

⚠ WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids or other combustible materials in the vicinity of this or any other appliance. To do so may result in an explosion or fire.

What to do if you smell gas:

- Do not try to light any appliance;
- Do not touch any electrical switch; do not use any phone in your building;
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions;
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

This manual should be maintained in legible condition and kept adjacent to the boiler or in a safe place for future reference.



Condexa PRO North America

INSTALLATION, OPERATION AND SERVICE MANUAL



Please scan for the current version of this manual.

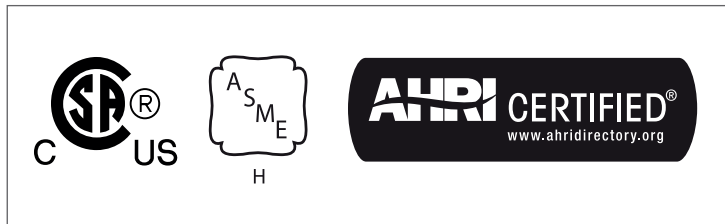
RIELLO

RANGE

MODEL	CODE
Condexa PRO NA 75 P	20142594
Condexa PRO NA 117 P	20142595

CONFORMITY

The **Condexa PRO NA** boiler range complies with:



Dear customer,

Thank you for choosing a **RIELLO** heating product, a quality product that is designed to give dependable, efficient and safe service; which will provide comfort in the home for many years to come. This manual provides information that is essential to the installation of the appliance. Used in conjunction with a qualified installer, service technician or the gas supplier's knowledge and expertise will allow for a quick, simple and correct appliance install.

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

INTENDED USE

This boiler must only be used for the purpose specified by the manufacturer and for which it is designed. The manufacturer declines all responsibility, contractual or other, for damage to property or injury to persons or animals caused by improper installation, adjustment, maintenance or use.

Installation of the boiler must comply with all applicable codes and regulations imposed by the national, Federal or local authorities and bodies. If no specific requirements are defined, in the USA, the latest edition of the National Fuel Gas Code ANSI Z223.1/ NFPA 54 must be complied with. In Canada, installation must be in accordance with the requirements of CAN/CSA B149.1, Natural Gas and Propane Installation Code.

Where required by local regulations, the system must comply with the American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).

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1 GENERAL INFORMATION

1.1 Key to symbols

Pay attention to these terms:

⚠ DANGER = indicates the presence of immediate hazards which will cause severe personal injury, death or substantial property damage if ignored.

⚠ WARNING = indicates the presence of hazards or unsafe practices which could cause severe personal injury, death or substantial property damage if ignored.

⚠ CAUTION = indicates the presence of hazards or unsafe practices which could cause minor personal injury or product or property damage if ignored.

⚠ NOTE = indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.

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

1.2 General safety information

⚠ Check that the product is complete, undamaged and as ordered as soon as you receive it. Report any discrepancies or damage to the **RIELLO** dealer who sold it.

⚠ The boiler must be installed by a qualified installer, service agency or gas supplier.

UPON COMPLETION OF THE INSTALLATION THE INSTALLER MUST INSTRUCT THE OWNER AND OPERATOR ON THE FUNCTIONALITY AND THE PROPER OPERATION OF THE BOILER AND THE HEATING SYSTEM.

THIS MANUAL SHOULD BE HANDED TO THE OWNER AND OPERATOR OF THE APPLIANCE.

THE INSTALLER MUST REVIEW ALL SAFETY INSTRUCTIONS WITH THE OWNER AND OPERATOR.

The installation instructions included in this Manual are intended solely for use by a qualified installer, service agency or gas supplier. If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- Have installation and service performed by a qualified installer, service agency or the gas supplier.
- **RIELLO** recommends signing a service and maintenance contract with a trained and qualified installer or service agency that covers annual servicing and condition-based maintenance. Proper maintenance is a fundamental requirement for safe and efficient operation and long service life.
- The boiler must be serviced annually including the main burner, ignition system, the entire venting system, and the combustion air supply. All parts that show any signs of damage or corrosion must be replaced.

⚠ WARNING: This product is a gas appliance that emits poisonous gases; such as CO (Carbon Monoxide). For this reason, it is required that CO detectors be installed in buildings where the boiler is installed. Failure to do so may result in severe injury or death.

⚠ WARNING: when servicing the boiler and venting components ensure the boiler components and venting components are installed properly per the Installation, Operation & Service Instructions for the boiler as well as the vent manufacturer's installation instructions and the local code having jurisdiction are followed. Failure to comply may result in substantial property damage, severe personal injury, or death.

- The owner and operator is responsible for the operational safety and regulatory compliance of the heating system.
- Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or death. Refer to this manual and consult a qualified installer or service agency, or the gas supplier before installation, service or maintenance.
- The boiler must be installed such that the gas ignition system components are protected from water (dripping, spraying, rain etc.) during boiler operation and circulator replacement, condensate trap, control replacement, etc.
- The boiler must not be installed on carpeting.

⚠ This product must only be used for the purpose for which it is designed and made, as specified by **RIELLO**. **RIELLO** declines all responsibility, contractual or other, for damage to property or injury to persons or animals caused by improper installation, adjustment, maintenance or use.

⚠ If you notice any water leaks, disconnect the boiler from the main electrical supply and shut off the water supply.

⚠ Periodically check that pressure in the central heating circuit, when cold, is approximately 20 psi (1.4 bar) and below the maximum limit specified for the boiler.

⚠ If the boiler is not going to be used for an extended period of time, perform the operations described later in this manual.

⚠ This instruction manual is an integral part of the boiler. It must be kept safe and must **ALWAYS** accompany the boiler, even if it is sold to another owner or transferred to another user or to another installation. If you damage or lose this manual, order a replacement immediately from your local **RIELLO** Technical Assistance Center.

⚠ The equipment without packaging, before being connected to the hydraulic system and to the gas supply and being electrically powered can be exposed to temperatures ranging between 39°F (4°C) and 104°F (40°C). Once it is able to activate the antifreeze functions, it can be exposed to temperatures within -4°F (-20°C) and 104°F (40°C).

⚠ Regularly check that the condensate drain is free from obstruction.

⚠ We recommend cleaning inside the heat exchanger once a year, extracting the fan and burner and removing any installation debris using a vacuum. This operation should be done by a qualified installer, service agency or gas supplier only.

1.3 Warnings

- Gas fired hot water boiler for either direct vent installation. Design according to: ANSI Z21.13-2017 CSA 4.9-2017 – Gas-Fired low pressure hot water boilers. Direct vent boiler, Category IV.
- SCAQMD Rule 1146.2

1.3.1 General warnings

⚠ DANGER: Make sure the gas on which the boiler will operate is the same type as that specified on the boiler rating plate and on the colored sticker near the boiler gas connection.

⚠ WARNING: Should overheating occur or the gas supply valve fail to shut off, turn off the manual gas control valve to the appliance.

⚠ WARNING: Do not use this boiler if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

⚠ WARNING: Automatic filling systems are not recommended with this product as they will continually add fresh water to the system if there is a leak resulting in the addition of new contaminants that could reduce the lifespan of the boiler.

⚠ WARNING: To minimize the possibility of improper operation, serious personal injury, fire, or damage to the boiler:

- Always keep the area around the boiler free of combustible materials, gasoline, and other flammable liquids and vapors.
- The boiler should never be covered or have any blockage to the flow of fresh air to the boiler.

⚠ WARNING: Risk of electrical shock. More than one disconnect switch may be required to de-energize the equipment before servicing.

⚠ WARNING: Failure to comply with the the previous warnings could result in severe personal injury, death or substantial property damage. Failure to adhere to the guidelines on this page can result in severe personal injury, death or substantial property damage.

⚠ WARNING: Installation and service must be performed by a gas supplier or a licensed qualified installer/service Technician.

⚠ CAUTION: This boiler requires forced water circulation when the burner is operating. See minimum and maximum flow rates. Severe damage will occur if the boiler is operated without proper water flow circulation.

⚠ NOTE: When the boiler has been filled for the first time or the system has been drained and refilled, it will be necessary to release any air that may have become trapped within the appliance heat exchanger. Loosen the bleed screw until water is released and then close. **IMPORTANT, THERE ARE NO OTHER MANUAL AIR RELEASE VALVES LOCATED ON THE APPLIANCE.**

The following instructions must be observed

- The boiler must only be used for its designated purpose, observing the Installation Instructions.
- Only use the boiler in combination and with the accessories and spare parts listed in the Riello Condexa spare parts catalog.
- Other combinations, accessories and consumables must only be used if they are specifically designed for the intended application and do not affect the system performance and the safety requirements.
- Maintenance and repairs must only be carried out by a qualified service agency at regular intervals.
- You must report the installation of a condensing gas boiler to the relevant gas and plumbing inspection authority and have it approved.
- You are only allowed to operate the condensing gas boiler with the combustion air/flue gas system that has been specifically designed and approved for this type of boiler.

You must also observe:

- The local building regulations stipulating the installation rules.
- The local building regulations concerning the air intake and outlet systems and the chimney connection.
- The regulations for the power supply connection.
- The technical rules laid down by the gas utility company concerning the connection of the gas connection to the local gas main.
- The instructions and standards concerning the safety equipment for the water/space heating system.
- The Installation instructions for building heating systems.
- The boiler must be located in an area where leakage of the heat exchanger or connections will not result in damage to the area adjacent to the boiler or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the boiler. The pan must not restrict combustion air flow.
- The boiler must be installed such that the gas ignition system components are protected from water (dripping, spraying, rain etc.) during boiler operation and circulator replacement, condensate trap, control replacement, etc.).
- The boiler must not be installed on carpeting.
- Do not restrict or seal any air intake or outlet openings.
- If you find any defects, you must inform the owner of the system of the defect and the associated hazard in writing.

⚠ DANGER: Flammable gas explodes. Beware if you smell gas: there may be an explosion hazard!

⚠ WARNING: RISK OF CARBON MONOXIDE POISONING OR FIRE DUE TO JOINT SEPARATION OR PIPE BREAKAGE. Ensure all of the venting system is properly supported and secured per these instructions, venting manufacturer's instructions and with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, CAN/CSA B149.1, and/or applicable provisions of local building codes. Failure to do so may result in substantial property damage, severe personal injury or death.

Observe these instructions as general warnings:

- **RIELLO** recommends that an inhibitor – suitable for use with stainless steel heat exchangers – is used to protect the boiler and system from the effects of corrosion and/or electrolytic action. The inhibitor must be administered in strict accordance with the manufacturers instructions.
- When the boiler has been filled for the first time or the system has been drained and refilled, it will be necessary to purge any air that may have become trapped within the appliance heat exchanger.

NOTE: Propylene glycol in the system must not exceed 50%.

Boiler water

- If you have an old system with cast iron radiators, thoroughly flush the system (without the boiler connected) to remove sediment. The high-efficiency heat exchanger can be damaged by build-up or corrosion due to sediment
- Do not use petroleum-based cleaning or sealing compounds in the boiler system. Gaskets and seals in the system may be damaged. This can result in substantial property damage.
- Do not use "homemade cures" or "boiler patent medicines." Substantial property damage, damage to boiler, and/ or serious personal injury may result.
- Continual fresh make-up water will reduce boiler life. Mineral build up in heat exchanger reduces heat transfer, overheats the stainless steel heat exchanger, and causes failure. Addition of oxygen carried in by make-up water can cause internal corrosion in system components. Leaks in the boiler or piping must be repaired at once to prevent make-up water.
- We recommend the use of water treatment additives to prolong the life of the boiler and prevent against corrosion and contaminant build ups in the heating system.
- Ensure piping in the heating system has an oxygen barrier.

Observe these instructions for space heating water:

- Thoroughly flush the system prior to filling. Only use untreated potable water to fill and top off the system.
- Do not use water softeners in the system.
- When using oxygen-permeable pipes, e.g. for floor heating systems, you must separate the system using heat exchangers. Unsuitable heating system water promotes the formation of sludge and corrosion. This may damage the heat exchanger or affect its operation.

Tools, materials and additional equipment

For the installation and maintenance of the boiler you will need the standard tools for space heating, gas and water connection.

Disposal:

- Dispose of the boiler packaging in an environmentally sound manner.
- Dispose of components of the heating system (e. g. boiler or control device), that must be replaced, by taking them in to an authorized recycling facility.

⚠ WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

⚠ WARNING: Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other boiler.

⊖ WARNING: Do not obstruct or restrict the vents in the room where the boiler is installed. Adequate ventilation is essential for correct combustion. Failure to comply may result in substantial property damage, severe personal injury or death.

⊖ WARNING: Do not expose the appliance to weather elements. It has been designed for indoor use only.

⊖ CAUTION: Do not switch off the appliance if the outdoor temperature may drop below 32°F (0°C) (freezing hazard).

⊖ CAUTION: Do not activate the boiler without adequate water in the heating system.

⊖ Individuals without specific qualifications and skills shall not remove the boiler's casing.

⊖ Individuals without specific qualifications and skills shall not remove the boiler's casing.

⚠ NOTE:

- Do not install a thermostatic flue gas damper downstream of the draft hood.
- Do not tamper with, remove, or attempt to repair a blocked vent switch.
- When replacing the blocked vent switch, install the new part in the original location.
- A blocked vent switch tripping more than once indicates a problem with the venting system or chimney which must be repaired immediately.
- Ensure none of the vent pipes and chimneys are damaged or blocked.
- Connect only one appliance to each venting system or chimney, unless using an approved cascade vent system listed in the section "Installation of the exhaust and air intake system".
- The venting system must not feed into or route through another exhaust flue.
- The venting system must be inspected annually. All parts that show any signs of damage or corrosion must be replaced.
- Never close off or reduce the size of the combustion air openings.
- The boiler must not be operated until any obstructions have been removed.

⚠ NOTE:

- Work on gas components may only be carried out by a qualified installer, service agency or gas supplier.
- Appliance installation, the connection of gas and vent piping, initial commissioning, electrical connections and service and maintenance must only be carried out qualified installer, service agency or gas supplier.

1.4 Description of the appliance


The Condexa PRO NA it is a condensing, pre-mixed thermal module consisting in a modulating thermal element.

It's available in two models of power: 255.900 BTU/hr (75 kW) and 399.000 BTU/hr (117 kW).

Optimal combustion management supports high thermal efficiencies (Over 95%) and low polluting emissions.

The boiler is designed for sealed chamber operation.

The appliance in standard configuration is for indoor installation to guarantee an IPX4D protection level.

 The **Condexa PRO NA** boilers can be cascaded to reach a maximum power of 2.388.500 BTU/hr (700 KW).

The appliance's key technical features are

- helicoidal heat exchanger with a double coil smooth stainless steel pipe, to guarantee good corrosion resistance and the option of operating with high Δt s (up to 72°F [40°C]), reducing system set-up times;
- maximum exhaust flue exit temperature 212°F [100°C];
- microprocessor management and control with self-diagnostics, shown by means of a display, and logging of main errors;
- Anti-Freeze function;
- pre-settings for room/heat demand thermostat for low and high temperature ranges;
- option to manage a CH circuit and a DHW circuit with storage tank;
- high-efficiency and high residual discharge head circulator;
- climate control function (available only when using the outdoor temperature sensor accessory).

1.5 Safety devices

All appliance functions are electronically controlled by a dual processor technology board.


Any malfunction results in the appliance being shut down and the automatic closure of the gas valve.


The following is installed on the CH water circuit:


- **Safety high-limit thermostat.**
- **Flow sensor** capable of monitoring the main heating circuit's flow on an ongoing basis and of stopping the appliance in the event of insufficient flow.
- **Temperature sensors** on supply and return lines that measure the temperature difference (Δt) between input and output fluid and allow the boiler to fire when a demand is made.
- **Minimum Water Pressure Switch** (set to 7 psi/0.5 bar).
- **Low Water Cut Off.**


The following is installed on the combustion circuit:

- **Gas solenoid** with pneumatic gas flow compensation depending on the suction line's air flow rate.
- **Ignition/detection electrode.**
- **Flue gas temperature sensor.**


 **WARNING:** The triggering of safety devices indicates the malfunction of a potentially hazardous situation. Therefore, contact a service agency immediately. After a brief pause, it is possible to try and restart the appliance (see section "Initial startup").

 **WARNING:** Safety devices must be replaced a qualified installer, service agency or gas supplier, using only original parts. Refer to the spare parts catalogue supplied with the appliance. After making the repair, check that the appliance is working properly.

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

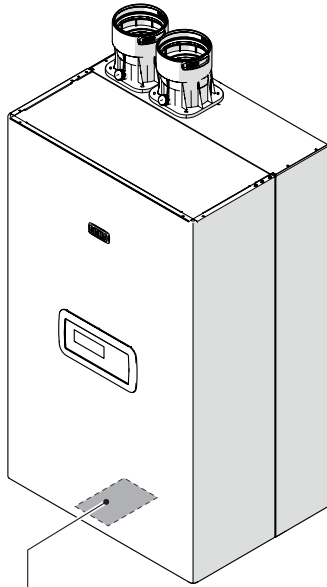
 A low water cutoff may be required by state local code or some insurance companies. Check code requirements before installation of the **Condexa PRO NA** boiler. If required:

- Use a low water cutoff designed for hydronic installations;
- Follow low water cutoff manufacturer's instructions.

 A hot water boiler installed above the radiation level or as required by the Authority having jurisdiction, must be provided with a low water cutoff device either as part of the boiler or at the time of boiler installation.

1.6 Identification

The products are identified by:



DIRECT VENT BOILER FOR EITHER DIRECT VENT INSTALLATION OR FOR INSTALLATION USING INDOOR COMBUSTION AIR

Category	IV	
Model no.	CONDEXA PRO NA 117 P	
Part no.	20142595	
Equipped for Natural gas		
Min. inlet gas pressure	0.87 kPa	3.5 in.W.C.
Max. inlet gas pressure	2.61 kPa	10.5 in.W.C.
Manifold pressure	factory set - not adjustable	
Min. input rate	11.7 kW	39,920 Btu/hr
Max. input rate	117.0 kW	399,204 Btu/hr
Output rate	111.1 kW	379,244 Btu/hr
Min. relief valve capacity	181.1 kg/hr	399.2 lbs/hr
Altitude*	0 - 610 m	0 - 2,000 ft

(*for installations above 2,000 ft, refer to installation manual)

120 V - 60 Hz less than 3 Amperes

Design to ANSI Z21.13-2017
CSA 4.9-2017
Hot Water Boiler

RIELLO

Certified by RIELLO S.p.a.
Via Nazionale 56/A
65010 Villanova di Cepagatti (PE) Italy

CRN no. W8206.2CL

Made in Italy



Serial number:

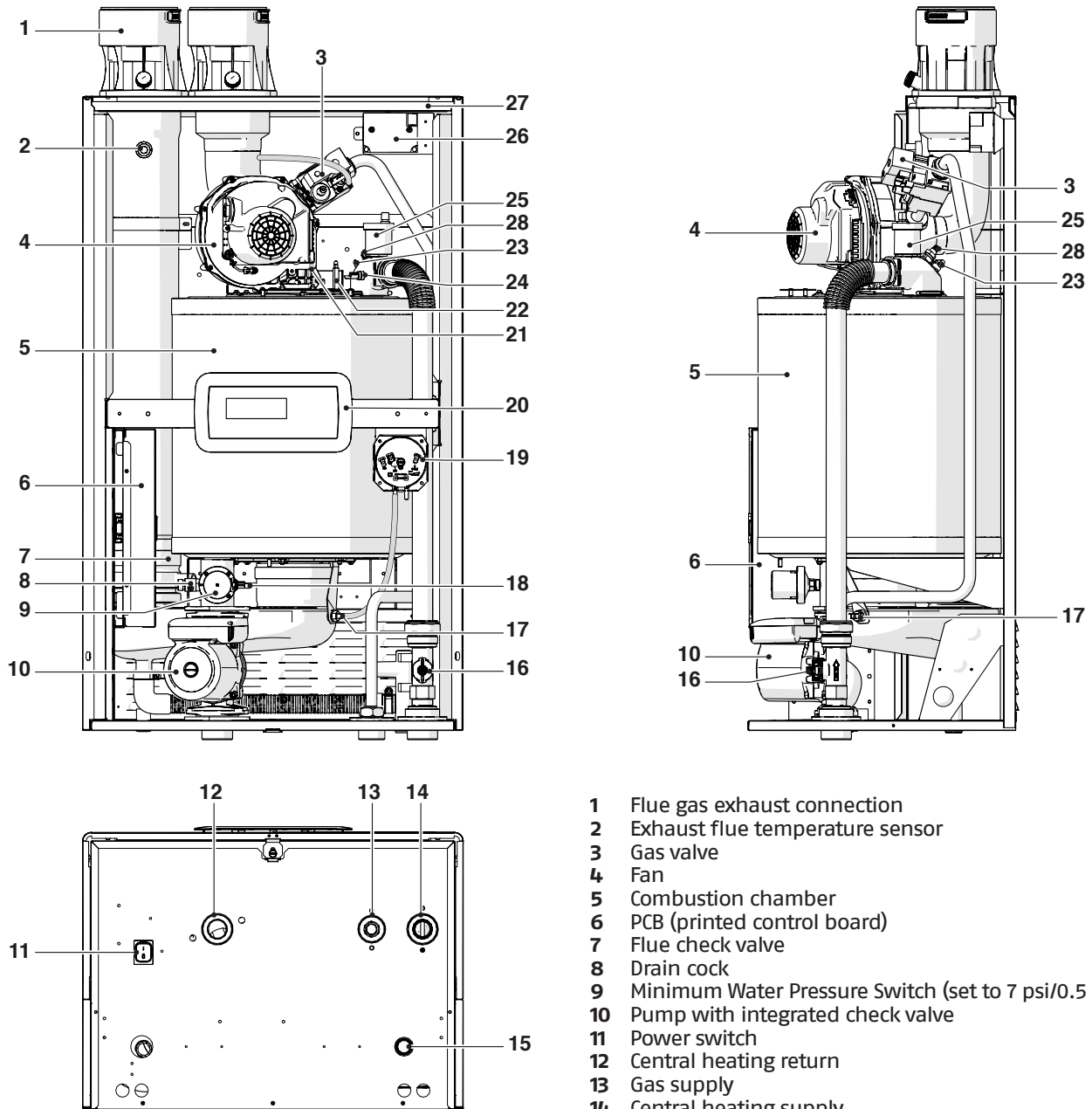
Data plate

This lists the technical specifications and performance of the product. This is supplied inside the document bag and **MUST BE APPLIED** to the boiler by the installer on completion of installation. If you damage or lose this label, order a replacement immediately from your local **RIELLO** boiler representative.

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

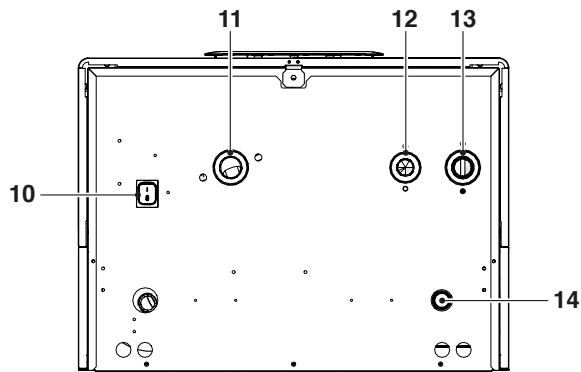
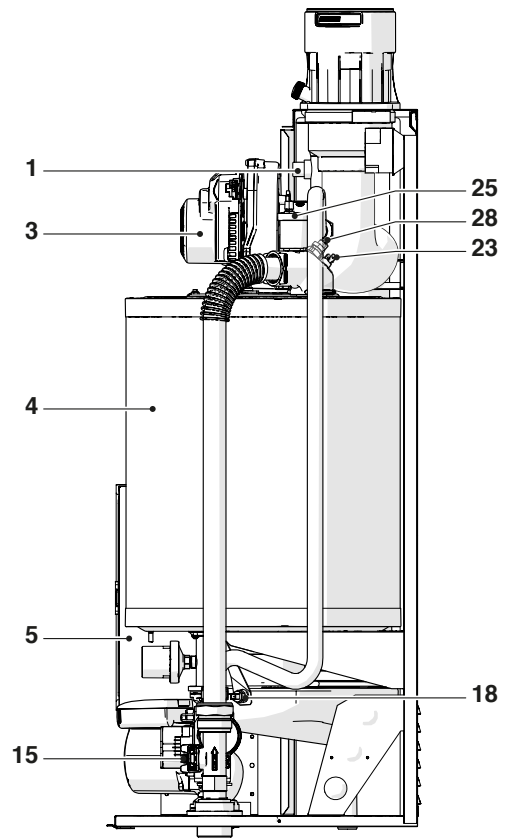
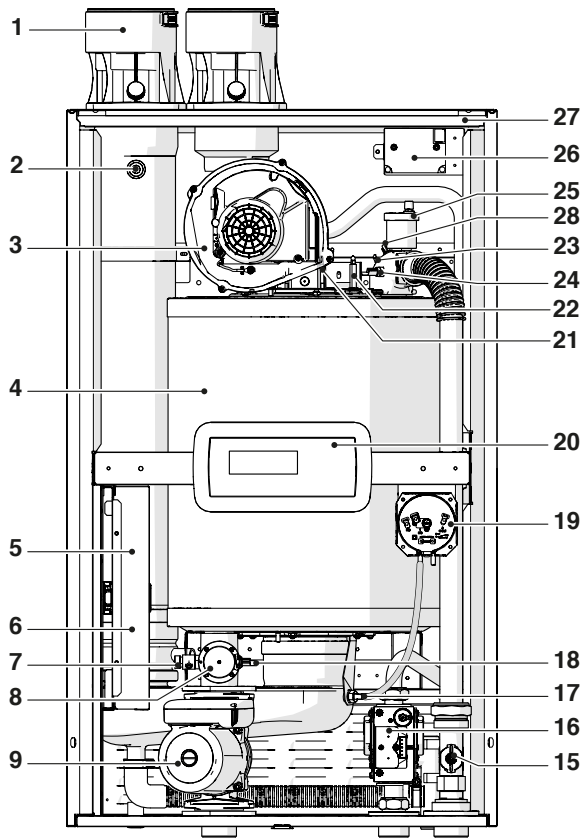
1.7 System layout

Condexa PRO NA 75 P



- 1 Flue gas exhaust connection
- 2 Exhaust flue temperature sensor
- 3 Gas valve
- 4 Fan
- 5 Combustion chamber
- 6 PCB (printed control board)
- 7 Flue check valve
- 8 Drain cock
- 9 Minimum Water Pressure Switch (set to 7 psi/0.5 bar)
- 10 Pump with integrated check valve
- 11 Power switch
- 12 Central heating return
- 13 Gas supply
- 14 Central heating supply
- 15 Condensate drain connection
- 16 Flow-meter
- 17 Intake pressure for flue gas pressure switch
- 18 Return temperature sensor
- 19 Flue gas pressure switch
- 20 Control panel
- 21 Detection electrode
- 22 Ignition electrode
- 23 Safety Water High-limit Thermostat with manual reset by PCB
- 24 Supply temperature sensor
- 25 Automatic air vent
- 26 Spark generator
- 27 Casing
- 28 LWCO - Low Water Cut Off

Condexa PRO NA 117 P



- 1 Flue gas exhaust connection
- 2 Exhaust flue temperature sensor
- 3 Fan
- 4 Combustion chamber
- 5 PCB (printed control board)
- 6 Flue check valve
- 7 Drain cock
- 8 Minimum Water Pressure Switch (set to 7 psi/0.5 bar)
- 9 Pump with integrated check valve
- 10 Power switch
- 11 Central heating return
- 12 Gas supply
- 13 Central heating supply
- 14 Condensate drain connection
- 15 Flow-meter
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- 22 Ignition electrode
- 23 Safety Water High-limit Thermostat with manual reset by PCB
- 24 Supply temperature sensor
- 25 Automatic air vent
- 26 Spark generator
- 27 Casing
- 28 LWCO - Low Water Cut Off

1.8 Technical specifications

Description	Unit	Condexa PRO NA 75 P	Condexa PRO NA 117 P
Boiler category		ASME Section IV	ASME Section IV
Type of Gas		Natural Gas, Propane*	
Max input rate	BTU/hr (kW)	255.900 (75)	399.204 (117)
Min input rate	BTU/hr (kW)	25.590 (7.5)	39.920 (11.7)
Turndown	Rate	10:1	
Gas Connections (NPT)	Ø Inch	1" 1/4	
Max. Natural Gas Pressure	Inch W.C.	10.5	10.5
	(mbar)	(26)	(26)
Min. Natural Gas Pressure	Inch W.C.	3.5	3.5
	(mbar)	(8.7)	(8.7)
Max. LPG Pressure	Inch W.C.	13	13
	(mbar)	(32)	(32)
Min. LPG Pressure	Inch W.C.	8.0	8.0
	(mbar)	(20)	(20)
Water Connections (NPT)	Ø Inch	1" 1/2	
Max. Allowable Working Pressure (MAWP)	PSI	80	
	(bar)	(5.5)	
Water Volume	Gallon	4	4.5
	(liter)	(15.2)	(17.0)
Water flow at max power (ΔT 36°F / 20°C)	GPM	13.2	19.8
	(m ³ /h)	(3)	(4.5)
Water flow at max power (ΔT 45°F / 25°C)	GPM	10.1	15.9
	(m ³ /h)	(2.3)	(3.6)
Vent/Air Intake Connections	Ø Inch	4	4
	(Ø mm)	(110)	(110)
Vent Materials		PP	
Max operating temperature	°F	194	194
	(°C)	(90)	(90)
Max HE allowable temperature	°F	210	210
	(°C)	(98.9)	(98.9)
Ambient storage temperature dry	°F	(5 to 150)	
	(°C)	(-15 to 65)	
Ambient functioning temperature	°F	(32 to 120)	
	(°C)	(0 to 49)	
Surface heat exchanger per module	SQFT	22	27
	(m ²)	(2)	(2.5)
Standard Listings & Approvals		CSA, ASME, AHRI	
Electrical Req. 120VAC/1Ph-N/60Hz		2.62 FLA **	3.81 FLA **
Weight (dry)	lbs	183	190
	(kg)	(83)	(86)
Dimension WxHxD	Inch	26 5/8" x 39 3/8" x 17 1/8"	
	(mm)	(600x1000x435)	

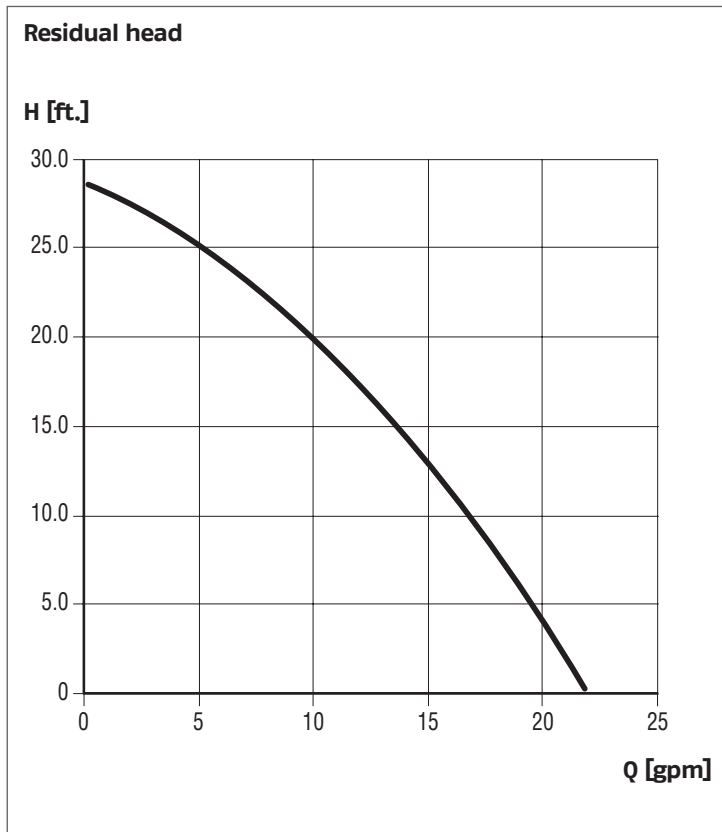
(*) with conversion accessory

(**) FLA (Full Load Amperage) – maximum current drawn by the boiler if all pumps reach rated horsepower

AHRI certified ratings	Unit	Condexa PRO NA 75 P	Condexa PRO NA 117 P
Input	MBH	255.9	399.2
Heating Capacity	MBH	243.1	379.2
AFUE	%	95	95
Combustion Efficiency	%	95	95
CO2	%	10.2 - 10.8	9.4 - 9.6

1.9 Pumps

The Condexa PRO NA 75 P and Condexa PRO NA 117 P are equipped with a built-in circulator with integrated check valve.

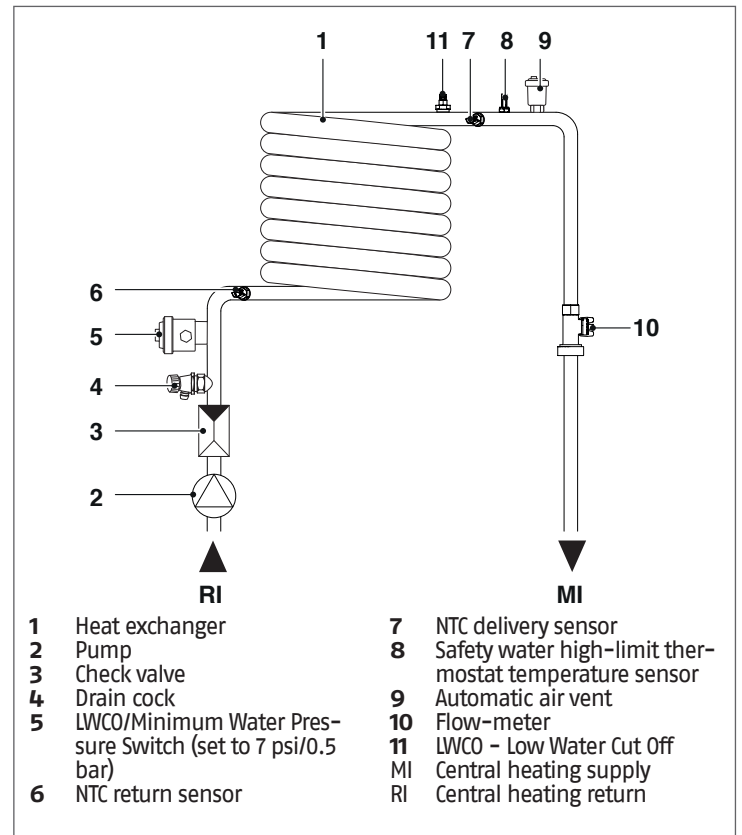


⚠ CAUTION: During the first start-up, and at least once a year, the rotation of the circulator shaft should be checked as, especially after long periods of not being operated, deposits and/or residuals could impede its free rotation.

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

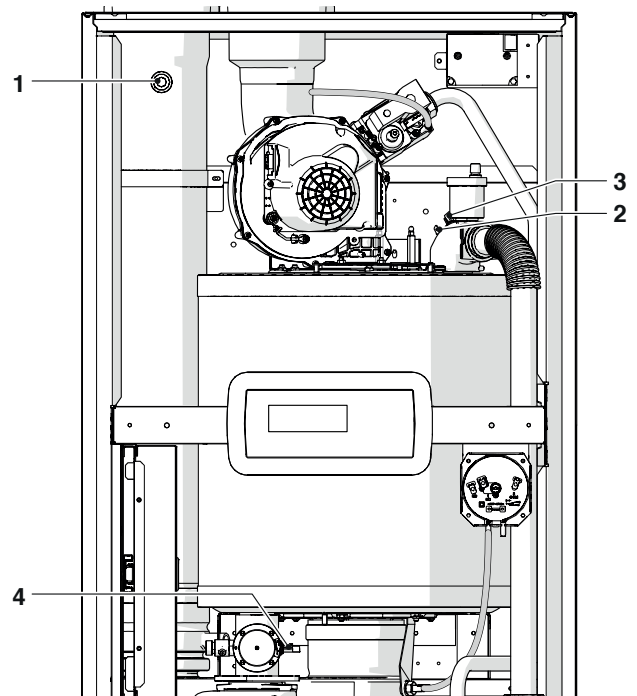
⊖ CAUTION: It is prohibited to operate the circulators without water.

1.10 Water circuit



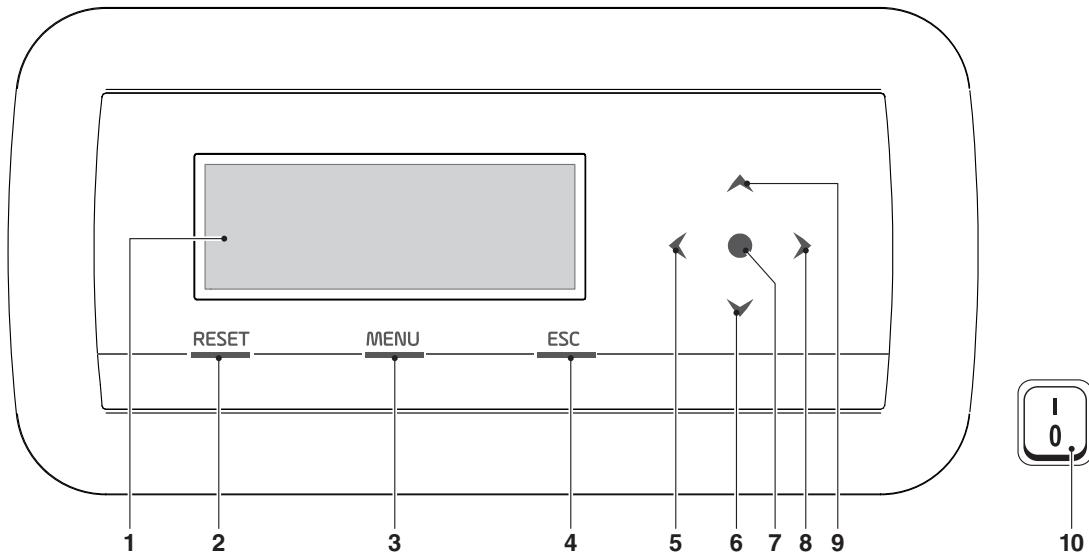
1.11 Positioning of the temperature sensors

- 1 Exhaust flue temperature sensor
- 2 Safety water high-limit thermostat temperature sensor
- 3 CH supply temperature sensor
- 4 Return temperature sensor



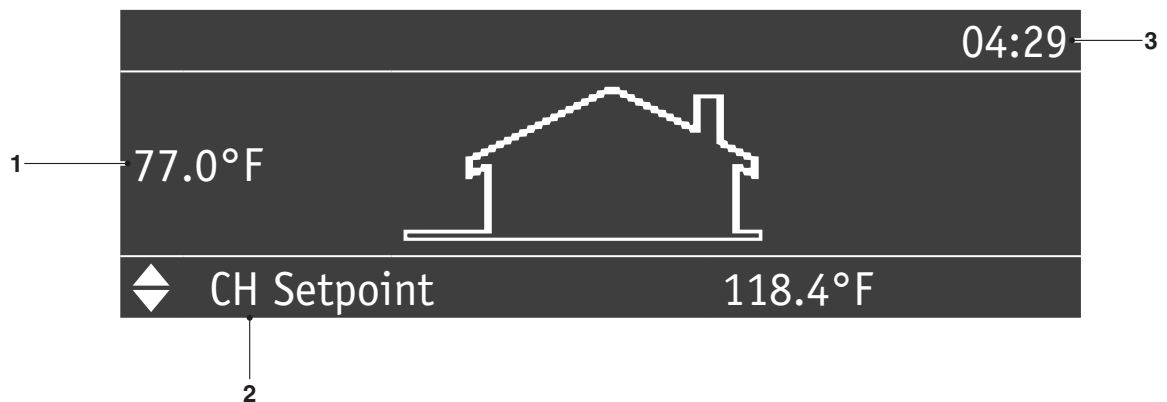
1.12 Control panel

CONTROL PANEL AND SYMBOLS



- 1 Backlit display (4 13/16" x 1 1/2" / 255mm x 80mm)
- 2 RESET key: restores normal operations after a safety lock-out
- 3 MENU key: switches on the main menu
- 4 ESC key: in menu navigation, it enables you to exit a menu item and go back to the previous one
- 5 - 9 Navigation keys ◀, ▼, ●, ▶, ▲
- 10 Power switch (located on the bottom left of the appliance)

SECONDARY INFORMATION/DISPLAY VISUALISATION



- 1 Outdoor temperature
- 2 Set-point
- 3 Clock

1.13 Regulations and guidelines

⚠ NOTE: Observe all rules, regulations, standards and guidelines applicable to the installation and operation of this appliance in your country.

⚠ NOTE: Valves external to the boiler must be fitted with T-handles and condensate piping must be installed in accordance with the local plumbing code.

1.13.1 Compliance with standards and regulations

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the latest edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or Natural Gas and Propane Installation Code, CAN/CSA B149.1. This condensing gas boiler complies in its design and mode of operation with the American National Standard ANSI Z21.13/CSA 4.9, latest edition for Gas Fired Low Pressure Steam and Hot Water Boilers.

Other confirmed approvals and certifications are indicated by labels on the boiler.

Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Install CO detectors per local regulations. The use of a carbon monoxide detector in conjunction with the **RIELLO** heating products is required. When installing a carbon monoxide detector, the manufacturer's instructions of the carbon monoxide detector must be followed in their entirety. It is recommended to use a carbon monoxide detector in compliance with a nationally recognized standard such as ANSI/UL 2034-2002 in the United States and CSA 6.19-01 in Canada. Boiler requires yearly maintenance (see section "Maintenance")

1.13.2 Operating limits of the boiler

The heat exchanger has been designed and certified in accordance with the ASME Boiler and Pressure Vessel Code, Section IV.

The hot water distribution system must comply with all applicable codes and regulations. When replacing an existing boiler, it is important to check the condition of the entire hot water heating distribution system to ensure safe operation. Common practice calls for inspecting an existing system in its entirety and bringing it up to code. All pipework should be properly cleaned and flushed.

1.13.3 Additional regulations for installations in the Commonwealth of Massachusetts

a) For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

INSTALLATION OF CARBON MONOXIDE DETECTORS: At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

- In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
- In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

APPROVED CARBON MONOXIDE DETECTORS: Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

SIGNAGE: A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment.

The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

INSPECTION: The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspections, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CRM 5.08(2)(a) 1 through 4.

b) EXEMPTIONS: The following equipment is exempt from 248 CRM 5.08(2)(a) 1 through 4:

- The equipment listed in Section 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the board;
- Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

c) MANUFACTURERS REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM REQUIRED: When the manufacturer of Product Approved side wall horizontally mounted gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for the installation of the equipment and venting shall include:

- Detailed instructions for the installation of the venting system or the venting system components;
- A complete parts list for the venting system design or venting system.

d) MANUFACTURERS REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED: When the manufacturer of Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for the venting of flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

- The referenced "special venting systems" shall be included with the appliance or equipment installation instructions;
- The "special venting systems" shall be Product Approved by the Board and the instructions for that system shall include a parts list and detailed installation instructions.

e) A copy of all instructions for all Product Approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions and/or venting design instructions shall remain with the appliance or equipment at the completion of the installation.

2 INSTALLATION

2.1 Unpacking the product

The **Condexa PRO NA** is shipped palletized, packaged and with cardboard protection.

The following material is supplied in a plastic envelope inside the package (1):

- Instruction manual

The following material is supplied in a cardboard box inside the package (2):

- Wall-mount bracket with plugs (no.4 plugs s=0.40" suitable for concrete, brick, compact stone and concrete hollow brick walls)
- Relief valve
- Condensate drain accessory

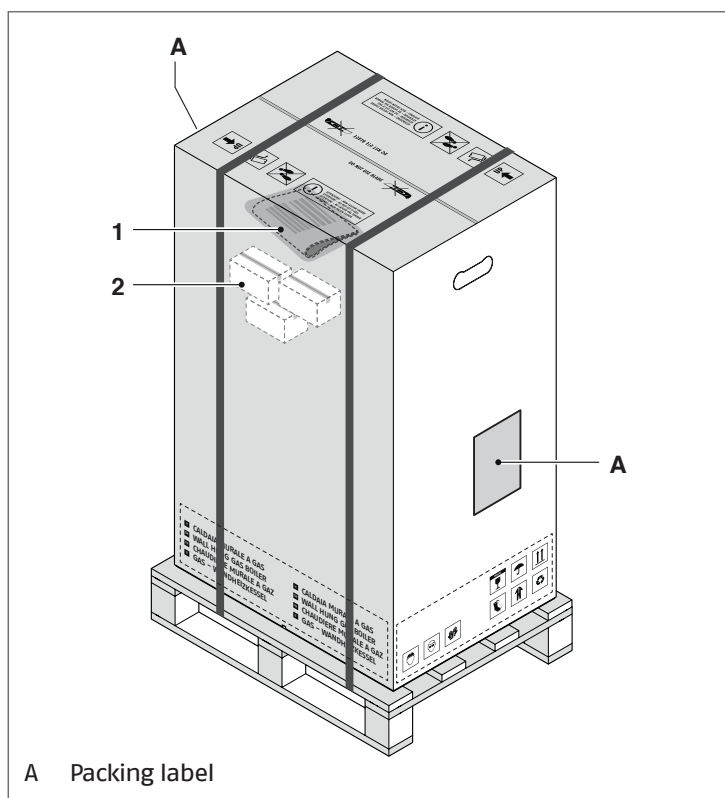
NOTE: The packaging shows the characteristics of the product: model, power, fuel type and version. In case of deviation from the order, contact your local dealer.

After removing the packaging check the condition and completeness of delivery.

WARNING: Keep the packing material out of reach of children as it may be dangerous.

Dispose of packaging in an environmentally responsible manner. **In order to ensure proper product identification do not remove or tamper with any product identification tags or labels.**

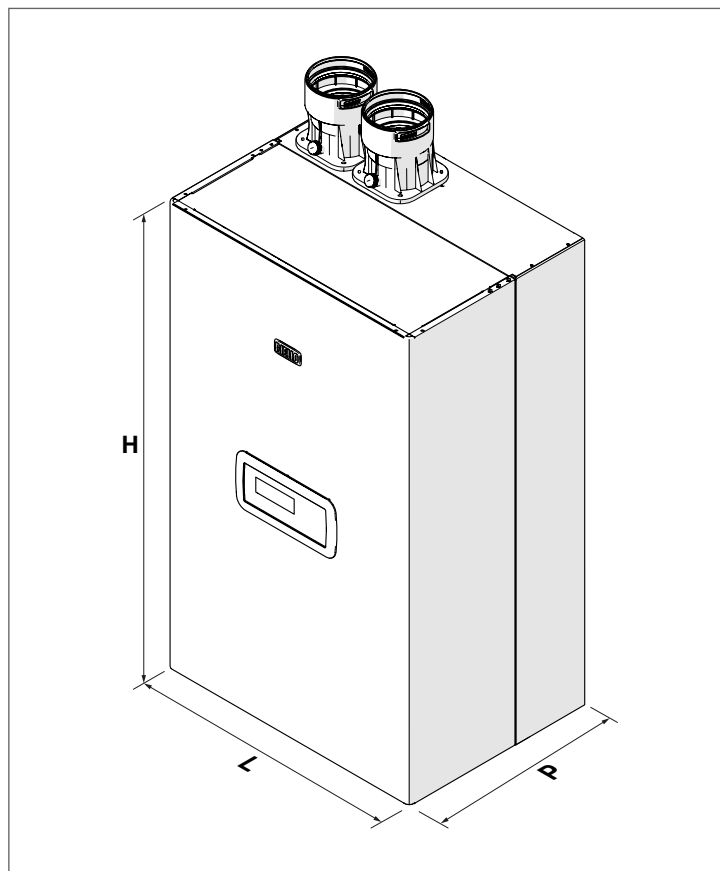
2.1.1 Positioning of labels



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

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

2.2 Overall dimensions and weights



Description	Condexa PRO NA 75 P	Condexa PRO NA 117 P
L	23 5/8" (600mm)	23 5/8" (600mm)
P	17 1/8" (415mm)	17 1/8" (415mm)
H	39 3/8" (1000mm)	39 3/8" (1000mm)
Net weight	183 lbs (83 kg)	190 lbs (86 kg)

2.3 Installation premises

The **Condexa PRO NA** can be installed in rooms that are permanently ventilated and equipped with suitably sized ventilation openings in line with Technical Standards and Regulations applicable to the installation site.

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

⚠ WARNING: Check that the electric protection level of the appliance is suitable for features of the room where it is installed.

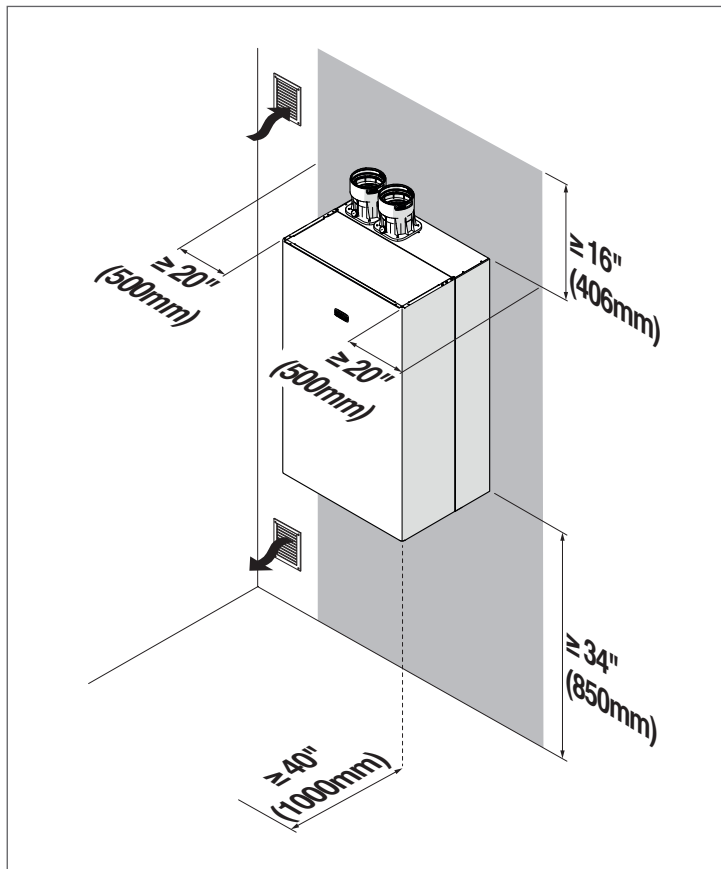
⚠ WARNING: Make sure that combustion air is not contaminated by substances containing chlorine or fluorine (elements found in sprays, paints, detergents etc.).

⊖ WARNING: Do not obstruct or restrict the air vents in the room where the boiler is installed. A free air supply is essential for correct combustion.

⊖ WARNING: It is forbidden to leave flammable containers and substances in the room where the boiler is installed.

2.3.1 Installation clearances

Recommended minimum clearances for installation and servicing (dimensions in inches [mm]).



The minimum surface of ventilation openings is 3.2ft² (0.3m²) for gas fuel heating systems.

2.4 Installation in older systems and systems requiring modifications

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

- Make sure that the flue is able to withstand the temperature of the combustion gases and that it has been designed and made in compliance with applicable standards. The flue must also be as straight as possible, sealed, insulated and not blocked or choked. See section "Combustion gas exhaust" for any additional information.
- Make sure that the electrical supply system has been installed by a qualified electrician in compliance with applicable standards
- Make sure that the fuel feed line and any storage tank are made and installed in compliance with applicable standards
- Make sure that expansion tank(s) are big enough to contain the additional volume generated by thermal expansion
- Make sure that the flow rate, head and direction of flow of the pumps are suitable and correct
- The system has been washed, cleaned of mud and grime and water seals have been checked
- A treatment system is fitted when the supply/refill water has values other than those indicated in section "Water Chemistry Guidelines"

⚠ NOTE: The manufacturer declines all responsibility for damage caused by incorrectly constructed flue systems.

2.5 Moving and removing the packaging

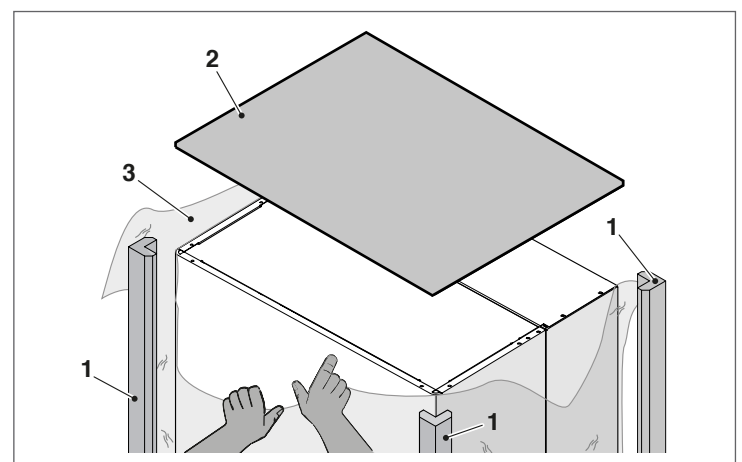
⚠ NOTE: Do not remove the cardboard packaging until you reach the installation location.

⚠ Before handling the appliance and removing the packaging, wear personal protective equipment (PPE) and use tools suitable for the appliance's size and weight.

⚠ This step must be carried out by several individuals equipped with suitable means with respect to the appliance's size. Make sure that the load is not unbalanced during handling.

Proceed as follows to remove the packing:

- Remove the strapping that secures the cardboard packaging to the pallet
- Remove the cardboard
- Remove edge protectors (1)
- Remove the Styrofoam protection (2)
- Remove the protective bag (3)

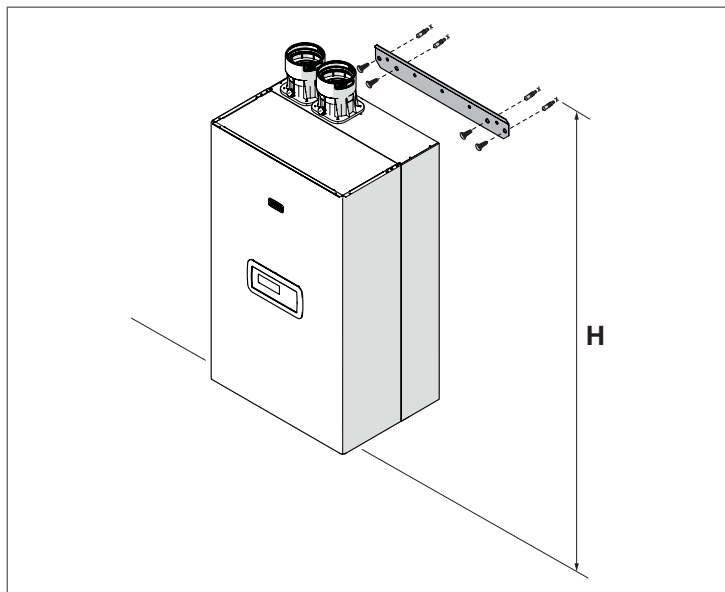


2.6 Boiler assembly

The **Condexa PRO NA** boilers are supplied complete with a wall-mounting bracket.

