



FORMENTERA

KC 12 - 24 - 28 - 32

KRB 12 - 24 - 28 - 32

KR 12 - 24 - 28 - 32

INSTALLATION, USE AND MAINTENANCE



fondital
BE INNOVATIVE

IST 03 C 545 - 02

EN

Dear Sirs,

Thank You for choosing and buying one of our boilers. Please read these instructions carefully in order to properly install, operate, and maintain the equipment.



We inform users that:

- **boilers shall be installed by a 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 qualified personnel only, under the requirements set forth by the prevailing rules.**

General notes for installers, maintenance technicians, and users

This instruction manual is an integral and essential part of the product. It shall be supplied by the installer to the user who shall keep it carefully to consult it whenever necessary.

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 things.

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 a wrong installation causing damages to persons, animals and/or property.

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 for children so keep them out of their reach.

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 boiler.

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



Routine boiler maintenance should be performed according to the schedule in the relevant section of this manual. Appropriate maintenance will keep the boiler 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 things.

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 power mains and close the gas cock.

Warning: Should power mains be disconnected, boiler electronic anti-freeze function will not be operative.

Should there be a risk of freezing, add anti-freeze: 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: 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.

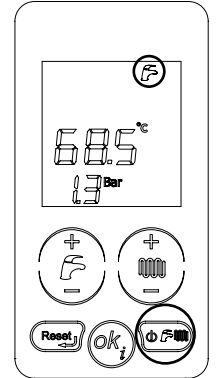
If any accessories have been fitted on the boiler, these instructions will not cover them. You will therefore have to refer to the full boiler instructions as well as to the specific instructions for the accessories.



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

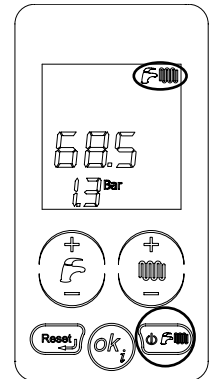
1. Open the gas cock installed ahead of the boiler.



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

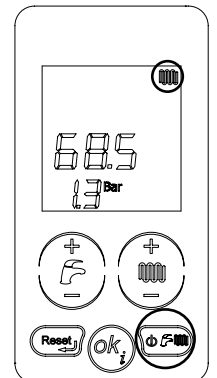
3. If you do not wish to activate the heating function, press the "operating mode selection" button  until displaying the symbol  : only the DHW function will be enabled.



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 .



6. To set the DHW water temperature press DHW +/- buttons (**A**, fig. 1). Set temperature as required.

7. To set the heating water temperature, press heating water +/- buttons (**B**, 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 (**C**, fig. 1).

If boiler does not resume its normal operation after 3 attempts, contact a qualified Service Centre.

CONTENTS

Warnings

General notes for installers, maintenance technicians, and users	page	3
Rapid operating instructions.	page	4
1. Instructions for the user	page	7
1.1. Control panel	page	7
1.2. Interpreting BOILER STATUS from LCD DISPLAY INDICATIONS	page	8
1.3. Selecting the operating mode	page	11
1.4. Adjusting CH and DHW temperature	page	12
1.5. Parameter display	page	12
1.6. Failures that cannot be reset	page	14
1.7. Boiler reset	page	14
1.8. Boiler operation	page	15
1.8.1. Switching on	page	15
1.8.2. CH function	page	15
1.8.3. DHW function	page	15
1.8.4. ANTI-FREEZE function	page	16
1.8.4.1. Flow anti-freeze function	page	16
1.8.4.2. DHW plate heat exchanger anti-freeze function	page	16
1.8.4.3. Water cylinder anti-freeze function	page	16
1.8.5. Pump and valve anti-shutdown function	page	16
1.8.6. Operation with external probe (optional)	page	17
1.8.7. Operation with (optional) Remote Control	page	17
1.9. Boiler shutdown	page	17
1.9.1. Burner shutdown	page	17
1.9.2. Shutdown due to overheating	page	17
1.9.3. Shutdown due to incorrect air/flue gas system draught	page	17
1.9.4. Shutdown due to insufficient water pressure in system	page	18
1.9.5. Alarm due to temperature probe malfunction	page	19
1.9.6. Shutdown for fan malfunction	page	19
1.9.7. Alarm due to (optional) Remote Control connection malfunction	page	19
1.10. Maintenance	page	19
1.11. Notes for the user	page	19
2. Technical features and dimensions	page	20
2.1. Technical features	page	20
2.2. Dimensions	page	21
2.3. Hydraulic diagram	page	24
2.4. Operating data	page	25
2.5. General characteristics	page	27
3. Instructions for the installer	page	29
3.1. Installation standards	page	29
3.2. Installation	page	29
3.2.1. Packaging	page	29
3.2.2. Choosing where to install the boiler	page	29
3.2.3. Positioning the boiler	page	29
3.2.4. Installing the boiler	page	31
3.2.5. Boiler room ventilation	page	31
3.2.6. Air intake and flue gas venting system	page	32
3.2.6.1. Configuration of air intake and flue gas venting ducts	page	33
3.2.6.2. Ø 100/60 mm and Ø 125/80 mm air/flue gas coaxial duct system	page	33
3.2.6.3. Air intake and flue gas venting via 80 mm split pipes	page	34
3.2.6.4. Air intake and flue gas venting via 60 mm split pipes	page	35
3.2.7. Checking combustion efficiency	page	36
3.2.7.1. Flue cleaning function	page	36
3.2.7.2. Measurement procedure	page	36
3.2.8. Connection to gas mains	page	37
3.2.9. Hydraulic connections	page	37
3.2.10. Connection to the electrical mains	page	38
3.2.11. Selecting the operating range in heating mode	page	38
3.2.12. Connection to ambient thermostat (optional)	page	38
3.2.13. Installation and operation with Open Therm Remote Control (optional)	page	38
3.2.14. Installation of the (optional) external probe and sliding temperature operation	page	39
3.2.15. TSP parameters that can be set from interface and Remote Control	page	41
3.3. Filling the system	page	43
3.4. Starting up the boiler	page	43
3.4.1. Preliminary checks	page	43
3.4.2. Switching on and switching off	page	43
3.5. Available head	page	44
3.6. Wiring diagrams	page	46
3.6.1. Wiring diagram for forced circulation solar system with combi boiler	page	47
3.6.2. Solar collector anti-freeze function	page	48
3.6.3. Collector heat transfer function	page	48
3.6.4. Water heater cooling function	page	48
3.6.5. Solar mode operation and failure signal	page	48
3.6.6. Natural circulation solar system with combi boiler wiring diagram	page	49
3.6.7. Forced circulation solar system with CH only boiler wiring diagram	page	51
3.6.8. Multifunction relay setting diagrams	page	51
3.6.9. Forced circulation solar system with CH only boiler wiring diagram	page	53
3.6.10. Multifunction relay	page	53

3.6.11. Multifunction relay setting diagrams	page	54
3.7. Adaptation to other gas types and burner adjustment	page	55
3.7.1. Switching from NATURAL GAS to PROPANE	page	55
3.7.2. Switching from PROPANE to NATURAL GAS	page	55
3.7.3. Gas valve setting	page	56
3.7.3.1. Maximum heat output adjustment	page	56
3.7.3.2. Minimum heat output adjustment	page	56
4. Testing the boiler	page	58
4.1. Preliminary checks	page	58
4.2. Switching on and switching off	page	58
5. Maintenance	page	59
5.1. Maintenance schedule	page	59
5.2. Combustion analysis	page	59
6. Troubleshooting	page	60

FIGURE INDEX

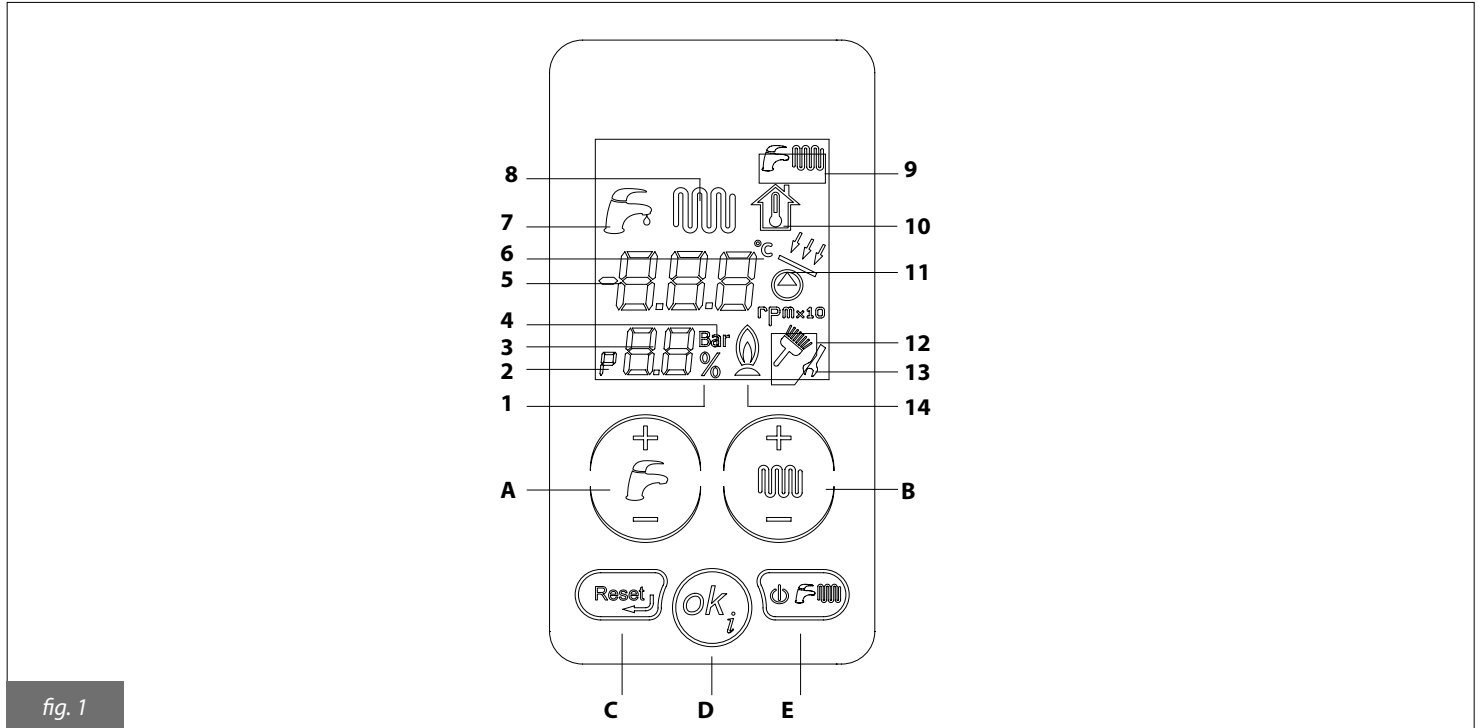
fig. 1 - Control panel	page	7
fig. 2 - Filler cock	page	18
fig. 3 - Dimensions model KC	page	21
fig. 4 - Dimensions model KRB	page	22
fig. 5 - Dimensions model KR	page	23
fig. 6 - Hydraulic diagram model KC	page	24
fig. 7 - Hydraulic diagram model KRB	page	24
fig. 8 - Hydraulic diagram model KR	page	25
fig. 9 - Installation template	page	30
fig. 10 - Installation examples	page	32
fig. 11 - Air intake and flue gas venting with coaxial duct system	page	35
fig. 12 - Dimensions for coaxial duct system	page	35
fig. 13 - Air intake and flue gas venting with split pipes	page	36
fig. 14 - Dimensions for split pipes	page	36
fig. 15 - Venting tower	page	36
fig. 16 - Combustion analysis ports	page	36
fig. 17 - Connection to gas mains	page	37
fig. 18 - Heating curves	page	40
fig. 19 - Available head curves - KC-KRB-KR 12	page	44
fig. 20 - Available head curves - KC-KRB-KR 24	page	44
fig. 21 - Available head curves - KC-KRB-KR 28	page	45
fig. 22 - Available head curves - KC -KRB-KR32	page	45
fig. 23 - Wiring diagram model KC	page	46
fig. 24 - Wiring diagram for forced circulation solar system with combi boiler	page	47
fig. 25 - Wiring diagram for natural circulation solar system with combi boiler	page	49
fig. 26 - Multifunction relay wiring diagram	page	49
fig. 27 - Wiring diagram model KRB	page	50
fig. 28 - Wiring diagram for forced circulation solar system with CH only boiler	page	51
fig. 29 - Multifunction relay connecting diagram	page	51
fig. 30 - Wiring diagram model KR	page	52
fig. 31 - Wiring diagram for forced circulation solar system with CH only boiler	page	53
fig. 32 - Multifunction relay wiring diagram	page	53
fig. 33 - Relay with Remote Control and TA2	page	54
fig. 34 - Relay with remote request (P17=1)	page	54
fig. 35 - Relay with TA2 request (P17=3)	page	54
fig. 36 - View of components	page	56
fig. 37 - Air/gas mixer opening	page	56
fig. 38 - Position of nozzles	page	56
fig. 39 - Mixer connection	page	56
fig. 40 - Gas valve	page	57

TABLE INDEX

Table 1 - Displayable symbols on LCD display	page	7
Table 2 - BOILER STATUS - LCD INDICATIONS during normal operation	page	8
Table 3 - BOILER STATUS - LCD INDICATIONS in the event of malfunction	page	9
Table 4 - Displayable parameters with "info" button	page	13
Table 5 - KC 12 model adjustment rates	page	25
Table 6 - KC 24 model adjustment rates	page	25
Table 7 - KC 28 model adjustment rates	page	26
Table 8 - KC 32 model adjustment rates	page	26
Table 9 - KRB - KR 12 model adjustment rates	page	26
Table 10 - KRB - KR 24 model adjustment rates	page	26
Table 11 - KRB - KR 28 model adjustment rates	page	26
Table 12 - KRB - KR 32 model adjustment rates	page	26
Table 13 - General specifications, KC/KRB/KR model	page	27
Table 14 - Combustion specifications, KC 12/KRB 12/KR 12 model	page	27
Table 15 - Combustion specifications, KC 24/KRB 24/KR 24 model	page	27
Table 16 - Combustion specifications, KC/KRB 28/KR 28 model	page	28
Table 17 - Combustion specifications, KC/KRB 32/KR 32 model	page	28
Table 18 - Boiler re-ignition temperatures	page	38
Table 19 - Limits to be set for TSP parameters and default values based on boiler type (TSP0)	page	39
Table 20 - General table of TSP parameters	page	41
Table 21 - Relationship between "Temperature and Nominal resistance" for temperature probes	page	55
Table 22 - CO ₂ values	page	57
Table 23 - Diameter of nozzles - diaphragms	page	57

1. INSTRUCTIONS FOR THE USER

1.1. Control panel



A. Domestic hot water set buttons (see par. 1.4, 1.8.3).

B. Hot water for heating purposes (see par. 1.4, 1.8.2) and **parameter** set buttons.

C. Buttons for **alarm reset** and **back to the starting page** during parameter selection.

D. Parameter confirmation and **information request** button.

E. Operating **status selection** button.

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	%	Percentage indication	
2	P	Indication of "parameter" inside the parameter menu	
3	8.8	Displaying of the number of parameters, or of the system pressure, or of the burner power percentage	
4	Bar	Indication of system pressure measurement unit	
5	8.8.8	Temperature, value, parameter and fault display.	
6	°C	Indication of the centigrade degrees.	
7	Faucet icon	A DHW request is active.	DHW temperature regulation with buttons (A fig.1)
8	Coil icon	A CH request is active.	CH temperature regulation with buttons (B fig.1)
9	Faucet and coil icons	Symbols for instantaneous DHW, heating. Symbol ON = function enabled, OFF = function disabled.	
10	House icon		In case an external probe is installed, this icon flashes when a calculated ambient temperature is set via buttons B (fig.1)
11	Sun icon	The solar pump or solar valve is active	
12	Broom icon and RPM	Displaying of the flue cleaning function and of the "rpm" wording to show the number of revolutions per minute of the fan.	The flashing broom symbol indicates that you are accessing the flue cleaning function.
13	Wrench icon	During parameter editing, the wrench symbol stays on until the set datum is confirmed.	
14	Flame icon	Flame "on" indication	

Table 1 - Displayable symbols on LCD display

1.2. Interpreting BOILER STATUS from LCD DISPLAY INDICATIONS

Normal operation

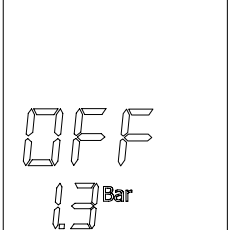
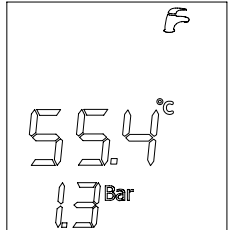
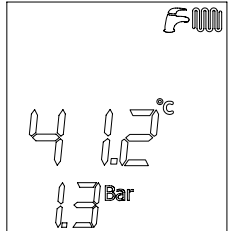
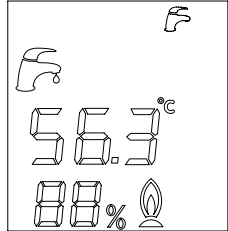
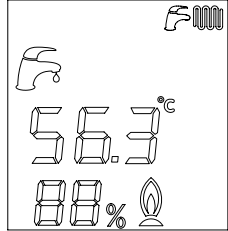
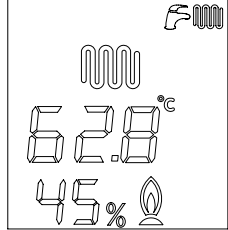
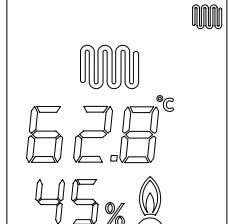
<p>Boiler switch in OFF mode</p>	
<p>Boiler switch in SUMMER mode No active function. The flow temperature and the system pressure are displayed.</p>	
<p>Boiler switch in WINTER mode No active function. The flow temperature and the system pressure are displayed.</p>	
<p>Boiler switch in HEATING ONLY mode No active function. The flow temperature and the system pressure are displayed</p>	
<p>Boiler switch in SUMMER mode DHW function enabled. The flow temperature and the modulation percentage are displayed</p>	
<p>Boiler switch in WINTER mode DHW function enabled. The flow temperature and the modulation percentage are displayed.</p>	
<p>Boiler switch in WINTER mode CH function active. The flow temperature and the modulation percentage are displayed.</p>	
<p>Boiler switch in HEATING ONLY mode CH function active. The flow temperature and the modulation percentage are displayed.</p>	

Table 2 - BOILER STATUS - LCD indications during normal operation





Malfunction

No flame	E 01
Triggering of double flow probe	E 02
Triggering of flue gas thermostat	E 03
Insufficient system pressure	E 04
Flow probe failure	E 05
DHW probe failure (only model KC)	E 06
Flue gas probe failure	E 07
System pressure too high	E 09
Water cylinder probe failure (optional, if connected; models KRB and KR only)	E 12
Return probe failure	E 15
Solar collector probe (SCS) failure (optional, if connected)	E 24
Solar valve probe (SVS) failure (optional, if connected)	E 27
Solar Water cylinder probe (SBS) failure (optional, if connected)	E 28
Remote Control connection failure (optional, if connected: this error appears only on the Remote Control display)	E 31
Triggering of safety thermostat in mixed zone 2 (optional, if connected)	E 35
Mixed zone flow probe 2 failure (optional, if connected)	E 36 02
Mixed zone flow probe 3 failure (optional, if connected)	E 36 03

Mixed zone flow probe 4 failure (optional, if connected)	E 35 04
Fan failure	E 40
Communication failure with peripheral boards (optional, if connected: zone board and solar board)	E 41
Hydraulic configuration not allowed	E 42
Zone configuration error (optional, if connected: Remote Control and ambient thermostat)	E 43
Pressure transducer fault	E 45
Communication error between main board and touch screen	E 49
Safety system hardware malfunction	E 51 E 52 E 53
Incompatibility between boiler main board and interface board	E 73
Offset error ΔT max	E 80
Flow or return probe > 120°C	E 85
Maximum flow derivative exceeded	E 86
Maximum return derivative exceeded	E 87
Flue gas temperature lower than CH return temperature	E 89
Flue gas maximum threshold exceeding	E 90
Alarm for flue gas maximum derivative exceeding	E 91
Max. number of reset attempts from touch screen reached	E 98
Max. number of reset attempts from remote control reached (optional, if connected)	E 99

Table 3 - BOILER STATUS - LCD indications in the event of malfunction

1.3. Selecting the operating mode

Every time the "operating status selection" button  (E, fig.1) is pressed, the SUMMER  , WINTER  , CH ONLY  and OFF modes are enabled in sequence.

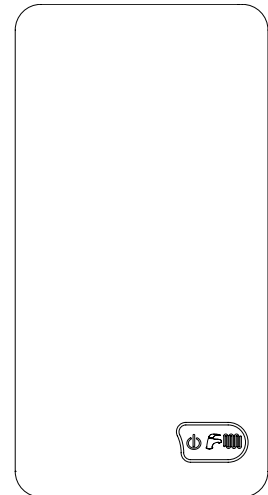
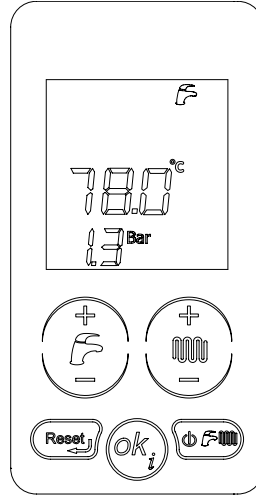
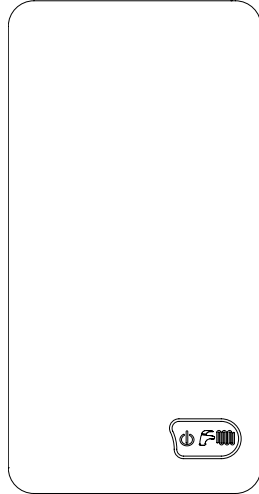
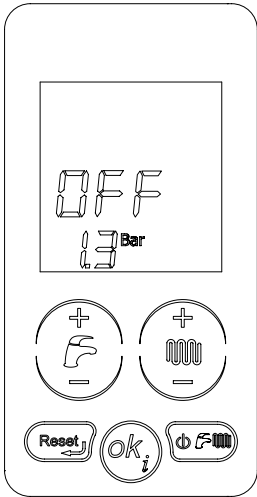
At this stage, all buttons are enabled.

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.

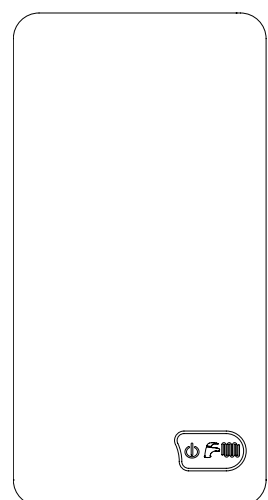
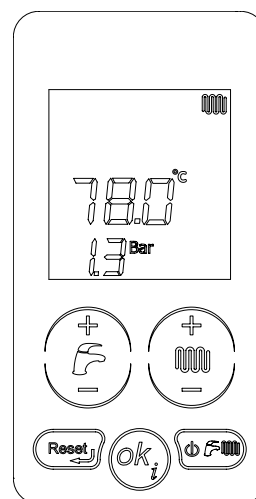
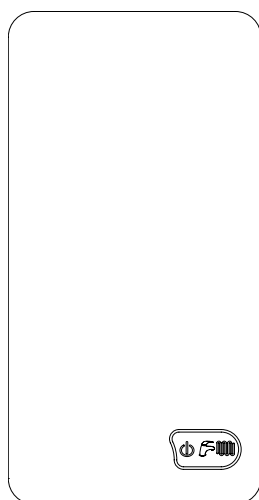
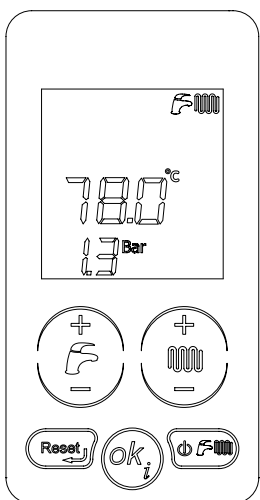
When the **WINTER** mode is enabled, both functions are active: DHW production and heating water production.

