



Arizona 150 – 3500kW

Installation and Instruction Manual



AutomaticHeating
efficiency □ performance □ solutions

Dear Customer,

Thank you selecting our company and choosing to purchase our products. We invite you to carefully read these instructions for correct installation, operation and maintenance of the above-mentioned products.

In accordance with standard installation regulations, we inform the User that:

- The boilers must be installed by a qualified installer, strictly adhering to the regulations in force.
- The installer is obliged by Law to issue a Declaration of Conformity with the regulations in force relating to the installation performed.
- Anyone entrusting the installation to an unqualified installer, is subject to administrative penalties.
- Maintenance of the boilers must be performed only by qualified personnel who meet the requirements of the regulations in force.



General information for installation and maintenance personnel and for the User

This instruction manual is an integral and essential part of the product and must be given by the installer to the User who must look after it for future consultation.

This manual must accompany the product in the case it is sold or moved.



The present product is designed to be connected to a water heating system for heating buildings or to a sanitary hot water heating system. Any other use is considered inappropriate and, therefore, dangerous for people, animals and/or property.

Installation must be performed in accordance with regulations in force and with the instructions of the manufacturer provided in the present booklet:

Incorrect installation can cause damage to persons, animals and/or property. The manufacturer does not accept responsibility for such damage.

Before installing the product, ensure that the technical data and characteristics correspond with requirements in order to guarantee correct functioning in the system. If this should not be the case, do not install the product.

Damage caused by installation or operating errors or due to a failure to observe the instructions of the manufacturer, do not constitute any contractual or extra-contractual responsibility of the manufacturer.

Furthermore, check the integrity of the product and that it has not been damaged during transport and moving. Do not install products which indicate damage and/or faults.

Only original accessories supplied by the manufacturer must be used for products with optional devices or kits (including electrical). If non-original accessories not supplied by the manufacturer are used, the correct functioning of the accessories and product cannot be guaranteed.

Do not dispose of the packaging into the environment during installation. All materials are recyclable and must be placed at the appropriate differentiated collection points.

Do not leave packaging within the reach of children since it can be, by its very nature, dangerous.

In the case of faults and/or defective functioning of the product, deactivate it and refrain from attempting to repair or intervene directly. Contact only qualified personnel who meet the requirements established by Law, for maintenance service.

Any repair of the product must use original spare parts supplied by the manufacturer.

Failure to observe the above instructions can compromise the safety of the product and expose persons, animals and/or property to danger.



Ensure periodic maintenance of the product according to the schedule specified in the relevant section of the present manual.

Correct maintenance ensures that the product operates in the best conditions, respecting the environment and in completely safety for persons, animals and/or property.

Incorrectly performed or timed maintenance can present a danger to persons, animals and/or property.

Refer maintenance and repair operations exclusively to qualified personnel who meet the requirements established by legislation in force.

If the boiler is not used for long periods, disconnect the power supply and close the fuel supply.

Place some calcium carbonate inside the furnace to absorb moisture.

Should there be a risk of freezing, add anti-freeze in the heating system. Do not empty the system as this may damage the entire system.

Use specific anti-freeze products suitable for multi-metal heating systems.



For boilers which use gaseous fuel, if a smell of gas is noticed:

- Do not activate electrical switches and do not turn on electrical devices;
- Do not ignite flames and do not smoke;
- Close the main gas tap;
- Open all doors and windows;
- Contact a qualified technician who meets the requirements of legislation in force or the gas supply company.

USING FLAMES TO DETECT GAS LEAKS IS STRICTLY FORBIDDEN.



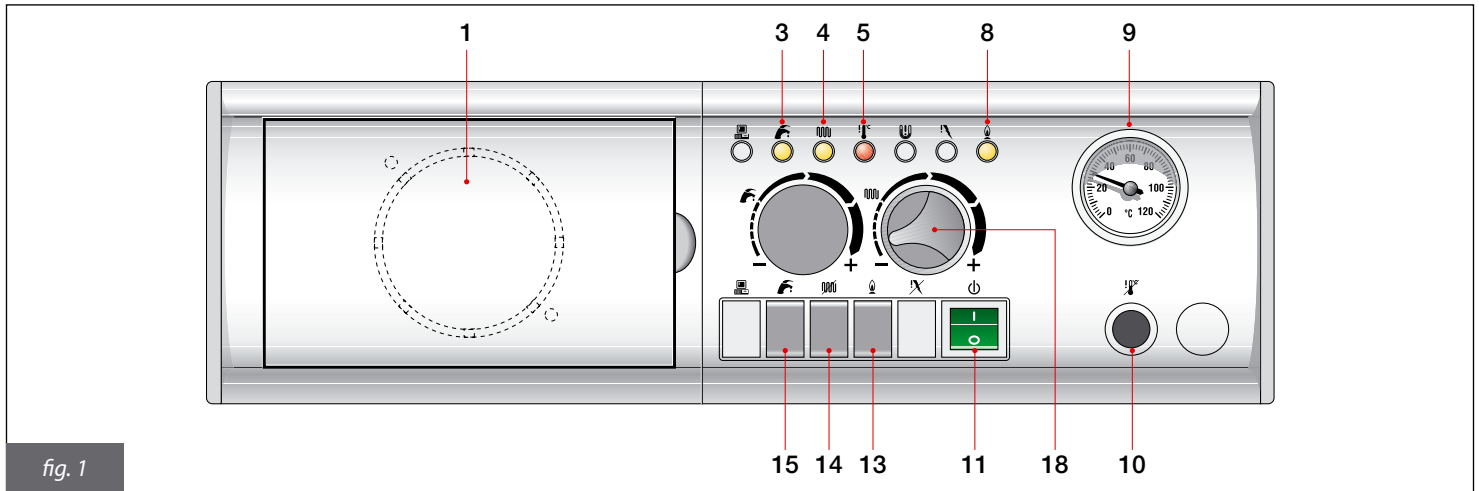
This product has been built for installation in the countries indicated on the technical data plate: Installation in any other country can present a danger to persons, animals and/or property.

The manufacturer does not accept any contractual or extra-contractual responsibility due to failure to observe the above instructions.

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1. User instructions

1.1. Control panel



1. Space for programming clock (optional) or for thermoregulation control unit (optional)

A thermoregulation control unit (optional) or a programming clock (optional) can be inserted here to programme the times for switching the boiler on and off.

3. DHW mode indicator light (yellow)

This indicator light indicates a DHW request (only if the boiler is connected to a DHW System).

4. CH mode indicator light (yellow)

This indicator light signals a heating request by the system.

5. Indicator light for shutdown due to excessive temperature (red)

This indicator light signals intervention of the safety thermostat with manual reset, due to an operational fault. In order to re-set the boiler to normal operation, see Point 10.

8. Burner on light (yellow)

This light indicates that the burner is receiving electrical power (request for heat).

9. Thermometer

The function of the thermometer is to indicate the flow water temperature.

10. Overheating thermostat with manual reset

After removing the black protection cover, it is possible to access the safety thermostat reset button. Press the button to reset the safety thermostat and start-up the boiler (following shutdown due to overheating).

11. Main power switch (green)

With the switch in position 0 the boiler is not electrically powered (boiler off) and the switch is off. With the switch in position I the boiler is electrically powered (boiler on) and the switch is lit up (green).

13. Burner switch

This switch turns the burner off.

14. Heating pump switch

This switch turns the CH pump(s) off.

15. DHW pump switch

This switch turns the DHW pump off (only if the boiler is connected to a DHW system).

18. CH water temperature regulator

This regulator allows the setting of the boiler water temperature, between a minimum value of 60°C and a maximum value of 90°C.

Correspondence of indicator lights with boiler status

	Light 11	Light 3	Light 4	Light 5	Light 8
Switch 11 in "0" position or electrical power off	OFF	OFF	OFF	OFF	OFF
Switch 11 in "I" position	GREEN	n.a.	n.a.	n.a.	n.a.
Burner power on	GREEN	n.a.	n.a.	OFF	YELLOW
DHW mode request ⁽¹⁾	GREEN	YELLOW	OFF	OFF	YELLOW
CH mode request	GREEN	OFF	YELLOW	OFF	YELLOW
Emergency thermostat shutdown	GREEN	n.a.	n.a.	RED	OFF

Table 1

⁽¹⁾ Only if the boiler is connected to a DHW system. DHW mode always has priority over CH mode.

Legend:

OFF – Light off
GREEN – Light permanently on (colour indicated)
n.a. – Light status not significant

1.2. Boiler operation

Refer to Table 1 for boiler operation status indicators.

1.2.1. Switching on

NOTE

See also Point 3.3 and sub-sections.

- Check the value of the water pressure in the system:
 - Maximum pressure 6 bar – 600kPa;
 - Minimum pressure 0.8÷1 bar, 80-100 kPa.
- Open the fuel tap.
- Position the boiler main switch **11** in the **I** position (switch is lit up).
- Place the burner switch **13** in the **ON** position (up).
- By turning the heating water temperature regulator **18**, set the value of the desired temperature for the water in the system.
- Set the value of the room temperature on the room thermostat (if present).
- When the system requires heat, the CH request light **4** lights up.
- When the burner is in operation, the burner indicator light **8** lights up.

The boiler is equipped with a thermometer displaying the water temperature.

1.2.2. Boiler shutdown

When there is a system malfunction, the burner automatically shuts down and the shutdown light on the boiler comes on.

In this case, proceed as follows:

- First, check the fuel supply.
- Then restart the burner by pressing the reset button on the burner. If the boiler does not restart after three attempts, call authorised personnel who satisfy the requirements of regulations in force, for maintenance service.

If the boiler shuts down frequently, indicating that there is a recurring fault, call qualified personnel who are able to meet the requirements of regulations in force, for maintenance service.

1.2.3. Shutdown due to overheating

If the red overheating light **10** lights up, indicating that the manual reset safety thermostat has activated due to a malfunction, contact qualified personnel who satisfy the requirements of regulations in force, for maintenance service.

1.3. Maintenance

Ensure periodic maintenance of the boiler according to the schedule specified in the relevant section of the present manual.

Correct maintenance ensures that the boiler and the burner operate in the best conditions, respecting the environment and in complete safety for persons, animals and/or property.

It is compulsory to have maintenance and repair operations performed by qualified personnel who meet the requirements established by legislation in force.

1.4. Information for the User

The User has free access only to parts of the boiler which can be operated without the use of tools and/or devices. It is, therefore, forbidden to dismantle the exterior cover of the boiler and tamper with the internal parts.

NO ONE, INCLUDING QUALIFIED PERSONNEL, IS AUTHORISED TO MAKE ANY MODIFICATIONS TO THE BOILER.

Qualified personnel who meet the requirements of legislation in force, can install on the boiler specific original accessories supplied by the manufacturer.

The manufacturer declines any responsibility for damage to persons, animals or property due to tampering or inappropriate interventions on the boiler.

The heating system can be effectively protected from freezing by using specific anti-freeze products suitable for multi-metal systems. Do not use anti-freeze products for car engines and regularly check the effectiveness of the product over time.

2. Technical characteristics and dimensions

2.1. Technical characteristics

These boilers are steel, pressurised, horizontal cylindrical type, with flame reversing process in the furnace and a third combustion flue pass.

They may be used for heating water to a temperature not exceeding boiling point under installation conditions.

The boilers meet the essential requirements of the relevant EC Directives, the laws and standards of the countries of destination which are indicated on the technical data plate of the boiler.

Installation in any other country can present a danger to persons, animals and/or property.

The boiler is a single-body type, compatible with blown air burners that can work on gas or liquid fuels.

The following models are available:

70 - HR 70, heat output 70 kW

80 - HR 80, heat output 80 kW

90 - HR 90, heat output 90 kW

100 - HR 100, heat output 100 kW

120 - HR 120, heat output 120 kW

150 - HR 150, heat output 150 kW

200 - HR 200, heat output 200 kW

250 - HR 250, heat output 250 kW

300 - HR 300, heat output 300 kW

350 - HR 350, heat output 350 kW

400 - HR 400, heat output 400 kW

500 - HR 500, heat output 500 kW

620 - HR 620, heat output 620 kW

750 - HR 750, heat output 750 kW

850 - HR 850, heat output 850 kW

950 - HR 950, heat output 950 kW

1020 - HR 1020, heat output 1020 kW

1200 - HR 1200, heat output 1200 kW

1300 - HR 1300, heat output 1300 kW

1400 - HR 1400, heat output 1400 kW

1600 - HR 1600, heat output 1600 kW

1800 - HR 1800, heat output 1800 kW

2000 - HR 2000, heat output 2000 kW

2400 - HR 2400, heat output 2400 kW

3000 - HR 3000, heat output 3000 kW

3500 - HR 3500, heat output 3500 kW

The boilers are fitted with a right- or left-hinged door.

The outer casing is lined with a glass wool layer.

Hooks are fitted to the upper part of the casing for lifting the boiler.

The boilers are fitted with a blind cylindrical furnace in which the centre flame of the burner reverses peripherally forwards: from there, the combustion gases enter the flue gas ducts. The flue gas is then collected in the smoke chamber at the extremity of the ducts and sent to the chimney.

While the burner is operating, within the range of output of the boiler, the combustion chamber always remains under pressure.

The boilers are designed to operate either with an ON/OFF burner or with a two-stage or modulating burner, on condition that the minimum heat output is not lower than the value indicated on the technical data plate for the type of fuel used.

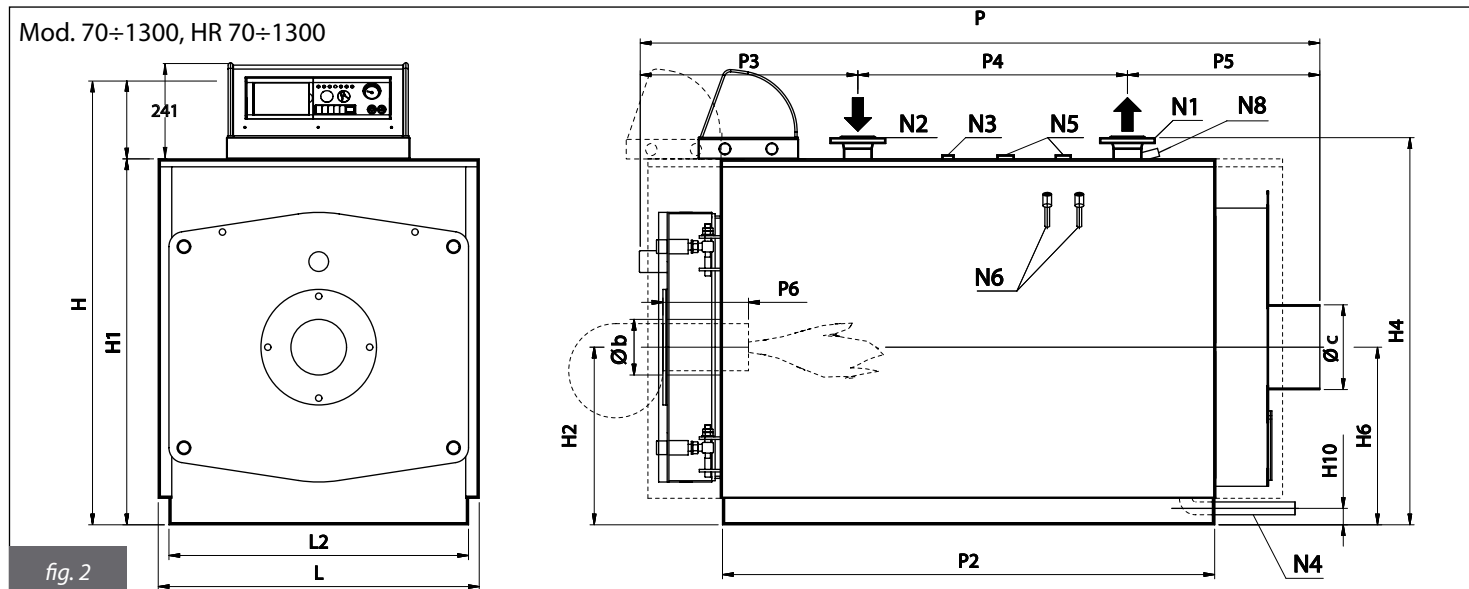
The control panel is designed for managing the CH mode only and it includes:

- Main back-lighted switch
- Burner switch
- CH pump switch
- DHW pump switch
- Indicator lights for:
 - Power on
 - Heating on
 - DHW mode
 - Burner on
 - Shutdown due to overheating
- Two-stage boiler water temperature regulator (60/90°C) with 8°C difference between 1st and 2nd stage
- Safety thermostat (100°C)
- Minimum thermostat (45°C)
- Thermometer

For DHW management, the control panel can be fitted with the following optional equipment:

- an additional CH pump and a DHW pump
- a water storage heater priority thermostat
- a thermoregulation control unit
- a board for controlling three different CH zones

