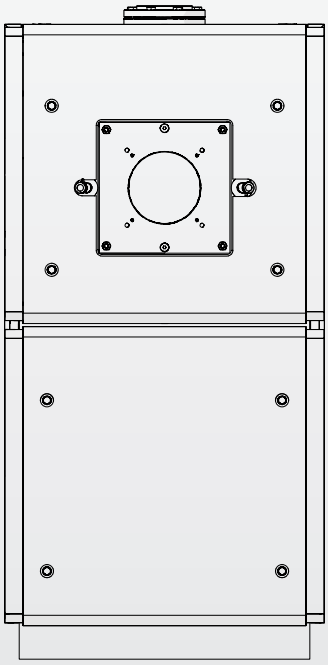
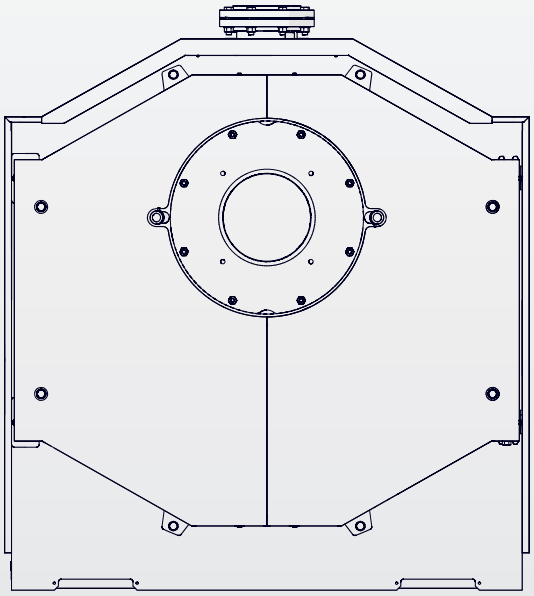
cod. 20112713 rev. 23
07/2026



RTC 3000-6000



RTC 8000-10000

RTC 3000-10000

USA INSTALLATION, OPERATION AND SERVICE MANUAL

RIELLO

Dear heating engineer,
Congratulations for proposing a **RIELLO** boiler. This appliance ensures maximum comfort for an extended period, with high reliability, efficiency, quality and safety.
This manual provides information that is essential to the installation of the appliance. Used in conjunction with your own knowledge and expertise it will enable you to install the appliance quickly, easily, and correctly.

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

CONFORMITY

RANGE

MODEL	CODE
RTC 3000	20150297
RTC 4000	20150291
RTC 5000	20150293
RTC 6000	20150294
RTC 8000	20150299
RTC 10000	20150300

CONTENTS

The following symbols are used in this manual:

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

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

This manual, Code 20112713 - Rev. 23 (07/2026) comprises 68 pages.

1 GENERAL

1.1 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 heating engineer.

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 trained and certified installer or service company, or the gas supply company.
- **RIELLO** recommends signing a service and maintenance contract with a trained and certified installer or service company 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 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.
- 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 trained and certified installer or service company, or the gas supply company before installation, service or maintenance.

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

⚠ The room where the boiler is installed must be properly ventilated to ensure a sufficient supply of air for correct combustion.

⚠ 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.

1.2 General safety instructions

If you hear gas leaking
- Leave the building immediately.
- Prevent others from entering the building.
- Notify the police and fire department from outside the building.
- From outside the building, call the gas supply company and a trained and certified installer or service company.

If you smell gas
- Turn off the gas shut-off valve.
- Open windows and doors
- Do not touch any electrical switch, telephone, and do not use outlets.
- Extinguish all open flames.
- Do not smoke!
- Do not use lighters!
- Warn all occupants of the building that they need to leave the building.
- Do not ring doorbells!
- Notify the police and fire department from outside the building.
- From outside the building, call the gas supply company and a trained and certified installer or service company.

If you smell flue gas
- Switch off the appliance.
- Open windows and doors.
- Inform a trained and certified heating contractor.

⚠ **DANGER: Risk of fatal injury from failing to consider your own safety!**
- Never risk your own life. Your own safety must always take the highest priority.

NOTE: Risk of appliance damage from improper operation of the boiler!
- Only use the boiler for its intended purpose.
- Only operate the boiler if it has been installed and maintained per the instructions provided in the Installation Manual.
- Do not attempt to operate an appliance if any part of it is not in working order or is damaged.
- Use only original spare parts! The use of parts not supplied by the manufacturer may cause damage to the boiler, other property and personal injury. Also, boiler damage caused by the use of unauthorized parts is not covered by the warranty.

DANGER: Risk of fire when soldering and brazing!
- Take appropriate protective measures when soldering and brazing around combustible and flammable material.

NOTICE!
- The installation must comply with all applicable national, state, and local codes, rules, and regulations.
- The operator is responsible for the operational safety and regulatory compliance of the heating system.
- In the Commonwealth of Massachusetts, the appliance must be installed by a licensed plumber or gas fitter.

DANGER: Risk of personal injury or death from flue gas poisoning!
- Do not install a thermostatic flue gas damper downstream of the draft hood.
- Do not tamper with, remove, or attempt to repair the 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.
- The venting system must not feed into or route through another air extraction duct.
- 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.

DANGER: Risk of personal injury or death from explosion!
- Work on gas components may only be carried out by a trained and certified installer or service company.
- Appliance installation, the connection of gas and vent piping, initial commissioning, electrical connections and service and maintenance must only be carried out by a trained and certified installer or service company.

DANGER: Risk of personal injury or death from fire!
- Do not use flammable or combustible material in the boiler room.
- It is recommended not to store any items within 16 inches (415mm) of the appliance.

CAUTION: Appliance damage from contaminated combustion air!
- Keep the combustion air free of corrosive substances, e.g. halogenated hydrocarbons from painting operations or beauty salons.
- Keep combustion air free from dust and lint, e.g. from laundry or agricultural operations.
- If clean room air is not available, fresh outdoor combustion air must be provided.

DANGER: Risk of personal injury or death from electric shock!
- Before removing the front panel, disconnect the heating system from the electrical power supply by shutting off the emergency shutoff switch or the heating system circuit breaker.
- It is not enough to switch off the control panel. **Power to the panel must be disconnected!** Ensure that the power is not restored unintentionally by following proper lock out/tag out procedures.
- Only qualified electricians are permitted to carry out electrical work.

DANGER: Safety devices!
- Never shut off safety valves!
- Hot water may escape from the safety valve at any time when the appliance is running.

DANGER: Risk of personal injury or death after a flood!
- Do not attempt to operate an appliance if any part of it has been under water.
- An appliance that was subject to flooding must be replaced.

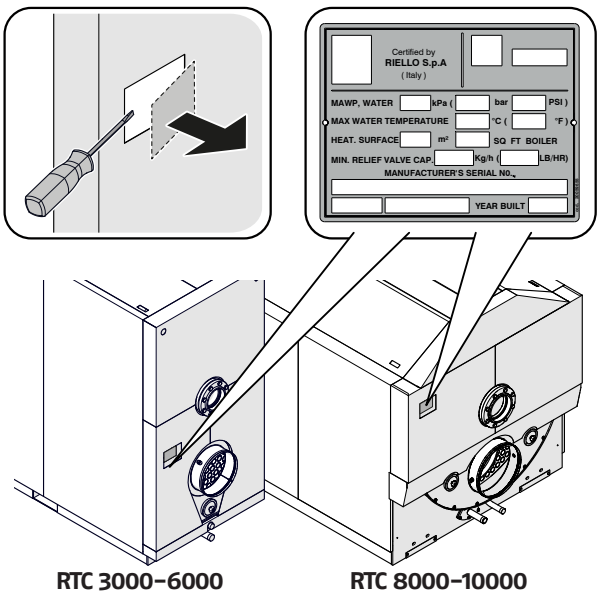
NOTICE!
- Upon completion of the installation, these instructions should be handed to the owner and operator of the appliance.
- The installer must instruct the owner and operator on the functionality of the components and the proper operation of the boiler and the heating system.
- The boiler must be serviced annually including the burner, ignition system and pilot, the entire venting system, and the combustion air supply. All parts that show any signs of damage or corrosion must be replaced.

1.3 Description of the appliance

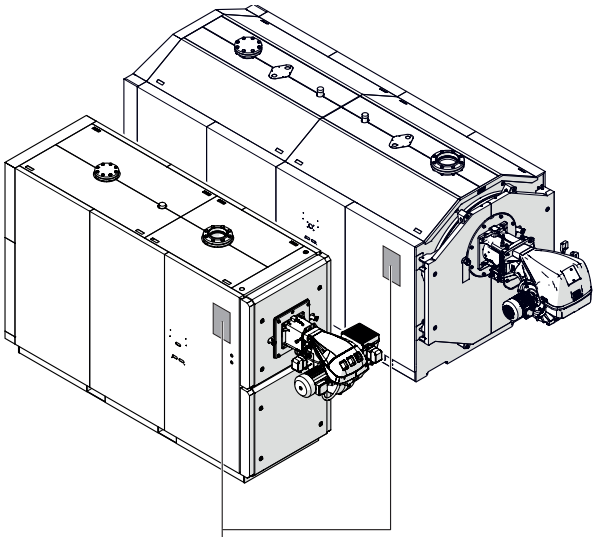
RTC stainless steel boilers are triple flue pass, condensing boilers for installation in a boiler room. They are designed for central heating purposes but can also produce domestic hot water in conjunction with a suitable storage cylinder.
All parts that come into contact with the combustion gases are made from titanium stabilised stainless steel to ensure maximum resistance to the corrosive action of acid condensation.
The boiler has been designed with the combustion chamber at the top and the smooth pipe tube bundle at the bottom to optimise heat exchange and energy efficiency and to maximise the condensing effect.
The boiler has a high total water content which is differentially distributed between its top and bottom sections. This allows outgoing water to reach the set temperature quickly while maintaining the condensing effect and the water heating time around the tube bundle for as long as possible.
RTC boilers feature low pressure combustion chambers for a smoother burner action, and temperature-resistant, stainless steel turbulators inside the tube bundle for maximum burner efficiency.
The boiler body is thoroughly insulated with a layer of high density glass wool.
The boiler casing is made from painted steel sheet.
The boiler's front door and flue gas chamber can be opened completely to facilitate inspection, maintenance and cleaning of internal parts and to speed up servicing in general.
The front door can open in either direction and can be opened without removing the burner. The door comes fitted with hinges on the right, but these can be reversed if necessary to suit individual installations.

1.4 Identification

The products are identified by:



ASME Plate



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RIELLO

Certified by **RIELLO S.p.A (ITALY)**

MAWP Water	bar	kPa	psi
Maximum water temp.		°C	°F
Heating surface		m^2	SQ FT
Minimum relief valve capacity		kg/h	lb/hr
Electrical rating (burner)	Less than 12 Amperes		

SERIAL NUMBER

Year built: **Model**

Approved for use with Natural Gas (NG), Liquid Petroleum Gas (LPG), and/or fuel oil not heavier than # 2 per ASTM D396.
Consult the Installation Manual for approved boiler and burner combinations.

Min. & Max. input oil:	Min =	gph	Max=	gph
Min. & Max. input gas:	Min =	kW	/	Mbtu/hr
	Max =	kW	/	Mbtu/hr

Design Manifold Pressure for: **NG** ___ "wc to ___"wc or **LP** ___"wc to ___"wc
Inlet Pressure for: **NG** ___ "wc to ___"wc or **LP** ___"wc to ___"wc

Gross output	kW	Mbtu/hr
Net IBR rating	kW	Mbtu/hr

T067822EN

MINIMUM CLEARANCES TO COMBUSTIBLE CONSTRUCTION FOR INSTALLATION ON NON COMBUSTIBLE FLOORS ONLY ALL OF THE INSTRUCTIONS MUST BE FOLLOWED EXACTLY

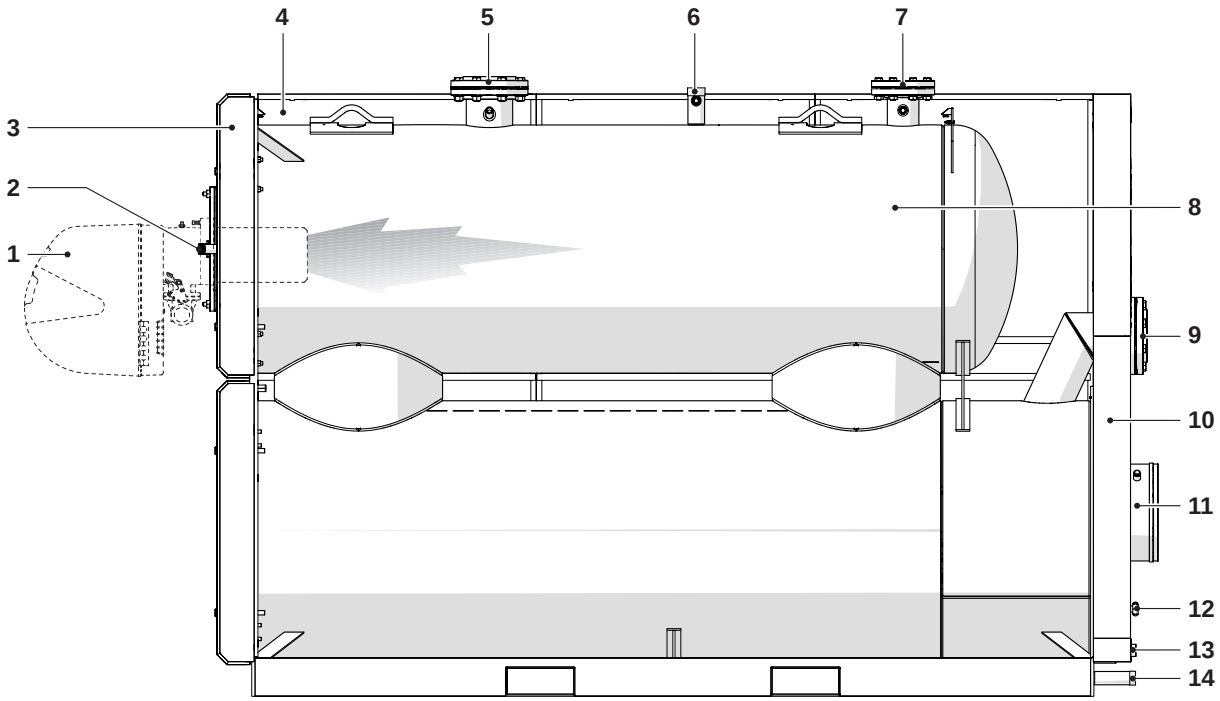
6" (152mm)	24" (610 mm)	18" (457mm)	18" (457mm)
ABOVE, SIDES AND REAR	FRONT	DRAFT HOOD VENT CONNECTOR	BAROMETRIC DAMPER CHIMNEY CONNECTOR

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.

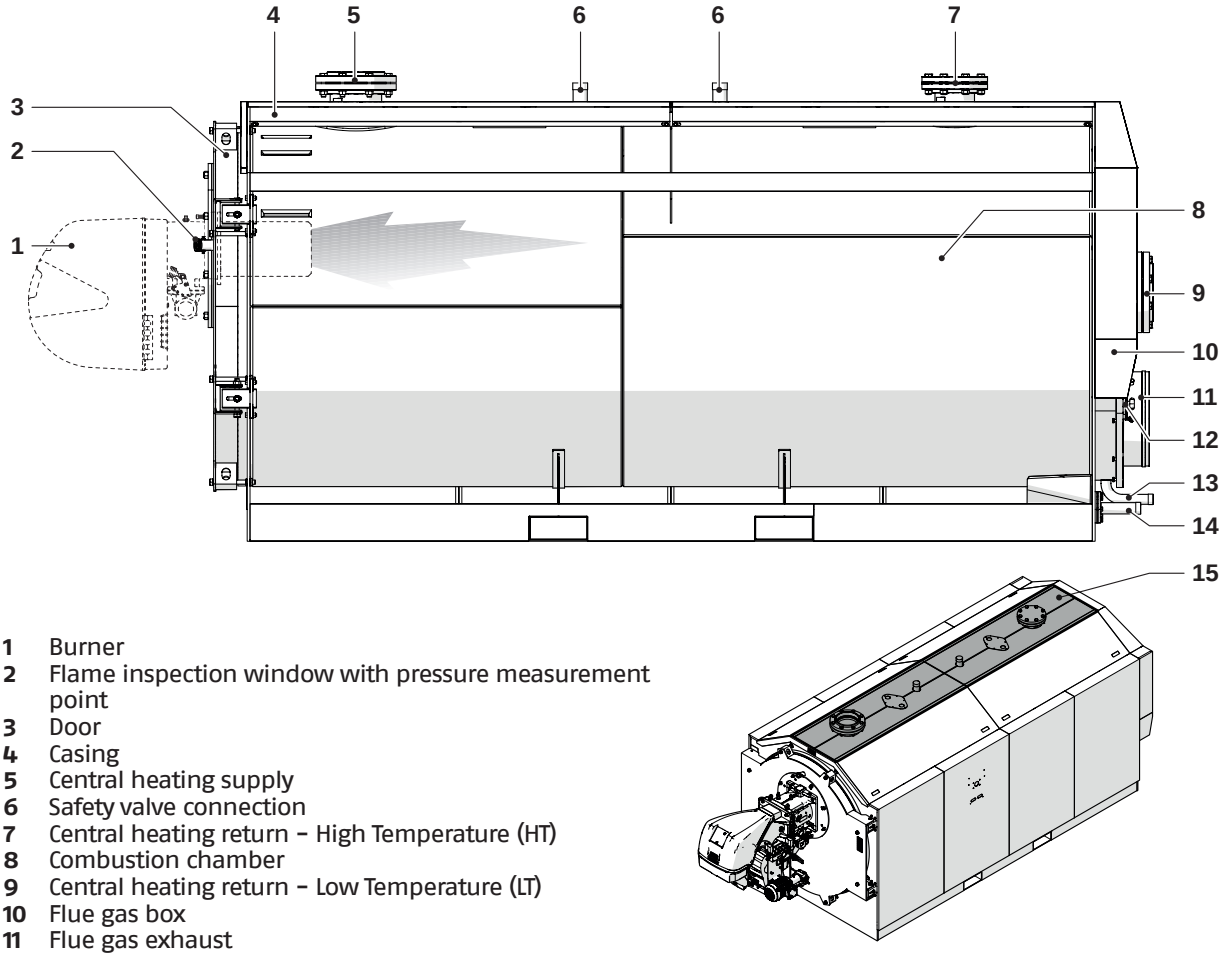
1.5 System layout

RTC 3000-6000



1 Burner
2 Flame inspection window with pressure measurement point
3 Door
4 Casing
5 Central heating supply
6 Safety valve connection
7 Central heating return – High Temperature (HT)
8 Combustion chamber
9 Central heating return – Low Temperature (LT)
10 Flue gas box
11 Flue gas exhaust
12 Inspection window
13 Condensate outlet
14 Boiler drain

RTC 8000–10000



1 Burner
2 Flame inspection window with pressure measurement point
3 Door
4 Casing
5 Central heating supply
6 Safety valve connection
7 Central heating return – High Temperature (HT)
8 Combustion chamber
9 Central heating return – Low Temperature (LT)
10 Flue gas box
11 Flue gas exhaust
12 Inspection window
13 Condensate outlet
14 Boiler drain
15 Support plane – Maximum load 330 lb (150kg)

1.6 Technical specifications

1.6.1 Ratings (natural gas firing)

Description			BOILER RTC					
			3000	4000	5000	6000	8000	10000
Minimum Input [1]		MBH	300	400	500	600	800	1000
Maximum Input		MBH	3000	4000	5000	6000	8000	10000
Output [2]	Condition 1 [3]	MBH	2640	3520	4400	5280	7040	8800
	Condition 2 [4]	MBH	2940	3920	4900	5880	7840	9800
Efficiency	Condition 1 [3]		88%	88%	88%	88%	88%	88%
	Condition 2 [4]		98%	98%	98%	98%	98%	98%
AHRI Combustion and Thermal Efficiency			94%	94%	94%	94%	94%	94%

[1] Values based on natural gas firing
[2] Maximum output dependent upon application
[3] Condition 1 based on return temperature 140°F and ΔT 36°F
[4] Condition 2 based on return temperature 80°F and ΔT 36°F

1.6.2 Ratings (oil firing)

Description			BOILER RTC					
			3000	4000	5000	6000	8000	10000
Minimum Input [1]		MBH	1000	1400	1700	2000	2700	3400
		GPH	3,6	4,8	6,0	7,1	9,5	11,9
Maximum Input		MBH	3000	4000	5000	6000	8000	10000
		GPH	21,4	28,6	35,7	42,9	57,1	71,4
Output [2]	Condition 1 [3]	MBH	2760	3680	4600	5520	7360	9200
Efficiency	Condition 1 [3]		92%	92%	92%	92%	92%	92%

[1] Values based on oil firing
[2] Maximum output dependent upon application
[3] Condition 1 based on return temperature 140°F and ΔT 36°F

1.6.3 Specifications

Description		BOILER RTC					
		3000	4000	5000	6000	8000	10000
Boiler category		ASME Section IV	ASME Section IV	ASME Section IV	ASME Section IV	ASME Section IV	ASME Section IV
Maximum allowable working pressure		160 psi	160 psi	160 psi	160 psi	160 psi	160 psi
Maximum allowable working temperature		210°F	210°F	210°F	210°F	210°F	210°F
Water Connections Inlet/Outlet (Flanged)		4"	6"	6"	6"	8"	8"
High Temp. Return Water Connections		3"	3"	4"	4"	6"	6"
Minimum Water Flow (GPM)		40	50	60	75	100	120
Maximum Water Flow (GPM)		360	550	650	750	1150	1250
Water Volume (gal)		354	420	489	597	951	1255
Water Pressure Drop		1.7 psi at 300GPM	0.7 psi at 400GPM	0.6 psi at 500GPM	1.3 psi at 600GPM	1.1 psi at 800GPM	0.8 psi at 1000GPM
Static pressure at the flue	max (positive)	0.2" W.C.	0.2" W.C.	0.2" W.C.	0.2" W.C.	0.2" W.C.	0.2" W.C.
	min. (negative)	-0.1" W.C.	-0.1" W.C.	-0.1" W.C.	-0.1" W.C.	-0.1" W.C.	-0.1" W.C.
Maximum turndown (Nat.Gas)		10:1	10:1	10:1	10:1	10:1	10:1
Vent Connections		10"	12"	14"	14"	16"	18"
Vent Materials		AISI 316L AL29-4C (29% Cr - 4% Mo)	AISI 316L AL29-4C (29% Cr - 4% Mo)	AISI 316L AL29-4C (29% Cr - 4% Mo)	AISI 316L AL29-4C (29% Cr - 4% Mo)	AISI 316L AL29-4C (29% Cr - 4% Mo)	AISI 316L AL29-4C (29% Cr - 4% Mo)
Type of Fuel		Natural Gas Propane #2 Fuel Oil (backup)	Natural Gas Propane #2 Fuel Oil (backup)	Natural Gas Propane #2 Fuel Oil (backup)	Natural Gas Propane #2 Fuel Oil (backup)	Natural Gas Propane #2 Fuel Oil (backup)	Natural Gas Propane #2 Fuel Oil (backup)
NOx Emissions <30ppm Capability on Nat. Gas		yes	yes	yes	yes	yes	yes
Temperature Control Range		80°F to 195°F	80°F to 195°F	80°F to 195°F	80°F to 195°F	80°F to 195°F	80°F to 195°F
Ambient Temperature Range		32°F to 140°F	32°F to 140°F	32°F to 140°F	32°F to 140°F	32°F to 140°F	32°F to 140°F
Standard Listings & Approvals		ASME, ETL, AHRI	ASME, ETL, AHRI	ASME, ETL, AHRI	ASME, ETL, AHRI	ASME, ETL, AHRI	ASME, ETL, AHRI
Weight (dry) lbs.		5,578	6,702	7,485	9,087	12,747	16,149
Weight (wet) lbs.		8,532	10,207	11,563	14,070	20,684	27,172
Shipping Weight lbs.		5,578	6,702	7,485	9,087	12,747	16,149

1.7 Intended use

This boiler must only be used for the purpose specified by the manufacturer and for which it is designed.
The **RTC** can be operated with gas, oil, and combination burners. For a list of the approved burners, see specific paragraph in this manual.
A variety of alternate fuels such as biodiesel, jet fuel, etc may also be utilized (contact **RIELLO** engineering for applicability).
The boiler can be operated with an aquastat and other control systems.
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.

1.8 Certification and test mark

This appliance has been tested and certified and meets all applicable standards for the US markets:
- UL 296 Standard for oil burners
- UL 726 Standard for oil-fired boiler assemblies
- UL 795 Standard for commercial industrial gas heating equipment.

1.9 Regulations and guidelines

1.9.1 National regulation

The heating system must comply with the requirements of the relevant regulatory authorities or otherwise of the National Fuel Gas Code, ANSI Z 223.1.
If specified by the relevant regulatory authorities, the heating system must comply with the regulations of the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.
Carbon monoxide detectors must be installed as specified by the local regulations. The boiler must be serviced annually.

1.9.2 Compliance with standards and regulations

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 boiler must comply with the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54.
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).

⚠ **WARNING**: Risk of fatal injury from explosion of flammable gases.
- Installation, connection of the fuel supply and flue pipe, commissioning, connection of the electrical power supply, servicing and repair may only be carried out by an authorized heating engineer.
- Any work on gas piping components may only be carried out by an authorized gas installer.

The local regulations regarding minimum pressure detectors, maximum relief valves and lowe water safety cutouts must be observed. Installation and operation must comply with the device manufacturer's technical documentation.
We recommend fitting an 80 mesh dirt filter externally to the boiler return to prevent contamination of the boiler by the water source.

Leak test
A leak test must be carried out on the hydronic heating system. The testing pressure is based on the normal operating pressure of the heating system and should be 1.3 times that pressure, and in any case no less than 14 psi (1 bar).

Safety limits	Value
Maximum allowable temperature:	210 °F (99 °C)
Maximum Allowable Working Pressure (MAWP)	160 psi (11 bar)
Maximum cycle time for safety temperature limiter:	40 s
Maximum cycle time for temperature control:	40 s

1.9.3 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.

1.10 Suitable fuels

Permissible fuels

- Natural gas from the public gas supply in accordance with national regulations with a total sulphur content < 15ppm.
- LP in accordance with national regulations with a content of elementary sulphur < 1.5 ppm and volatile sulphur < 50 ppm.
- Ultra Low Sulphur Diesel in accordance with national regulations with a content of elementary sulphur < 15 ppm (for use as back-up fuel in condensing operation).
- Heating oil type 2 when boiler return temperature is not lower than 140 degrees Fahrenheit; non-condensing operation (for use as backup fuel only). See the warranty statement for additional details.

⚠ Do not use gasoline, crankcase drainings, or any oil containing gasoline.

- The boiler must only be operated with the specified fuels.
- Only burners that are suitable for the specified fuels may be used.
- Observe the manufacturer's burner selection list and the burner manufacturer's instructions.

1.11 Burners

Follow the burner manufacturer's instructions when fitting the burner. A pre-drilled burner plate is included with the boiler.
An adapter plate may be required if a non-standard burner is used (see table).
As standard, the burner plate gasket must be trimmed in order to fit the burner blast tube.
The installer must cut the hole 3/8" larger than the blast tube diameter.
The combustion chamber door must be opened to allow the burner to be mounted.
If the burner head is too long to open/close the combustion chamber door, the burner will have to be removed prior to the opening/closing of the door.

For reduction of burner capacity according to altitude make reference to the burner manual.

⚠ After the burner is installed, fill the gap between the burner tube and the refractory material in the door with the ceramic insulation supplied loose with the boiler.

		BOILER RTC					
		3000	4000	5000	6000	8000	10000
Fireside pressure drop	inch W.C.	2.088	2.931	3.011	3.533	3.693	4.777
	mbar	5.2	7.3	7.5	8.8	9.2	11.9

At maximum output with water temps supply/return of 176/140 °F (80/60 °C), CO_2=9.7% and O_2=3.6%.

1.11.1 Recommended burners and burner plate accessories kit

BURNERS	BOILER RTC					
MODEL	3000	4000	5000	6000	8000	10000
GAS						
RS100/M	x●	x				
RS130/M		●	x			
RS190/M			●	x●		
RS100/E	x●	x				
RS130/E		●	x			
RS190/E			●	x●		
RS280/E				●	x●	x
RS300/E				●	x●	x
RS310/E						●
RS400/E						●
RS100/EV	x●	x				
RS130/EV		●	x			
RS190/EV			●	x●		
RS280/EV				●	x●	x
RS300/EV				●	x●	x
RS310/EV						●
RS400/EV						●
RS68/E	x					
RS120/E	x●	x				
RS160/E		x●	x●	x		
RS68/EV	x					
RS120/EV	x●	x				
RS160/EV		x●	x●	x		

BURNERS	BOILER RTC					
MODEL	3000	4000	5000	6000	8000	10000
MIXED OIL/GAS						
RLS100	x●	x				
RLS130		●	x			
RLS100/M	x●	x				
RLS130/M		●	x			
RLS190/M			x●	x		
RLS100/E	x●	x				
RLS130/E		●	x			
RLS190/E			x●	x		
RLS280/E				●	x●	x
RLS300/E				●	x●	x
RLS310/E						●
RLS400/E						●
RLS100/EV	x●	x				
RLS130/EV		●	x			
RLS190/EV			x●	x		
RLS280/EV				●	x●	x
RLS300/EV				●	x●	x
RLS310/EV						●
RLS400/EV						●
RLS120/E	x					
RLS160/E	●	x●	x●	x		
RLS120/EV	x					
RLS160/EV	●	x●	x●	x		
PREMIX						
RX850	x					
RX1000	x●	x				
RX1500		x●	x			
RX1800			x●	x		
RX2500				●	x	
RX3000					x●	x

(x) 0 feet altitude
(●) 6000 feet altitude

⚠ See the instruction manual provided with the burner:
- Burner installation
- Electrical connections
- Burner adjustments

1.11.2 Burner plate accessories kit

In the following table are shown the codes for the burner plate kit that shall be ordered as accessory for some matching boiler-burner.

BURNERS	BOILER RTC					
MODEL	3000	4000	5000	6000	8000	10000
GAS						
RS100/M	x	x				
RS130/M		x	x			
RS190/M			x	x		
RS100/E	x	x				
RS130/E		x	x			
RS190/E			x	x		
RS280/E				20126364	x	x
RS300/E				20126364	x	x
RS310/E						x
RS400/E						x
RS100/EV	x	x				
RS130/EV		x	x			
RS190/EV			x	x		
RS280/EV				20126364	x	x
RS300/EV				20126364	x	x
RS310/EV						x
RS400/EV						x
RS68/E	x					
RS120/E	x	x				
RS160/E		x	x	x		
RS68/EV	x					
RS120/EV	x	x				
RS160/EV		x	x	x		
MIXED OIL/GAS						
RLS100	x	x				
RLS130		x	x			
RLS100/M	x	x				
RLS130/M		x	x			
RLS190/M			x	x		
RLS100/E	x	x				
RLS130/E		x	x			
RLS190/E			x	x		
RLS280/E				20126364	x	x
RLS300/E				20126364	x	x
RLS310/E						x
RLS400/E						x
RLS100/EV	x	x				
RLS130/EV		x	x			
RLS190/EV			x	x		
RLS280/EV				20126364	x	x
RLS300/EV				20126364	x	x

BURNERS	BOILER RTC					
MODEL	3000	4000	5000	6000	8000	10000
RLS310/EV						x
RLS400/EV						x
RLS120/E	x					
RLS160/E	x	x	x	x		
RLS120/EV	x					
RLS160/EV	x	x	x	x		
PREMIX						
RX850	20124370					
RX1000	20124370	20124396				
RX1500		*	*			
RX1800			*	*		
RX2500				*	20124398	
RX3000					20124398	20124398

* Please refer to the table in section "Upper door accessories kit" on p. 14

1.11.3 Upper door accessories kit

In the following table are shown the codes for the upper door kit that shall be ordered as accessory for some matching boiler-burner.

The kit codes in the table below include the upper door and burner fitting flange.

