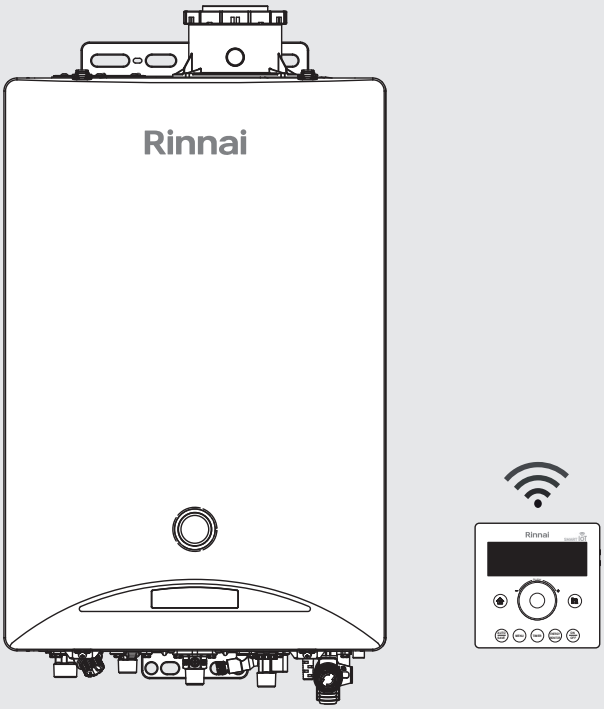
Models:

Zen I24 (REB-KBI2424FF)
Zen I29 (REB-KBI2929FF)
Zen I34 (REB-KBI3535FF)



Gas-fired, condensing, wall-hung boilers

User and installation manual

Rinnai

CE

1015

The Rinnai gas-fired combi-boilers are CE certified under Regulation 2016/426/EU and Directive 92/42/EEC.

Zen I24 - ZI24 - REB-KBI2424FF
Zen I29 - ZI29 - REB-KBI2929FF
Zen I34 - ZI34 - REBKBI3535FF

Designed and manufactured in accordance with the CE certification certificate; PIN number: CE-0051 CT4912.

Designed and manufactured in compliance with European standards;

EN 15502-1
EN 15502-2-1
EN 13203-2
EN 60335-2-102
EN 61000-3-2
EN 61000-3-3
EN 55014-1
EN 55014-2
EN 298
EN 60730-1
EN 549
BS EN 88-1
BS EN 126
BS EN 161
IEC 61558-2-16

Rinnai, constantly striving to improve the products, reserves the right to modify the details given in this documentation at any time and without notice.

*From the time this manual is printed and attached to the product, to the time the product is purchased and installed, the instructions and warnings may have changed: for Your interest and Your protection we recommend that You follow the instructions and warnings reported on the most recent version of the manual which is always available at Rinnai web site (*www.rinnai.it*).*

Rinnai disclaims any liability due to printing or transcription errors and reserves the right to update and change any technical and commercial lists without prior notice.

Dear Customer, our compliments for having chosen a Rinnai top-quality product, able to assure well-being and safety for a long period of time. As a Rinnai Customer you can also count on a qualified after-sales service to guarantee a constant efficiency of Your appliance.

The following pages are very important and contain useful instructions and suggestions on the correct use of Your appliance.

Do not hesitate to immediately contact the Rinnai authorized technical service center to request a free initial check of the correct installation and operation of your appliance: a qualified Rinnai technician will check the correct functioning of the product, adjust any parameters and, if necessary, they will provide valuable tips and advice for appropriate use.

GENERAL ADVISE

Rinnai products are provided with a packaging suitable for transport. The product must be stored in dry environments and protected from bad weather.

This manual is part of the product and must be left to the new user in the case of property change of the appliance. The manual must be kept in a safe place and carefully consulted as all warnings provide important safety instruction for the installation, the use and the maintenance.

This manual contains technical information on how to install the product: for any issue related to the installation, comply with the national and local laws in force and technical standards. According to legislation in force, the systems must be designed by qualified technicians. Installation and maintenance must be performed in compliance with the regulation in force, according to the manufacturer's instructions and by qualified personnel.

An improper installation or assembly of the appliance (components, accessories, kits, etc.) can cause unexpected problems to people, animals and property.

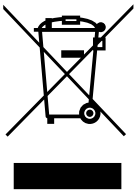
The product must be destined to the use for which it is designed for. Any other use will be considered as improper and therefore potentially dangerous.

In case of any errors in the installation, the use or the maintenance due to non compliance of the laws in force, Standards or manufacturer's instructions, the manufacturer is excluded from any contractual and extracontractual liability for any damages and the appliance warranty is invalidated.

The user may not install or adjust the appliance in any way that requires the removal of the front cover of the unit: to remove the front cover of the unit you must be certified competent to do so.

IMPORTANT

According to local laws in force, heating and hot water systems are subject to regular maintenance and regular checking of the heating performance. To comply with these obligations we invite You to contact the Rinnai local service.



Information on disposal of the product: the symbol shown here indicates that, according to the laws and local regulations, the product must be disposed of with household waste. At the end of its life, the appliance must be delivered to a collection point identified by local authorities. The separate collection and recycling of the product at the time of disposal will help conserve natural resources and ensure that it is recycled in order to protect health and the environment.

For further information on regulations related to the installation of the water heater or to find out Your closest authorized Rinnai service company You can contact:

Rinnai Italia S.r.l.

Via Liguria, 37
41012 - Carpi, Modena (Italy)
Tel: +39 059 622 9248
e-mail: info@rinnai.it
rinnai.it

WARRANTY

Dear Customer,

Our compliments for having chosen a Rinnai product.

The standard Rinnai warranty does not affect the terms of the legal warranty on customer's good and relates to Rinnai products purchased.

WHAT IS COVERED?

The warranty covers any defects in materials or workmanship when the product is installed and operated according to Rinnai installation instructions, subject to the terms within this limited warranty document. This warranty applies only to products that are installed by a registered gas engineer. Improper installation may void the warranty. This warranty extends to the original purchaser and subsequent owners, but only while the product remains at the site of the original installation. The warranty only extends through the first installation of the product and terminates if the product is moved or reinstalled at a new location.

WHAT WILL RINNAI DO?

Rinnai will repair or replace the product or any part or component that is defective in materials or workmanship, except as set forth below:

- all repairs must be performed using genuine Rinnai parts.

- all repairs or replacements must be performed by a registered gas engineer.

Replacement of the entire product or replacement of any parts may only be authorised by Rinnai.

Rinnai does not authorise any person or company to assume for it any obligation or liability in connection with the replacement of a product or heat exchanger. If Rinnai determines that repair of a product is not possible, Rinnai will replace the product with a comparable product, at Rinnai's discretion. If a component or product returned to Rinnai is found to be free of defects in material or workmanship, or damaged by improper installation the warranty claim may be denied.

HOW DO I GET SERVICE?

Contact your supplier or Rinnai.

Proof of date of purchase is required to obtain warranty service. You can show proof of purchase with a dated invoice or by completing and returning the enclosed warranty registration card.

Receipt of warranty registration by Rinnai will constitute proof-of-purchase for this product. However, warranty registration is not necessary in order to validate this warranty.

WHAT IS NOT COVERED?

This warranty does not cover any failures or operating difficulties due to accident, abuse, misuse, alteration, misapplication, acts of God, improper installation, improper maintenance or service, inadequate water quality, scale buildup, freeze damage or for any other causes other than defects in materials or workmanship. This warranty does not apply to any product whose serial number or manufacture date has been defaced.

Rinnai is not liable for any special, incidental, indirect or consequential damages that may arise, including damage to person or property, loss of use, failure to install drain pan under unit, or any inconvenience. This warranty does not effect your statutory rights as defined by European laws.

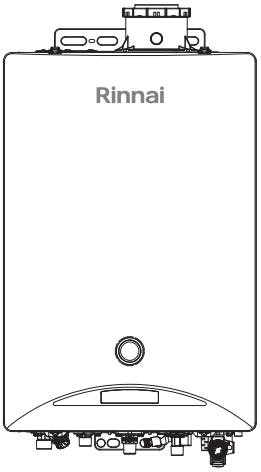
CONTENTS

1. USER'S INSTRUCTIONS

The following section shows the instructions for a correct use of the product.
It is intended for the use of qualified technical personnel and of the final user of the product.

1.1 FEATURES AND BENEFITS

Congratulations on purchasing the **CONDENSING** gas boiler Rinnai, with **ADJUSTABLE POWER** (**RANGE RATED**), sealed chamber and forced flow, with **ELECTRONIC CONTROL OF TEMPERATURE** and **WiFi ROOM THERMOSTAT**.



Zen is a **PREMIXED** boiler with "**CONTINUOUS MODULATION ON GAS AND AIR**". It is equipped with a **LOW NOx EMISSION** metal fiber burner: the emission values make it one of the most environmentally friendly products on the market.

The Rinnai *Zen* boiler is a **FORCED FLOW** gas appliance, with **HIGH ENERGY EFFICIENCY**: these features make it extremely compact, guaranteeing considerable space savings and drastically reducing gas consumption.

The *Zen* '*I*' range is supplied with a **WiFi ROOMTHERMOSTAT** as a standard, showing the operating temperatures (heating and DHW), error codes and the advanced boiler regulation functions. By activating the **WiFi FUNCTION** and installing the **application 'My Rinnai'** it is possible to control and manage the main functions directly through your **SMARTPHONE**. The application allows the installation up to a maximum of ten users per command and the management of three different boilers: the whole family can enjoy maximum comfort and it is also possible to manage the boiler of a second home or of the elderly, inexperienced parents.

THE NOISE DURING OPERATION IS EXTREMELY LOW.

The *Zen* serie is equipped with a **CONDENSATE TRAP SIPHON FILLED WITH A NEUTRALIZER**: you can waste condensate, moderately acidic and corrosive, without fear of damaging the drain or the disposal plant.

It is equipped with a **SAFETY SENSOR FOR EARTHQUAKES**: in case of medium or high sismic events, the boiler automatically isolates itself from the gas plant, thus limiting gas leaks, explosions or fires, which can make the environment affected by earthquake further dangerous.

The *Zen* serie is equipped with a **PRE-INSTALLED CLIMATIC PROBE**. It is no longer necessary to work hard to install the external temperature sensor: the probe is already connected and installed, ready for use. By activating the 'automatic operation', the boiler will adjust its combustion based on the external ambient temperatures, always guaranteeing excellent comfort and reducing fuel consumption and waste. As an optional element it is however possible to install a specific extension probe for outdoor environments.

With Rinnai's *Zen* boiler, You will **NEVER BE WITHOUT HOT WATER**: as long as electricity, water and gas are guaranteed, hot water is available every time a hot water tap opens.

Hot water is exclusively produced in an **INSTANTANEOUS** way: it is not stored in tanks with limited capacity, always source of constant dispersions and high energy consumption.

The appliance is equipped with a special safety and comfort function that **CONTROLS THE MAXIMUM TEMPERATURE** of the hot water supplied. The temperature can be adjusted to a precise value: this function is particularly useful when the appliance is installed at the service of children, patients or elderly people. If necessary, the temperature can be modified at will from the control panel (remote control), supplied as standard, to better serve the user. The temperature of the hot water supplied is constantly monitored by several internal sensors.

ERROR CODES are displayed on the remote control to facilitate technical assistance: they appear as flashing numeric codes on the display.

The range of *Zen* boiler has an **'IP 5' PROTECTION RATE** and can be freely installed in **EXTERNAL ENVIRONMENTS**, directly exposed to atmospheric agents without particular protection (the correct installation of the flue gas fitting is necessary).

ANTIFROST PROTECTION is included as standard on each model: the appliance is protected up to -20°C.

1.2 IMPORTANT SAFETY INFORMATION

	Meaning of the symbols used in the manual for important information concerning your safety:
IMPORTANT	Important sign. Indicates a situation of potential serious danger, to respect and follow carefully.
ATTENTION	Attention sign. Indicates a potentially hazardous situation which, if not avoided, may lead to injury or property damage.
WARNING	Warning sign. Indicates an important information.
NOTE	Note sign. Information on the correct use, installation and operation of the product.
	Attention sign. Indicates a potential condition of serious danger which must be complied.
	Prohibition sign. Indicates a condition which should be avoided.
	Grounding sign. Indicates a ground connection for the prevention of an electric shock.
	Prohibition sign. Warns of a risk of fire. Keep the area clean and free from flammable materials.
	Prohibition sign. Warns of a risk of injury or property damage when contacting.

IMPORTANT

Important! The appliance must be installed by qualified personnel only.

It is possible to install Zen boilers in outdoor areas, always open-air and well ventilated, or in partially protected areas (not exposed to direct atmospheric precipitation).

It is always mandatory to install an approved exhaust system.

Use the appliance exclusively for the use for which it was designed.

Rinnai boilers from the Zen range have been designed for wall installations only. They are built for domestic or similar uses, for the production of domestic hot water and the heating of water at a temperature lower than that of boiling at atmospheric pressure. They must be electrically powered, connected to a gas, heating and a domestic hot water distribution system suited to their performance and power

Only a professional licensed company is authorized to install Rinnai gas appliances. The installation must follow the requirements of the UNI and CEI Standards, current legislation and local technical regulations, according to the indications of good technique.

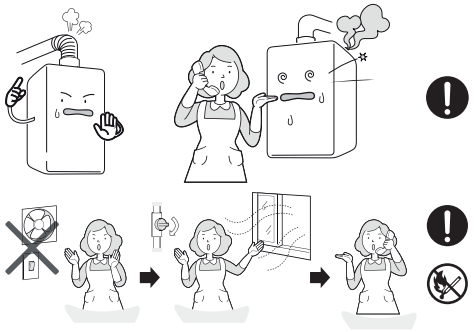
Do not make any changes to the appliance: do not attempt to repair, replace components, open sealed parts or disassemble the appliance. Any tampering can lead to risks to health, damage to property, compromise the safety and proper functioning of the product: for any type of repair, modification of settings or maintenance of the product and its accessories, we recommend contacting the Rinnai technical service center.

Use only original Rinnai parts.

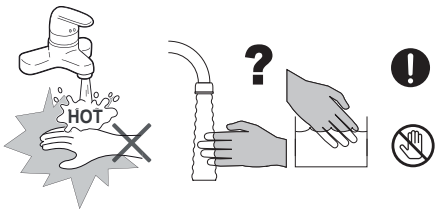
If you notice unusual noises, smells or vibrations, stop the appliance immediately and contact the Rinnai technical service company.

If you smell gas:
- close the main gas tap;
- open doors and windows to ventilate the room;
- contact Your technician and wait outside the house.

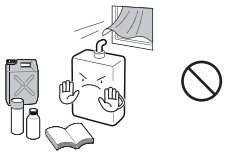
In the event of an earthquake, fire, gas leaks, noises, stop the gas and electricity supply and open doors and windows.



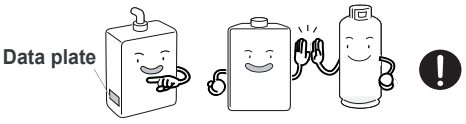
Water temperature over 50°C can cause severe burns instantly or even death from scalding. Hot water at 60°C can severely burn a child in less than a second. At 50°C it takes five minutes. Always test the temperature of the water before any use. To prevent these risks, Rinnai reccomends to consider setting your hot water production at a maximum temperature of 50°C.



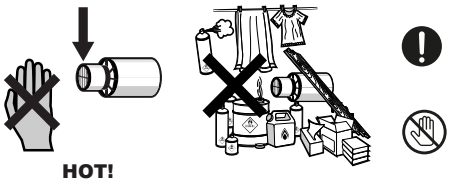
Do not store flammable objects near the appliance: it could cause a product failure or fire. Do not spray aerosols in the vicinity of this appliance while it is in operation.



Check that the appliance is supplied with the correct gas type and pressure according to the data plate: ensure that the gas in use matches with the gas indicated on the data plate. If not, there could be incomplete burning of the gas, resulting in toxic emissions and/or product failure.



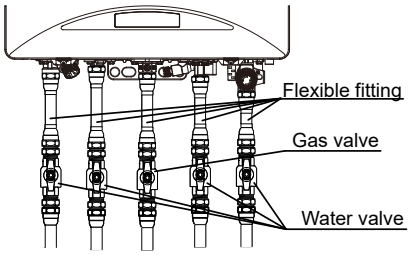
Do not insert objects into the flue outlet. Do not spray water directly into the flue outlet. Keep, trees, shrubs, etc. well clear of the flue outlet. On colder days steam may discharged from the flue outlet. This condition is normal for high efficiency appliances and does not indicate a fault.



Do not touch the unit cover or the flue outlet.

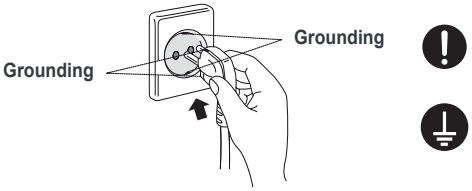
Verify that the main gas tap is open before using the product.

It is recommended to use flexible metal fittings, specific for gas (and water), in the appliance connections to the gas (water) network. Avoid using rubber fittings that may deteriorate early.



Insert valves on the gas and on the water pipes to facilitate any maintenance and safety in emergencies.

Before connecting the mains cable, check that the power supply is suitable: make sure that the electrical system is up to standard and has a good earth connection; otherwise the appliance may be damaged or malfunctioning.

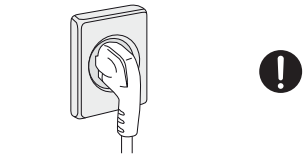


It is not recommended to extend the supplied electrical cable (eg through the use of extension cords or multiple sockets). In case of damage, replace the electric cable with an original one. Replacement may only be performed by Rinnai authorized technical personnel.

After installation (or long periods of inactivity) it is advisable to let the hot water run before the use.

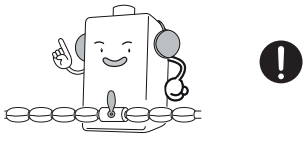
It is recommended the installation of a system to collect and drain water under the appliance in the case of water leakage to prevent material and property damages.

Frost protection: Make sure that the power cord of the appliance is plugged-in and the electrical power is always available.

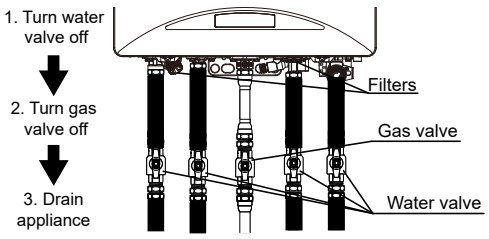


The frost protection system activates only when the appliance is electrically powered.

All pipes must be wrapped with insulating materials to prevent heat loss. The thickness of insulation should be between 25mm and 50mm according to outdoor temperatures. Electrical hot wires could be installed to protect pipework subjected to extreme cold or wind chill conditions. Hot wire use is recommended if the case of temperature drops below -15°C.

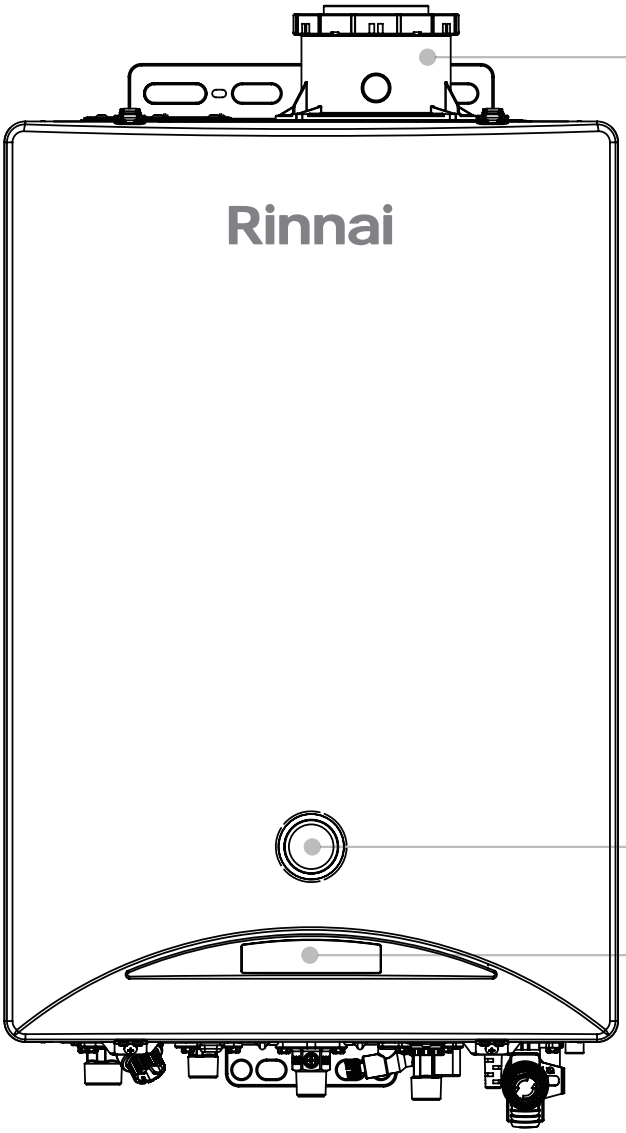


If extremely freezing conditions are expected, turn off water and gas, and drain all water from the appliance. If power and the automatic frost protection are connected, freezing will be prevented. (Anti-frost protection is fitted as standard equipment on all hot water units)



If water pipes are frozen, there would not be water flow in the system. Use a heat source (e.g. hair dryer) to unfreeze the frozen components and pipes. Before using the appliance after defrosting contact the Rinnai service to verify possible damages.

