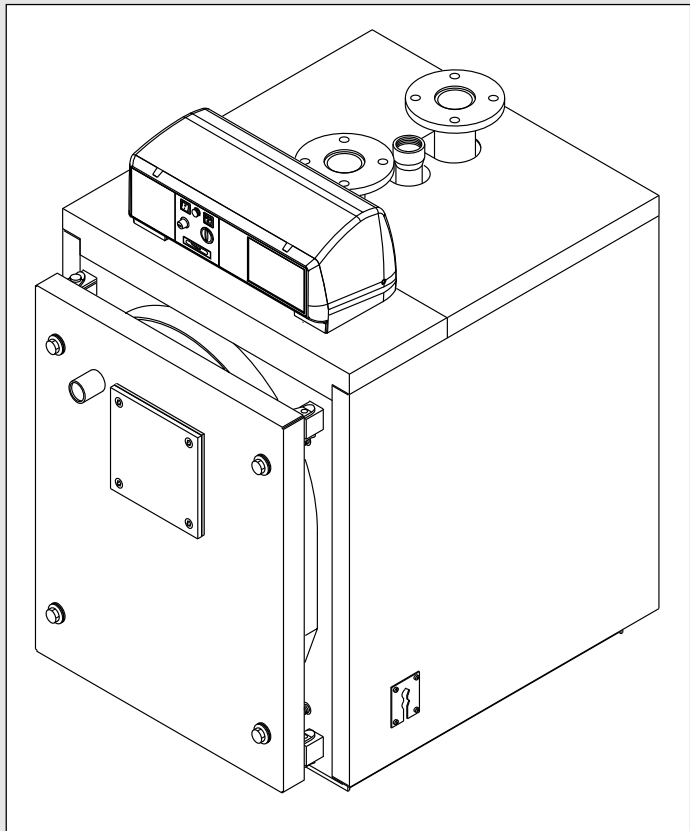


Unical[®]

TRISTAR 3G



INSTALLATION AND MAINTENANCE INSTRUCTIONS

General Information

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Attention: this manual contains instructions for the exclusive use of the professionally qualified installer and/or maintenance technician in compliance with current legislation.

The user is NOT qualified to intervene on the boiler.

The manufacturer will not be held liable in case of damage to persons, animals or objects resulting from failure to comply with the instructions contained in the manuals supplied with the boiler.

1 GENERAL INFORMATION

1.1 - SYMBOLS USED IN THE MANUAL

Pay special attention when reading this manual to the parts marked by the symbols:



DANGER !
Serious risks personal safety and life



ATTENTION !
Possibly hazardous situation for the product and the environment



NOTE !
Suggestions for the user

1.2 - APPROPRIATE USE OF APPLIANCE



The TRISTAR 3G appliance has been built according to the current level of engineering and acknowledged technical safety rules.

Nonetheless, if improperly used, dangers could arise for the safety and the very life of the user and other persons or damage to the equipment or other objects.

The appliance is intended to operate in hot air circulation heating systems.

Any other use must be considered improper.

UNICAL shall not be held liable for any damage resulting from improper use; in this case the user is fully responsible for the risk.

Use according to the intended purposes also includes careful compliance with the instructions in this manual.

1.3 - WATER TREATMENT (see specific booklet)



- The hardness of the feed water conditions the frequency at which the domestic hot water exchanger must be cleaned.
- If the water has a hardness greater than 15 °f, we recommend using water softeners, chosen according to the characteristics of the water.
- We recommend checking and cleaning the domestic hot water exchanger at the end of the first year of use and every two years thereafter; on this occasion, also check the state of wear of the anode.

1.4 - INFORMATION TO PROVIDE TO THE SYSTEM MANAGER



- The user must be instructed concerning the use and operation of his heating system, in particular:
- Deliver these instructions to the user, as well as other documents concerning the appliance included in the envelope inside the packaging. **The user must keep this documentation for future consultation.**
- Inform the user about the importance of the air vents and the flue gas exhaust system, highlighting their essential features and the absolute prohibition of modifying them.
- Inform the user about how to control the system's water pressure as well as operations to restore it.
- Inform the user about correct temperature control, control units/thermostats and radiators for saving energy.
- Remind that regularly system maintenance must be performed at least once a year and that combustion analysis must be performed as scheduled by applicable rules.
- Should the appliance be sold or transferred to a new owner or if you move and leave the appliance, always make sure that the instruction booklet accompanies it so the new owner and/or installer can access it.

General Information

1.5 - SAFETY WARNINGS



ATTENTION!

The appliance must be installed, adjusted and maintained by professionally qualified personnel, in compliance with standards and provisions in force. Incorrect installation can cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.



DANGER !

NEVER attempt to perform maintenance or repairs on the boiler on your own initiative.

Any work must be done by professionally qualified personnel.

We recommend stipulating a maintenance contract.

Insufficient or irregular maintenance can jeopardise the operating safety of the appliance and cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.



Modifying parts connected to appliance

Do not modify the following parts:

- the boiler
- the gas, air, water and electricity lines
- the flue gas pipe, the safety valves and the heating water drain pipe
- the parts of the device which affect the operating safety of the appliance



Attention !

To tighten or loosen the screwed fittings, use only appropriate fixed spanners.

Non-compliant use and/or inappropriate tools can cause damage (e.g. water or gas leakage).



ATTENTION !

Instructions for appliances fuelled by propane gas

Make sure that the gas tank has been deaerated before installing the appliance.

For state-of-the-art deaeration of the tank, contact the LPG supplier or a person qualified in compliance with law.

If the tank has not been professionally deaerated, ignition problems could occur.

In that case, contact the supplier of the LPG tank.



Smell of gas

Should you smell gas, follow these safety guidelines:

- do not use electric switches
- do not smoke
- do not use telephones
- close the gas shut-off valve
- air out the area where the gas leakage has occurred
- inform the gas supplier or a company specialised in installation and maintenance of heating systems.



Explosive and easily flammable substances

Do not use or store explosive or easily flammable materials (e.g. petrol, paints, paper) in the room where the appliance is installed.

1.6 - TECHNICAL DATA PLATE

The technical data plate is adhesive and is included in the document envelope; it must be applied by the installer on the outside of the case.

The serial number of the boiler is on the riveted plate on the front plate of the body:

lower right front for models between TRISTAR 3G 110 and TRISTAR 3G 1900 upper right front for models between TRISTAR 3G 2300 and TRISTAR 3G 3000.

CE marking

The CE marking certifies that the boilers meet:

- The essential requirements of the gas appliance directive (90/396/EEC)
- The essential requirements of the electromagnetic compatibility directive (89/336/EEC)
- The essential requirements of the efficiency directive (92/42/EEC)

Model	<input type="text"/>		
S.N°	<input type="text"/>	Year	<input type="text"/>
	GAS		SOLID
Fuel type:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3
Pn	<input type="text"/> kW	<input type="text"/> kW	<input type="text"/> kW
Pcond	<input type="text"/> kW	<input type="text"/> kW	<input type="text"/> kW
Qmax	<input type="text"/> kW	<input type="text"/> kW	<input type="text"/> kW
Adjusted Qn	<input type="text"/> kW	<input type="text"/> kW	<input type="text"/> kW
	<input type="text"/>	<input type="text"/>	<input type="text"/>
PIN	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Stock <input type="text"/> l	PMS <input type="text"/> bar	T max <input type="text"/> °C
	Stock <input type="text"/> l	PMW <input type="text"/> bar	T max <input type="text"/> °C
	230 V - 50 Hz		
	See Burner - Vedi Bruciatore - Voir Bruleur		
Note:			

Symbol	EN	IT
Model	Boiler Model	Modello Caldaia
S.N° (*)	Serial Number: see on boiler body	Matricola: vedi il numero di fabbricazione sul corpo caldaia
Year	Year of manufacturing	Anno di costruzione
Fuel type:	Fuel 1 - Gas 2 - Oil 3 - Heavy Oil	Combustibile 1 - Gas 2 - Gasolio 3 - Nafta
Pn	Nominal OUTPUT	Potenza Utile nominale
Pcond	Condensing nom. output	Pot. Utile nom. in condensazione
Qn	Nominal heat INPUT	Portata Termica nominale
Adjusted Qn	Adj. for nom. heat input	Portata Termica Regolata a ...
CE	Surveillance notified body	Ente di sorveglianza CE
PIN	P.I.N. code	Numero Identificazione Prodotto
	BOILER heating circuit:	Circuito riscaldamento CALDAIA:
Stock	Water content	Contenuto acqua
PMS	Max. Working Pressure	Pressione Massima d'Esercizio
T.max	Max. Working Temperature	Temperatura Massima d'Esercizio
	D.H.W. TANK:	BOLLITORE A.C.S.
Stock	Water content	Contenuto acqua
PMW	Max. Working Pressure	Pressione Massima d'Esercizio
T.max	Max. Working Temperature	Temperatura Massima d'Esercizio
	Electrical power supply	Alimentazione Elettrica
	Destination Countries: (SEE BURNER)	Paesi di destinazione: (vedi bruciatore)
Note	(Condensing boiler)	(caldaia a condensazione)

ATTENTION

Wherever the boiler operates with an air-blown gas-fired burner, the appliance, not belonging to any category among those considered in Annex II of the Legislative Decree 93 of 25/02/2000 (Implementation of Directive 97/23/EC regarding pressurised equipment), and moreover being considered by Directive 90/396/EEC (Gas-fired appliances - transposed in Italy with Italian Presidential Decree 661 of 15/11/1996) to which art. 1 subsection 3 paragraph "f.5" refers, is excluded from the range of application of the decree itself.

1.7 - GENERAL WARNINGS

Read the warnings contained in this instruction booklet carefully as they provide important guidelines regarding installation, use and maintenance safety.

Keep the booklet with care for further consultation.

Installation and maintenance must be performed in compliance with standards in force according to the instructions of the manufacturer and by qualified and certified personnel in compliance with law.

By professionally qualified personnel we mean: personnel with specific technical skill in the field of heating system components for civil use, domestic hot water production and maintenance. Personnel must have the qualifications foreseen by current legislation.

Incorrect installation or improper maintenance can cause damage to persons, animals or objects for which the manufacturer is not responsible.

Before performing any cleaning or maintenance, disconnect the appliance from the energy mains by acting on the switch of the system and/or through the specific cut-off devices.

Not obstruct the terminals of the intake/exhaust ducts.

In case of failure and/or malfunctioning of the appliance, switch it off and do not try to repair it or intervene on it directly. Contact only personnel qualified in compliance with law.

Any repairs must be performed solely by personnel authorised by Unical using original spare parts only. Failure to comply with the above can jeopardise the safety of the appliance.

To guarantee appliance efficiency and its correct operation, yearly maintenance must be performed by qualified personnel.

Should you decide not to use the appliance, parts entailing potential sources of hazard must be made safe.

Should the appliance be sold or transferred to a new owner or if you move and leave the appliance, always make sure that the instruction booklet accompanies it in order to be consulted by the new owner and/or installer.

Only original accessories must be used for all appliances with optionals or kits (including electric).

This appliance is intended solely for the use for which it was expressly designed. Any other use is to be considered improper and therefore dangerous.

2

TECHNICAL FEATURES AND DIMENSIONS

2.1 - TECHNICAL FEATURES

TRISTAR 3G boilers are of horizontal cylindrical type with flame inversion in the furnace and third flue gas pass in tubes. The construction fully complies the provisions of EN 303 part 1.

The components of the pressurised part, such as sheets and pipes, are made of certified carbon steel, according to the EURONORM 25 and EURONORM 28 tables.

Welding devices and procedures are approved by TÜV (D) - UDT (PL) - SA (S) and ISPESL (I).

For models TST 3G 110 ÷ TST 3G 380, the furnace is bonded to the rear tube plate.

For models TST 3G 500 ÷ TST 3G 300, the furnace is free to expand (it is only supported by the front tube plate). The boilers are equipped with an opening door on the right or left.

The outer shell is covered with a glass wool insulation mattress (thickness: 80 mm for models from TST 3G 110 to TST 3G 380, 100 mm for models from TST 3G 500 to TST 3G 1900, and 80 mm for models from TST 3G 2300 and TST 3G 3000) in turn protected by a mineral fibre fabric.

The top part of the shell is fitted with hooks for lifting the boiler.

Note: TRISTAR 3G boilers are intended to operate with an ON/OFF burner; as an alternative, they can be equipped with a dual-stage or modulating burner, as long as the minimum heat output that can be reached is not lower than the value indicated on the technical data plate for the type of fuel used.

The boilers are equipped with two ½" connections for conduits with an inside diameter of 15 mm (suitable to house 3 bulbs each).

The shell has holes at the sides for the cable glands of the power, pumps, burner cables and those of any other auxiliary device.

2.2 - MAIN COMPONENTS

TRISTAR 3G boilers are equipped with a direct crossing cylindrical furnace, making the flame of the burner more compact and shorter, thus reducing the residence time at high temperature.

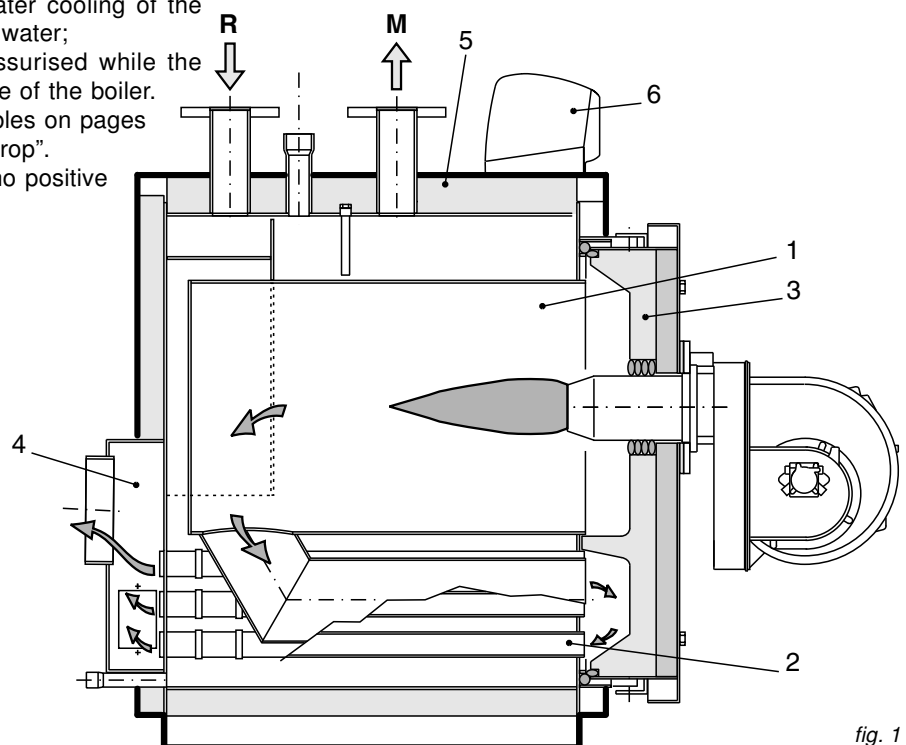
The combustion gases, entering the lower pipe connected to the furnace move towards the front of the boiler body, entering the smoke pipes. At the end of the pipes they are gathered in the smoke chamber and sent to the chimney.

The absence of inversion allows for greater cooling of the flame by the furnace walls covered by the water;

The combustion chamber is always pressurised while the burner is operating, within the power range of the boiler.

For the value of this pressure, see the tables on pages 9÷13, in the column "Flue gas pressure drop".

The chimney must be calculated so that no positive pressure is detected at its base.

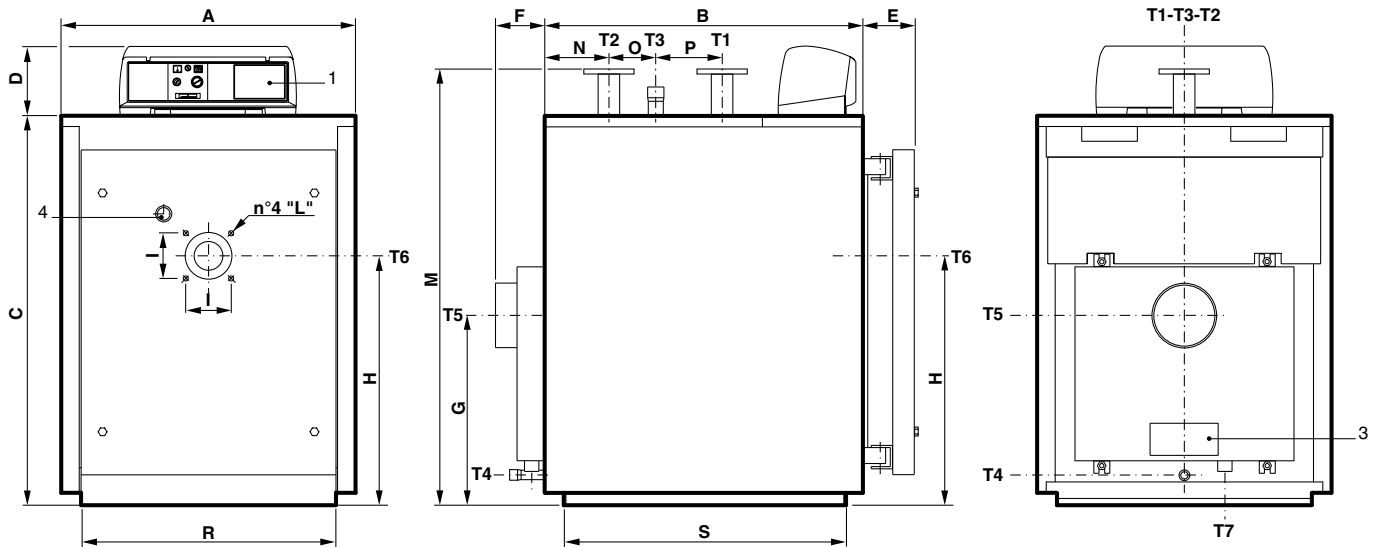


- 1 Furnace
- 2 Smoke pipes
- 3 Door with flame control warning light
- 4 Smoke chamber
- 5 Body insulation
- 6 Panel board

fig. 1

Technical features and dimensions

2.3 - DIMENSIONS - TRISTAR 3G 110÷150



- 1 Panel board
- 3 Smoke chamber cleaning door
- 4 Flame control warning light

- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain

- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

fig. 2

TRISTAR 3G Model	Nominal output kW	Heat input kW	Boiler capacity l	Water side pressure drops (**) m c.a.	Flue gas pressure drops mm c.a.	Boiler max. operating pressure bar	Weight kg	CONNECTIONS					
								T1 T2 UNI 2278 PN16	T3 ISO 7/1	T4 ISO 7/1	T5 Øi mm	T6 Øi mm	T7 Øe mm
TST 3G 110	81,7÷109	86,2÷115,6	201	0,11÷0,16	5,4÷9,7	5	—	DN 50	Rp 1¼	Rp ¾	200	130	40
TST 3G 150	112,5÷150	118,4÷158,6	266	0,16÷0,20	8,8÷15,6	5	—	DN 50	Rp 1¼	Rp ¾	200	130	40

TRISTAR 3G Model	DIMENSIONS															
	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M* mm	N mm	O mm	P mm	R* mm	S mm
TST 3G 110	820	885	1082	190	140	155	532	695	120	M8	1215	175	390	185	710	786
TST 3G 150	820	1145	1082	190	140	155	532	695	120	M8	1215	175	390	185	710	1046

(*) Minimum dimensions for boiler room access.

(**) Pressure drops corresponding to a thermal drop of 15K.