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



1. OPERATING STATUS: OFF

2. OPERATING STATUS: SUMMER



3. OPERATING STATUS: WINTER

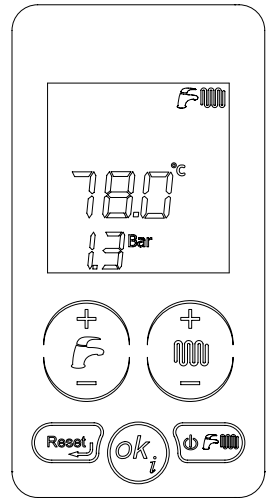
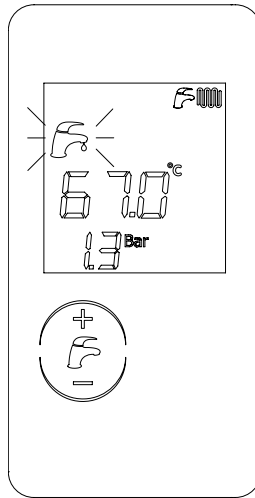
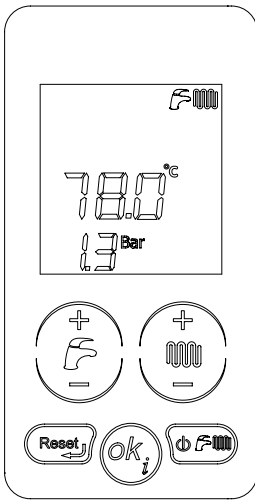
4. OPERATING STATUS: HEATING ONLY

1.4. Adjusting CH and DHW temperature

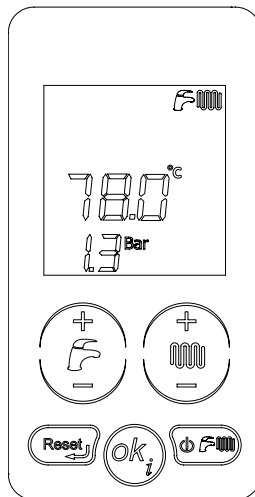
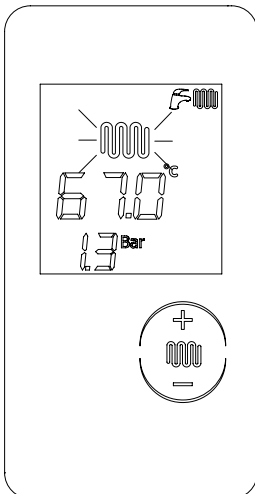
Press the DHW +/- button (A, fig.1) to select the desired domestic hot water temperature. During selection, DHW icon (7, fig. 1) will flash. As soon as button is released, icon will continue flashing for approx. 3 seconds, and the DHW value will flash as well. After this time, value is stored and display standard operation will be restored.

Press the CH +/- button (B, fig.1) to select the desired CH flow water temperature. During selection, HEATING icon (8, fig. 1) will flash. As soon as button is released, icon will continue flashing for approx. 3 seconds, and the CH water value will flash as well. After this time, value is stored and display standard operation will be restored.

At this stage, all buttons are enabled.



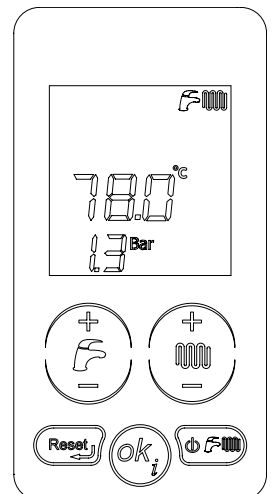
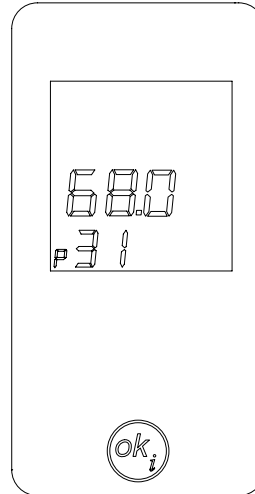
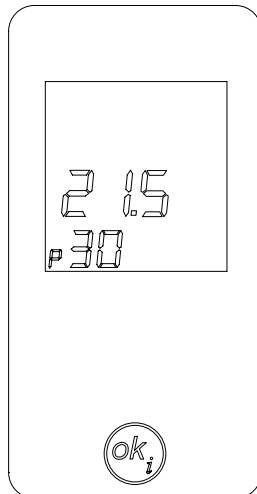
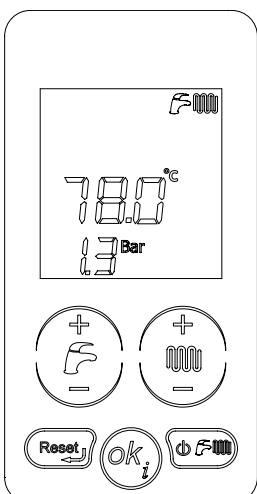
1. DHW TEMPERATURE SELECTION



2. CH TEMPERATURE SELECTION

1.5. Parameter display

Press "Info" (D, fig.1) to scroll the different parameter values. You can quit this function at any time by simply pressing the "Reset" button (C, fig.1). Table 2 describes the meaning of all displayable parameters.



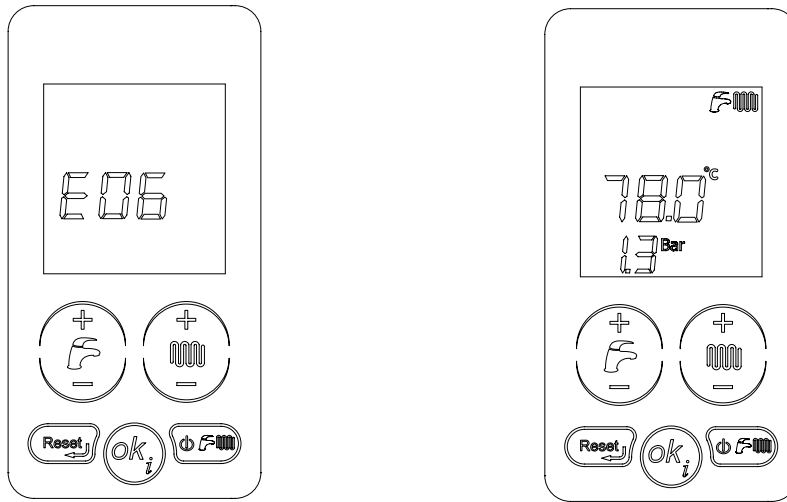
PARAMETERS	DESCRIPTION
P30 - TSP30	External temperature displaying (if an external probe is present).
P31	Flow temperature displaying.
P32	Calculated nominal flow temperature displaying. If no external probe is installed, the flow temperature manually set on boiler will be displayed. If an external probe is installed, the flow temperature boiler calculated through the curves on figure 18 will be displayed.
P42	DHW temperature displaying (only model KC).
P43	Boiler return temperature displaying.
P44	Water cylinder temperature displaying (for models KRB and KR with installed (optional) water cylinder probe installed).
P45	Flue gas temperature displaying.
P46	Solar collector temperature displaying (if the collector probe is installed on the boiler).
P47	Solar Water cylinder temperature or solar valve temperature displaying (if the Water cylinder probe or solar valve probe are installed on the boiler).
P48	Solar Water cylinder temperature or solar valve temperature displaying (if the Water cylinder probe or solar valve probe are installed on additional solar board).

Table 4 - Displayable parameters with "info" button

1.6. Failures that cannot be reset

The display shows the failure based on the corresponding error code (table 3). Some failures can be reset through the "reset" button, while some others are self-resettable. Refer to the following paragraph ("Boiler reset").

If failures cannot be reset but are of the self-resettable type, no key will be enabled and only the LCD backlighting 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.

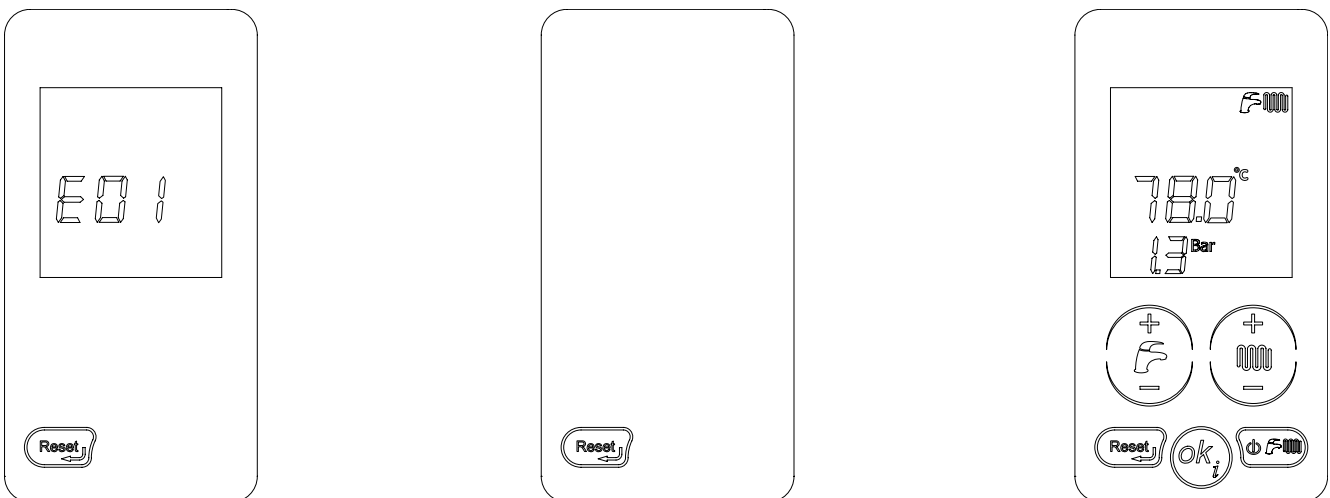


1.7. Boiler reset

The display shows the failure based on the corresponding error code (table 3). Some failures can be reset through the reset key, while some others are self-resettable.

If shutdowns can be reset (E01, E02, E03, E40), the reset key and the LCD backlighting 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.



1.8. Boiler operation

1.8.1. Switching on

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

- 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 3 and 4);
- select boiler operation mode by pressing the "operating status selection" button on the touch-screen (**E**, fig. 1): OFF, SUMMER, WINTER, CH ONLY (par. 1.3.);
- set desired CH temperature (see par. 1.8.2.);
- set desired DHW temperature (see par. 1.8.3.);
- set the desired room temperature on the ambient thermostat inside the home (if installed).

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 (C**, fig. 1).**

1.8.2. CH function

- Set desired heating water temperature via heating +/- buttons (**B**, fig. 1).
Heating temperature adjustment range depends on the selected operating range:
- **standard range:** 20°C to 78°C (via buttons "CH + and -" **B** in fig.1);
 - **reduced range:** 20°C to 45°C (via buttons "CH + and -" **B** in fig.1).

The operating range shall be selected by the installing technician or by a qualified Service Centre (see paragraph 3.2.11.).
During temperature setting, the CH symbol (**8**, fig.1) on the screen flashes and the CH current setting is displayed.
When the central heating system requests heat from the boiler, the LCD displays the CH symbol (steady on) (**8**, fig.1) and the current heating flow water temperature. The burner on symbol (**14**,fig.1) only shows 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, 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 3.2.11.).

1.8.3. DHW function

Set desired DHW water temperature via DHW +/- buttons (**A**, fig. 1).

The DHW production function is enabled on the KC models and on the KR and KRB models with external water cylinder (optional).

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

During temperature setting, the DHW symbol (**7**, fig.1) on the display flashes and the DHW setting is displayed.

In KR and KRB models with external water cylinder (optional), water cylinder production of DHW can be enabled or disabled by pressing button "Operating mode selection" on the touch-screen (**E**, fig.1). Water cylinder is enabled when boiler is in one of the following operating modes:
SUMMER, WINTER.

For KR and KRB models with external water cylinder (optional) with NTC probe (10 kΩ @ β=3435; refer to water cylinder technical specifications), temperature range is between 35 °C and 65 °C. When setting temperature, the DHW symbol (**7**, fig.1) will flash on the display and the DHW value being set will be shown.

In KR and KRB models featuring an external water cylinder (optional) it is not possible to use a thermostat. A probe must be inserted in the boiler instead. This allows to reduce gas consumption.

The burner on symbol (**14**, fig.1) shows while the burner is operating.

In KR and KRB models featuring an external water cylinder (optional) fitted with a water cylinder probe (optional), the anti legionary's disease function is activated each 15 days: this consists in bringing the water temperature in the cylinder to a temperature of 65 °C for 30 minutes, independently for any other setting.

WARNING

A standard feature of the boiler is a special adjusting device that limits domestic hot water output flow rate. This limit value is: 10 litres per minute for KC 12 model, 13 litres per minute for KC 24 model, 14 litres per minute for KC 28 model, and 16 litres per minute for KC 32 model.

In model KC, the domestic hot water flow rate supplied by the boiler depends on the temperature set by the user with the DHW +/- buttons, on water mains supply temperature and on boiler output, and can be calculated with the following formula:

$$l = \text{DHW litre per min.} = \frac{K}{\Delta T}$$

where K is:

- 258 in KC 12 model
- 402 in KC 24 model
- 465 for KC 28 model
- 486 for KC 32 model

ΔT = hot water temperature – cold water temperature

For instance, with model KC 24, if the cold water is at 8°C and you want hot water at 38°C for a shower, the value of ΔT is:

$$\Delta T = 38^\circ\text{C} - 8^\circ\text{C} = 30^\circ\text{C}$$

and the number of DHW litres per minute available at 38°C is:

$$l = \frac{402}{30} = 13.4 \text{ [litres per minute] (water mixed at cock)}$$

1.8.4. ANTI-FREEZE function

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



The anti-freeze function only protects the boiler, not the whole heating system.

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 anti-freeze functions are anyway enabled through the circulation pumps.

1.8.4.1. Flow anti-freeze 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.

1.8.4.2. DHW plate heat exchanger anti-freeze function

In model KC, the anti-freeze function also protects the DHW system.

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 DHW 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.

1.8.5.4. Water cylinder anti-freeze function

The water cylinder probe measures the temperature of water in the cylinder. When this temperature is less than 5°C a cylinder anti-freeze function begins: the circulating pump begins working and the burner is switched on.

In KR and KRB models featuring an external water cylinder (optional) for the production of DHW with a NTC type temperature sensor (10 k Ω @ $\beta=3435$; refer to water cylinder technical specifications) the anti-freeze function also protects the water cylinder.

When water cylinder temperature sensor detects a water temperature of 5°C, the boiler switches on and stays on at its minimum heating output until the temperature of the cylinder water reaches 10°C or 15 minutes have elapsed. The pump continues to operate even if the boiler shuts down.

During the water cylinder 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.

1.8.5. 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 shutdown. The same applies to the relay which can be freely programmed whenever this latter is used to power a recirculation pump or a deviating valve.

1.8.6. Operation with external probe (optional)

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 +/- buttons (B, fig. 1) are no longer used to set heating water temperature, but to edit virtual ambient temperature, namely the desired theoretical temperature.

During temperature setting, the virtual ambient temperature symbol flashes on the display (10, 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 3.2.14.



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 electronic parts, may affect boiler and external probe operation.

1.8.7. Operation with (optional) remote control

Boiler interface includes all the possible functions of a Remote Control (optional - not compulsory, supplied by the manufacturer) so as to manage several boiler parameters, such as:

- boiler status;
 - ambient temperature selection;
 - CH water temperature;
 - DHW water temperature;
 - CH system or external heater (optional) activation times programming;
 - boiler diagnostics display;
 - boiler reset;
- and others.

For instructions on how to connect the Remote Control, refer to par. 3.2.13 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.

1.9. Boiler shutdown

The boiler shuts down automatically if a malfunction occurs. Refer to Tables 3 and 4 to identify the boiler operating mode. To determine the possible causes of malfunction, see also paragraph 6. *Troubleshooting* section is at the end of this manual. Below is a list of kinds of shutdown and the procedure to follow in each.

1.9.1. Burner shutdown

Fault code **E01** is displayed flashing on the display in the event of burner shutdown 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;
- once having checked if the fuel is available, press the "reset" button to restore burner operation (**C**, fig. 1): if, after two starting attempts, the boiler still fails to start and enters the shutdown mode again, contact a Service Centre or qualified personnel for maintenance.

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

1.9.2. Shutdown due to overheating

In case of flow water overheating, the boiler shuts down and the **E02** code will start flashing. Contact a Service Centre or a qualified service engineer to carry out the maintenance.

1.9.3. Shutdown due to incorrect air/flue gas system draught

If the air intake/flue gas system malfunctions, the boiler shuts down. The code **E03** (flue gas thermostat triggering) is starts flashing on the display. Contact a Service Centre or a qualified service engineer to carry out the maintenance.

1.9.4. Shutdown due to insufficient water pressure in system


If "shutdown due to insufficient pressure in system" error **E04** starts flashing (indicating safety water pressure switch triggering), fill the system by opening the filler cock (model KC) or the cock on the cold water supply pipe (models KR and KRB) (see fig. 2).

E04 error is displayed when system pressure drops 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 (model KC) or the cock on the cold water supply pipe (models KR and KRB) (see fig. 2) anticlockwise to allow water to enter the boiler;
- keep the cock open until the control panel shows a value of $1 \div 1,3$ bar;
- turn filler cock (model KC) or the cock on the cold water supply pipe (models KR and KRB) (see fig. 2) 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.**

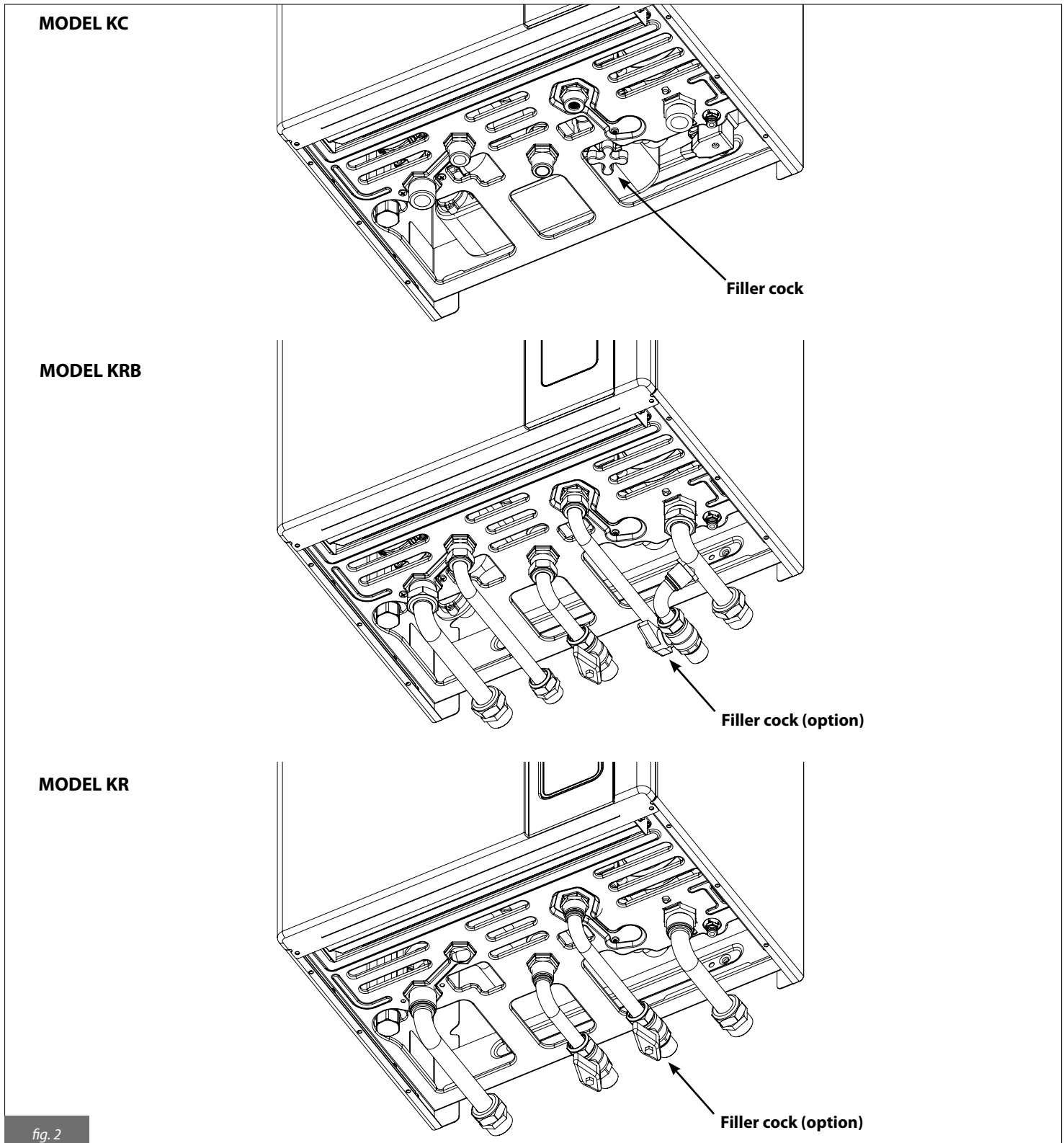


fig. 2

1.9.5. Alarm due to temperature probe malfunction

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

- **E05** for the CH probe. In this case the boiler does not work.
- **E06** for the DHW probe. In this case, the boiler works in central heating mode only, and the DHW function is disabled.
- **E12** for the water cylinder probe (models KRB/KR); in this case, the boiler works in central heating mode only, and the DHW function is disabled.
- **E15** for the return probe. In this case the boiler does not work.

In all cases, contact a Service Centre or a qualified engineer for maintenance.

1.9.6. Shutdown 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.

1.9.7. 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 control panel and ignore the Remote Control settings. The remote control can indicate faults or shutdown conditions and can also restore boiler operation after shutdown 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.

Contact a Service Centre or a qualified service engineer to carry out the maintenance.

1.10. 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. Maintenance and repairs must be performed by qualified personnel.

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

1.11. 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 pump. 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

The boiler is equipped with a fully pre-mixed gas burner. The following model is available:

- **KC:** condensing boiler with sealed chamber and forced draught, supplying CH water and instant DHW production;
- **KRB:** condensing boiler with sealed chamber and forced draught, supplying CH water only; with 3-way deviating valve for connection to external water cylinder (optional).
- **KR:** condensing boiler with sealed chamber and forced draught, supplying CH water only;

The boiler is available in four power rates:

- KC 12, KRB 12, KR 12: with heat input of 12.0 kW
- KC 24, KRB 24, KR 24: with heat input of 23.7 kW
- KC 28, KRB 28, KR 28: with heat input of 26.4 kW
- KC 32, KRB 32, KR 32: with heat input of 30.4 kW

All models are equipped with electronic ignition and ionisation flame sensing device.

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.
- Electronic start-up with built-in 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.
- Twin shutter modulating gas valve with constant air/gas ratio.
- Modulating, electronically managed combustion fan.
- 3-speed circulation pump with built-in air purging device.
- Heating system pressure sensor.
- DHW (only KC) and CH temperature probe (all models).
- Flue gas thermostat on discharge tower
- Flue gas probe on primary heat exchanger.
- Integrated, automatic by-pass.
- 10 litre expansion vessel.
- System manual filling (only KC) and draining cocks (all models).
- Stainless steel plate DHW heat exchanger (KC).
- Motorised deviating valve (KC).
- DHW priority flow switch (KC).
- 10 l/min (KC 12), 13 l/min (KC 24), 14 l/min (KC 28) and 16 l/min (KC 32) DHW flow-limiting device.

