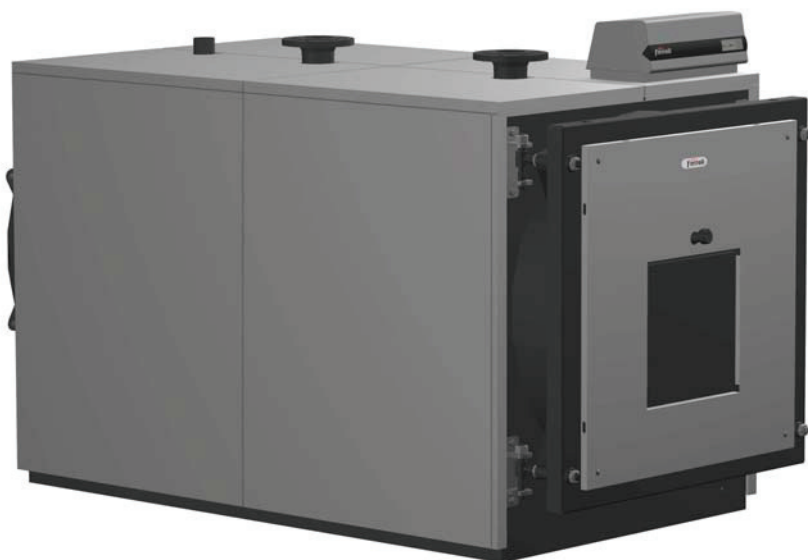


PREXTHERM RSH

Caldaie ad Altissimo Rendimento
Very high efficiency boilers



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1. PRESENTATION

Dear Customer,
Thank you for having chosen a PREXOTHERM RSH boiler.

This manual has been prepared to provide you with information, warnings and suggestions on

the installation, correct use and maintenance of the boiler. Please therefore read it thoroughly and keep it with care for future reference. In your interest, we suggest that you carefully observe the contents of this manual, so as to be able to get the most from this high quality

product. The Manufacturer declines all liability and the warranty will be void in the event where the instructions described in this manual are not observed.

2. GENERAL WARNINGS

- This instruction manual is an integral part of the product, and provides important instructions for installation, operation and maintenance.
- This appliance must only be used for the purposes it has been specifically designed for.
- **This appliance is used to heat water to below-boiling temperatures at atmospheric pressure, and must be connected to a central heating and/or domestic hot water distribution system, according to its characteristics, performance and heat output.**
- Before installation, check that the boiler has not been damaged due to handling and transport.
- The boiler must be installed in compliance with the standards in force, by suitably qualified personnel.

- Before performing any cleaning or maintenance operations, disconnect the appliance from the mains power supply.
- Ferrolì S.p.A. is not liable for any damage to persons people and/or things due to errors in installation, control, maintenance and improper use.
- The boiler and the corresponding system must be commissioned by authorised personnel.
- Commissioning is performed in order to check the correct operation of all the control devices.
- Qualified personnel must be contacted if the appliance is not used for an extended period.

Standards

The installer must observe the local standards in force as regards: the choice of the site of installation of the boiler, the compliance with the

required ventilation conditions; the tightness of the connection to the chimney; the connections of the fuel lines, electrical systems and any other relevant safety standards.

Warranty conditions

The warranty is only valid if the standards and the suggestions for use described in this manual are observed. Failure to observe such standards and suggestions will void the warranty. The warranty excludes all damage due to corrosion from the acidic condensate of the products of combustion or the formation of deposits caused by the use of hard or aggressive water, as such are solely due to the operation of the system.

3. CERTIFICATION

The CE Mark attests that Ferrolì appliances conform to the requirements specified in the applicable European directives.

In particular, this appliance conforms to the following EEC directives:

- Gas directive (2009/142/CE)
- Efficiency directive (92/42 EEC)

- Low voltage directive 73/23 EEC (amended by 93/68)
- Electromagnetic compatibility directive 89/336 (amended by 93/68)

4. TECHNICAL AND CONSTRUCTIONAL SPECIFICATIONS, DIMENSIONS

4.1 Description of the appliance

The construction of the PREXOTHERM RSH series boilers guarantees high output and efficiency at low flue gas temperatures, thus ensuring reduced polluting emissions. The appliances are made according to the EN 303 standard, part 1.

- The main technical elements of the design are:
- the careful design of the shapes, to ensure an optimum ratio between the combustion volumes and the heat exchange surfaces
 - the choice of materials used, for the long life of the boiler.

The boilers feature pressurised combustion, with three flue passes, a horizontal-cylinder configuration and flame reversal in the furnace, completely cooled; the flame produced by the burner is reversed peripherally towards the front, where the flue gas enters the tube bundle, featuring turbulators to create a swirling path that increases the heat exchange by convection. On leaving the tube bundle, the flue gas enters the rear chamber and is transferred to the chimney. The boilers are fitted with a door featuring hinges that can be reversed for opening to the right or the left, and is adjustable in both height and depth. The body plating is insulated with a thick layer of glass wool, and covered with a further layer of tearproof material. The external finish consists of painted steel panels. The hoisting hooks are fitted on the top of the plating. The boilers feature two 1/2" fittings for bulb sheaths (able to house three bulbs each).

The pre-wired control panel is located above the boiler, and allows automatic operation.

4.2 Operating principle

The PREXOTHERM RSH boilers are fitted with a closed cylindrical furnace, in which the flame produced by the burner is reversed peripherally towards the front, from where the burned gas enters the fire tubes. At the outlet, the gas is collected in the smokebox and is then sent to the chimney. The combustion chamber is always pressurised during the operation of the burner.

For the pressure values, see the tables on page 16, under the column Flue gas side pressure drop. The flue and the flue stack fitting must be made in compliance with the standards and the legislation in force, using rigid pipes that are resistant to high temperatures, condensate and mechanical stress, and are airtight. (Fig. 1)

4.3 Technical specifications - Dimensions - Water fittings

Key (Fig. 2 and 3)

- 1 Control panel
- 2 Burner mounting flange
- 3 Smoke box cleaning door
- 4 Flame inspection window
- T1 Water delivery
- T2 Water return
- T3 Expansion vessel connection
- T4 Discharge/exhaust boiler
- T5 Chimney connection
- T6 Burner connection

4.4 Identification

The boiler can be identified from the:

- **Document envelope**
This is applied to the door, and contains:
TECHNICAL MANUAL
WARRANTY CERTIFICATE
LABELS WITH BARCODE
RATING LABEL
CONSTRUCTION CERTIFICATE
(certifying that the water pressure tests have been passed)
- **Rating label**
This describes the technical specifications and the performance of the appliance (Fig. 4). It is included in the document envelope and **MUST BE APPLIED** by the installer, when installation is complete, to the top front part of one of the side panels of the casing, in a visible position.
If the label is lost, contact the Ferrolì Technical Service for a duplicate.

Tampering with or the removal or absence of rating labels or other means enabling the unit to be identified causes problems during installation and maintenance.

Key (Fig. 4)

- 1 Document envelope

PREXTHERM RSH			80	90	130	160	200	250	350	450	500	600	700	800	900	1100	1300
Heat output	min	<i>kW</i>	60	70	100	137	160	196	260	341	390	468	533	611	689	813	962
	max	<i>kW</i>	92	107	152	190	240	320	399	500	600	720	820	940	1060	1250	1480
Heat input	min	<i>kW</i>	63,7	74,3	105,8	144,4	168,4	206	272,6	357	407,9	489,8	558,4	638,9	719,9	848,2	1004,4
	max	<i>kW</i>	97,7	113,5	160,8	200,2	252,6	336,4	418,4	523,5	627,6	753,6	859,1	982,9	1107,6	1304,2	1545,2
Total water content		<i>l</i>	120	185	235	304	362	337	405	471	735	850	850	1240	1490	1490	1620
Water side load. loss	Δt 10°C	<i>mbar</i>	11	20	12	17	40	48	40	51	32	40	51	65	86	110	100
	Δt 15°C	<i>mbar</i>	6	12	7	10	17	23	22	28	18	25	25	33	40	55	45
	Δt 20°C	<i>mbar</i>	2	5	3	4	9	13	12	16	10	18	16	20	25	32	29
Flues side load. loss		<i>mbar</i>	0,7	1,2	1,2	2,3	3,3	3,5	4,3	4,8	4,5	5,6	5,4	6	6,5	6,5	6,8
Weight		<i>kg</i>	260	350	440	480	550	590	860	970	1250	1420	1420	1580	2650	2650	2850
DIMENSIONS	A	<i>mm</i>	760	760	810	810	950	950	950	1060	1060	1260	1450	1450	1530	1530	1530
	B	<i>mm</i>	764	764	1264	1264	1514	1514	1516	1776	1516	2016	2016	2016	2320	2320	2320
	C	<i>mm</i>	856	856	911	1031	1031	1031	1181	1181	1181	1331	1331	1551	1661	1661	1611
	D	<i>mm</i>	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165
	E	<i>mm</i>	130	130	130	150	150	150	170	170	170	170	170	190	190	190	190
	F	<i>mm</i>	152	152	152	152	152	152	152	152	152	212	212	212	212	212	212
	G	<i>mm</i>	515	515	545	630	630	630	725	725	725	815	815	900	1013	1013	1013
	H	<i>mm</i>	395	395	420	495	495	485	570	570	570	615	615	670	743	743	743
	I	<i>mm</i>	1046	1046	1516	1546	1816	1817	1838	2098	1838	2358	2398	2420	2722	2722	2722
	L	<i>mm</i>	100	100	100	100	100	100	100	100	100	100	100	90	120	120	120
	L1	<i>mm</i>	121	121	121	121	121	120	120	120	120	180	180	178	199	199	199
	M	<i>mm</i>	925	925	980	1100	1100	1100	1250	1250	1400	1400	1400	1580	1730	1730	1730
	N	<i>mm</i>	147	147	217	217	217	218	218	218	218	218	218	218	220	220	220
	O	<i>mm</i>	150	150	330	330	380	380	380	440	440	480	480	480	580	580	580
	P	<i>mm</i>	250	250	450	450	600	600	600	700	700	900	900	900	1100	1100	1200
	Q	<i>mm</i>	700	700	750	890	890	890	1000	1000	1000	1200	1200	1390	1470	1470	1470
	R	<i>mm</i>	740	740	1240	1240	1490	1491	1492	1492	1492	1992	1992	1994	2296	2296	2496
Hot water flow	DN T1	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	80	80	100	100	100	125	150	150	150
Hot water return	DN T2	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	80	80	100	100	100	125	150	150	150
Expansion vessel conn.	DN T3	1" 1/4	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	2"	2"	2" 1/2	2" 1/2	2" 1/2	3"	100	100	100
Boiler drain	DN T4	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	1" 1/2	1" 1/2	1" 1/2
Flue outlet	Ø T5	200	220	220	220	220	220	220	250	250	350	350	350	400	450	450	450

PREXTHERM RSH			1600			2000			2600		
Heat output	min	<i>kW</i>	1229			1535			1950		
	max	<i>kW</i>	1845			2360			3000		
Heat input	min	<i>kW</i>	1291,2			1603,1			2033,7		
	max	<i>kW</i>	1938			2464,7			3128,8		
Total water content		<i>l</i>	1925			2600			2920		
Water side load. loss	Δt 10°C	<i>mbar</i>	150			145			190		
	Δt 15°C	<i>mbar</i>	70			65			90		
	Δt 20°C	<i>mbar</i>	42			45			61		
Flues side load. loss		<i>mbar</i>	7,2			7,5			8,2		
Weight		<i>kg</i>	3900			5300			5800		
DIMENSIONS	A	<i>mm</i>	1610			1800			1800		
	B	<i>mm</i>	2772			2976			3346		
	C	<i>mm</i>	1810			2000			2000		
	D	<i>mm</i>	-			-			-		
	E	<i>mm</i>	210			220			220		
	F	<i>mm</i>	250			250			250		
	G	<i>mm</i>	1005			1100			1100		
	H	<i>mm</i>	860			940			940		
	I	<i>mm</i>	3232			3446			3816		
	L	<i>mm</i>	145			145			145		
	L1	<i>mm</i>	195			195			195		
	M	<i>mm</i>	1950			2140			2140		
	N	<i>mm</i>	662			716			786		
	O	<i>mm</i>	650			650			650		
	P	<i>mm</i>	1000			1150			1450		
	Q	<i>mm</i>	1000			1170			1170		
Hot water flow	DN T1		150			200			200		
Hot water return	DN T2		150			200			200		
Expansion vessel conn.	DN T3		100			125			125		
Boiler drain	DN T4		1" 1/2			1" 1/2			1" 1/2		
Flue outlet	Ø T5		450			500			500		

5. INSTALLATION

5.1 Packaging

The PREXTHERM RSH model 80-1300 boilers are supplied complete with the door and smoke-box fitted and insulation on the body, while the casing is contained in a separate cardboard box. The instrument panel is supplied in a cardboard box and positioned inside the combustion chamber.

The RSH model 1600-2600 boilers are supplied complete with insulation and casing.

