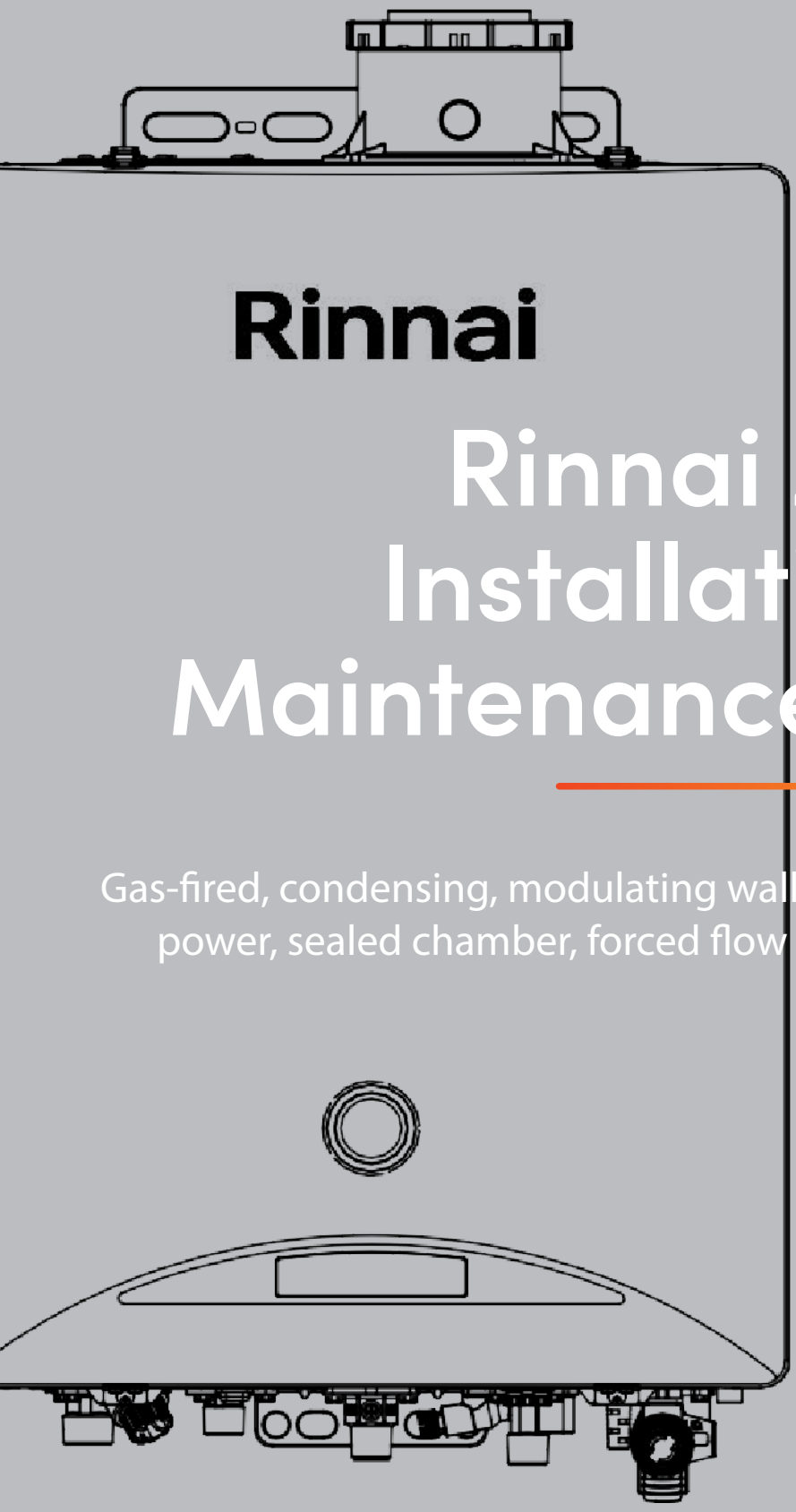
Central Heating
TRADE

by Rinnai



Rinnai Zen Installation & Maintenance Manual

Gas-fired, condensing, modulating wall-hung boilers with adjustable power, sealed chamber, forced flow with Wifi room thermostat

Download Zen Gas Boiler Commissioning Guide Here

Rinnai

The Rinnai gas-fired combi-boilers are CE certified under Regulation 2016/426/EU and Directive 2014/53/EU.

Zen I24 - ZI24 - REB-KBI2424FF
Zen I34 - ZI34 – REB-KBI3535FF

IMPORTANT SAFETY INFORMATION

Meaning of the symbols used in the manual for important information concerning your safety:

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

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 rain).

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.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.
If the supply cord is damaged, it must be replaced by a licensed tradesperson. This must be a genuine replacement part available from Rinnai.
DO NOT:

- Touch the unit cover or the flue outlet
- Insert objects into the flue outlet
- Spray water directly into the flue outlet
- Spray aerosols in the vicinity of this appliance while it is operating
- Use or store flammable materials near this appliance
- Place articles on or against the water heater
- Store pool chemicals near this appliance
- Modify this appliance Keep trees, shrubs, and other obstructions well clear of the flue outlet

Only a professional licensed company is authorized to install Rinnai gas appliances. The installation must follow the requirements the Manufacturer's installation instructions, Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 & G12/AS1 and all other relevant local codes & standards.

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.

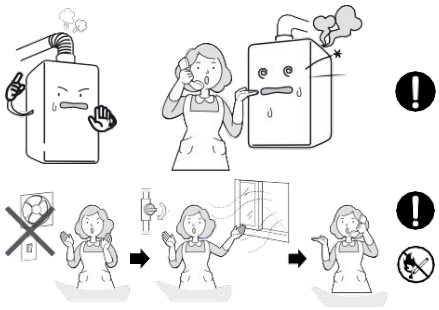
Use only original Rinnai parts.

If you notice unusual noises, smells or vibrations, stop the appliance immediately and contact CHNZ or your local installation 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 andelectricity supply and open doors and windows.



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, please visit Central Heating New Zealand's website to obtain this information

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.

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 systemsmust 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.

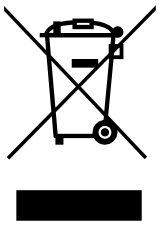
The product must be destined to the use for which it is designed for. Any other use will be considered as improper and therefore potentially dangerous.

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 Central Heating New Zealand.



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:

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. This product is warranted via Central Heating New Zealand (CHNZ) for a period of 5 years. Please refer to our terms & conditions for further details including criteria require to meet our warranty and relevant parts covered.

WHAT IS COVERED?

The warranty covers any defects in materials or workmanship when the product is installed and operated according to 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 CHNZ DO?

CHNZ 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.

CHNZ 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 CHNZ determines that repair of a product is not possible, CHNZ will replace the product with a comparable product, at CHNZ's discretion. If a component or product returned to CHNZ isfound 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?

The system must be serviced annually to ensure warranty applies to the appliance. Please contact the installation company to undertake the service

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.

CHNZ is not liable for any special, incidental, indirect or consequential damages that may arise, including damage toperson 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 NZ laws.

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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

The following section contains technical guidelines concerning the product's installation. The installation must follow the requirements the Manufacturer's installation instructions, Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 & G12/AS1 and all other relevant local codes & standards.

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 an appropriate gas supply, a hydronic heating emitter system and/or 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 gas boiler appliances and must be commissioned by a registered gas installer.

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 to +40°C.

For indoor installations, the boiler must be flued to the outside. They may be installed in an enclosure if the requirements of AS/NZS 5601.1 are satisfied. An enclosure is defined as a compartment, enclosed area or partitioned off space primarily used for the installation of the appliance.

• DO NOT install in areas where contaminated air is present.

• Consider, before installation, where air has the ability to travel within a building.

• Where possible, install the heater in a sealed space so that it is free of contaminated indoor air.

The installation in fire hazard places (garages, box, etc.), on cooking appliances or in particularly humid areas is forbidden; too close to 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 brackets (upper and lower) must be fixed to the wall with appropriate screws.