User interface

- Touch interface with built-in LCD to display and control boiler operating condition: OFF, RESET, WINTER, SUMMER and CH ONLY.
- CH water temperature regulator: 20-78°C (standard range) or 20-45°C (reduced range).
- DHW water temperature regulator: 35-57 °C; 35-65 °C (KRB/KR with optional water cylinder).

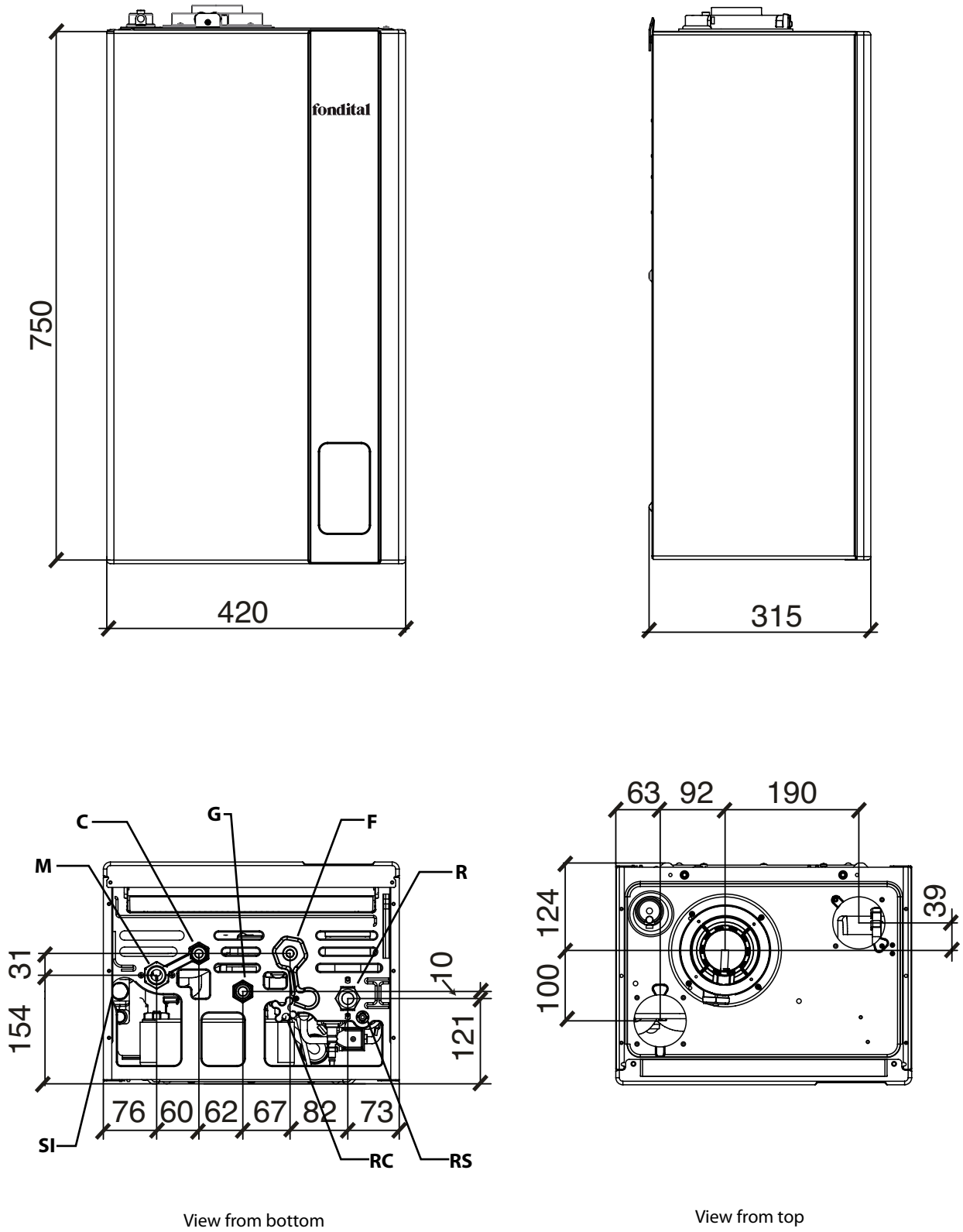
Operating features

- CH electronic flame modulation with timer-controlled rising ramp (60 seconds, adjustable).
- Electronic flame modulation in DHW mode (KC and KR/KRB with external water cylinder - optional).

- DHW priority function (only KC).
- 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.
- Water cylinder anti-freeze function (KR/KRB + optional external water cylinder with NTC probe): ON 5°C; OFF 10 °C or after 15 minutes of operation if boiler temperature > 5 °C.
- Timer-controlled flue cleaning function: 15 minutes.
- Anti-legionella function (KR/KRB + external water cylinder - optional);
- CH Maximum heat input parameter adjustment.
- Ignition heat input adjustment parameter.
- Possibility to select the heating range: standard or reduced.
- Ignition flame propagation function.
- CH thermostat timer: 240 seconds (adjustable).
- Post-circulation function in CH, anti-freeze and flue cleaning modes: 30 seconds (adjustable).
- DHW post-circulation mode (KC and KR/KRB with external water cylinder - optional): 30 seconds.
- Post-circulation function for heating temperature > 78 °C: 30 seconds.
- Post-ventilation function after working: 10 seconds.
- Post-ventilation function for heating temperature > 95°C.
- Circulation pump and deviating valve anti shutdown function: 30 seconds of operation after 24 hours of inactivity.
- Ready for connection to an ambient thermostat.
- Ready for operation with an external probe (optional, supplied by the manufacturer).
- Ready for operation with an OpenTherm remote control (optional, supplied by the manufacturer).
- Ready for operation with different temperature zones.
- Ready for integration with solar collectors.
- Anti- water hammer function: can be set from 0 to 3 seconds through parameter P15.

2.2. Dimensions

MODEL KC

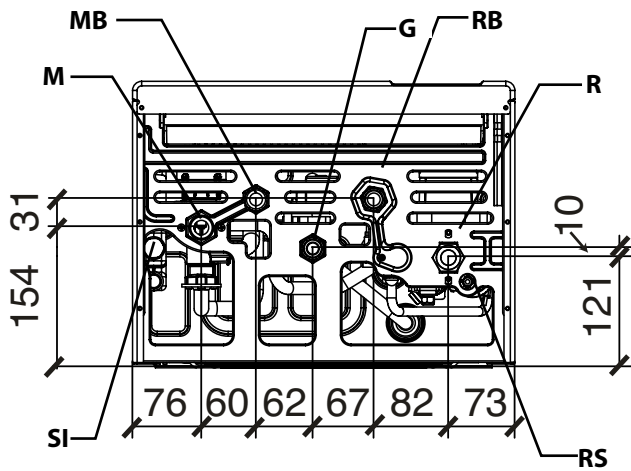
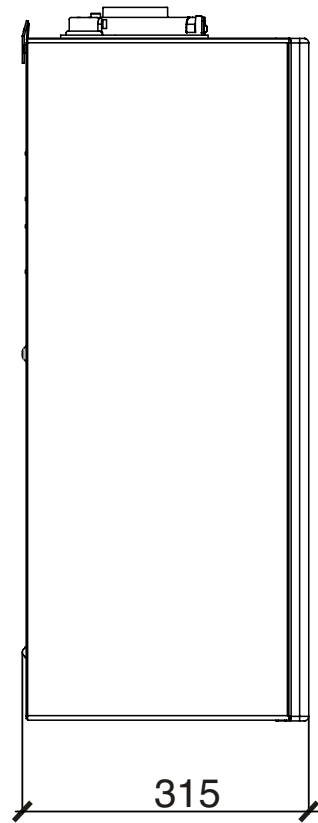
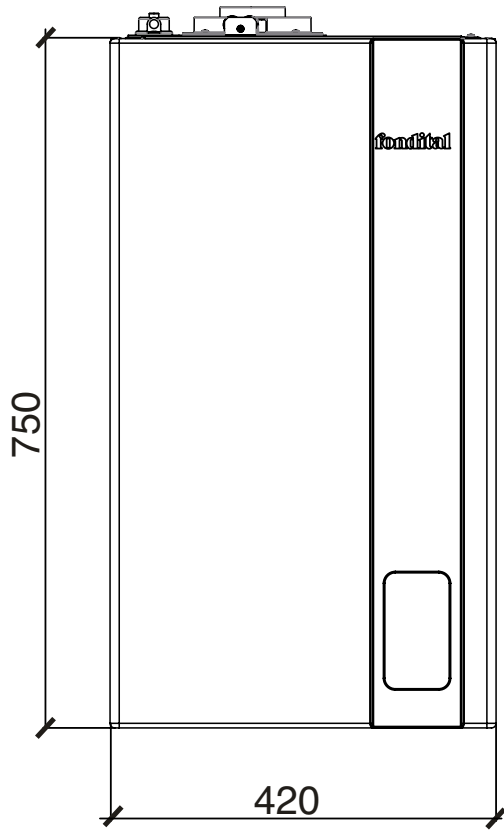


- F Cold water inlet (1/2")
- G Gas inlet (1/2")
- SI Trap inspection cap
- M CH flow (3/4")

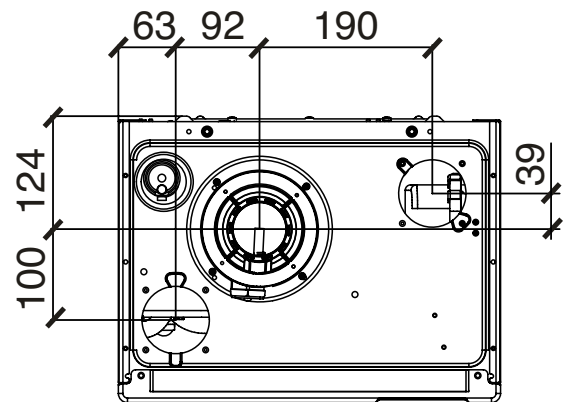
- C DHW outlet (1/2")
- R CH return (3/4")
- RS Discharge cock
- RC Filling cock

fig. 3

MODEL KRB



View from bottom

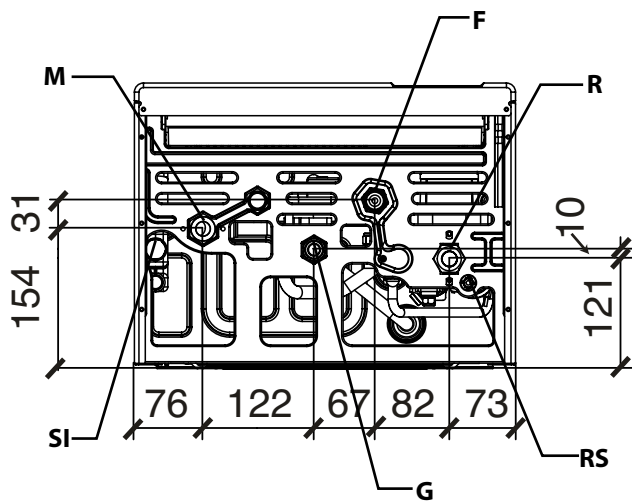
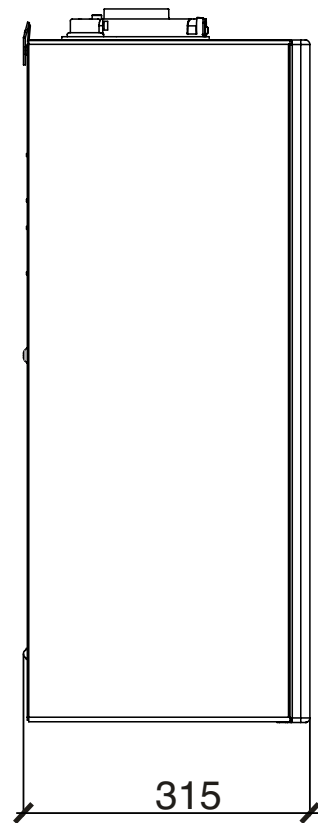
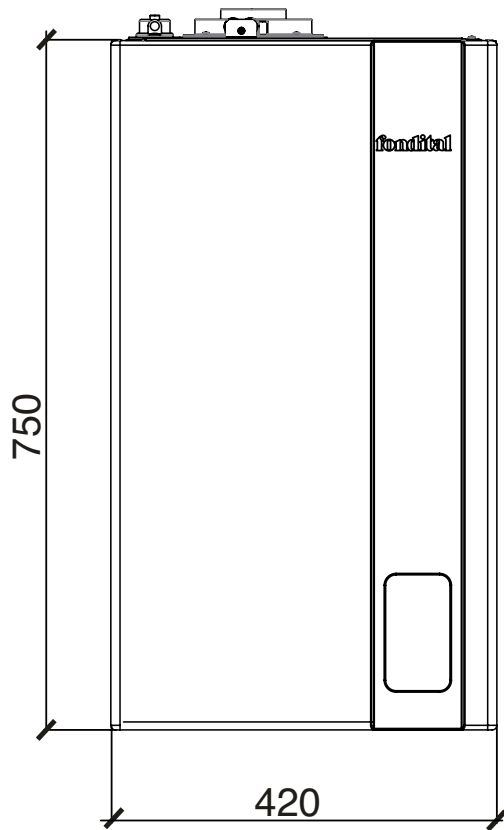


View from top

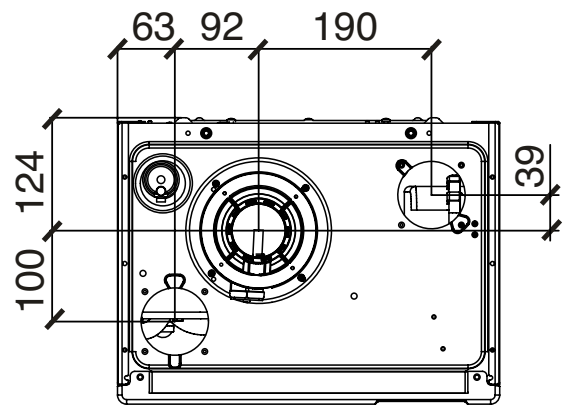
- RB Secondary return from water cylinder (1/2")
- G Gas inlet (1/2")
- SI Trap inspection cap
- M CH system flow (3/4")

- R CH system return (3/4")
- RS Discharge cock
- MB Secondary flow to water cylinder (1/2")

MODEL KR



View from bottom



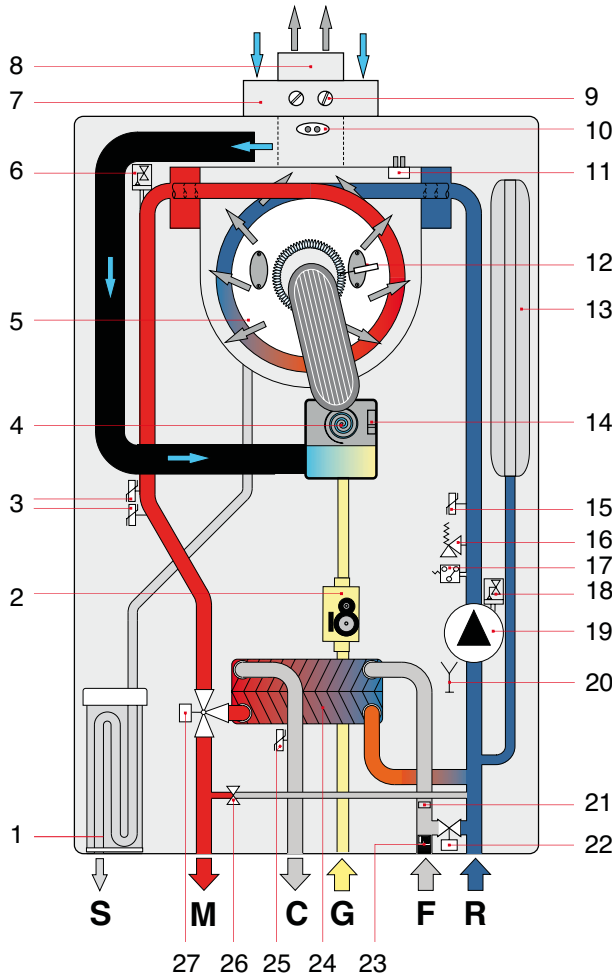
View from top

- F Cold water inlet (1/2")
- G Gas inlet (1/2")
- SI Trap inspection cap

- M CH system flow (3/4")
- R CH system return (3/4")
- RS Discharge cock

2.3. Hydraulic diagrams

Model KC

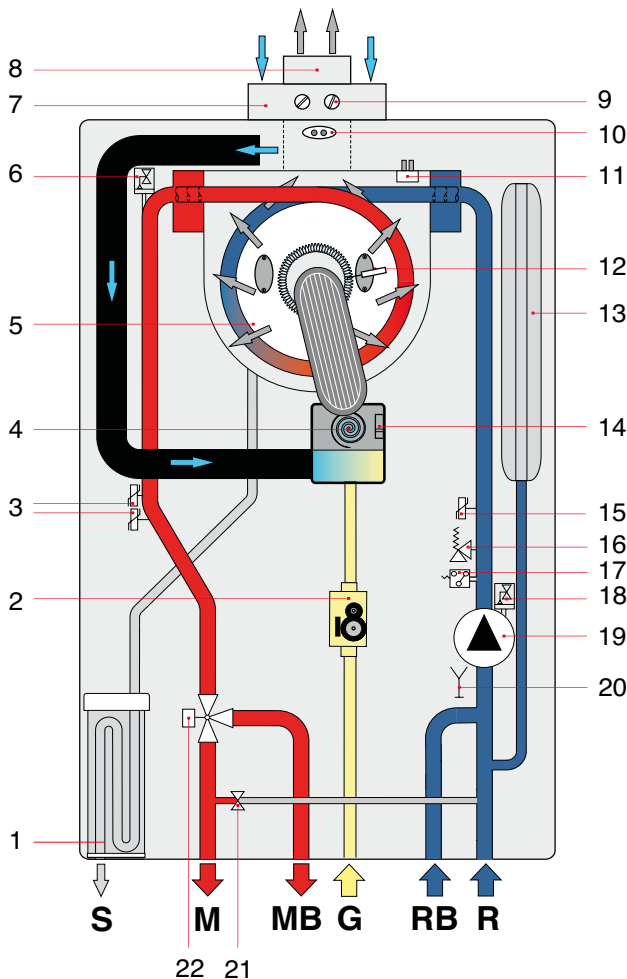


1. Condensate trap
2. Modulating gas valve
3. Flow temperature twin probe
4. Modulating fan
5. Primary condensing exchanger
6. Air-purging device
7. Air intake duct
8. Flue gas venting duct
9. Flue gas analysis ports
10. Flue gas thermostat on venting duct
11. Flue gas thermostat on exchanger
12. Ignition/detection electrode
13. Expansion vessel
14. Fan management probe
15. Return temperature probe
16. 3-bar safety valve
17. Pressure sensor
18. Air-purging device
19. 3-speed circulation pump
20. Discharge cock
21. Flow rate limiting device
22. Filler cock
23. Cold water flow switch with filter
24. Secondary plate exchanger
25. Domestic hot water temperature sensor
26. Automatic by-pass
27. Motorised 3-way valve

- M** CH system flow
G Gas
C Domestic hot water
F Cold water (from water mains)
R CH system return
S Condensate drain

fig. 6

Model KRB

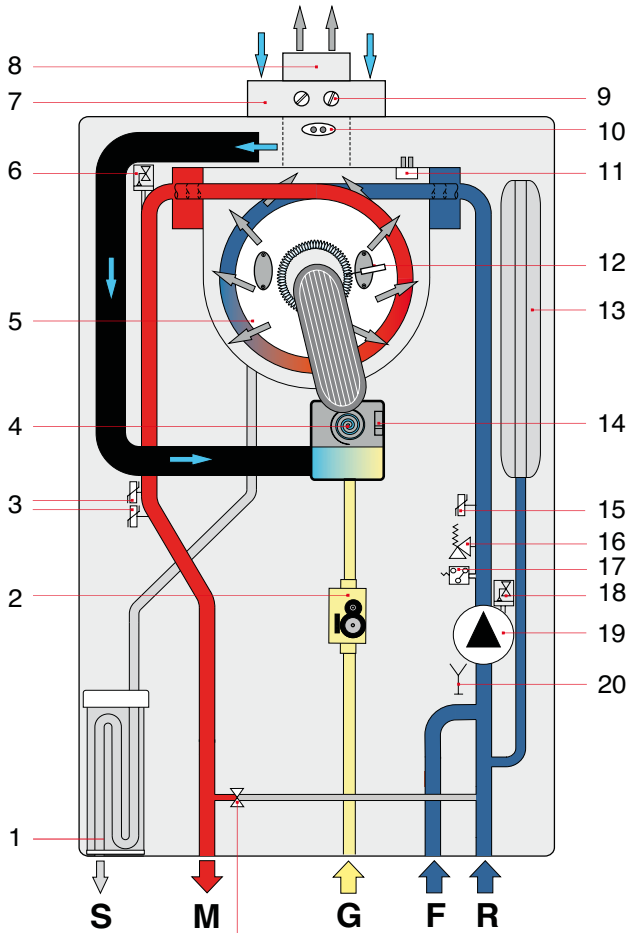


1. Condensate trap
2. Modulating gas valve
3. Flow temperature twin probe
4. Modulating fan
5. Primary condensing exchanger
6. Air-purging device
7. Air intake duct
8. Flue gas venting duct
9. Flue gas analysis ports
10. Flue gas thermostat on venting duct
11. Flue gas thermostat on exchanger
12. Ignition/detection electrode
13. Expansion vessel
14. Fan management probe
15. Return temperature probe
16. 3-bar safety valve
17. Pressure sensor
18. Air-purging device
19. 3-speed circulation pump
20. Discharge cock
21. Automatic by-pass
22. Motorised 3-way valve

- S** Condensate drain
G Gas
M CH system flow
RB Return ater cylinder return
R CH system return
MB Flow to water cylinder

fig. 7

Model KR



1. Condensate trap
 2. Modulating gas valve
 3. Flow temperature twin probe
 4. Modulating fan
 5. Primary condensing exchanger
 6. Air-purging device
 7. Air intake duct
 8. Flue gas venting duct
 9. Flue gas analysis ports
 10. Flue gas thermostat on venting duct
 11. Flue gas thermostat on exchanger
 12. Ignition/detection electrode
 13. Expansion vessel
 14. Fan management probe
 15. Return temperature probe
 16. 3-bar safety valve
 17. Pressure sensor
 18. Air-purging device
 19. 3-speed circulation pump
 20. Discharge cock
 21. Automatic by-pass
- S** Condensate drain
G Gas
M CH system flow
F Cold water (from water mains)
R CH system return

fig. 8

2.4. Operating data

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

KC 12

Fuel type	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 ₂ value [%]
		min.	max.	min.	max.	min.	max.				
Natural gas G20	12.0	1.8	11.6	2.1	12.6	1.8	18.6	20	3.05	-	9.0 ÷ 9.3
Propane Gas G31	12.0	1.8	11.6	2.1	12.6	1.8	18.6	37	2.50	-	10.0 ÷ 10.3

Table 5 - KC 12 adjustment rates

Domestic hot water supply ΔT 45°C = 5.7 l/min
 Domestic hot water supply ΔT 40°C = 6.5 l/min
 Domestic hot water supply ΔT 35°C = 7.4 l/min

Domestic hot water supply ΔT 30°C = 8.6 l/min *
 Domestic hot water supply ΔT 25°C = 10.3 l/min *
***Note: water mixed at cock**