DETAIL FOR DOOR DRILLING TST 3G 110-150

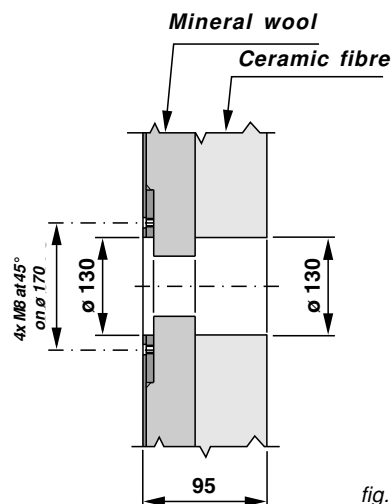
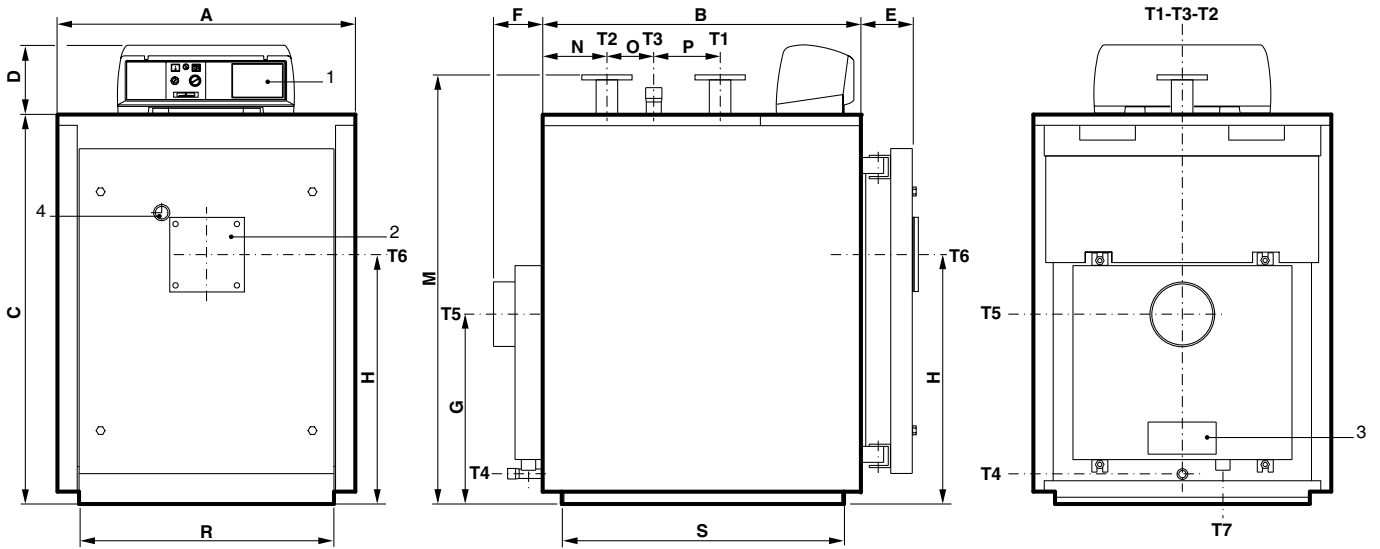


fig. 3

Technical features and dimensions

TRISTAR 3G 185÷380



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light

- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain

- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

fig. 4

TRISTAR 3G Model	Nominal output kW	Heat input kW	Boiler capacity l	Pressure drops on water side (**) m c.a.	Flue gas pressure drops mm c.a.	Boiler max. operating pressure bar	Weight kg	CONNECTIONS					
								T1 T2 UNI 2278 PN16	T3 ISO 7/1	T4 ISO 7/1	T5 Øi mm	T6 Ø mm	T7 Øe mm
TST 3G 185	138,7÷185	145,7÷195,3	291	0,09÷0,15	10,9÷19,5	5	--	DN 65	Rp 1 ½	Rp ¾	200	180	40
TST 3G 240	180÷240	188,6÷252,7	322	0,19÷0,33	13,6÷24,3	5	--	DN 65	Rp 1 ½	Rp ¾	200	180	40
TST 3G 300	225÷300	235,2÷315,3	413	0,12÷0,21	16÷28,4	5	--	DN 80	Rp 2	Rp ¾	250	180	40
TST 3G 380	285÷380	297,3÷398,5	479	0,16÷0,28	18,4÷32,7	5	--	DN 80	Rp 2	Rp ¾	250	180	40

TRISTAR 3G		DIMENSIONS													
Model	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	M* mm	N mm	O mm	P mm	R* mm	S mm	
TST 3G 185	860	1080	1182	190	140	155	757	775	1315	215	210	250	750	981	
TST 3G 240	860	1210	1182	190	140	155	757	775	1315	215	340	250	750	1111	
TST 3G 300	890	1275	1352	190	140	155	897	915	1470	255	285	315	780	1177	
TST 3G 380	890	1470	1352	190	140	155	897	915	1470	255	480	315	780	1372	

(*) Minimum dimensions for boiler room access.

(**) Pressure drops corresponding to a thermal drop of 15K.

DETAIL FOR DOOR DRILLING TST 3G 185÷380

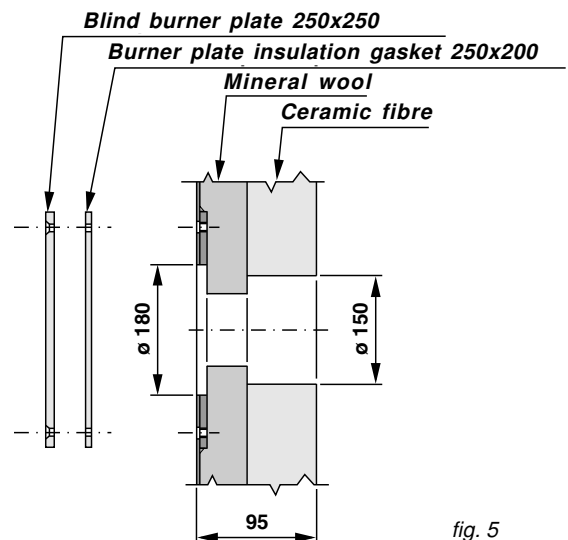
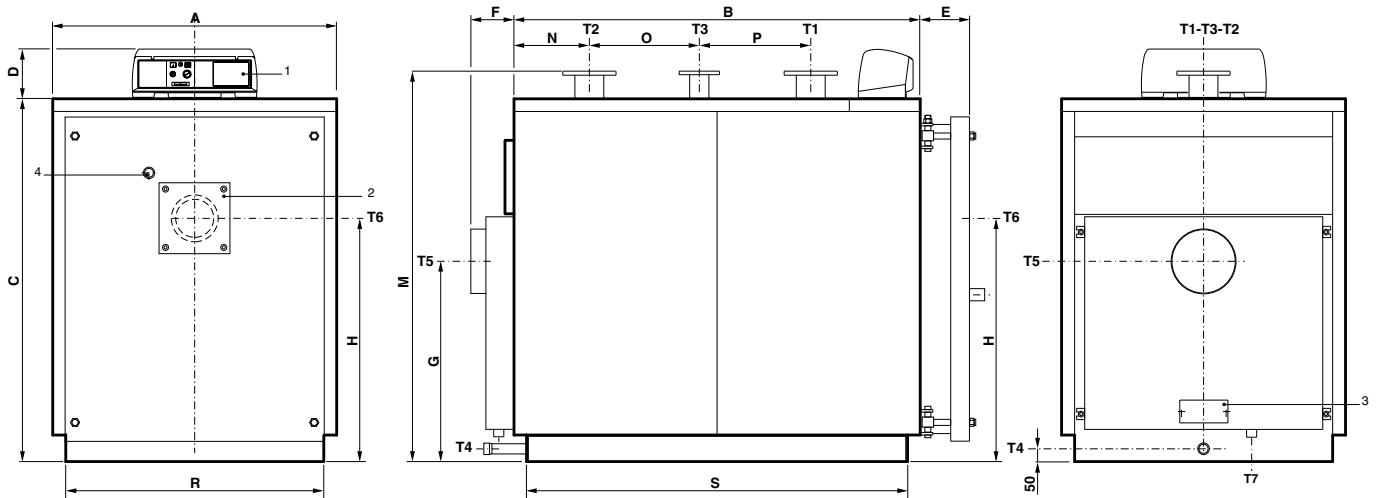


fig. 5

Technical features and dimensions

TRISTAR 3G 500÷840



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light

- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain

- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

fig. 6

TRISTAR 3G Model	Nominal output kW	Heat input kW	Boiler capacity l	Pressure drops on water side (**)	Fluegas pressure drops mm c.a.	Boiler max. operating pressure bar	Weight kg	CONNECTIONS					
								T1 T2 UNI 2278 PN16	T3 UNI 2278 PN16	T4 ISO 7/1	T5 Øi mm	T6 Ø mm	T7 Øe mm
TST 3G 500	375÷500	391÷524,1	693	0,09÷0,17	21,3÷37,8	5	--	DN 100	DN 65	Rp 1	300	270	40
TST 3G 630	472,5÷630	492,7÷660,4	779	0,14÷0,25	26,1÷46,5	5	--	DN 100	DN 65	Rp 1	300	270	40
TST 3G 840	630÷840	656,9÷880,5	908	0,21÷0,38	32,2÷57,3	5	--	DN 100	DN 65	Rp 1	300	270	40

TRISTAR 3G Model	DIMENSIONS													
	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	M* mm	N mm	O mm	P mm	R* mm	S mm
TST 3G 500	1122	1605	1432	190	195	185	442	960	1540	298	435	440	1020	1504
TST 3G 630	1122	1800	1432	190	195	185	442	960	1540	298	630	440	1020	1699
TST 3G 840	1122	1995	1432	190	195	185	442	960	1540	298	945	440	1020	2014

(*) Minimum dimensions for boiler room access.

(**) Pressure drops corresponding to a thermal drop of 15K.

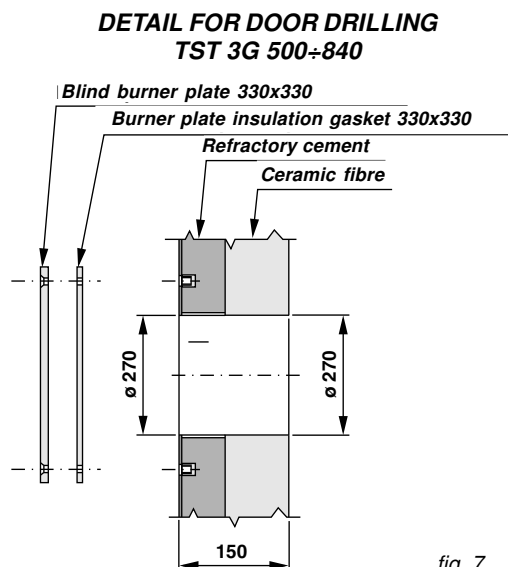


fig. 7

Technical features and dimensions

TRISTAR 3G 1100÷1900

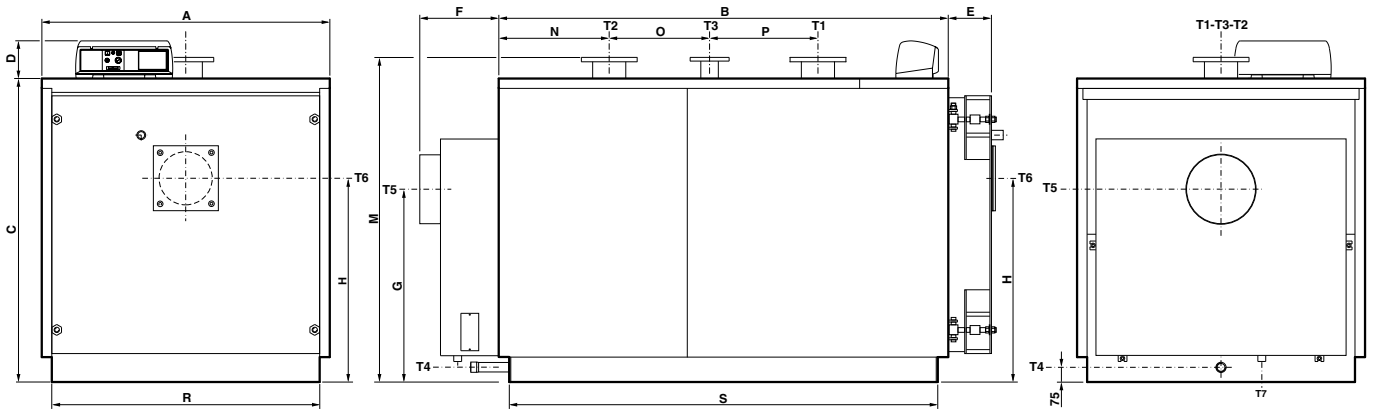


fig. 8

- | | | |
|-------------------------------|--------------------------------|-----------------------|
| 1 Panel board | T1 Heating flow | T5 Chimney connection |
| 2 Burner connection flange | T2 Heating return | T6 Burner connection |
| 3 Smoke chamber cleaning door | T3 Expansion vessel connection | T7 Condensation drain |
| 4 Flame control warning light | T4 Boiler drain | |

TRISTAR 3G Model	Nominal output kW	Heat input kW	Boiler capacity l	Pressure drops on water side(**) m c.a.	Fluegas pressure drops mm c.a.	Boiler max. operating pressure bar	Weight kg	CONNECTIONS					
								T1 T2 UNI 2278 PN16	T3 UNI 2278 PN16	T4 ISO 7/1	T5 Øi mm	T6 Ø mm	T7 Øe mm
TST 3G 1100	825÷1100	860,2÷1153	1546	0,15±0,26	38÷67,5	6	--	DN 150	DN 80	Rp 1½	450	270	40
TST 3G 1320	990÷1320	1032,3÷1383,6	1762	0,19±0,33	41,8÷74,3	6	--	DN 150	DN 80	Rp 1½	450	270	40
TST 3G 1600	1200÷1600	1251,3÷1677,1	2197	0,24±0,41	33,7÷60	6	--	DN 200	DN 100	Rp 1½	520	285	40
TST 3G 1900	1425÷1900	1485,9÷1991,5	2450	0,18±0,30	43,9÷78	6	--	DN 200	DN 100	Rp 1½	520	285	40

TRISTAR 3G Model	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	M* mm	N mm	O mm	P mm	R* mm	S mm
TST 3G 1100	1462	2282	1542	190	227	272	888	1035	1650	561	510	550	1360	2176
TST 3G 1320	1462	2652	1542	190	227	272	888	1035	1650	561	880	550	1360	2546
TST 3G 1600	1622	2692	1702	190	259	274	940	1155	1810	661	670	700	1520	2590
TST 3G 1900	1622	3014	1702	190	258	273	940	1155	1810	662	990	700	1520	2910

(*) Minimum dimensions for boiler room access.
 (**) Pressure drops corresponding to a thermal drop of 15K.

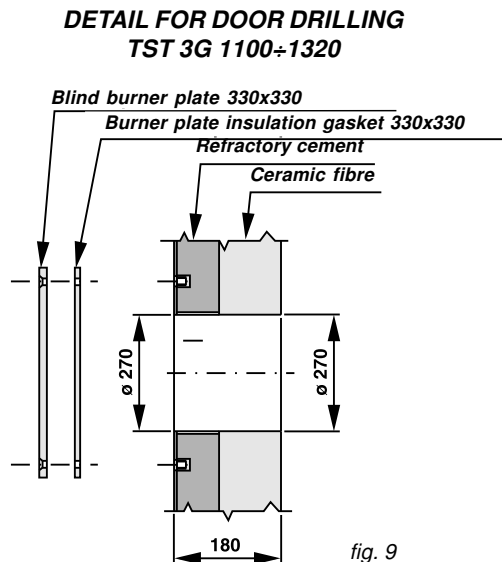


fig. 9

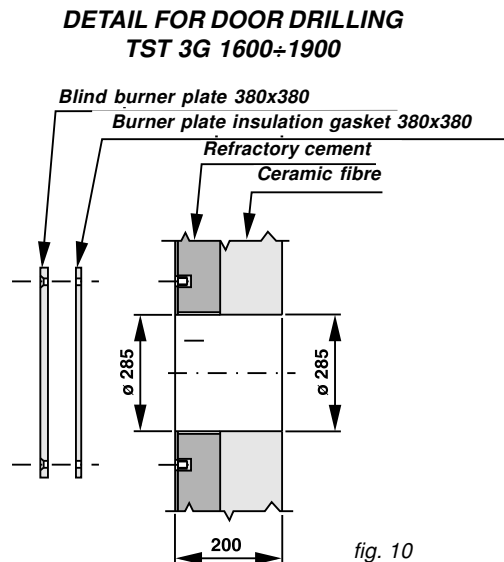


fig. 10

Technical features and dimensions

TRISTAR 3G 2300+3000

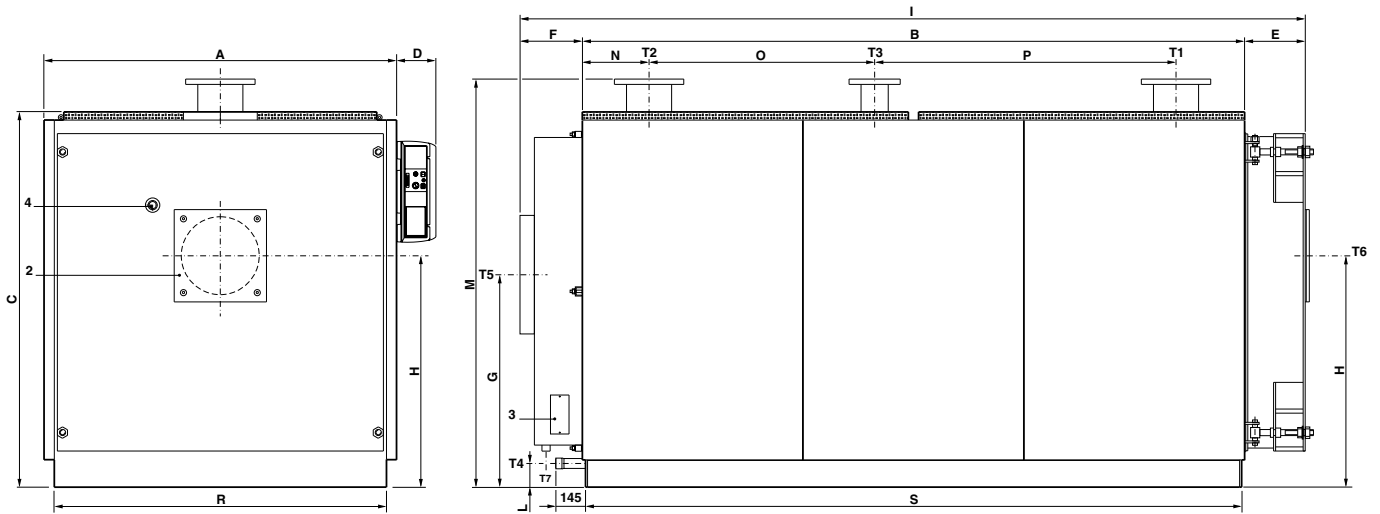


fig. 11

- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light

- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain

- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

TRISTAR 3G Model	Furnace output kW	Heat input kW	Boiler capacity l	Pressure drops on water side (**) m c.a.	Fluegas pressure drops mm c.a.	Boiler max. operating pressure bar	Weight kg	CONNECTIONS					
								T1 T2 UNI 2278 PN16	T3 UNI 2278 PN16	T4 ISO 7/1	T5 Øi mm	T6 Ø mm	T7 Øe mm
TST 3G 2300	1725÷2300	1798,7÷2410,8	2875	0,20÷0,35	45÷80	6	5350	DN 200	DN 125	Rp 1½	570	320	40
TST 3G 2650	1987,5÷2650	2072,4÷2777,7	4320	0,19÷0,33	41,3÷73,5	6	7070	DN 200	DN 125	Rp 1½	620	380	40
TST 3G 3000	2250÷3000	2346,1÷3144,5	4817	0,26÷0,45	50,6÷90	6	7600	DN 200	DN 125	Rp 1½	620	380	40

TRISTAR 3G Model	DIMENSIONS															
	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M* mm	N mm	O mm	P mm	R* mm	S mm
TST 3G 2300	1720	3230	1830	190	295	310	1315	1225	3835	115	1990	325	1100	1470	1620	3200
TST 3G 2650	1970	3194	2090	190	325	360	1535	1450	3879	144	2271	377	1060	1420	1870	3164
TST 3G 3000	1970	3594	2090	190	325	360	1535	1450	4279	144	2271	777	1060	1420	1870	3564

(*) Minimum dimensions for boiler room access.

