected to the control unit.
The control unit activates the connected loads, according to the configured scheme, activating all the available outputs in sequence for 10 seconds each, including the alarm relay and the relative buzzer. The test sequence, in multiples of 5, can be set using the only parameter present 'TMR'.
The activation of the test will be signaled on the display with the lighting up of the 'TIMER' icon.

ATTENTION
The activation of the alarm relay will be indicated on the display by the flashing 'TIMER' icon and by the activation of the buzzer in order to also test the emission of acoustic signals.

SELECTED THE PARAMETER P7
PRESS KEY ' ↵ '

▼

DISPLAY SHOWS ' TMR '
FLASHING

▼

USING THE KEYS'▲' or '▼' THE NUMBER OF CYCLES CAN BE VARIED 5, 10, 15, 20, 25

▼

PRESS ' ↵ ' THE SET DATA IS CONFIRMED AND THE LOAD TEST STARTS. HOWEVER, PRESSING 'esc' CANCELS THE CHANGE AND RETURNS TO DISPLAYING THE NUMBER OF PRESET CYCLES

▼

Impostazione sequenza test		
Dato	**Campo regolazione**	**Default**
TMR	05 .. 25	05

P8: ACCOUNTING OF PRODUCED ENERGY
Through this parameter it is possible to manage the data relating to the measurement of the amount of heat produced by the system.
The amount of energy produced will be stored in the memory of the control unit approximately every 2 hours.
If the stored flow value is equal to zero, the display will show 'FLOW OFF' and the energy calculation will be inactive.
If you want to reset the energy meter produced, select the 'RESET' parameter and press the 'ENTER' key.
If the parameter is not active in the selected scheme, the display will show 'NONE'.

SELECT PARAMETER P8
PRESSING KEY ' ↵ '

▼

LE FRECCE '▲' or '▼' È POSSIBILE SCORRERE CICLICAMENTE TRA I PARAMETRI DI CONTABILIZZAZIONE DI ENERGIA PRODOTTA:
- System flow rate liters / minute 'FLOW'
'RST'
- Resetting of energy produced counters

▼

PRESS KEY ' ↵ ' TO ENTER THE SELECTED PARAMETER;
THE PARAMETER STARTS TO FLASH

▼

SET THE DESIRED NUMERICAL VALUE USING THE ARROWS '▲' or '▼'
(only for the parameter FLOW)

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

System flow rate expressed in liters / minute		
Data	**Adjustment range**	**Default**
FLOW	OFF .. 20.0 l/min	2.3 l/min

P9: RECOOLING FUNCTION

This function consists in the automatic reduction of the boiler temperature.

This parameter can be used to set the data relating to the management of the automatic cooling function of the Boiler. The activation of the collector pump, for cooling the boiler, will be indicated on the display with the lighting of both the 'pump' and 'sun' symbols flashing.

The Recooling function will be active if the RCEN parameter is equal to 1, while it will be disabled if it is equal to 0.

If the parameter is not active in the selected scheme, the display will show 'NONE'.

SELECTED THE PARAMETER P9
PRESS KEY ' ↵ '

▼

WITH ARROWS '▲' or '▼' IT IS POSSIBLE TO SCROLL CYCLICALLY BETWEEN THE PARAMETERS OF THE RECOOLING FUNCTION: -
Temperature of Recooling 'TR'
- Recooling temperature differential 'ΔTR'
- Enabling the Recooling function 'RCEN'

▼

PRESS KEY ' ↵ ' TO ENTER IN THE SELECTED PARAMETER; THE PARAMETER STARTS TO FLASH

▼

SET THE DESIRED NUMERICAL VALUE USING THE ARROWS '▲' or '▼'

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

Temperature Recooling		
Data	**Adjustment range**	**Default**
TR	70 °C .. (TM3+5) °C	70 °C

ATTENTION

It is not possible to set the value of the 'TR' Recooling Temperature to a value equal to or lower than that of the highest Maximum Temperature.

The value of the Recooling Temperature TR is bound to the value of the highest Maximum Temperature +1 ° C.

If you want to decrease the value of the 'TR' Recooling Temperature below the value of the Maximum temperatures set, you must first decrease the value of the or of the maximum temperatures and then act on 'TR' Recooling Temperature.

If any of the Maximum Temperatures is increased to a value higher than that of the Recooling Temperature 'TR', this is automatically set to the highest maximum temperature value +1 ° C.

The same considerations apply to the 'TR' Recooling temperature compared to the 'TAH' Integration temperature.

Temperature differential of Recooling TR		
Data	**Adjustment range**	**Default**
ΔTR	6 °C .. 15 °C	8 °C

Activation / Deactivation of function Recooling		
Data	**Adjustment range**	**Default**
REGEN	0 .. 1	1

Note: with '0' the Recooling function is disabled, while with '1' it is enabled.

P10: PERIODIC ACTIVATION OF LOADS

Through this parameter you can manage the periodic activation of the loads (pumps and valves) present in the selected hydraulic diagram. In particular, if a load has not been activated for 21 hours, it will be activated automatically by the control unit for 15 seconds, in accordance with the operating logic.

If a load activation occurs in this interval, the count will start again from zero.

The timers that take into account the activation and waiting time will not be memorized and in the event of a reset or power failure the count will restart from zero.

The 'periodic activation of loads' function will be active if the PVK parameter is equal to 1, while it will be disabled if it is equal to 0.

SELECTED THE PARAMETER P10
PRESS KEY ' ↵ '

▼

DISLPAY SHOWS ' PVK '.

▼

PRESS KEY ' ↵ ' DSPLAY SHOWS ' PVK ' FLASHING

▼

SET THE DESIRED NUMERICAL VALUE USING THE ARROWS '▲' or '▼'

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

Periodic activation of loads		
Data	**Adjustment range**	**Default**
PVK	0 .. 1	1

Note: with '0' the periodic activation of the loads is deactivated, while with '1' it is activated.

P11: UNIT OF MEASUREMENT

Through this parameter it will be possible to select the desired unit of measurement, in ° C or ° F.

SELECT PARAMETER P11 PRESS KEY ' ↵ '

▼

DISPLAY SHOWS ' UNIT '.

▼

PRESS KEY ' ↵ ' DISPLAY SHOWS ' UNIT ' FLASHING

▼

SET THE DESIRED NUMERICAL VALUE USING THE ARROWS '▲' or '▼'

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

Unit of measure		
Data	**Adjustment range**	**Default**
UNIT	°C .. °C	°C

ATTENTION
The variation of the unit of measure from ° C to ° F or vice versa, will result in the restoration of the "default" data, or the loss of all personal data contained and stored in the control unit, such as thermal parameters, hydraulic diagram, meters , password and anything else stored in the internal memory of the control unit itself.
Restoring the default data could be exploited, for example, if the installer wanted to reset the factory data without, however, manipulating all the parameters individually.
If the unit of measurement is changed, the control unit will be reset to diagram n.1 and will show on the display for about 6 seconds, the writing 'RST data', indicating that all data has been restored to default values.

P12: MINIMUM MANIFOLD TEMPERATURE LIMITATION
The 'Minimum Temperature Limitation' parameter of the collector is used for the management of the Minimum Thermostat relating to the activation of the collector pumps.
This thermostat prevents the manifold pumps from being activated if a temperature lower than that set in the parameter is detected on the relevant panel.
The 'Minimum Temperature Limitation' function will not be active in ABC operation or if the manifold pumps are activated due to the Recooling function or other functions.

