

BRAND NAME



DELFI CONDENSING



INSTALLATION, USE & MAINTENANCE MANUAL

EN

IST 04 C 293 - 02

Dear Customer,

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.

The Manufacturer recommends that Customers contact qualified personnel only for maintenance and repair operations.

General information for Installers, Maintenance Technicians and Users

This INSTRUCTION MANUAL, which is an integral and indispensable part of the product, must be handed over to the user by the installer and must be kept in a safe place for future reference. The manual must accompany the boiler should it be sold or its possession transferred. Following to the boiler installation, the installer is to advise the user on the boiler operation and its safety devices

**This boiler must be used for the purposes for which it has been intended.
Any other use shall be considered incorrect and therefore dangerous.**

The boiler must be installed by qualified personnel, in compliance with applicable laws and standards and according to the manufacturer's instructions given in this manual. Incorrect installation may cause injury to persons and/or animals and damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Damage and/or injury caused by incorrect installation or use, or 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 corresponds to the requirements for its correct use in the system design.

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

Do not obstruct the air suction openings.

Only manufacturer approved and supplied accessories or optional kits (including electric ones) are to be installed with this product.

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

Keep the packaging out of the reach of children as it may represent a source hazard.

In the event of failure and/or faulty functioning, switch off the boiler. Do not attempt to make repairs: contact qualified technicians.

Manufacturer approved and supplied 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 property.

The manufacturer recommends Customers to contact qualified Service Centres for maintenance and repairs, they are best trained for that procedure.



Routine boiler maintenance should be performed according to the schedule in the relevant section of this manual. Appropriate boiler maintenance ensures efficient operation, preservation of the environment, and safety for people, animals and/or property.



Incorrect and irregular maintenance can be a source of danger for people, animals and property.

In the event of long periods of inactivity of the boiler, disconnect it from power mains and close the gas Isolation valve. Warning! Should power mains be disconnected, boiler electronic anti-freeze function will not be operative.

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

IMPORTANT

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 tap;**
- **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 country indicated on the technical data plate: installation in any other country may be a source of danger for people, animals and property.

Carefully read the warranty conditions and advantages offered by the manufacturer, as specified on the inspection certificate that comes with the boiler.

QUICK GUIDE 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 yellow handled gas cock installed Under the boiler.
2. Turn the Electrical mains switch installed adjacent to the boiler to **ON**: the display comes on and shows the function set via the boiler mode button (fig. 1) and flow water temperature.
3. If **you do not wish** to activate the heating function press the boiler mode button **3** (fig. 1) until displaying the SUMMER symbol: this will activate domestic hot water (DHW) only, and the display will show the DHW temperature.



Boiler mode button



SUMMER symbol

4. If **you wish** to activate the heating function and domestic hot water, press the boiler mode button (**3**, fig. 1) until displaying the WINTER symbol: this will activate both DHW and heating, the display will show the primary flow water temperature.



Boiler mode button



WINTER symbol

5. If **you wish** to activate the heating function press the boiler mode button **3** (fig. 1) until displaying the CENTRAL HEATING ONLY symbol: this will activate heating function, and the display will show the primary flow water temperature.

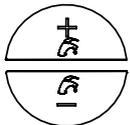


Boiler mode button



CENTRAL HEATING ONLY symbol

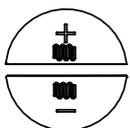
6. To adjust the DHW temperature press domestic hot water temperature buttons (**1** in fig. 1); then set as required. While regulating, the LCD displays the temperature setting and the tap symbol flashes.



Domestic hot water temperature buttons



7. To adjust the heating water temperature press heating water temperature buttons (**6** in fig. 1); then set as required. While the heating water temperature is being regulated, the LCD displays the temperature setting and the CH symbol flashes.



Central heating water temperature buttons



8. Set the desired temperature on the (optional) room thermostat in the building. The boiler is now ready to operate.

If the boiler shuts down, press boiler reset button (**4** in fig. 1). If the boiler does not restart, contact a qualified Service Centre.

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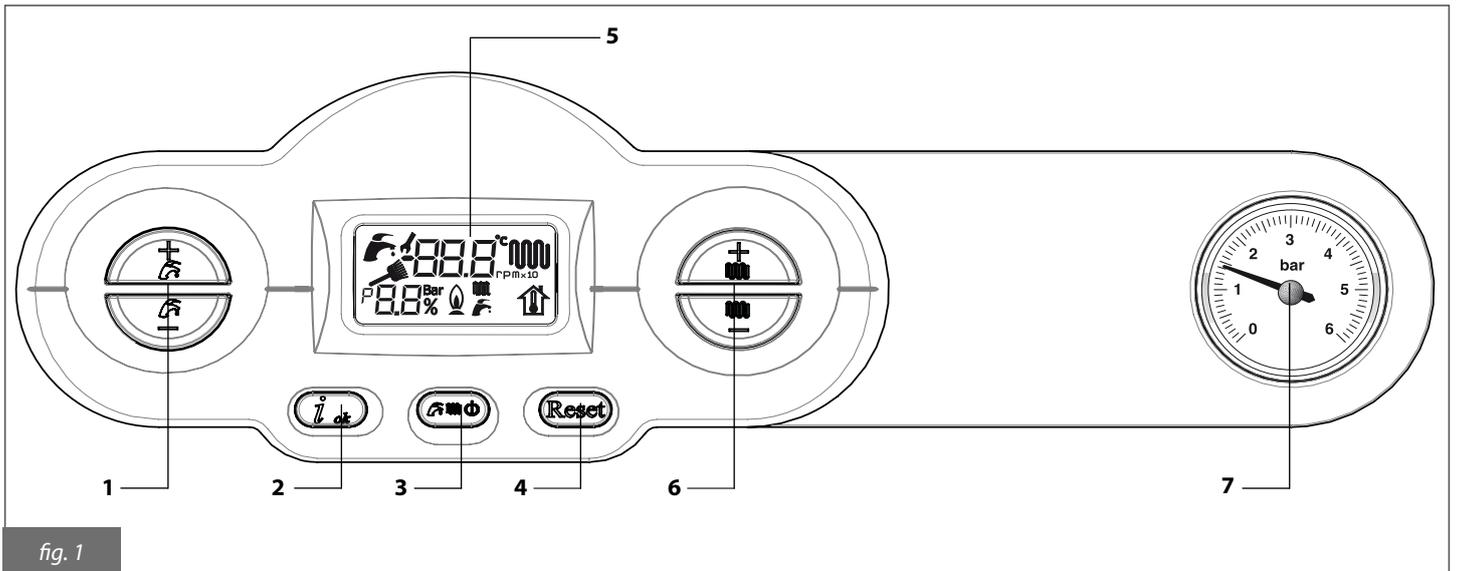
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1. INSTRUCTIONS FOR THE USER

1.1. Control panel



1. Set domestic hot water temperature

These buttons are used to set the domestic hot water temperature within a range from 35°C to 57°C.

2. Recall information and confirm parameters

This button is used to scroll the sequence of the values of some parameters, such as: primary flow water temperature, DHW temperature and display of the last 5 shutdowns. This button is also used to confirm parameter settings.

3. Select boiler mode

Press this button to set the following functions.

SUMMER

Boiler only produces domestic hot water.

WINTER

Boiler provides central heating water and produces domestic hot water.

CENTRAL HEATING ONLY

The boiler provides central heating water only.

STANDBY

Boiler in standby mode: central heating function and DHW production disabled.

4. Boiler Reset function

This button resets the boiler operation after the burner shutdown device (lockout) has been activated.

5. LCD

The LCD displays the boiler status and operating data (see fig. 2).

6. Set central heating water temperature

These buttons are used to set the heating water temperature within a range from 20°C to 78°C.

7. Water pressure gauge

This shows the pressure of the water in the primary heating system.

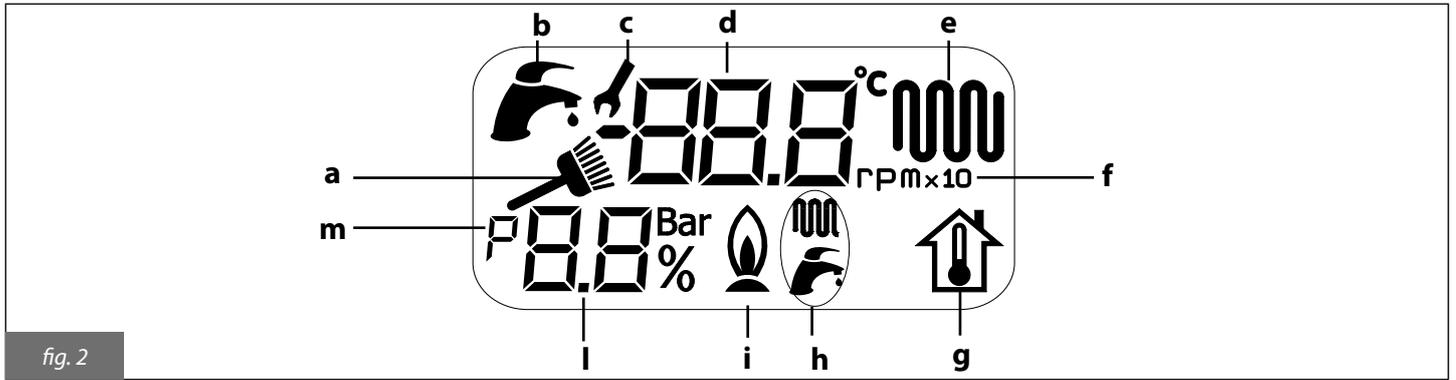


fig. 2

a. Flue cleaning function indicator (function reserved for installation/service technician)

This indicator flashes when the flue cleaning function is active (press the “info” and “reset” buttons simultaneously). The boiler flow water temperature and the fan speed (rpm) are shown (in this case, symbol **f** is also shown)

b. DHW indicator

This comes on when the boiler is in DHW mode.
Flashes when adjusting the DHW temperature with the buttons **1** (fig. 1).

c. Parameter editing indicator

This comes on when the value of the parameter can be modified (in this case, the indicator lights together with the symbol **m**). When edited parameter value is confirmed this symbol will flash.

d. Alphanumeric indicator

This shows the following:
- CH flow water temperature
- CH temperature setting
- DHW temperature setting
- boiler status
- boiler diagnostics

e. Central heating indicator

This comes on when the boiler is in CH mode.
It flashes when adjusting the central heating water temperature with the buttons **6** (fig. 1).

f. Fan speed in rpm (function reserved for installation/service technician)

When the flue cleaning function is activated, symbol **a** turns on and flow water temperature and fan rpm are shown (in this case, this symbol is also shown).

g. Calculated room temperature indicator

When an external probe is installed, this indicator flashes when the calculated room temperature is set via buttons **6**.

h. Boiler status indicator

The two icons indicate the currently active operating modes:
SUMMER: only icon : lits.
WINTER: both icons lit.
CENTRAL HEATING ONLY: only icon lits.
STANDBY: symbol displayed in alphanumeric indicator **d**

i. Flame indicator

This comes on when the burner flame is present.

l. Parameter indicator

Figures to view and edit parameters and indicate the burner current power rate (percentage).

m. Parameter indicator

It turns on when entering the parameter programming mode.

1.3. Interpreting BOILER STATUS from LCD DISPLAY INDICATIONS

Normal operation

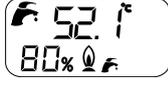
Boiler in STANDBY mode	
Boiler in SUMMER mode No function active The flow water temperature is displayed	
Boiler in WINTER mode No function active The flow water temperature is displayed	
Boiler in CENTRAL HEATING ONLY mode No function active The flow water temperature is displayed	
Boiler in SUMMER mode DHW temperature outlet DHW temperature displayed	
Boiler in WINTER mode DHW temperature outlet DHW temperature displayed	
Boiler in WINTER mode CH function active The flow water temperature is displayed	
Boiler in CENTRAL HEATING ONLY mode CH function active The flow water temperature is displayed	

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

Malfunction

Boiler not powered on	
Boiler lockout due to flame absence	
Triggering of double flow probe	
Boiler lockout due to flue gas thermostat activation	
Boiler lockout due to water pressure switch triggering	
CH probe failure	
DHW probe failure (KC model only)	
Flue gas probe failure	
External cylinder probe failure (KR or KRB models only)	

Return probe fault	E 15
Remote Control connection failure (only shows on Remote Control panel)	E3 1
Triggering of safety thermostat in mixed zone 2	E35
Flow probe failure in mixed zone (the relevant zone is indicated below)	E36 02
Fan failure	E40
Communication failure between additional devices	E4 1
Hydraulic configuration not allowed	E42
Safety system hardware malfunction	E5 1
	E52
	E53
Shutdown due to CH low water level	E80
Shutdown due to flow temperature rising too quickly	E86
Shutdown due to return temperature rising too quickly	E87
Max. number of resume attempts from remote exceeded (option, with installed Remote Control)	E99

Table 2 - BOILER STATUS - LCD DISPLAY INDICATIONS in the event of malfunction

1.4. Boiler operation

1.4.1. Switching on



It is presumed that the boiler has been installed by a qualified installer, a tightness test has been carried out and the boiler has been commissioned and is ready to operate correctly.

- Open the gas stop cock situated under the boiler;
- turn the mains fused spur switch installed adjacent to the boiler ON. The LCD activates and indicates the function currently active (see tables 1 and 2);
- select boiler operation mode via button **3** (fig. 1): OFF/SUMMER/WINTER/CENTRAL HEATING ONLY;
- set desired CH temperature (see par. 1.4.2.);
- set desired DHW temperature (see par. 1.4.3.);
- set desired room temperature by means of the room thermostat if fitted.

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 button 4 (fig. 1).

1.4.2. CH function

Set desired heating water temperature via buttons **6** (fig. 1);

CH water temperature adjusting range depends on operation range set through parameter **P10**:

- **standard range**: 20°C to 78°C;

- **reduced range**: 20°C to 45°C.

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

During temperature setting, the CH symbol on the LCD flashes and the CH setting is displayed.

When the central heating system requests heat from the boiler, the LCD displays the CH symbol (fixed) and the current CH flow water temperature.

The burner symbol  only shows while the burner is operating.

To prevent frequent ignition and switching off in the heating mode, the boiler has an anti cycling timer of 4 minutes between ignitions. Should water temperature in the system fall below set minimum value, the waiting time is reset and the boiler re-ignites.

1.4.3. DHW function

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

Such function has always priority over CH water supply.

For model KC, DHW temperature may be set within a range from 35°C to 57°C. During temperature setting, the DHW symbol on the LCD flashes and the DHW temperature setting is displayed.

For KRB and KR 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 will flash on the display and the DHW value being set will be shown.

In KRB and KR models featuring an external water cylinder (optional) fitted with a thermostat, the desired temperature must be set directly via the water cylinder (refer to water cylinder technical specifications).

When a water cylinder heating request is active, the DHW symbol (steady on) and the water flow temperature are shown on the LCD display

The burner on symbol shows while the burner is operating.

WARNING

On model KC a flow limiter is installed within the boiler, which limits domestic hot water output flow rate. This limit is: 8 litres per minute (for model KC 12), 13 litres per minute (for model KC 24) and 14 litres per minute (for model KC 28).

Domestic hot water temperature supplied depends on the DHW temperature setting and on the quantity requested by the user. The temperature of the water mains supply temperature is also a determining factor

Available DHW litres per minute depend on boiler thermal output and water mains supply temperature, according to the following formula:

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

where

K represents:

- 258 in KC 12 model

- 393 in KC 24 model

- 419 in KC 28 model

Δt = DHW temperature – water mains supply temperature

For instance, with model KC 24, if the water supplied is at 8°C and you want shower water at 38°C, 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:

$$I = \frac{393}{30} = 13.1 \text{ [litres per minute - water mixed at tap]}$$

30

1.4.4. Freeze protection function

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



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

A room thermostat must be used to provide freeze protection for the central heating system. Please be aware that the thermostat is disabled when the boiler is in OFF mode.

Therefore, if you want to protect both the boiler and the system, use button 3 in fig. 1 to select the WINTER mode .

When the heating water temperature probe 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.

The anti-freeze function also protects the DHW circuit.

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

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

For KRB and KR models with external water cylinder (optional) with NTC probe (10 kΩ @ β=3435; refer to water cylinder technical specifications), the anti-freeze function also protects the water cylinder.

