

UK

ENSURE THAT THESE INSTRUCTIONS ARE LEFT FOR  
THE USER



# MURELLE HE 110 R

## Installation and servicing instructions



Please read the Important Notice within  
this guide regarding your boiler warranty



## **IMPORTANT NOTICE**

For the first year all of our appliances are protected by our manufacturer's guarantee which covers both parts and labour.

As you would expect from Sime Ltd, it is our aim to provide our valued customers with the best in after sales and service.

To take advantage of any extended warranty offered, all you have to do is to adhere to these 3 simple conditions:

- The installation must be carried out to Manufacturers standards by a Gas Safe Registered Engineer, and recorded in the installation manual.
- The appliance must be registered with both Sime Ltd and Gas Safe within 30 days of installation.
- The appliance must be serviced annually, by either Sime Ltd or a Gas Safe registered engineer- ensuring that the service record in the installation manual is completed.

Failure to comply with the above will result in only the 12 month warranty being offered.

In the absence of any proof of purchase, the 12 month warranty period will commence from the date of manufacture of the boiler as shown on the appliance data plate.

## **SAFE HANDLING**

This boiler may require 2 or more operatives to move it into its installation site, remove it from its packaging and during movement into its installation location. Manoeuvring the boiler may include the use of a sack truck and involve lifting pushing and pulling.

Caution should be exercised during these operations.

Operatives should be knowledgeable in handling techniques when performing these tasks and the following precautions should be considered:

- Grip the boiler at the base
- Be physically capable
- Use personal protective equipment as appropriate e.g. gloves, safety footwear.

During all manoeuvres and handling actions, every attempt should be made to ensure the following unless unavoidable and/or the weight is light.

- Keep back straight
- Avoid twisting at the waist
- Always grip with the palm of the hand
- Keep load as close to the body as possible
- Always use assistance

### **WARNING**

Caution should be exercised when performing any work on this appliance.

Protective gloves and safety glasses are recommended.

- Avoid direct contact with sharp edges.
- Avoid contact with any hot surfaces.

### **NOTICE**

Please be aware that due to the wet testing of the appliance, there may be some residual water in the hydraulic circuit.

- Protect any surfaces, carpets or floorings.
- Use a suitable container to catch any water that escapes when removing the protective caps from the connections.



Murelle HE 110 R: Gas Council number 41-283-28

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## IMPORTANT INFORMATION

IT IS A STATUTORY REQUIREMENT THAT ALL GAS APPLIANCES ARE INSTALLED BY COMPETENT PERSONS, IN ACCORDANCE WITH THE GAS SAFETY (INSTALLATION AND USE) REGULATIONS (CURRENT EDITION). THE MANUFACTURER'S INSTRUCTIONS MUST NOT BE TAKEN AS OVERRIDING ANY STATUTORY REQUIREMENTS, AND FAILURE TO COMPLY WITH THESE REGULATIONS MAY LEAD TO PROSECUTION.

NO MODIFICATIONS TO THE APPLIANCE SHOULD BE MADE UNLESS THEY ARE FULLY APPROVED BY THE MANUFACTURER.

GAS LEAKS: DO NOT OPERATE ANY ELECTRICAL SWITCH, OR USE A NAKED FLAME. TURN OFF THE GAS SUPPLY AND VENTILATE THE AREA BY OPENING DOORS AND WINDOWS CONTACT THE GAS EMERGENCY SERVICE ON 0800111999.

Please refer to commissioning instructions for filling in the checklist at the back of this installation guide.

Note: All Gas Safe registered installers carry a ID Card.

You can check your installer is Gas Safe Registered by calling 0800 408 5577

## IMPORTANT

When carrying out commissioning of the boiler, you are highly recommended to perform the following checks:

- Make sure that there are no liquids or inflammable materials in the immediate vicinity of the boiler.
- Make sure that the electrical connections have been made correctly and that the earth wire is connected to a good earthing system.
- Open the gas valve and check the soundness of the connections, including that of the burner.
- Make sure that the boiler is set for operation for the type of gas supplied.
- Check that the flue pipe for the outlet of the products of the combustion is unobstructed and has been properly installed.
- Make sure that any shutoff valves are open.
- Make sure that the system is charged with water and is thoroughly vented.
- Check that the circulating pump is not jammed.
- Purge the system, bleeding off the air present in the gas pipe by operating the pressure relief valve on the gas valve inlet.
- Complete the checklist included in this manual.

# 1 DESCRIPTION OF THE BOILER

## 1.1 INTRODUCTION

**MURELLE HE 110 R** boilers are pre-mixed condensation heating modules intended only for heating, with high power modulation field (from 20% to 100%

of the power). They are designed for single installation and modular systems with multiple generators connected in sequence/cascade independent of each other. All modules are compliant with Europe-

an Directives 2009/142/CE, 2004/108/CE, 2006/95/CE and 92/42/CE.

For optimum installation and operation, always follow the instructions provided in this manual.

## 1.2 DIMENSIONS

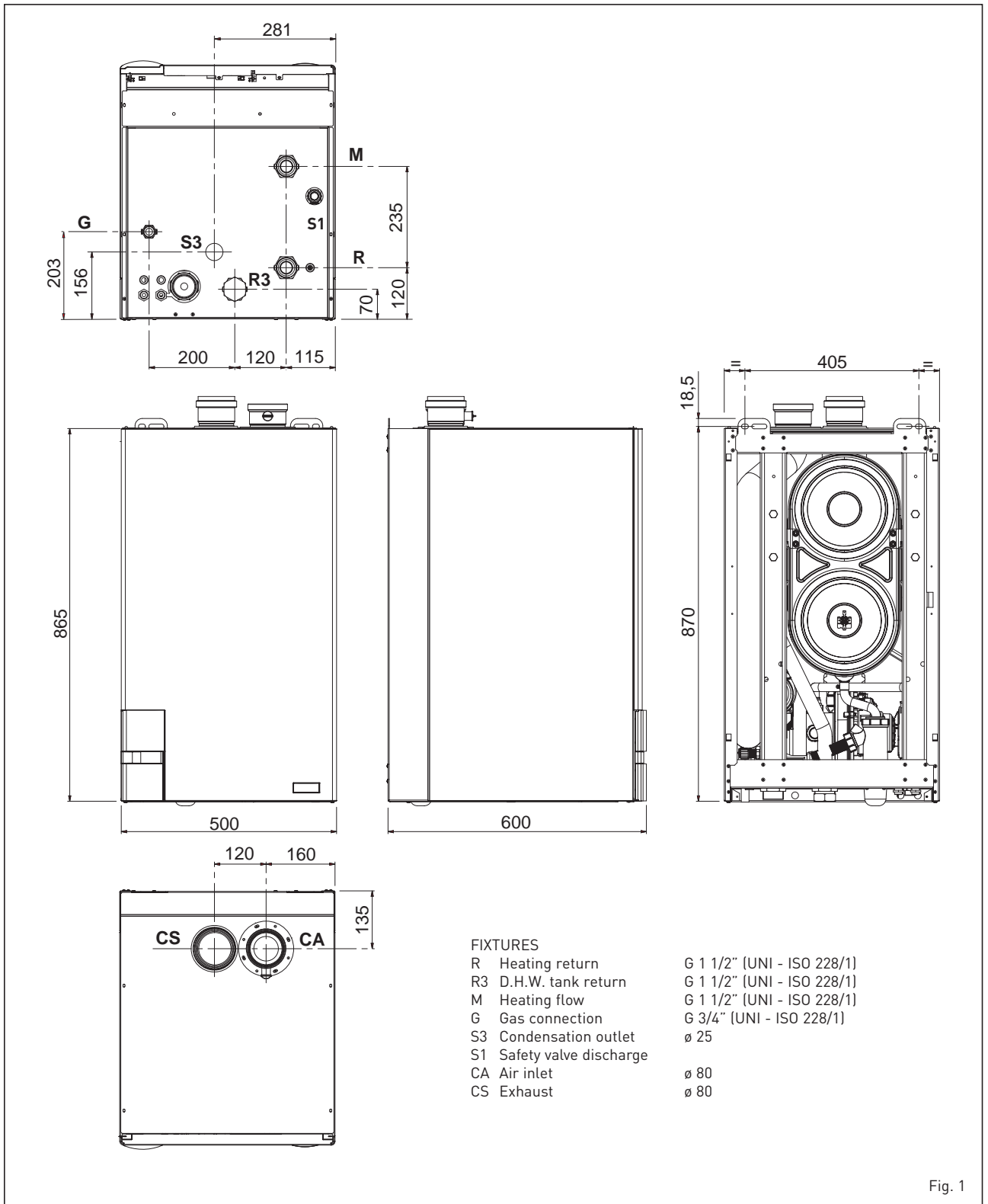
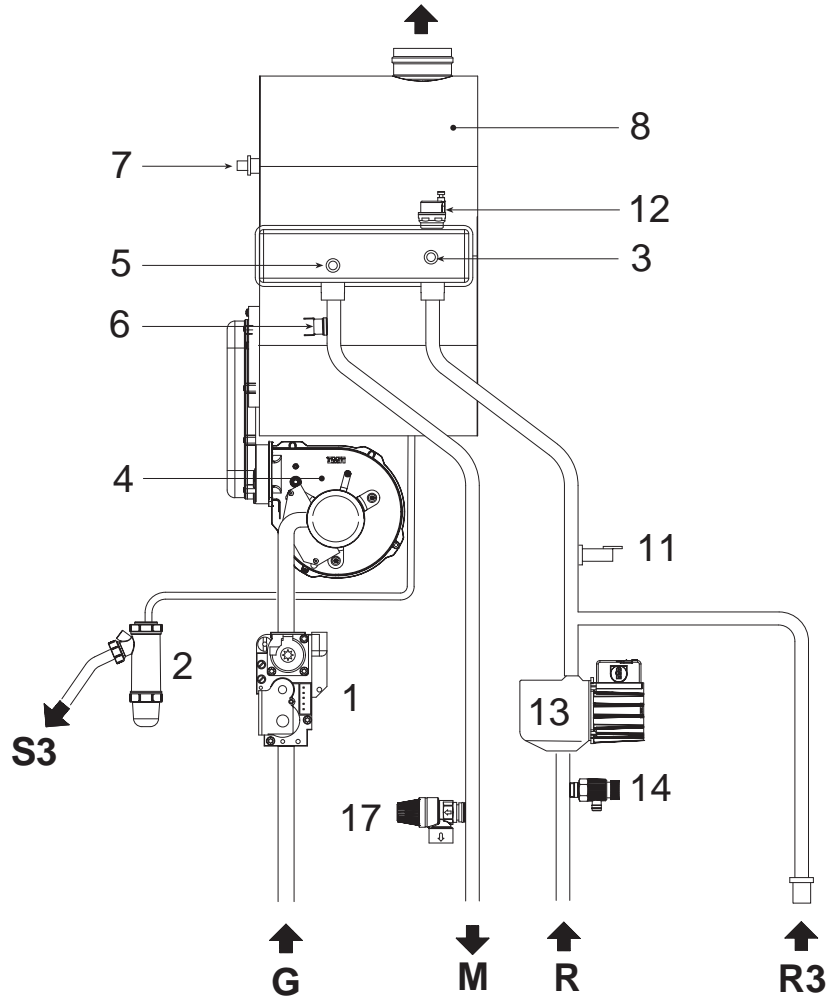


Fig. 1

### 1.3 TECHNICAL FEATURES

<b>MURELLE HE 110 R</b>		
<b>Heat output</b>		
Nominal (80-60°C)	kW	105,6
Nominal (50-30°C)	kW	114,6
Reduced (80-60°C)	kW	21,1
Reduced (50-30°C)	kW	23,6
<b>Heat input nominal</b>	kW	108,0
<b>Heat input reduced</b>	kW	21,6
<b>Max/min useful yield (80-60°C)</b>	%	97.7/97.8
<b>Max/min useful yield (50-30°C)</b>	%	109.1/106.1
<b>Thermal efficiency (CEE 92/42 directive)</b>		★★★★
<b>Losses after shutdown to 50°C (EN 483)</b>	W	126
<b>Supply voltage</b>	V-Hz	230-50
<b>Adsorbed power consumption</b>	W	309
<b>Electrical protection grade</b>	IP	X4D
<b>C.H. setting range</b>	°C	20/80
<b>Water content boiler</b>	l	8.2
<b>Maximum water head</b>	bar	5
<b>Maximum temperature</b>	°C	85
<b>Capacity of the heating expansion vessel</b>	l	--
<b>Pressure of the heating expansion vessel</b>	bar	--
<b>D.H.W. setting range</b>	°C	--
<b>D.H.W. flow rate (EN 625)</b>	l/min	--
<b>Continuous D.H.W. flow rate Δt 30°C</b>	l/min	--
<b>Minimum D.H.W. flow rate</b>	l/min	--
<b>D.H.W. pressure min/max</b>	bar	--
<b>D.H.W. pressure min. nom. power</b>	bar	--
<b>Exhaust fumes temperature at max flow rate (80-60°C)</b>	°C	86.2
<b>Exhaust fumes temperature at min. flow rate (80-60°C)</b>	°C	74.6
<b>Exhaust fumes temperature at max flow rate (50-30°C)</b>	°C	61.6
<b>Exhaust fumes temperature at min. flow rate (50-30°C)</b>	°C	49.2
<b>Smokes flow min/max</b>	kg/h	37/186
<b>CO<sub>2</sub> at max/min flow rate G20</b>	%	9.0/9.0
<b>CO<sub>2</sub> at max/min flow rate G31</b>	%	10.2/10.2
<b>CE certification</b>	n°	1312CM5614
<b>Category</b>		II2H3P
<b>Type</b>		B23-53/B23P-53P/C13-33-43-53-83
<b>NO<sub>x</sub> emission class</b>		5 (< 30 mg/kWh)
<b>Weight when empty</b>	kg	87
<b>Main burner nozzle</b>		
Quantity nozzles	n°	1
G20 nozzle diameter	∅	12.4
G31 nozzle diameter	∅	8.2
<b>Consumption at maximum/minimum flow rate</b>		
Maximum G20	m <sup>3</sup> /h	11.42
Minimum G20	m <sup>3</sup> /h	2.28
Maximum G31	kg/h	8.38
Minimum G31	kg/h	1.68
<b>Gas supply pressure</b>		
G20	mbar	20
G31	mbar	37

1.4 FUNCTIONAL DIAGRAM



KEY

- 1 Gas valve
- 2 Condensation drain trap
- 3 Return heating probe (SR)
- 4 Fan
- 5 Flow heating sensor (SM)
- 6 Safety thermostat 95°C
- 7 Exhaust sensor (SF)
- 8 Primary heat exchanger
- 11 Water pressure transducer
- 12 Auto air vent

13 Pump

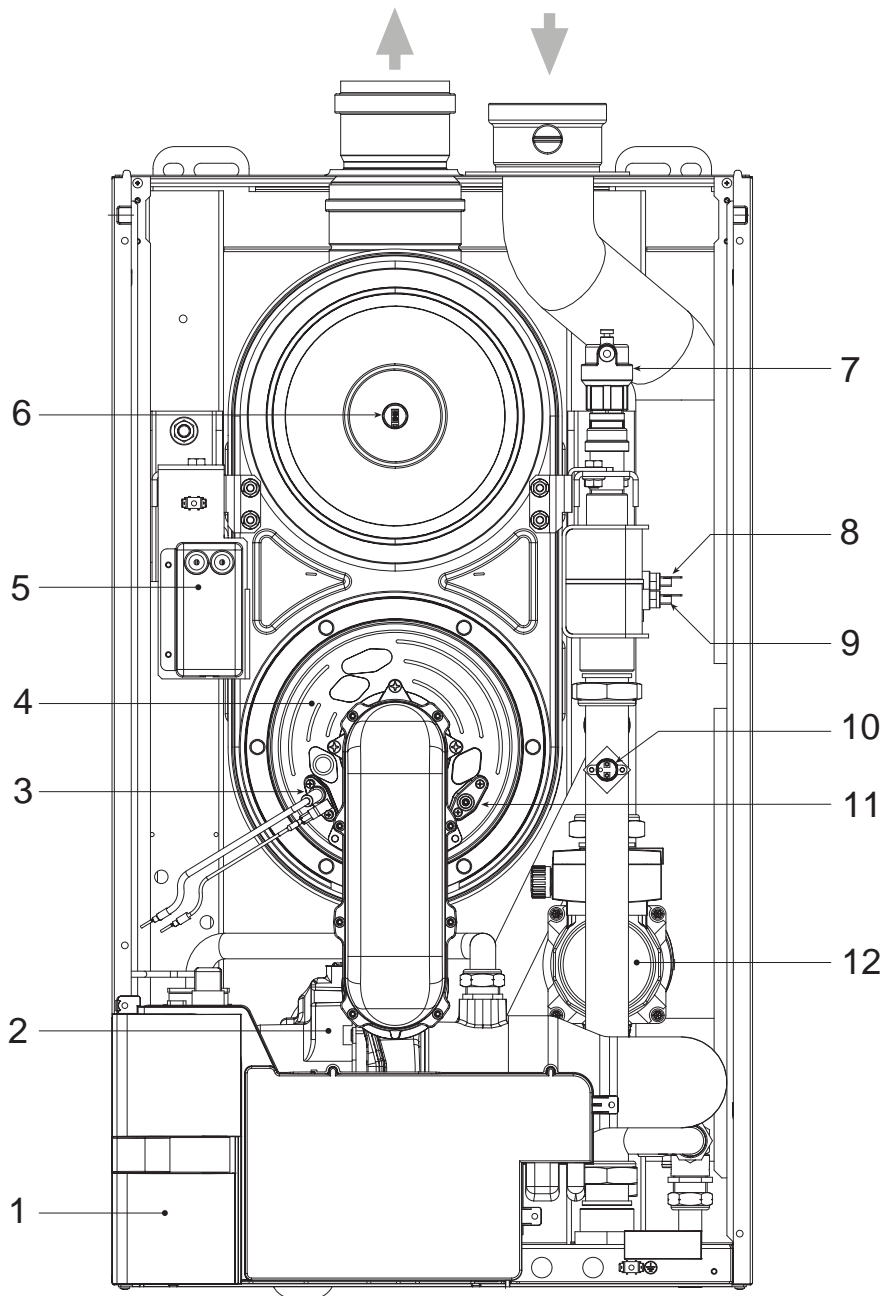
- 14 Drain vent
- 17 5 BAR safety valve

CONNECTIONS

- R Heating return
- M Heating flow
- G Gas connection
- S3 Condensation outlet
- R3 Tank return

Fig. 2

1.5 MAIN COMPONENTS



KEY

- 1 Control panel
- 2 Fan
- 3 Ignition electrode
- 4 Primary heat exchanger
- 5 Ignition transformer
- 6 Exhaust sensor (SF)
- 7 Auto Air Vent
- 8 Return heating probe (SR)
- 9 Flow heating probe (SM)
- 10 Safety thermostat 95°C
- 11 Ionisation electrode
- 12 Pump

Fig. 3

## 2 INSTALLATION

The boiler must be installed in a fixed location, by qualified engineers in compliance with all instructions contained in this manual.

Furthermore, the installation must be in accordance with current standards and regulations.

### 2.1 VENTILATION

**"MURELLE HE 110 HE" boilers** can be installed in boiler rooms whose size and requirements meet current regulations.

#### VENTILATION

The following is provided for your guidance only, and assumes the ventilation air is taken directly from outside. The sizes of the vents may need to be increased in respect of other appliances installed in the same area, and seasonal use. Take care that the position of low level vents would not be subject to adverse weather conditions, ie flooding.

Ventilation requirements for Murelle HE 110 R boilers and cascade systems. BS6644 has a requirement that the temperatures in a room or compartment do not exceed certain levels:-

- 25°C at floor level (0-100mm)
- 32°C at mid level (1.5M above the floor level)
- 40°C at ceiling level (0-100mm from ceiling)

**When installed as a class B appliance (open flued, not roomed sealed).**

#### Installed in a room

High level (within 15% of the room height from ceiling) - 2cm<sup>2</sup>/KW of net heat input  
 Low level (low as possible within 1 metre from floor natural gas, 250mm LPG) - 4cm<sup>2</sup>/KW of net heat input

A single Murelle HE 110 R (108 KW net input) boiler would require 240cm<sup>2</sup> at high level and 480cm<sup>2</sup> at low level.

Installed in a compartment or enclosure  
 High level (within 15% of the room height from ceiling) - 5cm<sup>2</sup>/KW of net heat input  
 Low level (low as possible within 1 metre from floor natural gas, 250mm LPG) - 10cm<sup>2</sup>/KW of net heat input.

A single Murelle HE 110 R (108 KW net input) boiler would require 600cm<sup>2</sup> at high level and 1200cm<sup>2</sup> at low level.

**When installed as a class C appliance (room sealed).**

#### Installed in a room

High level (within 15% of the room height from ceiling) - 2cm<sup>2</sup>/KW of net heat input  
 Low level (low as possible within 1 metre from floor natural gas, 250mm LPG) - 2cm<sup>2</sup>/KW of net heat input

A single Murelle HE 110 R (108 KW net input) boiler would require 240cm<sup>2</sup> at high level and 240cm<sup>2</sup> at low level.

Installed in a compartment or enclosure  
 High level (within 15% of the room height from ceiling) - 5cm<sup>2</sup>/KW of net heat input  
 Low level (low as possible within 1 metre from floor natural gas, 250mm LPG) -

5cm<sup>2</sup>/KW of net heat input.

A single Murelle HE 110 R (108 KW net input) boiler would require 600cm<sup>2</sup> at high level and 600cm<sup>2</sup> at low level.

### 2.2 INSTALLATION

#### 2.2.1 Single boiler

The use of a hydraulic separator or plate heat exchanger is mandatory. For single boiler installations a kit 8101587 is available. See fig 4.

Section 2.5 shows the various fluing options. PAR 9 must be adjusted according to the table shown in each option.

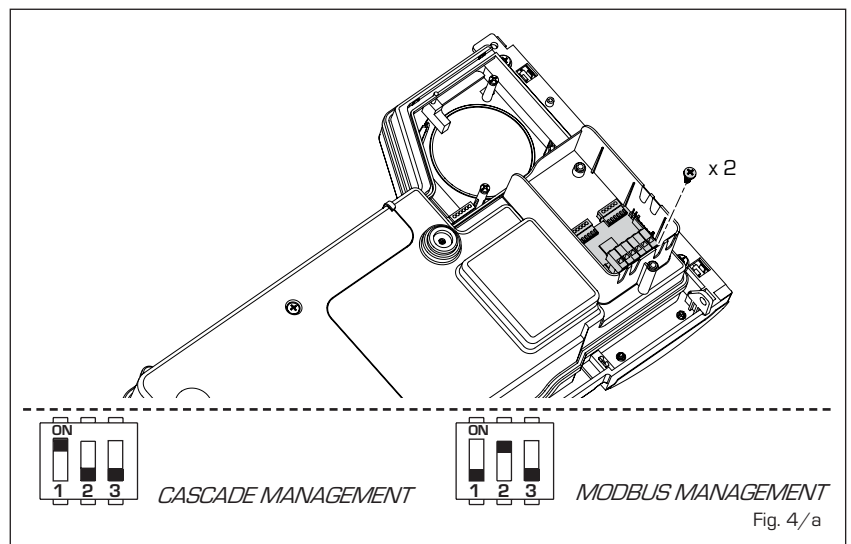
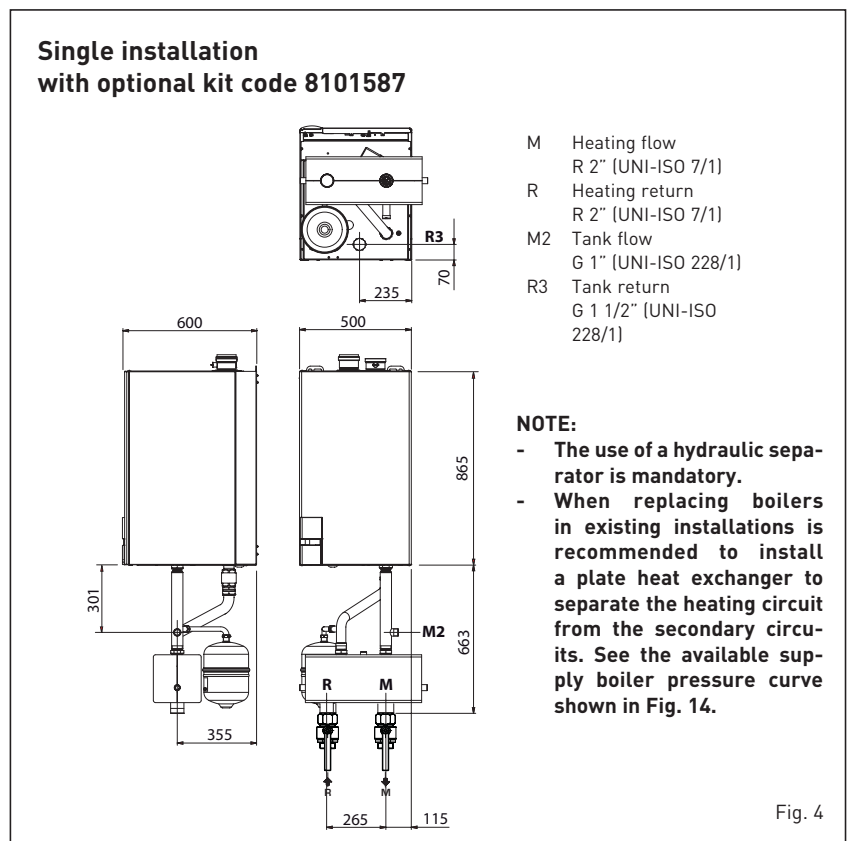
- **PAR 9** = See TABLE 1-2-3-3/a.