⚠ CAUTION: Check that the wall on which the appliance is to be fitted is sufficiently solid and supports safe screw fixing points.

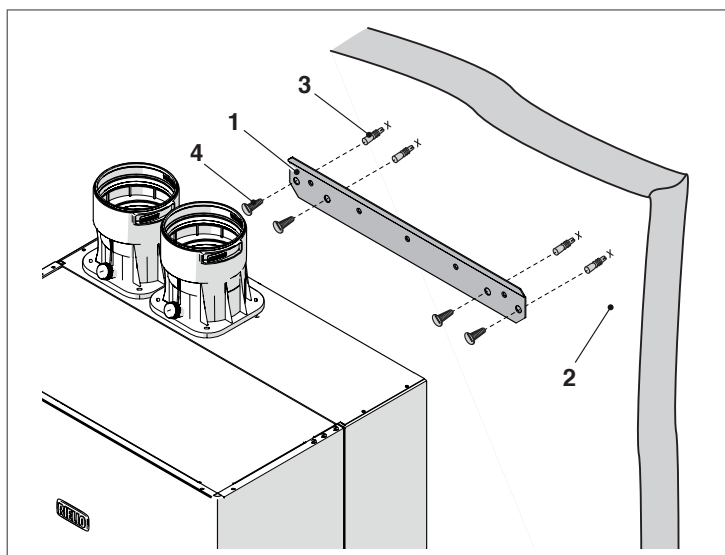
⚠ NOTE: The appliance's height must be selected so as to facilitate dismantling it and maintaining it.



Model	Height (H) ft
Condexa PRO NA 75 P	6<H<6.5
Condexa PRO NA 117 P	6<H<6.5

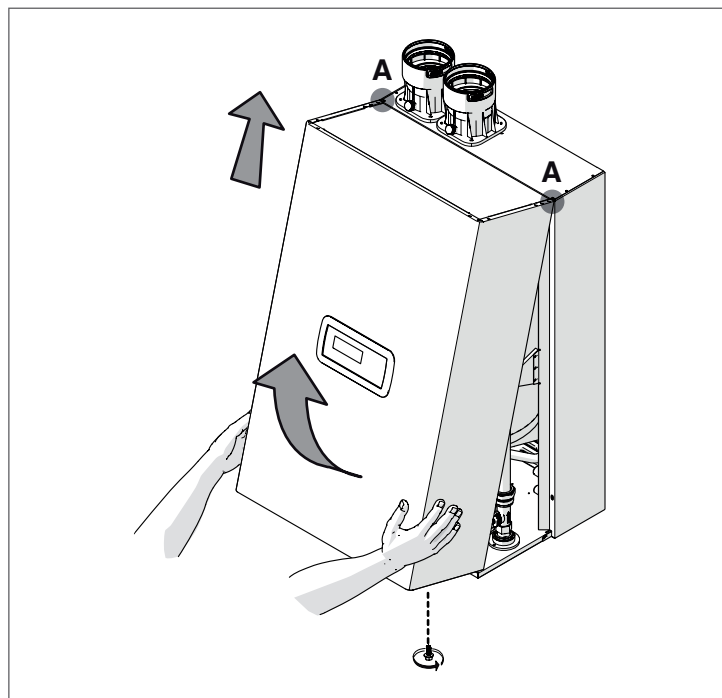
For installation:

- Position the bracket (1) onto the wall (2), at the point where you wish to install the appliance
- Ensure that the bracket is level and mark the points where the holes for fixing plugs must be drilled
- Drill the holes and insert expansion plugs
- Note: Drill bit size should be 3/8" (10mm) for expansion plugs (3).
- Fix the bracket to the wall using the screws (4)
- Secure the appliance to the bracket

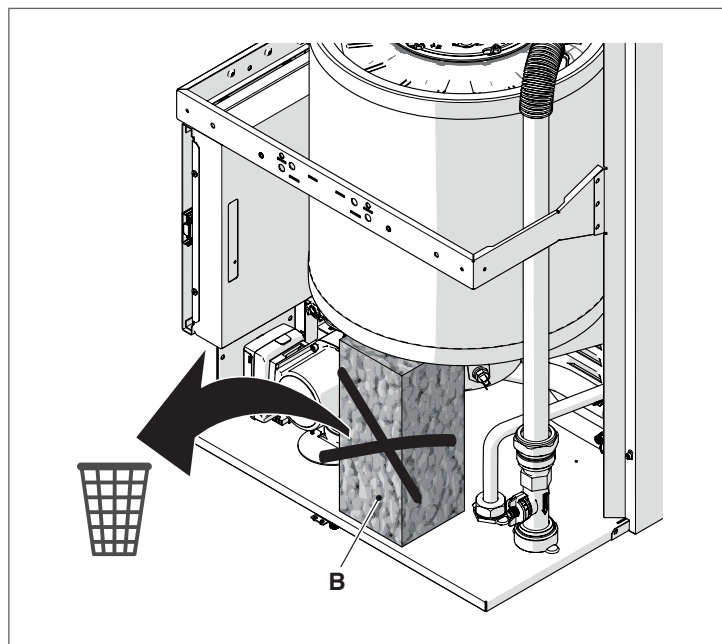


After installing the boiler:

- remove the locking screw at the bottom of the boiler.
- pull the front panel outwards and then to the top to remove it from points A.



- remove the polystyrene block (B) under heat exchanger.

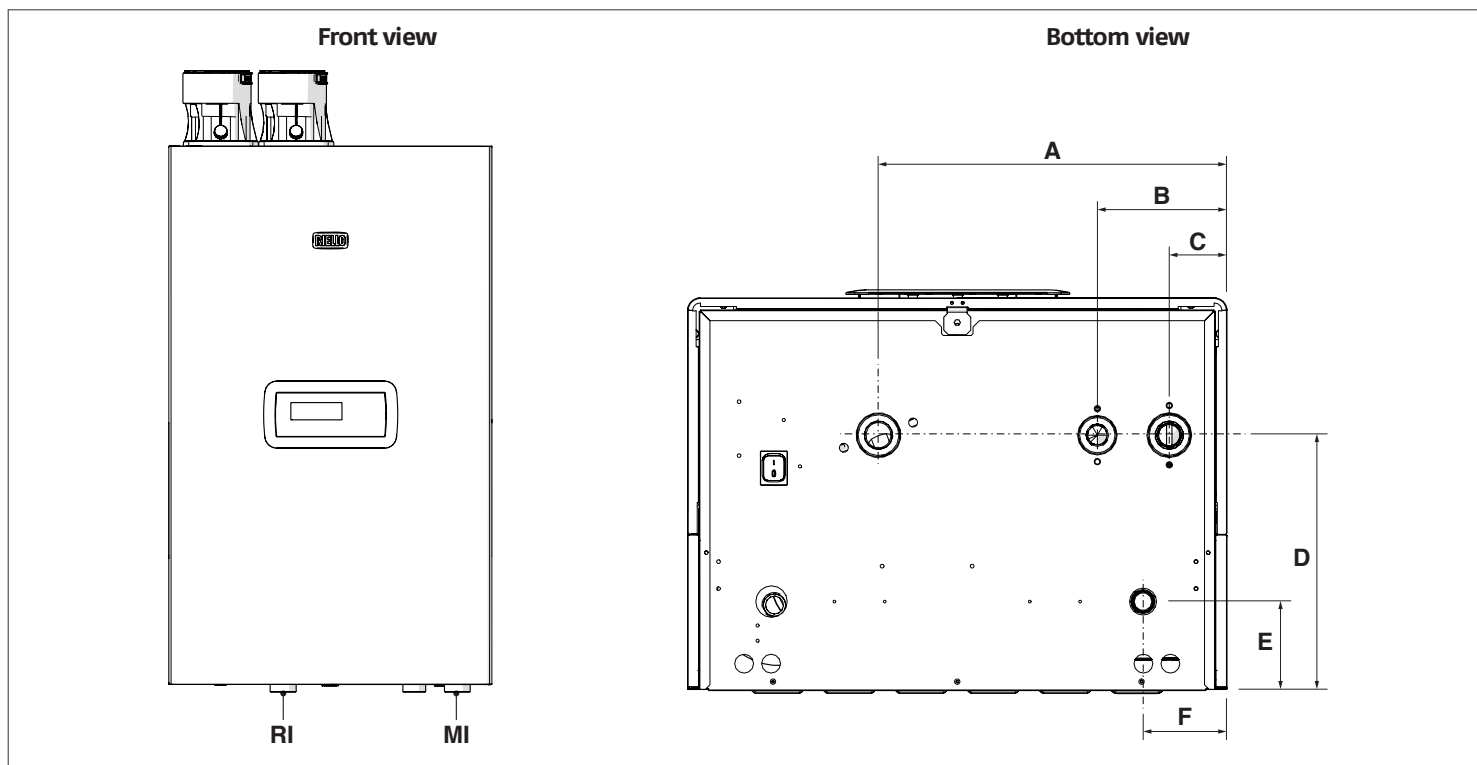


Close the panelling in reverse order to the one described above.

⚠ NOTE: Before proceeding with the hydraulic connections the protection plugs must be removed from the supply, return and condensate drain piping.

2.7 Water connections

The dimensions and position of boiler's hydraulic connections are shown in the table below.



DESCRIPTION	Condexa PRO NA 75 P	Condexa PRO NA 117 P	
A	15 3/16" (386mm)	15 3/16" (386mm)	
B	5 5/8" (142mm)	5 5/8" (142mm)	
C	2 1/2" (64mm)	2 1/2" (64mm)	
D	11 1/8" (282mm)	11 1/8" (282mm)	
E	3 15/16" (99mm)	3 15/16" (99mm)	
F	3 5/8" (91mm)	3 5/8" (91mm)	
MI (system supply)	NPT 1" 1/2 M	NPT 1" 1/2 M	Ø / inch
RI (system return)	NPT 1" 1/2 M	NPT 1" 1/2 M	Ø / inch
SC (condensate drain)	1"	1"	Ø / inch
G (gas inlet)	NPT 1" 1/4 M	NPT 1" 1/4 M	Ø / inch

⚠ NOTE: Before connecting the boiler the protection plugs must be removed from the supply, return and condensate drain pipes.

⚠ CAUTION: Before connecting the boiler, it is necessary to clean the system. This step is required when the appliance replaces another one on pre-existing systems.

In order to carry out this cleaning activity, if the old boiler is still installed on the system, it is advisable to:

- add a de-scaling additive.
- Operate the system with the boiler on for around 7 days.
- Discharge the dirty system water and flush the system one or more times with clean water.

If the system is very dirty, repeat the last procedure one more time. If the old boiler is not present or available, use a pump to circulate the water + additive through the system for about 10 days and perform a final washing as described in the previous paragraph. Once the cleaning has been completed, it is recommended to add a suitable protective fluid to the system's water before installing the boiler.

In order to clean the heat exchanger's built-in water system, please contact your local **RIELLO** boiler distributor for further assistance.

⊖ CAUTION: Do not use incompatible liquid detergents, including acids (for instance, chloridric acid and similar) in any concentration.

⊖ CAUTION: Do not subject the heat exchanger to cyclical pressure changes because fatigue stress is very dangerous for the integrity of system components.

The boiler, when used in connection with a refrigeration system, must be installed so the chilled medium is piped in parallel with the boiler with appropriate valves to prevent the chilled medium from entering the boiler.

The boiler piping system of a hot water boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

2.8 ASME pressure relief valve

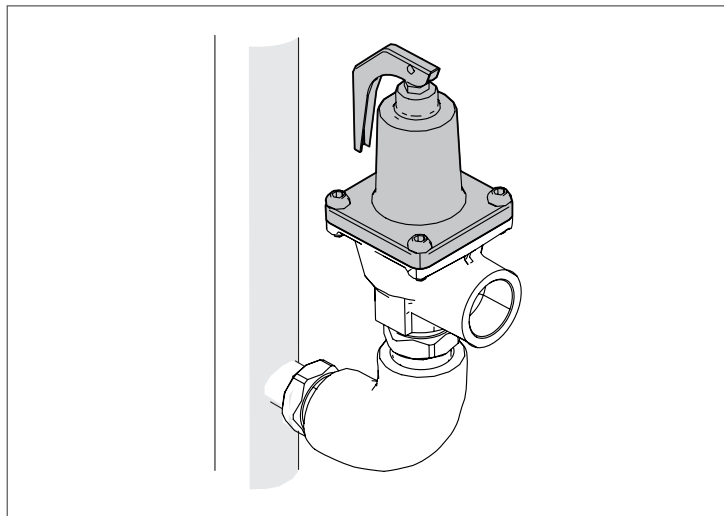
The **Condexa PRO NA** has a pressure relief valve supplied with the boiler.

Connect the valve hydraulically on the heating supply connection and in vertical position.

This device is designed for emergency safety relief and shall not be used as an operating control.

⚠ WARNING To avoid water damage or scalding due to relief valve operation:

- The discharge line must be connected to relief valve outlet and run to a safe place of disposal. Terminate the discharge line in a manner that will prevent possibility of severe burns or property damage.
- The discharge line must be as short as possible and be the same size as the valve discharge connection throughout its entire length.
- The discharge line must pitch downward from the valve and terminate at least 6" (152 mm) above the floor drain where any discharge will be clearly visible.
- The discharge line shall terminate through plain (unthreaded) pipe. The discharge line material must conform to local plumbing code or A.S.M.E. requirements.
- No shutoff valve shall be installed between the relief valve and the boiler, or in the discharge line.
- Do not pipe the discharge to any place where freezing could occur.
- Do not plug or place any obstruction in the discharge line.
- Test the operation of the valve after filling and pressurizing system by lifting the lever. Make sure the valve discharges freely. If the valve fails to operate correctly, replace it with a new relief valve.
- For boilers installed with only a pressure relief valve, the indirect tank (if used) must have a temperature and pressure relief valve installed. This relief valve shall comply with the standard for Relief Valves for Hot Water Supply Systems, ANSI Z21.22/CSA4.4.
- Failure to comply with the above guidelines could result in the failure of the relief valve to operate, resulting in the possibility of severe personal injury, death or substantial property damage.
- For safe operation of the appliance, the relief valve must not be removed or plugged.



Maintenance of the relief valve

⚠ CAUTION : The valve lever must be operated at least once a year by qualified personnel during annual maintenance to insure that water-ways are clear.

Certain natural occurring mineral deposits may adhere to the valve, rendering it inoperative.

When manually operating the lever, water will discharge and precautions must be taken to avoid contact with hot water to avoid water damage.

Before operating the lever, check to see that a discharge line is connected to this valve directing the flow of hot water from the valve to drain otherwise personal injury may result. If no water flows, the valve is inoperative. Call a qualified plumber immediately.

Pressure relief valve should be inspected at least once every three years by a licensed plumbing contractor or authorized inspection agency, to insure that the product has not been affected by corrosive water conditions and to insure that the valve and discharge line have not been altered or tampered with illegally.

Certain naturally occurring conditions may corrode the valve or its components over time, rendering the valve inoperative.

Such conditions are not detectable unless the valve and its components are physically removed and inspected.

Do not attempt to conduct this inspection on your own. Contact your plumbing contractor for a reinspection to assure continuing safety.

⚠ WARNING : Failure to reinspect this valve as directed could result in unsafe pressure buildup which can result in serious injury or death and/or severe property damage.

2.9 Low Water Cut Off

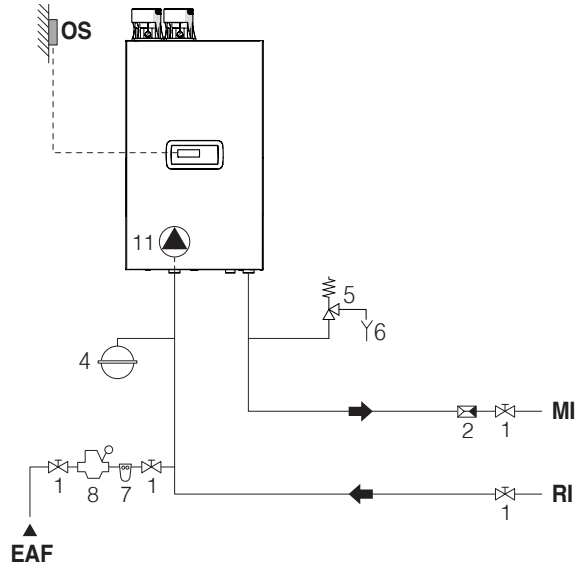
A Low Water Cut Off (LWCO) is installed in the boiler. To reset the Low Water Cut Off error press reset button on the removable display. To check the functionality of Water Cut Off access the System test and select Managing.

If required:

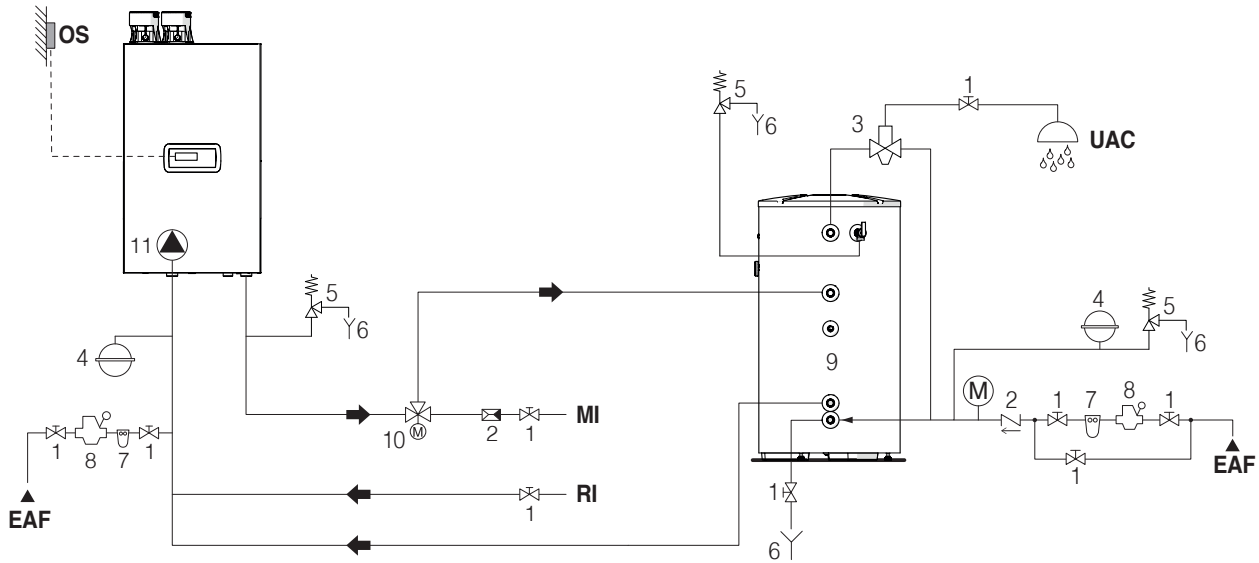
- Test state, then set as on LWCO2.
- At this point press the reset button on the removable display to restart the module. The error will turn off.

2.10 Typical water system schematics

Layout 1: circuit with boiler directly linked to heating system (check that the pump's discharge head is sufficient to ensure adequate circulation)



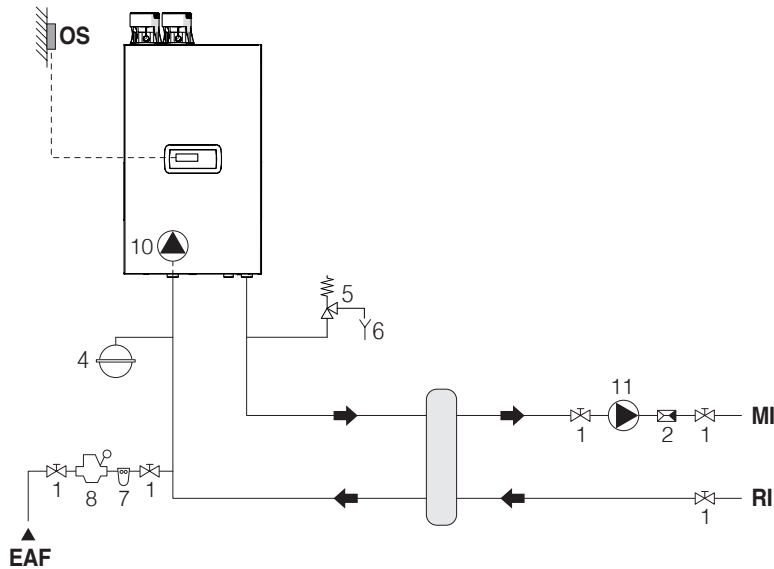
Layout 2: circuit with boiler directly linked to heating system and indirect DHW tank. (check that the pump's discharge head is sufficient to ensure adequate circulation)



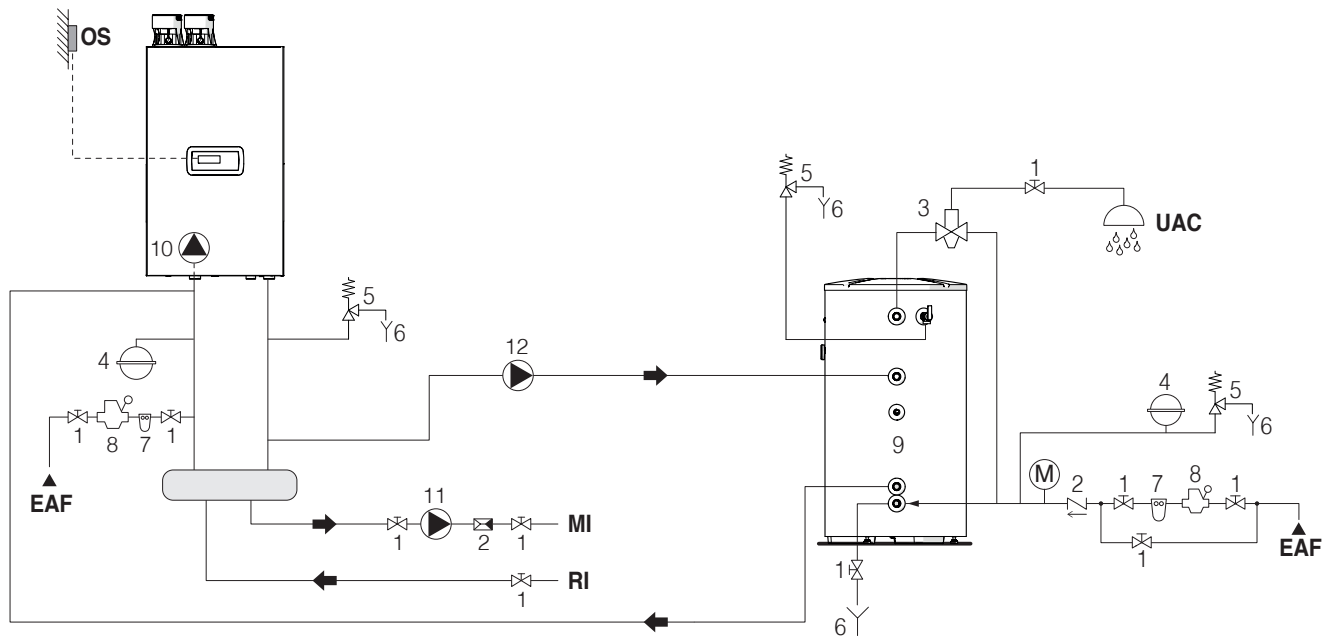
- | | | |
|---------------------------|-------------------------------|-----------------------------------|
| 1 Isolating valve | 7 Water softener filter | OS Outdoor temperature sensor |
| 2 Check valve | 8 Pressure reducer | MI High temperature system supply |
| 3 Anti-scald mixing valve | 9 Domestic water storage tank | RI High temperature system return |
| 4 Expansion tank | 10 Diverter valve | EAF Domestic cold water inlet |
| 5 Pressure relief valve | 11 Pump | UAC Domestic hot water outlet |
| 6 Drain | | |

- ⚠ WARNING:** Domestic hot water and central heating circuits must be completed with expansion tanks of adequate capacity and suitability, correctly-sized pressure relief valves. The discharge of pressure relief valves and appliances must be connected to a suitable collection and disposal system.
- ⚠ CAUTION:** The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- ⚠ CAUTION:** Special supply/refill water must be conditioned using suitable treatment systems.
- ⚠ WARNING:** It is prohibited to operate the boiler without water.

Layout 3: circuit with boiler connected to a heating system via a separator



Layout 4: circuit with boiler linked to Indirect DHW tank and heating system via a separator



- | | | |
|---------------------------|---------------------------------------|-----------------------------------|
| 1 Isolating valve | 7 Water softener filter | OS Outdoor temperature sensor |
| 2 Check valve | 8 Pressure reducer | MI High temperature system supply |
| 3 Anti-scald mixing valve | 9 Domestic water storage tank | RI High temperature system return |
| 4 Expansion tank | 10 Pump | EAF Domestic cold water inlet |
| 5 Pressure relief valve | 11 High-temperature system circulator | UAC Domestic hot water outlet |
| 6 Drain | 12 Indirect tank circulator | |

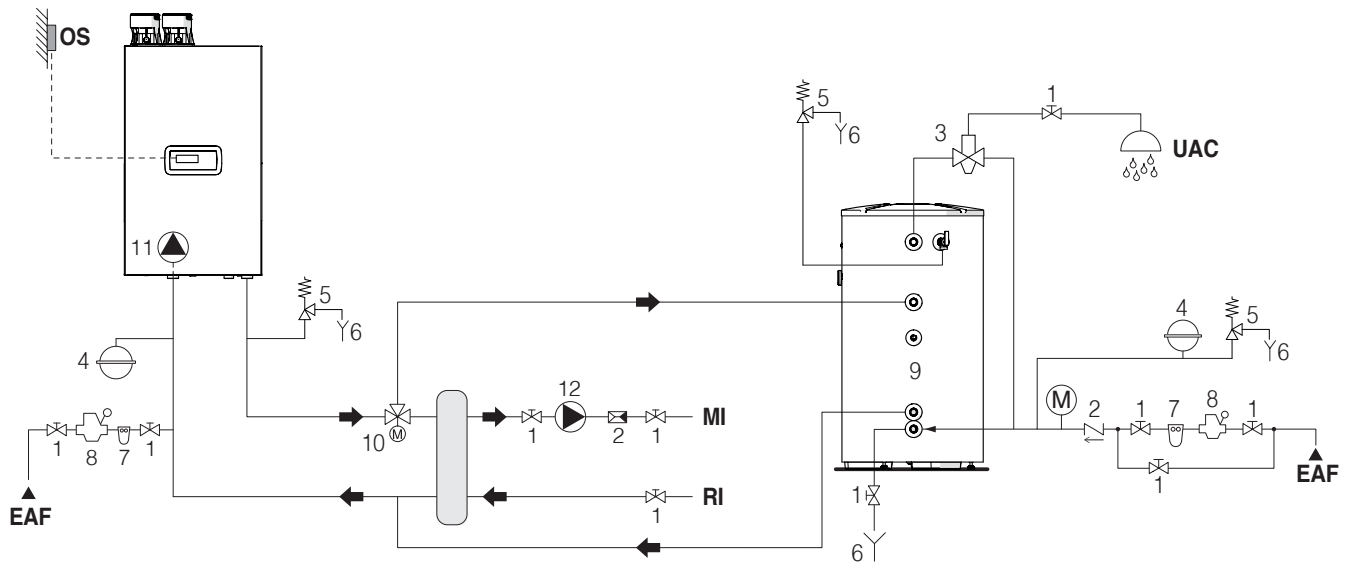
⚠ WARNING: Domestic hot water and central heating circuits must be completed with expansion tanks of adequate capacity and suitability, correctly-sized pressure relief valves. The discharge of pressure relief valves and appliances must be connected to a suitable collection and disposal system.

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

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

⊖ WARNING: It is prohibited to operate the boiler without water.

Layout 5: circuit with boiler linked to heating system and indirect DHW. tank via a separator



- | | | |
|---------------------------|---------------------------------------|-----------------------------------|
| 1 Isolating valve | 7 Water softener filter | OS Outdoor temperature sensor |
| 2 Check valve | 8 Pressure reducer | MI High temperature system supply |
| 3 Anti-scald mixing valve | 9 Domestic water storage tank | RI High temperature system return |
| 4 Expansion tank | 10 Diverter valve | EAF Domestic cold water inlet |
| 5 Pressure relief valve | 11 Pump | UAC Domestic hot water outlet |
| 6 Drain | 12 High-temperature system circulator | |

- ⚠ WARNING:** Domestic hot water and central heating circuits must be completed with expansion tanks of adequate capacity and suitability, correctly-sized pressure relief valves. The discharge of pressure relief valves and appliances must be connected to a suitable collection and disposal system.
- ⚠ CAUTION:** The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in conformity to all applicable legislation.
- ⚠ CAUTION:** Special supply/refill water must be conditioned using suitable treatment systems.
- ⊘ WARNING:** It is prohibited to operate the boiler without water.

2.11 Gas connections

Installation of the boiler and gas connection must comply with all applicable codes and regulations imposed by the national, Federal or local authorities and bodies. If no specific requirements are defined, in the USA, the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54 must be complied with. In Canada, installation must be in accordance with the requirements of CAN/CSA B149.1, Natural Gas and Propane Installation Code. Ensure the gas line is sized adequately to deliver gas to the burner. Before making the connection, check that:

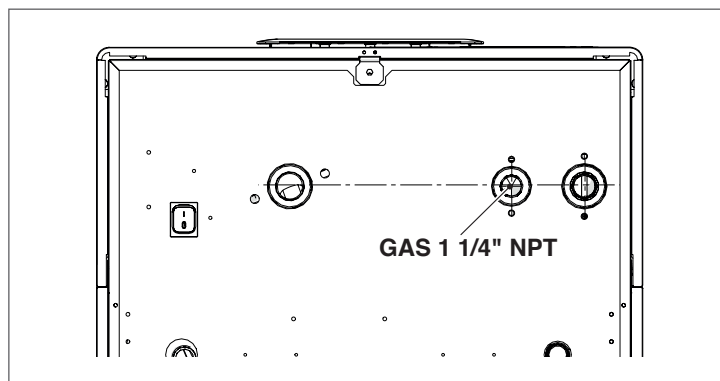
- ⚠ The gas type is suitable for the appliance
- ⚠ If the appliance needs to be adapted for use with another gas fuel, refer to section "Converting gas type". For further information please contact your local Riello distributor.
- ⚠ Ensure the piping is thoroughly clean
- ⚠ The gas meter's flow rate is capable of ensuring the simultaneous use of all the appliances connected to it. The appliance's connection to the gas supply line must be carried out in accordance with the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54, in the USA, and CAN/CSA B149.1, Natural Gas and Propane Installation Code, in Canada as well as local regulations.
- ⚠ Intake pressure with the appliance in the off position has the following reference values:
 - Natural Gas: optimal pressure 7" w.c.
 - Liquid Propane Gas (LPG): optimal pressure 11" w.c.
- ⚠ The minimum and maximum pressure for natural gas are 3.5" W.C. (8.72 mbar) and 10.5" W.C. (26.15 mbar) respectively.
- ⚠ The minimum and maximum pressure for LP gas are 8" W.C. (19.9 mbar) and 13" W.C. (32.3 mbar) respectively.
- ⊖ **WARNING:** Do not use any fuels with this product other than the fuel it is intended to be used with, either Natural Gas or LPG.
- ⚠ Ensure the gas lines are vented, bled in accordance to ANSI Z223.1/NFPA 54, National Fuel Gas Code and/or CAN/CSA B149.1, Natural Gas and Propane Installation Code.

While it is normal for the inlet pressure to decrease while the appliance is in operation, it is advisable to verify that no excessive pressure fluctuations take place. In order to limit the extent of these types of variations, the diameter of the gas supply line to be used must be assessed based on the length and the pressure drops of the line itself, from the meter to the boiler.

- ⚠ **WARNING:** If fluctuations in the gas distribution pressure are encountered, it is recommended to install an appropriate pressure regulator upstream of the appliance's gas inlet. For LPG gas supply, all the necessary precautions must be taken in order to prevent the gas from freezing in the case of extremely low outdoor temperatures.

If the gas distribution network contains solid particles, install a filter on the fuel supply line. When selecting it, consider that pressure drops due to the filter should be as low as possible.

- ⊖ **CAUTION:** The boiler and its individual shut off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).
- ⚠ A sediment trap must be provided upstream of the gas controls.
- ⚠ A gas shutoff cock shall be located upstream of the boiler on the gas supply line.
- ⚠ On completion of the installation, check that all joints are sealed.



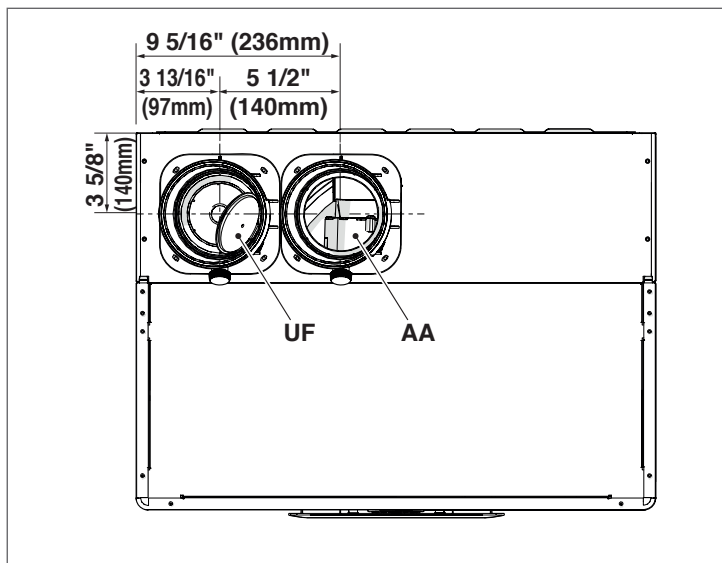
DESCRIPTION	Condexa PRO NA 75 P	Condexa PRO NA 117 P	
Gas inlet	1 1/4" NPT	1 1/4" NPT	∅

2.12 Combustion gas exhaust

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

- ⚠ **WARNING:** Do not connect this appliance's flue gas exhaust pipes with those of other appliances, unless this is specifically authorized by the manufacturer. Failure to comply with this precaution may cause a build-up of carbon monoxide in the room where the appliance is installed causing substantial property damage, server personal injury or death.
- ⚠ **NOTE:** For further information on flue gas exhaust pipes for the **Condexa PRO NA** series connected in a cascaded system, see section "Multiple boiler cascade system".
- ⚠ **WARNING:** Ensure that Intake combustion air is not contaminated by:
 - waxes/chlorinated detergents
 - chemical products based on swimming pool chlorine
 - calcium chloride
 - sodium chloride used to soften tap water
 - refrigerant leaks
 - paint or varnish removers
 - chloridric acid/muriatic acid
 - cements and glues
 - anti-static softeners used in dryers
 - chloride used for domestic or industrial applications as detergent, whitener or solvent
 - adhesives used to glue construction and other similar products.

- ⚠** To prevent contamination of the boiler, do not install combustion air intake and gas flue exhaust pipes near:
- dry-cleaners/laundry rooms and factories
 - swimming pools
 - metal processing plants
 - beauty parlours
 - fridge repair shops
 - photo-processing facilities
 - body-shops
 - plastics manufacturing plants
 - furniture workshops and manufacturing plants.



DESCRIPTION	Condexa PRO NA 75 P	Condexa PRO NA 117 P	
FO (flue gas outlet)	4" (102mm)		∅
AS (combustion air intake)	4" (102mm)		∅

- ⚠** **WARNING:** Read the requirements, instructions and prohibitions detailed below carefully, since non-compliance with them may result in substantial property damage, severe personal injury, death, or the appliance's malfunction.
- ⚠** **WARNING:** Check that pipes and joints are not damaged.
- ⚠** **WARNING:** Joint seals must be executed with materials that withstand the condensate's acidity and the temperatures of the appliance's flue gases. They must be approved joint methods as stated by the vent manufacturer's installation instructions for this type of condensing product. Failure to comply may result in substantial property damage, severe personal injury or death.
- ⚠** **WARNING:** When installing flue pipes, always bear in mind the direction of the flue gases and of possible condensate flows.
- ⚠** **WARNING:** Inadequate or incorrectly sized flue gas pipes may increase combustion noise, create condensate extraction issues and negatively impact on combustion parameters.
- ⚠** **WARNING:** Check that pipes are suitably far (min. 20") from flammable liquids.

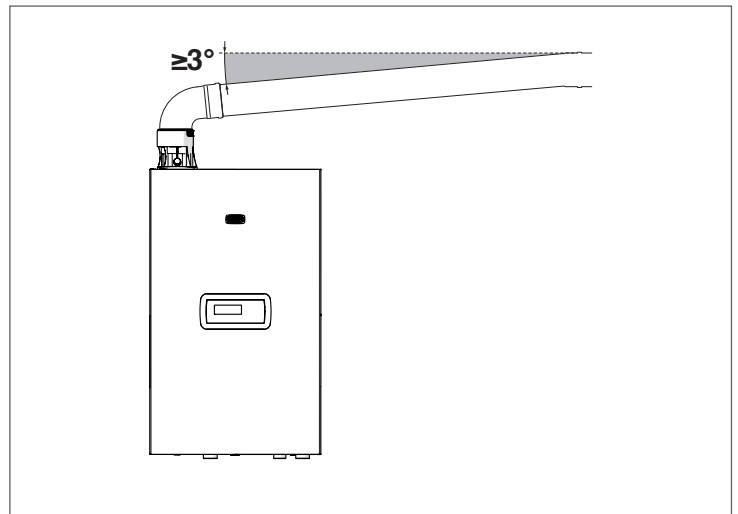
⚠ **CAUTION:** Make sure that condensation is not built up along the exhaust flue pipe. For this purpose, provide a slope of at least 3 degrees towards the appliance in horizontal sections. In case of cascade application, if the horizontal or vertical section is longer than 13ft (10m) in a cascade vent application, a condensate siphon drain must be provided at the base of the pipe. The height of the siphon must be at least equal to the value "H" (see figure below). The siphon discharge must then lead to a drain with an air gap between drain and the condensate trap. (See section "Preparation for the condensate drain")

⊘ **WARNING:** It is prohibited to block or section the flue gas exhaust pipe or the combustion air intake pipe, if any.

⊘ **WARNING:** It is prohibited to use condensate pipes that are not designed for this application, as the condensates acidity would damage them quickly.

The table with available residual discharge heads is shown below.

Description	Discharge head	
	Max	Min
Condexa PRO NA 75 P	0.41 in.w.c (103 Pa)	0.06 in.w.c (15 Pa)
Condexa PRO NA 117 P	0.74 in.w.c (184 Pa)	0.08 in.w.c (20 Pa)



To change direction, use a T section with an inspection cap to permit easy access for cleaning inside the pipe. After cleaning, always make sure that inspection caps are replaced tightly and that their seals are undamaged and efficient.

2.13 Venting and air piping system

⚠ WARNING: Do not connect this gas appliance with any other appliance unless approved by the manufacturer. Failure to comply with this WARNING could result in the accumulation of carbon monoxide gas which can cause severe personal injury or death.

⚠ DANGER: The condensate discharge must be filled with water or combustion gases will enter the room with a risk of an excessive level of carbon monoxide which can cause severe personal injury or death.

Make sure that the combustion air is not contaminated by:

- Permanent wave solutions;
- Chlorinated waxes/cleaners;
- Chlorine-based swimming pool chemicals;
- Calcium chloride;
- Sodium chloride used for water softening;
- Refrigerant leaks;
- Paint or varnish removers;
- Hydrochloric acid/muriatic acid;
- Cements and glues;
- Antistatic fabric softeners used in clothes dryers;
- Chlorine-type bleaches, detergents, and cleaning solvents found in household laundry rooms;
- Adhesives used to fasten building products and other similar products.

To prevent contamination do not connect the combustion air inlet and exhaust near:

- Dry cleaning/laundry areas and establishments;
- Swimming pools;
- Metal fabrication plants;
- Beauty shops;
- Refrigeration repair shops;
- Photo processing plants;
- Auto body shops;
- Plastic manufacturing plants;
- Furniture refinishing areas and establishments;
- Remodeling areas;
- Garages with workshops.

2.13.1 General venting and combustion air piping system

The Condexa PRO NA boilers require an approved vent system—designed for positive pressure.

Vent connectors serving appliances vented by natural draft shall not be connected to any portion of mechanical draft systems operating under positive pressure.

Ensure that the flue pipes and seals are not damaged.

Use only primer and glue compounds approved for use with the vent material used.

⚠ WARNING: Never install a barometric or a thermally controlled vent damper with this boiler.

Do not route the flue system piping through or inside another duct that is used for exhausting air or other flue gases.

⚠ WARNING: The condensate trap must be primed at all times. Failure to do so may allow combustion gases to escape into boiler room, which may result in substantial property damage, severe personal injury or death.

The unit is to be used for either direct vent installation or for installation using room air for combustion. When room air is used, it is necessary to provide an adequate opening for the fresh air intake.

The vent/air methods in this manual must be followed in their entirety.

Be sure to locate the unit such that the vent and combustion air piping can be routed through the building and properly terminated.

The boiler/vent installation shall be in accordance with "Venting of Equipment," of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or "Venting Systems and Air Supply for Appliances," of the Natural Gas and Propane Installation Code, CAN/CSA B149.1, or applicable provisions of the local building codes.

⚠ WARNING: All vent pipes must be installed in accordance with the boiler manufacturer's installation instructions as well as the vent manufacturer's instructions, failure to comply may result in severe injury or death.

The exhaust vent and the combustion air inlet lines must be supported to prevent sagging per the vent manufacturer's instructions.

Do not mix components from different systems. The vent system could fail, causing leakage of flue products into the living space. Use only approved materials.

Use of cellular core PVC (ASTM F891), cellular core CPVC or Radel® (polyphenolsulfone) in venting systems shall be prohibited.

⚠ WARNING: Improper venting due to failure to comply with the warnings above can result in excessive levels of carbon monoxide, which may result in substantial property damage, severe personal injury or death.

The exhaust pipe must be pitched a minimum of a 1/4 inch per foot back to the boiler, or 2 cm for every 1 m (to allow drainage of condensate).

The vent system shall be installed so as to prevent the accumulation of condensate.

Consult local and state codes pertaining to special building code and fire department requirements. Adhere to national code requirements.

Observe the listed maximum lengths of vent system, which are boiler model dependent.

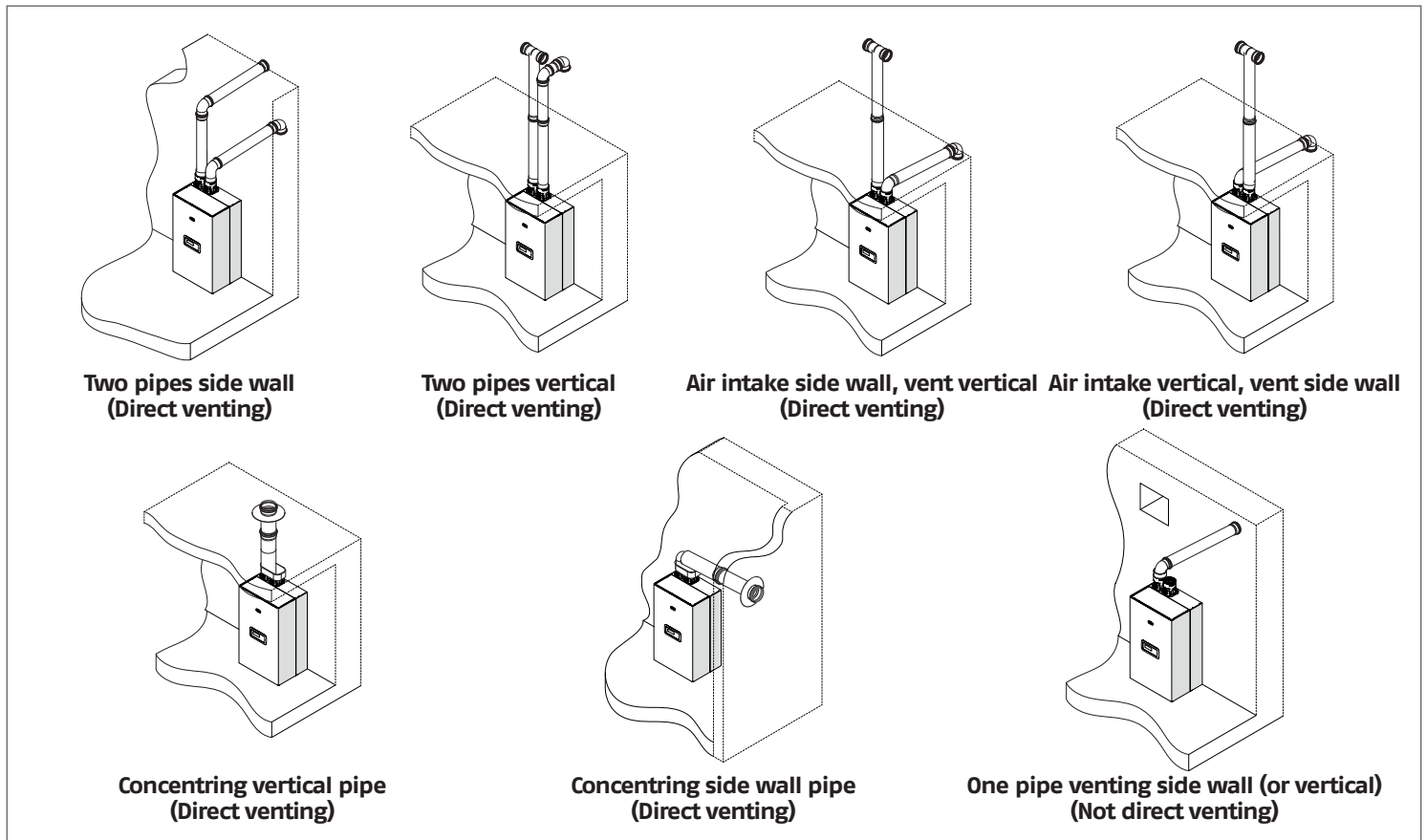
To avoid moisture and frost build-up and to maintain clearances to openings on adjacent structures, 45 ° and 90 ° elbows or tees may be attached to the end of the vent termination pipe to direct exhaust plumes away from the adjacent structure. The total allowable vent length, maximum number of elbows and distance to air intake restrictions must be adhered to.

Due to the high efficiency of the unit it may discharge what looks like white smoke especially when the outside air temperature is cold. This is due to the presence of water vapor, normally present in the exhaust gases.

Provisions for combustion and ventilation air in accordance with the section "Air for Combustion and Ventilation," of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or Clause 8.2, 8.3 or 8.4 of Natural Gas and Propane Installation Code, CAN/CSA B149.1, or applicable provisions of the local building codes.

⚠ WARNING: Covering non-metallic vent pipe and fittings with thermal insulation shall be prohibited.

The following figure shows the acceptable piping installation for venting and combustion air.



When removing an existing boiler from an existing common vent system

Do not install the **Condexa PRO NA** boiler into a common vent with any other appliance. This will cause flue gas spillage or appliance malfunction, resulting in possible severe personal injury, death or substantial property damage.

⚠ WARNING: Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances remaining connected to it.

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

- 1 Seal any unused openings in the common venting system.
- 2 Visually inspect the venting system for proper size and horizontal pitch and to determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.

- 3 Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building, so long as it is practical to do so. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
- 4 Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so the appliance will operate continuously.
- 5 Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.
- 6 After it has been determined that each boiler remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning boiler to their previous condition of use.
- 7 Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 – latest edition. Correct by resizing to approach the minimum size as determined using the appropriate tables in ANSI Z223.1/NFPA 54 of that code. Canadian installations must comply with CAN/CSA B149.1 Installation Code.

⚠ WARNING: Verify proper operation after servicing.

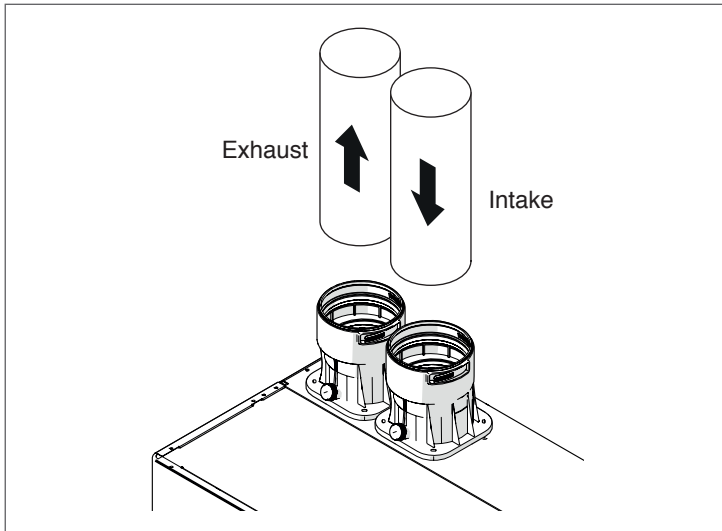
2.13.2 Connecting flue gas systems

Optional vent systems are:

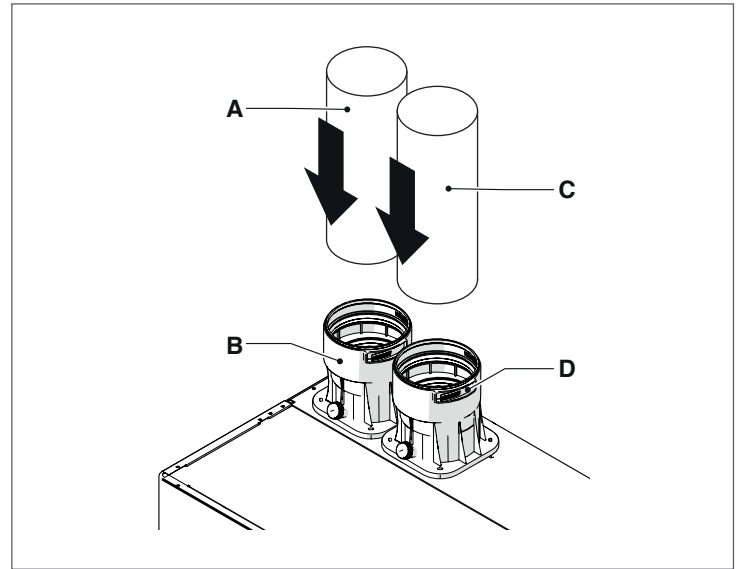
- Twin pipe, concentric pipe and 1 pipe using room air, approved cascade system;
- Approved materials Stainless Steel, PP and PP-Flex (M&G Duravent PolyPro and Centrotherm InnoFlue, Z-Flex, Z-Dens, CPVC);
- Sealed combustion or room air intake;
- Terminations can be either horizontal or vertical;
- The diameters of the flue outlet and combustion air intake inlet are designed to fit standard PP, CPVC and stainless steel pipes. The following table gives the diameter of the flue adapter on the boiler.

	Condexa PRO NA 75 P	Condexa PRO NA 75 P
Diameters	4" - 100mm	4" - 100mm

The correct flow direction into two pipes is shown in the following figure:



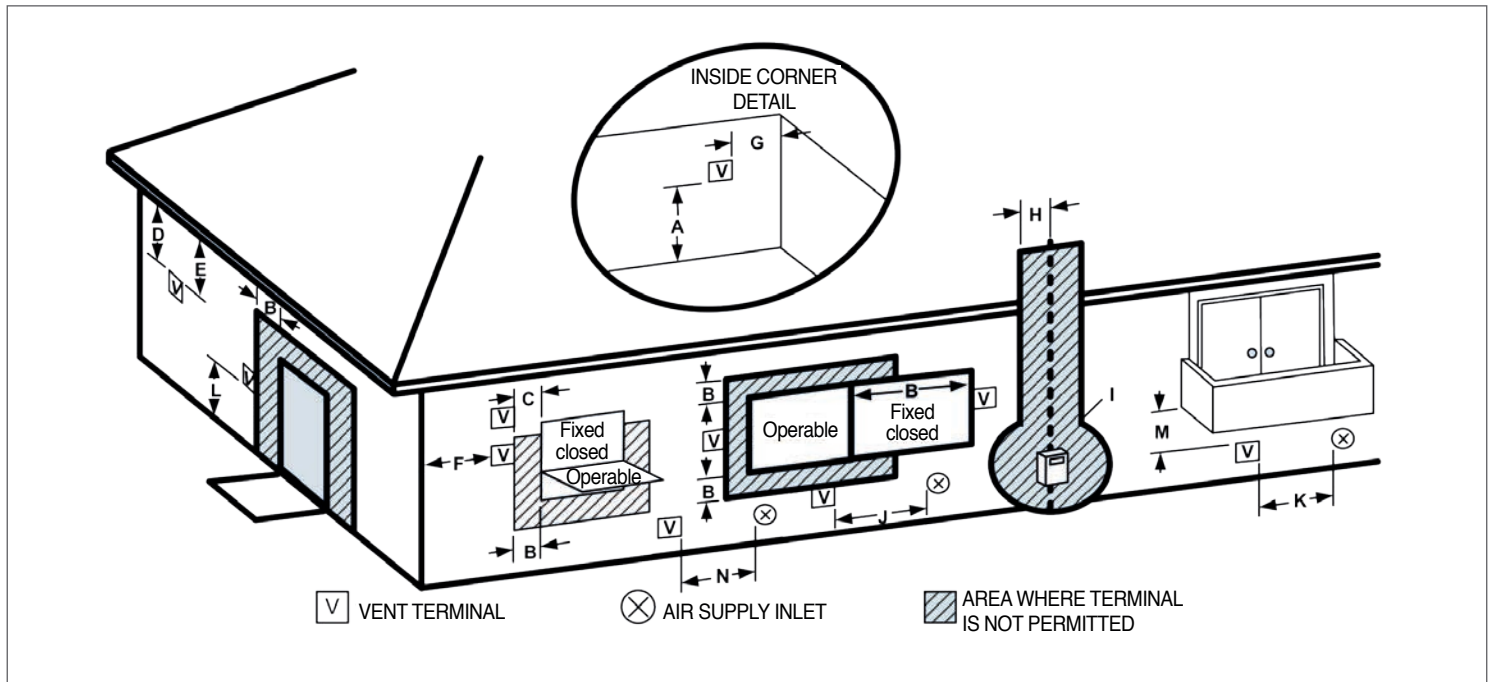
Insert the exhaust pipe and the air intake pipe as shown in the following figure:



- 1 Insert the flue exhaust pipe "A" completely into the adapter;
- 2 Tighten the clamp "B" present in the flue exhaust adapter;
- 3 Insert the air intake pipe "C" completely into the adapter;
- 4 Tighten the clamp "D" present in the air intake adapter.

