

SPK



115 - 150 - 230 - 300 - 348 - 400 - 500 - 600



INSTALLATION AND MAINTENANCE INSTRUCTIONS





<http://www.unicalag.it/catalogo-prodotti/professionale-300/334/commercial-condensazione-inox>


Provisions for proper disposal of the product

After decommissioning, this appliance must not be disposed of as mixed urban waste.

Separate waste collection is mandatory for this type of waste, in order to allow the recovery and reuse of the materials making up the appliance.

Please contact operators authorised for the disposal of this type of appliances

Incorrect management of waste and of its disposal has potential negative effects on the environment and human health

The  symbol on the appliance, represents the prohibition to dispose of the product as mixed urban waste.

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.

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1.1 - GENERAL WARNINGS

The instruction booklet is an integral and essential part of the product and must be kept by the user.

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.

Your appliance must be installed and serviced in compliance with the standards in force according to the manufacturer instructions, up to standard and by legally qualified and certified personnel. Systems for the production of domestic hot water **MUST** be constructed entirely with compliant materials.

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 provided for 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.

Do not obstruct the terminals of the intake/exhaust ducts.

In the event 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 product repairs must be performed solely by personnel authorised by Unical, using original spare parts only. Failure to comply with the above can compromise the safety of the appliance and void the warranty.

To guarantee appliance efficiency and its correct operation, annual 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. Before commissioning an appliance that has not been used, wash the domestic hot water production system, making the water flow until it has been fully replaced.

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 manual 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 (*) (see 1.7 Water Treatment).

1.2 - SYMBOLS USED IN THE MANUAL

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



DANGER!
Serious danger
to safety
and health



ATTENTION!
Possible dangerous
situation for the product
and the environment



NOTE!
Tips
for the user



NOTE!
For further details
refer to the Technical Information:
<http://www.unicalag.it/catalogo-prodotti/professionale-300/334/commercial-condensazione-inox>



DANGER!
Danger of burns!



OBLIGATION!
wear gloves
protective

1.3 - APPROPRIATE USE OF APPLIANCE



The heat generator 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 life of the user and other persons or damage to the equipment or other objects.

The appliance is designed to work in heating systems, with hot water circulation, for the production of domestic hot water.

Any other use must be considered improper.

For any damage resulting from improper use, UNICAL AG S.p.A. assumes no responsibility.

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

1.4 - INFORMATION FOR 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 inserted in the envelope inside the packaging. **The user must keep this documentation safe 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 concerning controlling the system's water pressure as well as operations to restore it.
- Inform the user concerning correct temperature control, control units/thermostats and radiators for saving energy.
- Please note that, in compliance with the standards in force, the inspection and maintenance of the appliance must be carried out in compliance with the regulations and frequency indicated by the manufacturer.
- 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 manual accompanies it in order to be consulted by the new owner and/or installer.

The manufacturer will not be held liable in the event of damage to persons, animals or objects resulting from failure to comply with the instructions contained in this manual.

1.5 - SAFETY WARNINGS



ATTENTION!

The appliance must not be used by children.

The appliance may be used by adults and only after carefully reading the operating instructions manual for the user.

Children must be supervised so they do not play or tamper with the appliance.



ATTENTION!

The appliance must be installed, adjusted and maintained by professionally qualified personnel, in compliance with the 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 performing 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.



Changes to the parts connected to the appliance (once the appliance installation is complete) Do not modify the following parts:

- the boiler
- the gas, air, water and electricity supply lines
- the flue gas pipe, the safety valve and the exhaust pipe
- the construction parts which affect the operating safety of the appliance



Attention!

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

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



ATTENTION!

Indications for propane gas-fired appliances

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

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

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

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



Smell of gas

Should a smell of gas be perceived, follow these safety guidelines:

- do not turn electric switches on or off
- do not smoke
- do not use the telephone
- 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.



ATTENTION!

Do not use the appliance to support any object.

Specifically, do not place any liquid containers (Bottles, Glasses, Containers or Detergents) on top of the boiler.

1.6 - TECHNICAL DATA PLATE

CE marking

The CE marking certifies that the boilers meet:

- The essential requirements of the gas appliance directive (directive 2009/142/EEC)
- The essential requirements of the electromagnetic compatibility directive (2004/108/EEC)
- The essential requirements of the efficiency directive (92/42/EEC)
- The essential requirements of the efficiency directive (directive 2006/95/EEC)



The data plate is situated in the lower part of the shell (next to the drain valve) under insulation. The Duplicate data plate is placed on the panel board cover.

KEY:

- 1 = CE monitoring body
- 2 = Type of boiler
- 3 = Boiler model
- 4 = Number of stars (directive 92/42 EEC)
- 5 = (S.N°) Serial Number
- 6 = P.I.N. Product Identification Number
- 7 = Types of approved flue gas exhaust configurations
- 8 = (NOx) NOx Class

- A = Heating circuit characteristics
- 9 = (Pn) Effective nominal output
- 10 = (Pcond) Effective output in condensation
- 11 = (Qn) Maximum heat output
- 12 = (Adjusted Qn) Adjusted for rated heat output
- 13 = (PMS) Max. heating operating pressure
- 14 = (T max) Max. heating temperature

- B = Domestic hot water circuit characteristics
- 15 = (Qnw) Rated heat output in domestic hot water function (if different to Qn)
- 16 = (D) Specific D.H.W. flow rate according to EN 625 - EN 13203-1
- 19 = (PMW) Max. domestic hot water operating pressure
- 20 = (T max) Max. domestic hot water temperature

- C = Electrical characteristics
- 21 = Electrical power supply
- 22 = Consumption
- 23 = Protection rating

- D = Countries of destination
- 24 = Direct and indirect countries of destination
- 25 = Gas category
- 26 = Supply pressure

- E = Factory settings
- 27 = Adjusted for gas type X
- 28 = Space for national brands

- G = ErP
- 29 = Seasonal space heating energy efficiency
- 30 = Energy efficiency in DHW production mode

②	
Model	③
S.N°	⑤ /
PIN	⑥
Types	⑦
NOx	⑧
A Central Heating	Pn ⑨ kW Pcond ⑩ kW Qn ⑪ kW Adjusted Qn ⑫ kW PMS ⑬ bar T max ⑭ °C
B DHW	Qnw ⑮ kW D ⑯ l/min PMW ⑰ bar T max ⑳ °C
G	s ⑲ % wh ⑳ %
E Factory setting <input checked="" type="checkbox"/> MET <input type="checkbox"/> GPL	D Countries of destination
⑳ mbar <input type="checkbox"/> ㉑ mbar <input type="checkbox"/> ㉒ mbar <input type="checkbox"/> ㉓ mbar <input type="checkbox"/> ㉔ mbar <input type="checkbox"/> ㉕ mbar <input type="checkbox"/> ㉖ mbar <input type="checkbox"/>	㉗ ㉘ ㉙
C Electrical Power supply	
㉚ V Hz ㉛ W	
IP class: ㉜	
	㉝
①	
Made in Italy	

1.7 - WATER TREATMENT



Feed water treatment prevents problems and maintains the functionality and efficiency of the generator over time.



ATTENTION!
ANY DAMAGE TO THE BOILER CAUSED BY THE FORMATION OF FOULING OR BY CORROSIVE WATER WILL NOT BE COVERED BY THE WARRANTY.



The ideal water pH in heating systems must be within:

VALUE	MIN	MAX
PH	6.5	8
Hardness [°fr]	9	15



ATTENTION (*) see general warnings 1.1:
The heating only models are NOT suitable for the production of water for human consumption according to Ministerial Decree D.M. 174/2004.



To minimise corrosion, it is crucial to use a corrosion inhibitor; in order for it to work properly, the metal surfaces must be clean.
 (see system protection ACCESSORIES sect. in domestic price list)

NOTE!
 Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

1.8 - BOILER ANTIFREEZE PROTECTION

It is activated by default



This protection can intervene only if the electricity and gas supplies are connected.
 If one of the two is not available and upon reset 11 (SM) a temperature level between 2 and 5°C is detected, the appliance will behave as described in the table below, pos 2.



The heating system can be protected effectively from frost by using antifreeze products with inhibitor for heating systems (specific for multidmetal)

Do not use car engine antifreeze products as they could damage the water gaskets.

P O S	ANTIFREEZE FUNCTION				
	Power supplies		SR (*)	Status antifreeze function	Actions
	Electric	Gas			
1	ON	ON	< 7 °C	ON	- Burner and Pump ON until T > 15°C
2	ON	OFF	< 5 ÷ 5 °C	ON	FAULT SIGNAL CODE 16 (with Electrical power supply ON) (see par. 4.6 - ERROR CODES). Ignition inhibited.
	OFF	ON		OFF	Ignition inhibited.
	OFF	OFF		OFF	Ignition inhibited.

(*) Flow sensor

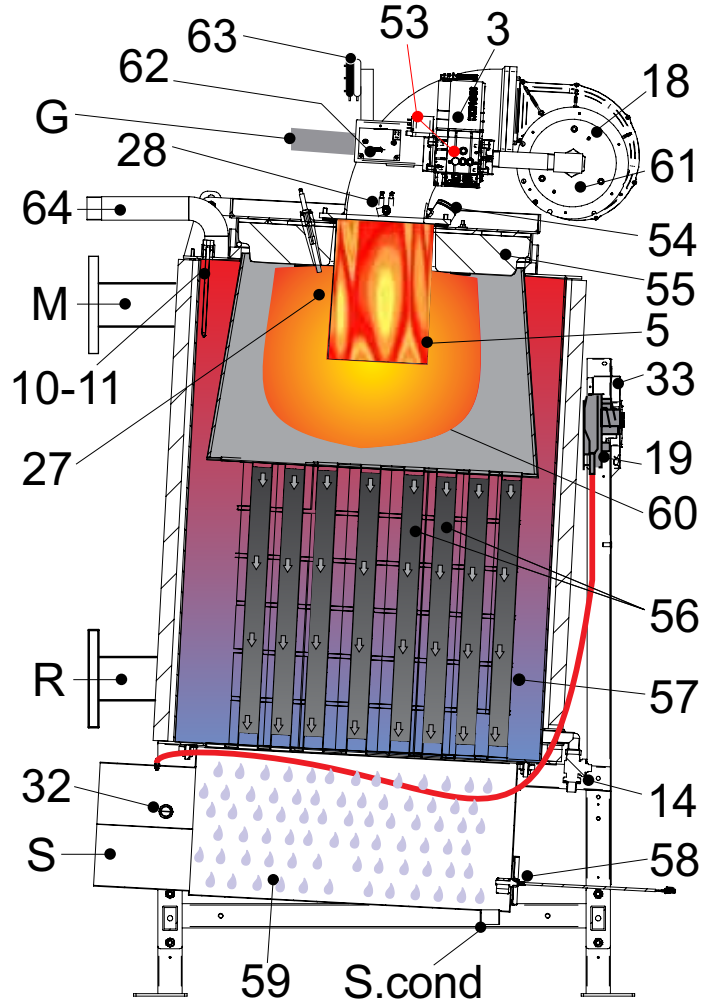
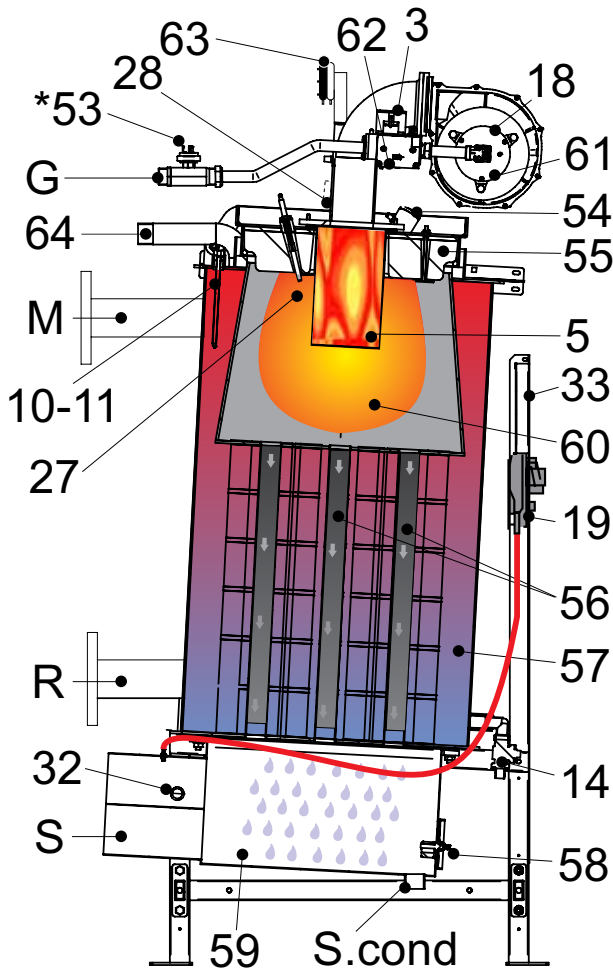
2.1 - TECHNICAL FEATURES

NOTE!
Further details in the section
"Technical Information" on the boiler
page of the www.unicalag.it website

2.2 - INTERNAL VIEW WITH THE INDICATION OF THE MAIN COMPONENTS

SPK 115 - 150

SPK 230 - 300 - 348 - 400 - 500 - 600



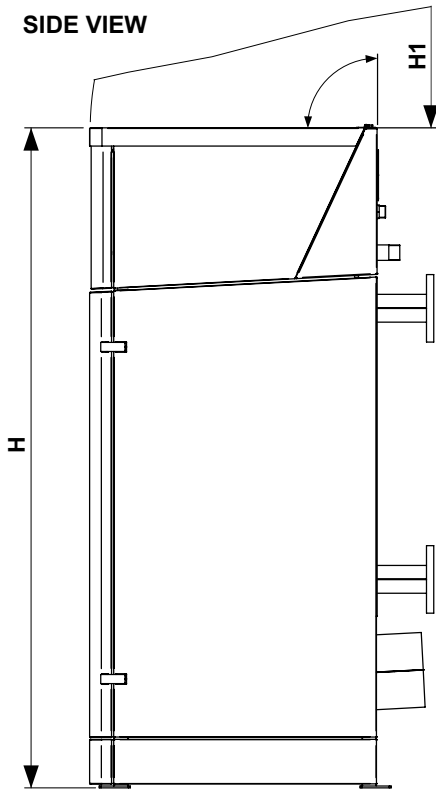
Technical features

KEY		
No.	S.E.	Description
3	VG	Gas valve
5		Burner
10	TL	Limit Thermostat Probe
11	SR	Flow sensor
14		Boiler drain valve
18	VM	Fan
19	PV	Flue gas pressure switch
27	E. RIL.	Detection electrode
28	E. ACC.	Ignition electrode
32		Inlet flue inspection
33		Panel Board
53	PGmin PGmax	Gas pressure switch (min.* SPK 115-150) (min. SPK 230 - 300 position at page 30) (min. / max SPK 348 ÷ 600 position at page 30)
54		Visual inspection glass

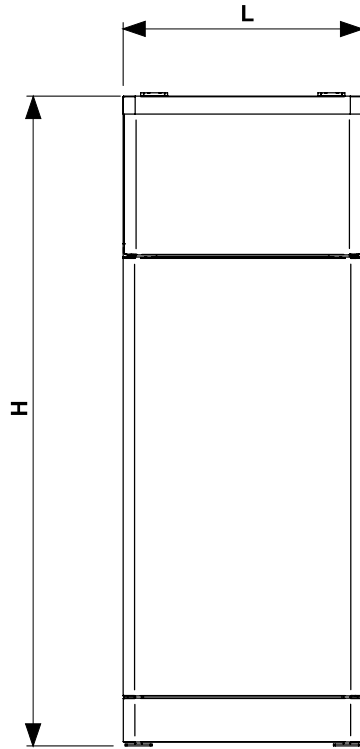
55		Door insulation
56		Stainless steel vertical smoke pipes with internal aluminium
57		Technical water tank
58	SL	Level sensor
59		Condensate collection pan
60		Combustion chamber
61		Air/gas mixer
62	T.ACC	Igniters
63	PFmin	Min. smoke pressure switch
64		Connection for air vent
G		Gas inlet
M		Heating system flow
R		Heating system return
Sm		Air vent connection
Scond		Condensate drain DN 32
	S.E.	= WIRING DIAGRAM KEY, see par. 4.5

