



TAU Unit 140 – 190

EN INSTALLATION, TECHNICAL ASSISTANCE SERVICE AND SYSTEM MANAGEMENT MANUAL

RIELLO

RANGE

| MODEL | CODE |
|--------------|----------|
| TAU Unit 140 | 20145135 |
| TAU Unit 190 | 20145136 |

Accessories

For a complete list of accessories and details of their compatibility, refer to the Catalogue.

Dear heating engineer,
Congratulations on having chosen a **RIELLO** boiler. You have selected a modern, quality product that is designed to give dependable, efficient and safe service and to provide comfort in the home for many years to come.

This manual provides information that is essential to the installation of the appliance. Used in conjunction with your own knowledge and expertise it will enable you to install the appliance quickly, easily, and correctly.

Please accept our thanks and our congratulations on your choice of product.
Riello S.p.A.

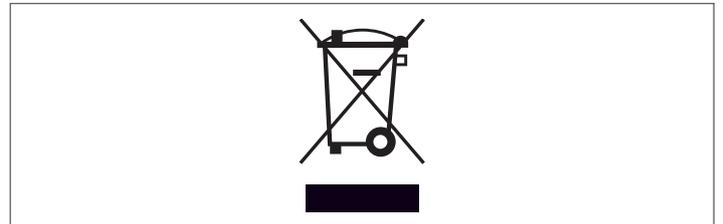
CONFORMITY

TAU Unit boilers conform to the following directives:

- Regulation (EU) 2016/426
- Directive 92/42/EEC on efficiency requirements
- Electromagnetic Compatibility Directive 2014/30/EU
- Ecodesign Directive 2009/125/CE for energy-related products
- Low Voltage Directive 2014/35/EU
- Delegated Regulation (EU) N. 811/2013
- Delegated Regulation (EU) N. 813/2013.



At the end of its life, the product should not be disposed of as solid urban waste, but rather it should be handed over to a differentiated waste collection centre.



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The following symbols are used in this manual:

 **CAUTION!** = Identifies actions that require caution and adequate preparation.

 **STOP!** = Identifies actions that you MUST NOT do.

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1 GENERAL INFORMATION

1.1 General Safety Information

-  After removing the packaging, check the condition and completeness of the supply. If there are any problems, contact the company **RIELLO** that sold the equipment.
-  This product must be installed by a legally qualified heating engineer. On completion of the installation, the installer must issue the owner with a declaration of conformity confirming that the installation has been completed to the highest standards in compliance with the instructions provided by **RIELLO** in this instruction manual, and that it conforms to all applicable laws and standards.
-  This product must only be used for the purpose for which it is designed and made, as specified by **RIELLO**. **RIELLO** declines all responsibility, contractual or other, for damage to property or injury to persons or animals caused by improper installation, adjustment, maintenance or use.
-  The room where the boiler is installed must be properly ventilated to ensure a sufficient supply of air for correct combustion.
-  In case of water leaks disconnect the equipment from the power mains, close the water supply and promptly alert Technical Assistance Service **RIELLO** or professionally qualified personnel.
-  Regularly check that the condensate drain is free from obstruction.
-  Periodically check that operating pressure in the water circuit is over 1 bar but below the maximum limit specified for the boiler. If this is not the case, contact Technical Assistance Service **RIELLO** or a professionally qualified heating engineer.
-  Long periods of inactivity of the equipment imply the following operations to be carried out:
 - Set the main switch of the equipment to "0"
 - Set the main switch of the system to "OFF"
 - Close the fuel valves and the water valves of the thermal system
 - Drain the central heating circuit if there is any risk of freezing.
-  The product must be serviced at least once a year. Servicing must be arranged in advance with the **RIELLO** Technical Assistance Service.
-  This manual is an integral part of the appliance and must therefore be kept with care and must ALWAYS accompany the boiler, even when it is passed on to another owner or user or transferred to another installation. If it is lost or damaged, please contact your local Technical Assistance Service **RIELLO** for a new copy.
-  This manual must be read carefully so as to ensure the correct and safe installation, operation and maintenance of the appliance. The Owner must be adequately informed and trained on how to operate the appliance. Make sure that he/she is familiar with all the information required for safe system operation.

 The equipment, before being connected to the hydraulic system and to the gas supply and being electrically powered can be exposed to temperatures ranging between 4°C and 40°C. Once it is able to activate the antifreeze functions, it can be exposed to temperatures within -20°C and 40°C

 We recommend cleaning inside the exchanger once a year, extracting jet and burner and removing any installation debris by suction. This operation should be done by personnel from the Technical Assistance Service only.

1.2 Precautions

The operation of any appliance that uses fuel, electrical power and water demands that a number of fundamental safety precautions be respected:

-  Do not allow children or infirm persons to operate the system unsupervised.
-  It is forbidden to use electrical devices or equipment, such as switches, appliances, etc. if there is a smell of gas or unburnt products. If so:
 - Ventilate the room, opening doors and windows
 - Close the fuel shut-off cock
 - Report the fault immediately to the **RIELLO's** Technical Assistance Service or a professionally qualified heating engineer.
-  Do not touch the boiler while barefoot or wet.
-  Any technical or cleaning operation is forbidden before:
 - removing the power supply by setting the main switch of the equipment to (I) and the main switch of the system to (OFF)
 - closing the water and fuel shut-off valves
-  Do not tamper with or adjust the safety or control devices without prior authorisation and instructions from the manufacturer.
-  Do not plug or block the condensate drain outlet.
-  Never pull, disconnect, or twist the electrical cables coming from the appliance even if it is disconnected from the mains electricity supply.
-  Do not obstruct or restrict the vents in the room where the boiler is installed. Adequate ventilation is essential for correct combustion.
-  Do not expose the boiler to the elements. It is not designed for use outdoors.
-  Do not switch off the appliance if the outdoor temperature may drop to below ZERO (frost hazard).
-  Do not leave flammable containers and substances in the room where the device is installed.
-  Do not dispose of packaging material into the environment, or leave it within the reach of children, since it can become a potential hazard. Dispose of packaging material in compliance with applicable legislation.
-  It is forbidden to activate the equipment without water.
-  The equipment casing must not be removed by people without specific qualification and expertise.

1.3 Description of the appliance

The condensing thermal unit **TAU Unit** is a hot water generator, with high thermal efficiency, for the heating of environments and production of domestic hot water (DHW) coupled to an external heater.

The boiler body is in high alloy stainless steel and develops vertically ensuring maximum duration and reliability, meeting at the same time the most stringent national and European regulations on the emission of heavy metals in condensate drain waters.

The double return hydraulic circuit (high or low temperature) favours temperature stratification inside the body and optimises the performance.

The boiler body is covered in high density glass wool insulation to reduce heat loss.

The micro-flame premix burner with an output modulation ration of 1:5 provides reduced polluting emissions (NO_x and CO), in compliance with the severest European Standards.

The thermoregulation with user interface and display in the control panel **TAU Unit** allows managing the safety and control devices in compliance with current regulation. By connecting the external probe it is possible to activate the climatic control function of the heating circuit, enhancing the seasonal energy recovery characteristics.

The thermoregulation adapts with flexibility to the different system needs; for example, it is possible to increase the number of heating circuits supplied with high and low temperature and connect the devices **TAU Unit** in cascade (see accessories Catalogue).

1.4 Safety and control devices

The thermal unit **TAU Unit** is equipped with the most advanced safety and regulation systems available on the market.

Each fault is signalled through a numeric error code displayed on the screen and stops the equipment causing the automatic closure of the gas valve.

The following are installed on the water circuit:

- **Safety thermostat:** on the body of the generator, it intervenes to stop the appliance if the temperature exceeds the threshold limit of 110°C.
- **Delivery temperature probe:** immersion probe on the delivery line of the generator is used by the regulator to view and check the delivery water temperature and check the correct switching on and off of the equipment based on the programmed setpoint. The regulator uses the same probe to stop the generator in case of overtemperature, before the triggering of the safety thermostat.
- **Return temperature probe:** the contact probe placed on the return line of the boiler is used by the regulator to view the return water temperature with which it calculates, together with the delivery temperature, the temperature difference between delivery and return (Δt), which allows regulating the modulation of the thermal unit circulation pump in heating mode.

- **Flue gas thermostat:** placed in the lower part of the exchanger, it triggers with high flue gas temperature (>75°C).
- **Flue gas probe:** placed in the lower part of the exchanger, causes a temporary error if the temperature of the combustion products exceeds 85°C, and a permanent error if it exceeds 90°C.

Through specific inlets and outlets, the thermoregulation **TAU Unit** allows managing the following optional safety devices outside the equipment:

- **INAIL safety devices:** the safety devices (minimum pressure switch and lockout pressure switch) present in the INAIL kit (optional) must be connected to the specific inlet indicated with "INAIL" in the terminal board. If one of the connected devices triggers, the equipment is set immediately to lockout status (permanent error) and can be restarted only after removing the fault and manually resetting the safety device.
- **Pressure transducer or water minimum pressure switch:** the connection of one of the two optional devices, to be carried out by the installer, allows the thermoregulation to continuously view and check the pressure of the primary circuit to start or stop the equipment in case of low pressure.
- **LPG fuel shut-off solenoid valve:** the thermoregulation, via a programmable output, allows managing (based on the designated type of fuel and system) the fuel shut-off solenoid valve for LPG, installed outside the equipment by the installer.
- **Gas minimum pressure switch:** a specific outlet is present for the connection of the gas minimum pressure switch (optional) to be installed outside the equipment. The device will continuously check the correct inlet gas pressure to start or stop the equipment in case of low pressure.

 The triggering of the safety devices indicates a potentially dangerous malfunctioning of the equipment. Therefore, immediately contact the Technical Assistance Service.

 Safety devices must be replaced by Technical Assistance Service, using only original parts. Refer to the spare parts catalogue supplied with the appliance. After the repair perform an ignition test and check that the equipment works correctly.

 The appliance must not be put in service, even temporarily, when tampered safety devices are not in operation or have been tampered with.

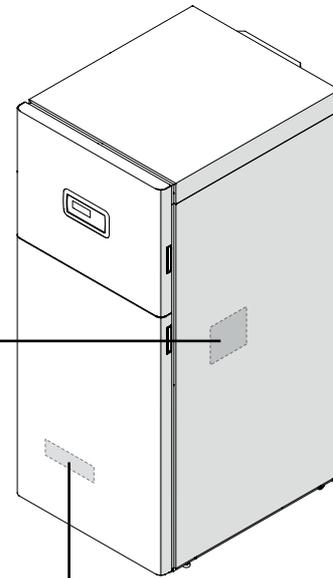
1.5 Identification

The products are identified by:

Data plate

This lists the technical specifications and performance of the product.

| | | | | | |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----|
| RIELLO RIELLO S.p.A. Via Ing. Pilade Riello 7 37045 Legnago (VR) - ITALY T067802GE | Combustibile: Brennstoff: | Combustibile: Brandstof: | Categoria: Categorie: Kategorie: |  / | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | NOx (PCS): mg/kWh | η _s = % | |
| Cod. | N° | |  |  | |
| IP | P.nom.G20= | mbar | | | |
| 230 V ~ 50Hz |  W |  | Qn(min)= | kW | kW |
| | | | Pn(min)= | kW | kW |
| Max. flue gas loss: ≤ 7 % | | | Qn(max)= | kW | kW |
| | | | Pn(max)= | kW | kW |
|  Pms= | | bar | T = | °C | |



| | | | |
|---------------|-------------------------------------------------------------------------|----------------------|---------------------------------|
| RIELLO | RIELLO S.p.A. Via Ing. Pilade Riello 7 37045 Legnago (VR) - ITALY | | T06778710 |
| | Mod. | <input type="text"/> | |
| Cod. | <input type="text"/> | N° | <input type="text"/> |
| Pms | <input type="text"/> | bar | Qn(max) <input type="text"/> kW |

-  Central heating section
- Qn** Rated heat input
- Pn** Rated useful heat output
- IP** Electric degree of protection
- Pms** Maximum operating pressure, CH circuit
- T** Maximum permitted temperature
- η** Efficiency
- NOx** NOx class

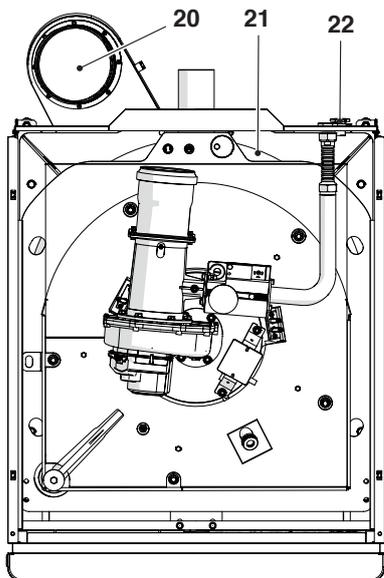
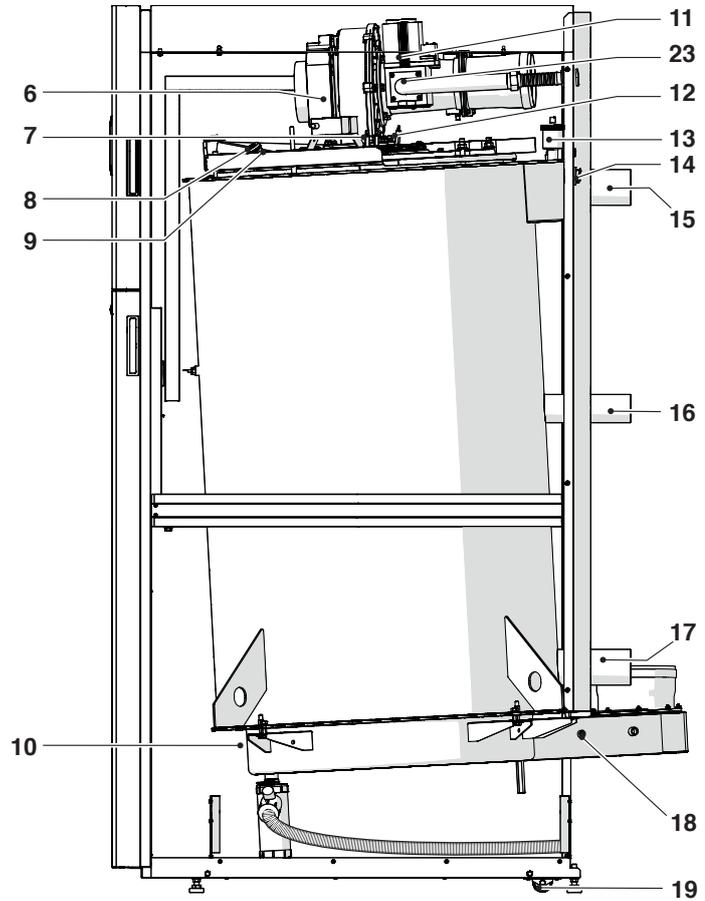
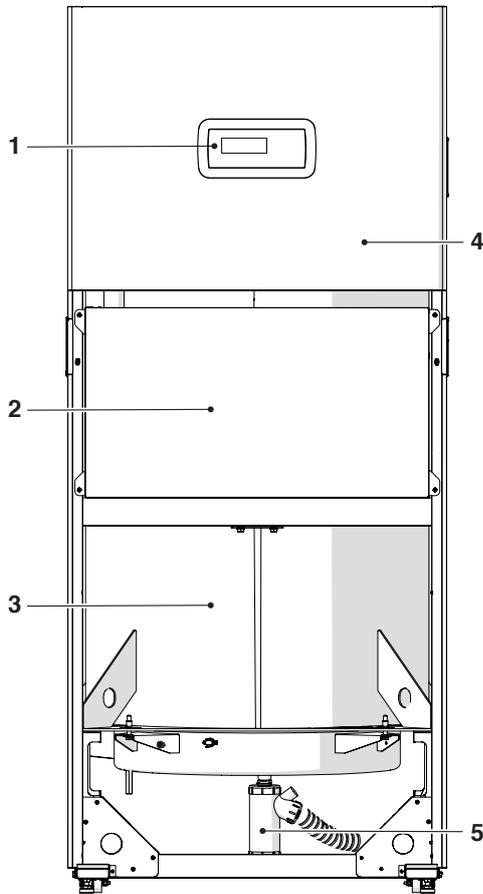
Serial number plate

Contains the serial number, the model and the main technical data.

 If these plates or any other means of clearly identifying the product are defaced, removed or lost, proper installation and servicing may be rendered difficult.

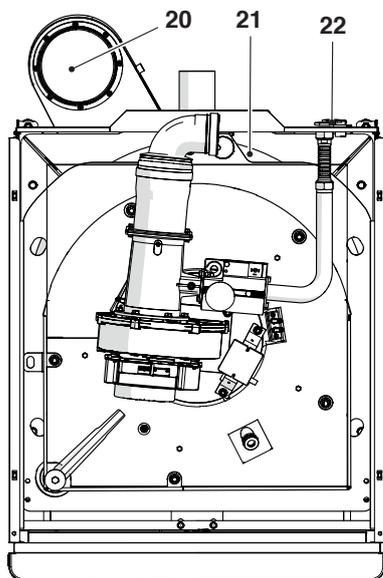
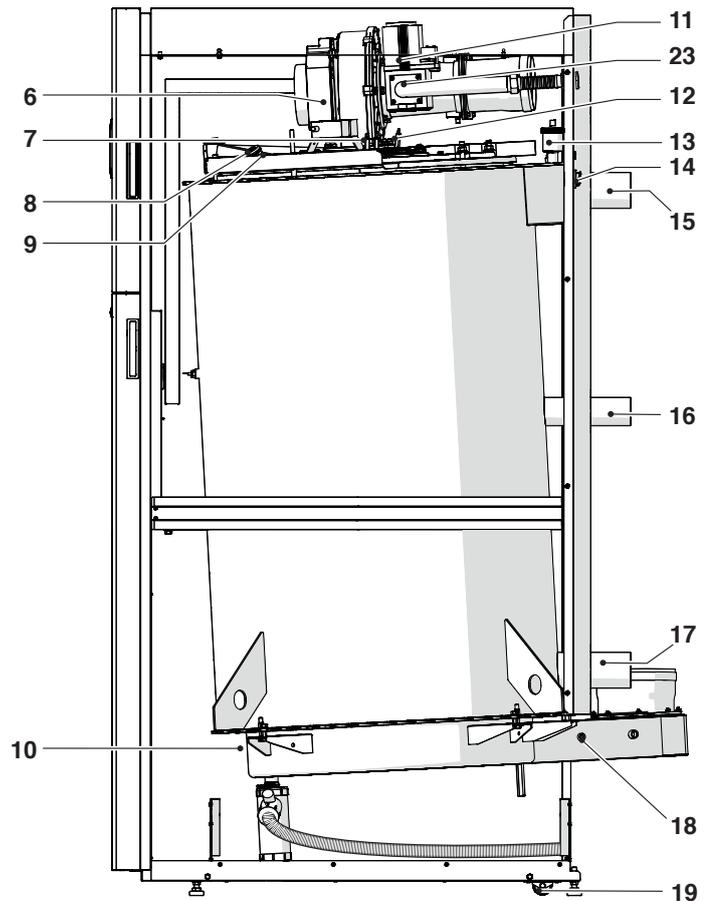
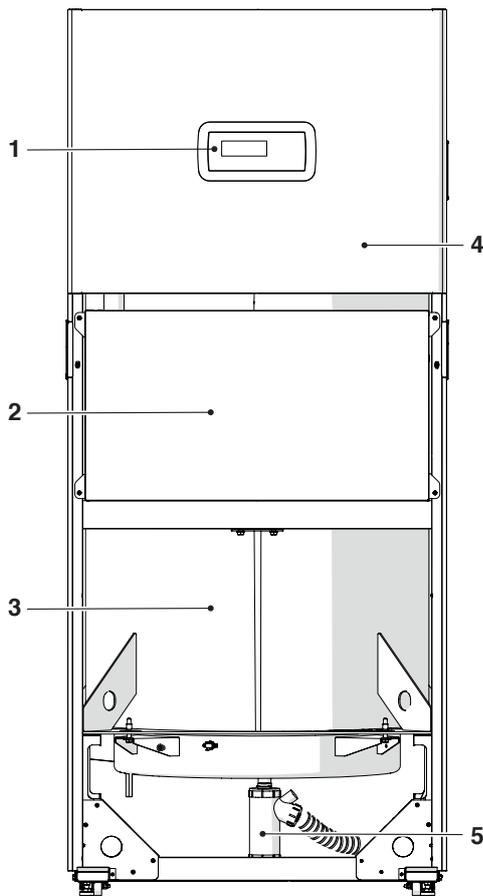
1.6 System layout

Mod. 140



- 1 Control panel
- 2 Electrical panel
- 3 Boiler body
- 4 Front panel
- 5 Condensate drain siphon
- 6 Fan
- 7 Ignition electrode
- 8 Flame inspection window
- 9 Combustion chamber pressure tap
- 10 Flue gas limit thermostat
- 11 Gas valve
- 12 Detection electrode
- 13 Automatic bleed valve
- 14 Main switch
- 15 Central heating flow
- 16 High temperature system return
- 17 Low temperature CH return
- 18 Exhaust flue probe
- 19 Wheels
- 20 Flue gas exhaust fitting
- 21 Upper panel
- 22 Gas fitting
- 23 Pressure test point

Mod. 190



- 1 Control panel
- 2 Electrical panel
- 3 Boiler body
- 4 Front panel
- 5 Condensate drain siphon
- 6 Fan
- 7 Ignition electrode
- 8 Flame inspection window
- 9 Combustion chamber pressure tap
- 10 Flue gas limit thermostat
- 11 Gas valve
- 12 Detection electrode
- 13 Automatic bleed valve
- 14 Main switch
- 15 Central heating flow
- 16 High temperature system return
- 17 Low temperature CH return
- 18 Exhaust flue probe
- 19 Wheels
- 20 Flue gas exhaust fitting
- 21 Upper panel
- 22 Gas fitting
- 23 Pressure test point

1.7 Technical specifications

| DESCRIPTION | | | TAU Unit 140 | TAU Unit 190 | | |
|---------------------------------------------------------------------------------|--|-------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|--------|
| Appliance type | | | condensing boiler for central heating B23, B23P, B53P, C13 (*), C33 (*), C43 (*), C53 (*), C63 (*), C83 (*), C93 (*) | condensing boiler for central heating B23, B23P, B53P, C43 (*), C53 (*), C63 (*), C83 (*), C93 (*) | | |
| Fuel | | | IT-CH-PT: G20=20mbar G31=37mbar FR: G20/G25 - 20/25 mbar G31=37mbar BE: G20/G25 - 20/25 mbar | | | |
| Device category | | | IT-CH-PT: II2H3P FR: II2Esi3P BE: I2E(R) | | | |
| Combustion chamber | | | vertical | | | |
| Maximum rated heat input at furnace referred to HVC (LCV) | | | 155,4 (140) | 210,9 (190) | kW | |
| Minimum rated heat input at furnace referred to HVC (LCV) | | | 31,1 (28) | 42,2 (38) | kW | |
| Useful (rated) heat output | | | 137 | 186 | kW | |
| Maximum rated heat output (80-60°C) | | P4 | G20 | 136,8 | 185,8 | kW |
| Maximum rated heat output (50-30°C) | | - | G20 | 152,3 | 205,2 | kW |
| Maximum nominal heat output (60-40°C) | | - | G20 | 144,4 | 195,4 | kW |
| 30% heat output with return at 30°C | | P1 | G20 | 45,7 | 62,0 | kW |
| Minimum rated heat output (80-60°C) | | - | G20 | 27,3 | 37,1 | kW |
| Minimum nominal heat output (50-30°C) | | - | G20 | 30,4 | 40,7 | kW |
| Efficiency class in central heating mode | | | A | A | | |
| Seasonal energy efficiency in central heating mode | | ηs | | 93 | 93 | % |
| Efficiency at rated heat input and High temperature GCV (NCV) regime | | η4 | Useful Pn (60-80°C) | 88 (97,7) | 88 (97,8) | % |
| Efficiency at 30% of the nominal thermal flow and on low PCS temperature regime | | η1 | Useful 30% of Pn | 98 (108,8) | 97,9 (108,8) | % |
| Chimney losses with burner on at max. Pn (80-60°C) | | | 2,1 | 2,1 | % | |
| Chimney losses with burner on at max. 30% Pn (50-30°C) | | | 1,2 | 1,2 | % | |
| Heat loss in standby mode | | Pstby | | 112 | 112 | W |
| | | | | 0,1 | 0,1 | % |
| Fan residual head (min/max) | | | 5/150 | 5/150 | Pa | |
| Annual energy consumption | | QHE | | 424 | 575 | GJ |
| Noise level (sound power) | | LWA | at P max | 73 | 73 | dB(A) |
| Emissions (**) | | Nox | (referred to HCV) | 53 (Class 6) | 54 (Class 6) | mg/kWh |
| Emissions at max./min. heat input, G20 | | CO2 | | 9/9 (±0,1) | 9/9 (±0,1) | % |
| | | CO | | 3/8 | 5/3 | ppm |
| Maximum rated heat input (LCV) | | G25 | | 140 | 190 | kW |
| Minimum rated heat input (LCV) | | G25 | | 28 | 38 | kW |
| Emissions at max./min. heat input, G25 | | CO2 | | 9/9 (±0,1) | 9/9 (±0,1) | % |
| | | CO | | 9/8 | 5/3 | ppm |
| Maximum rated heat input (LCV) | | G31 | | 140 | 190 | kW |
| Minimum rated heat input (LCV) | | G31 | | 28 | 38 | kW |
| Emissions at max./min. power G31 | | CO2 | | 10/10 (±0,1) | 10/10 (±0,1) | % |
| | | CO | | 3/5 | 8/6 | ppm |
| Flue gases temperature at P. max/P. min (80-60°C) | | | 68/61 | 68/60 | °C | |
| Consumption at part load | | Elmin | | 65 | 71 | W |
| Electrical consumption in standby mode | | Psb | | 18 | 18 | W |

(*) Configurations possible only with the installation of the dedicated accessories (available separately).

(**) Weighted values calculated according to standard EN 15502

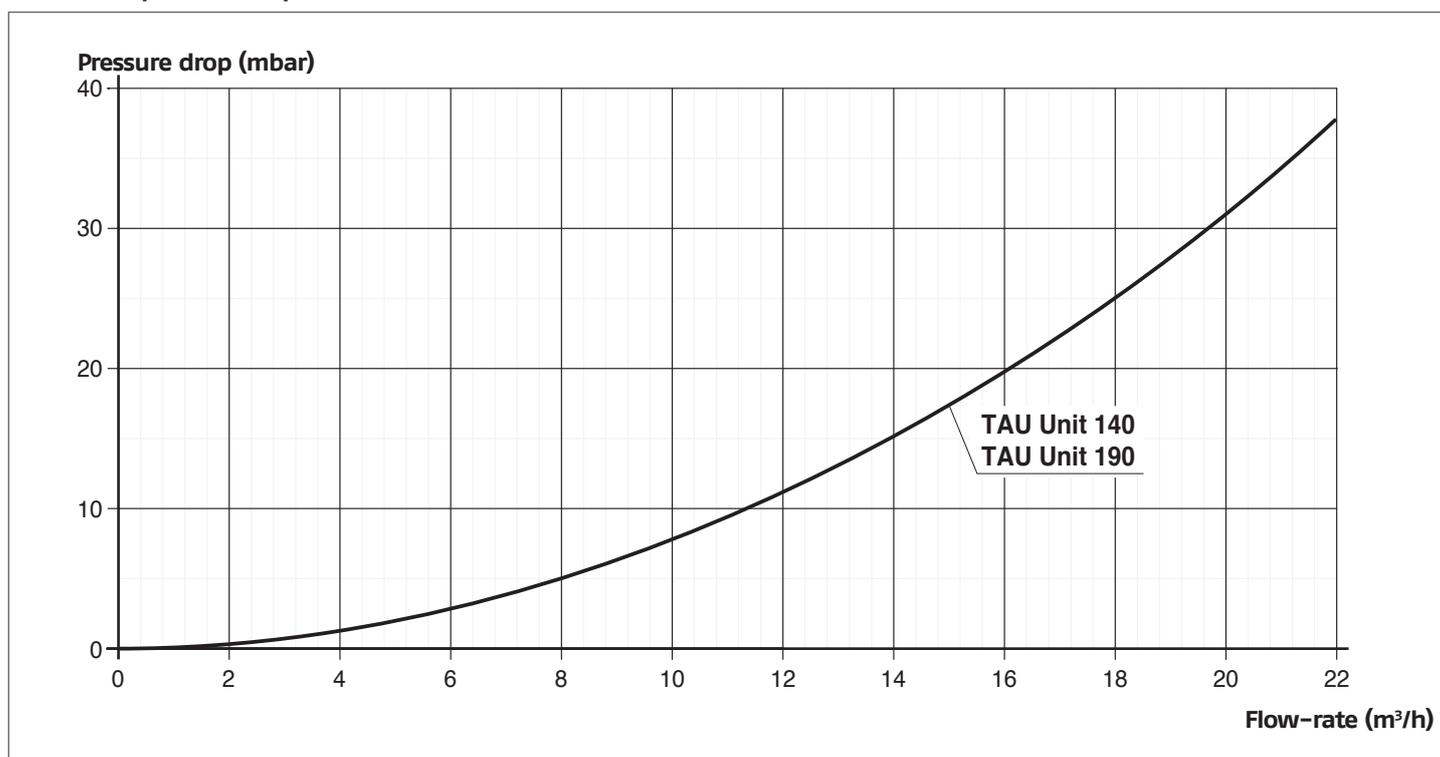
(***) Values referred to atmospheric pressure at sea level.

| DESCRIPTION | TAU Unit 140 | TAU Unit 190 | | |
|----------------------------------------------------------|--------------|--------------|------|---|
| Maximum working pressure | 5 | 5 | bar | |
| Minimum supply pressure | 1 | 1 | bar | |
| Maximum permitted temperature | 110 | 110 | °C | |
| Lockout thermostat activation temperature | 110 | 110 | °C | |
| Adjustment temperature (min / max) | 30/80 | 30/80 | °C | |
| Thermal module water content | 290 | 270 | l | |
| Maximum condensation at 100% rated heat output (40–30°C) | 18,5 | 25 | l/h | |
| Power supply | 230–50 | 230–50 | V-Hz | |
| Index of protection | X0D | X0D | IP | |
| Consumption at full load | Elmax | 270 | 282 | W |
| Consumption at part load | Elmin | 65 | 71 | W |
| Electrical consumption in standby mode | Psb | 18 | 18 | W |

1.8 Circulation pump sizing

This **TAU Unit** boiler comes without a pump. A pump must therefore be provided as part of the installation. In order to choose a pump of the right size, bear in mind the boiler's water-side pressure drop, as shown in the figure below.

Water-side pressure drop



⚠ At the first start-up, and at least once a year, the rotation of the circulator shaft should be checked as, especially after long periods of not being operated, deposits and/or residuals could impede its free rotation.

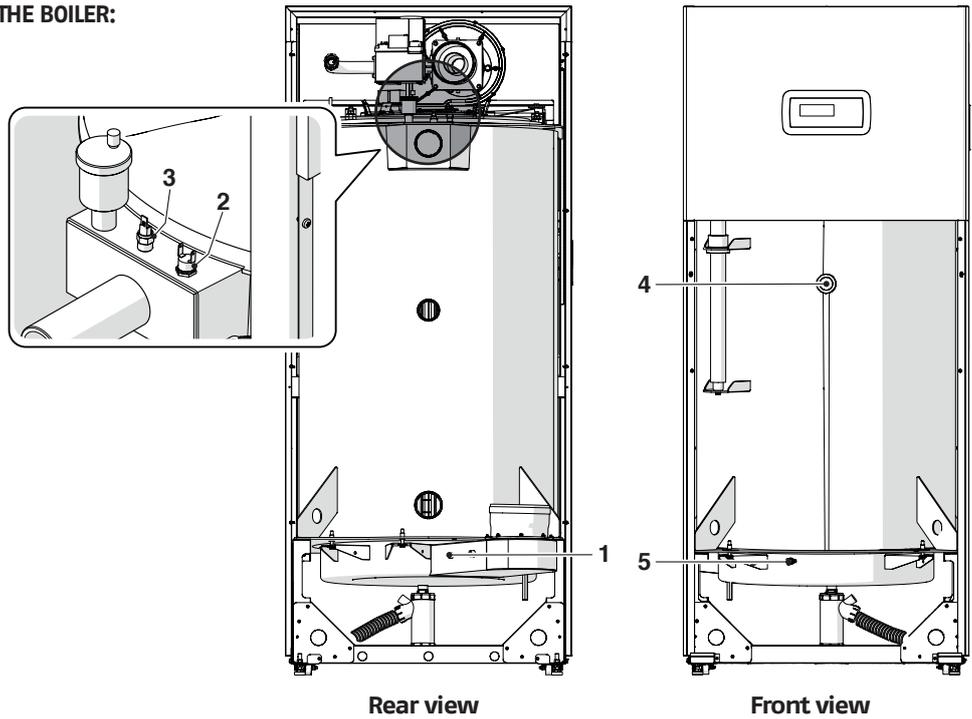
⚠ Before loosening or removing the circulator cap, protect the electric devices located underneath from any water that exits.

⊖ It is prohibited to operate the circulators without water.

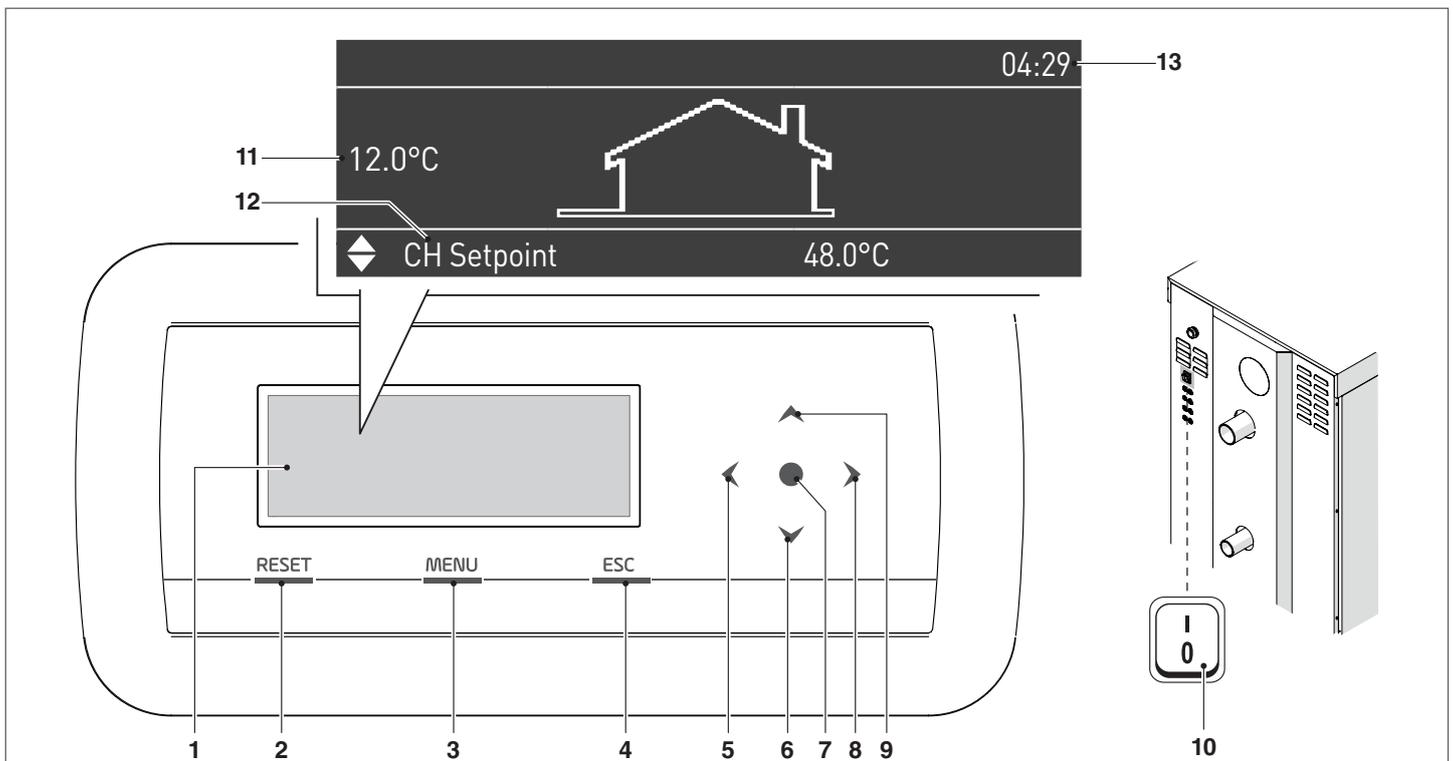
1.9 Location of sensors

SENSORS INSERTED IN THEIR SOCKETS IN THE BOILER:

- 1 Exhaust flue probe
- 2 Safety thermostat
- 3 CH flow temperature sensor
- 4 Return probe
- 5 Flue gas limit thermostat



1.10 Control panel



CONTROL INTERFACE

- 1 255x80 point backlit display (106,4x39,0mm)
- 2 RESET key: restores normal operations after a safety shut-down
- 3 MENU key: switches on the main menu
- 4 ESC key: in menu navigation, it enables you to exit a menu item and go back to the previous one
- 5 ÷ 9 Navigation keys ◀, ▼, ●, ▶, ▲
- 10 Main switch (placed on the rear panel of the equipment)

DISPLAY VISUALISATION

- 11 Outdoor temperature
- 12 Setpoint
- 13 Clock

2 INSTALLATION

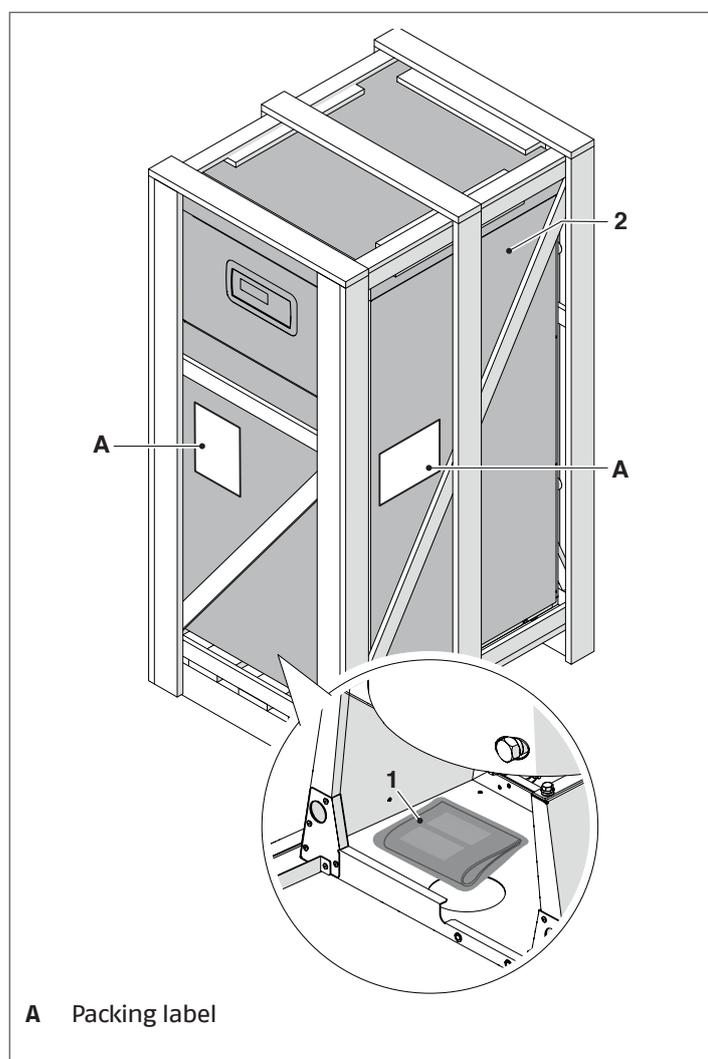
2.1 Unpacking the product

The thermal unit **TAU Unit** is supplied on pallet, protected by an anti-scratch canvas and a wooden cage. Check immediately that there is no damage and that the boiler is exactly as ordered. The product specifications are shown on the outside of the packing: model, power, equipment, fuel type. If there is any difference between the boiler ordered and that received, contact your agent, the warehouse or the sales department at head office immediately.

Inserted in a plastic bag (1) inside the boiler (2), the following material is supplied:

- Instruction manual
- Hydraulic test certificate
- Energy label
- Conventional warranty conditions
- Gas valve diaphragm for LPG (G31)

2.1.1 Positioning of labels

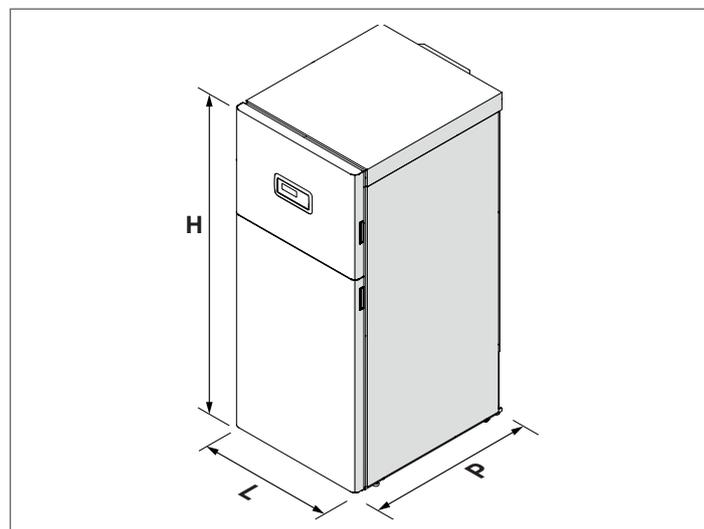


⚠ The instruction manual is an integral part of the appliance; therefore, it should be read and stored carefully.

⚠ Keep the documentation envelope in a safe place. Any replacement documents must be ordered from Riello S.p.A. who reserve the right to charge for the cost of the replacement.

2.2 Overall dimensions and weights

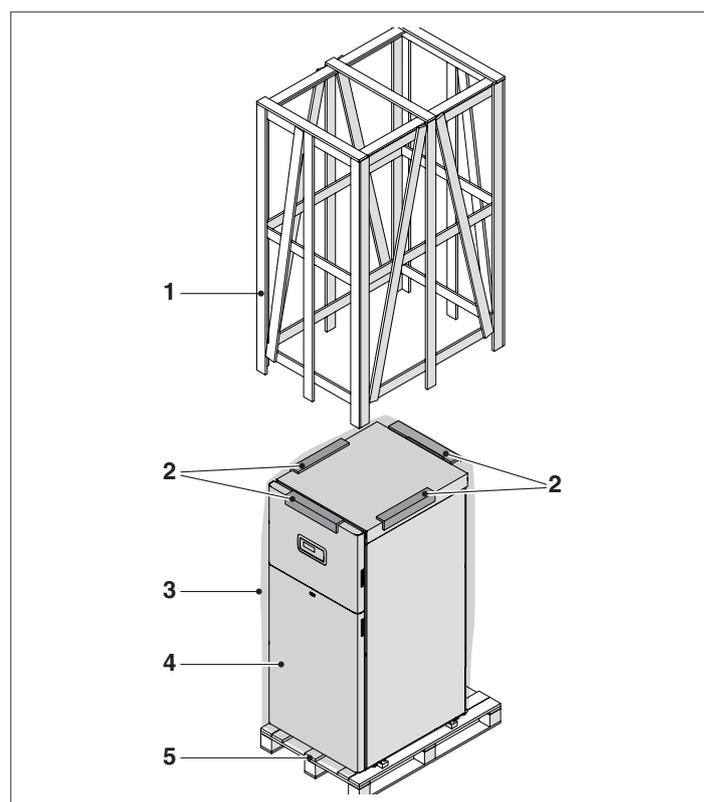
| | TAU Unit | |
|-----------------|----------|------|
| | 140 | 190 |
| L (mm) | 800 | 800 |
| P (mm) | 973 | 973 |
| H (mm) | 1885 | 1885 |
| Net weight (kg) | 400 | 420 |



2.3 Moving and removing the packing

⚠ Wear suitable personal protection equipment when moving the boiler and removing the packing. Only use lifting equipment that is suitable for the weight involved.

- Remove the wooden cage (1)
- Remove the angular protections in polystyrene (2)
- Remove the protective bag (3).

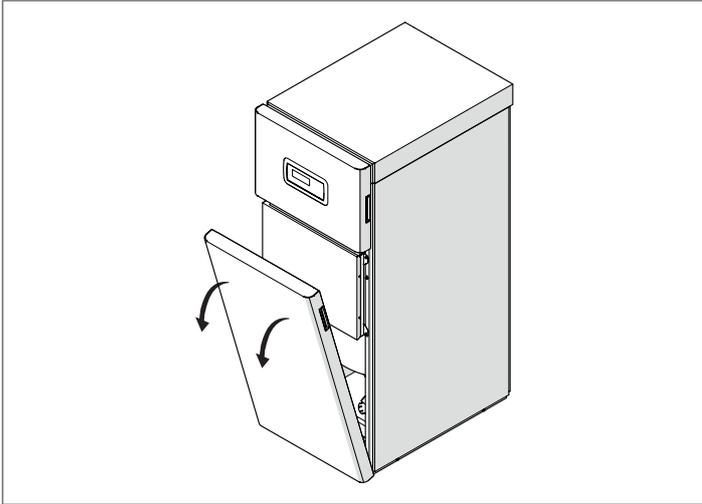


- 1 Wooden crate
- 2 Edge protectors
- 3 Protective bag
- 4 Boiler
- 5 Pallet

⚠ The packaging material must be disposed of carefully and must not be abandoned, as it is a source of potential danger.

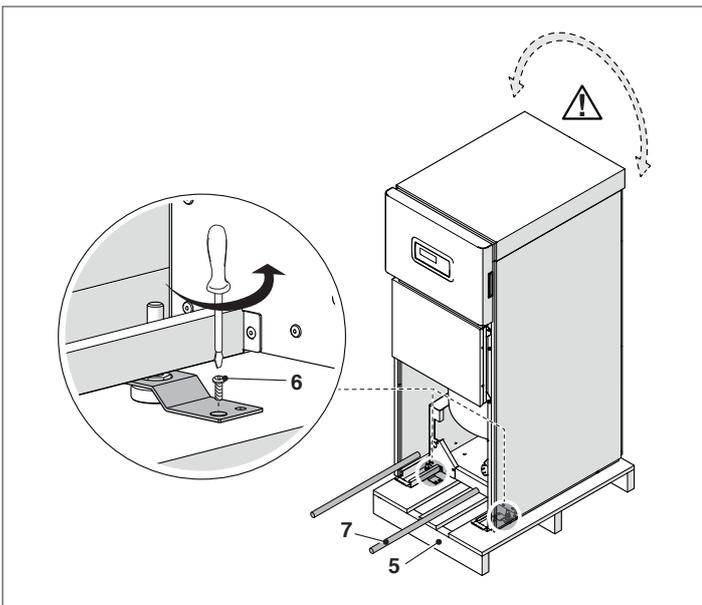
Once you have removed the packaging, proceed as follows to position the boiler:

- Pull the front panel towards you then lift it up to remove it



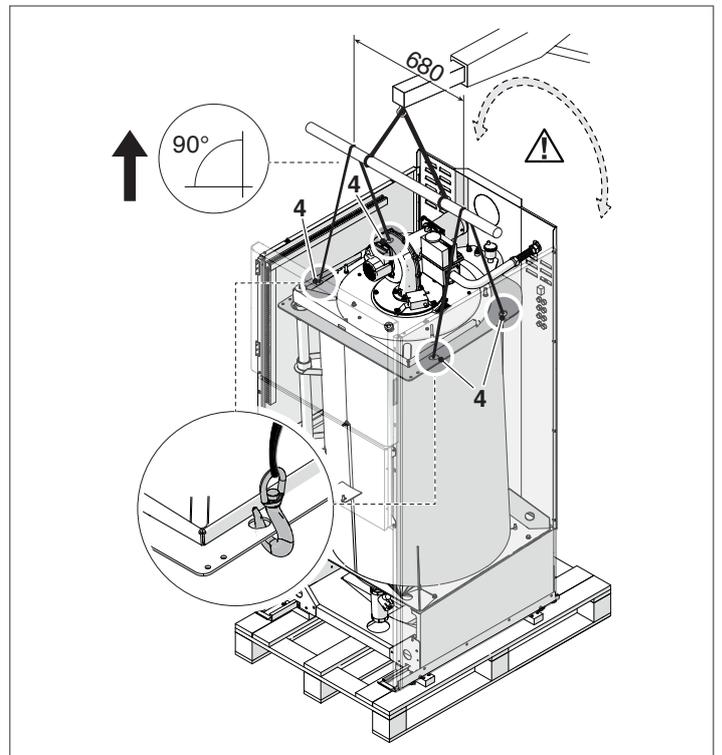
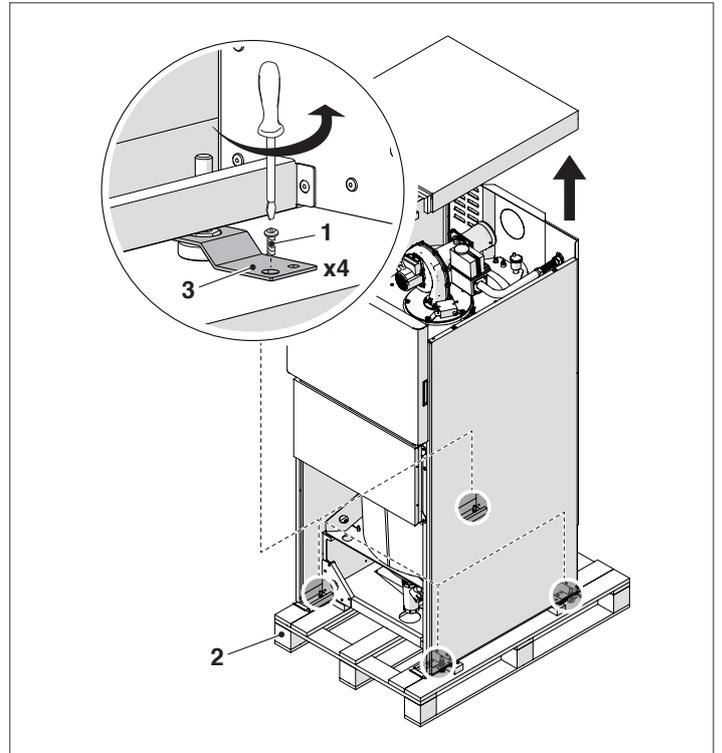
HANDLING WITH SUPPORT RAILS

- Loosen the screws (6) fastening the pallet (5)
- Insert two pieces of tube (7) with suitable length in the relevant holes, letting them come out evenly from both sides. Use the protruding lengths of pipe as lifting handles.



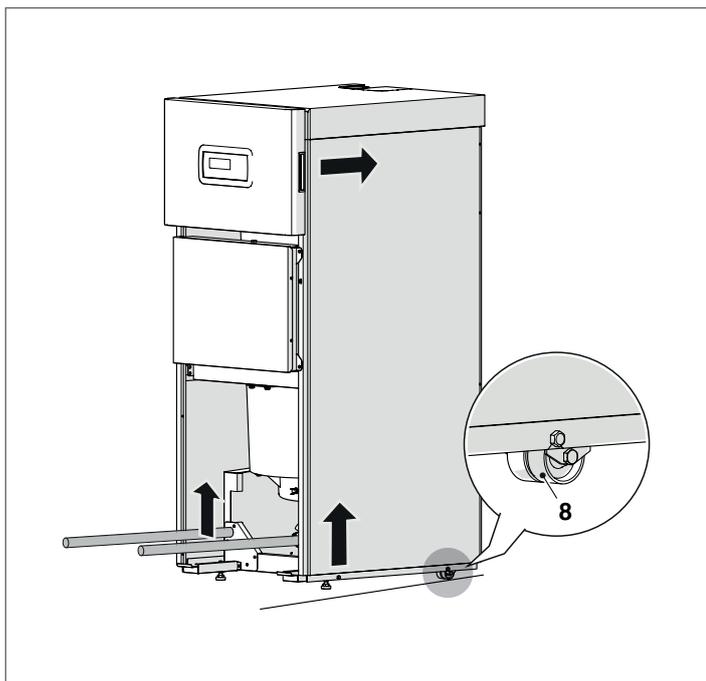
MOVING WITH A HOIST

- Remove the top panel
- Unscrew the screws (1) locking the pallet (2) at the brackets (3). Connect the belts at the points (4) and lift the boiler using equipment suitable for the weight of the appliance.



⚠ Take care because the boiler might swing when lifted.

With flat and smooth flooring and for **small** movements, the thermal unit can be **slightly** lifted and moved through the wheels (8).



Level the thermal unit by acting on the 2 feet on the front side of the thermal unit.

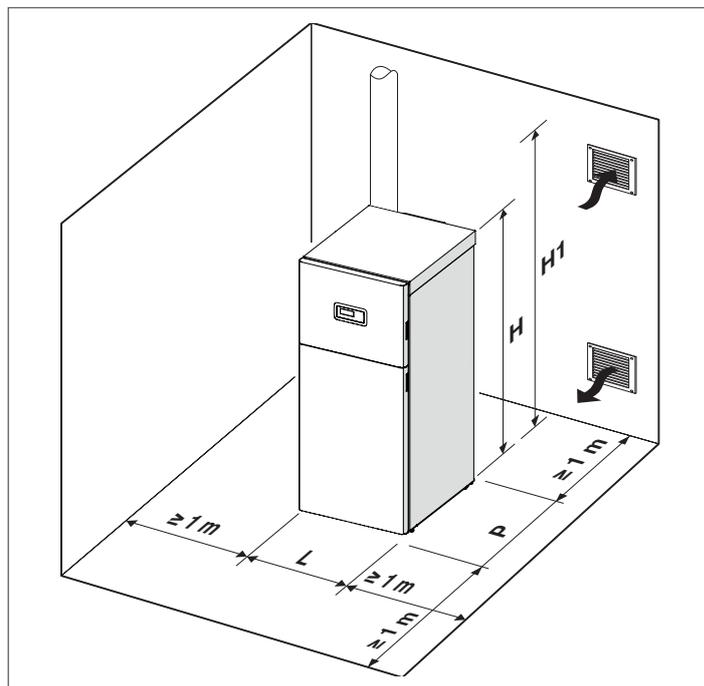
2.4 Installation premises

Because this **TAU Unit** boiler generates over 35 kW of heat output, it **MUST** be installed in a dedicated boiler room in compliance with applicable technical standards. The boiler must also be provided with a suitable condensate collection system and flue gas vent system (see the relevant sections in this manual).

- ⚠** In Belgium, boilers must be installed according to standards NBN D51.003, NBN B61.002 (heat output < 70 kW), and NBN B61.001 (heat output >70 kW)
- ⚠** When installing the boiler, allow sufficient space around it to access all safety and control devices and to permit easy maintenance.
- ⚠** Check that the electric protection level of the appliance is suitable for features of the room where it is installed.
- ⚠** Electrical parts must be placed at a height of no less than 500 mm from the ground where heating units are supplied with fuel gas with specific weight exceeding that of air.
- ⊖** These boilers must be installed indoors. They are not designed for outside use.
- ⊖** Do not obstruct or restrict the air vents in the room where the boiler is installed. A free air supply is essential for correct combustion.
- ⚠** Make sure that comburent air is not contaminated by substances containing chlorine or fluorine (elements found in sprays, paints, detergents etc.).

2.4.1 Recommended minimum distances

This figure shows the minimum distances that must be respected to allow installation and maintenance of the boiler.



- ⚠** H1 = 2230 mm, opening position of the "top flue gases chamber closing" for carrying out maintenance operations. The thermal module **TAU Unit** can be installed in rooms that are permanently ventilated and equipped with suitably sized ventilation openings in line with Technical Standards and Regulations applicable to the installation site.

2.5 Installation in older systems and systems requiring modernisation

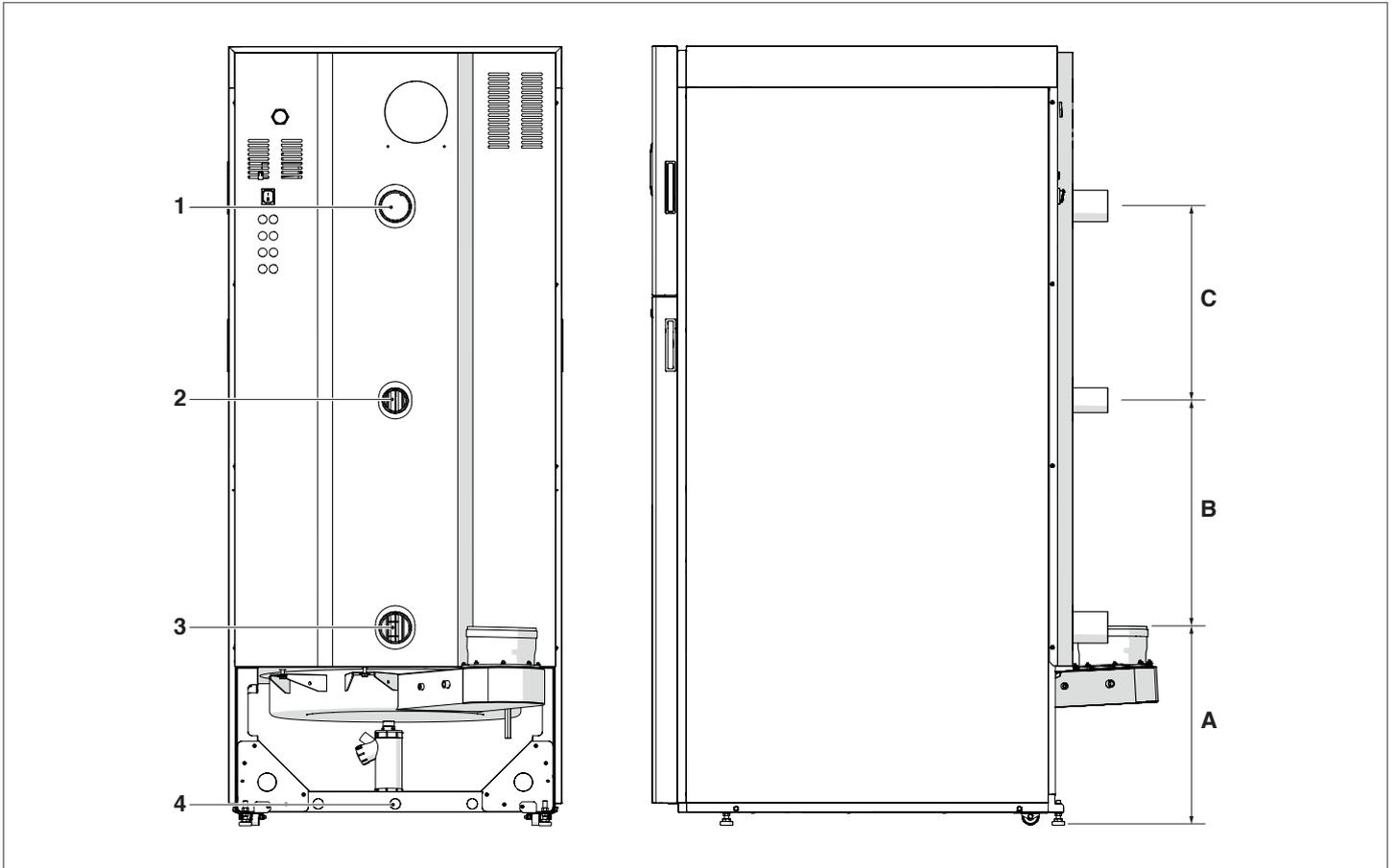
When installing these boilers in older systems or systems requiring modernisation, always perform the following checks:

- The flue must be suitable for condensing devices, for the temperature of the combustion products, calculated and constructed according to current standards, and must be as much straight as possible, sealed, isolated and with no occlusions or chokes
- Make sure that the flue is fitted with a condensation drainage union
- Make sure that the electrical supply system has been installed by a qualified electrician in compliance with applicable standards
- Make sure that the fuel feed line and any storage tank are made and installed in compliance with applicable standards
- Make sure that the flow rate, head and direction of flow of the pumps are suitable and correct
- Make sure that expansion vessels are big enough to contain the additional volume generated by thermal expansion
- Make sure that the central heating circuit has been flushed out to remove all sludge and lime scale, and that it has been bled and seal tested
- A water treatment system must be provided (see chapter "Water in central heating systems"). Refer to the **RIELLO** catalogue for details of specific products.

- ⚠** The manufacturer declines all responsibility for damage caused by incorrectly constructed flue systems.

2.6 Water connections

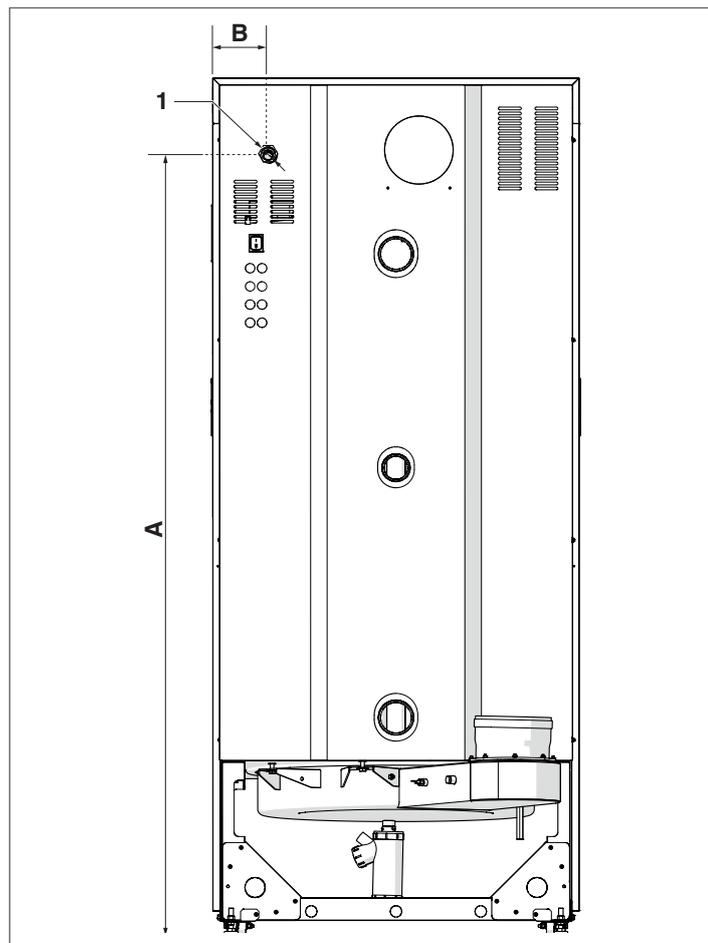
TAU Unit boilers are designed and made for installation in combined central heating and domestic hot water production systems. The specifications of the water fittings are as follows.



| DESCRIPTION | TAU Unit 140 | TAU Unit 190 | Unit of measurement |
|------------------------------|--------------|--------------|---------------------|
| A | 478 | 478 | mm |
| B | 550 | 550 | mm |
| C | 470 | 470 | mm |
| 1 - Central heating flow | 2" 1/2 | 2" 1/2 | ∅ |
| 2 - High temp. system return | 2" | 2" | ∅ |
| 3 - Low temp. system return | 2" 1/2 | 2" 1/2 | ∅ |
| 4 - Condensate outlet | 22 | 22 | ∅ mm |

NOTE: if the system only uses high temperature terminals, connect the system return to connection (3) for low temperature, so as to use the whole exchange surface.

2.7 Gas connections



| | TAU Unit 140 | TAU Unit 190 | Unit of measurement |
|-----------------|--------------|--------------|---------------------|
| A | 1719 | 1733 | mm |
| B | 124 | 124 | mm |
| 1 - Gas fitting | 1" | 1" | ∅ |

TAU Unit boilers must be connected to a methane or LPG gas supply in compliance with the relevant standards.

Perform the following checks before making the connection:

- Check that the boiler is compatible with the type of gas supply
- Check that the gas supply pipes have been thoroughly cleaned.

A filter of suitable particle rating should be installed.

⚠ The gas supply line must be suitable for the flow rate demanded by the burner. The gas supply system must also be equipped with all the necessary safety and control devices required by applicable legislation and standards.

⚠ On completion of the installation, check that all joints are sealed.

2.8 Flue gas vent and comburent air intake

The equipment is supplied as standard in type B configuration, hence prepared to suck air directly in the installation room through the venting openings, that must be carried out in compliance with the Technical Standards.

It can become a type C equipment with the use of specific accessories. In this configuration the equipment will suck air directly from the outside with the possibility to have coaxial or split pipes.

For flue gas extraction and the intake of combustion air, it is essential to use only specific pipes for condensing boilers and ensure that they are correctly connected, as shown in the instructions supplied with the flue gas accessories.

Exhaust and suction ducts must always be carried out in compliance with national, regional, provincial, etc. standards and regulations in force (UNI - CIG).

The combustion gases are cooled to a temperature near that of the central heating return before they leave the boiler body. This makes it possible to use plastic flue pipes instead of metal ones, with significant savings in overall installation costs.

To protect the vent pipes against possible damage, **TAU Unit** boilers are equipped with a flue gas temperature thermostat.

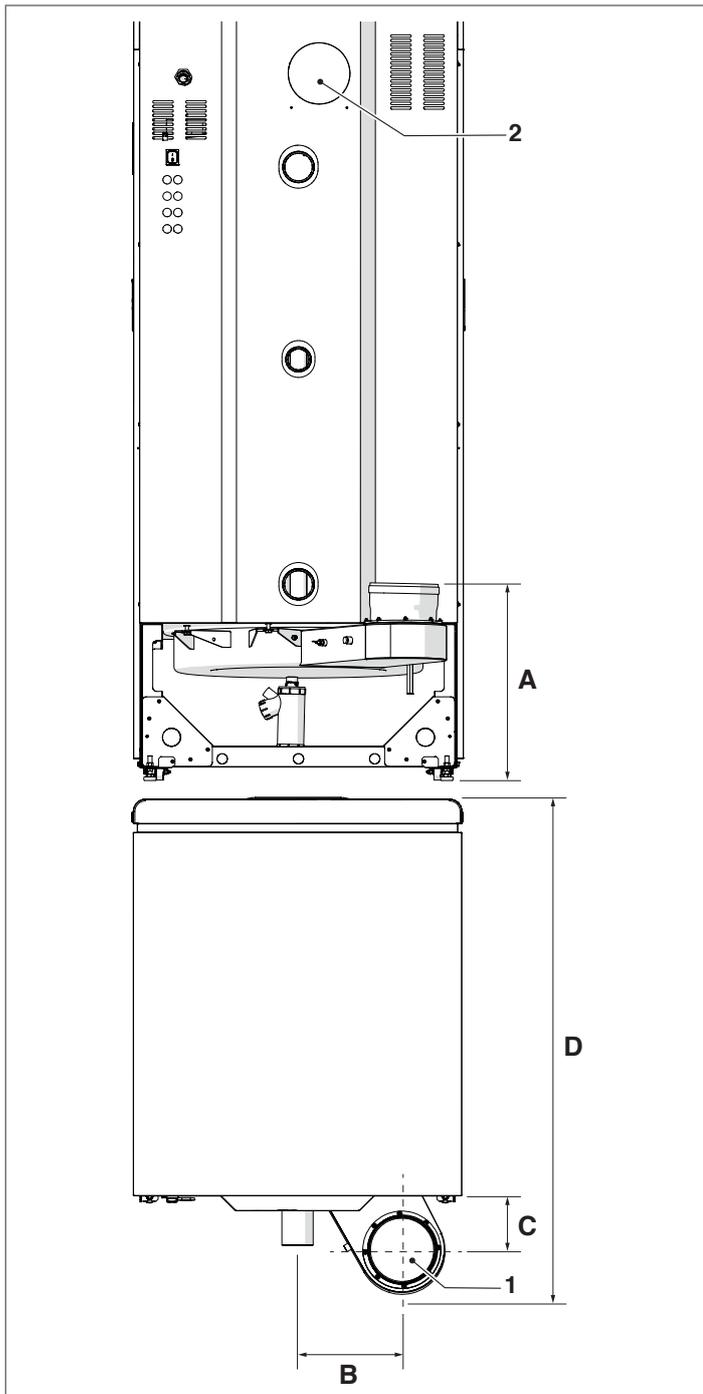
⚠ Do not connect this appliance's flue gas extraction pipes with those of other appliances, unless this is specifically authorised by the manufacturer. Non-compliance with this precaution may cause a build-up of carbon monoxide in the room where the appliance is installed. This could jeopardise people's health and safety.