2.13.3 Installation of the exhaust and air intake system

⚠ NOTE: Do not extend exposed vent pipe outside the building beyond recommended distance of 39" or 1 meter. Condensate could freeze and block vent pipe.



Vent Termination Minimum Clearances		US Insatallations (2)	Canadian Installations (1)
A	Clearance above grade, veranda, porch, deck, or balcony	12" (305mm)	12" (305mm)
B	Clearance to window or door that may be opened	12" (305mm)	3 ft. (0.9m)
C	Clearance to permanently closed window	12" (305mm)	12" (305mm)
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (610mm) from the center line of the terminal	18" (457mm)	18" (457mm)
E	Clearance to unventilated soffit	18" (457mm)	18" (457mm)
F	Clearance to outside corner	9" (229mm)	9" (229mm)
G	Clearance to inside corner	6" (152mm)	6" (152mm)
H	Clearance to each side of centerline extended above meter/ regulator assembly	3 ft. (0.9m) within a height of 15 ft. (4.5m) above the meter/ regulator assembly	3 ft. (0.9m) within a height of 15 ft. (4.5m) above the meter/ regulator assembly
I	Clearance to service regulator vent outlet	3 ft. (0.9m)	3 ft. (0.9m)
J	Clearance to non-mechanical air supply inlet	12" (305mm)	3 ft. (0.9m)
K	Clearance to mechanical air supply inlet	3 ft. (0.9m) above if within 10 ft. (3m) horizontally	
L	Clearance above paved sidewalk or paved driveway located on public property (5)	7 ft. (2.1m)	7 ft. (2.1m)
M	Clearance under veranda, porch, deck or balcony (7)	12" (305mm)	12" (305mm)
N	Clearance to the combustion air inlet to any other appliance (8)	12" (305mm)	3 ft. (0.9m)

NOTES:

- (1) Canadian installations must comply with the current CSA B149.1 Natural Gas and Propane Installation Code and local building codes.
- (2) US installations must comply with current ANSI Z223.1/NFPA 54 National Fuel Gas Code and local building codes.
- (3) Concentric vent must protrude from the roof 24" (610mm) measuring from the terminal end – cap vanes.
- (4) 24" is the recommended snow level allowance above grade/roofline or any surface that will support snow, debris, or ice (i.e. for roof venting clearances – roofline and snow level). If living in a snowfall region, consult your local weather office for the maximum typical snowfall for your area.
- (5) Above public walkways, driveways or parking lots if adjacent to it and condensate cannot drip, freeze, or create a hazard.
- (6) The termination shall be located, or protected by a guard, in such a way to prevent possible contact.
- (7) A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
- (8) Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor.

It is not recommended to terminate vent above any door or window, condensate can freeze causing ice formations. Do not use chimney as a raceway if another boiler or fireplace is vented into or through chimney.

⚠ NOTE: When using anti-freeze in the primary circuit of the boiler, use PP, CPVC or stainless steel only!
 Vent terminations must keep the following minimum clearances from electric meters, gas meters, regulators and relief equipment: 4 feet (1220 mm) [Canada 6 feet (1830 mm)] horizontally and in no case above and below, unless a horizontal distance of 4 feet (1220 mm) [Canada 6 feet (1830 mm)] is maintained.

Wall Thickness: Direct vent terminations are designed to work with any standard wall thickness. Installation guidelines for min/max wall thickness are as follows: Min. = 1 in., Max. = 36 in.

Approved Flue gas or combustion air materials and fittings per boiler

Material	Supplier	Standard [USA]	Standard [Canada]	Condexa PRO NA 75 P	Condexa PRO NA 117 P
PP	Centrotherm M&G Duravent Z-Flex	ANSI Cat IV Approved Polypropylene	All exhaust vent must be ULC S636 approved	4" (100mm)	4" (100mm)
PP-Flex	Centrotherm M&G Duravent	ANSI Cat IV Approved Polypropylene		4" (100mm)	4" (100mm)
Stainless Steel AL29-4C	Centrotherm M&G Duravent Z-Flex	UL1738		4" (100mm)	4" (100mm)
CPVC schedule 40	Centrotherm M&G Duravent	ANSI/ASTM F441		4" (100mm)	4" (100mm)

- Components of the approved vent systems must not be interchanged with other vent systems or unlisted pipe fittings. Plastic components, and specified primers and glues of the certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts. For installations in Canada, field supplied plastic vent piping must comply with CAN/CSA B149.1 (latest edition) and be certified to the Standard for Type BH Gas Venting systems ULC S636.

The supplied vent connector and separate available vent terminations are approved to be used with the boiler. Standard straight pipes, 90°-elbows or Tees are approved as roof or wall terminations in all the approved materials. Furthermore the following terminations are approved. For details please refer to the supplier's information.

Vent Termination	Material	Supplier	Part Number
4"/6" (100/150 mm) Concentric termination Kit	PP	Centrotherm InnoFlue	ICRT 4679 (Centrotherm)
4" (100 mm) Chimney Cap	PP Flex	M&G Duravent – PolyPro Centrotherm InnoFlue SW Flex	4PPS-FKL (M&G Duravent) ISCP04 (Centrotherm)
4" (100 mm) Twin pipe termination	PP	M&G Duravent PolyPro	4PPS-HTPL (M&G Duravent)
4"/6" (100/150 mm) Concentric termination	PP	Centrotherm InnoFlue	ICWS 4639 (Centrotherm)
4"/6" (100/150 mm) Concentric Horizontal Termination	PP	M&G Duravent PolyPro	4PPC-HCT
4"/6" (100/150 mm) Concentric Vertical Termination	PP	M&G Duravent PolyPro	4PPC-VCT
4" x 6" (100mm x 150mm) Horizontal Termination Kit – Concentric	PP	M&G Duravent PolyPro	4PPS-HKL
4" x 6" (100mm x 150mm) Vertical Termination Cap Kit – Concentric	PP	M&G Duravent PolyPro	4PPS-VK-TCL – 4PPS-VKL
4" (100mm) PolyPro Single Wall Pipe	PP	M&G Duravent PolyPro	4PPS-12L – 4PPS-36L – 4PPS-72L
6" (150mm) PolyPro Single Wall Pipe	PP	M&G Duravent PolyPro	5PPS-12L – 5PPS-36L – 5PPS-72L
4" (100 mm) Concentric kit	CPVC	IPEX System 636	197021

2.13.4 Vent and combustion air pipe length [For single boiler installations]

The maximum length for vent and combustion air pipes can be found in the following table. Please note the equivalent length is for the combined vent/combustion air pipe.

Single pipe

	Condexa PRO NA 75 P	Condexa PRO NA 117 P
4" (100 mm)	82 ft (25 m)	82 ft (25 m)
5" (130 mm)	100 ft (30 m)	100 ft (30 m)

The maximum length in case of concentric vent/combustion:

Concentric pipe

	Condexa PRO NA 75 P	Condexa PRO NA 117 P
4" / 6" (100 mm / 160 mm)	100 ft (30 m)	100 ft (30 m)

In the following tables are listed the equivalent length for CPVC pipes:

	4" (100 mm)	5" (130 mm)
1 ft (0.3m) vent pipe	1 ft (0.3m)	1 ft (0.3m)
45° elbows	4 ft (1.2m)	5 ft (1.5m)
90° elbows	7 ft (2.1m)	10 ft (3m)

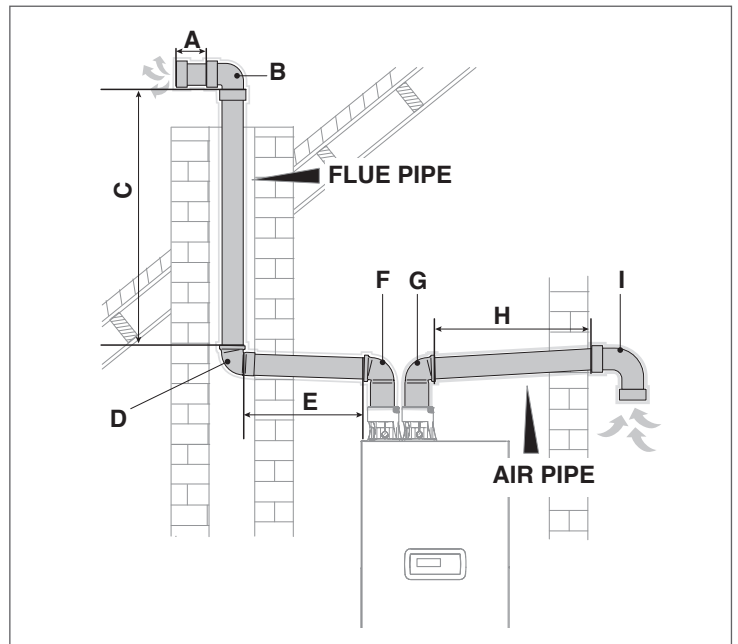
In the following tables are listed the equivalent length for PP pipes:

	4" (100 mm)	5" (130 mm)
1 ft (0.3m) vent pipe	1 ft (0.3m)	1 ft (0.3m)
1 ft (0.3m) flex pipe	2 ft (0.6m)	2 ft (0.6m)
45° elbows	5 ft (1.5m)	6 ft (1.8m)
90° elbows	12 ft (3.7m)	14 ft (4.3m)
Tee	19 ft (5.8m)	21 ft (6.4m)

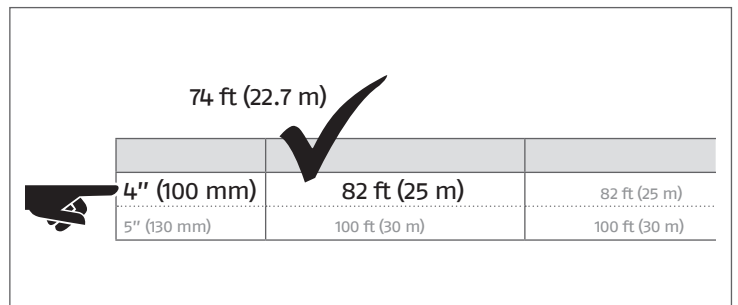
In the following tables are listed the equivalent length for concentric PP pipes:

	4" / 6" (100 mm) / (150 mm)
1 ft (0.3m) vent pipe	2 ft (0.6m)
45° elbows	8 ft (2.4m)
90° elbows	14 ft (4.3m)

EXAMPLE: 4" Single pipe for Condexa PRO NA 75 P



Quote	Equivalent length [ft]	Equivalent length [m]	
A	1	0.2	flue
B	12	3.7	flue
C	1	2	flue
D	7	3.7	flue
E	12	1	flue
F	3	3.7	flue
G	12	3.7	air
H	3	1	air
I	12	3.7	air
Tot.	74	22.7	flue+air



NOTE: Since the total equivalent length (74 ft) is below 82 ft the venting is within the permissible length.

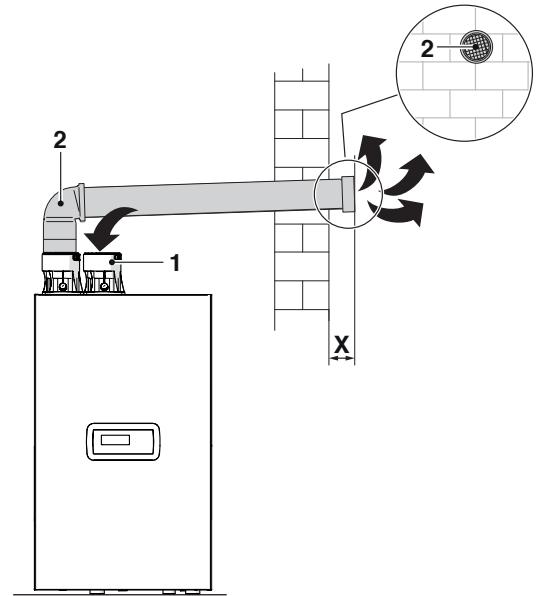
2.13.5 Approved examples of horizontal and vertical venting installation

⚠ NOTE: Place pipe supports a minimum of every 5 feet (1.525 mm) for horizontal and vertical runs, beginning with a support near the boiler unless the vent manufacturer or local code states smaller intervals. Venting shall also be supported at each connection point and 90 or 45 degree elbow. The first support shall be located close to the boiler. Ensure that proper venting supports are used for the vent type per the venting manufacturer's instructions. Failure to comply may cause vent separation resulting in a risk of carbon monoxide poisoning causing severe injury or death.

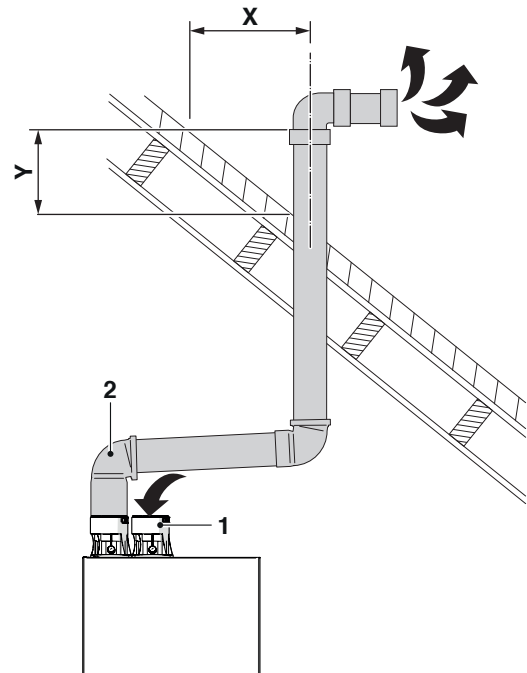
- Horizontal vent runs shall be supported where necessary to prevent sagging.
- Ensure horizontal vent runs have a upwards slope no less than 1/4 in/ft (21 mm/m) from the boiler to the vent terminal.
- The boiler and venting shall be installed so as to prevent accumulation of condensate; and where necessary, have means provided for drainage of condensate.
- The condensate must be disposed of in accordance with applicable code.
- Periodic cleaning of the vent terminal and air-intake screens is mandatory.
- Avoid locating vent terminals near equipment or building features which can be subject to degradation from exhaust gases.
- If multiple boilers are installed in a row, allow at least 1 foot (305 mm) clearance between the vent termination of one and the combustion air intake of the other.

In the following figures, the combustion air intake pipe is indicated with the number 1 (one) and the exhaust vent pipe with the number 2 (two).

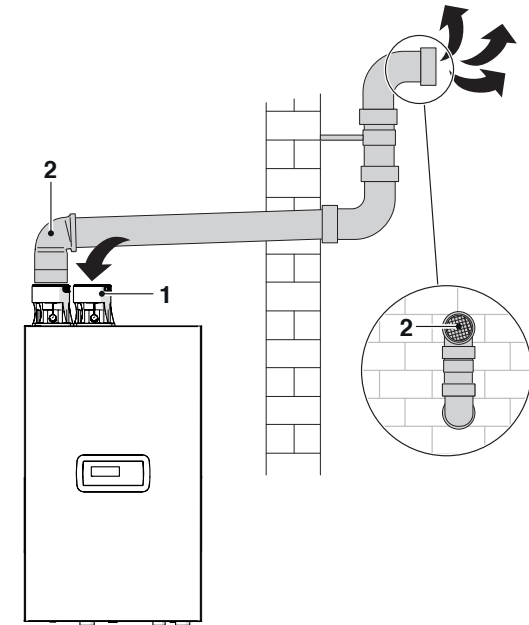
Horizontal venting system (room air only); $X \geq 4''$ (102 mm)



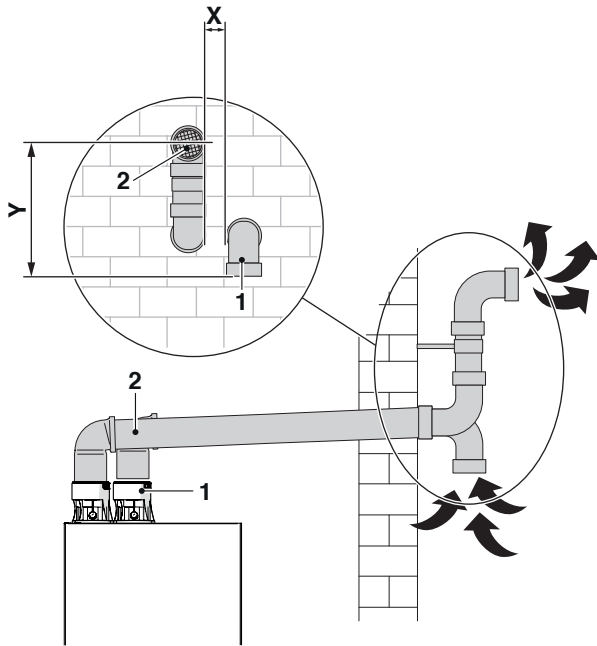
Vertical venting system (room air only); $X > 12''$ (305 mm); $Y \geq 12''$ (305 mm) above maximum snow level or at least $24''$ (610 mm) whichever is greater



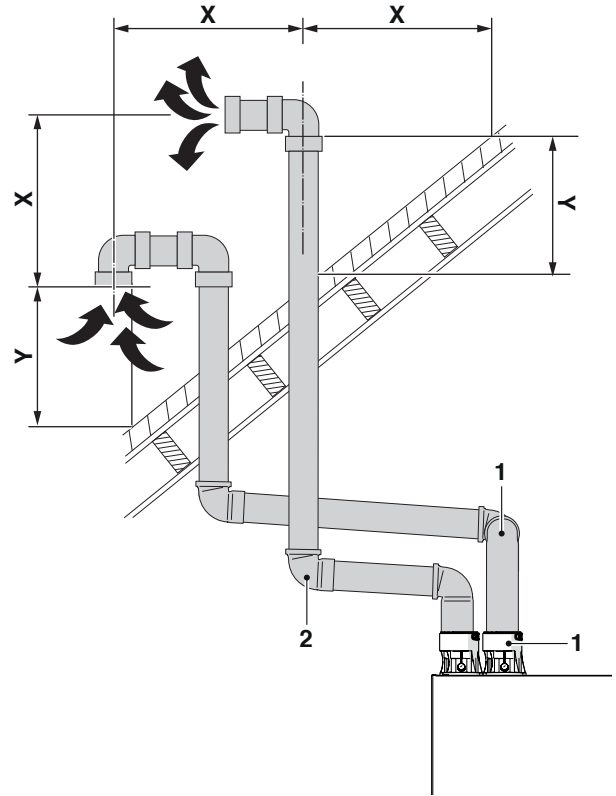
Horizontal venting system (room air only)



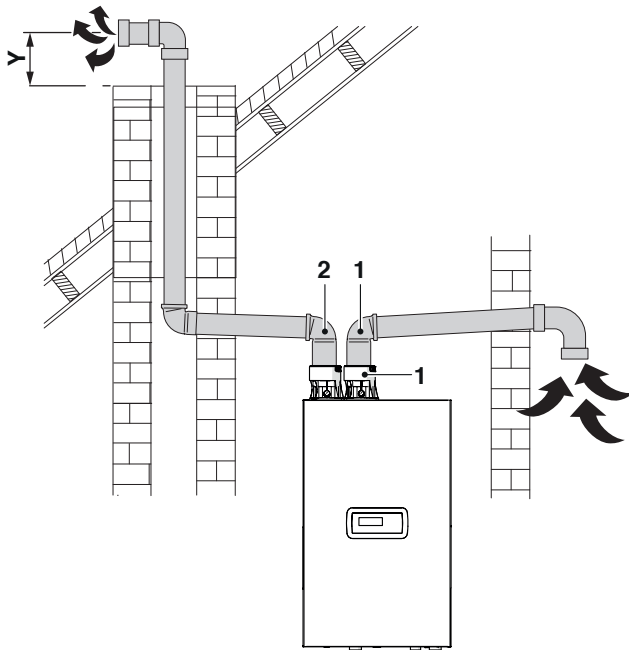
Horizontal venting system (sealed combustion); $X \geq 4''$ (102 mm); $Y \geq 12''$ (305 mm)



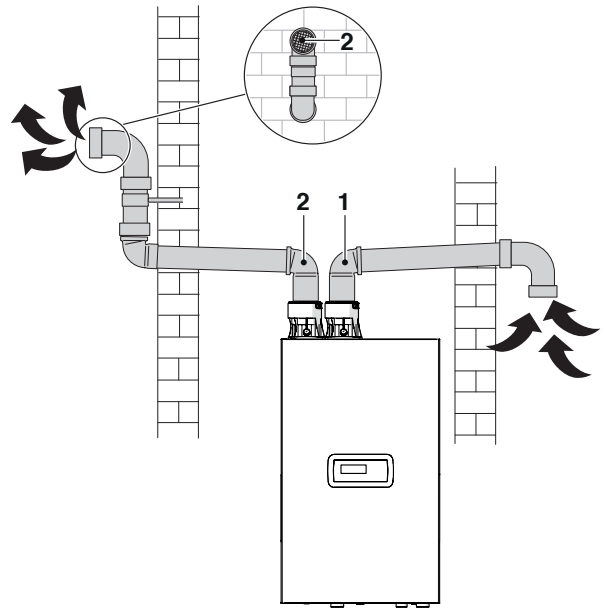
Vertical venting system (sealed combustion); $X > 12''$ (305 mm); Y 12'' (305 mm) above maximum snow level or at least 24'' (610 mm) whichever is greater



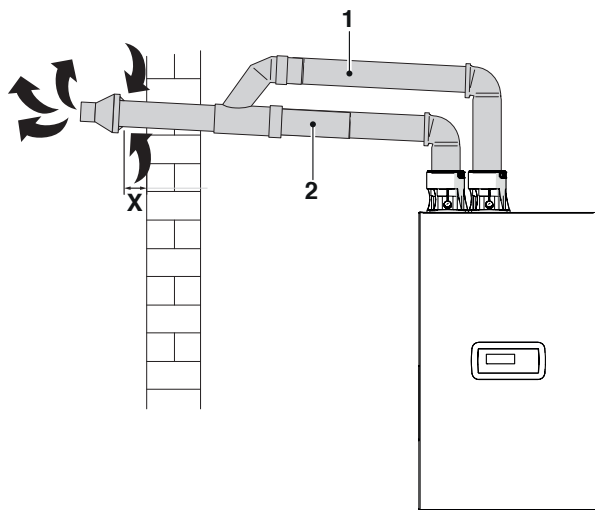
Vertical venting system (sealed combustion); Y 12'' (305 mm) above maximum snow level or at least 24'' (610 mm) which-ever is greater



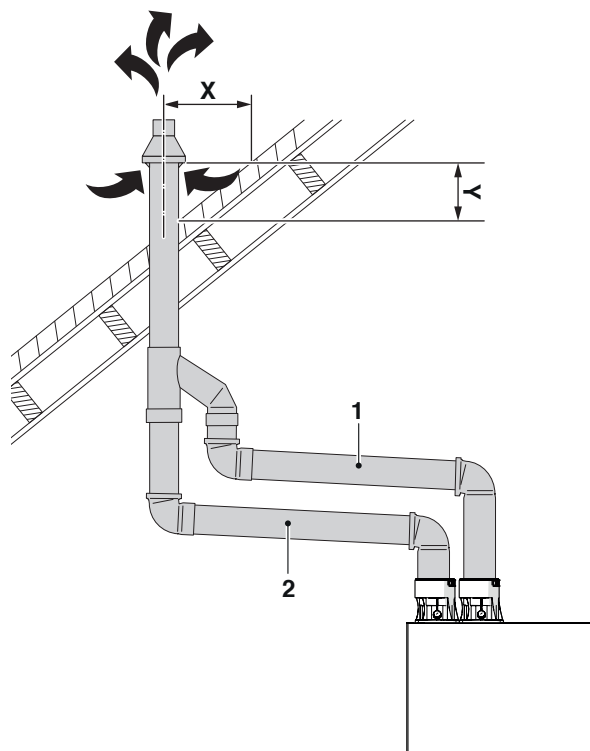
Horizontal venting system (sealed combustion)



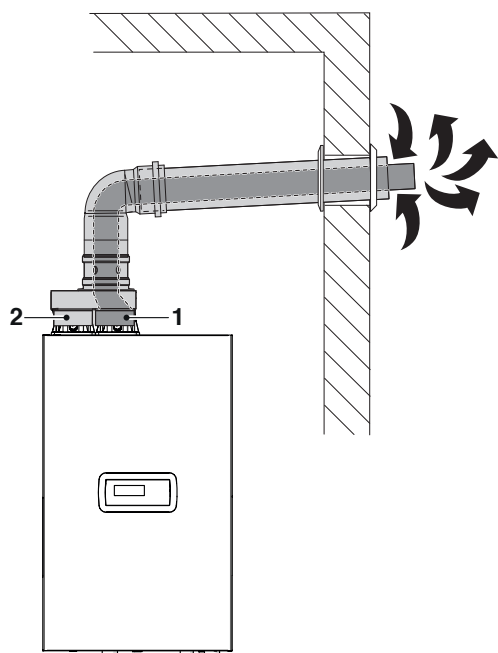
Horizontal venting system (sealed combustion); $X \geq 4''$ (102 mm)



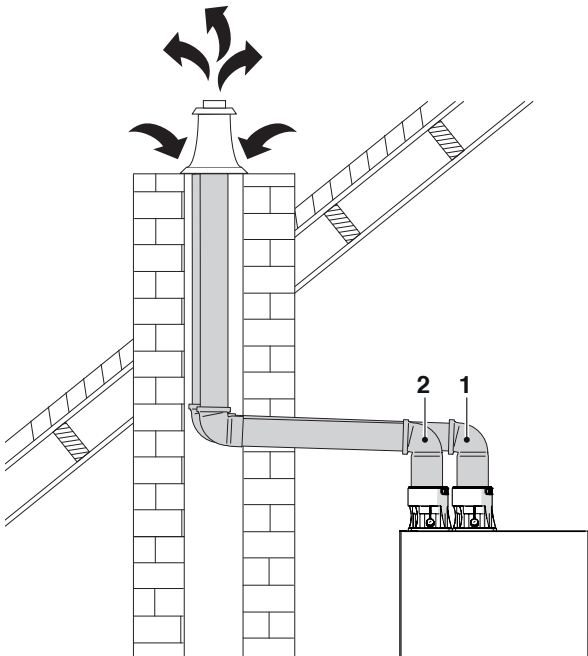
Vertical venting system (sealed combustion); $X > 12''$ (305 mm); Y 12'' (305 mm) above maximum snow level or at least 24'' (610 mm) whichever is great



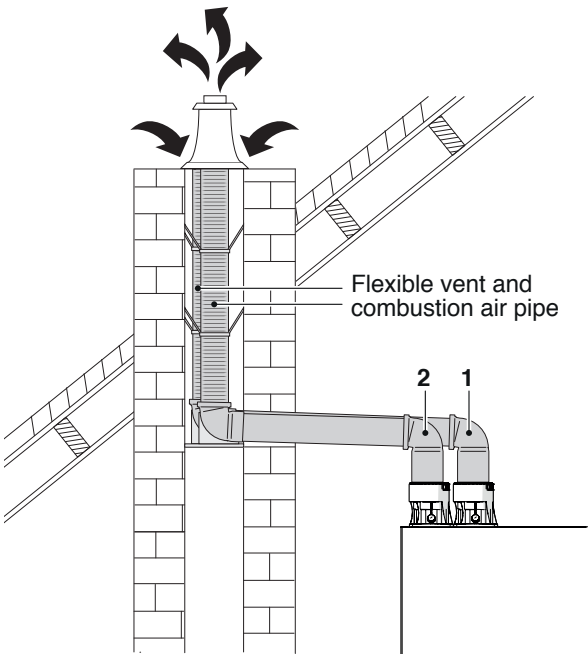
Horizontal concentric system (sealed combustion)



Vertical venting system (sealed combustion)



Vertical venting system (sealed combustion)

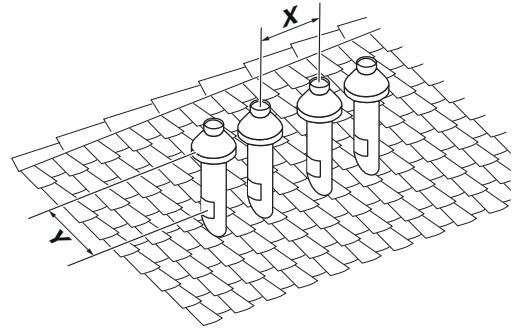


2.13.6 Multiple boilers

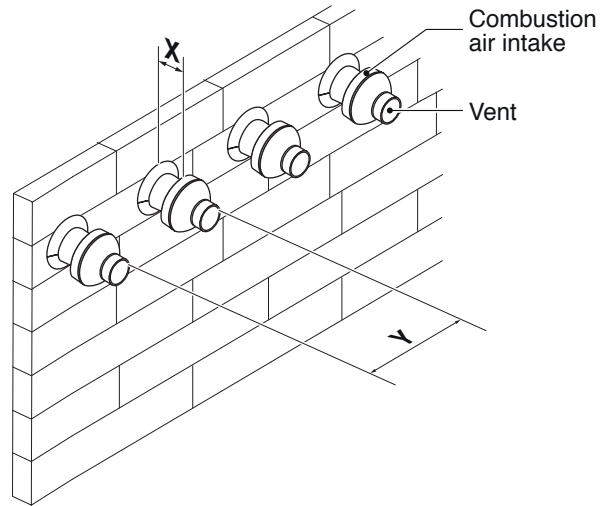
When installing multiple air and vent terminations, be sure that:

- The clearance between the vent and air termination are in accordance with the figures shown in this chapter
- All vent pipes and air inlets must terminate at the same height

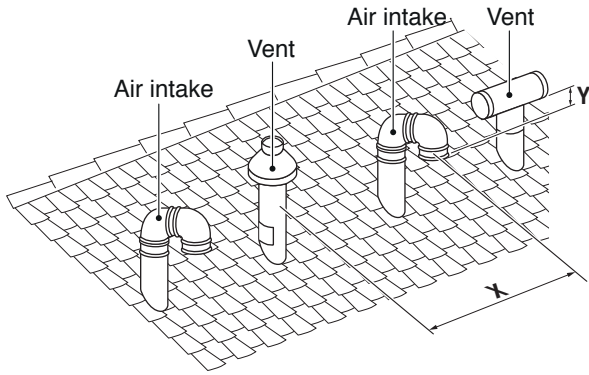
Concentric vent and combustion air vertical termination; $X \geq 12''$ (305 mm); $Y \geq 12''$ (305 mm) (18'' (457 mm) for Canada and/or per CAN/CSA B149.1) above highest snow level. Maximum 24'' above roof



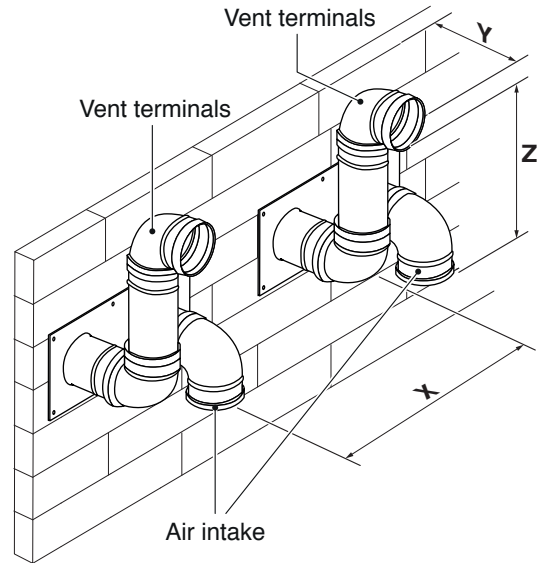
Concentric vent and combustion air horizontal termination; $X \geq 4''$ (102 mm); $Y \geq 24''$ (610 mm); Note: the terminations must all be level with each other and at a 12'' (305 mm) min from grade or the snow line.



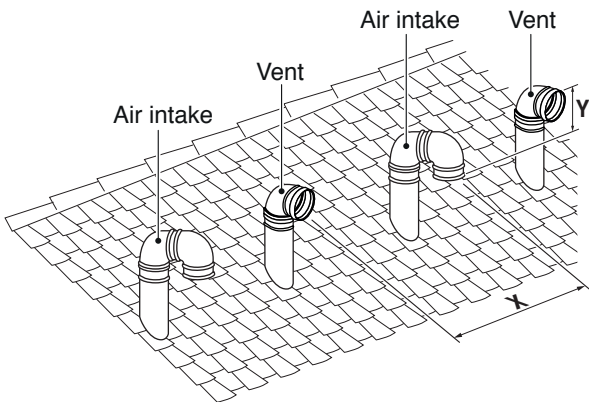
Multiple air and vent vertical terminations; $X \geq 12''$ (305 mm); $Y \geq 12''$ (305 mm)



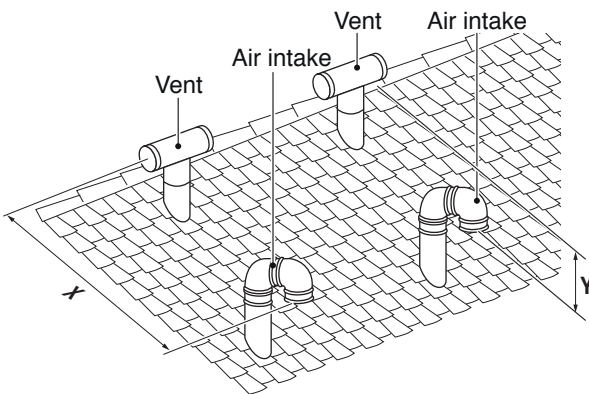
Multiple air and vent vertical termination ; $X \geq 12''$ (305 mm); $Y \leq 25''$ (635 mm); $Z = 12''$ (305 mm) to $16''$ (406 mm)



Multiple air and vent vertical termination; $X \geq 12''$ (305 mm); $Y \geq 12''$ (305 mm)



Multiple air and vent vertical termination; $X \geq 12''$ (305 mm); $Y \geq 12''$ (305 mm)



2.13.7 De-rating for altitude installation

When the appliance is installed at an altitude higher than 2000 ft, refer to the regulations and authorities having jurisdiction.

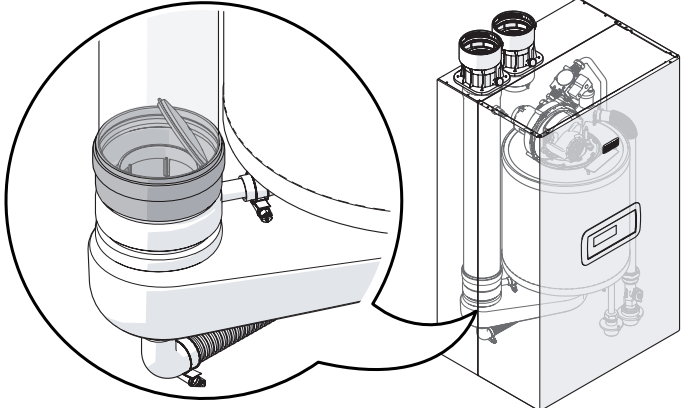
Condexa PRO NA 75 P	% range of the length of the vent and combustion air pipe installed referred to the maximum equivalent length			
	From 0% to 25%	From 25% to 50%	From 50% to 75%	From 75% to 100%
Altitude				
0-2000 ft (0-610m)	255900 btuh (75 kw)	255900 btuh (75 kw)	255900 btuh (75 kw)	255900 btuh (75 kw)

Condexa PRO NA 117 P	% range of the length of the vent and combustion air pipe installed referred to the maximum equivalent length			
	From 0% to 25%	From 25% to 50%	From 50% to 75%	From 75% to 100%
Altitude				
0-2000 ft (0-610m)	399000 btuh (117 kw)	399000 btuh (117 kw)	399000 btuh (117 kw)	399000 btuh (117 kw)

2.13.8 Multiple boiler cascade system

It is possible to connect up to 6 boilers of same size in a cascade system. If the number of cascade boilers is greater than six then separate air system should be used.

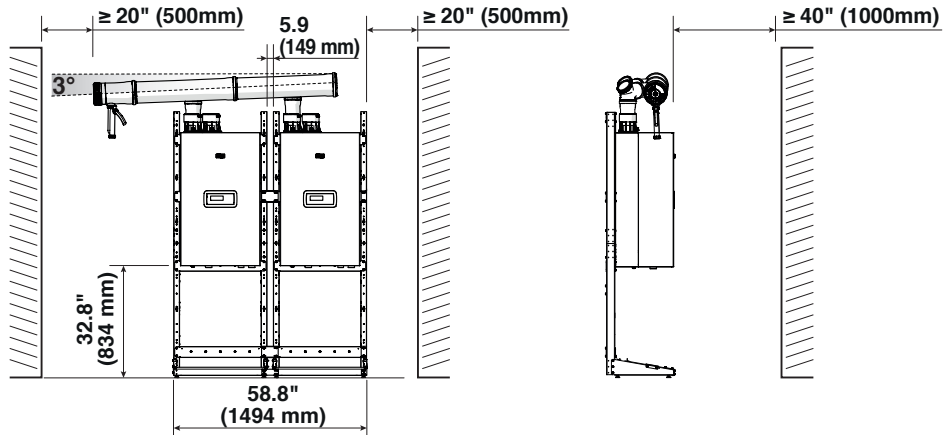
Flue gas backflow is prevented by the integrated flue damper gas.



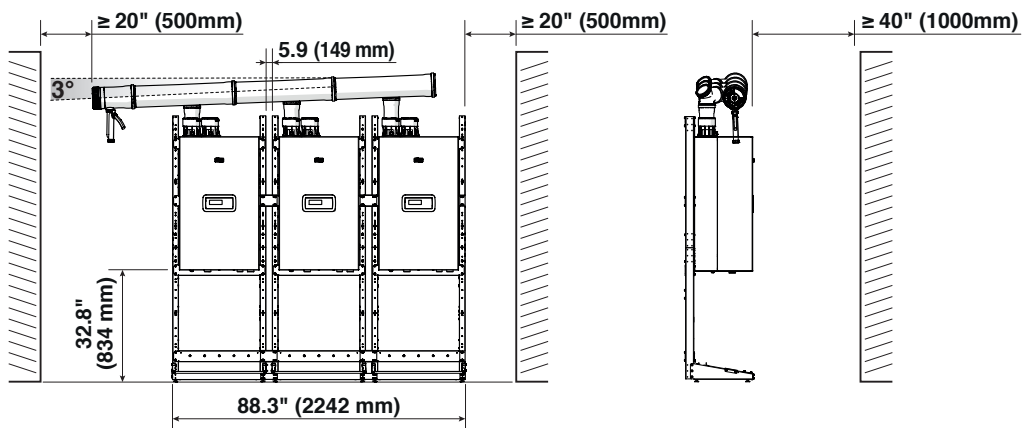
- ⚠ NOTE:** It is under the venting manufacturer responsibility to re-size the vent diameter in case of any change on the venting layout described in the pictures below. DO NOT modify venting diameters listed.
- ⚠ NOTE:** The boiler flue connection is not designed to support the weight of the vent system connected to the boiler. Please contact the vent manufacturer to highlight a suitable support (see vent manufactures list on page "29").
- ⚠ NOTE:** In order to guarantee the proper condensate drain, make sure the installation has a gradient of min. 3° (approx. 2 inch per 3.3 ft / 50mm per 1mt) on any horizontal venting part.
- ⚠ NOTE:** Please strictly follow the Manufacturer's instruction when aligning the venting connections.

The following images show the different systems to link the boilers in cascade.

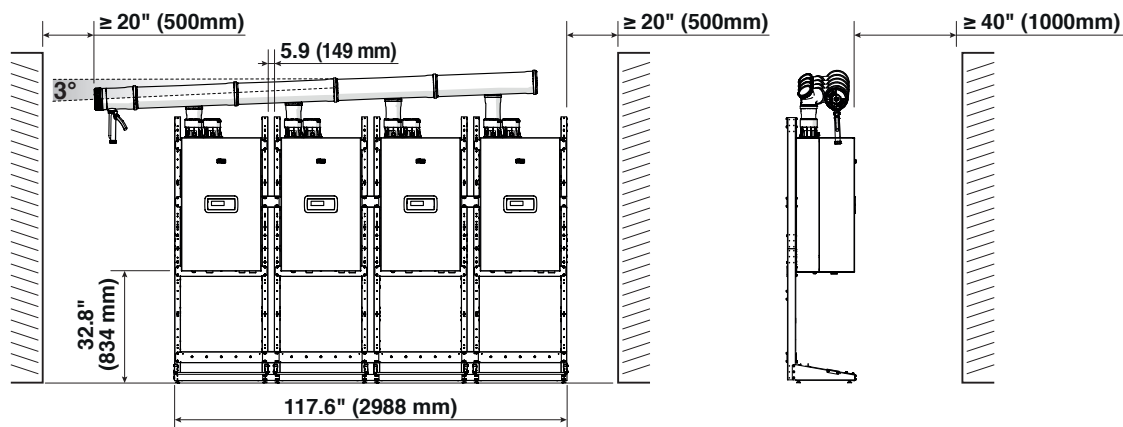
Exhaust system (in line lay-out with 2 boilers)



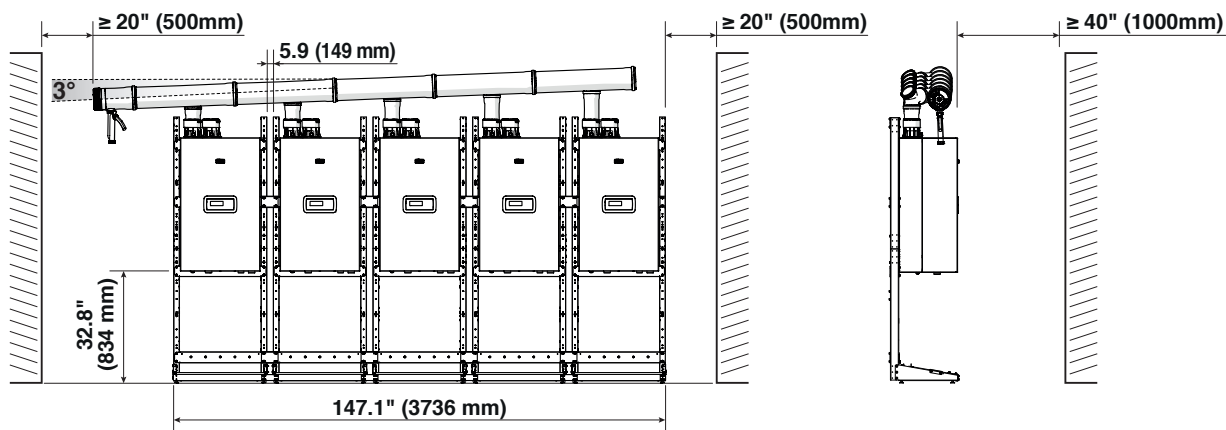
Exhaust system (in line lay-out with 3 boilers)



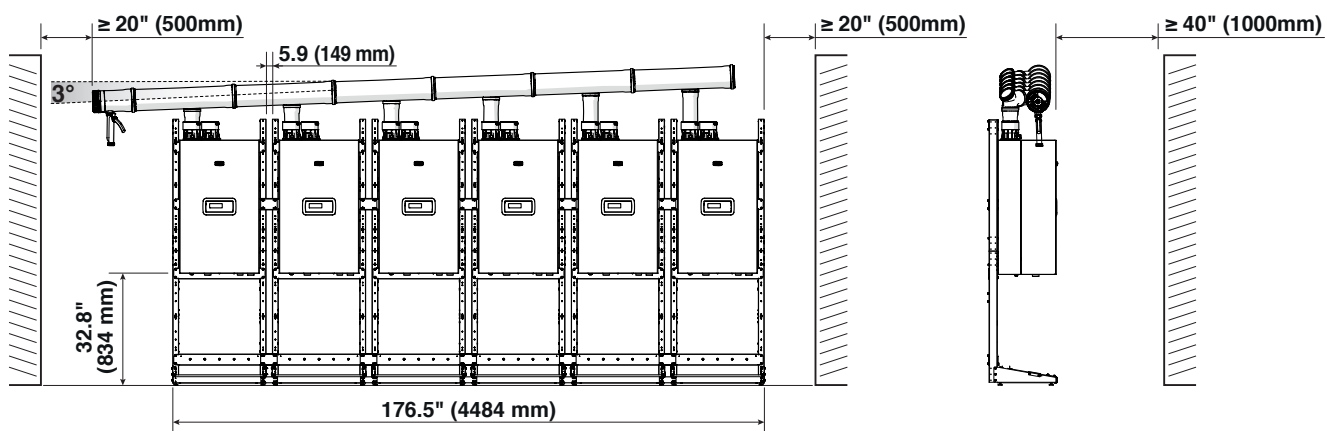
Exhaust system (in line lay-out with 4 boilers)



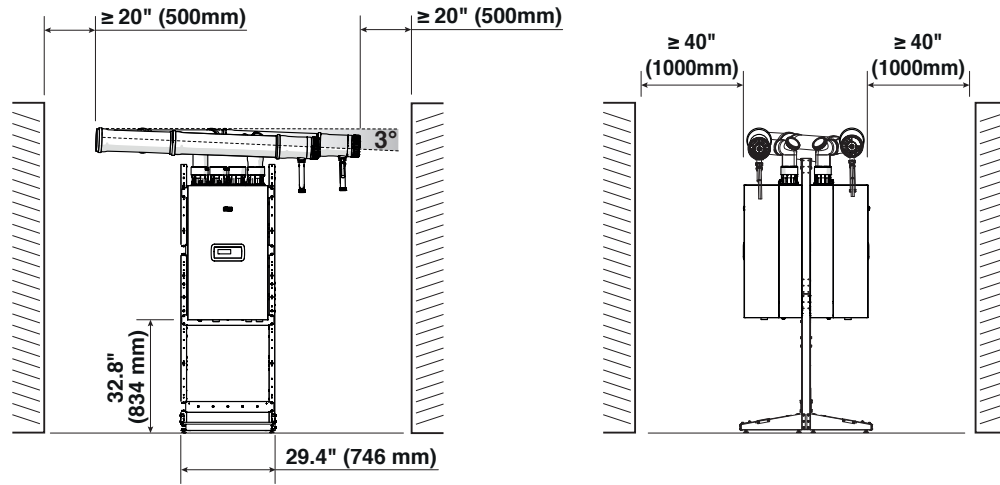
Exhaust system (in line lay-out with 5 boilers)



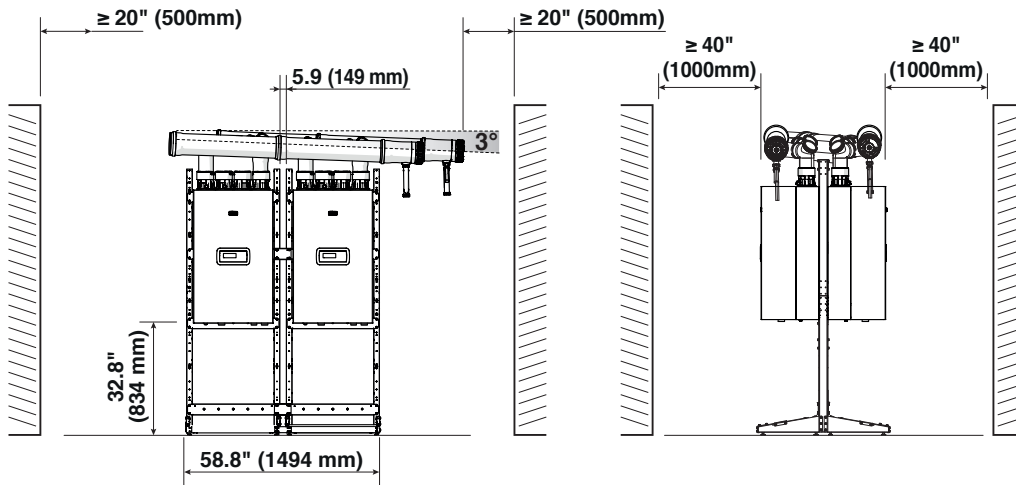
Exhaust system (in line lay-out with 6 boilers)



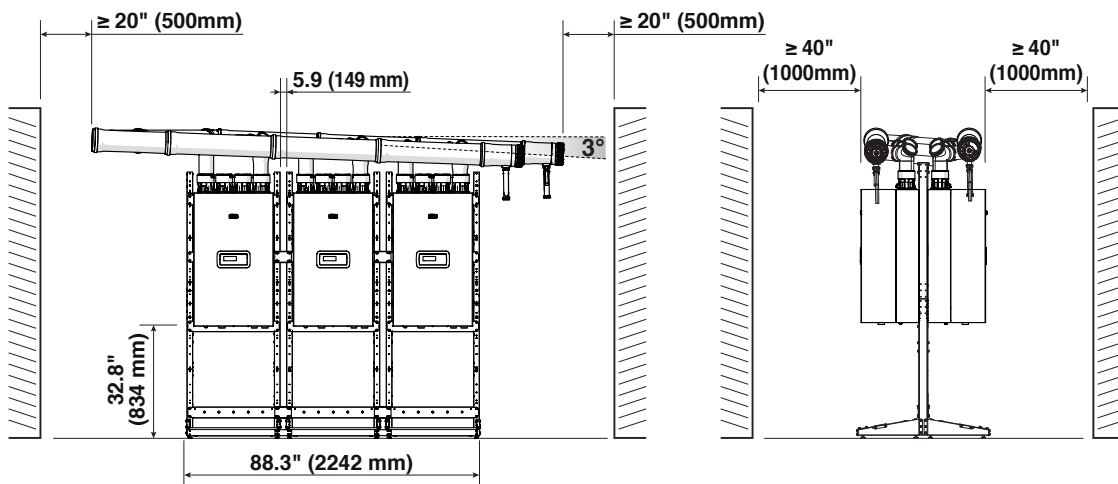
Exhaust system (B2B lay-out with 2 boilers)



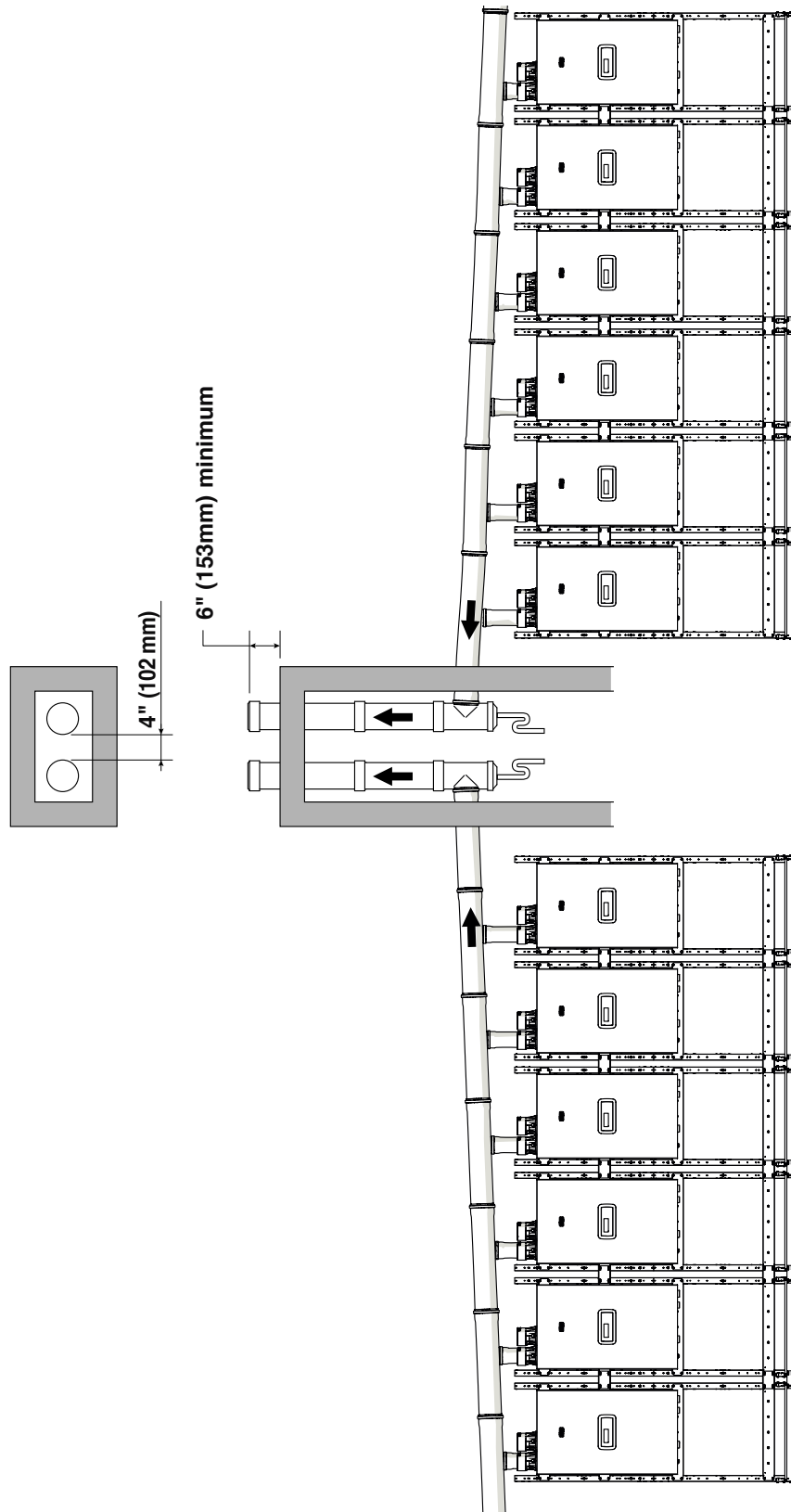
Exhaust system (B2B lay-out with 3-4 boilers)

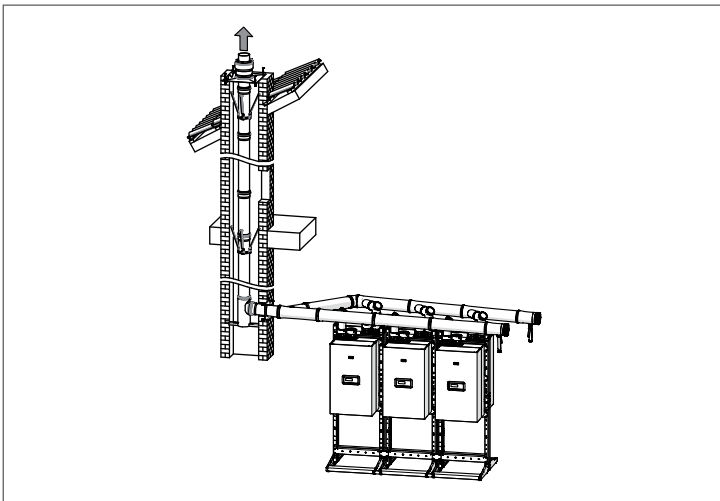
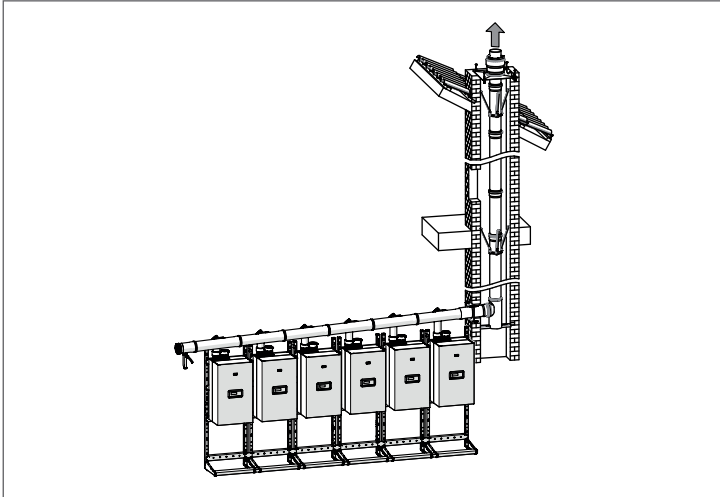


Exhaust system (B2B lay-out with 5-6 boilers)

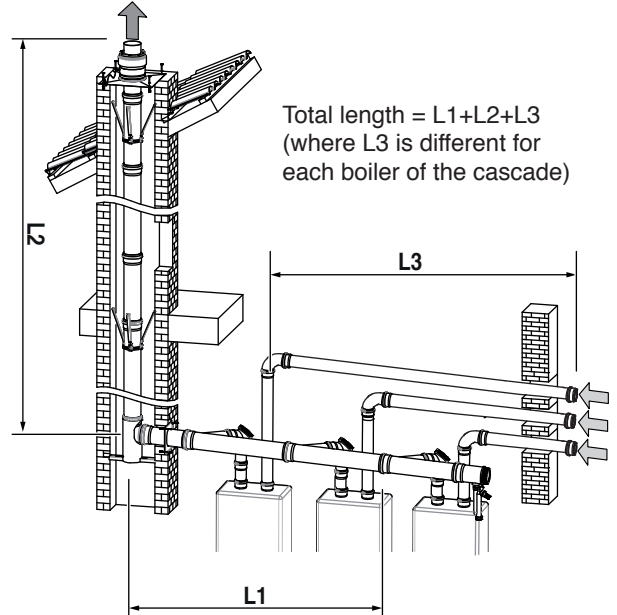


Multiple boiler installations (vertical termination with multiple boilers)





Common exhaust with individual air inlet (sealed combustion)



2.13.9 Vent and combustion air pipe length for cascade system

In the following tables are the maximum allowed length for flue pipe cascade system. The length is for each intake and exhaust system.