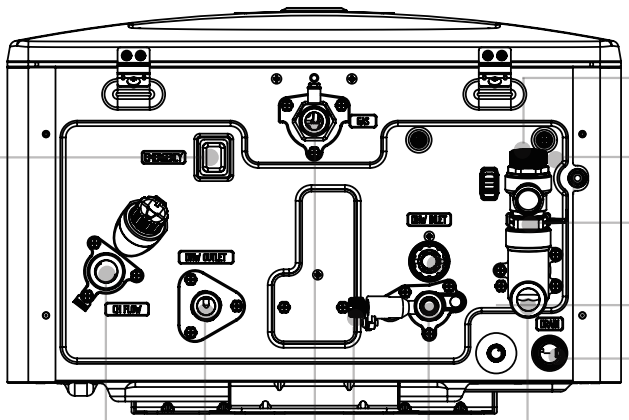
1.4 MAIN COMPONENTS



Coaxial flue connector

Manometer CH circuit

Body controller



Pressure relief valve

Emergency mode switch

Wiring access

CH return filter

DHW inlet filter

Condensate drainage

CH flow

CH return

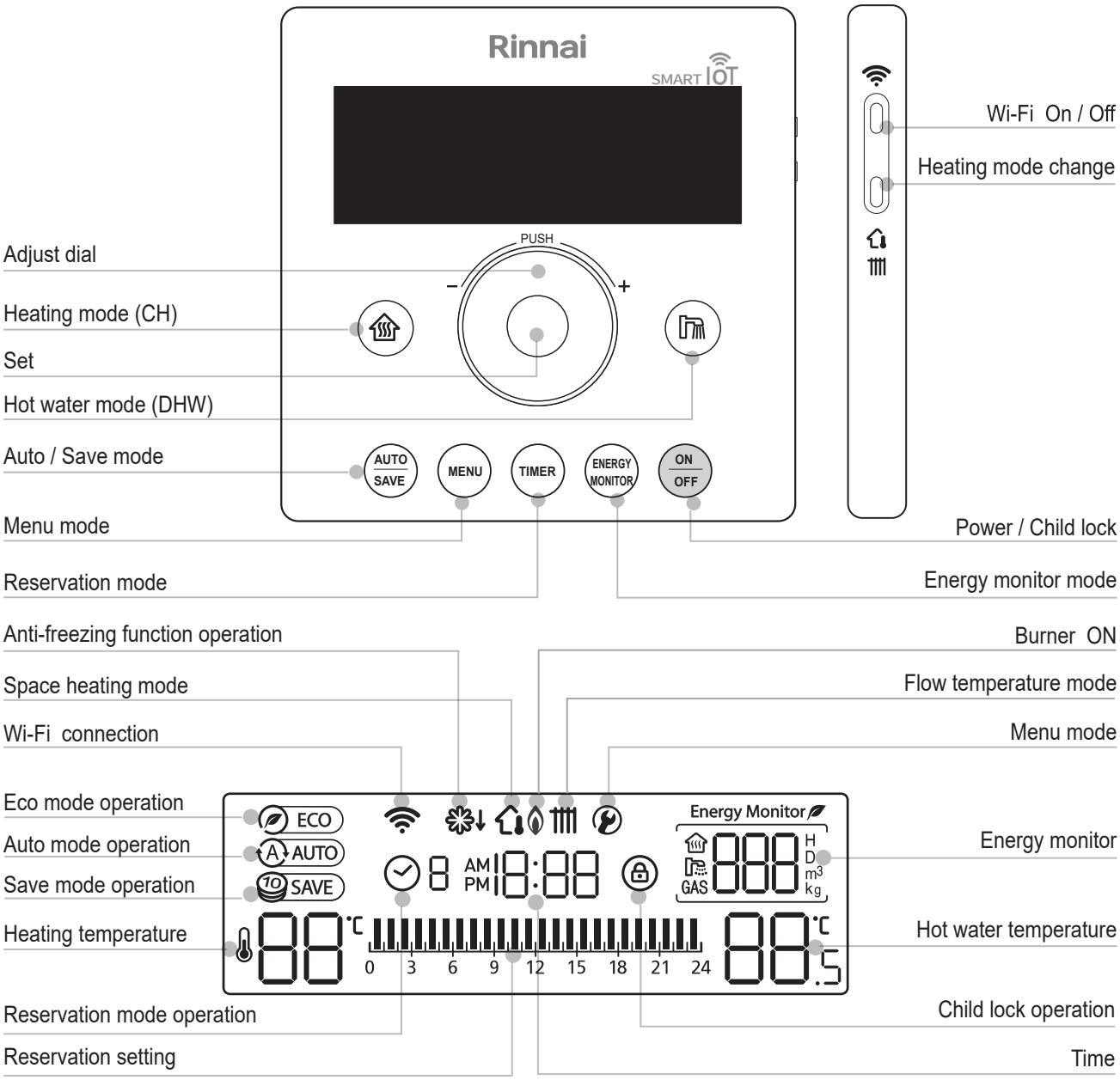
DHW outlet

DHW inlet

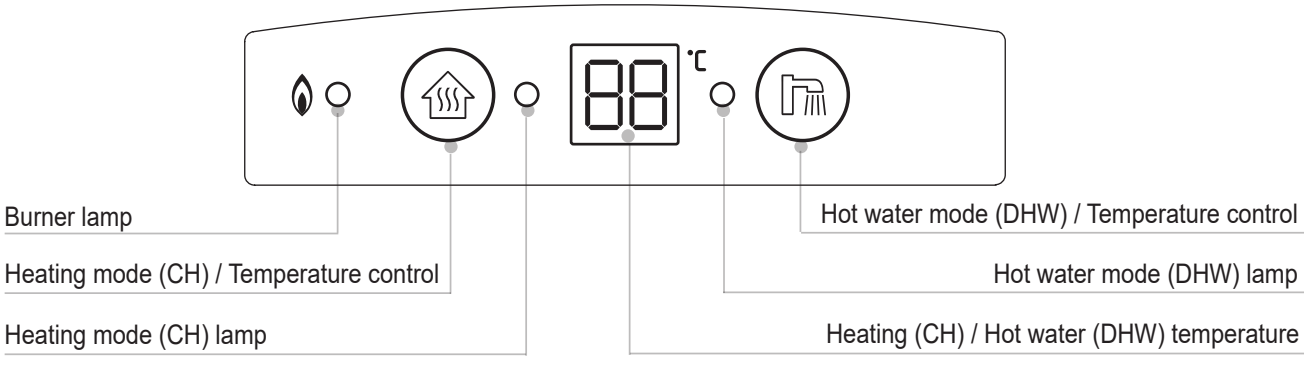
Gas

Water supply valve / CH

Wi-Fi REMOTE CONTROLLER



BODY CONTROLLER



1.5 OPERATION

Before to use the boiler, it is advisable to know how it properly works.

The operation of the boiler and the main functions that can be activated are described below.

IMPORTANT

Important! Before using the boiler, make sure that the heating circuit is always filled correctly: when the system is still cold, the pressure gauge on the front panel must indicate a value in the green sector (0.5 ÷ 1.5bar). If necessary, restore the correct value by operating the fill/load tap at the base of the boiler.

When the boiler is electrically connected, an automatic venting program is activated. It can last from 60 to 120 minutes depending on the system. It is necessary to wait until the end of the cycle to allow the expulsion of all the air that was formed in the installation phase (or in the period of non-use). Press a button on the remote control causes the early stop of the venting cycle and can cause problems. A particular noise can be a sign of the presence of air bubbles still circulating in the pipes: unplug the boiler and re-plug it to repeat the venting cycle.

The boiler is ready for the use and a wireless chronothermostat is supplied as a standard. The command is pre-set to control the 'heating temperature' of the system. To operate, the command must remain connected by cable to the boiler: in case of remote installation it is possible to extend the electrical cable paying particular attention to use a shielded cable in case it is positioned in the vicinity of high voltage electrical wiring.

The Rinnai condensing boiler can operate without the remote control connected: operated only by the control panel, which is pre-assembled on the boiler (body controller). This basic configuration allows to:

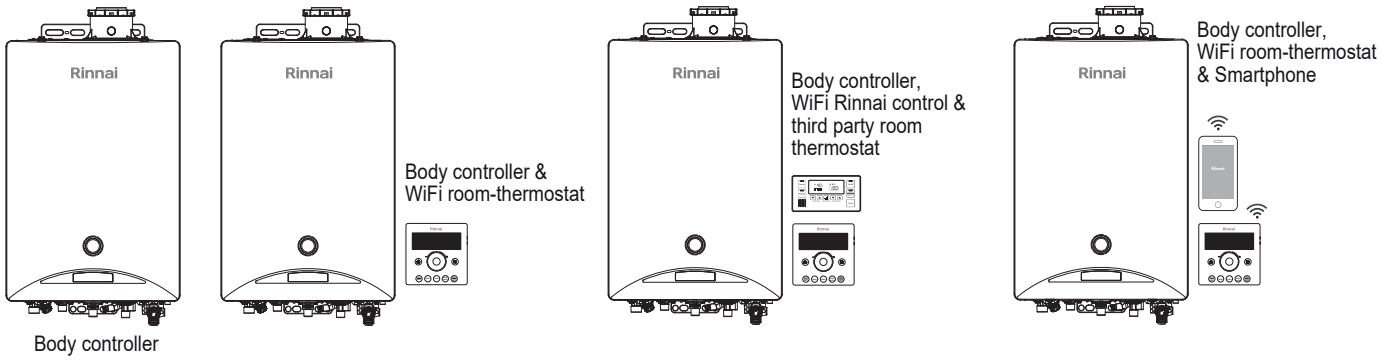
- activate/deactivate the heating mode and adjust the flow temperature of the heating system;
- activate/deactivate the hot water supply, adjusting the temperature of the hot water;
- check for malfunctions and error codes.

A second operation mode is by connecting the Rinnai WiFi chronothermostat, which is supplied as a standard with the appliance. The main features available are:

- select the heating mode (room temperature or flow temperature mode);
- activate/deactivate the heating mode and adjust the flow temperature of the heating system;
- activate/deactivate the hot water supply, adjusting the temperature of the hot water;
- special functions use (fast heating; hot water pre-heat; Auto mode, Save, Reservation, etc);
- check for malfunctions and error codes;
- monitor the energy consumption;
- adjustment of boiler's operation parameters;
- operation of the boiler through the 'My Rinnai' app and Your own samrtphone.

A third operation mode is made by connecting the boiler a third party thermostat in conjunction to the Rinnai WiFi one: in this configuration the Rinnai remote is no more controlling the room temperature, but it can be still used to adjust the hot water temperature. The third party thermostat is in control of the room heating temperature.

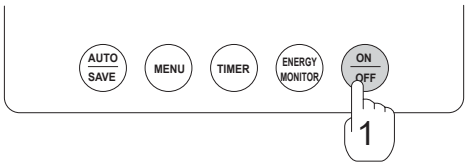
By activating the WiFi mode, the boiler can be operated and programmed by Your own Smartphone through the 'My Rinnai' application (up to ten users can register and control the boiler). The main functions are all available and always handy; more advanced and more specific ones are available, to manage and program the boiler. The application is equipped with a simple introductory guide that explains its operation quickly and easy. **The specific user manual for the application is available on the Internet site: *www.rinnai.it***



1.4.1 INITIAL SETTINGS

Turn the boiler On/Off

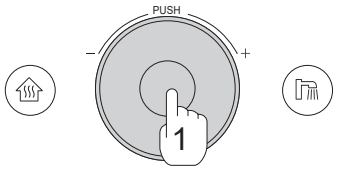
When first operated, by pressing the On/Off button (ON/OFF) (**1**) on the WiFi thermostat: the display lights up, the 'clock' flashes and the boiler can now operate.

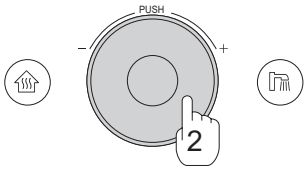


If the On/Off button (ON/OFF) is pressed during the boiler's operation, the display turns off and the boiler stops operating.

Time setting

It is possible to adjust the 'time' only when main functions (central heating and hot water heating) are not activated: check that their icons, on the sides of the adjusting dial, are not lighted. If they are lighted, it is necessary to





deactivate the function by pressing the icon on the panel.

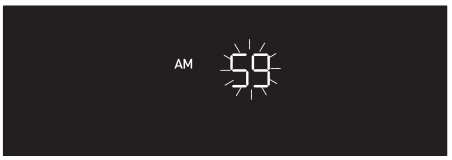
To set the time on the WiFi remote follow the procedure:

- Press and keep pressed for three seconds the adjusting dial (**1**):

  a 'beep' is heard and the 'hour' flashes;
- Rotate the knob to set the desired hour (**2**);
- To confirm the hour, press once the knob (**1**):

  a 'beep' is heard and the 'minute' flashes;
- Rotate the knob to set the desired minute (**2**);
- Press the knob once to confirm the time set (**1**):

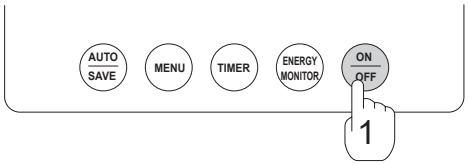
  a 'beep' is heard and the 'time' is set.



'Child-lock' function

To prevent tampering and to increase the security, the WiFi thermostat is equipped with a 'key lock' function.

To activate the 'Child-lock' function follow the procedure:



- Ensure the thermostat is switched On (press the On/Off button (ON/OFF) to switch it On);
- Press and keep pressed the On/Off button (ON/OFF) (**1**) for three seconds:

  a voice prompt is heard and the display shows the lock icon ();

NOTE

Note! To deactivate the lock function it is possible to follow the locking procedure or to keep the central heating button pressed for three seconds.

When the key lock function is active:

- **the icon shown on the display flashes when the keys of the thermostat are pressed;**
- **by pressing the button On/Off (ON/OFF) the thermostat will not switch Off;**
- **in the case of malfunction, to reset the error code flashing on the display, it is necessary to unlock the thermostat first;**
- **the lock function is active on the WiFi remote only: the body controller will not be locked.**

1.4.2 HEATING FUNCTION (CH)

The heating function will also be mentioned as **CH**.

Using the Rinnai WiFi roomthermostat, it is possible to choose between one of the two heating modes: by pressing the button of fig.1, on the right side of the WiFi thermostat, You select the desired heating mode and the relevant symbol appears on the display. To change the heating mode, it is necessary that the heating function is deactivated (the display must appear empty).

- **'Space-heating' mode**:

the Rinnai remote control is equipped with a temperature sensor that constantly monitors the temperature of the environment in which it is installed.

The boiler mantain the room heated according to the temperature set on the remote control: when the temperature detected in the room is higher/lower than the set temperature, the boiler stops/activates accordingly. The preset temperature is 22°C; it is possible to select temperatures ranging from 5°C to 40°C.

The room thermostat should be installed in a significative room for the home.

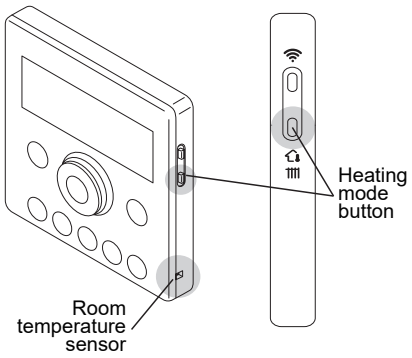


Fig.1

- **'Flow-heating' mode** (default setting):

the Rinnai remote control allows you to adjust the flow temperature of the heating system. When the measured temperature is higher/lower than the set temperature, the boiler stops/activates accordingly. The preset temperature is 55°C; it is possible to select temperatures ranging from 35°C to 80°C.

Heating temperature setting

To set the heating temperature follow the procedure:

- Press once the heating mode button (**1**):

  a 'beep' is heard and the button central heating lights up; on the display the temperature value previously selected is flashing;

  the boiler fires and the display shows the flame icon as soon as the burner is on;

  when the set temperature is achieved, the boiler switches the burner off and the icon of the flame is no more displayed.

- Rotate the adjusting dial (**2**) to modify the desired set temperature.

To deactivate the heating function of the boiler follow the procedure:

- Press once the heating mode button (**1**):

  a 'beep' is heard and the central heating button turns off; the display does not show anymore the heating temperature value.

NOTE

Note! To verify the real water delivery temperature of the heating system (this may differ from the set temperature) it is necessary to keep the thermostat knob pressed for three seconds: the display shows the real value for ten seconds and then returns to normal display.

eco

During normal operation, the boiler can operate at a pre-set regime which is particularly favorable for the reduction of polluting emissions and fuel consumption; during this operation the boiler operates at its maximum energy efficiency and the green "Eco" symbol shown on the side appears on the display.

1.4.3 DOMESTIC HOT WATER FUNCTION (DHW)

The hot water function will also be mentioned as **DHW**.

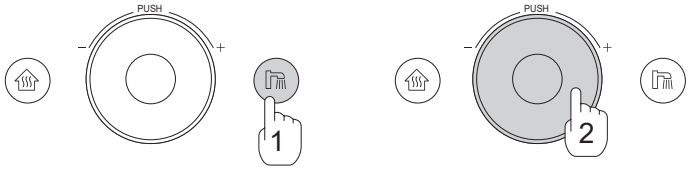
The production of hot water takes place in a direct and instantaneous way: you will never be without hot water as long as electric power, water and gas are guaranteed.

The appliance is equipped with a sensor that keeps the temperature of the supplied water under control: this is source of high comfort and extreme safety for every type of user.

It is always possible to activate the heating mode, during the hot water supply: this function will not be activated until the production of domestic hot water is completed.

It is possible to keep both CH and DHW functions activated but **the boiler always gives priority to the use of DHW mode with respect to CH**.

Hot water temperature setting



To activate and set the hot water temperature follow the procedure:

- Press once the hot water mode button (**1**):

  a 'beep' is heard and the water heating icon lights up; on the display the previously selected temperature value is flashing;

  by opening a tap, the boiler fires and the display shows the flame icon as soon as the burner is on; the color of the hot water function button's led turns to orange.

- Rotate the adjusting dial (**2**) to modify the desired temperature.

To deactivate the DHW function of the boiler follow the procedure:

- Press once the hot water function button (**1**):

  a 'beep' is heard and the water heating icon stops; the display does not show anymore the hot water temperature value.

  The selectable temperatures may vary between 35°C and 60°C.

ATTENTION

Attention! For safety reasons, all the taps must be closed before a higher value than 55°C is set. Hot water must not be used during the operation.

In order to reduce gas consumption and to extend the water heater's life, Rinnai suggests to set the device's temperature on the minimum which is more suitable for the intended use. Use hot water on the pre-set temperature, so there is no need to mix it with cold water.

1.4.4 HOT WATER RAPID HEATING AND PRE-HEATING FUNCTION

Rapid heating

The rapid heating function can be used to quickly restore the suitable temperature in a cold environment: the boiler will operate at maximum power for twenty-five minutes, in order to create the right conditions for a sudden rise in temperatures in the installation.

At the end of this time interval, the boiler will go automatically back to the pre-set functioning.

To activate the rapid heating function, perform the following steps:

- Activate the heating mode, by pressing the central heating button ;
- Press again central heating for three seconds:
  the display will show a temperature of 40°C if the boiler is set on the'room temperature' mode; or 80°C if the boiler is set on the 'flow temperature' mode.

Ambient temperature mode

Flow temperature mode

To deactivate the rapid heating function:

- Turn the dial.

Hot water pre-heating function

The pre-heating function consents to prepare the boiler for the provision of domestic hot water and to benefit of a superior comfort: pre-heat function allows a faster delivery of hot water at the desired temperature shortening the time needed for its production.

When the function is activated, the hot water preparing circuit is immediately raised to the right temperature and mantained hot for thirty minutes (or until first use).

At the end of this time period (or after having used hot water), the boiler stops this function automatically in order to reduce wasted energy and minimize the consumption, then returns to normal operation.

To activate the hot water pre-heating mode, follow the procedure:

- Activate the DHW mode, by pressing the water heating button ;
- Press again water heating for three seconds:
  the led symbol (in motion) will appear on the display, replacing the hot water temperature set before.

To deactivate the hot water pre-heating mode:

- hold the water heating button pressed for three seconds.

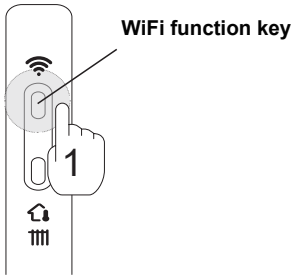
1.4.5 WIFI FUNCTIONS

It is possible to control the boiler through smartphone, by installing the free App 'My Rinnai' and registering the supplied WiFi chronothermostat: the information about the proper installation procedure are provided in the specific paragraph in the end of this handbook .

When the WiFi is on, this symbol will appear on the WiFi display

To activate or deactivate the WiFi function:

- Press the button (**1**) on the remote control's side.



1.4.6 AUTO MODE (AUTO)

Auto mode will be also indicated by the abbreviation **AUTO**.

The AUTO mode enables the boiler to adapt the regular flow temperature of the heating circuit to the values of the outdoor ambient temperature, in complete autonomy. The auto mode only works on the heating mode and not on the production of hot domestic water.

The device periodically monitors the external temperature in order to adjust the internal flow temperature by means of a sensor: in the cold seasons, the boiler will be able to adjust the heating circuit's water's temperature proportionally to the outdoor temperature reduction; the other way round, the boiler will lower the indoor temperature to adjust it to the rising outdoor temperature in the warmer seasons.

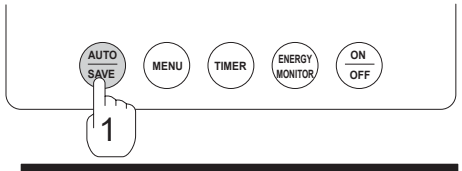
The device works autonomously, adjusting its own functioning to the actual temperatures of the current season. This provides a greater domestic comfort while reducing polluting emissions and fuel consumption.

To activate the AUTO mode, perform the following steps.:

- Press the Auto/Save button (AUTO SAVE) on the room-thermostat **once** (**1**):

  a light blue symbol will appear on the display auto (A AUTO) and the function is activated;

  if the heating mode is active, the display will appear as shown in the figure on the right;



Room temperature mode

Flow temperature mode

To leave the AUTO mode:

- Press once the Auto/Save button (AUTO SAVE), or the central heating button ().

NOTE

Note! When AUTO mode is on, the boiler will not consent you to modify the heating temperature: this value is entirely automatically managed. AUTO mode has to be disabled to change the temperature.

1.4.6 ENERGY-SAVING MODE (SAVE)

Energy-save mode will also be mentioned as **SAVE**.

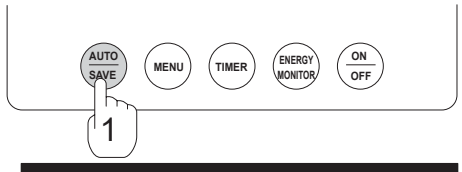
Energy-saving mode exclusively operates on the heating mode and not on the domestic hot water production. When the SAVE mode is on, the boiler modifies the on/off operation of the burner. The different temperatures that is possible to set with the chronothermostat are limited (in order to reduce energy consumption). So the maximum selectable room temperature shall be 20°C and the maximum flow temperature shall be limited to 60°C.

To activate SAVE mode, perform the following steps:

- Press the Auto/Save button (AUTO SAVE) on the chronothermostat **twice** (**1**):

  the light blue symbol 10 save (10 SAVE) will appear on the display and the mode will be activated;

  if the heating mode is active, the display will appear as shown in the figure on the right;



Room temperature mode

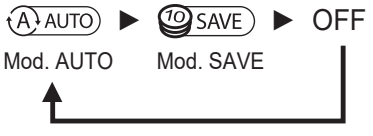
Flow temperature mode

To deactivate the SAVE mode:

- Press the Auto/Save button (AUTO SAVE) once, or the button central heating ().

NOTE

Note! Press the Auto/Save button (AUTO SAVE) more than once and scroll through the AUTO and SAVE functions as shown in the scheme:



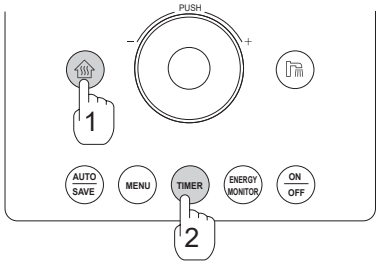
1.4.7 RESERVATION MODE (RESERVATION)

The functioning of the 'reservation mode' will also be mentioned as **RESERVATION**.

The Rinnai Wifi's chronothermostat consents you to set time slots for the heating mode every day. It is possible to program the favourite time slots during which the boiler must maintain a comfortable temperature and those during which it is allowed to reduce the temperature (night time or whenever nobody is at home).

The specific time reservation works both in 'room temperature' mode and in 'flow temperature' mode and works exclusively on the heating mode but not on the domestic hot water production.