When the water cylinder temperature probe detects a temperature of 5°C, the boiler switches on and stays on at its minimum thermal power until the temperature reaches 10°C or 15 minutes have elapsed.

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

For KRB and KR models with external water cylinder (optional) fitted with a thermostat, the anti-freeze function does not protect the water cylinder.

In this case the water cylinder can only be protected when the boiler is on SUMMER or WINTER mode and a temperature higher than 0 °C is set on the water cylinder thermostat.

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.

1.4.5. Pump and valve anti-shutdown function

If the boiler remains inactive and:

- the boiler operating mode is NOT OFF,
- the boiler is still connected to the mains supply,

the pump and the switching valve activate briefly every 24 hours to keep them efficient.

1.4.6. Operation with (optional) remote control

The boiler can be linked to an (optional) remote control (supplied by the Manufacturer), which can be used for setting numerous parameters:

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

Once the remote control has been installed, the boiler LCD will display the following code:



For instructions on how to connect the remote control, refer to par. 3.2.12. and the remote thermostat instruction booklet.



Only original remote controls supplied by the manufacturer must be used.

If non-original remote controls are used, correct operation of the boiler, or of the remote control, cannot be guaranteed.

1.5. Boiler shutdown

The boiler locks out automatically if a malfunction occurs.

Refer to Tables 1 and 2 to identify the boiler operating mode.

To determine the possible causes of malfunction, see also paragraph 6. *Troubleshooting* section is at the end of this manual.

Below is a list of shutdowns and the procedure to follow for each.

1.5.1. Burner shutdown

Fault code **E01** is displayed flashing on the LCD display in the event of burner shutdown due to no flame recognition.

If this happens, proceed as follows:

- check that the gas cock is open and that gas is available at the appliance to check the gas supply by turning on another gas appliance and check the emergency control valve is on;
- once you have confirmed fuel is available, press the reset button (4) (fig.1) to restore burner operation: if, after two starting attempts, the boiler still fails to start and enters 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.

1.5.2. Shutdown due to air intake/flue gas discharge system malfunction

If the air/flue gas system malfunctions, the boiler shuts down. The code **E03** (flue gas thermostat activation) is displayed flashing on the LCD. Contact a service Centre or a qualified service engineer.

1.5.3. Shutdown due to a water circulation malfunction

If there is a malfunction in water circulation in the heating system, the boiler shuts down.

The codes **E81** or **E82** or **E83** or **E84** are displayed, according to the malfunction.

There can be 2 different situations:

a) **the pressure gauge (7, fig. 1) shows a pressure lower than 1 bar**

Proceed as follows to restore the correct water pressure:

- turn the filling cock (fig. 3 for mod. KC, fig. 4 for mod. KRB, fig. 5 for mod. KR) anticlockwise to allow water to enter the boiler.
- keep the tap open until the pressure gauge shows a value of 1-1.3 bar.
- turn the tap off on completion.
- press the reset button (4 in fig. 1) to restore boiler operation then set it to the desired operating position.

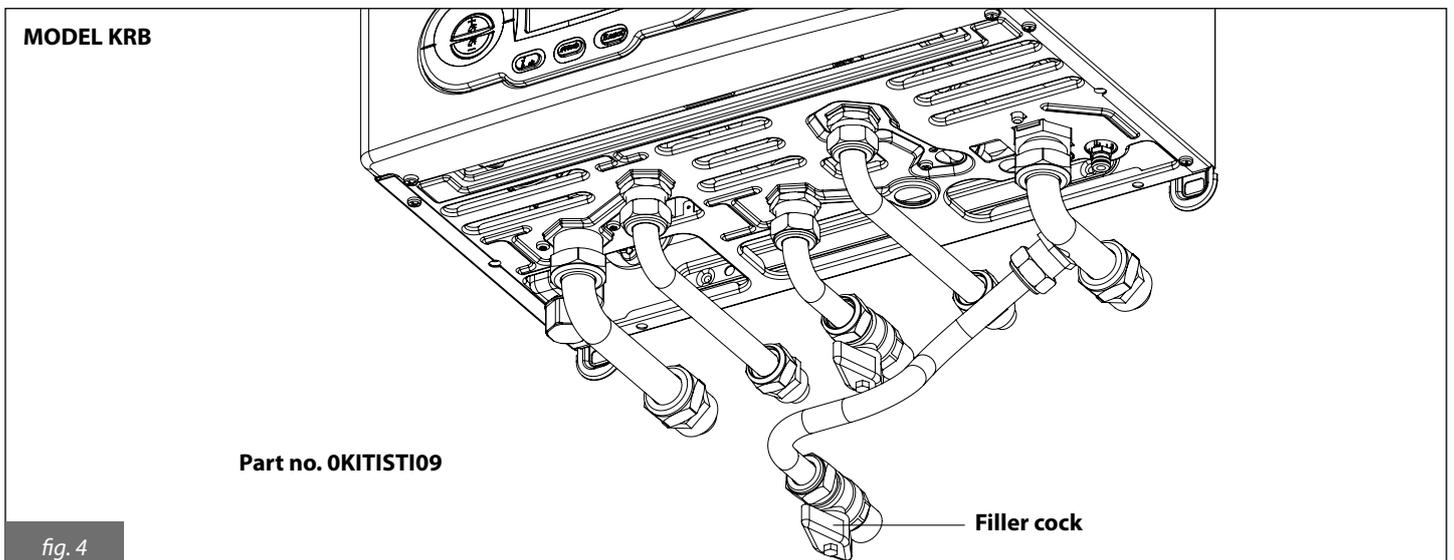
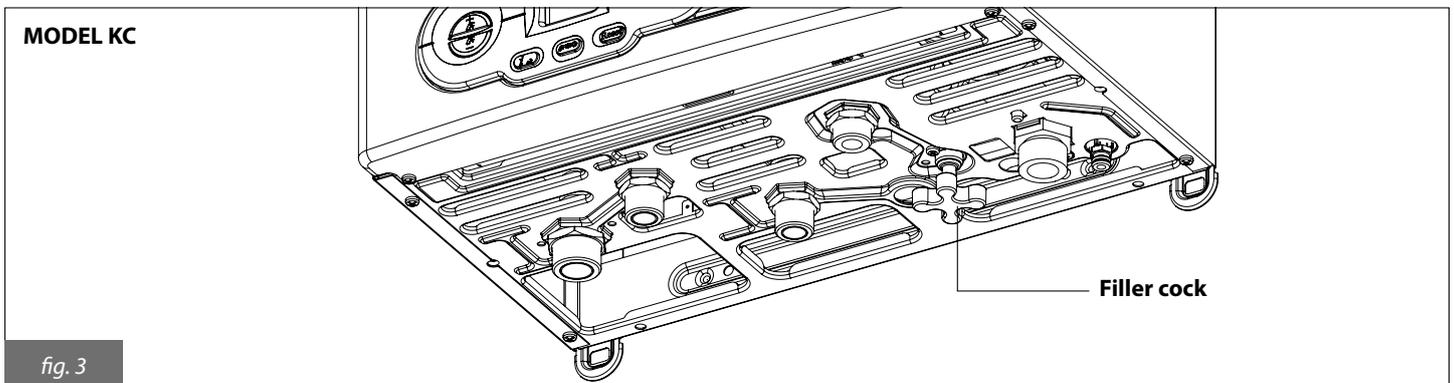
If the boiler still fails to operate, contact a service Centre or a qualified service engineer.

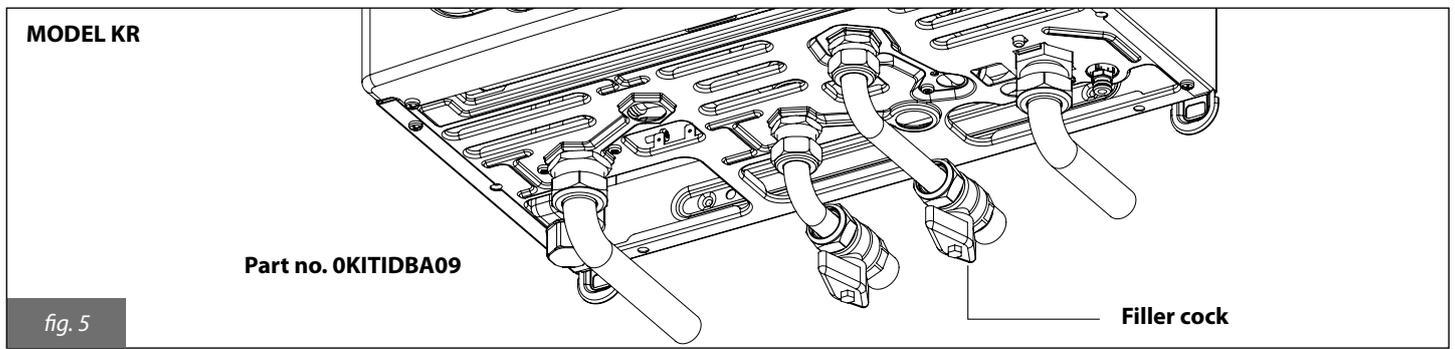


**Make sure you close the cock carefully after filling.
If you do not, when the pressure increases, the safety valve may activate and discharge water.**

b) **the pressure gauge (7, fig. 1) shows a pressure of 1-1.3 bar**

In the latter case, contact a service Centre or a qualified service engineer.





1.5.4. Shutdown due to fan malfunction

The fan operation is constantly monitored and in case of malfunction the burner goes off; the code E40 flashes on the LCD. This mode is maintained until the fan recovers normal working parameters. If the boiler should not re-start and remain in this mode, contact a Service Centre or a qualified service engineer.

E40

1.5.5. Alarm due to temperature probe malfunction

The following fault codes are shown on the LCD 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 functions in CH mode only, and the DHW function is disabled.
- **E12** for the water cylinder probe (only models KRB/KR). In this case, the boiler functions in CH mode only, and the DHW function is disabled.
- **E15** for the return probe. In this case the boiler does not work.

In all these cases, contact a Service Centre or a qualified service engineer.

1.5.6. Alarm due to (optional) remote control connection malfunction

The boiler recognises whether or not there is a remote control (optional).

If the remote control is connected but the boiler does not receive instructions from it, the boiler attempts to re-establish communication for 60 seconds, after which the fault code **E31** is shown on the remote control display.

E31

The boiler will continue to operate according to the settings on the control panel (fig. 1) 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 exceeded, fault code **E99** is shown on the boiler display.

E99

Contact a service Centre or a qualified service engineer.

1.5.7. Alarm due to (optional) external probe malfunction

If the (optional) external temperature probe malfunctions, the boiler is still operating, but the "weather compensation" operation is disabled; heating water temperature is adjusted according to the value set through buttons **6** (fig. 1) that, in this case, will no longer work as calculated room temperature adjusters (see paragraph 1.4.6.).

Contact a service Centre or a qualified service engineer.

1.6. Maintenance

Routine boiler maintenance must be provided according to manufacturer's instructions in the country of installation and following the instructions given in the relevant section in this manual.

Correct maintenance ensures that the boiler operates efficiently, is environmentally friendly, and is not a danger to people, animals or property.

Maintenance and repairs must be performed by qualified personnel.

For boiler breakdowns and advice on repair carried out by a qualified technician, refer to section 6 – *Maintenance*.

It is recommended that the boiler case is only cleaned with non abrasive standard household cleaning products.

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

1.7. Notes for the user

The user may only access boiler parts that can be reached without using any technical equipment or tools. The user is not authorised to remove the boiler casing or attempt to access any of the internal parts. No one, including qualified service engineers, are authorized to modify the boiler.

The manufacturer cannot be held liable for damage to people, animals, or property due to tampering or improper work carried out on this 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.

Pump servicing includes removing the boiler housing and accessing the internal parts of the boiler, so this must only be carried out by a qualified service engineer.

Pump blockage can be avoided by adding propriety inhibitors 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.

This version is available with two power ratings:

- KC - KRB - KR 12: with heat input of 12 kW
- KC - KRB - KR 24: with heat input of 24.9 kW
- KC - KRB - KR 28: with heat input of 27.9 kW

Both 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

- IPX4D electrically protected control panel
- Integrated, modulating electronic safety board
- Electronic ignition and ionisation flame detection device
- 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
- Three-speed pump with air purging device
- Minimum pressure switch
- CH (all models) and DHW (KC model) temperature probe
- Safety limit thermostat
- Flue gas thermostats
- Integrated, automatic by-pass
- 9 litre expansion vessel
- System loading and draining taps
- Stainless steel plate DHW heat exchanger (KC model)
- Motorised diverter valve (KC and KRB models)
- DHW priority flow switch (KC model)
- 8 l/min DHW flow-restrictor (KC 12), 13 l/min (KC 24), 14 l/min (KC 28)

User interface

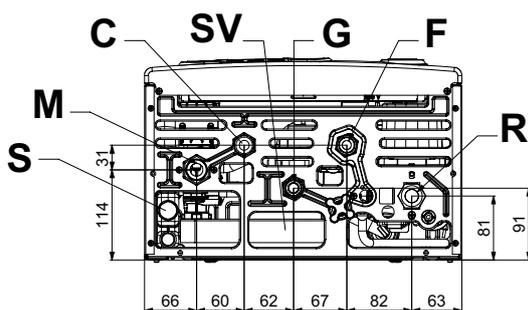
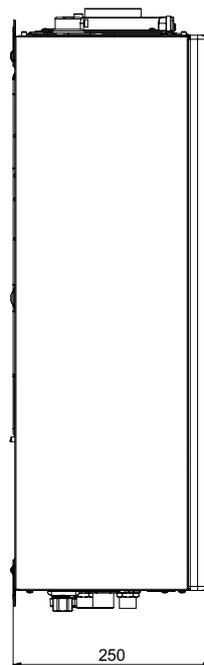
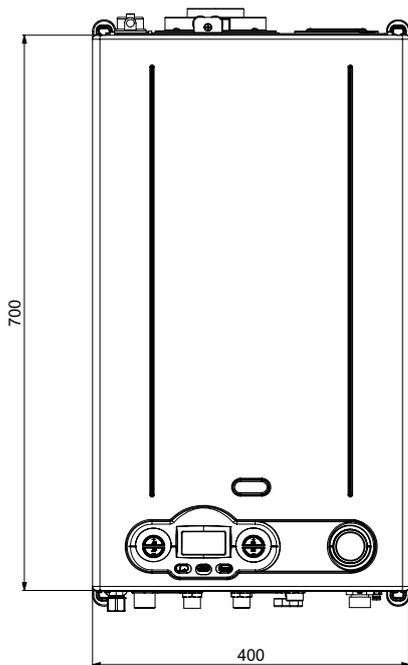
- Liquid crystal display showing the boiler operating status
- Mode button: OFF, WINTER, SUMMER and CENTRAL HEATING ONLY
- DHW water temperature regulator: 35-57°C (KC) - 35÷65°C (KRB/KR).
- CH water temperature regulator: 20-78°C (standard range) or 20-45°C (reduced range)
- Heating water pressure gauge

Operating features

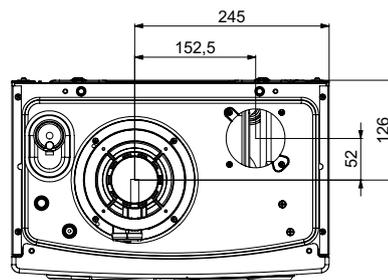
- CH electronic flame modulation with timer-controlled rising ramp (60 seconds)
- Electronic flame modulation in DHW mode
- DHW priority function
- CH flow anti-freeze function: ON 5°C; OFF 30°C or after 15 minutes of operation if CH temperature > 5 °C
- DHW anti-freeze function: ON 5°C; OFF 10°C or after 15 minutes of operation if DHW temperature > 5 °C
- Water cylinder anti-freeze function (only KRB/KR): ON 5°C OFF 10°C or after 15 minutes if water cylinder temperature > 5 °C
- Timer-controlled flue cleaning function (15 minutes)
- CH maximum heat output adjustment through parameter P7
- Ignition heat output adjustment through parameter P6
- Possibility to select the heating range through parameter P10: standard or reduced
- Ignition flame propagation function
- CH thermostat timer adjustable through parameter P11: 4 minutes
- Heating pump post-circulation function in CH, ANTI-FREEZE and FLUE CLEANING mode (30 seconds)
- DHW post-circulation function: 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
- Pump and diverter valve anti-seize function: 30 seconds of operation every 24 hours with boiler not in use
- Ready for connection to a room thermostat (optional)
- 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 a module for different temperature zones
- Anti- water hammer function: can be set from 0 to 3 seconds through parameter P15