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

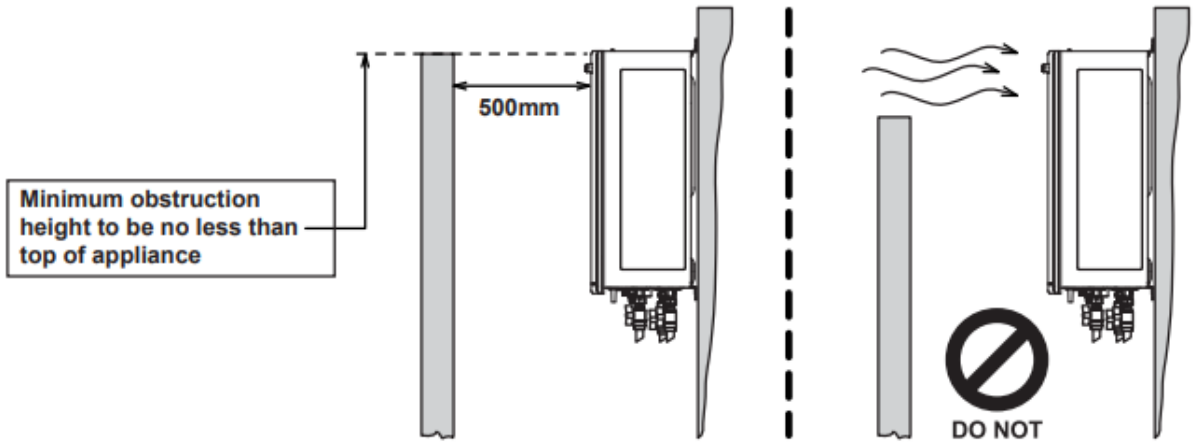
It is necessary to provide an electrical outlet with AC230V / 50Hz power supply with grounding nearby the appliance, sufficiently far from the gas and water connections of the appliance and from the exhaust outlet. For outdoor installations it is necessary to provide a protected and waterproof plug. 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 including AS/NZS 5601.1. the appliance must be used with an appropriate CHNZ flue system.

It is important a suitable drained catch pan is fitted where damage could be caused by discharge from the water heater. Provision must be made for safe disposal of any leaking water to an external location.

2.1.2 EXTERNAL CONDITIONS

AS/NZS 5601 states a minimum horizontal clearance of 500mm between a building structure and obstruction facing the terminal. At 500 mm the obstruction needs to be the full height of the unit, as shown below, and not a partial obstruction. A partial obstruction of less than 1 m could result in wind pushing the flue gases back into the flue terminal.

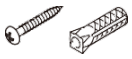


There must be NO partial obstructions to the appliance front cover or any other part of the appliance casing This will avoid the appliance from failing to operate under windy conditions .

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 accessories in the packaging:

Instructions manual and documentation

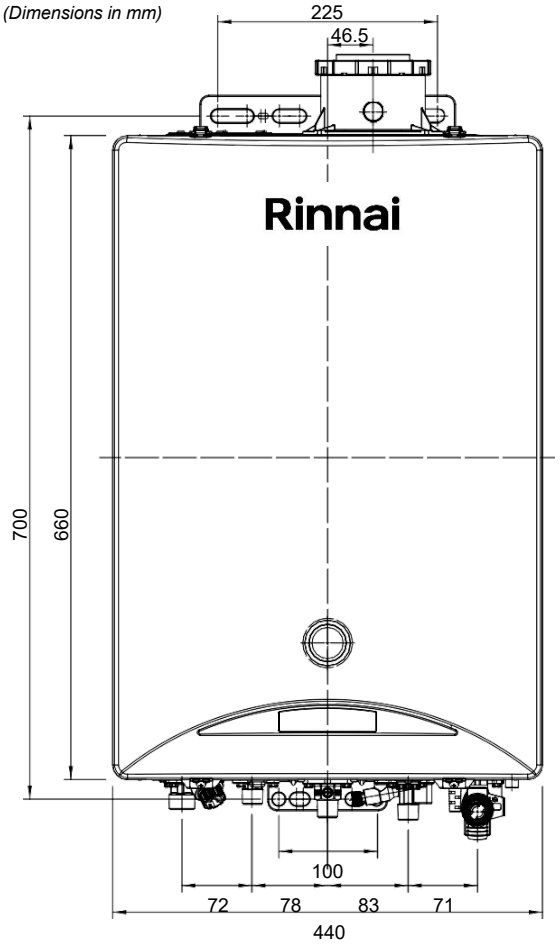


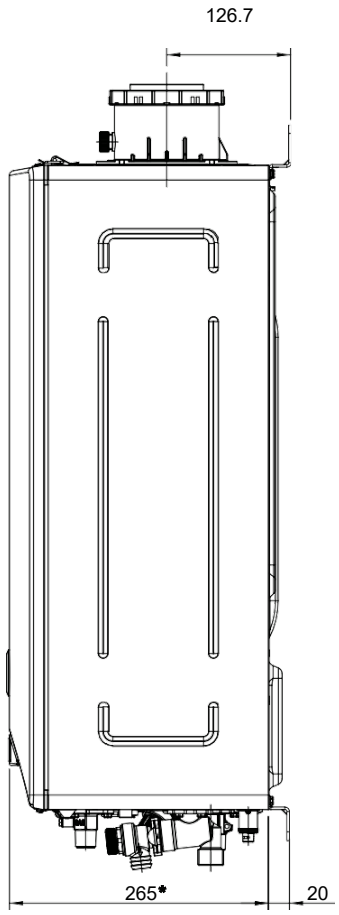
Screws' kit for controller

WiFi thermostat (WF-P100W)

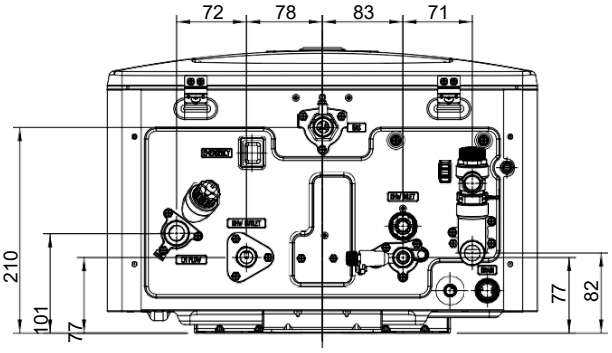
2.3 DIMENSIONS

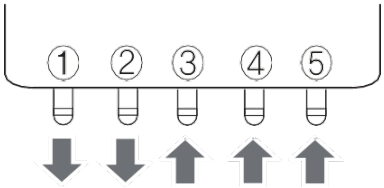
(Dimensions in mm)