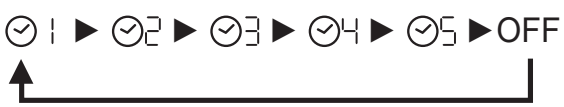
To activate and program the RESERVATION mode, perform the following steps.:

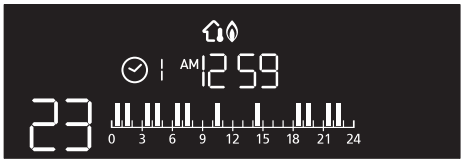


- set the intended time on the chronothermostat (see **par. 1.4.1**)
- Press central heating button (**1**);
- Press timer button once(**2**):

  the clock icon flashes on the display, meaning that the specific time program nr.1 of the RESERVATION mode has been activated;

- Press timer button several times to select the intended time slot:





  The programs from number one to three are predefined and cannot be modified, while the specific time programs number four and five can be personalized;

- to confirm the selection of the intended time in the program is sufficient to wait a few seconds: the icon of the intended specifics time slots will stop blinking.
- The specific time reservation will be completed by defining the temperatures **T1** (daytime) and **T2** (reduced) in the **menu A** (**parameters 6** and **7**) of the chronothermostat functions (see **par. 1.4.8**):

  the temperature T1 is used by the boiler during the intended and selcted specific times (highlighted in orange in the time slot); but the temperature T2 is used during the unselected time slots.

To exit RESERVATION mode during the operation:

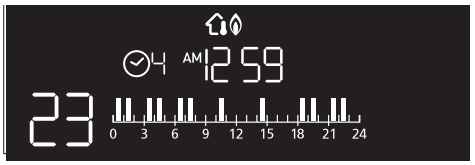
- Press the button timer : the boiler will go back to normal operation.

By re-activating RESERVATION mode, the system will re-open the previously selected program.

Personalizing the reservation mode

Only the programs four and five can be personalized. The use of 'My Rinnai' application allows to select a more detailed time slots programming schedule.

To select the time slots, perform the following steps:



- Press timer button until it is possible to select a program 4 o 5 ;
- Turn the dial (**1**) and drag the orange flashing selector of the hour bar on the intended time;
- Press the dial (**2**) to confirm the selection of the intended time;
- Repeat the previous operations util you have completed the intended pattern;
- The reservation is completed when temperature **T1** (daytime) e **T2** (reduced) are defined in the **menu A** (**parametres 6** and **7**) of the thermostat functions (see **par. 1.4.8**):

  the boiler uses temperature T1 in correspondence to the selected time slots (highlighted in orange in the time schedule); the temperature T2 is used during the unselected time slots.

1.4.8 PARAMETERS MENU

Rinnai WiFi chronothermostat allows the user to benefit from a great variety of parameters related to the boiler functioning. It provides precious information to understand eventual problems in the appliance's operation.

IMPORTANT

Important! For safety reasons, Rinnai suggests not to modify the parameter menus without having fully understood the meaning of the parameters themselves and their possible consequences on the boiler.

It is recommended to call the enterprise (Rinnai Italia) in advance, in order to not damage the boiler or the installation which is connected to it and to avoid all the possible risks for the customers.

Parameters are grouped by typology and sub-divided in sub-menus:

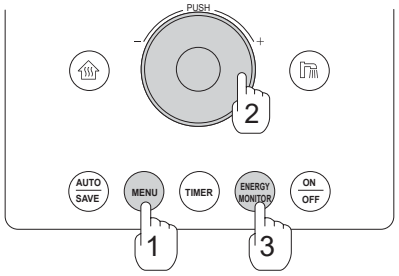
Menu A ► B ► C ► D ► Exit

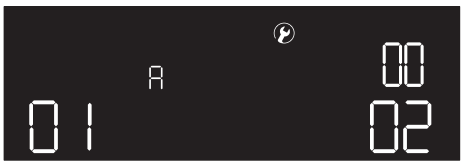
Menu	A / B / C / D / Exit
Menu A	Boiler and thermostat settings
Menu B	Services and maintenance
Menu C	Faulty History Mode
Menu D	Information

To enter and select the parameters menu, perform the following steps:

- press the button menu (MENU) (**1**);
- the following icons will appear on the WiFi chronothermostat:
  - the wrench icon means that you have entered in the parameters menu;
  - A - letter A indicates the selected menu: 'menu A';
  - 01 - 01 indicates the visualized parameters: 'parameter 01';
  - 02 - 02 indicates the value of the visualized parameters: '02'.
- press the button menu (MENU) several times to change menu:

  the A menu and the B menu are accessible only if the heating (CH) and hot water (DHW) functions are deactivated.





By turning the dial (**2**) it is possible to change the parameter (or its value): the icon will be lit up.

By pressing the dial (**2**) it is possible to confirm the selection of the parameter (or its value): the icon is not blinking.

To exit the parameters menu is necessary to press the button menu (MENU) (**1**) more than once.

NOTE

Note! After 20 seconds of inaction, the parameters menu will be automatically closed and the display will go back to its normal operating state.

Not to exit the parameters menu and to keep it forced active (for five minutes), press energy/monitor (ENERGY MONITOR) : the symbol H o Ho (hold) will show up on the display.

Parameters of A menu

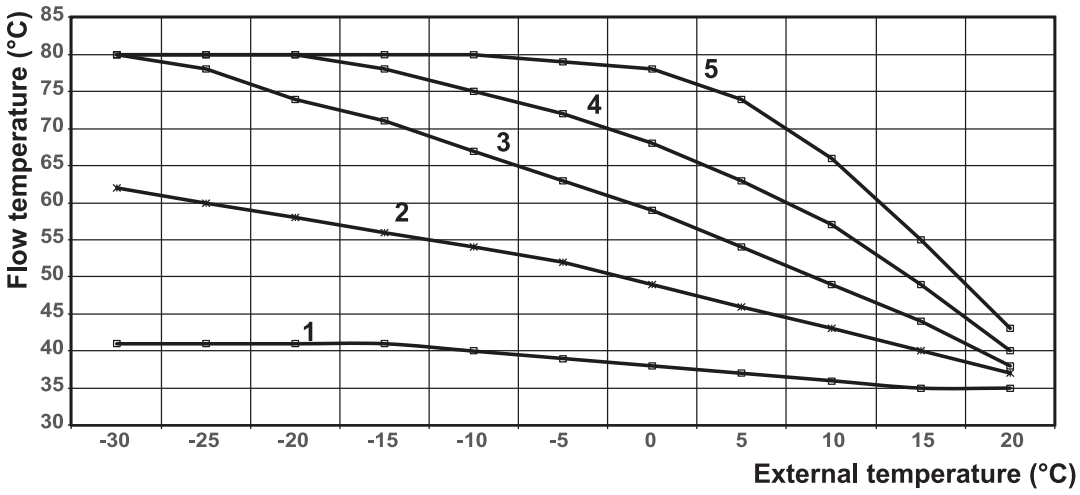
The A menu groups all the parameters concerning the thermostat settings and the boiler programming:

Nr par.	Parameter	Values	Parameter's description	Initial value
1	Thermostat language	EN, IT, ES	EN: English; IT: Italian; ES: Spanish.	EN
2	Loudspeaker volume	0~5 (OFF, 1~5)	Modifies the volume of the vocal messages of the thermostat.	3
3	Keyboard sounds	ON/OFF	Activates or deactivates the sounds of the buttons.	ON
4	Antifreeze signal / errors	ON/OFF	Acustic alarm protectioning notifications for antifrost and boiler functioning errors.	ON

Nr par.	Parameter	Values	Description parameter	Initial Value
5	Led brightness	1~3	Modifies the brightness of led CH e DHW.	2
6	Temperature T1 (daytime)	35~80°C 5~40°C	Programming of daytime temperature of thermostat.	75°C 21°C
7	Temperatura T2 (reduced)	35~80°C 5~40°C	Programming of reduced temperature of thermostat.	55°C 16°C
8	Limit of maximum discharge temperature	35~80°C	Limits the max. flow temperature that the boiler can reach, in every kind of functioning/mode/function.	80°C
9	Climatic curve	1~5	Activated during AUTO mode, selects the climatic curve.	4
10	Climatic curve translation	-10~10°C	Transfers the values of the preselected climatic curve.	0°C
11	Compensation temp. chronothermostat	-10~10°C	Modifies the perceived temperature by the room thermostat.	0°C
12	Compensation temp. outer sensor	-15~15°C	Modifies the external temperature detected by an outer sensor.	0°C
13	Burner ignition delay	OFF, 1~50	It enables the boiler to delay the ignition of the burner to a max. of 500 seconds on installation with slow peculiar commutational elements (local valves). Value x10 = delay	OFF
14	Frequence re-ignition CH	1~5	Modifies the 'OFF *forced stationary*' state of the burner, between two consecutive ignitions. Low value = longer waiting time	5
15	Positioning of the climatic sensor	OU/In	Defines the environment in which the climatic sensor has been installed: the sensor is pre-installed in the boiler (In), but it can be extended outside (OU).	In
16	Booster of delayed temperature CH	ON/OFF	In 'room temperature' mode, the flow temperature of the boiler changes when the differences between the pre-set temperature and the temperature detected by the thermostat changes. with this parameter, the flow temperature is incremented with respect to its normal value.	OFF
0	Reset parameters menu A	- -	The A menu's parameters are brought back to the initial settings.	- -

Climatic curves

The climatic curves (numbered from one to five), concerning **parameter 9** from **A menu are shown below**:



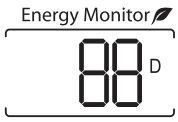
1.4.9 ENERGY MONITOR

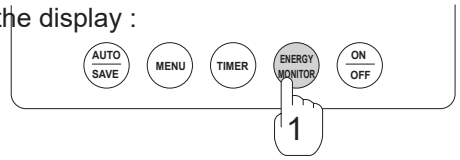
The Energy monitor of the WiFi thermostat consents to monitor some boiler's parameters concerning the storage time of the main CH e DHW modes and gas consumption.

The monitor shows values that can change depending on the usage of the boiler, on the season and the gas pressure. If other gas-driven devices are installed, the values on the monitor may be diferent from the values detected by the direct reading of the gas meter.

To use the Energy monitor follow the procedure:

- Press the button energy monitor (ENERGY MONITOR) (**1**). Energy monitor will appear on the display :

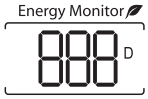




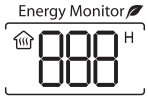
- Press the button energy monitor (ENERGY MONITOR) (**1**) repeatedly to change the parameters :

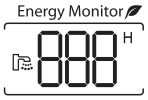
The figures on the Energy monitor can be cancelled by keep pressed the energy/monitor button (ENERGY MONITOR) (**1**) for three seconds.

The menus of the Energy monitor will appear on the display:

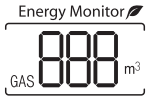


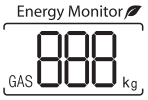
Days of use





Hours of burner ignition in:
heating (CH);
hot water production (DHW)





Gas consumption:
methane and propaned air in m^3;
LPG and propane in Kg

1.4.10 ANTIFROST PROTECTION

The boiler is equipped with an automatic antifrost mode that protects the heating circuit from the cold temperatures, together with the circuit that produces hot domestic water for the device.

If the heating circuit temperature drops to 6°C (or the temperature in the boiler's location drops to 3°C), a first level of protection activates a pump. This operation makes the water flow thorugh the heating circuit and thorugh the domestic water circuit.

If the heating circuit's temperature falls below 5°C, a second level of protection activates the boiler too, for a maximum of 60sec. (or until the temperature in the circuit get back to 55°C for 2 sec. at least)

If the heating circuit temperature falls to 2°C (or the temperature in the environment where the boiler is installed falls to 5°C), electrical resistors are activated to protect the domestic water circuit only.

IMPORTANT

Important! The symbol electrical resistances (fixed) is showed on the dyspaly of the thermostat when antifrost electrical resistances are activated.

When the boiler activates the circulating pump or briefly turns on the burner, the symbol electrical resistances starts blinking on the display.

If temperature drops below 0°C, the termostat warns the customers by making beeping noises on an hourly basis: in such a situation, the boiler may freeze, getting irreparably damaged; it is recommended to improve its isolation condition and to provide more antifrost protection.

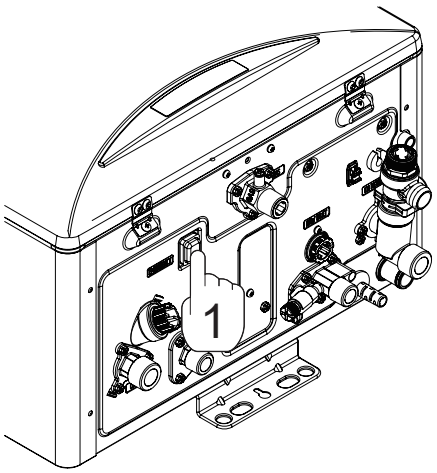
In conditions of normal operation, the boiler is protected until -20°C: only if the device is appropriately powered with proper gas flow and electrically powered, if the boiler is constantly powered and turned on, if the boiler activity is not stucked, if the device is not damaged. Particular attention to the condensate drainage system is required in order to protect it from freezing.

If the device is in danger of freezing because of very low temperatures, it should not be used during extended periods. It is recommended to make it safe by draining the boiler completely.

Frost/freezing damages are not covered by the guarantee.

1.4.11 EMERGENCY BUTTON

The boiler is equipped with an ‘emergency button’, which is situated at the base of the boiler casing, the use of which consents to use the boiler in critical conditions, within the proper limits.



If the WiFi chronothermostat is malfunctioning, it is possible to start the device and make it work as follows:

- discharge temperature of the heating installation to 52°C;
- domestic hot water temperature to 40°C.

It is not recommended to use the emergency button under normal conditions.

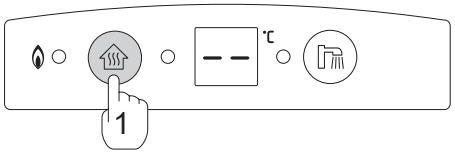
You can turn on the emergency switch if Rinnai chronothermostat is broken, so that you don’t find yourself with no heating service and domestic hot water. Call immediately Your Rinnai’s authorized technical assistance centre, in order to repare it or replace it.

1.4.12 BODY CONTROLLER (INTEGRATED CONTROL PANEL)

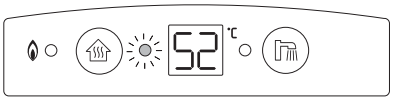
The boiler is equipped with an integrated control panel in the frontal boiler casing.The Body controller functioning instructions are described below.

Heating function (CH)

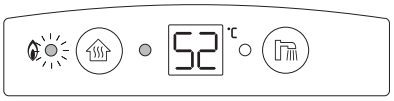
Press the button to activate the heating function(1):



The Body controller led will light up. They indicate that:



- The heating mode is activated;



- The boiler’s burner is on.

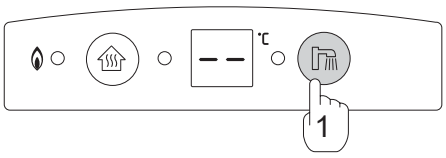
Press repeatedly the button to raise the temperature up until the central heating display shows the intended temperature. To deactivate the heating mode, hold down the button central heating for a few seconds.

When the WiFi thermostat is connected and the boiler works in room temperature mode, it will not be possible to modify the flow temperature. This symbol I N will appear on the Body controller: IN .

The display shows the selected discharge temperature: To see the ‘actual’ flow temperature, keep pressed the button central heating for a second. The display will show the discharge temperature, temporarily (10 seconds).

Domestic hot water function (DHW)

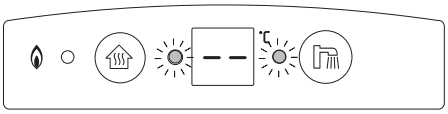
To activate the domestic hot water function, press button (1):



The DHW function is handled in a similar manner to the CH mode which was previously described. The leds have the same meaning.

Antifrost function - Body controller

If the temperature in the boiler drops to 0°C, antifrost mode is activated.



The leds of CH and DHW modes will start blinking (until the alarm is deactivated). The Body controller will emit a reapeated noise, every hour.

The acoustic alarm ceases when the boiler activates the burner, in order to avoid freezing. The leds will keep on blinking.

1.6 TROUBLESHOOTING

When the boiler does not work properly, it is possibile to consult the following suggestions to detect and solve some common problems without technical aid:

Problem	Possible causes	Suggestion
If you smell gas		1. Stop the boiler and gas immediately. Open all the windows and doors. 2. Do not try to use any appliances: you may cause an explosion. 3. Contact your gas supplier.. Periodically check the valve of the gas pipes /shut-off valve to ensure that there is no leakage.
If you smell exhaust gas	1. Check the flue system searching for possible obstructions, disconnections or damages.	1. Stop the boiler immediately and contact the Rinnai service or maintenance.
Ignition failure	1. Is there power to the boiler? 2. Is the set temperature lower than the current temperature? 3. Is the error code 11 shown on the display? 4. Is there gas supply to the boiler?	1. Plug into the outlet with the correct voltage. 2. Check that the set temperature on the display is higher than the current temperature. 3. Turn off the boiler, and turn it on again. 4. Open the gas supply valve.
Noise	1. Is the boiler well attached to the wall? 2. Is the noise from the air inlet/exha. pipe? 3. Does the noise come from hydraulic circuit?	1. Attach the boiler in the right way. 2. Call Rinnai service to check the flue system. 3.Remove air from pipes opening the drain point.
The room is not hot enough	1. Is the CH mode on? 2. Is the set temperature too low? 3. Is the reservation mode/ outgoing mode on? 4. Is the hot domestic water being used? 5. Is the heating valve closed? 6. Is the remote control ON? 7. Is the CH return filter blocked? 8. Is there air in the pipes?	1. Press button CH on the remote control. 2. Adjust the heating temperature. 3. Adjust the period or cancel the outgoing mode. 4. Stop using domestic hot water. 5. Open the closed heating valves. 6. Connect the remote controller and adjust CH. 7. Clean the CH return filter. 8. Open the manual air drain point to remove air.
There is no hot water	1. Is DHW mode active? 2. Is there water supply to the boiler? 3. Is water pressure too low? 4. Is the water supply valve for cold water too opened?	1. Press the button DHW of th remote control. 2. Wait for the water supply availability. 3. If the pressure of the cold water is lower than 2,3lit/min, the boiler will not start working. 4. Open the valve.
The domestic hot water is not hot enough	1. Check the flue system searching for possible obstructions, disconnections or damages.	1. Check the flue system searching for possible obstructions, disconnections or damages.

1.5.1 ERROR CODES

Rinnai products are equipped with a self-diagnostic system: in case of malfunctioning, a numerical error code appears on the control panel's display and starts blinking. This function will be useful to diagnose the problem and understand what possibly caused it. It consents to avoid, where possible, the external intervention of a Rinnai authorized technician Take note of the blinking error code before performing maintenance request.

To restore the normal functioning of the device, it is necessary to keep pressed the button On/Off 

for a few seconds. In case the error remain, ask for Rinnai authorized technical assistance center.

Error	Function	Possible cause	Suggestion
Fail 1	'My Rinnai' App installation: registration of WiFi remote control'	Password, internet connection, wrong security settings	Verify the password and the internet connection; Verify the safety protocol: select WPA or WPA2.
Fail 2	'My Rinnai' App installation: registration of WiFi remote control'	WiFi module failure	Restart the system; if the problem persists please contact a Rinnai technical assistance centre.
Fail 3	'My Rinnai' App installation: registration of WiFi remote control'	Compatibility problems	Verify the compatibility with the model of boiler in use.
Fail 4	'My Rinnai' App installation: registration of WiFi remote control'	Time-out exceeded for the registration (10 min.)	Complete the registration of the WiFi command in 10 min.
02	CH & DHW	Error in reset function	Press the button CH (or DHW) twice, to deactivate and re-activate the function
07	DHW	Continue use of domestic hot water (>8h)	Stop the domestic hot use and press the button DHW to reactivate the function; In case no one is using hot water, a breakage of the hydraulic pipeline is possible: call a technician.
11	CH & DHW	Burner flame not detected	Verifiy that the gas safety valve is open; Press the button CH twice to deactivate the heating function and to re-activate it.
12	CH & DHW	Unusual extinguishing of the burner	Verify the gas supply (turn on other gas utilities); Contact the gas service dealer or a speciaized technician.
14	CH & DHW	Overheating, safety circuit's failure	Turn off the boiler for at least 30 minutes; press the button CH or DHW. If the code remains, please contact immediately the Rinnai technical assistance service.
15	CH & DHW	Problem of water circulation in the hydraulic system	Check the boiler's hydraulic feeding; Check that the plumbing pipe are not freezed ; Verify the presence of air in the hydraulic circuit: disconnect the electric cable and reactivate the boiler (the de-aerating function will be reapeated).
16	CH & DHW	Overheating CH	Verify that at least a thermostatic valve is open; Vent the air in the heating circuit; Clean return line filter of CH.
18	CH & DHW	Earth not detected	Call the Rinnai technical assistance center.
19	CH & DHW	High temperature of exhaust	Call the Rinnai technical assistance center.
20	CH & DHW	Wrong setting of the microswitches on PCB	Call the Rinnai technical assistance center.
23	CH & DHW	Earthquake alarm	
31	CH & DHW	CH flow temperature thermistor failure	Press button CH (or DHW) twice to deactivate and activate the function : if the code reappears call the Rinnai technical assistance service
32	CH & DHW	External temperature thermistor failure (external sensor)	Press the button CH (or DHW) twice to deactivate and activate the function: if the code reappears call the Rinnai technical assistance service.

Error	Function	Possible cause	Suggestion
34	DHW	Hot water thermistor failure	Press the button DHW twice to deactivate and activate the function: if the code reappears call the Rinnai technical assistance service.
35	CH	Room thermostat failure (Rinnai remote control)	Call the Rinnai technical assistance center.
36	CH & DHW	Antifrost prevention/ thermistor failure	Press the button DHW twice to deactivate and activate the function: if the code reappears call the Rinnai technical assistance center.
37	CH & DHW	CH return temperature thermistor malfunction	Call the Rinnai technical assistance center
38	CH & DHW	Exhaust temperature thermistor malfunction	Call the Rinnai technical assistance center.
43	CH & DHW	Low pression of the CH hydraulic circuit	Check the manometer placed on the frontal panel and follow the filling instruction.
45	CH & DHW	Drain system blocked (sipho n full)	Check if the condensation drain system is obstructed.
61	CH & DHW	Combustion fan failure	Verify that the exhaust system is not obstructed. Turn off/on the boiler : if the error code remains, please call the Rinnai technical assistance service.
64	CH & DHW	Circulation pump failure	Call the Rinnai technical assistance center
70	CH & DHW	Fault of PCB	Call the Rinnai technical assistance center
71	CH & DHW	Solenoid gas valve failure	Press the button CH (or DHW) twice to turn off and on the function. If the error code remains, please call the Rinnai technical assistance service.
72	CH & DHW	Water's missing	Press the button CH (or DHW) twice to turn off and on the function. If the error code remains, please call the Rinnai technical assistance center.
89	POWER SUPPLY	Freezing	Call the Rinnai technical assistance center.
90	CH & DHW	Abnormal rotation of combustion fan	Premere il tasto CH twice to turn off and on the function
96	FUNCTION TEST.	Problem on internal test of CH & DHW modes	Check the DHW/CH taps below the boiler are open; Disconnect and reconnect the power cable to repeat the test procedure.
99	CH & DHW	Obstruction of the flue system	Check and clean the flue pipes. Call the Rinnai technical assistance service.

IMPORTANT

Important! You can see the error code blinking on the Body controller display.