⚠ Ensure that combustion air (suction line air) is not contaminated by:

- waxes/chlorinated detergents
- chemical products based on swimming pool chlorine
- calcium chloride
- sodium chloride use to soften tap water
- refrigerant leaks
- paint or varnish removers
- chloridric acid/muriatic acid
- cements and glues
- anti-static softeners used in dryers
- chloride used for domestic or industrial applications as detergent, whitener or solvent
- adhesives used to glue construction and other similar products.

⚠ To prevent thermal unit contamination, do not install suction air intakes and flue gas exhaust ducts near:

- dry-cleaners/laundry rooms and factories
- swimming pools
- metal processing plants
- beauty parlours
- fridge repair shops
- photo-processing facilities
- body-shops
- plastics manufacturing plants
- furniture workshops and manufacturing plants.



| | TAU Unit 140 | TAU Unit 190 | Unit of measurement |
|--------------------------------------------------------------|--------------|--------------|---------------------|
| A | 475 | 475 | mm |
| B | 255 | 255 | mm |
| C | 132 | 132 | mm |
| D | 1215 | 1215 | mm |
| 1 - Exhaust flue duct | 110 | 160 | ∅ mm |
| 2 - Set up for type C air suction configurations (accessory) | 110 | 110 | ∅ mm |

2.8.1 Technical specifications of stack

The stack must satisfy the following requirements::

- It must be constructed from materials that are impermeable to flue gases and that offer lasting resistance to mechanical stress, heat and the action of the products of combustion and condensate
- It must be vertical, free of restrictions and contain bends of no more than 45°
- It must be suitable for the specific operating conditions of the boiler and must be CE marked
- It must be of adequate dimensions to ensure draught and venting properties suitable for the needs of the boiler
- It must have adequate external insulation to prevent condensation and the cooling of flue gases
- the stack must have a dedicated condensate drain system at the bottom.

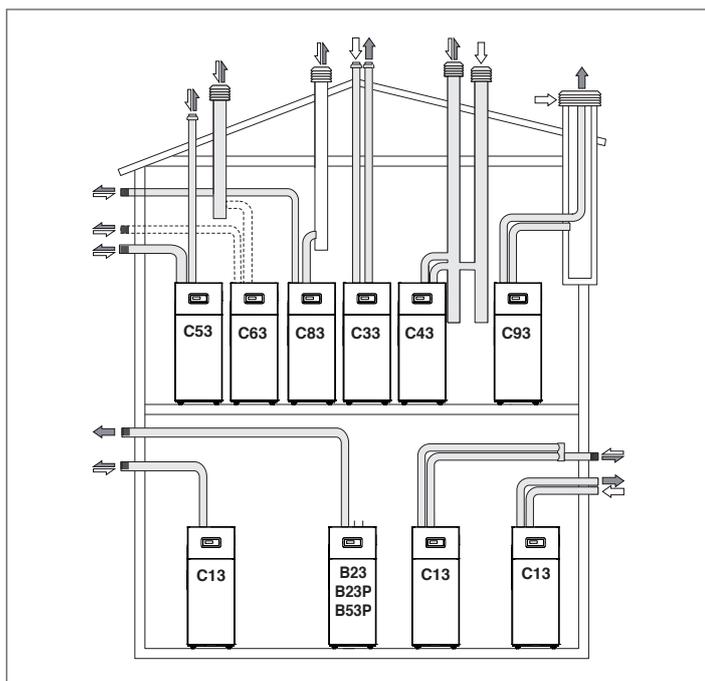
⚠ The diameter of the smoke duct must never be smaller than the diameter of the flue gas duct of the thermal unit.

⚠ In configuration B23, the stack must guarantee the minimum draught specified by applicable technical standards, assuming zero pressure at the boiler's flue gas exhaust.

2.8.2 Connection to the stack

The boiler must be connected to the stack using rigid flue pipes that are resistant to heat, condensate and mechanical stress. All joints must be sealed and the finished flue must be insulated. The near-horizontal section of flue pipe must have a slope of at least 5° towards the boiler and must also be properly insulated. In long near-horizontal sections of flue pipe (L>1 m), install a condensate drain system near the boiler exhaust (as shown in the figure) to drain off any condensate forming in this section of flue.

The diameter of the stack must always be greater than that of the flue pipe from the boiler's exhaust fitting. To change direction, use a T section with an inspection cap to permit easy access for cleaning inside the pipe. After cleaning, always make sure that inspection caps are replaced tightly and that their seals are undamaged and efficient.



- B23** Upstream fan. Comburent air intake directly from the room where the boiler is installed. Flue gas venting via horizontal or vertical pipes, with air ventilation to room.
- B23P** As B23 but with flue gas vent pipes designed to operate at positive pressure.
- B53P** As for B23P but with flue gas vent pipes supplied by boiler manufacturer.
- C13** Concentric wall vent. Twin flue pipes can also be used, but the wall through-pipes must be concentric or located close enough to be subjected to similar wind conditions.
- C33** Concentric roof vent. Twin flue gas vent pipes may be used, but terminals must be concentric or near enough to be subject to the same wind conditions (i.e. within a 100 cm square with a difference in height between the pipes of less than 100 cm).
- C43** Vent and air intake via separate twin pipes subject to similar wind conditions.
- C53** Separate wall or roof vent and air intake, in areas of different pressure but never on opposite walls.
- C63** Upstream fan. Boiler intended to be connected to a system for the supply of combustion air and for the evacuation of combustion products approved and sold separately.
- C83** Separate vent and inlet subject to natural draught. Wall air inlet. Vent to individual or shared chimney. Shared chimneys must be insulated to prevent the formation of condensation.
- C93** Fan in combustion circuit upstream from the combustion chamber/heat exchanger. This configuration is used in older system upgrades and with condensing boilers. It allows the system to make use of an old air well, chimney or flue that would otherwise be redundant.

- ⚠** See the specific standard for details. In Belgium, see NBN-D51-003.
- ⚠** For B-type installation, combustion air is taken from the environment and goes through the openings (shutters) on the rear panel of the device that must be located in a suitable and ventilated technical room.
- ⚠** Read the requirements, instructions and prohibitions detailed below carefully, since non-compliance with them may be result in a safety hazard or the appliance's malfunction.
- ⚠** Condensation appliances described in this handbook must be installed with flue gas pipes compliant with applicable legislation and expressly manufactured for this specific use.
- ⚠** Check that pipes and joints are not damaged.
- ⚠** Joint seals must be executed with materials that withstand the condensate's acidity and the temperatures of the appliance's flue gases.
- ⚠** When installing flue pipes, always bear in mind the direction of the flue gases and of possible condensate flows.
- ⚠** Inadequate or incorrectly sized flue gas pipes may increase combustion noise, create condensate extraction issues and negatively impact on combustion parameters.
- ⚠** Check that pipes are suitably far (min. 500 mm) from flammable or heat-sensitive construction elements.
- ⚠** Do not connect the vent flue directly to existing flues used to serve other appliances (cookers, other boilers, etc.). Larger disused flues can nevertheless be used as ducts for routing the boiler's intake and vent flues.
- ⚠** If the vertical section of vent flue is over 4 metres in height, a condensate drain must be provided at its bottom (see paragraph "Preparation for the condensate drain").
- ⊖** It is prohibited to block or section the flue gas extraction pipe or the combustion air suction pipe, if any.
- ⊖** It is prohibited to use pipes that not designed for this application, because the condensate's action would damage them quickly.

Following are the tables of the maximum equivalent lengths for the different available models.

EQUIPMENT CONFIGURATION TYPE B "OPEN"

| Description | TAU Unit | | |
|----------------------------------------------------|----------|-----|---|
| | 140 | 190 | |
| Maximum equivalent length of flue gas exhaust pipe | 20(*) | | m |

(*) This length must be reduced by 1 metre for every 90° curve and by 0.5 metres for every 45° curve.

EQUIPMENT CONFIGURATION TYPE C "SEALED"

If comburent air is drawn from outdoors, the appliances are type C "sealed" and the boiler room does not require ventilation.

! For this configuration the settings of the parameters shown in "Configuration of fan parameters for type C appliance configurations" must be changed.

Split ducts

The boiler must be fitted with the relevant kit for use in these configurations. (See the manual provided with the kit for installation instructions).

Split ducts can be oriented in the direction most suitable to the room needs, respecting the specified maximum lengths.

| Description | TAU Unit | | |
|----------------------------------------------------|----------|-----|---|
| | 140 | 190 | |
| Maximum equivalent length of flue gas exhaust pipe | 10+10(*) | | m |

(*) This length must be reduced by 1 metre for every 90° curve and by 0.5 metres for every 45° curve.

Coaxial ducts

The boiler must be fitted with the relevant kit for use in these configurations. (See the manual provided with the kit for installation instructions).

Coaxial flues can be oriented in whatever direction is most convenient for the room, provided the maximum specified lengths are respected.

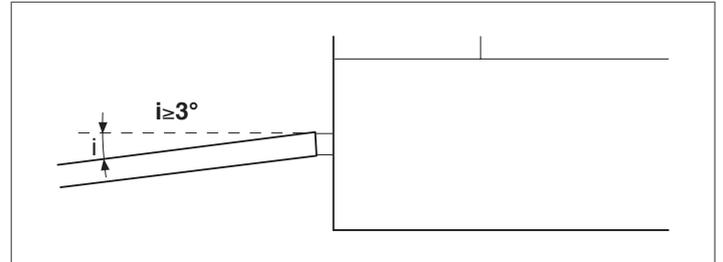
| Description | TAU Unit | | |
|----------------------------------------------------|----------|-----|---|
| | 140 | 190 | |
| Maximum equivalent length of flue gas exhaust pipe | 7(*) | | m |

(*) This length must be reduced by 1 metre for every 90° curve and by 0.5 metres for every 45° curve.

2.8.3 Preparation for the condensate drain

! Always maintain a slope "i" of over 3° and ensure that the diameter of any hose used is greater than that of the boiler's own condensate drain pipe.

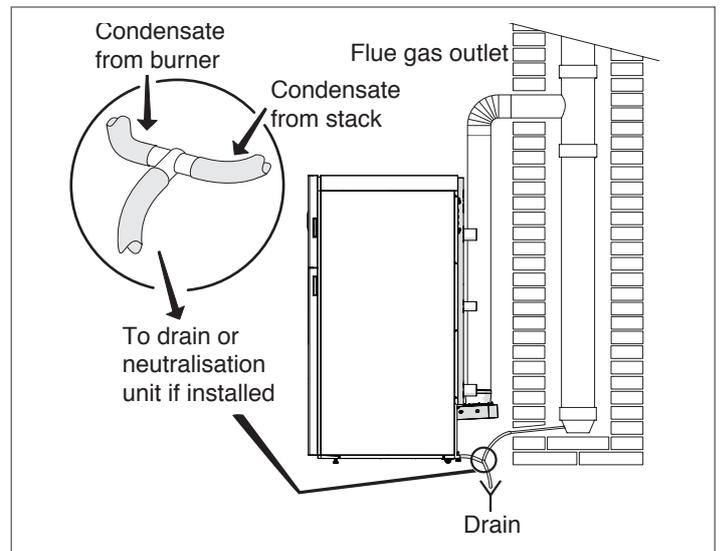
! The connection to the drainage system must be made according to current laws in compliance with any local regulations.



! Fill the siphon with water before you start up the boiler to prevent combustion gases escaping into the room during the first few minutes of boiler functioning.

! Condensate from the boiler and from the flue should be channelled to the same drain point.

! The base of the equipment must be horizontal and levelled in the frame resting area in order to let the condensate evacuate easily.



! Any condensate neutralisation devices can be connected after the siphon. For the calculation of the duration of the neutralisation load, the amount of neutraliser consumption must be evaluated after one year of operation. The total duration of the load can be extrapolated from this information.

To select the type of neutralisation unit to use, consult the Catalogue or contact the dealer who sold the boiler.

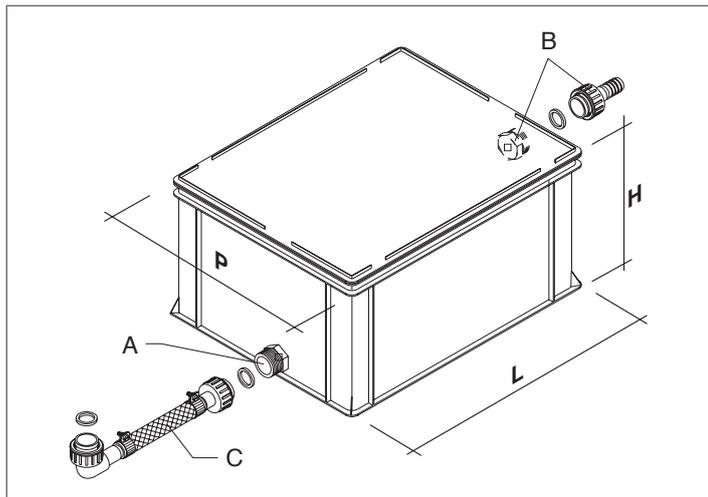
2.8.4 Neutralising the condensate

The N2 and HN2 neutralisation kits are available for condensate neutralisation.

N2 TYPE NEUTRALISATION KIT

The N2 TYPE neutralisation units were designed for systems equipped with the central heating plant condensate outlet trap located lower than the boiler condensate outlet. This neutralisation kits does not require electric connections.

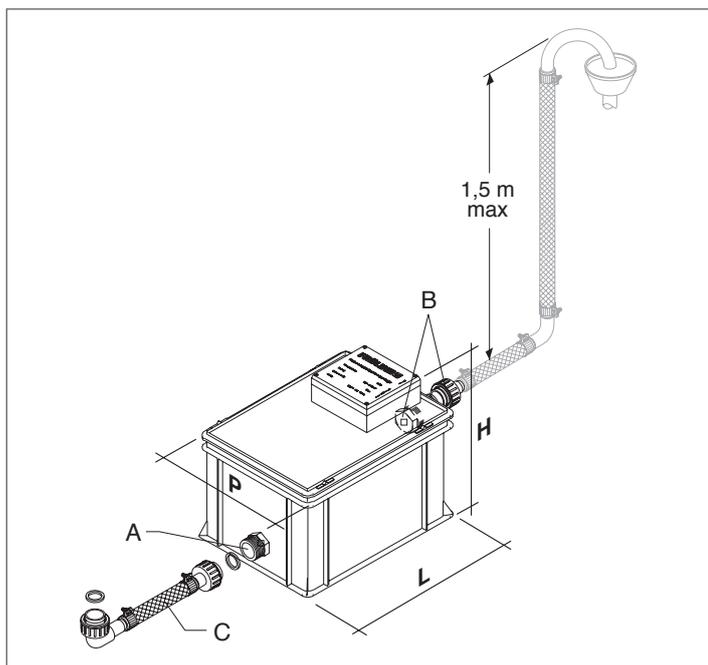
| Description | Dimensions | |
|-------------|------------|----|
| L - Width | 400 | mm |
| H - Height | 220 | mm |
| P - Depth | 300 | mm |



HN2 TYPE NEUTRALISATION KIT

The HN2 TYPE neutralisation units were designed for systems equipped with the central heating plant condensate outlet trap located higher than the boiler condensate outlet. This neutralisation kits does require electric connections.

| Description | Dimensions | |
|-------------------|------------|----|
| L - Width | 400 | mm |
| H - Height | 220 | mm |
| P - Depth | 300 | mm |
| Q.ty of granulate | 25 | kg |



2.9 System filling and emptying

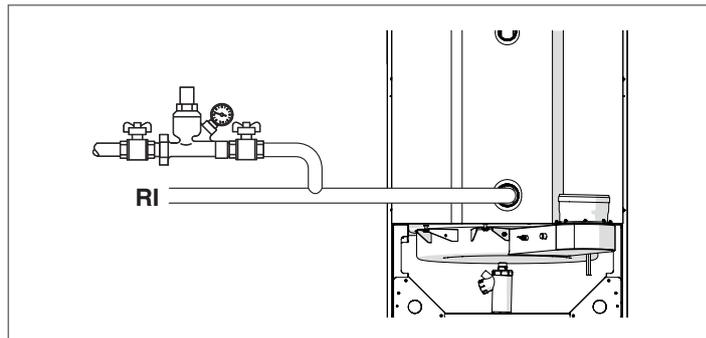
TAU Unit boilers require a filling pipe connected to the central heating circuit return pipe.

! All the necessary circuit shut-off and drain cocks must be provided.

FILLING

Before starting to recharge, check that the drain valve, on the system, is closed.

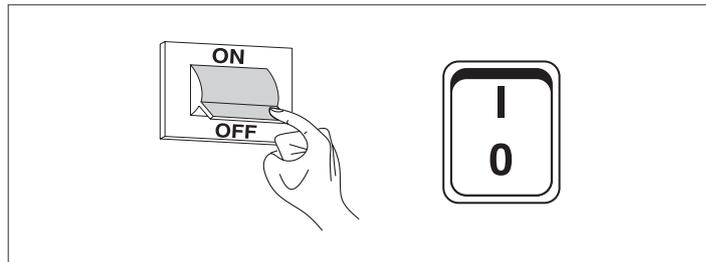
- Open the shut-off cocks for the water circuit
- Slowly fill until the pressure gauge reads, when cold, a value of 1,5 bar
- Close the central heating circuit shut-off cocks.



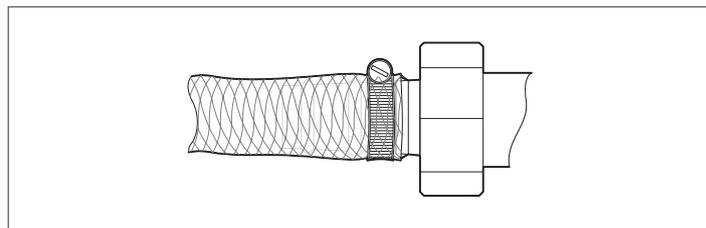
EMPTYING

Switch the electricity supply OFF at the system's main switch and at the control panel before starting to empty the boiler.

- Close the CH circuit water shut-off cocks



- Connect a plastic tube to the hose barb of the drain valve installed in the system and open it.



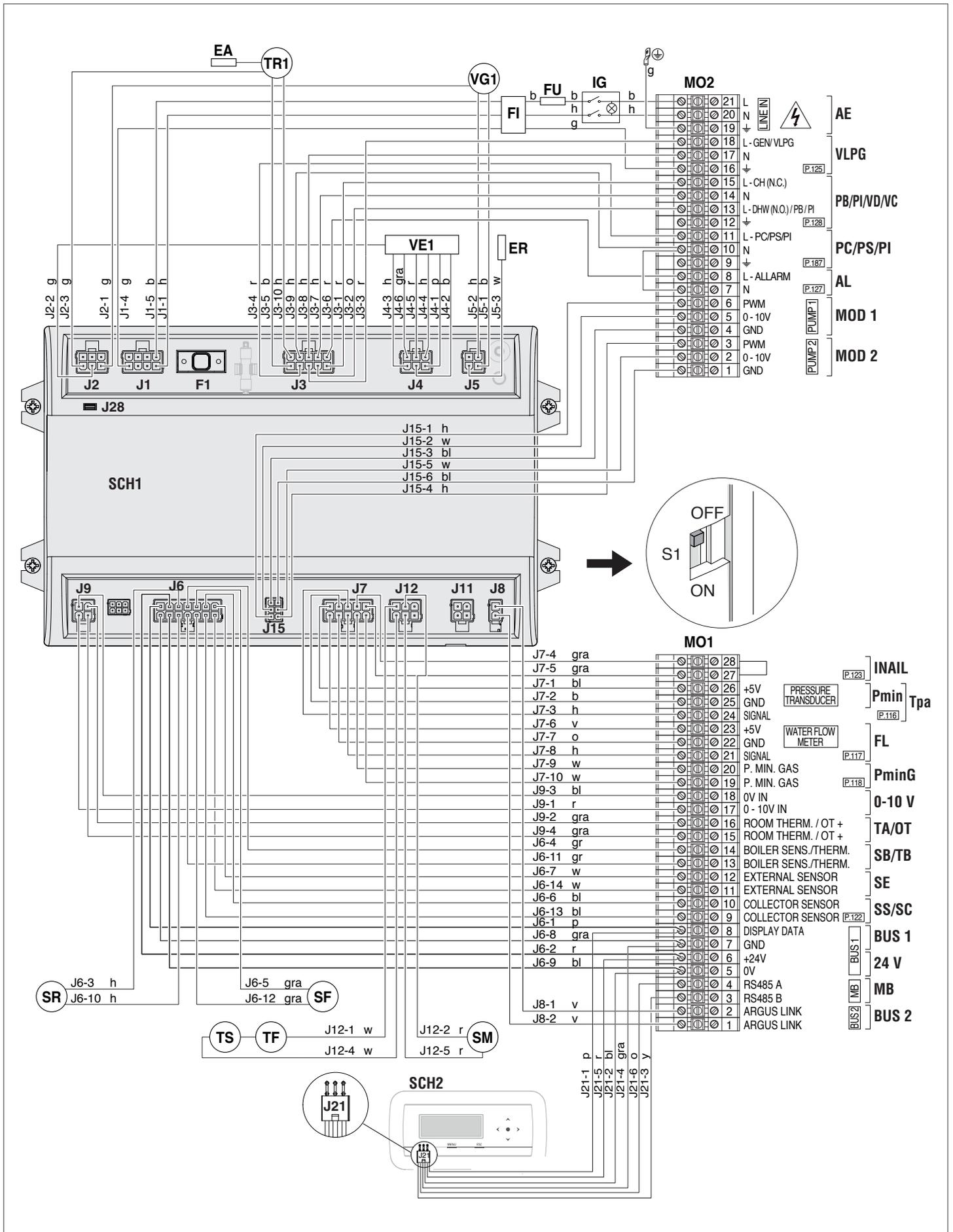
2.9.1 CH frost protection

The condensing thermal units **TAU Unit** feature an antifreeze protection that is activated by the thermoregulator if the delivery water temperature drops below 5°C.

! No special anti-frost additives are therefore needed, unless the system is to be completely shut down for an extended period of time.

! If you do use anti-freeze in the system, make sure that it is of the type that does not attack steel.

2.10 Wiring diagram



Low voltage legend

| | |
|---------------|-----------------------------------------------------|
| M01 | Low-voltage terminal board |
| INAIL | INAIL safety devices (accessory) |
| Tpa | Water pressure transducer (accessory) |
| Pmin | Water minimum pressure switch (accessory) |
| FL | Flow-meter (accessory) |
| PminG | GAS minimum pressure switch (accessory) |
| 0-10V | 0-10 V DC input |
| TA/OT | Room thermostat / Open Therm Interface (accessory) |
| SB/TB | Heater probe/Heater thermostat (accessory) |
| SE | Outdoor sensor (accessory) |
| SS | Primary circuit system probe in cascade (accessory) |
| SC | Secondary circuit sensor (accessory) |
| BUS 1 | Bus Managing/Zone |
| 24 V | 24V exit |
| MODBUS | Modbus outlet |
| BUS 2 | Bus Depending |
| SCH1 | Main control board |
| SCH2 | Display and control card |
| SM | CH flow temperature sensor |
| SR | Return probe |
| SF | Exhaust flue probe |
| TS | Water safety thermostat |
| TF | Flue gas thermostat |

High voltage legend

| | |
|--------------|------------------------------------------------|
| M02 | High-voltage terminal board |
| AE | Power supply (230V ~ 50Hz) |
| PI | Central heating system pump |
| VLPG | LPG shut-off solenoid valve (accessory) |
| PB | Storage cylinder circulator |
| VC | 2-way shut-off valve of thermal unit |
| VD | 3-way DHW diverting valve |
| PC | Thermal unit circulation pump |
| PS | System circulation pump |
| AL | Alarm output |
| MOD 1 | PWM/0-10V PC/PS output |
| MOD 2 | PWM/0-10V PI output (not available at present) |
| IG | Main switch |
| FI | Mains filter |
| FU | Fuse |
| TR1 | Ignition transformer |
| EA | Ignition electrode |
| ER | Detection electrode |
| VG1 | Gas valve |
| VE1 | Variable speed fan |

Cable colour

| | |
|------------|--------------|
| b | brown |
| bl | black |
| g | yellow/green |
| gr | green |
| gra | grey |
| h | blue |
| o | orange |
| p | pink |
| r | red |
| v | violet |
| w | white |
| y | yellow |

| DESCRIPTION | Terminal strip | Terminals No. | Par. No. |
|-----------------------|----------------|----------------------------------------------|----------|
| Programmable input 1 | M01 | 24-25-26 | 116 |
| Programmable input 2 | M01 | 21-22-23 (Flow-meter) 21-22 (Flow switch) | 117 |
| Programmable input 3 | M01 | 19-20 | 118 |
| Programmable input 7 | M01 | 9-10 | 122 |
| Programmable input 8 | M01 | 27-28 | 123 |
| Programmable input 9 | M02 | 13-14 | 188 |
| Programmable output 1 | M02 | 16-17-18 | 125 |
| Programmable output 3 | M02 | 7-8 | 127 |
| Programmable output 4 | M02 | 12-13-14-15 | 128 |
| Programmable output 5 | M02 | 9-10-11 | 187 |

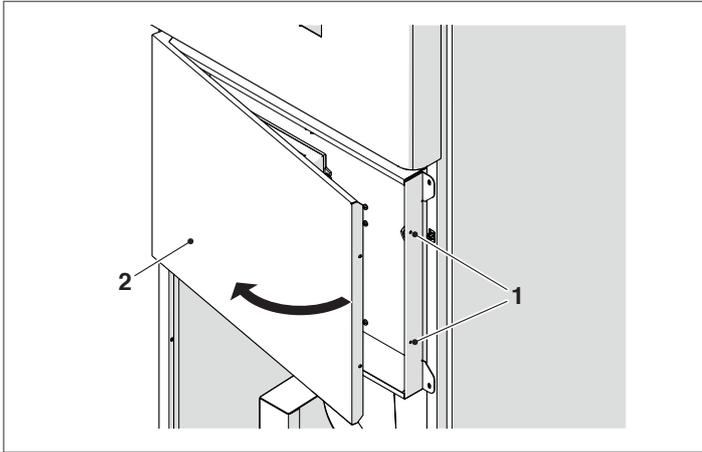
The input and output settings not shown must not be changed.

2.11 Electrical connections

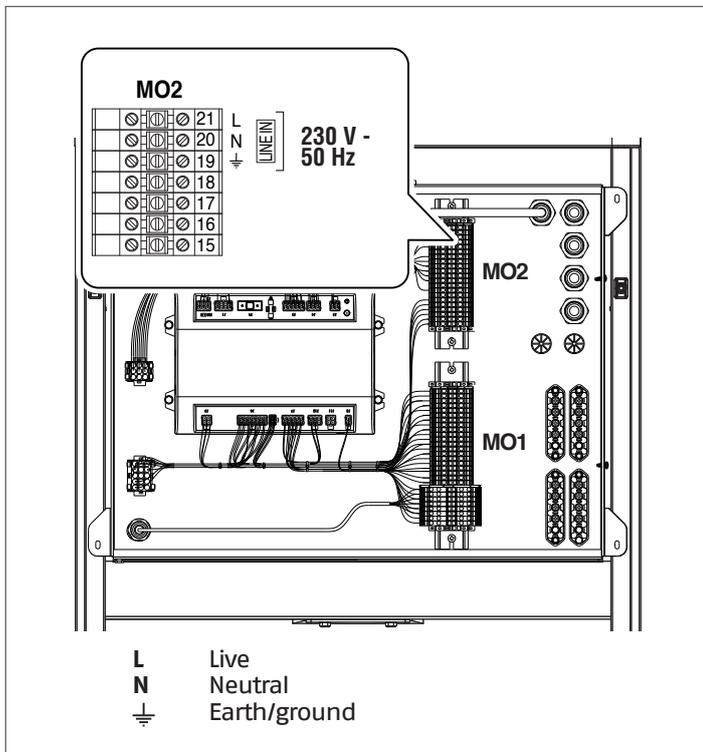
Condensing thermal units **TAU Unit** leave the factory fully wired and require only the connection of power cord and accessories, according to the system configuration.

Proceed as follows to make these connections:

- Remove the front panel from the boiler
- Loosen the screws (1)
- Open the door (2)



- Find the power terminal board (MO2).
- Perform the electrical connections following the indications below.
- Use the relevant cable glands placed on the rear side of the electric panel and of the thermal unit to route the power cord.



Once you have made all the necessary connections, close the control panel, reversing the steps followed to open it.

- ⚠** The following is mandatory:
- The use of an omnipolar magnetothermic switch, line disconnecting switch in compliance with CEI-EN standards (contact opening of at least 3 mm)
 - Respect the connection L (line) - N (neutral). Keep the earth conductor 2 cm longer than the power supply conductors
 - Use cables with a section greater than or equal to 1.5 mm², complete with cable terminal caps
 - Refer to the wiring diagrams in this manual for all electric operations
 - Connect the equipment to an effective earthing system.

⊖ It is strictly forbidden to use pipes of any kind to ground the appliance.

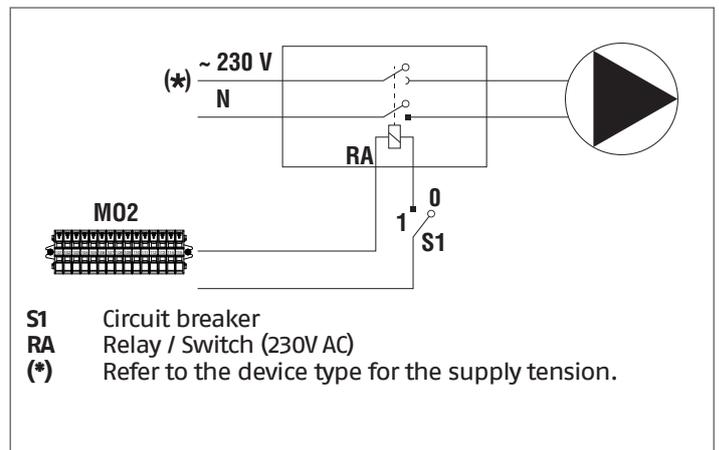
⊖ It is prohibited to lay power supply and room/heat demand thermostat cables near hot surfaces (delivery pipes). If they may come into contact with parts that have a temperature of over 50°C, use a suitable type of cable.

The manufacturer is not responsible for any damage caused by failure to earth connect the device and failure to comply with what is indicated in the wiring diagrams.

⚠ For the connection of the devices connected to the jig (pumps, circulators and diverting / mixing valves) use interposed relays unless the maximum absorption of all components connected to the board (including the module circulator) is less than or equal to 1.5 A. Relays sizing lays on the installer depending on the type of connected device.

⚠ For the electrical connections, use H05-W-F power cables with a minimum cross-section of 1.5 mm², complete with terminal ferrules. For the low voltage connections, use H05-W-F power cables with a minimum cross-section of between 0.5 and 1 mm², complete with terminal ferrules.

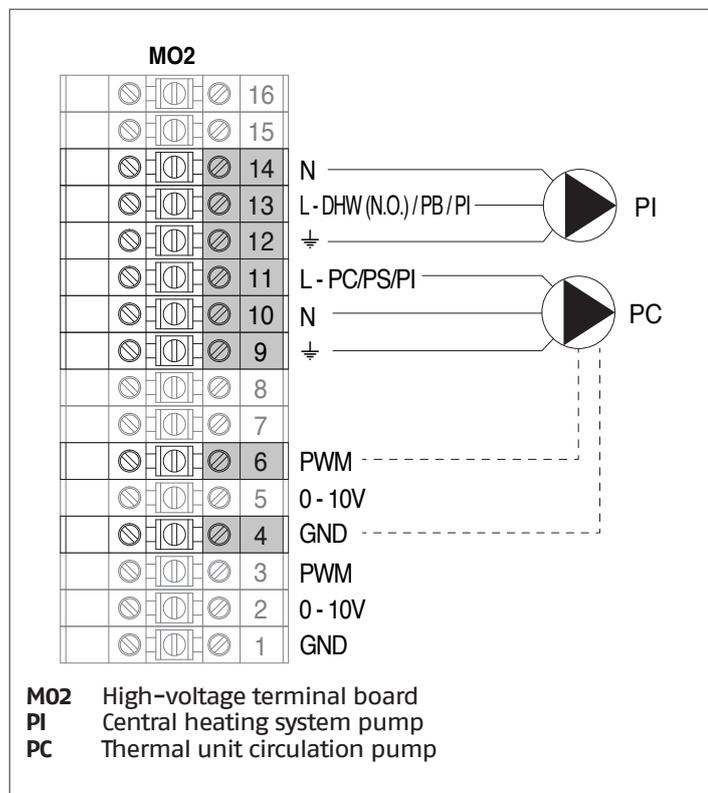
For connection, see the following figure:



- Perform the electrical connections following the indications below.
- Use the relevant cable glands placed on the rear side of the electric panel and of the thermal unit to route the connection cables.

2.12 Modulating circulation pump connection

The regulator on the control panel can manage one modulating circulation pump (as an alternative to standard 230Vac circulation pumps).



2.13 PWM control signals

The circulation pump must be controlled via a PWM (pulse width modulation) low-voltage digital signal. The speed of the circulation pump changes according to the input signal (see par. PWM input signal).

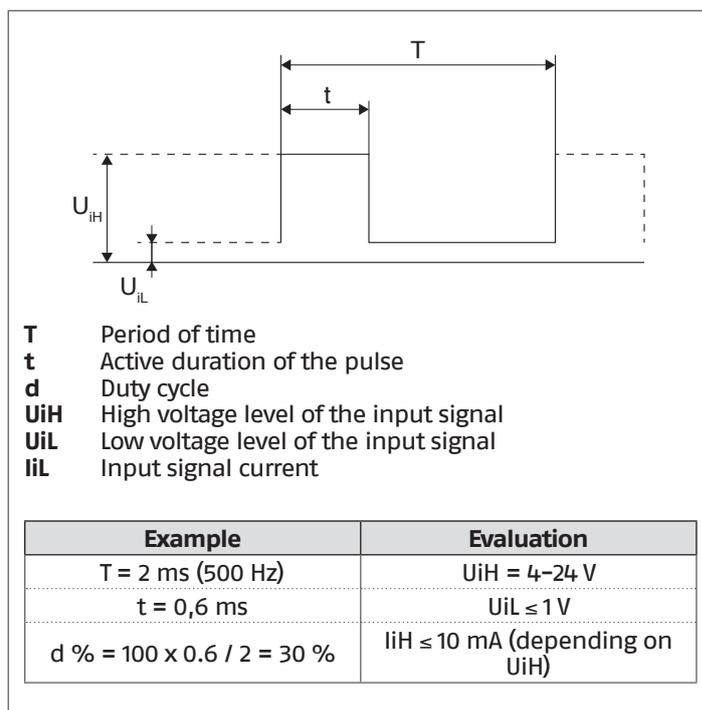
Here below are the main characteristics required of the PWM signal.

⚠ Check the characteristics of your pump PWM signal to ensure they comply with the features below. Different signals could irreversibly damage the pump on-board electronics.

PWM low-voltage digital signal

The PWM square wave signal was designed for a frequency interval between 100 and 4000 Hz. The PWM signal is used to set circulator speed.

Example of Duty cycle

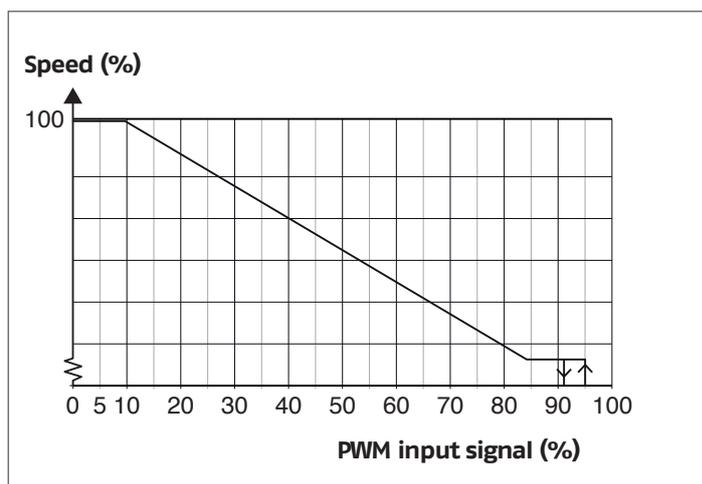


PWM input signal

With high PWM signal percentages (Duty Cycles) a hysteresis prevents the circulation pump activation if the input signal is around the status switching value.

With low PWM signal percentages, the circulation pump speed is high for safety reasons.

If when checking the circulation pump the thermal unit does not receive any input signal – due for example to the breakage of the signal cable – the circulation pump will carry on working at maximum speed to dissipate in the shortest time possible the heat accumulated by the thermal unit.

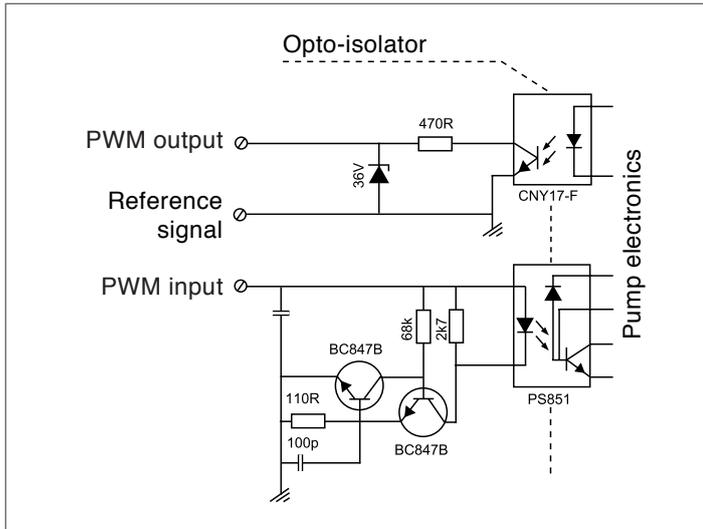


Set parameter 135 = 1

| PWM signal (%) | Circulation pump status |
|----------------|----------------------------------|
| ≤ 10 | Maximum speed |
| > 10 / ≤ 84 | Variable speed (from min to max) |
| > 84 / ≤ 91 | Minimum speed |
| > 91/95 | Hysteresis range: on/off |
| > 95 / ≤ 100 | Standby: off |

⚠ Verify that the control logic of your pump is directly proportional (as indicated in the chart) and not inversely proportional.

Electronic circuit



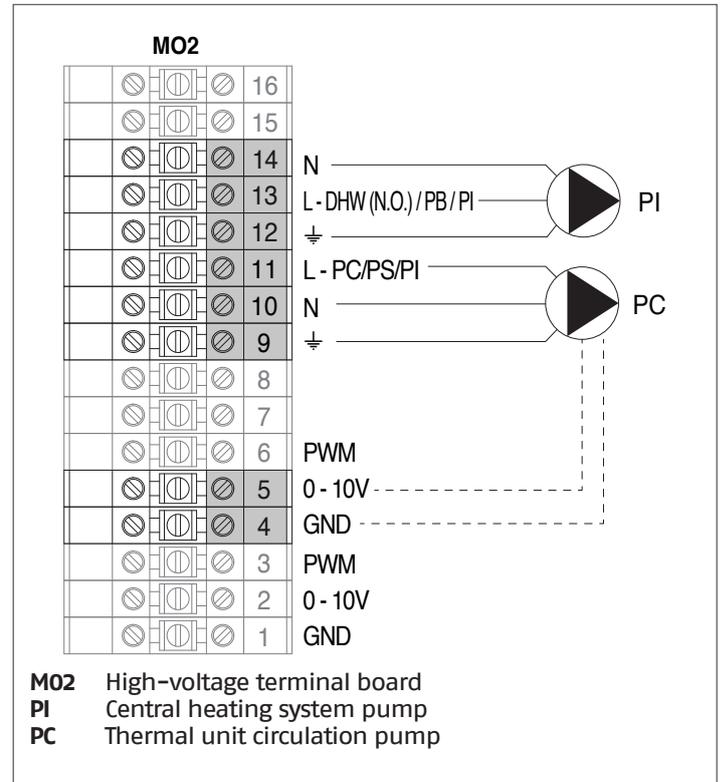
Technical specifications

| Maximum power | Symbol | Value |
|----------------------------------------|--------|-------------|
| PWM input frequency | f | 100-4000 Hz |
| Consumption in stand-by | | < 1 W |
| High voltage level of the input signal | UiH | 4-24 V |
| Low voltage level of the input signal | UiL | < 1 V |
| Input signal current | IiH | < 10 mA |
| Input Duty cycle | PWM | 0-100% |

2.14 0-10V circulation pump control

The regulator allows the control in modulating mode (0-10V) of one circulation pump (as an alternative to standard 230Vac circulation pumps).

To enable pump control, set parameter 135 = 1 and parameter 136 = Modulating.

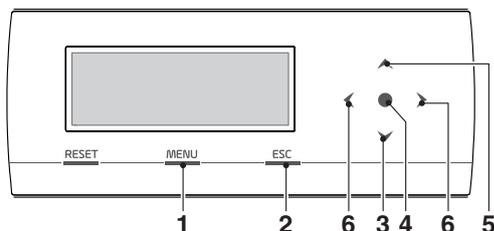


2.15 Electronic control

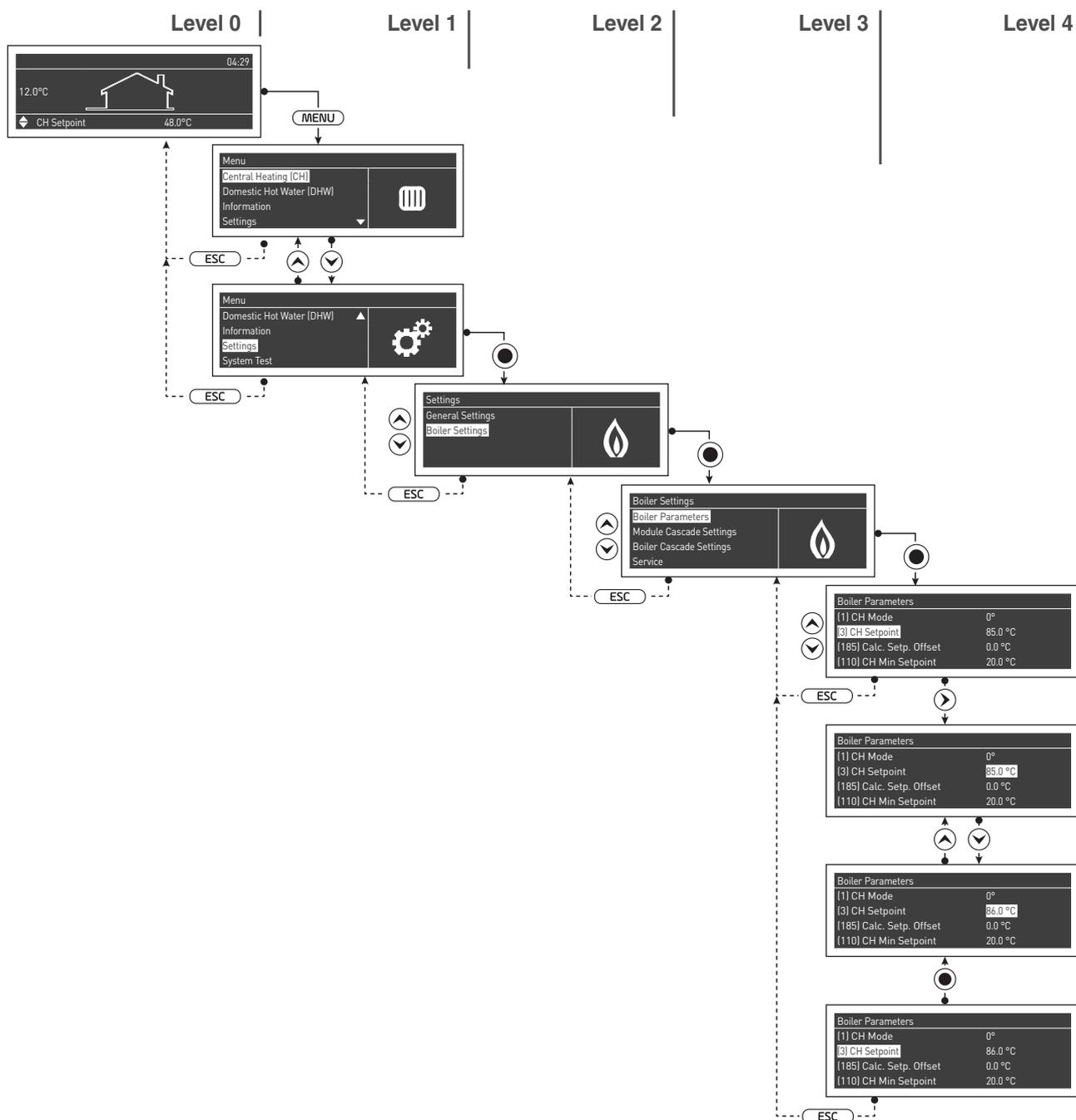
The electronic control operator interface menu is a multi-level one. Navigation between the various levels is shown in the figures below.

Level 0 displays the Home Screen (Home). Level 1 displays the Main Menu screen. The subsequent levels are activated depending on available sub-menus. For the full layout, see Paragraph "Control panel". For how to access and change the parameters, see the picture on the next page. The parameters for the installer are accessible only after entering the security password (see paragraph "Control panel").

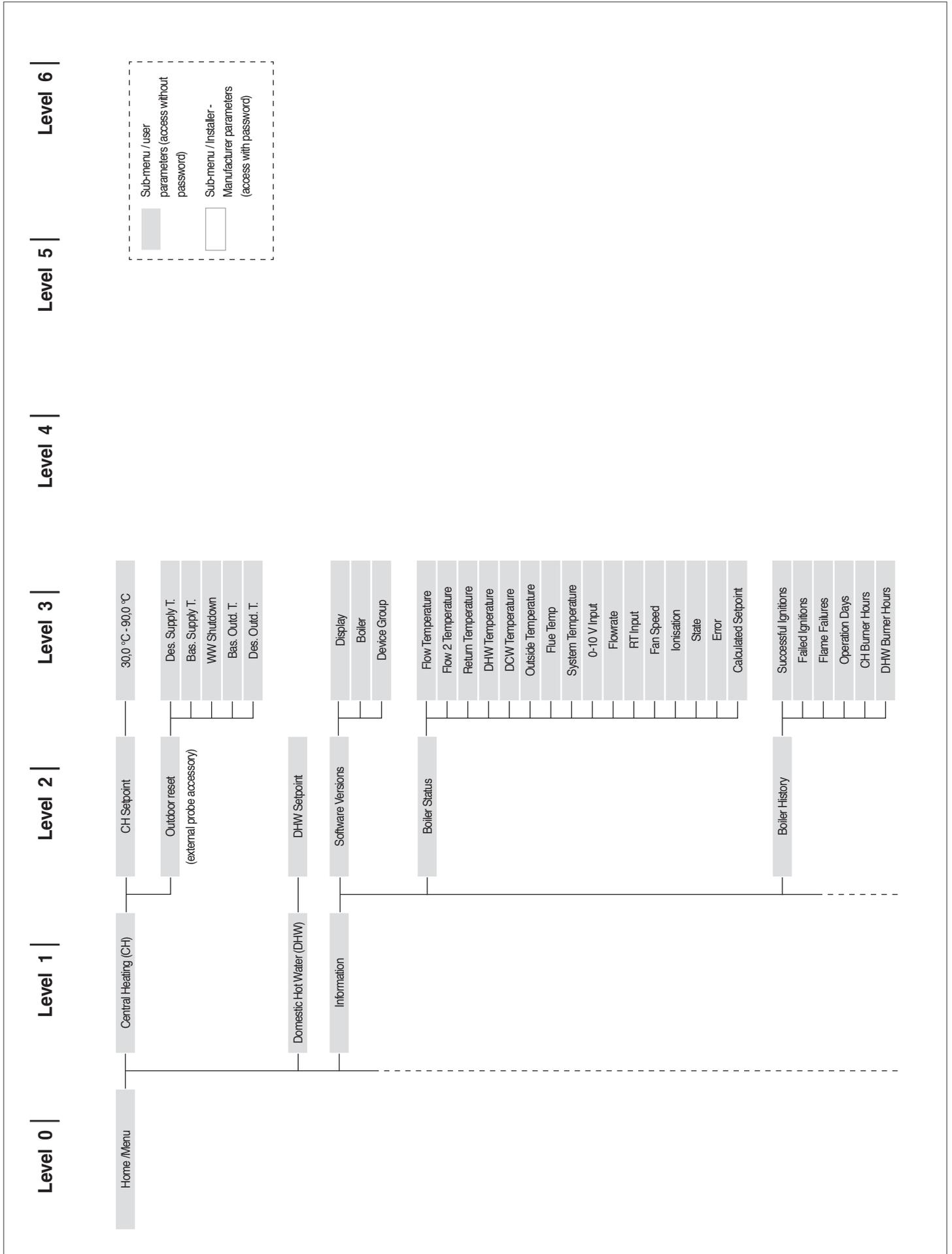
Please note that the thermal module's operating parameters are identified with a number, whilst other additional functions are simply descriptive.

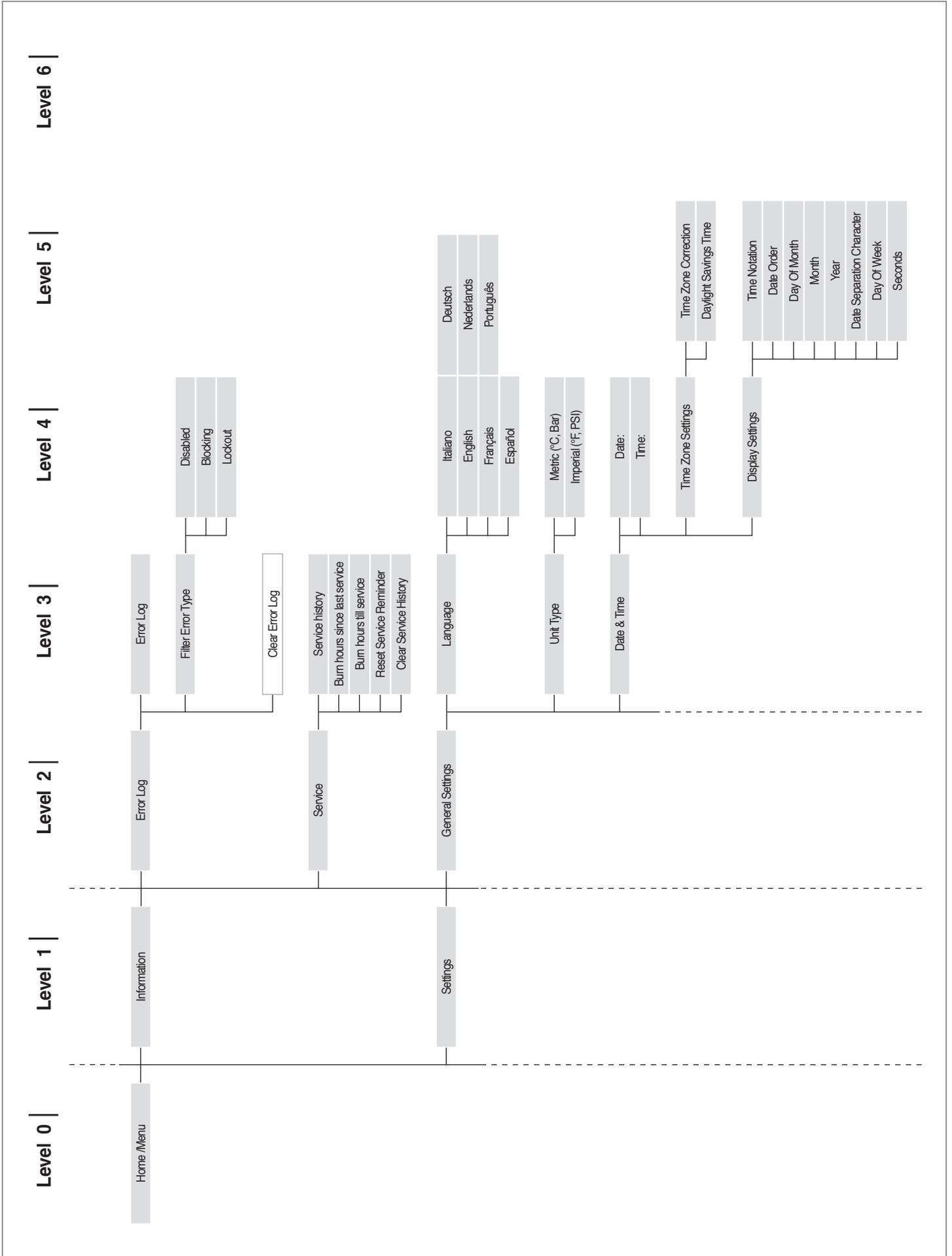


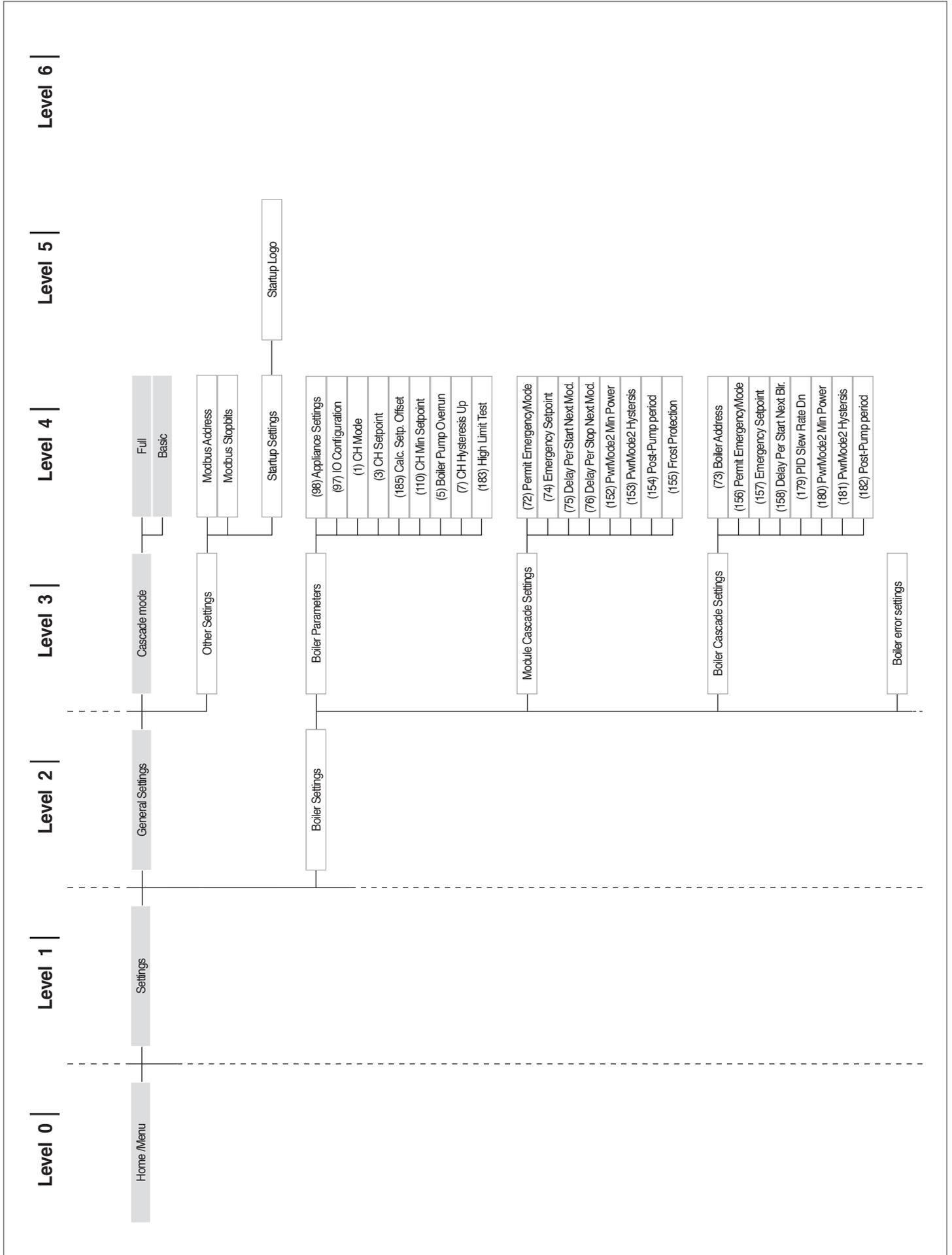
- 1 switches on the main menu
- 2 in menu navigation, it enables you to exit a menu item and go back to the previous one
- 3 supports selecting menus or parameters or decreasing numeric values
- 4 enter
- 5 supports selecting menus or parameters or increasing numeric values
- 6 supports moving to the RH/LH area of the display

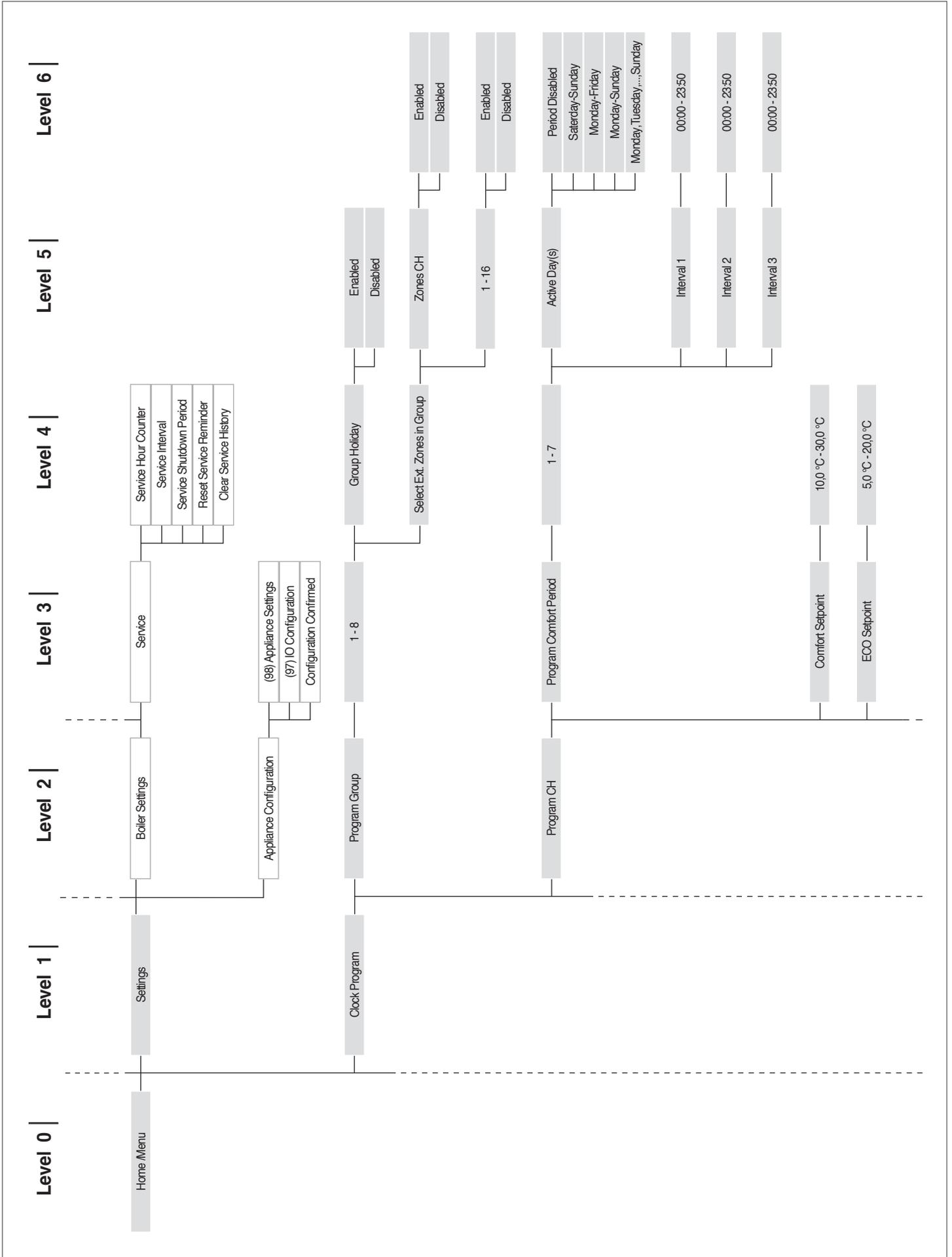


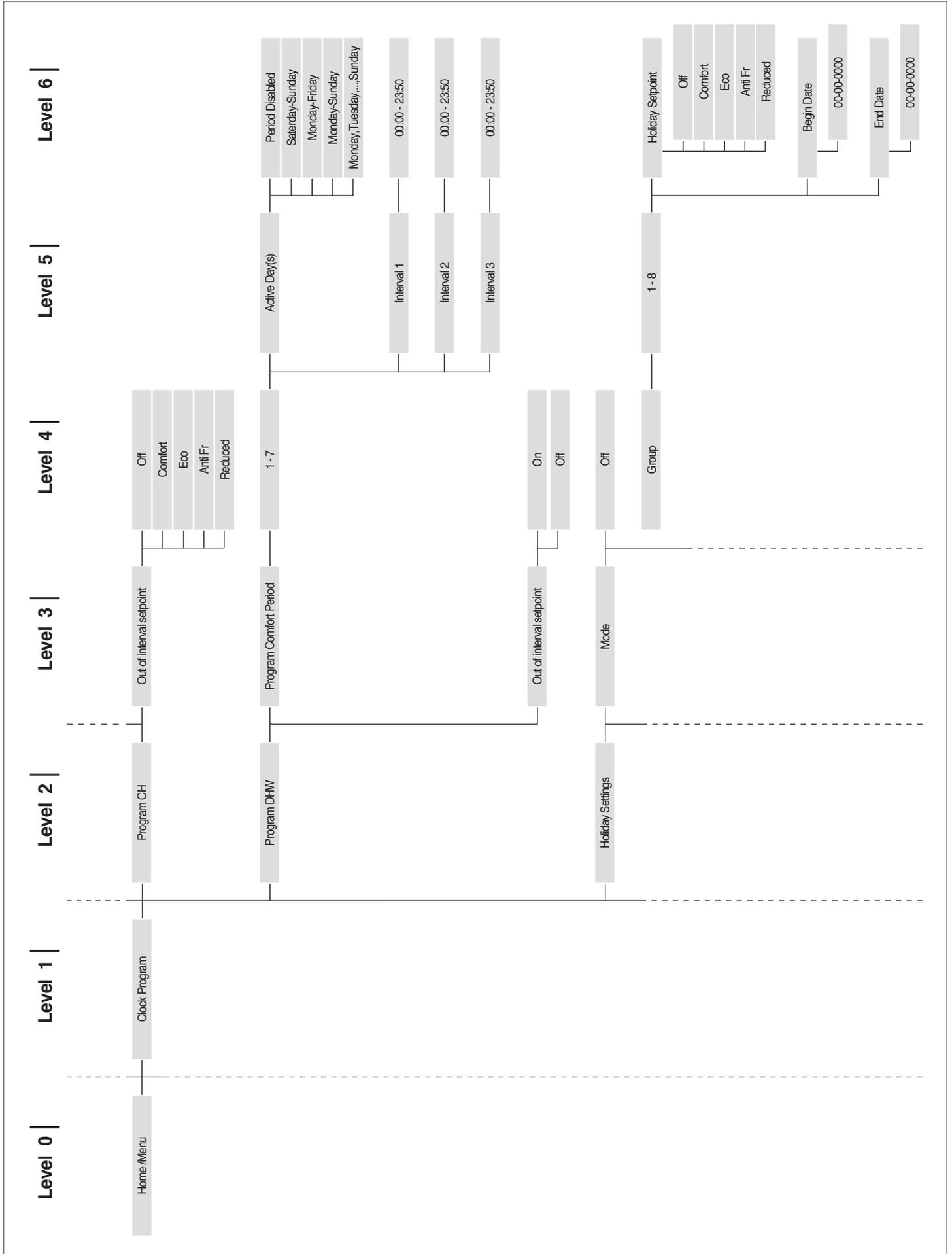
2.15.1 Menu structure

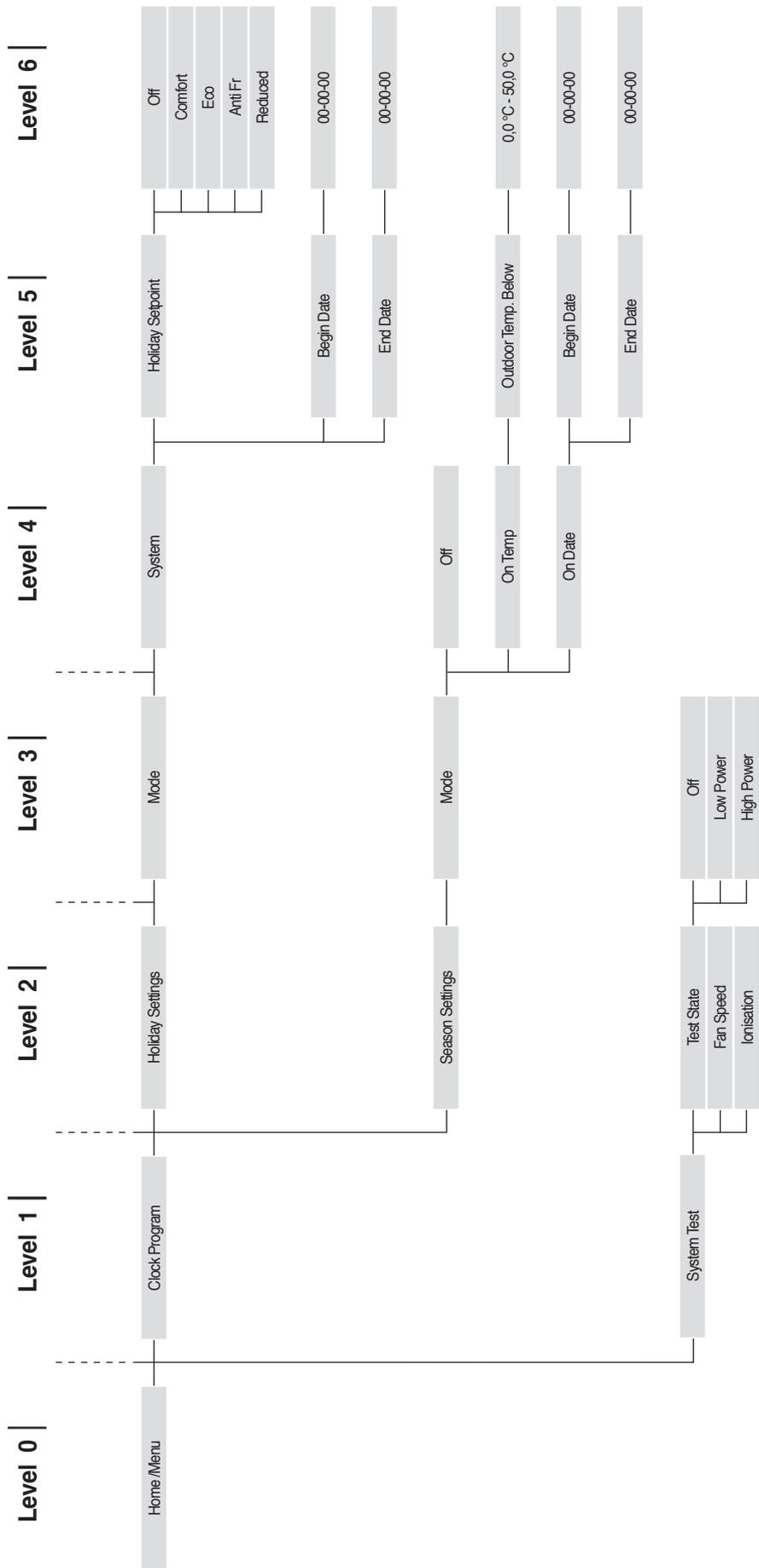












2.15.2 Parameters' list

A The programming lines can be hidden, according to the access level (User, Installer, Manufacturer) and to the thermal unit configuration.