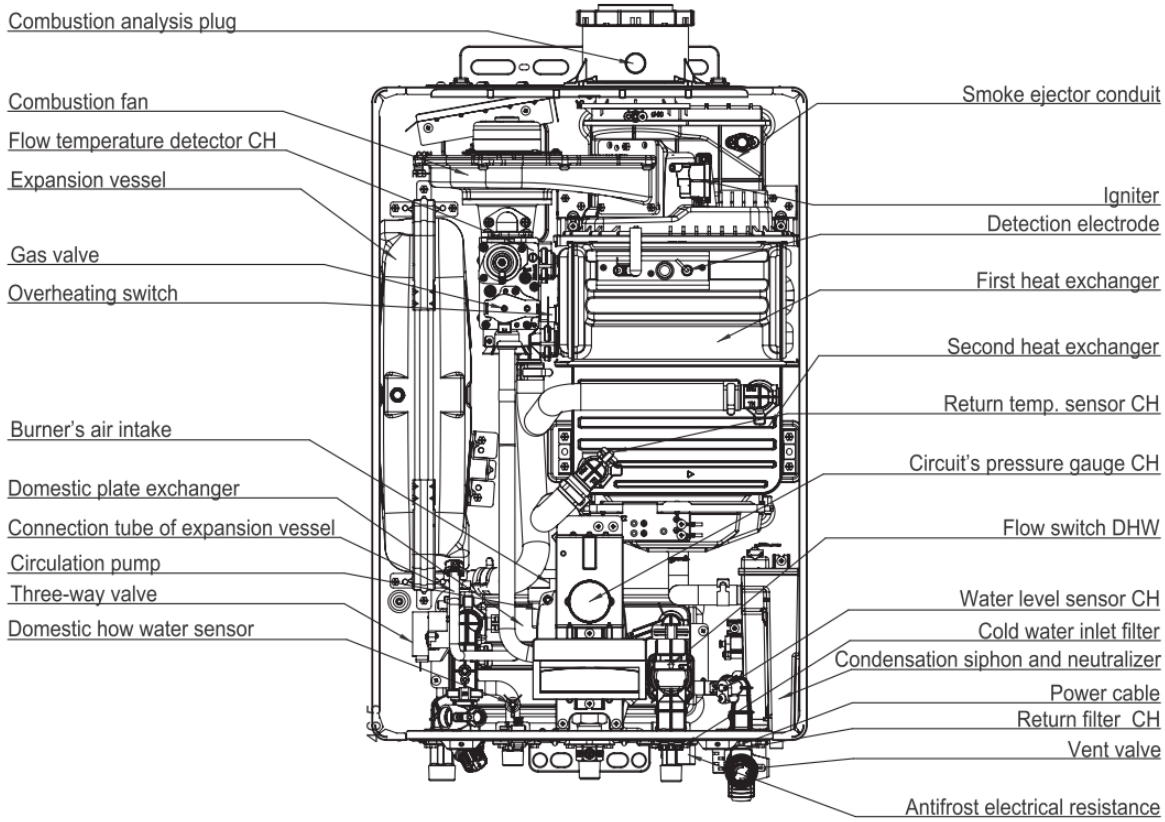
* REB-KBI3535FF = 315

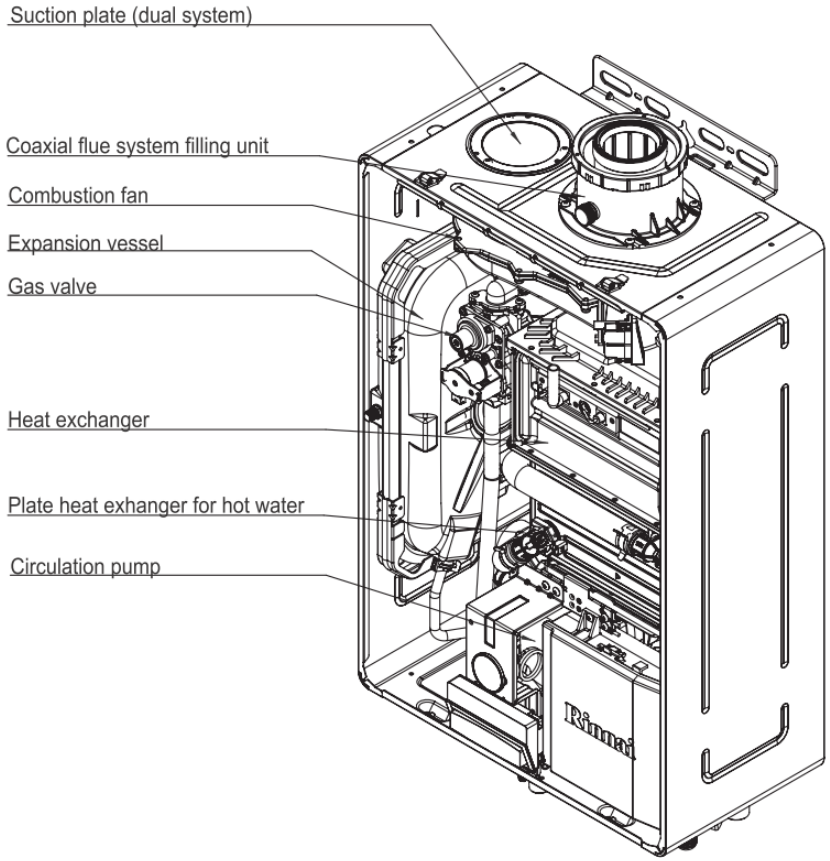




① Heating flow - 20A (3/4")
② Hot water outlet - 15A (1/2")
③ Gas - 15A (1/2")
④ Cold water inlet - 15A (1/2")
⑤ Heating return - 20A (3/4")

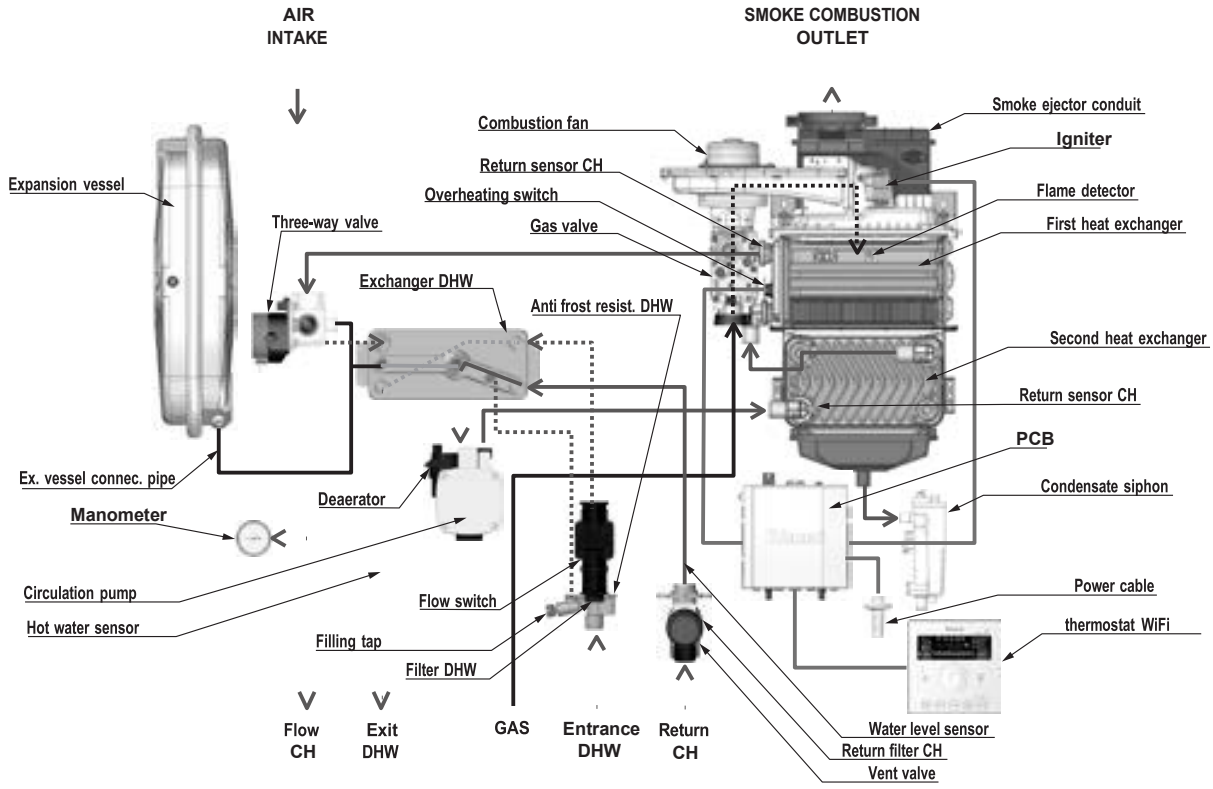
2.4 MAIN COMPONENTS



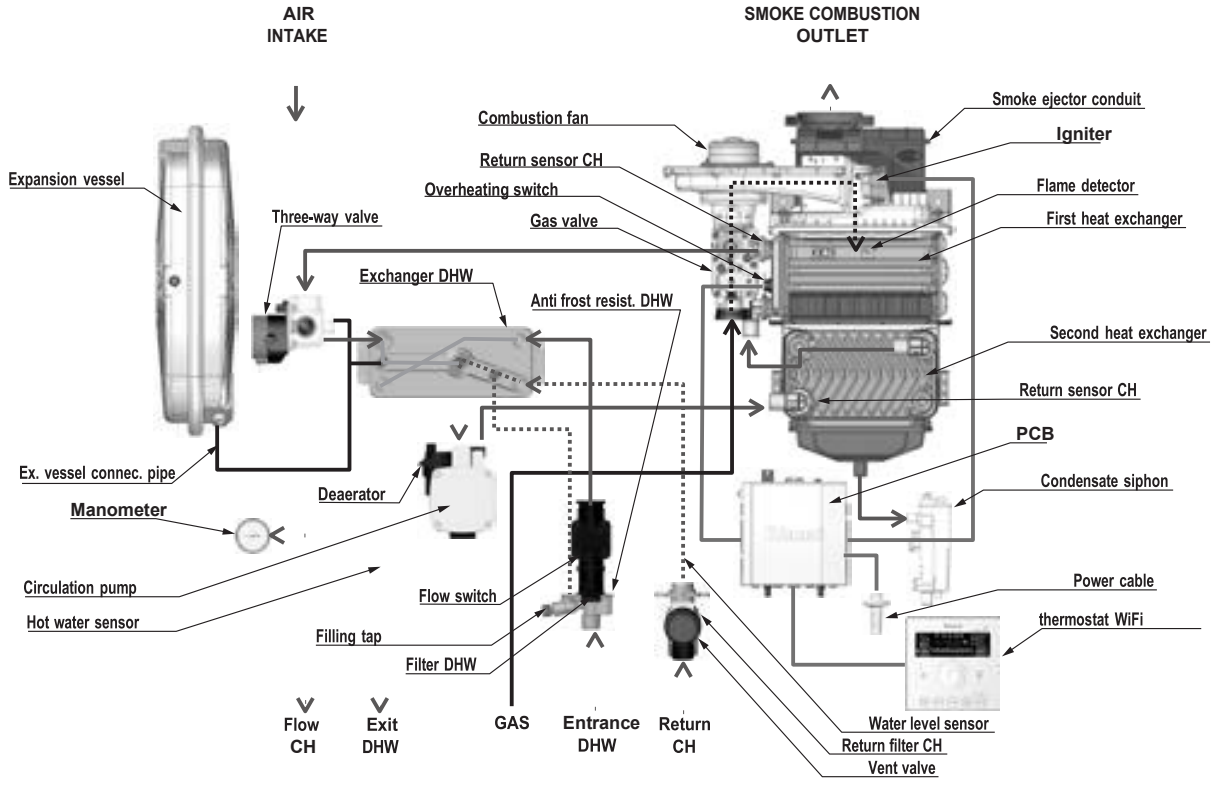


2.5 GENERAL SCHEME AND OPERATION PRINCIPLES

Heating circling mode (CH)



Domestic hot water circling (DHW)



2.6 INSTALLATION

2.6.1 HYDRAULIC COUPLINGS

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 installed at the inlet of the appliance or in the water supply to this appliance. To achieve the maximum flowrate, a water supply pressure of 1.5 bar 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 hardness	Chlorides	Magnesium	Calcium	Sodium	Iron
Maximum recommended levels	6.5-9.0	600mg/l	150mg/l	300mg/l	10mg/l	20mg/l	150mg/l	1mg/l

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 external drain, preferably a tundish 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 equipped with a sealed condensate trap siphon, already filled with an acid-neutralizer (the duration of 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 **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

IMPORTANT

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 registered gas installer and according to current regulations and must provide adequate dynamic pressure based on the rated power of the device.