For **INSTALLER PARAMETERS** see 3.3 section.

#### 2.2.2 Cascade boilers (fig. 4/a)

For sequence/cascade installations using polypropylene smoke collectors with a clapet valve, every single boiler that makes up the heating system must have the following installation parameters modified

When the boiler is used in cascade, PAR 1 of each boiler in the cascade must be reset as follows:





- PAR 1 = 8 (if boiler is NATURAL GAS G20).
- PAR 1 = 16 (if the boiler is PROPANE G31)

**ATTENTION: In the event that intake pressure drops are applied to sequence/cascade installations, it is important to verify the CO2 at MAX and MIN capacity and, if necessary, bring it back to the correct value described in section 4.2.2. In sequence/cascade installations, it is mandatory to arrange the thermal system with the hydraulic separator and safety devices.**

The boiler is supplied with **RS-485 board** that allows management of up to 8 boilers in cascade mode and MODBUS communication. The board is on the back of the control panel.

Select the correct mode (CASCADE or MODBUS) positioning by positioning the DIP SWITCH, as shown as figure 4/a

#### CASCADE mode (fig. 4/b)



Electrically connect all boilers in CASCADE mode and set PAR15 accordingly (master or slave). (As shown in Fig. 4 / b).

#### CASCADE WITH MORE THAN TWO BOILERS



When more than two boilers are connected in cascade, it is essential that the OEM

parameter on the "Master" boiler is reset to coincide with the number of boilers in the cascade.



This must be done after setting PAR 15 on the designated Master boiler to "0"  
On the "Master" boiler press any key to wake up the display.

Then press simultaneously the  and the  buttons for 5 seconds until the display is as shown.



Then press again, simultaneously, the  and the  buttons for 2 seconds until the display shows.




Next press, in the order shown  





The display will be as shown.



Press the  button, and the display will show.



Use the  and  buttons to set the number of boilers in the cascade.

Then press  to confirm the settings.

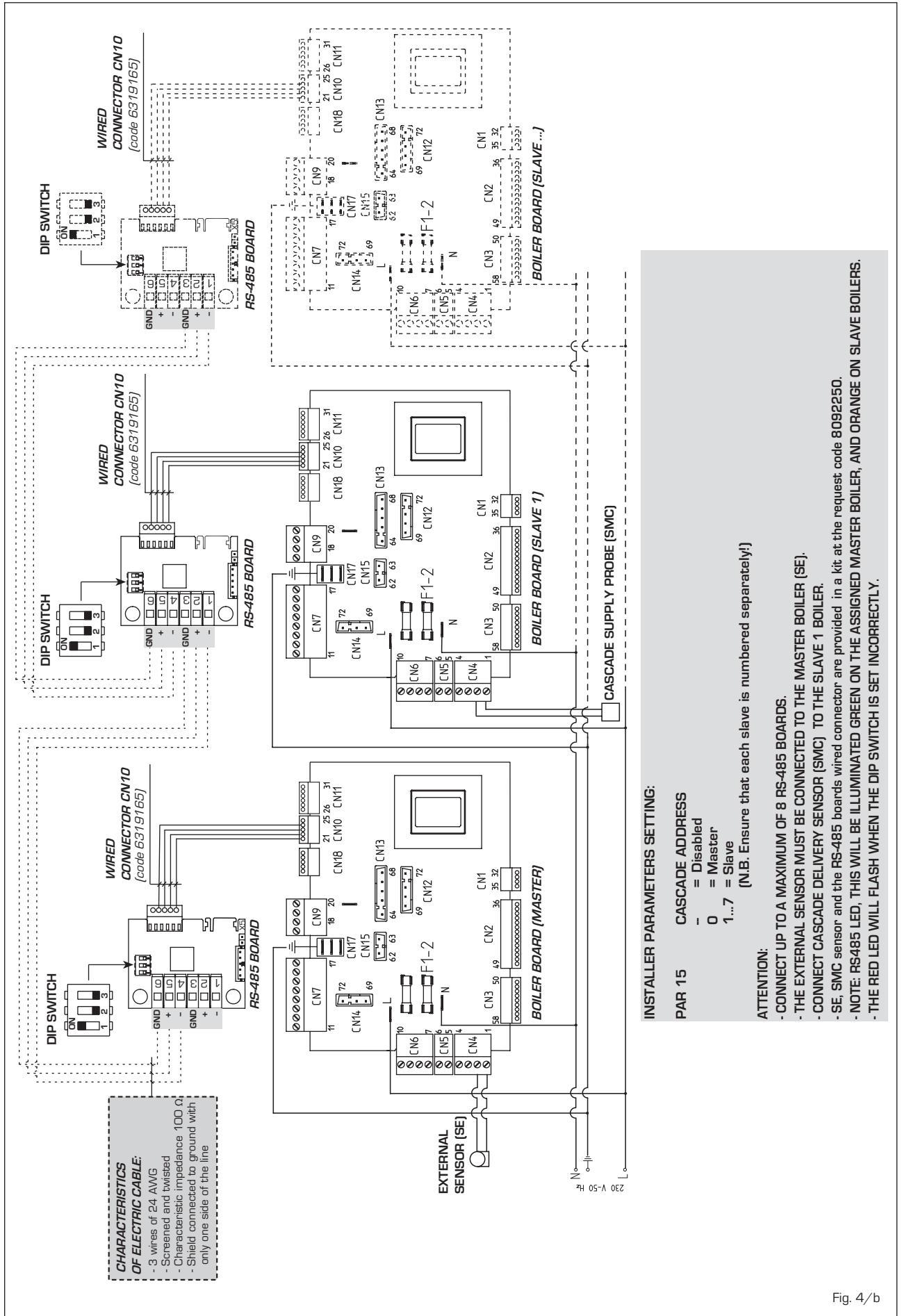


Fig. 4/b

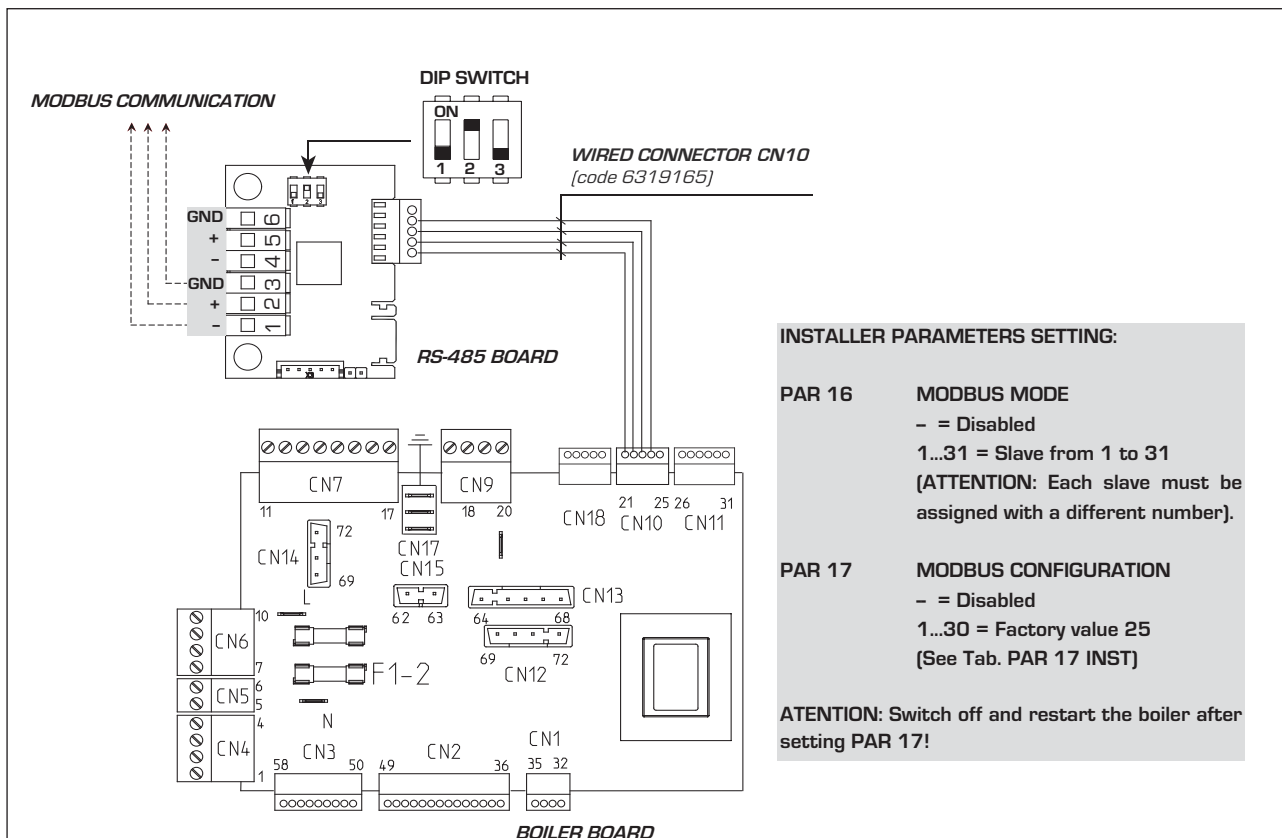
**MODBUS mode (fig. 4/c)**

RS-485 board can be used also for MODBUS communication between two boilers (MURELLE HE 110 HE R series).

Proceed as follows:

- Set the RS-485 board DIP SWITCH in MODBUS mode and set the PAR 16 as shown in figure.

- Choose the configuration of communication suitable for MODBUS network present (PAR 17 INST). (In accordance with the **Tab. PAR 17 INST**).



**Tab. PAR 17 INST**

Par 17 INST	Baud Rate	No. Data Bit	Parity	Stop Bit
1	1200	8	No	1
2	1200	8	No	2
3	1200	8	Even	1
4	1200	8	Even	2
5	1200	8	Odd	1
6	1200	8	Odd	2
7	2400	8	No	1
8	2400	8	No	2
9	2400	8	Even	1
10	2400	8	Even	2
11	2400	8	Odd	1
12	2400	8	Odd	2
13	4800	8	No	1
14	4800	8	No	2
15	4800	8	Even	1
16	4800	8	Even	2
17	4800	8	Odd	1
18	4800	8	Odd	2
19	9600	8	No	1
20	9600	8	No	2
21	9600	8	Even	1
22	9600	8	Even	2
23	9600	8	Odd	1
24	9600	8	Odd	2
25	19200	8	No	1
26	19200	8	No	2
27	19200	8	Even	1
28	19200	8	Even	2
29	19200	8	Odd	1
30	19200	8	Odd	2

Fig. 4/c

MODBUS BOILER VARIABLES LIST							
Modbus address	Variable description	Type	Read / Write	U.M.	Min value	Max value	Function
<b>Digital variables</b>							
1	Boiler CH Enable/Request	D	R/W	-	0	1	Request CH zone 1
2	Boiler DHW Enable	D	R/W	-	0	1	Enable DHW preparation
3	Boiler Water Filling Function	D	R/W	-	0	1	Not used
32	Boiler CH Mode	D	R	-	0	1	State CH zone 1
33	Boiler DHW Mode	D	R	-	0	1	State preparation DHW
34	Boiler Flame Status	D	R	-	0	1	State presence flame
35	Boiler Alarm Status	D	R	-	0	1	State presence alarm
<b>Analog variables</b>							
1	Boiler CH Primary Setpoint	A	R/W	0,1°C	20,0	80,0	Setpoint CH zone 1. If you receive a value out of range so the value isn't received and the boiler temperature control is maintained of fixed point or a temperature curve.
2	Boiler DHW Primary Setpoint	A	R/W	0,1°C	20,0	80,0	Setpoint CH during ACS preparation (for PAR 66 installer parameters) If you receive a value out of range the value isn't received and it is used the boiler value regulation .
3	Boiler DHW Setpoint	A	R/W	0,1°C	10,0	80,0	Setpoint ACS. If you receive a value out of range the value isn't received and it is used the boiler value regulation.
4	Outside Temperature MB	A	R/W	0,1°C	-55,0	95,0	External value of temperature by MobBus. If you receive a value out of range the value isn't received. In case of conflict the boiler will give priority to the value of the probe connected to it.
5	Boiler CH Curve Slope	A	R/W	0,1	3,0	40,0	Slope of heating curve of zone 1 (it is used instead of the curve set in the boiler). If you receive a value out of range the value isn't received and it is used the boiler heating curve.
6	Boiler CH Curve Displacement	A	R/W	0,1	-5,0	5,0	Shift value of room zone 1 set (it is used instead of the shift set in the boiler). If you receive a value out of range the value isn't received and it is used the boiler heating curve.
64	Boiler DHW Water Temperature	A	R	0,1°C	0,0	100,0	DHW temperature sensor
65	Boiler Primary Water Temperature	A	R	0,1°C	0,0	100,0	CH temperature sensor (Delivery)
66	Boiler Return Water Temperature	A	R	0,1°C	0,0	100,0	CH temperature sensor (Return)
67	Boiler Flue Gas Temperature	A	R	0,1°C	0,0	200,0	Smoke temperature sensor
68	Boiler Relative Modulation Level	A	R	0,1%	0,0	100,0	Modulation level: (0%= minimum boiler power 100%= maximum boiler power)
69	Boiler Primary Water Pressure	A	R	0,1 bar	0,0	6,0	Pressure value water CH
70	Boiler Outside Temperature	A	R	0,1°C	-100,0	100,0	Outside temperature read from the boiler through the probe connected to it
<b>Integer variables</b>							
129	Boiler Current Minute	I	R/W	-	0	59	Not used
130	Boiler Current Hour	I	R/W	-	0	23	Not used
131	Boiler Current Day of the Week	I	R/W	-	1 = Lun 7 = Dom		Not used
132	Boiler Current Day of the Month	I	R/W	-	1	31	Not used
133	Boiler Current Month	I	R/W	-	1	12	Not used
134	Boiler Current Year	I	R/W	-	2000	2200	Not used
192	Boiler Alarm Code	I	R	-	0	100	Numeric code shown during boiler error (If Master is in cascade)
193	Boiler Slave 1 Alarm Code	I	R	-	0	100	Numeric code shown during slave 01 error
194	Boiler Slave 2 Alarm Code	I	R	-	0	100	Numeric code shown during slave 02 error
195	Boiler Slave 3 Alarm Code	I	R	-	0	100	Numeric code shown during slave 03 error
196	Boiler Slave 4 Alarm Code	I	R	-	0	100	Numeric code shown during slave 04 error
197	Boiler Slave 5 Alarm Code	I	R	-	0	100	Numeric code shown during slave 05 error
198	Boiler Slave 6 Alarm Code	I	R	-	0	100	Numeric code shown during slave 06 error
199	Boiler Slave 7 Alarm Code	I	R	-	0	100	Numeric code shown during slave 07 error
200	Boiler Combustion Parameter (Par1)	I	R	-	0	199	PAR 1 value
201	Boiler Hydraulic Parameter (Par2)	I	R	-	0	199	PAR 2 value

**CASCADE+MODBUS mode**  
(fig. 4/d)

This mode enables the communication in MODBUS mode, at least two boilers in cascade; so we must take a second RS-485 board (supplied in the kit code 8092244).

**ATTENTION:**  
Communication will be with the **MASTER boiler (boiler with PAR 15=0)** interpreting the cascade as a single heat generator by power:

$$P_{\text{CASCADE}} = P_{\text{BOILER}} \times \text{No. BOILERS}$$

Follow the instructions for assembly this second **RS-485** board:

- Set **DIP SWITCH** of the second RS-485 board kit on MODBUS configuration.
- After having removed the power supply, remove the back cover fixed to the panel with a screw.
- Electrically connect the second **RS-485** board to the first **RS-485** board (which is already mounted in the MASTER panel of the boiler - boiler with **PAR 15 = 0**) with the wired connector provided in the kit.
- Set **PAR 17** (See **Table PAR 17 INST.**).  
**Note: The old back cover is not used!**

**Connection between RS-485 board and INSOL/MIXED ZONE kit**  
(fig. 4/e)

The RS-485 board can be connected to the optional Solar kit (code 8092254) and the Mixed Zone kit (code 8092252).

Connect as shown in fig 4/a.  
Expansion card housing code 8092236 will also be required.

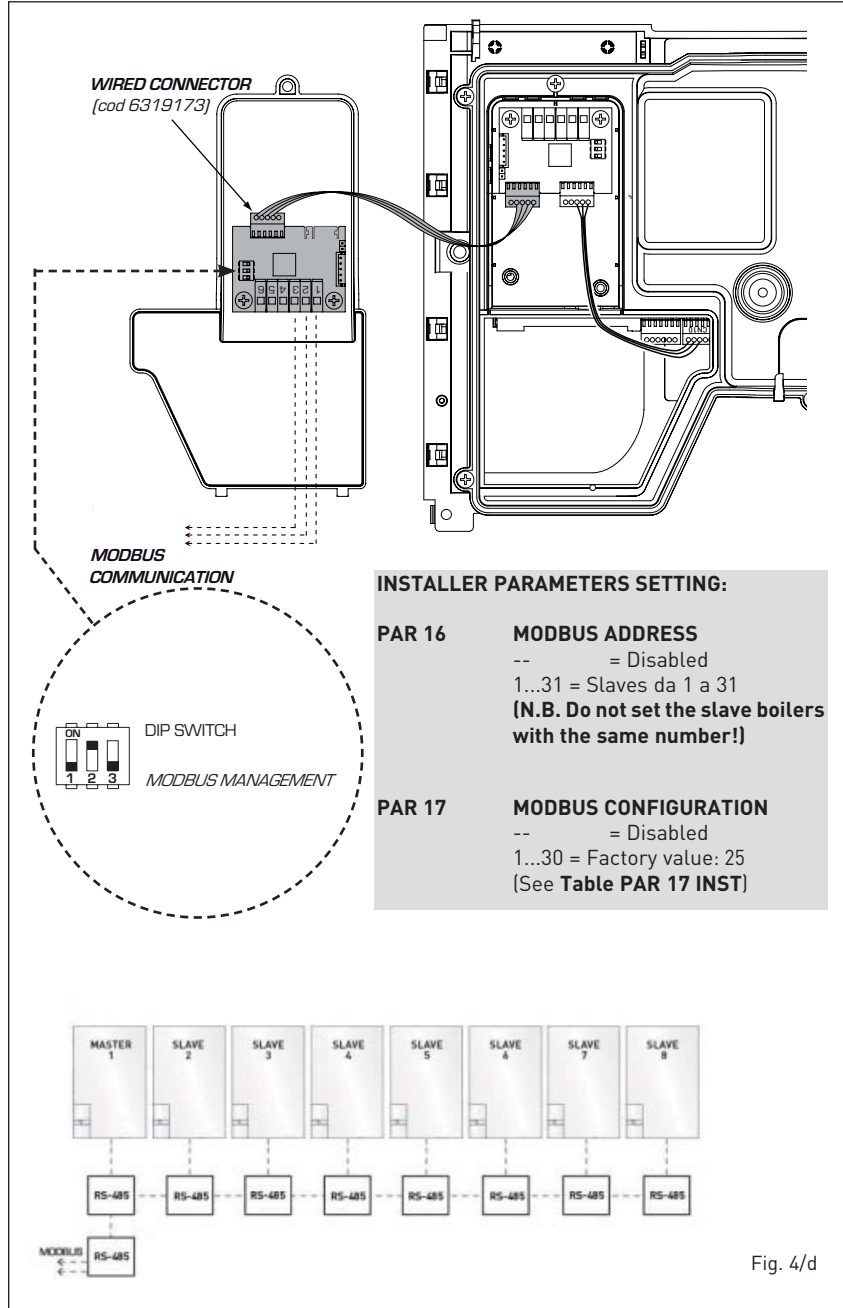
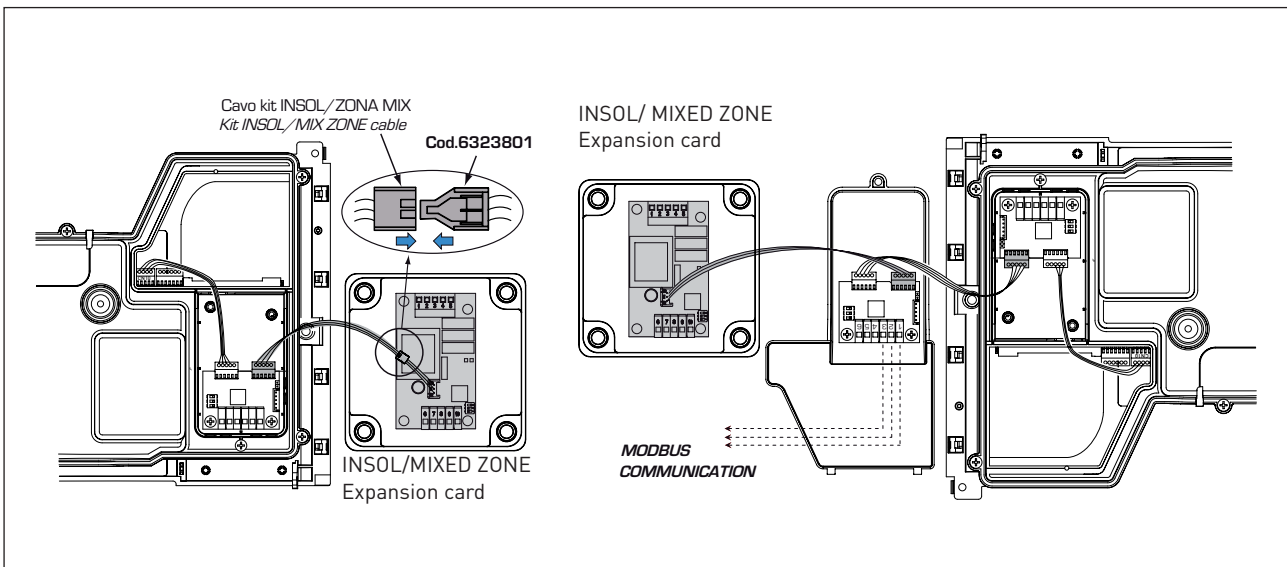


Fig. 4/d



**NOTE: See the instruction sheet attached to the kit for the wired connection of the INSOL / MIXED ZONE board to the board boiler.**

### 2.3 CONNECTING UP SYSTEM

To protect the heat exchanger becoming damaged by corrosion, incrustation or deposits, after installation it is extremely important to clean the system using suitable products. Sime recommend the use of FERNOX products for the flushing and final treatment of the system water. this is particularly important in hard water areas.