2.2. Dimensions



Model	H	H1	H2	H4	H6	H10	L	L2	P	P2	P3	P4	P5	P6	Øb	Øc	N1	N2	N3	N4	N5	N6	N8
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	DN/in	DN/in	DN/in	DN/in	DN/in	in	in
70 - HR 70	1030	855	415	911	415	54.5	750	700	994	630	413	240	402	200-250	130	200	50	50	1"	1"	-	1/2"	1/2"
80 - HR 80	1030	855	415	911	415	54.5	750	700	994	630	413	240	402	200-250	130	200	50	50	1"	1"	-	1/2"	1/2"
90 - HR 90	1030	855	415	911	415	54.5	750	700	1119	755	513	265	417	200-250	130	200	50	50	1"	1"	-	1/2"	1/2"
100 - HR 100	1030	855	415	911	415	54.5	750	700	1119	755	513	265	417	200-250	130	200	50	50	1"	1"	-	1/2"	1/2"
120 - HR 120	1030	855	415	911	415	54.5	750	700	1119	755	513	265	417	200-250	130	200	50	50	1"	1"	-	1/2"	1/2"
150 - HR 150	1080	905	440	961	440	54.5	800	750	1364	1000	513	475	452	200-250	160	250	50	50	1"	1"	-	1/2"	1/2"
200 - HR 200	1080	905	440	961	440	54.5	800	750	1364	1000	513	475	452	200-250	160	250	50	50	1"	1"	-	1/2"	1/2"
250 - HR 250	1080	905	440	961	440	54.5	800	750	1614	1250	513	725	376	200-250	160	250	50	50	1"	1"	-	1/2"	1/2"
300 - HR 300	1180	1005	490	1061	490	54.5	900	850	1614	1295	523	700	467	200-250	180	250	65	65	1"	1"	-	1/2"	1/2"
350 - HR 350	1180	1005	490	1061	490	54.5	900	850	1864	1500	523	980	437	200-250	180	250	65	65	1"	1"	-	1/2"	1/2"
400 - HR 400	1190	1015	500	1095	500	50	940	890	1872	1502	600	850	422	230-280	225	250	80	80	1"	1"	1"1/4 ⁽¹⁾	1/2"	1/2"
500 - HR 500	1380	1205	610	1285	610	60	1160	1110	1946	1502	663	850	437	270-320	225	300	80	80	1"	1"1/4	1"1/4	1/2"	1/2"
620 - HR 620	1380	1205	610	1285	610	60	1160	1110	2235	1792	663	1150	427	270-320	225	300	80	80	1"	1"1/4	1"1/4	1/2"	1/2"
750 - HR 750	1510	1335	675	1417	675	60	1290	1240	2247	1753	704	1100	451	270-320	280	350	100	100	1"	1"1/4	1"1/2	1/2"	1/2"
850 - HR 850	1510	1335	675	1417	675	60	1290	1240	2247	1753	704	1100	451	270-320	280	350	100	100	1"	1"1/4	1"1/2	1/2"	1/2"
950 - HR 950	1510	1335	675	1417	675	60	1290	1240	2497	2003	704	1200	596	270-320	280	350	100	100	1"	1"1/4	1"1/2	1/2"	1/2"
1020 - HR 1020	1660	1485	750	1568	750	60	1440	1390	2477	2003	704	1200	596	270-320	280	400	125	125	1"	1"1/4	1"1/2	1/2"	1/2"
1200 - HR 1200	1660	1485	750	1568	750	60	1440	1390	2477	2003	704	1200	596	270-320	280	400	125	125	1"	1"1/4	1"1/2	1/2"	1/2"
1300 - HR 1300	1660	1485	750	1568	750	60	1440	1390	2477	2003	704	1200	596	270-320	280	400	125	125	1"	1"1/4	1"1/2	1/2"	1/2"

(1) Single connection

- N1** Boiler flow
- N2** Boiler return
- N3** Connection to additional equipment
- N4** Connection to system loading/unloading
- N5** Safety valve(s) connection
- N6** Bulb-holding well
- N8** Inspection well

Mod. 1400÷3500, HR 1400÷3500

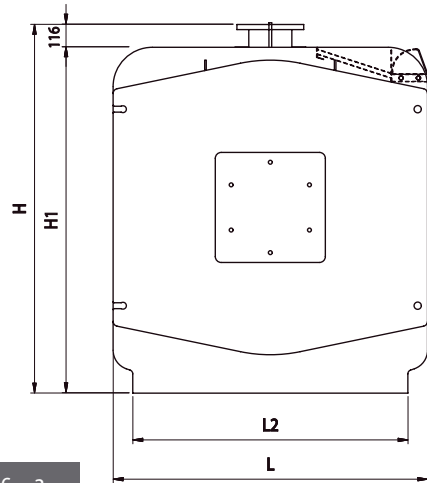
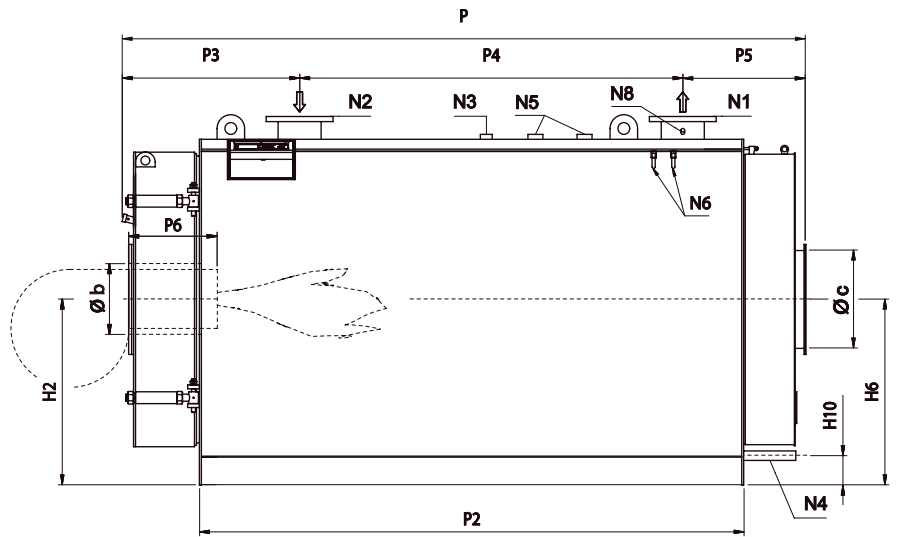


fig. 3



Model	H	H1	H2	H6	H10	L	L2	P	P2	P3	P4	P5	P6	Øb	Øc	N1	N2	N3	N4	N5	N6	N8
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	DN/in	DN/in	DN/in	DN/in	DN/in	in	in
1400 - HR 1400	1746	1630	880	880	150	1470	1270	2886	2300	831	1300	755	350-400	320	400	150	150	1"	1"1/4	1"1/2	1/2"	1/2"
1600 - HR 1600	1746	1630	880	880	150	1470	1270	2886	2300	831	1300	755	350-400	320	400	150	150	1"	1"1/4	1"1/2	1/2"	1/2"
1800 - HR 1800	1746	1630	880	880	150	1470	1270	3096	2510	771	1850	475	450-500	320	400	150	150	1"	1"1/4	1"1/2	1/2"	1/2"
2000 - HR 2000	1876	1760	945	945	150	1600	1400	3220	2510	903	1550	767	450-500	360	500	200	200	1"	1"1/4	2"	1/2"	1/2"
2400 - HR 2400	1876	1760	945	945	150	1600	1400	3480	2770	903	1950	627	450-500	360	500	200	200	1"	1"1/4	2"	1/2"	1/2"
3000 - HR 3000	2146	2030	1080	1080	150	1870	1670	3480	2770	903	2050	527	450-500	400	550	200	200	1"	1"1/4	2"	1/2"	1/2"
3500 - HR 3500	2146	2030	1080	1080	150	1870	1670	3935	3225	903	2050	982	450-500	400	550	200	200	1"	1"1/4	2"	1/2"	1/2"

N1 Boiler supply

N2 Boiler return

N3 Connection for additional equipment

N4 Connection to system loading/unloading

N5 Safety valve(s) connection

N6 Bulb-holding well

N8 Inspection well

2.3. Technical data

Model	Heat output	Heat input	Efficiency at 100% load	Efficiency class	Max. G20 gas consumption	Max. G30 gas consumption	Max. G31 gas consumption	Max. flue gas capacity	Min. heat output	Min. heat input	Efficiency at 30% load	Min. G20 gas consumption	Min. G30 gas consumption	Min. G31 gas consumption	Min. flue gas capacity	Load loss on flue side
	kW	kW	%	%	m³/h	kg/h	kg/h	kg/h	kW	kW	%	m³/h	kg/h	kg/h	kg/h	mbar
70	70	76	92.11	**	8.04	5.97	5.90	119.83	35	38.8	90.18	4.11	3.05	3.02	61.20	0.8
80	80	87	91.95	**	9.21	6.83	6.76	137.17	40	44.3	90.23	4.69	3.48	3.44	69.89	1.0
90	90	98	91.84	**	10.37	7.70	7.61	154.52	45	49.8	90.30	5.27	3.91	3.87	78.58	0.8
100	100	109	91.74	**	11.53	8.56	8.47	171.86	50	55.3	90.40	5.85	4.34	4.30	87.21	1.0
120	120	131	91.60	**	13.86	10.29	10.18	206.55	60	66.3	90.45	7.02	5.21	5.15	104.60	1.1
150	150	163	92.02	**	17.25	12.80	12.66	257.01	75	82.3	91.15	8.71	6.46	6.39	129.73	1.2
200	200	218	91.74	**	23.07	17.12	16.94	343.72	100	109.5	91.36	11.58	8.60	8.50	172.58	1.9
250	250	272	91.91	**	28.78	21.36	21.13	428.87	125	138.3	90.40	14.63	10.86	10.74	218.03	2.0
300	300	325	92.31	**	34.39	25.53	25.25	512.43	150	165.5	90.62	17.52	13.00	12.86	260.98	2.0
350	350	380	92.11	**	40.21	29.84	29.52	599.15	175	193.1	90.64	20.43	15.16	15.00	304.42	2.9
400	400	433	92.38	**	45.82	34.01	33.64	682.72	200	220.2	90.81	23.31	17.30	17.11	347.26	4.1
500	500	542	92.25	-	57.35	42.57	42.11	854.58	250	275.6	90.71	29.16	21.65	21.41	434.55	4.2
620	620	672	92.26	-	71.11	52.78	52.21	1059.56	310	341.9	90.68	36.18	26.85	26.56	539.02	6.4
750	750	813	92.25	-	86.03	63.85	63.16	1281.87	375	413.9	90.60	43.80	32.51	32.16	652.62	5.2
850	850	921	92.29	-	97.46	72.33	71.55	1452.16	425	468.4	90.73	49.57	36.79	36.39	738.56	7.2
950	950	1030	92.23	-	108.99	80.89	80.02	1624.02	475	523.7	90.70	55.42	41.13	40.69	825.74	5.2
1020	1020	1106	92.22	-	117.04	86.86	85.92	1743.85	510	562.6	90.65	59.53	44.19	43.71	887.07	4.0
1200	1200	1301	92.24	-	137.67	102.18	101.07	2051.31	600	661.7	90.67	70.03	51.97	51.41	1043.39	5.5
1300	1300	1409	92.26	-	149.10	110.66	109.46	2221.60	650	717.4	90.61	75.91	56.34	55.73	1131.08	6.5
1400	1400	1517	92.29	-	160.53	119.14	117.85	2391.88	700	774.7	90.36	81.98	60.84	60.18	1221.44	6.0
1600	1600	1733	92.33	-	183.39	136.11	134.63	2732.46	800	884.9	90.41	93.64	69.50	68.74	1395.18	6.5
1800	1800	1950	92.31	-	206.35	153.15	151.49	3074.60	900	994.5	90.50	105.24	78.11	77.26	1568.01	7.0
2000	2000	2167	92.29	-	229.31	170.19	168.35	3416.75	1000	1.107.4	90.30	117.19	86.98	86.03	1746.09	6.0
2400	2400	2600	92.31	-	275.13	204.20	201.99	4099.47	1200	1.324.5	90.60	140.16	104.02	102.90	2088.37	7.5
3000	3000	3250	92.31	-	343.92	255.25	252.48	5124.34	1500	1.656.5	90.55	175.30	130.10	128.69	2611.91	8.0
3500	3500	3792	92.30	-	401.27	297.82	294.59	5978.92	1750	1.940.1	90.20	205.30	152.38	150.72	3059.04	9.0

Model	Max chimney losses	Casing losses	Losses with burner off	Flue gas temperature			CO ₂			Pressure loss on water side	Nom. pressure	Water test pressure	Max. temper.	Total water content	Heat exchange surface	Furnace volume	Total weight
	%	%	%	°C	°C	°C	%	%	%	mbar	bar	bar	°C	l	m²	m³	kg
				gas	diesel-oil	naphta											
70	7.09	0.80	0.10	188	191	191	10.5	13.5	14.0	9	6	7.5	90	105	2.24	0.067	216
80	7.25	0.80	0.10	192	195	194	10.5	13.5	14.0	9	6	7.5	90	105	2.24	0.067	216
90	7.36	0.80	0.10	194	197	197	10.5	13.5	14.0	10	6	7.5	90	123	2.90	0.080	258
100	7.46	0.80	0.10	197	199	199	10.5	13.5	14.0	12	6	7.5	90	123	2.90	0.080	258
120	7.60	0.80	0.10	200	203	202	10.5	13.5	14.0	13	6	7.5	90	123	2.90	0.080	258
150	7.18	0.80	0.10	190	193	193	10.5	13.5	14.0	14	6	7.5	90	172	4.70	0.135	346
200	7.46	0.80	0.10	197	199	199	10.5	13.5	14.0	15	6	7.5	90	172	4.70	0.135	346
250	7.29	0.80	0.10	193	196	195	10.5	13.5	14.0	15	6	7.5	90	220	5.72	0.162	431
300	6.89	0.80	0.10	184	186	186	10.5	13.5	14.0	16	6	7.5	90	300	7.10	0.209	475
350	7.09	0.80	0.10	188	191	191	10.5	13.5	14.0	18	6	7.5	90	356	8.40	0.256	542
400	6.82	0.80	0.10	182	185	184	10.5	13.5	14.0	20	6	7.5	90	360	8.90	0.307	584
500	6.95	0.80	0.10	185	188	187	10.5	13.5	14.0	22	6	7.5	90	540	10.90	0.412	853
620	6.94	0.80	0.10	185	188	187	10.5	13.5	14.0	27	6	7.5	90	645	12.80	0.515	963
750	6.95	0.80	0.10	185	188	187	10.5	13.5	14.0	25	6	7.5	90	855	16.70	0.593	1205
850	6.91	0.80	0.10	184	187	187	10.5	13.5	14.0	27	6	7.5	90	855	16.70	0.593	1205
950	6.97	0.80	0.10	185	188	188	10.5	13.5	14.0	32	6	7.5	90	950	21.00	0.679	1417
1020	6.98	0.80	0.10	186	189	188	10.5	13.5	14.0	26	6	7.5	90	1200	26.20	0.897	1843
1200	6.96	0.80	0.10	185	188	188	10.5	13.5	14.0	30	6	7.5	90	1200	26.20	0.897	1843
1300	6.94	0.80	0.10	185	188	187	10.5	13.5	14.0	32	6	7.5	90	1200	26.20	0.897	1843
1400	6.91	0.80	0.10	184	187	187	10.5	13.5	14.0	28	6	7.5	90	1500	32.00	1.163	2600
1600	6.87	0.80	0.10	183	186	186	10.5	13.5	14.0	32	6	7.5	90	1500	36.00	1.163	2600
1800	6.89	0.80	0.10	184	186	186	10.5	13.5	14.0	37	6	7.5	90	1650	36.00	1.275	2750
2000	6.91	0.80	0.10	184	187	187	10.5	13.5	14.0	35	6	7.5	90	2000	43.00	1.454	3650
2400	6.89	0.80	0.10	184	186	186	10.5	13.5	14.0	40	6	7.5	90	2300	48.00	1.606	3900
3000	6.89	0.80	0.10	184	186	186	10.5	13.5	14.0	49	6	7.5	90	3150	62.50	2.337	5200
3500	6.90	0.80	0.10	184	187	186	10.5	13.5	14.0	60	6	7.5	90	3650	72.00	2.724	5700