(**) Pressure drops corresponding to a thermal drop of 15K.

DETAIL FOR DOOR DRILLING TST 3G 2300

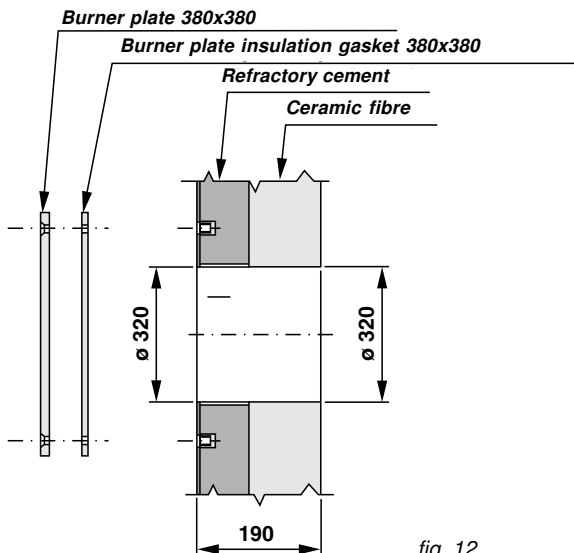


fig. 12

DETAIL FOR DOOR DRILLING TST 3G 2650 - 3000

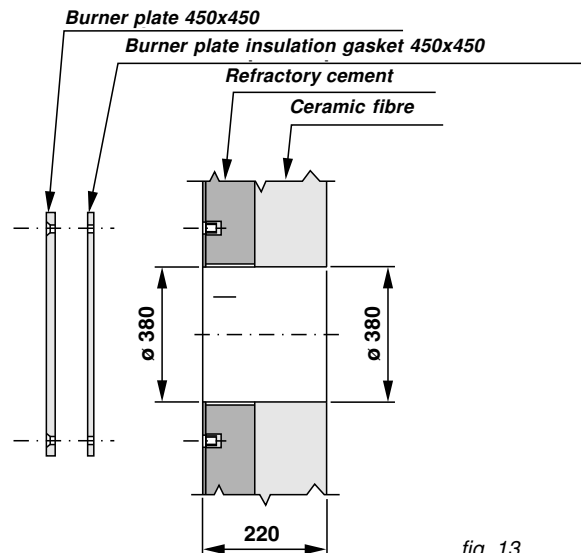


fig. 13

2.4 - OPERATING DATA ACCORDING AS PER UNI 10348

GAS-FIRED		TST 3G 110	TST 3G 150	TST 3G 185	TST 3G 240	TST 3G 300	TST 3G 380	TST 3G 500	TST 3G 630
Nominal heat output	kW	81,7÷109	112,5÷150	138,75÷185	180÷240	225÷300	285÷380	375÷500	472,5÷630
Nominal heat input	kW	86,3÷115,7	118,4÷158,6	145,7÷195,3	188,6÷252,7	235,2÷315,3	297,3÷398,5	391÷524,1	492,7÷660,3
Heat efficiency at nominal load (100%)	%	94,8÷94,3	95÷94,5	95,2÷94,7	95,5÷95	95,6÷95,1	95,9÷95,4	95,9÷95,4	95,9÷95,4
Heat efficiency at 30% load	%	95÷94,5	95,2÷94,7	95,4÷95	95,7÷95,2	95,8÷95,3	96,1÷95,6	96,1÷95,6	96,1÷95,6
Number of stars (according to 92/42 EEC)	n.	3	3	3	3	3	3	--	--
Combustion efficiency at nominal load (100%)	%	95,9÷95,1	95,9÷95,2	96÷95,2	96÷95,3	96,1÷95,4	96,3÷95,6	96,3÷95,6	96,3÷95,6
Heat loss at casing	%	1,1÷0,8	0,8÷0,6	0,7÷0,5	0,5÷0,3	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2
Heat loss at chimney with burner on	%	4,1÷4,9	4,1÷4,8	4÷4,8	4÷4,7	3,9÷4,6	3,7÷4,4	3,7÷4,4	3,7÷4,4
Heat loss at chimney with burner off	%	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1
Flue gas temperature t_{f-ta}	°C	85÷100	84÷99	83÷98	82÷97	80÷95	76÷91	75÷90	75÷90
CO ₂ content	%	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8
Flue gas mass flow rate	kg/h	129,7÷173,8	177,9÷238,5	219÷293,5	283,4÷379,9	353,6÷473,9	446,9÷599	587,8÷787,8	740,6÷992,6

GAS-FIRED		TST 3G 840	TST 3G 1100	TST 3G 1320	TST 3G 1600	TST 3G 1900	TST 3G 2300	TST 3G 2650	TST 3G 3000
Nominal heat output	kW	630÷840	825÷1100	990÷1320	1200÷1600	1425÷1900	1725÷2300	1987,5÷2650	2250÷3000
Nominal heat input	kW	656,9÷880,5	860,2÷1153	1032,3÷1383,6	1251,2÷1677,1	1485,9÷1991,5	1798,7÷2410,8	2072,4÷2777,7	2346,1÷3144,5
Heat efficiency at nominal load (100%)	%	95,9÷95,4	95,9÷95,4	95,9÷95,4	95,9÷95,4	95,9÷95,4	95,9÷95,4	95,9÷95,4	95,9÷95,4
Heat efficiency at 30% load	%	96,1÷95,6	96,1÷95,6	96,1÷95,6	96,1÷95,6	96,1÷95,6	96,1÷95,6	96,1÷95,6	96,1÷95,6
Number of stars (according to 92/42 EEC)	n.	--	--	--	--	--	--	--	--
Combustion efficiency at nominal load (100%)	%	96,3÷95,6	96,3÷95,6	96,3÷95,6	96,3÷95,6	96,3÷95,6	96,3÷95,6	96,3÷95,6	96,3÷95,6
Heat loss at casing	%	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2	0,4÷0,2
Heat loss at chimney with burner on	%	3,7÷4,4	3,7÷4,4	3,7÷4,4	3,7÷4,4	3,7÷4,4	3,7÷4,4	3,7÷4,4	3,7÷4,4
Heat loss at chimney with burner off	%	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1	0,1÷0,1
Flue gas temperature t_{f-ta}	°C	75÷90	75÷90	75÷90	75÷90	75÷90	75÷90	75÷90	75÷90
CO ₂ content	%	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8	9,8÷9,8
Flue gas mass flow rate	kg/h	987,4÷1323,5	1293,1÷1733,1	1551,7÷2079,7	1880,8÷2520,9	2233,5÷2993,5	2703,7÷3623,8	3115,1÷4175,2	3526,5÷4726,7

3

INSTALLATION INSTRUCTIONS

3.1 - GENERAL WARNINGS



ATTENTION!

This boiler is intended solely for the use for which it was expressly designed. Any other use is to be considered improper and therefore dangerous.

This boiler heats water at a temperature lower than the atmospheric pressure boiling temperature.



ATTENTION!

The appliances are designed to be installed inside suitable rooms or technical spaces only. The appliances cannot be installed or operate outdoors. Outdoor installation can cause malfunctioning and be dangerous. Choose specifically designed appliances for outdoor installation.



Before connecting the boiler, have professionally qualified personnel:

- a) Thoroughly wash all the piping of the system to remove any residue or impurities which could jeopardise proper operation of the boiler;
- b) Check that boiler is set up to operate with the available type of fuel.
This can be seen written on the package and on the technical feature plate;
- c) Check that the chimney/flue has an appropriate draught, without any bottlenecks, and that no exhausts from other appliances are inserted, unless the flue has been implemented to accommodate several utilities according to specific standards and prescriptions in force. Only after this check can the fitting between the boiler and chimney/flue be mounted;



ATTENTION!

In rooms with the presence of aggressive vapours or dust, the appliance must operate independently from the air inside the installation room!



ATTENTION!

The appliance must be installed by a qualified technician with the technical-professional requirements according to law 46/90 which, under his own responsibility, guarantees compliance with standards according to good practice rules.



The boiler must be connected to a central heating system and/or domestic hot water supply network compatible with its efficiency and output.

3.2 - INSTALLATION STANDARDS

The appliance must be installed in compliance with the instructions provided in this manual.

It must be installed by a professionally qualified technician, **who shall assume the responsibility of respecting all local and/or national laws published in the official journal , as well as applicable technical standards**.

TRISTAR 3G is a steel boiler which can be combined with air-blown burners fired by gas of category **I12H3+**.

Contact the gas supplying company before installing the appliance.

The following standards, rules and prescriptions must be observed to perform installation. This list is indicative and not complete, needing to follow the progress of the "state-of-the-art".

Standard UNI 7129
Design, installation and maintenance of gas systems for household use supplied by distribution network (NATURAL GAS).

Standard UNI 11137-1
Guidelines for inspection and restoration of the sealing of indoor systems in operation.

Standard UNI 7131
Design, installation and maintenance of liquefied petroleum gas (LPG) systems for household use not supplied by distribution network.

Standard UNI 10412 of December 1994.
Hot water heating systems. Safety prescriptions.
FIELD OF APPLICATION: thermal potentials greater than 35 kW (30,000 kcal/h).

LAW March 5,1990 N° 46 and relative applicative regulation by Italian Presidential Decree 447 of December 6, 1991 (and subsequent amendments).
Safety standards for systems
FIELD OF APPLICATION: without thermal potential limits.

STANDARD UNI EN 676, November 1998.
Air-blown gas-fired burners.
Safety prescriptions.

Legislative Decree N° 93 of February 25, 2000.
Implementation of directive 97/23/EC (P.E.D.) concerning pressurised equipment.
FIELD OF APPLICATION: appliances fed by liquid fuels (naphtha, diesel oil, combustible oil) and solids.

Standard UNI 10847 of March 2000.
Single flue systems for generators fed by solid and liquid fuels. Maintenance and control. Guidelines and procedures.

LAW January 9, 1990 N° 10 and relative applicative regulation by Italian Presidential Decree. 412 of 26 August 1993 (and subsequent modifications), Italian Presidential Decree n°551 of 21.12.1999.

Regulation with amendments to Italian Presidential Decree. n° 412 concerning design, installation, operation and maintenance of thermal systems in buildings, in order to reduce energy consumption.
FIELD OF APPLICATION: without thermal potential limits.

Law n°186 of 01.03.1968
Installation standard IEC 64-8 / II ed.
Electric systems using rated voltage no greater than 1000 V AC and 1500 V DC.

Installation standard IEC 64-8 / I ed.
Electric systems in buildings intended for residential and similar use.

LAW 615 of 13 July 1966 and relative applicative regulation by Italian Presidential Decree. 1391 of December 6, 1991 (and subsequent amendments).
Provisions against environmental pollution (systems fed with solid and liquid fuels).
FIELD OF APPLICATION: thermal potentials greater than 35 kW.

Approval art. 44 Community Law of 2001 "INSTALLATION OF HEAT GENERATORS" suppression of last period comma 10 DPR551/99, (0.4 m² ventilation).

D.M. April 28, 2005
Approval of the fire prevention technical rule for designing, construction and operating of liquid fuel fed heat systems.
FIELD OF APPLICATION: thermal potentials greater than 35 kW.

Directives concerning boiler rooms, building regulations and combustion heating provisions in the country of installation must also be respected.

The appliance must be installed, commissioned and undergo maintenance according to the current "state-of-the-art". This also holds for the hydraulic system, the flue exhaust system and the installation room.

Technical features and dimensions

3.3 - HANDLING



The boiler can be handled easily, lifting it by means of upper hook/s or shifting it on rollers underneath the sturdy base longerons.

If necessary for clearance purposes, the door and the smoke chamber can be removed to make it easier to enter the boiler room.

3.4 - POSITIONING IN BOILER ROOM

The boiler must be installed in compliance with standards and prescriptions in force.

The room must be well ventilated by openings with a total surface no less than 1/30 the surface of the boiler room, with a minimum of 0.5 m².

The ventilation openings must be permanent, communicate directly with the outside and be positioned high or low according to standards in force.

The location of the ventilation openings, the fuel supply circuits, electric energy supply and lighting must comply with current legal provisions in relation to the type of fuel used.

It is recommended to install the boiler as close to the chimney connection as possible.

To make it easier to clean the smoke circuit, in front of the boiler, there must be a free space no less than the length of the boiler body and, in any case, never less than 1300 mm. Check that with the door opened 90°, the distance between the door and the adjacent wall is at least the length of the burner.

The boiler can be placed directly on the floor as it is equipped with a base.

However it is useful to provide a flat, level cement plinth capable of bearing the weight of the boiler full of water.

When positioned on the plinth, the dimensions must be at least **R x S** (see dimensions table).

When installation has been performed, the boiler must be perfectly horizontal and stable (to reduce vibrations and noise).

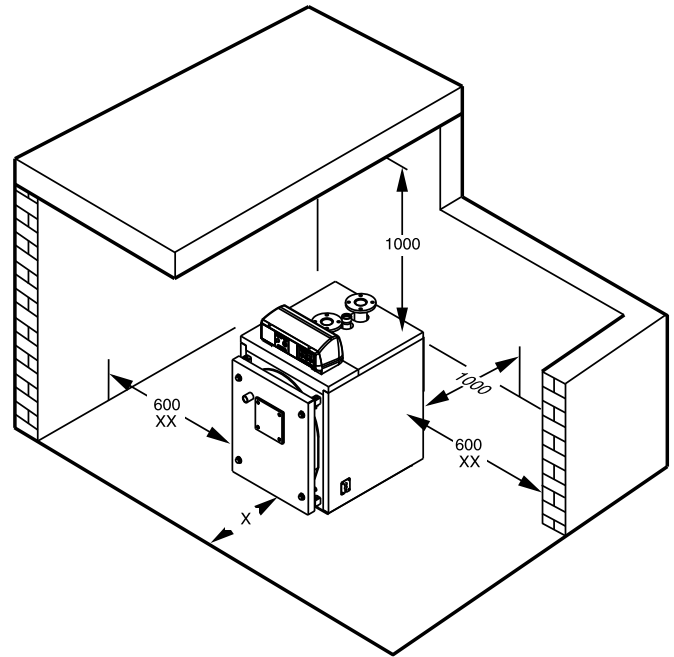


fig. 14

*x = not less than the length of the boiler body (dimensions in mm); in any case, never less than 1300 mm
xx = see instructions to the side.*

3.5 - BURNER

The burners operating with the TRISTAR 3G boilers must have the EC certification and comply with:

- Gas appliance directive (90/396/EEC);
- EMC Directive - Electromagnetic Compatibility (89/336/EEC).

They must also be approved according to the specifications:

- UNI EN 676 - air-blown burners for gaseous fuel.
- Efficiency Directive (92/42 EEC)

3.5.1 - CHOOSING THE BURNER

The correct choice and adjustment of the burner are fundamental for optimal operation of the boiler and therefore must be done carefully and not underestimated.

The burner must be chosen verifying that its firing rate (fuel capacity - combustion chamber pressure) is compatible with the same features declared for the boiler.

Remember that pressure drops on the flue side of the boiler,

namely combustion chamber backpressure, refer to zero pressure at the base of the chimney.

It is also recommended that the burner blast tube be no shorter than the minimum dimension shown in the following table and that the flame which must be implemented be suitable for the characteristics of the combustion chamber.

In order to take advantage of the whole heat exchange surface of the blind bottom furnaces, use burners capable of providing a "long and narrow" flame in any operating condition, namely even at the minimum output when controlling two or more stages or modulating.

Flames which are too short cause overheating in the front of the furnace and combustion products, not sufficiently cooled, entering the smoke pipes at too high temperatures can seriously damage the generator.

Technical features and dimensions

The manufacturing companies of the burners can supply the dimensions of the flames which their appliances develop, especially those approved based on the standards indicated above.

Further information is provided in the chapter "Commissioning".

BOILER TYPE	$\varnothing A$ mm	L mm
TRISTAR 3G 110-150	130	200
TRISTAR 3G 185÷380	180 </td <td>200</td>	200
TRISTAR 3G 500÷840	270	280
TRISTAR 3G 1100÷1320	270	320
TRISTAR 3G 1600÷1900	285	350
TRISTAR 3G 2300	320	350
TRISTAR 3G 2650 - 3000	380	400

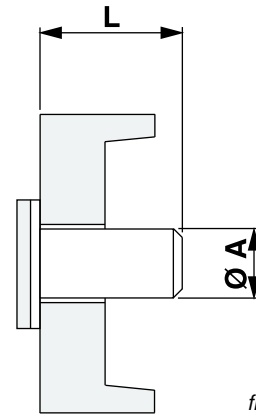


fig. 15

DIMENSIONS OF BURNER BLAST TUBE

3.5.2 - INSTALLING THE BURNER

The burner must be mounted to the door of the boiler guaranteeing perfect sealing of the combustion products.

The burner is supplied with a piece of ceramic fibre cord which must be placed on the blast tube of the burner to fully seal the space between the blast tube and the slot in the door.

Make sure that no gaps remain between the blast tube and the slot on the refractory material inside the door.

Should a cone larger than the diameter of the blast tube be mounted, it must be removed before mounting the burner on

the support plate and put back afterwards.

With the burner mounted, check that the electric cables are long enough to allow the door to open 90°.

For gas-fired burners, flexible hoses cannot be used for connections. Therefore it must be possible to disconnect the final section of the gas adduction tube by means of a threaded or flanged joint.

3.6 - CONNECTING FLAME CONTROL WARNING LIGHT TO BURNER

The flame control warning light is provided with a 1/8" threaded connection (pos. 1) upon which a 9 mm pressure test nipple is mounted. It can be used with a silicon tube to measure the backpressure in the combustion chamber.

In place of this test nipple, which must be kept, an appropriate fitting will be mounted to connect the flame control warning light directly to the pressure chamber downstream the burner fan by means of a copper tube (pos.2).

The air blown by the fan will conveniently cool the sight glass and keep it from blackening.

If the cooling tube is not connected to the sight glass, it could break.

ATTENTION: the flame control warning light can be very hot; therefore pay the utmost attention.

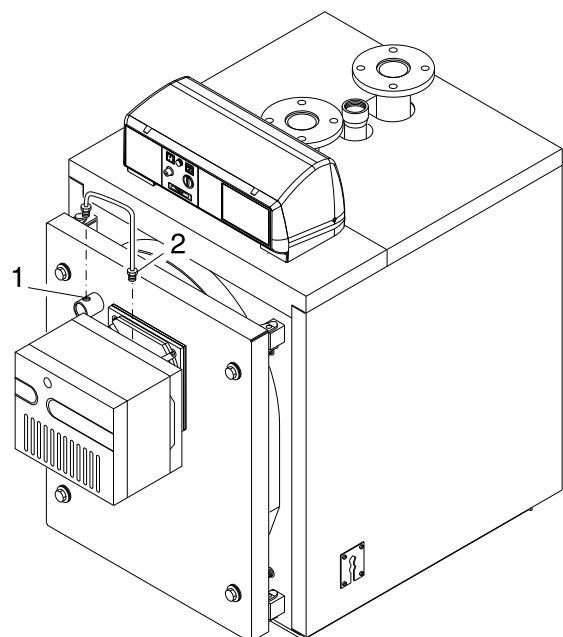


fig. 16

Technical features and dimensions

3.7 - FLUE CONNECTION

To connect the flue gas exhaust pipe, local and national standards must be respected (see Standards UNI-CIG 7129 point 4 and 7131 point 5).

The TRISTAR 3G boiler can be attached to the chimney in different ways; straight pipes or elbows can be used to exit from the rear, on the left, on the right, or else vertically to enter into the flue at a higher level. It is recommended to insulate the pipe connecting to the chimney to reduce heat loss and noise.

Along the section connecting the boiler to the flue there must be suitable points for measuring flue gas temperature and analysing combustion products.



Use only exhaust pipes suitable for the type of fuel used.

The supplier will have no contractual or extra-contractual liability for damage caused due to incorrect installation and use and anyway failure to comply with the instructions provided by the manufacturer.