The instrument panel is supplied in a cardboard box and positioned inside the combustion chamber.

5.2 Handling

The PREXTHERM RSH boilers are fitted with eyebolts for lifting. Make sure the hoisting equipment used is suitable for the weight being lifted. Before positioning the boiler, remove the wooden base support by unscrewing the fastening screws (Fig. 5).

5.3 Boiler room (Fig. 6)

The PREXTHERM RSH boilers should be installed in rooms exclusively used for this purpose, in accordance with the technical standards and legislation in force and featuring adequately sized ventilation openings.

The ventilation openings must be permanent, directly communicating with the outside and located in both a high and low position, in compliance with the standards in force.

The location of the ventilation openings, the fuel supply, power and lighting circuits must comply with the legislation in force in relation to the type of fuel used. To assist the cleaning of the flue gas circuit, free space must be left at the front of the boiler no less than the length of the boiler body and, in any case, never less than 1300 mm, checking that with the door open at 90° the distance between the door and the adjacent wall (X), is at least equal to the length of the burner. The boiler support surface must be perfectly horizontal. A flat cement base should be used that is able to support the overall weight of the boiler plus the water content. For the dimensions of the base, see the distances **R x Q** (table of dimensions). If the burner is supplied with gas fuel whose specific weight is higher than air, the electrical parts must be located more than 500 mm from the floor. The appliance cannot be installed outdoors as it is not designed to operate outside and does not feature automatic frost protection systems.

INSTALLATION IN OLD SYSTEMS OR SYSTEMS TO BE UPGRADED

When the boiler is installed in old systems or systems to be upgraded, check that:

- The flue stack is suitable for the temperature of the products of combustion, calculated and manufactured according to the standards in force, airtight, insulated and not blocked or choked.
- The electrical system has been installed in compliance with the relevant standards by qualified personnel.
- The fuel supply line and any tanks are made according to the relevant standards.
- The expansion vessel/vessels can completely absorb the expansion of the fluid contained in the system.

- The flow-rate, discharge head and the direction of the flow of the circulating pumps are suitable.
- The system is washed, cleaned of slime, fouling, vented and watertight.
- A treatment system is available for special supply/top-up water requirements (see the reference values).

5.4 Discharge of the products of combustion (Fig. 7)

The flue and the flue fitting must be made in compliance with the standards and the legislation in force, using rigid pipes that are resistant to high temperatures, condensate and mechanical stress, and are airtight.

The flue must ensure the minimum negative pressure specified by the standards in force, considering "zero" pressure at the fitting to the flue. Unsuitable or incorrectly sized flues may increase the noise produced due to combustion, generate problems involving condensation and negatively affect the combustion parameters.

Non-insulated flues are a source of potential danger. The joint seals should be made using materials that can resist temperatures of at least 250°C. Suitable points for measuring the flue gas temperature and analysing the products of combustion must be prepared in the connection between the boiler and the flue. As regards the cross-section and the height of the chimney, refer to the national and local standards in force.

5.5 Water connections

5.5.1 Supply water

The chemical characteristics of the supply and top-up water are fundamental for the correct operation and the safety of the boiler. The water should be treated using suitable systems. The values shown in the table below can be used as references.

TOTAL HARDNESS	ppm	10
ALKALINITY	mg/l CaCO ₃	750
PH		8÷9
SILICA	ppm	100
CHLORIDES	ppm	3500

The water used in the central heating system must be treated in the following cases:

- Very large systems
- Very hard water
- Frequent introduction of water to top up the system.

If, in these cases, the system needs to be partially or completely emptied, it must be refilled with treated water. To control the volume of water automatically refilled, an hour counter should be installed. The most common phenomena that occur in heating systems are:

- Lime scale deposits

Lime scale tends to concentrate at the points where the temperature of the wall is higher.

Due to their low heat conductivity, lime scale deposits cause a reduction in heat exchange to the extent that even when just a few millimetres thick, the heat exchange between the flue gas and the water is limited, bringing an increase in the temperature of the parts exposed to the flame and consequently breakages (cracks) on the tube plate.

- Corrosion on the water side

Corrosion of the metal surfaces on the water side of the boiler is due to the dissolution of iron into its ions. The presence of dissolved gases, in particular oxygen and carbonic dioxide, play an important part in this process. Softened and/or demineralised water provides protection against lime scale and other deposits, however does not protect against corrosion. The water therefore must be treated with corrosion inhibitors.

5.5.2 Central heating outlet/return pipes

The dimensions of the outlet and return pipes are shown for each model of the boiler, in the table of DIMENSIONS.

Check that the system features a sufficient number of vent openings. The boiler fittings must not be stressed by the weight of the connection pipes to the system, and consequently special supports must be installed.

5.5.3 System fill/drain pipes

To fill and drain the boiler, a cock can be connected to fitting T4 at the rear (see the drawing of the DIMENSIONS).

5.5.4 Expansion vessel and safety valve pipes

The PREXTHERM RSH boilers are suitable for operation with forced water circulation, both with open and closed expansion vessels.

An expansion vessel is always required, to allow for the increase in water volume due to heating. In the first case, the height of the hydrostatic column must be at least 3 metres above the boiler casing and must have a sufficient capacity to contain, between the surface of the water in the vessel and the overflow pipe, the increase in volume of all the water in the system.

High and narrow vessels are better, as they ensure minimum contact between the water surface and the air, thus reducing evaporation.

In the second case, the capacity of the closed expansion vessel must be calculated considering:

- the total volume of water contained in the system
- the maximum operating pressure of the system
- the maximum operating pressure of the expansion vessel
- the initial pre-charge pressure of the expansion vessel
- the maximum operating temperature of the boiler (the maximum temperature of the thermostat fitted on the panel is 90°C; when performing this calculation, use the value 100°C).

The expansion pipes connect the expansion vessel to the system. This pipes that run from fitting T3 (see the table of Dimensions), must not be fitted with on-off valves. On fitting T3, or on the outlet pipe, within 0.5 metres from the first flange, install a safety valve sized for the capacity of the boiler and in compliance with the local standards in force. No type of shut-off device may be installed between the boiler and the expansion vessel, and between the boiler and the safety valves, while the valves should be calibrated for activation at values no higher than the maximum admissible operating pressure.

5.5.5 Recirculating pump (Fig. 8)

The condensation of the water vapour contained in the flue gas leaving the boiler (condensate) occurs when the return water temperature is less than 55°C and is significant above all when starting in the morning, after the boiler has been off all night. This condensate is acidic and corrosive and, over time, attacks the metal plate on the boiler. Consequently, a recirculating pump with the function of preventing condensate should be installed between the outlet and return fittings, upstream of any mixing valve.

The pump must ensure, when the system is operating, a flow-rate of between 20 and 30% of the total; it must also ensure a return water temperature no less than 55°C, while the required discharge head is quite low, as it only needs to overcome the resistance of the boiler and the valves. To measure the effective central heating return inlet temperature for the purpose of controlling the condensate prevention pump or managing the functions for getting the system to stable temperature operation, a probe socket must be fitted at a distance equivalent to 3-5 times the diameter of the return pipe upstream of the water coupling.

5.6 Opening and adjusting the front door

For **PREXTHERM RSH models 80-1300** the door is hinged, fastened and reversed as regards the direction of opening as shown in Fig. 9. The following operations are required:

- The door is supplied with four equal brackets (pos. 3) and hinges.
- To establish the direction of opening, RIGHT or LEFT, unscrew the nut (pos. 7), unscrew and remove the R or L nut (pos. 6), depending on which side the door opens from.
- Height adjustment of the door is performed using the nut (pos. 2); after having completed the adjustments tighten the dowels (pos. 1).
- Longitudinal adjustment is performed using the screw (pos. 8).

Key (Fig. 9)

- 1 Fastening dowel
- 2 Door support/adjustment nut
- 3 Hinge bracket
- 4 Hinge pin
- 5 Hinge screw
- 6 Hinge fastening nut
- 7 Fastening nut
- 8 Hinge bracket fastening/adjustment screws and nuts

For **PREXTHERM models RSH 1600-2600** the door is hinged, fastened and reversed as regards the direction of opening as shown in Fig. 10.

The following operations are required:

- The door is supplied with four equal hinges (pos. 3).
- To establish the direction of opening, RIGHT or LEFT unscrew the nut (pos. 7), unscrew and remove the R or L nut (pos. 6), depending on which side the door opens from.
- Height adjustment of the door is performed using the nut (pos. 2); after having completed the adjustments tighten the dowels (pos. 1).

Key (Fig. 10)

- 1 Fastening dowel
- 2 Door support/adjustment nut
- 3 Hinge bracket
- 4 Hinge pin
- 5 Hinge screw
- 6 Hinge fastening nut
- 7 Fastening nut

5.7 Assembling the burner (Fig. 11)

The assembly of the burner to the door of the boiler must ensure perfect tightness to the products of combustion.

Once having installed the burner on the boiler, the space between the burner draught tube and the refractory material on the door must be filled with the layer of ceramic fibre (A) supplied.

This prevents the door from overheating and consequently from being irreversibly deformed.

The fuel connections to the burner must be located so as to allow the complete opening of the boiler door with the burner installed.

RSH	L min. (mm)	L max. (mm)	S
80-90	230	300	172
130-250	250	320	192
350-450	290	360	218
500-700	320	390	239
800-900	320	390	248
1300	340	410	262
1600	340	470	262
2000-2600	350	480	272

5.8 Connecting the flame inspection window (Fig. 12)

The flame inspection window features a pressure fitting (1) to be connected via a silicone hose or copper pipe to the outlet on the burner (2).

This operation allows the air blown by the fan to cool the glass and prevent it from turning black. Failure to connect the hose or pipe to the window may cause the glass to break.

5.9 Assembling the panels, models 80÷1300

Assembly sequence (Fig. 13)

- a) Position the right and left side panels (pos. 1-2) hooking them to the support (pos. 13).
To know which of the two sides is the right or the left, refer to the hole for the cable gland plate (pos. 6), which must be facing the front of the boiler.
- b) Fasten the control panel to the top panel (pos. 3).
- c) Rest the top right panel (pos. 3), complete with the control panel, to the side panel (pos. 1) complete with springs, closing pins and nuts (pos. 10-11-12).
- d) Insert the bulbs of the instruments into the sheaths as shown in Fig. 20 and make the electrical connection between the control panel and the power line, burner and any pumps etc. The probes should be inserted fully into the corresponding sockets, to improve contact. Then secure the capillary tubes with the springs. Close the cover on the electrical panel, pass the burner plug through the side plate (pos. 6) and secure the cable with the cable gland supplied. Fasten the plate (pos. 6) with the screws (pos. 7).
- e) Fit the panel left top (pos. 4) to the left side panel (pos. 2) complete with springs, closing pins and nuts (pos. 10-11-12).

- f) Insert the bulbs of the instruments into the sheaths as shown in Fig. 13-20 and make the electrical connection between the control panel and the power line, burner and any pumps etc. The probes should be inserted fully into the corresponding sockets, to improve contact. Then secure the capillary tubes with the springs. Close the cover on the electrical panel, pass the burner plug through the side plate (pos. 9) and secure the cable with the cable gland supplied. Fasten the plates (pos. 9) with the screws (pos. 10).
- g) Fit the top panel (pos. 6) to the side panel (pos. 3) complete with springs, closing pins and nuts (pos. 14-15-16).
- h) Fit the rear panel (pos. 8) to the boiler using the screws (pos. 13) and the nuts (pos. 14).
- i) Fit the front panel (pos. 5) to the door using the screws (pos. 8) and the nuts (pos. 9).
- l) Fasten the rating label to the boiler, see Chap. 1, after having cleaned and degreased the part in question using a suitable solvent, and apply it so as to ensure perfect adhesion. Do not remove the rating label, as it will lose its adhesiveness.

The rating label is included in the document envelope.

5.10 Assembling the panels, models 1600÷2600

Assembly sequence (Fig. 14)

- a) Position the side panels (pos. 1-2 and 3-4) hooking them to the supports (pos. 19).
- b) Position the top right panel (pos. 5-6) and then the left panel (7-8) hooking them to the supports on the boiler (pos. 19) and to the crossbeam (pos. 18).
- c) Fasten the control panel to the top right panel (pos. 5).
- d) Rest the top panel (pos. 5), complete with the control panel, to the side panel (pos. 1) complete with springs, closing pins and nuts (pos. 15-16-17).
- e) Insert the bulbs of the instruments into the sheaths as shown in Fig. 21 and make the electrical connection between the control panel and the power line, burner and any pumps etc. The probes should be inserted fully into the corresponding sockets, to improve contact. Then secure the capillary tubes with the springs. Close the cover on the electrical panel, pass the burner plug through the side plate (pos. 11) and secure the cable with the cable gland supplied. Fasten the plate (pos. 11) with the screws (pos. 12).
- f) Fit the support (pos. 18).
- g) Fit the top panels (pos. 5-6-7-8) hooking them to the side panels (pos. 1-2-3-4) complete with springs, closing pins and nuts (15-16-17).
- h) Fit the front panels (pos. 9-10) to the front door using the screws (pos. 14) and the nuts (pos. 13).
- i) Fasten the rating label to the boiler, see Chap. 1, after having cleaned and degreased the part in question using a suitable solvent, and apply it so as to ensure perfect adhesion. Do not remove the rating label, as it will lose its adhesiveness.