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

IMPORTANT

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 mentioned on the data plate (locatedon 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 CHNZ coaxial flue system: they should not be used without an exhaust system. The exhaust system is considered an integral part of the appliance: it is only possible to install certified and tested exhaust systemsin 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.

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.

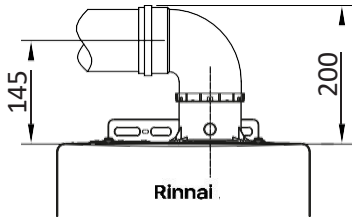
Beyond the 12m the boiler power is progressively reduced depending on the equivalent length of the exhaust system.

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.

Overall dimensions and connection to the boiler

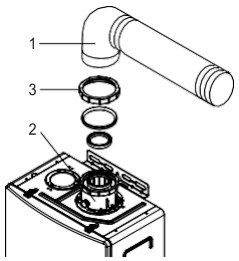
The main dimensions of some flue gas elements installed in the boiler are shown below:



Coaxial system
ø 60/100

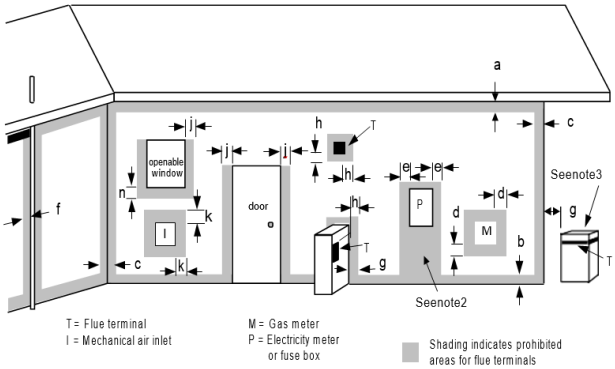
The connection of the inlet and exhaust pipes must be made as shown in the figure:

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



Minimum Flue Clearances.

Extract from AS5601/AG601-2002 5.13.6.5 Fig 5.3



† - unless appliance is approved for closer installation

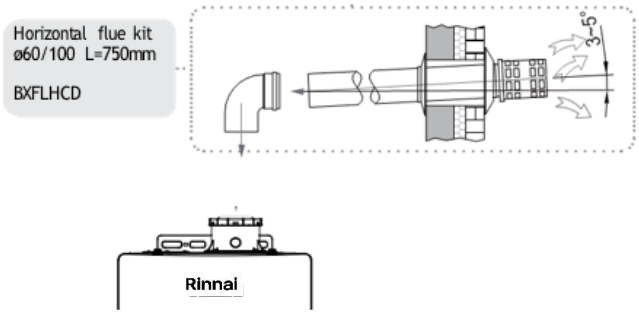
NOTES:
1 All distances are measured to the nearest part of the terminal.
2 Prohibited area below electricity meter or fuse box extends to ground level.
3 See Clause 5.13.6.6 for restrictions on a flue terminal under a covered area.
4 See Appendix J, Figures J2(a) and J3(a), for clearances required from a flue terminal to an LP Gas cylinder. A flue terminal is considered to be a source of ignition.
5 For appliances not addressed above, approval shall be obtained from the Authority.

Ref.	Item	Min. clearances (mm)
		Fan assisted
a	Below eaves, balconies and other projections:	
	• Appliances up to 50 MJ/h input	200
	• Appliances over 50 MJ/h input	300
b	From the ground, above a balcony or other surface †	300
c	From a return wall or external corner †	300
d	From a gas meter (M) (see 4.7.11 for vent terminal location of regulator)	1000
e	From an electricity meter or fuse box (P)	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure = or obstruction facing a terminal	500
h	From any other flue terminal, cowl, or combustion air intake †	300
j	Horizontally from an openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:	
	• Appliances up to 150 MJ/h input	300
	• Appliances over 150 MJ/h input up to 200 MJ/h input	500
	• Appliances over 200 MJ/h input	1500
	• All fan-assisted flue appliances, in the direction of discharge	1500
k	From a mechanical air inlet, including a spa blower	1000
n	Vertically below an openable window, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:	
	• Space heaters up to 50 MJ/h input	150
	• Other appliances up to 50 MJ/h input	500
	• Appliances over 50 MJ/h input and up to 150 MJ/h input	1000
	• Appliances over 150 MJ/h input	1500

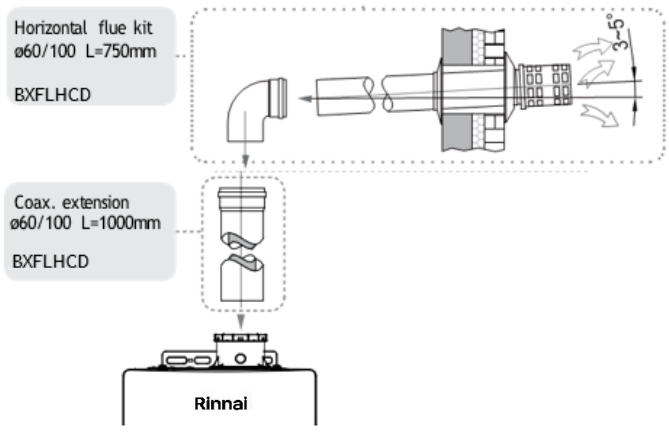
Main configuration of the flue system

COAXIAL FLUE SYSTEM Ø60/100mm

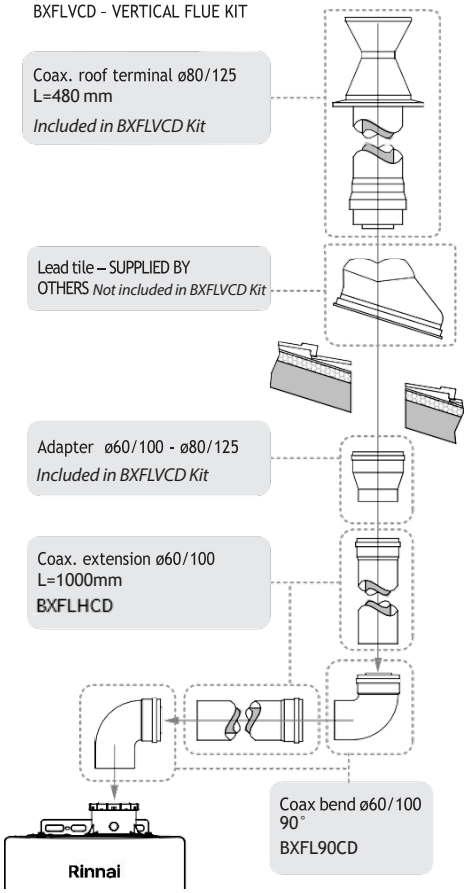
A) HORIZONTAL



B) HORIZONTAL EXTENSION FLUEING WITH WALL TERMINAL



C) VERTICAL



2.6.4 ELECTRICAL CONNECTION

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 a residual earth leakage circuit breaker.

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 adapters, multiple sockets and extensions cords.

The boilers are in IPx5D protection class.

2.6.5 RINNAI WIFI THERMOSTAT

The boiler is supplied ready for the use with the Rinnai WiFi thermostat. 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 electricallyin low voltage: it is possible to extend the supplied electric cable with a cable of the same section.

IMPORTANT

The controller must be installed on an accessible wall, at a height of 1.2-1.5m from the ground; located in an optimum space within 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).

