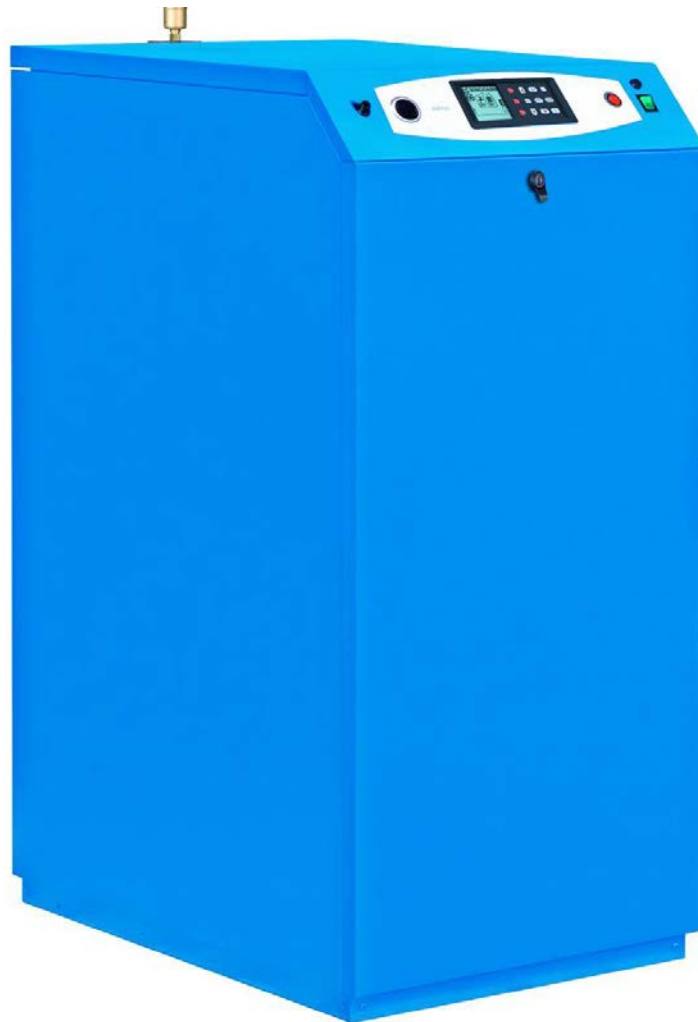


STREBEL

S-AF

Floor standing high efficiency boiler

Installation & Maintenance Manual



 **STREBEL**
HEATING TECHNOLOGY

2015-06-15 v1.0

CONFORMITY

The **S - AF** appliances comply with the following:

- Gas directive 2009/142/EC
- Efficiency Directive 92/42/EEC
- Low voltage directive 2006/95/EC
- Electromagnetic compatibility directive 2004/108/EC
- Energy Efficiency ☆☆☆
- "Condensing" classification
- NOx Class 5 (< 70 mg/kWh)



For the serial number and year of manufacturer, refer to the technical data plate.

Company Management

The appliance must be installed by qualified personnel in conformity with current Technical Standards and national and/or local legislation.

All safety, installation and maintenance instructions must also be strictly observed, as stated in this manual.

INDEX

SAFETY

SAFETY WARNINGS AND REGULATIONS	4
PROHIBITED ACTIONS	4

GENERAL

DESCRIPTION	5
DEVICES	5
IDENTIFICATION	6
MAIN STRUCTURE COMPONENTS	7
TECHNICAL SPECIFICATIONS	8
HYDRAULIC CIRCUIT - SENSORS	9
SYSTEM PUMP	10
CONTROL PANEL	11
WIRING DIAGRAM	15

INSTALLATION

PRODUCT DELIVERY	16
DIMENSIONS AND WEIGHT	16
HANDLING	17
INSTALLATION ROOM	17
NEW INSTALLATIONS OR REPLACEMENTS OF OLDER APPLIANCES	18
WATER TREATMENT	18
HYDRAULIC FITTINGS	19
OPERATING PRINCIPLE DIAGRAMS	20
ELECTRICAL CONNECTIONS	22
CONNECTION OF OUTSIDE SENSOR (OPTIONAL)	24
GAS CONNECTION	25
FLUE EXHAUST AND EXTRACTION OF COMBUSTION AIR	26
CONDENSATE REMOVAL	29
SYSTEM FILLING AND DRAINING	30
MENU NAVIGATION TREES AND PROCEDURE	31
- Key to the user menu lines	33
- Technician menu navigation tree	34
- Key to technician menu	39
INITIAL COMMISSIONING	42
- Preliminary procedures	42
- Initial commissioning	42
- User interface settings via technician menu	43
- Checking / modifying factory settings	45
- Change of gas type	46
- Heating unit ignition	47
MANUAL TEST function	47
Errors with safety block	49
Errors with safety stop	49
Operational checks - calibration after gas type changes	50
- Outside sensor and climatic curve	52
- 0..10V input check	53
- DHW request type	54
SCHEDULER SETTINGS	55
TEMPORARY SHUTDOWN OR HOLIDAY SCHEDULE	57

MAINTENANCE

MAINTENANCE AND CLEANING	59
TROUBLESHOOTING	61



SAFETY WARNINGS AND REGULATIONS

- After unpacking the appliance, ensure that all parts are intact and complete as per the supply specifications, and if any non-conformities are found, contact the Representative that sold the appliance.
- The appliance must be installed by professionally qualified personnel, in conformity with current national and local standards and the instructions in the manual supplied with the product.
- The appliance must only be used as envisaged in the design. The manufacturer declines all liability for physical injury or damage to animals or objects caused by errors in installation, adjustments, maintenance or improper use of the appliance.
- In the event of water leakage, disconnect the appliance from the electric power mains, shut off the water supply and promptly notify the Technical Services department or other professionally qualified personnel.
- Periodically check that the hydraulic system operating pressure, in cool conditions, is approx. 2 bar. Otherwise contact the Technical Services department or other professionally qualified personnel.
- In the event of prolonged disuse of the appliance, the following procedure must be observed:
 - Set the appliance main switch and the main system switch to "OFF".
 - Shut off the fuel and mains water valves.
- This manual is an integral part of the appliance and consequently must ALWAYS accompany the appliance, also in the event of sale to another Owner or User or transfer to another system. The manual must be kept with care and in the event of damage or loss, another copy may be requested from the Technical Services department.
- **It is recommended to service the appliance at least once a year.**



PROHIBITED ACTIONS

- **IT IS STRICTLY PROHIBITED** to allow children or disabled persons to change settings on the appliance without assistance.
- **IT IS STRICTLY PROHIBITED** to activate electrical devices or equipment such as switches, telephones, household appliances etc. if smells of fuel or uncombusted fuel are detected. In this case:
 - Open doors and windows to ventilate the room.
 - Close the fuel shut-off valve.
 - Arrange for prompt intervention of the Technical Services or other professionally qualified personnel.
- **IT IS STRICTLY PROHIBITED** to touch the appliance with bare feet or wet parts of the body.
- **IT IS STRICTLY PROHIBITED** to perform technical interventions or cleaning before disconnecting the appliance from the electrical power mains and setting the main system switch and main appliance switch to "OFF".
- **IT IS STRICTLY PROHIBITED** to modify safety devices or control devices without prior authorisation and instructions from the appliance manufacturer.
- **IT IS STRICTLY PROHIBITED** to pull, detach, or twist cables coming out of the appliance, even when disconnected from the electrical power mains.
- **IT IS STRICTLY PROHIBITED** to seal off or partially obstruct the ventilation outlets of the installation room and the appliance (if present). The ventilation outlets are essential to ensure efficient combustion.
- **IT IS STRICTLY PROHIBITED** to obstruct the condensate drain outlet.
- **IT IS STRICTLY PROHIBITED** to leave containers of flammable substances in the same room as the appliance.
- **IT IS STRICTLY PROHIBITED** to dispose of packaging into the environment as this constitutes a potential source of danger. It must therefore be disposed of in accordance with current legislation in the place of use.

DESCRIPTION

The aluminium heating units in the range **S - AF** are condensing heat generators, designed to heat rooms, and in combination with a storage tank, for the production of domestic hot water.

They comprise:

- an aluminium heat exchanger, with low water content and generously sized exchange surface to optimise energy efficiency and heating output;
- a full pre-mix microflame burner in stainless steel, to guarantee high modulation ratios, combustion stability and low pollutant emissions (NOx Class = 5);
- a variable speed blower, required for air/gas modulation and mixing;
- a combustion circuit, which can be “type C” (room-sealed) or “type B” (open-flued), with respect to the installation environment, and on the basis of the flue exhaust configuration on site;
- command-control electronics, which if equipped with outside sensor enables adjustment of the supply temperature on the basis of the outside temperature. The appliance thus only provides the heat effectively needed by the utility, avoiding energy waste. The unit is fitted with self-diagnostics with a display of the error codes and operating parameters at the time of the fault, thereby simplifying tasks for the Technical Services department.

Also, during periods of prolonged disuse or holidays, the appliance remains protected by the Anti-freeze Function, which is activated automatically when the supply temperature falls to 5°C and shuts off when it returns to 15°C. Obviously the gas and electrical mains supplies must be active during these periods.

The design phase adopted specific solutions to:

- obtain a constantly optimal air/gas mix;
- minimise dispersions;
- reduce noise levels to a minimum.

The **S - AF** heating units are designed for connection to 0-10 V DC controls and for operation in cascade, in sets of up to 6 units, and can be equipped with various system accessories, such as the mix bottle or water shut-off valve, and the ISPEL unit, which all simplify the work of the installer and comply with compulsory Italian legal requirements.

DEVICES

S - AF appliances are equipped with the following safety, control and adjustment devices:

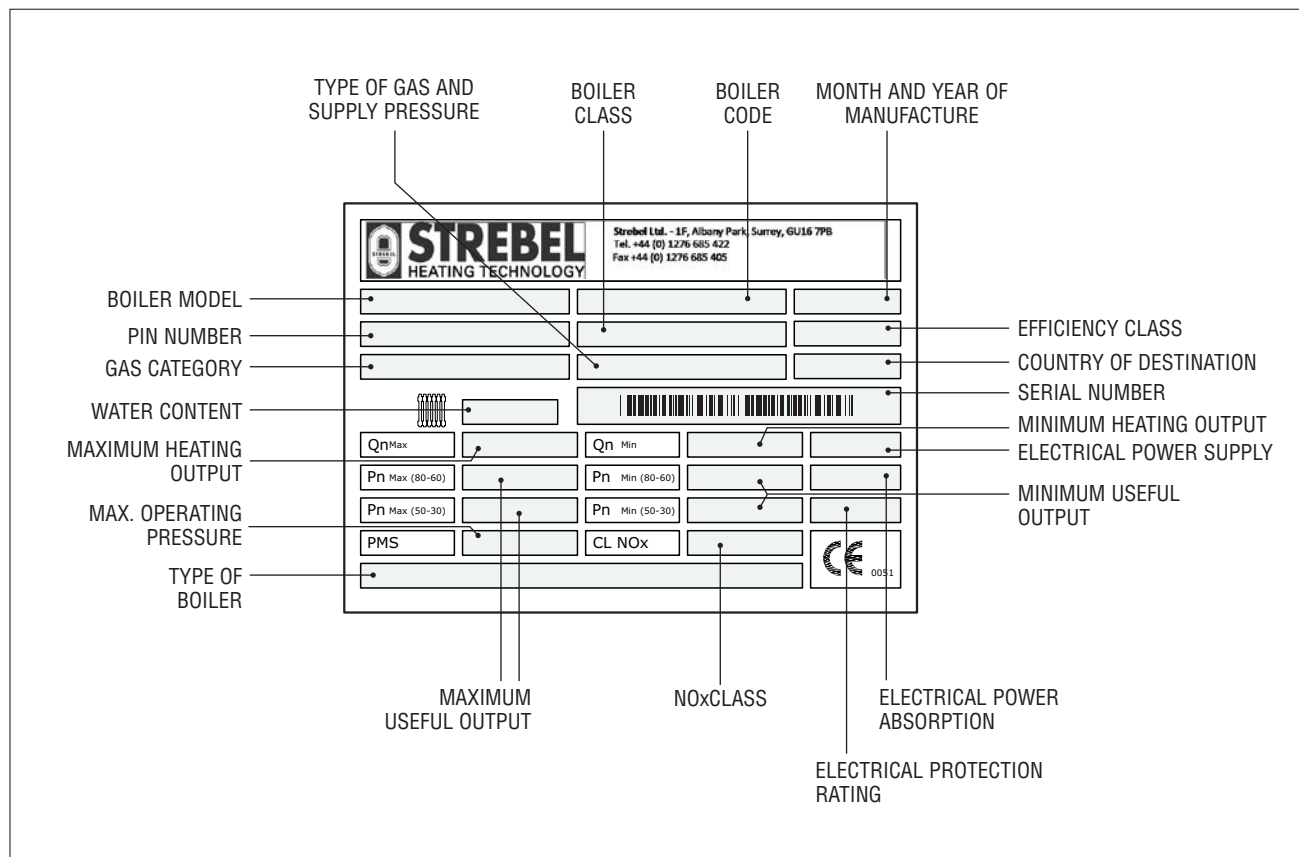
- Sensor on the appliance heat exchanger, to ensure thermal cut-out when the temperature reading exceeds the maximum admissible value. This is reset manually via the DSP keypad.
- Water pressure sensor: this intervenes when the hydraulic circuit pressure falls below 0.8 bar.
- Condensate pressure switch: this intervenes when the flue pressure in the condensate collection tank exceeds 5 mbar.
- Flue safety sensor: this intervenes when the flue temperature is too high.
- Gas pressure switch: this intervenes if the supply gas pressure falls below 14 mbar.
- Hydraulic circuit diagnostics to protect the heating unit against:
 - temperature overload, by checking the difference in temperatures on supply and return (ΔT);
 - inadequate water circulation in the heat exchanger, checking the difference in temperatures between the heat exchanger sensor and supply sensor.

WARNING

- If a safety device trips, this means that there is a potentially hazardous appliance malfunction. In this case contact Technical Services as soon as possible for assistance.

IDENTIFICATION

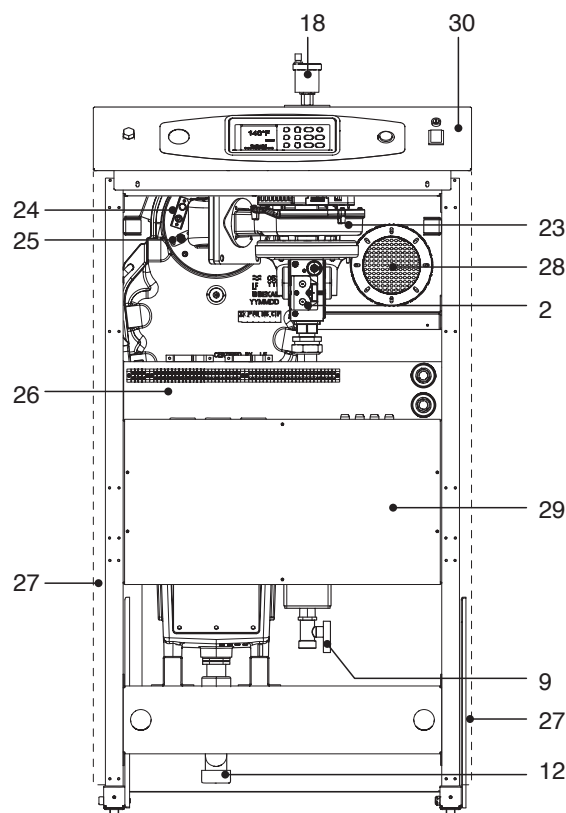
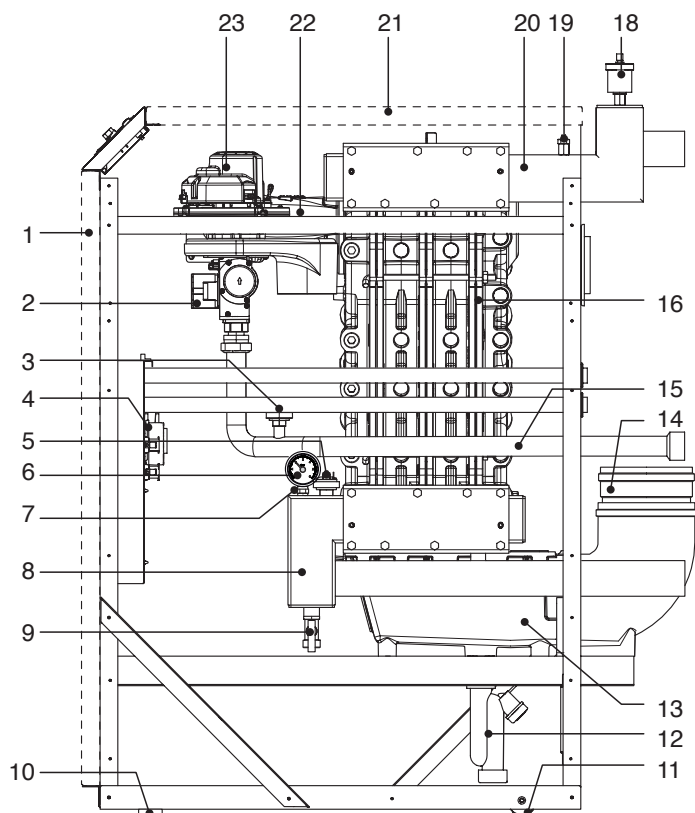
The appliance is identified by means of:
- the **Technical data plate** affixed to the casing.



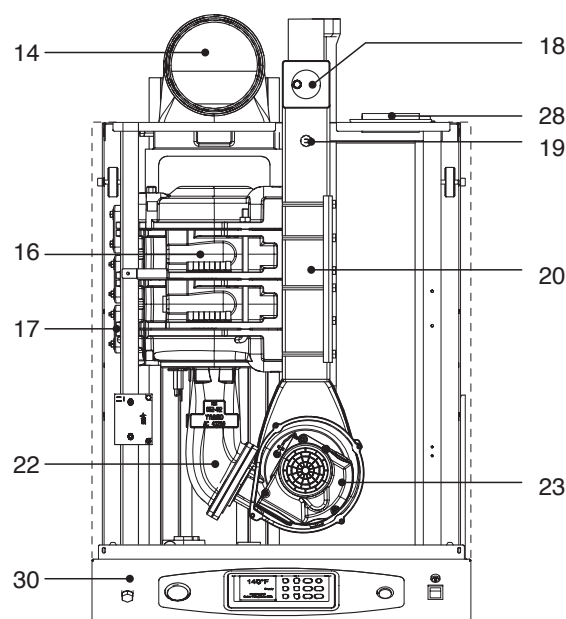
WARNING

- Any tampering, removal or elimination of the technical data plate or other element will prevent secure identification of the product, creating problems with installation and maintenance operations.

MAIN STRUCTURE COMPONENTS



- 1 Front panel
- 2 Gas valve
- 3 Gas pressure switch
- 4 Syphon pressure switch
- 5 Water pressure sensor
- 6 Pressure gauge
- 7 Return sensor
- 8 System return manifold
- 9 Heating unit drain valve
- 10 Foot
- 11 Wheel
- 12 Condensate drain syphon
- 13 Condensate collection tank
- 14 Flue exhaust connector
- 15 Gas intake hose
- 16 Heat exchanger
- 17 Inspection and cleaning access panel
- 18 Automatic purge valve
- 19 Supply sensor
- 20 System supply manifold
- 21 Top panel
- 22 Burner
- 23 Blower
- 24 Ignition electrodes
- 25 Flame detector electrode
- 26 Electrical connection terminal board
- 27 Side panels
- 28 Combustion air intake
- 29 Heating unit circuit board enclosure
- 30 Control panel



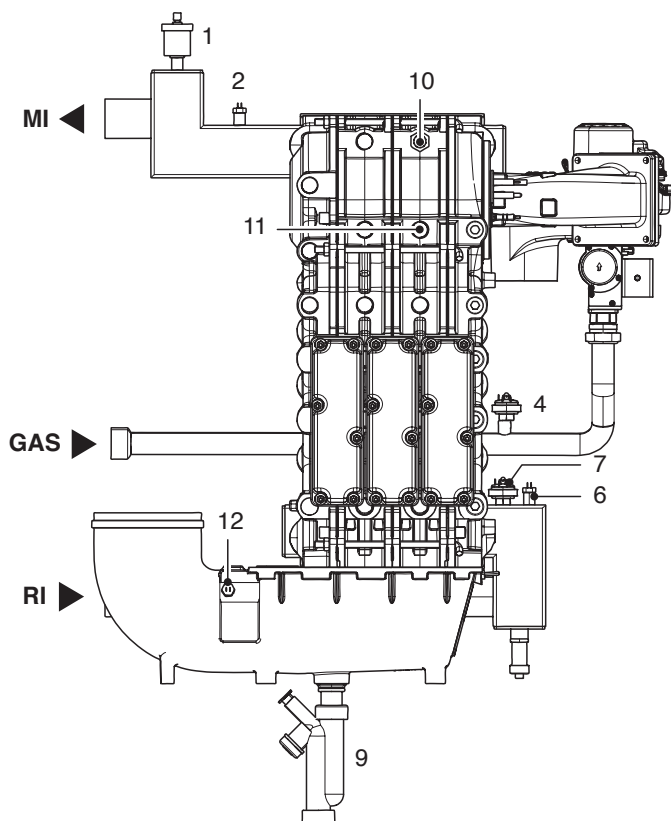
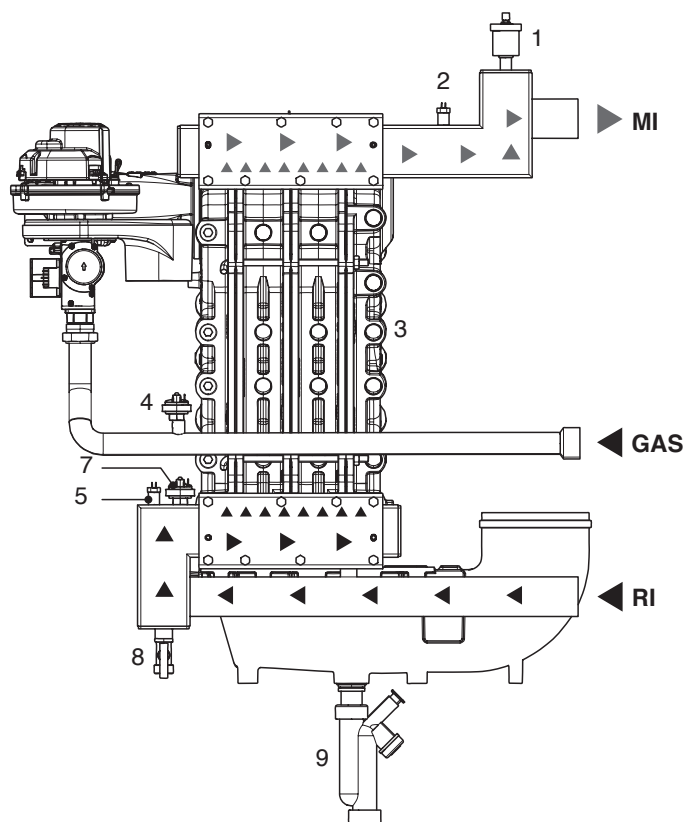
GENERAL