2.2. Dimensions

Model KC



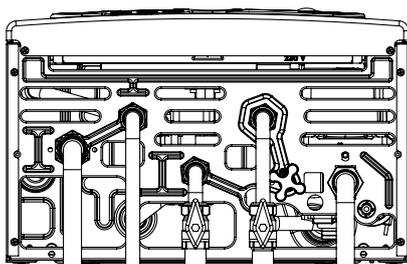
bottom view



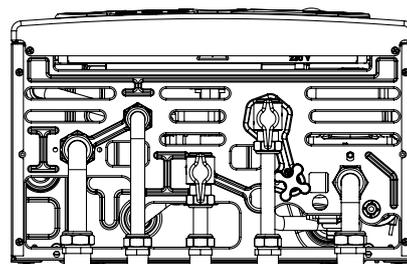
top view

- G** Gas inlet (1/2")
- M** CH flow (3/4")
- C** DHW outlet (1/2")
- F** Cold water inlet (1/2")

- R** CH return (3/4")
- S** Condensate drain
- SV** 3-bar safety valve drain cock

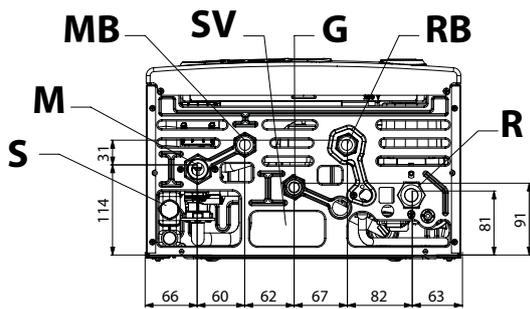
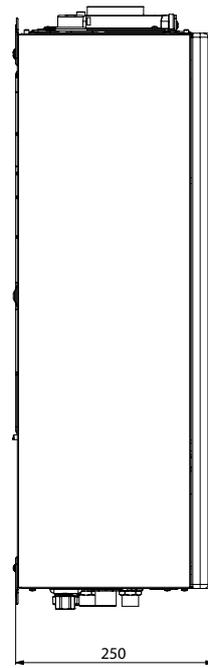
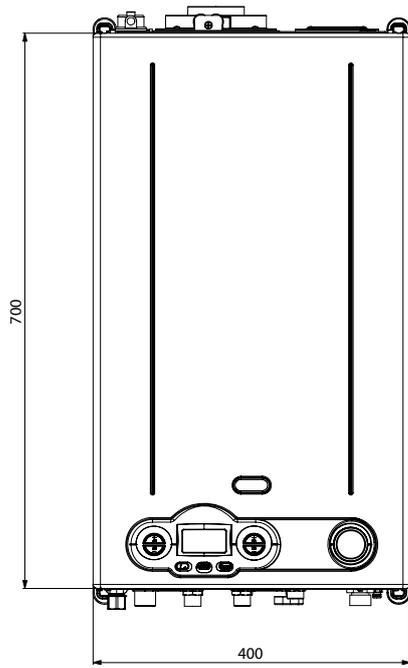


Dimensions for connection to base hydraulic kit (option)

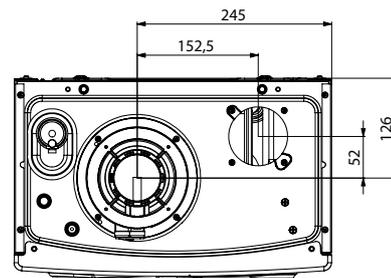


Dimensions for connection to "plus" hydraulic kit (option)

Model KRB



bottom view

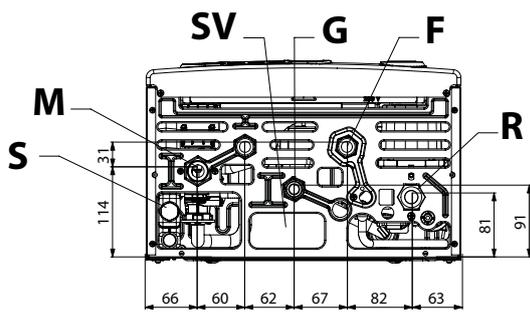
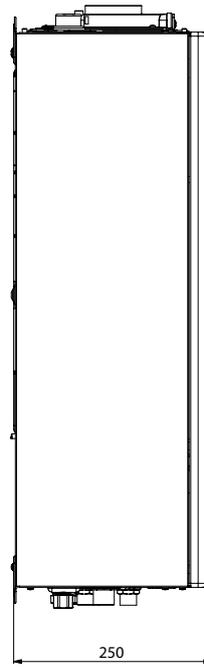
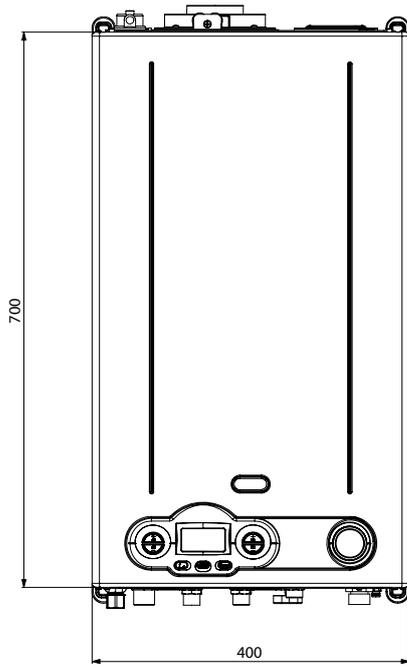


top view

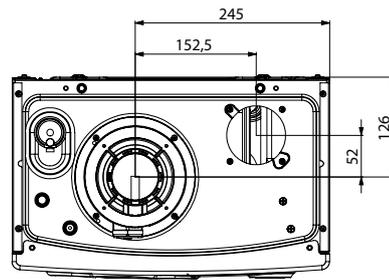
- G** Gas inlet (1/2")
- M** CH flow (3/4")
- MB** Secondary flow to water cylinder (1/2")
- RB** Secondary return from water cylinder (1/2")

- R** CH return (3/4")
- S** Condensate drain
- SV** 3-bar safety valve drain cock

Model KR



bottom view

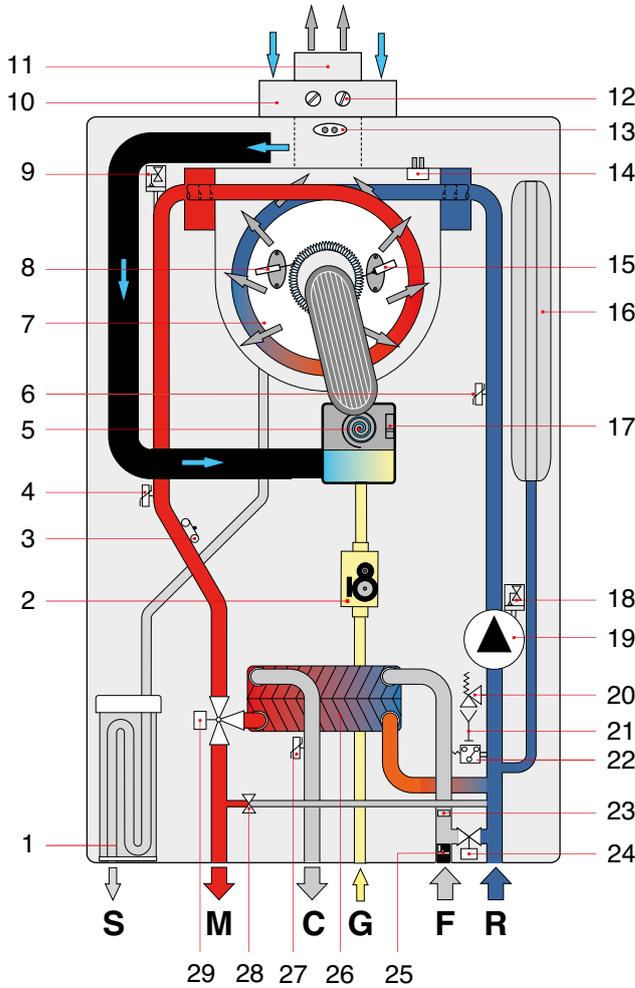


top view

- G** Gas inlet (1/2")
- M** CH flow (3/4")
- F** Cold water inlet (1/2")

- R** CH return (3/4")
- S** Condensate drain
- SV** 3-bar safety valve drain cock

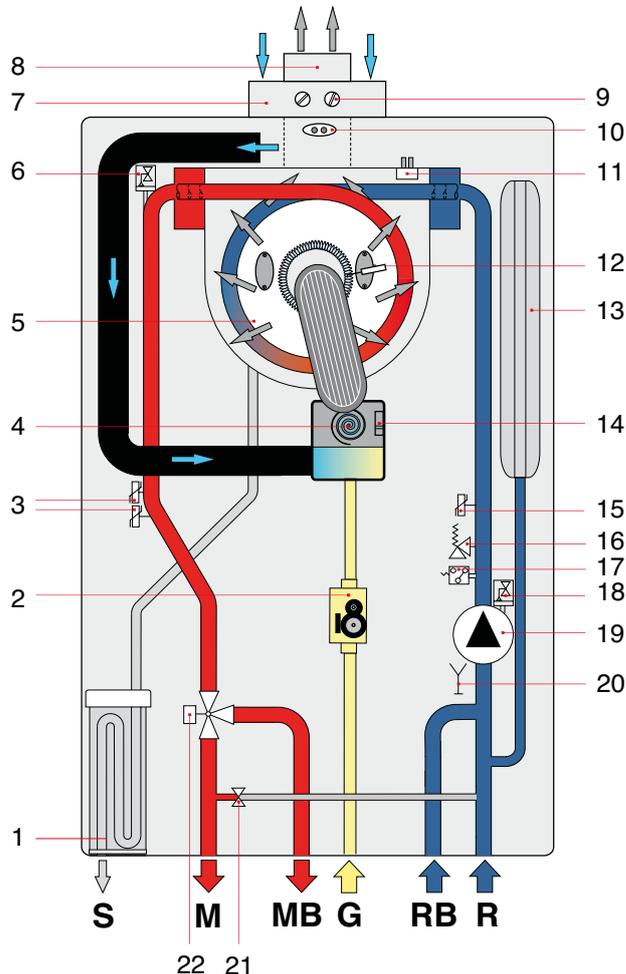
2.3. Boiler layout



1. Condensate trap
 2. Modulating gas valve
 3. Safety thermostat
 4. CH temperature probe
 5. Modulating fan
 6. CH temperature probe
 7. Main condensing heat exchanger
 8. Ignition electrode
 9. Air purging device
 10. Combustion air intake system
 11. Flue gas discharge system
 12. Flue gas analysis test points
 13. Flue gas thermostat on flue gas duct
 14. Flue gas thermostat on heat exchanger
 15. Flame sensing electrode
 16. Expansion vessel
 17. Fan management sensor
 18. Air purging device
 19. Pump
 20. 3-bar safety valve
 21. Unloading tap
 22. Minimum pressure switch
 23. Flow limiting device
 24. Filling loop
 25. Cold water flow switch with filter
 26. Secondary plate exchanger
 27. DHW probe
 28. Automatic by-pass
 29. Motorised 3-way diverter valve
- S Condensate drain
 G Gas intake
 M CH system flow
 C DHW outlet
 F Water mains inlet
 R CH system return

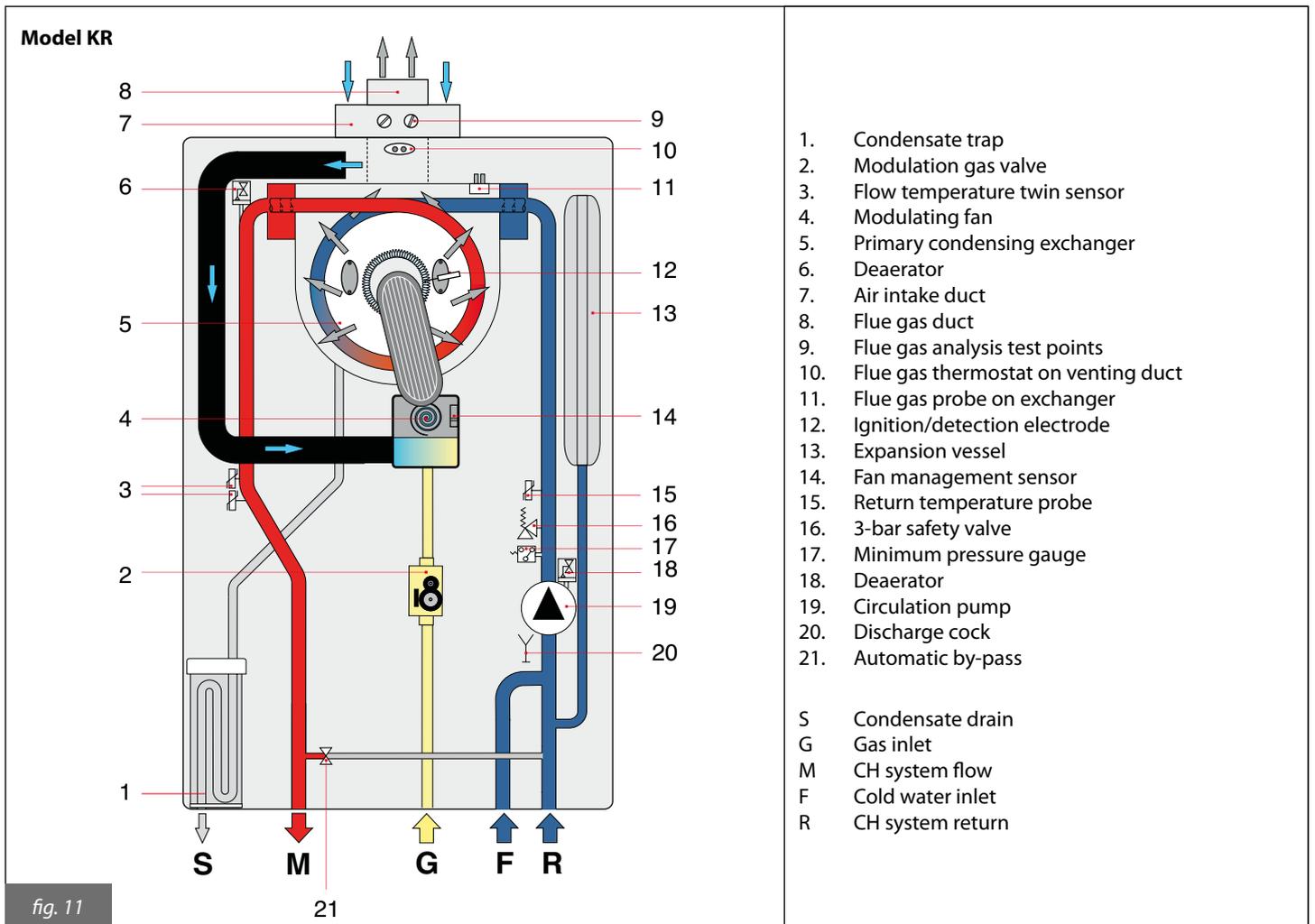
fig. 9

Model KRB



1. Condensate trap
 2. Modulation gas valve
 3. Flow temperature twin sensor
 4. Modulating fan
 5. Primary condensing exchanger
 6. Deaerator
 7. Air intake duct
 8. Flue gas duct
 9. Flue gas analysis test points
 10. Flue gas thermostat on venting duct
 11. Flue gas probe on exchanger
 12. Ignition/detection electrode
 13. Expansion vessel
 14. Fan management sensor
 15. Return temperature probe
 16. 3-bar safety valve
 17. Minimum pressure gauge
 18. Deaerator
 19. Modulating circulation pump
 20. Discharge cock
 21. Automatic by-pass
 22. Motorised 3-way valve
- S Condensate drain
 G Gas inlet
 M CH system flow
 RB Water cylinder return
 R CH system return
 MB Water cylinder flow

fig. 10



2.4. Operating data

Burner pressures must be verified after a three minute boiler operation time

KC 12

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		DHW output [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max	min	max			
Natural gas G20	12	1.8	11.6	2.1	12.6	2.0	18.4	20	3.05	9.0 ÷ 9.3
Propane Gas G31	12	1.8	11.6	2.1	12.6	2.0	18.4	37	2.50	10.0 ÷ 10.3

