

Installation & Servicing Instructions

High efficiency condensing system boiler E32S



Boiler G.C No
E 32S 41-310-13
CE PIN0063BR3405

Rinnai
EXPERIENCE OUR INNOVATION

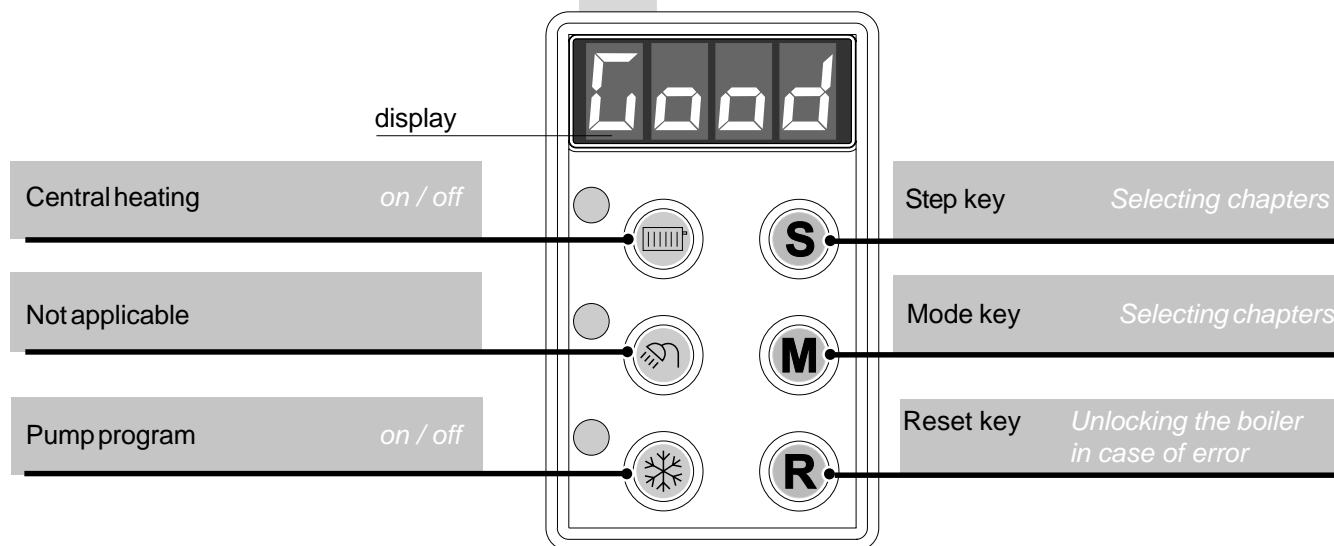
These instructions to be retained by user.

Explanations of symbols and signs on the Control Tower display.

Operation indication

(in the first display position of technical read out)

0	No heat requirement
1	Ventilation phase
2	Ignition phase
3	Burner active on central heating
4	Burner active on hot water (n.a.)
5	Fan check
6	Burner off when room thermostat is demanding
7	Pump overrun phase for central heating
8	Pump overrun phase for hot water (n.a.)
9	Burner off because of too high flow water temperature
R	Automatic venting program



From "Good" read-out to Technical read out (and vice versa):
- Press STEP key for 5 sec.

FILL

Water pressure is too low (<0.7 bar), FILL indication remains continuously visible, the boiler is taken out of operation. The installation needs to be topped up.



Water pressure is too low (<1.0 bar), flashing FILL will alternate with indication of water pressure, boiler power of 50% is possible. The installation needs to be topped up.

HIGH

Water pressure is too high (>2.8 bar), if HIGH indication remains continuously visible, the boiler is taken out of operation. The installation pressure needs to be decreased by draining water.

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The appliance should only be installed by a Competent Gas Installer. Work on the boiler must be carried out by a competent person, (Ref: Gas Safety Installation and Use Regulations) using correctly calibrated instruments with current test certification.

1 Introduction

These instructions describe the functioning, installation, use and primary maintenance of Rinnai central heating boilers for the United Kingdom and Ireland. Where necessary the different regulations for each country are separately described.

This appliance may only be installed by someone certified competent to do so. At the time of printing the only people deemed competent to install this appliance are those that are CORGI registered for this type of appliance in this type of location who have a current ACS certificate. It is advisable to read these instructions thoroughly, well in advance of installation. Separate instructions for use are supplied with the boiler for users of Rinnai central heating boilers. Rinnai is not liable for the consequences of mistakes or shortcomings which have found their way into the installation instructions or user's manual. Further, Rinnai reserves the right to alter its products without prior notification.



When delivering the boiler, give the customer clear instructions concerning its use; present the customer with the user's manual and card.

Each boiler is fitted with an identification plate. Consult the details on this plate to verify whether the boiler is compliant with its intended location, e.g.: gas type, power source and exhaust classification.

Relevant Installation, Service and User manuals:

- Rinnai Flue system guide
- Rinnai Digital room thermostat

2 Regulations

The following regulations apply to installation of Rinnai central heating boilers:

Legislation and Regulations.

Gas Safety (Installation and Use). All gas appliances must by law, be installed by a competent person, eg. Members of CORGI and in accordance with the current Gas Safety Regulation. Failure to install appliance correctly could lead to prosecution.

In addition to the above regulations this appliance must be installed in compliance with the current IEE Regulations, the Building Standards (Scotland Consolidation) Regulations. Regulations and bye laws of the Local Water Authority and the Current Health and Safety Regulation.

Ireland:

- Irish standard 813
- Domestic gas installations

The current, Electricity at Work Regulation must be complied with and also be in accordance with the relevant and current editions of the British Standards.

The Rinnai E boiler is a certified appliance and must not be modified or installed in any way contrary to this Installation Manual.

Manufacturers instructions must not be taken in any way as overriding statutory obligations.

The Rinnai E is a central heating system boiler. These boilers must be connected according to these instructions and all installation norms in respect of the part of the boiler to be connected.

Observe the following rules of safety:

- All work on the boiler must take place in a dry environment.
- Rinnai boilers must never be in operation without their housing, except in connection with maintenance or adjustments (see Chapter 13 and 14).
- Never allow electrical or electronic components to come into contact with water.

Carry out the following tasks in connection with maintenance, etc. to an already-installed boiler:

- Shut down all programs
- Close the gas isolation valve
- Isolate the electrical supply to the appliance.
- Close the isolation valve of the boiler's intake connection

Take note of the following when maintenance or adjustments are needed:

- The boiler must be able to function during these activities; for this reason, the boiler's supply voltage, gas pressure and water pressure must be maintained. Ensure that there is not a source of potential danger during these activities.



Following maintenance or other activities; always check the installation of all parts through which gas flows (using leak detection spray).



Following maintenance or other activities, always replace the housing and secure it with the screw behind the door at the front of the casing.

The following (safety) symbols may be encountered in these installation instructions and on the boiler:



This symbol indicates that the boiler must be stored away from frost.



This symbol indicates that the packaging and/or contents can be damaged as a result of insufficient care taken during transport.



This symbol indicates that, whilst still in its packaging, the boiler must be protected from weather conditions during transport and storage.



KEY-symbol. This symbol indicates that assembly or dismantling, must be carried out.



ATTENTION symbol. This symbol indicates that extra attention must be paid in connection with a particular operation.



Useful tip or advice

3 Scope of the supply

The boiler is supplied ready for use. The supply kit is composed as follows:

- Boiler with casing;
- Automatic vent (inside the boiler);
- Safety valve (inside the boiler);
- Suspension bracket
- Service valves
- Fixing material consisting of plugs and screws;
- Template;
- Installation instructions
- Operating manual;
- Warranty card.
- Outside sensor (separate delivery)

4 Description of the boiler

Room sealed boiler

The boiler retrieves its combustion air from the outside then discharges the flue gases to the outside.

Condensing

Retrieves heat from the flue gases. Water condensates on the heat exchanger.

Modulating

Higher or lower burning according to the heat demand.

Stainless Steel

Super solid kind of steel which keeps its quality for life. It will not rust or erode in contrast to composition materials, like aluminium.

The Rinnai E boiler is a room sealed, condensing, modulating central heating boiler.

The boiler is provided with a compact stainless steel heat exchanger with smooth tubes. A well thought out principal using durable materials.

The boiler burns gas for supplying warmth. The heat is transferred in the heat exchanger to the water in the central heating system. By cooling down the flue gasses condensate is formed. This results in high efficiency. The condensate, which has no effect on the heat exchanger and the function of the boiler, is drained through an internal siphon.

The boiler is provided with an intelligent control system (CMS Control Management System). The boiler anticipates the heat demand of the central heating system.

When an outside sensor is connected, the boiler works weather dependantly. This means that the boiler control measures the outside temperature and flow temperature. With this data the boiler calculates the optimal flow temperature for the installation.

Explanation of the type indication: Rinnai E 32S

E = Type _____
32 = Nominal load in kW _____
S = Solo _____

Statement: No banned materials including asbestos, mercury, CFC's have been included in the product.

5 Mounting the boiler

The room where the boiler will be placed must always be frost free. The boiler casing is splash water tight (IPX4D).

It is NOT necessary to have a purpose provided air vent in the room or internal space in which the boiler is installed. Neither is it necessary to ventilate a cupboard or compartment in which the boiler is installed, due to the extremely low surface temperature of the boiler casing during operation. Therefore the requirements of BS 6798, Clause 12, and BS5440:2 may be disregarded.