SELECT PARAMETER P11 PRESS KEY ' ↵ '

▼

THROUGH THE ARROWS '▲' or '▼' IT IS POSSIBLE TO CYCLICALLY SCROLL BETWEEN THE FOLLOWING REGULATION THERMAL DATA:
- 'MTC' minimum collector temperature setting -
Enabling / disabling limitation
min. temperature 'MTEN'

▼

PRESS KEY ' ↵ ' TO ENTER IN MODIFICATION OF THE SELECTED THERMAL DATA; THE DATA STARTS TO FLASH

▼

THROUGH THE ARROWS '▲' or '▼' SET THE NUMERICAL VALUE

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

Minimum collector temperature setting		
Data	**Adjustment range**	**Default**
MTC	10.0 °C .. 90.0 °C	10.0 °C

Enable / Disable min. Temperature limitation		
Data	**Adjustment range**	**Default**
MTEN	0 .. 1	0

Note: with '0' the minimum collector temperature limitation function is deactivated, while with '1' it is activated.

P14: COLLECTOR RESET TEMPERATURE
With this parameter it is possible to set the temperature value ('T_SE' - 'T_SW') for resetting the collector pump if the TS_2 safety temperature has intervened, in order to avoid thermal shocks and air pockets in the system. .
The collector pump will be automatically restarted only if the collector temperature, detected by the sensor S_1 for the EAST collector or S_4 for the WEST collector, is lower than the reset temperature of the collector, respectively, T_SE or T_SW.

SELECT PARAMETER P14 PRESS KEY ' ↵ '

▼

THROUGH THE ARROWS '▲' or '▼' IS POSSIBLE TO SCROLL CYCLICALLY BETWEEN THE FOLLOW ADJUSTMENT DATA:
- Collector reset temperature EST 'T_SE'
- Collector reset temperature OVEST 'T_SW'

▼

PRESS KEY ' ↵ ' TO ENTER IN MODIFICATION OF THE SELECTED DATA; THE DATA STARTS TO FLASH

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING MADE OR PRESS THE 'esc' KEY TO CANCEL THE CHANGE

▼

Collector reset temperature EST		
Data	**Adjustment range**	**Default**
T_SE	OFF / 60 °C .. 180 °C	OFF

Note: 1: The 'T_SW' parameter is visible only if a hydraulic scheme with two manifolds has been selected EST / OVEST.

FUNCTIONS ACCESSIBLE TO THE USER
The functions accessible by the user are limited and do not allow you to configure the data that affect the management of the system. The only operations allowed to the user are the following: - Switching on / off the control unit
- Activation / Deactivation ABC function of the control unit.
Menu

SELECT KEY ' 🕮 ' TO ACCESS THE 'USER PARAMETERS'

▼

THE FIRST 'USER PARAMETER' IS DISPLAYED

▼

THROUGH THE ARROWS '▲' or '▼' IT IS POSSIBLE TO SCROLL CYCLICALLY THROUGH THE USER PARAMETERS
- 'MTC' minimum collector temperature setting -
Enabling / disabling limitation
temperature min. 'MTEN'

▼

THROUGH THE ARROWS '▲' or '▼' IT IS POSSIBLE TO CYCLICALLY SCROLL BETWEEN USER PARAMETERS:

U1: MAXIMUM TEMPERATURE DISPLAY U2: ANTIFREEZE ACTIVATION / DEACTIVATION

▼

PRESS KEY ' ↵ ' TO ENTER THE SELECTED PARAMETER

▼

SET THE DATA RELATING TO EACH SINGLE PARAMETER AS SHOWN BELOW

▼

PRESS THE 'esc' KEY TO RETURN TO THE USER PARAMETERS SECTION

▼

WAIT 20 SECONDS OR PRESS THE 'esc' KEY TO EXIT USER MODE.

▼

WARNING!
In 'USER PARAMETERS' mode, all outputs are disabled.

Display of Maximum Recorded Temperatures
The 'TMAX U1' parameter allows you to view the maximum temperature recorded in the system by each TM- probe.

PRESS KEY ' ↵ ' TO ACCESS THE TEMPERATURE DISPLAY

▼

THROUGH THE ARROWS '▲' or '▼' **IT IS POSSIBLE TO SLIDE CYCLICALLY BETWEEN THE DETECTED TEMPERATURES:**
TM1 ➔ TM2 ➔ TM3 ➔ TM4 ➔

▼

PRESS KEY ' ↵ ' ITHE DISPLAY SHOWS THE NUMBER OF THE FLASHING PROBE
INSTEAD, PRESSING THE 'esc' KEY RETURNS TO THE DISPLAY OF USER PARAMETERS

▼

PRESS KEY ' ↵ ' THE TEMPERATURE RECORDED SO FAR IS RESET; PRESSING INSTEAD 'Esc' YOU RETURN TO THE DISPLAY OF THE STORED TEMPERATURE

▼

PRESS THE 'esc' KEY TO EXIT THE MAXIMUM TEMPERATURE DISPLAY

▼

Activation of the Antifreeze
The 'AFR U2' (anti frost) parameter allows you to activate or deactivate the antifreeze function.
The management of the antifreeze data is done through the user parameters.

PRESS KEY ' ↵ '
THE DISPLAY SHOWS FLASHING 'AFR'

▼

THROUGH THE ARROWS '▲' or '▼' IT IS POSSIBLE TO ACTIVATE OR DEACTIVATE THE ANTIFREEZE:
0: OFF
1: ACTIVE (THE DISPLAY SHOWS ❄)

▼

PRESS KEY ' ↵ ' TO CONFIRM THE SETTING OR PRESS THE 'esc' KEY TO EXIT USER PARAMETERS

▼

MANAGEMENT OF ANOMALIES AND POSSIBLE CAUSES

ANOMALY	POSSIBLE CAUSE
During normal operation, the control unit shows the symbol on the display and emits an acoustic signal characterized by a series of 'beeps'. The probe that generated the problem flashes.	The control unit has detected an anomaly on the probes. The number of the faulty probe will be displayed and the type of anomaly present will be indicated. Open probe (R = ∞). COL OPEn / S_2 OPEn / S_3 OPEn / S_4 OPEn Probe in short circuit (R ≈ 0). COL ShrT / S_2 ShrT / S_3 ShrT / S_4 ShrT
The display shows the icon ⚠ and the control unit emits an acoustic signal characterized by a series of 'beeps'.	One or more probes have detected a temperature higher than the relative safety temperature set.
In selecting the system to be built (installer parameter P1) one or more probes flash.	The probe has not been connected or is faulty.

WARRANTY
With a view to continuous development of its products, the manufacturer reserves the right to make changes to technical data and performance without prior notice. The consumer is guaranteed against conformity defects of the product according to the European Directive 1999/44 / c as well as the document on the policy of manufacturer's warranty.The full text of the guarantee is available from the seller on request.