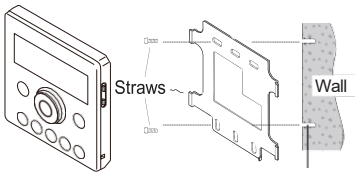
The electrical wiring of the remote control must be in good condition: in case of damage or deterioration it is necessary to replace it.

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 thermostat installation

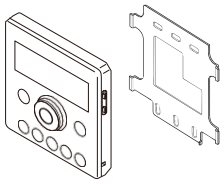
Prior to begin the installation, it is necessary to electrically isolate the appliance by disconnecting it from the electrical socket.

Wall mounted:



- separate the metal bracket from the controller;
- use the bracket as template to prepare the holes for the plug (Ø6.0 x35~40mm);
- 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 thecontrol (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 thecontrol (rear part);
- install the control to the metallic bracket.

2.6.6 THERMOSTAT OF A DIFFERENT BRAND

The Rinnai boiler can work by connecting a thermostat (optional). Or it can work by connecting a thermostat(optional),

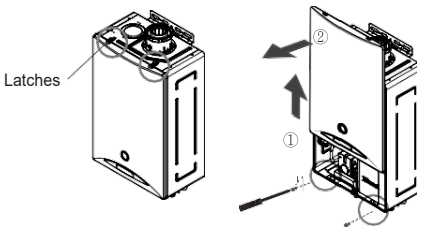
keeping the Rinnai WiFi thermostat connected: in this second configuration the Rinnai command transfers the room temperature control function to the optional thermostat. In order to connect the room thermostat of another brand to the boiler's electronic board, a special connector (blue) is supplied as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

Installation of the thermostat (of a different brand)

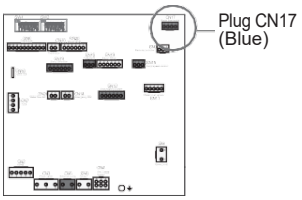
Isolate the appliance electrically by disconnecting it from the electrical socket:

- 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 thermostat to the cable installed;
- check that the type of thermostat connected is in 'open contact':if it is a 'closed contact' type it is necessary to modify the parameter number.14 in menu B;
- close the PCB protection cover and assemble the front panel;

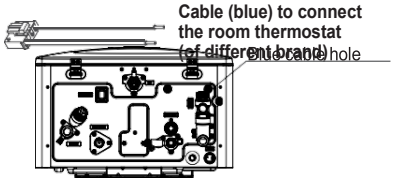
Removing the front panel



Main electric board



- electrically power the appliance, switch on the remote control and activate the heating function by pressing the 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

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 (1 ~ 1.5bar). if necessary, 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 button 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 refilling the system to the appropriate system pressure noted above.

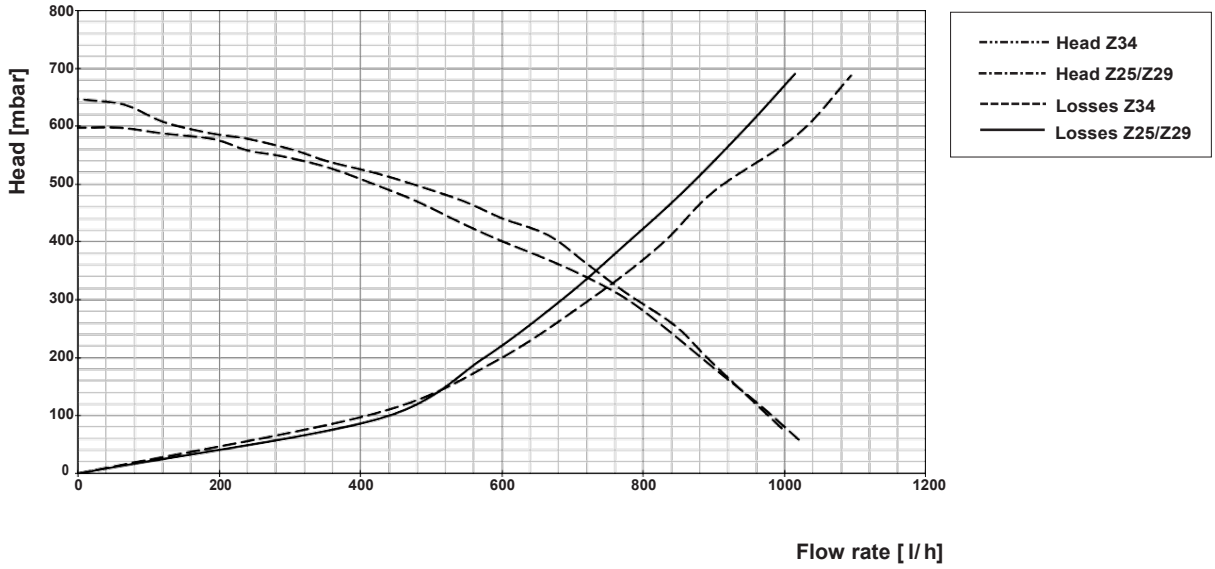
If the deaeration cycle is not sufficient to expel most of the air in the system, it is suggested to disconnect the power supply cable and reconnect it to repeat the boiler vent procedure. In the first uses and with a certain regularity it is advised to check that the pressure gauge on the front panel always indicates a normal pressure value: if necessary top up the system by operating the filling valve and restore the systempressure.

2.7 CIRCULATION PUMP

The boiler is supplied, as standard, with a built-in circulator with high energy efficiency.

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

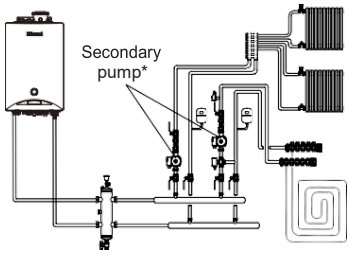
Inrush current: <1.5 A

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

Installation:

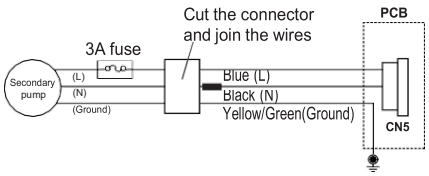
- unplug the boiler;
- install the pump into the CH system;
- connect the pump wire to the blue CN5 connector on the PCB;
- remove the connector from the free end of the wire and join it to the pump following the electrical scheme on the right side;
- the installation of a 3Amp fuse is recommended.

System connection

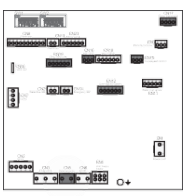


** = it is possible to connect only one secondary pump*

Electrical connection of the secondary pump



Main electric board



CN5 (blue) port

2.8 COMMISSIONING THE BOILER

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

Prior to commissioning of the system, the installer must refer to AS/NZS 5601.1, clauses 2.6.8 and 6.11.2. 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 AS/NZS 5601. 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 building regulations
	2. Verify that the hydraulic circuits are clean before connection 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 (1 ~ 1.5 bar)	
	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..	Purging can last up to one hour. Once all the air is removed from the system you can stop the purge process by pressing the CH button
	7. Press the buttons CH and DHW to adjust the desiredtemperature.	
Thermal insulation /lagging	1. Verify that the pipes are correctly insulatedand protected against frost.	
	2. Clean the location when the procedure is completed.	

At the end of the commissioning operations, by the installer, a copy of the test certificate 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 Registered gas installer must commission the boiler as follows:

- 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 (1 ~ 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 GAS CONVERSION AND PRESSURE ADJUSTMENT

ATTENTION

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; the nozzle must be changed on the appliance for LPG. Boiler is supplied with a NG nozzle.**
3. **verification of CO_2 and possible regulation of gas pressure (at minimum and maximum forced regime).**

   A flue gas analyzer should be used to complete this verification

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	LPG (G30)
2	OFF		ON	
3	OFF		OFF	

ATTENTION

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

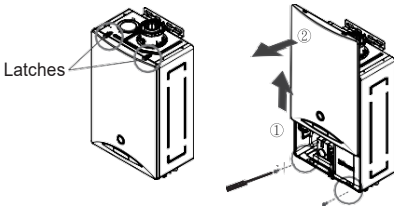
Phase 2

- 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:

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

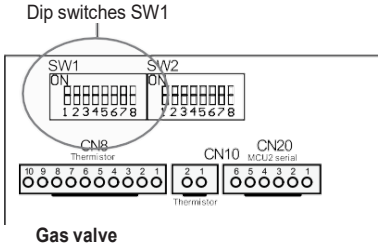
- assemble the gas valve taking care not to damage the o-rings;