When performing replacement installations, ALWAYS replace the flue gas exhaust accessory as well.

The flue must comply with standards in force.

3.8 - CONDENSATION DRAINAGE

CONDENSATION UPON COMMISSIONING

While the boiler is reaching the operating temperature, a good amount of condensation can be formed due to the low temperature of the flue gas.

In these conditions, it could be useful to have the condensation drained into the sewer. For this purpose, the smoke chamber is equipped with an attachment which the exhaust pipes will be connected to according to the following notes

When the operating temperature has been reached - see notes in chap. 3.22 "COMMISSIONING" - it is important to check whether more condensation has been formed.

This can be checked by direct inspection through the cleaning doors of the smoke chamber.

If not, after having verified the actual fuel flow rates, the operating temperature should be increased.

The condensation drainage in the sewer must be:

- implemented as to prevent releasing gaseous combustion products into the environment or sewer (siphoning);
- dimensioned and implemented to allow the correct outflow of liquid waste preventing any leakage;
- installed in such a way as to prevent the liquid contained in it from freezing in the intended operating conditions;

- mixed for example with household waste water (washer, dishwasher drainage, etc.) for the most part with basic pH in order to form a buffer solution to be then introduced in the sewer system.

Condensation must not stagnate in the combustion product drainage system (for this reason the evacuation duct must slope at least 30 mm/m towards the drain) except for a liquid seal, present in the drainage siphon for the evacuation of combustion products (which must be filled after assembly and must remain at least 25 mm high with the boiler running - see fig. 17).

Do not discharge condensation through gutter drainpipes due to the risk of turning into ice and the deterioration of the materials usually used to make the drainpipes (consult local hygiene regulations).

The drain fitting must be visible.

Due to the acidity level of the condensation (pH from 3 to 5) only suitable plastic materials must be used for the drain piping (special optional kits with neutralizer salts for acid condensation are available).

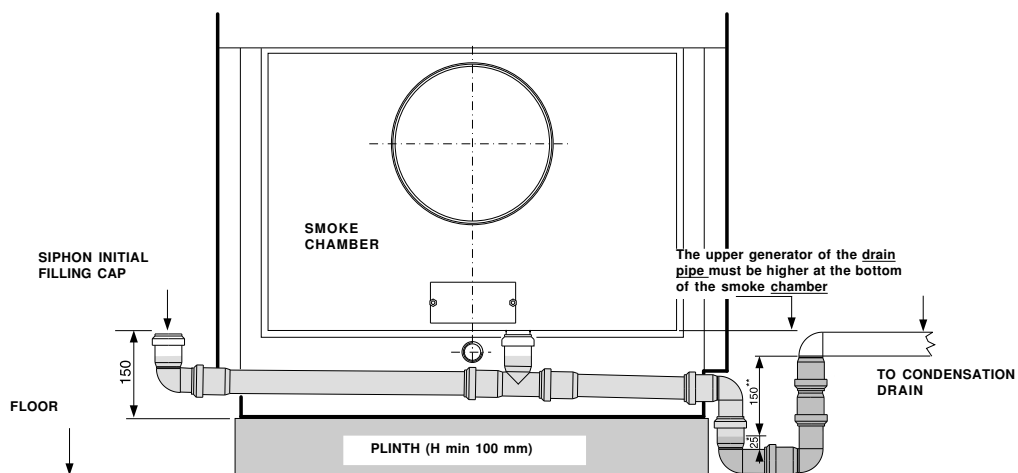


fig. 17

* Minimum safety siphon set by the standard

** Minimum head with boiler running at maximum power.

If you do not want to or cannot create a plinth, the boiler can be mounted at ground level and a sump at least 100 mm deep can be made to house the siphon.

3.9 - FURNACE DOOR: ADJUSTMENT, OPENING AND CLOSING

IMPORTANT

- The door of the boiler must be opened when it is cooled off to avoid damaging the fibre due to thermal shock.
- The insulation fibre of the door can show cracks after a short time of operation; this however does not reduce its insulation capacity nor jeopardise its lifespan.
- The door fibre is easy to replace and is covered by a two-year warranty.

3.9.1 - "TST 3G 110÷TST 3G 380" BOILERS

For all these models, the door is hinged and fixed according to the layout in fig. 18.

In these cases the door is mounted with four identical hinges: the two on the left side, with pins inserted, are normally used as rotation hinges (from right to left) while the two on the right are used as closing hinges, the door is then secured with 4 screws. It will be exactly the opposite when the door is opened from left to right.

To invert rotation, just move the pins to the opposite side.

The following adjustments can be made on the door of these boiler models:

- A) Vertical adjustment:** only by inserting suitably thick washers below the hinge which the door turns on.
- B) Crosswise rotation:** loosen the hinges fixed on the front plate of the boiler and move them sideways.
- C) Adjustment in the axial direction:** by adjusting the tightening screws.

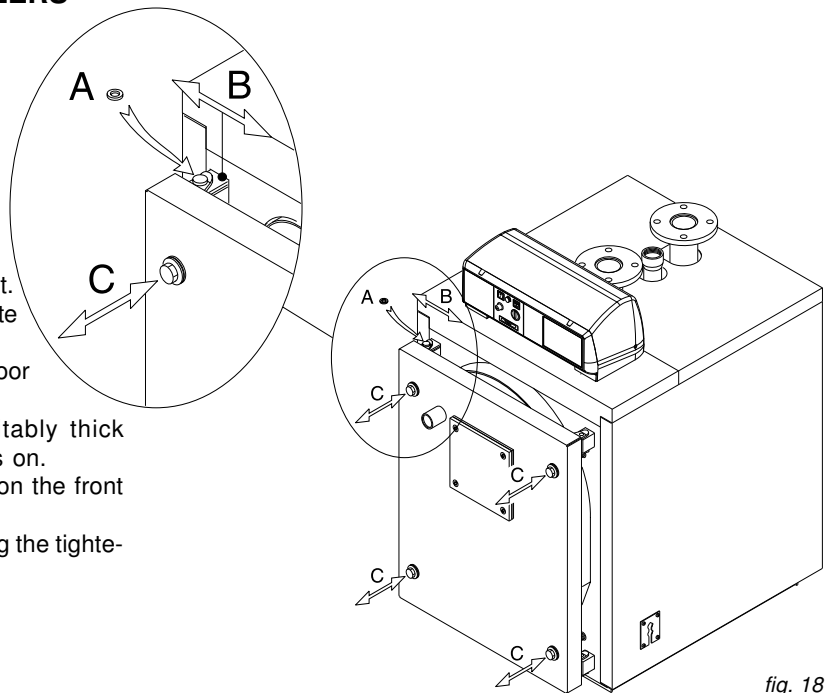


fig. 18

3.9.2 - "TST 3G 500÷TST 3G 840" BOILERS

For all these models, the door is hinged and fixed according to the layout in fig. 19.

In these cases, the two hinges on the left are normally used as rotation hinges (from right to left) while the two on the right are used as closing hinges.

It will be exactly the opposite when the door is opened from left to right.

To invert rotation, just move the rear locknuts to the opposite side.

The following adjustments can be made on the door of these boiler models:

- A) Vertical adjustment:** by acting on the nut of the upper hinge pin which the door turns on.
- B) Crosswise rotation:** loosen the hinges fixed on the front plate of the boiler and move them sideways.
- C) Adjustment in the axial direction:** by adjusting the tightening nuts.

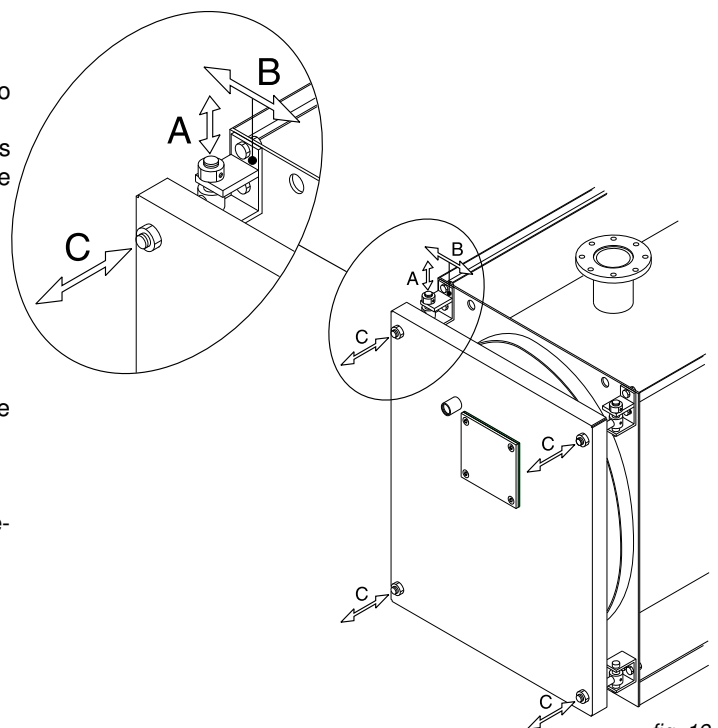


fig. 19

Technical features and dimensions

3.9.3 - "TST 3G 1100÷TST 3G 3000" BOILERS

For all these models, the door is hinged and fixed according to the layout in fig. 20.

In these cases, the two hinges on the left are normally used as rotation hinges (from right to left) while the two on the right are used as closing hinges.

It will be exactly the opposite when the door is opened from left to right.

To invert rotation, just move the door support bushings.

The following adjustments can be made on the door of these boiler models:

- A) Vertical adjustment:** by acting on the nut of the upper hinge pin which the door turns on.
- B) Crosswise rotation:** loosen the hinges fixed on the front plate of the boiler and move them sideways.
- C) Adjustment in the axial direction:** by adjusting the tightening nuts.

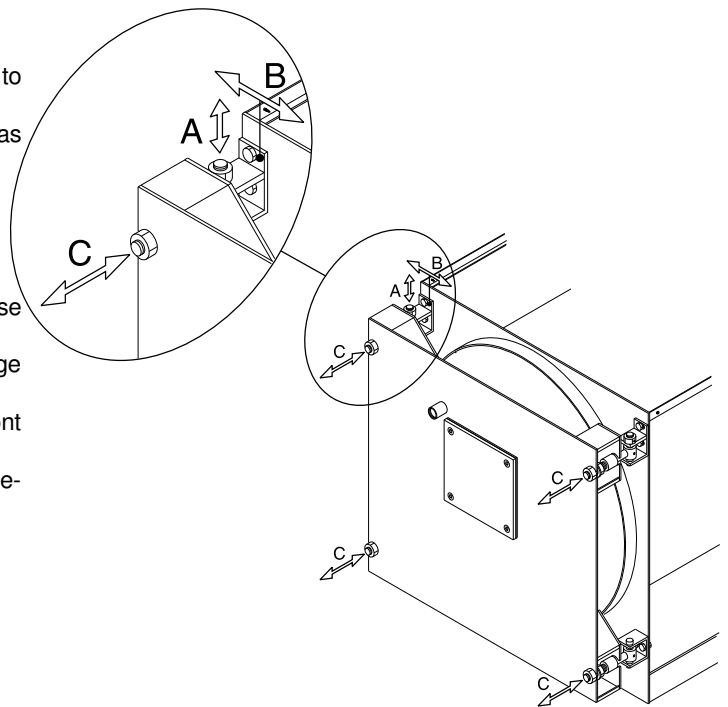


fig. 20

3.9.4 - IMPORTANT NOTE

Before opening the door of the furnace, take the following safety measures:

- Close the fuel supply to the burner.
- Cool the boiler off by having water circulate and then disconnect electrical power.

- Place a sign on the boiler with the following text: **DO NOT USE, BOILER MAINTENANCE UNDERWAY, OUT OF SERVICE.**

Technical features and dimensions

3.10 - CONNECTING BOILER TO SYSTEM



Attention!
Before connecting the boiler to the heating system, thoroughly clean the piping with an appropriate product in order to eliminate metallic residue from processing and welding, oil and grease which could be present and which, reaching the boiler, could alter its functioning.
Do not use solvents to wash the system as they could damage the system and/or its components.
Failure to comply with the instructions of the following manual can cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.



Attention!
Make sure that there are no mechanical tension points while connecting the pipes to avoid the risk of leakage!

Heating flow and return pipes must be connected to the boiler at the respective fittings as indicated on pages 8, 9, 10, 11 and 12.

For the dimensioning of the heating circuit pipes, you must take into account pressure drops caused by radiators, thermostatic valves, radiator stopping valves and by the configuration of the system.

The laying of the pipes must be designed taking every necessary precaution to avoid air pockets and to facilitate continuous degassing of the system.



Make sure that the pipes of the water and heating system are not used as earthing electrodes of the electric or telephone system. They are absolutely not suitable for this type of use. Serious damage could result for the piping, boiler and radiators in a short amount of time.

Heating system safety valve

Provide a drain pipe with a funnel and a siphon leading to an appropriate drainage at the heating safety valve. This drainage must be controlled on sight.



Attention!
If this precaution is not taken, triggering of the safety valve can cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.

Connection of expansion vessel

TRISTAR 3G boilers are suitable for operating with forced water circulation both with the expansion vessel opened or closed.

An expansion vessel is always necessary to compensate the increase in water volume due to heating.



The connection pipes of the expansion vessel will start from the T3 attachment (see DIMENSIONS TABLES) and must have no shut-off valve.

Connecting the filling / draining cock

A specific tap can be connected to the T4 attachment at the rear of the boiler for filling and draining.

3.10.1 - RECIRCULATION PUMP

TRISTAR 3G boilers must always operate with forced water circulation and an average temperature of 50°C or higher. It is therefore recommended to use a recirculation pump, which also has an anti-condensation function, installed between the flow and return connections upstream the mixer valve. This pump should be dimensioned according to the formula:

$$Q = P \times 22$$

where **Q** = Flow rate in l/hr

P = Nominal output of boiler in kW and hydraulic head
1 ÷ 2 m H₂O

3.11 - FILLING THE SYSTEM



Attention!
Do not mix the heating water with incorrect concentrations of antifreeze or anti-corrosion substances! This could damage the gaskets and cause noise during operation. Unical will not be held liable for damage to persons, animals or objects due to failure to comply with the instruction above.

When all system connections have been completed, the circuit can be filled.

This operation must be performed carefully, respecting the following phases:

- open the radiator air release valves.
- open the filling tap gradually, making sure that the automatic air release valves installed on the system work properly.
- close the radiator air release valves as soon as water comes out.

Technical features and dimensions

- check the pressure gauge until pressure reaches approximately 1 bar.
- close the filling tap and bleed air once again through the radiator air release valves.
- make sure that all the connections are watertight.
- after commissioning the boiler and bringing the system to the operating temperature, stop the pumps and repeat the air bleed operations.
- let the system cool off and, if necessary, return the water pressure to 1 bar.



NOTE

The water pressure in the heating system must not be drop below 1 bar; open the filling tap on the boiler when pressure is too low.

This operation must be performed with the system cool.



NOTE

If the boiler was without electric power, after a certain idle period, the pump could be blocked. Before turning on the main switch, the pump must be unblocked by operating as follows: Introduce a screwdriver in the hole below the protective screw in the centre of the pump intended for this purpose and turn the pump shaft clockwise.

After having unblocked the pump, tighten the protective screw and make sure there is no water leakage.



ATTENTION !

After removing the protective screw, a small amount of water could leak out. Dry off all wet surfaces before powering the boiler.

3.12 - GAS CONNECTION



Danger!

The gas connection must be carried out only by a qualified installer who must respect and apply that foreseen by relevant laws in force in the local prescriptions of the supply company. Incorrect installation can cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.



Before installation, we recommend a thorough inner cleaning of all fuel adduction piping to remove any residue which could jeopardise proper operation of the boiler.



Attention!

Make sure that there are no mechanical tension points while connecting gas to avoid the risk of leakage!



If you smell gas:

- Do not turn electric switches on or off, use a telephone or any other object which can create sparks;
- Immediately open doors and windows to create an air current to air out the room;
- Shut the gas cocks;
- Request the intervention of professionally qualified personnel.



As a precaution against gas leaks, we recommend installing a monitoring and protection system consisting of a gas leak detector coupled with a shut-off solenoid valve on the gas feed line.

The supply pipes must have a cross-section sufficient for the flow rate of the burner.

You should nonetheless comply with the "General installation regulations" laid down in the standards UNI 7129, UNI 7131 and UNI 11137-1.

Before commissioning an internal gas distribution system and therefore before connecting it to the gas meter, check its sealing carefully.

If any part of the system is out of sight, the sealing test must be done before the pipes are covered.

Before connecting the appliances, the system must be tested with air or inert gas at a pressure of at least 100 mbar.

The following operations and checks must also be performed while commissioning the system:

- Open the meter and air release valve to bleed the air from the piping of the appliances, performing the same operation for each appliance.
- With the appliances closed, check that there are no gas leaks. The pressure gauge must show no pressure drop during the second quarter of an hour from the start of the test. Gas leaks must be found with a soapy solution or similar product and eliminated. Never look for gas leaks with an open flame.

3.13 - PACKAGING

TRISTAR 3G boilers are supplied complete with the door and smoke chamber assembled, while the casing and insulation are included in separate cardboard package(s).

The panel and accessories are inside the combustion chamber.

Before starting installation, make sure that the length and width of the boiler body received correspond respectively to the dimensions **M**, **Q** and **R** of the boiler you have ordered, provided on the previous tables, and that the boxes containing the casing, or part of it, are marked as in the table at the bottom of the page.

The casing of boilers from TST 3G 110 to TST 3G 380, complete with insulation mattresses, is contained in one box.

The casing of boilers from TST 3G 500 a TST 3G 1320 is contained in 3 boxes.

The casing of the TST 3G 1900 2S boilers is contained in 4 boxes.

The casing of TST 3G 2300 and TST 3G 2650 boilers is contained in 3 boxes.

The casing of the TST 3G 3000 2S boilers is contained in 4 boxes.

In addition to the panel board packed in its own box, the following accessories are found in the combustion chamber:

- 1 box containing hydraulic connection flanges, with relative gaskets and bolts.

- ceramic fibre cord to insulate between burner blast tube and door.
- 1 bag containing the condensation drainage kit.



Upon reception, make sure that the supply is complete and undamaged.



Keep the packaging material (cardboard boxes, straps, plastic bags, etc.) **out of the reach of children as they are potential sources of danger.**

Unical will not be held liable for damage to persons, animals or objects due to failure to comply with the instruction above.

The document envelope, besides the appliance, contains:

- Hydraulic test certificate
- Heating system booklet
- System manager operating instructions
- Installation and maintenance instruction booklet
- Warranty
- Local ventilation requirements label.