2.3 - DIMENSIONS

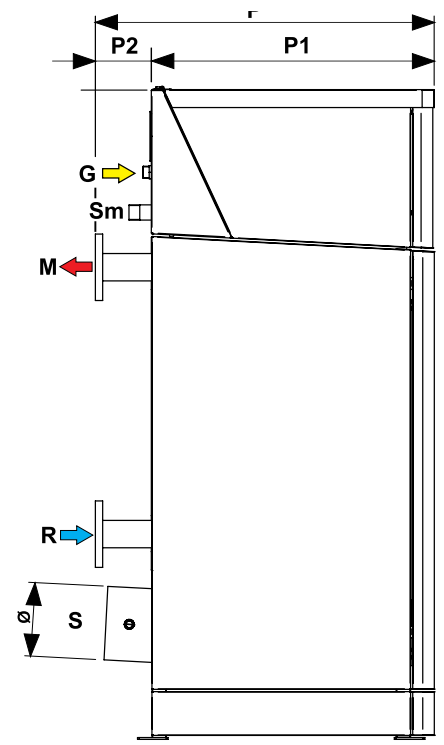
SIDE VIEW



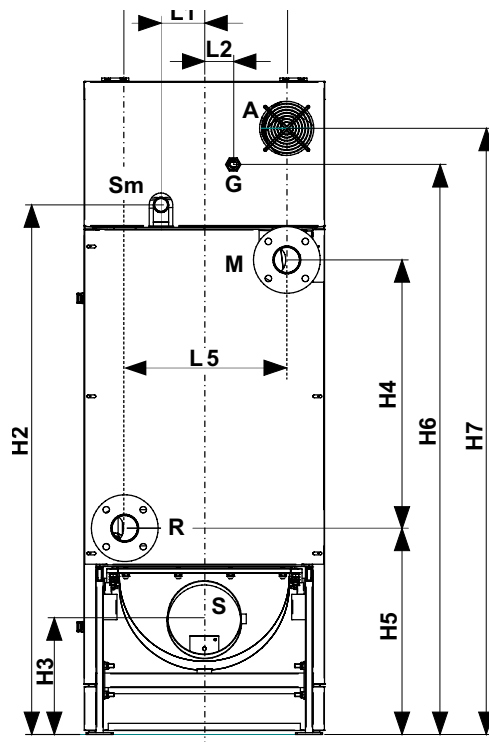
FRONT VIEW



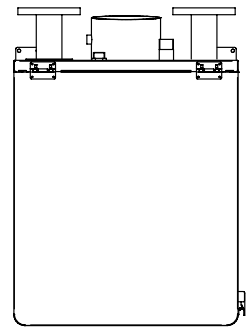
SIDE VIEW



REAR VIEW

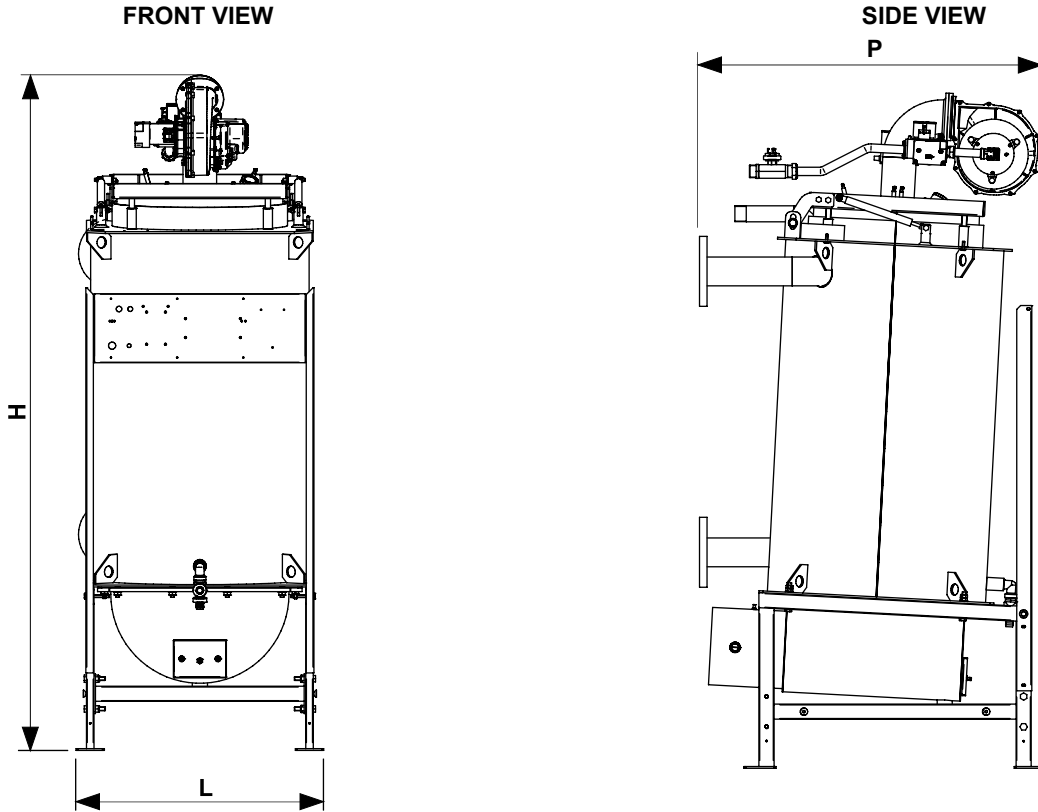


TOP VIEW



SPK	DIMENSIONS [mm]																
	Depth			Width							Height						
	P	P1	P2	L	L1	L2	L3	L4	L5	H	H1	H2	H3	H4	H5	H6	H7
115	944	777	156	666	120	81	228,5	228,5	457	1809	65,6	1467	323,5	770	554,5	1579	1679
150	944	777	156	666	120	81	228,5	228,5	457	1809	65,6	1467	323,5	770	554,5	1579	1679
230	1092	939	142	846	120	43	277	277	554	1917	65,6	1557	356	800	604,5	1697	1768
300	1181	1026	144	910	100	200	297	297	594	1946	65,6	1618	353	825	600,5	1741	1796
348	1276	1149	124	996	100	200	338	338	676	2130	65,6	1712	390	853	664	1794	1974
400	1276	1149	124	996	100	200	338	338	676	2130	65,6	1712	390	853	664	1794	1974
500	1276	1149	124	996	100	200	338	338	676	2130	65,6	1712	390	853	664	1794	1974
600	1398	1256	142	1096	200	220	386	386	772	2206	65,6	1753	390	900	673	1863	2052

2.3.1 - DIMENSIONS TO INSERT THE BOILER IN THE BOILER ROOM



SPK	BOILER DIMENSIONS WITHOUT ITS CASING [mm]		
	P	L	H
115	917	655	1785
150	917	655	1785
230	1027	795	1895
300	1134	845	1910
348	1258	965	2075
400	1258	965	2075
500	1258	965	2075
600	1313	1065	2186

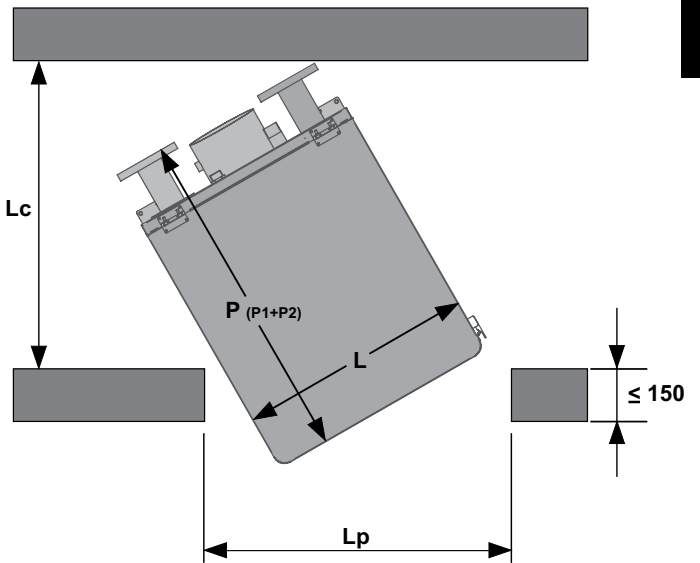
Example of Corridor Width (Lc) calculation required to handle the boiler SPK 150:

$$Cw = \frac{666}{900} \times 944 = > 698 \text{ mm}$$

$$Lc = \frac{L}{Lp} \times (P)$$

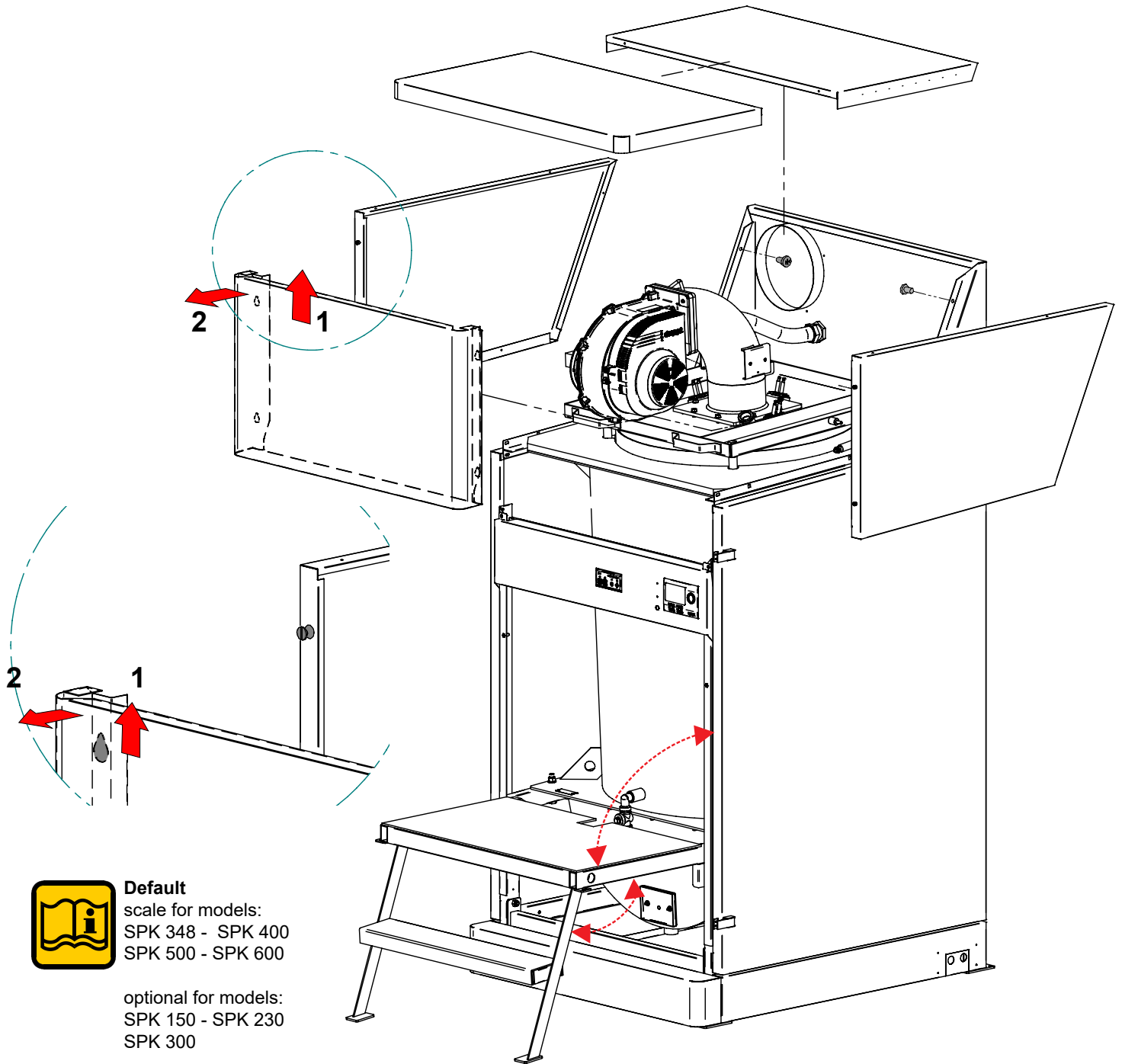
$$Lp = \frac{L}{Lc} \times (P)$$

- L = Boiler Width
- P = Boiler Depth
- LcLc = Corridor Width
- Lp = Door Width



Technical features

2.3.2 - VIEW OF INTERNAL ACCESS



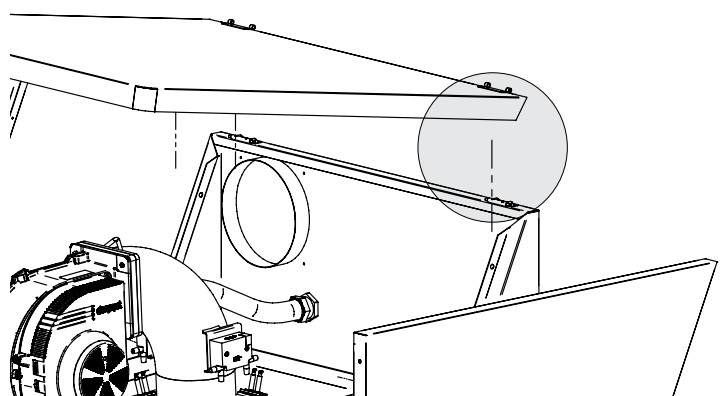
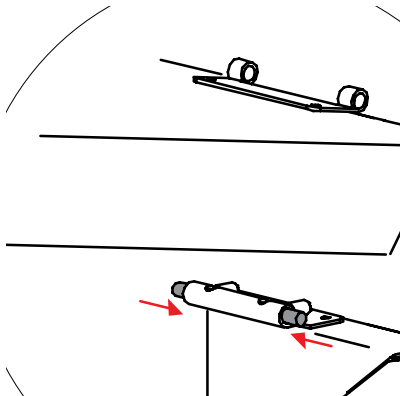
Default
 scale for models:
 SPK 348 - SPK 400
 SPK 500 - SPK 600

optional for models:
 SPK 150 - SPK 230
 SPK 300

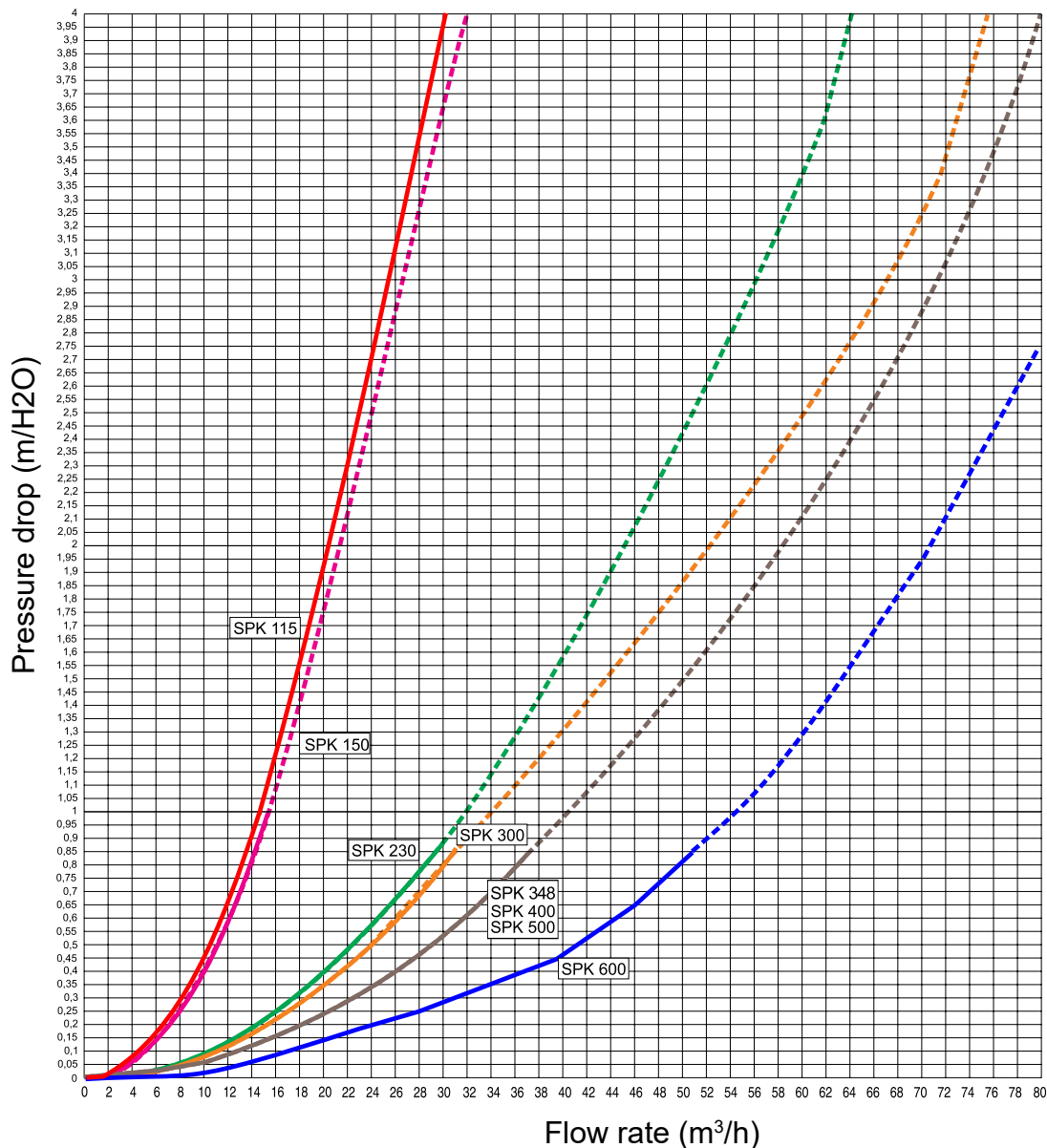


SPK 115 - SPK 150 - SPK 230 - SPK 300

To remove the cover,
 release the 2 springs, refer to the part
 shown below.



2.4 WATER SIDE PRESSURE DROPS DIAGRAM



Technical features

2.4.1 - DETERMINATION OF THE PRIMARY CIRCUIT PUMP OR BOILER PUMP

The boiler pump must have head that is able to ensure the pump's flow rates according to the circuit's Δt .

The pump is not an integral part of the boiler. It is recommended to select a pump with a flow rate and head of approximately 2/3 of its characteristic curve.



The pumps must be determined by the installer or designer according to the boiler and system data.