Remove the front panel

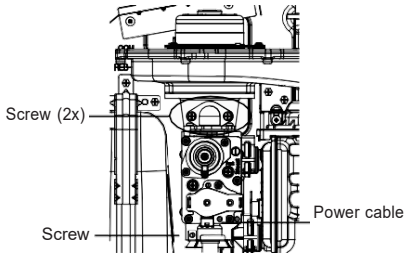


Main electronic board

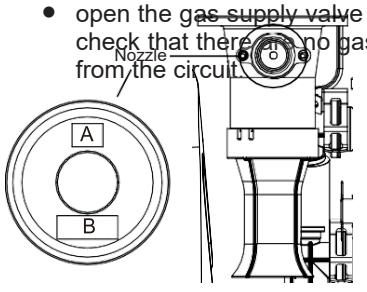
Dip switches SW1



Gas valve



- 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 **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 CHNZ before proceeding.**

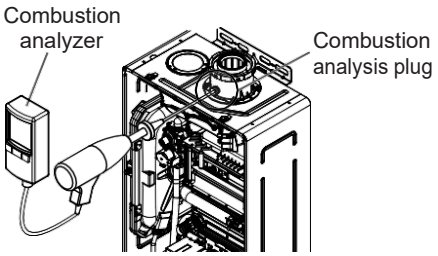
- remove the combustion test plug cap and insert the combustion analyzer probe;
- turn on the boiler in domestic hot water mode;
- force the appliance to minimum combustion mode by means of the microswitches of the bank SW2:

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

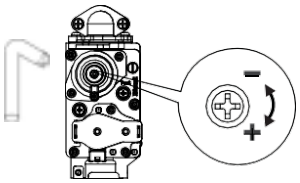
ATTENTION **The specific procedure described in PCB paragraph must be followed, in order to make any change to the microswitches effective.**

- 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.

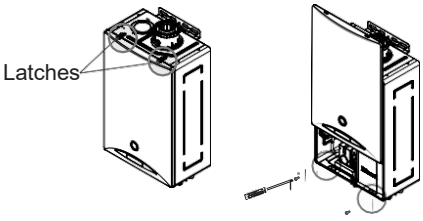
Combustion analysis



Adjustment of CO_2

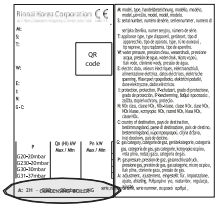


Repositioning the front panel



Data plate update

New Gas Settings



2.10 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.

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.

3.0 RINNAI BOILER NZ

The user manual enclosed within the package provided with this boiler has instruction on how to set up and operate the Rinnai Boiler NZ app. Please ensure to review these details and inform your customer.

3. MAINTENANCE INSTRUCTIONS

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

3.2 PARAMETERS MENU

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 CHNZ in advance so as not to damage the boiler or theplant to which it is connected and to exclude potential risks for the user.

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

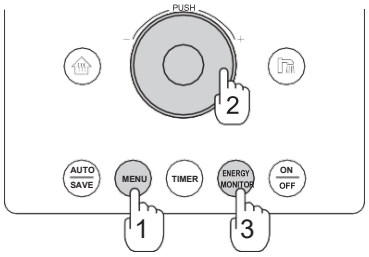
Menu A ► B ► C ► D ► Exit

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) (**1**);
- the following icons will appear on the WiFi thermostat:
  - - means that you have entered in the parameters menu;
  - - indicates the selected menu: 'menu A';
  - - indicates the visualized parameters: 'parameter 01';
  - - indicates the value of the visualized parameters: '02'.
- press the button (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) (**1**) more than once.

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) : the symbol 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	Acoustic alarm notifications for anti-frost 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	Temperature 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. thermostat	-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 to assist slow opening zone valves or reduce short cycling issues 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.	- -

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 – N/A; 3: Air/Propane – N/A; 4: ULPG - 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) Switch to A for External Room Thermostat	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 01	Error code & number of events	Shows: - the last twenty error codes registered (position 1 = the most recent); - the number of events occurred.
2	Error code 02	Error code & number of events	
...			
20	Error code 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

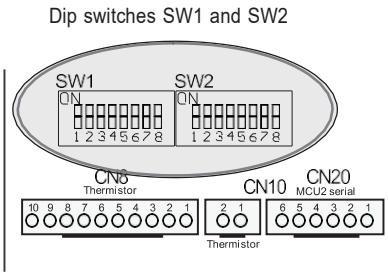
6	Exhaust sensor temperature	-9°C~161°C	Detected temperature by the exhaust sensor.	°C
7	Fan speed (Input)		It shows the rotation speed required to the fan.	RPM
8	Fan speed (Output)		It shows the detected rotation speed of the fan.	RPM
9	PWM of the fan (Input)	0~1023	It shows the PWM of the fan.	BIT

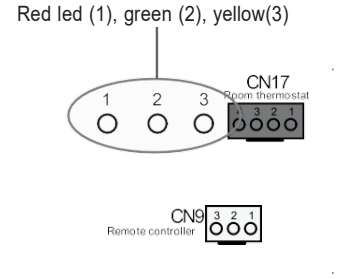
3.3 PCB

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 **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	Not in use	OFF	Not in use	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	Not in use			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			High altitude setting
Three blinks			
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:

Nr.	Bank SW2								
1	**OFF**	No combustion/boiler will not operate			**ON**	Continuous combustion			
2	**OFF**	Not in use			**ON**	Not in use			
3	**OFF**	Not in use			**ON**	Not in use			
4	**OFF**	**Normal** combustion	**OFF**	**Forced** combustion **min**	**ON**	**Forced** combustion **partial load**	**ON**	**Forced** combustion **max**	
5	**OFF**		**ON**		**OFF**		**ON**		
6	**OFF**	Normal operation mode			**ON**	Microswitch setting change enabled			
7	**OFF**				**ON**				
8	**OFF**	Not in use			**ON**	Not in use			

IMPORTANT

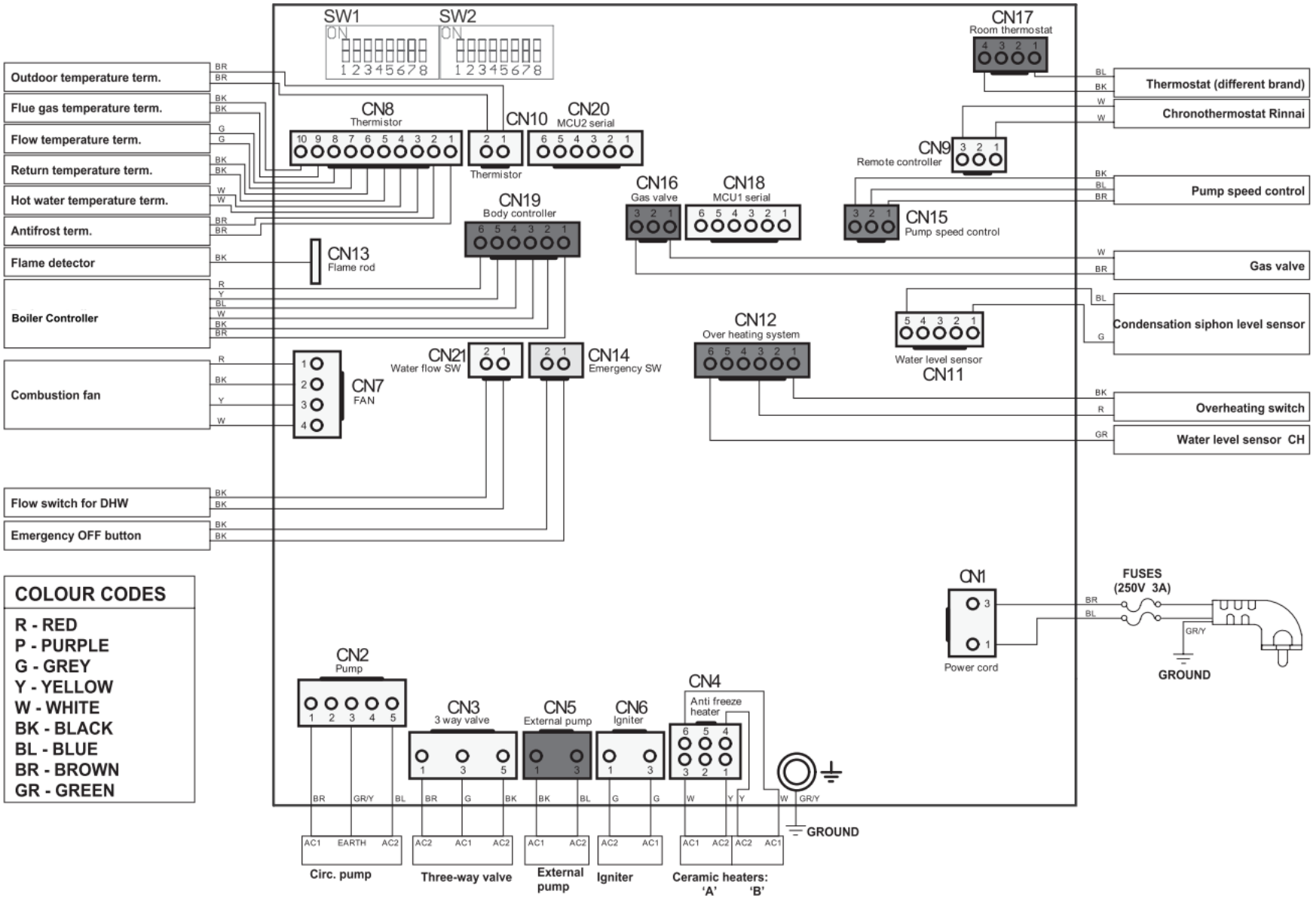
For safety reasons, the electronic card accepts the changes of the microswitches one, four and five only if the six and seven microswitches (ON) are enabled in advance; otherwise, the card ignores any change in the microswitches, interpreting the displacement as accidental, involuntary.