The rating label is included in the document envelope.

6. STANDARD INSTRUMENT PANEL

6.1 Panel (Fig. 15)

The instrument panel supplied, made from plastic with index of protection IP40, holds the control and safety instruments.

The boiler electrical system must be:

- designed and made by qualified personnel and connected to an earth system in compliance with the legalisation in force.
- suitable for the maximum power input of the boiler, using cables with an adequate cross-section.

The earth wire in the power cables and connection cables to the burner must be a few mm longer than the other wires in the same cable. For the connections between the burner, the electrical panel and the power supply, use H07 RN-F cables for installation in view. For other types of installation or special environmental conditions, refer to the legislation in force. The composition and the diameter of the wires should be calculated based on the power input of the burner. To access the instruments, rotate the front panel (A). To access the terminal block and unwind the capillary tubes from the thermostats and the

thermometer, remove the top panel (B), after having unscrewed the 2 side screws (C). The control thermostats (12-13 - Fig. 16) can be set by the user, using the knob at the front. The safety thermostat has a fixed setting and manual reset, as specified by Italian Min. Decree 1/12/75, collection R.

The following are compulsory:

- the use of a two-pole thermal-magnetic overload switch, mains disconnecting switch, compliant with the CEI-EN standards (minimum contact opening 3 mm)
- observe the polarity L1 (Phase) - N (Neutral)
- use cables with a minimum cross-section of 1.5 mm, complete with pointed end terminals.
- refer to the wiring diagrams in this booklet for any operations on the electrical system.
- connect the appliance to an effective earth system.
- the water pipes must not be used to earth the appliance.

The manufacturer is not liable for any damage due to the failure to earth the appliance and to observe the information provided on the wiring diagrams.

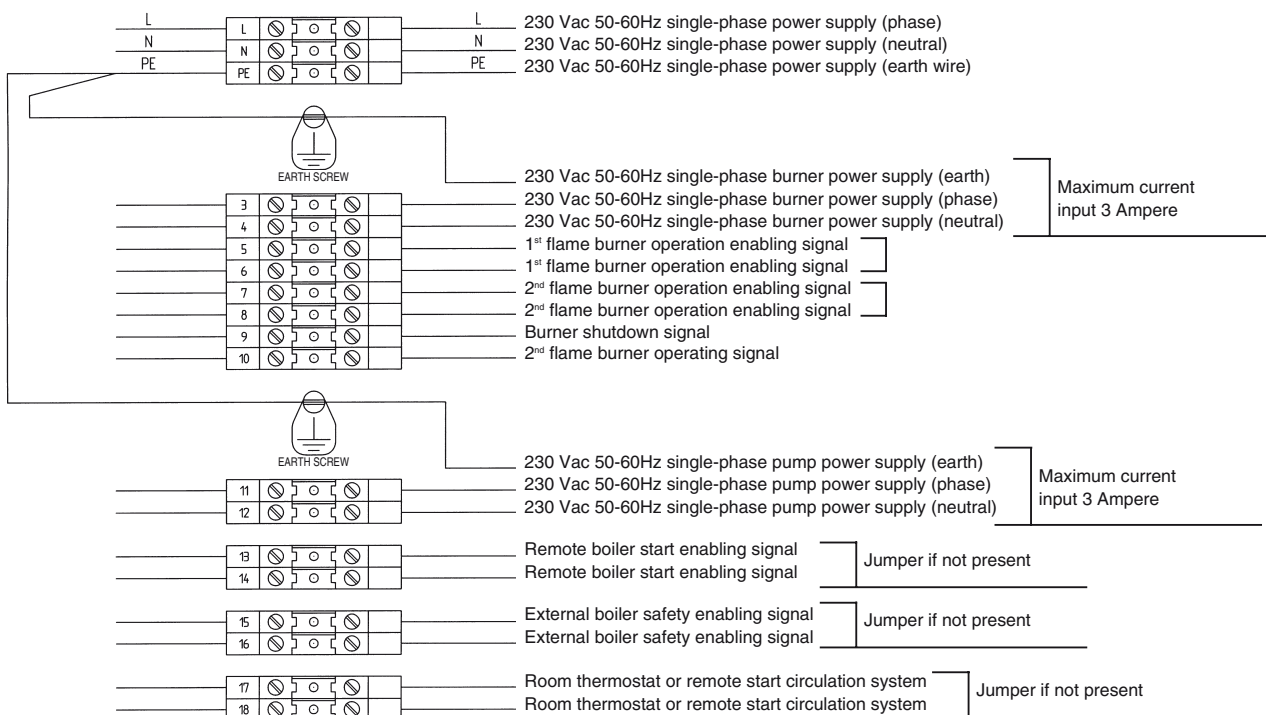
A connection point is provided on the front head for earthing the boiler body.

6.2 Panel front view (Fig. 16)

Key

- 1 Pump ON switch
- 2 Burner ON switch
- 3 Boiler ON switch
- 4 Test button
- 5 Safety pressure switch reset button
- 6 Boiler water temperature
- 7 Boiler on LED
- 8 1st burner flame LED
- 9 2nd burner flame LED
- 10 Burner shutdown LED
- 11 Safety pressure switch LED
- 12 2nd boiler flame control thermostat TR1
- 13 1st boiler flame control thermostat TR1
- 14 Space for temperature controller

6.3 Diagram of the terminal block electrical connections



6.4 Wiring diagram for burner and single-phase pump (Fig. 17)

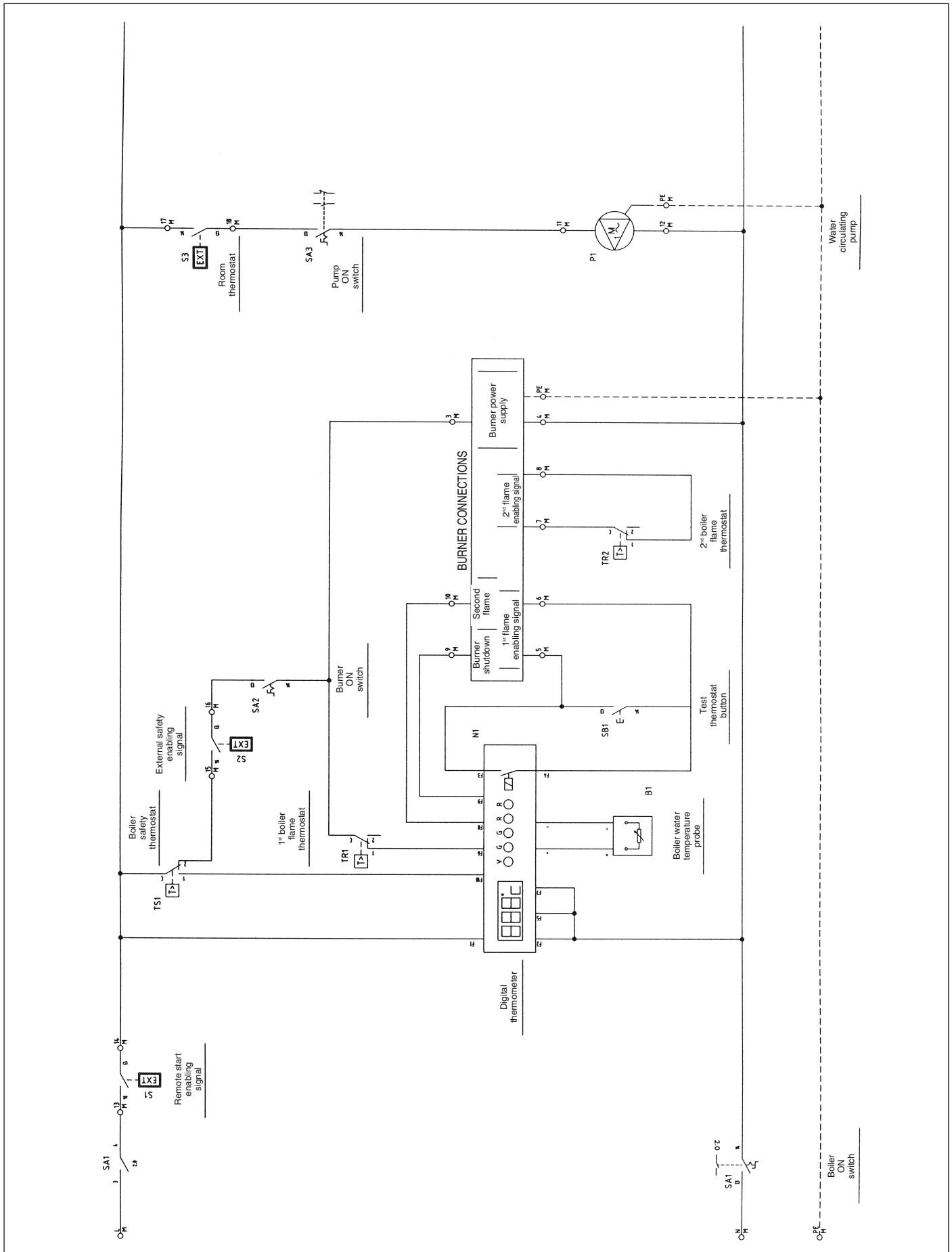


Fig. 17

Key to the symbols/components on the wiring diagram

	B1 QG 2	Water outlet temperature
	N1 QG 2	Boiler status/Water temperature instrument
	P1 QG 2	System water pump
	S1 QG 2	Remote start enabling signal
	S2 QG 2	External safety enabling signal
	S3 QG 2	Room thermostat
	SA1 QG 2	Boiler ON switch

	SA2 QG 2	Burner switch
	SA3 QG 2	Pump switch
	SB1 QG 2	Test button
	TR1 QG 2	1 st burner stage thermostat
	TR2 QG 2	2 nd burner stage thermostat
	TS1 QG 2	Boiler safety thermostat

6.5 Notes on the connections

The panel power cable, type FG7 RN-F 3G1,5, is already connected as standard to the terminal block. In the event of replacement, make sure an appropriate cable is used, according to the legislation in force. The power supply to the burner is taken directly from the terminal block, single-phase and with a maximum current

input of 3A. The power supply to the system water pump is taken directly from the terminal block, single-phase and with a maximum current input of 3A. If the current input of the burner or the pump is higher than envisaged, or the power supply is three-phase, power relays must be connected to the outputs on the terminal block. The remote start enabling signal

allows the boiler to be operated from a distance. This is jumpered when not used. The external boiler safety enabling signal represents a further contact that is used to stop the burner. This is jumpered when not used. The room thermostat contact only controls the water pump. This is jumpered when not used.

7. PRINCIPLE DIAGRAM - SYSTEM FOR CENTRAL HEATING AND THE PRODUCTION OF DOMESTIC HOT WATER (Fig. 18)

The choice and installation of the components making up the system is left to the expertise of the installer, who must operate in a workmanlike manner and according to the legislation in force. The systems loaded with antifreeze require the use of water disconnecting devices. It should be stressed that the diagram in Fig. 18 is a principle diagram. In the case of different systems, please contact our After-Sales Service, which will provide you all the details required.

Key

- A Central heating flow outlet
- B Central heating return inlet
- 1 Heat generator
- 2 Burner complete with shutdown and control valves
- 3 Storage heater
- 4 System manifolds
- 5 On-off valves
- 6 Circulating pump
- 7 Non-return valves
- 8 System expansion vessel
- 9 Automatic vent valve
- 10 Safety valve
- 11 Softener filter
- 12 System fill

- 13 Fuel on-off valve
- 14 Gas pressure stabiliser
- 15 Manual on-off valve
- 16 Gas filter
- 17 Vibration-damping joint
- 18 Pump
- 19 Pressure gauge
- 20 Safety thermostat
- 21 Control thermostat
- 22 Three-way cock
- 23 Pressure switch with manual reset
- 24 Flow switch
- 25 Control thermostat
- 26 Thermostat with manual reset
- 27 Temperature test socket
- 28 Temperature control valve

8. COMMISSIONING

8.1 Preliminary checks

Once having completed the water, electrical and fuel connections to the boiler, before starting, check that:

- The expansion vessel and the safety valve (if required) are connected correctly and cannot be shut-off.
- The bulbs of the thermostats and the thermometer are secured inside the corresponding sheaths.
- The turbulators are positioned in all the flues.

- The system is filled with water and completely vented of air.
- The pump or the pumps are working properly.
- The water, electrical, safety device and fuel connections have been performed in compliance with the national and local legislation in force.
- The burner is installed according to the instructions contained in the manual provided by the manufacturer.
- The mains voltage and frequency are compatible with the rating of the burner and the boiler's electrical equipment.

- The system is able to absorb the quantity of heat that will be produced.
- The recirculating pump is installed, as described in par. 5.5.5.