A The parameters of the Installer and Manufacturer levels should only be changed by Technical Assistance Service **RIELLO**. Parameters are listed base on the reference menu.

Reference Menu

M1 Parameters Menu
M2 Cascaded module configuration menu
M3 Cascaded boiler configuration menu
M4 Appliance configuration menu

Access type

U End user
I Installer
O Manufacturer

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|------|-------------|----------|
| M1 | 1 | CH mode | Defines the thermal module's various heating operation modes. 0 = Fixed setpoint with ambient thermostat 1 = Climate mode with external probe and ambient thermostat 2 = Climate mode with continuous operation and reduction with ambient thermostat 3 = Fixed setpoint with continuous operation and reduction with ambient thermostat 4 = Adjust Setpoint with 0-10V input 5 = Adjust power with 0-10V input | 0...5 | 0 | | I | Heating |
| M1 | 3 | CH set-point | It defines the desired delivery temperature with heating mode (Par. 1 = 0). | Par. 23...Par. 24 | 70 | °C | U | Heating |
| M1 | 185 | Calc. Set-point Off-set | Parallel shift of direct Zone/Zone 1 climatic curve | -10...10 | 0 | | I | Heating |
| M1 | 109 | Comp. T. @ T.ext. Max | Delivery temperature compensation at maximum external temperature in climate mode (Par. 1 = 1 or 2). | Off, -10...10 | 0 | | I | Heating |
| M1 | 110 | CH Min. Set-point | It defines the minimum delivery temperature value in heating mode (Par. 1 = 4). | 20...50 | 30 | °C | I | Heating |
| M1 | 111 | CH Max. Set-point | It defines the maximum delivery temperature value in heating mode (Par. 1 = 4). | 50...90 | 80 | °C | I | Heating |
| M1 | 190 | Outd Comp Fact | Outdoor temperature compensation factor | 0...100 | 50 | % | I | Heating |
| M1 | 5 | Boiler Pump Overrun | Sets the overrun time in seconds of the boiler's circulator during stand-alone operation; cascaded operation determines the module's overrun after switch-off due to temperature control. | 0...900 | 60 | Sec. | I | Heating |
| M1 | 6 | Flue Temp. Limit | Sets the activation temperature when the maximum flue gas temperature is exceeded. When the flue gas temperature is higher than a set value, the module switches off and an error message is generated. When the flue gas temperature is in the interval between (Par. 6) -5°C and Par. 6, the module reduces its power in a linear way until it reaches minimum power when the temperature measured is equal to Par. 6. | 10...120 | 90 | °C | O | General |
| M1 | 7 | CH Hysteresis | Sets the value in degrees beyond the set-point at which the burner switches off for thermoregulation. | 0...20 | 3 | °C | I | Heating |
| M1 | 112 | CH Hysteresis Down | Sets the value in degrees below the set-point at which the burner switches on again for thermoregulation. | 0...20 | 5 | °C | I | Heating |
| M1 | 9 | Anti-cycle Period | Sets the stand-by time before the appliance is switched on again after it switches off due to thermoregulation, independently from the delivery temperature dropping below the value indicated in Par. 10. Parameter valid only in stand-alone mode. | 10...900 | 120 | Sec. | I | Heating |
| M1 | 10 | Anti-cycle Temp. Diff. | Sets the value in degrees below which the burner switches on again notwithstanding from the time spent at Par. 9. | 0...20 | 16 | °C | I | Heating |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|------|-------------|----------|
| M1 | 12 | Hx diff. Minimum | Sets the value of the temperature difference (Delta T) between the module's delivery and return temperature. For a Delta T value ranging between Par. 12 and (Par. 12) +8°C, the module reduces its power in a linear fashion until it reaches the minimum power. The minimum power is maintained until reaching (Par. 12) +8°C+5°C, after which the module switches off for a period of time equal to the value attributed to Par. 13; at the end of this time interval, the module switches on again. | 10...60 | 40 | °C | 0 | General |
| M1 | 13 | Hx Diff. Max. Wait Time | Defines the restart time after reaching the Delta T limit between delivery and return. | 10...250 | 30 | Sec. | 0 | General |
| M1 | 14 | Max. Power CH | Sets the heating's % max. power. | 50...100 | 100 | % | I | Heating |
| M1 | 15 | Min. Power CH/DHW | Sets the heating's % min. power. | 1...30 | 1 | % | I | Heating |
| M1 | 16 | CH PID P | Defines the proportional parameter for modulation during heating operation. | 0...1275 | 100 | | 0 | Heating |
| M1 | 17 | CH PID I | Defines the modulation integral term during heating operation. | 0...1275 | 250 | | 0 | Heating |
| M1 | 18 | CH PID D | Defines the modulation derivative term during heating operation. | 0...1275 | 0 | | 0 | Heating |
| M1 | 19 | Design Supply Temp. | Defines the max. set-point at the minimum outdoor temperature for climatic regulation. | 30...90 | 80 | °C | U | Heating |
| M1 | 20 | Design Outdoor Temp. | Defines the minimum outdoor temperature to which the maximum set-point can be associated for climatic regulation. | -25...25 | 0 | °C | U | Heating |
| M1 | 21 | Baseline Supply Temp. | Defines the minimum set-point at the maximum outdoor temperature for climatic regulation. | 30...90 | 40 | °C | I | Heating |
| M1 | 22 | Baseline Outdoor Temp. | Defines the maximum minimum outdoor temperature to which the minimum set-point can be associated for climatic regulation. | 0...30 | 20 | °C | I | Heating |
| M1 | 23 | Design Supply Min. Limit | Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). | 4...82 | 30 | °C | I | Heating |
| M1 | 24 | Design Supply Max. Limit | Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). | 27...90 | 80 | °C | I | Heating |
| M1 | 25 | Warm Weather Shutdn | Defines the temperature at which climatic regulation is switched off. | 0...35 | 22 | °C | I | Heating |
| M1 | 26 | Boost Temp Increment | Establishes the set-point temperature increase delta T, if the heat demand in heating mode is not satisfied after the time interval specified in Par. 27 (applies only to stand-alone mode). | 0...30 | 0 | °C | I | Heating |
| M1 | 27 | Boost Time Delay | Defines the time interval after which the set-point is increased as defined in Par. 26 (applies only to stand-alone mode). | 1...120 | 20 | Min. | I | Heating |
| M1 | 28 | Night Set-back Temp. | Used in heating mode Par. 1= 2 or 3. Establishes by how many degrees the delivery set-point is reduced when the RT (room thermostat/heat demand) contact is closed. | 0...30 | 10 | °C | I | Heating |
| M1 | 35 | DHW mode | Establishes the domestic hot water circuit's operation mode. 0 = Disabled 1 = Water heater with probe 2 = Water heater with thermostat | 0...2 | 0 | | I | DHW |
| M1 | 113 | Max. Power DHW | Defines the domestic hot water circuit's % max. power. | 50...100 | 100 | % | I | DHW |
| M1 | 114 | Min. Power DHW | Defines the domestic hot water circuit's % minimum power. | 1...30 | 1 | % | I | DHW |
| M1 | 36 | DHW Tank Hyst. Down | Defines the hysteresis to initiate the domestic hot water demand. | 0...20 | 5 | °C | I | DHW |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------|------|-------------|----------|
| M1 | 37 | DHW Tank Hyst. Up | Defines the hysteresis to stop the domestic hot water demand. | 0...20 | 5 | °C | I | DHW |
| M1 | 38 | DHW Tank Supply Extra | Defines the primary circuit's set-point increase in degrees compared to the temperature set for the domestic hot water tank. | 0...30 | 15 | °C | I | DHW |
| M1 | 39 | DHW Tank Supp Hyst Dn | Defines the primary circuit's restart hysteresis in modes 1 and 2 of domestic hot water (valid both for cascade and stand-alone applications). | 0...20 | 5 | °C | 0 | DHW |
| M1 | 40 | DHW Tank Supp Hyst Up | Defines the primary circuit's shut-off hysteresis in modes 1 and 2 of domestic hot water (valid both for cascade and stand-alone applications). | 0...20 | 5 | °C | 0 | DHW |
| M1 | 41 | DHW Tank Hold Warm | Defines the value of a storage cylinder's delta T required for temperature maintenance. For instance, if set at 3 degrees, when the storage cylinder is at a set-point value minus 3 degrees, the boiler is switched on at minimum power to maintain the temperature to the set-point plus hysteresis. If this parameter is kept the same as Par. 36, this function is inactive and the boiler is switched on at the maximum power envisaged for the domestic hot water's circuit. | 0...10 | 5 | °C | 0 | DHW |
| M1 | 42 | DHW Priority | Defines the priority type: 0 = Time: time priority between the two circuits defined by Par. 43; 1 = Off: priority for CH; 2 = On: priority for DHW; 3 = Parallel: parallel priority managed on the basis of the primary circuit's temperature compared to the heating circuit's set-point. | 0...3 | 2 | | I | DHW |
| M1 | 115 | DHW storage tank setp. | Defines the Accumulation sanitary Setpoint in mode 1 | 40...71 | 57 | °C | U | DHW |
| M1 | 43 | DHW Max. Priority Time | Establishes the time in minutes during which priority is alternatively allocated to the DHW and CH circuits when Par. 43 is set to "time" mode. | 1...255 | 30 | Min. | I | DHW |
| M1 | 44 | DHW Pump Overrun | Establishes the overrun time in seconds for the domestic hot water mode with the boiler in stand-alone operation; cascaded operation defines the module's overrun after switch-off due to thermoregulation. | 0...900 | 60 | Sec. | I | DHW |
| M1 | 45 | DHW Tank PID P | Defines the proportional term for modulation during operation of the DHW storage tank. | 0...1255 | 100 | | 0 | DHW |
| M1 | 46 | DHW Tank PID I | Defines the integral term for modulation during operation of the DHW storage tank. | 0...1255 | 500 | | 0 | DHW |
| M1 | 47 | DHW Tank PID D | Defines the derivative term for modulation during operation of the DHW storage tank. | 0...1255 | 0 | | 0 | DHW |
| M1 | 48 | DHW tank set-point | Establishes the DHW storage tank set-point Par. 35 in mode 2. | 40...71 | 50 | °C | U | DHW |
| M1 | 92 | Fan Speed Maximum | Defines the number of fan rpm at max. power (it depends on the model and is defined at Par. 98). | 0...12750 | Defined by Par. 98 | RPM | I | General |
| M1 | 93 | Fan Speed Minimum | Defines the number of fan rpm at minimum power (it depends on the model and is defined at Par. 98). | 0...12750 | Defined by Par. 98 | RPM | I | General |
| M1 | 94 | Fan Speed Ignition | Defines the number of fan rpm when the boiler is switched on (it depends on the model and is defined at Par. 98). | 0...12750 | Defined by Par. 98 | RPM | I | General |
| M1 | 116 | Prog. Input 1. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Minimum water pressure switch 3 = Flue gas pressure switch | 0,1,3 | 0 | | I | General |
| M1 | 117 | Prog Input 2. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = DHW flowmeter 2 = DHW flow switch 3 = Heating flowmeter 4 = Heating flow switch | 0...4 | 0 | | I | General |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|----|-------------|----------|
| M1 | 118 | Prog Input 3. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Drainage switch 2 = Gas minimum pressure switch | 0...2 | 0 | | I | General |
| M1 | 120 | Prog Input 5. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Return probe 2 = External switch | 0...2 | 1 | | I | General |
| M1 | 121 | Prog Input 6. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Flue gas probe 2 = Flue gas thermostat 3 = APS switch | 0...3 | 1 | | I | General |
| M1 | 122 | Prog Input 7. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Flue gas probe 2 2 = T_Flue_2 + Bl. Flue 3 = System probe 4 = Blocked Flue switch 5 = Cascade probe | 0...5 | 0 | | I | General |
| M1 | 123 | Prog Input 8. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = EAF probe 2 = Water pressure switch | 0...2 | 2 | | I | General |
| M1 | 188 | Input Prog. 9. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = DHW sensor 2 = Zone probe | 0...2 | 1 | | I | General |
| M1 | 124 | Prog. Input RT. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = Enabled | 0...1 | 1 | | I | General |
| M1 | 125 | Prog. Output 1. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = General circulation pump 2 = Heating circulation pump 3 = DHW circulation pump 4 = System circulation pump 5 = Cascade circulation pump 6 = Alarm relay 7 = Filling valve 8 = LPG solenoid valve 9 = External ignitor 10 = Air damper 14 = CC burner alarm 15 = CC burner state 19 = Anti-Legionella pump | 0...10,14,15,19 | 0 | | I | General |
| M1 | 126 | Prog. Output 2. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = General circulation pump 2 = Heating circulation pump 3 = DHW circulation pump 4 = System circulation pump 5 = Cascade circulation pump 6 = Alarm relay 7 = Filling valve 8 = LPG solenoid valve 9 = External ignitor 10 = Air damper 14 = CC burner alarm 15 = CC burner state 19 = Anti-Legionella pump | 0...10,14,15,19 | 9 | | I | General |
| M1 | 127 | Prog. Output 3. | The value of this parameter is defined by Par. 97. 0 = Disabled 6 = Alarm relay 10 = Air damper 11 = HSI / External ignitor | 0, 6, 10, 11 | 6 | | I | General |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------|------|-------------|----------|
| M1 | 128 | Prog. Output 4. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = General circulation pump 2 = Heating circulation pump 3 = DHW circulation pump 4 = System circulation pump 5 = Cascade circulation pump 6 = Alarm relay 7 = Filling valve 8 = LPG solenoid valve 9 = External ignitor 10 = Air damper 14 = CC burner alarm 15 = CC burner state 16 = Zone circulation pump 19 = Anti-Legionella pump | 0...10,14,15,16,19 | 0 | | I | General |
| M1 | 187 | Prog. Output 5. | The value of this parameter is defined by Par. 97. 0 = Disabled 1 = General circulation pump 2 = Heating circulation pump 3 = DHW circulation pump 4 = System circulation pump 5 = Cascade circulation pump 6 = Alarm relay 7 = Filling valve 8 = LPG solenoid valve 9 = External ignitor 10 = Air damper 14 = CC burner alarm 15 = CC burner state 16 = Zone circulation pump 19 = Anti-Legionella pump | 0...10,14,15,16,19 | 1 | | I | General |
| M1 | 129 | Flow sensor | Defines the type of flow sensor used. | Bitron, Huba: DN8, DN10, DN15, DN20, DN25 | Huba DN25 | | I | General |
| M1 | 130 | Flow scaling factor | Defines the scaling factor for the flow meter. | 0...25.5 | 3,2(*) | | I | General |
| M1 | 131 | Min Press. | Defines the system minimum pressure value. | Off, 0.3,0.4...5.0 | 0,1 | bar | I | General |
| M1 | 133 | Mod. Pump dT | Defines the delta T set for the operation of the modulating circulator. | 5...40 | 15 | °C | I | General |
| M1 | 134 | Mod. Pump Start Time | Defines the time in seconds from the moment the burner is switched on to start the modulation of the circulator and obtain the delta T specified in Par. 133. | 0...255 | 120 | Sec. | I | General |
| M1 | 135 | Mod. Pump Type | It defines the installed PWM circulation pump model. 0 = Wilo Yonos 1 = Salmson 2 = Grundfos | 0...2 | 2 | | I | General |
| M1 | 136 | Mod. Pump Mode | Defines whether the boiler's circulator operates in modulating mode or at a set speed (as a percentage of maximum speed). | On/Off Modulating Fixed 20% Fixed 30%... Fixed 100% | Modulating | | I | General |
| M1 | 137 | Mod. Pump Min Pwr | Defines the percentage of speed that sets the minimum speed that the circulator can reach during modulation. | 0...100 | 30 | % | I | General |
| M1 | 138 | Appliance type | Value can vary depending on appliance configuration based on Par. 97 and 98. This value is calculated by the board, which, based on an internal logic, defines as a single number the settings of Par. 97 and 98. | 0...255 | Depends on boiler model | | I | General |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------|-------|-------------|----------|
| M1 | 139 | Dair active | Activates bleeding the system's air. To activate air bleeding, it is necessary to switch on the boiler and change the parameter from "No" to "Yes". Wait for one minute. Switch off and restart. At this stage, when it is restarted the boiler will initiate the automatic bleeding procedure (lasting around 20 minutes). With the parameter set to "Yes", the procedure is carried out each time the boiler is switched off and restarted using its master switch. The value must be set to "No" if you do not wish to initiate the bleeding procedure when the thermal module is switched on. | Yes No | No | | I | General |
| M1 | 140 | Minimum Flow | Defines the flow rate below which the boiler is switched off. The value varies depending on the model. | 0.0...100 | Depends on boiler model | l/min | I | General |
| M1 | 107 | Anti-Le-gionella day | Sets the weekday on which the anti-Legionella procedure is carried out. | Sunday... Saturday | Sunday | Day | I | DHW |
| M1 | 108 | Anti-Le-gionella Hour | Sets the time of the day during which the anti-Legionella procedure is carried out. | 0...23 | 0 | Time | I | DHW |
| M1 | 155 | Frost Pro-tection | Defines the delivery temperature below which the thermal unit pump and the system pump (with cascade configuration) are activated if. If the temperature of one of the delivery sensors (excluding the zone sensors) falls another 5 degrees below the value set by Par. 155, then a request to activate the cascade is generated. When the temperature of the primary sensor reaches five degrees above the value defined by Par. 155, then the request ceases and the cascade returns to stand-by mode. | 10...30 | 15 | °C | I | Cascade |
| M1 | 186 | Frost pro-tection out | If the temperature outside is below the value set in this parameter, the thermal unit pump (PC), the system pump (PS), and the central heating system pump (PI) are activated | -30...15 | 5 | °C | I | Cascade |
| M1 | 189 | Burner Address | Not usable | - | - | | - | Cascade |
| M1 | 191 | Fan Type | Defines the type of fan installed in the thermal unit | Do not change. Use permitted only to authorised service centres | Changes based on the configuration of Par. 97 | | I | General |
| M1 | 205 | Dep. Zone Control | Enables control of the additional heating zone managed by the Depending thermal unit 0 = Disabled 1 =Enabled | 0...1 | 0 | | U | General |
| M2 | 72 | Permit Emergency Mode | Activates the emergency mode. This mode comes on when communication between Managing and the primary circuit's probe is lost. In this event, if Par. 72 is set to "Yes", the cascade is initiated, working to the fixed set-point determined by Par. 74. | Yes No | Yes | | U | Cascade |
| M2 | 74 | Emergency Set-point | Set-point active in emergency mode. | 20...70 | 70 | °C | I | Cascade |
| M2 | 75 | Delay Per Start Next Mod. | Defines the stand-by time in seconds to restart the subsequent cascade module in normal start mode. | 5...255 | 120 | Sec. | I | Cascade |
| M2 | 76 | Delay Per Stop Next Mod. | Defines the stand-by time in seconds to switch off the last cascade module on in normal Off mode. | 5...255 | 30 | Sec. | I | Cascade |
| M2 | 142 | Delay Quick Start Next | Defines the stand-by time in seconds to restart the next cascade module in quick start mode. | 5...255 | 60 | Sec. | I | Cascade |
| M2 | 143 | Delay Quick Stop Next | Defines the stand-by time in seconds to switch off the last cascade module on in Quick Stop mode. | 5...255 | 15 | Sec. | I | Cascade |

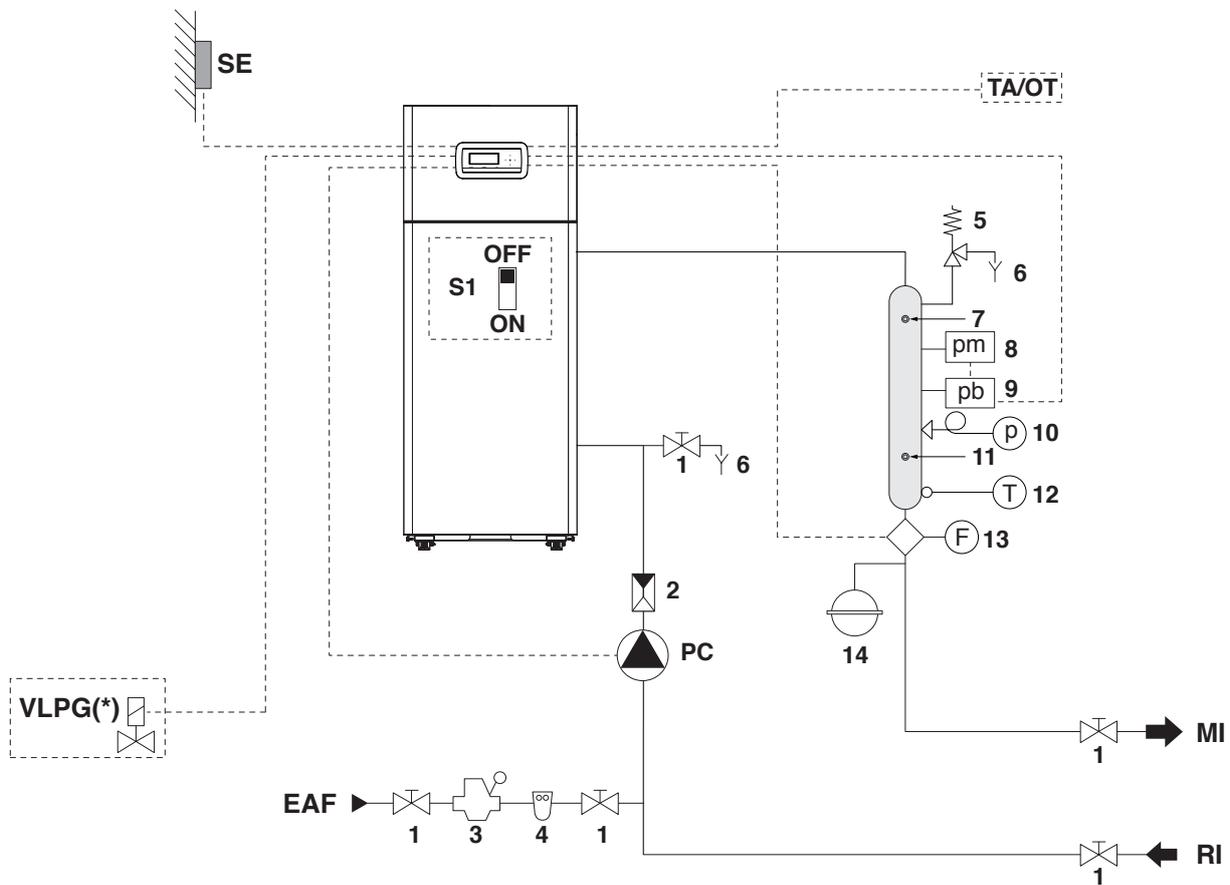
| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|------|-------------|----------|
| M2 | 77 | Hyst. Down Start Module | Defines by how many degrees the temperature measured by the primary circuit's probe must fall below the set-point in order for the subsequent module to be started after the time interval set by Par. 75. | 0...40 | 5 | °C | I | Cascade |
| M2 | 78 | Hyst. Up Stop Module | Defines by how many degrees the temperature measured by the primary circuit's probe must go above the set-point in order for the subsequent module to be switched off after the time interval set by Par. 76. | 0...40 | 4 | °C | I | Cascade |
| M2 | 144 | Hyst. Down Quick Start | Defines by how many degrees the temperature measured by the primary circuit's probe must go below the set-point in order for the subsequent module to be started after the time interval set by Par. 142 (quick-start mode). | 0...40 | 20 | °C | I | Cascade |
| M2 | 145 | Hyst. Up Quick Stop | Defines by how many degrees the temperature measured by the primary circuit's probe must go above the set-point in order for the subsequent module to be switched off after the time interval set by Par. 143 (quick stop mode). | 0...40 | 6 | °C | I | Cascade |
| M2 | 146 | Hyst. Up Stop All | Defines by how many degrees the temperature measured by the primary circuit's probe must go above the set-point in order for all "On" modules to be switched off at the same time. | 0...40 | 8 | °C | I | Cascade |
| M2 | 147 | Number of Units | Defines the number of modules of which the cascade consists. | 1...8 | 8 | | I | Cascade |
| M2 | 148 | Power Mode | Defines the cascade operation mode. 0 = Disabled 1 = Not applicable 2 = Maximum number of burners 3 = Minimum number of burners | 0...3 | 2 | | I | Cascade |
| M2 | 79 | Max. Setp. Offset Down | Defines the maximum decrease in the primary circuit's cascade set-point. Is based on the primary circuit's probe reading. | 0...40 | 2 | °C | I | Cascade |
| M2 | 80 | Max. Setp. Offset Up | Defines the maximum increase in the primary circuit's cascade set-point. Is based on the primary circuit's probe reading. | 0...40 | 5 | °C | I | Cascade |
| M2 | 81 | Start Mod. Delay Fact. | Defines the time in minutes from the moment the demand is triggered until the activation of the set-point increases or decreases provided for by Par. 79 e 80. | 0...60 | 60 | Min. | I | Cascade |
| M2 | 82 | Next Module Start Rate | It defines the minimum power for at least one of the modules in the cascade in order for the next module to be switched on (if the other conditions linked to Par. 75 and 77 are met). | 10...100 | 80 | % | I | Cascade |
| M2 | 83 | Next Module Stop Rate | It defines the maximum power for all the modules in the cascade in order for the last module on to be switched off (if the other conditions linked to Par. 76 and 78 are met). | 10...100 | 25 | % | I | Cascade |
| M2 | 84 | Module Rotation Interval | It defines the time interval (in days) after which modules are rotated. | 0...30 | 1 | Days | I | Cascade |
| M2 | 149 | First Module to Start | Establishes the number of the next module to be rotated (this value is automatically updated at each rotation). | 1...16 | 1 | | I | Cascade |
| M2 | 86 | PID P | Defines the proportional term to change the set-point of the cascade module. | 0...1275 | 50 | | 0 | Cascade |
| M2 | 87 | PID I | Defines the integral term to change the setpoint of the cascade module. | 0...1275 | 500 | | 0 | Cascade |
| M2 | 150 | PID Slew Rate Up | Defines the speed (in °C/100 ms) with which the set-point of individual modules is increased in the event the primary circuit's set-point is not achieved (if the value is set to zero, the change is controlled by the PI of Par. 86 and 87 without restrictions). | 0...25.5 | 1 | | 0 | Cascade |

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type | Category |
|------|----------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------|------|-------------|----------|
| M2 | 151 | PID Slew Rate Dn | Defines the speed (in °C/100 ms) with which the set-point of individual modules is decreased in the event the primary circuit's set-point is exceeded (if the value is set to zero, the change is controlled by the PI of Par. 86 and 87 without restrictions). | 0...25.5 | 1 | | 0 | Cascade |
| M2 | 152 | PwrMode2 Min Power | Defines the power value (in percentage terms) against which the average power of all on modules in cascade operation mode must be compared (Par. 148 = 2). | 0...100 | 3 | % | I | Cascade |
| M2 | 153 | PwrMode2 Hysteresis | Defines the extra power value (in percentage terms) compared to the average power of all on modules in cascade operation mode (Par. 148 = 2). | 0...100 | 40 | % | I | Cascade |
| M2 | 154 | Post-Pump Period | Defines the post-circulation time expressed in seconds at the end of the heat request in cascade mode (system pump PS) | 0...255 | 60 | Sec. | I | Cascade |
| M2 | 184 | No. Active DHW units | Defines how many units can be activated for the production of domestic hot water | 0...8 | 1 | | I | Cascade |
| M3 | 73 | Boiler Address | Defines the way in which the boiler is managed. | STAND ALONE MANAGING Dependent 1 Dependent 2 Dependent 3 Dependent 4 Dependent 5 Dependent 6 Dependent 7 | STAND ALONE | | I | Cascade |
| M3 | 169 | Max. Setp. Offset Down | Defines the maximum decrease in the setpoint in cascade mode on the primary circuit. It is based on the secondary circuit (SC) value reading. | 0...40 | 2 | °C | I | Cascade |
| M3 | 170 | Max. Setp. Offset Up | Defines the maximum increase in the setpoint in cascade mode on the primary circuit. It is based on the secondary sensor (SC) value reading. | 0...40 | 5 | °C | I | Cascade |
| M3 | 171 | Start Mod. Delay Fact. | Defines the time in minutes from the moment the request is triggered until the activation of the set-point increases or decreases provided for by Par.169 e 170. | 0...60 | 40 | Min. | I | Cascade |
| M3 | 176 | PID P | Defines the proportional term to change the set-point of the cascade module based on the secondary circuit's temperature. | 0...1275 | 25 | | 0 | Cascade |
| M3 | 177 | PID I | Defines the integral term to change the set-point of the cascade module based on the secondary circuit's temperature. | 0...1275 | 1000 | | 0 | Cascade |
| M3 | 178 | PID Slew Rate Up | Defines the speed (in °C/100 ms) with which the set-point of individual modules is increased in the event the secondary circuit's set-point not reached (if the value is set to zero, the change is controlled by the PI of Par. 176 and 177 without restrictions). | 0...25.5 | 1 | | 0 | Cascade |
| M3 | 179 | PID Slew Rate Dn | Defines the speed (in °C/100 ms) with which the set-point of individual modules is decreased in the event the primary circuit's set-point is exceeded (if the value is set to zero, the change is controlled by the PI of Par. 176 and 177 without restrictions). | 0...25.5 | 1 | | 0 | Cascade |
| M4 | 98 | Gas Type | Supports uploading the values of Par. 92, 93 and 94 from a set of pre-defined rpm values that identifies the boiler type. | 1...37 | (**) | | I | General |
| M4 | 97 | Model | Supports uploading the values of Par. from 116 to 128 from a set of pre-defined rpm values that defines the configuration of the boiler's inputs and outputs. | (***) | (***) | | I | General |

(*) To be configured based on the model as indicated in the paragraph "Flow meter parameters configuration (accessory)".
 (**) Default settings (see paragraph "Parameter configuration for changing the type of gas used").
 (***) It is not allowed to change the factory setting of this parameter.

2.16 Source water systems and configurations

Diagram 1: circuit with thermal module directly connected to the heating system



- | | | | |
|----|----------------------------|-------|----------------------------------|
| 1 | Isolating valve | EAF | Domestic cold water inlet |
| 2 | Non-return valve | MI | High temperature system flow |
| 3 | Pressure reducer | RI | High temperature system return |
| 4 | Water softener filter | PC | Thermal unit circulation pump |
| 5 | Safety valve | SE | Outdoor sensor |
| 6 | Drain | V LPG | LPG fuel shut-off valve (*) |
| 7 | VIC INAIL housing | TA | Room thermostat (accessory) |
| 8 | Minimum pressure switch | OT | Open Therm Interface (accessory) |
| 9 | Lockout pressure switch | | |
| 10 | Pressure gauge | | |
| 11 | Control thermostat housing | | |
| 12 | Temperature gauge | | |
| 13 | Flow-meter | | |
| 14 | Expansion tank | | |

(*) According to the set parameters it is possible to control a fuel shut-off gas solenoid valve for LPG.

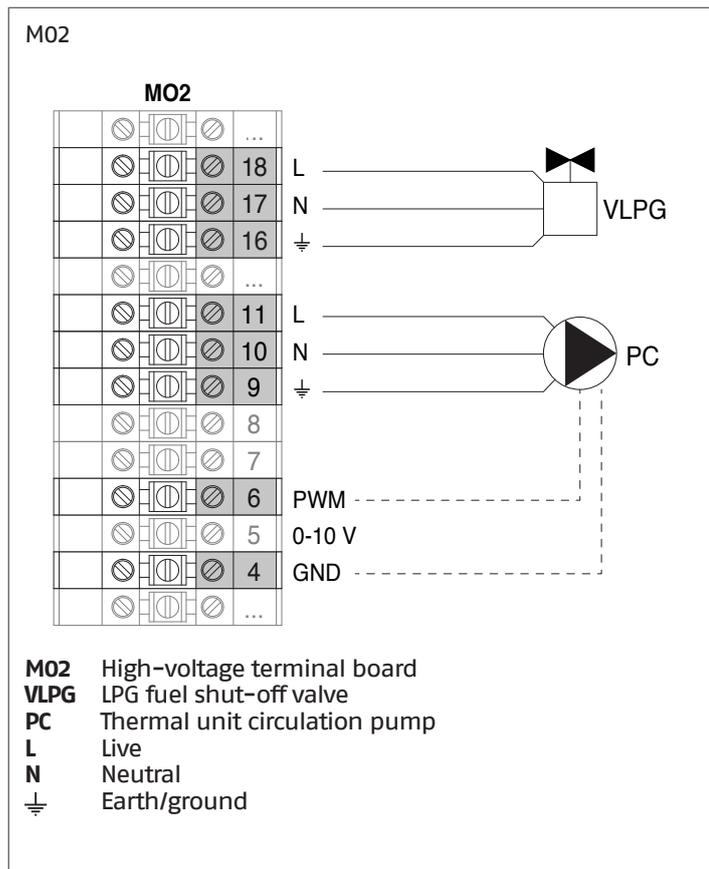
⚠ Domestic hot water and central heating circuits must be completed with expansion vessels of adequate capacity and suitable, correctly-sized safety valves. The discharge of safety valves and appliances must be connected to a suitable collection and disposal system (see Catalogue for compatible accessories).

⚠ The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.

⚠ Special supply/refill water must be conditioned using suitable treatment systems.

⊘ It is prohibited to operate the thermal module without water.

Electrical connections – Diagram 1



Basic parameter configuration – Diagram 1

| Par. No. | Description | Parameter setting | |
|----------|-------------------------------------|-------------------------------------------------------------|-------|
| 1 | CH mode | 1 = Climate mode with external probe and ambient thermostat | |
| 35 | DHW mode | 0 = Disabled (*) | |
| 117 | Prog Input 2 | 3 = Heating flow meter (*) | FL |
| 123 | Prog Input 8 | 2 = Water pressure switch (*) | INAIL |
| 124 | Progr.ble inp. TA | 1 = Enabled (*) | TA/OT |
| 125 | Progr.ble outp. 1 | 0 = Disabled (*) or 8 = LPG solenoid valve | V LPG |
| 128 | Progr.ble outp. 4 | 0 = Disabled (*) | |
| 187 | Progr.ble outp. 5 | 1 = General circulation pump (*) | PC |
| 135 | Modulating circulation pump model | 0 = Wilo Yonos 1 = Salmson 2 = Grundfos (*) | |
| 136 | Modulating circulation pump control | On Off Modulating (*) Fixed 20... 100% | |

(*) **Default setting**

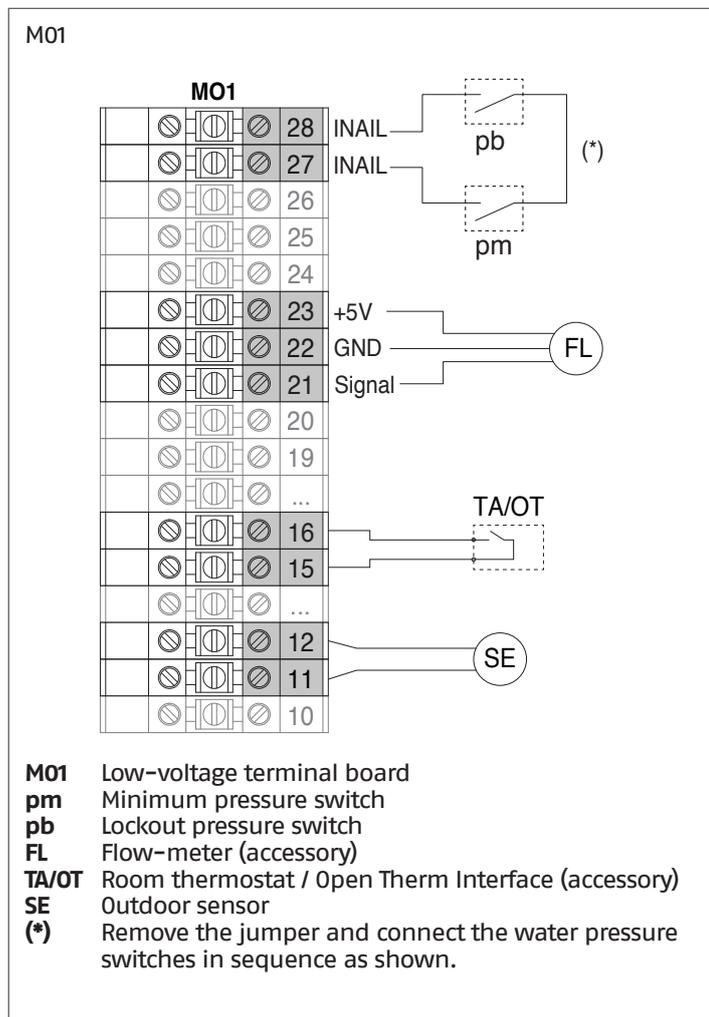
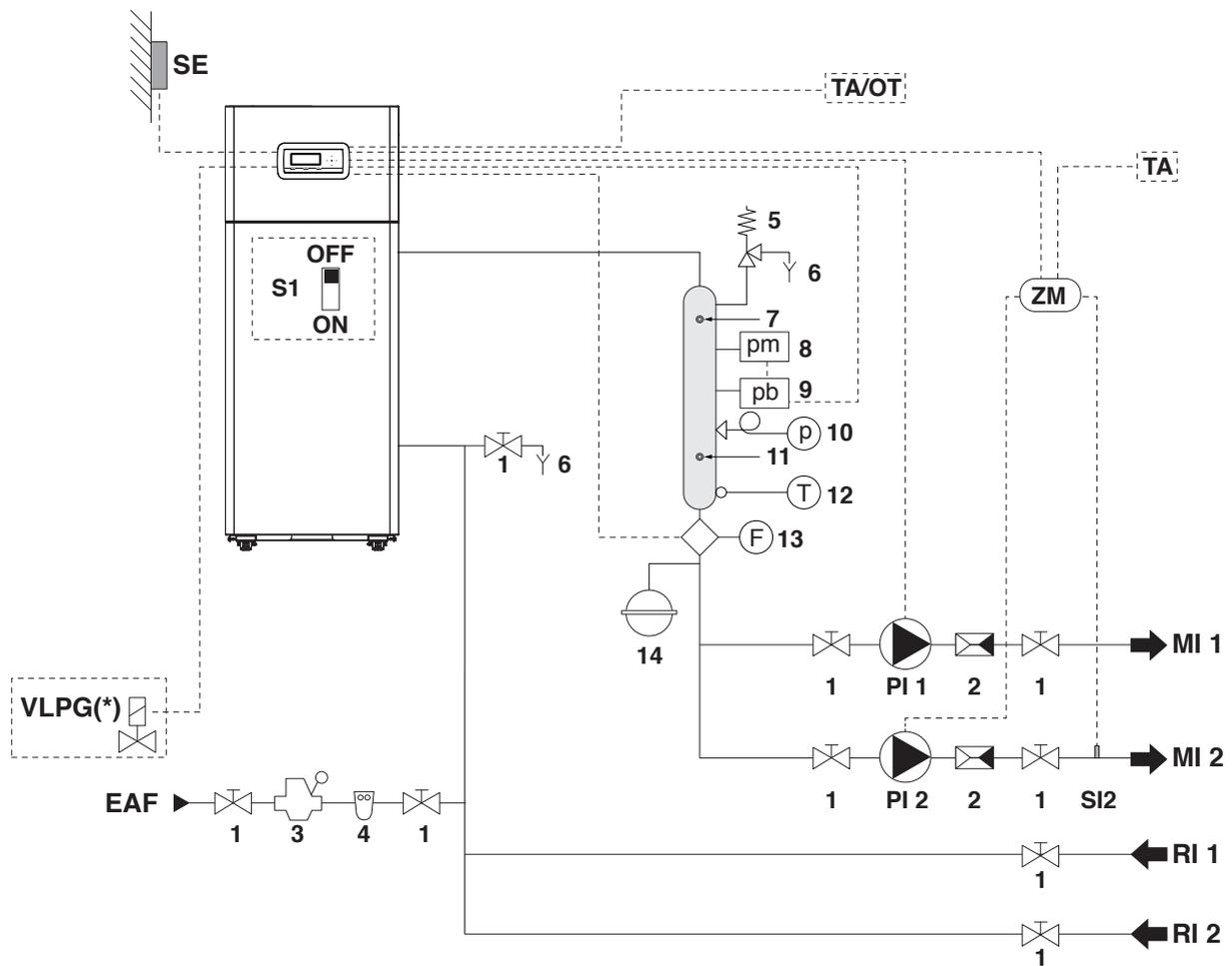


Diagram 1.1: circuit with thermal module directly connected to the system with two direct heating zones



- | | | | |
|----|----------------------------|-----------|----------------------------------------|
| 1 | Isolating valve | EAF | Domestic cold water inlet |
| 2 | Non-return valve | MI 1 | First circuit system delivery |
| 3 | Pressure reducer | RI 1 | First circuit system return |
| 4 | Water softener filter | MI 2 | Second circuit system delivery |
| 5 | Safety valve | RI 2 | Second circuit system return |
| 6 | Drain | PI 1 | First circuit system circulation pump |
| 7 | VIC INAIL housing | PI 2 | Second circuit system circulation pump |
| 8 | Minimum pressure switch | SE | Outdoor sensor |
| 9 | Lockout pressure switch | ZM | Zone management electronic device |
| 10 | Pressure gauge | SI 2 | Second circuit system delivery probe |
| 11 | Control thermostat housing | V LPG (*) | LPG fuel shut-off valve (*) |
| 12 | Temperature gauge | TA | Room thermostat (accessory) |
| 13 | Flow-meter | OT | Open Therm Interface (accessory) |
| 14 | Expansion tank | | |

(*) According to the set parameters it is possible to control a fuel shut-off gas solenoid valve for LPG.

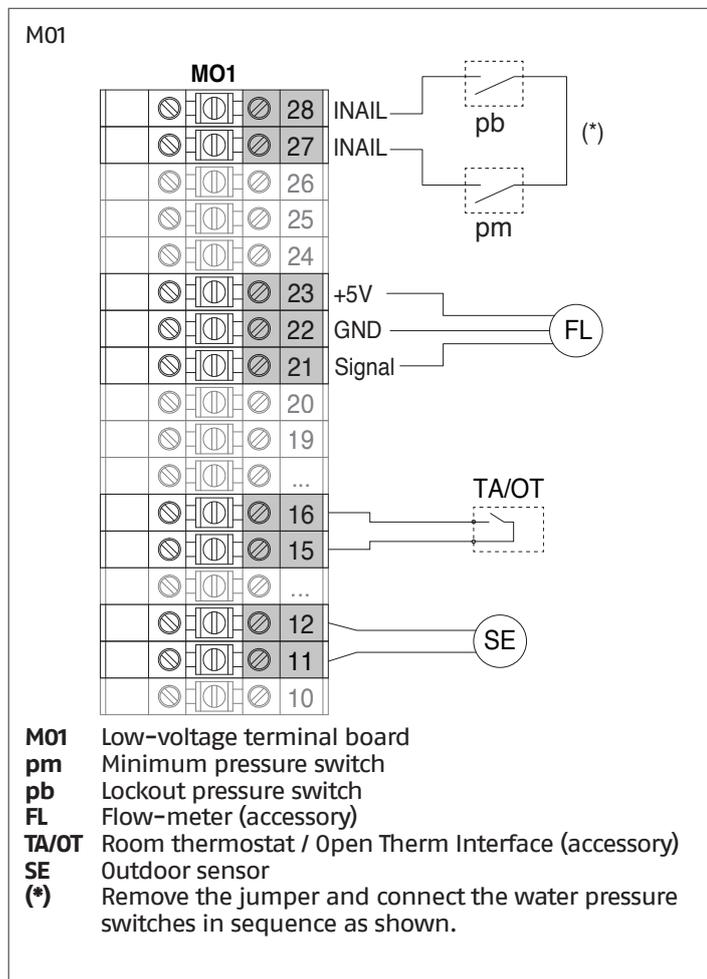
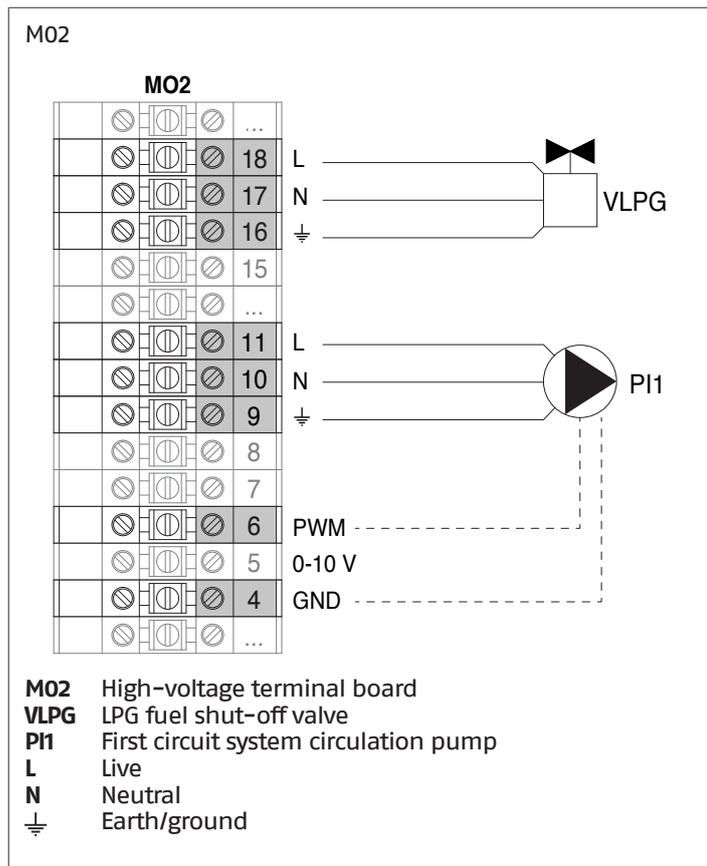
⚠ Domestic hot water and central heating circuits must be completed with expansion vessels of adequate capacity and suitable, correctly-sized safety valves. The discharge of safety valves and appliances must be connected to a suitable collection and disposal system (see Catalogue for compatible accessories).

⚠ The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.

⚠ Special supply/refill water must be conditioned using suitable treatment systems.

⊘ It is prohibited to operate the thermal module without water.

Electrical connections – Diagram 1.1



Basic parameter configuration – Diagram 1.1

| Par. No. | Description | Parameter setting |
|----------|-------------------------------------|-------------------------------------------------------------|
| 1 | CH mode | 1 = Climate mode with external probe and ambient thermostat |
| 35 | DHW mode | 0 = Disabled (*) |
| 117 | Prog Input 2 | 3 = Heating flowmeter FL |
| 123 | Prog Input 8 | 2 = Water pressure switch (*) INAIL |
| 124 | Progr.ble inp. TA | 1 = Enabled (*) TA/OT |
| 125 | Progr.ble outp. 1 | 0 = Disabled (*) or 8 = LPG solenoid valve V LPG |
| 128 | Progr.ble outp. 4 | 0 = Disabled (*) |
| 187 | Progr.ble outp. 5 | 2 = Heating circulation pump PI 1 |
| 135 | Modulating circulation pump model | 0 = Wilo Yonos 1 = Salmson 2 = Grundfos (*) |
| 136 | Modulating circulation pump control | On Off Modulating (*) Fixed 20... 100% |

(*) Default setting

NOTE: for additional zone programming, refer to chapter "Managing additional zone".

ZONE MANAGEMENT ELECTRONIC DEVICE OPTIONAL

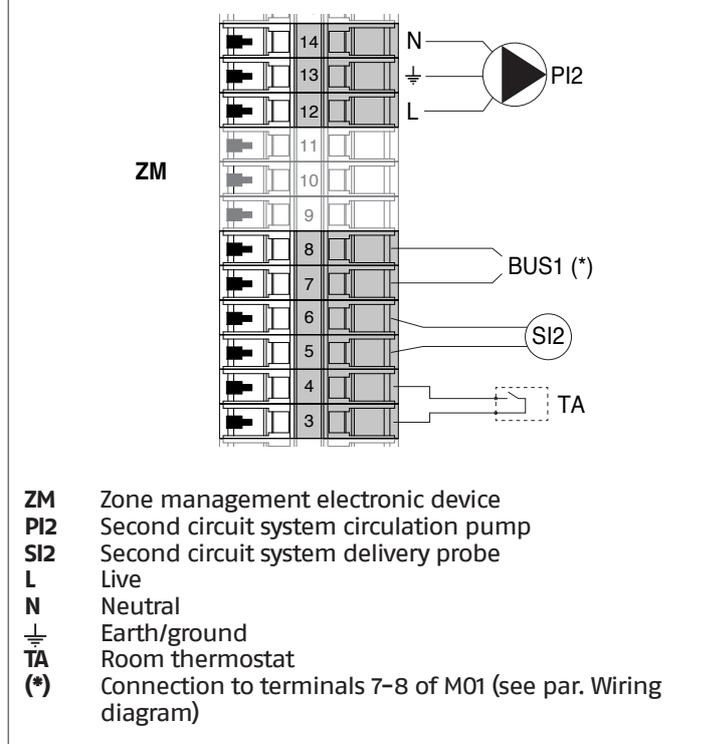
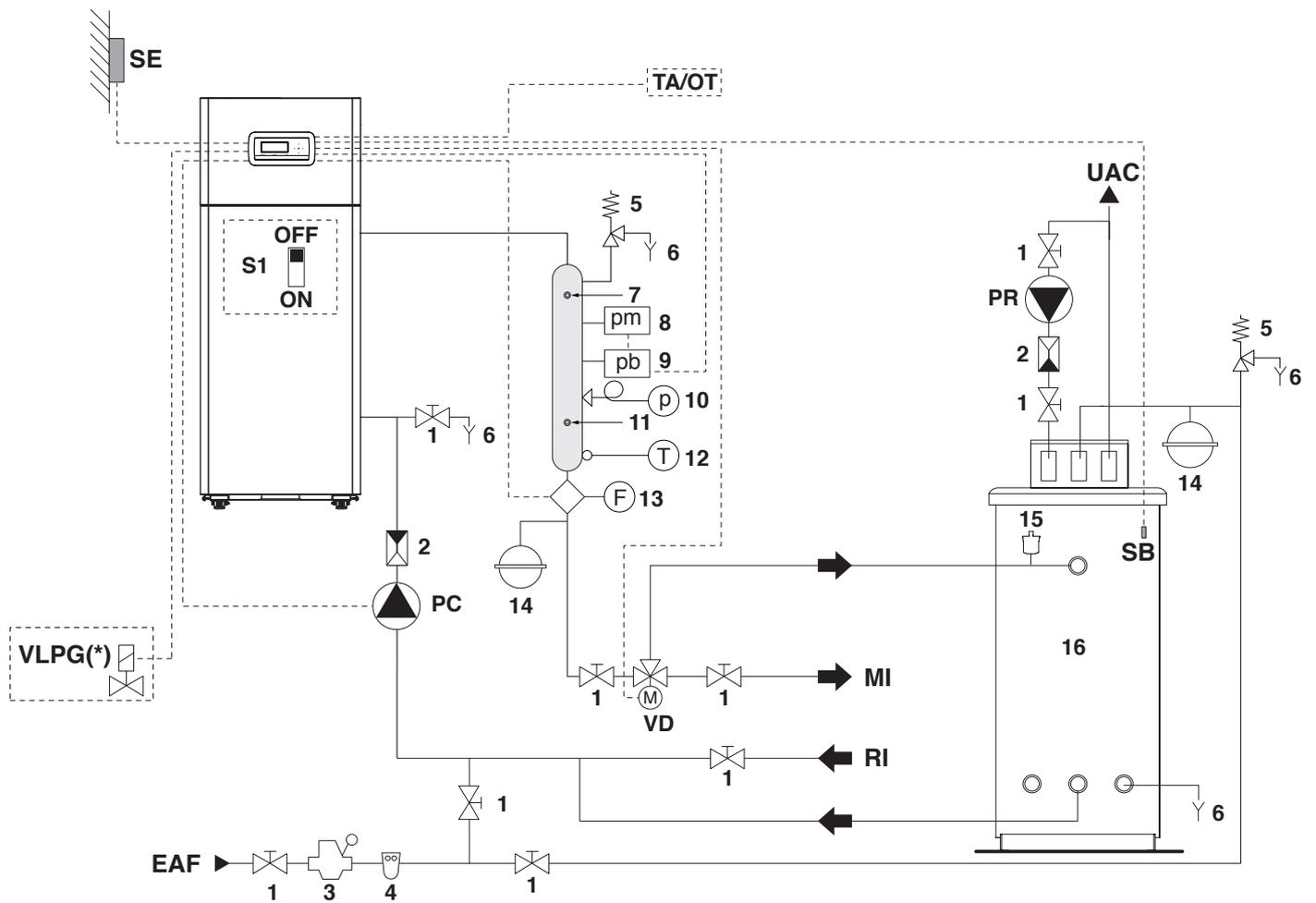


Diagram 2: circuit with thermal module directly connected to the heating system and DHW production with heater and diverting valve



- | | | | |
|----|----------------------------|------|------------------------------------|
| 1 | Isolating valve | EAF | Domestic cold water inlet |
| 2 | Non-return valve | UAC | Domestic hot water outlet |
| 3 | Pressure reducer | MI | High temperature system flow |
| 4 | Water softener filter | RI | High temperature system return |
| 5 | Safety valve | PC | Thermal unit circulation pump |
| 6 | Drain | VD | DHW diverting valve |
| 7 | VIC INAIL housing | PR | DHW circulation pump (not managed) |
| 8 | Minimum pressure switch | SE | Outdoor sensor |
| 9 | Lockout pressure switch | SB | Heater probe/thermostat |
| 10 | Pressure gauge | VLPG | LPG fuel shut-off valve (*) |
| 11 | Control thermostat housing | TA | Room thermostat (accessory) |
| 12 | Temperature gauge | OT | Open Therm Interface (accessory) |
| 13 | Flow-meter | | |
| 14 | Expansion tank | | |
| 15 | Automatic bleed valve | | |
| 16 | Storage cylinder | | |

(*) According to the set parameters it is possible to control a fuel shut-off gas solenoid valve for LPG.

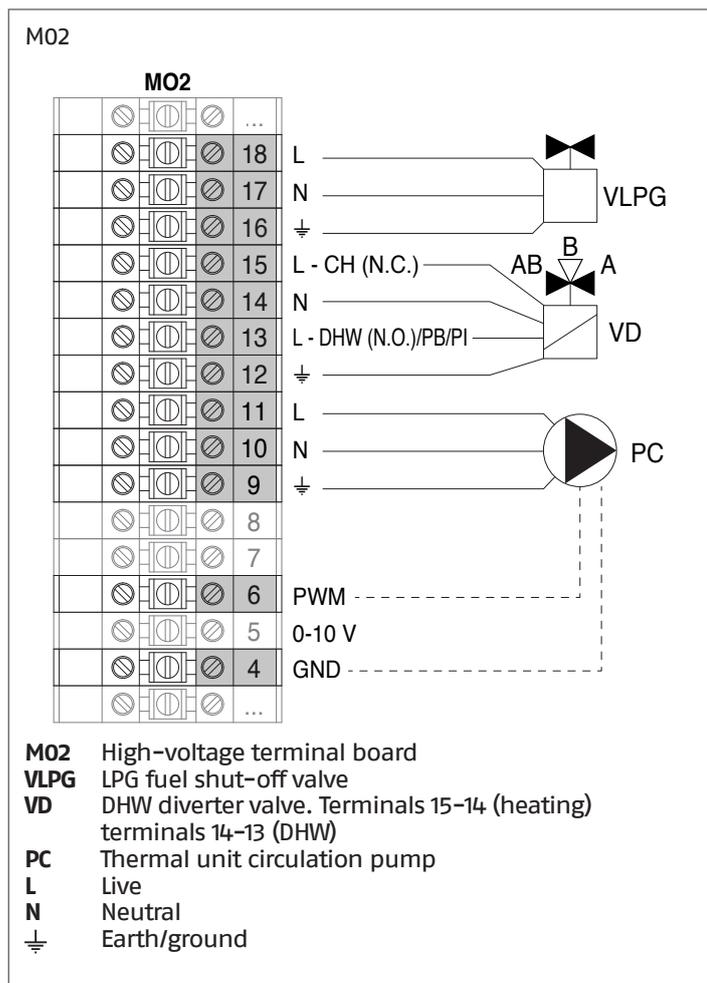
⚠ Domestic hot water and central heating circuits must be completed with expansion vessels of adequate capacity and suitable, correctly-sized safety valves. The discharge of safety valves and appliances must be connected to a suitable collection and disposal system (see Catalogue for compatible accessories).

⚠ The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.

⚠ Special supply/refill water must be conditioned using suitable treatment systems.

⊘ It is prohibited to operate the thermal module without water.

Electrical connections – Diagram 2



Basic parameter configuration – Diagram 2

| Par. No. | Description | Parameter setting |
|----------|-------------------------------------|-------------------------------------------------------------|
| 1 | CH mode | 1 = Climate mode with external probe and ambient thermostat |
| 35 | DHW mode | 1 = Water heater with probe SB |
| 42 | DHW Priority | 2 = On (*) |
| 117 | Prog Input 2 | 3 = Heating flowmeter FL |
| 123 | Prog Input 8 | 2 = Water pressure switch (*) INAIL |
| 124 | Progr.ble inp. TA | 1 = Enabled (*) TA/OT |
| 125 | Progr.ble outp. 1 | 0 = Disabled (*) or 8 = LPG solenoid valve V LPG |
| 128 | Progr.ble outp. 4 | 3 = DHW circulation pump (**) VD |
| 187 | Progr.ble outp. 5 | 1 = General circulation pump (*) PC |
| 135 | Modulating circulation pump model | 0 = Wilo Yonos 1 = Salmson 2 = Grundfos (*) |
| 136 | Modulating circulation pump control | On Off Modulating (*) Fixed 20... 100% |

(*) Default setting
 (**) Settings also valid for DHW diverter valve (VD)

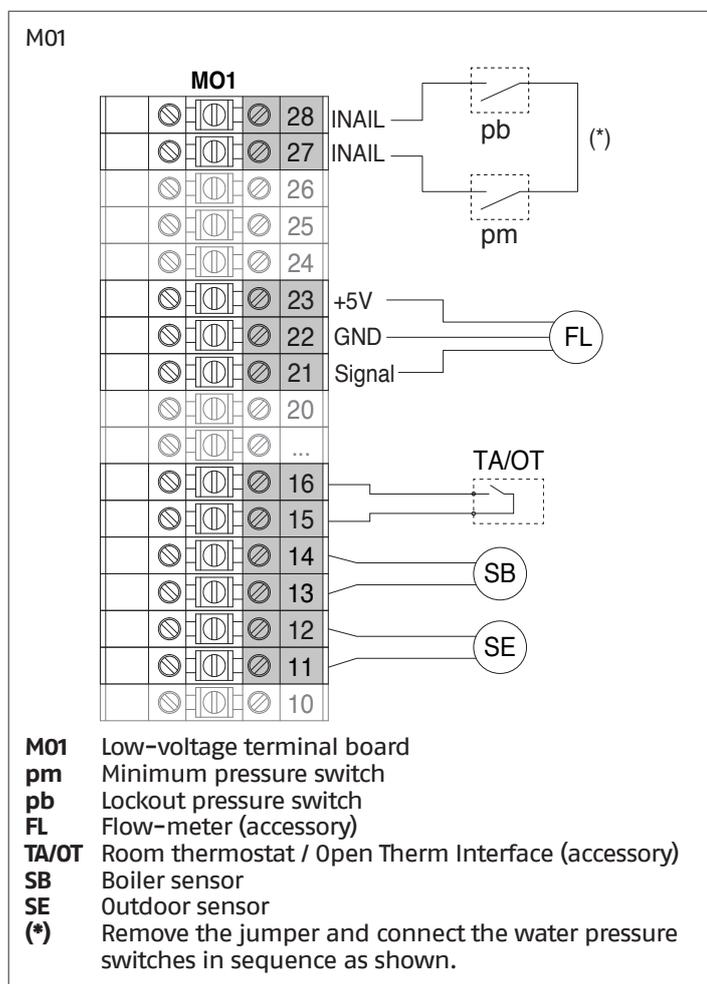
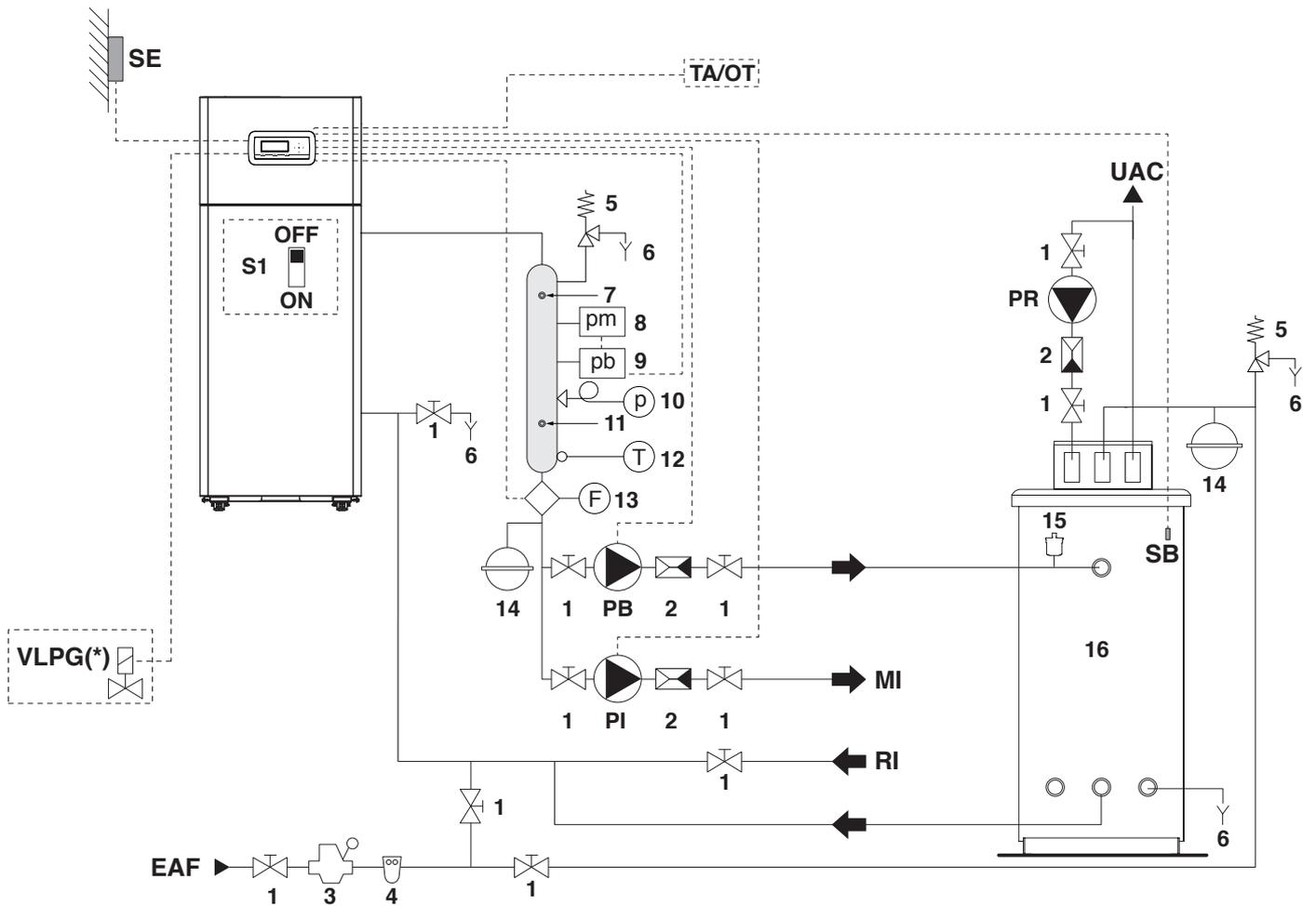


Diagram 3: circuit with thermal module directly connected to the heating system and DHW production with heater and dedicated circulation pump



- | | | | |
|----|----------------------------|------|------------------------------------|
| 1 | Isolating valve | EAF | Domestic cold water inlet |
| 2 | Non-return valve | UAC | Domestic hot water outlet |
| 3 | Pressure reducer | MI | High temperature system flow |
| 4 | Water softener filter | RI | High temperature system return |
| 5 | Safety valve | PB | DHW circulator |
| 6 | Drain | PR | DHW circulation pump (not managed) |
| 7 | VIC INAIL housing | SE | Outdoor sensor |
| 8 | Minimum pressure switch | SB | Heater probe/thermostat |
| 9 | Lockout pressure switch | VLPG | LPG fuel shut-off valve (*) |
| 10 | Pressure gauge | PI | Central heating system pump |
| 11 | Control thermostat housing | TA | Room thermostat (accessory) |
| 12 | Temperature gauge | OT | Open Therm Interface (accessory) |
| 13 | Flow-meter | | |
| 14 | Expansion tank | | |
| 15 | Automatic bleed valve | | |
| 16 | Storage cylinder | | |

(*) According to the set parameters it is possible to control a fuel shut-off gas solenoid valve for LPG.

