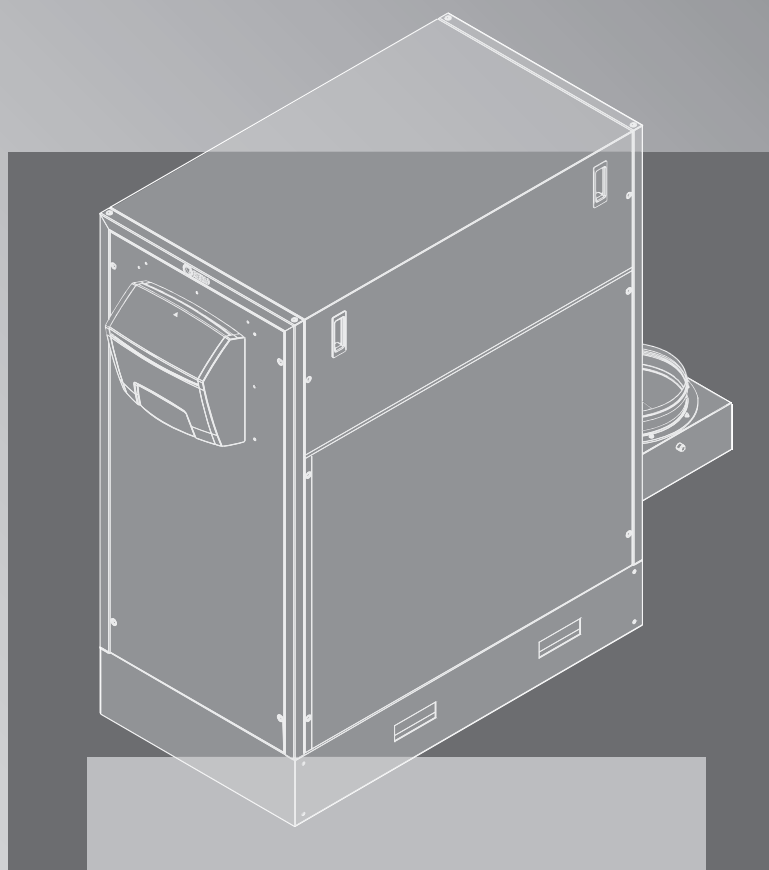


**ALUMINIUM
CONDENSING
BOILERS**

ALU PRO

power

**INSTRUCTIONS FOR THE INSTALLER AND
FOR THE TECHNICAL ASSISTANCE CENTRE**



RIELLO

CONFORMITY

ALU PRO Power condensing boilers comply with:

- Regulation (EU) 2016/426
- Efficiency Directive 92/42/EEC
- Electromagnetic Compatibility Directive 2014/30/EU
- Ecodesign Directive for energy-related products 2009/125/EC
- Low Voltage Directive 2014/35/EU
- Delegated regulation (EU) N. 813/2013



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

RANGE

| MODEL | CODE |
|-------------------|----------|
| ALU 115 PRO power | 20021781 |
| ALU 150 PRO power | 20020843 |
| ALU 225 PRO power | 20020844 |
| ALU 300 PRO power | 20020845 |
| ALU 349 PRO power | 20029287 |
| ALU 375 PRO power | 20020846 |
| ALU 450 PRO power | 20020847 |
| ALU 525 PRO power | 20020848 |
| ALU 600 PRO power | 20020849 |

ACCESSORIES

For the specific related accessories see the Riello catalogue and the product datasheet.

Dear Installer,

*congratulations on having chosen a **RIELLO** boiler, a 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 for the proper 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 again on your choice of product

Riello S.p.A.

GENERAL

| | |
|-------------------------------------|----|
| Conformity | 2 |
| Range | 2 |
| Index | 4 |
| General Safety Information | 5 |
| Basic safety rules | 5 |
| Description of the appliance | 6 |
| Safety devices | 6 |
| Identification | 7 |
| Data plate | 7 |
| Structure | 8 |
| Technical data | 11 |
| Water circuit | 12 |
| Pumps | 12 |
| Positioning the temperature sensors | 13 |
| Wiring diagram | 14 |
| Control panel | 16 |
| Operation | 19 |

INSTALLER

| | |
|---|----|
| Product delivery | 24 |
| Opening | 24 |
| Dimensions and weights | 25 |
| Handling | 25 |
| Place of installation | 28 |
| Installation in older systems and systems requiring modernisation | 28 |
| Water in central heating systems | 29 |
| Water connections | 32 |
| Draining the condensate | 37 |
| Condensate neutraliser | 38 |
| Gas connection | 40 |
| System anti-freeze protection | 41 |
| Flue gas exhaust and comburent air intake | 41 |
| Electrical wiring | 42 |
| Connecting the outdoor temperature sensor | 45 |
| System filling and emptying | 46 |
| Preparing for initial start-up | 46 |

TECHNICAL ASSISTANCE CENTRE

| | |
|--|----|
| Initial commissioning | 47 |
| Checks during and after initial start-up | 49 |
| Temporary shut-down | 50 |
| Preparing for extended periods of disuse | 50 |
| Setting the combustion parameters | 51 |
| Conversion from one type of gas to another | 55 |
| Setting the functional parameters | 57 |
| Information display | 59 |
| Fault codes | 60 |
| Parameters menu | 62 |
| Maintenance | 65 |
| Cleaning the condensate drain and siphon | 65 |
| Dismantling the fan | 66 |
| Removing the burner | 67 |
| Dismantling the check valve: | 68 |
| Positioning electrodes | 69 |
| Troubleshooting | 70 |

In some parts of the booklet, some symbols are used:











= for actions that require particular caution and adequate preparation



= for actions that absolutely **SHOULD NOT** be carried out












This booklet Cod. 20125662 Rev. 27 (11/21) is composed of 72 pages.

GENERAL SAFETY INFORMATION

-  After removing the packaging make sure that everything is there and undamaged, if not contact the **RIELLO** Agency that sold you the appliance.
-  The installation of the **ALU PRO power** boiler must be carried out by a qualified company that will issue the owner with the installation declaration of conformity on completion of the work, in compliance with the applicable National and Local Standards and the instructions supplied by **RIELLO** in the instruction booklet supplied with the appliance.
-  The **ALU PRO power** boiler must be used for the purpose intended by **RIELLO** for which it was expressly made. No contractual or extra-contractual liability is accepted by **RIELLO** for damage caused to people, animals, or objects due to errors in installation, adjustment, or maintenance or by improper use.
-  In the event of a water leak, disconnect the boiler from the mains electricity supply, shut off the water supply and promptly notify the **RIELLO** Technical Assistance Centre or else professionally qualified personnel.
-  Periodically check that operating pressure in the water circuit is **greater than 1.5 bar** and less than the maximum limit provided for the appliance. Otherwise, contact the **RIELLO** Technical Assistance Centre or professionally qualified personnel.
-  If the boiler is not going to be used for an extended period of time, proceed as follows to prepare it for shut-down:
 - set the appliance's main switch to "OFF"
 - turn off the system general switch
 - close the fuel and water taps of the heating system
 - drain the heating and domestic hot water circuits to prevent freezing
-  The boiler must be serviced at least once a year.
-  This manual is an integral part of the appliance and must therefore be kept with care and must ALWAYS accompany the boiler even when passed on to another owner or user or transferred to another installation. In case of loss or damage, please contact the local **RIELLO** Technical Assistance Centre in your Area for a new copy.

BASIC SAFETY RULES

Remember that the use of products that use fuel, electrical power and water demands that a number of fundamental safety precautions be respected, like:

-  Do not allow children or persons (including children) with reduced physical, sensorial or mental abilities or with insufficient experience and knowledge to use the system without proper supervision or instruction from the person responsible for its safe use.
-  It is forbidden to use electrical devices or equipment, such as switches, domestic appliances, etc. if there is a smell of gas or unburned products. In this case:
 - air the room, opening doors and windows;
 - close the fuel shut-off cock;
 - promptly contact the **RIELLO** Technical Assistance Centre or other professionally qualified personnel.
-  Do not touch the boiler while barefoot or when wet.
-  Never clean or service the boiler without first disconnecting it from the mains electricity supply by turning the main power switch to "off" and the main switch of the boiler to "OFF".
-  Do not modify the safety or adjustment devices without the receiving the manufacturer's authorisation and precise instructions.
-  Do not plug the condensate drain outlet.
-  Never pull, disconnect, or twist the electrical cables coming from the boiler even if it is disconnected from the mains electricity supply.
-  Do not obstruct or restrict the air vents in the room where the boiler is installed.
The ventilation openings are vital for correct combustion.
-  Do not expose the boiler to the elements.
It has been designed to work outdoors only when used with the special accessory kit.
-  Never leave inflammable substances and containers in the room where the boiler 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. It must be disposed in accordance with the present law.

DESCRIPTION OF THE APPLIANCE

The aluminium **ALU PRO POWER** boilers are modular condensing heat generators for heating systems and when used with storage cylinders, for producing domestic hot water.

The generator is based on a cascade of independent 75 kW thermal modules, managed in sequence by cascade control.

The modules are connected to each other using a delivery collector, a return line collector and a flue gas collector with a single condensate drain.

The number of modules ranges from 1 to 8 for outputs ranging from 75 to 600 kW. This logic allows you to ensure a high degree of continuous service and a high degree of modulation (up to 40:1 for the 600 kW model). The aluminium elements with a low water content have large exchange surface for maximising the heat exchange, energy efficiency, thermal equilibrium obtaining high condensation yields.

The stainless steel with continual total premix burner provides stable and quiet combustion with low pollutant emissions (NO_x class).

Mixing takes place using a venturi tube upstream of the fan.

The adjustment of the sequence is carried out with a

climate logic, with an outdoor temperature sensor, and it allows you to regulate the outlet temperature according to the outside temperature.

The **ALU PRO POWER** boiler, in its turn, can be managed in cascade logic in a system composed of up to 8 boilers, using a second level master (see RVS) thereby creating boilers up to 4.8 MW.

The sequence control on-board the boiler is set up to manage a pump (primary or system depending on the parametrisation) with modulating logic controlled with a 0-10V DC signal.

The sequence control can in any event be controlled with a TA, OT+ input or a 0-10V DC signal.

It is also possible to display the error codes on the display and the connections for diagnostics with a PC.

The boilers are supplied to operate with G20 methane gas. However, they can operate with G25 or G31 gas using the conversion kit supplied (for Belgium this type of conversion is prohibited).

SAFETY DEVICES

The **ALU PRO power** condensing boiler has the following safety devices:


Safety thermostat with manual reset, intervenes when the boiler water temperature exceeds 110°C.


Water pressure switch intervenes when the water circuit pressure is less than 0.5 bar.


Water circuit diagnosis checks the temperature difference between delivery and return (ΔT).

Flue gases safety, a probe intervenes when an increase in the temperature of the flue gases indicates the gases themselves are not being vented correctly.

Gas pressure switch intervenes if the gas supply pressure is less than 10 mbar.

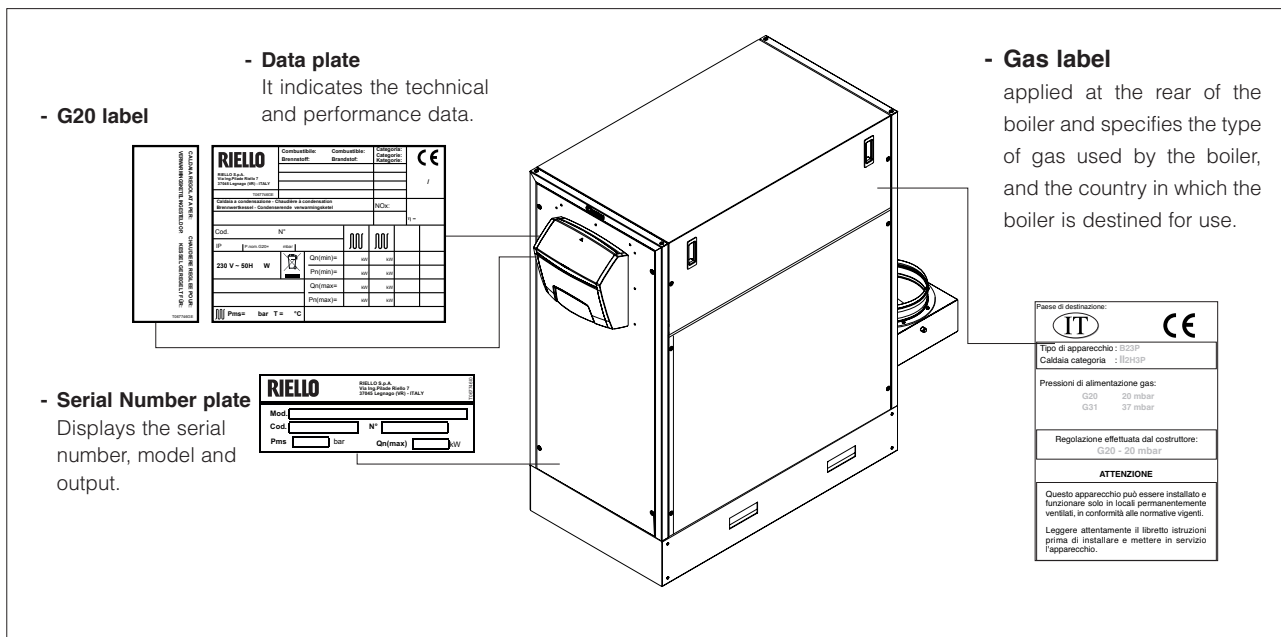
 The intervention of the safety devices indicates a boiler malfunction, which is potentially dangerous, therefore immediately contact the **RIELLO** Technical Assistance Centre. In any event, you may attempt to restart the boiler after a short wait (see chapter on initial start-up).

 Never start the boiler up, even for a short period, if the safety devices are not functioning correctly or have been tampered with.

 Replacement of safety devices must be performed by the **RIELLO** Technical Assistance Service, using only original components. Refer to the spare parts catalogue supplied with the boiler. After making the repair, check that the boiler is working properly.

IDENTIFICATION

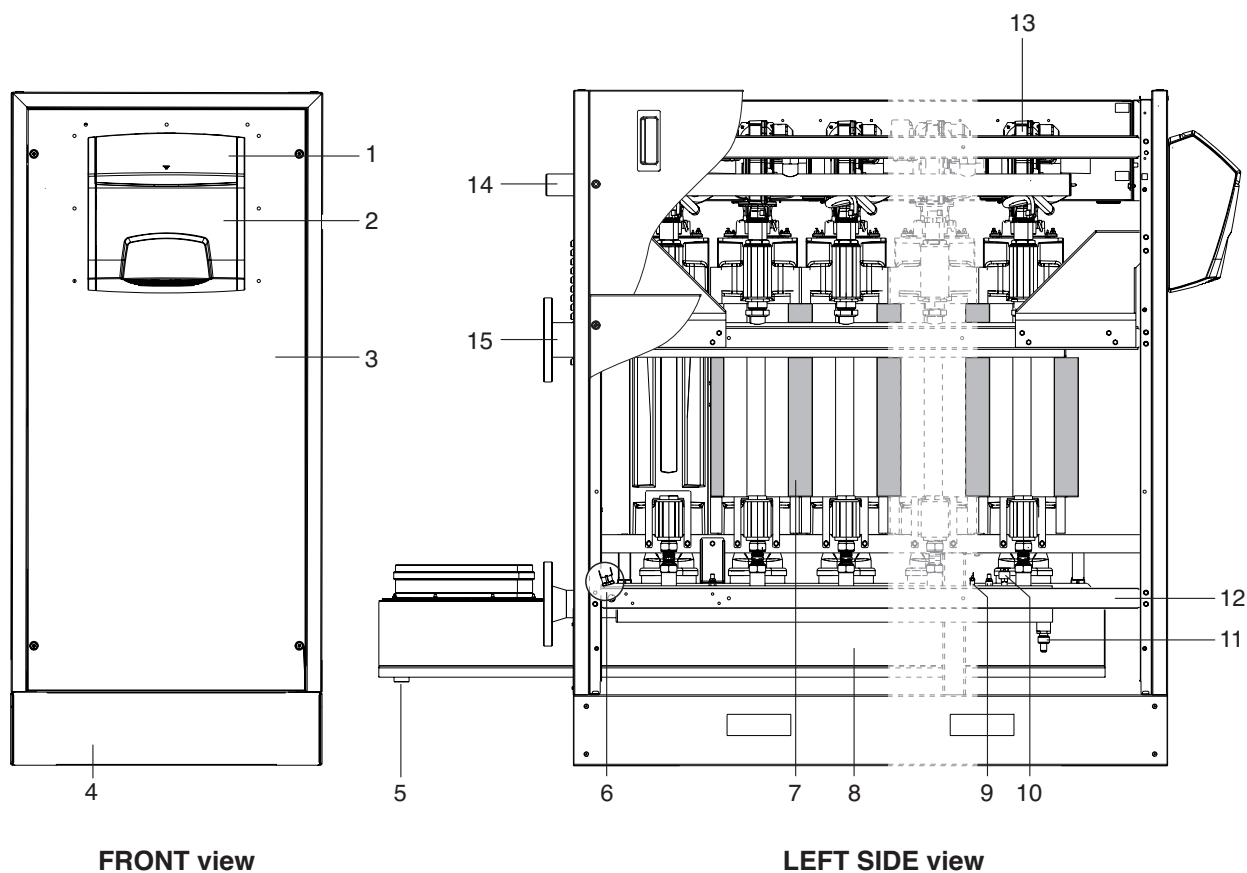
The products are identified by:



DATA PLATE

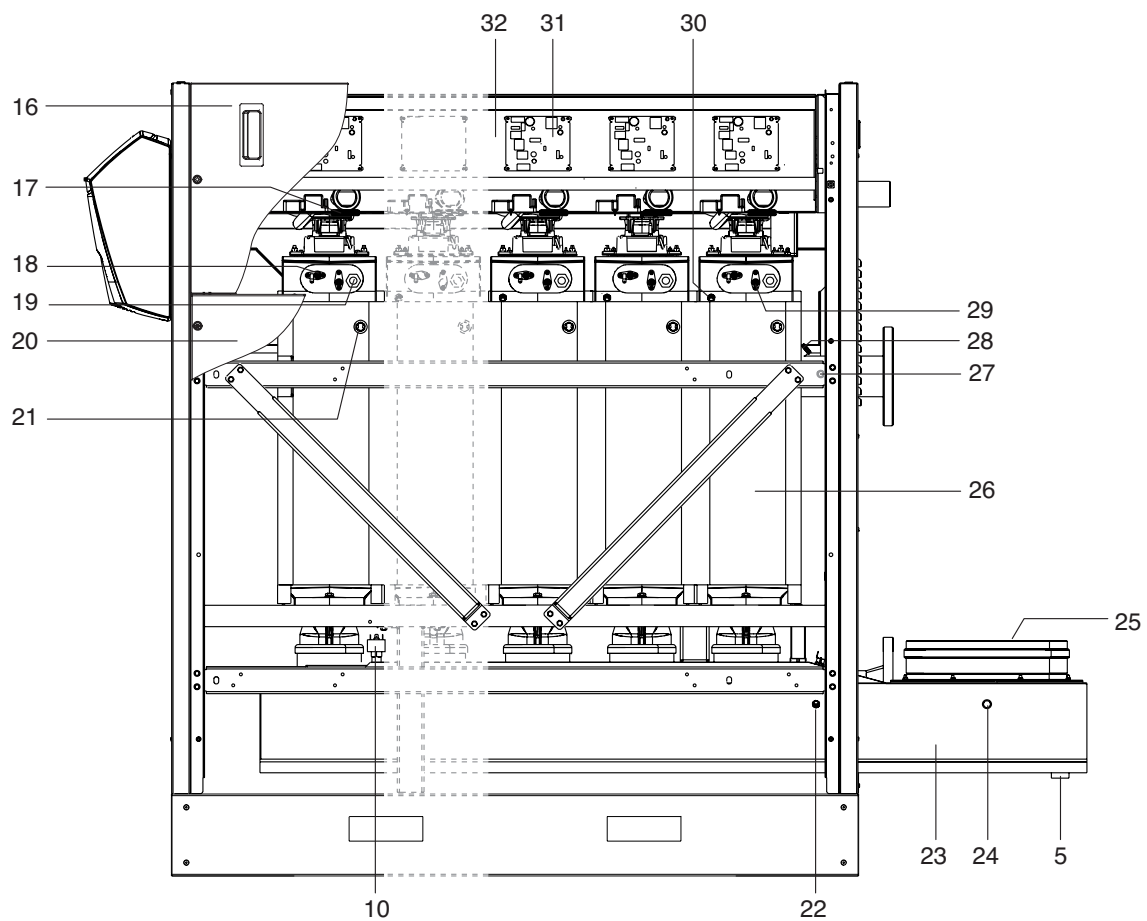
- Heating operation
Qn Nominal heat delivery
Pn Nominal operating output
IP Electrical protection rating
P.nom Nominal pressure
Pms Maximum pressure, heating
T Temperature
η Efficiency
NO_x Class of NO_x

| | | | | | |
|--|------------------|------------------------------|------------------------------|--------------------------|-----|
| RIELLO RIELLO S.p.A. Via Ing. Pilade Rielo 7 37045 Legnago (VR) - ITALY | | Combustibile: Brennstoff: | Combustibile: Brandstoff: | Categoria: Kategorie: | |
| | | | | | |
| T067746GE | | | | | |
| Caldaia a condensazione - Chaudière à condensation Brennwertkessel - Condenserende verwarmingsketel | | | | NO _x : | |
| | | | | | η = |
| Cod. | N° | | | | |
| IP | P.nom. G20= mbar | | | | |
| 230 V ~ 50H | W | | Qn(min)= | kW | kW |
| | | | Pn(min)= | kW | kW |
| | | | Qn(max)= | kW | kW |
| | | | Pn(max)= | kW | kW |
| Pms= bar | | | T = °C | | |

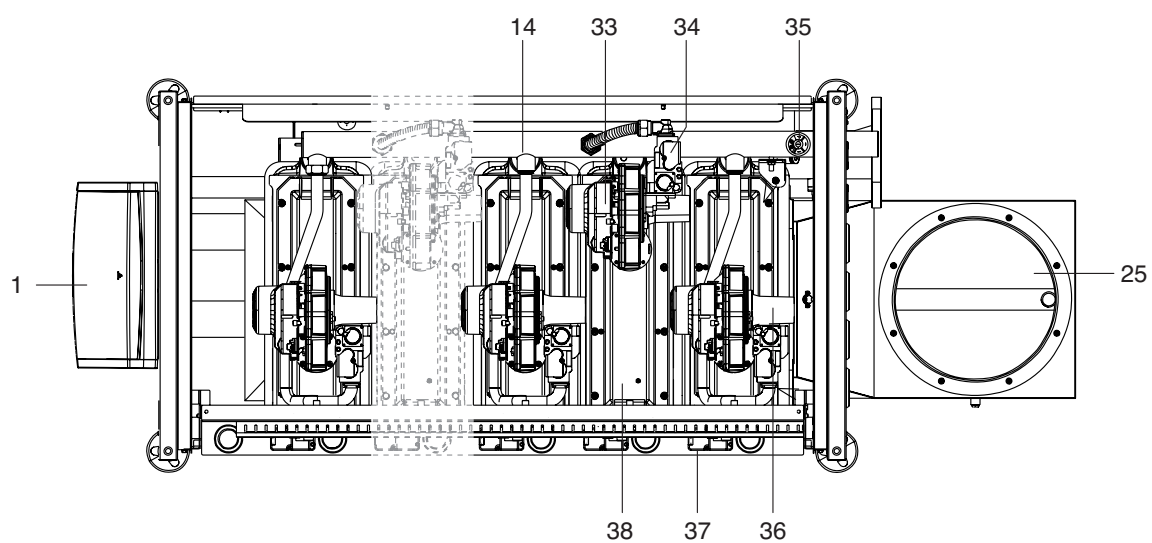


- 1 - Control panel
- 2 - Control panel
- 3 - Front panel
- 4 - Base
- 5 - Condensate drain
- 6 - Flue gas thermostat
- 7 - Module insulation
- 8 - Flue gas box
- 9 - Return temperature sensor fitting
- 10 - Water pressure switch
- 11 - Drain tap
- 12 - Return line collector
- 13 - Burner
- 14 - Gas collector
- 15 - Delivery collector
- 16 - Cover panel
- 17 - Burner check valve
- 18 - Ignition electrode
- 19 - Flame inspection window

- 20 - Side panel
- 21 - Thermal module safety thermostat
- 22 - Flue gas probe
- 23 - Flue gas box
- 24 - Flue gas analysis outlet
- 25 - Flue gas exhaust
- 26 - Boiler aluminium body
- 27 - Flow sensor
- 28 - Sensor socket + Safety thermostat
- 29 - Detection electrode
- 30 - Thermal module flow sensor
- 31 - Flame control boards
- 32 - Board support
- 33 - Fan motor
- 34 - Gas valve
- 35 - Transfer gas pressure switch
- 36 - Venturi tube
- 37 - Ignition transformer
- 38 - Thermal module cover

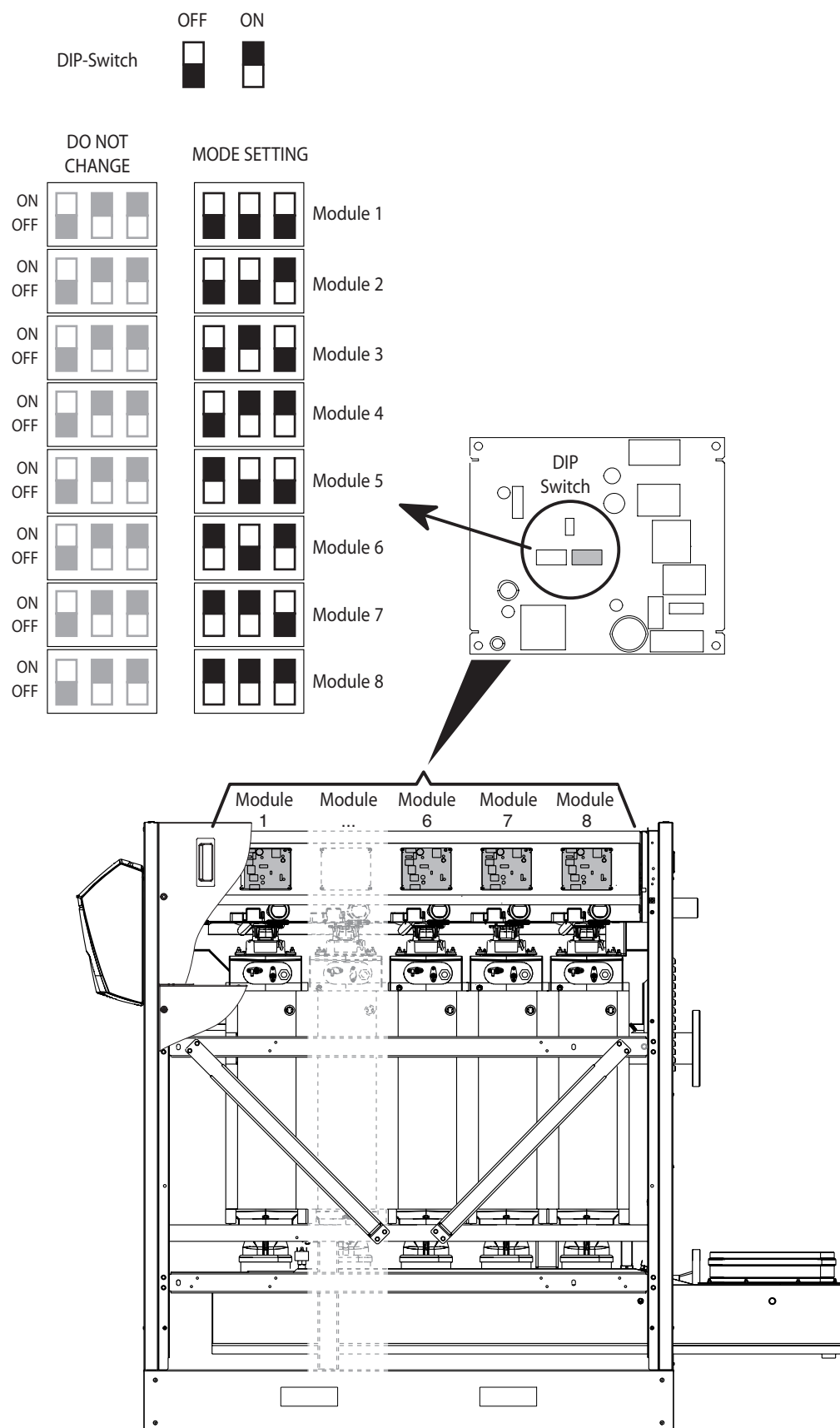


RIGHT SIDE view



TOP view

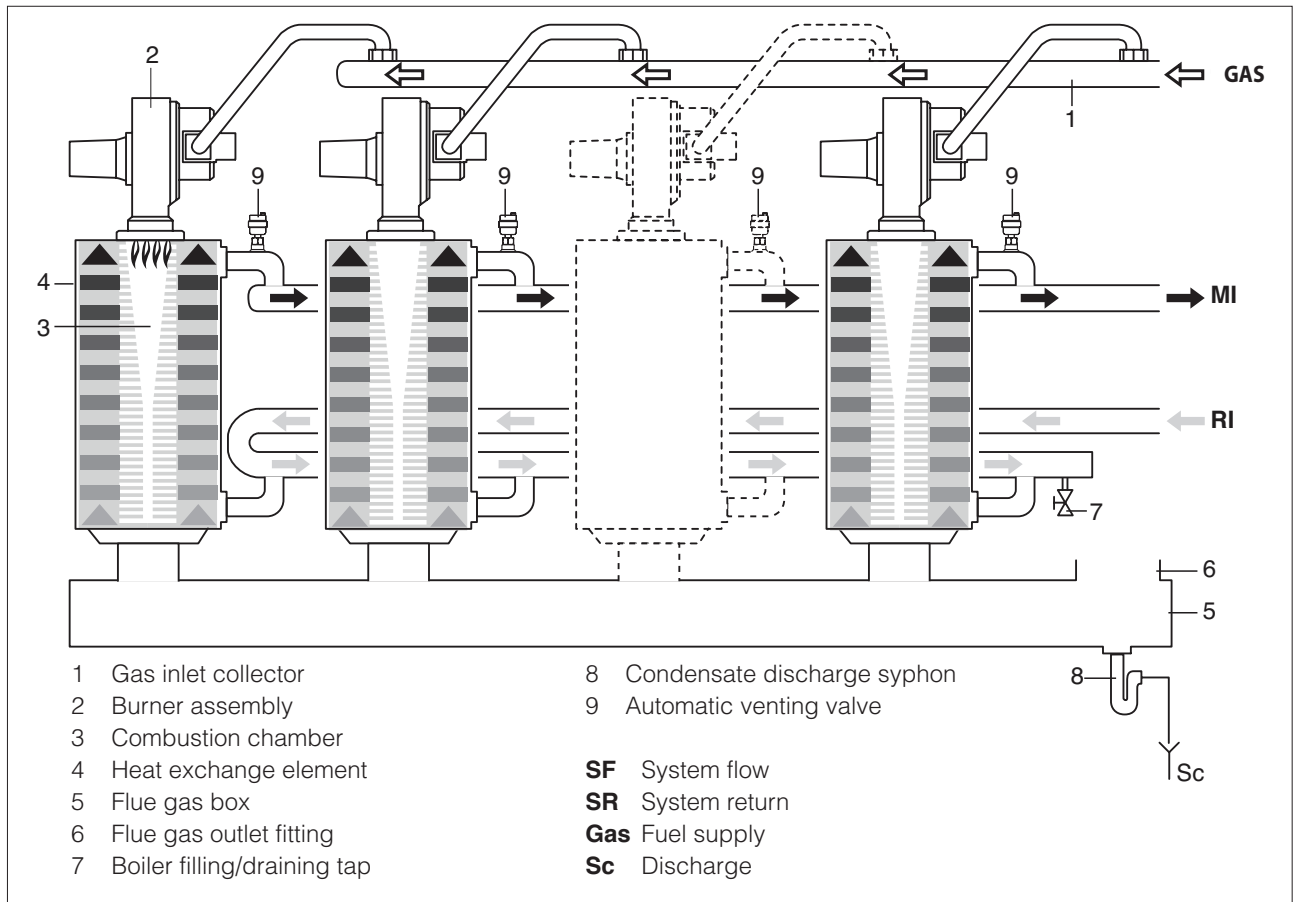
Diagram of SETTINGS FOR THE THERMAL MODULES