On the Rinnai WiFi thermostat you can see both the error (on the left) and the boiler model (on the right):

Display	Model
24	REB-KBI2424FF
29	REB-KBI2929FF
35	REB-KBI3535FF

It is necessary to hold down the button On/Off (ON/OFF) for a few seconds to restore the boiler's normal functioning and cancel the error.

If the error code persists, please call the authorised personnel from Rinnai.

1.7 MAINTENANCE

IMPORTANT

Important! Annual specific maintenance is required in order to preserve the boiler's entirety and to maintain safety, performance and reliability characteristics unchanged: always contact your Rinnai authorised technical assistence center.

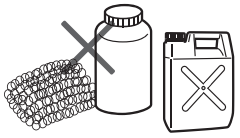
The control panel and the appliance must be repared and maintained only by the specialized and authorised techinical personnel of Rinnai: no partial or full repair by private household that requires the opening of the device's frontal panel is allowed.

The spare parts used for the maintenance must be original Rinnai parts.

Rinnai provides a technical support network with qualified and trained staff to provide you the best service about Rinnai products, available on the website: *www.rinnai.it*

It is recommended to previously take note of the boiler's model and the serial number before contacting Rinnai: this information will help us to understand the matter quickly and to ensure the best possible service.

The appliance must be clean.



The boiler must be electrically isolated and the gas valve closed before every kind of maintenance or cleaning can be performed.

Clean the outer boiler's case and the remote control with cloth pieces, moisted with water or non-aggressive detergents. Do not use solvents or dispersants.

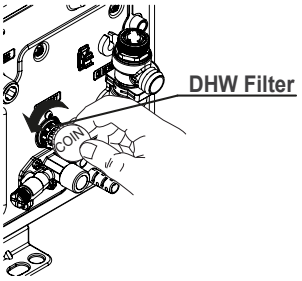
Always check the appliance and make sure nothing is accidentally disconnected or damaged, on completion of the maintenance phase: leakage produced by combustion can cause death or searious health disease to people and animals.

Cleaning the domestic water filter

The boiler has a mesh filter situated on the inlet connection of the cold water. This filter requires occasional cleaning: the frequency is determined by the quantity of water used by the boiler system. The customers can clean this filter independently and regularly, in order to keep the proper functioning of the device inaltered, by limiting failure and damage causes.

To clean the filter:

- elettrically isolate the boiler, unplugging it from the main;
- close the water vaves;
- open the tap (hot water) and drain the circuit;
- unscrew the mesh filter taking care not to damage it;
- clean it by washing it with cold water;
- reassemble and follow the same procedure backwards.



When the filter is dirty or clogged by debris, the entire performance is reduced.

2. INSTALLER’S INSTRUCTIONS

The following section provides specific instructions for a correct installation of the product.
It is intended for the exclusive use of qualified technical personnel.

2.1 INSTALLATION WARNINGS

IMPORTANT

Important! The following section contains technical guidelines concerning the product's installation. It is necessary to respect the dictates of the existing legislation and the principles of proper technical skills, as regards installation issues (safety, environmental protection, injury prevention, etc). Under the legislation in force, the installations must be projected and carried out by authorised professionals.

Rinnai Zen boilers have been designed only for wall-mounted installations. They are made for domestic (or similar) use, for the production of domestic hot water and for water heating (at a lower temperature than the atmospheric boiling point).

They have to be electrically powered, connected to a heating gaseous-fuelled installation and to a domestic hot water supply network, both of them in line with the boiler's performances and power.

Only professional enterprises are authorised to install Rinnai's appliances burning gaseous fuels.

The boiler's installation must follow the requirementes of the standards UNI e CEI, the existing legislation and the local technical legislation, in accordance with the indications of the good installing technique. It is particularly important to respect the Regulations UNI 7129 and 7131, and CEI 64-8 and 64-9.

2.1.1 LOCATION

The boiler can be installed outside without any particular protection against rain, snow etc. (a sheltered position is suggested for the installation, in order to reduce heat losses). It is necessary to provide proper insulation for the plumbing pipes to prevent frost; always ensure electrical power and sufficient quantity of gas; always make sure that the exhaust system is properly installed and sealed. The allowed temperatures of use in external environment are: -20°C÷40°C.

For indoor installations, the room must be provided with an adequate to boiler's capacity ventilation system.

The installation in fire hazard places (garages, box, etc.), on cooking appliances or in peculiarly humid areas is forbidden; to staw flammable material, chemical products, corrosive substances (or similar materials) nearby the boiler is installed is forbidden.

The air surrounding the appliance, the exhaust and inlet air system, is used for the flame's combustion: air must be devoid of each element that could cause the corrosion of the components (it means air must not contain corrosive substances, for instance, aerosol, spray, detergents, chemical solvents, oiled-base paints, refrigerants, etc.). The boiler and its exhaust and ventilation systems must not be installed in environments where corrosive, chemical and combustible substances can be found. Damages and repair due to corrosive chemicals compounds are not covered by warranty.

Installations in coastal areas require a more frequent maintenance: this is due to corrosive phenomenon of the air from the sea.

The appliance must be fixed to a flat vertical support wall, with the gas and water connections facing downwards. The wall that will support the boiler must be plain and able to hold the water heater (35-40kg), so it has to be built in solid or perforated bricks. Both the brakets (upper and lower) must be fixed to the wall with metallic screws.

The boiler must be easily accessible and maintainable: its postiton must ensure a risk-free accessibility for inspection, reparation and emergency measures. Sufficient space to remove components and properly maintaining the product must be ensured.

It is necessary to provide an electrical outlet with AC230V / 50Hz power supply with grounding nearby the appliance, sufficiently far from the gas and water connections of the appliance and from the exhaust outlet. For outdoor installations it is necessary to provide a protected and waterproof plug. The electrical cable of the appliance is 1.5m long.

The positioning of the exhaust terminal must comply with the provisions of the current legislation and the minimum distances from the architectural elements.

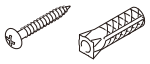
Connect the vent valve to a proper conveying system.

Provide an adequate liquid waste disposal system in the lower part of the boiler, in order to collect and dispose of liquid waste. This will prevent damages to goods and properties in case of pipes'accidental breakage.

2.2 UNPACKING THE BOILER

Prior to use, verify that the boiler is set up for the correct type of gas and that the appliance is intact. If the appliance is clearly damaged do not proceed with the installation: call your supplier or Rinnai immediately. Together with the appliance, you will find the following parts and accesories in the packaging:

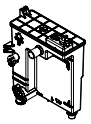
Instructions manual and documentation



Straws' kit and wall plugs for the device

WiFi chronothermostat (WF-P100W)

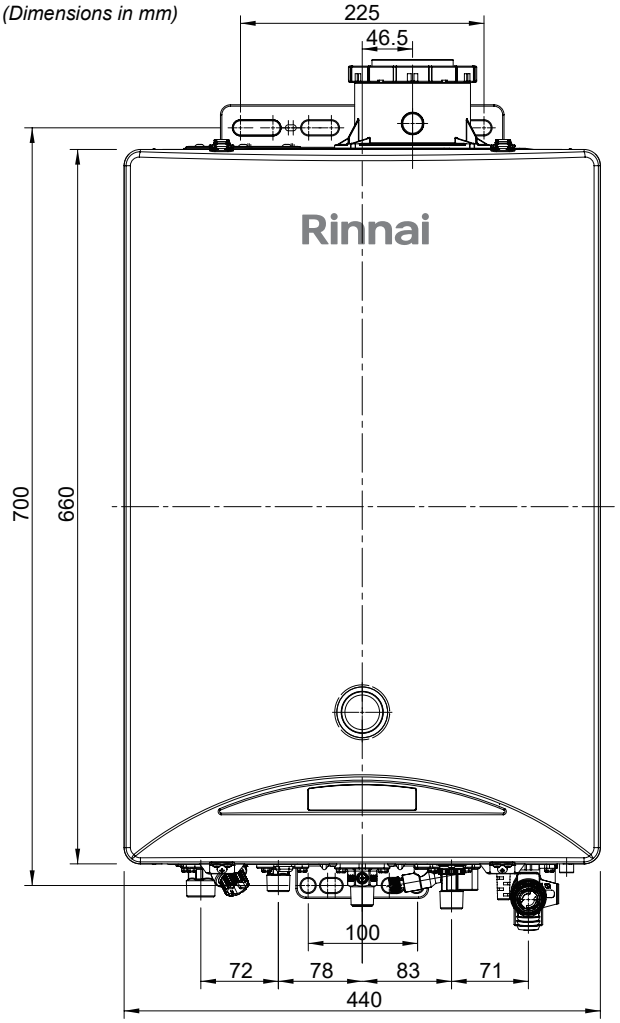
Connection cable for chronothermostat
(of different brand)

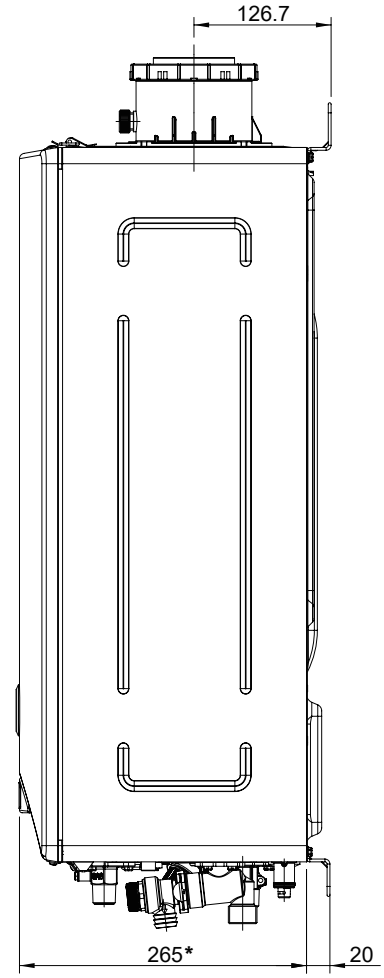


Condensate neutralizer
(preloaded in the siphon)

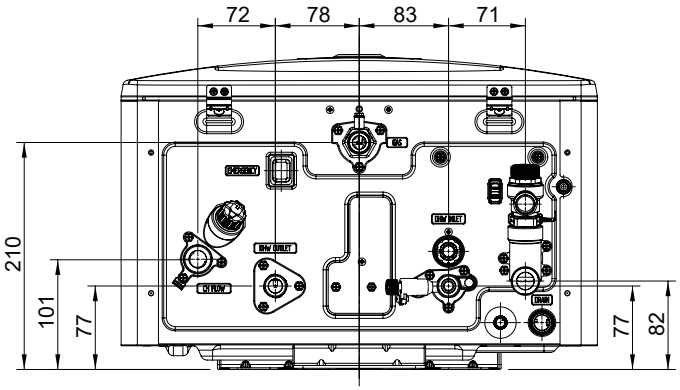
2.3 DIMENSIONS

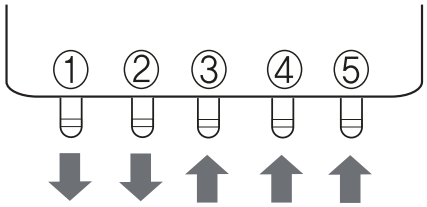
(Dimensions in mm)





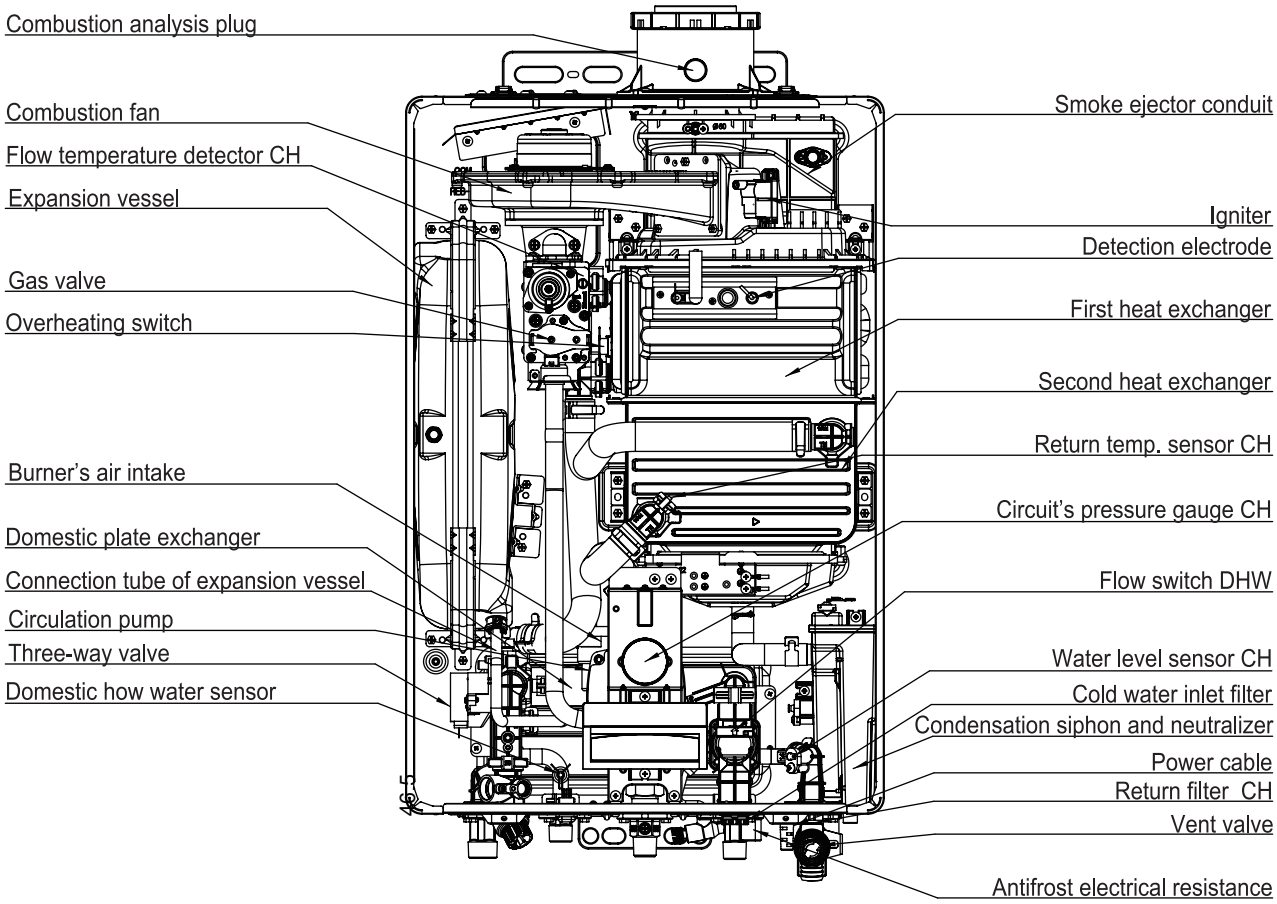
* REB-KBI3535FF = 315

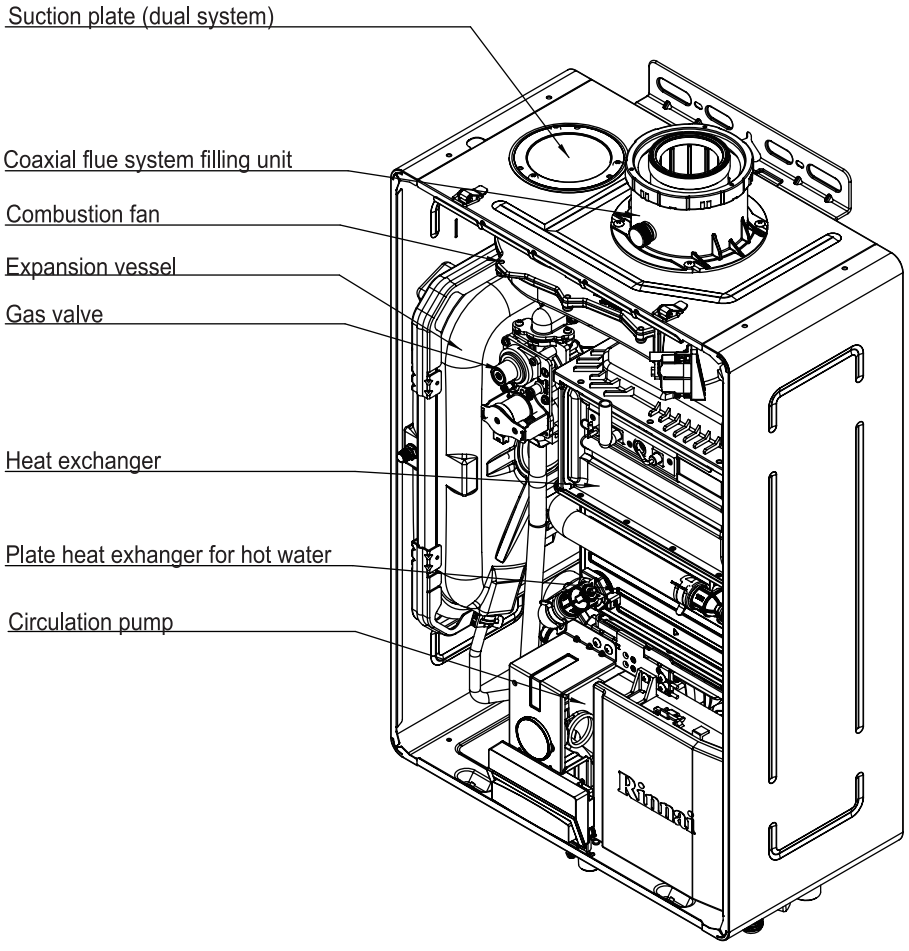




① Heating flow - 20A (3/4")
② Hot water outlet - 15A (1/2")
③ Gas - 15A (1/2")
④ Cold water inlet - 15A (1/2")
⑤ Heating retun - 20A (3/4")

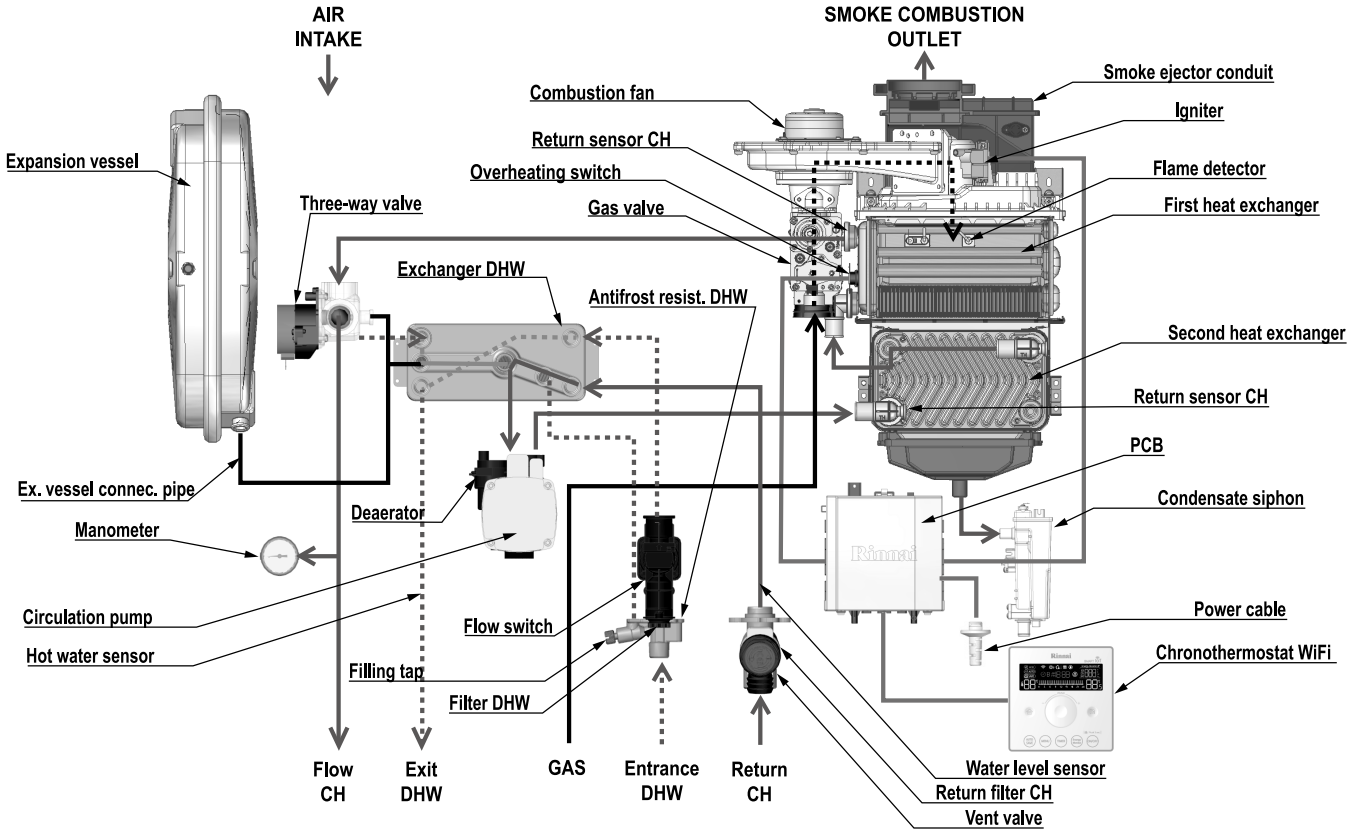
2.4 MAIN COMPONENTS



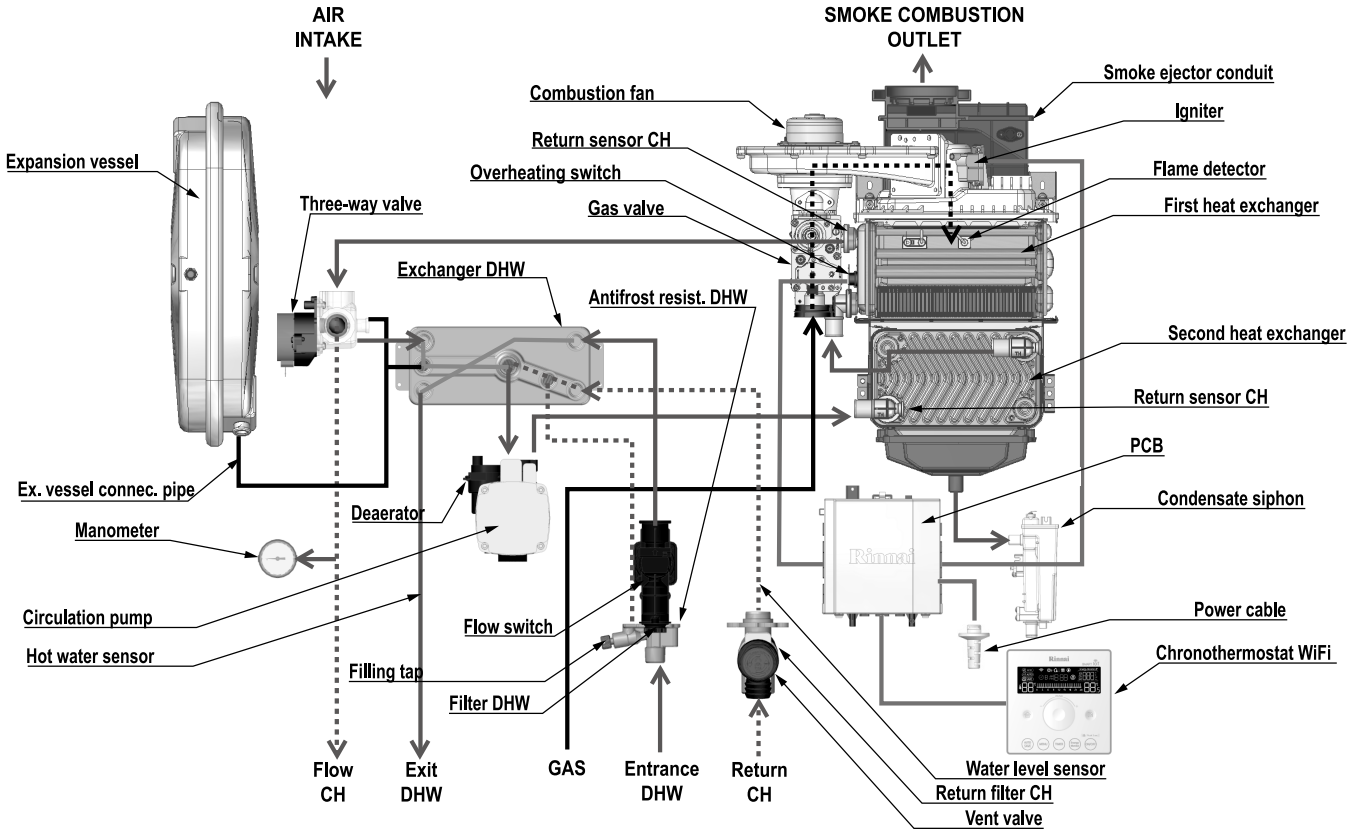


2.5 GENERAL SCHEME AND OPERATION PRINCIPLES

Heating circling mode (CH)



Domestic hot water circling (DHW)



2.6 INSTALLATION

2.6.1 HYDRAULIC COUPLINGS

IMPORTANT

Before proceeding with the hydraulic couplings, a good cleaning of the thermal installation is necessary (pipes, heating elements, etc.) to not compromise the product warranty. It must be done with specific pickling or anti-scaling products which are able to remove eventual residuums that could affect the good functioning of the product.