8.2 Starting for the first time

After the positive outcome of the checks described in the previous paragraph, the burner can be ignited for the first time; this operation must be performed by a technician who has been authorised by the Manufacturer of the burner. The technician has full responsibility as regards the field of calibration, within the declared and

approved output range of the boiler. After having opened the fuel on-off cocks and checked that there are no leaks in the supply line, place all the switches on the ON position. The burner will thus be ready for first ignition and for the adjustments to be made by the authorised technician. On first ignition, check that the door, the burner flange and the connections to the chimney are

9. MAINTENANCE

9.1 General instructions

Periodical maintenance is essential for the safety, efficiency and long life of the appliance. All the operations must be carried out by qualified personnel. All cleaning and maintenance operations must be performed after having closed the fuel supply and disconnected the power supply. For the correct operation and maximum efficiency of the boiler, the combustion chamber, fire tubes and smokebox must be cleaned regularly.

9.2 Routine maintenance

The interval between cleaning operations must be established by the user based on the experience acquired on each individual system, consequently the maintenance intervals cannot be established in advance.

In any case, the following minimum intervals are recommended, according to the fuel used:

- Gas: once a year
- Oil: twice a year
- Fuel oil: every 300 hours of operation

In any case, any local maintenance standards in force should be observed. During the routine maintenance operations, after having removed the turbulators, brush the tube bundle and the furnace. Remove the deposits accumulated in the smokebox by opening the inspection doors. For more intense cleaning, remove the rear smokebox and, if deteriorated, replace the flue gas seal. Check that the condensate drain is not blocked. Ensure that the control and measurement devices serving the boiler are working correctly. Measure the amount of top-up water added, and after having analysed the water, add descaler. The calcium and magnesium salts dissolved in the water will, after repeated refills, cause deposits in the boiler and the overheating of the metal plate, with possible damage that is not attributable to materials or workmanship, and consequently not covered by the warranty. After having completed the maintenance and cleaning operations and started the boiler again, check the tightness of the door and the smokebox, and in the event of gas leaks, replace the corresponding gaskets.

The operations carried out must be entered in the system logbook.

9.3 Special maintenance

Special maintenance to be performed at the end of the season or for extended shutdowns. All the operations described in the previous chapter must be completed, plus the following additional operations:

- Check the condition of the turbulators for wear.
- After cleaning the flue gas circuit, wipe with a rag dipped in a diluted solution of caustic soda. After having left to dry, wipe all the surfaces with a rag dipped in oil.

tight and that there is a slight negative pressure at the base of the flue. The fuel rate must correspond to the boiler's rated data and under no circumstances must exceed the maximum output value declared. The temperature of the flue gas must never fall below 160°C.

- Hygroscopic substances (quicklime, silica gel in small containers) should be placed inside the furnace, which must then be closed hermetically so that air cannot enter.
- Do not empty the system and the boiler.
- Protect the screws, nuts and pins on the door with graphite grease.

The operations carried out must be entered in the system logbook.

9.4 Cleaning the boiler (Fig. 19)

To clean the boiler, proceed as follows:

- Open the front door (1) and remove the turbulators (2).
- Clean the inside surfaces of the combustion chamber and the flue gas path using a brush (3) or other suitable implements.
- Remove the deposits accumulated in the smokebox by opening the inspection door (4). For more intense cleaning, remove the smokebox cover (5) and replace the gasket before reassembling.
- Periodically check that the condensate drain (6) is not blocked.

9.5 Checking the operation of the boiler

Before starting and running the functional tests on the boiler, make sure that:

- The turbulators are positioned against the exchanger tubes.
- The cocks in the water circuit and on the fuel lines are open.
- Fuel is available.
- The expansion vessel is suitably filled.
- The pressure of the water circuit, when cold, is more than 1 bar and less than the maximum limit allowed for the boiler.
- The water circuits have been vented.
- The electrical connections to the mains power and the components (burner, pump, control panel, thermostats etc.) have been completed.
- The phase-neutral connection must be observed, and the earth must be connected.

After having performed the operations described above, the following operations are necessary to start the boiler:

- If the system is fitted with a temperature controller or timer-thermostat, check that these are "on".
- Set the room timer-thermostat or the temperature controller to the desired temperature.
- Move the main system switch to "on"
- Set the boiler thermostat located on the control panel
- Move the main switch on the control panel to "on" and check that the green indicator light comes on.

The boiler will run the ignition phase and will remain on until the set temperature has been reached. If problems occur during ignition or operation, the boiler will "LOCKOUT", as signalled by the red light on the burner and the red

8.3 Shutting down the boiler

- Set the temperature controller to the minimum.
- Disconnect power from the burner and close the fuel supply.
- Let the pumps operate until they are stopped by the temperature controller.
- Disconnect power from the electrical panel.

indicator on the control panel. After a "LOCKOUT", wait around 30 seconds before restoring the ignition conditions. To restore the ignition conditions, press the burner "button/light" and wait for the flame to ignite. If this operation fails, it can be repeated a maximum 2-3 times, then check:

- The information provided in the burner instruction booklet.
- The chapter on "CHECKING THE OPERATION OF THE BOILER".
- The electrical connections described on the diagram supplied with the control panel.

When the boiler has started, check that it stops and starts again:

- Adjust the setting of the boiler thermostat.
- Move the main switch on the control panel.
- Set the room thermostat, the timer or the temperature controller.
- Check that the pumps are not blocked and rotate in the correct direction.
- Check the total shutdown of the boiler using the main system switch.

If all the conditions are correct, restart the appliance, check the combustion (flue gas analysis), the fuel rate and the tightness of the gaskets on the door and the smokebox.

9.6 Checking the operation of the burner

- Refer to the burner instruction manual.
- Follow all the local legislation in force on burner maintenance.

9.7 Troubleshooting

The following is a list with information on the main faults or problems that may occur during the operation of the boiler, showing the possible causes and corresponding solutions.

FAULT			
THE BOILER DIRTIES QUITE EASILY			
CAUSE:	Burner poorly adjusted	SOLUTION:	Check the burner adjustment (flue gas analysis)
	Flue blocked		Clean the flue gas path and the flue
	Burner air intake path dirty		Clean the burner air intake
THE BOILER DOES NOT REACH THE SET TEMPERATURE			
CAUSE:	Boiler body dirty	SOLUTION:	Clean the flue gas path
	Boiler/burner combination		Check the data and adjustments
	Burner flow-rate insufficient		Check the burner adjustment
	Control thermostat		Check correct operation
			Check the set temperature
BOILER THERMAL SAFETY SHUTDOWN WITH INDICATOR LIGHT ON THE CONTROL PANEL			
CAUSE:	Control thermostat	SOLUTION:	Check correct operation
			Check the set temperature
			Check the wiring
			Check the probe bulbs
	No water		Check the circuit pressure
	Air present		Check the vent valve
THE BOILER REACHES THE SET TEMPERATURE BUT THE CENTRAL HEATING SYSTEM IS COLD			
CAUSE:	Air in the system	SOLUTION:	Vent the system
	Pump fault		Reset the pump
	Minimum thermostat (if featured)		Check the set temperature
ODOUR OF UNBURNED SUBSTANCES			
CAUSE:	Flue gas leaking into the environment	SOLUTION:	Check and if necessary clean the boiler body
			Check and if necessary clean the flue
			Check the tightness of the boiler and the flue
FREQUENT ACTIVATION OF THE SAFETY VALVE			
CAUSE:	System circuit pressure	SOLUTION:	Check the fill pressure
			Check the system circuit
			Check the calibration
			Check the set temperature
	System expansion vessel		Check