BURNERS	BOILER RTC					
MODEL	3000	4000	5000	6000	8000	10000
RX1500		20136220	20136221			
RX1800		20136220	20136221			
RX2500				20136222		

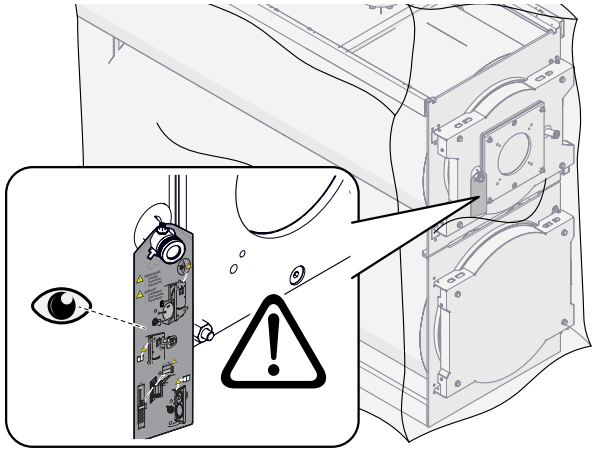
2 INSTALLATION

2.1 Unpacking the product

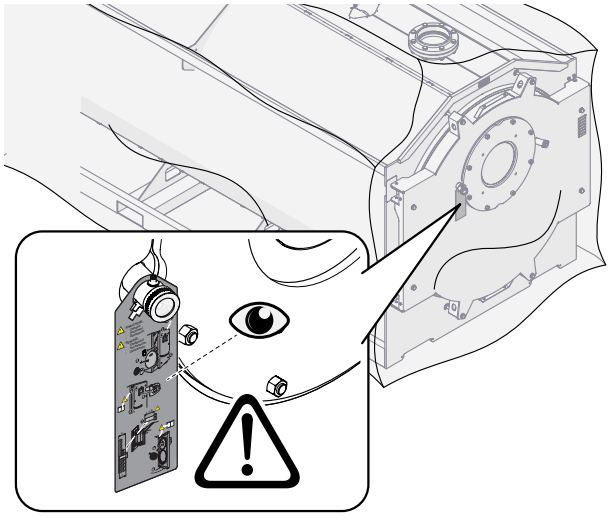
RTC boilers are delivered in two separate packs.
The first contains:
- the boiler body inside a protective bag;
- flue cleaning brush;
- boiler braid
- Hole cover plate kit (Only for RTC 8000-10000)
- ceramic insulation (A);
- documentation envelope (B) containing:
  - instruction manual
  - Copy of H-2 Form
  - data label and warning label (to be applied to the casing on completion of the installation)
  - water treatment instructions
  - instructions for assembling gas ramp burner flanges

DO NOT START THE BOILER UNTIL THE OPERATIONS INDICATED ON THE RED LABEL ON THE FLAME VIEWER HAVE BEEN CARRIED OUT.

RTC 3000-6000



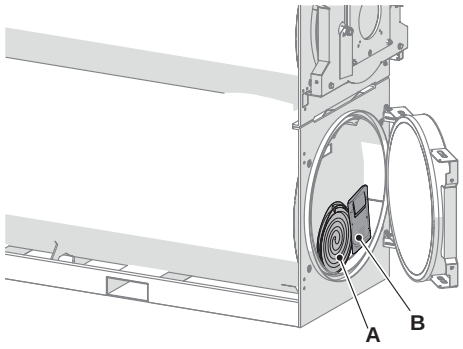
RTC 8000-10000



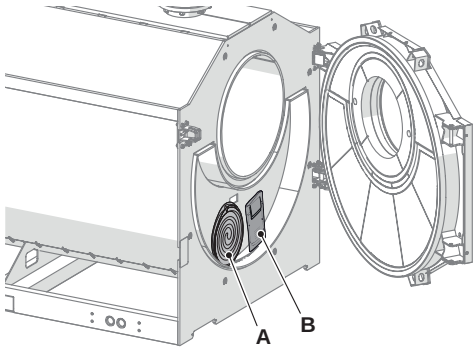
NOTE: The instruction manual is an integral part of the appliance; therefore, it should be read and stored carefully.

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.

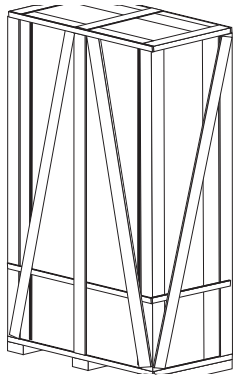
RTC 3000-6000



RTC 8000-10000

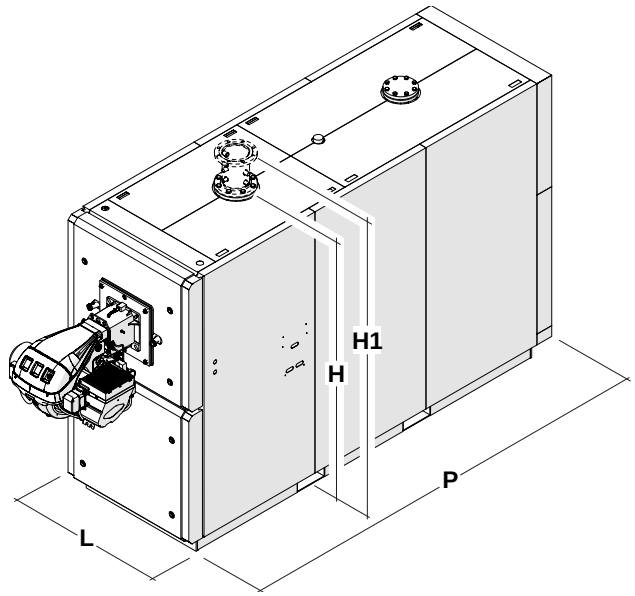


The second contains:
- the boiler casing complete with installation accessories, protected by cardboard packing and a wooden crate.

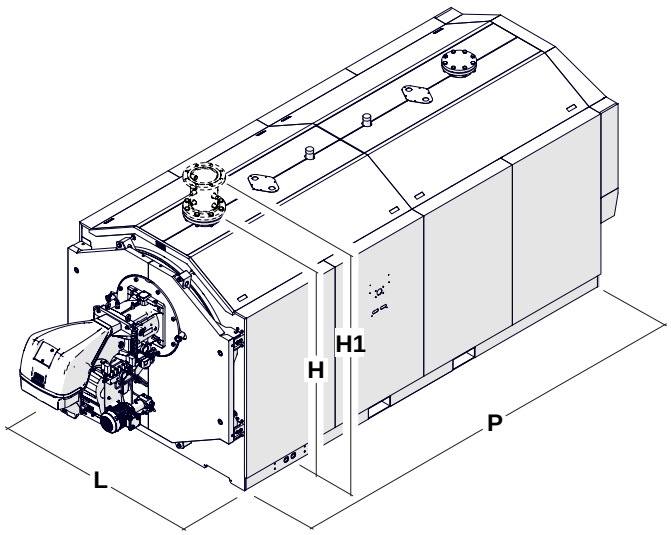


2.2 Overall dimensions and weights

RTC 3000-6000



RTC 8000-10000



Description	BOILER RTC						
	3000	4000	5000	6000	8000	10000	
L	39 13/32	41 19/64	43 19/64	46 3/32	70 29/32	74 51/64	inch
P	119 19/64	127 51/64	137 13/32	145 19/64	161	178 19/64	inch
H	79 3/32	82 29/32	86 51/64	92 19/64	76 51/64	81 45/64	inch
H1	91 29/32	95 45/64	99 19/32	105 3/32	89 19/32	94 1/2	inch
Net weight without burner	5,578	6,702	7,485	9,087	12,747	16,149	lbs

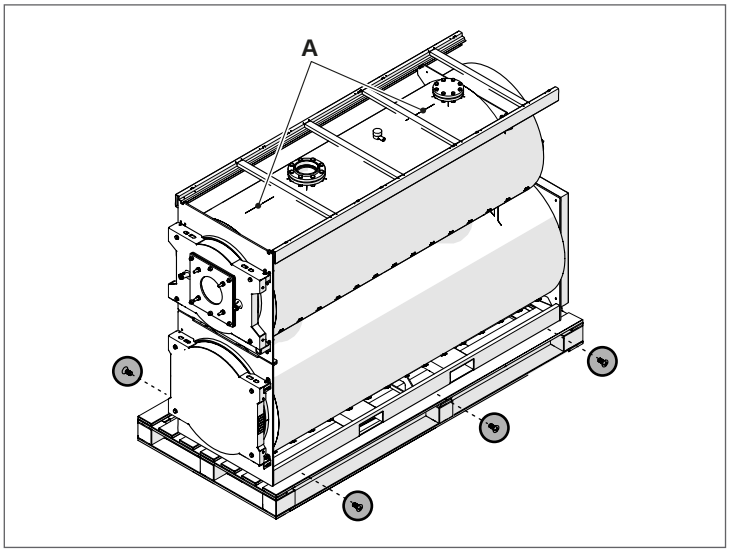
2.3 Moving and removing the packaging

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

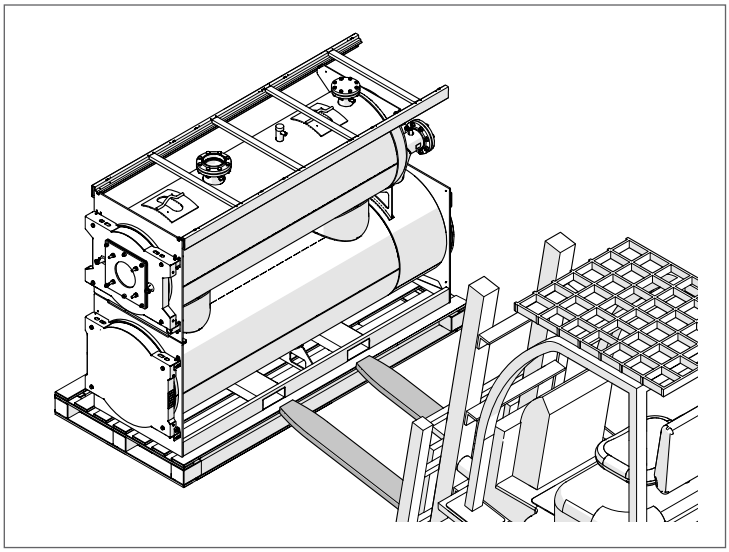
The product can be moved in two ways:
- using a hoist of suitable lifting capacity;
- using a fork lift of suitable lifting capacity.

Two lifting points (A) are provided at the top of the boiler body for use with a hoist.

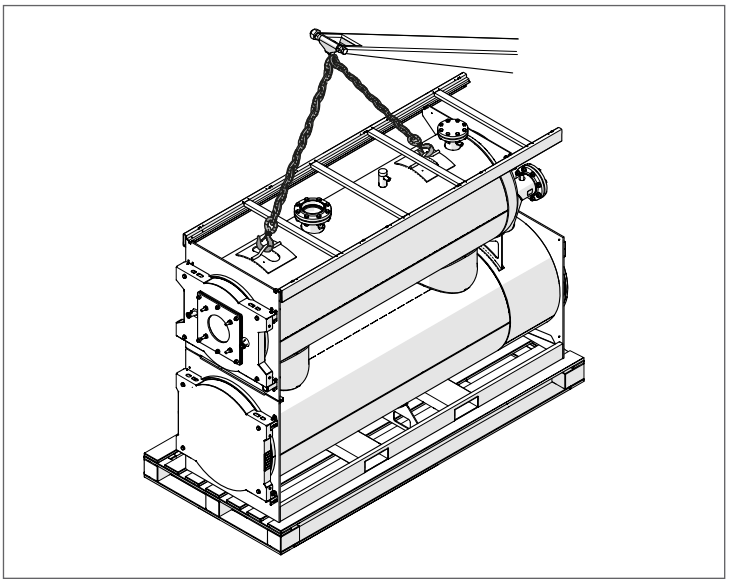
Proceed as follows to move the boiler and remove the packing:
- Move the boiler to its place of installation, using equipment of suitable lifting capacity;
- Remove the protective film;
- RTC 3000-4000 boiler bodies are secured to their pallets by 6 screws while the RTC 5000-10000 models are not placed on a pallet;



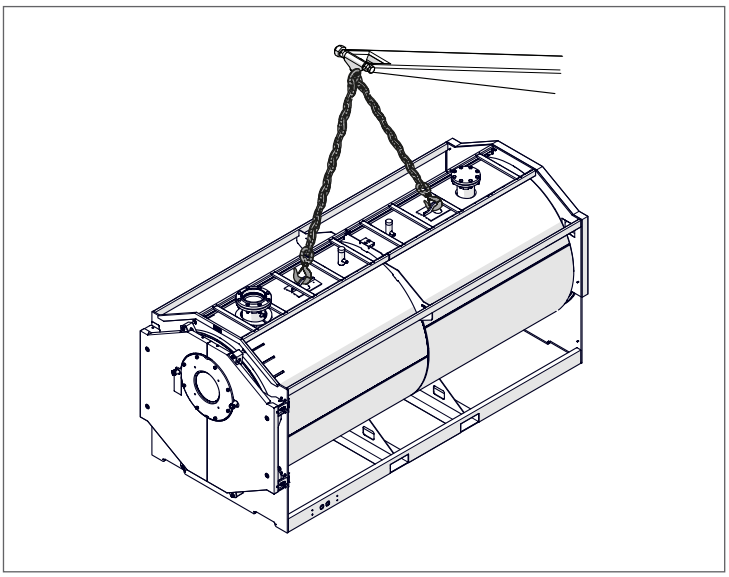
- Unscrew the screws securing the boiler to the pallet (models RTC 3000-4000) and position the boiler at its place of installation



CAUTION: Do not dispose of packaging material into the environment, or leave it within the reach of children, since it can become a potential hazard. Dispose of packaging material in compliance with the applicable legislation.



- for lifting using a rigging crane, use only the lifting provisions supplied.
- when lifting the boiler using chains, make sure that at least two chains are load-bearing. Lift up very carefully.
- maintain less than a 45 degree angle with the vertical when lifting the boiler with chains or cables.
- the rigging crane must be operated by trained personnel.



WARNING: Risk of injury from carrying heavy loads and inadequately securing loads for transport.
- Use suitable means of transportation, e.g. several pallet trucks, a forklift truck, crane or heavy duty rollers
- secure the load against falling.

2.4 Installation premises

RTC boilers must be installed in a dedicated boiler room that conforms to applicable laws and standards. The boiler room must have adequately sized vents that also conform to applicable laws and standards.
Ambient temperature must be between 32°F and 140°F (0°C and 60°C).
All boiler models, with the exception of the RTC 8000 and RTC 10000, must be installed at a height of at least 4" from the floor to permit the necessary pipes and valves to be connected to the boiler drain and condensate drain.
If possible, the boiler should be installed on a raised base to prevent the burner fan from drawing in dust and to facilitate draining of condensate to a neutralization system. The boiler base must be flat and levelled.
The boiler condensate drain must be located above the height of the lid of the system's condensate neutralizer.
The gas supply pipe should be installed in such a way that the boiler's paneling can be removed and the front door opened without having to remove the burner.

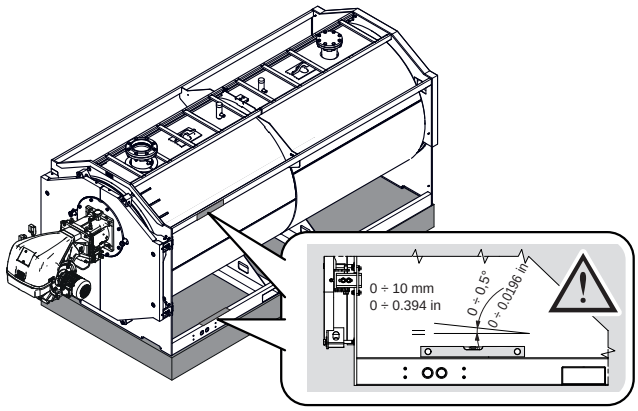
WARNING: When installing the boiler, allow sufficient space around it to access all safety and control devices and to permit easy maintenance.

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.).

These boilers must be installed indoors. They are not designed for outside use.

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.



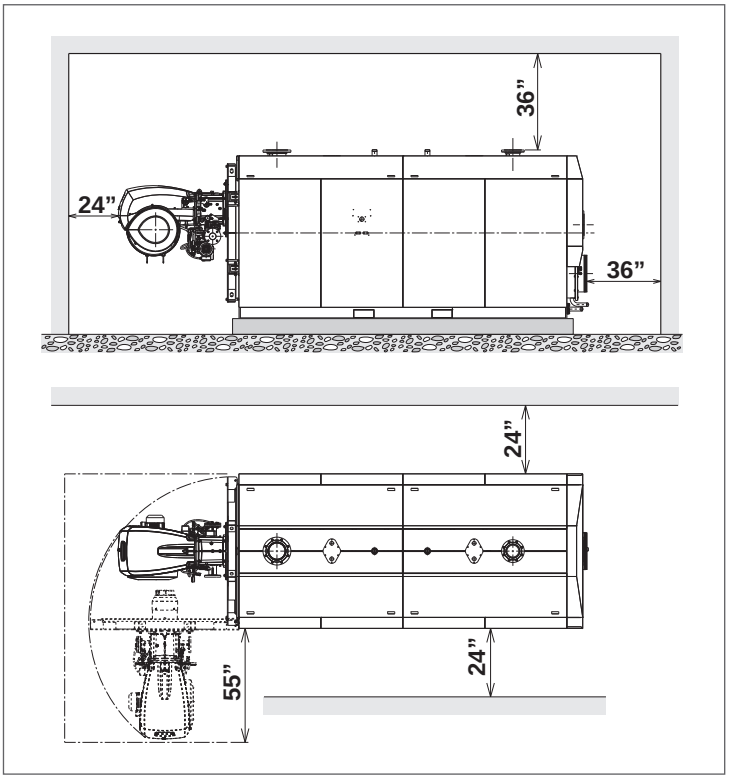
Before positioning the boiler, it is recommended, where feasible, to provide a support base made of concrete or steel, with a height equal to or greater than 100 mm, taking into account the requirements shown in the figure.

Before installation, verify that there is sufficient space to install the boiler on this support base and to allow full opening of the door with the burner installed.

2.4.1 Installation clearances

Single Boiler configuration

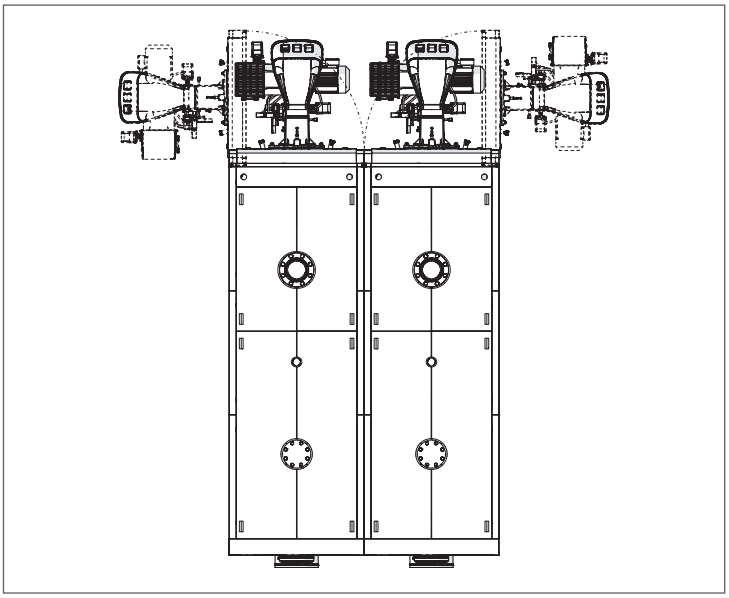
This figure shows the installation clearances that must be respected in order to allow proper maintenance of the boiler.



Two-Boilers configuration

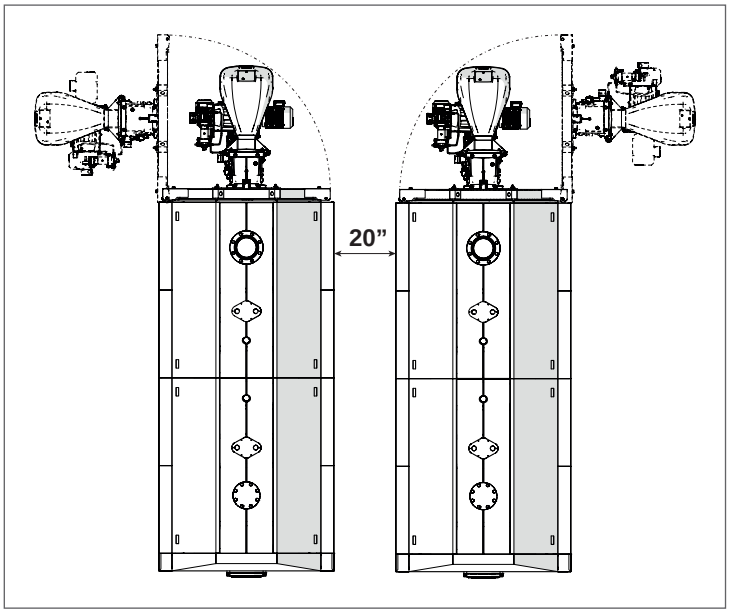
RTC 3000-6000
It's allowed to install up to two boilers with zero clearance.

⚠ **WARNING**: Make sure that the door is properly oriented.

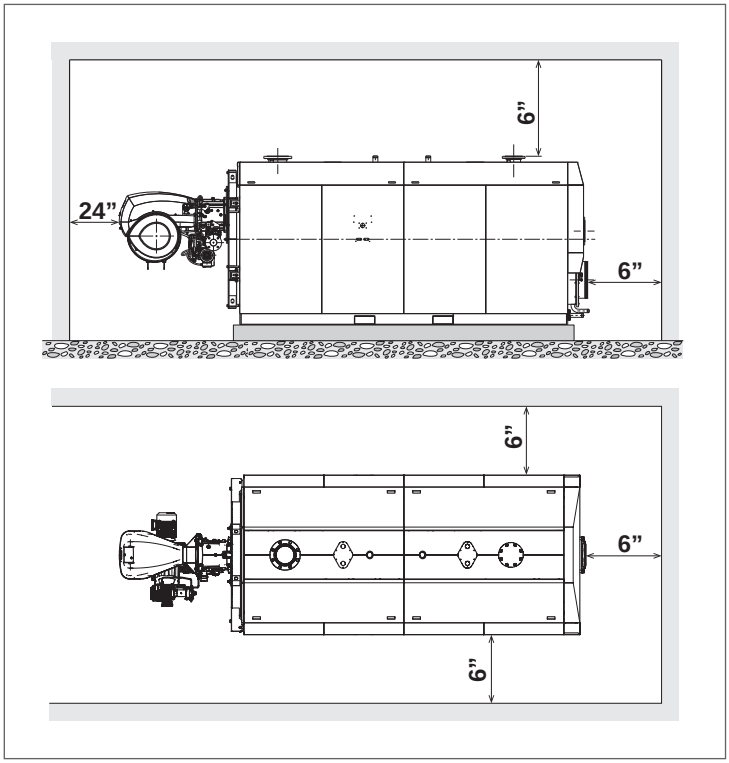


RTC 8000-10000
It's not allowed to install two boilers with zero clearance. The minimum clearance distance is 20".

⚠ **WARNING**: Make sure that the door is properly oriented.



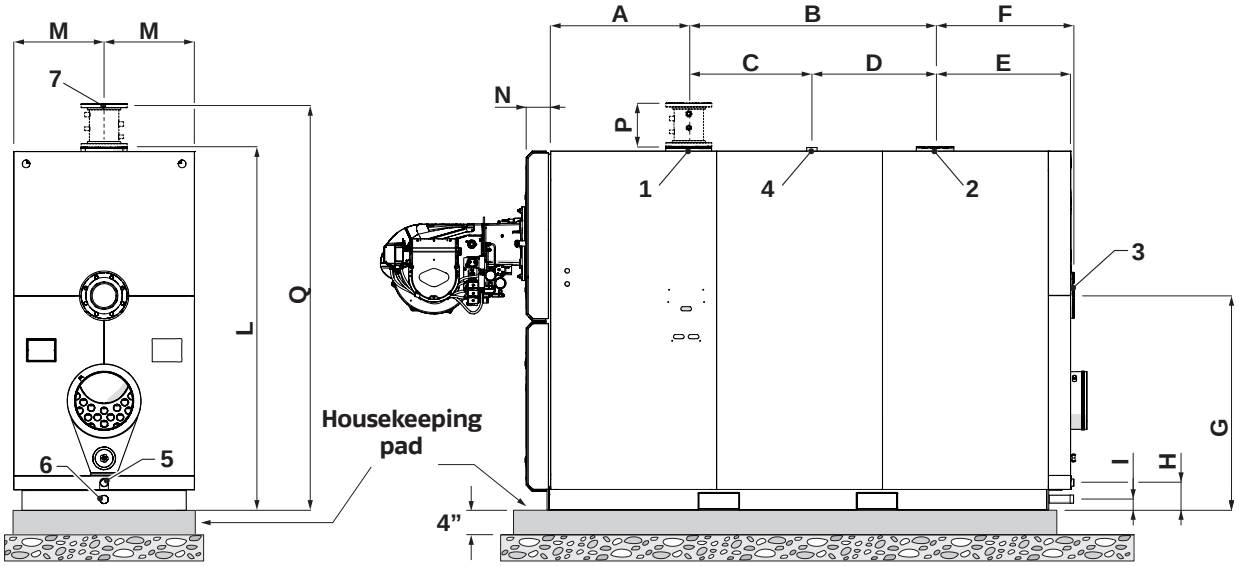
2.4.2 Minimum clearance to combustibles



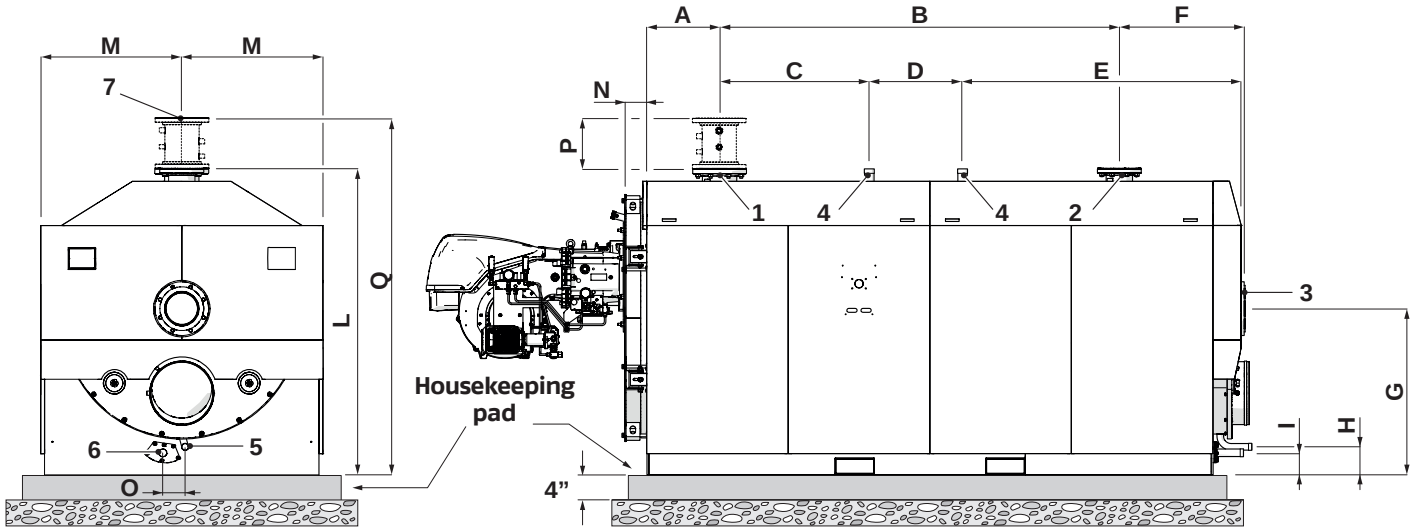
2.5 Water connections

The following table gives the dimensions and positions of the water fittings on **RTC** boilers.
Before installing the boiler, flush out all the pipes of the central heating circuit to remove any machining residues.

RTC 3000-6000

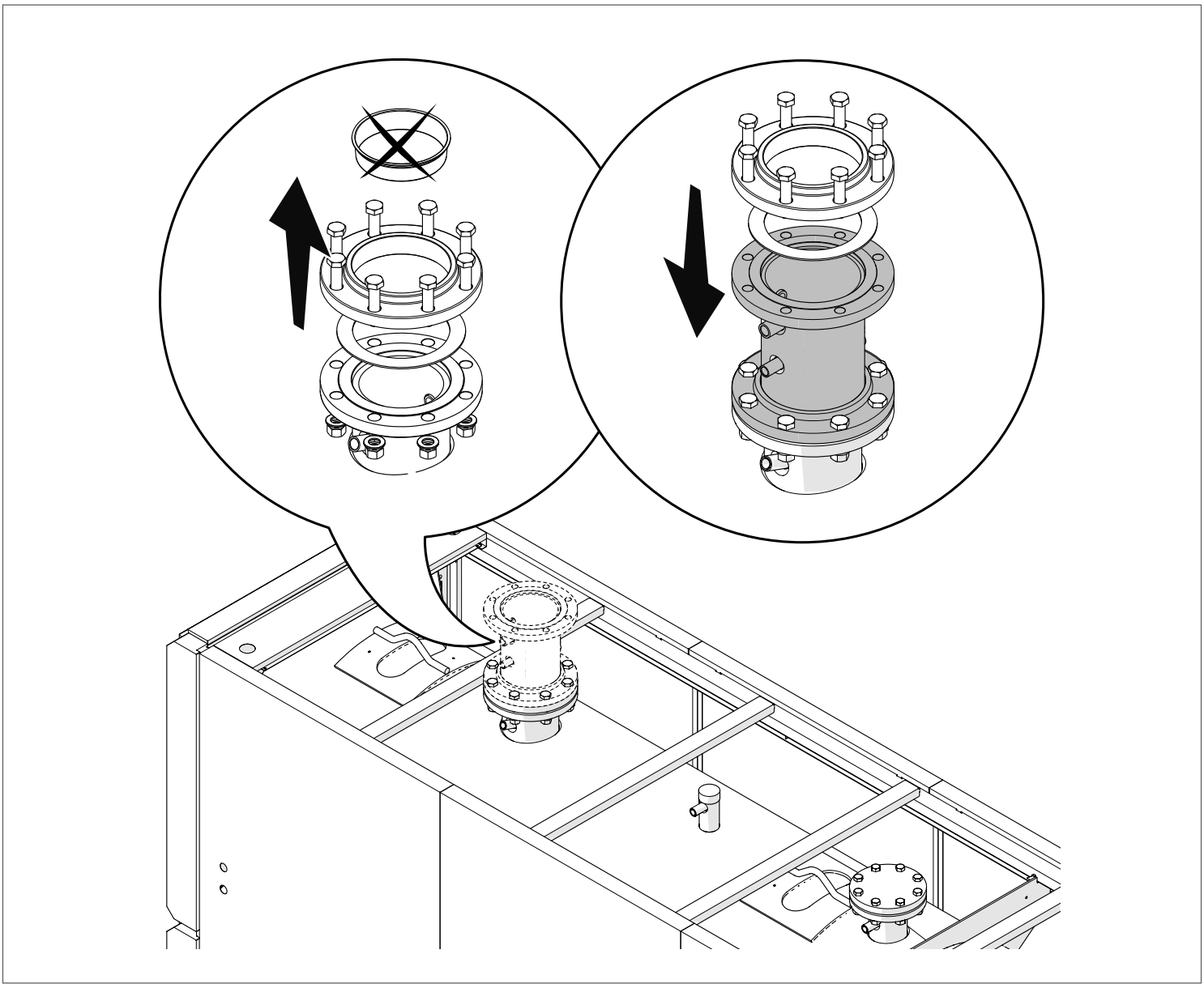


RTC 8000-10000



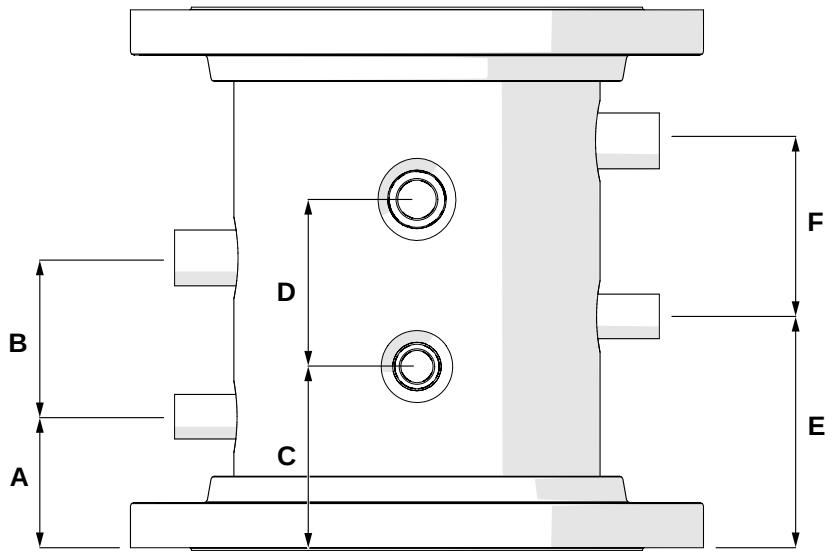
DESCRIPTION		BOILER RTC						
		3000	4000	5000	6000	8000	10000	
1	Central heating supply	4" #150	6" #150	6" #150	6" #150	8" #150	8" #150	NPS
2	HT Return	3" #150	3" #150	4" #150	4" #150	6" #150	6" #150	NPS
3	LT Return	4" #150	6" #150	6" #150	6" #150	8" #150	8" #150	NPS
4	Safety valve connection	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	Ø
5	Condensate outlet	1 1/4" NPT	1 1/4" NPT	1 1/4" NPT	1 1/4" NPT	1 1/4" NPT	1 1/4" NPT	Ø
6	Boiler drain	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	Ø
7	Sensor manifold outlet	4" #150	6" #150	6" #150	6" #150	8" #150	8" #150	NPS
A		25 13/64	25 13/64	33 3/32	33 3/32	19 19/64	19 13/32	inch
B		50 13/32	59 51/64	59	66 29/32	100 13/32	114 13/64	inch
C		18 29/32	28 19/64	29 1/2	29 1/2	37 19/32	47 13/64	inch
D		31 1/2	31 1/2	29 1/2	37 13/32	23 13/32	25 19/32	inch
E		31 19/64	31 13/64	32 1/2	32 1/2	39 13/32	41 19/64	inch
F		30 13/32	30 19/64	33 3/32	33 3/32	31 13/32	34 13/32	inch
G		46 29/32	48 45/64	51 1/2	54 45/64	41 45/64	45 19/64	inch
H		7	6 45/64	6 19/32	8 51/64	7	6 45/64	inch
I		2 1/2	2 13/32	2 19/32	3 19/64	5 1/2	4 1/2	inch
L		79 3/32	82 29/32	86 51/64	92 19/64	76 51/64	81 45/64	inch
M		19 45/64	20 45/64	21 45/64	23	35 13/32	37 13/32	inch
N		7 19/64	6 29/32	6 45/64	6 45/64	5 13/32	5 13/32	inch
O						5 19/32	5 13/32	inch
P		12 51/64	12 51/64	12 51/64	12 51/64	12 51/64	12 51/64	inch
Q		91 29/32	95 45/64	99 19/32	105 3/32	89 19/32	94 1/2	inch
Flange as for ASME B16.5								