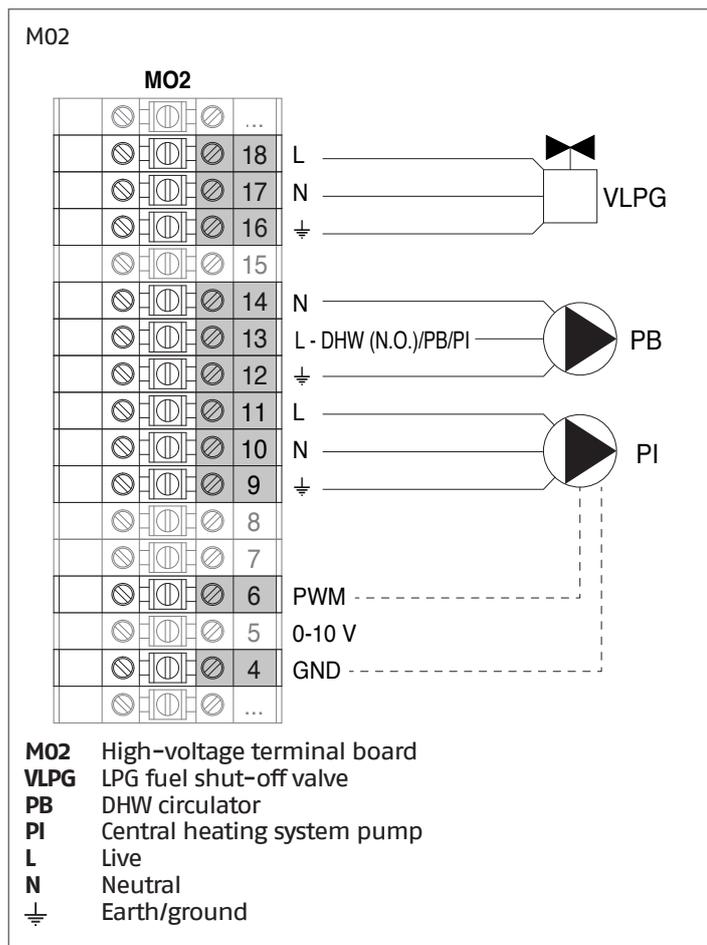
⚠ Domestic hot water and central heating circuits must be completed with expansion vessels of adequate capacity and suitable, correctly-sized safety valves. The discharge of safety valves and appliances must be connected to a suitable collection and disposal system (see Catalogue for compatible accessories).

⚠ The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.

⚠ Special supply/refill water must be conditioned using suitable treatment systems.

⊖ It is prohibited to operate the thermal module without water.

Electrical connections – Diagram 3



Basic parameter configuration – Diagram 3

| Par. No. | Description | Parameter setting |
|----------|-------------------------------------|-------------------------------------------------------------|
| 1 | CH mode | 1 = Climate mode with external probe and ambient thermostat |
| 35 | DHW mode | 1 = Water heater with probe SB |
| 42 | DHW Priority | 2 = On (*) |
| 117 | Prog Input 2 | 3 = Heating flowmeter FL |
| 123 | Prog Input 8 | 2 = Water pressure switch (*) INAIL |
| 124 | Progr.ble inp. TA | 1 = Enabled (*) TA/OT |
| 125 | Progr.ble outp. 1 | 0 = Disabled (*) or 8 = LPG solenoid valve VLPG |
| 128 | Progr.ble outp. 4 | 3 = DHW circulation pump PB |
| 187 | Progr.ble outp. 5 | 2 = Heating circulation pump PI |
| 135 | Modulating circulation pump model | 0 = Wilo Yonos 1 = Salmson 2 = Grundfos (*) |
| 136 | Modulating circulation pump control | On Off Modulating (*) Fixed 20... 100% |

(*) Default setting

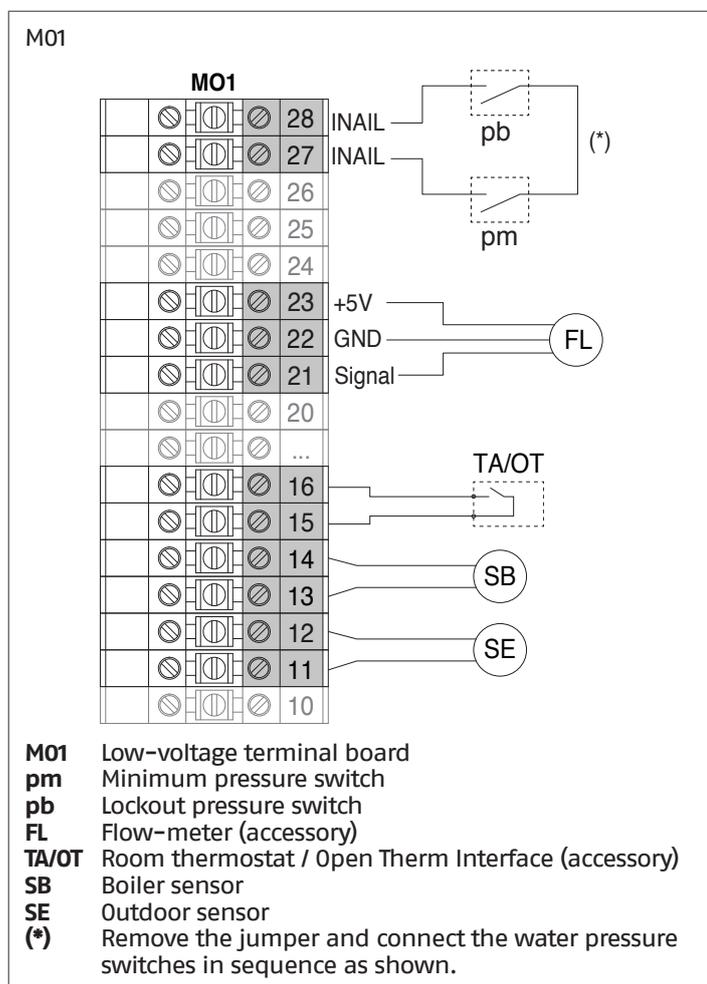
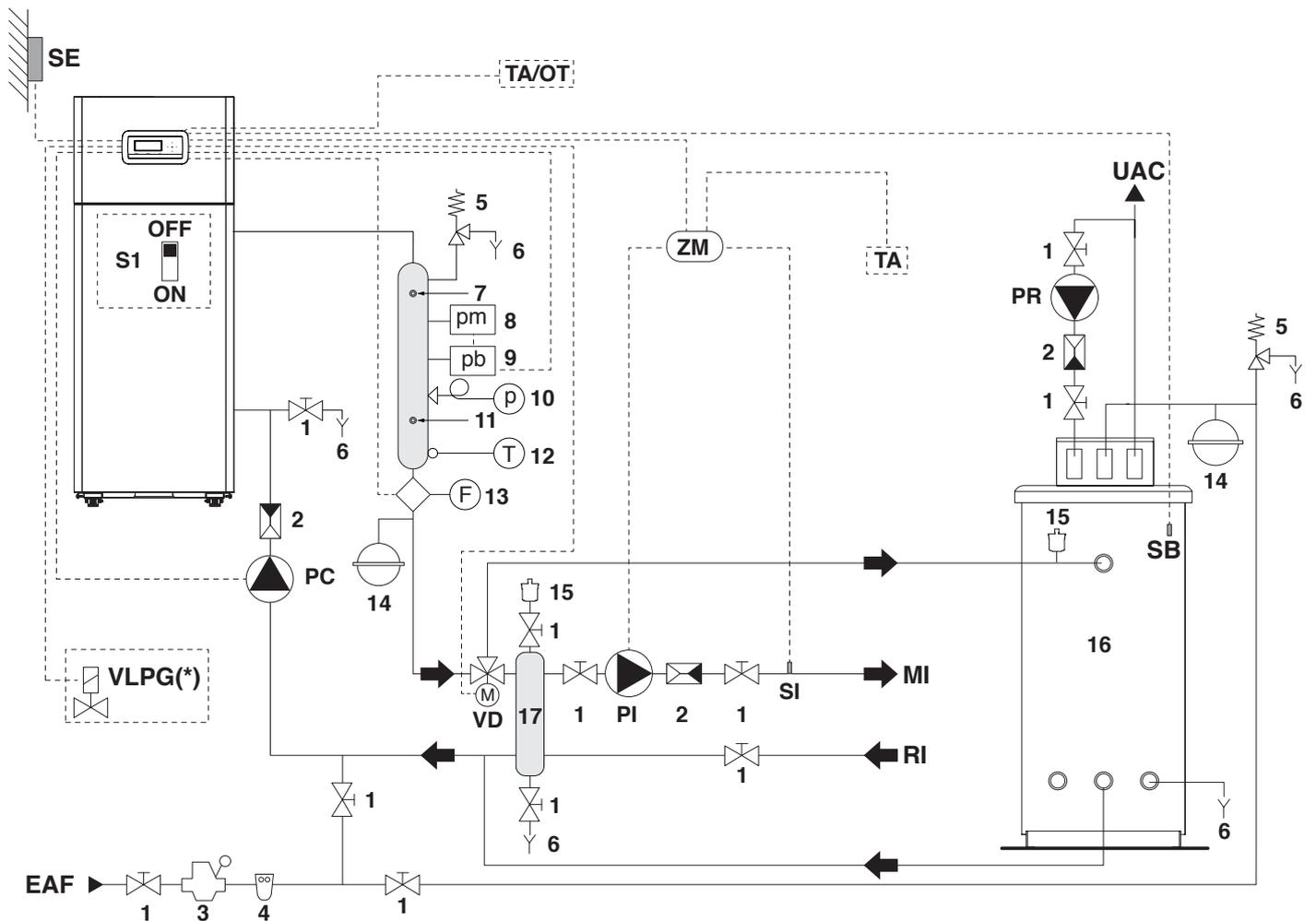


Diagram 4: circuit with thermal module connected through separator to the heating system. DHW production with heater and diverting valve on primary circuit



- | | |
|-------------------------------|---------------------------------------|
| 1 Isolating valve | EAF Domestic cold water inlet |
| 2 Non-return valve | UAC Domestic hot water outlet |
| 3 Pressure reducer | MI High temperature system flow |
| 4 Water softener filter | RI High temperature system return |
| 5 Safety valve | PC Thermal unit circulation pump |
| 6 Drain | VD DHW diverting valve |
| 7 VIC INAIL housing | PB DHW circulator |
| 8 Minimum pressure switch | PR DHW circulation pump (not managed) |
| 9 Lockout pressure switch | SE Outdoor sensor |
| 10 Pressure gauge | SB Heater probe/thermostat |
| 11 Control thermostat housing | VLPBG LPG fuel shut-off valve (*) |
| 12 Temperature gauge | ZM Zone management electronic device |
| 13 Flow-meter | PI Central heating system pump |
| 14 Expansion tank | SI System delivery probe |
| 15 Automatic bleed valve | TA Room thermostat (accessory) |
| 16 Storage cylinder | OT Open Therm Interface (accessory) |
| 17 Separator | |

(*) According to the set parameters it is possible to control a fuel shut-off gas solenoid valve for LPG.

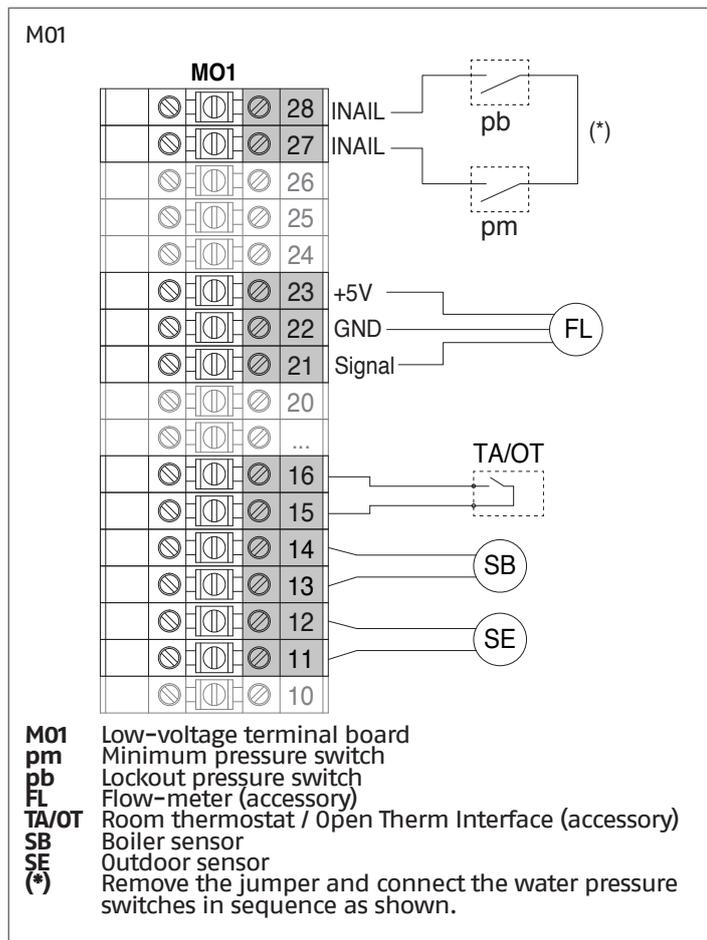
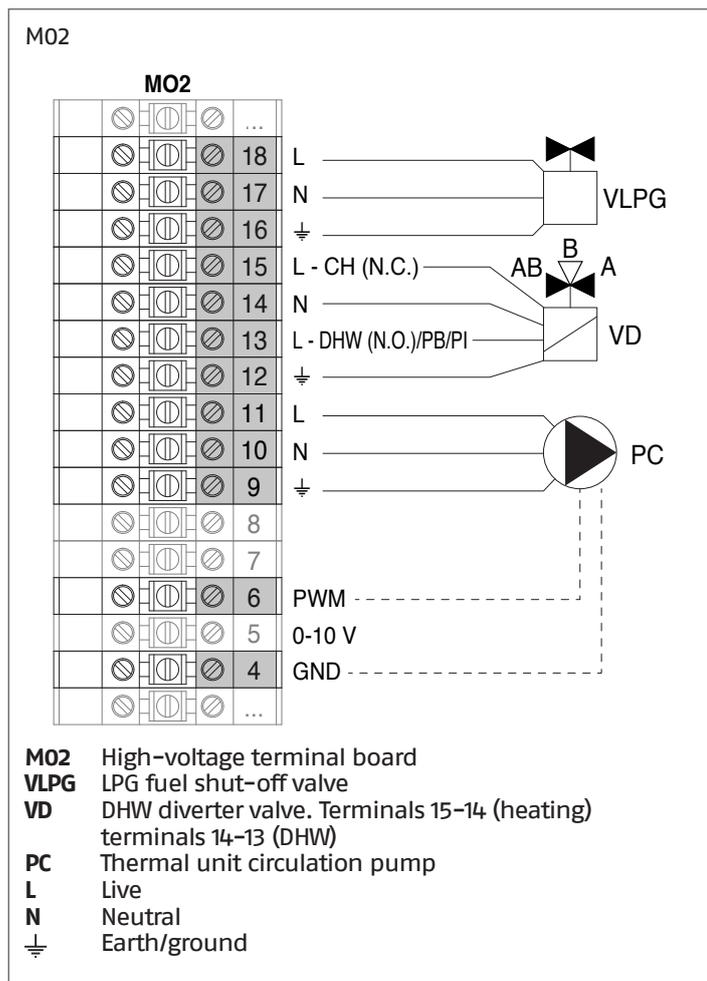
⚠ Domestic hot water and central heating circuits must be completed with expansion vessels of adequate capacity and suitable, correctly-sized safety valves. The discharge of safety valves and appliances must be connected to a suitable collection and disposal system (see Catalogue for compatible accessories).

⚠ The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.

⚠ Special supply/refill water must be conditioned using suitable treatment systems.

⊘ It is prohibited to operate the thermal module without water.

Electrical connections – Diagram 4

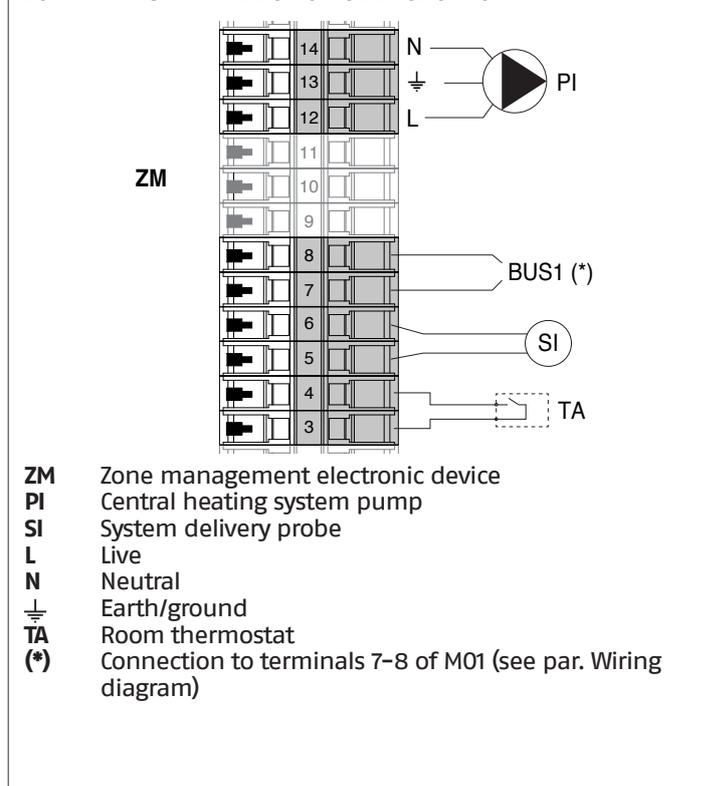


Basic parameter configuration – Diagram 4

| Par. No. | Description | Parameter setting |
|----------|-------------------------------------|-------------------------------------------------------------|
| 1 | CH mode | 1 = Climate mode with external probe and ambient thermostat |
| 35 | DHW mode | 1 = Water heater with probe SB |
| 42 | DHW Priority | 2 = On (*) |
| 117 | Prog Input 2 | 3 = Heating flow meter (*) FL |
| 123 | Prog Input 8 | 2 = Water pressure switch (*) INAIL |
| 124 | Progr.ble inp. TA | 1 = Enabled (*) TA/OT |
| 125 | Progr.ble outp. 1 | 0 = Disabled (*) or 8 = LPG solenoid valve V LPG |
| 128 | Progr.ble outp. 4 | 3 = DHW circulation pump (**) VD |
| 187 | Progr.ble outp. 5 | 1 = General circulation pump (*) PC |
| 135 | Modulating circulation pump model | 0 = Wilo Yonos 1 = Salmson 2 = Grundfos (*) |
| 136 | Modulating circulation pump control | On Off Modulating (*) Fixed 20... 100% |

(*) Default setting
()** Settings also valid for DHW diverter valve (VD)
NOTE: for additional zone programming, refer to chapter "Managing additional zone".

ZONE MANAGEMENT ELECTRONIC DEVICE OPTIONAL



3 COMMISSIONING AND MAINTENANCE

3.1 Preparing for initial startup

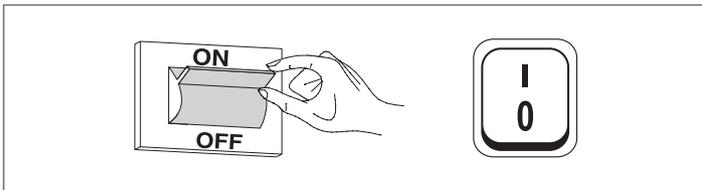
It is essential to perform the following checks before starting up or testing the functioning of the boiler:

- The fuel valves and the shut-off valves of the thermal system are open
- Check that the type and pressure of the gas supply are as specified for the boiler
- Check that the pressure in the CH circuit, when cold, is **above 1 bar** and that the circuit has been properly bled
- Check that the expansion vessel is correctly pre-charged
- Check that all electrical connections to the mains supply and to the system's control and safety devices must have been made correctly
- Check that the vent and air intake pipes have been correctly installed and connected.

! If you need to convert the boiler from METHANE to LPG, contact **RIELLO's** Technical Assistance Service.

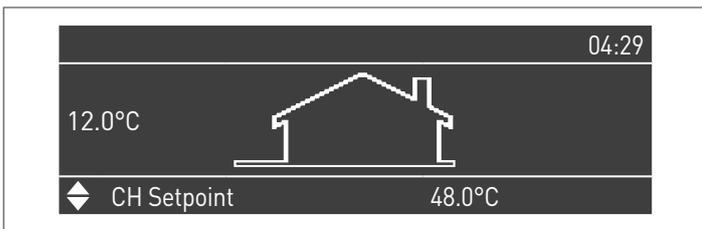
3.2 Initial startup

- Switch the system's master switch to the ON position and the thermal module's master switch to (I).



3.2.1 Switching the appliance on and off

After switching the appliance on, the display shall look as shown in the figure below:



External temperature is shown on the display on the left. This value is displayed only if the outdoor temperature sensor (accessory) is installed.

Main setpoint values are shown in the lower side of the display while the time is shown on the top right side.

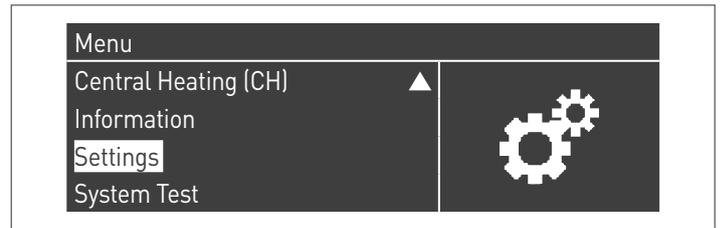
To turn the equipment off set the main switch "0/I" that is placed on the back side to "0".

! Never power off the appliance before switching the master switch to the "0" position.

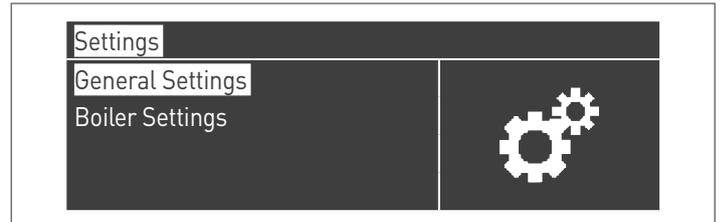
! Never switch off the appliance with the master switch if a request is active. Always make sure that the appliance is in stand-by before switching the main switch.

3.2.2 Date and time setting

Press the MENU key and select "Settings" with the ▲ / ▼ keys



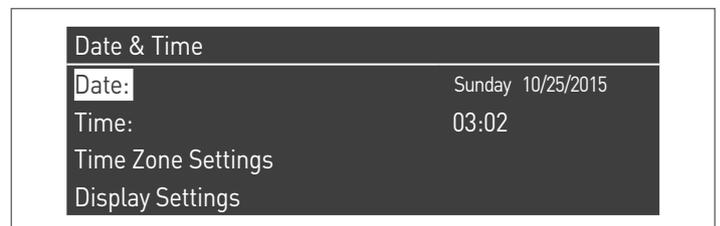
Confirm with the ● key and select "General settings" with the ▲ / ▼ keys



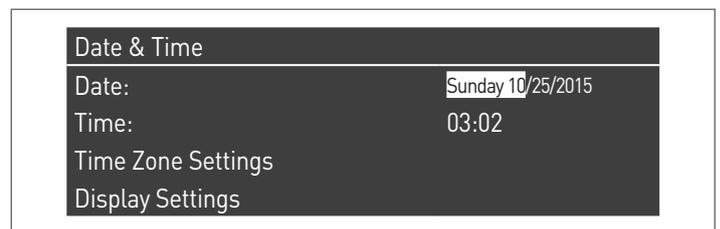
Confirm with the ● key and select "Date and Time " with the ▲ / ▼ keys



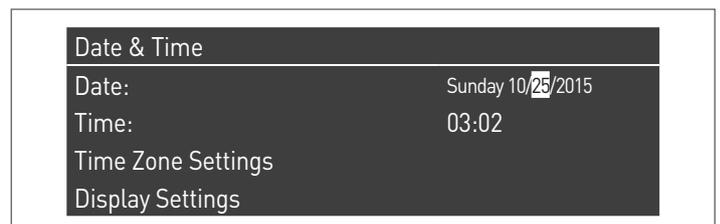
Press the ● key, the display will be shown as follows:



Press the ● key to highlight the values.

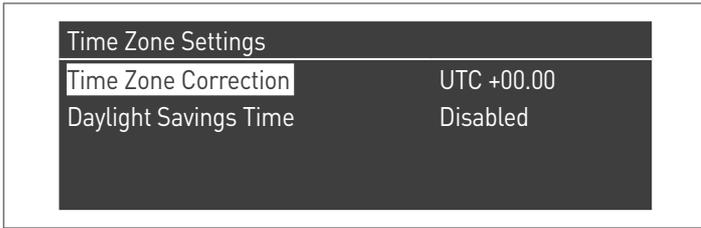


Values can be changed with the ▲ / ▼ keys. Confirm the value entered pressing the ● key and move to the next value.

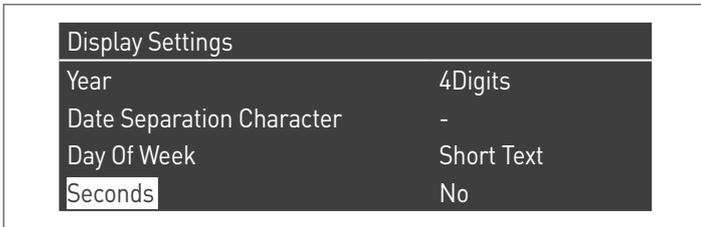
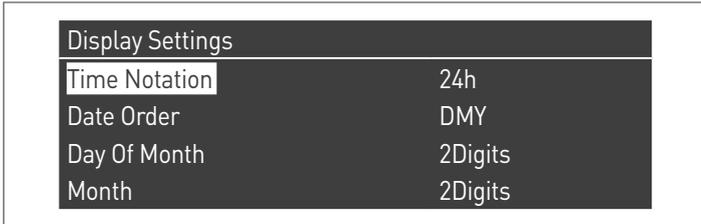


To set the time, follow the same procedure.

By accessing the "Time Zone Settings" menu, it is possible to set the time zone parameter as shown in the figure below:



To change the way in which date and time are displayed, it is possible to change the following characteristics by accessing the "Display Settings" menu:



3.2.3 Password access

To access the parameters, press the MENU key and select "Settings" with the ▲ / ▼ keys.



Confirm with the ● key and select "Boiler settings" with the ▲ / ▼ keys



Press the ● key to confirm.

- The system will now ask you to enter a password (the password is required for thermal module settings only):



Enter one digit at a time using the ▲ / ▼ keys to increase/decrease the numeric value. When you have set the right value, confirm by pressing the ● key.

The system provides for three types of access:
 USER (password not required, e.g. password No. 0000)
 INSTALLER (password No. 0300)
 MANUFACTURER

! After it is entered, the password is active during display and/or parametrisation. If the display is inactive for a few minutes, it needs to be re-entered.

3.2.4 Setting the heating parameters

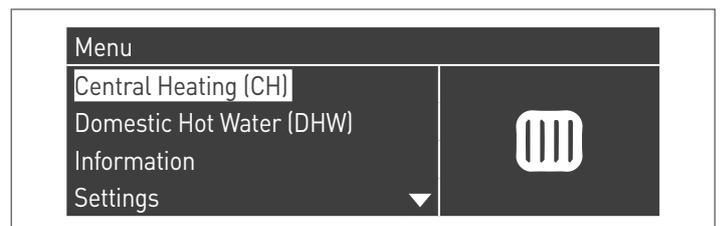
The parameter 1 establishes the thermal module's various heating operation modes.

Mode 0

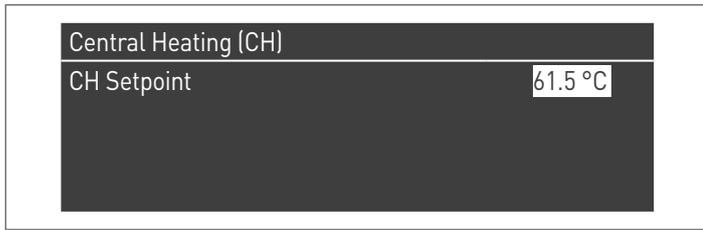
(Operation with room thermostat/heat demand and fixed heating setpoint)

In this mode, the thermal module operates with a fixed setpoint (controlled by the parameter3) based on whether the room/heat demand thermostat's contact is closed or not. The set-point value can be entered directly, without entering in the parameter list, by accessing the "CH" menu in the following way:

Press MENU and select "Central heating" using the ▲ / ▼ keys. Press the ● key to confirm.



After the selection, use the ► key to highlight the value and use the ▲ / ▼ keys to change the selected value. Press the ● key to confirm/save the new settings..

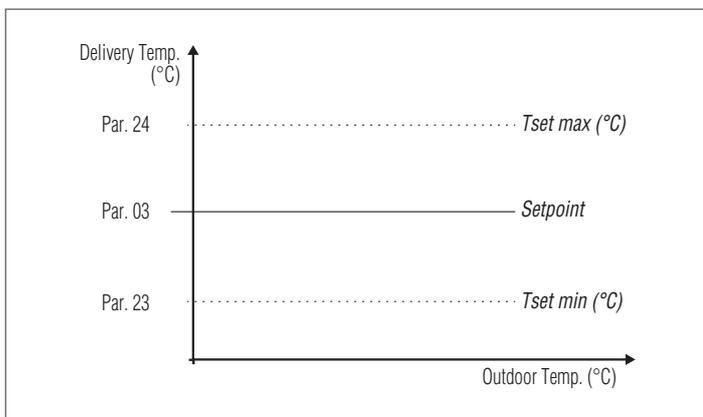


the set point can be set within a minimum and maximum value as indicated respectively on Par. 23 and 24 as shown in the figure.

The outdoor temperature sensor (accessory) is not required and if connected the outdoor temperature that is measured does not influence the setpoint that has been set.

The parameters regulating such temperature are:

| Par. No. | Description |
|----------|--------------------------------------------------------------------------------------------------------------------|
| 3 | Sets the desired flow temperature with heating mode. Active for the heating mode Par. 1 = 0 o 3 |
| 23 | Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 24 | Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |



Mode 1

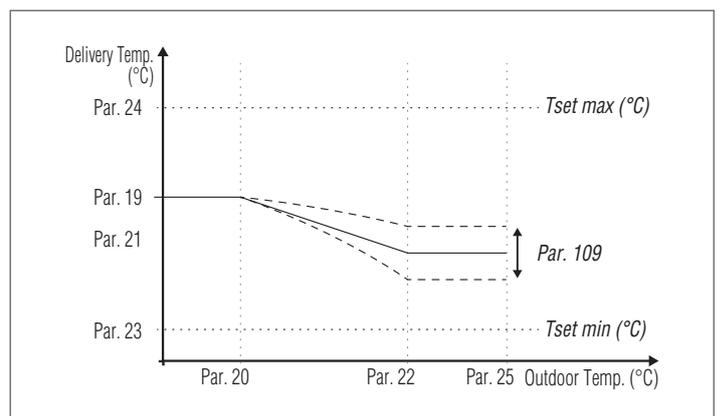
(Climatic functioning with room/heat demand thermostat, variable set point according to the outdoor temperature)

In this case the thermal module operates with a variable set-point depending on outdoor temperature based on a climatic curve defined by the following parameters:

| Par. No. | Description |
|----------|------------------------------------------------------------------------------------------------------------------------------|
| 185 | Parallel shift of direct Zone/Zone 1 climatic curve |
| 109 | Delivery temperature compensation at maximum external temperature in climate mode (Par. 1 = 1 or 2). |
| 190 | Outdoor temperature compensation factor |
| 19 | Establishes the max. set-point at the minimum outdoor temperature for climatic regulation |
| 20 | Establishes the minimum outdoor temperature to which the maximum set-point can be associated for climatic regulation |
| 21 | Establishes the minimum set-point at the maximum outdoor temperature for climatic regulation |
| 22 | Establishes the maximum minimum outdoor temperature to which the minimum set-point can be associated for climatic regulation |
| 23 | Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 24 | Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 25 | Defines the temperature at which climatic regulation is switched off |

Parameter 109 Comp. T. @ T.ext. Max

During in-between seasons, when the external temperature gets close to the maximum limit set in Par. 22, the delivery temperature calculated in the climatic curve could be different from the one suitable to meet the request. This parameter performs a non-linear correction of climatic curve to compensate such difference.



The demand is activated when the room/heat demand thermostat's contact is closed provided that outdoor temperature does not exceed the value set by the parameter 25.

if the outdoor temperature is higher than the one set on parameter 25 , the burner is stopped even if there is a heat demand. The climatic curve can also be adjusted in a simpler, more user-friendly way.

Parameter 190 (installer level)

Each building has its own thermal characteristics, therefore the time needed to set up the heating system can differ even among buildings located in the same area, with the same external temperature. By using this parameter it is possible to modify the heating system reactivity adapting its response to the thermal characteristics of the building and thus optimising the environmental comfort. Modifying the setting of this parameter (0-100%) increases or decreases the speed at which the delivery temperature changes according to the external temperature change. Setting a higher value will improve the building insulation. Example:

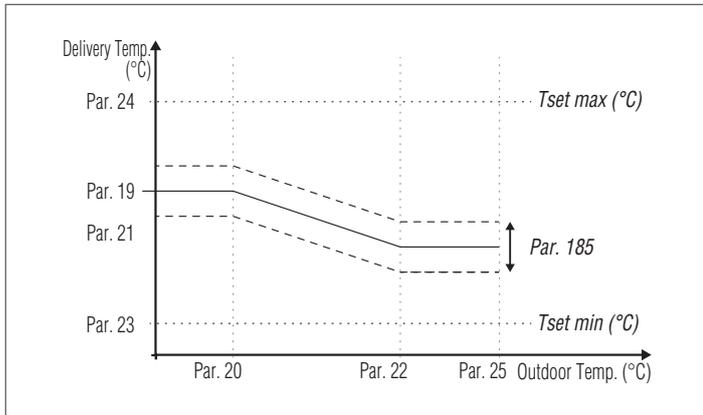
- 0%: The delivery temperature changes quickly when the external temperature changes.
- 100%: The delivery temperature changes slowly when the external temperature changes.

The demand is activated when the room/heat demand thermostat's contact is closed provided that outdoor temperature does not exceed the value set by the parameter 25.

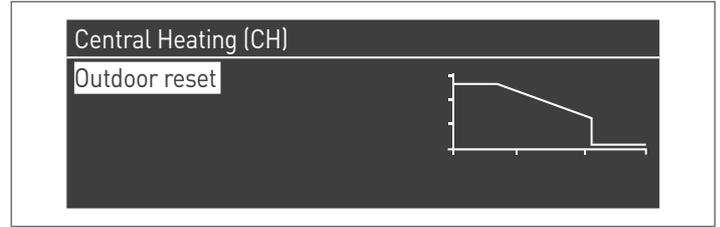
if the outdoor temperature is higher than the one set on parameter 25, the burner is stopped even if there is a heat demand.

Parameter 185 (installer level)

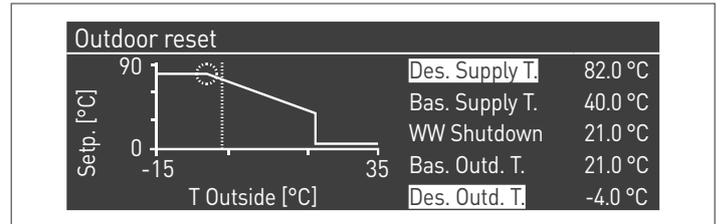
The parallel translation of the climatic curve is used to change the delivery temperature evenly for the entire outdoor temperature scale. Changing the value of this parameter corrects the climatic curve if the ambient temperature is too high (set a negative value) or too low (set a positive value). If the room has an Open Therm thermostat, this value is not taken into consideration. This parameter allows the user to directly and easily increase (positive value) or decrease (negative value) the delivery temperature to the heating system and thus the ambient temperature.



Enter the "CH" menu. The following display will appear:



Press the ● key to confirm and enter the climatic curve screen.



"Design Supply Temp." and "Design Outdoor Temp." will be displayed. To change their value, press the ● key.

- 1 Use the ▲ / ▼ keys to modify Design Supply Temp and the ◀ / ▶ keys to change Design Outdoor Temp.
- 2 Press ● to save changes
- 3 Use the ◀ / ▶ keys to select other values.

Repeat steps 1 from 3 to make other changes.

After setting the parameters, press the ESC key to exit the menu.

⚠ If the outdoor temperature sensor (accessory) is not detected (not installed or damaged) the system provides a warning: no. 202

The presence of the warning does not stop the thermal module allowing a heat request to be carried out at the maximum setpoint set on the climatic regulation.

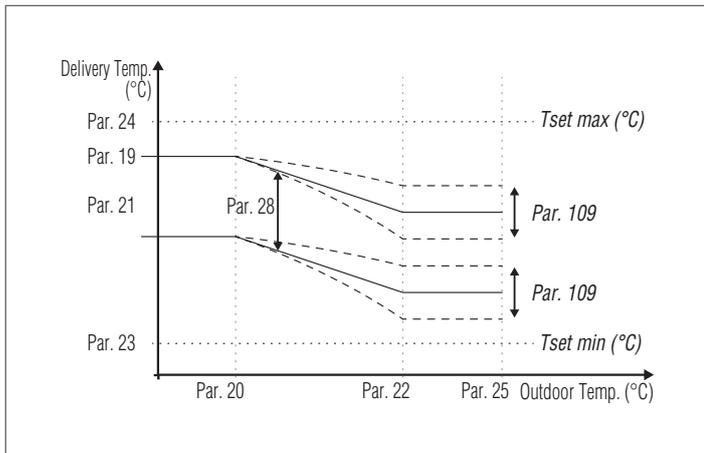
Mode 2

(Working on climatic mode with attenuation controlled by a room/heat demand thermostat, variable set point according to the outdoor temperature)

In this case the thermal module operates with a set-point defined by the climatic curve (which can be set in the same way as described in Mode 1) depending on outdoor temperature. Heat demand is actioned independently from whether the room/heat demand thermostat's contact is closed and stops only when the outdoor temperature is greater than the one defined by the parameter 25.

In this mode the parameter 28 defines by how many degrees the set-point is decreased (attenuation) when the room/heat demand thermostat's contact is opened.

| Par. No. | Description |
|----------|------------------------------------------------------------------------------------------------------------------------------|
| 109 | Delivery temperature compensation at maximum external temperature in climate mode (Par. 1 = 1 or 2). |
| 19 | Establishes the max. set-point at the minimum outdoor temperature for climatic regulation |
| 20 | Establishes the minimum outdoor temperature to which the maximum set-point can be associated for climatic regulation |
| 21 | Establishes the minimum set-point at the maximum outdoor temperature for climatic regulation |
| 22 | Establishes the maximum minimum outdoor temperature to which the minimum set-point can be associated for climatic regulation |
| 23 | Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 24 | Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 25 | Defines the temperature at which climatic regulation is switched off |
| 28 | Use the heating mode Par. 1= 2 or 3. Defines how many degrees the flow set point is lowered. |



Parameter 109 Comp. T. @ T.ext. Max

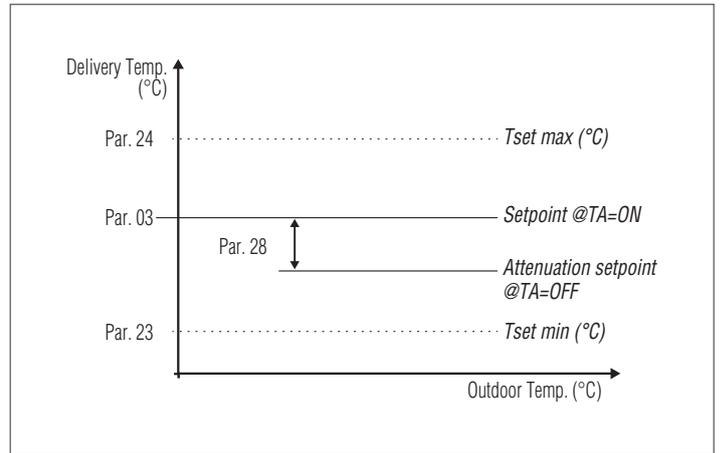
During in-between seasons, when the external temperature gets close to the maximum limit set in Par. 22, the delivery temperature calculated in the climatic curve could be different from the one suitable to meet the request. This parameter performs a non-linear correction of climatic curve to compensate such difference.

Mode 3

(Continuous fixed set-point operation with attenuation controlled by room/heat demand thermostat)

In this mode the fixed set-point is adjusted in the same way as described for Mode 0. The difference consists in the fact that the demand is always active and the set-point is decreased (attenuation) by the value defined by the parameter 28 when the room/heat demand thermostat's contact is opened.

| Par. No. | Description |
|----------|--------------------------------------------------------------------------------------------------------------------|
| 3 | Sets the desired flow temperature with heating mode. Active for the heating mode Par. 1 = 0 o 3 |
| 23 | Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 24 | Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4). |
| 28 | Use the heating mode Par. 1= 2 or 3. Defines how many degrees the flow set point is lowered. |



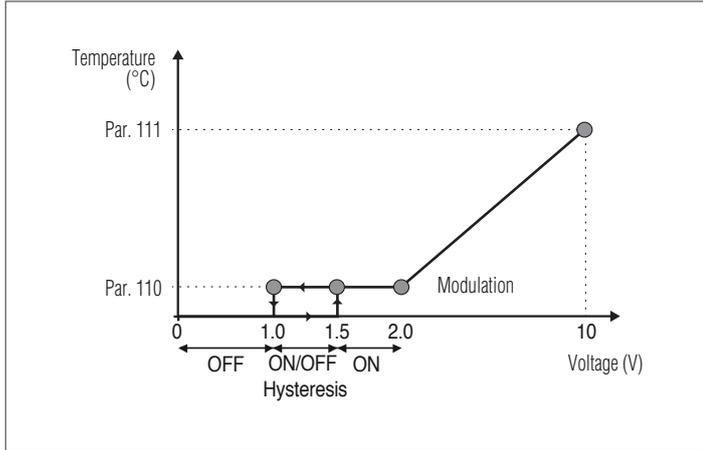
! The outdoor temperature sensor (accessory) is not required and if connected the outdoor temperature that is measured does not influence the setpoint that has been set.

Mode 4
(Set-point adjustment based on a 0-10V analogical input)

The parameters that control this mode are the following:

| Par. No. | Description |
|----------|---------------------------------------------------------------------------|
| 110 | Sets the minimum delivery temperature value in heating mode (Par. 1) = 4. |
| 111 | Sets the maximum delivery temperature value in heating mode (Par. 1) = 4. |

The operation set-point is adjusted on the basis of the following curve:



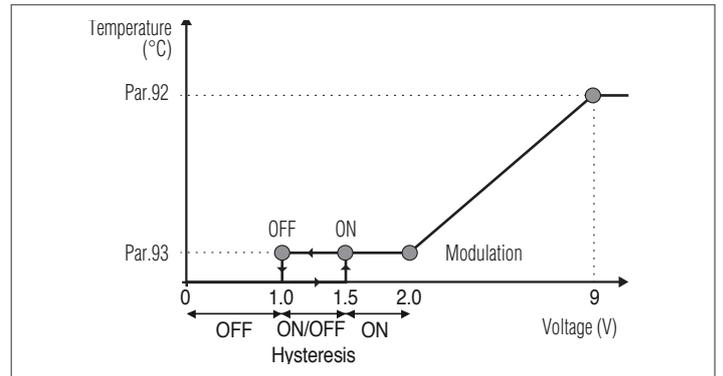
The maximum and minimum set-point values are defined respectively by Par. 111 and 110. When the value of the input voltage is greater than 1.5V, the request is activated (at minimum setpoint). For voltage values from 2 to 10, the setpoint varies linearly from the minimum to the maximum value. If the voltage falls from 10V to 2V, the setpoint falls linearly and keeps the minimum value between values 2 and 1V. For values lower than 1 V the demand ceases.

⚠ To activate the 0-10V analogue input it is necessary to disable the input of the room thermostat (TA). To do this, set the Par. 124 = 0 or else insert a jumper at the TA input (short-circuit the terminals 15-16).

Mode 5
(Adjusting the power based on an analogue input 0-10V)
In this operating mode, the power of the thermal unit (fan speed) is adjusted by an incoming analogue signal supplied by an external management system.
The parameters that control this mode are the following:

| Par. No. | Description |
|----------|-----------------------------------------------------------------------------------------------------|
| 92 | Defines the number of fan rpm at max. power (it depends on the model and is defined at Par. 98). |
| 93 | Defines the number of fan rpm at minimum power (it depends on the model and is defined at Par. 98). |

The power of the thermal unit is adjusted based on the following curve:



The maximum and minimum values of the number of revolutions of the fan are set by parameters 92 and 93 respectively. When the value of the input voltage reaches or is higher than 1.5V, the request is activated (Par. 93). The fan speed (thermal unit power) varies linearly in a range between 2.0 and 9.0 Volts. The fan speed varies linearly from minimum to maximum value for voltages between 2.0 and 9.0 volts. If the voltage falls from 9.0 to 2.0, the control point falls in a linear manner and maintains the minimum value between 2.0V and 1.0V. For values below 1 V demand is interrupted.

⚠ To activate the 0-10V analogue input it is necessary to disable the input of the room thermostat (TA). To do this, set the Par. 124 = 0 or else insert a jumper at the TA input (short-circuit the terminals 15-16).

3.2.5 Setting the domestic hot water parameters

The parameter 35 defines the various operation modes of the thermal module for DHW production

Mode 0
(No production of domestic hot water)

In this mode the thermal module will work only for the heating circuit (see paragraph "Setting the heating parameters")

Mode 1
(DHW production with storage tank and storage cylinder probe)

In this mode, the thermal module is activated when the temperature recorded by the storage cylinder probe falls below the DHW setpoint by an amount equal to the hysteresis value and is deactivated when the temperature rises above the DHW setpoint by the value of the hysteresis.

The parameters that control DHW production are the following:

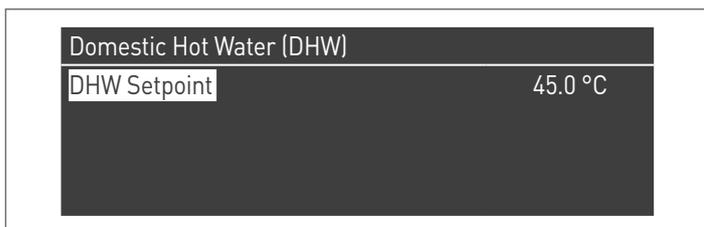
| Par. No. | Description |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| 36 | Defines the hysteresis to initiate the domestic hot water demand. |
| 37 | Defines the hysteresis to stop the domestic hot water demand. |
| 38 | Defines the primary circuit's set-point increase in degrees compared to the temperature set for the domestic hot water tank. |
| 39 | Defines the primary circuit's restart hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications). |
| 40 | Defines the primary circuit's shut-off hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications). |
| 48 | Establishes the DHW storage tank set-point. |

The setpoint value can be set directly, without entering the list of the parameters:

- Press MENU and select "Domestic Hot Water" using the ▲ / ▼ keys.



- Press the ● key to confirm.



- Use the ► key to highlight the value, and use the ▲ / ▼ keys to change the selected value. Press the ● key to confirm/save the new settings..

the DHW value can be changed only when the "domestic hot water" function is enabled. See paragraph "Password access" for instructions about outdoor recovery.

Mode 2
(DHW production with storage tank controlled by a thermostat)

In this case the thermal module is activated when the contact in boiler's thermostat is closed and is deactivated when the latter is opened.

The parameters that control DHW production are the following:

| Par. No. | Description |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 38* | Defines the primary circuit's set-point increase in degrees compared to the temperature set for the domestic hot water tank. |
| 39 | Defines the primary circuit's restart hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications). |
| 40 | Defines the primary circuit's shut-off hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications). |
| 41 | Defines the value referred to the Delta T of the tank for maintenance purposes. E.g.: if it is set on 3, when the tank has a set point lowered of 3 degrees, the module turns on at the minimum to allow maintenance till the set point plus hysteresis. If this parameter is equal to 36, this function is inactivated and the thermal module starts at the maximum sanitary power. |
| 48 | Establishes the DHW storage tank set-point. |

(*) Parameter 38 is active on such mode even if the tank probe is not installed and it influences the flow temperature of the module.

It can be used to limit the difference between the flow and set temperature on the tank thermostat so that the system efficiency is maximized.

Also in this case, the setpoint value can be set directly, without entering the parameters list, by accessing the "Domestic Hot Water" menu, as already earlier for mode 1.

Priority setting

The parameter 42 sets the priorities between the DHW and CH circuit.

Four modes are envisaged:

- 0 **Time:** timed priority between the two circuits. In the event of a simultaneous demand, initially the domestic hot water circuit is made to operate for a number of minutes equal to the value assigned to the parameter 43. At the end of this time period, the CH circuit is operated (also for the same amount of time) and so on until demand for one or the other circuit stops
- 1 **Off:** priority given to the heating circuit
- 2 **On:** priority allocated to the DHW circuit
- 3 **Parallel:** simultaneous operation of both circuits provided that the delivery temperature requested by the DHW circuit is lower than or equal to the setpoint requested by the heating circuit. When the temperature requested by the DHW circuit exceeds the heating setpoint, the circulation pump of the heating is turned off and priority is switched to the DHW.

Anti-Legionella function

When the domestic hot water production is active (only with Par. 35=1), using the parameters 107 and 108 it is possible to make a weekly programming of the "Anti Legionella" function.

Parameter 107 sets the day of the week on which the activity is performed, whilst parameter 108 sets the time.

At the planned time, the thermal module generates a heat demand for DHW storage tank with a pre-set set-point of 60°C (not adjustable). After reaching 60°C, the temperature is maintained for 30 minutes, during which the system checks that the probe's temperature does not fall below 57°C. At the end of this time interval, the Anti-Legionella function stops and standard operation of the thermal module is resumed.

Operation in "Anti-Legionella" mode has priority over other demands independently from the setting of the parameter 42.

| Par. No. | Description |
|----------|-------------------------------------------------------------------------------------|
| 107 | Sets the weekday on which the anti-Legionella procedure is carried out. |
| 108 | Sets the time of the day during which the anti-Legionella procedure is carried out. |

3.2.6 Scheduled programme

The Scheduled Programme is designed to program the operation of the various circuits managed by the thermal module, (CH, DHW and additional mixed zones).

Seasonal Programme

The Seasonal Programme is use to exclude additional mixed zones during the summer season.

It does not control any DHW parameter.

Holiday Programme

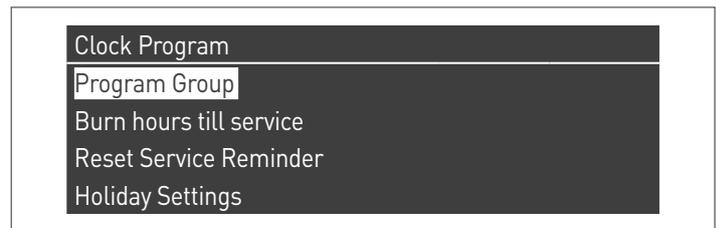
The Holiday Programme is used to exclude part of or all the circuits at a certain time of the year.

A holiday can be set both on the full system and on various groups of circuits.

The group system enables the user to add various circuits to the group to set a holiday period for several circuits at the same time. (For instance, to manage a semi-detached house with a centralised heating system when one of the two families is on holiday and the other is not).

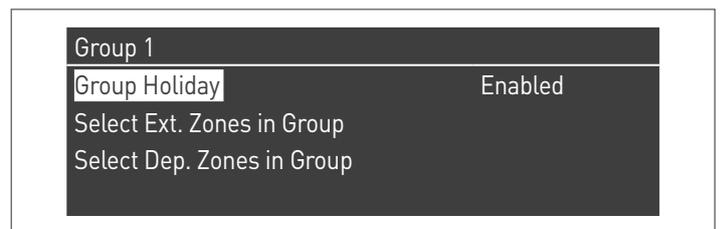
The set-point type can be adjusted so as to correspond to the desired setting.

The system can control up to a total of 16 "Mixed" zones. The programming of mixed areas is only allowed with an accessory. At the same time as these 16 areas, it is also possible to enable the CH zone (direct zone for central heating only).



The time programme includes the following parameters:

Group Programming



It enables the user to select a group to add zones to the selected group. It also enables the user to enable/disable the group in question.

Group settings are used to add zones to the groups.

The "Group programming" menu enables the use to chose among 8 groups. Each of them can be enabled or disabled.

Within it, it is possible to select zones to be added to the group (direct zone (CH) - mixed zones from 1 to 16)

| Select Ext. Zones in Group 1 | | |
|------------------------------|----|----------|
| External Zone | CH | Disabled |
| External Zone | 1 | Disabled |
| External Zone | 2 | Disabled |
| External Zone | 3 | Disabled |

N.B. The programming of mixed areas is only allowed with an accessory.

Heating programming

| Group 1 | |
|--------------------------|---------|
| Program Comfort Period | 1 |
| Comfort Setpoint | 28.0 °C |
| ECO Setpoint | 20.0 °C |
| Out of interval setpoint | Reduced |

It supports adjusting the time programme for the CH zones with the following parameters:

Period setting

Enables the user to select a period from 1 to 7. Period settings enable the user to adjust the active periods for this zone.

- **Active days:** Selection of the day (s) on which the period is active. Enables the user to disable the period set for one or more days. When this parameter is set as inactive, the other items on this menu are no longer used and hidden from the view. The choice of active days is between the following macro-groups: Sat-Sun, Mon-Fri, Mon-Sun, or individual days: Mon, Tue, Wed,...
- **Interval 1 (hidden if Active Days is disabled):** This parameter allows the user to regulate the starting and end time of the period. The starting time must always be before the finishing time.
- **Interval 2 (hidden if Active Days is disabled):** Same as interval 1. Interval added for the activated period.
- **Interval 3 (hidden if Active Days is disabled):** Same as interval 1. Interval added for the activated period.

| External Zone CH - Period 1 | | |
|-----------------------------|--------|-------|
| Active Day(s) | Sunday | |
| Interval 1 | 00:00 | 00:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

Comfort Set-point

Comfort temperature to be used when the zone is in a certain period. (10 -30 °C).

ECO set-point

ECO temperature. Adjustable temperature that can be used outside set periods (5 - 20 °C).

Set-points outside the interval

Selection of the type of set-point to be used when a zone is not on a set period by selecting between:

- Off
- Comfort
- Eco
- Anti-Freeze (is activated below 5°C NON-ADJUSTABLE)
- Reduced (Calculated as -10°C Comfort Set-point value)

DHW setting

| Group 1 | |
|--------------------------|----|
| Program Comfort Period | 1 |
| Out of interval setpoint | On |

It supports adjusting the time programme for the DHW zone.

Period setting

Enables the user to select a period from 1 to 7. Period settings enable the user to adjust the active periods for this zone.

- **Active days:** Selection of the day (s) on which the period is active. Enables the user to disable the period set for one or more days. When this parameter is set as inactive, the other items on this menu are no longer used and hidden from the view. The choice of active days is between the following macro-groups: Sat-Sun, Mon-Fri, Mon-Sun, or individual days: Mon, Tue, Wed,...
- **Interval 1 (hidden if Active Days is disabled):** This parameter allows the user to regulate the starting and end time of the period. The starting time must always be before the finishing time.
- **Interval 2 (hidden if Active Days is disabled):** Same as interval 1. Interval added for the activated period.
- **Interval 3 (hidden if Active Days is disabled):** Same as interval 1. Interval added for the activated period.

| External Zone DHW - Period 1 | | |
|------------------------------|--------|-------|
| Active Day(s) | Sunday | |
| Interval 1 | 00:00 | 00:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

Set-points outside the interval

Selection of the type of set-point to be used when a zone is not on a set period by selecting between:

- Off
- On

Holiday setting

| Holiday Settings | |
|------------------|-------|
| Mode | Group |
| Group | 1 |

Enables the user to change parameters for the Holiday Programme.

Mode

Select the Holiday programme mode. It can be set to Off, System or group.

Off

Disabled programme

Group

it enables the selection of the group (1 – 8).

As part of group selection, the Holiday Group is displayed with the following parameters:

- **Holiday set-point:** Set-point type to be used for the selected group. All zones in this group shall use this set-point if the current date is between the start and end date of the holiday period, but only if the group is enabled in the group settings menu, and can be selected from: Off, Comfort, Eco, Anti-freeze and Reduced.
- **Start date / End date (Day DD-MM-YEAR):**

| External Zone DHW - Period 1 | | |
|------------------------------|--------|-------|
| Active Day(s) | Sunday | |
| Interval 1 | 00:00 | 00:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

- **System:** It enables the user to select the holiday programme for the entire system. In this mode, the set-point is common to all system groups.

| External Zone DHW - Period 1 | | |
|------------------------------|--------|-------|
| Active Day(s) | Sunday | |
| Interval 1 | 00:00 | 00:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

- **Holiday set-point (hidden if the Mode is set to "Off"):** Type of reference to be used when system mode is selected. This set-point is used for all areas. Only used for the holiday system.

Seasonal setting

Enables the user to change parameters for the Seasonal Programme.

The seasonal programme is used to define a period of inactivity for the heating system. This menu includes the following elements:

Mode

Selects how the seasonal programme must verify whether heating can be allowed or not. It can be set on:

- **Off:** it means that the seasonal programme is ignored and (CH) heat demand is always allowed throughout the year.

| Season Settings | |
|-----------------|-----|
| Mode | Off |

- **At date:** excludes heating (CH+zone) when the current date is included between the start and the end dates.

| Season Settings | |
|-----------------|---------|
| Mode | On Date |
| Begin Date | 15-04 |
| End Date | 15-09 |

- **At Temp:** excludes heating (CH+zone) when the outdoor temperature is higher than the selected temperature. (Ext. deactivation T: 0.0 °C/50 °C)

| Season Settings | |
|---------------------|---------|
| Mode | On Temp |
| Outdoor Temp. Below | 25.0 °C |

3.2.7 Thermal module information

In order to display key information on the screen, press the menu key and select "Information" with the ▲ / ▼ keys.



Press the ● key to confirm.

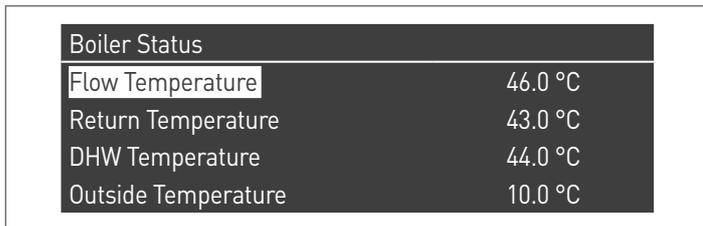
The following screen will be displayed:



By selecting "Boiler status" and pressing the ● key, the following values are displayed:

- Delivery temperature
- Return temperature
- DHW temperature (the sensor must be connected in order to display a value; if it is not present, the default value is displayed)
- Outdoor temperature
- Flue gas temperature
- System temperature (the sensor must be connected in order to display a value; if it is not present, the default value is displayed)
- Fan speed
- Ionization
- State
- Error

A The display shows four lines at a time. You can scroll the list by using the ▲ / ▼ keys.



By selecting "Boiler log" and pressing the ● key, the following values are displayed:

- Firing OK
- No firing
- No flame det.
- Oper. days
- Heat. burner hours
- DHW burner hours



You can scroll the list by using the ▲ / ▼ keys.

By selecting "Error log" and pressing the ● key, the following values are displayed:

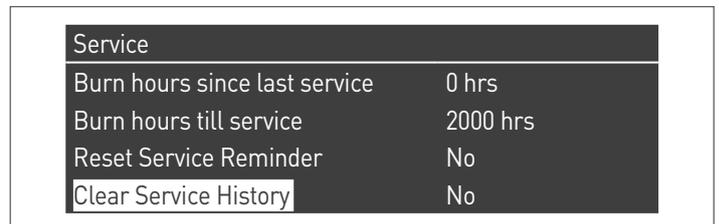
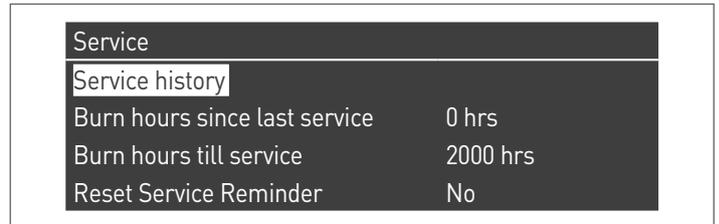
- Error log (the errors listed in paragraph "Manual error list" are displayed)
- Error filter (in the "Error filter" item, it is possible to select: Disabled - Vol. Err. - Block)
- Erase Error Log (allowed only with Installer password)



You can scroll the list by using the ▲ / ▼ keys.

By selecting "Maintenance" and pressing the ● key, the following values are displayed:

- Maintenance log (each time a "Maintenance reminder reset" is performed, the event is logged)
- Oper. hours since last Maint.
- Oper. hours until next Maint
- Maintenance reminder reset (accessible only with installer password)
- Delete Maint. history (accessible only with OEM password)



You can scroll the list by using the ▲ / ▼ keys.

3.2.8 Flow meter parameters configuration (accessory)

Choose the flow meter to be installed according to the ΔT of operation of the thermal module.

| | TAU Unit | |
|---------------------------------|----------|-------|
| | 140 | 190 |
| $\Delta T = 20^{\circ}\text{C}$ | DN 25 | DN 32 |
| $\Delta T = 15^{\circ}\text{C}$ | DN 25 | DN 32 |
| $\Delta T = 10^{\circ}\text{C}$ | DN 32 | DN 32 |

After installing the flow meter accessory following the instructions provided, set the following parameters:

| Par. No. | Description | Parameter setting |
|----------|---------------|-----------------------|
| 117 | Prog Input 2. | 3 = Heating flowmeter |

| Par. No. | DN 25 | DN 32 | UM |
|----------|-----------|--------|-------|
| 129 | HUBA DN25 | BITRON | |
| 130 | - | 0,6 | |
| 140 | 11(*) | 16(*) | l/min |

(*) Recommended value

3.2.9 Flow switch configuration

After connecting the flow switch to terminals 21-22 of terminal board M01, set parameter 117 = 4 (heating flow switch).

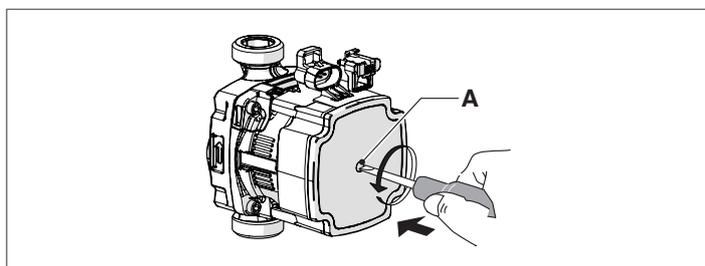
3.3 Checks during and after initial start-up

When the appliance it started, it must be checked by stopping and then restarting the thermal module in the following way:

- Set the operating mode of the thermal module in heating to 0 (Par. 1) e and close the RT input to generate a heat request



- If required, increase the set-point value (CH → Heating Set-point)
- Check that the pump turns freely as deposits and/or residue may prevent this from happening, especially after long periods of inactivity;

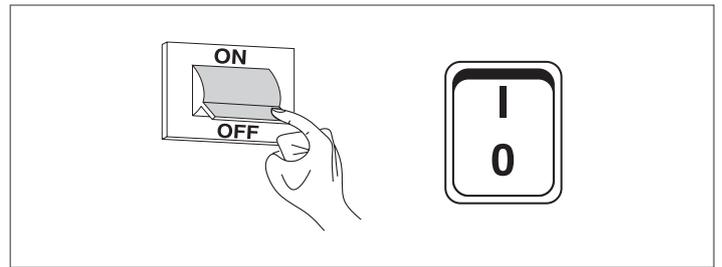


Releasing the pump shaft (if necessary)

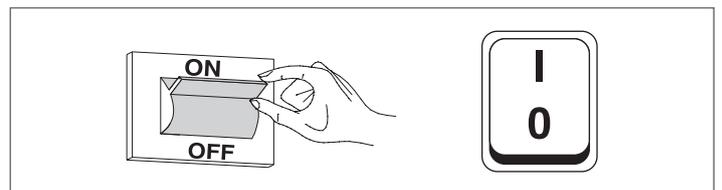
- insert a screwdriver in the hole (A) in the pump.
- press and turn the screwdriver to release the driveshaft.

⚠ Take extreme care when doing this so as not to damage the components.

- Check the full stop of the thermal module and the heat demand by opening the "RT" contact (OFF).
- Check that the thermal module has come to a complete stop by setting the main switch of the equipment and the main switch of the system to "off".

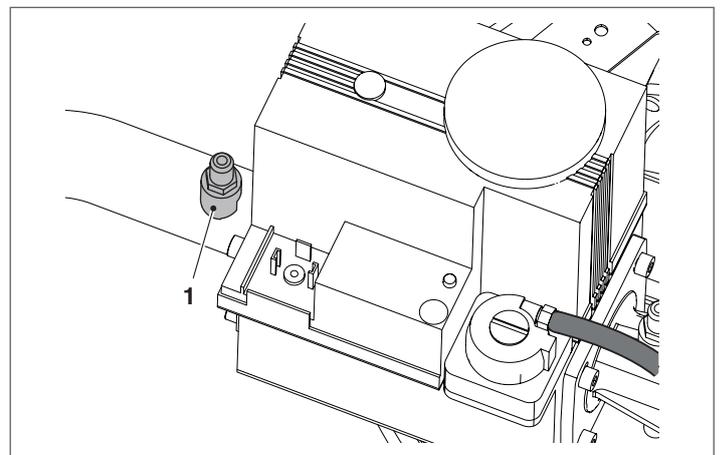


If all conditions are met, power the thermal module by setting the system's and the appliance's master switches to "On" and test combustion products (see Paragraph "Adjustments").

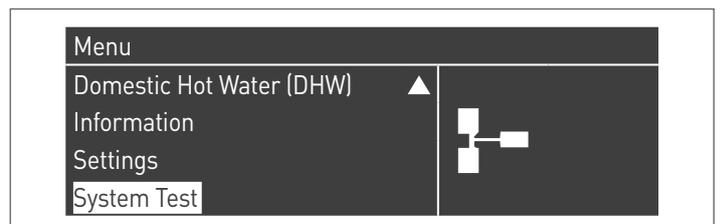


SUPPLY GAS PRESSURE CHECK

- Turn the main system switch "off"
- Remove the locking screws and the panel's front side
- Loosen by about two turns the pressure inlet screw (1) upstream of the gas valve and connect the pressure gauge



- Power the thermal module by setting the system's and the appliance's master switches to "On".
- Press the MENU key, select "System test" and press ● to confirm.



- select "Max. power" with the ▲ / ▼ keys and press ● to confirm. The fan starts turning at its maximum speed (which can vary based on the model).
- The equipment will work at maximum power (chimney sweep function)
- Check that the nominal pressure of the supply gas is that indicated in the table

| DESCRIPTION | G20 | G31 | |
|-------------------------|------|------|-------------------|
| Wobbe index | 45.7 | 70.7 | MJ/m ³ |
| Nominal supply pressure | 20 | 37 | mbar |

After the checks:

- select "OFF" with the ▲ / ▼ keys and press ● to confirm.
- Disconnect the pressure gauge and tighten again the pressure test point screw (1) upstream from the gas valve.

| System Test | |
|-------------|--------|
| Test State | Off |
| Fan Speed | 0 rpm |
| Ionisation | 0.0 µA |

- Fulfil the operations, place back the front panel and lock the locking screws.

3.4 Error List

When a display has a technical fault, a numeric error code appears that will enable the maintenance operator to identify the possible cause.