TECHNICAL SPECIFICATIONS

DESCRIPTION	S - AF						
	115	150	200	240	280		
Fuel	G20 (20 mbar) - G31 (37 mbar)						
Country(s) of destination	EU						
Appliance category	II2H3P						
Type of appliance	B23, B33, C43, C53, C63, C83						
Max. nominal heating output (Qn)	113.0	150.0	200.0	235.0	275.0	kW	
Min. heating output (Qmin)	21.0	30.0	35.5	42.5	49.5	kW	
Nominal heating output (80-60°C) (Pn)	109.7	146.7	196.0	229.8	269.2	kW	
Nominal heating output (50-30°C)	116.1	156.2	207.8	243.9	285.5	kW	
Minimum heating output (80-60°C) (Pmin)	20.0	29.0	34.7	41.5	48.3	kW	
EFFICIENCY							
Useful efficiency at Pn (80-60°C)	97.1	97.8	98.0	97.8	97.9	%	
Useful efficiency at min. Pn (80-60°C)	95.0	96.5	97.7	97.6	97.5	%	
Useful efficiency at Pn (50-30°C)	102.7	104.1	103.9	103.8	103.8	%	
Useful efficiency at 30% (return 30°C)	107.6	107.5	107.5	107.5	107.5	%	
Max. gas consumption	G20	11.96	15.87	21.16	24.87	29.10	m³/h
	G31	8.78	11.66	15.54	18.26	21.37	kg/h
Min. gas consumption	G20	2.22	3.17	3.76	4.50	5.24	m³/h
	G31	1.63	2.33	2.76	3.30	3.85	kg/h
EMISSIONS							
Flue temperature (80-60°C) at Pn	65 - 70					°C	
Flue temperature (80-60°C) at Pn min	60 - 65					°C	
Flue temperature (50-30°C) at Pn / min. Pn	40 - 45					°C	
Mass flue gas rate at Pn (80-60°C)	49.1	64.6	86.1	99.5	110.8	g/s	
Mass flue gas rate at Pn min (80-60°C)	9.8	16.1	16.3	19.1	21.5	g/s	
Max. condensate production	15	19	25	30	36	l/h	
max/min CO2 (G20) (average values)	9.3/9.1					%	
max/min CO2 (G31) (average values)	10.6/10.3					%	
CO	25	30	35	20	28	ppm	
NOx	15	20	18	18	18	ppm	
NOx Class	5					-	
ELECTRICAL DATA							
Electrical power absorption	225	260	320	320	320	W	
Power supply voltage	220/240 ~ 50/60					Volt ~ Hz	
Protection rating	X0D					IP	
BOILER							
Max. heating pressure	6					bar	
Max. operating temperature	90					°C	
Heating water content	15.3	18.0	22.9	25.6	28.4	l	
Pressure drop on water side ΔT nom. (20°C)	80	80	90	90	100	mbar	
ΔT Maximum supply/return	35					°C	
Water flow rate ΔT nom. (20°C)	4.86	6.45	8.60	10.11	11.83	m³/h	
Water flow rate ΔT (10°C)	9.72	12.90	17.20	20.21	23.65	m³/h	
FLUE EXHAUST							
Flue connector	150	150	200	200	200	Ø	
Air connector	100					Ø	
Total residual head (drain + intake)	320	233	100	180	85	Pa	
BLOWER							
RPM Min - Max	G20	1665 - 7400	1650 - 6250	1230 - 5600	1320 - 5800	1300 - 5800	rpm
Frequency Min - Max		55.5 - 246.7	55 - 208.3	61.5 - 280	66 - 290	65 - 290	Hz
RPM Min - Max	G31	1665 - 7400	1650 - 6250	1230 - 5600	1320 - 5800	1300 - 5800	rpm
Frequency Min - Max		55.5 - 246.7	55 - 208.3	61.5 - 280	66 - 290	65 - 290	Hz
DIMENSIONS and WEIGHTS							
Width	640					mm	
Depth (including flue)	1115	1115	1335	1335	1335	mm	
Height	1200					mm	
Weight	180	190	240	257	274	Kg	

HYDRAULIC CIRCUIT - SENSORS

GENERAL

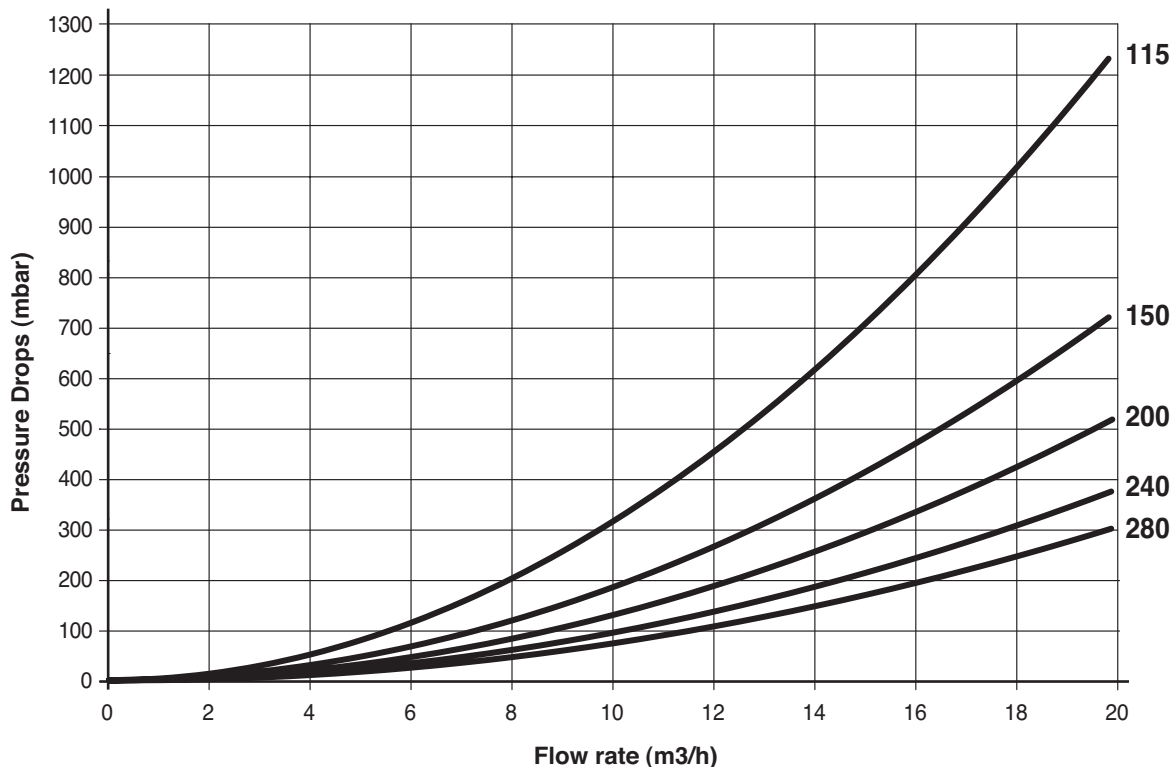


- 1 Automatic purge valve
- 2 Supply sensor
- 3 Heat exchanger
- 4 Gas pressure switch
- 5 Pressure gauge connector
- 6 Return sensor
- 7 Water pressure sensor
- 8 Heating unit drain valve
- 9 Condensate drain syphon
- 10 Heat exchanger sensor
- 11 Safety thermostat
- 12 Flue exhaust sensor

SYSTEM PUMP

Select a pump that is compatible with the hydraulic resistance of the heating unit and system.
The graph shows the pressure drop curves of the heating units.

GENERAL



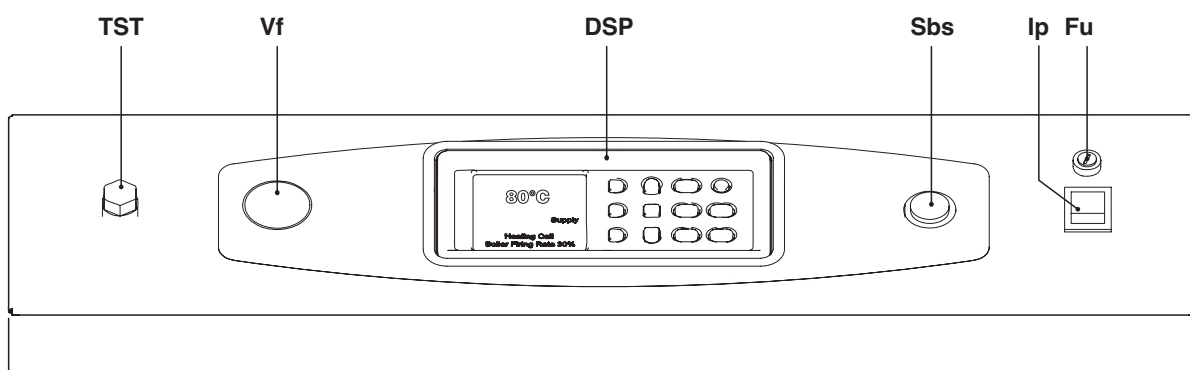
It is recommended to observe the water flow rates in the table and as specified below.

DESCRIPTION	S - AF					
	115	150	200	240	280	
Water flow rate ΔT 20	4.72	6.30	8.42	9.88	11.57	m ³ /h
Water flow rate ΔT 15	7.08	9.45	12.63	14.82	17.36	m ³ /h

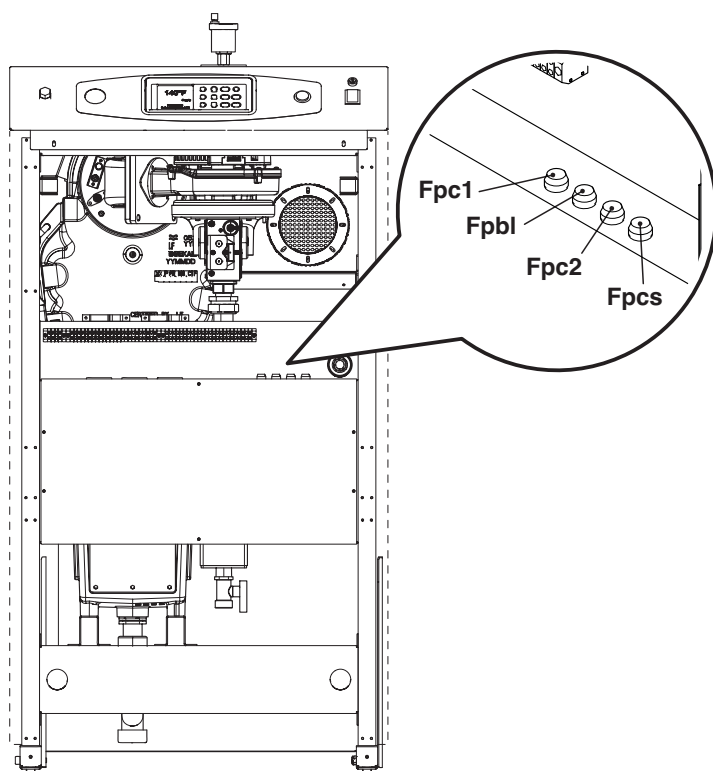
WARNINGS

- Failure to observe the recommended flow rates could cause appliance malfunctions.
- On initial start-up, check rotation of the pump shafts.
- NEVER run the pump without water.
- The selected pumps must have adequate absorption levels in relation to the fuse installed on the electrical panel (6.3A).

CONTROL PANEL

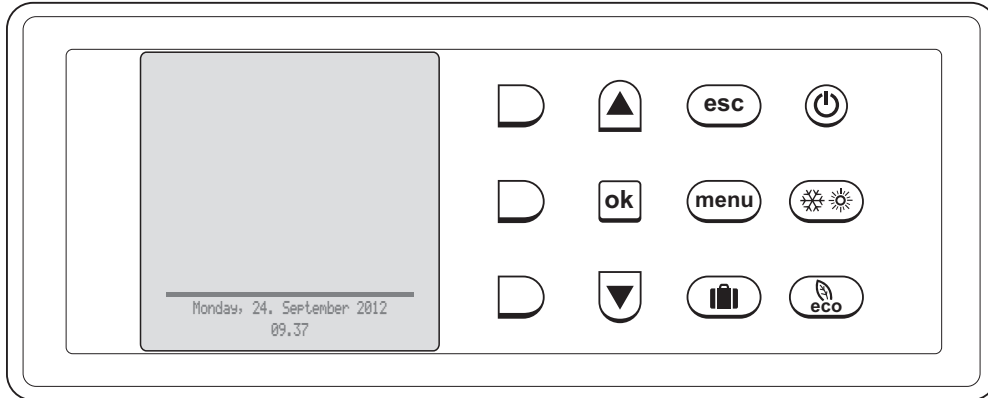


- Sbs** Block indicator light due to intervention of safety devices
- DSP** User interface with display
- Ip** Main switch with indicator light
- Fu** Main fuse (10A)
- Vf** Flame screen
- TST** Heating safety thermostat with manual reset

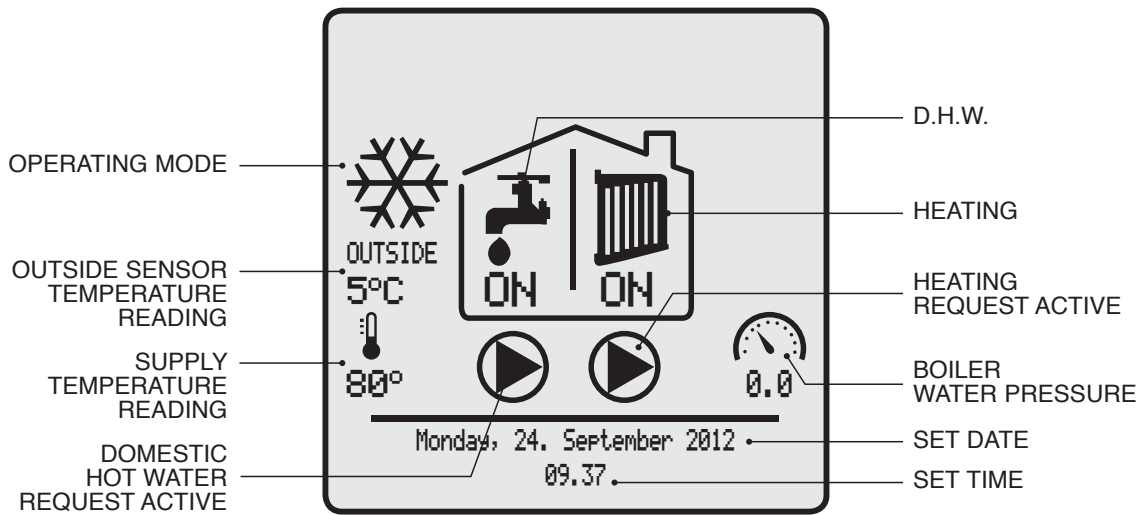


- Fpc1** Primary pump 1 fuse (6.3A)
- Fpbl** Storage tank pump fuse (6.3A)
- Fpc2** Primary pump 2 fuse (6.3A)
- Fpcs** Cascade pump fuse (6.3A)

DSP


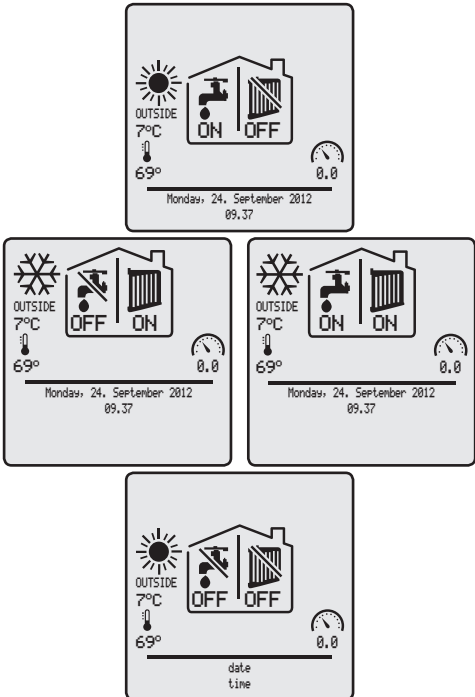

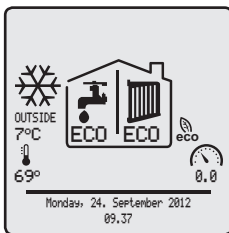

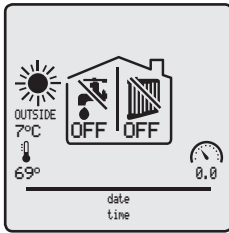

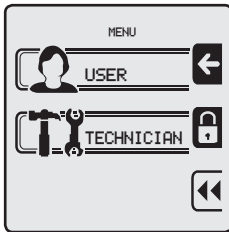



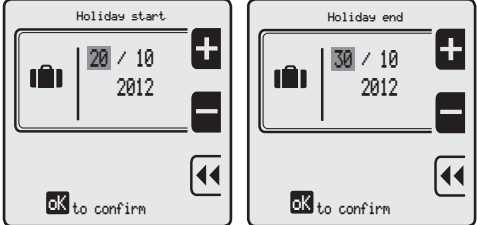


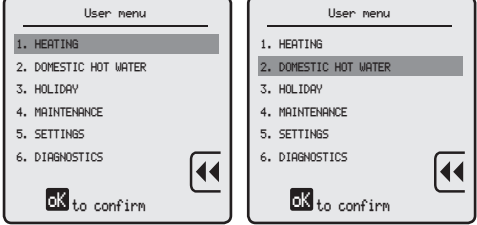

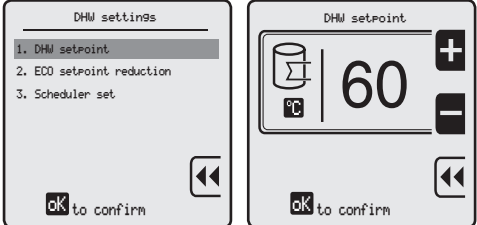

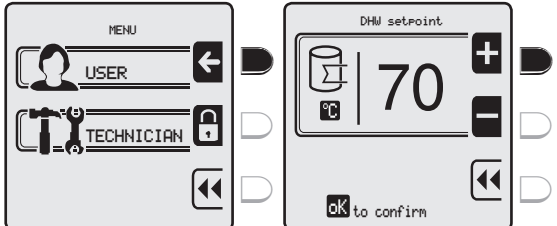

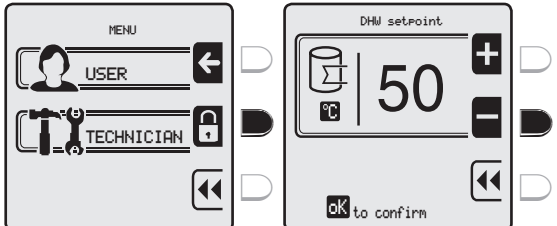

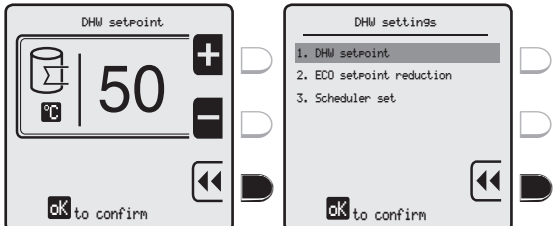
DESCRIPTION OF SYMBOLS ON DISPLAY



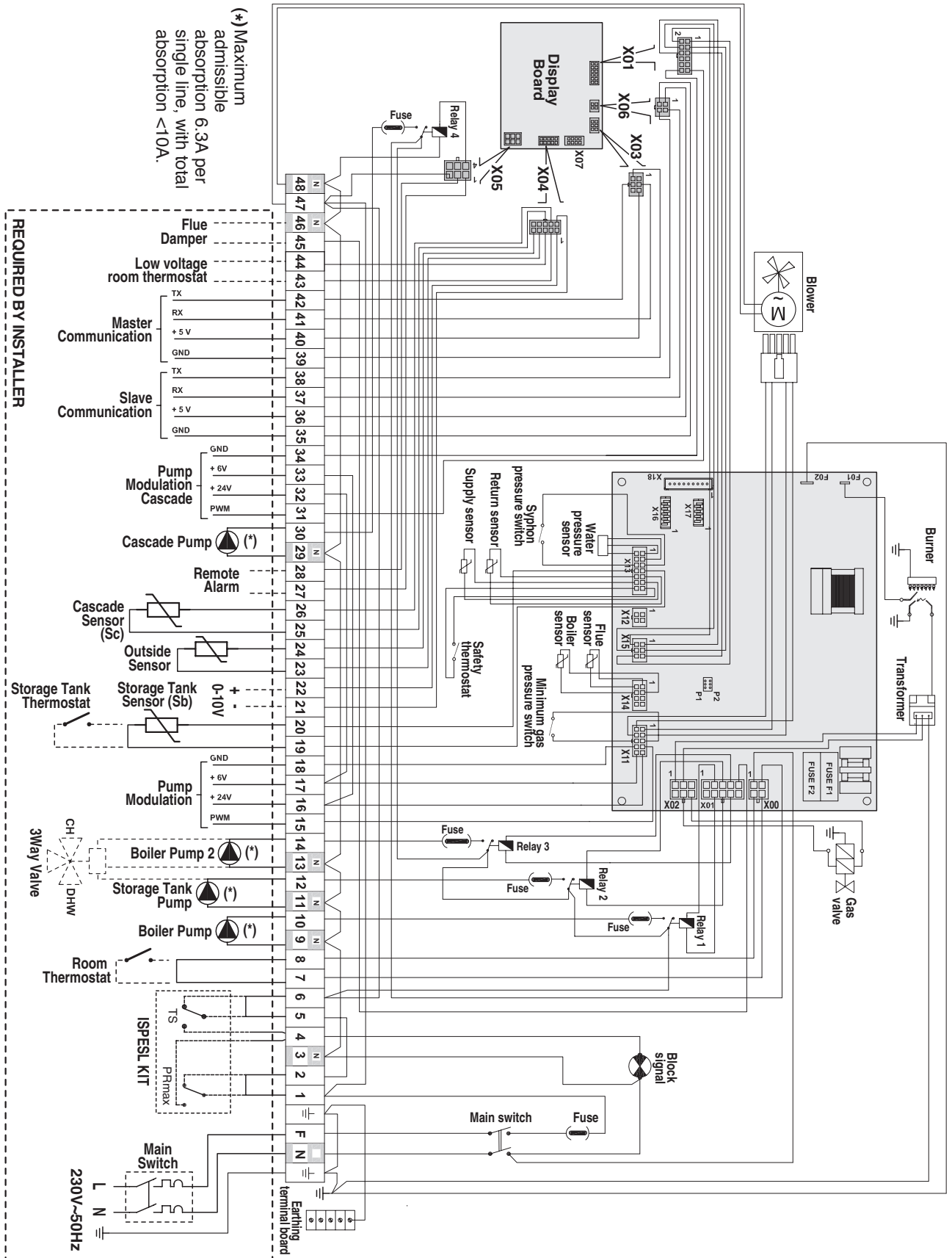
INITIAL SCREEN

Key	Description of function	Display
	<p>ON/STAND-BY</p> <p>STAND-BY: This shuts down the appliance, inhibiting the use of DSP keys</p> <p>ON: This enables start-up of the appliance, enabling use of DSP keys</p>	