SPK 115	
Portata massima in l/h ($\Delta t=15K$)	6.412
Portata nominale richiesta in l/h ($\Delta t=20K$)	4.809

SPK 150	
Portata massima in l/h ($\Delta t=15K$)	7.818
Portata nominale richiesta in l/h ($\Delta t=20K$)	5.863

SPK 230	
Portata massima in l/h ($\Delta t=15K$)	11.999
Portata nominale richiesta in l/h ($\Delta t=20K$)	9.000

SPK 300	
Portata massima in l/h ($\Delta t=15K$)	15.740
Portata nominale richiesta in l/h ($\Delta t=20K$)	11.805

SPK 348	
Portata massima in l/h ($\Delta t=15K$)	19.575
Portata nominale richiesta in l/h ($\Delta t=20K$)	14.681

SPK 400	
Portata massima in l/h ($\Delta t=15K$)	21.386
Portata nominale richiesta in l/h ($\Delta t=20K$)	16.039

SPK 500	
Portata massima in l/h ($\Delta t=15K$)	25.338
Portata nominale richiesta in l/h ($\Delta t=20K$)	19.004



SPK 600	
Portata massima in l/h ($\Delta t=15K$)	30.978
Portata nominale richiesta in l/h ($\Delta t=20K$)	23.234

2.5 - OPERATING DATA AND GENERAL FEATURES

For the adjustment data: NOZZLES - PRESSURE - DIAGRAMS - FLOW RATES refer to the paragraph ADAPTATION TO OTHER TYPES OF GAS.

	SPK	115	150	230	300	348	400	500	600
Boiler category		II _{2H3P}							
Modulation ratio		1 : 3,3	1 : 4,0	1 : 4,3	1 : 4,3	1 : 3,9	1 : 4,2	1 : 3,9	1 : 4,4
Rated heat output on P.C.I. Qn	kW	115	140	214	280	348	380	450	550
Minimum heat output on P.C.I. Qmin	kW	35	35	50	65	90	90	115	125
Rated useful power (Tr 60 / Tm 80 °C) Pn	kW	111,84	136,36	209,29	274,54	341,42	373,01	441,95	540,32
Minimum useful power (Tr 60 / Tm 80 °C) Pn min	kW	32,49	32,52	48,25	63,57	87,67	87,80	111,09	118,53
Rated useful power (Tr 30 / Tm 50 °C) Pcond	kW	118,45	145,88	226,84	292,88	363,31	399,00	472,2	581,19
Minimum useful power (Tr 30 / Tm 50 °C) Pcond min	kW	36,54	36,54	54,60	70,01	99,09	97,20	124,09	135,88
Rated power performance (Tr 60 / Tm 80°C)	%	97,25	97,4	97,8	98,05	98,11	98,16	98,21	98,24
Minimum power performance (Tr 60 / Tm 80°C)	%	92,82	92,92	96,5	97,8	97,41	97,55	96,6	94,82
Rated power performance (Tr 30 / Tm 50°C)	%	103	104,2	106	104,6	104,4	105	104,9	105,67
Minimum power performance (Tr 30 / Tm 50°C)	%	104,4	104,4	109,2	107,7	110,1	108	107,9	108,7
Performance at 30% of the load (Tr 30°C)	%	107,3	107,7	107,2	108,9	108,4	108,8	108,9	106,5
Combustion efficiency at nominal load	%	98,1	97,8	97,9	98,2	98,2	98,2	98,2	98,3
Combustion efficiency with reduced load	%	98,38	98,38	98,32	98,40	98,34	98,31	98,43	98,42
Casing heat loss with burner operating (Qmin)	%	5,56	5,46	1,82	0,60	0,93	0,76	1,83	3,60
Casing heat loss with burner operating (Qn)	%	0,8	0,4	0,1	0,1	0,1	0,1	0,03	0,04
Net flue gas temperature tf-ta (min)(**)	°C	32,3	32,3	33,6	32	33,2	33,7	31,3	31,5
Net flue gas temperature tf-ta (max)(**)	°C	38	44,2	42,7	36,7	35,6	35,4	35,5	34,3
Maximum permitted temperature	°C	100							
Maximum operating temperature	°C	90							
Flue gas mass flow rate (min)	kg/h	57	57	82	106	147	147	188	204
Flue gas mass flow rate (max)	kg/h	188	229	350	458	569	621	735	899
Excess air	%	25,53							
Heat loss at chimney with burner on (min)	%	1,62	1,62	1,68	1,60	1,66	1,69	1,57	1,58
Heat loss at chimney with burner on (max)	%	1,90	2,21	2,14	1,84	1,78	1,77	1,78	1,72
Minimum heating circuit pressure	bar	0,5							
Maximum heating circuit pressure	bar	6							
Water content	l	153	153	210	270	340	340	340	425
Methane gas consumption G20 (pow.sup. 20 mbar) at Qn	m³/h	12,16	14,80	22,63	29,61	36,80	40,18	47,58	58,15
Methane gas consumption G20 (pow.sup. 20 mbar) at Qmin	m³/h	3,70	3,70	5,29	6,87	9,52	9,52	12,16	13,22
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	8,93	10,87	16,61	21,73	27,01	29,50	34,93	42,69
Propane gas consumption (pow. sup. 37/50 mbar) at Qmin	kg/h	2,72	2,72	3,88	5,05	9,70	6,99	8,93	8,70
Chimney base maximum pressure available	Pa	100							
Max condensate production	kg/h	11,2	11,5	13,7	15,8	29,1	28,5	28,8	31,0
Emissions									
CO at maximum heat output with 0% of O2	mg/kWh	17,86	13,73	18,05	28,08	25,27	18,25	22,46	22,1
NOx at maximum heat output with 0% of O2	mg/kWh	53	54	43	53	49	50	48	50
NOx Class		6							
Electrical data									
Power supply voltage/frequency	V/Hz	230/50							
Fuse on the power supply	A (R)	6							
Protection rating	IP	X4D							
Room Temperature = 20°C									
(*) Temperature detected with appliance operation flow rate 80°C / ret. 60°C									
CO ₂ (min/max) See table "NOZZLES - PRESSURE"									
Seasonal energy efficiency to heat the room 2009/125 CEE (<=400Kw) η _s - see table ErP									
Heat loss in stand-by ΔT 30°C - P _{stb} - see table ErP									
Electricity consumption on standby - P _{sb} - see table ErP									

2.5.1 - TECHNICAL DATA ACCORDING ErP DIRECTIVE

		SPK	115	150	230	300	348	400	500	600
Element	Symbol	Unit								
Effective nominal output	P _{nomiale}	kW	112	136	209	274	341	371	442	540
Seasonal energy efficiency to heat the room	η _s	%	92	93	92	94	93	94	94	92
Season efficiency class to discharge			A	A	A	A	A	A	*	*
For CH only and combination boilers: useful heat output										
Useful Heat Output in high-temperature regime (Tr 60 °C / Tm 80 °C)	P ₄	kW	111,8	136,3	209,3	274,5	341,4	373,0	441,9	540,3
Useful efficiency at nom. heat output in high-temperature regime (Tr 60 °C / Tm 80 °C)	η ₄	%	87,6	87,8	88,1	88,3	88,4	88,4	88,5	88,5
Useful heat output at 30% of nom. heat output in low-temperature regime (Tr 30 °C)	P ₁	kW	37,0	45,2	68,8	91,5	113,2	124,0	147,1	175,7
Useful efficiency at 30% of nom. heat output in low-temperature regime (Tr 30 °C)	η ₁	%	96,6	97,0	96,6	98,1	97,7	98,0	98,2	96,0
Range-rated boiler: YES / NO			NO	NO	NO	NO	NO	NO	NO	NO
Auxiliary electricity consumption										
At full load	el _{max}	kW	0,190	0,190	0,195	0,210	0,270	0,425	0,555	0,590
At part load	el _{min}	kW	0,042	0,042	0,040	0,032	0,036	0,051	0,053	0,088
In stand-by mode	P _{SB}	kW	0,005	0,005	0,005	0,005	0,005	0,005	0,004	0,007
Other items										
Heat loss in stand-by	P _{stb}	kW	0,32	0,32	0,39	0,34	0,95	0,95	0,95	1,34
Emissions of nitrogen oxides ref. PCS	NO _x	Mg/kWh	53	53	51	53	49	50	48	50
Annual electricity consumption	Q _{HE}	GJ	349	424	653	844	1054	1148	1358	1694
Inside sound power level	L _{wa}	dB (A)	-	-	-	-	-	-	-	-
For CH & DHW production boilers										
Declared load profile			-	-	-	-	-	-	-	-
Energy efficiency in DHW production mode	η _{wh}	%	-	-	-	-	-	-	-	-
Daily electricity consumption	Q _{elec}	kWh	-	-	-	-	-	-	-	-
Daily fuel consumption	Q _{fuel}	kWh	-	-	-	-	-	-	-	-
Annual electricity consumption	AEC	kWh								
Annual fuel consumption	AFC	GJ								
Seasonal efficiency class in DHW production mode			-	-	-	-	-	-	-	-

* Appliances not covered by Directive 2009/15 / EC

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.

Before connecting the boiler, have professionally qualified personnel:

- a) Thoroughly wash all the piping of the system to remove any residues 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 bottle-necks, and that no exhausts from other appliances are inserted, unless the flue has been implemented to accommodate several utilities according to specific standards and regulations in force. Only after this check can the fitting between the boiler and chimney be mounted;



ATTENTION!

If there is dust and/or if there are aggressive/corrosive vapours present in the installation room, the appliance must be protected suitably and must be able to operate independently from the air in the room.



ATTENTION!

Mount the appliance respecting the minimum distances required for installation and maintenance.



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



NOTE!

Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

3.2 - STANDARDS FOR INSTALLATION

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



NOTE!

For further details relating to the standards, rules and regulations for safe installation of the thermal unit, refer to the section "Technical Information" on the boiler page of the www.unicalag.it website

3.3 - PREVENTIVE VERIFICATION AND VERIFICATION AND ADJUSTMENT OPERATIONS

Before installing this appliance on old systems, check that:

- The chimney is suitable for appliances with condensation, combustion products temperature, and built in compliance with the standards in force in this regard.
 - Is as straight as possible, airtight and insulated, and has no obstructions or constructions.
- The chimney is equipped with a fitting to drain condensate.
- The boiler room is equipped with a duct to drain condensate produced from the boiler.
- The electrical system has been set up by a qualified techni-

cian in compliance with the rules in force.

- The rate, head and direction of the flow of the circulation pumps are appropriate.
- The fuel adduction line and the tank, if any, are made according to relevant standards in force.
- The expansion vessels can fully absorb dilation of the fluid in the system.
- The system has been cleaned from sludge and scaling.

If it is possible to program replacements, you must provide for intervention with protective washing equipped with basic dispersant.

Washing must be carried out four weeks prior to replacement, with the system operating at 35°C - 40°C

Attention! If the new boiler was replaced in an old system without having provided for the aforementioned washing cycle, do not start the system since any product residues in the circuit can, after replacement, fill the generator with residues. It is recommended to contact a specialised company for water treatment.



NOTE!
Further details in the section
“Technical Information” on the boiler
page of the www.unicalag.it website

3.4 - PACKAGING



Check integrity of the content.



Keep the packaging material (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 above instruction.

SPK	P depth (mm)	L width (mm)	H height (mm)	Net Weight (kg)	Weight Packaging (kg)
115	1042	780	2010	347+60*	15** + 20***
150	1042	780	2010	347+60*	15** + 20***
230	1232	1120	2200	399+80*	43** + 30***
300	1495	1120	2393	459+90*	57** + 30***
348	1495	1120	2393	610+106*	57** + 30***
400	1495	1120	2393	610+106*	57** + 30***
500	1495	1120	2393	610+106*	57** + 30***
600	1520	1120	2500	755+120*	59** + 35***

(*) casing - (**) pallet - (***) cardboard

As well as the appliance, the packaging contains:

Pouch with the following documentation:

- Manager operating instructions booklet
- Instruction booklet for the installer and maintenance engineer
- BCM instructions booklet
- Warranty
- 2 Spare parts form
- Certificate of conformity
- Testing certificate
- Gas conversion label

Accessories box containing:

- 5 bends + a T + a plastic condensate draining cap
- External probe
- Storage tank probe
- Cables output sheet metal
- SHC multifunction kit module
- Condensate drain siphon pipe 1 m.

3.4.1 - HANDLING



The boiler must be handled by lifting it from the holes on the upper plate or using a transpallet.



OBLIGATION!
wear protective gloves

- Only transport the boiler using appropriate transport equipment
- Protect all parts against impacts if they are to be transported.
- Follow the transport instructions on the packaging.

3.5 - POSITIONING IN THE BOILER ROOM

Special attention must be paid to the standards and local laws with regard to boiler rooms, especially the minimum distances that must be kept free around the boiler.

Installation must comply with the provisions in the most recent standards and laws in force with regard to boiler rooms, installation of heating systems and domestic hot water production, ventilation, suitable chimneys to drain combustion products from condensate boilers and anything else applicable.

When choosing the place of the installation of the appliance, follow the safety instructions below:

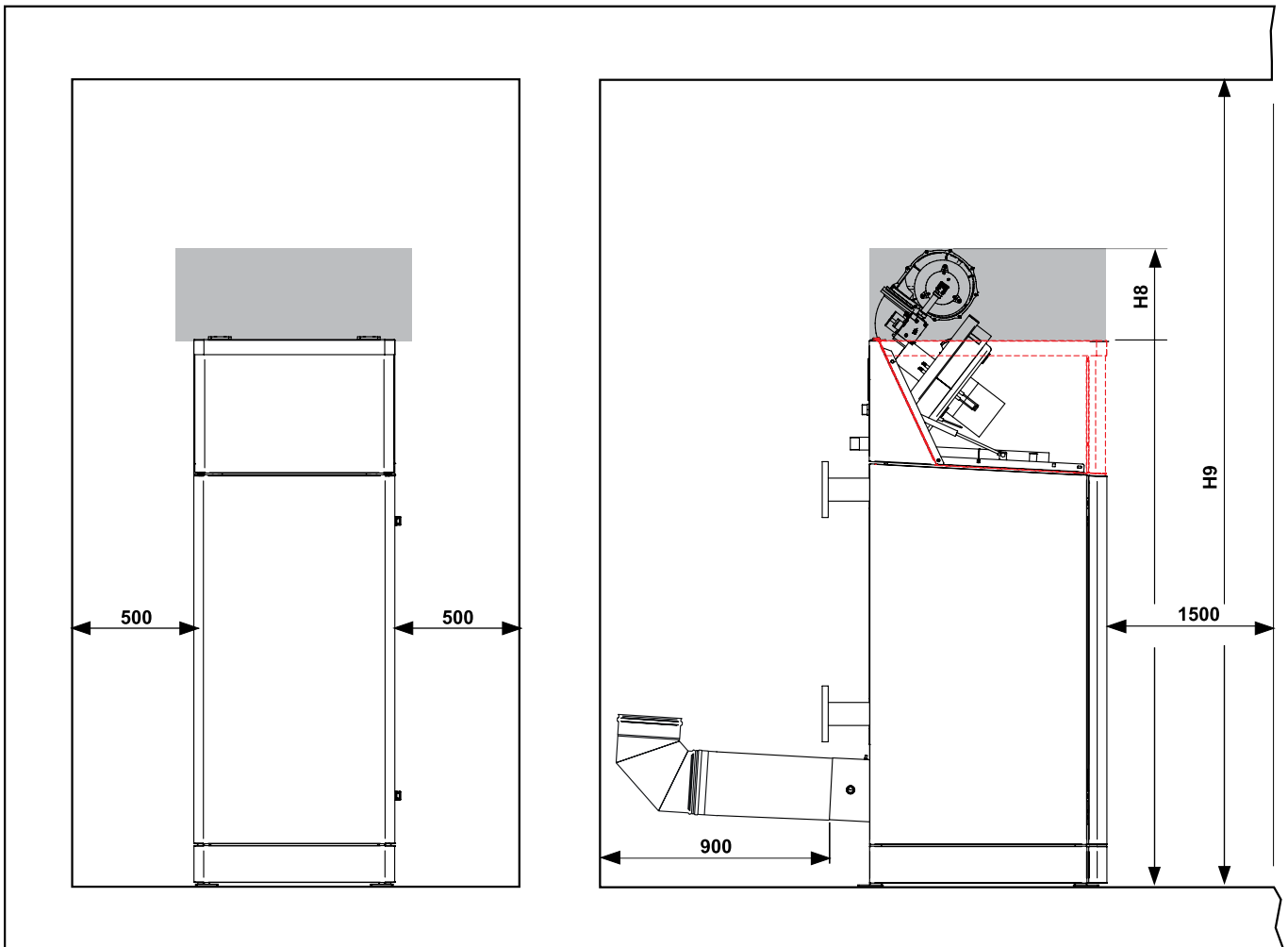
- Place the appliance in rooms protected from frost.
- Avoid installation in rooms with a corrosive or very dusty atmosphere.



Comply with the minimum overall dimension distances in order to execute normal maintenance and cleaning operations.

SPK	CLEARANCE	
	H8 (*)	H9
115	2109	2300
150	2109	2300
230	2147	2500
300	2366	2500
348	2690	3000
400	2690	3000
500	2690	3000
600	2770	3000

(*) Space for combustion chamber opening



3.6 - FLUE GAS EXHAUST PIPE CONNECTION

To connect the flue gas exhaust pipe, local and national standards must be observed

In the event the boiler is replaced, ALWAYS replace the flue gas pipe as well.

The boiler is type approved for the exhaust configurations listed below:

B23P	<p>ATTENTION For this type of connection, the room follows the same installation rules for boilers with natural draught.</p>
<p>Connection to a combustion products evacuation pipe outside the room; the combustion air is taken directly from the room where the appliance is installed.</p>	

C63	<p>ATTENTION With C63 configurations, you must order the optional air intake kit, which contains the installation instructions.</p>
<p>Separate combustion air intake and combustion products evacuation pipes. (Commercial accessories)</p>	

HEAD AVAILABLE AT THE BASE OF THE CHIMNEY	
D (Drain)	I (Intake)
$\Delta p = 100 \text{ Pa}$	-

The maximum permitted length of the pipes is determined by head (Δp) available at the base of the chimney.