2.6 Sensor manifold installation



	BOILER RTC						
	3000	**4000**	**5000**	**6000**	**8000**	**10000**	
Sensor manifold type	4" #150	6" #150	6" #150	6" #150	8" #150	8" #150	NPS

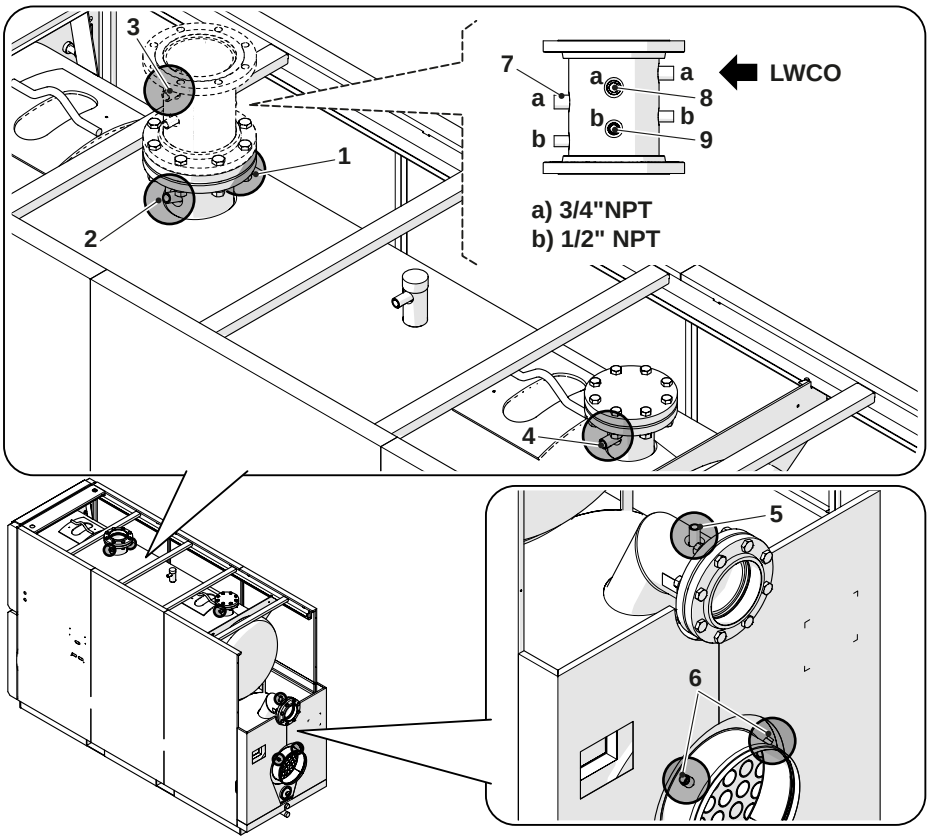
2.7 Sensor manifold connections



Sensor manifold type	4''#150	6''#150	8''#150
A	3" 5/32 80mm	3" 5/32 80mm	3" 5/32 80mm
B	3" 47/64 95mm	3" 47/64 95mm	3" 47/64 95mm
C	4" 21/64 110mm	4" 21/64 110mm	4" 21/64 110mm
D	3" 15/16 100mm	3" 15/16 100mm	3" 15/16 100mm
E	5" 33/64 140mm	5" 33/64 140mm	5" 33/64 140mm
F	4" 1/8 105mm	4" 1/8 105mm	4" 1/8 105mm

2.8 Positioning of sensor sockets

RTC 3000-6000

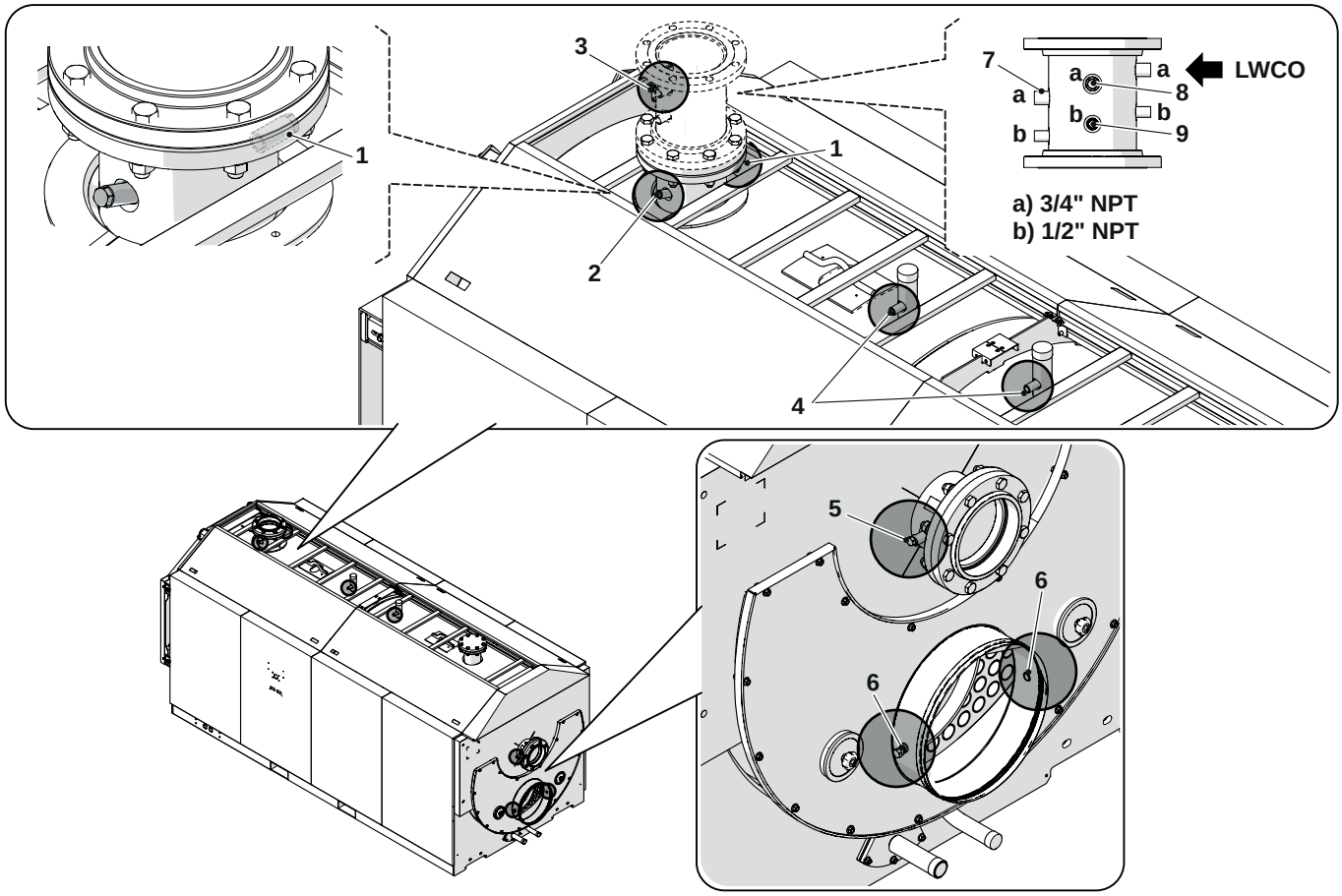


Boiler		BOILER RTC							
		3000		4000		5000		6000	
Thermowell lenght		min.	max.	min.	max.	min.	max.	min.	max.
1	Outlet operating temperature sensor (1/2" NPT)	2" 1/2 63mm	3" 3/4 95mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm
2	Over- temperature protection (1/2" NPT)	2" 1/2 63mm	5" 1/2 140mm	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
3	LWCO (3/4" NPT)	2" 1/2 63mm	3" 3/4 95mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	7" 1/2 190mm
4	Drum temp & LF Hold (1/2" NPT)	2" 1/2 63mm	4" 1/2 110mm	2" 1/2 63mm	4" 1/2 110mm	2" 1/2 63mm	5" 130mm	2" 1/2 63mm	5" 130mm
5	Inlet operating temperature sensor (1/2" NPT)	2" 1/2 63mm	3" 3/4 95mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm
6	Exhaust Gas Detection and installation of a pressure switch for blocked duct (1/2 NPT)	2" 1/2 63mm	10" 250mm	2" 1/2 63mm	12" 300mm	2" 1/2 63mm	12" 350mm	2" 1/2 63mm	12" 350mm
7	Gauge (3/4" NPT)	2" 1/2 63mm	3" 3/4 95mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	7" 1/2 190mm
8	Manual reset high limit (3/4" NPT)	2" 1/2 63mm	3" 3/4 95mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	7" 1/2 190mm
9	Outlet temperature sensor (1/2" NPT)	2" 1/2 63mm	5" 1/2 140mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	6" 150mm	2" 1/2 63mm	7" 1/2 190mm

⚠ The sensor sockets are not supplied. The tapping are closed with metallic plugs.

⚠ The LWCO must be installed in a position higher than all other regulation and safety devices (over-temperature protection, operating temperature sensor and temperature gauge).

RTC 8000–10000



Boiler		BOILER RTC			
		8000		10000	
Thermowell lenght		min.	max.	min.	max.
1	Outlet operating temperature sensor (1/2" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
2	Over- temperature protection (1/2" NPT)	2" 1/2 63mm	9" 1/2 240mm	2" 1/2 63mm	9" 1/2 240mm
3	LWCO (3/4" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
4	Drum temp & LF Hold (1/2" NPT)	2" 1/2 63mm	3" 1/2 89mm	2" 1/2 63mm	3" 1/2 89mm
5	Inlet operating temperature sensor (1/2" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
6	Exhaust Gas Detection and installation of a pressure switch for blocked duct (1/2 NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
7	Gauge (3/4" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
8	Manual reset high limit (3/4" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm
9	Outlet temperature sensor (1/2" NPT)	2" 1/2 63mm	7" 1/2 190mm	2" 1/2 63mm	7" 1/2 190mm

⚠ The sensor sockets are not supplied. The tapping are closed with metallic plugs.

⚠ The LWCO must be installed in a position higher than all other regulation and safety devices (over-temperature protection, operating temperature sensor and temperature gauge).

2.8.1 Water-side pressure drop

Model	ΔT=20°F		ΔT=30°F		ΔT=40°F		ΔT=60°F	
	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop
	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)
RTC 3000	285	1.56	190	0.86	143	0.58	95	0.34
RTC 4000	380	0.63	253	0.39	190	0.29	127	0.19
RTC 5000	475	0.59	317	0.36	238	0.25	158	0.16
RTC 6000	570	1.24	380	0.76	285	0.54	190	0.35
RTC 8000	760	1.01	507	0.59	380	0.41	253	0.25
RTC 10000	950	0.76	633	0.41	475	0.28	317	0.17

At 95% efficiency and full firing rate

Model	ΔT=20°F		ΔT=30°F		ΔT=40°F		ΔT=60°F	
	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop
	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)
RTC 3000	276	1.48	184	0.82	138	0.55	92	0.33
RTC 4000	368	0.61	245	0.38	184	0.28	123	0.18
RTC 5000	460	0.56	307	0.34	230	0.25	153	0.16
RTC 6000	552	1.19	368	0.73	276	0.52	184	0.33
RTC 8000	736	0.97	491	0.56	368	0.39	245	0.24
RTC 10000	920	0.72	613	0.39	460	0.27	307	0.16

At 92% efficiency and full firing rate

Model	ΔT=20°F		ΔT=30°F		ΔT=40°F		ΔT=60°F	
	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop	Flow rate	Pressure drop
	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)	(GPM)	(psi)
RTC 3000	261	1.36	174	0.76	131	0.51	87	0.30
RTC 4000	348	0.57	232	0.36	174	0.26	116	0.17
RTC 5000	435	0.52	290	0.32	218	0.23	145	0.15
RTC 6000	522	1.11	348	0.68	261	0.49	174	0.32
RTC 8000	696	0.90	464	0.52	348	0.36	232	0.22
RTC 10000	870	0.66	580	0.36	435	0.25	290	0.15

At 87% efficiency and full firing rate

2.8.2 Flow limits

RTC boilers do not require a minimum flow rate in order to maintain warranty. The boiler has been designed to operate with a temperature difference between the supply and return of up to 100°F. Flow should be initiated with the start of the burner to minimize temperature fluctuations and control deviations. The field installed manual reset high limit (as required by CSD-1) must be fitted to the instrument tapping of the heating supply, set to 210°F and electrically connected into the Control unit or the burner enable/disable circuit directly.

RTC boilers can operate with zero flow, and do not require a minimum flow rate.
It is recommended a minimum flow only to have heat transfer and a maximum flow, to prevent erosion.

Model	Flow Limits		
	Maximum	Minimum	
RTC 3000	360	40	GPM
RTC 4000	550	50	GPM
RTC 5000	650	60	GPM
RTC 6000	750	75	GPM
RTC 8000	1,150	100	GPM
RTC 10000	1,250	120	GPM

2.8.3 Water quality requirements

The manufacturer recommends the use of water as heat transfer fluid for the central heating system. A chemical treatment system must be provided for this water.
The heat transfer fluid (water) for the central heating circuit must conform to the quality parameters given in the following table:

Chemical and physical requirements of heating system water			
	U/M	Initial filling water	Regular service water (*)
pH (with aluminum)		7 - 8	7 - 8.5
pH (without aluminum)		8.3 - 9.5	8.3 - 9.5
Hardness	°fH / ppm	< 15 / 150	< 15 / 150
Electrical conductivity	µs/cm		< 500
Chlorides	mg/l / ppm		< 50 / 50
Oxygen (O_2)	mg/l / ppm		< 0.1 / 0.1
Iron (Fe)	mg/l / ppm	< 0.5 / 0.5	< 0.5 / 0.5 (**)
Copper (Cu)	mg/l / ppm	< 0.1 / 0.1	< 0.1 / 0.1 (**)
(with aluminum) (Al)	mg/l / ppm		< 0.1 / 0.1 (**)
Turbidity		Clear	Clear

(*) system water values after 8 weeks of operation;
(**) higher values are due to corrosion, to be eliminated.

NOTICE:
If it proves impossible to treat the heating system water supply properly because the water charging system is automatic and uncontrolled, if there are no barriers installed to prevent water oxygenation and if the heating system includes an open expansion vessel, then the boiler itself must be separated from the heating system by means of a heat exchanger.
If the hardness of the water exceeds the value specified in the table, it is mandatory to install a water softening system.

NOTICE:
- Chemical products used for water treatment must be compatible with applicable water pollution laws.
- Provided they are properly applied, these laws guarantee the safe functioning of the heating system.

2.8.4 Central heating system

Possible causes for corrosion and limescale
Typical problems encountered in central heating systems include:
- the breakage of heated surfaces through overheating caused by the thermal insulation of limescale deposits on the water side
- oxygen corrosion
- deposit corrosion
- stray current corrosion
- diffused and localized acid corrosion.

The technical details provided in this section refer specifically to domestic and industrial hot water heating systems with working temperatures up to 210°F (99°C).

2.8.5 New central heating systems

Mistakes to avoid and precautions.
To eliminate contact between system water and the air, the following is required:

- ensure that the expansion vessel is a closed vessel, and of the correct size and pre-charge pressure (the pressure should be checked periodically)
- ensure that the system is always kept at a pressure higher than atmospheric pressure at all points (including the pump suction side) and at all operating conditions (precisely because the seals, gaskets and joints in a water circuit are designed to resist pressure from within, but not to resist a vacuum within)
- ensure that no part of the system is made from materials that are permeable to gases (e.g. plastic pipes with no oxygen barrier used in floor heating systems).

NOTICE:
The original system filling water and any topping up water must always be filtered (using synthetic or metal mesh filters with a filtration rating of no less than 50 microns) to prevent sludge from forming and triggering deposit induced corrosion.

NOTICE:

- Loss of water from the system, and the consequential need to add water, can be caused not only by leaks from the circuit, but also from the incorrect sizing of the expansion vessel or precharge pressure. (If normal thermal expansion causes pressure in the system to increase beyond the setting of the safety valve, that safety valve will open continuously.)
- The expansion vessel size should be corrected to prevent unnecessary safety valve blow-off.

The heating system should not need any further topping up once it is filled and bled of all air.
Any top-ups need to be monitored (by a meter), treated and recorded in the heating system's technical log. The presence of a water softener in conjunction with an automatic filling system is not sufficient to ensure proper performance.
If more than one boiler is installed in a large system, all boilers must be switched on at the same time to ensure that any possible limescale formation is uniformly distributed.

2.8.6 Reconditioning old heating systems

Frequent mistakes and necessary precautions.
If a boiler must be replaced, do not refill the entire central heating circuit if the quality of water in it conforms to requirements.
If the quality of water fails to conform to requirements, either recondition the old water or separate the water circuits (water in the boiler circuit must conform to requirements).

Conclusions
Never forget that proper water conditioning and proper heating system design not only guarantee safety and security but also ensures significant savings in maintenance costs and overall thermal efficiency.

2.8.7 Elimination of air and gas from central heating system

When designing new heating systems, it is necessary to eliminate the air and other gases that form in the system.
Recently added fill or top-up water loses much of its volume in the first few days because it releases gases. With new systems you should therefore initially check the heating water pressure on a daily basis, and then at gradually longer intervals. Air and gas in the water system not only causes the corrosion problems listed above, but also reduces thermal efficiency, causing pump failure and noise and vibration throughout the heating system. Air bubbles and gas inevitably form in heating circuits during normal functioning, especially if the precautions listed above are not fully respected.
In particular:

- as temperature increases, oxygen becomes less watersoluble and bubbles begin to form;
- C02 (carbon dioxide) is generated as the carbonates of calcium and magnesium precipitate out;
- the chemical oxidation of the metals in the system also generates hydrogen.

These gases must be eliminated as they are formed. The system needs to be designed and installed so that all gases can be vented quickly, easily, and effectively.

2.8.8 Use of antifreeze

Do not use automotive silicate-based antifreeze in the heating system.
In areas where freezing may occur, an antifreeze may be added to the system water as protection. Please adhere to the specifications provided by the antifreeze manufacturer.

- Use the anti-freeze manufacturer's data to determine the anti-freeze ratio for the desired freeze protection temperature.
- Do not exceed 50% antifreeze mix ratio and do not use antifreeze other than specifically made for hot water heating systems.
- the chemical oxidation of the metals in the system also generates hydrogen.

2.8.9 Glycol

The percentage of propylene glycol which can be used is dependent on the maximum delivery temperature and the project ΔT as defined by the generator.

To calculate the freezing temperature associated with the mix and the maximum percentage to be used, please see the technical datasheet for the product used.

⚠ The values given in the tables refer to the **RIELLO** product.

Anti-freeze effect		
Glycol (%)	Temperature (°C)	Temperature (°F)
55	-40,4	-40,7
50	-32,4	-26,3
45	-26,0	-14,8
40	-21,5	-6,7
35	-17,6	0,3
30	-14,0	6,8
25	-10,7	12,7
20	-7,0	19,4
15	-4,0	24,8
10	-2,0	28,4

Mix boiling point								
P (bar)	Glycol (%)							T (°)
	25	30	35	40	45	50	55	
11,0	186,0	187,0	186,0	188,0	189,0	189,0	189,5	°C
	366,8	368,6	366,8	370,4	372,2	372,2	373,1	°F
10,0	181,5	182,0	182,5	183,0	184,0	185,0	186,5	°C
	358,7	359,6	360,5	361,4	363,2	365,0	367,7	°F
9,0	176,5	177,0	177,5	178,0	179,5	181,0	182,5	°C
	349,7	350,6	351,5	352,4	355,1	357,8	360,5	°F
8,0	171,5	172,0	172,5	173,0	174,0	175,0	176,0	°C
	340,7	341,6	342,5	343,4	345,2	347,0	348,8	°F
7,0	166,0	166,5	167,0	167,5	168,0	168,5	170,0	°C
	330,8	331,7	332,6	333,5	334,4	335,3	338,0	°F
6,0	159,0	159,5	160,5	161,0	161,5	162,0	163,5	°C
	318,2	319,1	320,9	321,8	322,7	323,6	326,3	°F
5,0	152,5	153,0	154,0	155,0	156,0	157,0	158,0	°C
	306,5	307,4	309,2	311,0	312,8	314,6	316,4	°F
4,0	144,5	145,0	145,5	146,0	147,0	148,0	149,0	°C
	292,1	293,0	293,9	294,8	296,6	298,4	300,2	°F
3,5	141,5	142,0	142,5	143,0	143,5	144,0	145,0	°C
	286,7	287,6	288,5	289,4	290,3	291,2	293,0	°F
2,0	122,5	123,0	123,5	124,0	125,0	126,0	127,0	°C
	252,5	253,4	254,3	255,2	257,0	258,8	260,6	°F
1,0	100,5	101,0	101,5	102,0	103,0	104,0	105,0	°C
	212,9	213,8	214,7	215,6	217,4	219,2	221,0	°F

IMPORTANT INFORMATION REGARDING HEAT-TRANSFER FLUIDS
Heat-transfer fluids are particularly important for protecting the system: efficient heat exchange, thanks to a good specific heat capacity; anti-freeze properties, important for the life of the system in the winter; and anti-corrosion properties to preserve the heating system components.

When choosing a heat-transfer fluid, consider the following:
- **toxicity** in the event of leakage, contaminating domestic water or water for animal/human use/contact
- **biodegradability** in the event of leakage into the environment

All heat-transfer fluids recommended by **RIELLO** are non-toxic and in large part biodegradable.

⚠ Choose the liquid carefully and manage the heating system correctly to keep monitoring and maintenance work to a minimum, and reduce fluid changes.

⚠ Use concentrated, non-polluting propylene glycol-based antifreeze liquid with corrosion inhibitors for heating systems.

⚠ Do not use a mixture with other antifreeze liquids, rather always use the same one.

⚠ Use a liquid that is not chemically hazardous.

⚠ It is mandatory to check the percentage of glycol based on the antifreeze effect on the data sheet for the purchased product.

⚠ It is recommended to check the compatibility of the purchased product with the circuit sealing materials, e.g., elastomers or plastics.

⚠ It is recommended to use a filter in the primary circuit to purify the propylene glycol.

⚠ The system may not have galvanized tanks or pipes on the primary side, as zinc can be dissolved by mixtures of propylene glycol and water.

2.9 Typical water system schematics

The following P&ID represent the typical arrangements for the most common types of installation and they are only a suggestion for the installer that is responsible for all equipment and details required by local laws.

⚠ The DHW and central heating circuits must incorporate expansion vessels of adequate capacity as well as suitably rated safety valves. The condensate drain must be connected to a suitable collection and drain system.

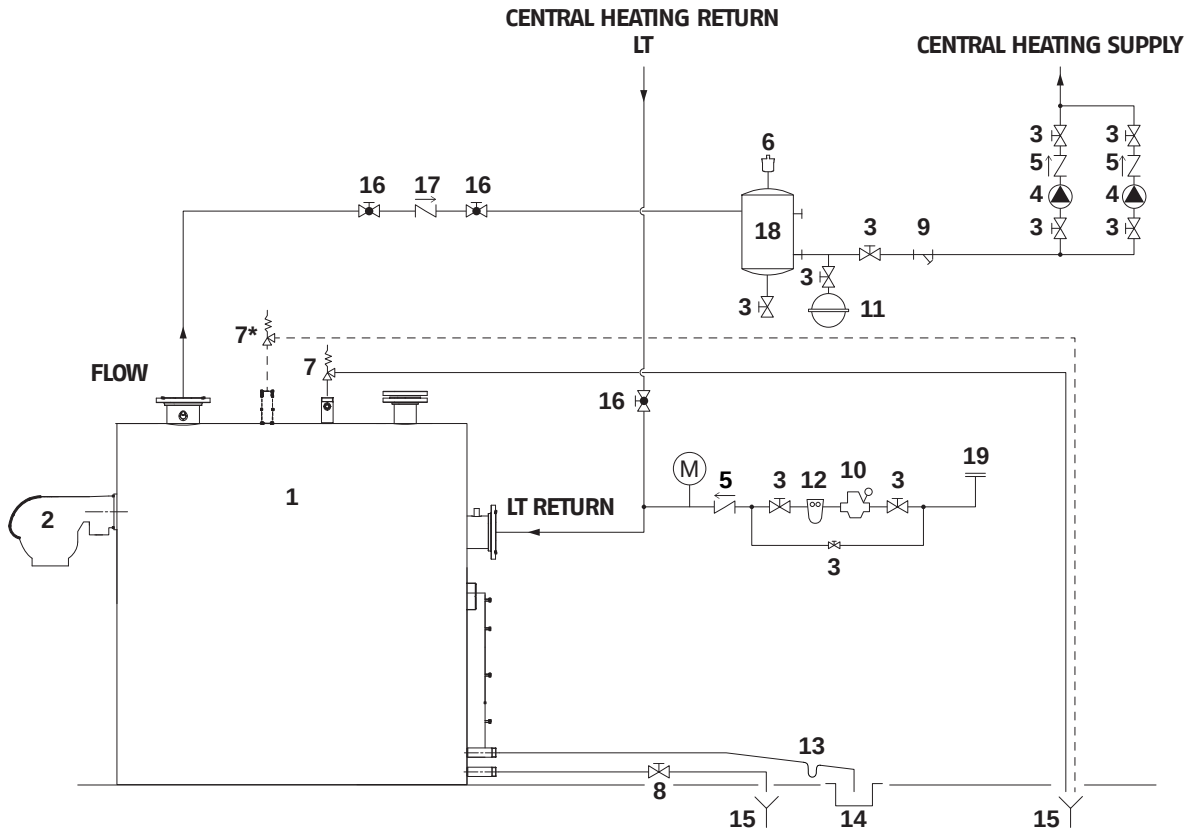
⚠ The selection and the installation of the components of the system is the responsibility of the installer, who must operate in accordance with good practice and current Legislation.

⚠ If needed, water supplies and recovery circuits must be conditioned by suitable treatment systems. Refer to the values listed in the table in the paragraph Water quality requirements.

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

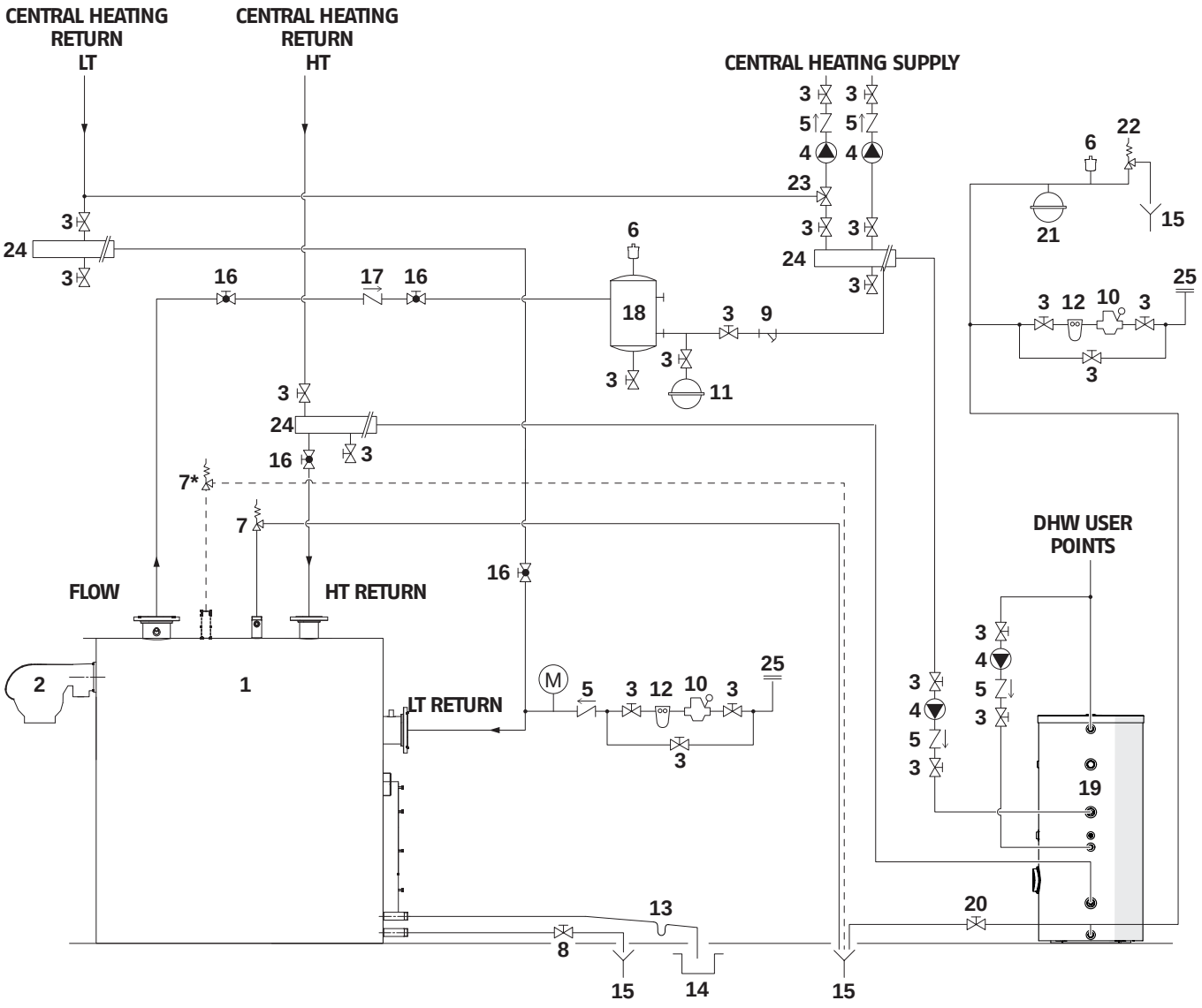
⚠ The use of automatic fill valves is not recommended by Riello S.p.A.. The system should be pressurized during commissioning and the fill valve closed. Routine maintenance must include regular checks of the system pressure to identify leaks in the hydronic system. All fill water must be conditioned in line with the water quality requirements outlined in this manual. For installations where a manual fill system is impractical the fill system must be monitored to ensure the fill water is properly conditioned in line with the water quality requirements. System leaks should be sealed to prevent a constant flow of fill water which can create deposits in the system and boiler vessel. However, if this system load should be automatic, it is recommended to treat the water against limescale using a water softener.