Table 3 – KC 12 model adjustment rates

Hot water supply ΔT 45°C = 5,73 l/min
 Hot water supply ΔT 40°C = 6,45 l/min
 Hot water supply ΔT 35°C = 7,37 l/min

Hot water supply ΔT 30°C = 8,6 l/min *
 Hot water supply ΔT 25°C = 10,32 l/min *
***Note: water mixed at tap**

KC 24

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		DHW output [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max	min	max			
Natural gas G20	23.7	2.7	22.9	3.2	24.9	3.0	27.4	20	3.70	9.0 ÷ 9.3
Propane Gas G31	23.7	2.7	22.9	3.2	24.9	3.0	27.4	37	3.00	9.8 ÷ 10.1

Table 4 – KC 24 model adjustment rates

Hot water supply ΔT 45°C = 9,0 l/min
 Hot water supply ΔT 40°C = 10,1 l/min
 Hot water supply ΔT 35°C = 11,6 l/min

Hot water supply ΔT 30°C = 13,5 l/min *
 Hot water supply ΔT 25°C = 16,2 l/min *
***Note: water mixed at tap**

KC 28

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		DHW output [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max	min	max			
Natural gas G20	26.4	3.0	25.4	3.58	28.1	3.0	29.2	20	4.00	9.0 ÷ 9.3
Propane Gas G31	26.4	3.0	25.4	3.58	28.1	3.0	29.2	37	3.30	10.0 ÷ 10.3

Table 5 – KC 28 model adjustment rates

Hot water supply ΔT 45°C = 10.0 l/min
 Hot water supply ΔT 40°C = 11.2 l/min
 Hot water supply ΔT 35°C = 12.9 l/min

Hot water supply ΔT 30°C = 15.0 l/min *
 Hot water supply ΔT 25°C = 18.0 l/min *

***Note: water mixed at tap**

KRB 12 - KR 12

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max			
Natural gas G20	12	1.8	11.6	2.1	12.6	20	3.05	9.0 ÷ 9.3
Propane Gas G31	12	1.8	11.6	2.1	12.6	37	2.50	10.0 ÷ 10.3

Table 6 – KR/KRB 12 model adjustment rates

KRB 24 - KR 24

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max			
Natural gas G20	23.7	2.7	22.9	3.2	24.9	20	3.70	9.0 ÷ 9.3
Propane Gas G31	23.7	2.7	22.9	3.2	24.9	37	3.00	9.8 ÷ 10.1

Table 7 – KR/KRB 24 model adjustment rates

KRB 28 - KR 28

Gas type	Max. CH heat input [kW]	CH heat output (80-60°C) [kW]		CH heat output (50-30°C) [kW]		Gas mains pressure [mbar]	Nozzle [mm/100]	Flue gas CO ₂ [%]
		min	max	min	max			
Natural gas G20	26.4	3.0	25.4	3.45	27.8	20	4.00	9.0 ÷ 9.3
Propane Gas G31	26.4	3.0	25.4	3.45	27.8	37	3.30	10.0 ÷ 10.3

Table 8 – KR/KRB 28 model adjustment rates

MODEL		KC/KRB/KR 12	KC/KRB/KR 24	KC/KRB/KR 28
Equipment category	-	I12H3P	I12H3P	I12H3P
Minimum CH system pressure	bar	0.5	0.5	0.5
Maximum CH system pressure	bar	3.0	3	3
DHW min. pressure	bar	0.5	0.5	0.5
DHW max. pressure	bar	6.0	6	6
DHW specific flow rate (Δt 30 K) EN 625	l/min	8.6 (KC)	13.5 (KC)	15.0 (KC)
Electric power supply – voltage / frequency	V - Hz	230 - 50	230 - 50	230 - 50
Power mains supply fuse	A	3.15	2	2
Maximum power consumption	W	131	131	133
Electric protection rating	IP	X4D	X4D	X4D
Net weight (KC)	kg	28.66	29.83	31.22
Net weight (KRB)	kg	28.38	29.21	30.55
Net weight (KR)	kg	29.50	28.92	30.26
Natural gas consumption at maximum CH output (*)	m ³ /h	1.27	2.51	2.8
Propane gas consumption at maximum CH output	kg/h	0.93	1.84	2.1
Maximum CH working temperature	°C	83	83	83
Maximum DHW working temperature	°C	62 (KC) 70 (KRB/KR)	62	62
Total capacity of expansion vessel	l	9	9	9
Maximum recommended system capacity (**)	l	200	200	200

Table 9 - General specifications

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

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

KC/KRB/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		
Chimney heat loss with burner on	%	2.64	1.92	-
Flue gas 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 10 - Combustion specifications, model KC/KRB/KR 12

KC/KRB/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		
Chimney heat loss with burner on	%	2.62	2.09	-
Flue gas 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 11 - Combustion specifications, model KC/KRB/KR 24

KC/KRB/KR 28		Max. output	Min. output	30% load
Casing heat loss with burner on	%	1.40	5.70	-
Casing heat loss with burner off	%	0.25		
Chimney heat loss with burner on	%	2.40	2.00	-
Flue gas 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 12 - Combustion specifications, model KC/KRB/KR 28

3. INSTRUCTIONS FOR INSTALLATION

3.1. Installation standards

This is an I12H3P category boiler and must be installed in compliance with laws and standards enforced 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:

- a bag containing:
 - a) boiler installation, use and maintenance manual,
 - b) template for mounting boiler on a wall (fig. 12),
 - c) two screws and wall blocks for fixing the boiler to the wall,
 - d) corrugated pipe for condensate drain.

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 discharge system" and relevant sub-paragraphs;
- check the wall for sturdiness, avoiding weak areas;
- do not install the boiler over appliances which may compromise the function of the boiler itself (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. 12), within its 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 discharge 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 level. It provides all the locations required to drill the boiler fixing holes to the wall, procedure which is done using two 'L' shaped hanging hooks and wall plugs.

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, water mains supply pipe, DHW flow pipe, 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 discharge ducts, in the case of proximity with flammable walls and passages through walls, apply insulating material between the wall and the flue gas discharge duct.

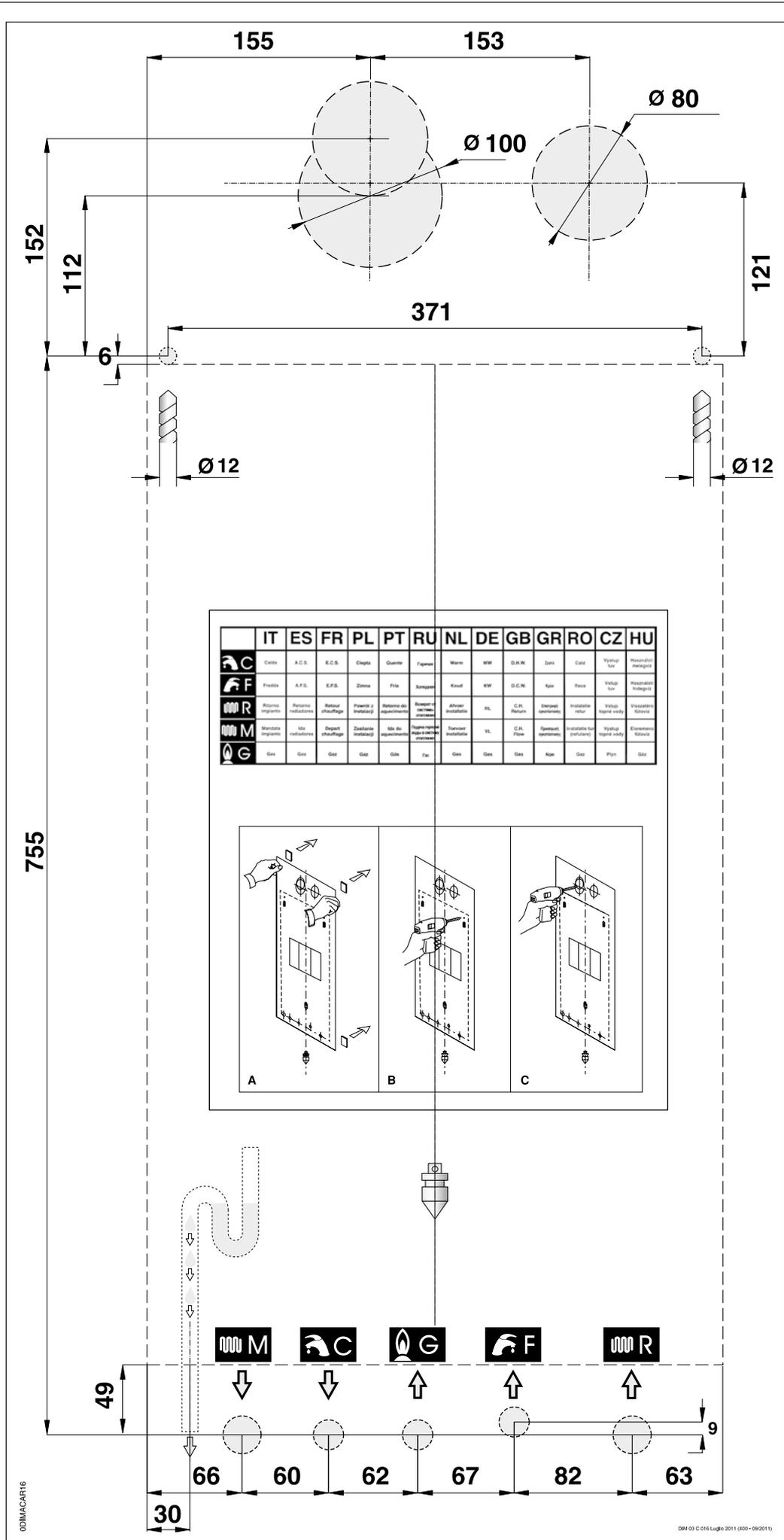


fig. 12

ODIMACRT16

DM 03 C 016 Luglio 2011 (600-092011)

3.2.4. Installing the boiler



Before connecting the boiler to CH and DHW networks, clean all primary pipe work carefully.

- Before commissioning a NEW system, clean it to remove any metal chips due to machining and welding, 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 a non-acid propriety brand product.

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. 12) to the wall;
- drill two Ø12 mm holes in the wall to accommodate the boiler wall blocks;
- if necessary, provide holes in the wall to allow air intake and/or flue gas discharge pipes to pass through it;
- position the connections for the gas mains pipe (**G**), the cold water inlet pipe (**F**, models KC and KR), the secondary return from the water cylinder **RB** (KRB only), the hot water outlet pipe (**C**, model KC only), the secondary flow to the water cylinder **MB** (model KRB only), the central heating flow (**M**) and return pipes (**R**), as indicated at the bottom of the template;
- provide a condensate drain (**S**) (fig. 6. 7, and 8) and an outlet for the 3-bar safety valve (**SV**) (fig. 6. 7, and 8);
- fasten boiler to the wall using the supplied blocks;
- connect the boiler to supply pipes (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 discharge system (refer to 3.2.6. paragraph and following sub-paragraphs);
- connect electric power supply, room 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 or area surrounding the boiler therefore specific recommendations for ventilation in the area of the appliance is not required.



It is mandatory to install the boiler in an adequate room following laws and standards applicable in the country of installation, which are considered as fully transcribed in this manual.

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 relevant legislation of the country of installation, which is considered as fully transcribed in this manual

3.2.6. Air intake and flue gas discharge system

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



The boiler is equipped with safety devices checking correct flue gas discharge. Should an air/flue gas system malfunction occur, the safety devices shut down 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 shut down, 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.

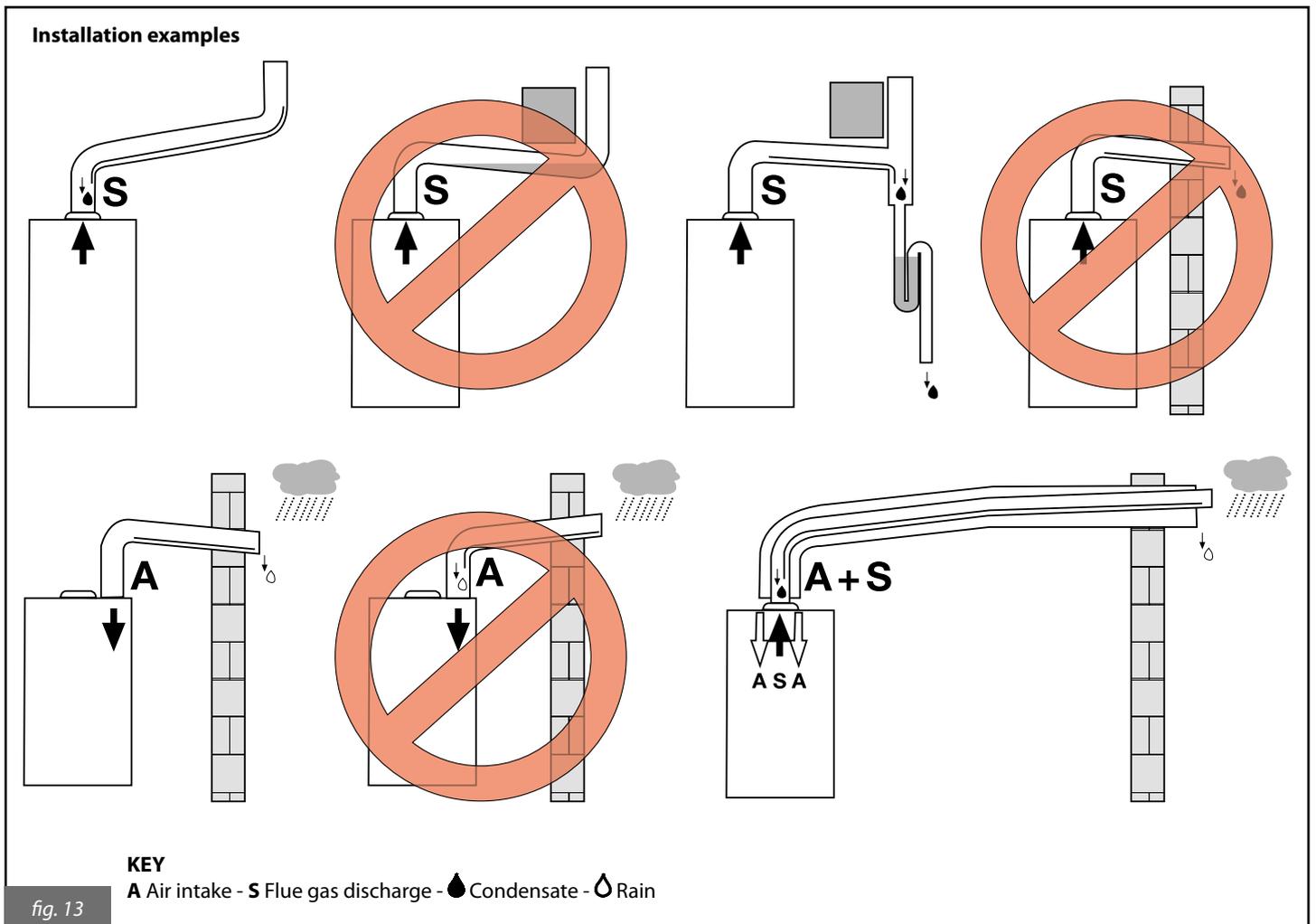


For the air intake/flue gas discharge systems, only specific, manufacturer approved, condensate acid-resistant pipes and systems must be used, suitable for condensing boilers.



Flue gas discharge 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 discharge system, with the exception of the condensate trap possibly connected to the discharge 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.



3.2.6.1. Configuration of air intake and flue gas discharge 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 does not require any cowl while it must 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 discharge terminal. Combustion air is taken directly from the boiler room itself while flue gas is conveyed to the outside.

The boiler does not require any cowl while it must be equipped with a fan mounted before the combustion chamber/heat exchanger.