The DPR 59/09 prescribes a chemical treatment for the water used by the thermal installation, according to the UNI 8065 standard, in the cases covered by the Ordinance, and in order to protect the installation and the device from pipe-scaling, mud and other dangerous deposits.

The dimensioning and the layout of hydraulic pipes must be properly designed in order to ensure an adequate water flow rate to the appliance.

Domestic hot water

The DHW connections are: 15A (R1/2") male type.

Where the water supply pressure exceeds 10bar, an approved pressure regulator must be fit at the inlet of the appliance. To achieve the maximum flowrate, a water supply pressure of 1.5bar is required. The unit will operate at lower pressures but the maximum flow rate may not be achieved. The minimum pressure to ensure the nominal flowrate is equal to: 0.7Bar (Zen I24), 1.10Bar (Zen I29), 1.2Bar (Zen I34).

Connect the hot and cold water supply pipes. An approved interception ball valve and strainer MUST be installed on the cold water inlet pipe. An approved interception ball valve and draining point should be installed on the hot water outlet pipe. Do not connect the valves directly to the appliance, but interpose a flexible connection joint.

If the boiler is installed in a hard water area, a suitable water conditioning system must be installed to prevent limescale damages to the heat exchanger: damages by scaling are not covered by the manufacturer's warranty. Below are some limit values of substances dissolved in water:

Description	pH	Tot. dissolved solid	Total hardeness	Chlorides	Magnesium	Calcium	Sodium	Iron
Maximum recommended levels	6.5-9.0	600mg/liter	150mg/liter	300mg/liter	10mg/liter	20mg/liter	150mg/liter	1mg liter

The hydraulic pipes must be insulated to optimize energy efficiency and reduce heat loss.

Heating

The CH connections are: 20A (PT3/4") male type.

The vent valve must be connected to an exhaust funnel and conveyed appropriately to prevent damages.

When connecting the water supply pipes, it is recommended to have an interception ball valve and a filter on the return pipe from the system, and an interception ball valve on the flow connection. Do not connect the valves directly to the boiler, but interpose a flexible connection joint. It is recommended the installation of vent valves on the system.

Condensate drain pipe

During operation, the appliance can produce a significant amount of condensate as a product of the combustion of a highly-efficient system. The condensate is mild acid and non-potable: to prevent damages and disposal problems, the boiler is equpped with a sealed condensate trap siphon, already filled with an acid-neutraliser (the duration fo use is estimated to be eight/ten year long - it is necessary to check the PH regularly).

Connect a non-metallic pipe to the siphon's base (PVC, PVC-U, ABS, PVC-C or PP): it drains and eliminates excess of condensate. The connected pipe must have minimum slope of 2.5°. It is recommended to install the condensate drain pipe indoor to prevent freezing; if it is installed outside, it must be connected to a tube of Ø≥32mm and an adequate protection against frost must be provided to the pipe.

IMPORTANT

Important! Once the condensate drain is connected, proceed with filling the siphon by pouring water into the exhaust duct until the siphon is overflowed: pay attention to this phase because a siphon that is not correctly filled can spread harmful combustion products into the room where the boiler is installed.

2.6.2 GAS CONNECTION

Impoprtant! Before connecting the appliance to the gas mains, in order not to invalidate the warranty, it is necessary to clean the pipe and remove any impurities or production residues that could cause the product to malfunction.

Make sure that the appliance is set up for the correct type of gas.

The gas connection is: 15A (R1/2") male type.

Check that the gas meter and the gas pipes are adequate to the power of the appliance (and of all the appliances connected to the same gas line): the gas network must be designed by qualified professionals and according to current regulations and must provide adequate dynamic pressure based on the rated power of the device. Refer to what reported by the UNI 7129.

Insufficient gas supply may cause premature damage to the appliance.

The gas supply pressure directly affects the delivered power and can cause problems if it is not correct. If the dimensioning of the gas piping is insufficient, the customer will not be able to enjoy the maximum benefit in terms of performance.

When connecting the gas piping, it is recommended to have an interception ball valve for emergency situations and to facilitate maintenance; do not connect the valve directly to the boiler, but interpose a flexible connection joint.

Fuel quality: the appliance is designed to work with combustible gas without impurities. If this is not the case, an adequate filtration system should be installed upstream of the appliance, in order to restore the necessary quality.

LPG tanks: inert gas residues (e.g. nitrogen, etc…) could remain inside new tanks resulting in a poor gas mixture and could cause incorrect operation or product failure. The gases in the mixture could stratify during storage, causing the variation of the fuel calorific value and altering the appliance efficiency.

2.6.3 FLUE SYSTEM CONNECTION

Impoprtant! The exhaust system operates under positive pressure: it must be carried out by competent personnel, qualified according to the law, following the manufacturer's instructions and respecting the provisions of the law and the technical regulations in force.

The type of the flue system must be listed into the classes mentionned on the data plate (located on the side of the appliance). Rinnai provides a specific flue system for the appliance. Detailed installation instructions are supplied with the flue elements. For more information contact Rinnai.

Zen boilers must be installed by always connecting a Rinnai homologated exhaust system: they can not be used without having installed the exhaust system. The exhaust system is considered an integral part of the appliance: it is only possible to install certified and tested exhaust systems in combination with the appliance.

Before proceeding with the installation of the flue system, it is necessary to carefully check that each component is not damaged: install the component only if free from defects. Use of faulty or damaged components and improper installation can cause serious damage to people or property.

Make sure that the flue terminal is not obstructed or blocked.

Coaxial flue system

In the upper part of the appliance there is a coaxial connection (Ø60 / 100mm) for the intake of combustion air (external pipe) and for the expulsion of combustion products (inner pipe) with a socket for combustion analysis.

It is possible to install the flue system by connecting the specific flue accessories to the predisposed connection: the flue system (coaxial extensions and curves) must have a diameter not inferior to the initial connection, be made of materials suitable for the appliance flue temperatures and have 'male / female' watertight seal. Traits exposed to direct sunlight must be homologated for such use or be adequately protected.

Using a Ø60/100mm coaxial exhaust system, the maximum equivalent length allowed is 30m. It is necessary to subtract 2.0m for each 90° bend used and 1.0m for each 45° bend from the maximum equivalent length.

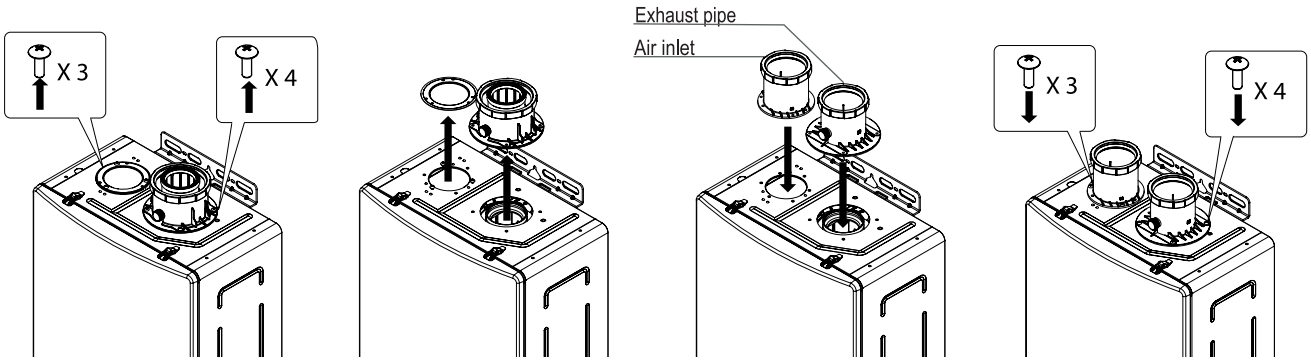
Beyond the 12m the boiler power is progressively reduced depending on the equivalent length of the exhaust system.

The maximum number of 90° bends is three (six for 45° bend).

It is allowed the use of any possible combination of curves and extensions that respects the maximum equivalent length and the maximum number of bends for each section.

Parallel flue system

The Zen boiler can be modified for the use with a parallel flue system. To adapt the boiler to this kind of exhaust appliance, it is necessary to remove the coaxial flue connection and the air suction plate located on the upper part of the appliance; subsequently it is possible to install and fix the appropriate kit (FOT-KB015):



The boiler is now equipped with a Ø80-80mm split connection: an intake for combustion air intake (left-hand duct) and one for the expulsion of combustion products (right-hand duct) with a combustion test outlet.

IMPORTANT

Important! Once the splitter kit has been installed, it is necessary to move and anchor the climatic probe in the middle of the inlet air pipe: it is normally already positioned inside the appliance, but prepared for the coaxial flue gas system.

It is possible to install the flue system by connecting the specific flue accessories to the predisposed connection: the flue system (extensions and curves) must have a diameter not inferior to the initial connection, be made of materials suitable for the flue temperatures of the appliance and have a 'male / female' watertight seal. Traits exposed to direct sunlight must be homologated for such use or be adequately protected.

Using a Ø80-80mm split exhaust system, the maximum permissible equivalent length is 50m (total intake + exhaust); the maximum permissible equivalent length for the air intake duct is 10m. It is necessary to subtract 1.5m for each 90° bend used and 0.5m for each 45° bend.

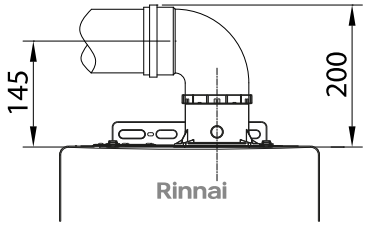
By extending over the equivalent 20m the exhaust system (total intake + exhaust) the boiler power is progressively reduced depending on the equivalent length of the exhaust system.

The maximum number of 90° usable curves is three (six for 45° curves).

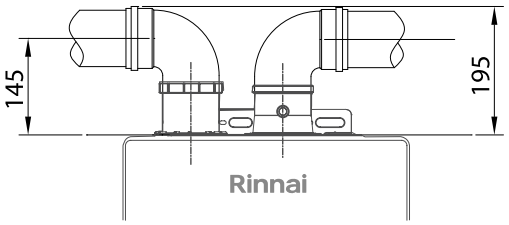
It is allowed the use of any possible combination of curves and extensions that respects the maximum equivalent length and the maximum number of bends for each section.

Overall dimensions and connection to the boiler

The main dimensions of some flue gas elements installed in the boiler are shown below:



Coaxial system
ø 60/100

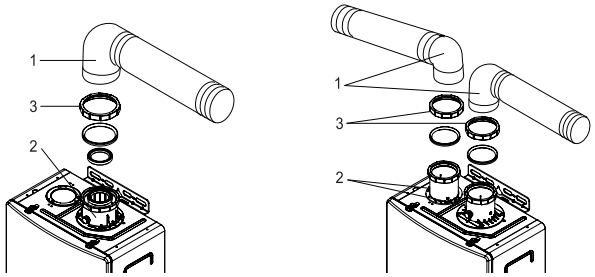


Parallel exhaust system
ø 80-80

(Dimensions in mm)

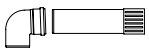
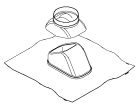
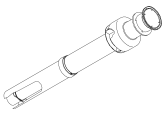
The connection of the inlet and exhaust pipes must be made as shown in the figure:

- inserting (≥40mm) the flue (1) in the appropriate location (2);
- fastening the connection seal (3) and verifying the absence of leakage.



Main components of the exhaust system

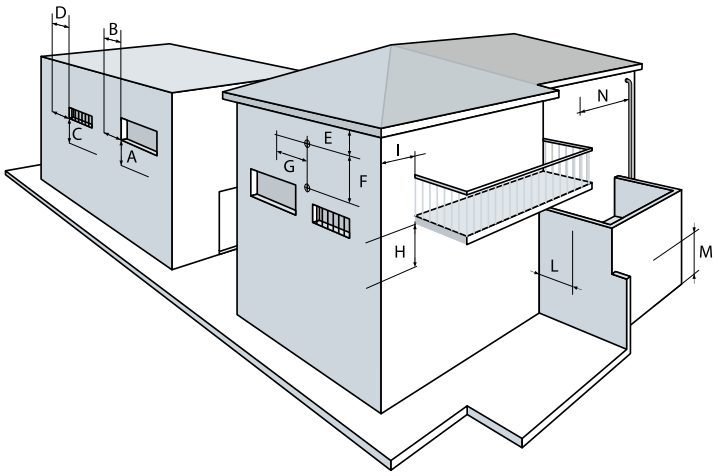
The main components and their codes codes are listed below

FOT-KX060-001		Coax extension L=1000mm	FOT-KS080-001		Extension ø 80 L=1000mm
FOT-KX060-004		2 x Coax 45° bend	FOT-KS080-004		2 x 45° bend ø 80
FOT-KX060-005		Coax 90° bend	FOT-KS080-005		90° bend ø 80
FOT-KX060-A07		Horizontal flue kit	FOT-KS080-007		Horizontal flue kit parallel system ø 80
FOT-HX060-A15		Adapter ø 60/100 ▸ ø 80/125	FOT-KB015		Adapters for split system
FOT-HX125-012		Lead tile	FOT-KX080-009		Coaxial roof terminal ø 80/125

Distances of the flue terminal from achitectural elements

The main minimum distances required by the UNI 7129 technical standard for the correct positioning of the exhaust terminals of appliances equipped with a fan with a thermal capacity between 16 and 35kW, are shown in the table below.

In particular, the Law no.90 of 4th August 2013 (Article 17-bis) and Legislative Decree 102/2014 establish the cases and conditions in which the wall drain for the Zen boiler is permitted.

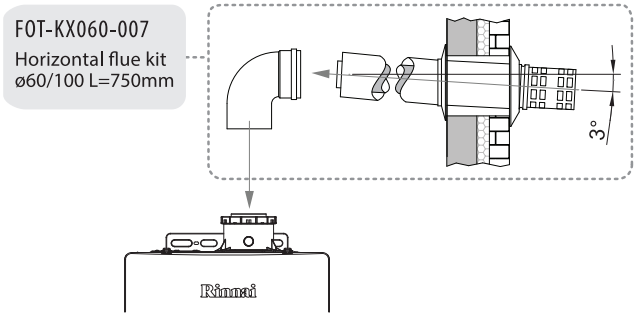


DISTANCES FROM THE FLUE TERMINAL		(mm)
A	Under a window	600
B	Next to a window	400
C	Under aeration/ ventilation intake	600
D	Next to a aeration/ventilation intake	600
E	Under a drainpipe	300
F	Between two vertical terminals	1500
G	Horizontally situated next to an exhaust terminal	1000
H	Under a balcony	300
I	Alongside a balcony	1000
L	From a corner/a recess/a building's wall	300
M	From the ground or other walking areas	2200
N	From pipes or exhaust and drain pipes	300

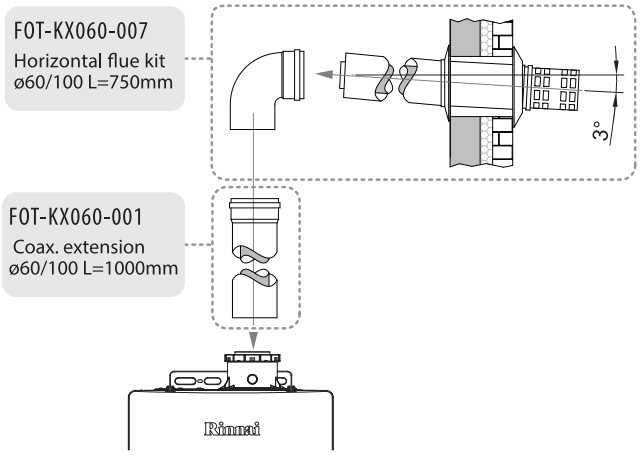
Main configuration of the flue system

COAXIAL FLUE SYSTEM Ø60/100mm

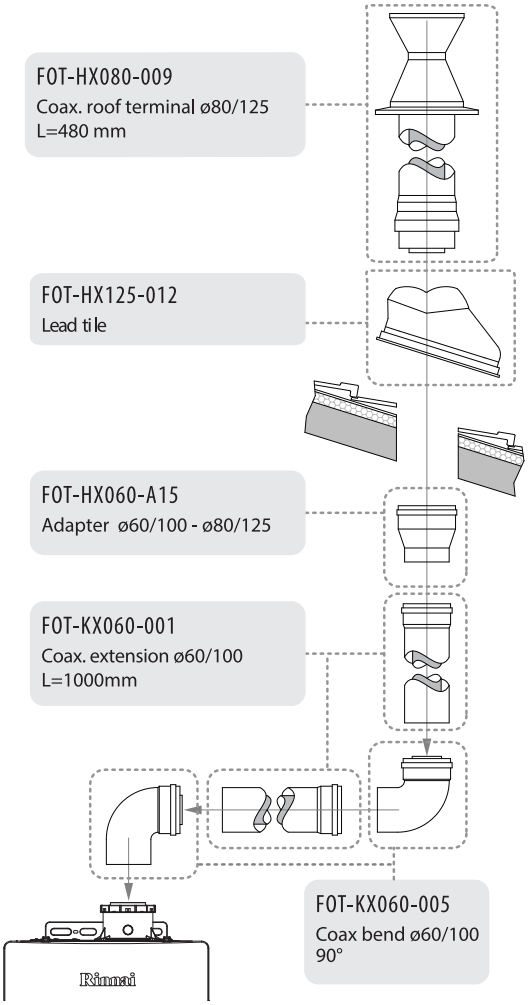
A) DIRECT FLUEING WITH WALL TERMINAL



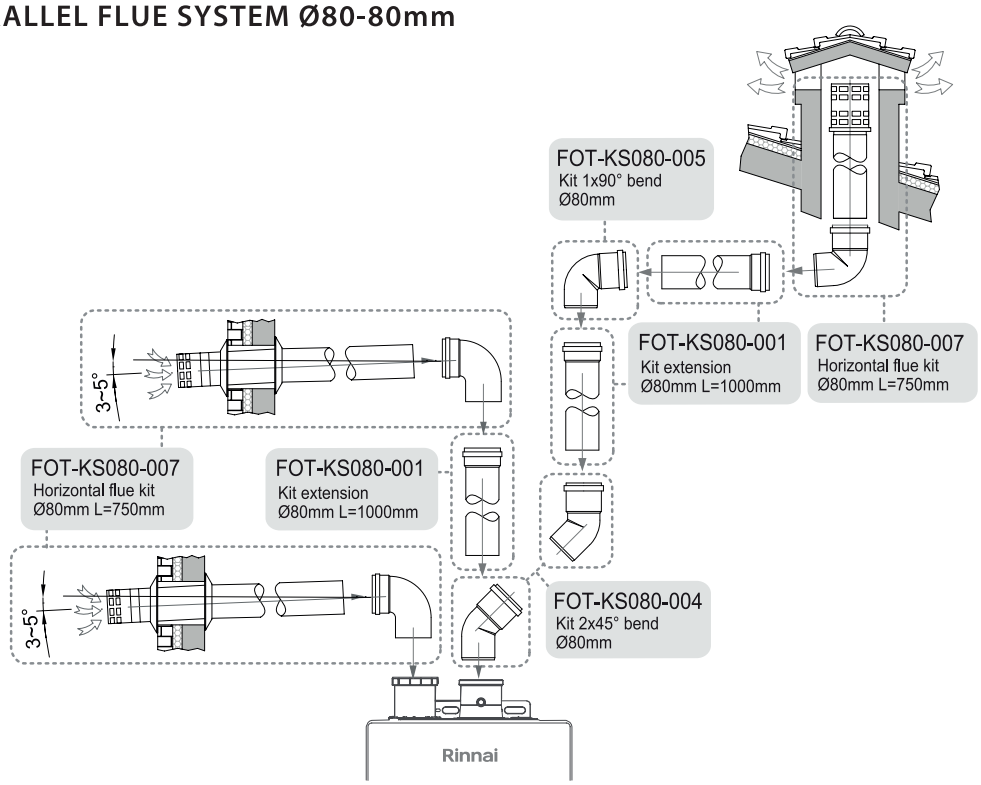
B) HORIZONTAL EXTENSION FLUEING WITH WALL TERMINAL



C) VHORIZONTAL/VERTICAL EXTENSION FLUEING



PARALLEL FLUE SYSTEM Ø80-80mm



2.6.4 ELETTRICAL CONNECTION

IMPORTANT

Important! Connect the boiler to a 230V ±10% / 50Hz power supply.

Do not use the gas or hydraulic lines for the grounding.

The electricity safety is ensured only when the device is provided with an appropriate grounding and when the grounding system has been realized according to the safety requirements envisaged by the law.

Make sure that the electrical system is adequate for the maximum power absorbed and is equipped with an omnipolar disconnector with class III overvoltage category.

The appliance is supplied with an electric cable already fitted with a plug: in case of replacement, contact a qualified technician and use only original Rinnai spare parts to avoid invalidating the warranty..

Do not use adatpors, multiple sockets and extensions cords.

The device fullfills the requirements of European Directives:

- "Low voltage" Directive;
- "Elettromagnetic compatibility" Directive.

The boilers are in IPx5D protection class.

2.6.5 RINNAI WIFI CHRONOTHERMOSTAT

The boiler is supplied ready for the use with the Rinnai WiFi chronothermostat. The controller is pre-set to operate by controlling the flow temperature of the heating system.

To operate, the remote control must remain connected via cable (two wires) to the device, which supplies it electrically in low voltage: it is possible to extend the supplied electric cable with a cable of the same section.