Model	Heat output	Heat input	Efficiency at 100% load	Efficiency class	Max. G20 gas consumption	Max. G30 gas consumption	Max. G31 gas consumption	Max. flue gas capacity	Min. heat output	Min. heat input	Efficiency at 30% load	Min. G20 gas consumption	Min. G30 gas consumption	Min. G31 gas consumption	Min. flue gas capacity	Load loss on flue side
	kW	kW	%	%	m³/h	kg/h	kg/h	kg/h	kW	kW	%	m³/h	kg/h	kg/h	kg/h	mbar
HR 70	70	74.2	94.34	***	7.85	5.83	5.76	116.97	35	36.9	94.80	3.91	2.90	2.87	58.21	0.9
HR 80	80	84.7	94.45	***	8.96	6.65	6.58	133.50	40	42.2	94.70	4.47	3.32	3.28	66.61	1.1
HR 90	90	95.2	94.54	***	10.07	7.48	7.40	150.04	45	47.4	95.00	5.01	3.72	3.68	74.69	0.9
HR 100	100	105.6	94.7	***	11.17	8.29	8.20	166.43	50	52.7	94.80	5.58	4.14	4.10	83.16	1.1
HR 120	120	126.5	94.86	***	13.39	9.94	9.83	199.51	60	63.1	95.10	6.68	4.96	4.90	99.48	1.3
HR 150	150	157.8	95.06	***	16.70	12.39	12.26	248.83	75	78.4	95.70	8.29	6.16	6.09	123.57	1.3
HR 200	200	210	95.24	***	22.22	16.49	16.31	331.08	100	104.9	95.30	11.10	8.24	8.15	165.45	2.2
HR 250	250	263.5	94.88	***	27.88	20.69	20.47	415.41	125	131.1	95.38	13.87	10.29	10.18	206.64	2.4
HR 300	300	315.5	95.09	***	33.39	24.78	24.51	497.51	150	156.9	95.59	16.61	12.32	12.19	247.42	2.4
HR 350	350	367	95.37	***	38.84	28.82	28.51	578.72	175	183.1	95.60	19.37	14.38	14.22	288.63	3.4
HR 400	400	420	95.24	***	44.44	32.99	32.63	662.16	200	209.6	95.40	22.18	16.46	16.29	330.54	4.7
HR 500	500	524	95.42	-	55.45	41.15	40.71	826.21	250	261.2	95.70	27.64	20.52	20.29	411.89	4.8
HR 620	620	649	95.53	-	68.68	50.97	50.42	1023.33	310	323.3	95.90	34.21	25.39	25.11	509.68	7.3
HR 750	750	786	95.42	-	83.17	61.73	61.06	1239.23	375	391.0	95.92	41.37	30.71	30.37	616.42	5.8
HR 850	850	891	95.4	-	94.29	69.98	69.22	1404.92	425	443.6	95.80	46.94	34.84	34.46	699.48	8.0
HR 950	950	997	95.29	-	105.50	78.30	77.45	1571.95	475	495.9	95.79	52.47	38.95	38.52	781.85	5.9
HR 1020	1020	1069	95.42	-	113.12	83.96	83.05	1685.49	510	532.4	95.80	56.33	41.81	41.36	839.38	4.5
HR 1200	1200	1259	95.31	-	133.23	98.88	97.81	1985.13	600	626.2	95.81	66.27	49.18	48.65	987.41	6.2
HR 1300	1300	1364	95.31	-	144.34	107.13	105.97	2150.67	650	679.2	95.70	71.87	53.34	52.77	1070.92	7.3
HR 1400	1400	1468	95.37	-	155.34	115.29	114.05	2314.57	700	730.2	95.87	77.26	57.35	56.72	1151.24	6.6
HR 1600	1600	1675	95.52	-	177.25	131.55	130.13	2641.03	800	835.1	95.80	88.37	65.59	64.87	1316.67	7.1
HR 1800	1800	1885	95.49	-	199.47	148.05	146.44	2972.10	900	940.4	95.70	99.52	73.86	73.06	1482.81	7.6
HR 2000	2000	2094	95.51	-	221.59	164.46	162.68	3301.69	1000	1043.8	95.80	110.46	81.98	81.09	1645.84	6.6
HR 2400	2400	2518	95.31	-	266.46	197.76	195.62	3970.25	1200	1257.9	95.40	133.11	98.79	97.72	1983.29	8.1
HR 3000	3000	3142	95.48	-	332.49	246.77	244.09	4954.10	1500	1569.0	95.60	166.04	123.23	121.89	2473.93	8.6
HR 3500	3500	3670	95.37	-	388.36	288.24	285.11	5786.56	1750	1825.4	95.87	193.16	143.36	141.81	2878.12	9.6

Model	Max chimney losses	Casing losses	Losses with burner off	Flue gas temperature	CO ₂	Pressure loss on water side	Nom. pressure	Water test pressure	Max. temper.	Total water content	Heat exchange surface	Furnace volume	Total weight
	%	%	%	°C	%	mbar	bar	bar	°C	l	m²	m³	kg
				gas	gas	(ΔT=12°C)							
HR 70	5.16	0.50	0.10	148	11.0	9	5	7.5	90	105	2.24	0.067	222.0
HR 80	5.05	0.50	0.10	146	11.0	9	5	7.5	90	105	2.24	0.067	222.0
HR 90	4.96	0.50	0.10	143	11.0	10	5	7.5	90	123	2.90	0.080	266.0
HR 100	4.80	0.50	0.10	140	11.0	12	5	7.5	90	123	2.90	0.080	266.0
HR 120	4.64	0.50	0.10	136	11.0	13	5	7.5	90	123	2.90	0.080	266.0
HR 150	4.44	0.50	0.10	131	11.0	14	5	7.5	90	172	4.70	0.135	356.5
HR 200	4.26	0.50	0.10	127	11.0	15	5	7.5	90	172	4.70	0.135	356.5
HR 250	4.62	0.50	0.10	135	11.0	15	5	7.5	90	220	5.72	0.162	442.0
HR 300	4.41	0.50	0.10	130	11.0	16	5	7.5	90	300	7.10	0.209	488.5
HR 350	4.13	0.50	0.10	124	11.0	18	5	7.5	90	356	8.40	0.256	558.0
HR 400	4.26	0.50	0.10	127	11.0	20	5	7.5	90	360	8.90	0.307	599.5
HR 500	4.08	0.50	0.10	122	11.0	22	5	7.5	90	540	10.90	0.412	870.5
HR 620	3.97	0.50	0.10	120	11.0	27	5	7.5	90	645	12.80	0.515	980.5
HR 750	4.08	0.50	0.10	122	11.0	25	5	7.5	90	855	16.70	0.593	1229.5
HR 850	4.10	0.50	0.10	123	11.0	27	5	7.5	90	855	16.70	0.593	1229.5
HR 950	4.21	0.50	0.10	126	11.0	32	5	7.5	90	950	21.00	0.679	1445.5
HR 1020	4.08	0.50	0.10	122	11.0	26	5	7.5	90	1200	26.20	0.897	1880.0
HR 1200	4.19	0.50	0.10	125	11.0	30	5	7.5	90	1200	26.20	0.897	1880.0
HR 1300	4.19	0.50	0.10	125	11.0	32	5	7.5	90	1200	26.20	0.897	1880.0
HR 1400	4.13	0.50	0.10	124	11.0	28	5	7.5	90	1500	32.00	1.163	2665.0
HR 1600	3.98	0.50	0.10	120	11.0	32	5	7.5	90	1500	36.00	1.163	2665.0
HR 1800	4.01	0.50	0.10	121	11.0	37	5	7.5	90	1650	36.00	1.275	2815.0
HR 2000	3.99	0.50	0.10	120	11.0	35	5	7.5	90	2000	43.00	1.454	3730.0
HR 2400	4.19	0.50	0.10	125	11.0	40	5	7.5	90	2300	48.00	1.606	3980.0
HR 3000	4.02	0.50	0.10	121	11.0	49	5	7.5	90	3150	62.50	2.337	5306.0
HR 3500	4.13	0.50	0.10	124	11.0	60	5	7.5	90	3650	72.00	2.724	5806.0

3. Instructions for the installer

3.1. Installation regulations

The boiler is designed in compliance with rules and regulations enforced in the country indicated on the technical data plate. The installation in a different country may be a source of danger for people, animals and property.

3.2. Installation

Use only original accessories and spare parts supplied by the manufacturer for installation as well as maintenance and any component replacements.

Proper functioning of the boiler cannot be guaranteed in the event that non-original accessories and spare parts are used.

3.2.1. Packaging

The boilers are supplied with the door and smoke chamber already assembled, but the boiler housing or staves with the insulation are supplied in separate cardboard packaging.

The models for heat output above 1300 kW are supplied with pre-installed embossed aluminium shell protective insulation.



The flue brush for cleaning the tubes is delivered inside the combustion chamber.

After having removed the packaging of the boiler and accessories, ensure that these are in perfect condition.

The packaging materials are recyclable. Gather them in the appropriate collection points.

Do not leave packaging within the reach of children since it can be, by its very nature, dangerous.

The manufacturer declines any responsibility for damage to people, animals and property due to failure to observe the above.

Before commencing installation, check that the length and width of the body of the boiler delivered correspond to the dimensions of the boiler ordered, as shown on the technical data tables, and that the cardboard boxes containing the casing are marked with the same model.

Before connecting the boiler, perform the following operations:

- Thoroughly wash all tubing of the system in order to remove any residues which may compromise the functioning of the boiler.
- Check that the chimney has sufficient suction, that it does not have any bottlenecks and is free of slag; that it is free of discharges from other devices (unless this duct has been specially designed to support other systems).

Ensure that all the current regulations relative to chimneys are observed.

3.2.2. Choosing where to install the boiler

In determining the location for installing the boiler, take into consideration the instructions provided in Point 3.2.4 "Air intake/flue gas system" and sub-paragraphs.

Installation must observe the regulations and laws in force.

It is advisable to install the boiler in a well-ventilated place and where ordinary and extraordinary maintenance can be easily performed.

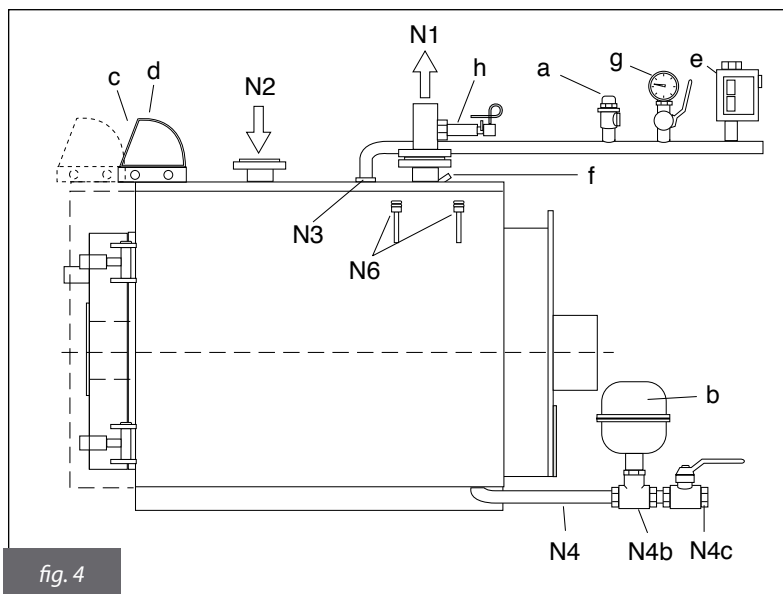
3.2.3. Hydraulic connections

3.2.3.1. Thermal hot water system with closed expansion vessel

Furnace output ≤ 300.000 kcal/h – pressure 6 bar (fig. 4)

The generator must be equipped with:

- a** - Safety valve
- b** - Expansion vessel (connected with $a \geq 18$ mm diam. duct)
- c** - Regulation thermostats
- d** - Safety thermostat
- e** - Locking pressure switch
- f** - Regulation thermometer well
- g** - Manometer with flange for control manometer
- h** - Thermal discharge valve or fuel valve
- N1** - Flow
- N2** - Return
- N3** - Connection for additional equipment
- N4** - Lower connections:
 - N4b** - Expansion vessel connection
 - N4c** - Loading / unloading
- N6** - Bulb-holding well (thermometer, regulation thermostat, safety thermostat, pump consent thermostat).

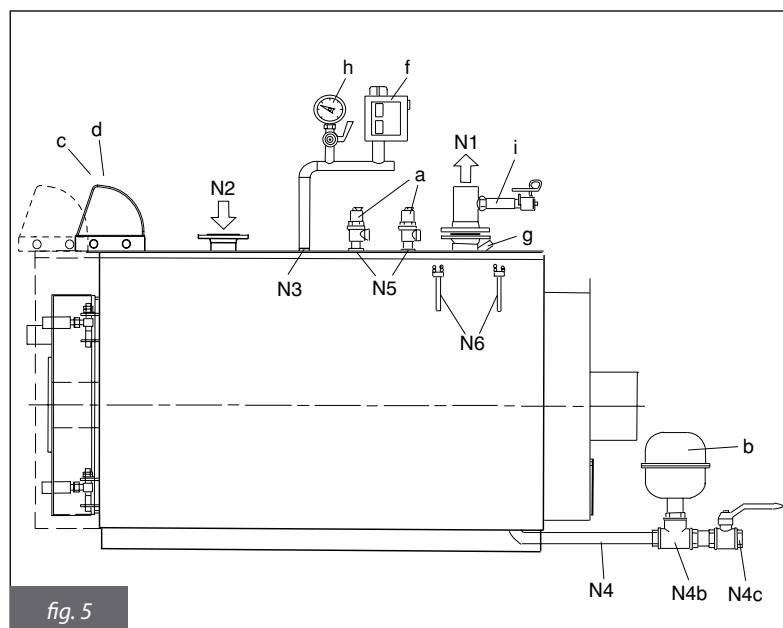


3.2.3.2. Thermal hot water system with closed expansion vessel

Furnace output > 300.000 kcal/h – pressure 6 bar (fig. 5)

The generator must be equipped with:

- a** - 1 safety valve
- 2 safety valves if $P > 500.000$ kcal/h
- b** - Expansion vessel
- c** - Regulation thermostats
- d** - 1st safety thermostat
- f** - Locking pressure switch
- g** - Regulation thermometer well
- h** - Manometer with flange for control manometer
- i** - Thermal discharge valve or fuel valve
- N1** - Flow
- N2** - Return
- N3** - Connection for additional equipment
- N4** - Lower connections:
 - N4b** - Expansion vessel connection
 - N4c** - Loading / unloading
- N5** - Safety valves connection
- N6** - Bulb-holding well (thermometer, regulation thermostat, safety thermostat, pump consent thermostat).



- Ensure that the hydraulic pressure measured after the reduction valve on the flow duct is not higher than the operating pressure indicated on the plate of the component (boiler, external water heater, etc.).
- Since the water pressure in the heating system increases during operation, ensure that the maximum value does not exceed the maximum hydraulic pressure shown on the component's plate (6 bar).
- Check that the boiler and water heater safety valve discharges are connected to a discharge hopper so as to avoid that the valves, as a result of a malfunction, flood the area during operation.
- Check that the hydraulic and heating system piping is not used for earthing the electrical system. Should this be the case, in a short time serious damage may be caused to the piping, boiler, water heater and radiator.
- Once the heating system is filled with water, it is advisable to close the supply tap and keep it in this position. Any leakages from the system will, therefore, be noticed by a drop in the hydraulic pressure shown on the manometer.

3.2.4. Air intake / flue gas system

The boilers are built with an open combustion chamber and are designed to be attached to a chimney. The combustion air is taken **directly from the environment in which the boiler is installed.**

The burner needs air for the combustion of solid or liquid fuel. Therefore, it is necessary to provide openings for the entry of air into the boiler room. Ensure that these openings are never obstructed.

It is mandatory to install the boiler in a room complying with the prescriptions of the regulations in force, which should be considered as a full integral part of this manual.

The boiler has a flue discharge connection suited to be connected to a flue duct with a diameter as indicated in figures 2, 3, 4, 5, 6 ("Øc" parameter).

With regard to flue discharge into the atmosphere, follow the regulations in force which should be considered as a full integral part of this manual.

The flue ducts coming from the boiler must be connected to a chimney made in compliance with the applicable regulations, which should be considered as a full integral part of this manual.

The chimney must be calculated to ensure that there is no positive pressure at the base.

Since this is a high-performance boiler, the temperature of the flue gas is low.

Condensate may form inside the chimney, particularly with a two-stage burner.

The chimney must, therefore, comply with the following requirements:

- The diameter must not be less than the diameter of the boiler discharge pipe.
- It must be made of impermeable material, resistant to flue temperature and acid condensate.
- Low thermal conductivity, sufficient mechanical resistance, perfect seal, correctly calculated height and cross-section.
- Vertically positioned with a constant cross-section, without any bottlenecks.
- The end section must ensure constant, efficient discharge of flue in any atmospheric conditions

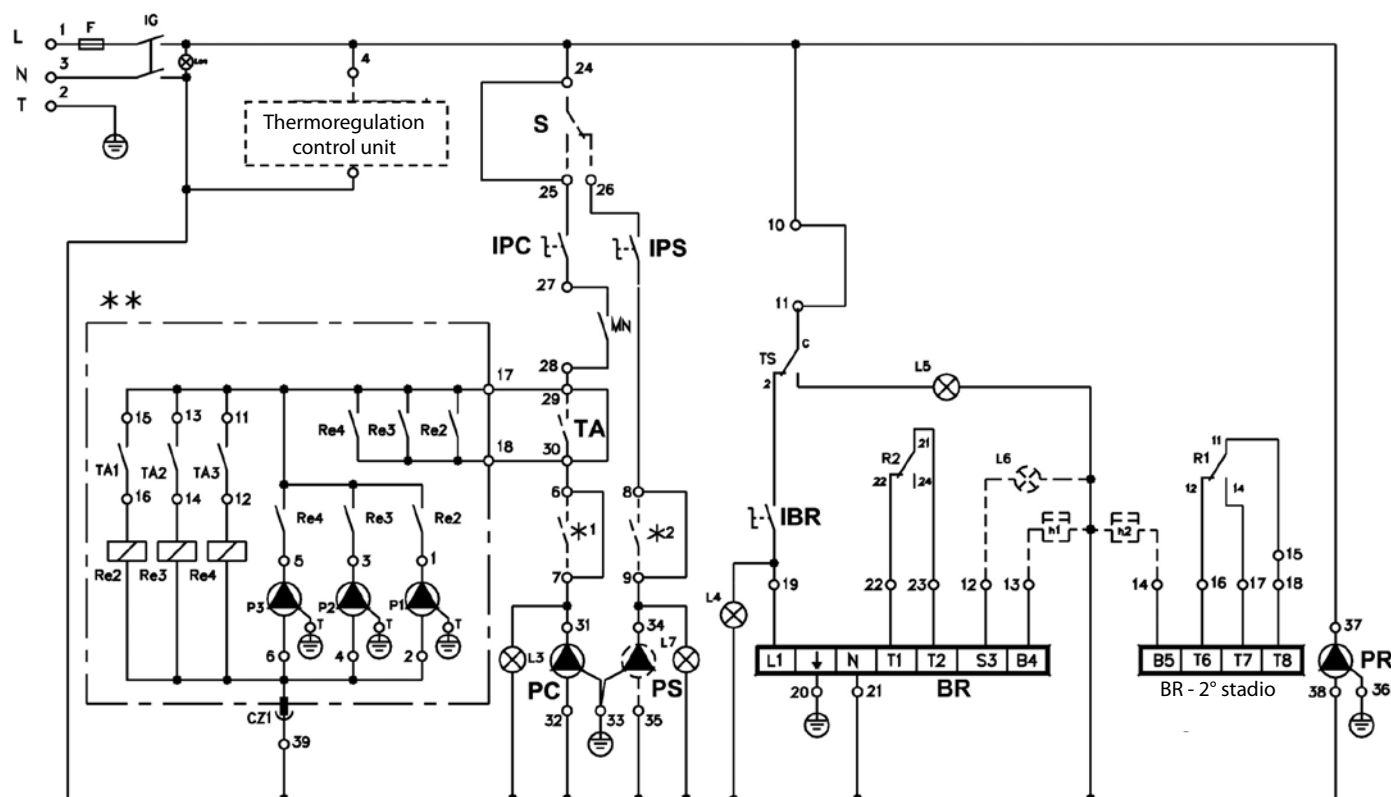
During installation a special fitting must be installed allowing for flue gas sampling and subsequent burner regulation and the measurement of the boiler efficiency.