In a system as shown in Fig. "Both common air intake and exhaust system (sealed combustion)" it is necessary to verify the max. length for intake pipe of each boiler installed.

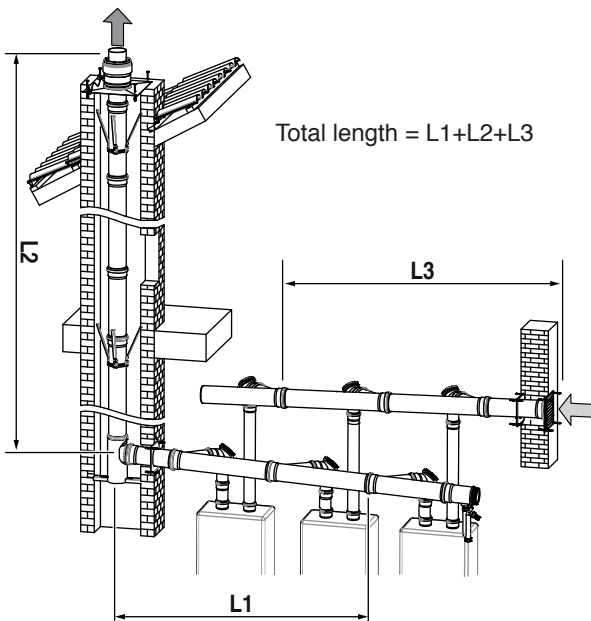
Maximum length for air and combustion pipe for cascade of Condexa PRO NA 75 P

Condexa PRO NA 75 P	6" (150 mm)	8" (200 mm)
x2	100 ft (30 m)	115 ft (35 m)
x3	82 ft (25 m)	115 ft (35 m)
x4	82 ft (25 m)	115 ft (35 m)
x5	65 ft (20 m)	100 ft (30 m)
x6	65 ft (20 m)	100 ft (30 m)

Maximum length for air and combustion pipe for cascade of Condexa PRO NA 117 P

Condexa PRO NA 117 P	8" (200 mm)
x2	115 ft (35 m)
x3	115 ft (35 m)
x4	115 ft (35 m)
x5	100 ft (30 m)
x6	100 ft (30 m)

Both common air intake and exhaust system (sealed combustion)



2.13.10 Preparation for the condensate drain

The exhaust of the condensation produced by the **Condexa PRO NA** during its normal operation, must be carried out with an accessory (siphoned condensate collector) that needs to be installed below the boiler as specified in its assembly instructions. The condensate coming out of the drain must be collected and disposed in the sewer system, if necessary by using a neutralizer, according to the following procedure:

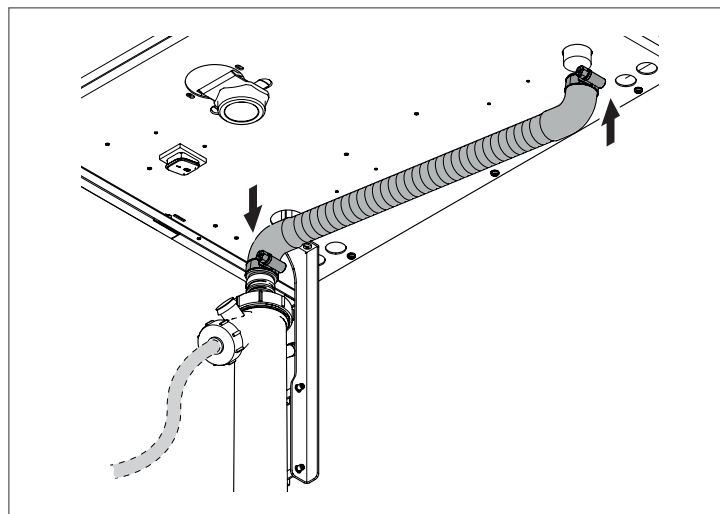
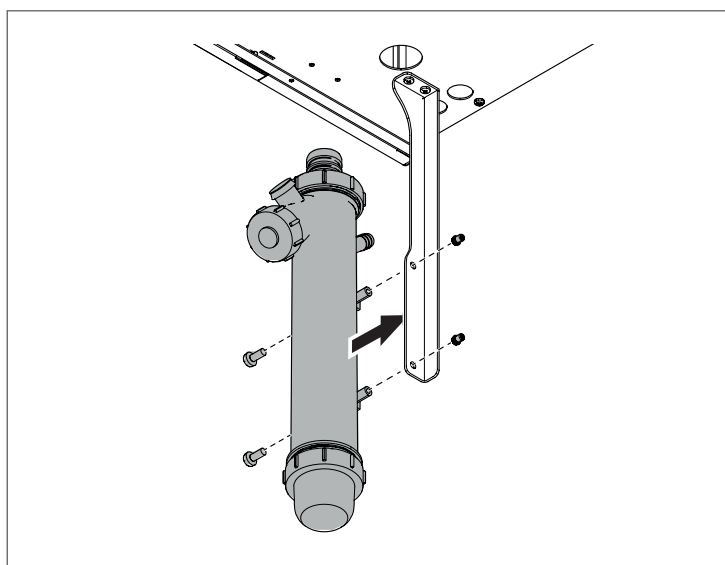
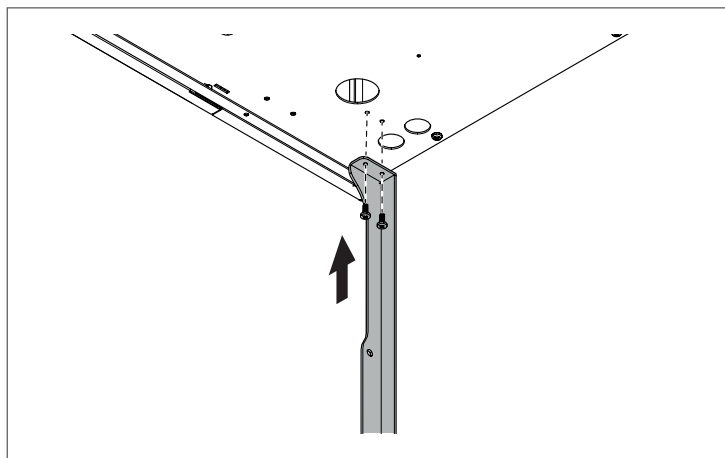
- Connect the condensate hose in such a way that hose drains into the sewer system with an air gap between the condensate hose and the sewer system.

The connection to the local drain or sewer system must be executed using a siphon in order to prevent unpleasant odours from being released back into the room from the sewer.

We advise using plastic (PP) piping for building the condensate drainage.

CAUTION: Never use copper pipes under any circumstances, as the condensate itself will cause them to rapidly deteriorate.

Condensate drain installation



WARNING: Always maintain a slope angle "s" of over 3° and ensure that the diameter of any condensate drain pipe is greater than that of the connection fitted at the drain outlet

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

WARNING: Fill the siphon with water before activating on the boiler in order not to release any combustion products into the environment when the boiler is first switched on. Failure to comply may result in substantial property damage, severe injury or death.

NOTE: It is recommended that condensate from the boiler and from the flue should be channelled into the same drain pipe.

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

CAUTION: Size the condensate drain outlet so as to ensure the proper drainage of waste liquids without leaks

WARNING: The condensate drain must be connected to the drain and sewage network in such a way so that the condensate may not freeze under any circumstances

2.13.11 Water Chemistry Guidelines

- ⚠ NOTE:** If using anti-freeze:
- Follow the boiler manufacturer's instructions on antifreeze concentration.
 - Frost protection and inhibitor level has to be checked annually during the regular scheduled maintenance of the condensing boiler.
- ⚠ NOTE:** System damage!
- It is the installer's responsibility to ensure that the heating system is compatible with the boiler type and size installed.
 - pH-value of the heating water should be kept between 6.5 and 8.

To avoid any presence of oxygen in the system, it is advised to prevent as little as possible air during installation. Usual spots where air is most likely to seep in are: gaskets, pumps, air vents and O-ring gaskets. Using an automatic water fill system exposes the system to fresh oxygenated water. In commercial applications it is recommended to install a water meter to measure the introduction of fresh water into the system.

A minimum water pressure is required for optimum performance. Minimum water pressure required: 7.25 psi (0.5 bar).

Before and during assembly, the system must be kept free of impurities, construction dust, sand, copper dust, grease, carbon deposits, etc., as well as welding flux residue. In any of these instances, the old system must be rinsed with clear water mixed with a highly concentrated rinse agent.

For freeze protection use only propylene glycol, with scale inhibitors, with a maximum volume [concentration] of 50% of glycol.

- ⚠ NOTE:** When using anti-freeze in the primary circuit of the boiler, use PP, CPVC or stainless steel venting only!

Water hardness must fall within the following limits:
50 ppm of CaCO₃ < (alkali strength) < 150 ppm of CaCO₃.

- Use only untreated water to fill the system.
- Do not use TSP (tri-sodium phosphate).
- Do not use fill water treated with salt bedding type exchangers (ion exchanger).
- Never introduce non-approved boiler treatment or similar additives.
- Only use fill water with a hardness below 7 grains.
- Filling with chlorinated water is acceptable if chlorine levels are below 100 ppm.
- Consult a local water treatment specialist for recommendations if any of the above is outside the stated ranges.
- When using oxygen permeable PEX, the system must be separated from the boiler by a heat exchanger.
- A correctly sized and working expansion tank must be installed.
- Do not exceed the maximum permissible flow rate through the boiler.
- Excessive flow can cause erosion damage to the heat exchanger.
- Eliminate System Leaks:

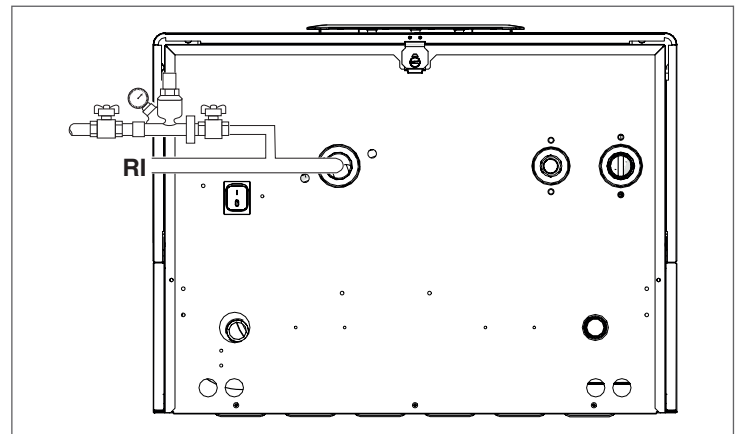
Continuous addition of make-up water will constantly add oxygen to the system and lead to corrosion. All system leaks must be repaired.

In the following table are listed the chemical water specifications.

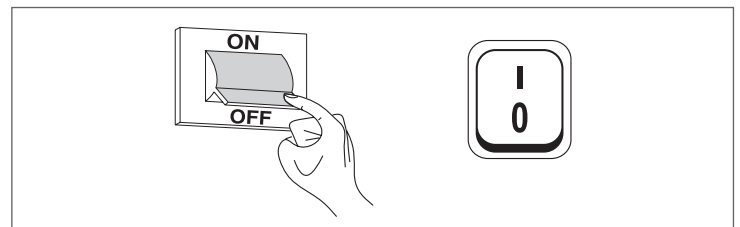
Parameters	Value
General feature	Colorless, no sediment
Dissolved Oxygen	<0.05 ppm
Total iron (Fe)	< 0.3 ppm
Total copper (Cu)	< 0.1 ppm
Na ₂ SO ₃	< 10 pp,
N ₂ H ₄	< 3 ppm
PO ₄	< 15 ppm
Electrical conductivity	< 500 microsiemens/inch

2.14 System filling and emptying

The **Condexa PRO NA** must be provided with a means of filling the system to be connected to the appliance's return line.

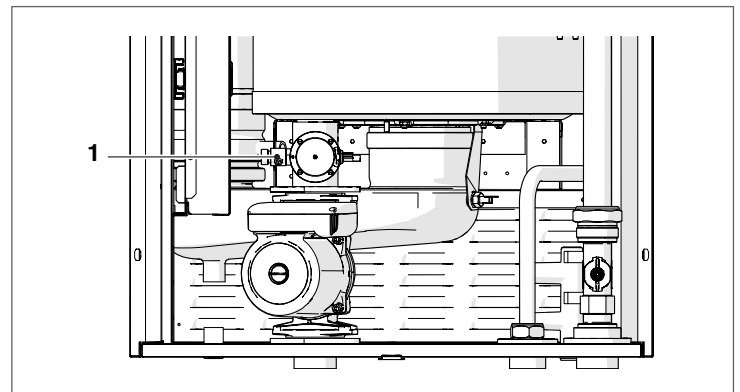


Before filling or draining the system, switch the system's master switch to the OFF position and the boiler's master switch to (0).

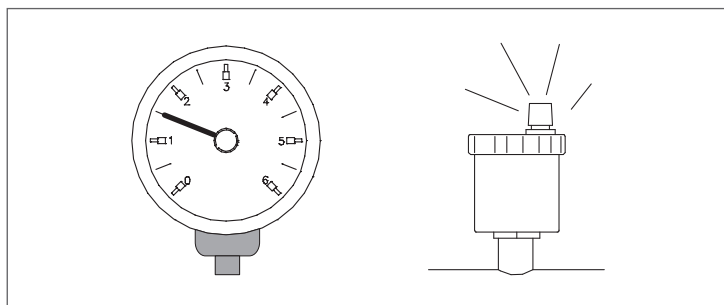


2.14.1 Filling

- Make sure the drain cock (1) is closed before you start filling the system



- Unscrew the air vents release cap
- Open the shut-off cocks in order to slowly fill the system
- Use a pressure gauge to check that the pressure is rising and the water is exiting through the air vents
- Close the shut-off cocks after the pressure reaches 21.75 psi (1.5 bar)
- Start the system pumps and the boiler's pump as shown in section "Commissioning and maintenance"
- During this stage, check that the air is correctly eliminated
- Restore the pressure if necessary
- Switch the pumps off and on again
- Repeat the last three steps until the pressure has stabilized.



⚠ The system must be filled up slowly the first time; once it is filled and the air is expelled it should never need to be topped up again.

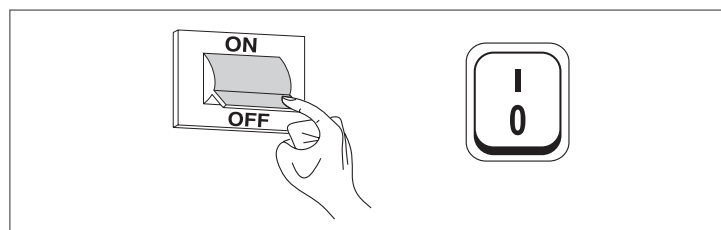
⚠ Systems should also be operated at maximum working temperature the first time they are started up, in order to facilitate de-aeration. (Gas is not released from the water at low temperatures).

⚠ NOTE: An automatic air purge can be performed during the first ignition. The parameter that sets the air purge cycle is Par. 139. See section "Parameters' list" for more information.

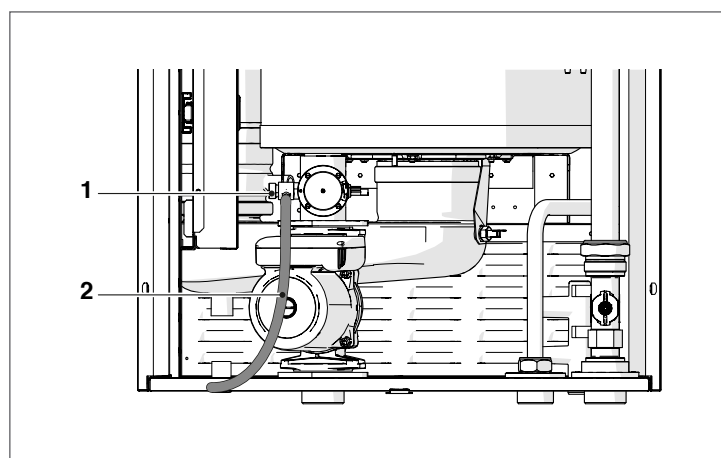
2.14.2 Emptying

Before starting to empty the appliance and the storage cylinder:

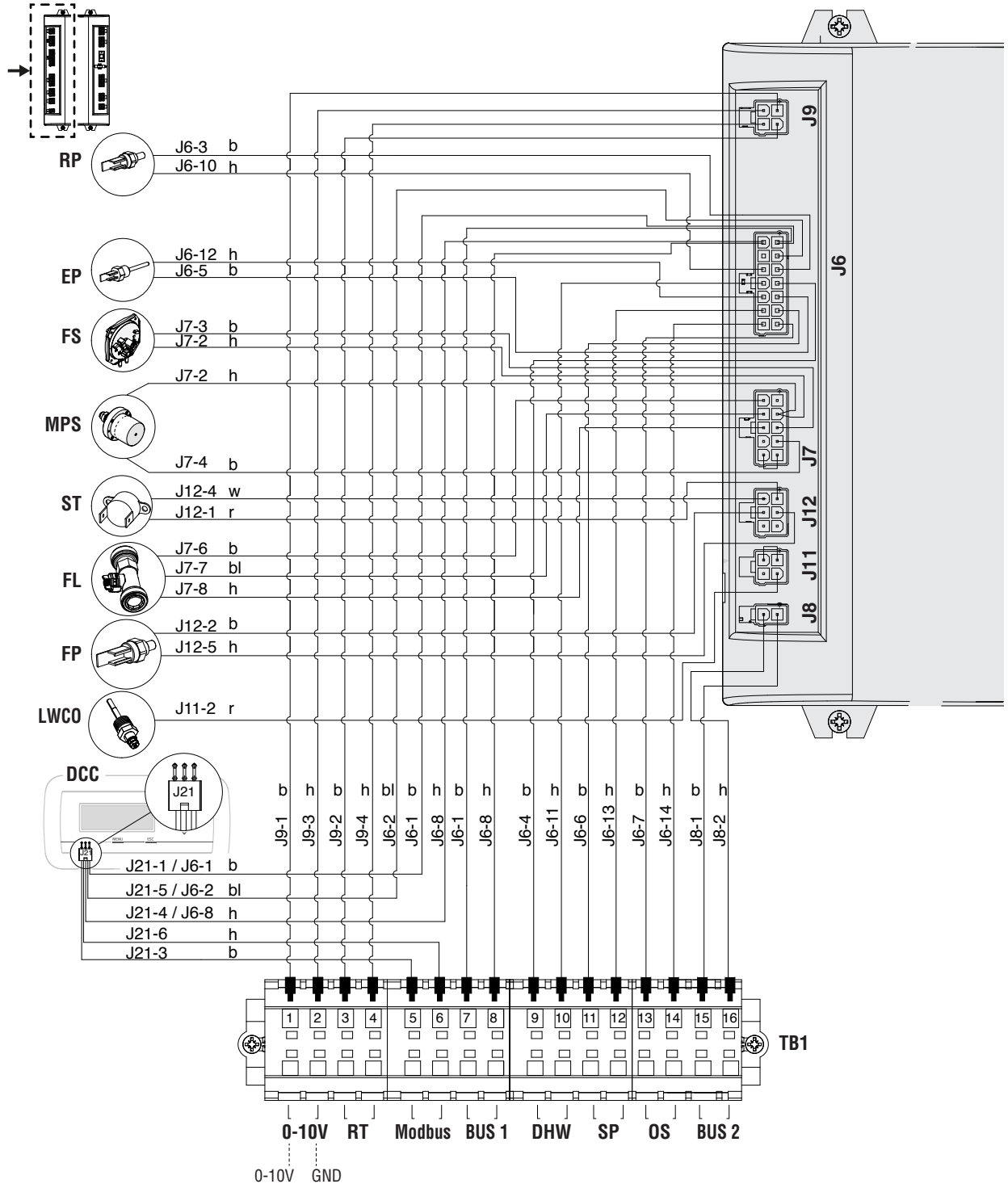
- Switch the system's master switch to the OFF position and the boiler's master switch to (0).



- Close the water supply shut-off cocks;
- In order to empty the appliance, fit a rubber hose (2) (inner diameter int. $\varnothing = 1/2''$ (13mm)) to the boiler's drain valve (1).



2.15 Wiring diagram



Key

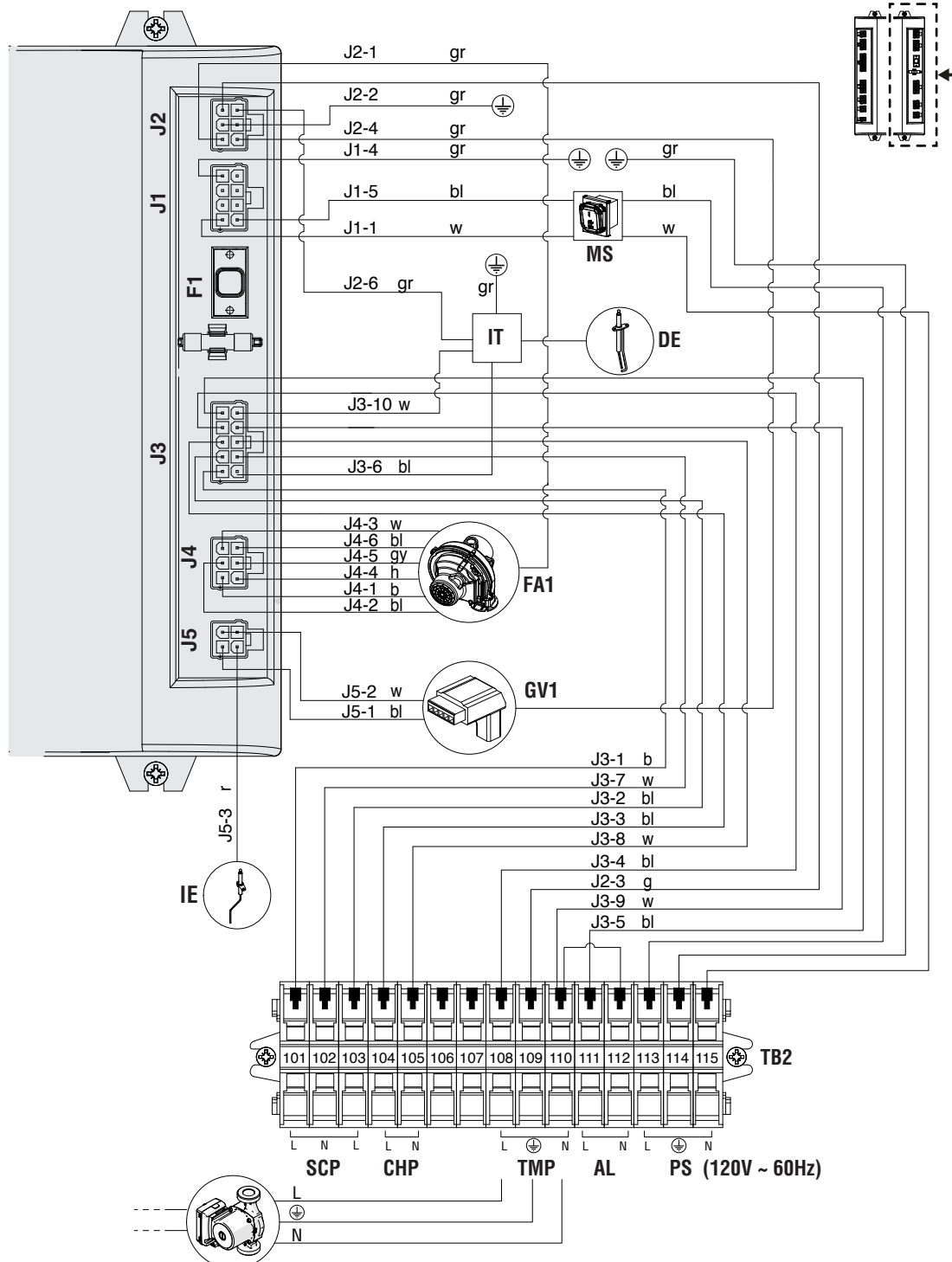
- EP Exhaust flue temperature sensor
- FP Supply temperature sensor
- RP Return temperature sensor
- ST Water high-limit safety thermostat
- MPS Low Water Cut Off
- FS Flue gas air pressure switch
- FL Flow-meter
- DCC Display and control card
- TB1 Low-voltage terminal board

0-10V

- 0-10V 0-10V input
- RT Room/heat demand thermostat
- Modbus Modbus outlet
- DHW Indirect storage tank sensor (accessory)
- SP System temperature sensor (accessory)
- OS Outdoor temperature sensor (accessory)
- LWCO Low Water Cut Off

Cable colour

- b brown
- h blue
- r red
- w white
- bl black
- g yellow/green
- y yellow
- gr green
- gy grey



Key

- MS Power switch
- DE Ignition electrode
- IT Spark generator
- IE Flame sensor
- GV1 Gas valve
- FA1 Variable speed fan
- TB2 High-voltage terminal board

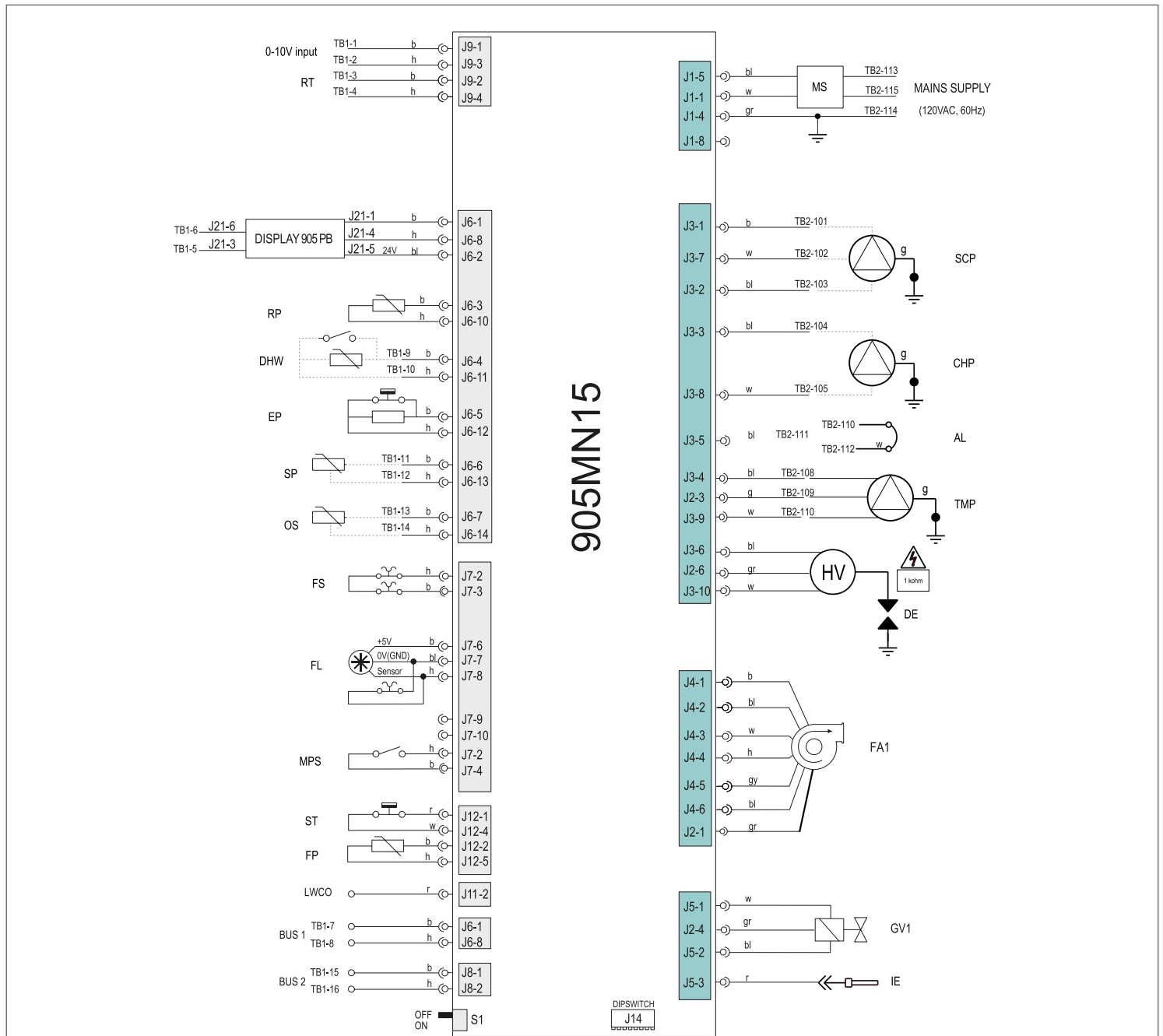
- SCP Indirect tank pump
- CHP Central heating system pump
- TMP Boiler circulator
- AL Alarm output (*)
- PS Power supply

Cable colour

- b brown
- h blue
- r red
- w white
- bl black
- g yellow/green
- y yellow
- gr green
- gy grey

(*) Connect a resistive load between 10VA and 50VA.

2.16 Ladder diagram



Wire line type
 _____ factory wiring
 - - - - - field wiring

Key
 905MN15 Main board
 0-10V 0-10 V signal input
 RT Room/heat demand thermostat
 TB1 Low voltage terminal box
 TB2 High voltage terminal box
 905 PB Display board
 RP Return temperature sensor
 DHW Indirect storage tank sensor
 EP Exhaust flue temperature sensor
 SP System temperature sensor
 OS Outdoor temperature sensor
 FS Flue gas air pressure switch
 FL Flow-meter

MPS Minimum water pressure switch
 ST Water high-limit safety thermostat
 FP Supply temperature sensor
 LWCO Low Water Cut Off
 BUS1 Bus connection
 BUS2 Bus connection
 MS Power switch
 SCP Indirect tank pump
 CHP Central heating system pump
 AL Alarm output
 TMP Boiler circulator
 DE Ignition/detection electrode
 FA1 Fan
 GV1 Gas valve
 P Pump
 IE Flame sensor
 HV High voltage

Cable colour
 b brown
 h blue
 r red
 w white
 bl black
 g yellow/green
 y yellow
 gr green
 gy grey
 o orange

2.17 Electrical connections

The **Condexa PRO NA** is manufactured fully wired and only needs to be connected to the main power supply, the room/heat demand thermostat and any other system components.

If an external electrical source is utilized, the boiler, when installed, must be electrically bonded to ground in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70 and/or the Canadian Electrical Code Part 1, CSA C22.1, Electrical Code.

- ⚠ CAUTION:** The following is mandatory:
- The use of an omnipolar magnetothermic switch, line disconnecting switch in compliance with standards (contact opening of at least 1/8" [3mm])
 - Respect the connection L (line) - N (neutral). Keep the ground conductor 13/16" (20 mm) longer than the power supply conductors
 - Refer to the wiring diagrams in this manual for all electric operations.

⚠ CAUTION: The use of adaptors, multiple sockets and extensions to power the appliance is not allowed

⚠ CAUTION: to connect external electric components, it is necessary to use auxiliary relays and/or contactors to be fitted in a dedicated external electrical panel

⚠ DANGER: Any work on the electrical system must be carried out only by qualified personnel in compliance with all legal provision and safety regulations in particular

⚠ WARNING: Secure the wires into dedicated wire ties in order to always guarantee their correct positioning within the appliance.

⚠ WARNING: Electrical supply wires and control wires (room/heat demand thermostat, external temperature sensors, etc.) must be separate from one another and fitting inside independent ribbed PVC sheaths up to the electrical panel.

⚠ CAUTION: the boiler must be supplied with 120V power supply.

⚠ CAUTION: Never shut the appliance off during normal operation (with the burner on) by shutting off the electrical power supply using the On-Off key or an external switch. This could cause the primary heat exchanger to overheat.

⚠ NOTE: To switch the boiler off (during the heating stage) use a room/heat demand thermostat. The On-Off key can only be utilized when the appliance is in stand-by or emergency mode.

⚠ Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation; verify proper operation after servicing.

⚠ CAUTION: Before connecting any external electrical components to the appliance (regulators, electric valves, climate control probes, etc.), check to make sure that their electrical characteristics are compatible with the available inputs and outputs (voltage, absorption, acceleration current).

⚠ WARNING: Always check the proper operation of the "grounding conductor" for the electrical system to which the appliance will be connected.

⚠ NOTE: **RIELLO** shall bear no responsibility for any personal injuries or property damage caused by non-compliance with wiring diagrams or the electrical system's incorrect/lacking connection to the grounding system, or by non-compliance with applicable Standards.

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

⊖ WARNING: It is prohibited to lay power supply and room/heat demand thermostat cables near hot surfaces (delivery pipes). If they may come into contact with parts that have a temperature of over 122 F (49 C), use a suitable type of cable.

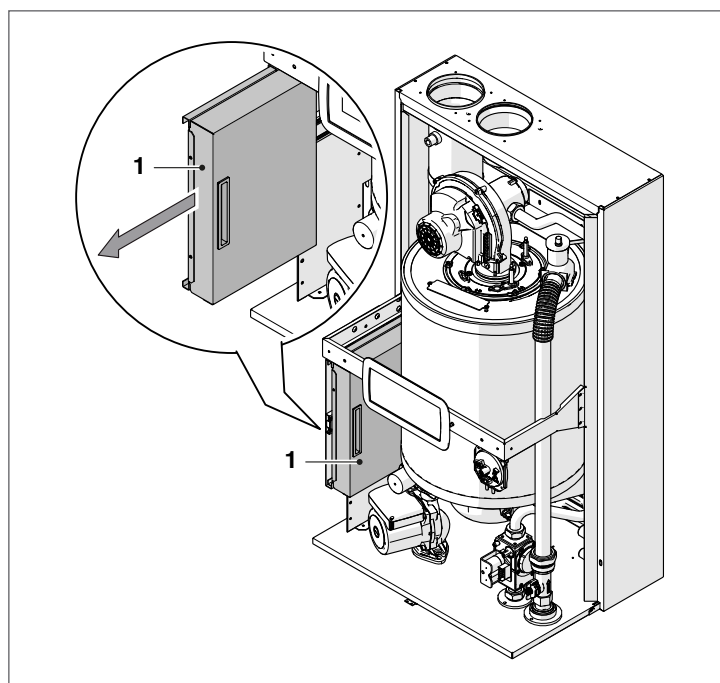
⊖ DANGER: It is prohibited to touch electric appliances with damp/wet body parts or when your feet are wet.

⊖ WARNING: It is prohibited to leave the appliance exposed to weather elements (rain, sun, wind, etc.).

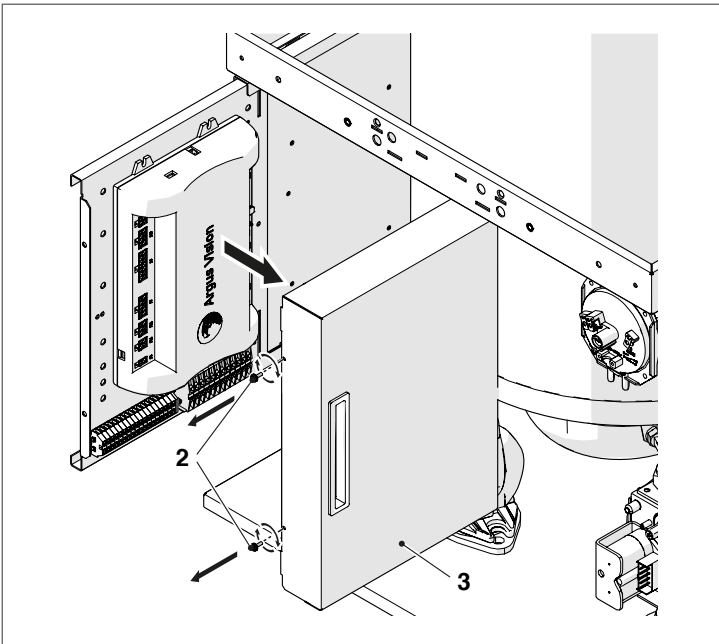
⊖ WARNING: It is prohibited to pull, detach, or twist any electric cables coming from the boiler even when the latter is disconnected from the main power supply.

Proceed as follows to access the control panel terminals:

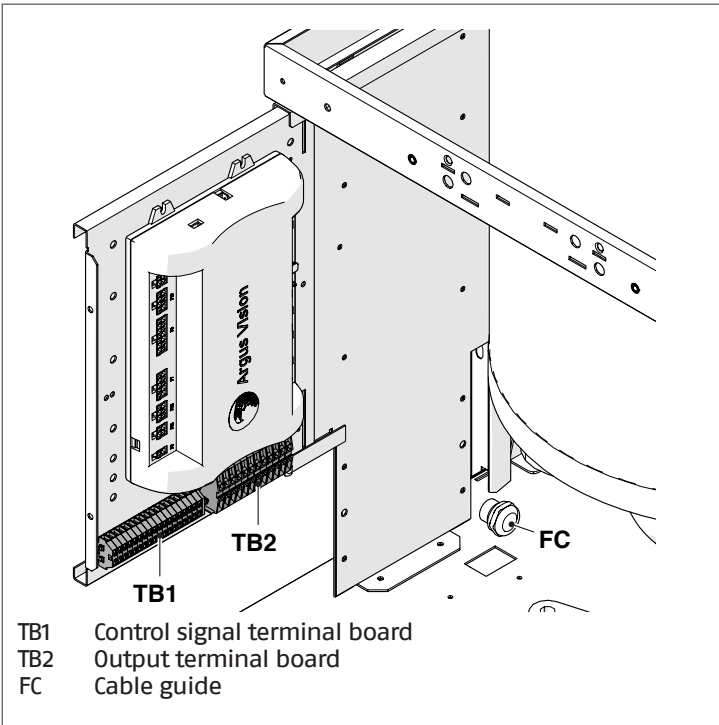
- Remove the locking screw and the panel's front side
- Pull and slide the electrical panel box towards the outside (1)



Loosen the screws (2) and remove the cover (3)



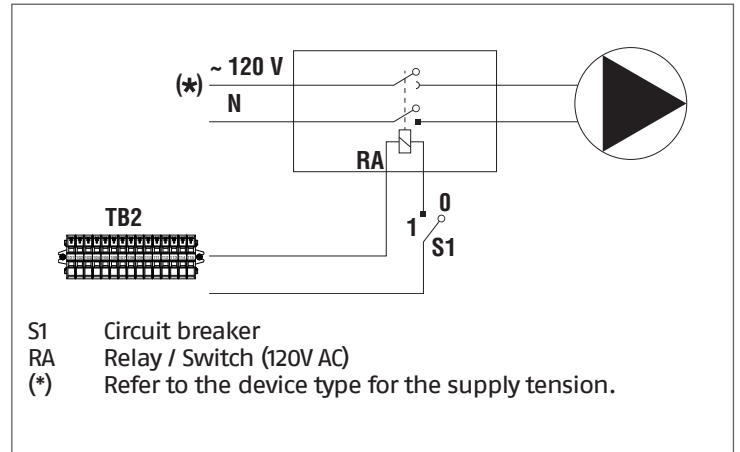
- Identify the Control signal terminal board (TB1) and the high-tension terminal board (TB2)



TB1 Control signal terminal board
 TB2 Output terminal board
 FC Cable guide

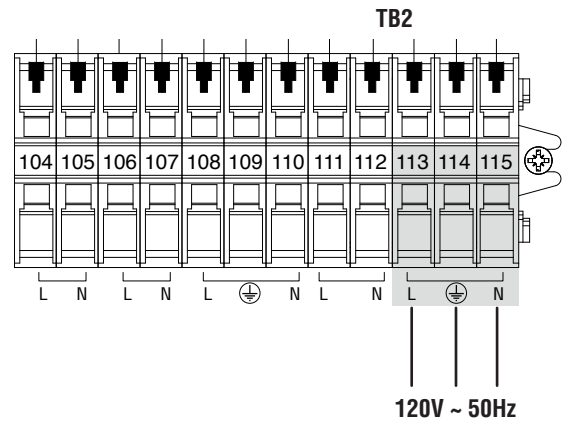
⚠ NOTE: For the connection of the devices connected to the PCB (pumps, circulators and diverting / mixing valves) use interposed relays unless the maximum absorption of all components connected to the board (including the boiler's circulator) is less than or equal to 1.5 A. Relay(s) sizing is the responsibility of the installer.

For connection, see the following figure:



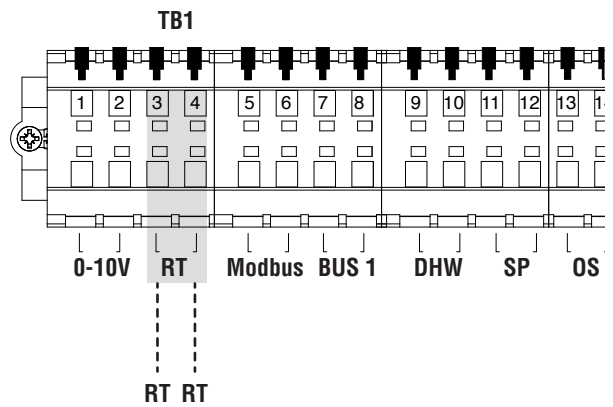
- Install electrical wiring in compliance with the diagrams shown below

Power supply



L Live
 N Neutral
 PE Earth/ground

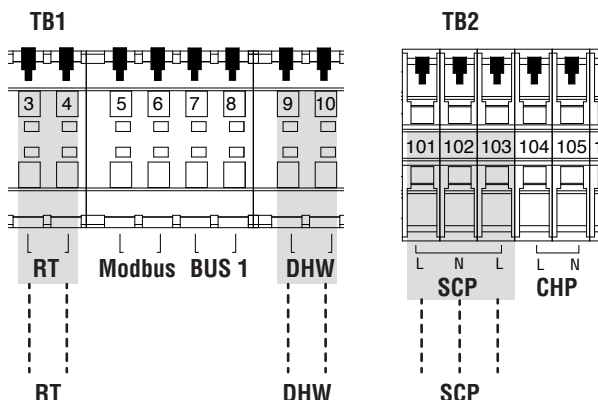
Electrical wiring referred to layout 1 at page "20".



RT Room/heat demand thermostat

NOTE: The room thermostat connection must be dry (no voltage).

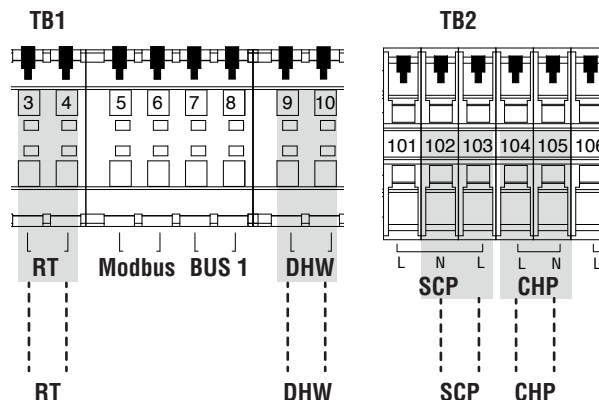
Electrical wiring referred to layout 2 at page "20".



- RT Room/heat demand thermostat
- DHW Connection to the indirect tank sensor (Mod. San. 1) or to aquastat (Mod. San. 2)
- SCP Connection to 3-way valve (13). Contacts 101-102 control the deviation on heating, contacts 102-103 control the deviation on domestic hot water

NOTE: The room thermostat connection must be dry (no voltage).

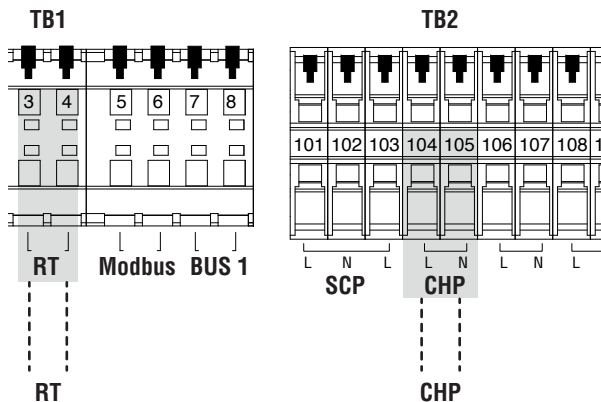
Electrical wiring referred to layout 4 at page "21".



- RT Room/heat demand thermostat
- DHW Connection to the indirect tank sensor (Mod. San. 1) or to aquastat (Mod. San. 2)
- SCP Connection to the indirect tank pump
- CHP Connection to the high temperature system pump

NOTE: The room thermostat connection must be dry (no voltage).

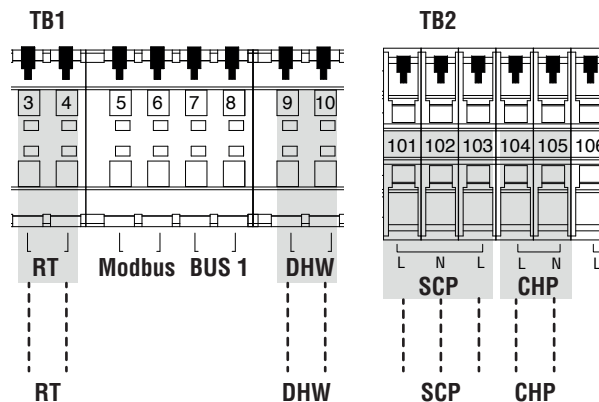
Electrical wiring referred to layout 3 at page "21".



- RT Room/heat demand thermostat
- CHP Connection to the high temperature system pump

NOTE: The room thermostat connection must be dry (no voltage).

Electrical wiring referred to layout 5 at page "22".



- RT Room/heat demand thermostat
- DHW Connection to the indirect tank sensor (Mod. San. 1) or to aquastat (Mod. San. 2)
- SCP Connection to 3-way valve (13). Contacts 101-102 control the deviation on heating, contacts 102-103 control the deviation on domestic hot water
- CHP Connection to the high temperature system pump

NOTE: The room thermostat connection must be dry (no voltage).

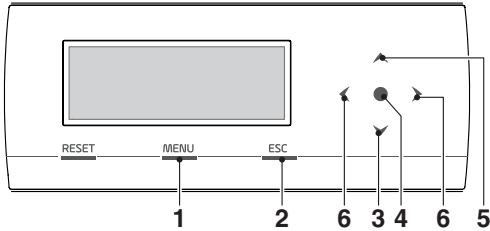
⚠ NOTE: Some electric connections of the terminal block have a double function. With special reference to the principle schemes 2 and 5 where no tank pump is used, the three-way valve of each boiler must be connected to the above-mentioned connections 101-102-103.

2.18 Electronic control

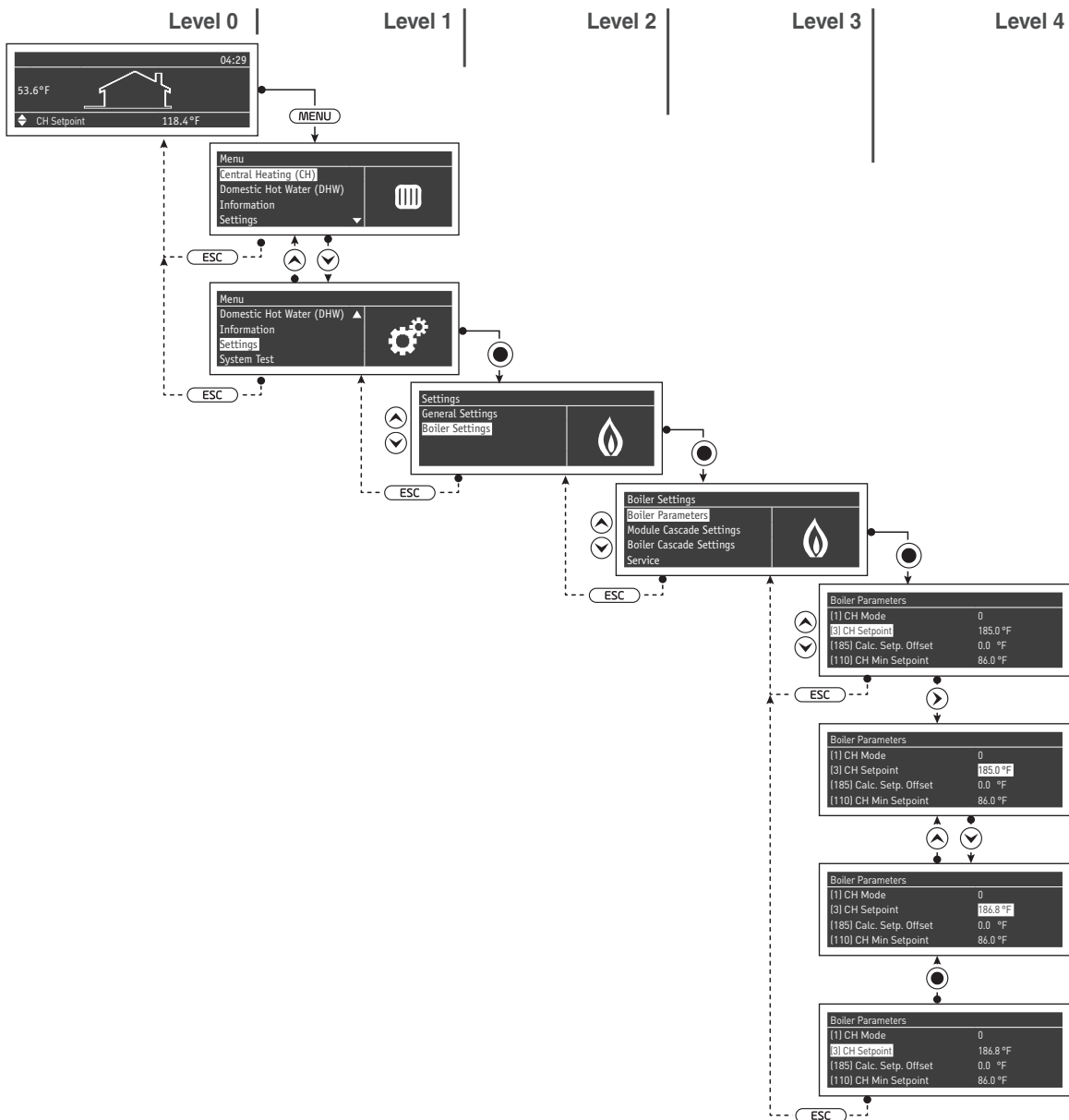
The electronic control interface menu is multi-level.

Navigation between the various levels is shown in the figures below.

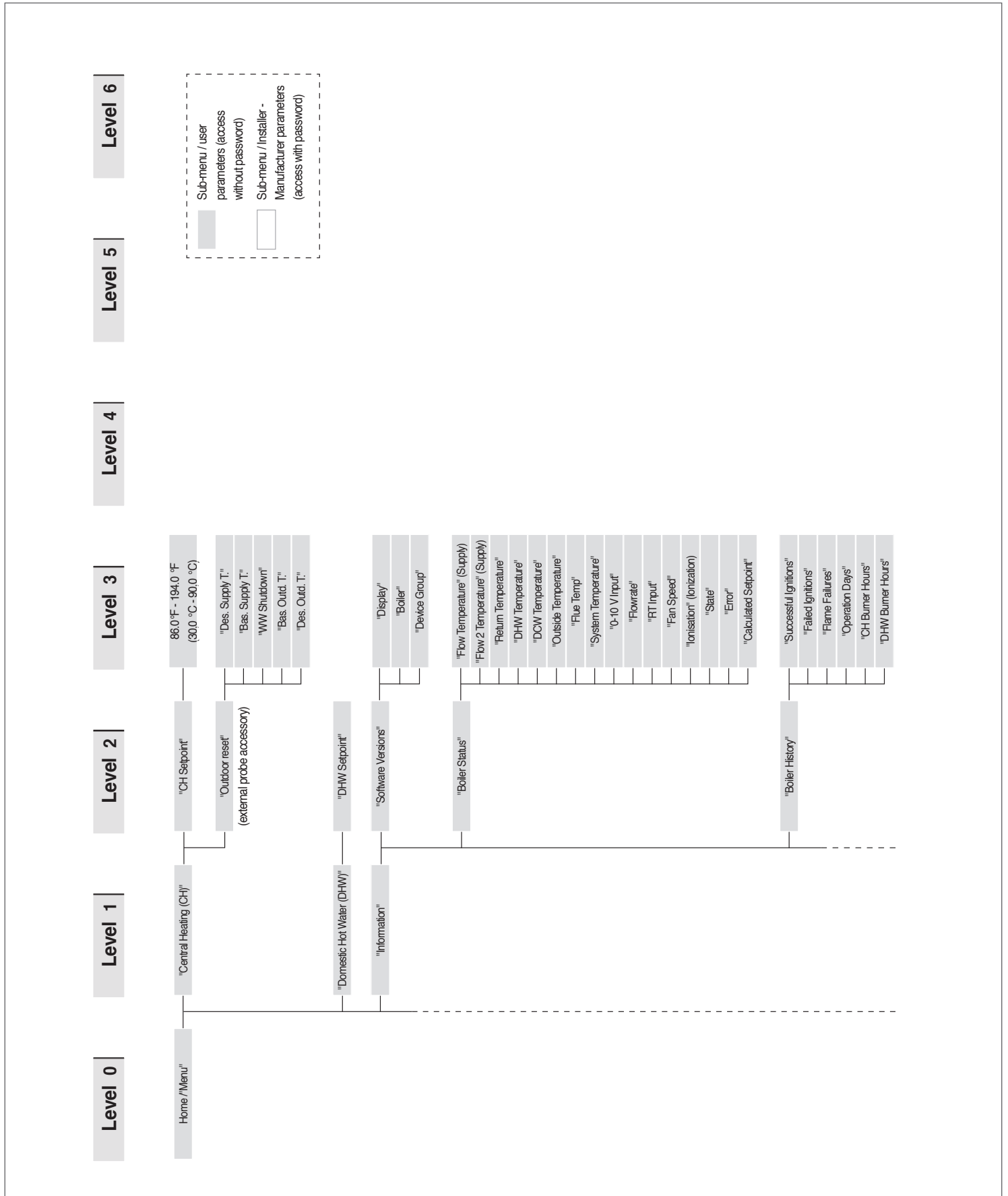
Level 0 displays the Home Screen (Home). Level 1 displays the Main Menu screen. The subsequent levels are activated depending on available sub-menus. For the full layout, see section "Control panel". For how to access and change the parameters, see the picture on the next page. The parameters for the installer are accessible only after entering the security password (see section "Control panel"). Please note that the boiler's operating parameters are identified with a number, all other additional functions are simply descriptive.