Type C13

Boiler intended for connection to horizontal air intake / flue gas discharge ducts connected to the outside by means of coaxial or split ducts. The minimum distance between the air intake duct and the flue gas discharge 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 air intake / flue gas discharge ducts connected to the outside by means of coaxial or split ducts.

The minimum distance between the air intake duct and the flue gas discharge 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 air intake and one 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 air intake and flue gas discharge.

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 discharge 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 or Ø 125/80 mm air intake/flue gas discharge via coaxial ducts system



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

Type C13

KC/KRB/KR 12

Minimum permissible length of horizontal coaxial pipes is 1 meter.

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

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

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

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

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

The wall terminal reduces maximum permissible length by 1.5 meters.

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

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

KC/KRB/KR 24

Minimum permissible length of horizontal coaxial pipes is 1 meter.

Maximum permissible length of Ø 100/60 mm horizontal coaxial pipes is 10 meters.

Maximum permissible length of Ø 125/80 mm horizontal coaxial pipes is 14.5 meter.

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

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

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

The wall terminal reduces maximum permissible length by 1.5 meters.

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

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

KC/KRB/KR 28

Minimum permissible length of horizontal coaxial pipes is 1 meter.

Maximum permissible length of Ø 100/60 mm horizontal coaxial pipes is 9 meter.

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

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

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

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

The wall terminal reduces maximum permissible length by 1.5 meters.

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

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

Type C33**KC/KRB/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 100/60 mm roof coaxial terminal reduces maximum permissible length by 1.5 meters.

KC/KRB/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 100/60 mm roof coaxial terminal reduces maximum permissible length by 1.5 meters.

KC/KRB/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 100/60 mm roof coaxial terminal reduces maximum permissible length by 1.5 meters.

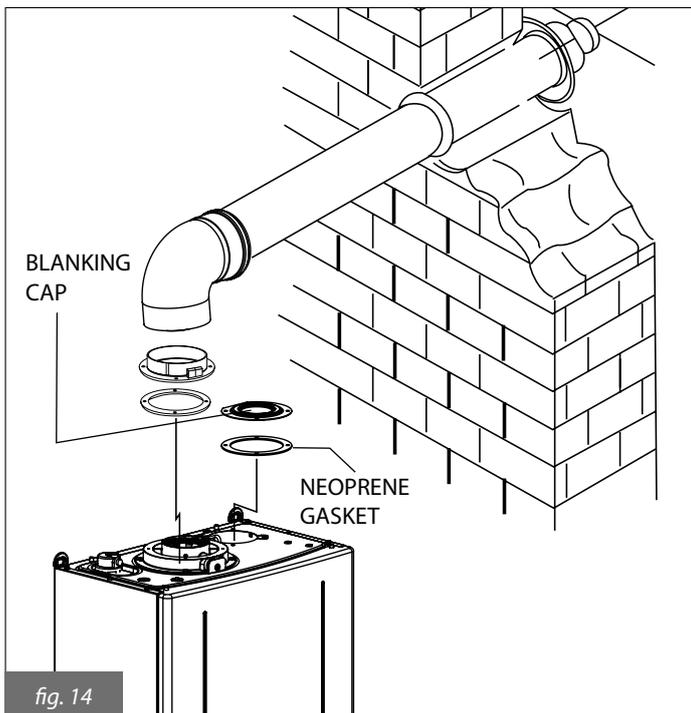


fig. 14

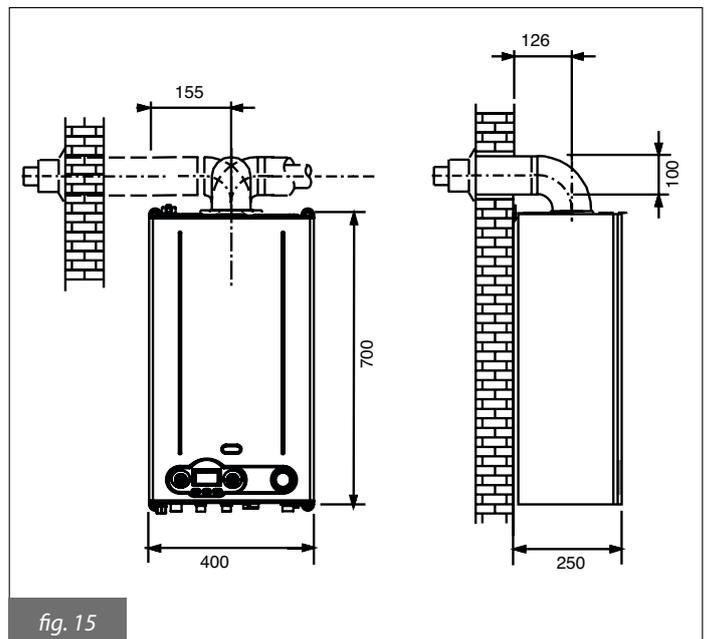


fig. 15

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

3.2.6.3. Ø 80 mm air intake/flue gas discharge via split ducts system



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

Installation types C43 - C53 - C83

KC/KRB/KR 12

Minimum permissible length of air intake duct is 1 meter.

Minimum permissible length of flue gas discharge duct is 1 meter.

Maximum permissible length of air intake/flue gas discharge ducts is 152 meters (combined length of air intake and flue gas discharge pipe length).

For each additional 1 meter of straight duct 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/KRB/KR 24

Minimum permissible length of air intake duct is 1 meter.

Minimum permissible length of flue gas discharge duct is 1 meter.

Maximum permissible length of air intake/flue gas discharge ducts is 84 meters (combined length of air intake and flue gas discharge pipe length).

For each additional 1 meter of straight duct 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/KRB/KR 28

Minimum permissible length of air intake duct is 1 meter.

Minimum permissible length of flue gas discharge duct is 1 meter.

Maximum permissible length of air intake/flue gas discharge ducts is 91 meters (combined length of air intake and flue gas discharge pipe length).

For each additional 1 meter of straight duct 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.

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



The information given is with reference to air intake/flue gas discharge 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 metres for KC/KRB/KR 12 models, 23 metres for KC/KRB/KR 24 and KC/KRB/KR models (combined length of air intake and flue gas venting pipe length).

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

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

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

The wall terminal reduces maximum permissible length by 4 metres for KC/KRB/KR 12 models and by 4.5 metres for KC/KR/KRB 24 - KC/KR/KRB 28 - KC/KR/KRB 32 models.

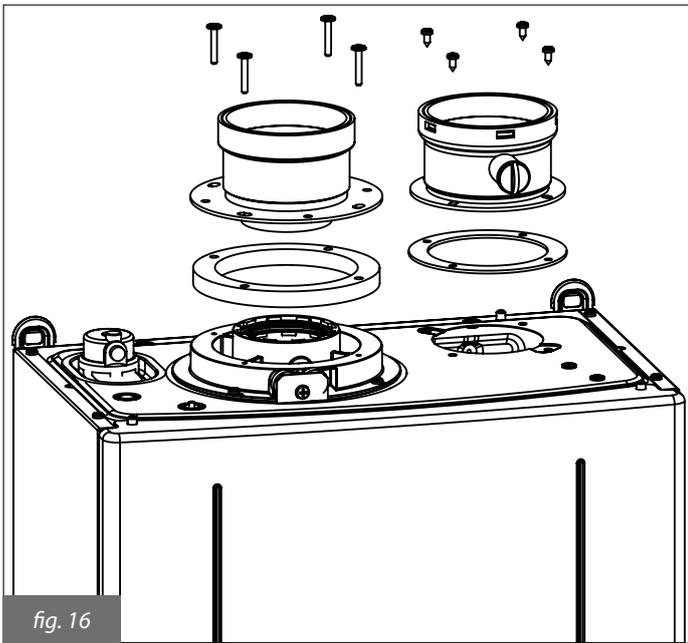


fig. 16

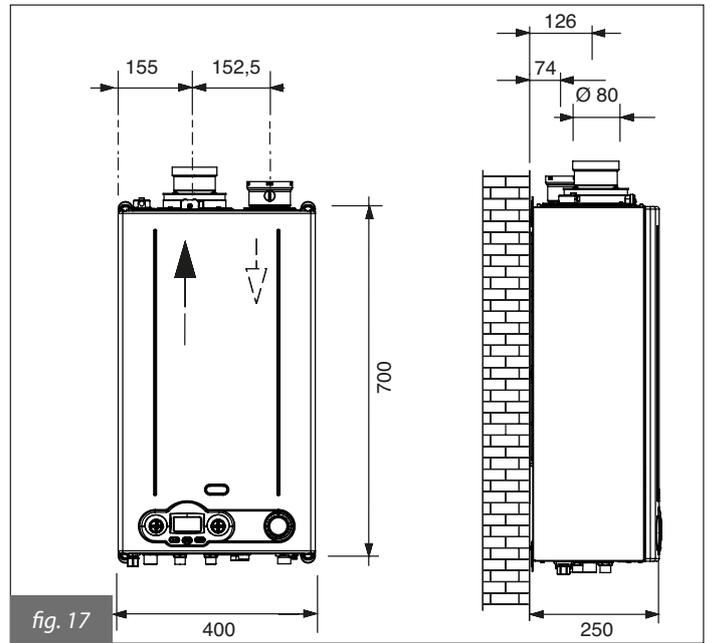


fig. 17

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 in situ combustion efficiency and to set the burner. To activate the flue cleaning function, press and hold the buttons "info" and "Reset" simultaneously for 3 seconds. The flow temperature and the symbol  are shown on the LCD.

When the flue cleaning function is activated, with the boiler in **WINTER**  or **SUMMER**  mode, the boiler performs the ignition sequence and then operates at a fixed power output predetermined by the parameter P1 (maximum CH output).

To exit the flue cleaning mode, press "Reset" or wait 15 minutes.

3.2.7.2. Measurement procedure

The boiler is equipped with a tower allowing for air intake/flue gas discharge duct connection (fig. 18 and 19).

The tower is designed with two pre-arranged openings directly accessing air and flue gas ducts (fig. 19).

Remove cap A from the pre-arranged openings on the tower, before starting combustion checking procedure (fig. 18).

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

- assess combustion air from no. 1 opening (fig. 19).
- assess flue gas temperature and CO₂ from no. 2 opening (fig. 19).

Allow boiler to reach working temperature before taking any measurement.

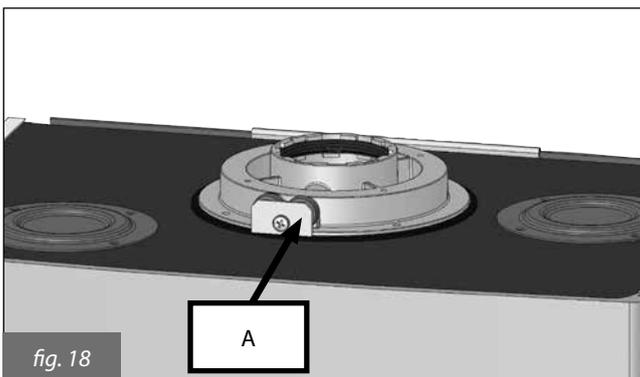


fig. 18

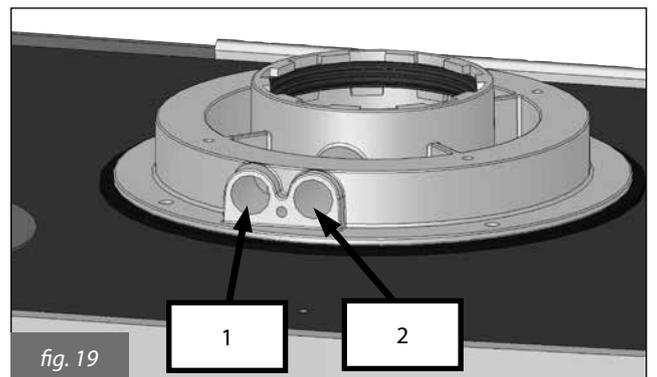


fig. 19

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 installation country which are considered as fully transcribed in this booklet.



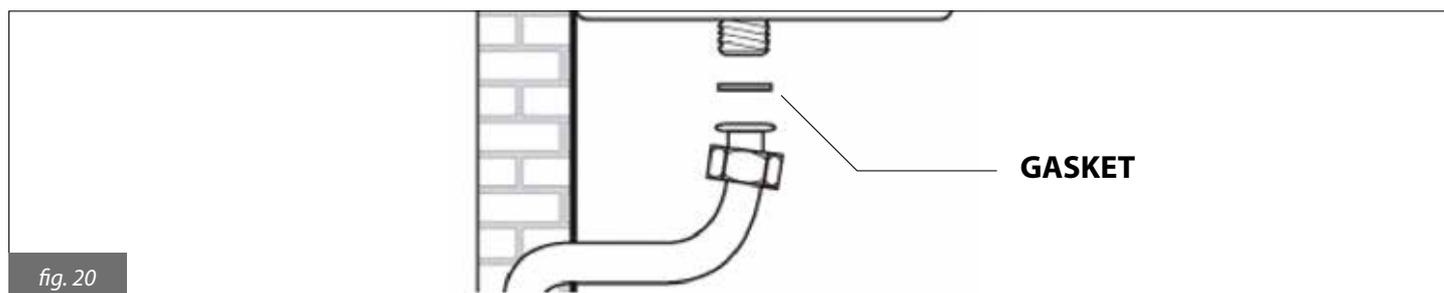
Remember that before operating an indoor gas distribution system and before connecting it to a meter, it must be tightness tested checked for leaks.

- Tightness test is to be carried out before pipes are covered.
 - Tightness 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. 20).

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.

CENTRAL HEATING

The CH outlet and return pipes must be connected to the respective 3/4" connectors (**M** and **R**) on the boiler (fig. 12).
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 the 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)

The DHW outlet and return pipes must be connected to the respective 1/2" connectors (**C** and **F**) on the boiler (fig. 12).
Hardness of water supplied to the boiler may increase the plate heat exchanger cleaning/replacement intervals.

WATER CYLINDER (Model KRB)

The secondary flow to the water cylinder and secondary return from the water cylinder must be connected to the respective 1/2" connectors **MB** and **RB** (fig. 7) which are indicated with **C** and **F** in fig. 12.



Do not discharge water from connection MB (fig. 7) 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 **S** in fig. 6, 7 and 8) 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.

WARNING

Depending on hardness level of the water supplied, it might be necessary to install a suitable water treatment device for domestic use and in compliance with applicable laws and standards.

Water treatment is always advisable when water supplied to the boiler is more than 20°F hard.

Water treated by commonly marketed water softeners, due to PH level induced in water, may not be compatible with some components of the system.

3.2.10. Connection to electrical mains

The boiler is supplied with a three-core 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 considered as an integral part of this booklet.

An easily accessible two-poled switch, with a minimum 3 mm distance between contacts, is to be installed adjacent to 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.



WARNING

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

3.2.11. Connection to room thermostat (optional)

The boiler is designed to be connected to a room thermostat (not supplied with the boiler).

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

Room thermostat wiring must be connected to the relevant terminal (see wiring diagram, fig. 18), after removing the jumper supplied as standard with the boiler.

The room thermostat wirings are NOT to be grouped together in the same sheath as power mains supply cables.

3.2.12. 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.

If non-original remote controls are used, correct operation of the boiler, or of the remote control, cannot be guaranteed.

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).

Central heating and DHW functions are activated and deactivated directly from the remote control. Once the remote control has been installed, the boiler LCD will display the following page:



For complete instructions on how to programme the remote control, refer to the instruction manual included in the remote control kit.

The remote control may be used to view and set a number of special parameters denominated TSP parameters and reserved solely for qualified technicians (table 13).

TSP0 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 24 kW Propane	Default 28 kW Nat. gas	Default 28 kW Propane
TSP0 Boiler type and default data chart	0 - 5	0	5	1	3	2	4
TSP4 Fan speed at burner maximum power (DHW)	P5 ÷ 250 Hz	187 Hz	181 Hz	199 Hz	192 Hz	201 Hz	198 Hz
TSP5 Fan speed at burner minimum power (DHW and CH)	25 ÷ 120 Hz	39 Hz	39 Hz	42 Hz	42 Hz	40 Hz	40 Hz
TSP6 Fan speed at burner ignition power and flame propagation	25 ÷ 160 Hz	48 Hz	48 Hz	58 Hz	58 Hz	60 Hz	60 Hz
TSP7 Upper limit for maximum CH output can be set via parameter TSP7	10 ÷ 100 %	75%	75%	88%	88%	88%	88%
TSP10 Heating output curves	0 ÷ 3	1,5	1,5	1,5	1,5	1,5	1,5

Table 13 - Limits to be set for TSP parameters and default values in relation to boiler type (TSP0)

3.2.13. Installation of the (optional) external probe and “Weather compensation” operation

The boiler can be connected to an (optional) external temperature probe for “weather compensation” 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. 18).