HEAD AVAILABLE AT THE BASE OF THE CHIMNEY	
D (Drain)	I (Intake)
$\Delta p = 100 \text{ Pa}$	$\Delta p = 40 \text{ Pa}$

The maximum permitted length of the pipes is determined by head (Δp) available at the base of the chimney.

	<p>ATTENTION: for B23P types of connection, the room follows the same installation rules for natural draught boilers.</p>
--	---

	<p>NOTE! Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website</p>
--	---

	<p>ATTENTION: The flue must comply with the standards in force.</p>
--	--

Technical features and dimensions

3.7 - CONNECTION

SPK	CONNECTIONS						
	G Gas Inlet [Inch]	M Flow [PN16 - DN]	R Return [PN16 - DN]	A Air intake [Ø mm]	S Flue gas exhaust fm [Ø mm]	Sm Air vent connec- tion [Inch]	Sc Condensation drain [Ø mm]
115	1"	65	65	150	200 (*)	1"	DN 40
150	1"	65	65	150	200 (*)	1"	DN 40
230	1" ¼	65	65	250	250	1" ¼	DN 40
300	1" ¼	80	80	250	250	1" ½	DN 40
348	1" ½	80	80	250	300	1" ½	DN 40
400	1" ½	80	80	250	300	1" ½	DN 40
500	1" ½	80	80	250	300	1" ½	DN 40
600	1" ½	100	100	250	300	1" ½	DN 40



Danger!

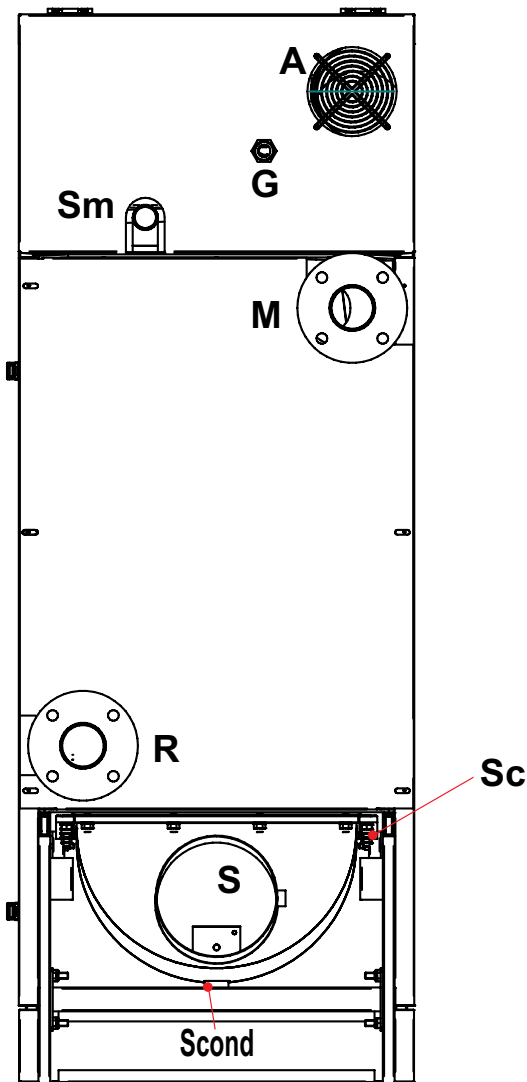
The gas connection must be carried out only by a qualified installer who must respect and apply that foreseen by relevant laws in force in the local prescriptions of the supply company. Incorrect installation can cause damage to persons, animals and objects for which the manufacturer cannot be held responsible.



If you smell gas:

- Do not operate electric switches, the telephone or any other object that may cause sparks;
- Immediately open doors and windows to create air current to purify the room;
- Shut the gas cocks.

Sc	BOILER DRAIN
S.cond	CONDENSATION DRAIN
	<p>SAFETY VALVE DRAIN</p> <p>Provide a drain pipe with funnel and a trap that lead to a suitable drain, in correspondence with the drain</p> <p>This drainage must be controlled on sight.</p> <p>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.</p>



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 above instruction.



The mains pressure must be within 0.5 and 6 bar (in the event of greater pressure install a pressure reducer).



To fill the system, you must provide a filling valve on the heating circuit, or use the optional accessories.



The boiler is equipped with its own draining valve, **Sc**. This valve can never be used to drain the system since all the dirt in the system can accumulate in the boiler and jeopardise its proper operation. Therefore, before using the drain valve, make sure the system's check valve, which is situated under the pump, has been closed.

The system must be equipped with its own drain valve, which is to be suitably sized according to the system's capacity.

Condensation drain

The boiler, during the combustion process, produces condensation that, through pipe "A", flows into the trap. The condensation that forms inside the boiler flows into a suitable drain via pipe "B".

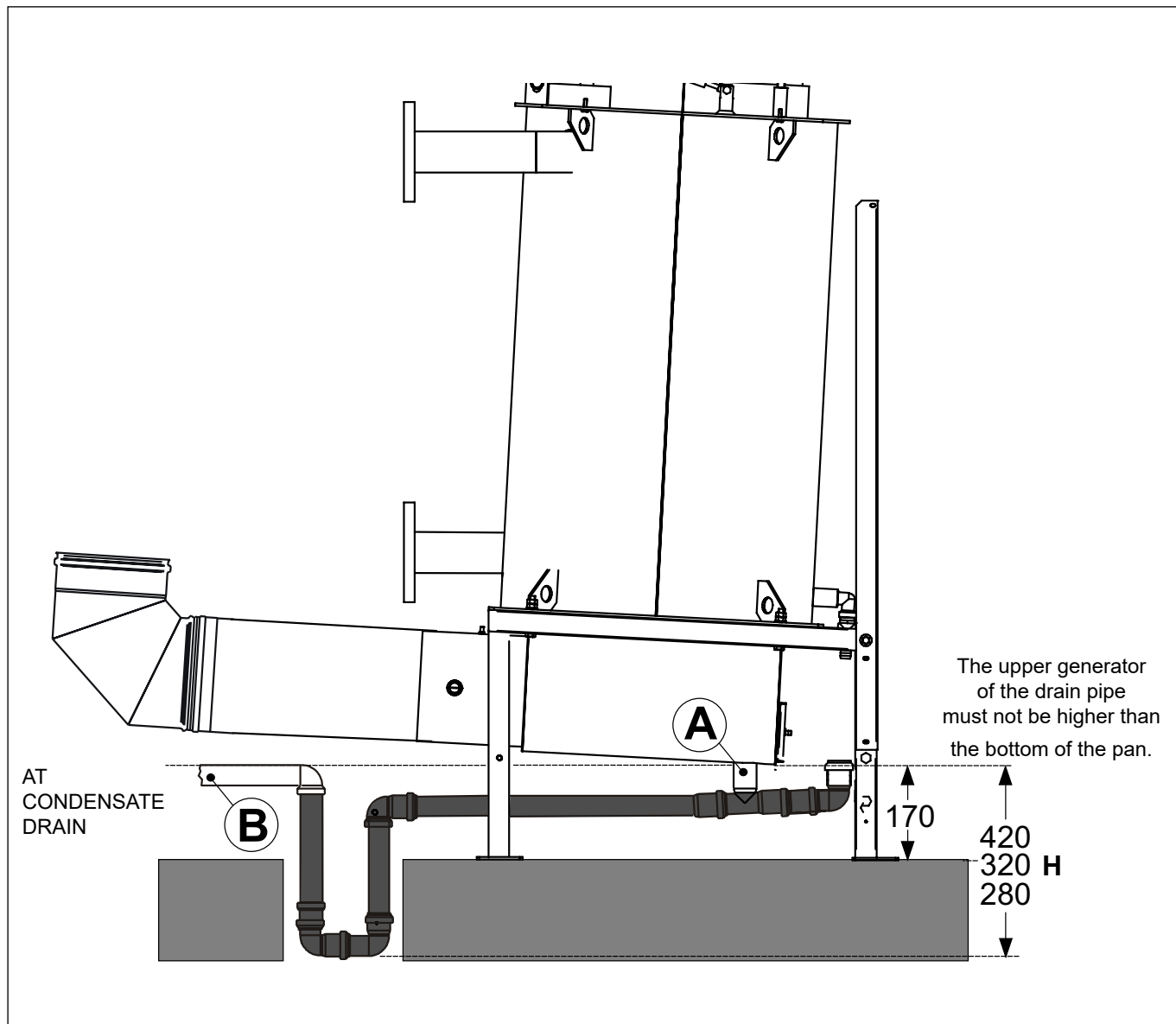


Danger!

Before commissioning the appliance:

- check that the trap is assembled of the siphon (* H = XXX mm)
- fill the trap and check that the condensation is drained properly

If the appliance is used with an empty condensation drain trap, there is an intoxication hazard due to the release of exhaust gasses.



Technical features and dimensions

H = Siphon head
Capacity conditions 0 and Max Fan Head

SPK 115 - 150 - 230	= 420 mm
SPK 300	= 320 mm
SPK 348 - 400 - SPK 500 - SPK 600	= 280 mm



If you do not want to or cannot create a basement, the boiler can be mounted at ground level and a bulb holder 250 mm deep can be made to house the siphon.



The connection between the appliance and the domestic waste system must be made in compliance with the specific reference standards.



NOTE!
Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

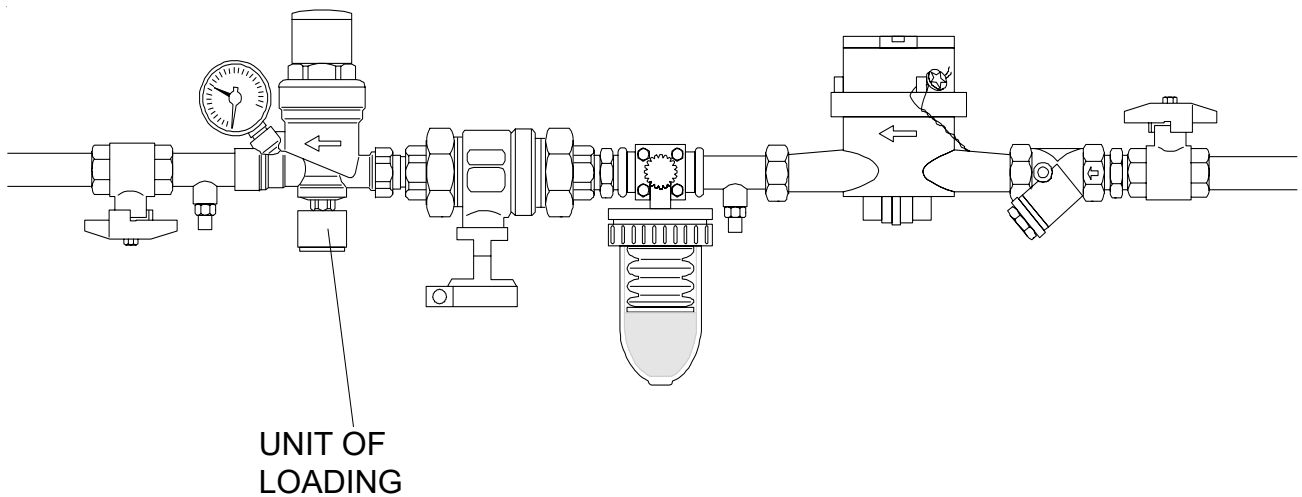
3.8 - FILLING AND EMPTYING THE SYSTEM



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

To fill the system, you must provide a filling valve on the system's return.

EXAMPLE OF THE SYSTEM'S LOADING UNIT



3.9 - ELECTRICAL CONNECTIONS

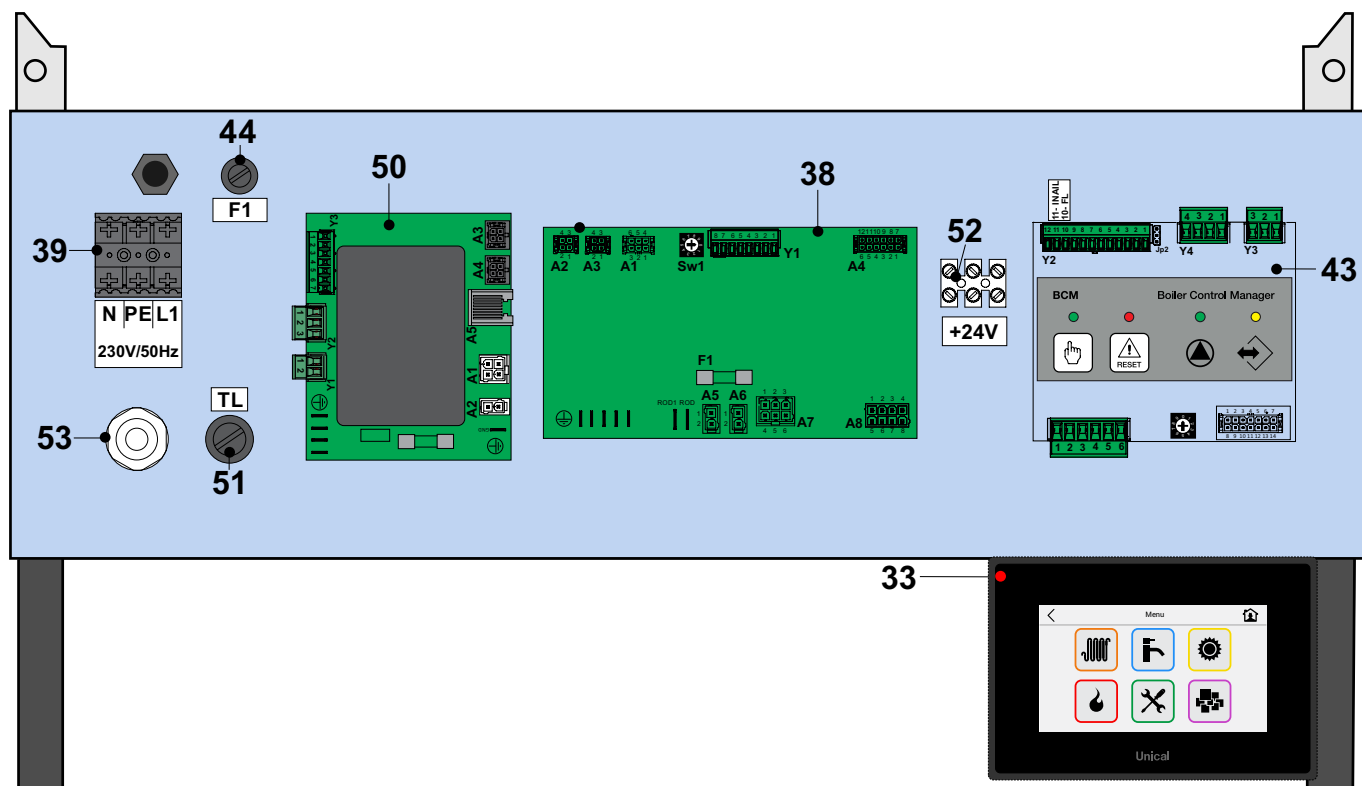
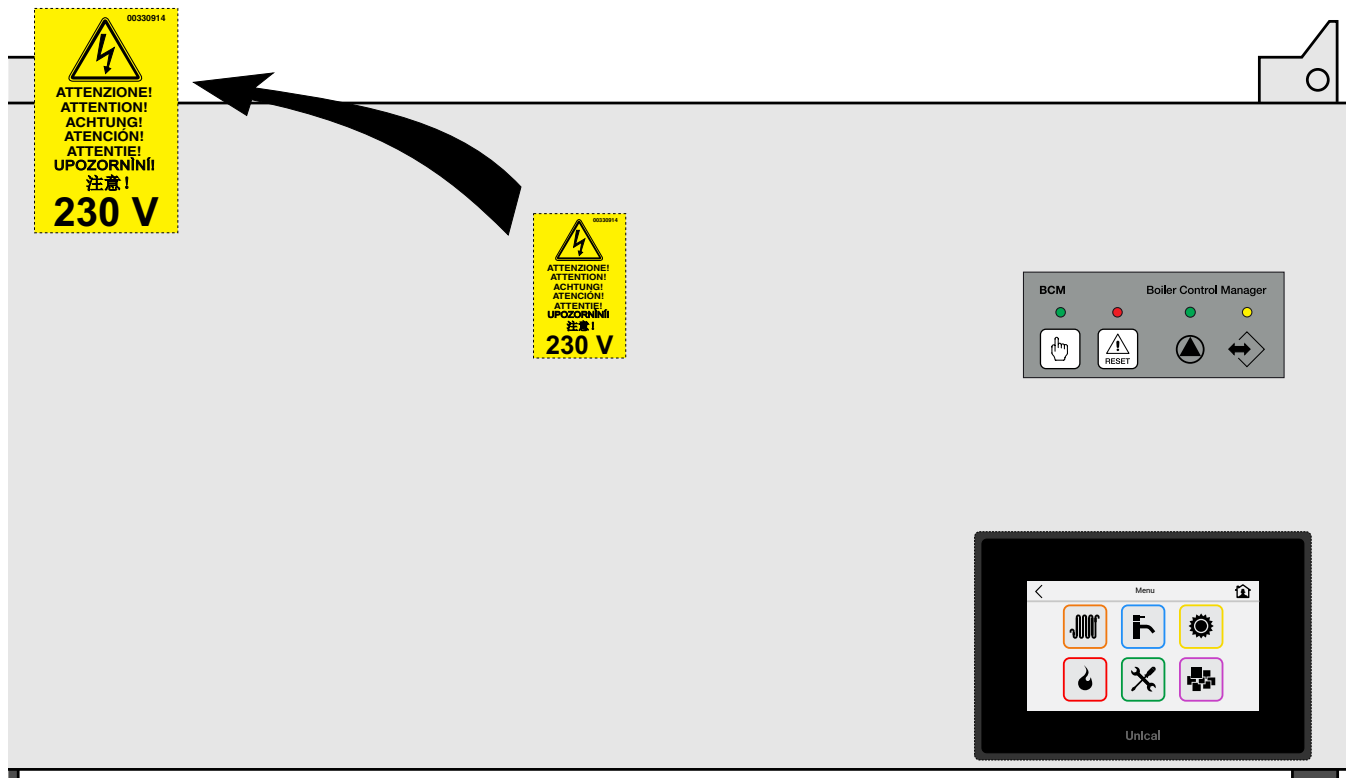


Danger! Only a qualified technician may perform the electrical installation. Before performing connections or any type of operation on electrical parts, always disconnect electrical power and make sure that it cannot be reconnected accidentally.