There are 3 categories of errors:

- 1 Permanent: errors that require a manual reset
- 2 Temporary: errors that are automatically reset once the cause that generated them is removed or stopped
- 3 Notices: simple warnings that do not block the appliance's operation

| System Test | |
|-------------|------------|
| Test State | High Power |
| Fan Speed | 0 rpm |
| Ionisation | 0.0 µA |

3.4.1 Permanent Errors

| Nr. | Error | Description |
|-----|------------------------|-----------------------------------------------------------------------------------------------------------------|
| 0 | E2PROM_READ_ERROR | Internal software error |
| 1 | IGNIT_ERROR | Three unsuccessful ignition attempts in a row |
| 2 | GV_RELAY_ERROR | Failure detected in the GV relay |
| 3 | SAFETY_RELAY_ERROR | Failure detected in safety relay |
| 4 | BLOCKING_TOO_LONG | Control had a blocking error for more than 20 hours |
| 5 | FAN_ERROR_NOT_RUNNING | Fan is not running for more than 60 seconds |
| 6 | FAN_ERROR_TOO_SLOW | Fan runs too slow for more than 60 seconds |
| 7 | FAN_ERROR_TOO_FAST | Fan runs too fast for more than 60 seconds |
| 8 | RAM_ERROR | Internal software error |
| 9 | WRONG_EEPROM_SIGNATURE | Contents of Eeprom is not up to date |
| 10 | E2PROM_ERROR | Wrong safety parameters in Eeprom |
| 11 | STATE_ERROR | Internal software error |
| 12 | ROM_ERROR | Internal software error |
| 15 | MAX_TEMP_ERROR | The external overheat protection is enabled or the T_Supply sensor measures a temperature of over 100°C (212°F) |
| 16 | FLUE_GAS_ERROR | Flue temperature exceeded the maximum flue temperature |
| 17 | STACK_ERROR | Internal software error |
| 18 | INSTRUCTION_ERROR | Internal software error |
| 19 | ION_CHECK_FAILED | Internal software error |
| 20 | FLAME_OUT_TOO_LATE | Flame still present 10 seconds after closing the gas valve |
| 21 | FLAME_BEFORE_IGNIT | Flame is detected before ignition |
| 23 | CORRUPTED_ERROR_NR | Error code RAM byte was corrupted to an unknown error code |
| 29 | PSM_ERROR | Internal software error |
| 30 | REGISTER_ERROR | Internal software error |

3.4.2 Temporary Errors

| Nr. | Error | Description |
|-----|--------------------------------|-----------------------------------------------------------------------|
| 100 | WD_ERROR_RAM | Internal software error |
| 101 | WD_ERROR_ROM | Internal software error |
| 102 | WD_ERROR_STACK | Internal software error |
| 103 | WD_ERROR_REGISTER | Internal software error |
| 106 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 107 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 108 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 109 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 110 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 111 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 112 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 113 | REFHI_TOO_HIGH / REFHI_TOO_LOW | Internal software error |
| 114 | FALSE_FLAME | Flame is detected in a state in which no flame is allowed to be seen. |
| 115 | LOW_WATER_PRESSURE_ERROR | Water pressure error |
| 118 | WD_COMM_ERROR | Watchdog communication error |
| 119 | RETURN_OPEN | Return sensor open |
| 120 | SUPPLY_OPEN | Supply sensor open |
| 122 | DHW_OPEN | DHW sensor open |
| 123 | FLUE_OPEN | Flue sensor open |
| 126 | RETURN_SHORTED | Return sensor shorted |
| 127 | SUPPLY_SHORTED | Supply sensor shorted |
| 129 | DHW_SHORTED | DHW sensor shorted |
| 130 | FLUE_SHORTED | Flue sensor shorted |
| 133 | Net Freq Error | Net. freq. error detected by the watchdog |
| 134 | RESET_BUTTON_ERROR | Too many resets in a short time period |
| 163 | T_SELECTION1_OPEN | Heat exchanger's flow rate too low |

3.4.3 Warnings

| Nr. | Error | Description |
|-----|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| 200 | CC_LOSS_COMMUNICATION | Cascade system: the burner of the managing module has lost the signal of one of the depending thermal module burner |
| 201 | CC_LOSS_COMMUNICATION | Cascade system: the managing module has lost the signal of one of the depending thermal module |
| 202 | OUTDOOR_WRONG | Outdoor sensor is open or shorted |
| 203 | T_SYSTEM_WRONG | T_System sensor is open or shorted |
| 204 | T_CASCADE_WRONG | T_Cascade sensor is open or shorted |

3.5 Conversion from one type of gas to the other

The boiler **TAU Unit** is delivered set up to operate with G20 (methane gas), however it can be converted to operate with the following gases:

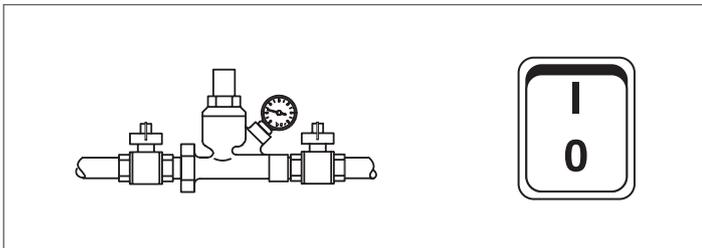
| methane | Country | TAU Unit 140 | TAU Unit 190 |
|---------|----------------|--------------------------------------------------------------------------------------------------|--------------|
| G25 | BE | No kit expected. No gas regulation / parametrization allowed. | |
| | FR | Without gas valve diaphragm. Regulation/ modification of the parametrization as described below. | |
| G31 | EN FR CH | Replace the diaphragm. Regulation/ modification of the parametrization as described below. | |

⚠ Note that all modifications to the gas feed system are forbidden in Belgium. In Belgium, contact **RIELLO's** Technical Assistance Service.

⚠ Conversions must only be performed by qualified personnel from **RIELLO's** Technical Assistance Service, even after the boiler has been installed.

Before making the transformation:

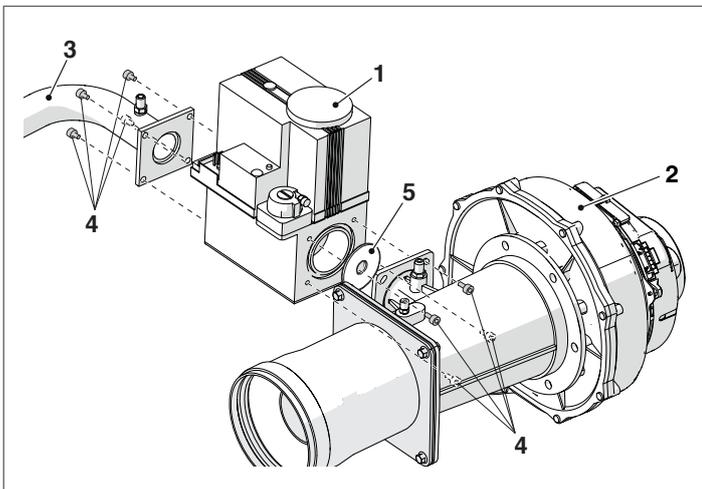
- Cut power off by setting the main switch of the system and of the thermal module to "off"
- Close the fuel shut-off valve



- Disassemble the gas valve (1) from the Venturi unit (2) and from the gas conveyance pipe (3), loosening the screws (4)

For G31:

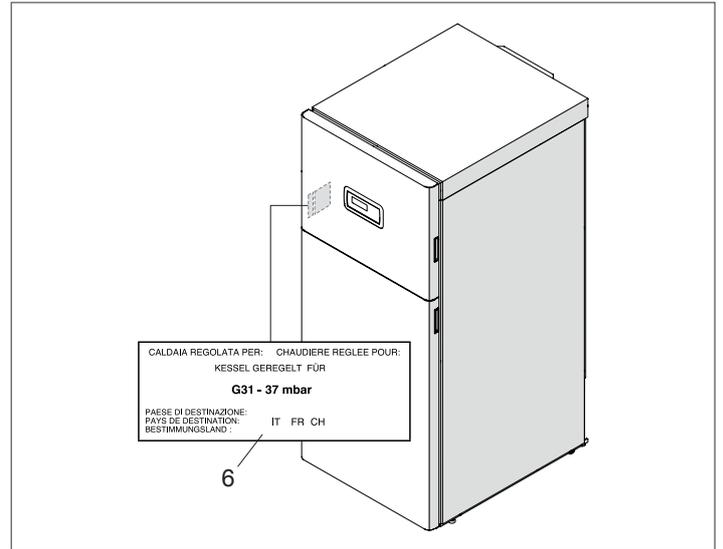
- Replace the diaphragm (5) on the gas valve with the one supplied in the material bag.



The table shows the various diaphragm diameters calibrated according to the type of gas and the type of boiler.

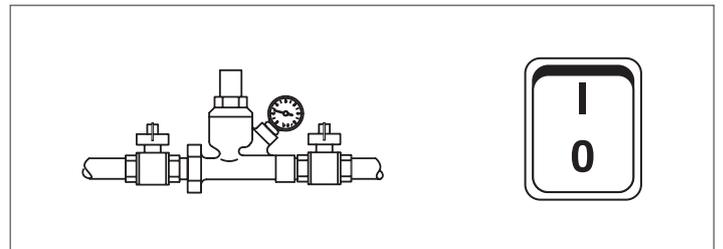
| methane | TAU Unit 140 | TAU Unit 190 |
|---------|--------------|--------------|
| G20 | 14,2 | 17,5 |
| G31 | 9,9 | 12,4 |

- Refit the parts in reverse order
- Apply the new gas sticker (6) supplied inside the paneling, and remove the one for G20



⚠ After installing the kit, check the tightness of all connections made.

If all conditions are met, power the thermal module positioning the main switch of the system and of the equipment to "on". Open the fuel shut-off valve.



⚠ Once the conversion has been carried out, adjust the boiler again following what is set out in the paragraph "Adjustments".

⚠ The pressure values for the gas supply are:

- for G20 = 20 mbar
- for G25 = 25 mbar
- per LPG (G31) = 37 mbar

3.5.1 Parameter configuration for changing the type of gas used

⚠ By changing the value of parameter 98 the settings of parameters 123, 125 and 128 will return to factory settings.

| Par. 97 | Par. 98 | TAU Unit 140 | | | TAU Unit 190 | | | Par. 92 | Par. 93 | Par. 94 | Par. 191 |
|---------|---------|--------------|-----|-----|--------------|-----|-----|---------|---------|---------|-----------|
| | | G20 | G25 | G31 | G20 | G25 | G31 | | | | |
| 24 | 38 | x(*) | | | | | | 4750 | 1050 | 3200 | NRG175_5% |
| 24 | 39 | | x | | | | | 4850 | 1100 | 3200 | NRG175_5% |
| 24 | 40 | | | x | | | | 4800 | 1050 | 3200 | NRG175_5% |
| 25 | 41 | | | | x(*) | | | 4900 | 1100 | 3200 | G1G170_5% |
| 25 | 42 | | | | | x | | 5100 | 1100 | 3200 | G1G170_5% |
| 25 | 43 | | | | | | x | 4800 | 1050 | 3200 | G1G170_5% |

(*) FACTORY SETTING

⚠ The settings of parameters 92, 93, 94 relate to TYPE B appliance configuration.

Configuration of fan parameters for type C appliance configurations

Change the following parameters depending on the type of appliance configuration and gas used.

| | methane | TAU Unit 140 | | | TAU Unit 190 | | |
|-------------------|---------|--------------|---------|---------|--------------|---------|---------|
| | | Par. 92 | Par. 93 | Par. 94 | Par. 92 | Par. 93 | Par. 94 |
| Split ducts (*) | G20 | 4750 | 1050 | 3200 | 4900 | 1100 | 3200 |
| | G25 | 4850 | 1100 | 3200 | 5100 | 1100 | 3200 |
| | G31 | 4800 | 1050 | 3200 | 4800 | 1050 | 3200 |
| Coaxial ducts (*) | G20 | 4950 | 3200 | 1100 | - | - | - |
| | G25 | 5100 | 3200 | 1100 | - | - | - |
| | G31 | 4950 | 3200 | 1100 | - | - | - |

(*) The relevant kit must be installed for these configurations (for its installation follow the instructions supplied with the accessory)

3.6 Adjustments

The thermal module **TAU Unit** is supplied for operation with G20 (methane gas), as indicated by the type plate, and has already been factory-calibrated by the manufacturer.

If it is necessary to adjust it again, for example after extraordinary maintenance, after the replacement of the gas valve or after a conversion from G20 gas to G25/G31 or vice-versa, carry out the procedure below.

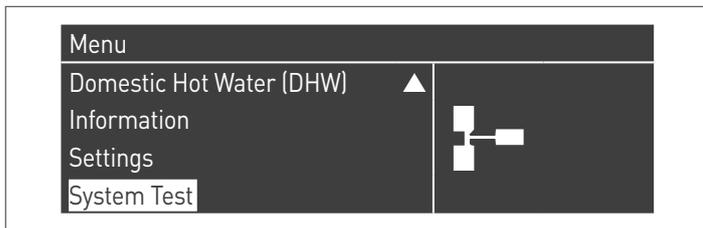
⚠ Adjustments to maximum and minimum power must be performed in the indicated sequence and only by Technical Assistance Service.

Before making the regulation:

- remove the upper panel

CO2 ADJUSTMENT AT MAXIMUM POWER

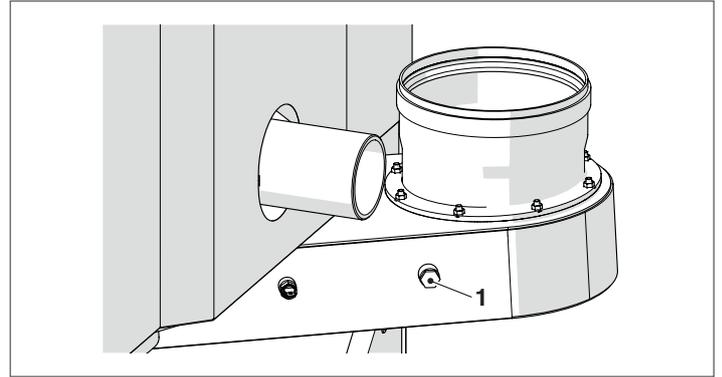
- Press the MENU key, select "System test" and press ● to confirm.



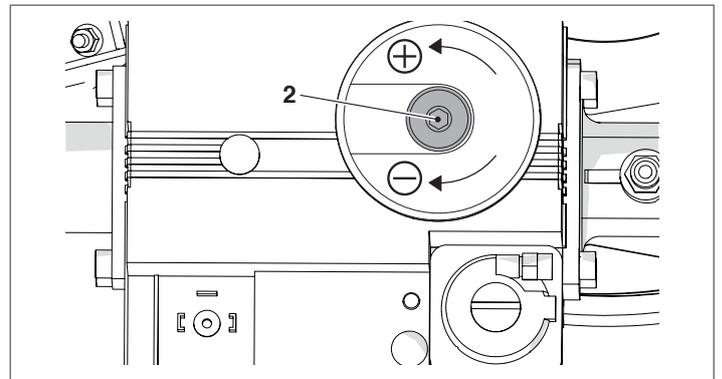
- select "Max. power" with the ▲ / ▼ keys and press ● to confirm. The fan starts turning at its maximum speed (which can vary based on the model).



- the appliance will operate at maximum power.
- unscrew the cap (1) and insert the combustion analyser sensor



- Adjust the CO2 using an Allen wrench on the adjustment screw (2) on the gas valve, so as to obtain a value listed in the table. Going clockwise the CO2 diminishes, going anti-clockwise the CO2 increases.



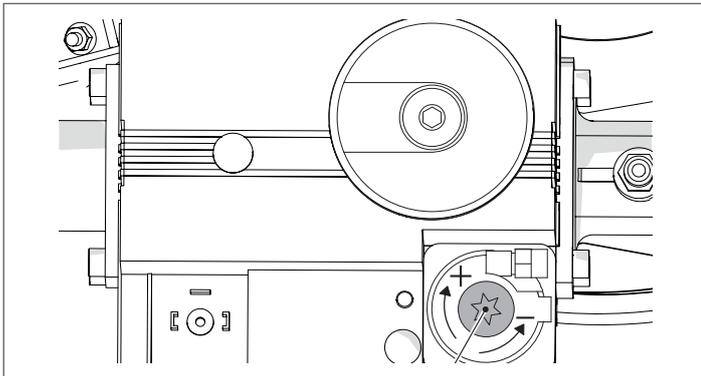
| Gas type | TAU Unit 140 | TAU Unit 190 |
|----------|--------------|--------------|
| G20 | 8,9/9,1 | 8,9/9,1 |
| G25 | 8,9/9,1 | 8,9/9,1 |
| G31 | 9,9/10,1 | 9,9/10,1 |

CO2 ADJUSTMENT AT MINIMUM POWER

- Select "Min. power" with the ▲ / ▼ keys and press ● to confirm.

| System Test | |
|-------------|-----------|
| Test State | Low Power |
| Fan Speed | 0 rpm |
| Ionisation | 0.0 µA |

- the appliance will operate at minimum power.
- Adjust the CO2 using a TORX wrench on the adjustment screw (3) on the valve, so as to obtain a value listed in the table. Going clockwise the CO2 diminishes, going anti-clockwise the CO2 increases..



| Gas type | TAU Unit 140 | TAU Unit 190 |
|----------|--------------|--------------|
| G20 | 8,9/9,1 | 8,9/9,1 |
| G25 | 8,9/9,1 | 8,9/9,1 |
| G31 | 9,9/10,1 | 9,9/10,1 |

CHECKING THE CALIBRATION

Select the "Max. power" value, wait until speed stabilises and check that CO2 correspond to required ones.

After the checks:

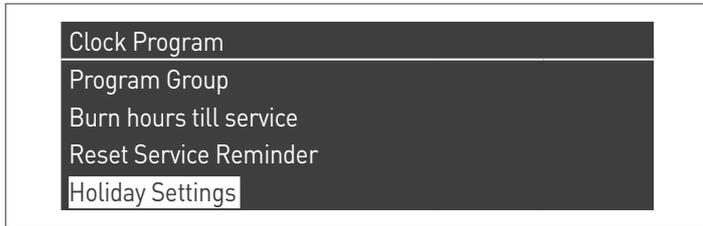
- select "OFF" with the ▲ / ▼ keys and press ● to confirm.
- remove the analyser sensor and carefully retighten the cap (1)
- place back the front panel and lock the locking screw.

| System Test | |
|-------------|--------|
| Test State | Off |
| Fan Speed | 0 rpm |
| Ionisation | 0.0 µA |

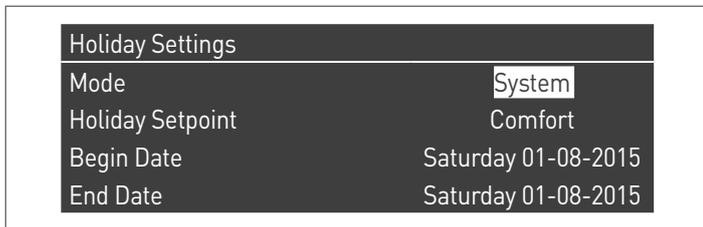
3.7 Temporary or short-term shut-down

In the event of temporary or short-term shut-down (e.g. due to holidays), proceed as follows:

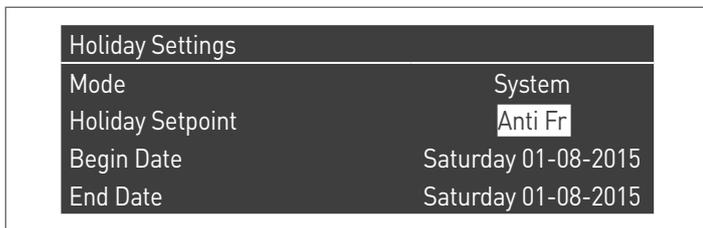
- Press the MENU key and select with keys ▲ / ▼ "Time schedule", confirm with key ●.
- Select with keys ▲ / ▼ "Holiday Schedule" and confirm with key ●.



- Select with keys ▲ / ▼ "Mode" and confirm with key ●. Select "System" mode and confirm.



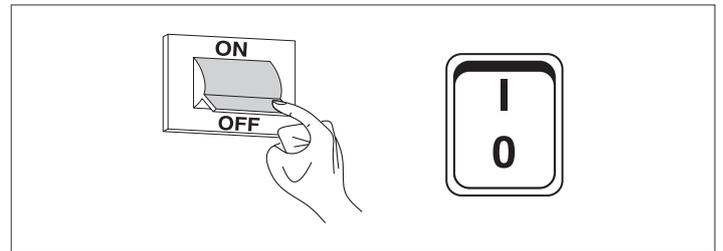
- Select with keys ▲ / ▼ "Holiday Setpoint" and confirm with key ●.
- Select "Antifreeze" holiday setpoint and confirm.



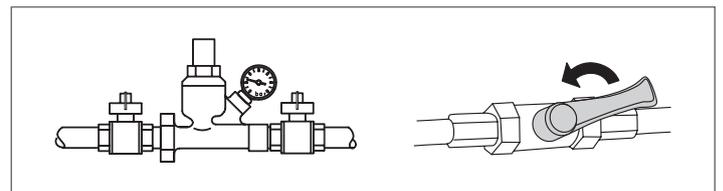
3.8 Preparing for extended periods of disuse

Long periods of inactivity of the thermal module **TAU Unit** imply the following operations to be carried out:

- position the main switch of the thermal module and of the system to "off"



- close the fuel valves and the water valves of the thermal and DHW system.



! Empty the thermal and sanitary system if there is a danger of frost.

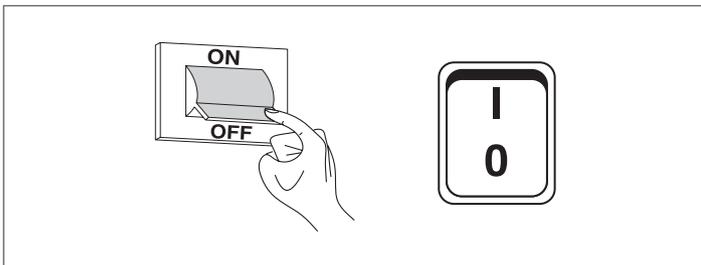
3.9 Cleaning and maintenance

It is essential to clean the boiler and remove carbon deposits from the surfaces of the heat exchanger in order to keep the boiler efficient and economical.

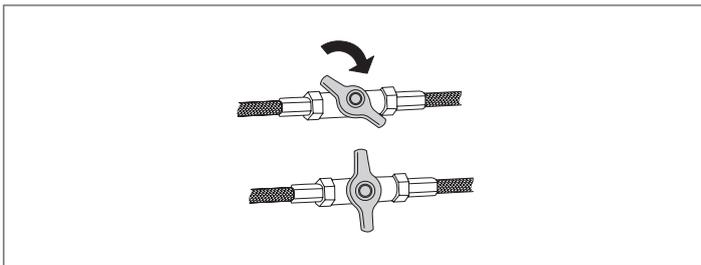
- ⚠** All cleaning operations MUST be performed under the following conditions:
- boiler cold
 - boiler switched OFF
 - Suitable personal protection equipment

Perform the following operations before beginning any maintenance or cleaning:

- set the main switch of the equipment to (0) and the main switch of the system to (OFF);



- close the fuel shut-off valves outside the equipment.



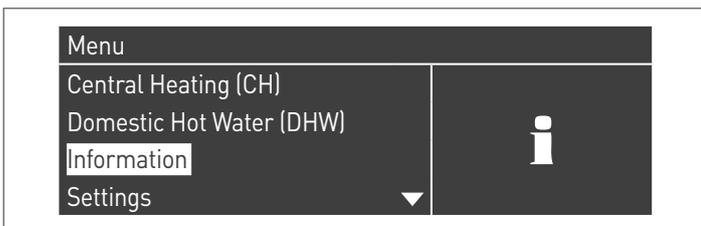
3.9.1 "Service reminder" function

The thermal module is fitted with a function that reminds the user of the need to carry out planned maintenance on the appliance after a number of hours defined in the maintenance plan.

When this maintenance activity is required, the following text appears on the normal display: **"Maintenance required!"**

This text will remain active until the technical support service resets the internal meter after maintaining the appliance.

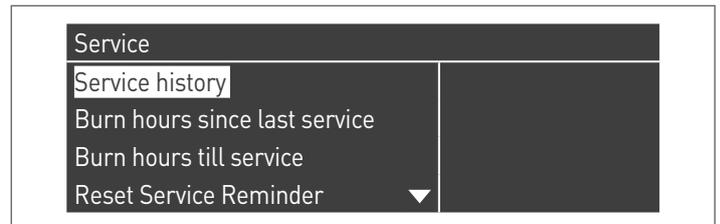
The user can check at any time how many hours miss from the next planned maintenance activity by accessing the "Information" menu



and selecting "Maintenance" using the ▲ / ▼ arrows



The menu also shows the hours from the last maintenance activity performed and access to a log that lists the dates of the last 15 maintenance activities.



The "Settings" → "Boiler set." → "Maintenance" menu contains the advanced controls for this function, which, in any case, are only available if you access it with the manufacturer password. If it is necessary to use this access level, contact the Technical Assistance Service.

3.9.2 Annual cleaning

It is mandatory to perform maintenance and cleaning of the device at least once a year.

- ⚠** The non-performance of the annual maintenance will invalidate the warranty.

This operation, carried out by Technical Assistance Service or by professionally qualified personnel, is necessary to monitor and ensure that the flue pipes inside and outside of the device, the fan, the safety valves, the condensate removal devices, the water drainage tubes and all the measurement and control devices are in perfect working order.

Table of the compulsory maintenance activities (to be performed every 2000 working hours or at least once a year)

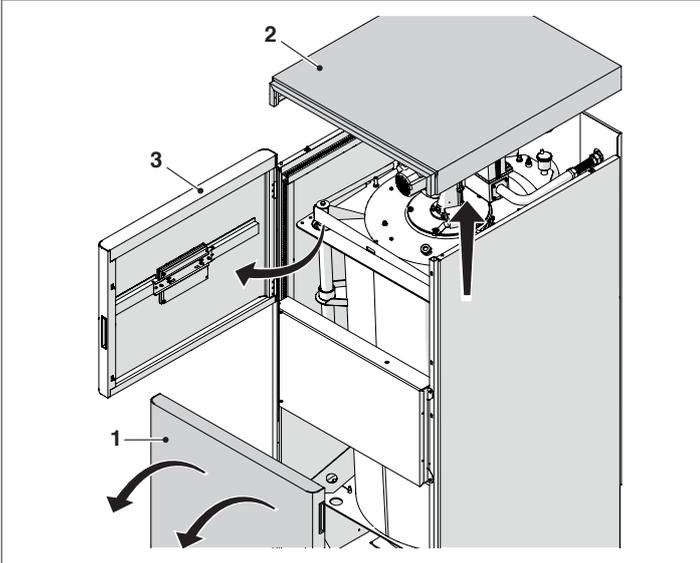
| |
|-------------------------------------------------------------------------------------------------------------------|
| Make the combustion test |
| Check the conditions of the inlet pipes (if present) and the flue pipes by making sure that no leakage is present |
| Check the ignition electrode |
| Clean the combustion chamber and check the conditions of the gaskets you have dismantled during such operation |
| Clean the condensate discharge pipe |
| Check the parameters settings |
| Check if there is any gas leakage |
| Check if there is any leakage on the hydraulic connections |
| Check the integrity of the cabling system and its related connections |
| Make sure the ignition takes place regularly |
| Make sure that there is the flame after ignition |
| Check the safety devices down the equipment |
| Check the system pressure |

3.10 Lifting combustion chamber closing

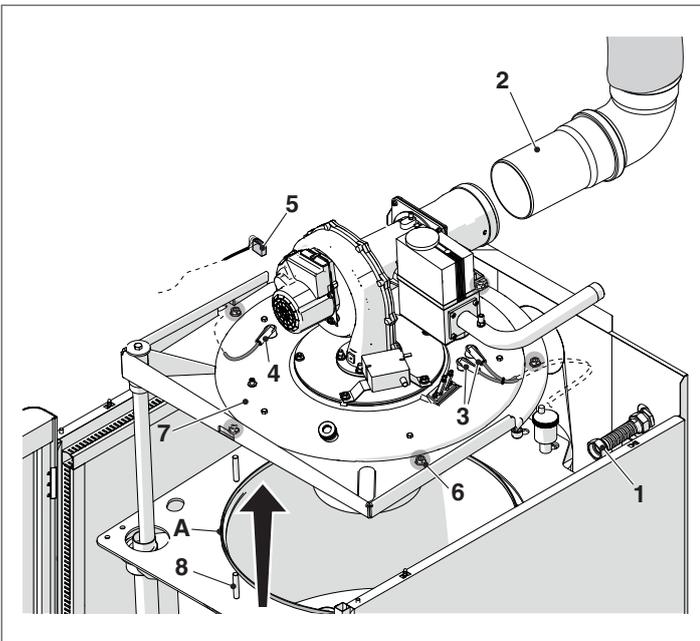
The cover of the combustion chamber is raised by a hydraulic system that also rotates it out of the way and holds it steady while you perform the necessary maintenance.

Proceed as follows:

- Remove the bottom front panel (1) and the top panel (2)
- Open the top front panel (3)

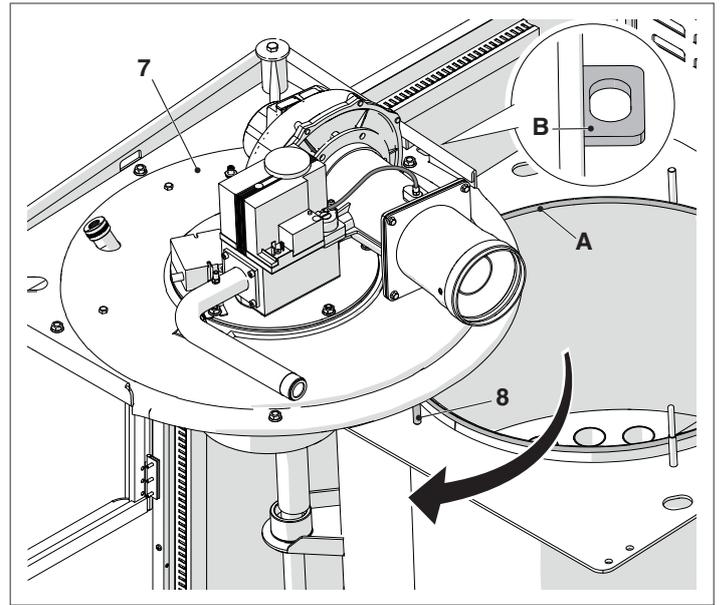


- Disconnect the gas supply pipe unscrewing the nut (1)
- If the appliance is type C (configuration obtained with the relative accessory):
 - Remove the air intake pipe (2)
- Detach the connectors of the ignition electrodes (3), of detection (4) and of the fan (5)
- Unscrew the five nuts (6) and raise the flue gases chamber closing (7)

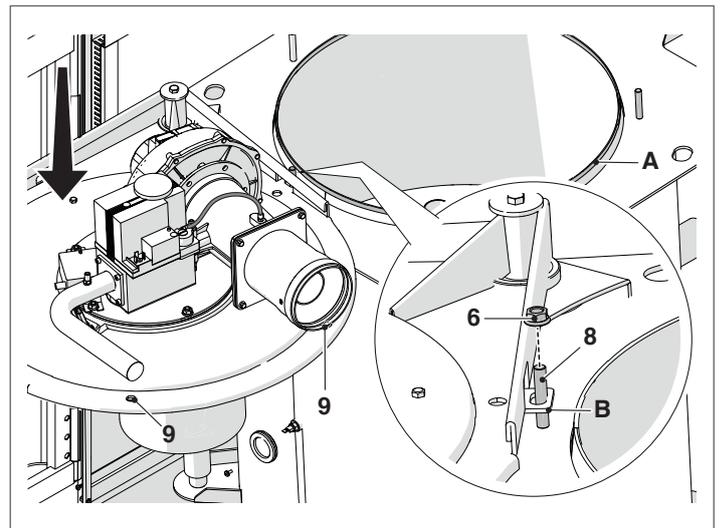


⚠ When lifting, be careful with the gasket (A)

- Turn the chamber (7) until the slot (B) is aligned with the bolt (8)



- Lower the chamber and fix it to the slot (B) with one of the nuts (6) removed previously.



- In this position it is possible to check the state of wear of the turbulators, the ignition and detection electrodes, the ceramic insulation, the gasket (A) and the combustion head as indicated in the paragraphs below.

⚠ The maximum overall height, with the closing of the combustion chamber fully raised, is 2230 mm.

⚠ To put the combustion chamber closing back in its seat, turn it to its original position aligning the holes (9) with the relative pins in order to ensure it inserts correctly, being careful not to damage the gasket (A) and the insulation.

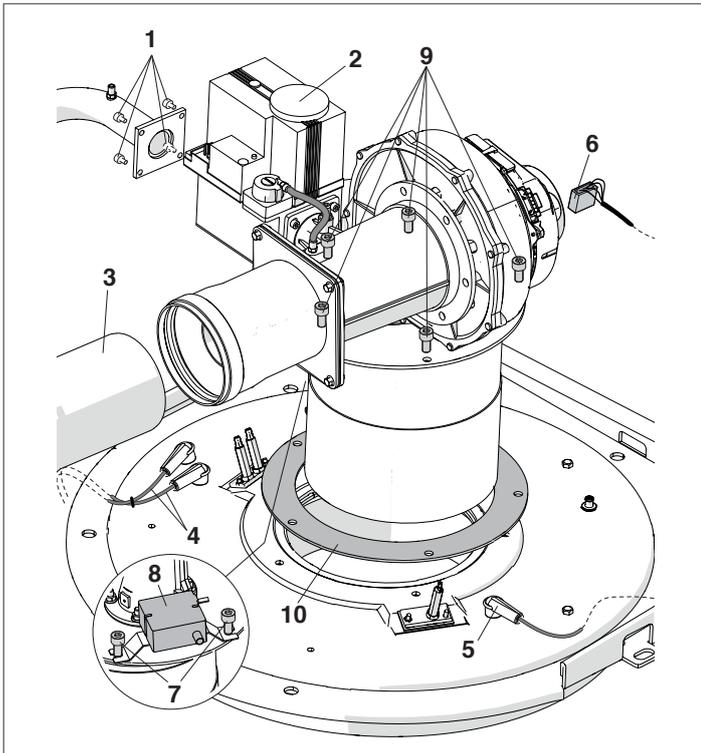
Reverse the above steps to fit the new tube.

⚠ Check that the gas connection is leak proof.

3.10.1 Removing the burner

Proceed as follows to remove the burner:

- Remove the top panel of the appliance
- Open the top front panel
- Unscrew the screws (1) sealing the gas supply pipe from the gas valve (2)
- If the appliance is type C (configuration obtained with the relative accessory):
 - Remove the air intake pipe (3)
- Detach the connectors of the ignition electrodes (4), of detection (5) and of the fan (6)
- Unscrew the screws (7) and remove the ignition transformer (8)
- Unscrew the five bolts (9) securing the burner to the flue gas chamber closure and carefully remove it, taking care not to damage the gasket (10). The various components (gas valve, venturi, fan) can now be removed.



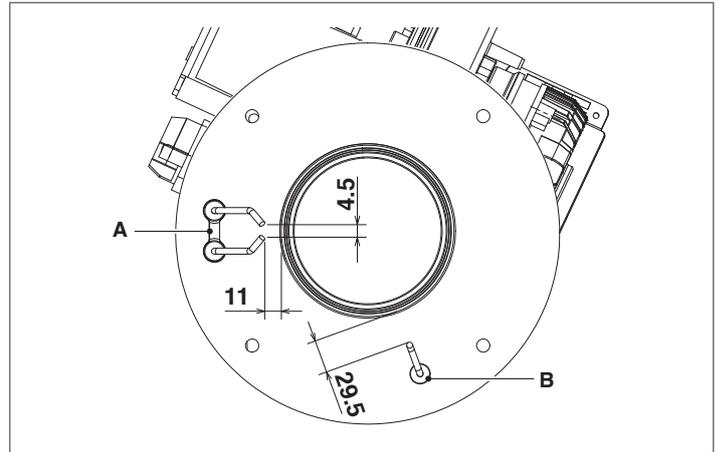
Reverse the above steps to fit the new pump.

⚠ Check that the gas connection is leak proof.

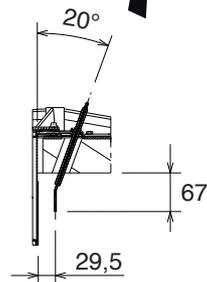
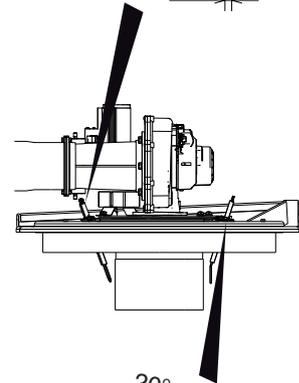
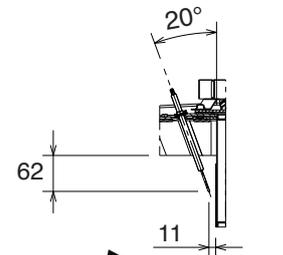
3.10.2 Setting the electrodes

The positioning of the ignition (A) and detection (B) electrodes is fundamental to obtain reliable flame ignitions. With the burner removed, verify the state of wear and the positioning of the ignition electrodes and flame detection sensor according to the figure below. Replace if damaged or worn.

⚠ It is essential to respect the dimensions in the figure.



IGNITION ELECTRODES

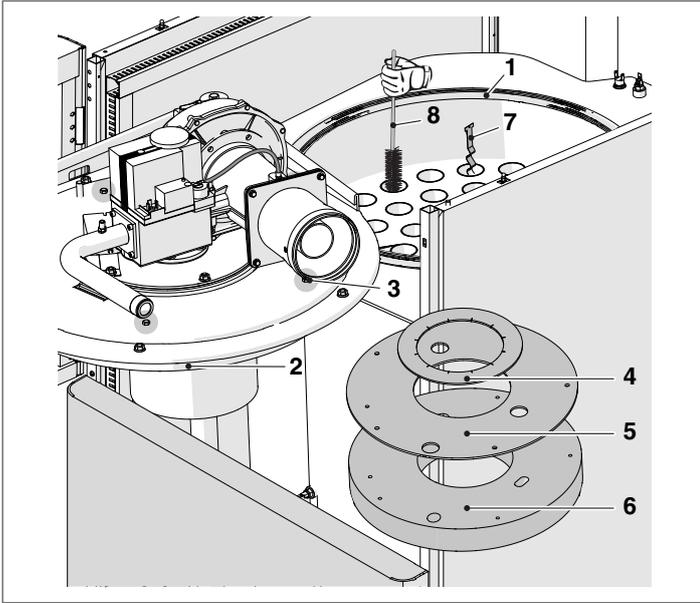


DETECTION ELECTRODE

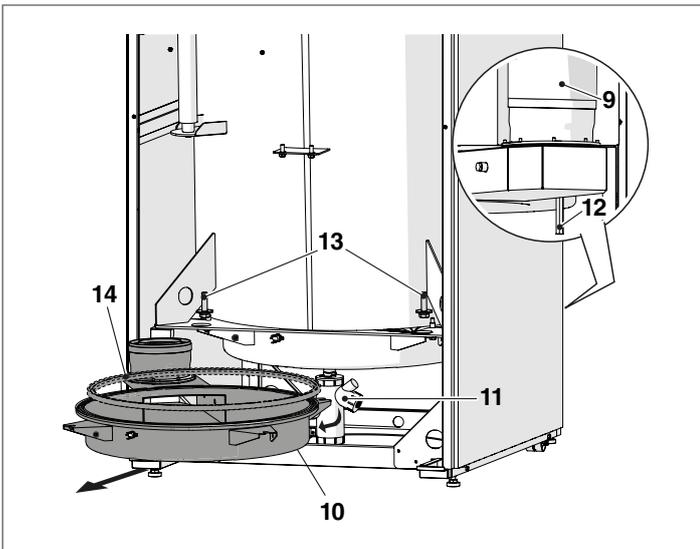
3.10.3 Boiler exchanger cleaning

After raising the combustion chamber as described in the paragraph "Lifting combustion chamber closing", proceed as follows:

- Check the wear status of the seal (1) and of the ceramic insulation (2) and replace, if necessary
- Unscrew the screws (3) to replace the ceramic insulation and check the state of wear of the following components:
 - Insulation panel (4)
 - Combustion chamber closing insulation (5)
 - Ceramic insulation (6)
 - Replace if necessary.
- Remove the turbulators (7), check their condition and the opening of the flaps (replace them if necessary)
- Use a swab (8) or another suitable tool



- Disconnect the flue gas discharge duct (9) from the flue gas chamber closure (10)
- Remove the condensate drain siphon (11) as indicated on paragraph Condensate drain siphon cleaning
- Loosen the rear bolt (12) and the front bolts (13) and extract the flue gas chamber closure from the front
- Clean the flue gas chamber closure to remove any residue
- Check the wear status of the seal (14) and replace it, if necessary

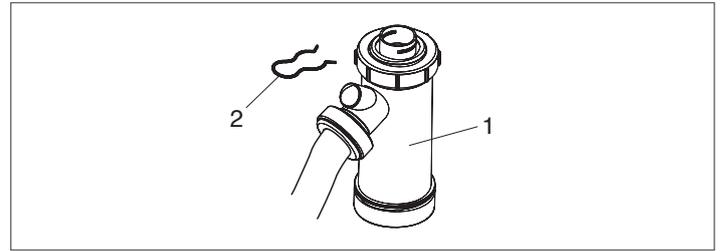


Once the maintenance operations are complete, refit the components working in the opposite direction of what was described.

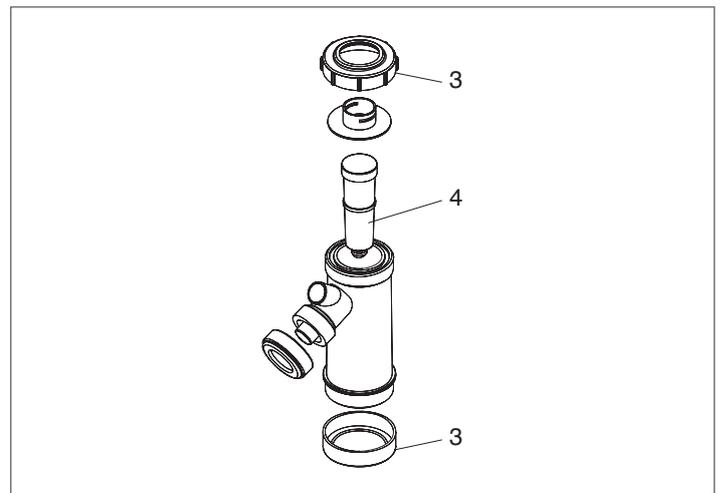
! Check that the gas connection is leak proof.

3.10.4 Condensate drain siphon cleaning

- Remove the front panel from the boiler and locate the condensate discharge syphon (1)



- Remove the split pin (2), detach the corrugated condensate drain hose, and remove the siphon. Unscrew the two caps (3) to disassemble the siphon
- Remove the float (4) and clean all internal components.



Once the maintenance operations are complete, refit the components working in the opposite direction of what was described.

! Fill the siphon with water before you start up the boiler to prevent combustion gases escaping into the room during the first few minutes of boiler functioning.

3.10.5 External cleaning

OUTSIDE

Clean the casing, the control panel, the painted parts and plastic parts with cloths moistened with soap and water. In the case of stubborn stains, moisten the cloth with a 50% water and alcohol mixture or specific products.

! Do not use fuels, sponges impregnated with abrasive solutions or powder detergents.

3.11 Troubleshooting

| FAULT | CAUSE | SOLUTION |
|---------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The burner performs pre-ventilation and ignition correctly but shuts down after about 5 attempts | Flame not detected | - Call Technical Assistance Service |
| | No gas supply | - Check gas valve opening |
| The burner shuts down during pre-ventilation | Flue blocked | - Check flue |
| | Flame detection error | - Call Technical Assistance Service |
| | The flame is already lit | - Call Technical Assistance Service |
| | Air intake obstructed | - Check for blockage |
| The burner shuts down after pre-ventilation because the flame fails to ignite | Gas valve feeds too little gas | - Check gas supply pressure |
| | Gas valve faulty | - Call Technical Assistance Service |
| | Weak or no ignition arc | - Call Technical Assistance Service |
| | Air in gas line | - Bleed the gas feed circuit |
| The burner does not start when it receives the control signal | No electrical power | - Check voltage at gas valve terminals - Check the condition of the fuses |
| | No gas supply | - Check the opening of the valve in line |
| | Electrical short circuit | - Call Technical Assistance Service |
| There is a smell of gas | Leaks from the supply circuit | - Check the seal of the gaskets and the closure of the pressure tapping points |
| There is a smell of fumes | Fumes escaping into the air | - Check that the burner body is clean - Check that the flue pipes are clean - Check the condition of the boiler seals - Check the quality of combustion |
| The boiler reaches the set temperature but the radiators are still cold | Air in the circuit | - Bleed the circuit |
| | Pump malfunctioning | - Check/unseize the pump - Change the pump |
| The boiler does not reach its temperature setpoint | Boiler dirty | - Clean the combustion chamber |
| | Burner capacity insufficient | - Check and adjust the burner |
| | Incorrect boiler temperature setpoint | - Check the temperature setting |
| The generator triggers a thermal safety block | Incorrect boiler temperature setpoint | - Check correct functioning - Check the temperature setting - Check the electrical wiring |
| | No water | - Check the bleed valve - Check CH circuit pressure |

4 CONFIGURATION OF CASCADED THERMAL UNITS

- ⚠ The DHW and heating circuits must be completed with expansion vessels of a suitable capacity and correctly sized relief valves. The discharge of the relief valves and the appliances must be connected to an evacuation and collection system (see paragraph Neutralization of the condensate).
- ⚠ The installer is responsible for selecting and installing the system components and must work in full compliance with correct technical regulations and legislation in force.
- ⚠ Special supply/refill water must be conditioned using suitable treatment systems.
- ⚠ For the electrical connections, use H05-W-F power cables with a minimum cross-section of 1.5 mm², complete with terminal ferrules. For the low voltage connections, use H05-W-F power cables with a minimum cross-section of between 0.5 and 1 mm², complete with terminal ferrules.
- ⚠ When connecting the devices connected to the power terminal board (pumps, circulators and diverting/mixing valves) position relays in between unless the maximum consumption of all components connected to the board (including the thermal unit pump) is less than or equal to 1.5 A. The choice and size of these relays lies with the installer depending on the type of device connected.
- ⊖ It is prohibited to operate the thermal module without water.

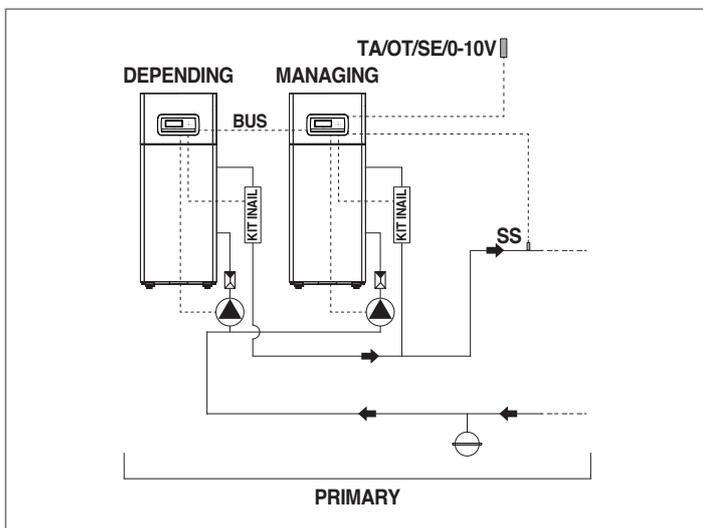
4.1 Configuration of the primary system

The basic cascade configuration consists of at least two thermal units. One is assigned the "Managing" role and the others are assigned the "Depending" role.

- ⚠ The cascade of thermal units can be seen as the primary system of a heat generation system. This configuration could be ideal to replace one or more larger generators in an existing system if system reliability and efficiency is to be increased.

In order for cascade operation to be possible, the "Managing" thermal module must be connected to the primary sensor (SS) at least, available as an accessory.

The primary sensor is required in order to manage the cascade setpoint and is essential for managing the thermal modules as a single generator.



- ⚠ The installation of thermal units of similar power is recommended in order to maximise the cascaded system's performance.
- ⚠ Check that the parameter "Cascade mode" is set at "BASIC" on each thermal unit

Operation of the primary system can be:

- Mode 0
Operating with room thermostat/heat request and fixed central heating setpoint.
- Mode 1
Operating in climatic mode with room thermostat/heat request, variable setpoint depending on the outdoor temperature.
- Mode 2 - Not recommended.
Operating in climatic mode with decrease (attenuation) controlled by room thermostat/heat request, variable setpoint depending on the outdoor temperature.
- Mode 3 - Not recommended.
Continuous operation with fixed setpoint with decrease (attenuation) controlled by room thermostat/heat request.
- Mode 4
Adjusting the setpoint based on a 0-10V analogue input.
- Mode 5 - Not applicable

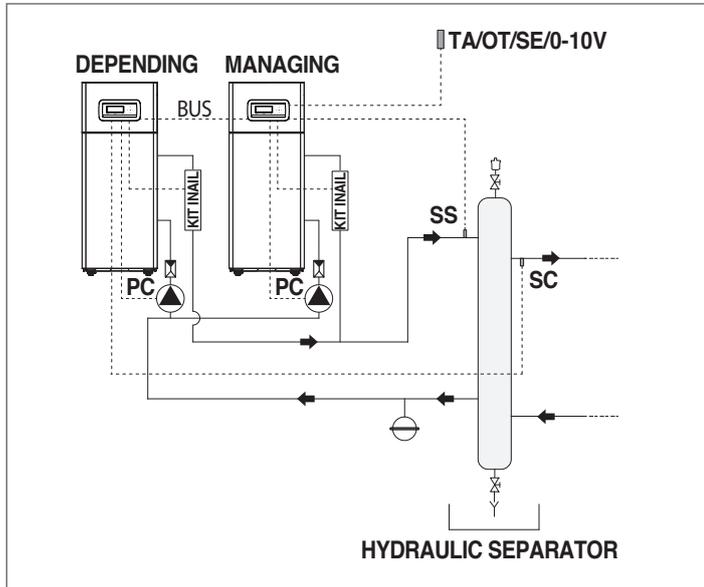
The functions described can be set using the parameterisation carried out on the "Managing" thermal unit.

The electrical and hydraulic connections of the primary system are to be completed selecting from:

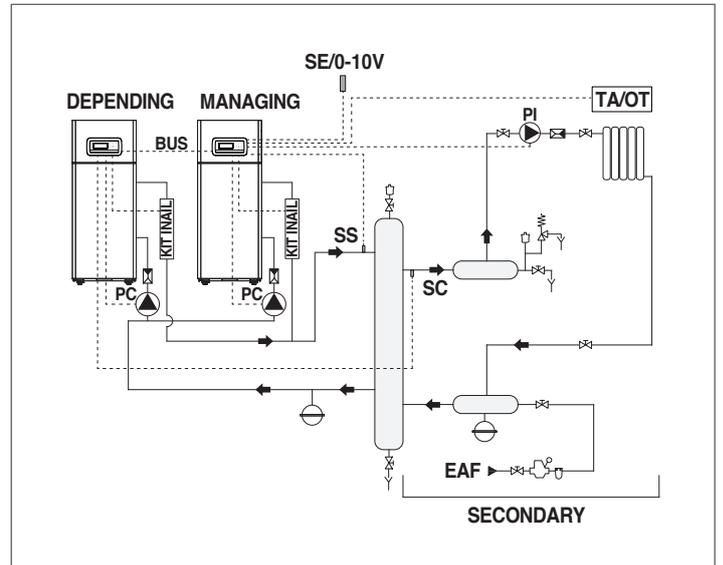
- Use of the thermal unit pump available as an accessory for all models **TAU Unit**.
- Use of the system circulator (PS) and two-way valves (V1) for each thermal module (these devices are available as accessories).

4.2 Configuration of the secondary system

Optimal use of the modules in cascade occurs by placing a hydraulic separator (available as an accessory) between the primary system (thermal modules in cascade for thermal generation) and the secondary system (users, such as heat distribution systems, DHW production). This device allows a different flow rate to be compensated between the primary and secondary systems.

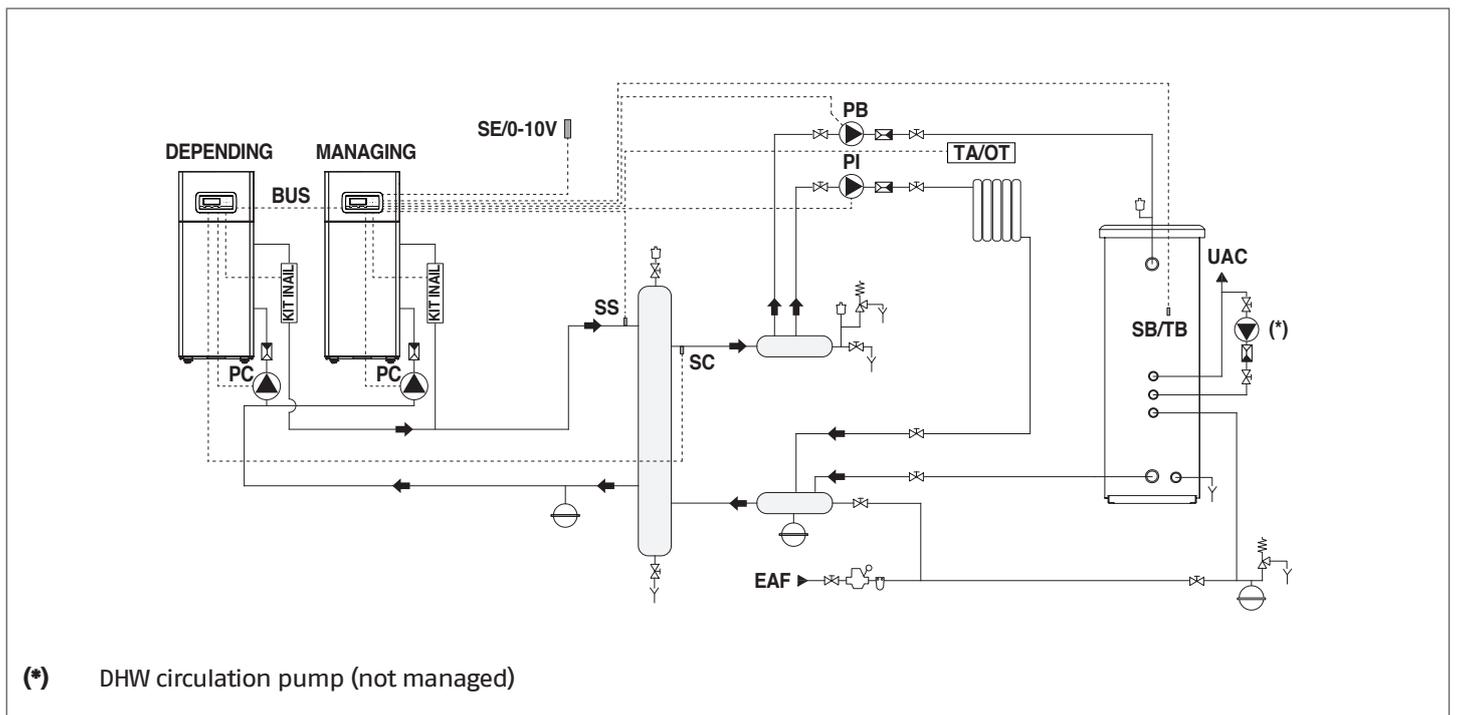


For the sake of simplicity, the hydraulic circuits downstream of the separator can be identified as the secondary system. The basic configuration of the secondary system takes place using a system circulator (PI). This circulator, connected to the modules in cascade, allows the transfer of the heat energy to a user circuit to be controlled, for example, a direct zone for high temperature heating of a room.



The secondary system can be configured using the following accessories:

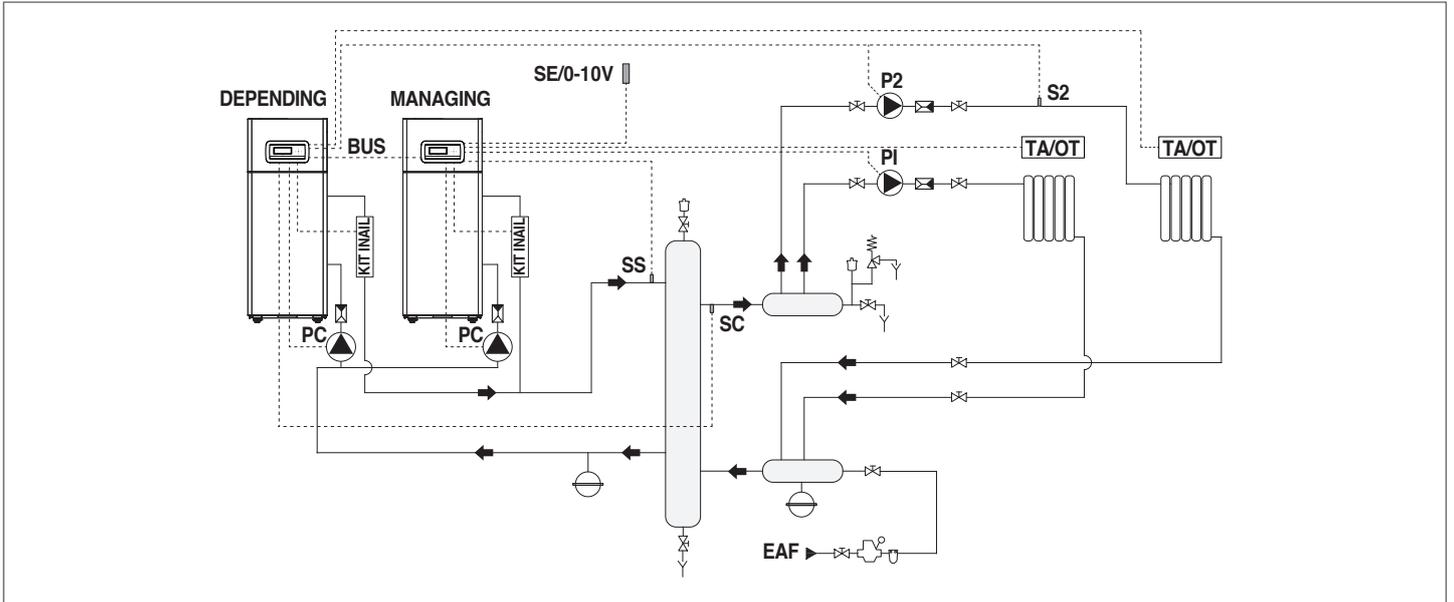
- Secondary circuit sensor (SC)
This is required in order to manage the setpoint, and therefore the required temperature, downstream of the hydraulic separator.
The secondary circuit sensor must be connected to the controller of the first "Depending" unit.
- Hot water tank sensor/thermostat (SB/TB)
This is required in order to manage the production of DHW in combination with a hot water tank circulator (PB).
The hot water tank sensor/thermostat is connected to the controller of the "Managing" unit.



(*) DHW circulation pump (not managed)

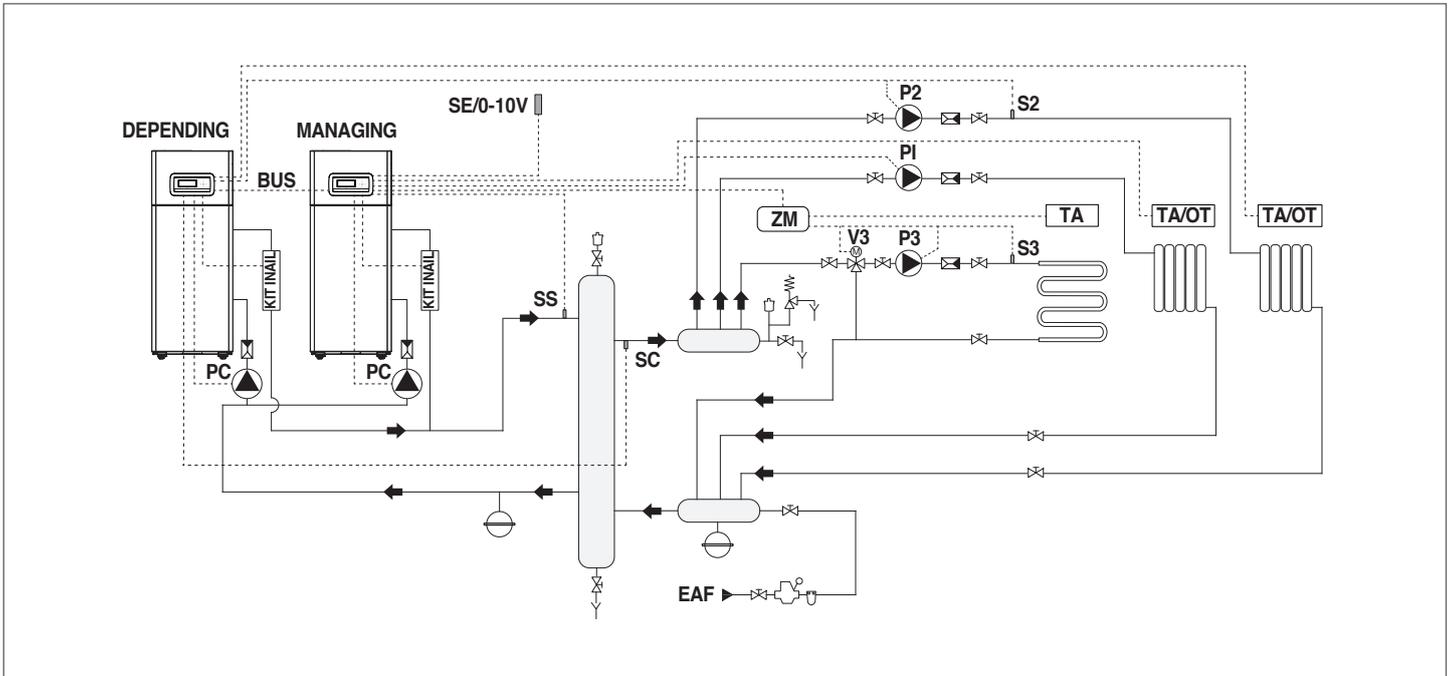
- Zone sensor (S2)

This is required to adjust and control an additional direct zone managed by the "Depending" thermal unit in combination with the zone pump (P2).
The zone sensor (S2) and the pump (P2) must be connected to the "Depending" thermal unit, which communicates via Bus with the "Managing" thermal unit.



- Zone sensor (S3)

This is required to adjust and control an additional direct zone in combination with an electronic device for zone management (ZM) and the zone circulator (P3).
The zone sensor is used to adjust and control an additional mixed direct zone in combination with an electronic device for zone management (ZM), the zone (P3) circulator and the mixer valve (V3).
The zone sensor (S3), the circulator (P3) and the mixer valve (if present) (V3) must be connected to the electronic device for zone management (ZM), which communicates via Bus with the "Managing" thermal module.

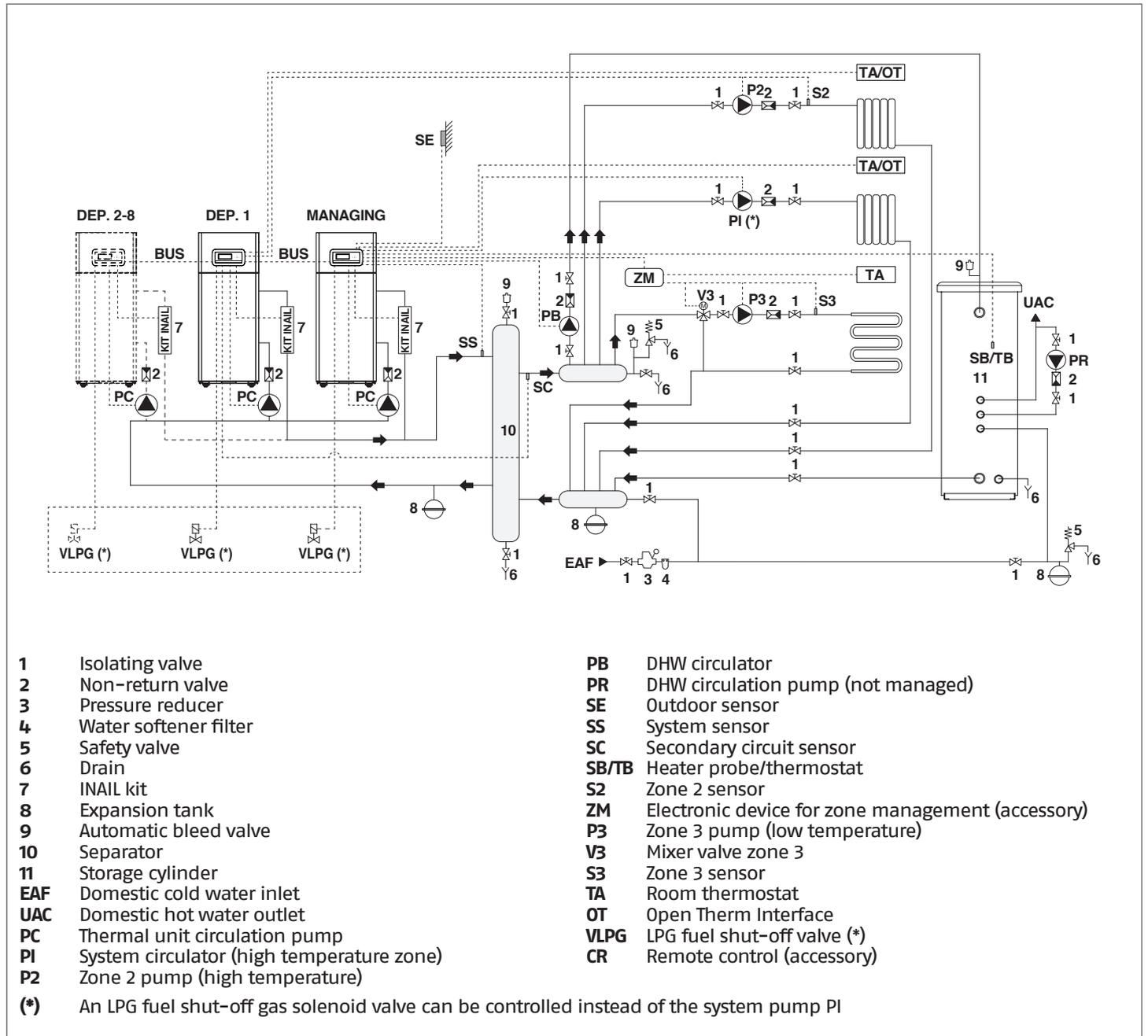


To make the electrical connections, refer to the wiring diagrams of the selected system.
For the Bus connection mode, refer to the section "System management".