IMPORTANT

Important! The controller must be installed on an accessible wall, at a height of 1.2-1.5m from the ground; in a place that is significant for the home, especially if it is used in 'room-thermostat' mode.

Avoid installing it in areas where the temperature is >40°C, <-20°C or with a high humidity level, where it is directly affected by solar light, subjected to splashes of water, to the effect of chemical agents or fouling (in particular of fatty substances).

The electrical wiring of the remote control must be in good condition: in case of damage or deterioration it is necessary to replace it.

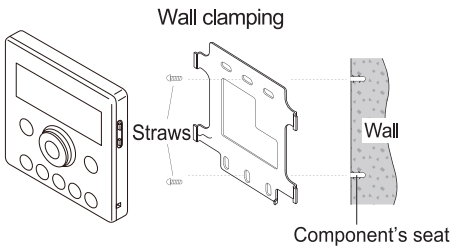
Do not use electrical conduits already used for high voltage cables (230V): in this case it is necessary to replace the supplied cable with a suitably shielded cable to avoid electromagnetic interferences.

WiFi Rinnai chronothermostat installation

Prior to begin the installation, it is necessary to electrically isolate the appliance by disconnecting it from the electrical socket.

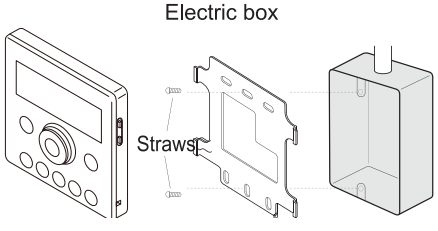
Wall mounted:

- separate the metal bracket from the controller;
- use the bracket as template to prepare the holes for the plug (Ø6.0 x 35~40mm);
- insert the plugs in the holes prepared;
- fasten the bracket with the screws;
- fix the two ends of the supplied electric cable to the two poles of the control (rear part);
- install the control to the metallic bracket.



Installation in electric box:

- separate the metal bracket from the controller;
- fix the bracket to the electric box;
- fix the two ends of the supplied electric cable to the two poles of the control (rear part);
- install the control to the metallic bracket.



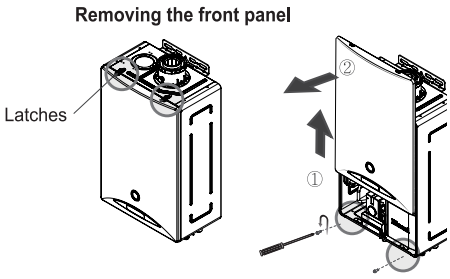
2.6.6 CHRONOTHERMOSTAT OF A DIFFERENT BRAND

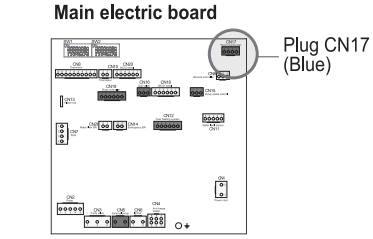
The Rinnai boiler can work by connecting a chronothermostat (optional). Or it can work by connecting a chronothermostat (optional), keeping the Rinnai WiFi chronothermostat connected: in this second configuration the Rinnai command transfers the room temperature control function to the optional chronothermostat. In order to connect the room thermostat of another brand to the boiler's electronic board, a special connector (blue) is supplied as standard.

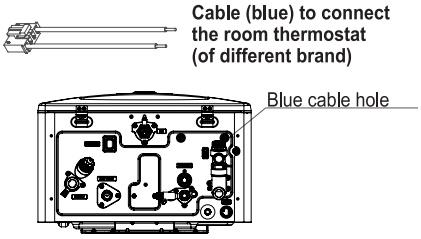
Installation of the chronothermostat (of a different brand)

Isolate the appliance electrically by disconnecting it from the electrical socket:

- remove the front panel from the boiler body taking care not to damage the pressure gauge, first lifting it upwards and then moving it away from the boiler body;
- remove the protective cover of the main electronic board (PCB) and connect the supplied cable to the CN17 port at the top right of the PCB;
- insert the cable through the holes provided in the lower part of the appliance casing and connect the secondary room chronothermostat to the cable installed;
- check that the type of chronothermostat connected is in 'open contact': if it is a 'closed contact' type it is necessary to modify the **parameter nr.14 of menu B**;
- close the PCB protection cover and assemble the front panel;
- electrically power the appliance, switch on the remote control and activate the heating function by pressing the central heating button : the boiler must be set on 'flow temperature' mode ( ); check if it operates correctly.







2.6.7 FILLING THE SYSTEM

Once the hydraulic, gas and electrical connections have been completed and the drainage system is connected, proceed with filling the boiler heating circuit by opening the special tap at the base of the boiler.

IMPORTANT

Important! The filling of the circuit must be carried out in a very slow way: this prevents the formation of air bubbles that cause slowdowns in the commissioning of the system and can cause more problems in the initial phase of use.

Once the boiler has been installed, before operating it, always make sure that the system is filled correctly and that the pressure gauge on the front panel indicates, when the heating circuit is still cold, values from the green sector (0.5 ÷ 1.5bar). In case of necessity, restore the correct values by operating the appropriate tap at the base of the boiler.

The boiler has a vent valve built-in, on the circulation pump: make sure the valve cap is loose and free to vent air.

Open the bleed valves of the hydraulic system and the radiators, bleeding air until only water comes out.

By connecting the power supply cable, the boiler performs an automatic venting cycle of 60-120 min (and some internal control operations): during this phase, you do not have to press any on the remote control until the cycle is completed (during this phase some symbols may light up on the display and/or disappear).

At the end of the venting cycle it is possible that the system pressure has fallen below the minimum recommended value: restore the correct value by acting on the load tap.

If the deaeration cycle is not sufficient to expel most of the air in the system, it is suggested to disconnect the power supply cable and reconnect it to repeat the boiler vent procedure.

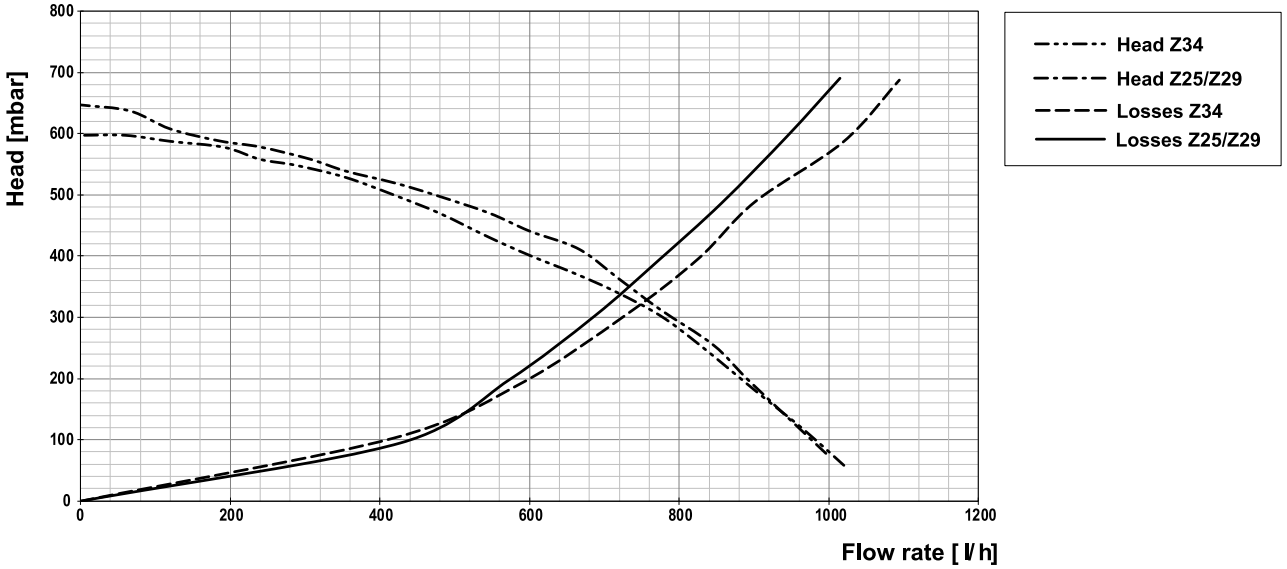
In the first uses and with a certain regularity it is advised to check that the pressure gauge on the front panel always indicates a normal pressure value: if necessary top up the system by operating the filling valve and restore the system pressure.

2.7 CIRCULATION PUMP

The boiler is supplied, as standard, with a built-in circulator with high energy efficiency, already compliant with Regulation 641/2009/EU.

The pump is directly managed by the PCB of the boiler and has an automatic operation: it is set for the most suitable operation based on the measured temperature difference between flow and return.

In the lower diagram are shown the specific curve of the pump and the losses of the heat exchanger:



Secondary circulating pump

In specific applications, due to the high losses in the system, the free head of the circulation pump may be poor or insufficient for the correct circulation of water in the heating circuit. For this purpose an optional accessory is available to connect a secondary pump external to the boiler. The operation of the secondary pump is managed, quite simply, like the operation of the primary pump: the pump is activated during the heating phases, when antifreeze protection is required, and when the initial functional test (deaeration cycle) is performed.

The characteristics of a compatible supplementary pump are:

Voltage: 230V AC, 50Hz

Amperage: <1 A

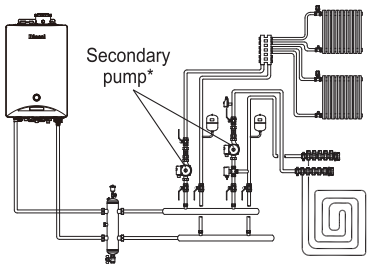
Inrush current: <1.5 A

(pumps with special and different technical charachteristics may cause the improper functioning of the boiler and damage the PCB).

Installation:

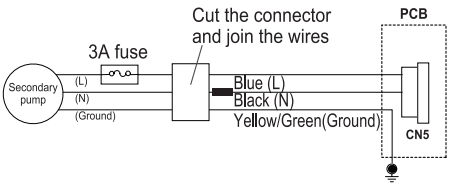
- unplug the boiler;
- install the pump into the CH system;
- connect the pump wire to the blue CN5 connector on the PCB;
- remove the connector from the free end of the wire and join it to the pump following the electrical scheme on the right side;
- the installation of a 3Amp fuse is recommended.

System connection

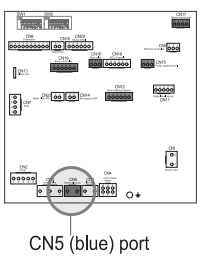


** = it is possible to connect only one secondary pump*

Electrical connection of the secondary pump



Main electric board



2.8 COMMISSIONING THE BOILER

IMPORTANT

Important! The operations listed below must be carried out only by professionally qualified personnel and only in the presence of professionals.

For the commissioning of the system, the installer must refer to the UNI 7129-4 Standard. In particular, for new systems, it is recommended to open doors and windows and ventilate the room well, avoid the presence of open flames or sparks, purge the gas system from the air and check the tightness of the internal system according to the indications given in the standard UNI 7129. Below are some general operations for a final verification:

Inspection type	Verification procedure	Notes
General inspections	1. Verify that the product has been installed in accordance with the instruction manual.	The installation must be performed in accordance with the builder's delle istruzioni del costruttore.
	2. Verify that the hydraulic circuits are clean before connecting or using the device.	Remove deposits, sediments, dirt or cutting waste.
	3. Check the electrical connection, the flue system, eventual gas or water losses.	
Condensate drain	1. Check the preparation of the condensate drain.	In case of improper connection, the device could be damaged.
Filling phase of systems CH and DHW	1. Open the interception valve of the hydraulic circuits.	Check for eventual water losses.
	2. Open the load tap of the device.	
	3. Fill the heating circuit until the pressure gauge is on the level (0.5~1.5bar).	
	4. Open the radiator or CH manifold's vent valves	
	5. Vent the air of the circuit until only water flows out.	
	6. Plug the device and wait for the end of the automatic venting cycle.	
	7. Press the buttons CH and DHW to adjust the desired temperature.	
Thermal insulation and trimmings	1. Verify that the pipes are correctly insulated and protected against frost.	
	2. Clean the location when the procedure is completed.	

At the end of the commissioning operations, by the installer, the Rinnai authorized technical assistance center will be able to perform the initial free test necessary for the activation of the Warranty. A copy of the test certificate issued by the technical assistance center must be provided to the User; this certificate must be carefully kept together with the product documentation and presented on request during the subsequent technical maintenance operations.

The Rinnai authorized technical service center must commission the boiler as:

- verify the Declaration of Conformity issued by the installer;
- check the correspondence between the gas used and the one for which the product is prepared;
- check that the electrical mains connection (230V, 50Hz) and grounding are correctly performed;
- verify that the heating system is loaded correctly and at the correct pressure (0.5 ÷ 1.5bar);
- check that the deaeration valve is working and the system is well drained;
- make sure that the boiler operates correctly;
- check the gas pressures (both for DHW & CH operation) are correct;
- **check the CO_2 emissions,** both maximum and minimal flows;
- check if the intake/exhaust system is properly connected and clear of obstruction;
- seal the gas regulation devices (in case of variation);
- check the hydraulic circuits tightness;
- check the aeration in the water heater's location.

In case of negative evaluation of one of these conditions, the commissioning cannot be performed.

2.9 ANTIFROST PROTECTION

The boiler is equipped with an automatic anti-freeze function to protect the heating and DHW heating circuit of the appliance from the cold temperatures.

When the water temperature in the heating circuit drops to 6°C, or the ambient temperature in which the boiler is installed drops to 3°C, a first level of protection activates the pump making it run a four-minute cycle of circulation on the heating circuit and a thirty-second cycle on the DHW circuit.

When the water temperature in the heating circuit falls below 5°C, a second level of protection activates the appliance burner for a maximum period of sixty seconds, or until the temperature of the circuit goes back to 55°C for at least two seconds.

If the temperature of the heating circuit drops to 2°C, or the temperature of the environment in which the boiler is installed falls to 5°C, electrical resistances are activated to protect the DHW circuit.

The frost protection functions are guaranteed only if:

- **the appliance is constantly supplied with an adequate gas flow and is electrically powered;**
- **the boiler is not blocked (error code);**
- **the appliance is not damaged.**

Under the above conditions the boiler is protected against freezing up to an ambient temperature of -20°C.

If the appliance is at risk of freezing due to very low temperatures or if it is not intended to be used for prolonged periods, it is advisable to carry out an emptying procedure.

Important! Particular care must be taken to also protect the condensate drainage system from freezing. It is suggested the use of electric heating elements in particular for the domestic water supply pipes.

All pipes and connections at risk of freezing must be suitably insulated.

Frost damages are not covered by the warranty.

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www.rinnai.co.kr

3. MAINTENANCE INSTRUCTIONS

The following section contains specific instructions for proper product maintenance.
It is intended for the exclusive use of qualified technical personnel.

3.1 PARAMETERS MENU

IMPORTANT

Important! For safety reasons, it is advisable not to modify the parameters of the menus without having fully understood the meaning of the parameters themselves and the consequences produced on the boiler.

It is recommended to always contact Rinnai Italia in advance so as not to damage the boiler or the plant to which it is connected and to exclude potential risks for the user.

Parameter unit of measurement

The value of the displayed parameter is shown on the right side of the WiFi thermostat display:

00 - the value is expressed in hundreds (1 = 100);

02 - the value is expressed in units.

Parameters of B menu

The B menu mainly collects the parameters relating to the use of the boiler:

Nr par.	Parameter	Values	Parameter description	Unit / Default value
1	Gas type	1~4	1: NG - G20; 2: Propane - G31; 3: Air/Propane - G230; 4: GPL - G30.	
2	Hours of combustion in CH mode	0~1999	Total hours of operating in CH.	1 = 100h
3	Hours of combustion in DHW mode	0~1999	Total hours of operating in DHW.	1 = 100h
4	Flame failure during operation	0~1999	Total flame failures during combustion.	
5	Burner ignitions in CH mode	0~1999	Total burner ignitions in CH.	1 = 100 times
6	Burner ignitions in mode DHW	0~1999	Total burner ignitions in DHW.	1 = 100 times
7	Black-out	0~1999	Total detected black-out .	1 = 10 times
8	Gas consumption in CH mode	0~1999	Total gas consumption in CH.	1 = 100 (m^3 or Kg)
9	Gas consumption in DHW mode	0~1999	Total gas consumption in DHW.	1 = 100 (m^3 or Kg)
10	Power limiter CH	Min~100%	The boiler power is limited to the set % value, de-powering the CH function only (range rated boiler).	100%
11	Modulating pump	ON/OFF	Pump operation: modulating flow or max. ON = modulating operation / OFF = max	ON
12	Pump activation	ON/OFF	OFF: pump active during combustion; ON: pump always active.	OFF
13	Switching time DHW-CH 3-way valve	ON = 30 sec OFF = 3 min	Waiting time of the 3-way valve before switching from DHW to CH after the use of hot water.	OFF
14	Room thermostat type	A = closed B = open	Type of contact of the room thermostat. (Closed contact = heat request with closed circuit)	B
15	Hearthquake sensor	ON/OFF	Activate / deactivate the earthquake sensor.	ON
16	Chimney sweep function	ON/OFF	Activate the boiler at max power for ten minutes.	OFF

Parameters of C menu

The C menu shows the history of twenty error codes detected (from the most recent one):

Nr par.	Parameters	Values	Parameter description
1	Error code Nr.01	Error code & number of events	Shows: - the last twenty error codes registered (position 1 = the most recent); - the number of events occured.
2	Error code Nr.02	Error code & number of events	
...			
20	Error code Nr.20	Error code & number of events	
21	Total error codes		Total of all error codes detected.

Parameters of D menu

The D menu shows the value detected by the many sensors of the boiler:

Nr par.	Parameters	Values	Parameter description	Unit / Default value
1	Outdoor temperature	-50°C~50°C	Detected temperature by the external temperature sensor.	°C
2	Flow temperature (CH)	-9°C~161°C	Flow temperature of heating circuit.	°C
3	Return temperature (CH)	-9°C~161°C	Return temperature from the heating system.	°C
4	Hot water temperature (DHW)	-9°C~161°C	Hot water temperature.	°C
5	Antifrost sensor temperature	-50°C~50°C	Detected temperature by the antifrost sensor.	°C
6	Exhaust sensor temperature	-9°C~161°C	Detected temperature by the exhaust sensor.	°C
7	Fan speed (Input)		It shows the rotation speed required to the fan.	RPM
8	Fan speed (Output)		It shows the detected rotation speed of the fan.	RPM
9	PWM of the fan (Input)	0~1023	It shows the PWM of the fan.	BIT

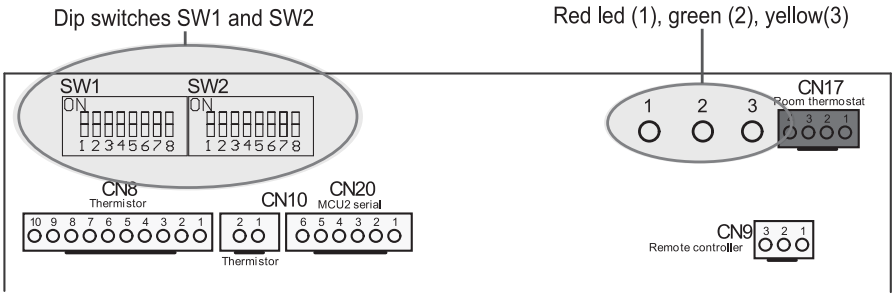
3.2 PCB

The main board (PCB) of the boiler is protected by a plastic cover that must be removed to access to the micro-switches on the board. The circuits of the electronic board are protected by a coating: this particular treatment protects it from stray currents, humidity, dust and tampering, guaranteeing a longer component longevity.

IMPORTANT

Important! For safety reasons and in order not to damage the boiler itself, every time you work on the PCB it is necessary to disconnect the plug from the electrical outlet: the boiler switch off via the ON/OFF button of the control is not sufficient.

At the top of the PCB, on the left, there are two banks (SW1 and SW2) of eight microswitches each; on the right, there are three leds of different colors (red, green and yellow).



Meaning of microswitches SW1

Some boiler settings can be changed by changing the sequence of the micro switches on the SW1 bank according to the following table:

Nr.	Bank SW1															
1	OFF	NG (G20)	ON	Prop. (G31)	OFF	Air-prop. (G230)	ON	LPG (G30)	OFF	Not in use	ON	Not in use	OFF	Not in use	ON	Not in use
2	OFF		OFF		ON		ON		OFF		OFF		ON		ON	
3	OFF		OFF		OFF		OFF		ON		ON		ON		ON	
4	OFF	Model: REB-KBI2424FF			ON	Model: REB-KBI2929FF			OFF	Not in use			ON	Model: REB-KBI3535FF		
5	OFF				OFF				ON				ON			
6	OFF	Low altitude installation (to 900m asl)							ON	High altitude installation (above 900m asl)						
7	OFF	Normal operation mode							ON	Microswitch setting change enabled						
8	OFF								ON							

IMPORTANT

For safety reasons, the electronic board accepts the changes of the microswitches only if the microswitches no. seven and eight (ON) are enabled in advance; otherwise, the board ignores any change of the microswitches, interpreting their displacement as accidental, involuntary, and the boiler goes to lock, showing the error code 20.

At the end of the changes it is necessary to restore the microswitches no. seven and eight to OFF.

Led meaning

The LEDs of the PCB help as a visual guide during the changes to the microswitches of the bank SW1.

The ignition and the flashing have a precise meaning:

	Red led = gas type	Green led = model	Yellow led = altitude
One blink	NG (G20)	REB-KBI2424FF	Low altitude setting
Two blinks	Propane (G31)	REB-KBI2929FF	High altitude setting
Three blinks	Air/propane (G230)		
Four blinks	LPG (G30)	REB-KBI3535FF	

Meaning of microswitches SW2

Some boiler settings can be changed by changing the sequence of the micro switches on the SW2 bank according to the following table:

<table>
<tr><th>Nr.</th><th colspan="8">Bank SW2</th></tr>
<tr><td>1</td><td>OFF</td><td colspan="3">Discontinuous combustion</td><td>ON</td><td colspan="3">Continuous combustion</td></tr>
<tr><td>2</td><td>OFF</td><td colspan="3">Not in use</td><td>ON</td><td colspan="3">Not in use</td></tr>
<tr><td>3</td><td>OFF</td><td colspan="3">Not in use</td><td>ON</td><td colspan="3">Not in use</td></tr>
<tr><td>4</td><td>OFF</td><td rowspan="2">Normal combustion</td><td>OFF</td><td rowspan="2">Forced combustion min</td><td>ON</td><td rowspan="2">Forced combustion partial load</td><td>ON</td><td rowspan="2">Forced combustion max</td></tr>
<tr><td>5</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>6</td><td>OFF</td><td colspan="3" rowspan="2">Normal operation mode</td><td>ON</td><td colspan="3" rowspan="2">Microswitch setting change enabled</td></tr>
<tr><td>7</td><td>OFF</td><td>ON</td></tr>
</table>

IMPORTANT

Important! For safety reasons, the electronic card accepts the changes of the microswitches one, four and five only if the six and seven microswitches (ON) are enabled in advance; otherwise, the card ignores any change in the microswitches, interpreting the displacement as accidental, involuntary.

At the end of the operations it is necessary:

- **verify that the microswitches four and five are in 'OFF position';**
- **set the microswitches number six and seven back to OFF position.**

To preserve the boiler and for safety reasons, after two hours from their activation, the forced-mode combustion settings are ignored and the boiler returns to normal combustion operation.