Artificially softened water must not be used to fill the heating system.

It is important to check the concentration of the inhibitor after each system modification and during maintenance, following the product manufacturers instructions (specific test kits are available).

A suitable connection must be made to the safety valve, extending it to a safe termination, incorporating a tun dish if required.

Isolation valves must be incorporated in the heating flow and return, to enable boiler maintenance or repair without the need to drain the entire heating system.

**WARNING:**

**Failure to clean , or adequately treat the heating system could invalidate the boiler warranty.**

Gas connections must be made in accordance with current standards and regulations. When dimensioning gas pipes from the meter to the module, both capacity volume (consumption) in m<sup>3</sup>/h and gas density must be taken into account.

The sections of the piping making up the system must be such as to guarantee a supply of gas sufficient to cover the maximum demand, limiting pressure loss between the gas meter and any apparatus being used to not greater than:

- 1.0 mbar for family II gases (natural gas);
- 2.0 mbar for family III gases (butane or propane).

An adhesive data plate is positioned inside the front panel; it contains all the technical data identifying the boiler and the type of gas for which the boiler is arranged.

#### 2.3.1 Connection of condensation water trap

To ensure safe disposal of the condensate produced by the flue gases, refer-

ence should be made to BS6798:2009. The boiler incorporates a condensate trap which has a seal of 75mm, therefore no additional trap is required.

The condensate should ideally be discharged internally into an internal waste pipe(washing machine/sink waste) or a soil pipe to avoid the risk of freezing. External pipe runs should be avoided, but if it is necessary, the pipework should be at least 32 mm and protected from the risk of freezing with a waterproof insulation and the length kept to a minimum and not exceeding 3 m. termination should be into an external gully or purpose made soaka-way. We recommend that the condensate drain at the boiler is in 20 mm solvent weld pipe with a socket covering the connection to the trap. Alternatively a suitable hose can be secured to the trap and terminated as required.

**NOTE: All pipework must have a continuous fall from the boiler and must be resistant to corrosion by condensate, copper or steel is NOT suitable. It should be noted that the connection of a condensate pipe to a drain may be subject to local building control requirements.**

#### 2.3.2 Filter on the gas pipe

The gas valve is supplied ex factory with an inlet filter, which, however, is not adequate to entrap all the impurities in the gas or in gas main pipes. To prevent malfunctioning of the valve,

or in certain cases even to cut out the safety device with which the valve is equipped, install an adequate filter on the gas pipe.

### 2.4 INITIAL PHASE SYSTEM FILLING

Cold system filling pressure must be **1 bar**. The system must be filled slowly so that air bubbles are released through the specific escapes.

#### 2.4.1 System draining (fig. 5)

To drain the system, turn off the boiler , isolate the flow and return, and use the boiler drain vent (2 fig. 5).

#### 2.4.2 Dealing with condensate

See appendix 1, "Dealing with condensate"

#### 2.4.3 Requirements for sealed water systems MURELLE HE 110 R (fig. 5/b)

The heating system design should be based on the following information:

- a) The available pump head is given in fig. 14.
- b) A filling device as shown in fig 5/b must be incorporated.

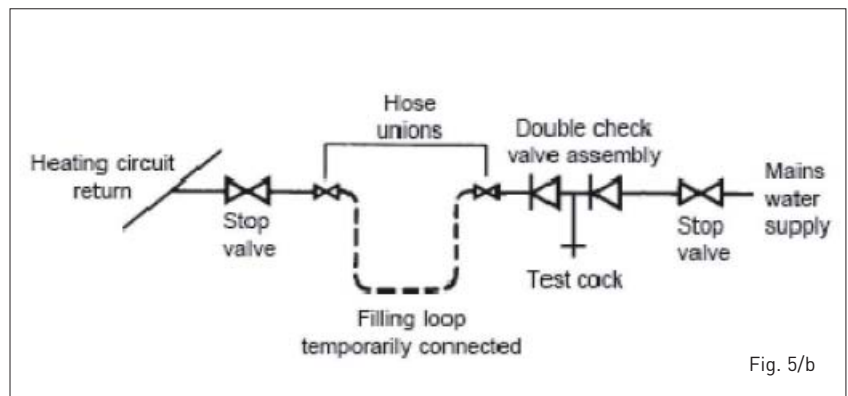


Fig. 5/b

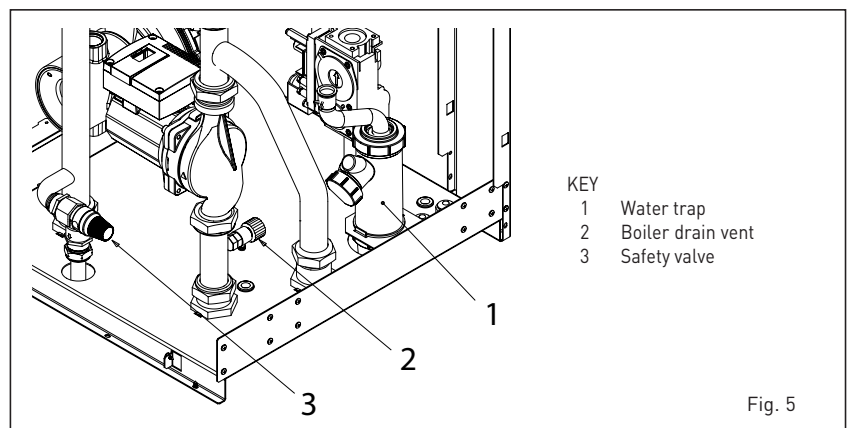


Fig. 5

## 2.5 EXHAUST

The boiler is supplied with a 80mm gasket, which must be fitted over the exhaust terminal prior to the flue being installed. Item 11 on fig 6/7/8.

### 2.5.1 B type (fig. 6)

If the air inlet is not connected, the boiler should be regarded a Class B device. When installing the boiler in locations where the air inlet needs to be protected from water ingress, replace the intake terminal provided in the flange with terminal code 8089510. For information on how to configure the boiler in this mode see figure 6.

#### WARNING:

**The maximum overall length of ø 80 exhaust flues is determined by the load losses of the single accessories installed and should not exceed 42 mm H2O. When load loss exceeds 4 mm H2O, in order to assure the correct operation of the appliance, set the installer parameter PAR 9 as indicated in TABLE 1 (see point 3.3 to access installer parameters).**

The exhaust pipe may be connected to suitable existing flues.

When the boiler operates at low temperature, you can use the normal chimney to the following conditions:

- The exhaust pipe should not be used by

other boilers.

- The inside of the chimney must be protected from direct contact with the condensing boiler. Combustion products must be conveyed with a hose or rigid plastic with a diameter of about 100-150 mm by ensuring that the condensate drain trap at the bottom of the pipe. The effective height of the trap must be at least 150 mm.

### 2.5.2 C Type (fig. 7 - fig. 8)

The boiler becomes a Class C device (room sealed), when the air intake terminal is removed from the flange and separate ducts (fig. 7) or coaxial ducts (fig. 8) are connected.

### B type

**WARNING:** Before installing accessories, lubricate the internal part of gaskets with silicon-based products. Avoid using oils and greases.

80 mm accessories			
Key	Code	Description	Load loss mm H2O
1	8077450A (single) 8077450 (6 pieces)	90° bend	3,5
2a	8077351A (single) 8077351 (6 pieces)	1000mm Extension	1,4
2b	8077350A (single) 8077350 (6 pieces)	500mm Extension	0,7
3	8091300	Articulated Tile	
4	8091212B	Roof terminal (1381 mm)	5,0
5	6296513	Extension with test point (250mm)	0,3
6	8077451A (single) 8077451 (6 pieces)	45° bend	2,3
7	8089501	Exhaust terminal	4,0
8	8091500	Inner/outer wall seal (2 of each)	
11	Gasket (supplied with boiler)		

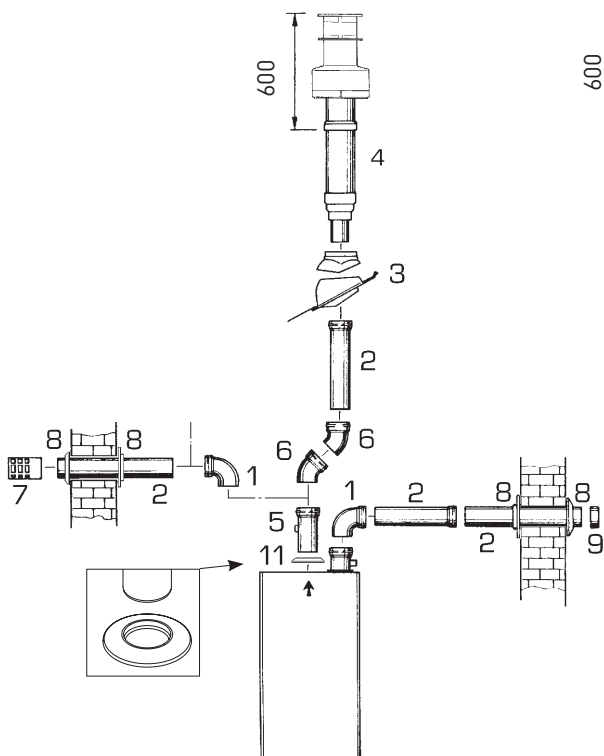
**WARNING !**

When load loss of the individual accessories connected exceeds 4 mm H2O, in order to assure the correct operation of the appliance, set the installer parameter PAR 9 as indicated in TABLE 1 (see point 3.3 to access the installer parameters).

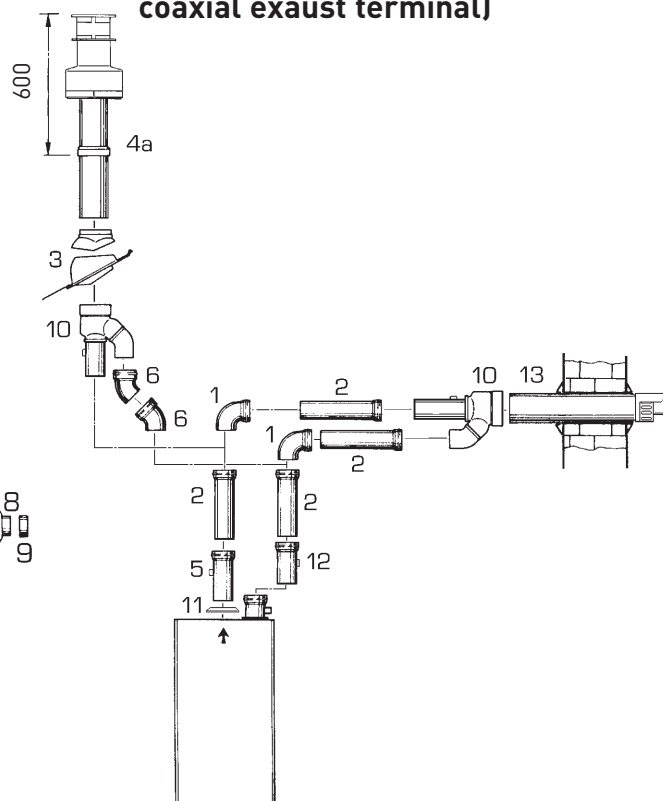
Load loss (mm H2O)	PAR 9 (long chimneys)
0 - 4	0
4 - 8	1
8 - 12	2
12 - 16	3
16 - 20	4
20 - 24	5
24 - 28	6
28 - 32	7
32 - 36	8
36 - 40	9
40 - 42	10

Fig. 6

### C Type (ø 80 separate pipes)



### C type (ø 80 separate pipes and coaxial exhaust terminal)



#### WARNING !

When load loss of the individual accessories connected exceeds  $i$  4 mm H<sub>2</sub>O, to assure correct operation of the appliance, do as follows:

- set the installer parameter PAR 9 as indicated in TABLE 2 (see point 3.3 to access the installer parameters).

TABLE 2

Load loss (mm H <sub>2</sub> O)	PAR 9 (long chimneys)
0 - 4	0
4 - 8	1
8 - 12	2
12 - 16	3
16 - 20	4
20 - 24	5
24 - 28	6
28 - 32	7
32 - 36	8
36 - 40	9
40 - 42	10

- proceed with calibrating CO<sub>2</sub> at the maximum and minimum capacity as specified in point 4.2.2.

#### 80 mm accessories

Key	Code	Description	Load loss mm H <sub>2</sub> O	
			Inlet	Exhaust
1	8077450A (single)	90° bend - 80 mm	2,3	3,5
	8077450 (6 pieces)			
2a	8077351A (single)	1000mm Extension - 80mm	1,4	1,4
	8077351 (6 pieces)			
2b	8077350A (single)	500mm Extension - 80mm	0,7	0,7
	8077350 (6 pieces)			
3	8091300	Articulated Tile	-	-
4	8091212B	Roof terminal(L 1381mm)	-	5,0
4a	8091212B	Coaxial roof exit terminal	-	16,0*
5	6296513	Extension with test point(L 250mm)	-	0,3
6	8077451A (single)	45° bend - 80mm	1,7	2,3
	8077451 (6 pieces)			
7	8089501	Exhaust terminal - 80mm	-	4,0
8	8091500	Inner/outer wall seal (2 of each)	-	-
9	8089500	Inlet terminalm - 80mm	1,8	-
10	8091401	Inlet/ exhaust fitting	-	-
11		Gasket (supplied with boiler)	-	-
12	8092800	Condensate recovery	5,8	-
13	8096253A	Coaxial terminal 80/125	-	17,0*
*	This loss includes the losses of item 10			

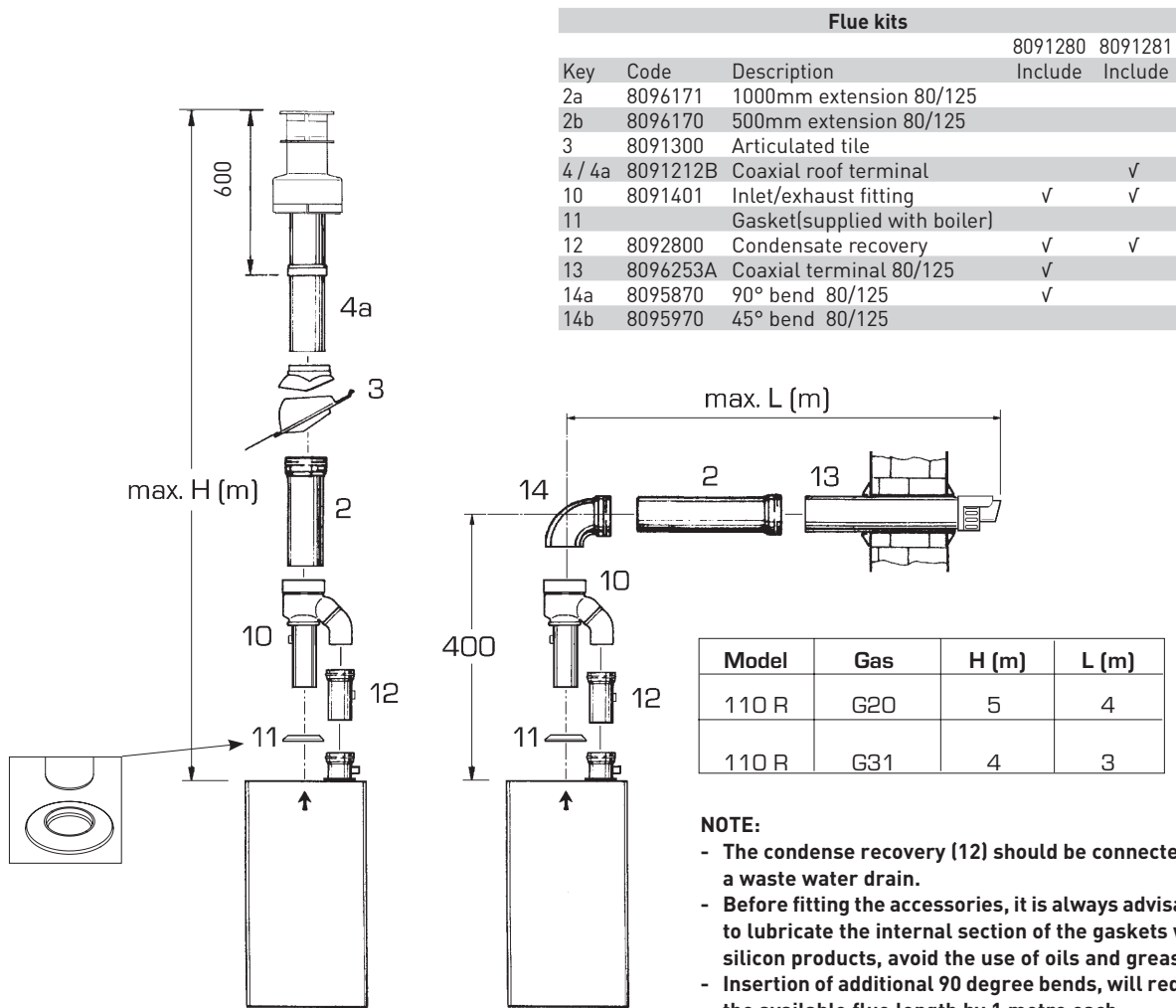
#### ATTENTION:

- Installations with coaxial roof exit terminal (4a) and coaxial exhaust (13) require the use of a condensate recovery (12) that has to be connected to the water drain (waste water).
- Before fitting the accessories, it is always advisable to lubricate the internal section of the gaskets with silicon products, avoid the use of oils and greases.

Fig. 7



## C type (Coaxial exhaust $\varnothing$ 80/125)



### NOTE:

- The condensate recovery (12) should be connected to a waste water drain.
- Before fitting the accessories, it is always advisable to lubricate the internal section of the gaskets with silicon products, avoid the use of oils and greases.
- Insertion of additional 90 degree bends, will reduce the available flue length by 1 metre each.
- Insertion of additional 45 degree bends, will reduce the available flue length by 0.5 metre each.

### VERTICAL EXHAUST

To ensure correct operation of the appliance, do as follows:

- set the installer parameter PAR 9 as indicated in TABLE 3 (see point 3.3 to access the installer parameters).

TABLE 3

Maximum length exhaust (m)	PAR 9 (long chimneys)
0 - 1,0	6
1,0 - 2,0	7
2,0 - 3,0	8
3,0 - 4,0	9
4,0 - 5,0	10

- proceed with calibrating CO<sub>2</sub> at the maximum and minimum capacity as specified in point 4.2.2.

### HORIZONTAL EXHAUST

To ensure correct operation of the appliance, do as follows:

- set the installer parameter PAR 9 as indicated in TABLE 3/a (see point 3.3 to access the installer parameters).

TABLE 3/a

Maximum length exhaust (m)	PAR 9 (long chimneys)
0 - 1,0	7
1,0 - 2,0	8
2,0 - 3,0	9
3,0 - 4,0	10

- proceed with calibrating CO<sub>2</sub> at the maximum and minimum capacity as specified in point 4.2.2.

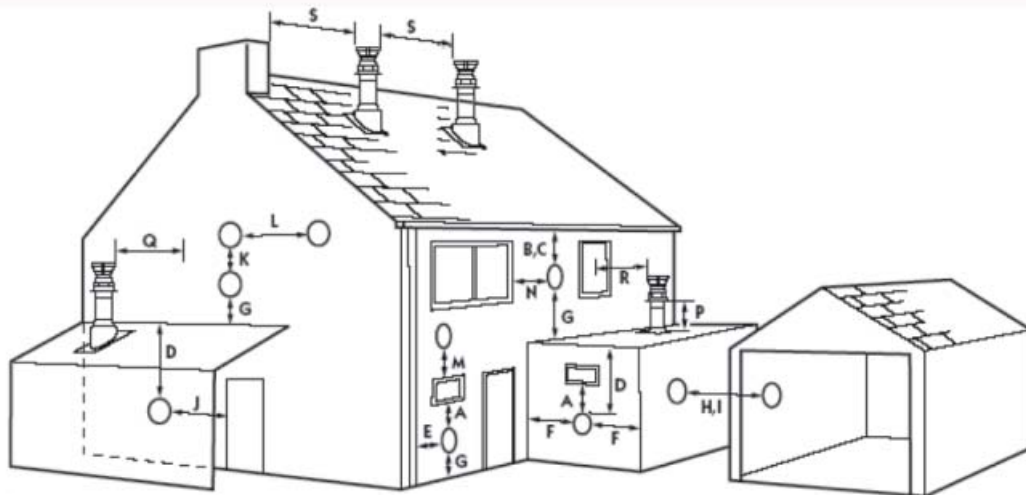
Fig. 8

## Flue termination positions, condensing room sealed, fan flued boilers

All measurements are in mm and are minimum clearances.

Terminal Location	Boilers with a rated Input < 70kW Net	Boilers with a rated Input > 70kW Net
A	*Below and opening window etc.	300
B	Below gutter soil pipes etc.	75
C	Below Eaves.	200
D	*Below balconies or car port roof.	200
E	From vertical drain or soil pipe etc.	150
F	From internal or external corners.	300
G	Above ground or balcony level.	300
H	From a surface facing the terminal.	2000
I	From a terminal facing the terminal.	2000
J	*From opening in a carport into a dwelling.	1200
K	Vertically from a terminal on the same wall.	1500
L	Horizontally from a terminal on the same wall.	300
M	Above an opening, window etc.	500
N	*Horizontally to an opening, window etc.	300
P	Above a level roof (base of terminal.)	500
Q	From an adjacent wall (edge of terminal.)	500
R	From adjacent opening, window etc.	1000
S	From any other flue terminal.	600

\* Positions not recommended.



Groups of appliances of 150kW gross input (136kW net input) and above must comply with the Clean Air Act with respect to the chimney discharge height.

The terminal/s shall be guarded if it is less than 2000mm above the ground or in any position where it may cause injury to persons resulting from touching a hot surface.

Document Intended for quick guidance only. Absolute guidance must be sought from the respective regulation.

Fig. 8/a

### 2.5.3 Positioning the outlet terminals (fig. 8/a)

The outlet terminals for forced-draught appliances may be located in the external perimeter walls of the building. To provide some indications of possible solutions, table gives the minimum distances to be observed, with reference to the type of building shown in fig. 8/a.

### 2.5.4 Maximum usable length for separate $\varnothing$ 80 flues

The maximum overall length of  $\varnothing$  80 inlet and exhaust flues is determined by the load losses of the single accessories installed and should not exceed 42 mm H<sub>2</sub>O.

#### ATTENTION!

When the load loss exceeds 4 mm H<sub>2</sub>O, in order to assure the correct operation of the appliance, set the installer parameter PAR 9 as indicated in TABLE 2 (see point 3.3 to access installer parameters) it is necessary to check and if required, re calibrate the gas valve as specified in point 4.2.2.

### 2.5.5 Maximum usable length for coaxial $\varnothing$ 80/125 flues

In installations with  $\varnothing$  80/125 coaxial flue, the maximum horizontal length including the 90° curve, should not exceed 4 m when the boiler is operating on natural gas G20 and 3 m when it is operating on LPG G31.

For vertical flues, it must not be greater than 5 m straight vertical lines when the boiler is operating on natural gas G20 and 4 m when operating on LPG G31.

#### WARNING:

In order to assure the correct operation of the appliance, set the installer parameter PAR 9 as indicated in TABLES 3-3/a (see point 3.3 to access the installer parameters) it is necessary to check and if required, re calibrate the gas valve as specified in point 4.2.2.

## 2.6 ELECTRICAL CONNECTION

The boiler is supplied with an electric cable. Should this require replacement, it must be purchased exclusively from SIME.