11 - SECTION F
WIRING DIAGRAMS
HUB RADIATOR PLUS 250 - 400 SOLAR

11.1 KEY OF ELECTRICAL DIAGRAMS HUB RADIATOR PLUS 250 - 400 SOLAR

LEGEND

M1	terminal block Booster 1
M2	terminal block Booster 2
Pb1	technical water probe
Pb3	battery probe Booster
Stc	compressor thermal probe
Tr	transformator 230V - 12V
R1	electrical resistance relay
RD	diverter relay
RP	system pump relay
RT	voltage mounting relay (3)
RR	electrical resistance relay
RB	Booster 3.0 compressor relay
TA	room thermostat
R	electrical resistance 2000W (4)
CD	digital controller DIXELL
VD	diverter valve (2)
P	pump
Cr	remote control (1)
TM	minimum thermostat
MT	differential magnetothermic (5)
IR	electrical resistance switch
DR	electrical resistance diverter
ICS	solar control unit switch
IPI	system pump switch

Cr (1)

Remote Command
P 15

R (4)

Resistance Relay
Electric

N.B. *Before making connections make sure you have correctly sized the section of the power cables based on the actual distance from the counter. Always foresee a special protection magnetothermic*

(5) differential magnetothermic ***MT***

N.B. *Not supplied as standard, to be calculated by an electrical designer.*

VD (2)

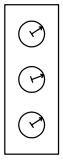
***Letter* A**
diverter valve flow fed to the system

***Letter* B**
diverter valve not powered DHW priority

***Letters* AB**
circulator side

RT (3)

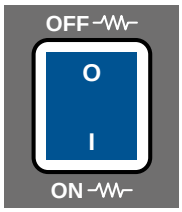
Relay setting
Voltage monitoring



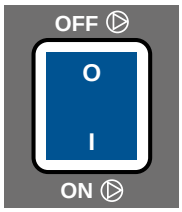
Umax 253 V
T 8 s
Umin %80

OK
U>Umax
U<Umin

IR
resistance switch

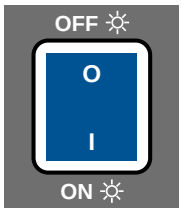


IPI
system pump switch



DR
resistance diverter

ICS
solar control unit switch



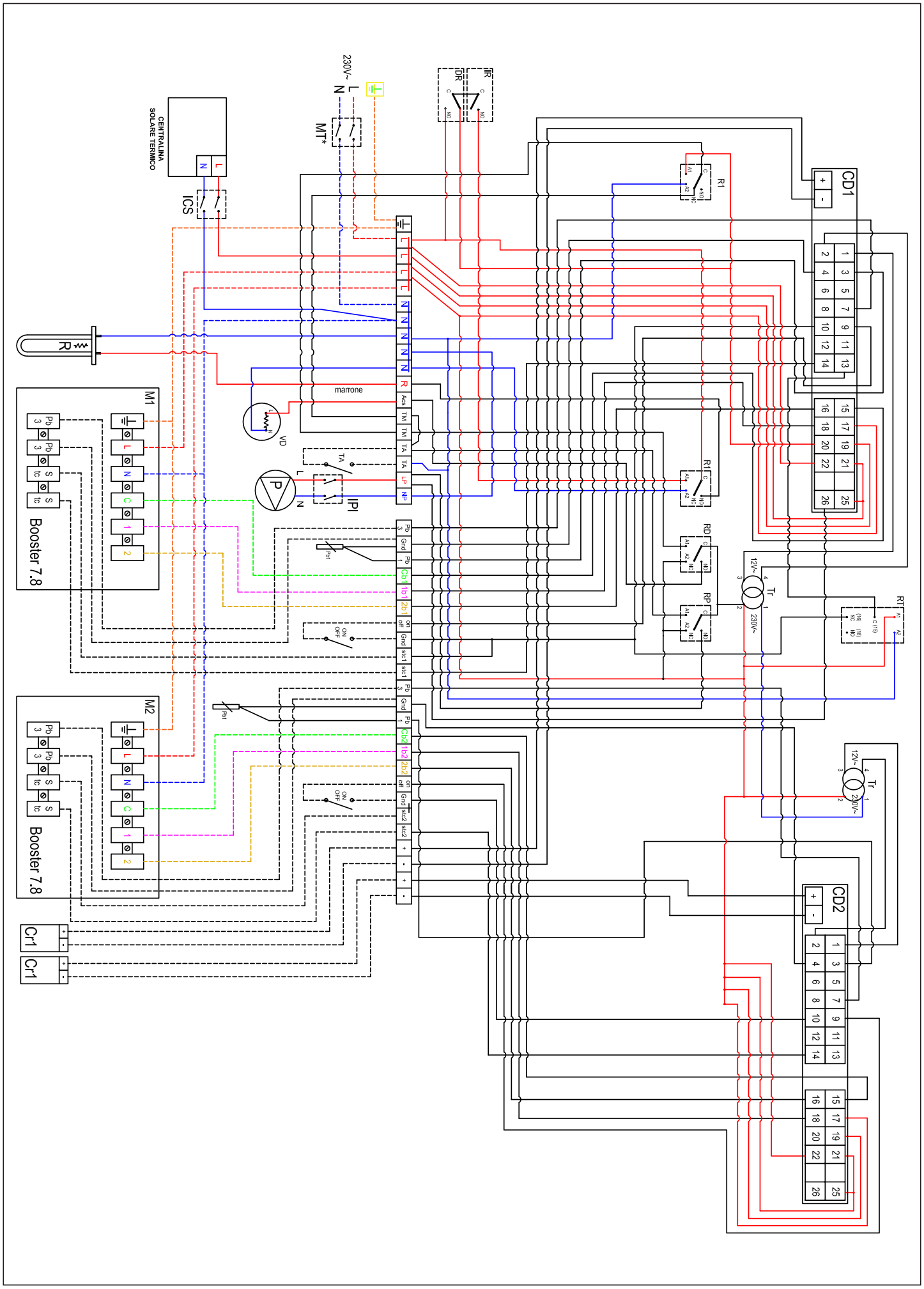
All the products of the HUB RADIATOR PLUS SOLAR series they are equipped with a 2000W single-phase electrical resistance.
This resistor can be used either as a replacement of the heat pump that integrates it.
the type of operation can be selected using the buttons on the control plate of the cabinet of external cover.

A) OPERATION ONLY HEAT PUMP
The "**IR**" button in the figure must be in the **OFF** position "**key O**", in this way the resistance electric will never go into operation

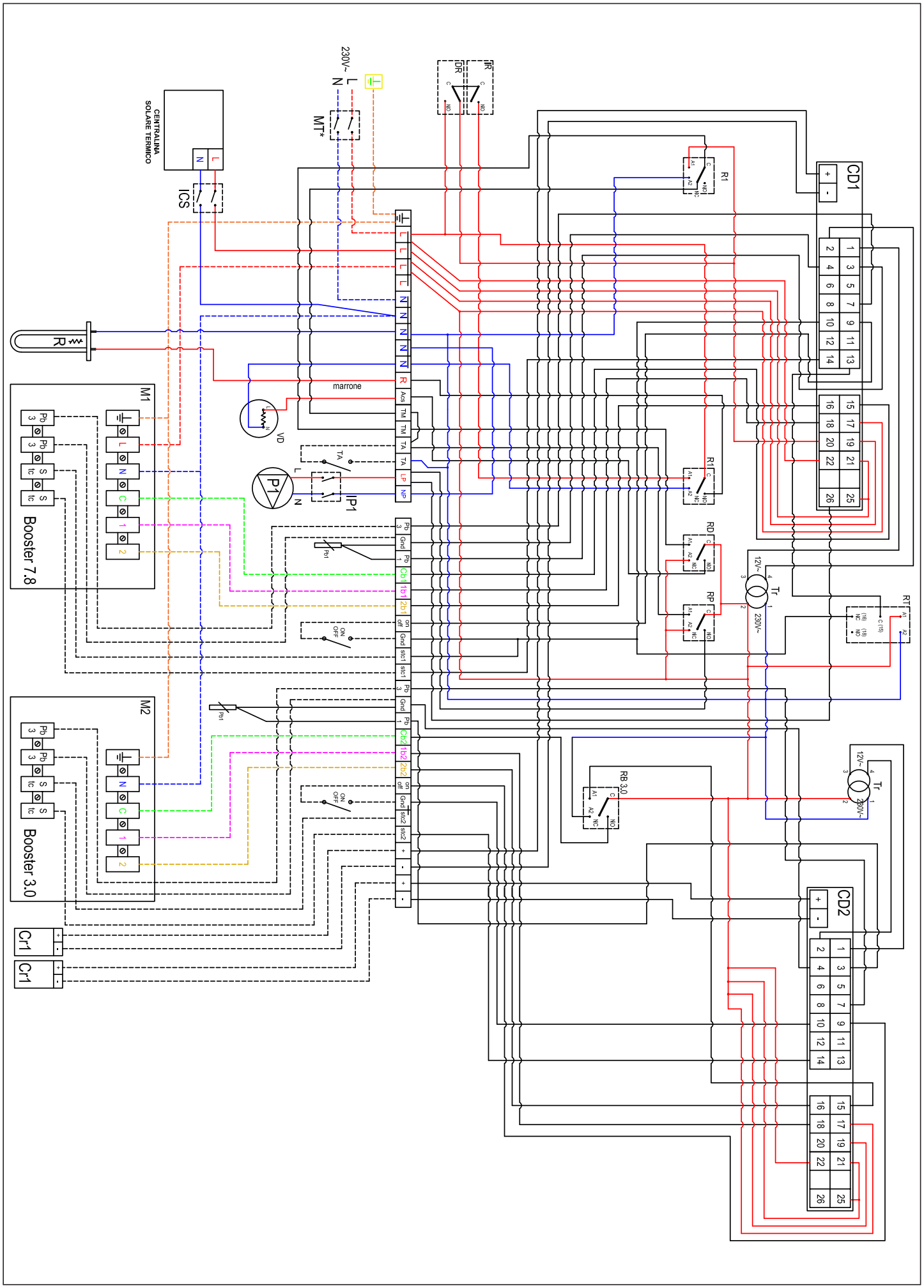
B) OPERATION WITH ACTIVATED SUPPORT RESISTANCE
To use the integration resistance just press the "**IR**" key in the **ON** position "**I key**" and the "**DR**" **INTEGRATION** "**key II**" key. In this way the control unit will decide when it is necessary the help of the resistance that will work in tandem to the heat pump.

