



MADEIRA  
SOLAR COMPACT  
KBS 24 - 32

INSTALLATION, USE AND MAINTENANCE



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IST 03 C 620 - 03

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Dear Sirs,

thank you for choosing and buying our boilers. Please, carefully read these instructions in order to properly install, operate and maintain the above-mentioned equipment.



**We inform users that:**

- **boilers shall be installed by an authorised company in full compliance with the prevailing standards;**
- **the installing company is required by law to issue a declaration of conformity with the current Standards concerning the performed installation;**
- **anyone entrusting installation to an unqualified installer will be subject to administrative sanctions;**
- **boilers can be maintained by authorised personnel only, under the requirements set forth by the prevailing rules.**

## General notes for installing and maintenance technicians, and users

This instruction manual, which is an integral and indispensable part of the product, must be handed over to the user by the installer and must be kept in a safe place for future reference. The manual must accompany the kit should it be sold or its possession transferred. This document shall be supplied together with the equipment in case the latter is sold or transferred to others.

 **This equipment has been manufactured to be connected to a room heating system and to a DHW distribution system. Any other use shall be considered unsuitable and dangerous for people, animals, and/or property.**

The equipment shall be installed in compliance with the prevailing standards and in accordance with the manufacturer's instructions specified in this manual: the manufacturer will not be held responsible for injuries to people and animals and/or damages to property resulting from an incorrect installation.

Damage and/or injury caused by incorrect installation or use and/or damage and/or injury due to non-observance of the manufacturer's instructions shall release the manufacturer from any and all contractual and extra-contractual liability.

Before installing the boiler, check that the technical data correspond to the requirements for its correct use in the system.

Check that the boiler is intact and it has not been damaged during transport and handling. Do not install equipment which is clearly damaged and/or faulty.

Do not obstruct the air intake openings.

Only original accessories or optional kits (including the electric ones) are to be installed.

Properly dispose of the packaging as all the materials can be recycled. The packaging must therefore be sent to specific waste management sites.

The packages can be dangerous: keep them out of the reach of children.

In the event of failure and/or faulty functioning, switch off the boiler. Do not attempt to make repairs: contact qualified technicians. Original parts must be used for all repairs to the product.

Non-observance of the above requirements may affect the safety of the boilers and endanger people, animals and/or property.

 **Routine equipment maintenance should be performed according to the schedule in the relevant section of this manual. Appropriate maintenance will keep the equipment working in optimum conditions, ensuring environmental protection and total safety for persons, animals and/or property. Incorrect and irregular maintenance can be a source of danger for people, animals and property.**

The user is strongly advised to have the boiler serviced and repaired by a qualified Service Centre.

In the event of long periods of inactivity of the boiler, disconnect it from the electrical power mains and close the gas cock.

**Warning: should power mains be disconnected, boiler electronic antifreeze function will not be operative.**

Should there be a risk of freezing, add antifreeze: it is not advisable to drain the system as this may result in damage; use specific anti-freeze products suitable for multi-metal heating systems.

 **With gas fired boilers, take the following measures if you smell gas:**

- do not turn on or off electric switches and do not turn on electric appliances;
- do not ignite flames and do not smoke;
- close the main gas cock;
- open doors and windows;
- contact a Service Centre, a qualified installer or the gas supply company.

**Never use a flame to locate a gas leak.**

 **The boiler is designed for installation in the countries indicated on the technical data plate which is applied both to the package and the boiler itself: installation in any other country may be a source of danger for people, animals and/or property.**

**The manufacturer will bear no contractual and tortious liability for failure to comply with all the instructions above.**

## RAPID OPERATING INSTRUCTIONS

The following instructions will help you to switch the boiler on quickly and regulate it for immediate use.



**It is presumed that the boiler has been installed by a qualified installer, it has been commissioned and is ready to operate correctly.**

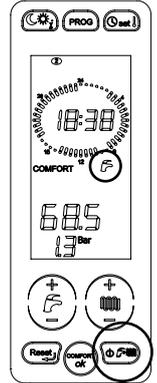
**If any accessories have been fitted on the boiler, these instructions will not cover them.**

**You will therefore have to refer to the full boiler instructions as well as to the specific instructions for the installed accessories.**

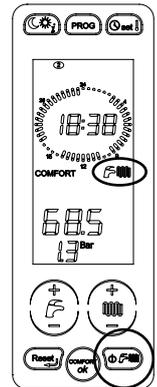
This manual contains full details of how the boiler works, and full operating and safety instructions.

1. Open the gas cock installed ahead of the boiler.
2. Turn the master switch installed ahead of the boiler ON: the boiler display (fig. 1) turns on.

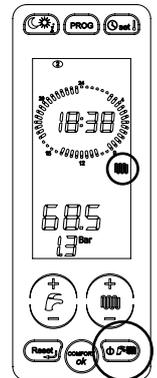
3. If **you do not wish to** activate the heating function, press the "operating mode" selection button  until displaying the symbol : this will activate the DHW function only.



4. If **you wish** to activate both the heating and DHW functions, press the "operating mode selection" button  until displaying the symbol .



5. If **you do not wish to** activate the DHW function, press the "operating mode" selection button  a few times until displaying the symbol : this will activate the heating function only.



6. To set the DHW water temperature press DHW +/- buttons (**D**, fig. 1). Set temperature as required.
7. To set the heating water temperature, press heating water + and - buttons (**E**, fig. 1). Set temperature as required.
8. Set the desired temperature on the (optional) ambient thermostat in the building.

The boiler is now ready to operate.

If the boiler shuts down, press "reset" button (**F**, fig. 1).

If boiler does not resume its normal operation after three attempts, contact a qualified Service Centre.

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# 1. INSTRUCTIONS FOR THE USER

## 1.1. Control panel

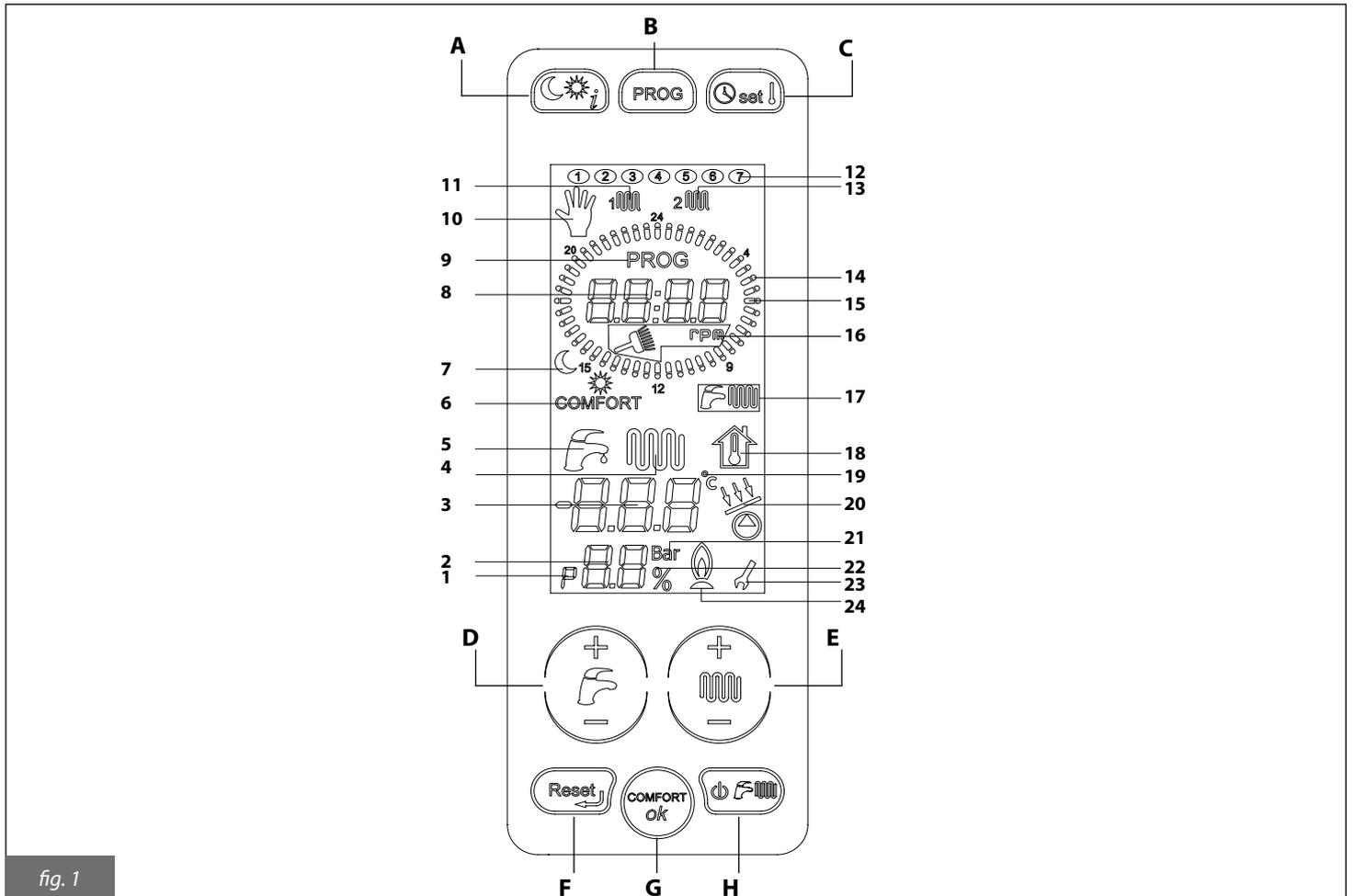


fig. 1

**A. Temperature selection** (day/night) and recall information.

**B. Weekly programme** for temperature zones and manual programme selection.

**C. Timer and ambient temperature** setting.

**D. Domestic hot water setting** (see paragraphs 1.3., 1.4., 1.5., 1.14.3).

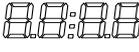
**E. CH water setting** (see paragraphs 1.4., 1.5., 1.14.2.) and **parameter setting**.

**F. Alarm reset** and back to the starting page during parameter selection.

**G. DHW comfort function** enabling and **confirm key**.

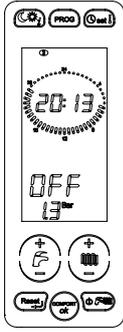
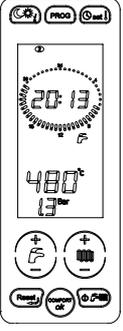
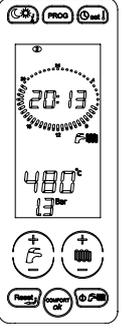
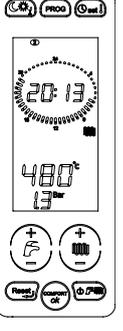
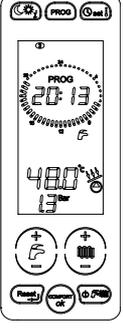
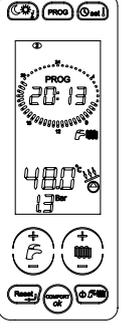
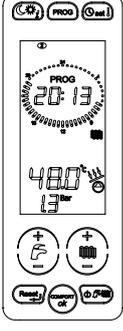
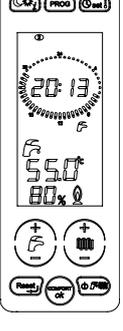
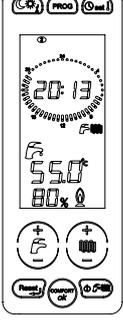
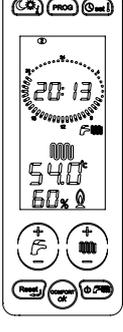
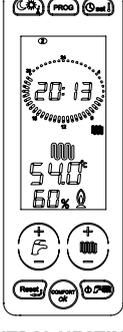
**H. Mode selection.**

To gain access to the interface, touch the display area. Once active, the interface enables all the keys. 15 seconds after the last key has been touched, the interface disables all the keys.

	SYMBOL	STEADY	FLASHING
1		Indication of "parameter" inside the parameter menu.	
2		Displaying of the number of parameters, or of the system pressure, or of the burner power percentage.	
3		Indication of the temperatures, parameter values, faults and shut-downs.	
4		Boiler is in CH mode.	CH water temperature adjustment with buttons (E, fig. 1).
5		Boiler is in DHW mode.	DHW temperature adjustment with buttons (D, fig. 1).
6	COMFORT	Display of DHW "comfort" state: wording ON = comfort enabled; wording OFF = comfort disabled	
7		Current temperature (sun = day; moon = night)	Setting of the two temperatures associated with the day and the night.
8		Display of current time/fan revolutions.	
9	PROG	Indicates if the unit is in time slot programming mode.	
10		Manual mode operation.	Manual mode setting.
11		Display of zone 1 heating programme.	Edit zone 1 heating programme.
12		Current day of the week.	Edit day of the week.
13		Display of zone 2 heating programme.	Edit zone 2 heating programme.
14		Night time temperature indication.	
15		Daytime temperature indication.	All lights flashing: automatic mode setting.
16		Displaying of the flue cleaning function and of the "rpm" wording to show the number of revolutions per minute of the fan.	Indicates that you are accessing the flue cleaning function.
17		Symbols for instantaneous DHW, heating. Symbol ON = function enabled, OFF = function disabled.	
18			With external probe installed, it flashes when the calculated ambient temperature is being set through the buttons (E, fig. 1).
19		Indication of the centigrade degrees.	
20		Solar pump or solar valve active.	
21	Bar	Indication of system pressure measurement unit.	
22	%	Percentage indication.	
23		During parameter editing, the wrench symbol stays on until the set datum is confirmed.	
24		Lit flame indication on the burner.	

## 1.2. Interpreting BOILER STATUS from LCD DISPLAY INDICATIONS

### Normal operation

<p><b>Boiler switch in OFF mode</b></p>	
<p><b>Boiler switch in SUMMER or WINTER mode or CH ONLY</b>  <b>No active function</b>  <b>The flow temperature and the heating system pressure are displayed</b></p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <b>SUMMER</b> </div> <div style="text-align: center;">   <b>WINTER</b> </div> <div style="text-align: center;">   <b>CENTRAL HEATING ONLY</b> </div> </div>
<p><b>Boiler switch in SUMMER or WINTER mode or CH ONLY</b>  <b>Solar pump active (24, fig. 10) or solar valve active (20, fig. 10)</b>  <b>The flow temperature and the heating system pressure are displayed</b></p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <b>SUMMER</b> </div> <div style="text-align: center;">   <b>WINTER</b> </div> <div style="text-align: center;">   <b>CENTRAL HEATING ONLY</b> </div> </div>
<p><b>Boiler switch in SUMMER or WINTER mode</b>  <b>The boiler is heating the water coming from the water heater</b>  <b>DHW temperature displayed</b></p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <b>SUMMER</b> </div> <div style="text-align: center;">   <b>WINTER</b> </div> </div>
<p><b>Boiler switch in WINTER mode or CH ONLY</b>  <b>CH function active</b>  <b>The flow water temperature is displayed</b></p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <b>WINTER</b> </div> <div style="text-align: center;">   <b>CENTRAL HEATING ONLY</b> </div> </div>

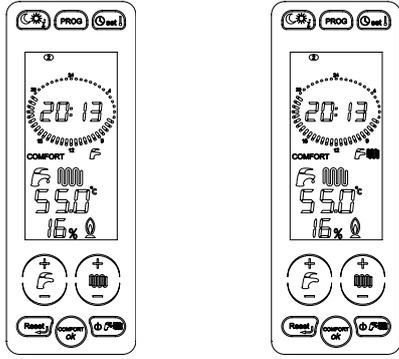
<p><b>Boiler switch in SUMMER or WINTER mode</b>  <b>Comfort function in progress (the plate exchanger is kept heated)</b>  <b>The flow water temperature is displayed</b></p>	
--	--

Table 1 - BOILER STATUS - LCD DISPLAY INDICATIONS during normal operation

**Malfunction**

<b>No flame</b>	E 0 1
<b>Triggering of double flow probe</b>	E 0 2
<b>Triggering of flue gas thermostat</b>	E 0 3
<b>Insufficient system pressure</b>	E 0 4
<b>Flow probe failure</b>	E 0 5
<b>DHW probe failure</b>	E 0 6
<b>Flue gas probe failure</b>	E 0 7
<b>Too high system pressure</b>	E 0 9
<b>Plate inlet water probe failure</b>	E 1 2
<b>Return probe failure</b>	E 1 5
<b>Solar collector probe failure (SCS)</b>	E 2 4
<b>Solar valve probe failure, water heater top part (SVS)</b>	E 2 7
<b>Solar water heater probe failure, low part (SBS)</b>	E 2 8
<b>Remote Control connection failure (only shown on Remote Control panel)</b>	E 3 1
<b>Triggering of safety thermostat in mixed zone 2</b>	E 3 5
<b>Flow probe failure in mixed zone 2</b>	E 3 6 0 2
<b>Flow probe failure in mixed zone 3</b>	E 3 6 0 3

<b>Fan failure</b>	E40
<b>Communication failure between peripheral devices (zone boards, solar)</b>	E41
<b>Hydraulic configuration not allowed (wrong P03 and P18 parameter setting)</b>	E42
<b>Zone configuration error (ambient probe, Remote Control and ambient thermostat). Wrong setting of P61 parameter.</b>	E43
<b>Ambient probe 1 failure</b>	E44
<b>Ambient probe 2 failure</b>	E45
<b>Pressure transducer failure</b>	E46
<b>External probe fault with connected ambient probe (displayed if P57=2 or P57=3)</b>	E47
<b>Communication error between main board and interface board</b>	E49
<b>Shut-down due to safety circuit hardware fault</b>	E51 E52 E53
<b>Incompatibility between boiler board and interface board</b>	E73
<b>Offset error <math>\Delta T</math> max</b>	E80
<b>Flow or return probe &gt; 120°C</b>	E85
<b>Maximum flow derivative exceeded</b>	E86
<b>Maximum return derivative exceeded</b>	E87
<b>Flue gas temperature lower than heating return temperature</b>	E89
<b>Flue gas maximum threshold exceeded</b>	E90
<b>Flue gas maximum derivative exceeding alarm</b>	E91
<b>Max. number of reset attempts from touch screen reached</b>	E98
<b>Max. number of reset attempts from Remote Control reached (optional, if connected)</b>	E99

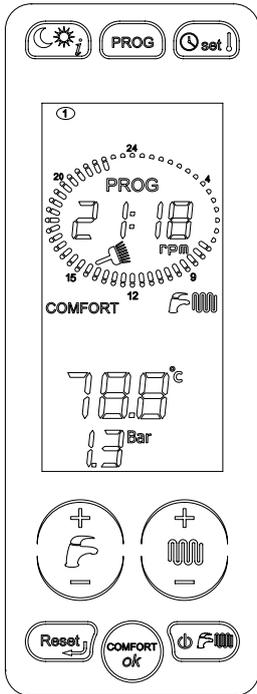
Table 2 - BOILER STATUS - LCD indications in the event of malfunction

### 1.3. Enabling/disabling the "Comfort" function

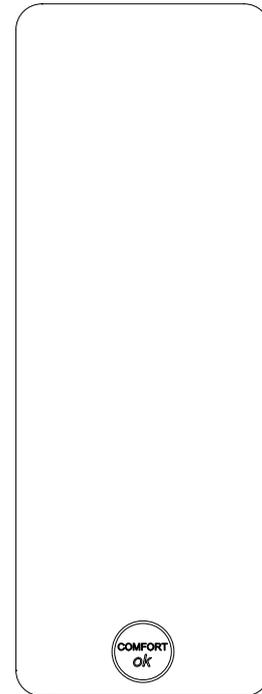
This function keeps the plate heat exchanger hot, to minimise the waiting time for the production of DHW. When the "COMFORT" icon (6, fig. 1) is on, the function is enabled. When it is off the function is disabled and the boiler performs the standard functions.

If "COMFORT" function is enabled (icon "COMFORT" 6, in fig. 1 on) press "COMFORT" button (G, fig. 1) to disable it.

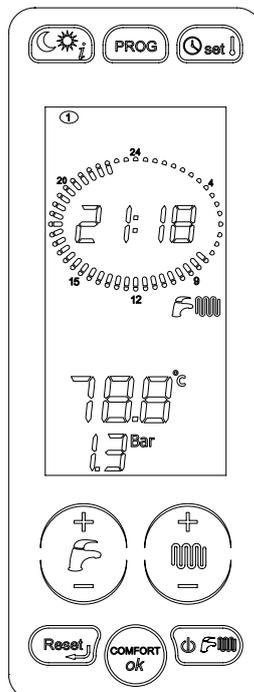
If "COMFORT" function is disabled (icon "COMFORT" 6, fig. 1 OFF) press "COMFORT" button to enable it.



1. "COMFORT"  
FUNCTION ENABLED



2. PRESS THE  
COMFORT BUTTON



3. "COMFORT"  
FUNCTION DISABLED

### 1.4. Selecting the operating mode

Whenever button  is pressed, the "SUMMER" , "WINTER" , "CH ONLY" , "OFF" modes are enabled in sequence.

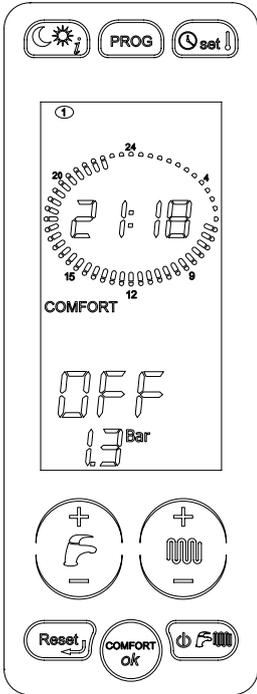
At this stage, all buttons are enabled.

When the "SUMMER" mode is enabled, only the DHW production function is active.

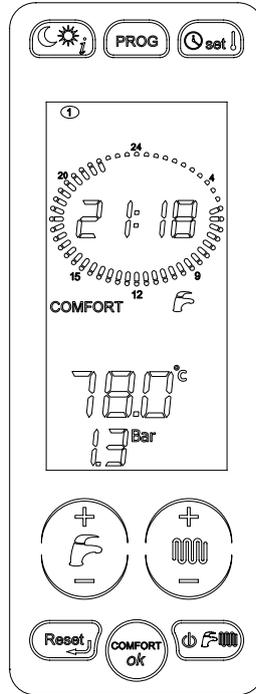
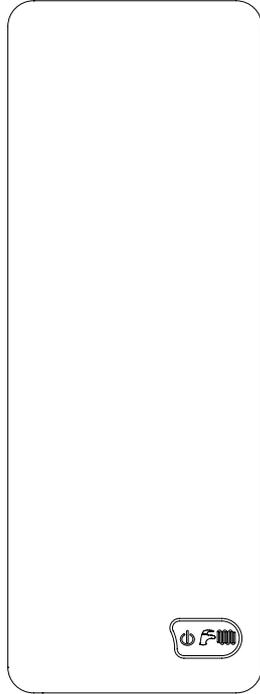
When the "CH ONLY" mode is enabled, only the heating water production function is active.

When the "WINTER" mode is enabled, both DHW and CH functions are active.

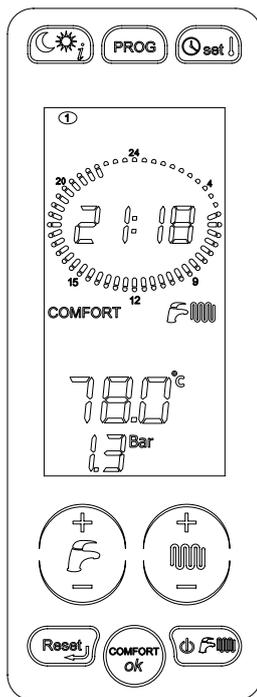
When the "OFF" mode is enabled, no function is active.



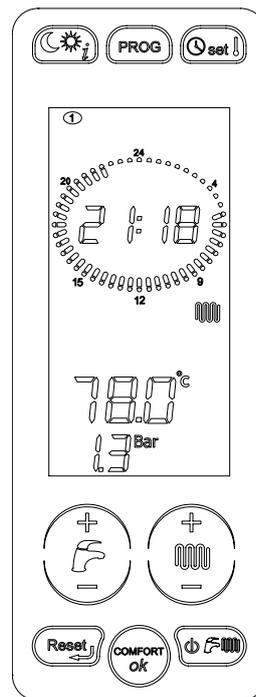
1. OPERATING MODE:  
OFF



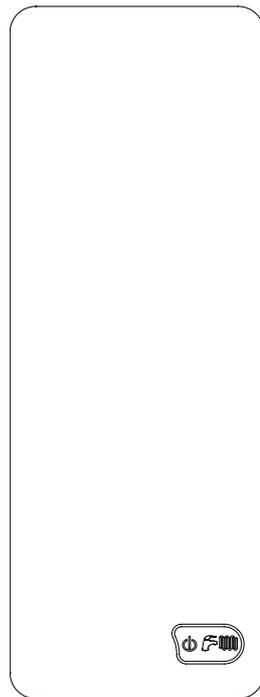
2. OPERATING MODE:  
SUMMER



3. OPERATING MODE:  
WINTER



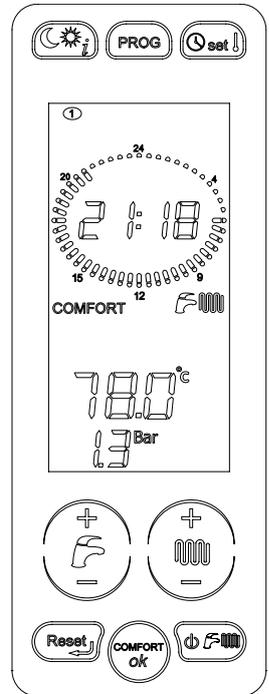
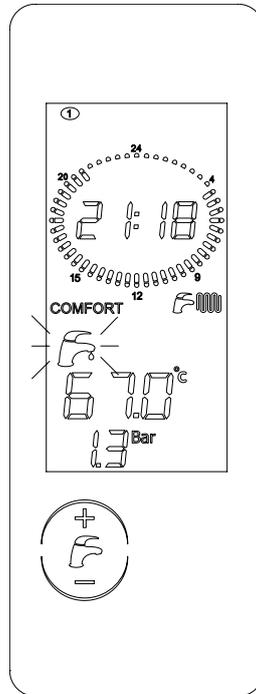
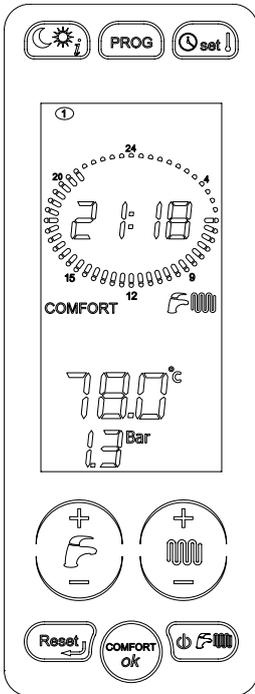
4. OPERATING MODE:  
CENTRAL HEATING ONLY



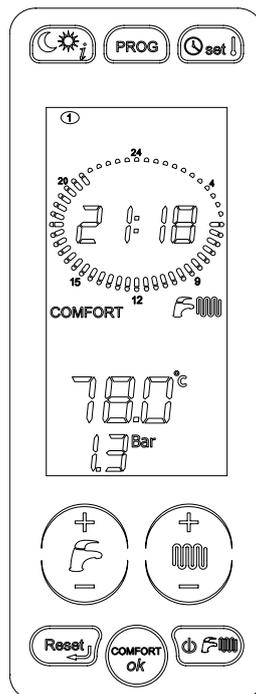
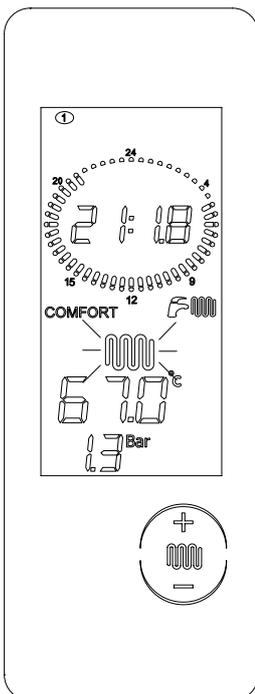
## 1.5. Adjusting heating and DHW temperature

Press the "DHW + and -" button (D, fig. 1) to select the desired domestic hot water temperature (refer to paragraph 1.14.3). During selection, DHW icon (5, fig. 1) will flash. As soon as button is released, icon will continue flashing for approx. 3 seconds, and temperature value will flash as well. After this time, value is stored and display standard operation will be restored. In the phase in which the icon is flashing, only the buttons to adjust the temperature of the DHW are enabled.

Press the "Heating + and -" button (E, fig. 1) to select the desired flow water temperature (refer to paragraph 1.14.2). During selection, CH icon (4, fig. 1) will flash. As soon as button is released, icon will continue flashing for approx. 3 seconds, and temperature value will flash as well. After this time, value is stored and display standard operation will be restored. In the phase in which the icon is flashing, only the buttons to adjust the heating temperature are enabled.