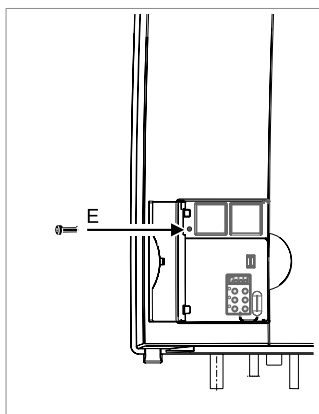
The boiler can be mounted practically to any wall with the suspension bracket and the enclosed fixing equipment. The wall must be flat and of sufficient strength in order to be able to carry the boiler weight with its water content.

Above the boiler there must be at least 250 mm working space in order to be able to fit a coaxial flue system. On the left side of the boiler at least 50 mm and on the right side 10 mm must be reserved to allow fitting or removing of casing. The location of the boiler can be determined by using the template.

Remove the casing of the boiler. The casing is also the airbox of the boiler and is secured with a screw behind the door at the front. Also the four quick-release fasteners (2 at the top and 2 at the bottom) should be secured with a screw.



First remove the screws before loosening the quick-release fasteners. Tighten the screws again when replacing the housing.



Removing the casing

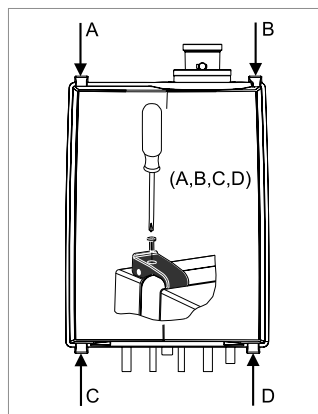


figure 1

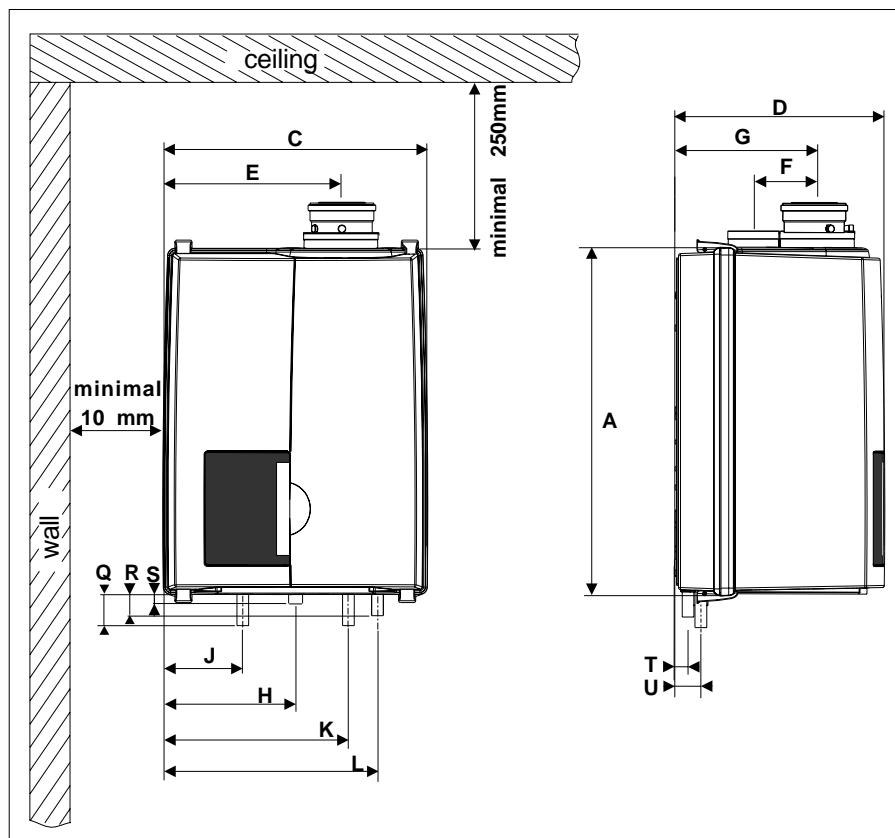


Lift the boiler only by the boilers back plate.

Lifting and carrying precautions:

- Lift only a manageable weight, or ask for help.
- When lifting the boiler, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry the boiler close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

5.1 Dimensions



dimensions (in mm)

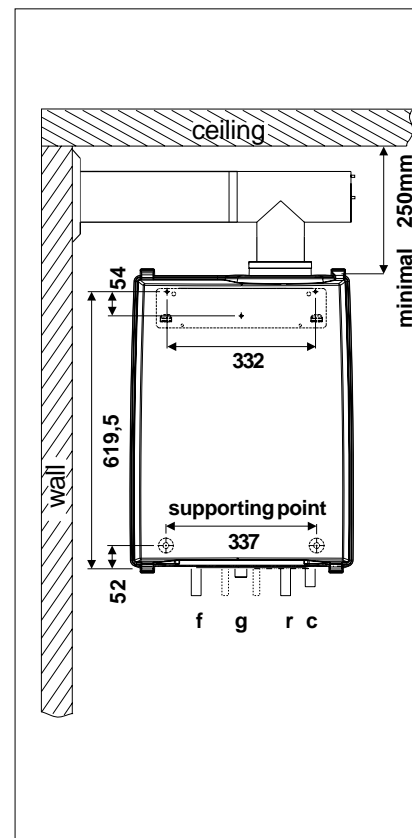


figure 2 boiler connections/mounting points

figure 3

type of unit	E32S
A height	mm 650
C width	mm 500
D depth	mm 395
E left side / flue gas exhaust	mm 335
F centre to centre / flue - airtake	mm 120
G back / flue gas exhaust	mm 270
H left side / gas pipe	mm 250
J left side / flow pipe	mm 150
K left side / return pipe	mm 350
L left side / condensation pipe	mm 405
Q pipe length of g*	mm 215
R pipe length of c*	mm 40
S pipe length of c;f and r*	mm 160
T back / centre of pipe c*	mm 26
U back / centre of pipe f;g and r*	mm 50

dimensions

table 1

type of unit	E32S
flue gas system / air supply	mm 80 / 125
gas pipe - g	½" female
central heating flow pipe - f	mm 22
central heating return pipe - r	mm 22
condensation discharge pipe - c	mm 22

connection diameters

table 2

6 Connecting the boiler

The boiler has the following connection pipes;

- The central heating pipes.
These can be connected to the installation by means of compression fittings / adapter fittings. Install the supplied service valves directly under the boiler;
- The gas pipe.
It is provided with a female thread into which the tail piece of the gas valve can be screwed;
- The condensation drain pipe.
It consists of a 22mm plastic pipe. The drain pipe can be connected to this by means of an open connection. If the open connection is fitted in a different location, then the pipe can be lengthened by means of a 32 mm PVC sleeve;
- The flue gas exhaust system and air supply system.
It consists of a concentric connection 80/125 mm.



Isolation valves fitted to the connections should be by way of a union fitting to allow removal of the appliance.



It is advisable to spray-clean all of the boiler's connecting pipes and/or to spray-clean/blow-clean the installation before connecting it to the boiler.

6.1 Central heating system

Connect the central heating system according to the actual regulations.

The boiler pipes can be connected to the installation by means of compression fittings. Reducers should be used for connecting to thick-walled pipe (welded or threaded). Install the supplied service valves directly under the boiler in the flow and return pipe.



When removing the plastic sealing caps from the pipes, contaminated testing water may be released.

The boiler has a self-adjusting and self-protecting control system for the load. This means the temperature difference between the flow and return water is checked. Table 3 shows the water displacement which supplies the circulation pump at a certain installation resistance.

type of unit	Pump type	water flow rate ΔT 20°C		permissible installation resistance	
		l/min	l/h	kPa	mbar
E32S	UP 20-60	20.7	1244	17	170

Installation resistance

table 3

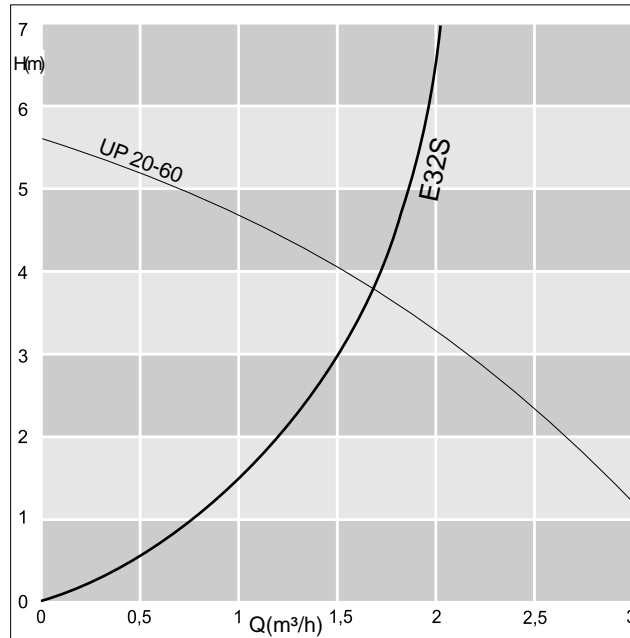
If the installation resistance is higher than the stated value the load will be adjusted until an acceptable temperature difference between flow and return water has been obtained. If, after this, the temperature difference remains too much then the boiler will switch itself off and wait until an acceptable temperature has been reached.