N.B. For models from **TST 3G 110** and **TST 3G 380** (ref. fig. 21 and 22), the casing and insulation are contained in 1 box marked:

50053 (TRISTAR 3G 110)
 50054 (TRISTAR 3G 150)
 50055 (TRISTAR 3G 185)
 50056 (TRISTAR 3G 240)
 50057 (TRISTAR 3G 300)
 50058 (TRISTAR 3G 380)

N.B. For models from **TST 3G 500** to **TST 3G 840** (ref. fig. 23 and 22), and for models from **TST 3G 1100** and **TST 3G 1600** (ref. fig. 24 and 27) the casing and insulation are contained in 3 boxes marked:

50062 (front casing TRISTAR 3G 500)
 50063 (rear casing TRISTAR 3G 500)
 50064 (top casing TRISTAR 3G 500)
 50062 (front casing TRISTAR 3G 630)
 50065 (rear casing TRISTAR 3G 630)
 50066 (top casing TRISTAR 3G 630)
 50096 (front casing TRISTAR 3G 840)
 29957 (rear casing TRISTAR 3G 840)
 29958 (top casing TRISTAR 3G 840)
 50074 (front casing TRISTAR 3G 1100)
 50075 (rear casing TRISTAR 3G 1100)
 39812 (top casing TRISTAR 3G 1100)
 50074 (front casing TRISTAR 3G 1320)
 50075 (rear casing TRISTAR 3G 1320)
 39813 (top casing TRISTAR 3G 1320)
 50079 (front casing TRISTAR 3G 1600)
 50080 (rear casing TRISTAR 3G 1600)
 39814 (top casing TRISTAR 3G 1600)

N.B. For the model **TST 3G 1900** (ref. fig. 25 and 27) the casing and insulation are contained in 4 boxes marked:
 50079 (front casing TRISTAR 3G 1900)
 50082 (rear casing TRISTAR 3G 1900)
 39815 (top casing TRISTAR 3G 1900)
 50084 (central casing TRISTAR 3G 1900)

N.B. For models from **TST 3G 2300** and **TST 3G 2650** (ref. fig. 26 and 27), the casing and insulation are contained in 3 boxes marked:

30111 (front casing TRISTAR 3G 2300)
 30112 (rear casing TRISTAR 3G 2300)
 30113 (central casing TRISTAR 3G 2300)
 30114 (front casing TRISTAR 3G 2650)
 30115 (rear casing TRISTAR 3G 2650)
 30116 (central casing TRISTAR 3G 2650)

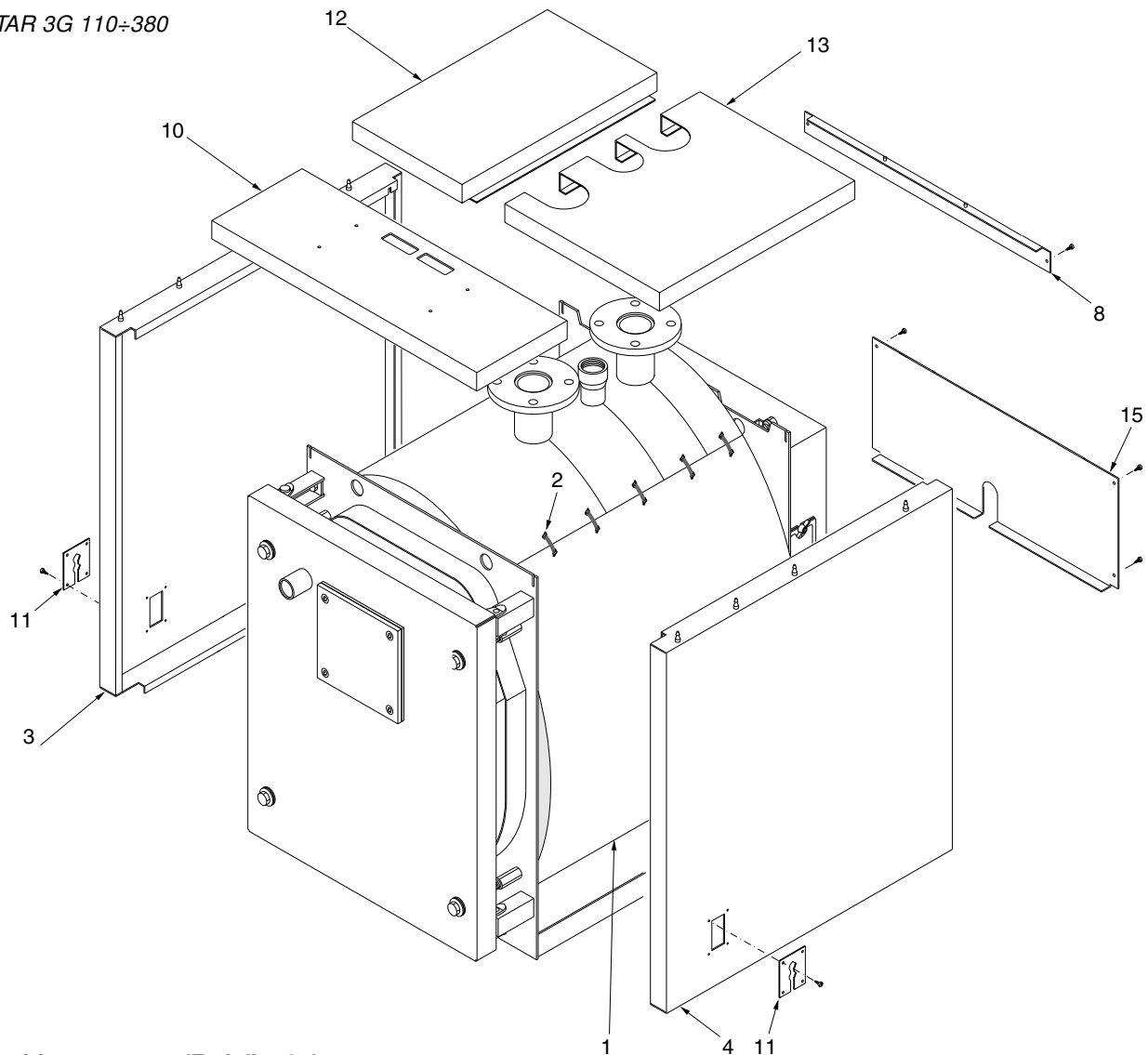
N.B. For the model **TST 3G 3000** (ref. fig. 26 and 27) the casing and insulation are contained in 4 boxes marked:

30114 (front casing TRISTAR 3G 3000)
 30115 (rear casing TRISTAR 3G 3000)
 30116 (central casing TRISTAR 3G 3000)
 30543 (rear casing TRISTAR 3G 3000)

Technical features and dimensions

3.14 - ASSEMBLING CASING

TRISTAR 3G 110÷380



Assembly sequence (Ref. fig. 21)

fig. 21

- A) Mount the insulation (pos. 1) of the boiler body and secure the 2 edges with the elastic straps (pos. 2) supplied in the accessory box, hooking them to the external fabric part of the insulation.
- B) Position the side panels (pos. 3 e 4) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part in the plate cuts.
To determine which is the right side and which is the left side, refer to the cable gland plates (pos. 11): they must face the front of the boiler.
- C) Fix the middle rear panel (pos. 15) and the top rear panel (pos. 8) with the specific self-threading screws.
- D) Rotate the cover of the panel board frontwards after having removed the two screws on the side and insert the electric inlet cables and the outlet probe capillaries through the slots at the base.
Fit the panel board to the upper panel (pos. 10). Fit the upper panel pos. 10, complete with panel board, to the two sides of the casing.
- E) Insert into the conduits the bulbs of the instruments as indicated in fig. 22 and wire the panel board to the power line, to the burner and to any pumps, etc.

- Close the cover of the electric control board.
Guide the burner plug through the side plate (pos. 11) on the preferred side and secure the cable with the cable gland supplied.
Fasten the plates (pos. 11) to the sides of the casing.
Secure the electric cables coming out from the rear of the boiler with the cable clamps, tightening them moderately.
- F) Fit the upper longitudinal panels (pos. 12 and 13) hooking them to the sides.
- G) Fix the installation and boiler data plate (pos.14) to the side panel after having degreased the relevant part with the specific solvent.

The plates are included in the document envelope.

Technical features and dimensions

- 1 Thermometer probe
- 2 Working thermostat probe
- 3 Safety thermostat probe
- 4 Minimum thermostat probe
- 5 Safety spring
- 6 Probe bulb holders

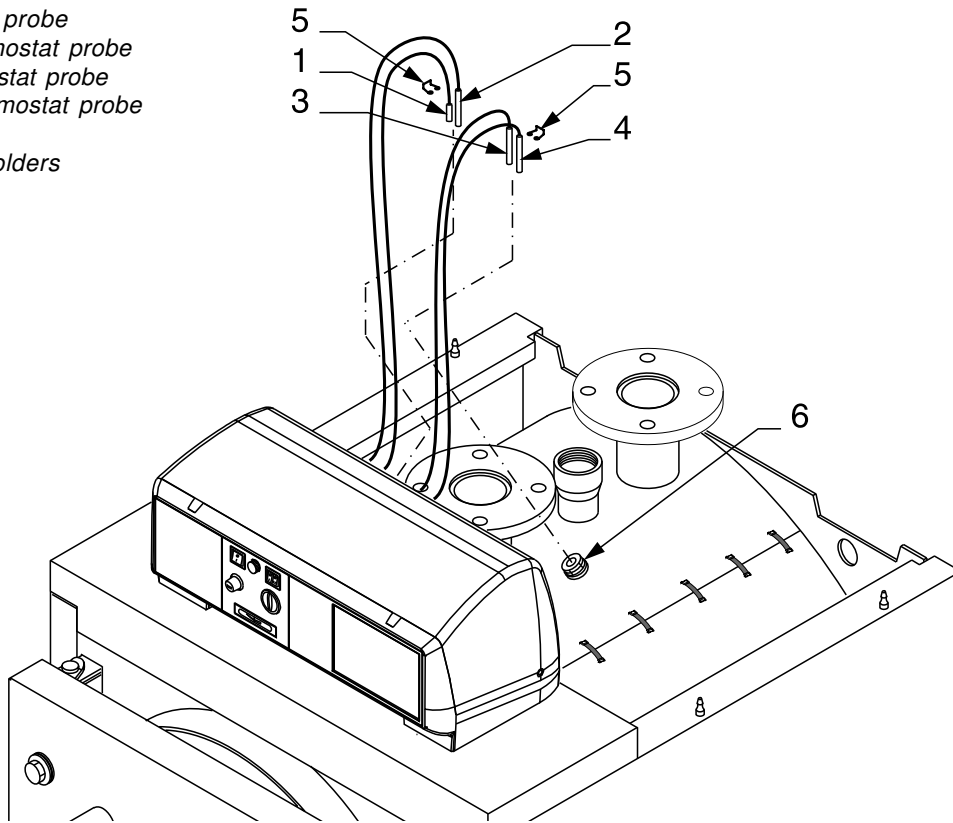


fig. 22

Technical features and dimensions

TRISTAR 3G 500÷840

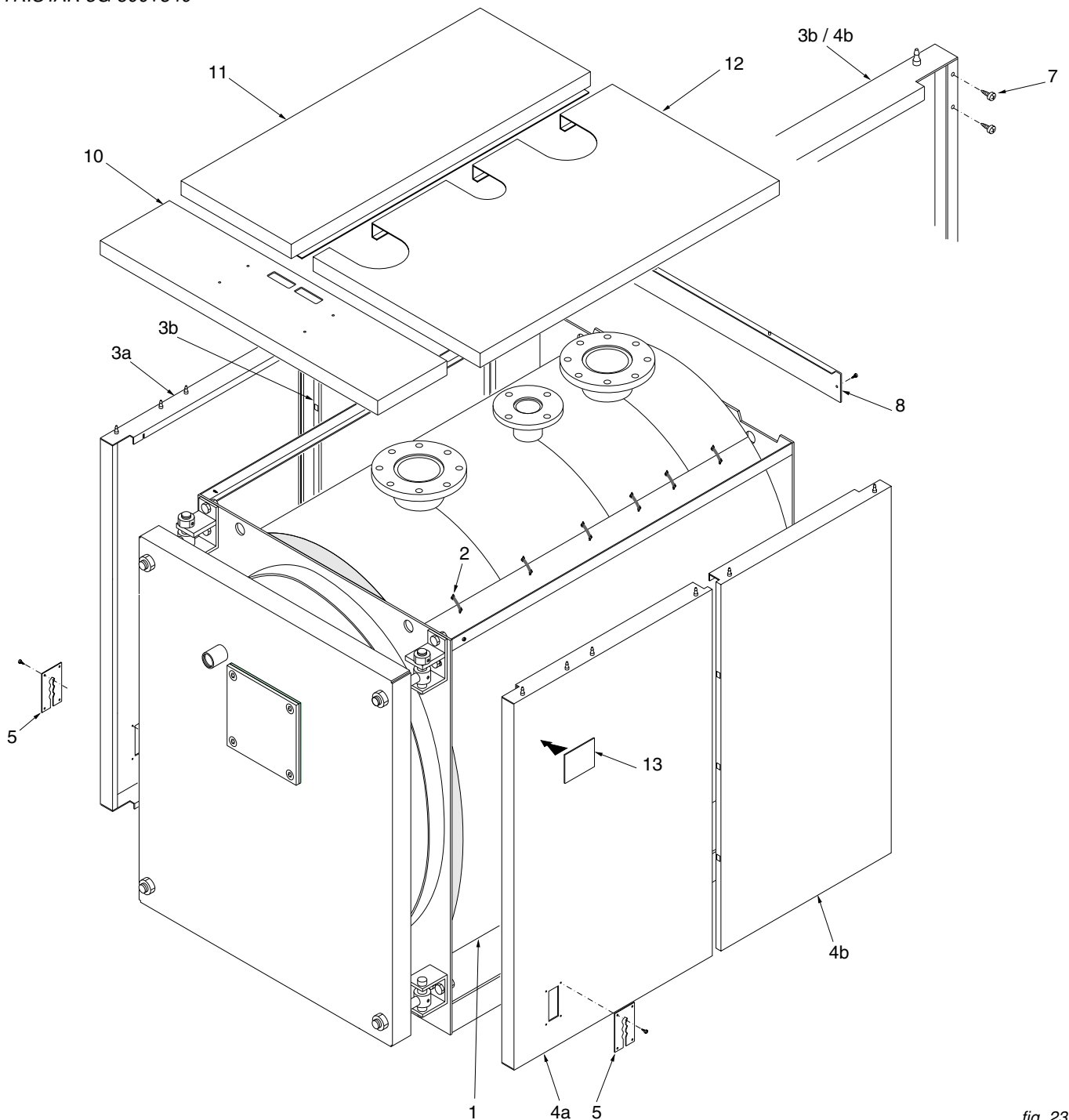


fig. 23

Assembly sequence (Ref. fig. 23)

- A) Mount the insulation (pos. 1) of the boiler body and secure the 2 edges with the elastic straps (pos. 2) supplied in the accessory box, hooking them to the external fabric part of the insulation.
- B) Position the side panels (pos. 3a, 3b and 4a, 4b) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part to plate junction profiles.
- To determine which is the right side and which is the left side, refer to the cable gland plates on the front panels (pos. 5): they must face the front of the boiler.

- Fasten the 4 countersunk screws (pos. 7) to the two sides 3b and 4b on the inner rear side.
- C) Fit the upper rear panel (pos. 8) to the screws pos. 7.
- D) Rotate the cover of the panel board frontwards after having removed the two screws on the side and insert the electric inlet cables and the outlet probe capillaries through the slots at the base.
- Fit the panel board to the upper panel (pos. 10.)
- Fit the upper panel pos. 10, complete with panel board, to the two sides of the casing.
- E) Insert into the conduits the bulbs of the instruments as indicated in fig. 22 and wire the panel board to the power line, to

Technical features and dimensions

the burner and to any pumps, etc.

Close the cover of the electric control board.

Guide the burner plug through the side plate (pos. 5) on the preferred side and secure the cable with the cable gland supplied.

Fasten the plates (pos. 5) to the sides of the casing.

Secure the electric cables coming out from the rear of the boiler with the cable clamps, tightening them moderately.

- F) Fit the upper longitudinal panels (pos. 11 and 12) hooking them to the sides.

- G) Fix the installation and boiler data plate (pos.13) to the side panel after having degreased the relevant part with the specific solvent.

The plates are included in the document envelope.

Assembly sequence (Ref. fig. 24)

- A) Mount the insulation (pos. 1) of the boiler body and secure the 2 edges with the elastic straps (pos. 2) supplied in the accessory box, hooking them to the external fabric part of the insulation.

Perform a sufficient cut on the top part near the bulb holders.

- B) Position the side panels (pos. 3a, 3b and 4a, 4b) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part to plate junction profiles.

To determine which is the right side and which is the left side, refer to the cable gland plates on the front panels (pos. 5): they must face the front of the boiler.

- C) Fit the upper rear panel (pos. 7.)

- D) Rotate the cover of the panel board frontwards after having removed the two screws on the side and insert the electric inlet cables and the outlet probe capillaries through the slots at the base.

Fit the panel board to the upper panel (pos. 9.)

Fit the upper panel pos. 9, complete with panel board, to the two sides of the casing.

- E) Insert into the conduits the bulbs of the instruments as indicated in fig. 27 and wire the panel board to the power line,

to the burner and to any pumps, etc.

Close the cover of the electric control board.

Guide the burner plug through the side plate (pos. 5) on the preferred side and secure the cable with the cable gland supplied.

Fasten the plates (pos. 5) to the sides of the casing.

Secure the electric cables coming out from the rear of the boiler with the cable clamps, tightening them moderately.

- F) Fit the upper longitudinal panels (pos. 10 and 11) hooking them to the sides.

- G) Fix the installation and boiler data plate (pos.12) to the side panel after having degreased the relevant part with the specific solvent.

The plates are included in the document envelope.