KC 24

Fuel type	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 ₂ value [%]
		min.	max.	min.	max.	min.	max.				
Natural gas G20	23.7	2.7	22.9	3.2	24.9	3.0	27.4	20	3.7	-	9.0 ÷ 9.3
Propane Gas G31	23.7	2.7	22.9	3.2	24.9	3.0	27.4	37	3.0	-	10.0

Table 6 - KC 24 adjustment rates

Domestic hot water supply ΔT 45°C = 8.9 l/min
 Domestic hot water supply ΔT 40°C = 10 l/min
 Domestic hot water supply ΔT 35°C = 11.5 l/min

Domestic hot water supply ΔT 30°C = 13.4 l/min
 Domestic hot water supply ΔT 25°C = 16.1 l/min
***Note: water mixed at cock**

KC 28

Fuel type	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 ₂ value [%]
		min.	max.	min.	max.	min.	max.				
Natural gas G20	26.4	3.0	25.4	3.6	27.9	3.0	29.2	20	4.0	-	9.0 ÷ 9.3
Propane Gas G31	26.4	3.0	25.4	3.6	27.9	3.0	29.2	37	3.3	-	10.0 ÷ 10.3

Table 7 - KC 28 adjustment rates

Domestic hot water supply ΔT 45°C = 10.3 l/min

Domestic hot water supply ΔT 40°C = 11.6 l/min

Domestic hot water supply ΔT 35°C = 13.3 l/min

Domestic hot water supply ΔT 30°C = 15.5 l/min

Domestic hot water supply ΔT 25°C = 18.6 l/min

***Note: water mixed at cock**

KC 32

Fuel type	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 ₂ value [%]
		min.	max.	min.	max.	min.	max.				
Natural gas G20	30.4	3.9	29.4	4.4	32.3	3.9	33.4	20	4.45	-	9.0 ÷ 9.3
Propane Gas G31	30.4	3.9	29.4	4.4	32.3	3.9	33.4	37	3.55	7.2	10.0

Table 8 - KC 32 adjustment rates

Domestic hot water supply ΔT 45°C = 10.8 l/min

Domestic hot water supply ΔT 40°C = 12.2 l/min

Domestic hot water supply ΔT 35°C = 13.0 l/min

Domestic hot water supply ΔT 30°C = 16.2 l/min

Domestic hot water supply ΔT 25°C = 19.5 l/min

***Note: water mixed at cock**

KRB 12 - KR 12

Fuel type	CH max. heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Diaphragm diameter [mm]	Flue gas CO ₂ value [%]
		min	max	min	max				
Natural gas G20	12.0	1.8	11.6	2.1	12.6	20	3.05	-	9.0 ÷ 9.3
Propane Gas G31	12.0	1.8	11.6	2.1	12.6	37	2.50	-	10.0 ÷ 10.3

Table 9 - KRB-KR 12 adjustment rates

KRB 24 - KR 24

Fuel type	CH max. heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Diaphragm diameter [mm]	Flue gas CO ₂ value [%]
		min	max	min	max				
Natural gas G20	23.7	2.7	22.9	3.2	24.9	20	3.7	-	9.0 ÷ 9.3
Propane Gas G31	23.7	2.7	22.9	3.2	24.9	37	3.0	-	10.0

Table 10 - KRB-KR 24 adjustment rates

KRB 28 - KR 28

Fuel type	CH max. heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Diaphragm diameter [mm]	Flue gas CO ₂ value [%]
		min	max	min	max				
Natural gas G20	26.4	3.0	25.4	3.6	27.9	20	4.0	-	9.0 ÷ 9.3
Propane Gas G31	26.4	3.0	25.4	3.6	27.9	37	3.3	-	10.0 ÷ 10.3

Table 11 - KRB-KR 28 adjustment rates

KRB 32 - KR 32

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

Table 12 - KRB-KR 32 adjustment rates

2.5. General characteristics

MODEL		12 kW	24 kW	28 kW	32 kW
Device category	-	I12H3P	I12H3P	I12H3P	I12H3P
Minimum CH system pressure	bar	0.5	0.5	0.5	0.5
Maximum CH system pressure	bar	3.0	3.0	3.0	3.0
DHW system min. pressure (KC)	bar	0.5	0.5	0.5	0.5
DHW system max. pressure (KC)	bar	6.0	6.0	6.0	6.0
DHW specific flow rate (Δt 30K) (KC)	l/min	8.6	13.4	15.5	16.2
Electric power supply – voltage / frequency	V - Hz	230 - 50	230 - 50	230 - 50	230 - 50
Power mains supply fuse	A	3.15	3.15	3.15	3.15
Maximum power consumption	W	151	151	151	151
Electric protection rating	IP	X5D	X5D	X5D	X5D
Net weight (KC)	kg	29.8	30.5	32	38
Net weight (KRB)	kg	28.8	29.5	31	37
Net weight (KR)	kg	28.3	29	30.5	36.5
Natural gas consumption at maximum CH output (*)	m ³ /h	1.27	2.51	2.79	3.22
Propane gas consumption at maximum CH output	kg/h	0.93	1.84	2.05	2.36
Max CH working temperature	°C	83	83	83	83
Max DHW working temperature (mod. KC)	°C	62	62	62	62
Max DHW working temperature (mod. KR and KRB with optional water cylinder)	°C	65	65	65	65
Total capacity of expansion vessel	l	10	10	10	10
Maximum recommended system capacity (**)	l	200	200	200	200

Table 13 - General specifications, KC/KRB/KR model

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

(**) Maximum water temperature 83°C, expansion vessel pressure 1 bar

KC 12/KRB 12/KR 12		Max. output	Min. output	30% load
Casing heat loss with burner on	%	0.26	7.78	-
Casing heat loss with burner off	%	0.55		
Flue system heat loss with burner on	%	2.64	1.92	-
Flue system mass capacity	g/s	8.25	0.89	-
Flue gas temp. – air temp.	°C	57.9	34.5	-
Maximum heat output efficiency rating (60/80°C)	%	97.1	-	-
Maximum heat output efficiency rating (30/50°C)	%	105.1	-	-
Minimum heat output efficiency rating (60/80°C)	%	-	90.3	-
Minimum heat output efficiency rating (30/50°C)	%	-	105.0	-
30% heat output efficiency rating	%	-	-	106.0
Efficiency rating (according to 92/42/EC)	-	★★★★		
NO _x emission class	-	5		

Table 14 - Combustion specifications, KC 12/KRB 12/KR 12 model

KC 24/KRB 24/KR 24		Max. output	Min. output	30% load
Casing heat loss with burner on	%	0.97	6.49	-
Casing heat loss with burner off	%	0.28		
Flue system heat loss with burner on	%	2.62	2.09	-
Flue system mass capacity	g/s	12.43	1.33	-
Flue gas temp. – air temp.	°C	61	33	-
Maximum heat output efficiency rating (60/80°C)	%	96.7	-	-
Maximum heat output efficiency rating (30/50°C)	%	105.1	-	-
Minimum heat output efficiency rating (60/80°C)	%	-	91.4	-
Minimum heat output efficiency rating (30/50°C)	%	-	104.9	-
30% heat output efficiency rating	%	-	-	106.5
Efficiency rating (according to 92/42/EC)	-	★★★★		
NO _x emission class	-	5		

Table 15 - Combustion specifications, KC 24/KRB 24/KR 24 model

KC 28/KRB 28/KR 28		Max. output	Min. output	30% load
Casing heat loss with burner on	%	1.4	5.7	-
Casing heat loss with burner off	%	0.25		
Flue system heat loss with burner on	%	2.4	2.0	-
Flue system mass capacity	g/s	13.93	1.47	-
Flue gas temp. – air temp.	°C	60	45	-
Maximum heat output efficiency rating (60/80°C)	%	96.4	-	-
Maximum heat output efficiency rating (30/50°C)	%	105.5	-	-
Minimum heat output efficiency rating (60/80°C)	%	-	92.3	-
Minimum heat output efficiency rating (30/50°C)	%	-	104.5	-
30% heat output efficiency rating	%	-	-	107
Efficiency rating (according to 92/42/EC)	-	★★★★		
NO _x emission class	-	5		

Table 16 - Combustion specifications, KC 28/KRB 28/KR 28 model

KC 32/KRB 32/KR 32		Max. output	Min. output	30% load
Casing heat loss with burner on	%	0.99	5.06	-
Casing heat loss with burner off	%	0.22		
Flue system heat loss with burner on	%	2.61	2.04	-
Flue system mass capacity	g/s	15.81	1.87	-
Flue gas temp. – air temp.	°C	60	40.5	-
Maximum heat output efficiency rating (60/80°C)	%	96.8	-	-
Maximum heat output efficiency rating (30/50°C)	%	106.2	-	-
Minimum heat output efficiency rating (60/80°C)	%	-	92.9	-
Minimum heat output efficiency rating (30/50°C)	%	-	104.8	-
30% heat output efficiency rating	%	-	-	108.3
Efficiency rating (according to 92/42/EC)	-	★★★★		
NO _x emission class	-	5		

Table 17 - Combustion specifications, KC 32/KRB 32/KR 32 model

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

Boiler is shipped in a sturdy cardboard box.

Remove boiler from cardboard box 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.

Packaging includes:

- the hydraulic kit with copper pipes for boiler connection to gas mains, to CH (all models) and DHW systems (model KC);
- gas and water cocks kit (only for model KRB)
- a wall bracket;
- a bag containing:
 - a) boiler installation, use and maintenance manual;
 - b) the template for mounting boiler on a wall (fig. 9);
 - c) two screws and relevant wall blocks for fixing the metal plate to the wall;

3.2.2. Choosing where to install the boiler

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

- instructions from section 3.2.6. "Air intake and flue gas venting system" and relevant sub paragraphs;
- check the wall for sturdiness, avoiding weak areas;
- do not install the boiler over appliances which may affect boiler operation (e.g. cookers, which produce steam and grease, washing machines etc.);

3.2.3. Positioning the boiler

Each boiler is supplied with a paper template (fig. 9), found inside the packaging.

The template allows you to ensure that the pipes connected to the central heating system, the domestic hot water system and the gas mains, and the air intake/flue gas venting pipes are all laid out correctly during the realisation of the water system and before installation of the boiler.

The template is made of heavy-duty paper, it is to be affixed to the wall where the boiler is to be mounted using a carpenter's level. It provides all the indications required to drill the boiler mounting holes to the wall, procedure which is done using two screws and wall blocks.

The lower area of the template shows where to mark the exact point at which the couplings are to be positioned for boiler connection to the gas supply pipe, cold water mains supply pipe, hot water outlet, CH flow and return pipes.

The upper area of the template shows where air intake and flue gas ducts are to be positioned.



Since the temperature of the walls on which the boiler is mounted and external temperature of coaxial air/flue gas system do not exceed 60°C, no minimum distance from flammable walls is to be accounted for. For boilers with split air intake and flue gas venting ducts, in the case of proximity with flammable walls and passages through walls, apply insulating material between the wall and the flue gas venting pipe.

3.2.4. Installing the boiler



Before connecting the boiler to CH and DHW systems, 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.

In order to install the boiler proceed as follows:

- secure the template (fig. 9) to the wall;
- drill two Ø 12 mm holes in the wall to accommodate the boiler bracket wall blocks;
- if necessary, provide holes in the wall to allow air intake and/or flue gas venting pipes to pass through it;
- secure the supporting bracket to the wall using the blocks supplied with the boiler;
- position the connections for the gas mains pipe (**G**), the cold water inlet pipe (**F**), the secondary return from the water cylinder (**RB**) (only model KRB), the hot water outlet pipe (**C**) (only model KC), the secondary flow to the water cylinder (**MB**) (only model KRB), the hot water inlet pipe (**M**) and return pipe (**R**), as indicated at the bottom of the template;
- provide an outlet for the condensate drain and one for the 3-bar safety valve;
- hook boiler to supporting bracket;
- connect the boiler to mains pipes by means of the coupling kit supplied with the boiler (refer to 3.2.9. paragraph);
- connect the boiler to pipe for condensate drain (refer to 3.2.9. paragraph);
- provide a system for relieving the 3-bar safety valve;
- connect the boiler to the air intake and flue gas venting system (refer to 3.2.6. paragraph and following sub-paragraphs);
- connect electric power supply, ambient thermostat (when available) and other available accessories (refer to the following paragraphs).

3.2.5. 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.

3.2.6. 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 exhaustion. Should an air/flue gas system malfunction occur, the safety devices will shutdown the boiler and the LCD will display the E03 code flashing. It is strictly forbidden to tamper with and/or prevent operation of such safety devices. Should the boiler repeatedly shutdown, it is necessary to have air/flue gas system ducts inspected, as they might be obstructed or inadequate to flue gas discharge 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 legislation and standards applicable 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.

Installation examples

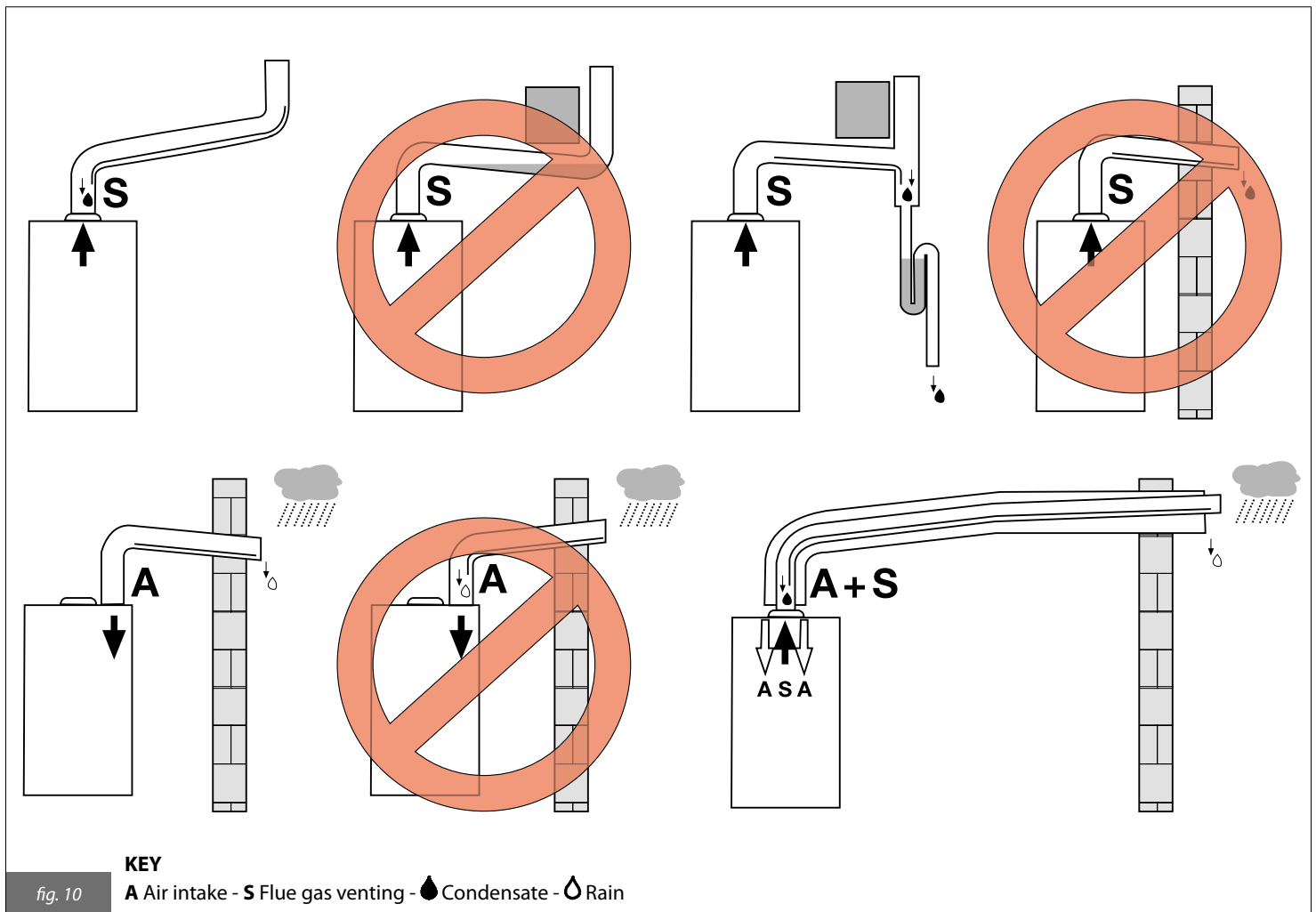


fig. 10

3.2.6.1. Configuration of air intake and flue gas venting ducts

Type B23

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.

Type B53

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.

Type C13

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.

Type C33

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.

Type C43

Boiler intended for connection to collective chimney pipe system that includes two ducts, one for the air intake and the second for 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.

Type C53

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.

Type C83

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.

3.2.6.2. 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.

Type C13

KC 12 - KRB 12 - KR 12

Minimum permissible length of horizontal coaxial pipes is 1 meter.

Maximum permissible length of Ø100/60 mm horizontal coaxial pipes is 9 meters.

Maximum permissible length of Ø125/80 mm horizontal coaxial pipes is 13.5 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 air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

KC 24 - KRB 24 - KR 24

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 air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

KC 28 - KRB 28 - KR 28

Minimum permissible length of horizontal coaxial pipes is 1 meter.

Maximum permissible length of Ø100/60 mm horizontal coaxial pipes is 9 meters.

Maximum permissible length of Ø125/80 mm horizontal coaxial pipes is 13.5 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 air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

KC 32 - KRB 32 - KR 32

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 air intake duct is to be tilted down by 1% toward its exit, in order to avoid rain water to enter it.

The flow resistance of the first elbow shall not be taken into account to calculate maximum permissible length.

Type C33**KC 12 - KRB 12 - KR 12**

Minimum permissible length of vertical coaxial pipes is 1 meter.

Maximum permissible length of Ø 100/60 mm vertical coaxial pipes is 9 meters.

Maximum permissible length of Ø 125/80 mm vertical coaxial pipes is 13.5 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.

KC 24 - KRB 24 - KR 24

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 meter.

The roof vent terminal reduces maximum permissible length by 1.5 meters.

KC 28 - KRB 28 - KR 28

Minimum permissible length of vertical coaxial pipes is 1 meter.

Maximum permissible length of Ø 100/60 mm vertical coaxial pipes is 9 meters.

Maximum permissible length of Ø 125/80 mm vertical coaxial pipes is 13.5 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.

KC 32 - KRB 32 - KR 32

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.

3.2.6.3. Air intake and flue gas venting via 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**KC 12 - KRB 12 - KR 12**

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 152 meters (combined length of air intake and flue gas venting pipe).

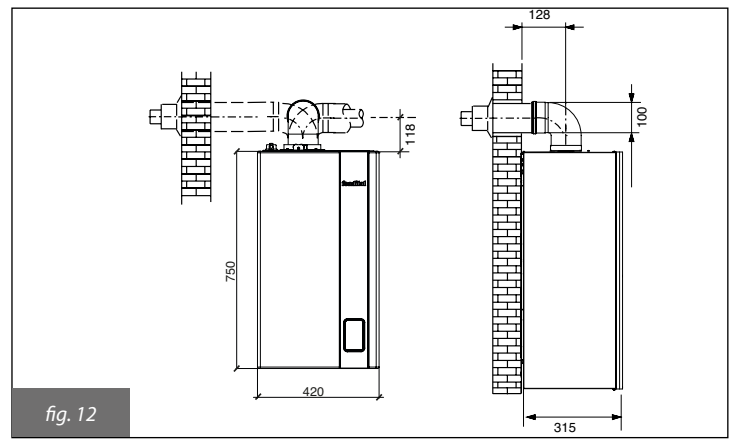
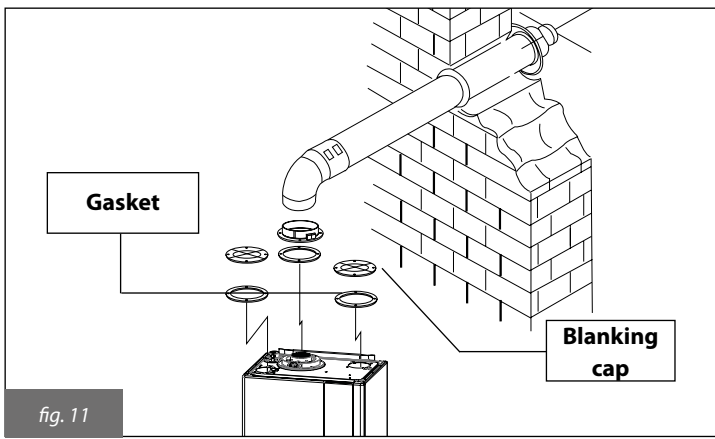
For each additional 1 meter of straight pipe maximum permissible length is to be reduced by 1 meter.

For each additional 90° elbow, maximum permissible length is to be reduced by 1 meter.

For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.

The roof terminal reduces maximum permissible length by 5 meters.

The wall terminal reduces maximum permissible length by 4.5 meters.



KC 24 - KRB 24 - KR 24

- 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 84 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 meter.
- For each additional 45° elbow, maximum permissible length is to be reduced by 0.5 meter.
- The roof terminal reduces maximum permissible length by 5.5 meters.
- The wall terminal reduces maximum permissible length by 5 meters.

KC 28 - KRB 28 - KR 28

- 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 91 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 5.5 meters.
- The wall terminal reduces maximum permissible length by 5.5 meters.

KC 32 - KRB 32 - KR 32

- 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 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.

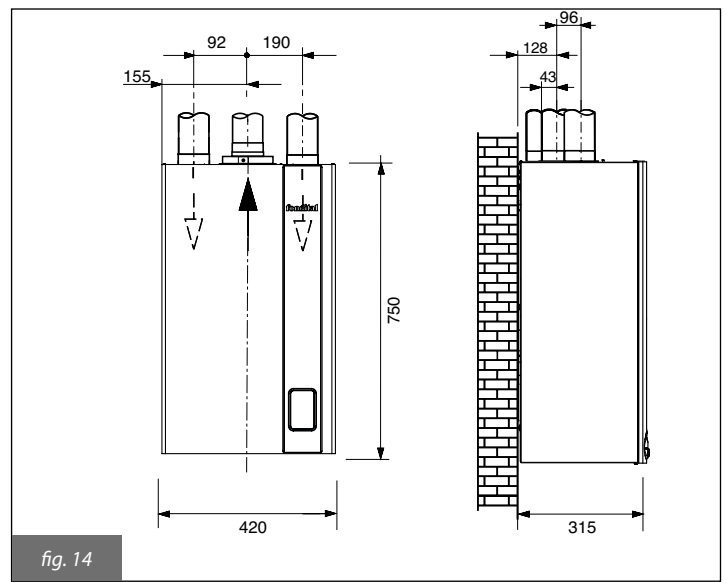
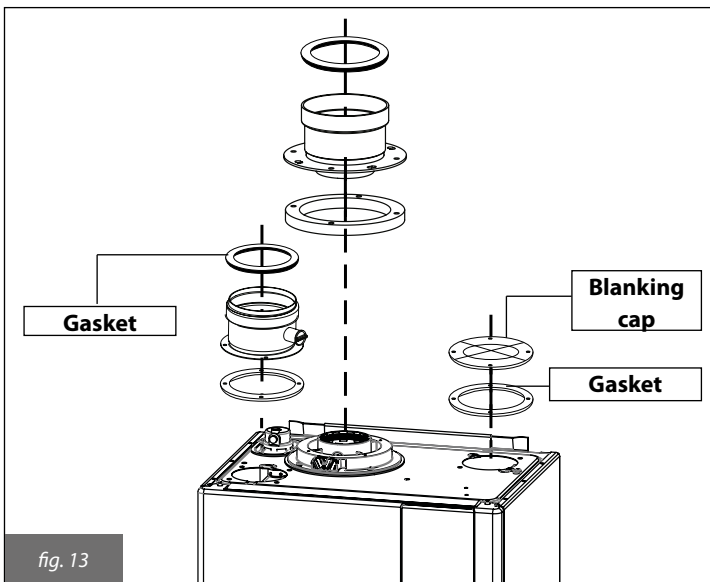
3.2.6.4. Air intake and flue gas venting via 60 mm split pipes

 **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

KC / KRB / KR 12 - KC / KRB / KR 24 - KC / KRB / KR 28 - KC / KRB / KR 32

- 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 39 meters for the KC / KRB / KR 12, 23 meters for the KC / KRB / KR 24 and KC / KRB / KR 28 models and of 20 meters for the KC / KRB / KR 32 model (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 air intake/flue gas venting terminal reduces maximum permissible length by 4.5 meters.