Key	Description of function	Display
	<p>OPERATING MODE</p> <p>SUMMER: DHW production only</p> <p>WINTER: heating only or heating and DHW</p> <p>NONE: no heating or DHW Anti-freeze or "Manual Test" function active</p>	
	<p>ECO - Manual</p> <p>This reduces, by the set value, the temperature of domestic water supply and heating water (energy saving mode)</p>	
	<p>ESC</p> <p>Interrupts the current action and returns to the initial screen</p>	
	<p>MENU</p> <p>Enables display of the page for menu selection (USER or TECHNICIAN)</p>	

Key	Description of function	Display
	<p>HOLIDAY</p> <p>This enables entry of the holiday dates (start/end) and values for the supply of domestic hot water and heating water during this period</p>	
 	<p>UP</p> <p>Enables the user to scroll up through the lines on screen</p> <p>DOWN</p> <p>Enables the user to scroll down through the lines on screen</p> <p>Keep pressed to speed up the scrolling action.</p>	
	<p>OK</p> <p>Enables:</p> <ul style="list-style-type: none"> - access to the selected line of the menu or sub-menu - confirmation of a newly modified value 	
	<p>RED (at top)</p> <p>Enables:</p> <ul style="list-style-type: none"> - access to the USER menu - increases to the value to be modified <p>Keep pressed to speed up the action.</p>	
	<p>RED (intermediate)</p> <p>Enables:</p> <ul style="list-style-type: none"> - access to the TECHNICIAN menu - decreases to the value to be modified <p>Keep pressed to speed up the action.</p>	
	<p>RED (at bottom)</p> <p>Enables return to the selected line without saving/storing the modified data.</p>	

WIRING DIAGRAM



PRODUCT DELIVERY

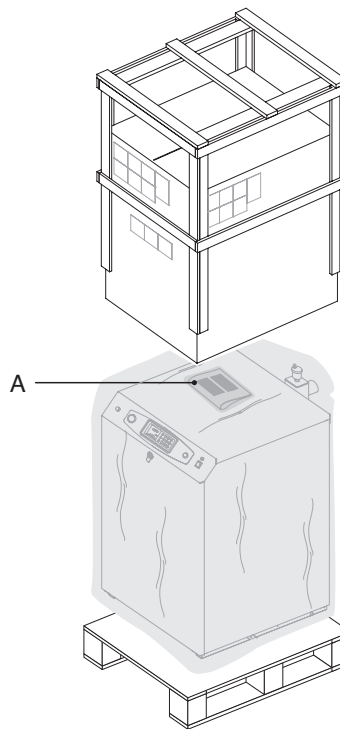
S - AF appliances are supplied in a single pack on a wooden pallet, protected by carton packaging and a wooden crate.

The following material is supplied in a plastic envelope (A), placed inside the packaging:

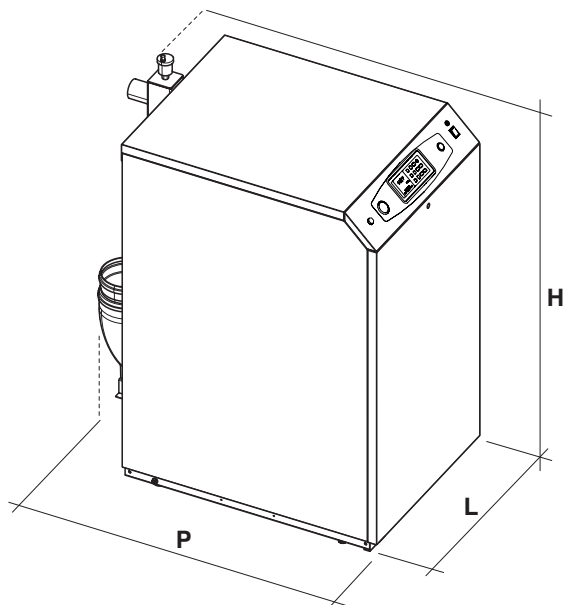
- Installation, operation and maintenance manual
- Warranty certificate and adhesive labels with bar code
- Hydraulic test certificate
- Spare parts catalogue.

⚠ WARNINGS

- Always use suitable personal protective equipment when removing packaging and handling the appliance.
- The manual is an integral part of the appliance and therefore it is recommended to read it before installing and operating the appliance. The manual should be stored with care for future consultation and possible transfer to another Owner or User.



DIMENSIONS AND WEIGHT



Dimensions and Weights	S - AF					
	115	150	200	240	280	
L	640					mm
D	1115	1115	1335	1335	1335	mm
H	1200					mm
Net weight	180	190	240	257	274	Kg

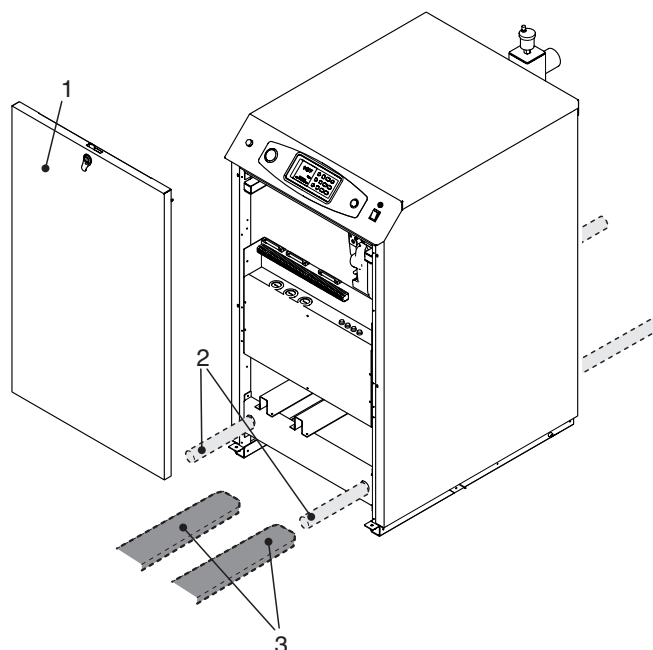
HANDLING

After removing the packaging, the appliance is handled as follows:

- Remove the front panel (1) to facilitate pick-up and handling.
- Insert two 1" pipes (2) in the relative slots or insert the lift truck forks (3) under the structure.
- Lift the unit and handle as required.

WARNINGS

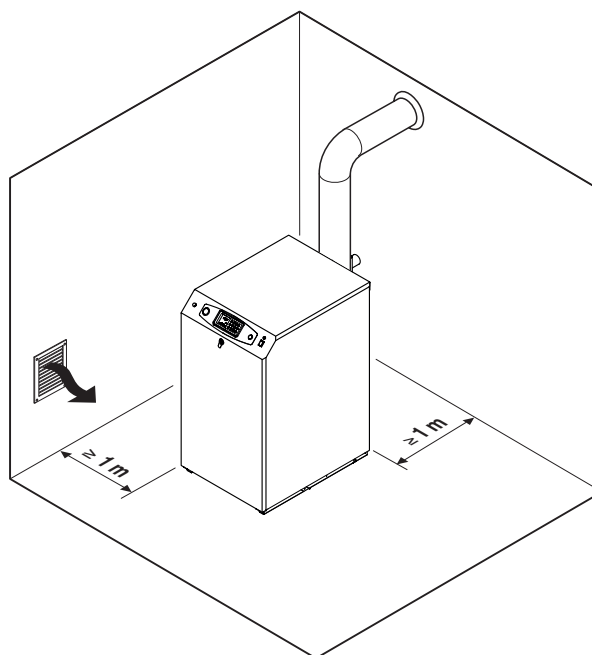
- ALWAYS use suitable accident protection equipment.
- If the appliance is handled manually, take care to observe the maximum weight that can be lifted per person.



INSTALLATION ROOM

The installation room must always comply with current technical standards and legislation in the country of use. It must be equipped with suitably sized ventilation outlets.

INDICATIVE SAFETY ZONES



WARNINGS

- Take into account the clearances required for accessibility of the safety/adjustment devices and for maintenance purposes.
- **IT IS STRICTLY PROHIBITED** to install **S - AF** appliances outdoors, unless adequately protected against atmospheric agents.

NEW INSTALLATIONS OR REPLACEMENTS OF OLDER APPLIANCES

When the appliance is installed on systems that are old or to be updated, ensure that:

- The flue duct, if re-used, is suitable for the new condensing boiler, and that it is calculated and constructed in compliance with current standards, as straight as possible, airtight, insulated and free of any obstructions or narrowed sections.
- The flue is fitted with an outlet for removal of condensate.
- The electrical system complies with the relevant standards and is set up by professionally qualified personnel.
- The fuel intake line and tank (if fitted) is produced according to the specific standards and is fitted with a gas meter.
- The expansion vessel ensures total absorption of fluid expansion in the system.
- The system is washed, removing all sludge and deposits and that all hydraulic seals are efficient.
- A supply water treatment/replenishment system is fitted, as described in the next chapter.
- **Efficient systems are fitted for the elimination of air and impurities up to 5 µm (e.g. Y filters, micro-impurity separators and micro air bubble separators).**
- if an automatic filling system is fitted, a litre counter is installed in order for a precise check on the entity of any leaks.
- Water must never be drained from the system during routine maintenance, even in apparently insignificant quantities. For example when cleaning filters, ensure that the system has specific shut-off valves for this purpose.

(*) The manufacturer declines all liability for possible damage caused by incorrect installation or design of the flue or constant replenishment of water in the heating unit.

WATER TREATMENT

Before installing the appliance, thoroughly clean all pipelines and heating elements.

PROPERTIES OF WATER TO BE USED WHEN FILLING THE SYSTEM

The following type of water must be used to fill the system:

pH :	from 6.5 to 8.5 (presence of aluminium)
Ca ⁺⁺⁺ Mg ⁺⁺ :	less than 0.5°f
OH ⁻ + 1/2 Ca ³⁻ :	from 5 to 15°f
P ₂ O ₅ :	from 10 to 30 mg/l
Na ₂ SO ₃ :	from 20 to 50 mg/l

If the analysis of a sample of the water to be used for filling the system shows values other than those above, a suitable inhibitor must be used. This will prevent the formation of scale, which could impair correct operation of the boiler unit. In the case of systems at low temperatures only, a product must be used to inhibit the spread of bacteria.

Water treatment in civil heating systems: see standard UNI 8065 of 1989.

REPAIRS AND PARTS REPLACED DUE TO THE FORMATION OF SCALE ARE NOT COVERED BY THE WARRANTY.

CAUTION: both on new systems or replacements, the system must be fitted with efficient systems that eliminate the air and impurities up to 5 µm (e.g. Y filters, micro impurity separators and micro air bubble separators).

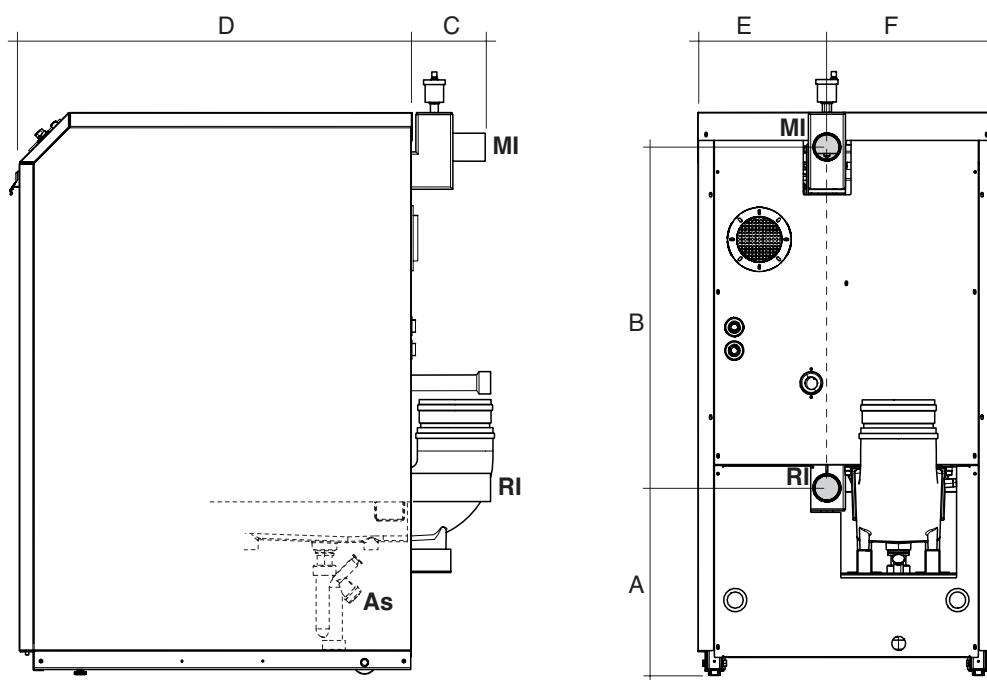
⚠ WARNINGS

- Never soften water using the ion exchange principle.
- Never fill the system using distilled or demineralised water, as these cause serious corrosion of the aluminium heat exchanger. The system must be filled and replenished with softened water to reduce overall hardness. The water must also be treated to maintain the pH factor within the envisaged range, to avoid the risk of corrosion.
- On a register, note the quantity of filling water, top-up water, water quality readings and water treatment used.
- Install a meter to control the quantity of filling and top-up water.
- The conductivity of the untreated water in the system must NEVER exceed 600 $\mu\text{s}/\text{cm}$.
- If the system water is treated, strictly observe the instructions of the manufacturer of the product used, and ensure that conductivity NEVER exceeds 2000 $\mu\text{s}/\text{cm}$.
- **In the event of generator replacement, it is COMPULSORY to wash the entire system.**

NOTE: If conductivity exceeds the values specified above, drain the system, flush it and fill with clean and treated tap water.

HYDRAULIC FITTINGS

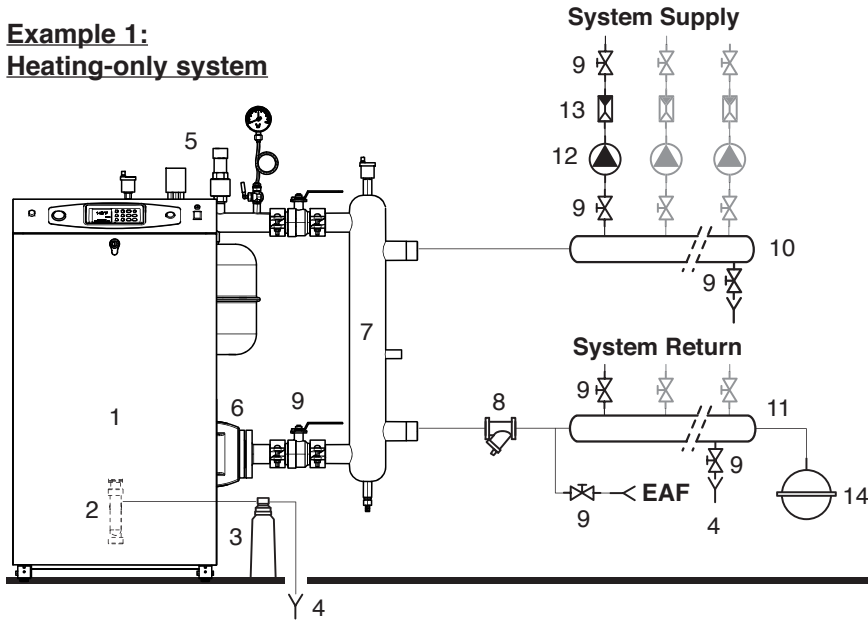
The following section specifies the requirements of the heating unit hydraulic fittings.



Description	S - AF					
	115	150	200	240	280	
MI System supply	2" M					Ø
RI System return	2" M					Ø
As Syphon fitting	25					mm
A	400					mm
B	728					mm
C	175	175	245	245	245	mm
D	848	848	1088	1088	1088	mm
E	279					mm
F	363					mm

OPERATING PRINCIPLE DIAGRAMS

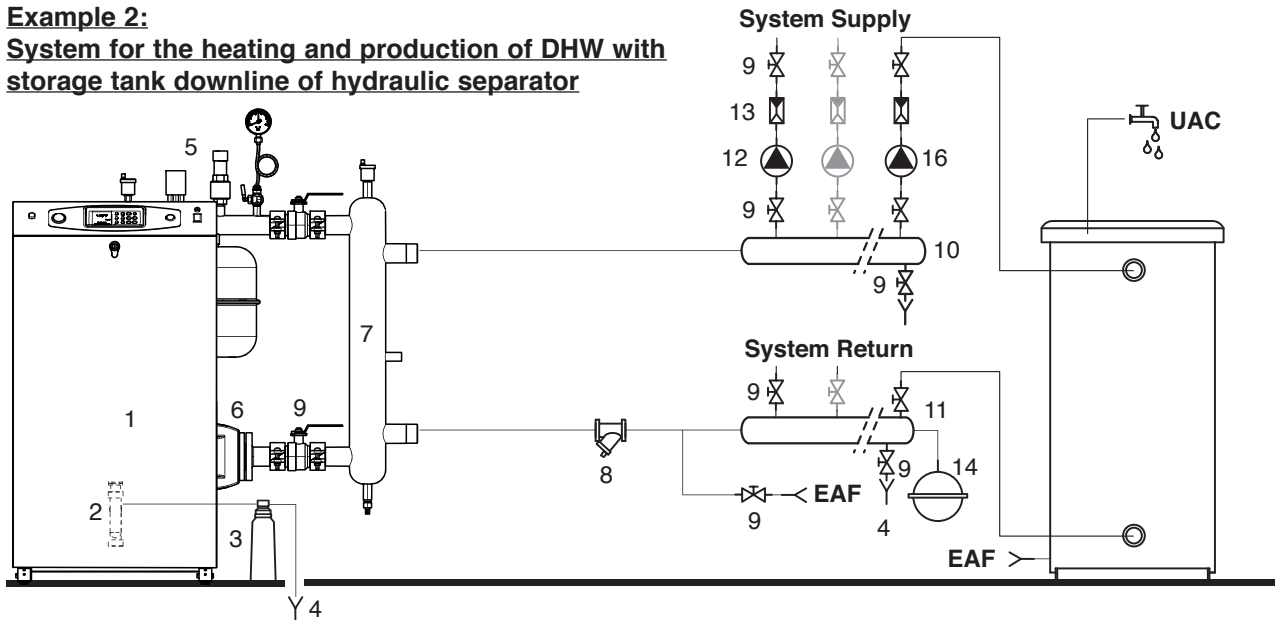
Example 1:
Heating-only system



- | | | |
|------------------------------|-----------------------|-----------------------------|
| 1 Heating unit | 7 Hydraulic separator | 13 Check valve |
| 2 Condensate drain syphon | 8 Screening filter | 14 Expansion vessel |
| 3 Condensate neutraliser (*) | 9 Shut-off valve | |
| 4 Drain | 10 Supply manifold | EAF Cold water inlet |
| 5 ISPEL safety module | 11 Return manifold | |
| 6 Primary pump 1 | 12 System pump | |

(*) Not supplied with heating unit. Available as accessory.