If an unacceptable temperature is detected, then the control will repeatedly try to achieve water flow, and if this does not work then the boiler will switch off.

If the capacity of the boiler pump is insufficient, an extra external pump can be installed in combination with a low velocity header in series with the boiler. The electrical side of this external circulation pump can be connected in the Control Tower on connection 4,5 and 6, by means of an optional connector, which can be ordered separately (art.nr. S4351300). The external pump will switch at the same times as the boiler pump.

The maximum absorbed current consumption of the external circulation pump may be 230 W (1 Amp). The extra external pump must be selected according to the installation resistance and the required flow.

As standard the boiler is provided with a water filter in the return pipe of the boiler. With this, possible contamination of the central heating water is prevented from ending up in the boiler. The boiler is also provided with an internal safety valve set at 3 bar. This is connected to the waste discharge together with the condensation discharge.



pump index lines

graph 1

If all, or a large part of the radiators are provided with thermostatic radiator valves it is advisable to use an automatic bypass in order to prevent flow problems in the installation.



The boiler is designed to be used on a sealed system only.



Use only potable water for filling the heating system.

When the water hardness of the filling water exceeds $\geq 200\text{ppm}$ and the volume of the installation $\geq 20\text{L/kW}$ the water has to be treated until below the maximum value of 200ppm.

The pH value of the installation water must be between 5 and 8.5.



Additives in the installation water are only permitted in consultation with the country distributor.

6.2 Expansion vessel

The central heating system must be provided with an expansion vessel. The expansion vessel which is used should be geared to the water content of the installation. The pre-charge pressure depends on the installation height above the mounted expansion vessel. See table 4. Fit the expansion vessel into the return pipe as close as possible to the boiler.

installation height above the expansion vessel	pre-charge pressure of the expansion vessel
5 m	0,5 bar
10 m	1,0 bar
15 m	1,5 bar

choice of expansion vessel

table 4

6.3 Underfloor heating system (plastic pipes)

When connecting or using an underfloor heating system, designed with plastic pipes, or plastic pipes are used elsewhere in the installation, one should ensure that the plastic pipes used comply with the DIN 4726/4729 standard. It is set out in this standard that the pipes may not have oxygen permeability higher than 0.1 g/m³.d at 40°C. If the system does not comply with this DIN standard, the underfloor heating component will have to be separated from the central heating appliance by means of a plate exchanger.



No recourse can be made to the terms of the warranty in the event of failure to observe the regulations pertaining to plastic underfloor heating pipes.

6.4 Gas connection

The appliance pipe is fitted with an internal thread, into which the tail piece of the isolation valve can be screwed.

United Kingdom:

The gas supply must comply to the current Gas Safety, Installation & Use Regulations.

Ireland:

- Irish standard 813
- Domestic gas installations

The connection to the appliance must include a suitable method of disconnection and an isolation valve must be installed adjacent to the appliance for isolation purposes. The nominal inlet working gas pressure measured at the appliance should be 20 mbar for Nat gas (G20).



Make sure that the gas pipe work does not contain dirt, particularly with new pipes.

When the boiler has to be converted from natural gas to LPG, Rinnai provides special kits for this purpose. Special instructions are supplied with the kit.



Always check the installation of all of the parts through which gas flows (using leak detection spray)

6.5 Condensation drain pipe

Rinnai boilers produce condensate. This condensate must be drained otherwise the boiler will not function.

The condensation drain pipe must be piped via a tundish because it is also the pressure relief valve drainage. If it is then piped into a drain or soil pipe it must be trapped after the tundish to prevent smells from entering the room. The drain connection should have a minimum diameter of 32mm.

Connect the condensation drain pipe according to the actual regulations.

The following components are connected to the collective condensation drain pipe:

- Condensation discharge;
- Safety valve;



Draining of the condensation water to the external rain guttering is not permitted in view of the danger of freezing.



Before putting the boiler into operation fill the siphon with 300 ml of water.



The condensate pipe must be run using suitable corrosion resistant materials (eg. PVC, uPVC, or ABS pipe) . Copper and steel are not recommended.

6.6 Flue gas exhaust system and air supply system

The flue gas exhaust system and air supply system consists of:

- Flue gas pipe;
- Air supply pipe;
- Roof or wall terminal.

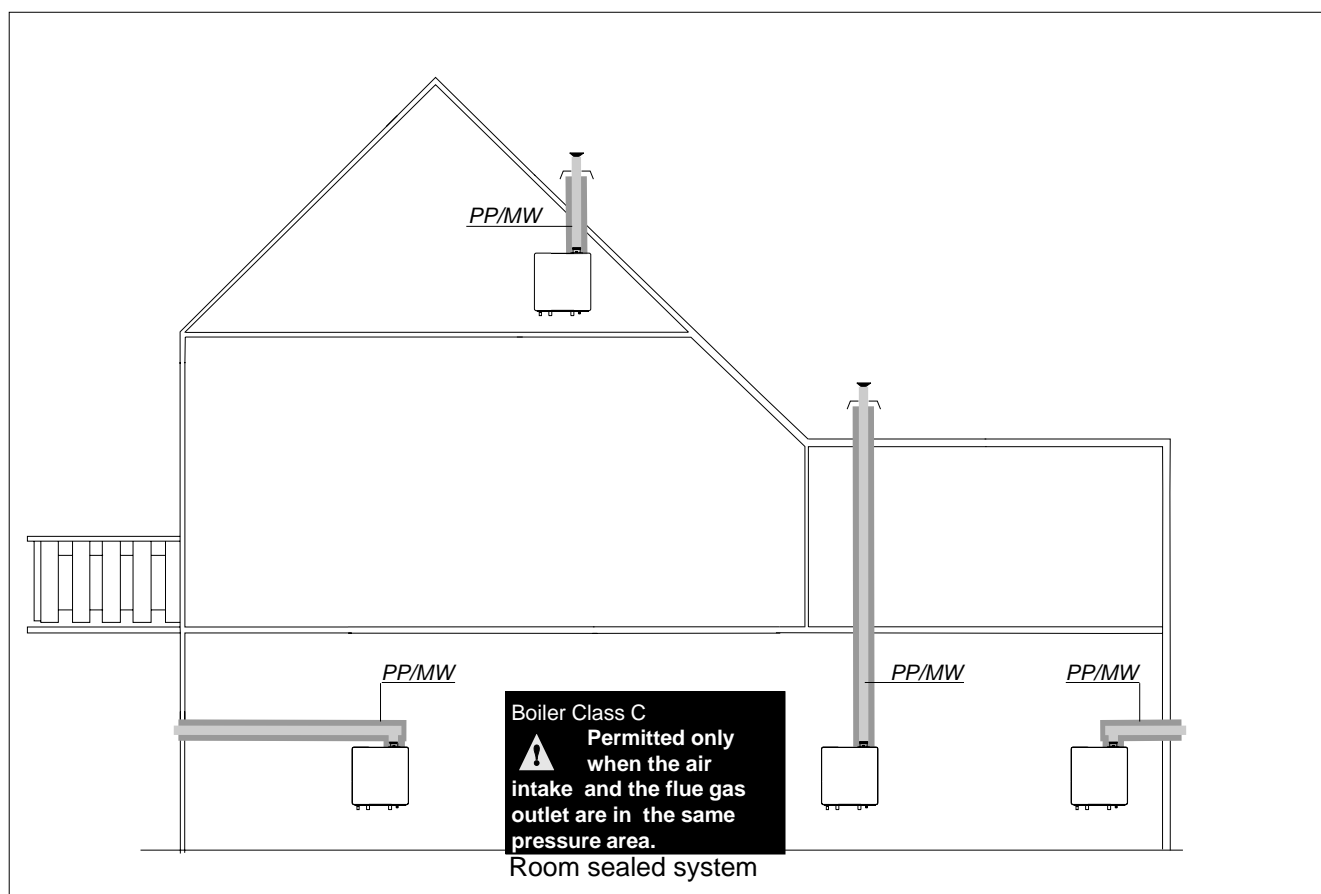
The flue gas exhaust system and air supply system must comply with:

United Kingdom:

The flue gas outlet and air supply installation must comply with the current regulation requirements. IGE UP 10 and BS 715.

Ireland:

- Irish standard is 813 section 9.10.1



Examples of room sealed systems

figure 4

The appliance concentric connection diameter is 80/125mm, to which the flue gas outlet and air supply system can be fitted, with or without elbow pieces. The maximum permissible pipe length is set out in Table 5.



We suggest you design a simple flue gas system and air supply system. For further information about the available components of the flue gas and air supply system we recommend you consult the Rinnai Flue system literature.

The Rinnai flue gas system is meant and designed solely for the use on Rinnai central heating boilers adjusted to Nat gas or LPG. The maximum flue gas temperatures are below 70°C (full load 80/60°C)

The operation can be influenced by changes or adjustments to the set up.

Possible warranty claims will not be honoured if incorrect changes result in non compliance with the installation manual or local rules and regulations in force.

The flue gas systems described in this document are solely suited for Rinnai central heating boilers of the Rinnai boiler range. For this purpose the CE Certificate has been supplemented under the Gastec nr: 0063BR3405, 0063BQ3021, 0063AS3538 and 0063AU3110.

The flue gas system should be built up using only Rinnai flue products. Combinations with other brands or systems are not permitted.