Single Boiler Piping Schematic



1	Boiler	7	Boiler safety valve	13	Siphon	M	Pressure gauge
2	Burner	7*	Second boiler safety valve	14	Condensate outlet	HT	High Temperature
3	Isolation valves	8	Boiler drain valve	15	Drain	LT	Low Temperature
4	Central heating system pump	9	Y strainer	16	Isolation valve	_ _ _	(*)
5	Non-return valves	10	Pressure reducer	17	Non-return valve		
6	Automatic vent valve	11	Expansion tank	18	Air separator		
		12	Water softener filter	19	Water inlet	*	only for RTC 8000-10000

Single Boiler Combination Heating & Domestic Water Plant

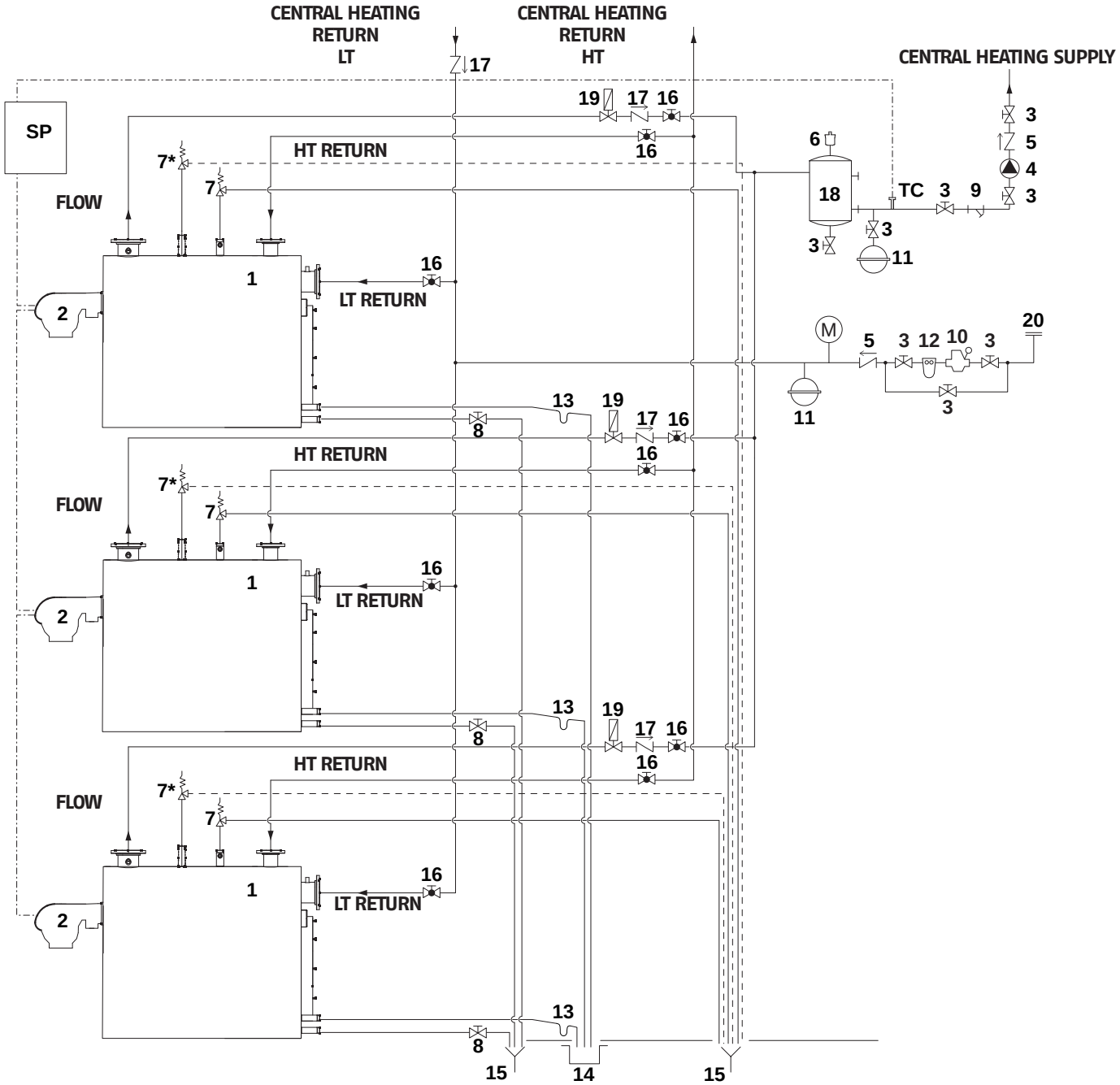


1 Boiler
2 Burner
3 Isolation valves
4 Central heating system pump
5 Non-return valves
6 Automatic vent valve
7 Boiler safety valve
7* Second boiler safety valve
8 Boiler drain valve
9 Y strainer
10 Pressure reducer
11 Expansion tank
12 Water softener filter
13 Siphon
14 Condensate outlet
15 Drain
16 Isolation valve
17 Non-return valve
18 Air separator
19 Domestic water storage tank
20 Storage tank drain valve
21 DHW circuit expansion tank
22 Storage tank safety valve
23 3-way valve
24 Central heating system manifold
25 Water inlet

M Pressure gauge
HT High Temperature
LT Low Temperature
– – – (*)

* only for RTC 8000-10000

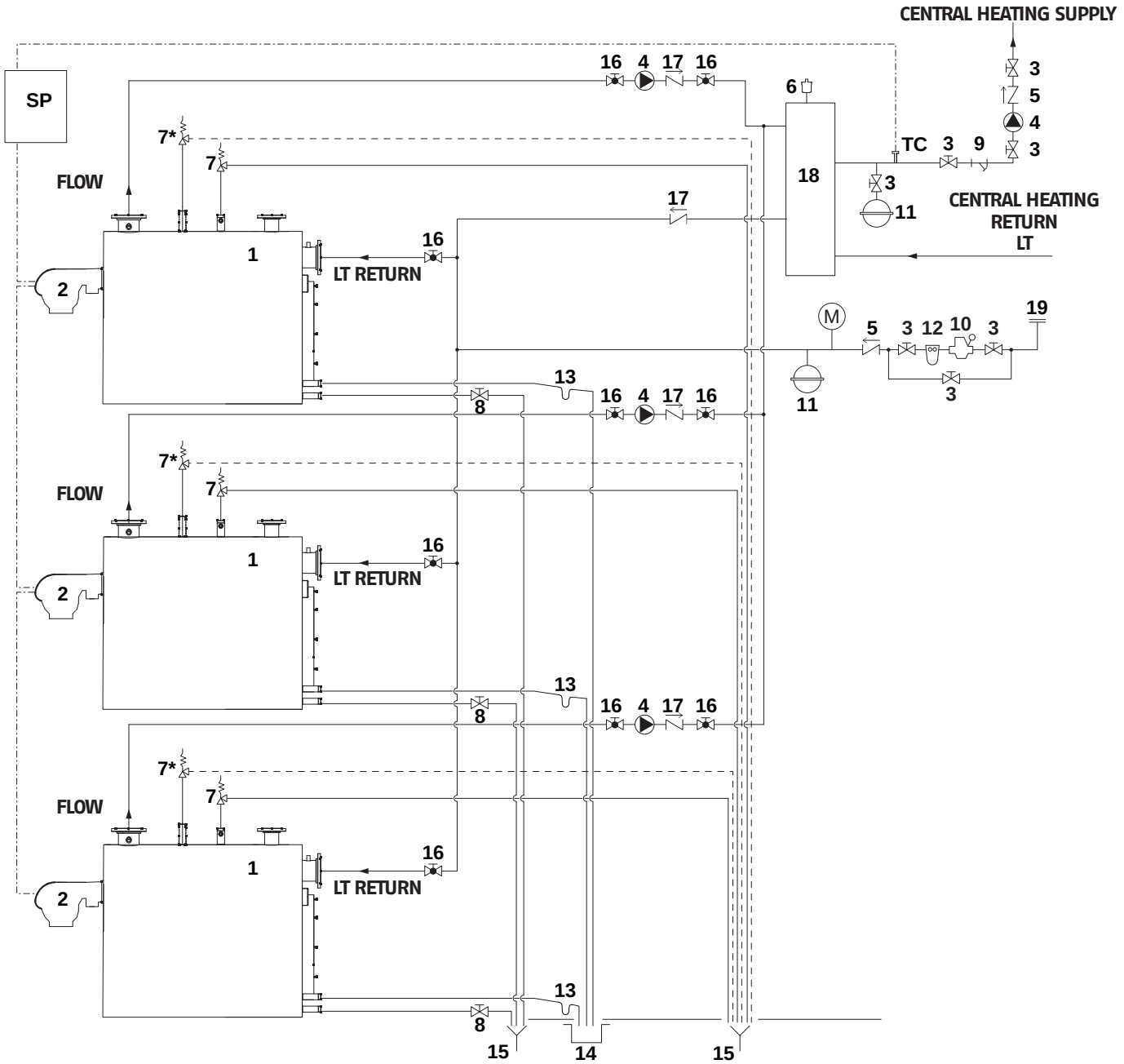
Multiple Boiler Piping Schematic with Sequencing Panel



1	Boiler	15	Drain
2	Burner	16	Isolation valve
3	Isolation valves	17	Non-return valve
4	Central heating system pump	18	Air separator
5	Non-return valves	19	Motorized isolation valve
6	Automatic vent valve	20	Water inlet
7	Boiler safety valve		
7*	Second boiler safety valve	M	Pressure gauge
8	Boiler drain valve	SP	Sequencing panel
9	Y strainer	TC	Control temperature
10	Pressure reducer	HT	High Temperature
11	Expansion tank	LT	Low Temperature
12	Water softener filter	_ _ _	(*)
13	Siphon	. _ . _ .	Electrical signal
14	Condensate outlet		

* only for RTC 8000-10000

Multiple Boiler Piping with Primary and Secondary Piping

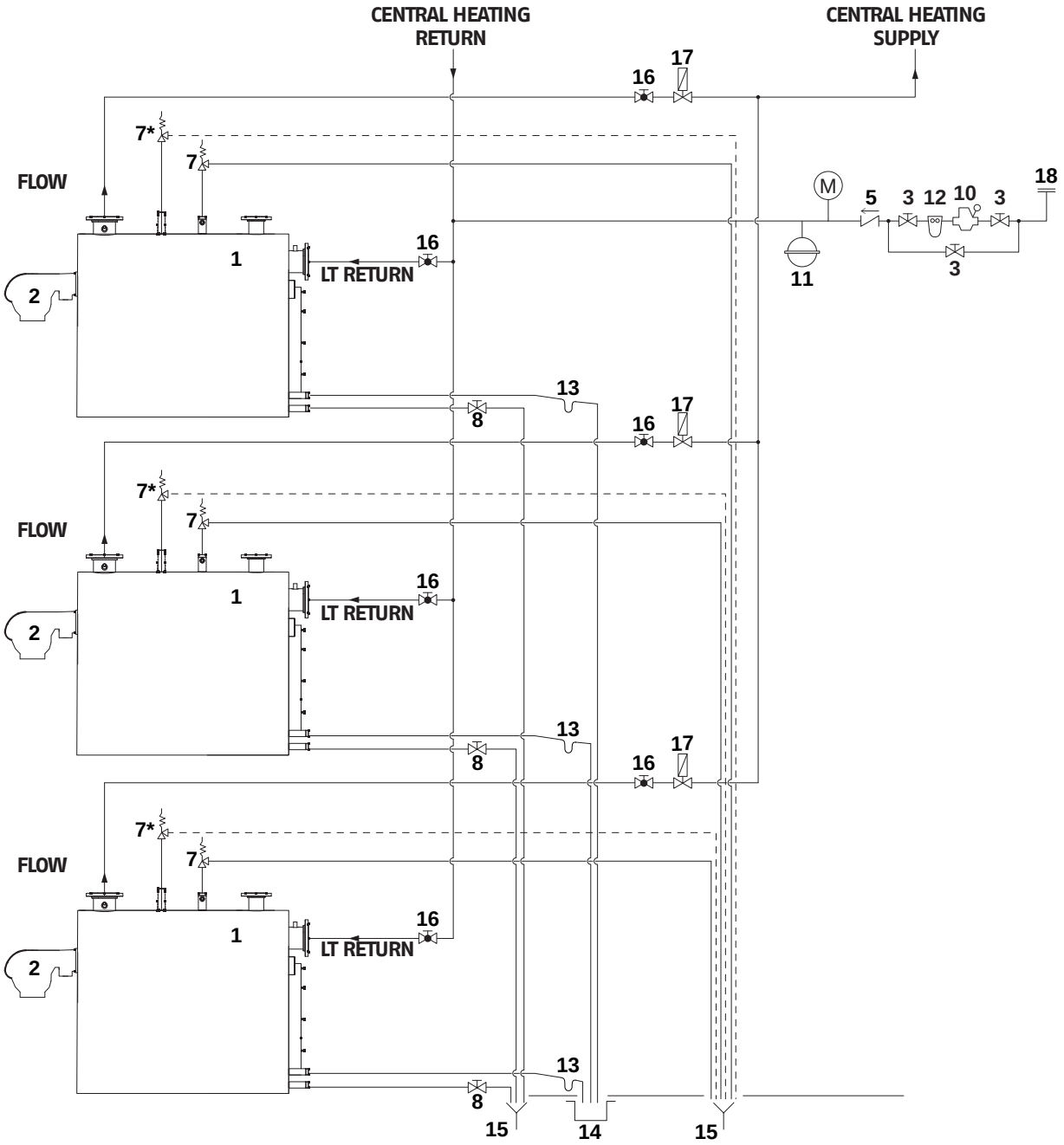


1 Boiler
2 Burner
3 Isolation valves
4 Central heating system pump
5 Non-return valves
6 Automatic vent valve
7 Boiler safety valve
7* Second boiler safety valve
8 Boiler drain valve
9 Y strainer
10 Pressure reducer
11 Expansion tank
12 Water softener filter
13 Siphon
14 Condensate outlet
15 Drain
16 Isolation valve
17 Non-return valve
18 Mixer tank
19 Water inlet

M Pressure gauge
SP Sequencing panel
TC Control temperature
HT High Temperature
LT Low Temperature
_ _ _ (*)
. _ . _ . Electrical signal

* only for RTC 8000-10000

Multiple-Boiler Piping with Motorized Sequencing Valves

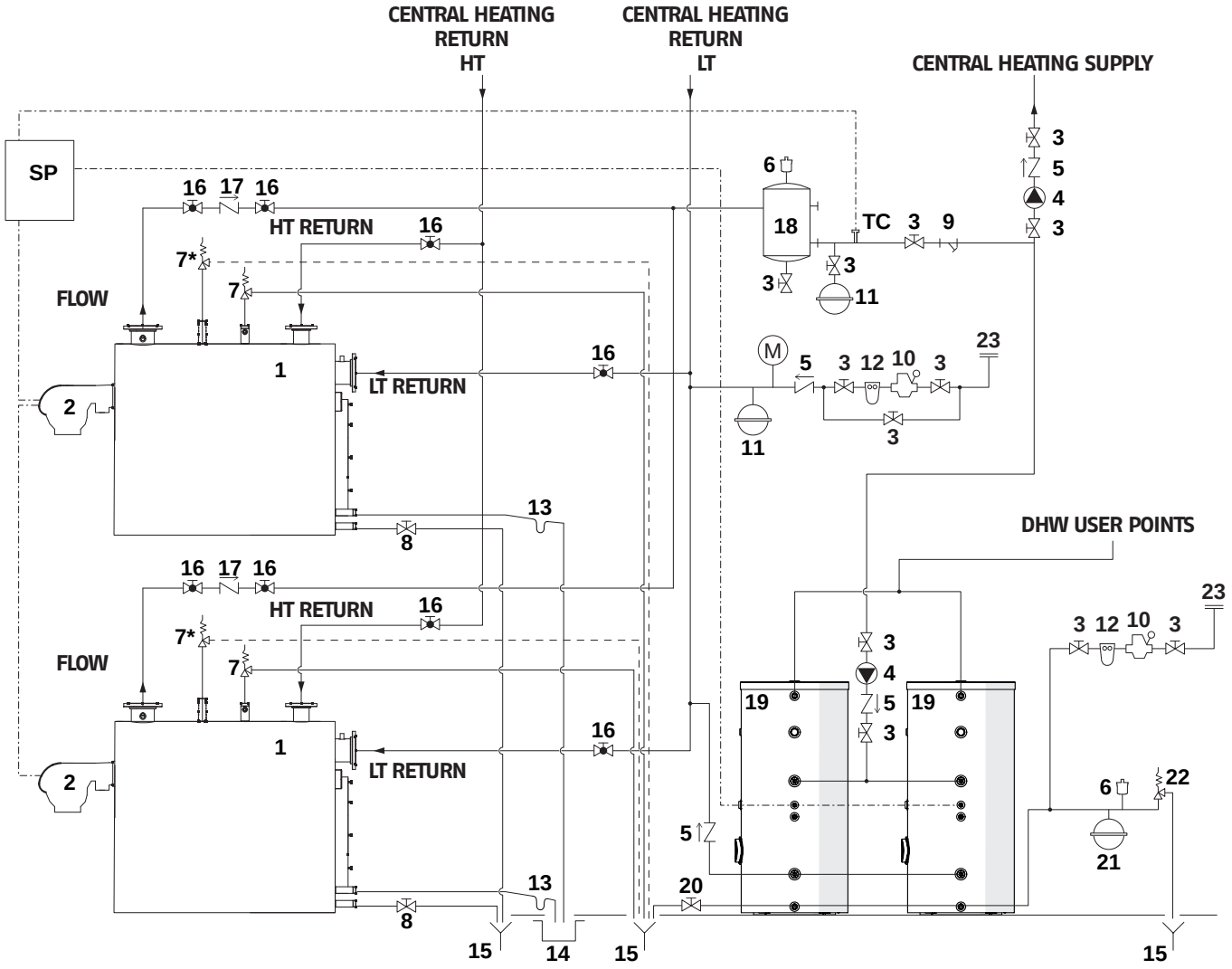


1 Boiler
2 Burner
3 Isolation valves
4 Central heating system pump
5 Non-return valves
6 Automatic vent valve
7 Boiler safety valve
7* Second boiler safety valve
8 Boiler drain valve
9 Y strainer
10 Pressure reducer
11 Expansion tank
12 Water softener filter
13 Siphon
14 Condensate outlet
15 Drain
16 Isolation valve
17 Motorized sequencing valve
18 Water inlet

M Pressure gauge
HT High Temperature
LT Low Temperature
(*)
_ _ _
. _ . _ . Electrical signal

* only for RTC 8000-10000

Two-Boiler Combination Heating & Domestic Water Plant

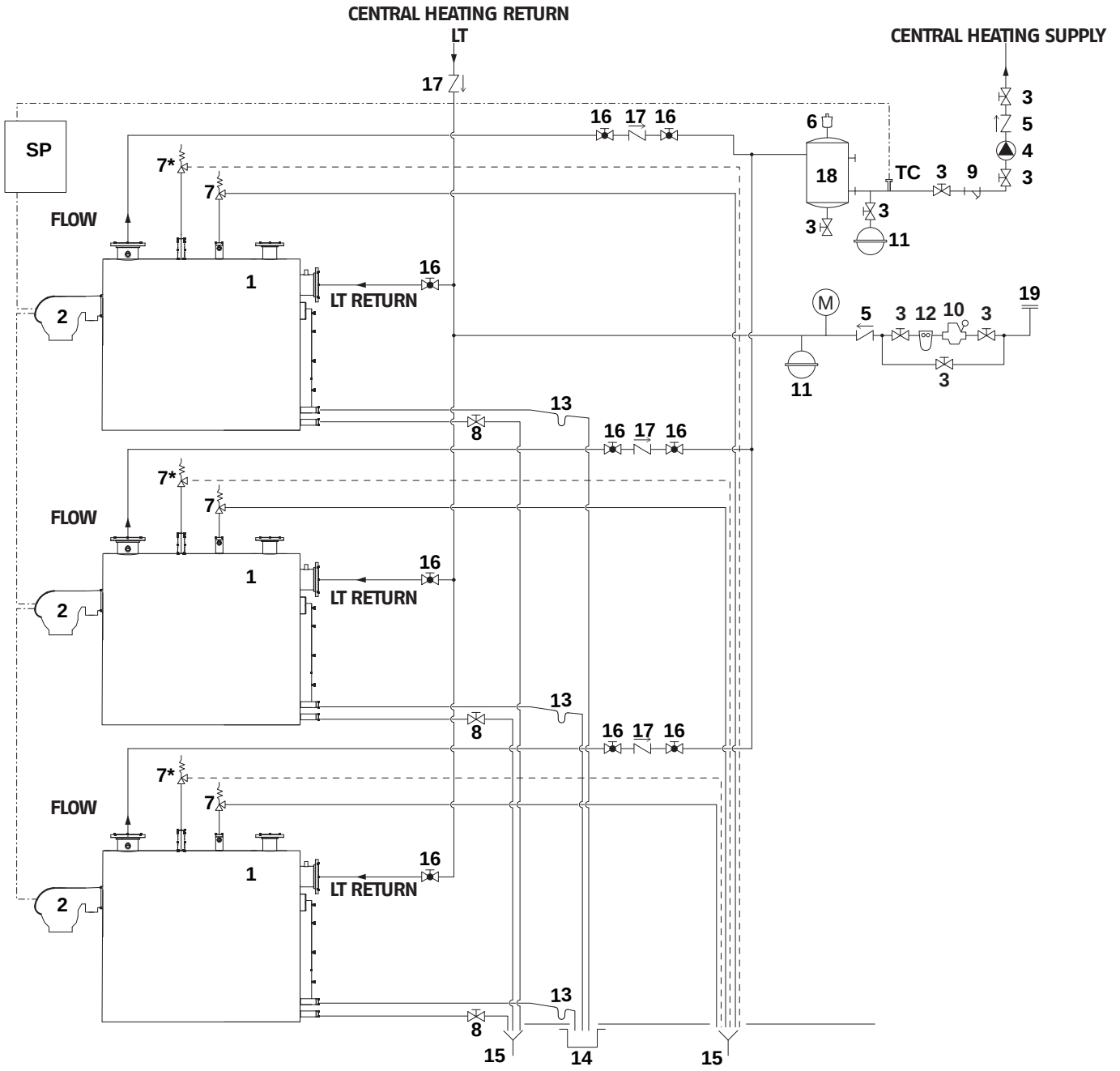


1 Boiler
2 Burner
3 Isolation valves
4 Central heating system pump
5 Non-return valves
6 Automatic vent valve
7 Boiler safety valve
7* Second boiler safety valve
8 Boiler drain valve
9 Y strainer
10 Pressure reducer
11 Expansion tank
12 Water softener filter
13 Siphon
14 Condensate outlet
15 Drain
16 Isolation valve
17 Non-return valve
18 Air separator
19 Domestic water storage tank
20 Storage tank drain valve
21 DHW circuit expansion tank
22 Storage tank safety valve
23 Water inlet

M Pressure gauge
SP Sequencing panel
TC Control temperature
HT High Temperature
LT Low Temperature
_ _ _ (*)
. _ . _ . Electrical signal

* only for RTC 8000-10000

Multi-Boiler Combination



1 Boiler
2 Burner
3 Isolation valves
4 Central heating system pump
5 Non-return valves
6 Automatic vent valve
7 Boiler safety valve
7* Second boiler safety valve
8 Boiler drain valve
9 Y strainer
10 Pressure reducer
11 Expansion tank
12 Water softener filter
13 Siphon
14 Condensate outlet
15 Drain
16 Isolation valve
17 Control valve
18 Air separator
19 Water inlet

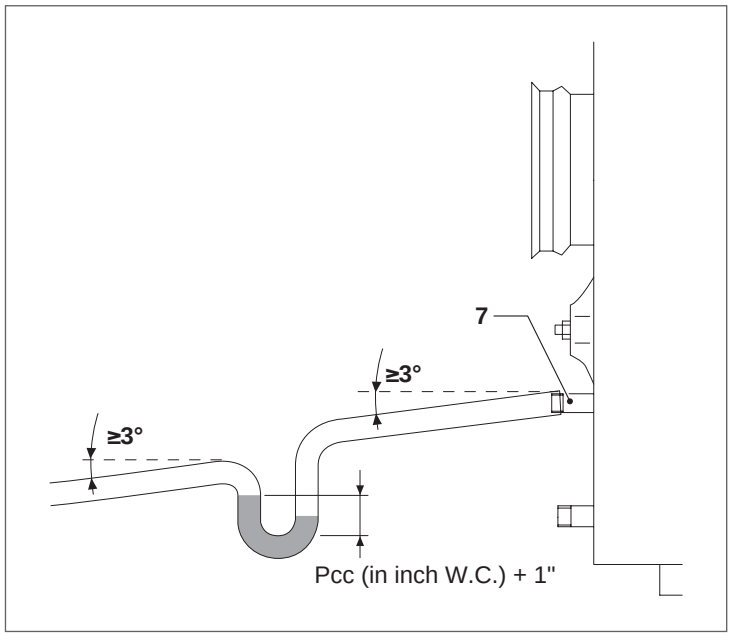
M Pressure gauge
SP Sequencing panel
TC Control temperature
HT High Temperature
LT Low Temperature
_ _ _ (*)
. _ . _ . Electrical signal

* only for RTC 8000-10000

2.10 Draining the condensate

RTC condensing boilers produce a flow of condensate that varies according to operating conditions.
The maximum hourly production of condensate for each model is given in the table in the paragraph Neutralizing the condensate.
The condensate drain system must be suitably dimensioned to cope with the flow produced. Also, pipe and hose diameter must not be less than 1 1/4" at any point. This diameter corresponds to that of the boiler's condensate drain fitting (7).

Collection and connection to the drain system must conform to applicable national and local codes.
To prevent combustion fumes from leaking into the air of the boiler room, the condensate drain pipe must incorporate a siphon creating a minimum head equivalent to the furnace pressure plus 1" W.C..
The connecting pipes between the boiler, siphon and waste water drain pit must be laid at a minimum down slope of 3° and must be installed in such a way as to prevent any build-up of condensate.



2.11 Neutralizing the condensate

Installation of a condensate neutralization kit is always recommended. The following table states the rate of condensate flow produced by the boiler.

Model	Condensate Production		Condensate Production	
RTC 3000	21	GPH	78	l/h
RTC 4000	30	GPH	112.8	l/h
RTC 5000	37	GPH	139.2	l/h
RTC 6000	46	GPH	175	l/h
RTC 8000	54	GPH	203.2	l/h
RTC 10000	68	GPH	256	l/h

At full load with Tin=86°F and Tout=122°F

⚠ All connecting hoses must be kept as straight and as short as possible. Any curves or sharp bends can lead to the hoses becoming clogged and can therefore prevent proper condensate discharge.

⚠ Refer to the manual supplied with the kit for installation and connection instructions.

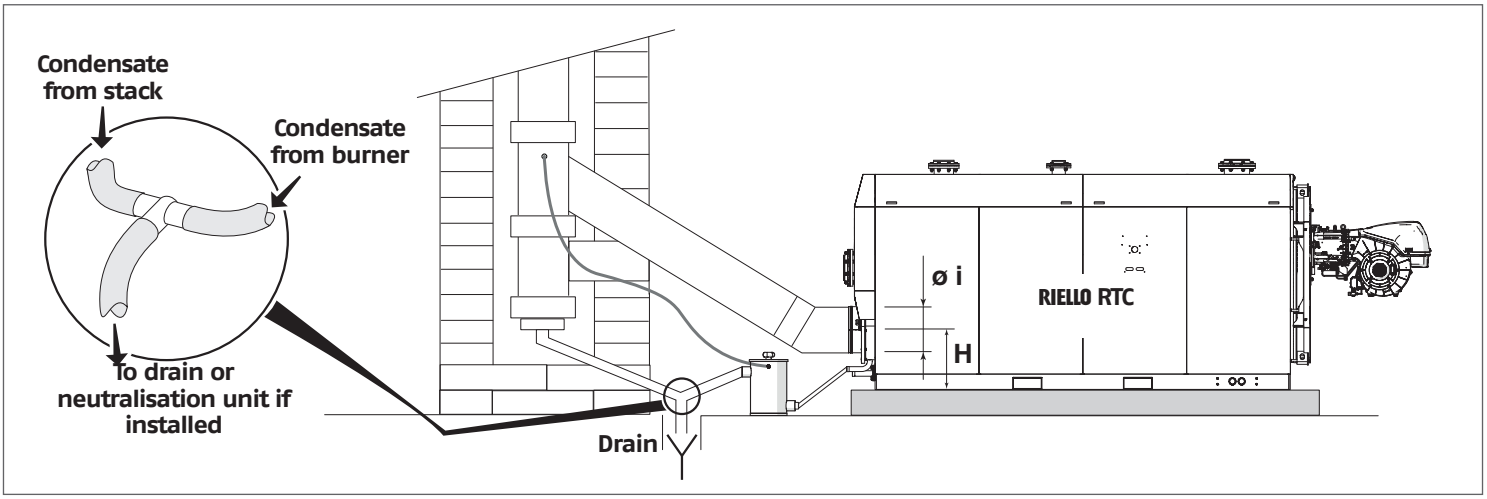
⚠ **NOTICE**: The boiler room's condensate drain pit must be located at a lower level than the fitting on the neutralization unit.

If it ever proves necessary to neutralize the condensate that forms in the flue gas stack, connect the condensate drain fittings of the boiler and flue gas stack together using a 'T' union and connect the leg of the 'T' to the inlet of the neutralization unit.

2.12 Combustion gas exhaust

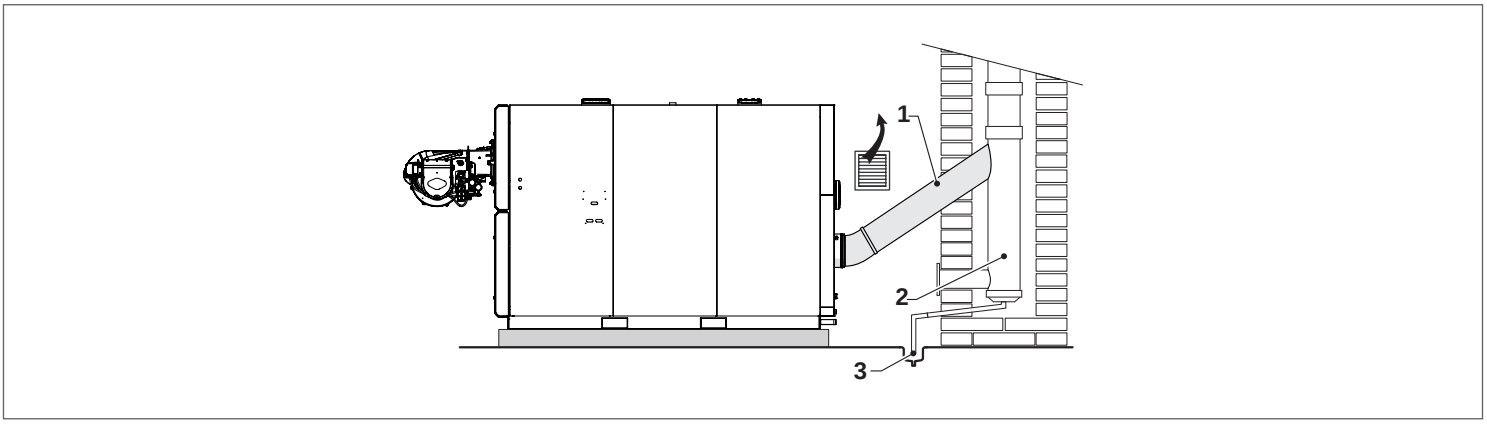
For each boiler used, to reduce pressure drop in exhaust and dampen turbulent exhaust flow, the horizontal exhaust duct must have at least a straight run of 3 pipe diameters of venting from the exhaust outlet of the boiler to either:

1 45 degree elbow piped into the vertical using 45 degree connectors



or
2 use a 90 degree swept elbow.

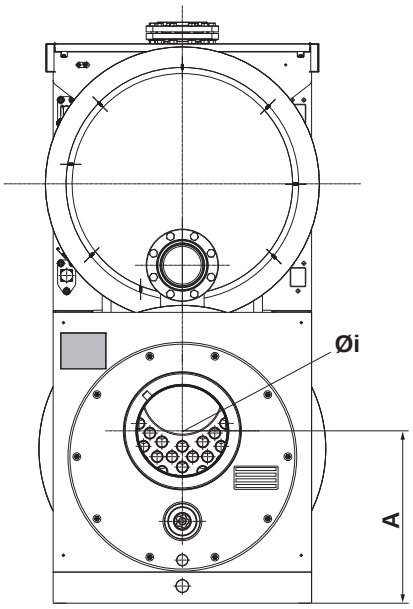
The flue pipe (1) and the connection to the stack (2) must conform to applicable national and local laws and standards. Flue pipe must be rigid, impermeable to fumes, able to withstand mechanical strain, heat, and the action of combustion gases and the condensate formed by them.