Example 2:
System for the heating and production of DHW with storage tank downline of hydraulic separator



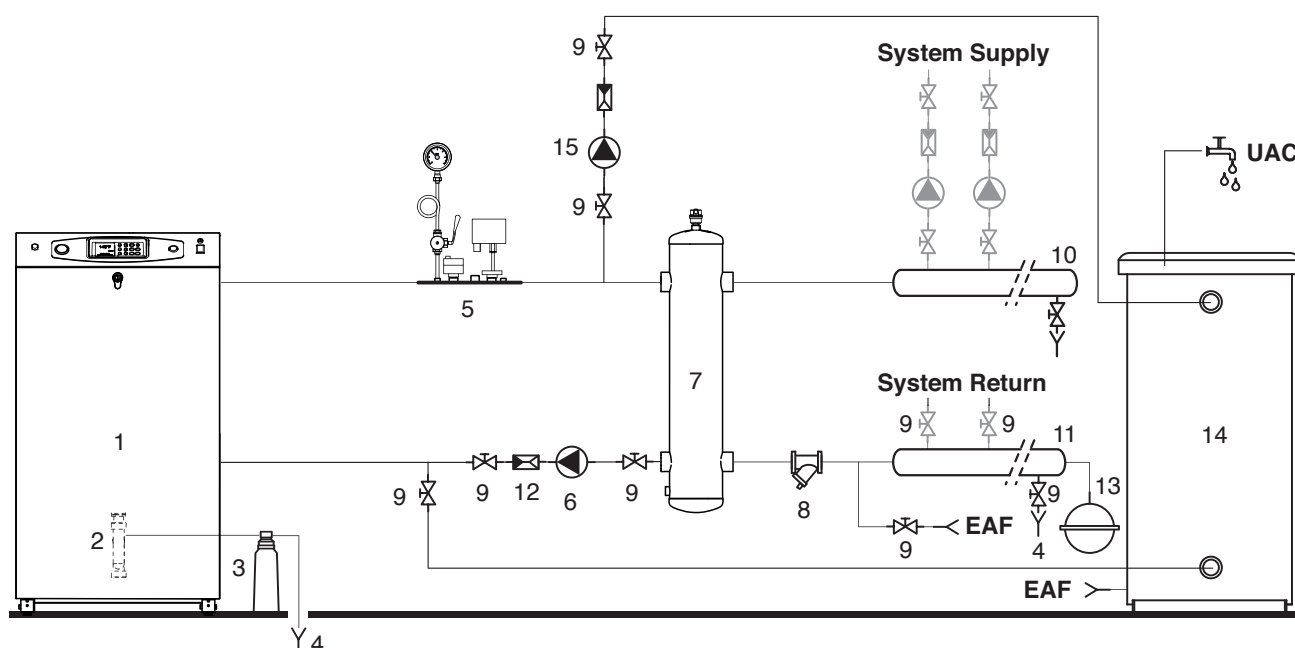
- | | | |
|------------------------------|-----------------------|-----------------------------------|
| 1 Heating unit | 7 Hydraulic separator | 13 Check valve |
| 2 Condensate drain syphon | 8 Screening filter | 14 Expansion vessel |
| 3 Condensate neutraliser (*) | 9 Shut-off valve | 15 Remote storage tank |
| 4 Drain | 10 Supply manifold | 16 Storage tank pump |
| 5 ISPEL safety module | 11 Return manifold | EAF Cold water inlet |
| 6 Primary pump 1 | 12 System pump | UAC Domestic water utility |

(*) Not supplied with heating unit. Available as accessory.

Example 3:
System for the heating and production of DHW with storage tank upline of hydraulic separator

! WARNINGS

- If the DHW is produced by the storage tank pump located upline of the hydraulic separator, use boiler pump 2 as the primary pump (without the mix valve).
 This enables management of two above pumps, to avoid increases in the temperature of the heating circuit.



INSTALLATION

- | | | |
|------------------------------|-----------------------|----------------------------|
| 1 Heating unit | 7 Hydraulic separator | 13 Expansion vessel |
| 2 Condensate drain syphon | 8 Screening filter | 14 Remote storage tank |
| 3 Condensate neutraliser (*) | 9 Shut-off valve | 15 Storage tank pump |
| 4 Drain | 10 Supply manifold | EAF Cold water inlet |
| 5 ISPEL safety module | 11 Return manifold | UAC Domestic water utility |
| 6 Primary pump 2 | 12 Check valve | |

(*) Not supplied with heating unit. Available as accessory.

! WARNINGS

- Fill the condensate drain syphon (2) to a sufficient level and route the condensate drain hose correctly. Envisage suitable condensate treatment systems.
- The safety valve drain must be connected to a suitable disposal system. The manufacturer is not responsible for possible flooding caused by intervention of the safety valve.
- Systems charged with anti-freeze require the compulsory use of water shut-off devices.
- The selection and installation of the system components is the task of the installer, who must observe all current legislation and professional technical practices.
- The expansion vessel of the heating circuit must ensure total absorption of the fluid expansion in the system.

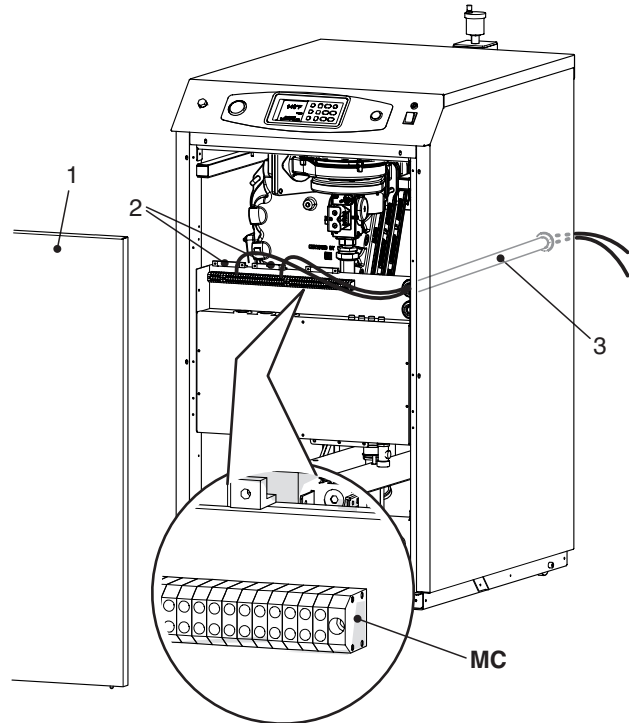
ELECTRICAL CONNECTIONS

S - AF appliances require the connections shown below, which must be made by the installer or other professionally qualified personnel.

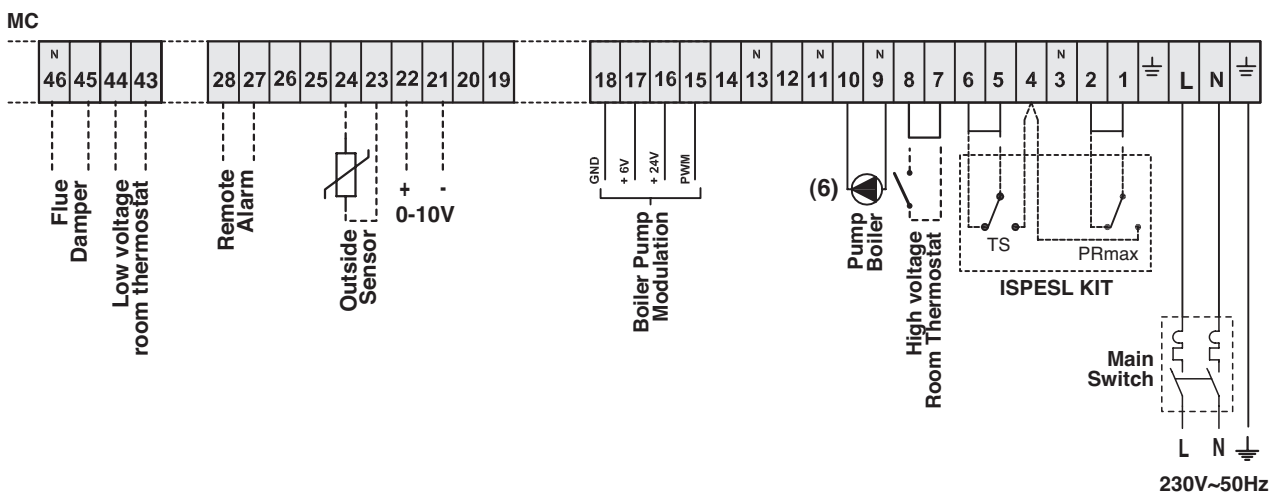
To access the terminal board (MC):

- Remove the front panel (1).
- Insert the cables in the relative strain relief cable glands (2) located above the terminal board (MC) and route through the tube (3) on the inside of the casing.

After making all connections, refit the front cover (1).

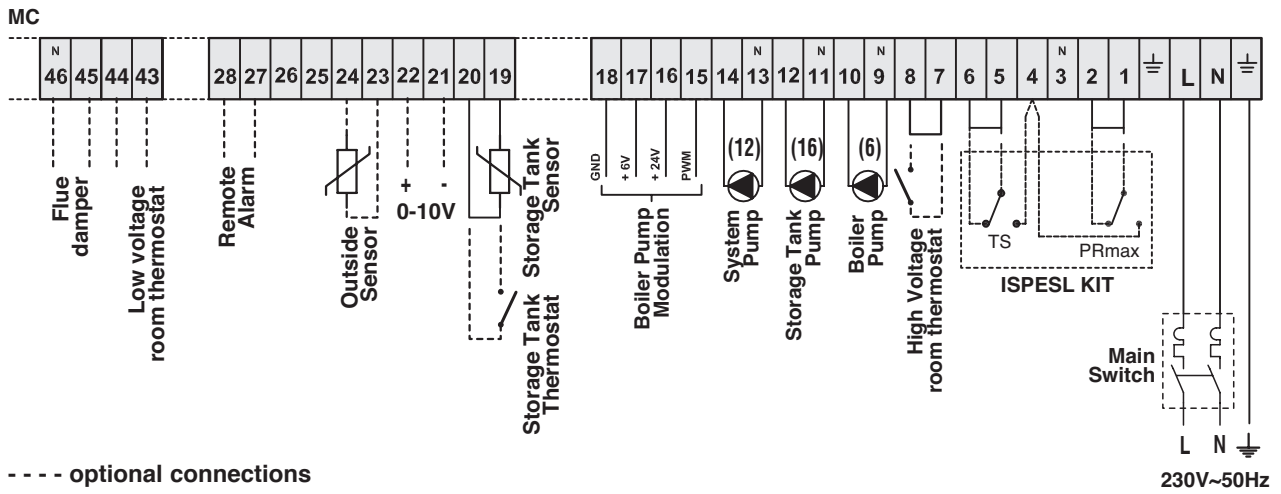


CONNECTIONS FOR OPERATION IN HEATING MODE ONLY (example 1 on page 20)

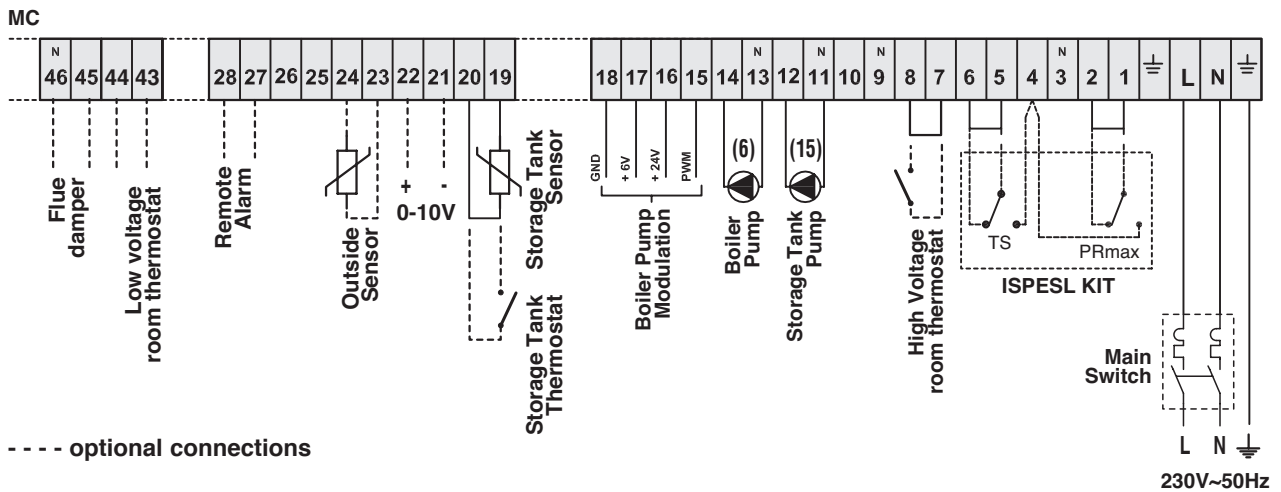


----- optional connections

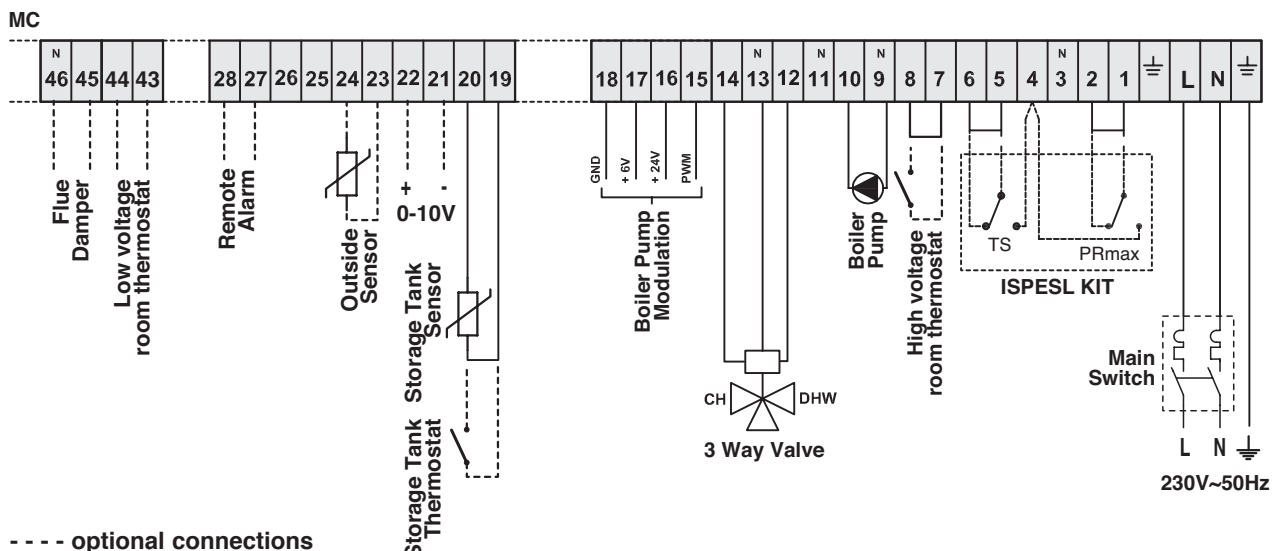
CONNECTIONS FOR OPERATION IN HEATING MODE AND DOMESTIC HOT WATER PRODUCTION WITH STORAGE TANK PUMP AND BOILER PUMP 2 (SYSTEM PUMP) (example 2 on page 20)



CONNECTIONS FOR OPERATION IN HEATING MODE AND DOMESTIC HOT WATER PRODUCTION WITH STORAGE TANK UPLINE OF THE HYDRAULIC SEPARATOR (example 3 on page 21)



CONNECTIONS FOR OPERATION IN HEATING AND DOMESTIC HOT WATER PRODUCTION MODE WITH 3WAY VALVE



WARNINGS

The following is compulsory:

- Use of an omnipolar thermal magnetic circuit breaker, line disconnecter, in compliance with EN standards.
- Observance of the connections L (Phase) - N (Neutral).
- Use of cable sections of at least 1 mm².
- Use of an earthing wire that is at least 2 cm longer than those of the L (Phase) - N (Neutral) connections.
- Reference to the wiring diagrams included in this manual for any type of electrical intervention.
- **Connections to an efficient earthing system (*)**.
- **NEVER** use water hoses for earthing the appliance.
- Great care to observe maximum absorption levels of the external circulation pumps (see "WIRING DIAGRAM" page 15).

(*) **The manufacturer declines all liability for any damage caused by failure to earth the appliance or specifications in the wiring diagrams.**

REMOTE ALARM

The outputs of terminals 27-28 supply a voltage-free contact for the management of an alarm signal. This contact is activated each time an error/malfunction occurs on the heating unit.

WARNINGS

- In the event of an error/malfunction of the heating unit the "Block indicator light due to intervention of safety devices" **Sbs**, on the control panel, does not light up. This light only illuminates if one of the ISPEL safety devices trips (if correctly connected as shown in the wiring diagram) at the same time as disconnection of the electrical power supply to the heating unit.

CONNECTION OF OUTSIDE SENSOR (OPTIONAL)

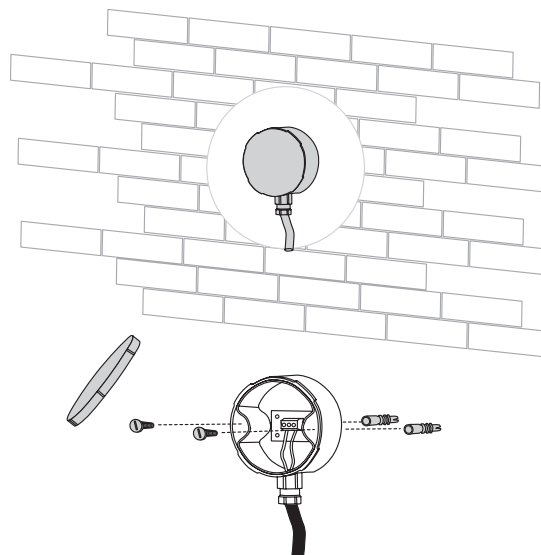
The outside sensor must be installed on the outside of the building, on a flat surface in a north/north-east position (the coolest side) and at a safe distance from the flues, doors, windows and areas exposed to direct sunlight.

To install, proceed as follows:

- Remove the cover.
- Fix the sensor to the wall using two plugs.
- Make the electrical connections.

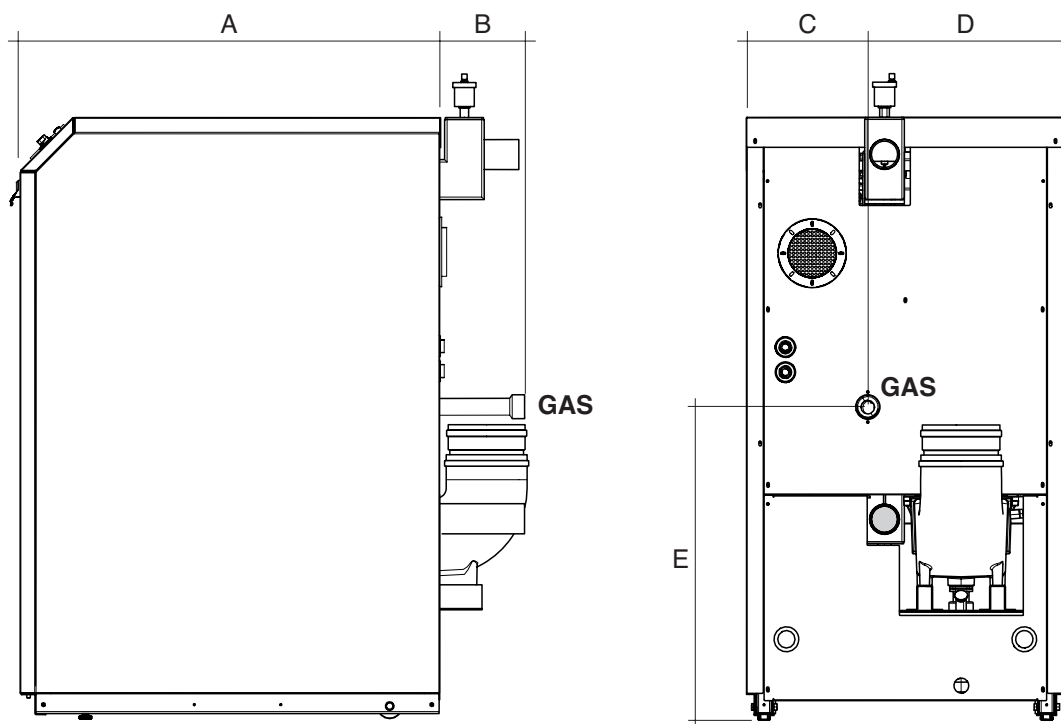
NOTE:

- Minimum cable section: 1 mm².
- Maximum connection length: 50 m.
- Non-polarised connection terminals.
- Use shielded coaxial cables, with 2 wires and connect the sheath to earth.



GAS CONNECTION

Connection of the **S - AF** appliance to the gas mains must comply with current installation standards.



INSTALLATION

Hydraulic fittings	S - AF					
	115	150	200	240	280	
GAS Gas supply	1" 1/2					Ø
A	848	848	1088	1088	1088	mm
B	175					mm
C	245					mm
D	397					mm
E	624					mm

Before making the connection, ensure that:

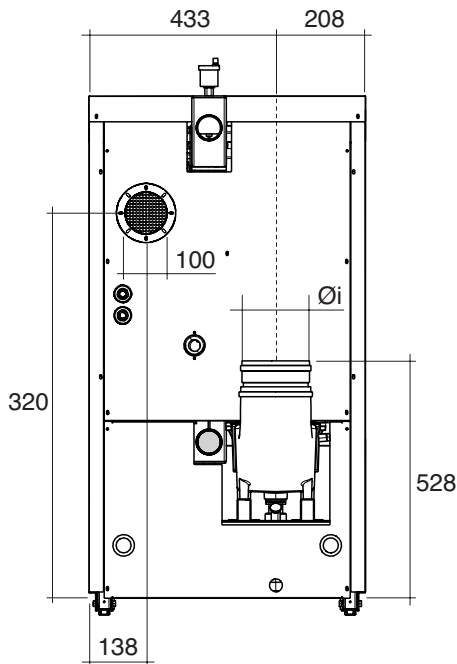
- the type of gas corresponds to the design specifications of the appliance
- the pipelines are thoroughly clean and free of processing residue.

The installation of the suitably sized filter is recommended.

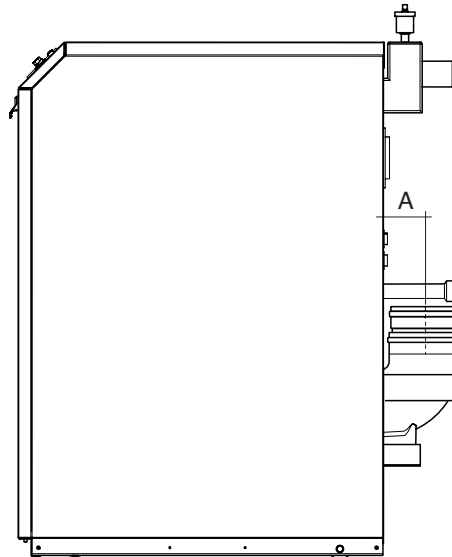
WARNINGS

- The gas supply system must be suitable for the capacity of the appliance and be equipped with all safety and control devices as envisaged by current standards.
- On completion of installation, check that all connections are sealed and secure.