It is obligatory to install a special section to allow the collection and discharge of acid condensates before these reach the boiler.

3.3. Electrical connection

The electrical connections of a thermal system designed only for the heating of buildings is subject to numerous legal regulations of a general and specific nature for the individual types of applications or fuel. It is therefore necessary to comply with local standards.

3.3.1. Wiring diagram for RODI DUAL and RODI DUAL HR



ELECTRICAL SPECIFICATIONS

Power supply: 230 VAC + 10% - 15%

Frequency: 50 Hz

Maximum total current: 4 A

IMPORTANT: if the sum of all connected power loads exceed 4 A (inductive), supply one or more of the power supplies via a relevant contactor.

KEY CHART:

IG: Main switch

IPC: CH pump switch

IPS: DHW pump switch

IBR: Burner switch

L3: Main pump light

L4: Burner ON light

L5: Safety thermostat light

L6: Burner shutdown light (not supplied)

L7: DHW re-circulation pump light

TA: Room thermostat

R1: CH thermostat: 1st contact

R2: CH thermostat: 2nd contact

TS: Safety thermostat

F: F4A 250V fuse

BR: Burner

BR - 2° stadio: burner 2nd stage control

PC: CH pump

PS: DHW re-circulating pump

PR: Boiler re-circulating pump

P1: Zone 1 pump

P2: Zone 2 pump

P3: Zone 3 pump

TA1: Zone 1 room thermostat

TA2: Zone 2 room thermostat

TA3: Zone 3 room thermostat

S: DHW priority thermostat (not supplied)

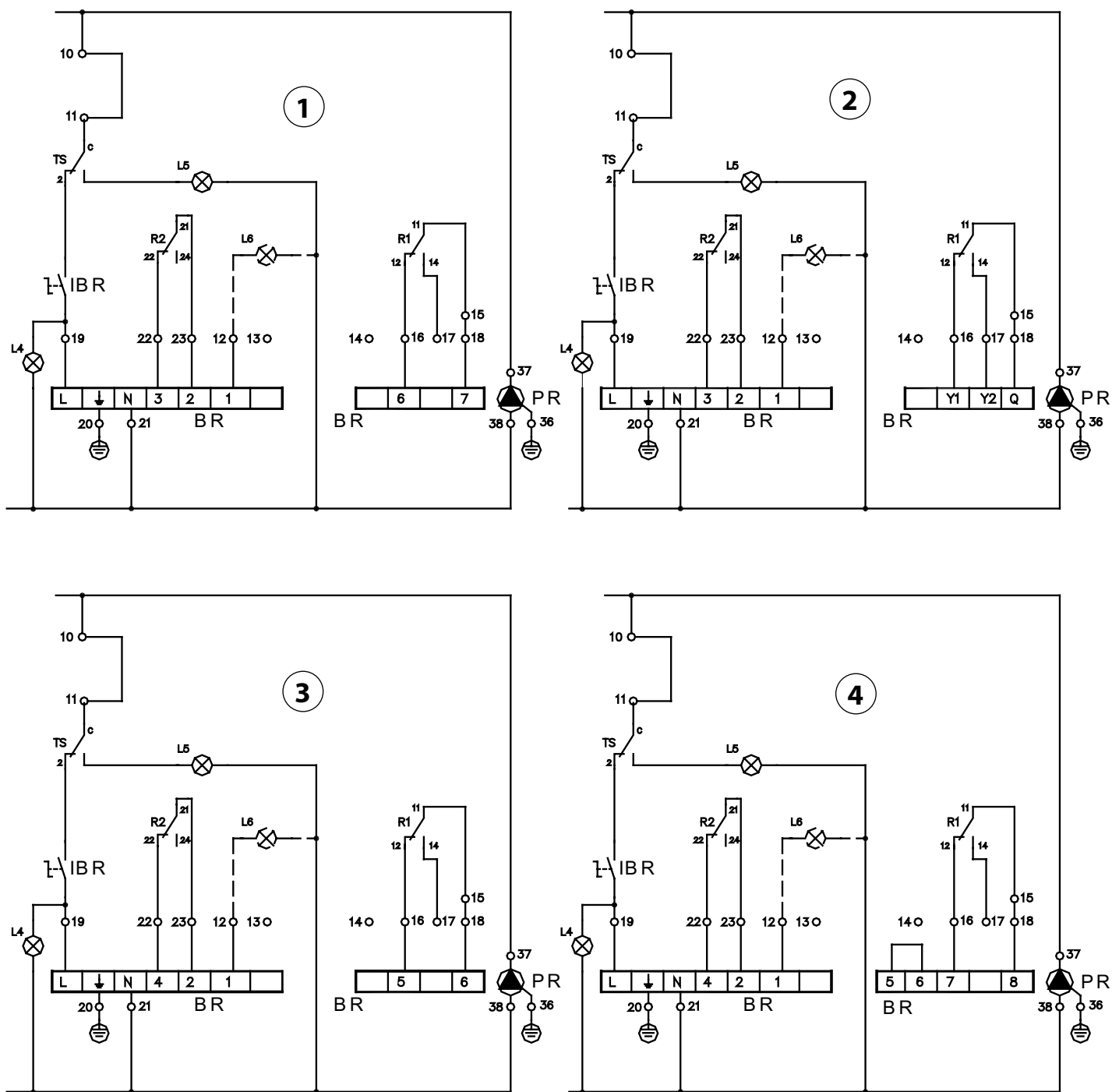
h1: Burner 1st stage hour counter (not supplied)

h2: Burner 2nd stage hour counter (not supplied)

***** Thermoregulation control unit and contacts (not supplied)

****** Zone pump module (only for version P control panels)

3.3.2. Connection examples for Riello burners



Type of burners listed:

- 1 - Gas burners RS70, RS100, RS130
- 2 - Gas burners GAS P/M, GAS 9 P/M, GAS 10 P/M
- 3 - Diesel oil burners RL70, RL100, RL130
- 4 - Diesel oil burners P 140 T/G, T P200/G, P 300 T/G, P 450 T/G

fig. 7

3.4. Door reverse

Should it be necessary to reverse the door opening direction, proceed as follows:

1. Exchange the external nut (or bush) of a hinge with the diametrically opposite closing bush. Then secure the cone on the hinge side to the door with the internal nut.
2. Repeat the operation for the other hinge.
3. Use the appropriate nuts of the hinges to make any adjustments.

3.5. Burner connection

It must be remembered that the electrical board of the boiler supports a two-stage burner.

Before installing, it is advisable to thoroughly clean the inside of all fuel supply pipes in order to remove any residues which may compromise the proper functioning of the boiler.

Check the maximum pressure value in the furnace indicated in the technical data tables. The value measured can increase by 20% if the fuel used is naphtha rather than gas or diesel-oil. In addition, perform the following checks:

- a) Check internal and external sealing of the fuel supply system.
- b) Regulate the fuel supply rate according to the capacity required by the boiler.
- c) Check that the boiler is supplied with the type of fuel for which it is pre-adjusted.
- d) Check that the fuel supply pressure is within the values indicated on the burner plate.
- e) Check that the fuel supply system is sized for the maximum capacity needed by the boiler and is equipped with all the safety and regulating devices required by the regulations mentioned above.
- f) Ensure that the ventilation of the area is sufficient to guarantee air flow as required by law and so as to achieve perfect combustion.

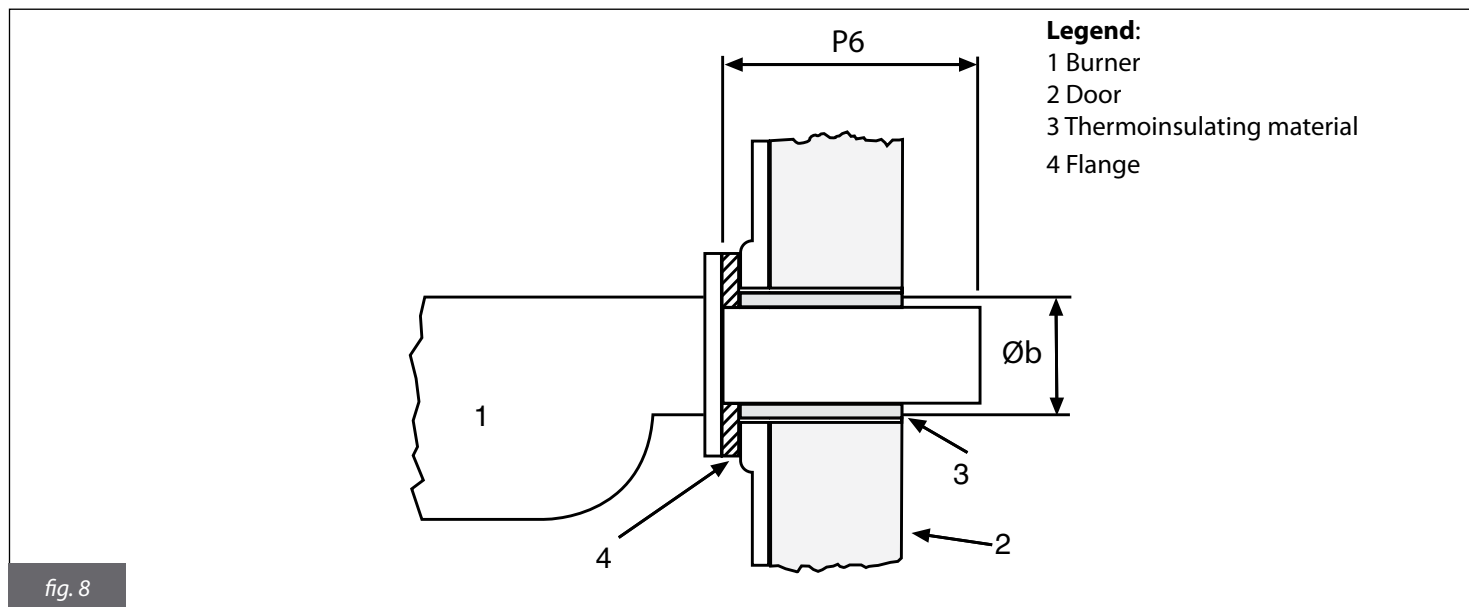
In particular, when using gas it is necessary to:

- g) Check that the supply line and gas train comply with the relevant regulations in force.
- h) Ensure that all gas connections are sealed.
- i) Ensure that the gas pipes are not used to earth electrical devices.

If the boiler is not used for a certain period, cut off the fuel supply.

IMPORTANT

Fill the space between the burner nozzle and the door with suitable thermoinsulating material, such as a ceramic seam (fig. 8).



See Point 2.2: Dimensions for nozzle length (P6), diameter of burner hole (Øb) and the pressure value.

4. Assembly

4.1. Boiler housing panels for RODI DUAL and RODI DUAL HR 70÷400 (fig. 9)

- Wrap the glass wool around the boiler body, ensuring that the bulb-carrying wells (P) located on the right-hand side remain visible.
- Lead the burner-control panel connection cables through the holes present on the lower part of panels (1S) and (1D) according to the opening direction of the door.
- Mount panel (1S) by hooking the upper fold onto the square pipe and the lower fold to the boiler side member.
- Mount the upper panel (2S) on the boiler and position on it the control panel. Unravel the wires of the thermostats and thermometer and insert the bulbs in the wells.
- Mount panel (1D) as described in point (b) and then panel (2D), checking that the wires are inserted in the slot provided. Finally fix the control panel.
- Fix the upper panels with the screws and close the guide holes with the plugs provided (see figure).

Superinsulation (on request)

- Mount panels (3) and (4) by fixing them to the side panels.