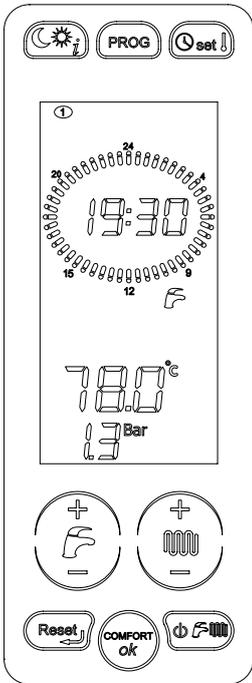


1. DHW  
TEMPERATURE  
SETTING

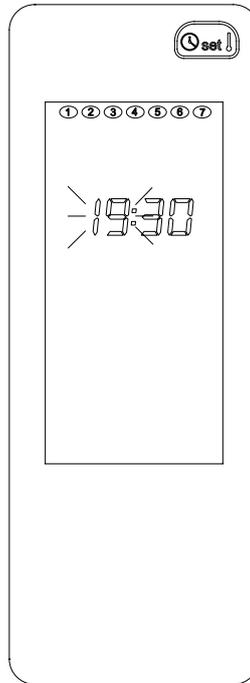


2. CH  
TEMPERATURE  
SETTING

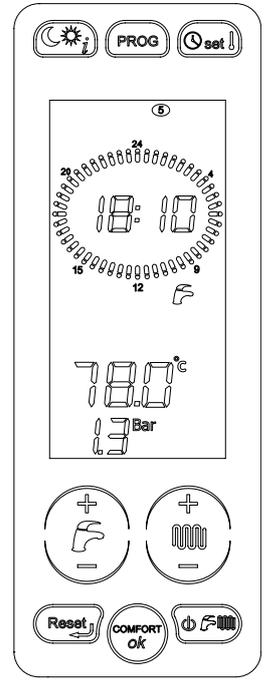
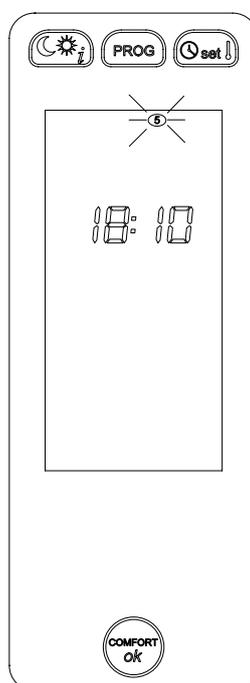
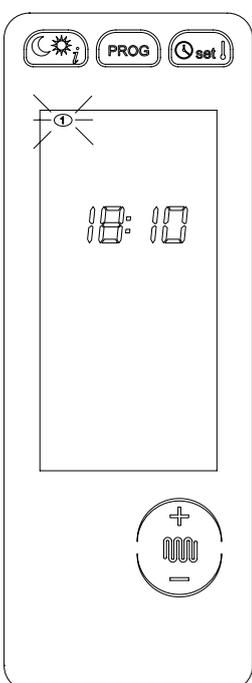
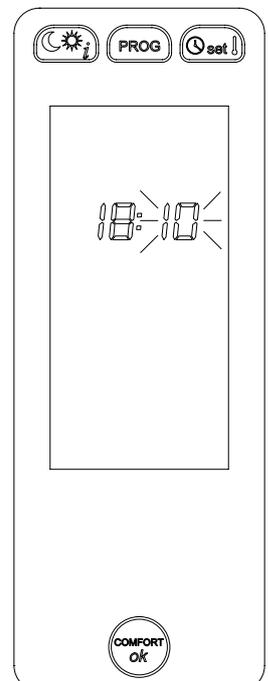
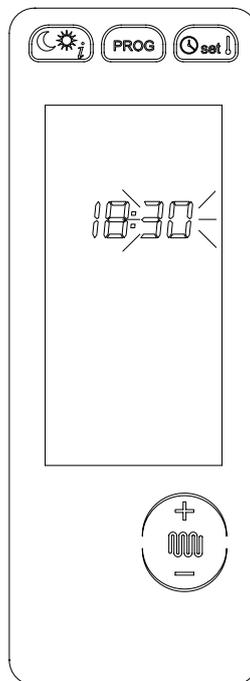
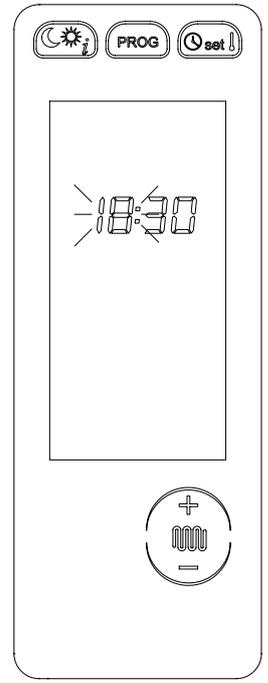
## 1.6. Timer setting



1- To set time, minutes and day of the week, press "set".



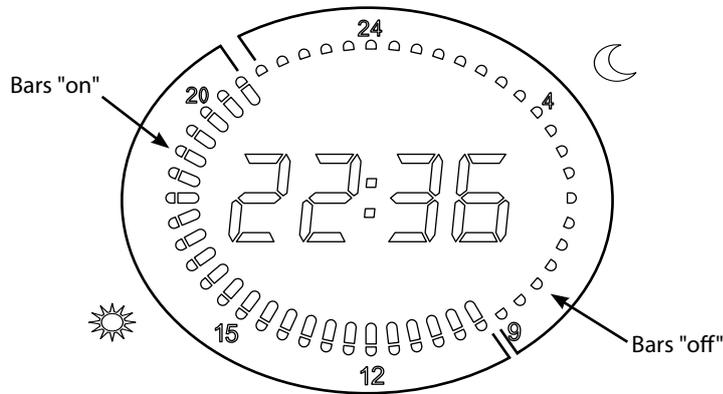
2- Flashing values can be edited by pressing "CH + and -" buttons. Press "ok" to confirm the edited value and shift to next parameter, press "reset" to quit the function and go back to starting page. Press "set" to access the day and night setting function described in the following paragraph.



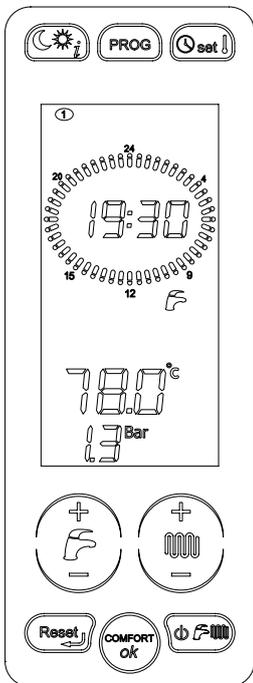
## 1.7. "Day temperature" and "night temperature" setting

When one or more ambient probes are connected to boiler electronic board, two levels of ambient temperatures can be set. Boiler will manage the heating request based on the set temperatures, as follows. If no ambient probe is connected to the boiler, temperatures cannot be set.

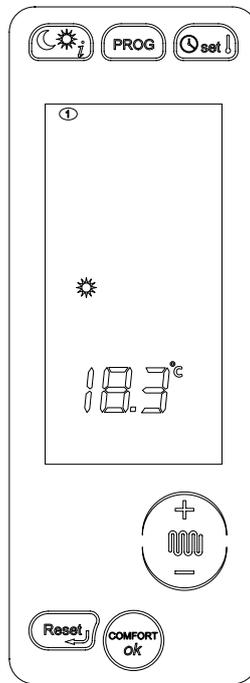
"Day" temperature is identified by the symbol ☀, while "night" temperature by the symbol ☾.



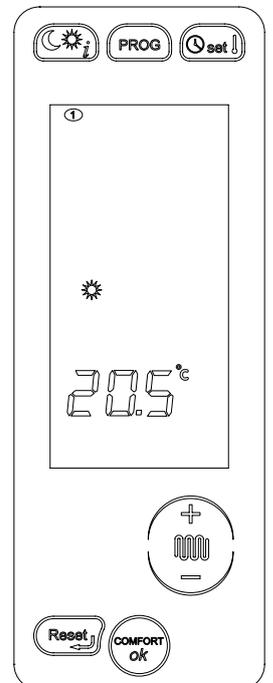
The "day temperature" is active when bars are on, while "night" temperature is active when bars are off.



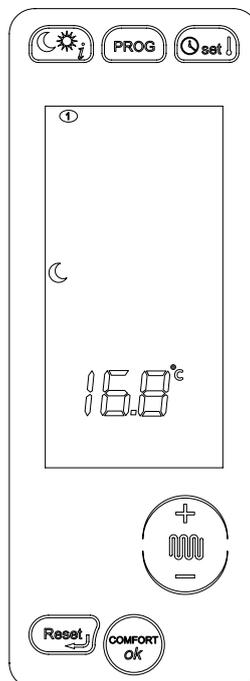
1- Press "set" twice to access the "day temperature" setting mode.



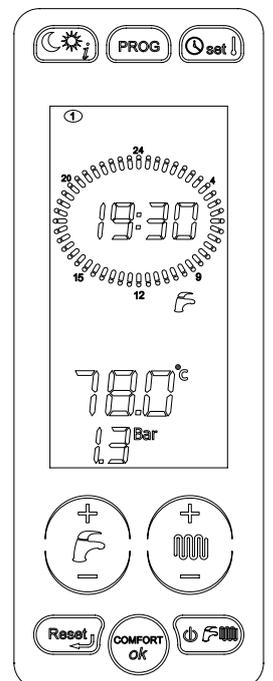
2- Press "CH + and -" buttons to edit "day temperature" values. Press "ok" to confirm the edited value and enter the "night temperature" setting mode.



3- Press "CH + and -" buttons to edit "night temperature" values.

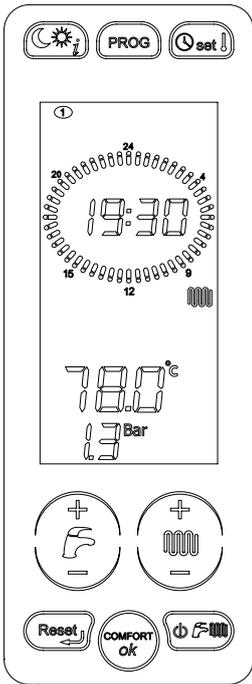


4- Press "ok" to confirm the edited value and quit the "day temperature" and "night temperature" setting mode.

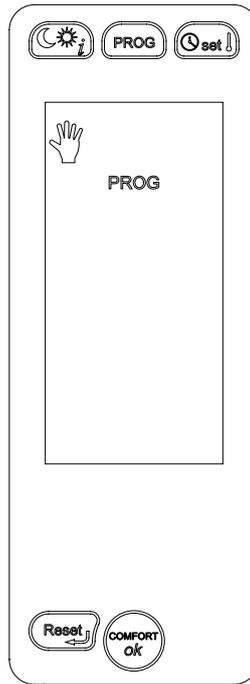


## 1.8. "Manual" programme setting

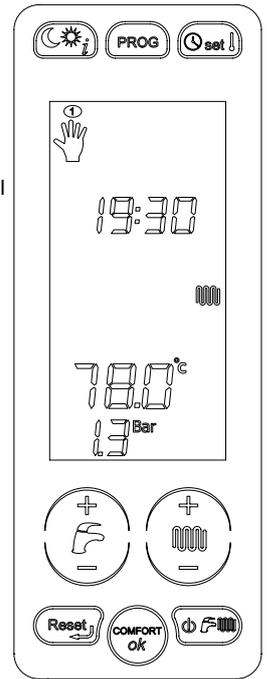
The "manual" mode selection indicated with symbol , allows activating the heating function, 24 hours a day, in both zones at the "day temperature"; disabling at the same time zone 1 and zone 2 programming.



1- Press "prog" to access the manual programme setting mode.

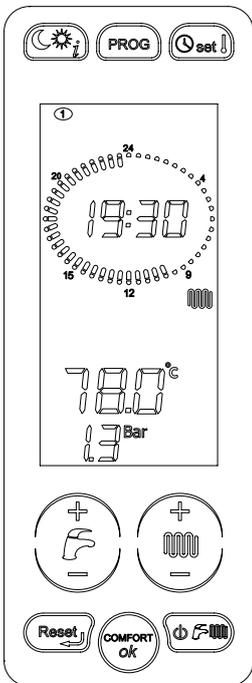


2- Press "ok" to confirm manual programming activation. Press "reset" to go back to the starting page, namely to quit the function.

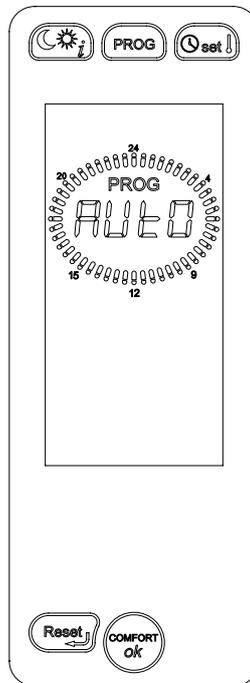


## 1.9. "Automatic" programme setting

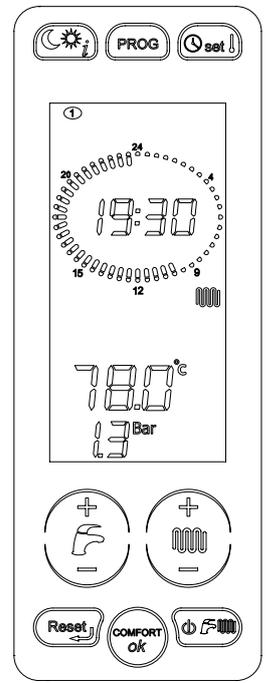
The selection of "automatic" mode, identified by symbol , allows boiler to enable heating of both zones in "day temperature" or "night temperature", based on the programming envisaged for zone 1 and zone 2.



1- Press "prog" to access the automatic programme setting mode.

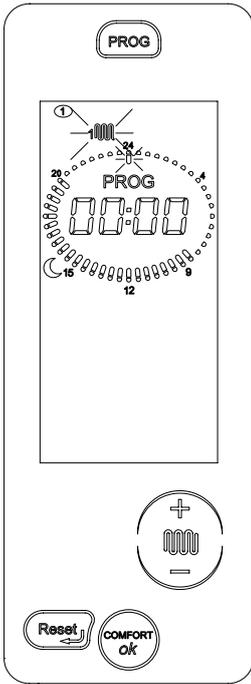


2- Press "ok" to confirm automatic programming activation. Press "reset" to go back to the starting page, namely to quit the function.

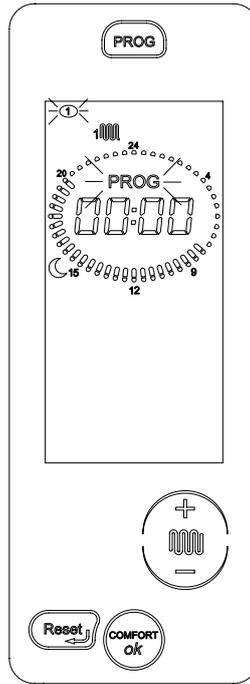


## 1.10. CH programme mode

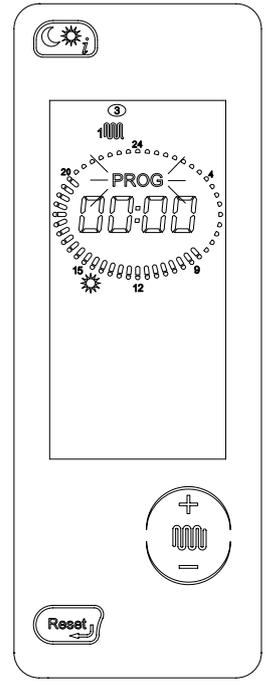
To access zone 1 heating programme displaying or editing, press "prog" button twice.



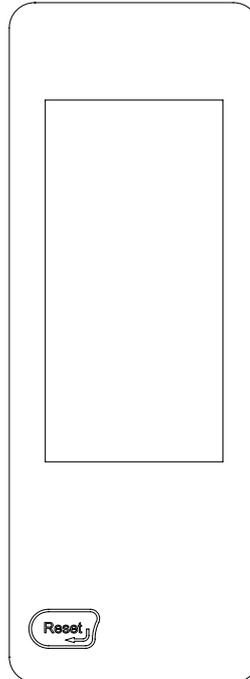
1- The display shows zone 1 symbol flashing, sun or moon symbols, bars on or off, respectively, at 00:00. Clock lights display the programming associated to day 1 (Monday) and 00:00 bar is flashing.



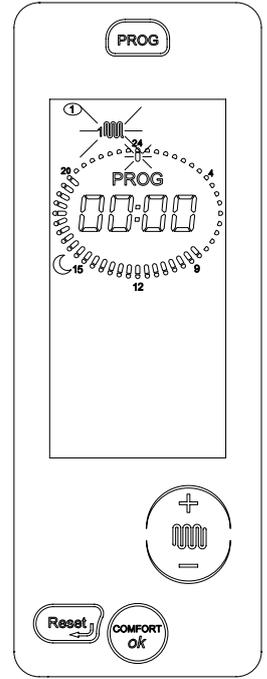
2- Press "ok" to access zone programming function. "Prog" wording starts flashing together with number 1 (Monday). Press CH + and - buttons to select the desired day of the week. Press "ok" to select the desired day. Now you can associate the day/night level to the desired time of the day.



3- Whenever "day/night" button (A, fig. 1) is pressed, the sun and moon symbols are alternately activated (sun = day level; moon = night level). At the same time, close to the current time (flashing bar) clock bar comes on if the "sun" icon is on, or turns off if the "moon" icon is on. Current time is indicated by both the clock and the flashing bar. Press "CH +/-" buttons to move inside the different times of the day.



4- To program other days of the week or to program zone 2 press "reset". You will go back to the starting page.



Whatever part of the programme can be quit by pressing the "reset" button twice. The procedure to program zone 2 is very similar to the one followed to program zone 1. Press "prog" to access the 3 following programmes in a sequence: manual; zone 1; zone 2.

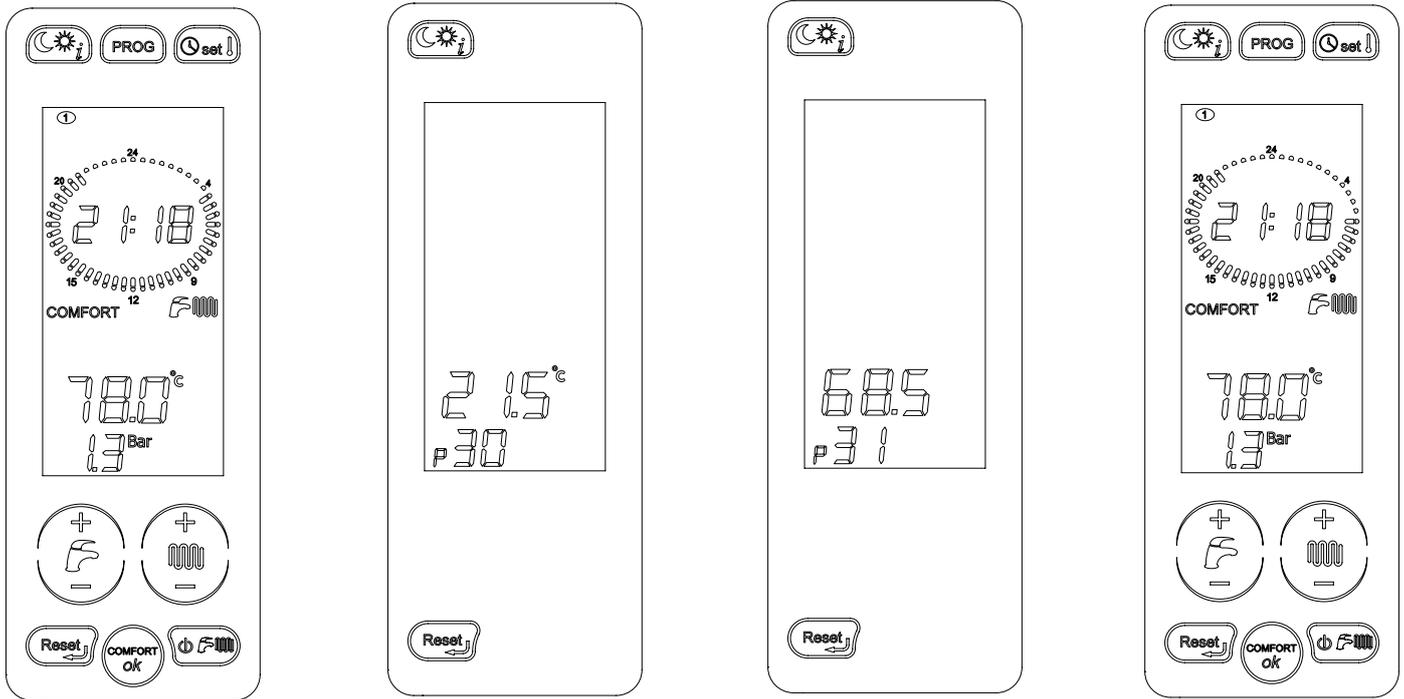
If ambient probes are connected, the "day temperature" level and the "night temperature" will acquire the temperature value, and heating will be active until the temperature measured by the ambient probe reaches the preset value for the different time slots.

When no ambient probe is connected, the two day/night levels will acquire the on and off values. So heating is ON in the selected periods with the sun symbol, while it is OFF in the selected periods with the moon symbol.

In case of connection with Open Therm Remote Control, that zone shall not be managed by boiler boards, as it will be directly managed by the Remote Control and, as a consequence, zone programming will be inhibited.

## 1.11. Parameters display

Press "Info" (A, fig. 1) to scroll the different parameter values. You can quit this function at any time by simply pressing the "Reset" button. Paragraph 3.2.14 describes the meaning of all parameters.

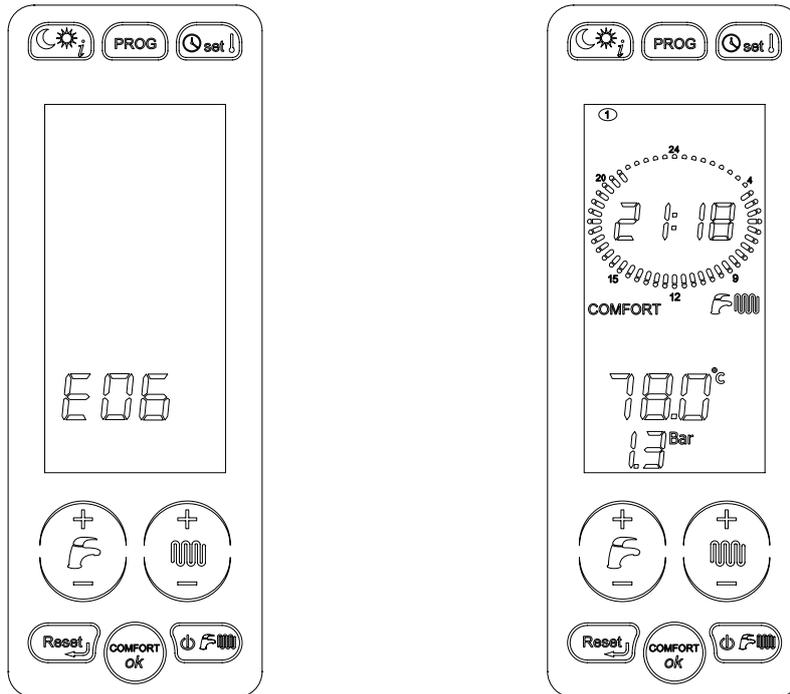


PARAMETERS	DESCRIPTION
P30 - TSP30	External temperature displaying (if an external probe is present).
P31	Flow temperature displaying.
P32	Calculated nominal flow temperature displaying. If no external probe is installed, the flow temperature manually set on boiler will be displayed. If an external probe is installed, the flow temperature boiler calculated through the curves on fig. 27 will be displayed
P33	Displaying of flow temperature set for zone 2 (V versions)
P34	Displaying of flow temperature currently detected for zone 2 (V versions)
P36	Displaying of flow temperature set for zone 3 (Z versions)
P37	Displaying of flow temperature currently detected for zone 3 (Z versions)
P42	Displaying of domestic hot water temperature.
P43	Displaying of return temperature.
P44	Displaying of plate inlet water temperature.
P45	Displaying of flue gas temperature.
P46	Displaying of solar collector temperature (if the collector probe is installed).
P47	Displaying of solar water heater temperature (low part).
P48	Displaying of solar valve temperature (water heater, top part).
P49	Displaying of ambient probe 1 temperature (if ambient probe is connected).
P50	Displaying of ambient probe 2 temperature (if ambient probe is connected).

Table 3 - Displayable parameters with info button

### 1.12. Failures that cannot be reset

The display shows the failure based on the corresponding error code (see paragraph 1.2). Some failures can be reset through the reset key, while some others are self-resettable. Refer to the following paragraph ("Resume boiler function").  
If failures cannot be reset but are of the self-resettable type, no key will be enabled and only the LCD back-lighting will be on. As soon as the error cause is eliminated, the failure signal will disappear from the interface, this latter will be enabled and, 15 seconds after no key is touched, all the keys but the one around the LCD will be disabled.

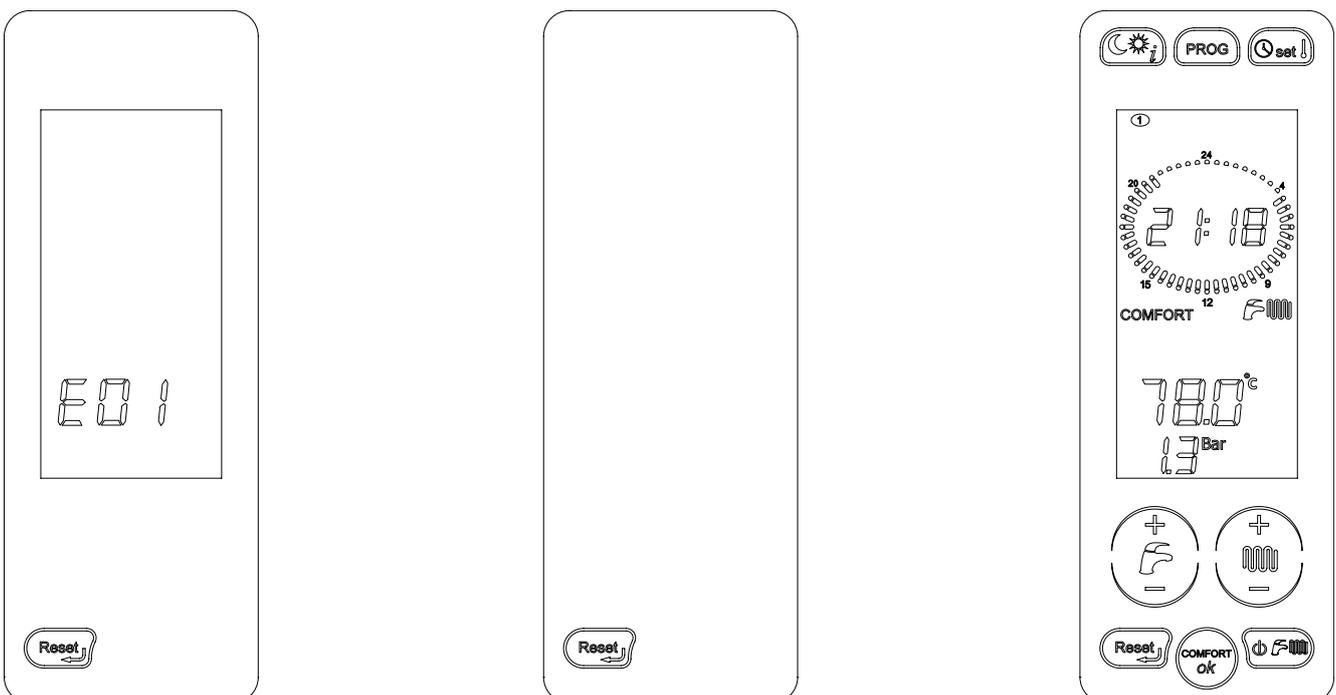


### 1.13. Resuming boiler function

The display shows the failure based on the corresponding error code (see paragraph 1.2). Some failures can be reset through the reset key, while some others are self-resettable.

If shut-downs can be reset (E01, E02, E03, E40, E80, E86, E87), the "reset" key and the LCD back-lighting will always be on. The only active key you can press is the "reset" key.

When the reset key is pressed and boiler is under the correct conditions, the error is reset. The failure signal will disappear from the interface, this latter will be enabled and, 15 seconds after no key is touched, all the keys but the one around the LCD will be disabled.



## 1.14. Boiler operation

### 1.14.1. Switching on



- Open the gas stop cock;
- turn the master switch installed ahead of the boiler ON. The display turns on and indicates the function currently active (see tables 1 and 2);
- select boiler operating mode pressing "Operating mode selection" button on the touch-screen (**H**, fig. 1): OFF, SUMMER, WINTER, CH ONLY (paragraph 1.4.);
- set desired CH temperature (see par. 1.14.2);
- set the desired DHW temperature value by pressing the "DHW +/-" buttons (**D**, fig. 1) and setting the position of the mixing valve in fig. 2 (see paragraph 1.14.3.);
- if one or more ambient probes or thermostats are present, set the desired ambient temperature value and the weekly programming.

#### WARNING

**Should the boiler be left inactive for a long time, particularly when boiler is propane-fired, ignition might be difficult. Before starting the boiler switch on another gas powered device (e.g. kitchen range).**

**Beware that even by following this procedure, the boiler might still experience some starting difficulties and shut down once or twice.**

#### Reset boiler operation

**by pressing the "reset" button (F, fig. 1).**

### 1.14.2. CH function

Set desired heating water temperature via "heating + and -" buttons (**E**, fig. 1).

Heating temperature adjustment range depends on the selected operating range:

- **standard range:** 20°C to 78°C (press "heating +/-" buttons **E**, fig. 1);
- **reduced range:** 20°C to 45°C (press "heating + and -" buttons).

Operation range selection is to be implemented by a installer or a Service Centre (see paragraph 3.2.10.).

During temperature setting, the CH symbol (**4**, fig. 1) on the screen flashes and the CH current setting is displayed.

For models with double or triple outlet for high-temperature and low-temperature zones (V, Z versions) the boiler operating range in CH mode must be set to standard range. The mixing valve on the low-temperature zone flow will adjust the flow to the correct temperature, based on the signal coming from the relevant zone.

When the central heating system requests heat from the boiler, the LCD displays the CH symbol steady on (**4**, fig. 1) and the current heating flow water temperature. The burner on symbol (**25**, fig. 1) only appears while the burner is operating. The waiting time between one boiler ignition and the following one, used to prevent boiler frequent turning on and off in CH mode, ranges between 0 and 10 minutes (default value: 4 min), and can be edited with the **P11** parameter.