Technical features and dimensions

TRISTAR 3G 1100÷1600

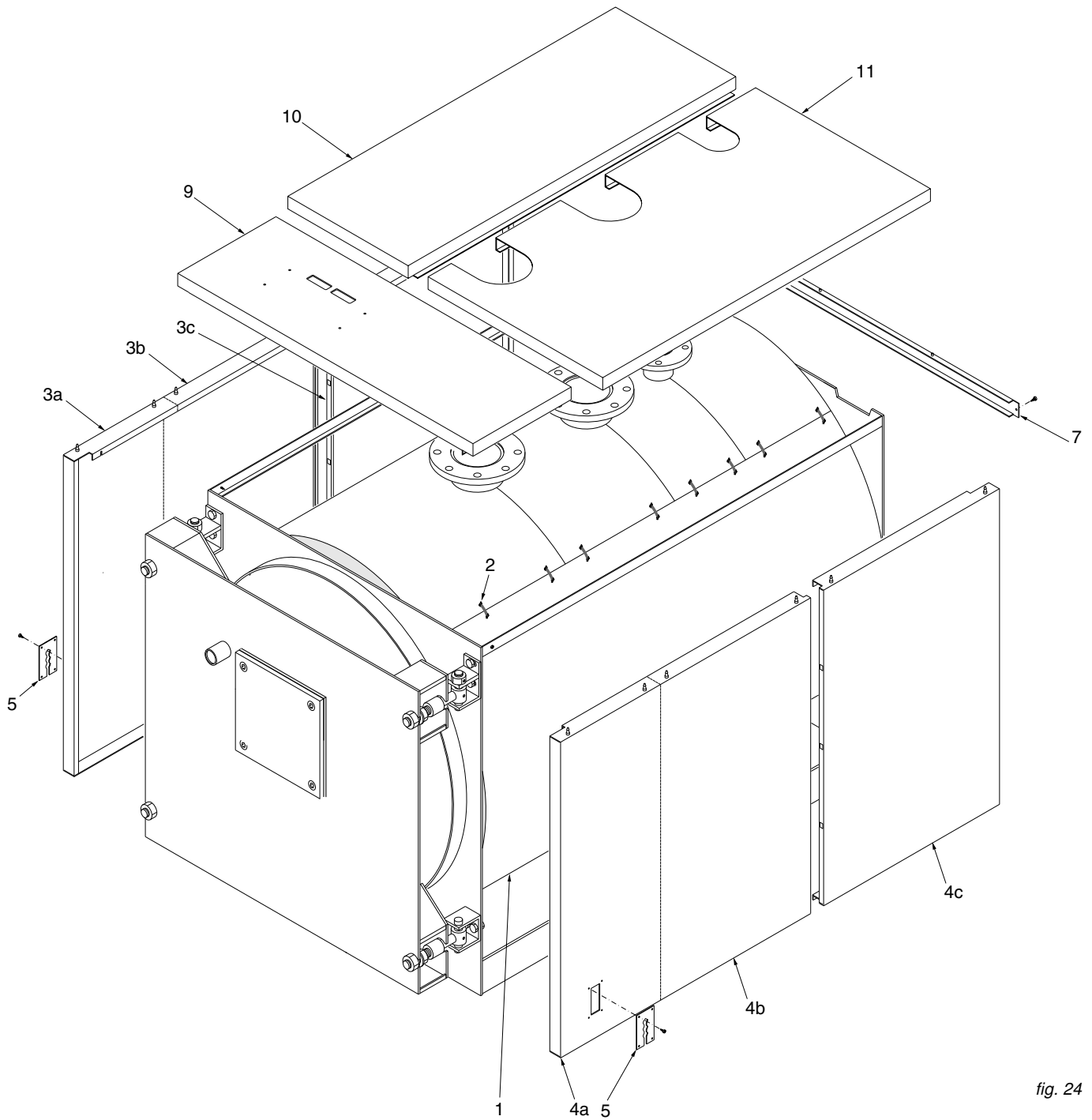


fig. 24

TRISTAR 3G 1900

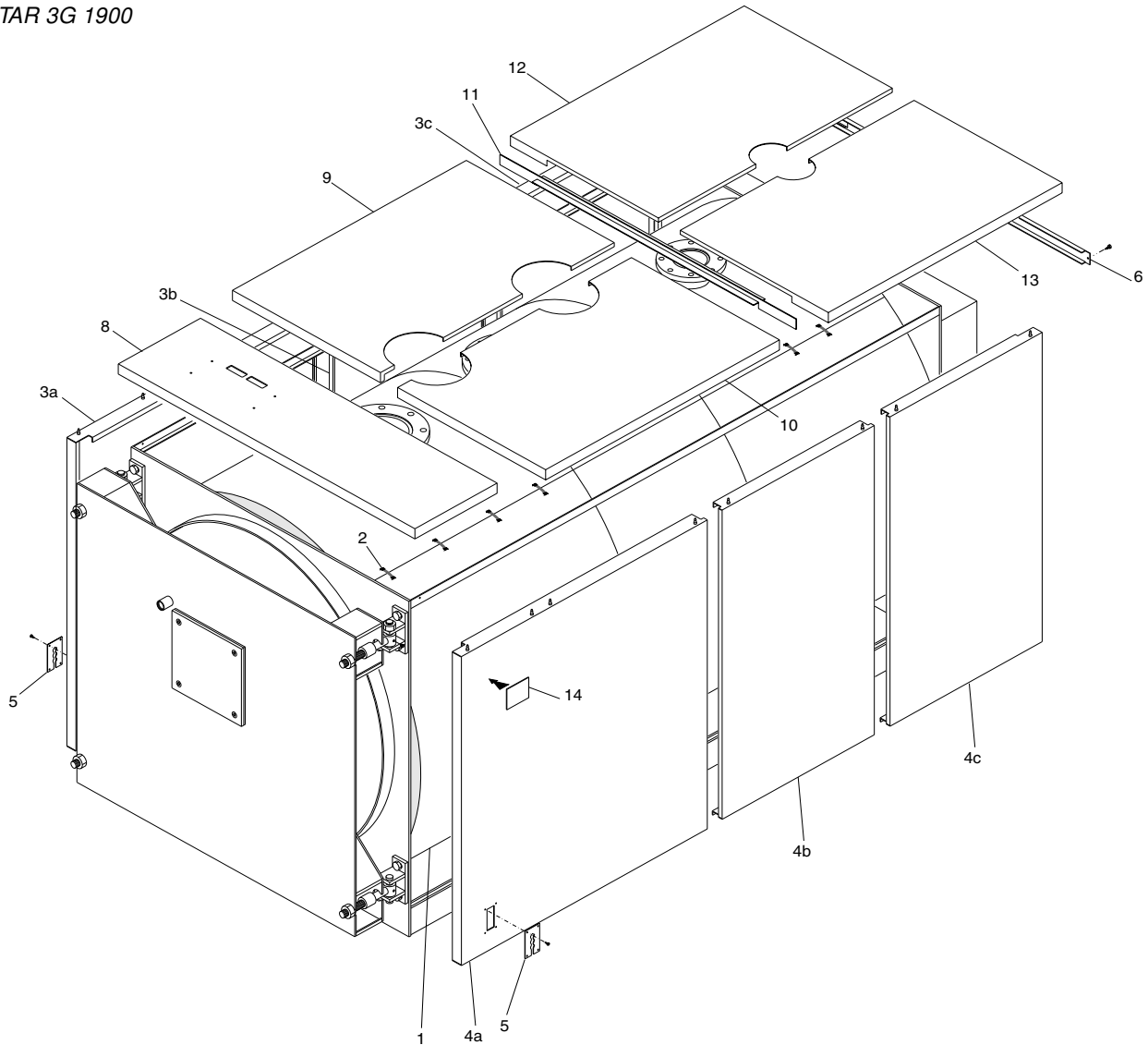


fig. 25

Assembly sequence (Ref. fig. 25)

- A) Mount the insulation (pos. 1) of the boiler body and secure the 2 edges with the elastic straps (pos. 2) supplied in the accessory box, hooking them to the external fabric part of the insulation.
Perform a sufficient cut on the top part near the bulb holders.
- B) Position the side panels (pos. 3a, 3b, 3c and 4a, 4b, 4c) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part to plate junction profiles.
To determine which is the right side and which is the left side, refer to the cable gland plates on the front panels (pos. 5): they must face the front of the boiler.
- C) Fit the upper rear panel (pos. 6.)
- D) Rotate the cover of the panel board frontwards after having removed the two screws on the side and insert the electric inlet cables and the outlet probe capillaries through the slots at the base.
Fit the panel board to the upper panel (pos. 8.)
Fit the upper panel pos. 8, complete with panel board, to the two sides of the casing.
- E) Insert into the conduits the bulbs of the instruments as indicated in fig. 27 and wire the panel board to the power line, to the burner and to any pumps, etc.
Close the cover of the electric control board.
Guide the burner plug through the side plate (pos. 5) on the preferred side and secure the cable with the cable gland supplied.
Fasten the plates (pos. 5) to the sides of the casing.
Secure the electric cables coming out from the rear of the boiler with the cable clamps, tightening them moderately.
- F) Fit the upper longitudinal panels (pos. 9 and 10) hooking them to the sides.
- G) Mount the top panel support (pos. 11), inserting it below the top panels - rear side.
- H) Fit the upper longitudinal panels (pos. 12 and 13) hooking them to the sides.
- I) Fix the installation and boiler data plate (pos.14) to the side panel after having degreased the relevant part with the specific solvent.
The plates are included in the document envelope.

Technical features and dimensions

Assembly sequence (Ref. fig. 26)

- A) Mount the insulation (pos. 1) of the boiler body and secure the 2 edges with the elastic straps supplied in the accessory box, hooking them to the external fabric part of the insulation.
Perform a sufficient cut on the top part near the bulb holders.
- B) **Note: for the TST 3G 3000 model, aside from the rear panels pos. 3 (2 per side), 2 side panels are supplied (400 mm long) (not viewed) which must be mounted on the back of the boiler, 1 each side.**
Position the left side panels (pos. 2 and 3) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part in the screws fastened on the top longitudinal pipe.
To determine which of the front sides is right and which is left, refer to the holes to fix the panel board; it must face the front of the boiler.
The hole-covering panel pos. 4 is already mounted.
- C) Position the right side panels (pos. 6 and 3) with the lower bend inside the L-shaped profile at the base of the boiler body and hook the upper part in the screws fastened on the top longitudinal pipe.
- D) Fix the panel board to the side panel pos. 6.
Rotate the cover of the panel board frontwards after having removed the two screws on the side and insert the electric inlet cables and the outlet probe capillaries through the slots at the base.
- E) Insert into the conduits the bulbs of the instruments as indicated in fig. 27 and wire the panel board to the power line, to the burner and to any pumps, etc.
Close the cover of the electric control board.
Guide the burner plug through the side plate (pos. 7) on the preferred side and secure the cable with the cable gland.
Fasten the plates (pos. 7) to the sides of the casing.
- F) Fix the installation and boiler data plate to the side panel after having degreased the relevant part with the specific solvent.
The plates are included in the document envelope.

TRISTAR 3G 2300 - 3000

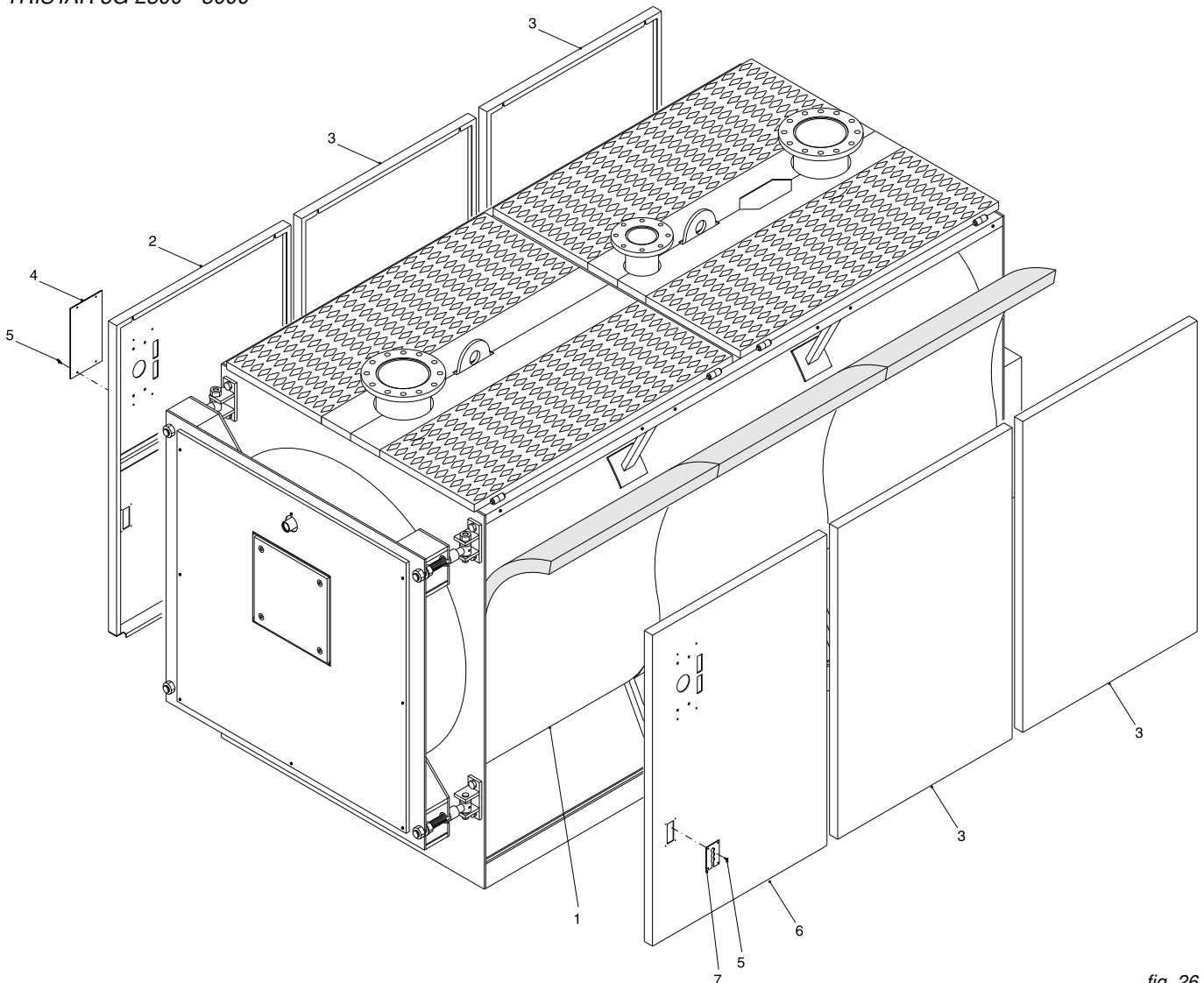


fig. 26

Probe insertion sequence

Following this sequence, insert the probes of the instruments in the bulb holder/s on the top of the boiler (Ref. Fig. 27): of the thermometer (pos. 1), of the working thermostat (pos. 2) of the safety thermostat (pos. 3), and of the minimum thermostat (pos. 4.) It is recommended to insert the probes all the way in the relative bulb holders for best contact.

Insert the contact spring (pos. 6.) and fasten the capillaries with the fixing clip/s (pos.5).

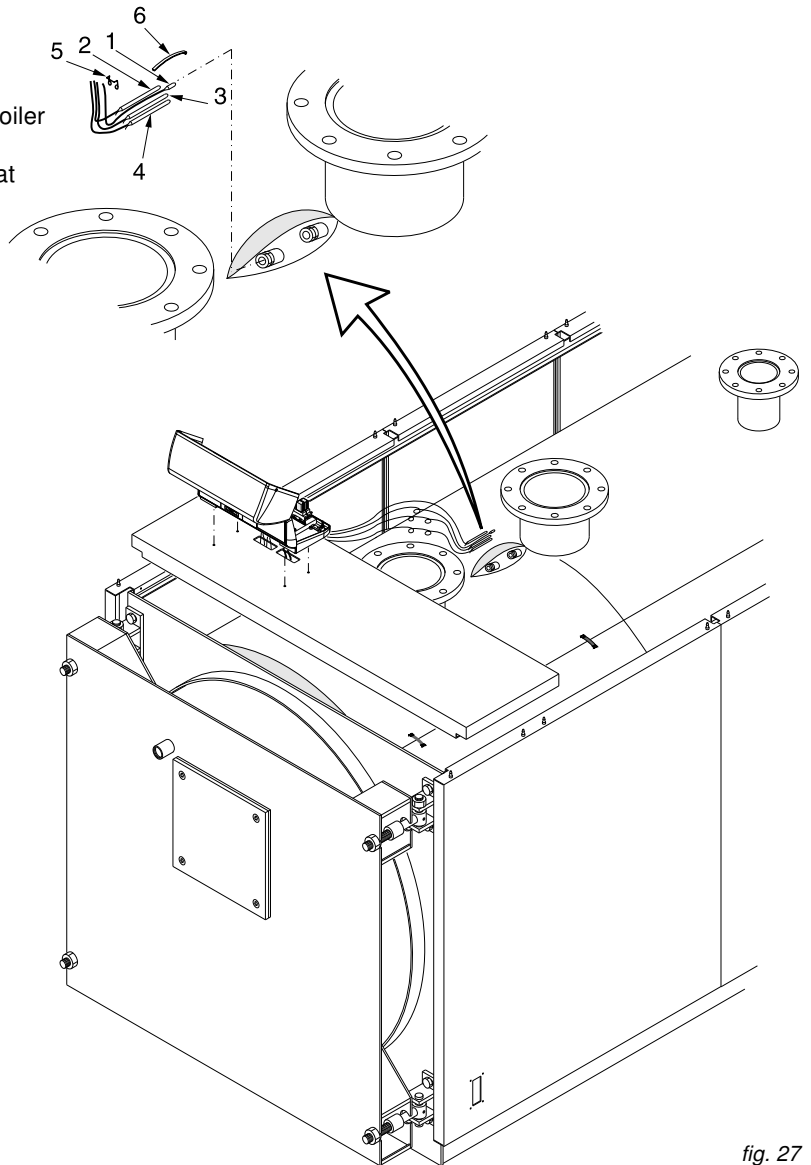


fig. 27

Technical features and dimensions

3.15 - ELECTRICAL CONNECTIONS

General warnings

The electrical safety of the appliance is guaranteed only when it has been properly connected to an efficient earthing system carried out as intended by safety standards in force: pipes of the gas, water and heating systems are absolutely unsuitable as earthing electrodes.

It is necessary to verify this fundamental safety requirement. If in doubt, have the electric system carefully checked by professionally qualified personnel as the manufacturer is not liable for damage caused by failure to provide an earthing system.

Have professionally qualified personnel check that the electric system is adequate for the maximum power absorbed by the appliance, indicated on the data plate. Make sure in particular that the cross-section of the cables is suitable for the power absorbed by the appliance.

Adapters, multiple sockets and/or extension cords cannot be used to power the appliance.

Use of any type of component using electric energy requires the observance of some fundamental rules, such as:

- do not touch the appliance with wet and/or moist parts of the body and/or in bare feet;
- do not pull the electric cables;
- do not leave the appliance exposed to atmospheric agents (rain, sun, etc.) unless expressly designed;
- do not allow children or unskilled persons to use the appliance.

230V electric power supply connection

The electrical connections are illustrated in chap. 3.16, 3.17, 3.18, 3.19, 3.20.

The boiler installation requires a connection to a 230 V - 50 Hz electric mains: this connection must be properly carried out as provided for by current IEC regulations.



Danger!

Only a qualified technician may perform the electrical installation.

Before performing connections or any type of operation on electrical parts, always disconnect electrical power and make sure that it cannot be reconnected accidentally.

Remember that a bipolar switch must be installed on the boiler power line with over 3 mm between contacts, easy to access, making maintenance quick and safe.



The power cable must be replaced by authorised technical personnel. Failure to comply with the above can jeopardise the safety of the appliance.

3.16 - STANDARD PANEL BOARD

The main switch [11] powers the board and the equipment connected to it.

The switches [12] and [13] in turn cut power to the burner and to the system pump.

The thermostat [32] adjusts the working temperature of the boiler.

The working thermostat is provided with two switching contacts to control the two-stage burners.

The differential between the two contacts is 6°C (not adjustable).

The minimum thermostat, which can only be accessed after having lifted the cover of the electric control board, stops the system pump until the boiler reaches the temperature of 50°C. The electric power line of the boiler's control board must have a switch with protective fuses.

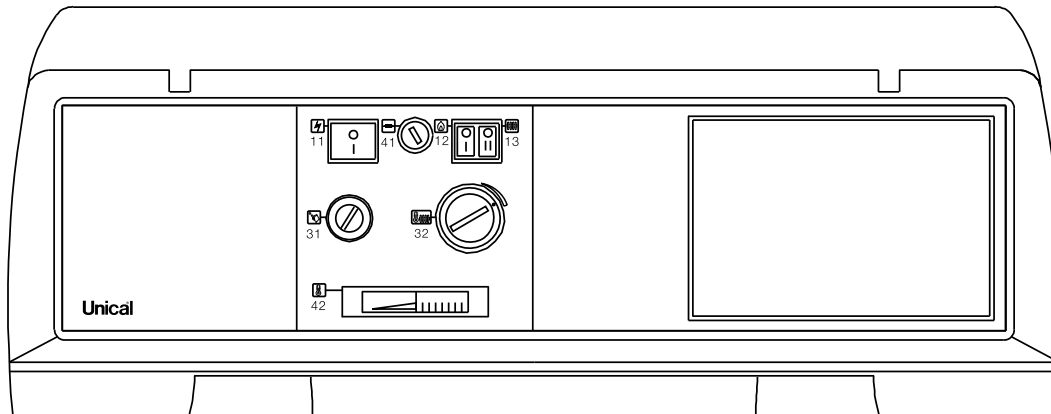


fig. 28

11 Main switch with indicator light

12 Burner switch

13 System pump switch

31 Safety thermostat

32 Working thermostat

41 General fuse

42 Boiler thermometer

For use of the panel board, see the system manager instruction booklet

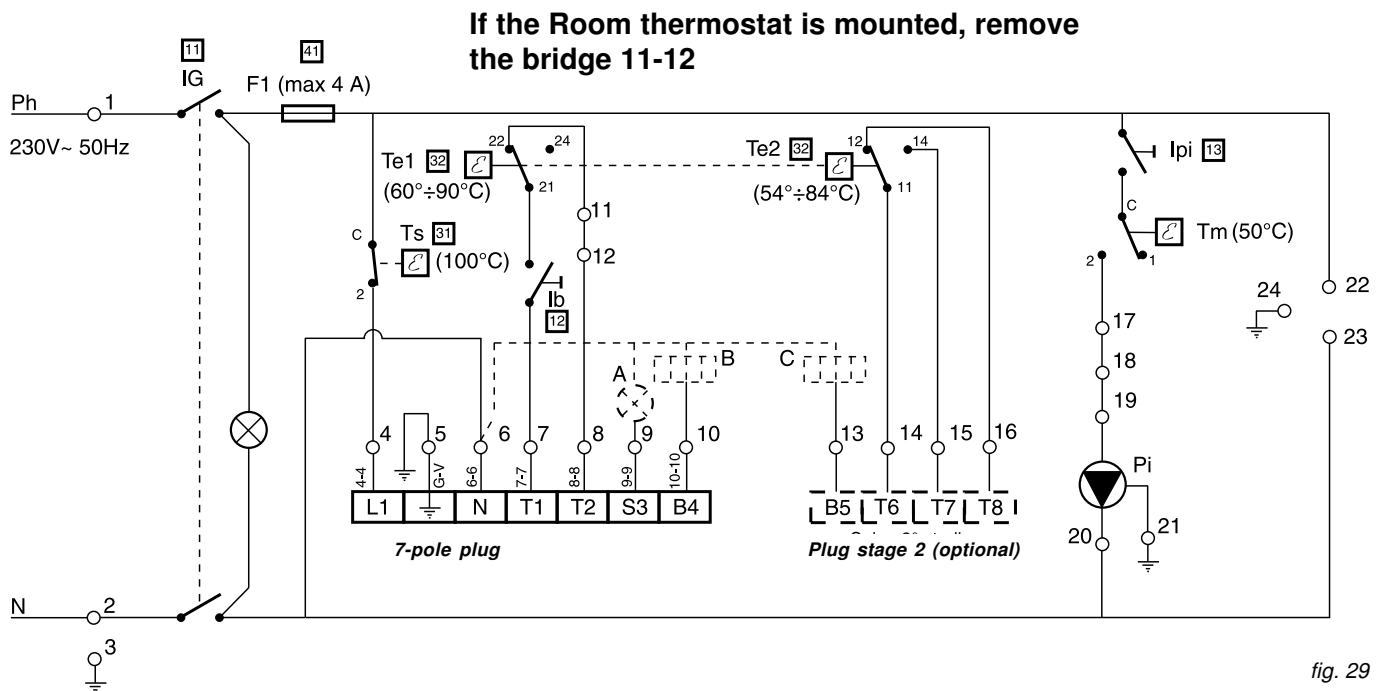


fig. 29

Ph Phase (230V ~50Hz)