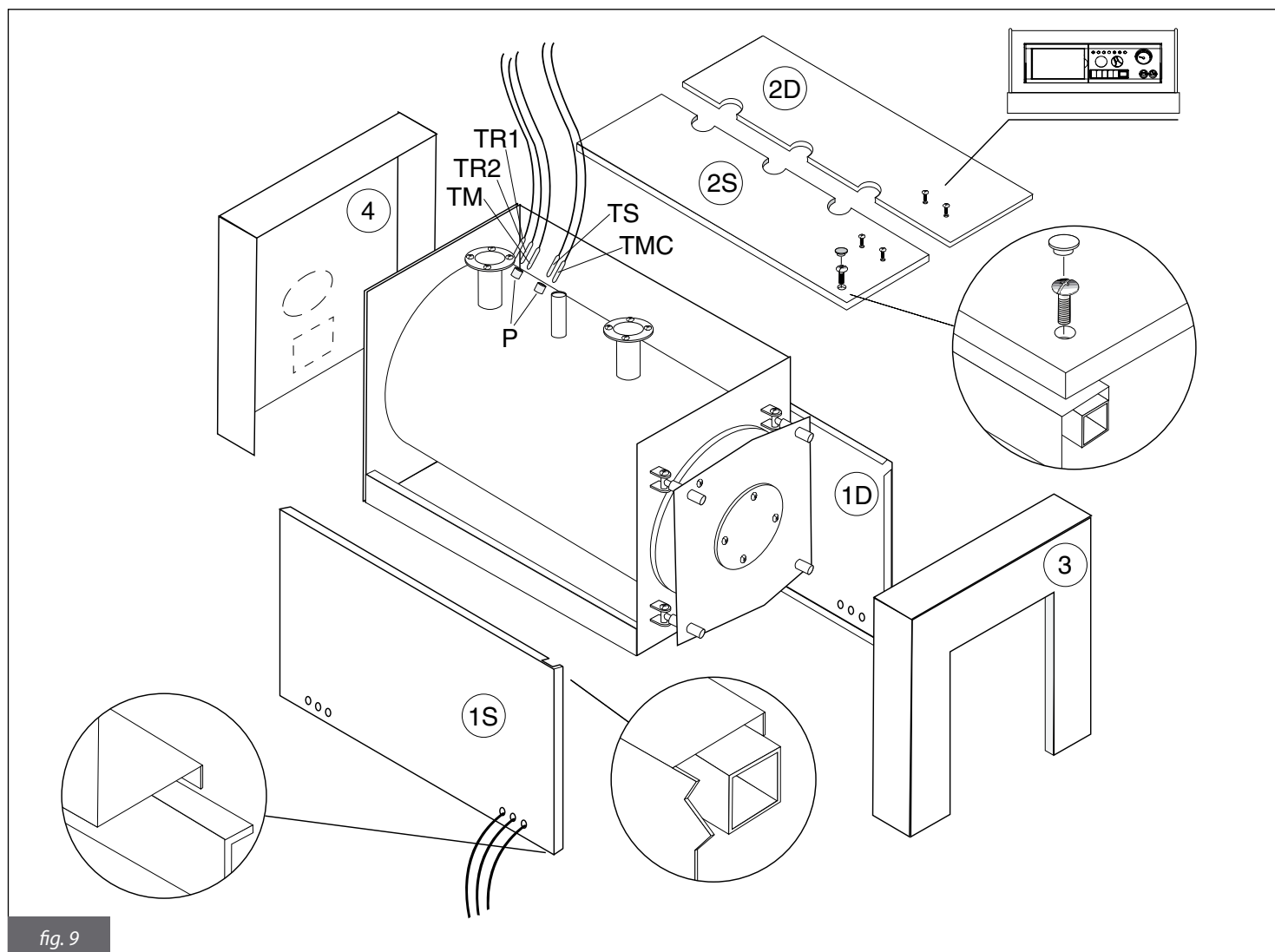


fig. 9

Legend

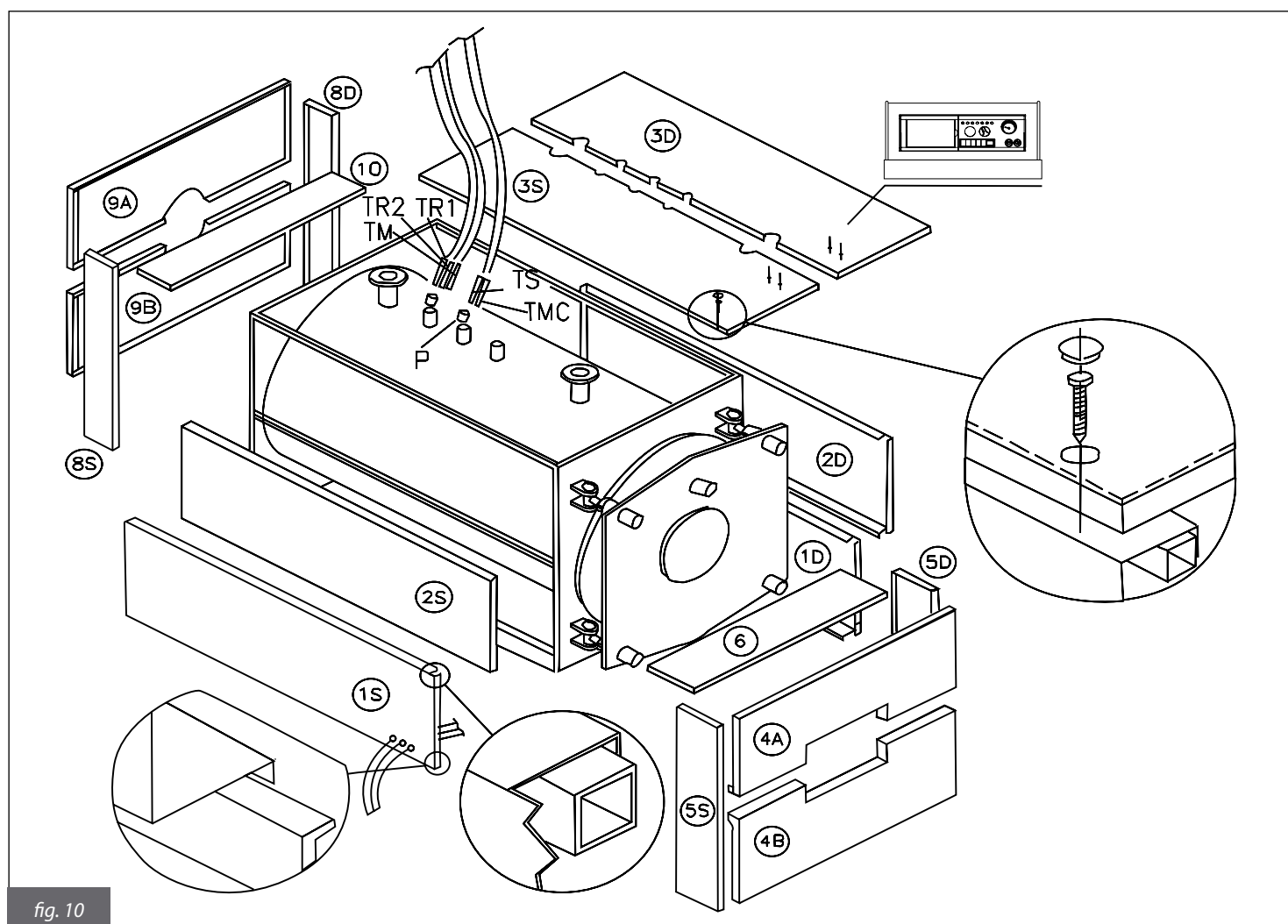
P	Bulb-holding wells	TM	Pump consent thermostat
TR1-TR2	Boiler regulating thermostats	TMC	Boiler thermometer
TS	Safety thermostat		

4.2. Boiler housing panels for RODI DUAL and RODI DUAL HR 500÷1300 (fig. 10)

- Wrap the glass wool around the boiler body, ensuring that the bulb-carrying wells located on the right-hand side remain visible.
- Lead the burner/control panel connection cables through the holes present on the lower part of panels (1S) and (1D) according to the opening direction of the door.
- Mount the lower panel (1S) by hooking the fold onto the square pipe and following the same procedure with the upper panel (2S).
- Mount the upper panel (3S) onto the boiler. Position the control panel onto 3S panel; unravel the wires of the thermometer and thermostats and insert the bulbs into the wells (P).
- Mount panels (1D), (2D) and (3D) taking care that the wires are inserted into the slot provided in panel (3D). Finally fix the control panel.

Superinsulation (on request)

- Mount panels (5S) and (5D) by securing them onto the side panels of the boiler with the brackets provided. Mount the front panels (4B) and (4A) by securing these to panels (5S) and (5D). Close the door casing with the upper panel (6), securing it with the screws and closing the holes with the plugs provided.
- Mount panels (8S) and (8D) by securing them to the side panels of the boiler with the brackets provided. Mount the back panels (9B) and (9A) by securing these to panels (8S) and (8D). Close the casing of the flue chamber with the upper panel (10), securing it with the screws and closing the holes with the plugs provided.

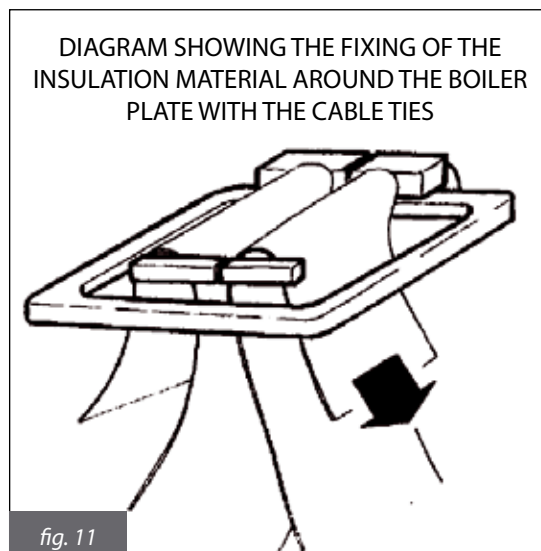


Legend

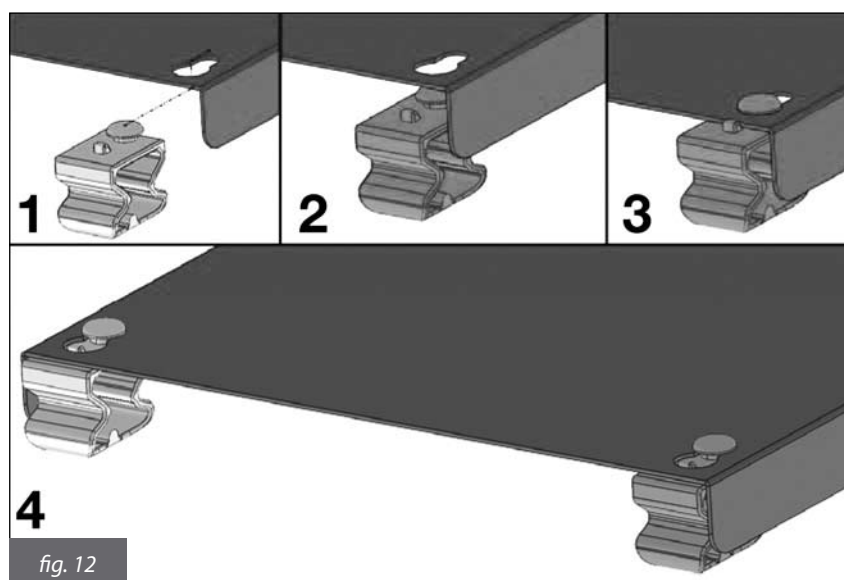
P	Bulb-holding wells	TM	Pump consent thermostat
TR1-TR2	Boiler regulating thermostats	TMC	Boiler thermometer
TS	Safety thermostat		

4.3. Boiler housing staves

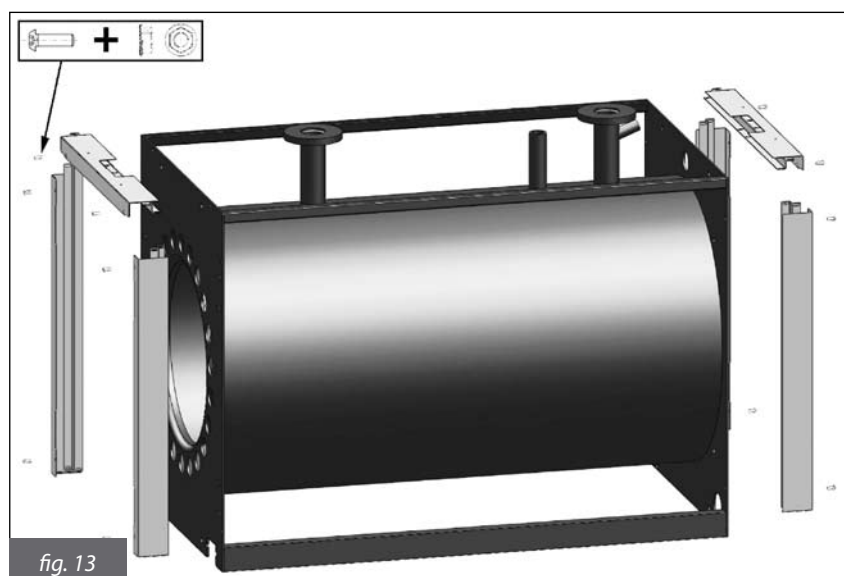
- 1) Wrap the insulation material around the body of the boiler and secure it with the cable ties provided (see pic. 11).



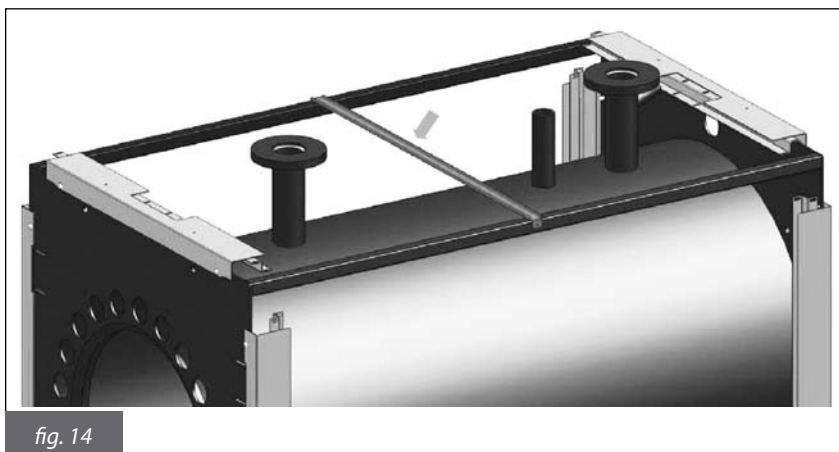
- 2) Prepare the staves by placing the 4 locking caps in each, as shown in the explicative picture.



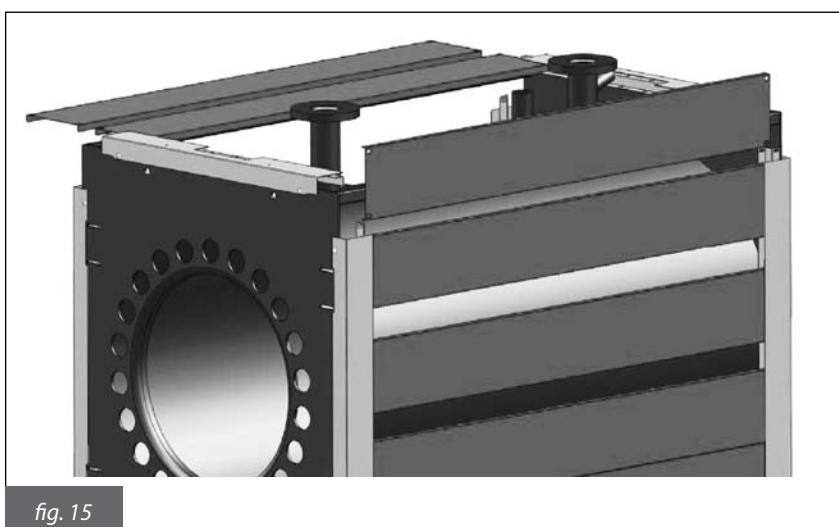
- 3) Fix the uprights and crossbars to the main structure with suitable fixings.



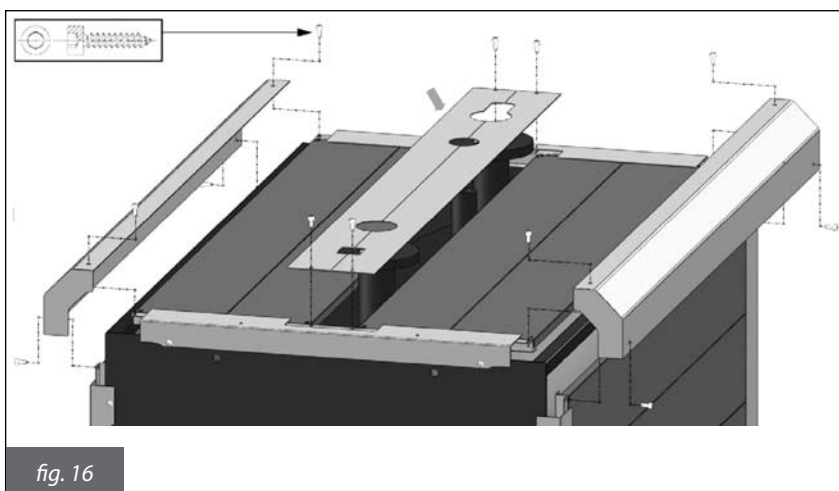
NOTE: the crossbar shown in the picture, if included, should be positioned between the two square tubes to support the staves.



4) Insert the previously prepared staves between the uprights and crossbars as shown in picture 15.



5) After all staves are positioned, assemble the casing with self-tapping screws.



NOTE: In the case of boilers with upper supports the suitable central guard must be assembled as shown in picture 16. Otherwise completely enclose the upper part with the staves and side panels.

6) The control panel supplied with the boiler must be mounted on the support provided in the kit and attached to the front crossbar of the boiler. Pass the cable through the opening shown (see fig. 17).

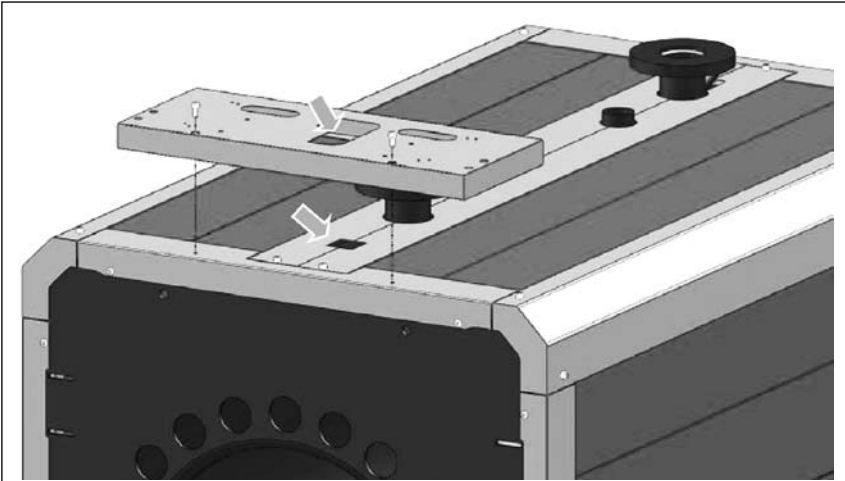


fig. 17

If the kit includes the staves for the panel (completed with mounting holes and openings for all cables) it is advisable to use it for ease of use; in this case the panel can be either mounted on the right hand or left hand side of the casing.

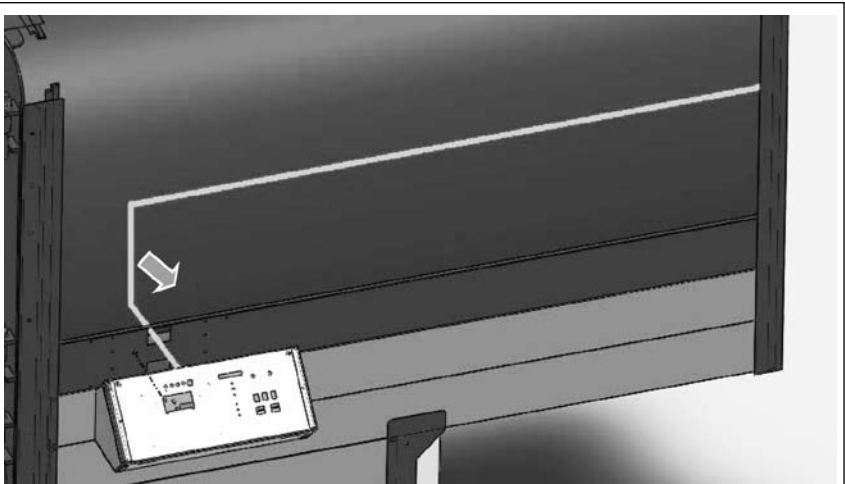


fig. 18

5. Start-up

IMPORTANT

Before start-up, fully insert the flue gas agitators, taking care that they are pushed inside by at least 100 mm.

5.1. Preliminary checks

Before starting-up the boiler check that:

- The **plate data** corresponds with the electrical power, hydraulic and liquid or gas fuel supply;
- The power range of the burner is compatible with that of the boiler.
- The instructions for the boiler, as well as for the burner, are available in the boiler room.
- The **chimney** functions properly.
- The air vent present is sufficiently large and free of obstacles.
- The **door, flue chamber** and **burner plate** are properly closed so as to guarantee flue sealing in all parts of the boiler.
- The system is full of water and that any **air pockets** have been eliminated.
- **Anti-freeze** measures have been taken.
- The circulating pumps function correctly.
- The expansion vessel and the safety valve(s) are correctly connected (without any locking device) and function properly.
- Check electrical parts and that thermostats function properly.