To access the panel, remove the indicated screws

Note: The panel shown referred to 115 - 150 model. For all other models the Ufly thermoregulator is in line with the BCM.



Technical features and dimensions

KEY		
No.		Description
33		Ufly P standard heating controller
38	BMM	Burner management board
39	M1	230 V Power Supply Terminals
43	BCM	Boiler controller

44	F1	Power supply fuse 4 ÷ 6.3 A
50		Power supplier board
51	TL	Manually resettable limit thermostat
52	M2	Supplementary terminal +24V BCM
53		Power supply cable gland



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.

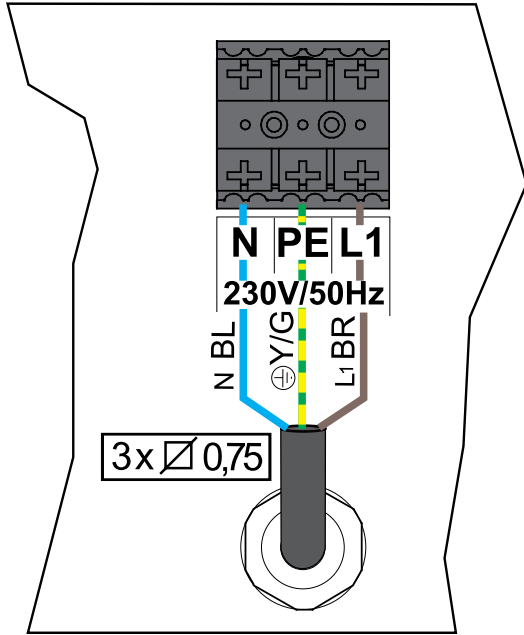


Electrical connection to the main power supply
This connection must be made up to standard, as required the regulations in force.



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.

Electric power supply connection



ATTENTION!

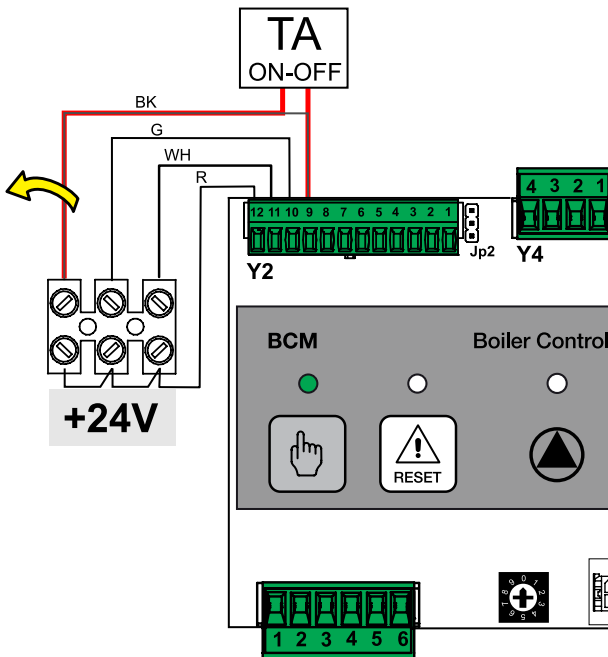
Size of power supply cables according to the boiler's power, thus of absorbed current, according to standards.
See Chap. 4.5, the ammeter capacity, indicated for each model of SPK, (main protective fuses).
3 X 0.75, is the minimum section to use on boilers SPK 150 / 230 / 300.



ATTENTION!

Comply with the PHASE and NEUTRAL polarity since flame detection is Phase Sensitive.

TA connection (*)



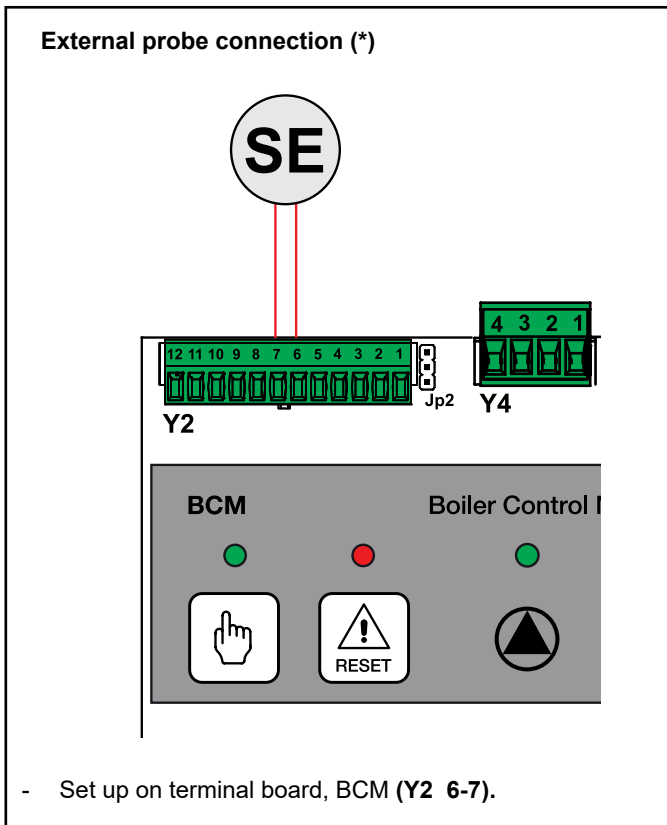
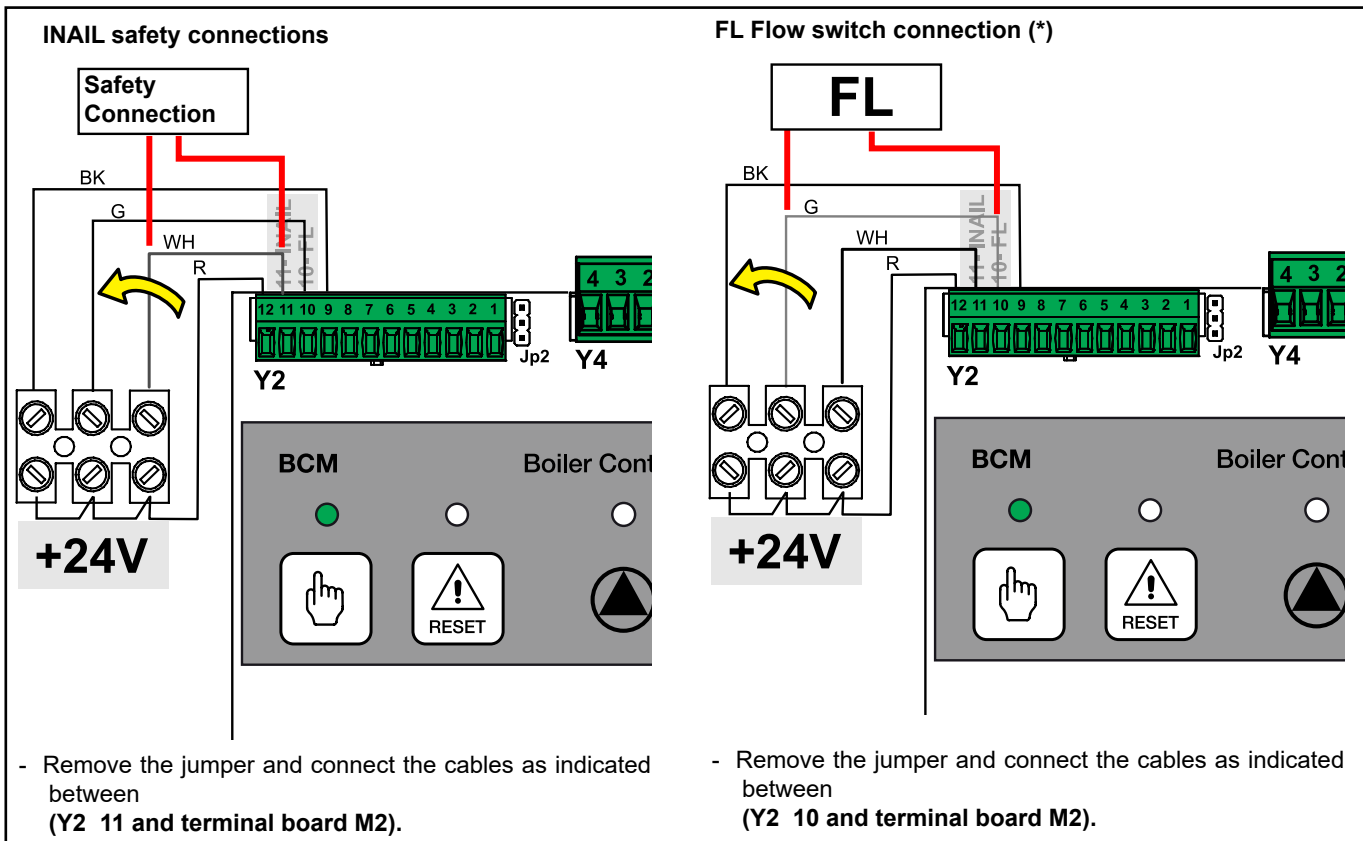
ATTENTION:
The 230 V cables must run far apart from 24V cables.



NOTE!
Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

- (Y2 - 9 and terminal board M2) after removing the jumper.

(*) Optional



**NOTE:**

The boiler is set up for direct flow and storage tank management.

If **Stemp. ACC** is connected automatically, DHW is activated, which will have priority management with regard to direct flow through the pumps shown below.

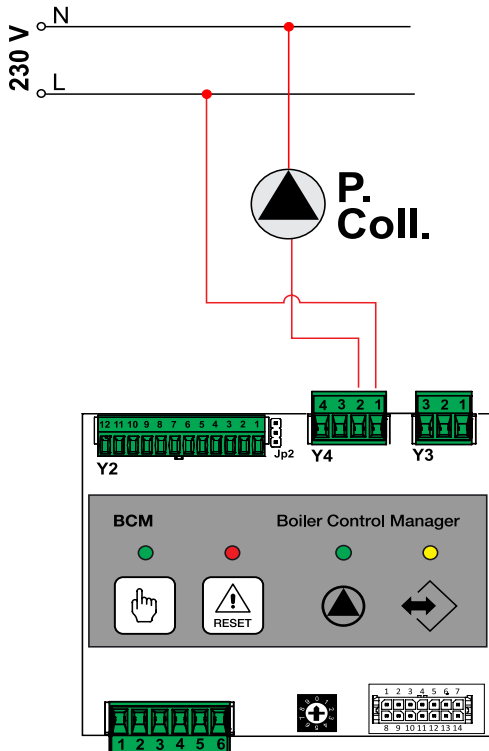
Should additional services be requested (storage

tanks, mixed areas, solar, etc), you must purchase **SHC** multi-function modules to connect to the local bus for total management through **HSCP** (and **UFLY**) heating controller.

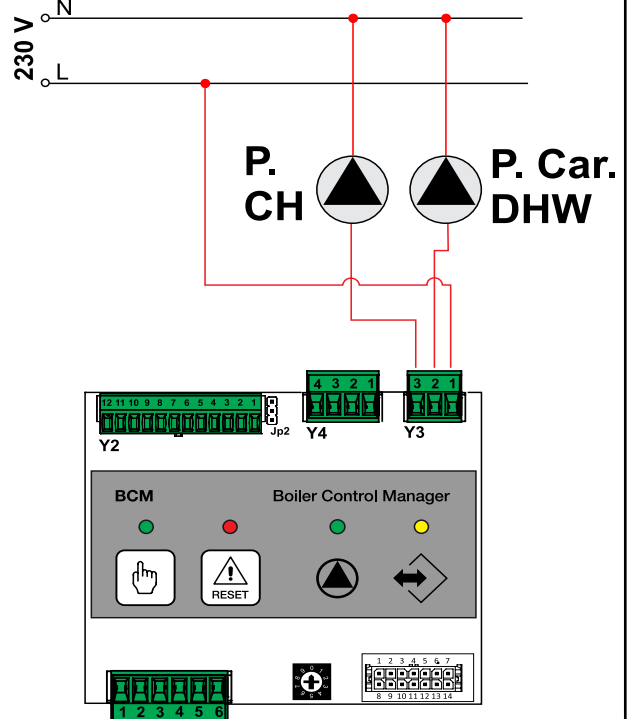


BCM relay contacts support pumps with max. 4A absorption.

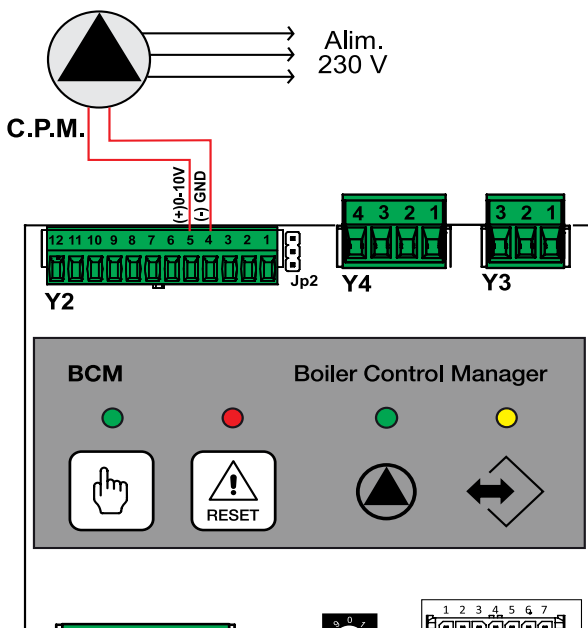
(*) **Optional**

P. Coll. - Collector Pump (*) (Primary ring)

- Connect the cables as indicated Y4.

**P. CH - Heating Pump (heating circuit)
P. Car DHW - Storage tank loading pump**

- Connect the cables as indicated Y3 1-2-3

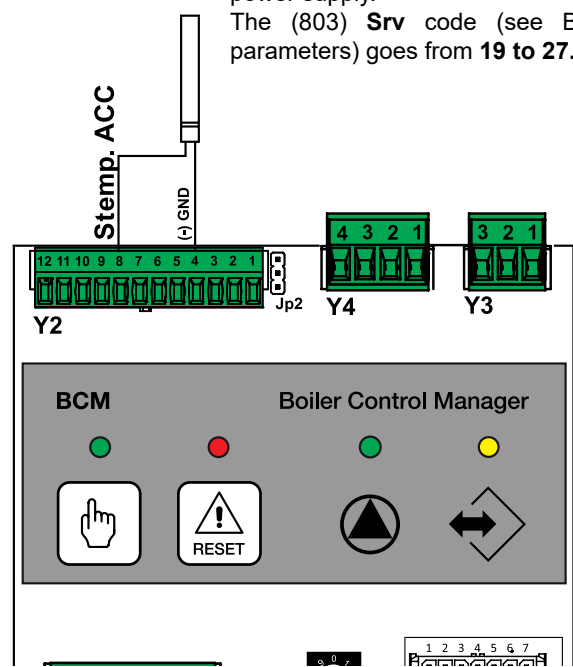
P. Mod. - Modulating Heating Pump (*)**P. Mod.**

- Connect the modulation control cables as indicated (Y2 4-5).
External 230 V-50 Hz power supply.

Stemp. ACC. Storage Tank Temperature Sensor (*)

If the storage tank temperature sensor is connected, DHW service is automatically activated on boiler power supply.

The (803) **Srv** code (see BCM parameters) goes from **19 to 27**.



- Connect the temperature sensor cables as indicated (Y2 4-8).

3.10 - COMMISSIONING



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 aforesaid instructions. Before commissioning the boiler, check that:

does the installation meet the specific standards and regulations in force, both relating to the gas part as well as the electrical part?	<input type="checkbox"/>
do the combustion air intake and flue gas exhaust take place properly according to what is defined by the specific rules and regulations in force?	<input type="checkbox"/>
is the fuel supply system sized according to the capacity required by the boiler? Is it equipped with all safety and control devices required by the standards in force?	<input type="checkbox"/>
is the power supply of the boiler 230V - 50Hz?	<input type="checkbox"/>
has the system been filled with water (approximately 0.8/1 bar pressure on the pressure gauge with the pump stopped)?	<input type="checkbox"/>
Has the condensation drain trap been filled with water as indicated in chapter 3.7?	<input type="checkbox"/>
are any system shut-off gate valves open?	<input type="checkbox"/>
does the gas to be used correspond to the boiler calibration gas?: otherwise, perform the boiler conversion in order to use the gas available (see section: 4.3"); this operation must be carried out by technical staff qualified in compliance with the standards in force;	<input type="checkbox"/>
is the gas supply valve open?	<input type="checkbox"/>
has the system been checked for gas leaks?	<input type="checkbox"/>
is the outside main switch ON?	<input type="checkbox"/>
is the system safety valve efficient and is it connected to the drains? is the condensation drain trap connected to the drains?	<input type="checkbox"/>
has the system been checked for water leaks?	<input type="checkbox"/>
are the ventilation conditions and minimum distances to perform any maintenance ensured?	<input type="checkbox"/>
have the GAS and HEATING pipes been cleaned thoroughly with products suitable for each circuit? have GAS and HEATING circuits been tested?	<input type="checkbox"/>
has a surveillance and protection system against gas leaks been installed? (Optional)	<input type="checkbox"/>
are the system pipes NOT used as the electrical system earthing?	<input type="checkbox"/>
has the system been sized properly bearing in mind the radiator pressure drops? thermostatic valves, radiator stop valves	<input type="checkbox"/>
has the operator been trained and has the documentation been supplied?	<input type="checkbox"/>
Please tick the operations performed	

Technical features and dimensions



Recommendations for using the generator on the first day of operation.
Operate the burner at minimum capacity or, if this is not possible, cause frequent stops to gradually warm the fibre and obtain its "cooking".