FLUE EXHAUST AND EXTRACTION OF COMBUSTION AIR



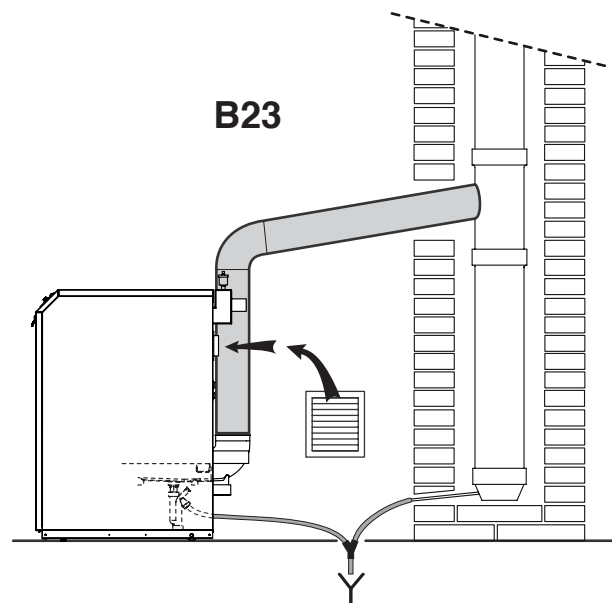
Dimensions	S - AF					
	115	150	200	240	280	
Øi (internal)	150		200			mm
A	108		133			



“TYPE B” installations

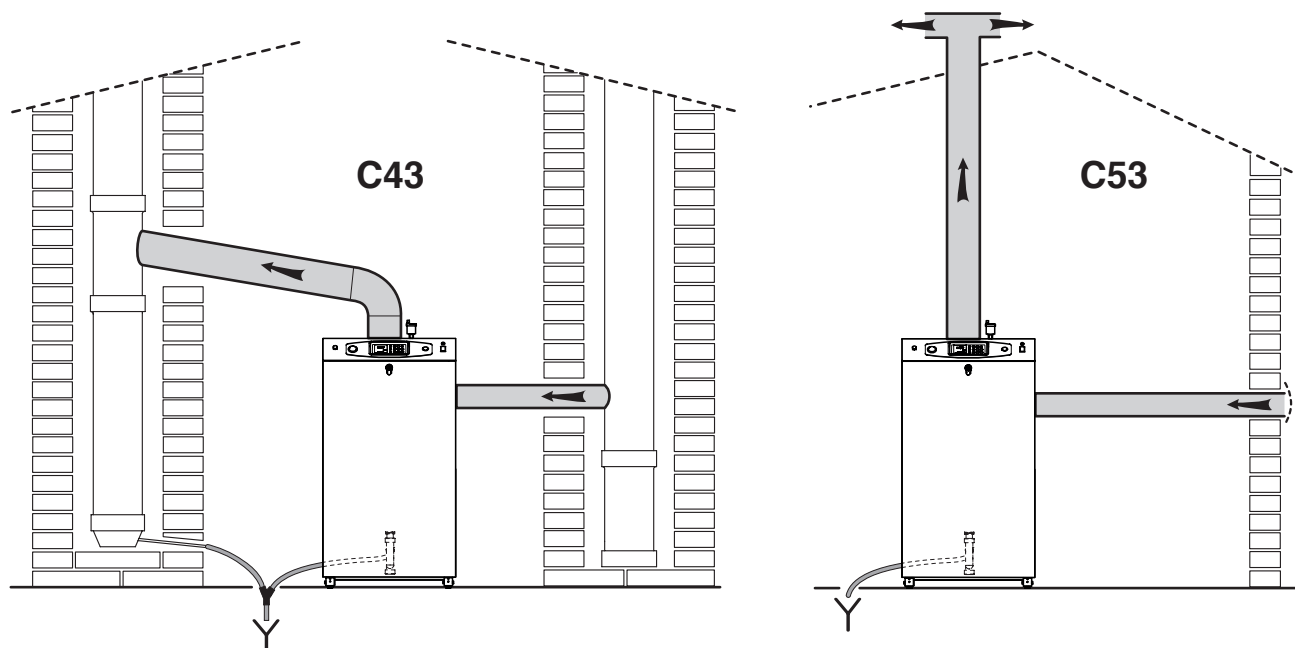
⚠ WARNINGS

- S - AF appliances are equipped with a flue exhaust sensor, which in the event of anomalous increases in flue temperatures, shuts down the appliance.
- In this configuration, the appliance receives the combustion air from the installation room, which **MUST BE FITTED** with ventilation outlets installed in compliance with the specifications of the relevant technical standards.
- For the flue duct, the use of stainless steel piping is recommended, in compliance with standards EN1856-1 and EN1856-2.
- The flue duct must ensure a minimum negative pressure as envisaged by current technical standards, considering “zero” pressure at the fitting with the flue duct, and must be equipped with a condensate drain trap. The condensate drain of the heating unit must only extract condensate from the heating unit and flue duct.
- Connect the condensate collection syphon to a clear water drain.
- Drain pipelines that are not insulated constitute a potential hazard.
- **The flue duct must be correctly sized for condensing heating units. Inadequate or incorrectly sized flue ducts and pipelines can cause problems with combustion parameters and excessive noise.**
- **IT IS STRICTLY PROHIBITED** to seal off or partially obstruct the ventilation apertures of the installation room and the appliance.
- Envisage a 3% inclination of the flue gas duct toward a condensate collector.



“TYPE C” installations

S - AF appliances are approved for installation types “C43, C53, C63 and C83” and it is a **COMPULSORY** requirement that they are equipped with an exhaust flue and combustion air extractor in compliance with the above types of installation.



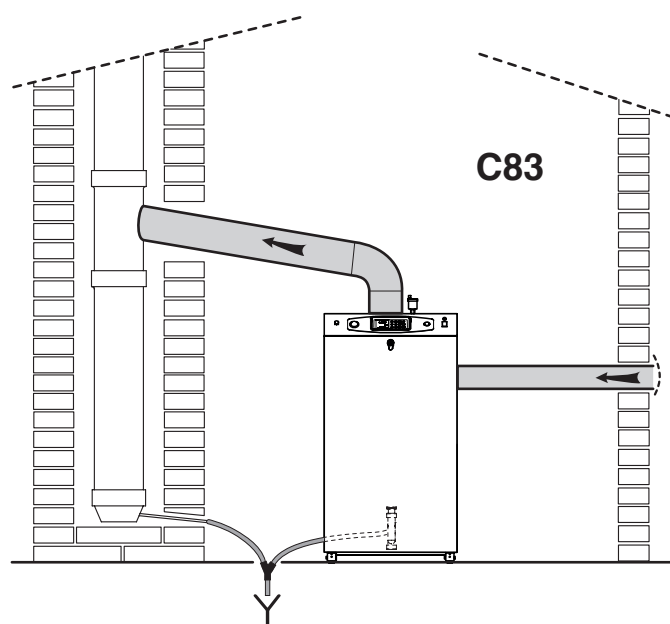
INSTALLATION

WARNINGS

- In the case of “C53” type installations, the extraction and exhaust flue terminals may not be installed on walls opposite the building.

C63

If ducts and terminals of another manufacturer are used (C63 type), they must be approved. In the case of flue ducts, the materials used must furthermore be compatible with the condensate products. When dimensioning the ducts, take into account the values of the residual head to the blower as stated in the table on the following page.



The heating appliance is delivered with the configuration B23.

To intake air from the outside it is necessary to connect a plastic pipe with diameter of 100mm to the appliance intake outlet, bearing in mind that this pipe must not allow pressure drops over the value specified in the table below.

The air inlet and flue outlet must be located in an area with the same pressure values.
A protection mesh is fitted on entry to the air duct to prevent the ingress of foreign bodies.

Calculations for the flue outlet and air inlet: the table below specifies the overall residual head available for the flue outlet and combustion air inlet.

Description	S - AF					Pa
	115	150	200	240	280	
Total residual head (exhaust + intake)	320	233	100	180	85	Pa

Ensure that the head required does not exceed the values as stated in the table; otherwise there is the risk of pressure switch intervention with consequent shutdown of the heating appliance.

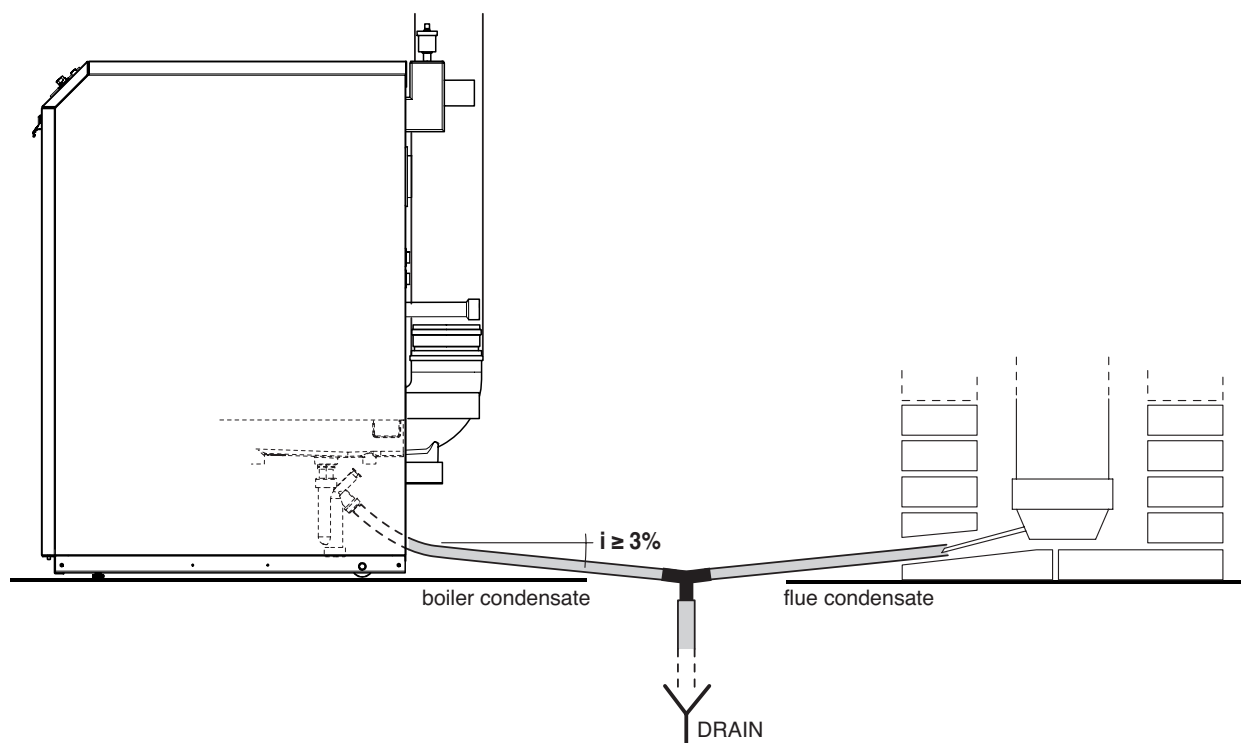
 **WARNINGS**

- The **S - AF** appliances are equipped with a flue exhaust sensor, which in the event of anomalous increases in flue temperatures, shuts down the appliance.
- In configuration "C" the appliance takes in combustion air from outside the installation room and therefore does NOT REQUIRE ventilation outlets.
- The use of stainless steel flue ducts is recommended, in compliance with standards EN1856-1 and EN1856-2. If using ducts in PPS, these must be certified and fitted with a condensate collector upline of the flue connection of the heating appliance.
- It is compulsory to use terminals that comply with the requirements of standard EN1856-1.
- Connect the condensate collection syphon to a clear water drain.
- Drain pipelines that are not insulated constitute a potential hazard.
- **The flue duct must be correctly sized for condensing heating units. Inadequate or incorrectly sized flue ducts and pipelines can cause problems with combustion parameters and excessive noise.**
- **IT IS STRICTLY PROHIBITED** to run the appliance if the flue exhaust ducts and combustion air intake ducts are not suited to the installation.
- Envisage a 3% inclination of the flue gas duct toward a condensate collector.

CONDENSATE REMOVAL

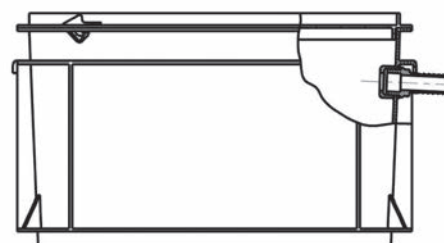
WARNINGS

- The condensate drain line must be tightly sealed, with dimensions suited to those of the syphon and without any throttled or reduced sections in gradient “i”, which is recommended at $\geq 3\%$.
- The condensate drain must comply with current local and/or national standards.
- Before commissioning the appliance, fill the syphon with water.



The following is recommended:

- Plumbing in manifolds on the condensate drain and flue exhaust
- Installing a neutralisation device, such as the model supplied separately on request (code no. 008087030).



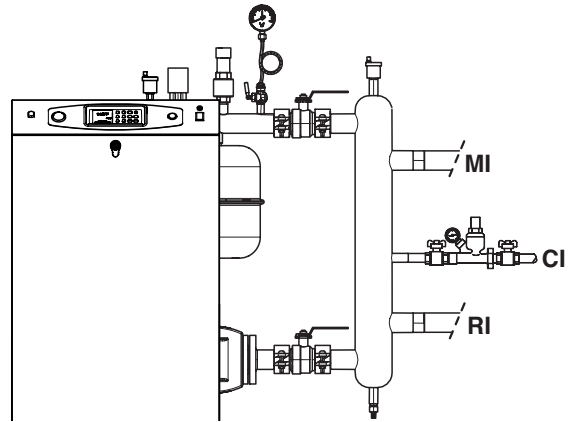
SYSTEM FILLING AND DRAINING

S - AF appliances are NOT fitted with a filler valve, and therefore a suitable filling system must be envisaged during installation at the most convenient point for the installer.

As a guideline, the figure illustrates a possible system filling unit connection point (CI).

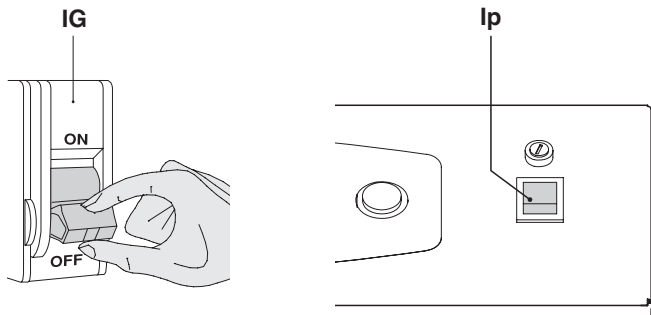
NOTE:

The appliance is equipped with an automatic valve for purging the air from the system.



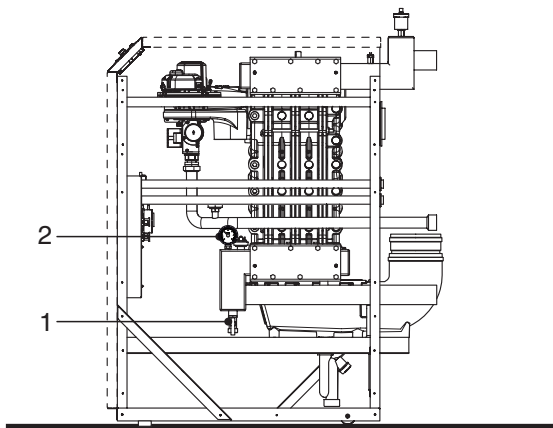
Before starting the system filling or draining operation:

- Set the main switch (IG) of the system and the main appliance switch (Ip) to "OFF"



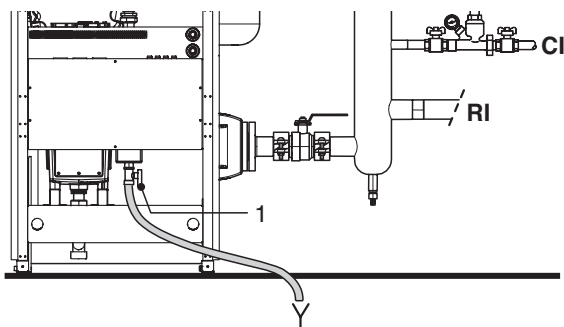
FILLING

- Ensure that the drain valve (1) is closed
- Ensure that the pre-charge pressure of the expansion vessel(s) is correct
- Open the water system shut-off devices (CI) and slowly charge until the pressure gauge (2) indicates a value, **in cool conditions, of approx. 2 bar**
- Close the water system shut-off devices (CI).



DRAINING

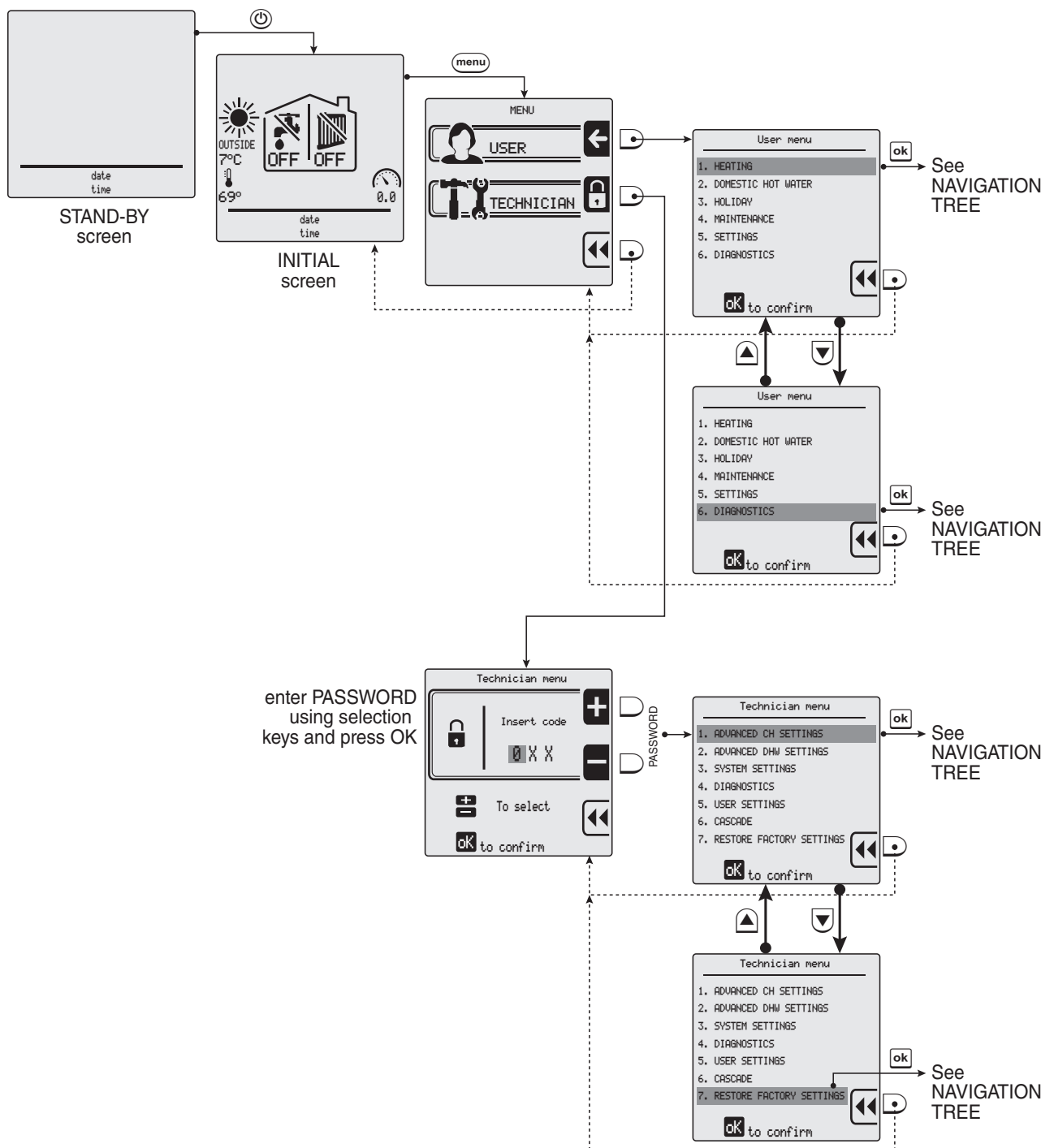
- Ensure that the water system shut-off devices (CI) are closed
- Connect a transfer hose to the drain valve (1) and then open the valve
- On completion of draining, close the valve (1).



MENU NAVIGATION TREES AND PROCEDURE

Navigation procedure

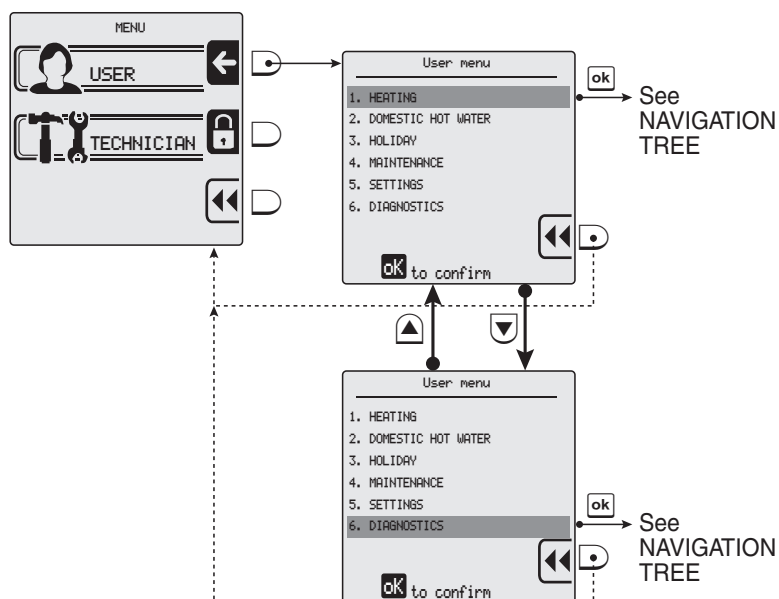
The appliance is supplied in the configuration STAND-BY.
To scroll through the screen menus, use the keys shown in the diagram below.