The terminal should be located where dispersal of combustion products is not impeded and with due regard for the damage or discolouration that might occur to parts of the building in the vicinity (see fig 5).

In certain weather conditions condensation may also accumulate on the outside of the air inlet pipe. Such conditions must be considered and where necessary insulation of the inlet pipe may be required.

In cold and/or humid weather water vapour may condense on leaving the flue terminal. The effect of such 'plumeing' must be considered.

The terminal must not be located in a place where it is likely to cause a nuisance. For protection of combustibles, refer to IS 813 section 9.10.1. where the terminal is less than 2m (6.6ft) above a pavement or platform to which people have access (including) any balcony or flat roof. The terminal must be protected by a guard of durable material. A suitable guard is available from Rinnai.



Where a terminal is fitted below a window which is hinged at the top, and where the hinge axis is horizontal, and the window opens outwards, the terminal shall be 1m below the bottom of the window opening.

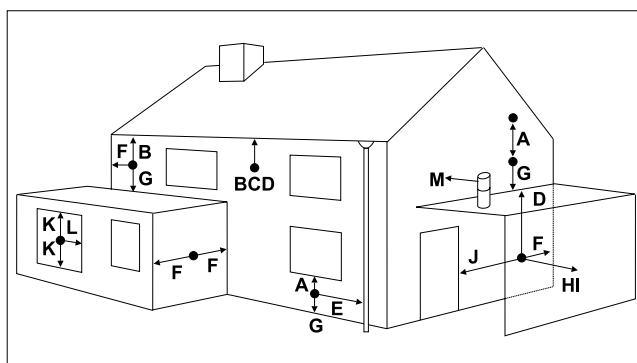


figure 5

terminal position for fan assisted boiler		minimum distance
A	directly below an open window or other opening (e.g. air brick)	mm 300
B	below gutters, soil pipes or drain pipes	mm 75
C	below eaves	mm 200
D	below balconies or car port roof	mm 200
E	from vertical drain pipes and soil pipes	mm 75
F	from internal or external corners	mm 300
G	above ground or below balcony level	mm 300
H	from a surface facing a terminal	mm 600
I	from a terminal facing a terminal	mm 1200
J	from an opening in the car port (e.g. door window) into dwelling	mm 1200
K	vertically from a terminal on the same wall	mm 1500
L	horizontally from a terminal on the same wall	mm 300
M	horizontally from a vertical terminal to a wall	mm 300

Dimensions

table 5



If the boiler is to be located under stairs, a smoke alarm meeting the requirements of I.S. 409 or equivalent must be fitted.



The flue must be terminated in a place not likely to cause a nuisance.

For horizontal sections, the outlet system should always be fitted on an incline (50 mm/m) sloping down towards the appliance so that no condensation water is able to accumulate in the outlet system. The chances of icicles forming on the roof outlet is minimised by causing the condensation water to run back towards the appliance. In the case of horizontal outlets the inlet system should be fitted on an incline sloping down towards the outside to prevent rainwater from coming in.

The appliance produces a white wisp of condensation (plumeing). This wisp of condensation is harmless, but can be unattractive, particularly in the case of outlets in outside walls.

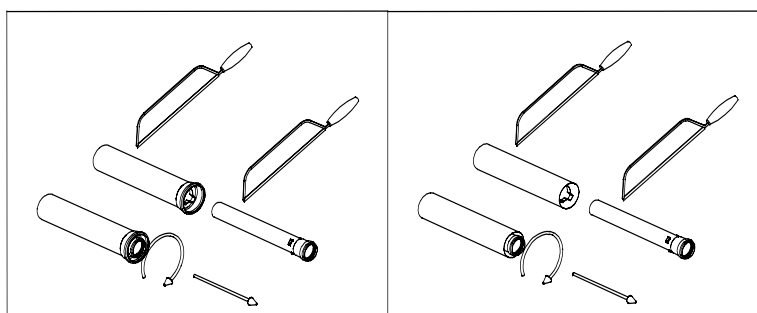
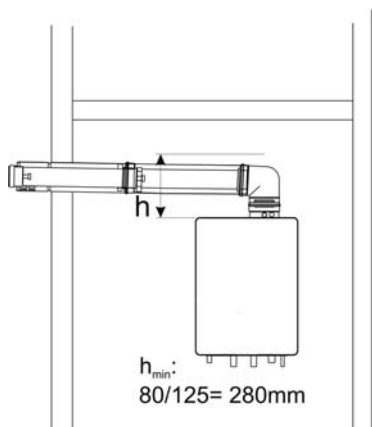
The flue gas duct for 80/125 are push fit connections, see figure 6.

Cutting the pipe goes as follows:

- Take out the inner tube by turning it until it releases from its security position;
- Cut just as much from the air intake part as from the flue gas part;
- Take off the burrs from the cutting edge to prevent cutting the seals;
- Click the pipes back together again.

Use special grease to simplify the fitting

When mounting the flue gas system, pay attention to the flow direction. An arrow on the product points this out. It is not permitted to mount a system upside down and will lead to complaints.



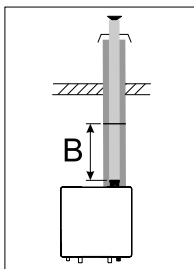
Dismantlement and shorten pipes

figure 6

6.6.1 Dimensioning of the flue gas and air intake duct

Example:

A 32kW with a concentric flue gas system ø80/125mm has according to the table a maximum flue straight length of 24m. In the system that is going to be put in there are 2 x 87° bends, so the maximum flue gas length is $24 - (2 \times -2.3) = 19.4$ meters.



The flue diameter is determined by the total length of the run, including for the connection pipe, elbows fittings and terminal covers etc.

Look at table 1 for the maximum flue length and the impact of the length reduction by using bends.

Explanation table 6:

Concentric flue gas system: maximum noted length = distance between boiler and roof terminal B

When using bends the noted value behind every bend should be deducted from the maximum straight length.

Concentric flue system		
	ø80/125mm	B in m
E32S	Maximum straight length 80/125	24
	87° bend resistance length	-2,8
	45° bend resistance length	-1,1

Dimensions flue gas system and air supply system

Table 6

7 External hot water supply

The separate Rinnai Infinity water heater has to be mounted according the instructions supplied with the mounting bracket together with the E boiler. Each appliance must be served via its own gas isolation valve and flue system.

8 Electrical connection

The appliance complies with the CE Machinery Directive 89/392/EEC. The EC Low Voltage Directive 72/23/EEC and the EC EMC Directive 89/336/EEC.

A 230V -50Hz mains electrical supply is required fused externally at 5A.

The installation must continue to comply with:

United Kingdom:

- the national rules for electrical installations.

Ireland:

- the ECTI national rules for electrical installations

The boiler electrical supply must be installed to the latest I.E.E. regulations. If the unit is hard wired (moulded plug removed) it must be provided with a fused (5A) local isolator with a contact separation of 3mm minimum on all poles for servicing. Observe polarity and ensure that wiring is correctly restrained.

The following general stipulations also apply:

- No changes may be made to the internal wiring of the appliance;
- All connections should be designed in accordance with the enclosed regulations.;
- Should it be necessary to change it, the mains power supply cable may only be replaced with an Rinnai mains power supply cable (item No. S4477300).





The Rinnai room thermostat and controls (Open Therm) must be connected to their allocated connections. All other types or makes of room thermostats or controls which are used must have a Volt free contact.

When using an on/off thermostat or control, it is possible that an anticipating resistance must be installed in order to prevent too high temperature fluctuations. As a standard rule this means mercury thermostats. This resistance wire can be ordered by your supplier and must be connected to clamps 23 and 27. The anticipating resistance in the room thermostat has to be set at 0.11 A.

For more detailed questions regarding the components which are not supplied, contact Rinnai.

If the Rinnai water heater and boiler operating together would exceed the capacity of the gas meter it is possible to control the system with a Domestic Hot Water flow switch. This switch, when installed in the cold water flow to the Rinnai water heater and wired to break the DHW flow switch electrical connection, will prevent the boiler from operating when the water heater is operating. This will ensure that only one appliance can operate at once and the capacity of the gas meter will not be exceeded.