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



2.18.1 Menu structure



Level 6

Level 5

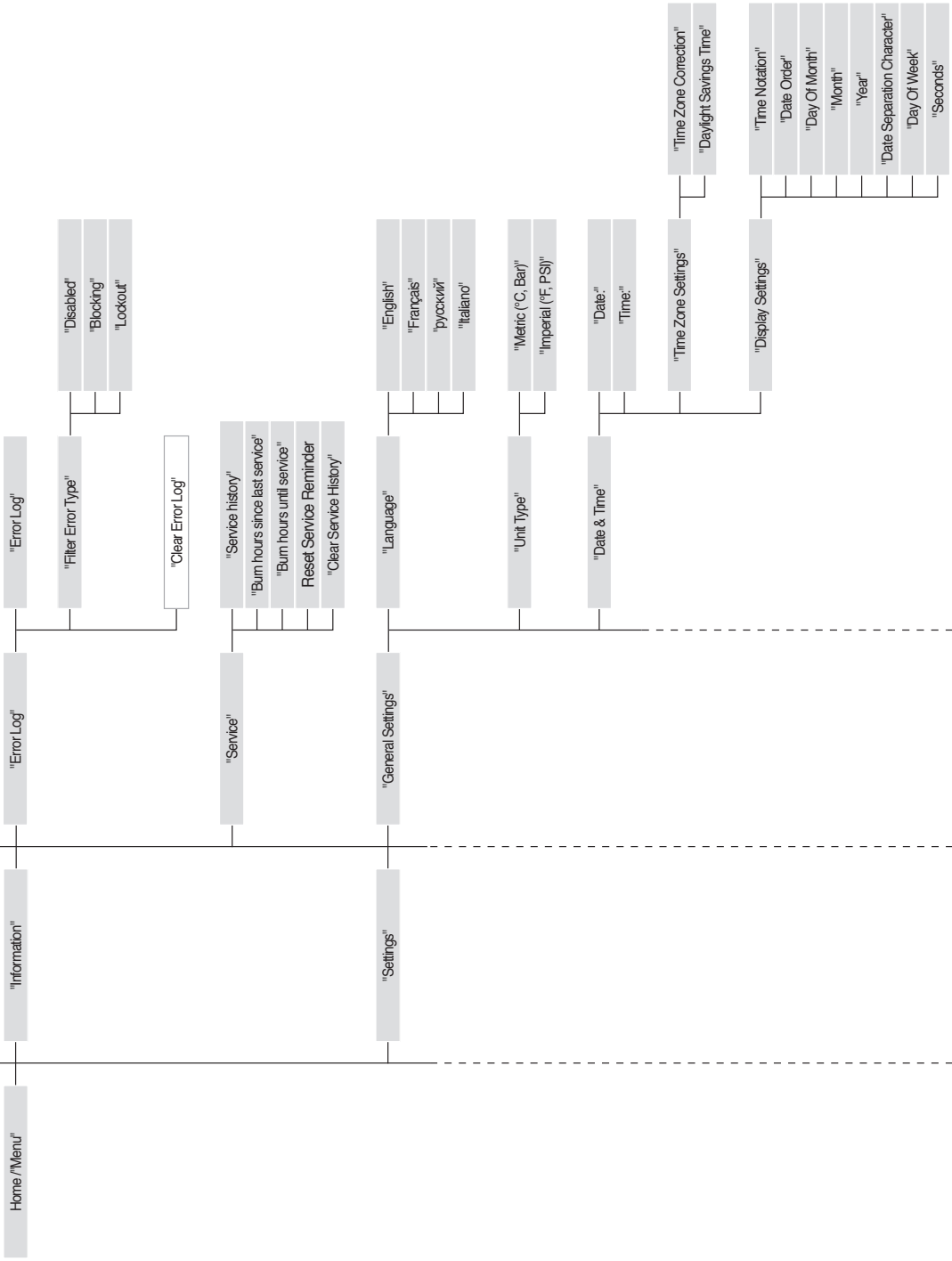
Level 4

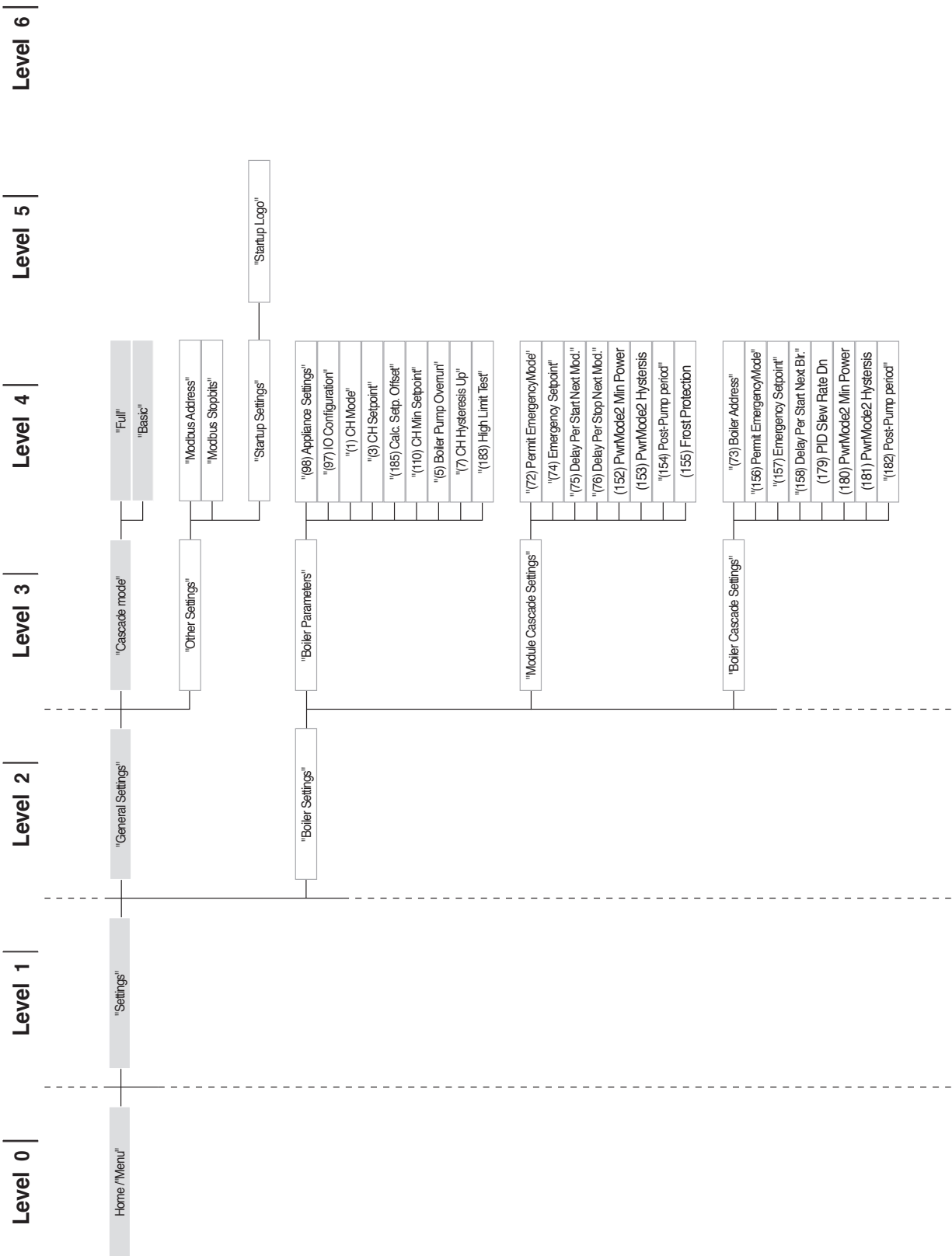
Level 3

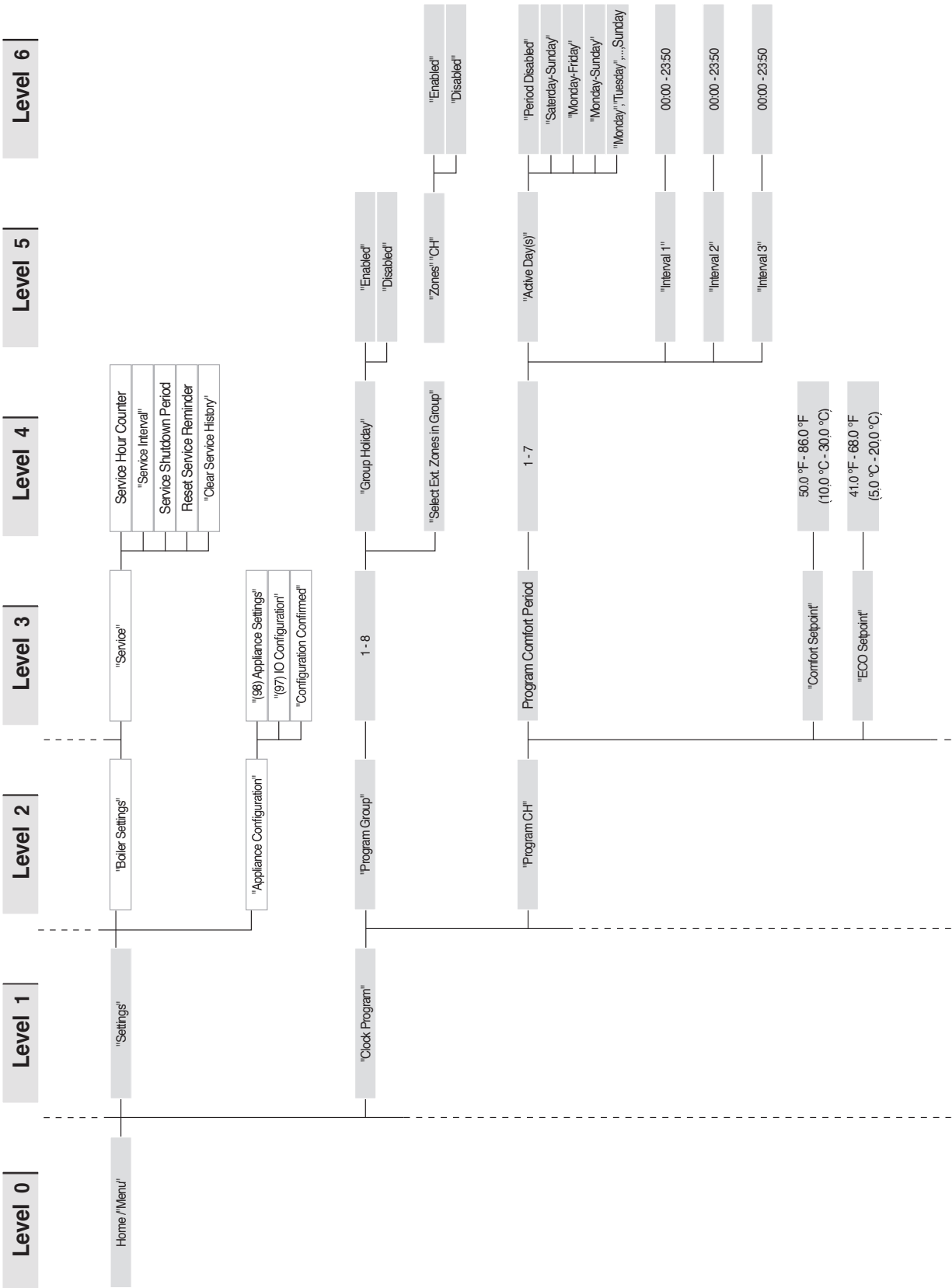
Level 2

Level 1

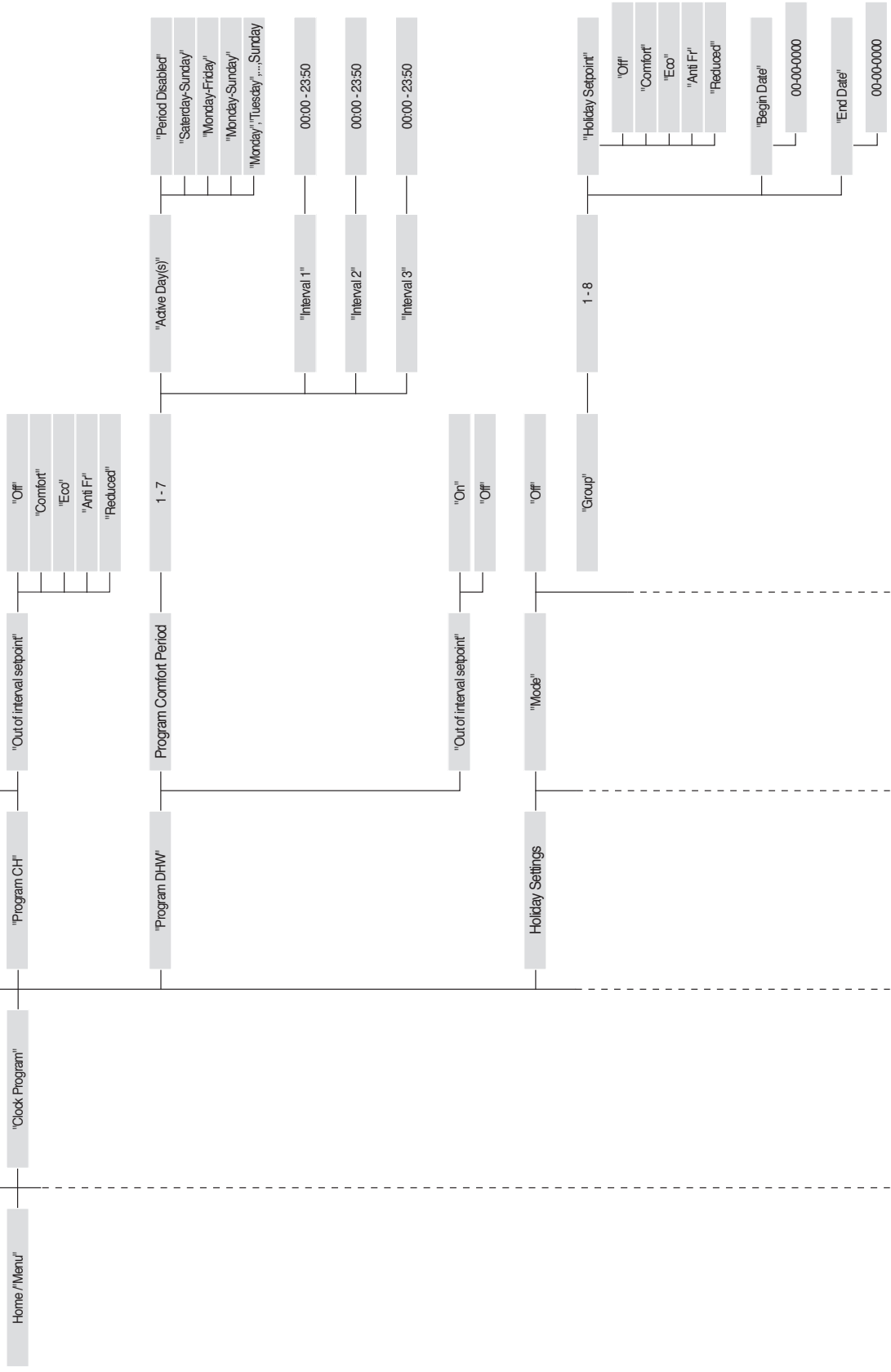
Level 0

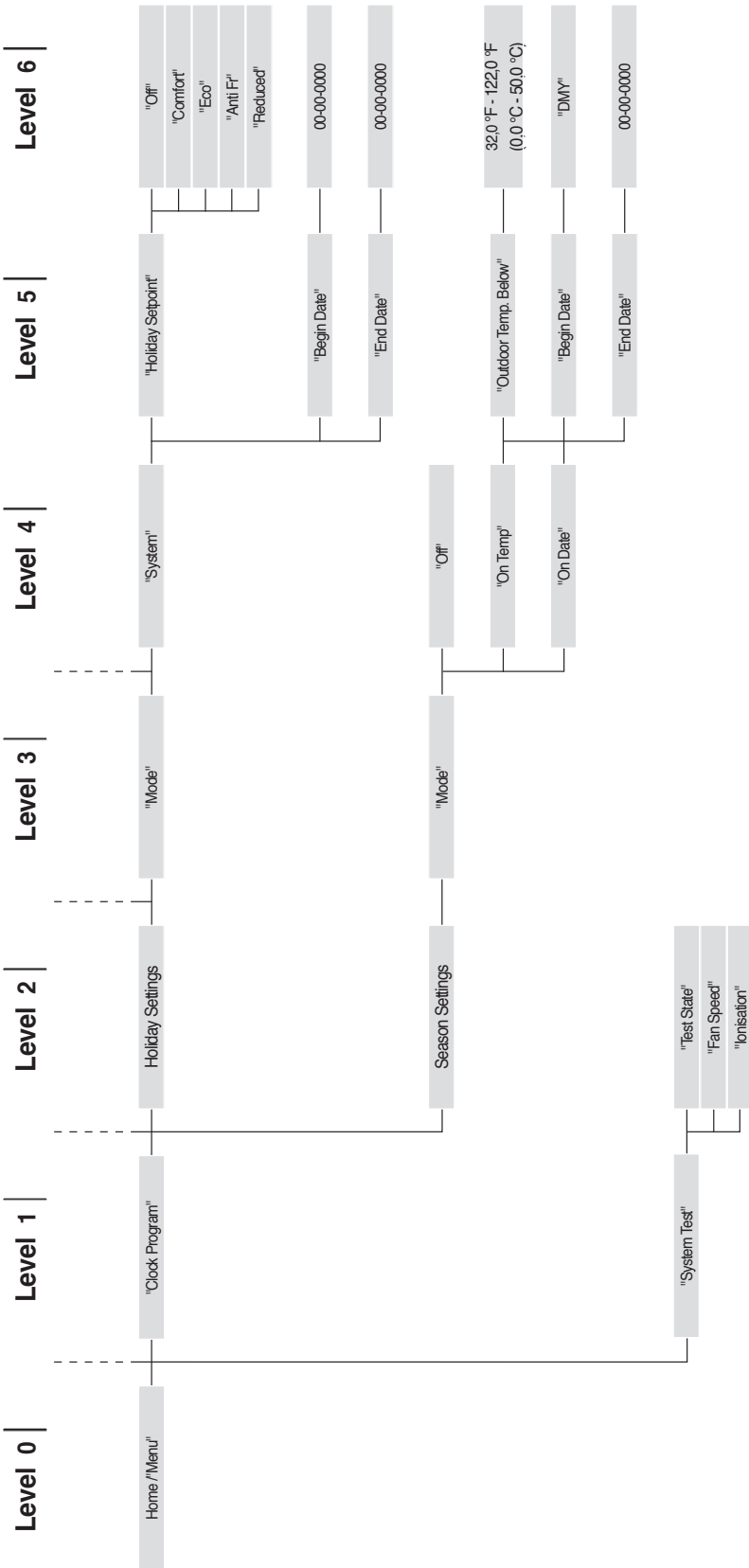






Level 0 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6





2.18.2 Parameters' list

Parameters are listed base on the reference menu.

Reference Menu

M1	Boiler parameters menu
M2	System cascade settings menu
M3	Boiler cascade settings menu
M4	Appliance configuration menu

Access type

U	End user
I	Installer

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M1	1	CH mode	Defines the boiler's various heating operation modes.	0 - 5	0		I	Heating
M1	3	CH set-point	Defines the desired supply temperature in heating mode (Par. 1) = 0.	Par. 23 - Par. 24	158 (70)	°F (°C)	U	Heating
M1	109	Calc. set-point off-set	Establishes the set-point offset value calculated in climatic mode (Par. 1= 1). Offsets the climatic curve in presence of mild outdoor temperatures.	Off, - 10 - 10	0		I	Heating
M1	110	CH Min. Set-point	Sets the minimum supply temperature value in heating mode (Par. 1) = 4.	68 - 122 (20 - 50)	86 (30)	°F (°C)	I	Heating
M1	111	CH Min. Set-point	Sets the maximum supply temperature value in heating mode (Par. 1) = 4.	122 - 194 (50 - 90)	176 (80)	°F (°C)	I	Heating
M1	5	Boiler Pump Overrun	Sets the overrun time in seconds of the boiler's circulator during stand-alone operation; cascade operation determines the boiler's overrun after switch-off due to temperature control.	0 - 900	140	Sec.	I	Heating
M1	7	CH Hys-teresis	Sets the value in degrees beyond the set-point at which the burner switches off for thermoregulation.	0 - 36 (0 - 20)	11 (5)	°F (°C)	I	Heating
M1	112	CH Hys-teresis Down	Sets the value in degrees below the set-point at which the burner switches on again for thermoregulation.	0 - 36 (0 - 20)	11 (5)	°F (°C)	I	Heating
M1	9	An-ti-cycle Period	Sets the stand-by time before the appliance is switched on again after it switches off due to thermoregulation, independently from the supply temperature dropping below the value indicated in Par. 10. Parameter valid only in stand-alone mode.	10 - 900	120	Sec.	I	Heating
M1	10	An-ti-cycle Temp. Diff.	Sets the value in degrees below which the burner switches on again notwithstanding from the time spent at Par. 9.	0 - 36 (0 - 20)	60.8 (16)	°F (°C)	I	Heating
M1	14	Max. Power CH	Sets the heating's % max. power.	50 - 100	100	%	I	Heating
M1	15	Min. Power CH/DHW	Sets the heating's % min. power.	1 - 30	1	%	I	Heating
M1	19	Design Supply Temp.	Defines the max. set-point at the minimum outdoor temperature for climatic regulation.	86 - 194 (30 - 90)	176 (80)	°F (°C)	U	Heating
M1	20	Design Outdoor Temp.	Defines the minimum outdoor temperature to which the maximum set-point can be associated for climatic regulation.	-52 - 52 (-25 - 25)	0 (0)	°F (°C)	U	Heating
M1	21	Baseline Supply Temp.	Defines the minimum set-point at the maximum outdoor temperature for climatic regulation.	86 - 194 (30 - 90)	104 (40)	°F (°C)	I	Heating
M1	22	Baseline Outdoor Temp.	Defines the maximum minimum outdoor temperature to which the minimum set-point can be associated for climatic regulation.	-32 - 86 (0 - 30)	68 (20)	°F (°C)	I	Heating

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M1	23	Design Supply Min. Limit	Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4).	39 - 180 (4 - 82)	86 (30)	°F (°C)	I	Heating
M1	24	Design Supply Max. Limit	Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4).	81 - 194 (27 - 90)	176 (80)	°F (°C)	I	Heating
M1	25	Warm Weather Shutdn	Defines the temperature at which climatic regulation is switched off.	-32 - 95 (0 - 35)	71.6 (22)	°F (°C)	I	Heating
M1	26	Boost Temp Increment	Establishes the set-point temperature and increases delta T, if the heat demand in heating mode is not satisfied after the time interval specified in Par. 27 (applies only to stand-alone mode only).	0 - 54 (0 - 30)	0 (0)	°F (°C)	I	Heating
M1	27	Boost Time Delay	Defines the time interval after which the set-point is increased as defined in Par. 26 (applies only to stand-alone mode).	1 - 120	20	Min.	I	Heating
M1	28	Night Setback Temp.	Used in heating mode Par. 1= 2 or 3. Establishes how many degrees the supply set-point is reduced when the RT (room thermostat/heat demand) contact is closed.	0 - 86 (0 - 30)	50 (10)	°F (°C)	I	Heating
M1	35	DHW mode	Establishes the domestic hot water circuit's operation mode.	0 Disabled 1 Tank + Sensor 2 Tank + aquastat	0		I	DHW
M1	113	Max. Power DHW	Defines the domestic hot water circuit's max. % power.	50 - 100	100	%	I	DHW
M1	114	Min. Power DHW	Defines the domestic hot water circuit's minimum % power.	1 - 30	1	%	I	DHW
M1	36	DHW Tank Hyst. Down	Defines the hysteresis to initiate the domestic hot water demand.	0 - 36 (0 - 20)	9 (5)	°F (°C)	I	DHW
M1	37	DHW Tank Hyst. Up	Defines the hysteresis to stop the domestic hot water demand.	0 - 36 (0 - 20)	9 (5)	°F (°C)	I	DHW
M1	38	DHW Tank Supply Extra	Defines the primary circuit's set-point increase in degrees compared to the temperature set for the domestic hot water tank.	0 - 54 (0 - 30)	27 (15)	°F (°C)	I	DHW
M1	42	DHW Priority	Defines the priority type: On: priority for DHW; Off: priority for CH; Time: time priority between the two circuits defined by Par. 43; Parallel: parallel priority managed on the basis of the primary circuit's temperature compared to the heating circuit's set-point.	ON/OFF/Time Parallel	On		I	DHW
M1	43	DHW Max. Priority Time	Establishes the time in minutes during which priority is alternatively allocated to the DHW and CH circuits when Par. 43 is set to "time" mode.	1 - 255	30	Min.	I	DHW
M1	44	DHW Pump Overrun	Establishes the overrun time in seconds for the domestic hot water mode with the boiler in stand-alone operation; cascaded operation defines the boiler's overrun after switch-off due to thermoregulation.	0 - 900	60	Sec.	I	DHW

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M1	48	DHW tank set-point	Establishes the DHW indirect storage tank set-point Par. 35 in mode 2.	104-160 (40-71)	122 (50)	°F (°C)	U	DHW
M1	92	Fan Speed Maximum	Defines the fan rpm at max. power (it depends on the model and is defined at Par. 98).	0-12750	Defined by Par. 98	RPM	I	General
M1	93	Fan Speed Minimum	Defines the fan rpm at minimum power (it depends on the model and is defined at Par. 98).	0-12750	Defined by Par. 98	RPM	I	General
M1	94	Fan Speed Ignition	Defines the fan rpm when the boiler is switched on (it depends on the model and is defined at Par. 98).	0-12750	Defined by Par. 98	RPM	I	General
M1	116	Prog. Input 1.	The value of this parameter is defined by Par. 97.	0 Disabled 1 Water pressure sensor 2 CH flow switch 3 Flue pressure switch	Defined by Par. 97		I	General
M1	117	Prog Input 2.	The value of this parameter is defined by Par. 97.	0 Disabled 1 DHW flow sensor 2 DHW flow switch 3 CH flow sensor	Defined by Par. 97		I	General
M1	118	Prog Input 3.	The value of this parameter is defined by Par. 97.	0 Disabled 1 Drain switch 2 Gas pressure switch	Defined by Par. 97		I	General
M1	120	Prog Input 5.	The value of this parameter is defined by Par. 97.	0 Disabled 1 T_Return sensor 2 Extern switch	Defined by Par. 97		I	General
M1	121	Prog Input 6.	The value of this parameter is defined by Par. 97.	0 Disabled 1 T_Flue sensor 2 Flue switch 3 APS switch	Defined by Par. 97		I	General
M1	122	Prog Input 7.	The value of this parameter is defined by Par. 97.	0 Disabled 1 T_Flue_2 sensor 2 T_Flue_2 + Bl. Flue 3 T_System sensor 4 Blocked Flue switch 5 Cascade Sensor	Defined by Par. 97		I	General
M1	123	Prog Input 8.	The value of this parameter is defined by Par. 97.	0 Disabled 1 T_Flue_2 sensor 2 T_Flue_2 + Bl. Flue 3 T_System Sensor 4 Blocked Flue Switch 5 Cascade Sensor	Defined by Par. 97		I	General

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M1	124	Prog. Input RT.	The value of this parameter is defined by Par. 97.	0 Disabled 1 Enabled	Defined by Par. 97		I	General
M1	125	Prog. Output 1.	The value of this parameter is defined by Par. 97.	0 Disabled 1 General Pump 2 CH Pump 3 DHW Pump 4 System Pump 5 Cascade Pump 6 Alarm Relay 7 Filling Valve 8 LPG Tank 9 External Igniter 10 Air Damper 14 Alarm Burner CC 15 Status Burner CC 17 Anti-legionella pump	Defined by Par. 97		I	General
M1	126	Prog. Output 2.	The value of this parameter is defined by Par. 97.	0 Disabled 1 General Pump 2 CH Pump 3 DHW Pump 4 System Pump 5 Cascade Pump 6 Alarm Relay 7 Filling Valve 8 LPG Tank 9 External Igniter 10 Air Damper 14 Alarm Burner CC 15 Status Burner CC 17 Anti-legionella pump	Defined by Par. 97		I	General
M1	127	Prog. Output 3.	The value of this parameter is defined by Par. 97.	0 Disabled 1 General Pump 10 Air Damper 11 HIS 12 Modulating Pump	Defined by Par. 97		I	General
M1	128	Prog. Output 4.	The value of this parameter is defined by Par. 97.	0 Disabled 1 General Pump 2 CH Pump 3 DHW Pump 4 System Pump 5 Cascade Pump 6 Alarm Relay 7 Filling Valve 8 LPG Tank	Defined by Par. 97		I	General
M1	129	Flow sensor	Defines the type of supply sensor used.	Bitron, Huba: DN8, DN10, DN15, DN15, DN20, DN25	Huba DN25		I	General
M1	138	Appliance type	Value can vary depending on appliance configuration based on Par. 97 and 98. This value is calculated by the board, which, based on an internal logic, defines as a single number the settings of Par. 97 and 98.	0 - 255	Depends on boiler model		I	General

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M1	139	Dair active	Activates bleeding the system's air. To activate air bleeding, it is necessary to switch on the boiler and change the parameter from "No" to "Yes". Wait for one minute. Switch off and restart. At this stage, when it is restarted the boiler will initiate the automatic bleeding procedure (lasting around 20 minutes). With the parameter set to "Yes", the procedure is carried out each time the boiler is switched off and restarted using its master switch. The value must be set to "No" if you do not wish to initiate the bleeding procedure when the boiler is switched on.	Yes, No	No		I	General
M1	140	Minimum Flow	Defines the flow rate below which the boiler is switched off. The value varies depending on the model.	0 - 26 (0.0 - 100)	Depends on boiler model	gal/min (l/min)	I	General
M1	107	Anti-Le-gionella day	Sets the weekday on which the anti-Le-gionella procedure is carried out.	Sun - Sat	Sun	Day	I	DHW
M1	108	Anti-Le-gionella Hour	Sets the time of the day during which the anti-Le-gionella procedure is carried out.	0 - 23	0	Hour	I	DHW
M2	72	Permit Emergency Mode	Activates the emergency mode. This mode comes on when communication between Managing and the primary circuit's sensor is lost. In this event, if Par. 72 is set to "Yes", the cascade is initiated, working to the fixed set-point determined by Par. 74.	Yes/No	Yes		U	Cascade
M2	74	Emergency Set-point	Set-point active in emergency mode.	68 - 194 (20 - 90)	158 (70)	°F (°C)	I	Cascade
M2	75	Delay Per Start Next Mod.	Defines the stand-by time in seconds to restart the subsequent cascade boiler in normal start mode.	5 - 255	120	Sec.	I	Cascade
M2	76	Delay Per Stop Next Mod.	Defines the stand-by time in seconds to switch off the last cascade boiler on in normal Off mode.	5 - 255	30	Sec.	I	Cascade
M2	142	Delay Quick Start Next	Defines the stand-by time in seconds to restart the next cascade boiler in quick start mode.	5 - 255	60	Sec.	I	Cascade
M2	143	Delay Quick Stop Next	Defines the stand-by time in seconds to switch off the last cascade boiler on in Quick Stop mode.	5 - 255	15	Sec.	I	Cascade
M2	77	Hyst. Down Start Module	Defines how many degrees the temperature measured by the primary circuit's sensor must fall below the set-point in order for the subsequent boiler to be started after the time interval set by Par. 75.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M2	78	Hyst. Up Stop Module	Defines by how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for the subsequent module to be switched off after the time interval set by Par. 76.	0 - 72 (0 - 40)	7 (4)	°F (°C)	I	Cascade
M2	144	Hyst. Down Quick Start	Defines how many degrees the temperature measured by the primary circuit's sensor must go below the set-point in order for the subsequent boiler to be started after the time interval set by Par. 142 (quick-start mode).	0 - 72 (0 - 40)	36 (20)	°F (°C)	I	Cascade

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M2	145	Hyst. Up Quick Stop	Defines how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for the subsequent boiler to be switched off after the time interval set by Par. 143 (quick stop mode).	0 - 72 (0 - 40)	11 (6)	°F (°C)	I	Cascade
M2	146	Hyst. Up Stop All	Defines how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for all "On" sensor to be switched off at the same time.	0 - 72 (0 - 40)	14 (8)	°F (°C)	I	Cascade
M2	147	Number of Units	Defines the number of boilers of which the cascade system consists of.	1 - 6	6		I	Cascade
M2	148	Power Mode	Defines the cascade operation mode.	0 Disabled 1 Min burners 2 Max burners	2		I	Cascade
M2	79	Max. Setp. Offset Down	Defines the maximum decrease in the primary circuit's cascade set-point. It is based on the primary circuit's sensor reading.	0 - 72 (0 - 40)	5.6 (2)	°F (°C)	I	Cascade
M2	80	Max. Setp. Offset Up	Defines the maximum increase in the primary circuit's cascade set-point. It is based on the primary circuit's sensor reading.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M2	81	Start Mod. Delay Fact.	Defines the time in minutes from the moment the demand is triggered until the activation of the set-point increases or decreases provided for by Par. 79 and 80.	0 - 60	60	Min.	I	Cascade
M2	82	Next Module Start Rate	Defines the minimum power for at least one of the boilers in the cascade system in order for the next boiler to be switched on (if the other conditions linked to Par. 75 and 77 are met).	10 - 100	80	%	I	Cascade
M2	83	Next Module Stop Rate	Defines the maximum power for all the boilers in cascade in order for the last boiler on to be switched off (if the other conditions linked to Par. 76 and 78 are met).	10 - 100	25	%	I	Cascade
M2	84	Module Rotation Interval	It defines the time interval (in days) after which boilers are rotated.	0 - 30	1	Days	I	Cascade
M2	149	First Module to Start	Establishes the number of the next boiler to be rotated (this value is automatically updated at each rotation).	1 - 16	1		I	Cascade
M2	152	Pwr-Mode2 Min Power	Defines the power value (in percentage terms) against which the average power of all on boilers in cascade operation mode must be compared (Par. 148 = 2).	0 - 100	20	%	I	Cascade
M2	153	Pwr-Mode2 Hysteresis	Defines the Hysteresis power value (in percentage terms) compared to the average power of all on boilers in cascade operation mode (Par. 148 = 2).	0 - 100	40	%	I	Cascade
M2	154	Post-Pump Period	Defines pump overrun time in seconds at the end of the cascade heat demand.	0 - 255	60	Sec.	I	Cascade
M2	155	Frost Protection	Defines the temperature (detected by the primary sensor) below which the boiler circulator and the system circulator (with cascade configuration) activate. If the temperature of the primary sensor falls another 9°F (5°C) below the value set by Par. 155, then a request to activate the cascade system is generated. When the temperature of the primary sensor reaches the value defined by Par. 155 increased by 9°F (5°C), then the request ceases and the cascade returns to stand-by mode.	18 - 54 (10 - 30)	27 (15)	°F (°C)	I	Cascade

Menu	Par. No.	Nr. displayed Display	Description	Range	Default setting	UM	Access type	Category
M3	73	Boiler Address	Defines the way in which the boiler is managed.	Managing, Stand-alone, Dependent	Stand-alone		I	Cascade
M3	169	Max. Setp. Offset Down	Defines the maximum decrease in the primary circuit's cascade set-point and is based on the secondary circuit's sensor reading.	0 - 72 (0 - 40)	5.6 (2)	°F (°C)	I	Cascade
M3	170	Max. Setp. Offset Up	Defines the maximum increase in the primary circuit's cascade set-point and is based on the secondary circuit's sensor reading.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M3	171	Start Mod. Delay Fact.	Defines the time in minutes from the moment the request is triggered until the activation of the set-point increases or decreases provided for by Par. 169 and 170.	0 - 60	40	Min.	I	Cascade
M4	98	Appliance Settings	Supports uploading the values of Par. 92, 93 and 94 from a set of pre-defined rpm values that identifies the boiler type.	1 - 26	Condexa PRO NA 75 P=25 Condexa PRO NA 117 P=23		I	General
M4	97	IO Configuration	Supports uploading the values of Par. from 116 to 128 from a set of pre-defined rpm values that defines the configuration of the boiler's inputs and outputs.	22	22		I	General

3 CONFIGURATION OF THE MAIN BLOCK DIAGRAMS

⚠ CAUTION: The DHW and heating circuits must be completed with expansion tanks of a suitable capacity and correctly sized pressure relief valves. The discharge of the pressure relief valves and the appliances must be connected in accordance with local code and the authorities having jurisdiction. In general, the pressure relief valve should be routed to a suitable drain, the drain pipe should be within 6 inches from the floor or drain. It is not acceptable for the pressure relief valve to be routed to the outdoors.

⚠ WARNING: The installer is responsible for selecting and installing the system components and must work in full compliance with correct technical regulations and legislation in force.

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

⚠ WARNING: For the connection of the devices connected to the terminal block (pumps, circulators and diverting / mixing valves) use interposed relays unless the maximum absorption of all components connected to the board (including the boilers circulator) is less than or equal to 1.5 A. Relay sizing is the responsibility of the installer depending on the type of connected device.

⊖ WARNING: It is prohibited to operate the boiler without water.

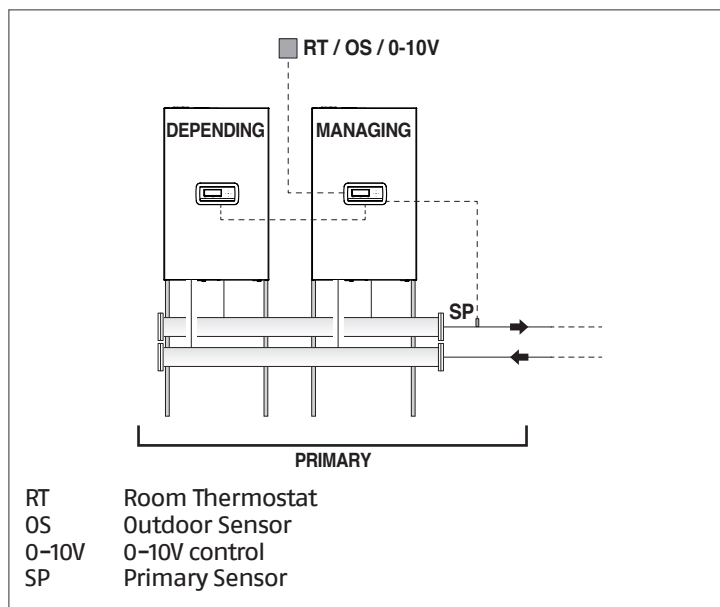
3.1 Configuration of the primary system

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

Cascaded boilers can be seen as the primary circuit of the heating system. This configuration could be ideal for replacing one or more larger boilers in an existing system if system reliability and efficiency is to be increased.

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

The primary sensor is required in order to manage the cascade setpoint and is essential for managing the boilers in harmony.



Operation of the primary system can be:

- Mode 0 - With fixed setpoint.
This configuration requires the connection of an ambient thermostat or heat request contact (RT).
- Mode 1 - In climatic mode with variable setpoint based on the outdoor temperature.
This configuration requires the connection of an ambient thermostat or heat request contact (RT) and an outdoor temperature sensor (OS), available as an accessory.
- Mode 2 - In climatic mode with intensity controlled by the ambient thermostat/heat request signal and variable setpoint based on the outdoor temperature.
This configuration requires the connection of an ambient thermostat or heat request contact (RT) and an outdoor temperature sensor (OS), available as an accessory.
- Mode 3 - With fixed supply set point and the boiler controlled by the ambient thermostat/heat request signal.
This configuration requires the connection of an ambient thermostat or heat request contact (RT).
- Mode 4 - With supply setpoint adjustment on the basis of the analog input 0-10V.
This configuration requires an external device (for example, PLC of the central heating system) able to generate this signal connected to the analog input 0-10 V.

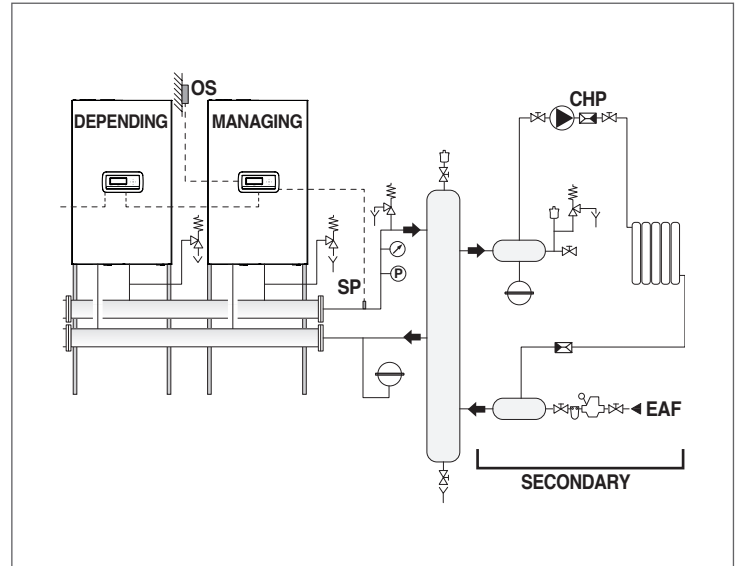
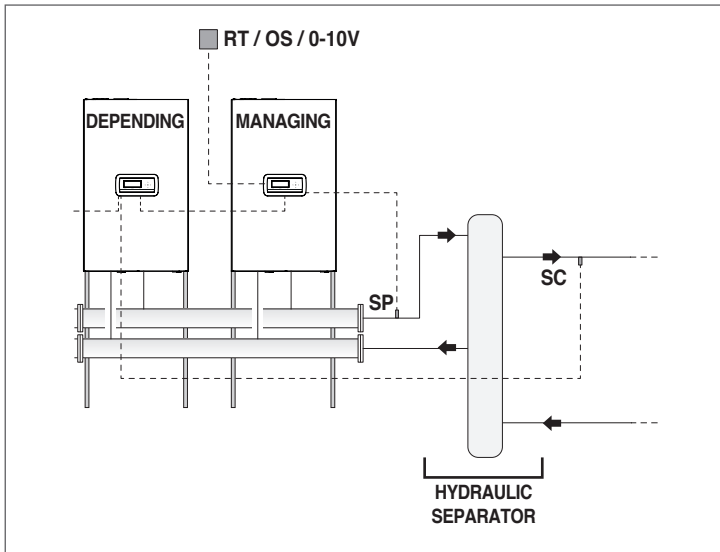
The functions described can be set using the "Managing" boiler's control interface. This is described in the manual of the individual thermal modules in the section "Setting the heating system".

The electrical and hydraulic connections of the system are to be completed by selecting the use of the system circulator (TMP) and two-way valves (V1) for each boiler (these devices are available as third party accessories).

3.2 Configuration of the secondary system

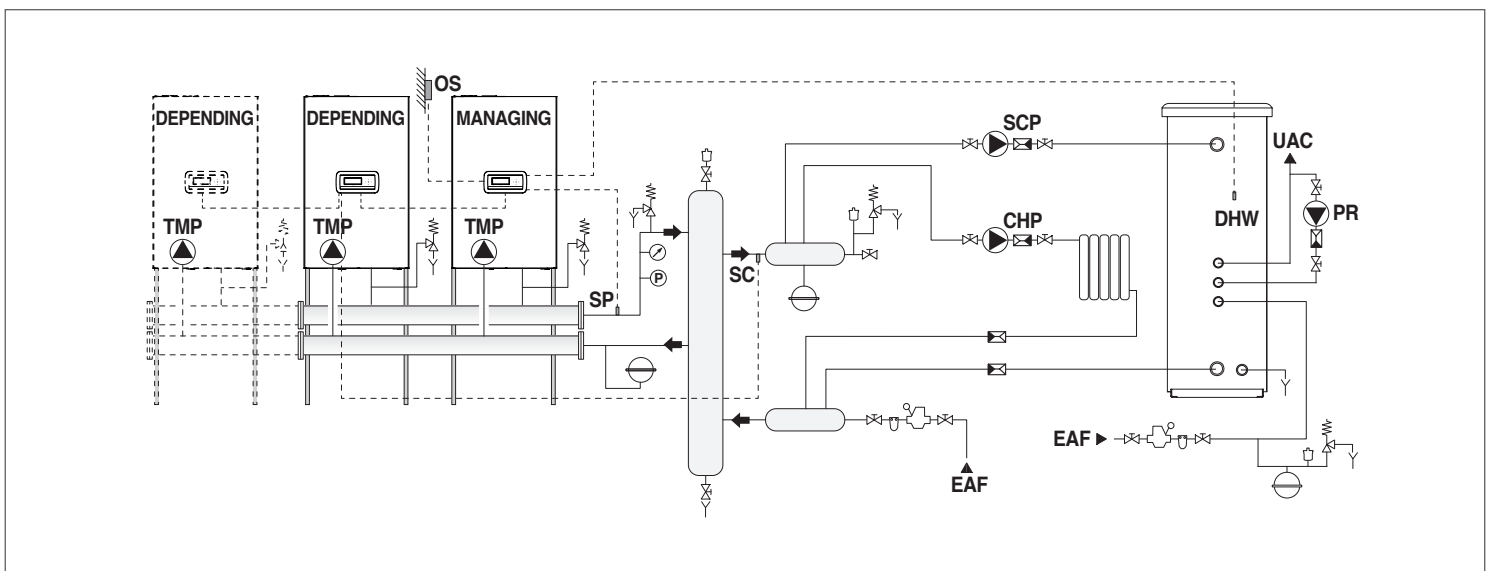
Optimal use of the boilers in cascade occurs by placing a hydraulic separator (available as a third party accessory) between the primary system (boilers in cascade) and the secondary system (such as heat distribution systems, DHW production). This device allows a different flow rate to be compensated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

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



The secondary system can be configured using the following accessories:

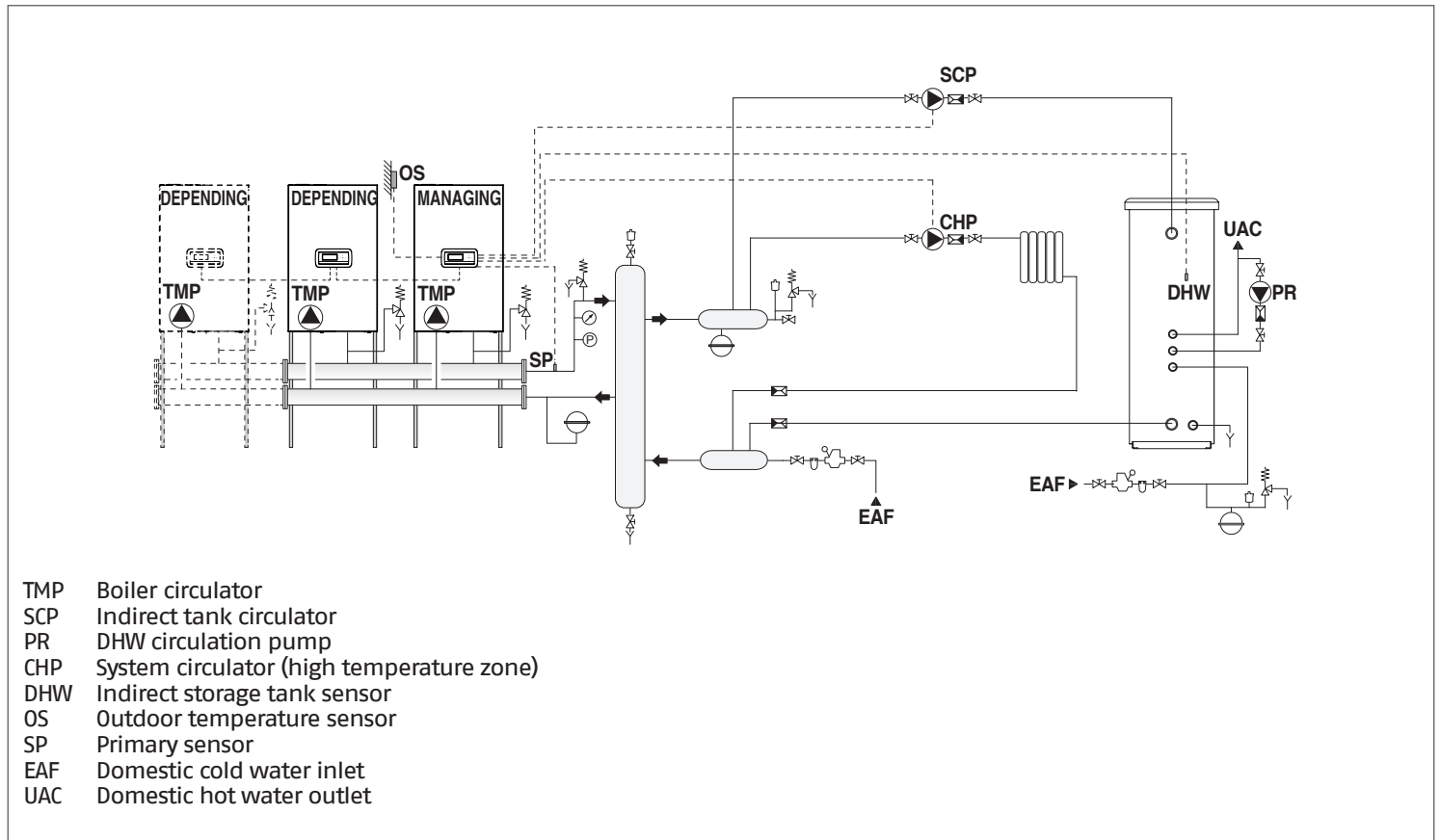
- Secondary sensor (SC)
This is required in order to manage the setpoint, and therefore the required temperature, downstream of the hydraulic separator.
The secondary sensor is connected to the controller of the first "Depending" boiler.
- Hot water tank sensor (DHW)
This is required in order to manage the production of DHW in combination with an indirect hot water tank circulator (SCP).
The indirect hot water tank sensor is connected to the controller of the "Managing" boiler.



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

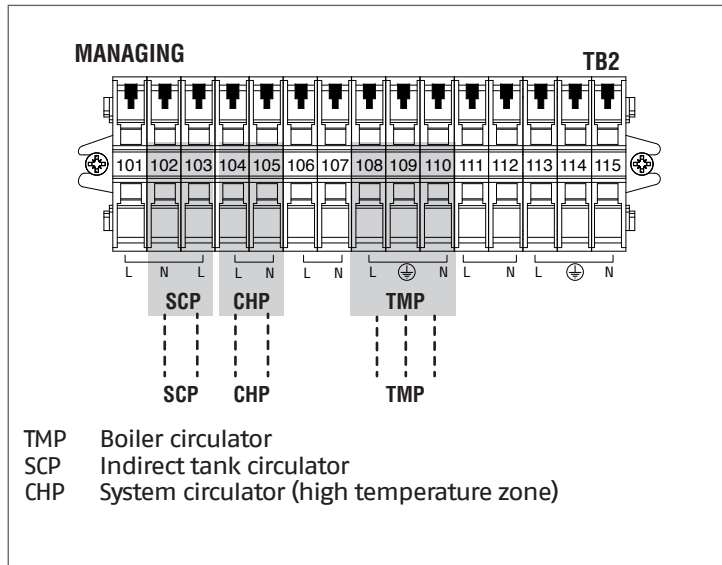
3.3 Block diagram 1

Circuit with boilers with their own circulator, connected in cascade.