INSTALLATION

The following pages in this manual illustrate the user menu trees and the technician menu trees, together with the keys used for navigation.




















User MENU navigation tree



USER MENU	Keys	Sub-menu	Keys	Lines	Keys	Factory settings	Field	
1. HEATING	ok ▼ ▲	1. CH temperature/OTC Set	ok	1. CH temperature	ok	75°C	20 - max. absolute T. (*)	
			▼	2. Outside temperature for CH off	ok	OFF	OFF / 7 - 30°C	
		▼	2. ECO setpoint reduction	ok	--->	--->	50°C	0 - 50°C
		▼	3. Scheduler set	ok	1. Enable/disable scheduler	ok	Enabled	Enabled/disabled
▼	2. Scheduler settings	ok		Monday	week days			
2. DOMESTIC HOT WATER	ok ▼ ▲	1. DHW setpoint	ok	--->	--->	80°C (**)	35 - 85°C	
			▼	2. ECO setpoint reduction	ok	--->	--->	20°C
		▼	3. Scheduler set	ok	1. Enable/disable scheduler	ok	Enabled	Enabled/disabled
		▼		2. Scheduler settings	ok	Monday	week days	
3. HOLIDAY	ok ▼ ▲	1. CH holiday setpoint	ok	--->	--->	20°C	20 - max. absolute T. (*)	
		2. DHW holiday setpoint	ok	--->	--->	80°C (**)	30 - 85°C	
4. MAINTENANCE	ok ▼ ▲	1. Service information	ok	--->	--->	read only		
		2. Service due date	ok	--->	--->	read only		

(*) Maximum absolute temperature set at point "1.2.1" of the technician menu.

(**) - If "2.5 TYPE OF REQUEST" of the Technician menu = "Contact" then "Factory setting" = 80°C with "Field" = 30 - 85°C.
 - If "2.5 TYPE OF REQUEST" of the Technician menu = "Sensor" then "Factory setting" = 60°C with "Field" = 10 - 65°C.

USER MENU	Keys	Sub-menu	Keys	Lines	Keys	Factory settings	Field
5. SETTINGS		1. Select Language		English / Italiano		<i>Italiano</i>	<i>English / Italiano</i>
 		2. Select Units		Fahrenheit / Celsius		<i>Celsius</i>	<i>Fahrenheit / Celsius</i>
		3. Set date		--->	--->	<i>day / month / year</i>	
		4. Set time		24 hour / 12 hour		<i>hours : minutes</i>	
		5. Restore factory settings		--->	--->	<i>OK to reset</i>	
6. DIAGNOSTICS		1. Boiler information		<i>read-only display of set parameters and values</i>			
		2. Lockout history		<i>read-only display of lockout/fault history</i>			

KEY TO THE USER MENU LINES

Ref. menu line	Line title	Meaning
1. HEATING		
1.1.1	CH temperature	Entry of setpoint of supply temperature (heating)
1.1.2	Outside temperature for CH off	Entry of setpoint of outside temperature for automatic switchover to "Summer mode"
1.2	ECO setpoint reduction	Entry of value to reduce temperature on supply in "energy saving" mode (day or night time)
1.3.1	Enable/disable on board scheduler	Enable or Disable implementation of the "heating time bands" set for the various week days
1.3.2	Scheduler set	Settings of the "heating time bands" applied for the various week days
2. DOMESTIC HOT WATER		
2.1	DHW setpoint	Entry of the setpoint for DHW temperature
2.2	ECO setpoint reduction	Entry of value to reduce temperature of DHW in "energy saving" mode (day or night time)
2.3.1	Enable/disable on board scheduler	Enable or Disable implementation of the "DHW production time bands" set for the various week days
2.3.2	Scheduler set	Settings of the "DHW production time bands" applied for the various week days
3. HOLIDAY		
3.1	CH holiday setpoint	Entry of the setpoint for supply temperature during the holiday period.
3.2	Instant DHW setpoint	Entry of the setpoint for DHW during the holiday period.
4. MAINTENANCE		
4.1	Contact info	Display of services contact phone number
4.2	Service due date	Display of date for next maintenance due

Ref. menu line	Line title	Meaning
5. SETTINGS		
5.1	Select Language	Selection of language (English or Italian)
5.2	Select Units	Selection of units of measurement (Celsius or Fahrenheit)
5.3	Set date	Entry or modification of current date
5.4	Set time	Selection of 12 or 24 hour format - Entry or modification of current time
5.5	Restore factory settings	Restores factory settings
6. DIAGNOSTICS		
6.1	Boiler information	Display of boiler status and temperature readings To display, select the message, press ok and view the values, scrolling through items by means of the arrows ▼ ▲
6.2	Lockout history	Display of the error list.

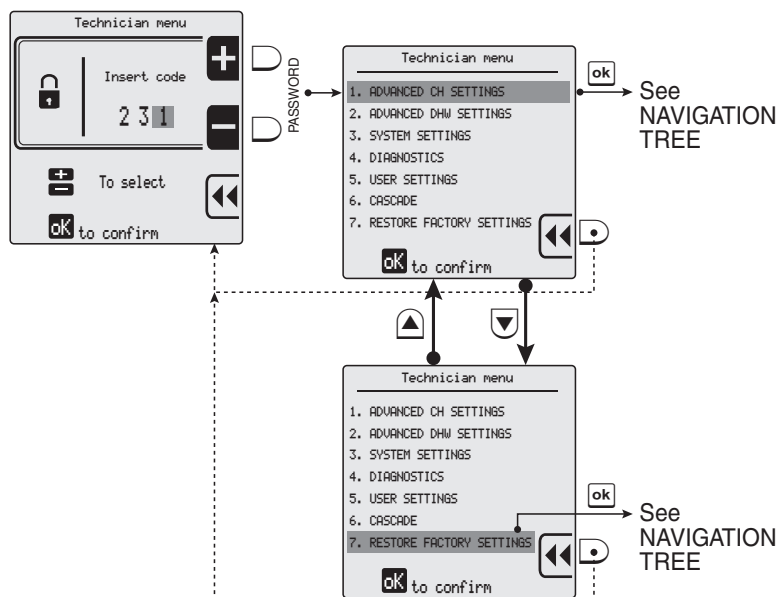
TECHNICIAN MENU NAVIGATION TREE

Access to the technician menu requires entry of the PASSWORD "231".

The procedure is as follows:







































































- press **+** TWICE followed by **ok**
- press **+** THREE TIMES followed by **ok**
- press **+** ONCE followed by **ok**.

For a maximum of 15 minutes, the system enables exit and subsequent re-entry to the technician menu without the need to enter the password. On elapse of this interval, entry of the password is required again to access the technician menu.



TECHNICIAN MENU	Keys	Sub-menu	Keys	Lines	Keys	Factory settings	Field	
1. ADVANCED CH SETTINGS	ok	1. CH power set	ok	1. Maximum power 100%	ok	100%	0 - 100%	
			▼	2. Minimum power 0%	ok	0%	0 - 100%	
	▼	2. CH temperatures	ok	1. ABS max temperature	ok	80°C	20 - 85°C	
			▼	2. CH maximum setpoint	ok	75°C	20 - 85°C	
			▼	3. CH minimum setpoint	ok	40°C	20 - 70°C	
			▼	4. CH setpoint hysteresis	ok	3°C	2 - 10°C	
			ok	1. Outside temp for max CH	ok	-10°C	-34 - 10°C	
	▼ ▲	▼	3. OTC parameters	▼	2. Outside temp for min CH	ok	18°C	15 - 25°C
				▼	3. Outside CH temp. OFF	ok	OFF	OFF / 7 - 30°C
				▼	4. OTC setpoint table	ok	read only	
				▼	5. OTC curve	ok	read only	
				ok	1. DHW post pump time	ok	5'	1' - 30'
	▼	4. DHW pump settings	ok	1. DHW post pump time	ok	5'	1' - 30'	
	▼	5. CH anticycling timer	ok	---	---	2'	0' - 15'	
	▼	6. DHW request type	ok	Outside sensor / room therm. / 0-10V signal [%] / 0-10V signal [SP]	ok	Room thermostat	Outside sensor / room therm. / 0-10V signal [%] / 0-10V signal [SP]	
	2. ADVANCED DHW SETTINGS	ok	1. DHW power	ok	1. Maximum power 100%	ok	100%	0-100%
				▼	2. Minimum power 0%	ok	0%	0-100%
▼		2. DHW temperature	ok	1. Storage DHW setpoint	ok	80°C	35-85°C	
			▼	2. Instant DHW setpoint	ok	60°C (*)	10-65°C	
			▼	3. DHW setpoint hysteresis	ok	3°C	2-10°C	
▼		3. DHW pump settings	ok	1. DHW post pump time	ok	30s	Off/1-180s	
▼		4. DHW priority	ok	1. DHW status	ok	Enabled	Enabled/disabled	
			▼	2. DHW priority timeout	ok	Off	Off/1-60min.	
▼		5. DHW request type	ok	---	---	Switch	Switch / Sensor (*)	




(*) In the event of a "sensor" type DHW request, the heating appliance heats the water to a temperature as set in point "2.2.2" of the technician menu + 20°C.

TECHNICIAN MENU	Keys	Sub-menu	Keys	Sub-menu	Keys	Lines	Keys	Factory settings	Field			
5. USER SETTINGS	 	1. Heating		1. DHW setpoint		1. DHW setpoint		75°C	20 - 85°C			
				2. ECO setpoint reduction		2. Outside temperature for CH off		OFF	OFF / 7 - 25°C			
				3. Scheduler set		1. Enable/disable on board scheduler		Enabled	Enabled/disabled			
						2. Scheduler set		Monday	week days			
				1. DHW setpoint		---		---	80°C	30 - 85°C		
				2. ECO setpoint reduction		---		---	20°C	0 - 50°C		
		2. DHW settings				1. DHW setpoint		1. Enable/disable on board scheduler		Enabled	Enabled/disabled	
								2. Scheduler set		Monday	week days	
						1. CH holiday setpoint		---		---	20°C	20 - 85°C
						2. DHW holiday setpoint		---		---	30°C	30 - 85°C
		6. CASCADE	 	1. Cascade set		1. Cascade switch delay		---		60s	0-255 s	
						2. Cascade min power		---		18%	0-100%	
						3. Single burner power		---		depending on heating appliance	0-2550kW	
						4. Boiler for DHW		---		0	0-6	
	5. PI loop period					---		5s	1-15 s			
	6. Burner water flow delay					---		30s	0-255 s			
	7. Different boiler size					---		Disabled	Enabled/disabled			
	8. Cascade pump speed max.					---		100%	15-100%			
	9. Cascade pump speed min.					---		30%	15-100%			
	2. Cascade info				---		---		Read only			
	3. Cascade autodetect		---		---		----	----				

TECHNICIAN MENU	Keys	Sub-menu	Keys	Sub-menu	Keys	Lines	Keys	Factory settings	Field
7. RESTORE FACTORY SETTINGS	<input type="checkbox"/> ok	To restore the factory settings							
8. BOILER TYPE	<input type="checkbox"/> ok	1. Wall Hung Boiler	<input type="checkbox"/> ok	1. G20	<input type="checkbox"/> ok	1. 60kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	2. 100kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	3. 115kW	<input type="checkbox"/> ok	--->	Set
			<input type="checkbox"/> ok	2. LPG/G30	<input type="checkbox"/> ok	1. 60kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	2. 100kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	3. 115kW	<input type="checkbox"/> ok	--->	Set
	<input type="checkbox"/> ok	2. Floor standing boiler 1	<input type="checkbox"/> ok	1. G20	<input type="checkbox"/> ok	1. 115kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	2. 150kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	3. 200kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	4. 240kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	5. 280kW	<input type="checkbox"/> ok	--->	Set
			<input type="checkbox"/> ok	2. G31	<input type="checkbox"/> ok	1. 115kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	2. 150kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	3. 200kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	4. 240kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	5. 280kW	<input type="checkbox"/> ok	--->	Set
	<input type="checkbox"/> ok	3. Floor standing boiler 2	<input type="checkbox"/> ok	1. G20	<input type="checkbox"/> ok	1. 340kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	2. 410kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	3. 480kW	<input type="checkbox"/> ok	--->	Set
					<input type="checkbox"/> ok	4. 550kW	<input type="checkbox"/> ok	--->	Set
<input type="checkbox"/> ok					5. 620kW	<input type="checkbox"/> ok	--->	Set	

KEY TO TECHNICIAN MENU

Ref. menu line	Line title	Meaning
1. ADVANCED CH SETTINGS		
1.1.1.	Maximum power	Entry of maximum applicable power
1.1.2.	Minimum power	Entry of minimum applicable power
1.2.1	ABS max temperature	Setting of maximum admissible appliance supply temperature
1.2.2	CH maximum setpoint	Setting of maximum supply temperature, corresponding to minimum outside temperature
1.2.3	CH minimum setpoint	Setting of minimum supply temperature, corresponding to maximum outside temperature
1.2.4	CH setpoint hysteresis	Value in °C, over which the maximum set temperature, before burner shut-off
1.3.1	Outside temp. for Max CH	Setting of minimum outside temperature, corresponding to the maximum supply temperature
1.3.2	Outside temp. for Min CH	Setting of maximum outside temperature, corresponding to the minimum supply temperature
1.3.3	Outside temp for CH off	Setting of outside temperature for automatic switchover to "Summer mode"
1.3.4	OTC setpoint table	Display of corresponding values of outside and supply temperatures, according to the set climatic curve
1.3.5	OTC curve	Display of set climatic curve graph
1.4.1	Post-pump time	Post-pump time setting
1.5	CH anticycling timer	Time interval during which burner ignition requests are ignored
1.6	CH request type	Selection of device used: Outside sensor, room thermostat, 0-10V signal [%] (power), 0-10V signal [SP] (temperature)
2. ADVANCED DHW SETTINGS		
2.1.1	Maximum power	Entry of maximum applicable power
2.1.2	Minimum power	Entry of minimum applicable power
2.2.1	Storage DHW setpoint	Water temperature of primary circuit for filling the storage tank (with tank thermostat fitted)
2.2.2	Instant DHW setpoint	DHW temperature (with tank sensor fitted)
2.2.3	DHW setpoint hysteresis	Value below the setpoint entered in the parameter 2.2.2 , which activates a DHW request in the boiler
2.3.1	Post-pump time	Post-pump time setting
2.4.1	DHW status	Enables/Disables priority of DHW over heating
2.4.2	DHW priority timeout	Entry of time after which DHW priority elapses (heating, if present, is served for the same time interval as that of DHW)
2.5	DHW request type	Selection of device used: Sensor (Probe) or Contact (Thermostat)
3. SYSTEM SETTINGS		
3.1.1	Ignition power	Burner ignition power
3.1.2	Delay siphon check	Entry of delay before syphon pressure switch fault signal
3.1.3	Number of boiler pumps	Selection of 3-way valve and double heating pump

Ref. menu line	Line title	Meaning
3.1.4	Pump speed max	Maximum boiler pump speed (primary)
3.1.5	Pump speed min	Minimum boiler pump speed (primary)
3.1.6	Antilegionella	Enables/Disables Anti-legionella function
3.1.7	Heat exchanger protection	Enables/Disables protection with heat exchanger sensor
3.1.8	Heat exchanger delta	Entry of increment from supply temp., over which the heat exchanger temp. generates an error
3.1.9	Modbus parameters	Changes address of the display on the bus
3.1.10	3-way valve travel time	Enables modification to the stroke time of the 3-way valve for DHW if/when present.
3.2.1	Select Language	Selection of language (English or Italian)
3.2.2	Select Units	Selection of units of measurement (Celsius or Fahrenheit)
3.2.3	Set date	Entry or modification of current date
3.2.4	Set time	Selection of 12 or 24 hour format - Entry or modification of current time
3.3.1	Service information	Entry of telephone number for Technical Services
3.3.2	Set maintenance date	Entry of date for next maintenance
4. DIAGNOSTICS		
4.1	Boiler information	Display of boiler status and temperature readings To display, select the message, press  and view the values, scrolling through items by means of the arrows  
4.2	Lockout history	Display of the error list.
4.3	Manual test	Override of a heating cycle, with settable power, for a maximum duration of 15 minutes
5. USER SETTINGS		
5.1	Heating	See USER menu - 1. HEATING
5.2	DHW settings	See USER menu - 2. DOMESTIC HOT WATER
5.3	Holiday settings	See USER menu - 3. HOLIDAY

Ref. menu line	Line title	Meaning
6. CASCADE		
6.1.1	Cascade switch delay	Interval between ignition of different boilers
6.1.2	Cascade min power	Minimum available power in cascade
6.1.3	Single burner power	Maximum power of single burner
6.1.4	Boiler for DHW	Number of boilers also used for DHW
6.1.5	PI loop period	Time interval for recalculating power requirements
6.1.6	Burner water flow delay	Delay of response of control algorithm according to hydraulic structure. In the case of cascade configurations with disconnect, it is possible to balance the time in which a temperature variation, read by the cascade sensor, is effectively received by the control board.
6.1.7	Different boiler size	Enables/Disables algorithm-based control of cascade configurations of boilers with different outputs (e.g. in the presence of a low power generator dedicated to DHW production). In the case of combining several generators of the same output, this algorithm does not need to be enabled.
6.1.8	Cascade pump speed max	Setting of maximum admissible speed for cascade pumps
6.1.9	Cascade pump speed min	Setting of minimum admissible speed for cascade pumps
6.2	Cascade info	Display of information on the cascade configuration
6.3	Cascade autodetect	Start of cascade auto-configuration process.
7. RESTORE FACTORY SETTINGS		Restores factory settings
8. BOILER TYPE		
8.1	Wall Hung Boiler	Setting of type of boiler as "Wall-hung" "Multidea EVO" and selection of output model Change to type of gas used
8.2	Floor standing boiler 1	Setting of type of boiler as "Floor-standing" "S - AF" and selection of output model Change to type of gas used
8.3	Floor standing boiler 2	Setting of type of boiler as "Floor-standing" "S - AF" and selection of output model Change to type of gas used

INITIAL COMMISSIONING

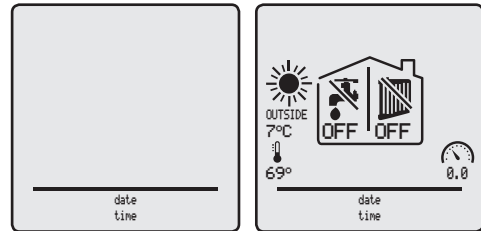
PRELIMINARY PROCEDURES

The **S - AF** heating appliances leave the factory in the following condition:

- set up for operation with G20 (natural gas), but with the option of operating with G31 (propane)

- unit DSP in stand-by

- in the “none” operating mode; both heating and DHW requests are disabled. This prevents the heating unit from starting when power up, even when there is a heating request.



Before commissioning the appliance, it is essential to establish which type of gas is to be used. If this is G31, the setting of the type of gas must be changed as described in the paragraph "Change of gas type" page 46.

Following this, ensure that:

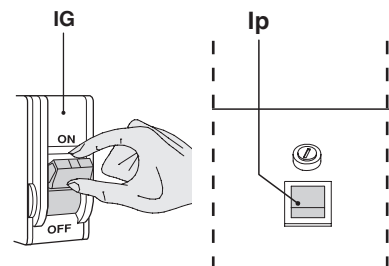
- all fuel shut-off valves and water valves are open
- the mains gas pressure is sufficient and that the pipelines have been purged
- the hydraulic circuit pressure, in cool conditions, is greater than 2 bar and no air is present in the circuit (purging completed)
- the expansion vessel is fitted, correctly sized and pre-charged
- all electrical connections have been made correctly
- the flue exhaust ducts and fuel air intake points (if present) comply with specifications/requirements
- the check valve is fitted and the relative data plate specifications are compatible with the maximum operating pressure of 6 bar
- the syphon is filled and the condensate drain line is routed correctly.

WARNINGS


- Ensure that no ice has formed inside the boiler before connecting and powering it up.

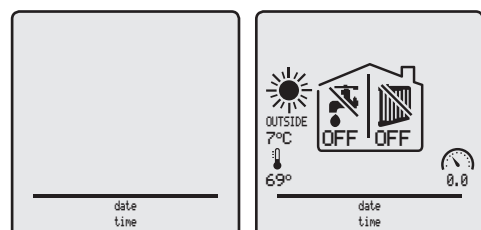
INITIAL COMMISSIONING

- Turn on the heating unit by setting the main system switch (IG) and the main appliance switch (Ip) to “ON”.



- The display returns to the stand-by screen.

- Press  to activate the keypad for the DSP.