| ALU PRO power | | UM | 115 | 150 | 225 | 300 | 349 | 375 | 450 | 525 | 600 |
|--|-----------------------|---------|---|---------|--------|--------|---------|--------|--------|--------|--------|
| Type of appliance | | | condensing boiler for central heating B23, B23P | | | | | | | | |
| Fuel | | | IT-CH: G20=20mbar G31=37mbar FR: G20/G25 - 20/25 mbar G31=37mbar BE: G20/G25 - 20/25 mbar | | | | | | | | |
| Appliance category | | | IT-CH: II2H3P - FR: II2Esi3P - BE: I2E(R) | | | | | | | | |
| Maximum rated heat input (GCV) | G20 | kW | 127,8 | 166,6 | 250,0 | 333,3 | 387,7 | 416,6 | 499,9 | 583,3 | 666,6 |
| Maximum rated heat input NCV | G20 | kW | 115 | 150 | 225 | 300 | 349 | 375 | 450 | 525 | 600 |
| Reduced heat input GCV (NCV) | G20 | kW | 16,7 (15) | | | | | | | | |
| Rated heat output (80-60°C) P4 | G20 | kW | 112,2 | 146,6 | 220,1 | 294,0 | 342,4 | 368,3 | 442,4 | 517,1 | 591,6 |
| 30% heat output with return at 30°C (P1) | G20 | kW | 37,3 | 48,6 | 73,0 | 97,3 | 113,2 | 121,6 | 145,9 | 170,3 | 194,6 |
| Reduced heat output (80-60°C) | G20 | kW | 14.7 | | | | | | | | |
| Seasonal energy efficiency in central heating mode | η_s | % | 92 | 92 | 92 | 93 | 93 | 93 | 93 | 93 | 93 |
| Constant pressure drop with the burner off | | % | < 1 | | | | | | | | |
| Losses from stack | | % | 0.7 | 0.7 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Efficiency at rated heat input and in High temperature mode (GCV) η_4 - (80-60°C) | | % | 87.9 | 88 | 88.1 | 88,2 | 88,3 | 88,4 | 88,5 | 88,7 | 88,8 |
| Efficiency at 30% rated heat input and in Low temperature mode (GCV) η_1 | | % | 97,3 | | | | | | | | |
| Max gas consumption | G20 | m³/h | 12.1 | 15.8 | 23.7 | 31.6 | 36.7 | 39.5 | 47,4 | 55.3 | 63.2 |
| Max. flue gas temperature (80°- 60°) | | °C | 65 - 70 | | | | | | | | |
| Min. flue gas temperature (80°- 60°) | | °C | 60 - 65 | | | | | | | | |
| Mass flue gas flow rate (80°- 60°) min-max | | kg/h | 30-164 | 30-164 | 38-224 | 63-285 | 67-336 | 67-336 | 73-392 | 73-457 | 73-523 |
| Residual head | | Pa | ~ 100 | | | | | | | | |
| Noise levels (*) at Pn min/Pn max | | dB(A) | 44-62 | 44-62,5 | 44-63 | 44-64 | 44-64,5 | 44-65 | 44-66 | 44-67 | 44-68 |
| CO2 max-min | G20 | % | 9 - 9 | | | | | | | | |
| CO S.A. max-min | | mg/kWh | 42 - 4 | | | | | | | | |
| NOx (referring to GCV) | | mg/kWh | 35 | 35 | 38 | 35 | 56 | 56 | 56 | 52 | 46 |
| Max-min heating pressure | | bar | 6 - 0,5 | | | | | | | | |
| Maximum permitted temperature | | °C | 110 | | | | | | | | |
| Lockout thermostat activation temperature | | °C | 110 | | | | | | | | |
| Boiler minimum operating output | | l/h | 1,300 | 1,300 | 1950 | 2600 | 3250 | 3250 | 3900 | 4550 | 5200 |
| Water content in the heating circuit | | l | 30 | 30 | 40 | 55 | 65 | 65 | 78 | 88 | 100 |
| Pressure drop water side (ΔT 20) | | mbar | 30 | 50 | 60 | 70 | 80 | 80 | 90 | 100 | 150 |
| Elmax electric power consumption | | W | 300 | 300 | 440 | 580 | 720 | 720 | 860 | 1000 | 1140 |
| Electric power consumption at partial load - Elmin | | W | 90 | 90 | 132 | 174 | 216 | 216 | 258 | 300 | 342 |
| Electric power consumption in Psb Standby mode | | W | 20 | | | | | | | | |
| Voltage supply | | Volt/Hz | 230/50 | | | | | | | | |
| Electrical protection level | as standard | IP | 20 | | | | | | | | |
| | with kit for outdoors | IP | X5D | | | | | | | | |
| Boiler net weight | | Kg | 240 | 240 | 310 | 395 | 470 | 470 | 565 | 640 | 735 |

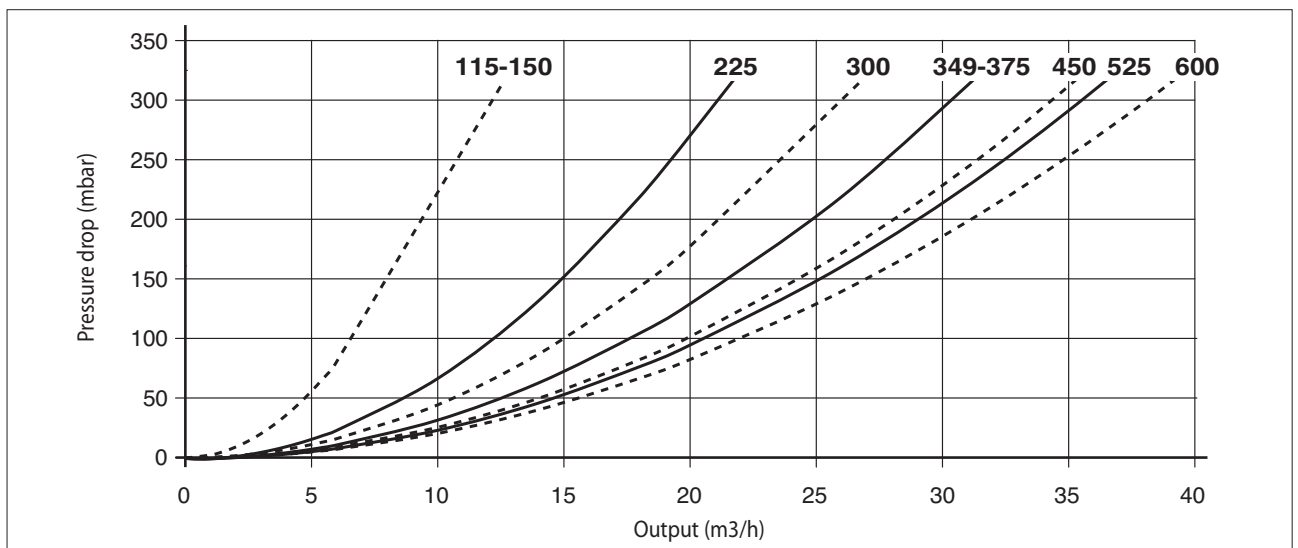
(*) Noise levels measured as continuous A-weighted sound pressure, at 1 metre from the appliance.

WATER CIRCUIT



PUMPS

Select a pump that is compatible with the water resistor of the boiler and the system.
The illustration below shows the resistor characteristics.



At first start-up, and at least once a year, the rotation of the circulator shaft should be checked, especially after long periods of not being operated, since deposits and/or residues could impede it from rotating freely.

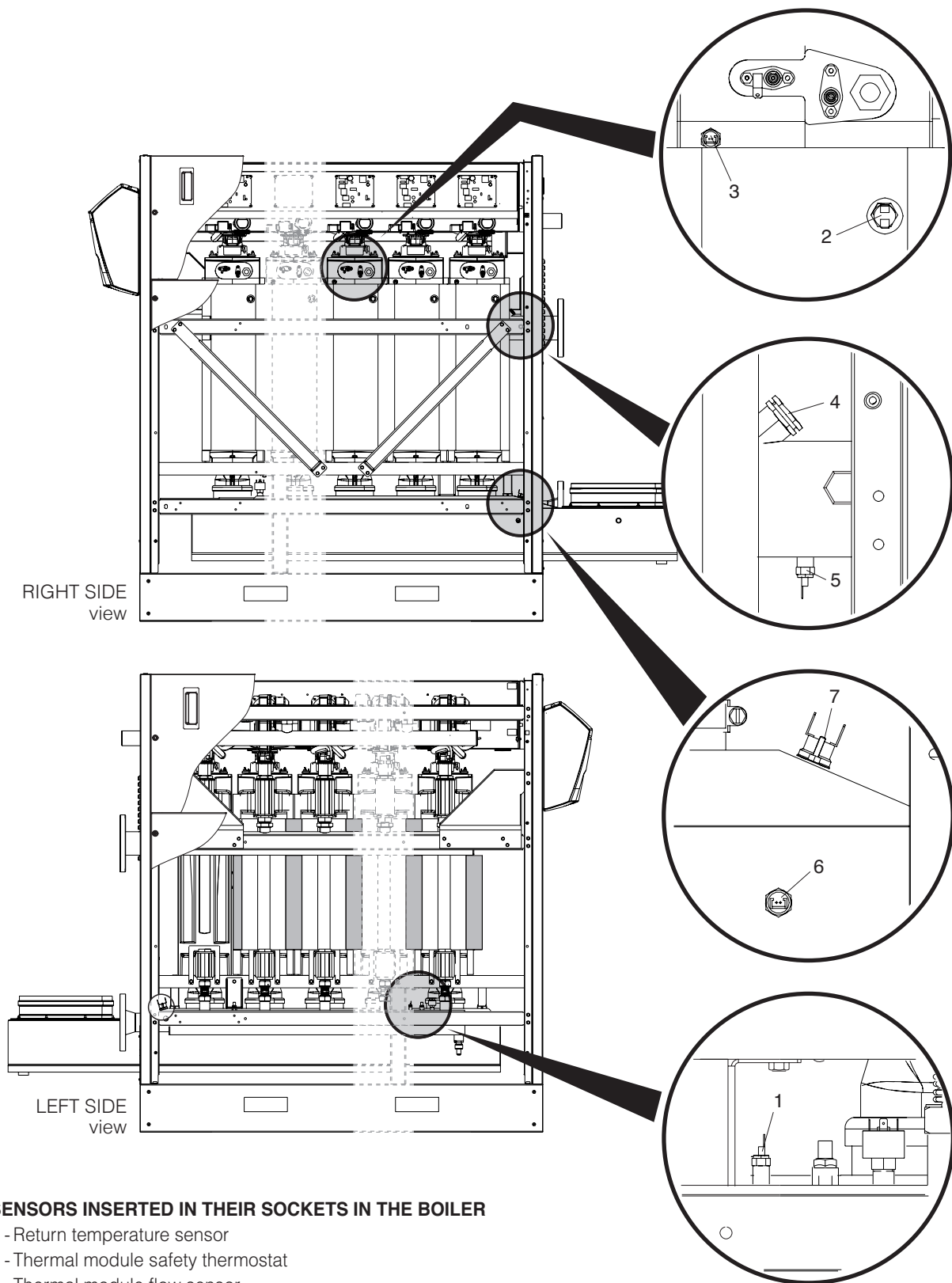


Before loosening or removing the circulator cap, protect the electric devices located underneath from any water that might come out.

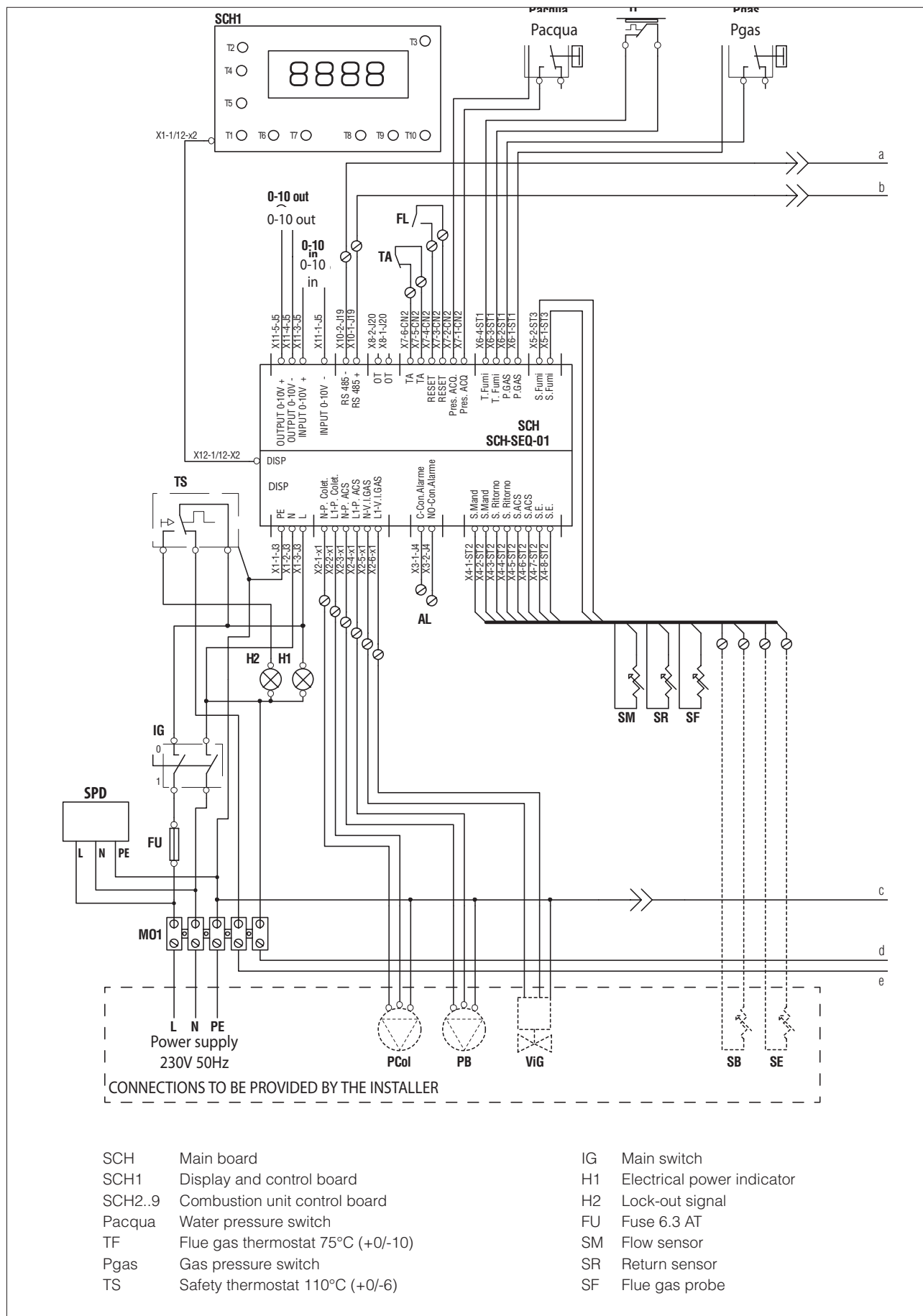


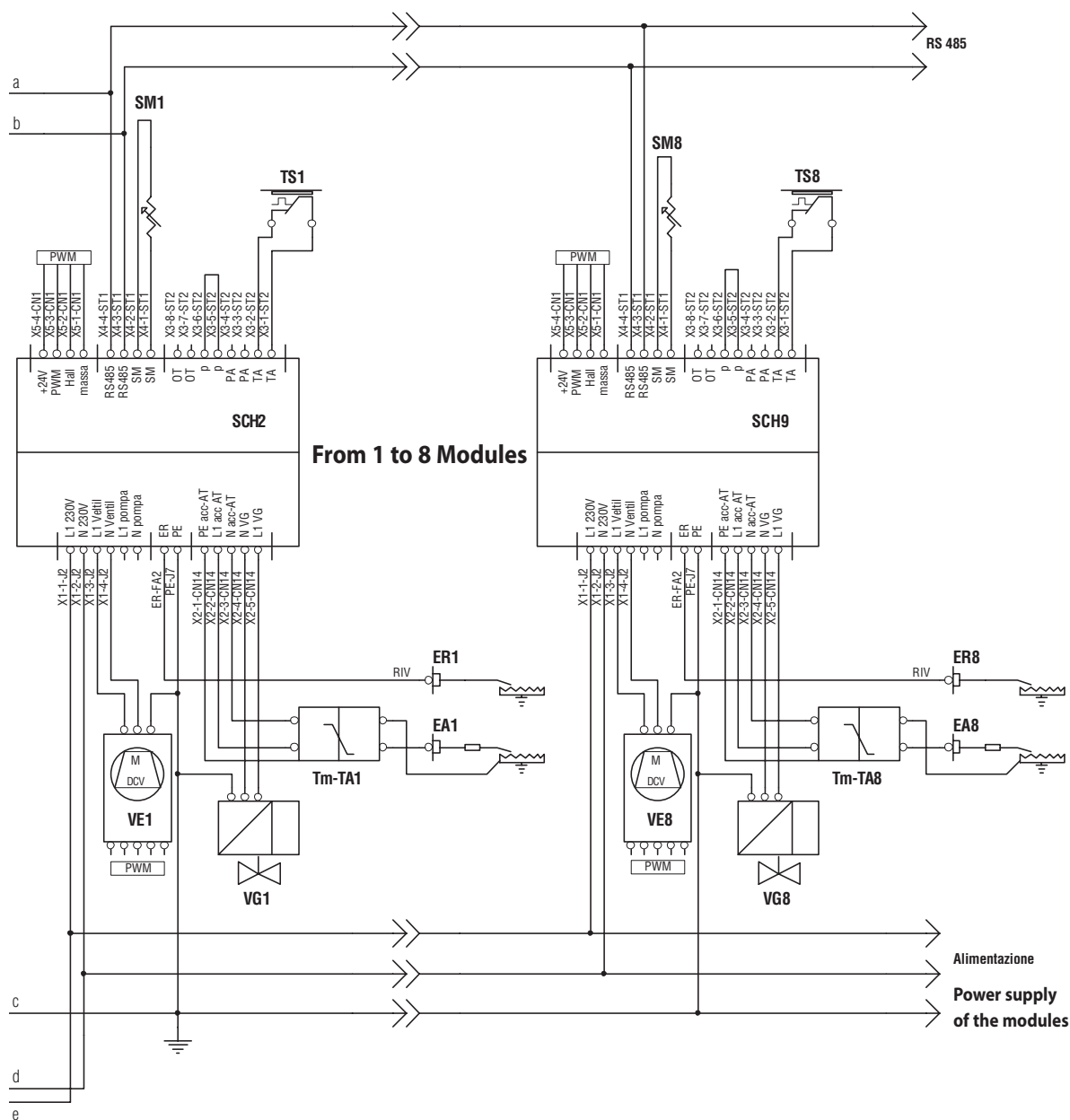
Never operate the pumps without water.

POSITIONING THE TEMPERATURE SENSORS



WIRING DIAGRAM





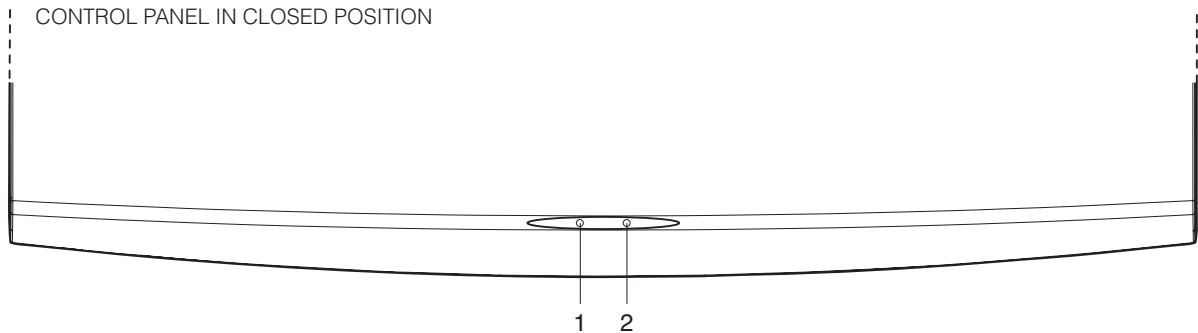
Connections to be provided by the installer:

SM1..8 Flow sensor heating element
 TS1..8 Safety thermostat heating element
 ER1..8 Flame detection electrode
 EA1..8 Ignition electrode
 Tm-TA1..8 Ignition transformer
 VG1..8 Combustion unit gas valve
 VE1..8 Variable speed fan
 MO1 Electrical supply terminal board
 SPD Overvoltage protection device

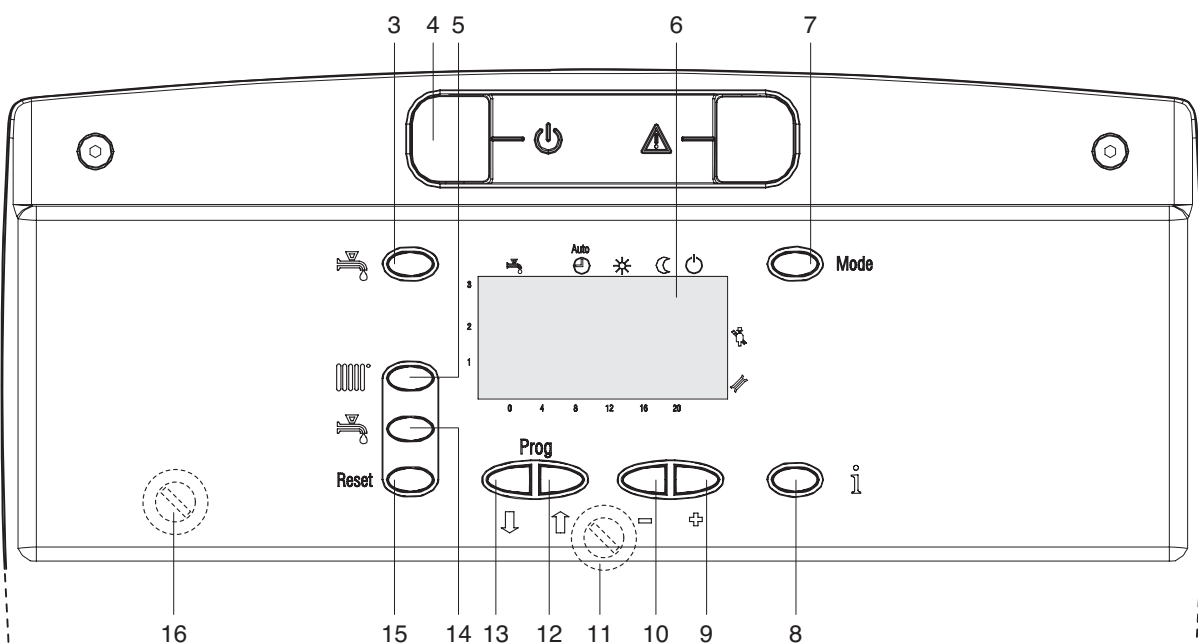
PCol Circulator collector (accessory)
 PB Circulator storage cylinder (accessory)
 ViG Gas shut-off valve (accessory)
 SB Storage cylinder probe (accessory)
 SE Outdoor temperature sensor (supplied)
 TA Room thermostat (low voltage 24V)
 0-10 out Output 0-10 Volt (for system pump)
 0-10 in Input 0-10 Volt
 AL Alarm connection with clean contact
 FL Flow switch (accessory)

BASIC INFORMATION / INTERFACE COMMANDS

CONTROL PANEL IN CLOSED POSITION

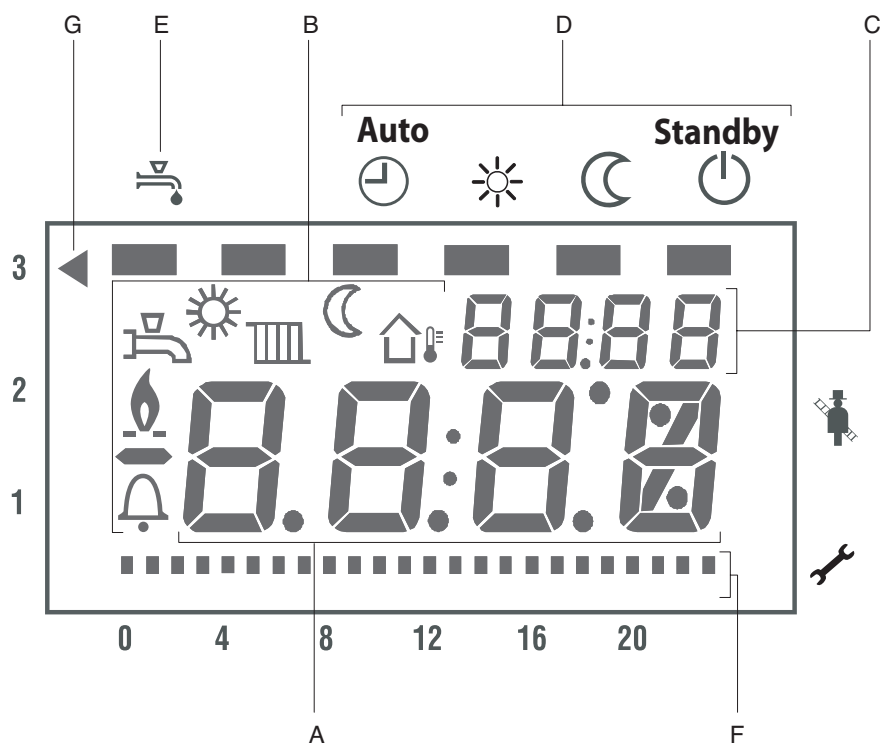


CONTROL PANEL IN OPEN POSITION



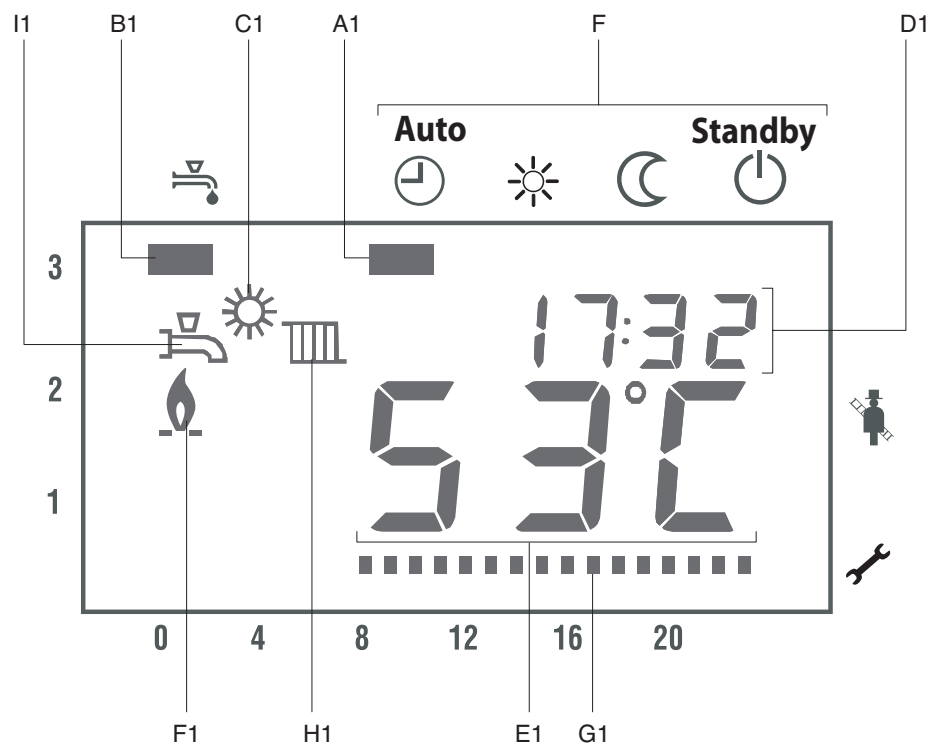
- | | | | |
|---|---|-------|--|
| 1 | - Electrical power indicator (green) Lights to show that the system is receiving electrical power . | 8 | - Information button |
| 2 | - Burner lockout indicator (red) Lights to show that a burner lockout has occurred. | 9-10 | - Button for changing parameter value |
| 3 | - DHW production on/off button When active the symbol appears on the display | 11 | - Fuse (accessed by slightly turning the control panel) |
| 4 | - Main switch | 12-13 | - Buttons for electing parameters |
| 5 | - Button regulating heating temperature or room temperature setpoint | 14 | - Button for regulating DHW temperature |
| 6 | - Display | 15 | - Reset button Restores normal functioning after a safety shut-down |
| 7 | - Button for selecting operating mode. A line appears under the symbols: <ul style="list-style-type: none"> Automatic: the boiler functions according to the set program Continuous: continuous mode Reduced: reduced mode Stand-by | 16 | - Safety thermostat with manual reset (accessed by slightly turning the control panel) |

SECONDARY INFORMATION / DISPLAY VIEW



- A -Large numeric display.
Displaying current value, non-volatile errors
- B -Display symbols:
 - DHW temperature or DHW mode active
 - CH or room temperature setpoint, or CH mode active
 - Outdoor temperature
 - Nominal mode
 - Reduced mode
 - Flame present
 - Error
- C -Small numeric display
Displays time, parameters or error codes,
displaying combustion module
- D -Heating circuit operating modes:
 - Automatic: the boiler functions according to the set program
 - Continuous: the boiler operates at daytime (comfort) setpoint
 - Reduced: the boiler operates at night-time (reduced) setpoint
 - Stand-by
- E -DHW mode: ON or OFF
- F -Current time bar
- G -Indicating 0-10 V device operating

MAIN SCREEN



A1 -Operating mode.

Pressing the **"Mode"** button, the bar appears under the corresponding mode symbol.

B1 -DHW mode.

The button "☰" (above the display) switches the mode on or off.

C1 -Nominal operating mode

D1 -Time of day

E1 -Current boiler temperature

F1 -Flame presence

G1 -Current time indication

H1 -Current mode heating

I1 -Current mode DHW.