3.3 GAS CONVERSION AND PRESSURE ADJUSTMENT

IMPORTANT

Important! This procedure can only be performed by qualified technical personnel.

Any tampering by unqualified personnel will result in immediate forfeiture of the product warranty.

The gas valve assembly and the electronic board are electronically calibrated at the factory during product testing.

The appliance does NOT need to be adjusted during installation.

The conversion procedure to a different type of gas consists of three phases:

1. **modification of the microswitches of the electronic board and selection of the new type of gas;**
2. **gas nozzle replacement;**
3. **verification of CO_2 and possible regulation of gas pressure (at minimum and maximum forced regime).**

Phase 1

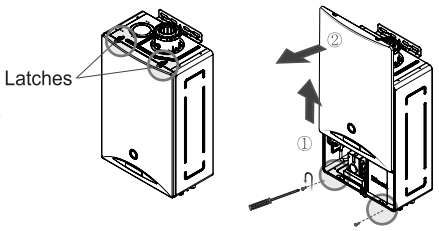
- Close the gas supply valve and disconnect the plug from the socket;
- remove the front panel;
- verify that the type of gas selected by the microswitches of the bank SW1 coincides with the gas used in the system:

Nr.	SW1							
1	OFF	NG (G20)	ON	Prop. (G31)	OFF	Air-prop. (G230)	ON	LPG (G30)
2	OFF		OFF		ON		ON	
3	OFF		OFF		OFF		OFF	

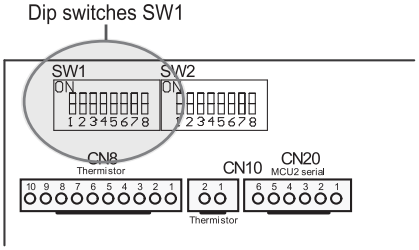
IMPORTANT

Important! The specific procedure described in PCB paragraph must be followed, in order to make any change to the microswitches effective.

Remove the front panel



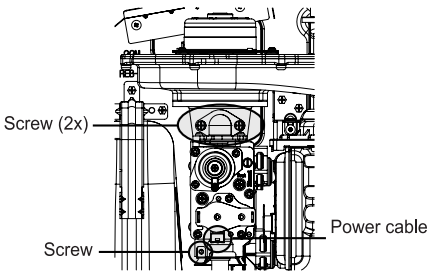
Main electronic board



Phase 2

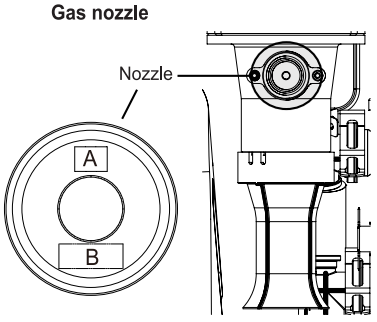
- Disconnect the gas valve supply cable;
- unscrew the screws (3x) that fix the gas valve;
- remove the valve taking care not to damage the sealing O-rings;
- replace the gas nozzle:

Gas valve



Model	Letter mark				
	A	B			
REB-KBI2424FF REB-KBI2929FF	29	G20	G30	G31	G230
REB-KBI3535FF	35	G20	G30	G31	G230

Gas nozzle



- assemble the gas valve taking care not to damage the o-rings;
- open the gas supply valve and check that there are no gas leaks from the circuit.

Phase 3

- Connect the plug to the electrical outlet;

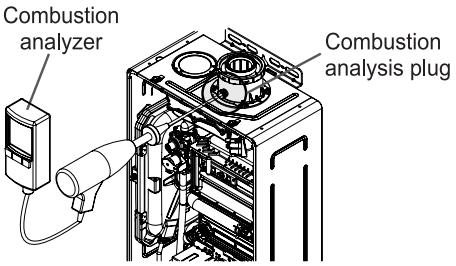
IMPORTANT

Important! The following part of the procedure is particularly sensitive. To avoid irreparable damage to the boiler, it is necessary to use calibrated equipment and the utmost care: if in doubt, do not proceed further and contact Rinnai Italia before proceeding.

- remove the combustion test plug cap and insert the combustion analyzer probe;
- turn on the boiler in domestic hot water mode;
- force the appliance to minimum combustion mode by means of the microswitches of the bank SW2:

Nr.	SW2							
4	OFF	Norm comb	OFF	Comb. min	ON	Partial load	ON	Comb. max
5	OFF		ON		OFF		ON	

Combustion analysis

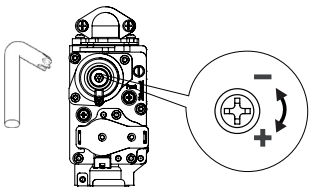


IMPORTANT

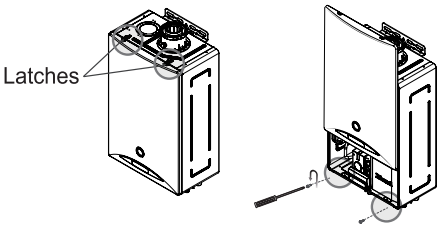
Important! The specific procedure described in PCB paragraph must be followed, in order to make any change to the microswitches effective.

- compare the CO_2 value detected on minimum forced combustion with the data reported in the paragraph ‘combustion parameters’;
- if necessary, to modify the CO_2, remove the black cap on the gas valve adjustment screw and turn the screw clockwise to increase (in the opposite direction to decrease);
- force the appliance at maximum combustion rate by means of the microswitches of the bank SW2;
- compare the CO_2 value detected on maximum forced combustion with the data reported in the paragraph ‘combustion parameters’;
- if necessary, to modify the CO_2, remove the black cap of the gas valve adjustment screw and turn the screw clockwise to increase (in the opposite direction to decrease);
- bring the microswitches of the bank SW2 back to ‘normal’ mode and switch off the boiler;
- mount the front panel;
- update the last row of the appliance data plate (on the right side) by pasting the adhesive corresponding to the type of modified gas.

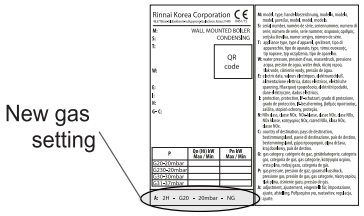
Adjustment of CO_2



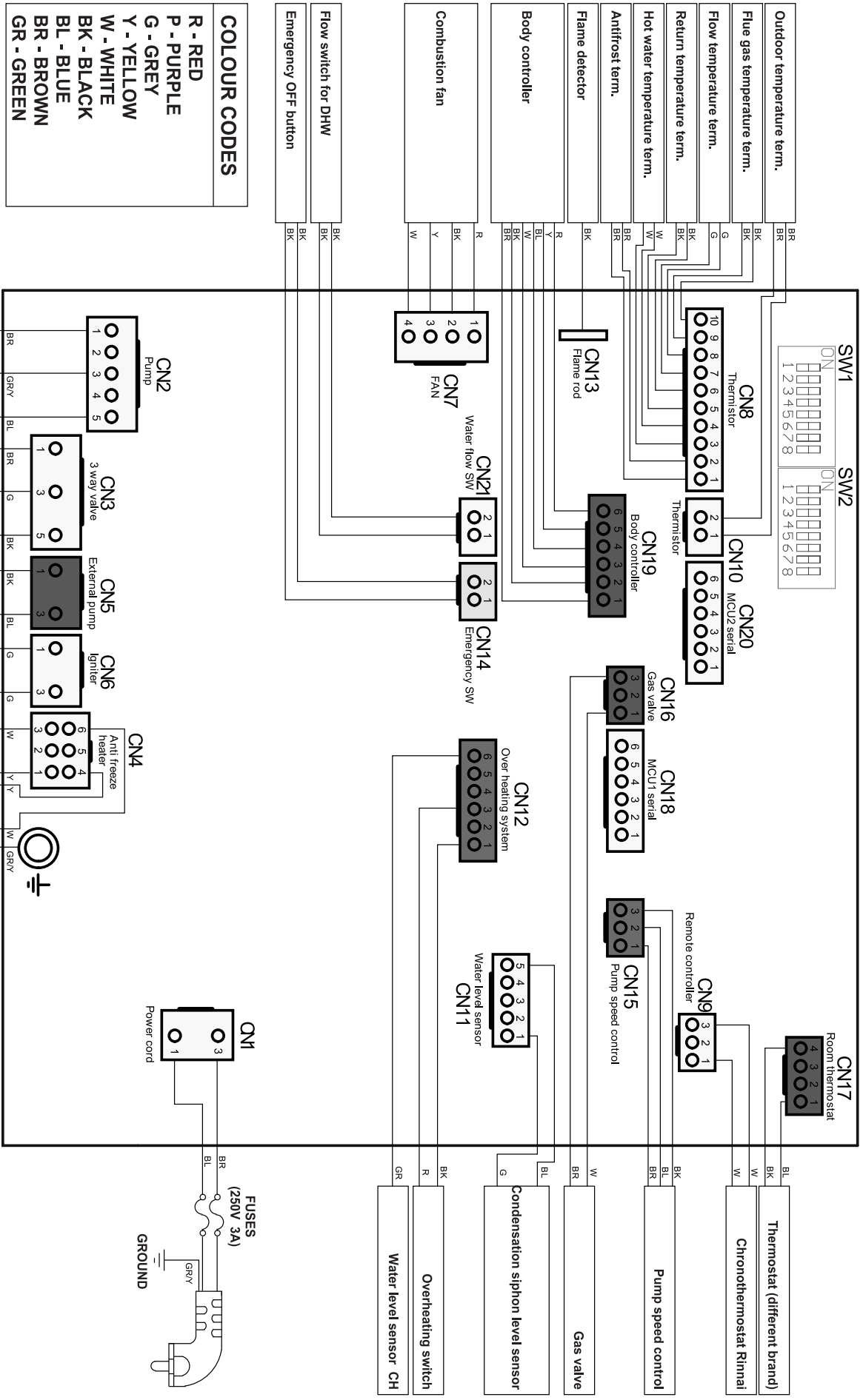
Repositioning the front panel



Data plate update



3.4 WIRING DIAGRAM AND DIAGNOSTIC POINTS



Components	Measuring point		Standard values	Notes
	CN/ Con.re	Wiring colors		
Electric power supply cable	1	Bl-Br	AC 195.5~253V	
Circulating pump	2	Br-Bl	AC 195.5~253V	Working
Three-way valve	3	Br-G	AC 195.5~253V	In mode CH
		Bk-G	AC 195.5~253V	In mode DHW
Anti-freeze resistances	4	Y-W	AC 195.5~253V	Working
External circulating pump	5	Bk-Bl	AC 195.5~253V	Working
Scintillator	6	G-G	AC 195.5~253V	Working
Combustion fan	7	R-Bk	DC 2~54V	Working
		Y-Bk	DC 10~14V	
Anti-freeze thermistor	8	Br-Br	-10°C : 16.5~18.1kΩ 0°C : 9.6~12.2kΩ 10°C : 6.3~7.9kΩ 20°C : 4.2~ 5.2kΩ	Disconnect the thermistor and measure the resistance
Domestic hot water thermistor		W-W	15°C : 11.9~13.3kΩ 30°C : 6.7~ 7.41kΩ 45°C : 4.0~ 4.3kΩ 60°C : 2,4~ 2.6kΩ 20°C : 0.7~ 0.9kΩ	Disconnect the thermistor and measure the resistance
Return temperature thermistor CH		Bk-Bk		
Discharge temperature thermistor CH		G-G		
Exhaust temperature thermistor		Bk-Bk		
Rinnai Chronothermostat	9	W-W	DC 10V~14V	
External temperature thermistore	10	Br-Br	-20°C : 26.7~29.8kΩ -10°C : 16.5~18.1kΩ 0°C : 9.6~12.2kΩ 10°C : 6.3~ 7.9kΩ 20°C : 4.2~ 5.2kΩ	Disconnect the thermistor and measure the resistance
Overheating circuit	12	Bk-Gr	DC 10V~14V	
		R-Gr	DC 10V~14V	
Flame sensor	13	Bk-TERRA	AC 0V	In standby
			AC 50~100V	Working
Emergency switch	14	Bk-Bk	DC 4.5V~5.5V	
Speed control pump	15	Br-Bl	Working pump: DC 0.01V~1.0V Pump off: DC 4.5V~5.5V	
		Bk-Bl	Working pump: DC 0.1V~1.5V Pump off: DC 4.5V~5.5V	
Gas valve	16	W-Br	DC 10V~14V	Measure the voltage with valve ON; Measure reistance with valve OFF
Ambient thermostat (other label)	17	Bl-Bk	DC 4.5V~5.5V	
Body controller	19	Bl-Bk	DC 4.5V~5.5V	
		R-Bk	DC 10V~14V	
Domestic hot water flow switch	21	Bk-Bk	DC 4.5V~5.5V	In standby
		Bk-Bk	DC 0V~0.5V	Working

3.5 TECHNICAL DATA

Model	REB-KBI2424FF	REB-KBI2929FF	REB-KBI3535FF	Unit
CH Input (Max/Min), (G20), (Hi)	24.0 / 5.8	29.0 / 5.8	34.88 / 7.9	kW
CH Input (Max/Min), (G230), (Hi)	-	-	-	kW
CH Input (Max/Min), (G30), (Hi)	24.6 / 5.9	29.7 / 5.9	34.88 / 8.1	kW
CH Input (Max/Min), (G31), (Hi)	24.5 / 5.9	29.6 / 5.9	34.88 / 8.1	kW
CH Output (Max/Min), 80°C/60°C, (G20)	23.2 / 5.3	28.0 / 5.3	33.7 / 7.3	kW
CH Output (Max/Min), 80°C/60°C, (G230)	-	-	-	kW
CH Output (Max/Min), 80°C/60°C, (G30)	23.2 / 5.3	28.0 / 5.3	33.0 / 7.3	kW
CH Output (Max/Min), 80°C/60°C, (G31)	23.2 / 5.3	28.0 / 5.3	33.0 / 7.3	kW
CH Output (Max/Min), 50°C/30°C, (G20)	24.8 / 5.8	30.0 / 5.8	36.1 / 8.0	kW
CH Output (Max/Min), 50°C/30°C, (G230)	-	-	-	kW
CH Output (Max/Min), 50°C/30°C, (G31)	24.8 / 5.8	30.0 / 5.8	35.3 / 8.0	kW
CH Output (Max/Min), 50°C/30°C, (G30)	24.8 / 5.8	30.0 / 5.8	35.2 / 7.3	kW
CH Output @ partial load (30%), return 30°C, (G20)	7.7	9.3	11.2	kW
CH Output @ partial load (30%), return 30°C, (G230)	-	-	-	kW
CH Output @ partial load (30%), return 30°C, (G30)	7.7	9.3	11.0	kW
CH Output @ partial load (30%), return 30°C, (G31)	7.7	9.3	11.0	kW
DHW Input (Max/Min), (G20), (Hi)	24.0 / 5.8	29.0 / 5.8	34.88 / 7.9	kW
DHW Input (Max/Min), (G230), (Hi)	-	-	-	kW
DHW Input (Max/Min), (G30), (Hi)	24.6 / 5.8	29.7 / 5.8	34.88 / 7.9	kW
DHW Input (Max/Min), (G31), (Hi)	24.5 / 5.8	29.6 / 5.8	34.88 / 7.9	kW
DHW Output (Max/Min), (G20)	23.5 / 5.4	28.4 / 5.4	33.1 / 7.4	kW
DHW Output (Max/Min), (G230)	-	-	-	kW
DHW Output (Max/Min), (G30)	23.5 / 5.4	28.4 / 5.4	33.4 / 7.4	kW
DHW Output (Max/Min), (G31)	23.5 / 5.4	28.4 / 5.4	33.4 / 7.4	kW
Efficiency CH (Max/Min), 80°C/60°C, (G20), (Hi)	97.2 / 92.0	97.2 / 92.0	97.2 / 92.2	%
Efficiency CH (Max/Min), 80°C/60°C, (G230), (Hi)	-	-	-	%
Efficiency CH (Max/Min), 80°C/60°C, (G30), (Hi)	94.8 / 89.7	94.8 / 89.7	94.8 / 89.9	%
Efficiency CH (Max/Min), 80°C/60°C, (G31), (Hi)	95.1 / 90.0	95.1 / 90.0	95.1 / 90.2	%
Efficiency CH (Max/Min), 50°C/30°C, (G20), (Hi)	103.4 / 100.7	103.5 / 100.7	103.5 / 101.0	%
Efficiency CH (Max/Min), 50°C/30°C, (G230), (Hi)	-	-	-	%
Efficiency CH (Max/Min), 50°C/30°C, (G30), (Hi)	100.8 / 98.2	100.9 / 98.2	100.9 / 98.5	%
Efficiency CH (Max/Min), 50°C/30°C, (G31), (Hi)	101.1 / 98.5	101.3 / 98.5	101.2 / 98.8	%
Efficiency CH @ partial load (30%), return 30°C, (G20), (Hi)	109.6	109.4	109.2	%
Efficiency CH @ partial load (30%), return 30°C, (G230), (Hi)	-	-	-	%
Efficiency CH @ partial load (30%), return 30°C, (G30), (Hi)	106.9	106.7	106.4	%
Efficiency CH @ partial load(30%), return 30°C, (G31), (Hi)	107.2	107.0	106.8	%
Gas cathegory	II2H3P, II2H3B/P, II2HM3B/P			
Noise level (L_{WA})	43	44	40	dB
NOx class	6			
NOx pondered (G20)	52	50	35	mg/kWh
Expansion tank capacity	8		10	l
Pressure of expansion tank's pre-inflation	1			bar
Working maximum pressure CH - PMS	3.0			bar

Working maximum temperature CH	80			°C
Temperature range CH (mode: flow heating mode / space heating mode)	35-80 / 5-40			°C
Working maximum pressure DHW - PMS	10			bar
Working minimum pressure DHW (portata nominale)	0.7	1.1	1.2	bar
Activation minimum load DHW	2.0			l/min
Temperature range DHW	35-60			°C
Rated flow DHW (ΔT=25°C)	13.5	16.3	19.6	l/min
Rated flow DHW (ΔT=30°C)	11.2	13.6	16.3	l/min
Rated flow DHW (ΔT=35°C)	9.6	11.6	14.0	l/min
Maximum smoke temperature	85			°C
Exhaust temperature @ rated flow CH (80-60°C)	73	73	73	°C
Exhaust temperature @ min flow CH (50-30°C)	45	45	45	°C
Exhaust temperature @ rated flow & max temperature DHW	66	66	66	°C
Exhaust temperature @ min flow DHW & min flow DHW	45	45	45	°C
Exhaust temperature@ rated output CH (80-60°C)	11.7	13.6	17.0	g/s
Mass flow @ min flow CH (50-30°C)	2.8	2.8	4.0	g/s
Mass flow @ rated flow & max temperature DHW	11.7	13.6	17.0	g/s
Mass flow @ min flow DHW & min flow DHW	2.8	2.8	4.0	g/s
Exhaust flue system diameters (intake-discharge)	Coaxial system: Ø60/100 Parallel system: Ø80-80, Ø60-60			mm
Device type	B23, B53,C13, C33, C53, C63, C83, C93 C(10)3, C(12)3, C(13)3, C(15)3			-
Protection class IP	IPX5D			-
Activation power	13	13	19	kW
Max. Time for starting attempt (TSA)	4.0~6.0			s
Receptacle dimensions CH / DHW / Gas	20A / 15A / 15A			
Dimensions (A x L x P)	660 × 440 × 285		660×440×335	mm
Weight (unladen)	33		37	Kg
Electricity supply	230 / 50			V/Hz
Electric fuses (internal)	3.0			A
Electrical absorption (CH / DHW)	83 / 85	100 / 105	95 / 98	W

Model		REB-KBI2424FF	REB-KBI2929FF	REB-KBI3535FF	
Condensing boiler		YES	YES	YES	
Low temperature boiler		NO	NO	NO	
B1 Boiler		NO	NO	NO	
Cogeneration space heater		NO	NO	NO	
Combination heater		YES	YES	YES	
Element	**Symbol**	**Level**			**Unità**
Rated heat output	$P_{nominal}$	23	28	34	kW
Useful heat output @ rated heat output (80/60°C)	P_4	23.0	28.0	34.0	kW
Useful heat output @ 30% of rated heat output (30°C return)	P_1	7.7	9.2	11.3	kW
Seasonal space heating energy efficiency CH	η_s	91	91	92	%
Useful efficiency @ rated heat output (80/60°C)	η_4	87.6	88.3	88.6	%
Useful efficiency @ 30% of rated heat output (30°C return)	η_1	96.9	95.7	97.3	%
Auxiliary electricity consumption @ full load	el_{max}	0.085	0.100	0.095	kW
Auxiliary electricity consumption @ partial load	el_{min}	0.065	0.066	0.066	kW
Auxiliary electricity consumption in stand-by mode	P_{SB}	0.003	0.003	0.003	kW
Standby heat loss	P_{stby}	0.065	0.065	0.065	kW
Ignition burner power consumption	P_{ign}	0.000	0.000	0.000	kW
Emissions of nitrogen oxides	NOx	50	50	35	mg/kWh
Declared load profile (DHW)		L	XL	XL	
Daily electricity consumption	Q_{elec}	0.120	0.170	0.149	kWh
Water heating energy efficiency	η_{wh}	82	84	84	%
Daily fuel consumption	Q_{fuel}	14.544	23.380	23.435	kWh

Values setted with gas G20-20mbar - gross calorific value (Hs) - According to Reg.UE813/2013

3.6 COMBUSTION PARAMETERS

Supply pressure	mbar	20	20	30	30, 37, 50
CH Input **Qn** (Max/Min) - (Hi)	kW	24.0 / 5.8	-	24.5 / 5.9	24.5 / 5.9
Gas flow **Vm** (Max/Min)	m^3/h	2.529 / 0.611	-	0.741 / 0.178	0.972 / 0.233
CO_2 (Max) - (front panel on)	%	9.7 ± 0.6	-	12.1 ± 0.6	11.3 ± 0.6
CO_2 (Min) - (front panel on)	%	9.4 ± 0.6	-	13.0 ± 0.8	10.7 ± 0.7
CO_2 (Max) - (without front panel)	%	9.6 ± 0.6	-	12.0 ± 0.6	11.2 ± 0.6
CO_2 (Min) - (without front panel)	%	9.2 ± 0.6	-	12.5 ± 0.8	10.5 ± 0.7
CO/CO_2 (Max)	ppm	< 300	-	< 800	< 300
CH NOx @ Qn - 80°C/60°C	mg/kWh	40	-	180	65
CH NOx @ 30%Qn - temp. return 30°C	mg/kWh	30	-	90	40
DHW CO/CO_2 (Max)	ppm	< 300	-	< 800	< 300
DHW NOx (Max/Min)	mg/kWh	35 / 30	-	170 / 50	60 / 35