N Neutral

F1 General fuse (max 4A)

Ib Burner switch

IG Main switch with indicator light

Ipi System pump switch

Ta Room thermostat

Te1 Working thermostat stage 1
(60°C÷90°C)

Te2 Working thermostat stage 2
(54°C÷84°C)

Tm Minimum thermostat (50°C)

Ts Safety thermostat (100°C)

Pi System pump

A Possible repetition of burner block

B Possible working hour counter stage 1

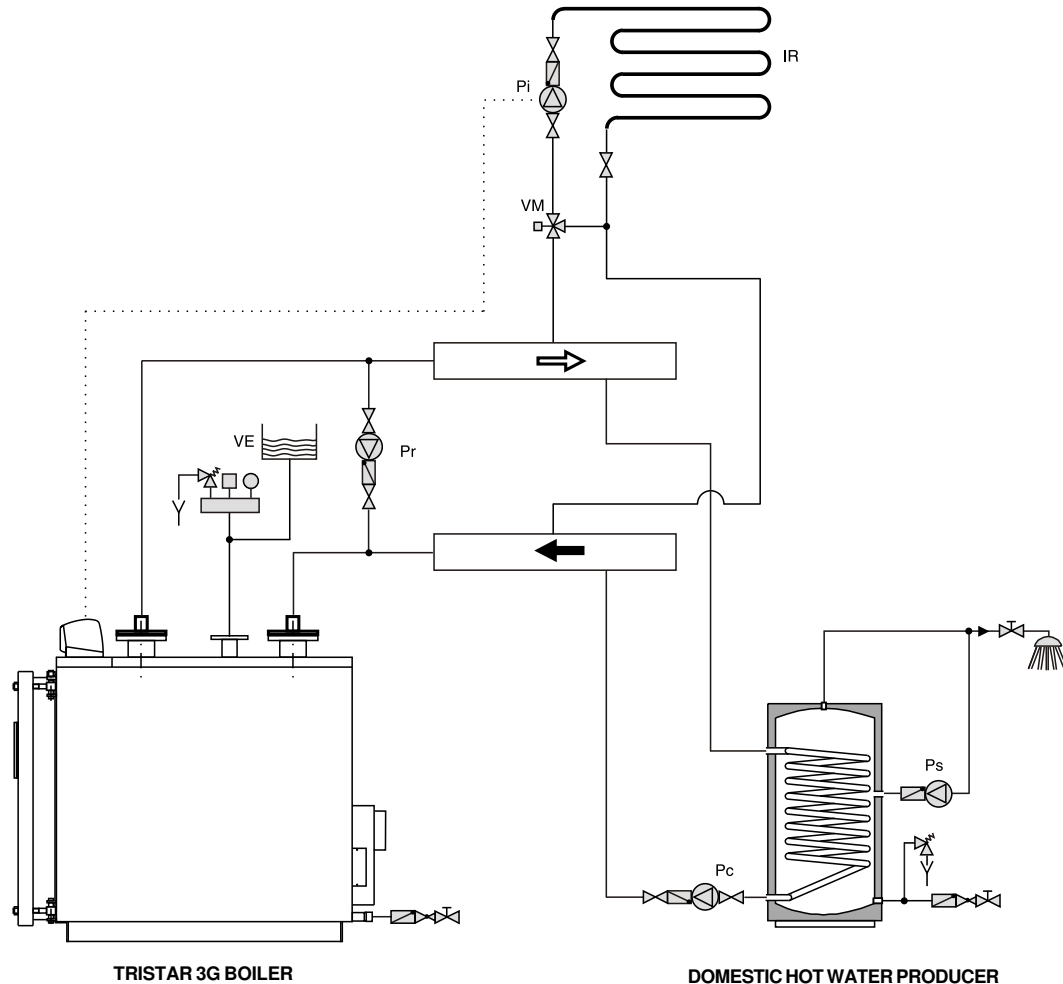
C Possible working hour counter stage 2

Technical features and dimensions

3.17- HYDRAULIC AND ELECTRICAL SYSTEM CONNECTION

Fig. 30 and 31 show the typical layout of the connection of the boiler to the heating system with production of domestic hot water.

Remember that TRISTAR 3G boilers operate with forced circulation.



Key:

- Pr* = recirculation pump
- VM* = zone mixer valve
- Pi* = heating system pump
- VE* = open expansion vessel
- IR* = heating system distribution
- Ps* = domestic water recirculation pump
- Pc* = domestic hot water production charge pump
- TA* = room thermostat

fig. 30

The standard panel board of the TRISTAR 3G boiler automatically switches the burner off when the temperature in the boiler reaches the value set on the control thermostat.

It also manages the system pump, which will only be activated when the minimum boiler temperature of 50°C has been reached (anti-condensation protection temperature).

The pump will switch off when the lower threshold of 50°C (decreasing) is reached.

The panel is set up to manage dual-stage or modulating burners.

With this layout configuration, the DHW storage tank loading pump will have the priority over the heating system pump.

Technical features and dimensions

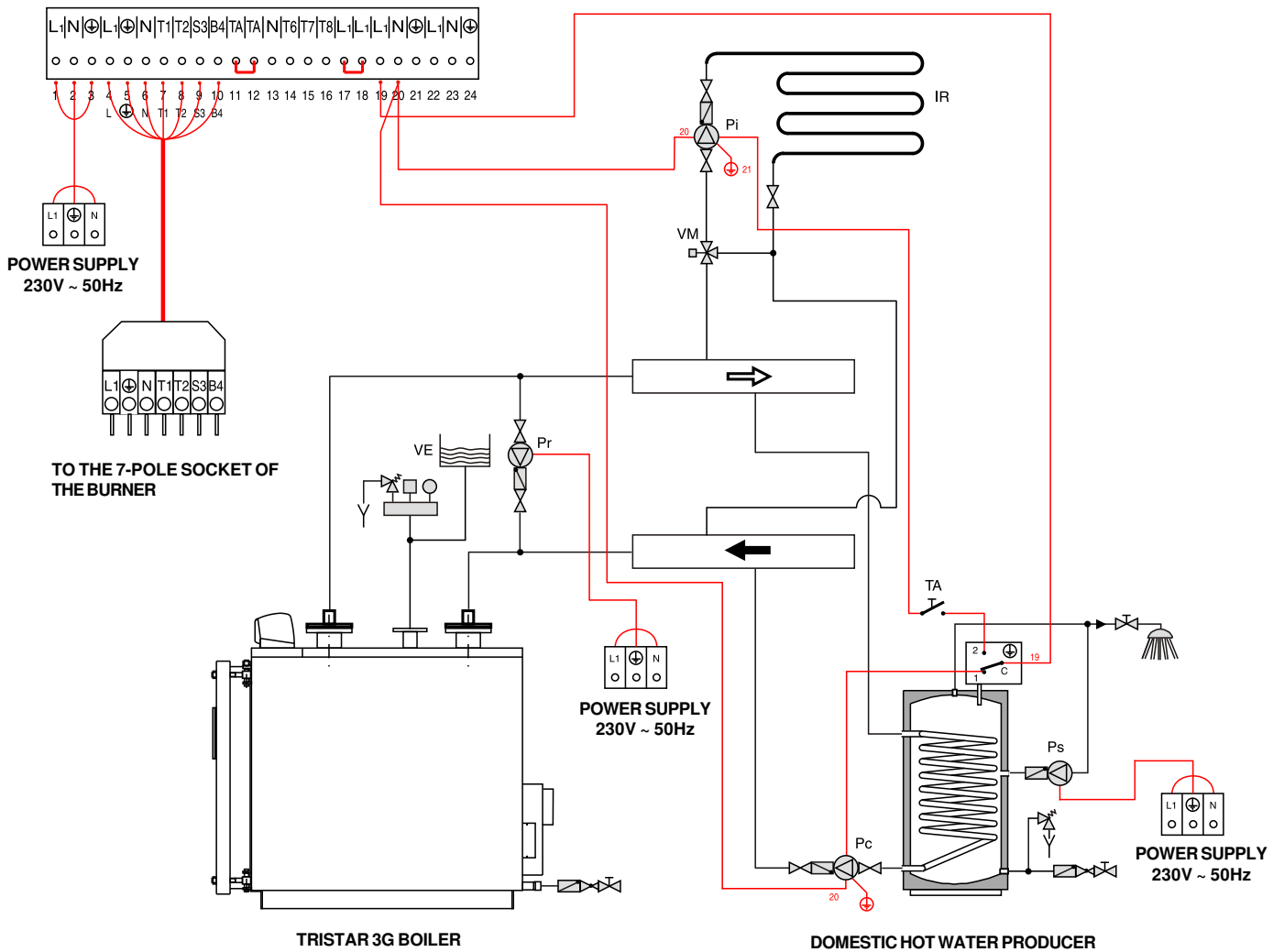


fig. 31

NOTE: With absorption beyond 4A, place adequate contactors between the panel board and the loads

Technical features and dimensions

3.18 - OPTIONAL PANEL BOARD

The main switch [11] powers the board and the equipment connected to it.

Switches [12] and [13] control the burner and the mixed zone system pump.

Switches [14] and [15] control the direct zone system pump and the storage tank pump.

The thermostat adjusts the working temperature of the boiler: to achieve this, the thermostat must be placed at maximum full-scale pos. [32].

Eventual operation of the second stage of the burner will be managed by the heat control.

The default setting of the heating controller stops the system pump until the boiler reaches the temperature of 50°C.

The electric power line of the boiler's control board must have a switch with protective fuses.

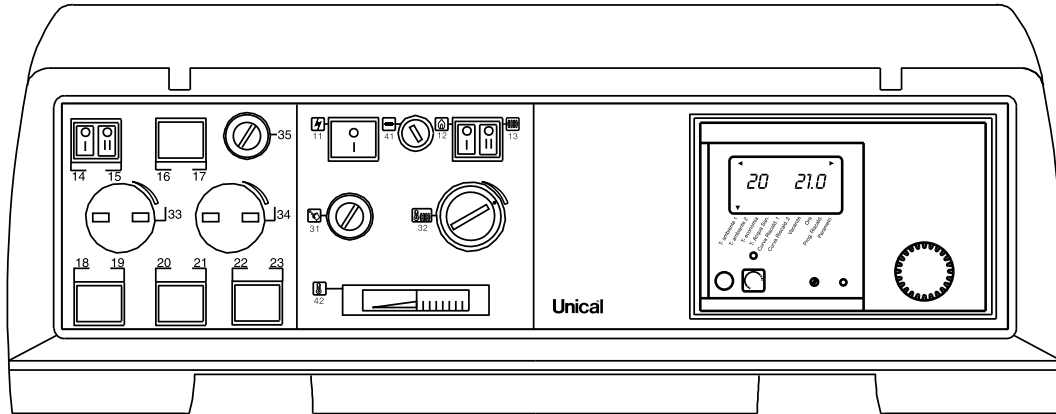
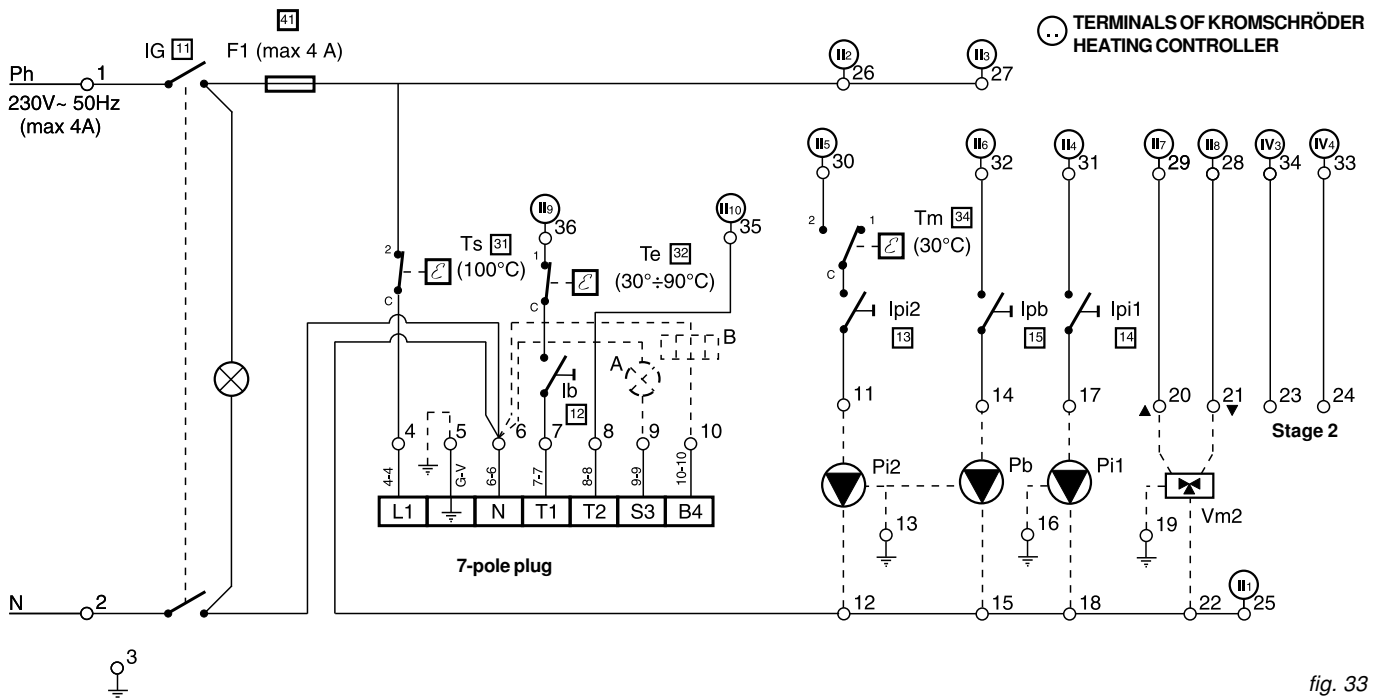


fig. 32

- 11 Main switch with indicator light
- 12 Burner switch
- 13 Mixed zone system pump switch
- 14 Direct zone system pump switch
- 15 Storage tank pump

- 31 Safety thermostat
- 32 Working thermostat
- 41 General fuse
- 42 Boiler thermometer

For use of the panel board, see the system manager instruction booklet



⊙ TERMINALS OF KROMSCHRÖDER HEATING CONTROLLER

- Ph Phase (230V ~50Hz)
- N Neutral
- F1 General fuse (max 4A)
- Ib Burner switch
- IG Main switch with indicator light
- Ipi1 System pump 1 switch

- Ipi2 System pump 2 switch
- Ipb Storage tank pump switch
- Pb Storage tank pump
- Pi1 Direct zone system pump
- Pi2 Mixed zone system pump
- Te Working thermostat

- Tm Minimum thermostat
- Ts Safety thermostat (100°C)
- Vm2 Mixer valve
- A Possible repetition of burner block
- B Possible working hour counter stage 1

fig. 33

3.19 - LAYOUT OF PROBE CONNECTION ON HEATING CONTROLLER CODE 30680

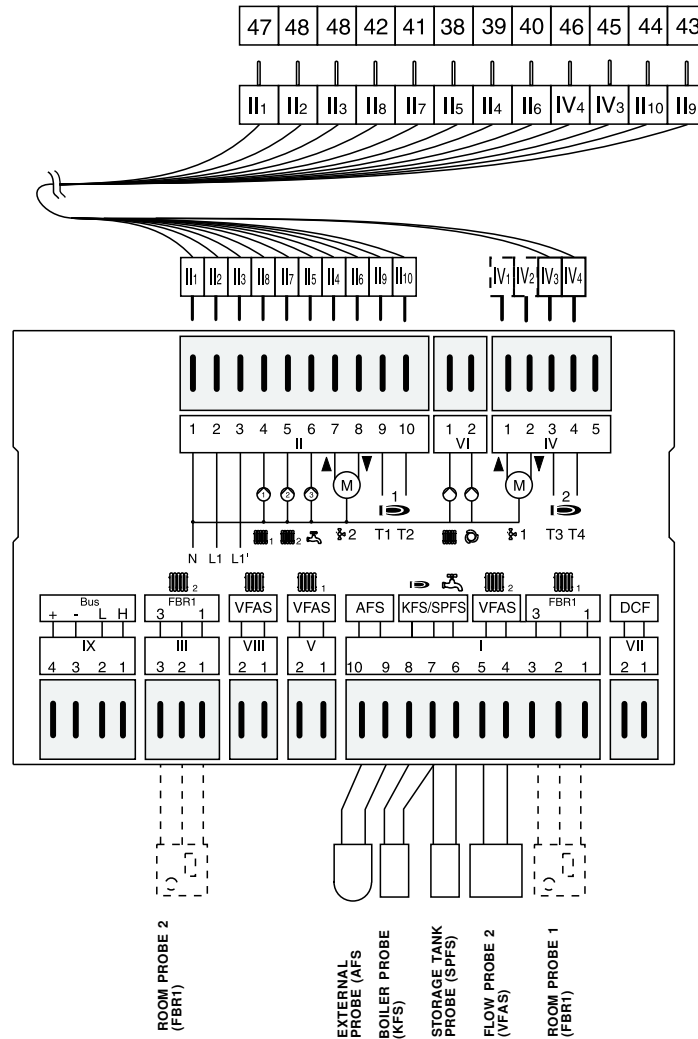


fig. 34

The heating controller probes (boiler, storage tank, external, flow) are included in the supply; the ambient probes 1 and 2 are optional; the mixer valve and relative control motor are not included in the supply.

Should ambient probes be mounted (optional), the room temperature will only be determined with the boiler curve set by the program.

If you intend to mounting 2 boilers in cascade, please contact our after-sales service.

3.20 - PROGRAMMING THE HEATING CONTROLLER


For that which concerns adjustment or programming of the heating controller, see the instruction booklets attached to the device.

The following are the default parameters which cannot be modified.


As far as parameters which can be programmed by the user according to his requirements, see the system manager instruction book.