Functional notes

The control panel of the **ALU PRO power** boiler oversees:

- The domestic hot water priority function that gives domestic hot water priority over heating hot water.
- The anti-freeze function:
The boiler's anti-freeze function. If the boiler's temperature is less than H511 the burner comes on at maximum power until the boiler temperature reaches H512. The anti-freeze system, active only with the outdoor temperature sensor connected. If the outside temperature drops below -5°C the pumps are switched on. If the outdoor temperature is between -5° and 1.5°C, the pumps are switched on for 10 minutes at intervals of 6 hours; If outside temperature is above 1.5°C the pumps are switched off.
- The over-temperature dispersal function: if for any reason the limit temperature C515 is reached, the boiler switches off and the accumulated heat is dispersed activating the system pump, if the last request was heating, or the domestic hot water pump if the last request was domestic hot water.
- The cascade control function: using the regulator (accessory) it is possible to connect the boiler in cascade up to a maximum of 16.
- The ignition/shut-off control function: to prevent repeated ignitions and shut-downs, the boiler stays off for a minimum period of time. The boiler will only start up again if the difference between the setpoint and the actual boiler temperature exceeds a predetermined value.

OPERATION

HEAT REQUEST (WITH THREE SYSTEMS)

The **ALU PRO POWER** adjustment system has three different types.

- 1 - with OT+ signal
- 2 - with external 0-10V control
- 3 - with room thermostat.

Once the heat request is finished, the system carries out the post-circulation, namely the heating circulator is started for the time set in parameter H543.

1 - Heat request with OT+ signal

The OT+ input is enabled only using the RVS communication kit available as an accessory ordered separately.

2 - Temperature request with 0-10V control

The 0-10Vdc input is translated into a temperature setpoint.

- 0Vdc - 1Vdc = no request;
- 1Vdc = request present with temperature setpoint at the minimum permitted value;
- 10Vdc = request present with temperature setpoint at the maximum permitted value.

The 0-10V regulators are: output 0-10V RVS63.

The management of the 0-10V device is set using the selection of parameter C750, which can have the following values:

- 0 = no 0-10V device is connected to the system;
- 1 = the 0-10V device is connected to the system; the minimum stand-by signal is 0.5V. If the input read by

the main board is less than this threshold, the request through TA is enabled; for higher values the TA input is disabled;

- 2 = the 0-10V device is connected to the system; the minimum stand-by signal is 0.5V. The TA input is always disabled.

If both an opentherm device and a 0-10V device (parameter C750 in cases 1 or 2) are detected connected to the system at the same time, any requests coming from the latter will not be handled.

The display regarding the presence and the operating status of the 0-10V input device is as follows:

- If C750 = 0: no signal is activated;
- if C750 = 1 or 2, and the input signal is greater than 0.5Vdc: the symbol ◀ in the top left of the 'LCD comes on in a fixed manner;
- if C750 = 1 or 2, and the input signal is less than 0.5Vdc: the symbol ◀ in the top left of the 'LCD comes on flashing;

3 - Enabling request with TA function

the heating request with a room thermostat is managed only in the case where no device is connected to the opentherm bus nor to the 0-10V input of the system (C750 = 0 or else C750 = 1 with 0-10V input less than the threshold of 0.5V). In the above-mentioned cases, the closure of the thermostat generates a request with a set point set from the interface keypad, if there is no outdoor probe, or with a set point calculated on the basis of the climatic curves, if there is an outdoor temperature sensor.

NIGHT-TIME REDUCTION

the night-time reduction function is active when all the following conditions exist contemporaneously:

- parameter C806 = 1 (function enable);
- there is an outdoor temperature sensor and it is working;
- no device is connected to the OpenTherm input;
- no device is connected to the 0-10Vdc input.

In this case, also outside the time band programming the closure of the Ambient Thermostat input generates a heat request. The set point is the one calculated from the weather compensation curves, reduced by a value given by the parameter H507.

WEATHER COMPENSATION

The weather compensation is activated if there is an outdoor temperature probe; The delivery temperature set point is calculated using the weather compensation curve that is established in the following way:

The slop of the compensation curve is set using the parameter H532, so as to adjust the delivery temperature of the water in accordance with the outdoor temperature, When the compensation curve is active the parameter T_SET (H505) is added to the value calculated by the weather curve, so as to be able to shift the curve vertically.

| Outdoor temperature | Setpoint temperature |
|---------------------|-------------------------------------|
| $TE \geq 0$ | $TV = TRw + s(TRw - 8/9 TE) + Korr$ |
| $TE < 0$ | $TV = TRw + s(TRw - 0.7 TE) + Korr$ |

TV = delivery setpoint temperature

TRw = ambient temperature setpoint

TE = outdoor temperature

s = weather curve slope

$Korr = (20 - TRw) * (20 - TE) * s/120$

The outdoor temperature used for the weather compensation is that currently measured every 10 minutes and averaged over a period of 10 hours. Based on the temperature parameter for the passage from summer/winter and winter/summer, the change of season occurs automatically.

In this way the delivery setpoint temperature to be maintained is established.

SEQUENCE CONTROL STRATEGIES

The sequence control commands the flame control sending a target output signal and operating with two different strategies that can be selected using the parameter C604:

Strategy A = Simultaneous Ignition/Switching off of all modules (C604=0)

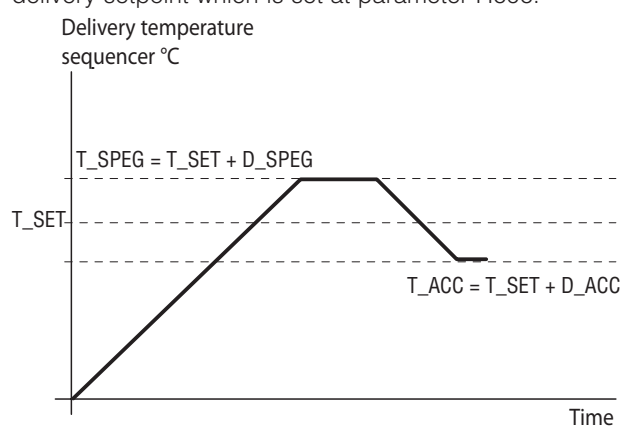
Strategy B = independent Simultaneous Ignition/Switching off (C604=1).

The control for managing the output at the flame controls can be adjusted regarding frequency updating with the parameter C607 (establishes every how many seconds the command for varying the request output is sent) and how much with parameter C608 (establishes the maximum output variation that can be adjusted with each update).

Strategy A

The burners, in this sequence management mode, operate at the same time like a single burner and the same command signal is passed to all of them simultaneously. They switch on and modulate together to seek to maintain the collector temperature at the same value that has been set.

The switching off and switching on of the burners take place according to the logic presented in the diagram below operating on the base of an offset value on the delivery setpoint which is set at parameter H606.



Each module, therefore, takes care of its own safety working on the module probe in the following way:

if the water temperature exceeds the maximum value set in parameter C517, the effective output of the module is reduced with respect to the value requested by the boiler. If there is no temperature reduction and this exceeds by a value equal to DELTA OFF the limit set above, the flame control switches off the burner. The burner is then restarted when the water temperature of the module has dropped by a value equal to DELTA ON below the value expressed in parameter C517.

Strategy B

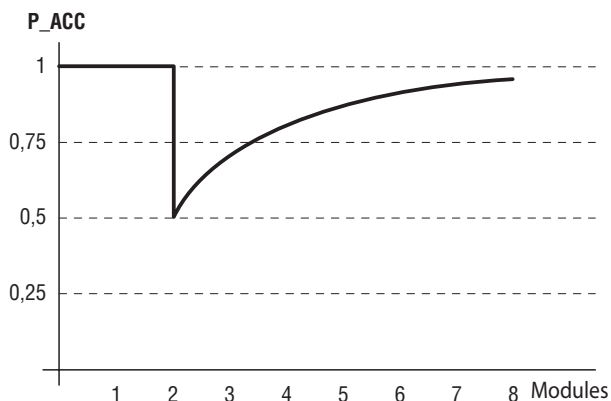
In this control strategy the burners are ignited one after the other.

In the event of a heat request, the first module (leader module) comes on and the second module comes on when the output percentage requested by the regulator of the leader module reaches the value of the parame-

ter C609 (P_ACC). After the second module comes on, the overall output requested is divided between the two modules.

When the two modules that are on reach the output of the parameter C609 (P_ACC), a third module is ignited and the overall output is divided between three and so on until all the burners are on.

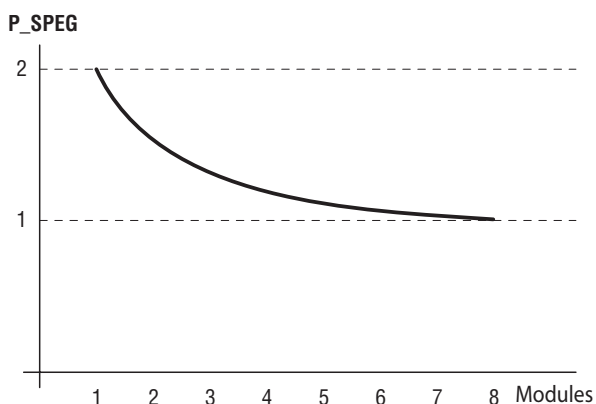
When each module is switched on, the calculation of the PID is paused, until all the modules have reached the common output setpoint, limited by F_SET (C607) and by V_SET (C608).



When all the modules making up the boiler are on, the regulator sends an output request (P_SET) to the modules that is the same for them all until the maximum output is reached.

If the overall output requested by the regulator diminishes, then the output requests for the modules diminish in a proportional and uniform way (as if it were a single boiler) up to a switching off output percentage that is set with parameter C612.

From then on the modules are switched off backwards as soon as the switching off output is reached, according to the «first on - last off» logic and the overall output requested is divided proportionally among the ones left on.



The switching off phase concludes when the leader burner is off. This switches off according to the logic expressed in figure 1.

NB.

1 - If the difference between the setpoint temperature and the temperature of the delivery collector probe is greater than the parameter C616 (Delta_T for ignition of all the modules with strategy B), then all the modules come on at the same time (automatic passage to management as per strategy A) to speed up the implementation of the system (rapid implementation).

2 - With the aim of reducing the number of inactive ignitions you can use the parameter H611 which sets the minimum time that has to pass between a burner's switching off and its restarting.

Similarly with parameter H610 the minimum time between ignition and switching off is limited (start-stop limitation).

3 - The first module to come on in strategy B is the «Leader» module; the modules then come on in ascending order of address with the largest number of operating hours, and so on.

When the leader module has reached a number of ignition hours equal to the parameter C618 (valid only for strategy B), the number of its operating hours is reset and the new leader is identified, which will that one with a greater address with the most number of operating hours. (rotation of burners).

4 - A module is active if it is connected and has no faults

DOMESTIC HOT WATER PRODUCTION

The domestic hot water request comes via a temperature probe or a thermostat. The selection of the type is made with parameter C559:

- with C559=0 boiler only with heating
- with C559=1 storage cylinder probe
- with C559=2 storage cylinder thermostat.

At the end of each request there is a post-circulation control, namely the domestic hot water circulator is started for the time set in parameter H544.

With a thermostat, the request occurs when the contact is closed and ends when the contact re-opens.

With a domestic hot water probe, the request occurs when the temperature displayed drops below the value requested for a quantity equal to parameter H617. The request ceases if the temperature measured by the probe exceeds the setpoint of a value in parameter H617.

The domestic hot water temperature has a maximum that is expressed by parameter C513.

With a storage cylinder probe, the anti-legionella function can be activated (H614) in the following ways:


| | |
|----------|----------------------------|
| H614 = 0 | Anti-legionella disengaged |
| H614 = 1 | Anti-legionella weekly |
| H614 = 2 | Anti-legionella daily |

If the weekly mode is set, the function is activated at 02:00 on Wednesday.

If the daily mode is set, the function is activated every day at 02:00.

If the clock is not working, the function is deactivated.

The setpoint value of the domestic hot water temperature during the Anti-legionella phase is 60°C (cannot be changed).

With the OT+ input activated, the  button is disabled and the domestic hot water control passes to the regulator connected to OT+.

BOILER SET POINT IN DOMESTIC HOT WATER PHASE

The setpoint of the boiler delivery temperature during the domestic hot water phase is calculated by adding to the hot water temperature a value equal to parameter H510. The setpoint is between a minimum value (H508) and a maximum value (H509).

NB. The delivery temperature of the boiler in domestic hot water mode cannot be higher than the maximum value of the temperature of the individual modules C517.

DOMESTIC HOT WATER PUMP MANAGEMENT MODE

Using parameter C805 to select the operating mode of the domestic hot water pump.

- C805 = 0 - the hot water pump is managed upstream of the water equalisation device: when there is a DHW request, the primary pump remains off;
- C805 = 1 - the hot water pump is managed downstream of the water equalisation device: when there is a DHW request, the primary pump is switched on together with the DHW circulator; primary non-modulating pump.
- C805 = 2 - the hot water pump is managed downstream of the water equalisation device: when there is a DHW request, the primary pump is switched on together with the DHW circulator; primary modulating pump based on the ΔT between the delivery and return temperature of the primary pump.
- C805 = 3 - the DHW pump is managed as a zone pump downstream of the water equalisation device; the DHW request is not handled; when there is a CH request, both pumps are switched on (primary and DHW).

ADDITIONAL FUNCTIONS

0-10V output (modulating pump)

The 0-10V analogue output available on the boiler is used for a rapid control of the system pump that is managed so as to maintain the boiler delivery-return delta at the value set with parameter H605.

The signal outputs have the following meaning:

0V = switching off pump

1V = minimum speed

10V = maximum speed

The modulation field is between 1 V and 10 V, but it is possible to limit this variation if conditions require it, by setting a minimum value that can be set with parameter H615. The value is in volts and limits the analogue output above this value.

The modulating pump is controlled with PID logic.

Time band programming

It is possible to carry out weekly time band programming for the heating circuit and one for the domestic hot water circuit.

For each day it is possible to set up to 3 phases, during which the circuit is enabled to operate, while outside the phase any requests will be ignored.

Using the pre-selection parameter P900 for heating and P960 for domestic hot water it is possible to select a time period that is valid for the programming entered: for a single day, for all the days of the week, for the period Monday-Friday or for Saturday-Sunday.

It is also possible to set the default values using the parameters P916 for heating and P976 for domestic hot water.

SetPoint limitation with return line Probe

The temperature setpoint of the water is managed so as to keep the outlet /return Delta in parameter H605 (delivery/return Delta for output reduction). Therefore the temperature setpoint is limited to the value of the return temperature sensor + the outlet /return Delta.

The switching off value remains that of the setpoint set + the switching off value.

Example: Set = 80°C, delivery = 40°C, return = 25°C; if the delivery /return Delta = 20°C, then the setpoint is limited to 25°C+20°C = 45°C; increasing the return temperature increases the temperature setpoint. The switching off value remains at 80+delta_switching off = 84°C.

Fuel check valve

The control of the ALU PRO power boiler allows you to control an external fuel shut-off valve. The function is activated through parameter C613. When all the modules are off, if C613 = 1 the fuel shut-off valve is not powered while if C613 = 0 the valve is always powered.

PROTECTION FUNCTIONS

1 - Boiler temperature limit

If the boiler's outlet temperature reaches the limit value in parameter C515 all the modules are switched off and the system pump is started, if the heat request that came from the heating circuit or the domestic hot water pump, if the heat request came from the domestic hot water circuit. The post-circulation remains until the delivery temperature drops 5°C below the value in parameter C515.

2 - Safety temperature

If the delivery temperature reaches the safety value in parameter C518, the boiler goes into a non-volatile lockout. All the modules are switched off and there is no overtemperature dispersal.

3 - Flue gases temperature

If the temperature of the flue gases goes above the value set in parameter C593 all the modules that are on go to the output specified in parameter C612.

If, after this, the flue gases temperature goes back below parameter C593-5°C the modules go back to operating normally (the boiler restarts from the output in parameter C612).

If the temperature of the flue gases rises above the value set in parameter C592 all the modules switch off and there is a temporary fault. When this fault occurs, post-purging is activated for 10 minutes (all the active modules). If after this the temperature of the flue gases drops 5°C below the threshold specified in parameter C592 the cascades resumes normal operations.

4 - Control of delivery and return temperature

If the return water temperature exceeds the delivery temperature a temporary error signal occurs; the modules are switched off and the pumps keep working.

If the return temperature does not drop below the delivery temperature within 10 minutes, there is a non-volatile lockout and the pumps are switched off.

5 - Pump anti-block function

If the system pump does not operate for 24h, it is started for 10s (system pump anti-block).

If the domestic hot water pump does not operate for 24h, it is started for 10s (domestic hot water pump anti-block).

6 - Module anti-freeze protection

When the delivery temperature drops below the anti-freeze activation temperature in parameter H511 a heat request is made to all the modules until the temperature goes above the anti-freeze deactivation temperature set in parameter H512. This function is always active.

7 - System anti-freeze protection

The system's anti-freeze protection is active if the parameter H556 is set to 1 and there is an outdoor temperature probe. The control logic is as follows:

- If the outdoor temperature is between -5°C and 1.5°C, the system pump is switched on for 10 minutes every 6 hours;
- If the outdoor temperature is lower than -5°C, the system pump stays on in continuous mode.

8 - Pump test function

The pump test function checks the match between system pump's operating status and input of the FLOW SWITCH. The function is active when the parameter C807 = 1.

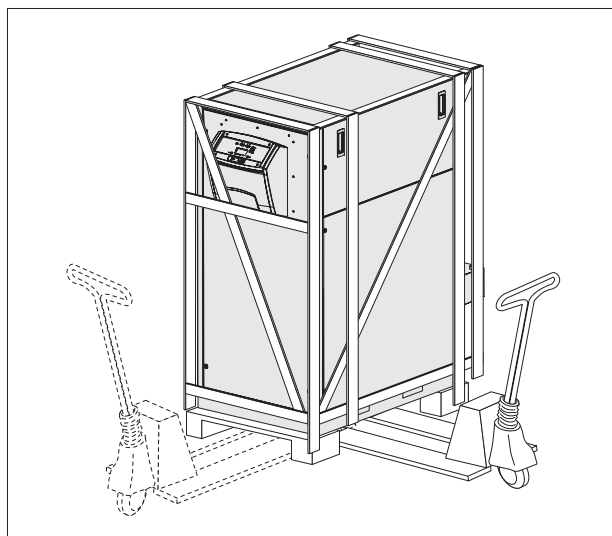
- If the primary pump is active and the flow switch input is closed, then there is no signal (normal behaviour).
- If the primary pump is off and the flow switch input is open, then there is no signal (normal behaviour).
- If the primary pump is active and the flow switch input is open, 10 seconds from the start of the fault state the error status is signalled (error code E118), and the burners are prevented from starting.
- If the primary pump is off and the flow switch input is closed, 10 seconds from the start of the fault state the error status is signalled (error code E117), and the burners are prevented from starting.

When the domestic hot water pump is upstream of the water equalisation device (parameter C805 = 0), then the consistency test of the status of the pump is carried out on both pumps, both the heating circuit one and the domestic hot water one.

In other cases (parameter C805 ≠ 0), the test is carried out only for the heating pump.

PRODUCT DELIVERY

The boiler is delivered on a wooden pallet, suitably packed and protected by a wooden crate. Its condition and compliance with what was ordered must be checked immediately. The specific characteristics of the product are indicated on the outside: model, power, equipment, fuel type. If there is a discrepancy between what was ordered and what was received, immediately contact the local agent, warehouse or sales service.



OPENING

⚠ If the installation involves a lot of moving (e.g. to a rooftop or cellar utility room, etc.) DO NOT REMOVE the protective wooden cage until the boiler is at its place of installation (see the “Handling” section on the next page).

- Remove the wooden crate (1)
- Remove the polystyrene edge protectors (2)
- Pull off the protective bag (3).
- Remove the four fixing brackets (6).

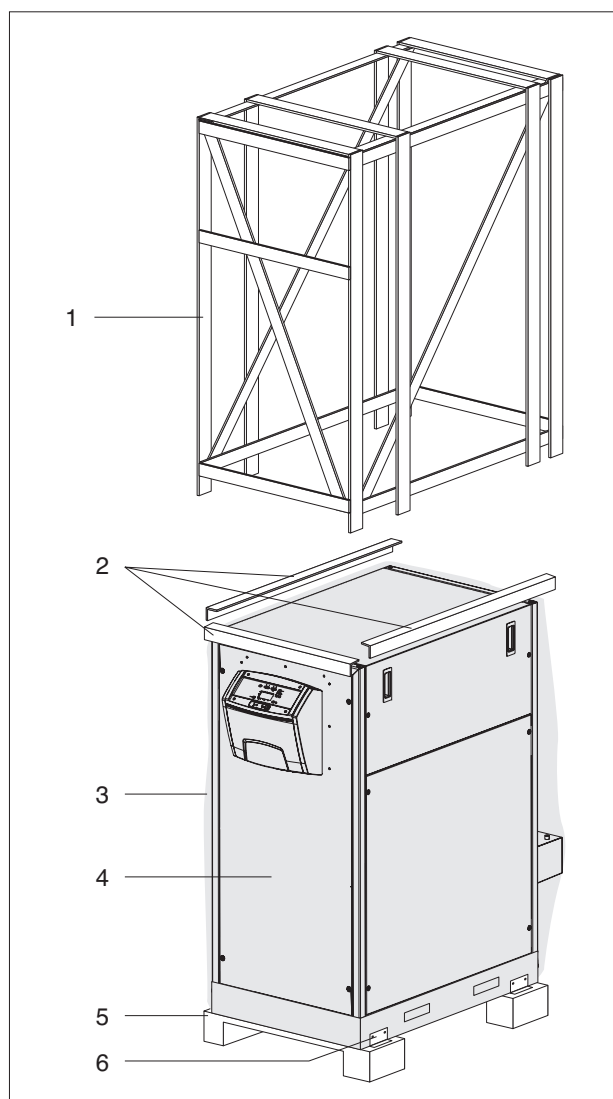
- 1 - Wooden crate
- 2 - Edge protectors
- 3 - Protective bag
- 4 - Boiler
- 5 - Pallet
- 6 - Fixing brackets

Material supplied in the bag inside the boiler:

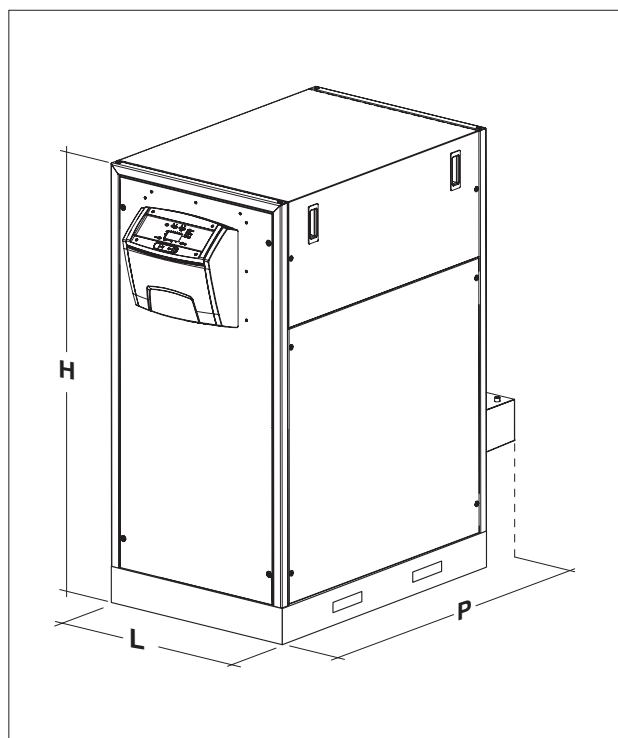
- outdoor temperature sensor
- lifting eyebolts
- condensate siphon
- adjustable feet

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

⚠ Keep the documentation envelope in a safe place. Any copies requested from **RIELLO** may be charged for.



DIMENSIONS AND WEIGHTS



| ALU PRO power | 115 | 150 | 225 | 300 |
|---------------|--------|--------|--------|--------|
| L | 690 | 690 | 690 | 690 |
| P | 1264 | 1264 | 1264 | 1654 |
| H | 1534,5 | 1534,5 | 1534,5 | 1534,5 |
| Weight | 240 | 240 | 310 | 395 |

| ALU PRO power | 349 375 | 450 | 525 | 600 |
|---------------|------------|--------|--------|--------|
| L | 690 | 690 | 690 | 690 |
| P | 1654 | 2103 | 2103 | 2298 |
| H | 1534,5 | 1534,5 | 1534,5 | 1534,5 |
| Weight | 470 | 565 | 640 | 735 |

HANDLING

⚠ Use equipment adequate for the weight involved to move the boiler to the place of installation.

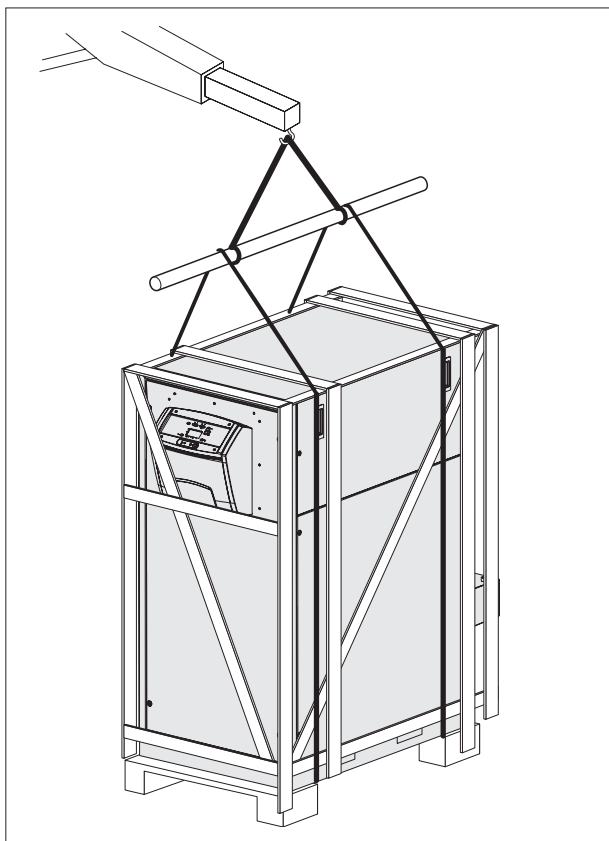
⚠ Make sure that the boiler does not strike rigid surfaces like floors or walls when it is being moved.

HANDLING WITH A CRANE

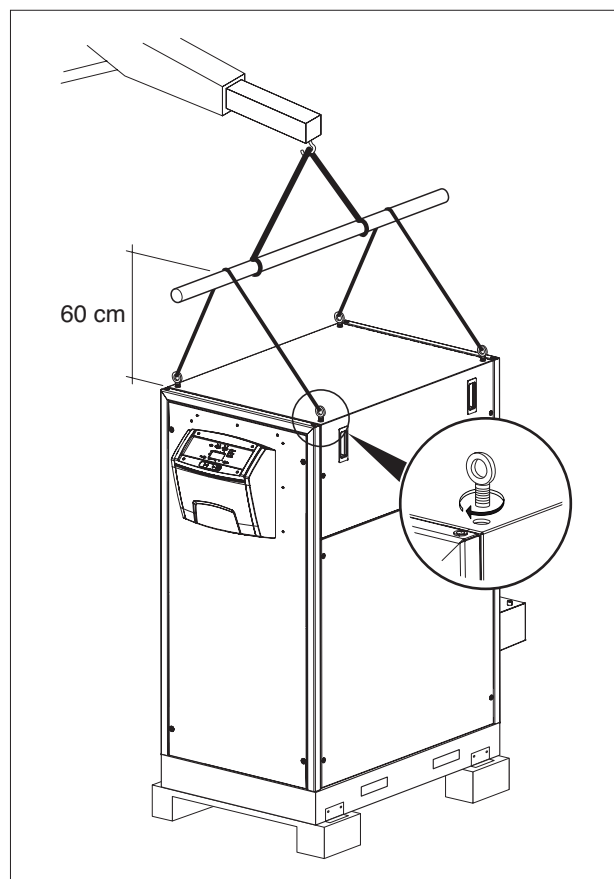
- Pass the slings through the pallet. Lift carefully and position the boiler at the place of installation.

⚠ **DO NOT REMOVE the protective wooden crate until the installation place has been reached.**

- Once the boiler has reached the place of installation, remove the wooden cage, remove the polystyrene edge protectors and remove the protective bag.

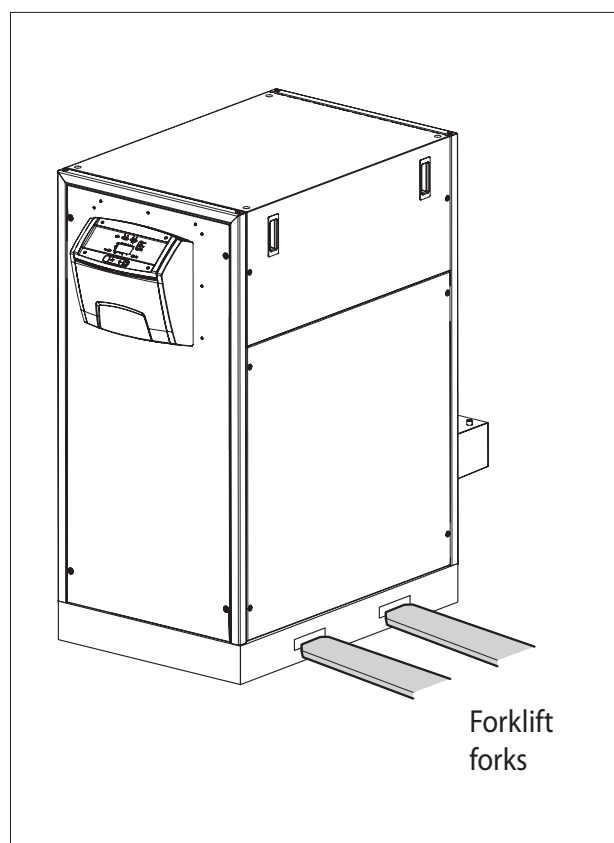


- Remove the brackets at the corners of the base fixing the boiler to the pallet.
- Screw the eyebolts (supplied) into their holes, then hook up the lifting belts as shown in the illustration.
- Carefully lift the boiler and position it.



HANDLING WITH A FORK LIFT

- Once the fixing brackets have been removed, the boiler can be moved also with a forklift using the holes in its base for this purpose.



HANDLING WITH ROLLERS

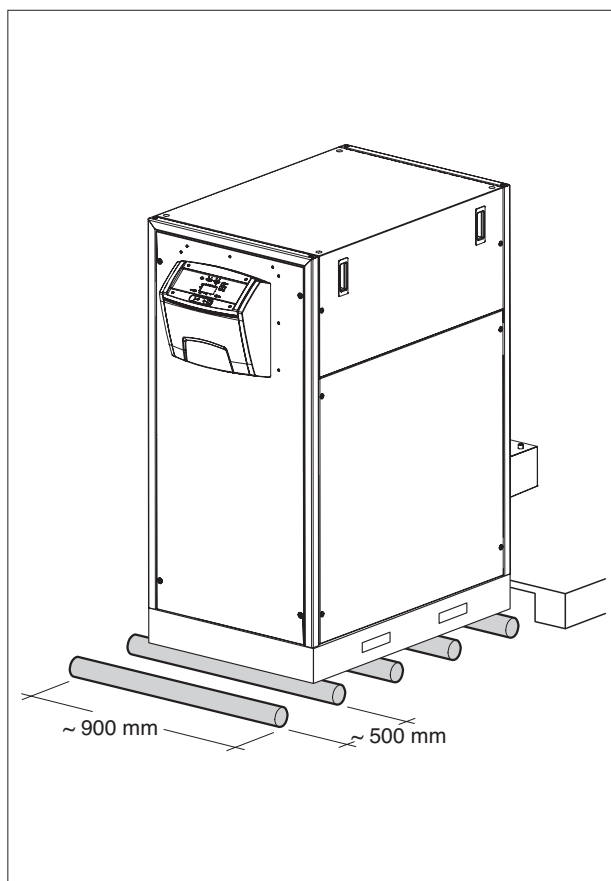
If the route to the installation area is flat, the boiler can be moved with the use of rollers.