5.2. Water treatment

The most common phenomena occurring in thermal systems are:

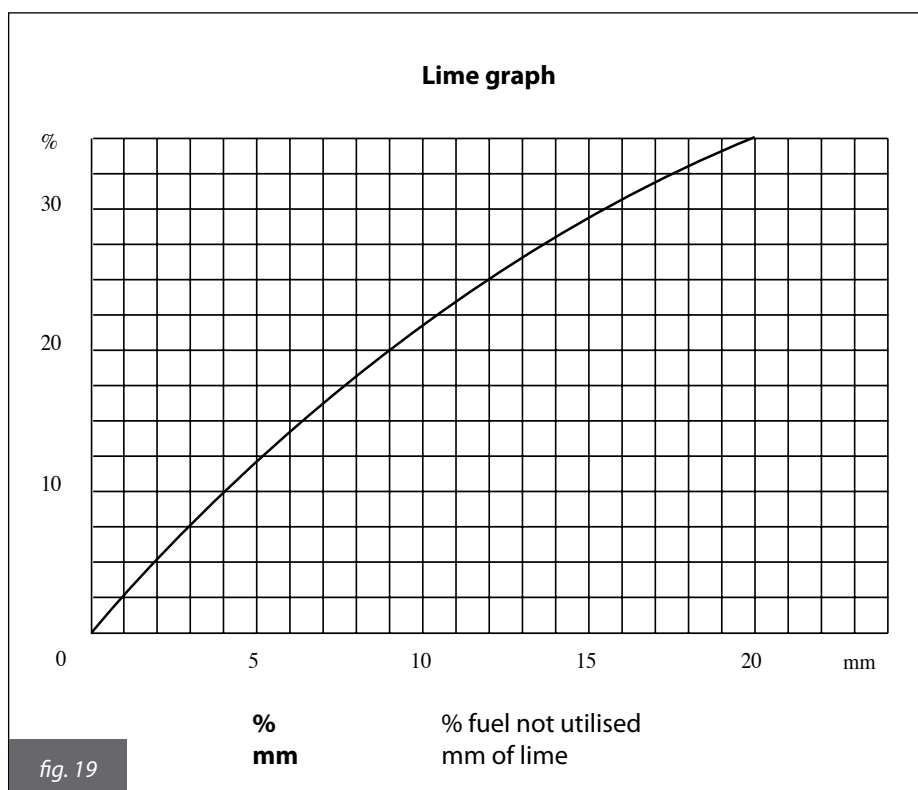
Lime incrustations

Lime incrustations interfere with the thermal exchange between the combustion gases and water, causing an abnormal increase in the temperature of the parts exposed to flame and therefore, a noticeable reduction in the life-span of the boiler.

Lime becomes concentrated at the points where the wall temperature is the highest. The best prevention measure is, therefore, the elimination of areas of over-heating.

The incrustations form a non-conductive layer which reduces the thermal exchange of the generator, diminishing the efficiency.

This means that a substantial part of the heat obtained by combustion is not fully transferred to the water in the system but escapes via the chimney.



Water side corrosion

The corrosion of the metal surfaces of the boiler on water side is due to ions of the iron solution passing through the system (Fe^{+}). The presence of dissolved gases, in particular oxygen and carbon dioxide, has a significant role in this process.

Often corrosive phenomena are seen in softened and/or demineralised water which by nature is already more aggressive towards iron (acid water with $\text{pH} < 7$). In these cases, incrustation is avoided but not corrosion and it is necessary to treat the water itself with corrosive process inhibitors.

5.3. Filling the system

Water must enter the heating system as slowly as possible and in quantities proportional to the air release capacity of the relevant components.

The filling time varies according to the size of the system but is never less than 2 or 3 hours.

In the case of a closed expansion vessel system, water must be added until the arrow on the manometer reaches the static pressure value pre-set by the vessel.

Proceed to initial water heating to the maximum temperature permitted by the system but never exceeding 90°C .

During this operation the air in the water is released via automatic or manual air separators fitted in the system. Once the air release is complete, restore the pressure to the pre-set value and close the manual and/or automatic supply tap.

6. Operation

The heating system must be suitably operated so as to ensure optimal combustion with reduced atmospheric emissions of carbon dioxide, unburnt hydrocarbon and soot, as well as to avoid damage to persons or property.

Guideline combustion values:

FUEL	%CO ₂	Flue temperature	% CO
Gas	10	190°C	0 – 20 ppm
Diesel-oil	13	195°C	10 – 80 ppm
Naphta	13.5	200°C	50 – 150 ppm

The diagram below indicates the boiler output in relation to the flue and air temperature and the percentage of carbon dioxide (%CO₂), without, however, considering dispersion through the boiler casing.

Example:
Fuel **DIESEL-OIL**
Ambient temperature **20 °C**
%CO₂ **13%**
Output **91.4%**

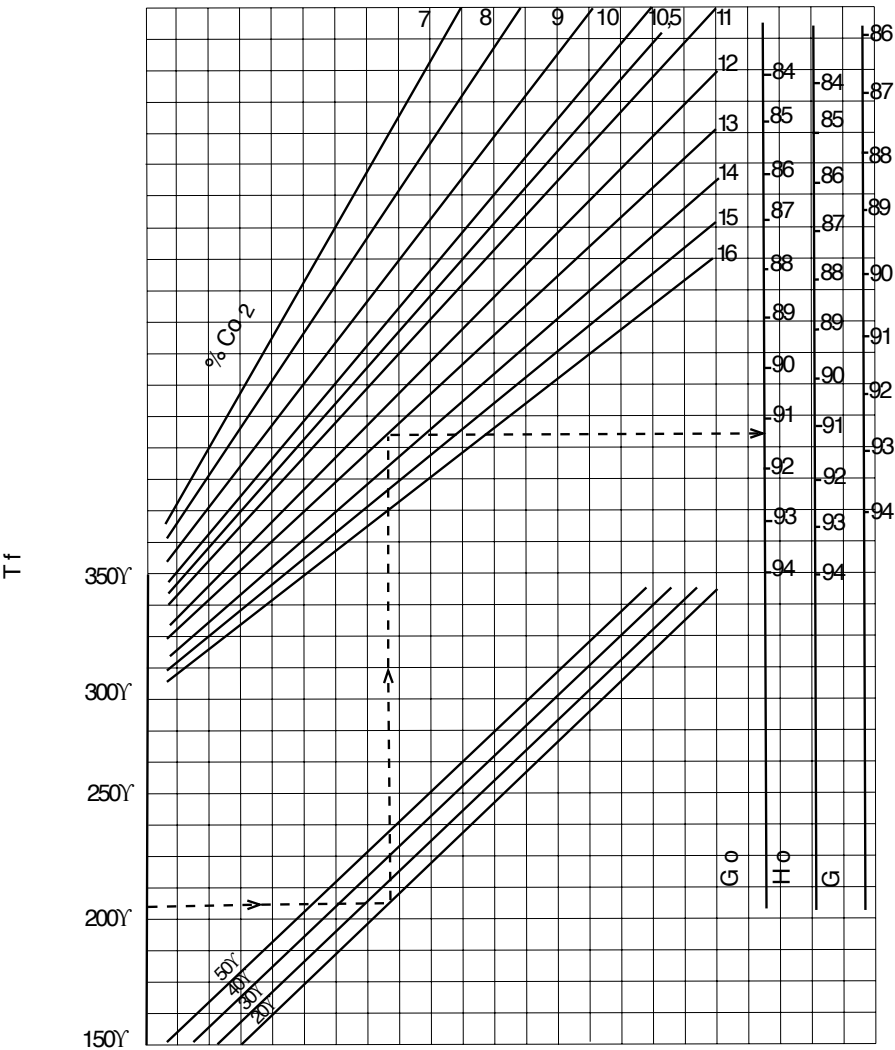


fig. 20

Legend:
Tf Flue temperature in chimney °C
Go Diesel-oil
G Gas
Ta Room temperature °C
Ho Naphta

Pressure must be within the values specified in the technical data table.



The temperature gap between flow and return must not exceed 15°C in order to avoid thermal shocks to the boiler structure.
The return temperature must not decrease below 55°C so as to protect the boiler from corrosion due to condensation of flue gases on surfaces which are too cold.
For this reason, it is advisable to moderate the return temperature by installing a 3 or 4-way mixer valve.
The guarantee does not cover damage caused by condensate.

It is obligatory to install a recirculation pump (anti-condensate pump) to mix cold returns.
The pump must have a minimum capacity of about 5 m³/h and be at least equal to approx. 1/3 of the CH pump capacity.

The burner switch must always be on.

In this way, the water temperature in the boiler will remain around the value set with the thermostat.

NOTE

In the event of insufficient flue sealing in the front part (door and burner plate) or back part (flue chamber) of the boiler, it is necessary to adjust the tension rods of the individual components. If this is not sufficient, replace the relevant gaskets.

NOTE

Do not open the door and do not remove the flue chamber while the burner is operating. Wait a few minutes after the burner has been switched off to allow the insulations cool down.

7. Maintenance

Maintenance (and repair) operations must be performed only by qualified personnel who satisfy the requirements established by the laws in force.

A correct maintenance of the boiler and burner in terms of procedures and time, ensures that these function under the best conditions, with respect for the environment and in complete safety for persons, animals and property.

The manufacturer advises the Customer to contact the manufacturer's Authorised Service Centres who are trained to perform the required maintenance and repair operations.



Before proceeding with maintenance, repair, component replacement or internal cleaning of the boiler, and in particular, before opening the door of the furnace, it is necessary to take the following safety precautions:

- Interrupt fuel supply.
- If the boiler was operating, wait for it to cool down, allowing the water circulate within the system.
- Disconnect the boiler and burner from the mains.
- Place a sign on the boiler with the following text:
DO NOT USE, MAINTENANCE IN PROGRESS, BOILER NON-OPERATIONAL

Wear suitable clothing, gloves, goggles and face masks during maintenance operations.

Use a vacuum cleaner to remove the residue of combustion which must be disposed of in special containers showing the contents.

Combustion residues are highly polluting. Do not disperse into the environment but place them in the appropriate collection areas.

7.1. Ordinary maintenance

The operating conditions of the boiler vary from case to case and depend on: fuel used, burner regulation, number of times the boiler is started up and system characteristics.

Therefore, it is not possible to establish in advance a set interval between one maintenance session and the next.

The service engineer must determine this time interval on the basis of an initial observation of the degree of soiling of the flue system.

As a guide, the following intervals are recommended for cleaning the pipes (with the brush provided) and the agitators depending on the type of fuel used:

- Once a year for gas boilers.
- Every three months for diesel-oil boilers.
- Once a month for naphta boilers.

Local regulations regarding maintenance must always be observed.

A quick clean of the product can be performed by opening the front door only, removing the agitators and brushing the pipes with the brush provided.

This operation should be repeated at least once a month during periods of activity of the generator and is intended to avoid combustion residues from blocking the agitators so that these cannot be easily removed.

For a more thorough clean, remove the flue chamber to expel carbon residues from the back.

During any ordinary maintenance operation, the brush must always be used to clean the pipes (after having removed the agitators) and the furnace, and also to collect the combustion residues through the doors located on the flue chamber.

Do not use flammable products, such as petrol, solvents or others, to clean the heat exchanger.

Check on the proper functioning of the control and measuring instruments of the generator (thermostats, thermometers) and of the system (hydrometers, flow meters, pressure switches, expansion vessels, power units, safety devices).

It is good practice to analyse the water in the system and ensure that it is adequately treated to avoid the formation of lime incrustations which initially reduce the output of the boiler and can cause its breakdown over time.

It must be remembered that calcium and magnesium salts dissolved in water with frequent topping up, lead to deposits in the boiler which prevent circulation within the generator and cause overheating of the metal plates. This may cause serious damage which cannot be attributed to the structural geometry of the product and/or materials used and/or technical design, and therefore, is not covered by the guarantee.

It is also necessary to check the condition of the refractory insulation and the flue sealing gaskets and replace them if necessary.

7.2. End-season maintenance or maintenance before long periods of inactivity

In addition to the operations described above, the following has to be performed:

- Check the wear of the agitators to ensure their timely replacement.
- After cleaning the flue ducts, clean the inside of the pipes and furnace with a cloth soaked in a diluted solution of caustic soda.
- Once dry, rub all the surfaces with an oil-soaked cloth.
- Seal well the air intake opening of the burner and the connection to the chimney in order to prevent the flow of moist air through the boiler.
- It is advisable to place some quicklime in a container inside the furnace to absorb any moisture.
- Do not empty the system or the boiler.
- Protect the screws, nuts and pins of the door with graphite grease.
- Take note of all the operations which need to be done at the next start-up; in particular, check the operation of the recirculation pump.

7.3. Burner maintenance

During each maintenance operation on the boiler, it is necessary to check the burner functioning and adjustment according to the operating, installation and maintenance manual of the burner.

This operation must be performed by qualified professional personnel.

7.4. Checking the boiler performance

Check the following to ensure that the boiler operates safely:

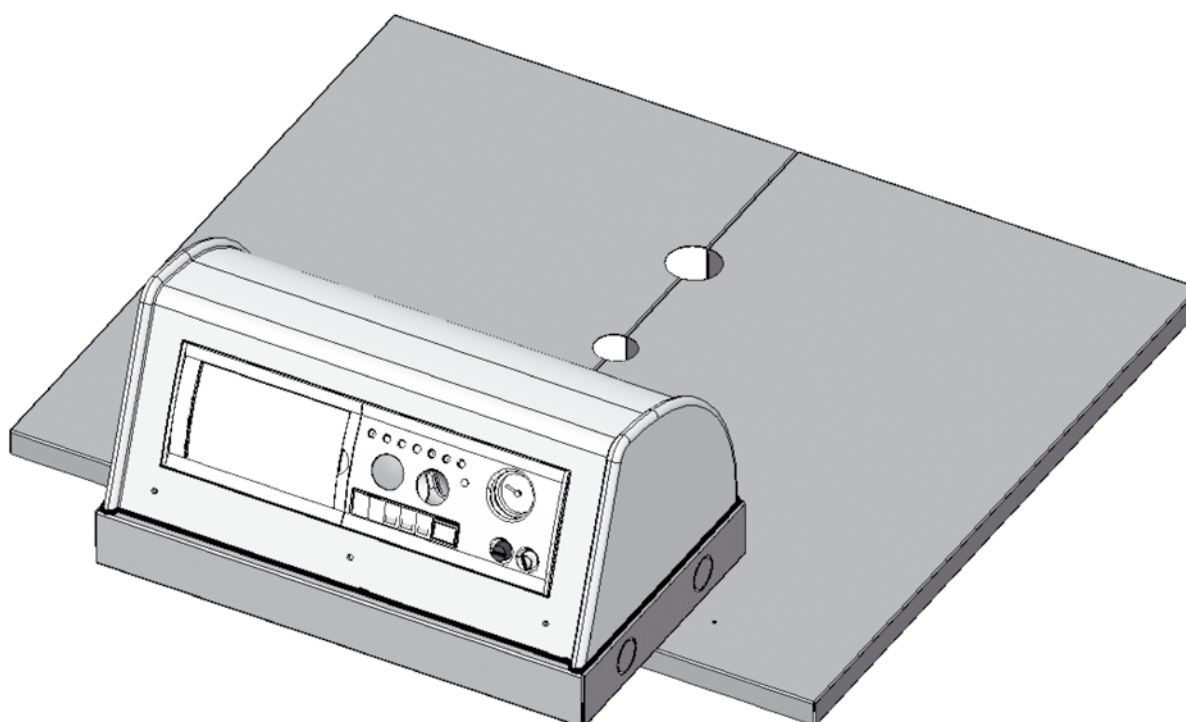
- The regulation thermostat.
- The safety thermostat.
- The minimum thermostat (its regulation and proper functioning).
- The recirculation system.
- The thermoregulator (if present).
- All other safety and control devices required by local regulations.

If the boiler is started-up for the first time, check:

- The system manual.
- The suitability of the room where the boiler is installed.
- Air vents in the room.
- Flue exhaust pipes, diameters and length.
- The correct installation of the boiler in accordance with the instructions contained in the present manual.

Should the boiler not operate correctly and in the absence of danger to persons, animals or property, notify the system supervisor and complete a declaration describing this fact.

ASSEMBLY INSTRUCTIONS FOR THE BOILER CONTROL PANEL



• **How to assemble the control panel**

Fig. 21 shows the support used to fix the control panel to the boiler. The openings in the bottom (**A**) and the rectangular one in the side (**C**) (in case when used with a bracket) can be used for passing the capillary tubes through.

In case of need, additional side slots (**B**) are present to host fittings model PG 21 (not provided), that can be used for the passage of electric cables.