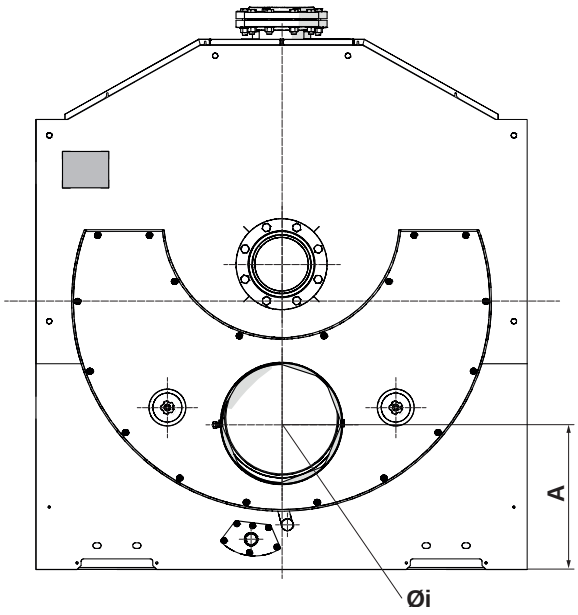
⚠ The boiler takes in combustion air from the boiler room. Room vents must therefore be compliant with the relevant technical standards.

⛔ Do not obstruct or restrict the air vents in the room where the boiler is installed. Adequate ventilation is essential for correct combustion and functioning.

RTC 3000-6000



RTC 8000-10000



	BOILER RTC						
	3000	4000	5000	6000	8000	10000	
Øi	9 27/32	11 13/16	13 25/32	13 25/32	15 3/4	17 23/32	inch
	250	300	350	350	400	450	mm
A	25 3/32	25 51/64	26 19/64	28 1/2	20 1/2	21 45/64	inch

2.12.1 Venting Requirements

WARNING: Risk of system damage or personal injury!
The vent system could fail, causing flue gas leakage, resulting in severe personal injury or death.
- Use only an approved vent starter coupling and approved vent pipe from **RIELLO**
- Do not mix components from different systems.

NOTICE: How to design the flue gas outlet
- Connect an oil-fired unit to a vent having sufficient draft at all times to ensure safe and proper operation of the unit.

The RTC Boiler is a category II or IV appliance and the exhaust vent materials must be UL listed for use with a category IV appliance: operating temperatures of up to 210 °F, positive pressure, condensing flue gas. Currently, UL Listed vents of AL29-4C or 316L stainless steel must be used with the RTC Boiler. Proper clearances to combustibles must be maintained per UL and vent manufacturer instructions.
The specifying engineer should dictate flue venting as appropriate to the installation.
The vent system should be designed to facilitate smooth travel for both the intake and exhaust. Avoid the use of bullhead tees and back-to-back 90 degree elbows. The exhaust system must never be installed in a downward fashion. Be sure to follow all instructions provided by the vent manufacturer.
Keep the supply of combustion air free of corrosive substances (e.g. halogenated hydrocarbons that contain chlorine or fluorine compounds). This will help prevent corrosion. Never use or store chlorinated cleaning agents or halogenated hydrocarbons (as contained in spray cans, solvents or cleaning agents, paints and adhesives, for example) in the boiler room.
UL, NFPA 54 & 211, ANSI Z223.1 and CSA B149.1 guidelines are often the basis for state and local codes. Follow the guidelines of these recognized agencies unless codes applicable to the installation site are most stringent. The venting and combustion air systems must meet all applicable code requirements. Where code differs from the instructions provided with the equipment, code will take precedence.
Constant pressure at the flue gas outlet is not required. Size the flue system to limit pressure variations. The maximum allowable breech pressure for design of the flue system is positive 0.2" W.C. for proper combustion and light off.
A draft control system may be required to ensure proper draft when two or more boilers are connected to a common stack. Consult the flue material manufacturer for design calculations and recommendations.

2.12.2 Code Required Vent Terminations

Horizontal Terminations:

- Vent terminations should be at least 4 feet below, 1 foot above or 4 feet horizontally from any window, door or gravity air inlet of a building.
- The termination shall be at least 6 feet away from any other building opening, gas utility meter, service regulator or the like.
- The termination shall be at least 6 feet away from the combustion air intake of any other appliance.
- The bottom of the vent terminal should be at least 12 inches above both finished grade and any snow accumulation point.
- Vent should not terminate over public walkways or over an area where condensate or vapor could create a nuisance or be detrimental to the operation of regulators, meters and other equipment.
- Discharges should not be in wind-blocked areas, corners, or directly adjacent to vegetation.

Vertical Terminations:

- Roof penetrations should follow all appliance codes and the vent manufacturer's instructions. The vent should never be installed at less than the required clearances to combustible materials per UL, NFPA and local codes. "Double-wall or thimble" assemblies are required when penetrating combustible walls and roofs.
- Vertical discharges should extend at least 2 feet above the roof through properly flashed penetrations and at least 2 feet above anything within a 10 foot horizontal diameter. Discharges that extend more than 2 feet above the roof must be laterally supported.
- If the vent systems is to be connected to an existing stack, the stack must be UL Listed for Category II or IV appliances (capable of 210 °F, positive pressure and condensing flue gas operation).
- Masonry stacks must be lined and the vent penetration must terminate flush with and be sealed to this liner. Vents may enter the stack through the bottom or side.
- RTC Boiler vent systems must not be interconnected to any other venting system; The RTC Boiler is designed to maintain its own vent system.
- The exhaust vent must be pitched up toward the termination a minimum of 1/4 inch per foot of length. Condensate must flow back to the boiler flue collector freely, without accumulating in the vent.

2.12.3 Combustion Air from outside the building

Two permanent openings method
If outside combustion air is required, the room shall have two permanent louvered openings to the outdoors. Each opening must have a minimum free area of 1 square inch for each 4,000 Btu/hr of total input rating of all fuel burning equipment in the space. When the air is supplied to the room via ducts, two ducts must be used. Vertical ducts and openings must have a minimum free area of 1 square inch for each 4,000 Btu/hr of the total input rating of all fuel burning equipment in the space. Horizontal ducts and openings must have a minimum free area of 1 square inch for each 2,000 Btu/hr of the total input rating of all fuel burning equipment in the space.

One permanent opening method
If outside combustion air is required, the room shall have one permanent louvered opening to the outdoors. The opening must communicate directly with the outdoors or through a duct in either a vertical or horizontal arrangement. The opening must have a minimum free area of 1 square inch for each 3,000 Btu/hr of total input rating of all fuel burning equipment in the space.
The free area of the opening must take into account restrictions from louvers and screens. The louver manufacturer should be consulted for the percentage of free area available. When free area is not known, metal louvers typically have 60-70% of free area, wooden louvers have between 20-25% of free area. Louvers should be in a fixed position or interlocked with equipment so that they open automatically during equipment operation. The combustion air damper opening shall be located as follows: top louver shall begin within 12" of the ceiling and the bottom louver within 12" of the floor as prescribed in NFPA 54.

Direct intake method
If outside combustion air is required, air may be drawn from the outdoors via a duct connected directly to the burner intake. The duct shall be constructed of galvanized steel or a material having equivalent strength and rigidity. Refer to the burner manufacturer's recommendations and installation instructions for additional guidelines and application requirements.

2.12.4 Combustion Air from an adjacent room

Where combustion air is to be used from within the building, air must be provided into the equipment room through two permanent openings into the interior building. Each opening must have a minimum free area of 1 square inch for each 1,000 Btu/hr of the total input rating of all fuel burning equipment in the space. The louvers shall be located as follows: top louver shall start within 12" of the ceiling and the bottom louver within 12" of the floor as prescribed in NFPA 54.

2.12.5 Condensate Removal

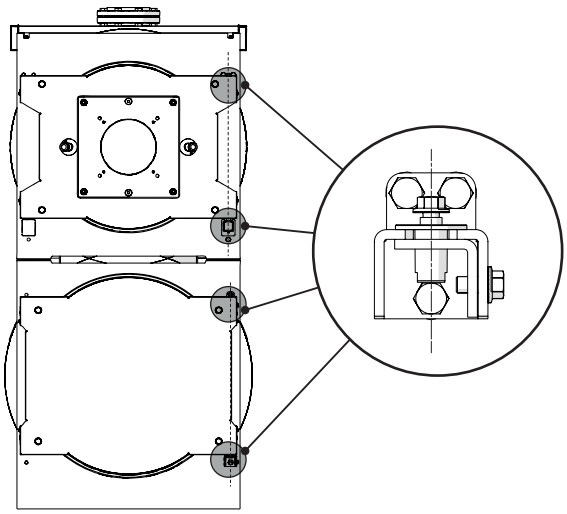
The exhaust vent pipe must be pitched at least 1/4" per foot of length back to the boiler. This will allow condensate to drain back to the unit to be disposed. Low spots in the venting where condensate may collect should be avoided. A plastic hose or PVC drain pipe may be used to discharge condensate to the neutralization system. Care should be taken to avoid kinks and from raising the drain line above the trap assembly.

2.13 Door hinges

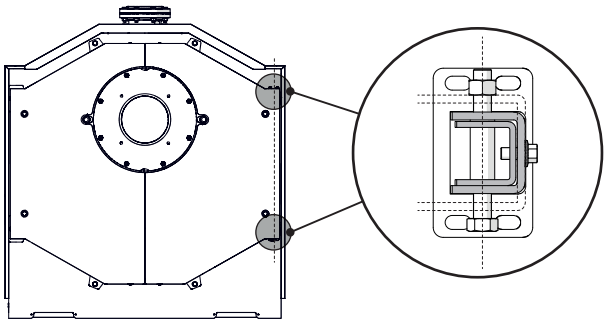
Two different door hinge systems have been used to meet different design requirements

- **RTC 3000 - RTC 6000**: there are four hinges, two for the upper door of the burner and two for the door of the reverse flow combustion chamber.
- **RTC 8000 - RTC 10000**: The front door opens on two hinges.

RTC 3000-6000



RTC 8000-10000

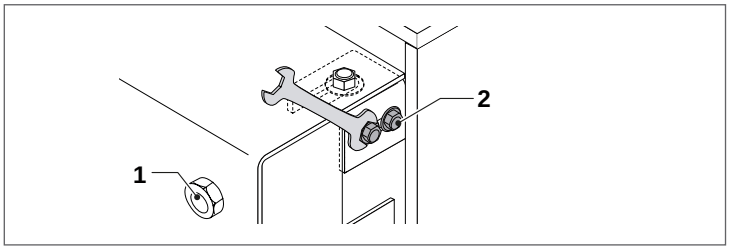


2.13.1 Changing the direction of door opening

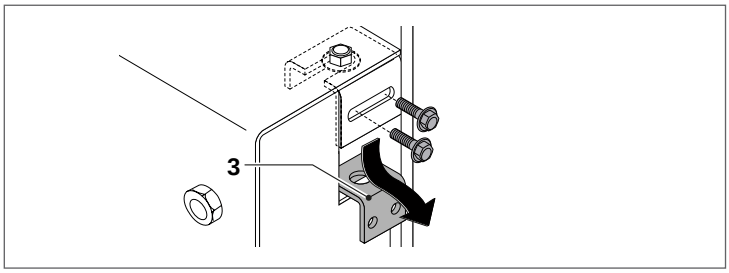
The boiler door hinges are fitted on the right of the door in the factory. If you need to reverse the direction of opening, remove the boiler's side panel and proceed as follows.

Door - RTC 3000-6000

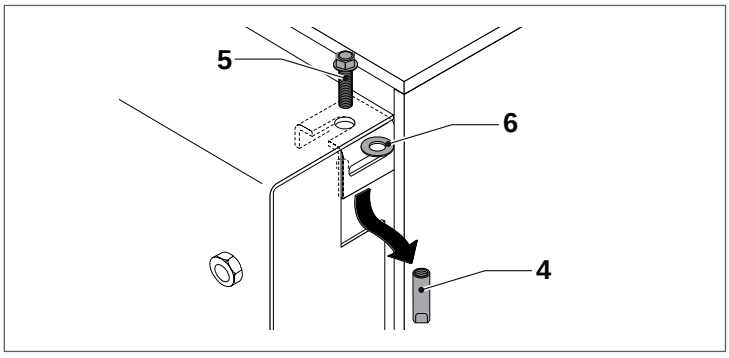
Check that the main door fixing bolts (1) are tight and then remove the safety bolts (2).



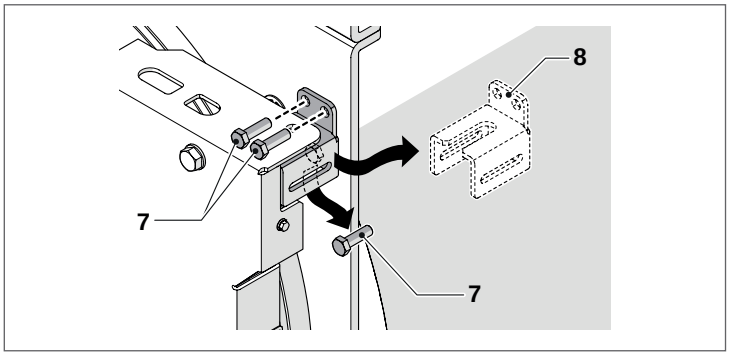
Remove the nuts and door brackets (3).



Insert a spanner through the top side slot and hold the bushing (4) steady.
Unscrew the top screw (5), then remove the bushing (4) and washer (6).



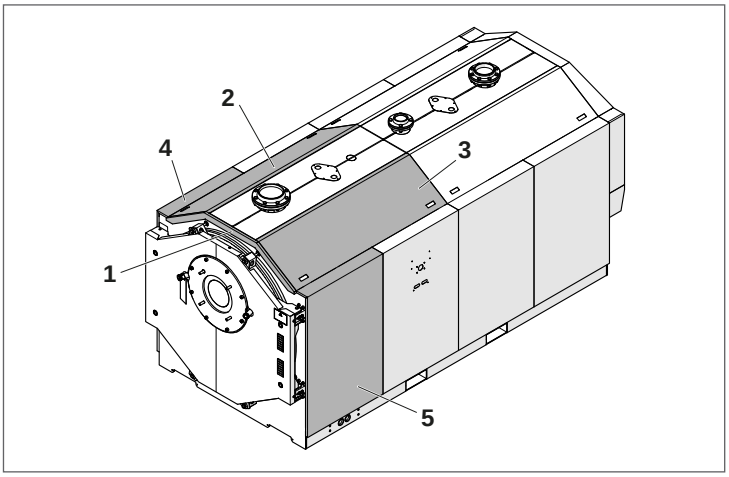
Remove the three bolts (7) and remove the bracket (8).



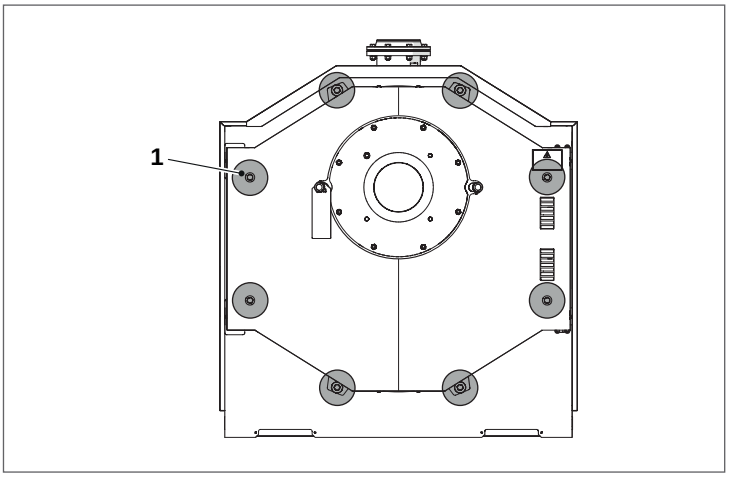
Fit the hinge on the opposite side, reversing the steps described above.
Repeat these steps for the other hinges.

Door – RTC 8000-10000

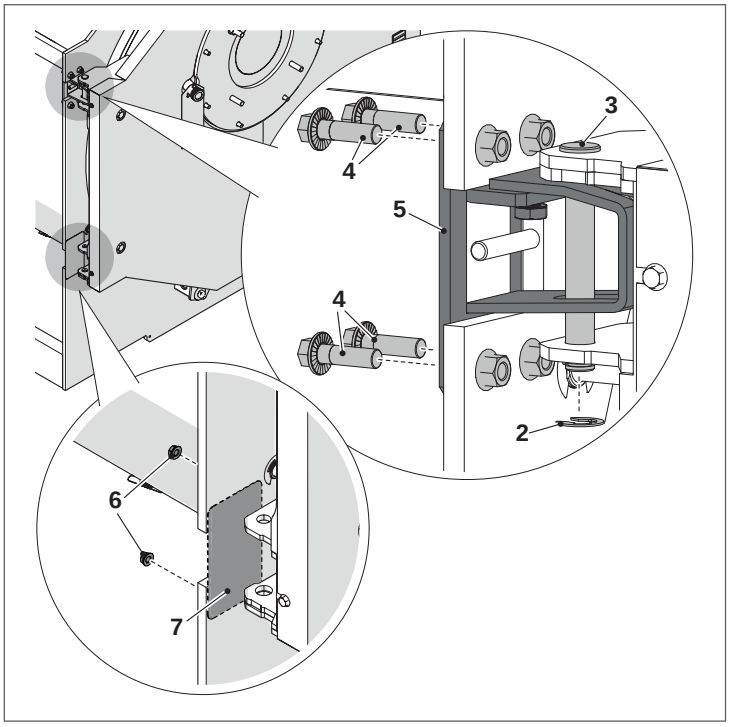
- Remove the upper profile (1), the upper panels (2) or (3) and side panels (4) or (5) depending on the opening direction of the door.



⚠ Check that the main locking screws (1) are fully tightened.

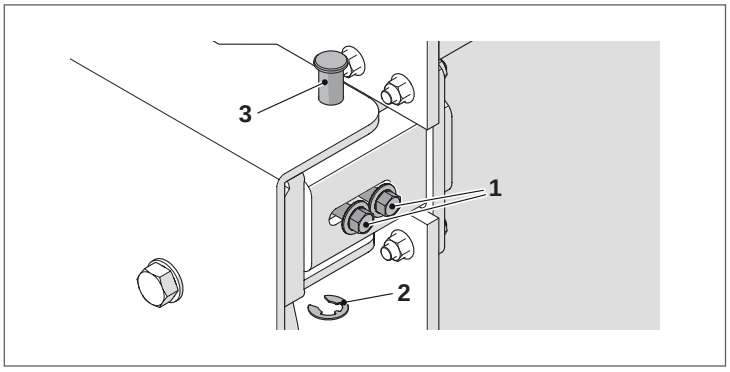


- Remove the snap ring (2) and the through pin (3).
- Unscrew the screws (4) (0 45/64 – 18mm wrench) and remove the support/centering bracket (5).
- Unscrew the nuts (6) and remove the plate (7).

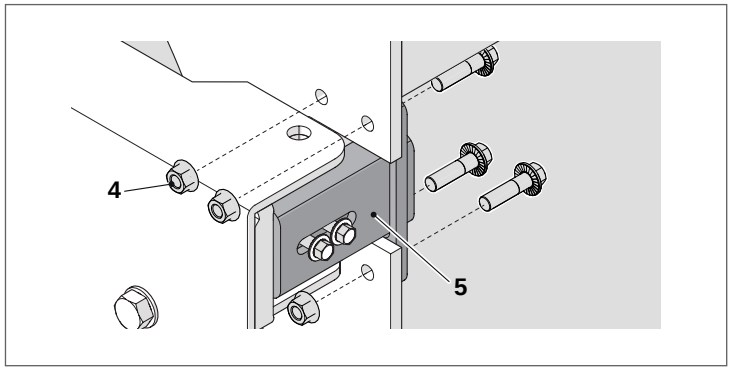


Top hinge

- Loosen the bolts (1) (0 5/8 in – 16mm wrench) and remove the circlip (2).
- Remove the through bolt (3).



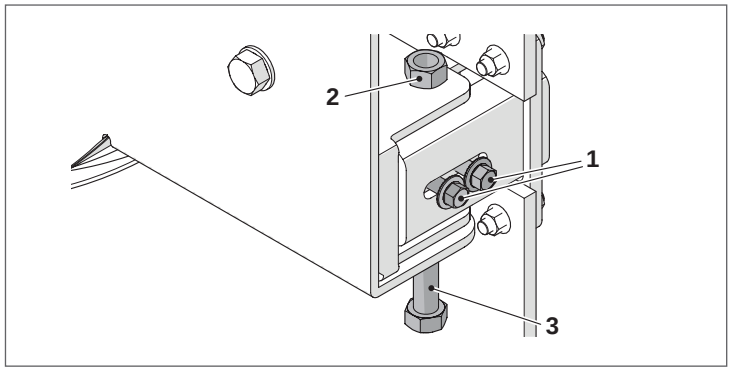
- Undo the screws (4) (0 45/64 - 18mm wrench), remove the bracket (5) and refit it on the opposite side, inverting the sequence of the operations.



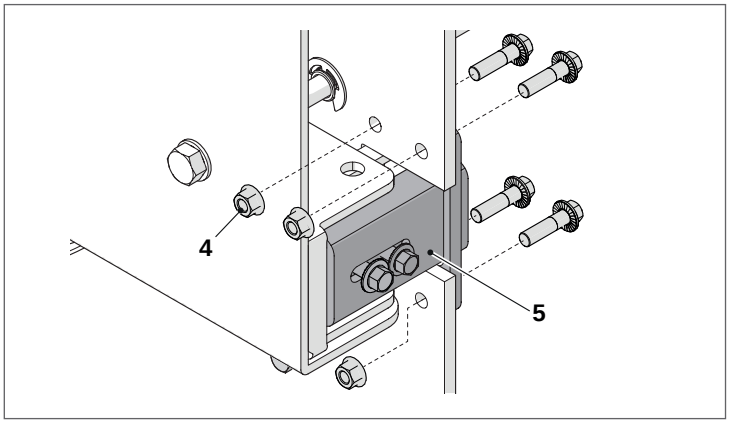
- From this side, fit the support/centring bracket and relative pin previously removed.

Bottom hinge
Fit the hinge on the opposite side, reversing the steps described above.
Repeat these steps for the other hinges.

- Loosen the nuts (1) (0 5/8 in - 16mm wrench).
- Loosen the nut (2) (1" 1/16 - 27 mm wrench), unscrew and remove the through bolt (3) (1" 1/16 - 27 mm wrench).



- Undo the screws (4) (0 45/64 - 18mm wrench), remove the bracket (5) and refit it on the opposite side, inverting the sequence of the operations.



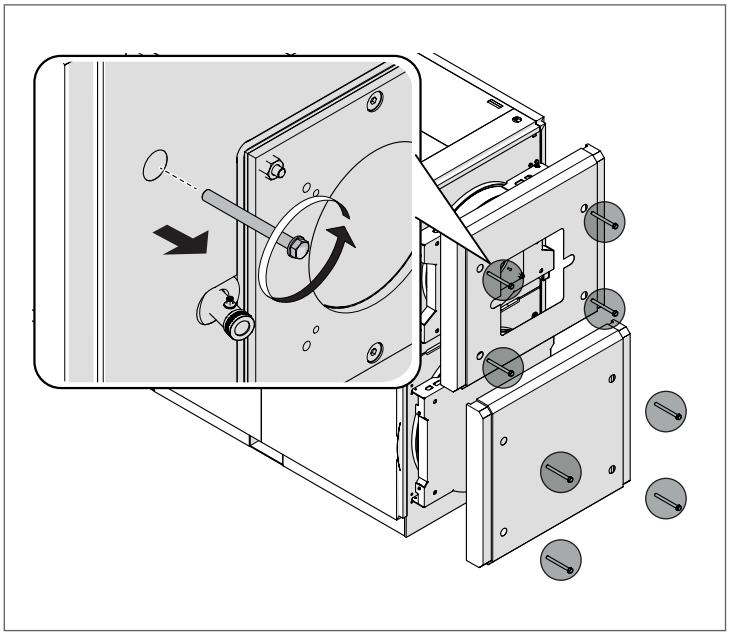
- From this side fit the plate using the nuts previously removed.

2.14 Opening the door

The instructions contained in this section can also be performed by Technical Assistance Service.

RTC 3000-6000

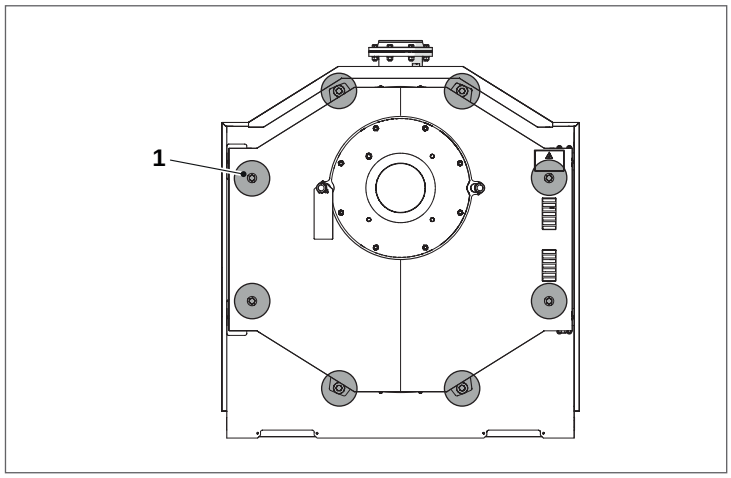
To open the door, unscrew fully the main fixing bolts holding the door in place.

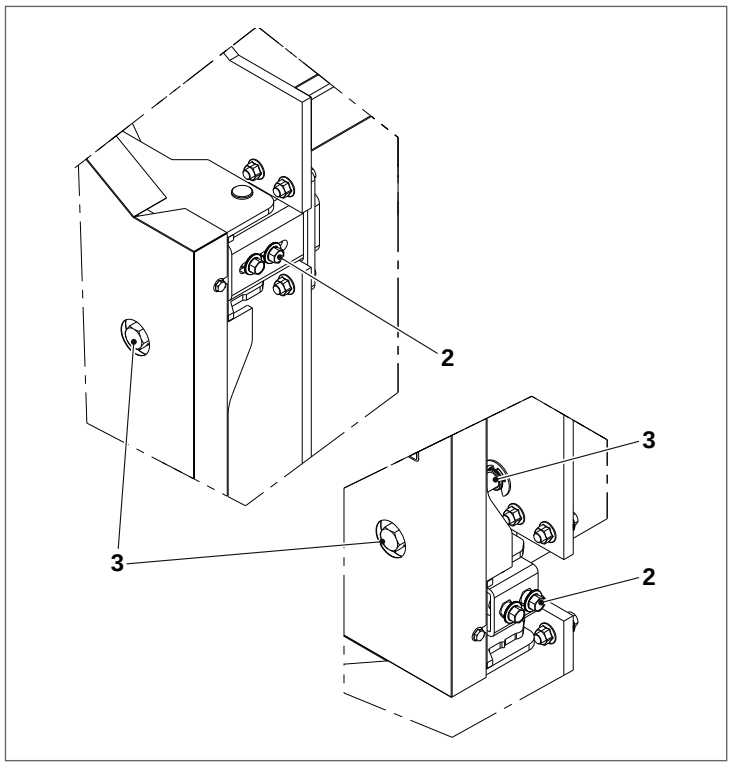


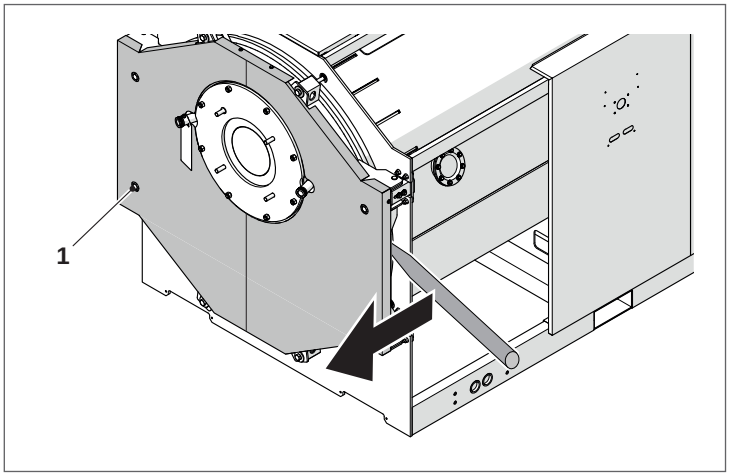
RTC 8000-10000

⚠ Make sure there are no obstacles or connections (gas ramp) for the rotation of the door on the hinge side.

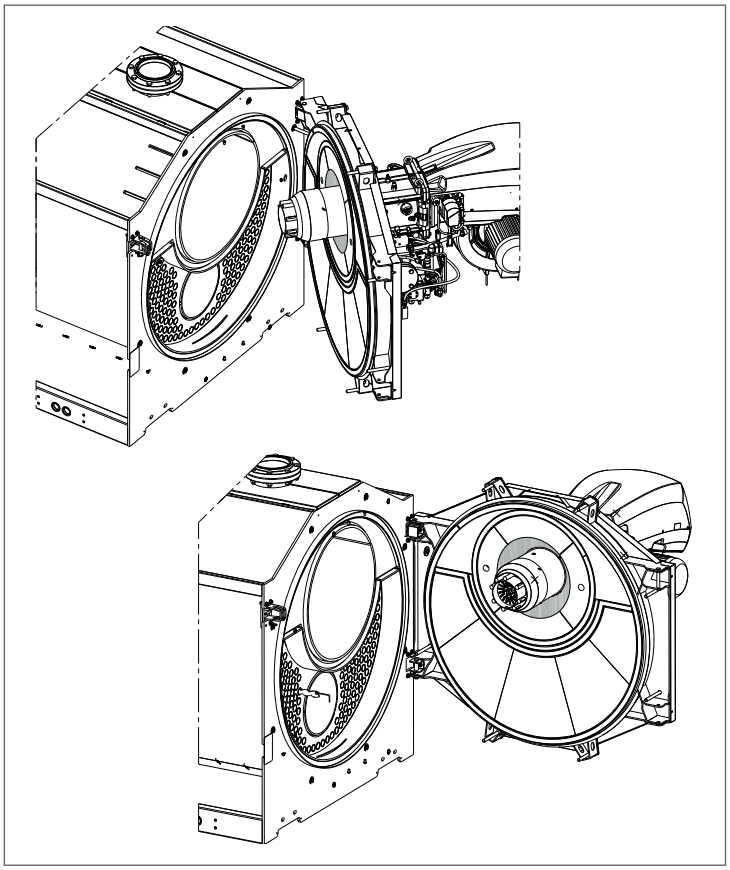
- Loosen the screws (1) (1 /16 in - 27mm wrench) approx. 0 5/64 - 0 0,5/32 in (2-4mm) and make sure they are still fit in their seats.
- Unscrew and remove the hinge screws (2) (0 5/8 in - 16mm wrench) such that the hinge bracket can slide.







- Move the door out of its seat and bring it close to the loosened screws (1), using both hands or a lever as an aid.
- Tighten the hinge screws (2) (85 N/m).
- Completely unscrew the screws (1).
- Working from the side opposite of the hinges, open the door with both hands, guiding it until it is completely open.



- With the door open, visually inspect the condition of the components (refractory, braid, turbulators, boiler baffle).

If components are in a bad condition, refer to the section Inspection and maintenance" on page 53.

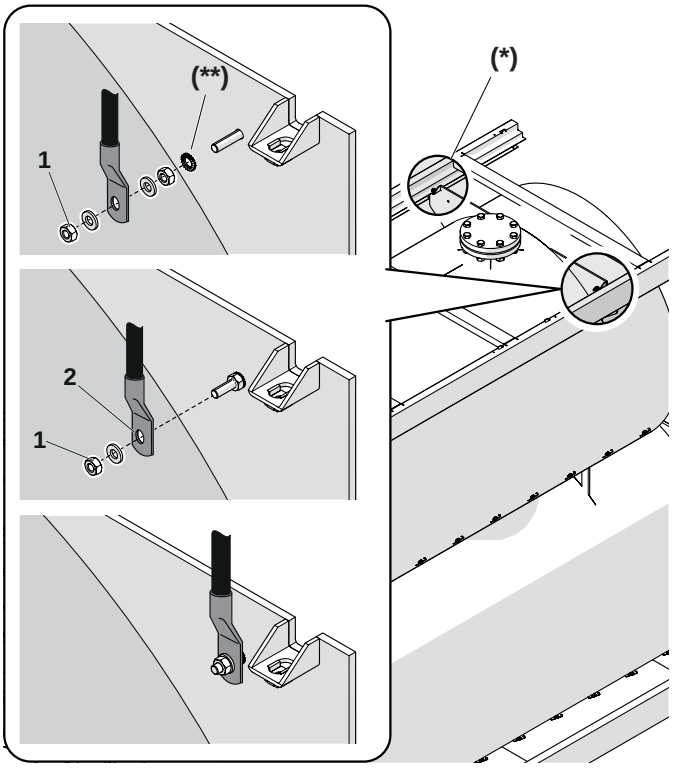
2.15 Earth connection

A ground connection is provided on the rear head (models **RTC 3000-RTC 6000**), and at the centre of the frame (models **RTC 8000 -RTC 10000**) for connection to an efficient earth system.