Should water temperature in the system fall below the set minimum value, between 20°C and 78°C (default value for standard range: 40°C, default value for reduced range: 20°C) to be edited with the **P27** parameter, the waiting time is reset and the boiler re-ignites (see paragraph 3.2.10.).

### 1.14.3. DHW function

The boiler is equipped with a 170-litre water heater with single coil, preset for connection to a solar circuit for the integration of the DHW production. The water heater is heated exclusively by the solar plant. During a request of DHW, in case the water heater does not reach the temperature value set with buttons **D** (fig. 1), the boiler is activated. Through the plate exchanger, the boiler heats the domestic water, that has been pre-heated by the water heater, up to the desired temperature.

Such function has always priority over CH water supply.

#### 1.14.3.1. DHW integration through boiler burner

Set desired DHW temperature via buttons **D** (fig. 1).

DHW temperature may be set within a range from 35°C to 57°C.

During temperature setting, the DHW symbol on the LCD appears and the DHW setting is displayed.

The domestic hot water production function performed by the boiler burner consists in controlling the motorised deviating valve (**20**, fig. 8) so that it enables the boiler burner only if the temperature in the solar water heater is lower than the value that has been set manually with buttons **D**. This function is active only if the boiler is set to SUMMER  or WINTER .

### 1.4.3.2. DHW production through solar plant

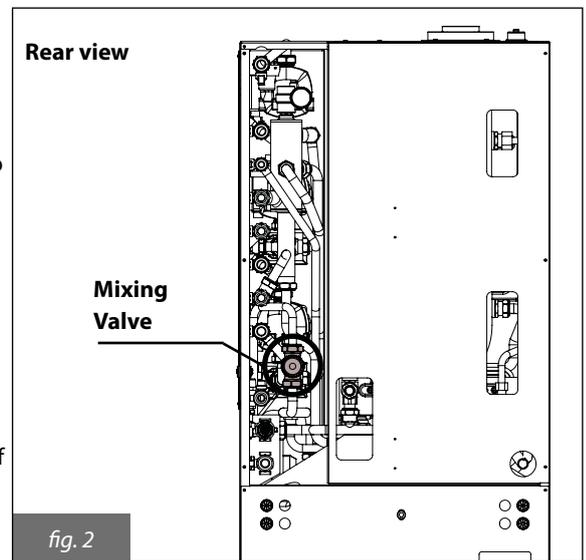
The domestic hot water production through solar plant is always enabled, as long as the solar collectors are correctly connected. In this case, the solar plant heats the water inside the water heater, according to the settings made on the solar plant electronic control board through the dedicated parameters (see paragraph 3.2.14). Parameter selection is to be carried out by an installer or a qualified Service Centre.

In this case, the user can set the DHW temperature by using the mixing valve located in the rear part of the boiler (see fig. 2).

The DHW circuit is equipped with a thermostatic mixing valve with manual adjustment that ensures a constant domestic hot water temperature, even if the water inside the water heater has reached very high temperatures.

Turning the knob anti-clockwise (+ position) increases the domestic hot water temperature, turning it clockwise (- position) decreases it.

To obtain an output temperature of approximately 50°C, completely close the valve by turning the knob clockwise, then reopen it by turning it anti-clockwise by three and a half turns.



**Setting the manual mixing valve to the clockwise or anticlockwise limit stop position is not recommended.**

#### WARNING

**A special adjusting device is installed within the boiler, which limits domestic hot water flow rate deviated towards the boiler. This limit is: 13 litres per minute for model KBS 24 and 16 litres per minute for model KBS 32.**

### 1.14.4. Freeze protection function

This boiler is fitted with a freeze protection system, which works when the following functions are activated: OFF/SUMMER/WINTER/CH ONLY.



**The freeze protection function only protects the boiler, not the whole heating system.**

**Ambient probes or a room thermostat must be used to provide freeze protection for the central heating system. Bear in mind, however, that they are disabled when the boiler is in OFF operating mode.**

**To protect the system, as well as the boiler, set the boiler to WINTER operating mode .**

The central heating system can be effectively protected against icing by using specific anti-freeze products that are suitable for multi-metal systems.

**Do not use anti-freeze products for car engines, and check the effectiveness of the product used over time.**

In case burner cannot be ignited due to the lack of gas, the freeze protection functions are anyway enabled through the circulation pumps.

#### 1.14.4.1. Ambient probe freeze protection function

If the boiler board is OFF, or in SUMMER mode, and the ambient probes detect a temperature below 5°C, a heating request to heat the probe-controlled room is launched. The heating function ends when the probe ambient temperature reading reaches 6°C.

#### 1.14.4.2. Flow freeze protection function

When the heating water temperature sensor detects a water temperature of 5°C, the boiler switches on and stays on at its minimum heat output until the temperature reaches 30°C or 15 minutes have elapsed.

The pump continues to operate even if the boiler shuts down.

#### 1.14.4.3. Plate DHW freeze protection function

When the DHW temperature sensor detects a temperature of 5°C, the boiler switches on and stays on at its minimum heat output until the temperature reaches 10°C or 15 minutes have elapsed (the deviating valve is in the DHW position).

During the DHW anti-freeze operation the temperature detected by the flow probe is constantly checked, and in case it reaches 60°C the burner is switched off. The burner is switched on again if the operation request in anti-freeze mode is still present and the flow temperature is below 60°C. The pump continues to operate even if the boiler shuts down.

#### 1.14.4.4. Solar collector freeze protection function

Solar collector freeze protection function is enabled by setting parameter **P24** = 1. With this function, solar pump is activated as soon as solar collector probe detects a temperature of 4° C.

#### 1.14.5. Pump and valve anti-shutdown function

If the boiler remains inactive and connected to the power mains, the circulation pump and the deviating valve will be shortly enabled every 24 hours so as to avoid any shut-down. Moreover, the solar plant circulation pump is activated for 10 seconds for every 24 hours of inactivity. On models with high- and low-temperature outlet (V, Z versions, only) the high- and low-temperature zone pumps and the mixing valve are equipped with an anti-shutdown function. In particular, the pumps are enabled for 10 seconds and the valve carries out a complete cycle after 24 hours of inactivity.

#### 1.14.6. Collector heat transfer function

This function prevents that solar collectors in stagnation state are exposed to high thermal stresses.

With the boiler in SUMMER, WINTER or CH ONLY mode, if the temperature read by the solar collector probe is between 110°C and 115°C (editable with parameter **P22**) and the temperature measured by the solar water heater probe is below 93 °C, solar pump is enabled to fill water heater. Solar pump operation is disabled as soon as solar collector temperature goes below 108 °C or solar water heater probe detects a temperature above 95°C.

#### 1.14.7. Water heater cooling function

This function consists in cooling water heater down to the temperature value set by the user by transferring excess heat from the boiler to the solar collector.

With the boiler in SUMMER, WINTER or CH ONLY mode, when the water heater temperature is at least 2°C higher than the set-point temperature and at the same time the collector probe temperature is lower than the temperature of the solar water heater probe by 6°C (this value can be edited with parameter P20), the solar pump is activated to cool the water heater. Function is interrupted as soon as water heater temperature reaches the set-point value set by the user, or when solar collector probe temperature is 3°C lower than solar water heater probe temperature (editable with parameter P21). Function can be disabled with parameter **P26** (P26 = 1 enabled; P26 = 0 disabled).

#### 1.14.8. Solar mode operation and failure signal

When solar pump is active, symbol  (20, fig. 1) appears on the display. In case of solar collector probe or solar water heater probe failure, the boiler display will show the fault codes **E24** and **E28** respectively, and the solar pump will be turned off at the same time.

#### 1.14.9. Operation with (optional) external probe

Boiler can be connected to a probe measuring the external temperature (optional - not compulsory, supplied by the manufacturer). Once the external temperature value is known, the boiler will automatically adjust the heating water temperature: increasing it as the external temperature decreases and decreasing it as the external temperature increases. This will both improve room comfort and reduce fuel consumption. Standard and reduced range max. temperature values will nevertheless be respected.

This boiler operating mode is called "sliding temperature operation".

Heating water temperature varies based on a programme written inside boiler electronic microprocessor.

**When working with an external probe, the "heating + and -" buttons (E, fig. 1) are no longer used to set heating water temperature, but to edit calculated ambient temperature, namely the desired theoretical temperature in the rooms to be heated.**

During temperature setting, the calculated ambient temperature symbol flashes on the display (**18**, fig. 1) and the value being set is shown.

For curve optimal setting, a position close to 20° C is recommended. For further details on sliding temperature, refer to paragraph 3.2.13.



**Only original external temperature probes supplied by the manufacturer must be used. The use of non-original external temperature probes, with technical specifications differing from those required by the managing electronics, may affect boiler and external probe operation.**

#### 1.14.10. Operation with (optional) Remote Control

Boiler interface includes all the possible functions of a Fondital Remote Control, and can control up to two heating zones. User can also connect the boiler to a Remote Control (optional - not compulsory, supplied by the manufacturer) so as to manage several boiler parameters, such as:

- boiler mode selection;
- ambient temperature selection;
- CH system water temperature selection;
- DHW system water temperature selection;
- heating system activation time programming and water heater temperature lack of variations;
- boiler diagnostics display;
- boiler reset;
- and others.

For instructions on how to connect the Remote Control, refer to par. 3.2.12 and to its own instruction booklet.



**Only original Remote Controls supplied by the manufacturer must be used. The use of non-original Remote Controls, not supplied by the manufacturer, may affect Remote Control and boiler operation.**

## 1.15. Boiler shut-down

The boiler shuts down automatically if a malfunction occurs. Refer to Tables 1 and 2 to identify the boiler operating mode. To determine the possible causes of malfunction, see also paragraph 6. The troubleshooting section is at the end of this manual. Below is a list of kinds of shut-down and the procedure to follow in each.

### 1.15.1. Burner shut-down

Fault code **E01** is displayed flashing on the display in the event of burner shut-down due to missing flame. If this happens, proceed as follows:

- check that the gas cock is open and light a kitchen gas ring for example to check the gas supply;
- after checking if the fuel is available, press the "reset" button to restore burner operation (**F**, fig. 1): if, after two starting attempts, the boiler still fails to start and enters the shut-down mode again, contact a Service Centre or qualified personnel for maintenance.

If the burner shuts down frequently, there is a recurring malfunction. Please contact a Service Centre or a qualified service engineer.

### 1.15.2. Shut-down due to incorrect air/flue gas system draught

In case of malfunction of the air/flue gas system, the boiler shuts down. The code **E03** (flue gas thermostat) is shown flashing on the display. In this case, contact a qualified Service Centre or qualified personnel for maintenance.

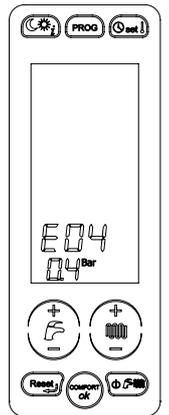
### 1.15.3. Shut-down due to low water pressure

If shutdown due to insufficient pressure in system fault code **E04** starts flashing (indicating safety water pressure switch triggering), fill the system by opening the filler cock as shown in fig. 3. Fault code **E04** is displayed when system pressure goes below 0.4 bar, and error will be automatically reset as soon as system pressure reaches 1.0 bar. Water pressure must be 1-1.3 bars while the boiler is cold.

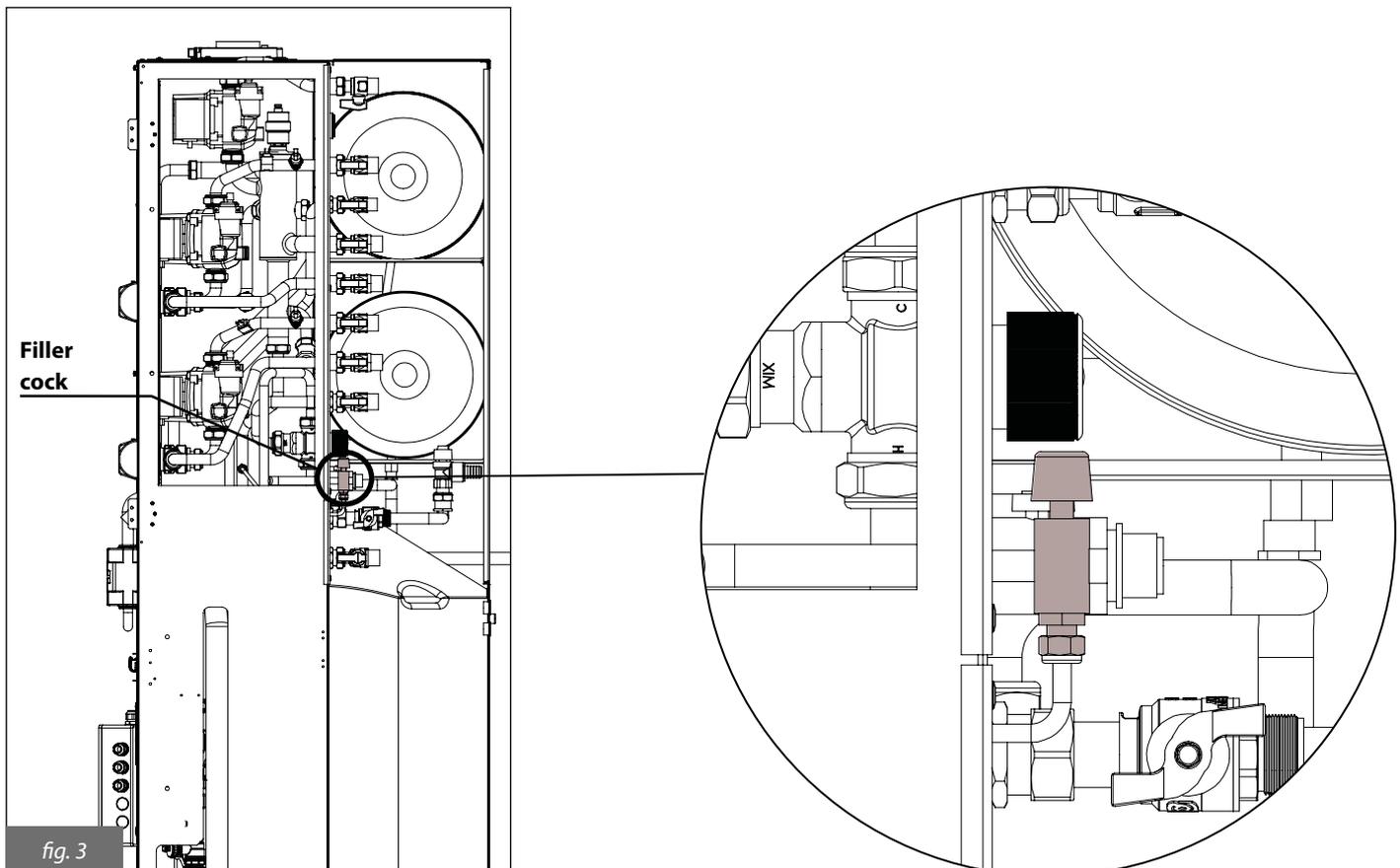
In order to restore water pressure, proceed as follows:

- turn the filler cock (fig. 3) anticlockwise to allow water to enter the boiler;
- keep the cock open until the control panel shows a value of 1-1.3 bar;
- turn cock clockwise to close it.

If the boiler still fails to operate, contact a Service Centre or a qualified service engineer.



 **Make sure you close the cock carefully after filling. If you do not, when the pressure increases, error E09 may be displayed and the heating system safety valve may activate and discharge water.**



#### 1.15.4. Shut-down for fan malfunction

The fan operation is constantly monitored and in case of malfunction the burner goes off; the code **E40** flashes on the display.

This mode is maintained until the fan recovers normal working parameters.

If the boiler does not start and remains in this mode, contact a Service Centre or a qualified service engineer.

#### 1.15.5. Alarm due to temperature probe malfunction

The following fault codes are shown on the display in the event of burner shut-down due to a temperature probe fault:

- **E05** for the CH probe. In this case the boiler ignition is disabled.
- **E06** for the DHW probe. In this case, the boiler works in central heating mode only, and the DHW function is disabled.
- **E12** for plate inlet DHW probe. In this case, the boiler works in standard mode, comfort function excluded.
- **E15** for the return probe. In this case the boiler does not work.
- **E24** for the solar collector probe. In this case, the water heater CANNOT be heated by the solar collectors. The CH and DHW production functions operate normally.
- **E27** for the solar valve probe. In this case the water heater cooling function is disabled.
- **E28** for the solar water heater probe. In this case, the water heater CANNOT be heated by the solar collectors.
- **E36** for CH flow probe in one of the installed zones (V and Z versions). In this case boiler ignition is disabled only for the zone affected by the fault. All other zones operate correctly.

In any case, contact a qualified Service Centre or qualified personnel for maintenance.

#### 1.15.6. Alarm due to (optional) Remote Control connection malfunction

The boiler recognises whether or not there is a Remote Control (optional).

If the boiler does not receive information from the Remote Control after the Remote Control itself is connected, the boiler attempts to re-establish communication for 60 seconds, after which the fault code **E31** is shown on the Remote Control display.

The boiler will continue to operate according to the settings on the touch screen panel and ignore the Remote Control settings.

In this case, contact a qualified Service Centre or qualified personnel for maintenance.

The Remote Control can indicate faults or shut-down conditions and can also restore boiler operation after shut-down up to a maximum of 3 times in a 24 hour period. If the maximum number of attempts is reached, fault code **E99** is shown on the boiler display. To reset error **E99**, disconnect and re-connect again boiler from/to power mains.

#### 1.16. Maintenance

The boiler must be serviced periodically as indicated in the relevant section of this manual.

Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects.

Any maintenance (and repair) work must only be carried out by qualified personnel.

The user is strongly advised to have the boiler serviced and repaired by a qualified Service Centre.

See *chapter 5 Maintenance* for maintenance operations.

The user may only clean the external casing of the boiler, employing common household products.

Do not use water!

#### 1.17. Notes for the user

**The user may only access parts of the boiler that can be reached without using special equipment or tools. The user is not authorised to remove the boiler casing or to operate on any internal parts.**

**No one, including qualified personnel, is authorised to modify the boiler.**

**The manufacturer shall not be held responsible for damage to people, animals, or property due to tampering with or improper intervention to the boiler.**

**If the boiler remains inactive and the power supply is switched off for a long time, it may be necessary to reset the pumps.**

**This involves removing the casing and accessing internal parts, so it must only be carried out by suitably qualified personnel.**

**Pump failure can be avoided by adding to the water filming additives suitable for multi-metal systems.**

## 2. TECHNICAL FEATURES AND DIMENSIONS

### 2.1. Technical features

This boiler is equipped with a built-in fully pre-mixed gas burner, a condensing heat exchanger, a single-coil water heater and hydraulic and electronic equipment for connection to a solar plant. The following models are available:

- **KBS 24** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 23.7 kW heat input.
- **KBS 32** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 30.4 kW heat input.
- **KBS 24 V** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 23.7 kW heat input. Version preset for connection to a high-temperature and a low-temperature zone.
- **KBS 32 V** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 30.4 kW heat input. Version preset for connection to a high-temperature and a low-temperature zone.
- **KBS 24 Z** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 23.7 kW heat input. Version preset for connection to a high-temperature zone and two low-temperature zones.
- **KBS 32 Z** - Condensing boiler with water heater with single coil for solar integration and domestic hot water production, with 30.4 kW heat input. Version preset for connection to a high-temperature zone and two low-temperature zones.

The boilers meet local applicable Directives enforced in the country of destination, which are stated on their rating plate. Installation in any other country may be a source of danger for people, animals and property.

The key technical features of the boilers are listed below.

#### Manufacturing characteristics:

- IPX5D electrically protected control panel;
- Integrated, modulating electronic safety board;
- Solar plant electronic control board;
- Electronic start-up with igniter and ionisation flame detection;
- Stainless steel, fully pre-mixed burner;
- Mono-thermal, high efficiency, composite and stainless steel heat exchanger with air purging device;
- Stainless steel plate DHW heat exchanger;
- Twin shutter modulating gas valve with constant air/gas ratio;
- Modulating, electronically managed combustion fan;
- 3-speed CH circulation pump with built-in air purging device;
- Heating circuit pressure sensor;
- Hydraulic separator, mixing valves and circulation pumps for high- and low-temperature outlets (**V and Z versions**);
- Circulation pump for solar plant;
- Solar plant hydraulic control unit;
- Flowmeter for domestic hot water flow measurement;
- 13 l/min (KBS 24) and 16 l/min (KBS 32) DHW flow-limiting device;
- Heating water temperature probe, domestic hot water temperature probe, plate inlet water temperature probe, solar collector temperature probe, solar water heater temperature probe (low part), solar valve temperature probe (water heater, top part);
- Safety limit thermostat on low-temperature flow zones;
- Double safety probe on CH flow;
- Flue gas thermostat on discharge tower;
- Flue gas probe on primary heat exchanger;
- Integrated, automatic by-pass;
- 10-litre CH expansion vessel, 12-litre DHW expansion vessel;
- 12 litre solar expansion vessel;
- Central heating system filling and draining cocks;
- Water heater discharge cock;
- 3-bar safety valve for CH circuit;
- 6-bar safety valve for DHW circuit;
- 6-bar safety valve for solar circuit;
- CH motorised deviating valve;
- Motorised solar deviating valve.

#### User interface

- Touch interface with built-in LCD to display and control boiler operating condition: OFF, WINTER, SUMMER and CH ONLY;
- System water temperature regulator: 20/78 °C (standard range) – 20/45 °C (reduced range);
- DHW temperature regulator on the control panel: 35/57 °C;
- Manual mixing valve for domestic hot water temperature setting.

## Operating features

- CH electronic flame modulation with timer-controlled rising ramp (60 seconds, adjustable);
- Electronic flame modulation in DHW mode;
- DHW priority function;
- Flow anti-freeze function: ON 5°C; OFF 30°C or after 15 minutes of operation if CH temperature > 5 °C;
- DHW anti-freeze function: ON 5°C; OFF 10 °C or after 15 minutes of operation if DHW temperature > 5 °C;
- Timer-controlled flue cleaning function: 15 minutes;
- Ignition flame propagation function;
- Possibility to select the heating range: standard or reduced;
- CH Maximum heat input parameter adjustment;
- Ignition heat input adjustment parameter;
- CH thermostat timer: 240 seconds (adjustable);
- Heating pump post-circulation function in CH, anti-freeze and flue cleaning modes: 30 seconds (adjustable);
- DHW post-circulation function: 30 seconds;
- Post-circulation function for heating temperature > 78 °C: 30 seconds;
- Post-ventilation function: at the end of each operation request, the fan continues to operate for 10 seconds;
- Safety post-ventilation function: with flow temperature > 95 °C, the fan is activated until the flow temperature drops below 90 °C;
- Heating pump and deviating valve anti-shutdown function: 30 seconds of operation every 24 hours with boiler not in use;
- Solar plant pump and solar valve anti-shutdown function: 10 seconds of operation every 24 hours with boiler not in use;
- Anti-shutdown function for zone pumps and mixing valve (the latter for **V and Z versions only**): 10 seconds of operation every 24 hours with boiler not in use;
- Anti-water hammer function: can be set from 0 to 10 seconds through parameter P15;
- High- and low-temperature zone heating system supply (**V and Z versions**);
- Solar collector heat transfer function;
- Water heater cooling function;
- Ready for chronothermostat function on the boiler, in combination with two ambient probes;
- Ready for operation with an Open Therm Remote Control (optional, supplied by the manufacturer).
- Ready for operation with external temperature probe (standard on V and Z versions, optional on all other versions).