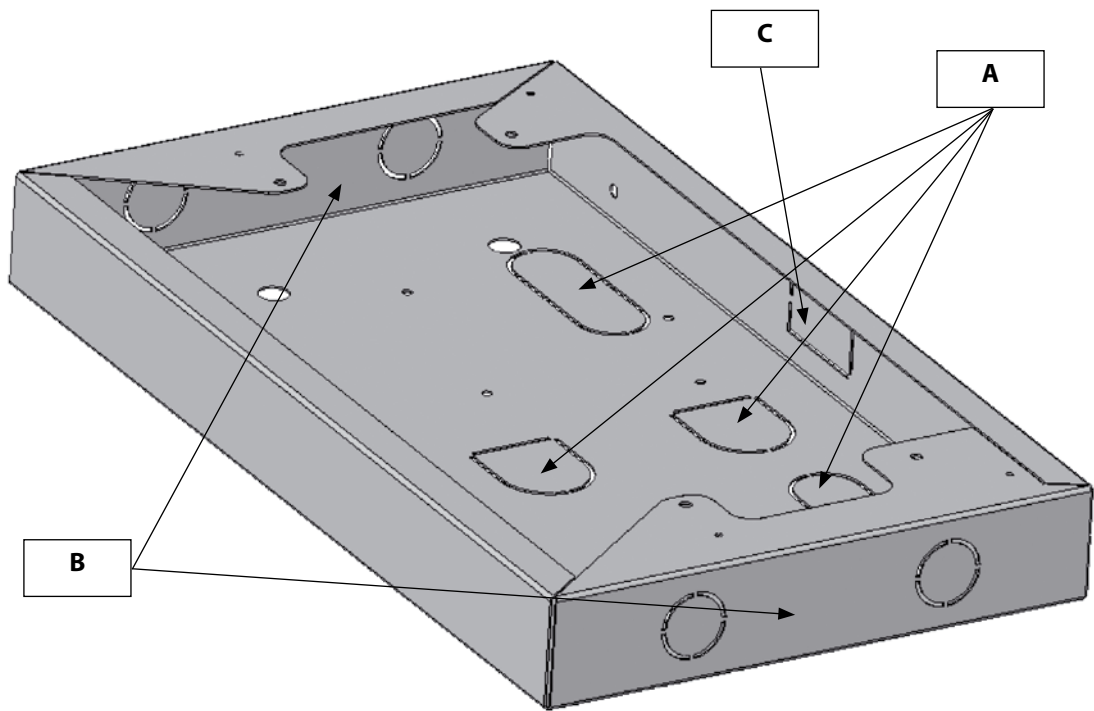


fig. 21

Model	Openings for cables	Openings for capillary tubes
RODI DUAL 70÷1300 kW RODI DUAL HR 70÷1300 kW	A - B	A
RODI DUAL 1400÷3500 kW RODI DUAL HR 1400÷3500 kW	B	C

HOW TO ASSEMBLE THE CONTROL PANEL

• How to remove the satellite cap

To remove the satellite cap (A), remove the securing screws (C) first, then fix the control panel (B) onto the boiler as shown below.

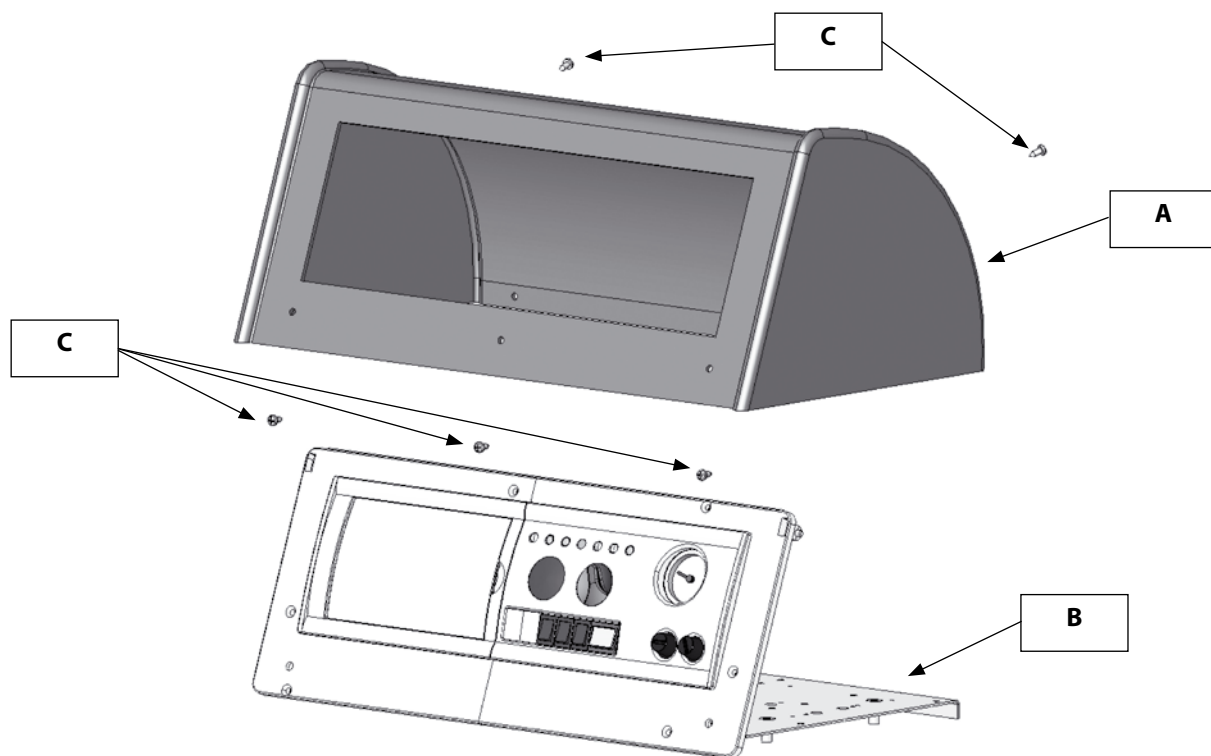


fig. 22

• How to assemble the control panel plate

Fix plate (A) onto the support (B), positioning the special gasket (C) as shown below. Secure using the M5 screws provided, inserting them from underneath support (D).

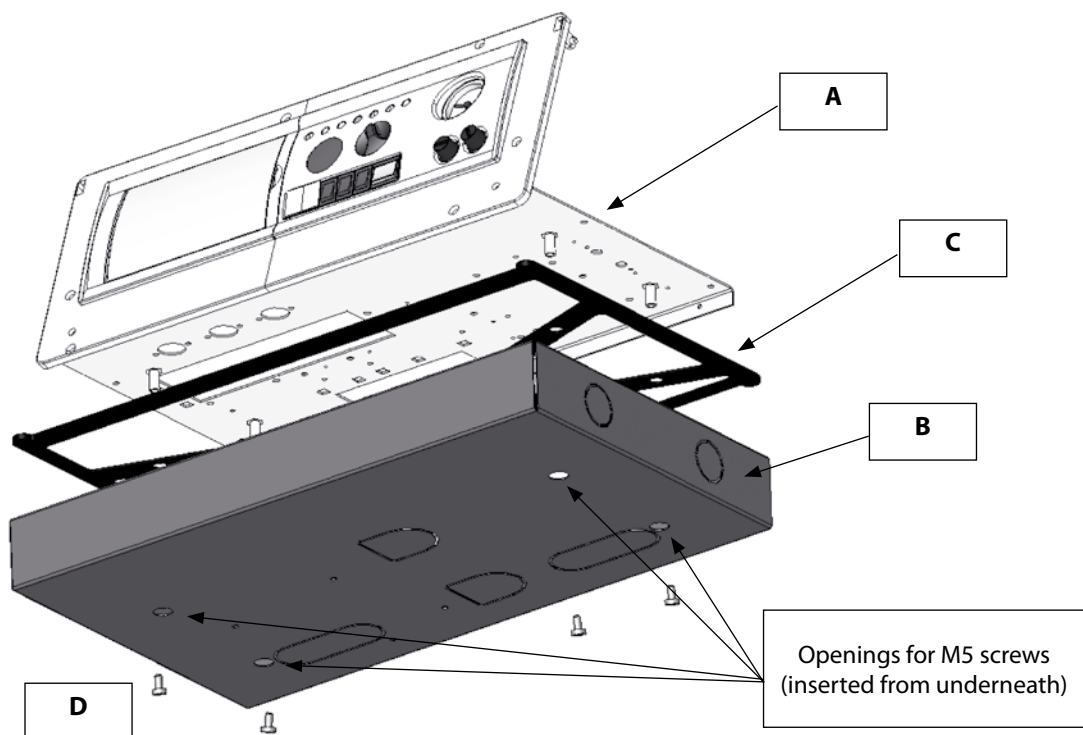


fig. 23

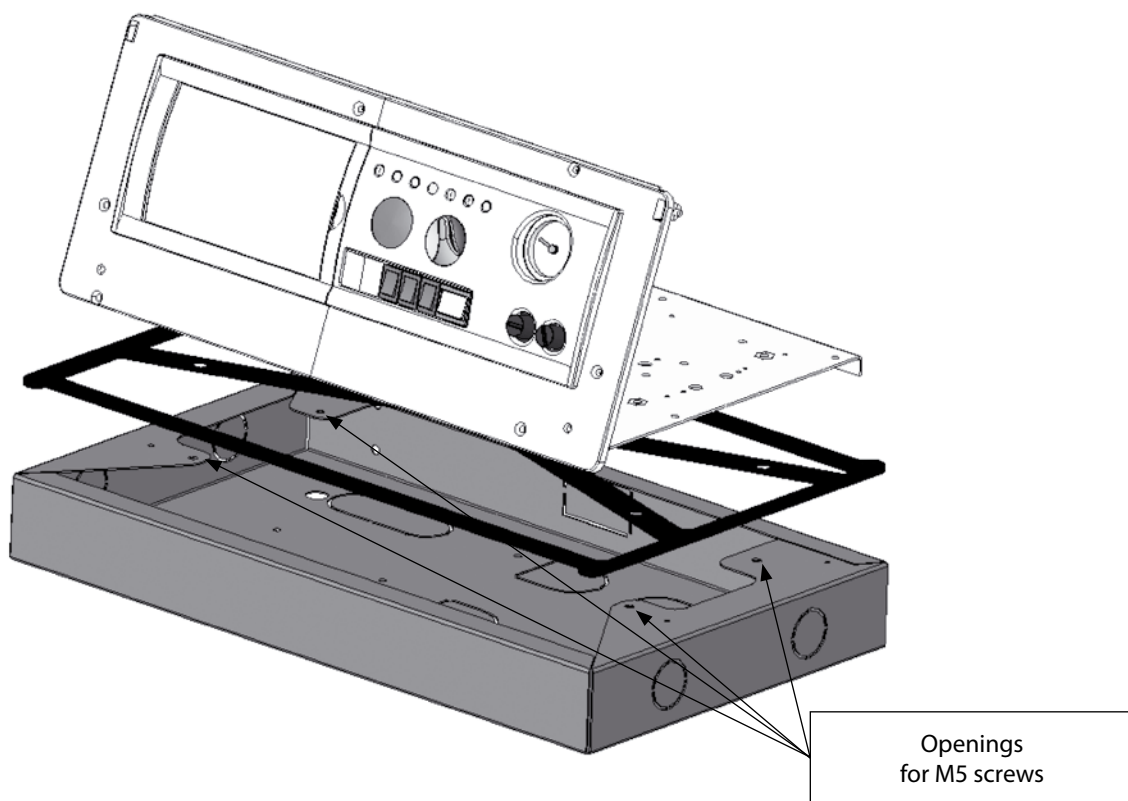


fig. 24

• How to position and secure the support

Position the support on the pre-mounted boiler panel as shown in the following diagrams, making sure the holes in the support align with those in the panelling.
Secure the support with self-drilling screws, as shown in fig. 27.

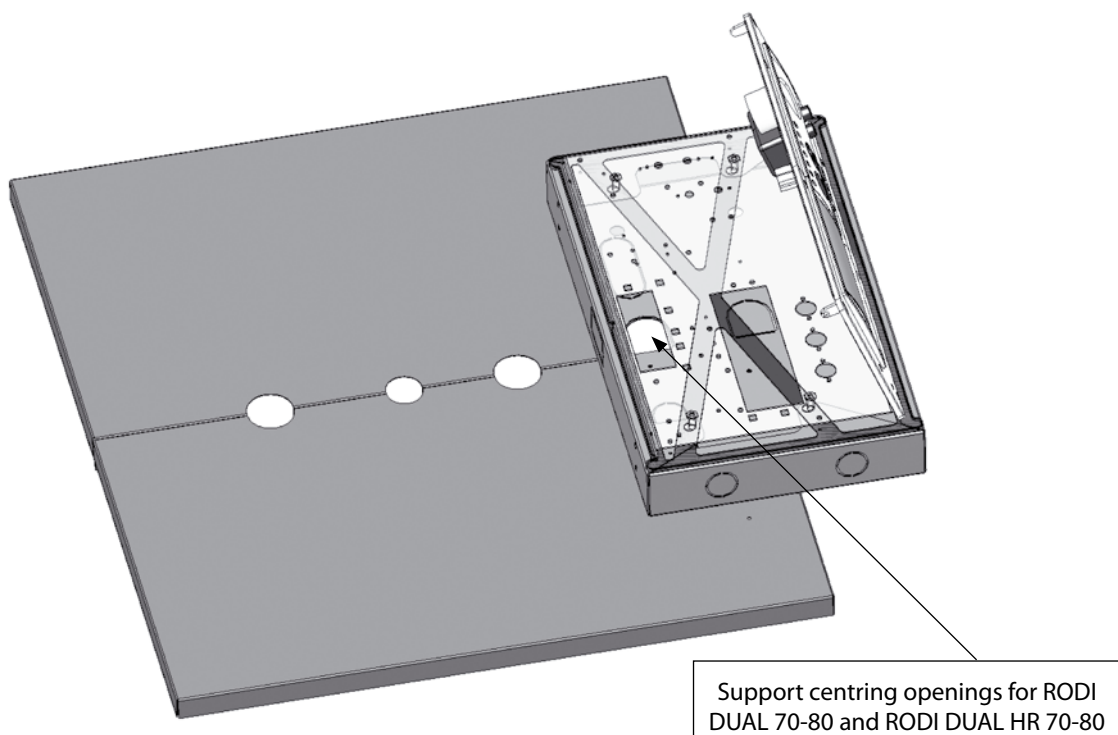


fig. 25

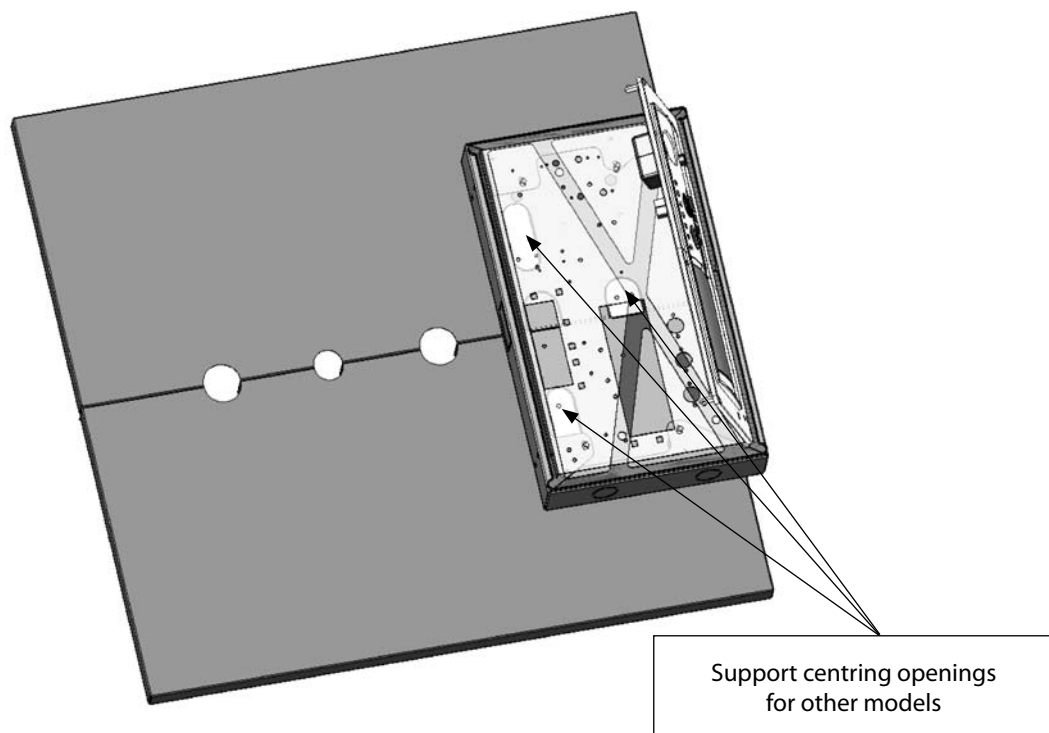


fig. 26

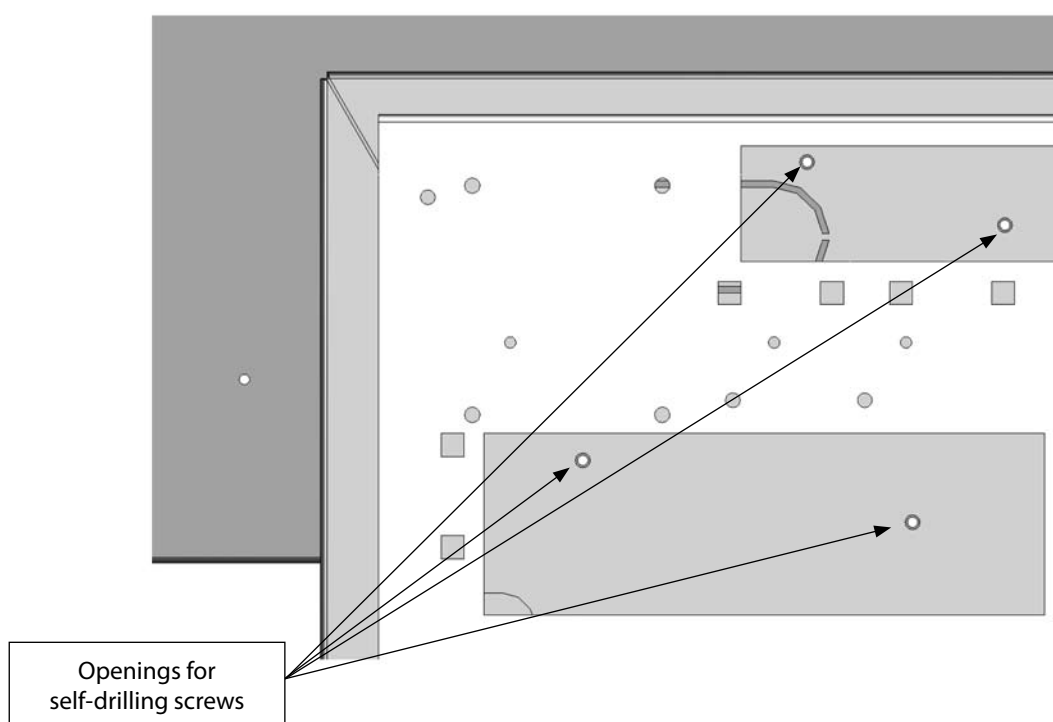


fig. 27

- **How to mount the complete control panel**

Remove the right-hand panel of the boiler and make the electrical connections.