Switching boiler on and off

NOTE!
Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

3.11 - MEASUREMENT OF THE COMBUSTION EFFICIENCY DURING INSTALLATION Generator Menu

3.11.1 - CALIBRATION FUNCTION (CHIMNEY SWEEP)



ATTENTION!
Function reserved for After Sale
Service Centres only.



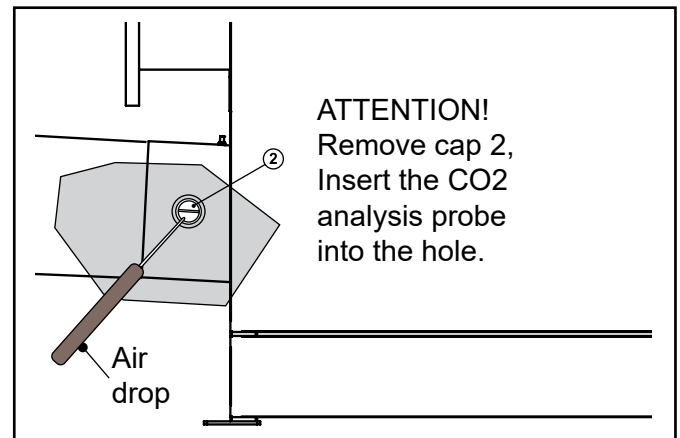
ATTENTION!
These functions are explained in
chapter 2.9 (Burner menu) of the
Ufly P. TOUCH CONTROL instal-
lation and maintenance manual.

3.11.2 - POSITIONING THE PROBES

To determine the combustion efficiency
one must make the following measurements:

- measurement of the combustion air temperature
- measurement of the flue gas temperature and content of CO₂ taken in the relevant hole 2.

Take the measurements with the generator in steady state conditions (see par. 3.11.1).



3.12 - ADJUSTING THE BURNER



All boilers leave the factory already calibrated and tested, however, in the event gas valve recalibration is required (MODULE 1, MODULE 2)



The following instructions are intended exclusively for **authorised service personnel**.

- Remove the cap and insert the CO₂ analysis probe in the flue gas sample point of the intake/exhaust terminal, see chap. 3.11.2.

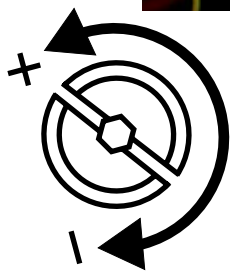
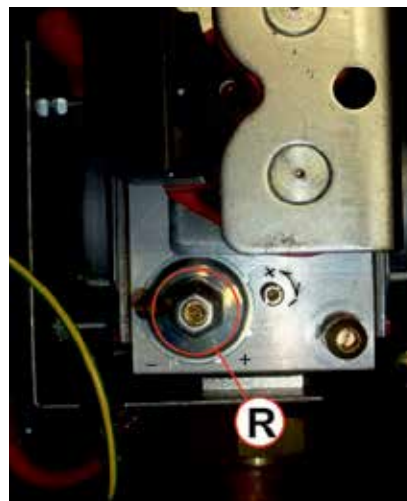
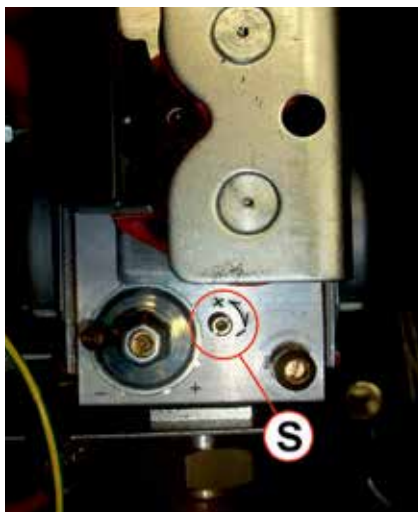
SPK 150

1) Maximum output adjustment

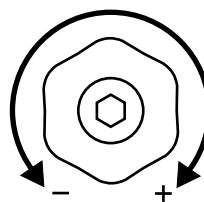
- Operate the boiler in “calibration” mode at MAXIMUM OUTPUT (see 3.11.1)
- Once the burner is on check that the “MAXIMUM” CO₂ output value corresponds to that indicated in the table “NOZZLES - PRESSURE”.
- If necessary, adjust the value by turning the “S” adjustment screw CLOCKWISE to decrease it and ANTICLOCKWISE to increase it (see table NOZZLES-CAPACITY-PRESSURE).

2) Minimum output adjustment

- Operate the boiler in “calibration” mode at MINIMUM OUTPUT (see 3.11.1)
- Once the burner is on, check that the “MINIMUM” CO₂ output value corresponds to what is indicated in the table “NOZZLES - PRESSURE”.
- If necessary, adjust the value by turning (with a 2.5 mm hex key) screw “R” CLOCKWISE to increase it, ANTICLOCKWISE to decrease it (see table NOZZLES-CAPACITY-PRESSURE).



(S)
ADJUSTMENT SCREW
MAXIMUM OUTPUT



(R)
ADJUSTMENT SCREW
MINIMUM OUTPUT

SPK 230 - SPK 300 - SPK 400 - SPK 500 - SPK 600

1) Maximum output adjustment

- Operate the boiler in "calibration" mode at MAXIMUM OUTPUT (see 3.11.1)
- Once the burner is on check that the "MAXIMUM" CO2 output value corresponds to that indicated in the table "NOZZLES - PRESSURE".
- if it does not correspond, correct it by turning screw "S" CLOCKWISE to increase it, ANTICLOCKWISE to decrease it. (see table NOZZLES-CAPACITY-PRESSURE).

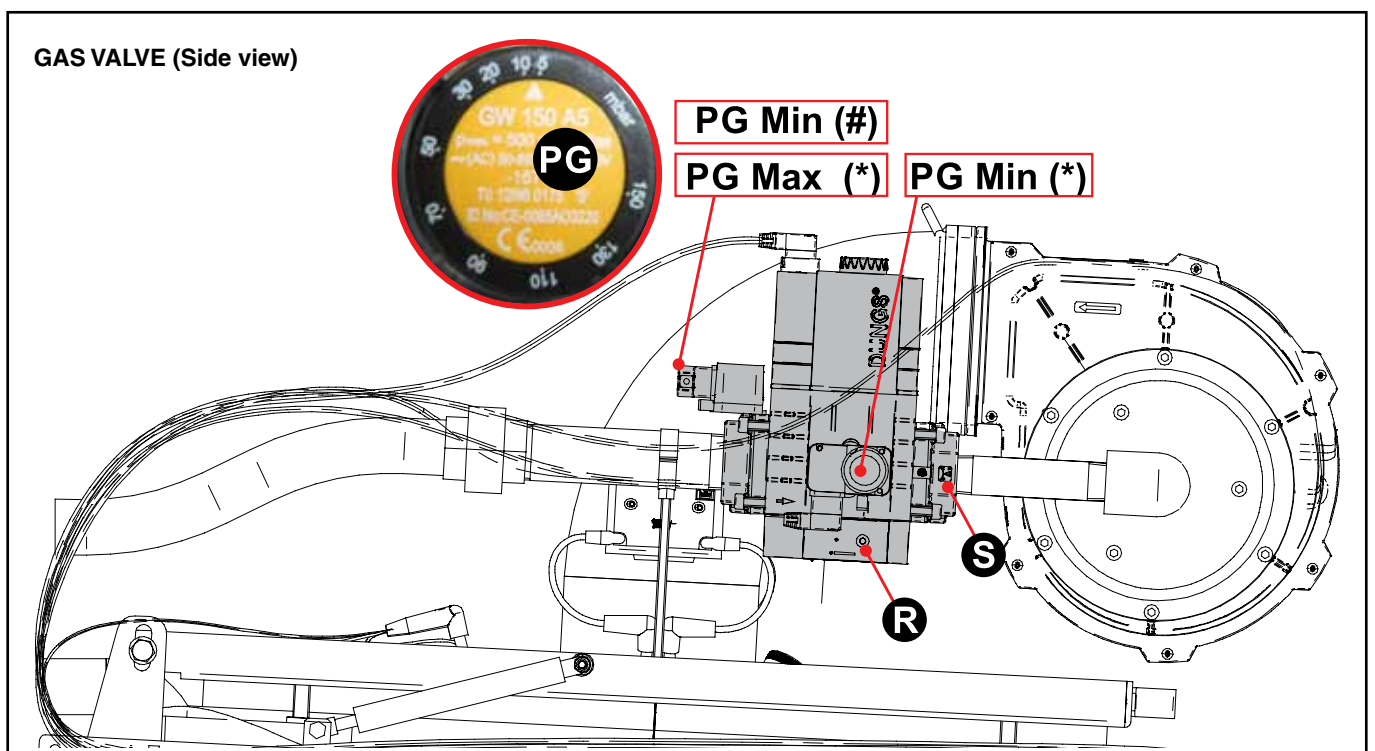
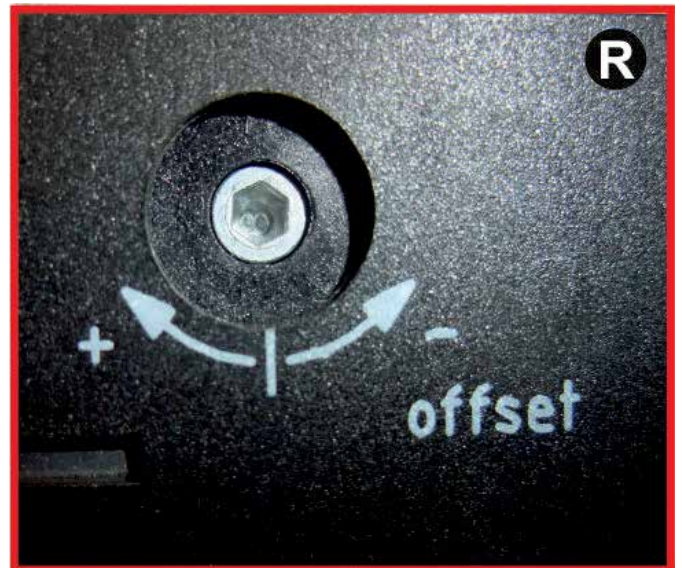
2) Minimum output adjustment

- Operate the boiler in "calibration" mode at MINIMUM OUTPUT (see 3.11.1)
- Once the burner is on, check that the "MINIMUM" CO2 output value corresponds to what is indicated in the table "NOZZLES - PRESSURE".
- If necessary, adjust the value by turning (with a 2.5 mm hex key) screw "R" CLOCKWISE to increase it, ANTICLOCKWISE to decrease it (see table NOZZLES-CAPACITY-PRESSURE).

(R) MINIMUM OUTPUT ADJUSTMENT SCREW



(S) MAXIMUM OUTPUT ADJUSTMENT SCREW

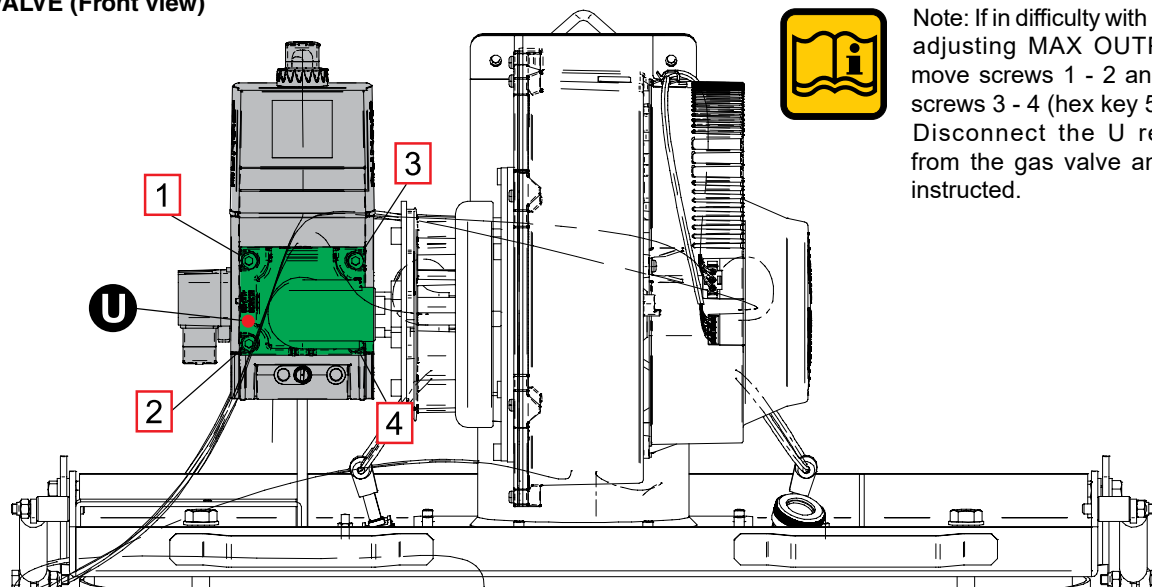


PG = GAS PRESSURE SWITCH

(*) PG Max and PG Min - only for SPK 348 / 400 / 500 / 600

(#) PG Min 230 / 300

GAS VALVE (Front view)



Note: If in difficulty with regard to adjusting MAX OUTPUT, remove screws 1 - 2 and loosen screws 3 - 4 (hex key 5 mm). Disconnect the U regulator from the gas valve and do as instructed.



(*)

Adjust VG Shutter Opening to the values indicated (see table NOZZLES-PRESSURE-CAPACITY) by means of screw S.

GPL xx mm (*)
G 20 xx mm (*)

3) Conclusion of the basic calibrations

- once the CO₂ values at minimum and maximum output have been checked and any adjustments have been made (sections 1-2):
- disable the timed "calibration" function by switching off the main switch.
- close the flue gas inspection sample points of the intake and exhaust terminal
- check that there are no gas leaks.



For proper operation, the CO₂ values must be calibrated with particular attention, observing the values indicated in the table.



If the capacity read is too low, make sure the power supply system and drain (power supply and drain pipes) are not clogged.

If they are not clogged, make sure the burner and/or heat exchanger is not dirty.

NOZZLES - PRESSURE - FLOW RATES TABLE

SPK 115								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	9	NO	37	85	9,1	9,1	50
Propane (G31)	37	9	NO	38	80	10,4	10,6	50

SPK 150								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	9	NO	31	99	9,1	9,1	50
Propane (G31)	37	9	NO	31	94	10,5	10,5	50

SPK 230								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	15	6,0	32	86	9,1	9,1	35
Propane (G31)	37	15	2,5	32	82	10,5	10,5	35

SPK 300								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	15	9,0	32	83	9,1	9,1	45
Propane (G31)	37	15	3,0	32	81	10,5	10,5	45

SPK 348								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	18		34	67	9,1	9,1	45
Propane (G31)	37	18		34	64	10,7	10,8	45

SPK 400								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	18	12,3	32	76	9,1	9,1	45
Propane (G31)	37	18	6,0	36	69	10,8	10,8	45

SPK 500								
Type of Gas	Supply Press.	Ø Noz-zlesi (mm)	Opening VG Shutter (mm)	Fan speed		CO ₂ levels		Furnace power
	[mbar]			min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Nat. gas (G20)	20	18	18,3	32	88	9,1	9,1	35
Propane (G31)	37	18	6,3	33	83	10,8	10,8	35

SPK 600								
Type of Gas	Supply Press.	Ø Noz- zlesi	Opening VG Shutter	Fan speed		CO ₂ levels		Furnace power
	[mbar]	(mm)	[mm]	min	max	[%]		[%]
				FL [% FU]	FH [% FU]	min	max	IG
Gas nat. (G20)	20	20	21	29	88	9,1	9,1	35
Propano (G31)	37	18	6,3	30	92	10,7	10,7	35

4

INSPECTION AND MAINTENANCE



ATTENTION
before opening the combustion chamber,
cool the fibre.



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



Inspections and maintenance performed professionally and according to a regular schedule, as

4.1 - 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.

If a component needs to be replaced:

- Disconnect the appliance from the electrical mains and make sure that it cannot be reconnected accidentally.
- Close the gas shut-off valve upstream the boiler.
- If needed, and depending on the intervention to be carried out, close any shut-off valves on the flow and return line of the heating system, as well as the cold water inlet valve.

Once all maintenance operations are complete resume boiler operation

- Open the heating flow and return pipes, as well as the cold water inlet valve (if closed previously).
- Vent and, if necessary, restore the heating pressure until reaching a pressure of 0.8/1.0 bar.
- Open the gas shut-off valve.
- Switch the boiler on
- Make sure the appliance is gas tight and watertight.

TABLE OF RESISTANCE VALUES, ACCORDING TO THE TEMPERATURE OF THE HEATING PROBES 11 (SR) AND ANY DOMESTIC HOT WATER PROBES 1 (SS) AND HEATING RETURN PROBE 22 (SRR) see par. 4.5.