Proceed as follows:

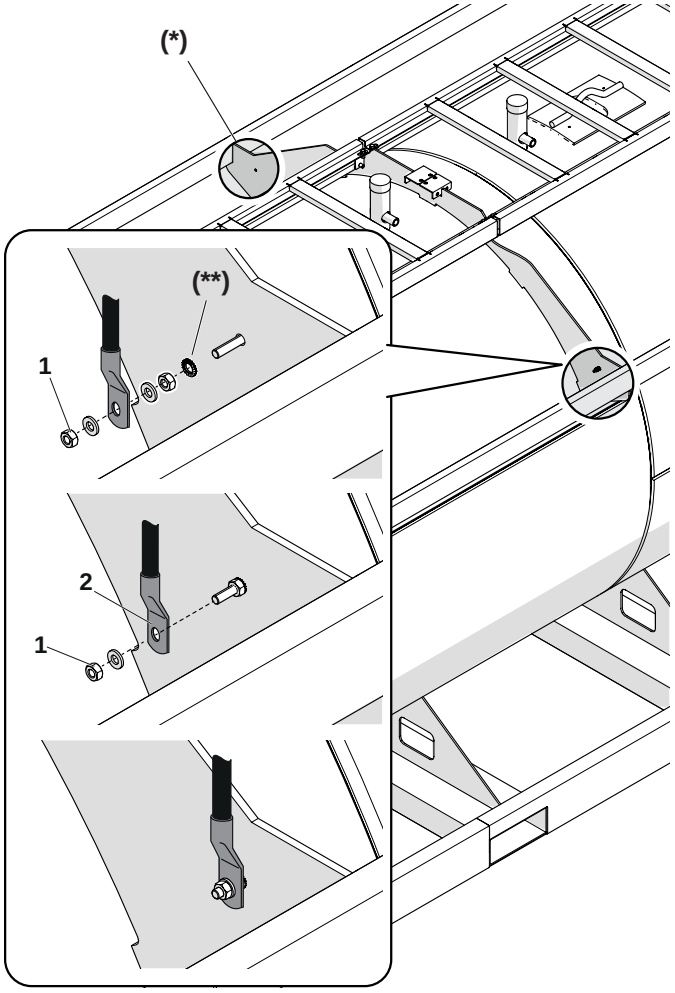
- Unscrew the nut and washer (1) from the earth terminal;
- Attach the earth cable's eye connector (2) to the terminal (make sure that the cable is of adequate size and complies with legislation in the country of installation);
- Fit the nut and washer (1) to the earth terminal and tighten the nut;
- Connect the other end of the cable to the system's earth ground.

RTC 3000-6000



(**) **M6x30 brass**

RTC 8000-10000



(**) **M6x30 brass**

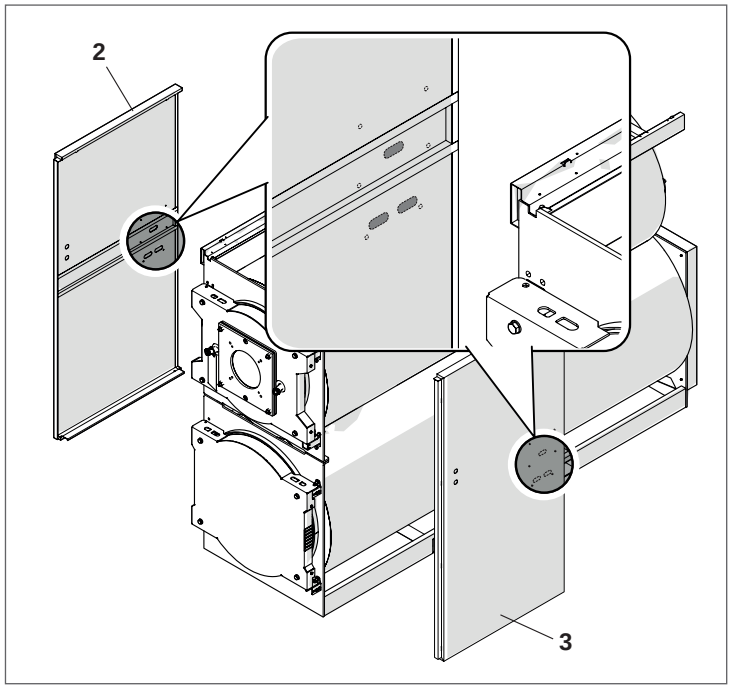
⚠ Another hole (*) in the left side of the boiler head can also be used to ground the appliance. If you wish to use this hole for the earth connection, remove the terminal fittings from the right of the head and move them to the left grounding point.

2.16 Fitting the casing panels

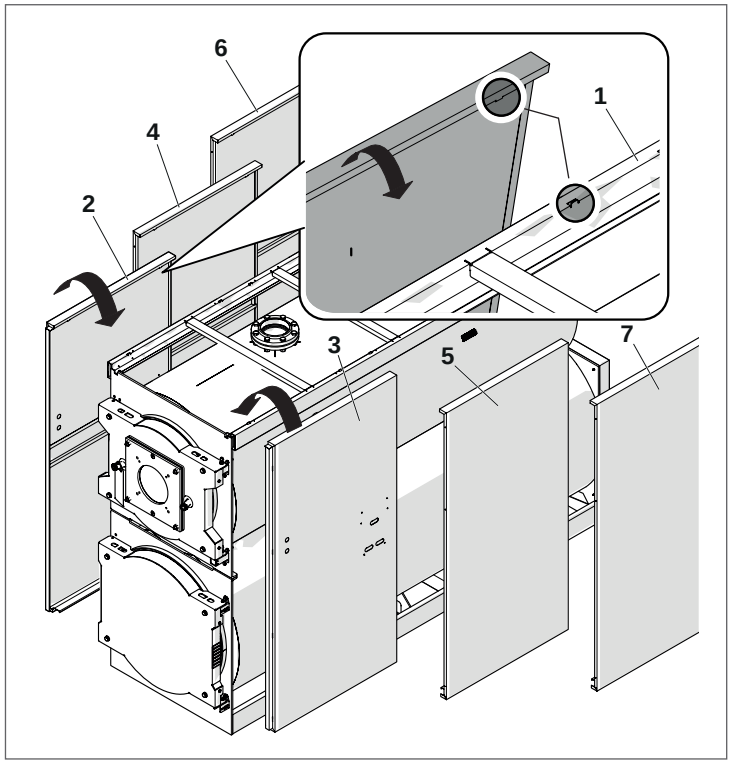
RTC 3000-6000

Proceed as follows to fit the boiler casing panels:

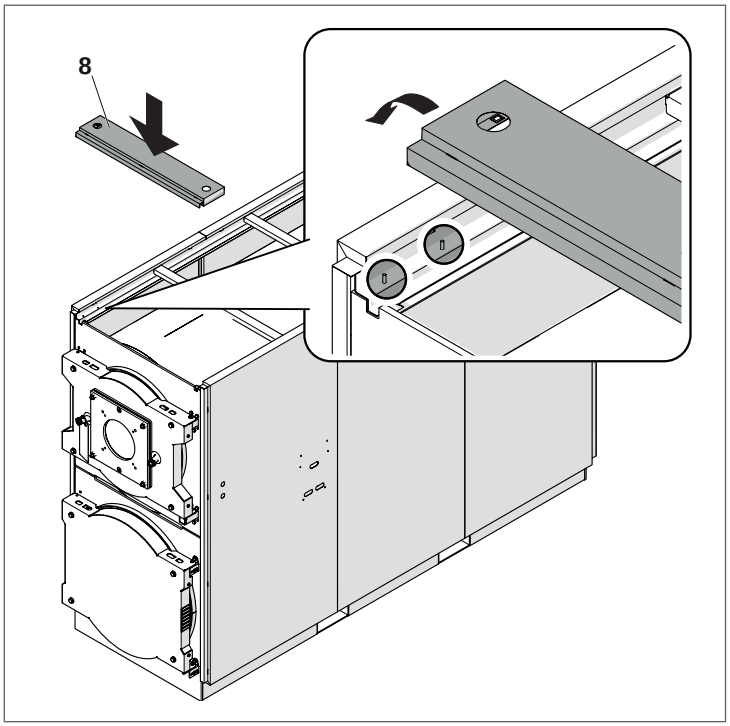
- Push out the pre-formed cutouts in the boiler's side panel (2) or (3) depending on what side you want to install the control panel) corresponding to the oval cable grommets in the control panel. The control panel is not supplied.



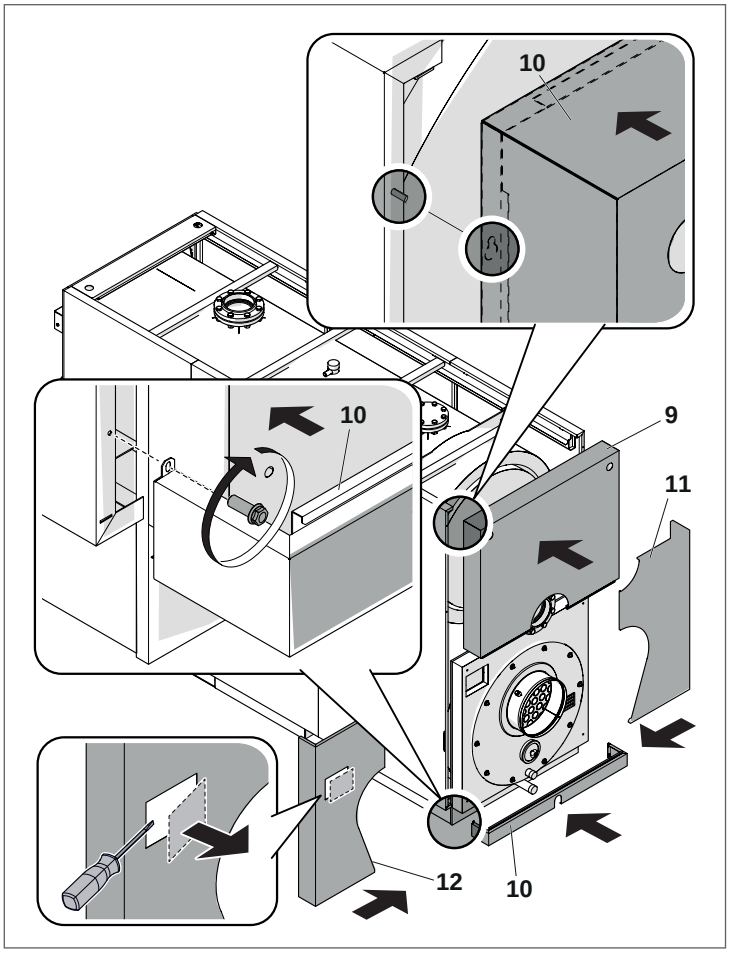
- Fit the side panels (2, 3, 4, 5, 6 and 7) over the boiler's top profiles (1), taking care to align the pins with the holes in the panels.



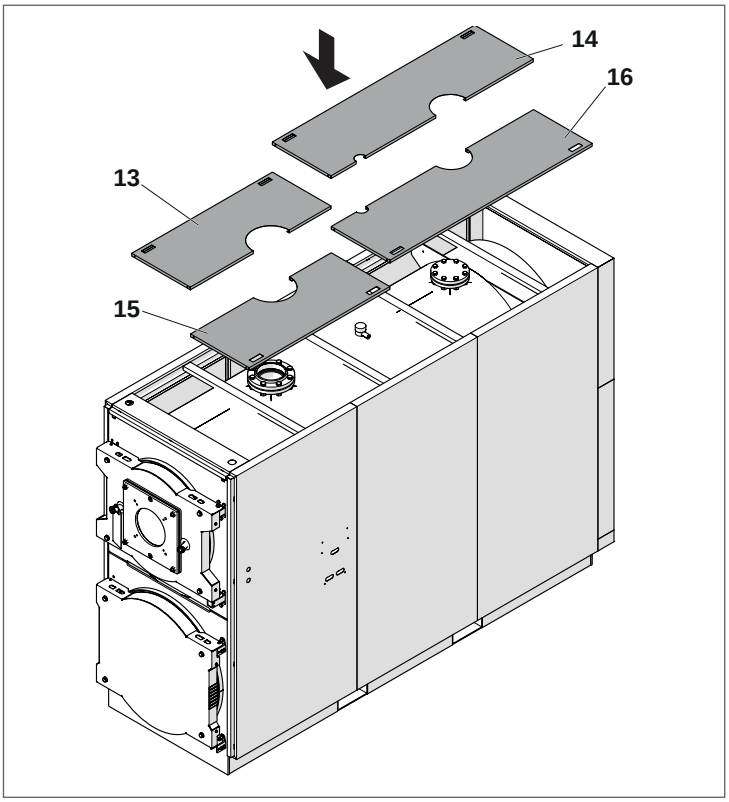
- Fit the front top panel (8) over the pins provided.



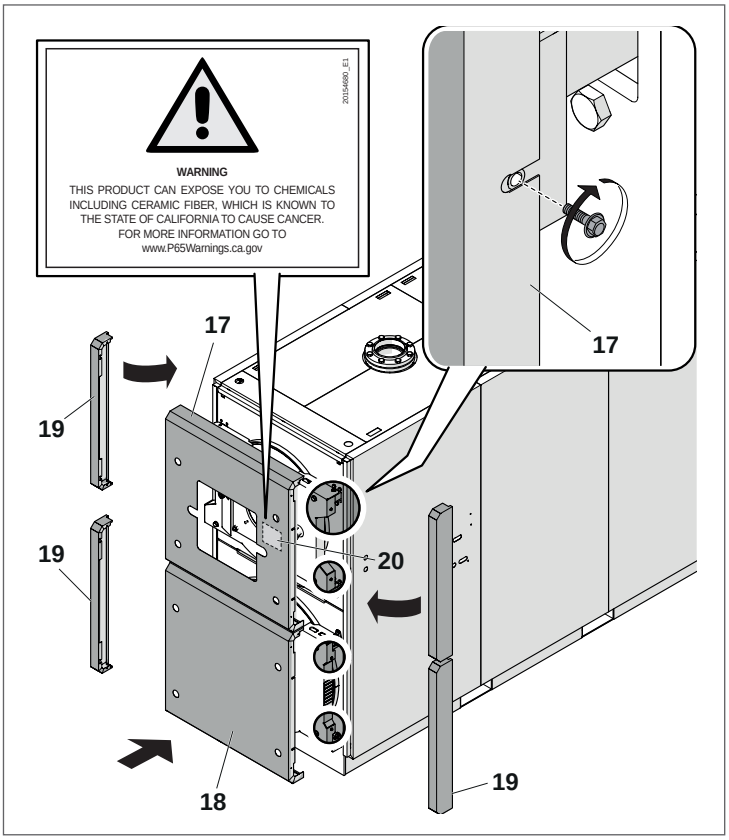
- Fit the top rear panel (9) and fix the bottom rear profile (10) in place with two screws. Then fit the bottom rear panels (11) and (12).



- Fit the top panels (13, 14, 15 and 16)



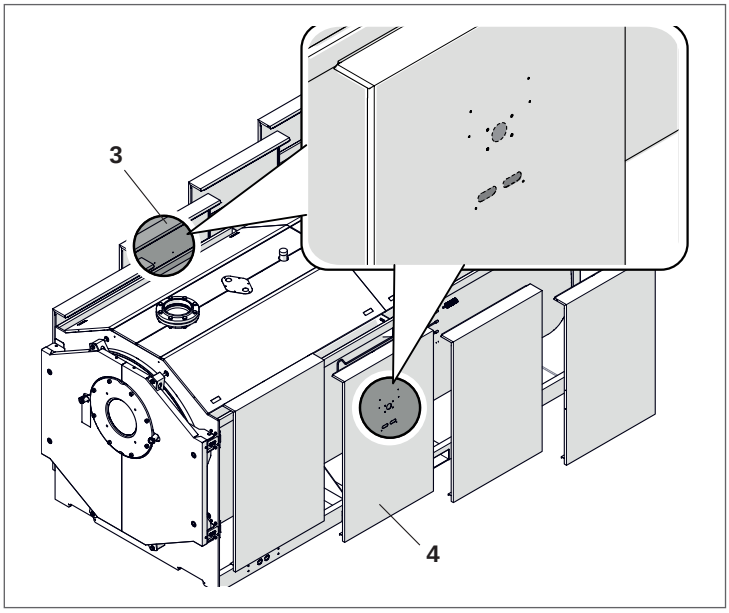
- Fix the front panels (17) and (18) in place and fit the side profiles (19).
- Locate the bag containing the documentation, extract the warning label (20) and apply it to the boiler casing.



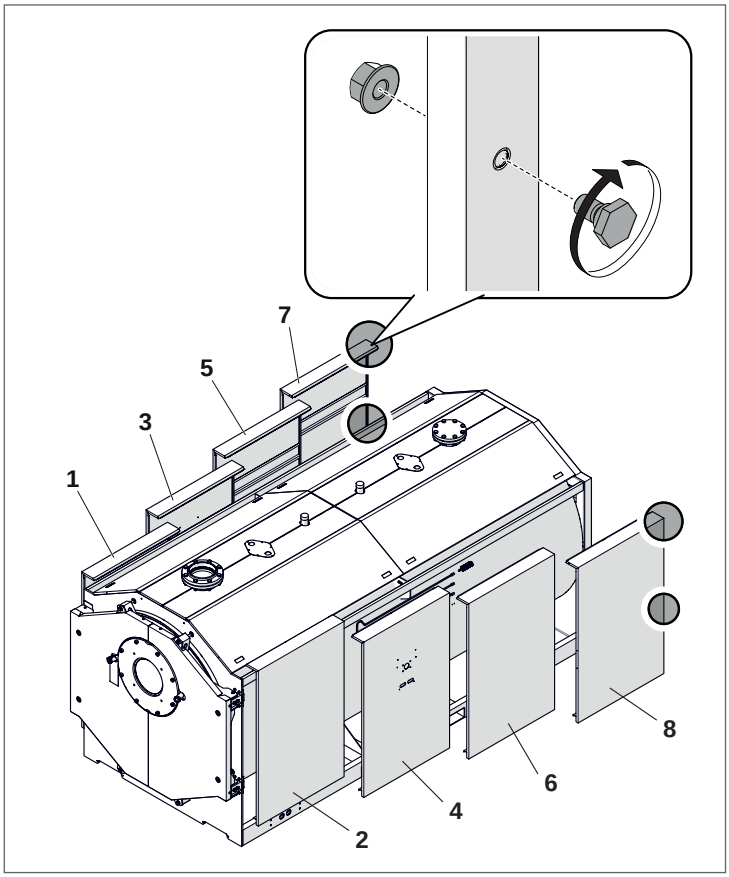
RTC 8000-10000

Proceed as follows to fit the boiler casing panels:

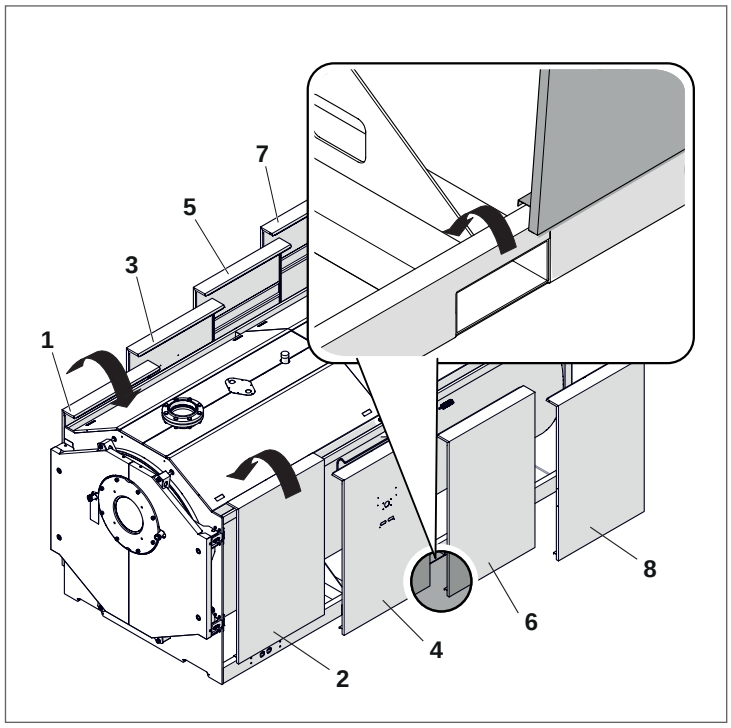
- Push out the pre-formed cutouts in the side panel (3) or (4) (depending on what side you want to install the control panel) corresponding to the oval cable grommets in the control panel. The control panel is not supplied.



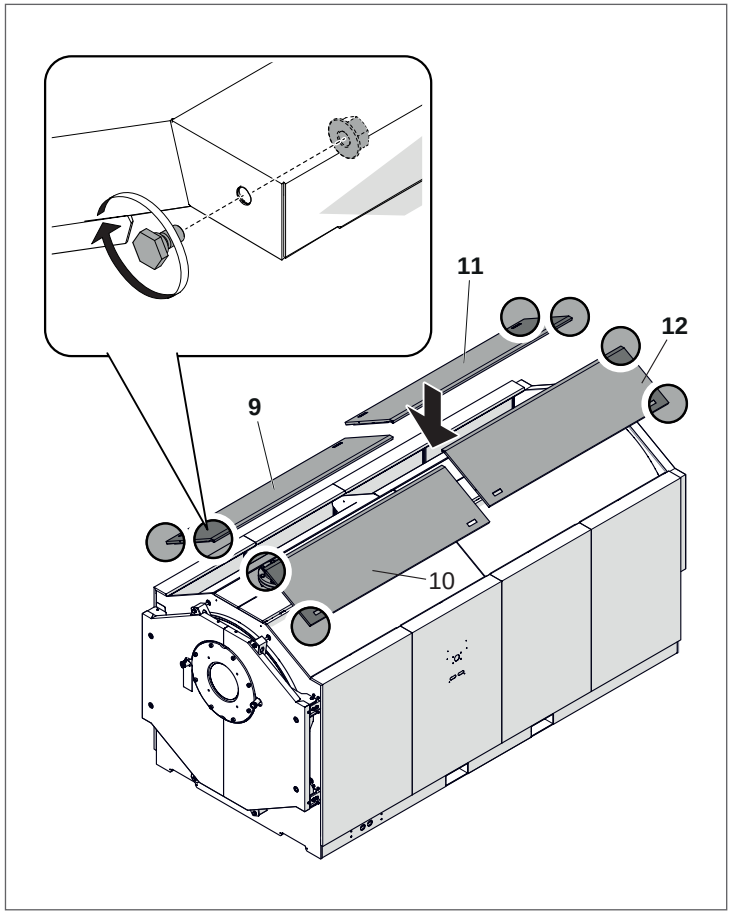
- Fit four AVP pins in the holes in the rear of the panels 7 and 8 (two per panel).



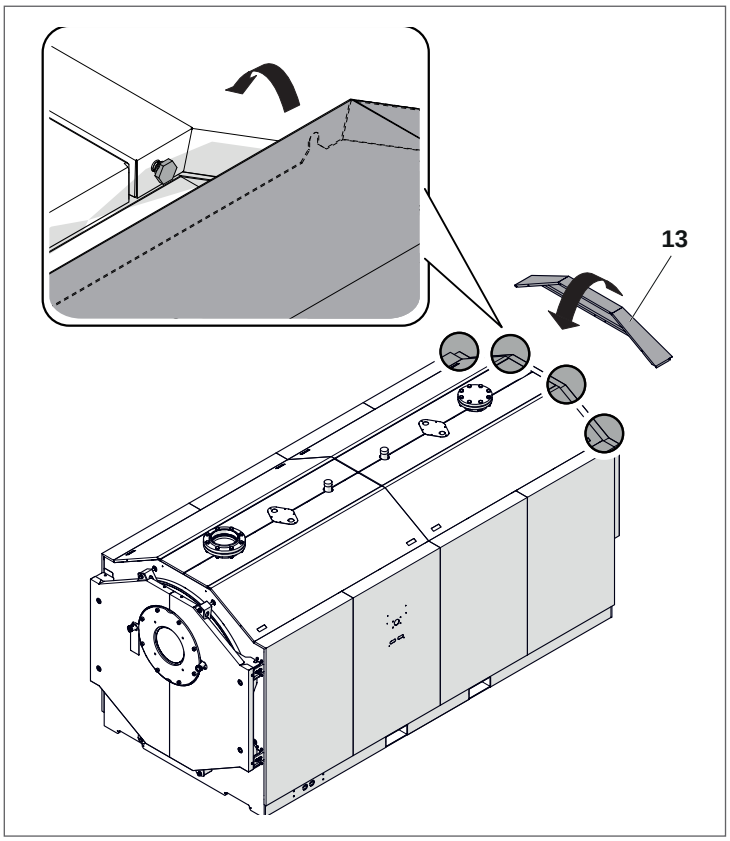
- Fit the side panels (1, 2, 3, 4, 5, 6, 7, 8) over the boiler's top profiles.



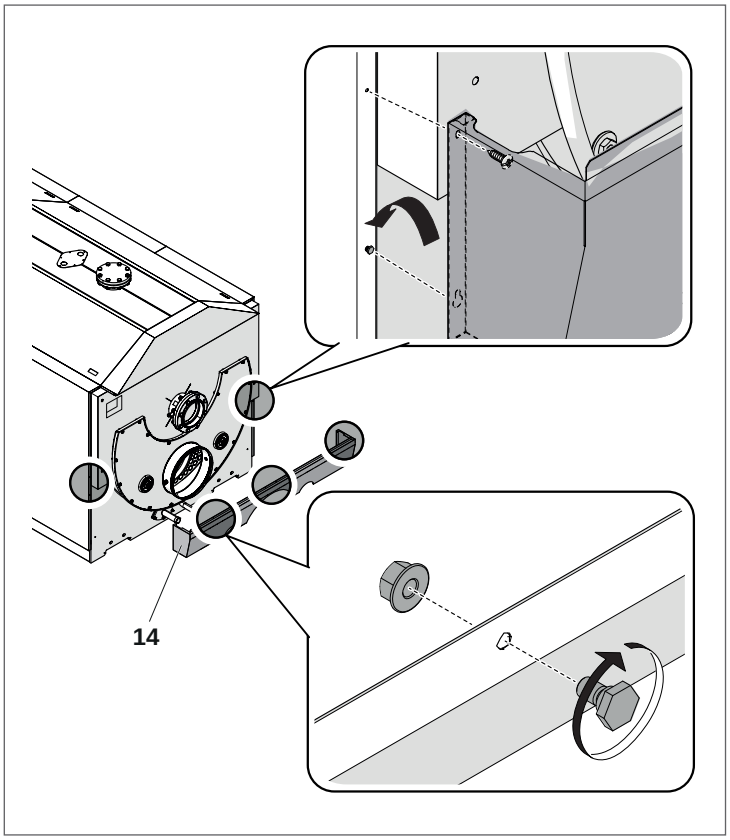
- Fit eight AVP pins in the holes in the front of the panels 9, 10, 11 and 12 (two per panel) and fit the top panels



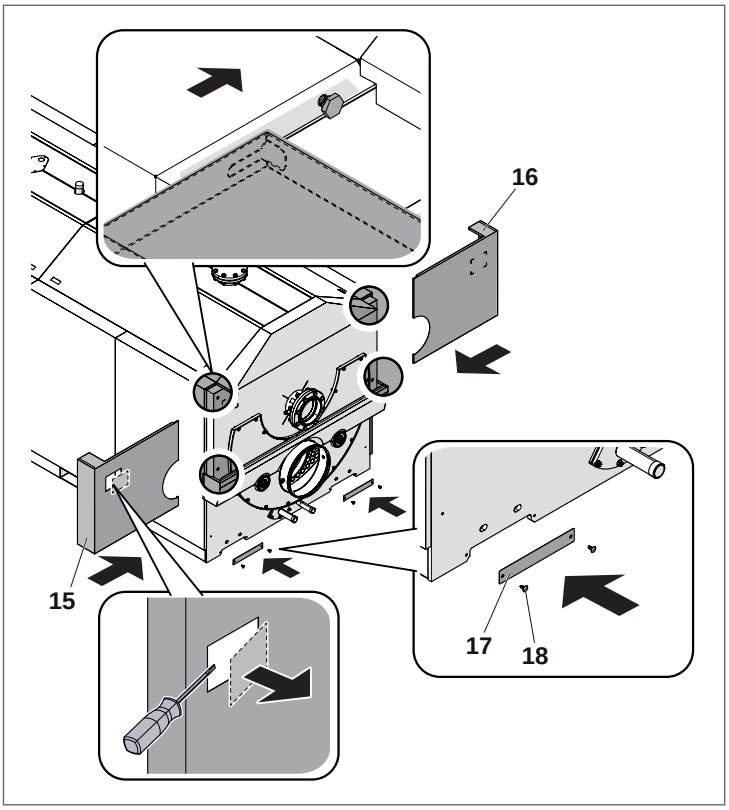
- Fit the top rear panel (13) over the pins provided.



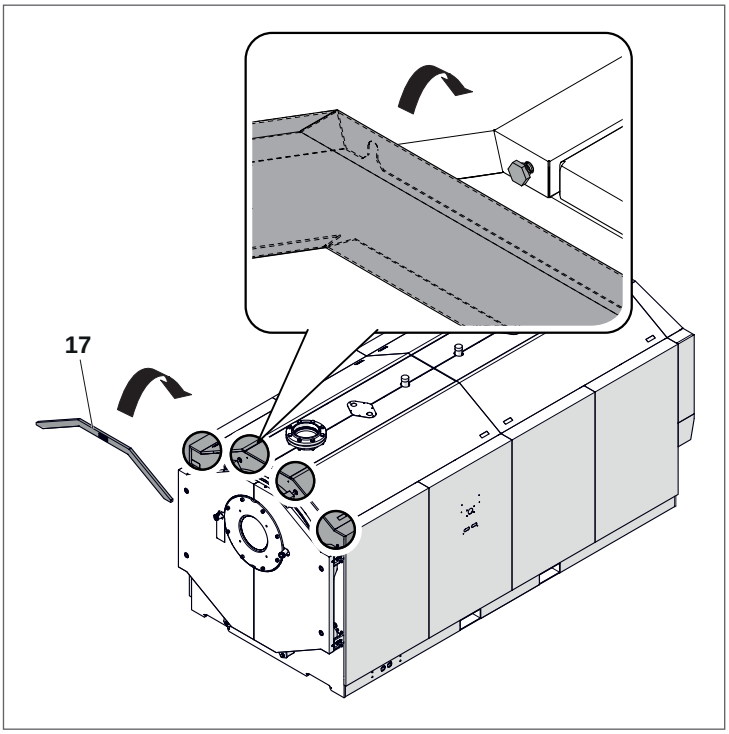
- Fit four AVP pins to the bottom rear panel (14), fit the panel and fix it in place with two self-tapping screws.



- Fit the central rear panels (15, 16), inserting them from the sides to engage the pins in the top and bottom panels.
- Fit the bottom caps (17) and secure them with the appropriate clips (18) using a hammer.



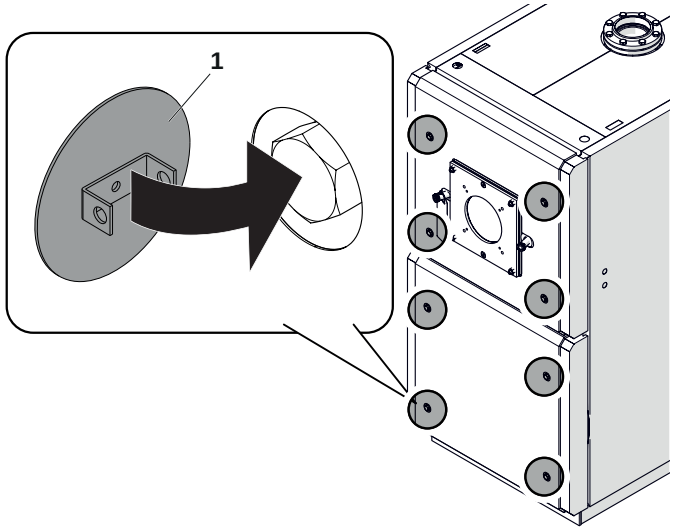
- Fit the front profile 17 over the pins on the top panels.



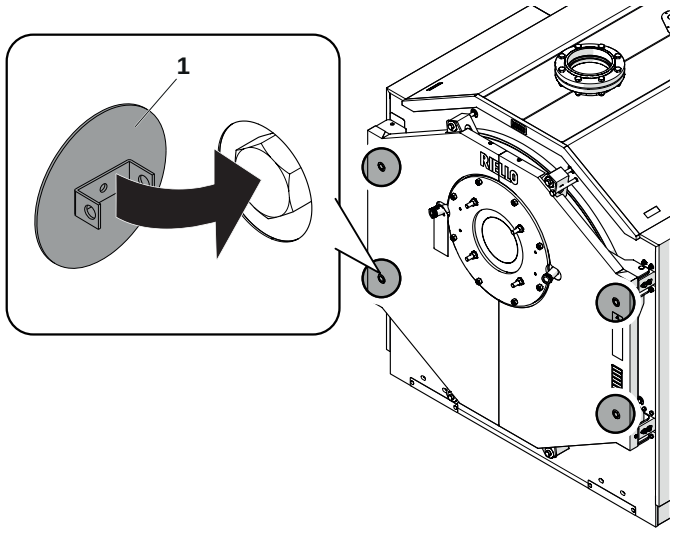
2.16.1 Cover caps for door fastening bolts

- Apply the caps (1) to the heads of the door clamping bolts..