2.2. Dimensions

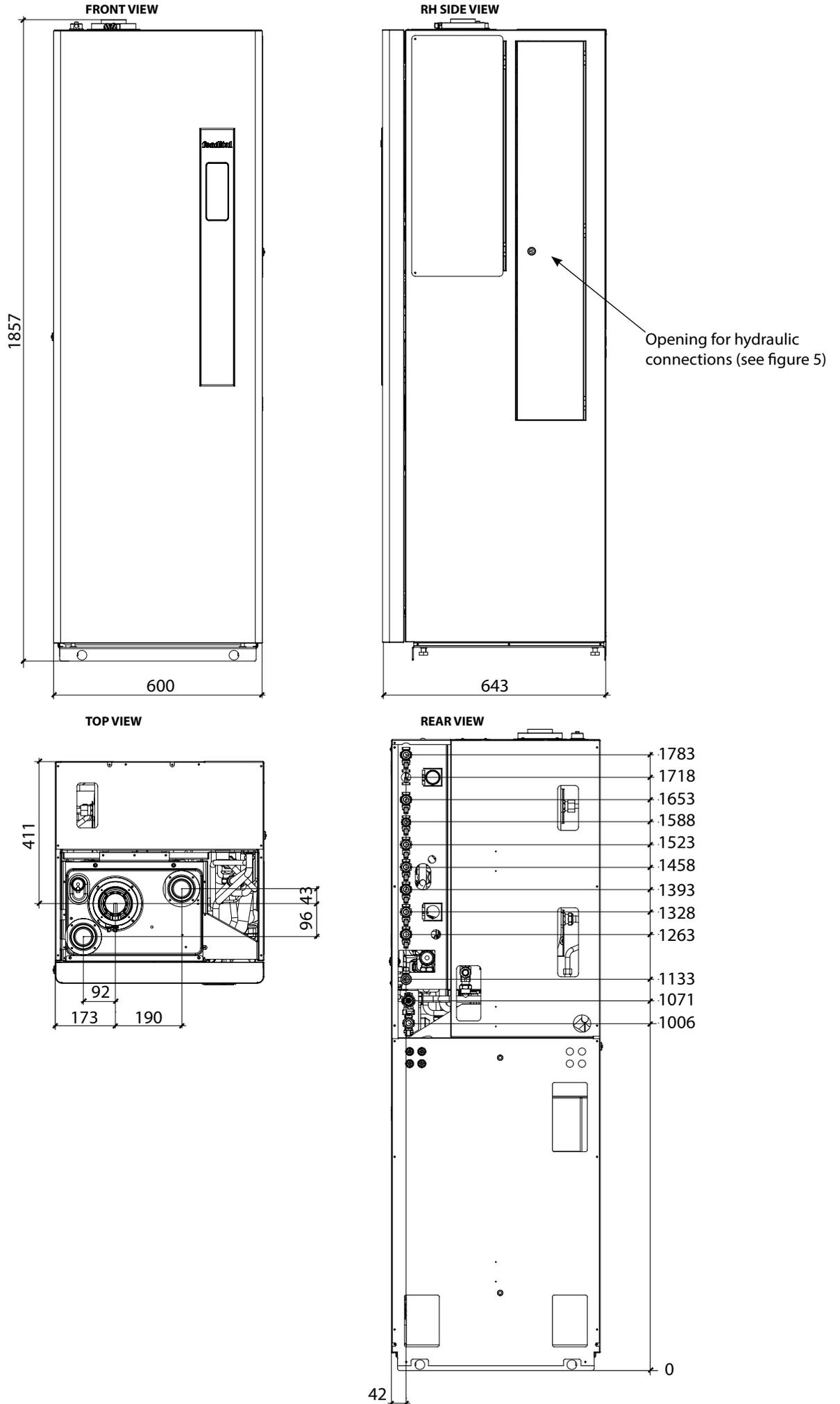


fig. 4

## HYDRAULIC CONNECTIONS

### MADEIRA SOLAR COMPACT KBS

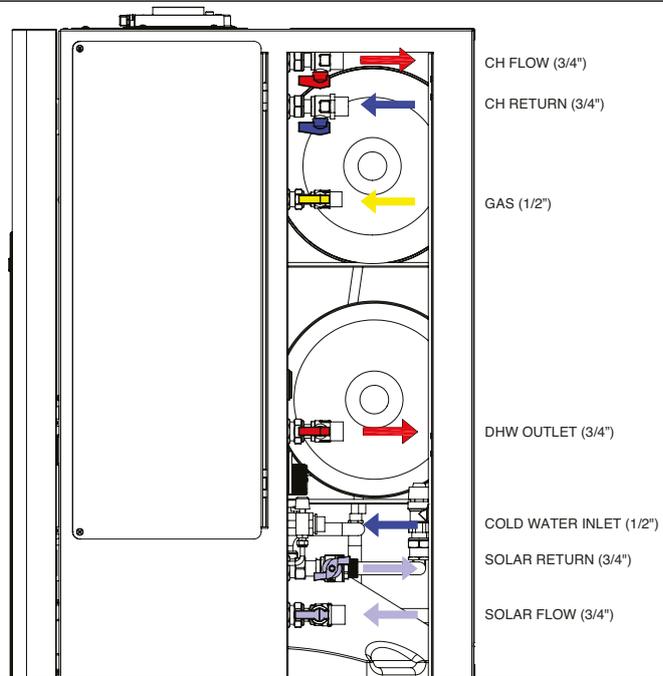


fig. 5

## HYDRAULIC CONNECTIONS

### MADEIRA SOLAR COMPACT KBS V

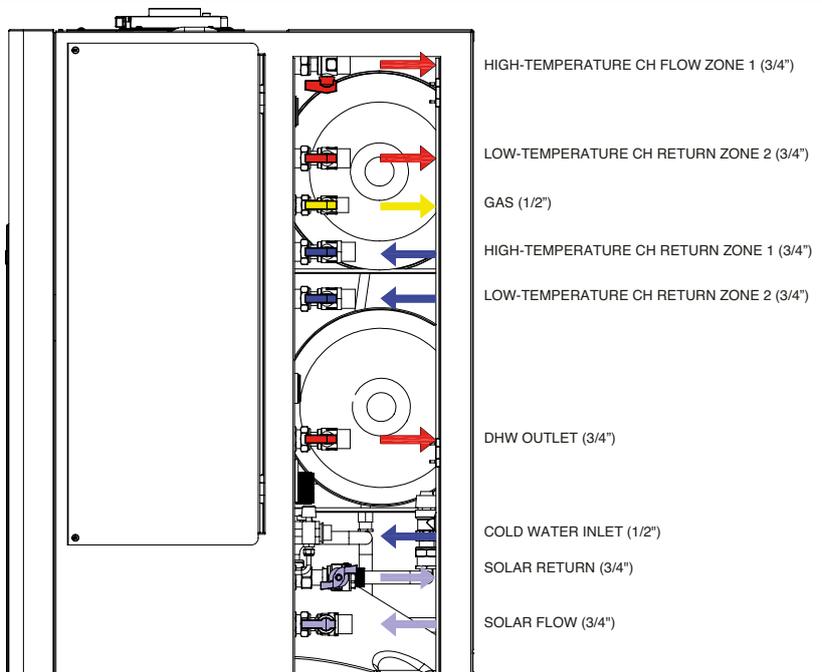


fig. 6

## HYDRAULIC CONNECTIONS

### MADEIRA SOLAR COMPACT KBS Z

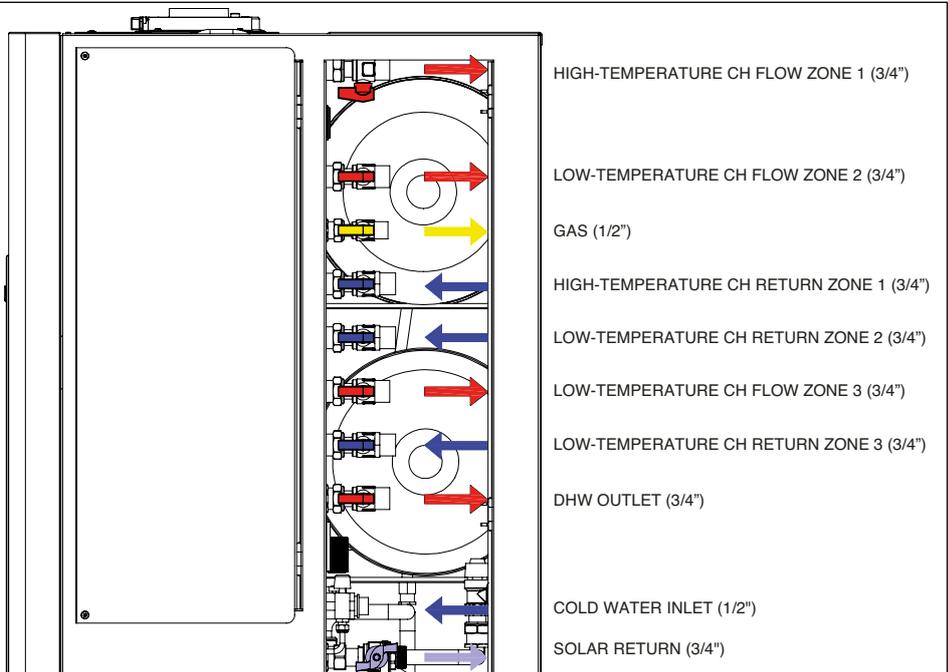
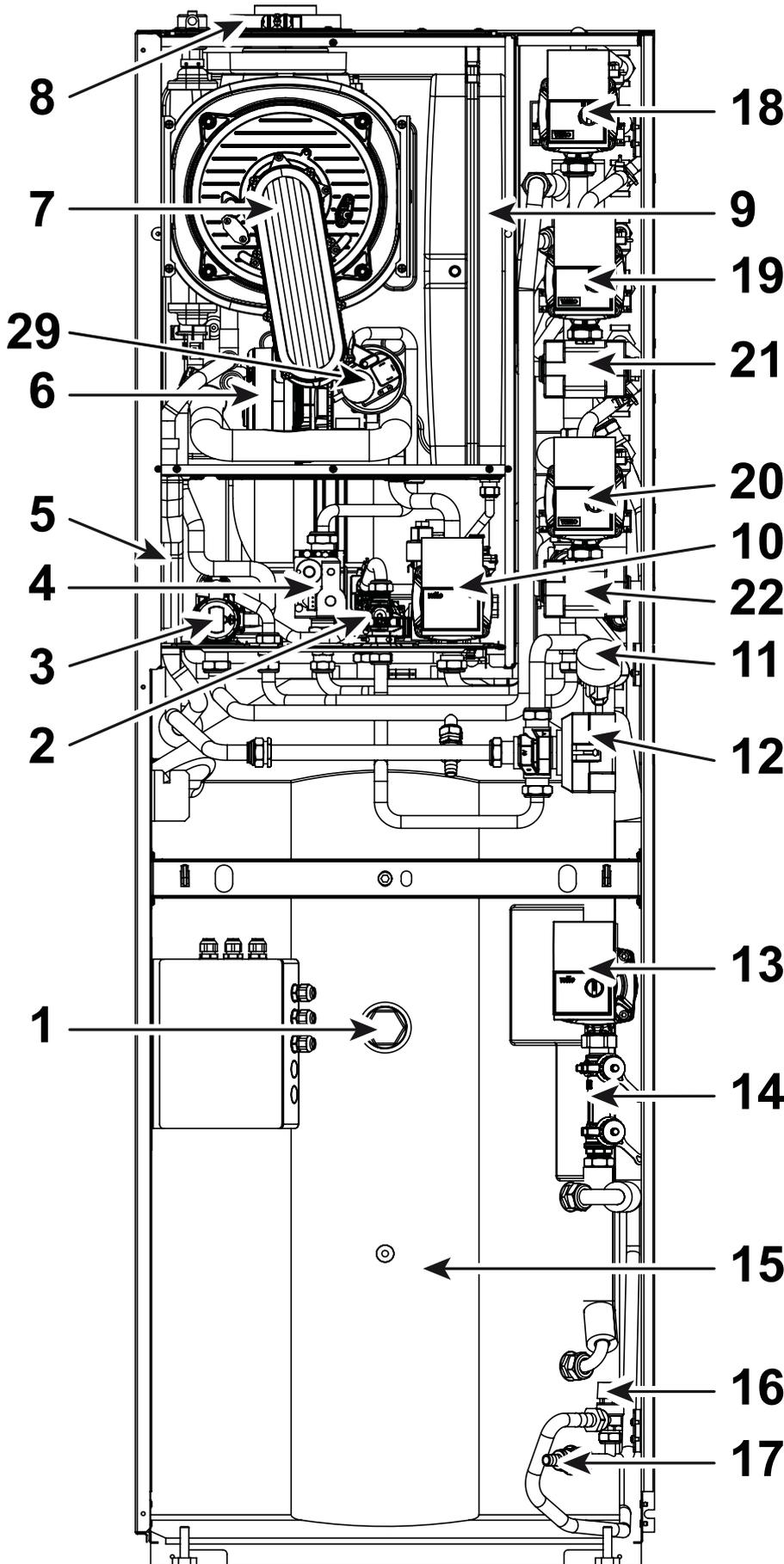


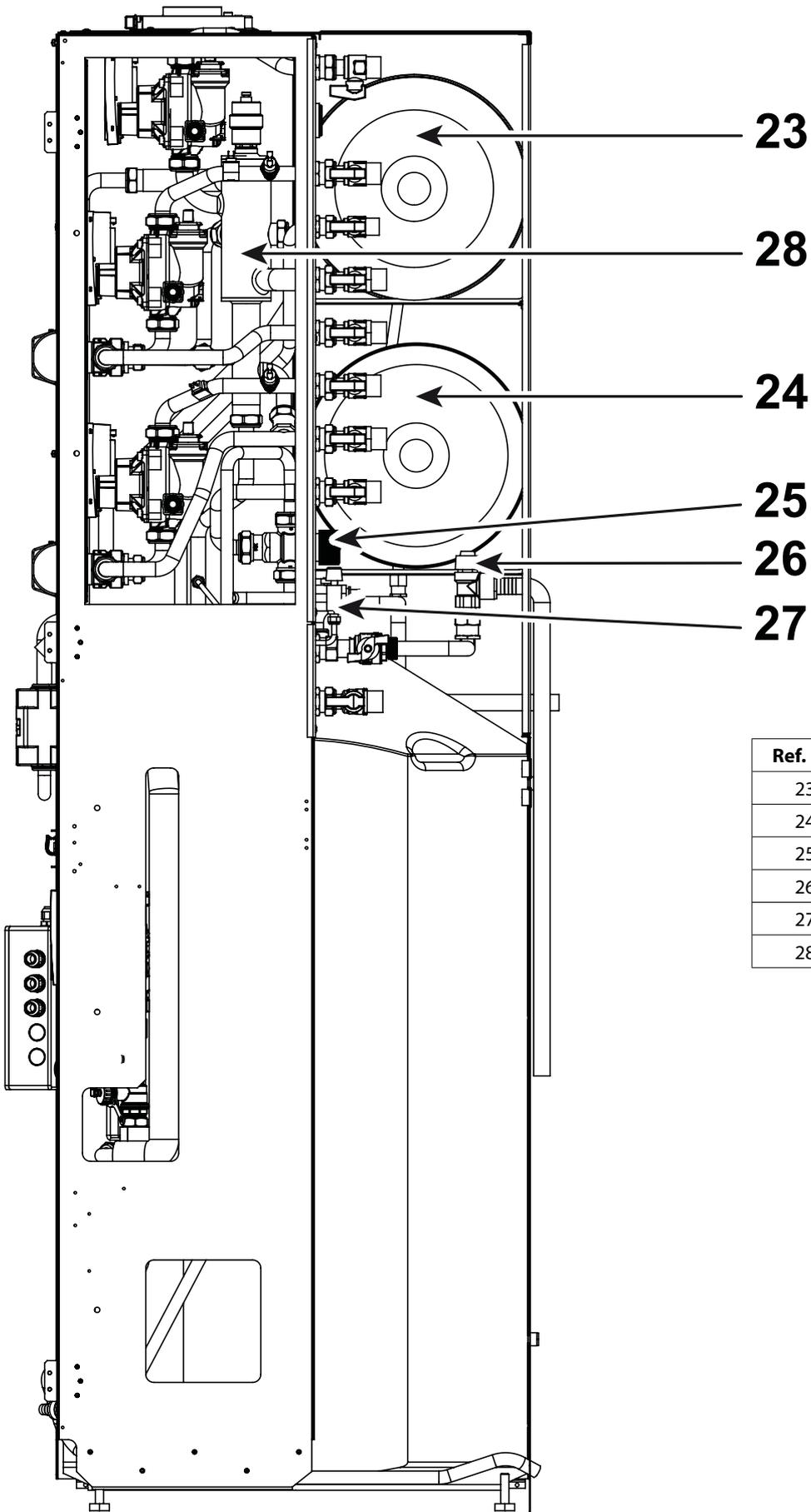
fig. 7

2.3. Key components



Ref. no.	Description
1	Boiler protective anode
2	DHW flowmeter
3	Three-way valve
4	Gas valve
5	Condensate trap
6	Modulating fan
7	Pre-mixed burner
8	Flue gas discharge tower
9	CH expansion vessel
10	CH circulation pump
11	Solar system pressure gauge
12	DHW motorised 3-way deviating valve
13	Solar system circulation pump
14	Solar plant flowmeter with filler cock and discharge cock
15	170-litre solar water heater
16	DHW 6-bar safety valve
17	System discharge cock
18	Zone 1 high-temperature pump (V and Z versions)
19	Zone 2 low-temperature pump (V and Z versions)
20	Zone 3 low-temperature pump (Z versions)
21	Zone 2 low-temperature mixing valve (V and Z versions)
22	Zone 3 low-temperature mixing valve (Z versions)
29	Air pressure switch

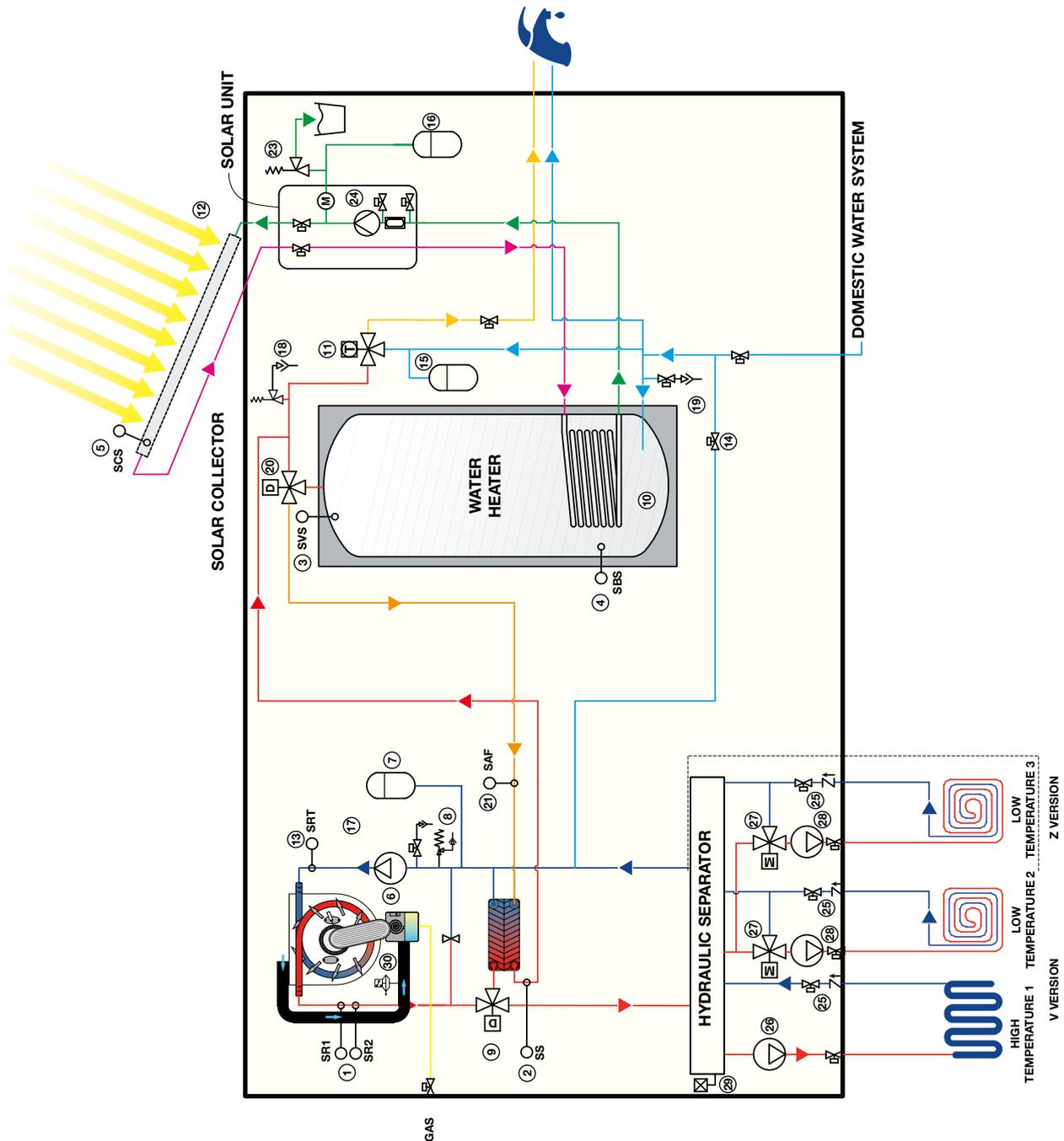
fig. 8



Ref. no.	Description
23	DHW expansion vessel
24	Solar expansion vessel
25	DHW mixing valve
26	Solar 6-bar safety valve
27	CH system filler cock
28	Hydraulic separator

fig. 9

2.4. Boiler operating diagram



Ref.	Description	Ref.	Description
1	Double CH flow probe	16	12 litre solar expansion vessel
2	DHW probe	17	CH system discharge cock
3	Solar valve probe (water heater top part)	18	DHW 6-bar safety valve
4	Solar water heater probe (water heater low part)	19	Water heater drain cock
5	Solar collector probe	20	DHW motorised 3-way deviating valve
6	CH circulation pump	21	Cold water probe
7	10 litre CH expansion vessel	22	Cock with non-return valve
8	3-bar safety valve	23	Solar 6-bar safety valve
9	CH Motorised 3-way deviating valve	24	Solar circulation pump
10	170 litre water heater	25	Cock with non-return valve
11	3-way thermostatic mixing valve	26	High-temperature zone circulation pump (V and Z versions)
12	Solar collector (optional)	27	Motorised 3-way mixing valve
13	CH return probe	28	Low-temperature zone circulation pump (V and Z versions)
14	CH system filler cock	29	Automatic gas purging device
15	12 litre DHW expansion vessel	30	Intake pipe

NOTE:

Sections highlighted with a dotted line include boiler in versions different from the standard ones

fig. 10

## 2.5. Operating data

Burner pressures reported in the following page must be verified after the boiler has been operating for 3 minutes.

### KBS 24

Type of gas	CH max. heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		DHW heat output [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Diaphragm diameter [mm]	Flue gas CO <sub>2</sub> value [%]
		min.	max.	min.	max.	min.	max.				
Methane G20	23.7	2.7	22.9	3.2	24.9	3.0	27.4	20	3.7	-	9 ÷ 9.3
Propane G31	23.7	2.7	22.9	3.2	24.9	3.0	27.4	37	3.0	-	10.0

Table 4 - KBS 24 adjustment rates

### KBS 32

Type of gas	CH max. heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		DHW heat output [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Diaphragm diameter [mm]	Flue gas CO <sub>2</sub> value [%]
		min.	max.	min.	max.	min.	max.				
Methane G20	30.4	3.9	29.4	4.4	32.3	3.9	33.4	20	4.45	-	9.0 ÷ 9.3
Propane G31	30.4	3.9	29.4	4.4	32.3	3.9	33.4	37	3.55	7.2	10.0

Table 5 - KBS 32 adjustment rates

## 2.6. General characteristics

		KBS 24	KBS 32
Device category	-	I12H3P	I12H3P
CH circuit max. and min. pressure	bar	3.0 - 0.5	3.0 - 0.5
DHW circuit max. and min. pressure	bar	6.0 - 0.5	6.0 - 0.5
Specific flow rate $\Delta T = 30^\circ\text{C}$ - EN 625	l/10'	134	162
Qualification of domestic hot water - EN 13203-1		★★★	★★★
Draw capacity for 10 min. - EN 13203-1	l/min	13.4	16.2
Cocks (taps) - EN 13203-1	1..4	2	3
Power supply: Voltage ~ Frequency	V ~ Hz	230 ~ 50	230 ~ 50
Power mains supply fuse	A	3.15	3.15
Power absorption (version without zones)	W	118	127
Power absorption (version V)	W	205	215
Power absorption (version Z)	W	253	263
Stand-by power absorption (version without zones)	W	4.2	4.2
Stand-by power absorption (version V)	W	6.0	6.0
Stand-by power absorption (version Z)	W	7.8	7.8
Pump absorption in CH mode (version without zones)	W	50	50
Pump absorption in CH mode (V version)	W	133	133
Pump absorption in CH mode (Z version)	W	176	176
Electric protection rating	IP	X5D	X5D
Total boiler weight (*)	Kg.	186	194
Methane gas consumption at maximum CH output (*)	m <sup>3</sup> /h	2.51	3.22
Propane gas consumption at maximum CH output (*)	Kg/h	1.84	2.36
Maximum CH working temperature	°C	78 + 5	78 + 5
Maximum DHW working temperature	°C	57 + 5	57 + 5
CH expansion vessel total capacity	l	10	10
DHW expansion vessel total capacity	l	12	12
Solar expansion vessel total capacity	l	12	12
Maximum recommended system capacity (***)	l	200	200

Table 6 - Technical features

(\*) Weight of empty water heater and boiler without optional components (high- and low-temperature heating outlet)

(\*\*) Value referred to 15 °C - 1013 mbar

(\*\*\*) Maximum water temperature 78 °C, expansion vessel pressure 1 bar

KBS 24		Max. output	Min. output	30% load
Casing heat loss with burner on	%	0.61	6.52	-
Casing heat loss with burner off	%		0.21	
Flue system heat loss with burner on	%	2.69	2.08	-
Flue system mass capacity	g/s	12.43	1.33	-
Flue gas temp. – air temp	°C	61	33	-
Efficiency rating at maximum heat output (60/80°C)	%	96.7	-	-
Efficiency rating at maximum heat output (30/50°C)	%	105.1	-	-
Efficiency rating at minimum heat output (60/80°C)	%	-	91.4	-
Efficiency rating at minimum heat output (30/50°C)	%	-	104.9	-
Efficiency rating at 30% heat output	%	-	-	106.5
Efficiency rating (according to 92/42/EC)	-		★★★★	
NO <sub>x</sub> emission class	-		6	

Table 7 - Combustion specifications, model KBS 24

KBS 32		Max. output	Min. output	30% load
Casing heat loss with burner on	%	0.87	5.10	-
Casing heat loss with burner off	%		0.19	
Flue system heat loss with burner on	%	2.33	2.00	-
Flue system mass capacity	g/s	15.81	1.87	-
Flue gas temp. – air temp	°C	60	40.5	-
Efficiency rating at maximum heat output (60/80°C)	%	96.8	-	-
Efficiency rating at maximum heat output (30/50°C)	%	106.2	-	-
Efficiency rating at minimum heat output (60/80°C)	%	-	92.9	-
Efficiency rating at minimum heat output (30/50°C)	%	-	104.8	-
Efficiency rating at 30% heat output	%	-	-	108.3
Efficiency rating (according to 92/42/EC)	-		★★★★	
NO <sub>x</sub> emission class	-		6	

Table 8 - Combustion specifications, model KBS 32

## 2.7. CH circulation pump available head

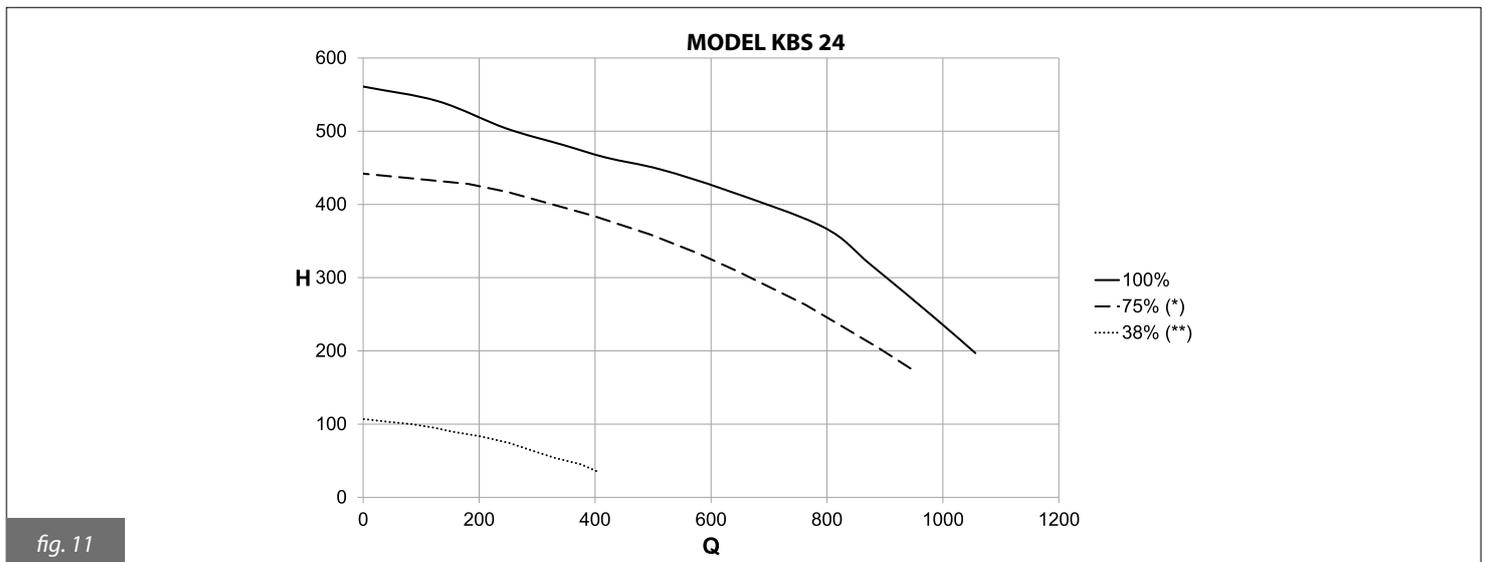


fig. 11

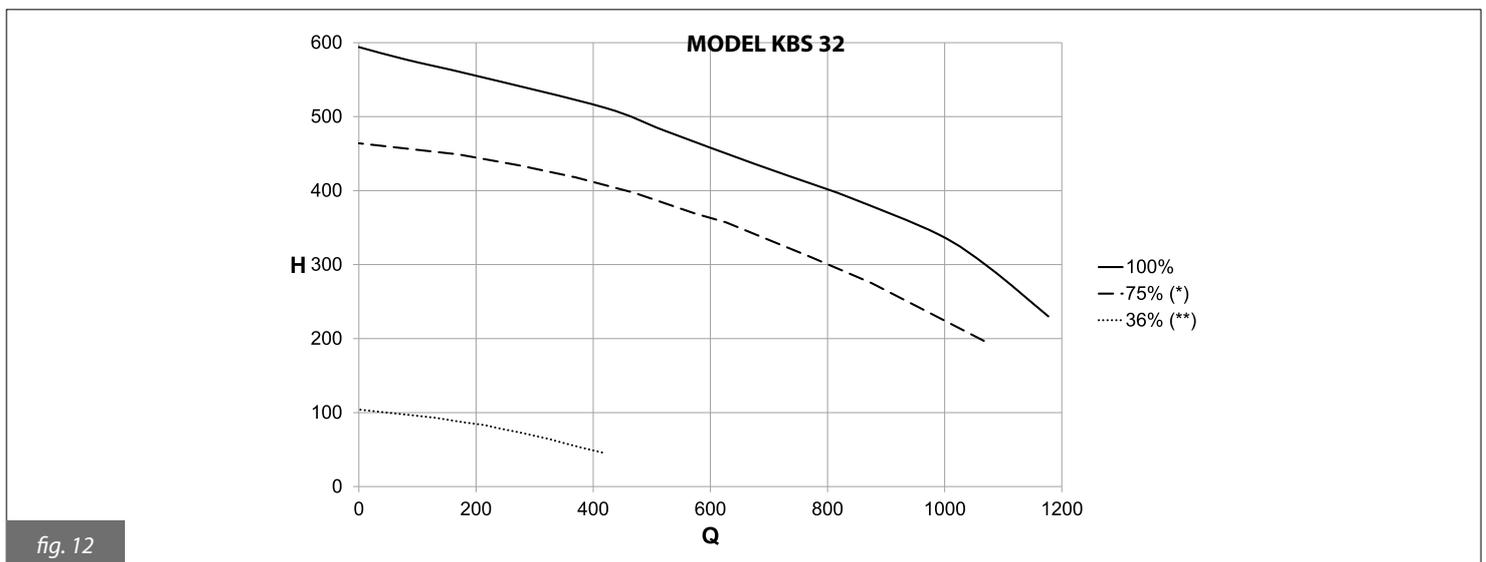
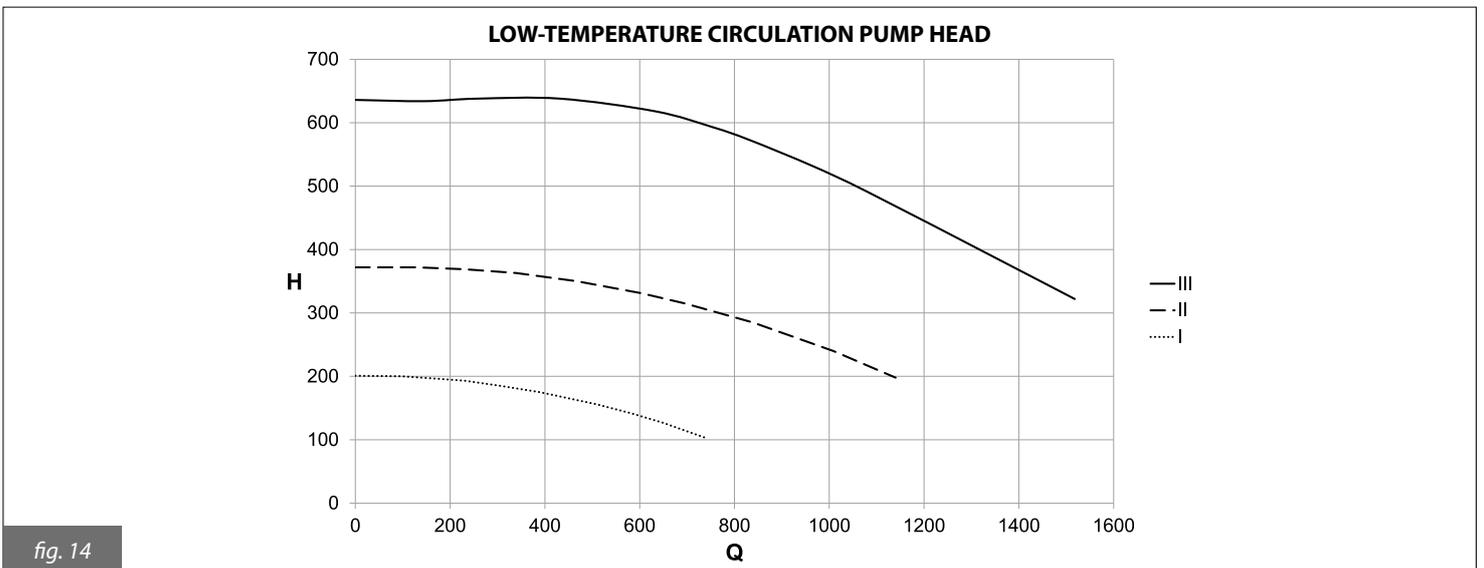
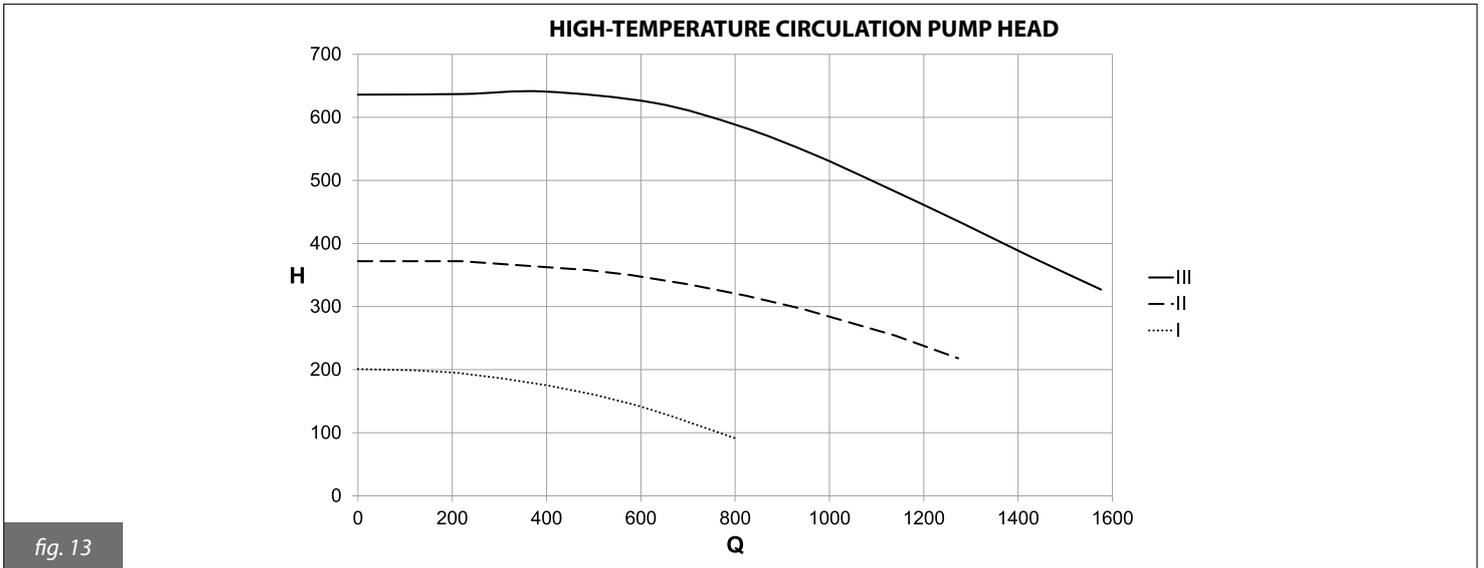
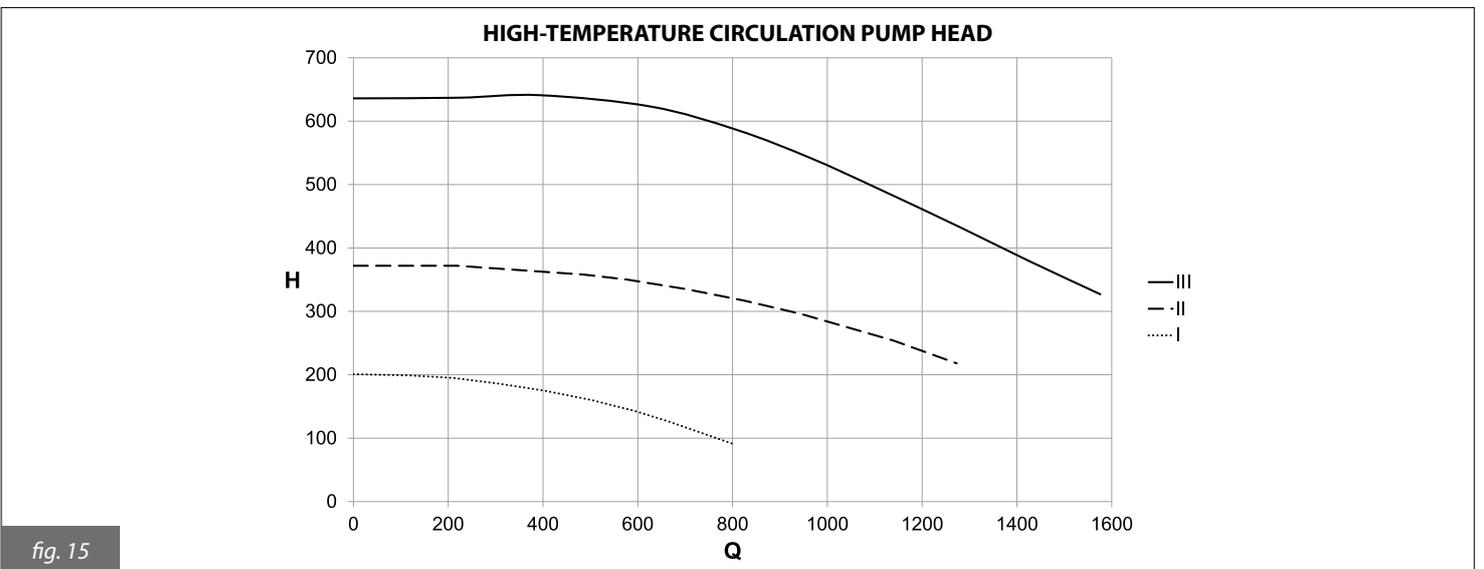