Connection terminal E-Series

230 V~ Power Supply			230 V~ External Pump			230 V~			230 V~			8G.35.24.00	n.a.							Outside sensor		Open Therm		Room therm. On / Off		External safety contact		24 V~ 100 mA		
	N	L		N	L		N	L		N	L		12	13	14	15	16	17	18	19	A	B	20	21	22	23	24	25	26	27
1	2	3	4	5	6	7	8	9		10	11																			
Mains power supply			230 Volts for external control			230 Volts										Outside sensor		Open Therm room thermostat		On/off thermostat or control (Volt free)		Domestic Hot Water Flow Switch		24 Volts maximum 100 mA						

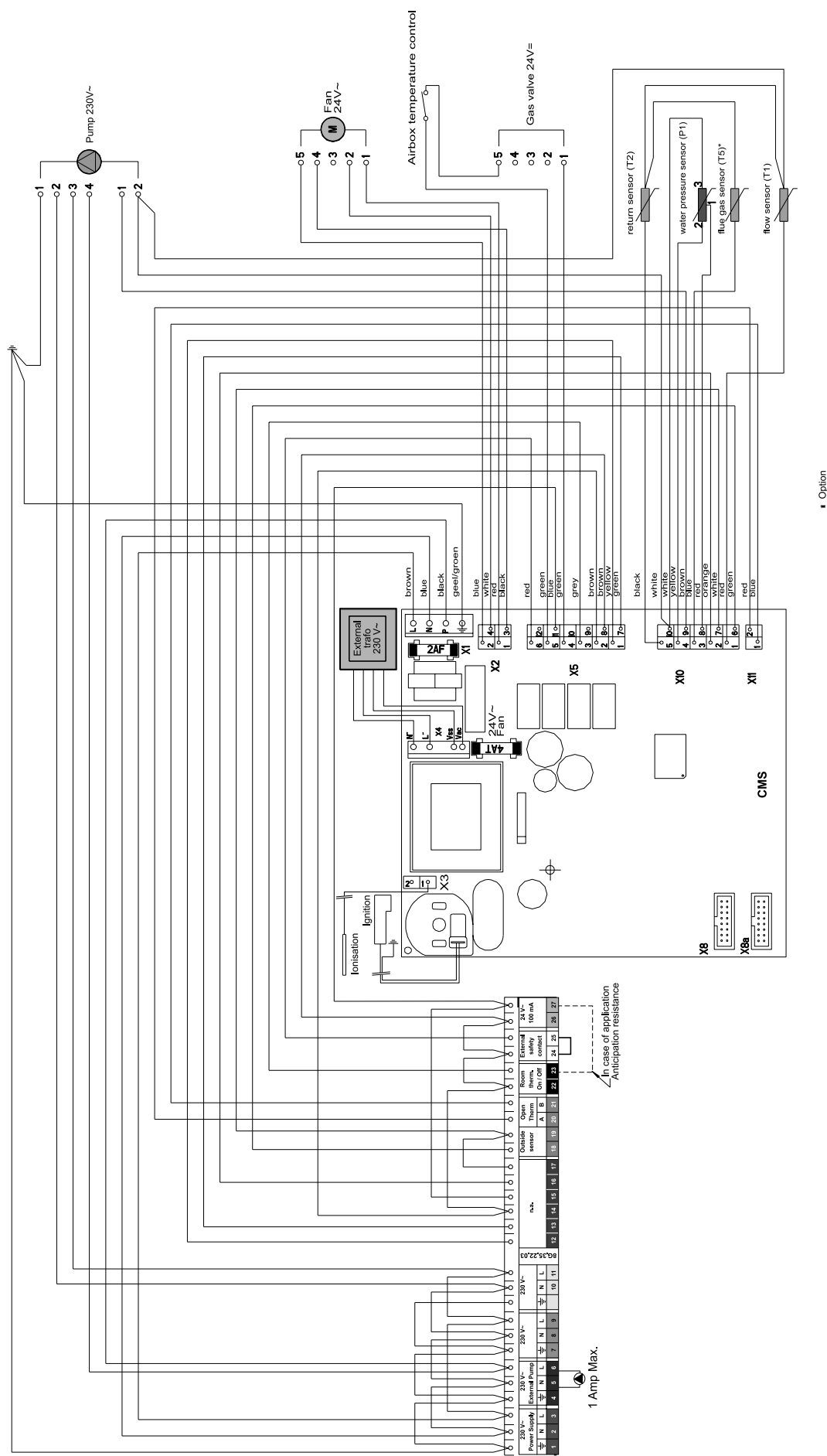


figure 8	electrical diagram
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8.1 Outside sensor



The outside sensor is supplied separately.

Mounting Location

The outside sensor should be mounted on the most exposed and coldest side of the building (north or north-east) at a height of min. 2 m above ground.

When mounting the sensor mind external heat sources (heated chimneys, warm hot air from air shafts, installation on black surfaces, thermal bridges in the wall, etc.) which could falsify the measuring value. The cable outlet must always be directed downwards in order to avoid the penetration of moisture. The outside sensor may not be mounted close to transmitting or receiving equipment (on garage walls close to receivers for radio-controlled garage door openers, amateur radio antennas, radio controlled alert systems or close to large scale radio transmission equipment).

Electrical connection

For the electrical installation preferably use a 2-strand cable with a minimum cross-section of 0,75mm². The connection is made at the 2 screw terminals inside the sensor case and may be interchanged. Connect the outside sensor to terminal 18 and 19 on the terminal block in the boiler (see figure 7 and 8).

Mounting instructions

1. Route the sensor cable to the mounting location
2. Loosen lid screws from sensor case and remove top
3. Mount sensor base with enclosed central fastening screw. Use sealing ring! The cable outlet must be directed downwards!
4. Insert the sensor cable so that the cable jacket is fully enclosed by the sealing lip.
5. Establish the electrical connection. The terminals may be interchanged.
6. Place the lid and screw it firmly onto the base. Ensure correct fit of sealing ring.

Temp °C	NTC 12K (12kΩ/25°C) flow sensor T1 return sensor T2 DHW sensor T3 outside sensor T4 flue gas sensor T5
------------	--

-20	98.000
-18	90.000
-16	82.000
-14	74.000
-12	66.000
-10	58.000
-8	53.500
-6	49.000
-4	45.000
-2	40.500
0	36.000
2	33.500
4	30.900
6	28.200
8	25.600
10	23.000
12	21.400
14	19.900
16	18.100
18	16.600
20	15.000
22	14.000
24	12.900
26	11.900
28	10.850
30	9.800
32	9.100
34	8.500
36	7.900
38	7.200
40	6.500
45	5.600
50	4.600
55	4.000
60	3.400
70	2.300
80	1.700
90	1.300
100	950

Resistance values of outside sensor depending on temperature.

NTC resistance table

Table 7

9 Boiler controls

The boiler is provided with a fully automatic microprocessor control, called CMS Control Management System. This system simplifies operation by undertaking all major control functions. Initially when power to the boiler is switched on it will remain on standby. There is no indication LED on, until one of the programme keys is pressed. The control panel display will show the relevant state. When the installation is empty the display will show FILL.

The various parameters can be called up in two ways:

The Good-state or standard read out

The first way shows a simple display read out.

The boiler in operation will always show 'Good'. When a message is necessary this will be shown instead of Good.

Technical read out

The second way is a technical read out. In normal situations the following will be shown:

- on the left the status in which the boiler is active;
- on the right the flow temperature;
- the water pressure in the installation.

When a message (error or blocking code) is necessary this will be shown instead of the technical read out..



To switch over from the Good-state to the Technical read out (and vice versa):
- Press the STEP-key for 5 sec.

When the system has been filled the automatic venting program starts, when a program has been selected, by pressing the key for Central Heating or pump program (▢▢▢▢▢ or ❄). The program takes 17 minutes and stops automatically. After this the boiler will function normally. (See also 'Filling and venting the boiler and installation').

During this 17 minute program, the boiler will not operate for Central Heating. The display will show A and the boilers current flow temperature.

On a call for heating the control system will select the required water control temperature. This water temperature is called the T-set value. On a call for central heating the boiler ignites first at low output. The output is then changed slowly to match the load required. The boiler operates in this way to avoid excessive installation noises and temperature overshoot.

9.1 Explanation of the function keys



- Central Heating program key.
Switching the Central Heating on or off (LED on/off);



- DHW key: Not applicable.



- PC program key.
adjusts the pump to continuous water circulation in the central heating system (LED on), or according to the pump overrun times on the relevant programs (LED off);

When the pump is switched on continuously it can lead to undesired heating up of the central heating system during the summer.

- **Mode-key.**
*After briefly pressing, a selection of the data chapters can be retrieved.
After pressing for 5 seconds it is possible to enter the code as described in chapter 11.3;*
- **Step-key.**
*After briefly pressing, the water pressure can be retrieved and pages per chapter can be retrieved.
After pressing for 5 seconds it switches from the Good-state to technical read out and vice versa;*
- **Reset-key.**
After briefly pressing, for:
 - unlocking errors;
 - ending the access code;*After pressing for 5 seconds an operating stop is made, for example, for activating the automatic venting program.*




Some keys have other functions. These functions are only active when according to the procedure described in chapter 11.3, adjustment has to be changed or data must be retrieved from the CMS.

The other functions are:

- Central Heating program key : **+** function;
- DHW key: - function;
- PC program key : store-function, which means that by means of this key a modified setting is confirmed;
- Step-key: scrolling in a data chapter.

10 Filling and venting the boiler and installation

The central heating installation needs to be filled with potable water. For filling or topping up the installation use the filling loop according to the following procedure:

- 1 Switch on the power supply;
- 2 The display will show FILL;
- 3 All functions off (heating, DHW and pump);
- 4 Push briefly the 'STEP'-button: P x.x = water pressure in bar;
- 5 Open the filling loop (Indication on display increases);
- 6 Fill up slowly to 1.5 to 1.7 bar;
- 7 STOP appears on the display;
- 8 Close the filling loop;
- 9 De-aerate the complete installation, start at the lowest point;
- 10 Check the water pressure and if necessary top it up;
- 11 Close the filling loop;
- 12 Activate the functions in use (heating , DHW  and/or pump );
- 13 If A xx appears on the display, wait for 17 minutes;
- 14 Check the water pressure and if necessary top it up to 1,5 to 1,7 bar
- 15 Close the filling loop;
- 16 Press the 'STEP'-button;
- 17 Be sure that the filling loop is closed.
- 18 After the automatic de-aeration program (A xx) is finished the boiler will return to the Good state or Technical read out.