4.3 Typical water system schematics and configuration of cascaded thermal units

4.3.1 Block diagram 1

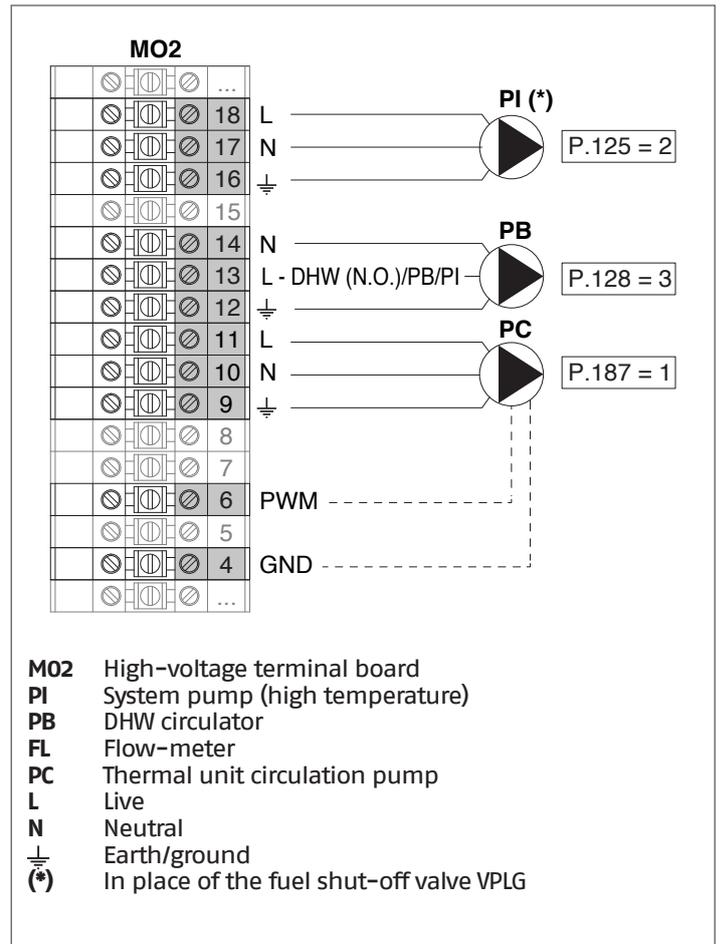
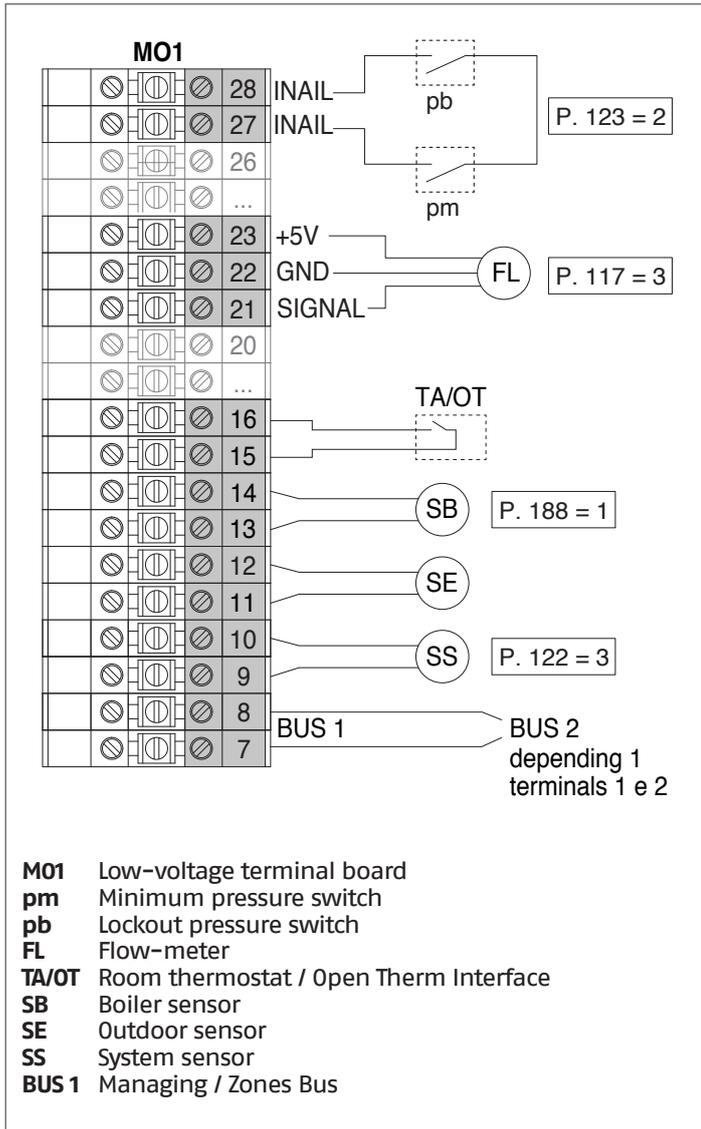
Cascaded thermal units with single pump for each thermal unit and system and cascade sensors.
 Management of a DHW circuit with two direct zones and a mixed zone, with electronic zone management device (ZM).



- Install thermal units of similar power to maximise the cascaded system's performance.
- The DHW circuits and CH circuits must be provided with expansion tanks of adequate capacity and suitably sized safety valves. The drain from the safety valves and appliances must be connected to a suitable collection and evacuation system (see catalogue for compatible accessories).
- The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- Special supply/refill water must be conditioned using suitable treatment systems.
- It is prohibited to operate the thermal module without water.

4.3.2 Electrical connections - Diagram 1

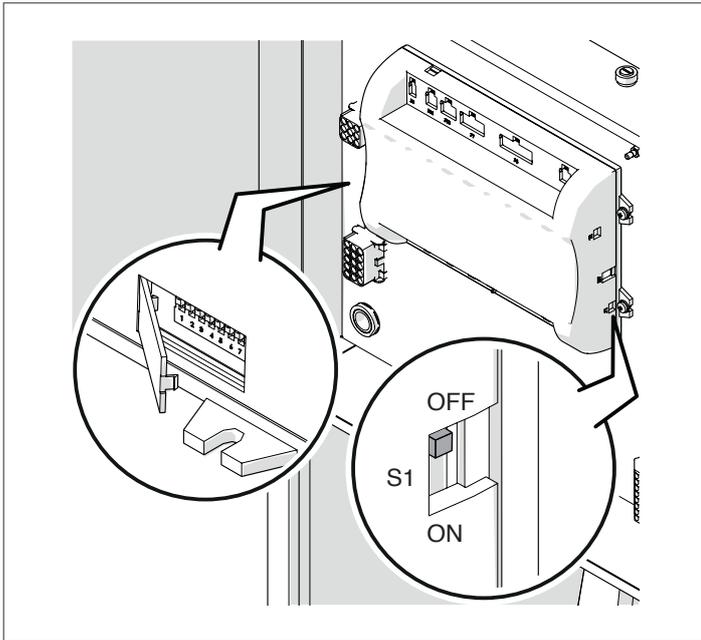
MANAGING CONNECTIONS



Hardware configuration

S1 = OFF (not used)

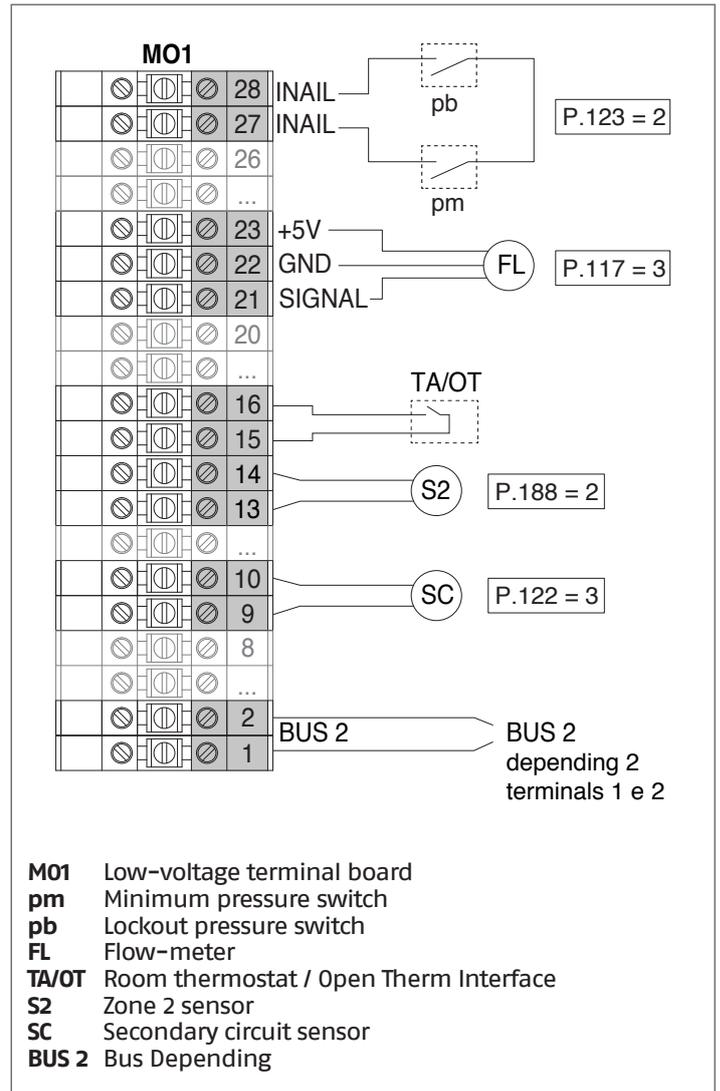
DIPSWITCH = 10000000

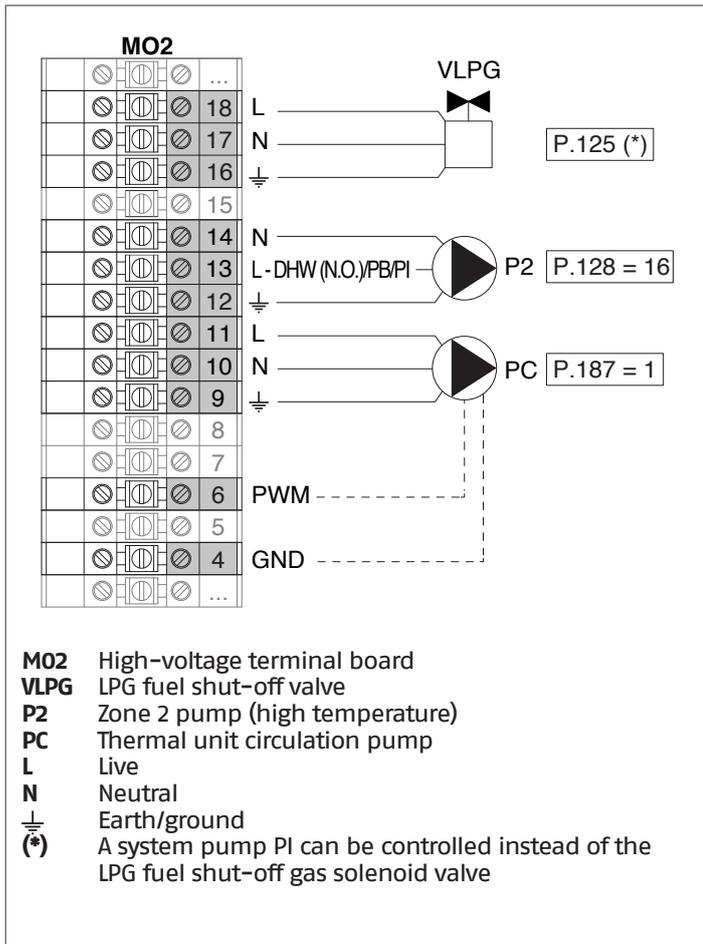


| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 1st module (Managing) |

For further information see section "System management".

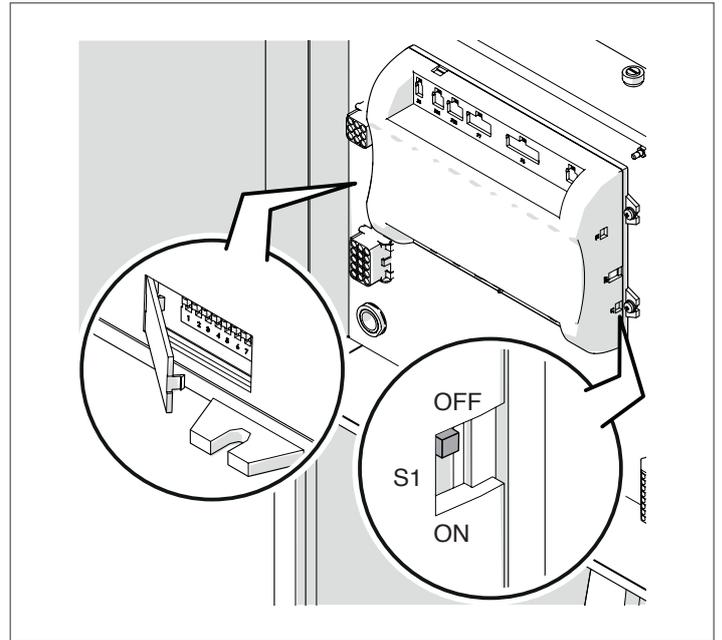
DEPENDING CONNECTIONS 1





Hardware configuration

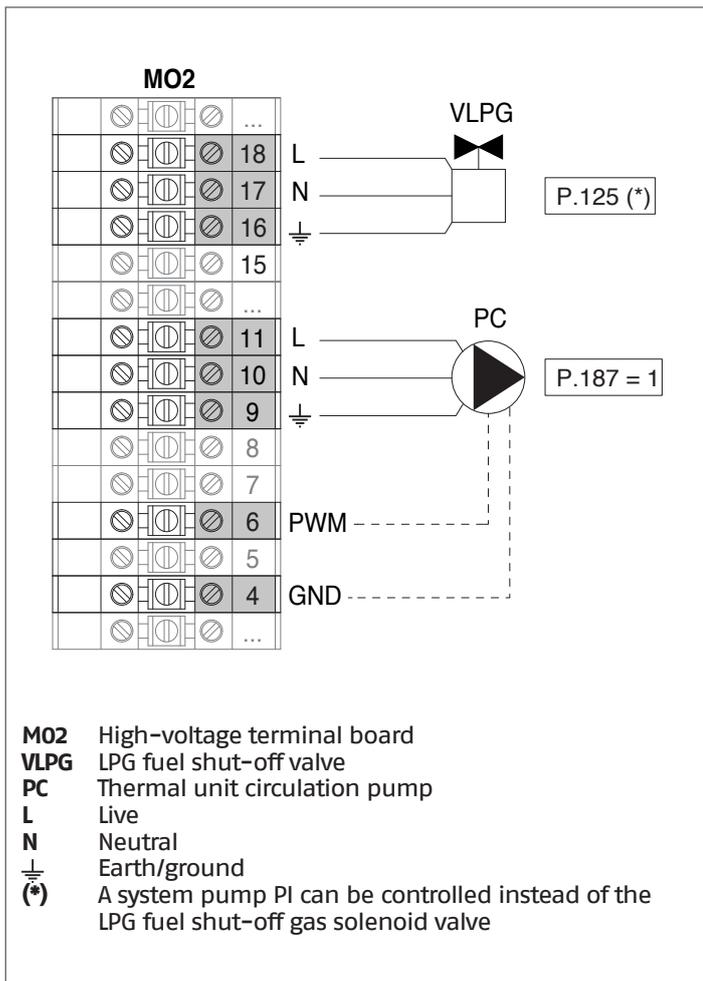
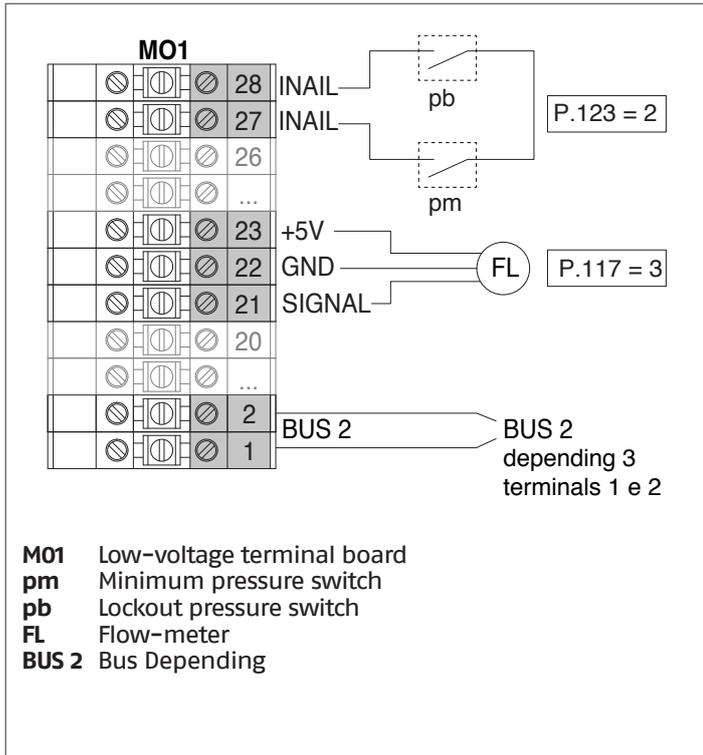
S1 = OFF (not used)
 DIPSWITCH = 01000000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 2nd module (Depending) |

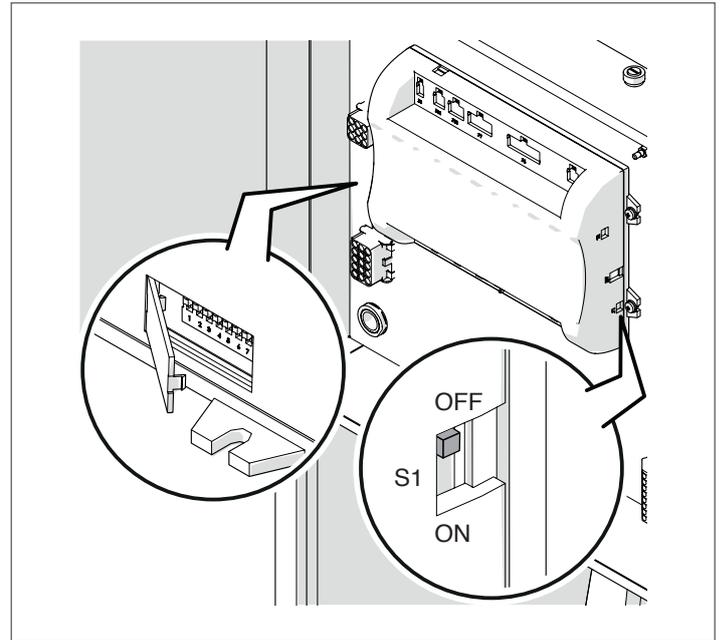
! For further information see section "System management".

DEPENDING CONNECTIONS 2-8



Hardware configuration

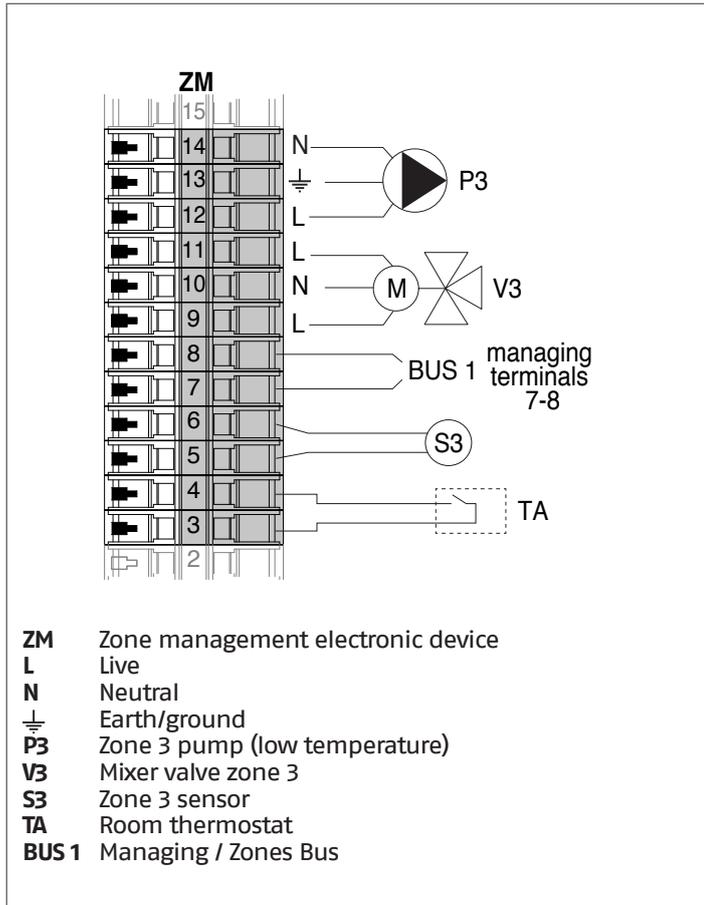
S1 = OFF (not used)
 DIPSWITCH = 00100000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 3rd module (Depending) |
| | 4th module (Depending) |
| ↓ | ↓ |
| | 8th module (Depending) |

For further information see section "System management".

ZONE MANAGEMENT ELECTRONIC DEVICE



4.3.3 System parameters Block diagram 1

! See section "Commissioning and maintenance" for a detailed description of how the parameters work

MANAGING

Functions:

- Reads system sensor (SS)
- Controls thermal unit pump (PC)
- Controls DHW pump (PB)
- Reads storage tank sensor (SB)
- Controls pump (PI), with consent of TA/OT (room thermostat/Open Therm interface), instead of LPG gas solenoid valve (VPLG)
- Manages control of mixed zone 3 zone management (ZM) device via bus. Up to a maximum of 16 devices can be managed.

Programmable outputs and inputs parameter configuration (*) (If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 2 = CH pump (**) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 3 = DHW pump (PB) | M02 | 12-13-14 |
| 122 | Prog Input 7 | 3 = System sensor (SS) | M01 | 9-10 |
| 188 | Prog Input 9 | 1 = DHW sensor (SB) | M01 | 13-14 |

- (*) Do NOT change the factory setting of parameter 97
 (**) In place of the fuel shut-off valve VPLG

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

- (***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
 DIPSWITCH = 10000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|----------------------|-----------------------------------------------------------------------------------------------------------|
| 73 | Boiler Address | - "Managing" (if the cascade sensor is used SC) - "Stand-Alone" (if the cascade sensor is not used SC) |
| 147 | Number of Units | Set the total number of cascaded units (from 2 to 8) |
| 184 | No. Active DHW units | 0 to 8 (Number of active units for DHW production) |
| 7 | CH Hysteresis | 7°C |
| 35 | DHW mode | Choose from: 1 = Water heater with probe 2 = Water heater with thermostat |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

Configuration of cascade parameters

| Par. No. | Description | Parameter setting |
|----------|--------------------------|--------------------------------------------------------------------------------|
| 148 | Power Mode | Choose from: 2 = Maximum number of burners 3 = Minimum number of burners |
| 152 | PwrMode2 Min Power | 4% |
| 153 | PwrMode2 Hysteresis | 40% |
| 84 | Module Rotation Interval | 5 days |
| 74 | Emergency mode setpoint | 50 (according to need) |

DEPENDING 1

Functions:

- Reads the secondary circuit sensor (SC)
- Controls thermal unit pump (PC)
- Controls the pump in a DEPENDENT direct zone (P2) with the zone sensor (S2), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|---------------------------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (VLPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 16 = Zone pump (P2) | M02 | 12-13-14 |
| 122 | Prog Input 7 | 3 = System sensor (used as secondary circuit sensor SC) | M01 | 9-10 |
| 188 | Prog Input 9 | 2 = Zone sensor (S2) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
DIPSWITCH = 01000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

DEPENDING 2-8

Functions:

- Controls thermal unit pump (PC)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|-----------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (VLPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

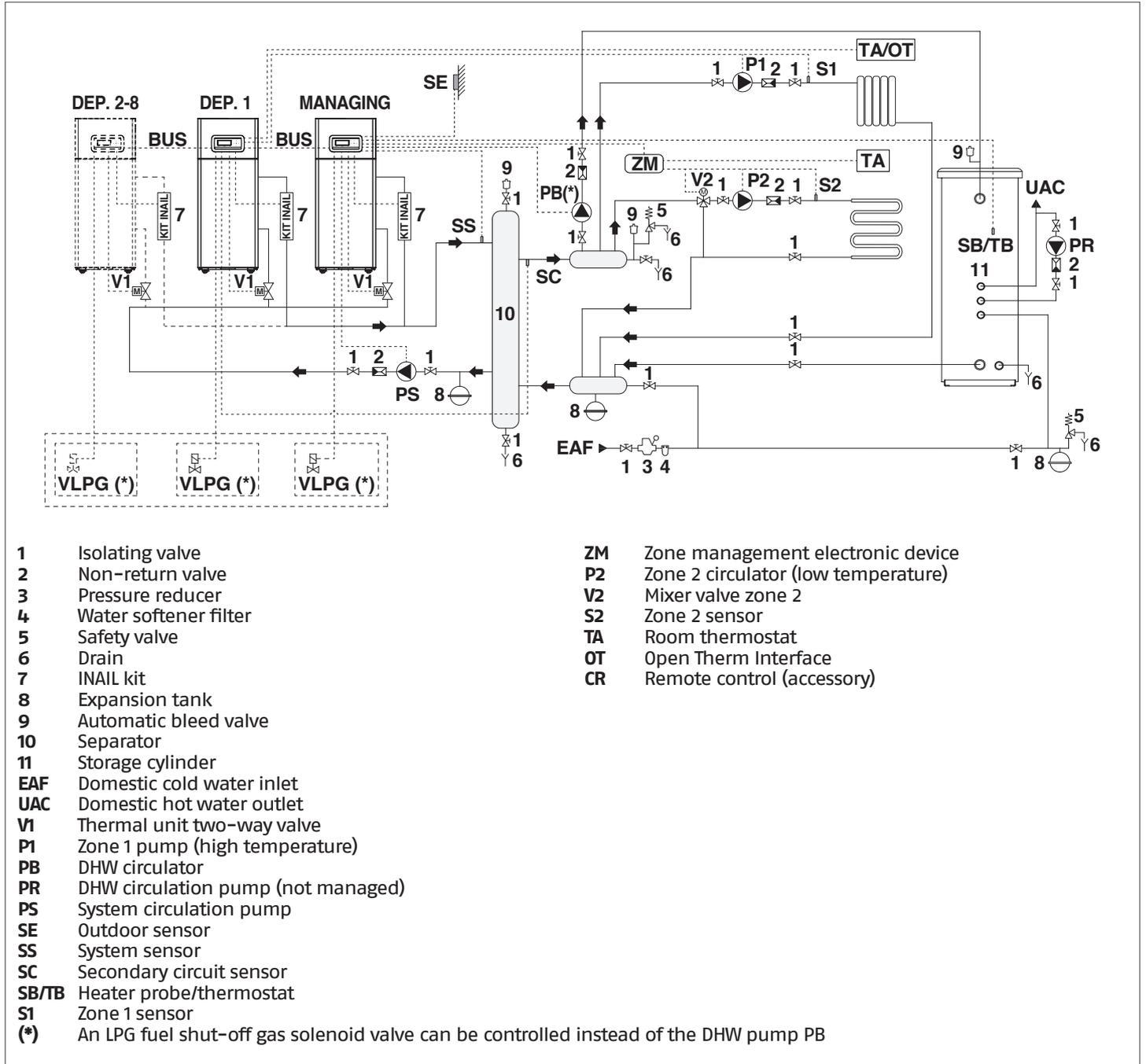
S1 = OFF (not used)
DIPSWITCH = 00100000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|---------------|-------------------|
| 7 | CH Hysteresis | 7°C |
| 140 | Minimum Flow | 5 l/min |

4.3.4 Block diagram 2

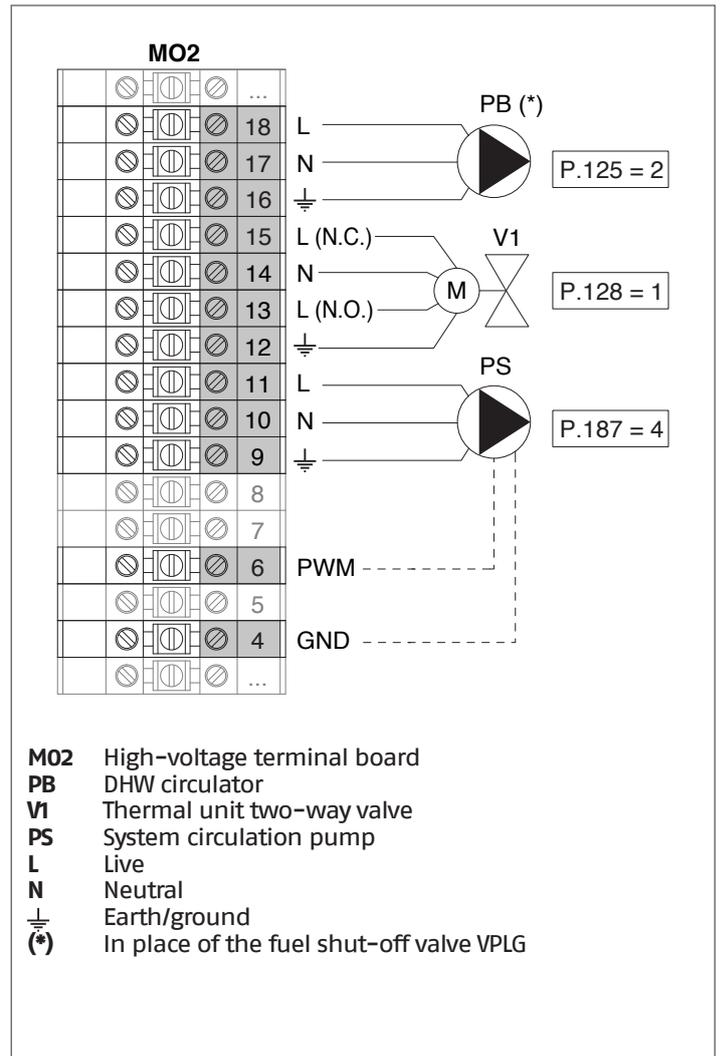
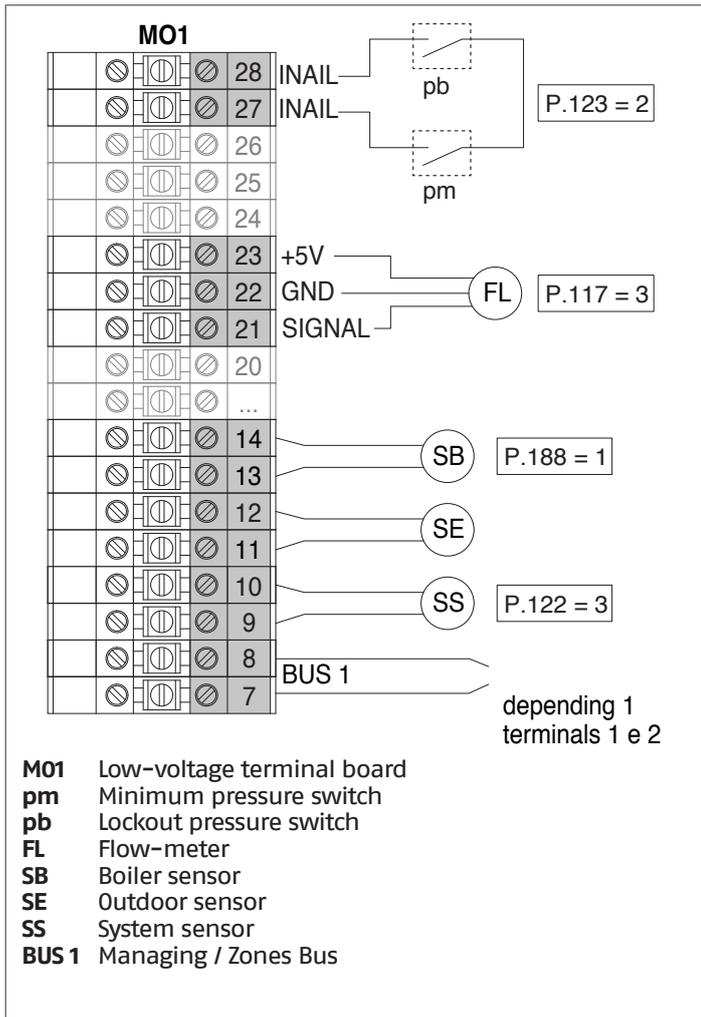
Cascaded thermal units with two-way valve for each thermal unit, system pump, and system and cascade sensors. Management of a DHW circuit, of a direct zone and a mixed zone with electronic zone management device (ZM).



- Install thermal units of similar power to maximise the cascaded system's performance.
- The DHW circuits and CH circuits must be provided with expansion tanks of adequate capacity and suitably sized safety valves. The drain from the safety valves and appliances must be connected to a suitable collection and evacuation system (see catalogue for compatible accessories).
- The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- Special supply/refill water must be conditioned using suitable treatment systems.
- It is prohibited to operate the thermal module without water.

4.3.5 Electrical connections - Diagram 2

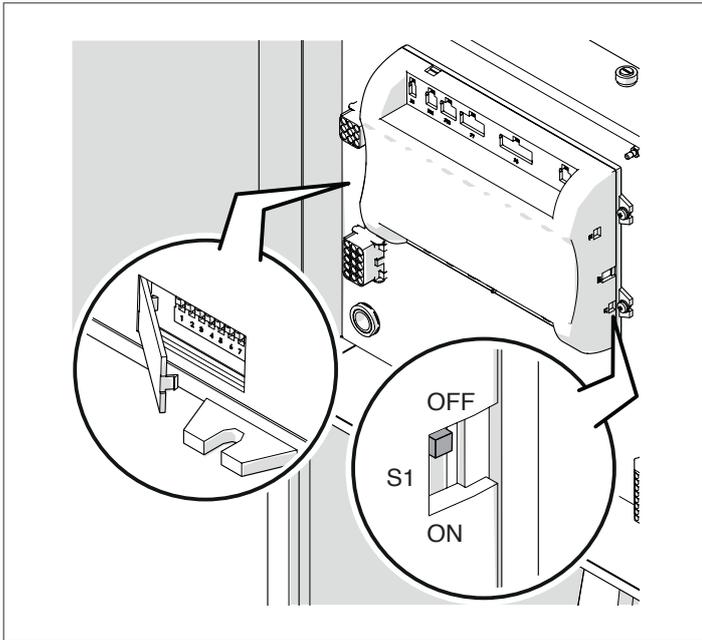
MANAGING CONNECTIONS



Hardware configuration

S1 = OFF (not used)

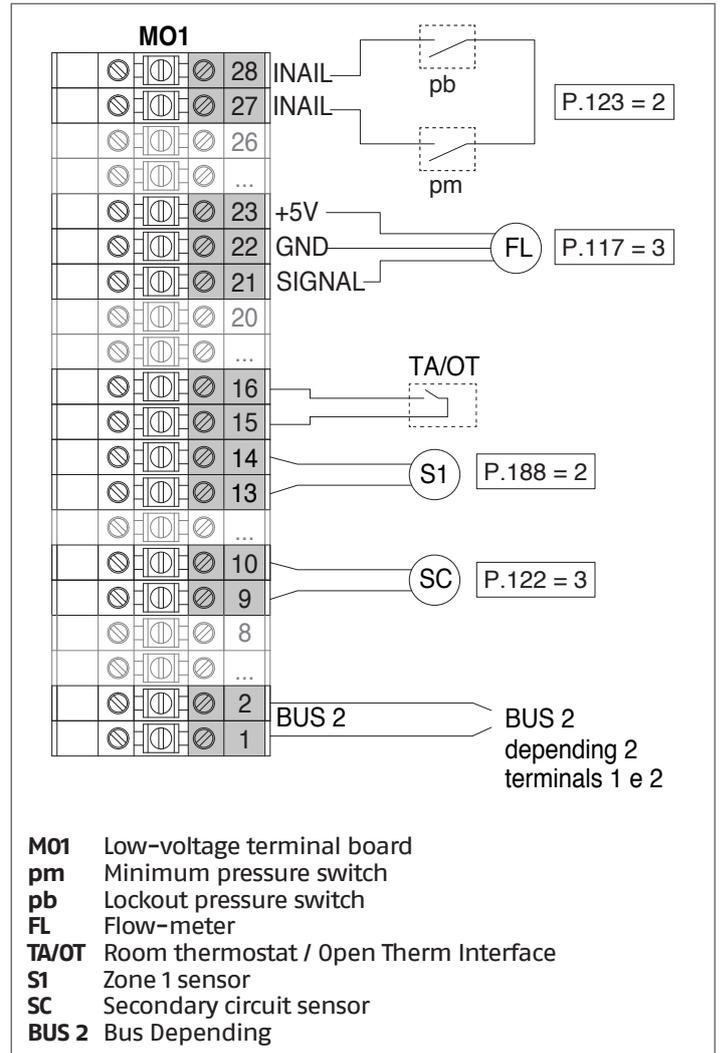
DIPSWITCH = 10000000

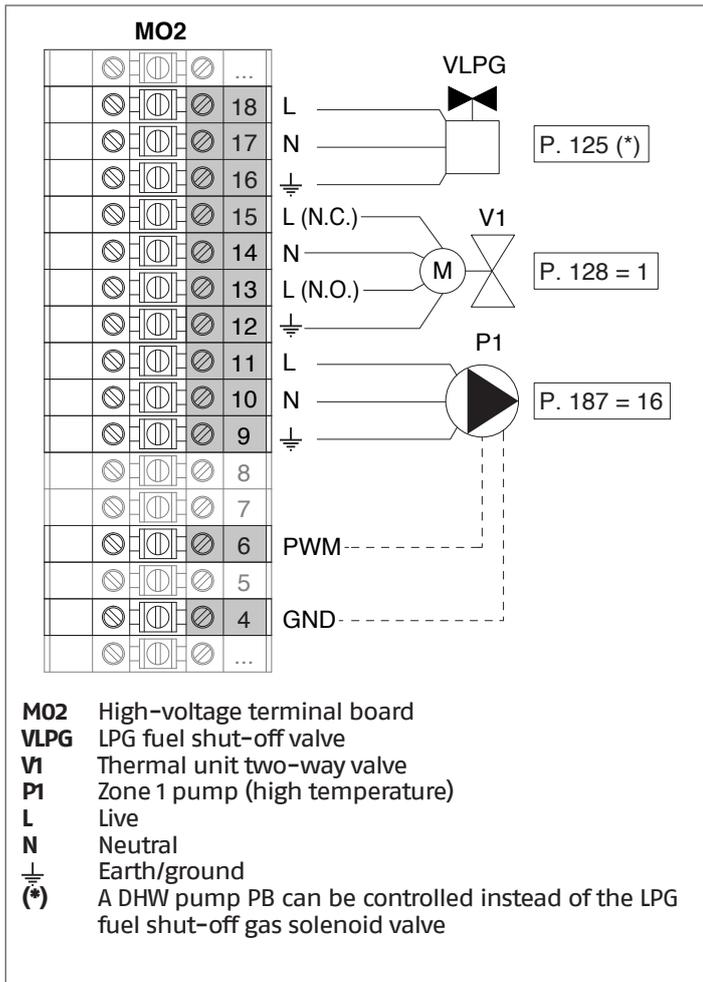


| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 1st module (Managing) |

For further information see section "System management".

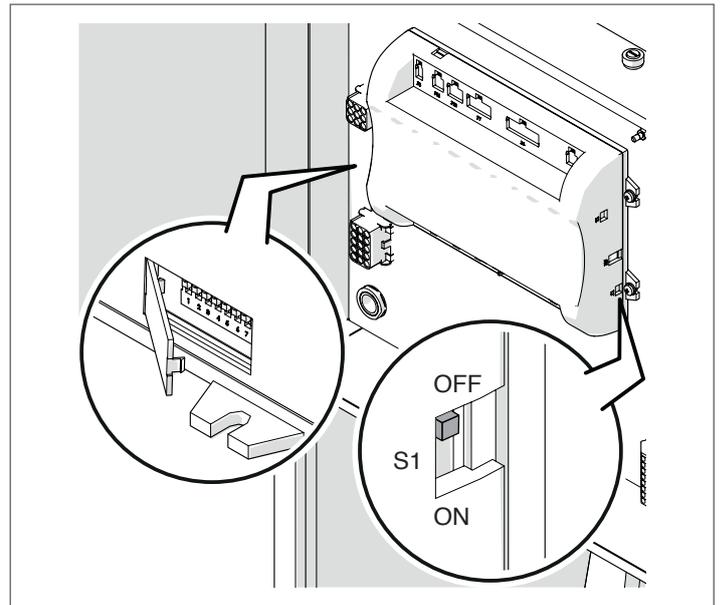
DEPENDING CONNECTIONS 1





Hardware configuration

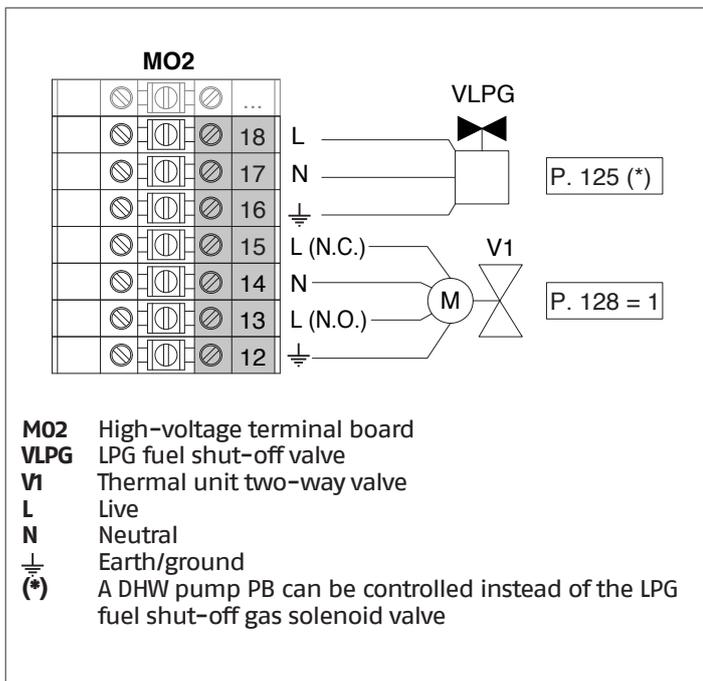
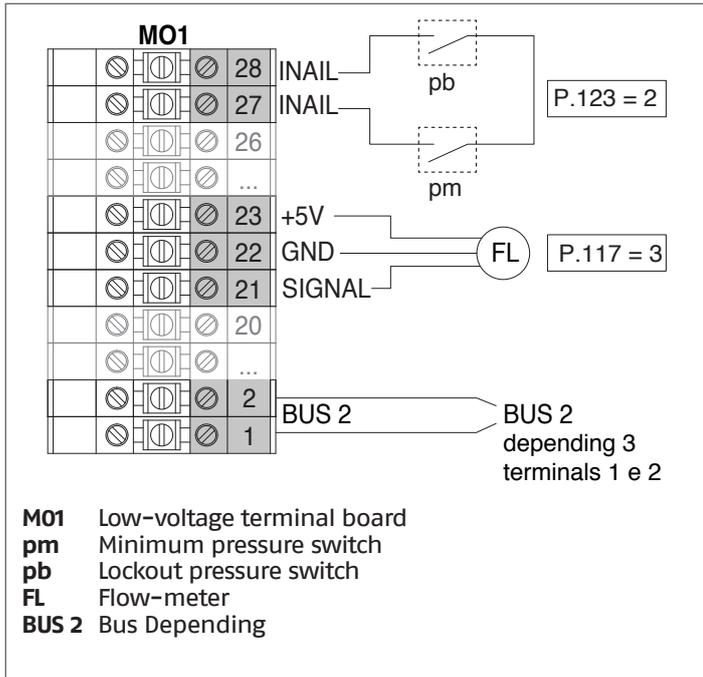
S1 = OFF (not used)
 DIPSWITCH = 01000000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 2nd module (Depending) |

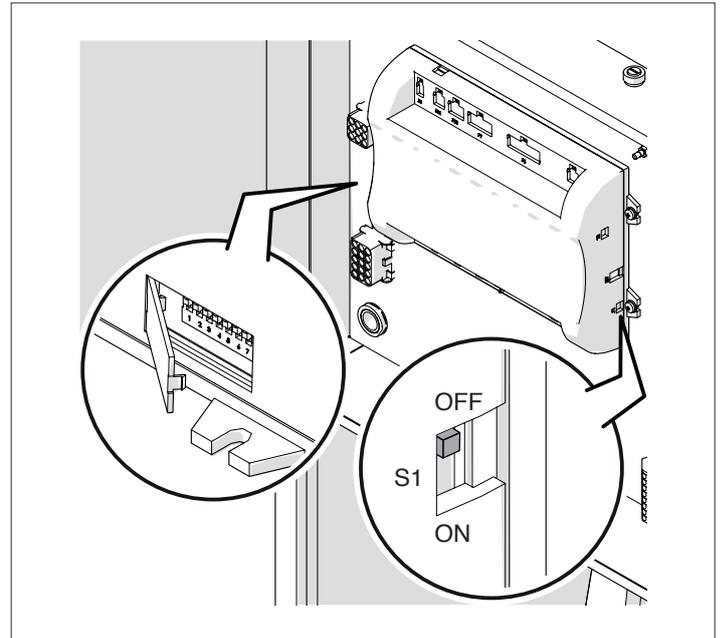
! For further information see section "System management".

DEPENDING CONNECTIONS 2-8



Hardware configuration

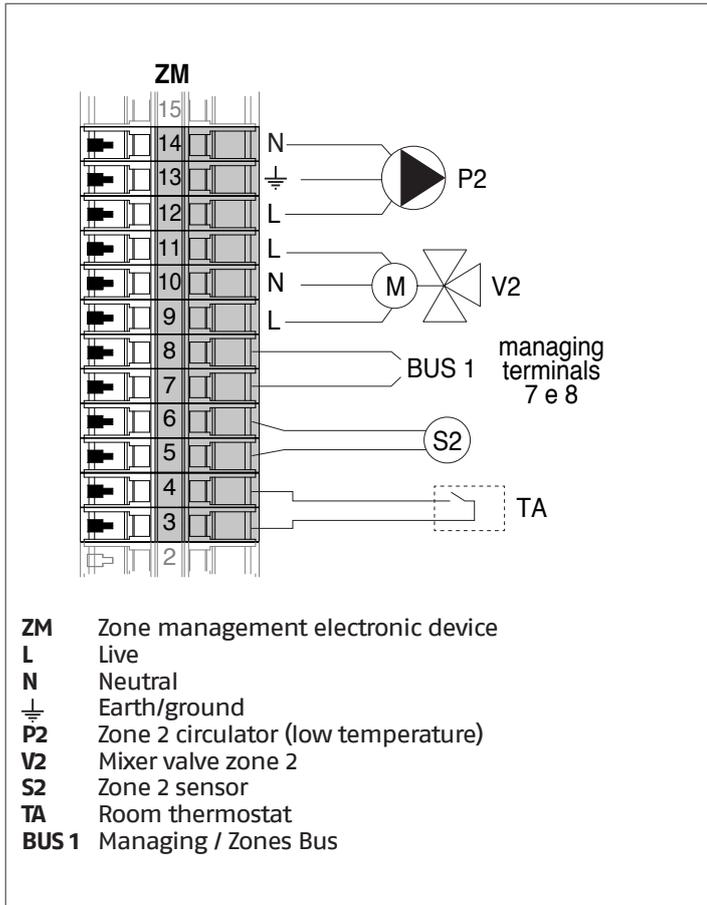
S1 = OFF (not used)
 DIPSWITCH = 00100000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 3rd module (Depending) |
| | 4th module (Depending) |
| ↓ | ↓ |
| | 8th module (Depending) |

For further information see section "System management".

ZONE MANAGEMENT ELECTRONIC DEVICE



4.3.6 System parameters Block diagram 2

⚠ See section "Commissioning and maintenance" for a detailed description of how the parameters work

MANAGING

Functions:

- Reads system sensor (SS)
- Controls thermal unit two-way valve (V1)
- Controls system pump (PS)
- Controls DHW pump (PB) instead of the LPG gas solenoid valve (VPLG)
- Reads storage tank sensor (SB)
- Manages control of mixed zone 2 zone management (ZM) device via bus. Up to a maximum of 16 devices can be managed.

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 3 = DHW pump (**) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 4 = System pump (PS) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |
| 122 | Prog Input 7 | 3 = System sensor (SS) | M01 | 9-10 |
| 188 | Prog Input 9 | 1 = DHW sensor (SB) | M01 | 13-14 |

- (*) Do NOT change the factory setting of parameter 97
 (**) In place of the fuel shut-off valve VPLG

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
 DIPSWITCH = 10000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|----------------------|-----------------------------------------------------------------------------------------------------------|
| 73 | Boiler Address | - "Managing" (if the cascade sensor is used SC) - "Stand-Alone" (if the cascade sensor is not used SC) |
| 147 | Number of Units | Set the total number of cascaded units (from 2 to 8) |
| 184 | No. Active DHW units | 0 to 8 (Number of active units for DHW production) |
| 7 | CH Hysteresis | 7°C |
| 35 | DHW mode | Choose from: 1 = Water heater with probe 2 = Water heater with thermostat |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

Configuration of cascade parameters

| Par. No. | Description | Parameter setting |
|----------|--------------------------|--------------------------------------------------------------------------------|
| 148 | Power Mode | Choose from: 2 = Maximum number of burners 3 = Minimum number of burners |
| 152 | PwrMode2 Min Power | 4% |
| 153 | PwrMode2 Hysteresis | 40% |
| 84 | Module Rotation Interval | 5 days |
| 74 | Emergency mode setpoint | 50 (according to need) |

DEPENDING 1

Functions:

- Reads the secondary circuit sensor (SC)
- Controls thermal unit two-way valve (V1)
- Controls the pump in a DEPENDENT direct zone (P1) with the zone sensor (S1), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|---------------------------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 16 = Zone pump (P1) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |
| 122 | Prog Input 7 | 3 = System sensor (used as secondary circuit sensor SC) | M01 | 9-10 |
| 188 | Prog Input 9 | 2 = Zone sensor (S1) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
DIPSWITCH = 01000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

DEPENDING 2-8

Functions:

- Controls thermal unit two-way valve (V1)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

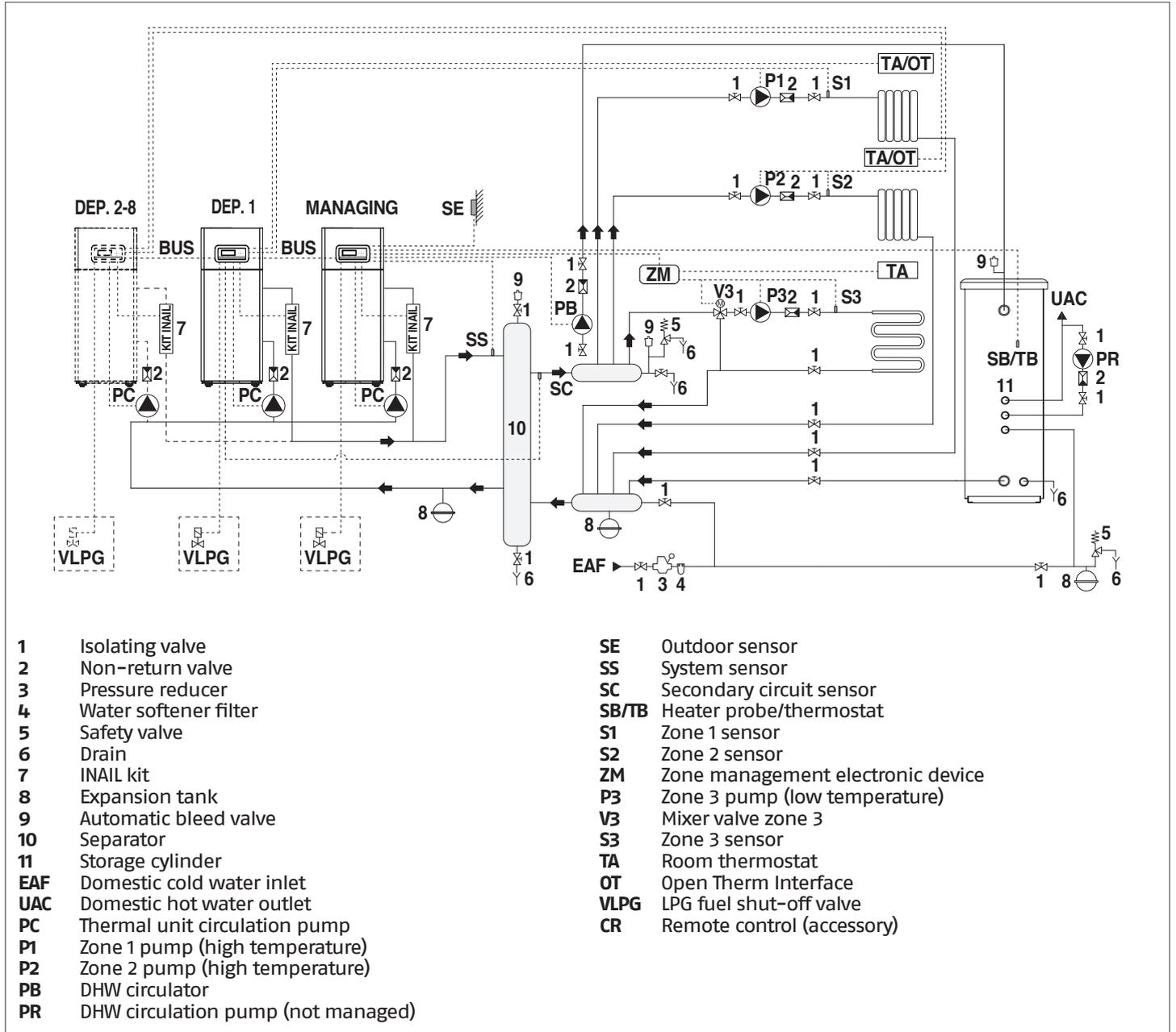
S1 = OFF (not used)
DIPSWITCH = 00100000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|---------------|-------------------|
| 7 | CH Hysteresis | 7°C |
| 140 | Minimum Flow | 5 l/min |

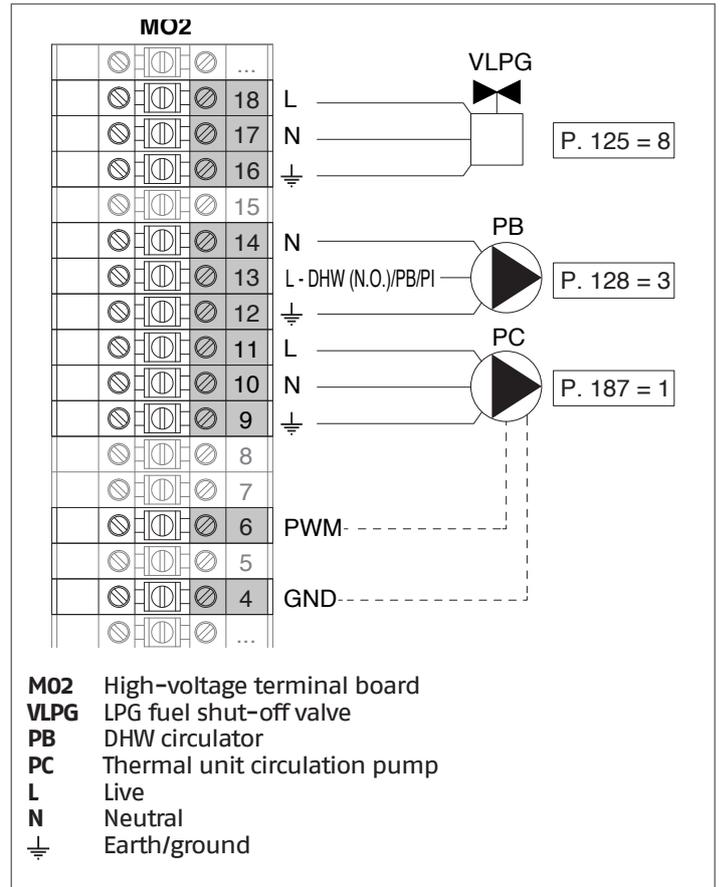
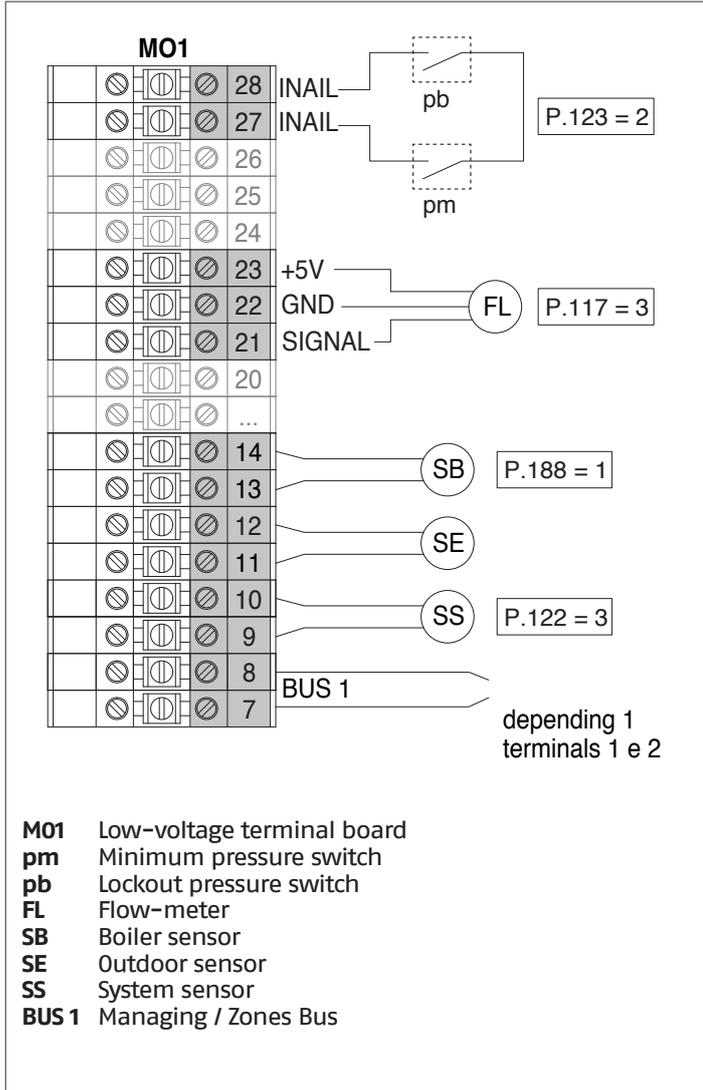
4.3.7 Block diagram 3

Cascaded thermal units with single pump for each thermal unit and system and cascade sensors.
 Management of a DHW circuit with two direct zones and a mixed zone, with electronic zone management device (ZM).



- Install thermal units of similar power to maximise the cascaded system's performance.
- The DHW circuits and CH circuits must be provided with expansion tanks of adequate capacity and suitably sized safety valves. The drain from the safety valves and appliances must be connected to a suitable collection and evacuation system (see catalogue for compatible accessories).
- The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- Special supply/refill water must be conditioned using suitable treatment systems.
- It is prohibited to operate the thermal module without water.

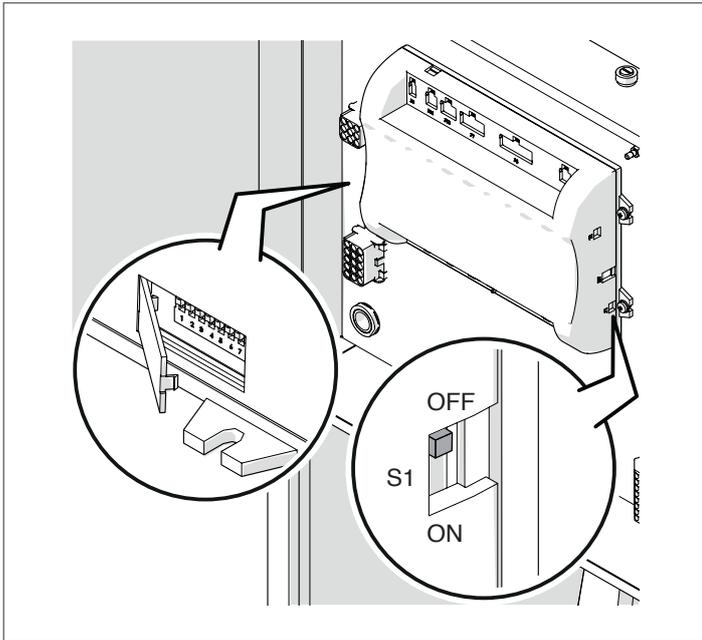
MANAGING CONNECTIONS



Hardware configuration

S1 = OFF (not used)

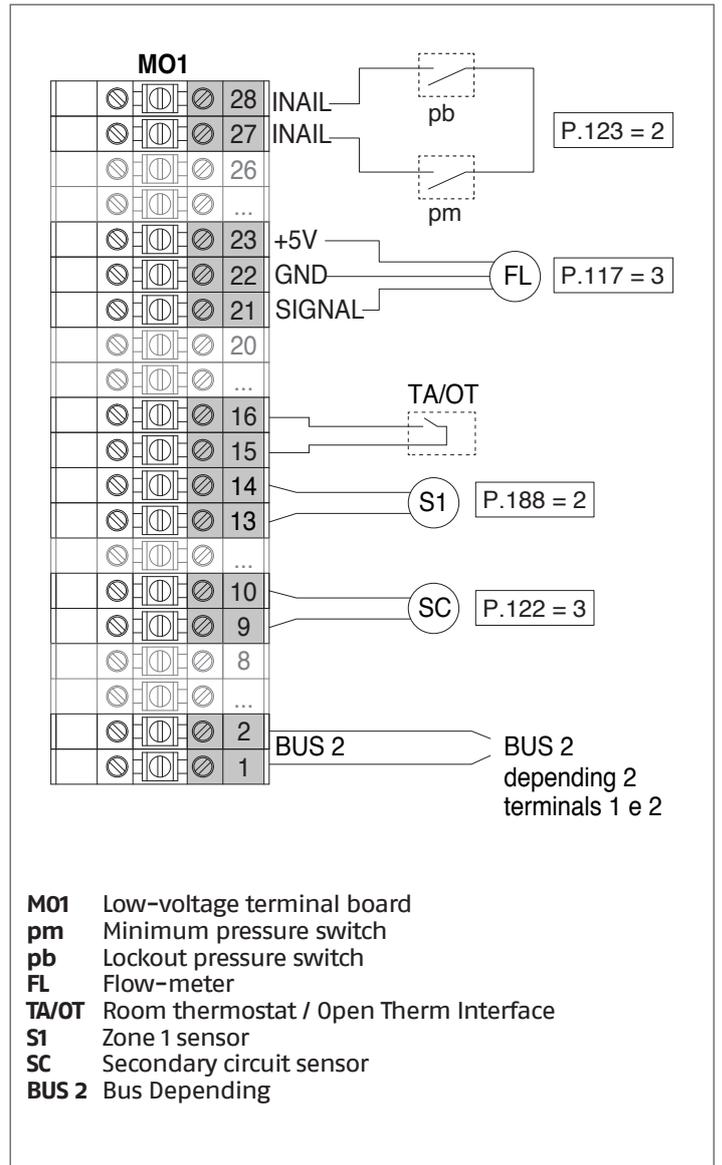
DIPSWITCH = 10000000

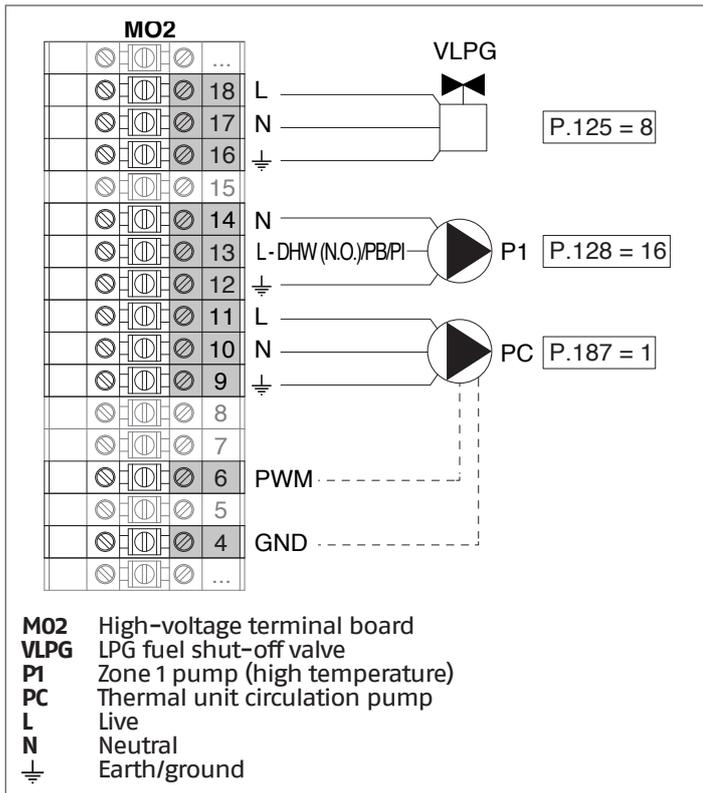


| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 1st module (Managing) |

For further information see section "System management".

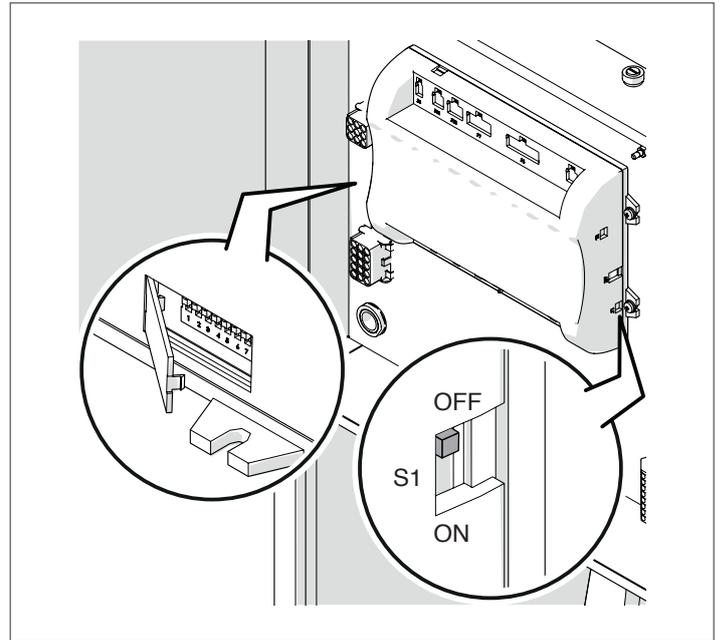
DEPENDING CONNECTIONS 1





Hardware configuration

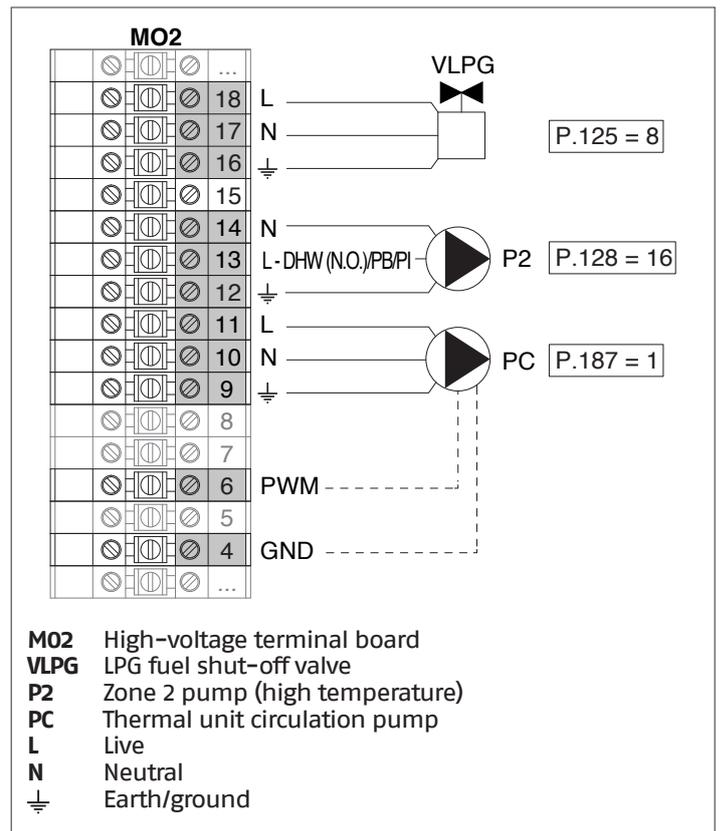
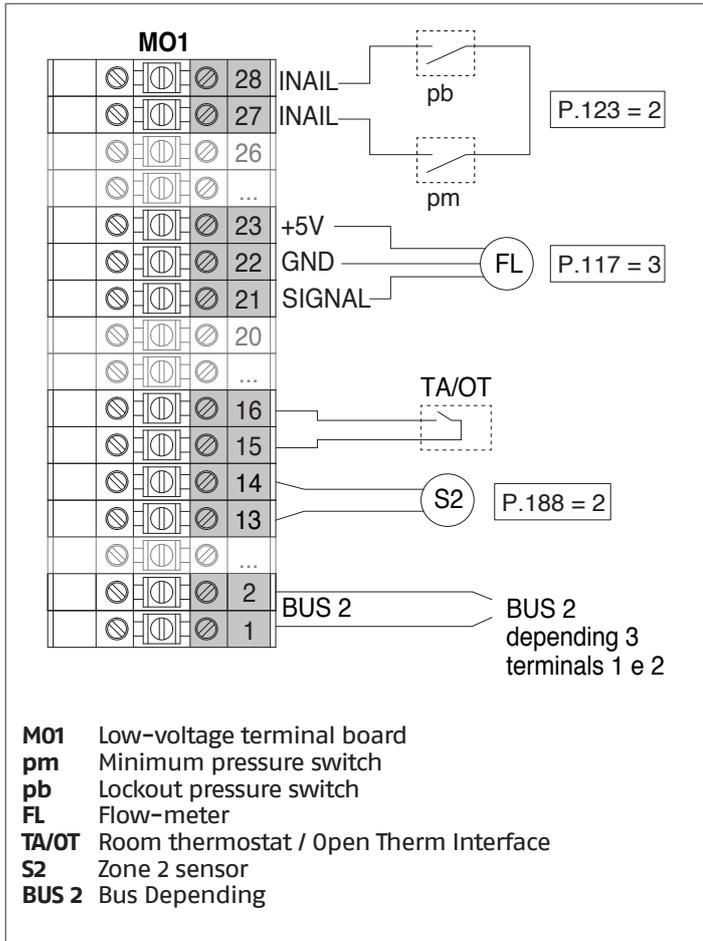
S1 = OFF (not used)
 DIPSWITCH = 01000000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 2nd module (Depending) |

⚠ For further information see section "System management".