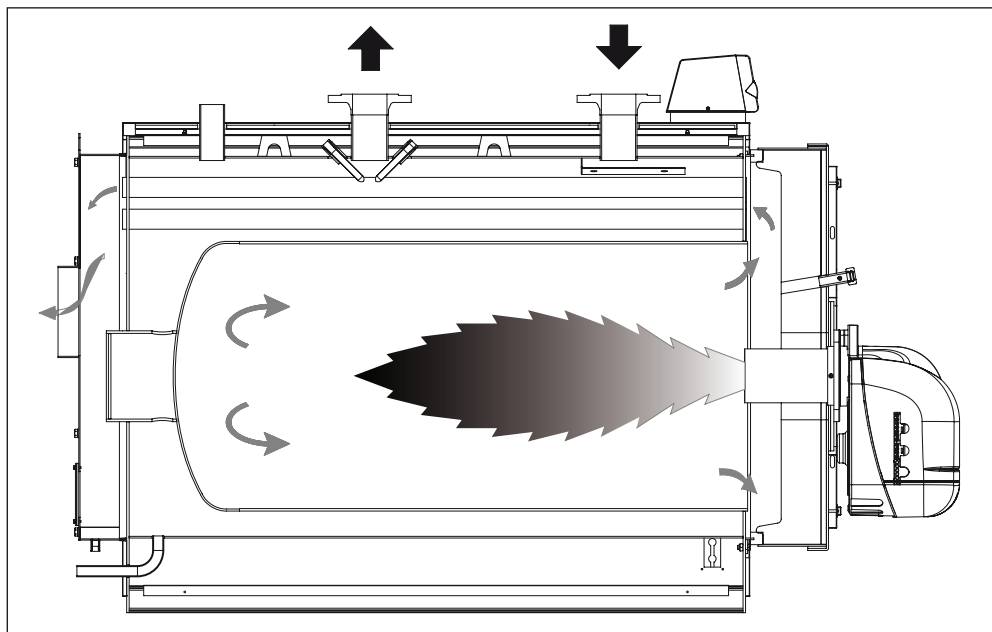


Fig. 1

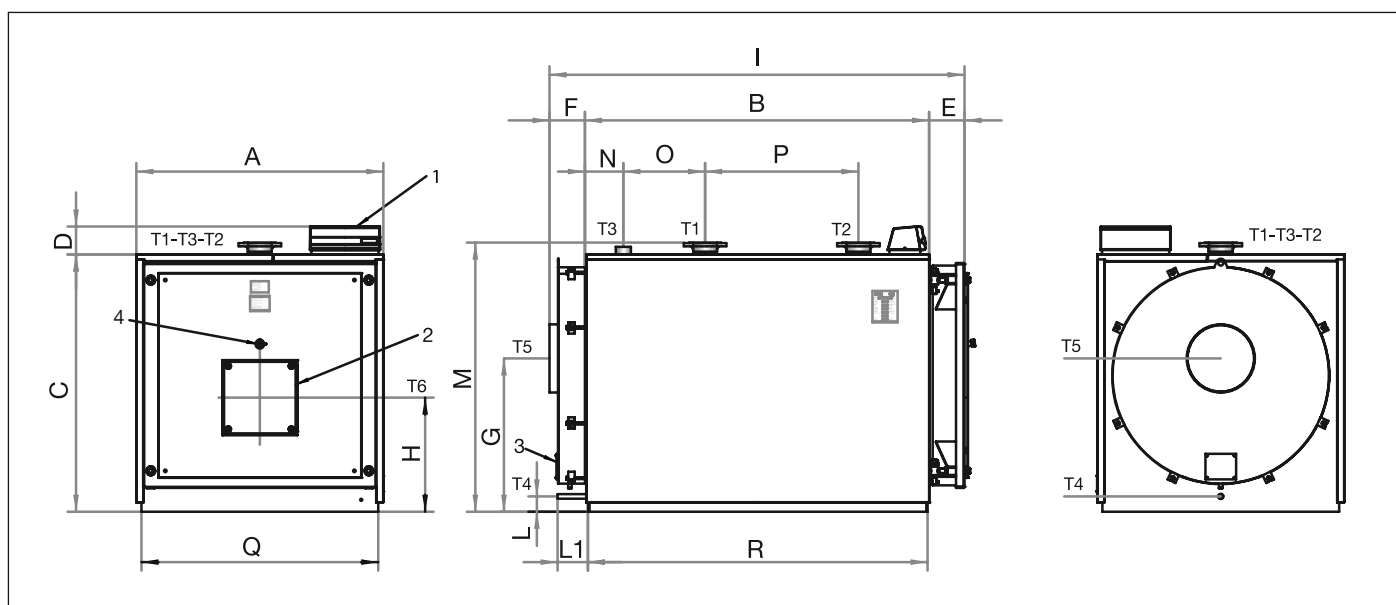


Fig. 2

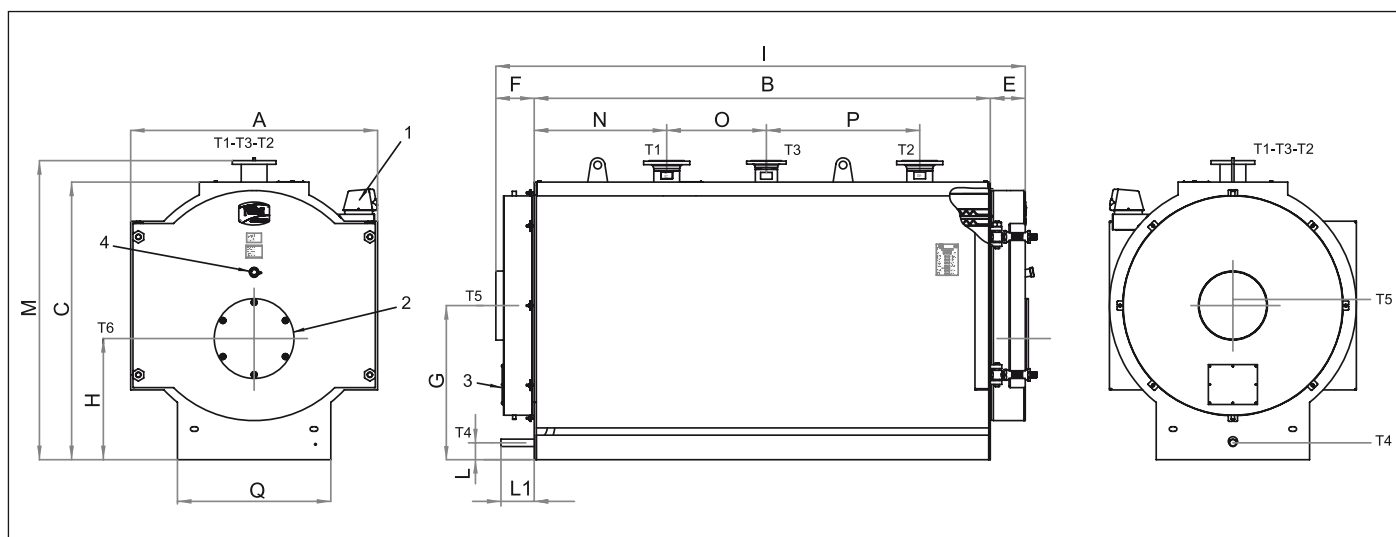


Fig. 3

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No. Matricola Construction No. No. de fabrication Valmistusnumero Node fabricación	<input type="text"/>	
Portata Termica Nominale Nominal Power Input Débit thermique nominal Caudal térmico nominal Nominel termisk forsyning	kW <input type="text"/> t.max safety 114°C bar <input type="text"/>	Konstruktions-nr. Herstell.nr. Fabrikaatnr. No de construccao Konstruktion Nr. Nennwärmeleistung Nominal wärmevermögen Débito térmico nominal Nominel varmetilforsel suurin nimellinen lämpöjakehu Nennheizwert Nominaal verwarmingsvermogen Potencia Nominal Nominel effekt Suurin nimmellisteho Max. Wasserdruck Max. waterdruk Pressao máx. de caldeira Max tryck Boilerin suurin paine Max. Kesseltemperatur Max. Keteltemperatuur Temperatura máx. de caldeira Max varmatemperatur Boilerin suurin lämpötila H ₂ O — I <input type="text"/> Alimentazione elettrica Electrical Input Alimentation électrique Alimentación eléctrica Elektrisk forsyning 230V - ~50 Hz
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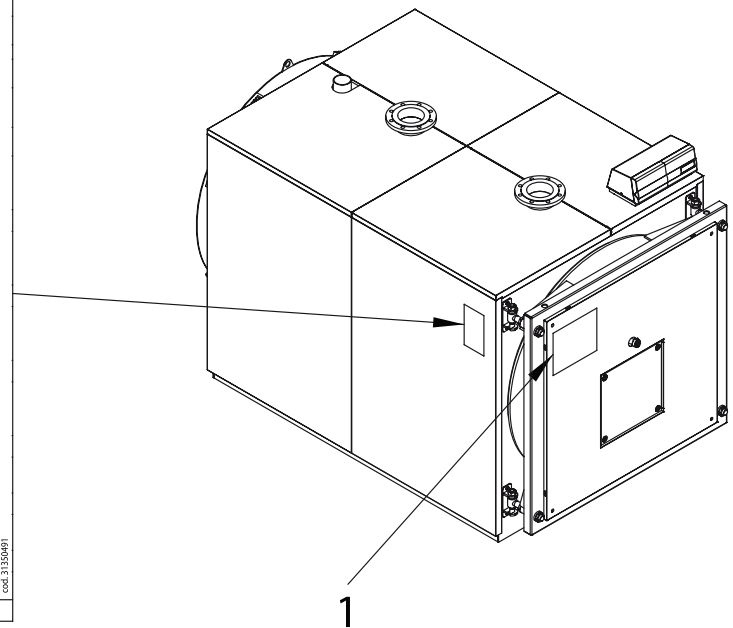