Check the water pressure regularly and top up the installation when necessary. The working pressure of the installation should be between 1.5 and 1.7 bar when the installation is cold.




It can take a while before all air has disappeared from a filled installation. Especially in the first week noises may be heard which indicate the presence of air. The automatic air vent in the boiler will make this air disappear, which means the water pressure can reduce during this period and therefore topping up with water will have to be done.

11 Commissioning the boiler

Before the boiler is fired, ensure that the boiler and the system are well vented and free of air. Purge the gas line between the gas meter and the boiler and carry out a gas soundness test as specified in the current Gas Safety, Installation & Use Regulations. The boiler does not require adjustment of the burner pressure and air quantity because it is self adjusting and is factory set at the correct value.

11.1 Central Heating system

Provided there is a heat requirement from the thermostat or control, the central heating program will be put into operation by means of the  key (central heating program). The circulation pump will start circulating and the boiler will start the burner.

11.2 Adjustments

When the boiler is installed it is in principal ready for use. All adjustments of the boiler control are already pre-programmed for a heating system with radiators/convectors with a flow temperature of 85°C. The adjustments are described in the Parameter chapter on page 26.

In certain cases adjustment have to be altered in case of :

- Lower flow temperature

Read through the Parameter chapter to adjust the boiler to its installation.
Contact Rinnai Heating in case of doubt.

Please follow next procedure to alter adjustments:

Altering adjustments

STEP 1 Press the Mode-key for 5 secondss.

The display shows COdE followed by an arbitrary number;

STEP 2 Press by means of the + or the - key until the code C123 is shown;

STEP 3 Press the STORE-key to confirm the code (code blinks 1 x).

Now you have acces to the installer level. There are 4 chapters:

- PARA Parameters
- I NFO Information chapter (no adjustments possible)
- SERV Service chapter
- ERRO Error-chapter (no adjustments possible)

The content of the chapters is described on the following pages.

STEP 4 Press briefly the MODE-key to select one of the 4 chapters, i.e. PARA;

STEP 5 Press once or more briefly on the STEP-key to select a Parameter
(parameter visible on the left, value on the right) ;

STEP 6 Alter the value, if necessary/possible, by means of the + or the - key

STEP 7 Press briefly on the STORE-key to confirm the alteration.
When you have to change more values, repeat from step 5.

STEP 8 Press once or more on the MODE-key until StBY or Good is shown:
After a few seconds the text StBY will be replaced by the technical read-out or Good-state (Depending from the position the access code is keyed in)

When you want to return from an arbitrary position to the original read out press once or more on the MODE-key until StBY is shown.



If for 20 minutes no single key is used the display will return automatically to its original read-out (Good state or technical read out)

Parameter chapter			
PARA	Factory	Description	Range
1	85°C	maximum flow temperature CH	20 - 90°C
2	01	type of CH installation: <i>radiators; air heating; convectors:</i> <i>T max. flow 85°C; K factor heating line 2.3; gradient 5°C/min; gear differential 6°C</i>	01
		<i>radiators with large surface areas or underfloor heating as additional heating:</i> <i>T max. flow 70°C; K factor heating line 1.8; gradient 5°C/min; gear differential 5°C</i>	02
		<i>under floor heating with radiators as additional heating:</i> <i>T max. flow 60°C; K factor heating line 1.5; gradient 4°C/min; gear differential 4°C</i>	03
		<i>full under floor heating:</i> <i>T max. flow 50°C; K factor heating line 1.0; gradient 3°C/min; gear differential 3°C</i>	04
3	max.	maximum power CH in kW	min-max
4	00	control principal with on / off thermostat: 100 % on / off thermostat 100 % on / off weather dependant	00 01
5	2.3	heating line K-factor (see also heating line graph)	0.2 - 3.5
6	1.4	heating line exponent (see also heating line graph)	1.1 - 1.4
7	-10	heating line climate zone (see also heating line graph)	-20 - 0
10	0°C	fine adjustment heating line day temperature	-5 until 5°C
11	0°C	fine adjustment heating line night temperature	-5 until 5°C
14	7	gradient speed	0 - 15
15	0	booster after night reduction: no yes	00 01
23	-3°C	frost safety temperature	-20 until 10°C
31	63°C	switch-off temperature of additional cylinder with E boiler	40 - 80°C
36	0	type of three-way valve VC 2010 / VC 8010 / VC 8610 VC 6940 modulating	00 01
43	max.	maximum power DHW in kW	min-max
45	0	Not applicable	00 - 01
89	00	address setting interface: Spare ATAG Bus thermostat (BrainQ, Smart) boiler 1 - 8 in cascade	-01 00 00 - 07

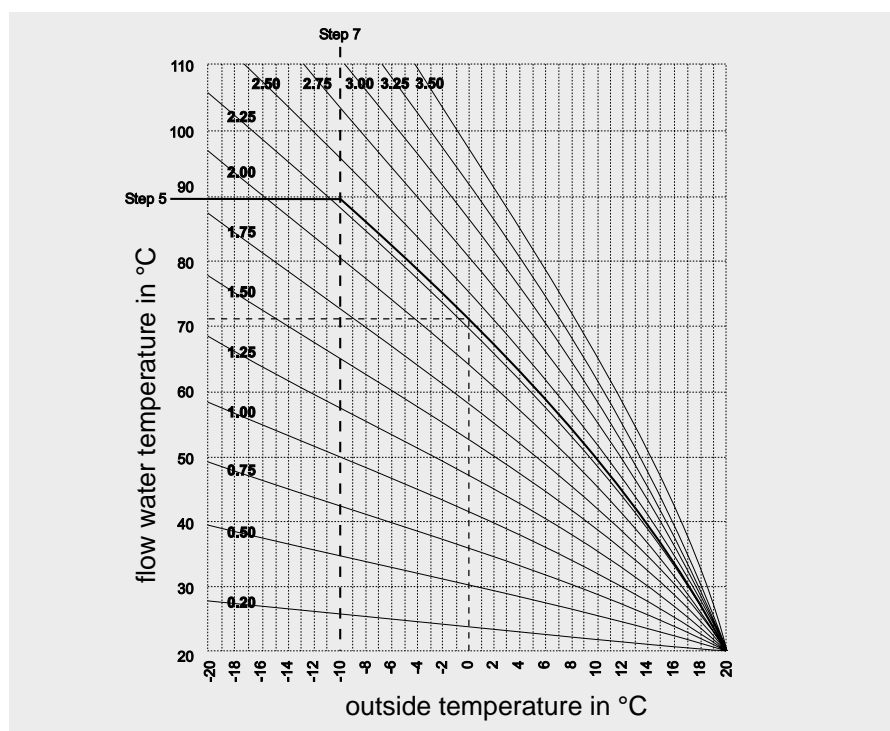
Information chapter		
INFO	Value	Description
1	°C	flow water temperature T1
4	°C	return water temperature T2
5	°C	DHW temperature T3
7	°C	outside temperature T4
8	°C	flue gas temperature T5
16	%	actual power in %
17	kW	actual power in kW
18	kW	actual load in kW
20		indication bus communication
21	GJ	consumption total in GJ (.. x 33 = .. m3)
22	GJ	consumption CH in GJ (.. x 33 = .. m3)
23	GJ	consumption DHW in GJ (.. x 33 = .. m3)
24	hour	total number of burner run hours
25	hour	number of burner run hours CH
26	hour	number of burner run hours DHW
32	hour	total number of hours counter
37	hour	total number of run hours pump CH and DHW
46	hour	within how many hours is service required

Service chapter			
SERV	Value	Description	Range
1	OFF	boiler in operation with burner function on	OFF - max.
2	OFF	fan adjustable and burner off	OFF - max.
3	OFF	pump adjustable with burner on	OFF - max.
4	OFF	showroom position ON = active and OFF = non active	ON - OFF

Error chapter			
ERRO	Value	Description	
Err.L - Err.5		Last saved error until 5 last predecesing errors	
1		error code	
2		operation status boiler	
3	°C	flow water temperature T1	
4	°C	return water temperature T2	
5	kW	load	
6	%	pump capacity	

Parameter-, Info-, Service- and Error-chapters

Table 8



heating line adjustments Parameter Step 6 and 7

graph 2



11.3 Activating factory settings (green key function)

To activate the factory settings again please follow the next procedure (Note: all altered adjustments will be set back):

- Select, when necessary, the technical read out;
- Select with the MODE-key chapter PARA;
- Press the STORE-key.

The word "Copy" will appear and the factory settings are active again.

12 Isolating the boiler

In some situations it may be that the entire boiler must be switched off. By switching off the three keys with the lamps for central heating and pump program ( or ), the boiler is switched off. Leave the 230V mains supply switched on so as the circulation pump is activated once every 24 hours in order to prevent jamming.



In the event of frost danger it is advisable to drain the boiler and/or the installation.

13 Commissioning



Work on the boiler must be carried out by a competent person, (Ref: Gas Safety, Installation & Use Regulations) using correctly calibrated instruments with current test certification.

To commission the boiler the casing has to be removed.

Remove the lower part of the casing which covers the expansion vessel (if present) forward. The casing is fixed by 4 quick release clamps and 5 screws (4x 1 clamp and 1 behind door). After removing the screws, unlock the clamps, now the casing can be removed forward.