RTC 3000-6000

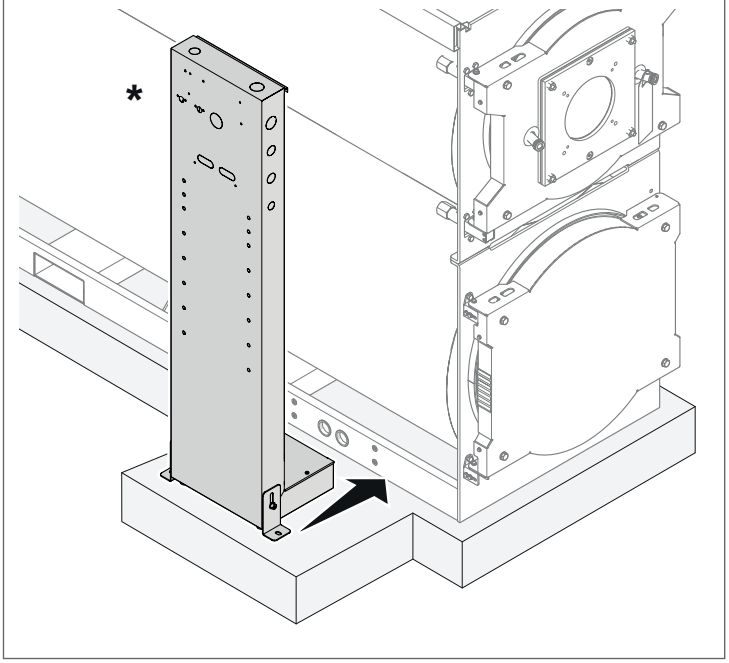


RTC 8000-10000



2.17 Control panel support kit

RTC 3000-6000



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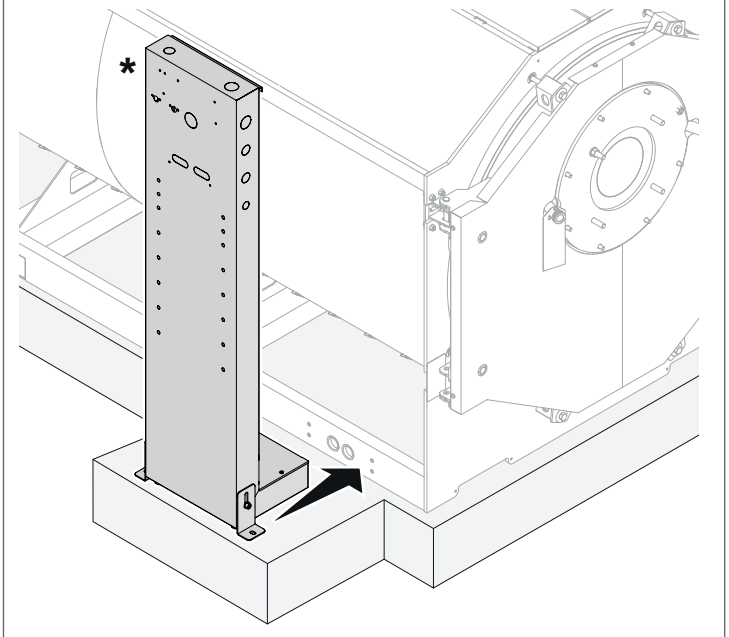
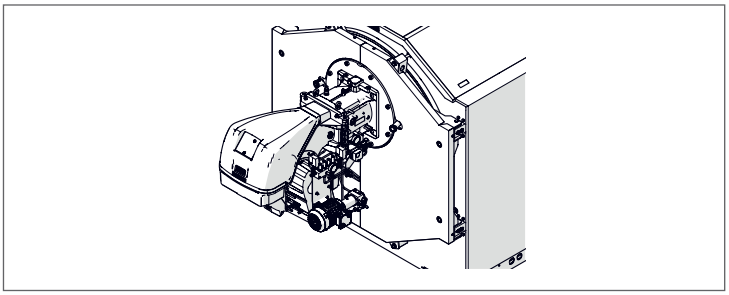


(*) Control panel support kit: accessory not supplied as standard.

3 COMMISSIONING

3.1 Preparing for initial startup



⚠ **NOTICE:** Proceed as follows to start up models with refractory cement doors for the first time. Set the burner to its minimum heat output and **perform cycles of 15 minutes running followed by 30 minutes of shutdown for the first 2–3 hours of functioning.** This eliminates all residual humidity from the refractory material without risk of damage. On completion of these cycles, the burner may be operated at its maximum heat output.

⚠ **NOTICE:** Risk of boiler damage through contaminated combustion air.
- Never operate the boiler in very dusty conditions, e.g. if building work is taking place in the installation room.
- Ensure adequate ventilation.
- Never use or store chlorinated cleaning agents or halogenated hydrocarbons (as contained in spray cans, solvents or cleaning agents, paints and adhesives, for example) in the boiler room.
- A burner contaminated during building work must be cleaned before commissioning.
- All cover plates, enclosures, clean out ports, and guards must be in place at all times, except during maintenance and servicing.
- Never burn garbage or paper in the unit, and never leave combustible materials around it.

3.2 Third party control units

Control panels are not supplied.

⚠ **NOTICE:** System damage due to incorrect sensor position!
Safety cut-out and thermostat sensors of third party control units must be fitted in the instrument tapping of the outlet of the boiler.

- The third party control unit (building management system or PLC controllers) must ensure a maximum internal boiler water temperature that is sufficiently different from the high limit safety cut-out. It must also be ensured that the digital burner controller rather than the boiler water temperature regulator switch the burner on and off.
- The control unit must ensure that the burner is switched to low fire before being shut down.
- Select control equipment that allows a gentle start-up with a time delay when the system is cold.
- After the burner demand, an automatic timer (for example) should limit the burner to low fire for a period of approx. 180 seconds. This restricted heat demand will prevent uncontrolled starting and stopping of the burner.
- It must be possible to show the number of burner starts on the control unit used.

3.3 Hydraulic connection to the heating system

- If the system temperatures are different, use both return connectors high temperature and low temperature. For an optimum energy yield, we recommend supplying a flow rate of > 10 % of the total nominal flow rate via the low temperature flange, with a return temperature below the dew point. If there are no varying return temperatures, only the low temperature flange needs to be connected.
- Size the pumps correctly. High flow rates and oversized pumps can result in the accumulation of sludge or deposits on the heat exchanger surfaces.
- Before connecting the boiler, flush sludge and dirt out of the heating system.
- Ensure that no oxygen enters the heating water during operation.
- Only operate the boiler in sealed unvented systems.

3.4 Making the electrical connection

⚠ **DANGER:** Danger to life through electric shock!
- Before opening the boiler, isolate the heating system across all live phases and secure against unintentional reconnection.
- Carefully route the cables/leads and capillary tubes.
- Ensure that capillaries are never kinked.
- Only carry out electrical work if you are a competent person. If you are not suitably qualified, arrange for a qualified electrician to make the electrical connections.
- Observe local installation regulations.
- Create all electrical connections in accordance with National Electrical Code or the applicable and local regulations.

⚠ **NOTICE:**
- The phase-neutral polarity must be respected.
- **A ground (earth) connection is obligatory.**

Wiring diagrams related to the burner installation may be found in the burner installation manual.

3.5 Fitting temperature sensors

NOTICE: System damage through damaged capillaries or incorrectly fitted temperature sensor.
- Ensure that the capillaries are neither kinked nor flattened when uncoiling and routing them.
- Always push the temperature sensor completely into the bottom of the sensor well.
- **Insert the temperature sensor set as far as it will go into the test point (to the bottom).** Mark the sensor to determine if it is correctly installed.
- Secure the temperature sensor set in the test point with a sensor retainer.
- Never kink excess lengths of capillaries.
- Route the sensor lead through the cable conduit to the control unit.
- Connect the sensor lead to the control unit.
- Complete the commissioning report.

3.6 Flushing the heating system

If the heating system contains several heating circuits, these must be flushed one after the other.
To prevent contamination in the boiler, flush the heating system prior to commissioning.
- Flush the system prior to connection to the boiler. Isolate the heating supply and return at the boiler.
- Connect the heating supply to a water connection.
- Connect hose to the heating return of the heating system.
- Route hose from the heating return to a drain.
- Open connected consumers (e.g. radiators).
- Flush the heating system with fresh water until clear water emerges from the heating return.
- Drain the heating system.

3.7 Filling the heating system

CAUTION: Health risk through contaminated drinking water.
- Observe all country-specific regulations and standards regarding the prevention of drinking water contamination.

NOTICE: System damage through temperature stresses.
- Only fill the heating system when cold (the water supply temperature must not exceed 104 °F (40 °C).
- During operation, only fill the heating system via the fill valve in the heating system pipework (return).

Open the automatic air vent valve only briefly for venting.

The fill and top-up water quality must comply with the water requirements in this manual.
The pH value of the heating water increases after the heating system has been filled. After 3 – 6 months (initial service) check whether the pH value of the heating water has settled down.
- Adjust the pre-charge pressure of the expansion vessel to the required pressure (only for sealed unvented systems).
- Open the shut-off valves on the heating water side.
- Fill the heating system slowly and observe the pressure gauge whilst doing so.
- Vent the heating system via the radiator air vent valves.

If the water pressure drops as a result of venting the system:
- Top up the system with water.
- Carry out a leak test in accordance with locally applicable regulations.
- After the tightness test, reinstate all components that were taken out of operation.
- Ensure that all pressure, control and safety equipment is functioning correctly.

Once the boiler has been tested for tightness and no leaks have been found:
- Set the correct operating pressure. The working pressure in the heating system should be over 14 PSI but below the maximum limit specified for the boiler.
- Close the automatic air vent valve.

3.8 Preparing the heating system for operation

Observe the following points during commissioning:
- Before commissioning, vent the heating system via the ventilation facilities provided for this purpose.
- Check that the inspection opening on the flue gas collector is closed.
- Check that the combustion chamber door is securely closed.
- Check that the safety equipment (e.g. safety valve, minimum and maximum pressure limiters, high limit safety cut-out) is functioning correctly.
- Check that the required operating pressure has been achieved.
- Check the flange connections and other connections for tightness.
- Check the control unit connections and temperature sensor positions.
- Fill the condensate siphon.

3.9 Commissioning the control unit and burner

By commissioning the control unit you automatically commission the burner as well. The burner can then be started by the control unit. For further information, see the installation instructions of the relevant control unit or burner.
- Use the control unit to commission the boiler.
- Set the control unit parameters.
- Complete the commissioning report in the technical documentation of the burner.

3.10 Commissioning report

The boiler can be operated with a gas or dual fuel burner.

- Carefully complete the commissioning report for the relevant approved burner.
- Sign all completed commissioning work and enter the date.

COMMISSIONING STEPS	COMMENTS (SIGNATURE)
Flush the heating system.	
Fill the heating system with water.	
Vent the heating system.	
Carry out tightness test.	
Switch on the control unit. –Boiler–specific parameters set and recorded.	
Ensure the function of all safety equipment.	
Check the fuel line for tightness.	
Start the burner.	
Complete the burner test report regarding the individual output stages.	
Conduct a tightness test on the hot gas side. After a short time in operation, tighten the screws in the combustion chamber door to prevent leakage around the door as a result of the packing cord settling.	
Check the flange connections and fittings after the boiler has been heated up and retighten.	
Check flue path for tightness.	
Check the flue gas temperature.	
Carry out a function test on all safety equipment and record this.	
Instruct the system user and hand over technical documentation.	
Enter the fuel used in the table (See "General" operating instructions)	
Confirm commissioning by a competent person. Company stamp/signature/date	

4 SHUTDOWN

CAUTION: Risk of system damage through frost.
When there is a frost, the heating system can freeze up if it is not operational, e.g. because of a fault shutdown.
- When there is a risk of frost, protect your heating system against freezing up.
- If your heating system has been shut down for several days due to a fault shutdown and there is a risk of frost, drain the heating water at the drain & fill valve. Also leave the air vent valve at the highest point in the system open.

NOTICE: Risk of system damage through frost.
The heating system can freeze up as a result of a power failure or if the power has been switched off.
- Check the "Control unit settings" to ensure the system remains operational (especially when there is a risk of frost).

NOTICE:
- Always keep the oil supply valve shut off if the burner is shut down for an extended period of time.

4.1 Shutting down the heating system

Shut down your heating system via the control unit. Switching off the control unit also switches off the burner automatically.
- Set the On/Off switch of the control unit to Off.
- Isolate the fuel supply to the burner.

4.2 Shutting down the heating system in an emergency

Only in emergencies, switch OFF the heating system via the boiler room breaker or the heating system emergency stop switch.
- In dangerous situations, immediately close the main fuel shut-off valve and the power supply of the heating system via the boiler room main breaker or the heating system emergency stop switch.
- Isolate the fuel supply to the burner.
- Never put your life at risk. Your own safety is paramount.

5 INSPECTION AND MAINTENANCE

5.1 Why is regular maintenance important?

Heating systems require regular maintenance and service for the following reasons:
- to maintain a high level of efficiency and to operate the system economically (low fuel consumption),
- to achieve a high level of operational reliability
- to maintain the cleanest possible combustion

The operator is required to have the entire heating system at least once a year maintained, serviced and cleaned.
We recommend that an annual inspection and as-required service contract is signed.
The servicing work carried out should be recorded.
Burner servicing should be carried out in accordance with the instructions of the burner manufacturer.

5.2 Maintenance

DANGER: Risk to life from electric shock!
- Before opening a unit: disconnect electrical power and lockout to prevent accidental reactivation.

DANGER: Risk to life from explosion of flammable gases!
- Work on gas components must only be carried out by qualified and authorized gas fitters.

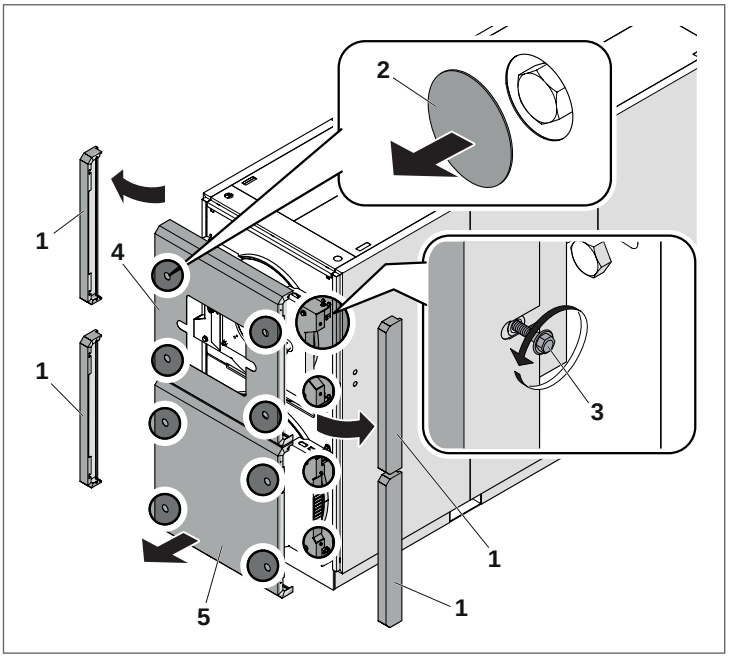
NOTICE:
- All cover plates, enclosures, and guards must be in place at all times, except during maintenance and servicing.

Analyze the combustion flue gas before commencing any maintenance.
The results of flue gas analysis can give a clear idea of what servicing or repairs are needed.

5.3 Front panel removal

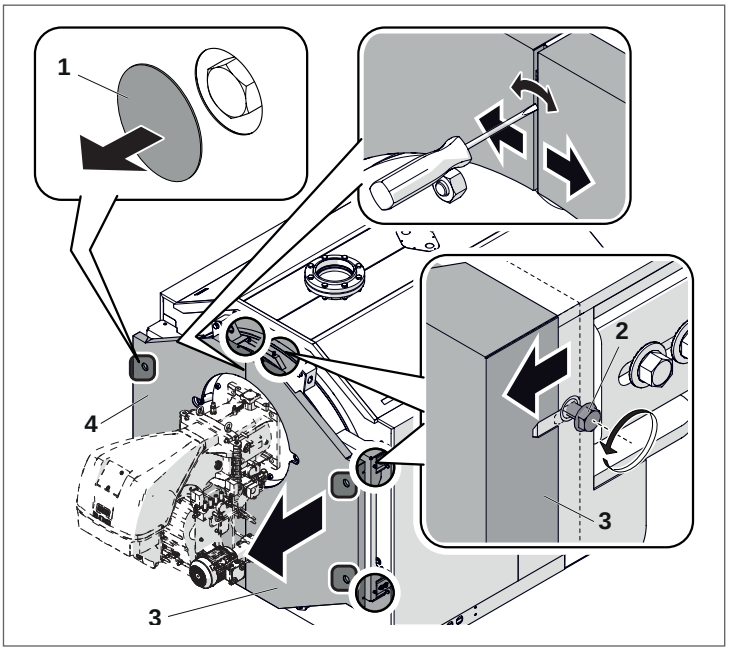
RTC 3000-6000

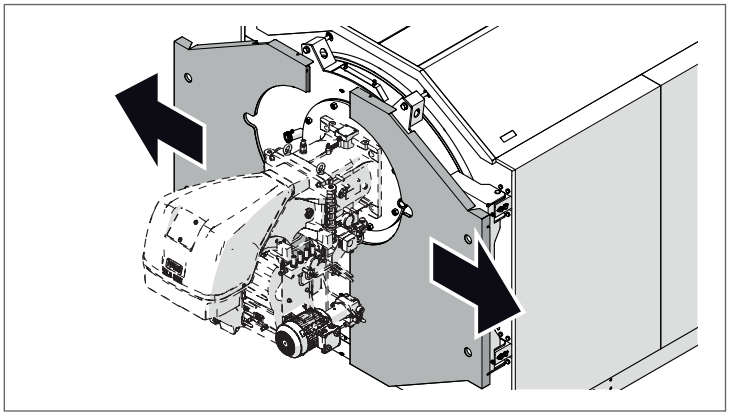
- Unfasten the side panels (1);
- Remove the caps (2) covering the door fastening bolts;
- Loosen the screws (3) to release the front panels (4) and (5).



RTC 8000-10000

- Remove the caps (1) covering the door fastening bolts;
- Loosen the screws (2) to release the front panels (3) and (4);
- Move the front panels (3) and (4) away slightly from the boiler body;
- Remove the front panels (3) and (4) making them slide laterally. If necessary, lever first with a slotted screwdriver between the two elements to separate them.

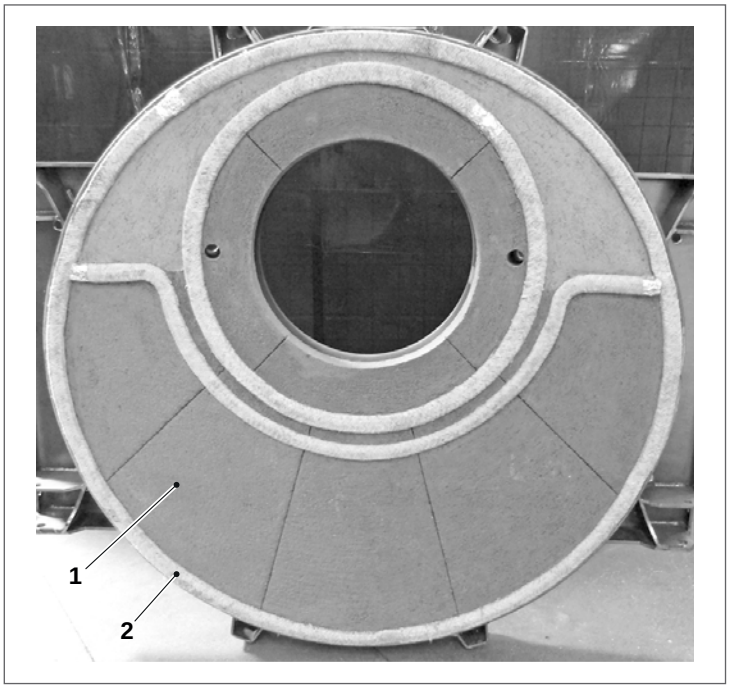




5.4 Check and restore criteria for door in refractory material

After opening the front door, following the procedures in the booklet, the condition of the following components must be checked and controlled to ensure proper operation:

1 Door refractory
2 Door and boiler sealing braid



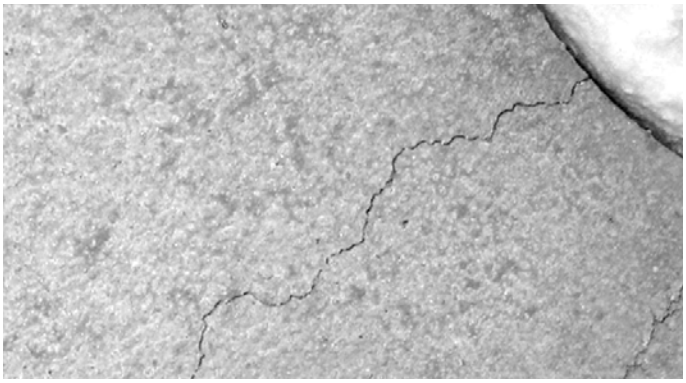
⚠ It is very important to control and check the condition of the refractory. It must be intact.

5.5 Door refractory

5.5.1 Crack in the refractory cement

Due to the expansion of the refractory material due to high generator temperatures, there may be some cracks.
If the cracks have a maximum amplitude of 1 mm, they do not cause any problems for the door.

Crack in the cement

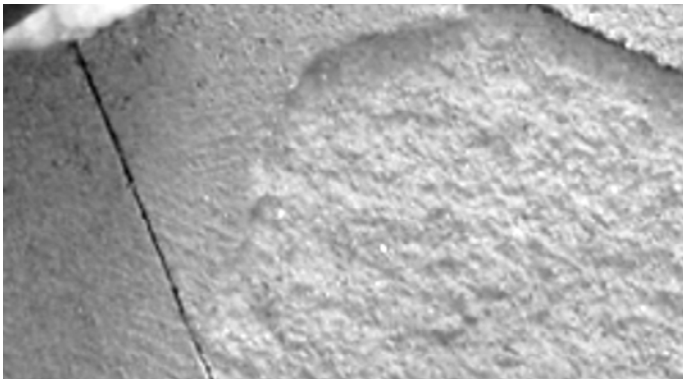


⚠ If the amplitude of the cracks is larger (approx. 2–3 mm), proceed as follows:
- Insert the paste/glue at a high temperature (see the attached sheet) along the crack, using a blade to make the product penetrate as deep as possible;
- Remove and clean the part extending past the refractory.

5.5.2 Superficial separation of the refractory cement

⚠ Superficial separation of the refractory cement is permitted in areas that are not too large (max 30x25 cm), with a maximum depth of 10 mm.

Superficial separation of the cement



In this case, proceed as follows:

Horizontal door
- Remove the raised part completely.
- Lightly brush the concerned area and remove the residual dust using a brush wet with water.
- Use a spatula to restore the missing part using refractory cement, type DIPLASTIT B65-3 from RHI (product sheets attached).

Vertical door
- Remove the raised part completely.
- Slightly brush the concerned area and remove the residual dust using a brush wet with water.
- Spray a very diluted first layer of cement in order to suitably penetrate the surface of the cement already present.
- Use a brush to apply a hardened second layer.

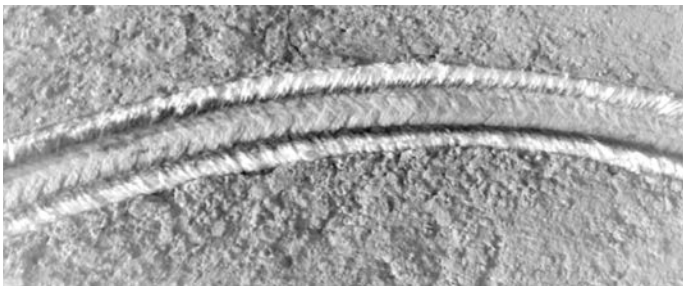
In both cases:
- Use a wooden board to roughen the finished surface.
- When the cement is almost hardened, wet the surface with a brush soaked in water in order to slow down the drying reaction of the refractory cement.

Once the door has been restored, see the section "First start-up" in the booklet to start up the boiler.

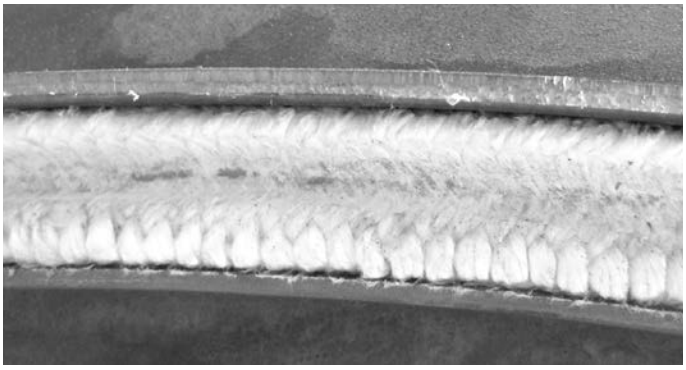
5.6 Door and boiler sealing braid

The braid is an essential component for preventing the leakage of hazardous combustion gas.
The door must be constantly and uniformly pressed onto the gaskets located on the door (green, for high temperatures) and on the boiler (white).

HT door braid (high temperatures)



Boiler braid



⚠ At each opening for internal inspection, control and check that the integrity and adherence conditions of the braid are suitable.

The flattening of the door must be uniform and central, which indicates the centering of the door.

If the braid can be flattened when pressing it with a finger, it can be reused as it is not crystalized. 0therwise it must be replaced.

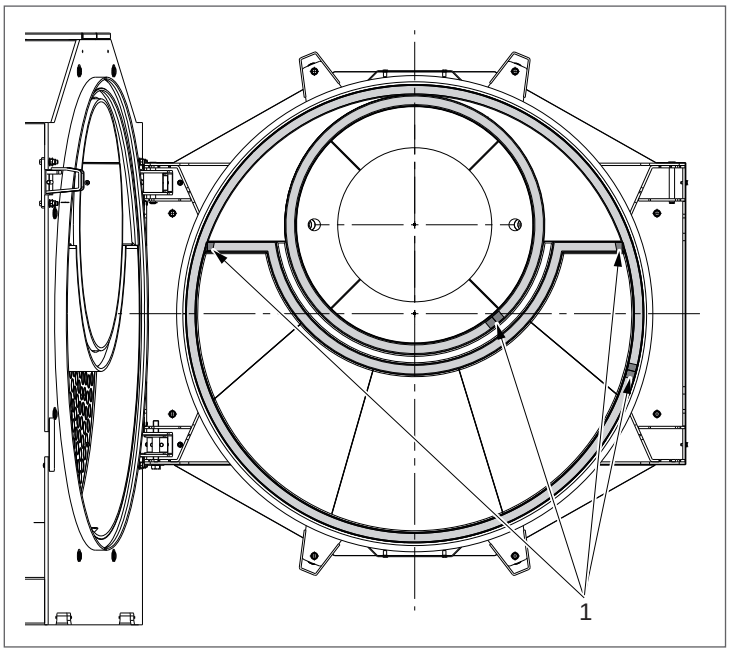
⚠ To guarantee a good seal, the braid should be replaced every year at start up.

5.7 Braid replacement

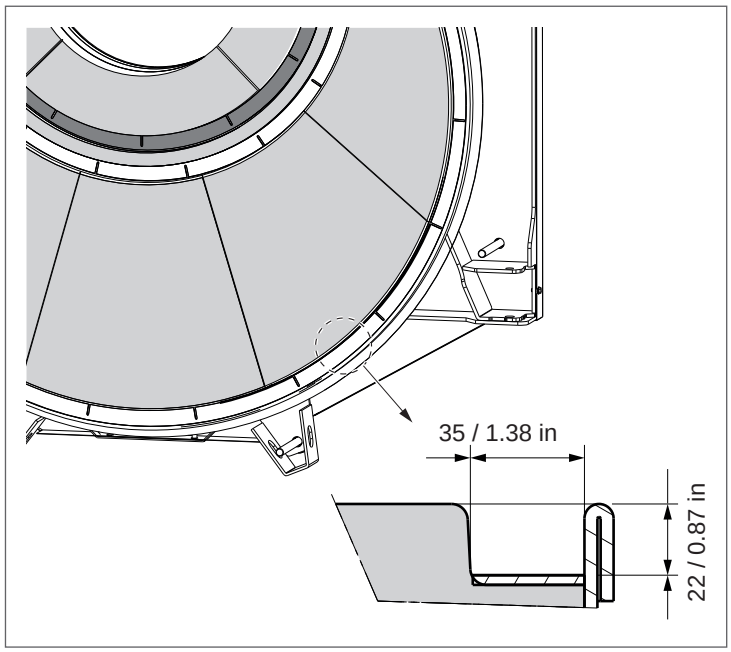
⚠ All repair operations must be performed by a qualified technician.

⚠ Use gloves, protective garments, protect eyes and face.

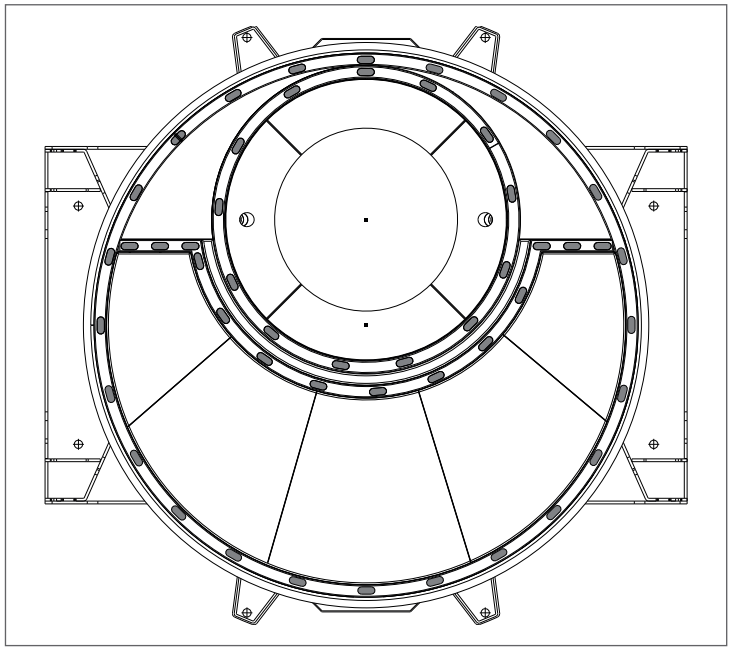
- Remove the existing braid, starting from the connection points (1), using a slotted screwdriver or a small chisel as an aid.
- When the ends lift up, pull carefully in order to not detach the refractory part.



- Once the braids have been removed, use a small chisel and a hammer to remove the remaining braid glue.
- Check that the entire seat of the braid is free of glue and clean.

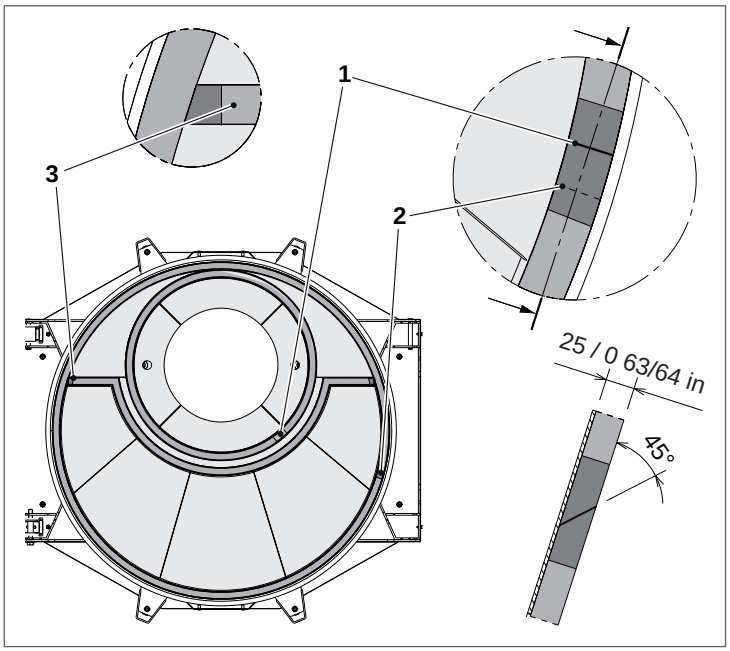


- Along the entire seat of the braid, apply a small amount of glue sufficient for gluing every 10 cm. The supplied cartridge is sufficient for gluing the seal for two doors.