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

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

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

- the outdoor temperature measured
- the thermoregulation curve selected
- the calculated room temperature selected.

The thermoregulation curve is selected via parameter **P10**.

During adjustment, the set value will flash on LCD. Such value can also be read as parameter **TSP10** on the Remote Control (when installed).

The relation between parameter TSP10 setting and the thermoregulation curve coefficient is the following:

$$\text{coefficient} = \text{TSP10 value} / 84.67$$

The calculated room temperature is set using buttons **6** (fig.1) that, with external temperature probe installed, no longer work to set the heating water temperature. Fig. 21 shows the curves for a calculated room temperature of 20°C.

Increasing or decreasing this value using buttons **6**, the curves shift up or down, respectively, by the same amount.

With a 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.

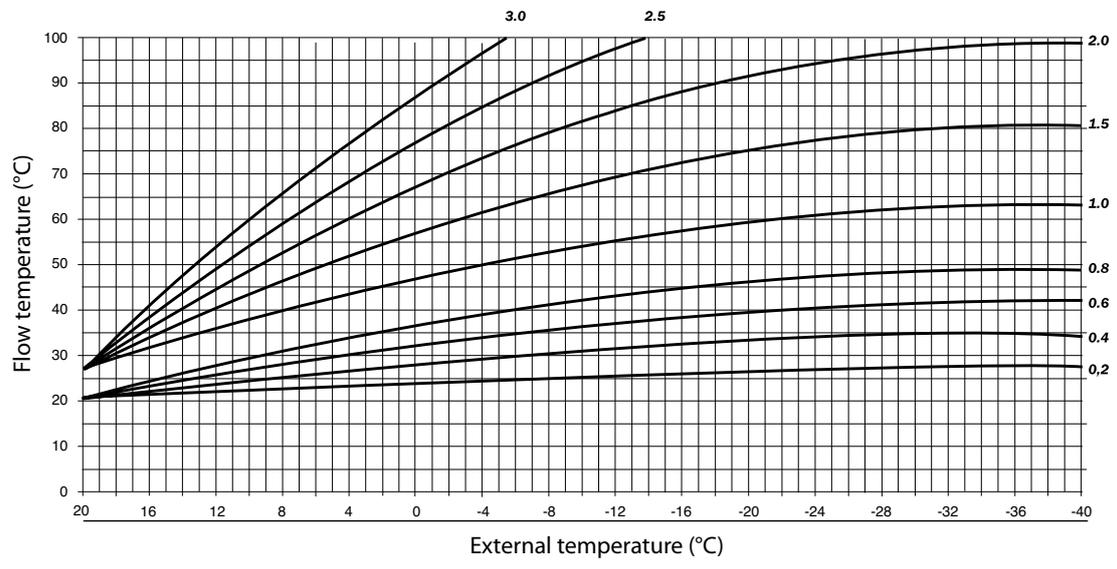


fig. 21

3.2.14. Parameters that can be set from boiler and remote control

Parameter	Configurable value range	Default values	Notes
P0 - TSP0 Boiler output selection	0 to 4	1	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
P3 - TSP3 Boiler type selection	1 to 3	1	1= combi boiler with plate heat exchanger for DHW, 2=heating only, 3=heater
P4 - TSP4 Fan speed at burner maximum output	Value P5 ÷ 250 Hz	187 (12 kW natural gas) 181 (12 kW propane) 199 (24 kW natural gas) 201 (28 kW natural gas) 192 (24 kW propane) 198 (28 kW propane)	
P5 - TSP5 Fan speed at burner minimum output	25 to 120 Hz	39 (12 kW) 42 (24 kW) 40 (28 kW)	
P6 - TSP6 Fan speed at burner ignition output	25 to 160 Hz	48 (12 kW) 58 (24 kW) 60 (28 kW)	
P7 - TSP7 Maximum CH output setting	10 to 100 %	77 % (12 kW) 88 % (24-28 kW)	
P8 - TSP8 Minimum starting speed of negative ramp start	Value P5 ÷ Value P6	56 (12-24 kW) 60 (28 kW)	
P9 - TSP9 Negative ramp time	0 to 300 s	18 (180 s)	18 (180 s) : 12-24 kW natural gas/propane 25 (250 s) : 28 kW natural gas/propane
P10 - TSP10 Heating output curves	0 to 3	1.5	
P11 - TSP11 CH thermostat timer	0 to 10 min	4 minutes	
P12 - TSP12 CH power increase ramp timer	0 to 10 min	1 minute	
P13 - TSP13 Timer for CH post-circulation, freeze protection and flue cleaning function	30 to 180 s	30 s	
P15 - TSP15 Water hammer protection delay, configurable	0 to 3 s	0 s	
P16 - TSP16 Ambient thermostat / OpenTherm reading delay	0 to 199 s	0 s	
P17 - TSP17 Multifunction relay settings	0 to 3	0	0 = shutdown and fault, 1 = remote relay/TA1, 3 = request TA2
P27 - TSP27 CH timer reset temperature	20 to 78 °C	40°C	
P28 - TSP28 Hydraulic selection for deviating valve relay control	0 to 1	0	0 = recirculating pump and deviating valve, 1 = double pump
P29 - TSP29 Default parameters set except for P0-P1-P2-P17-P28	0 to 1	1	0 = off
P30 - TSP30 Display of external temperature			
P31 Display of flow temperature			

P32 Display of max calculated flow temperature (with thermoregulation only)			
P33 Display of flow temperature setpoint for zone 2			
P34 Display of current flow temperature for zone 2			
P36 Display of flow temperature setpoint for zone 3			
P37 Display of current flow temperature for zone 3			
P39 Display of flow temperature setpoint for zone 4			
P40 Display of current flow temperature for zone 4			
P42 Display of DHW plate heat exchanger temperature			
P43 Display of boiler return temperature			
P44 Display of boiler temperature			
P45 Display of flue gas temperature			
P50 Display of boiler type	X, Y, Z		X = value P0, Y = value P2, Z = value P18
P51 Display of most recent boiler shutdown/fault	Fault code		
P52 Display of second last boiler shutdown/fault	Fault code		
P53 Display of third last boiler shutdown/fault	Fault code		
P54 Display of fourth last boiler shutdown/fault	Fault code		
P55 Display of fifth last boiler shutdown/fault	Fault code		

Table 14 - Configurable limits for TSP parameters and default values

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:

- open the air purging valves on all radiators and verify the boiler automatic valve operation;
- Gradually open the relevant filling loop connection (fig. 3), 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 filling loop 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 boiler and wait for the pump to stop, then repeat the air bleeding procedures;
- allow the system to cool and restore water pressure to 1÷1.3 bars.

WARNING

As regards treating water in domestic heating systems, it is advisable to use propriety branded products that are suitable for multi-metal plants, in order to optimize performance and safety, preserve these conditions over time, ensure regular operation of auxiliary equipment as well, and minimize energy consumption, in compliance with the applicable laws and standards.

WARNING

The electronic control system protecting the heating system will not electrically enable the burner ignition when water flow rate is too low.

The low water safety pressure switch will not electrically enable the burner ignition when water pressure is below 0.4÷0.6 bar.

CH water pressure is not to be less than 1 bar. Restore proper value as needed, via the filling cock of the boiler (fig. 3, 4 and 5) or the cock on the cold water supply pipe (for models KRB/KR).

The procedure is to be followed while the system is cold. The pressure gauge fitted on the boiler control panel indicates the pressure in the CH 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, by 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 discharge 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 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 gas supplied to the boiler must be of the type for which the boiler is designed. If necessary, convert the boiler following the instructions in subsection 3.7. *Adaptation to other gases and burner adjustment*. This operation must be carried out by a qualified service engineer;
- the gas supply cock is open;
- **the gas tightness test shows there are no gas leaks;**
- the main switch installed adjacent to 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 pump; three different residual head values correspond to each speed, according to the curves shown in figures 22, 23 and 24.

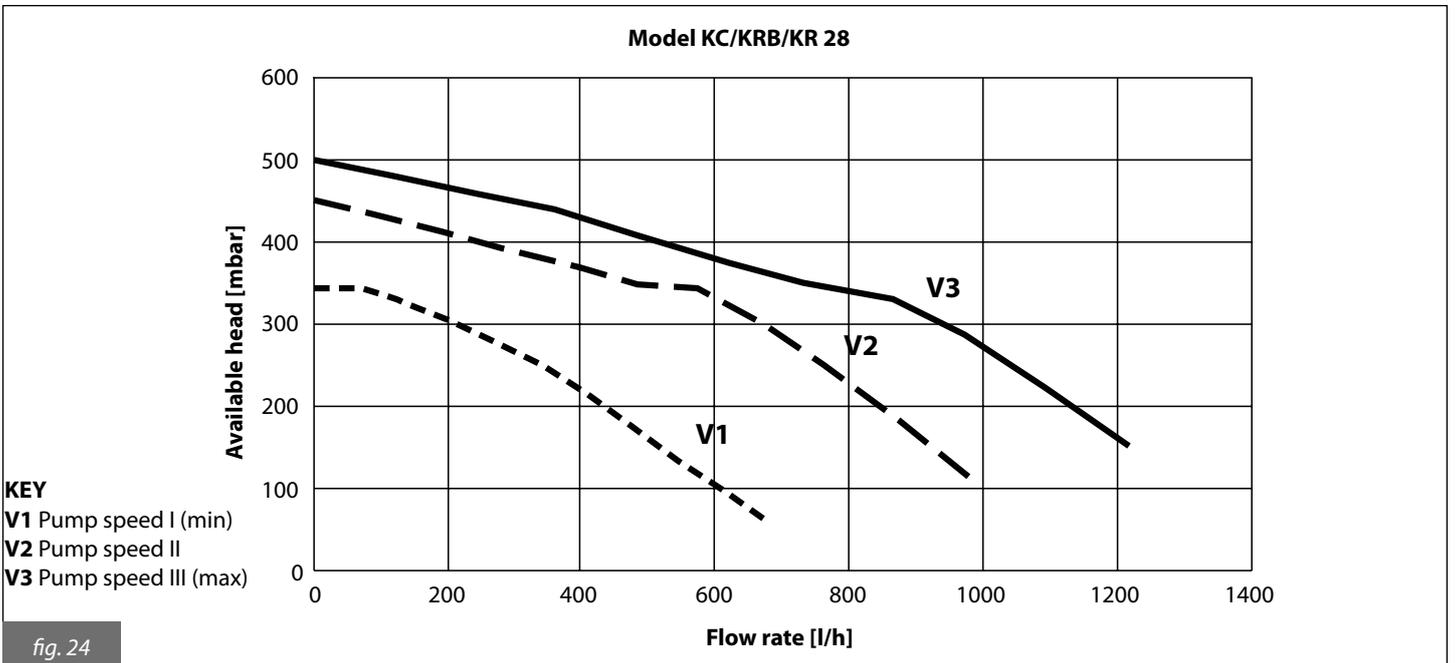
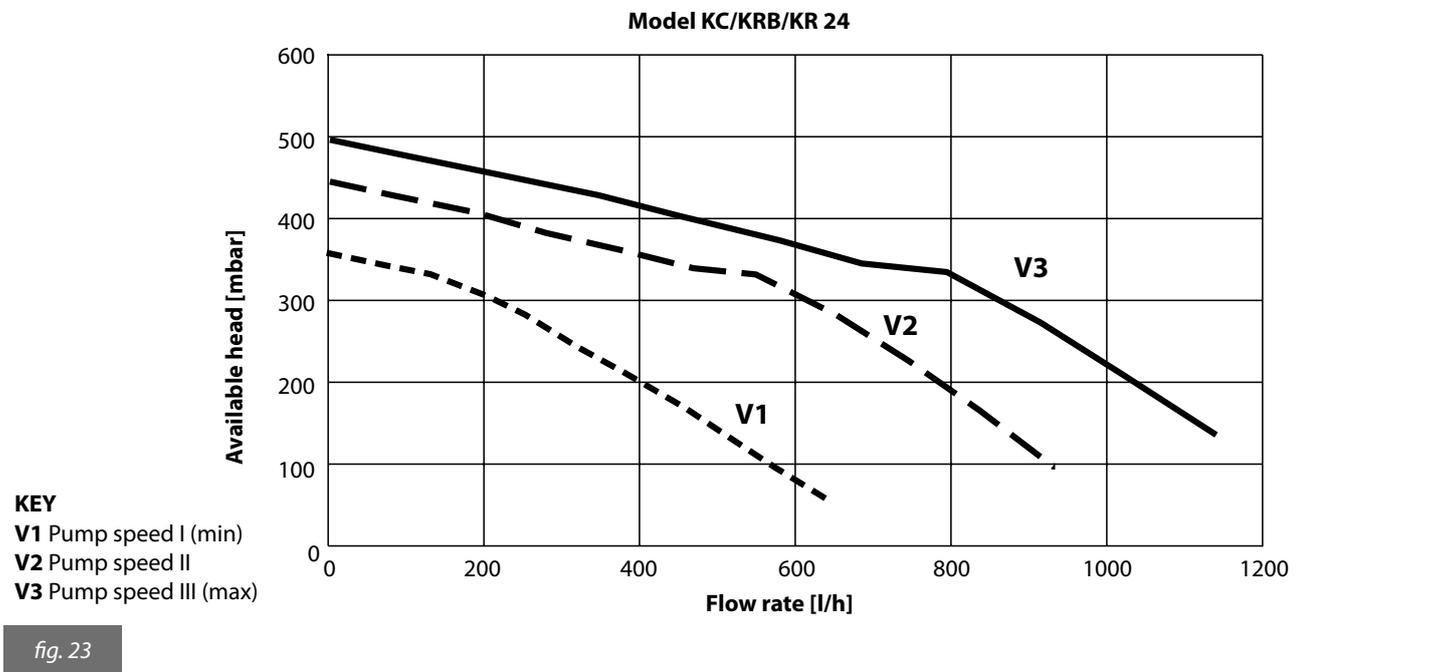
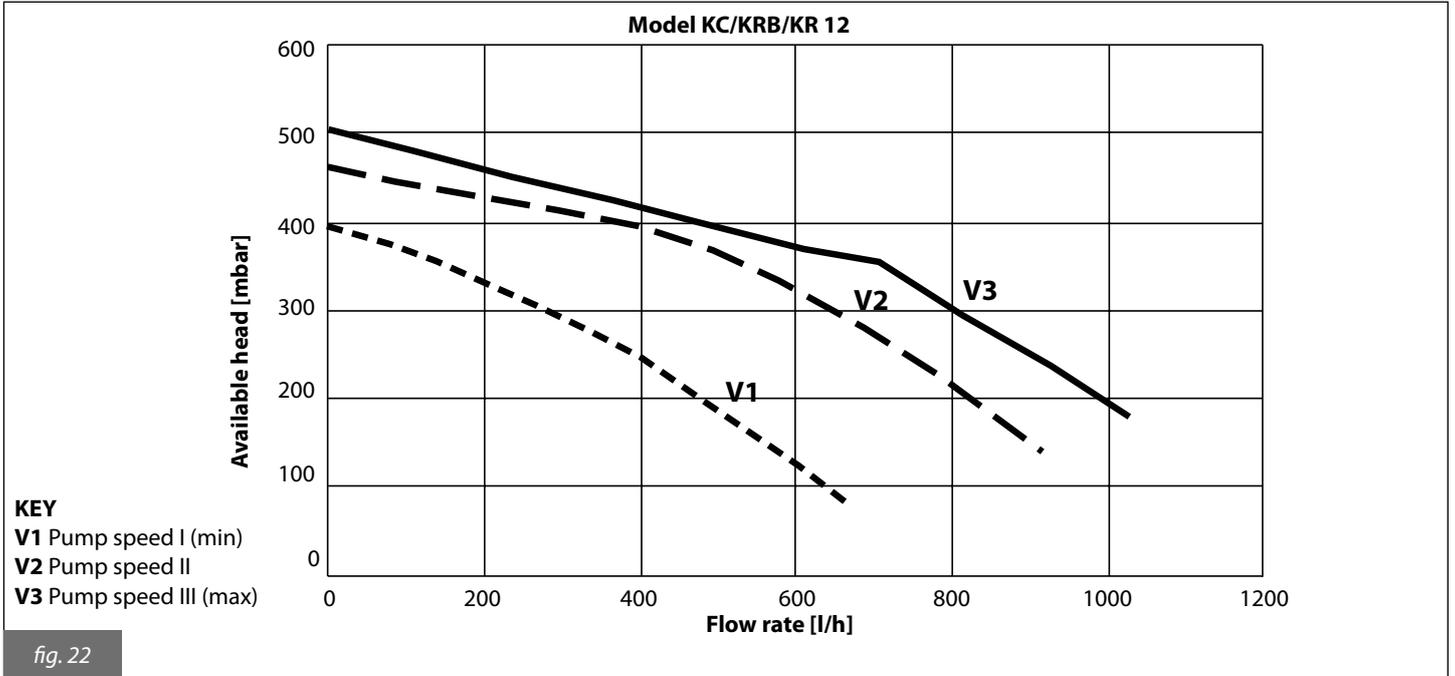
It is delivered with the circulation pump set at the third speed setting.