The boiler settings, such as burner pressure and adjustment of the air quantity are unnecessary, due to the fact that the boiler operates with a so-called zero pressure control. This means the correct gas quantity is controlled by the suction operation of the fan. The fine adjustment which is carried out at the factory is one off, which means that adjusting of these values is unnecessary. Only when replacing the gas valve, venturi and/or the fan, does the zero pressure and the incorrect CO₂ adjustment have to be checked and, if necessary, adjusted to the correct value.



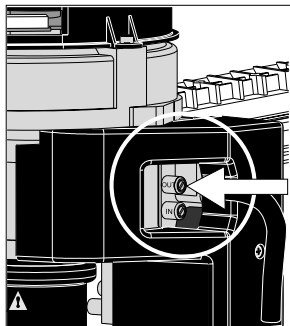
Always check the installation of all parts through which gas flows (using leak detection spray)

13.1 Checking for contamination

In order to be able to check the boiler for contamination in the following running years it is advisable to measure the maximum air displacement in the boiler when putting the boiler into operation. This value can be different with each type of boiler.

In order to be able to measure this value follow the next procedure:

- Press the Central Heating and DHW buttons once to ensure that the boiler is OFF and not firing.
- Press the MODE-key for 5 seconds.
- The display will show COdE followed by an arbitrary number;
- Select by means of the + or the - key the code C123;
- Press the Store-key to confirm the code (code blinks 1 x);
- Press the MODE-key until SERV is shown;
- Press the STEP-key until 2 is shown;
alternately 2 and OFF will be shown.
- Undo the upper measuring nipple on the gas valve open (fig. 9);
- Connect the hose of the digital pressure gauge to the upper measuring nipple of the gas valve
- Press the + key until the maximum value is achieved;
The fan will function to its maximum revolutions (burner stays off)
- Measure the under pressure and write down this value.
At the next commissioning visit this value may drop 20% of its original value on the moment of intallation. When this value is dropped more than 20% the boiler needs maintainance.
- Press the - key until OFF is shown (keep key pressed)
With this the procedure is finished.



Check point contamination
figure 9

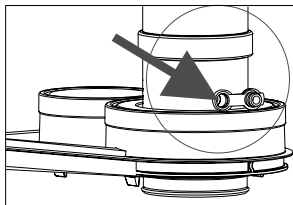
13.2 Checking the CO₂



The CO₂ percentage is factory-set. This has to be checked at commissioning, maintenance and faults.

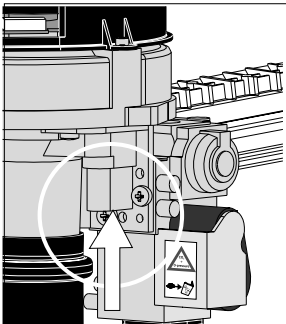
This can be checked by means of the following procedure:

- Remove the black cover of the gas valve by unscrewing the sealed screw.
- Put the boiler into operation and take care that it can deliver its heat;
- Press the MODE-key for 5 seconds.
- The display will show COdE followed by an arbitrary number;
- Select by means of the + or the - key the code C123;
- Press the Store-key to confirm the code (code blinks 1 x);
- Press the MODE-key until SERV is shown;
- Press the STEP-key once until 1 is shown;
alternately 1 and OFF will be shown.
- Calibrate the CO₂ meter ;
- Place the lance of the CO₂ meter into the check point (see fig. 10);
- Press the + key until the maximum value (in kW) is achieved;
The boiler will burn on full load (value on display in kW)
- Check Table 8 for the correct CO₂ percentage (page 33)
- Let the CO₂ meter do its measuring procedure.
- Adjust, if necessary, the adjustment screw to correct the CO₂ value (see fig. 11).



checkpoint CO₂

figure 10



adjustment screw CO₂
figure 11

Ending the CO₂ measuring procedure:

- Press the - key until OFF is shown (keep key pressed).
With this the procedure has ended..
- Replace the black cover on the gas valve and fix it with the screw.

14 Maintenance

Maintenance or changes to the boiler may only be carried out by an authorised technician.

14.1 The frequency of maintenance

We advise that an inspection is carried out every year with an overhaul every three years. When doing this the circumstances of the boiler's location must be taken into account. From this one can determine whether to deviate from this advice.

Please contact Rinnai for further guidance on the frequency and service requirements.

14.2 Maintenance activities

To carry out the maintenance activities please follow the next procedure:

- switch off the power supply;
- remove the four screws out of the quick release fasteners;
- remove the screw behind the door on the front of the casing;
- remove the casing towards the front.

The air box

- the casing is also the airbox
- clean the casing with a cloth with a simple (non-abrasive) cleaning agent;

The fan unit and burner cassette

- remove the electrical connection plug from the gas valve and fan motor;
- loosen the nut of the gas pipe under the gas valve;
- replace the gasket with a new one;
- loosen the front cross head screw of the black plastic silencer;
- after this turn the two clamping rods $\frac{1}{4}$ turn and remove them by pulling them forward. Note the right turning direction (red indicator);
- slightly lift the fan unit and remove it towards the front of the heat exchanger;
- remove the burner cassette out of the fan unit;
- check the burner cassette for wear, pollution and possible cracks. Clean the burner cassette with a soft brush and vacuum cleaner. If burners are cracked replace the complete burner cassette;
- replace the gaskets between burner and fan unit and the gasket between fan unit and heat exchanger;
- check the venturi and the gas-air distribution plate for pollution and clean this part, if necessary with a soft brush and vacuum cleaner. If the air box contains a lot of dirt it is plausible that the fan itself is dirty as well. To clean this, the fan has to be removed from the hood and the venturi. Clean the fan with a soft brush and a vacuum cleaner. Replace the gasket and ensure that all gaskets of the fan parts are mounted correctly.

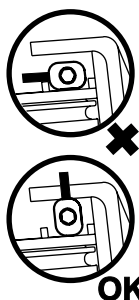
Heat exchanger

- check the heat exchanger for contamination. Clean this if necessary with a soft brush and a vacuum cleaner. Prevent dirt falling down into the heat exchanger.

Flushing the heat exchanger from the top down is not permitted

Refitting of the components is done in reverse order.

Make sure that during refitting the clamping rods they are put in the right position. They should be turned vertical.



Ignition electrode

The replacement of the electrode is only necessary when the electrode is worn off. This can be checked by measuring the ionisation current. The minimum ionisation current has to be higher than 4µA on full load.

If the viewing glass is damaged the complete electrode must be replaced.

Replacement goes as follows:

- remove the electrical connections of the electrode;
- press the clips on both sides of the electrode to both sides and remove the complete electrode;
- remove and replace the gasket;

Refitting of the components is done in reverse order.

Siphon and condensate tray

- first remove the condensate cup;
Check this for pollution. If there is no sign of strong pollution it is not necessary to clean the condensate tray. If there is a strong pollution in the cup it is necessary to remove and clean the condensate tray;
- check the O-rings of the cup as well as those from the pipe and replace if necessary;
- clean both part by flushing it with clean water;
- grease the O-rings again with acid free O-ring grease to make fitting easier;
- if there is a leak at the siphon cup or tray the complete siphon unit has to be replaced by S4421200;
- remove the plug from the flue gas sensor if present;
- turn the two short clamping rods ¼ turn and remove them by pulling them forward; Note the right turning direction (red indicator);
- lift the flue gas pipe out of the condensate tray;
- press the condensate tray carefully downwards and remove it by pulling it forward;
- replace the gasket between condensate tray and heat exchanger with a new one;
- clean the condensate tray with water and a hard brush;
- check the condensate tray for leaks.

Refitting is done in reverse order.

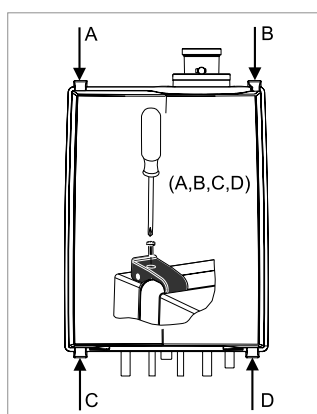
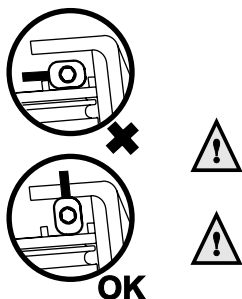
Note that the gasket of the condensate tray seals completely.

Make sure that during refitting of the clamping rods they are put in the right position. They should be turned vertically.

Always replace all removed gaskets of dismantled parts during the maintenance activities.

Put the boiler into operation and check the CO₂ (see page 30).

Replace the secure screws A, B, C, D and E in the quick-release fasteners after the maintenance activities.