3.2.7. Checking combustion efficiency

3.2.7.1. 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 (12, fig. 1) and the fan speed indicate that the flue cleaning function is active. The display shows the flow temperature and the FLAME ON symbol (14, fig. 1), 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 (13, fig. 1,) (indicating that the parameter is being edited), the broom (12, fig. 1), the H letter (indicating Hertz), the speed set-point value in Hz, the fan current speed, and the 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 FLAME ON symbol and 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.

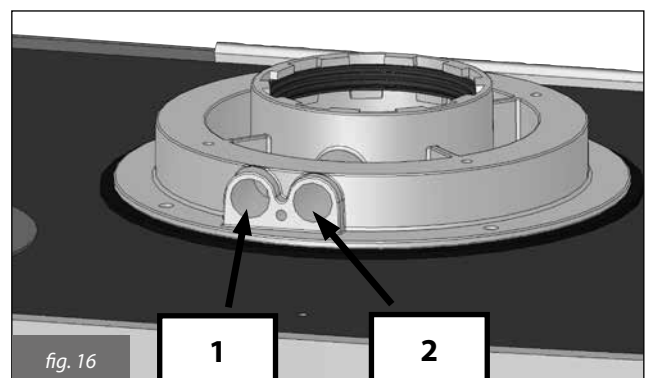
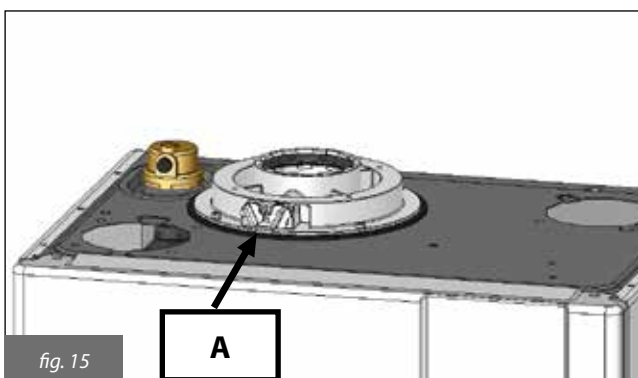
3.2.7.2. Measurement procedure

The boiler is equipped with a tower allowing for air intake/flue gas venting pipe connection (fig. 15 and 16). The tower is designed with two pre-arranged openings directly accessing air and flue gas ducts (fig. 16). Before starting combustion checking procedure, remove cap A from the pre-arranged openings on the tower (fig. 15).

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

- assess combustion air from no. 1 opening (fig. 16);
- assess flue gas temperature and CO₂ from no. 2 opening (fig. 16).

Allow boiler to reach working temperature before taking any measurement.




3.2.8. Connection to gas mains

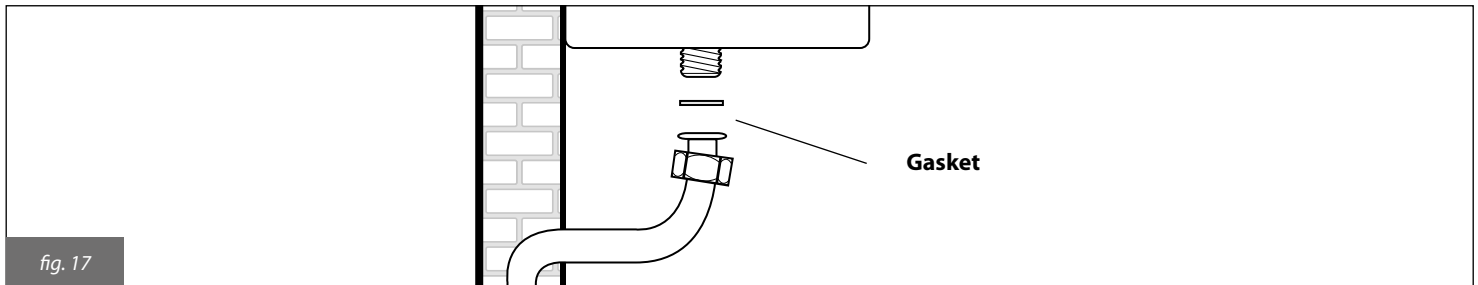
Gas supply pipe cross-section must be equal or greater than boiler gas pipe.

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. 17).
The boiler gas inlet coupling is **NOT** suitable for hemp, teflon tape or similarly made gaskets.



3.2.9. Hydraulic connections

Prior to installing the boiler, the hydraulic system is to be cleaned in order to remove impurities; they could be present in system components and damage the pump and the heat exchanger.

HEATING

The CH outlet and return pipes must be connected to the respective 3/4" connectors (**M** and **R**) on the boiler (see fig. 3, 4 and 5).


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 (model KC)

Cold water inlet and DHW outlet shall be connected to the boiler through the special 1/2" **C** and **F** fittings (fig. 3).

Hardness of water supplied to the boiler may increase the plate heat exchanger cleaning/replacement intervals.

 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.

DOMESTIC HOT WATER and EXTERNAL WATER CYLINDER (model KRB)

Model **KRB**: return and flow to the cylinder shall be connected to the boiler through the corresponding 1/2" **MB** and **RB** fittings (fig. 4) which in fig. 9 are indicated with letters **C** and **F**.

 In model **KRB** water from **MB** connection (fig. 4) must not be discharged into the DHW distribution system.

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 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 shall not be held responsible in case of damage to people, animals, or property due to failure to follow the above mentioned 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 230V-50Hz electrical power supply.

When connecting the boiler 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 ground the system correctly: gas, water, or CH system pipes are not suitable for grounding power networks.

3.2.11. Selecting the operating range in heating mode

Heating water temperature adjustment range depends on the selected operating range:

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

The standard range is active with curves ≥ 1 , while the reduced range is active with curves < 1 .

Curves can be selected via the parameter P10. 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	$< 40^{\circ}\text{C}$ (P27)
Reduced range	$< 20^{\circ}\text{C}$

Table 18 - Boiler re-ignition temperatures

Operation range selection is to be implemented by an 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. 23, 27 and 30), 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 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.

The Remote Control cables must be connected to terminals **3** and **4** of the electronic board (fig. 23, 27 and 30).

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 the 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 settings 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 19 and 20).

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 12 kW nat. gas	Default 12 kW propane	Default 24 kW nat. gas	Default 28 kW nat. gas	Default 24 kW propane	Default 28 kW propane	Default 32 kW nat. gas	Default 32 kW propane
P0 - TSP0 Boiler type and default data chart	1 - 7	0	5	1	2	3	4	6	7
P4 - TSP4 Fan speed at burner maximum output (DHW)	TSP5 ÷ 250 Hz	187 Hz	185 Hz	199 Hz	201 Hz	192 Hz	198 Hz	210 Hz	205 Hz
P5 - TSP5 Fan speed at burner minimum output (DHW and heating)	25 ÷ 120 Hz	39 Hz	39 Hz	42 Hz	40 Hz	42 Hz	40 Hz	43 Hz	43 Hz
P6 - TSP6 Fan speed at ignition power and propagation	25 ÷ 160 Hz	48 Hz	48 Hz	58 Hz	60 Hz	58 Hz	60 Hz	76 Hz	76 Hz
P7 - TSP7 Upper limit for maximum CH heat output	10 ÷ 100 %	75%	74%	88%	87%	88%	87%	88%	88%
P8 - TSP8 Negative ramp start minimum starting speed	TSP5 ÷ TSP6 Hz	56	56	56	60	56	60	60	60
P9 - TSP9 Negative ramp time	0 ÷ 30 (1 = 10 sec.)	18	18	18	25	18	25	18	18
P10 - TSP10 Heating (thermoregulation) curves	0 ÷ 3	1,5	1,5	1.5	1.5	1.5	1.5	1.5	1.5

Table 19 - Limits to be set for TSP parameters and default values in relation to boiler type (TSP0)

3.2.14. Installation of the (optional) external probe and "sliding temperature" operation

The boiler can be connected to an (optional) external temperature probe (optional, provided by the manufacturer) 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 (fig. 23, 27 and 30).

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 virtual ambient temperature selected.

The virtual ambient temperature is set using "CH + and -" keys that, with the external temperature probe installed, no longer work to set the heating water temperature (see paragraph 1.8.6.) and the set value can be read on the Remote Control (if installed), through parameter TSP6.

Fig. 18 shows the curves for a virtual ambient temperature of 20°C. Editing parameter P10, the curves shift up or down, respectively, by the same amount.

With a virtual 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.

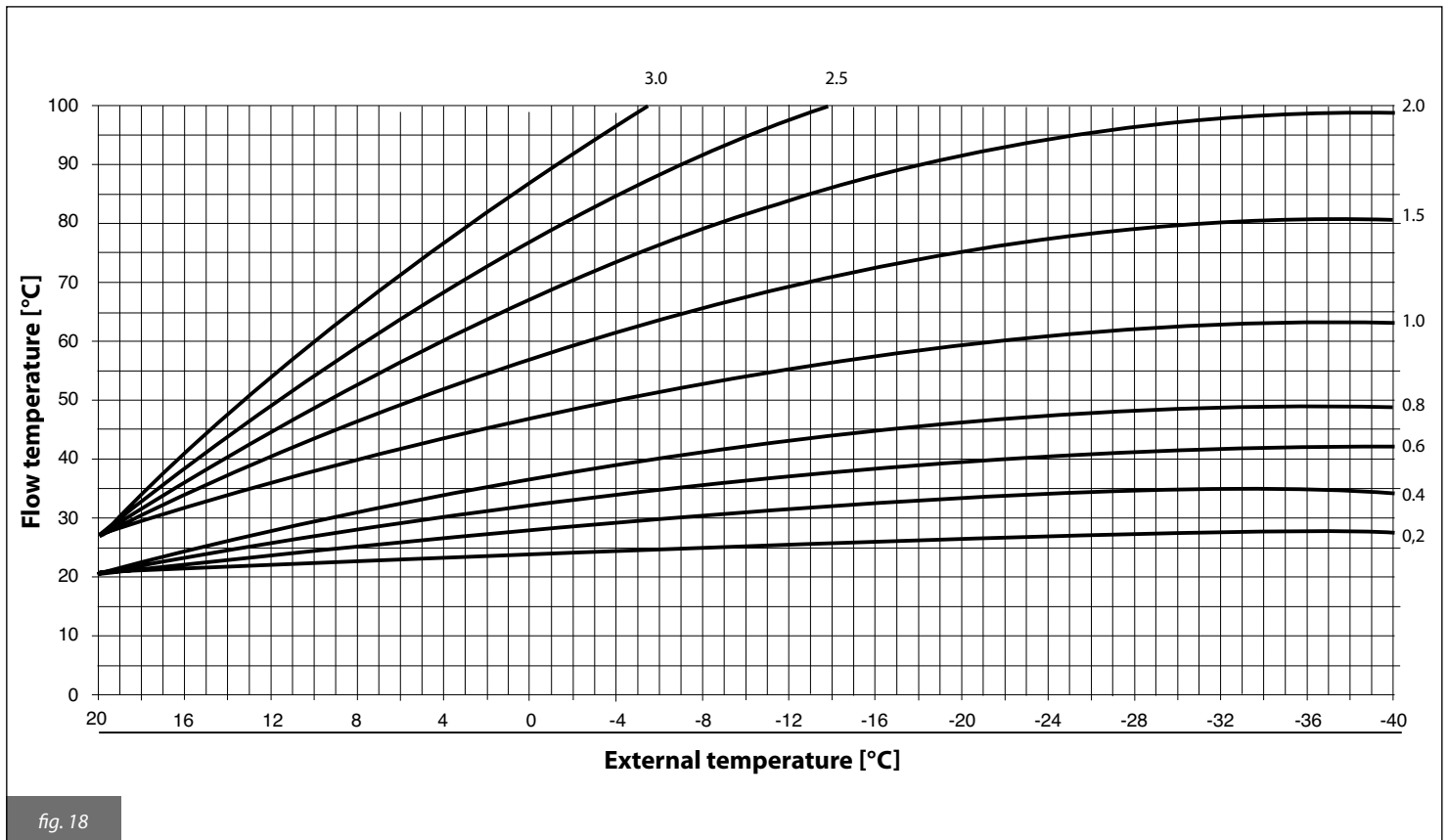


fig. 18

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

Parameter	Settable values	Default values	Notes	
P0 - TSP0 Boiler type selection	0, 1, 2, 3, 4, 5, 6, 7	Depending on the model	0 = 12 kW natural gas; 1 = 24 kW natural gas; 2 = 28 kW natural gas; 3 = 24 kW propane; 4 = 28 kW propane; 5 = 12 kW propane; 6 = 32 kW natural gas; 7 = 32 kW propane.	
P3 - TSP3 Boiler type selection	1 ÷ 3	Depending on the model	1 = combi instantaneous, 2 = heating only, 3 = with water cylinder	
P4 - TSP4 Fan speed at burner maximum output	Value of P5 ÷ 250 Hz	Depending on the model	187 = 12 kW natural gas; 199 = 24 kW natural gas; 201 = 28 kW natural gas; 192 = 24 kW propane; 198 = 28 kW propane; 185 = 12 kW propane; 210 = 32 kW natural gas; 205 = 32 kW propane.	
P5 - TSP5 Fan speed at burner minimum output	25 ÷ 120 Hz	Depending on the model	39 = 12 kW; 42 = 24 kW; 40 = 28 kW; 43 = 32 kW	
P6 - TSP6 Fan speed at ignition power	25 ÷ 160 Hz	Depending on the model	48 = 12 kW; 58 = 24 kW; 60 = 28 kW; 76 = 32 kW	
P7 - TSP7 Fan speed at heating maximum output	10 ÷ 100%	Depending on the model	75 = 12 kW; 88 = 24 and 32 kW; 87 = 28 kW	
P8 - TSP8 Negative ramp start minimum speed	P5 ÷ P6	Depending on the model	56 = 12 and 24 kW; 60 = 28 kW and 32 kW	
P9 - TSP9 Negative ramp time	0 ÷ 30 (1 = 10 sec.)	Depending on the model	18 = 12, 24 and 32 kW; 25 = 28 kW	
P10 - TSP10 Heating output curves	0 ÷ 3	1.5		
P11 - TSP11 Heating thermostat timing	0 ÷ 10 min.	4		
P12 - TSP12 CH power rising ramp timer	0 ÷ 10 min.	1		
P13 - TSP13 Timing of post-circulation, heating, anti-freeze, flue cleaning adjustable	30 ÷ 180 sec.	30		
P14 - TSP14 Setting of DHW standard or solar thermostats	0 ÷ 1	0	0 = normal 1 = solar	
P15 - TSP15 Anti water hammer delay settable	0 ÷ 3 sec.	0		
P16 - TSP16 Ambient thermostat reading delay / OT	0 ÷ 199 sec.	0		
P17 - TSP17 Multifunction relay setting	0 ÷ 3	0	0 = shutdown and failure; 1 = remote relay / TA1; 2 = solar relay; 3 = TA2 request	
Solar parameters (with P17=2 or with supplementary board)	P18 - TSP18 Solar plant type selection	0 ÷ 1	0	0 = solar valve; 1 = solar pump
	P19 - TSP19 Water cylinder set-point setting	10 ÷ 90 °C	60 °C	
	P20 - TSP20 ΔT ON (diff. solar pump ignition)	1 ÷ 30 °C	6 °C	
	P21 - TSP21 ΔT OFF (diff. solar pump shutdown)	1 ÷ 30 °C	3 °C	only with P18 = 1
	P22 - TSP22 Maximum collector temperature	80 ÷ 140 °C	120 °C	
	P23 - TSP23 Minimum collector temperature	0 ÷ 95 °C	25 °C	
	P24 - TSP24 Solar collector anti-freeze	0 ÷ 1	0	0 = anti-freeze not enabled; 1 = anti-freeze enabled (only with P18 = 1)
	P25 - TSP25 Solar load forcing	0 ÷ 1	0	0 = automatic operation; 1 = always enabled
	P26 - TSP26 Enabling of Water cylinder cooling	0 ÷ 1	0	0 = disabled; 1 = enabled (only with P18 = 1)
P27 - TSP27 Heating timer reset temperature	20 ÷ 78 °C		P10 < 1 (low temp.) = 20 °C P10 > 1 (high temp.) = 40 °C	
P29 - TSP29 Setting of default parameters (except P0, P1, P2, P17)	0 ÷ 1	0	0 = OFF; 1 = default	
Display only	P30 External temperature			only with external probe connected
	P31 Flow temperature			
	P32 Nominal calculated flow temperature			only with external probe connected
	P33 Set point of zone 2 flow temperature			only with at least one zone board connected

Display only	P34 Current zone 2 flow temperature			only with at least one zone board connected
	P36 Set point of zone 3 flow temperature			only with at least two zone boards connected
	P37 Current zone 3 flow temperature			only with at least two zone boards connected
	P39 Set point of zone 4 flow temperature			only with three zone boards connected
	P40 Current zone 4 flow temperature			only with three zone boards connected
	P42 DHW plate heat exchanger temperature			
	P43 Boiler return temperature			
	P44 Water cylinder temperature			only for models KR and KRB
	P45 Flue gas temperature			
	P46 Solar collector temperature			only with solar collector probe connected
	P47 Temperature of Water cylinder or solar valve from boiler			only with Water cylinder probe or solar valve connected
P48 Temperature of Water cylinder or solar valve from solar board			as above, but only with solar board connected	
P59 Type of temperature visualization on display	0 ÷ 7	0	0 = flow temp.; 3 = external temp.; 4 = Water cylinder temp.; 5 = solar coll. temp.; 6 = solar valve temp.; 7 = solar valve temp. from solar board	
P60 Number of additional boards connected	0 ÷ 4	0	Maximum 4 boards (3 zone + 1 solar)	
P61 Association between remote and ambient thermostats	00 ÷ 02	00	00 = zone 2 remote / TA2 zone 1; 01 = TA1 zone 2 / TA2 zone 1; 02 = TA2 zone 2 / zone 1 remote	
P62 Selection of zone 2 curve	0 ÷ 3	0.6	only with zone board connected	
P63 Zone 2 set-point	15 ÷ 35 °C	20 °C	only with zone board connected	
P66 Selection of zone 3 curve	0 ÷ 3	0.6	only with two zone boards connected	
P67 Zone 3 set-point	15 ÷ 35 °C	20 °C	only with two zone boards connected	
P70 Selection of zone 4 curve	0 ÷ 3	0.6	only with three zone boards connected	
P71 Zone 4 set-point	15 ÷ 35 °C	20 °C	only with three zone boards connected	
P74 Low temperature zone mixer valve opening time	0 ÷ 300 sec.	140 sec.	only with zone boards connected	
P75 Rise in nominal boiler temperature with zone board	0 ÷ 35 °C	5 °C	only with zone boards connected	
P76 Thermal discharge enabling with solar board	0 ÷ 1	0	0 = disabled; 1 = enabled	
P78 Interface back-lighting switching on	0 ÷ 2	0	0 = standard; 1 = LCD always on; 2 = LCD and keys always on	
System check	P80 Multifunction relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited
	P81 Zone 2 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited
	P82 Zone 2 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force in opening; 2 = force in closing
	P84 Zone 3 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited
	P85 Zone 3 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force in opening; 2 = force in closing
	P87 Zone 4 pump relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited
	P88 Zone 4 mixing valve forcing	0 ÷ 2	0	0 = standard function; 1 = force in opening; 2 = force in closing
	P91 Solar board relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited, solar valve opens on the solar water cylinder
	P92 Solar board valve relay forcing	0 ÷ 1	0	0 = standard function; 1 = relay excited, solar valve opens on the heat relief system

Table 20 - General table of TSP parameters

3.3. Filling the system

Once all boiler connections have been completed, CH system can be filled.

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

- gradually open the relevant filler cock (fig. 2), or the cock on the cold water supply pipe for models KRB/KR), checking any automatic bleeding valves installed in the system properly work;
- close all radiator air purging valves as soon as water starts coming out;
- check boiler water pressure gauge not to 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 water 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 (see paragraph 3.2.4.).

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 filling cock of the boiler (fig. 2) or the cock on the cold water supply pipe (for models KRB/KR).

The procedure is to be followed while the system is cold. Digital pressure gauge is used to read pressure inside the heating system.

WARNING

After long inactivity of the boiler, its pump may be stuck. Before starting up the boiler, make sure that the pump is 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 refitting the boiler casing ensure that all surfaces are properly dried.

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 (pressure 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 if necessary (see section 3.7. *Adaptation to other gas types and burner adjustment*): have this operation carried out 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 3-bar safety valve is not stuck;
- there are no water leaks;
- the pump has not seized;
- the condensate trap installed on the boiler is discharging condensate correctly and is not stuck.