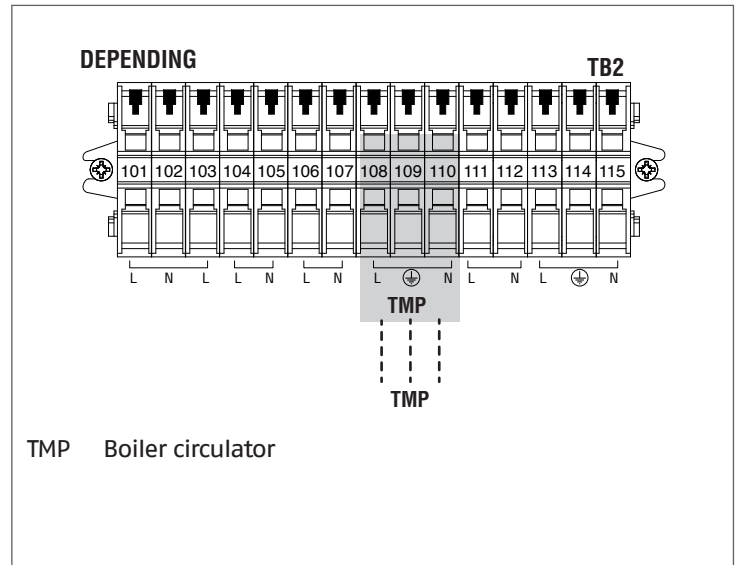


3.3.1 Electrical power connections Block diagram 1

MANAGING CONNECTIONS

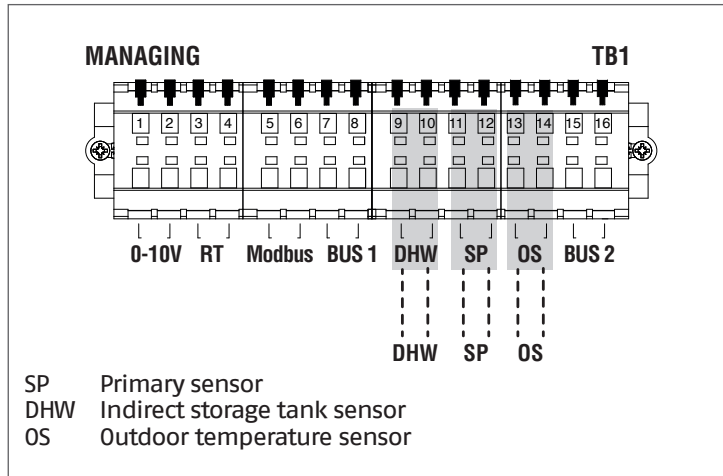


DEPENDING CONNECTIONS



3.3.2 Sensor connections Block diagram 1

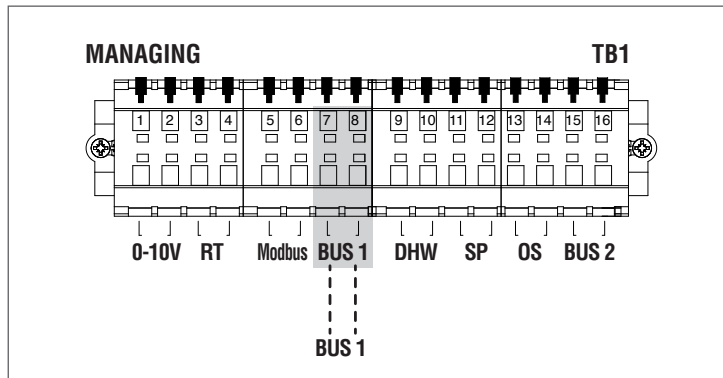
MANAGING CONNECTIONS



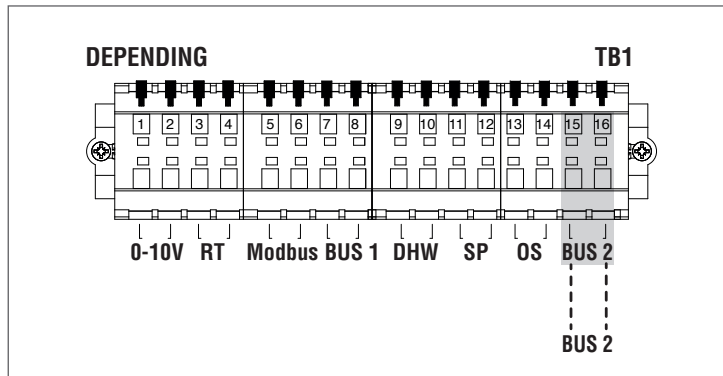
3.3.3 Bus connections Block diagram 1

See section "System management" for a detailed description of the connections between the boilers.

MANAGING CONNECTIONS



DEPENDING CONNECTIONS



3.4 System parameters Block diagram 1

NOTE: See the section "Commissioning and maintenance" for a detailed description on parameter operation

Essential parameters to be configured for the block diagram 1:

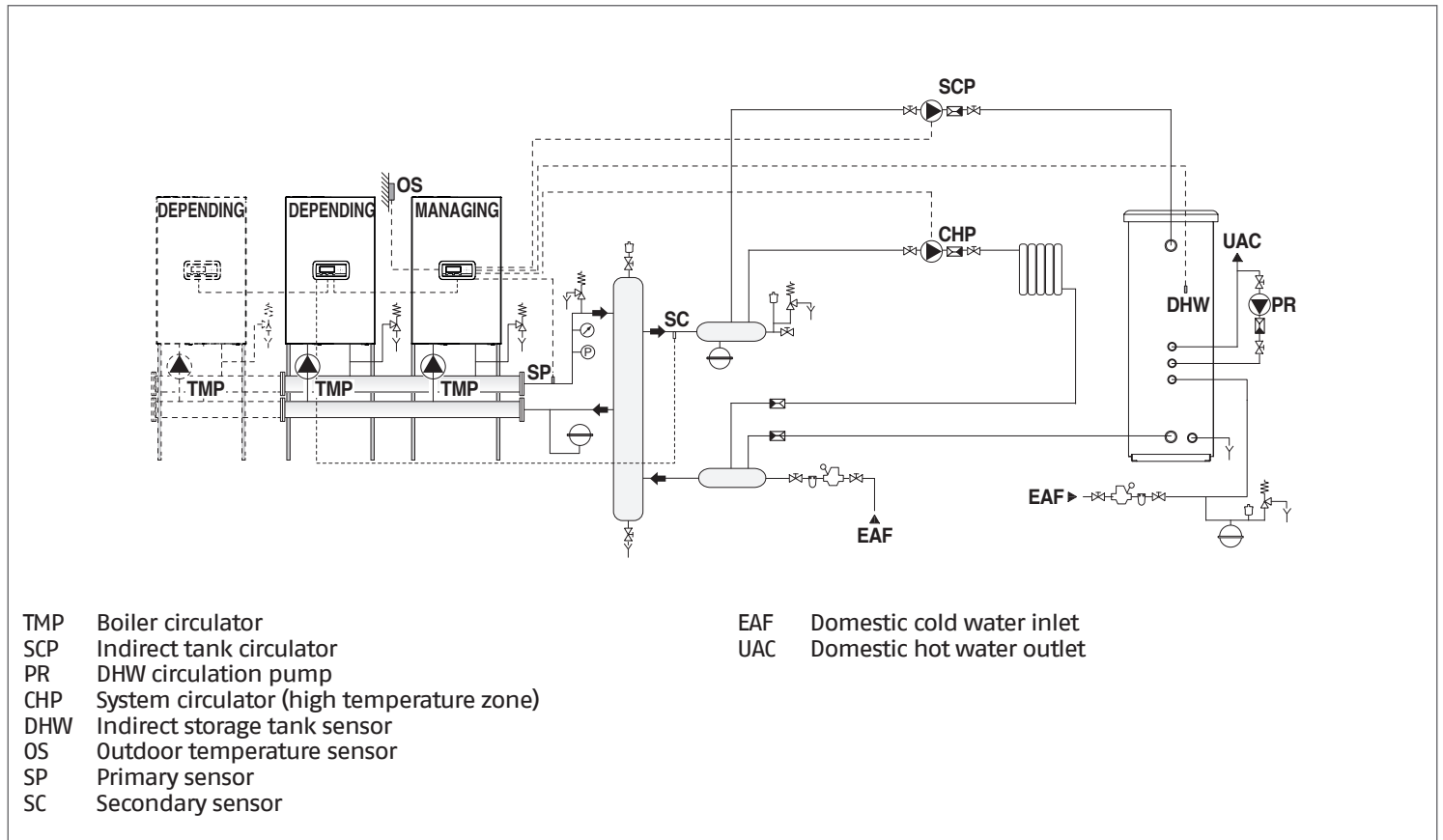
	Managing	Depending
S1	OFF	OFF
Dip-switch	1 to ON	2-10 to ON
Par.73	Stand-alone	Dependent
Par.147	no. of depending boiler installed	/
Par.7	greater than/equal to 18°F (10°C)	greater than/equal to 18°F (10°C)
Par.97	22	22

Specific parameters to be configured for the block diagram 1:

	Managing	Depending
Par.79	adjust according to requirements	/
Par.80	adjust according to requirements	/
Par.81	adjust according to requirements	/
Par.86	adjust according to requirements	/
Par.87	adjust according to requirements	/

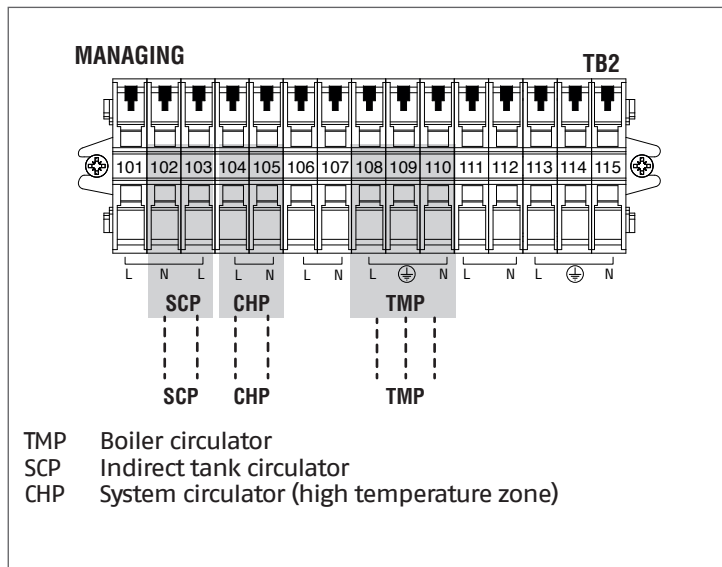
3.5 Block diagram 2

Circuit with thermal modules with their own circulator, connected in cascade. Using the secondary sensor.

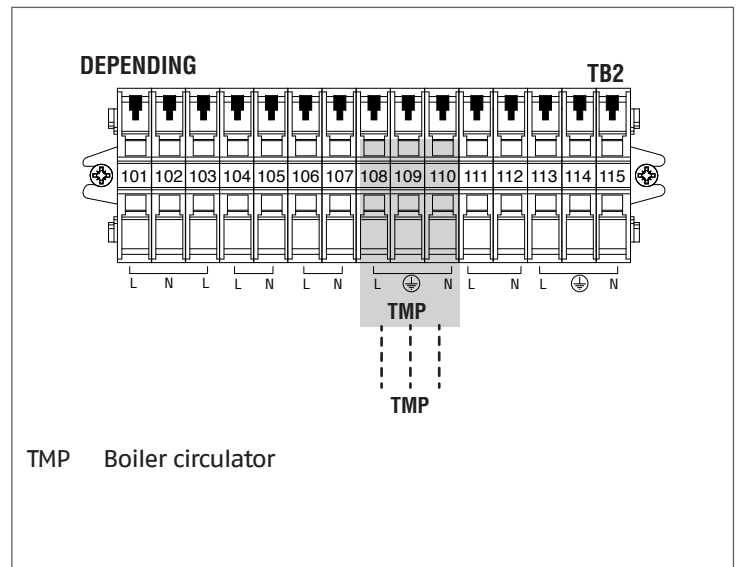


3.5.1 Electrical power connections Block diagram 2

MANAGING CONNECTIONS

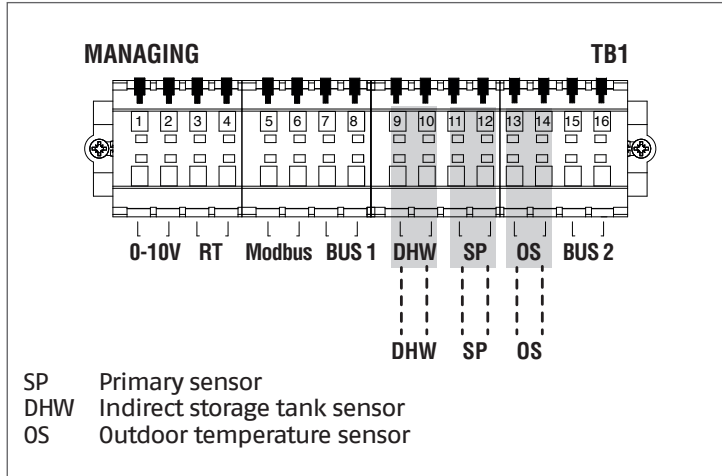


DEPENDING CONNECTIONS



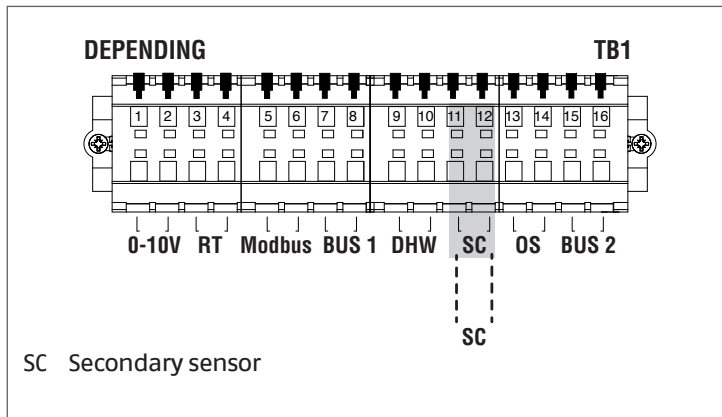
3.5.2 Sensor connections Block diagram 2

MANAGING CONNECTIONS



DEPENDING CONNECTIONS

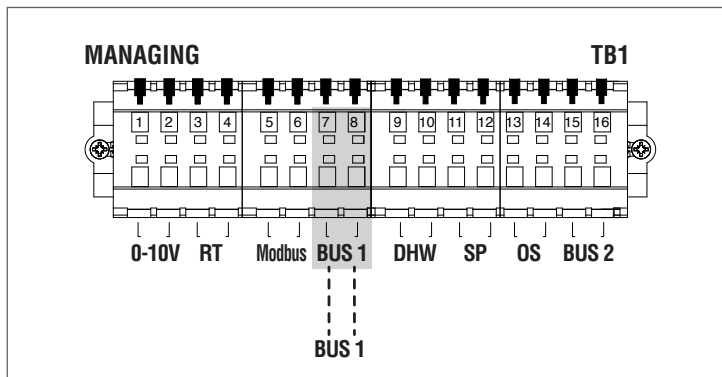
⚠ NOTE: Connections to be made on the first depending boiler only.



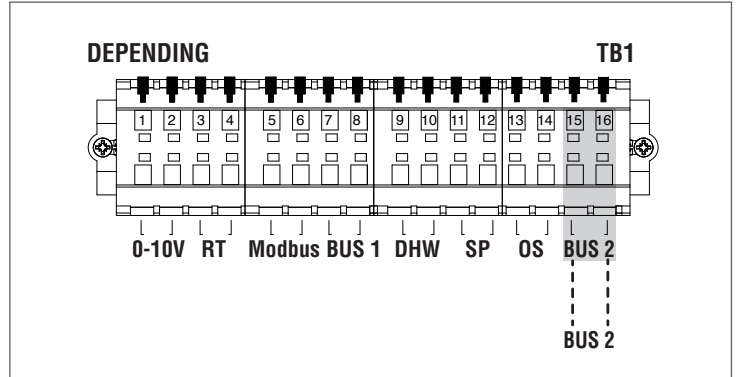
3.5.3 Bus connections Block diagram 2

See section "System management" for a detailed description of the connections between the boilers.

MANAGING CONNECTIONS



DEPENDING CONNECTIONS



3.6 System parameters Block diagram 2

⚠ NOTE: See the section "Commissioning and maintenance" for a detailed description on parameter operation

Essential parameters to be configured for the block diagram 2:

	Managing	Depending
S1	OFF	OFF
Dip-switch	1 to ON	2-10 to ON
Par.73	Managing	Dependent
Par.147	no. of depending boiler installed	/
Par.7	greater than/equal to 18°F (10°C)	greater than/equal to 18°F (10°C)
Par.97	22	22

Specific parameters to be configured for the block diagram 2:

	Managing	Depending
Par.79	adjust according to requirements	/
Par.80	adjust according to requirements	/
Par.81	adjust according to requirements	/
Par.86	adjust according to requirements	/
Par.87	adjust according to requirements	/
Par.169	adjust according to requirements	/
Par.170	adjust according to requirements	/
Par.171	adjust according to requirements	/
Par.176	adjust according to requirements	/
Par.177	adjust according to requirements	/

4 COMMISSIONING AND MAINTENANCE

4.1 Lighting instructions

- There are several steps involved in starting up the boiler.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury, or loss of life (death).

- This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS:
 - Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

- STOP!** Read the safety information above on this label.
- Set the thermostat to lowest setting.
- Turn off all electric power to the appliance.
- This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- Turn external gas shutoff valve clockwise to close valve to the full OFF position.
- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label.
- Turn gas shutoff valve counterclockwise to open valve to the ON position.
- Turn on all electrical power to the appliance.
- Set thermostat to desired setting.
- If the appliance will not operate, follow the instructions "To Turn Off Gas To the Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

- Set the thermostat to lowest setting.
- Turn off all electric power to the appliance if service is to be performed.
- Turn gas shutoff valve clockwise to close valve to the full OFF position.

4.2 Introduction

WARNING: Before starting the boiler, the user must be correctly instructed by the installer, on how to operate the boiler, in particular:

- Make sure that the user understands that combustion air and ventilation openings must not be restricted, closed, or modified in any way.
- Make sure that the user is informed of all the special measures to be taken for combustion air inlet and discharging flue gases, and that these must not be modified in any way.
- Make sure that the user keeps this manual and all other documentation included with the boiler.
- Make sure that the user understands never to tamper with gas control settings and that there is a risk of fire, explosion, or CO poisoning should an unauthorized individual do so.
- Make sure that the user knows how to adjust temperatures and controls.

⚠ WARNING: Do not attempt to dry fire the unit. Starting the unit without a full water level can seriously damage the unit and may result in injury to personnel or property damage. This situation will void any warranty.

⚠ CAUTION: All of the installation procedures in "Installation" must be completed before attempting to start the unit.

4.3 Filling the Condensate System

The condensate system must be filled with water according to the Section "Preparation for the condensate drain".

⚠ WARNING: At start-up and after prolonged shutdown of the boiler, the condensate trap and the syphon must be filled with water prior to restarting the boiler, otherwise combustion gases will enter the room with a risk of an excessive level of carbon monoxide which could result in substantial property damage, severe injury or death.

4.4 Filling the Boiler Heating System

To fill the heating system, proceed as follows:

- Open any automatic air vents in the heating system.
- Open the fill valve and proceed to fill the heating system and boiler. The heating system water pressure must be higher than 7.5 psi (0.5 bar).
- Check that there is no water leaking from the fittings. If there is, the leaks must be repaired.
- Check the pressure during the purging process. If the pressure has dropped, re-open the fill valve to bring the pressure back to the desired value.

4.5 Warnings Concerning the Gas Supply

When starting up the unit for the first time the following must be checked:

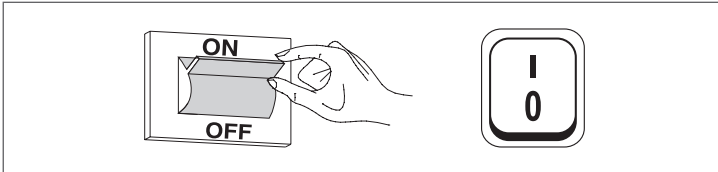
- That the unit is supplied with the type of fuel that it is configured to use.
- That the gas supply system is provided with all the safety devices and controls required under current national and local codes.
- That the vent and combustion air terminals are properly connected and free from any blockages.
- That the condensate drain tube is properly connected.

4.6 Gas Type Conversion

If the gas available at the installation site is not the type the boiler is configured to use, the boiler must be converted. Special conversion kits are available for this purpose inside the boiler. The gas conversion procedure may be found in Section "Converting gas type". Conversion must be carried out by a qualified technician.

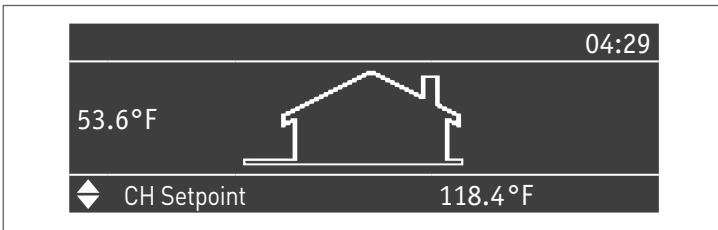
4.7 Initial startup

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



4.7.1 Switching the appliance on and off

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



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

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

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

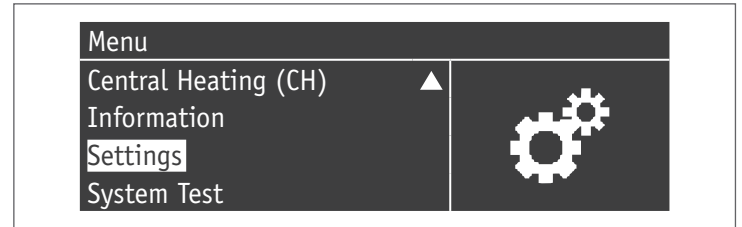
CAUTION: Never power off the appliance before switching the master switch to the "0" position.

CAUTION: Never switch off the appliance with the master switch if a request is active. Always make sure that the appliance is in stand-by before switching the main switch; this could overheat the heat exchanger.

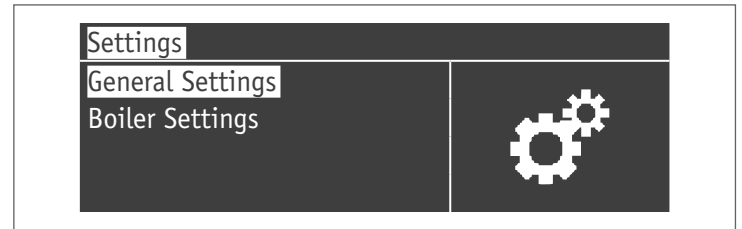
After placing the boiler in operation, the ignition system safety shutoff device must be tested.

4.7.2 Date and time setting

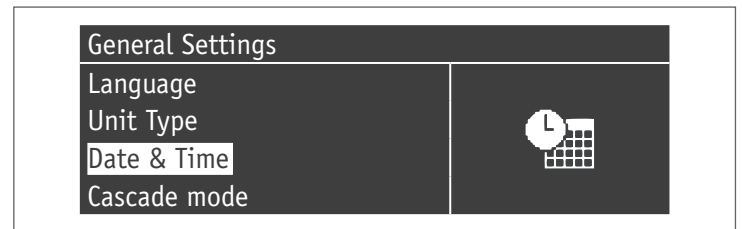
Press the MENU button and select "Settings" with the ▲ / ▼ buttons



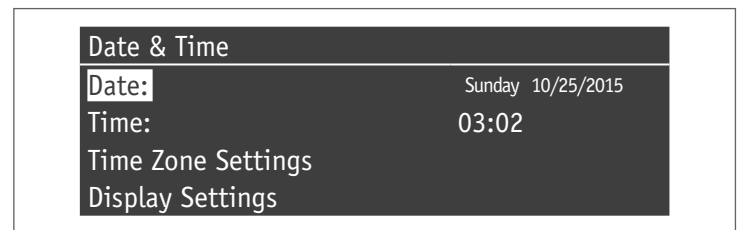
Confirm with the ● button and select "General settings" with the ▲ / ▼ buttons



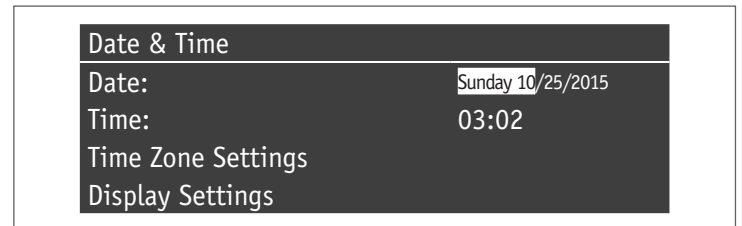
Confirm with the ● button and select "Date and Time " with the ▲ / ▼ buttons



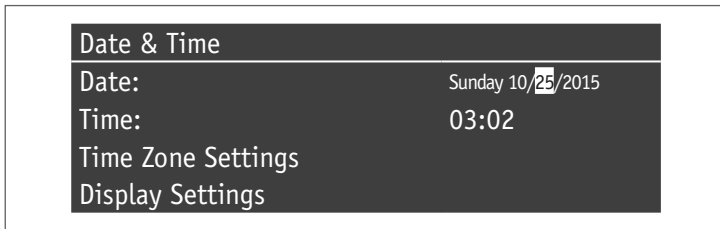
Press the ● button, the display will be shown as follows:



Press the ● button to highlight the values.

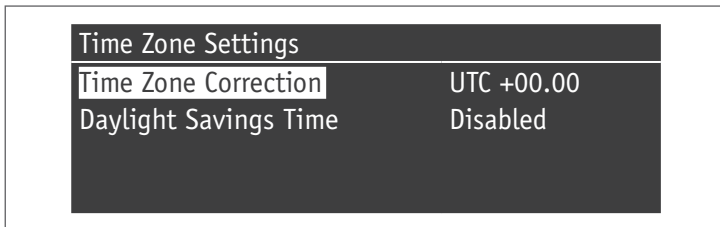


Values can be changed with the ▲ / ▼ buttons. Confirm the value entered by pressing the ● button and move to the next value.

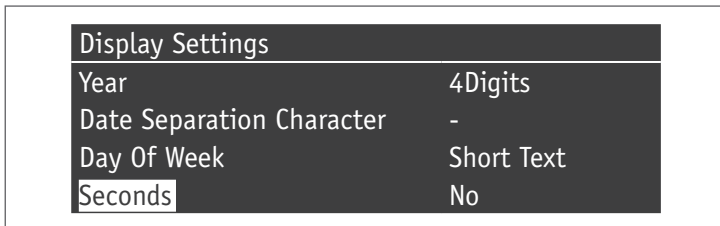
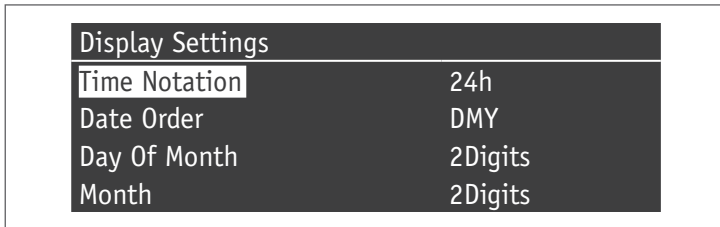


To set the time, follow the same procedure.

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

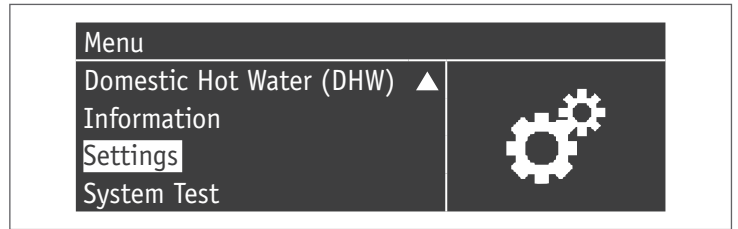


To change the way in which date and time are displayed, it is possible to change the following characteristics by accessing the "Display Parameters" menu:



4.7.3 Password access

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



Confirm with the ● button and select "Boiler settings" with the ▲ / ▼ buttons



Press the ● button to confirm.

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



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

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

⚠ NOTE: After it is entered, the password is active during display and/or parameter mode. If the display is inactive for a few minutes, it needs to be re-entered.

4.7.4 Setting the heating parameters and outdoor reset

Parameter 1 establishes the boiler's various heating operation modes.

Mode 0

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

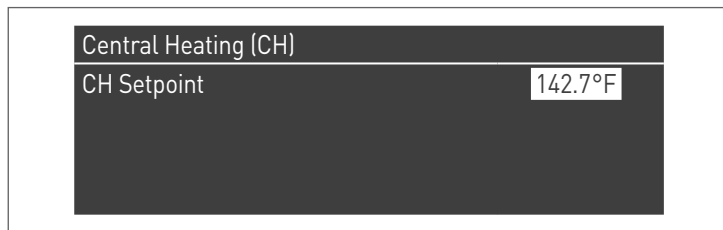
In this mode, the boiler operates with a fixed set-point (controlled by the parameter 3) based on whether the room/heat demand thermostat's contact is closed or not.

The set-point value can be entered directly, without entering the parameter list, by accessing the "CH" menu in the following way:

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



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

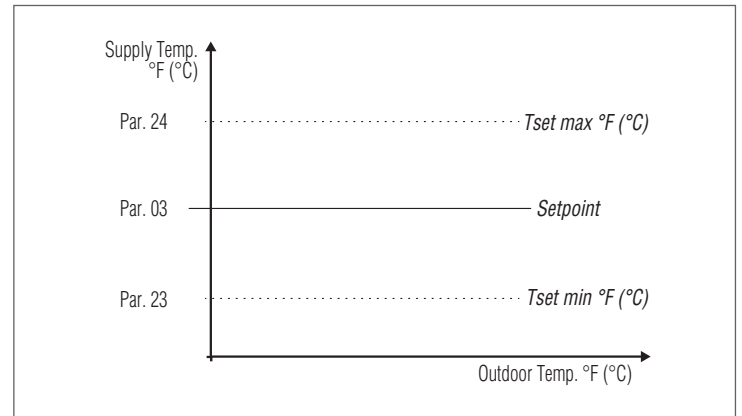


The set point can be set within a minimum and maximum value as indicated respectively on Par. 23 and 24 as shown in the following figure.

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

The parameters regulating such temperature are:

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

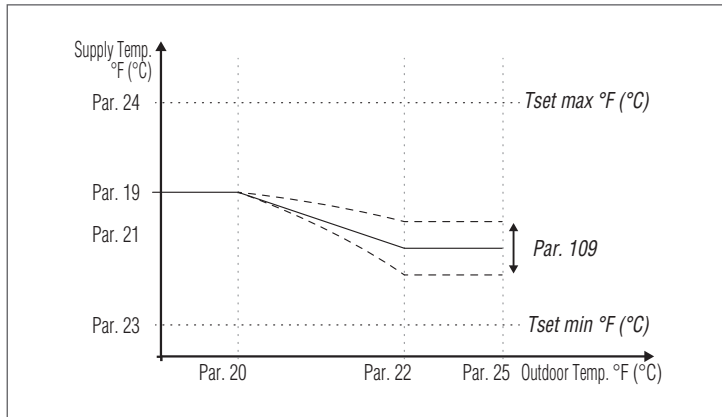


Mode 1

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

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

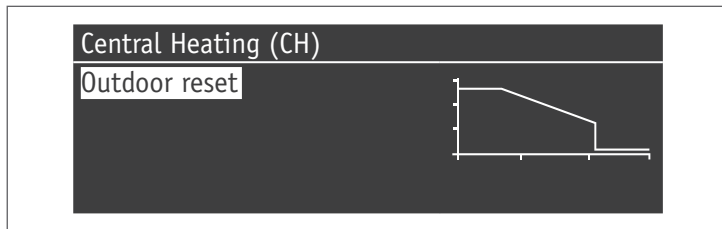
Par. No.	Description
109	Defines the value of the set point calculated in climatic mode (Par. 1 = 1).
19	Establishes the max. set-point at the minimum outdoor temperature for climatic regulation
20	Establishes the minimum outdoor temperature to which the maximum set-point can be associated for climatic regulation
21	Establishes the minimum set-point at the maximum outdoor temperature for climatic regulation
22	Establishes the maximum minimum outdoor temperature to which the minimum set-point can be associated for climatic regulation
23	Limits the minimum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4).
24	Limits the maximum value that can be assigned to the set-point in heating mode (does not apply to heating mode 4).
25	Defines the temperature at which climatic regulation is switched off



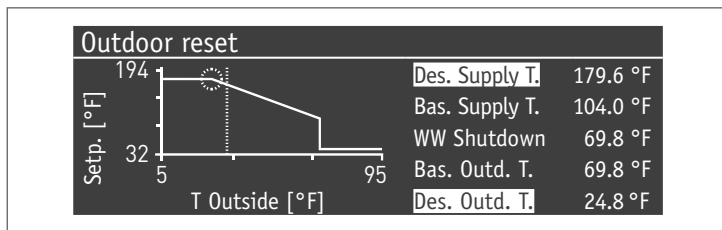
The demand is activated when the room/heat demand thermostat's contact is closed provided that outdoor temperature does not exceed the value set by the parameter 25.

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

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



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



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

- 1 Use the ▲ / ▼ buttons to modify Design Supply Temp and the ◀ / ▶ buttons to change Design Outdoor Temp.
 - 2 Press ● button to save changes
 - 3 Use the ◀ / ▶ buttons to select other values.
- Repeat steps 1 to 3 to make other changes.
After setting the parameters, press the ESC key to exit the menu.

⚠ If the outdoor temperature sensor (sold as an accessory) is not detected (not installed or damaged) the system provides a warning: no. 202
The presence of the warning does not stop the boiler from allowing a heat request to be carried out at the maximum setpoint set on the climatic regulation.

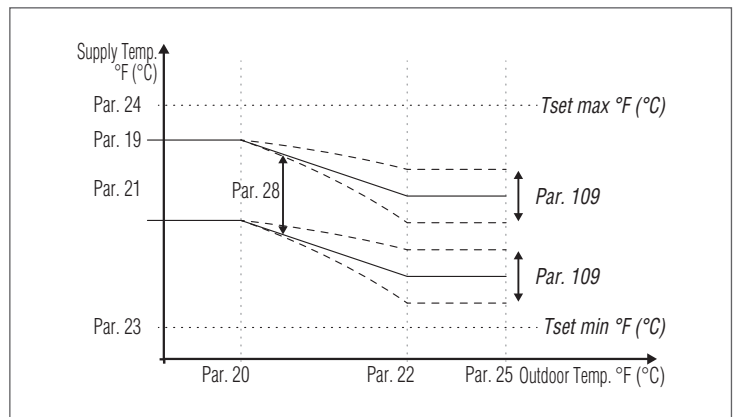
Mode 2

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

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

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

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

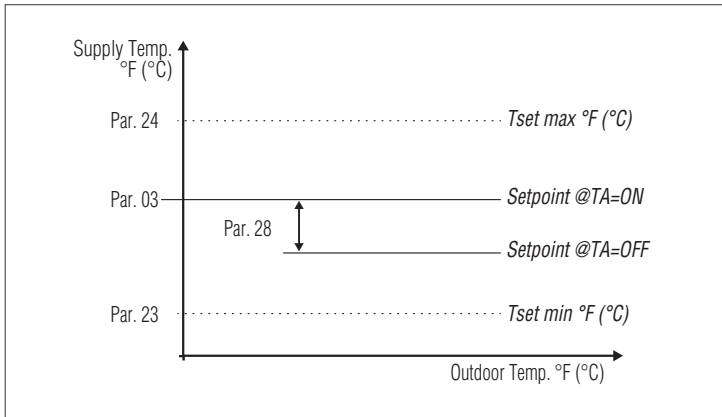


Mode 3

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

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

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



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

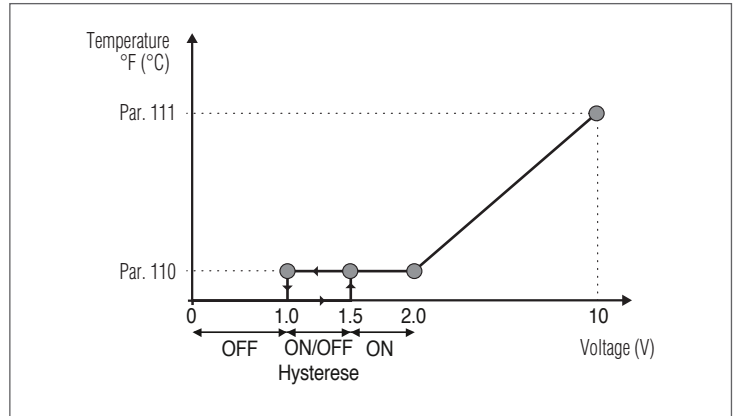
Mode 4

(Set-point adjustment based on a 0-10V analog input)

The parameters that control this mode are the following:

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

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



The maximum and minimum set-point values are defined respectively by Par. 111 and 110. When the input voltage value exceeds 1.5V, the demand is triggered (at the minimum set-point). For voltage values ranging from 2 to 10, the set-point varies in a linear fashion from the minimum through to the maximum value. If the voltage is decreased from 10 to 2, the set-point decreases in a linear fashion and maintains the minimum value between 2 and 1V. For values lower than 1V the demand stops.

4.7.5 Setting the domestic hot water parameters

Parameter 35 defines the various operation modes of the boiler for DHW production

Mode 0
(No production of domestic hot water)

In this mode the boiler will work only for the heating circuit (see section "Setting the heating parameters and outdoor reset")

Mode 1
(DHW production with indirect storage tank and indirect tank sensor)

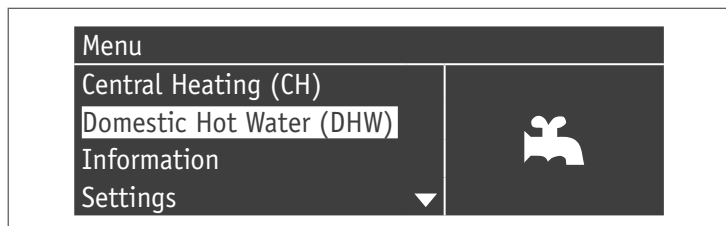
In this mode, the boiler is activated when the temperature recorded by the indirect tank sensor falls below the DHW setpoint by an amount equal to the hysteresis value and is deactivated when the temperature rises above the DHW setpoint by the value of the hysteresis.

The parameters that control DHW production are the following:

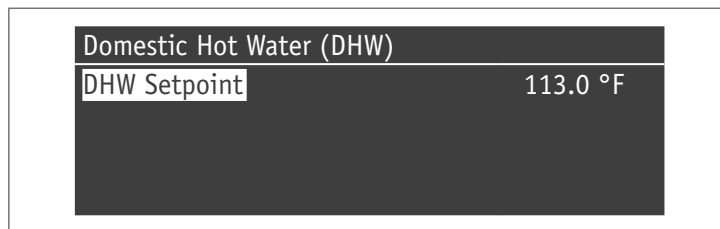
Par. No.	Description
36	Defines the hysteresis to initiate the domestic hot water demand.
37	Defines the hysteresis to stop the domestic hot water demand.
38	Defines the primary circuit's set-point increase in degrees compared to the temperature set for the domestic hot water tank.
39	Defines the primary circuit's restart hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications).
40	Defines the primary circuit's shut-off hysteresis in modes 1 and 2 of DHW (valid both for cascade and stand-alone applications).
41	Defines the value referred to the Delta T of the tank for maintenance purposes. E.g.: if it is set on 5.4 °F (3 °C), when the tank has a set point lowered of 5.4 °F (3 °C), the boiler turns on at the minimum to allow maintenance until the set point plus hysteresis. If this parameter is equal to parameter 36, this function is inactivated and the boiler starts at the maximum sanitary power.
48	Establishes the DHW storage tank set-point.

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

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



- Press the ● button to confirm.



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

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

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

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

The parameters that control DHW production are the following:

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

- (*) Parameter 38 is active on such mode even if the indirect tank sensor is not installed and it influences the supply temperature of the boiler.

It can be used to limit the difference between the actual supply and set temperature on the indirect tank sensor so that the system efficiency is maximized.

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

Priority setting

Parameter 42 sets the priorities between the DHW and CH circuit. Four modes are available:

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

Anti-Legionella function

When the production of domestic hot water is activated (Par. 35=1), using parameters 107 and 108 it is possible to carry out weekly scheduling of the "Anti-legionella" function.

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

At the planned time, the boiler generates a call for the DHW indirect storage tank with a pre-set set-point of 140 °F (60 °C) (not adjustable). After reaching 140 °F (60 °C), the temperature is maintained for 30 minutes, during which the system checks that the sensor's temperature does not fall below 134.6 °F (57 °C). At the end of this time interval, the Anti-Legionella function stops and standard operation of the boiler is resumed.

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

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

4.7.6 Scheduled program

The scheduled program is designed to program the operation of the various circuits managed by the boiler, (CH, DHW and additional mixed zones).

Seasonal Program

The seasonal program is used to exclude additional mixed zones during the summer season.

It does not control any DHW parameter.

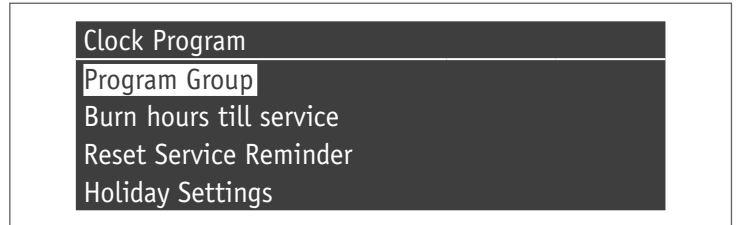
Holiday program

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

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

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

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



The time program includes the following parameters:

Group Programming



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

Group settings are used to add zones to the groups. The "Group programming" menu enables the ability to choose among 8 groups. Each of them can be enabled or disabled. Within it, it is possible to select zones to be added to the group [direct zone (CH)]



Heating programming

Group 1	
Program Comfort Period	1
Comfort Setpoint	82.4 °F
ECO Setpoint	68.0 °F
Out of interval setpoint	Reduced

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

Period setting

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

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

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

Comfort Set-point

Comfort temperature to be used when the zone is in a certain period (50-86 °F / 10 °C - 30 °C)

ECO set-point

ECO temperature (Night Setback). Adjustable temperature that can be used during unoccupied periods (41 - 68 °F / 5 - 20 °C).

Set-points outside the interval

Selection of the type of set-point to be used when a zone is not on a set period. This can be done by selecting one of the following options:

- Off
- Comfort
- Eco
- Anti-Freeze (activated below 41 °F (5 °C) NON-ADJUSTABLE)
- Reduced (Calculated as 14 °F (7 °C) Comfort Set-point value)

DHW setting

Group 1	
Program Comfort Period	1
Out of interval setpoint	On

This setting allows the domestic hot water to be set to a timed program for the DHW zone.

Period setting

Period setting allows the user to adjust the active periods for the DHW zone. This setting can be adjusted for up to 7 on/off periods.

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

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

Set-points outside the interval

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

- Off
- On

Holiday setting

Holiday Settings	
Mode	Group
Group	1

Enables the user to change parameters for the Holiday Program.

Mode

Selects the Holiday program mode. It can be set to Off, System or group.

Off

Disabled program

Group

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

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

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

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

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

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

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

Seasonal setting

Enables the user to change parameters for the Seasonal Program. The seasonal program is used to define a period of inactivity for the heating system. This menu includes the following elements:

Activates heating basis

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

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

Season Settings	
Mode	Off

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

Season Settings	
Mode	Off
Begin Date	15-04
End Date	15-09

- **At Temp:** excludes heating (CH+zone) when the outdoor temperature is higher than the selected temperature. (Ext. deactivation T: 32.0 °F (0 °C) / 122 °F (49 °C))

Season Settings	
Mode	Off
Outdoor Temp. Below	77.0 °F

4.7.7 Boiler information

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

Menu	
Central Heating (CH)	i
Domestic Hot Water (DHW)	
Information	
Settings ▼	

Press the ● button to confirm.

The following screen will be displayed:

Information	
Software Versions	i
Boiler Status	
Boiler History	
Error Log ▼	

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

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

NOTE: The display shows four lines at a time. You can scroll the list by using the ▲ / ▼ buttons.

Boiler Status	
Flow Temperature (Supply)	114.8 °F
Return Temperature	109.4 °F
DHW Temperature	111.2 °F
Outside Temperature	50.0 °F

By selecting "Boiler History" and pressing the ● button, the following values are displayed:

- Firing OK
- Not firing
- No flame det.
- Oper. days
- Heat. burner hours
- DHW burner hours

Boiler History	
Successful Ignitions	0
Failed Ignitions	1
Flame Failures	1
Operation Days	1 days

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

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

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

Error Log	
Error Log	
Filter Error Type	Disabled
Clear Error Log	

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

By selecting "Service" and pressing the ● button, the following values are displayed:

- Service History (each time a "Maintenance reminder reset" is performed, the event is logged)
- Burn hours since last Maint.
- Burn hours until next Maint
- Reset service reminder (accessible only with installer password)

Service	
Service history	
Burn hours since last service	0 hrs
Burn hours till service	2000 hrs
Reset Service Reminder	No


Service	
Burn hours since last service	0 hrs
Burn hours till service	2000 hrs
Reset Service Reminder	No
Clear Service History	No

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

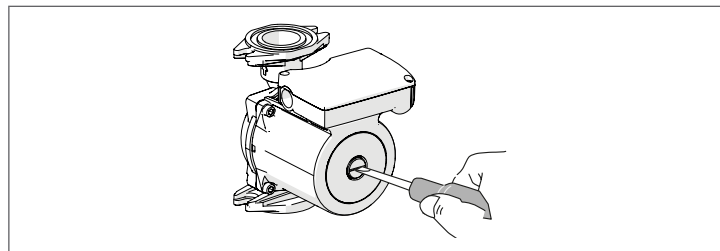
4.8 Checks during and after initial start-up

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

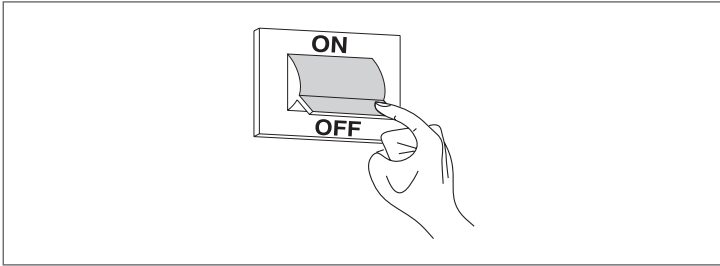
- Set the operating mode of the boiler in heating to 0 (Par. 1) and close the RT input to generate a heat request
- If required, increase the set-point value (CH → Heating Set-point)

Menu	
Central Heating (CH)	
Domestic Hot Water (DHW)	
Information	
Settings ▼	

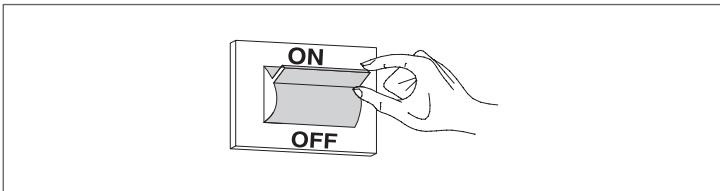
- Make sure that all the pumps in the system are free, bled and rotate in the right direction



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

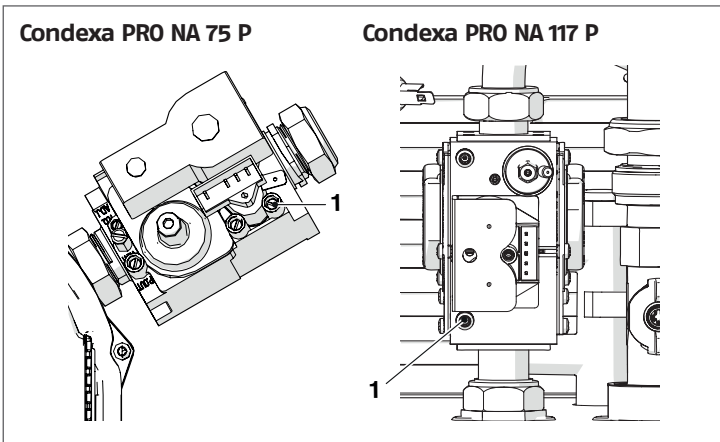


If all conditions are met, power the boiler by setting the system and the appliance master switches to "On" and test combustion products (see section "Combustion Analysis").



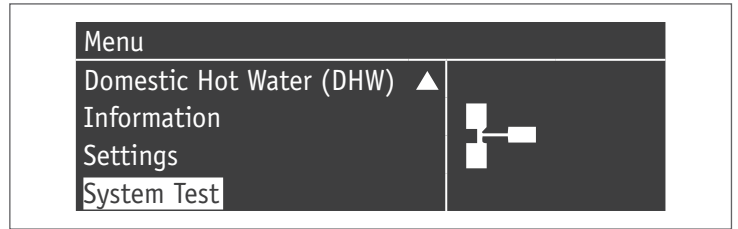
SUPPLY GAS PRESSURE CHECK

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



- Power the boiler by setting the system and the appliance master switches to "On".

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



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



- The equipment will work at maximum power (chimney sweep function)
- Check that the nominal pressure of the supply gas is that indicated in the table

DESCRIPTION	Natural Gas	LPG	
Nominal supply pressure	7.0	11.0	in w.c.

After checking the gas:

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



- Reassemble the front panel and lock the locking screws.

4.9 Error List

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

There are 3 categories of errors:

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

4.9.1 Permanent Errors

Nr.	Error	Description	Checks	Solutions
0	E2PROM_READ_ERROR	Internal software error		Replace the power control board
1	IGNIT_ERROR	Three unsuccessful ignition attempts in a row	Check gas supply pressure Check ignition spark Correct amount of air Check for 120VAC at the gas valve	Replace the power control board If the gas supply pressure is incorrect, it must be adjusted to the correct pressure If spark is not present check for correct ignition electrode position If the combustion air pressure is incorrect, inspect the vent system and eliminate any obstructions If the voltage to the gas valve is not 120Vac the power control board must be replaced
2	GV_RELAY_ERROR	Failure detected in the GV (Gas Valve) relay	Check the integrity of the wire connections between gas valve and control board	If wires are damaged, replace them If wires are ok, replace the gas valve or the power control board
3	SAFETY_RELAY_ERROR	Internal control board error		Replace the power control board
4	BLOCKING_TOO_LONG	Control had a blocking error for more than 20 hours This error is caused when any Blocking errors occur and are not corrected automatically.	Press RESET button to display the Blocking error description	Remove the cause of the Blocking error
5	FAN_ERROR_NOT_RUNNING	Fan is not running for more than 60 seconds	Check for 120 VAC power connection of the fan. Check PWM connection of the fan.	If no 120 VAC voltage is present, replace the power control board; If no PWM signal is present, replace power control board; Replace the fan.
6	FAN_ERROR_TOO_SLOW	Fan runs too slow for more than 60 seconds		
7	FAN_ERROR_TOO_FAST	Fan runs too fast for more than 60 seconds		
8	RAM_ERROR	Internal software error		Replace the power control board
9	WRONG_EEPROM_SIGNATURE	Contents of Eeprom is not up to date		Replace the power control board
10	E2PROM_ERROR	Wrong safety parameters in Eeprom		Replace the power control board
11	STATE_ERROR	Internal software error		Replace the power control board
12	ROM_ERROR	Internal software error		Replace the power control board
15	MAX_TEMP_ERROR	The external overheat protection is enabled or the T _{Supply} sensor measures a temperature of over 212°F (100°C)	Check the pump to verify the flow circulation; Check if the valves on hydraulic circuit are open; Check the high limit switch.	Change the pump or restart it; Open the valves on hydraulic circuit; Change the high limit switch.
16	FLUE_GAS_ERROR	Flue temperature exceeded the maximum flue temperature		
17	STACK_ERROR	Internal software error		Replace the power control board
18	INSTRUCTION_ERROR	Internal software error		Replace the power control board
19	ION_CHECK_FAILED	Internal software error		Replace the power control board
20	FLAME_OUT_TOO_LATE	Flame still present 10 seconds after closing the gas valve		Replace the gas valve
21	FLAME_BEFORE_IGNIT	Flame is detected before ignition		Replace the gas valve
22	Loss of flame	Flame lost three times during a request		
23	CORRUPTED_ERROR_NR	Error code RAM byte was corrupted to an unknown error code		

Nr.	Error	Description	Checks	Solutions
29	PSM_ERROR	Internal software error		
30	REGISTER_ERROR	Internal software error		Replace the power control board
37	Flue gases pressure switch error	Flue pressure switch open	Check for obstruction in the flue piping. Blocking errors should be recorded prior to the occurrence of this Locking error. Check for condensate in the hose connecting the flue pressure switch to ensure it isn't blocked	

4.9.2 Temporary Errors

Nr.	Error	Description	Checks	Solutions
100	WD_ERROR_RAM	Internal software error		Replace the power control board
101	WD_ERROR_ROM	Internal software error		Replace the power control board
102	WD_ERROR_STACK	Internal software error		Replace the power control board
103	WD_ERROR_REGISTER	Internal software error		Replace the power control board
106	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
107	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
108	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
109	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
110	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
111	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
112	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
113	REFHI_TOO_HIGH / REFHI_TOO_LOW	Internal software error		Replace the power control board
114	FALSE_FLAME	Flame is detected in a state in which no flame is allowed to be seen.		Replace the power control board
115	LOW_WATER_PRESSURE_ERROR	Low water pressure error		
118	WD_COMM_ERROR	Communication error		Replace the power control board
119	RETURN_OPEN	Return sensor open	Check the integrity of the wire connections; Check the return temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
120	SUPPLY_OPEN	Supply sensor open	Check the integrity of the wire connections; Check the return temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
122	DHW_OPEN	DHW sensor open	Check the integrity of the wire connections; Check the DHW temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
123	FLUE_OPEN	Flue sensor open		

Nr.	Error	Description	Checks	Solutions
126	RETURN_SHORTED	Return sensor shorted	Check the integrity of the wire connections; Check the return temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
127	SUPPLY_SHORTED	Supply sensor shorted	Check the integrity of the wire connections; Check the return temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
129	DHW_SHORTED	DHW sensor shorted	Check the integrity of the wire connections; Check the DHW temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
130	FLUE_SHORTED	Flue sensor shorted	Check the integrity of the wire connections; Check the Outdoor temperature sensor.	If the wiring is damaged, replace it; Verify that the temperature sensor has the correct resistance values. If values are incorrect sensor must be replaced.
133	Net Freq Error	Net. freq. error detected by the watchdog		
134	RESET_BUTTON_ERROR	Too many resets in a short time period		
155	Flue gases press. switch err.	Flue pressure switch open	Check for any obstruction in the exhaust system; Check the condensate discharge.	Remove any obstructions from the exhaust system; Remove any obstruction from condensate discharge and confirm if the condensate can flow freely.
163	T_SELECTION1_OPEN	Heat exchanger's flow rate too low		
164	Boiler model not detected	Boiler model not set		

4.9.3 Warnings

Nr.	Error	Description	Checks	Solutions
200	CC_LOSS_COMMUNICATION	Cascade system: the burner of the managing boiler has lost the signal of one of the depending boiler burner		
201	CC_LOSS_COMMUNICATION	Cascade system: the managing boiler has lost the signal of one of the depending boiler		
202	OUTDOOR_WRONG	Outdoor sensor is open of shorted		
203	T_SYSTEM_WRONG	T_System sensor is open of shorted		
204	T_CASCADE_WRONG	T_Cascade sensor is open of shorted		
209	Boiler request disabled	Boiler request disabled		

4.10 Converting gas type

4.10.1 Converting gas type LPG

The **Condexa PRO NA** is equipped for natural gas. It can be converted to LPG (propane) using the appropriate accessory kit 20150039 (75 P) - 20150040 (117 P).

⚠ WARNING: Conversion can only be executed by qualified installer, service agency or gas supplier.