C) OPERATION WITH ALWAYS ACTIVE RESISTANCE
To use only the resistance in place of the pump heat, just press the "**IR**" button in the **ON** position "**I key**" and the "**DR**" **EMERGENCY** "**key I**".

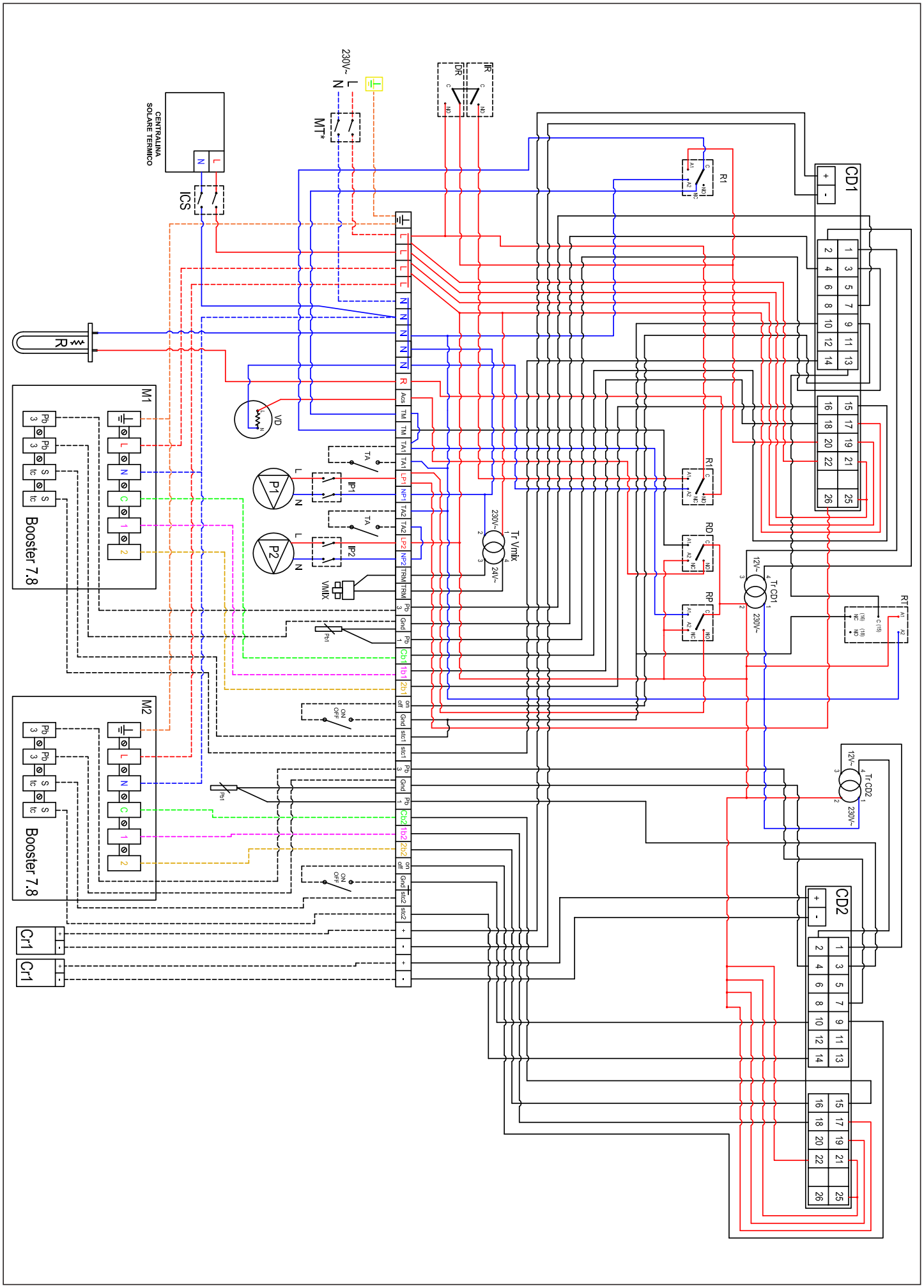
11.2 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with double external Booster model 7.8 (only one direct circulation unit)