fig. 12

2.8. Low and high temperature circulation pumps available head (V versions)



2.9. Low and high temperature circulation pumps available head (Z versions)



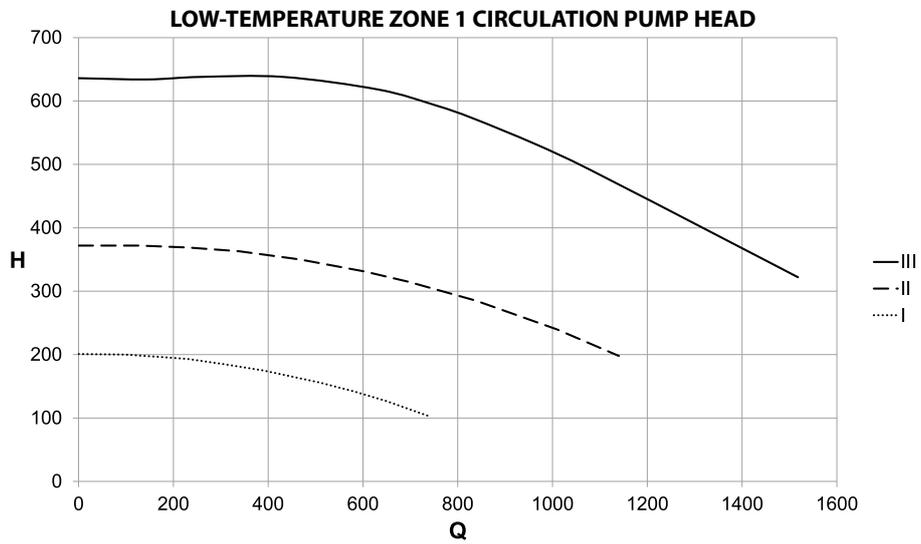


fig. 16

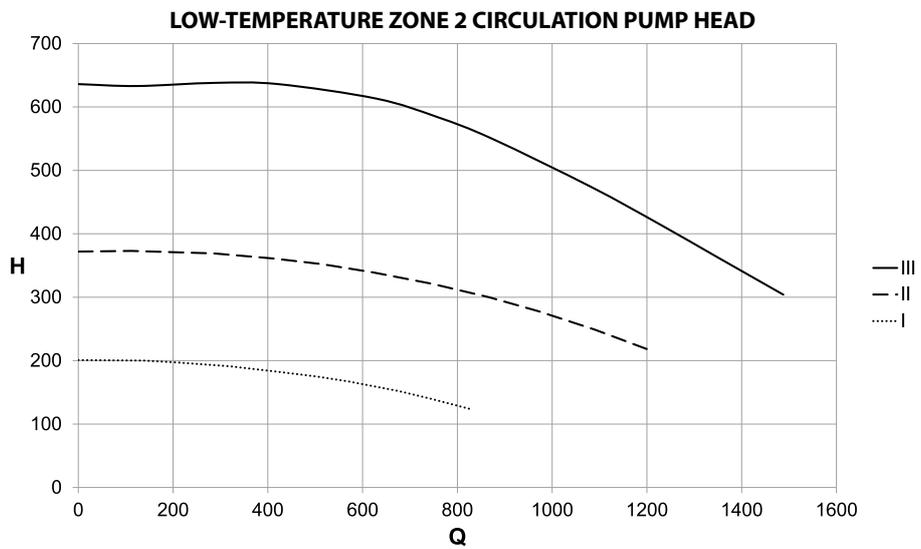


fig. 17

**2.10. Solar circulation pump available head**

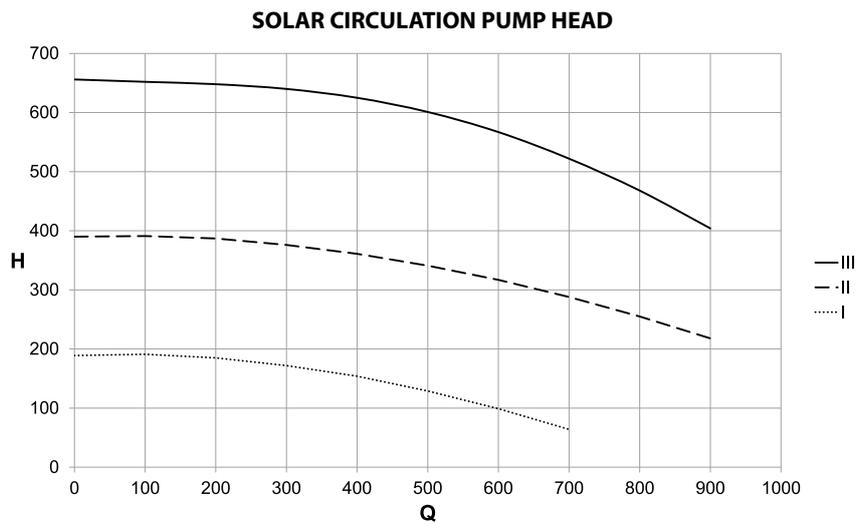


fig. 18

## 3. INSTRUCTIONS FOR THE INSTALLER

### 3.1. Installation standards

This is an II2H3P category boiler and must be installed in compliance with the laws and standards in force in the country of installation, which are herein considered as entirely transcribed.

### 3.2. Installation



**Accessories and spare parts for installation and service procedures are to be supplied by the Manufacturer. Should non original accessories and spare parts be employed, boiler proper performance is not guaranteed.**

#### 3.2.1. Packaging

The boiler is shipped in a wooden cage and secured to a wooden pallet with 4 screws. Remove boiler from wooden cage and check its integrity. The packing materials can be recycled. Disposal must be managed via appropriate waste collection sites.

Keep packaging out of reach of children, as it may be dangerous.

The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure in following the above mentioned information.

The packaging contains a bag, which includes:

- this boiler installation, use and maintenance manual;
- air-intake blanking cap kit
- temperature probe for solar collector (type PT1000)

#### 3.2.2. Choosing where to install the boiler

The following must be taken into account when choosing where to install the boiler:

- it is recommended to leave at least a 50-cm clearance on each side of the boiler and a 10-cm clearance on the rear side to facilitate maintenance operations;
- avoid installation in damp or dusty environments;
- the place of installation must not be accessible to strangers, children and animals.

#### 3.2.3. Installing the boiler



**Before connecting the boiler to CH and DHW networks, clean the pipes carefully.**

**- Before commissioning a NEW system, clean it to remove any metal chips due to machining and welding, and any oil and grease that might negatively affect boiler operation or even damage it in case they get inside it.**

**- Before commissioning a RECONDITIONED system (where radiators have been added, the boiler has been replaced, etc.) thoroughly clean it to remove any sludge and residues.**

**Clean the system using standard non acid products, available on the market.**

**Do not use solvents as they could damage system components.**

**Furthermore, in the central heating system (either new or reconditioned), it is always advisable to add to water a suitable percentage of corrosion protectants for multi-metal systems that will create a protective film onto all internal surfaces.**

**The manufacturer shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned instructions.**

**For all boiler installation types, it is necessary to install a filter which can be inspected (Y-shaped type) with Ø 0.4mm-mesh, on the return pipe before the boiler.**

After transporting the boiler to the place of installation, proceed as follows to install it:

- unscrew the screws securing the boiler to the wooden pallet;
- lift the boiler from the pallet and position it on the floor, taking care not to damage it;
- adjust the supporting feet, ensuring that the boiler is stable;
- provide a condensate drain (see fig. 26) and an outlet for the 3-bar and 6-bar safety valves and an outlet for the 6-bar solar circuit safety valve. Please bear in mind that, in case the latter opens, it will release a mixture of water and glycol, which should not be discharged into the sewers, but collected in a container instead;
- connect the boiler to cold water supply pipes, the heating flow and return pipes, the domestic hot water flow pipes from the water heater, the solar plant flow and return pipes (see paragraph 3.2.8);
- connect the boiler to pipe for condensate drain (refer to paragraph 3.2.8).
- provide a system for relieving the 3-bar safety valve and the 6-bar safety valve. Otherwise, the boiler manufacturer shall not be held responsible if the safety valves are activated and the room is flooded;
- provide a system for relieving the 6-bar safety valve of the solar circuit;
- connect the boiler to the air intake and flue gas venting system (refer to paragraph 3.2.5);
- connect the boiler to the gas supply system (refer to paragraph 3.2.7);
- connect electric power supply, ambient thermostat (optional) and other available accessories (refer to the paragraphs 3.2.9 and following).

### 3.2.4. Boiler room ventilation

The boiler has sealed combustion chamber. Combustion air is not drawn from boiler room, therefore no specific recommendations need to be applied concerning the boiler room or openings and ventilation provided to the boiler room.

 **The boiler must be installed in a room that is compliant with the legislation and standards in force in the country of installation, which are herein considered as entirely transcribed**

### 3.2.5. Air intake and flue gas venting system.

Flue gas discharge into the atmosphere and air intake/flue gas venting systems must comply with applicable laws and standards in the country of installation that are considered as fully transcribed herein.

 **The boiler is equipped with safety devices checking correct flue gas discharge. Should an air intake/flue gas venting system malfunction occur, the safety devices will shut-down the boiler and the E03 code will be flashing. It is strictly forbidden to tamper with and/or prevent operation of such safety devices. In the event of repeated boiler arrest, the air intake/flue gas venting ducts must be inspected, as they may be obstructed or inadequately sized to vent the flue gases correctly into the atmosphere.**

 **For the air intake/flue gas venting systems, specific, manufacturer approved, condensate acid-resistant pipes and systems must be used, suitable for condensing boilers.**

 **Flue gas venting pipes are to be installed tilted toward the boiler so that condensate runs toward the combustion chamber, which is designed for condensate collection and drainage. Should the above procedure not be possible, it is necessary to install, in condensate stagnation areas, devices designed for condensate collection and conveying to the condensate drain system. It is necessary to avoid formation of condensate stagnation areas in the flue gas venting system, with the exception of the condensate trap possibly connected to the venting system itself.**

**The manufacturer cannot be held responsible for any damage caused by inappropriate boiler installation or operation, modification to the boiler, or due to non-observance of the instructions provided by the manufacturer or of the applicable legislation and standards for the materials installed.**

When positioning the boiler exhaust terminals onto the wall, comply with the distances specified in the applicable standards and regulations in force in the Country of installation, which are herein considered as entirely transcribed.

### 3.2.5.1. Configuration of air intake and flue gas venting ducts: B23, B53, C13, C33, C43, C53, C83



The information given above is with reference to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.

#### **B23 installation type**

Boiler intended for connection to an existing flue system external to the boiler room. Combustion air is taken directly from the boiler room itself while flue gas is conveyed to the outside.

The boiler is not to be fitted with anti-wind gust device; it has to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **B53 installation type**

Boiler intended for connection, via an independent duct, to the flue gas venting terminal. Combustion air is taken directly from the boiler room itself while flue gas is conveyed to the outside.

The boiler is not to be fitted with anti-wind gust device; it has to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **C13 installation type**

Boiler intended for connection to horizontal outlet and intake ducts connected to the outside by means of coaxial or split ducts.

The minimum distance between the air intake duct and the flue gas venting duct must be at least 250 mm, whereas both terminals must be contained within a square measuring 500 x 500 mm.

The boiler is to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **C33 installation type**

Boiler intended for connection to vertical outlet and intake ducts connected to the outside by means of coaxial or split ducts.

The minimum distance between the air intake duct and the flue gas venting duct must be at least 250 mm, whereas both terminals must be contained within a square measuring 500 x 500 mm.

The boiler is to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **C43 installation type**

Boiler intended for connection to collective chimney pipe system that includes two ducts, air intake and flue gas exhaustion.

These ducts may be coaxial or split.

The chimney must be compliant with applicable legislation and standards.

The boiler is to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **C53 installation type**

Boiler with separate pipes for combustion air intake and flue gas evacuation.

These flues may discharge in areas at a different pressure.

The terminals may not face each other from opposed walls.

The boiler is to be equipped with a fan mounted before the combustion chamber/heat exchanger.

#### **C83 installation type**

Boiler intended to be connected to combustion air terminal and to a single flue gas terminal or collective chimney.

The chimney must be compliant with applicable legislation and standards.

The boiler is to be equipped with a fan mounted before the combustion chamber/heat exchanger.

### 3.2.5.2. Ø 100/60 mm and Ø 125/80 mm air/flue gas coaxial duct system

 The information given above is with reference to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.

#### C13 installation type

##### 24 kW

Minimum permissible length of horizontal coaxial pipes is 1 meter.  
Maximum permissible length of Ø100/60 mm horizontal coaxial pipes is 10 meters.  
Maximum permissible length of Ø125/80 mm horizontal coaxial pipes is 14.5 meters.  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.  
The wall terminal reduces maximum permissible length by 1.5 meters.  
The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.  
The air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

##### 32 kW

Minimum permissible length of horizontal coaxial pipes is 1 meter.  
Maximum permissible length of Ø100/60 mm horizontal coaxial pipes is 7 meters.  
Maximum permissible length of Ø125/80 mm horizontal coaxial pipes is 10.5 meters.  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.  
The wall terminal reduces maximum permissible length by 1.5 meters.  
The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.  
The air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

#### C33 installation type

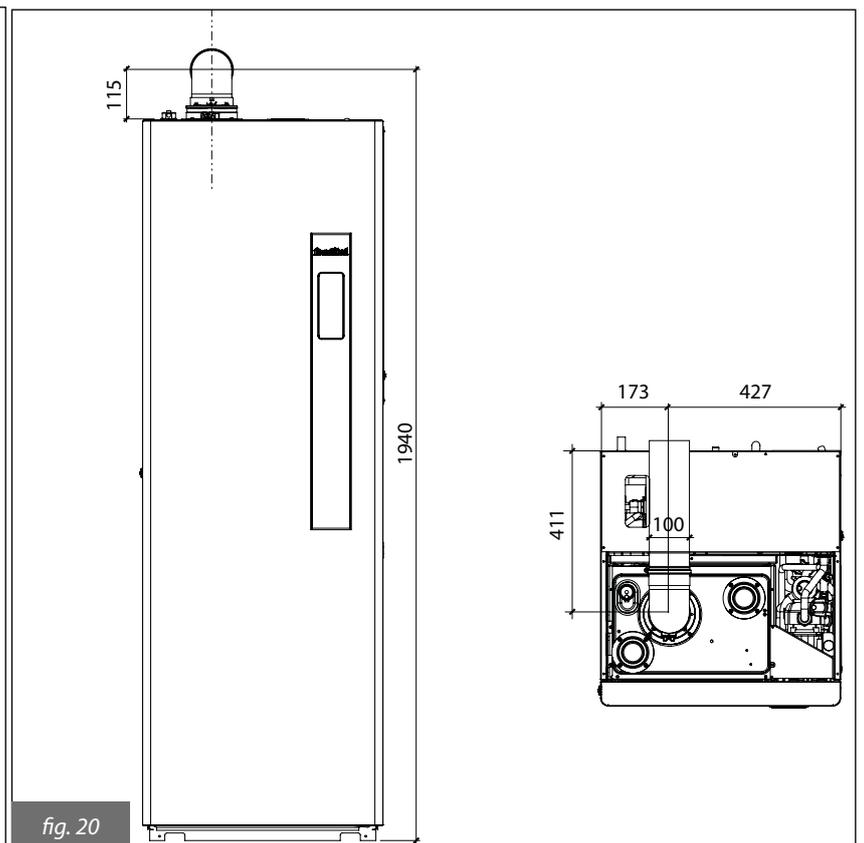
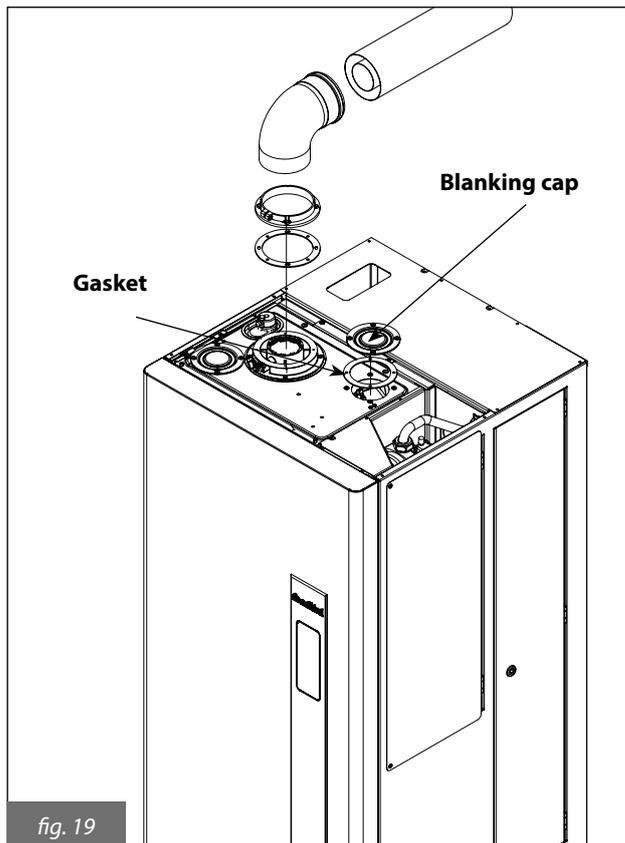
##### 24 kW

Minimum permissible length of vertical coaxial pipes is 1 meter.  
Maximum permissible length of Ø 100/60 mm vertical coaxial pipes is 10 meters.  
Maximum permissible length of Ø 125/80 mm vertical coaxial pipes is 14.5 meters.  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meters.  
The roof vent terminal reduces maximum permissible length by 1.5 meters.

##### 32 kW

Minimum permissible length of vertical coaxial pipes is 1 meter.  
Maximum permissible length of Ø 100/60 mm vertical coaxial pipes is 7 meters.  
Maximum permissible length of Ø 125/80 mm vertical coaxial pipes is 10.5 meters.  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.  
The roof vent terminal reduces maximum permissible length by 1.5 meters.

*The illustrations are indicative only. When installing accessories, refer to the instructions supplied with the accessories themselves.*



### 3.2.5.3. Air intake and flue gas venting via Ø 80 mm split pipes

 The information given above is with reference to air intake/flue gas venting ducts made from smooth, rigid pipes approved and supplied by the manufacturer.

#### Installation types C43 - C53 - C83

##### 24 kW

Minimum permissible length of air intake pipe is 1 meter.  
Minimum permissible length of flue gas venting pipe is 1 meter.  
Maximum permissible length of air intake/flue gas discharge pipes is 84 meters (combined length of air intake and flue gas discharge pipe length).  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meters.  
The roof terminal reduces maximum permissible length by 5.5 meters.  
The wall terminal reduces maximum permissible length by 5 meters.

##### 32 kW

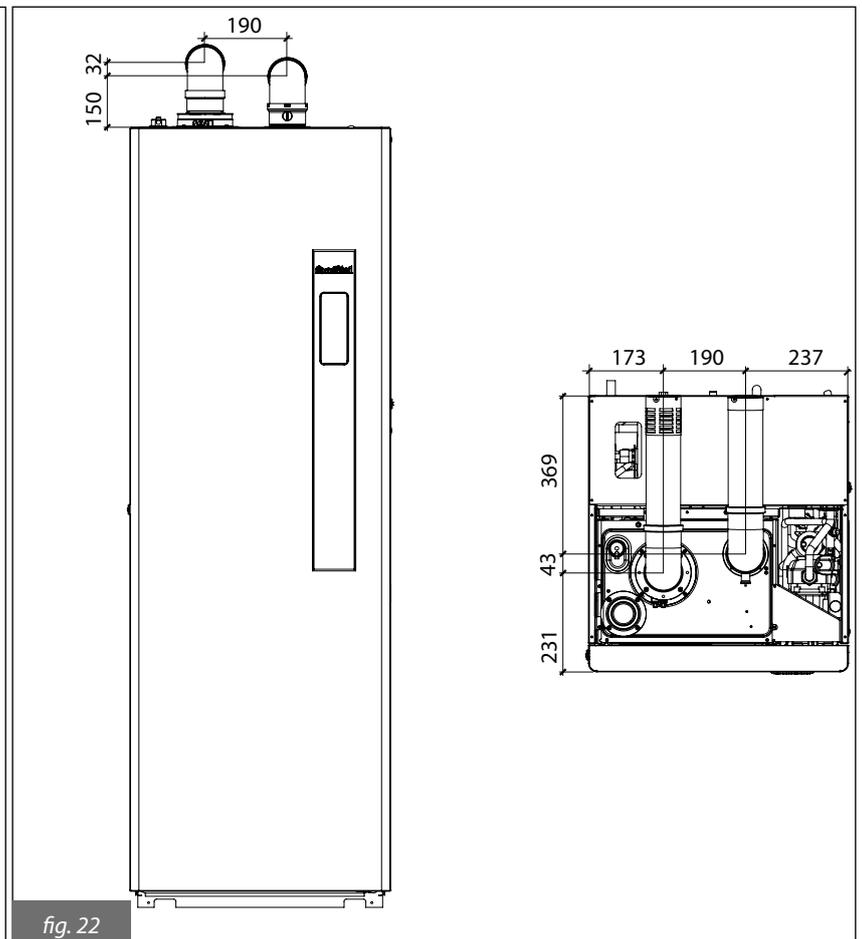
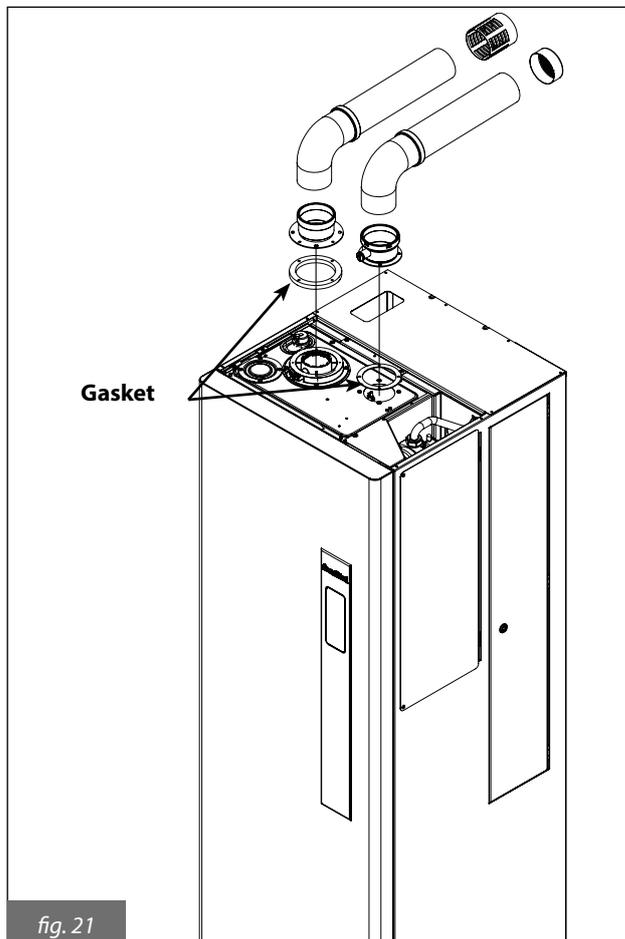
Minimum permissible length of air intake pipe is 1 meter.  
Minimum permissible length of flue gas venting pipe is 1 meter.  
Maximum permissible length of intake/flue gas venting pipes is 78 meters (combined length of air intake and flue gas venting pipe).  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1.5 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 1 meter.  
The roof terminal reduces maximum permissible length by 6 meters.  
The wall terminal reduces maximum permissible length by 5.5 meters.

### 3.2.5.4. Air intake and flue gas venting via 60 mm split pipes

#### Installation types C43 - C53 - C83

##### 24 kW - 32 kW

Minimum permissible length of air intake pipe is 1 meter.  
Minimum permissible length of flue gas venting pipe is 1 meter.  
Maximum permissible length of air intake/flue gas venting pipes is 23 metres for KBS 24 models, 20 metres for model KBS 32 (combined length of air intake and flue gas venting pipe).  
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.  
For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.  
For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.  
The wall terminal reduces maximum permissible length by 4.5 meters.



### 3.2.6. Checking combustion efficiency

#### 3.2.6.1. Flue cleaning function

The boiler features a flue cleaning function which must be used to measure combustion efficiency during operation and to adjust the burner.

To enable the flue cleaning function, press the "reset" key and keep it pressed for about three seconds. If the "reset" key is released before the three seconds have lapsed, the boiler continues to operate normally.

The "broom" symbol steady on and the fan speed indicate that the flue cleaning function is active.