REB-KBI2929FF	Unit	G20	G230	G30	G31
Supply pressure	mbar	20	20	30	30, 37, 50
CH Input **Qn** (Max/Min) - (Hi)	kW	29.0 / 5.8	-	29.7 / 5.9	29.6 / 5.9
Gas flow **Vm** (Max/Min)	m^3/h	3.056 / 0.611	-	0.895 / 0.178	1.170 / 0.233
CO_2 (Max) - (front panel on)	%	9.5 ± 0.6	-	12.0 ± 0.6	11.0 ± 0.6
CO_2 (Min) - (front panel on)	%	9.4 ± 0.6	-	13.0 ± 0.8	10.7 ± 0.7
CO_2 (Max) - (without front panel)	%	9.4 ± 0.6	-	11.9 ± 0.6	10.8 ± 0.6
CO_2 (Min) - (without front panel)	%	9.2 ± 0.6	-	12.5 ± 0.8	10.5 ± 0.7
CO/CO_2 (Max)	ppm	< 300	-	< 800	< 300
CH NOx @ Qn - 80°C/60°C	mg/kWh	40	-	180	70
CH NOx @ 30%Qn - temp. return 30°C	mg/kWh	30	-	86	50
DHW CO/CO_2 (Max)	ppm	< 300	-	< 800	< 300
DHW NOx (Max/Min)	mg/kWh	35 / 30	-	165 / 50	60 / 35

REB-KBI3535FF	Unit	G20	G230	G30	G31
Supply pressure	mbar	20	20	30	30, 37, 50
CH Input **Qn** (Max/Min) - (Hi)	kW	34.88 / 7.9	-	34.88 / 8.1	34.88 / 8.1
Gas flow **Vm** (Max/Min)	m^3/h	3.676 / 0.833	-	1.051 / 0.244	1.379 / 0.320
CO_2 (Max) - (front panel on)	%	9.2 ± 0.6	-	12.3 ± 0.6	10.9 ± 0.6
CO_2 (Min) - (front panel on)	%	8.1 ± 0.6	-	11.1 ± 0.8	9.7 ± 0.7
CO_2 (Max) - (without front panel)	%	9.0 ± 0.6	-	12.2 ± 0.6	10.7 ± 0.6
CO_2 (Min) - (without front panel)	%	8.2 ± 0.6	-	11.1 ± 0.8	9.8 ± 0.7
CO/CO_2 (Max)	ppm	< 200	-	< 800	< 300
CH NOx @ Qn - 80°C/60°C	mg/kWh	25	-	120	70
CH NOx @ 30%Qn - temp. return 30°C	mg/kWh	20	-	55	40
DHW CO/CO_2 (Max)	ppm	< 200	-	< 800	< 300
DHW NOx (Max/Min)	mg/kWh	25 / 15	-	110 / 35	65 / 25

3.7 PRODUCT FICHE

Chart legend	Power generator			Unit
Supplier's name	Rinnai Italy srl			
Supplier's model	REB-KBI2424FF	REB-KBI2929FF	REB-KBI3535FF	
	Gas condensing combi-boiler			
Declared load profile - DHW	L	XL	XL	
Seasonal space heating energy efficiency class (η_s)	A	A	A	
Water heating energy efficiency class (η_{wh})	A	A	A	
Rated heat output (P_n) - (80~60°C)	23	28	34	kW
Annual energy consumption - CH (Q_{HE}) - (Hs)	73	88	105	GJ/annum
Annaul electricity consumption - DHW (**AEC**)	26	37	32	kWh/annum
Annual fuel consumption - DHW (**AFC**) - (Hs)	11	18	18	GJ/annum
Seasonal space heating energy efficiency - CH (η_s) - (Hs)	91	91	92	%
Water heating energy efficiency - DHW (η_{wh}) - (Hs)	82	84	84	%
Sound power level, indoor (L_{WA})	40	44	43	dB

Values setted with gas G20-20mbar - High calorific value (Hs) - According to Reg.UE813/2013

Chart legend	Temperature control device	Unit
Supplier's name	Rinnai Italy srl	
Supplier's model	WF-P100W_EU	
Class of the temperature control	V	
Contribution of the control to the seasonal space heating energy efficiency CH	3	%

3.8 DATA PLATE

Rinnai Korea Corporation CE

48,577Beon-Gil,Baekbeom-ro,Bupyeong-Gu Incheon, Korea 21449

M: WALL MOUNTED BOILER
S: CONDENSING
T:

Wp :

E:
I:
N:
G-C:

P	Qn (Hi) kW Max /Min	Pn kW Max /Min
G20-20mbar		
G230-20mbar		
G30-30mbar		
G31-37mbar		

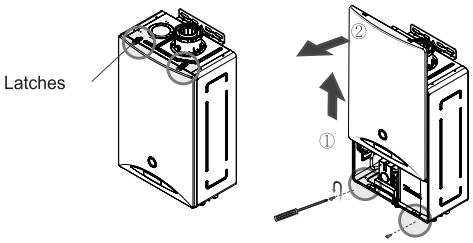
A:

M: model, type, handelsbezeichnung, modello, modelo, model, μοντέλο, model, model, modelo.
S: serial number, numéro de série, seriennummer, numero di serie, número de serie, serie nummer, σειριακός αριθμός serijska številka, numer seryjny, número de série.
T: appliance type, type d'appareil, geräteart, tipo di apparecchio, tipo de aparato, type, τύπος συσκευής, tip naprave, typ urządzenia, tipo de aparelho.
Wp : water pressure, pression d'eau, wasserdruck, pressione acqua, presión de agua, water druk, πίεση νερού, tlak vode, ciśnienie wody, pressão de água.
E: electric data, valeurs électriques, elektroanschluß, alimentazione elettrica, datos eléctricos, elektrische spanning, Ηλεκτρική τροφοδοσία, električni podatki, dane elektryczne, dados eléctricos.
I: protection, protection, IP-schutzart, grado di protezione, grado de protección, IP-bescherming, βαθμός προστασίας, zaščita, stopień ochrony, proteção.
N: NOx class, classe NOx, NOx-klasse, classe NOx, clase NOx, NOx klasse, κατηγορίας NOx, razred NOx, klasa NOx, classe NOx.
C: country of destination, pays de destination, bestimmungsland, paese di destinazione, país de destino, bestemmingsland, χώρα προορισμού , ciljna država, kraj docelowy, país de destino.
G: gas category, catégorie de gaz, gerätekategorie, categoria gas, categoría de gas, gas categorie, κατηγορία αερίου, vrsta plina, rodzaj gazu, categoria de gás.
P: gas pressure, pression de gaz, gasanschlussdruck, pressione gas, presión de gas, gas categorie, πίεση αερίου, tlak plina, ciśnienie gazu, pressão de gás.
A: adjustment, ajustement, eingestellt für, impostazione, ajuste, afstelling, Ρυθμισμένο για, nastavitev,regulacja, ajuste.

3.9 MAIN COMPONENTS DISASSEMBLY

Front panel

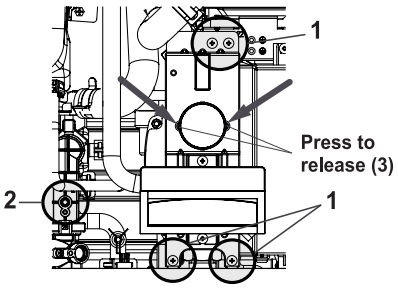
- Isolate the appliance electrically by disconnecting it from the electrical socket;
- remove the two fixing screws at the base of the panel;
- unhook the bolts in the upper part;
- remove the front panel from the boiler body taking care not to damage the pressure gauge: first lift it upwards and then away from the boiler body.



Manometer

- Isolate the appliance electrically by disconnecting it from the electrical socket and closing the heating circuit and gas taps;
- remove the plastic filter on the flow connection and completely empty the CH circuit of the boiler;

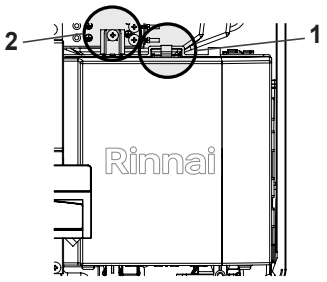
IMPORTANT **Important! Completely drain the heat exchanger not to flood the boiler during the next phases.**



- remove the front panel;
- remove the screws (4x) of the fixing plate (1);
- remove the pressure gauge tube locking screw (2);
- Press the tabs (located behind the plate) to release the pressure gauge (3).

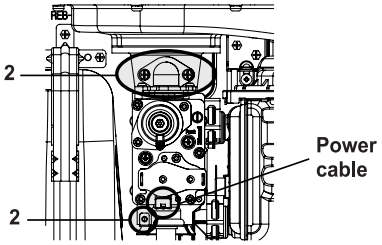
PCB

- Isolate the appliance electrically by disconnecting it from the electrical socket;;
- remove the front panel;
- remove the plastic protection by pressing the tab (1);
- disconnect the electrical wiring on the PCB;
- remove the fixing screw (2) and remove the electronic board.



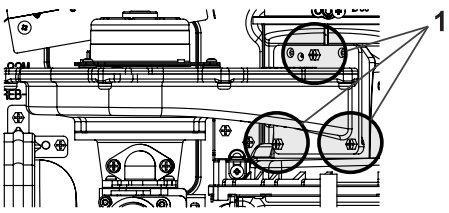
Gas valve

- Isolate the appliance electrically by disconnecting it from the electrical socket;
- close the gas valve;
- remove the front panel;
- disconnect the gas valve electric cable (1);
- unscrew the screws (3x) that fix the gas valve (2);
- remove the valve taking care not to damage the sealing O-rings.



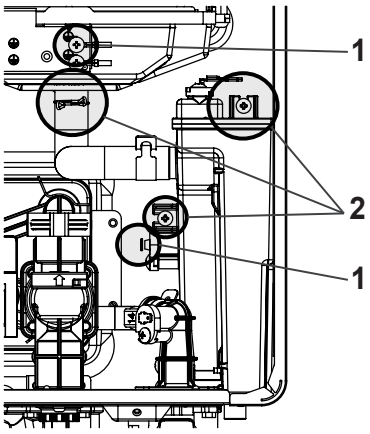
Combustion fan

- Insulate the device by disconnecting it from the electrical outlet;
- close the gas valve;
- remove the front panel and the gas valve;
- disconnect the fan's power cable from the PCB;
- unstraw the straws(3x) that bolt the fan (1) and remove the fan.



Condensate trap

- Electrically isolate the appliance by disconnecting it from the electrical socket;
- remove the front panel and the PCB;
- disconnect the earth cable and the condensate sensor connector (1);
- unscrew the screws (2x) and the fixing clip of the condensate drain pipe that fix the siphon (2);
- remove the siphon.

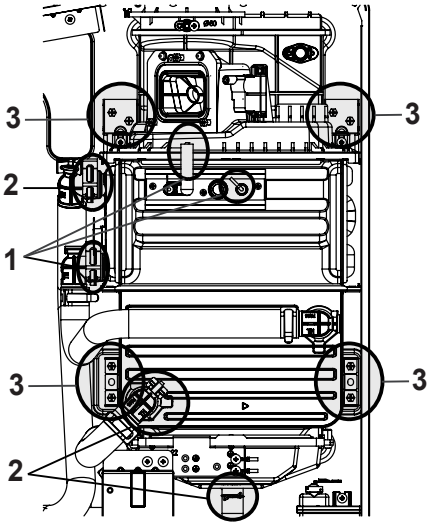


Heat exchanger

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the flow connection and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel, pressure gauge, PCB, gas valve and fan;
- disconnect the scintillator, overheating switch and flame sensor from the heat exchanger (1);
- disconnect the fixing clips of the connection pipe to the pump, to the three-way valve and to the condensate siphon (2);
- unscrew the screws fixing the exchanger to the chassis (3);
- remove the exchanger.

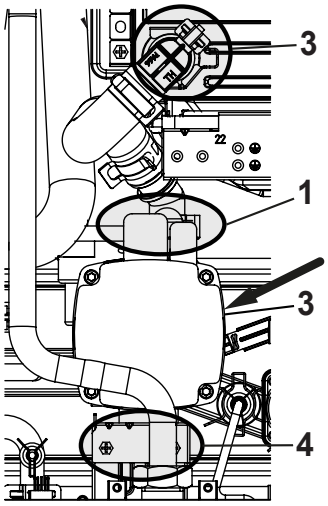


Circulation pump

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel, pressure gauge, PCB;
- disconnect the electrical wiring of the pump (1);
- disconnect the fixing clip of the connection tube to the heat exchanger (2);
- remove the clip (3) - it remains hidden behind the pump;
- unscrew the fixing screws of the pump to the chassis (4);
- remove the pump taking care not to damage the rear seal o-ring.

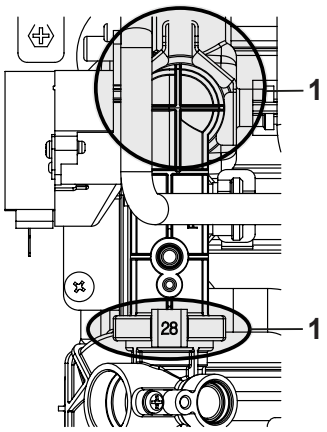


Connection joint - flow

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel and pressure gauge;
- disconnect the fixing clips of the joint (1);
- remove the joint taking care not to damage the upper and lower sealing o-rings.

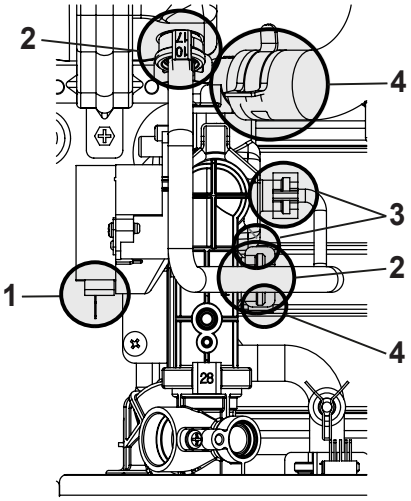


Three-way valve

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel, pressure gauge and delivery connection joint;
- disconnect the three-way valve power cable (1);
- remove the connection tube to the expansion vessel (2) and the by-pass (3) by removing the fixing clips;
- disconnect the fixing clips to the delivery pipe and to the sanitary exchanger (4);
- remove the three-way valve taking care not to damage the sealing o-ring.



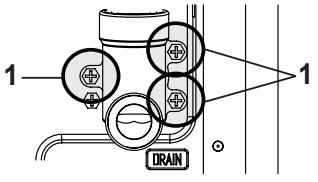
Connection joint - return

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

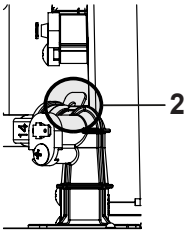
ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel and PCB;
- unscrew the anchor bolts of the return pipe union to the chassis (1);
- remove the fixing clip to the connection joint to the sanitary exchanger (2);
- remove the joint.

Bottom view



Front view



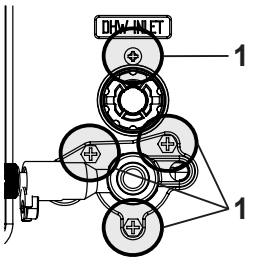
Flow switch

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

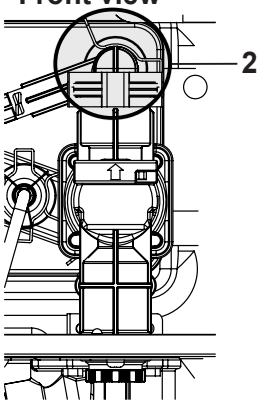
ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove front panel and PCB;
- unscrew the anchor screw of the coupling and the cold water inlet union to the chassis (1);
- remove the fixing clip of the joint to the sanitary exchanger (2);
- remove the joint.

Bottom view



Front view

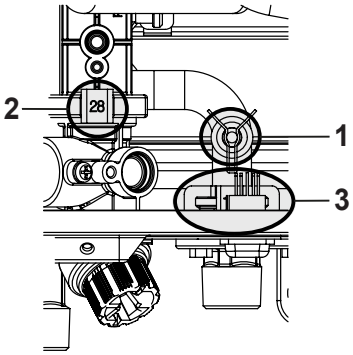


Hot water connection joint

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

  - remove the front panel;
- remove the hot water sensor fixing clip (1);
- remove the fixing clip of the joint to the sanitary exchanger (2);
- remove the fixing clip of the joint to the filler (3);
- remove the joint.

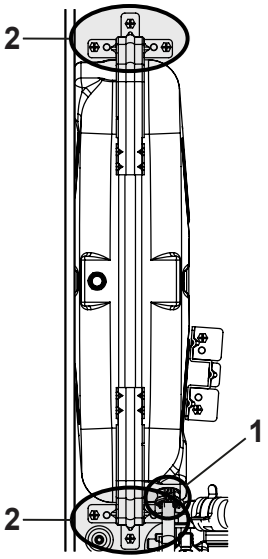


Expansion vessel

- Electrically isolate the appliance by disconnecting it from the electrical socket and closing the cocks of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

ATTENTION **Attention! Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- remove the front panel;
- remove the fixing clips of the connection tube to the expansion vessel (1);
- unscrew the anchoring screws of the expansion vessel to the chassis (2);
- remove the vessel.

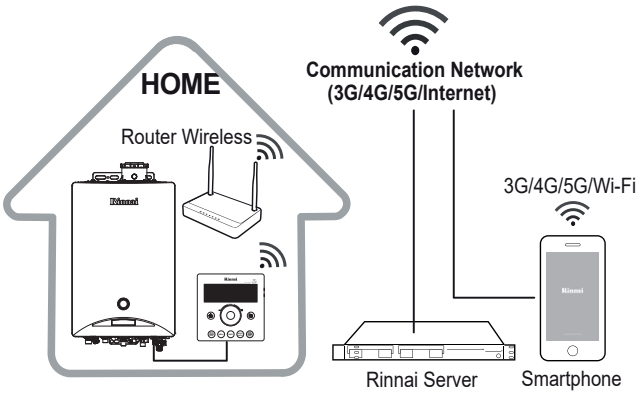


3.10 ‘MY RINNAI’ APPLICATION

Installed the free application ‘My Rinnai’, downloadable from the main app stores, Zen is equipped with a WiFi chronothermostat that allows users to manage the main functions and to program the boiler directly from their smartphones. **The specific application manual can be found on the website: *www.rinnai.it***

The following is the main information for a correct installation of the application.

Block diagram



NOTE

Installation notes

The use of the ‘My Rinnai’ application together with the WiFi Rinnai remote control is only possible in the presence of a wireless router.

If the connection between the remote command and the Rinnai server is lost due to problems related to the Internet connection, the router or due to other external causes, the smartphone application may not work properly.

Router related notes

This product only supports DHCP (Dynamic Host Configuration Protocol). If you want to use an existing router, DHCP must be selected.

Channels 1 ~ 13 are available for connection.

The remote control supports WPA and WPA2 authentication protocols, while it does not support WEP and other non-standard authentication methods.

The quality of the connection can be influenced by the presence of electromagnetic interference.

Some router models can communicate a fictitious DNS address even if they are not connected to the Internet; as a consequence, the WiFi connectivity symbol is still displayed on the remote control display: for information contact the router manufacturer.

The router must support the 2.4Ghz frequency to be compatible with the Rinnai WiFi command.

The WiFi Rinnai remote control supports the IEEE802.11.b communication protocol: check that the router supports this protocol before proceeding with the installation.

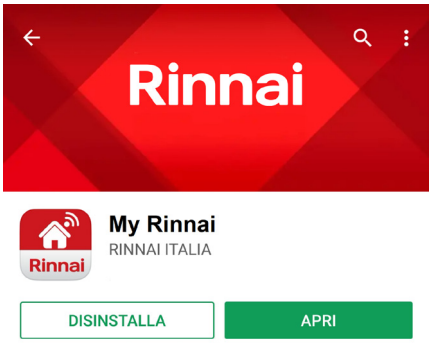
The Rinnai Wi-Fi remote control does not support network connections whose names contain special characters.

Download the application for smartphone

The application can be downloaded from ‘Play Store’ or from the ‘iPhone App Store’, by entering the keywords ‘My Rinnai’ in the search field: the application is optimized for iOS and Android systems.

Check the version of your smartphone’s operating system: Android systems are supported, from the “Gingerbread 2.3” version, and iOS, from the “iOS7” version.

The application is optimized for smartphones: it may not work properly if used on different devices (e.g .: tablet).



Registration procedure for iOS systems

Note! Before proceeding with registration, it is necessary to activate the GPS function of the smartphone.

1. Start the application and accept the terms of service provision;
2. enter the required fields (country, telephone number) and confirm; enter the further required fields (user name, password, security question and related answer);
3. press the button to automatically scan the QR code of the boiler and proceed with the scan: the QR code to be scanned is on the right side, on the data plate of the appliance;
4. verify that the scanned data are correct: in particular, if the type of gas for which the boiler was set has been modified, correct the information manually (otherwise the gas consumption detected will not be correct);
5. check if the central heating and water heating icons of the remote control are switched off: for a correct installation of the application, the CH and DHW modes must be disactivated;
6. press the button of the Rinnai WiFi chronothermostat **for three seconds**: an alpha-numeric code shall appear on the display (1) with four figures (A, b, c, d, E, F, 0~9);
7. on your smartphone, press the 'home' button (2), then select 'settings' (3);
8. select the WiFi item (4) from the settings menu and choose the item that shows the ID displayed on the command: 'Rinnai _ ####';
9. return to the 'My Rinnai' application and press the 'OK' button (5);
10. select the WiFi network of your wireless router from the list shown;
11. enter the network password (6) and confirm by pressing 'OK' (7);
12. app terminates registration and installation is complete: you can use your smartphone to manage the boiler.

Registration procedure for Android systems

Note! Before proceeding with the registration, it is necessary to activate the GPS and WiFi functions of the smartphone and deactivate the 3G/4G/5G connection.

1. Follow steps 1 to 6 of the registration procedure for iOS systems;
2. select the WiFi network of your wireless router from the list shown;
3. enter the network password (1) and confirm by pressing 'OK' (2);
4. select the command to combine with the app, choosing the item that shows the ID shown on the display (3): 'Rinnai _ ####';
5. app terminates registration and installation is complete: you can use your smartphone to manage the boiler.

‘Rinnai WiFi Thermostat’ product fiche

Name of the product		Rinnai WiFi thermostat
Name of the type		WF-P100W_EU
Installation		Wall clamping
Dimensions (mm)		120 (A) x 120 (L) x 16.6 (P)
Weight (gr)		237 (Remote control only)
		460 (With packaging)
Power supply		DC 12V
Temperature regulation	CH	Heating at flow temperature : 35~80 ℃ / Room temperature : 5~40 ℃
	DHW	35 ~ 47℃ adjusted from 1°C and higher than 50°C is adjusted to 50,55, 60°C
Energy consumption (W)		3.5 (Remote control only)
Energy consumption in Stand-by (W)		0.5 (Remote control only)
Frequence range		2412-2472 MHz
Max conveyed capacity		13.93 dBm
Antenna type		Internal Dipole Antenna
Modulation		DSSS. OFDM
Functioning modulation		Duplex
WiFi		IEEE 802.11b/g/n, 2.4GHz
Communication		Network WiFi 2.4GHz with safety protocol WPA, WPA2
Operating temperature		-20℃ / 70℃
Builder		**Rinnai Korea Corporation** 48, BAEKBEOM-RO 577BEON-GIL, BUPYEONG-GU, INCHEON, KOREA Tel. +82-32-570-8300 Fax. +82-32-578-7024 www.rinnai.co.kr

SIMPLIFIED UE DECLARATION OF CONFORMITY

Rinnai Korea Corporation declares that the radio instrumentation WF-P100W_EU complies with the Directive 92/42/EEC.

The full text of the Declaration of Conformity is available on this website: www.rinnai.it

V3 - 250724 - This edition replaces any previous publication

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