The electric power supply to the boiler must be 230V - 50Hz single-phase 3 amp, fused main switch, with at least 3 mm spacing between contacts.

Respect the L and N polarities and the earth connection.

**NOTE: SIME declines all responsibility for injury or damage to persons, animals or property, resulting from the failure to provide for proper earthing of the appliance.**

### 2.6.1 Room Thermostat and/or Timer (clean contact)

The heating demand can be controlled by a thermostat and or timer(TA) connected to CN 6 terminals 7-8, (see fig. 11) after having removed the existing bridge. The control being used must be of a class conforming to the standard EN 607301 (clean electrical contact).

### 2.6.2 Climatic regulator CR 53 connection (optional)

The boiler is designed for use with a climatic regulator, supplied on request (code 8092227), for the management of a heating circuit.

The boiler will still display information and if connected. manage production of DHW and a second heating zone. For installation and use of the climatic regulator, follow the instructions included in the packaging.

#### NOTE:

Reset parameter 10 to 2 (PAR 10 = 2).

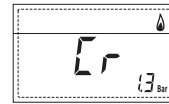
### 2.6.3 Remote control CR 73 connection (optional)

The boiler is designed for connection to a remote control unit, supplied on request

(code 8092226).

The remote control unit CR 73 allows for complete remote control of the boiler, except lockout reset.

The boiler display will show the following message:



For installation and use of the remote control, follow the instructions in the package.

**NOTE: Ensure PAR 10 set to 1 (PAR 10 = 1).**

### 2.6.4 External sensor connection (SE)

The boiler is designed for connection to an external temperature sensor, supplied on request (code 8094101), which can automatically regulate the flow temperature value of the boiler output according to the external temperature.

For installation, follow the instruction in the package. It is possible to make corrections to the values by adjustment of PAR 11.

### 2.6.5 Heat Demand by 230v

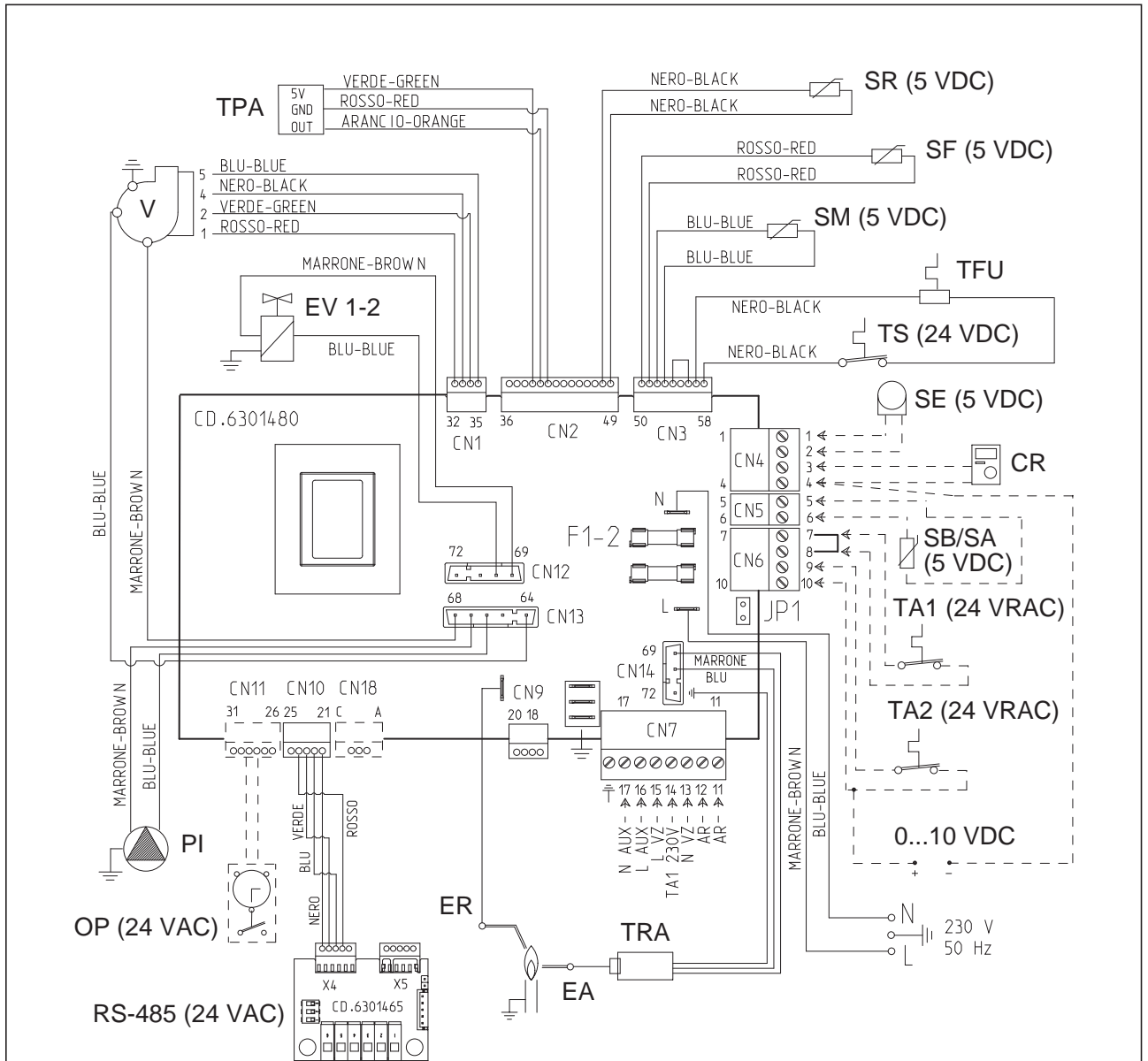
The heating demand can be controlled by 230v applied to terminal 14 on CN7, and removal of the bridge on CN6 terminals 7 & 8.

### 2.6.6 BMS (Building Management Systems)

Single or cascade boilers can be integrated into a building management system. The BMS signal should be connected to the single, or master boiler as shown in fig11.

**Set PAR 14 according to the maximum(10v) flow temperature required.**

## 2.7 BOILER ELECTRICAL (fig. 11)



<b>KEY</b>		<b>JP1</b>	Selection TA2 or 0-10 VDC (See note below).
F1-2	Fuse (4 AT)	TA1	Zone 1 environment thermostat
TRA	Ignition transformer	TA2	Zone 2 environment thermostat
PI	Boiler pump	SB	Sensor tank L. 2000 (optional)
V	Fan	CR	Remote control CR73 (optional)
EA	Ignition electrode	SE	External sensor (optional)
ER	Ionisation electrode	OP	Programming clock (optional)
EV1-2	Gas valve coil	AR	Remote alarm
TS	Safety thermostat	VZ	Zone valve
SF	Fumes temperature sensor	AUX	Auxiliary connection
TFU	Thermal fuse	SA	Frost detector (external version only)
SM	Flow temperature sensor	RS-485	CASCADE/MODBUS board
SR	Return temperature sensor		
TPA	Pressure transducer		

### CONNECTOR SPARE PART CODES:

<b>CN1</b>	code 6319162
<b>CN2</b>	code 6319168
<b>CN3</b>	code 6319164
<b>CN4</b>	code 6316203
<b>CN6</b>	code 6316202
<b>CN7</b>	code 6316204
<b>CN10</b>	code 6319165
<b>CN12</b>	code 6319166
<b>CN13</b>	code 6319167
<b>CN14</b>	code 6319169

### "NOTE - JP1 link

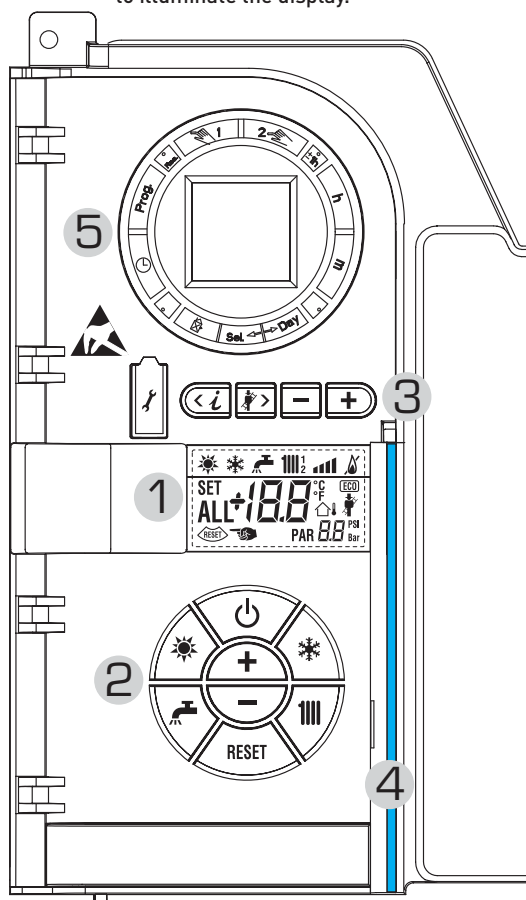
With JP1 link fitted TA2 input is by operation of a clean contact.  
For operation by a BMS (0-10v dc) signal, JP1 must be removed, TA1 link fitted and the BMS connected, +ve to terminal 10 - CN6, -ve to terminal 4 - CN4.  
PAR 14 will require setting to the maximum flow temperature required."

Fig. 11

### 3 CHARACTERISTICS

#### 3.1 CONTROL PANEL (fig. 12)

Note- The first press of any key only acts to illuminate the display.



#### DESCRIPTION OF DISPLAY ICONS



**SUMMER MODE ICON**



**WINTER MODE ICON**



**D.H.W. MODE ICON**



**HEATING DEMAND ICON**



**GRADED POWER SCALE**

The segments of the bar light up in proportion to boiler power output .



**BURNER FUNCTIONING AND LOCKOUT ICON**



**RESET REQUIRED ICON**



**CHIMNEY SWEEP ICON**



**SECONDARY DIGITS**

This displays the value of the pressure of the system (correct value is between 1 and 1.5 bar)



**MAIN DIGITS**

This displays the values set, the code of any error and the external temperature



**INTEGRATIVE SOURCES ICON**

#### 2 - DESCRIPTION OF CONTROLS



**ON/OFF KEYS**

ON = Electricity supply to boiler is on  
OFF = Electricity supply to boiler is on with the boiler not operational. However, the protection functions are active.



**SUMMER MODE KEY**

When this key is pressed, the boiler functions only when D.H.W. is requested (**function not available**)



**WINTER MODE KEY**

When this key is pressed, the boiler provides heating and D.H.W.



**D.H.W. TEMP KEY**

When this key is pressed, the temperature of the D.H.W. is shown on the display (**function not available**)



**HEATING TEMP KEY**

The first time the key is pressed, the temperature of heating circuit 1 is shown.  
The second time the key is pressed, the temperature of heating circuit 2 is shown.  
With the third press of the button, it displays the temperature of the heating circuit 3 (3-zone system).



**RE-SET KEY**

Use this key to reset after a functioning error.



**INCREASE AND DECREASE KEY**

Increases/decreases the set value of the DHW or heating.

#### 3 - KEYS RESERVED FOR THE INSTALLER (access to INST and OEM parameters)



**PC CONNECTION**

To be used only with the SIME programming kit and only by authorised personnel. Do not connect other electronic devices (cameras, telephones, mp3 players, etc.) Use a tool to remove the cap and reinsert after use.

**ATTENTION: Communication port sensitive to electrostatic charges.**



Before use, it is advisable to touch an earthed metallic surface to discharge static electricity.



**INFORMATION KEY**

Use this key to access the installer information (see 3.2).



**CHIMNEY SWEEP KEY**

Use this key to enable the "Chimney Sweep" function, see 4.5.1.



**DECREASE KEY**

Use this key to increase parameter values.



**INCREASE KEY**

Use this key to decrease parameter values.

#### 4 - LUMINOUS BAR

Blue = Functioning  
Red = Functioning error

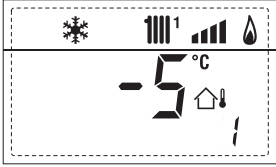


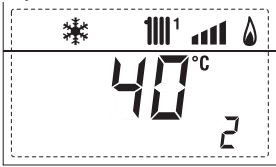
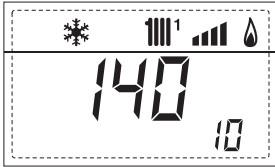

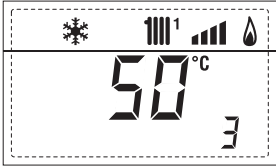


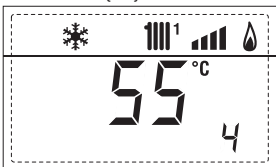
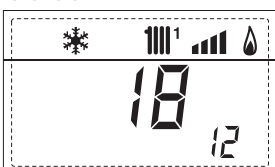
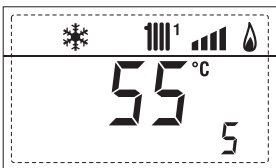

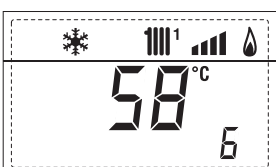

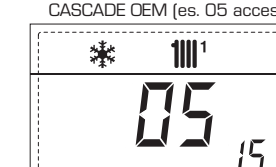
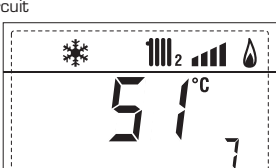
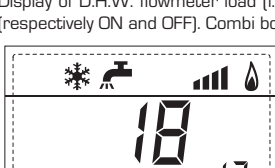
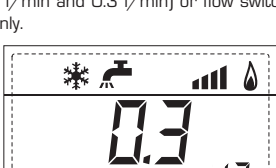

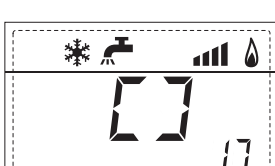
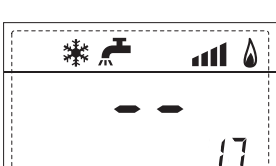
#### 5 - PROGRAMMING CLOCK (optional)

Mechanical clock (code 8092228) or digital clock (code 8092229) to program heating (single zone only).

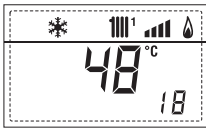
Fig. 12

### 3.2 ACCESS TO INSTALLER'S INFORMATION

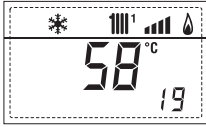
For access to information for the installer, press the key (3 fig. 14). Each time the key is pressed, the display moves to the next item of information. If expansion boards (MIXED ZONE o INSOL) are connected, the related info will be displayed. If the key is not pressed, the system automatically quits the function. Please note the first press of any key acts to illuminate the display only.

- |   |  |  |
|---|--|--|
| <p>1. Display of external temperature, only when external sensor connected</p>       | <p>9. Display fan speed in rpm x 100 (e.g. 4.800 and 1850 rpm)</p>    |   |
| <p>2. Display of heating flow temperature sensor (SM)</p>                            | <p>10. Display of number of hours of functioning of the burner in h x 100 (e.g. 14000 and 10)</p>   |   |
| <p>3. Display of D.H.W. temperature sensor (SS) only for instantaneous boilers</p>  | <p>11. Display of number of times the burner has ignited x 1000 (e.g. 97000 and 500)</p>   |    |
| <p>4. Display of auxiliary temperature sensor or D.H.W. sensor (SB)</p>            | <p>12. Display of total number of errors</p>    |  |
| <p>5. Display of fumes temperature sensor (SF)</p>                                 | <p>13. Parameter access counter-Installer (i.e. 140 accesses)</p>   |  |
| <p>6. Display of heating temperature of first circuit</p>                          | <p>14. Parameter access counter-OEM (i.e. 48 accesses)</p>    | <p>15. Access counter parameters CASCADE OEM (es. 05 access)</p>  |
| <p>7. Display of heating temperature of second circuit</p>                         | <p>17. Display of D.H.W. flowmeter load (i.e. 18 l/min and 0.3 l/min) or flow switch (respectively ON and OFF). Combi boiler only.</p>  |   |
| <p>8. Display of ionisation current in µA</p>                                      |   |   |

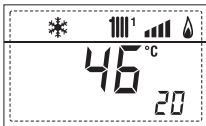
18. Display of heating return temperature sensor (SR)



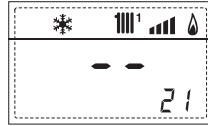
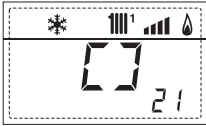
19. Display of the Cascade flow temperature value (when fitted)



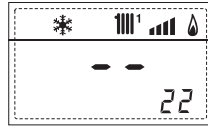
20. Display delivery probe value mixed with board MIXED ZONE 1 (input S2)



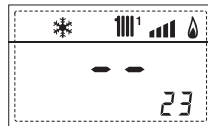
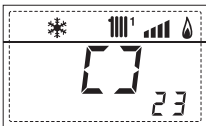
21. Display safety thermostat MIXED ZONE (input S1) respectively ON and OFF



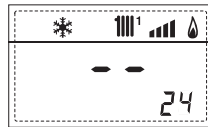
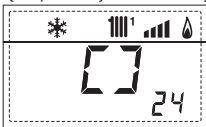
22. Display of pump operation with board MIXED ZONE (respectively ON and OFF)



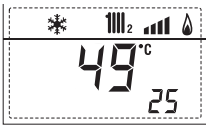
23. Display valve opening control with board MIXED ZONE (respectively ON and OFF)



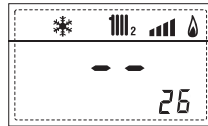
24. Display valve closing control with board MIXED ZONE (respectively ON and OFF)



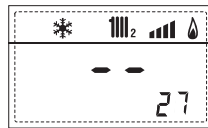
25. Display of the plant delivery probe mixed with board MIXED ZONE 2



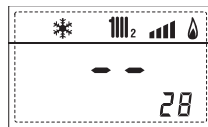
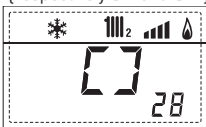
26. Display safety thermostat with board MIXED ZONE 2 (input S1) respectively ON and OFF



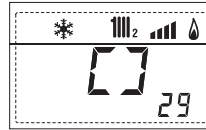
27. Display pump with board MIXED ZONE 2 (respectively ON and OFF)



28. Display valve opening control with board MIXED ZONE 2 (respectively ON and OFF)



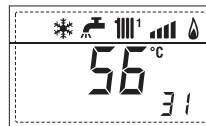
29. Display of valve operation with board MIXED ZONE 2 (respectively ON and OFF)



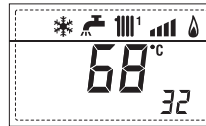
30. Display solar probe temperature value S1 with solar board INSOL



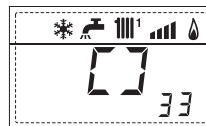
31. Display solar probe temperature value S2 with solar board INSOL



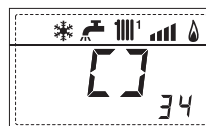
32. Display solar probe temperature value S3 with solar board INSOL



33. Display solar relay R1 with solar board INSOL (respectively ON and OFF)



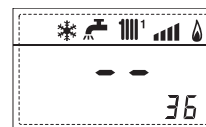
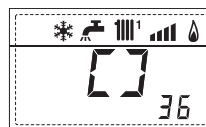
34. Display solar relay R2 with solar board INSOL (respectively ON and OFF)



35. Display solar relay R3 with solar card INSOL (respectively ON and OFF)



36. Display of solar flow meter state (respectively ON and OFF)



40. Display % value pump control PWM (Modulating pump version only)



60. Code of last recorded error.



61. Code of penultimate error recorded.



70. Warning code (see 3.3.2)



90. RS-485 software last version (es. 01 version)



91. EXP software version (configuration MIXED ZONE)



92. 2° EXP software version (configuration MIXED ZONE)

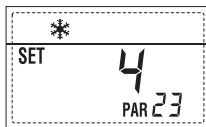


### 3.3 ACCESS TO INSTALLER'S PARAMETERS

To access to the installer's parameters, press simultaneously the keys and or 5 seconds (3 fig. 12).

For example, the parameter PAR 23 is shown on the display of the control panel in the following way:

The parameters scroll forwards and



backwards with the key and and the default value can be changed with the keys and .

The standard display returns automatically after 60 seconds, or by pressing one of the control keys (2 fig. 12).

#### 3.3.1 Replacing the board or RESETTING parameters

If the PCB is changed or reset (PAR49), then PAR1 and PAR2 will need to be reset to the correct values, see the table below:

GAS	BOILER	PAR 1
NATURAL GAS (G 20)	110 R	7
	Cascade	8
PROPANE (G 31)	110 R	15
	Cascade	16

PARAMETERS INSTALLER					
FAST CONFIGURATION					
PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
1	Combustion configuration	- = ND 1...31	=	=	".."
2	Hydraulic configuration	- = ND 1...14	=	=	".."
3	Timetable 2 programmer	1 = DHW + Recirc. pump 2 = DHW 3 = Recirculation pump	=	=	1
4	Pressure transducer disabler	0 = Disabled 1 = Enabled 0-4 BAR 2 = Enabled 0-6 BAR 3 = Enabled 0-4 BAR (NO ALL 09) 4 = Enabled 0-6 BAR (NO ALL 09)	=	=	1
5	Assignment of auxiliary relay AUX	1 = Remote alarm NO 2 = Recirculation pump 3 = Automatic load. 4 = Remote alarm NC 5 = Heat pump 6 = Zone 2 valve	=	=	1
6	Luminous bar indicating presence of voltage	0 = Disabled 1 = Enabled	=	=	1
7	Allocation of CR73 channels	0 = Not assigned 1 = Circuit 1 2 = Three-zone circuit	=	=	1
8	Fan rpm Step ignition	0,0 ... 81	rpmx100	0,1 from 0,1 to 19,9 1 from 20 to 81	0,0
9	Long chimneys	0 ... 20	%	1	0
10	Remote control option setting	1 = CR 73 2 = CR 53 3 = RVS 43.143 4 = RVS 46.530 5 = RVS 61.843	=	=	1
11	Correction values external sensor	-5 ... +5	°C	1	0
12	Backlighting duration	- = Always 0 = Never 1...199	sec. x 10	1	3
13	Modulating pump speed	- = None AU = Automatic mod. 30...100 = % Settable modulation	%	10	-
14	Setting second input TA	- = Contact TA 5...160 = Input 0...10VDC	-	-	-
15	Cascade address	- = Not enabled 0 = Master 1...7 = Slaves	-	1	-
16	ModBus address	- = Not enabled 1...31 = Slaves	-	1	-
17	ModBus communication configuration	1...30	-	1	25
19	Type circuit	0 = Two zones 1 = Three zones	-	-	0
D.H.W. - HEATING					
PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
20	Minimum heating temperature Zone 1	PAR 64 OEM ... PAR 21	°C	1	20
21	Maximum heating temperature Zone 1	PAR 20 ... PAR 65 OEM	°C	1	80
22	Heating curve slope Zone 1	3 ... 40	-	1	20
23	Minimum heating temperature Zone 2	PAR 64 OEM ... PAR 24	°C	1	20
24	Maximum heating temperature Zone 2	PAR 23 ... PAR 65 OEM	°C	1	80
25	Heating curve slope Zone 2	3 ... 40	-	1	20
26	Minimum heating temperature Zone 3	PAR 64 OEM ... PAR 27	°C	1	20
27	Maximum heating temperature Zone 3	PAR 26 ... PAR 65 OEM	°C	1	80
28	Heating curve slope Zone 3	3 ... 40	-	1	20
29	At heating circuit	10 ... 40	°C	1	20
30	Post-circulation heating time	0 ... 199	Sec.	10	30
31	Maximum heating capacity	30 ... 100	%	1	100
32	Zone 1 pump activation delay	0 ... 199	10 sec.	1	1
33	Start-up delay	0 ... 10	Min.	1	3
34	Additional source activation threshold	-,-10 ... 40	°C	1	".."
35	Boiler antifreeze	0 ... +20	°C	1	3
36	External sensor antifreeze	-5 ... +5	°C	1	-2
37	Band saturation flowmeter modulation	- = Disabled 0 ... 100	%	1	100
38	D.H.W. post-circulation time	0 ... 199	Sec.	1	0
39	Anti-legionella (only D.H.W tank)	0 = Disabled 1 = Enabled	-	-	0



BOILER	PAR 2
Instantaneous with diverter valve and flowmeter	1
Instantaneous with diverter valve, flowmeter and solar system	2
Remote control cylinder with diverter valve and cylinder sensor T version (LOW INERTIA)	3
On board DHW cylinder, diverter valve and DHW sensor (LOW INERTIA)	4
Remote DHW cylinder with diverter valve and tank thermostat. or heating only T/R version (LOW INERTIA)	5
Remote DHW cylinder with double pump and cylinder sensor T/R version (LOW INERTIA)	6
Remote DHW cylinder with double pump and tank thermostat T/R version (LOW INERTIA)	8
Only heating with antifreeze sensor (LOW INERTIA)	9

**NOTE: the inside of the upper door of the boiler panel has a label with the values that have to be set for PAR 1 and PAR 2 (fig. 19).**

### 3.3.2 Warning

If the boiler is functioning but not optimally, and it is not showing any error, press repeatedly until info 70 is displayed. When the boiler is operating at its optimum the display will show "- -" Refer to the table below for a description of any warning displayed.