- Position the braid 35 mm to the side, following the numerical sequence and taking care to press it into its seat so it is effectively housed.
- Before inserting the last 20 cm of the braid, unite the two ends, if possible, with the cut offset 45°, so the 2 ends are in perfect contact with each other.

⚠ Pay close attention to the connection of the braid head. Its detachment could cause the combustion products to leak.

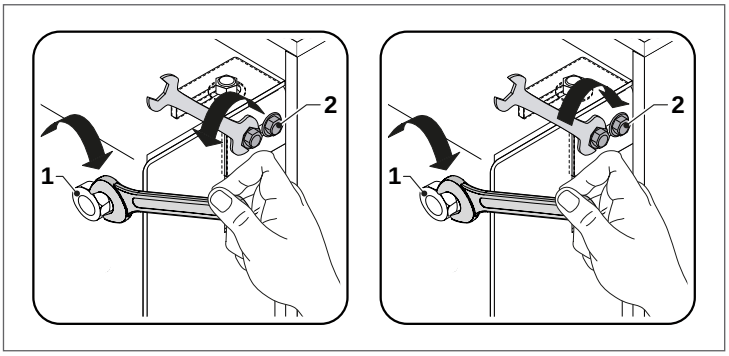


5.8 Adjusting the door

Make sure that the door presses uniformly all around the double seal to prevent dangerous fumes escaping into the air. Proceed as follows to adjust the door seals:

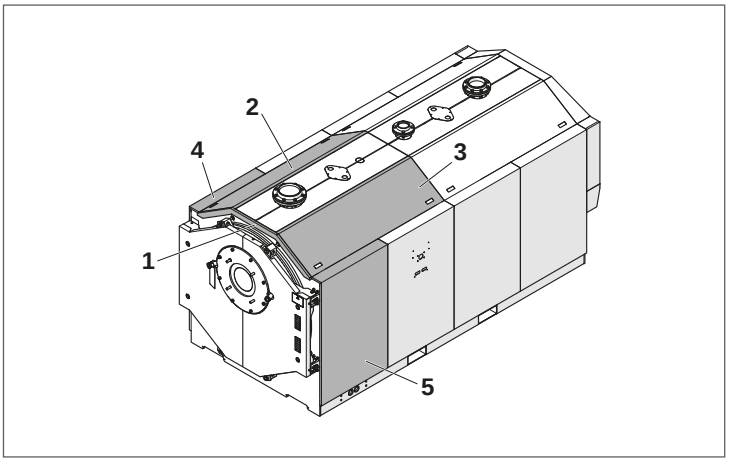
RTC 3000-6000

- Fit the door and tighten the main fixing bolts (1) until the seals begin to compress.
- Loosen the safety bolts (2) then screw the main door fixing bolts (1) all the way in.
- Tighten the safety bolts (2).

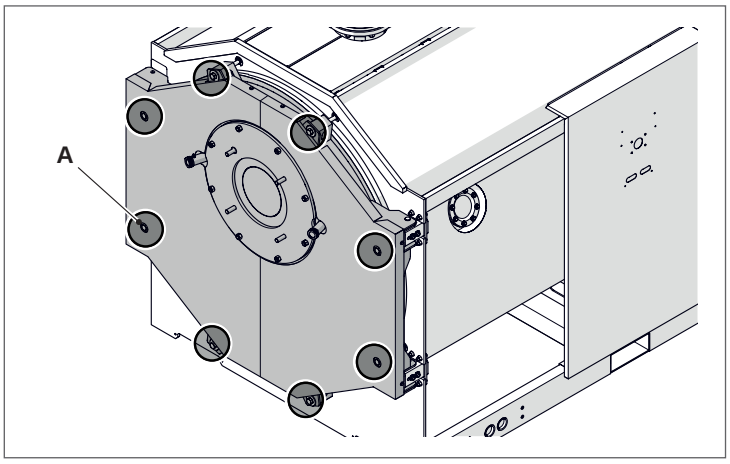


RTC 8000-10000

- Remove the upper profile (1), the upper panels (2) or (3) and side panels (4) or (5) depending on the opening direction of the door.



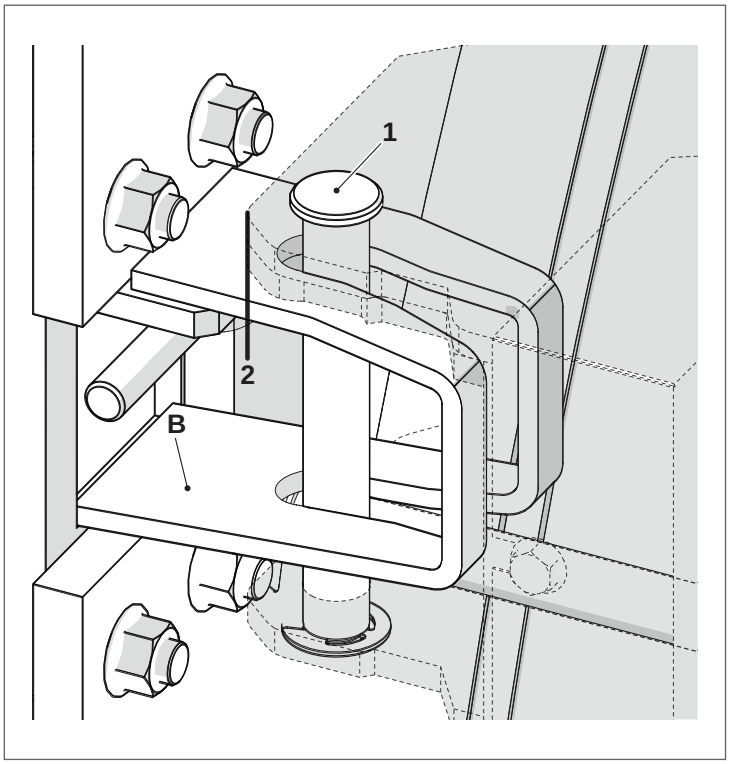
- Fully tighten the door locking bolts (A), using a 27 mm hexagonal socket wrench.



Before proceeding with the adjustment of the door:

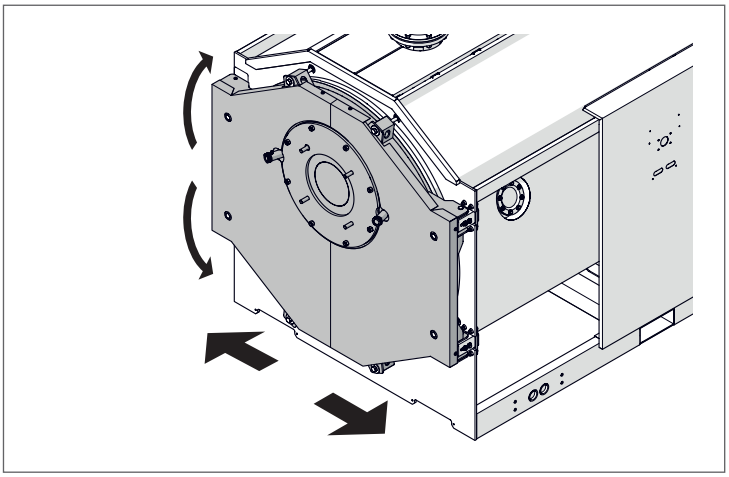
- Check that the pin (1)on the door slides freely in the centre of the slot on the support/centring bracket (B).
- Check that the door profile (2) rests on the support/centring bracket (B),

If one of these two conditions is not met, proceed with the adjustment operations described on the following pages.

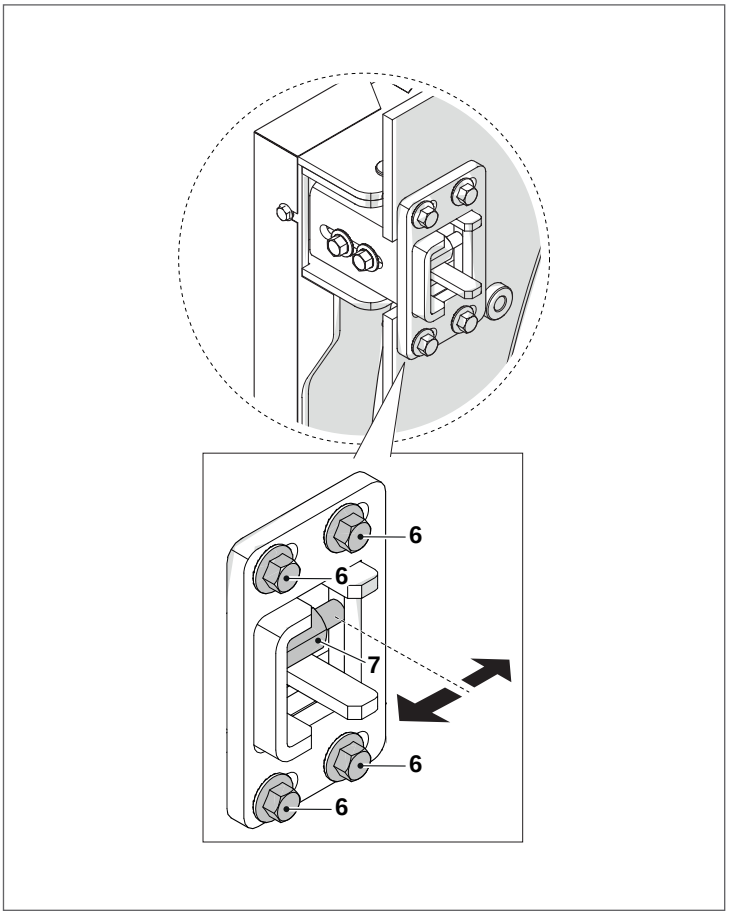


⚠ The pin (1) must not be used as a handle to close the door.

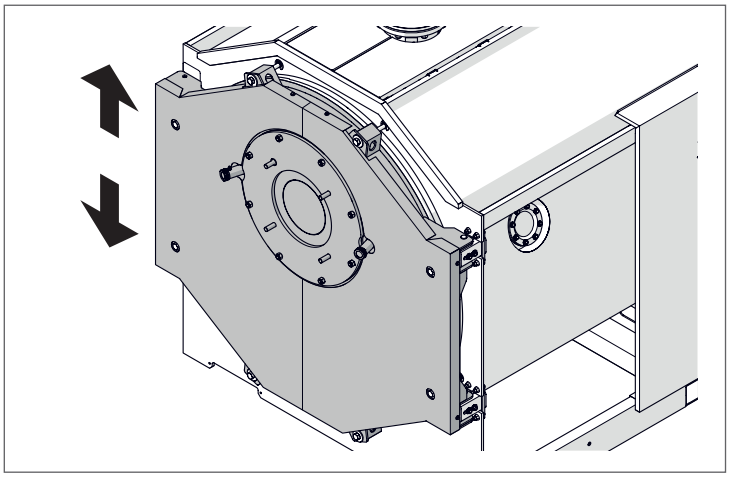
Door balancing



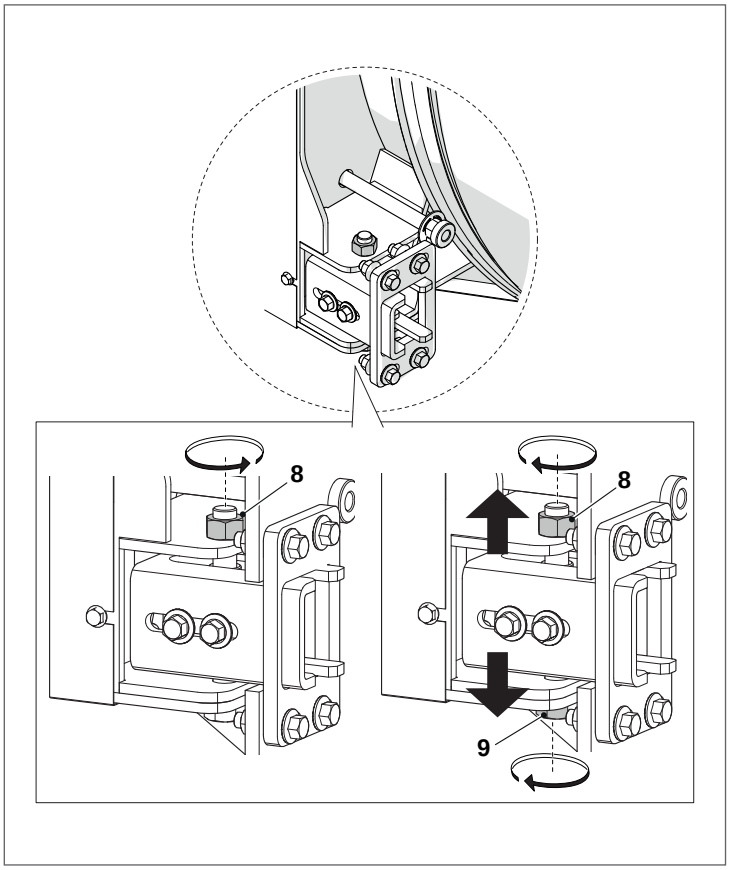
- Loosen the screws (6) (0 45/64 - 18 mm wrench) of the upper hinge and adjust the set screw (7) to correct the horizontal alignment of door opening/closing.
- When the operation is concluded, completely screw the screws (6) on the upper hinge and close.
- Check the correct opening/closing of the door.



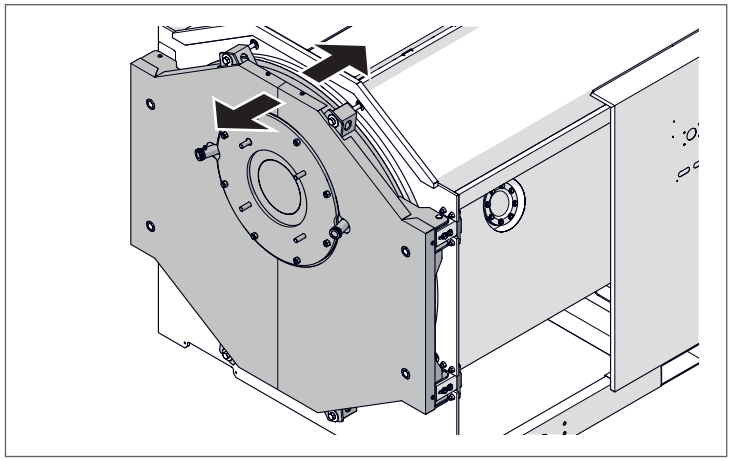
Door height adjustment



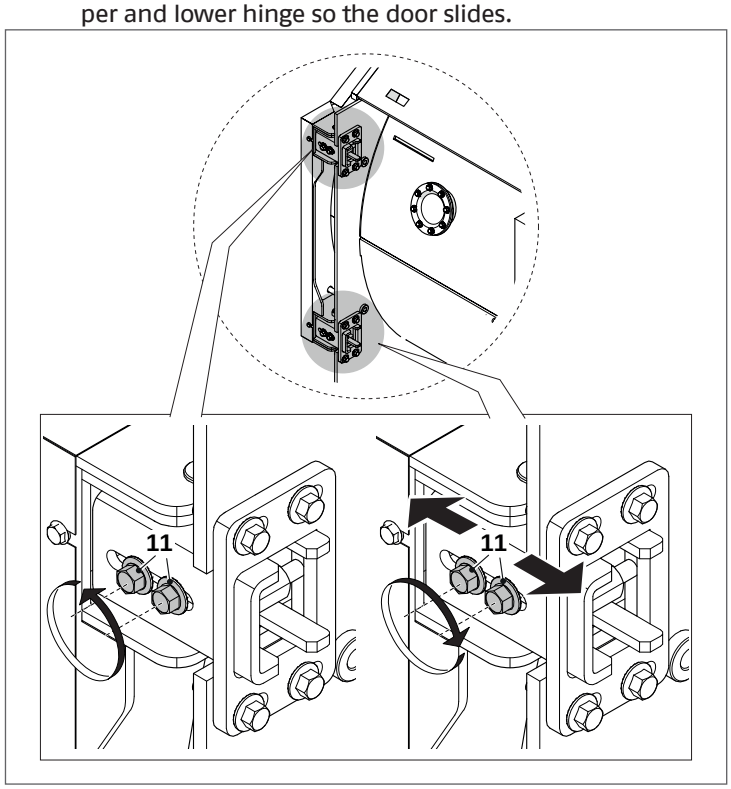
- Loosen the nut (8) of the lower hinge and adjust the vertical alignment of the door opening/closing by turning the screw (9).
- Once the operation is completed, tighten the nut (8) completely.
- Check the correct opening/closing of the door.



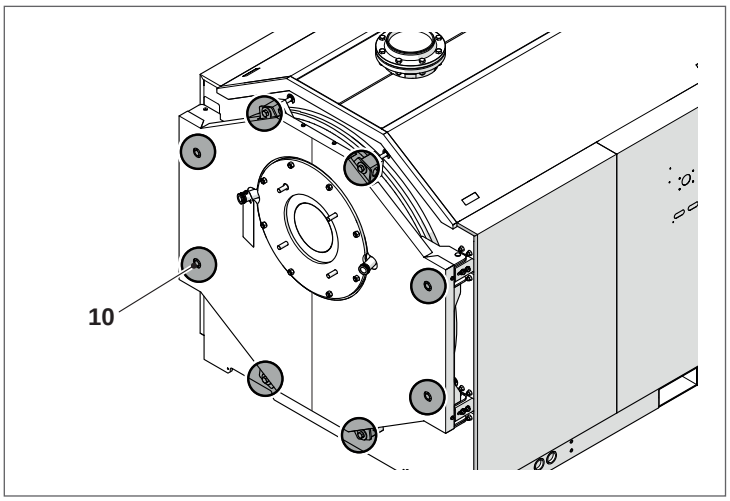
Door seal adjustment



- Once the door has been adjusted and its correct opening/closing checked, fit and slightly tighten the screws (10) (1" 1/16 - 27 mm wrench).
- Loosen the screws (11) (0 5/8 in - 16 mm wrench) of the upper and lower hinge so the door slides.



- Tighten the screws (10) until the seals are flattened.
- Once they are flattened, tighten the screws (11) (85 N/m).



⚠ Check the seal of the door gasket. If the combustion products leak, the door clamping bolts must be further tightened, performing the operations described above.

⚠ Make sure that the door is properly adjusted after every maintenance operation.

⚠ Make sure that the door is properly adjusted after every maintenance operation.

⚠ To avoid the hazardous leakage of combustion gas, the door must be constantly and uniformly placed on the double gaskets. For the adjustment follow what is indicated in the paragraph "Adjusting the door" on page 58.

5.9 Cleaning the boiler

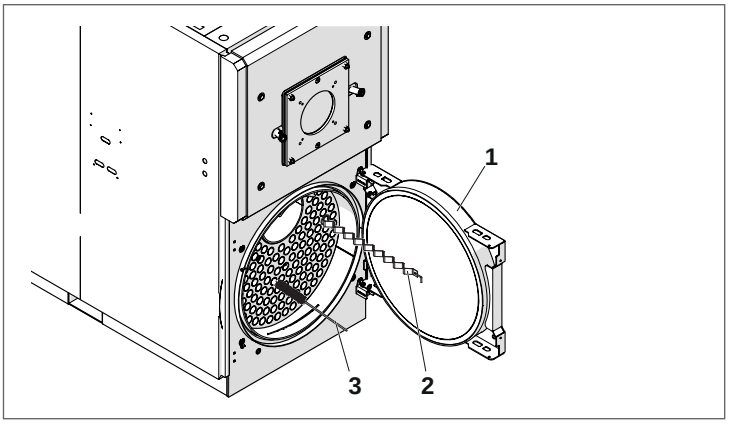
⚠ **DANGER:** Risk to life from electric shock!
- Before opening a unit: disconnect electrical power and lock to prevent accidental reactivation.

⚠ **WARNING:** System damage!
- Do not use abrasive cleaning pads or powder detergents.

⚠ **NOTICE:**
The combustion chamber and flues must be cleaned periodically - at least once a year - by a qualified technician.

Clean the boiler and remove any carbon deposits from the surfaces of the heat exchanger **at least once a year**. This not only extends the boiler's working life, but also keeps it efficient in terms of heat output and consumption.

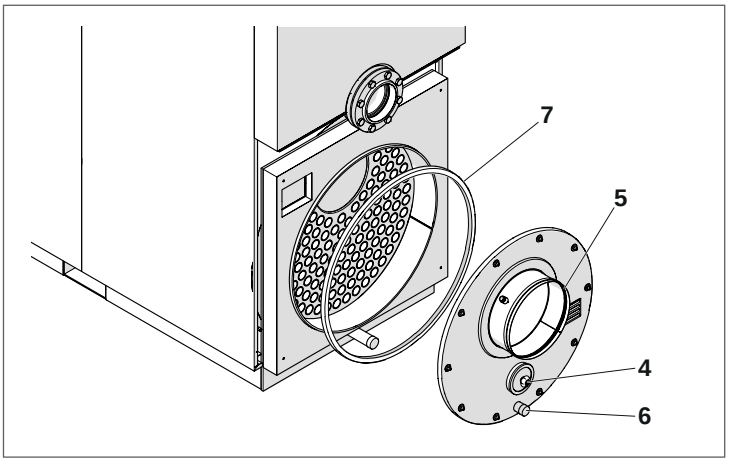
- Open the door (1) and pull out the turbulators (2).
- Use a flue brush (3) or other suitable tool to clean inside the combustion chamber and the flue gas pipes.



- Open the inspection port (4) and clean out any deposits from inside the flue gas box.

If more thorough cleaning is required:

- Remove the outer panels.
- Unscrew the fixing bolts and pull firmly on the flue gas box (5) to remove it from the boiler.
- Check at regular intervals that the condensate drain (6) is not blocked.
- If necessary, replace the gasket (7).
- Clean all removed components, then follow the above steps in the reverse order to refit them.



5.10 External cleaning

Clean the outside of the boiler casing with a soft cloth dampened with soapy water.
To remove stubborn marks, use a cloth dampened in a 50% mix of water and denatured alcohol or a suitable cleaning product.
Dry the boiler after cleaning it.

⊖ Do not use abrasive products, petrol or triethylene.

5.11 Checking and correcting the water pressure

The heating system must contain sufficient water to safeguard its correct function.

- If the water pressure in the heating system is too low, top up with water.

When should you check the water pressure in the heating system?

The fill and top-up water quality must comply with the water requirements in this manual.
Air pockets may form in the heating system from gases released by the fill and/or top-up water.

- Vent the heating system (e.g. bleeding the radiators).
- If required, top up with water

Recently added fill or top-up water loses much of its volume in the first few days because it releases gases. With new systems you should therefore initially check the heating water pressure on a daily basis, and thereafter at gradually longer intervals.
Once the volume of the heating system has stabilized, check the heating water pressure monthly.
A distinction is generally made between open vented and sealed unvented systems. In practice, open vented systems are hardly installed nowadays. We will therefore be using a sealed unvented heating system to demonstrate how you can check the water pressure. All settings will have already been made by the installation engineer when the system was first commissioned.

Sealed unvented systems

⚠ NOTICE: System damage through frequent topping up.
Subject to the water quality, your heating system can be damaged through corrosion or scaling.

- Ensure that the heating system is vented correctly.
- Check the heating system for leaks and the expansion vessel for functionality.
- Observe the requirements regarding water quality.
- If water loss occurs frequently, locate the cause and rectify the problem without delay.

⚠ NOTICE: System damage through temperature stresses.

- Only fill the heating system when cold (the system flow temperature must not exceed 104 °F (40 °C)).
- During operation, only fill the heating system via the fill valve in the heating system pipework (return).

For sealed unvented systems, the pressure gauge needle should be near the mid point of the gauge. The red needle of the pressure gauge must be set to the pressure required for the heating system.

- Check the heating system water pressure.
- Top up with water via the filling valve in the heating system pipework.
- Vent the heating system.
- Check the water pressure once more.

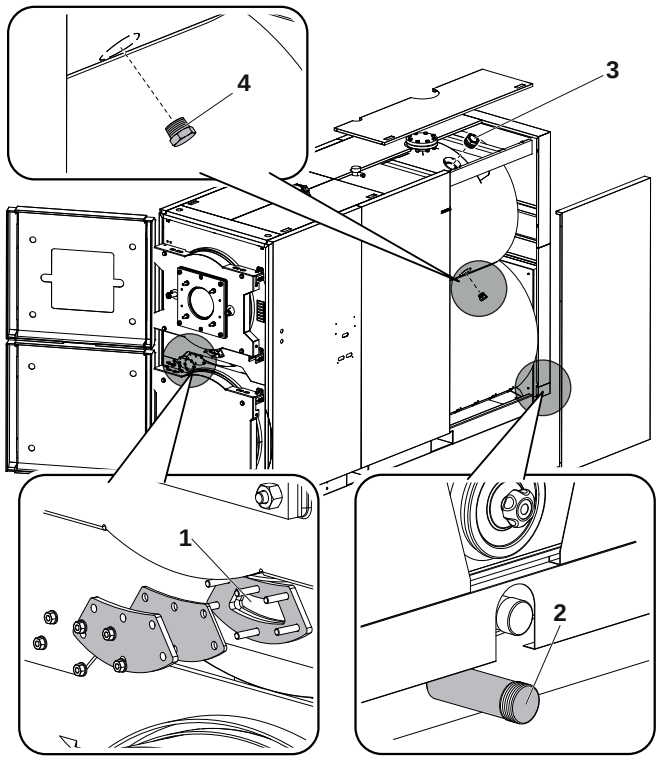
5.12 Boiler inspection - water-side

Carrying out the inspection is important in order to check the condition of thermal exchange surfaces and the presence of sludge or lime scale.
The boiler's inner can be inspected through dedicated openings

⚠ The inspection must be carried out with the boiler in the off position, in safe mode and cold (room temperature), with all system shut-off valves closed except the discharge valve.

In order to inspect the upper part of the boiler, partially empty the boiler before opening inspection openings.
Inspection openings are located in the following areas:

RTC 3000-6000

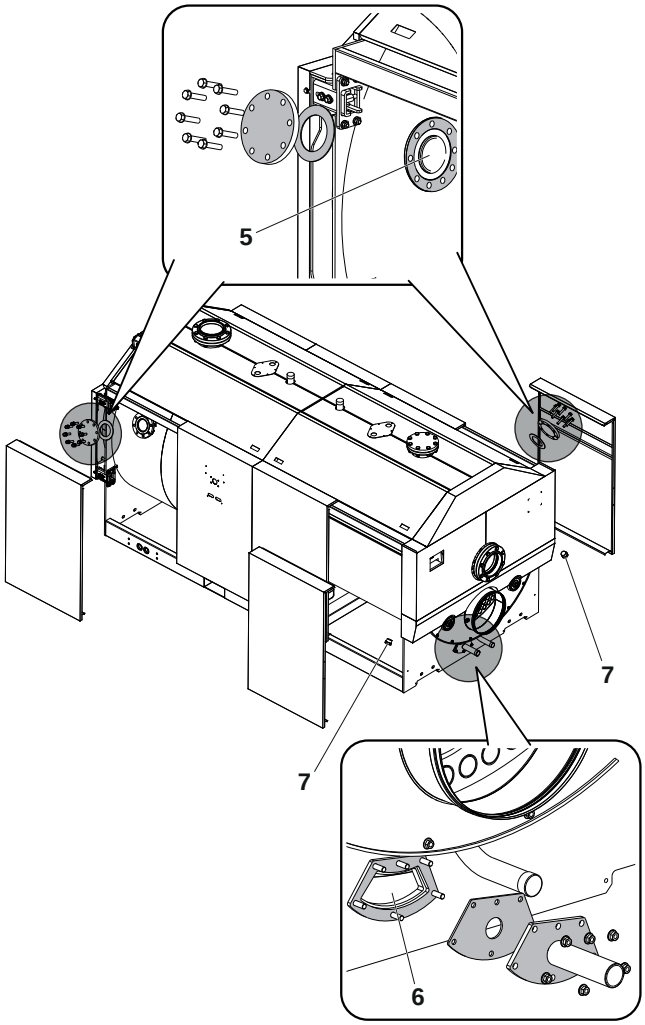


1 Inspection
2 Inspection and sludge discharge NPS 1" 1/2
3 Handholes NPS 3"
4 Washout plugs NPS 1" 1/2 both sides

The boiler must be fully emptied if it is necessary to access the inspection and discharge outlet (2).

Check the integrity of the seals and close inspection openings by tightening the cross-head screws.
Fill the system and check the pressure as detailed in paragraph " Checking and correcting the water pressure".

RTC 8000-10000



5 Inspection
6 Inspection and sludge discharge NPS 1" 1/2
7 Boiler washout plug 1" 1/2

The boiler must be emptied completely if it is necessary to access the opening of the rear inspection door (6) and washout plugs (7) on both rear sides.

Check the integrity of the seals and close inspection openings by tightening the cross-head screws.
Fill the system and check the pressure as detailed in paragraph " Checking and correcting the water pressure".

5.12.1 Inspection and maintenance reports

The inspection and maintenance reports provide an overview of the required inspection and service steps that should be carried out annually.
Warranty:

- Annual inspection and service are part of the warranty terms.

Complete these reports after inspections and service. The report can also be used as copying template:

- Sign and date the completed inspection work.

INSPECTION WORK	REFERENCES	NOTES
Check the general condition of the heating system (visual inspection).		
Check the heating system function.		
Check the components in contact with fuel and water throughout the system for the following: -Tightness -Visible signs of corrosion -Signs of aging		
Check the combustion chamber and heating surface for contamination and clean them. For this, shut down the heating system.	See spec. chapter of this manual	
Check gaskets/packing cords on combustion chamber door and replace if required.		
Check and clean the burner: -Visual inspection and remove any contamination. -Check all safety equipment (safety shutdown). -Function check -Flue gas analysis with test report for each output stage.	See technical burner documentation.	
Check the flue for function and safety.	See flue manufacturer documentation.	
Check the hydraulic seal of the condensate siphon and replace if required.		
Check the water pressure and pre-charge pressure of the expansion vessel.	See spec. chapter of this manual	
Confirm the control unit settings are suitable and adjust if required.	See technical control unit	
Test all safety equipment (safety shutdown) and record findings. For example: -High limit safety cut-out -Minimum limiter pressure -Maximum limiter pressure (if installed) -Other safety equipment.		
Conduct a water analysis and record the results in the operator's log: -pH value -Residual hardness -Oxygen binder -Phosphate -Electrical conductivity -Appearance -Check water records (e.g. amount of make-up water) in the operator's log.		
Check the neutralization system.		
Final check of the inspection work, take measurements and record values and test results.		

5.13 Troubleshooting

PROBLEM	CAUSE TROUBLESHOOTING	TROUBLESHOOTING
The boiler does not reach its set temperature.	Heat exchanger dirty.	– Clean the flue gas pipes.
	Heat exchanger and burner mismatched.	– Check specifications and settings.
	Insufficient burner gas flow.	– Check and adjust the burner.
	Control thermostat problem.	– Check the functioning of the aquastat.
		– Check the temperature setting.
The boiler keeps shutting down, and the control panel warning light comes on.	Control thermostat problem.	– Check the functioning of the aquastat.
		– Check the temperature setting.
		– Check the electrical wiring.
		– Check the sensor bulbs.
	No water supply.	– Check the circuit pressure.
	Air in the circuit.	– Check the vent valve.
The boiler has reached the set temperature but the radiators are still cold.	Air in the circuit.	– Bleed the circuit.
	Pump malfunctioning.	– Check/release the pump.
	Problem with minimum temperature aquastat (if present).	– Check the temperature setting.
There is a smell of exhaust fumes.	Fumes are escaping into the air.	– Check that the boiler body is clean.
		– Check that the flue pipes are clean.
		– Check that the boiler, flue pipes and flue gas exhaust stack are all properly sealed.
The safety valve keeps opening.	Excessive pressure in the circuit.	– Check the circuit pressure.
		– Check the functioning of the pressure reducer.
		– Check the settings of the pressure reducer.
	Problem with heating system expansion vessel.	– Check the efficiency of the expansion vessel.
There are traces of condensate on the rear head.	Flue gas box seals.	– Check the seals between the rear head and the flue gas box.

6 ENVIRONMENTAL PROTECTION/DISPOSAL

Environmental protection is one of the fundamental company policies of the Riello. We regard quality of performance, economy and environmental protection as equal objectives.
Environmental protection laws and regulations are strictly adhered to.
To protect the environment, we use the best possible technology and materials taking into account economic points of view.

Packaging
For the packaging, we participate in the country-specific recycling systems, which guarantee optimal recycling. All packaging materials used are environmentally-friendly and recyclable.

Old appliances
Old appliances contain resources that should be recycled.
The components are easy to separate and the plastics are marked.
This allows the various components to be sorted for appropriate recycling or disposal.

RIELLO

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