⚠ WARNING: For the conversion, follow what is written in this manual, according with the safety rules and instructions provided in the kits supplied

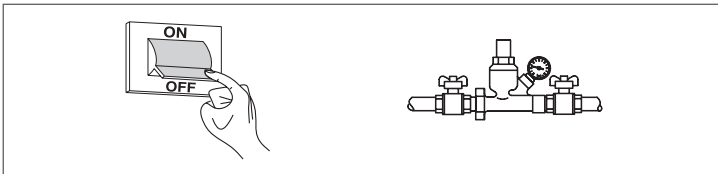
⚠ WARNING: If the information contained in these instructions is not properly performed or performed by personnel not properly trained, there is a potential risk of fuel leakage and/or carbon monoxide production resulting in substantial property damage, severe personal injury or death.

⚠ WARNING: Conversion is not complete until all the control steps described in these instructions have been carried out.

⚠ WARNING: After conversion, calibrate the CO2 as shown in the "Combustion Analysis" section.

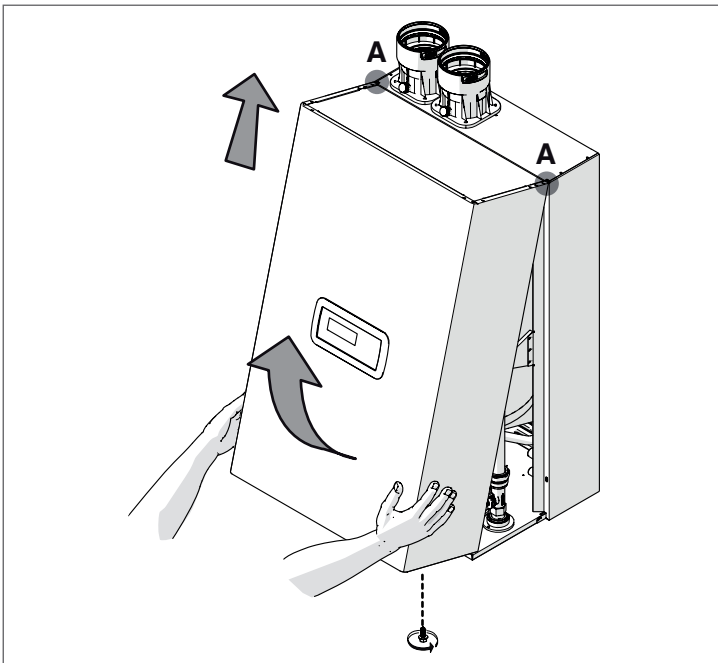
Before making the conversion:

- make sure that the master switch and the boiler switch are in the "Off" position
- check that the gas shutoff valve is closed.

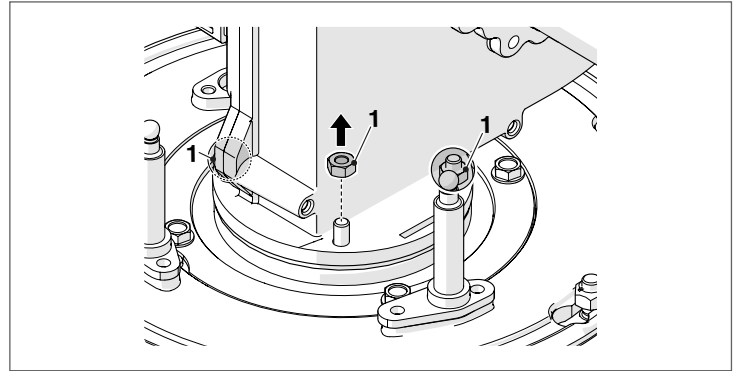


To install the gas conversion kit:

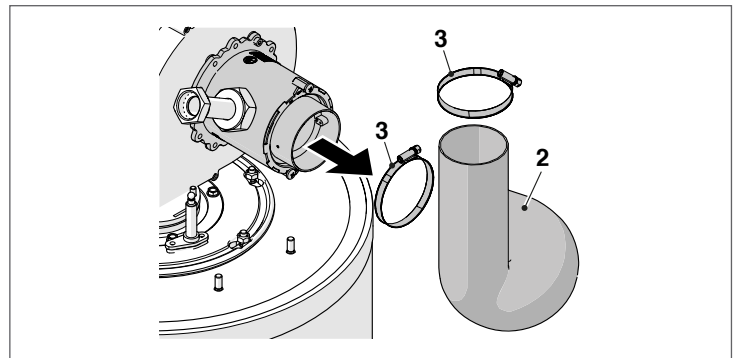
- remove the locking screw
- pull the front panel outwards and then to the top to remove it from points A.



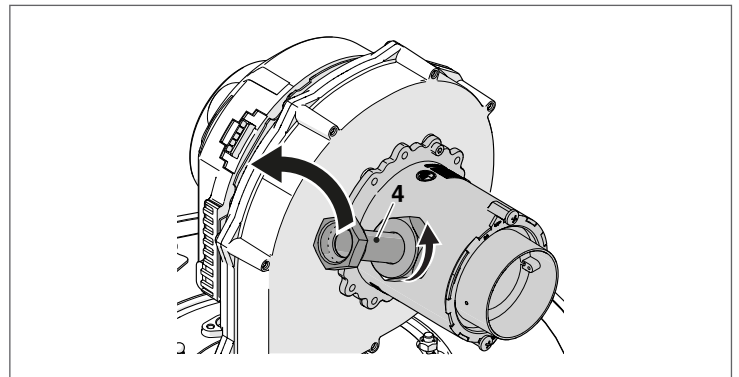
- unscrew the nuts (1) that connect the fan to the upper flange of the heat exchanger



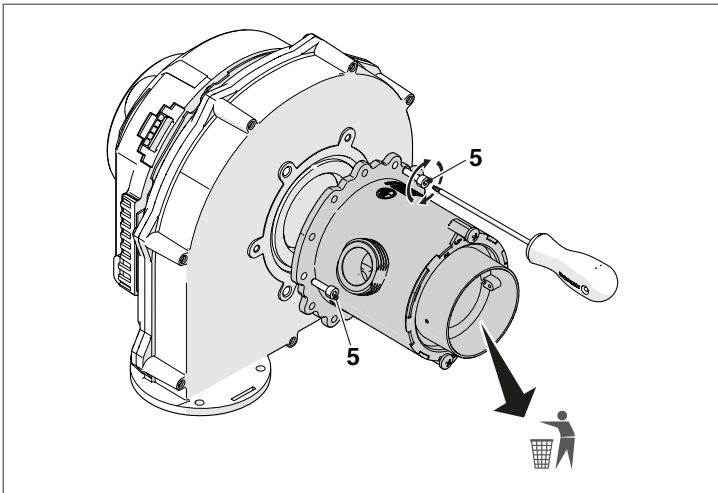
- remove the flexible air intake pipe (2), by unscrewing the metal collars (3)



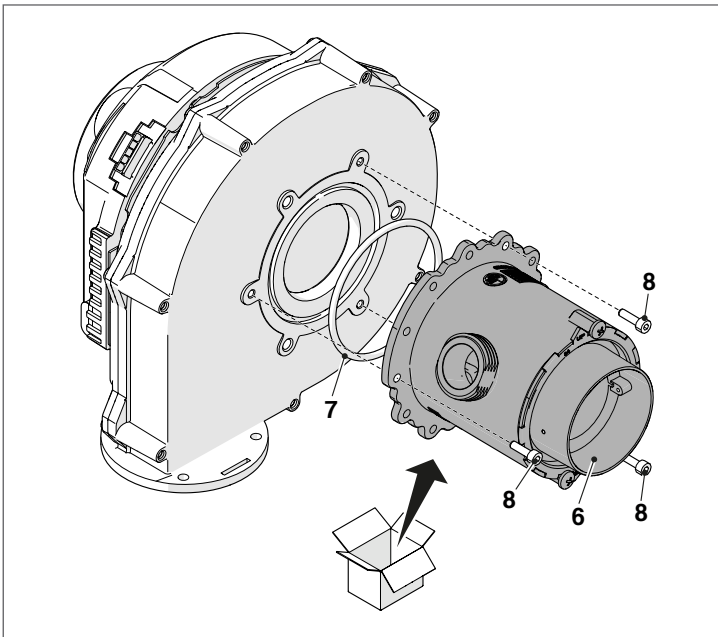
- remove the tube (4), that connects the mixer and the gas valve



- remove screws (5) in order to get out the mixer



- connect the LPG mixer (6) to the fan, putting in the O-ring (7) and screws (8)

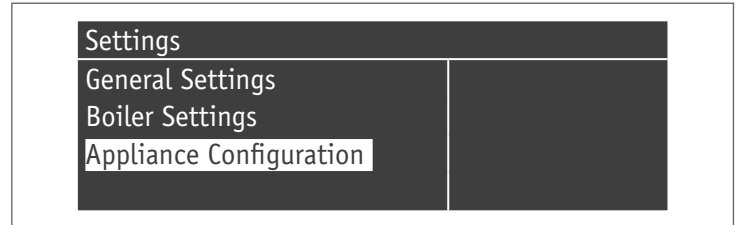


- reassemble the fan unit and the mixer by reversing the previous operations.

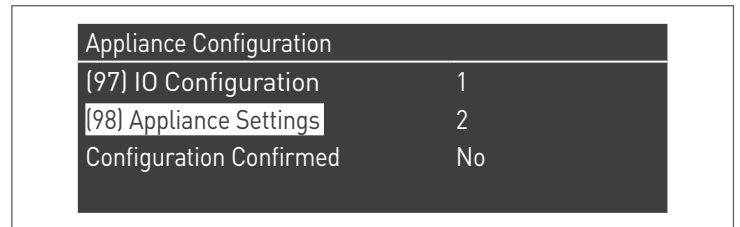
- Reassemble the front panel and lock the locking screws.
- Open the gas shutoff valve.
- Switch the power supply ON at the system's main switch and at the control panel.
- Make sure that there is no call for heat or DHW.

It is now necessary to change the setting of the parameter 98. Proceed as follows:

- On the home screen of the control panel, press the ● button
- Select "Settings" with the ▲ / ▼ buttons and press the ● button
- Select "Device configuration" with the ▲ / ▼ buttons and press the ● button



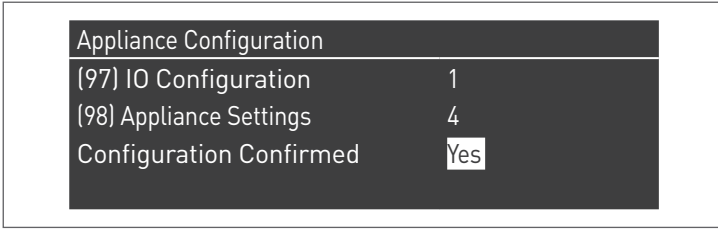
- Enter the password as described in section "Password access"
- Press the ▼ button, select "(98) Appliance Settings" and press the ● button



- With the ▲ / ▼ buttons change the value following what is in the following table and press the ● button:

Model	Parameter 98
Condexa PRO NA 75 P	26 LPG
Condexa PRO NA 117 P	24 LPG

- Press the ▼ button, select "Config. Confirmed" and press the ● button
- With the ▲ / ▼ buttons change the value to "Yes" and press the ● button

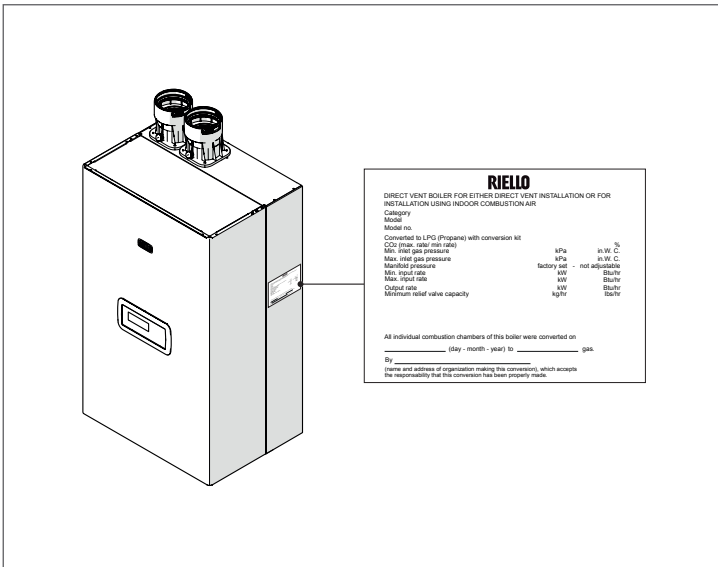


At this point the system starts an application update process. Once this is finished, the menu "Settings" appears on the menu.

- Press ◀ until you return to the home screen

An error message is displayed for a few seconds and then the display returns to its normal state.

Remove the adhesive (valid for Natural Gas supply only) and use the adhesive sticker for LPG only, provided with the accessory kit.



After installing the LPG conversion kit, check all gaskets tightness. Carry out all calibration activities described in section "Combustion Analysis".

Restore the desired set points.

4.10.2 Converting gas type Natural Gas

In order to restore the Natural Gas configuration, use the originally mixer installed in the boiler.

⚠ WARNING: Conversion can only be executed by qualified installer, service agency or gas supplier.

⚠ For the conversion, follow what is written in this manual.

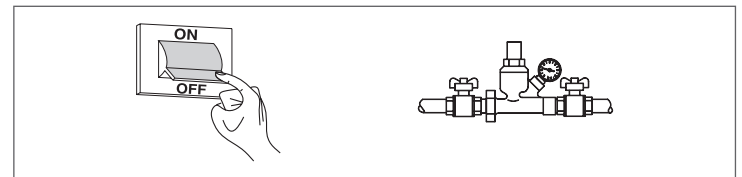
⚠ WARNING: If the information contained in these instructions is not properly performed or performed by personnel not properly trained, there is a potential risk of fuel leakage and/or carbon monoxide production resulting in substantial property damage, severe personal injury or death.

⚠ WARNING: Conversion is not complete until all the control steps described in these instructions have been carried out.

⚠ WARNING: After conversion, calibrate the CO₂ as shown in the "Combustion Analysis" section.

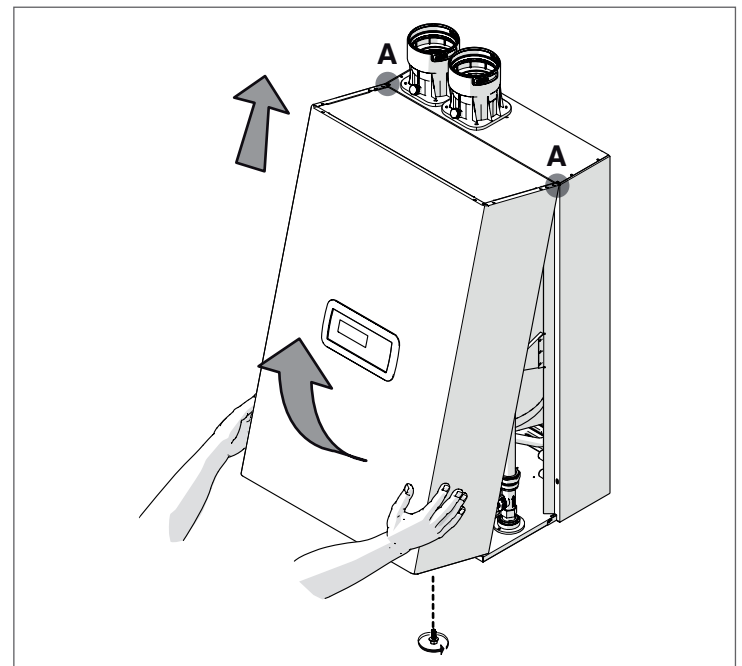
Before making the conversion:

- make sure that the master switch and the boiler switch are in the "Off" position
- check that the gas shutoff valve is closed.

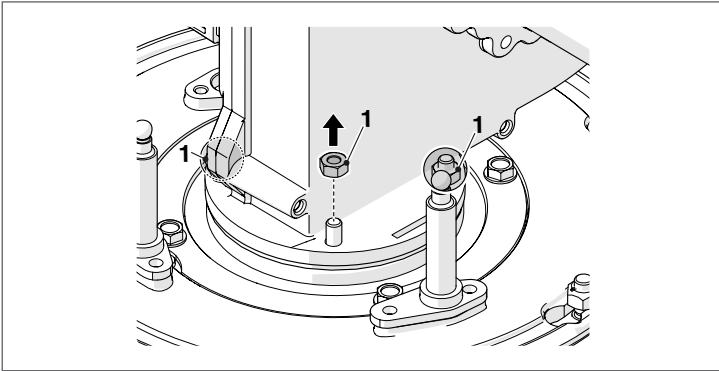


To install the Natural Gas mixer, originally inside the boiler:

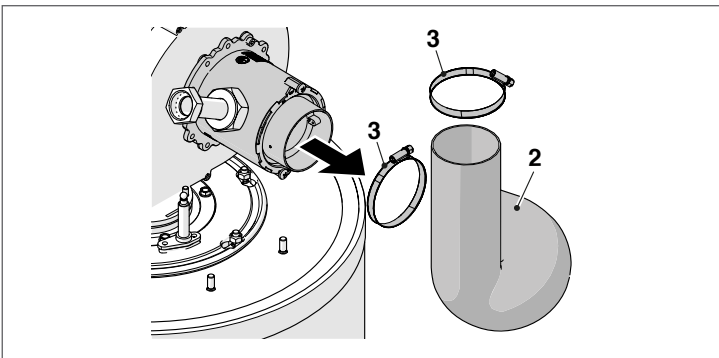
- remove the locking screw
- pull the front panel outwards and then to the top to remove it from points A.



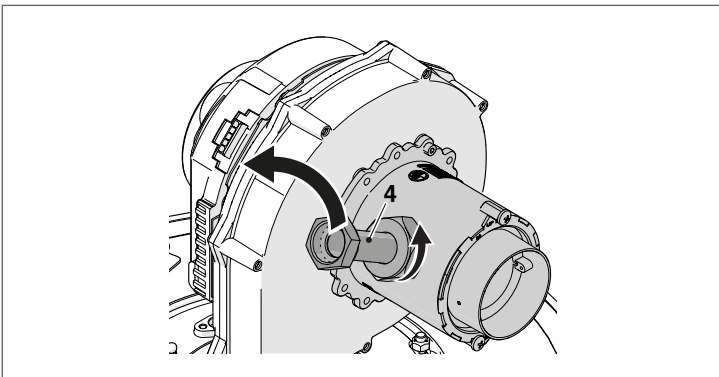
- unscrew the nuts (1) that connect the fan to the upper flange of the heat exchanger



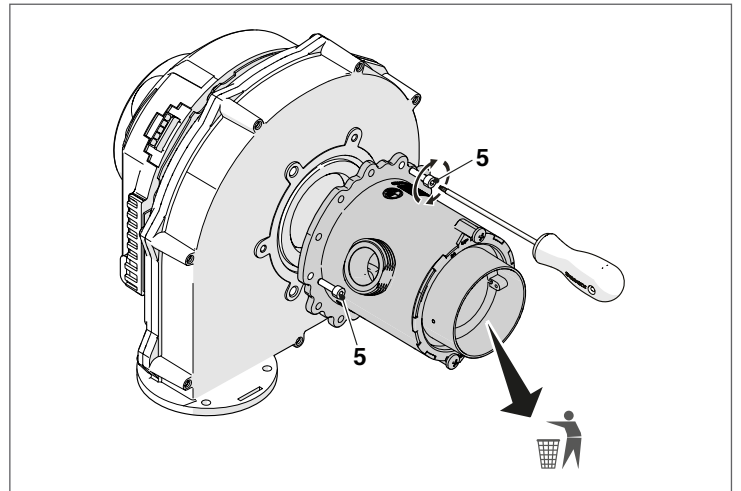
- remove the flexible air intake pipe (2), by unscrewing the metal collars (3)



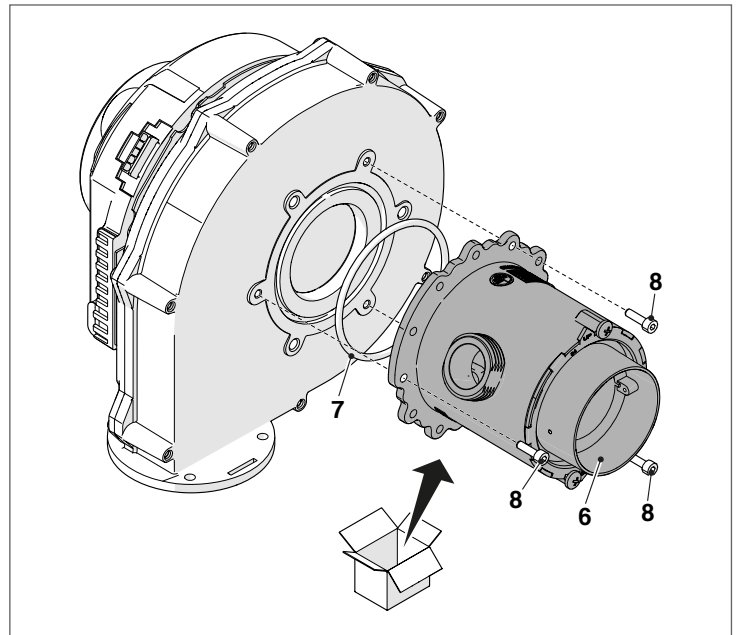
- remove the tube (4), that connects the mixer and the gas valve



- remove screws (5) in order to get out the mixer



- connect the Natural Gas mixer (6) to the fan, putting in the O-ring (7) and screws (8)



- reassemble the fan unit and the mixer by reversing the previous operations.

4.11 Combustion Analysis

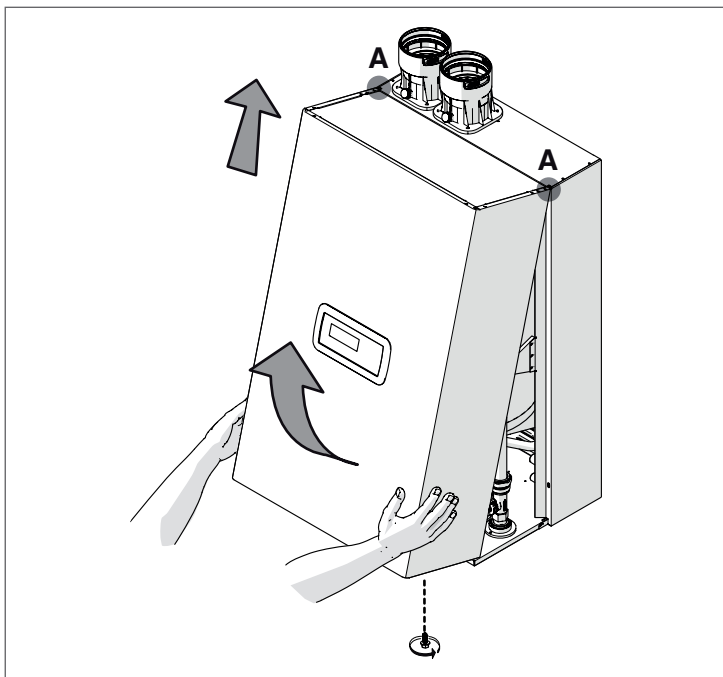
The **Condexa PRO NA** is supplied for operation with natural gas, as indicated by the rating plate, and has already been factory-calibrated by the manufacturer.

However, if it is necessary to repeat the adjustments, for example after non-scheduled maintenance, replacing the gas valve or after gas conversion from natural gas to LPG, or vice versa, proceed as described below.

⚠ WARNING: Adjustments to maximum and minimum power must be performed in the indicated sequence and only by qualified installer, service agency or gas supplier.

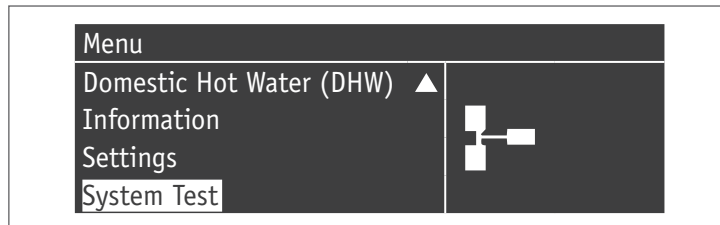
Before making the adjustments:

- remove the locking screw
- pull the front panel outwards and then to the top to remove it from points A.



CO2 ADJUSTMENT AT MAXIMUM POWER

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



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



- the appliance will operate at maximum power.
- remove the cap (1) and insert the combustion analyzer probe
- set the CO2 with a screwdriver on the adjustment screw (2) on the gas valve, thus reaching the value reported on the table.

Gas type	CO2% maximum power
Natural Gas	8.8-9.2
LPG (Propane)	10.2-10.6

CO2 ADJUSTMENT AT MINIMUM POWER

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

System Test	
Test State	Low Power
Fan Speed	0 rpm
Ionization	0.0 μA

- the appliance will operate at minimum power.

Version Condexa PRO NA 75 P

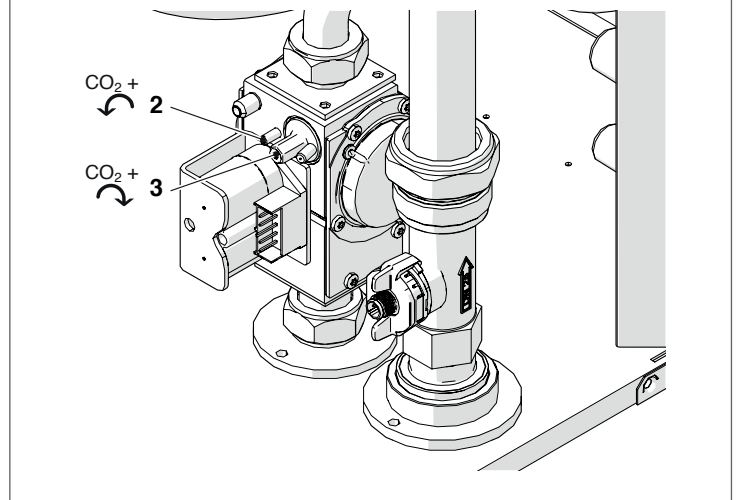
- With a flathead screw driver remove the slotted cap (3) located on the gas valve and adjust the CO2 using a 4 mm allen key to adjust the screw on the gas valve to the obtain value listed in the table below.

Version Condexa PRO NA 117 P

- Adjust the CO2 using a 2 mm allen key to adjust the screw (3) on the gas valve to the obtain value listed in the table below.

Gas type	CO2% maximum power
Natural Gas	8.8-9.2
LPG (Propane)	10.2-10.6

Version Condexa PRO NA 117 P



CHECKING THE CALIBRATION

Select the "Max. power" value, wait for the set-up to stabilise and check that the CO² values correspond to the required values.

After checking the gas:

- select "OFF" with the ▲ / ▼ buttons and press ● button to confirm.
- remove the probe of the flue gas analyzer and replace the flue gas probe (1)
- place the front panel back on the unit and lock the locking screw.

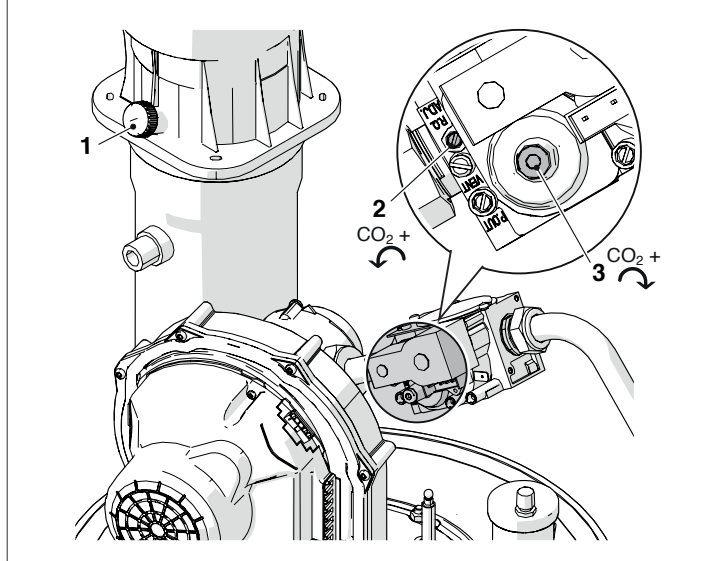
System Test	
Test State	Off
Fan Speed	0 rpm
Ionization	0.0 μA

4.12 Temporary or short-term shut-down

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

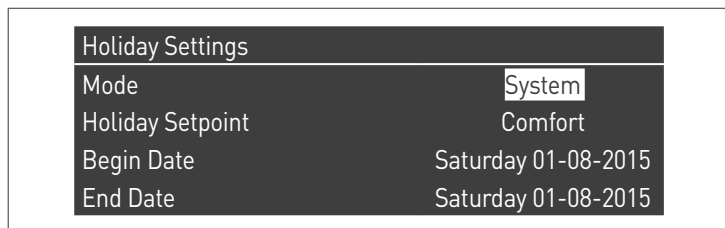
- Press the MENU button and select "Time Schedule" with the ▲ / ▼ buttons, confirm with ● button.
- Select "Holiday Schedule" with the ▲ / ▼ buttons, and confirm with the ● button.

Version Condexa PRO NA 75 P

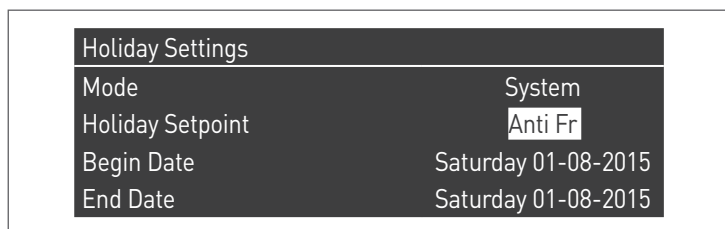


Clock Program
Program Group
Burn hours till service
Reset Service Reminder
Holiday Settings

- Select "Mode" with the ▲ / ▼ buttons, and confirm with ● button. Select "System" mode and confirm.



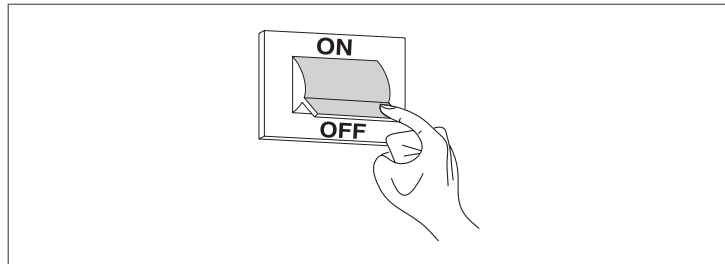
- Select "Holiday Setpoint" with the ▲ / ▼ buttons, and confirm with ● button.
- Select "Antifreeze" holiday setpoint and confirm.



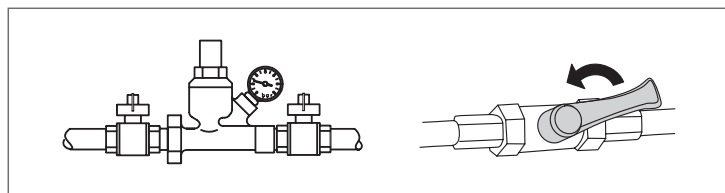
4.13 Preparing for extended periods of shut-down

Long periods of inactivity of the thermal module require the following operations to be carried out:

- turn the main switch of the boiler and the main system switch to "off"



- Close the fuel and water valves for the heating and domestic hot water system.



⚠ WARNING: Empty the central heating and domestic system if there is a danger of freezing.

4.14 Display board replacement

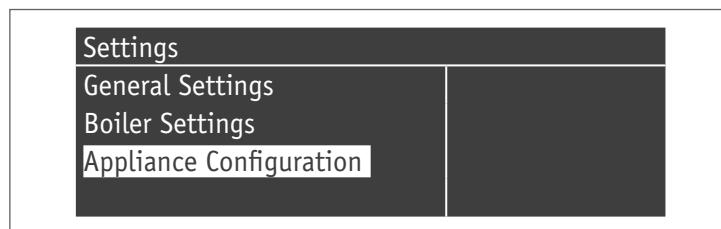
⚠ System configurations must be performed only by the Technical Assistance Service or by personnel authorized by RIELO.

When replacing the front control panel, at the subsequent restart it displays an initial screen with the RIELO logo.

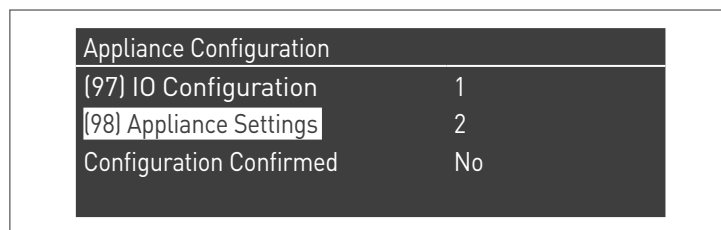
The system performs a consistency check between the configuration data saved on the motherboard and those saved in the user interface; therefore, when replacing the control interface, the system can detect an inconsistency between the saved data. Set the Par. 97 and the Par. 98.

Proceed as follows:

- On the home screen of the control panel, press the ● button
- Select "Settings" with the ▲ / ▼ buttons and press the ● button
- Select "Device configuration" with the ▲ / ▼ buttons and press the ● button



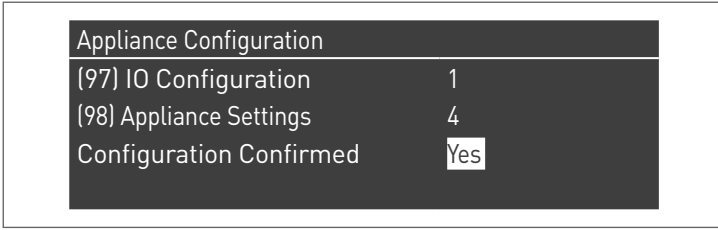
- Enter the password as described in section "Password access"
- Select "(97) IO Configuration" and press the ● button
- With the ▲ / ▼ change the value to 22 and press the ● button
- Press the ▼ button, select "(98) Appliance Settings" and press the ● button



- With the ▲ / ▼ buttons change the value following what is in the following table and press the ● button:

Model	Parameter 98
Condexa PRO NA 75 P	26 LPG
Condexa PRO NA 75 P	25 Natural Gas
Condexa PRO NA 117 P	24 LPG
Condexa PRO NA 117 P	23 Natural Gas

- Press the ▼ button, select "Config. Confirmed" and press the ● button
- With the ▲ / ▼ buttons change the value to "Yes" and press the ● button



At this point the system starts an application update process. Once this is finished, the menu "Settings" appears on the menu.

- Press ◀ until you return to the home screen

An error message is displayed for a few seconds and then the display returns to its normal state.

4.15 Control board replacement

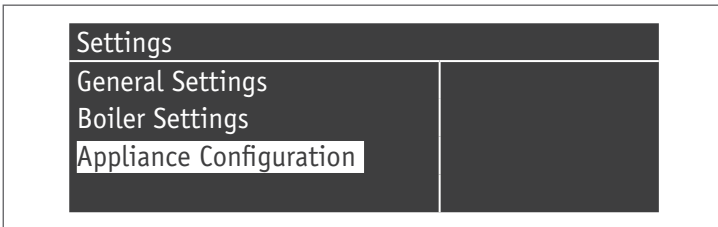
⚠ System configurations must be performed only by the Technical Assistance Service or by personnel authorized by **RIELLO**.

When replacing the main board, an initial screen with the logo **RIELLO** is displayed on the next reboot.

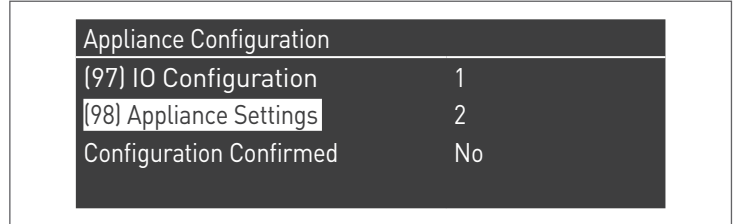
The system performs a consistency check between the configuration data saved on the motherboard and those saved in the user interface; therefore, when replacing the control interface, the system can detect an inconsistency between the saved data. Set the Par. 97 and the Par. 98.

Proceed as follows:

- On the home screen of the control panel, press the ● button
- Select "Settings" with the ▲ / ▼ buttons and press the ● button
- Select "Device configuration" with the ▲ / ▼ buttons and press the ● button



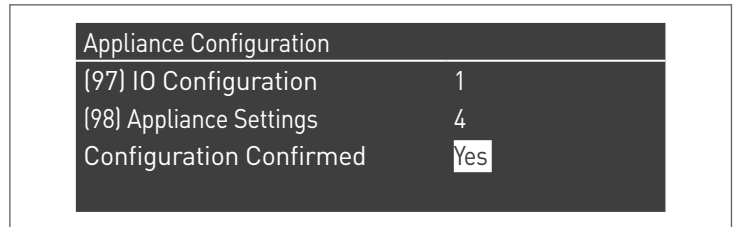
- Enter the password as described in section "Password access"
- Select "(97) IO Configuration" and press the ● button
- With the ▲ / ▼ change the value to 22 and press the ● button
- Press the ▼ button, select "(98) Appliance Settings" and press the ● button



- With the ▲ / ▼ buttons change the value following what is in the following table and press the ● button:

Model	Parameter 98
Condexa PRO NA 75 P	26 LPG
Condexa PRO NA 75 P	25 Natural Gas
Condexa PRO NA 117 P	24 LPG
Condexa PRO NA 117 P	23 Natural Gas

- Press the ▼ button, select "Config. Confirmed" and press the ● button
- With the ▲ / ▼ buttons change the value to "Yes" and press the ● button



At this point the system starts an application update process. Once this is finished, the menu "Settings" appears on the menu.

- Press ◀ until you return to the home screen

An error message is displayed for a few seconds and then the display returns to its normal state.

4.16 Maintenance

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

⚠ WARNING: Failure to provide annual maintenance will void the warranty.

This operation, carried out by a qualified service agency or gas supplier, is necessary to monitor and ensure that the flue pipes inside and outside of the device, the fan, the pressure relief valves, the condensate removal devices, the water drainage tubes and all the measurement and control devices are in perfect working order.

Once a year (or every 2000 operating hours) inspect and replace all the sealing elements of the following components: combustion head, burner and blower flange, spark plugs, inspection window, exhaust flue circuit, condensation discharge system and exhaust of all combustion products.

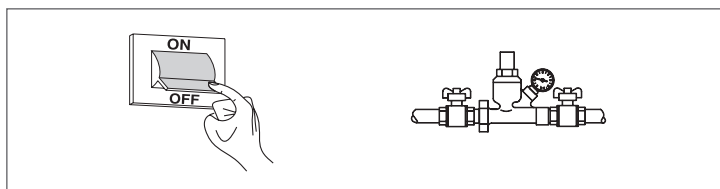
Time interval	Maintenance
Annually	Verify the cleanliness of the area around the boiler
Annually	Check the pressure of the hydraulic system
Annually	Check vent piping and verify if leaks are present
Annually	Check air piping and verify if leaks are present
Annually	Check relief valve
Monthly (follow local, state, federal or local authority having jurisdiction guidelines)	Verify the condensate discharge system
Every two months	Test low water cut off
Every two months	Verify the reset button of low water cut off
Every six months	Check all piping (gas and water) for leaks
End of heating season	Shut off the boiler
Annually *	Combustion test
Annually *	Verify condition of flue and air system (including Venturi and fan)
Annually *	Check ignition electrode
Annually *	Cleaning the combustion chamber (including the burner tube)
Annually *	Clean condensate discharge
Annually *	Safety block check, modulation range check, gas valve closing after burner stop
Annually *	Check control parameters
Annually *	Check for gas piping leak
Annually *	Check wiring and connection
Annually *	Verify startup
Annually *	Verify the flame
Annually *	Check relief valve
Annually *	Inspect the burner gasket

(*) Annually or every 2000 hours. Whichever occurs first.

⚠ WARNING: Before carrying out any maintenance or cleaning, disconnect the power from the device by turning off the main switch and closing the main gas valve. In addition, for all maintenance (to be carried out at least once a year, as noted above) always replace all the boiler's internal flue and gas seals, in particular the burner seals, when servicing these components.

Before performing any operation:

- disconnect the electric power supply by turning the main system switch to "off"
- close the gas shut-off valve.



GAS LEAKING INSPECTION

Verify all gas piping to ensure that there are no leaks.

⚠ DANGER: To verify the gas leaks use a soap solution or a gas leak detector. Do not use matches, candles, or other methods that can cause explosions!

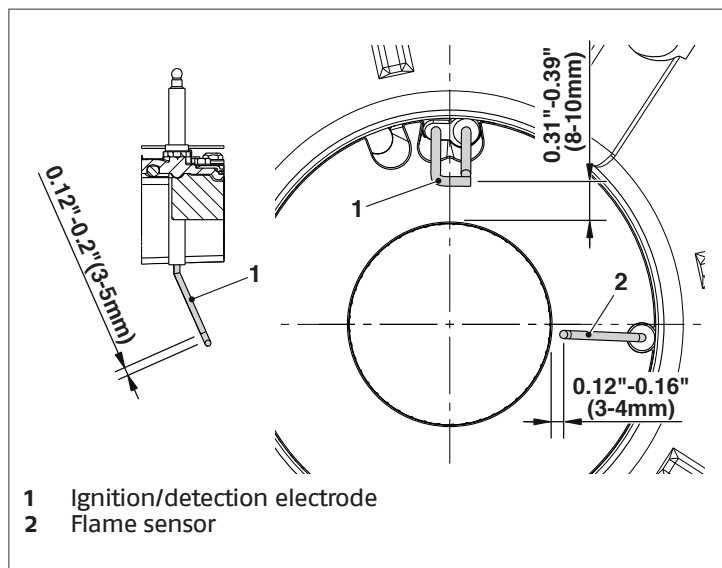
CHECK EXHAUST AND COMBUSTION AIR PIPE SYSTEM

Clear vent systems of any obstructions, corrosion, physical damage, water stains, rust. Verify the connection between the single components.

Verify the outside terminations are clear. Clean the screens and the louvers if there is any debris.

INSPECTION OF IGNITION ELECTRODE

Verify that the electrode is clean of deposits and use an emery cloth or other material to remove deposits as required.



CHECKING FOR WIRING AND CONNECTIONS

Check that all wiring is securely fastened and in good condition without any cracking or alteration of isolation or presence of corrosion in metallic connection.

BURNER GASKET INSPECTION

You must maintain the boiler as outlined in this manual and have the boiler started up and serviced at least annually by a qualified service technician to ensure boiler/system reliability. This includes a combustion test and the cleaning of the combustion chamber.

When disassembling the heat exchanger it is crucial to inspect the Burner Gasket for damage.

It is a must to replace the burner gasket when servicing and if there are any signs of wear, deformity or discoloration of the gasket and in any case not later than every two years.

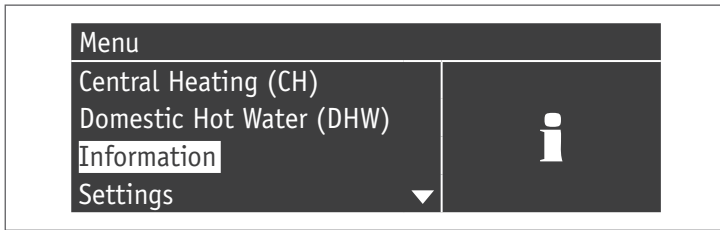
4.16.1 "Service reminder" function

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

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

This text will remain active until a qualified service agency resets the internal meter after maintaining the appliance.

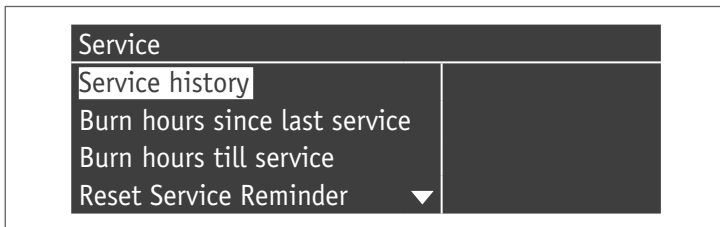
The user can check at any time how many hours until the next planned maintenance activity by accessing the "Information" menu



and selecting "Maintenance" using the ▲ / ▼ buttons

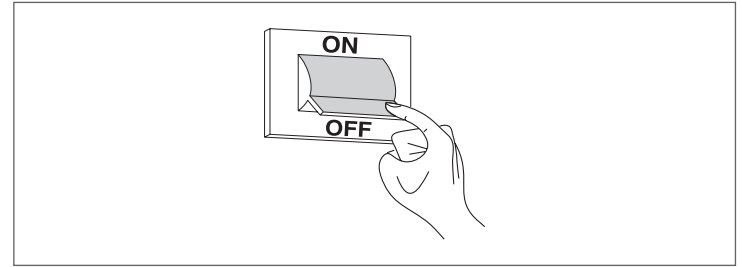


The menu also shows the hours from the last maintenance activity performed and access to a log that lists the dates of the last 15 maintenance activities, if this function has been utilized.



4.17 Cleaning and removing internal components

Before any cleaning operation, disconnect the electrical power supply by switching the main system switch to "off".



OUTSIDE

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

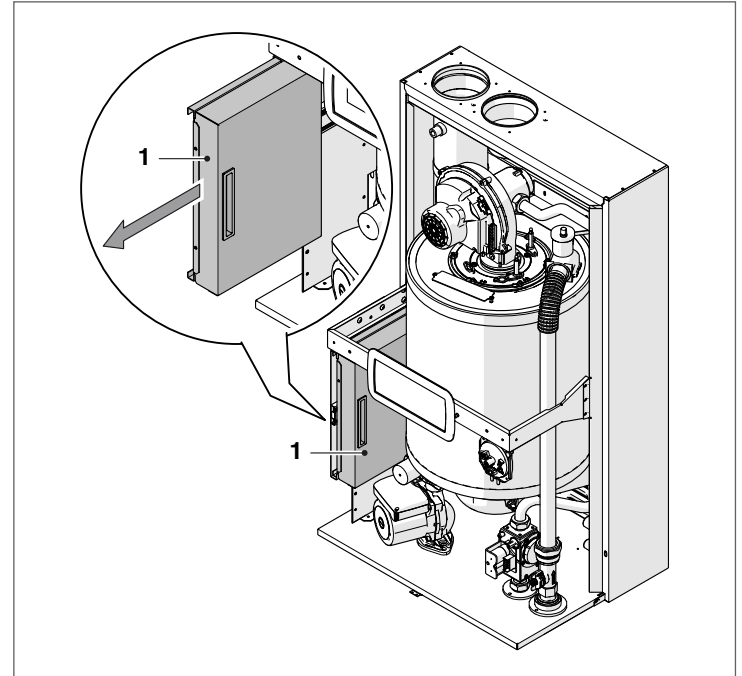
⚠ CAUTION: Do not use fuels, sponges with abrasive solutions or powder detergents.

INSIDE

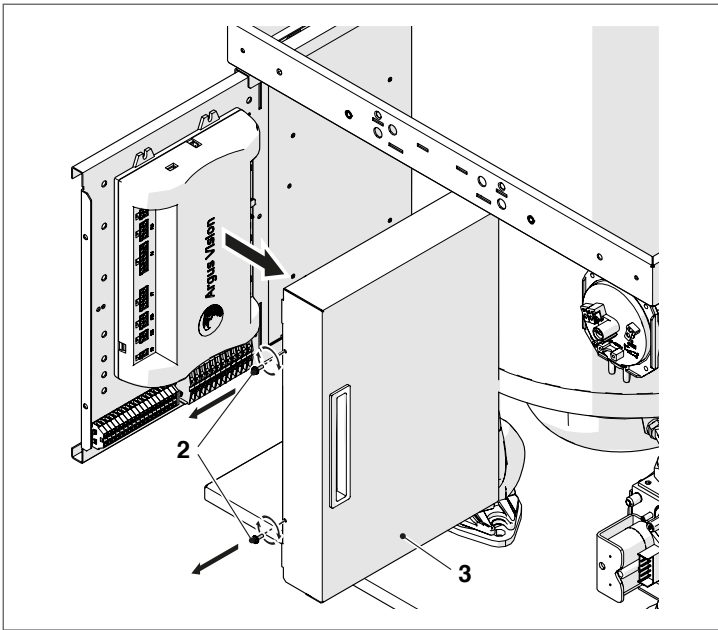
Before starting to disassemble components, close any fill valves to the unit.

Access to the control panel and the internal parts of the boiler

- Remove the locking screw and the panel's front side
- Pull and slide the electrical panel box towards the outside (1)



Loosen the screws (2) and remove the cover (3)

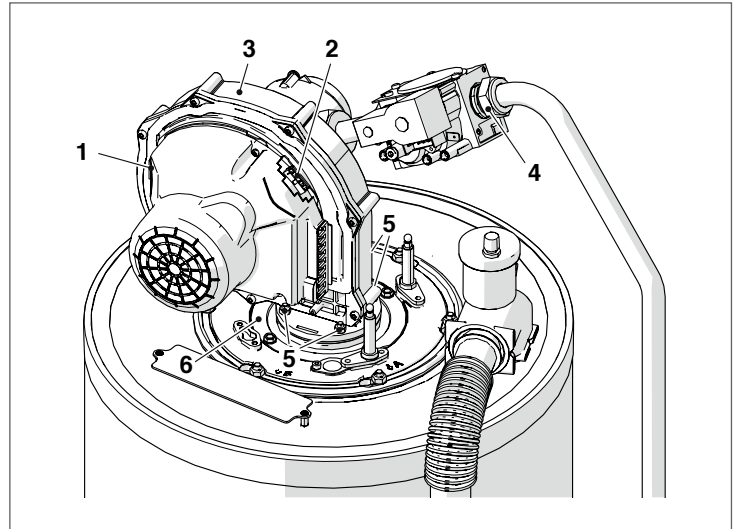


At this point, it will be possible to access PCB and terminal blocks. Once the maintenance is complete, refit the components working in the opposite direction of what was described.

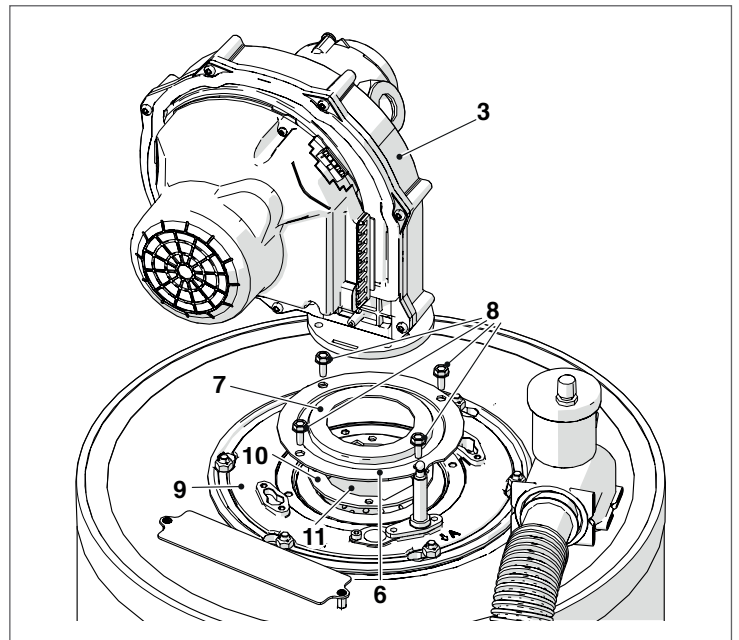
⚠ NOTE: If the electronic control box is replaced, see the electrical wiring diagram in order to reset the connections.

Disassembling the fan and burner model Condexa PRO NA 75 P

- Remove the locking screw and the panel's front side
- Remove wires (1) and (2) for the fan (3)
- Remove the air pipe from the fan
- Unscrew the swivel nut (4) and disconnect the gas pipe
- Unscrew the four screws with a pipe wrench (5) fixing the fan (3) to the flange (6)



- Take the fan (3) and the gasket (7) out
- Unscrew the 4 screws (8) that fix the flange (6) to the lower flange (9)
- Remove the gasket (10) and the burner (11).

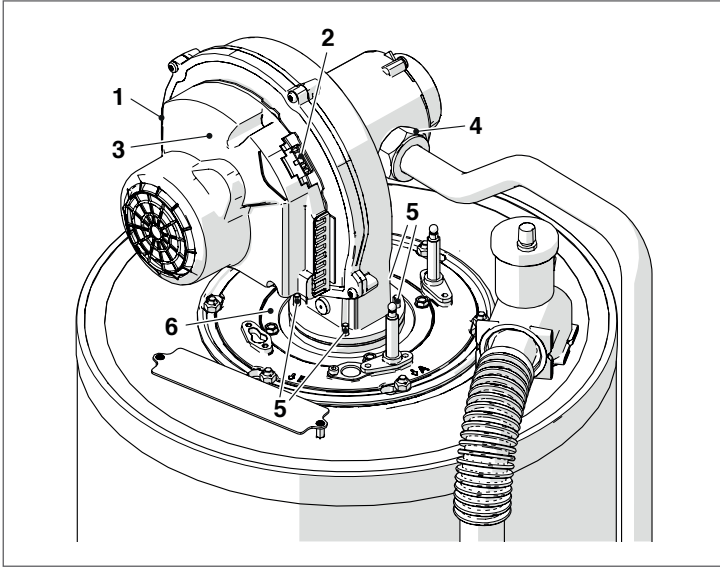


- Replace the gaskets (7-10) with the new ones. Once the maintenance is complete, refit the components working in the opposite direction of what was described.

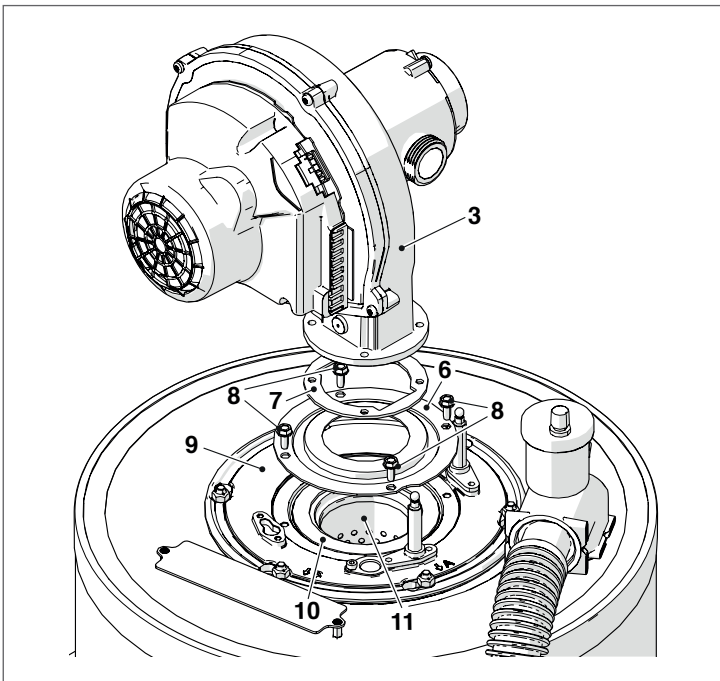
⚠ WARNING: Check that the gas connection for leaks.