CODE	DESCRIPTION
E0	Reduced capacity operation (Δt between delivery and return over 40°C)
E1	Shorted external sensor (SE)
E2	Preheating function active
E3	TBD
E4	TBD
E5	TBD
E6	TBD
E7	TBD
E8	TBD
E9	TBD

PARAMETERS INSTALLER				
<b>EXPANSION CARD</b>				
PAR DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
40 Number of expansion boards	0 ... 3	=	1	0
41 Mix valve stroke time	0 ... 199	10 sec.	1	12
42 Priority of D.H.W. over mixed zone	0 = Paralle 1 = Absolute	=	=	1
43 Floor Screed Drying(see 4.5.2)	0 = No activated 1 = Curve A 2 = Curve B 3 = Curve A+B	=	=	0
44 Type of solar system	1 ... 8	=	1	1
45 Δt solar collector pump 1	PAR 74 OEM - 1 ... 50	°C	1	8
46 Solar integration delay	"-", 0 ... 199	Min.	1	0
47 Tmin solar collector	"-", -30 ... 0	°C	1	-10
48 Tmax solar collector	"-", 80 ... 199	°C	1	120
<b>PARAMETERS RESTORATION</b>				
PAR DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
49 * Reset default parameters (par 01 - par 02 = "-")	- , 1	=	=	=
* Should the boiler not be operating correctly, the original default values can be reset by setting PAR 49 = 1 and the PAR 1 and PAR 2 as specified at point 3.3.1.				

### CASCADE CONNECTION PARAMETERS

When the appliance is installed in sequence/cascade (modular system with several generators) it is necessary to set on all the boilers the following INST PAR parameters:

**PAR 15 = 0 for the first boiler (MASTER)  
1 .... 7 for the other boilers (SLAVE)  
(Avoid assigning the same number to SLAVE boilers)**

**Boiler connected to a common(cascade) flue. whether working in cascade or independently must have PAR1 reset**

**PAR 1 = 8 (for NATURAL GAS boilers)  
16 (for PROPANE boilers)**

**In addition, when the number of boilers in cascade is more than two, configure the parameters OEM A1 of the MASTER boiler.**

**(See 2.2.2)**

### 3.4 EXTERNAL SENSOR (fig. 13)

If there is an external sensor, the heating settings SET can be taken from the climatic curves according to the external temperature and, in any case, limited to with the range values described in point 3.3 (parameters PAR22 for zone 1, PAR 25 for zone 2 and PAR28 for zone 3).

The climatic curve to be set can be selected from a value of 3 and 40 (at step 1). Increasing the steepness of the curves of fig. 13 will increase the output temperature as the external temperature decreases.

### 3.5 CARD FUNCTIONING

The electronic card has the following functions:

- Antifreeze protection of the heating and sanitary water circuits (ICE).
- Ignition and flame detection system.
- Control panel setting for the power and the gas for boiler functioning.
- Anti-jamming for the pump which is fed for a few seconds after 24 hours of inactivity.
- Antifreeze protection for boilers with cylinders.
- Chimney sweep function which can be activated from the control panel.
- Flow temperature control, which can be shifted with the external probe connected.

It can be set from the control panel and is active on the heating systems of both circuit 1 and circuit 2 and 3.

- Management of 3 independent heating circuit systems.
- Automatic regulation of the ignition power and maximum heating. Adjustments are managed automatically by the electronic card to guarantee maximum flexibility in use of the system.
- Interface with the following electronic systems: climatic regulator CR 53, remote control CR 73, thermal regulator RVS, connected to a management card of a mixed zone ZONA MIX code 8092234, card solar INSOL code 8092235 and to board RS-485 for managing up to 8 boilers in cascade or implement a communication type Modbus (slave RTU-RS485, Reference Guide PI-MBUS-300 Rev. J) cod. 8092243.

**NOTE: If using CR 53 set parameter 10 to 2 (PAR 10 = 2).**

### 3.6 TEMPERATURE DETECTION SENSOR

Table 4 shows the resistance values of the heating, and exhaust fumes thermistors.

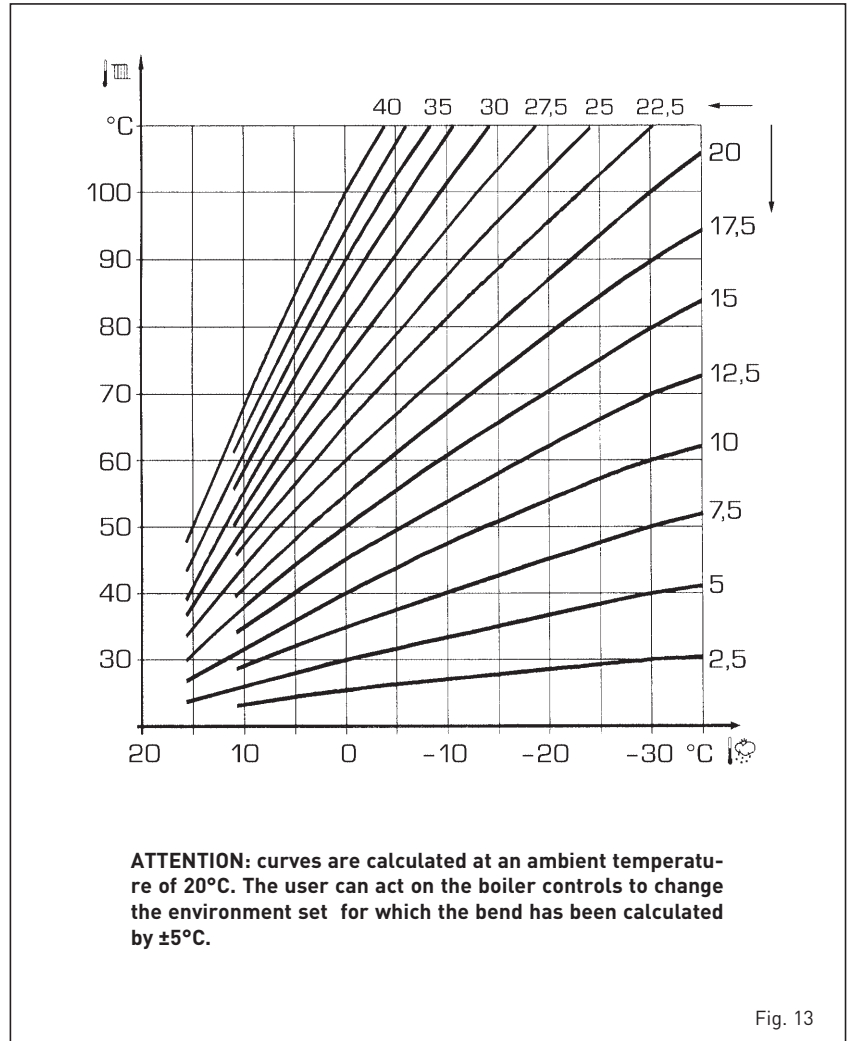


Fig. 13

**If the heating flow probe (SM), heating return probe (SR) or the exhaust fumes sensor (SF) are faulty or open circuit, the boiler will not function.**

TABLE 4 (SM - SS - SF sensor)

Temperature [°C]	Resistance [Ω]
20	12.090
30	8.313
40	5.828
50	4.161
60	3.021
70	2.229
80	1.669

### 3.7 ELECTRONIC IGNITION

Ignition and flame detection is controlled by a electrodes on the burner which guarantees reaction in the case of accidental extinction or lack of gas within one second.

#### 3.7.1 Functioning cycle

Burner ignition occurs within max. 10

seconds after the opening of the gas valve. If after three attempts to light the ignition is not detected the boiler will lockout. This can be due to:

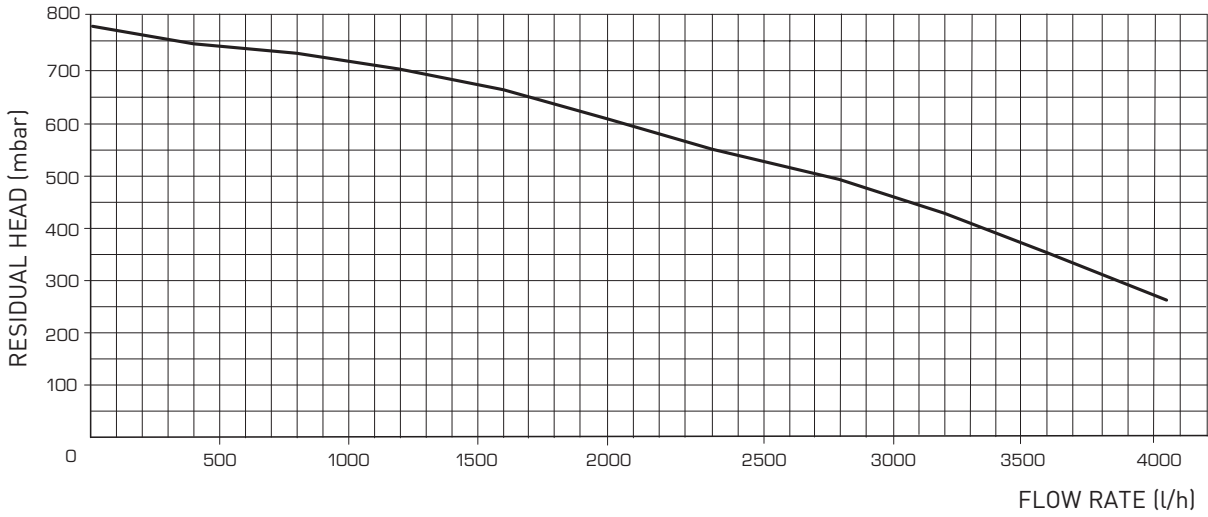
- **Lack of gas**  
The ignition electrode will discharge for max. 10 seconds. If the burner does not ignite, the error ALL06 is signalled. This can happen the first time the boiler is switched on after a long period of inactivity due to the presence of air in the gas pipes. It can be caused by a closed gas tap or by a broken valve coil (the interruption does not allow for opening).
- **No ionisation.**  
The boiler will make three attempts to light. If after then third attempt the flame has not been recognised it may be due to a faulty, worn or distorted ionisation electrode.

In the case of a sudden loss of voltage, the burner will immediately switch off.

When voltage returns, the boiler will automatically start up again.

### 3.8 HEAD AVAILABLE TO SYSTEM (fig. 14)

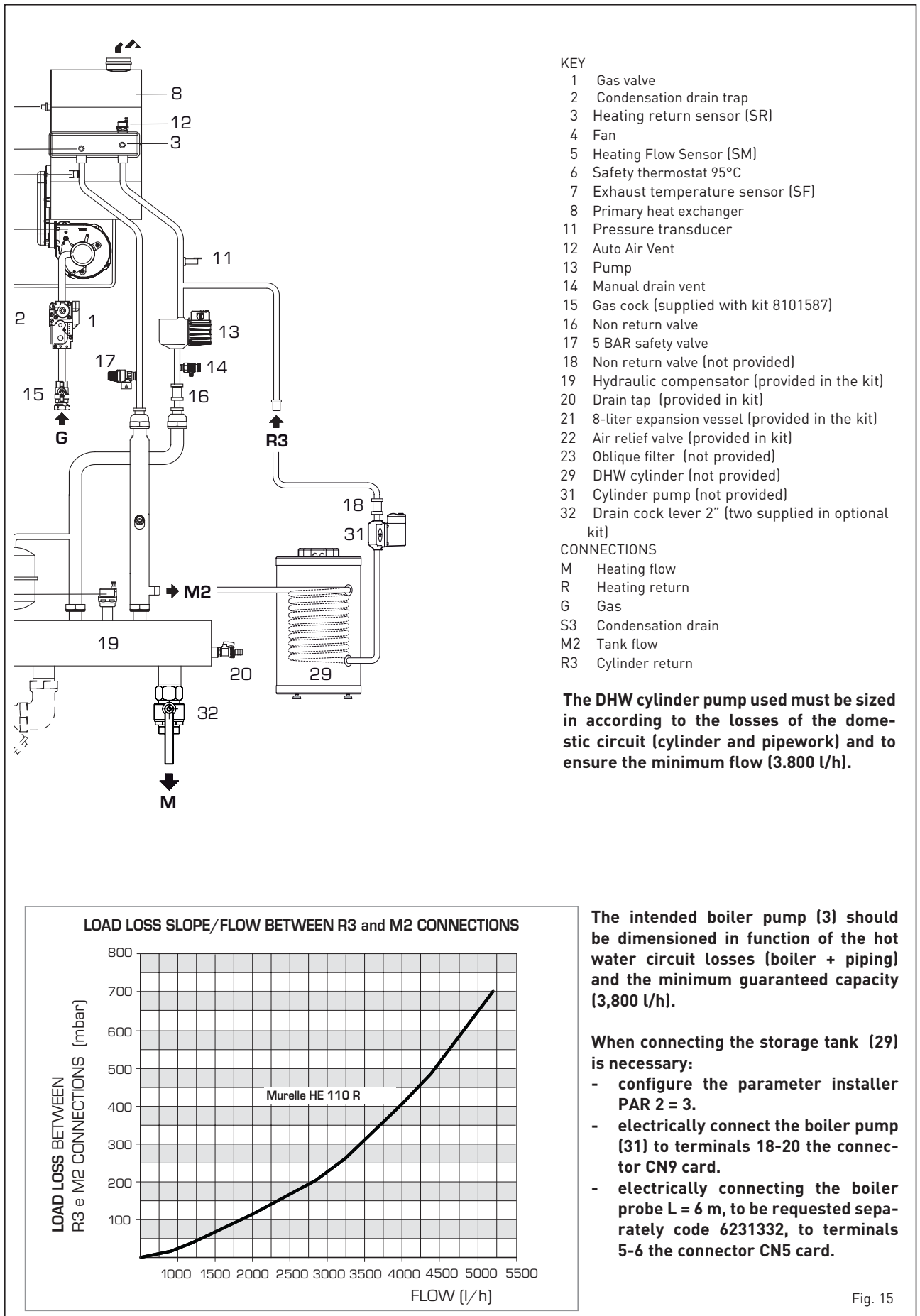
Residual head for the heating system is shown as a function of rate of flow in the graph in fig. 14.



Flow (l/h)	Flow rate (mbar)
0	778
400	748
800	730
1200	701
1600	662
2000	611
2400	555
2800	498
3200	432
3600	353
4000	272
4082	258

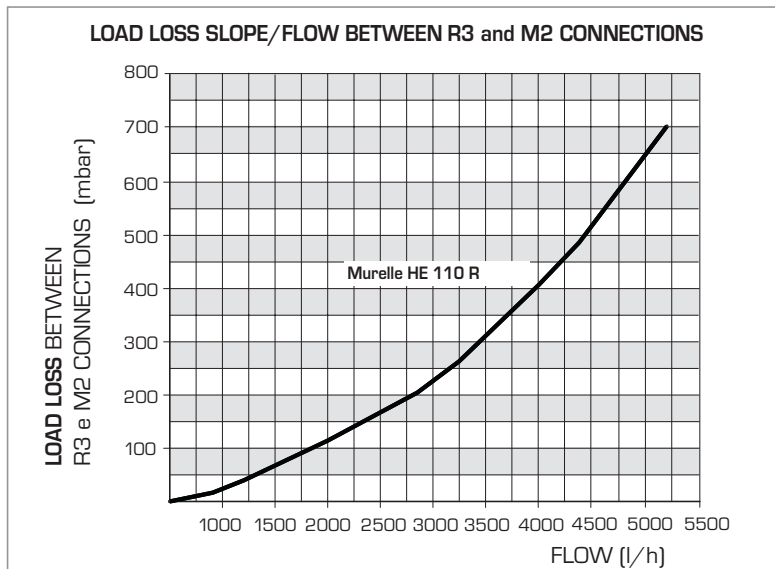
Fig. 14

3.9 "MURELLE HE 110 R" WITH COMPENSATOR KIT CODE 8101587 AND DHW CYLINDER (fig. 15)



- KEY
- 1 Gas valve
  - 2 Condensation drain trap
  - 3 Heating return sensor (SR)
  - 4 Fan
  - 5 Heating Flow Sensor (SM)
  - 6 Safety thermostat 95°C
  - 7 Exhaust temperature sensor (SF)
  - 8 Primary heat exchanger
  - 11 Pressure transducer
  - 12 Auto Air Vent
  - 13 Pump
  - 14 Manual drain vent
  - 15 Gas cock (supplied with kit 8101587)
  - 16 Non return valve
  - 17 5 BAR safety valve
  - 18 Non return valve (not provided)
  - 19 Hydraulic compensator (provided in the kit)
  - 20 Drain tap (provided in kit)
  - 21 8-liter expansion vessel (provided in the kit)
  - 22 Air relief valve (provided in kit)
  - 23 Oblique filter (not provided)
  - 29 DHW cylinder (not provided)
  - 31 Cylinder pump (not provided)
  - 32 Drain cock lever 2" (two supplied in optional kit)
- CONNECTIONS
- M Heating flow
  - R Heating return
  - G Gas
  - S3 Condensation drain
  - M2 Tank flow
  - R3 Cylinder return

The DHW cylinder pump used must be sized in according to the losses of the domestic circuit (cylinder and pipework) and to ensure the minimum flow (3.800 l/h).



The intended boiler pump (3) should be dimensioned in function of the hot water circuit losses (boiler + piping) and the minimum guaranteed capacity (3,800 l/h).

When connecting the storage tank (29) is necessary:

- configure the parameter installer PAR 2 = 3.
- electrically connect the boiler pump (31) to terminals 18-20 the connector CN9 card.
- electrically connecting the boiler probe L = 6 m, to be requested separately code 6231332, to terminals 5-6 the connector CN5 card.

Fig. 15

## 4 COMMISSIONING, USE and MAINTENANCE

### COMMISSIONING INSTRUCTIONS

A Commissioning checklist is included in this manual and must be completed by the engineer at the time of commissioning.

#### General

Please note: the combustion for this appliance has been checked, adjusted and preset at the factory for operation on the gas type defined on the appliance data plate. However, it is advisable to check for correct combustion having first checked the following.

- That the boiler has been installed in accordance with these instructions
- The integrity of the flue system and the flue seals
- That PAR 9 has been set according to the calculated flue head losses (single boilers)
- That PAR 1 is set correctly for boilers connected to cascade flues
- The integrity of the boiler combustion circuit

Proceed to put the boiler into operation as follows:

#### 1. Check the operational (working) gas inlet pressure.

Set up the boiler(s) to operate at maximum rate as described in 4.5.1

(chimney sweep)

With the boiler operating in the maximum rate condition check that the operational (working) gas pressure at the inlet gas pressure test point (see fig 16 item 1) complies with the requirements of table 1.3.

Ensure that this inlet pressure can be obtained with all other gas appliances in the property working.

#### 2. Competence to carry out the check of combustion performance

- The person carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyser and the interpretation of the results.
- The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers requirements, and
- Competence can be demonstrated by satisfactory completion of the CPA1 ACS assessment, which covers the use of electronic portable gas analysers in accordance with BS 7967, parts 1 to 4.

#### 3. Combustion check

Connect the flue gas analyser to the flue gas sampling point as shown in the diagram (fig. 15/a).

Procedure for checking the combustion.

Operate the boilers in "Chimney Sweep" mode as described in section 4.5.1 and record the measurements from the flue gas analyser on both minimum and maximum output. Compare the results to the following:

CO less than 200ppm

CO<sub>2</sub> between 8.7% and 9.3% natural gas, and 9.9% and 10.5% LPG

Ratio less than 0.004

If the combustion reading is greater than the acceptable value AND the integrity of the complete flue system, combustion circuit seals have been verified, AND the gas inlet pressure has been verified, AND the boiler parameter settings are correct, proceed as shown in 4.2.3

Any adjustments should be done in small steps and adjustments of no more than 1/8th of a turn should be made, waiting at least 1 minute between adjustments to allow the settings to stabilise. Using the CO<sub>2</sub> reading, adjustments should be made to the "OFF-SET" screw (6 fig 16) if it is incorrect at the minimum output, or to the "SHUTTER" (5 fig 16) if it is incorrect at the maximum output.

If an acceptable setting level cannot be achieved, re-confirm that the integrity of the flue system, combustion circuit and working gas supply pressure. If required contact Sime Ltd for further assistance.