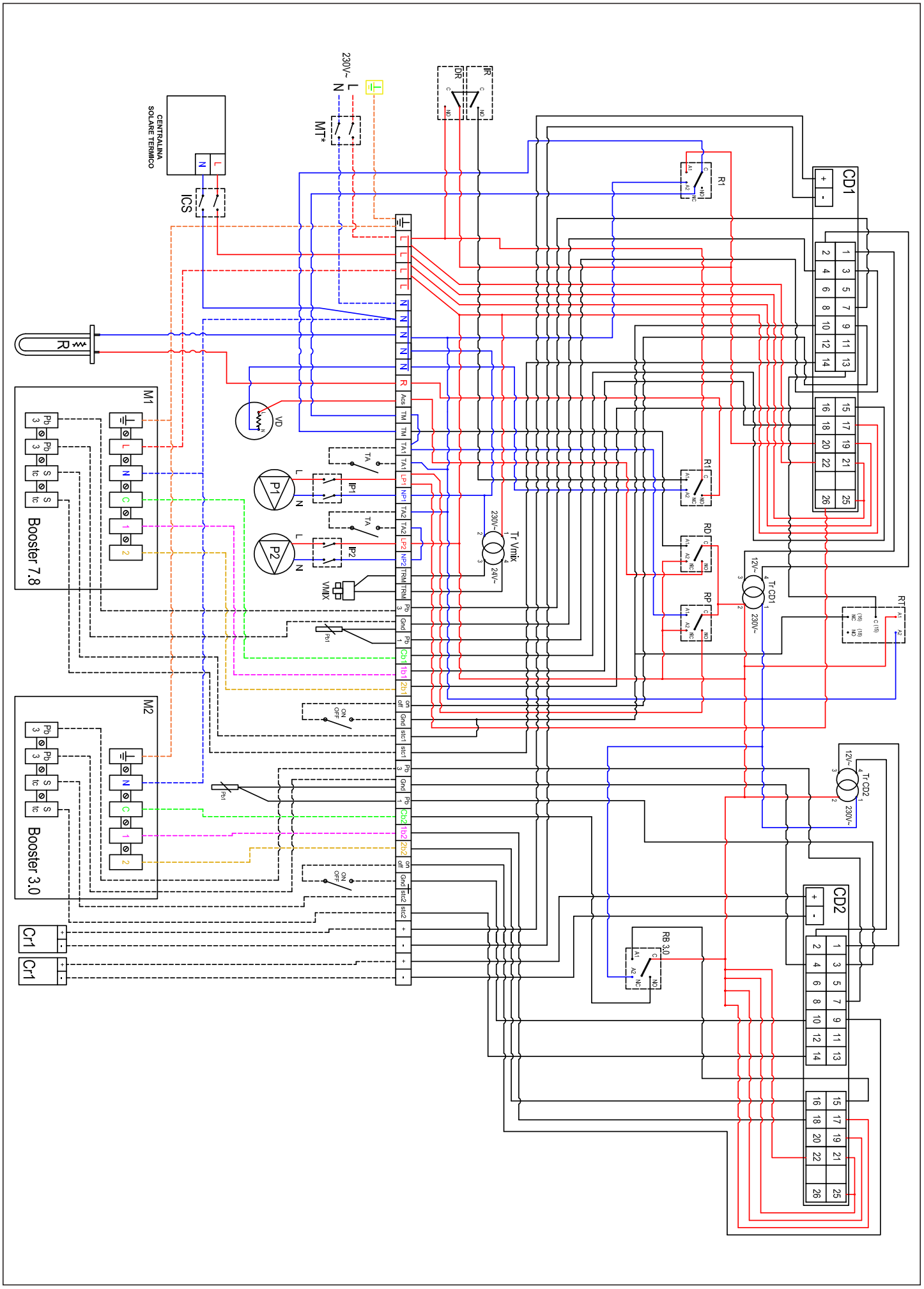
11.3 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with double external Booster model 7.8 + 3.0 (only one direct circulation group)



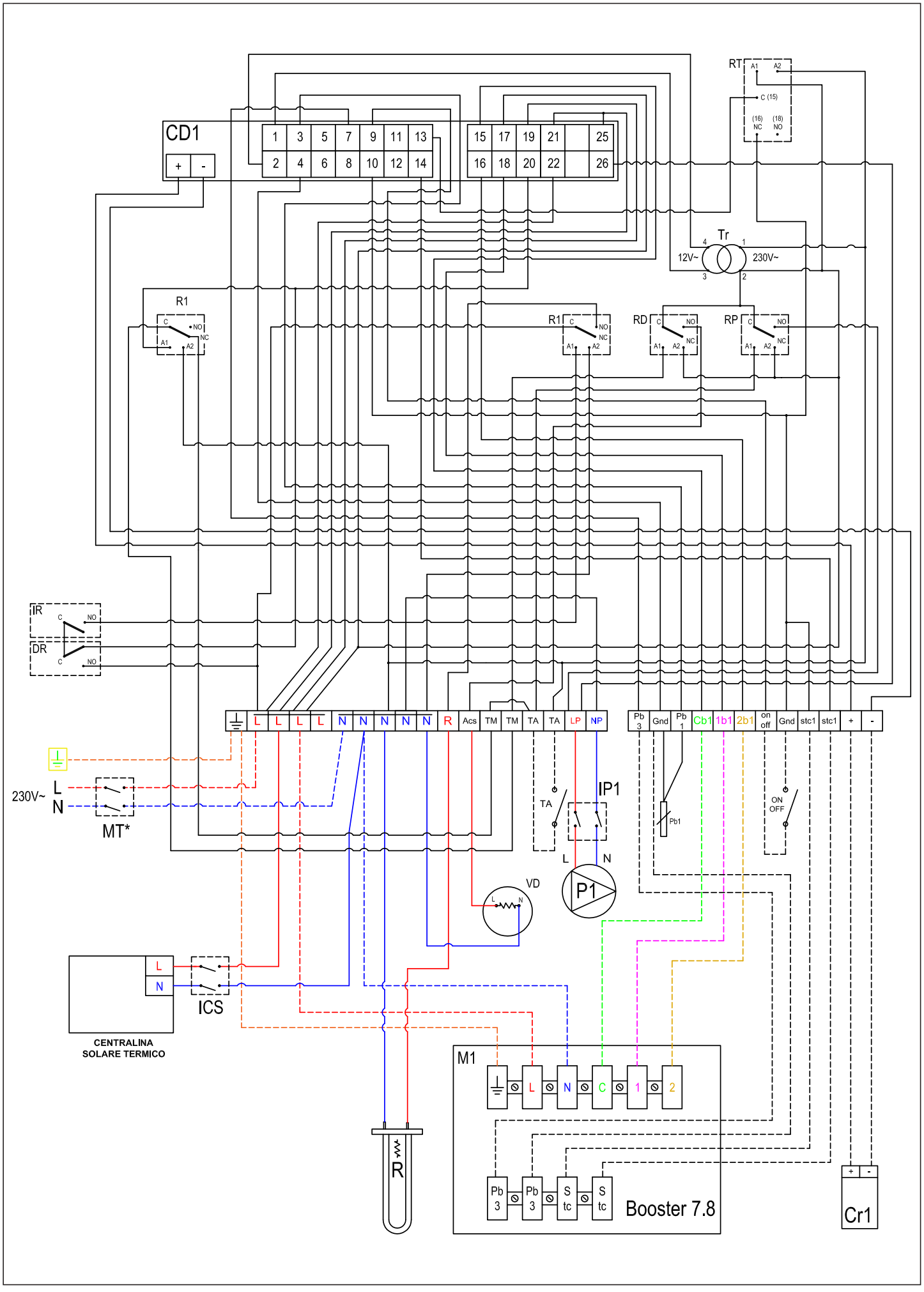
11.4 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with double external booster model 7.8 (one direct and one mixed circulation group)