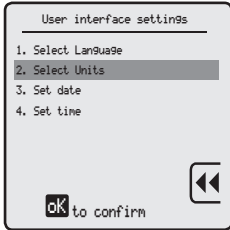
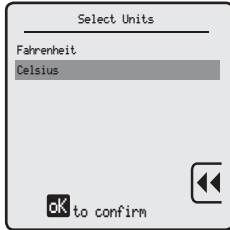


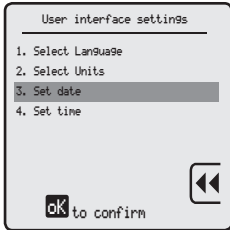
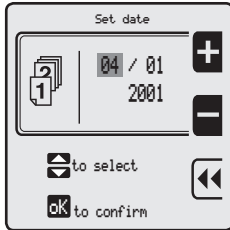









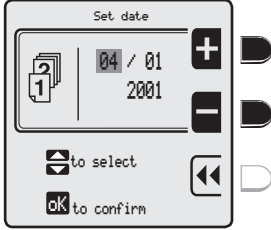
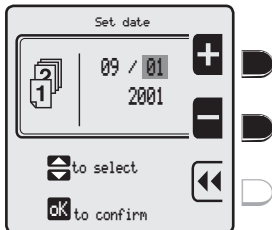
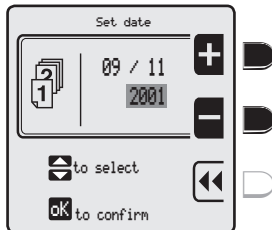
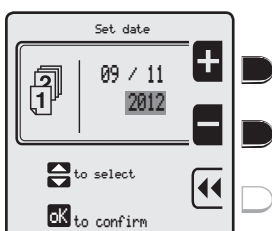
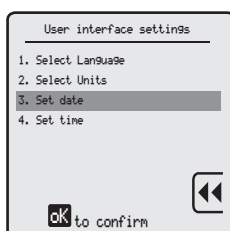






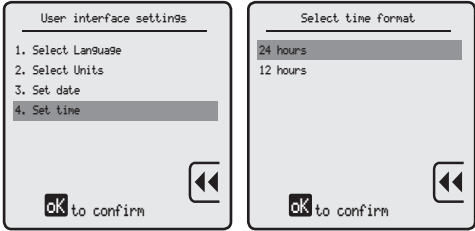
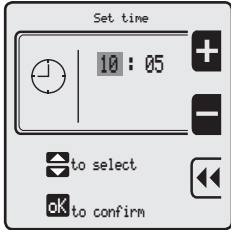







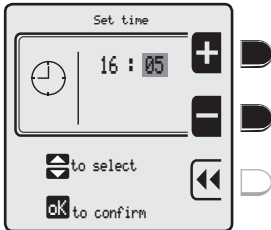
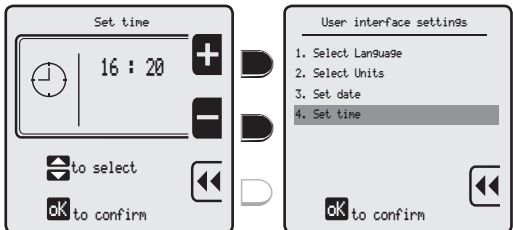
USER INTERFACE SETTINGS VIA TECHNICIAN MENU

This procedure enables the user to check or modify the LANGUAGE THE CURRENT UNIT OF MEASUREMENT and the current date and time.

Key to press	Description	Display
 	<p>to display the MENU screens</p> <p>to enter the TECHNICIAN menu, which requires entry of the PASSWORD</p>	
TWICE 3 TIMES ONCE 	<p>To enter the PASSWORD "231":</p> <p>to enter the first digit "2"</p> <p>to confirm and move to the second digit</p> <p>to enter the second digit "3"</p> <p>to confirm and move to the third digit</p> <p>to enter the third digit "1"</p> <p>to confirm the password and enter the menu</p>	
TWICE 	<p>to select "3. SYSTEM SETTINGS"</p> <p>to confirm and access the selected line</p>	
ONCE 	<p>to select "2. User interface settings"</p> <p>to confirm and access the selected line</p>	
 	<p>to confirm and access the selected line</p> <p>to modify the language used</p> <p>to confirm the selection and return to line "1. Select Language"</p>	

INSTALLATION

Key to press	Description	Display
   	<p>to select "2. Select Units"</p> <p>to confirm and access the selected line</p> <p>to modify the unit of measurement to be used</p> <p>to confirm the selection and return to line "2. Select Units"</p>	 
 	<p>to select "3. Set date"</p> <p>to confirm and access the selected line</p>	 
 OR    OR    OR  	<p>to set the current day</p> <p>to select the month</p> <p>to set the current month</p> <p>to select the year</p> <p>to set the year</p> <p>to confirm the settings and return to line "3. Set date"</p>	    

Key to press	Description	Display
   	<p>to select "4. Set time"</p> <p>to confirm and access the selected line</p> <p>to modify the time format used</p> <p>to confirm and access the selected line</p>	 
 OR   OR   OR  	<p>to set the current time</p> <p>to select the minutes</p> <p>to set the minutes</p> <p>to confirm the settings and return to line "4. Set time"</p>	 

INSTALLATION

CHECKING / MODIFYING FACTORY SETTINGS

The appliance leaves the factory with the settings as described in the paragraph "Technician menu navigation tree" page 34. If the factory settings are not optimal for the specific system to be managed, follow the navigation tree to locate the value to be modified.

CHANGE OF GAS TYPE

The appliance leaves the factory set to operate with G20. If using LPG proceed as described below.

Key to press	Description	Display
 	<p>to display the MENU screens</p> <p>to enter the TECHNICIAN menu, which requires entry of the PASSWORD</p>	
TWICE 3 TIMES ONCE 	<p>To enter the PASSWORD "231":</p> <p>to enter the first digit "2"</p> <p>to confirm and move to the second digit</p> <p>to enter the second digit "3"</p> <p>to confirm and move to the third digit</p> <p>to enter the third digit "1"</p> <p>to confirm the password and enter the menu</p>	
7 TIMES 	<p>to select "8. BOILER TYPE"</p> <p>to confirm and access the selected line</p>	
 	<p>to select "2. Floor standing boiler 1"</p> <p>to confirm and access the selected line</p>	
 	<p>to select "2. G31"</p> <p>to confirm and access the selected line</p>	

Key to press	Description	Display
	to select the output corresponding to the appliance model	
	to confirm the selection and return to the INITIAL screen.	

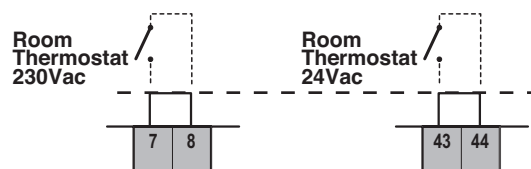
The setting of the “gas change” parameter AUTOMATICALLY sets the blower RPM as stated in the table.

DESCRIPTION	S - AF						
	115	150	200	240	280		
Nominal heating output - Min - Max	21.0 - 113.0	30.0 - 150.0	35.5 - 200.0	42.5 - 235.0	49.5 - 275.0	kW	
Operating RPM	a G20	1665 - 7400	1650 - 6250	1230 - 5600	1320 - 5800	1300 - 5800	rpm
Frequency		55.5 - 246.7	55 - 208.3	61.5 - 280	66 - 290	65 - 290	Hz
Operating RPM	a G31	1665 - 7400	1650 - 6250	1230 - 5600	1320 - 5800	1300 - 5800	rpm
Frequency		55.5 - 246.7	55 - 208.3	61.5 - 280	66 - 290	65 - 290	Hz

HEATING UNIT IGNITION

To start up the heating unit:

- Ensure that a jumper is wired in or that an on-demand room thermostat is set between terminals 7 and 8. The heating unit will not work without these conditions.



MANUAL TEST function

This procedure enables the user to override a heating cycle, with settable power, for a maximum duration of 15 minutes

Key to press	Description	Display
	to display the MENU screens	
	to enter the TECHNICIAN menu, which requires entry of the PASSWORD	

Key to press	Description	Display
TWICE 	To enter the PASSWORD "231": to enter the first digit "2" to confirm and move to the second digit	
3 TIMES 	to enter the second digit "3" to confirm and move to the third digit	
ONCE 	to enter the third digit "1" to confirm the password and enter the menu	
3 TIMES 	to select "4. DIAGNOSTICS" to confirm and access the selected line	
TWICE ONCE	to select "3. Manual test" to confirm	
 OR 	to start the test (maximum duration 15 minutes) to increase or decrease the power (from 0 to 100%)	
	Perform all checks as described in section "OPERATIONAL CHECKS - CALIBRATION AFTER GAS TYPE CHANGES" page 50	
	to deactivate the MANUAL TEST function	

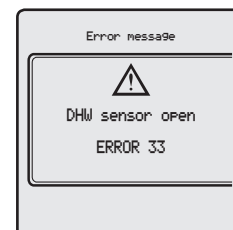
In the event of a malfunction, the appliance applies a **Safety block** or **Safety stop**, depending on the type of error/fault that has occurred, as signalled on the DSP display.

Errors with safety block

The table below lists the errors/faults that generate a Safety Block.

To restore normal operating conditions:

- Disconnect the electrical and gas power supplies from the appliance
- Eliminate the cause of the fault
- Restart the appliance.



Display items		Meaning
Failed ignition	Error 1	The flame has not been ignited within the appliance safety interval, 3 times consecutively
False flame	Error 2	False flame detection
High Boiler Temperature	Error 3	The appliance safety thermostat has tripped due to high temperature
Blower speed	Error 5	The blower speed has not been detected
Flame circuit	Error 8	Flame detection (circuit) error
Gas valve circuit fault	Error 9	Gas valve (circuit) error
	Error 13	Repeated errors exceeding 5 manual resets in less than 15 minutes Also in this case, turn the appliance off and on again to reset.
Internal control fault	Error 21	Fault on internal equipment/board
CRC connection	Error 25	CRC connection error
Supply sensor shorted	Error 30	The supply sensor has detected a temperature outside the admissible range (equivalent to short circuit)
Supply sensor open	Error 31	The supply sensor has detected a temperature outside the admissible range (equivalent to short circuit)
Return sensor shorted	Error 43	The return sensor has detected a temperature outside the admissible range (equivalent to short circuit)
Return sensor open	Error 44	The return sensor has detected a temperature outside the admissible range (equivalent to short circuit)

Errors with safety stop

The table below lists the errors/faults that generate a Safety Stop.

To restore normal operating conditions:

- Disconnect the electrical and gas power supplies from the appliance
- Eliminate the cause of the fault

The appliance restarts automatically on the first heat request.


Display items		Meaning
	Error 7	Flue temperature over limit
ΔT Supply/Return high	Error 11	ΔT Supply/Return > 5°C for at least 5 seconds, on stand-by, measured continuously
	Error 15	On start-up: (Supply T. - Ret. T.) > 3°C
	Error 16	On start-up, the supply T. does not vary by at least 1°C
	Error 17	On start-up, the return T. does not vary by at least 1°C
	Error 18	General sensor error, reading off scale
DHW sensor shorted	Error 32	The DHW sensor has detected a temperature outside the admissible range (equivalent to short circuit)
DHW sensor open	Error 33	The DHW sensor has detected a temperature outside the admissible range (equivalent to short circuit)
Low voltage	Error 34	The mains voltage is low (V<230-15%)
Low water pressure	Error 37	The water pressure switch detects/signals low pressure
Water pressure error	Error 41	The frequency of water pressure update is insufficient
Flue sensor shorted	Error 45	The flue sensor has detected a temperature outside the admissible range (equivalent to short circuit)

Display items		Meaning
Flue sensor open	Error 46	The flue sensor has detected a temperature outside the admissible range (equivalent to short circuit)
Water pressure error	Error 47	The water pressure switch is disconnected or damaged
Gas pressure	Error 76	Low gas pressure (pressure switch tripped)
Syphon error	Error 77	The syphon sensor has detected excessively high pressure
	Error 80	Ret. T. > Supply T.
	Error 81	Test in progress on temperature difference between sensors If the test fails, Error 15 is displayed.
	Error 82	The heat exchanger sensor has shorted or detected a temperature outside the admissible range (equivalent to short circuit)
	Error 83	The heat exchanger sensor is detached or has detected a temperature outside the admissible range (equivalent to short circuit)
	Error 84	High heat exchanger temperature (heat exchanger T > Supply T +10°C)
	Error 89	Incompatible programming (e.g. Max< Min.)
	Error 91	Cascade sensor in DC
	Error 92	Cascade sensor in AC
	Error 93	Outside sensor in DC
	Error 94	Error in display board
	Error 95	General cascade sensor error
	Error 96	Outside sensor in AC
	Error 97	Cascade connection defective
	Error 98	Boiler bus connection error
	Error 99	Internal boiler bus error

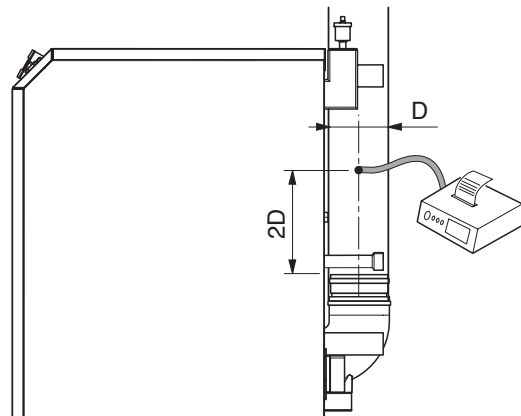
OPERATIONAL CHECKS - CALIBRATION AFTER GAS TYPE CHANGES

For the gas change procedure, see the specific section on page 46.

To perform the operational checks and/or calibration after a gas change, proceed as follows:

- Activate the MANUAL TEST function and press  to increase power to 100% (see section "MANUAL TEST function" page 47).
This sets the heating unit to operate at **Maximum Capacity**.
- The blower RPM is shown on the display, at maximum capacity. Check that this value corresponds to the value stated in the table "TECHNICAL SPECIFICATIONS".
- Measure the gas flow rate, taking into account any relevant corrective factors.
- Use the analyser to take CO₂ and CO readings.

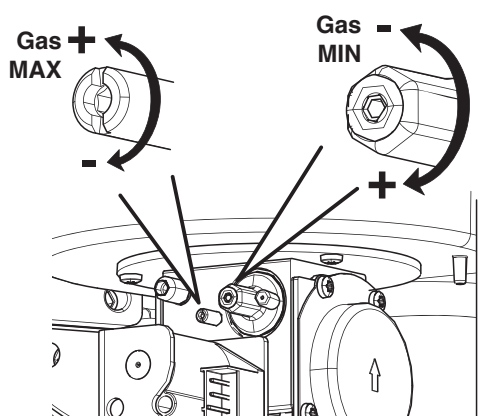
The test hole for flue analysis must be made on the straight section of the flue duct at a distance of at least twice the diameter from the appliance outlet (refer to current standards).



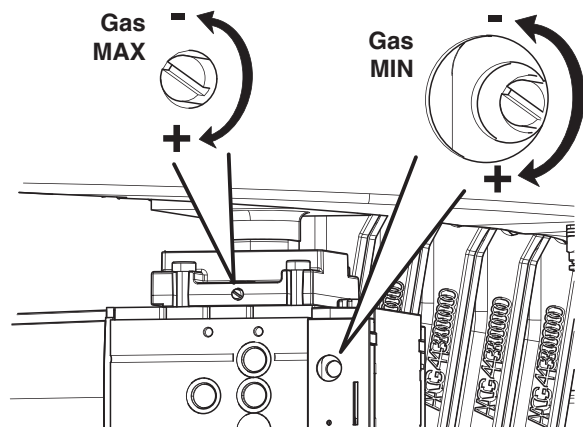
Compare the readings with those stated in the table below, considering a tolerance of ± 5%.

DESCRIPTION		S - AF					
		115	150	200	240	280	
Max. gas consumption	G20	11.96	15.87	21.16	24.87	29.10	m ³ /h
	G31	8.78	11.66	15.54	18.26	21.37	kg/h
Min. gas consumption	G20	2.22	3.17	3.76	4.50	5.24	m ³ /h
	G31	1.63	2.33	2.76	3.30	3.85	kg/h
Max/min CO ₂ (average values)	G20	9.3/9.1					%
Max/min CO ₂ (average values)	G31	10.6/10.3					%
CO		25	30	35	30	28	ppm

If these do not correspond, gradually adjust the MAX gas adjuster screw on the gas valve until the analyser shows the correct combustion values.



S - AF gas valve
115 / 150



S - AF gas valve
200 / 240 / 280

- Press to reduce power to 0% (see section "MANUAL TEST function" page 47). This sets the heating unit to operate at **Minimum Capacity**.
- The blower RPM is shown on the display, at minimum capacity. Check that this value corresponds to the value stated in the table "TECHNICAL SPECIFICATIONS".
- Measure the gas flow rate, taking into account any relevant corrective factors.
- Use the analyser to take CO₂ and CO readings.

Compare the readings with those of the table on the previous page.

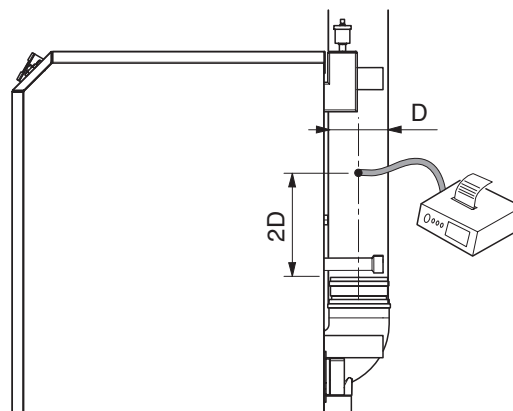
If these do not correspond, gradually adjust the MIN gas adjuster screw on the gas valve until the analyser shows the correct combustion values.

Press to deactivate the MANUAL TEST function.

If necessary, make adjustments both at the maximum and minimum values.

WARNINGS

- If the control values are not accessible, check that:
 - the flue extraction ducts or air intake ducts are not obstructed;
 - the gas pressure is not lower than 18 mbar (G20) or 25 mbar (G31);
 - the blower RPM is correct (see page 47).



OUTSIDE SENSOR AND CLIMATIC CURVE

When operation envisages the use of the outside sensor ("sliding temperature") the MAXIMUM and MINIMUM SUPPLY temperatures must be set, as well as the OUTSIDE temperature range so that the appliance can calculate the climatic curve on the basis of these settings.

The procedure is as follows:

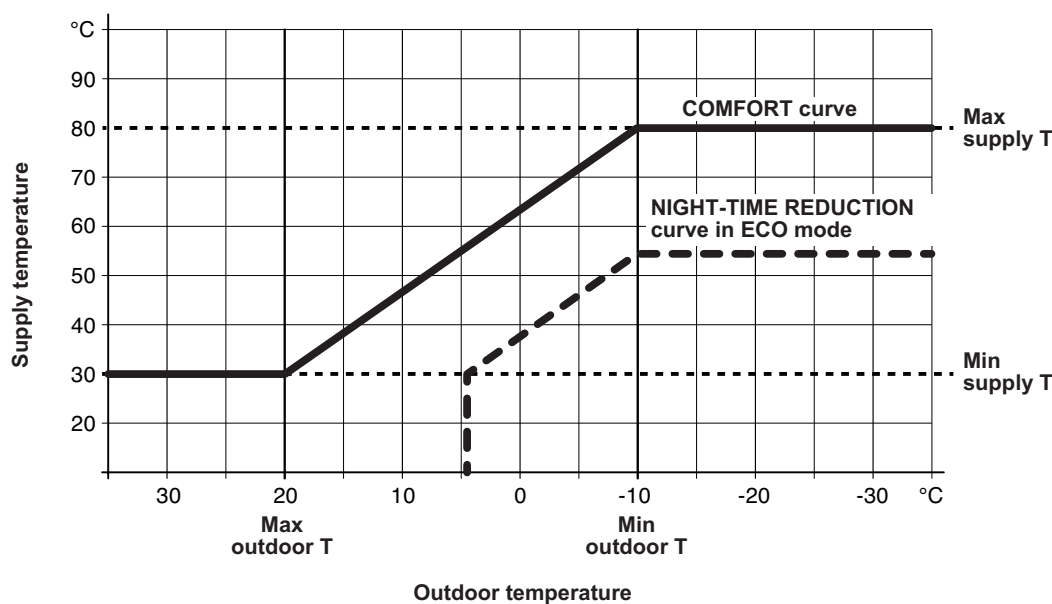
- Enter the Technician Menu (see page 34)
- Enter "1. ADVANCED CH SETTINGS" and proceed to line "2. CH temperatures" (see page 35)
- Press **ok** and check the existing values
- If these need to be modified, select and enter the relevant line to be modified
- Modify the value and press **ok** to confirm.
- Press **←**
- Select "3. OTC sensor parameters"
- Press **ok** and check the existing values
- If these need to be modified, select and enter the relevant line to be modified
- Modify the value and press **ok** to confirm.

IMPORTANT

After setting/entering the optimal values, enter lines 4. OTC setpoint table and 5. OTC curve, to display the appliance operating mode and make further corrections if necessary (it may be necessary to wait for around one minute to enable the system to update all data).

- Press **←** to return to the initial line
- Select "6. DHW request type"
- Press **ok**
- Select "outside sensor" and press **ok** to confirm.

The outside temperature can always be read on the initial display screen.



0..10V INPUT CHECK

IMPORTANT PRELIMINARY INFORMATION

When an external controller is used with a 0-10V signal for power control, it is essential that the system, on the supply side, is fitted with an additional temperature sensor, to be connected to the external controller.

This must therefore be installed if not already present.

SETTINGS ON DSP

The settings required on the DSP to select the control function with 0-10V controller are:

- Enter the Technician Menu (see page 34)
- Enter "1. ADVANCED CH SETTINGS" and proceed to line "6. Request type" (see page 35)
- Then select "0-10V signal [%]" (power request) or "0-10V signal [SP]" (temperature request).

With these settings, the appliance heating power / temperature is managed directly by the 0-10V signal as follows:

- | | | |
|----------------------------|-----------------------------------|---|
| A) with voltage increase | voltage < 2V | ---> OFF |
| | $2V \leq \text{voltage} \leq 10V$ | ---> linear variation of Power or Temperature |
| B) with voltage decreasing | $2V \leq \text{voltage} \leq 10V$ | ---> linear variation of Power or Temperature |
| | $1V \leq \text{voltage} < 2V$ | ---> Minimum Power or Minimum Temperature |
| | voltage < 1V | ---> OFF |

In both modes, climatic control is managed by the external controller, and therefore to avoid problems of overlapping time bands, at least one of the following conditions must apply:

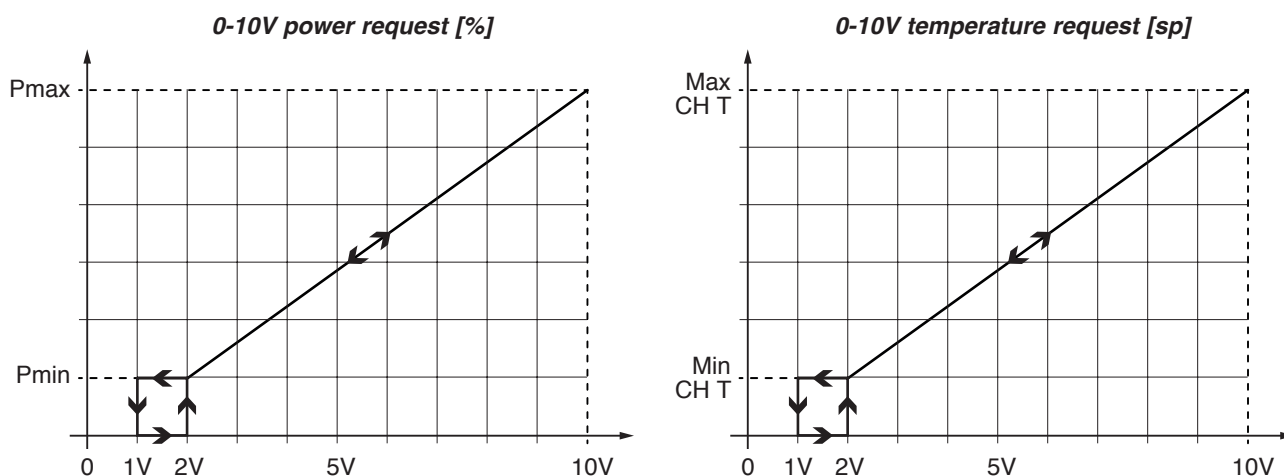
- the Timer is disabled
- the Timer is enabled but not set to "OFF" mode

To modify the functions on level "3.Scheduler settings":

- Enter the Technician Menu (see page 34)
- Select "5.USER SETTINGS" (see page 37)
- Enter the line "1.Heating" and proceed to the line "3. Scheduler settings"

IMPORTANT

The heating function (CH) must always be active (not disabled).