This requires at least 5 pipes roughly 900 mm long and 1"1/4 in diameter, or else commonly found transport rollers can be used.

⚠ To avoid damaging the appliance the weight should be equally distributed over all the rollers.

To move the appliance:

- Place the rollers on the floor at a distance of about 500 mm from each other.
- Slide the boiler from the pallet to the rollers and carefully transport it to the installation area.



PLACE OF INSTALLATION

The **ALU PRO power** boilers, since they generate over 35 kW of heat output, **MUST** be installed in a dedicated boiler room in compliance with applicable technical standards. The boiler must also be provided with a suitable system for collecting condensate and venting the flue gases (see the relevant sections in this manual).

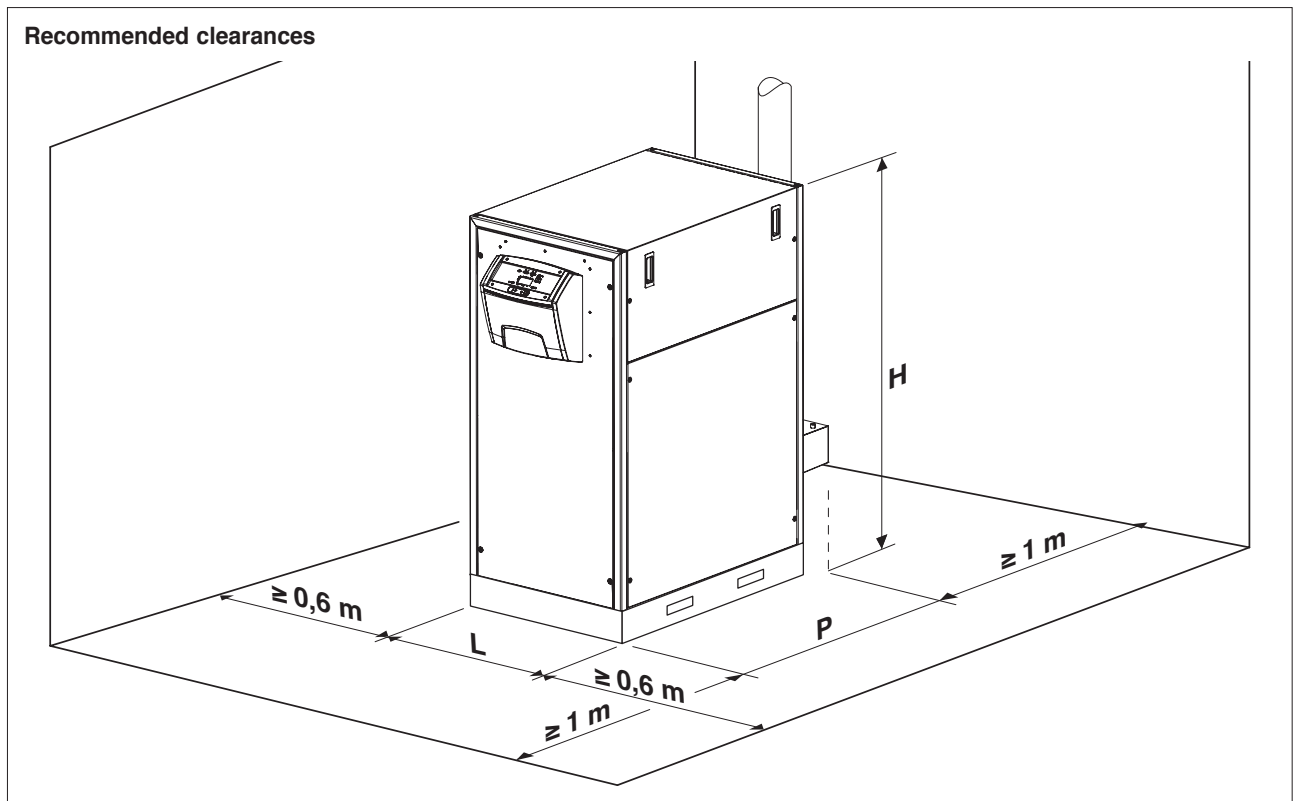
⚠ In Belgium, boilers must be installed according to NBN D51.003, NBN B61.002 (heat output < 70 kW), and NBN B61.001 (heat output >70 kW).

⚠ When installing the boiler, allow sufficient space around it to access all safety and control devices and to permit easy maintenance.

⚠ Ensure that the boiler's electrical protection level is compatible with the characteristics of the installation area.

⊘ These boilers must be installed indoors, since they have not been designed for outside use. Outdoor use is only possible with the installation of the "OUTDOORS KIT" available as an accessory that can be ordered separately.

Recommended clearances



NOTE: See the table on the previous page for boiler dimensions.

INSTALLATION IN OLDER SYSTEMS AND SYSTEMS REQUIRING MODERNISATION

When the boiler is installed in old systems or systems being updated, make sure that:

- The flue is suitable for condensing appliances, for the temperatures of the combustion gases and that it has been designed and constructed in compliance with applicable standards. It is as straight as possible, airtight, isolated and not have obstructions or constrictions.
- The smoke flue should have a connection for removing condensate.
- The electrical system has been implemented by qualified personnel in compliance with the relevant standards.
- The output, the discharge head and flow direction of the circulation pumps is appropriate.

- The gas supply line and any tank are implemented according to the relevant standards.
- The expansion tanks provide for the total absorption of the expansion of the fluid contained in the system.
- The system should be free of sludge and encrustations.

There is a water treatment system (see section "The water in the heating systems"). For the use of specific products see the **RIELLO** catalogue.

⚠ We recommend the use of a water equalising device or a heat exchanger for separating the primary circuit and the secondary circuit.

INTRODUCTION

It is ABSOLUTELY NECESSARY to treat the water system for the heat generator to work properly and to guarantee its service life together with all its components.

This not only applies to jobs carried out on existing installations but also on new installations.

Sludge, lime-scale and pollutants present in the water can cause permanent damage to the heat generator, also within a short time and regardless of the quality standards of the materials used.

For additional information regarding the type and the use of additives contact the Technical Assistance Centre.



Always comply with the legislation applicable in the country of installation.

THE WATER IN THE HEATING SYSTEMS.

INSTRUCTIONS FOR THE DESIGN, INSTALLATION AND MANAGEMENT OF THE HEATING SYSTEMS.

1. Chemical and physical characteristics

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:

| ALUMINIUM BOILERS with furnace power < 150 kW | | | |
|--|-------|-----------------------|---------------------------|
| | | Initial filling water | Regular service water (*) |
| ph | | 6-8 | 7-8 |
| Hardness | °fH | < 10° | < 10° |
| Electrical conductivity | µs/cm | | < 200 |
| Chlorides | mg/l | | < 25 |
| Sulphides | mg/l | | < 25 |
| Nitrides | mg/l | | < 25 |
| Iron | mg/l | | < 0,5 |






| ALUMINIUM BOILERS with furnace power > 150 kW | | | |
|--|-------|-----------------------|---------------------------|
| | | Initial filling water | Regular service water (*) |
| ph | | 6-8 | 7-8 |
| Hardness | °fH | < 5° | < 5° |
| Electrical conductivity | µs/cm | | < 150 |
| Chlorides | mg/l | | < 15 |
| Sulphides | mg/l | | < 15 |
| Nitrides | mg/l | | < 15 |
| Iron | mg/l | | < 0,5 |

(*) values for water in system after 8 weeks of operation

General note on water used to top up systems:

- if softened water is used to top up a system, after 8 weeks verify that the water in the system respects the above limits, in particular for electrical conductivity
- These control are not necessary if demineralised water is used

2. The heating systems

-  Topping up should not be done using an automatic filling system, but rather done manually and should be recorded in the service book.
-  If there are more than one boiler, they must all be put into service either at the same time or with a very short rotation time 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 for filling or eventually topping up the system must always be filtered (synthetic or metal mesh filters with filtering capacity of no less than 50 micron) to avoid deposits possibly triggering under-deposit corrosion.
-  The heating system must be flushed out and cleaned thoroughly 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 effective 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:

- that the expansion system be a closed vessel, correctly sized and with the correct pre-loading pressure (to be regularly checked);
- that the system is always at a pressure higher than that of the atmosphere at any point (comprising the pump suction side) and under all running conditions (all the water sealing and water couplings in the installation are designed to resist pressure towards outside, but not for depression);
- that the installation is not made with gas-permeable materials (e.g. plastic pipes for floor systems without an anti-oxygen barrier).

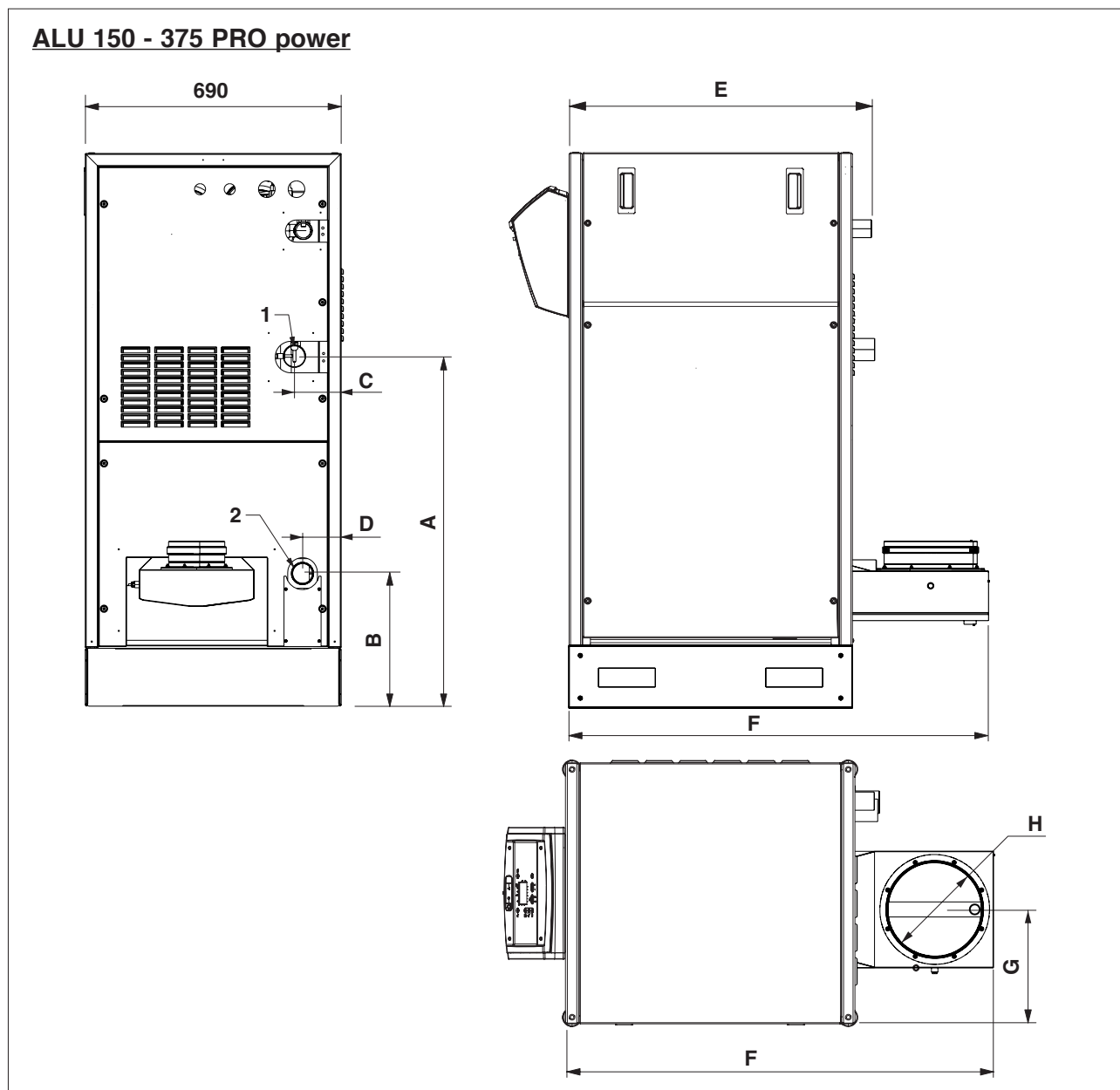


Lastly we would like to remind you that the warranty does not cover breakdowns incurred by the boiler due to deposits and corrosion.

WATER CONNECTIONS

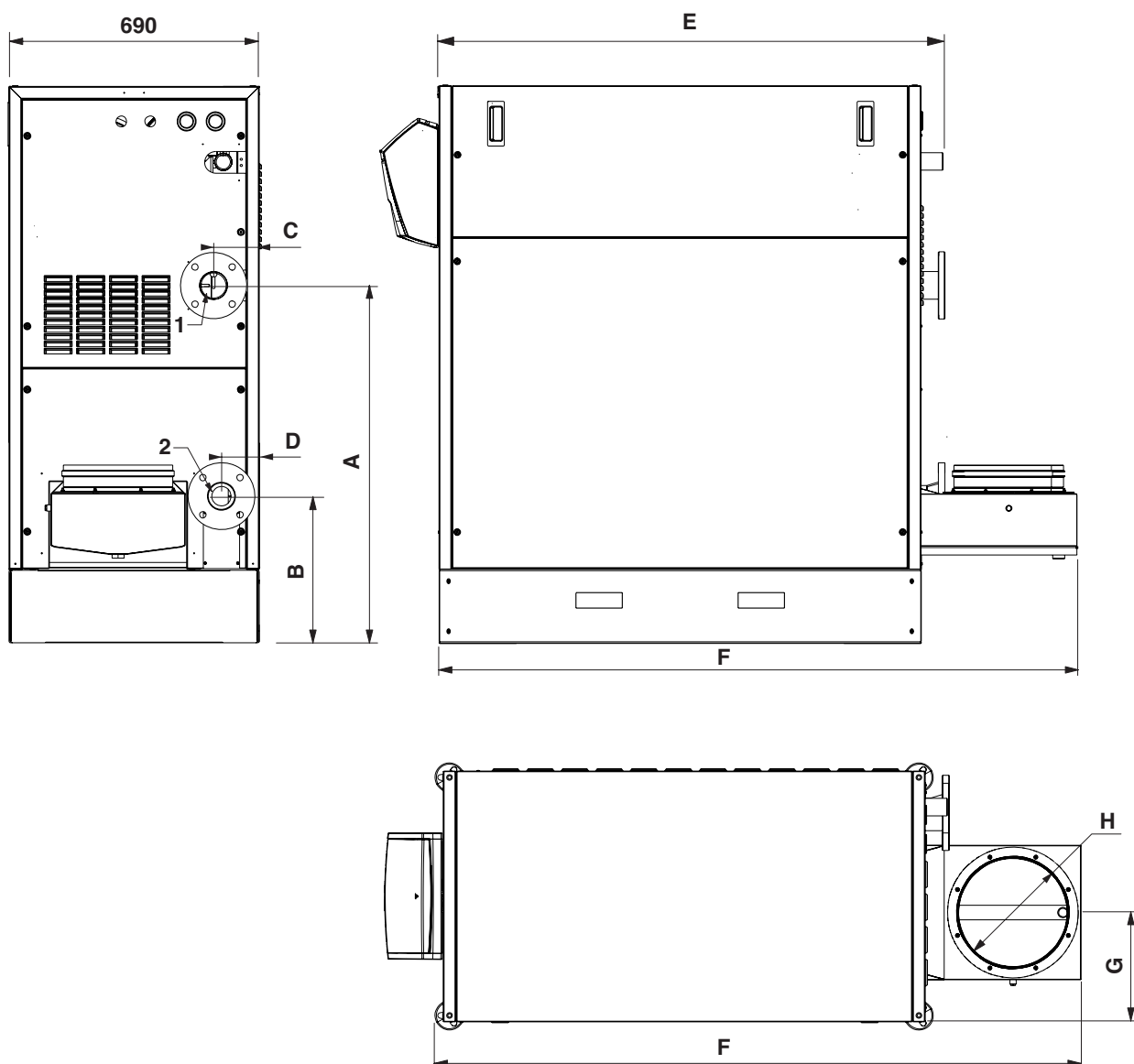
The **ALU PRO power** boilers have been designed and constructed to be installed on central heating systems and, if used with a remote storage cylinder, the production of hot water.

Water fittings have the following specifications:



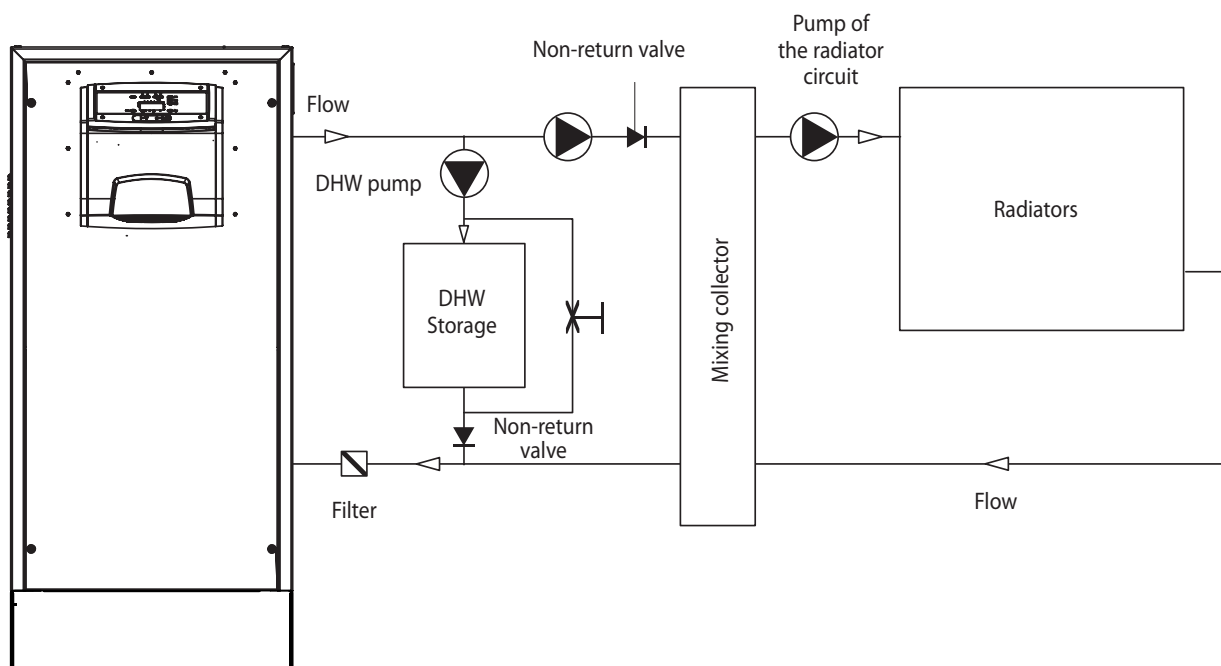
| | ALU 115 PRO power | ALU 150 PRO power | ALU 225 PRO power | ALU 300 PRO power | ALU 349-375 PRO power |
|---------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|
| A (mm) | 987,5 | 987,5 | 987,5 | 985,5 | 985,5 |
| B (mm) | | | 402 | | |
| C (mm) | | | 126 | | |
| D (mm) | | | 104 | | |
| E (mm) | 947 | 947 | 947 | 1337 | 1337 |
| F (mm) | 1264 | 1264 | 1264 | 1654 | 1654 |
| G (mm) | 301 | 301 | 301 | 300 | 300 |
| Ø H (mm) | 150 | 150 | 200 | 250 | 250 |
| 1 - System delivery | Ø 2" G | Ø 2" G | Ø 2" G | Ø 2" G | Ø 2" G |
| 2 - System return | Ø 2" G | Ø 2" G | Ø 2" G | Ø 2" G | Ø 2" G |

ALU 450 - 600 PRO power

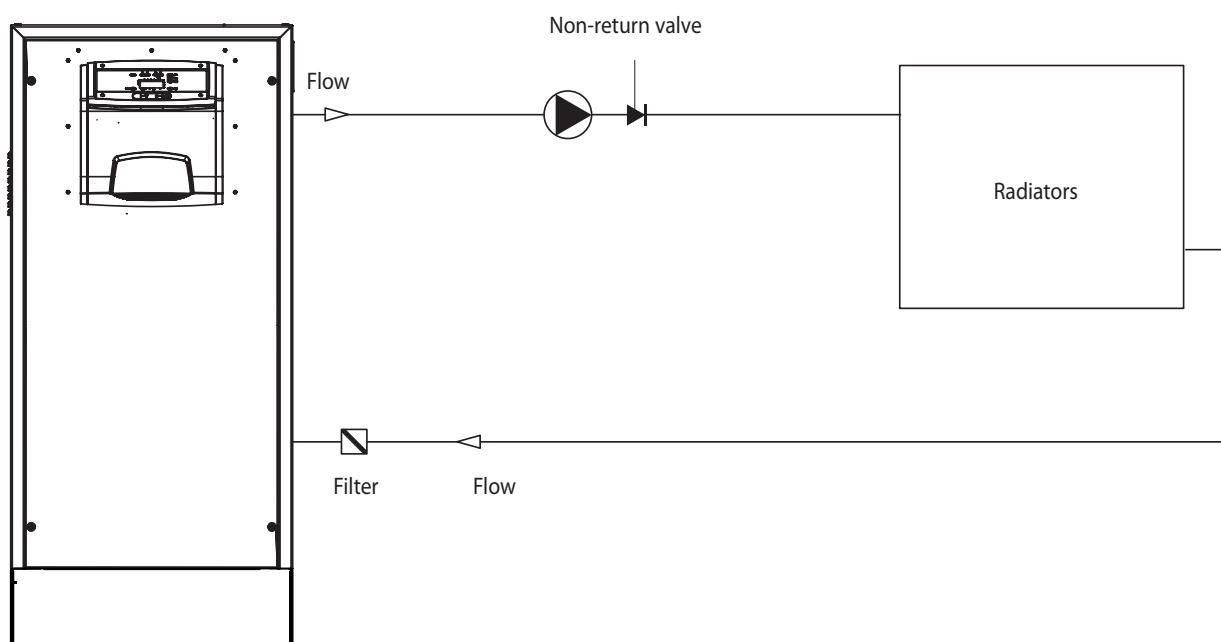


| | ALU 450 PRO power | ALU 525 PRO power | ALU 600 PRO power |
|---------------------|-------------------|-------------------|-------------------|
| A (mm) | 985 | 985 | 982 |
| B (mm) | 404 | 404 | 401 |
| C (mm) | 126 | 126 | 126 |
| D (mm) | 104 | 104 | 104 |
| E (mm) | 1735 | 1735 | 1938 |
| F (mm) | 2103 | 2103 | 2298 |
| G (mm) | 300 | 300 | 300 |
| Ø H (mm) | 300 | 300 | 300 |
| 1 - Delivery System | Flange PN10 DN65 | Flange PN10 DN65 | Flange PN10 DN65 |
| 2 - System return | Flange PN10 DN65 | Flange PN10 DN65 | Flange PN10 DN65 |

Typical water system schematics

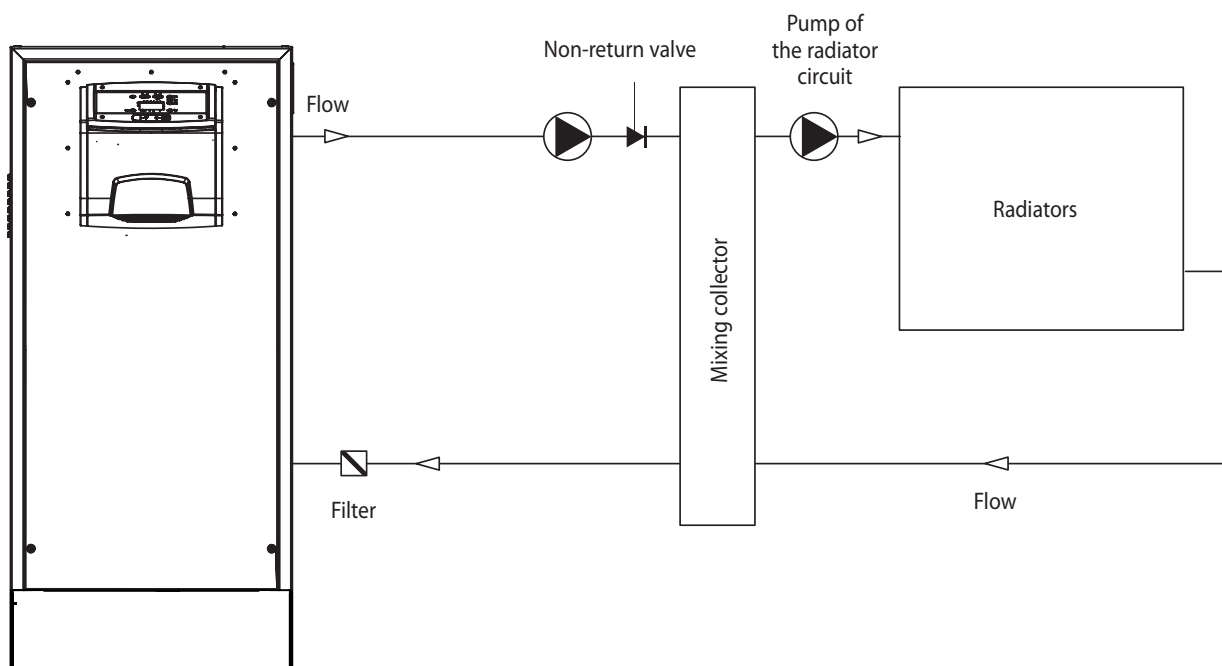


Boiler circuit with DHW pump (boiler production > DHW production) and 1 unit of radiators
On/off or modulating room thermostat

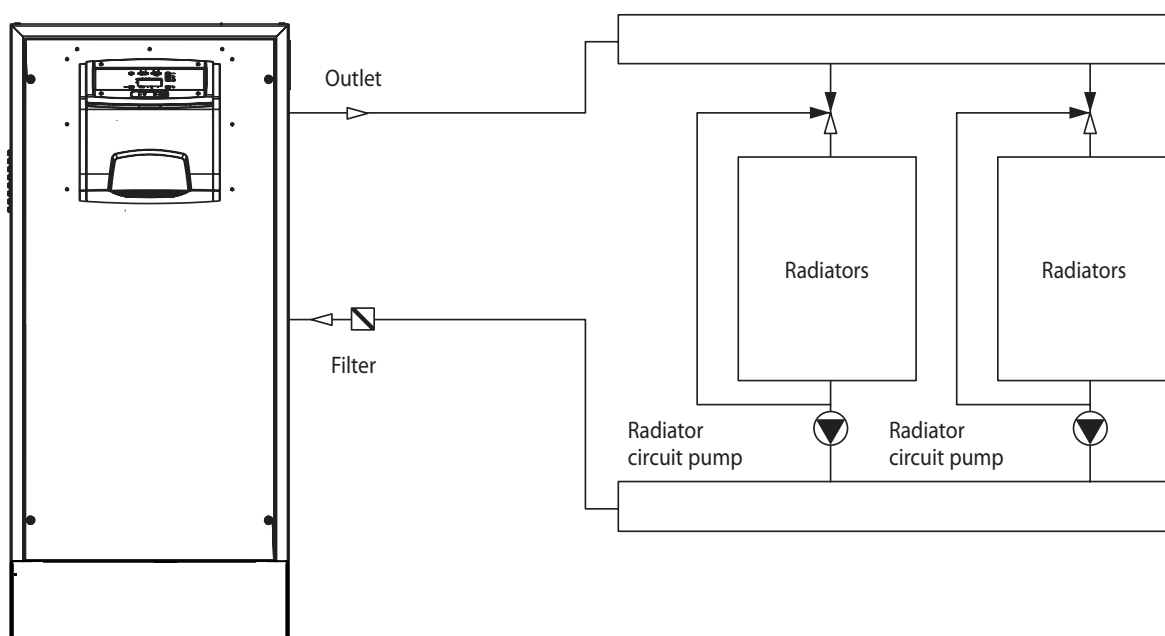


Boiler circuit with a unit of radiators
On/off or modulating room thermostat

Typical water system schematics

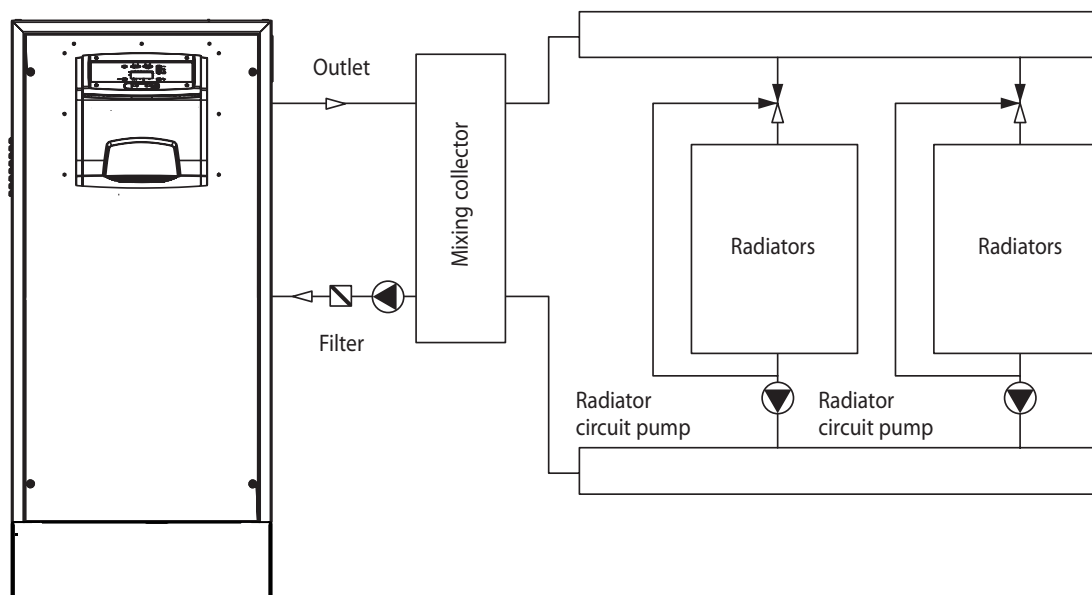


Boiler circuit with a unit of radiators
On/off or modulating room thermostat



Boiler circuit with several radiator units.
Each radiator unit has its own outdoor sensor command.
The delivery temperature curve of the boiler is 5 degrees higher than the highest curve of the radiator units.