If you wish to set a different speed, taking into account the water circulation requirements in the boiler (confirmed by the main water flow switch) 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



3.6. Wiring diagram

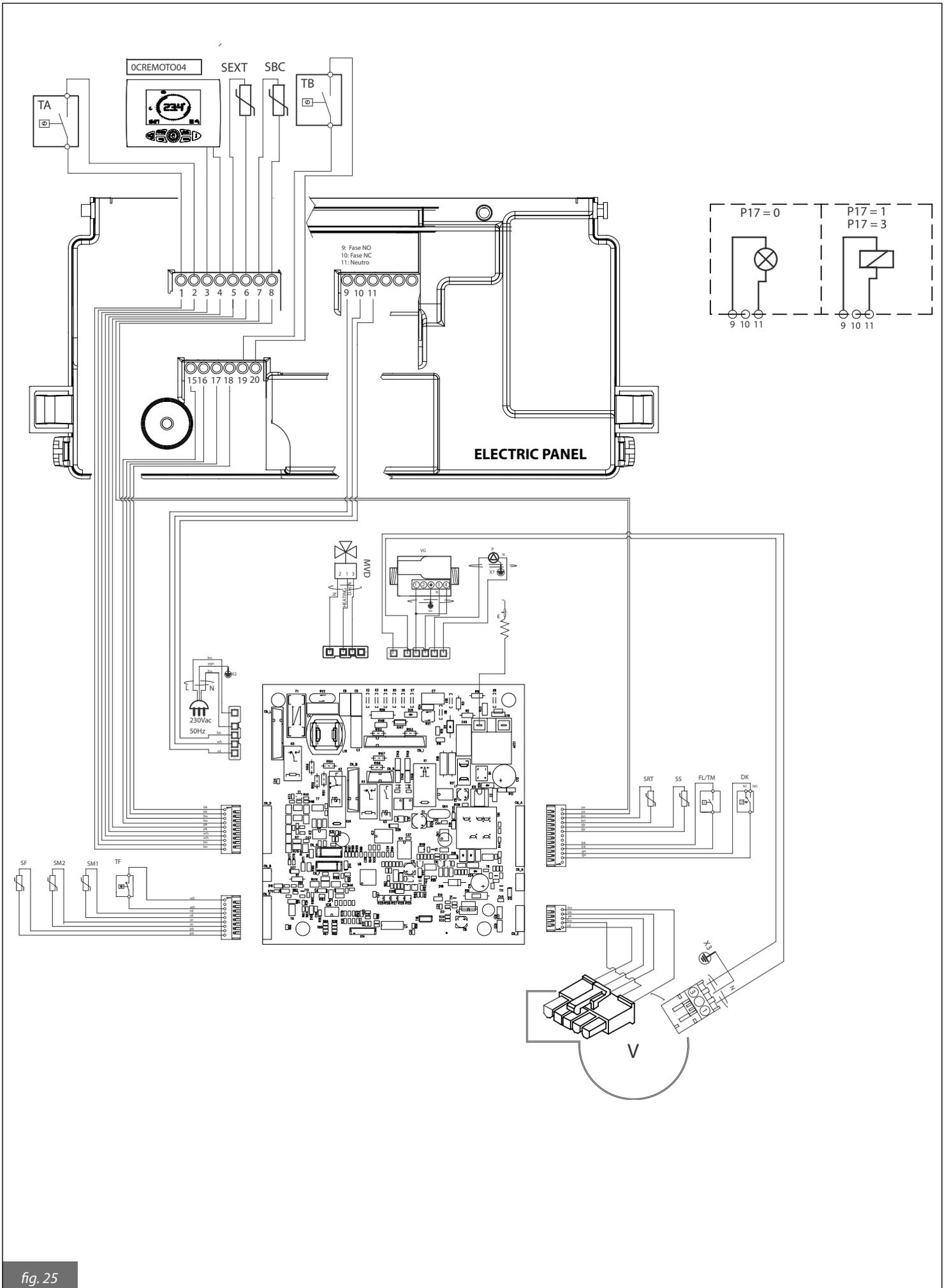


fig. 25

Key

DK: water pressure switch
FL/TM: flow switch (mod. KC)/timer (KRB/KR)
SS: DHW NTC probe 10K Ohm at 25 °C
 B=3435
STR: return NTC probe 10K Ohm at
 25 °C B=3435
SR1-SR2: CH NTC probe 10K Ohm at 25 °C
 B=3435
SF: flue gas NTC probe 10K Ohm at 25 °C
 B=3435 or thermal fuse

VG: gas valve
P: boiler pump
MDV: electric deviating valve
E: ignition/flame detection electrode
V: brushless fan
OSCHEMOD22: electronic board
CN_A-CN_M: signal/load connectors
X2-X7: ground connectors
TA (PIN 1 and 2): room thermostat (use
 a no load contact)

OCREMOTO04 (PIN 3 and 4): OpenTherm
 remote control
SEXT (PIN 5 and 6): external NTC probe 10K
 Ohm at 25 °C B=3977
SBC: water heater probe, boiler side, NTC 10K
 Ohm at 25 °C B=3435
MULTIFUNCTION RELAY 230 Vac 5A
cosφ=1:
 PIN 15: phase, normally open
 PIN 16: phase, normally closed
 PIN 17: neutral

Relationship between temperature (°C) and nominal resistance (Ohm) of the central heating probe (SR), of the DHW probe (SS) and of the return probe (SRT).

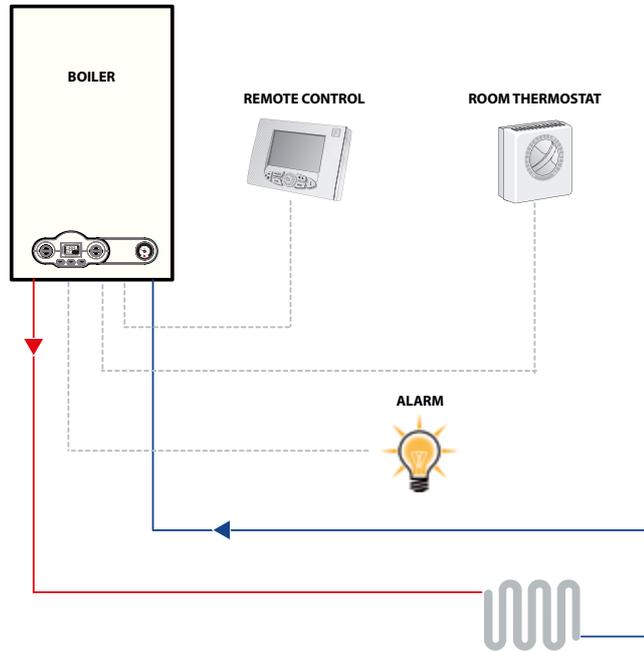
T (°C)	0	2	4	6	8
0	27203	24979	22959	21122	19451
10	17928	16539	15271	14113	13054
20	12084	11196	10382	9634	8948
30	8317	7736	7202	6709	6254
40	5835	5448	5090	4758	4452
50	4168	3904	3660	3433	3222
60	3026	2844	2674	2516	2369
70	2232	2104	1984	1872	1767
80	1670	1578	1492	1412	1336
90	1266	1199	1137	1079	1023

Table 15 - Relationship between Temperature and Nominal resistance for temperature probes

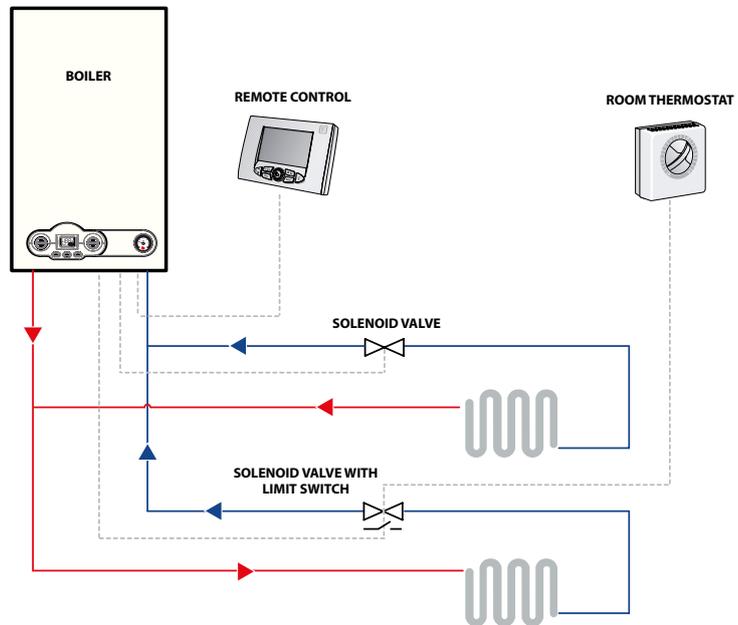
Boilers are equipped with a multifunction relay that can be selected using the relevant parameter P17-TSP17 (see table 14).
 Provided functions are the following:

- remote alarm signal (ALARM reference);
- additional zone relay (REMOTE reference);
- booster pump control (ROOM THERMOSTAT reference).

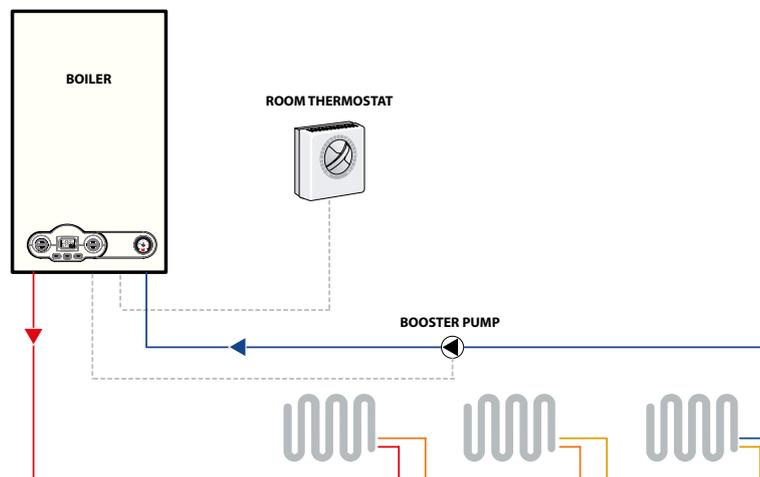
**ALARM REFERENCE
P17=0**



**REMOTE REFERENCE
P17=1**



**ROOM THERMOSTAT
REFERENCE
P17=3**



3.7. Conversion 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 conversion is to be exclusively carried out by qualified personnel, using only manufacturer-approved accessories and following the procedure and adjustment instructions for an accurate boiler setting-up.

3.7.1. Switching from NATURAL GAS to PROPANE

- Remove boiler outer front panel as described in picture 26 and 27; remove the combustion chamber front door.
- Remove air-intake pipe.
- Disconnect gas pipe from mixer (A, fig. 30) and open the mixer (fig. 29).
- Replace the nozzles in the mixer (fig. 29) with the ones for **PROPANE** (see tables 3, 4, 5, 6 and 7).
- Restore the mixer and change the value of parameter P00 from 1 to 3.
- See par. 3.7.3.

3.7.2. Switching from PROPANE to NATURAL GAS

- Remove boiler outer front panel as described in picture 26 and 27; remove the combustion chamber front door.
- Remove air-intake pipe.
- Disconnect gas pipe from mixer (A, fig. 30) and open the mixer (fig. 29).
- Replace the nozzles in the mixer (fig. 29) with the ones for **NATURAL GAS** (see tables 3, 4, 5, 6 and 7).
- Restore the mixer and change the value of parameter P00 from 1 to 3.
- See par. 3.7.3.



3.7.3. Burner adjustment

Maximum heat output adjustment

- Start boiler in flue cleaning mode (see paragraph 3.2.7.1);
- Set fan speed according to the type of gas (see table 16).
- Set flue gas CO₂ rate by turning the ratio adjuster B (fig. 28) and ensure that reading falls within the limits of table 17.
- Let boiler flue cleaning function on and continue with the next point "Minimum heat output adjustment".

Fuel	Fan speed
Natural gas (12 kW)	187 Hz
Propane (12 kW)	181 Hz
Natural gas (24 kW)	199 Hz
Propane (24 kW)	192 Hz
Natural gas (28 kW)	201 Hz
Propane (28 kW)	198 Hz