Technical features and dimensions


PARAMETERS PROGRAMMABLE BY TECHNICIAN AND PROTECTED BY ACCESS CODE


INSTALLATION			
Description	Value range	Default	Individual values
CODE NUMBER	0000 - 9999	ENTRY	
CODE NUMBER (adjustment)	0000 - 9999	0000	
BUS ID 1	(00), 01 - 15	01	
BUS ID 2	(00), 01 - 15	02	
AF SUPPLY	00,01 (off/on)	01 = ON	
TEMPERATURE MASTER	00, 01 (OFF / ON)	00 = OFF	
MAX-BOILER	30 °C - 110 °C	80 °C	
MIN-BOILER	10 °C - 80 °C	60 °C	
T-WARM-UP	10 °C - 85 °C	50 °C	
L. MIN.	00, 01, 02	00	
HYSTERESIS	5K - 20K	5 degrees	
HYSTERESIS TIME	00 min - 30 min	10 min	
BURNER TIME 2	00 min - 30 min	10 min	
BURNER HYSTERESIS 2	2K - 20K	2 degrees	
HEAT SEQ TEMP (*)	0h - 250h	0h (*)	
RELAY FUNCT	00 - 08	00	
T MULTI-PROBE	30 °C - 90 °C	30 °C	
MFR HYSTERESIS	2K - 10K	5 degrees	
RELAY 2 FUNCT	00 - 03	00	
SCREED	00 - 01 (OFF / ON)	00 = OFF	
SCREED PROGRAM	see heating controller booklet		
RETURN	Exit level using 		

* NOTE: For cascade boilers, the technical installation parameter HEAT SEQ TEMP is 250h

DOMESTIC HOT WATER PRODUCTION			
Description	Value range	Default	Individual values
CHARGE PUMP	00 - 01 (OFF / ON)	01 = ON	
PARALLEL PUMP	00 , 01, 02, 03	00	
DHW TEMPERATURE	00 °C - 50 °C	20 °C	
DHW HYSTERESIS	5K - 30K	5 degrees	
DHW TIME	00 min - 30 min	00 min	
INLET TEMPERATURE	00, 01 (OFF / ON)	00 = OFF	
THERM FUNCT	00, 01 (OFF / ON)	00 = OFF	
RETURN	Exit level using 		

Technical features and dimensions

HEATING CIRCUIT 1			
Description	Value range	Default	Individual values
HEATING CIRCUIT FUNCTION	00 - 04	00	
PUMP MODE	00 , 03	00	
MIXER OPEN (not in hot water circuit)	5 - 25	16	
MIXER CLOSED (not in hot water circuit)	5 - 25	12	
MAX FLOW TEMPERATURE	20 °C - 110 °C	80 °C	
MIN FLOW TEMPERATURE	10 °C - 110 °C	10 °C	
FROST PROTECTION TEMP	- - - - (-15)°C - (5)°C	0 °C	
OUTSIDE TEMP DELAY	0:00 - 24:00	1	
HEATING SLOPE DISTANCE	0K - 50K	5 degrees	
REDUCTION	00 - 01 (OFF / ON)	01 = ON	
RETURN	Exit level using 		

HEATING CIRCUIT 2			
Description	Value range	Default	Individual values
HEATING CIRCUIT FUNCTION	00 - 04	00	
PUMP MODE	00 , 03	00	
MIXER OPEN (not in hot water circuit)	5 - 25	16	
MIXER CLOSED (not in hot water circuit)	5 - 25	12	
MAX FLOW TEMPERATURE	20 °C - 110 °C	45 °C	
MIN FLOW TEMPERATURE	10 °C - 110 °C	10 °C	
FROST PROTECTION TEMP	- - - - (-15)°C - (5)°C	0 °C	
OUTSIDE TEMP DELAY	0:00 - 24:00	1	
HEATING SLOPE DISTANCE	0K - 50K	5 degrees	
REDUCTION	00 - 01 (OFF / ON)	01 = ON	
RETURN	Exit level using 		

Technical features and dimensions

3.21 - HYDRAULIC AND ELECTRIC SYSTEM CONNECTION WITH OPTIONAL PANEL BOARD

Fig. 35 and Fig. 36 show the typical layout of the connection of the boiler to the heating system consisting of 2 zones one of which is controlled by a motorised mixer valve.

DHW production can also be managed. Remember that TRISTAR 3G boilers operate with forced circulation.

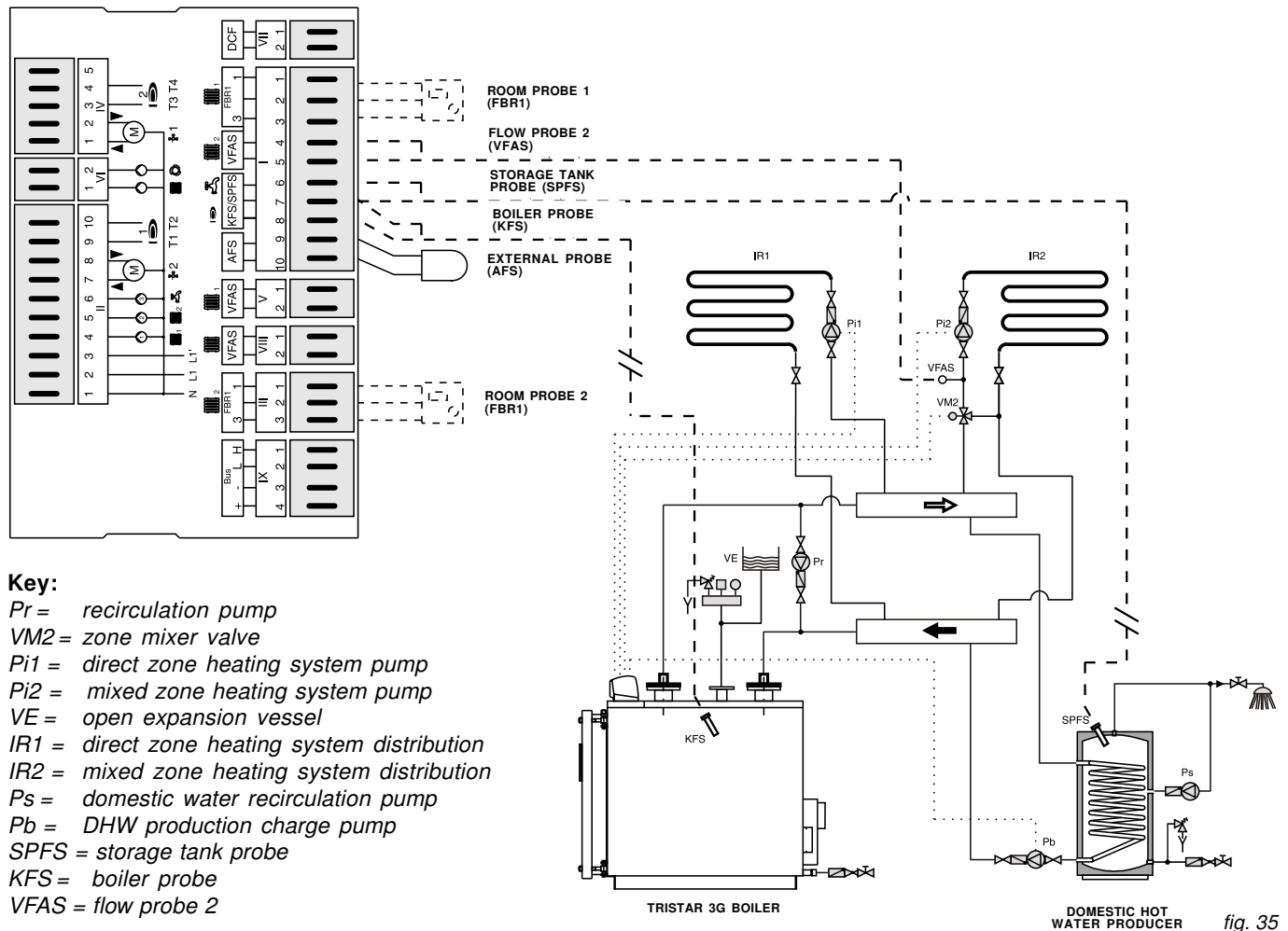


fig. 35

The optional panel board of the TRISTAR 3G boiler automatically switches the burner off when the temperature in the boiler reaches the value set on the heating controller. It also manages the pump to fill a storage tank for DHW production.

Two distinct heating zones are managed automatically based on the data detected by the boiler, external, ambient and flow probes.

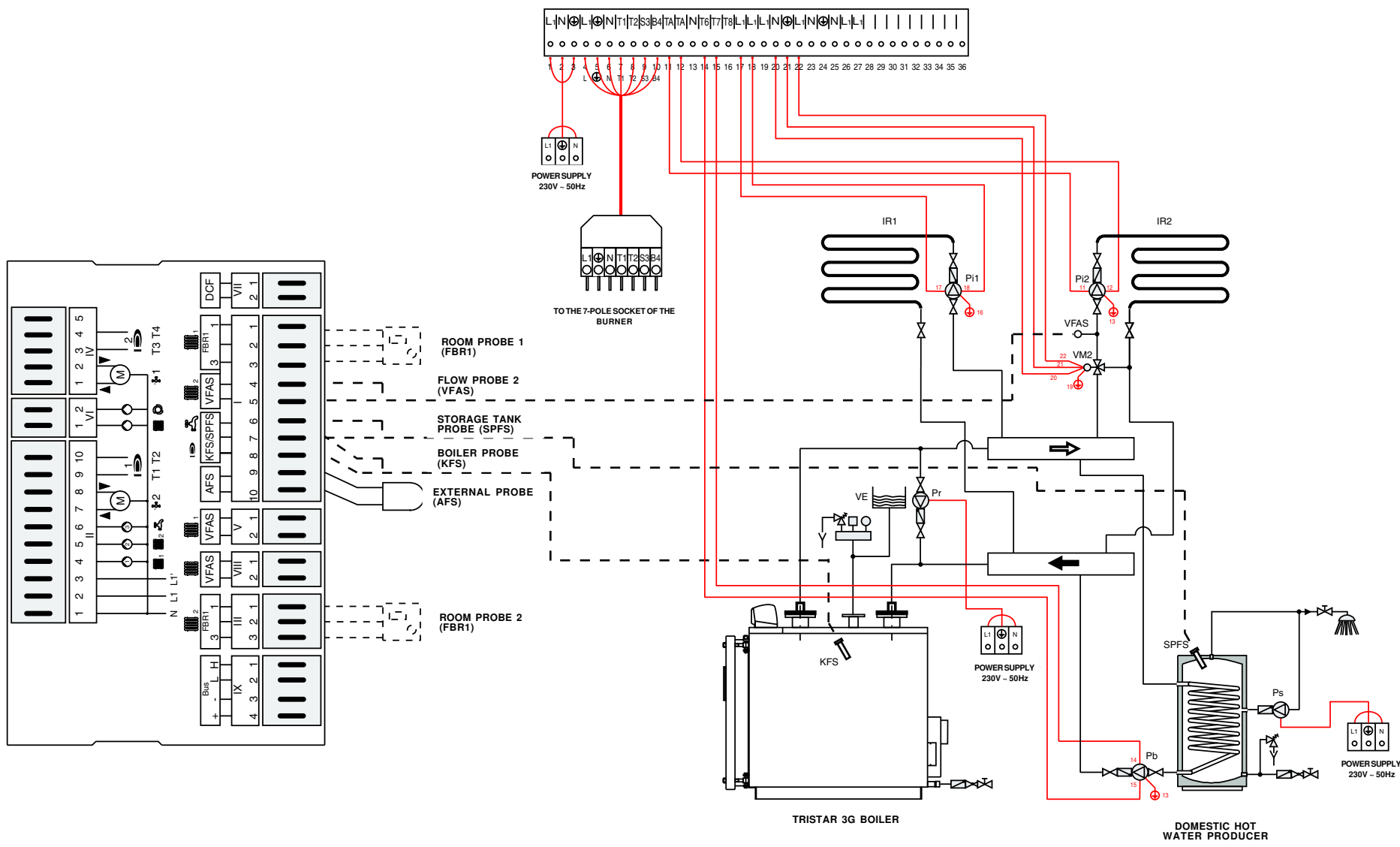
The main system pump (mixed zone) will only be activated when the minimum boiler temperature of 50°C has been reached (anti-condensation protection temperature).

The pump will switch off when the lower threshold of 50°C (decreasing) is reached.

The panel is set up to manage dual-stage or modulating burners.

With this layout configuration, the DHW storage tank loading pump will have the priority over the heating system pump. The heating controller is capable of controlling various system configurations:

- one direct zone system without mixer valve: the flow probe must not be mounted; the control unit only commands the system pump 1.
- one zone system with motorised mixer valve: the flow probe (downstream the mixer valve) must be fitted; the control unit commands the system pump 2 and the mixer valve 2.
- system with 2 zones: one direct and one with mixer valve; the control unit controls: the system pump of the direct zone 1, the mixer valve 2 and the system pump 2 of the mixed zone.



NOTE: With absorption beyond 4A, place adequate contactors between the panel board and the loads

fig. 36

Technical features and dimensions

3.22 - COMMISSIONING

Preliminary checks



Commissioning must be done by professionally qualified personnel. Unical will not be held liable for damage to persons, animals or objects due to failure to comply with the instruction above.

Before commissioning the boiler, check that:

- installation complies with standards UNI 7129 and 7131 for the gas part and with standards IEC 64-8 and 64-9 for the electrical power;
- the adduction of combustion air and flue gas evacuation are performed correctly according to that laid down by standards in force (UNI 7129/7131);
- the fuel feed system is dimensioned according to the flow rate required for the boiler and is provided with all safety and control systems prescribed by current standards;
- the power supply of the boiler is 230V - 50Hz;
- the system is filled with water (approximately 1 bar pressure on the pressure gauge with the pump stopped);
- any system shut-off gate valves are open;
- the gas used corresponds to boiler calibration: if not, modify the boiler to use type of gas available; this operation must be carried out by qualified technical personnel according to standards in force;
- the gas feed valves are open;
- there is no gas leakage;
- the external main switch is connected;
- the system safety valves are not blocked and are connected to the sewer system drainage;
- there is no water leakage.
- ventilation conditions and minimum distances are guaranteed to perform maintenance should the boiler be enclosed between furniture or in a niche.

Switching boiler on and off

To switch the boiler on and off, see the "**SYSTEM MANAGER OPERATING INSTRUCTIONS**".

Information for system manager

The system manager must be instructed concerning the use and operation of his heating system, in particular:

- Give the system manager the "SYSTEM MANAGER OPERATING INSTRUCTIONS", as well as the other appliance documents inserted in the envelope inside the packaging. **The system manager must keep this documentation for future reference.**
- Inform the system manager about the importance of the air vents and the flue gas exhaust system, highlighting their essential features and the absolute prohibition of modifying them.
- Inform the system manager concerning control of the system's water pressure as well as operations to restore it.
- Inform the system manager concerning correct control of temperatures, control units/thermostats and radiators to save energy.
- Remind that the system must receive regular maintenance at least once a year and a combustion analysis must be performed in the timetable foreseen by standards in force.
- Should the appliance be sold or transferred to a new owner or if you move and leave the appliance, always make sure that the instruction booklet accompanies it so the new owner and/or installer can access it.

TRISTAR 3G boilers are forced circulation boilers: it is therefore necessary to make sure that water circulates while the boiler is running.

Do not allow the burner to run without the system pump being activated; otherwise the safety thermostat could be triggered.

The return temperature must not drop below 47 °C to avoid, or at least limit, flue gas condensation which causes premature deterioration of the boiler.

The working temperature of the boiler can therefore be adjusted between 60 and 80 °C. Room temperature will be regulated by the mixer valve commanded by the heating controller.

The system must slowly reach the operating temperature, with the eventual insertion in the secondary ring circuit, to avoid the temperature from dropping below 47 °C.

It is always recommended to install an anti-condensation or recirculation pump (between the flow and return lines of the boiler).

Returns to low temperatures, below 47 °C, cause the flue gas to condense corroding the heat exchange surfaces. You must therefore pay the utmost attention while operating the system.

Corrosion caused by acid condensation of combustion products is not covered by the warranty as it is attributable to operation of the system alone.

3.23 - ADJUSTING THE BURNER



The following instructions are intended exclusively for service personnel **authorised by the manufacturer of the burner**.

Burner calibration and preliminary operations are described in the burner's instruction booklet.

Gas-fired burners are equipped with a gas valve with which

the flow rate can be determined: upon commissioning the actual thermal flow rate **must always** be controlled by means of the counter on the main piping, making sure it is not below the minimum value on the data plate of the boiler.

When the burner is adjusted properly, the values measured on the chimney by the specific analyser should correspond to those on the table on page 13.

4

INSPECTIONS AND MAINTENANCE



Inspections and maintenance performed professionally and according to a regular schedule as well as the use of original spare parts are of the utmost importance for fault-free operation of the boiler and to guarantee its long life.

Yearly maintenance of the appliance is mandatory in compliance with applicable law.



Failure to perform Inspections and Maintenance can entail material and personal damage.

We therefore recommend stipulating an inspection or maintenance contract.

Inspections help to determine the actual status of the appliance and to compare it with the nominal status. This is done through measuring, controls and observation.

Maintenance is required to eliminate any differences between the actual status and the nominal status. This is normally done by cleaning, setting and replacing individual components subject to wear.

Maintenance intervals and their extent are determined by a specialist based on the status of the appliance ascertained through inspection.

Inspection and maintenance jobs must be performed in the order shown on page 44.

Inspection and maintenance instructions



To assure long-term functioning of your appliance and to avoid altering its approved status, only original Unical spare parts must be used.

Before proceeding with maintenance, always perform the following operations:

- Disconnect the electric mains switch.
- Isolate the appliance from the electric mains by means of an isolated device with a contact opening of at least 3 mm (e.g. safety devices or power switches) and make sure that it cannot be re-connected accidentally.
- Close the gas shut-off valve upstream the boiler.
- Close any shut-off valves on the heating flow and return pipes.

After having completed all maintenance work, always perform the following operations:

- Open the heating flow and return pipes.
- If necessary, restore the heating system pressure until it reaches the static pressure relative to the highest point of the system.
- Open the gas shut-off valve.
- Reconnect the appliance to the electric mains and engage the switch.
- Make sure the appliance is gas tight and watertight.
- Vent the heating system and restore pressure if necessary.

Should you decide to temporarily deactivate the boiler, you must:

- a) cut off the supplies: electricity, water and fuel;
- b) empty the water system if antifreeze is not used.

Inspections and maintenance

Boiler body maintenance



Danger!
Before performing any maintenance, make sure the boiler and its components have cooled off.

Disconnect the boiler from the electric mains and shut the gas supply to the appliance.



Attention!
Before cleaning the boiler body, protect the panel board against any water sprays.

Once a year, at the end of the heating season, the boiler must receive a general cleaning.

Before performing any maintenance, make sure that all the precautions referred to in the previous point have been taken.

To proceed with maintenance you must:

- disconnect power by acting on the main switch;
- remove the burner, which could be overhauled at the same time;
- open the furnace door to access the combustion chamber;
- remove the smoke chamber access door;
- make sure the internal parts are intact.

Checking status of gaskets and insulation fibres



The insulation fibre of the door can show cracks after a short time of operation; this however does not reduce its insulation capacity nor jeopardise its lifespan. Check the condition of the seal gasket which must not show signs of deterioration; if so, it must be replaced, using only original spare parts.

Check the condition of the smoke chamber inspection cover gasket.

Replace it if worn, using only original spare parts.

Maintenance of burner

Burner maintenance must be carried out by personnel authorised by its manufacturer (or else the warranty shall be terminated).

Checking ignition electrode

Burner maintenance must be carried out by personnel authorised by its manufacturer (or else the warranty shall be terminated).

Components to check during yearly inspection

COMPONENT:	VERIFY:	CONTROL/INTERVENTION MEASURE:
Ts (safety thermostat)	Does the thermostat place the boiler in safety when overheating?	Bring the boiler to operating temperature with the pumps stopped
System expansion vessel	Does the vessel contain the right amount of air?	Check the nitrogen pressure. Pressurise the boiler (open the pump bleeder). Open the heating circuit closing valves.
Door gaskets	Does smoke seep through the door gaskets?	Further tighten the door screws. Replace the sealing gasket and possibly the internal gasket of the door.
Smoke chamber gaskets	Does smoke seep through the smoke chamber gaskets?	Further tighten the smoke chamber nuts. Replace the sealing gaskets.

■ *Inspections and maintenance*

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