Typical water system schematics

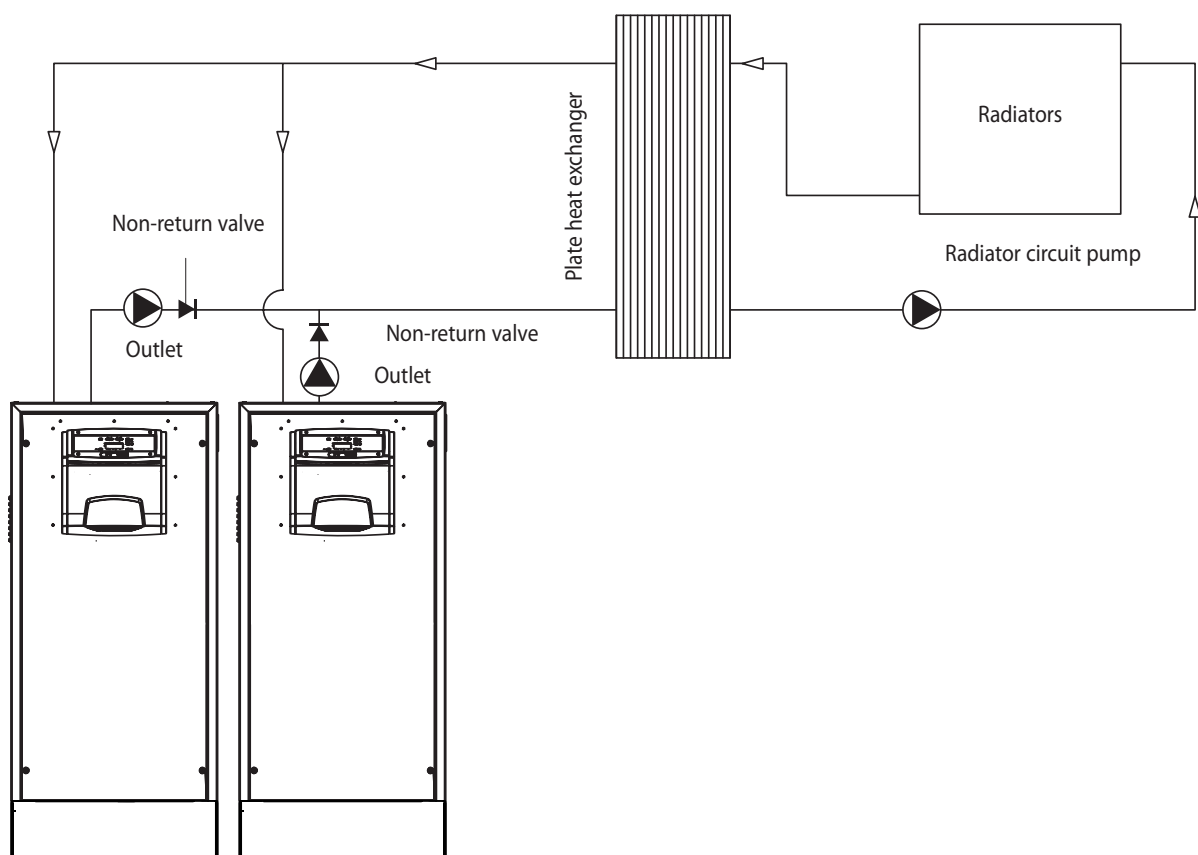


Boiler circuit with several radiator units.

Outdoor sensor and preliminary control of the delivery temperature of the boiler.

Each radiator unit has its own outdoor sensor command.

The delivery temperature curve of the boiler is 5 degrees higher than the highest curve of the radiator units.



Cascade connection with two boilers with group/s of radiator/s, with external controller or room thermostat.
Plate heat exchanger added to prevent the boilers getting polluted.

Condensate drainage systems must be:

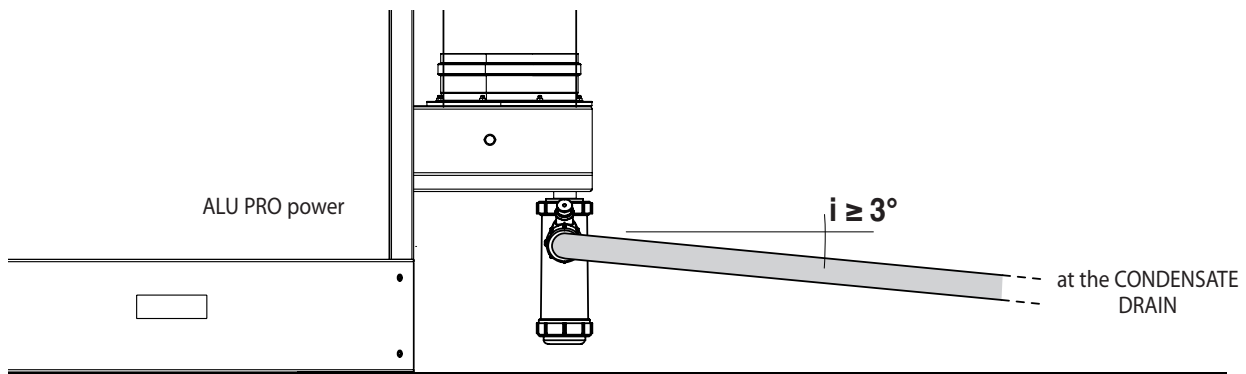
- made in such a way as to prevent the leakage of flue and combustion gases into the environment or the sewer system (siphon required)
- of the right size and type to ensure the proper drainage of waste liquids without leakage
- installed in such a way as to prevent the freezing of the liquid inside under normal operating conditions
- mixed for example with domestic waste liquids (from washing machines, dishwashers, etc.) mostly with a standard pH so as to form a buffer solution that can be put in the sewers.

IT is not recommended draining condensate through rainwater drain pipes because of the risk of freezing and chemical degradation of the materials from which such pipes are normally made.

Connections to the drain must be clearly visible.

The siphon is supplied with the appliance and must be mounted during installation.

⚠ If installed outdoors provide an adequate protection system to prevent the liquid in the siphon freezing.



⚠ 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.

⚠ Connect the condensate drain hose to a domestic water drain in accordance with national and local legislation and standards.

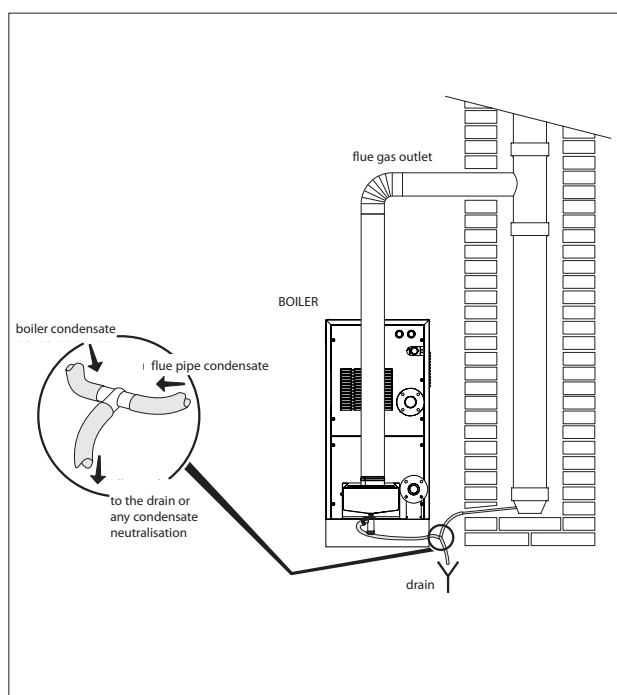
⚠ Fill the siphon with water prior to igniting the boiler, avoiding combustion products entering the air during the first few minutes the boiler is running.

⚠ IT recommended that condensate from the boiler and from the flue should be channelled to the same drain pipe.

⚠ The boiler base must be horizontal and flat in the area of the support frame to prevent problems with condensate evacuation.

⚠ 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.

⚠ IT is recommended that there also be a siphon to the condensate drain from the flue gas pipes.



CONDENSATE NEUTRALISER

TYPE N2 NEUTRALISATION UNIT

The TYPE N2 neutralisation unit was 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.

| Type | Qt y. granulate | Dimensions (mm) | Ø fittings |
|------|-----------------|-----------------|------------|
| N2 | 25 kg | 400x300x220 | 1" |

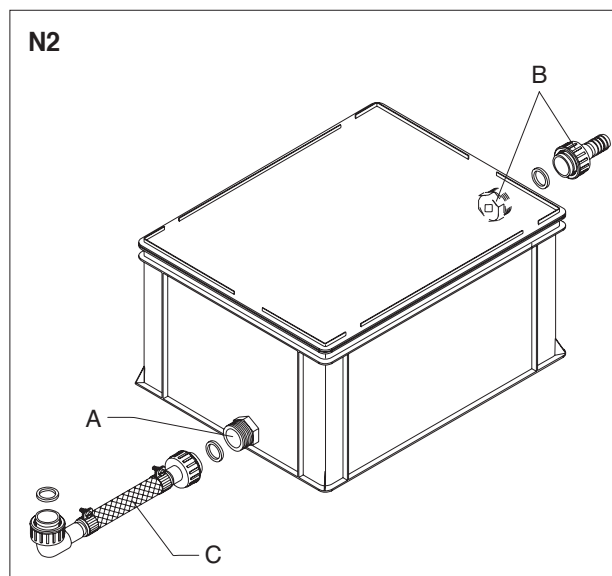
The inlet fitting (A) of the N2 neutralisation unit (the lower fitting) must be connected to the boiler condensate drain using the flexible hose (C) supplied with the unit. This condensate drain hose is specially made to prevent combustion fumes escaping into the atmosphere.

The outlet fitting (B) of the neutralisation unit (the top fitting) must be connected to the boiler room's waste water drain pit using another section of flexible hose (not supplied).

⚠ The central heating system's condensate drain pit must be located at a lower level than the fitting (B) on the neutralisation unit.

If it necessary to neutralise the condensate produced in the flue pipe, it is recommended that the boiler's and flue pipe's condensate outlet be connected with a "T" fitting and then bring it to the input of the N2 neutraliser.

⚠ Make sure that you tighten the hose clamps sufficiently.



⚠ The connection pipes used must be as short and straight as possible. Any curves or sharp bends can lead to the hoses becoming clogged and can therefore prevent proper condensate discharge.

NEUTRALISATION UNIT TYPE HN2 (with pump)

The TYPE HN2 neutralisation unit was designed for systems equipped with the central heating plant condensate outlet trap located higher than the boiler condensate outlet.

The pump is controlled by an electric level contact with which the HN2 neutralisation unit is fitted.

Refer to the instructions provided to connect these neutralisation units up electrically. The electrical protection rating is IP44.

| Type | Consumption (W) | Electrical (V-Hz) | Condensate output (l/m) (*) | Dimensions (mm) | Qt y. granulate (kg) | Ø fittings |
|------|-----------------|-------------------|-----------------------------|-----------------|----------------------|------------|
| HN2 | 50 | 230-50 | 12 | 400x300x220 | 25 | 1" |

(*) with panel = 3m

The inlet fitting (A) of the N2 neutralisation unit (the lower fitting) must be connected to the boiler condensate drain using the flexible hose (C) supplied with the unit. This condensate drain hose is specially made to prevent combustion fumes escaping into the atmosphere.

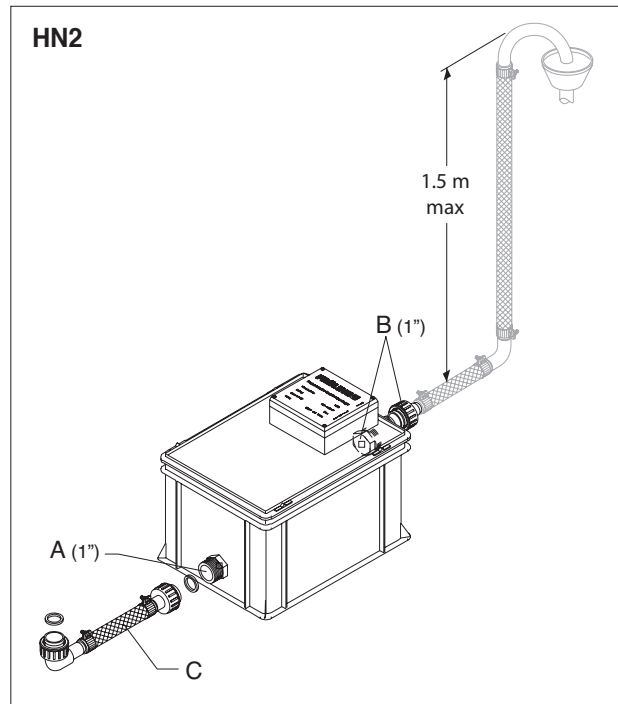
The outlet fitting (B) of the neutralisation unit (the top fitting) must be connected to the boiler room's waste water drain pit using another section of flexible hose (not supplied).

IMPORTANT

The condensate drain of the central boiler should not be more than 1.5 m higher than the neutralisation unit .



The connection pipes used must be as short and straight as possible. Any curves or sharp bends can lead to the hoses becoming clogged and can therefore prevent proper condensate discharge. Hoses should also be fixed to the floor and suitably protected whenever possible.

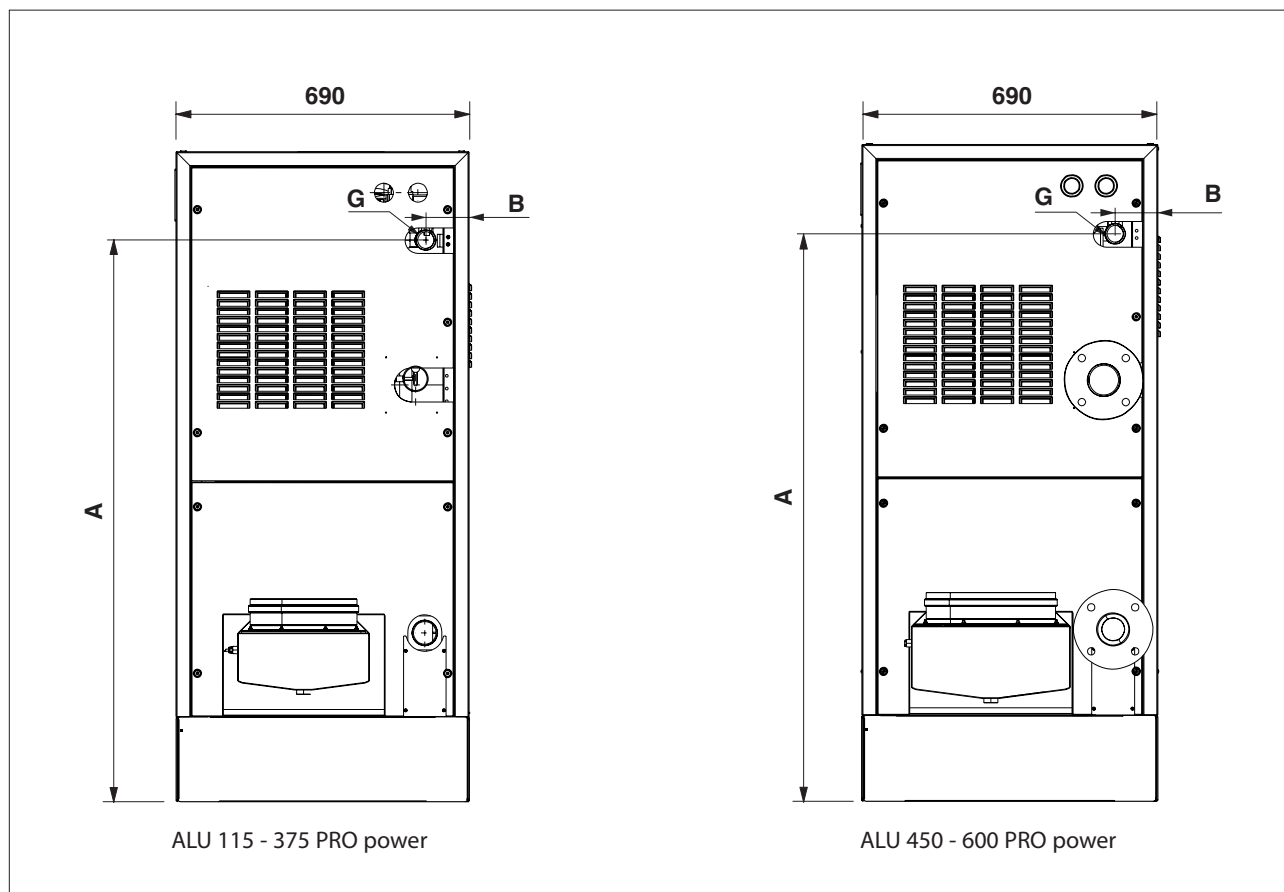


MAINTENANCE

Neutralisation device maintenance must be performed at regular intervals and as required (minimum once per year). The requirement for maintenance depends on the system characteristics. For this purpose, the filling level of the dolomitic granules must be checked. The minimum filling level is equal to 15 cm, starting from the upper edge of the box. The first filling of neutralisation product is sufficient at least for one heating season in the case of maximum formulation of condensate.

The operation can be checked easily using the pH indicator boards available commercially. They can be purchased from any pharmacy or store selling chemical products. The condensate that exits must have a pH value between 6.5 and 9. If any deposits are found on the surface of the neutralisation device during maintenance, it is recommended to replace the granulate.

GAS CONNECTION



| | ALU 115 PRO power | ALU 150 PRO power | ALU 225 PRO power | ALU 300 PRO power | ALU 349-375 PRO power | ALU 450 PRO power | ALU 525 PRO power | ALU 600 PRO power |
|-----------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------------|-------------------------|-------------------------|-------------------------|
| A (mm) | 1326 | 1326 | 1326 | 1326 | 1326 | 1326 | 1326 | 1326 |
| B (mm) | 102 | 102 | 102 | 102 | 102 | 100 | 100 | 100 |
| G - Gas fitting | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G | Ø 1" 1/2 G |

The connection of the **ALU PRO power RIELLO** boiler to the gas supply should be carried out in compliance with current installation regulations (NBN D51-003 in Belgium).

Before carrying out the connection, it is necessary to ensure that:

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


A filter of suitable particle rating should be installed.


⚠ The gas supply system should be suitable for the boiler's flow rate and should be fitted with all the necessary safety and control devices required by current legislation.

⚠ Once the installation is complete, check the connections are sealed properly.

SYSTEM ANTI-FREEZE PROTECTION

The **ALU PRO power** condensing boilers are fitted with electronics that provide protection against frost. The electronics activate the heating unit if the temperature drops below the minimum threshold.

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


 If using anti-freeze fluids make sure they are not aggressive for steel.


FLUE GAS EXHAUST AND COMBURENT AIR INTAKE


The **ALU PRO power** condensing boilers must be installed with flue gas vent pipes that conform to applicable legislation. The boilers are type B23 - B23P.


DO NOT START UP THE BOILERS if these pipes are not fitted.

The pipes are an integral part of the boiler, but are supplied by **RIELLO** in separate kits.

 **IT is mandatory to use stainless steel flue gas vent pipes conforming to EN1856-1 and EN1856-2.**

 Provide a slope of the flue exhaust pipe of 3% towards the condensate collector.

 Connect the boiler's condensate siphon is properly connected to a domestic water drain.

 Uninsulated flue pipes are a potential source of danger.

ELECTRICAL WIRING

The **ALU PRO power** condensing boilers leave the factory completely cabled.

There remain only the connections to the electrical supply, to the room thermostat and to the outdoor temperature sensor.

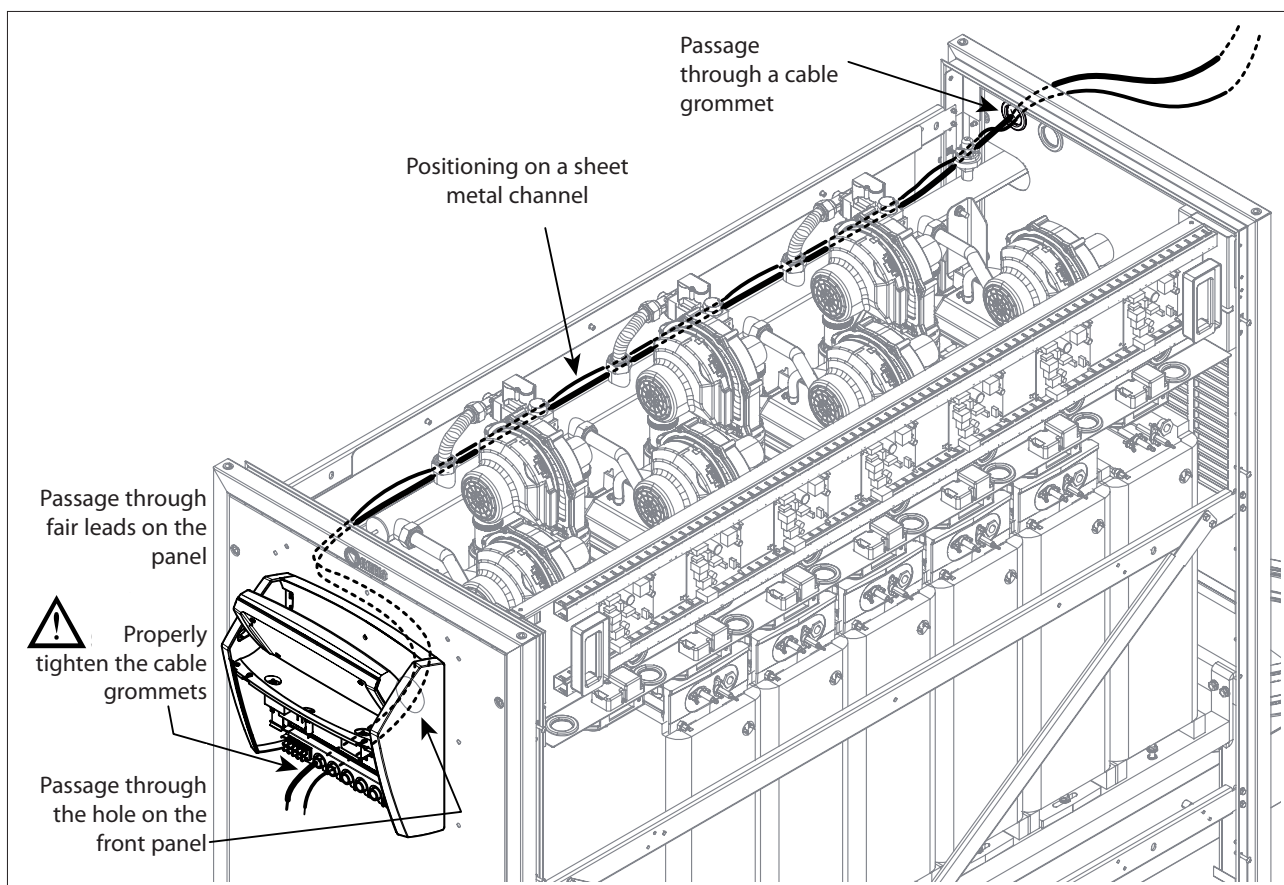
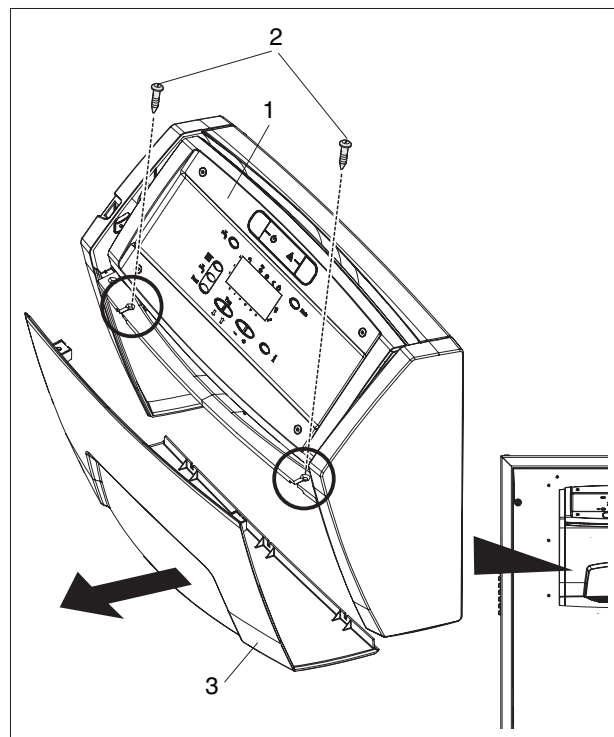
For the connections to any other devices (accessories) see the diagram on the following page.

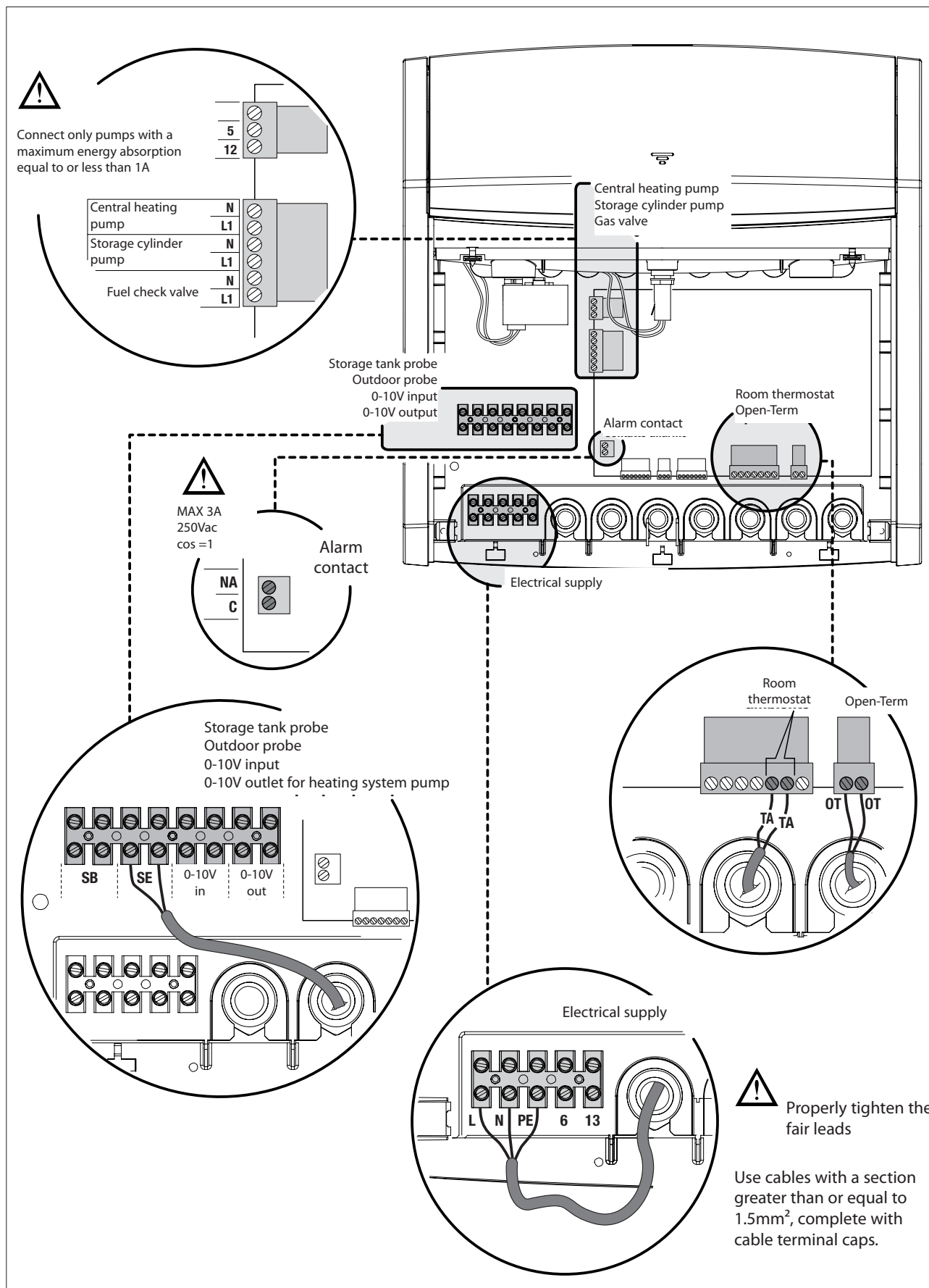
Proceed as follows to access the control panel terminals:

- Turn the small panel (1), unscrew the two screws (2) and remove the cover (3).
- Carry out the connections shown in the diagram on the following page.

⚠ Refer to the diagram below concerning the path the cables must follow to reach the instrument control panel from the outside of the appliance.

⚠ Prepare a connection suitable for the electrical protection level of the installation room.





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

⚠ If there is a storage cylinder, the cylinder probe must be placed following the instructions of the cylinder itself.

⚠ For information on how to connect up additional kits, refer to the instructions provided with the kits themselves.



it is mandatory to:

- 1 - to use an omnipolar cut-off switch, a line disconnecting switch, in compliance with CEI-EN standards (contact opening of at least 3 mm);
- 2 - to respect the connection L1 (Phase) - N (Neutral) - PE (earth). Ensure that the earth conductor is approx. 2 cm longer than power supply cables;
- 3 - to use cables with a section greater than or equal to 1.5mm², complete with cable terminal caps;
- 4 - to refer to the wiring diagrams in this manual for all electric operations.
- 5 - to connect the equipment to an effective earthing system.
- 6 - to use a 30 mA differential switch for the boiler.



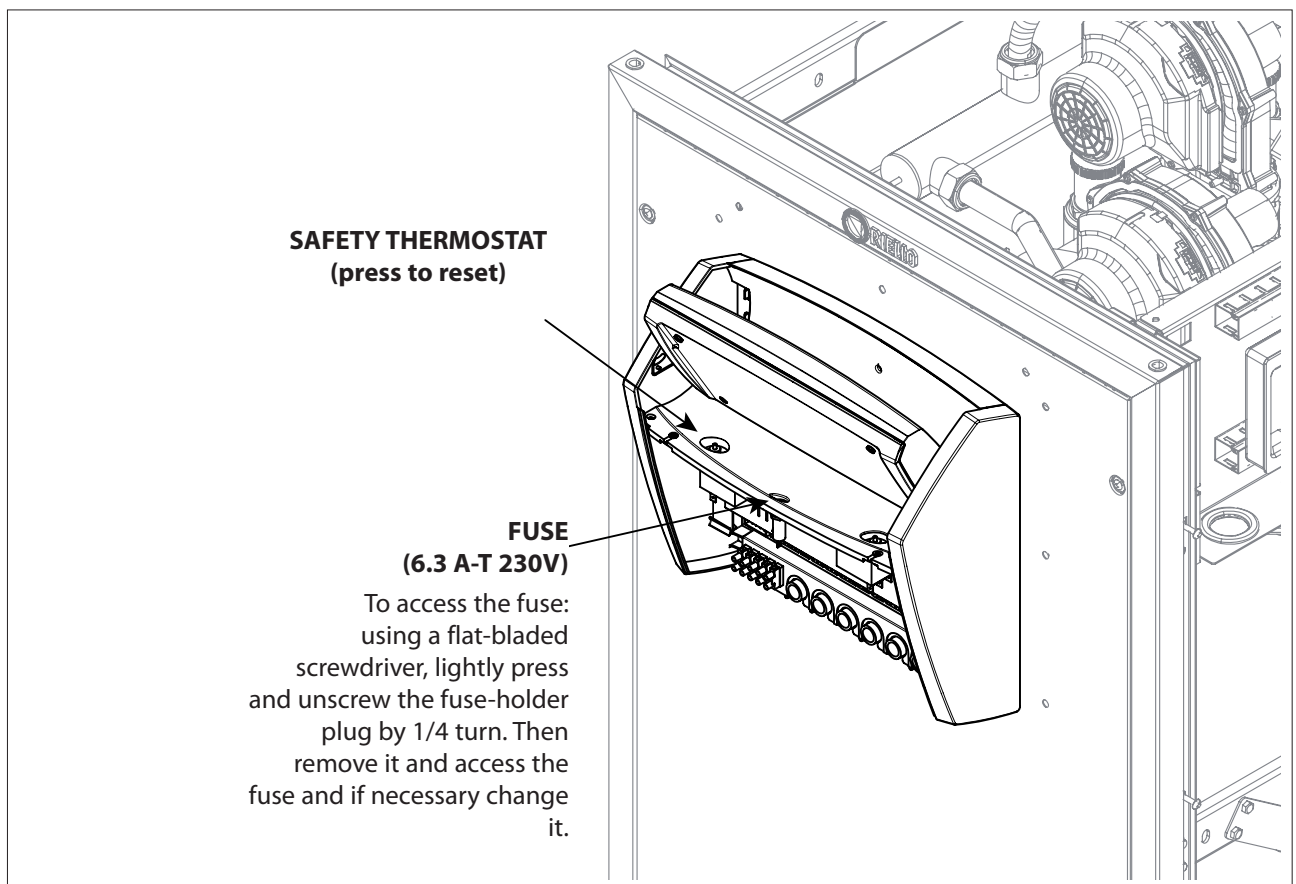
It is prohibited to use gas and/or water pipes for earthing the appliance.