T°C	0	1	2	3	4	5	6	7	8	9
0	32755	31137	29607	28161	26795	25502	24278	23121	22025	20987
10	20003	19072	18189	17351	16557	15803	15088	14410	13765	13153
20	12571	12019	11493	10994	10519	10067	9636	9227	8837	8466
30	8112	7775	7454	7147	6855	6577	6311	6057	5815	5584
40	5363	5152	4951	4758	4574	4398	4230	4069	3915	3768
50	3627	3491	3362	3238	3119	3006	2897	2792	2692	2596
60	2504	2415	2330	2249	2171	2096	2023	1954	1888	1824
70	1762	1703	1646	1592	1539	1488	1440	1393	1348	1304
80	1263	1222	1183	1146	1110	1075	1042	1010	979	949
90	920	892	865	839	814	790	766	744	722	701

Relation between the temperature (°C) and the nom. resistance (Ohm) of the heating probe SR and of the domestic hot water probe SS

Example: At 25°C, the nominal resistance is 10067 Ohm At 90°C, the nominal resistance is 920 Ohm

ROUTINE YEARLY VERIFICATION OPERATIONS		
COMPONENT:	VERIFY:	CONTROL/INTERVENTION METHOD:
VG (Gas valve) (3)	Does the valve modulate properly?	The check is carried out in "Calibration" mode, requesting 100% , 50%, and minimum modulation percentage. Check the modules flame.
SM (flow sensor) (11)	Do the sensors maintain the original characteristics?	12571 ohm at 20° C / 1762 ohm at 70° C. Measurement to be taken with the wires disconnected (see table Res/Temp).
E ACC (ignition electrode (28)	Does the discharge of sparks before putting the boiler in safe conditions last less than 3 sec.?	Detach the electrode ionisation wire and check the securing time.
TL (anti-overheating limit thermostat) (10) (51) (Chap.3.9)	Does the TL put the boiler in safety conditions when overheating?	Heat the TL until it intervenes at 102°C and check that it intervenes at 102°.
Condensation drain trap (27)	Has the trap got deposits on the bottom?	Clean the trap with water.
Heat exchanger body	If SL places the boiler in safety mode in the event of condensate level increases If PF places the boiler in safety mode in the event of flue gas exhaust clogging	Check/Remove any deposits in the combustion chamber using a vacuum cleaner, then wash the heat exchanger body with water and check proper draining of the smoke chamber and siphon / remove any obstructions from the flue gas side.
Burner (5)	Check the state of cleanliness of the burner mesh	Remove any deposits using compressed air, blowing from the mesh side.
(Num) = see key Par. 2.2		

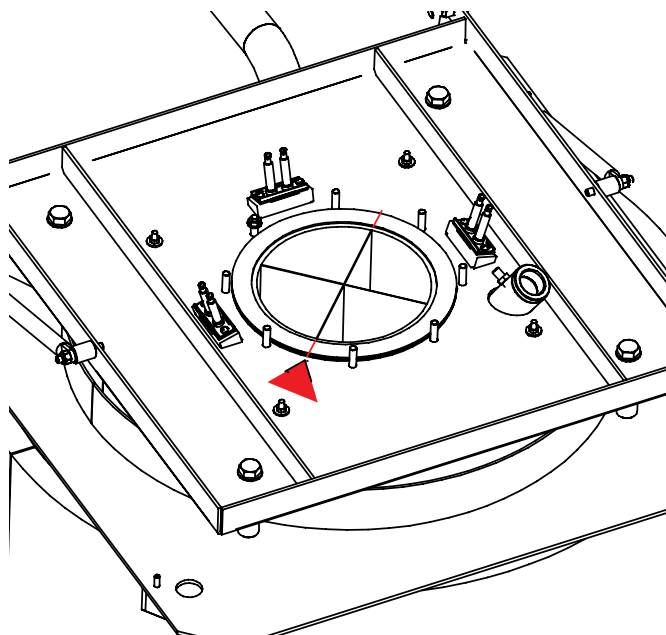
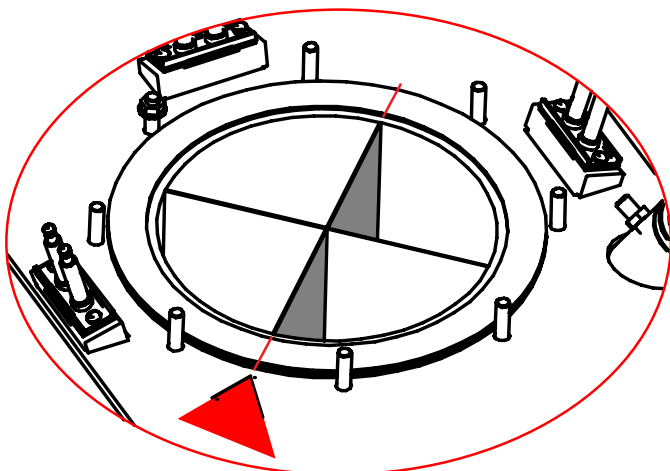
POSITIONING AND REASSEMBLING THE BURNER



ATTENTION:

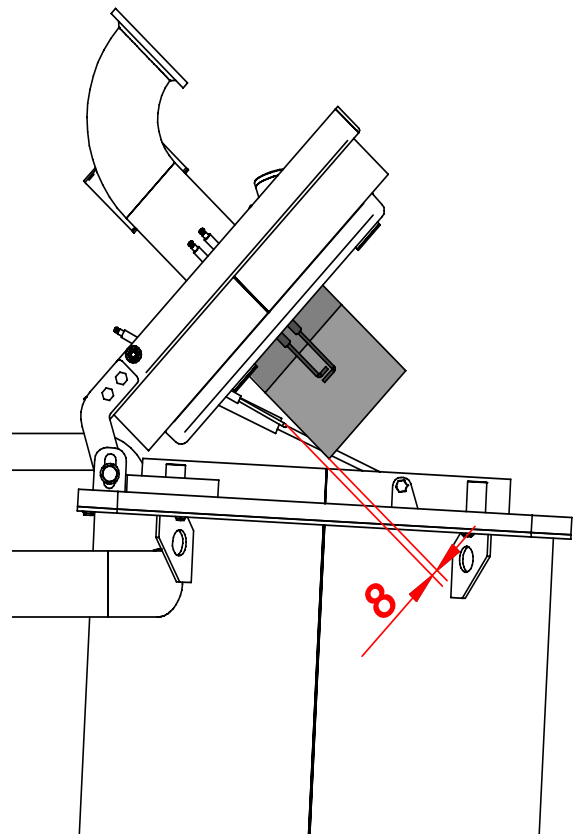
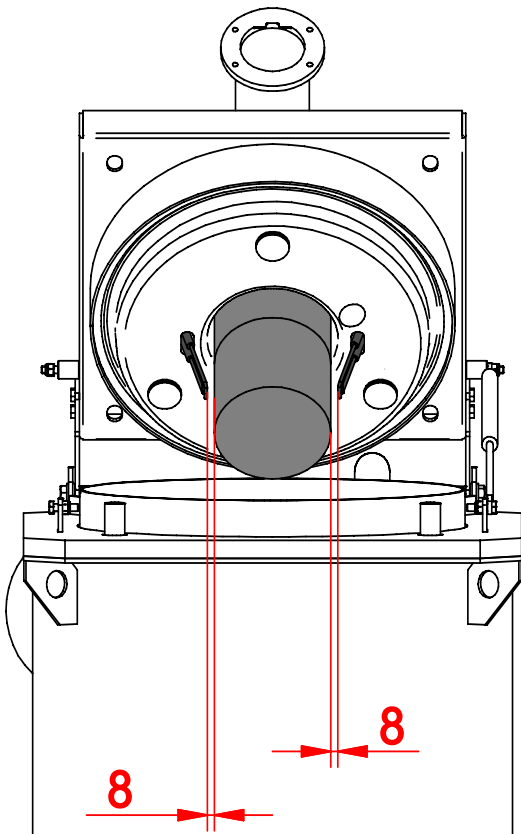
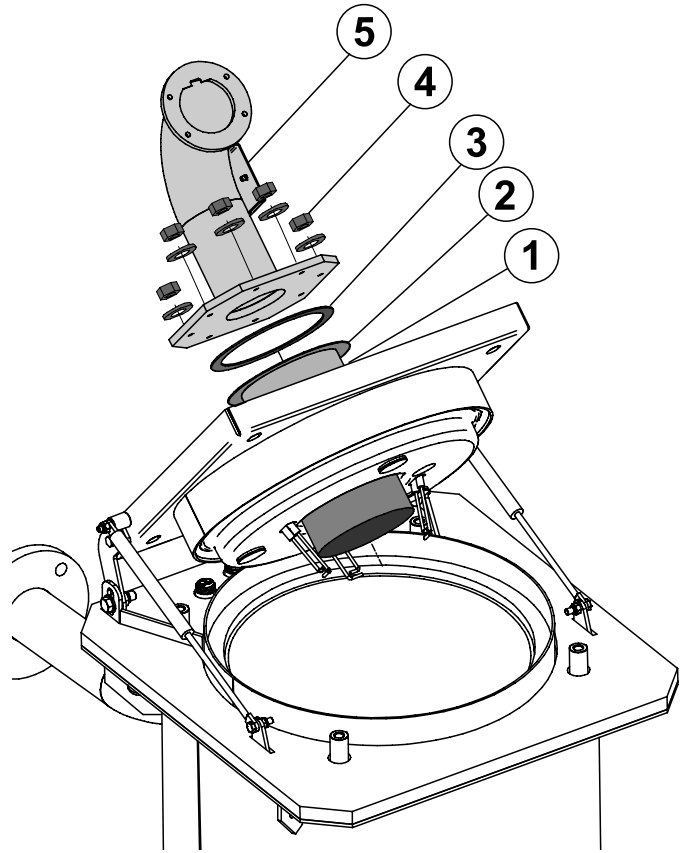
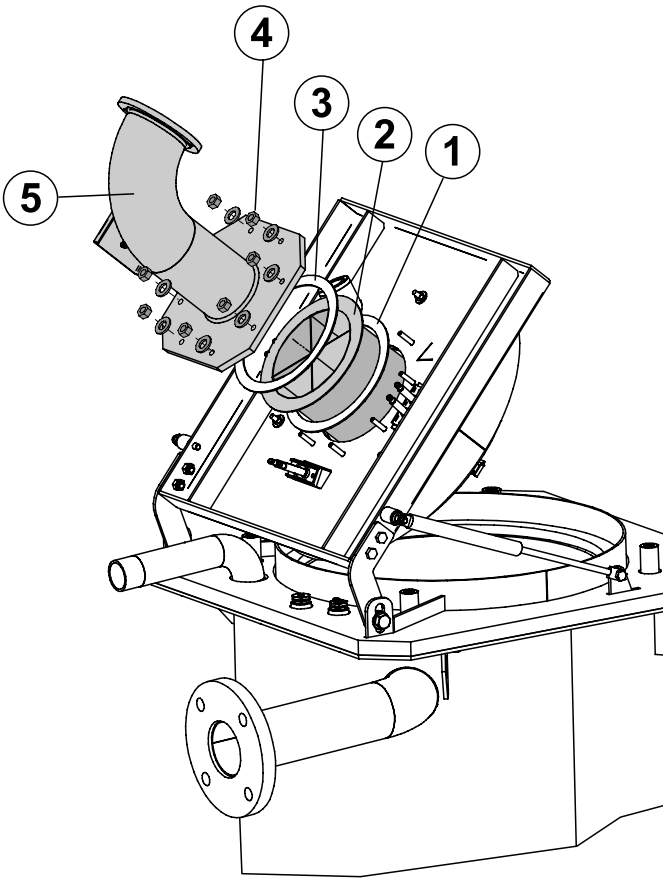
After executing maintenance operations , it is **essential to assemble** the burner correctly.

- A - Insert gasket 1
- B - Direct the burner 2 as indicated in the drawing (incision in the shape of an arrow on the door must correspond to the burner's fins)
- C - Insert the gasket 3





- D - Provisionally secure the flanged curve **5** to the cover (do not tighten the nuts completely **4**)
- F - Centre the burner between the electrodes, keeping the same distance (approximately 8-9 mm)
- E - Now completely secure the flange to the burner.



4.3 - ADAPTATION TO THE USE OF OTHER GAS

The boilers are produced for the type of gas specifically requested upon ordering.



DANGER!

The conversion for the operation of the boiler with a type of gas other than that specifically required in the order, must be performed by professionally qualified personnel, in compliance with the standards and regulations in force.

The manufacturer cannot be held liable for any damage resulting from a conversion operation that is incorrect or not performed in compliance with the laws in force and/or with the instructions given.



ATTENTION!

After performing the conversion for the operation of the boiler with a type of gas (e.g. propane gas) other than that specifically requested when ordering, the appliance will only work with this new type of gas.



ATTENTION!

Indications for propane gas-fired appliances 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 arise.

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

Gas Conversion

NOTE!

Further details in the section "Technical Information" on the boiler page of the www.unicalag.it website

Adjust the GAS Min/Max pressure switches only for models: SPK 230 - 300 - 400 - 500 - 600.

Methane Gas = 10 mbar



LPG = 15 mbar



Methane Gas/LPG = 50 mbar



Edit the parameters

FH and FL max and min Fan speed.

(*) for values, see TABLE NOZZLES-PRESSURE-CAPACITY)

METANO	Code	Symbol	Description	Value
G P L	526	FU	Fan: Maximum speed	(*)
	346	FL	Fan: Minimum speed	(*)

- Follow the instructions regarding Burner Adjustment (Chap. 3.12 /METHANE/LPG gas valve shutter).
- when the conversion is complete, fill in the information required on the label supplied in the documentation envelope and apply it next to the technical data label of the boiler.

EXAMPLE OF COMPILATION

Data - Fecha
Date - Datum 08, 09, 05

Firma - Signature
Unterschrift [Signature]

- Regolata per

- Réglée pour

- Adjusted for

- Reglada para

- Eingestellt für

G 20

G 25

G 30

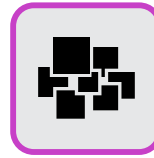
G 31

ETI 4530C

4.4 - PROGRAMMING THE OPERATING PARAMETERS



ATTENTION!
Function reserved for After Sale Service Centres only.



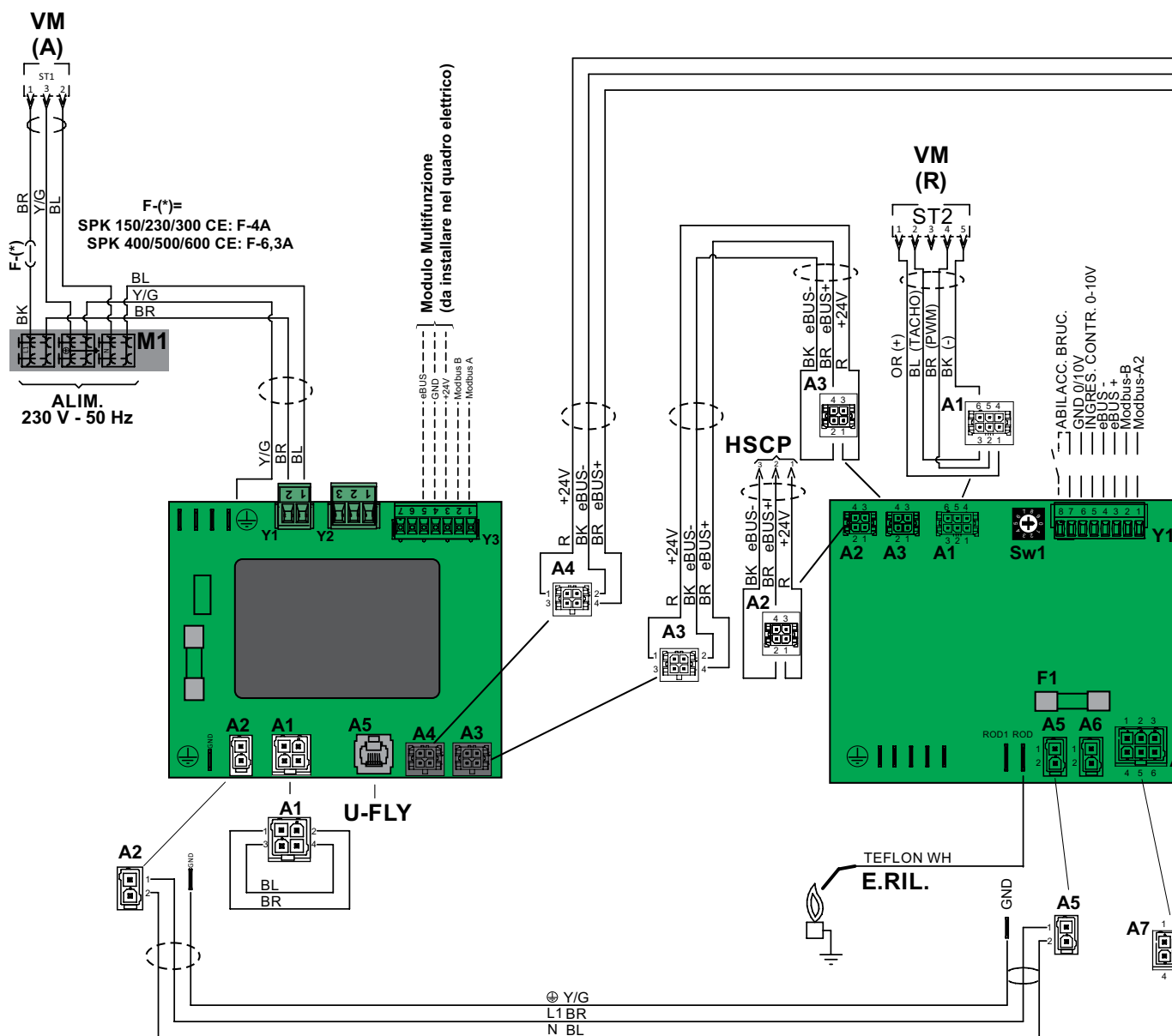
ATTENTION!
These functions are explained in chapter 2.8 (DEVICES menu) of the Ufly P. TOUCH CONTROL installation and maintenance manual.