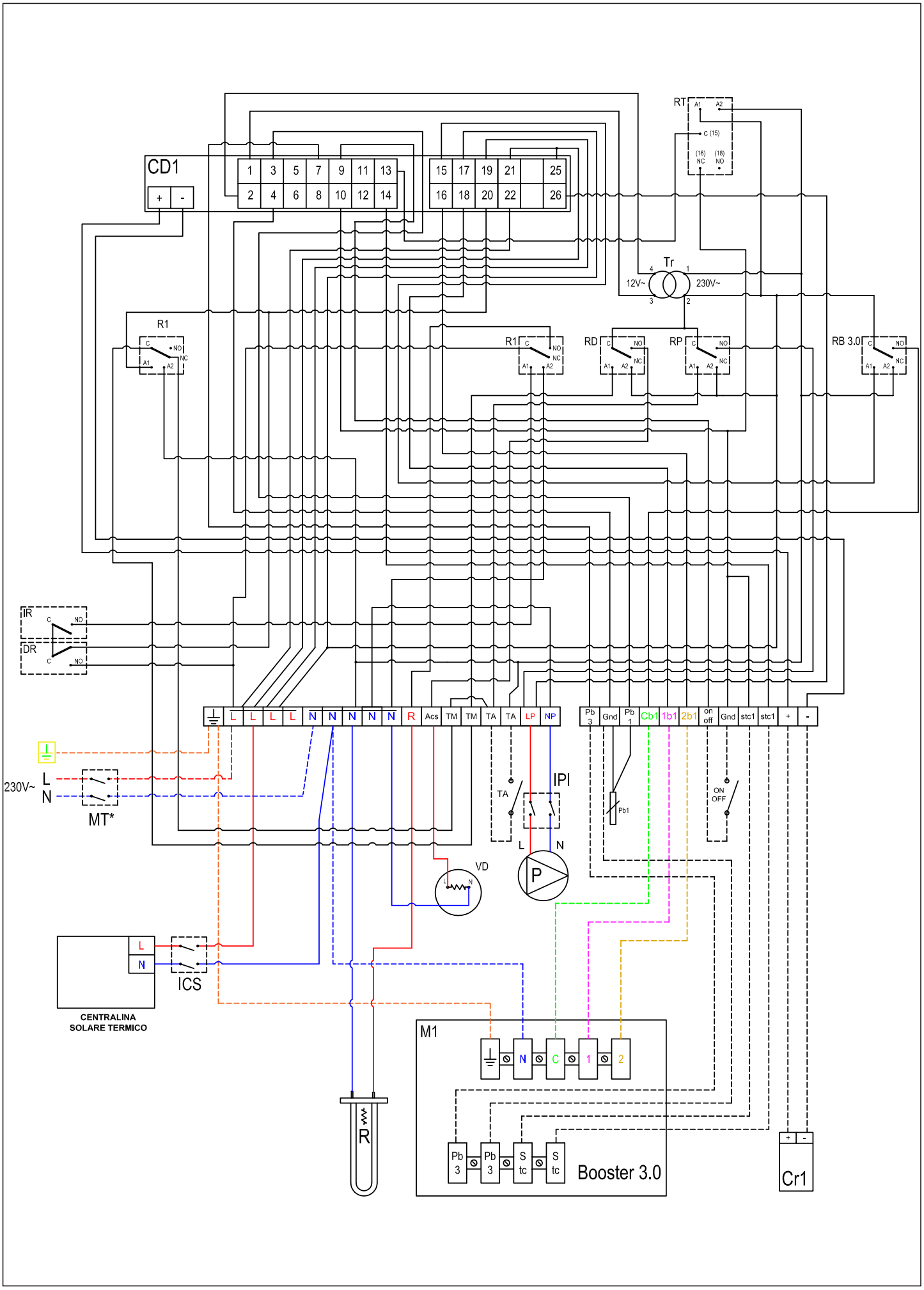
11.5 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with double external Booster model 7.8 + 3.0 (one direct and one mixed circulation group)



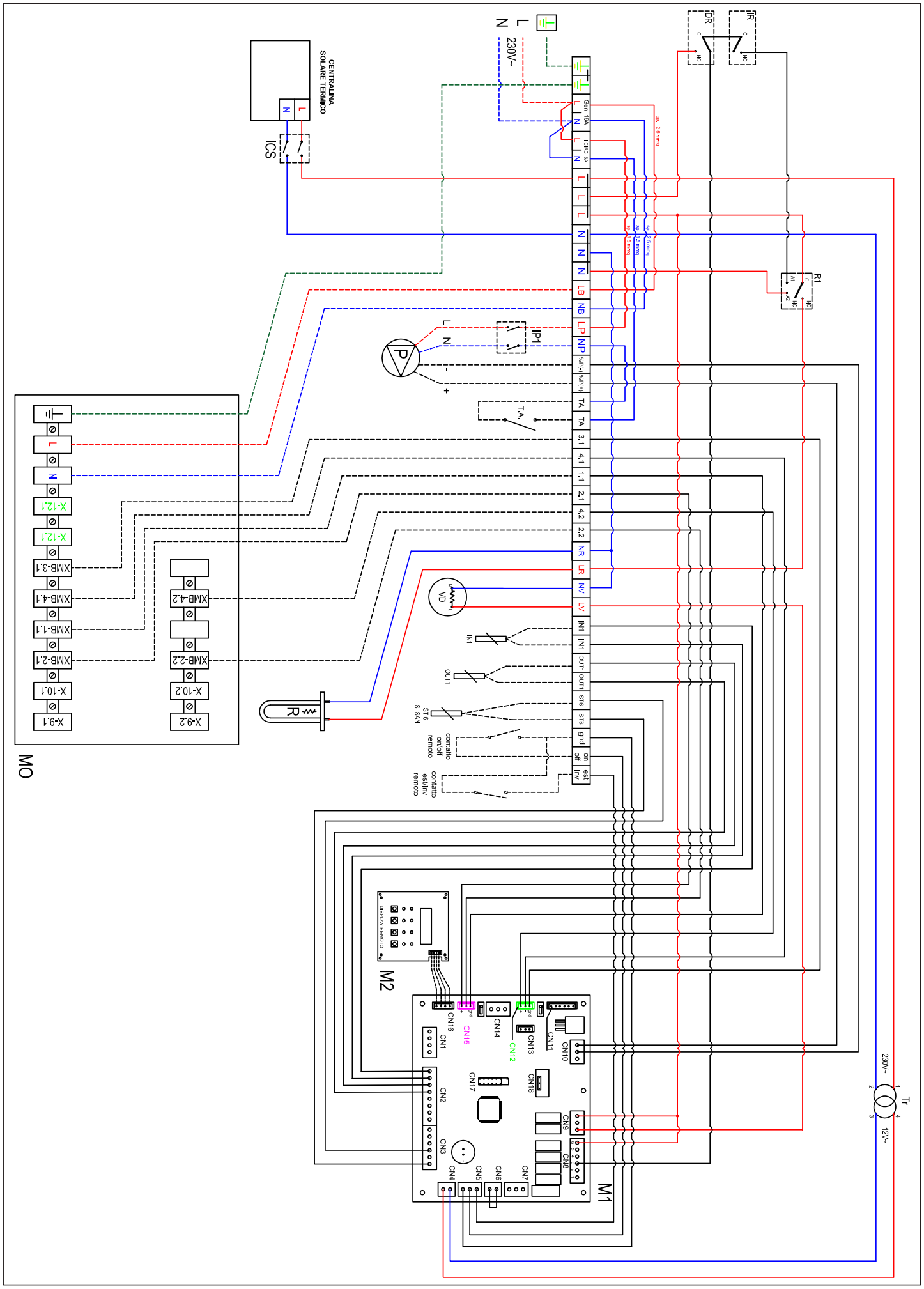
11.6 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with external Booster model 7.8 (only one circulation group)