It is prohibited to pass the power supply and room thermostat cables near hot surfaces (delivery pipes). If contact is possible with parts that have temperatures above 50°C, use a suitable type of cable.

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

SAFETY THERMOSTAT AND FUSE

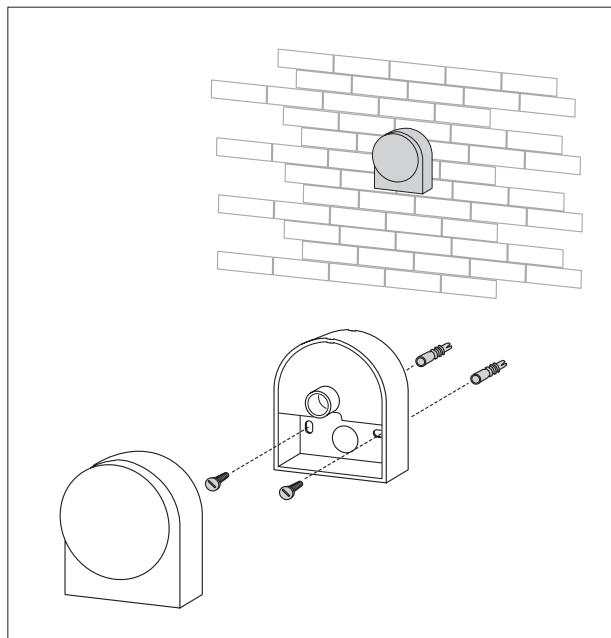


CONNECTING THE OUTDOOR TEMPERATURE SENSOR

The correct positioning of the outdoor sensor is of fundamental importance for proper climate control operation. The sensor must be installed outside the building to be heated, at approx. 2/3 the height of the NORTH or NORTH WEST façade and far from flues, doors, windows and sunny areas.

Fastening the outdoor sensor to the wall

- Unscrew the sensor protection box cover, turning it anticlockwise to access the terminal board and fastening holes
- Trace the fastening points using the box as a template
- Remove the box and drill the holes for the 5x25 expansion plugs
- Fix the box to the wall, using the two dowels supplied
- Insert a two core cable (with cross section between 0.5 and 1mm², not supplied) to connect the sensor to terminals 20 and 21 (see the diagram on the previous page)
- Connect the two cable wires to the terminal board without having to identify the polarities
- Fully tighten the cable gland nut and close the protection box cover.



⚠ The sensor must be positioned on a smooth section of wall; in the case of exposed brickwork or an uneven wall, the smoothest possible area must be used

⚠ The connection cable between the outdoor temperature sensor and the control panel must not have joints; if necessary, they should be plated and adequately protected. It is recommended a shielded cable be used.

⚠ Any channelisation of the connection cable must be separated from live cables (230Vac).

Correspondence table

Temperature measured (°C) - Resistance value of the outdoor temperature sensor (Ω).

| T (°C) | R (Ω) | T (°C) | R (Ω) | T (°C) | R (Ω) | T (°C) | R (Ω) |
|--------|-------|--------|-------|--------|-------|--------|-------|
| -50 | 43907 | -15 | 5861 | 20 | 1,218 | 55 | 345.3 |
| -45 | 31840 | -10 | 4574 | 25 | 1000 | 60 | 293.8 |
| -40 | 23374 | -5 | 3600 | 30 | 826.8 | 65 | 250.8 |
| -35 | 17359 | 0 | 2857 | 35 | 687.5 | 70 | 214.9 |
| -30 | 13034 | 5 | 2284 | 40 | 574.7 | 75 | 184.8 |
| -25 | 9889 | 10 | 1840 | 45 | 482.8 | | |
| -20 | 7578 | 15 | 1492 | 50 | 407.4 | | |

SYSTEM FILLING AND EMPTYING

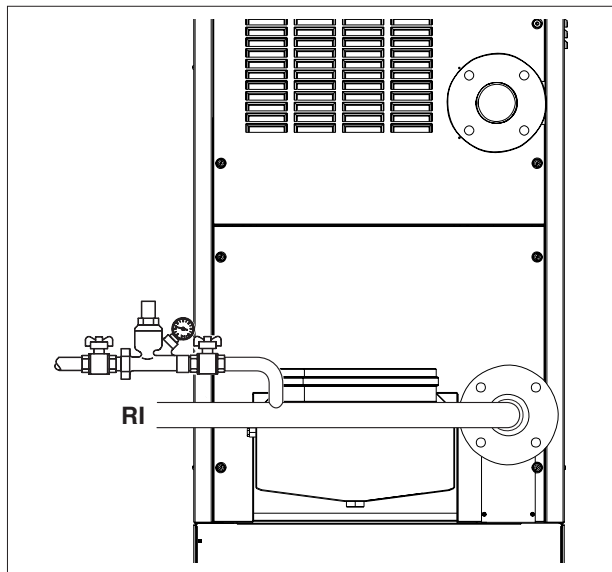
The **ALU PRO power** boilers require a filling system connected to the central heating circuit return line.

⚠ All the necessary circuit shut-off and drain components must be provided.

LOADING

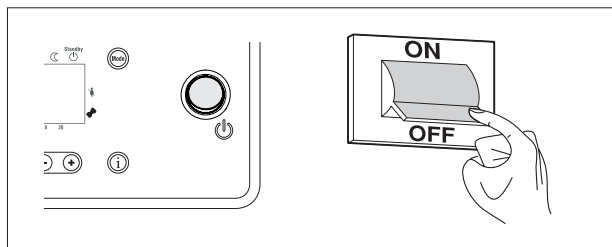
Make sure that the drain cocks (1) are closed before you start loading the system.

- Open the DHW circuit shut-off cocks.
- Slowly load until the pressure gauge displays a cold value of between **1.5 and 2 bar**.
- Close the devices opened previously.

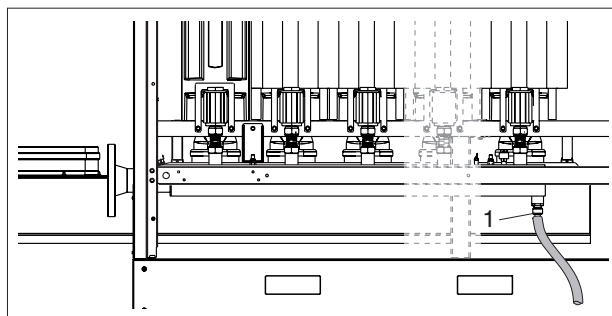


EMPTYING

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



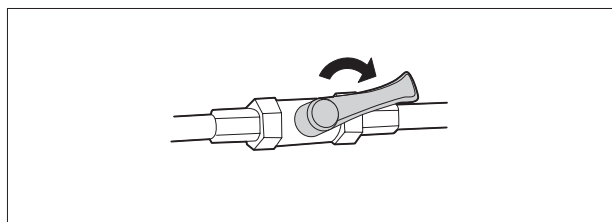
- Close the heating system's shut-off devices
- Connect a plastic tube (Ø int. 13 mm) to shank of the drain tap (1) and open it.



PREPARING FOR INITIAL START-UP

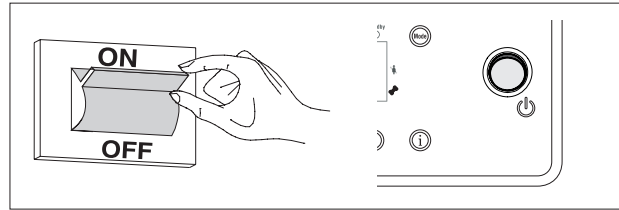
Before starting and testing the operation of the **ALU PRO power** boiler, you must check that:

- The fuel and shut-off taps of the heating system are open.
- The pressure of the water circuit, when cold, is **higher than 1.5 bar** and the circuit has been fully vented.
- The expansion tanks have been adequately pre-charged
- The electric connections have been carried out correctly.
- The pipes for discharging combustion products and the suction of the combustion air have been suitable made.

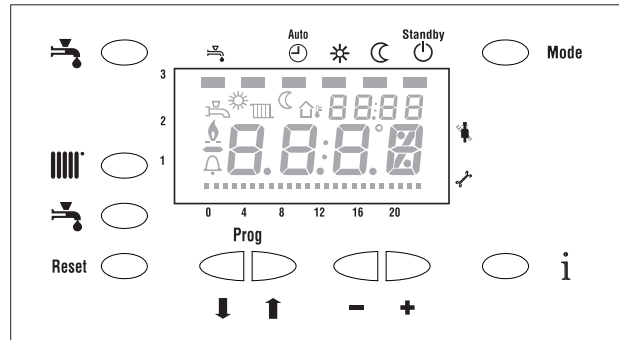


INITIAL COMMISSIONING

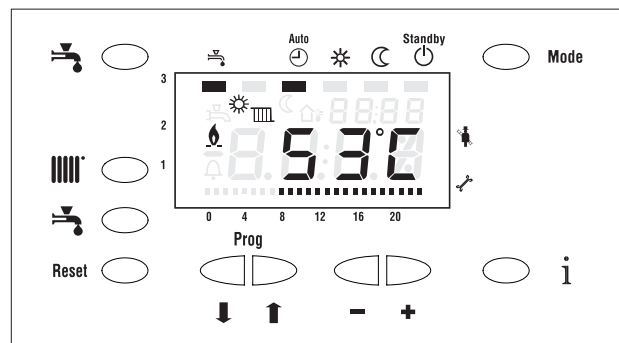
- Set the system's main switch and the main one of the control panel to "on".



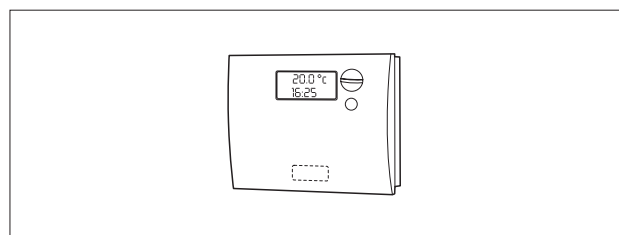
- The boiler switches on.




- The display shows the status of the system and the temperature measured by the flow sensor.



- Set the room thermostat to the desired temperature (20°C).

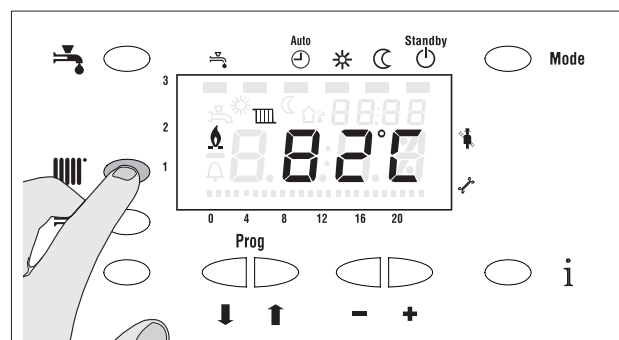


- Press the button :
 - with an outdoor temperature sensor: set the room temperature setpoint
 - with no outdoor temperature sensor: set the heating circuit setpoint.


To adjust the setpoint use the keys "+" "-".


To exit press the button .

The setting will be stored in memory.

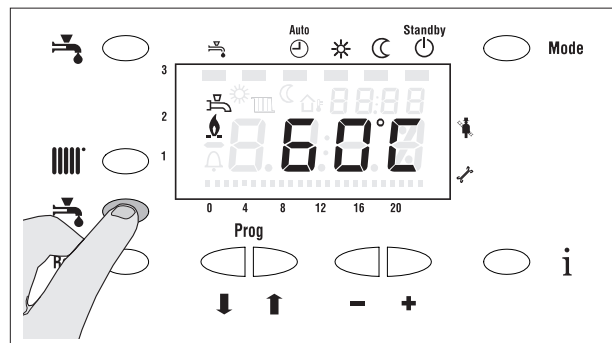


When there is a remote storage cylinder (accessory), after connecting the storage cylinder to the electrical panel and having set the manufacturer parameter "559=1" (see section "Manufacturer level"):

- Press the button .
To change the domestic hot water setpoint use the buttons "+" and "-".

To exit press the button .

The setting will be stored in memory.



When there is a remote storage cylinder with a thermostat set the manufacturer parameter "559" (see section "Manufacturer level"):

- con 559=0 boiler only with heating
- con 559=1 storage cylinder probe
- con 559=2 storage cylinder thermostat

- If an outdoor temperature sensor is installed, set installer parameter "532 heating curve slope" as instructed in the section "Setting operating parameters".

If any boiler ignition faults or boiler operating errors are detected, the display shows the type of error.

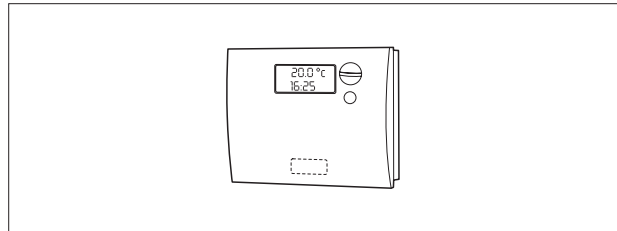
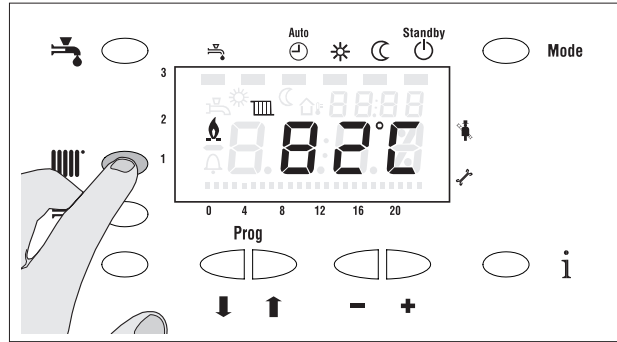
There are two types of errors:

- PERMANENT errors are those that can only be deactivated by pressing the **Reset** button.
- TEMPORARY errors are those that are deactivated when the cause of the error disappears (see Error Table on page 60).

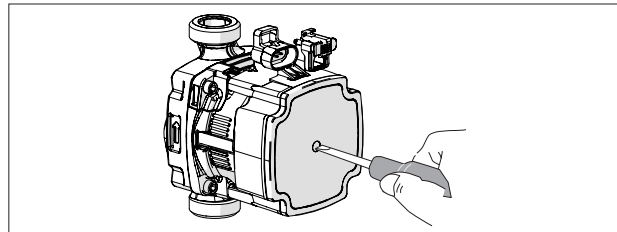
CHECKS DURING AND AFTER INITIAL START-UP

Once the boiler has started up, make sure that it shuts down and re-starts properly:

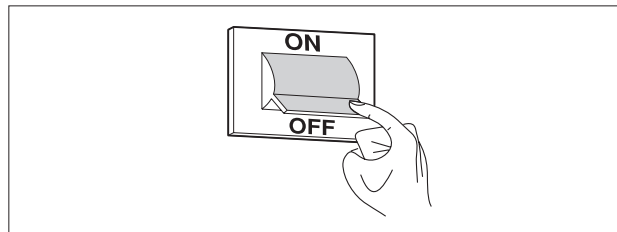
- Changing the central heating temperature setpoint (see page 58)
- Using the main switch of the control panel
- Using the room thermostat or the hourly programmer



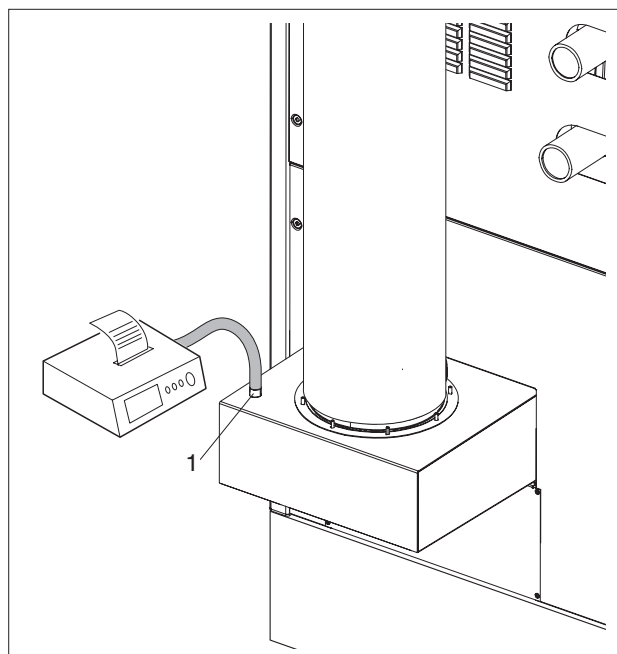
Make sure that all the pumps in the system are free and rotate in the right direction.



Turn the mains power switch to "off" and make sure that the boiler shuts down completely.



If all the conditions are satisfied, restart the boiler and carry out an analysis of the combustion products, **first for each module and then for the entire boiler**. To do so, unscrew the plug (1) and insert the combustion analysis probe into the socket at the rear of the boiler.



TEMPORARY SHUT-DOWN

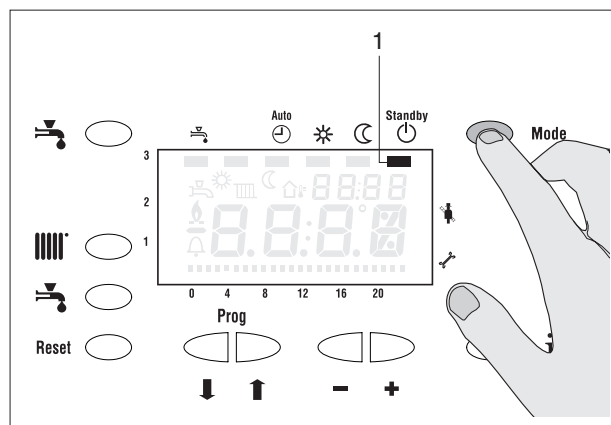
In the case of temporary absences, weekends, short trips, etc., proceed as follows:

- keep the **Mode** button pressed until the bar (1) moves under the "stand-by" mode.

With the electrical power supply, indicated by the green LED, and also the fuel supply remaining on, the boiler is protected by the **anti-freeze** function:

Boiler anti-freeze: if the boiler temperature is less than 5°C the burner switches on at maximum output until the boiler temperature reaches 10°C;

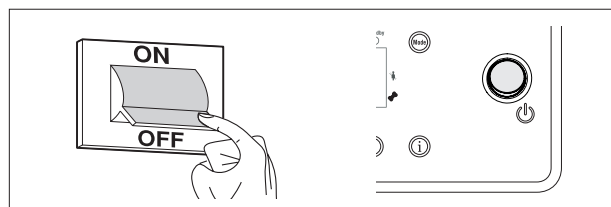
CH frost protection: this function is only active if an outdoor temperature sensor is connected. If outside temperature drops below -5°C the pumps are switched on. If outside temperature is between -4° and 1.5°C, the pumps are switched on for 10 minutes at intervals of 6 hours. If outside temperature is above 1.5°C the pumps are switched off.



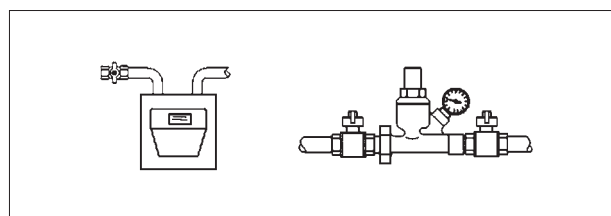
PREPARING FOR EXTENDED PERIODS OF DISUSE

If the heating unit is not going to be used for an extended period of time, proceed as follows to prepare it for shut-down

- Set the main switch of the control panel to "off" and check that the display switches off
- Set the system's main switch to "off"



- Close the fuel and water taps of the heating and domestic hot water system



⚠ Under these conditions the system is not protected against frost. Drain the heating and domestic hot water systems to prevent freezing.

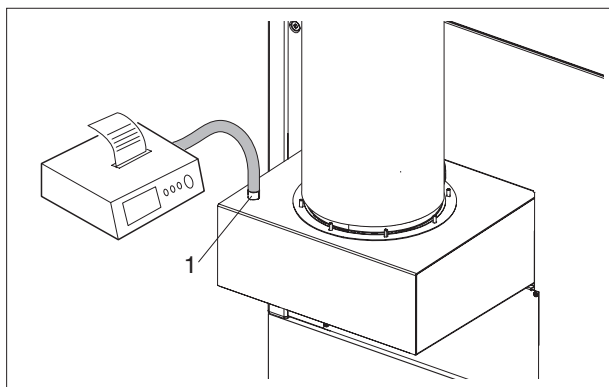
SETTING THE COMBUSTION PARAMETERS

The **ALU PRO power** boilers have been adjusted to operate with G20 gas (20 mbar).

If gases other than those shown in the following tables are used, contact the **RIELLO** Technical Assistance Centre

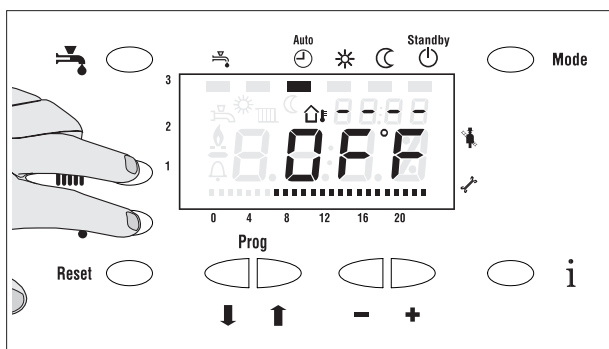
To calibrate the combustion parameters proceed as described below.

- Unscrew the plug (1), insert the combustion analyser into the socket on the flue gases box for analysing the flue gases.

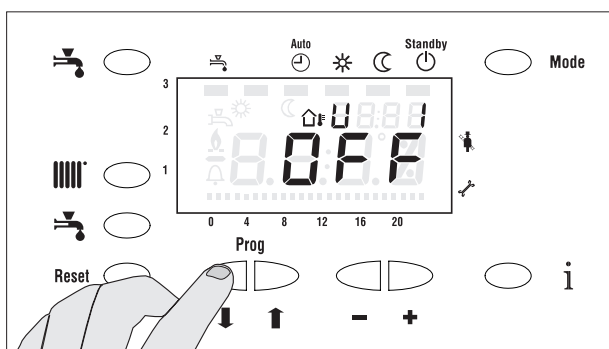


CALIBRATION FOR EACH SINGLE THERMAL MODULE

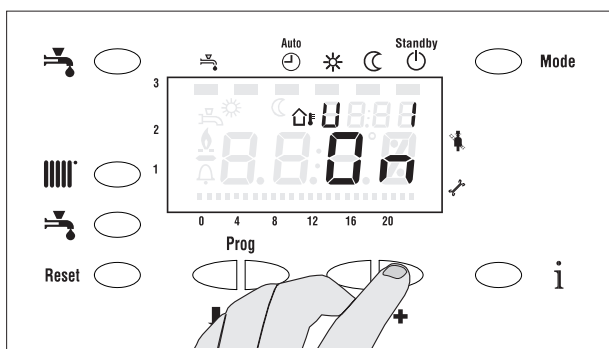
- Simultaneously press the buttons and for more than 2 seconds to enter chimney sweep mode. On the top right of the display (small digits) four lines appear that indicate that the commands sent are valid for all the thermal modules.



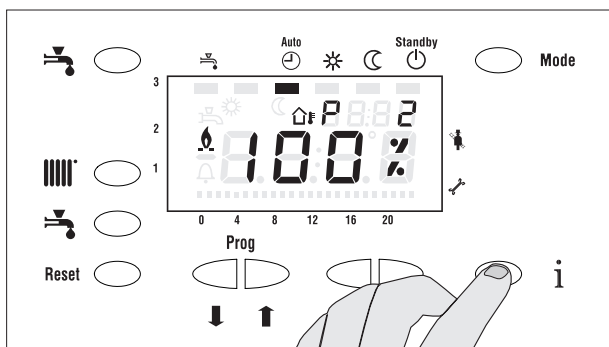
- Use the keys and to select the first thermal module (the small digits indicate U1).



- Press the key "+". At this point the selected combustion unit comes on and the fan runs at maximum speed.



- Press the key **i** twice to select the parameter "P2" highlighted by small digits.
- Press the key "+". At this point the fan switches to maximum speed.



- Adjust the CO₂ using a screwdriver on the adjustment screw (2) on the fan unit. Going clockwise the CO₂ diminishes, going anti-clockwise the CO₂ increases. When the adjustment is completed, the parameters should reflect those shown in the table below.

Values of CO₂ for operating at MAXIMUM POWER

| | |
|------------|--------------|
| G20 | $9 \pm 0,1$ |
| G25 | $9 \pm 0,1$ |
| G31 | $10 \pm 0,1$ |

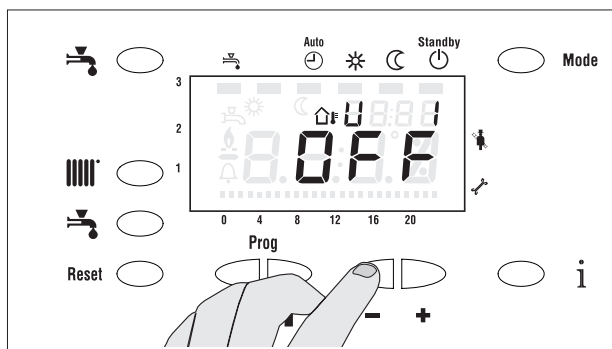
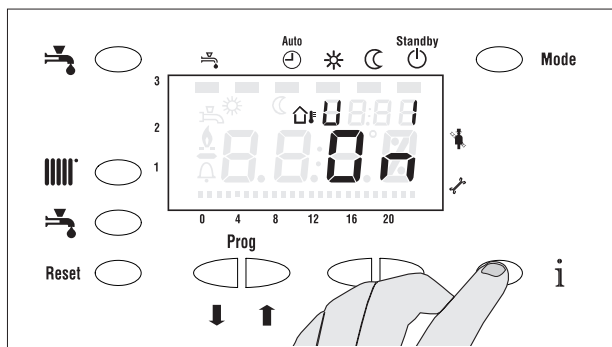
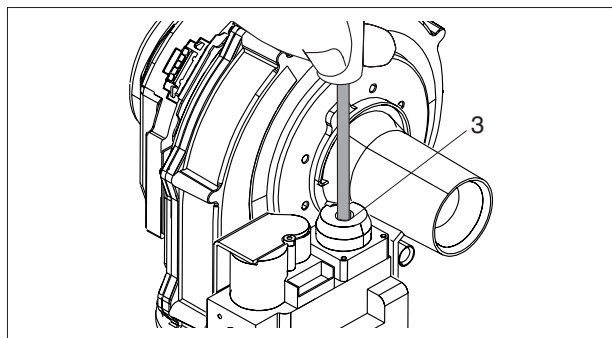
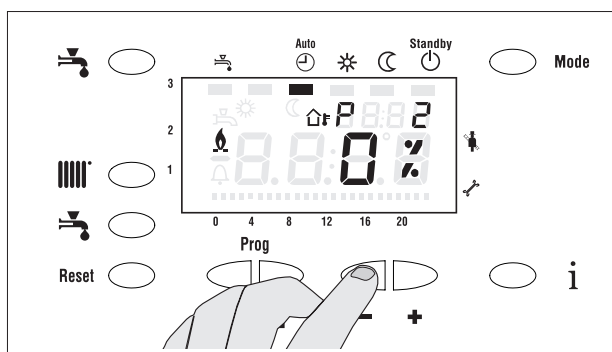
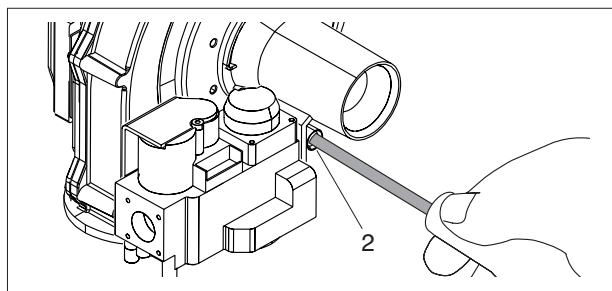
- Press the key "-".
The fan switches to minimum speed.
- Adjust the CO₂ using a TORX40 wrench on the adjustment screw (3) on the valve. Going anti-clockwise the CO₂ diminishes, going clockwise the CO₂ increases. When the adjustment is completed, the parameters should reflect those shown in the table below.



Values of CO₂ for operating at MINIMUM POWER

| | |
|------------|---------------|
| G20 | $9 \pm 0,1$ |
| G25 | $8,9 \pm 0,1$ |
| G31 | $9,9 \pm 0,1$ |

- Press the button **i** to return to the display of the first thermal module (the small digits will indicate U1).

- Press the button "-" to deactivate the module.





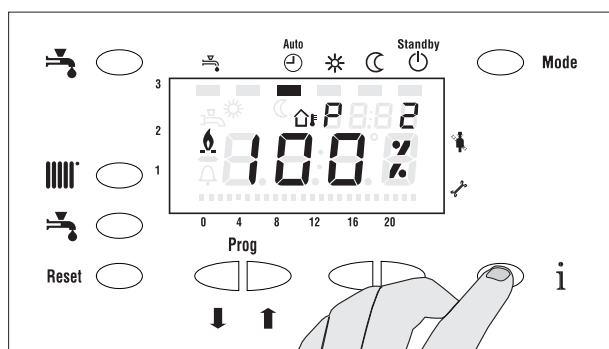
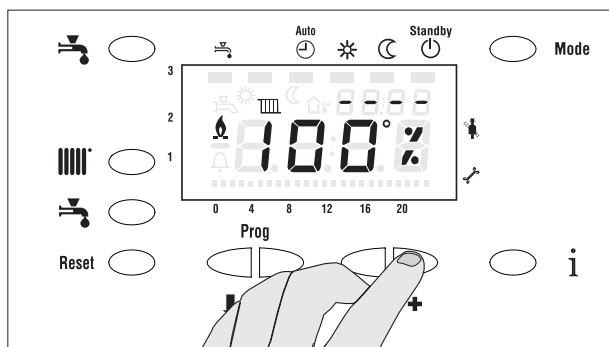
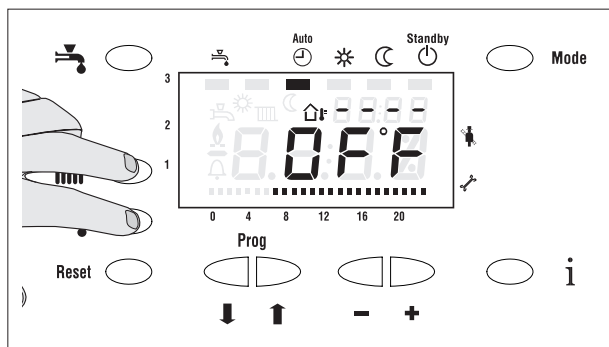
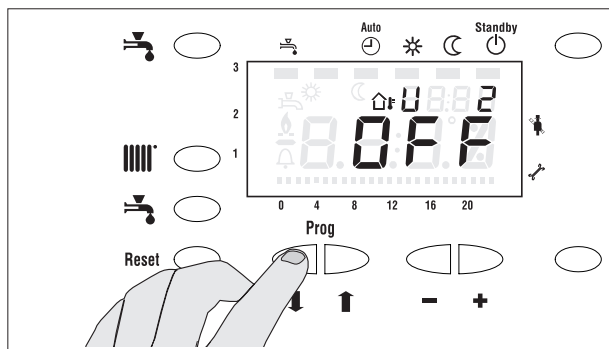
- Use the buttons  and  to select the second thermal module (the small digits will indicate U2) and repeat the same calibration operations carried out for the first module.
- Proceed in the same way for all the modules making up the boiler.