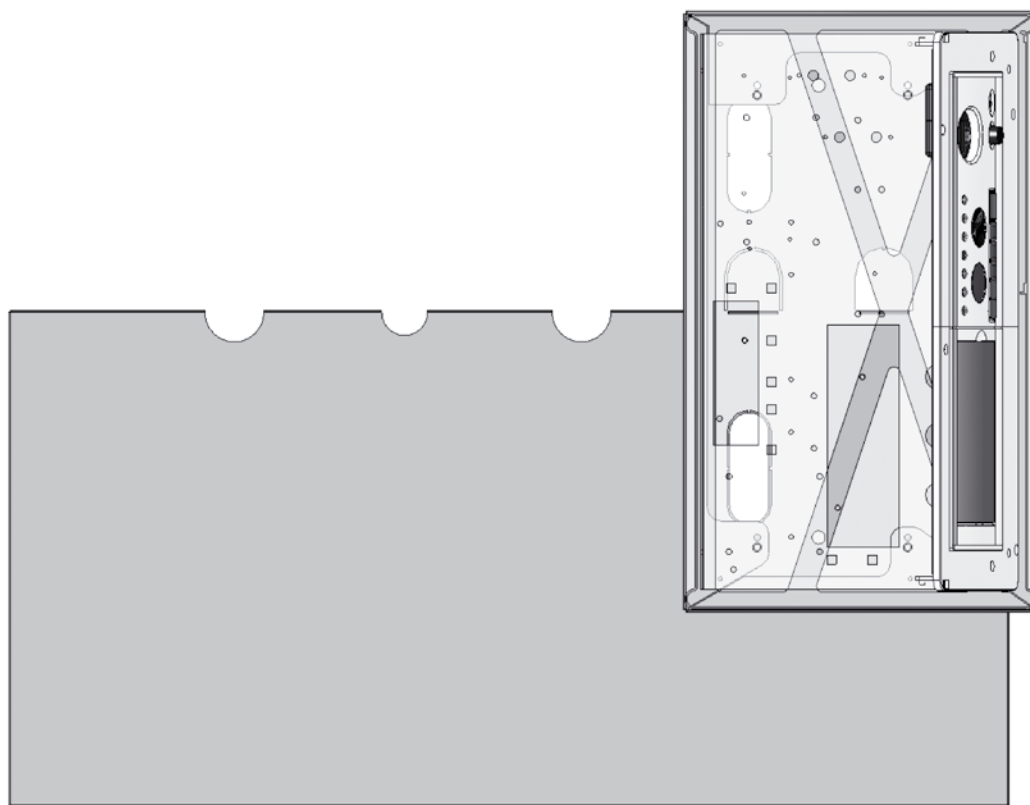


fig. 28

Mount the satellite cap and the right-hand panel as shown in fig. 20.

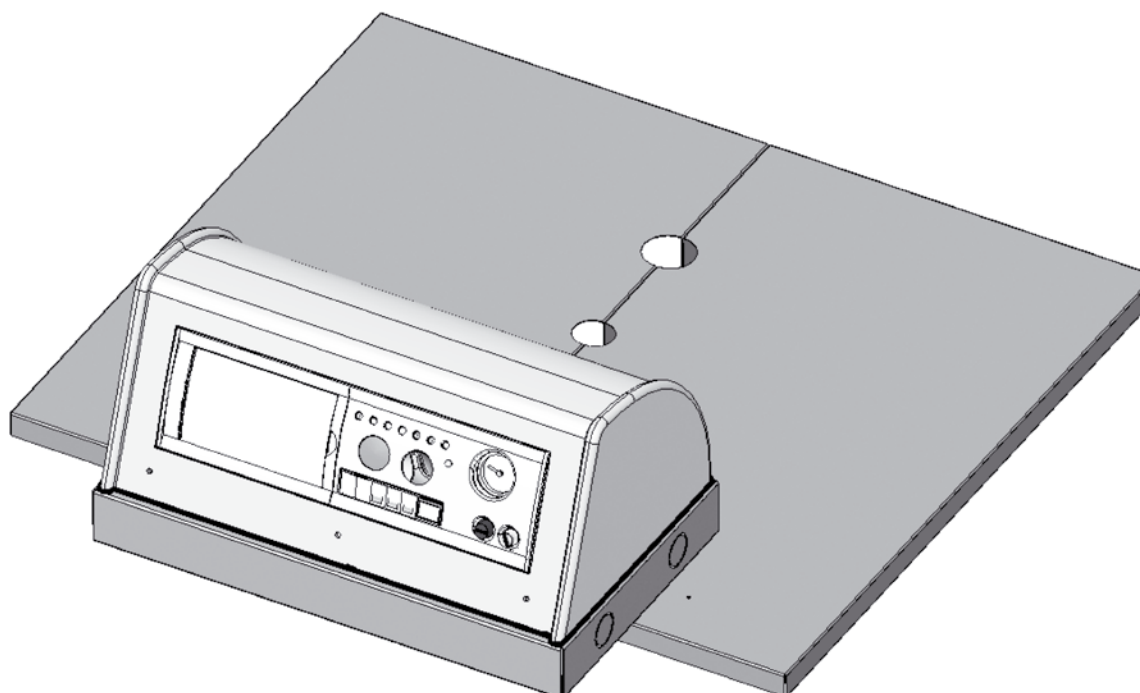


fig. 29

• **How to mount the complete control panel with the support (RODI DUAL and RODI DUAL HR 1400÷3500 kW)**

Fixing the control panel (together with the support and the bracket assembly) must be done in four stages:

- 1)** perform the preliminary operations shown in figs. 22, 23 and 24; arrange for the electrical connections of the control panel;
- 2)** re-install the satellite cap (**A**, fig. 30) using the screws provided (**B**, fig. 30).
- 3)** fix the pre-assembled unit (**C**) of the control panel to bracket (**D**) using the M4 screws (**E**) provided (fig. 31 and 32).
- 4)** perform the electrical connections of the control panel and fix it onto the boiler casing, using the screws provided (fig. 33 and 34).

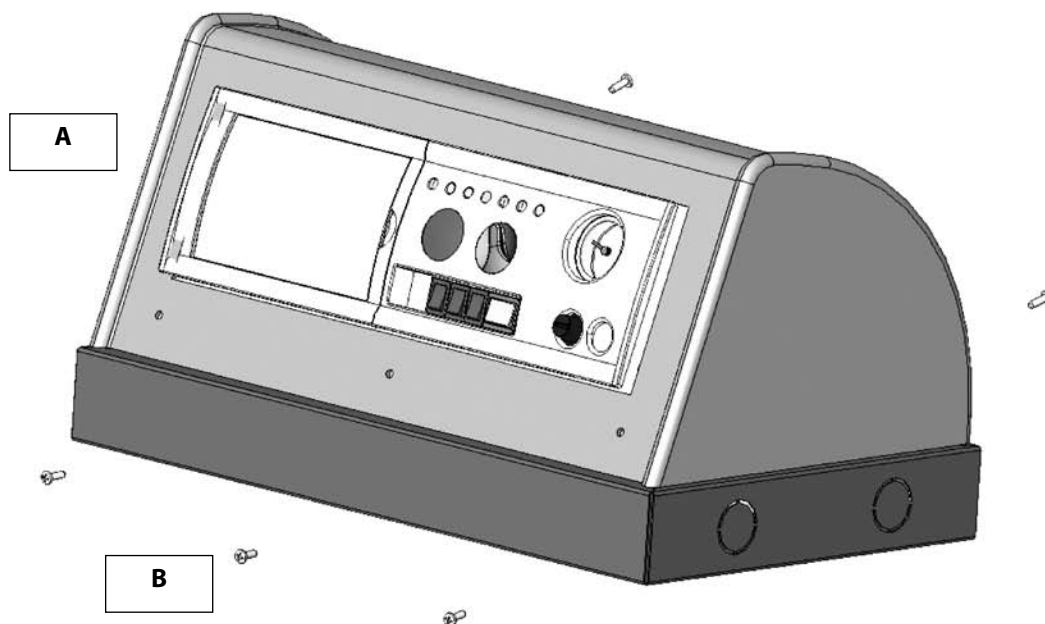


fig. 30

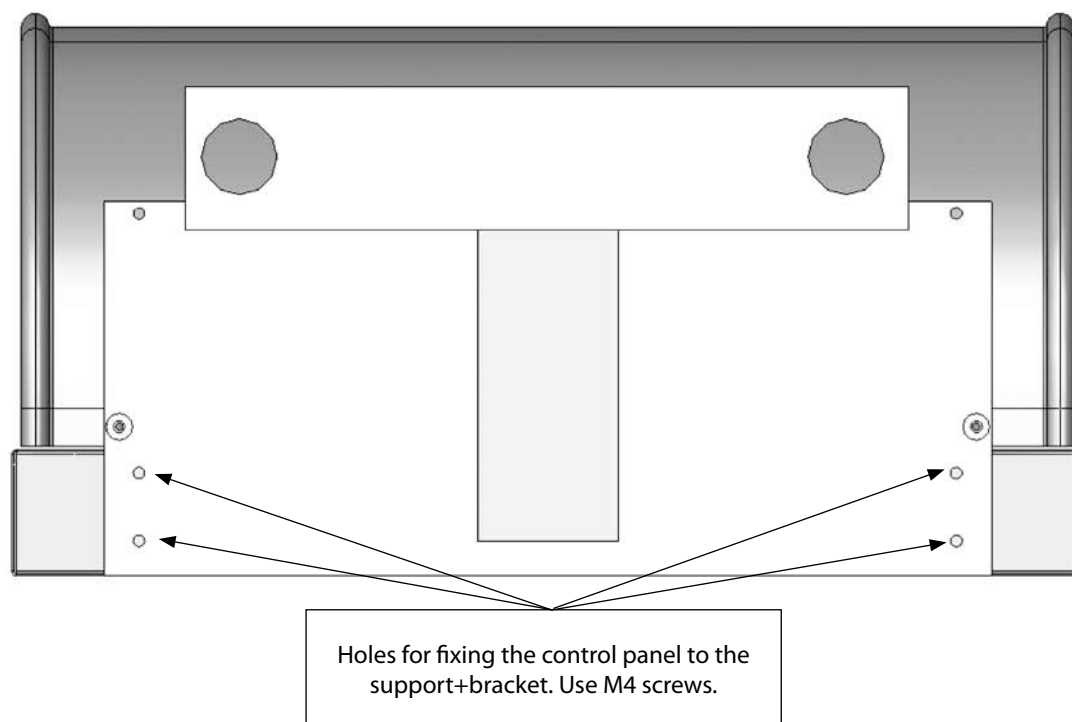


fig. 31

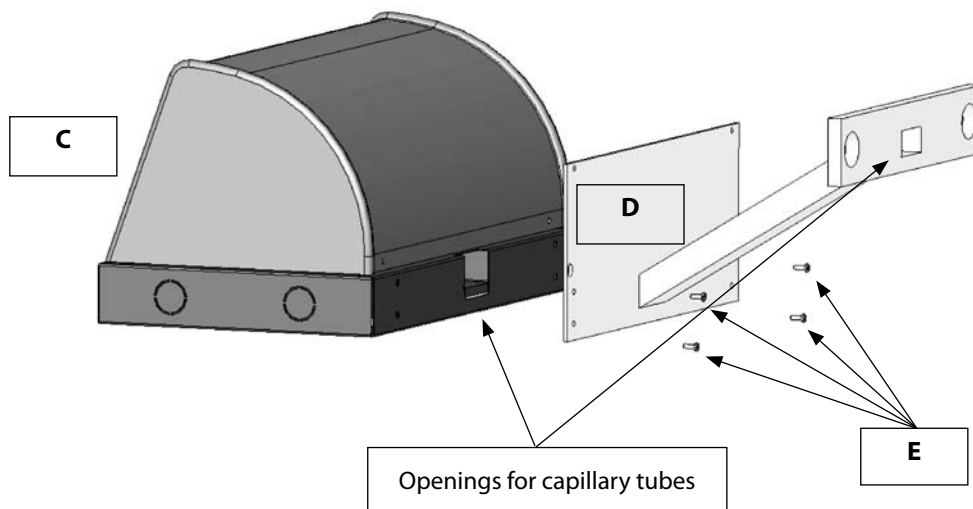


fig. 32

Control panel fixing

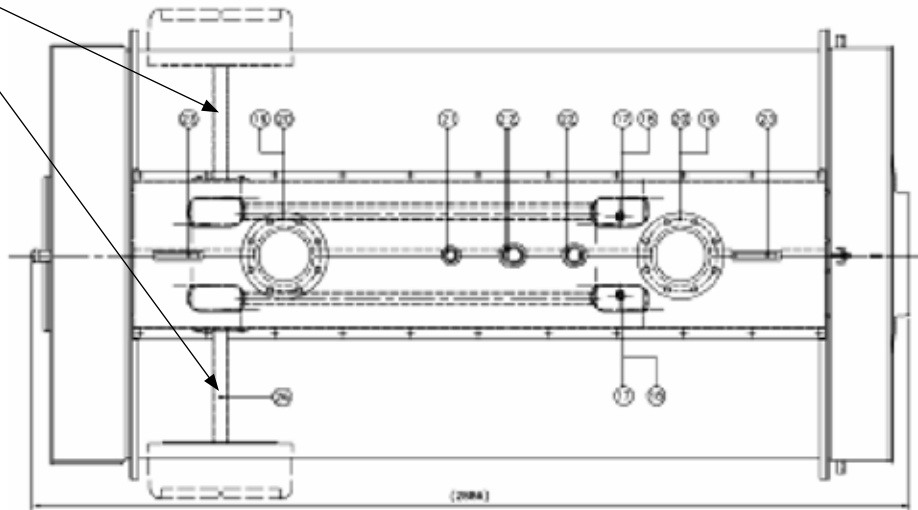


fig. 33

Control panel fixing

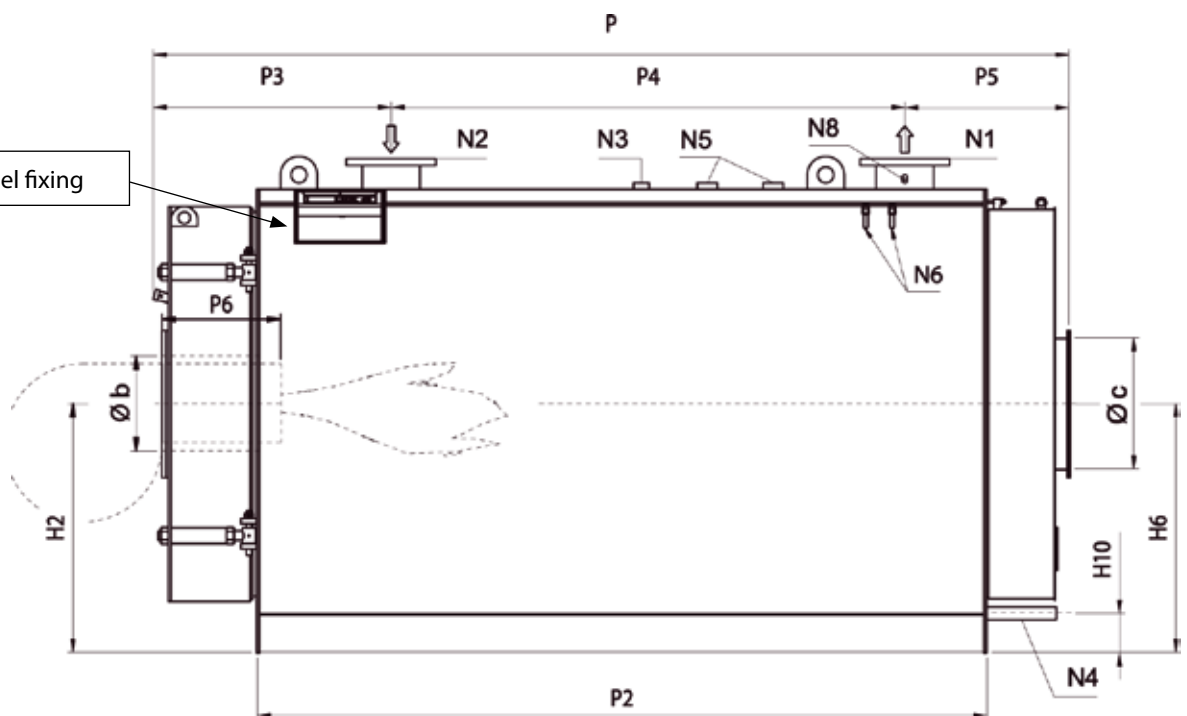


fig. 34

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