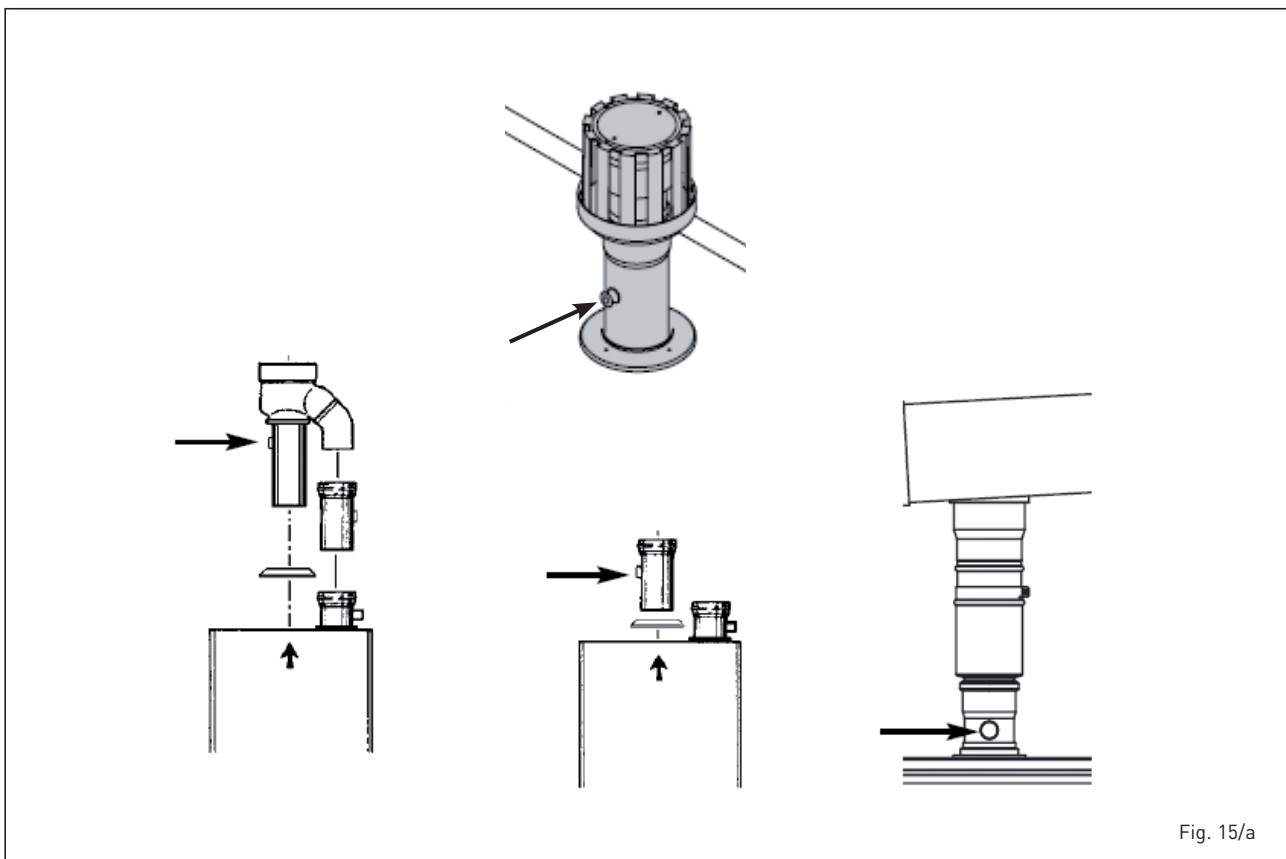
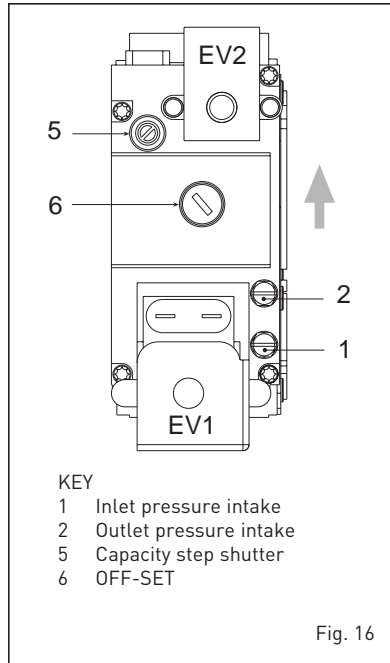


Fig. 15/a

#### 4.1 GAS VALVE (fig. 16)

The boiler is supplied as standard with a gas valve, model SIT 822 NOVAMIX (fig. 16).



#### 4.2 GAS CONVERSION (fig. 17)

**This operation must be performed by authorised personnel using original Sime components.**

To convert from natural gas to LPG or vice versa, perform the following operations

- Close the gas cock.
- Replace the nozzle with OR (1) and gasket (2) with the one supplied in the kit.
- On completion of the conversion test all gas connections using suitable leak detection fluid. Do not use a naked flame.
- Apply the new data plate showing the correct gas used.
- Re configure PAR 1, as shown in 4.2.1, and check the combustion performance as described in 4.2.2.

##### 4.2.1 New fuel configuration

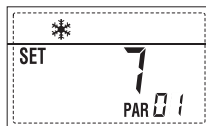
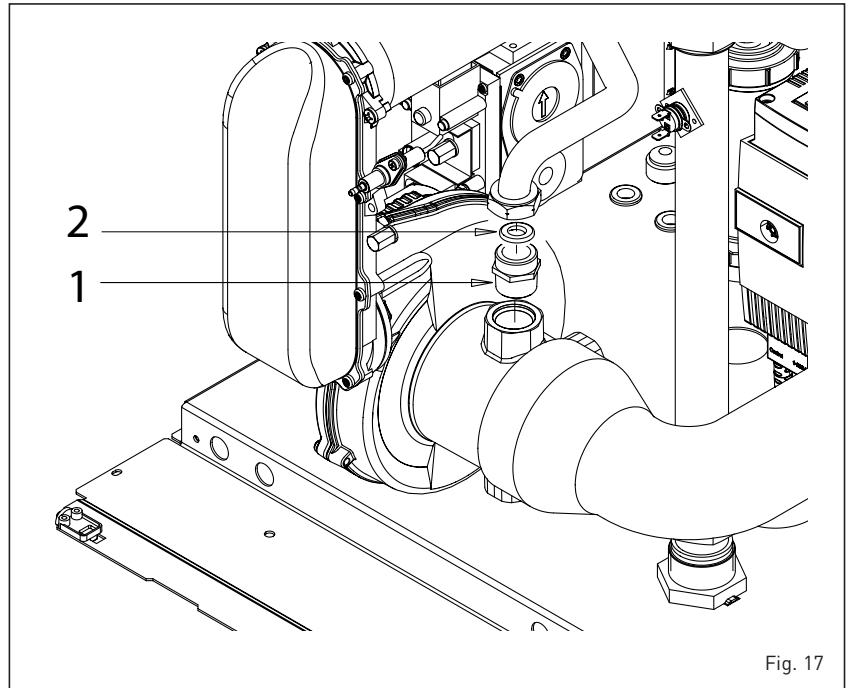
For access to the installer's parameters, press simultaneously keys and for 5 seconds (3 fig. 12).

Scroll parameters using the or buttons.

The SET of the parameter is changed using the and .

The display pane will show the values of the parameter PAR 1.

If the boiler is a methane (G20) model, SET 7 will be displayed:



To change the fuel to propane (G31), it is necessary to set SET 15, by pressing the key .



The standard display will automatically return after 10 seconds.

The table below shows the SET settings to enter when the type of gas fuel is changed.

GAS	BOILER	PAR 1
NATURAL GAS (G 20)	Single (110 HE IE)	7
	Cascade	8
PROPANE (G 31)	Single (110 HE IE)	15
	Cascade	16

##### 4.2.2 Calibrating the gas valve pressures

This can only be done using a flue gas analyser. If the combustion reading is greater than the acceptable value AND the integrity of the complete flue system and combustion seals have been verified, and the inlet gas pressure has been verified then adjustments to the gas valve can be made as described below. Make only small adjustments (1/8 turn max), and allow time for the combustion analysis to be made before making further adjustments.

##### Sequence of operations:

- 1) Press and hold the button down for a few seconds .
- 2) Press the button for a few seconds .
- 3) Identify the CO<sub>2</sub> values at max. power by adjusting the shutter (5 fig. 16):

MAX power	
CO <sub>2</sub> (Methane)	CO <sub>2</sub> (Propane)
9,0 ±0,3	10,2 ±0,3

- 4) Press the button for a few seconds .
- 5) Identify the CO<sub>2</sub> values at min. power by adjusting the OFF-SET regulation screw (6 fig. 16):

MIN power	
CO <sub>2</sub> (Methane)	CO <sub>2</sub> (Propane)
9,0 ±0,3	10,2 ±0,3

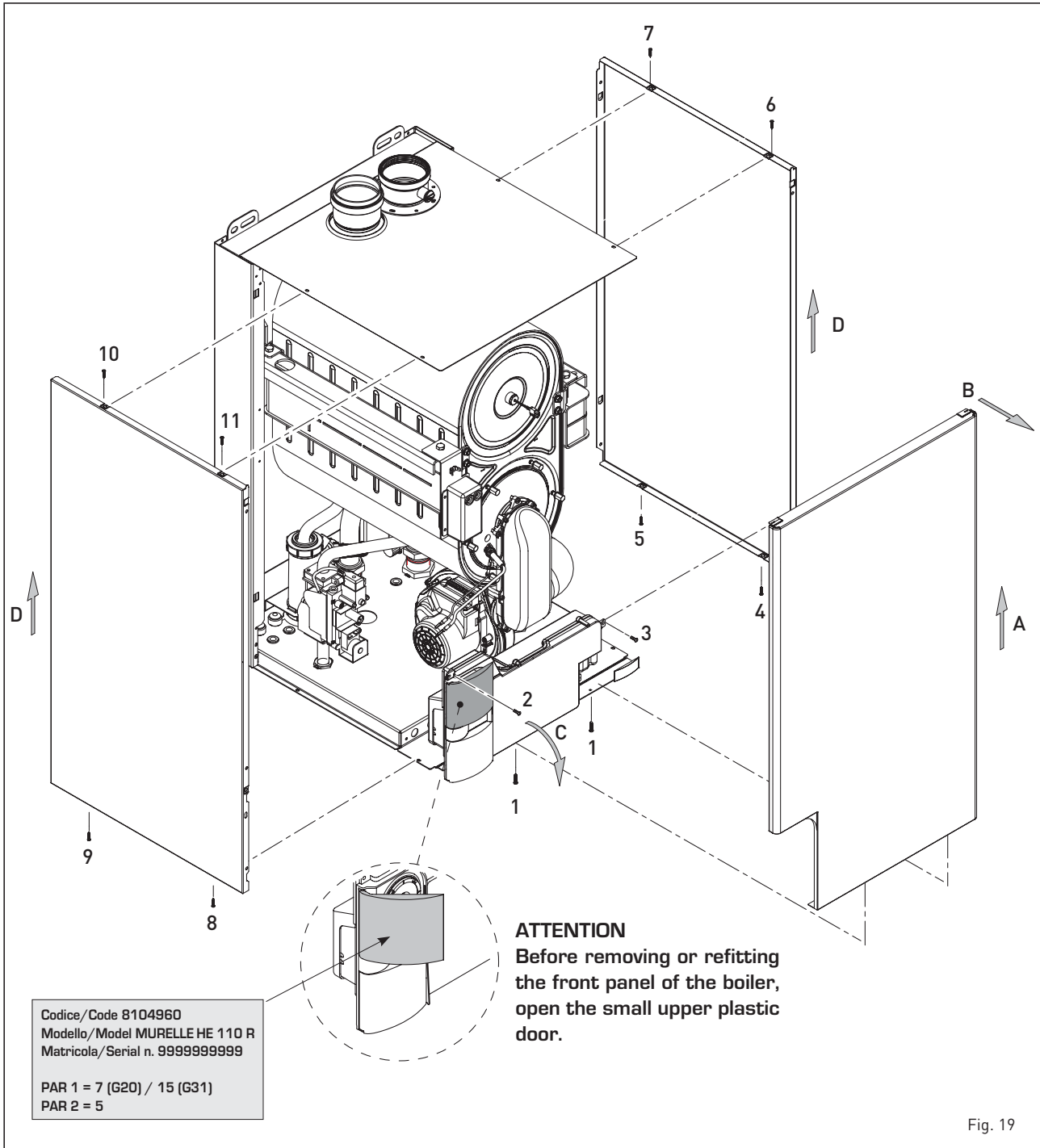


Fig. 19

6) Press the min and max values several times using the and buttons, reset as necessary.

7) Press the button once more to quit the function.

#### 4.3 CO / CO<sub>2</sub> RATIO

		CO ppm	
		100	400
CO <sub>2</sub> %	NG 9%	0,0011	0,0044
	LPG 10%	0,0010	0,0040

#### 4.4 DISASSEMBLING THE SHELL (fig. 19)

To simplify maintenance operations on the boiler, it is also possible to completely remove the shell, as shown in figure 19.

Turn the control panel to move it forward and be able to access the internal components of the boiler.

#### 4.5 MAINTENANCE

To ensure correct operation and efficien-

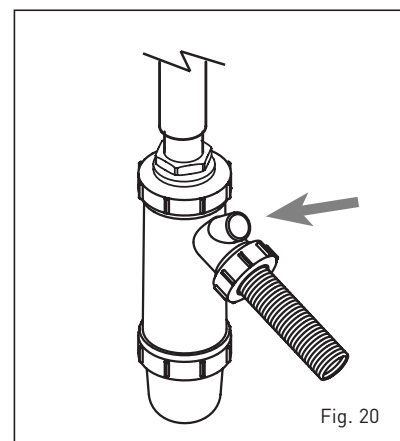


Fig. 20

cy it is important that the boiler is serviced at regular intervals, at least once a year (this may also be a condition of the warranty). Servicing must only be done by a qualified technician. It is recommended that the service should include the removal and inspection of the burner and its insulation. On completion a combustion analysis must be done. During the routine service the condensate drain can be checked, by carefully pouring water into the combustion chamber, while the burner is removed.

Should the boiler not be used for long periods of time, it is important that the condensate trap is checked and filled if required. It can be filled via the filling vent, see fig 20.

#### 4.5.1 Chimney sweep function (fig. 21)

To check boiler combustion, press the installer's key for a few seconds. The chimney sweep function will switch on and will continue for 15 minutes.

**(ATTENTION! Ensure adequate circulation to the heating system is available before activating chimney sweep.)**

If the key and are pressed during the 15 minutes of the chimney sweep function, the boiler will be brought respectively to maximum and minimum power.

**The chimney sweep function will automatically switch off after 15 minutes or when the key is pressed again.**

1 = Curve setting A

2 = Curve setting B

3 = Curve setting A + B

The turning off of the function happens clicking on the button OFF (return of PAR 43 to the value 0) or automatically at the end of the function.

The set of the mixed zone follows the development of the selected curve and reaches a maximum of 55°C.

During the function all the other heating demands are ignored (heating, sanitary,

antifreeze and chimney sweep).

During the functioning the display shows the remaining days for the completion of the function (example mains digits -15 = 15 days lack to the end of the function). The diagram fig. 22 reports the development of the curve.

#### ATTENTION:

- Observe the relevant standards and regulations of the floor manufacturer!
- Proper functioning is ensured only

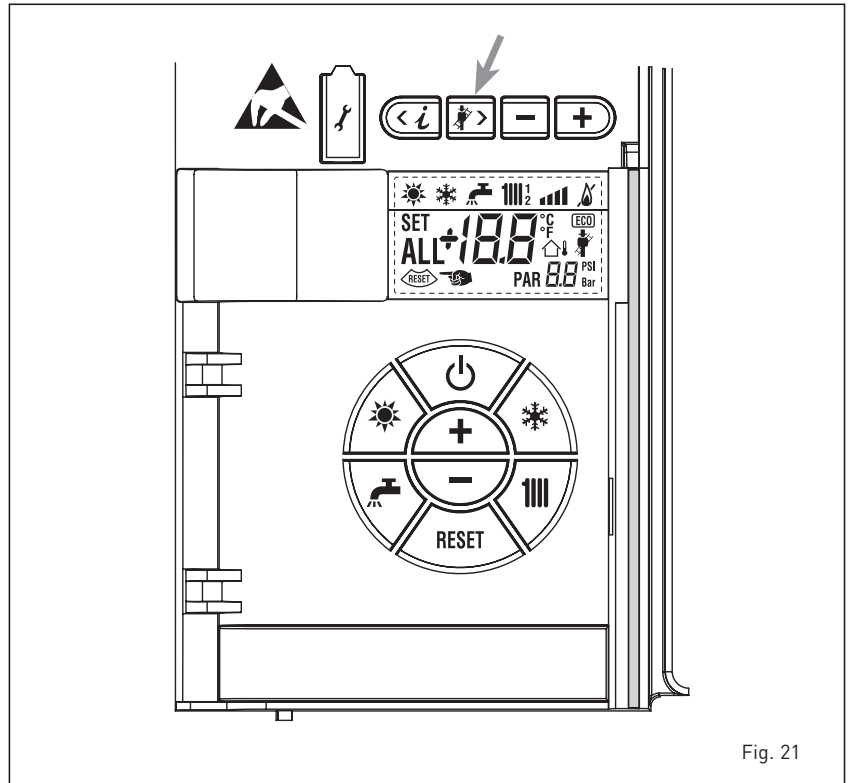


Fig. 21

#### GENERAL

**PLEASE NOTE : During routine servicing, and after any maintenance or change of any part of the combustion circuit, the following must be checked:**

- The integrity of the flue system, and the flue seals.
- The integrity of the combustion circuit and the relevant seals.
- The combustion performance, as described in the commissioning section

#### 4.5.2 Operation floor drying (fig. 22)

The operation floor drying keeps the floor at a pre-established temperature profile and it is activated only for those systems combined with the mixed zone card ZONA MIX code 8092234. The temperature profiles can be selected by means of the installer parameter PAR 43:  
0 = Not activated function

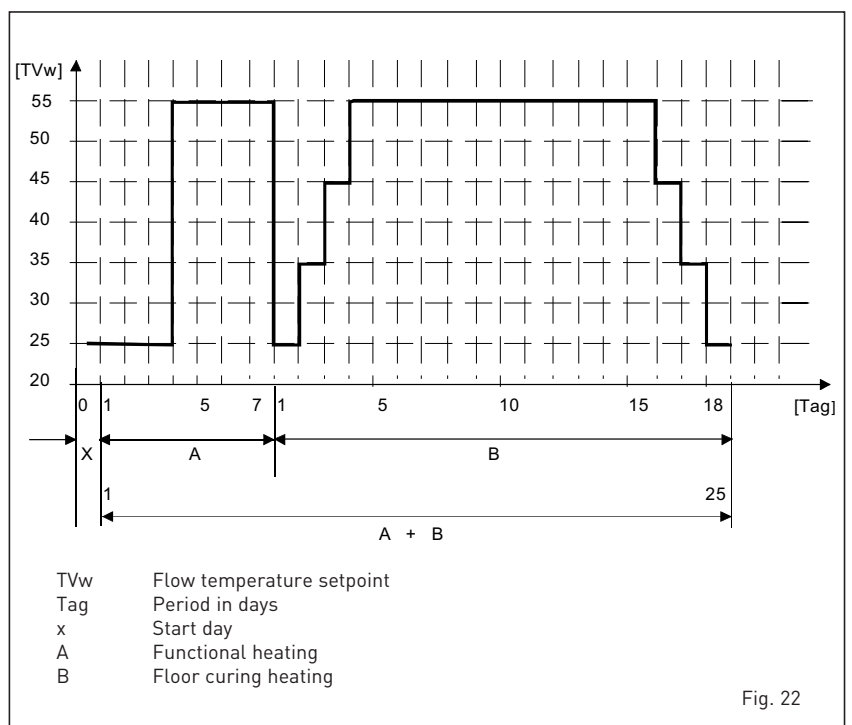


Fig. 22



when the plant is correctly installed (hydraulic system, electrical installation, settings)! If not observed, the floor might get damaged!

#### 4.6 FUNCTIONING ERRORS

When there is a functioning error, an alarm appears on the display **and the blue luminous bar may become red.**

Descriptions of the errors with relative alarms and solutions are given below:

**- LOW WATER PRESSURE ERRORS ALARM 02 (fig. 23/a)**

If the pressure detected by the transducer is lower than 0.5 bar, the boiler stops and the display shows the alarm "ALL 02". Using the external filling device, fill the system until the pressure indicated by the transducer is between 1 and 1.5 bars (PAR4 default).

**If the load procedure has to be repeated several times, it is advisable to check that the seal of the heating circuit is intact (check that there are no leaks).**

**- HIGH WATER PRESSURE ERROR ALARM 03 (fig. 23/b)**

If the pressure detected by the transducer is more than 4.8 bar, the boiler stops and the display shows anomaly "ALL 03" (PAR 4 default).


**- D.H.W. SENSOR ERROR ALARM 04 (fig. 23/c) (Disabled)**

Check that PAR2 is set correctly.

**- HEATING FLOW SENSOR ERROR ALARM 05 (fig. 23/d)**

If the heating flow sensor (SM) is open or short circuited, the boiler will not function and the display will show the alarm "ALL 05".

**- LOCKOUT ALARM 06 (fig. 23/e)**

If a flame is not detected after a complete ignition sequence, or for any other reason the card cannot "see" the flame, the boiler will stop and the display will show the alarm "ALL 06". Press the key  of the controls (2) to start up the boiler again.

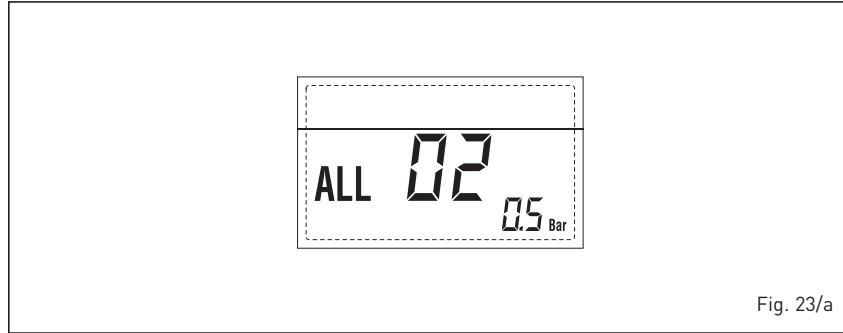


Fig. 23/a

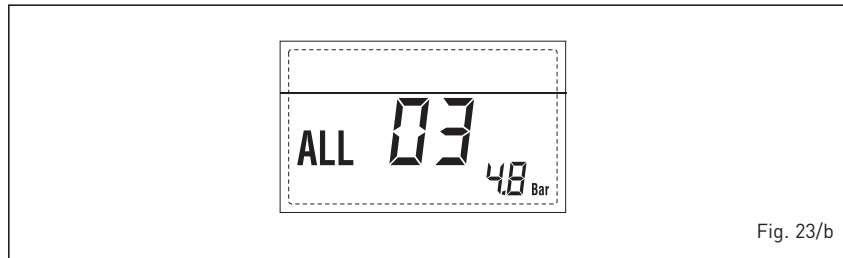


Fig. 23/b



Fig. 23/c



Fig. 23/d

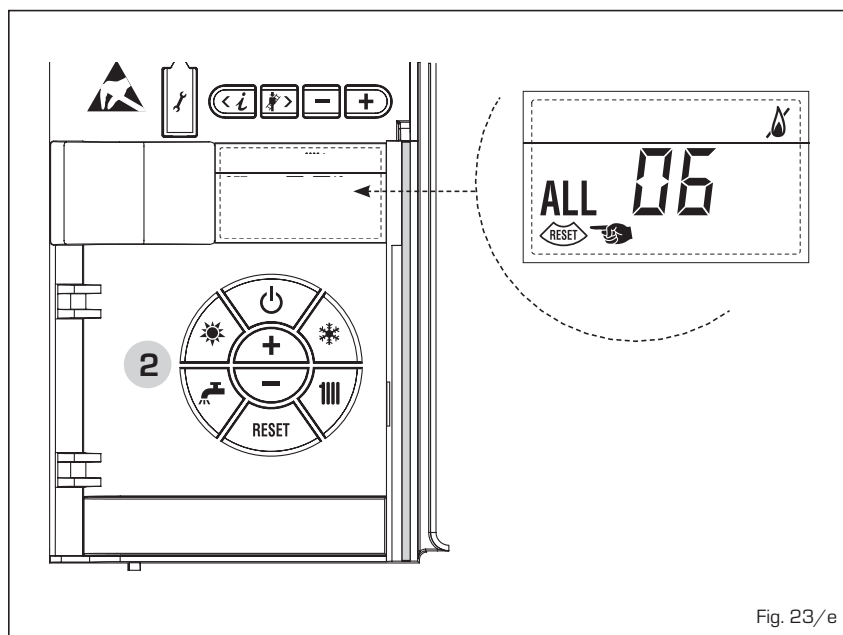



Fig. 23/e

- **SAFETY/LIMIT THERMOSTAT ERROR ALARM 07 (fig. 23/f)**

If either the 95 degree stat or the heat exchanger safety stat opens, the burner will turn off and ALL 07 will be displayed. If the thermostat connection is restored within the minute, the boiler will start up working normally again, otherwise it will stop and the display will show the alarm "ALL 07". Press the key  of the controls (2) to start up the boiler again.