DHW REQUEST TYPE

Depending on the selected device used (parameter Heating 1.6), the following table shows the priorities according to the conditions of the room thermostat and Scheduler settings.

		CH Demand		
		Only OTC	Room thermostat	0-10V (power or temperature)
AT contact closed	Scheduler ENABLED	The heating unit follows the Timer settings, observing the bands set as ON, ECO and OFF. The temperature is modulated on the basis of the outside temperature.	The heating unit follows the Scheduler settings, observing the bands set as ON, ECO and OFF. If = OFF => Request disabled, heating unit on stand-by; If = ON => Request enabled, fixed setpoint at set Tmax*; If = ECO => Request enabled, fixed setpoint at the temperature corresponding to ECO mode	Request enabled, setpoint depending on 0-10V signal
	Scheduler DISABLED	Request enabled, setpoint corresponding to ON mode (comfort). The temperature is modulated on the basis of the outside temperature.	Request enabled, fixed setpoint at set Tmax*;	
AT contact open	Scheduler ENABLED	Request disabled, heating unit on stand-by	Request disabled, heating unit on stand-by	Request disabled, heating unit on stand-by
	Scheduler DISABLED	Request enabled, setpoint corresponding to ECO mode. The temperature is modulated on the basis of the outside temperature.		

(*) Tmax = Set maximum temperature (see parameter 1.2.2 technician menu)



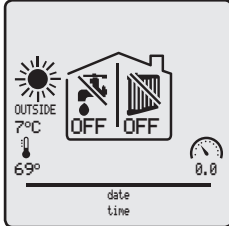
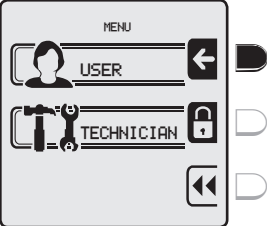




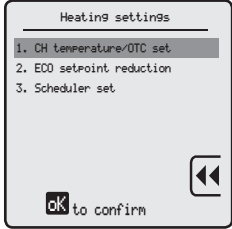


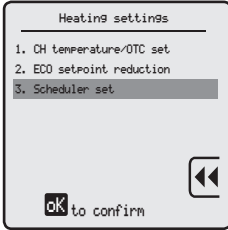
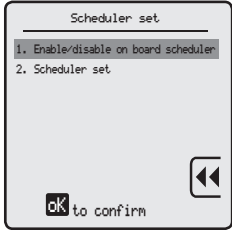



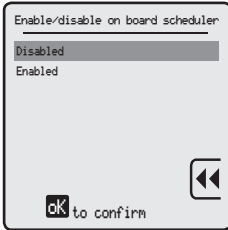
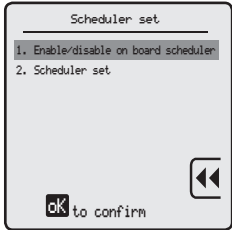



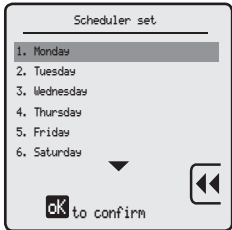





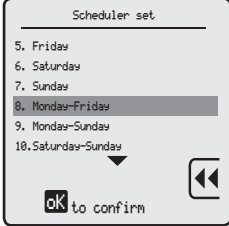
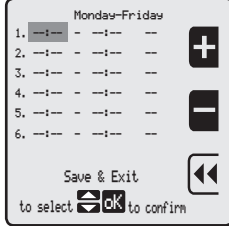





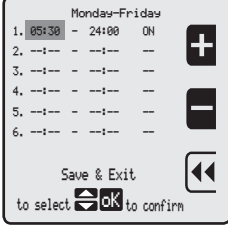
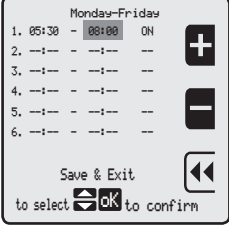
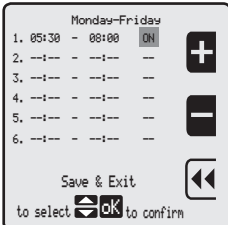
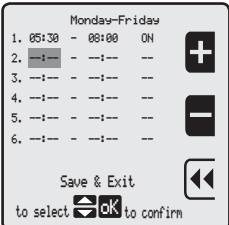


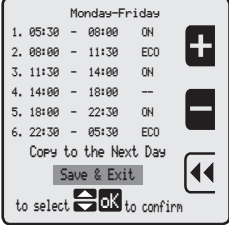
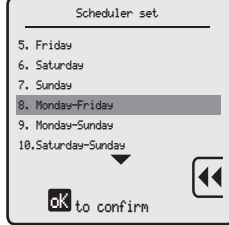




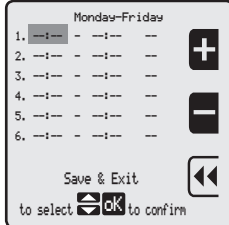
This operating mode applies regardless of whether the AT is high voltage or low voltage (see page 47)).

SCHEDULER SETTINGS

The system also envisages the option of setting time bands during which the heating unit is set to operate, if there is a demand for heat, and those during which it remains off, or in ECO mode when fitted with an outside sensor.

There is a maximum of 6 programmable time bands within 24 hours, each of which must be identified by a start time (ON), and end time (OFF). The minimum interval between each time is half an hour.

Key to press	Description	Display
 	<p>to display the MENU screens</p> <p>to enter the USER MENU</p>	 
  	<p>to select "1. HEATING"</p> <p>or</p> <p>to select "2. DOMESTIC HOT WATER"</p> <p>NOTE: the scheduler setting procedure is the same for both functions.</p>	 
 TWICE 	<p>to select "3. Scheduler set"</p> <p>to confirm and access the selected line</p>	 
  	<p>to select Enabled or Disabled</p> <p>to confirm the selection and return to line "1. Enable/disable on board scheduler"</p> <p>CAUTION: if the selection is DISABLED, the scheduler settings are memorised but not enabled.</p>	 
 	<p>to select "3. Scheduler set"</p> <p>to confirm and access the selected line</p>	 

Key to press	Description	Display
  	<p>to select the single day or group of days in the week</p> <p>to confirm and access the selected line</p>	 
 OR    	<p>to set the "start" time of the first band</p> <p>to set the "end" time of the first band</p> <p>to select the operating mode of the first time band, from ON, ECO or -- (heating unit OFF)</p> <p>to go to the second time band To enter the settings, proceed in the same way as with the first band.</p> <p>NOTE: the time entry procedure is the same for all selected time bands.</p>	   
 	<p>to select "Save and exit" or "Copy to the Next Day" (if the user wishes to copy the current settings to the next day)</p> <p>to save the settings made and return to the line of the single day or group of week days selected previously</p>	 
  	<p>to select the day or days remaining and set the required time bands</p> <p>to confirm and access the selected line</p> <p>NOTE: the time entry procedure is the same for all selected time bands.</p>	 

TEMPORARY SHUTDOWN OR HOLIDAY SCHEDULE

This function enables a reduction in the operating regime of the heating unit in the case of temporary absences, weekends, holidays and above all automatic restart after the set time interval.

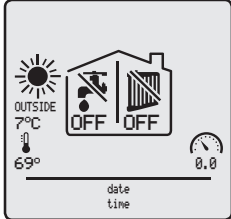

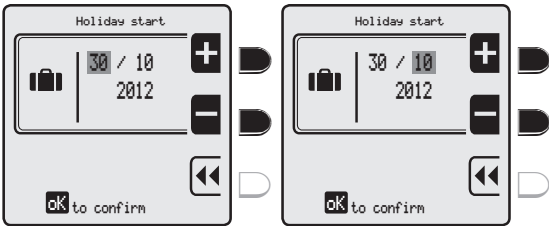
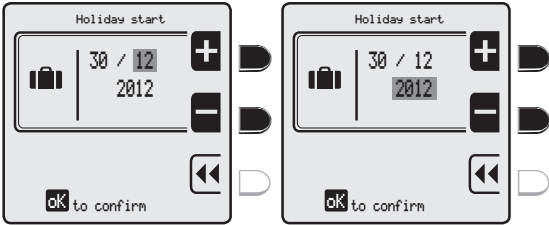
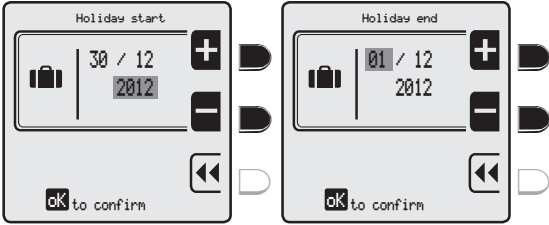
WARNINGS

- During the holiday period, it is essential to leave the electrical and gas mains supplies to the appliance powered, to ensure correct operation.

The supply temperatures for the heating system and/or production of domestic hot water, must be set as described below:

Key to press	Description	Display
 	<p>to display the MENU screens</p> <p>to enter the USER MENU</p>	
 TWICE 	<p>to select "3. HOLIDAY"</p> <p>to confirm and access the selected line</p>	
 OR 	<p>to select "1. CH holiday setpoint"</p> <p>to set the required value</p> <p>to confirm the settings and return to line "1. CH holiday setpoint"</p>	
 OR 	<p>to select "2. DHW holiday setpoint"</p> <p>to confirm and access the selected line</p> <p>to set the required value (only in the case of storage tanks with sensor) (*)</p> <p>to confirm the settings and return to line "2. DHW holiday setpoint"</p>	

(*) In the case of storage tanks with thermostat, take care not to set an excessively low value, as this could cause continuous requests for domestic hot water.

Key to press	Description	Display
<p>esc</p> <p></p>	<p>to return to the initial screen</p> <p>to display the "Holiday start" date</p>	 
<p>+ </p> <p>OR</p> <p>- </p> <p></p> <p>+ </p> <p>OR</p> <p>- </p> <p></p> <p>+ </p> <p>OR</p> <p>- </p> <p>ok</p>	<p>to set the holiday start day</p> <p>to select the month</p> <p>to set the month</p> <p>to select the year</p> <p>to set the year</p> <p>to confirm the settings made and enter the "Holiday end" screen.</p> <p>NOTE: to make the settings for the day, month and year of the holiday end, follow the same procedure as described for "Holiday start".</p>	  

MAINTENANCE AND CLEANING

Periodic maintenance is a compulsory legal requirement and is essential to ensure optimal safety, performance and lifetime of the appliance.

Internal cleaning of the appliance and removal of combustion residue from the exchange surfaces are operations required **at least once a year**. This is an essential condition to reduce consumption, pollutant emissions and to maintain optimal performance.

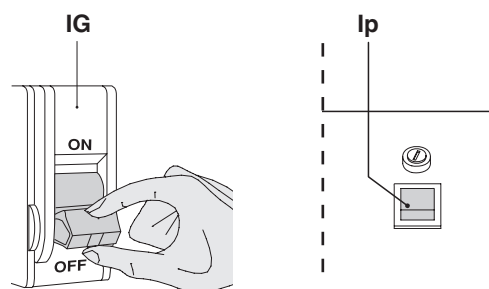
Before starting maintenance and/or cleaning:

- Set the main switch (IG) of the system and the main appliance switch (Ip) to "OFF"
- Close the fuel shut-off valves.

EXTERNAL CLEANING

The outer casing should be cleaned with cloths dampened with water and detergent. In the case of stubborn stains, dampen a cloth with a mix of 50% water and denatured alcohol or with special products.

After cleaning, dry the appliance thoroughly.



WARNINGS

- If replacing parts, use **EXCLUSIVELY** original spare parts.
- Never use abrasive products, benzene or trichloroethane.

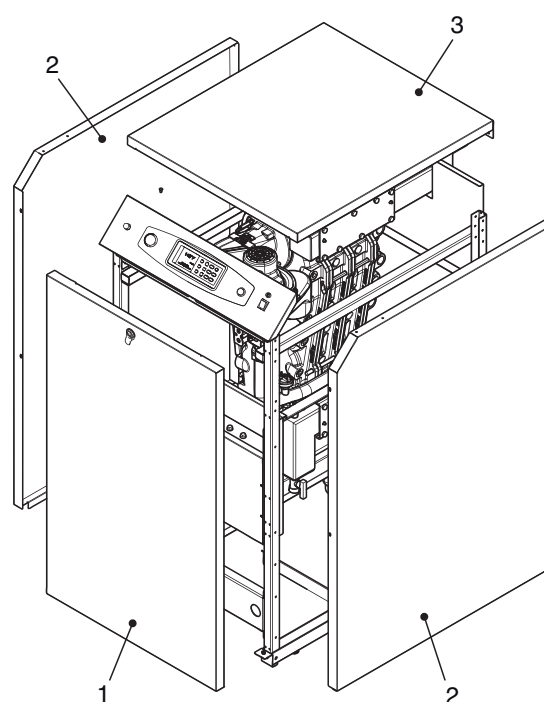
INTERNAL CLEANING OF HEAT EXCHANGER AND BURNER

To ensure correct operation of the appliance, the burner and flue lines in the exchanger need to be cleaned periodically. It is indispensable to mechanically and completely remove the dirt from the exchanger to avoid the possible formation of scale during the lifetime of the heating unit. If necessary, chemically remove all residue using products compatible with aluminium (the material of the heat exchanger).

After cleaning operations, remove/vacuum all residue from the condensate collection tank, accessed by opening the inspection door and also cleaning the condensate collection syphon. **IF IN DOUBT, CONTACT BONGIOANNI CALDAIE FOR ASSISTANCE.**

Panelling disassembly

- Open and remove the front panel (1), side panels (2) and top panel (3) of the casing.



Burner disassembly and cleaning

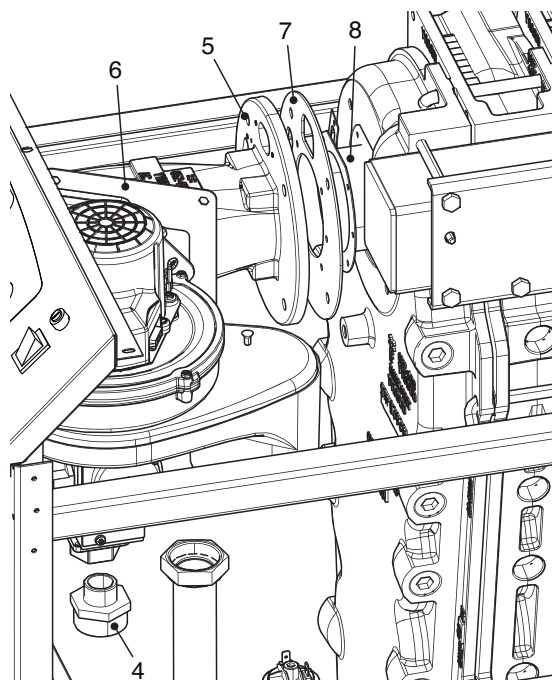
If appliance performance indicates the need to clean the burner head, proceed as follows:

- Remove the two connectors of the blower and that of the gas valve
- Unscrew the three-part fitting (4) of the gas line
- Loosen the four fixing screws (5) and remove the burner-blower-gas valve assembly (6) from the heat exchanger, taking care not to damage the seal (7)
- Extract the combustion head (8) and clean with care, using compressed air.

After cleaning, re-fit all components in reverse order of the above, inserting new seals where necessary.

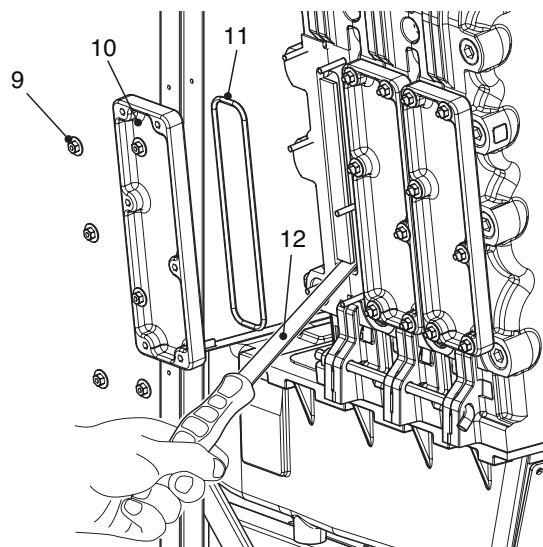
IMPORTANT

It is compulsory to test sealing efficiency of the gas line, as required by current standards.



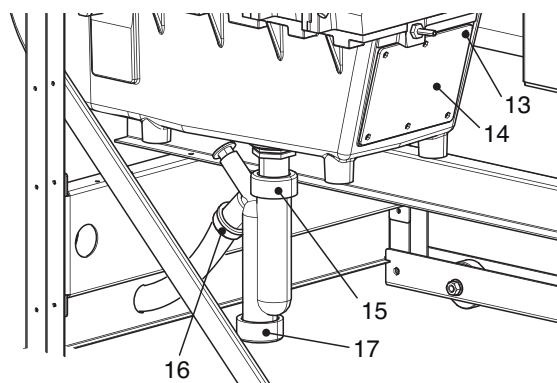
Exchanger disassembly and cleaning

- Loosen the nuts (9) and remove the inspection panels (10) and relative seals (11)
- Use a pig brush or similar tool to clean the pipelines of the exchanger. Bongioanni can provide a tool as an accessory (metal blade 12) suitable for mechanical cleaning of the flue lines
- After the cleaning operations, check the condition of the seals (6) and replace when necessary.



Syphon and condensate collection tank disassembly and cleaning

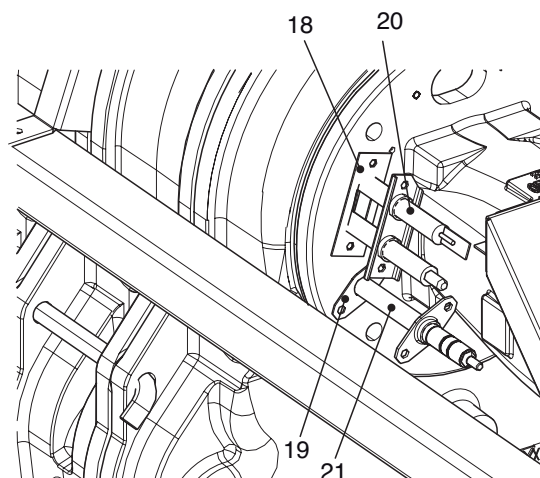
- Loosen the nuts (13) and remove the inspection panel (14). Check and clean the condensate collection tank. After cleaning, re-fit the inspection panel ensuring complete sealing, replacing the seal when necessary
- Unscrew the ring nuts (15) and (16) and remove the syphon with care to avoid the spillage of condensate
- Unscrew the ring nut (17) and thoroughly clean all internal parts of the syphon.



Electrode disassembly and replacement

WARNINGS

- During disassembly of the electrodes, take care not to damage the seals (18) and (19). If damaged, replace immediately.
- Loosen the fixing screws of the electrode unit (20), remove and check to ensure good working condition. **REPLACEMENT of the electrodes is recommended given the frequent ignition of the appliance.**
- Loosen the fixing screws of the sensor (21), remove and check to ensure good working condition. Replace when necessary.



TROUBLESHOOTING

Appliance malfunctions/faults are indicated on the display as shown in the table on page 49.

However, other anomalies may occur on the appliance/system, and these are listed below.

Fault	Cause	Remedy
Smell of gas	- Gas supply circuit	- Check sealing efficiency of the joints and closure of the pressure points
Smell of uncombusted fuel	- Flue circuit	- Check: - sealing of joints - for possible obstructions - combustion quality
Irregular combustion	- Supply gas pressure	- Check settings
	- Burner and/or exchanger dirty	- Check conditions
	- Intake and/or exhaust lines dirty	- Check conditions
Delayed ignition with pulsing on burner	- Incorrect blower RPM	- Check the blower RPM (see page 47).
	- More precise tuning of ignition power required	- Modify settings of the gas valve
The generator does not reach the set temperature	- Generator heat exchanger dirty	- Clean the combustion chamber
	- Insufficient burner flow rate	- Check burner settings

Fault	Cause	Remedy
The generator reaches the set temperature but the heating systems are cool	- Presence of air in the system	- Purge the system
	- System pump	- Unblock the pump - Replace the pump
Frequent intervention of the system safety valve	- System safety valve	- Check setting or efficiency
	- System pressure	- Check filling pressure - Check pressure reducer - Check filling valve
	- System expansion vessel	- Check efficiency
System pump/s do not work	- Pump blocked, electrical connections	- Check pump and connections
	- Room thermostat	- Check room thermostat and connections
Storage tank pump does not work	- Pump blocked, electrical connections	- Check the pump - Check the electrical connection between the pump and control panel
	- Storage tank thermostat	- Check efficiency and position of the thermostat

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