WARNING

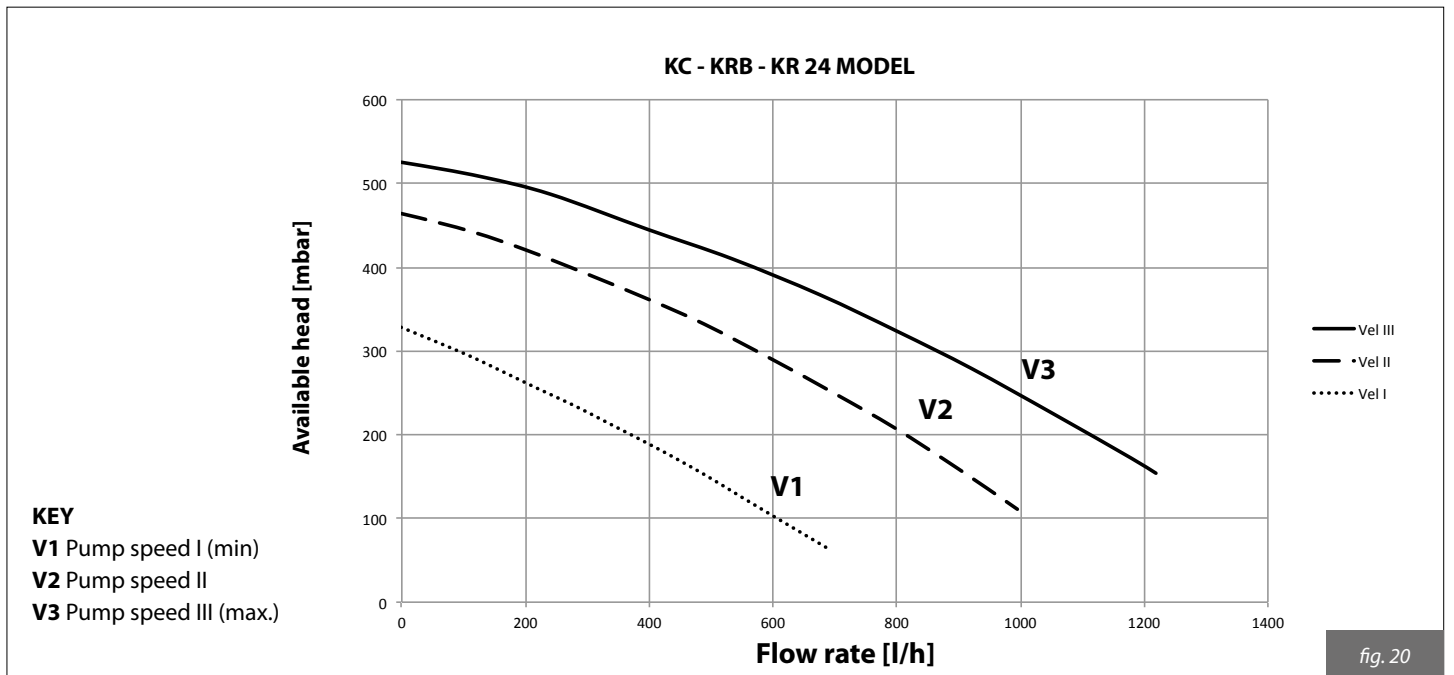
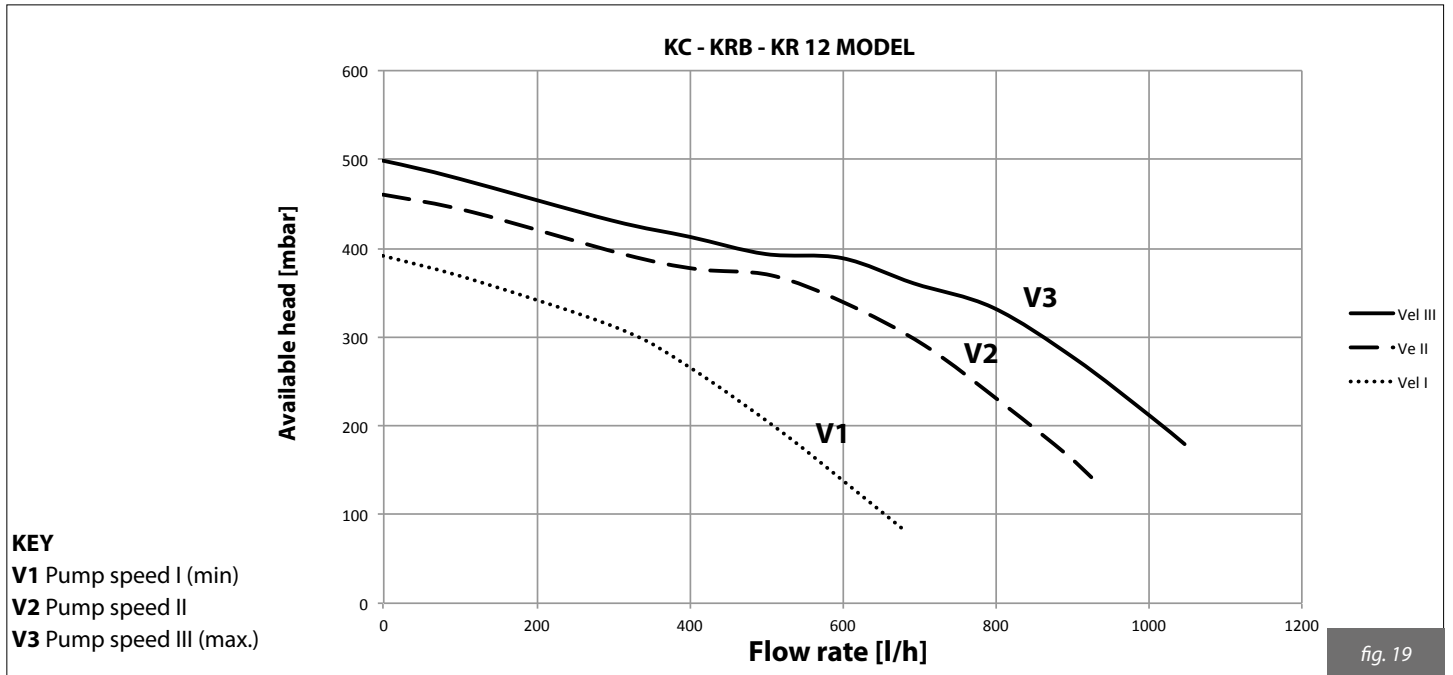
The boiler is equipped with a three-speed circulation pump; figures 19 to 22 show the different residual head values.

If you wish to set a different speed, taking into account the water circulation requirements in the boiler and the resistance properties of the system, check 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).

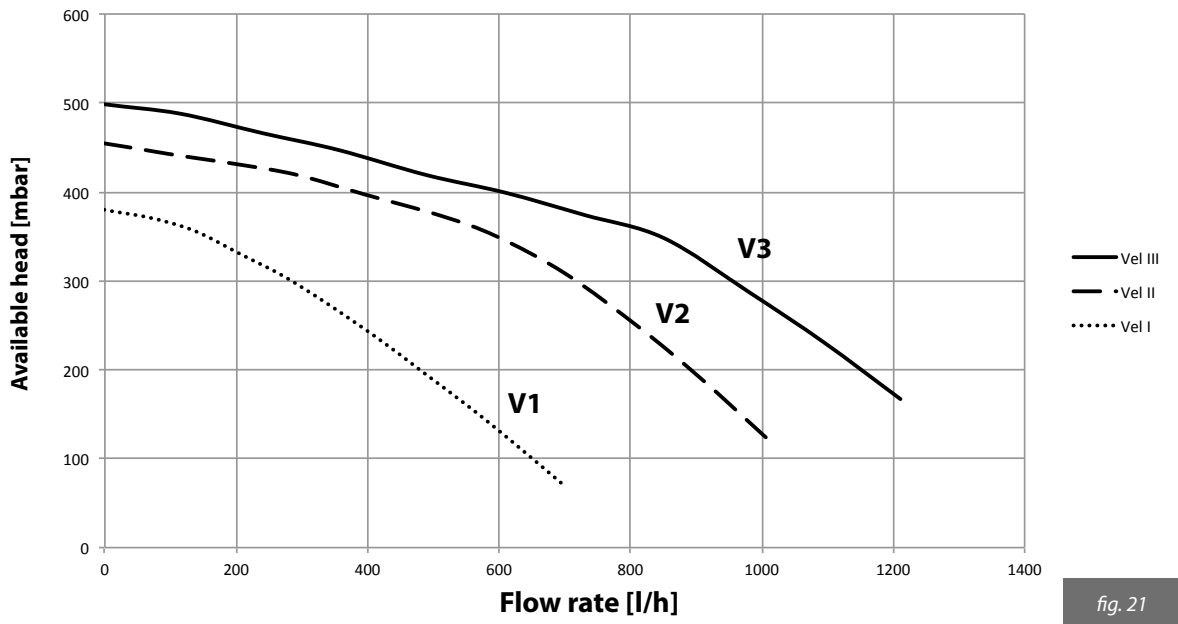
3.4.2. Switching on and switching off

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

3.5. Available head



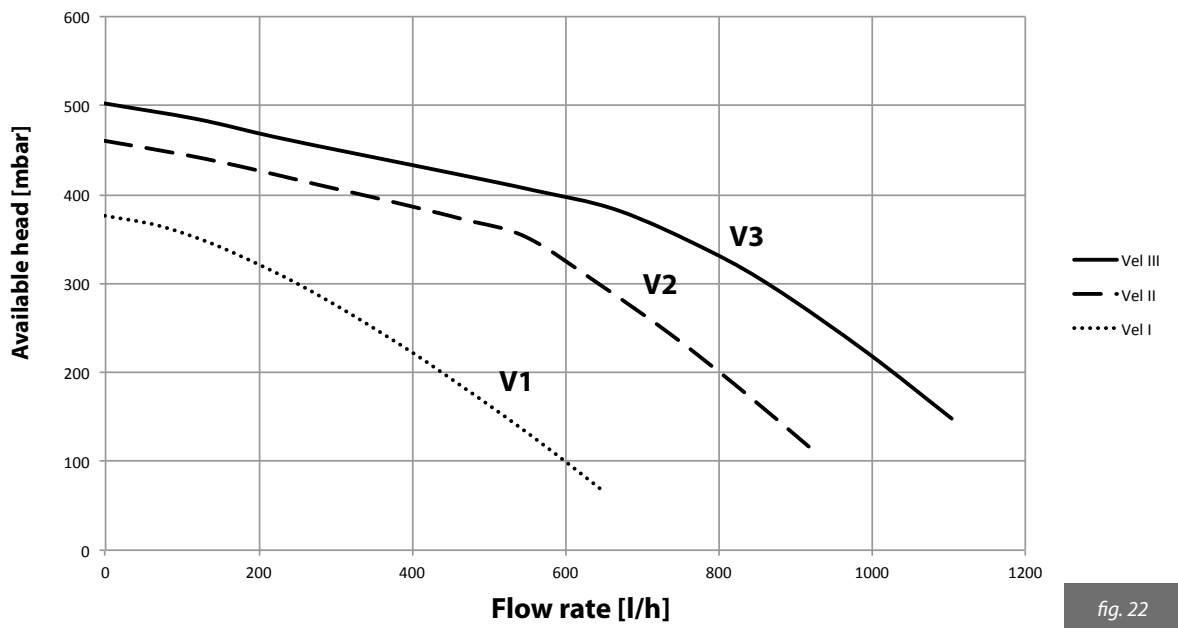
KC - KRB - KR 28 MODEL



KEY
V1 Pump speed I (min)
V2 Pump speed II
V3 Pump speed III (max.)

fig. 21

KC - KRB - KR 32 MODEL



KEY
V1 Pump speed I (min)
V2 Pump speed II
V3 Pump speed III (max.)

fig. 22

3.6. Wiring diagrams

MODEL KC

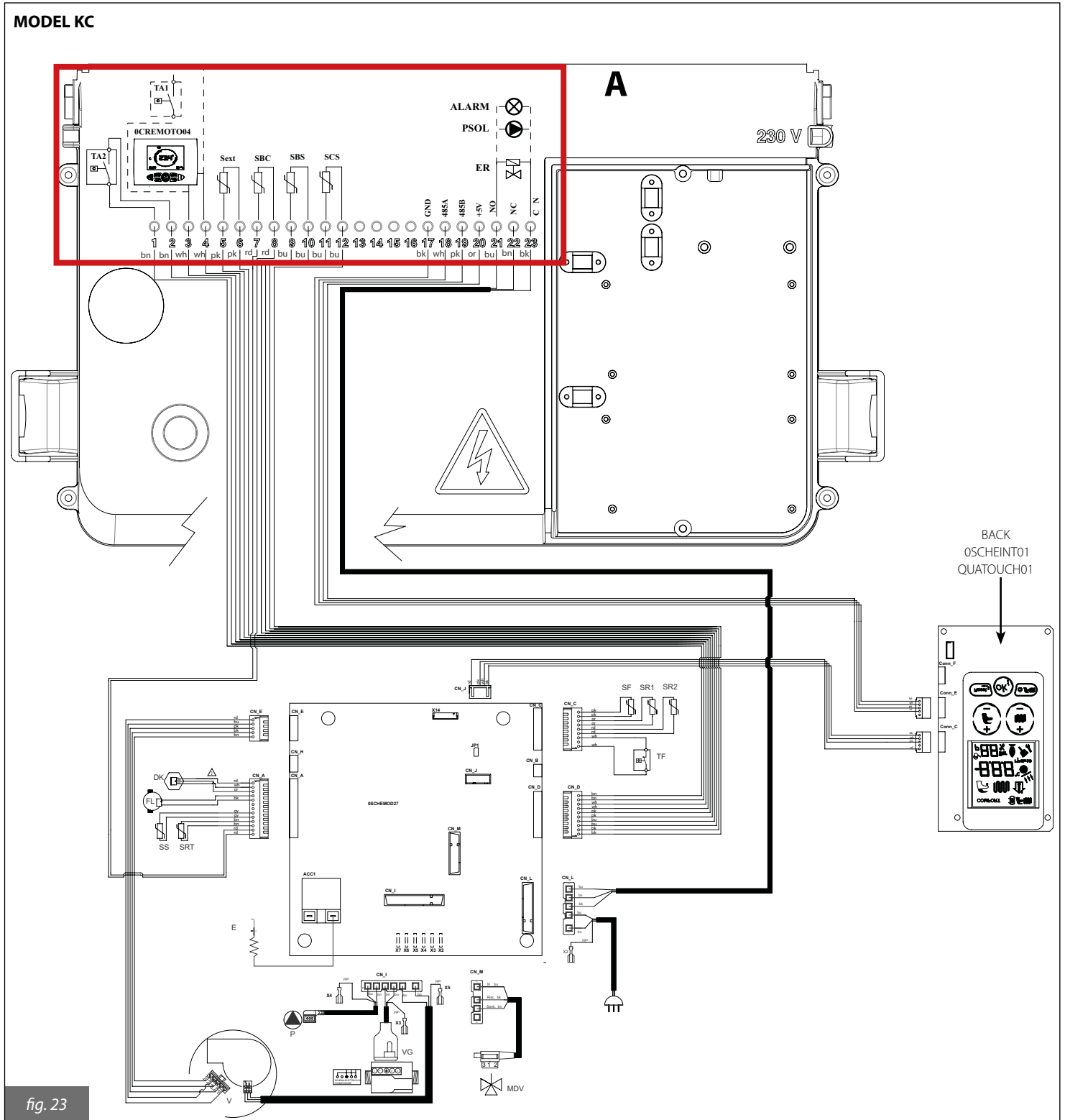
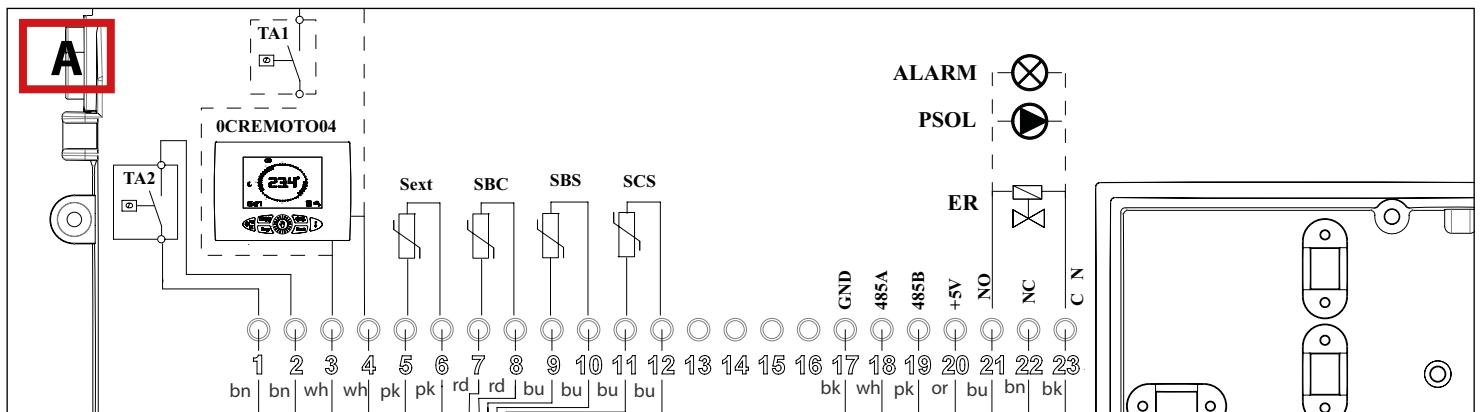


fig. 23



KEY

- 0SCHEMOD27:** boiler PCB
- 0SCHEINT00:** interface PCB
- DK:** analogue water pressure switch
- FL:** flow switch
- SS:** DHW OUT NTC probe 10 kOhm at 25 °C B=2435
- S3S:** DHW IN NTC probe 10 kOhm at 25 °C B=2435
- SRT:** return NTC probe 10 kOhm at 25 °C B=2435
- SR1-SR2:** heating NTC probe 10 kOhm at 25 °C B=2435
- SF:** flue NTC probe 10 kOhm at 25 °C B=2435

- TF:** flue gas thermostat
- VG:** gas valve
- P:** modulating circulator boiler pump
- MDV:** electric deviating valve
- E:** ignition/flame detection electrode
- V:** brushless fan
- ACC1:** ignition transformer
- CN_A-CN_M:** signal/load connectors
- X2-X7:** ground connectors
- 0CREMOTO04:** Opentherm Fondital remote control
- 0SONDAES01:** external probe to be used with Remote Control (p/n 0CREMOTO04, optional)

PANEL ELECTRICAL CONNECTIONS

- 1-2:** ambient thermostat contact 2
- 3-4:** ambient thermostat contact 1 or opentherm
- 5-6:** external probe
- 7-8:** boiler Water cylinder probe
- 9-10:** boiler solar probe
- 11-12:** solar collector probe
- 17:** serial input GND
- 18:** serial input 485A
- 19:** serial input 485B
- 20:** serial input +5V
- 21-22-23:** multifunctional relay contact (not potential free), 250V 1A: 21=NO (normally open); 22=NC (normally closed); 23=common

3.6.1. Wiring diagram for forced circulation solar system with combi boiler

Parameter setting		
P03	P17	P18
1	2	1

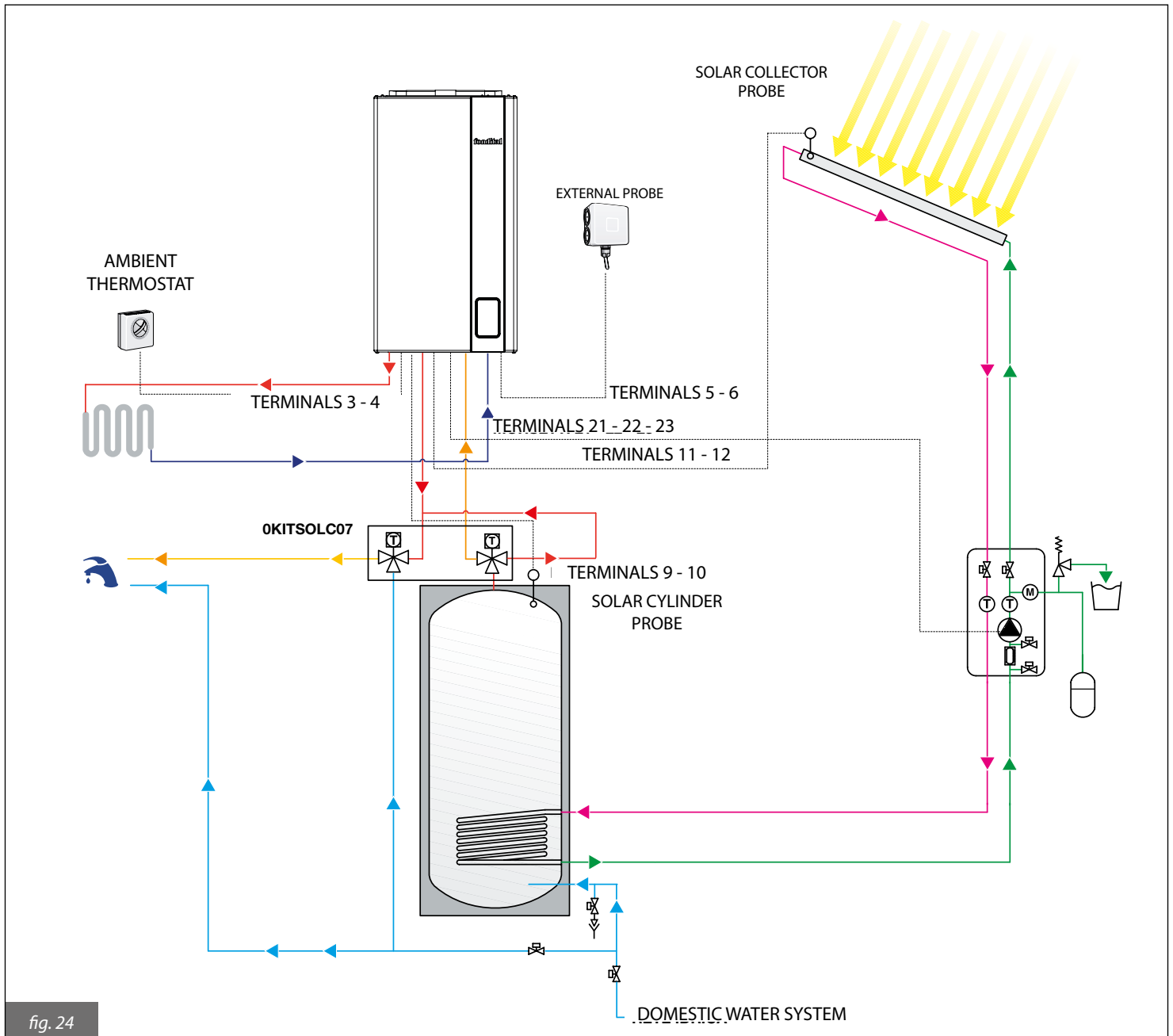
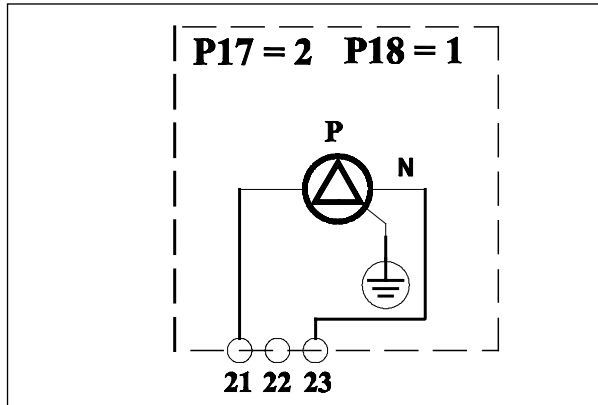


fig. 24

Multifunction relay connecting diagram



3.6.2. Solar collector anti-freeze function

Solar collector anti-freeze 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

3.6.3. 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 solar collector probe is between 110°C and 115°C (editable with parameter **P22**) and the temperature measured by the solar water cylinder probe is below 93 °C, solar pump is enabled to fill water cylinder. Solar pump operation is disabled as soon as solar collector temperature goes below 108 °C or solar water cylinder probe detects a temperature above 95°C.