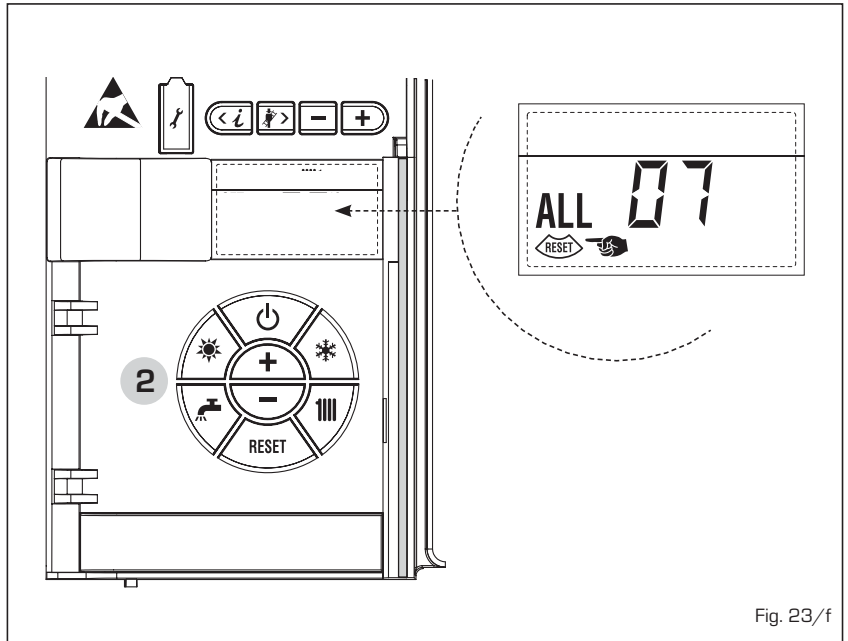


Fig. 23/f

- **FLAME DETECTION ERROR ALARM 08 (fig. 23/g)**

If the flame control section recognises the presence of a flames in phases when they should not be present, it means there is a breakdown in the flame detection circuit; the boiler will stop and the display will show error "ALL 08".

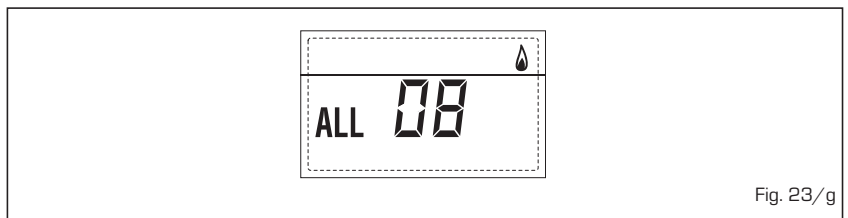


Fig. 23/g

- **WATER CIRCULATION ERROR ALARM 09 (fig. 23/h)**

1, Water circulation has not been detected in the primary(boiler) circuit. If this error is detected the boiler will make two further attempts. If circulation is not detected it will stop and display ALL09.

Note, circulation is detected by a small rise in system pressure at the boiler transducer when the pump is energised. In large systems this may not be detected, and can be disabled by alteration of PAR 4.

2, The flow temperature sensor has detected a temperature rise in excess of 5 degrees per second.

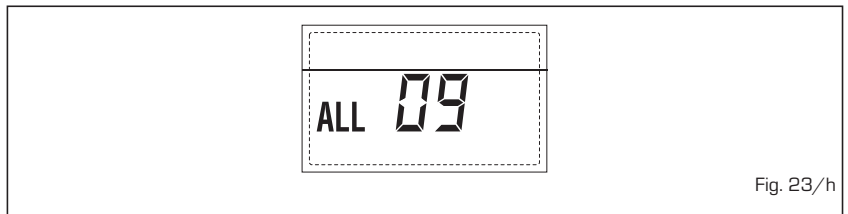


Fig. 23/h

- **AUXILIARY SENSOR ANOMALY ALARM 10 (fig. 23/i)**

SB sensor (if fitted), shorted or open circuit. Confirm correct setting of PAR2.

On BOX version shorted or open circuit of SA sensor.



Fig. 23/i

- **ACTIVATION OF THE EXHAUST TEMPERATURE SENSOR "ALL 13" (fig. 23/l)**

The activation of this probe causes the boiler to stop and error message "ALL 13" to display.

Press the key  of the controls (2) to start up the boiler again.

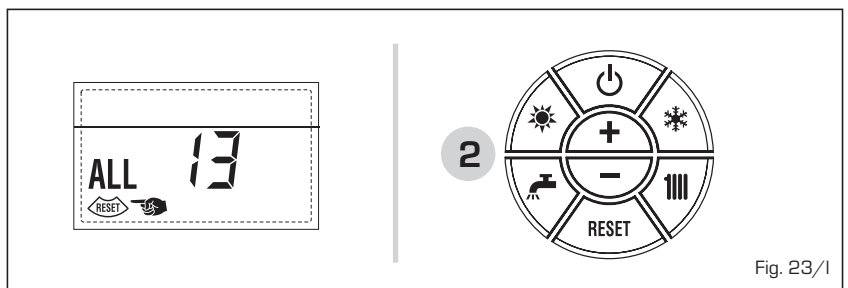


Fig. 23/l

- **EXHAUST FUMES TEMPERATURE SENSOR ERROR "ALL 14" (fig. 23/m)**

If the exhaust fumes probes is open or short-circuited, the boiler stops and error message "ALL 14" displays.

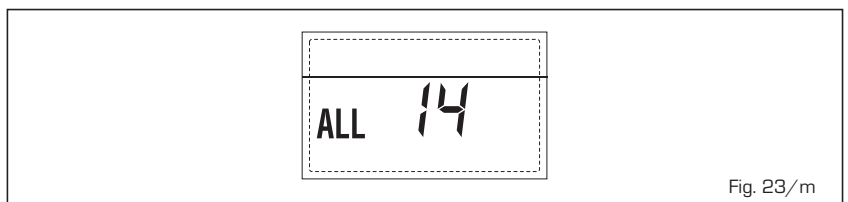


Fig. 23/m

**- FAN ERROR**

**"ALL 15" (fig. 23/n)**

If the fan speed is not within the rated speed range, the display will show ALL15. If the problem persists for more than two minutes the boiler will stop for thirty minutes, and then attempt to resume.

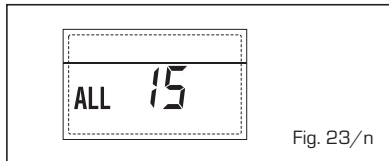


Fig. 23/n

**"ALL 22" (fig. 23/s)**

When a mixed zone board is connected to the boiler, an intervention of the safety thermostat switches the mixed zone pump, the mixed zone valve closes and the display indicates ALL 22. During this anomaly the boiler continues to function normally.

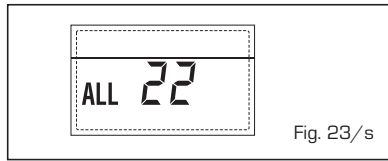


Fig. 23/s

circuited, on the display the anomaly ALL 26 appears. During this anomaly the boiler continues to function normally but loses the solar function that is no longer available.

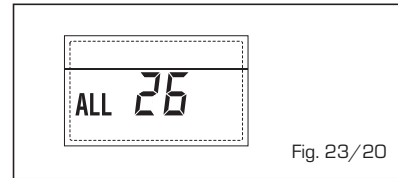


Fig. 23/20

**- EXTERNAL PROBE ERROR**

**(fig. 23/p)**

When fitted if the external temperature sensor is short-circuited, the symbol flashes on the display . During such error the boiler continues normal functioning.

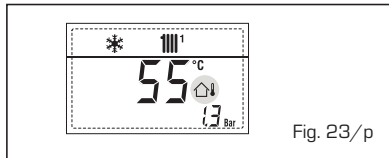


Fig. 23/p

**- DELIVERY PROBE BREAKDOWN**

**SECOND MIXED ZONE**

**"ALL 23" (fig. 23/t)**

When the mixed zone board is connected to the boiler, if the delivery probe is open or short circuited the display will show ALL23. During this error the boiler continues to function normally.

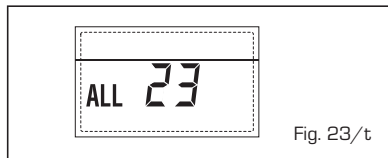


Fig. 23/t

**- ERROR SOLAR APPLICATION COMPATIBILITY "ALL 27" (fig. 23/21)**

When the hydraulic configuration is not consistent with the selection solar application, on the display the anomaly ALL 27 appears.

During this anomaly the boiler continues to function normally but for the board is active in the solar anomaly, the function is only available antifreeze collector.

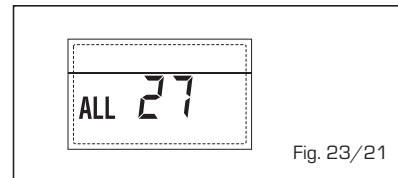


Fig. 23/21

**- SAFETY THERMOSTAT INTERVENTION FIRST MIXED ZONE "ALL 20" (fig. 23/q)**

When the mixed zone board is connected to the boiler, a safety thermostat intervention switches on the mixed zone pump, the mixed zone valve closes and the display indicates error ALL 20.

During this anomaly the boiler continues to function normally.

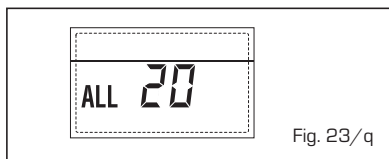


Fig. 23/q

**- SOLAR COLLECTOR SENSOR ERROR (S1) "ALL 24" (fig. 23/18)**

When the solar probe is open or short circuited, on the display the anomaly ALL 24 appears. During this anomaly the boiler continues to function normally but loses the solar function that is no longer available.

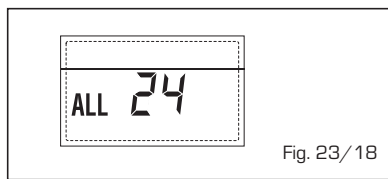


Fig. 23/18

**- COMPATIBILITY INPUT (S3) ERROR ONLY FOR SYSTEM 7 "ALL 28" (fig. 23/22)**

When a probe is connected instead of a clean contact on entry S3 the board on display shows the anomaly ALL 28. During this anomaly the boiler continues to function normally but for the board is active in the solar anomaly, the function is only available antifreeze collector.

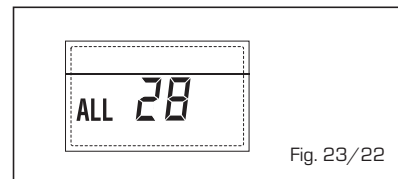


Fig. 23/22

**- DELIVERY PROBE BREAKDOWN ANOMALY FIRST MIXED ZONE "ALL 21" (fig. 23/r)**

When the mixed zone board is connected to the boiler, if the delivery probe becomes open or short circuit the display will indicate ALL21. During this error, the boiler continues to function normally.

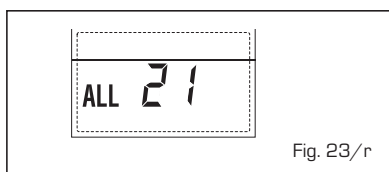


Fig. 23/r

**- SOLAR PROBE ERROR STORAGE TANK (S2) "ALL 25" (fig. 23/19)**

When the solar probe is open or short circuited, on the display the anomaly ALL 25 appears. During this anomaly the boiler continues to function normally but loses the solar function that is no longer available.

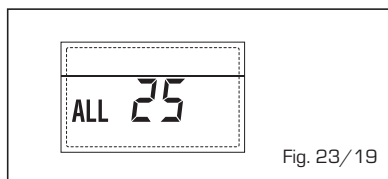


Fig. 23/19

**- NUMBER OF BOARD CONNECTED ERROR "ALL 29" (fig. 23/u)**

When the number of connected boards does not correspond to the number of boards set in the PCB (PAR40) or there is no communication with it, the display indicates ALL29.

During this error the boiler continues to function normally.

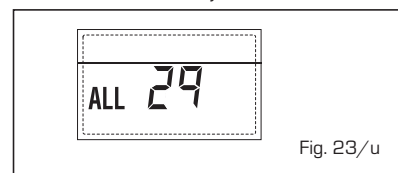


Fig. 23/u

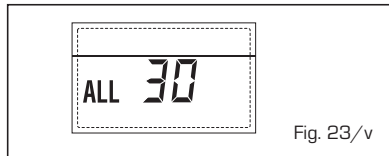
**- SAFETY THERMOSTAT INTERVENTION SECOND MIXED ZONE**

**- AUXILIARY SENSOR ERROR (S3) "ALL 26" (fig. 23/20)**

When the solar probe is open or short

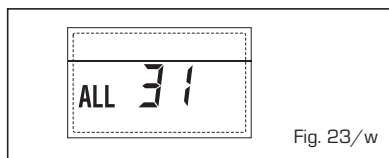
- **HEATING RETURN SENSOR ERROR  
"ALL 30" (fig. 23/v)**

When the heating return temperature sensor(SR) ids open or short circuited the display shows ALL30. During such error the boiler continues normal functioning.



- **CASCADE DELIVERY SENSOR  
ERROR"ALL 31" (fig. 23/w)**

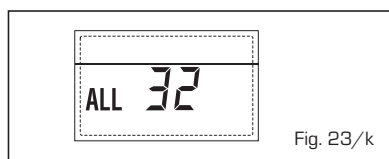
In cascade systems, should the cascade delivery temperature sensor(SMC) become open or short circuited, the display will show ALL31. during this error the boilers will continue normal functioning.



- **THREE ZONE CONFIGURATION ERROR  
"ALL 32" (fig. 23/k)**

When RS-485 boards are not sufficient number and/or at least one board is not a mixed area, the boiler stops and the display shows the error ALL 32.

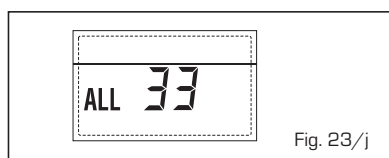
The boiler re-start when you activate the correct configuration for systems with 3 zones.



- **RS-485 COMUNICATION  
ERROR IN MODBUS MODE  
"ALL 33" (fig. 23/j)**

When PAR 16 is different from "- -" and there isn't communication between boiler board and RS-485 board (in MODBUS mode and at least 4 minutes) the boiler stop and the display shows ALL 33.

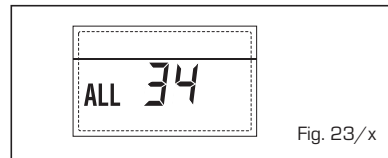
The boiler re-start when the communication is restored or set PAR 16 = "- -".



- **RS-485 COMUNICATION  
ERROR IN CASCADE MODE  
"ALL 34" (fig. 23/x)**

When il PAR 15 is different from "- -" and there isn't communication between boiler board and RS-485 board (in CASCADE mode) the boiler stop and the display shows ALL 34.

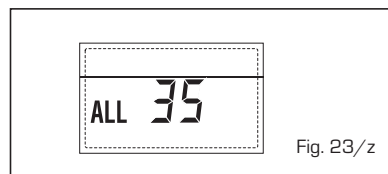
The boiler re-start when the communication is restored or set PAR 15 = "- -".



- **COMMUNICATION ERROR BETWE-  
EN RS-485 BOARD AND RS-485 BO-  
ARD "ALL 35" (fig. 23/z)**

When PAR 15 is different from "- -" and there isn't communication between RS-485 board and RS-485 board the boiler stop and the display shows ALL 35.

The boiler re-start when the communication is restored or set PAR 15 = "- -".



**ATTENTION: In cascade connecting, re-  
mote control display CR 73 shows 70  
and 71 error codes:**

- **ALARM 70**

When there is an error that stops the cascade connecting (Cascade flow probe ALL 31) the remote control display CR 73 shows 70 error.

Check the fault on the cascade.

- **ALARM 71**

When there is an error in one of modules and the others continue to operate, the remote control display CR 73 shows 71 error. Check the fault on the cascade.

## Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed. This is also a condition of any extended warranty offered.

### Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

#### Service 1 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 2 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 3 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 4 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 5 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 6 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Operative ID No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 7 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 8 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 9 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

#### Service 10 Date:

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

## INSTALLATION CHECKLIST

### SINGLE BOILER INSTALLATION

**PAR 9** (see section 2.5)      Calculated head loss of flue, see tables on fig 6, 7 and 8 MMh20       Set value of PAR 9

**PAR 14** (See section 2.6.6)      When BMS input used, and input is 10v, the required flow temperature =  °C      Set value of PAR 14

### BOILERS INSTALLED IN CASCADE

#### ALL BOILERS IN THE CASCADE

**PAR 15** (see fig 4/b)      The cascade address must be set in each boiler in the cascade, denoting the master and each slave ( Master = 0)

	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Boiler 6
Set value of PAR 15	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**PAR 9** (see section 2.5)      When installed in cascade but individually flued, PAR 9 on each boiler must be set according to the calculated head loss, tables on fig 6,7 and 8

	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Boiler 6
Calculated head loss	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Set value of PAR 9	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**PAR 1** (see section 2.2.2)      When installed with a cascade flue, incorporating a clappet( non return) valve, PAR 1 must be set accordingly on each boiler in the cascade

	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Boiler 6
Set value of PAR 1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### MASTER BOILER

**OEM A1** (see section 2.2.2)      When the number of boilers in the cascade is greater than two, the OEM A1 on the MASTER boiler (boiler with PAR 15=0), must be set to the same value as the number of boilers in the cascade. This can only be done after PAR 15 has been set.

Number of boilers in cascade   
 Set value of OEMA1  on boiler number

**PAR 14** (See section 2.6.6)      When BMS input used, and input is 10v, the required flow temperature =  °C      Set value of PAR 14  on the master boiler

# Commissioning Checklist for Murelle HE 110 R Single Boilers and Boilers in Cascade

This checklist is for guidance only, and is not a full installation safety check

Address \_\_\_\_\_ Commissioning Engineer \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_

## All Systems

Has the system been flushed and cleaned in accordance with BS7593 and manufactureres recommendations?  YES

What system cleanser was used? \_\_\_\_\_

What inhibitor was used? \_\_\_\_\_ Quantity  Litres

	1	2	3	4	5	6	7	8
Satisfactory visual check of flue Y/N								
Flue within allowable length and correctly terminated Y/N								
Confirm Tightness of installation pipework downstream of Isolating valve using leak detection fluid Y/N								
Check tightness of all valves Y/N								
Carryout ignition test of boiler with gas isolated to ensure boiler fails safe Y/N								
Turn on gas supply to boiler and isolate main burner(disconnect gas valve) and ensure boiler goes to lockout Y/N								
Reset boiler lockout and retry, ensuring boiler again locks out Y/N								
Reconnect gas valve, reset boiler lockout, and ensure boiler lights and is stable Y/N								
Test safety devices Y/N								
Safety stat(TS) - Disconnect - the boiler locks out Y/N								

Flue analysis	Boiler 1		Boiler 2		Boiler 3		Boiler 4		Boiler 5		Boiler 6		Boiler 7		Boiler 8	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Boiler Output																
CO ppm																
CO2 %																
Ratio																
Boiler size																
Serial Number																
Completed By																
Date																

## 5 FAULT FINDING

If an electrical fault occurs on the appliance the preliminary electrical system checks must be carried out first.

When any service or replacement of electrical components which has required the breaking and re-making of electrical connections has taken place, the following tests must be repeated:

- earth continuity;
- short circuit;
- polarity;
- resistance to earth.

### 5.1 EARTH CONTINUITY CHECK

Appliances must be electrically disconnected, meter set on  $\Omega$  (ohm) x 1 scale and adjust zero if necessary. Test leads from any appliance earth point (e.g. inside control box) see wiring diagrams (section 7) to earth pin on plug.

Resistance should be less than 1  $\Omega$  (ohm). If the resistance is greater than 1  $\Omega$  (ohm) check all earth wires for continuity and all contacts are clean and tight. If the resistance to earth is still greater than 1  $\Omega$  (ohm) then this should be investigated further.

### 5.2 SHORT CIRCUIT CHECK

Switches turned FULL ON - meter set on  $\Omega$  (ohms) x 1 scale. Test leads from L to N on appliance terminal block, if meter reads 0 then there is a short circuit.

Meter set on  $\Omega$  (ohm) x 100 scale. Repeat it with leads from L to E. If meter reads less than infinity ( $\infty$ ) there is a fault.

**NOTE: Should it be found that the fuse has failed but no fault is indicated, a detailed continuity check (i.e. by disconnecting and checking each component) is required to trace the faulty component. It is possible that a fault could occur as a result of local burning/arc-ing but no fault could be found under test. However, a detailed visual inspection should reveal evidence of burning around the fault.**

### 5.3 POLARITY CHECK

Appliance reconnected to mains supply and meter set on 300 V ac scale. Test at appliance terminal block.

- Test leads from L to N meter reads

approx.: 240 V ac.

- Test leads from L to E " \* " meter reads approx. 240 V ac.
- Test leads from N to E " \* " meter reads from 0 to 15 V ac.

### 5.4 RESISTANCE TO EARTH CHECK

Appliance must be disconnected from main supply and meter on  $\Omega$  (ohm) x 100 scale.

All switches including thermostat on test leads from L to E - if meter reads other than infinity ( $\infty$ ) there is a fault which should be isolated.

A detailed continuity check is required to trace the faulty component.

#### IMPORTANT:

**These series of checks are the first electrical checks to be carried out during a fault finding procedure. On completion of the service/fault finding task which has required the breaking and remaking of electrical connections then the checks 5.1 Earth continuity, 5.3 Polarity and 5.4 Resistance to earth must be repeated.**



## 6 REPLACEMENT OF PARTS

The boiler certification and warranty will be void should spares or replacement parts be used that are not supplied by Sime Ltd, and only suitably qualified personnel are permitted to work on gas appliances.

Ensure that the boiler is isolated from the gas and electrical supply before commencing work. Use appropriate personal safety equipment and be aware of hot surfaces and hot water.

Close the flow and return valves, and use the drain vents provided before removal of any part of the hydraulic circuit.

The boiler shell can be removed to improve access, see 4.4

The control panel can be lowered after removal of the securing screw.

### 6.1 BURNER INSPECTION

Isolate the electrical and gas supply.

Lower the control panel.

Disconnect the ignition and ionisation electrodes.

Disconnect the air inlet to the fan.

Disconnect the gas connection at the fan.

Disconnect the two electrical connections from the fan.

While supporting the assembly, remove the six nuts securing the burner plate.

Carefully remove the burner / fan assembly from the heat exchanger.

Inspect the internal section of the heat exchanger, clean if required using a soft brush and vacuum cleaner.

Inspect the burner seals and insulation, replace if damaged.

Check the position and condition of the ignition and ionisation electrodes, replace if required. Refit in reverse order.

On completion a flue gas analysis must be taken. See section 4- Commissioning.

### 6.2 FAN

Remove the burner / fan assembly as described in 6.1.

Remove the four fixing bolts and remove the fan.

Inspect the gasket and replace if necessary.

Fit the fan and replace in reverse order.

On completion a flue gas analysis must be taken. See section 4- Commissioning.

### 6.3 PUMP

Isolate the electrical and gas supply.

Lower the control panel.

Where possible to improve access, remove the RHS panel, see 4.4

Isolate the flow and return valves, and drain the boiler using the drain vents provided.

Protect any electrical equipment from possible

spills of system water.

Disconnect the electrical connection.

Remove the pump noting its orientation.

Fit the new pump in the reverse order, using new washers, ensuring it is oriented in the correct direction.

### 6.4 WATER PRESSURE TRANSDUCER

Isolate the electrical and gas supply.

Lower the control panel.

Where possible to improve access, remove the RHS panel.

Isolate the flow and return valves, and drain the boiler using the drain vents provided.

Protect any electrical equipment from possible spills of system water.

Disconnect the electrical connection.

Unscrew the transducer

Ensure the waterway is clear

Refit in reverse order.

### 6.5 PCB (PRINTED CIRCUIT BOARD)

Isolate the electrical and gas supply.

Lower the control panel.

Remove the PCB covers

Disconnect all the plugs around the circuit board noting positions of single connections.

Remove the PCB fixing screws.

Replace in reverse order

The new or replacement PCB will need to be reconfigured to suit the boiler.

PAR 1 will need to be set according to the gas used

PAR 2 will need to be set according to the boiler configuration

See section 3.3.