Securing casing

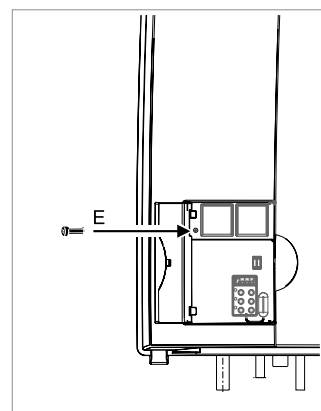


figure 12

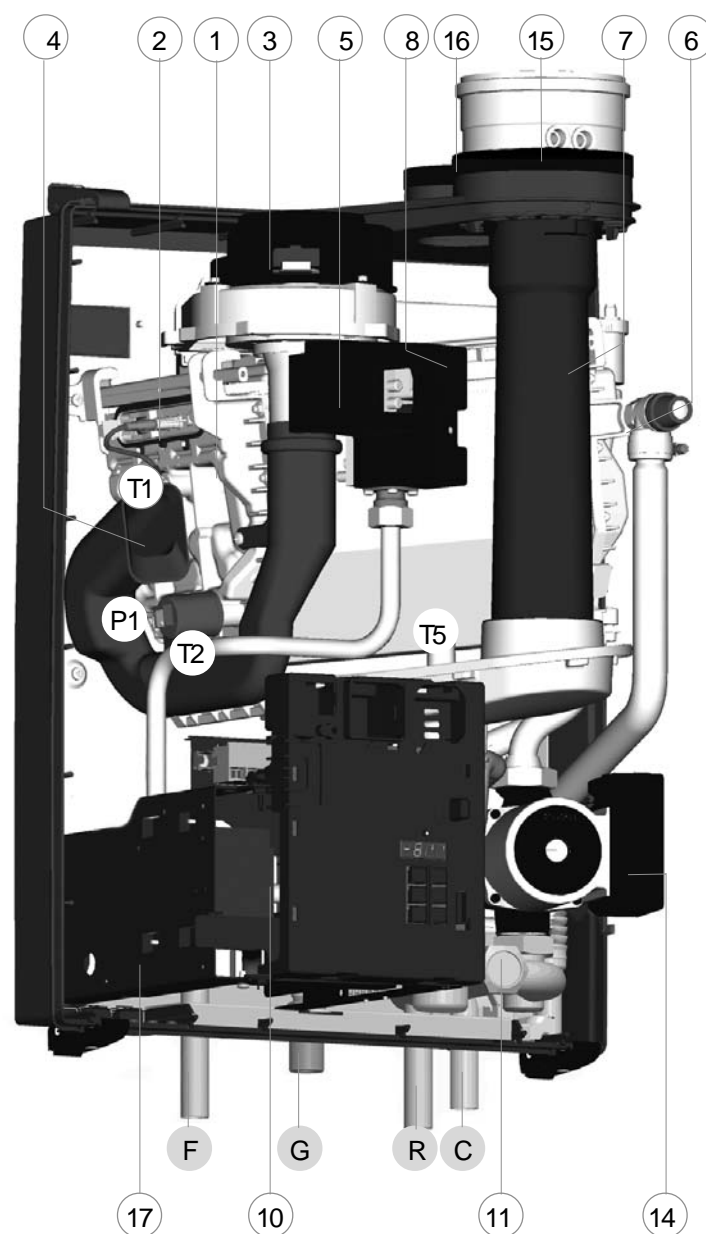
14.3 Warranty

For warranty conditions we refer to the warranty card supplied with the boiler.

15 Technical specifications

Boiler type		E32S
Input Hs CH	kW	32
Q _n Output Hi CH	kW	28.8
Efficiency class according BED		★★★★
Efficiency according EN677 (36/30°C part load. Hi)	%	109.9
Efficiency according EN677 (80/60°C full load. Hi)	%	97.9
Modulation range CH (capacity 80/60°C)	kW	6.1 - 28.2
Modulation range CH (capacity 50/30°C)	kW	6.8 - 30.6
Nox class EN483		5
CO ₂	%	9
Temperature class for PP flue		T100
Appliance type		C13 C43 C53 C63 C83
Flue gas temp. CH (80/60°C on full load)	°C	68
Flue gas temp. CH (50/30°C on low load)	°C	31
Categories		II2L3P
Gas consumption G20 CH (DHW) (at 1013 mbar/15°C)	m ³ /h	3.05
Electr. power consumption max.	W	145
Electr. power consumption stand by	W	10
Current	V/Hz	230/50
Fuse rating	A	5
Degree of protection acc. EN 60529		IPX4D
Weight (empty)	kg	40
Width	mm	500
Height	mm	870
Depth	mm	395
Water content CH	l	5
After run time pump CH	min	19
After run time pump DHW	min	
P _{MS} Water pressure min./max.	bar	1/3
Flow temperature max.	°C	85
Pump type		UP20-60
Available pump height CH	kPa	17
CE product identification number(PIN)		0063BR3409

16 Parts of the boiler



Boiler parts

figure 13

- 1 heat exchanger
- 2 ignition unit
- 3 fan unit
- 4 air inlet damper
- 5 gas valve
- 6 safety valve
- 7 automatic air vent

- 8 ceramic burner cassette
- 10 operating panel
- 11 Control Tower (CMS)
- 12 water filter return CH
- 14 circulation pump
- 15 flue gas duct
- 16 combustion air supply

- 17 type plate

- T1 flow sensor
- T2 return sensor
- T5 flue gas sensor (option)

- P1 water pressure sensor

- G gas pipe
- F flow connection central heating
- R return connection central heating
- C condensate pipe

17 Error indication

A detected error is indicated on the display by means of a blocking or error messages. A distinction should be made between these two messages due to the fact that blocking can be of a temporary nature, however, error messages are fixed lockings. The control will try its utmost to prevent locking and will temporarily switch off the boiler by blocking it. Below is a list of some of the messages.

Blocks **bL** with a number in the last 2 positions.

bL60	Block 60: Incorrect parameter setting of the minimum or maximum power.
bL67	Block 67: A ΔT has been detected between flow and return sensor whereas the burner is not in operation. After the ΔT has disappeared the block will disappear.
bL80	Block 80: Maximum flue gas temperature has been exceeded (if present). The block will not be cancelled until the flue gas temperature has lowered to a correct figure.
bL81	Block 81: The flue gas sensor is not connected although it was connected to the control. The burner is blocked until the flue gas sensor is reconnected.
bL82	Block 82: The flue gas sensor has short-circuited, heat requirement blocked and pump capacity at minimum.
bL85	Block 85: The control has not detected a water flow. The venting cycle is started. If during this cycle water flow is detected, the venting cycle is ended and the burner is released.
bL86	Block 86: The frequency of the power supply deviates more than 2.5Hz (<47.5Hz, >52.5Hz)

Error **E** with a number in the last two positions.

E 00	Error 00: Poor flame-forming
E 01	Error 01: short-circuit of 24 volt circuit
E 02	Error 02: no flame-forming
E 04	Error 04: the control unit has detected an error
E 05	Error 05: fault control unit
E 12	Error 12: fuse 24 volt/3AT faulty
E 19	Error 19: fault control
E 28	Error 28: number of revolutions not reported back from fan

18 CE Declaration of conformity

CE DECLARATION OF CONFORMITY

Hereby declares ATAG Verwarming Nederland BV that,

the condensing boiler types: Rinnai

E32S

are in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:

<u>Directive</u>		<u>Used standards</u>
Gas Appliance Directive	90/396/EEC	EN483: 1999 EN50165: 1997
Efficiency Directive	92/42/EEC	EN677: 1998
Low Voltage Directive	73/23/EEC	EN50165: 1997 EN60335-1: 1994
EMC Directive	89/336/EEC	EN61000-3-2: 2000 EN61000-3-3: 1995 EN61000-6-1: 2001 EN61000-6-3: 2001

Report numbers

	GAD	ED	LVD	EMC D
ATAG E	177405	177405	177405	06C00165

and that the products are in conformity with EC type-examination certificate number E0430, as stated by KIWA-Gastec Certification BV, Apeldoorn, The Netherlands.

Date : 1 April 2007

Signature :



Full name : C. Berlo
CEO

ATAG
Verwarming

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UK APPROVAL
Certificate Number: 0401702

Date Issued: 31st March 2006
Date Expired: 22nd January 2009

**Description: ATAG E Range of wall mounted
combination condensing boilers**

Product Designation: ATAG E Range 18-32Kw

This is to certify that the above range of products manufactured / supplied by

ATAG Verwarming Nederland BV

has been tested and found to comply with the requirements of the Water Supply (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.

This certificate must be read in conjunction with the acceptance letter for this product.

This approval is intended for compliance with the above Regulations and must not be considered equivalent to the product certification provided by Kiwa N.V

To comply with the Regulations and Byelaws all products require the correct installation. Details of the installation requirements (IRN's) can be obtained from the acceptance letter supplied with this certificate.
Applicable IRN's for this certificate – R001, R140, R360

Authorised Signature
Kiwa Quality Services Ltd

Kiwa Quality Services Ltd
The Innovation Centre
Victoria Park
Festival Drive
Ebbw Vale
Gwent
NP23 8XA
UNITED KINGDOM
Tel: 0044 (0) 1495 356795
Fax: 0044 (0) 1495 350020
E-mail: info@kiwa.co.uk
Web: www.kiwa.co.uk

Certificate Issued To –
ATAG Verwarming Nederland BV
Galileistraat 27
7131 PE
Lichtenvoorde
The Netherlands

Tel: 0031 544 391 777
Fax: 0031 544 391 703



kiwa
approved
product



UK WATER SUPPLY
REGULATIONS

Ditributor for UK

Rinnai UK Limited • 9 Christleton Court • Manor Park • Runcorn Cheshire WA7 1ST
Phone: 01928 531 870 • Fax 01928 531 880 • E-mail: info@rinnaiuk.com • Internet: www.rinnaiuk.com

E. & O. E.

This renewed publication cancels all previous installation instructions. The company reserves the right to change the specifications and dimensions without prior notice.