3.6.4. Water cylinder cooling function

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

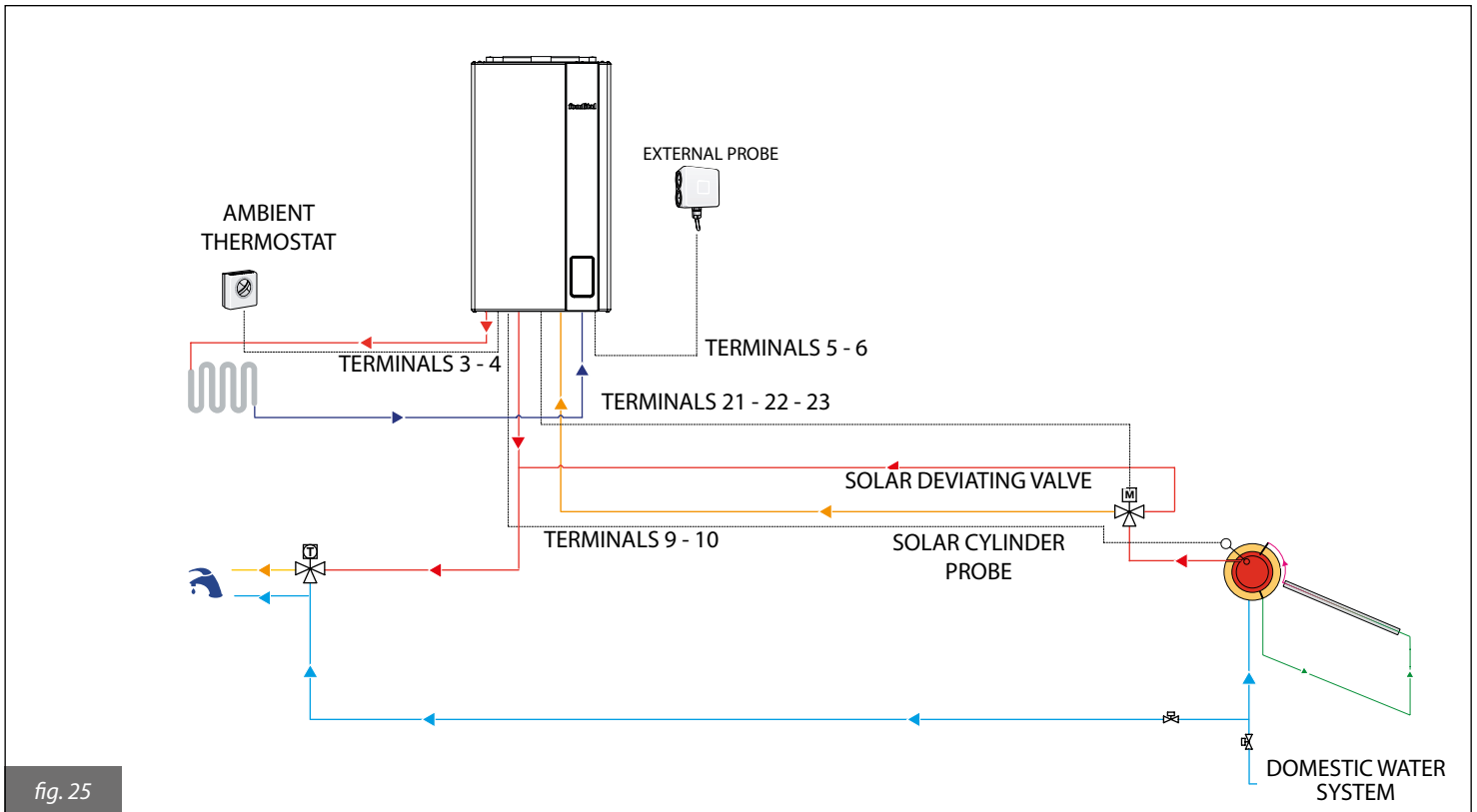
With the boiler in SUMMER, WINTER or CH ONLY mode, if water cylinder temperature is 2°C higher than set-point temperature and collector probe temperature is 6°C lower than solar water cylinder probe temperature (editable with parameter **P20**), solar pump is enabled to cool water cylinder. Function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

3.6.5. Solar mode operation and failure signal

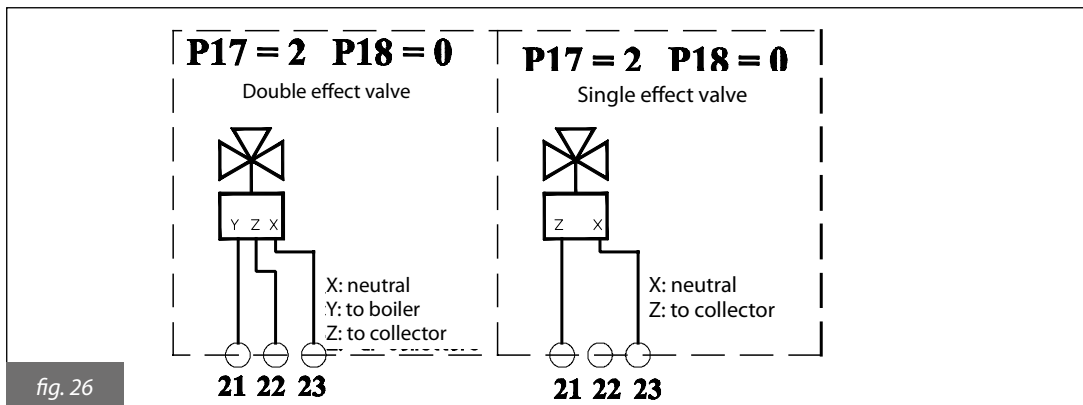
When solar pump is active, symbol  (11, fig.1) appears on the display. If solar collector probe or solar water cylinder probe are faulty, error codes **E24** and **E28** will be displayed, respectively. Solar pump will be turned off.

3.6.6. Wiring diagram for natural circulation solar system with combi boiler

Parameter setting		
P03	P17	P18
1	2	0



Multifunction relay connecting diagram



MODEL KRB

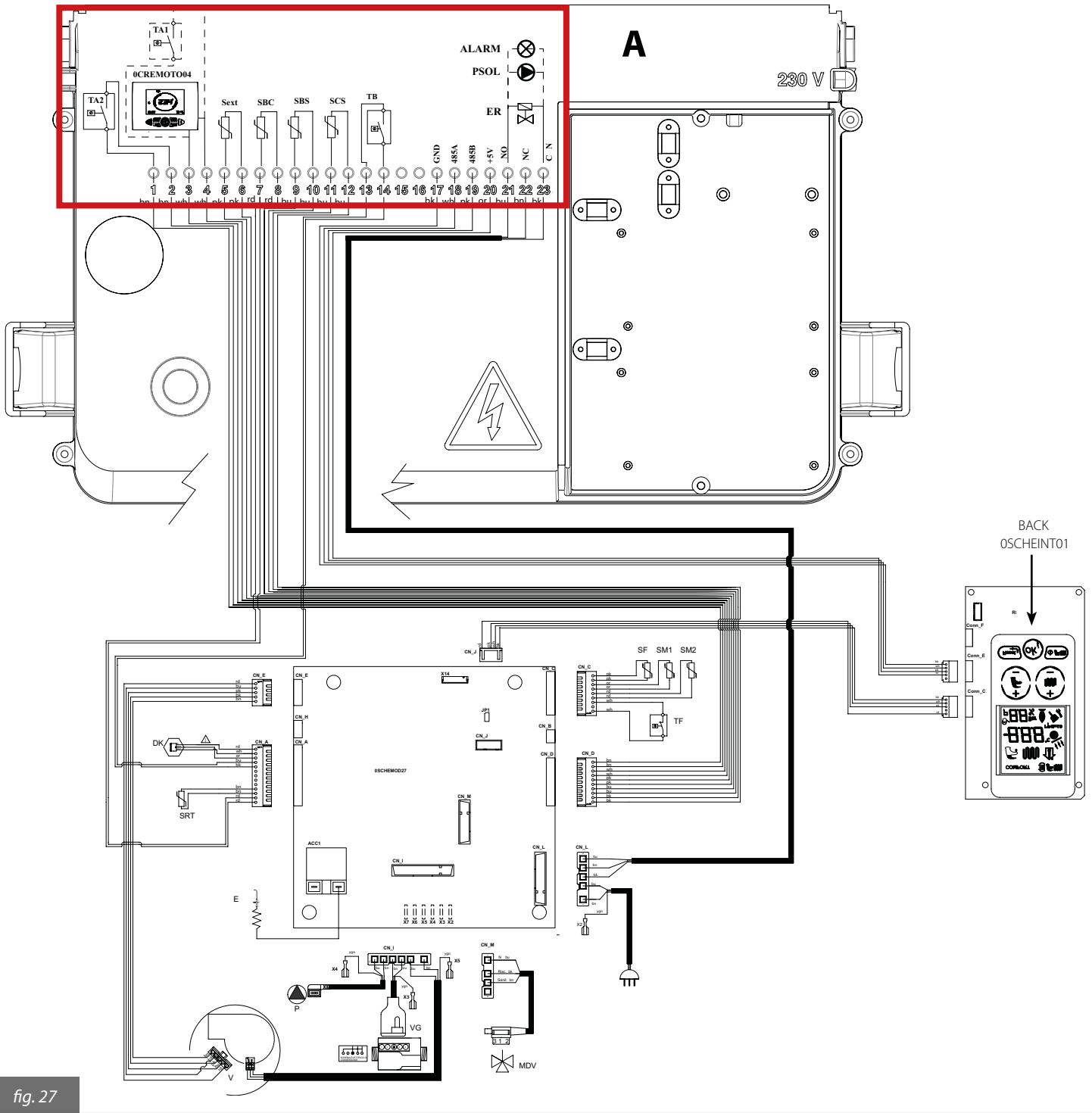
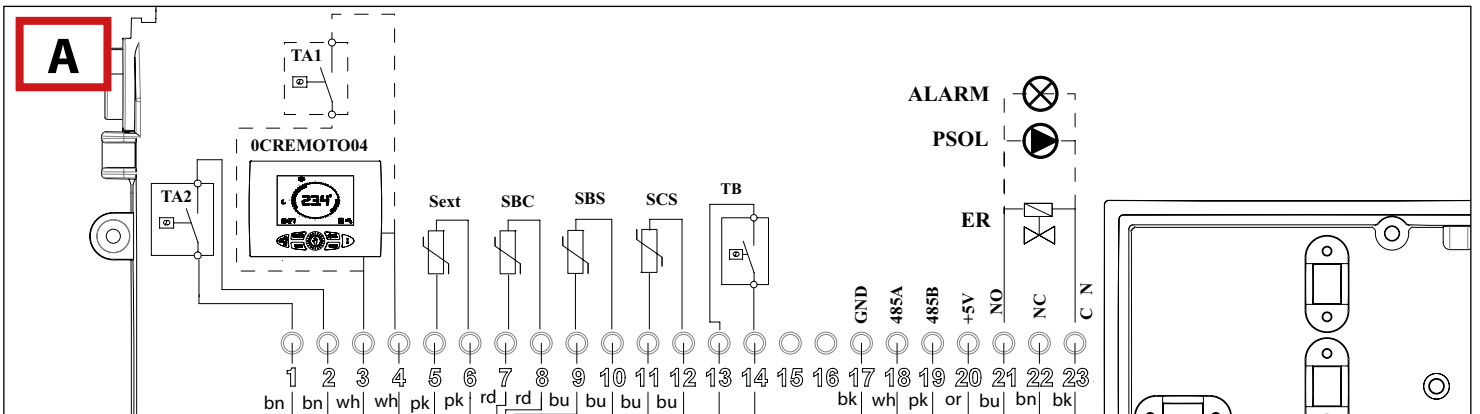


fig. 27



KEY

- OSCHEMOD27:** boiler PCB
- OSCHEINT00:** interface PCB
- DK:** analogue water pressure switch
- SRT:** return NTC probe 10 kOhm at 25 °C B=2435
- SM1-SM2:** heating NTC probe 10 kOhm at 25 °C B=2435
- SF:** flue NTC probe 10 kOhm at 25 °C B=2435
- TF:** flue gas thermostat
- VG:** gas valve
- P:** circulator boiler pump
- MDV:** electric deviating valve
- E:** ignition/flame detection electrode
- V:** brushless fan
- ACC1:** ignition transformer

- CN_A-CN_M:** signal/load connectors
- X2-X7:** ground connectors
- OCREMOTO04:** Opentherm Fondital remote control
- OSONDAES01:** external probe to be used with Remote Control (p/n 0CREMOTO04, optional)

- 17:** serial input GND
- 18:** serial input 485A
- 19:** serial input 485B
- 20:** serial input +5V
- 21-22-23:** multifunctional relay contact (not potential free), 250V 1A: 21=NO (normally open); 22=NC (normally closed); 23=common

PANEL ELECTRICAL CONNECTIONS

- 1-2:** ambient thermostat contact 2
- 3-4:** ambient thermostat contact 1 or opentherm
- 5-6:** external probe
- 7-8:** boiler Water cylinder probe
- 9-10:** boiler solar probe
- 11-12:** solar collector probe
- 13-14:** timer/cylinder thermostat if a water cylinder probe is not present

3.6.7. Wiring diagram for forced circulation solar system with CH only boiler

Parameter setting		
P03	P17	P18
3	2	1

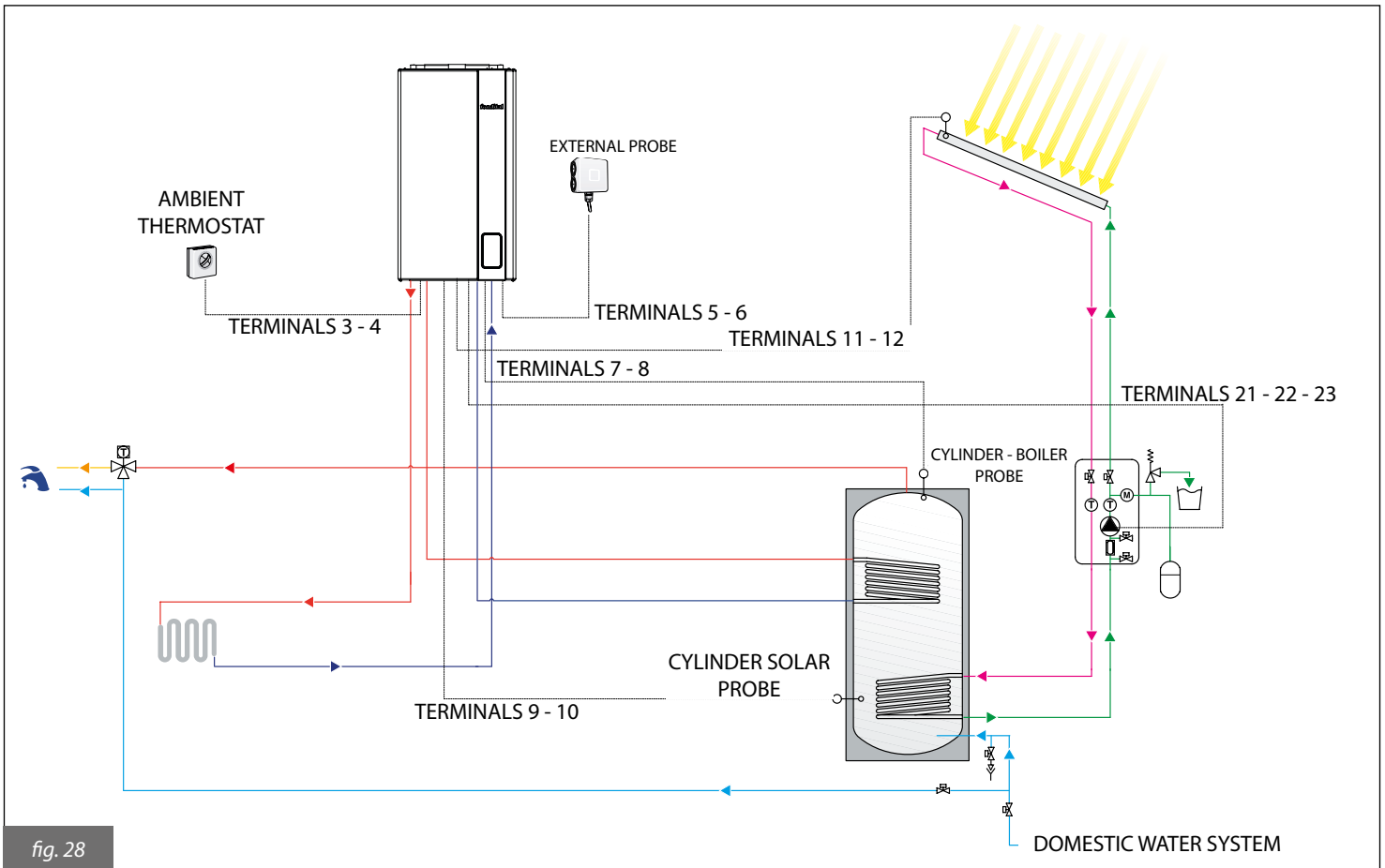


fig. 28

3.6.8. Multifunction relay connecting diagram

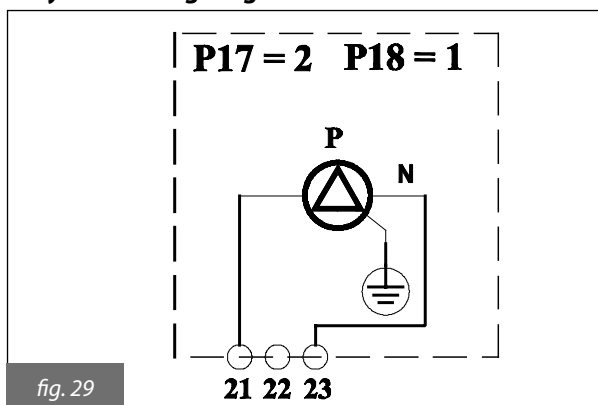


fig. 29

MODEL KR

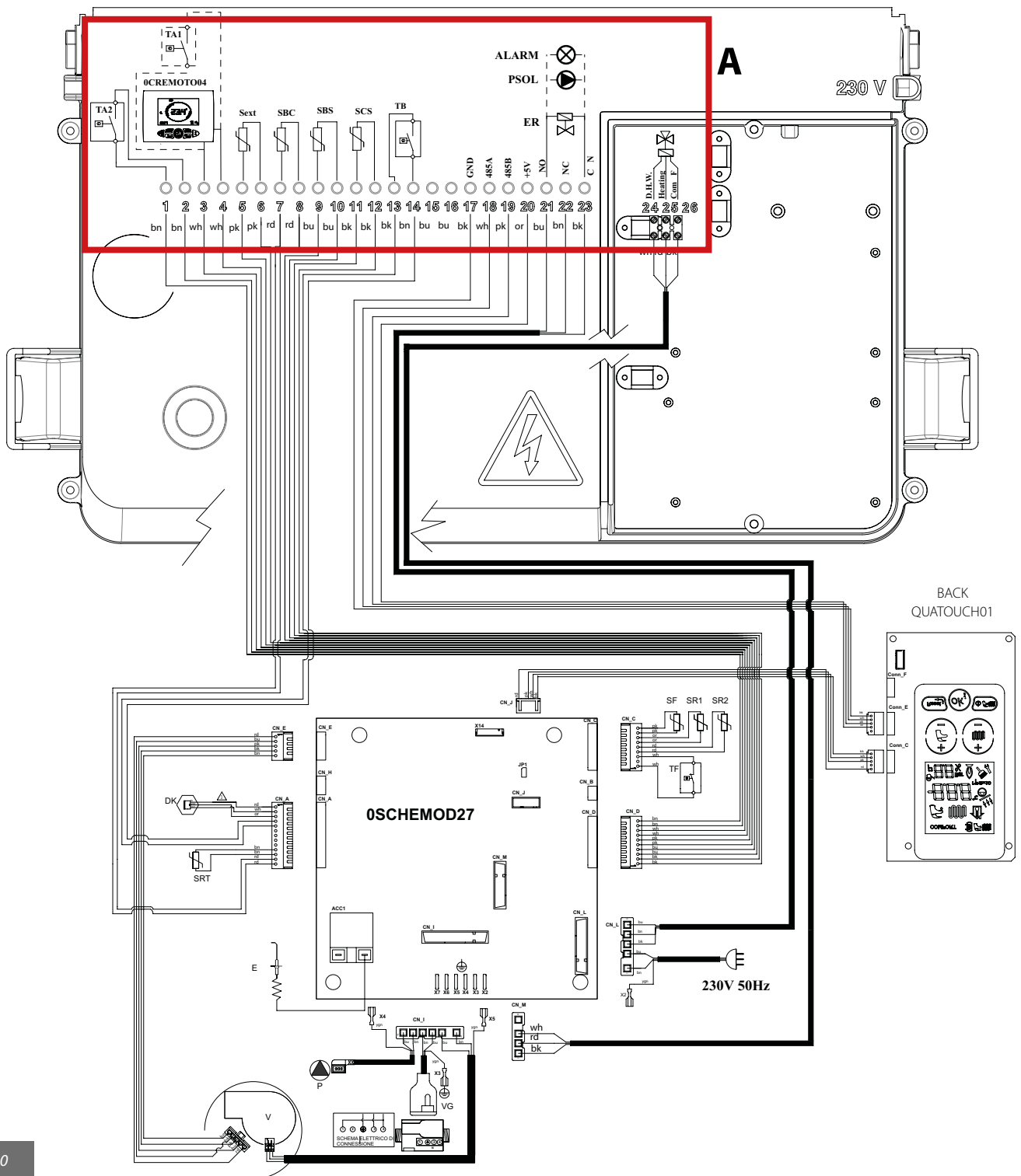
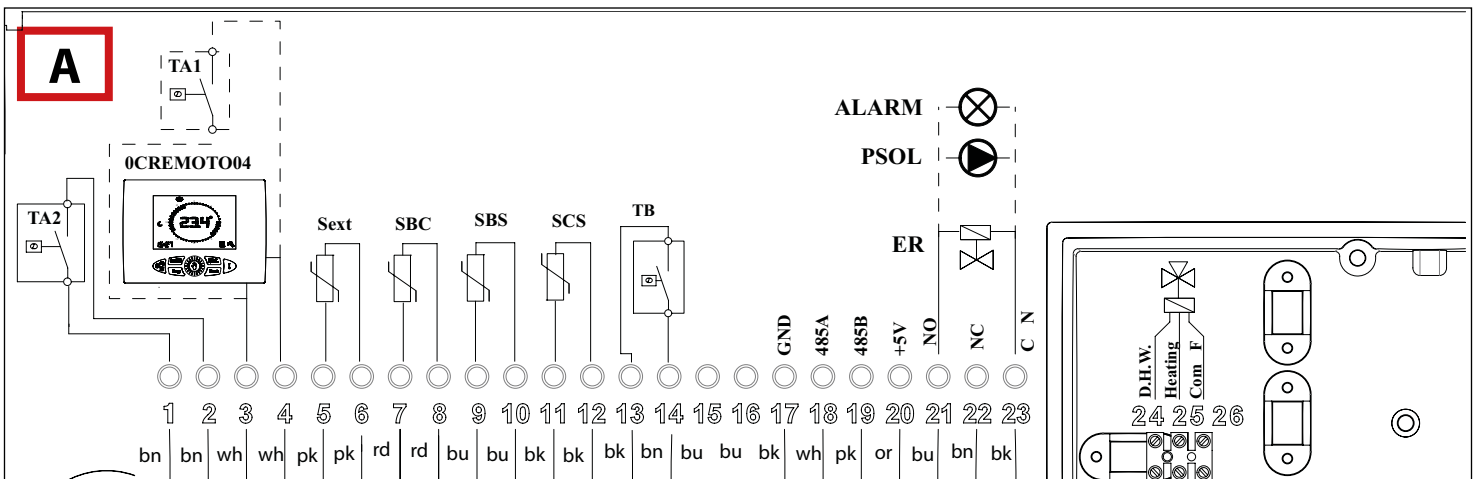


fig. 30



- KEY**
- OSCHEMOD27:** boiler PCB
 - OSCHEINT00:** interface PCB
 - DK:** analogue water pressure switch
 - SRT:** return NTC probe 10 kOhm at 25 °C B=2435
 - SM1-SM2:** heating NTC probe 10 kOhm at 25 °C B=2435
 - SF:** flue NTC probe 10 kOhm at 25 °C B=2435
 - TF:** flue gas thermostat
 - VG:** gas valve
 - P:** circulator boiler pump
 - MDV:** electric deviating valve
 - E:** ignition/flame detection electrode
 - V:** brushless fan
 - ACC1:** ignition transformer
- CN_A-CN_M:** signal/load connectors
- X2-X7:** ground connectors
- OCREMOTO04:** Opentherm Fondital remote control
- OSONDAES01:** external probe to be used with Remote Control (p/n OCREMOTO04, optional)

- 17:** serial input GND
- 18:** serial input 485A
- 19:** serial input 485B
- 20:** serial input +5V
- 21-22-23:** multifunctional relay contact (not potential free), 250V 1A: 21=NO (normally open); 22=NC (normally closed); 23=common
- 24-25-26:** VRA, relay contacts (not potential free) for 3-way valve, 250V 1A: 24=DHW; 25=CH; 26=common

PANEL ELECTRICAL CONNECTIONS

- 1-2:** ambient thermostat contact 2
- 3-4:** ambient thermostat contact 1 or opentherm
- 5-6:** external probe
- 7-8:** boiler Water cylinder probe
- 9-10:** boiler solar probe
- 11-12:** solar collector probe
- 13-14:** timer/cylinder thermostat if a water cylinder probe is not present