Once these operations are finished, press the **"Mode"** button for more than two seconds to exit the flue cleaning mode.

CALIBRATION WITH ALL THERMAL MODULES WORKING

IT is now necessary to carry out the calibration operations with all the heating elements working.
To do this:

- Simultaneously press the buttons  and  for more than 2 seconds to enter the flue cleaning mode. On the top right of the display (small digits) four line appear that indicate that the commands sent are valid for all the heating modules.
- Press the key **"+"**. Once all the combustion units switch on and the fans switch to maximum speed.
- Press the key **i** twice to select the parameter **"P2"** highlighted by small digits.
- Press the key **"+"**. At this point all the fans switch to maximum speed.
- Check that the parameters are the same as those in the table below.



Values of CO₂ for operating at MAXIMUM POWER

| | |
|------------|--------------|
| G20 | $9 \pm 0,1$ |
| G25 | $9 \pm 0,1$ |
| G31 | $10 \pm 0,1$ |


- Press the key "-".
At this point all the fans switch to minimum speed.
- Check that the parameters are the same as those in the table below.

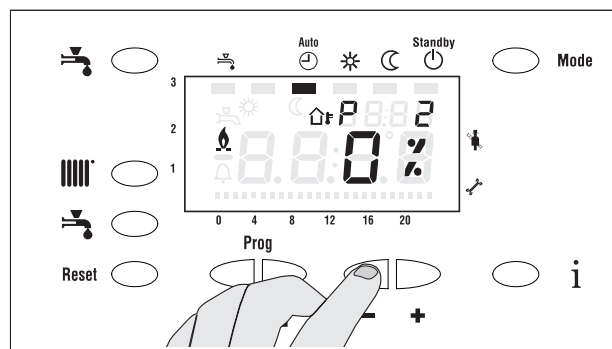
Values of CO₂ for operating at MINIMUM POWER

| | |
|------------|---------------|
| G20 | $9 \pm 0,1$ |
| G25 | $8,9 \pm 0,1$ |
| G31 | $9,9 \pm 0,1$ |

- Press the "**Mode**" button for more than two seconds to exit the flue cleaning mode.

Once the calibrations are complete, carefully close the plug of the combustion analysis socket.

 All the calibration operations should be carried out by the **RIELLO** Technical Assistance Centre.



CONVERSION FROM ONE TYPE OF GAS TO ANOTHER

⚠ THIS CHAPTER IS NOT VALID FOR COUNTRIES WHERE IT IS NOT POSSIBLE TO CARRY OUT THIS TYPE OF CONVERSION.

The **ALU PRO power** boilers are supplied to operate with G20 (methane gas). They can, however, be converted to operate with G25 or G31 using the relative Kit supplied.

⚠ Contact the **RIELLO** Technical Assistance Centre.

Before carrying out the conversion:

- Switch off the electricity supply setting the system's main switch and that of the control panel to "off"
- Close the gas shut-off tap

- Remove the top panel
- Disconnect the line gas valve

- With a TORX wrench unscrew the screws (3) and free the gas valve (1) from the venturi pipe unit (2)

- Replace the diaphragm (4), fitted on the gas valve, with the one supplied with the kit, whose diameter is shown in the table below.

| DIAPHRAGM diameter (Ø) | |
|------------------------|------------------|
| G20 | 7.7 |
| G25 | NO (not present) |
| G31 | 5.8 |

- Put back the gas valve and carry out all the calibration operations described in the section "Setting the combustion parameters" on page 51.

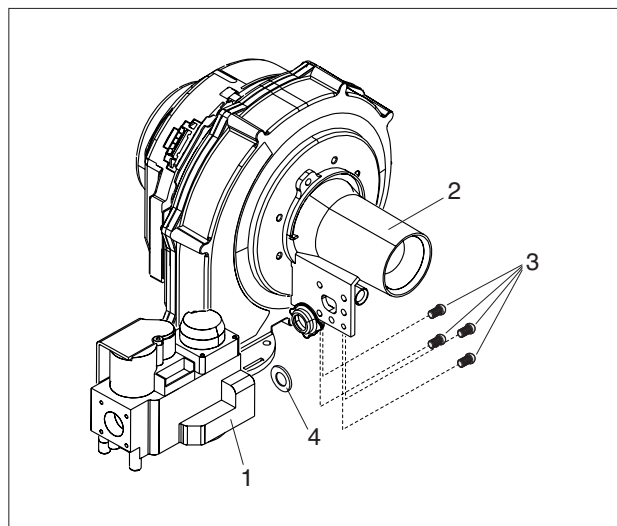
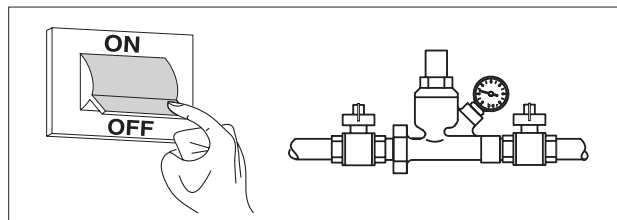
⚠ After installing the kit, check the seals on all connections made.

⚠ The pressures to have on the gas network are shown in the table below.

| NOMINAL gas feeding pressures | |
|-------------------------------|---------|
| G20 | 20 mbar |
| G25 | 25 mbar |
| G31 | 37 mbar |

⚠ Conversions should only be carried out by the **RIELLO** Technical Assistance Centre or by authorised personnel, even when the boiler has already been installed.

⚠ On completion of the conversion, adjust the boiler again following the instructions given in the "Calibrating combustion parameters" section".



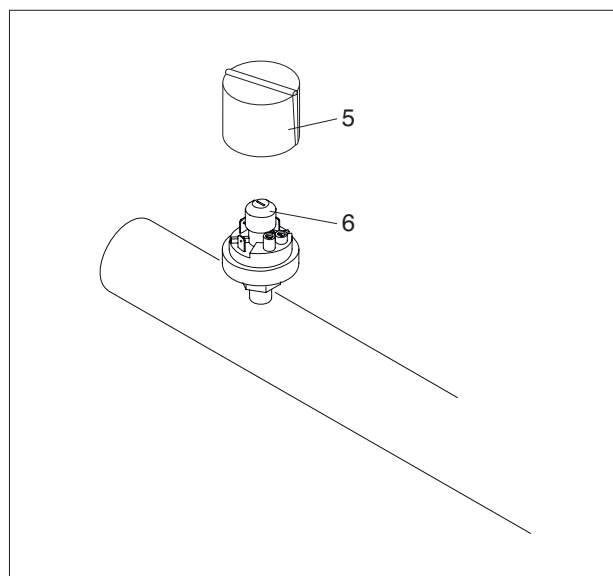
| MINIMUM gas feeding pressure | |
|------------------------------|---------|
| G20 | 13 mbar |

Adjusting the gas pressure switch

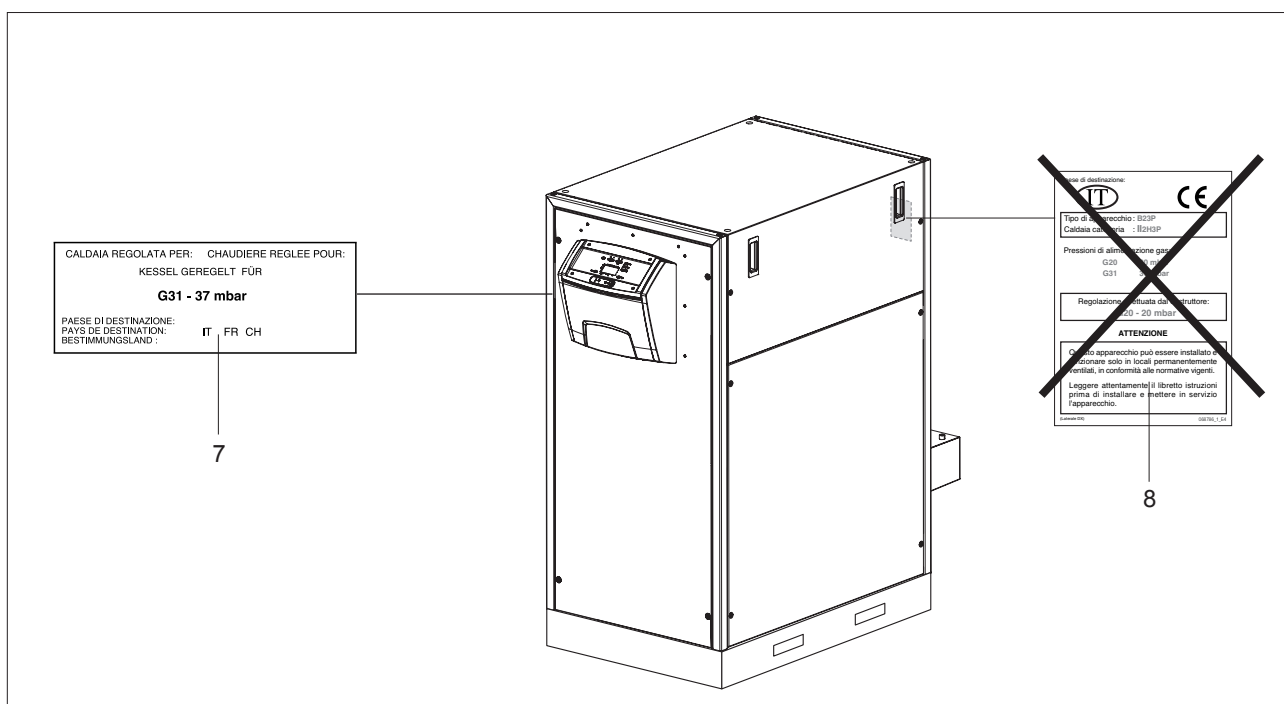
To ensure the boiler operates correctly, adjust the minimum gas pressure switch to a value of at least **5 to 10 mbar** below that of the gas supply pressure.

To do this:

- Remove the screws securing the pressure switch cover (5)
- Adjust the knob (6) to the desired value
- Put back the cover and secure it with the screws removed previously.



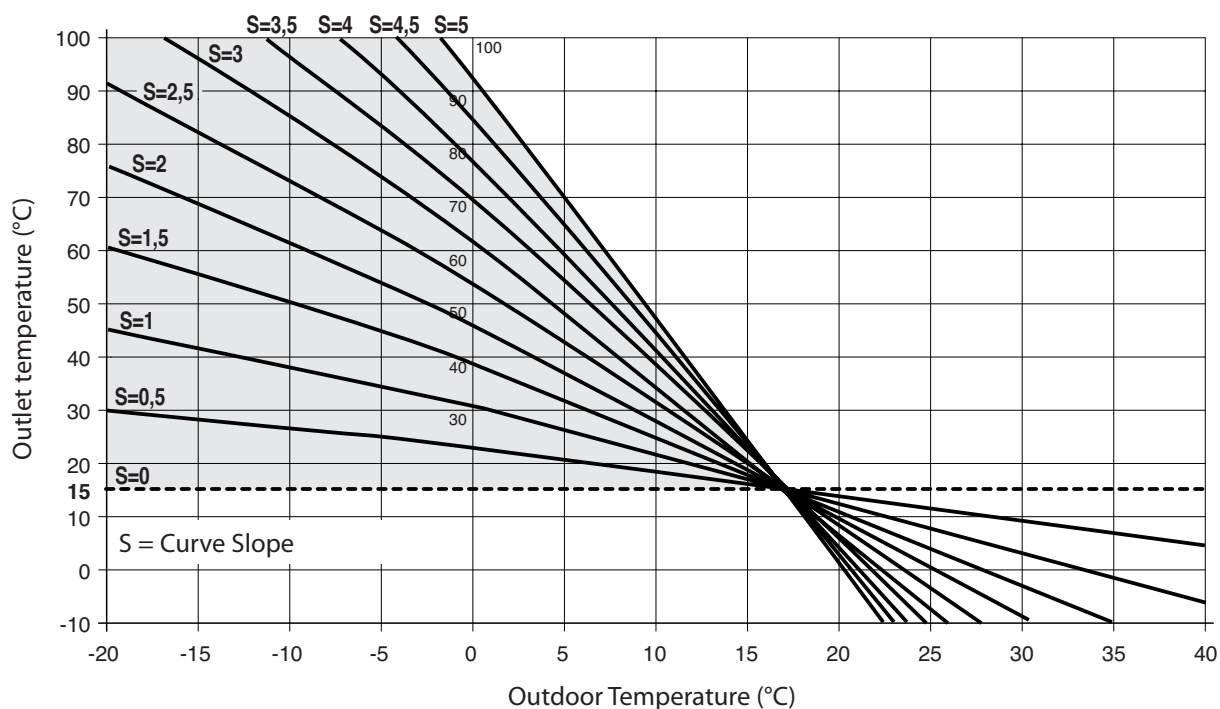
- Apply the label (7) for G31, supplied with the kit, inside the panelling, and remove the one for G20
- Remove the gas label (8) from the outside.



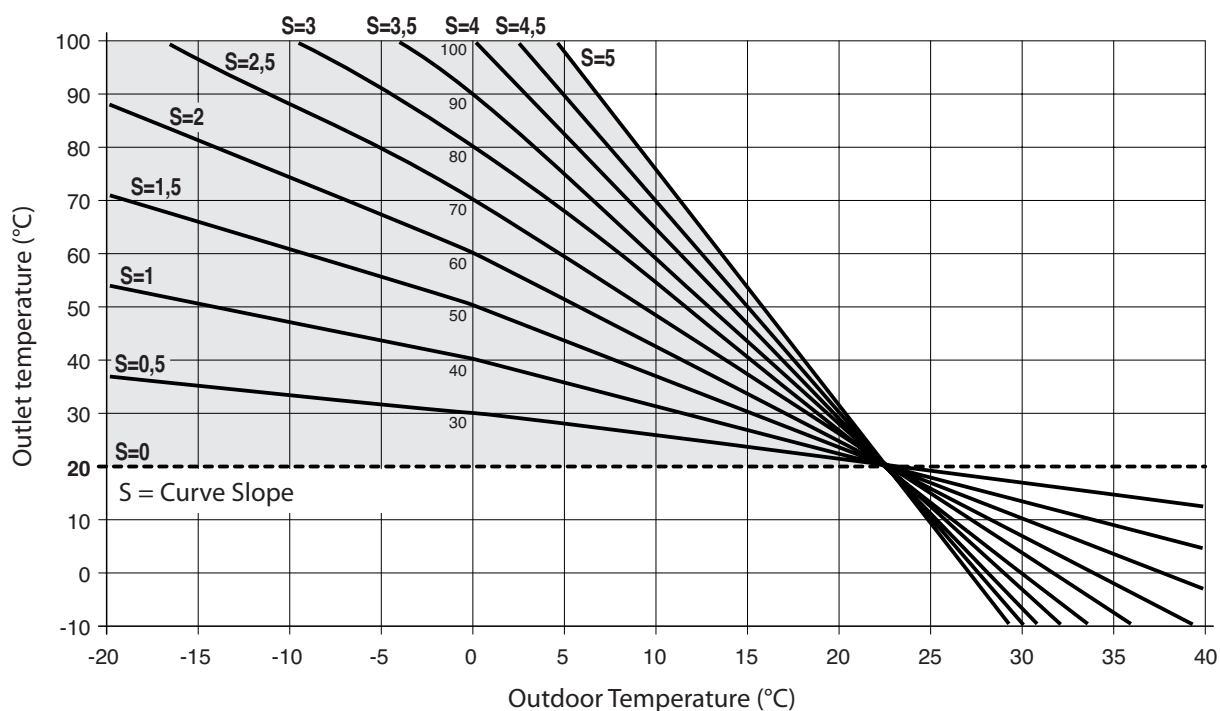
SETTING THE FUNCTIONAL PARAMETERS

If an outdoor temperature sensor is connected, the controller uses the heating curve to generate the CH flow temperature setpoint, thus enabling the boiler to maintain a constant room temperature even without the use of an ambient unit. The steeper the slope of the heating curve, the higher the flow temperature setpoint at low outdoor temperatures (see "Installer" parameter 532).

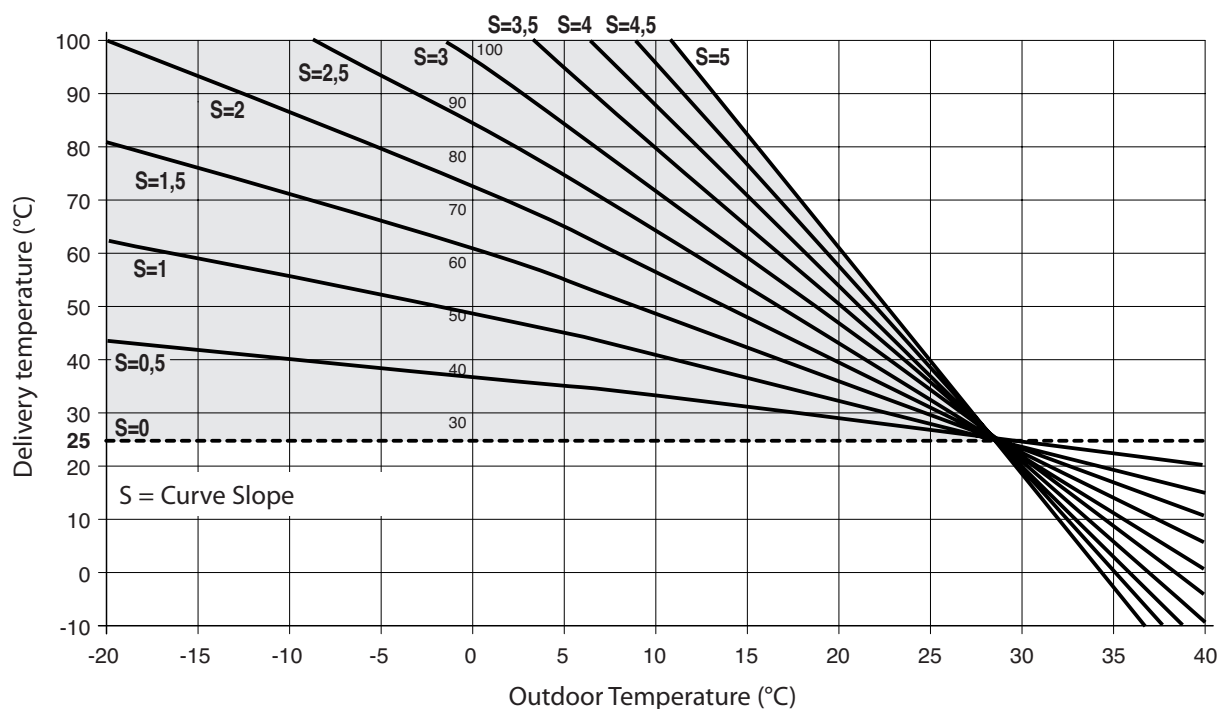
Heating curves with room temperature setpoint = 15°C




Heating curves with room temperature setpoint = 20°C



Heating curves with room temperature setpoint = 25°C



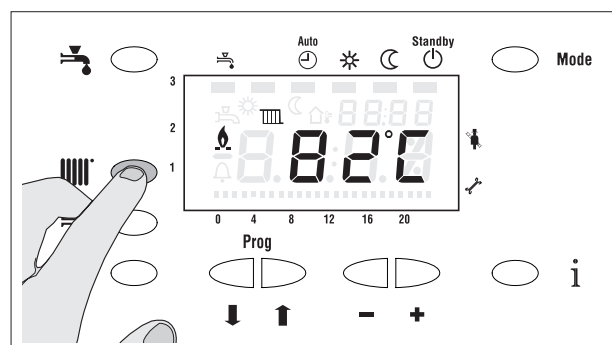
SETTING CENTRAL HEATING PARAMETERS

- Press the button :
- with an outdoor temperature sensor: set the ambient temperature setpoint. This setting shifts the heating curves
- with no outdoor temperature sensor: set the boiler setpoint with fixed point operation.

To adjust the setpoint use the keys "+" and "-".


To exit press one of the  keys .

The setting will be stored in memory.




SETTING DOMESTIC HOT WATER PARAMETERS

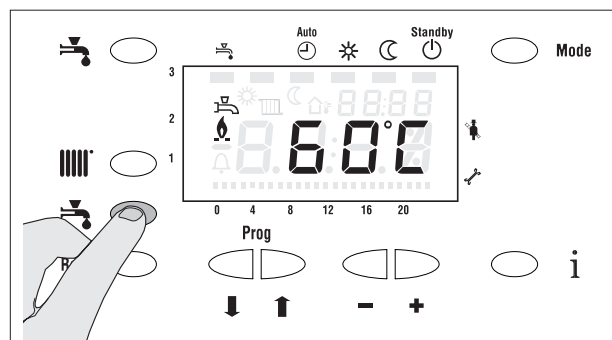
When there is a remote storage cylinder (accessory), after connecting the storage cylinder sensor to the electrical panel and having set the manufacturer parameter C559:

- Press the button .

To adjust the DHW setpoint use the keys "+" and "-".

To exit press one of the  keys .

The setting will be stored in memory.



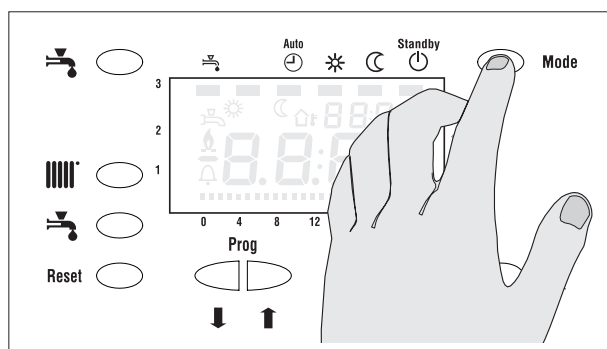
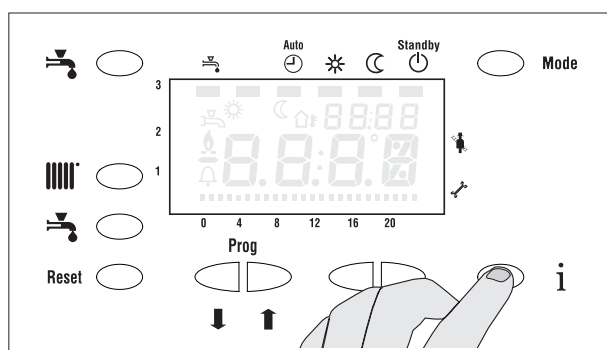
INFORMATION DISPLAY MENU

To access the information display menu, a starting with the standard display, press button **i**; in the small digits at the top the page number of the current display will appear, while in the large digits the current value of the corresponding information will appear.

Pressing button **i** it is possible to pass on to the next information.

Having reached the last page, you return to the starting page. To exit the information display menu, press the

"Mode" button.

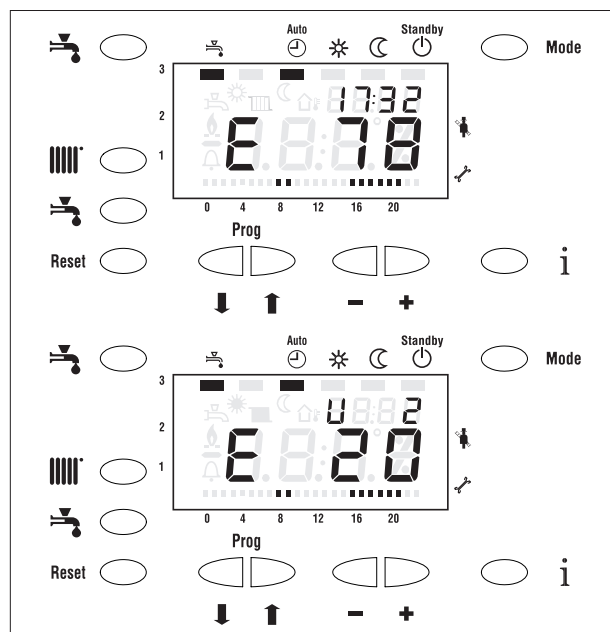


The list of information that can be displayed is shown in the table below.

| Page number | Description |
|-------------|---|
| 1 | Storage cylinder sensor temperature. If the storage cylinder thermostat mode has been set the symbol "- -" is displayed |
| 2 | Return sensor temperature |
| 3 | Flue gas probe temperature |
| 4 | outdoor temperature sensor. If no device is connected, the symbol "- -" is displayed |
| 5 | Output percentage requested from the modules. In the event of strategy B the information regarding the last module on is displayed. |
| 6 | Number of modules connected in cascade. |
| 7 | Number of modules connected not malfunctioning. |
| 8 | Total output in kW currently delivered by the system. |
| 9 | Address of the leader module for strategy B. |
| 10 | Output percentage that will be sent to the modules at the next request from the sequencer. |
| 11 | Current strategy. 0 indicates strategy A, 1 indicates strategy B. |
| 12 | Heating set temperature set using the 0-10Vdc input. If there are no devices connected at the input, the symbol "- -" is displayed. |
| 13 | Number of steady state SIC712 modules |
| 14 | Number of SIC712 modules available to the system (active, not malfunctioning) |
| 15 | Average outdoor temperature over the last 10 hours |
| 16 | Heating delivery setpoint calculated on the basis of the weather curves |
| 17 | Effective working output of address 1 module |
| 18 | Effective working output of address 2 module |
| 19 | Effective working output of address 3 module |
| 20 | Effective working output of address 4 module |
| 21 | Effective working output of address 5 module |
| 22 | Effective working output of address 6 module |
| 23 | Effective working output of address 7 module |
| 24 | Effective working output of address 8 module |

DISPLAYING TEMPORARY ERROR CODES

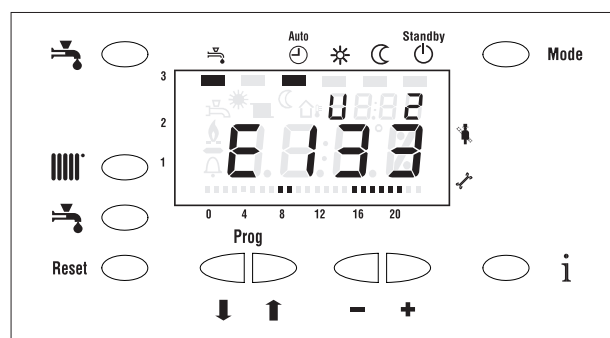
- When there is a temporary error, the error code flashes on the display.
- The top right shows the module from where the error is coming, or else the time continues to be displayed if the error concerns the entire boiler.



DISPLAYING A PERMANENT ERROR

- If a permanent error occurs, the main display flashes. The board goes into lockout. Example: E133.
- The top right shows the module from where the error is coming, or else the time continues to be displayed if the error concerns the entire boiler.

Note: after the error is corrected, press the **Reset** button to release the boiler.



ERROR TABLE



| Error code | Description |
|------------|--|
| E20 | Flow sensor faulty |
| E28 | Flue gas probe faulty |
| E40 | Return temperature sensor faulty |
| E50 | Storage cylinder sensor faulty / Domestic hot water overtemperature |
| E78 | Water pressure switch faulty – Pressure switch open |
| E81 | Communication error – number of modules detected different to the number of modules expected |
| E91 | EEPROM error – Loading in EEPROM default values |
| E110 | Safety temperature exceeded / Safety thermostat intervention |
| E111 | Limit temperature exceeded |
| E113 | Flue gas thermostat tripped |
| E117 | Pump fault - Primary pump OFF and input flow switch closed |
| E118 | Pump fault - Primary pump ON and input flow switch open |
| E119 | Flue gas thermostat tripped |
| E130 | Flue gas temperature threshold exceeded |
| E132 | Gas pressure switch and/or gas shut-off valve faulty (if present) |
| E133 | No flame detection |
| E154 | Return temperature sensor higher than flow sensor temperature |
| E160 | Fan modules fault (during switch-on) |
| E199 | Generic error / Fan modules fault (during normal operation) |
| E232 | Drop in gas pressure alarm (if no heat request) |
| b199 | Alarm (temporary) excessive delivery temperature gradient of module x |

RECENT ERRORS MEMORY MENU

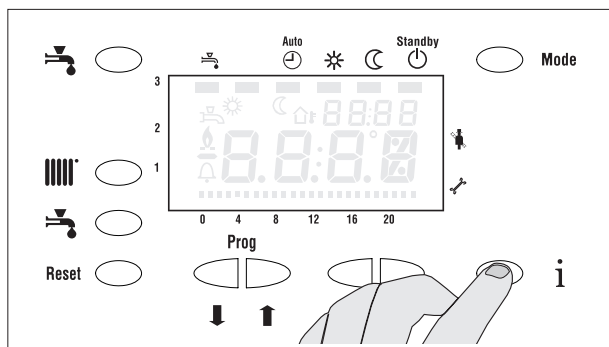
To access the records of the last 10 errors, starting with a standard display keep button **i** pressed for at least 5 seconds.

The error code is shown in the large digits; if it concerns a fault with a SIC712 module, the address of that module is shown in the small digits.

Pressing button **i** displays the date and time of the error.

pressing button  it is possible to go to the next page, while with the button  you return to the previous page.

To exit the menu for memorised errors, keep the "Mode" button pressed for more than 5 seconds.



PARAMETERS MENU

The parameters menu for control of the **ALU PRO power** is divided into three sections:

- User Menu
- Installer Menu
- OEM Menu

User Menu

To access the User Menu parameters, press the “up arrow and down arrow” keys at the same time for two seconds; the number of the selected parameter will appear in the top right (small digits) and its value in the middle (large digits). To move forward through the parameters press the “up arrow” or “down arrow” keys and to change the value of the parameter press the “+” or “-” keys.

To exit the menu press the “i” or “mode” keys.

| Code | Description | Minimum | Maximum | Default |
|------|---|---|---------|---------|
| P1 | Clock adjustment – Hours:Minutes | 00:00 | 23:59 | - |
| P2 | Calendar adjustment – Day.Month | 1,01 | 31,12 | - |
| P3 | Calendar adjustment – Year | 2000 | 2099 | - |
| P4 | Calendar adjustment – Day of the week | [Mo Tu We Th Fr Sa Su] | | - |
| P5 | Date when to change from daylight saving to summer time – Day.Month | 1.01 | 31.12 | 25.03 |
| P6 | Date when to change from daylight saving to summer time – Day.Month | 1.01 | 31.12 | 25.10 |
| P900 | CH scheduling – Pre-selection day | [MoSu Mo Tu We Th Fr Sa Su MoFr SaSu] | | - |
| P901 | CH scheduling – Start phase 1 | 00:00 | P902 | 6:00 |
| P902 | CH scheduling – End phase 1 | P901 | P903 | 22:00 |
| P903 | CH scheduling – Start phase 2 | P902 | P903 | 23:59 |
| P904 | CH scheduling – End phase 2 | P903 | P905 | 23:59 |
| P905 | CH scheduling – Start phase 3 | P904 | P906 | 23:59 |
| P906 | CH scheduling – End phase 3 | P905 | 23:59 | 23:59 |
| P916 | CH scheduling– Loading default values | [No Yes] | NO | |
| P960 | DHW scheduling – Pre-selection day | [MoSu Mo Tu We Th Fr Sa Su MoFr SaSu] | | - |
| P961 | DHW scheduling – Start phase 1 | 00:00 | P902 | 6:00 |
| P962 | DHW scheduling – End phase 1 | P901 | P903 | 22:00 |
| P963 | DHW scheduling – Start phase 2 | P902 | P903 | 23:59 |
| P964 | DHW scheduling – End phase 2 | P903 | P905 | 23:59 |
| P965 | DHW scheduling – Start phase 3 | P904 | P906 | 23:59 |
| P966 | DHW scheduling – End phase 3 | P905 | 23:59 | 23:59 |
| P976 | DHW scheduling – Loading default values | [No Yes] | NO | |

Installer Menu

To access the Installer Menu parameters, press the “up arrow and down arrow” keys at the same time for five seconds; the number of the selected parameter will appear in the top right (small digits) and its value in the middle (large digits). To move forward through the parameters press the “up arrow” or “down arrow” keys and to change the value of the parameter press the “+” or “-” keys.