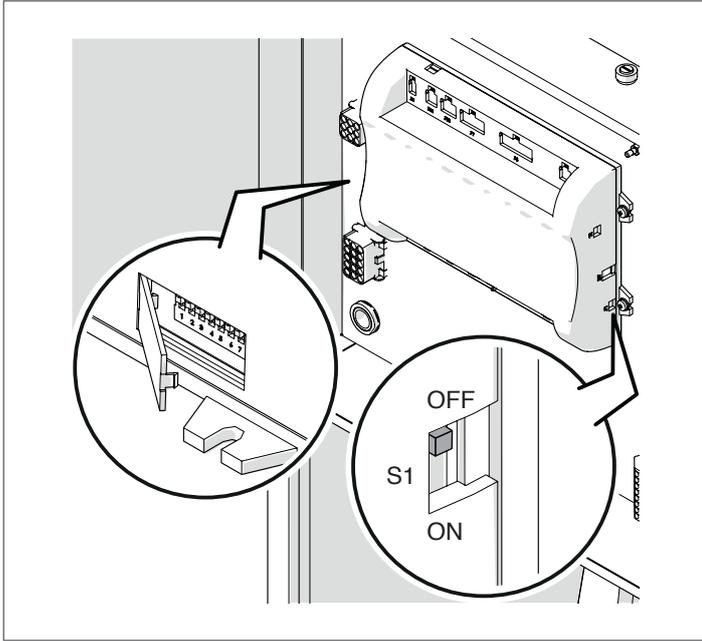
DEPENDING CONNECTIONS 2-8



Hardware configuration

S1 = OFF (not used)

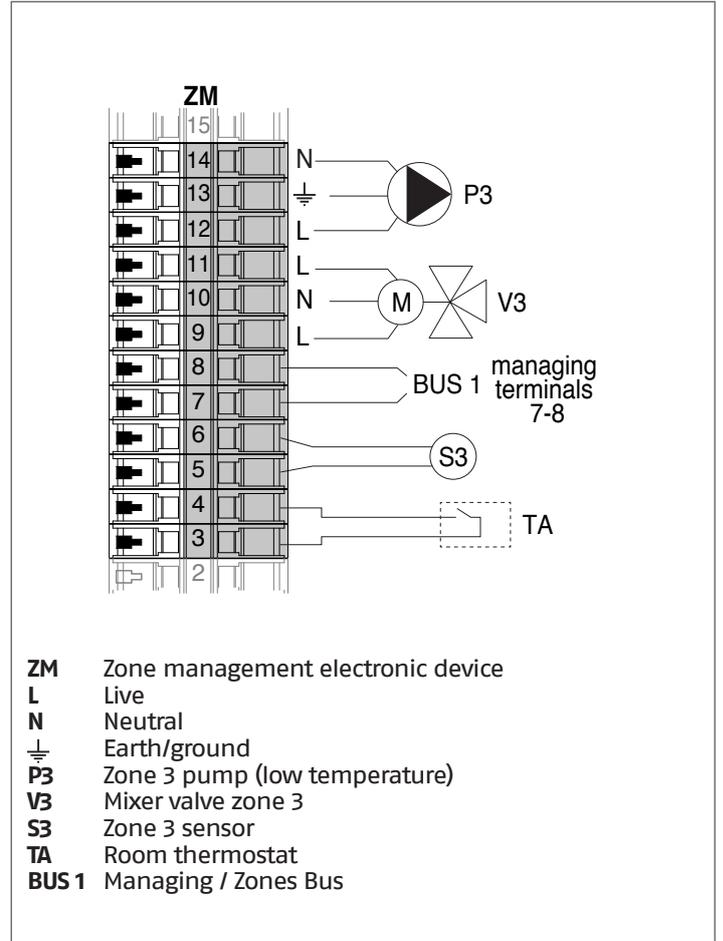
DIPSWITCH = 00100000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 3rd module (Depending) |
| | 4th module (Depending) |
| ↓ | ↓ |
| | 8th module (Depending) |

For further information see section "System management".

ZONE MANAGEMENT ELECTRONIC DEVICE



4.3.8 System parameters Block diagram 3

⚠ See section "Commissioning and maintenance" for a detailed description of how the parameters work

MANAGING

Functions:

- Reads system sensor (SS)
- Controls thermal unit pump (PC)
- Controls DHW pump (PB)
- Reads storage tank sensor (SB)
- Manages control of mixed zone 3 zone management (ZM) device via bus. Up to a maximum of 16 devices can be managed.

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|-----------------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (VPLG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 16 = Zone pump (P1) | M02 | 12-13-14 |
| 122 | Prog Input 7 | 3 = System sensor (used as cascade sensor SC) | M01 | 9-10 |
| 188 | Prog Input 9 | 2 = Zone sensor (S1) | M01 | 13-14 |

- (*) Do NOT change the factory setting of parameter 97
 (**) In place of the fuel shut-off valve VPLG

Configuration of parameters for INAIL kit (*)**

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
 DIPSWITCH = 10000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|----------------------|-----------------------------------------------------------------------------------------------------------|
| 73 | Boiler Address | - "Managing" (if the cascade sensor is used SC) - "Stand-Alone" (if the cascade sensor is not used SC) |
| 147 | Number of Units | Set the total number of cascaded units (from 2 to 8) |
| 184 | No. Active DHW units | 0 to 8 (Number of active units for DHW production) |
| 7 | CH Hysteresis | 7°C |
| 35 | DHW mode | Choose from: 1 = Water heater with probe 2 = Water heater with thermostat |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

Configuration of cascade parameters

| Par. No. | Description | Parameter setting |
|----------|--------------------------|--------------------------------------------------------------------------------|
| 148 | Power Mode | Choose from: 2 = Maximum number of burners 3 = Minimum number of burners |
| 152 | PwrMode2 Min Power | 4% |
| 153 | PwrMode2 Hysteresis | 40% |
| 84 | Module Rotation Interval | 5 days |
| 74 | Emergency mode setpoint | 50 (according to need) |

DEPENDING 1

Functions:

- Reads the secondary circuit sensor (SC)
- Controls thermal unit pump (PC)
- Controls the pump in a DEPENDENT direct zone (P1) with the zone sensor (S1), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|-----------------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 16 = Zone pump (P1) | M02 | 12-13-14 |
| 122 | Prog Input 7 | 3 = System sensor (used as cascade sensor SC) | M01 | 9-10 |
| 188 | Prog Input 9 | 2 = Zone sensor (S1) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
DIPSWITCH = 01000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

DEPENDING 2-8

Functions:

- Controls thermal unit pump (PC)
- Controls the pump in a DEPENDENT direct zone (P2) with the zone sensor (S2), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 1 = General pump (PC) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 16 = Zone pump (P2) | M02 | 12-13-14 |
| 188 | Prog Input 9 | 2 = Zone sensor (S2) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

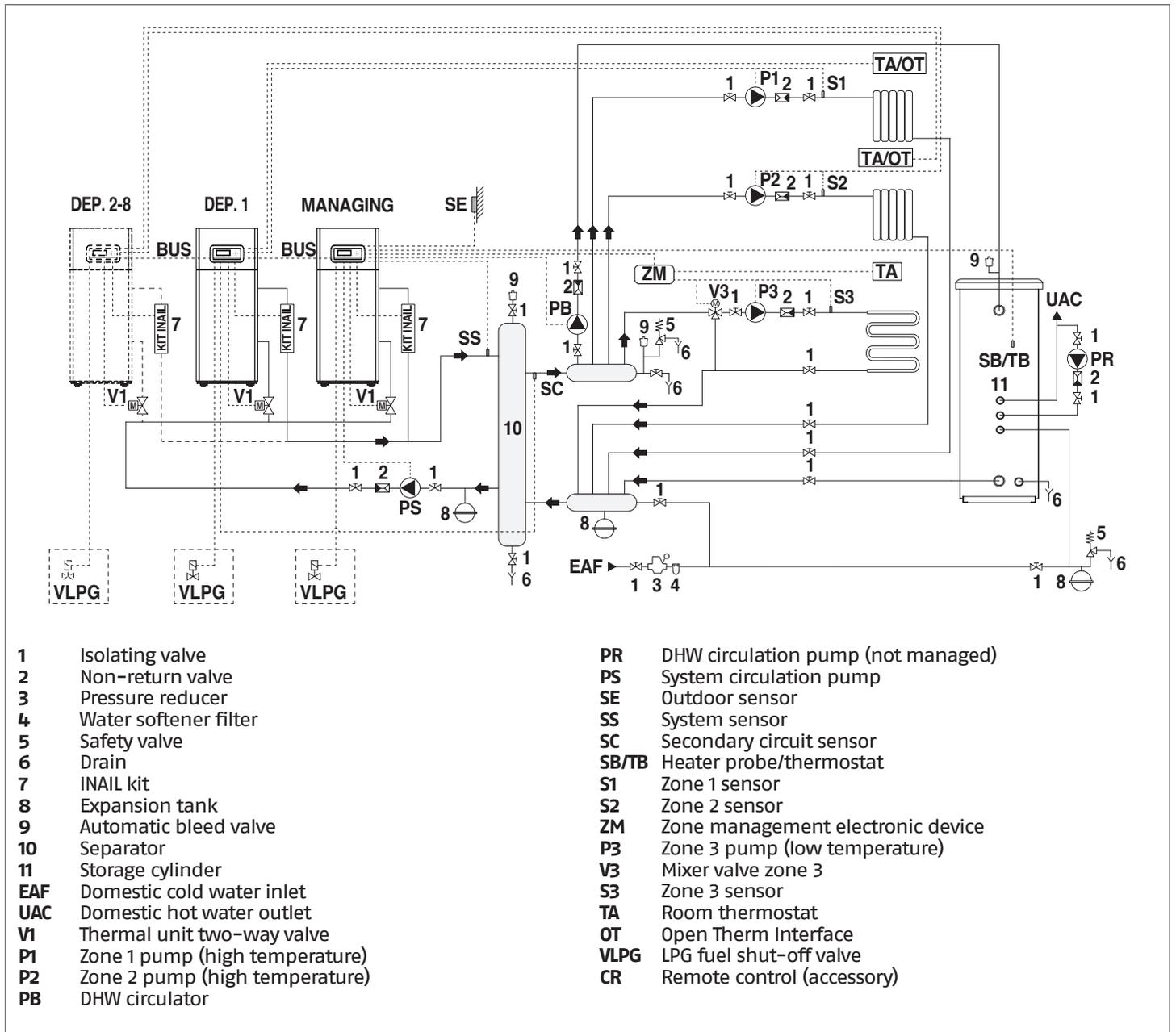
S1 = OFF (not used)
DIPSWITCH = 00100000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

4.3.9 Block diagram 4

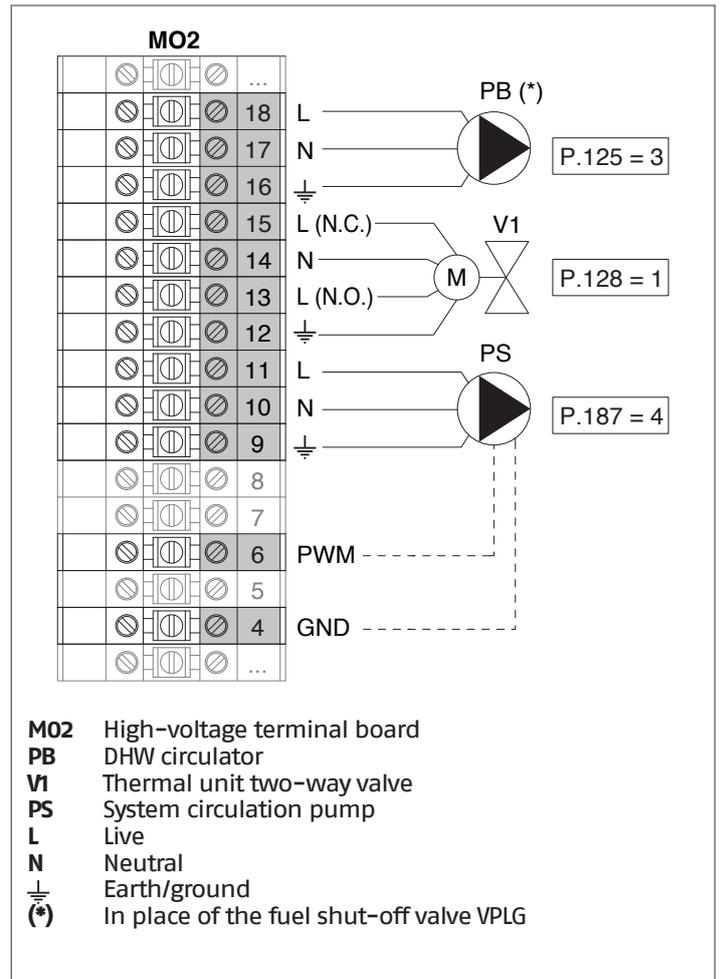
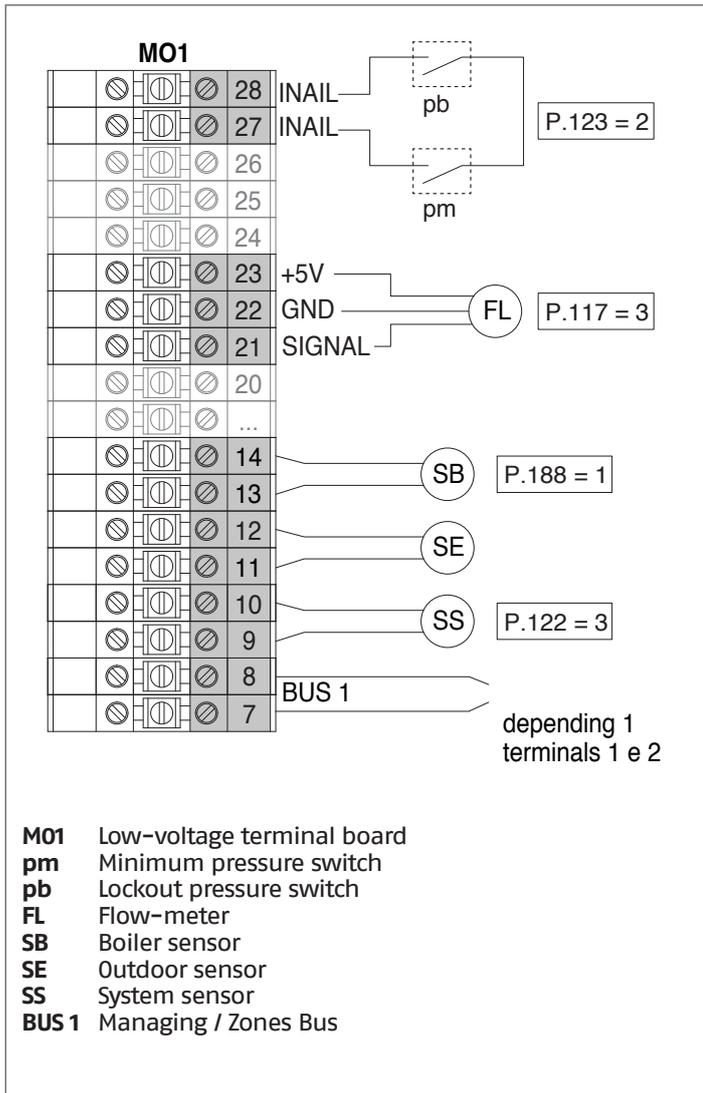
Cascaded thermal units with two-way valve for each thermal unit, system pump, and system and cascade sensors. Management of a DHW circuit with two direct zones and a mixed zone, with electronic zone management device (ZM).



- Install thermal units of similar power to maximise the cascaded system's performance.
- The DHW circuits and CH circuits must be provided with expansion tanks of adequate capacity and suitably sized safety valves. The drain from the safety valves and appliances must be connected to a suitable collection and evacuation system (see catalogue for compatible accessories).
- The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- Special supply/refill water must be conditioned using suitable treatment systems.
- It is prohibited to operate the thermal module without water.

4.3.10 Electrical connections - Diagram 4

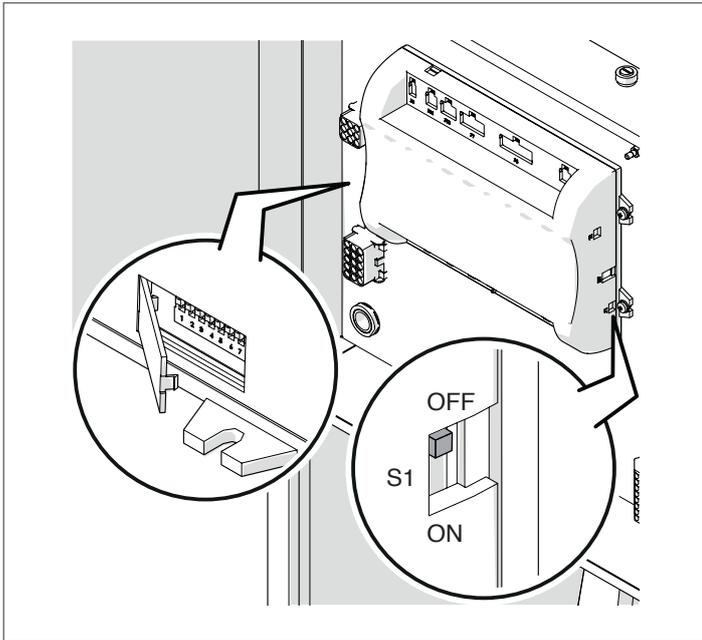
MANAGING CONNECTIONS



Hardware configuration

S1 = OFF (not used)

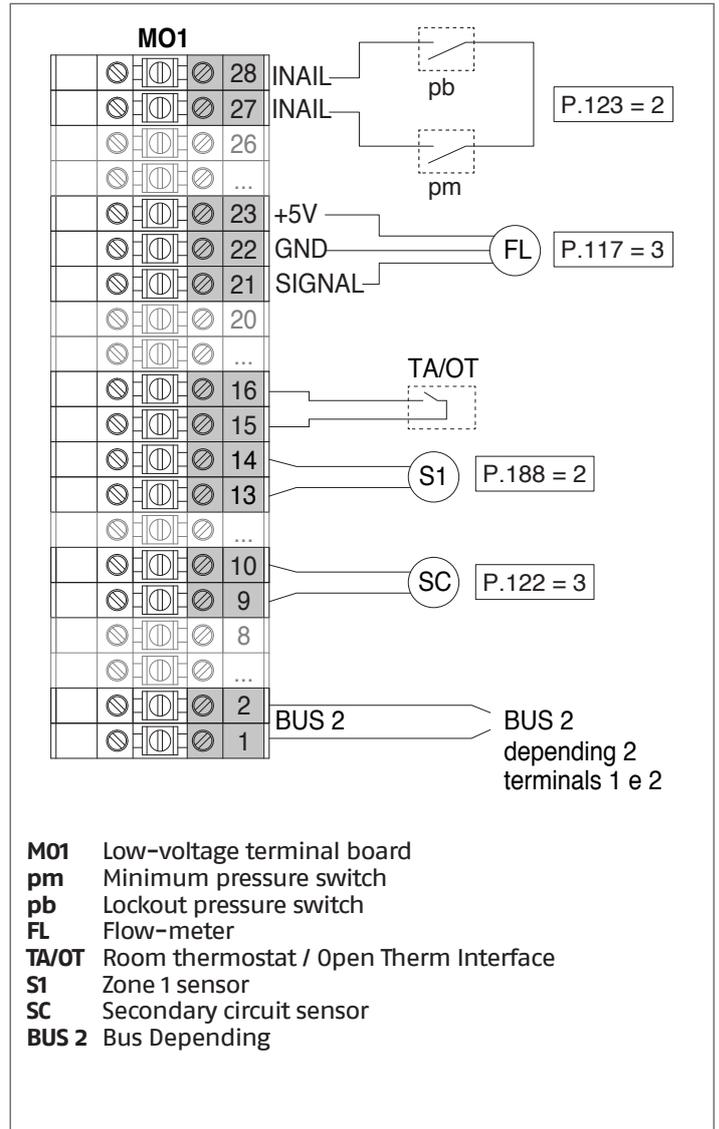
DIPSWITCH = 10000000



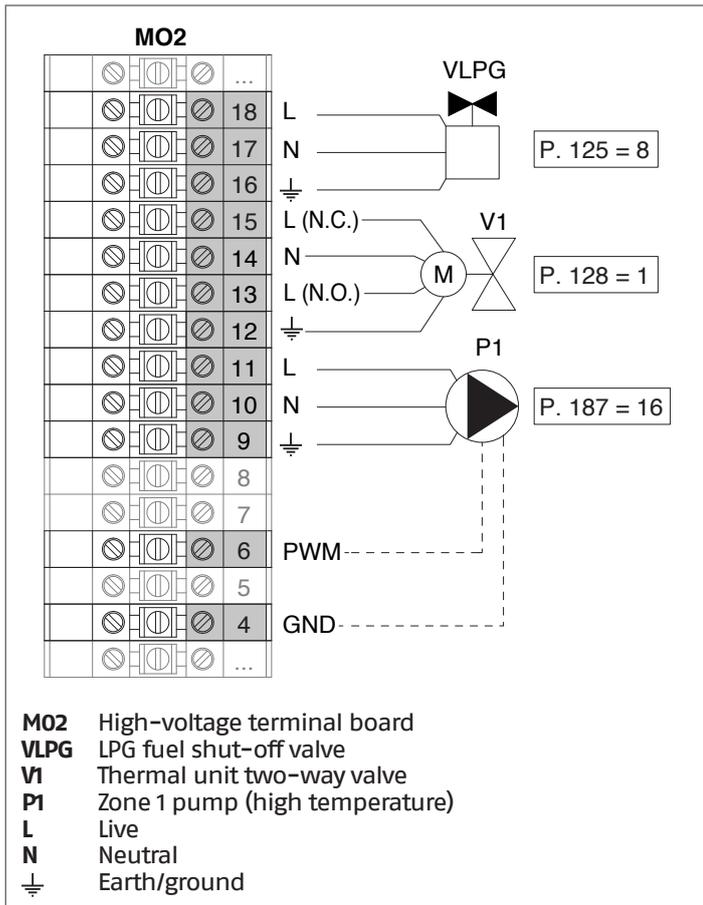
| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 1st module (Managing) |

For further information see section "System management".

DEPENDING CONNECTIONS 1

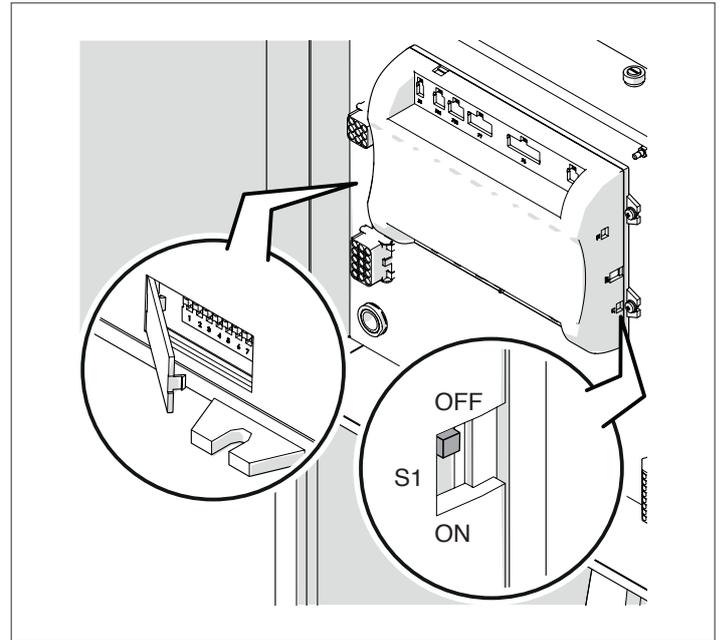


- M01** Low-voltage terminal board
- pm** Minimum pressure switch
- pb** Lockout pressure switch
- FL** Flow-meter
- TA/OT** Room thermostat / Open Therm Interface
- S1** Zone 1 sensor
- SC** Secondary circuit sensor
- BUS 2** Bus Depending



Hardware configuration

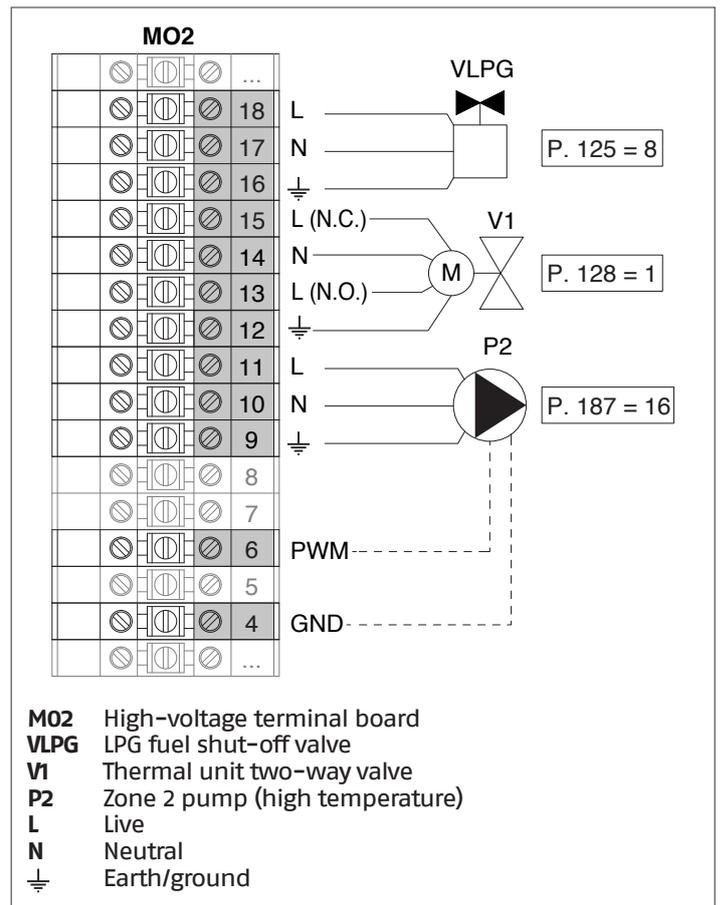
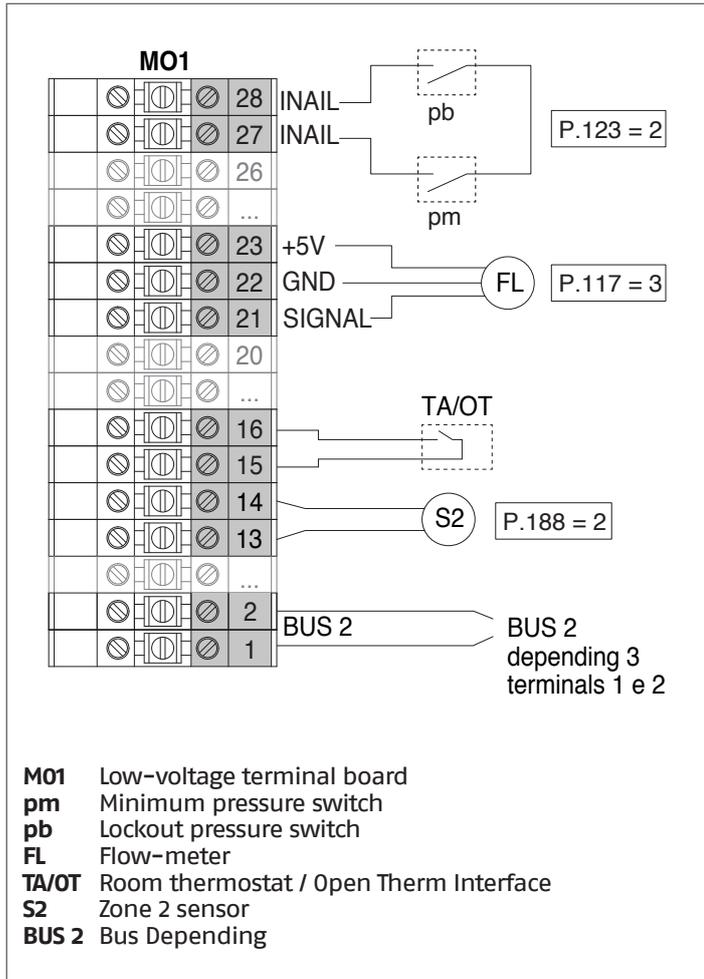
S1 = OFF (not used)
 DIPSWITCH = 01000000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 2nd module (Depending) |

⚠ For further information see section "System management".

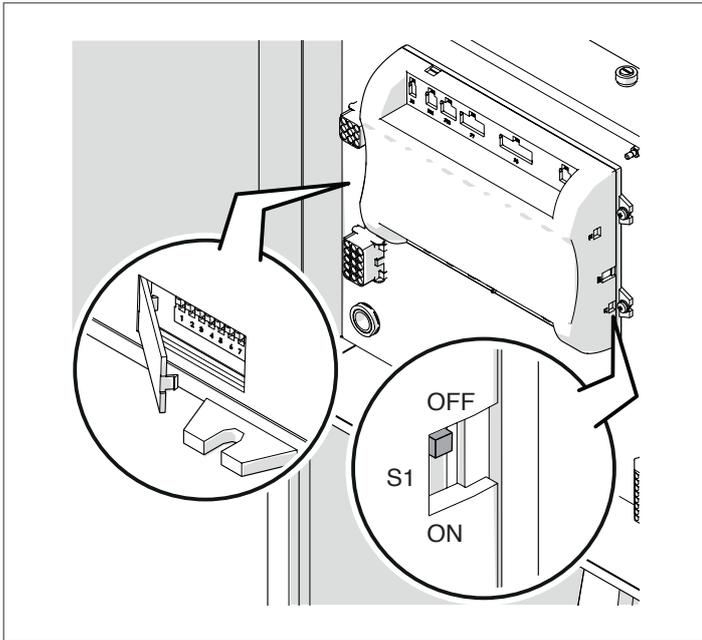
DEPENDING CONNECTIONS 2-8



Hardware configuration

S1 = OFF (not used)

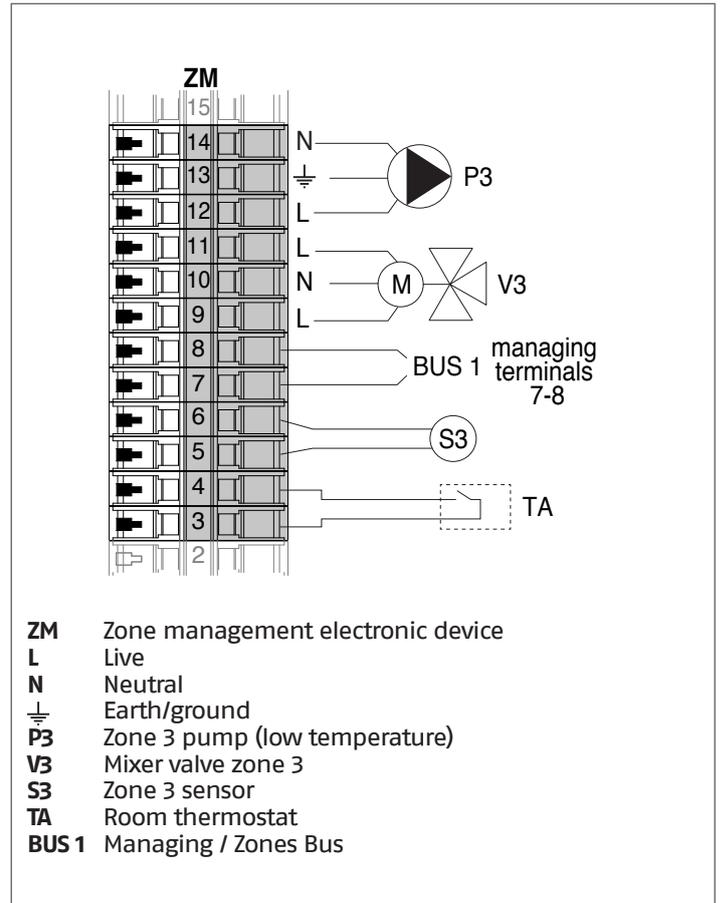
DIPSWITCH = 00100000



| Key | |
|------------------------|------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | 3rd module (Depending) |
| | 4th module (Depending) |
| ↓ | ↓ |
| | 8th module (Depending) |

For further information see section "System management".

ZONE MANAGEMENT ELECTRONIC DEVICE



4.3.11 System parameters Block diagram 4

⚠ See section "Commissioning and maintenance" for a detailed description of how the parameters work

MANAGING

Functions:

- Reads system sensor (SS)
- Controls thermal unit two-way valve (V1)
- Controls system pump (PS)
- Controls DHW pump (PB) instead of the LPG gas solenoid valve (VLPG)
- Reads storage tank sensor (SB)
- Manages control of mixed zone 3 zone management (ZM) device via bus. Up to a maximum of 16 devices can be managed.

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 3 = DHW pump (**) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 4 = System pump (PS) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |
| 122 | Prog Input 7 | 3 = System sensor (SS) | M01 | 9-10 |
| 188 | Prog Input 9 | 1 = DHW sensor (SB) | M01 | 13-14 |

- (*) Do NOT change the factory setting of parameter 97
 (**) In place of the fuel shut-off valve VPLG

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|------------------|---------------------------|---------------|----------|
| 123 | Progr.ble inp. 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Progr.ble inp. 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
 DIPSWITCH = 10000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|----------------------|-----------------------------------------------------------------------------------------------------------|
| 73 | Boiler Address | - "Managing" (if the cascade sensor is used SC) - "Stand-Alone" (if the cascade sensor is not used SC) |
| 147 | Number of Units | Set the total number of cascaded units (from 2 to 8) |
| 184 | No. Active DHW units | 0 to 8 (Number of active units for DHW production) |
| 7 | CH Hysteresis | 7°C |
| 35 | DHW mode | Choose from: 1 = Water heater with probe 2 = Water heater with thermostat |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

Configuration of cascade parameters

| Par. No. | Description | Parameter setting |
|----------|--------------------------|--------------------------------------------------------------------------------|
| 148 | Power Mode | Choose from: 2 = Maximum number of burners 3 = Minimum number of burners |
| 152 | PwrMode2 Min Power | 4% |
| 153 | PwrMode2 Hysteresis | 40% |
| 84 | Module Rotation Interval | 5 days |
| 74 | Emergency mode setpoint | 50 (according to need) |

DEPENDING 1

Functions:

- Reads the secondary circuit sensor (SC)
- Controls thermal unit two-way valve (V1)
- Controls the pump in a DEPENDENT direct zone (P1) with the zone sensor (S1), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|---------------------------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 16 = Zone pump (P1) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |
| 122 | Prog Input 7 | 3 = System sensor (used as secondary circuit sensor SC) | M01 | 9-10 |
| 188 | Prog Input 9 | 2 = Zone sensor (S1) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
DIPSWITCH = 01000000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

DEPENDING 2-8

Functions:

- Controls thermal unit two-way valve (V1)
- Controls the pump in a DEPENDENT direct zone (P2) with the zone sensor (S2), with the consent of TA/OT (room thermostat/Open Therm interface)

Programmable outputs and inputs parameter configuration (*)
(If Par. 97 = 21-22-23-24-25 - Stand alone configuration)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|-------------------|------------------------------------|---------------|----------|
| 125 | Progr.ble outp. 1 | 8 = LPG gas solenoid valve (V LPG) | M02 | 16-17-18 |
| 187 | Progr.ble outp. 5 | 16 = Zone pump (P2) | M02 | 9-10-11 |
| 128 | Progr.ble outp. 4 | 1 = General pump (V1) | M02 | 13-14-15 |
| 188 | Prog Input 9 | 2 = Zone sensor (S2) | M01 | 13-14 |

(*) Do NOT change the factory setting of parameter 97

Configuration of parameters for INAIL kit (***)

| Par. No. | Description | Parameter setting | Terminals No. | |
|----------|--------------|---------------------------|---------------|----------|
| 123 | Prog Input 8 | 2 = Water pressure switch | M01 | 27-28 |
| 117 | Prog Input 2 | 3 = Heating flowmeter | M01 | 21-22-23 |

(***) An INAIL kit is required for each thermal unit

Hardware configuration

S1 = OFF (not used)
DIPSWITCH = 00100000

Configuration of boiler parameters

| Par. No. | Description | Parameter setting |
|----------|-------------------|-----------------------------------------|
| 205 | Dep. Zone Control | 1 = Enabled (according to need) |
| 7 | CH Hysteresis | 7°C |
| 135 | Mod. Pump Type | 2 = Grundfos (choose according to need) |
| 136 | Mod. pump mode | Fixed 90% (according to need) |
| 140 | Minimum Flow | 5 l/min |

4.3.12 Adjusting setpoint

Adjusting setpoint with sensor on primary circuit (SS)

Through setting the following parameters you can manage automatically decreasing/increasing the setpoint, if necessary, based on the value detected by the primary circuit sensor (SS). The setpoint will be decreased/increased after the time set in Par. 81 has elapsed.

Reference Menu:

M2 Cascaded module configuration menu

M3 Cascaded boiler configuration menu

Access type:

I Installer

O Manufacturer

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type |
|------|----------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|------|-------------|
| M2 | 79 | Max. Setp. Offset Down | Defines the maximum decrease in the cascade setpoint on the primary circuit. It is based on the reading of the primary circuit sensor (SS). | 0...40 | 2 | °C | I |
| | 80 | Max. Setp. Offset Up | Defines the maximum increase in the cascade setpoint on the primary circuit. It is based on the reading of the primary circuit sensor (SS). | 0...40 | 5 | °C | I |
| | 81 | Start Mod. Delay Fact. | Defines the time in minutes from the moment the demand is triggered until the activation of the set-point increases or decreases provided for by Par. 79 e 80. | 0...60 | 60 | Min. | I |
| | 86 | PID P | Defines the proportional term to change the setpoint of the cascade module. | 0...1275 | 50 | | O |
| | 87 | PID I | Defines the integral term to change the setpoint of the cascade module. | 0...1275 | 500 | | O |

Adjusting setpoint with sensor on secondary circuit (SC)

Through setting the following parameters you can manage automatically decreasing/increasing the setpoint, if necessary, based on the value detected by the secondary circuit sensor (SC). The setpoint will be decreased/increased after the time set in Par. 171 has elapsed.

| Menu | Par. No. | Nr. displayed Display | Description | Range | Default setting | UM | Access type |
|------|----------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|------|-------------|
| M3 | 169 | Max. Setp. Offset Down | Defines the maximum decrease in the cascade setpoint on the primary circuit. It is based on the reading of the secondary circuit sensor (SC). | 0...40 | 2 | °C | I |
| | 170 | Max. Setp. Offset Up | Defines the maximum increase in the cascade setpoint on the primary circuit. It is based on the reading of the secondary circuit sensor (SC). | 0...40 | 5 | °C | I |
| | 171 | Start Mod. Delay Fact. | Defines the time in minutes from the moment the request is triggered until the activation of the set-point increases or decreases provided for by Par.169 e 170. | 0...60 | 40 | Min. | I |
| | 176 | PID P | Defines the proportional term to change the set-point of the cascade module based on the secondary circuit's temperature. | 0...1275 | 25 | | O |
| | 177 | PID I | Defines the integral term to change the set-point of the cascade module based on the secondary circuit's temperature. | 0...1275 | 1000 | | O |

5 SYSTEM MANAGEMENT

5.1 Communication between the thermal modules

Communication between all the modules installed is a fundamental aspect in a system with multiple thermal modules.

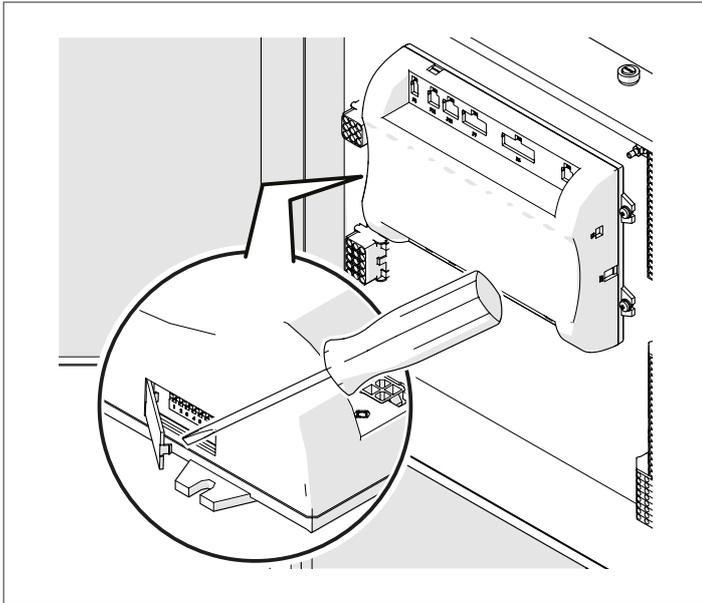
The essential steps for configuration are:

- allow the Managing module to recognise which and how many depending modules are present in the system. Act on the dip-switch
- connect the thermal modules with a BUS cable to allow communication between the control units.

5.1.1 Setting the dip-switch

The dip-switches of all the thermal modules in the system must be set, and each must be set with an unequivocal sequence. This way the controller of the Managing module will be able to recognise which thermal modules are present in the system.

To access the dip-switches, open the hatch using a flat-bladed screwdriver.



! The setting must be carried out on each thermal module. For configuration of the individual thermal module, refer to the following table.

| Key | |
|------------------------|-----------------------------------------------------------------------------------------|
| | Dip switch ON |
| | Dip switch OFF |
| Setting the Dip-switch | Thermal Module Configuration |
| | Stand-alone module (all the dip-switches set to OFF, configuration not used in cascade) |
| | 1st module (Managing) |
| | 2nd module (Depending) |
| | 3rd module (Depending) |
| | 4th module (Depending) |
| ↓ | ↓ |
| | 8th module (Depending) |

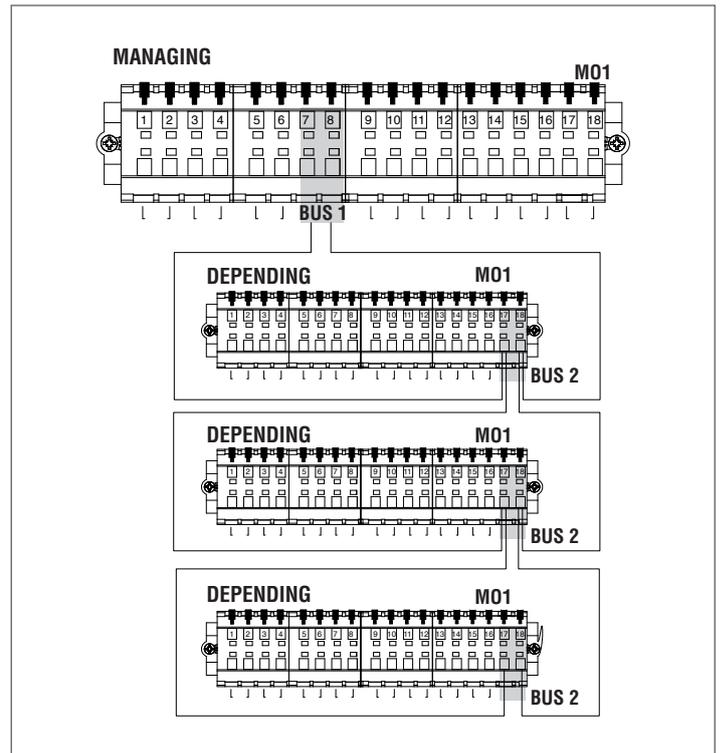
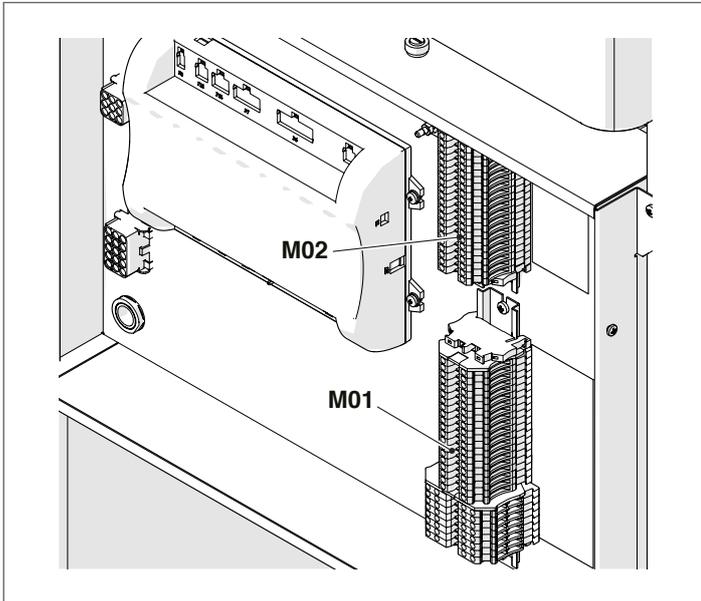
! If two modules have the same Dip-switch setting, the Managing module will signal a communication error and the cascade will not work correctly.

! A module will not be considered if it has the setting of all the Dip-switches set to OFF.

5.2 Bus connections

Identify the terminal boards located beside the controller. The bus connections are to be made on the low voltage terminal board (M01).

Thermal module terminal board



⚠ The bus connection to the Depending thermal modules must be made in parallel without the closing terminal which would cause a short circuit.

⚠ Use the "Remote control" accessory connected to the "Managing" boiler to run programming for the dependent zone.

5.2.1 Zone control with Depending module

If used on a cascade system, with heating zone control using DEPENDING thermal module, after carrying out the connections as described in the Cascade Manual, the following modifications need to be made.

On the display of the Depending thermal module to which the zone is connected:

Par. 205

By default the parameter is disabled. To enable the recognition of the zone the value must be changed from "DIS" to "ENA" and confirmed.

When the modifications are complete the following new functions will be available on the display of the device:

- in the "Information" menu the number of the connected zone appears (zone of the dependent), from where it is possible to display information about it;
- in the "Settings" menu two new lines will be displayed:
 - "Config. Zone Dep."
 - "Clim. Curve Zone Dep."
- The following new row will appear in the "Clock program" menu:
 - "Program CH Zone Dep."

5.2.2 Deleting dependent zone

To remove a Dependent zone operate in the reverse way to its installation:

- enter the parameters menu and select the par. 205. Change its value from "ENA" to "DIS";

On the "Information" menu:

- enter "Status zone dep.";
- select the number of the depending zone;
- The "Detection" field will indicate "NO";
- select "Remove zone" changing to "YES" and confirm.

Now in the "Settings" and "Information" menus the depending zone will no longer be displayed.

 For thermal units **TAU Unit** it is possible to manage only direct Depending zones (high temperature).

The electronic control of the thermal module will automatically check which zones are connected to the bus.

The zone menu headings in the thermal unit electronic control will be available on the managing display menu, when 1 or more zone management devices are detected.

The electronic control of the thermal module remembers the zone number detected when a device is connected.

The zone number detected is not automatically removed when the corresponding accessory is no longer connected.

The zone number needs to be removed manually.

Removing the zone number

- remove the bus connection of the zone to be deleted;
- access the Settings/Zone Config./Zone;
- select the disconnected zone;
- go to Remove Zone;
- press the ► key to highlight the values, change them to "Yes" with the ▲ / ▼ keys, press the ● key to confirm and remove the zone from the display menus.

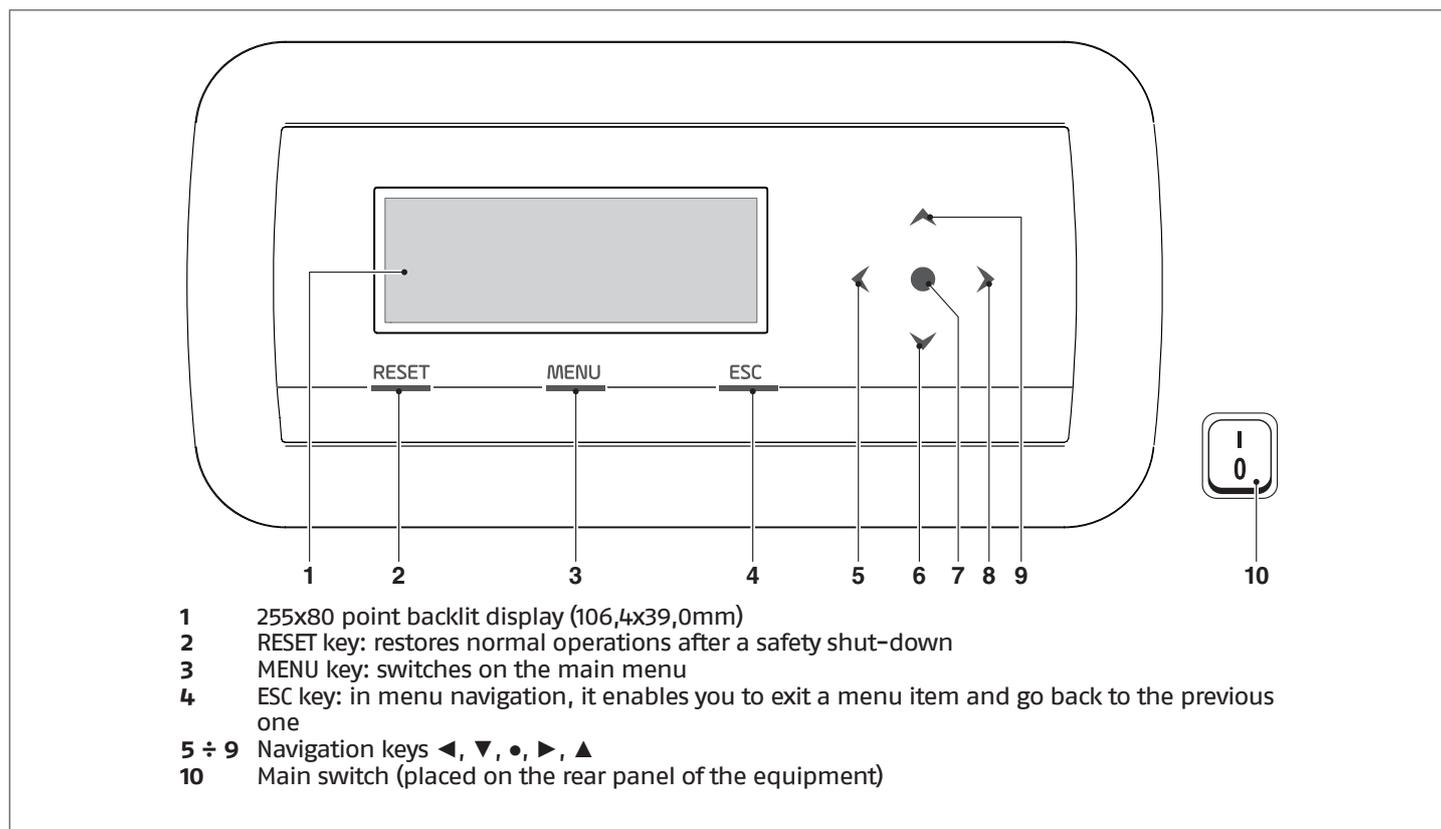
Example:

| | |
|-----------------|----|
| External Zone 2 | |
| Detection | No |
| Remove Zone | No |

| | |
|-----------------|-----|
| External Zone 2 | |
| Detection | No |
| Remove Zone | Yes |

5.3 Setting depending zone parameters

Controls interface



5.4 Setting zone parameters (accessible only with installer password)

Menu → "Settings" → ""Config. Dep. Zone"

This menu allows you to separately set the parameters of all the connected zones with the exception of the "Extra setpoint zone" which is the same for all zones.

To select the zone for controlling/changing the parameters, proceed as follows:

- press the ▶ key so that the number to the right of "zone" is highlighted;
- once the number is highlighted use the ▲ and ▼ keys to change the number of the zone;
- once the zone is selected, confirm with the • key.

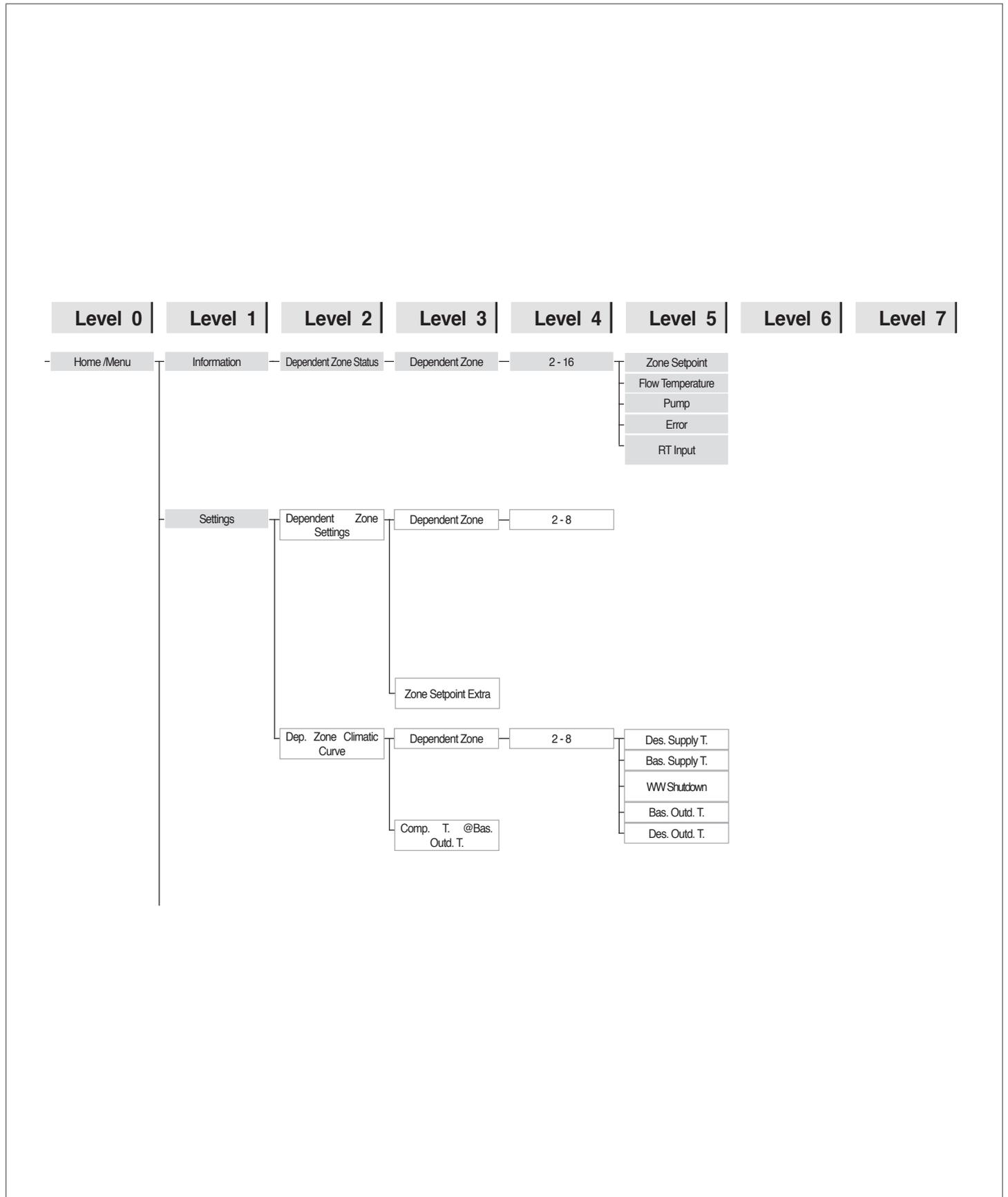
The zone parameters are the following:

| Description | Standard value that is set | Range | Explanation | UM |
|-------------------------|----------------------------|-------|-------------------------------------------------------------------------------------|------|
| Post-circ. Zone Pump | 120 | 0-255 | Establishes the time in seconds of the post-circulation | Secs |
| Extra zone setpoint (*) | 10 | 0-30 | Establishes the increase for the primary setpoint with respect to the zone setpoint | °C |

⚠ For more information regarding navigating the commands interface (thermal module display) see the paragraph "Electronic control".

⚠ (*) If a direct depending zone is used, set the Extra zone setpoint value to 0

5.4.1 Menu structure

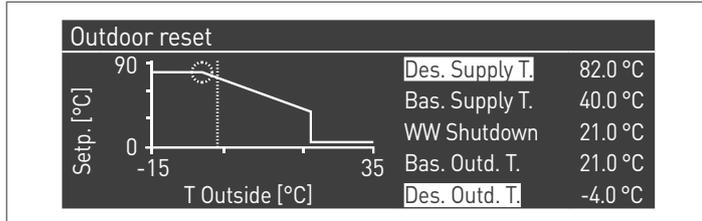


5.5 Setting zone's climatic curve parameters (accessible only with installer password)

Menu → "Settings" → "Zone Clim. Curve"

- press the ► key so that the number is highlighted on the right of the word "Zone";
- use the ▲ and ▼ keys to change the zone number;
- press the ● key.

The following is displayed:

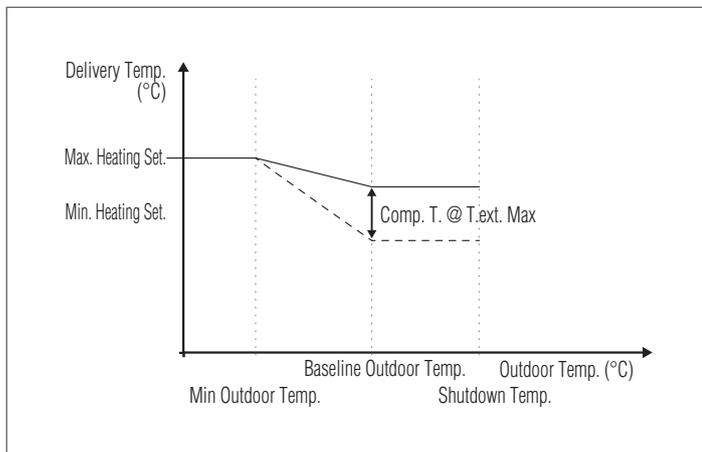


The "Comp. T. @ T.ext. Max" parameter, if other than 0, transforms the climatic curve from linear to quadratic allowing you to best adapt the variation of the setpoint to the variation of the outdoor temperature.

The resulting quadratic climatic curve will have three parameters:

- Heat. Set. Max
- Baseline Outdoor Temp.
- T. Out. Min

of the basic linear climatic curve and a value of the Heat. Set. Min. diminished by the value of the parameter "Comp. T. @ T.ext. Max", as can be seen in the example in the figure.



⚠ When more than one direct zone activates a heat request at the same time, the delivery setpoint will be equal to the highest setpoint of the zones making the request.

⚠ To set the direct zone with a fixed setpoint, the zone setpoint values "Max. Set. CH" and "Min. Set. CH" must be equal.

5.6 Programming the zone

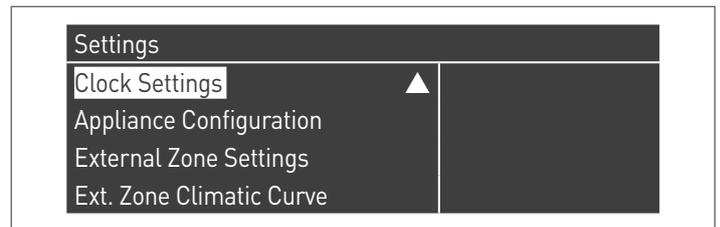
By default the schedule timer is disabled.

To start up a request from the zone, just close the zone request contact. In that event the thermal unit (or the cascade of thermal units) will start up with a setpoint equal to the value calculated on the zone climatic curve increased by the "Zone Extra Setpoint" value and, if it is a mixed zone, the mix valve will modulate to maintain the delivery temperature of the zone at the setpoint calculated.

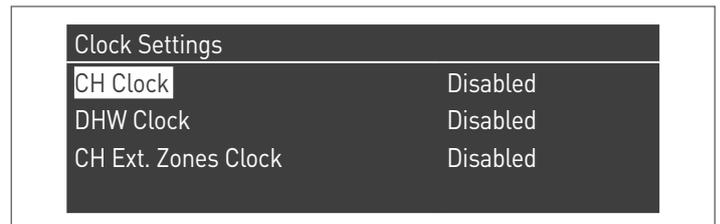
If there is no external sensor, the delivery setpoint of the thermal unit will be equal to the maximum setpoint of the climatic curve.

To activate zone programming:

Menu → "Settings" → "Clock Settings"



Confirming with ● the following screen is displayed:



- with the ▲ / ▼ keys select "CH Zones clock"
- with the ► key move to "Disabled", change it to "Enabled" with the ▲ / ▼ keys
- confirm with the ● key

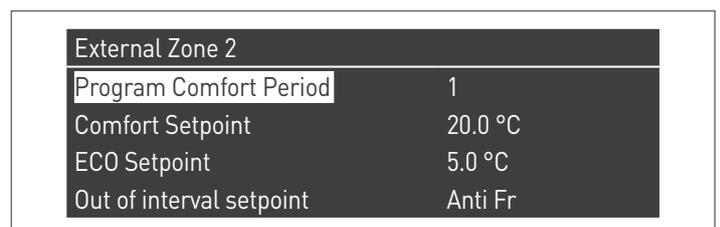
Go to:

Menu → "Clock program"

Confirming with the ● key:



At this point select the number of the zone to be programmed and confirm with the ● key.



The programmable periods for each zone are 7 and they can be selected by changing the number that appears beside "Program Comfort period".

The "Comfort Setpoint" is the setpoint that is set for the area served by the zone in the active time band established within the period and can be set between ten and forty degrees. Setting the "Comfort Setpoint" at a default of 20°C, the climatic curve that regulates the setpoint of the zone is exactly that which was set in paragraph Setting zone's climatic curve parameters (accessible only with installer password) on page 116 125.

By changing the "Comfort Setpoint" the climatic curve is moved upwards or downwards depending on whether the setpoint is higher or lower than 20°C. The curve will shift by two degrees for each degree of difference between the value of the setpoint and the value 20.

The "ECO Setpoint" is a setpoint that can be set between 5 and 20 degrees and can be selected as a setpoint for the area served by the zone outside the active time band.

The "Out of the interval Setpoint" defines how the zone outside the active time bands are managed (within which the setpoint of the area is always set on "comfort").

The selections for the "Out of the interval Setpoint" are the following:

- **Eco:** the ambient setpoint is set to ECO. The zone setpoint is changed by two degrees less for each degree of difference between the ECO setpoint and the value 20 (for example, if at 20° I have a setpoint of 50, at 18 degrees I have a setpoint of $50+2*(18-20)=46$).
- **Night-time:** the zone setpoint is lowered by 10 degrees with respect to the value of the zone setpoint set.
- **Antifreeze:** the ambient setpoint is set at 10°C, thereby achieving a reduction compared to the zone setpoint of 20°C.
- **Off:** in this case the delivery of heat is interrupted.
- **Comfort:** the setpoint remains the same as that for the active time bands. This choice clearly makes no sense when scheduling is desired, but it can be useful if you want to provide heat continuously without changing the programming itself.

 So that the zone programming works the "heat request" contact should be closed. Otherwise the zone will ignore any request from the schedule timer.

5.7 Scheduling the time bands

By going to:
Menu → "Clock program" → "Zones CH Program "

| Dependent Zone 2 | |
|--------------------------|---------|
| Program Comfort Period | 1 |
| Comfort Setpoint | 20.0 °C |
| ECO Setpoint | 5.0 °C |
| Out of interval setpoint | Anti Fr |

Entering in "Program Comfort Period":

| Dependent Zone 2 - Period 1 | | |
|-----------------------------|---------------|-------|
| Active Day(s) | Monday-Sunday | |
| Interval 1 | 07:10 | 11:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

Using the option "Active Day(s)" it is possible to select the scheduling period. You can select a day of the week or else one of these three groups of days:

- Mon-Sun
- Mon-Fri
- Sat-Sun

This facilitates weekly scheduling or else scheduling that is different during the work week and the week-end.

There are three active time bands for each period. The time resolution is 10 minutes.

5.8 Information on the operation of the zone

By going to:
Menu → "Information" → "Zone Status"

| Dependent Zone Status 2 | |
|-------------------------|---|
| Dependent Zone | 1 |

To choose the zone whose information will be displayed, proceed in the same way as in the previous paragraph.