Fig. 4

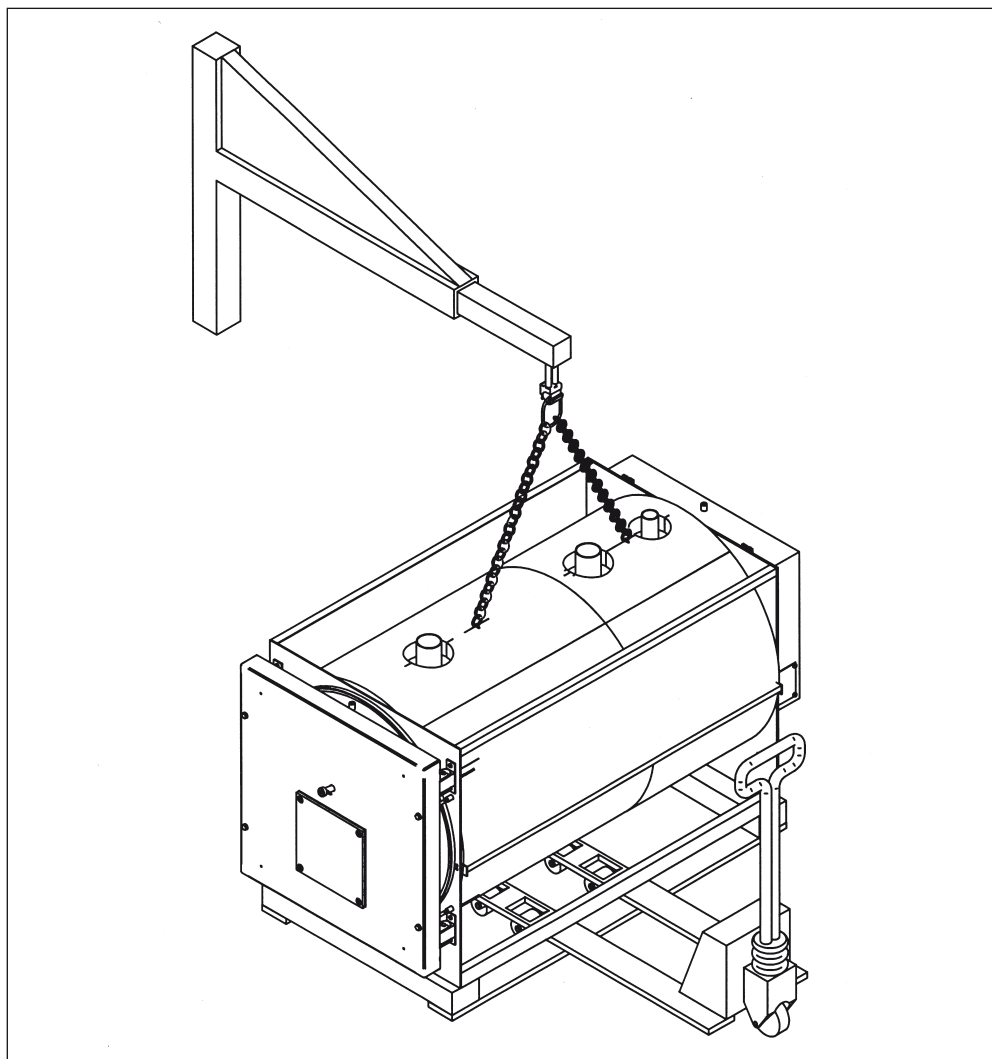


Fig. 5

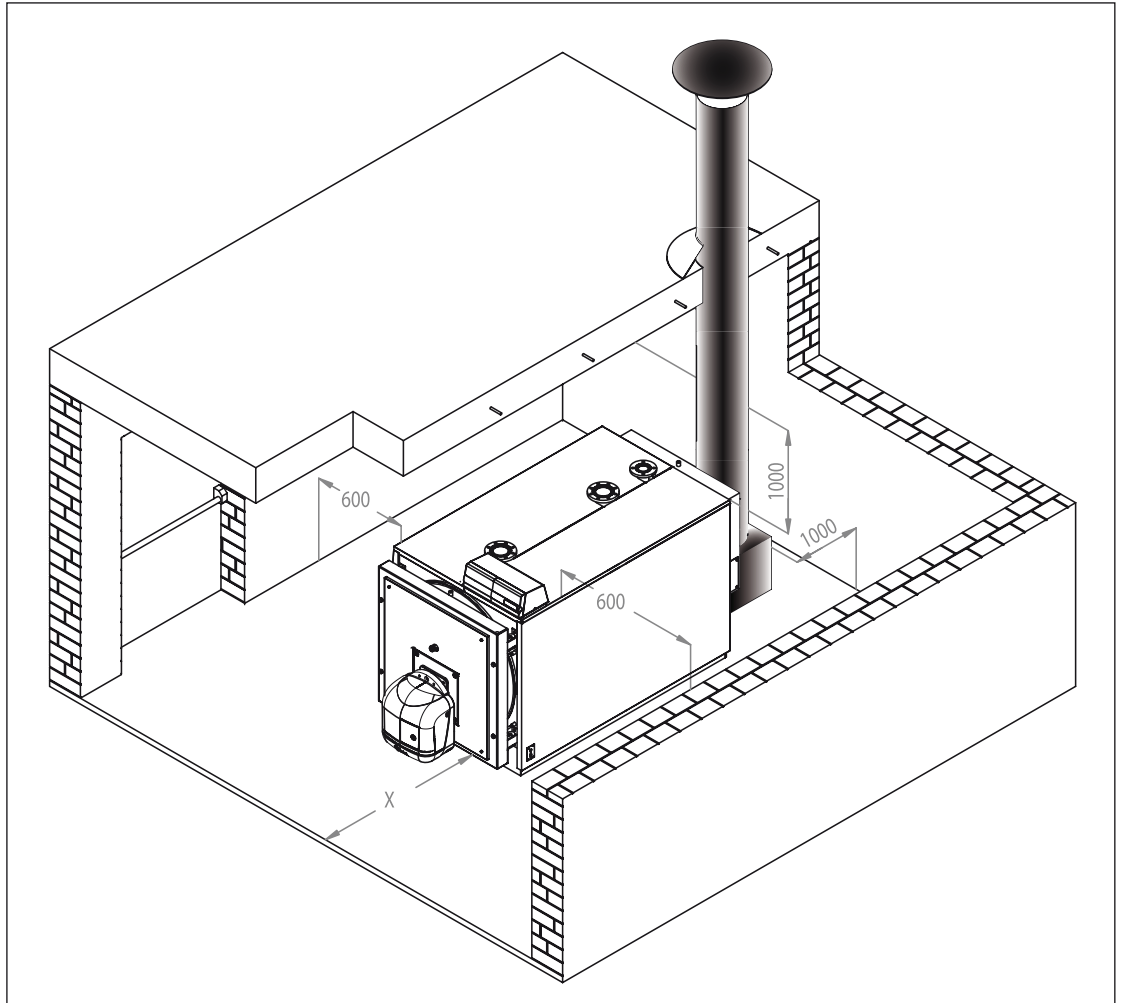


Fig. 6

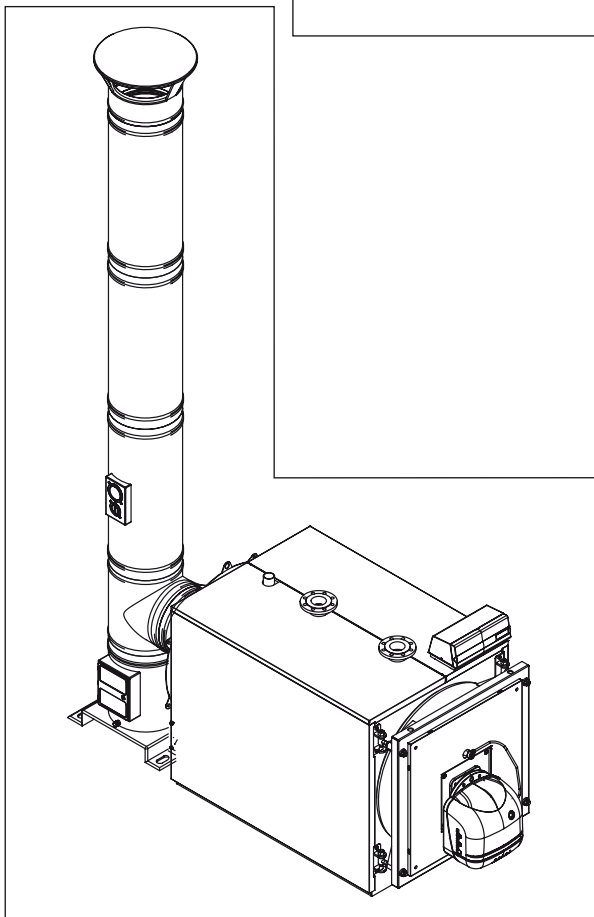


Fig. 7

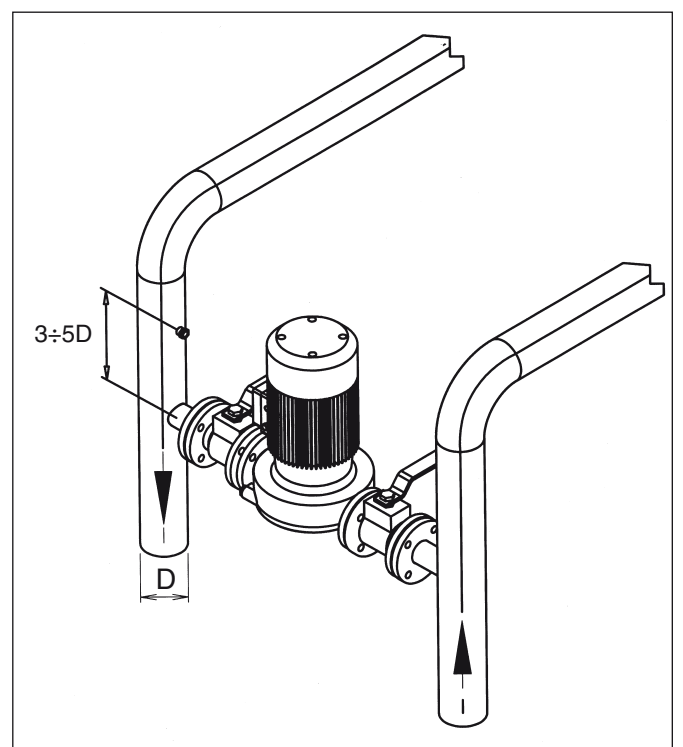


Fig. 8

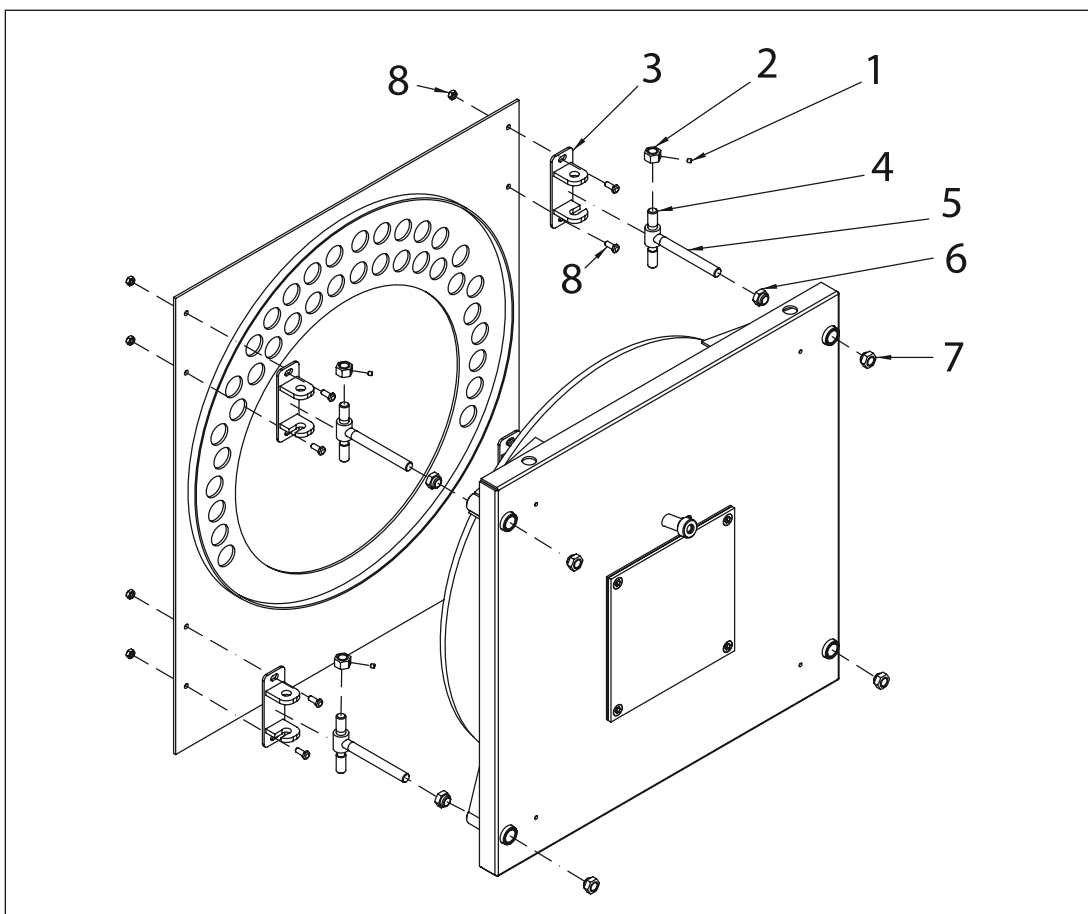


Fig. 9

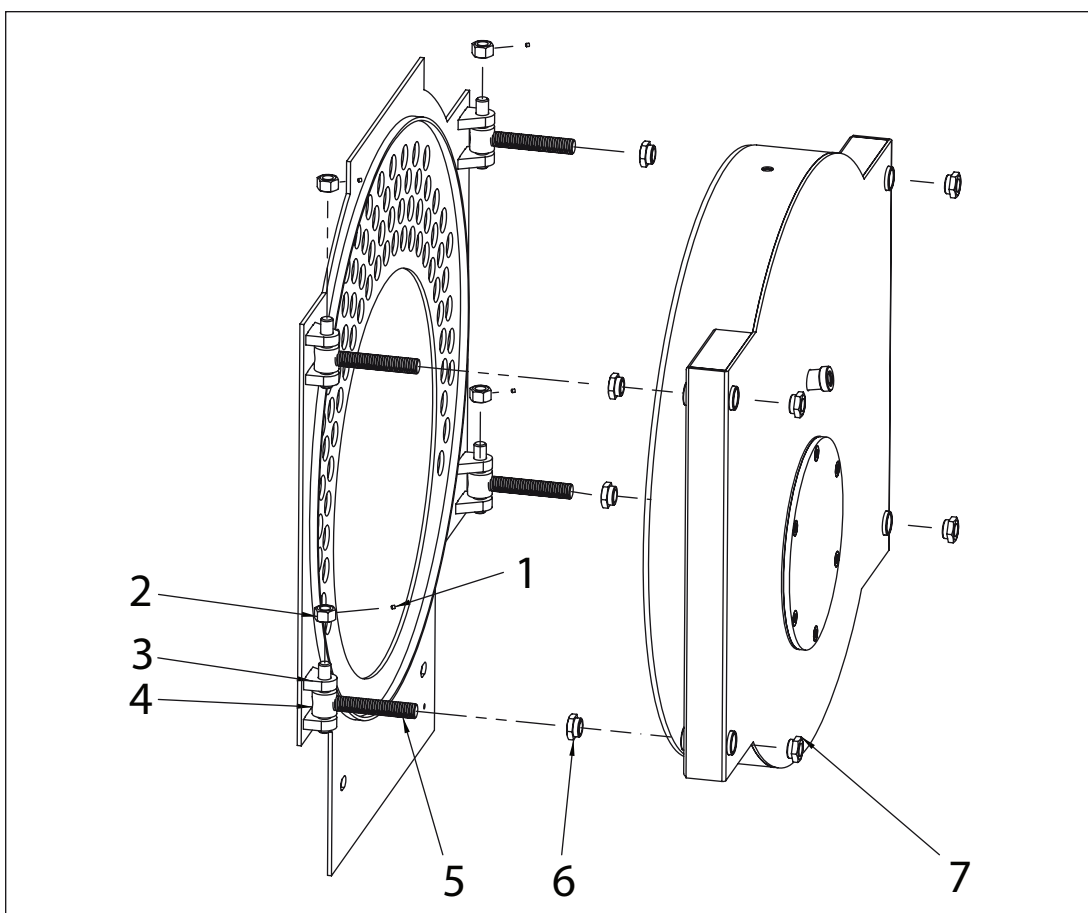


Fig. 10

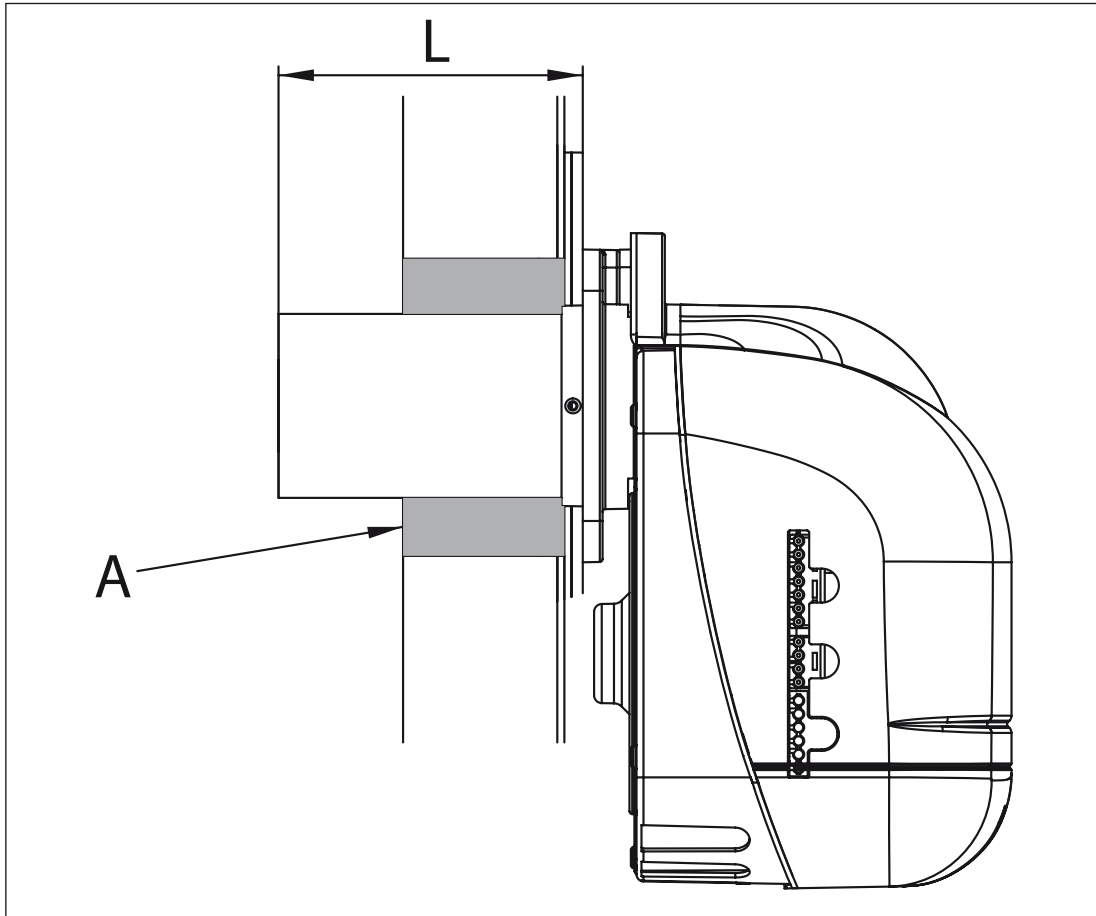


Fig. 11

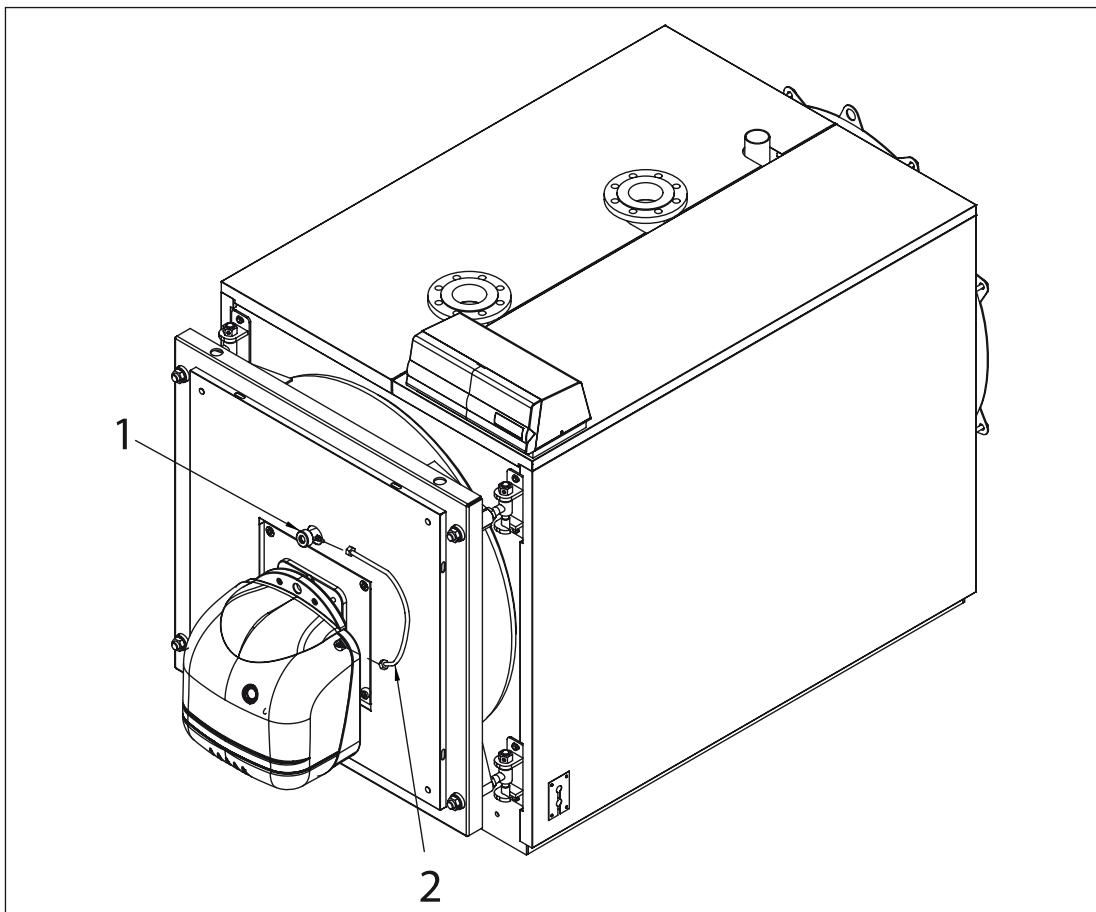


Fig. 12

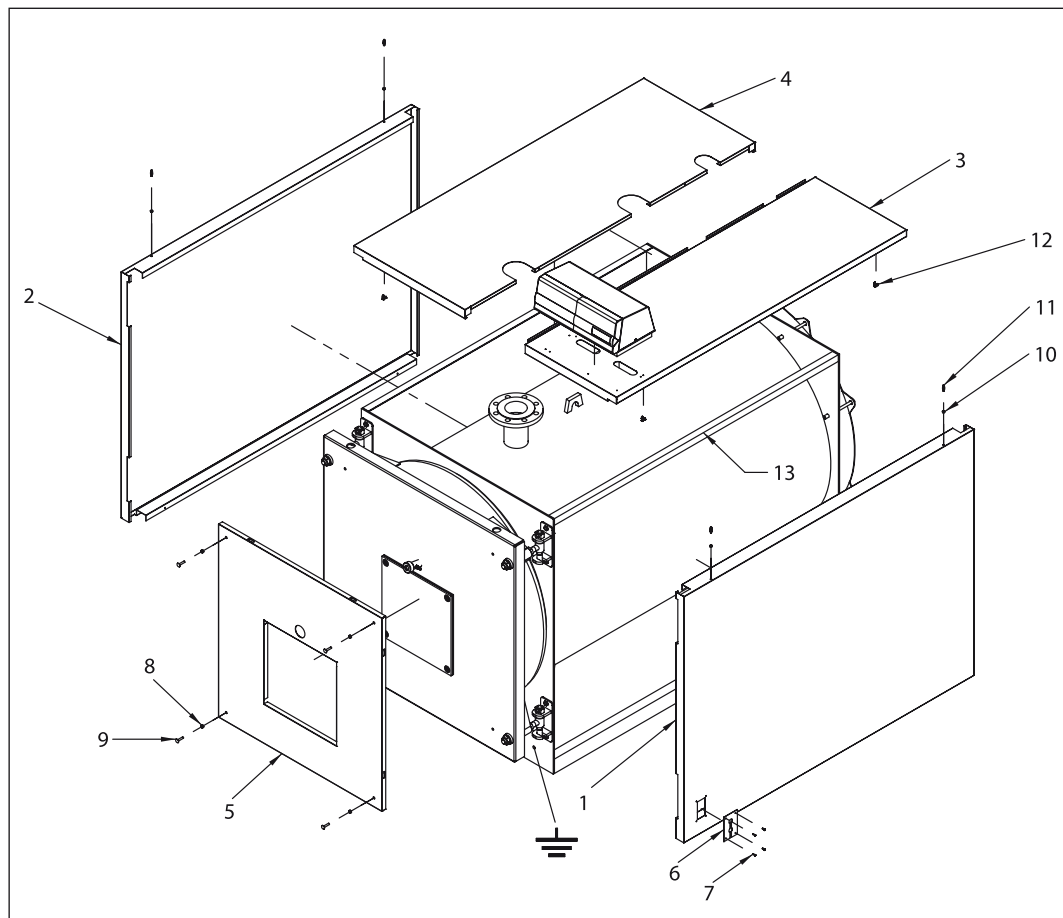


Fig. 13

⚠ Per la messa a terra del corpo caldaia è previsto sulla testata anteriore un punto di connessione.

⚠ A connection point is provided on the front head for earthing the boiler body.

⚠ Une connexion est prévue sur la tête avant pour la mise à la terre du corps de chaudière.

⚠ Para la puesta a tierra del cuerpo de la caldera está previsto en el anterior un punto de conexión.

⚠ Der findes et forbindelsessted til kedelhovedelementets jordforbindelse på forhovedet.

⚠ Für die Erdung des Kesselkörpers ist an der vorderen Stirnseite ein Anschluss vorgesehen.

⚠ Voor de aardaansluiting van het ketellichaam is een aansluitpunt voorzien op het voorste kopstuk.

⚠ Está previsto na cabeça frontal um ponto de conexão para a ligação de terra do corpo da caldeira.

⚠ För att jorda värmepannans struktur, har en anslutningspunkt förutsetts på främre överstycket.

⚠ Etummaisessa päädyssä on liitospiste lämmityskattilan rungon maadoitusta varten.

⚠ Точка подключения на передней плите для заземления корпуса котла.