The display shows the flow temperature and the lit flame on, if burner is on. The boiler performs the ignition sequence and then operates at the burner maximum output (parameter **P4**). The keys active in this function are: "reset" and "DHW +/-".

By pressing the "DHW +/-" keys it is possible to change the fan speed from **P5** (minimum speed) to P4 (maximum speed). The display shows the wrench symbol (indicating that the parameter is being edited), the broom, the **H** letter (indicating Hertz), the speed set-point value in Hz, the fan current speed, and the lit flame on symbol if burner is on.

As soon as the "DHW +/-" key is released again, the display will show fan current rpm value, flow temperature, system pressure, the lit flame on symbol, the "broom" symbol to indicate that the flue cleaning function is active.

The flue cleaning function lasts 15 minutes. To quit this function, press "reset" and you will go back to the standard operating mode.

#### 3.2.6.2. Measurement procedure

The boiler is equipped with a tower allowing for air intake/flue gas venting pipe connection (fig. 23 and 24).

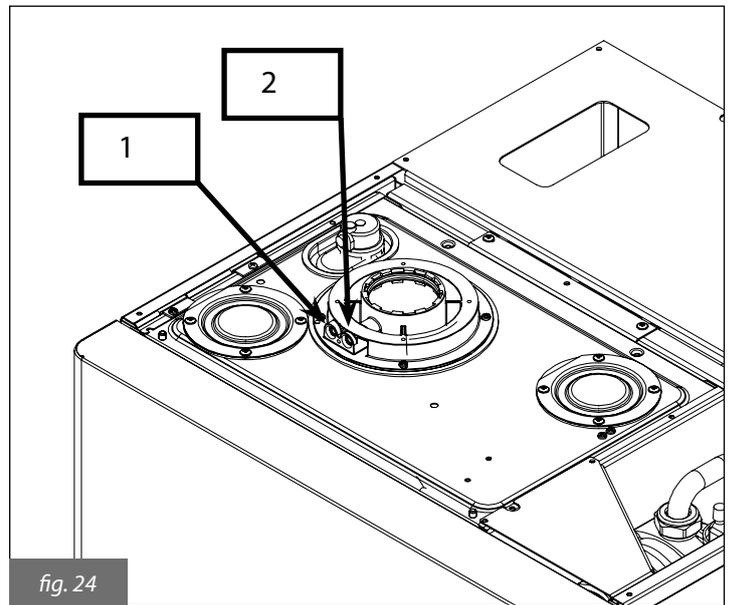
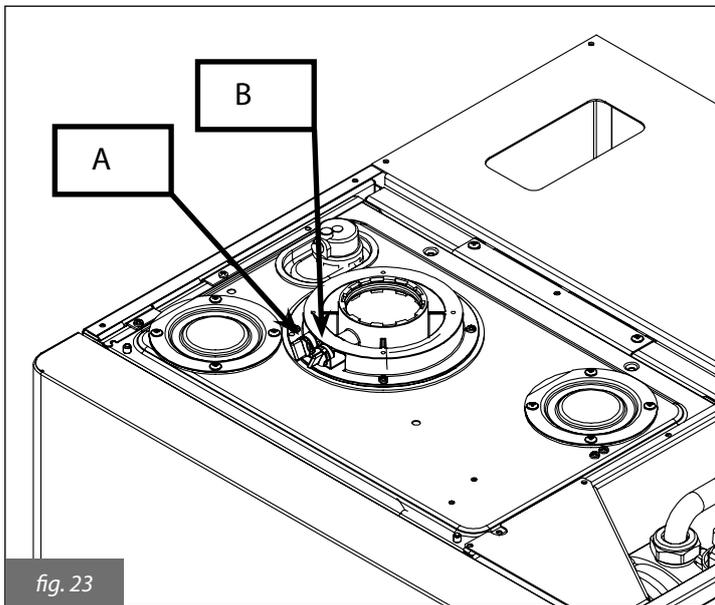
The tower is designed with two pre-arranged openings directly accessing air and flue gas ducts (fig. 24).

Remove caps **A** and **B** from the pre-arranged openings on the tower, before starting combustion checking procedure (fig. 24).

In order to verify combustion efficiency the following measurements must be implemented:

- assess combustion air from no. 1 opening (fig. 24);
- assess flue gas temperature and CO<sub>2</sub> from no. 2 opening (fig. 24).

Allow boiler to reach working temperature before taking any measurement.



### 3.2.7. Connection to gas mains

Gas supply pipe cross-section must be equal or greater than boiler gas pipe. Cross-section gas pipe size depends on its length, layout pattern, gas flow rate. Gas pipe size is to be selected accordingly.

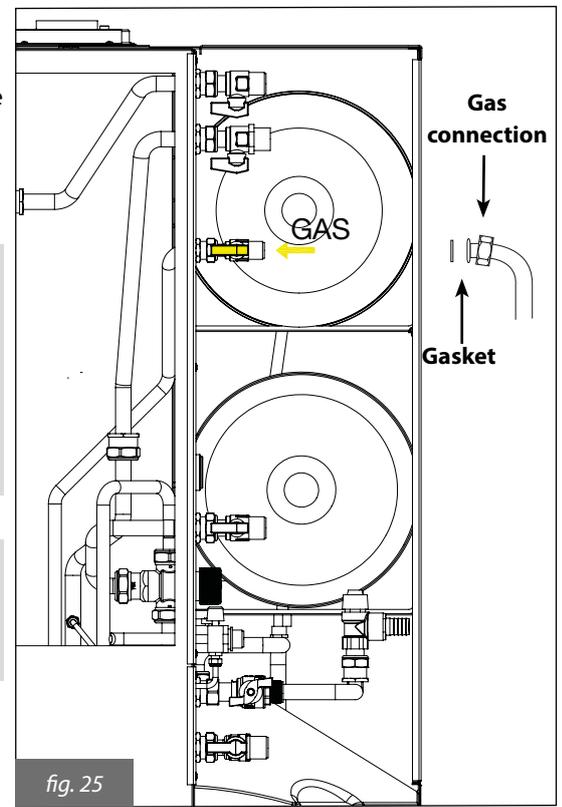
**Comply with installation standards enforced in the country where the boiler is installed which are considered as fully transcribed in this booklet.**



**Remember that before operating an indoor gas distribution system and before connecting it to a meter, it must be checked for leaks. If some system parts are not visible, the leak test is to be carried out before the pipes are covered. Leak test is NOT to be carried out employing flammable gas: use air or nitrogen for this purpose. Once gas is in the pipes, leak test by a naked flame is forbidden; use specific products available on the market.**



**When connecting the boiler to gas supply network, it is COMPULSORY to install an appropriately sized gasket made from suitable material (fig. 25). The boiler gas inlet coupling is NOT SUITABLE for hemp, teflon tape or similarly made gaskets.**



### 3.2.8. Hydraulic connections

Prior to installing the boiler, the hydraulic system is to be cleaned in order to remove impurities as much as possible; they could be present in system components and damage the pump and the heat exchanger (see paragraph 3.2.3).

#### CH

In the version without zones, the CH flow and return pipes must be connected to the boiler through the relevant fittings as shown in figure 5. For versions V and Z see figures 6 and 7, respectively.

When calculating the cross section of CH system pipes, bear in mind load losses induced by radiators, thermostatic valves, radiator gate valves, and the configuration of the system itself.



**It is advisable to convey the discharge flow of boiler safety valve to the sewer system. Should the above precaution not be implemented and the safety valve be activated, boiler room flooding may occur. Manufacturer shall not be held responsible for any damage resulting as failure in observing the above mentioned technical precaution.**

#### DOMESTIC HOT WATER

Cold water inlet and DHW outlet shall be connected to the boiler through the dedicated fittings as shown in figure 5. For versions V and Z see figures 6 and 7, respectively.



**Depending on the hardness of the mains water supply, ascertain whether or not to install appropriate domestic water treatment systems using water treatment products suitable for drinking water and compliant with the standards in force in the country of installation. Water treatment is always advisable when water supplied to the boiler is more than 20°F hard. Water supplied by commonly marketed water softeners, due to PH level induced in water, may not be compatible with some components in the system.**

#### SOLAR COLLECTORS

Connection to solar collectors is made by connecting the solar flow pipe (from collectors to boiler) and solar return pipe (from boiler to collectors) to the relevant fittings as shown in figures 5, 6 and 7.

## CONDENSATE DRAIN

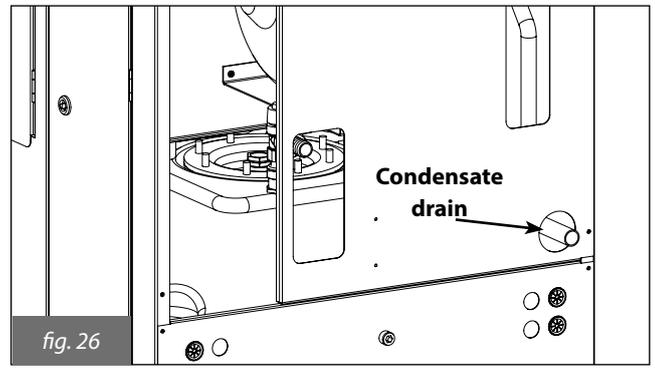
Comply with condensate drain laws and standards applicable in the country of installation, which are considered herein integrally transcribed.

Unless forbidden, the condensate produced by combustion is to be routed (via the condensate drain in fig. 26) through a discharge system connected to the domestic sewer, which due to its basicity, counteracts flue gas condensate acidity.

In order to avoid domestic sewer odour to reach the premises, it is advisable to install an appropriate device between the discharge system and the domestic sewer.

The condensate drain system and the domestic discharge system is to be made of an adequate, condensate-resistant material.

The manufacturer disclaims any liability in case of damage to people, animals, or property resulting from user's failure to follow the above mentioned instructions.



### 3.2.9. Solar collector probe installation

The boiler is equipped with a solar plant temperature probe that must be installed by a qualified engineer.

The probe must be installed between the boiler and the solar field. If the supplied cable is not long enough, add an extension by using a 2-wire shielded outdoor cable.

The two probe cables must be connected to pins **11** and **12** of the boiler electronic board (see fig. 29, 30 and 31). The probe sensor must be installed on the solar field to detect the output temperature of the same (see solar collector instructions).

### 3.2.10. Connection to electrical mains

The boiler is supplied with a three-poled power cable, already connected to the electronic board and it is provided with a safety clamp.

The boiler is to be connected to a 230 V ~ 50 Hz electrical power supply.

**When connecting it to power mains, follow correct phase / neutral polarity sequence.**

Installation standards must be complied with and they are herein considered as entirely transcribed.

An easily accessible two-poled switch, with a minimum 3 mm distance between contacts, is to be installed ahead of the boiler. The switch is to allow power supply cut-off in order to safely perform maintenance and service procedures.

Power supply to the boiler must be fitted with a residual-current circuit breaker having suitable disconnection capacity. Electric power supply must be properly earthed.

The above mentioned safety measure must be verified. If in doubt, ask a qualified technician to thoroughly check the power network.



**The manufacturer cannot be held responsible for any damage caused by failure to earth the system correctly: gas, water, or CH system pipes are not suitable for grounding power networks.**

### 3.2.11. Selecting the operating range in CH mode

Heating temperature adjustment range depends on the selected operating range:

- **standard range:** 20°C to 78°C (press heating +/- keys on the display, **E**, fig. 1);
- **reduced range:** 20°C to 45°C (press heating +/- keys on the display, **E**, fig. 1);

The standard range is active with parameter **P10**  $\geq 1$ , while the reduced range is active with **P10**  $< 1$ .

The two ranges can also be selected even with the external probe disconnected.

The waiting time between one boiler ignition and the following one, used to prevent boiler frequent turning on and off is 4 minutes for both ranges, and can be edited with the parameter **P11**.

If system water temperature decreases below a certain value, the waiting time is reset and the boiler re-ignited, as shown in the following table:

Selected range	Re-ignition temperature
Standard range	< 40°C (P27)
Reduced range	< 20°C

Table 9 - Boiler re-ignition temperatures

Operation range selection is to be implemented by a qualified installer or a Service Centre.

### 3.2.12. Connection to ambient thermostat (optional)

The boiler is designed to be connected to an ambient thermostat (optional, not compulsory).

Ambient thermostat contacts must be properly sized in compliance with a load of 5 mA at 24 Vdc.

Ambient thermostat cables shall be connected to electronic board pins **1** and **2** (fig. 29, 30 and 31), after having eliminated the jumper supplied as a standard with the boiler.

**The ambient thermostat cables are not to be grouped together in the same sheath as power mains supply cables.**

### 3.2.13. Installation and operation with Open Therm Remote Control (optional)

The boiler may be connected to an Open Therm Remote Control (non-compulsory optional accessory supplied by manufacturer).

The Remote Control cables must be connected to terminals **3** and **4** of the electronic board (fig. 29, 30, 31).

**The Remote Control must only be installed by qualified personnel.**



**Only use original Remote Control Units supplied by the manufacturer.**

**The correct operation of the Remote Control itself and of the boiler is not guaranteed if non original Remote Control units not supplied by the manufacturer are used.**

To install the Remote Control, refer to the instructions provided with the Remote Control itself.

Please note the following precautions when installing the Remote Control:

- **the Remote Control wiring must not be grouped together in the same sheath as the power cables:** if the cables are sheathed together, electrical interference from other power cables may compromise the functions of the Remote Control;
- the Remote Control must be installed on an indoor wall at a height of approximately 1.5 m from the floor and in a suitable location for measuring ambient temperature: do not install in recess or corners, behind doors or curtains, and install away from heat sources, direct sunlight, air draughts and water sprays.

The Remote Control connector is protected against inverted polarity, and the connections may be inverted.



**Do not connect the Remote Control to mains electrical power 230 V ~ 50 Hz.**

For complete instructions on how to program the Remote Control, refer to the instruction manual included in the Remote Control kit.

Board and Remote Control communicate in each operating mode: OFF, SUMMER, WINTER, CH ONLY; boiler display layout corresponds to the setting made from the Remote Control, as for the operating mode.

The Remote Control may be used to view and set a number of special parameters denominated TSP parameters and reserved solely for qualified technicians (tables 10 and 11).

TPS0 parameter sets default data table and restores all factory settings, cancelling all preceding modifications on single parameters.

If a single parameter is found to be incorrect, the value given in the default value table is restored.

If the user attempts to set a value not within the permissible range for the parameter, the new value is rejected and the existing value is maintained.

Parameter	Configurable value range	Default 24 kW methane	Default 24 kW propane	Default 32 kW methane	Default 32 kW propane
<b>P0 - TSP0</b> Boiler type and default data chart	1, 3, 6, 7	1	3	6	7
<b>P4 - TSP4</b> Fan speed at burner maximum output (DHW)	From TSP5 ÷ 250 Hz	197 Hz	192 Hz	208 Hz	206 Hz
<b>P5 - TSP5</b> Fan speed at burner minimum output (DHW and CH)	25 ÷ 120 Hz	40 Hz	40 Hz	43 Hz	43 Hz
<b>P6 - TSP6</b> Fan speed at ignition power and propagation	25 ÷ 160 Hz	58 Hz	58 Hz	76 Hz	76 Hz
<b>P7 - TSP7</b> Upper limit for maximum CH heat output	10 ÷ 100 %	88%	88%	89%	88%
<b>P8 - TSP8</b> Negative ramp start minimum speed	P5 ÷ P6	56	56	60	60
<b>P9 - TSP9</b> Negative ramp time	0 ÷ 30 (1 = 10 sec.)	18	18	18	18
<b>P10 - TSP10</b> CH curves	0 ÷ 3	1.5	1.5	1.5	1.5

Table 10 - Limits to be set for TSP parameters and default values in relation to boiler type (TSP0)

### 3.2.14. Connection to the external probe (optional) and "sliding temperature" operation

The boiler can be connected to an external temperature probe (optional - not compulsory) for sliding temperature operation.

 **Only original external temperature probes supplied by the manufacturer must be used. If non-original external temperature probes are used, correct operation of the boiler and external probe cannot be guaranteed.**

The external temperature probe must be connected by means of a double insulated wire, minimum cross-section 0.35 sq.mm. The external probe must be connected to pins 5-6 of boiler electronic board (see fig. 29, 30 and 31).

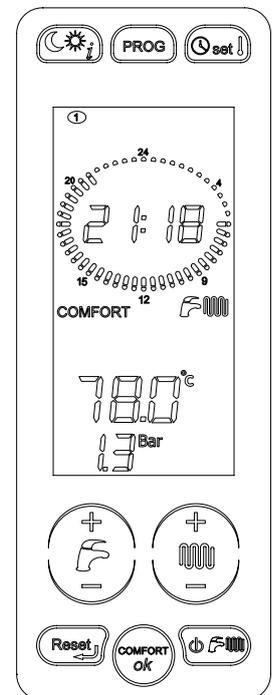
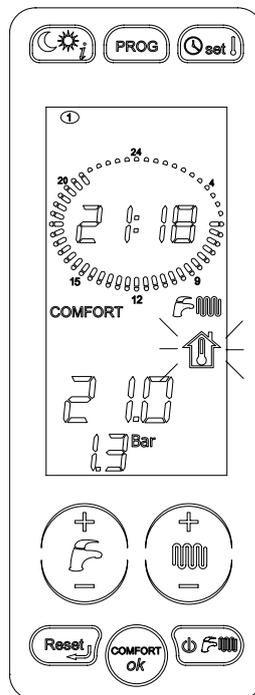
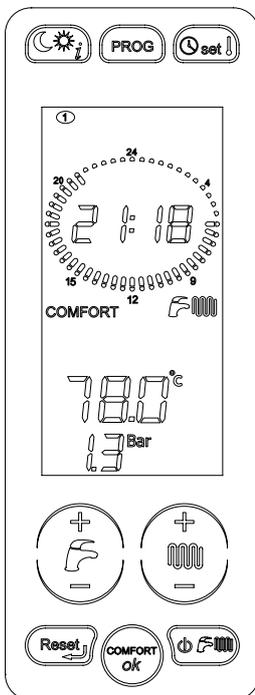
**The temperature probe cables must NOT be routed together with power cables.**

The temperature probe must be installed on an outside wall facing NORTH - NORTH EAST, in a position protected from weather. Do not install near a window, ventilation openings or sources of heat.

The external temperature probe automatically modifies the CH flow temperature in relation to:

- the outdoor temperature measured;
- the thermoregulation curve selected;
- the calculated ambient temperature selected.

The calculated ambient temperature is set using "CH + and -" buttons (**E**, fig. 1) that, with external temperature probe installed, no longer work to set the heating water temperature (see paragraph 1.14.11.). The external temperature value detected by the external probe through boiler **P30** parameter can be displayed.



**1-** With installed external probe, press "CH + and -" buttons (**E**, fig. 1) to set calculated ambient temperature. As soon as button is released, "ambient temperature" icon will continue flashing for approx. 3 seconds, and the domestic hot water value will flash as well.

**2-** After this time, value is stored and display standard operation will be restored.

Figure 27 shows the curves for a calculated ambient temperature of 20°C. Parameter **P10** allows selecting the curve value shown in fig. 27. If calculated ambient temperature value is edited on boiler display, the curves shift up or down, respectively, by the same amount.

With a calculated ambient temperature setting of 20°C, for example, if you select the curve corresponding to parameter 1 and the outdoor temperature is -4°C, the CH flow temperature will be 50°C.

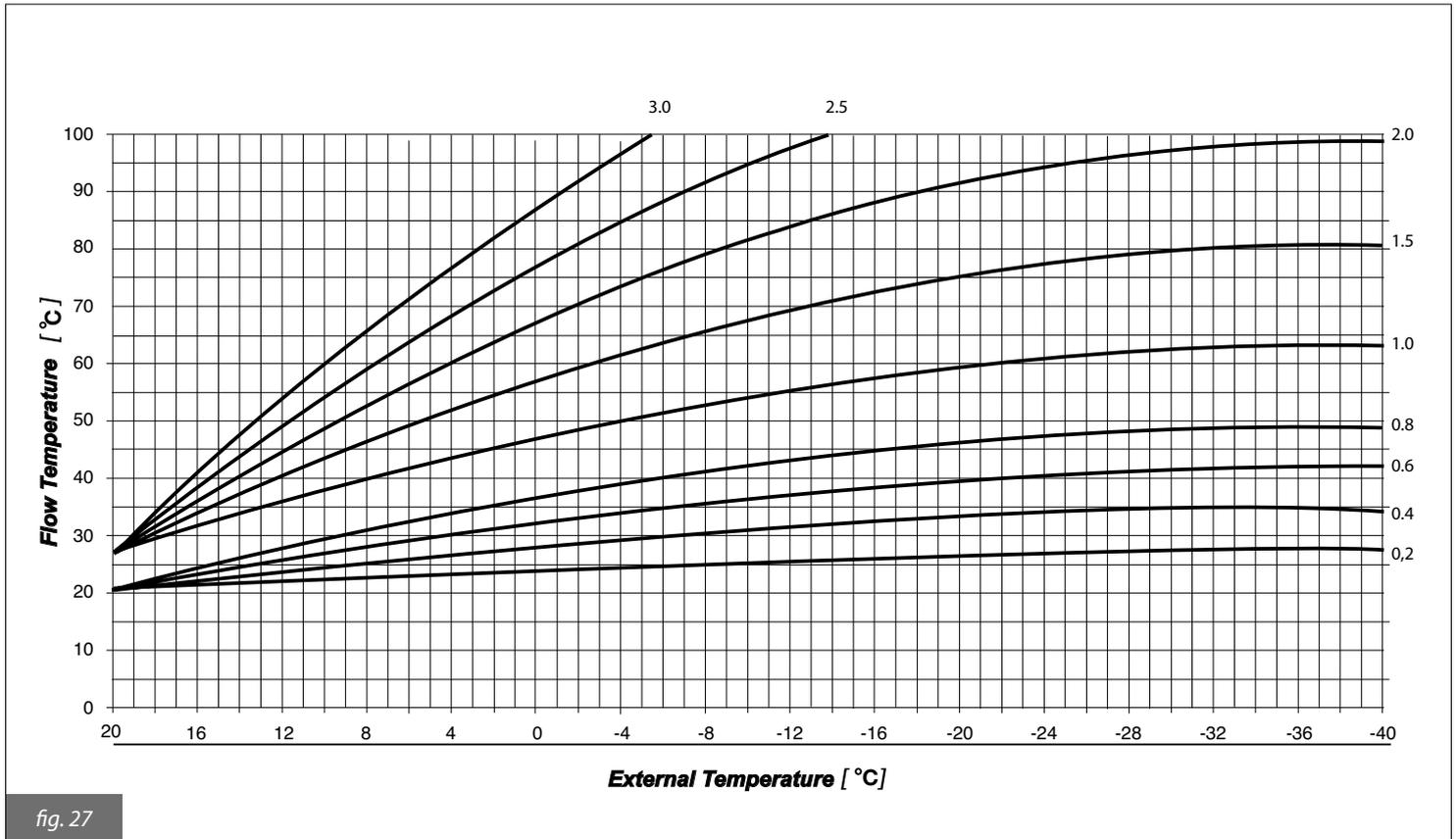


fig. 27

### 3.2.15. TSP parameters that can be set from interface or Remote Control

Parameter		Settable values	Default values	Notes
<b>P0 - TSP0</b> Boiler power selection		1, 3, 6, 7	Depending on the model	1 = 24 kW methane; 3 = 24 kW propane; 6 = 32 kW methane; 7 = 32 kW propane.
<b>P4 - TSP4</b> Fan speed at burner maximum output		Value of P5 ÷ 250 Hz	Depending on the model	24 kW methane = 197; 24 kW propane = 192; 32 kW methane = 208; 32 kW propane = 206.
<b>P5 - TSP5</b> Fan speed at burner minimum output		25 ÷ 120 Hz	Depending on the model	24 kW = 40; 32 kW = 43
<b>P6 - TSP6</b> Fan speed at ignition power		25 ÷ 160 Hz	Depending on the model	24 kW = 58; 32 kW = 76
<b>P7 - TSP7</b> Fan speed at CH maximum output		10 ÷ 100%	Depending on the model	24 kW methane = 88; 24 kW propane = 88; 32 kW methane = 89; 32 kW propane = 88.
<b>P8 - TSP8</b> Negative ramp start minimum speed		P5 ÷ P6	Depending on the model	24 kW = 56; 32 kW = 60
<b>P9 - TSP9</b> Negative ramp time		0 ÷ 30 (1 = 10 sec.)	18 (180 sec.)	
<b>P10 - TSP10</b> CH curves		0 ÷ 3	1.5	With external probe: low temp. from 0 to 0.8 high temp. from 1 to 3 Without external probe: value <1, reduced range (low temperature)
<b>P11 - TSP11</b> CH thermostat timing		0 ÷ 10 min.	4	
<b>P12 - TSP12</b> CH power rising ramp timer		0 ÷ 10 min.	1	
<b>P13 - TSP13</b> Timer for CH post-circulation, freeze protection and flue cleaning function, configurable		30 ÷ 180 sec.	30	
<b>P14 - TSP14</b> Setting of "solar" DHW thermostats		0 ÷ 1	1	0 = normal 1 = solar
<b>P15 - TSP15</b> Water hammer protection delay, configurable		0 ÷ 10 sec.	0	
<b>P16 - TSP16</b> Ambient thermostat reading delay / OT		0 ÷ 199 sec.	0	
<b>P17 - TSP17</b> Multifunction relay setting		0 ÷ 3	0	0 = shut-down and malfunction; 1 = ambient thermostat 1 request /Remote Control; 2 = solar; 3 = ambient thermostat 2 request
Solar par. (with P17=2 or with supplementary board)	<b>P18 - TSP18</b> Solar system selection	0 ÷ 1	0	0 = solar valve; 1 = solar pump
	<b>P19 - TSP19</b> Water heater set-point setting	10 ÷ 90 °C	60 °C	
	<b>P20 - TSP20</b> ΔT ON (diff. for solar pump switch-on)	1 ÷ 30 °C	6 °C	
	<b>P21 - TSP21</b> ΔT OFF (diff. for solar pump shut-down)	1 ÷ 30 °C	3 °C	only with P18 = 1
	<b>P22 - TSP22</b> Maximum collector temperature	80 ÷ 140 °C	120 °C	
	<b>P23 - TSP23</b> Minimum collector temperature	0 ÷ 95 °C	25 °C	
	<b>P24 - TSP24</b> Solar collector freeze protection	0 ÷ 1	0	0 = anti-freeze not enabled; 1 = anti-freeze enabled (only with P18 = 1)
	<b>P25 - TSP25</b> Solar load forcing	0 ÷ 1	0	0 = automatic operation; 1 = always active
	<b>P26 - TSP26</b> Enabling of water heater cooling	0 ÷ 1	0	0 = disabled; 1 = enabled (only with P18 = 1)
<b>P27 - TSP27</b> Heating timer reset temperature		20 ÷ 78 °C		P10 < 1 (low temp.) = 20 °C P10 > 1 (high temp.) = 40 °C
<b>P29 - TSP29</b> Setting of default parameters (except P0, P1, P2, P17)		0 ÷ 1	0	0 = user parameters; 1 = default parameters.
Display only	<b>P30</b> External temperature			only with external probe connected
	<b>P31</b> Flow temperature			
	<b>P32</b> Nominal calculated flow temperature			only with external probe connected
	<b>P33</b> Set point of zone 2 flow temperature			in V versions

Display only	<b>P34</b> Current zone 2 flow temperature			in V versions
	<b>P36</b> Set point of zone 3 flow temperature			in Z versions
	<b>P37</b> Current zone 3 flow temperature			in Z versions
	<b>P39</b> Set point of zone 4 flow temperature			only with three zone boards connected (optional)
	<b>P40</b> Current zone 4 flow temperature			only with three zone boards connected (optional)
	<b>P42</b> Plate DHW temperature			
	<b>P43</b> Boiler return temperature			
	<b>P44</b> Displaying of plate inlet water temperature			
	<b>P45</b> Flue gas temperature			
	<b>P46</b> Solar collector temperature			only with solar collector probe connected
	<b>P47</b> Displaying of solar water heater temperature (low part)			
	<b>P48</b> Displaying of solar valve temperature (water heater, top part).			
	<b>P49</b> Ambient probe SA1 temperature			only with connected ambient probe
<b>P50</b> Ambient probe SA2 temperature			only with connected ambient probe	
<b>P51</b> SA1 ambient probe triggering differential OFF	0.0 ÷ 1.0 °C	0.0 °C	only with connected ambient probe	
<b>P52</b> SA1 ambient probe triggering differential ON	-1.0 ÷ -0.1 °C	-0.5 °C	only with connected ambient probe	
<b>P53</b> Ambient probe SA1 correction range	-5.0 ÷ 5.0 °C	0.0 °C	only with connected ambient probe	
<b>P54</b> SA2 ambient probe triggering differential OFF	0.0 ÷ 1.0 °C	0.0 °C	only with connected ambient probe	
<b>P55</b> SA2 ambient probe triggering differential ON	-1.0 ÷ -0.1 °C	-0.5 °C	only with connected ambient probe	
<b>P56</b> Ambient probe SA2 correction range	-5.0 ÷ 5.0 °C	0.0 °C	only with connected ambient probe	
<b>P57</b> Type of modulation with connected ambient probes (only with P61 set between 03 and 07)	0 ÷ 4	4	0 = on/off; 1 = ambient probe modulation; 2 = external probe modulation; 3 = ambient probe and external probe modulation; 4 = no ambient probe connected.	
<b>P58</b> Ambient probe weight during modulation	0 ÷ 20 °C	8 °C	used for thermoregulation with P57=3	
<b>P59</b> Type of temperature visualization on display	0 ÷ 7	0	0 = flow temp.; 1 = SA1 probe temp.; 2 = SA2 probe temp.; 3 = external temp.; 4 = water heater temp.; 5 = solar coll. temp.; 6 = solar valve temp.; 7 = solar valve temp. from solar board	
<b>P60</b> Number of additional boards connected	0 ÷ 4	0	Maximum 4 boards (3 zone + 1 solar)	
<b>P61</b> Association between remote and ambient thermostats	00 ÷ 07	00	00 = remote zone 2 / TA2 zone 1; 01 = TA1 zone 2 / TA2 zone 1; 02 = TA2 zone 2 / remote zone 1; 03 = SA1 zone 1 / TA2 zone 2; 04 = SA1 zone 1 / SA2 zone 2; 05 = remote zone 1 / SA2 zone 2; 06 = zone 1 not managed / SA2 zone 2; 07 = TA1 zone 1 / SA2 zone 2.	
<b>P62</b> Selection of zone 2 curve	0 ÷ 3	0.6	only with zone board connected	
<b>P63</b> Zone 2 set-point	15 ÷ 35 °C	20 °C	only with zone board connected	
<b>P66</b> Selection of zone 3 curve	0 ÷ 3	0.6	only with two zone boards connected	
<b>P67</b> Zone 3 set-point	15 ÷ 35 °C	20 °C	only with two zone boards connected	
<b>P70</b> Selection of zone 4 curve	0 ÷ 3	0.6	only with three zone boards connected	
<b>P71</b> Zone 4 set-point	15 ÷ 35 °C	20 °C	only with three zone boards connected	

<b>P74</b> Low temperature zone mixer valve opening time	0 ÷ 300 sec.	140 sec.	only with zone boards connected	
<b>P75</b> Rise in nominal boiler temperature with zone board	0 ÷ 35 °C	5 °C	only with zone boards connected	
<b>P76</b> Thermal discharge enabling with solar board	0 ÷ 1	0	0 = disabled; 1 = enabled	
<b>P78</b> Interface back-lighting switching on	0 ÷ 2	0	0 = standard; 1 = LCD always on 2 = LCD and keys always on	
System check	<b>P80</b> Multifunction relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised
	<b>P81</b> Zone 2 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised
	<b>P82</b> Zone 2 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force opening; 2 = force closing
	<b>P84</b> Zone 3 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised
	<b>P85</b> Zone 3 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force opening; 2 = force closing
	<b>P87</b> Zone 4 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised
	<b>P88</b> Zone 4 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force opening; 2 = force closing
	<b>P90</b> Solar card pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised
	<b>P91</b> Solar board valve relay forcing - opening	0 ÷ 1	0	0 = standard function; 1 = relay energised, solar valve opens on solar water heater
	<b>P92</b> Solar valve / solar water heater relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay energised, solar valve opens on thermal discharge
<b>P93</b> DHW 3-star function with connected Remote Control	0 ÷ 1	0	0 = OFF; 1 = ON	

Table 11 - General table of parameters

### 3.3. Filling the system

Once all boiler connections have been completed, CH system circuits and solar collectors can be filled.