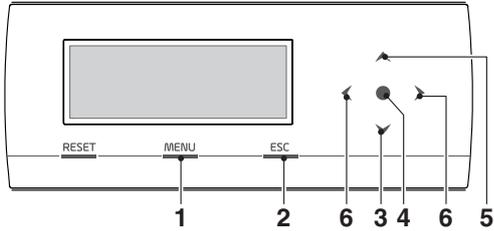
Once the ● key is selected the following display appears:

| Dependent Zone 2 | |
|------------------|----------|
| Error | ▲ 255 |
| RT Input | No |
| Zone Setpoint | -10.0 °C |
| Flow Temperature | 25.5 °C |

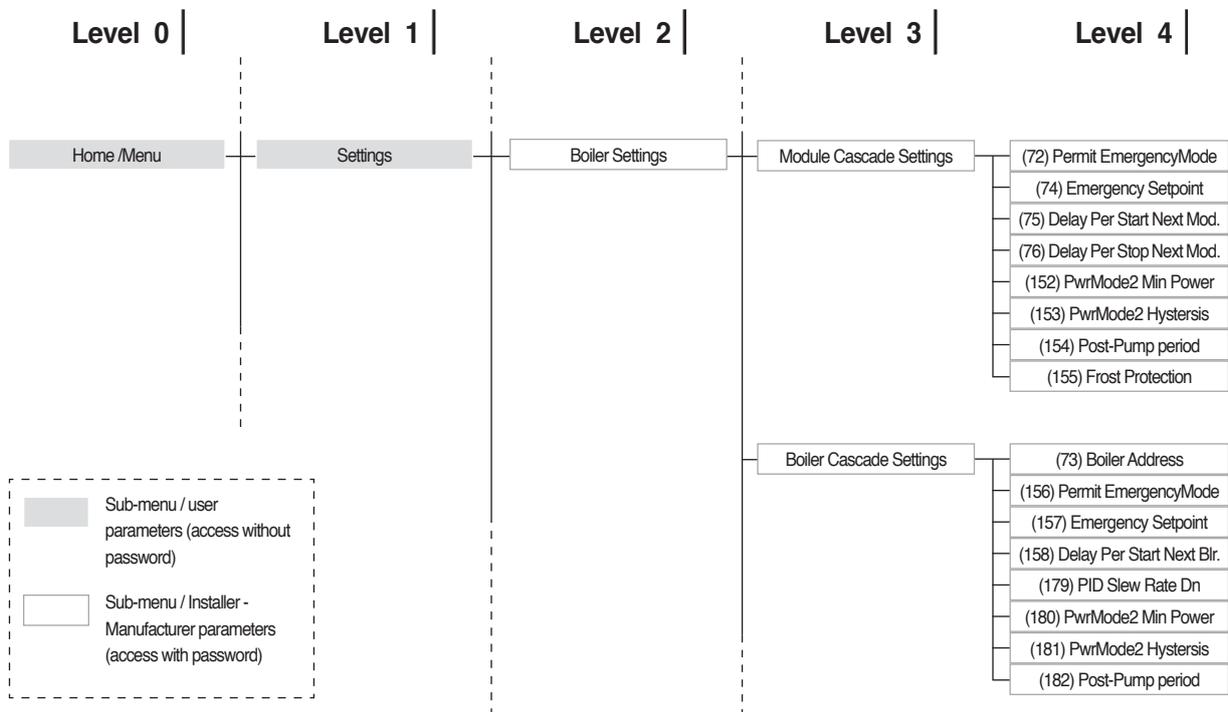
| Dependent Zone 2 | |
|------------------|------------|
| Zone Setpoint | ▲ -10.0 °C |
| Flow Temperature | 25.5 °C |
| Pump | Off |

5.9 Electronic control

! For further information on the electronic control, refer to the specific section in the user manual of the individual appliance TAU Unit.



- 1 switches on the main menu
- 2 in menu navigation, it enables you to exit a menu item and go back to the previous one
- 3 supports selecting menus or parameters or decreasing numeric values
- 4 enter
- 5 supports selecting menus or parameters or increasing numeric values
- 6 supports moving to the RH/LH area of the display



5.9.1 Setting the main parameters

Some parameters are essential in order for the system to operate in cascade and setting these parameters is a determining factor for correct system operation.

5.9.2 Par.73 – Managing, Stand-alone, Dependent mode.

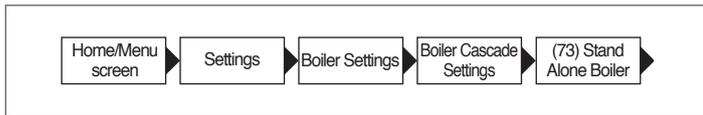
Parameter 73 defines how the thermal unit is addressed and serves to ensure that the signal from the secondary circuit sensor is recognised.

Three values can be set:

- **1** to be set on the Managing module so that secondary sensor operation is activated.

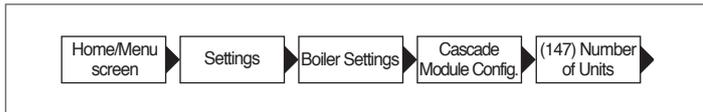
N.B.The secondary sensor SC must be connected to the 2nd burner (1st Depending module);

- **0** to be set on the Managing module so that secondary sensor operation is deactivated;
- **2 ÷ 7** do not use. Address all the thermal units using the dip-switches as shown in paragraph "Setting the dip-switch".



5.9.3 Par.147 – No. thermal modules

Parameter 147 defines the number of thermal modules in the system (it is important to set the number of connected modules for the system to work properly). This parameter must only be set on the "Managing" module.

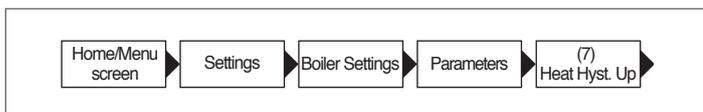


5.9.4 Par.7 – heating setpoint hysteresis

The parameter 7 adjust shutdown of the individual modules when the setpoint is exceeded. With cascade operation, this value must be increased (up to a maximum of 20°C) to prevent operation of the unit from being disabled (since the default value is 3°C) if the system decides to increase the setpoint based on the value detected by the primary or secondary circuit sensor (see explanation in paragraphs "General operation", "Operation with the primary sensor" and "Operation with the secondary sensor")

This parameter is to be modified (in the same way) on all modules of the cascade (Managing module and all the relative Depending modules).

Recommended value = 7



5.9.5 General operation

With cascade operation the managing unit regulator sets a setpoint to send to the depending units.

On the basis of the setpoint received from the Managing module, each module modulates based on its own PID (Par 16, Par 17 and Par 18) as a function of the difference between the setpoint (sent by the Managing module) and the value read by the delivery sensor on the module itself.

! The PID is a Proportional-Integral-Derivative control system (abbreviated to PID) with retro-action. By reading an input value which determines the current value, it is able to react in the event of a positive or negative error (difference between the current value and the target value), tending towards 0. Reaction to the error can be regulated through the terms "proportional, integral, derivative".

5.10 Operation with primary circuit sensor

The system sensor (SS) present on the primary circuit allows the setpoint sent to the individual units to be modulated based on the difference between the setpoint set and the value read on the delivery manifold of the primary system.

The following parameters regulate this modulation:

- 79** defines the maximum setpoint decrease
- 80** defines the maximum setpoint increase
- 81** defines the time (from the start of the request) from which the setpoint modulation is started
- 86** proportional parameter for setpoint modulation
- 87** integrative parameter for setpoint modulation

5.11 Operation with secondary circuit sensor

When the secondary circuit sensor (SC) is present, the setpoint sent to the units is modulated based on the difference between the setpoint set and the value read on the delivery manifold of the secondary system.

In the same way that modulation is based on the system sensor, the following parameters intervene:

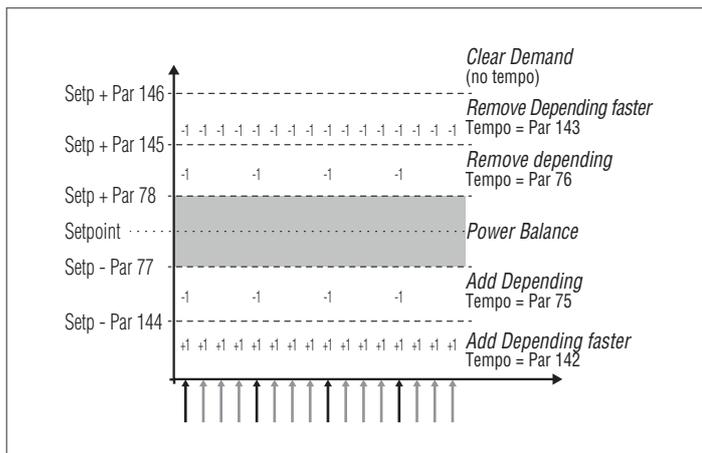
- 169** defines the maximum setpoint decrease
- 170** defines the maximum setpoint increase
- 171** defines the time (from the start of the request) from which the setpoint modulation is started
- 176** defines the proportional term for setpoint modulation
- 177** defines the integrative term for setpoint modulation

5.12 Parameter 148: operating mode of the cascade

It is possible to adopt cascade management which can be modified according to different strategies. These different strategies can be set using the parameter known as "Cascade mode" Par. 148.

The start-up/shutdown law of each module is based on the following graph.

In the central band (Power Balance) no start-ups and/or shutdowns of the Depending units are envisaged. The shut-off values of the lines with the y axis are the sum or the difference of the values of the corresponding parameter in relation to the value of the setpoint sent by the Managing module to the modules.



Six bands are defined on the basis of the temperature read (by the Managing module) on the delivery manifold of the primary system.

- In the central band **Power balance**, which is defined (again by variable parameters) around the setpoint.
- In the band **Remove dependent** and **Add dependent**, the start-ups and shutdowns are carried out with "long" time intervals which can differ between start-up and shutdown. The parameters which define this band are 77, 78, 144, 145. The time interval is defined by parameters 75 and 76.
- In the band **Remove dependent Faster** and **Add dependent Faster**, start-ups and shutdowns are carried out with a "short" time interval which, even in this case, can differ between start-up and shutdown. The shutdown band is between the values of parameters 146 and 145, while the start-up band is below the value defined by parameter 144. The time range is defined by parameters 142 and 143.
- In the band **Clear demand**, all the thermal modules are immediately stopped. This band is above the value defined by parameter 146.

5.12.1 Par 148 = 1

Not applicable

5.12.2 Par 148 = 2

In this mode the system manages the cascade so that the maximum number of modules is on.

This mode is similar to mode 0 apart from the start-up and shutdown rules.

In this case the rules based on the information illustrated by the previous graph are still valid, with the following differences (in any case, always applicable to the "balancing" band only):

To add an additional depending module, the managing module evaluates whether the sum of the power (calculated on the basis of the fan speed) of all the active thermal modules is greater than the product between the number of the active depending modules increased by one and the minimum power value (Par 152) increased by a hysteresis value (defined by Par 153). $[\sum (P_1, P_2, \dots, P_n) > (n+1) * (Par 152) + (Par 153)]$.

To shutdown a depending access, the managing module evaluates whether the sum of the power (calculated on the basis of the fan speed) of all the active thermal modules is less than the product between the number of the active depending modules and the minimum power value (Par 152). $[\sum (P_1, P_2, \dots, P_n) < (n) * (Par 152)]$.

5.12.3 Par 148 = 3

In this mode the system manages the cascade so that the minimum number of modules is on.

This mode is similar to mode 0 apart from the start-up and shutdown rules.

In this case the rules based on the information illustrated by the previous graph are still valid, with the following differences (in any case, always applicable to the "balancing" band only):

To start up an additional depending unit, the managing unit evaluates whether the total power (calculated based on the fan speed) of all the active thermal units is greater than the product between the number of the active depending units increased by one and the minimum power value (Par 82). $[(P_1, P_2, \dots, P_n) > (n+1) * (Par 82)]$.

To shut down a depending unit that has been started up, the managing unit evaluates whether the total power (calculated based on the fan speed) of all the active thermal units is less than the product between the number of the active depending units and the maximum power value (Par 83). $[(P_1, P_2, \dots, P_n) < (n) * (Par 83)]$.

⚠ We must consider that the percentage of power varies from a minimum of 1% to a maximum of 100% and therefore, the parameter values 152 and 153 are not to be taken as the percentage of absolute power but relate to the units which are active.

6 MANAGING ADDITIONAL ZONE

6.1 Check zone with zone management electronic device optional

If you need to check an additional heating zone (direct or mixed) other than those allowed by the system configuration, it is possible to install the ZONE CONTROL ELECTRONIC DEVICE optional. The optional must be connected to BUS 1 of low voltage terminal board M01 of the thermal module, as indicated in the figure. Up to 16 zone management devices can be connected to a thermal module.

In case of mixed zone the optional will control the circulation pump and the mixing valve, whereas in case of direct zone it will control the circulation pump only.

The programming of the parameters of the zone is always carried out using the control interface of the thermal module.

Zone number setting

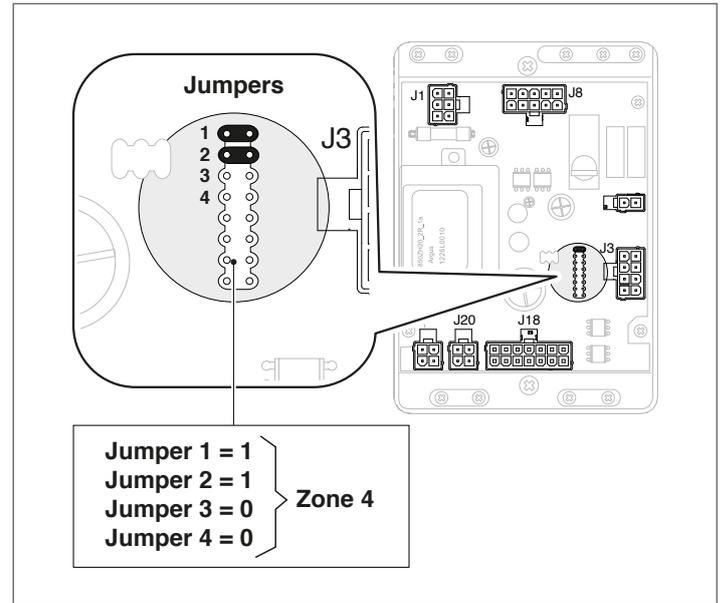
The optional connected to the system must be set with an identification number (zone number), so that the electronic board of the thermal module will recognise which zone is requesting heat.

The number of recognition actions is set with the help of the jumpers to be applied to each pair of pins.

⚠ The setting must be carried out on each board of the additional zone accessory. To assign the required number to the additional zone, refer to the following table, applying the jumpers to the positions illustrated from 1-4.

| Jumpers | | | | Zone number | AI device ID |
|-----------------------|---|---|---|-------------------|--------------|
| 1 | 2 | 3 | 4 | | |
| 0 | 0 | 0 | 0 | 1 | 140 |
| 1 | 0 | 0 | 0 | 2 | 141 |
| 0 | 1 | 0 | 0 | 3 | 142 |
| 1 | 1 | 0 | 0 | 4 | 143 |
| 0 | 0 | 1 | 0 | 5 | 144 |
| 1 | 0 | 1 | 0 | 6 | 145 |
| 0 | 1 | 1 | 0 | 7 | 146 |
| 1 | 1 | 1 | 0 | 8 | 147 |
| 0 | 0 | 0 | 1 | 9 | 148 |
| 1 | 0 | 0 | 1 | 10 | 149 |
| 0 | 1 | 0 | 1 | 11 | 150 |
| 1 | 1 | 0 | 1 | 12 | 151 |
| 0 | 0 | 1 | 1 | 13 | 152 |
| 1 | 0 | 1 | 1 | 14 | 153 |
| 0 | 1 | 1 | 1 | 15 | 154 |
| 1 | 1 | 1 | 1 | 16 | 155 |
| 0 = Jumper not placed | | | | 1 = Jumper placed | |

Jumper positioning example.

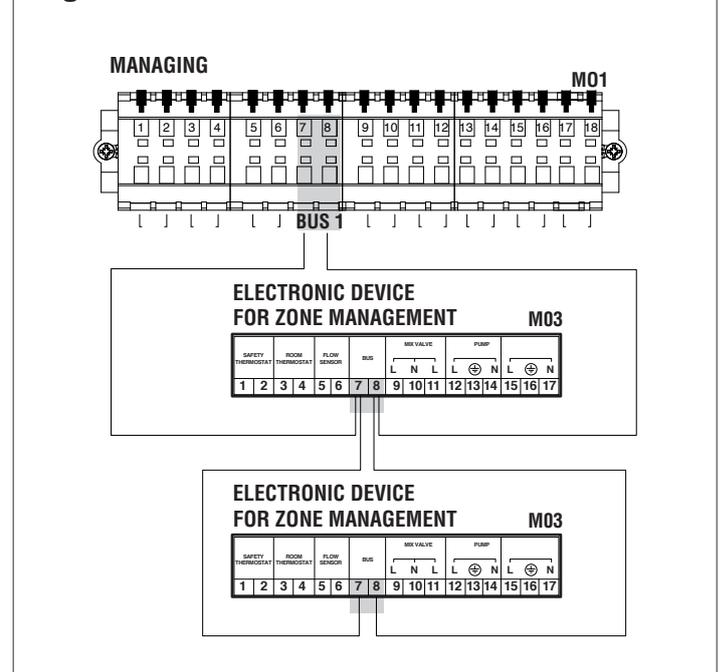


Each zone management electronic device must have its own address.

⚠ The zones connected with the same address will lead to a wrong system operation!

⚠ For further details, refer to the manual of the zone management electronic device optional.

Single module connection



After connecting the optional, wait for the detection of the module.

At the end of the detection, the following new functions will be available:

- in the "Information" menu "Ext. Zone Status." will be displayed, from where it is possible to display information regarding the selected zone;
- in the "Settings" menu two new lines will be displayed:
 - "Zone Config."
 - "Zone Clim. Curve"

The electronic control of the thermal module will automatically check which zones are connected to the bus.

The menu items of the zone in the electronic control of the thermal module will be available when one or more zone management devices are detected.

The electronic control of the thermal module remembers the zone number detected when a device is connected.

The zone number detected is not automatically removed when the corresponding accessory is no longer connected.

The zone number needs to be removed manually.

Removing the zone number

- remove the bus connection of the zone to be deleted;
- access the Settings/Zone Config./Zone;
- select the disconnected zone;
- go to Remove Zone;
- press the ► key to highlight the values, change them to "Yes" with the ▲ / ▼ keys, press the ● key to confirm and remove the zone from the display menus.

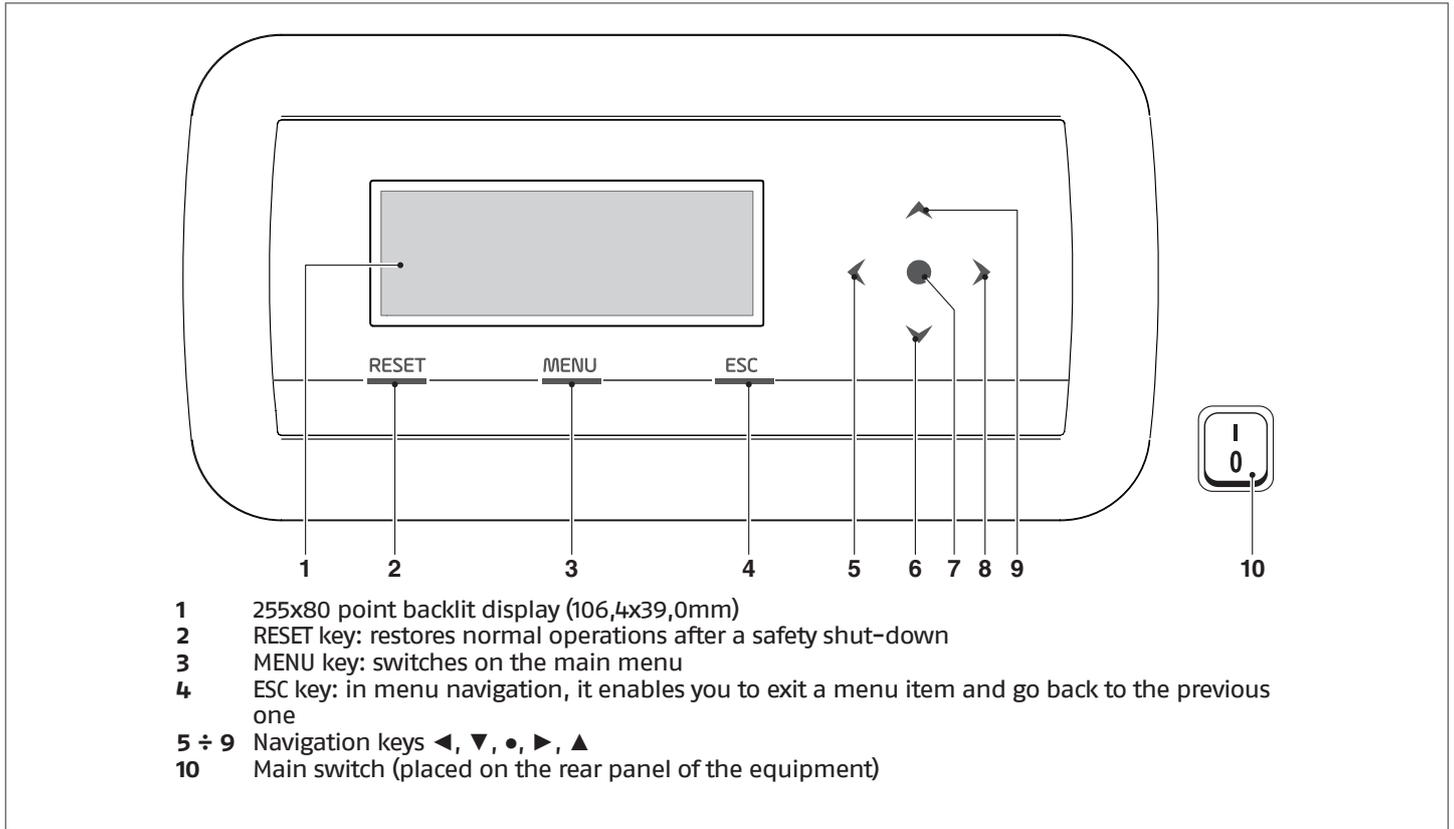
Example:

| External Zone 3 | |
|-----------------|----|
| Detection | No |
| Remove Zone | No |

| External Zone 3 | |
|-----------------|-----|
| Detection | No |
| Remove Zone | Yes |

6.2 Setting parameters of the additional zone

Controls interface



6.3 Setting zone parameters (accessible only with installer password)

Menu → "Settings" → "Zone Config."

This menu allows you to separately set the parameters of all the connected zones with the exception of the "Extra setpoint zone" which is the same for all zones.

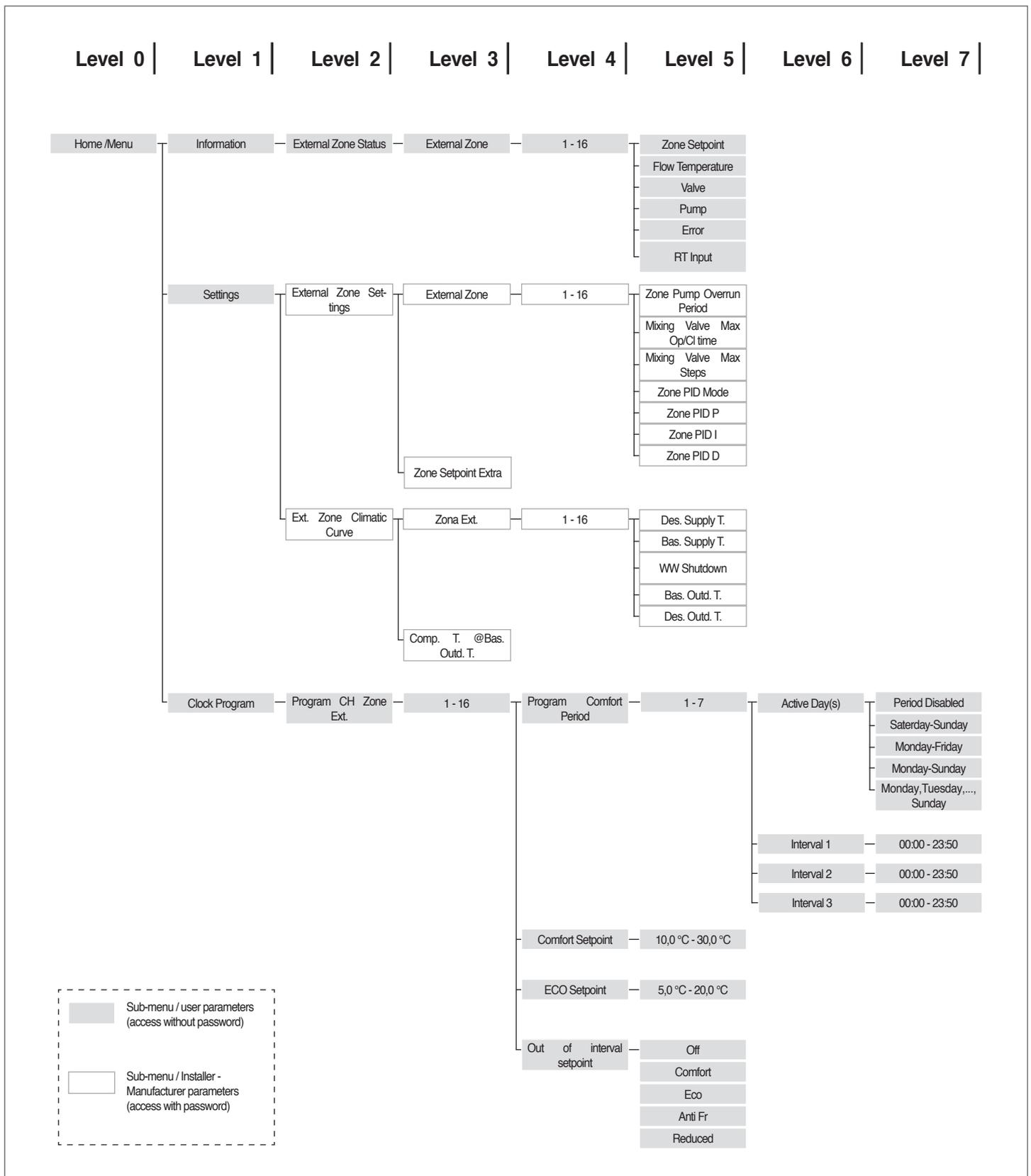
To select the zone for controlling/changing the parameters, proceed as follows:

- press the ▶ key so that the number to the right of "zone" is highlighted;
- once the number is highlighted use the ▲ and ▼ keys to change the number of the zone;
- once the zone is selected, confirm with the ● key.

The zone parameters are the following:

| Description | Standard value that is set | Range | Explanation | UM |
|--------------------------|----------------------------|--------------------------|----------------------------------------------------------------------------------------------------------|------|
| Post-circ. Zone Pump | 120 | 0-255 | Establishes the time in seconds of the post-circulation | Secs |
| Mix Valve Max Op/Cl Time | 25 | 0-255 | Fixes the time in second of the total opening/closing of the mix valve (valid for three point mix valve) | Secs |
| Mix Valve Max steps | 700 | 0-65535 | Fixes the number of steps for the total opening of the mix valve (valid for step-by-step mix valve) | |
| PID zone mode | Symmetrical | Symmetrical/Asymmetrical | Fixes the PID control mode | |
| PID P Zone | 10 | 0-255 | Proportional parameter for the valve control | |
| PID I Zone | 150 | 0-255 | integrative parameter for the valve control | |
| PID D Zone | 0 | 0-255 | Derivative parameter for the valve control | |
| Extra zone setpoint | 10 | 0-30 | Establishes the increase for the primary setpoint with respect to the zone setpoint | °C |

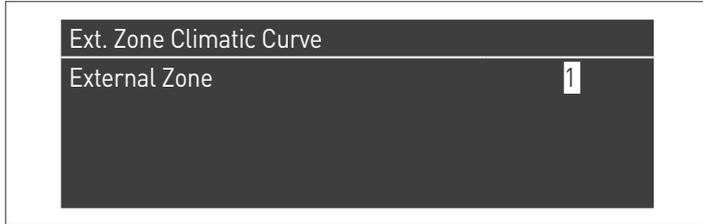
6.3.1 Menu structure



6.4 Setting zone's climatic curve parameters (accessible only with installer password)

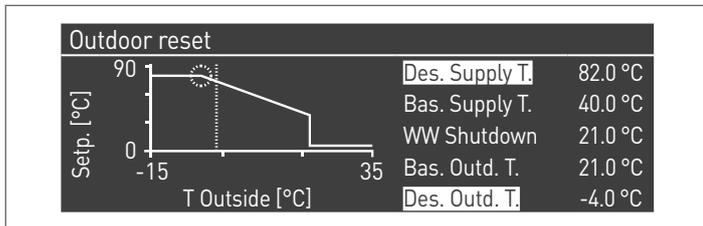
Menu → "Settings" → "Zone Clim. Curve"

- press the ► key so that the number is highlighted on the right of the word "Zone";



- use the ▲ and ▼ keys to change the zone number;
- press the ● key.

The following is displayed:



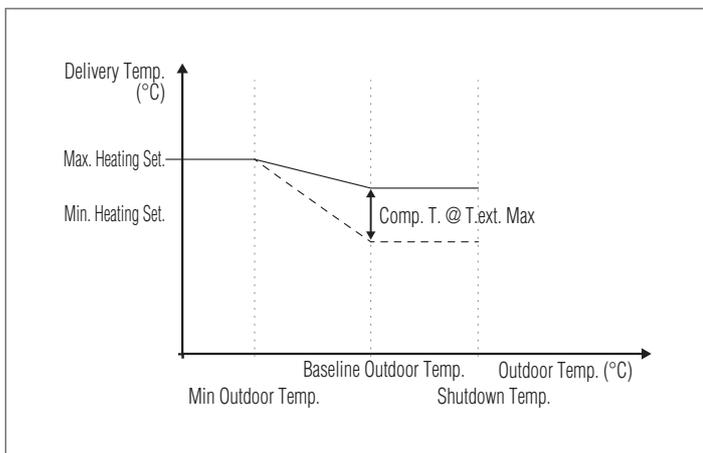
| Par. No. | Description |
|------------------------|-------------------------------|
| Design Supply Temp. | Zone heating maximum setpoint |
| Baseline Supply Temp. | Zone heating minimum setpoint |
| Baseline Outdoor Temp. | Maximum external temperature |
| Design Outdoor Temp. | Minimum external temperature |

T_Switch off Summer/winter switching

It blocks the heating request when the external temperature is greater than this setpoint.

Comp. Parameter T. @ T.ext. Max

During in-between seasons, when the external temperature gets close to the maximum limit set (T. Ext. Max.), the delivery temperature calculated in the climatic curve could be different from the one suitable to meet the request. This parameter performs a non-linear correction of climatic curve to compensate such difference.



6.5 Programming the zone

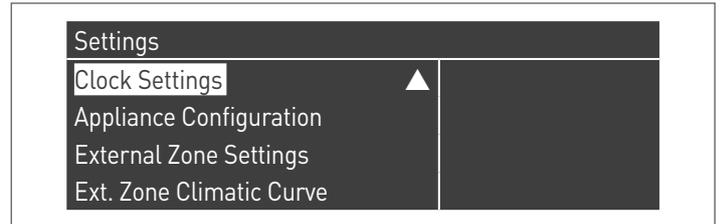
By default the schedule timer is disabled.

In fact, to start a request from the zone just close the contact of the zone request. In this case the thermal module (or the cascade of thermal modules) will start with a setpoint equal to the value calculated on the zone climatic curve increased by the "Zone Extra Setpoint" value and the mix valve will modulate to maintain the delivery temperature of the zone at the calculated setpoint.

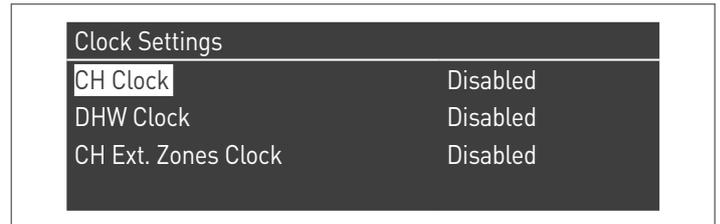
If there is no external sensor, the delivery setpoint of the thermal unit will be equal to the maximum setpoint of the climatic curve.

To activate zone programming:

Menu → "Settings" → "Clock Settings"



Confirming with ● the following screen is displayed:

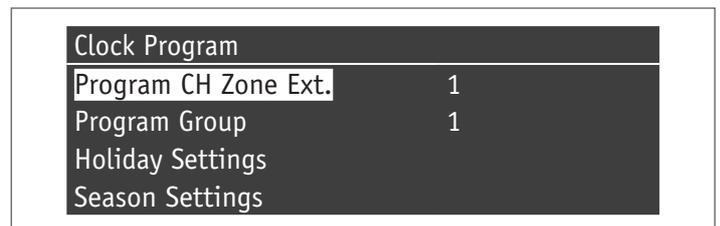


- with the ▲ / ▼ keys select "CH Zones clock"
- with the ► key move to "Disabled", change it to "Enabled" with the ▲ / ▼ keys
- confirm with the ● key

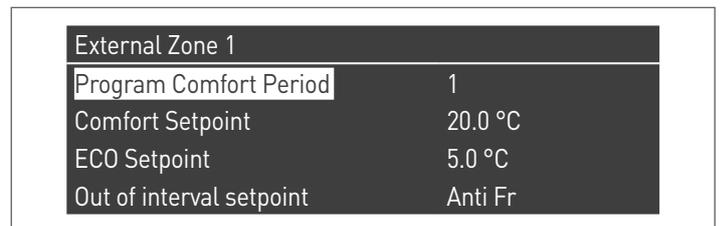
Go to:

Menu → "Clock program"

Confirming with the ● key:



At this point select the number of the zone to be programmed and confirm with the ● key.



The programmable periods for each zone are 7 and they can be selected by changing the number that appears beside "Program Comfort period".

The "Comfort Setpoint" is the setpoint that is set for the area served by the zone in the active time band established within the period and can be set between ten and forty degrees. Setting the "Comfort Setpoint" at a default of 20°C, the climatic curve that regulates the setpoint of the zone is exactly that which was set in paragraph Setting zone's climatic curve parameters (accessible only with installer password) on page 116 125.

By changing the "Comfort Setpoint" the climatic curve is moved upwards or downwards depending on whether the setpoint is higher or lower than 20°C. The curve will shift by two degrees for each degree of difference between the value of the setpoint and the value 20.

The "ECO Setpoint" is a setpoint that can be set between 5 and 20 degrees and can be selected as a setpoint for the area served by the zone outside the active time band.

The "Out of the interval Setpoint" defines how the zone outside the active time bands are managed (within which the setpoint of the area is always set on "comfort").

The selections for the "Out of the interval Setpoint" are the following:

- **Eco:** the ambient setpoint is set to ECO. The zone setpoint is changed by two degrees less for each degree of difference between the ECO setpoint and the value 20 (for example, if at 20° I have a setpoint of 50, at 18 degrees I have a setpoint of $50+2*(18-20)=46$).
- **Night-time:** the ambient setpoint is set to ECO. The zone setpoint is changed by two degrees less for each degree of difference between the ECO setpoint and the value 20 (for example, if at 20° I have a setpoint of 50, at 18 degrees I have a setpoint of $50+2*(18-20)=46$).
- **Antifreeze:** the ambient setpoint is set at 10°C, thereby achieving a reduction compared to the zone setpoint of 20°C.
- **Off:** in this case the delivery of heat is interrupted.
- **Comfort:** the setpoint remains the same as that for the active time bands. This choice clearly makes no sense when scheduling is desired, but it can be useful if you want to provide heat continuously without changing the programming itself.

 So that the zone programming works the "heat request" contact should be closed. Otherwise the zone will ignore any request from the schedule timer.

6.6 Scheduling the time bands

By going to:
Menu → "Clock program" → "Zones CH Program "

| External Zone 1 | |
|--------------------------|---------|
| Program Comfort Period | 1 |
| Comfort Setpoint | 20.0 °C |
| ECO Setpoint | 5.0 °C |
| Out of interval setpoint | Anti Fr |

Entering in "Program Comfort Period":

| External Zone 1 - Period 1 | | |
|----------------------------|---------------|-------|
| Active Day(s) | Monday-Sunday | |
| Interval 1 | 07:10 | 11:00 |
| Interval 2 | 00:00 | 00:00 |
| Interval 3 | 00:00 | 00:00 |

Using the option "Active Day(s)" it is possible to select the scheduling period. You can select a day of the week or else one of these three groups of days:

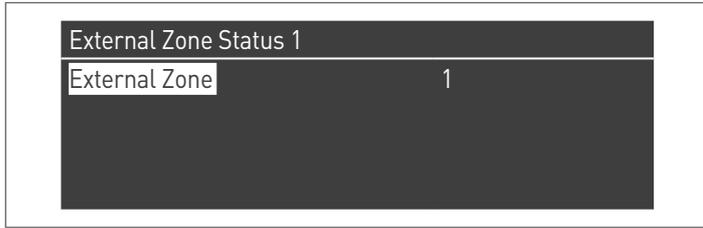
- Mon-Sun
- Mon-Fri
- Sat-Sun

This facilitates weekly scheduling or else scheduling that is different during the work week and the week-end.

There are three active time bands for each period. The time resolution is 10 minutes.

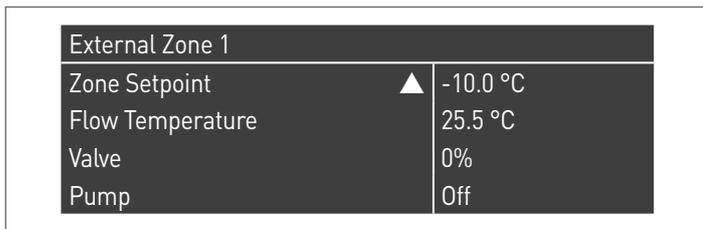
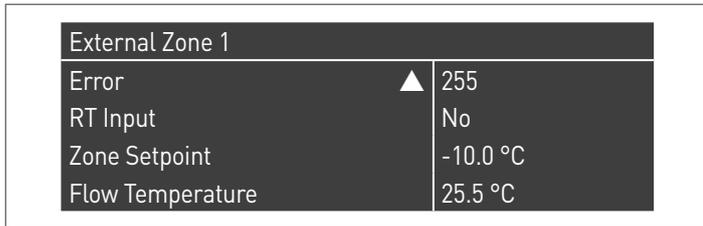
6.7 Information on the operation of the zone

By going to:
Menu → "Information" → "Zone Status"



To choose the zone whose information will be displayed, proceed in the same way as in the previous paragraph.

Once the ● key is selected the following display appears:



The information displayed is the following:

| Error code | Description |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Err | Indicates the error code of the board (255 = no error) |
| Input Heat | Indicates whether there is a request (namely, if the contact for the heat request is open (NO, no request) or closed (Yes, request present)) |
| Zone set-point | Indicates the zone setpoint |
| Delivery temperature | Indicates the temperature measured by the zone probe |
| Valve | Indicates the opening percentage of the valve (100% = fully open) |
| Pump | Indicates if the pump is stopped (off) or active (on) |

Zone board errors table:

| Error code | Description | Solution |
|------------|---------------------------------------------------------|----------------------------------------------|
| 22 | Zone probe disconnected | Check probe |
| 23 | Zone probe short-circuit | Check probe |
| 24 | Overtemperature detected (opening of safety thermostat) | Check parameters Check operation of mixer |

7 SYSTEM MANAGER

7.1 Putting into service

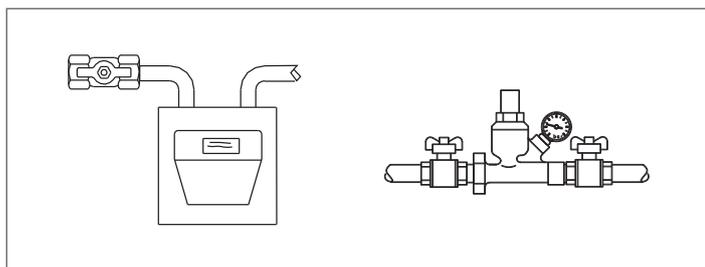
- ⚠** The appliance must be maintained and adjusted at least once a year by Technical Assistance Service or by professionally qualified staff in compliance with all applicable National and Local provisions.
- ⚠** Incorrect maintenance or adjustment may damage the appliance and cause damage to people or create a hazard.
- ⚠** The system manager is forbidden from opening and removing the appliance's casing. These activities must be carried out only by Technical Assistance Service or by professionally qualified personnel.

The thermal module **TAU Unit RIELLO** must be commissioned by Technical Assistance Service **RIELLO**, after which step the appliance may operate automatically.

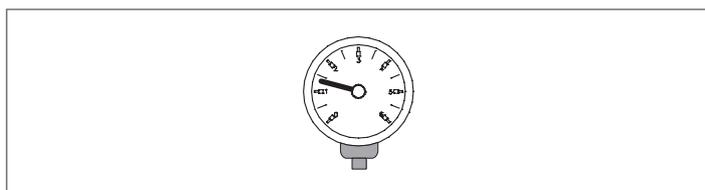
However, the system manager may be required to restart the appliance independently, without involving Technical Assistance Service; for example after a long period of absence.

To do so, perform the following checks and operations:

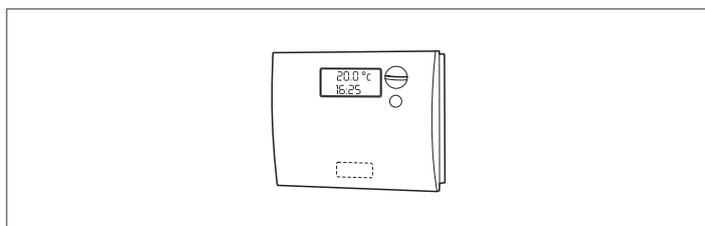
- Check that the fuel valves and the water valves of the thermal system are open



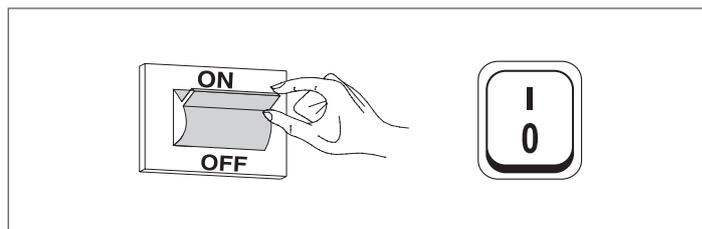
- While the system is still cold, check that working pressure in the central heating circuit is over 1 bar but below the maximum limit specified for the boiler



- Adjust the room thermostats for the high and low temperature zones to the required temperature (~20°C) or, if the systems are equipped with timer thermostats or a time programming unit, make sure it is on and adjusted (~20°C)



- Switch the system's master switch to the ON position and the thermal module's master switch to (I).



The appliance will go through the switch-on stage and, after starting, it will continue to operate until set temperatures are achieved.

The burner will then switch off and on automatically to maintain the set temperature without further operator action.

In the event of ignition or operation faults, the display will show a numeric error code that will enable the user to interpret the possible cause as detailed in Paragraph "Error List".

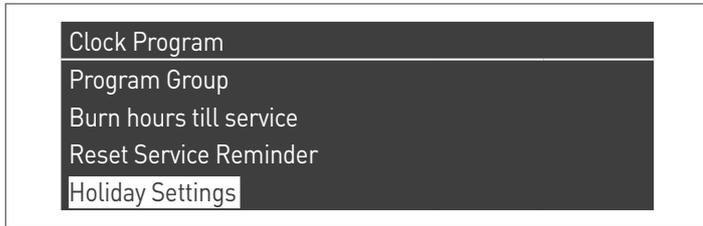
- ⚠** In the event of a permanent error, to reset starting conditions press the "RESET" key and wait for the thermal module to restart.

Repeat this operation 2-3 times at the most. If the problem persists after that, call **RIELLO's** Technical Assistance Service.

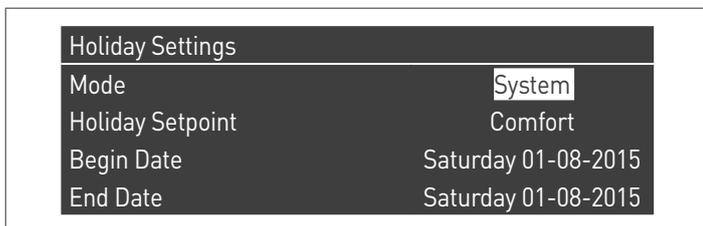
7.2 Temporary or short-term shut-down

In the event of temporary or short-term shut-down (e.g. due to holidays), proceed as follows:

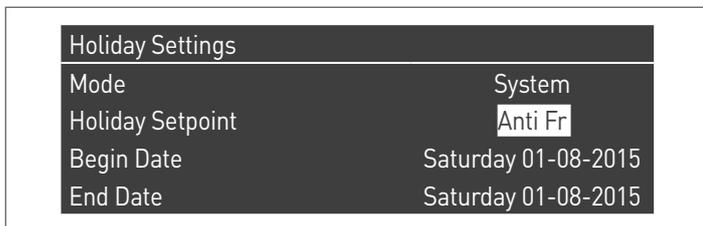
- Press the MENU key and select with keys ▲ / ▼ "Time schedule", confirm with key ●.
- Select with keys ▲ / ▼ "Holiday Schedule" and confirm with key ●.



- Select with keys ▲ / ▼ "Mode" and confirm with key ●. Select "System" mode and confirm.



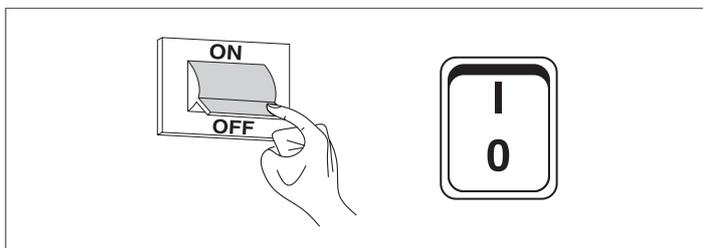
- Select with keys ▲ / ▼ "Holiday Setpoint" and confirm with key ●.
- Select "Antifreeze" holiday setpoint and confirm.



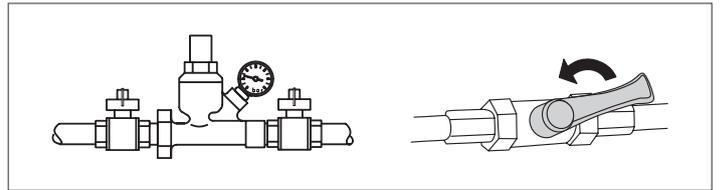
7.3 Preparing for extended periods of disuse

Long periods of inactivity of the thermal module **TAU Unit** imply the following operations to be carried out:

- position the main switch of the thermal module and of the system to "off"



- close the fuel valves and the water valves of the thermal and DHW system.



⚠ Empty the thermal and sanitary system if there is a danger of frost.

7.4 Cleaning

Use a cloth damped in soapy water to clean the boiler's external casing.

To remove stubborn marks, use a cloth damped in a 50% mix of water and denatured alcohol or a suitable cleaning product. Carefully dry after cleaning.

⊘ Do not use abrasive cleaning pads or powder detergents.

⊘ Never clean the boiler without first disconnecting it from the mains electricity supply by turning the mains power switch and the control panel switch OFF.

⚠ The combustion chamber and flue pipes must be cleaned periodically by the manufacturer's Technical Assistance Service or by a qualified heating engineer.

7.5 Maintenance

Please remember that THE PERSON RESPONSIBLE FOR SYSTEM MANAGEMENT MUST ENSURE THAT PROFESSIONALLY QUALIFIED HEATING ENGINEERS UNDERTAKE PERIODIC MAINTENANCE AND COMBUSTION EFFICIENCY MEASUREMENTS.

RIELLO's Technical Assistance Service is qualified to satisfy these legal requirements and can also provide useful information on MAINTENANCE PROGRAMMES designed to guarantee:

- Greater safety
- Compliance with applicable legislation
- Freedom from the risk of fines in the event of spot checks.

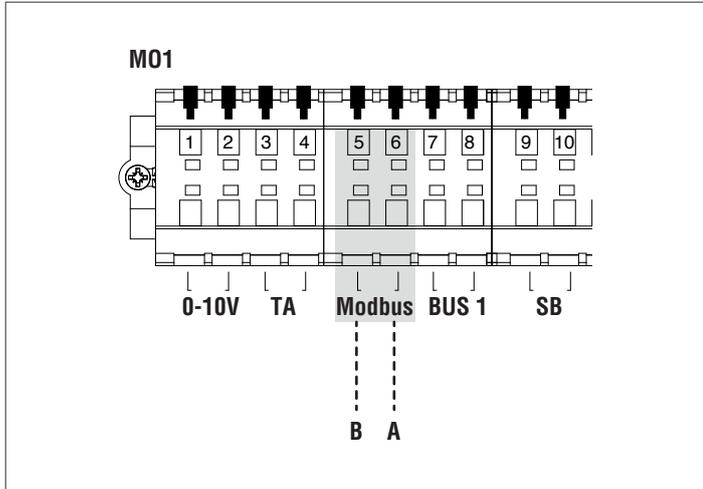
Regular maintenance is essential for the safety, efficiency and durability of the boiler.

Servicing is a legal requirement and must be performed at least once a year by a professionally qualified heating engineer.

8 MODBUS CONNECTION

The thermal mode is equipped with a Modbus connection (based on the RS485 communication standard) that supports the remote management and adjustment of the aforementioned thermal module.

The Modbus connection is available in the low-voltage terminal board.



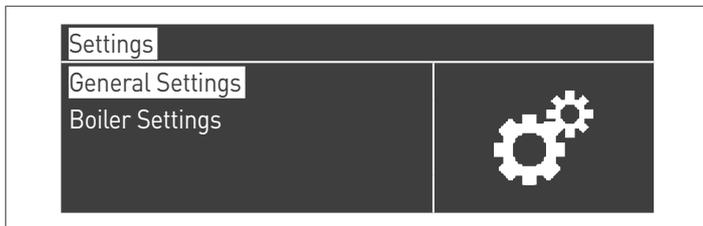
Configuration

The following table shows the connection details.

| | |
|---------------------------|------------------------------------------------------------------------------------------------------------|
| Protocol | Modbus RTU |
| Slave address | Adjustable from the display. Default: 1 |
| Supported Modbus controls | Read Holding registers (03) Write single holding register (06) Write multiple holding registers (10) |
| Baud rate | 9600 bps. |
| Length | 8 |
| Parity | No |
| Stop Bits | Default: 2 stopbits |
| Connection | RS485 (2 wires + optional earthing) |

As shown in the table above, the thermal module's address (meant as the address of the slave device in the Modbus system) and the number of "Stop Bits" are two adjustable values.

To modify one or the other, from the home screen, access the "Settings" menu, select "General settings" and confirm.



Access the "Other settings" menu and select "Modbus Address"



Registers

Depending on the type of Modbus device used to connect to the thermal module, the registers' addressing may start from 0x0000 or 0x0001.

If addressing starts from 0x0000, the numbers of the registers listed in the table below may be used directly for reading/writing operations; if addressing starts from 0x0001, the numbers of registers shown in the table, plus one, must be used for reading/writing operations.

Control register

The control register is used for special functions.

The first one is that of enabling writing on registers. All accessible registers, including write ones, must be first enabled to receive data. To prevent undesired entries, it is possible to change the value in a register only during the first four seconds after the status change of the 0 bit in the control register.

Therefore, before changing the value of a register, it is necessary to change the status of 0 bit of the control register (register No. 99), sending the string 1 to it.

The control register also supports the remote resetting of the board, by changing the status of the 14 bit. Therefore, by sending the value 16384 to register No. 99, it is possible to reset the board.

! By sending a value other than 1 and from 16384 to register No. 99, the latter will return to the write-protected status (bit 0=0).

The table that summarises the control register's operation is provided below:

| Register number | Access | Access | | Description | Value range |
|-----------------|--------|--------|---|------------------|----------------------------------------------------|
| | | L | S | | |
| 99 | 0063 | X | X | Control register | Bit 0: enables writing Bit 14: controller reset |

Measurement unit selection register

Register 98 is used to change the format of the data stored in registers (those containing temperature or pressure values).

Before changing the value of the selection register, it is necessary to enable it for writing by forwarding the enabling command to the 99 control register.

The table for measurement unit selection register is the following:

| Register number | Access | Access | | Description | Value range |
|-----------------|--------|--------|---|-------------------------------------|--------------------------------|
| | | L | S | | |
| 98 | 0062 | X | X | Measurement unit selection register | Bit 0: °C/°F Bit 1: bar/psi |

Types of data

| Type of data | Unit |
|--------------------|---------|
| Temperature | °C/°F |
| Voltage | Volt |
| Pressure | bar/psi |
| Ionisation current | µA |
| Percentage | % |

Status parameters

| Register number | Access | | Description | Automatic conversion | Value range |
|-----------------|--------|---|------------------------------|----------------------|---------------------|
| | L | S | | | |
| 100 | X | | State | | See "State" table |
| 101 | X | | Status | | See "Status" table |
| 102 | X | | Error code | | See "Error" tables |
| 103 | X | | Alarm code | | See "Warning" table |
| 110 | X | | General pump or heating pump | Yes | 0/100 or 0..100% |
| 111 | X | | ACS pump | Yes | 0/100 or 0..100% |
| 112 | X | | Module pump | Yes | 0/100 or 0..100% |

Temperatures/Information

| Register number | Access | | Description | Automatic conversion | Value range |
|-----------------|--------|---|---------------------------------------|----------------------|------------------------|
| | L | S | | | |
| 120 | X | | Delivery temperature | Yes | Depends on °C/°F units |
| 121 | X | | Return temperature | Yes | Depends on °C/°F units |
| 122 | X | | DHW temperature | Yes | Depends on °C/°F units |
| 123 | X | | Flue gas temperature | Yes | Depends on °C/°F units |
| 124 | X | | System temperatures (where available) | Yes | Depends on °C/°F units |
| 125 | X | | Outdoor temperature (where available) | Yes | Depends on °C/°F units |
| 140 | X | | Power | Yes | 0..100% |
| 141 | X | | Minimum output | Yes | 0..100% |
| 142 | X | | Ionisation current | Yes | 0..x µA |

Dependent information

| Register number | Access | | Description | Automatic conversion | Value range |
|-----------------|--------|---|-------------|----------------------|--------------------|
| | L | S | | | |
| Dependent 01 | | | | | |
| 300 | X | | State | | See "State" table |
| 302 | X | | Error code | | See "Error" tables |
| 303 | X | | Power | Yes | 0..100% |
| Dependent 02 | | | | | |
| 306 | X | | State | | See "State" table |
| 308 | X | | Error code | | See "Error" tables |
| 309 | X | | Power | Yes | 0..100% |
| Dependent 03 | | | | | |
| 312 | X | | State | | See "State" table |
| 314 | X | | Error code | | See "Error" tables |
| 315 | X | | Power | Yes | 0..100% |
| Dependent 04 | | | | | |
| 318 | X | | State | | See "State" table |
| 320 | X | | Error code | | See "Error" tables |
| 321 | X | | Power | Yes | 0..100% |
| Dependent 05 | | | | | |
| 324 | X | | State | | See "State" table |
| 326 | X | | Error code | | See "Error" tables |
| 327 | X | | Power | Yes | 0..100% |
| Dependent 06 | | | | | |
| 330 | X | | State | | See "State" table |
| 332 | X | | Error code | | See "Error" tables |
| 333 | X | | Power | Yes | 0..100% |
| Dependent 07 | | | | | |
| 336 | X | | State | | See "State" table |
| 338 | X | | Error code | | See "Error" tables |
| 339 | X | | Power | Yes | 0..100% |
| Dependent 08 | | | | | |
| 342 | X | | State | | See "State" table |
| 344 | X | | Error code | | See "Error" tables |
| 345 | X | | Power | Yes | 0..100% |

| Register number | Access | | Description | Automatic conversion | Value range |
|-----------------|--------|---|-------------|----------------------|--------------------|
| | L | S | | | |
| Dependent 09 | | | | | |
| 348 | X | | State | | See "State" table |
| 350 | X | | Error code | | See "Error" tables |
| 351 | X | | Power | Yes | 0..100% |
| Dependent 10 | | | | | |
| 354 | X | | State | | See "State" table |
| 356 | X | | Error code | | See "Error" tables |
| 357 | X | | Power | Yes | 0..100% |
| Dependent 11 | | | | | |
| 360 | X | | State | | See "State" table |
| 362 | X | | Error code | | See "Error" tables |
| 363 | X | | Power | Yes | 0..100% |
| Dependent 12 | | | | | |
| 366 | X | | State | | See "State" table |
| 368 | X | | Error code | | See "Error" tables |
| 369 | X | | Power | Yes | 0..100% |
| Dependent 13 | | | | | |
| 372 | X | | State | | See "State" table |
| 374 | X | | Error code | | See "Error" tables |
| 375 | X | | Power | Yes | 0..100% |
| Dependent 14 | | | | | |
| 378 | X | | State | | See "State" table |
| 380 | X | | Error code | | See "Error" tables |
| 381 | X | | Power | Yes | 0..100% |
| Dependent 15 | | | | | |
| 384 | X | | State | | See "State" table |
| 386 | X | | Error code | | See "Error" tables |
| 387 | X | | Power | Yes | 0..100% |

Parameters registers

| Register number | Access | | Description | Note | Automatic conversion | Value range |
|-----------------|--------|---|-----------------------------------------------------------------------|------|----------------------|------------------------|
| | L | S | | | | |
| 500 | X | X | Heating mode (Par. 1) | NV | | 0..x |
| 501 | X | X | DHW mode (Par. 35) | NV | | 0..x |
| 502 | X | X | Heating set-point (Par. 3) | V | Yes | Depends on °C/°F units |
| 503 | X | X | DHW set-point (Par. 48) | V | Yes | Depends on °C/°F units |
| 504 | X | X | Set-point at min. climatic T (Par. 19) | NV | Yes | Depends on °C/°F units |
| 505 | X | X | Set-point at max. climatic T (Par. 21) | NV | Yes | Depends on °C/°F units |
| 506 | X | X | Out. temperature for climatic minimum (Par. 22) | NV | Yes | Depends on °C/°F units |
| 507 | X | X | Out. temperature for climatic maximum (Par. 20) | NV | Yes | Depends on °C/°F units |
| 508 | X | X | Climatic shut-off (Par. 25) | NV | Yes | Depends on °C/°F units |
| 509 | X | X | Maximum value that can be assigned to the heating set-point (Par. 24) | NV | Yes | Depends on °C/°F units |

| Register number | Access | | Description | Note | Auto-matic conversion | Value range |
|-----------------|--------|---|-----------------------------------------------------------------------|------|-----------------------|------------------------|
| 510 | X | X | Minimum value that can be assigned to the heating set-point (Par. 23) | NV | Yes | Depends on °C/°F units |
| 511 | X | X | Night-time attenuation (Par. 28) | NV | Yes | Depends on °C/°F units |

In the "Note" column, the registers marked with "V" can be written on an ongoing basis (and be used for dynamic size control). Registers marked with "NV", on the other hand, can be overwritten only for a limited number of times (around 10,000 times with an average of twice a day).

Service reminder

| Register number | Access | | Description | Auto-matic conversion | Value range |
|-----------------|--------|---|--------------------------------------------------|-----------------------|-----------------|
| | L | S | | | |
| 1500 | X | | Hours elapsed from the last maintenance activity | | 0...65534 hours |
| 1501 | X | | Hours from the next maintenance activity | | .. 0...2000 |
| 33000 | X | | Hours elapsed from the last maintenance activity | | 0...65534 hours |
| 33001 | X | | Hours from the next maintenance activity | | .. 0...2000 |

STATUS table

| Nr. | Name | Description |
|-----|-----------------|-------------------------------------|
| 0 | STANDBY | Standby |
| 10 | ALARM | Non-volatile lockout error |
| 14 | BLOCK | Volatile lockout error |
| 15 | FROST_PROTECT | Frost protection on |
| 16 | CH_DEMAND | Heat demand |
| 17 | RESET_STATE | Reset |
| 18 | STORAGE_DEMAND | DHW demand |
| 19 | DHW_TAP_DEMAND | Imm. DHW demand. |
| 20 | DHW_PRE_HEAT | Pre-heating demand |
| 21 | STORE_HOLD_WARM | Holding desired storage temperature |
| 22 | GENERAL_PUMPING | General pump ON |

STATE table

| Nr. | Name | Description |
|-----|------------------------|-------------------------------------------------------------------|
| 0 | RESET_0 | Initialisation of reset variables |
| 1 | RESET_1 | Reset |
| 2 | STANDBY_0 | Standby |
| 3 | PRE_PURGE | Initialisation of pre-purging variables |
| 4 | PRE_PURGE_1 | Pre-purging |
| 5 | SAFETY_ON | ON safety relay test |
| 6 | SAFETY_OFF | OFF safety relay test |
| 7 | IGNIT_0 | Initialisation of ignition variables |
| 8 | IGNIT_1 | Start-up |
| 9 | BURN_0 | The module is ON |
| 10 | SHUT_DOWN_RELAY_TEST_0 | Initialisation of variables to check safety devices and gas valve |
| 11 | SHUT_DOWN_RELAY_TEST_1 | Safety and gas valve test relay |
| 12 | POST_PURGE_0 | Initialisation of post-purging variables |
| 13 | POST_PURGE_1 | Post-purging |
| 14 | PUMP_CH_0 | Initialisation of heating pump variables |
| 15 | PUMP_CH_1 | Heating pump |
| 16 | PUMP_HW_0 | Initialisation of DHW pump variables |
| 17 | PUMP_HW_1 | DHW pump |
| 18 | ALARM_1 | Non-volatile lockout error |
| 19 | ERROR_CHECK | Volatile lockout error |
| 20 | BURNER_BOOT | Restart of board |
| 21 | CLEAR_E2PROM_ERROR | Cancel error E2PROM |
| 22 | STORE_BLOCK_ERROR | Save error |
| 23 | WAIT_A_SECOND | Waiting before entering another state |

9 WATER IN CENTRAL HEATING SYSTEMS

INTRODUCTION

Water used in central heating systems MUST be suitably treated to ensure the correct functioning of those systems and to guarantee an extended working life for boilers and all other system components. This applies not only to existing systems but to newly installed systems too.

Sludge, lime-scale and pollutants present in the water can cause permanent damage to the heating unit, also within a short time and regardless of the quality standards of the materials used. Contact the Technical Assistance Service for any further information on type and use of additives.

! Always conform to the standards and legislation applicable in the country of installation.

WATER IN CENTRAL HEATING SYSTEMS. INSTRUCTIONS FOR THE DESIGN, INSTALLATION AND MANAGEMENT OF CENTRAL HEATING SYSTEMS.

1. Chemical and physical characteristics of water

The chemical and physical characteristics of water used in central heating systems must conform to the requirements of EN 14868 standard and to the following tables:

| STEEL BOILERS with furnace power < 150 kW | | | |
|----------------------------------------------|-------|-----------------------|---------------------------|
| | | Initial filling water | Regular service water (*) |
| ph | | 6-8 | 7,5-9,5 |
| Hardness | °fH | < 10° | < 10° |
| Electrical conductivity | µs/cm | | < 150 |
| Chlorides | mg/l | | < 20 |
| Sulphides | mg/l | | < 20 |
| Nitrides | mg/l | | < 20 |
| Iron | mg/l | | < 0,5 |

| STEEL BOILERS with furnace power > 150 kW | | | |
|----------------------------------------------|-------|-----------------------|---------------------------|
| | | Initial filling water | Regular service water (*) |
| ph | | 6-8 | 7,5-9,5 |
| Hardness | °fH | < 5° | < 5° |
| Electrical conductivity | µs/cm | | < 100 |
| Chlorides | mg/l | | < 10 |
| Sulphides | mg/l | | < 10 |
| Nitrides | mg/l | | < 10 |
| Iron | mg/l | | < 0,5 |

(*) values for water in system after 8 weeks of functioning

General note on water used to top up systems:

- If softened water is used to top up a system, 8 weeks of functioning after topping up, verify that the water in the system respects the above limits, in particular for electrical conductivity
- This check is not necessary if demineralised water is used to top up the system.

2. Central heating systems

! Do not use automatic filling devices to add water to central heating systems. Use a manual device instead and record top-ups in the system service book.

! If there are more than one boiler, they must all be put into service either contemporarily or with a very low rotation time during the initial period of service, so as to evenly distribute the limited quantity of initial lime-scale.

! A flushing cycle must be programmed after the plant has been installed to flush out any installation debris.

! Water used to fill a system for the first time and water used to top it up must always be filtered (using synthetic or metal mesh filters with a filtration rating of no less than 50 microns) to prevent sludge from forming and triggering deposit corrosion.

! The heating system must be flushed out and cleaned with good workmanship before filling up the existing systems. The boiler may not be filled until after the heating system has been flushed out.

2.1 New central heating systems

The system must be filled up slowly the first time; once it is filled and the air expelled it should never need to be topped up again. Systems should also be operated at maximum working temperature the first time they are started up, in order to facilitate de-aeration. (Gas is not released from the water at low temperatures).

2.2 Reconditioning old central heating systems

If a boiler has to be replaced, do not refill the entire central heating circuit if the quality of water in it conforms to requirements. If the quality of water fails to conform to requirements, either recondition the old water or separate the water circuits (water in the boiler circuit must conform to requirements).

3. Corrosion

3.1 Deposit corrosion

Under-deposit corrosion is an electrochemical process, due to the presence of sand, rust, etc., inside the mass of water. These solid substances generally deposit on the bottom of the boiler (sludge), on tube and pipe heads or in the gaps between pipes and tubes.

Micro-corrosion phenomena may be triggered off owing to the difference in electrochemical potential coming to be created between the material in contact with the impurity and the surrounding one.

3.2 Stray current corrosion

Corrosion from stray currents can occur due to the differing electrical potentials between water in the boiler and the metallic mass of the boiler or piping. This process leaves unmistakable traces i.e. small regular conical holes.

! All metallic parts should be grounded by an efficient earth cable for this reason.

4. Eliminating air and gas from central heating systems

If oxygen enters a circuit continuously or even intermittently (e.g. in under-floor heating systems whose pipes are not protected by impermeable synthetic sheaths, in circuits with open expansion vessels, or in circuits that require frequent top-ups) always separate the boiler's water circuit from the central heating circuit.

Mistakes to avoid and precautions.

From what we have seen it is therefore important to avoid two factors possibly leading to the above mentioned processes i.e. contact between air and water in the installation and regular topping up with fresh water.

To eliminate contact between air and water (and to prevent the latter from becoming oxidized), it is necessary:

- For the expansion system to be a closed vessel type, correctly scaled and with the correct pre-loading pressure (to be regularly checked)
- For the installation to always be at a higher pressure than that of the atmosphere at any point (comprising the pump suction side) and under all running conditions (all the water sealing and couplings in the installation are designed to resist pressure towards outside, but not for depression)
- That the installation will not be made with materials permeable to gas (e.g. plastic pipes for floor systems without anti-oxygen barrier).



Lastly we would remind you that the warranty does not cover breakdowns incurred by the boiler due to deposits and corrosion.

10 RECYCLING AND DISPOSAL

The device is primarily composed of:

| Material | Component |
|---------------------------------------|-------------------------------|
| Metal materials | Pipework, boiler body |
| ABS (acrylonitrile-butadiene-styrene) | Control panel enclosure |
| Glass wool felt | Boiler body insulation |
| Electrical and electronic components | Cables and wiring, controller |

At the end of the device's useful life, these components must be separated and disposed of according to current regulations in the country of installation.

 Adequate sorted waste collection, processing and environmentally-friendly disposal contribute to preventing possible negative impacts on the environment and health and promote the reuse and/or recycling of the materials of which the appliance consists.

 Illegal disposal of the product by the owner shall be subject to administrative fines provided for by applicable laws.

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The manufacturer strives to continuously improve all products. Appearance, dimensions, technical specifications, standard equipment and accessories are therefore liable to modification without notice.