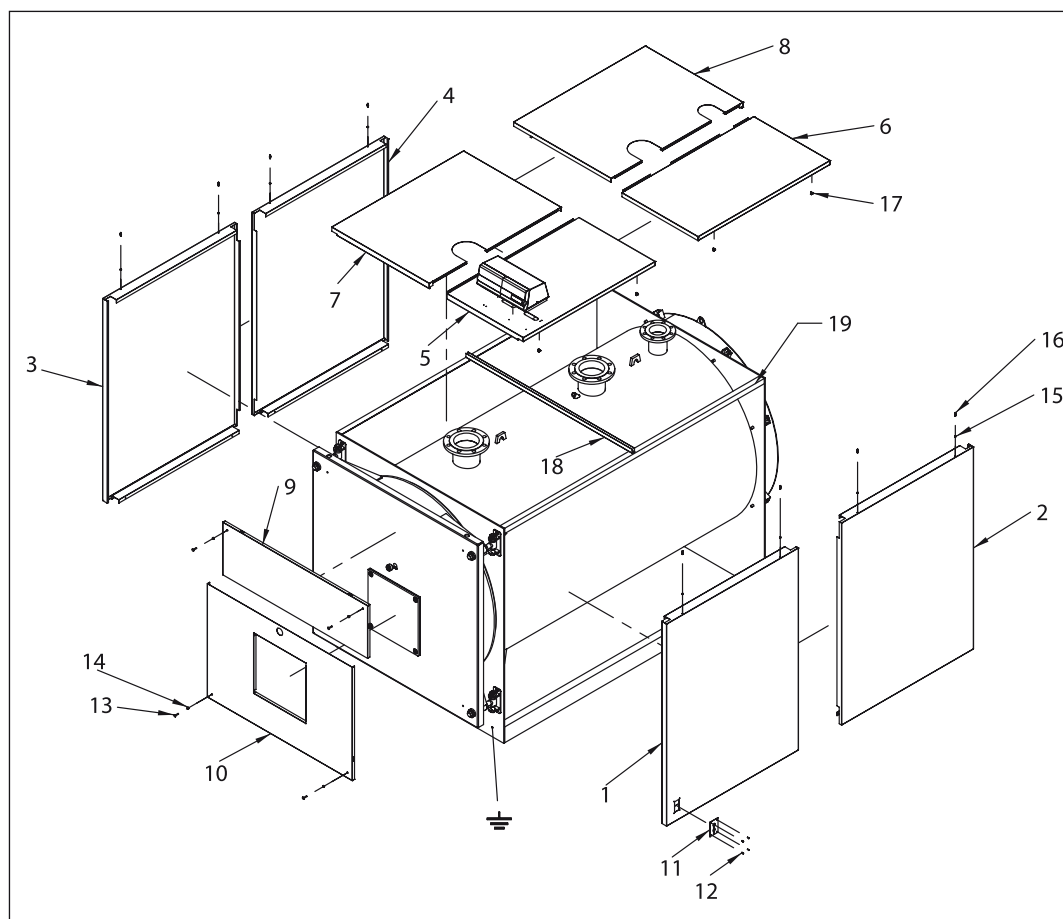


Fig. 14

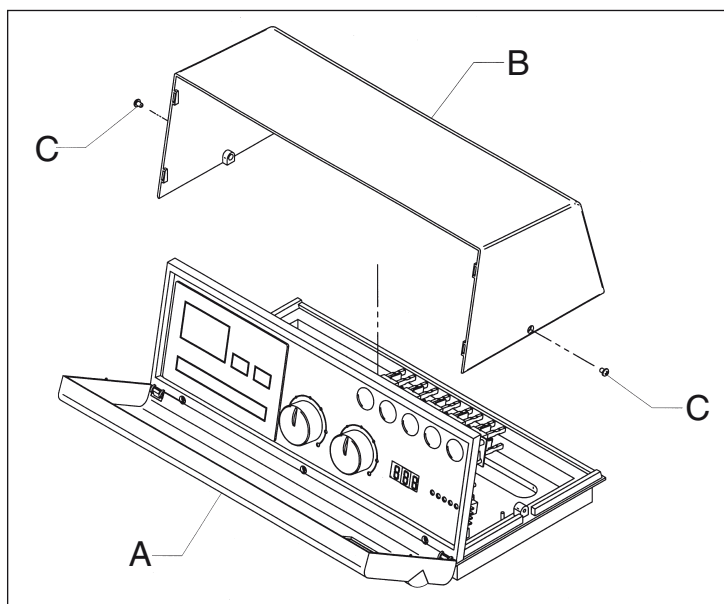


Fig. 15

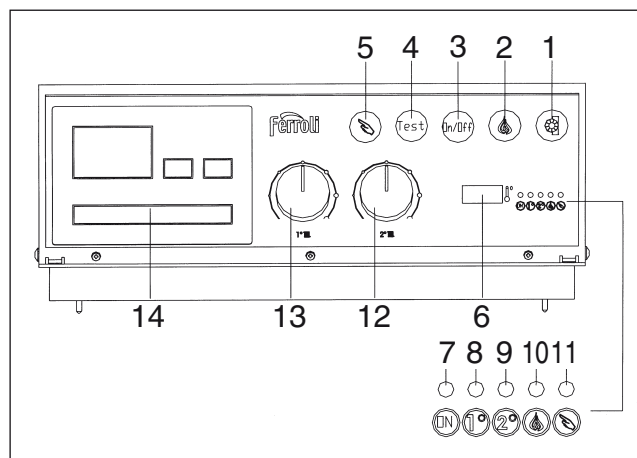


Fig. 16

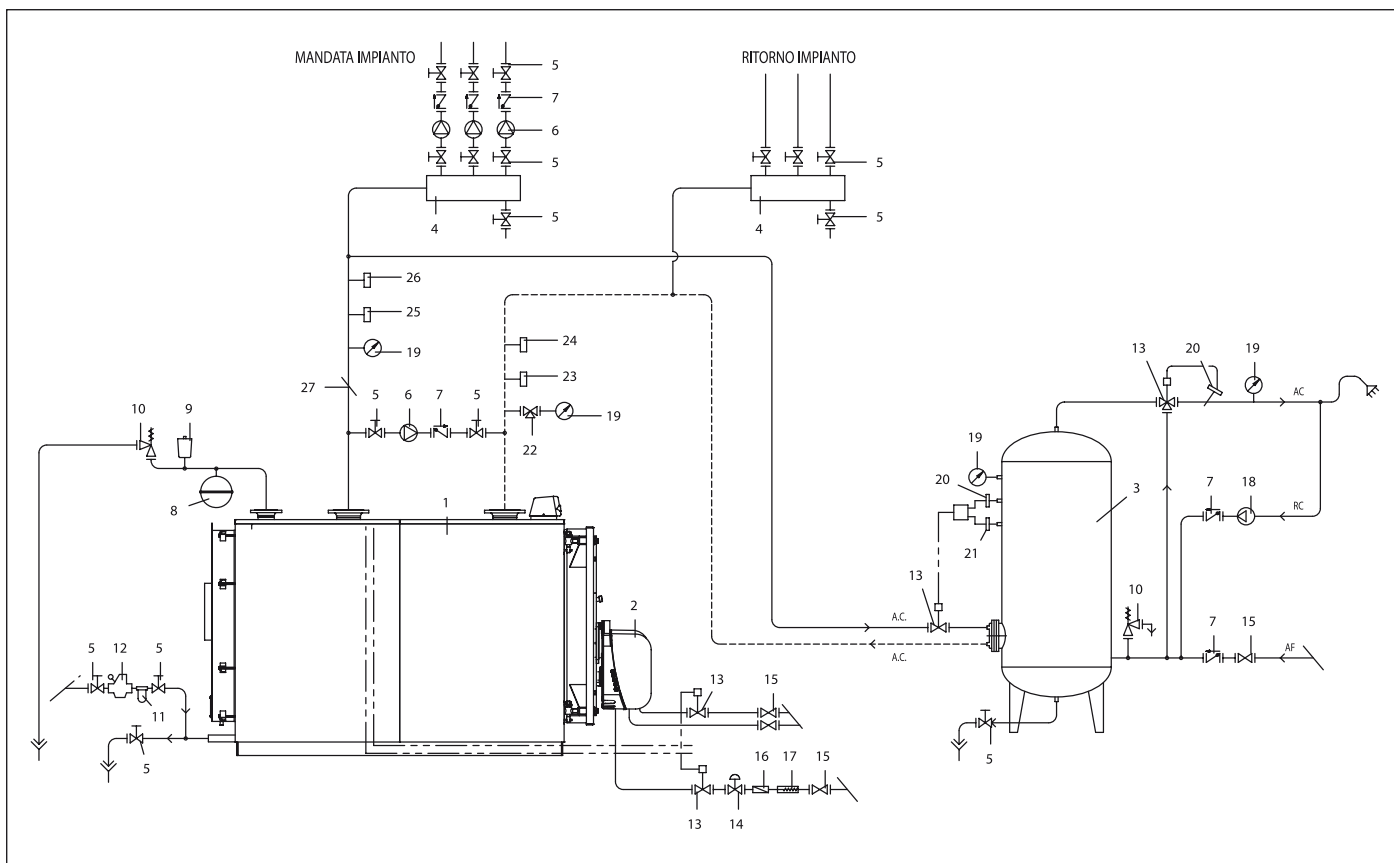


Fig. 18

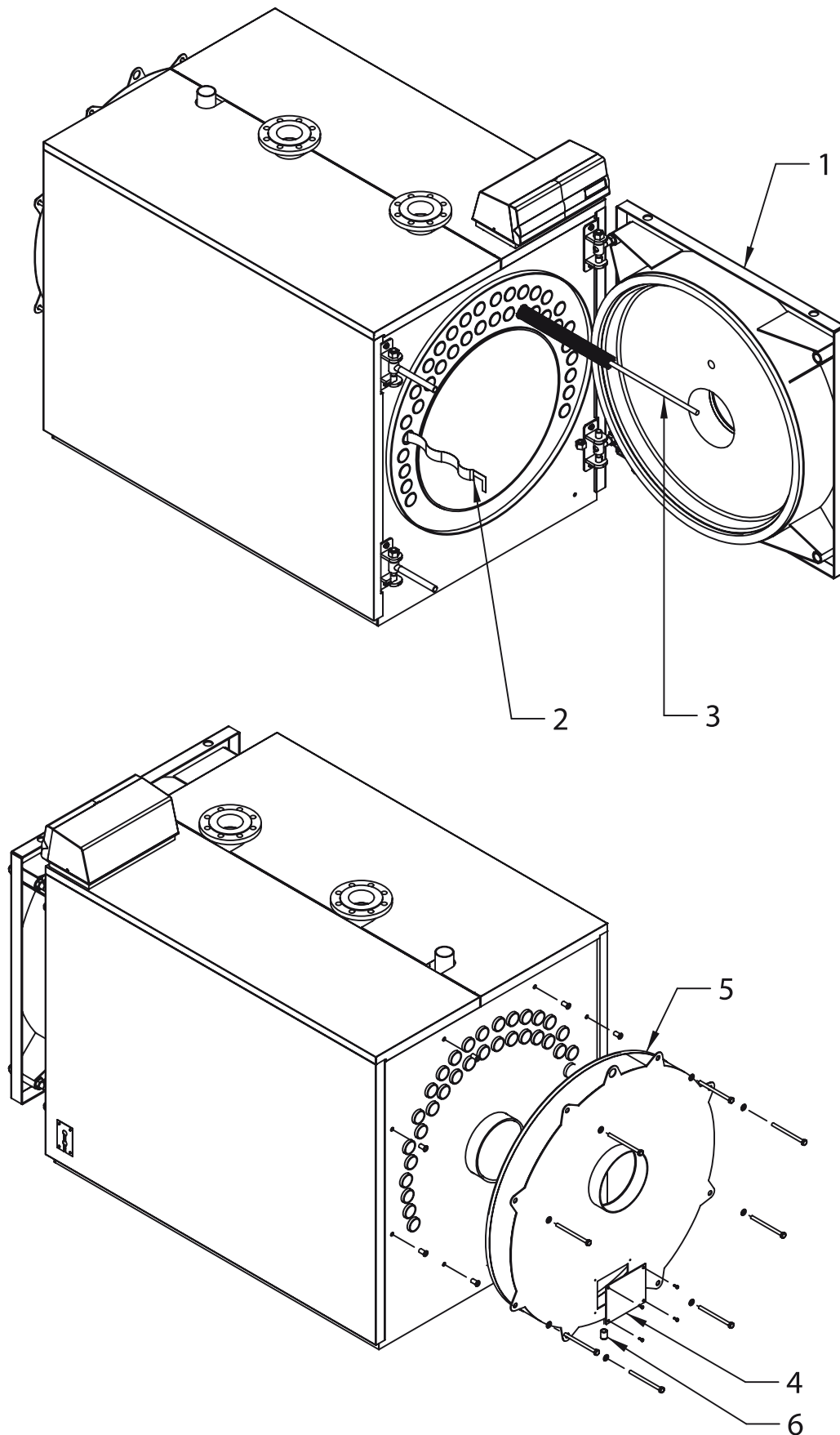


Fig. 19

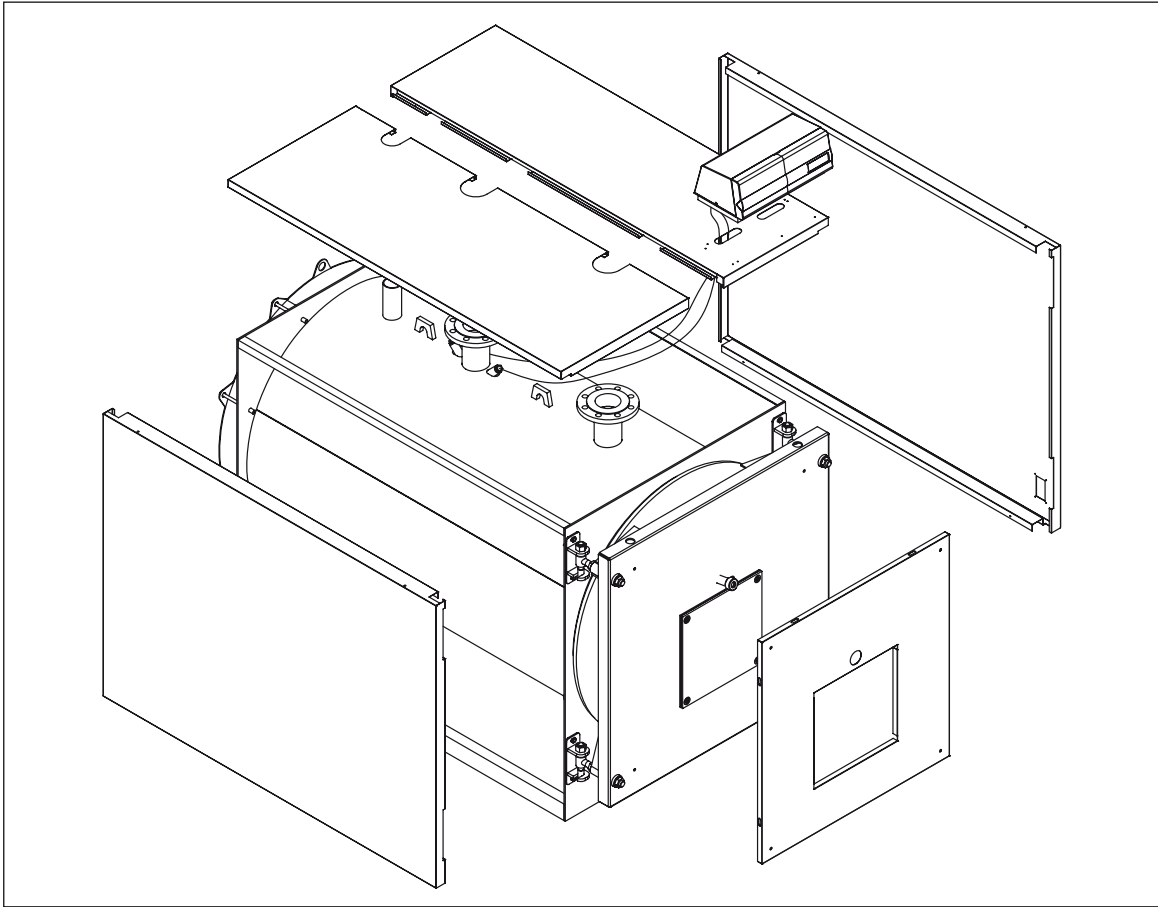


Fig. 20

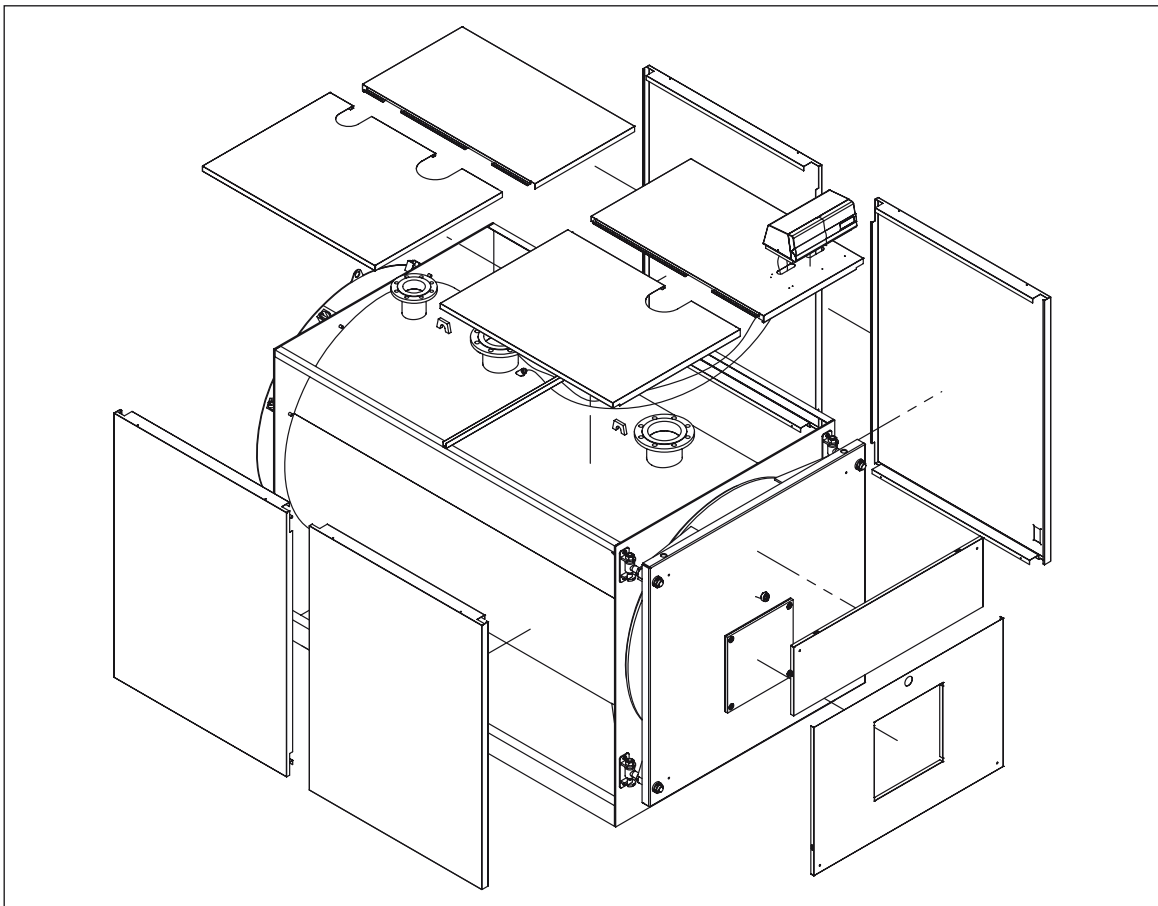


Fig. 21



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