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.

3.4 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
Ignitor	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 Thermostat	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 resistance with valve OFF
Ambient thermostat (other label)	17	Bl-Bk	DC 4.5V~5.5V	
Boiler display	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

3.4 TECHNICAL DATA

Model	REB-KBI2424FF	REB-KBI3535FF	Unit
CH Input (Max/Min), (G20), (Hi)	24.0 / 5.8	34.88 / 7.9	kW
CH Input (Max/Min), (G230), (Hi)	-	-	kW
CH Input (Max/Min), (G30), (Hi)	24.6 / 5.9	34.88 / 8.1	kW
CH Input (Max/Min), (G31), (Hi)	24.5 / 5.9	34.88 / 8.1	kW
CH Output (Max/Min), 80°C/60°C, (G20)	23.2 / 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	33.0 / 7.3	kW
CH Output (Max/Min), 80°C/60°C, (G31)	23.2 / 5.3	33.0 / 7.3	kW
CH Output (Max/Min), 50°C/30°C, (G20)	24.8 / 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	35.3 / 8.0	kW
CH Output (Max/Min), 50°C/30°C, (G30)	24.8 / 5.8	35.2 / 7.3	kW
CH Output @ partial load (30%), return 30°C, (G20)	7.7	11.2	kW
CH Output @ partial load (30%), return 30°C, (G230)	-	-	kW
CH Output @ partial load (30%), return 30°C, (G30)	7.7	11.0	kW
CH Output @ partial load (30%), return 30°C, (G31)	7.7	11.0	kW
DHW Input (Max/Min), (G20), (Hi)	24.0 / 5.8	34.88 / 7.9	kW
DHW Input (Max/Min), (G230), (Hi)	-	-	kW
DHW Input (Max/Min), (G30), (Hi)	24.6 / 5.8	34.88 / 7.9	kW
DHW Input (Max/Min), (G31), (Hi)	24.5 / 5.8	34.88 / 7.9	kW
DHW Output (Max/Min), (G20)	23.5 / 5.4	33.1 / 7.4	kW
DHW Output (Max/Min), (G230)	-	-	kW
DHW Output (Max/Min), (G30)	23.5 / 5.4	33.4 / 7.4	kW
DHW Output (Max/Min), (G31)	23.5 / 5.4	33.4 / 7.4	kW
Efficiency CH (Max/Min), 80°C/60°C, (G20), (Hi)	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 / 89.9	%
Efficiency CH (Max/Min), 80°C/60°C, (G31), (Hi)	95.1 / 90.0	95.1 / 90.2	%
Efficiency CH (Max/Min), 50°C/30°C, (G20), (Hi)	103.4 / 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 / 98.5	%
Efficiency CH (Max/Min), 50°C/30°C, (G31), (Hi)	101.1 / 98.5	101.2 / 98.8	%
Efficiency CH @ partial load (30%), return 30°C, (G20), (Hi)	109.6	109.2	%
Efficiency CH @ partial load (30%), return 30°C, (G230), (Hi)	-	-	%
Efficiency CH @ partial load (30%), return 30°C, (G30), (Hi)	106.9	106.4	%
Efficiency CH @ partial load(30%), return 30°C, (G31), (Hi)	107.2	106.8	%
Gas cathegory	II2H3P, II2HM3B/P		
Noise level (LWA)	43	40	dB
NOx Class	6		
NOx pondered (G20)	52	45	Mg/kWh
Expansion Vessel Capacity	8	10	L
Pressure of expansion tank's pre-inflation	1		bar
Working maximum pressure CH - PMS	3		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	1.2	bar
Activation minimum load DHW	2.0		l/min
Temperature range DHW	35-60		°C
Rated flow DHW (ΔT=25°C)	13.5	19.6	l/min
Rated flow DHW (ΔT=30°C)	11.2	16.3	l/min
Rated flow DHW (ΔT=35°C)	9.6	14.0	l/min
Maximum smoke temperature	85		°C
Exhaust temperature @ rated flow CH (80-60°C)	73	73	°C
Exhaust temperature @ min flow CH (50-30°C)	45	45	°C
Exhaust temperature @ rated flow & max temperature DHW	66	66	°C
Exhaust temperature @ min flow DHW & min flow DHW	45	45	°C
Exhaust temperature@ rated output CH (80-60°C)	11.7	17.0	g/s
Mass flow @ min flow CH (50-30°C)	2.8	4.0	g/s
Mass flow @ rated flow & max temperature DHW	11.7	17.0	g/s
Mass flow @ min flow DHW & min flow DHW	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, C93C(10)3, C(12)3, C(13)3, C(15)3		-
Protection class IP	IPX5D		-
Activation power	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	95/98	

Model		REB-KBI2424FF	REB-KBI3535FF	
Condensing boiler		YES	YES	
Low temperature boiler		NO	NO	
B1 Boiler		NO	NO	
Cogeneration space heater		NO	NO	
Combination heater		YES	YES	
Element	**Symbol**	**Level**		**Unit**
Rated heat output	$P_{nominal}$	23	34	kW
Useful heat output @ rated heat output (80/60°C)	P_4	23.2	33.7	kW
Useful heat output @ 30% of rated heat output (30°C return)	P_1	7.7	11.2	kW
Seasonal space heating energy efficiency CH	η_s	92.0	92.2	%
Useful efficiency @ rated heat output (80/60°C)	η_4	87.5	87.5	%
Useful efficiency @ 30% of rated heat output (30°C return)	η_1	98.6	98.2	%
Auxiliary electricity consumption @ full load	el_{max}	0.083	0.095	kW
Auxiliary electricity consumption @ partial load	el_{min}	0.065	0.066	kW
Auxiliary electricity consumption in stand-by mode	P_{SB}	0.003	0.003	kW
Standby heat loss	P_{stby}	0.065	0.065	kW
Ignition burner power consumption	P_{ign}	0.000	0.000	kW
Emissions of nitrogen oxides	NOx	50	35	mg/kWh
Declared load profile (DHW)		L	XL	
Daily electricity consumption	Q_{elec}	0.084	0.122	kWh
Water heating energy efficiency	η_{wh}	84	86	%
Daily fuel consumption	Q_{fuel}	14.188	22.604	kWh

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

3.5 COMBUSTION PARAMETERS

REB-KBI2424FF	Unit	G20	G30
Supply pressure	mbar	20	30
CH Input **Qn** (Max/Min) - (Hi)	kW	24.0 / 5.8	24.5 / 5.9
Gas flow **Vm** (Max/Min)	m^3/h	2.529 / 0.611	0.741 / 0.178
CO_2 (Max) - (front panel on)	%	9.7 ± 0.6	12.1 ± 0.6
CO_2 (Min) - (front panel on)	%	9.4 ± 0.6	13.0 ± 0.8
CO_2 (Max) - (without front panel)	%	9.6 ± 0.6	12.0 ± 0.6
CO_2 (Min) - (without front panel)	%	9.2 ± 0.6	12.5 ± 0.8
CO/CO_2 (Max)	ppm	< 300	< 800
CH NOx @ Qn - 80°C/60°C	mg/kWh	40	180
CH NOx @ 30%Qn - temp. return 30°C	mg/kWh	30	90
DHW CO/CO_2 (Max)	ppm	< 300	< 800
DHW NOx (Max/Min)	mg/kWh	35 / 30	170 / 50

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

3.6 PRODUCT FICHE

	Power generator		Unit
Supplier's name	Central Heating New Zealand Ltd		
Supplier's model	REB-KBI2424FF	REB-KBI3535FF	
	Gas condensing combi-boiler		
Declared load profile - DHW	L	XL	
Seasonal space heating energy efficiency class (η_s)	A	A	
Water heating energy efficiency class (η_{wh})	A	A	
Rated heat output (P_n) - (80~60°C)	23	34	kW
Annual energy consumption - CH (Q_{HE}) - (Hs)	73	105	GJ/annum
Annaul electricity consumption - DHW (**AEC**)	18	26	kWh/annum
Annual fuel consumption - DHW (**AFC**) - (Hs)	11	17	GJ/annum
Seasonal space heating energy efficiency - CH (η_s) - (Hs)	92	92	%
Water heating energy efficiency - DHW (η_{wh}) - (Hs)	84	86	%
Sound power level, indoor (L_{WA})	40	43	dB