#### 3.3.1. Filling the CH system

The procedure is to be cautiously carried out, following each step:

- open the air purging valves on all radiators and verify the boiler automatic valve operation;
- gradually open the relevant filler cock, checking any automatic bleeding valves installed in the system properly work;
- close all radiator air purging valves as soon as water starts coming out;
- ensure that boiler water pressure gauge does not exceed 1 ÷ 1.3 bars reading;
- shut the filler cock and bleed any air out again, by opening the air bleeding valves on radiators;
- start the boiler and bring the system to working temperature, stop the pump, and repeat air bleeding procedure;
- allow the system to cool and restore system pressure to 1 ÷ 1.3 bars.

#### WARNING

**As for water treating in the domestic heating systems in order to optimise efficiency and safety, ensure a long life, trouble-free operation of auxiliary equipment, minimise power consumption, thereby integrating the standards and rules in force in the country of installation, it is recommended to use specific products suitable for multi-metal heating systems.**

#### WARNING

**Pressure sensor will not electrically enable the burner ignition when water pressure is below 0.4 bar (this parameter can be edited by qualified professional staff).**

**CH water pressure must not to be less than 1 bar. Restore proper value as needed, via the filler cock of the boiler (fig. 3). The procedure is to be followed while the system is cold. Digital pressure gauge fitted on the boiler control panel indicates the pressure in the system.**

## WARNING

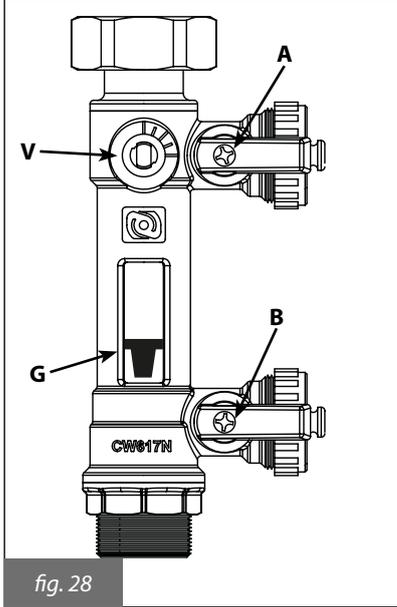
After long inactivity of the boiler, its pumps may be stuck.

Before starting up the boiler, make sure that the pumps are operating, with the following procedure:

- unscrew the protective cap at the centre of the pump motor;
- put a screwdriver into the hole and manually rotate the circulation pump shaft clockwise;
- once the unblocking operation is completed, screw the protective cap back on and check for water leaks.

When the protection cap is removed, some water may flow out. Before reinstalling the boiler casing, make sure all internal surfaces are dry.

### 3.3.2. Filling the solar plant



The solar plant should be filled when the collectors are cold, in the morning or in the evening. If this is not possible, cover the collectors with sheets that do not let the sun rays through.

Keep in mind that the suggested solar plant pressure, in case of a classic installation with one collector and a total surface of approximately 2.5 sq. m is of 3.5 bar approximately. In different systems, the filling pressure depends on the characteristics of the system. The solar expansion vessel filling pressure should be the same as the system pressure.

To fill the solar plant, proceed as follows:

- Open the two ball valves on solar circuit flow and return (14, fig. 8).
- Interrupt the flow into the system by closing valve **V** in fig. 28. To do so, use a flat screwdriver and bring the slot on the screw to a horizontal position.
- After having opened cocks **A** and **B** of fig. 28, always using a flat screwdriver, let the heat transfer fluid flow in from cock **A** through the special pump suitable for solar system filling, then let it flow out of cock **B** until all air is bled from system.
- Slowly close the two cocks **A** and **B**, so as to bring the pressure of the solar plant to the system-specific value.
- Re-open the flow of liquid into the system, by slowly turning valve **V**, until the top part of float **G** indicates the desired flow value. It is recommended to set a flow value of approx. 30 l/h for every sq. m of installed solar collector (for example, for one panel having an overall surface of 2.5 sq. m corresponds to a recommended value of 75 l/h).

## 3.4. Starting up the boiler

### 3.4.1. Preliminary checks

Before starting the boiler, check that:

- the flue gas venting duct and the relevant terminal are installed in conformity with the instructions: with the boiler operating, there must be no leakage of combustion by-products from any of the gaskets;
- the supply power to the boiler must be 230 V ~ 50 Hz;
- the system is correctly filled with water (stream gauge reading 1 to 1.3 bar);
- any shut-off cocks in the system pipes are open;
- the mains gas type is correct for the boiler calibration: convert the boiler to the available gas when necessary (see paragraph 3.6. *Adaptation to other gas types*): this operation must only be performed by qualified technical personnel;
- the gas supply cock is open;
- there are no gas leaks;
- the main switch installed ahead of the boiler is turned on;
- boiler safety valves are not stuck;
- there are no water leaks;
- pumps are not stuck;
- the condensate trap installed on the boiler is discharging condensate correctly and is not stuck.

**The boiler is equipped with a CH three-speed circulation pump; three different residual head values correspond to each speed, according to the system's residual head values (see fig. 11 and 12). The boiler is delivered with this circulation pump set at the third speed setting. If you wish to set a different speed, taking into account the water circulation requirements in the boiler and the hydraulic resistance properties of the system, check the correct operation of the boiler in all the conditions dictated by the features of the system (e.g. closure of one or more heating zones or of thermostat-controlled valves).**

### 3.4.2. Switching on and switching off

To switch the boiler on and off, refer to the "Instructions for the User".

### 3.5. Wiring diagrams

KBS version

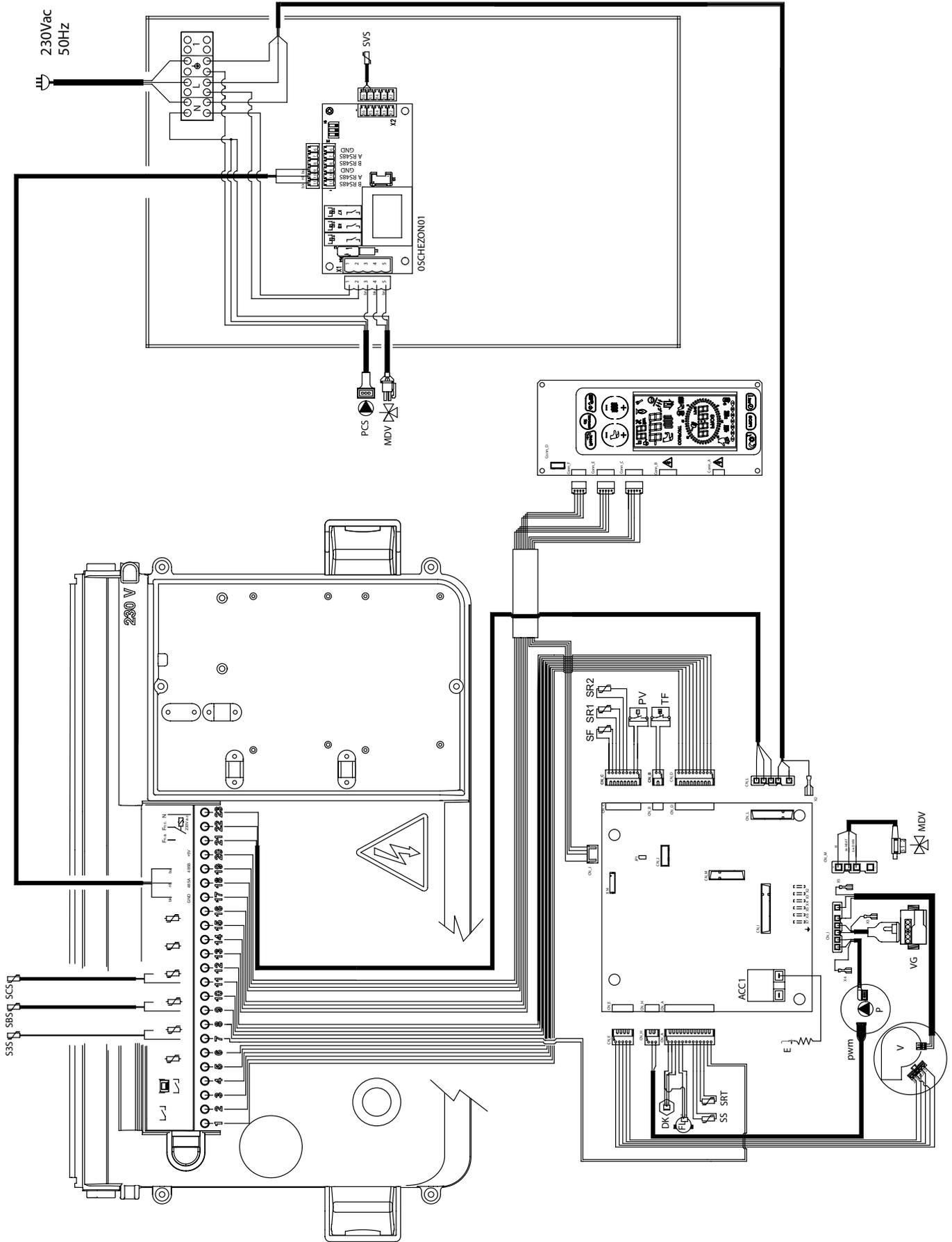
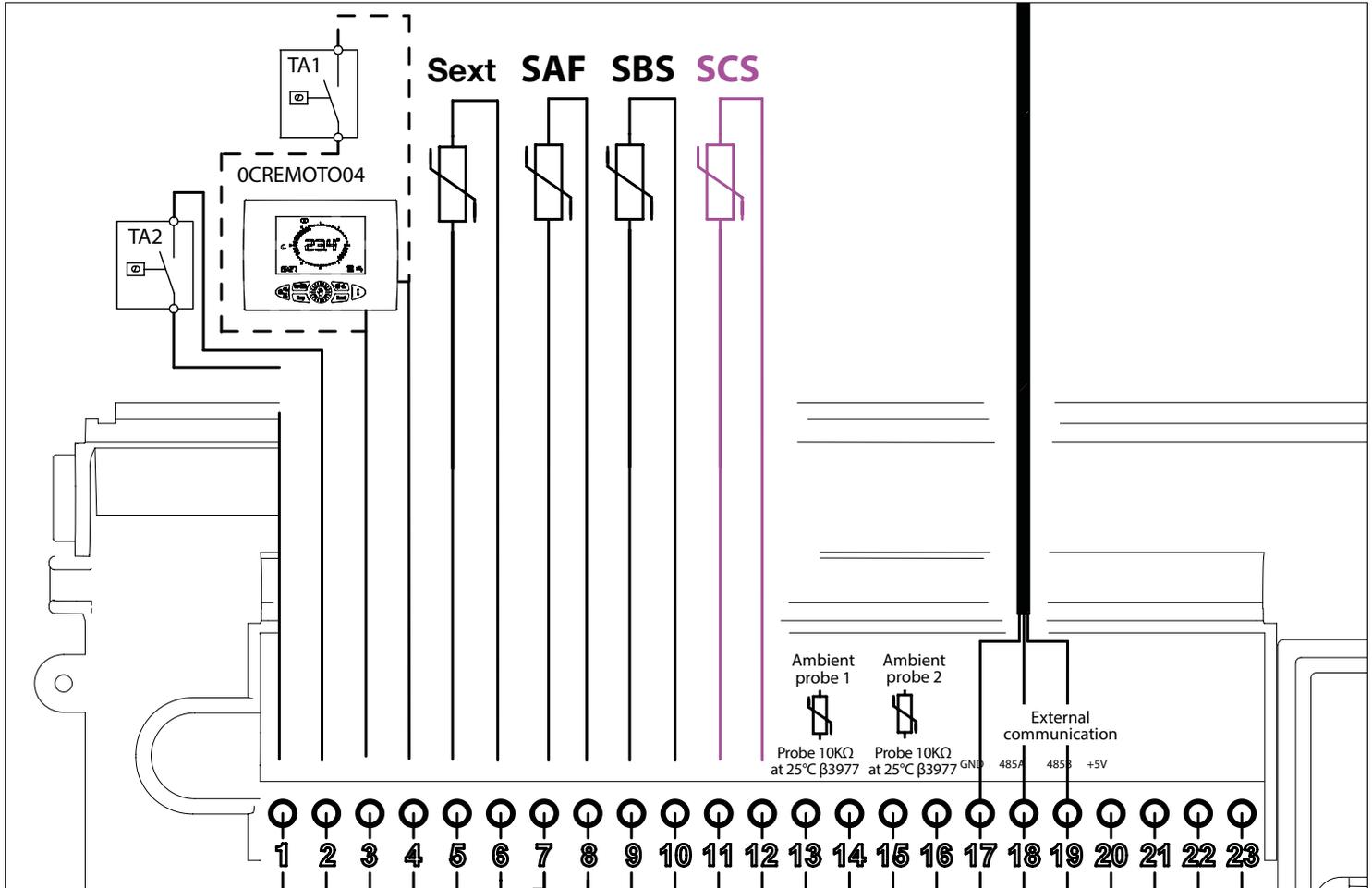


fig. 29

## KEY

**0SCHEMOD27:** boiler board  
**0SCHEINT00:** interface board  
**DK:** pressure transducer  
**SAF:** cold water NTC probe 10 kOhm at 25 °C B=3435  
**SRT:** return NTC probe 10 kOhm at 25 °C B=3435  
**SS:** DHW OUT NTC probe 10 kOhm at 25 °C B=3435  
**SR1-SR2:** CH NTC probe 10 kOhm at 25 °C B=3435  
**SF:** flue gas NTC probe 10 kOhm at 25 °C B=3435  
**PV:** Air pressure switch  
**PCS:** solar collector pump  
**SBS:** solar water heater probe PT1000  
**SCS:** solar collector probe PT1000  
**Sext:** external NTC probe 10K Ohm B=3977  
**TA1:** zone 1 ambient thermostat (use a contact free from potential)

**SVS:** solar valve probe PT1000  
**TA2:** zone 2 ambient thermostat (use a contact free from potential)  
**TF:** flue gas thermostat  
**VG:** gas valve  
**P:** boiler circulation pump  
**MDV:** electric deviating valve  
**E:** ignition/flame detection electrode  
**V:** brushless fan  
**ACC1:** ignition transformer  
**X2-X7:** ground connectors  
**0CREMOTO04:** Open Therm Fondital Remote Control  
**0SONDAES01:** external probe to be used with 0CREMOTO04 Remote Control  
**FL:** flowmeter



## PANEL ELECTRICAL CONNECTIONS

**1-2:** ambient thermostat contact 2  
**3-4:** ambient thermostat contact 1 or Open Therm  
**5-6:** external probe  
**7-8:** cold water probe  
**9-10:** solar water heater probe  
**11-12:** solar collector probe  
**13-14:** ambient probe 1  
**15-16:** ambient probe 2  
**17:** serial input GND  
**18:** serial input 485A  
**19:** serial input 485B  
**20:** serial input +5V  
**21:** relay neutral  
**22:** 'normally closed' phase  
**23:** 'normally open' phase

## ELECTRICAL CONNECTIONS TO BE MADE BY THE INSTALLER

**TA (PIN 1 and 2):** ambient thermostat 2 contact  
**(PIN 3 and 4):** ambient thermostat 1 contact or Open Therm Remote Control  
**Sext (PIN 5 and 6):** external NTC probe 10K Ohm at 25 °C B=3977  
**SCS (11 and 12):** solar collector probe PT1000  
**(PIN 13 and 14):** ambient probe 1  
**(PIN 15 and 16):** ambient probe 2

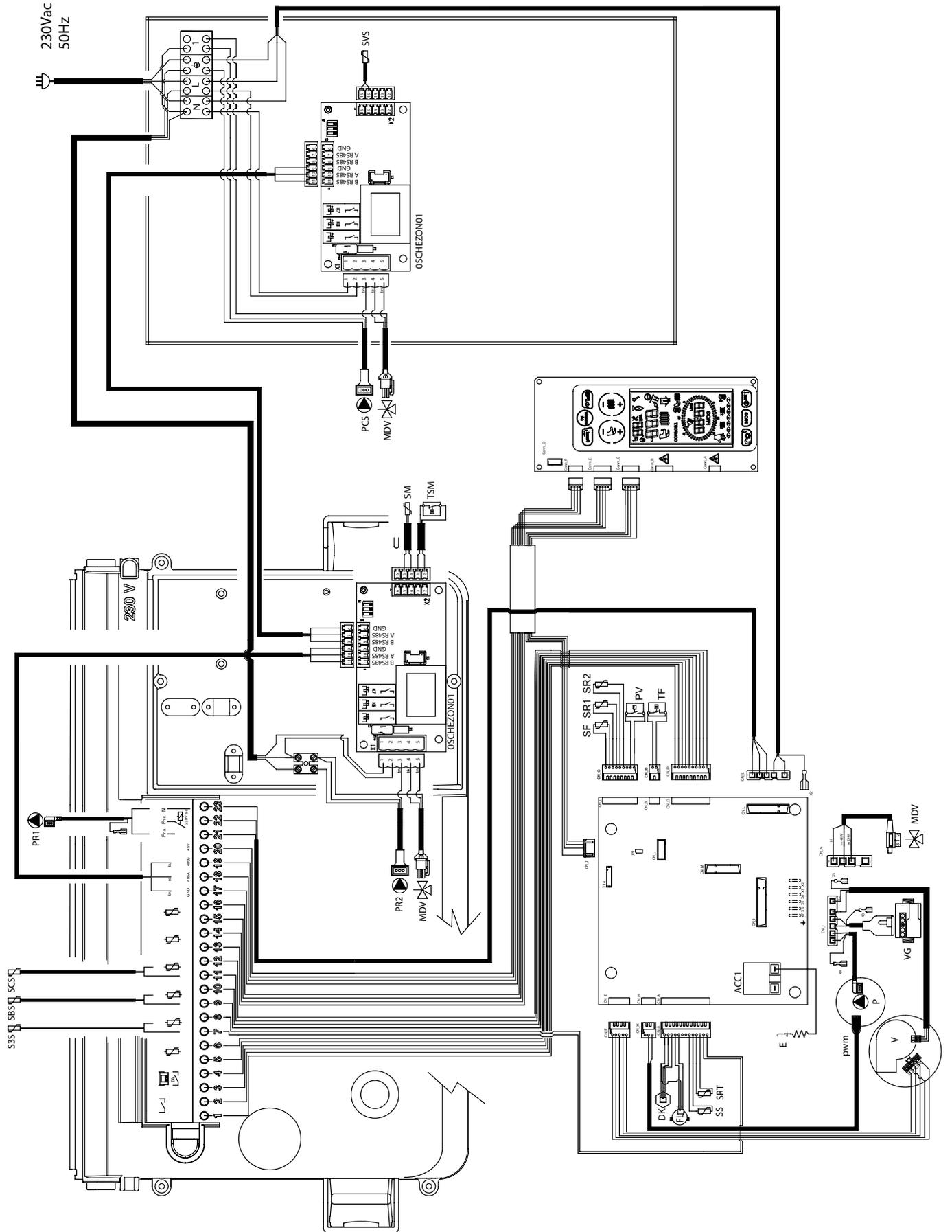
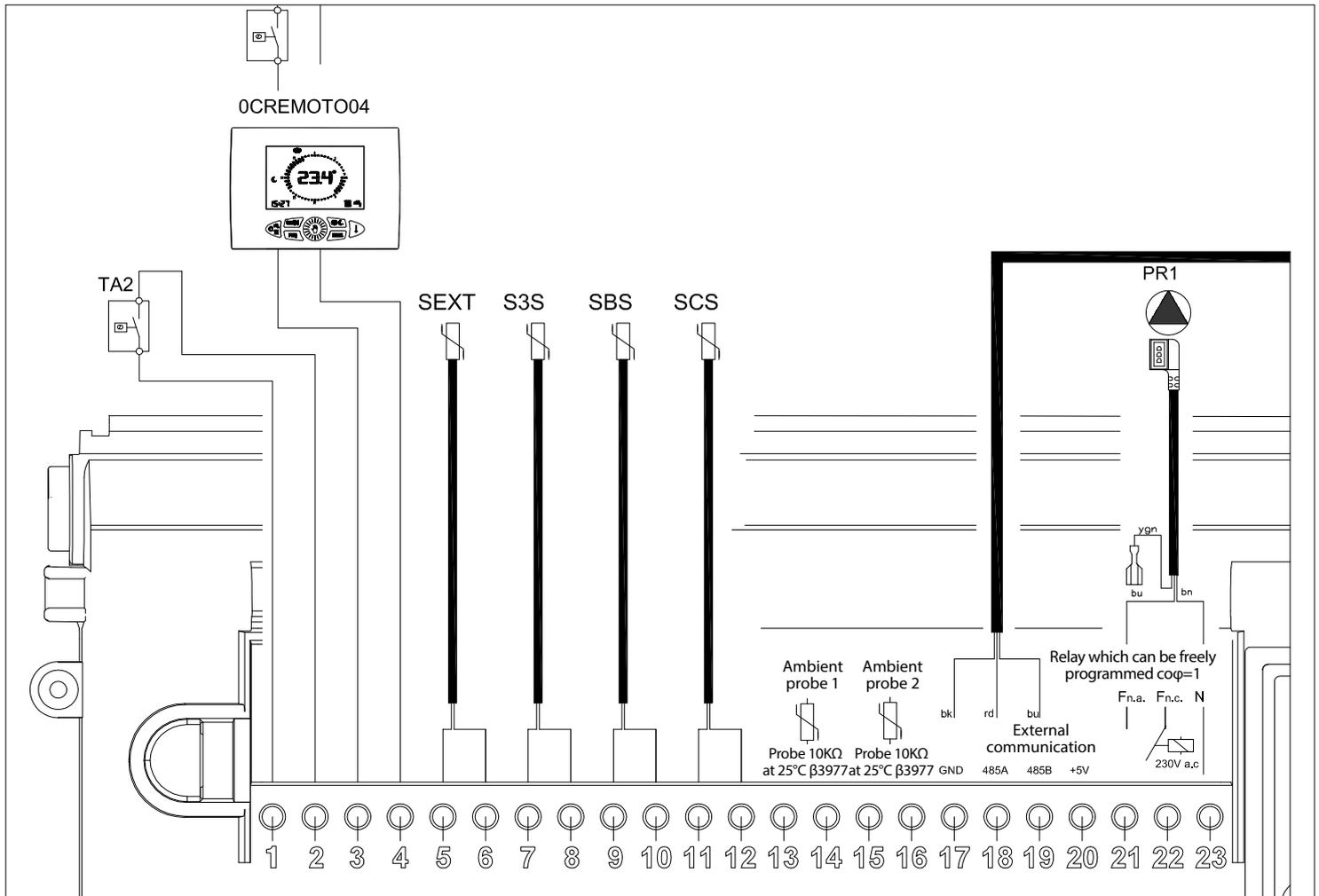


fig. 30

## KEY

**0SCHEMOD27:** boiler board  
**0SCHEINT00:** interface board  
**DK:** pressure transducer  
**S3S:** Cold water NTC probe 10 kOhm at 25 °C B=3435  
**SRT:** return NTC probe 10 kOhm at 25 °C B=3435  
**SS:** DHW OUT NTC probe 10 kOhm at 25 °C B=3435  
**SR1-SR2:** CH NTC probe 10 kOhm at 25 °C B=3435  
**SF:** flue gas NTC probe 10 kOhm at 25 °C B=3435  
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**SVS:** solar valve probe PT1000  
**TA2:** zone 2 ambient thermostat (use a contact free from potential)

**TF:** flue gas thermostat  
**VG:** gas valve  
**P:** boiler circulation pump  
**MDV:** electric deviating valve  
**E:** ignition/flame detection electrode  
**V:** brushless fan  
**ACC1:** ignition transformer  
**X2-X7:** ground connectors  
**0CREMOTO04:** Open Therm Fondital Remote Control  
**0SONDAES01:** external probe to be used with 0CREMOTO04 Remote Control  
**FL:** flowmeter  
**SM:** mixed zone flow probe  
**TSM:** mixed zone flow safety thermostat  
**0SCHEZON01:** zone management board  
**PR1:** zone 1 circulation pump  
**PR2:** zone 2 circulation pump



### PANEL ELECTRICAL CONNECTIONS

**1-2:** ambient thermostat contact 2  
**3-4:** ambient thermostat contact 1 or Open Therm  
**5-6:** external probe  
**7-8:** cold water probe  
**9-10:** solar water heater probe  
**11-12:** solar collector probe  
**13-14:** ambient probe 1  
**15-16:** ambient probe 2  
**17:** serial input GND  
**18:** serial input 485A  
**19:** serial input 485B  
**20:** serial input +5V  
**21:** relay neutral  
**22:** 'normally closed' phase  
**23:** 'normally open' phase

### ELECTRICAL CONNECTIONS TO BE MADE BY THE INSTALLER

**TA (PIN 1 and 2):** ambient thermostat 2 contact  
**(PIN 3 and 4):** ambient thermostat 1 contact or Open Therm Remote Control  
**Sext (PIN 5 and 6):** external NTC probe 10K Ohm at 25 °C B=3977  
**SCS (11 and 12):** solar collector probe PT1000  
**(PIN 13 and 14):** ambient probe 1  
**(PIN 15 and 16):** ambient probe 2