BMM parameters													
Cod.	Simb.	Description	Unit	Min.	Max.	Default Settings							
						SPK 115	SPK 150	SPK 230	SPK 300	SPK 348	SPK 400	SPK 500	SPK 600
803	Srv	Enabled Services		0	1	1							
48	ChSet	CH#1: Set-point	°C	20	85	80							
784	BC	Local BUS address		0	7	0							
816	MI	Modbus Address		1	127	1							
817	MT	Modbus Time-out	sec.	0	240	30							
896	TU	°Fahrenheit		0	1	0							
799	AC	Input 0/10V		0	2	0							
376	DI1	Programmable Input #1		0	3	0							
322	Po	Pump: Post-circulation	min.	1	30	3							
341	PL	Pump: Minimum Control	%	0	100	30							
313	Pr	Pump: Maximum Control	%	0	100	100							
31	HL	CH#1: Minimum Set-point	°C	20	85	30							
39	HH	CH#1: Maximum Set-point	°C	20	85	85							
792	CHP	CH: Max. Modulation	%	0	100	100							
619	IG	Ignition Modulation	%	30	80	50	50	35	45	45	45	40	35 (33)
527	PU	Fan: Imp./Pass		0	3	2	2	2	3	3	3	3	3
486	FP	Fan: Reg. Prop.		0	50	30	30	30	25	25	25	25	25
487	FI	Fan: Reg. Int.		0	50	9	9	9	25	25	25	25	25
489	Fpl	Fan: PWM min.	%	5	15	8							
337	Fr	Modulation Gradient	%	1,0	100,0	1,5							
526	FU	Fan: Max Speed	Hz	50	120	85 (80)	99 (94)	86 (82)	83 (81)	67 (64)	76 (69)	88 (83)	88 (92)
319	FH	Maximum Modulation	%	1,0	100,0	100							
346	FL	Minimum Modulation	%	1,0	100,0	37 (38)	31 (31)	32 (32)	32 (32)	34 (34)	32 (36)	32 (33)	29 (30)
314	Sb	Modulation on Standby	%	0	100	0							
620	IP	Postpurge: Fan	%	0	100	65							
617	IGL	Ignition: Mod. Min.	%	0	100	30	30	30	30	30	30 (36)	30 (34)	30 (29)
618	IGH	Ignition: Mod. Max.	%	0	100	80	80	80	74	54	54	45	40
353	HP	CH PID: Proportional	°K	0	50	25							
354	HI	CH PID: Integrative		0	50	12							
478	Hd	CH PID: Derivative		0	50	0							
34	HY	Burner Hysteresis	°K	5,0	20,0	5,0							
336	HS	Temperature Gradient	°C/min	0	30	5							

483	rP	Gen: Temp. Max Differential	°C	0,0	50,0	0,0							
380	AI1	Programmable Sensor #1		0	2	0							
777	AFC	APS Control		0	2	0							
805	LV	Mains Voltage	V	100	240	230							
2590		Burner Output	kW	10	1000	115	150	214	280	348	380	450	550
() Values for Propane													

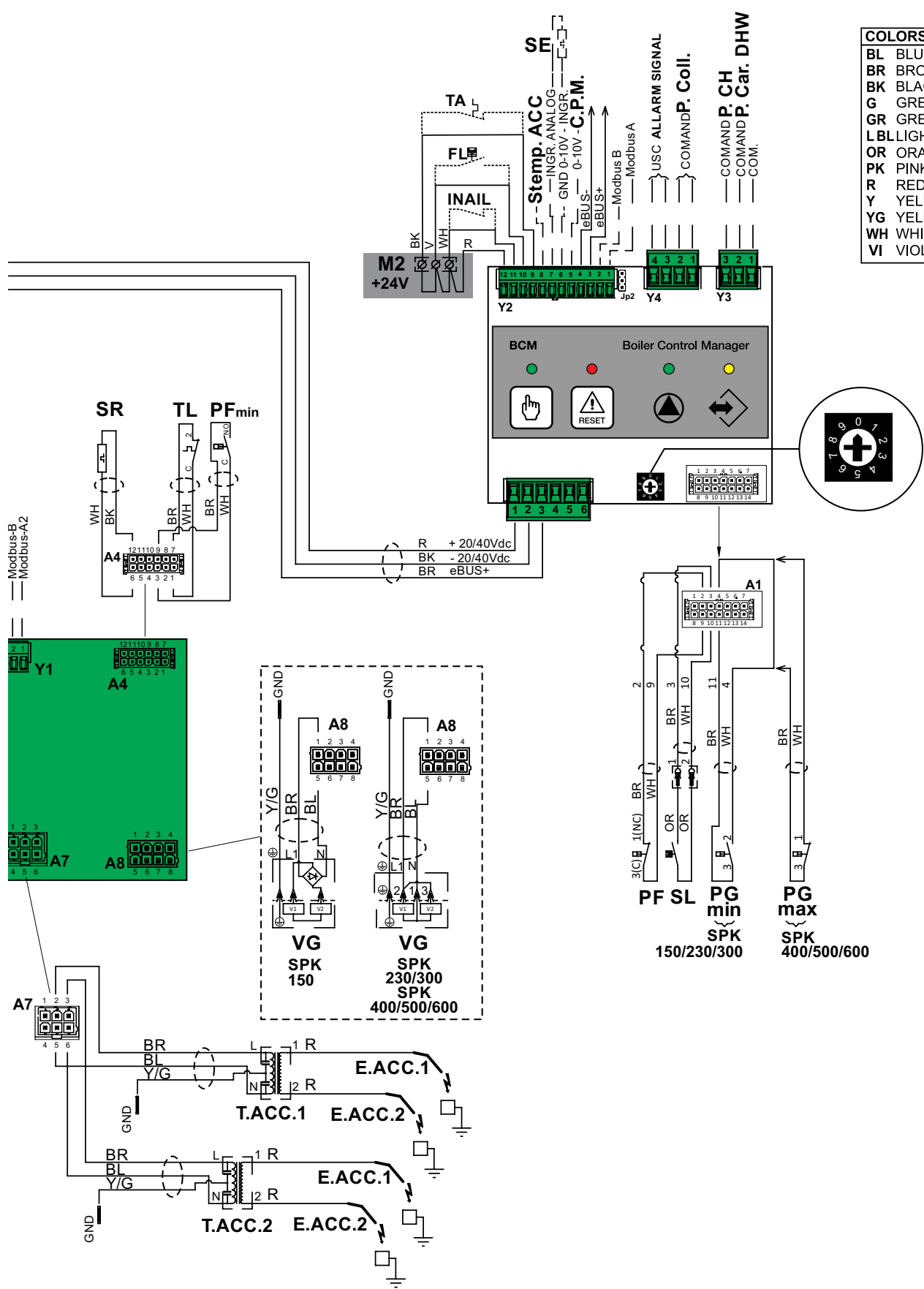
BCM Parameters						
Code	Symbol	Description	Unit	Min.	Max.	Imp. Fab.
803	Srv	Enabled Services		16	27	19
483	rP	Gen: Temp. Max Differential	°K	0,0	50,0	0
34	HY	Burner Hysteresis	°K	5,0	20,0	5,0
31	HL	CH#1: Minimum Set-point	°C	20,0	40,0	35,0
39	HH	CH#1: Maximum Set-point	°C	45,0	85,0	80,0
799	AC	Input 0/10V		0	3	1
376	DI1	Programmable Input #1		0	2	0
322	Po	Pump: Post-circulation	min.	1	10	5
341	PL	Pump: Minimum Control	V	0	10	3
313	Pr	Pump: Maximum Control	V	0	10	10
792	CHP	CH: Mx. Modulation	%	0	100	100
611	POT	Gen: Err. Max. Parallel	°K	0	30	5
612	POL	Gen: Mod. Max. Parallel	%	0	100	0
650	dL	DHW: Minimum Set-point	°C	25,0	45,0	35,0
385	dH	DHW: Maximum Set-point		50,0	65,0	65,0
360	dt	Storage Tank Adjustment		0	15	0
656	drT	DHW: Temp. Requested Differential	°K	-20	20	4
657	drH	DHW: Requested Temp. Hysteresis	°K	1	20	8
310	DpT	DHW Pump: Postcirc.	sec.	5	600	60
660	dbT	DHW: Temp. Maximum Boiler	°C	50,0	85,0	75,0
48	ChSet	CH#1: Set-point	°C	20,0	85,0	85,0
64	ChPO1	CH#1: Parallel Supply		0	1	0
346	FL	Minimum Modulation	%	0	100,0	25,0
600	mB	Burners: Min. Inserted		1	8	1
616	BSt	Gen: Insertion Time	sec.	30	900	120
613	BRt	Gen: Removal Time	sec.	30	900	120
336	HS	Temperature Gradient	°C/min	1	30	5
353	HP	CH PID: Proportional	°K	0	50	25
354	HI	CH PID: Integrative	°K	0	50	12
478	Hd	CH PID: Derivative	°K	0	50	0
816	MI	Modbus Address		1	127	1
817	MT	Modbus Time-out	sec.	0	240	30
896	TU	°Fahrenheit		0	1	0
309	St	Application Code		0	1	1
368	VA1	Programmable Relay #1		0	1	0
369	VA2	Programmable Relay #2		0	1	1
771	PS	Water Pressure Sensor		0	1	0
768	LG	Min. Gas Pressure Sensor		0	1	1
793	COC	Chimney Obstruction Sensor		0	2	1
622	FS	Minimum Flow Sensor		0	1	3

4.5 - PRACTICAL CONNECTION WIRING DIAGRAM



KEY	
A1.....A9	Services connectors
E. ACC. 1-2	Ignition electrode 1-2
E. RIL.	Detection electrode
Ufly P	Heating controller
M1	Boiler Power Supply Terminal Board
SR	Sensore di temperatura riscaldamento
M2	Morsettiere Sicurezze
PF	Smoke pressure switch
PF min	Minimum flue pressure pressure switch
PG min	Gas minimum pressure switch

PG max	Gas maximum pressure switch
SL	Condensate level sensor
T. ACC 1-2	Ignition Transformation 1-2
TL	Limit thermostat
VG	Gas valve
VM (A)	Modulating Fan Power Supply
VM (R)	Modulating Fan Det./Adjustment
SE	External probe connection terminals
U-FLY	Heating Controller Touch (*)



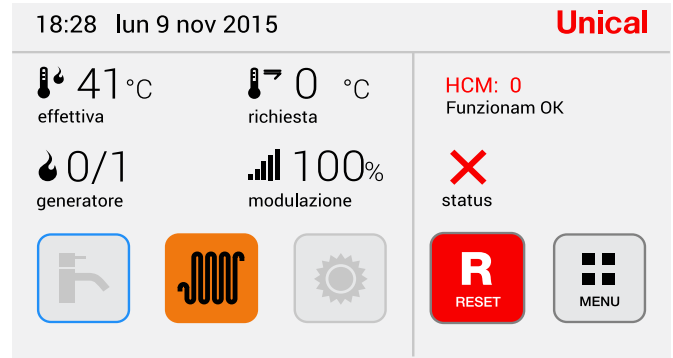
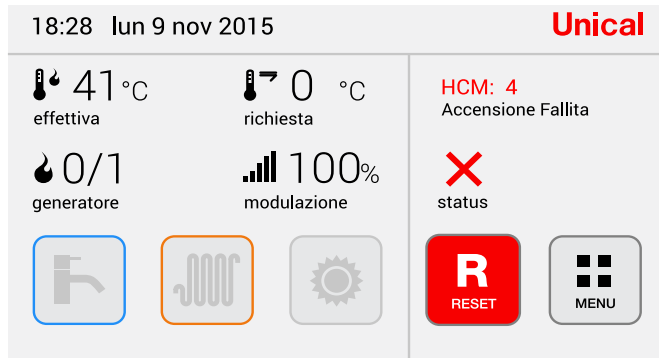
COLORS	
BL	BLUE
BR	BROWN
BK	BLACK
G	GREEN
GR	GREY
LBL	LIGHT BLUE
OR	ORANGE
PK	PINK
R	RED
Y	YELLOW
YG	YELLOW/GREEN
WH	WHITE
VI	VIOLET

FL	Flow switch
INAIL	Connection
TA	Room thermostat
S.temp ACC	Storage Tank Temperature Sensor
INGR. ANALOG	Analogical input
GND 0-10V ING	Analogical input 0-10 V

0-10V C.P.M.	Modulating Pump Control
ALLARM SIGNAL	Alarm Output
Comm P. COLL	Boiler collector pump control
Comm P. CH	Heating pump control
P. car DHW	Storage tank loading pump control
COM.	Common

Maintenance instructions

4.6 - ERROR CODES



Fault that causes the boiler to stop:

- The error code is displayed, the boiler has stopped running. After solving the failure, press Reset to restart the boiler.

Fault that does NOT cause the boiler to stop:

- The error code is displayed, the boiler has a heating request, Reset icon (informing that a failure has been detected, even if the fault was temporary). Therefore, you must always carry out reset to cancel the word "Error" displayed.

(Num) = see key Par. 2.2		
CODE	DESCRIPTION detected on BMM	SOLUTIONS
01	SAFETY THERMOSTAT Intervention of the safety thermostat (10)	Press the release button on the panel and/or check that the thermostat and its connections are not blocked, and make sure the INTC switches are closed (position 1)
04	BLOCK No gas or failed burner ignition	Check the gas supply or that the ignition/detection electrode is working properly (4).
05	FLAME LOSS DURING OPERATION.	Check the detection electrode
06	HIGH TEMPERATURE Boiler temperature too high	Check pump operation and if needed clean the exchanger (24)
10	INTERNAL FAULT	
11	Flame detection prior to ignition (flame parasite)	
12	HEATING SENSOR (11) Heating sensor fault	Check the efficiency of the sensor (see table Res/Temp) (Par.4) or its connections.
14	RETURN PROBE (if present) Auxiliary (SRR) sensor interrupted	Check the wiring, if needed replace the auxiliary sensor (22)
15	INSUFFICIENT WATER CIRCULATION Primary circuit water circulation insufficient ($\Delta t > 40^\circ \text{C}$)	Check pump operation and its speed - remove any obstructions in the heating system
16	EXCHANGER FREEZING (24) Exchanger freezing is detected If the heating sensor detects a temperature below 2°C , burner ignition is inhibited until the sensor detects a temperature above 5°C .	Disconnect the from the power supply, close the gas valve, defrost the exchanger carefully.

22	LACK OF AIR IN IGNITION Stop	Verify that the fan has a prevalence of at least 60 Pa.
23	UNATTENDED AIR FLOW	Min pressure switch blocked (closed)
24	SPEED OUT OF CONTROL Alteration of the fan speed; the speed is not reached.	Check fan operation (18) and the connections
26	SPEED OUT OF CONTROL Alteration of the fan speed; the speed is above that requested	Check fan operation (18) and the connections
27	LACK OF AIR Stop	Verify that the fan has a prevalence of at least 60 Pa.
30	FACTORY PARAMETERS Alteration of the factory parameters or possible electromagnetic interferences.	Press the unblock key; if the anomaly persists, replace the board
32	Line voltage at 80% of the nominal value. Wait until the line voltage is > 85% of the nominal value. .	Correction: if the line voltage is < 190Vac: the line voltage is really below the minimum limit, otherwise there is a monitor line error: replace BMM
CODE	DESCRIPTION detected on HCM (BCM)	SOLUTIONS
2	GAS PRESSURE MINIMUM PRESSURE SWITCH TRIGGERED stop effect	The ignition procedure is inhibited until gas pressure reaches the correct values.
17	EXCHANGER FREEZING (24) stop effect	Try to Reset since the system automatically activates an antifreeze function, therefore, it could only be a warning.
18	FLOW-RETURN ΔT MAXIMUM PRESSURE stop effect	Check circulation, check installation (only with a return probe present).
19	FLOW OVERTEMPERATURE. It is activated when the flow temperature is > 95. Resetting is automatically carried out when the temperature is < 80. Effect: Stop burner, Pump On	Circulation control
28	CLOGGED OUTLETS Stop	Check the Chimneys / Check the trap.
29	WATER IN THE COMBUSTION CHAMBER Stop	Check the combustion chamber / check the siphon.
37	PARAMETERS MEMORY DEFECTIVE Flame Block	Contact Customer Care
38	DAMAGED DEFAULT PARAMETERS due to electromagnetic interferences. stop	Contact Customer Care
40	FL INTERVENTION insufficient water circulation Stop	Check water circulation
56	NO REMOTE CONTROL DETECTED Flame Block	Check electrical connections e-BUS1
57	BMM BOARD NOT DETECTED stop	check electrical connections BMM and e-BUS
58	FLOW SENSOR Stop	Connect a new sensor if the code disappears, replace the sensor otherwise check the electrical connections
93	ISPESL SAFETY INTERVENTION Stop	check the safety parts, manually reset after blocking each individual safety device.

The error codes are displayed in the info row of the remote console and remain there even if the fault is temporary. Therefore, you must always reset to cancel **"Alarm" displayed.**

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ORIGINAL INSTRUCTION - 00335735/a - 2^a ed. 11/2020

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