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

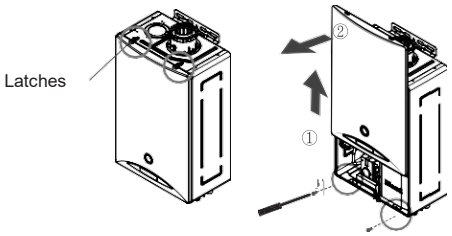
	Temperature control device	Unit
Supplier's name	Central Heating New Zealand Ltd	
Supplier's model	WF-P100W_EU	
Class of the temperature control	V	
Contribution of the control to the seasonal space heating energy efficiency CH	3	%

3.7 MAIN COMPONENTS DISASSEMBLY

Front panel

- Isolate the appliance electrically by disconnecting it from the electricalsocket;
- 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 damagethe pressure gauge: first lift it upwards and then away from the boiler

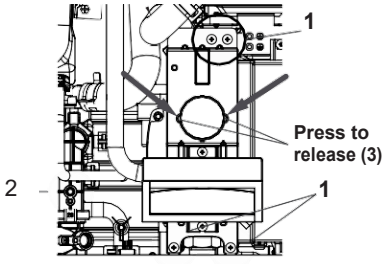
body.



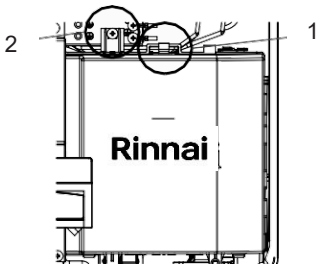
Manometer

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

ATTENTION **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).

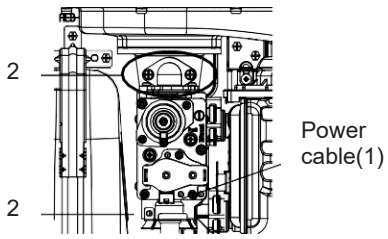


PCB

- Isolate the appliance electrically by disconnecting it from the electricalsocket;
- 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.

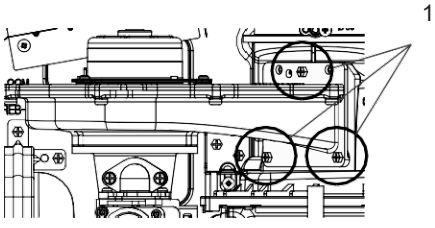
Gas valve

- Isolate the appliance electrically by disconnecting it from the electricalsocket;
- 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.

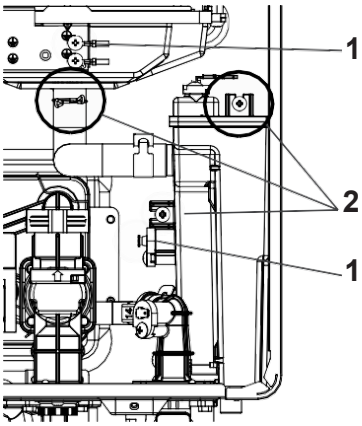


Combustion fan

- 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;
- unscrew the straws(3x) that bolt the fan (1) and remove the fan.

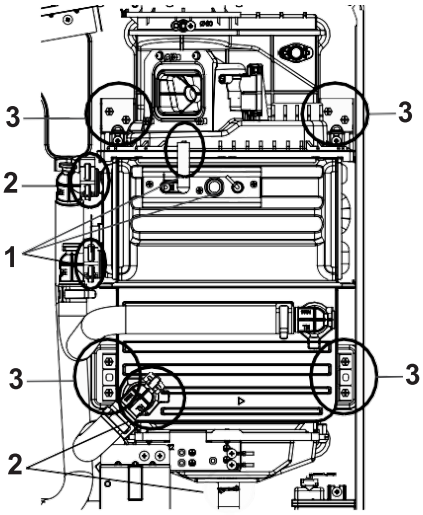


Condensate trap



- Electrically isolate the appliance by disconnecting it from the electricalsocket;
- 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



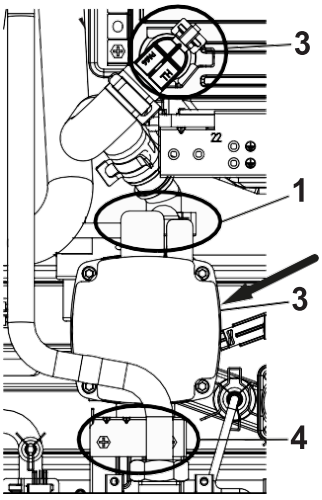
- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the flow connection and completely emptythe CH circuit of the boiler;

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 fromthe heat exchanger (1);
- disconnect the fixing clips of the connection pipe to the pump, to thethree-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 electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;

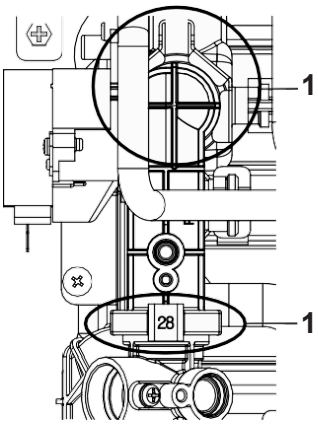
ATTENTION

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 electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely empty the CH circuit of the boiler;

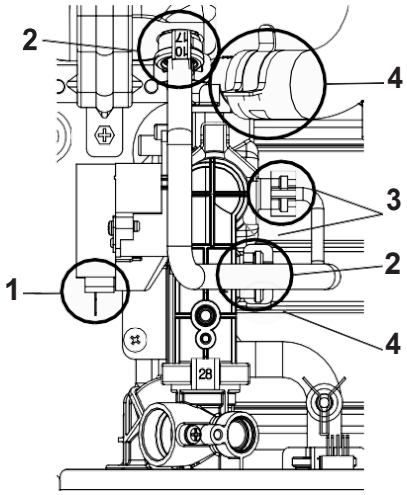


ATTENTION **Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- 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 sealingo-rings.

Three-way valve

- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;



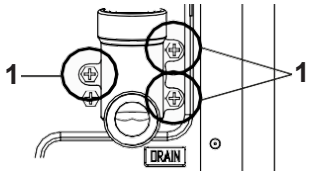
ATTENTION **Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

- 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 sanitaryexchanger (4);
- remove the three-way valve taking care not to damage the sealingo-ring.

Connection joint - return

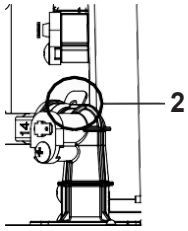
- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;

Bottom view



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

Front view



- 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.

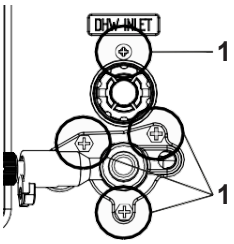
Flow switch

- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;

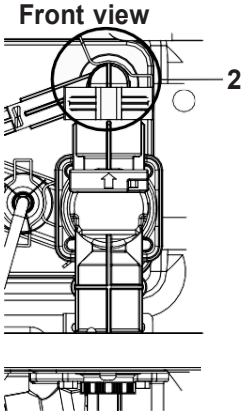
ATTENTION **Empty the exchanger completely so as not to flood the boiler in the subsequent disassembly phases.**

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

Bottom view



Front view

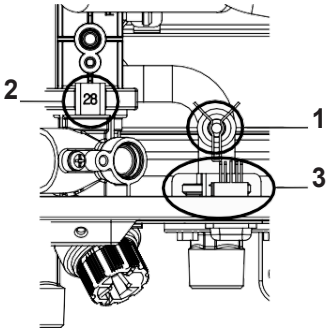


Hot water connection joint

- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;

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.

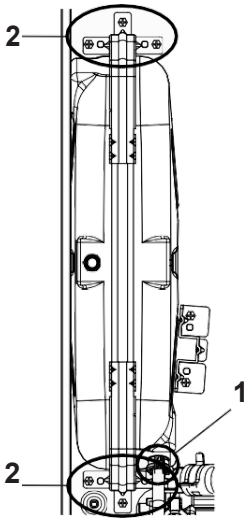


Expansion vessel

- Electrically isolate the appliance by disconnecting it from the electricalsocket and closing the valves of the heating and gas circuit;
- remove the plastic filter on the delivery nozzle and completely emptythe CH circuit of the boiler;

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.



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