To exit the menu press the “i” or “mode” keys.

| Code | Description | Minimum | Maximum | Default |
|------|---|---------|---------|---------|
| H503 | Heating minimum setpoint temperature | 20°C | 60°C | 40°C |
| H504 | Heating maximum setpoint temperature (*) | 60°C | 85°C | 80°C |
| H505 | Temperature to be added to the setpoint calculated with the weather curve | -5°C | 5°C | 0°C |
| H507 | Temperature to be subtracted from the setpoint calculated with the weather curve in the event of night-time reduction | 0°C | 30°C | 0°C |
| H508 | Domestic hot water minimum setpoint temperature | 10°C | 30°C | 20°C |
| H509 | Domestic hot water maximum setpoint temperature | 40°C | 65°C | 60°C |
| H510 | Boiler setpoint increase for domestic hot water service | 0°C | 30°C | 20°C |
| H511 | Temperature for activating anti-freeze modules | 0°C | 10°C | 5°C |
| H512 | Temperature for deactivating anti-freeze modules | 5°C | 20°C | 10°C |
| H532 | Weather compensation curve slope | 0 | 5 | 0 |
| H543 | System pump post-circulation time (in 10sec) | 0 | 255 | 18 |
| H544 | Domestic hot water pump post-circulation time (in 10sec) | 0 | 255 | 18 |
| H556 | Activation of system anti-freeze protection | 0 | 1 | 0 |
| H605 | Delivery/return Delta for output reduction | 0°C | 40°C | 20°C |
| H606 | Temperature variation with respect to the setpoint for switching on or switching off the boiler | 0°C | 20°C | 7°C |
| H610 | Minimum time between the starting of a module and when it is switched off in strategy B (in 10sec) | 0 | 42 | 6 |
| H611 | Minimum time between the switching off of a module and when it is switched on again in strategy B (in 10sec) | 0 | 42 | 6 |
| H614 | Anti-legionella function | 0 | 2 | 0 |
| H615 | Minimum voltage 0-10Vdc output for modulating pump control | 1V | 10V | 4V |
| H617 | Temperature variation with respect to the domestic hot water setpoint for switching on or switching off the boiler | 0°C | 10°C | 3°C |
| H619 | Threshold for automatic passage from summer mode to winter mode, and vice-versa | 8°C | 30°C | 20°C |

(*) The delivery temperature of the boiler is limited to 80°C for the intervention of the flame control module.

OEM Menu

To access the OEM menu press the "up arrow and down arrow" keys at the same time for eight seconds; you access the page for entering the password composed of the following sequence of keys: "down arrow", "up arrow", "+", "-", "+". If the password is incorrect you return to the installer menu; if it is correct you enter the OEM menu, and in the top right (small digits) the number of the selected parameter will appear and in the middle (large digits) the value it has. To move forward through the parameters press the "up arrow" or "down arrow" keys and to change the value of the parameter press the "+" or "-" keys. To exit the menu press the "i" or "mode" keys.


| Code | Description | Minimum | Maximum | Default |
|------|--|----------|----------|---------|
| C513 | Storage cylinder maximum temperature | 50°C | 80°C | 70°C |
| C515 | Limit temperature for switching off the boiler | 85°C | 100°C | 95°C |
| C517 | Maximum delivery temperature of the modules | 80°C | 95°C | 90°C |
| C518 | Safety temperature | 90°C | 110°C | 99°C |
| C559 | Domestic hot water request mode | 0 | 2 | 1 |
| C592 | Flue gases temperature for boiler shut-down | 85°C | 120°C | 90°C |
| C593 | Flue gas temperature for reducing heat output | 80°C | 115°C | 85°C |
| C604 | Strategy selection for igniting modules | 0 | 1 | 0 |
| C607 | Period for sending output setpoint to the modules | 10s | 255s | 20s |
| C608 | Maximum variation of the output setpoint to be sent to the modules | 4% | 99% | 6% |
| C609 | Threshold for switching on module in strategy B | C612 x 2 | 99% | 50% |
| C612 | Threshold for switching off module in strategy B | 1% | C609 / 2 | 4% |
| C613 | Protection activation mode with fuel valve | 0 | 1 | 0 |
| C616 | Delta temperature for the simultaneous ignition of all the modules in strategy B | 1°C | 50°C | 30°C |
| C618 | Operating time for rotation of modules in strategy B (in 1h) | 10h | 127h | 100h |
| C700 | PID adjustment for CH – Kp | 0 | 99 | 5 |
| C701 | PID adjustment for CH – Ti | 0 | 99 | 50 |
| C702 | PID adjustment for CH – Ki | 0 | 99 | 1 |
| C703 | PID adjustment for DHW – Kp | 0 | 99 | 1 |
| C704 | PID adjustment for DHW – Ti | 0 | 99 | 5 |
| C705 | PID adjustment for DHW – Ki | 0 | 99 | 1 |
| C706 | PID adjustment for modulating pump – Kp | 0 | 99 | 5 |
| C707 | PID adjustment for modulating pump – Ti | 0 | 99 | 11 |
| C708 | PID adjustment for modulating pump – Ki | 0 | 99 | 1 |
| C750 | operating mode 0-10V device | 0 | 2 | 0 |
| C800 | Number of SIC712 modules that need to be connected to the system | 0 | 8 | (*) |
| C801 | Enabling saturation management of modules | 0 | 1 | 1 |
| C802 | Threshold for recognition of modules saturation condition | C803 | 100% | 12% |
| C803 | Threshold for exiting modules saturation condition | 0% | C802 | 3% |
| C804 | Standby time for modules saturation status | 0sec | 240sec | 15sec |

(*) - Number of modules in the boiler.

| Code | Description | Minimum | Maximum | Default |
|------|---|--|---------|---------|
| C805 | Domestic hot water pump management mode | 0 = domestic hot water pump upstream of the water equalisation device 1 = domestic hot water pump downstream of the water equalisation device (primary non-modulating pump) 2 = domestic hot water pump downstream of the water equalisation device (primary modulating pump based on the ΔT between the delivery and return temperature of the primary pump) 3 = zone pump downstream of the water equalisation device | | 0 |
| C806 | Enable night-time reduction function | 0 = function disabled 1 = function enabled | | 0 |
| C807 | Enable circulation test | 0 = function disabled 1 = function enabled | | 0 |

MAINTENANCE

Regular maintenance is mandatory according to Pres. Decree 26 August 1993 no. 412, and it is essential for the safety, the efficiency and long life of the boiler. Proper maintenance keeps consumption and emissions down, and ensures that the boiler continues to operate reliably over time.

 On completion of maintenance operations, the original settings must be restored and combustion fumes analysed to verify everything is working correctly.

Before starting maintenance operations:

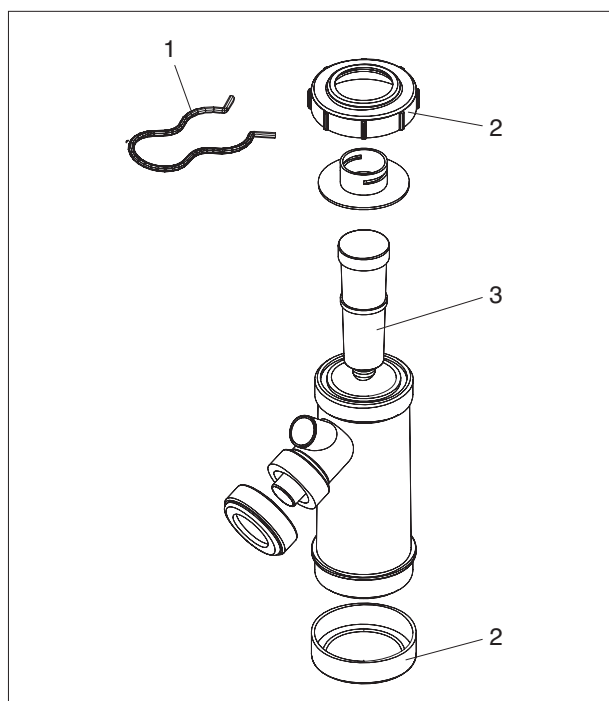
- Switch the electricity supply "off" using the system's main switch and the one on the main control panel
- Close the fuel shut-off taps.

CLEANING THE CONDENSATE DRAIN AND SIPHON

- Remove the split pin (1), detach the corrugated condensate drain hose, and remove the siphon unscrewing the two screw caps (2).

- Remove the float (3) and clean all the components.

Once the cleaning operations are finished, reassemble all the components, following the above instructions in the reverse order.



DISMANTLING THE FAN

Before starting the maintenance operations:

- Set the general switch on the system and the switch on the main control panel to "off"
- Turn off the fuel shut-off cock.

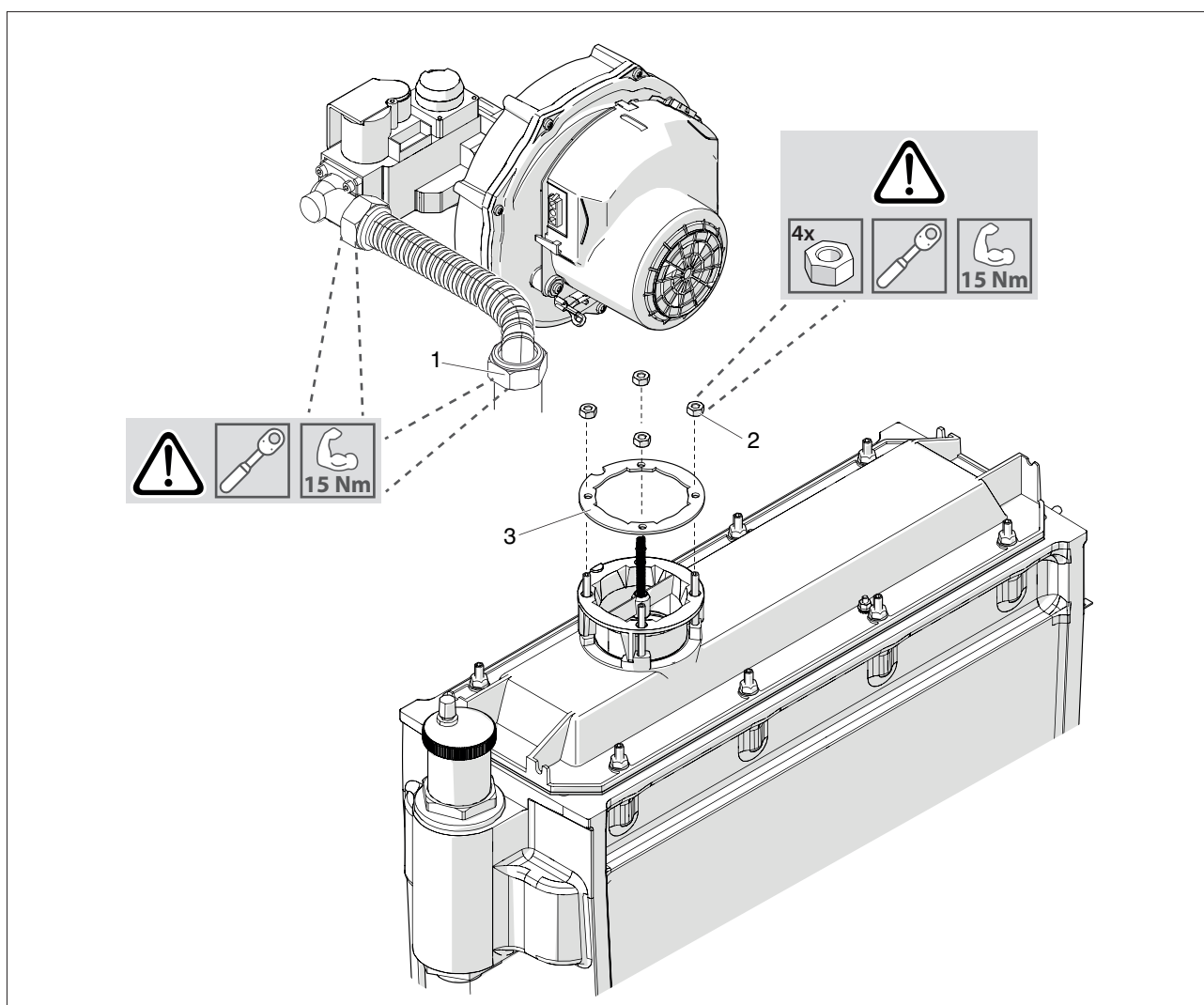
To dismantle the fan:

- Remove the cover panel from the boiler.
- Loosen the nut (1) securing the gas feed pipe from the gas collector.
- Unscrew the nuts (2) attaching the fan to the combustion chamber cover.
- Carefully remove the fan, making sure not to damage the seal (3).

⚠ Check the seal is intact. Replace it if necessary.

To reassemble, follow the above steps in reverse order.

⚠ Check all the connections are tight.



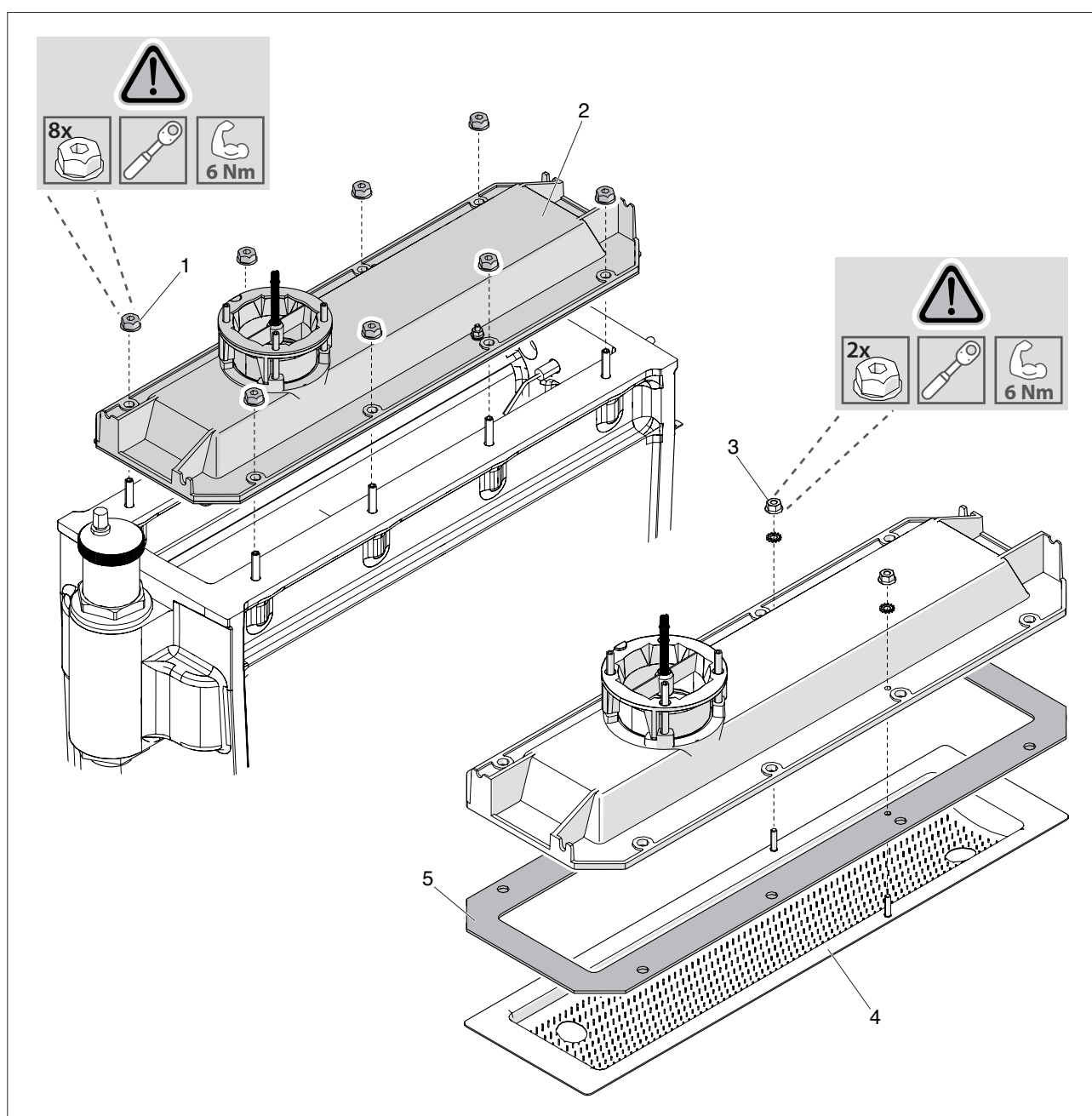
REMOVING THE BURNER

Proceed as follows to remove the burner:

- Remove the fan as described in paragraph "Dismantling the fan" on page 66
- Unscrew the nuts (1) holding the combustion chamber cover (2) in place and remove the cover.
- Unscrew the nuts (3) and carefully remove the burner (4), making sure not to damage the seal (5).
- Check that the seal is intact. Replace it if necessary.

To reassemble, follow the above steps in reverse order.

 Check all the connections are tight.



DISMANTLING THE CHECK VALVE:

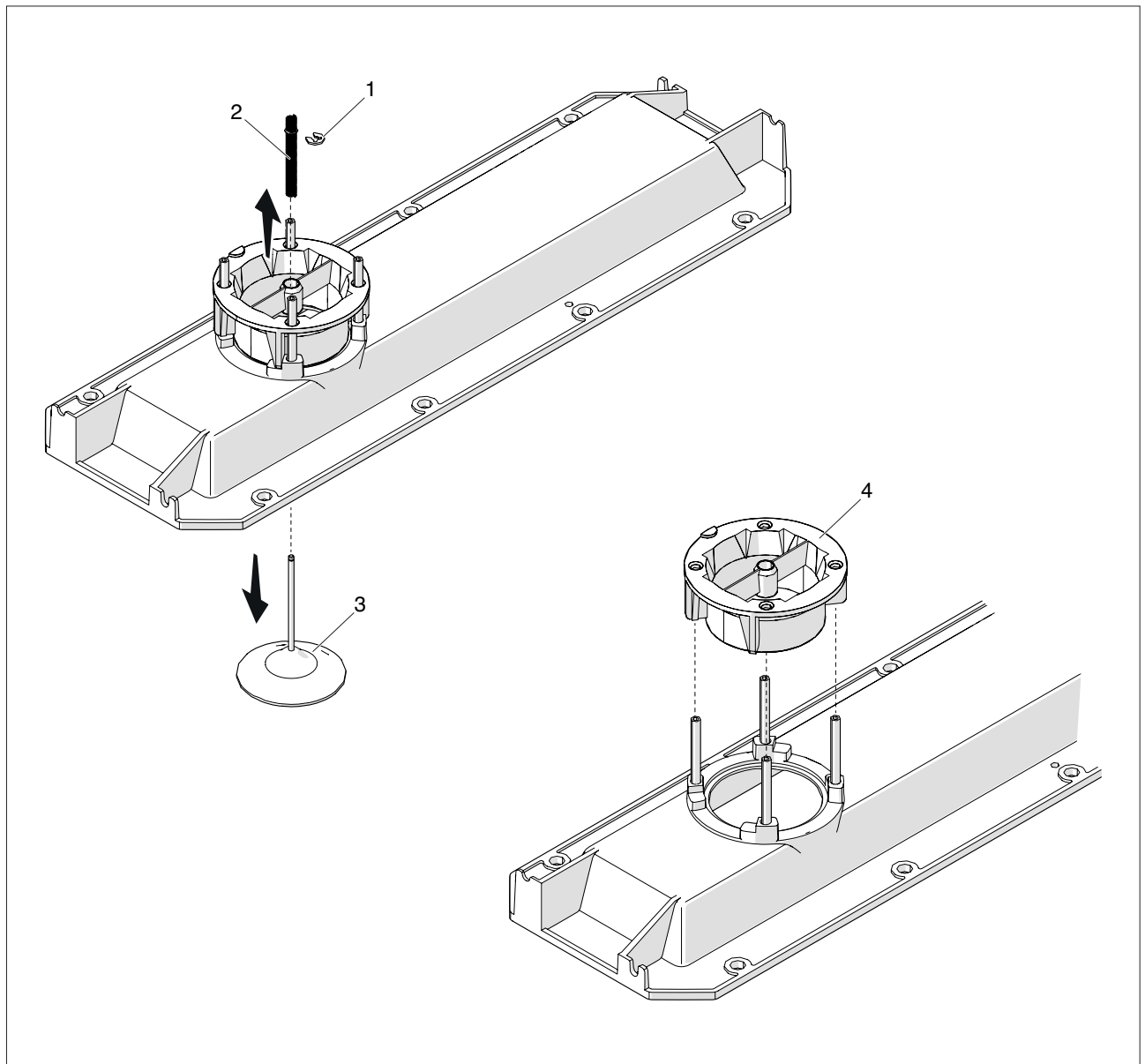
To dismantle the check valve:

- Remove the burner as described in paragraph "Removing the burner" on page 67.
- Remove the Seeger ring (1), slide off the spring (2), and remove the check valve (3).
- Remove the check valve cast (4).

⚠ Ensure the check valve components are not corroded. Replace them if necessary.

To reassemble, follow the above steps in reverse order.

⚠ Check all the connections are tight.

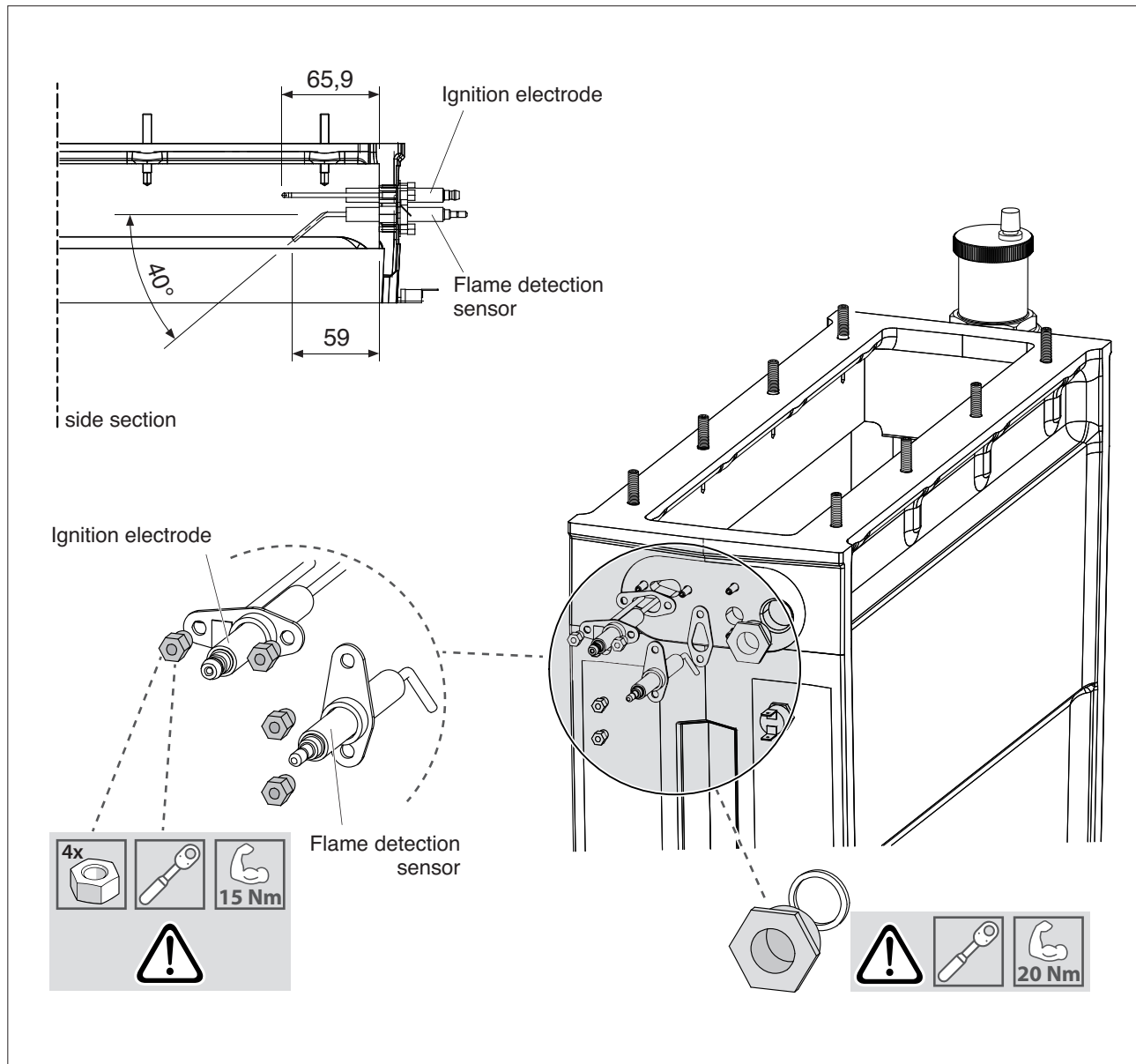


POSITIONING ELECTRODES

Correct positioning of the ignition electrodes and flame detection sensor is essential for efficient ignition and combustion. Check their state of wear and that they are positioned correctly, as shown in the diagram. Replace if damaged or worn.

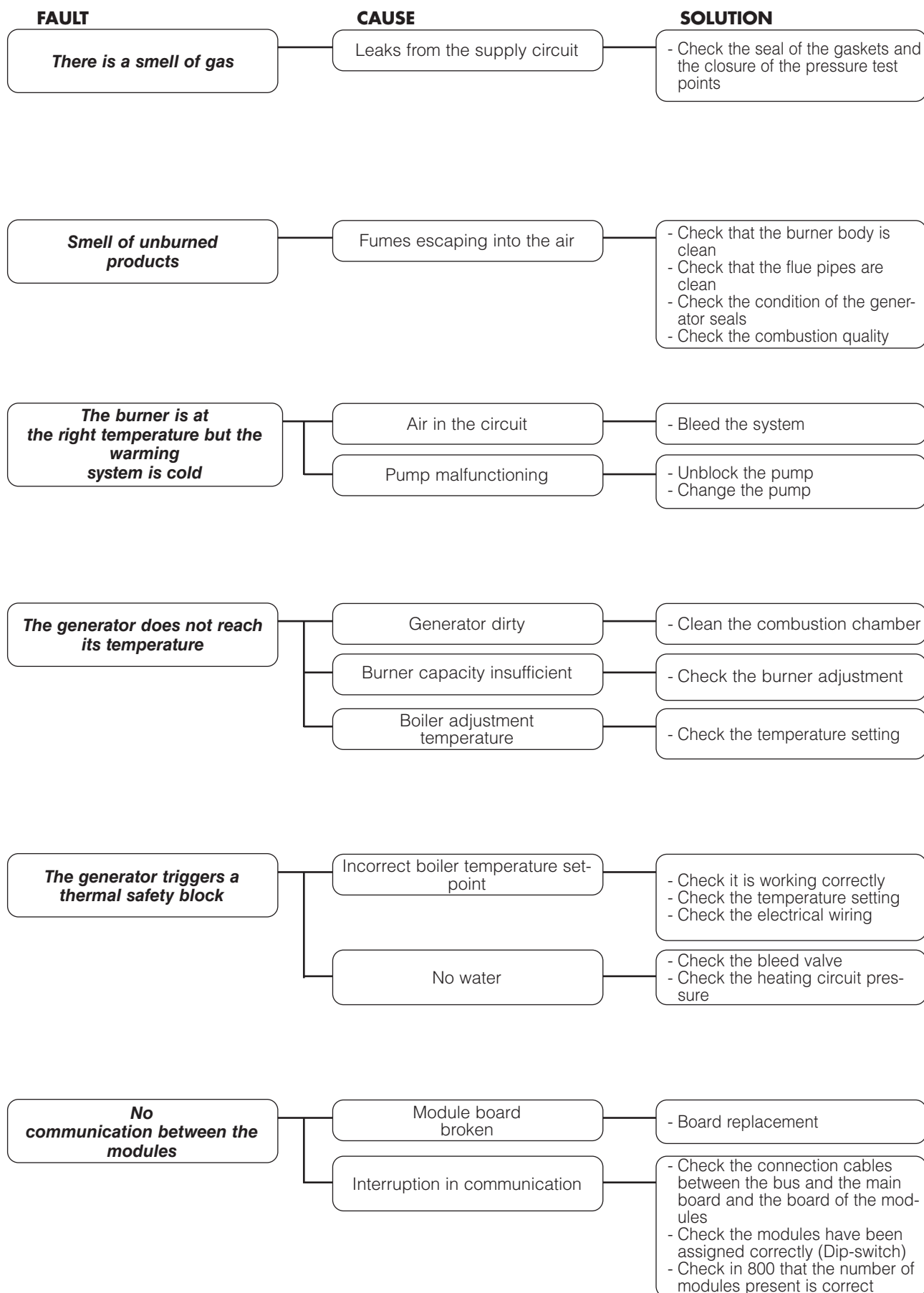
⚠ It is obligatory to respect the dimensions shown in the figure.

⚠ Check the seals are intact. Replace them if necessary.



TROUBLESHOOTING

| FAULT | CAUSE | SOLUTION |
|---|--|--|
| The heating unit performs pre-ventilation and ignition correctly but shuts down after about 2 attempts | Flame not detected | - Call the Technical Assistance Centre |
| | No gas | - Make sure gas tap is open |
| The burner shuts down during pre-ventilation | Flue blocked | - Check the flue |
| | Flame detection error | - Call the Technical Assistance Centre |
| | The flame is already lit | - Call the Technical Assistance Centre |
| | Air intake obstructed | - Check for blockage |
| The burner shuts down after pre-ventilation because the flame fails to ignite | The valve group feeds too little gas | - Check gas supply pressure |
| | Gas valve faulty | - Call the Technical Assistance Centre |
| | Irregular ignition or no electric ignition arc | - Call the Technical Assistance Centre |
| | Air in the gas pipe | - Bleed the gas line |
| The burner does not start with adjustment consent | No electrical power | - Check for voltage at gas valve terminals - Check the condition of the fuses |
| | No gas supply | - Make sure the in-line tap is open |
| | Electrical short circuit | - Call the Technical Assistance Centre |



RIELLO

RIELLO S.p.A.
37045 Legnago (VR)
Tel. 0442630111 - Fax 0442630371 - www.riello.it

**As part of the company's ongoing commitment to perfecting its range of products,
the appearance, dimensions, technical data, equipment and accessories
may be subject to variation.**