Disassembling the fan and burner model Condexa PRO NA 117 P

- Remove the locking screw and the panel's front side
- Remove wires (1) and (2) for the fan (3)
- Remove the air pipe from the fan
- Unscrew the swivel nut (4) and disconnect the gas pipe
- Unscrew the four screws with a pipe wrench (5) fixing the fan (3) to the flange (6)



- Take the fan (3) and the gasket (7) out
- Unscrew the 4 screws (8) that fix the flange (6) to the lower flange (9)
- Remove the gasket (10) and the burner (11).

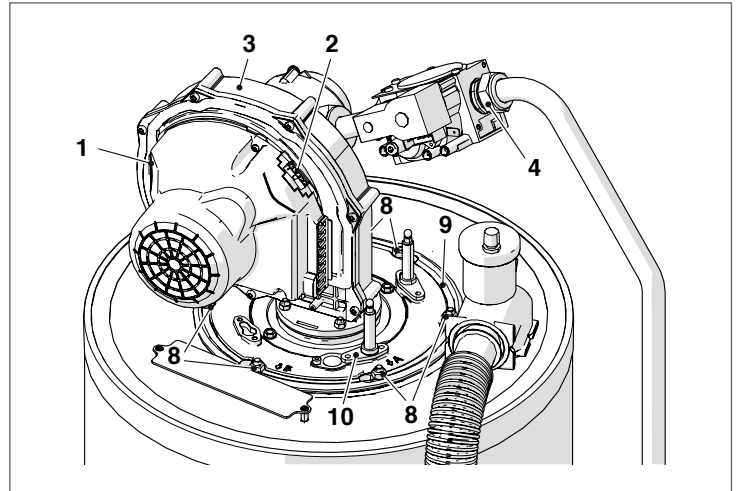


- Replace the gaskets (7-10) with the new ones.
- Once the maintenance is complete, refit the components working in the opposite direction of what was described.

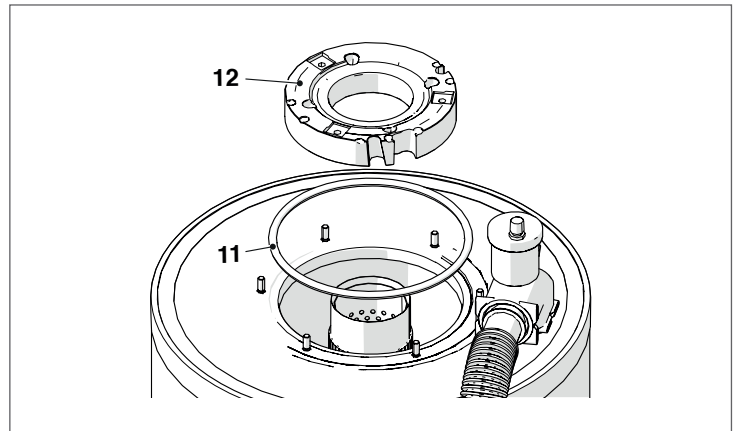
⚠ WARNING: Check that the gas connection for leaks.

Disassembling the flange for cleaning the heat exchanger model Condexa PRO NA 75 P

- Remove the locking screw and the panel's front side
- Remove wires (1) and (2) for the fan (3)
- Remove the air pipe from the fan
- Unscrew the swivel nut (4) and disconnect the gas pipe
- Unscrew the six screws (8) that secure the burner unit (9) to the heat exchanger with a socket wrench
- Remove the fan and the entire burner body (9)
- Remove the electrode plate(10), check the electrode condition and replace them if necessary



Remove the gasket (11) and the heating element (12)

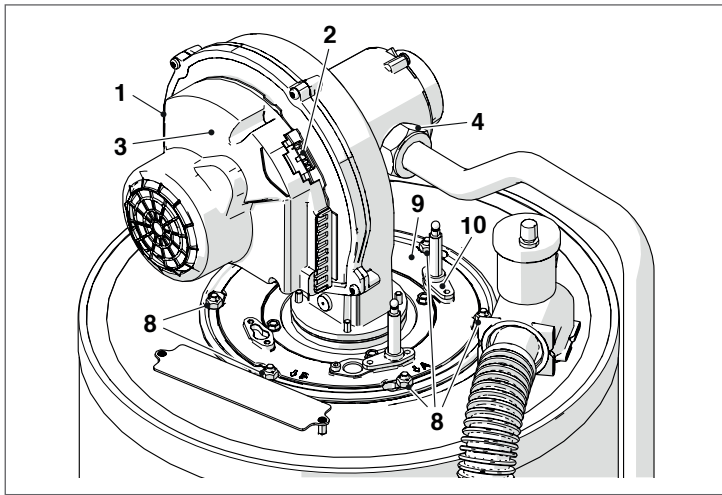


Once the maintenance is complete, refit the components working in the opposite direction of what was described.

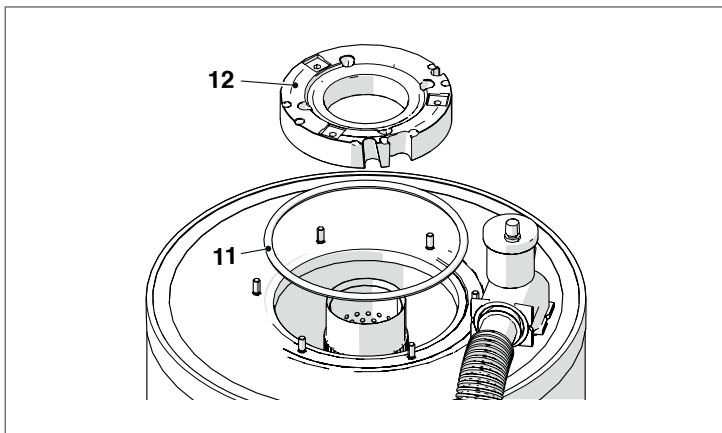
⚠ WARNING: Check that the gas connection for leaks.

Disassembling the flange for cleaning the heat exchanger model Condexa PRO NA 117 P

- Remove the locking screw and the panel's front side
- Remove wires (1) and (2) for the fan (3)
- Remove the air pipe from the fan
- Unscrew the swivel nut (4) and disconnect the gas pipe
- Unscrew the six screws (8) that secure the burner unit (9) to the heat exchanger with a socket wrench
- Remove the fan and the entire burner body (9)
- Remove the electrode plate(10), check the electrode condition and replace them if necessary



Remove the gasket (11) and the heating element (12)

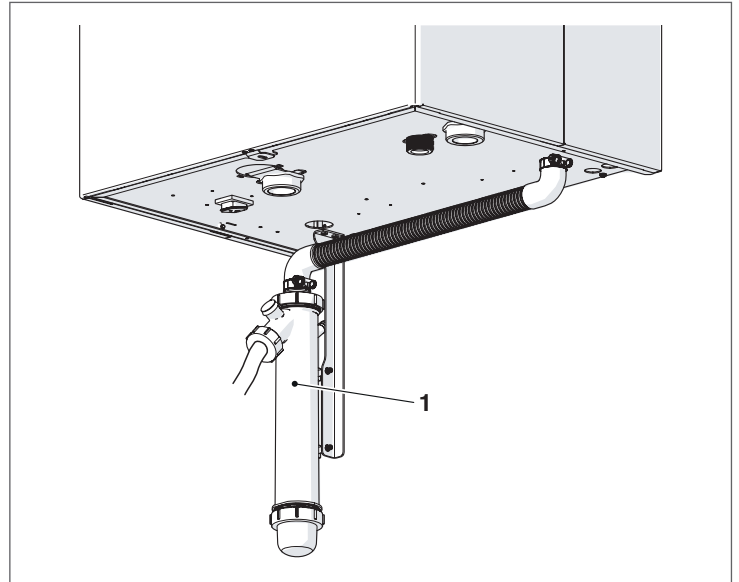


Once the maintenance is complete, refit the components working in the opposite direction of what was described.

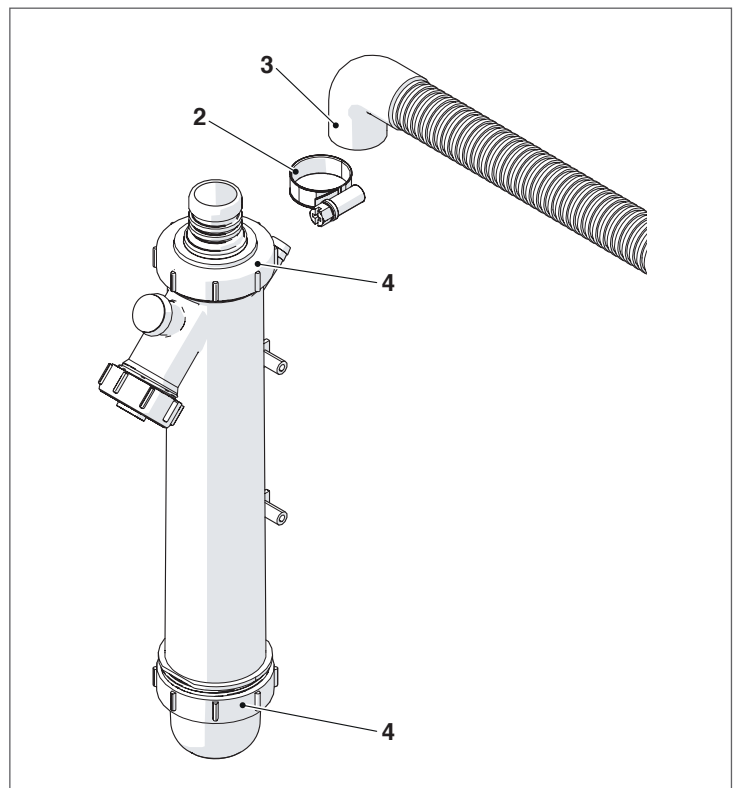
⚠ WARNING: Check that the gas connection for leaks.

4.17.1 Condensate drain siphon cleaning

- Locate the condensate drain trap (1), mounted under the appliance.



- Loosen the clamp (2), detach the condensate drainage corrugated tube (3), remove the siphon and remove it using the two screw plugs (4)
- Remove the float and clean all internal components.



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

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

4.18 Troubleshooting

FAULT	CAUSE	SOLUTION
There is a smell of gas	Gas supply circuit leaks	- Check the seal of the gaskets and the pressure test ports/taps for leaks
Odour of unburnt gas	Flue gas circuit	- Check the gasket seals - Make sure there are no obstructions - Check the combustion quality
Irregular combustion	Burner gas pressure	- Check the setting
	Orifice installed	- Check the diameter
	Dirty burner and heat exchanger	- Clean the burner and heat exchanger - Perform a combustion analysis
	Heat exchanger passages obstructed	- Clean the burner and heat exchanger - Perform a combustion analysis
	Faulty fan	- Check the operation of the fan; replace if necessary
Ignition delays with pulsating at the burner	Burner gas pressure	- Check the setting
	Ignition electrode	- Check the positioning and conditions
The boiler becomes dirty very quickly	Combustion	- Perform a combustion analysis
The burner does not start upon consent of the boiler control	Gas valve	- Check for the presence of 120Vac voltage on the gas valve terminals (J5 connector of main board), check wiring and connections
The boiler does not start	No electrical power supply (no message on the display)	- Check the electrical connections - Check the condition of the fuse
The boiler does not arrive at temperature	Boiler dirty	- Clean the combustion chamber
	Burner capacity insufficient	- Check and clean the burner - Perform a combustion check
	Boiler system adjustment	- Check the parameters are set correctly - Check the temperature setting is correct
The boiler triggers the water high limit error	No water	- Check the water high limit is working properly - Check the temperature setting is correct - Check the electrical wiring is not disconnected - Check the position of the sensor
	Boiler system adjustment	- Check the auto air vent is bleeding properly - Check the heating circuit pressure
The boiler is at temperature but the heating system is cold	Presence of air in the system	- Bleed the system
	Pump malfunctioning	- Check/unseize the pump - Replace the circulator - Check the electrical connection of the circulator
The circulator does not start	Pump malfunctioning	- Check/unseize the pump - Replace the circulator - Check the electrical connection of the circulator
Frequent tripping of the low water cutoff	System pressure relief valve	- Check the pressure relief valve is not out of calibration and that the low water cutoff is functioning properly
Frequent tripping of the low water cutoff	Incorrect system pressure	- Check the system pressure - Check pressure reducer functioning
Frequent tripping of the low water cutoff	Expansion tank	- Check the expansion tank is charged properly and not ruptured

5 SYSTEM MANAGEMENT

5.1 Communication between the boilers

Communication between boilers is necessary when using a cascade system to prevent short-cycling and allow equal run-times between units.

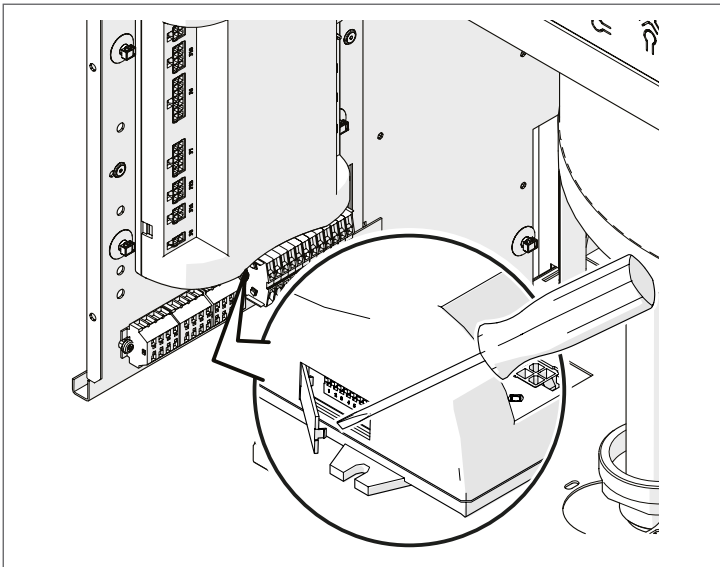
The essential steps for configuration are:

- allow the Managing boiler to recognize which and how many depending boilers are present in the system, using the dip-switches
- connect the boiler's with a BUS wire to allow communication between the control units.

5.1.1 Setting the dip-switch

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

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



⚠ WARNING: The setting must be carried out on each boiler. For configuration of the individual boiler, refer to the following table.

Key	
	Dip switch ON
	Dip switch OFF
Setting the Dip-switch	Boiler Configuration
	Stand-alone boiler (all the dip-switches set to OFF, configuration not used in cascade)
	1st boiler (Managing)
	2nd boiler (Depending)
	3rd boiler (Depending)
	4th boiler (Depending)
↓	↓
	8th boiler (Depending)
	9th boiler (Depending)
	10th boiler (Depending)

⚠ NOTE: If two boilers have the same Dip-switch setting, the Managing boiler will signal a communication error and the cascade will not work correctly.

⚠ NOTE: A boiler will not be recognized if it has the setting of all the Dip-switches set to OFF.

6 SETTING PARAMETERS OF THE CASCADE SYSTEMS

6.1 Parameters specific to cascade systems

Parameters are listed base on the reference menu.

Reference Menu

M1	Boiler parameters menu
M2	System cascade settings menu
M3	Boiler cascade settings menu
M4	Appliance configuration menu

Access type

U	End user
I	Installer

Menu	Par. No.	Nr. displayed Display	Description	Range	Factory setting	UM	Access type	Category
M2	72	Permit Emergency Mode	Activates the emergency mode. This mode comes on when communication between Managing and the primary circuit's sensor is lost. In this event, if Par. 72 is set to "Yes", the cascade is initiated, working to the fixed set-point determined by Par. 74.	Yes/No	Yes		U	Cascade
M2	74	Emergency Set-point	Set-point active in emergency mode.	68 - 194 (20 - 90)	158 (70)	°F (°C)	I	Cascade
M2	75	Delay Per Start Next Mod.	Defines the stand-by time in seconds to restart the subsequent cascade boiler in normal start mode.	5 - 255	120	Sec.	I	Cascade
M2	76	Delay Per Stop Next Mod.	Defines the stand-by time in seconds to switch off the last cascade boiler on in normal Off mode.	5 - 255	30	Sec.	I	Cascade
M2	142	Delay Quick Start Next	Defines the stand-by time in seconds to restart the next cascade boiler in quick start mode.	5 - 255	60	Sec.	I	Cascade
M2	143	Delay Quick Stop Next	Defines the stand-by time in seconds to switch off the last cascade boiler on in Quick Stop mode.	5 - 255	15	Sec.	I	Cascade
M2	77	Hyst. Down Start Module	Defines how many degrees the temperature measured by the primary circuit's sensor must fall below the set-point in order for the subsequent boiler to be started after the time interval set by Par. 75.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M2	78	Hyst. Up Stop Module	Defines by how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for the subsequent module to be switched off after the time interval set by Par. 76.	0 - 72 (0 - 40)	7 (4)	°F (°C)	I	Cascade
M2	144	Hyst. Down Quick Start	Defines how many degrees the temperature measured by the primary circuit's sensor must go below the set-point in order for the subsequent boiler to be started after the time interval set by Par. 142 (quick-start mode).	0 - 72 (0 - 40)	36 (20)	°F (°C)	I	Cascade
M2	145	Hyst. Up Quick Stop	Defines how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for the subsequent boiler to be switched off after the time interval set by Par. 143 (quick stop mode).	0 - 72 (0 - 40)	11 (6)	°F (°C)	I	Cascade
M2	146	Hyst. Up Stop All	Defines how many degrees the temperature measured by the primary circuit's sensor must go above the set-point in order for all "On" sensor to be switched off at the same time.	0 - 72 (0 - 40)	14 (8)	°F (°C)	I	Cascade
M2	147	Number of Units	Defines the number of boilers of which the cascade system consists of.	1 - 16	14 (8)	°F (°C)	I	Cascade
M2	148	Power Mode	Defines the cascade operation mode.	0 Disabled 1 Min burners 2 Max burners	2		I	Cascade
M2	79	Max. Setp. Offset Down	Defines the maximum decrease in the primary circuit's cascade set-point. It is based on the primary circuit's sensor reading.	0 - 72 (0 - 40)	4 (2)	°F (°C)	I	Cascade

Menu	Par. No.	Nr. displayed Display	Description	Range	Factory setting	UM	Access type	Category
M2	80	Max. Setp. Offset Up	Defines the maximum increase in the primary circuit's cascade set-point. It is based on the primary circuit's sensor reading.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M2	81	Start Mod. Delay Fact.	Defines the time in minutes from the moment the demand is triggered until the activation of the set-point increases or decreases provided for by Par. 79 and 80.	0 - 60	60	Min.	I	Cascade
M2	82	Next Module Start Rate	Defines the minimum power for at least one of the boilers in the cascade system in order for the next boiler to be switched on (if the other conditions linked to Par. 75 and 77 are met).	10 - 100	80	%	I	Cascade
M2	83	Next Module Stop Rate	Defines the maximum power for all the boilers in cascade in order for the last boiler on to be switched off (if the other conditions linked to Par. 76 and 78 are met).	10 - 100	25	%	I	Cascade
M2	84	Module Rotation Interval	It defines the time interval (in days) after which boilers are rotated.	0 - 30	1	Days	I	Cascade
M2	149	First Module to Start	Establishes the number of the next boiler to be rotated (this value is automatically updated at each rotation).	1 - 16	1		I	Cascade
M2	152	PwrMode2 Min Power	Defines the power value (in percentage terms) against which the average power of all on boilers in cascade operation mode must be compared (Par. 148 = 2).	0 - 100	20	%	I	Cascade
M2	153	PwrMode2 Hysteresis	Defines the Hysteresis power value (in percentage terms) compared to the average power of all on boilers in cascade operation mode (Par. 148 = 2).	0 - 100	40	%	I	Cascade
M2	154	Post-Pump Period	Defines pump overrun time in seconds at the end of the cascade heat demand.	0 - 255	60	Sec.	I	Cascade
M2	155	Frost Protection	Defines the temperature (detected by the primary sensor) below which the boiler circulator and the system circulator (with cascade configuration) activate. If the temperature of the primary sensor falls another 9 (5) degrees below the value set by Par. 155, then a request to activate the cascade is generated. When the temperature of the primary sensor reaches the value defined by Par. 155 increased by 9 (5) degrees, then the request ceases and the cascade returns to stand-by mode.	18 - 54 (10 - 30)	27 (15)	°F (°C)	I	Cascade
M3	73	Boiler Address	Defines the type of system.	Managing, Stand-alone, Dependent	Stand-alone		I	Cascade
M3	169	Max. Setp. Offset Down	Defines the maximum decrease in the primary circuit's cascade set-point and is based on the secondary circuit's sensor reading.	0 - 72 (0 - 40)	4 (2)	°F (°C)	I	Cascade
M3	170	Max. Setp. Offset Up	Defines the maximum increase in the primary circuit's cascade set-point and is based on the secondary circuit's sensor reading.	0 - 72 (0 - 40)	9 (5)	°F (°C)	I	Cascade
M3	171	Start Mod. Delay Fact.	Defines the time in minutes from the moment the request is triggered until the activation of the set-point increases or decreases provided for by Par. 169 and 170.	0 - 60	40	Min.	I	Cascade
M4	97	Model	Allows the setting of Par. from 116 to 128 through some pre-set values which define the configuration of the inlets and outlets of the boiler.	22	22		I	General
M2	205	Dep. Zone Control	Enables the control of the additional heating zone managed by "Depending" boiler. 0 = Disabled 1 = Enabled	0 - 1	0		U	General

6.1.1 Setting the main parameters

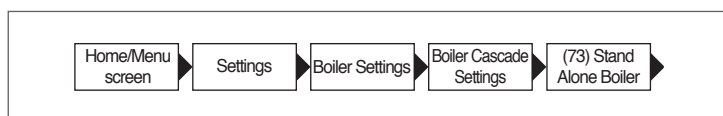
Some parameters are essential in order for the system to operate in cascade and setting these parameters is a determining factor for correct system operation.

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

Parameter 73 defines how the boiler is addressed and ensures that the signal from the secondary sensor is recognized.

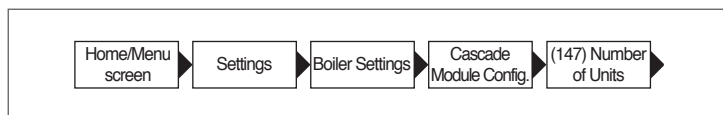
Three values can be set:

- **Managing:** to be set on the Managing boiler so that secondary sensor operation is activated.
- NOTE:** The secondary sensor SC must be connected to the 2nd boiler (1st Depending boiler);
- **Stand Alone:** to be set on the Managing boiler so that secondary sensor operation is deactivated;
- **2 ÷ 7** to be set on all Depending boilers.



6.1.3 Par.147 – No. of boilers

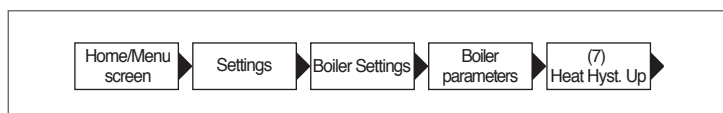
Parameter 147 serves to define the number of boilers present on the system (it is important to set the number of boilers connected in order to ensure correct system operation). This parameter must only be set on the Managing boiler.



6.1.4 Par.7 – heating setpoint hysteresis

Parameter 7 adjusts shutdown of the individual boilers when the setpoint is exceeded. With cascade operation, this value must be increased (up to a maximum of 36 °F (20 °C) to prevent the boiler operation from being disabled (since the default value is 9 °F (5 °C) if the system decides to increase the setpoint based on the value read on the primary or secondary sensor (see sections "General operation", "Operation with the primary sensor" and "Operation with the secondary sensor")

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



6.1.5 General operation

With a cascade system, the regulator of the managing boiler establishes a setpoint to be sent to the depending boilers based on parameters 86-87, the difference between the setpoint value set and the value read on the primary supply manifold (or on the basis of par 176-177 and the difference between the setpoint value set and the value read on the secondary supply manifold).

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

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

6.2 Operation with the primary sensor

The system sensor present on the primary system (see block diagrams 1 and 3) allows the setpoint sent to the individual boilers to be modulated on the basis of the difference between the setpoint and the value read on the supply manifold of the primary system.

The following parameters regulate this modulation:

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

6.3 Operation with the secondary sensor

When the secondary system is present (see block diagrams 2 and 4), the setpoint sent to the individual boilers to be modulated on the basis of the difference between the setpoint and the value read on the delivery manifold of the secondary system.

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

- 169 defines the maximum setpoint decrease
- 170 defines the maximum setpoint increase

- 171 defines the time (from the start of the request) from which the setpoint modulation is started
- 176 defines the proportional term for setpoint modulation
- 177 defines the integrative term for setpoint modulation

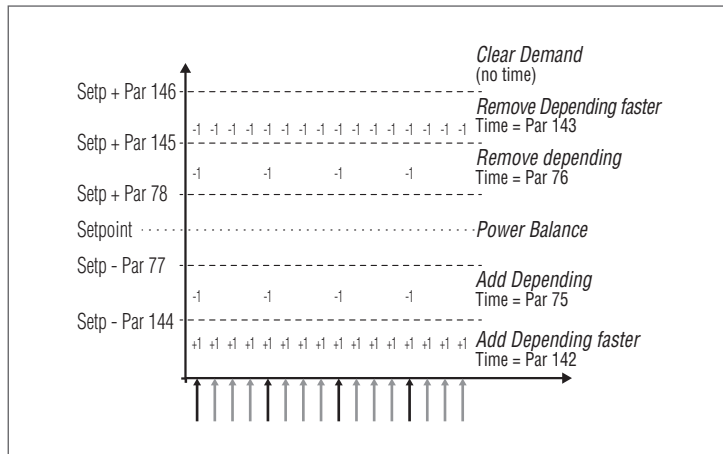
6.4 Parameter 148: operating mode of the cascade

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

6.4.1 Par 148 = 0

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

The shut-off values of the lines with the y axis are the sum or the difference of the values of the corresponding parameter in relation to the value of the setpoint sent by the Managing boiler to the boilers.



Six options are defined on the basis of the temperature read (by the Managing boiler) on the supply manifold of the primary system.

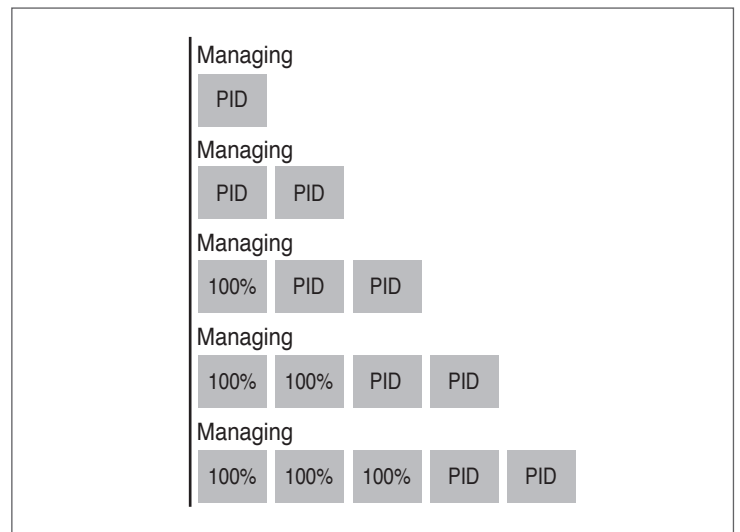
- In the central option, **Power balance**, defined (by the variable parameters) around a setpoint, no start-ups or shutdowns of the Depending boilers are made. The parameters which define this band are 77 and 78.
- In the options, **Remove dependent** and **Add dependent**, the start-ups and shutdowns are carried out with "long" time intervals which can differ between start-up and shutdown. The parameters which define this band are 77, 78, 144, 145. The time interval is defined by parameters 75 and 76.
- In the options, **Remove dependent Faster** and **Add dependent Faster**, start-ups and shutdowns are carried out with a "short" time interval which, even in this case, can differ between start-up and shutdown. The shutdown option is between the values of parameters 146 and 145, while the start-up band is below the value defined by parameter 144. The time range is defined by parameters 142 and 143.
- In the option, **Clear demand**, all the boilers are immediately stopped. This option is above the value defined by parameter 146.

6.4.2 Par 148 = 1

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

The first difference in relation to mode 0 refers to the logic with which the modulation of the Depending boilers within the cascade is managed.

In fact, while each boiler modulates with its own PID in mode 0, no more than two Depending boilers modulate with the same criteria in mode 1, while the remaining boilers operate at maximum power. The diagram is represented in the following figure:



Practically speaking, if more than two boilers are on, only two boilers are controlled via PID, while the others receive a signal to move to maximum power.

The second difference refers to the start-up/shutdown rules of the individual modules.

In any case, the start-up and shutdown rules are managed according to the indications shown in the previous graph. The difference is that it is also possible to have start-ups/shutdowns of the Depending boilers in the "balancing" zone.

This additional start-up criteria (valid in the balancing band only) ensures that a boiler is started-up when any one of the two boilers controlled by a PID adjustment has reached a threshold power (Par 82) once a specific wait time defined by Par 75 has elapsed. Similarly (still within the balancing band), a boiler is shutdown if both boilers controlled by a PID adjustment have reached a percentage of power which is below the minimum power threshold (Par 83) once a specific wait time defined by Par 75 has elapsed.

6.4.3 Par 148 = 2


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

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

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

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

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

 **NOTE:** We must consider that the percentage of power varies from a minimum of 1% and a maximum of 100% and therefore, the parameter values 152 and 153 are not to be taken as the percentage of absolute power.

7 SYSTEM MANAGER

7.1 Commissioning

⚠ WARNING: The appliance must be maintained and adjusted at least once a year by a qualified service agency in compliance with all applicable National and Local codes.

⚠ WARNING: Incorrect maintenance or adjustment may damage the appliance and cause damage to people or create a hazard.

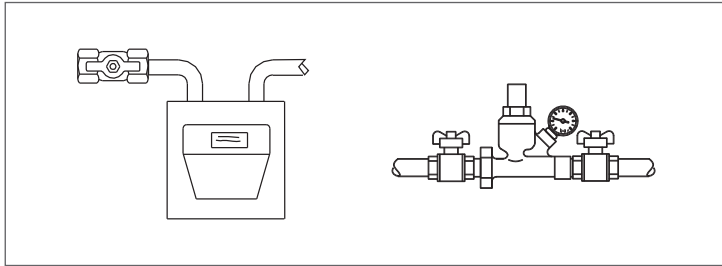
⚠ DANGER: The unqualified personnel is forbidden from opening and removing the appliance's casing. These activities must be carried out only by a qualified installer, service agency, or gas supplier.

The **RIELLO Condexa PRO NA** must be commissioned by a qualified installer, service agency or gas supplier, after which step the appliance may operate automatically.

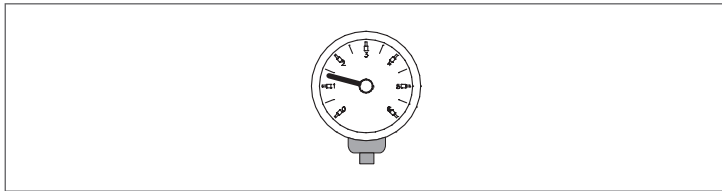
However, the system manager may be required to restart the appliance independently, without involving a qualified installer, service agency or gas supplier; for example after a long period of absence.

To do so, perform the following checks and operations:

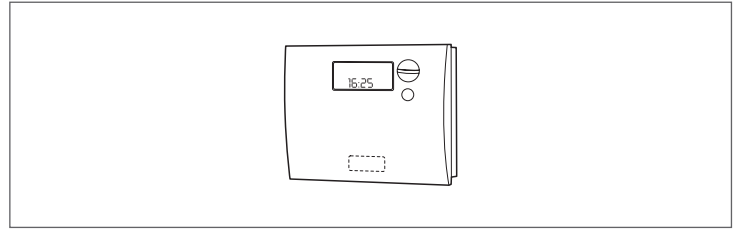
- Check that the gas shutoff valve and the supply/return shutoff valves are open



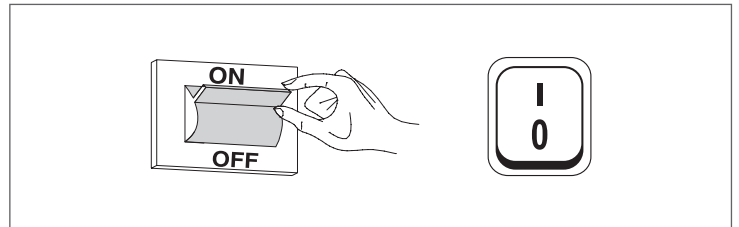
- While the system is still cold, check the working pressure in the central heating circuit is over 14.5 psi (1 bar) but below the maximum limit specified for the boiler and the pressure relief valve rating



- Adjust the room thermostats for the high and low temperature zones to the required temperature (~68 °F/20 °C) or, if the systems are equipped with a programmable thermostat, make sure it is on and adjusted (~68 °F/20 °C)



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



The appliance will go through the begin it's sequence of operation and, after starting, it will continue to operate until set temperatures are achieved.

The burner will then switch off and on automatically to maintain the set temperature automatically.

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

⚠ NOTE: In the event of a hard lock-out error, press the "RESET" button and wait for the boiler to restart.

WARNING: If the error code persists, the boiler should never be reset more than three times without contacting a qualified service agency or the gas supplier to service the unit. Consistently re-setting the unit without having it properly serviced by a qualified service agency or gas supplier could result in substantial property damage, severe injury or death.

7.2 Temporary or short-term shut-down

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

- Press the MENU button and select "Time Schedule" with the ▲ / ▼ buttons, confirm with ● button.
- Select "Holiday Schedule" with the ▲ / ▼ buttons, and confirm with the ● button.

Clock Program
Program Group
Burn hours till service
Reset Service Reminder
Holiday Settings

- Select "Mode" with the ▲ / ▼ buttons, and confirm with ● button. Select "System" mode and confirm.

Holiday Settings	
Mode	System
Holiday Setpoint	Comfort
Begin Date	Saturday 01-08-2015
End Date	Saturday 01-08-2015

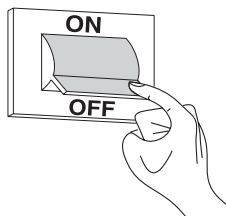
- Select "Holiday Setpoint" with the ▲ / ▼ buttons, and confirm with ● button.
- Select "Antifreeze" holiday setpoint and confirm.

Holiday Settings	
Mode	System
Holiday Setpoint	Anti Fr
Begin Date	Saturday 01-08-2015
End Date	Saturday 01-08-2015

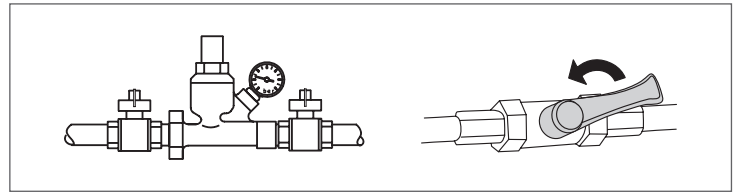
7.3 Preparing for extended periods of shut-down

Long periods of inactivity of the thermal module require the following operations to be carried out:

- turn the main switch of the boiler and the main system switch to "off"



- Close the fuel and water valves for the heating and domestic hot water system.



⚠ WARNING: Empty the central heating and domestic system if there is a danger of freezing.

7.4 Cleaning

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

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

⊖ CAUTION: Do not use abrasive cleaning pads or powder detergents.

⊖ WARNING: Never clean the boiler without first disconnecting it from the main power supply by turning the main power switch and the control panel switch to OFF.

⚠ The combustion chamber and flue pipes must be cleaned periodically by a qualified service agency or gas supplier. Ensure venting is properly sealed and put back together per the instructions in this manual, the venting manufacturer instructions and the local code having jurisdiction. Failure to do so may result in substantial property damage, severe injury or death due to carbon monoxide poisoning.

7.5 Maintenance

Please remember that THE PERSON RESPONSIBLE FOR SYSTEM MANAGEMENT MUST ENSURE THAT A PROFESSIONALLY QUALIFIED SERVICE AGENCY OR GAS SUPPLIER UNDERTAKE PERIODIC MAINTENANCE AND COMBUSTION EFFICIENCY MEASUREMENTS.

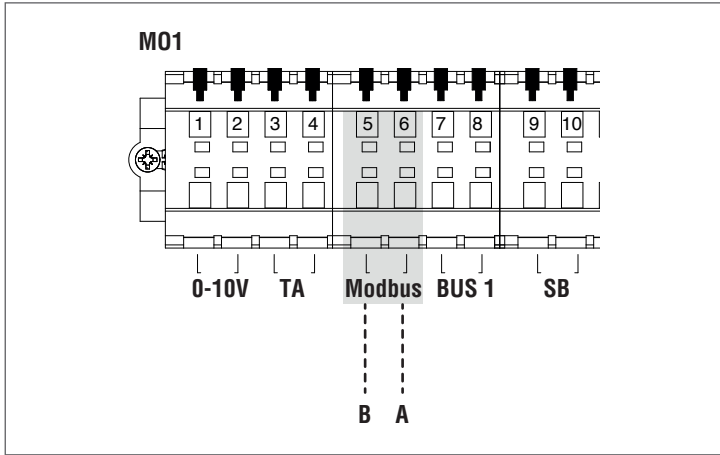
More information on Annual Maintenance can be obtained at www.riello.com or by contacting Riello North America at 1.800.474.3556.

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

Servicing is a legal requirement and must be performed at least once a year by a professionally qualified service agency or gas supplier.

8 MODBUS CONNECTION

The boiler is equipped with a Modbus connection (based on the RS485 communication standard) that supports the remote management and adjustment of the boiler. The Modbus connection is available on the low-voltage terminal board.



Configuration

The following table shows the connection details.

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

As shown in the table above, the boiler's address (meant as the address of the slave device in the Modbus system) and the number of "Stop Bits" are two adjustable values. To modify one or the other, from the home screen, access the "Settings" menu, select "General settings" and confirm.



Access the "Other settings" menu and select "Ind. Modbus"



Registers

Depending on the type of Modbus device used to connect to the boiler, the registers' addressing may start from 0x0000 or 0x0001. If addressing starts from 0x0000, the numbers of the registers listed in the table below may be used directly for reading/writing operations; if addressing starts from 0x0001, the numbers of registers shown in the table, plus one, must be used for reading/writing operations.

Control register

The control register is used for special functions. The first one is that of enabling writing on registers. All accessible registers, including write ones, must be first enabled to receive data. To prevent undesired entries, it is possible to change the value in a register only during the first four seconds after the status change of the 0 bit in the control register. Therefore, before changing the value of a register, it is necessary to change the status of 0 bit of the control register (register No. 99), sending the string 1 to it.

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

NOTE: By sending a value other than 1 and from 16384 to register No. 99, the latter will return to the write-protected status (bit 0=0).

The table below summarizes the control register's operation:

Register number	Access	Access		Description	Value range
		R	W		
99	0063	X	X	Control register	Bit 0: write enable Bit 14: controller reset

Measurement unit selection register

Register 98 is used to change the format of the data stored in registers (those containing temperature or pressure values). Before changing the value of the selection register, it is necessary to enable it for writing by forwarding the enabling command to the 99 control register.

The table for measurement unit selection register is the following:

Register number	Access	Access		Description	Value range
		R	W		
98	0062	X	X	Measurement unit selection register	Bit 0: °C/°F Bit 1: bar/psi

Types of data

Type of data	Unit	Scale factor
Temperature	°C/°F	10
Pressure	bar/psi	10
Voltage	Volt	10
Percentage	%	1
Ionization current	µA	10

Status parameters

Register number	Access		Description	Automatic conversion	Value range
	R	W			
100	X		State		See "State" table
102	X		Error code		See "Error" tables
103	X		Actual CH_setpoint		Depends on °C/°F units
110	X		System or CH pump	Yes	0 = off 1 = on
111	X		DHW pump	Yes	0 = off 1 = on

Temperatures/Information

Register number	Access		Description	Automatic conversion	Value range
	R	W			
120	X		Supply temperature	Yes	Depends on °C/°F units
121	X		Return temperature	Yes	Depends on °C/°F units
122	X		DHW temperature	Yes	Depends on °C/°F units
123	X		Flue gas temperature	Yes	Depends on °C/°F units
124	X		System temperatures (where available)	Yes	Depends on °C/°F units
125	X		Outdoor temperature (where available)	Yes	Depends on °C/°F units
140	X		Power	Yes	0..100%
142	X		Ionization current	Yes	0..x µA

Dependent information

Register number	Access		Description	Automatic conversion	Value range
	R	W			
Dependent 01					
300	X		State		See "State" table
302	X		Error code		See "Error" tables
303	X		Power	Yes	0..100%
Dependent 02					
306	X		State		See "State" table
308	X		Error code		See "Error" tables
309	X		Power	Yes	0..100%
Dependent 03					
312	X		State		See "State" table
314	X		Error code		See "Error" tables
315	X		Power	Yes	0..100%
Dependent 04					
318	X		State		See "State" table
320	X		Error code		See "Error" tables
321	X		Power	Yes	0..100%
Dependent 05					
324	X		State		See "State" table
326	X		Error code		See "Error" tables
327	X		Power	Yes	0..100%
Dependent 06					
330	X		State		See "State" table
332	X		Error code		See "Error" tables
333	X		Power	Yes	0..100%
Dependent 07					
336	X		State		See "State" table
338	X		Error code		See "Error" tables
339	X		Power	Yes	0..100%
Dependent 08					
342	X		State		See "State" table
344	X		Error code		See "Error" tables
345	X		Power	Yes	0..100%

Register number	Access		Description	Automatic conversion	Value range
	R	W			
Dependent 09					
348	X		State		See "State" table
350	X		Error code		See "Error" tables
351	X		Power	Yes	0..100%
Dependent 10					
354	X		State		See "State" table
356	X		Error code		See "Error" tables
357	X		Power	Yes	0..100%
Dependent 11					
360	X		State		See "State" table
362	X		Error code		See "Error" tables
363	X		Power	Yes	0..100%
Dependent 12					
366	X		State		See "State" table
368	X		Error code		See "Error" tables
369	X		Power	Yes	0..100%
Dependent 13					
372	X		State		See "State" table
374	X		Error code		See "Error" tables
375	X		Power	Yes	0..100%
Dependent 14					
378	X		State		See "State" table
380	X		Error code		See "Error" tables
381	X		Power	Yes	0..100%
Dependent 15					
384	X		State		See "State" table
386	X		Error code		See "Error" tables
387	X		Power	Yes	0..100%

Parameters registers

Register number	Access		Description	Note	Automatic conversion	Value range
	R	W				
500	X	X	Heating mode (Par. 1)	NV		0..x
501	X	X	DHW mode (Par. 35)	NV		0..x
502	X	X	Heating set-point (Par. 3)	V	Yes	Depends on °C/°F units
503	X	X	DHW set-point (Par. 48)	V	Yes	Depends on °C/°F units
504	X	X	Set-point at min. climatic T (Par. 19)	NV	Yes	Depends on °C/°F units
505	X	X	Set-point at max. climatic T (Par. 21)	NV	Yes	Depends on °C/°F units
506	X	X	Out. temperature for climatic minimum (Par. 22)	NV	Yes	Depends on °C/°F units
507	X	X	Out. temperature for climatic maximum (Par. 20)	NV	Yes	Depends on °C/°F units
508	X	X	Climatic shut-off (Par. 25)	NV	Yes	Depends on °C/°F units
509	X	X	Maximum value that can be assigned to the heating set-point (Par. 24)	NV	Yes	Depends on °C/°F units

Register number	Access		Description	Note	Automatic conversion	Value range
510	X	X	Minimum value that can be assigned to the heating set-point (Par. 23)	NV	Yes	Depends on °C/°F units
511	X	X	Night setback temp. (Par. 28)	NV	Yes	Depends on °C/°F units

In the "Note" column, the registers marked with "V" can be written on an ongoing basis (and be used for dynamic size control). Registers marked with "NV", on the other hand, can be overwritten only for a limited number of times (around 10.000 times with an average of twice a day).

Service reminder

Register number	Access		Description	Automatic conversion	Value range
	R	W			
33000	X		Hours elapsed from the last maintenance activity		0...65534 hours
33001	X		Hours from the next maintenance activity		.. 0...2000

STATUS table

Nr.	Name	Description
0	STANDBY	Standby
10	ALARM	Soft lockout error
14	BLOCK	Hard lockout error
15	FROST_PROTECT	Freeze protection on
16	CH_DEMAND	Heat demand
17	RESET_STATE	Reset
18	STORAGE_DEMAND	DHW demand
19	DHW_TAP_DEMAND	Imm. DHW demand.
20	DHW_PRE_HEAT	Pre-heating demand
21	STORE_HOLD_WARM	Holding desired storage temperature
22	GENERAL_PUMPING	Boiler pump ON

STATE table

Nr.	Name	Description
Standby		
0	Initialization	Initialization of reset variables
1	Reset	Reset
2	Standby	Standby
Active		
3	Pre Purge 1	Initialization of pre-purging variables
4	Pre Purge 2	Pre-purging
5	Pre Ignition 1	ON safety relay test
6	Pre Ignition 2	OFF safety relay test
7	Flame Proving	Initialization of ignition variables
8	Burn 1	Start-up
9	Burn 2	The boiler is ON
10	Post Purge 1	Initialization of post-purging variables
11	Post Purge 2	Post-purging
Error		
12	Error	Boiler Lockout
13	Alarm	Boiler Error
14	Warning	Boiler Alarm
15	Burner Boot	Restart of board

9 COMMISSIONING LOG FOR THE APPLIANCE

NOTE: Please complete a separate log for each appliance.

Home owner/operator:					
Last name, first name			Number, Street		
Telephone/fax			ZIP code, town		
System installer:					
Order number:					
Appliance type					
FD (Date of manufacture):					
Date commissioned:					
<input type="checkbox"/> Individual appliance					
Installation location:		<input type="checkbox"/> Basement <input type="checkbox"/> Garage <input type="checkbox"/> other:			
Room air only: Number and size of ventilation openings					
Vent pipe routing:		<input type="checkbox"/> Twin pipe system (Rigid) <input type="checkbox"/> Twin pipe system (Flex) <input type="checkbox"/> Concentric pipe system <input type="checkbox"/> Room air <input type="checkbox"/> Sealed combustion			
<input type="checkbox"/> PP <input type="checkbox"/> 4" <input type="checkbox"/> other:					
Total length: Approx. ft (m) Elbows 90°: Qty Elbows 15 - 45°: Qty					
Flue tightness check completed: <input type="checkbox"/> yes <input type="checkbox"/> no					
CO ₂ value in the exhaust air at maximum nominal output:					
O ₂ value in the exhaust air at maximum nominal output:					
Notes regarding under or over pressure operation:					
Get setting and flue gas test:					
Gas conversion: <input type="checkbox"/> NG <input type="checkbox"/> LPG (propane)					
Gas pressure		"W.C. (mbar)	Gas static supply pressure:		"W.C. (mbar)
Selected maximum output:		MBH (KW)	Selected minimum output:		MBH (KW)
Flow rate at maximum nominal output:		gpm (l/min)	Flow rate at minimum nominal output:		gpm (l/min)
Net calorific value H ₁₈ (per gas supplier):		MBTU/ft ³ (kwh/m ³)			
CO ₂ at maximum nominal output:		%	CO ₂ at minimum nominal output:		%
O ₂ at maximum nominal output:		%	O ₂ at minimum nominal output:		%
CO at maximum nominal output:		ppm	CO at minimum nominal output:		ppm
Flue gas temperature at maximum nominal output:		°F (°C)	Flue gas temperature at minimum nominal output:		°F (°C)
Maximum measured supply temperature:		°F (°C)	Minimum measured supply temperature		°F (°C)
System hydraulics:					
<input type="checkbox"/> Low-loss header, type:		<input type="checkbox"/> Additional expansion tank			
<input type="checkbox"/> Heating pump:		Size/pre-charge pressure:			
<input type="checkbox"/> Primary secondary piping:		Automatic air vent present? <input type="checkbox"/> yes <input type="checkbox"/> no			
<input type="checkbox"/> DHW tank/type/number/heating surface output:					
<input type="checkbox"/> System hydraulics checked, notes:					

10 LIMITED WARRANTY – TERMS AND CONDITIONS

GENERAL NOTE

This limited warranty is provided by Riello Canada Inc. ("Riello") the following Riello products sold and installed in the United States and Canada:

Condexa PRO NA 75 P
Condexa PRO NA 117 P

This warranty is provided to the original purchaser as long as the boiler remains installed at its original place of installation. This warranty is provided in respect of the boiler heat exchanger and its insulation, casing and approved accessories designated by Riello.

The warranty is conditional upon:

- The proper installation of the boiler by a qualified HVAC mechanical contractor or installer trained and certified in accordance with applicable laws and regulations of the jurisdiction in which the boiler is installed ("the Qualified Contractor"); and
- Proper operation and maintenance of the boiler in accordance with the boiler operation manual and service bulletins as issued by Riello from time to time and the mandatory maintenance schedule provided in the Riello Installation & Operation Manual For Contractors.

Installation or maintenance of the boiler by a person other than a Qualified Contractor shall void this warranty.

Any component of a boiler returned to Riello in connection with this warranty agreement remains the property of Riello.

WARRANTY TERMS & CONDITIONS

PARTS WARRANTY

Riello warrants that the boilers and approved accessories designated by Riello shall be free of defects in manufacture, material and workmanship for 18 months from shipment or TWELVE (12) MONTHS from start-up (whichever comes first).

Furthermore, Riello will warrant parts for boilers mentioned in this certificate for an additional FOUR (4) YEARS bringing the total parts warranty to FIVE (5) YEARS provided the boiler is registered on the riello website, www.riello.com, within NINETY (90) DAYS.

The obligation of Riello under this warranty shall be to repair or replace those parts determined by Riello to be defective in material or workmanship.

This warranty is only in respect of boilers for which payment has been made in full.

TEN (10) YEAR WARRANTY OF PRIMARY and SECONDARY PLATE HEAT EXCHANGERS

Riello warrants that the heat exchanger(s) of the boiler shall be free from leakage, thermal shock and condensate corrosion, and shall be free from defects in material and workmanship for TEN (10) YEARS from the date of manufacture, which date is found within the boilers serial number on the data plate so long as the boiler has been registered at www.riello.com.

The obligation of Riello under this ten year heat exchanger warranty shall be to repair or replace those parts of the heat exchanger determined by Riello to be defective in material and workmanship in the heat exchanger as determined by Riello.

WARRANTY EXCLUSION

- If the boiler is not installed by a qualified, Riello-trained heating contractor.
- Any costs for labor for the examination, removal or re-installation of allegedly defective Boiler parts, and transportation thereof to and from Riello facilities in North America or Italy, or as determined by Riello.
- Failures or malfunctions resulting from: Failure to properly install, operate or maintain the Boilers in accordance with our published Installation, Operation and Maintenance Manual or Users Information Manual provided with the product.
- Failure to install a low loss header or provide proper hydronic separation where required.
- Damage to the Boilers or any of its original or authorized replacement parts or other accessories designated by Riello as standard equipment caused by excessive temperatures or pressures, unsuitable fuels, fuel impurities, improper fuel mixture, fuel or gas explosion, electrical, chemical or electrochemical reaction, water impurities, unsuitable water conditions which may have caused unusual deposits within the water side and heat exchanger combustion area of the pressure vessel within the Boiler, water treatment chemicals, or water conditioning systems, electrical failures, insurrection, riots, war, or acts of God, combustion air contaminated externally, air impurities, sulfur or sulphuric action or reaction, dust particles, corrosive vapors, oxygen corrosion, and situating the Boiler in an unsuitable location or continuing use of the Boiler after onset of a malfunction or discovery of a defect.
- Deformation occurs due to freezing; improper storage or handling.
- If the appliance is not installed in accordance with all applicable local and national codes and regulations.
- If the boiler is not installed in a clean, dry area.
- Any alterations are made without written authorization by the manufacturer.

WARRANTY DAMAGES AND LIMITATIONS

The obligations of Riello here under shall also be subject to the following terms and conditions;

- Any repaired or replaced component of a Boiler and approved accessories will be warranted only for the remaining unexpired term of the warranty applicable to the original Boiler.
- Negotiations, intermediate acts, discussions, disagreements or denials concerning alleged defects or deficiencies shall not extend any warranty herein and shall not waive or be deemed to waive any requirement for notification of defect or deficiency.
- Additional costs arising out of the performance of this warranty including but not limited to transport, labor, installation, assembly, testing and putting a Boiler back into operational use are the responsibility of the owner.
- RIELLO IS NOT RESPONSIBLE FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY A Boiler.
- Riello does not extend this warranty to any Boiler or related parts or products that are not supplied and sold directly by Riello.

ASSIGNABILITY

This warranty is not assignable.

WARRANTY NOTIFICATION

- All warranty enquiries must notify Riello in writing, within FOURTEEN (14) DAYS of the discovery of the alleged defect or deficiency, and provide the following data:
 - Serial number of the affected Boiler, list of the alleged parts with a short description of the failure and of the conditions under which the failure happened.
 - Information about the hydraulic system, flow rate, length of the venting system, installation scheme and total heating power of the system.
 - Identify of the Qualified installer who performed the Boiler start-up.

Written permission is required for the return of any parts or equipment and any such return must be made on the basis of transportation charges prepaid. Shipments may be refused unless prior written permission is obtained and goods returned prepaid.

Written permission must be obtained through a local Riello distributor and must be obtained by your qualified service technician.

Contact your installing/service contractor to initiate a claim. Do not contact Riello as they cannot provide technical assistance unless you are a qualified service technician.

Parts under warranty will be replaced or credited only. Credits will only be issued to authorized wholesalers.

Maintain a copy of all service records and combustion tests as these may be required for any warranty claim.

APPLICABLE LAW, JURISDICTION AND DISPUTE RESOLUTION

All disputes, claims or demands arising from or relating to this warranty shall be determined in accordance with the laws within the Province of Ontario, Canada and the Courts of Ontario shall have exclusive jurisdiction to adjudicate all such disputes, claims or demands.

If you have any questions about the coverage provided by this warranty, contact Riello at one of the addresses set out below

Riello Burners North America – Canada

2165 Meadowpine Blvd.
Mississauga, ON L5N 6H6

Riello Burners North America – America

35 Pond Park Rd.
Hingham, MA 02043

11 RECYCLING AND DISPOSAL

The appliance is manufactured using various materials, such as metal, plastics, and electric and electronic components. At the end of the life cycle, safely remove the components and dispose of them in a responsible manner, in compliance with the installation country's applicable environmental legislation.

⚠ NOTE: Adequate sorted waste collection, processing and environmentally-friendly disposal contribute to preventing possible negative impacts on the environment and health and promote the reuse and/or recycling of the materials of which the appliance consists.

⚠ NOTE: Illegal disposal of the product by the owner shall be subject to administrative fines provided for by applicable laws.



RIELLO

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CANADA

Technical Support Hotline: **1.800.474.3556**
Professional Resources: www.riello.com

The manufacturer strives to continuously improve all products: appearance, dimensions, technical specifications, standard equipment and accessories are subject to change without notice.