Table 16 - Fan speeds

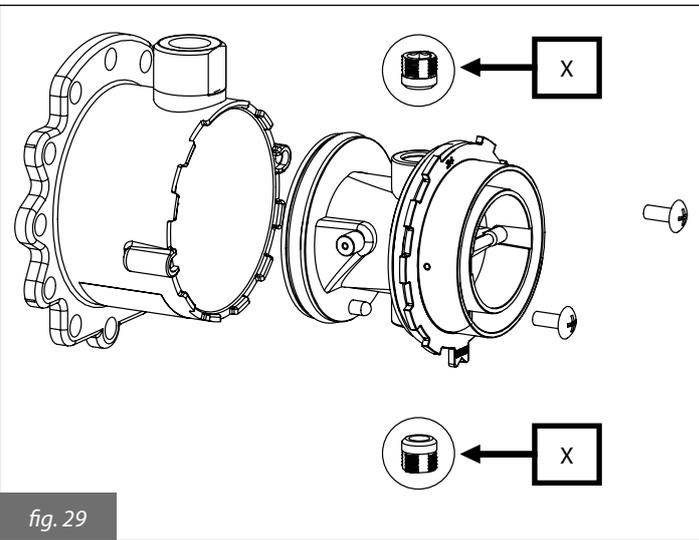
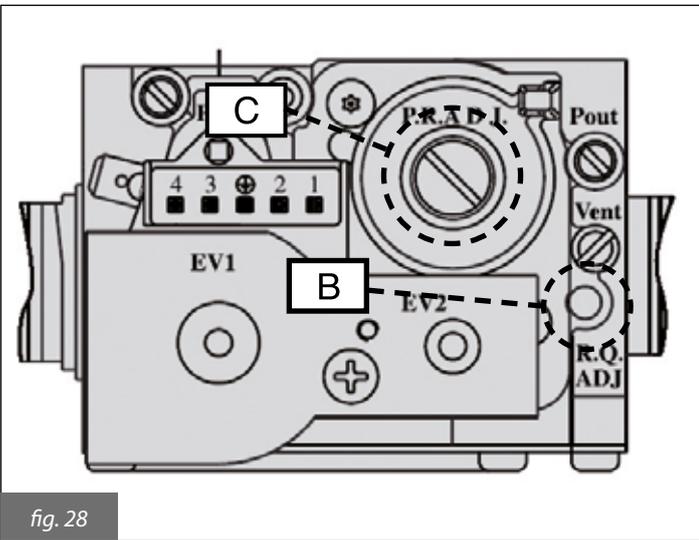
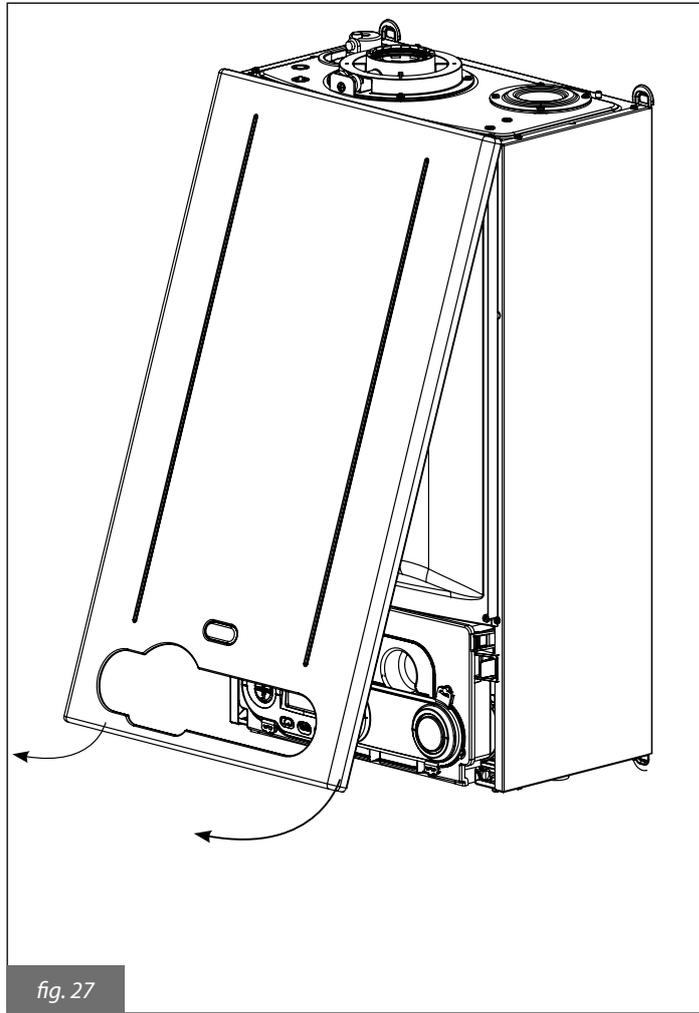
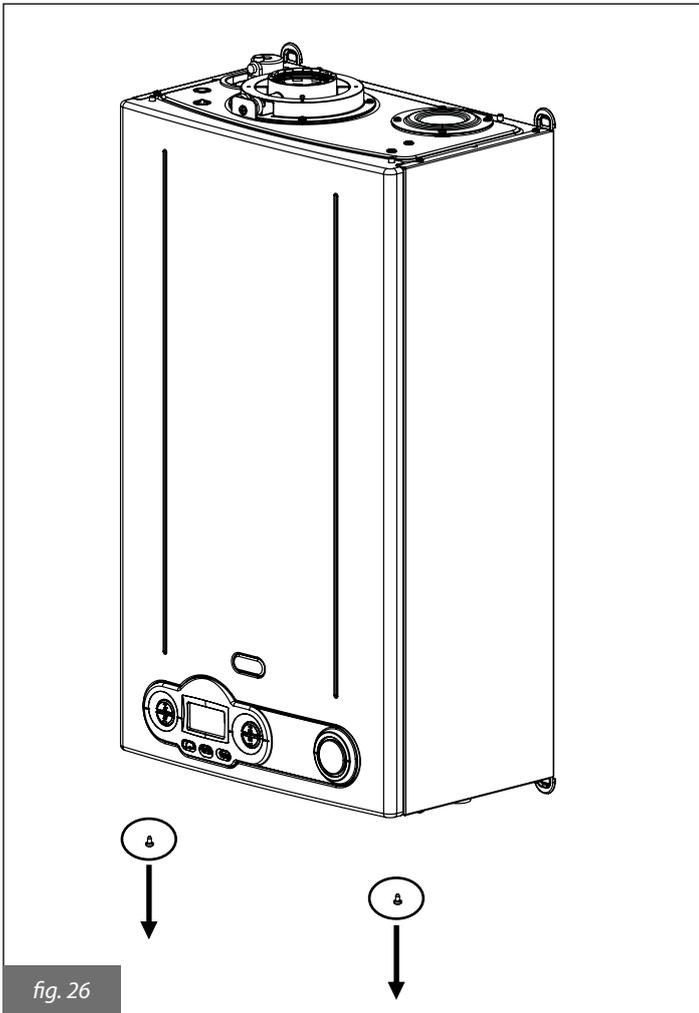
Minimum heat output adjustment

- Press button "+ DHW";
- Set flue gas CO₂ rate by turning the offset adjuster C (fig. 28) and ensure that reading falls within the limits of table 17.
- To turn off the flue cleaning function press "Reset" or select another boiler operating mode.

Flue gas CO₂

Fuel	CO ₂ (%)
Natural gas (12 kW)	9.0 ÷ 9.3
Propane (12 kW)	10.0 ÷ 10.3
Natural gas (24 kW)	9.0 ÷ 9.3
Propane (24 kW)	9.8 ÷ 10.2
Natural gas (28 kW)	9.0 ÷ 9.3
Propane (28 kW)	10.0 ÷ 10.3

Table 17 - CO₂ rates



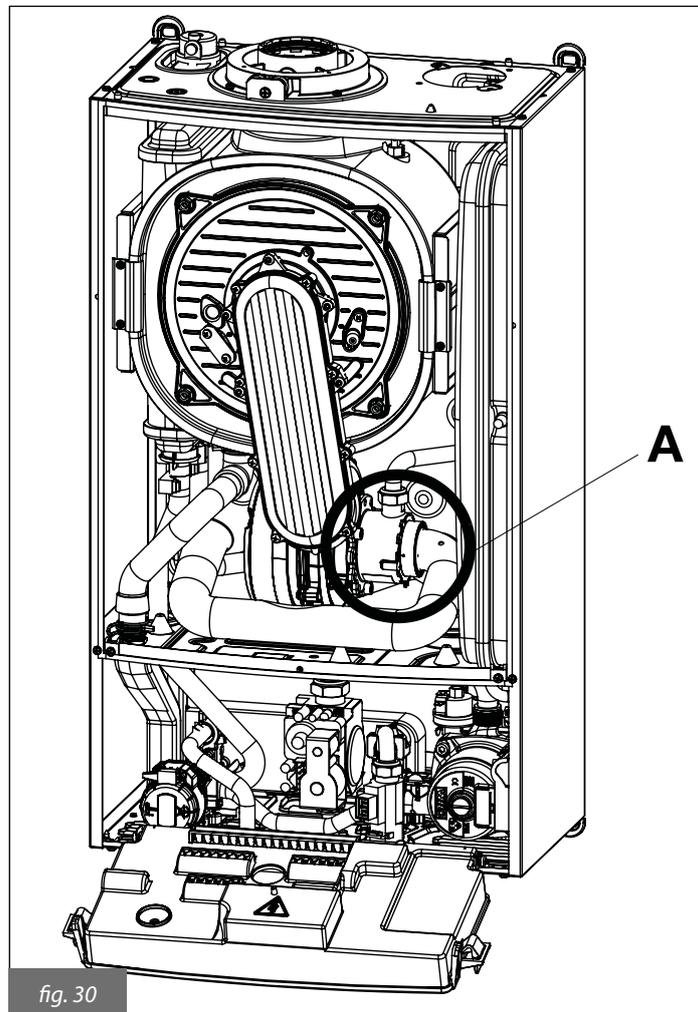


fig. 30

4. TESTING THE BOILER

4.1. Preliminary checks

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

- the flue gas discharge 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 gas supplied to the boiler must be of the type for which the boiler is designed. If necessary, convert the boiler following the instructions in subsection 3.7. *Adaptation to other gases and burner adjustment*. This operation must be carried out by a qualified service engineer;
- the gas supply cock is open;
- **there are no 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.



If the boiler not be installed in compliance with these installation instructions, current laws and standards, notify the responsible person for the system 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 manufacturer recommends Customers to contact qualified Service Centres for maintenance and repairs, they are best trained for that procedure.

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.



Isolate the appliance from the electric power supply before starting any maintenance procedure, involving replacement of components and/or cleaning inside parts of boiler.

The combustion chamber internal insulating material contains aluminium silicate wool (RCF/ASW).

Tests on animals have shown that the inhalation of RCF/ASW powder can cause the cancer.

Avoid inhaling the powder released by such material.

Use the personal protection equipment as recommended.

Read the ECFA code of conduct as well as the safety sheets before using the products.

For further information, please visit the website www.label.ecfia.eu

Only skilled personnel is allowed to handle this material.

Routine maintenance schedule are to include the following:

Inspections and checks:

- check visually general integrity of the boiler;
- check boiler and network gas supply for leakage;
- check inlet 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 discharge 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 loading pressure;
- check safety flow switch, preventing low water pressure operation;
- check correct draining of condensate from the condensate trap installed on the boiler;
- check visually the flue discharge pipe throughout the flue length.

The following cleaning is to be done:

- clean the general interior of the boiler;
- clean the gas nozzles;
- clean the air intake and flue gas discharge circuits;
- clean the heat exchanger (burner side);
- 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.

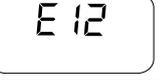
Should the boiler not operate correctly, while not posing danger to people, animals or property, notify the system supervisor both verbally and in writing.

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, which are considered as fully transcribed in this manual.

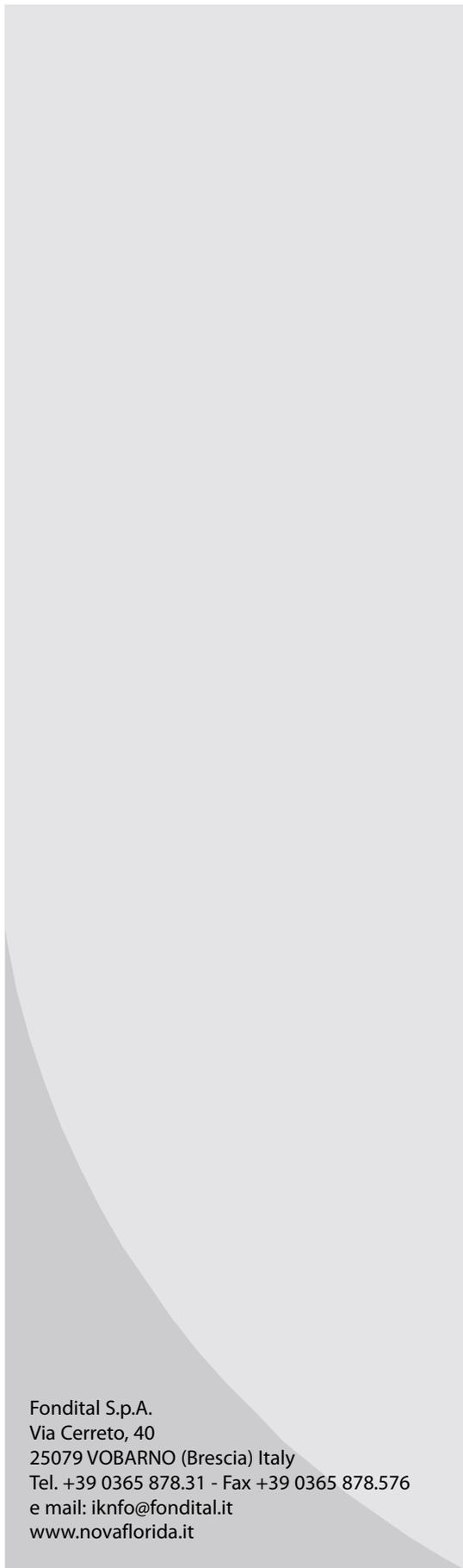
6. TABLE OF FAULT CODES

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
<p>Boiler in shutdown state, fault code E01 shown on LCD display. Press the Reset button to restore operation.</p> 	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
		PCB is faulty	Replace it
	Burner does not ignite: there is no spark	Ignition/detection electrode faulty	Replace the electrode
		Ignition transformer faulty.	Replace the ignition transformer.
		Electronic board does not switch on: it is faulty	Replace PCB
	Burner ignites for a few seconds and goes off	Electronic board does not detect flame: inverted phase and neutral	Verify correct neutral and phase connection
		Ignition/detection electrode wire is interrupted	Reconnect or replace wire
		Ignition/detection electrode faulty	Replace the electrode
		Electronic board does not detect flame: it is faulty	Replace PCB
		Ignition heat output setting is too low	Increase it
Minimum heat output is not set correctly		Check burner setting	
<p>Boiler in shutdown state, fault code E02 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified.</p> 	Flow temperature exceeded the max. allowed value.	Circulation pump is faulty.	Replace it.
		Circulation pump is seized.	Remove seizure.
<p>Boiler in shutdown state, fault code E03 shown on LCD display. Press the Reset button to restore operation</p> 	One of the flue gas thermostats has tripped.	Poor flue draught	Check the chimney and ambient air suction openings.
		Flue gas thermostat is faulty	Replace it
<p>Fault code E04 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified.</p> 	CH system water pressure is low	There are leaks in the heating system	Check system for leaks
		Water pressure switch is disconnected	Reconnect it
		Water pressure switch is not operating: it is faulty	Replace it
<p>Fault code E05 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified.</p> 	Flow probe not working.	Flow probe disconnected.	Reconnect it
		Flow probe faulty.	Replace it

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
Fault code E06 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified. 	DHW probe is not working (model KC only)	DHW probe is disconnected	Reconnect it
		DHW probe is faulty	Replace it
Fault code E07 shown on LCD display. Press the Reset button to restore operation 	Flue gas probe fault.	Flue gas probe is disconnected.	Reconnect it.
		Flue gas probe is faulty.	Replace it.
Fault code E12 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified. 	Water cylinder probe fault (only for models KRB/KR with optional water cylinder fitted with an NTC-probe).	Water cylinder probe is disconnected.	Reconnect it.
		Water cylinder is faulty.	Replace it.
Fault code E15 shown on LCD display. Normal operation is restored automatically when the faults causing the alarm state are rectified. 	Return probe not working.	Return probe disconnected.	Reconnect it.
		Return probe faulty.	Replace it.
Boiler is not supplying DHW	DHW flow switch is not working (model KC only)	System insufficient pressure or flow rate.	Check DHW system.
			Check DHW flow switch filter.
		DHW flow switch probe is faulty or disconnected.	Replace or reconnect it.
		DHW flow switch is blocked.	Replace it.
Fault code E31 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. 	No communication possible with Remote Control	Connector cable between boiler and remote control disconnected.	Reconnect it.
		Remote control faulty.	Replace it.
Fault code E35 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. 	Safety thermostat 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.

BOILER STATUS	MALFUNCTION	PROBABLE CAUSE	SOLUTION
Fault code E36 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E36 02 </div>	Flow probe failure on one of the installed zones (only with additional zone kit installed).	Probe is disconnected.	Reconnect it.
		Probe is faulty.	Replace it.
Fault code E40 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E40 </div>	Fan failure.	Fan disconnected.	Reconnect it.
		Fan faulty.	Replace it.
Fault code E41 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E41 </div>	No communication between main board and zone board (only with additional zone kit installed).	One of the zone boards is not properly connected.	Reconnect it.
		One of the zone boards is faulty.	Replace it.
Fault code E42 shown on remote control display. Normal operation is restored automatically when the faults causing the shutdown state are rectified. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E42 </div>	Incorrect hydraulic configuration.	The values set for the main board parameters are non correct.	Check P3 parameter value.
Boiler in shutdown state, fault code E80 shown on LCD display. Press the Reset button to restore operation. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E80 </div>	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 circuit is obstructed.	Clean or replace the exchanger.
Boiler in shutdown state, fault code E86 shown on LCD display. Press the Reset button to restore operation. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E86 </div>	Flow temperature increases too quickly.	Pump is seized.	Unseize the pump.
		Pump is faulty.	Replace it.
		Air present inside CH system.	Bleed the air from the boiler by opening the jollies on the exchanger and pump.
Boiler in shutdown state, fault code E87 shown on LCD display. Press the Reset button to restore operation. <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 10px auto;"> E87 </div>	Return temperature increases too quickly.	Circulation of foreign water in boiler.	Check that there are no other boilers or additional cascading heat sources
		Air present inside CH system.	Bleed the air from the boiler by opening the jollies on the exchanger and pump.

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The manufacturer reserves the right to modify its products as deemed necessary without altering the basic characteristics of the products themselves.