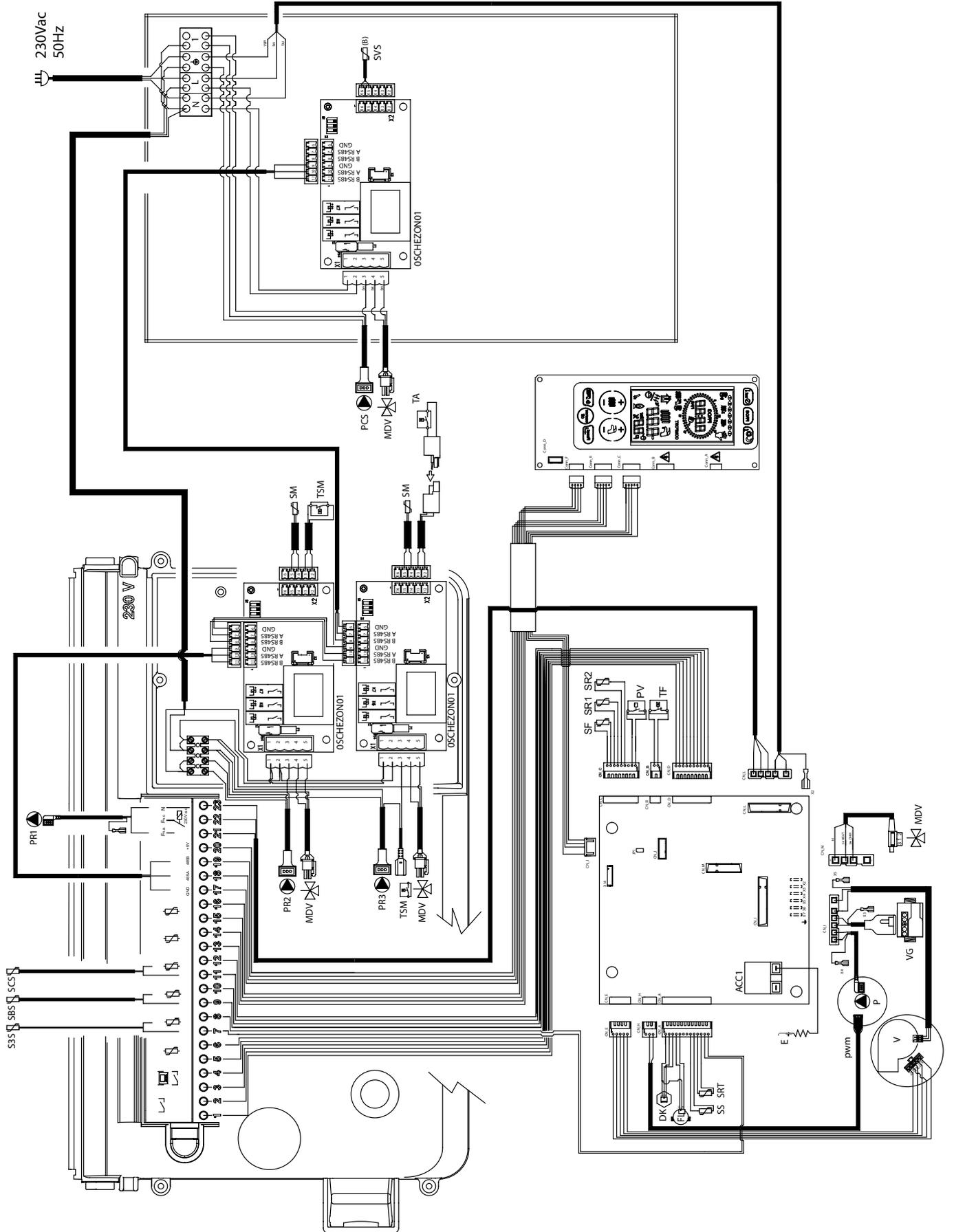
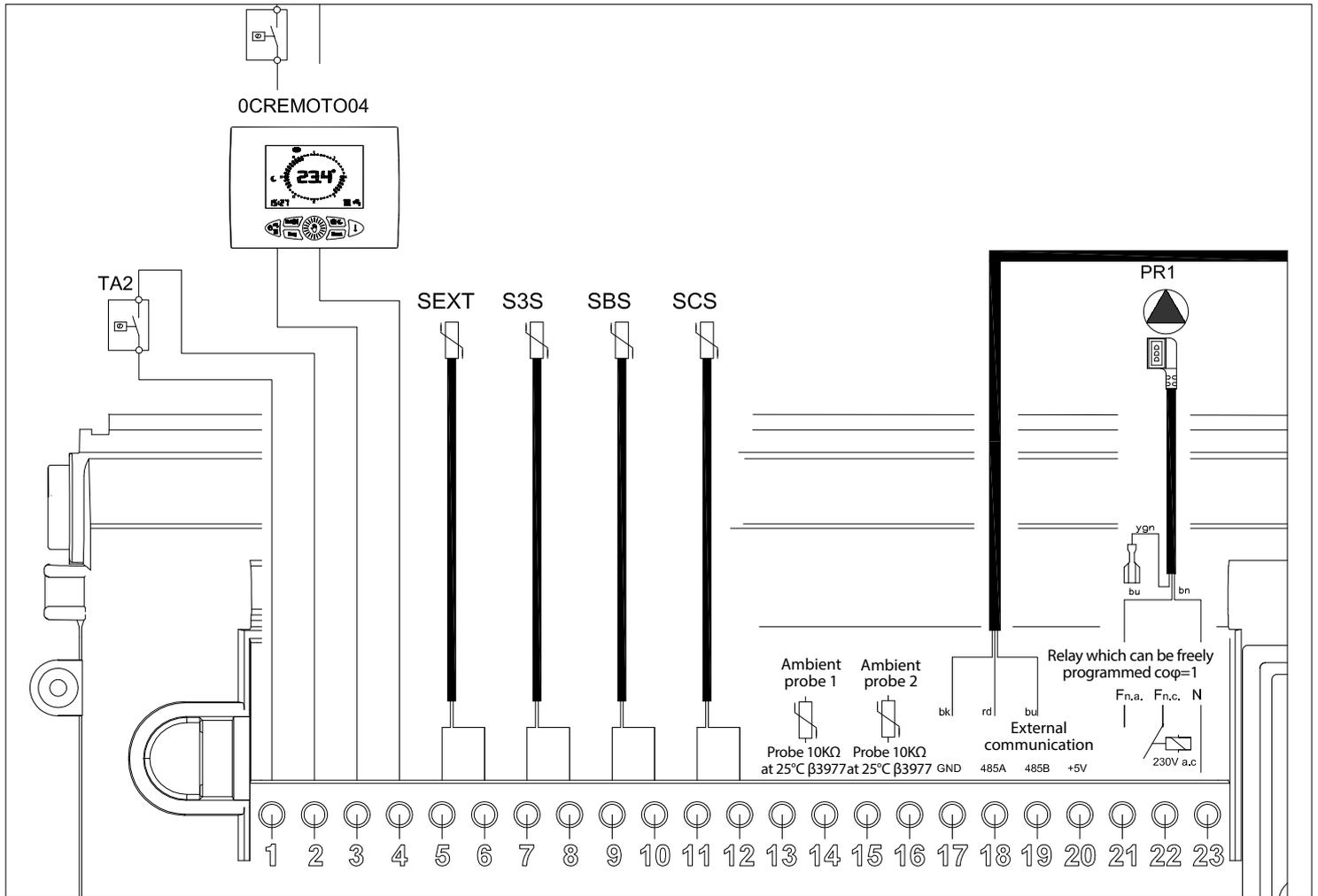


fig. 31

## KEY

**0SCHEMOD27:** boiler board  
**0SCHEINT00:** interface board  
**DK:** pressure transducer  
**S3S:** Cold water NTC probe 10 kOhm at 25 °C B=3435  
**SRT:** return NTC probe 10 kOhm at 25 °C B=3435  
**SS:** DHW OUT NTC probe 10 kOhm at 25 °C B=3435  
**SR1-SR2:** CH NTC probe 10 kOhm at 25 °C B=3435  
**SF:** flue gas NTC probe 10 kOhm at 25 °C B=3435  
**PV:** Air pressure switch  
**PCS:** solar collector pump  
**SBS:** solar water heater probe PT1000  
**SCS:** solar collector probe PT1000  
**Sext:** external NTC probe 10K Ohm B=3977  
**TA1:** zone 1 ambient thermostat (use a contact free from potential)  
**SVS:** solar valve probe PT1000  
**TA2:** zone 2 ambient thermostat (use a contact free from potential)

**TF:** flue gas thermostat  
**VG:** gas valve  
**P:** boiler circulation pump  
**MDV:** electric deviating valve  
**E:** ignition/flame detection electrode  
**V:** brushless fan  
**ACC1:** ignition transformer  
**X2-X7:** ground connectors  
**0CREMOTO04:** Open Therm Fondital Remote Control  
**0SONDAES01:** external probe to be used with 0CREMOTO04 Remote Control  
**FL:** flowmeter  
**SM:** mixed zone flow probe  
**TSM:** mixed zone flow safety thermostat  
**0SCHEZON01:** zone management board  
**PR1:** zone 1 circulation pump  
**PR2:** zone 2 circulation pump  
**PR3:** zone 3 circulation pump



### PANEL ELECTRICAL CONNECTIONS

**1-2:** ambient thermostat contact 2  
**3-4:** ambient thermostat contact 1 or Open Therm  
**5-6:** external probe  
**7-8:** cold water probe  
**9-10:** solar water heater probe  
**11-12:** solar collector probe  
**13-14:** ambient probe 1  
**15-16:** ambient probe 2  
**17:** serial input GND  
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**19:** serial input 485B  
**20:** serial input +5V  
**21:** relay neutral  
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### ELECTRICAL CONNECTIONS TO BE MADE BY THE INSTALLER

**TA (PIN 1 and 2):** ambient thermostat 2 contact  
**(PIN 3 and 4):** ambient thermostat 1 contact or Open Therm Remote Control  
**Sext (PIN 5 and 6):** external NTC probe 10K Ohm at 25 °C B=3977  
**SCS (PIN 11 and 12):** solar collector probe PT1000  
**(PIN 13 and 14):** ambient probe 1  
**(PIN 15 and 16):** ambient probe 2

T (°C)	0	2	4	6	8
0	27203	24979	22959	21122	19451
10	17928	16539	15271	14113	13054
20	12084	11196	10382	9634	8948
30	8317	7736	7202	6709	6254
40	5835	5448	5090	4758	4452
50	4168	3904	3660	3433	3222
60	3026	2844	2674	2516	2369
70	2232	2104	1984	1872	1769
80	1670	1578	1492	1412	1336
90	1266	1199	1137	1079	1023

Table 12 - Relationship between temperature (°C) and nominal resistance (Ohm) of all NTC probes

### 3.6. Adaptation to other gas types and burner adjustment

This boiler is built to run on the type of gas specified on the order, which is shown on the packaging and on the boiler rating plate. Any later transformation is to be exclusively carried out by qualified personnel, using manufacturer designed accessories and following the procedure and adjustment instructions for an accurate boiler setting-up.

#### 3.6.1. Adapting the boiler from METHANE to PROPANE

- Disconnect the boiler from the electric power supply.
- Open the boiler front casing.
- Loosen the three screws securing combustion chamber front panel to frame, then remove panel.
- Loosen the screw securing intake pipe to mixer, and remove pipe (fig. 32).
- Disconnect the gas pipe from the mixer (fig. 32).
- Loosen the three socket head screws, and remove the mixer (fig. 33).
- Loosen the two retaining screws, and slide out mixer plastic body (fig. 34).
- Using a 6 mm Allen wrench, loosen the two mixer nozzles (fig. 34).
- Screw the new nozzles for propane listed in table 14, **taking care to drive them fully home, without tightening.**
- Only for 32 kW versions model, insert the 7.2 mm diaphragm on the outlet of the gas valve.

 **In case the nozzle idles when reaching the bottom of the nozzle threaded seat, it means that the thread is damaged and perfect sealing is not ensured. The whole mixer shall be replaced.**

- To refit the plastic body (Venturi), insert it inside mixer and secure it in place with the retaining screws. **Take care not to damage the O-rings assembled on plastic body ends (fig. 34) and to respect the assembling direction (fig. 35).**
- Refit the reassembled mixer onto the fan with the socket head screws, making sure to insert the O-ring between mixer and fan (fig. 34).
- Reconnect boiler to electric power supply, and open the gas cock.
- Access the programming page to set the parameters P4-P5-P6-P7 to the propane gas values, as described in table 10.
- Adjust the gas valve (see next paragraph, 3.6.3.).

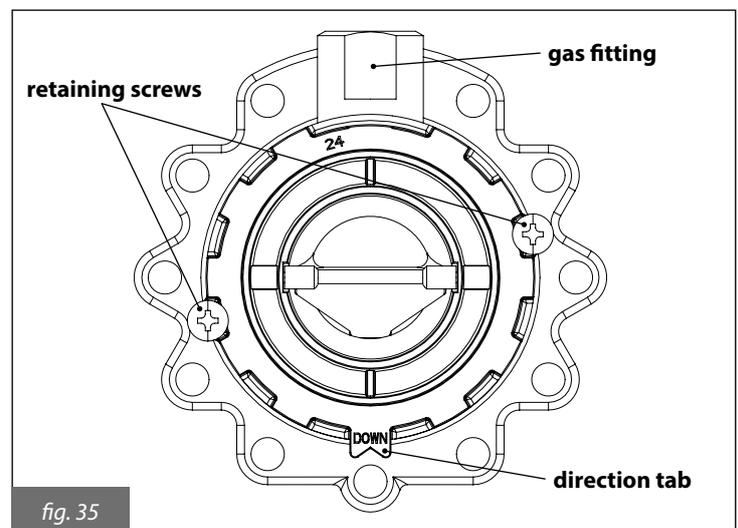
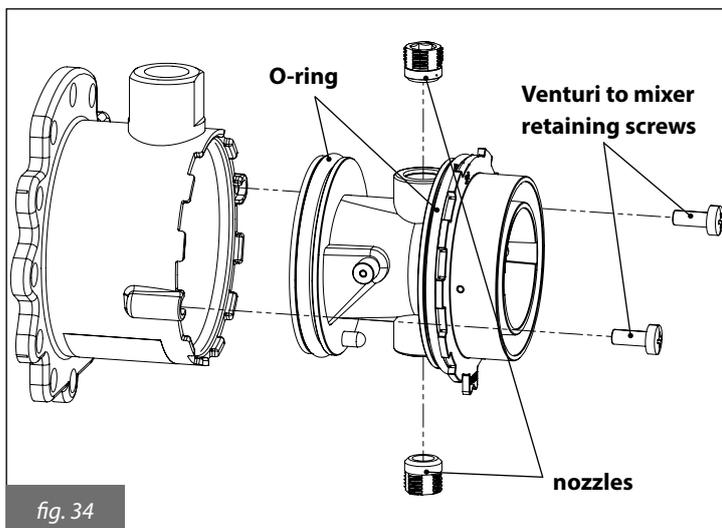
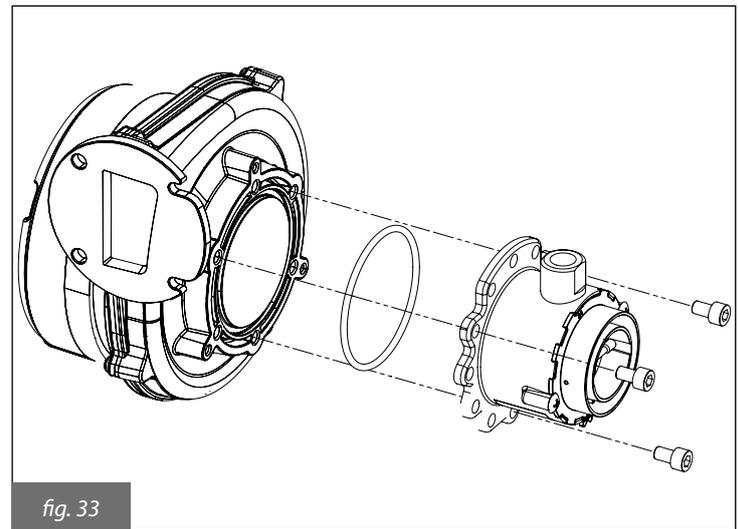
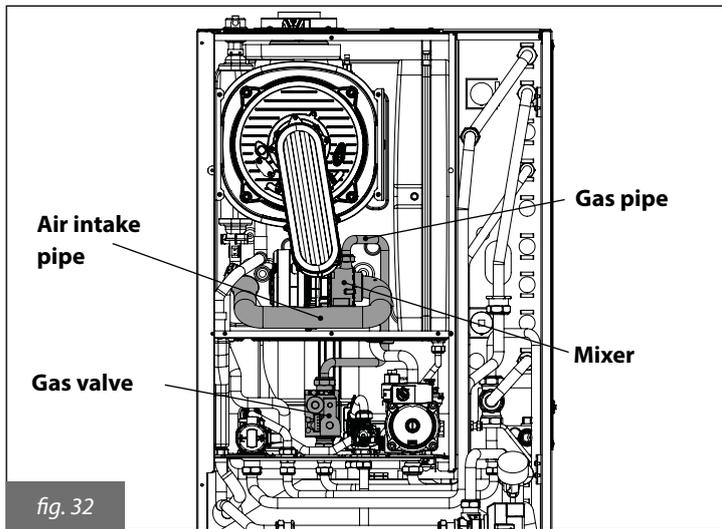
#### 3.6.2. Adapting the boiler from PROPANE to METHANE

- Disconnect the boiler from the electric power supply.
- Open the boiler front casing.
- Loosen the three screws securing combustion chamber front panel to frame, then remove panel.
- Loosen the screw securing intake pipe to mixer, and remove pipe (fig. 32).
- Disconnect the gas pipe from the mixer (fig. 32).
- Loosen the three socket head screws, and remove the mixer (fig. 33).
- Loosen the two retaining screws, and slide out mixer plastic body (fig. 34).
- Using a 6 mm Allen wrench, loosen the two mixer nozzles (fig. 34).
- Screw the new nozzles for methane listed in table 14, **taking care to drive them fully home, without tightening.**
- Only for 32 kW versions model, remove the 7.2 mm diaphragm on the outlet of the gas valve.

 **In case the nozzle idles when reaching the bottom of the nozzle threaded seat, it means that the thread is damaged and perfect sealing is not ensured. The whole mixer shall be replaced.**

- To refit the plastic body (Venturi), insert it inside mixer and secure it in place with the retaining screws. **Take care not to damage the O-rings assembled on plastic body ends (fig. 34) and to respect the assembling direction (fig. 35).**
- Refit the reassembled mixer onto the fan with the socket head screws, making sure to insert the O-ring between mixer and fan (fig. 34).
- Reconnect boiler to electric power supply, and open the gas cock.

- Access the programming page to set the parameters P4-P5-P6-P7 to the propane gas values, as described in table 10.
- Adjust the gas valve (see next paragraph, 3.6.3.).



### 3.6.3. Gas valve setting

#### 3.6.3.1. Maximum CH output adjustment

- Make sure that the ambient thermostat (optional), if fitted, is set to ON.
- Select the "heating" mode on the control panel pressing key  n times until symbol  is displayed.
- Start the 'flue cleaning' function by keeping key  pressed until symbol  stops flashing. Boiler switches to max. output operation.
- If a gas switching has been made, access the programming page and set the P0-P4-P5-P6-P7-P8 parameters based on the power and on the gas, as specified in table 10.
- Set the flue (CO<sub>2</sub>) rate by turning the ratio adjuster **B** (fig. 36) and ensure that reading falls within the limits of table 13. Let boiler flue cleaning function on and continue with the next point "Minimum heating output adjustment".

#### 3.6.3.2. Minimum CH output adjustment

- Set boiler min. output operation by keeping symbol '-' pressed on the heating temperature adjustment key until the value corresponding to fan min. speed for the output and boiler gas (refer to table 10) is displayed.
- Boiler switches to min. output operation.
- Set the flue (CO<sub>2</sub>) rate by turning the offset adjuster **C** (fig. 36) and ensure that reading falls within the limits of table 13.
- Keep key  pressed to end the flue cleaning function.

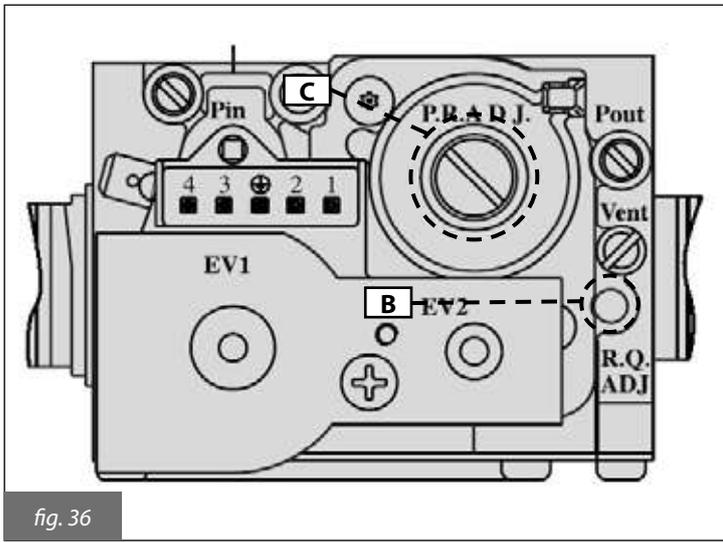


fig. 36

FLUE CO <sub>2</sub> RATES	
Fuel	CO <sub>2</sub> rate (%)
24 kW Methane	9.0 - 9.3
24 kW Propane	10
32 kW Methane	9.0 - 9.3
32 kW Propane	10

table 13 - CO<sub>2</sub> rates

DIAMETER OF NOZZLES / DIAPHRAGMS (mm)		
	Methane	Propane
24 kW	3.70	3.00
32 kW	4.45	3.55 + diaphragm Ø 7.2

table 14 - Diameter of nozzles - diaphragms

## 4. TESTING THE BOILER

### 4.1. Preliminary checks

Before testing the boiler, it is recommended to check the following:

- the installation is compliant with the prevailing standards;
- the flue gas venting duct and the relative terminal are installed in conformity with the instructions: **with the boiler operating there must be no leakage of combustion by-products from any of the gaskets;**
- the boiler is powered by a 230 V - 50 Hz mains supply;
- the heating system is correctly filled with water (pressure gauge reading 1 to 1.3 bar);
- the solar plant is filled with the correct mix of water and glycol and the flowmeter indicates the correct fluid flow value;
- any shut-off cocks in the system pipes are open;
- the mains gas type is correct for the boiler calibration: convert the boiler to the available gas when necessary (see paragraph 3.6.); this operation must only be performed by qualified technical personnel;
- the gas supply cock is open;
- **there are no fuel gas leaks;**
- the main switch installed ahead of the boiler is turned on;
- the safety valves of the CH and DHW circuits are not stuck;
- the solar circuit safety valve is not stuck;
- there are no water leaks;
- pumps are not stuck;
- the condensate trap installed on the boiler is discharging condensate correctly and is not stuck.



**Should the boiler not be installed in compliance with the prevailing laws and standards, notify the system supervisor and do not test the boiler.**

### 4.2. Switching on and switching off

To switch the boiler on and off, refer to the *"Instructions for the User"*.

## 5. MAINTENANCE

**Any maintenance (and repair) work must only be carried out by qualified personnel.**

The user is strongly advised to have the boiler serviced and repaired by a qualified Service Centre.

Appropriate boiler maintenance ensures efficient operation, environment preservation, and safety for people, animals and objects.

### 5.1. Maintenance schedule

**The boiler must be serviced at least once every year.**

 **Disconnect electric power supply before starting any maintenance procedure, involving replacement of components and/or cleaning inside parts of boiler.**

Maintenance operations include check and cleaning procedures. In particular:

#### **Boiler checks:**

- check general integrity of the boiler;
- check boiler and network gas supply for leakage;
- check gas supply pressure to boiler;
- check minimum and maximum gas pressures to boiler nozzles;
- check boiler ignition sequence;
- check the condition and seal integrity of the flue gas venting pipes;
- check operation of safety thermostat installed on the flue gas hood;
- check boiler combustion parameters by flue gas analysis;
- check fan hall sensor operation;
- check integrity of safety devices of the boiler in general;
- check for water leaks and oxidised areas on the boiler's couplings;
- check efficiency of the system safety valves;
- check CH and DHW expansion vessel filling pressure;
- check water heater magnesium anode integrity;
- check correct draining of condensate from the condensate trap installed on the boiler;

#### **Solar plant checks:**

- check solar plant pressure and top up fluid if necessary;
- check solar plant flow rate;
- check solar expansion vessel filling pressure.

 **If a solar plant fluid top-up is required, use the same product that was used for filling. Do not dilute the original fluid with water or with other fluids for any reason, because this may significantly alter the fluid's heat exchange capability and its resistance to high and low temperatures.**

#### **The following cleaning is to be done:**

- clean the general interior of the boiler;
- clean the air intake and flue gas venting circuits;
- clean the heat exchanger;
- clean the condensate discharge ducts.
- clean the condensate drain installed on the boiler.

#### **When checking the boiler for the very first time, also verify:**

- boiler room suitability;
- diameter and length of flue gas system ducts;
- boiler installation in accordance to this "Installation use and maintenance" manual instructions.

**Should the boiler not operate correctly, while not posing danger to people, animals or property, notify the system supervisor both verbally and in writing.**

### 5.2. Combustion analysis

The combustion parameters of the boiler, which have to be checked in order to determine efficiency and emissions, must be measured in compliance with applicable legislation and standards.

## 6. TROUBLESHOOTING

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
E01*	Burner does not ignite	Gas supply failure.	Check gas supply. Check gas supply cock or gas network safety valve intervention.
		Gas valve is disconnected.	Reconnect it.
		Gas valve is faulty.	Replace it.
		Electronic board is faulty.	Replace it.
	Burner does not ignite: there is no spark	Ignition electrode is faulty.	Replace the electrode.
		Electronic board does not ignite. It is faulty.	Replace electronic board.
	Burner ignites for a few seconds and goes off.	Electronic board does not detect flame: inverted phase and neutral.	Check the correct phase-neutral connection to the power supply.
		Detection electrode cable is interrupted.	Reconnect or replace wire.
		Detection electrode is faulty.	Replace the electrode.
		Electronic board does not detect flame: it is faulty.	Replace electronic board.
		Ignition heat input setting is too low.	Increase it
		Minimum heat input is not set correctly.	Check burner setting
E02*	Flow temperature exceeded the max. allowed value.	Circulation pump is blocked or faulty.	Check the circulation pump.
		The system is leaking.	Check system.
E03*	Flue thermostat triggering.	Poor flue draught.	Check the chimney and ambient air suction openings.
		Flue vent / air intake duct is obstructed.	Check for any duct obstruction, and eliminate.
		Flue gas thermostat is faulty.	Replace it.
E04**	CH system water pressure is too low.	The system is leaking.	Check system.
		Pressure transducer is disconnected.	Reconnect it.
		Pressure transducer is faulty.	Replace it.
E05**	CH probe failure	Flow probe is electrically disconnected.	Reconnect it.
		Flow probe faulty.	Replace it.
E06**	DHW probe failure	DHW probe is disconnected.	Reconnect it.
		DHW probe is faulty.	Replace it.
E07**	Flue gas probe failure	Flue gas probe is electrically disconnected.	Reconnect it.
		Flue gas probe is faulty.	Replace it.
E09	System pressure is too close to the max. limit.	During manual filling, a system pressure too close to the safety valve drain value has been restored.	Progressively drain the system until the error symbol disappears.
E12**	Plate inlet water probe failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E15**	Return probe failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E24**	Solar collector failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E27**	Solar valve probe failure (water heater, top part).	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E28**	Solar water heater probe failure (low part).	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
<b>E31**</b>	Remote Control connection failure (only shown on Remote Control display).	The Remote Control is not connected to boiler board.	Reconnect it.
		Remote control faulty.	Replace it.
		Boiler board is faulty.	Replace it.
<b>E35**</b>	Safety thermostat triggering to protect the mixed "zone 2" (on versions V and Z, only).	Mixer valve is faulty.	Replace it.
		Thermostat is disconnected.	Reconnect it.
		Thermostat is faulty.	Replace it.
<b>E36**</b>	Flow probe failure on one of the installed zones.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
<b>E40*</b>	Fan failure.	Fan disconnected.	Reconnect it.
		Fan faulty.	Replace it.
<b>E41**</b>	No communication between board and peripheral devices (panel interface and/or zone/solar boards).	Interface display is disconnected.	Reconnect it.
		Zone/solar boards are disconnected.	Reconnect them.
		Interface display and/or zone/solar boards are faulty.	Replace them.
<b>E42</b>	Solar system setting error.	Wrong boiler board or solar board setting parameters.	Check that the P03 and P18 parameter set values match with those specified on the reference tables.
<b>E43</b>	Zone configuration error. Wrong setting of P61 parameter.	Setting parameters for boiler board are not correct.	Check that the P61 parameter set values match with those specified on the reference tables.
<b>E44**</b>	Ambient probe 1 failure.	Ambient probe is disconnected.	Reconnect it.
		Ambient probe is faulty.	Replace it.
<b>E45**</b>	Ambient probe 2 failure.	Ambient probe is disconnected.	Reconnect it.
		Ambient probe is faulty.	Replace it.
<b>E46</b>	Pressure transducer failure.	Pressure transducer is disconnected.	Reconnect it.
		Pressure transducer is faulty.	Replace it.
<b>E47</b>	External probe with connected ambient probe error.	External probe is disconnected.	Reconnect it.
		External probe is faulty.	Replace it.
<b>E49</b>	The interface does not work.	The interface does not communicate with the boiler board.	Replace it.
<b>E80*</b>	The $\Delta T$ between flow and return is not within the limits.	Flow and/or return probes are faulty.	Replace them.
		Obstructed bypass pipe	Remove any obstructions, or replace the pipe.
		The bypass valve is not assembled or wrongly assembled.	Restore bypass valve correct assembling.
		Heat exchanger primary circuit is obstructed.	Clean or replace the exchanger.
<b>E86*</b>	Flow temperature increases too quickly.	Pump is seized.	Unseize the pump.
		Pump is faulty.	Replace it.
		Air present inside heating system.	Bleed the air from the boiler by opening the jollies on the exchanger and pump.
<b>E87*</b>	Return temperature increases too quickly.	Circulation of foreign water in boiler.	Check that there are no other boilers or additional cascading heat sources.
		Air present inside heating system.	Bleed the air from the boiler by opening the jollies on the exchanger and pump.
<b>E89***</b>	Faulty flue temperature value.	Flue probe on heat exchanger is faulty or damaged.	Replace it.
<b>E98</b>	The max. number of resets from the boiler touch screen has been reached.	The user has reached the max. number of resettable errors from boiler control panel.	Power off and then on using the switch installed ahead of the boiler.
<b>E99</b>	The max. number of resets from the Remote Control has been reached.	The user has reached the max. number of resettable values from the Remote Control.	Reset boiler interface.

\* errors that can be reset by the user by keeping the 'Reset' button pressed

\*\* self-resettable errors, they automatically reset as soon as the failure is fixed

\*\*\* errors that can be reset only by the Technical Service personnel

If fault codes **E51**, **E52**, **E53**, **E73**, **E85**, **E89**, **E90** and **E91** occur, please contact a qualified Service Centre.









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**Fondital S.p.A. Società a unico socio**

25079 VOBARNO (Brescia) Italy - Via Cerreto, 40  
Tel. +39 0365/878.31 - Fax +39 0365/878.304  
e mail: [info@fondital.it](mailto:info@fondital.it) - [www.fondital.com](http://www.fondital.com)

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