3.6.9. Wiring diagram for forced circulation solar system with CH only boiler

Parameter setting		
P03	P17	P18
3	2	1

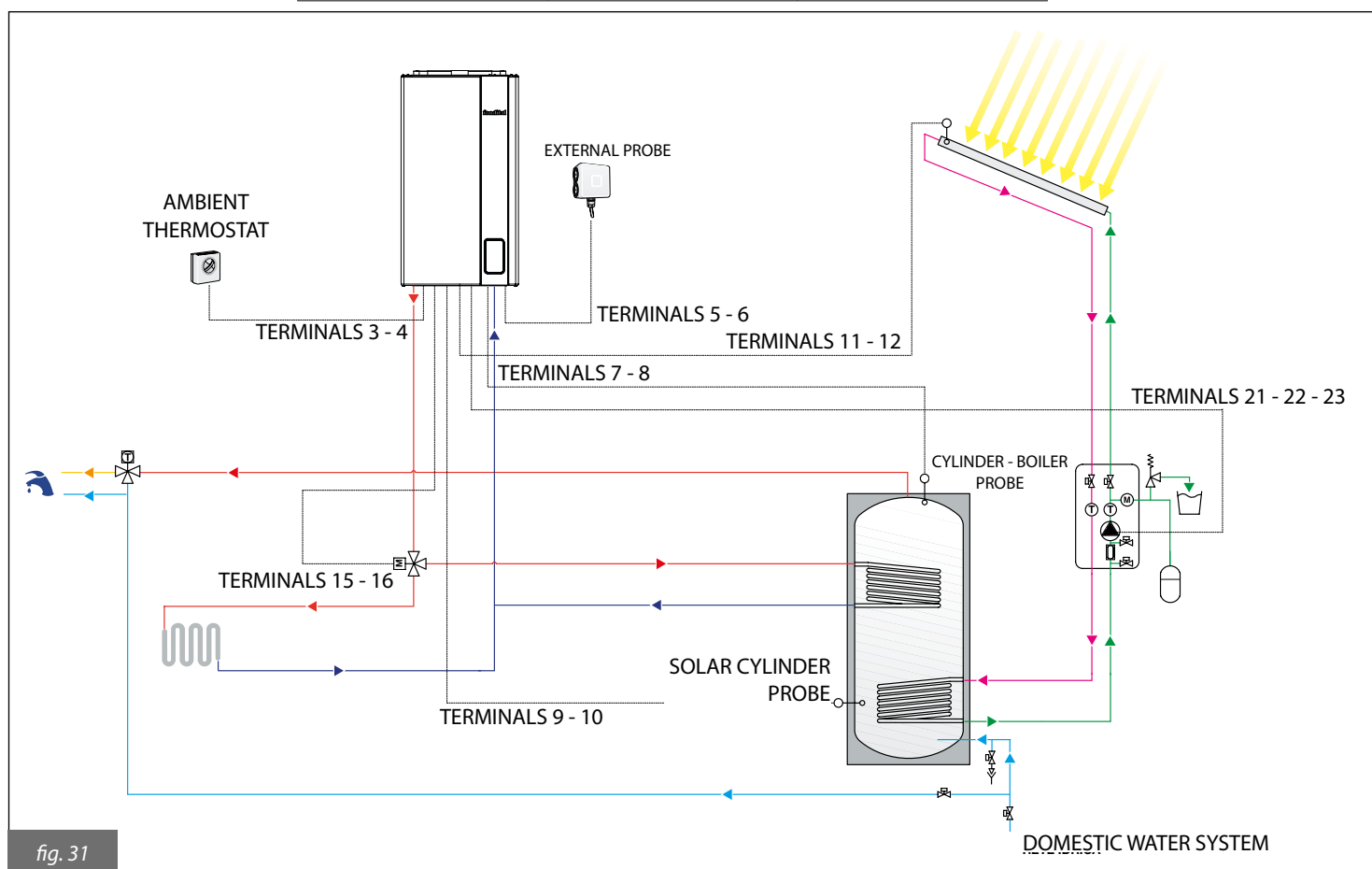


fig. 31

3.6.10. Multifunction relay connecting diagram

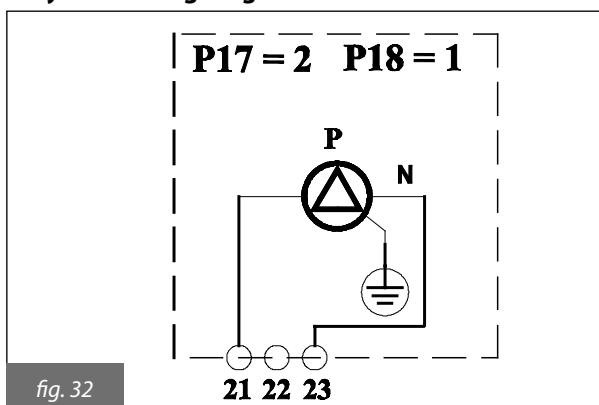


fig. 32

3.6.11. Multifunction relay setting diagrams

The control panel features a multifunction relay, to be set through the parameter P17 - TSP17

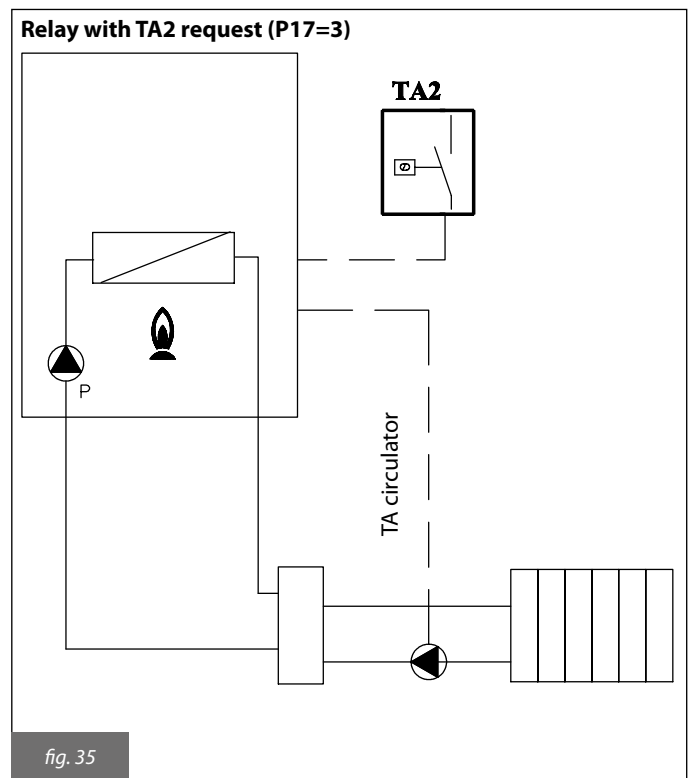
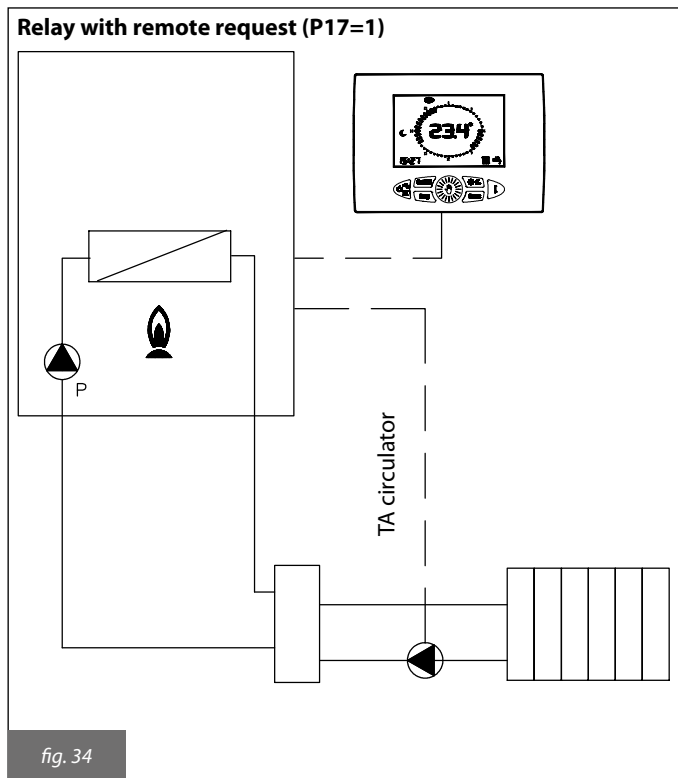
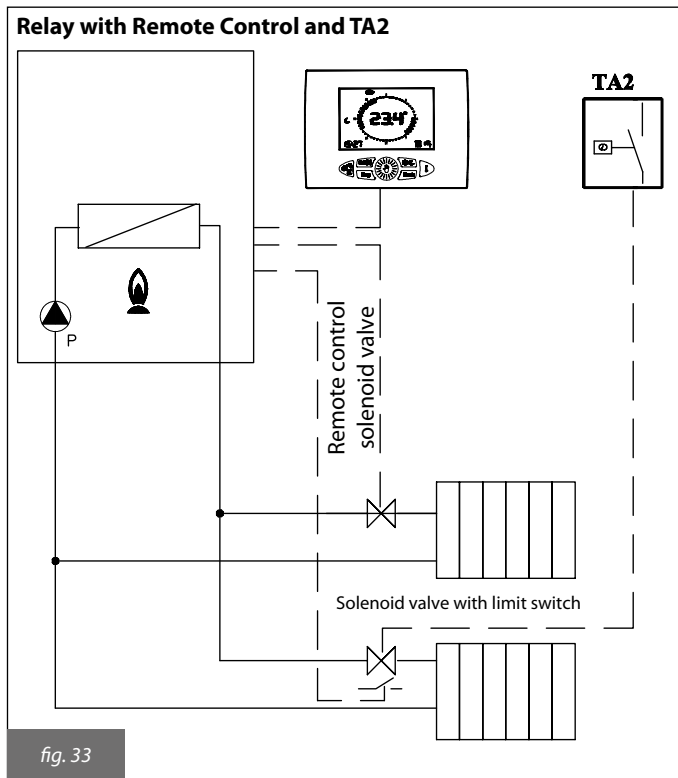


DIAGRAM PARAMETER SETTING (SOLAR EXCLUDED)

	P17
Error signalling relay	0
Relay controlled by TA1 or by the Remote Control	1
Relay controlled by TA2 or by the interface	3

Relationship between temperature (°C) and nominal resistance (Ohm) of all NTC probes.

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	1767
80	1670	1578	1492	1412	1336
90	1266	1199	1137	1079	1023

Table 21 - Relationship between "Temperature and Nominal resistance" for temperature probes

3.7. 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.

3.7.1. Switching from NATURAL GAS to PROPANE

- Disconnect the boiler from the electric power supply.
- Remove boiler outer front panel.
- 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. 36).
- Disconnect gas pipe from mixer (fig. 36).
- Loosen the three socket head screws, and remove the mixer (fig. 37).
- Loosen the two retaining screws, and slide out mixer plastic body (fig. 38).
- Using a 6 mm Allen wrench, loosen the two mixer nozzles (fig. 38).
- Screw the new nozzles for propane listed in table 23, **taking care to drive them fully home, without tightening.**
- Only for the 32 kW 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. 38) and to respect the assembling direction (fig. 39).**
- Refit the reassembled mixer onto the fan with the socket head screws, making sure to insert the O-ring between mixer and fan (fig. 37).
- Reconnect boiler to electric power supply, and open the gas cock.
- Access the programming page to set the parameters P4-P5-P6-P7-P8 to the propane gas values, as described in table 19.
- Adjust the gas valve (see next paragraph, 3.7.3.).

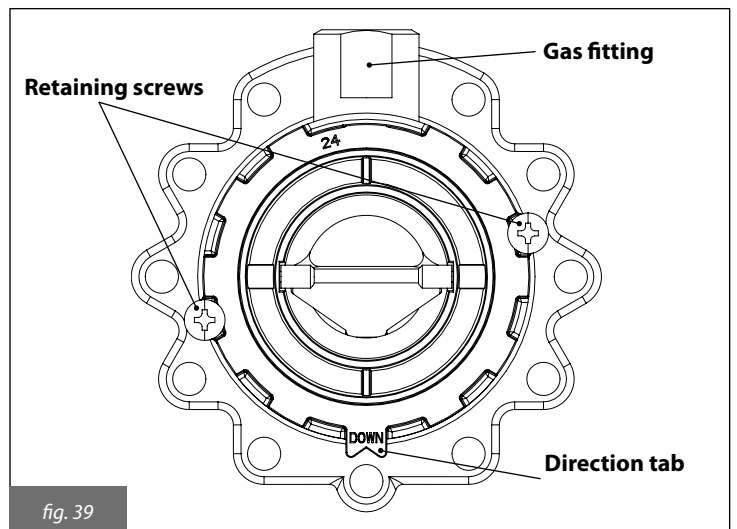
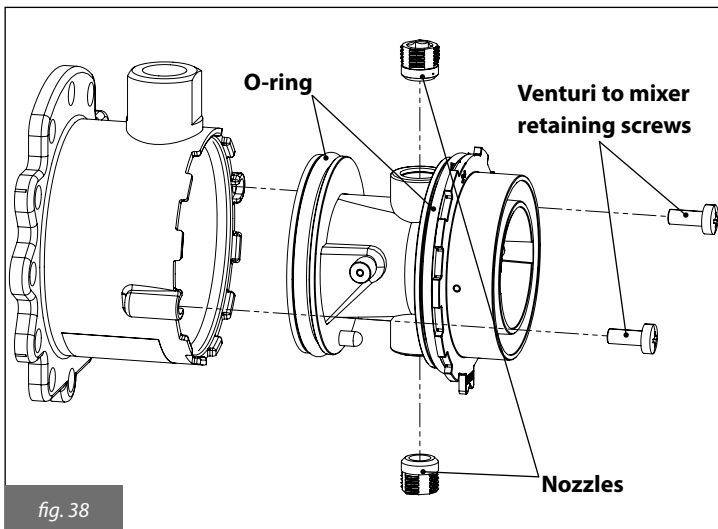
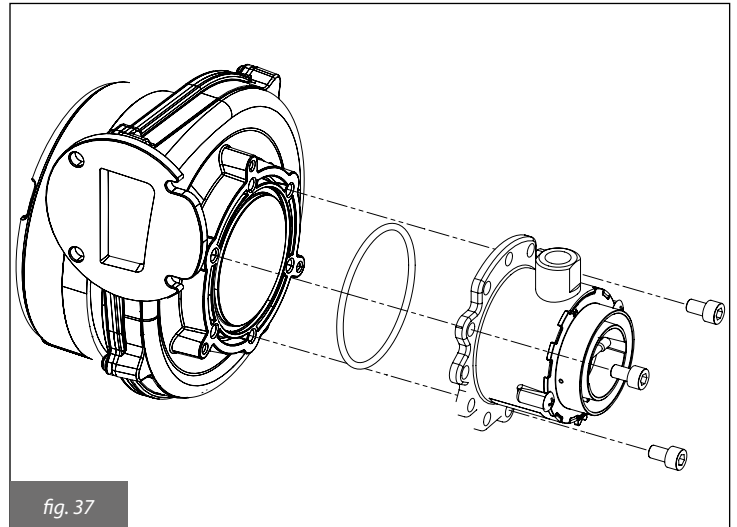
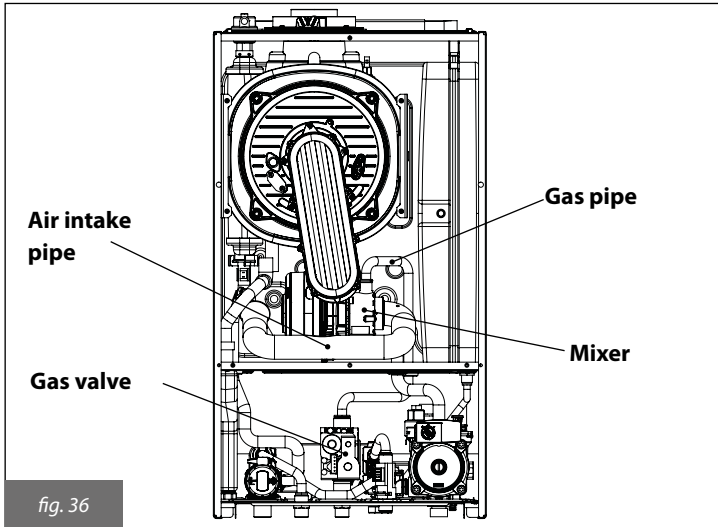
3.7.2. Switching from PROPANE to NATURAL GAS

- Disconnect the boiler from the electric power supply.
- Remove boiler outer front panel.
- 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. 36).
- Disconnect gas pipe from mixer (fig. 36).
- Loosen the three socket head screws, and remove the mixer (fig. 37).
- Loosen the two retaining screws, and slide out mixer plastic body (fig. 38).
- Using a 6 mm Allen wrench, loosen the two mixer nozzles (fig. 38).
- Screw the new nozzles for natural gas listed in table 23, **taking care to drive them fully home, without tightening.**
- Only for the 32 kW 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. 38) and to respect the assembling direction (fig. 39).**
- Refit the reassembled mixer onto the fan with the socket head screws, making sure to insert the O-ring between mixer and fan (fig. 37).
- Reconnect boiler to electric power supply, and open the gas cock.
- Access the programming page to set the parameters P0-P4-P5-P6-P7-P8 to the natural gas values, as described in table 19.
- Adjust the gas valve (see next paragraph, 3.7.3.).





3.7.3. Gas valve setting

3.7.3.1. Maximum heating 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 output and on the gas, as specified in table 19.
- Set the flue (CO₂) rate by turning the ratio adjuster **B** (fig. 40) and ensure that reading falls within the limits of table 22. Let boiler flue cleaning function on and continue with the next point "Minimum heating output adjustment".

3.7.3.2. Minimum heating 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 19) is displayed.
- Boiler switches to min. output operation.
- Set the flue (CO₂) rate by turning the offset adjuster **C** (fig. 40) and ensure that reading falls within the limits of table 22.
- Keep key  pressed to end the flue cleaning function.

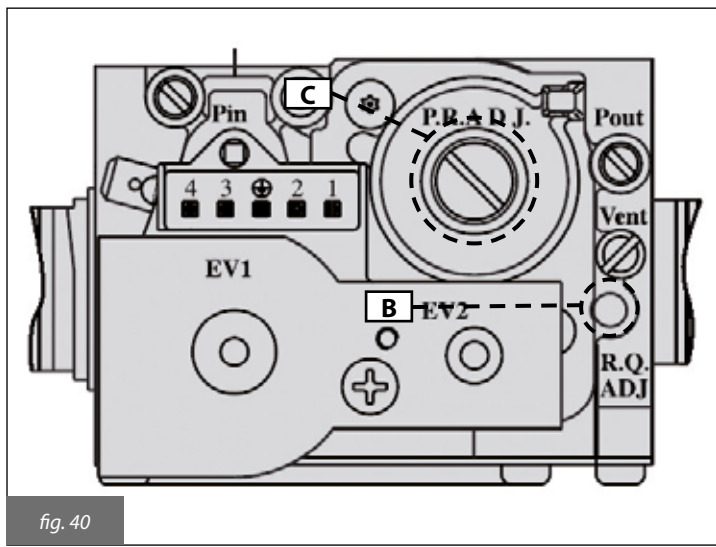


fig. 40

FLUE CO ₂ RATE	
Fuel	CO ₂ rate (%)
12 kW Natural gas	9.0 - 9.3
12 kW Propane	10.0 - 10.3
24 kW Natural gas	9.0 - 9.3
24 kW Propane	10
28 kW Natural gas	9.0 - 9.3
28 kW Propane	10 - 10.3
32 kW Natural gas	9.0 - 9.3
32 kW Propane	10

Table 22 - CO₂ rates

DIAMETER OF NOZZLES / DIAPHRAGMS (mm)		
	Natural gas	LPG
12 kW	3.05	2.50
24 kW	3.70	3.00
28 kW	4.00	3.30
32 kW	4.45	3.55 + diaphragm Ø 7.2

Table 23 - Diameter of nozzles - diaphragms

4. TESTING THE BOILER

4.1. Preliminary checks

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

- 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 system is correctly filled with water (pressure 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 section no. 3.7.); 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 3-bar safety valve is not stuck;
- there are no water leaks;
- the pump has not seized;
- 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.



Maintenance operations include check and cleaning procedures. In particular:

Inspections and checks:

- check general integrity of the boiler;
- check boiler and network gas supply for leakage;
- check gas supply pressure to boiler;
- check boiler ignition sequence;
- check boiler combustion parameters by flue gas analysis;
- check the condition and seal integrity of the flue gas venting pipes;
- check the state of combustion fan;
- 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 valve;
- check expansion vessel filling pressure;
- check correct draining of condensate from the condensate trap installed on the boiler.

The following cleaning is to be done:

- clean the general interior of the boiler;
- clean the gas nozzle;
- clean the air intake and flue gas venting systems;
- clean the heat exchanger;
- clean the condensate trap and discharge ducts.

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.
		The 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 cable.
		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 faulty.	Replace it.
		Circulation pump is seized.	Check pump electrical connection.
E03*	Flue thermostat triggering.	Poor flue draught.	Check the chimney and ambient air-intake 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 low.	There are leaks in the CH system.	Check system.
		Transducer is disconnected.	Reconnect it.
		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 (only KC).	DHW probe is electrically 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**	Water cylinder probe fault (KRB with external water cylinder, optional, and NTC probe).	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 probe failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E27**	Solar valve probe failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
E28**	Solar Water cylinder probe failure.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E31**	Remote Control connection failure (shown on the 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.
E35**	Safety pressure switch protecting the mixed 'zone 2' triggering (with zone kit installed, only)	Mixer valve is faulty.	Replace it.
		Thermostat is disconnected.	Reconnect it.
		Thermostat is faulty	Replace it.
E36**	Flow probe failure on one of the heating zones.	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
E40*	Fan failure	Fan disconnected.	Reconnect it.
		Fan faulty.	Replace it.
E41**	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.
E42	Solar plant configuration 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.
E43	Zone configuration error (optional, if Remote Control and ambient thermostat are connected).	Wrong boiler board setting parameters.	Check that the P61 parameter set values match with those specified on the reference tables.
E46	Pressure transducer failure.	Pressure transducer is disconnected.	Reconnect it.
		Pressure transducer is faulty.	Replace it.
E49	Communication error between boiler board and touch screen.	The interface is faulty.	Replace the interface.
E80*	The ΔT 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 system is obstructed.	Clean or replace the exchanger.
E86*	Flow temperature increases too quickly.	Pump is seized.	Unseize the pump.
		Pump is faulty.	Replace it.
E87*	Return temperature increases too quickly.	Pump is seized.	Unseize the pump.
		Pump is faulty.	Replace it.
		Condensate trap is clogged.	Check and clear the condensate trap.
		Flue gas probe is faulty	Replace it.
E89***	Faulty flue gas temperature value.	Flue gas probe on heat exchanger is faulty or damaged.	Replace it.
E98	Max. number of reset attempts from touch screen reached	The user has reached the max. number of resettable errors from the boiler.	Disconnect the boiler from the power supply.
E99	Max. number of reset attempts from Remote Control reached (optional, if connected).	The user has reached the max. number of resettable values from the Remote Control.	Disconnect the boiler from the power supply.

* 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 corrected

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

In case when errors **E51, E52, E53, EE73, E85, E90** and **E91** are displayed, please contact a qualified Service Centre.



0LIBMCEN06

Fondital S.p.A.

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

The manufacturer reserves the right to modify his/her products as deemed necessary, without altering the basic characteristics of the products themselves.

Uff. Pubblicità Fondital IST 03 C 545 - 02 Marzo 2015 (03/2015)