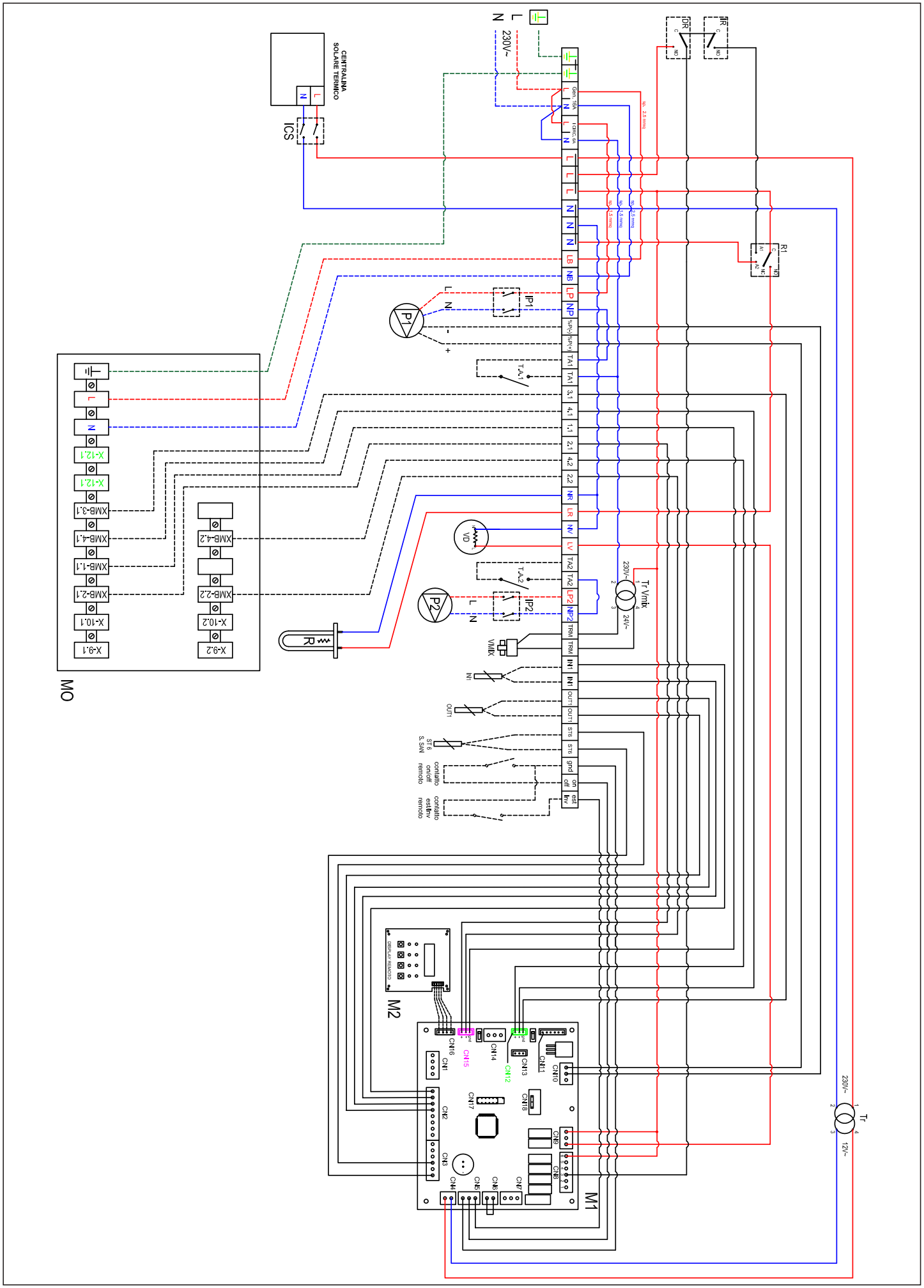
11.7 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with external Booster model 3.0 (only one circulation group)



11.8 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with single external Booster model 9.0 inverter (only one circulation group)



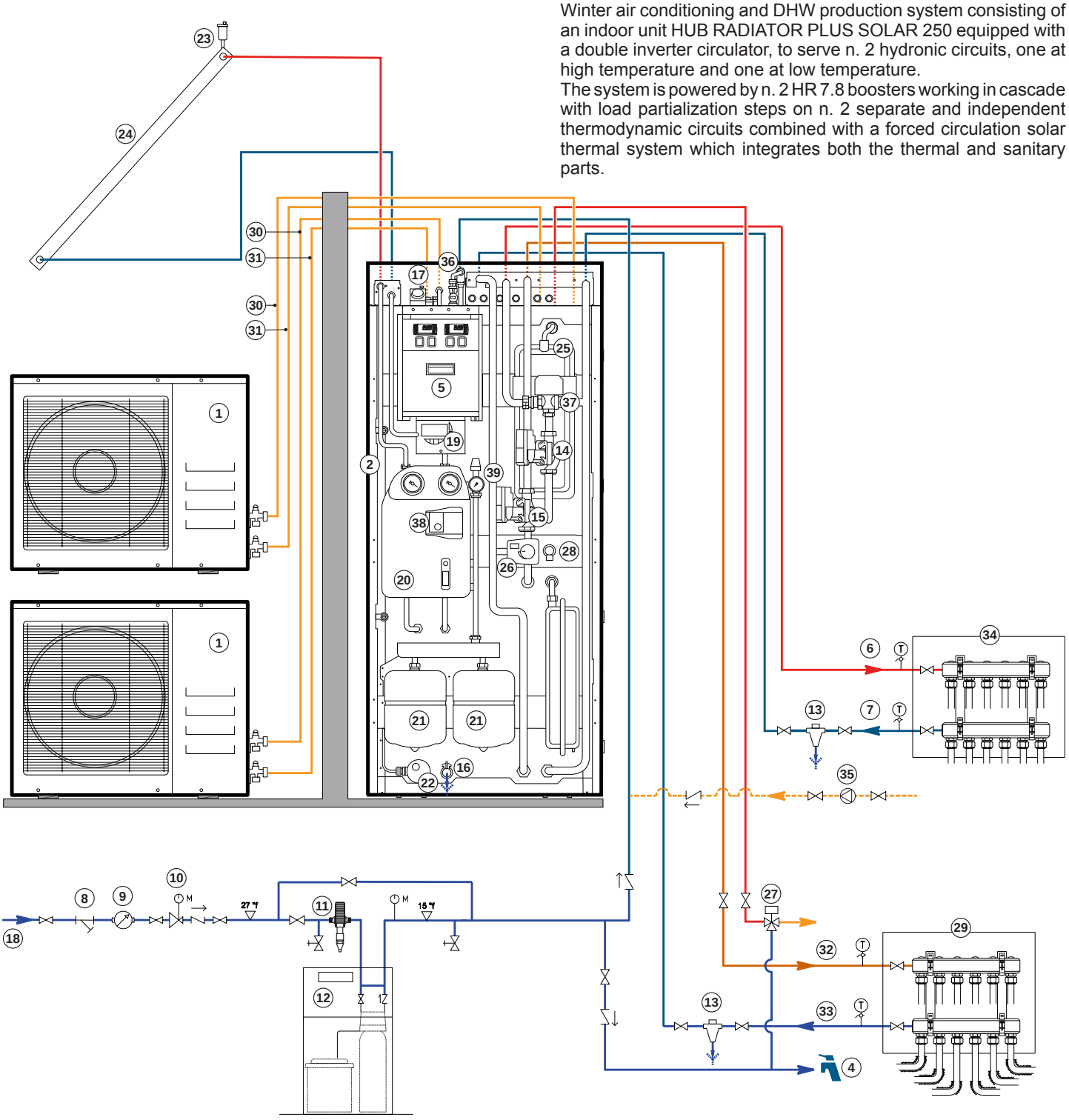
11.9 Wiring diagram HUB RADIATOR PLUS SOLAR 250 with single external Booster model 9.0 inverter (one direct and one mixed circulation group)



12 - SECTION G
HYDRAULIC DIAGRAMS
HUB RADIATOR PLUS 250 - 400 SOLAR

12.1 Application example HUB RADIATOR PLUS SOLAR 250 with double external Booster mod. 7.8

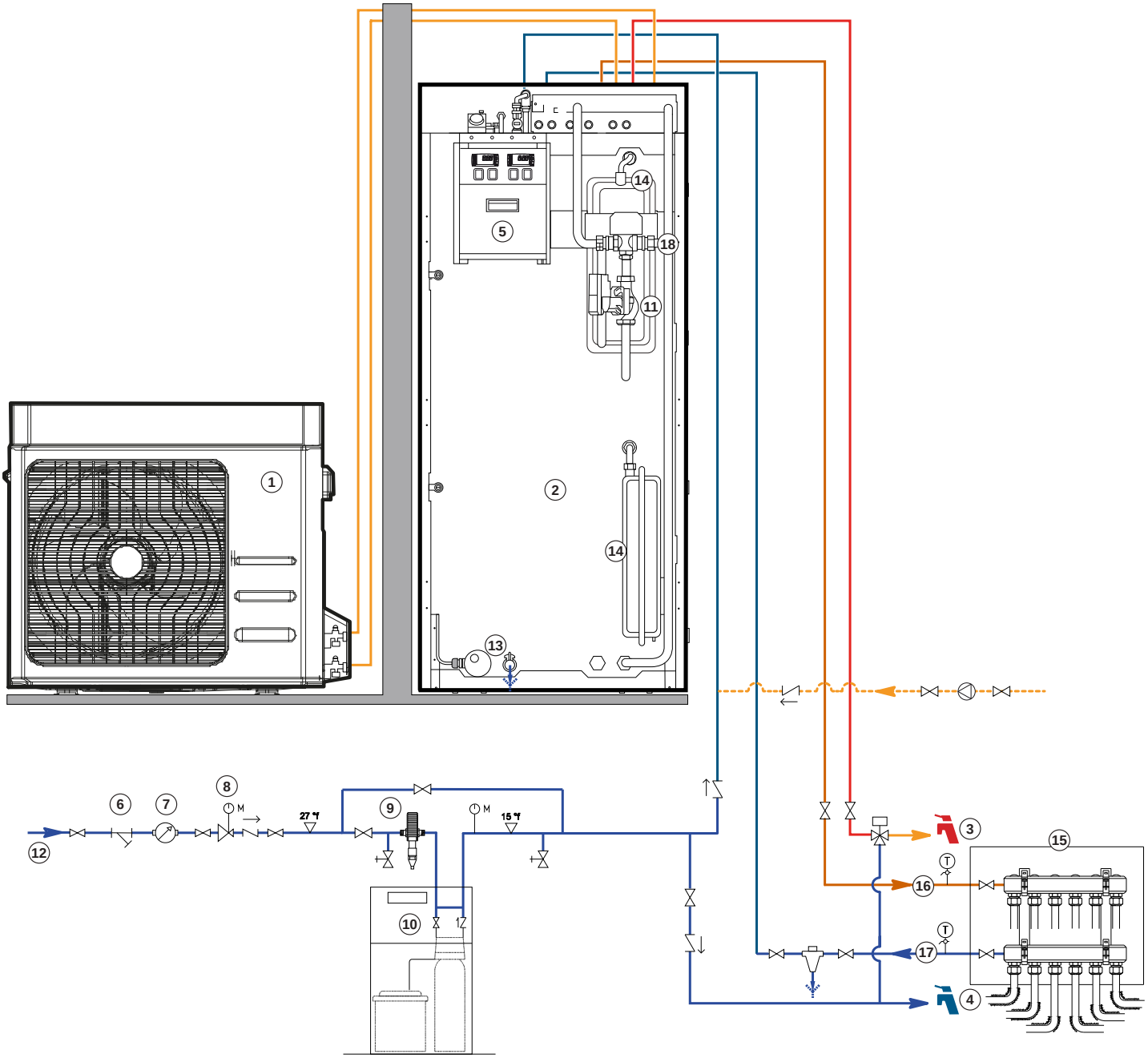
Winter air conditioning and DHW production system consisting of an indoor unit HUB RADIATOR PLUS SOLAR 250 equipped with a double inverter circulator, to serve n. 2 hydronic circuits, one at high temperature and one at low temperature.
The system is powered by n. 2 HR 7.8 boosters working in cascade with load partialization steps on n. 2 separate and independent thermodynamic circuits combined with a forced circulation solar thermal system which integrates both the thermal and sanitary parts.



1 Booster HR 7.8 only hot
2 Technical storage unit 250 liters
3 Domestic hot water delivery
4 Domestic cold water delivery
5 Electric command and control panel
6 System technical water delivery high temperature
7 System technical water return high temperature
8 Mechanical “Y” filter
9 Water mains volumetric meter
10 Water mains pressure reducer
11 Water mains sand trap filter
12 Volumetric softener
13 Magnetic dirt separator
14 High temperature inverter circulator
15 Low temperature inverter circulator
16 Storage tank emptying cock
17 Technical water system pressure gauge
18 Water mains inlet
19 0-10V digital solar control unit CONTROL MULTI 06 S
20 UNIT 2 PLUS solar station
21 8 liter solar expansion vessel
22 Integrative electric heater 2 kW
23 Jolly air vent valve
24 Solar collector SELECTIVE HX +
25 System expansion vessel 8 liters
26 Motorized mixing valve for radiant floor system
27 DHW mixing valve anti-burn
28 3 bar system safety valve
29 Low temperature system manifold
30 R410A 1/4 “refrigeration line (liquid)
31 R410A 3/8” refrigeration line (gas)
32 System technical water delivery low temperature
33 System technical water return low temperature
34 High temperature system manifold
35 DHW recirculation pump
36 System filling group
37 DHW priority diverter valve
38 Inverter solar pump
39 Solar system safety group forced circulation

12.2 Application example HUB RADIATOR PLUS SOLAR 250 with single external Booster mod. 9.0 inverter

Winter air conditioning and DHW production system consisting of an indoor unit HUB RADIATOR PLUS SOLAR 250 equipped with an inverter circulator, to serve n. 1 high temperature hydronic circuit.
The system is powered by n. 1 Booster HR 9.0 inverter that works in modulation on n. 1 thermodynamic circuit with direct immersion.



1	Booster HR 9.0 heating only inverter	10	Volumetric softener
2	Technical storage unit 250 liters	11	High temperature inverter circulator
3	Domestic hot water delivery	12	Water mains inlet
4	Domestic cold water delivery	13	Integrative electrical resistance 2 kW
5	Electric command and control panel	14	System expansion vessel 8 liters
6	Mechanical “Y” filter	15	Low temperature system manifold
7	Volumetric meter for aqueduct	16	Low temperature system technical water delivery
8	Water mains pressure reducer	17	Low temperature system technical water return
9	Water mains sand trap filter	18	DHW priority diverter valve

DECLARATION OF CONFORMITY

Supplier: A2B Accorroni E.G. srl
Address: 60027 Osimo (AN) - Via D'Ancona, 37
Tel 071/723991 - Fax 071/7133153
Appliances: Hub Radiator Mini, Hub Radiator Plus, Hub Radiator Full, Hub Radiator AP, Super Hub Radiator, Hub Radiator Black

DECLARES

than the product

- complies with the European Directive 2004/108 / EC Compatibility electromagnetic;
- complies with the provisions of the following other Directives: 2006/95 / EC EC Directive on low voltages, 2002/95 / EC EU guidelines for substance restriction harmful (RoHS) and waste electrical and electronic equipment (WEEE);
- complies with the provisions of the European Directive EN 378 Cooling systems e heat pumps; safety and environmental protection requirements;
- complies with the provisions of the European Directive 94/42 / EEC on the degree of efficiency;

and comply with the EC Construction Products Directive and meet the requirements of the following directive:

- 89/106 / EEC Construction Products Directive, Appendix III - 2 - ii - 3
  In accordance with
- En12897 Storage water heater (reference for the applicable type of construction only partially)

Osimo, May 2021

A2B Accorroni E.G. srl

The legal Representative
Altamura Lorenza

CE

ACCORRONI Climate Technology

A2B Accorroni E.G. s.r.l.
Via d'Ancona, 37 - 60027 Osimo (An) - Tel. 071.723991
web site: www.accorroni.it - e-mail: a2b@accorroni.it