Boilers used in cascade may require additional configuration, see installation checklist.

### 6.6 GAS VALVE

Isolate the electrical and gas supply.

Lower the control panel.

Where possible to improve access, remove the LHS panel, see 4.4

Remove the electrical connection to the gas valve.

Disconnect the gas cock

Remove the gas pipe securing nut at base of boiler

Disconnect the gas connection at then fan  
Remove the gas valve and pipe assembly from the boiler

Remove the pipework from the gas valve and fit to the replacement valve

Replace the gaskets as required.

Replace in reverse order.

On completion the gas valve will require adjustment. See section 4.

### 6.7 FLOW AND RETURN SENSORS (SM, SR)

Isolate the electrical and gas supply.

Lower the control panel.

Where possible to improve access, remove the RHS panel, see 4.4

Isolate the flow and return valves, and drain the boiler using the drain vents provided.

Protect any electrical equipment from possible spills of system water.

Disconnect the electrical connection to the sensor

Unscrew the sensor

Refit in reverse order.

### 6.8 SAFETY STAT

Isolate the electrical and gas supply.

Lower the control panel.

Disconnect the electrical connection.

Remove the two fixing screws.

Apply heat conducting paste to the replacement stat.

Refit in reverse order.

### 6.9 EXHAUST SENSOR (SF)

Isolate the electrical and gas supply.

Disconnect the exhaust sensor.

Unscrew the exhaust sensor.

Refit in reverse order.

### 6.10 IGNITION TRANSFORMER

Isolate the electrical and gas supply.

Remove the ignition transformer cover fixing screws.

Disconnect the electrical connections.

Remove the securing screws.

Replace in reverse order.

### 6.11 IGNITION ELECTRODE

Isolate the electrical and gas supply.

Remove the ignition transformer cover fixing screws.

Disconnect the ignition electrode wiring.

Remove the Ignition electrode fixing screws.

Remove the ignition electrode.

Check the gasket and replace if required.

Refit in reverse order.

### 6.12 IONISATION ELECTRODE

Isolate the electrical and gas supply.

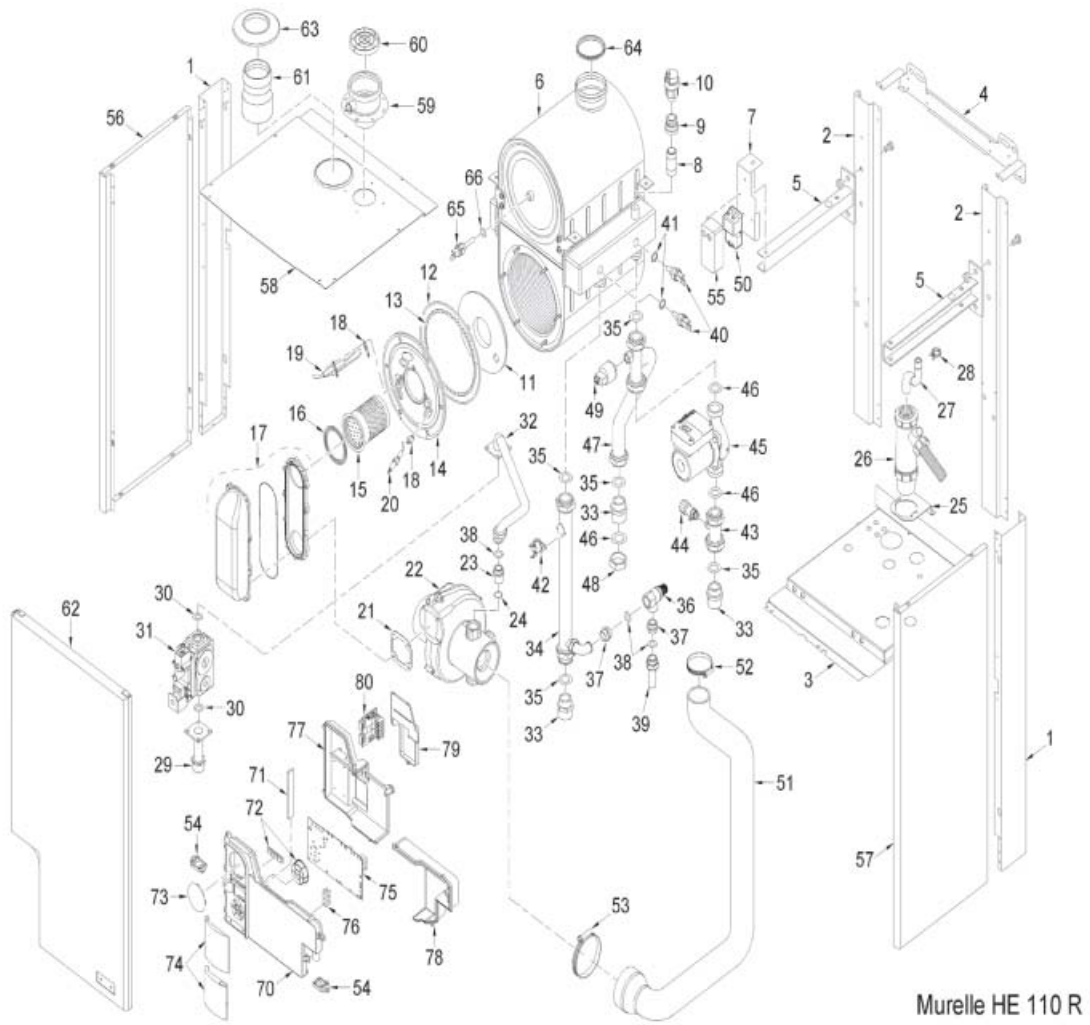
Disconnect the ionisation electrode wiring.  
Remove the ionisation electrode fixing screws.  
Remove the ionisation electrode.  
Check the gasket and replace if required.  
Refit in reverse order.

### 6.13 SAFETY DISCHARGE VALVE

Isolate the electrical and gas supply.  
Lower the control panel.  
Where possible to improve access, remove the  
RHS panel, see 4.4  
Isolate the flow and return valves, and drain the  
boiler using the drain vents provided.  
Protect any electrical equipment from possible  
spills of system water.  
Disconnect the discharge pipe.  
Disconnect the safety discharge valve.  
Remove the washer.  
Replace in reverse order using a new washer.

## 7 EXPLODED VIEWS

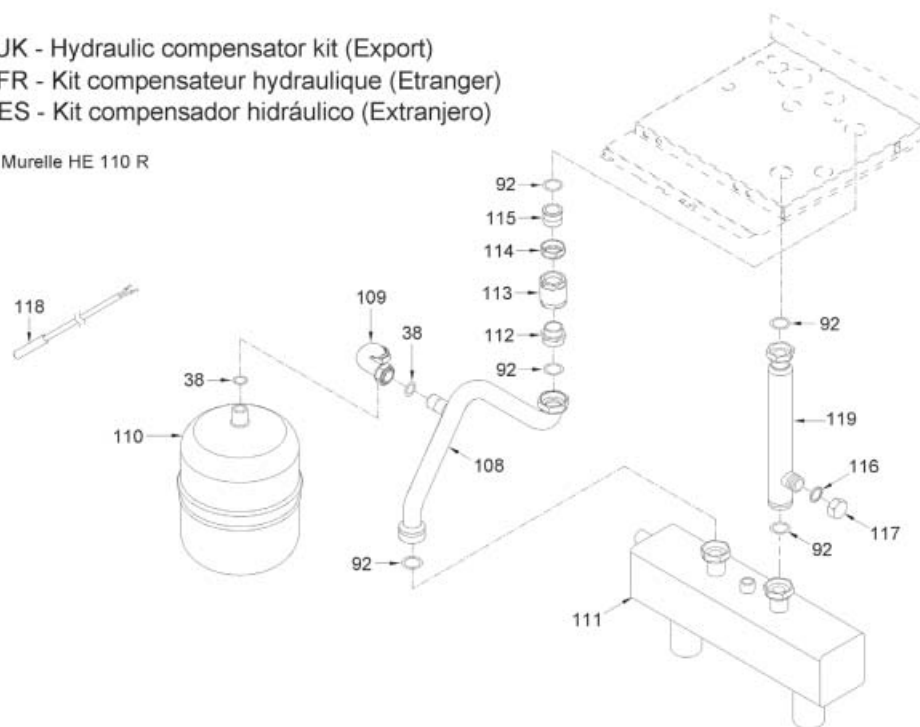
8104960 CALD.MET. MURELLE HE 110 R



Murelle HE 110 R

UK - Hydraulic compensator kit (Export)  
 FR - Kit compensateur hydraulique (Etranger)  
 ES - Kit compensador hidráulico (Extranjero)

Murelle HE 110 R



Posiz.	Codice	Descrizione	
001	6138555	Right/left hand side frame part	
002	6256731	Main exchanger rear support	
003	6138896	Frame assembly lower side	
004	6138715	Frame assembly upper support	
005	6294823	Main exchanger support	
006	6278915	Main exchanger body	
007	6189562	Ignition transformer panel brac	
008	6070815	Extension MM 3/4"	
009	6104710	Reduction	
010	6013105	Automatic air vent 1/2"	
011	6269009	Main exchanger door insulation	
012	6278967	Combustion chamber O-ring	
013	6278968	Glass fibre sealing cord	
014	6278854	Main exchanger door	
015	6278360	Premix burner	
016	6174823	Gasket for burner flange	
017	6278880	Air-gas hose	
018	6174809	Gasket for ignition electrode	
019	6221622	Ignition electrode	
020	6221623	Ionisation electrode	
021	6174816	Gasket for fan flange	
022	6261413	Fan	
023	6274185	Burner nozzle	MET
023A	6274186	Burner nozzle	GPL
024	6226407	O-ring 130 ø 22,22x2,62	
025	6010822	Water trap bracket	
026	6277201	Water trap	
027	6034155	Condensate drainage pipe	
028	2051123	Clamp diam. 24,2	
029	6226892	Gas inlet pipe	
030	2030223	Gasket NPR 24x35x4	
031	6238503	Gas valve	
032	6226969	Pipe connecting gas valve-mixer	
033	6120529	Nipple 1"1/4 x 1"1/2	
034	6216245	C.H. flow pipe	
035	2030256	Gasket diam.26x38x3	
036	6040210	Pressure relief valve 3/4" 5 ba	
037	6120502	Nipple 3/4" x3/4" OT	
038	2030249	Gasket Ø 24x17x3	
039	6142511	Pipe diam. 18x70x3/4"	
040	6231351	Plunged sensor	
041	6022010	Sensor gasket	
042	6146722	95°C safety stat	
043	6277941	Pump connecting pipe	
044	6017211	Manual air vent 1/4"	
045	6124820	Circulating pump	

046	2030254	Gasket Ø 33x44x3
047	6277942	Pump connecting pipe
048	6229505	Plug 1-1/2"
049	6273610	Water pressure transducer
050	6098350	Ignition transformer
051	6001155	Pipe Ø 60
052	2051200	Hose clamp Ø 50-70
053	2051202	Hose clamp Ø 90-110
054	6302000	Plastic pin
055	6159710	Ignition transformer protection
056	6242235	Casing left hand side panel
057	6242135	Casing right hand side panel
058	6010861	Upper protection shield
059	6083062	Flue inlet flange Ø 80
060	6190001	Intake terminal Ø 80
061	6296527	Reducer DN 80-100"
062	6304233	Casing front panel
063	6230402	External ring for pipe diam.80
064	6248829	Air inlet / smoke outlet gasket
065	6277131	Probe NTC D.4X47
066	6226440	O-ring diam. 9,25x1,78
070	6304700	Control panel
071	6305160	Guidelight with led
072	6305120	Kit Rubber button
073	6247327	Cap for time programmer
074	6304890	Flap door assembly
075	6301480	Main PCB
076	2211610	Earth faston
077	6305000	Cover
078	6305010	connection cover
079	6305020	Time programmer cover
080	6301465	PCB expansion
092	2030206	Piracriten gasket Ø 33,5x45x2
093	6291966	ISPESL safeties pipe
094	6146004	Thermometer 0-120°C
095	6216606	Manometer cock ISPESL 1/4"
096	6216650	Manometer cock connection pipe
097	2030225	Gasket Ø 5,5x11x2
098	6217051	Manometer 0/10 bar
099	6001409	H.L. stat 100°C
100	6291981	Water pressure switch block
101	6291982	90° MM G 1/4" curve
102	6037551	Min.m.reset water press.switch
103	6037550	Safety m.reset water pres.switc
104	2040252	Nipple 1" x 3/4"
105	6042203	Pressure relief valve 3/4" X1" 4
106	5064600	Bulb holder 1/2" L=50
107	6269402	Tundish
108	6227440	C.H. return pipe
109	6227683	Pipe connecting D.H.W. expans.
110	6245108	D.H.W. expansion vessel l. 8
111	6216313	Hydraulic compensator
112	6120527	Nipple 1" 1/2 X 1" 1/4
113	6238304	Check valve
114	6271810	Pipe fitting 1" 1/2
115	6120541	Pipe fitting 1" 1/4"
116	2030257	Gasket diam. 30x22x3
117	6229502	Plug 1" F. OT
118	6231331	D.H.W. tank sensor
119	6291967	C.H. flow pipe
700	5197141	Complete control panel
701	6127214	Main cable L=1500
702	6319169	3 pole cable connector
703	6319162	4 pole cable connector
704	6319167	5 pole cable connector
705	6319164	9 pole cable connector
706	6319168	14 pole cable connector
707	6319166	4 pole cable connector
708	6316202	Connector 4 poli CN6
709	6316203	Connector 4 poli CN4
710	6316204	Connector 8 poli CN7
711	6186587	Ionisation electrode cable
712	6319165	5 pole cable connector
713	5185141	Conversion kit to LPG

## **INDUSTRY GUIDANCE FOR INSTALLERS ON CONDENSATE**

### **DRAINAGE PIPE INSTALLATION**

This guidance is endorsed by HHIC members.

#### **1. BACKGROUND**

During recent winters the UK has experienced prolonged spells of extremely cold weather - down to minus 20°C and below in many areas. This resulted in a significant increase in the number of calls to boiler manufacturers and heating engineers from householders with condensing (high efficiency) boilers where the condensate drainage pipe had frozen and become blocked with ice, causing the boiler to shut down. In the vast majority of cases such problems occur where the condensate drainage pipe is located externally to the building for some part of its length.

British Standards, Building Regulations etc. currently allow condensate drainage pipes to be run either internally or externally, or a combination of these. These documents give guidance on how to install the pipes in order to reduce the possibility of freezing. However this guidance may not be sufficient to prevent freezing in extreme conditions - with widespread and prolonged very low temperatures.

In view of the possibility that UK weather patterns will show more “extremes” in future due to the effects of global climate change, the following guidance updates previous recommendations on condensate drainage pipe installation. All other technical requirements for condensate drain installation given in British Standard BS 6798:2009, or in boiler manufacturers’ installation instructions should still be followed.

#### **2. REVISED GUIDANCE ON CONDENSATE DRAINAGE PIPE INSTALLATION**

Where a new or replacement boiler is being installed, access to an internal “gravity discharge” termination should be one of the main factors considered when determining potential boiler locations, so that the condensate drainage pipe can be terminated as recommended below. On an existing installation, the guidance below should also be followed if work is carried out to “upgrade” the condensate drainage system to reduce the risk of freezing in extreme conditions.

Internal condensate drainage pipework must be a minimum of 19mm ID (typically 22mm OD) plastic pipe and this should “fall” at least 45 mm per metre away from the boiler, taking the shortest practicable route to the termination point.

In order to minimise the risk of freezing during prolonged very cold spells, one of the following methods of terminating condensate drainage pipe should be adopted -

## **2.1 INTERNAL TERMINATION:**

Wherever possible, the condensate drainage pipe should be terminated at a suitable internal foul water discharge point such as (a) an internal soil and vent stack or (b) an internal kitchen or bathroom waste pipe, washing machine waste pipe etc. A suitable permanent connection to the foul waste pipe should be used. Figures 1, 2(a), 2(b) show appropriate connection methods.

The possibility of waste pipes freezing downstream of the connection point should be considered when determining a suitable connection point - e.g. a slightly longer pipe run to an internal soil stack may be preferable to a shorter run connecting into a kitchen waste pipe discharging directly through the wall to an external drain.

Where "gravity discharge" to an internal termination is not physically possible (e.g. the discharge point is above the appliance location, or access is obstructed by a doorway), or where very long internal pipe runs would be required to reach a suitable discharge point, the following measures may be adopted -

## **2.2 USE OF A CONDENSATE PUMP (TO AN INTERNAL TERMINATION):**

Condensate can be removed using a proprietary condensate pump, of a specification recommended by the boiler or pump manufacturer.

The pump outlet should discharge to a suitable internal foul water discharge point, such as (a) an internal soil and vent stack or (b) an internal kitchen or bathroom waste pipe, washing machine waste pipe etc. Figure 3 shows a typical connection method.

A suitable permanent connection to the foul waste pipe should be used and the manufacturer's detailed installation instructions for the pump should be followed.

## **2.3 EXTERNAL TERMINATION:**

The use of an externally-run condensate drainage pipe, terminating at a suitable foul water discharge point or purpose-designed soakaway, may be also be considered; however if this termination method is chosen then the following measures should be adopted -

The pipe should be run internally as far as possible before going externally and the pipe diameter should be increased to a minimum of 30mm ID (typically 32mm OD) before it passes through the wall.

The external run should be kept as short as possible, taking the most direct and "most vertical" route possible to the discharge point, with no horizontal sections in which condensate might collect.

The external pipe should be insulated using suitable waterproof and weatherproof insulation ("Class O" pipe insulation is suitable for this purpose) .

The use of fittings, elbows etc should be kept to a minimum and any internal “burrs” on cut pipework should be removed so that the internal pipe section is as smooth as possible.

The customer/householder should be advised that even with the above measures this type of installation could freeze, and that if this were to occur then boiler shutdown could result, requiring remedial action - possibly involving a chargeable engineer call-out.

Where there are likely to be extremes of temperature or wind-chill, the use of a proprietary trace-heating system for external condensate drainage pipework, incorporating an external frost thermostat, should therefore be considered. If such a system is used then the installation instructions of the trace heating manufacturer and any specific recommendations regarding pipe diameter, insulation, etc. should be followed. All other relevant guidance on condensate drainage pipe installation should also be followed.

*Other cold weather protection methods approved or endorsed by boiler manufacturers and/or service organisations may be adopted if these are considered suitable by the parties involved.*

If an external soil/vent stack is used as the external termination then the connection method shown in Figure 4 should be used, together with the measures on insulation etc. as described above and shown in the diagram.

When a rain water downpipe is used as the termination (**NB** only permissible if this downpipe passes to a combined foul and rainwater drainage system) an air break must be installed between the condensate drainage pipe and the downpipe to avoid reverse flow of rainwater into the boiler should the downpipe itself become flooded or frozen. Figure 5 shows a suitable connection method.

Where the condensate drainage pipe is terminated over an open foul drain or gully, the pipe should terminate below the grating level, but above water level, in order to minimise “wind chill” at the open end. Pipe drainage will be improved if the end is cut at 45° as opposed to a straight cut. The use of a drain cover (such as those used to prevent blockage by leaves) may offer further protection from wind chill. Figure 6 shows a suitable connection method.

Where the condensate drain pipe terminates in a purpose-designed soakaway (see BS 6798:2009 or boiler installation manual for soakaway design requirements) any above-ground section of condensate drainage pipe should be run and insulated as described above. Figure 7 shows a suitable connection method.

### **3. UNHEATED INTERNAL AREAS:**

Internal condensate drainage pipes run in unheated areas such as lofts, basements and garages should be treated as external pipe.





## **NOTES**

*The Benchmark Commissioning Checklist (located at the back of the boiler installation manual) should be completed as required to record details of the condensate drainage pipe installation.*

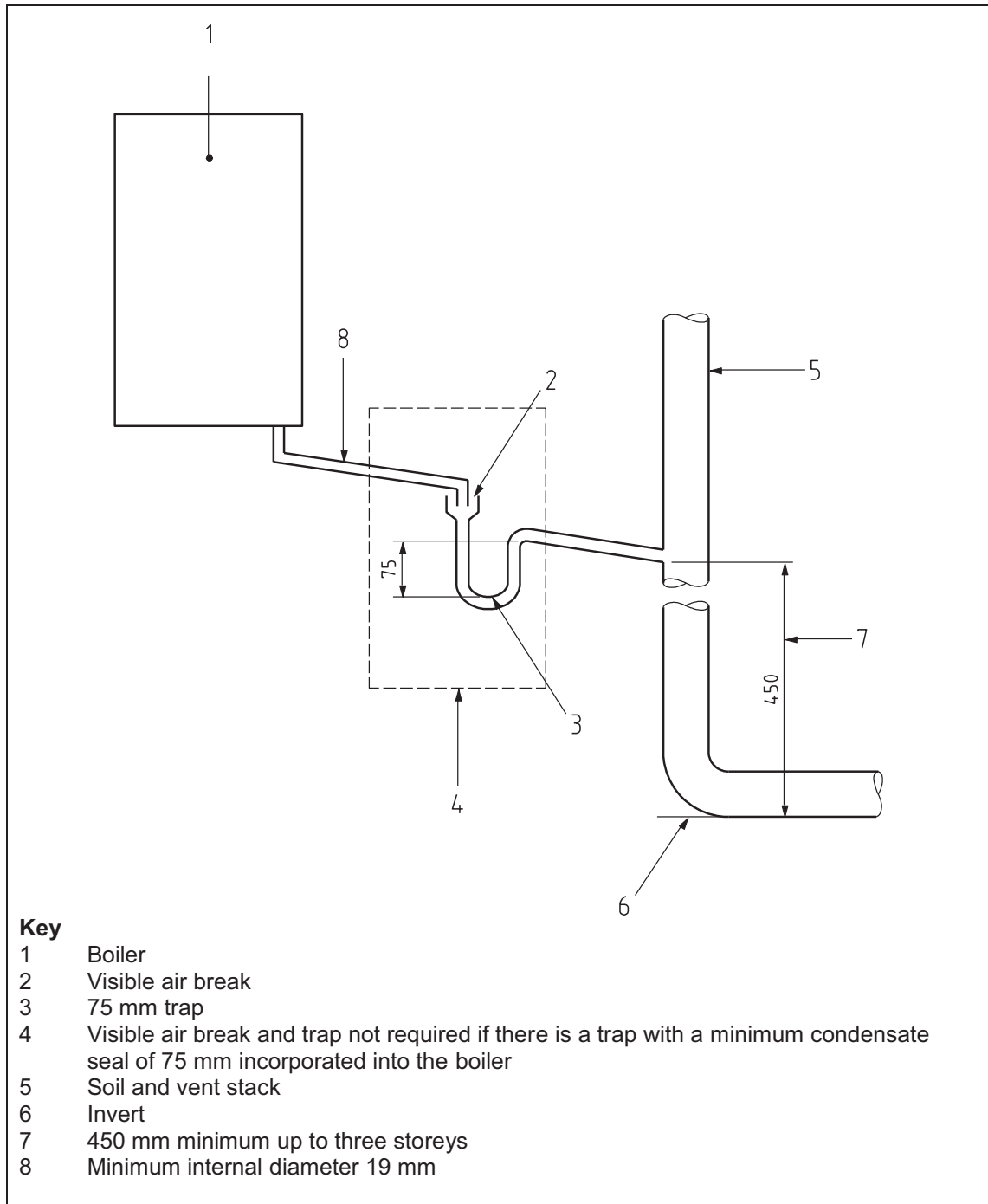
*Where an external condensate drainage pipe is installed, the customer should be made aware of the risks and consequences of its freezing and offered the option to fit trace heating (or other measures approved by the boiler manufacturer or service organisation).*

*Separate guidance has been published for householders on remedial actions which can be taken if a condensate drainage pipe freezes. This may result in requests for alteration to condensate drainage pipework, in which case the guidance above should be followed.*

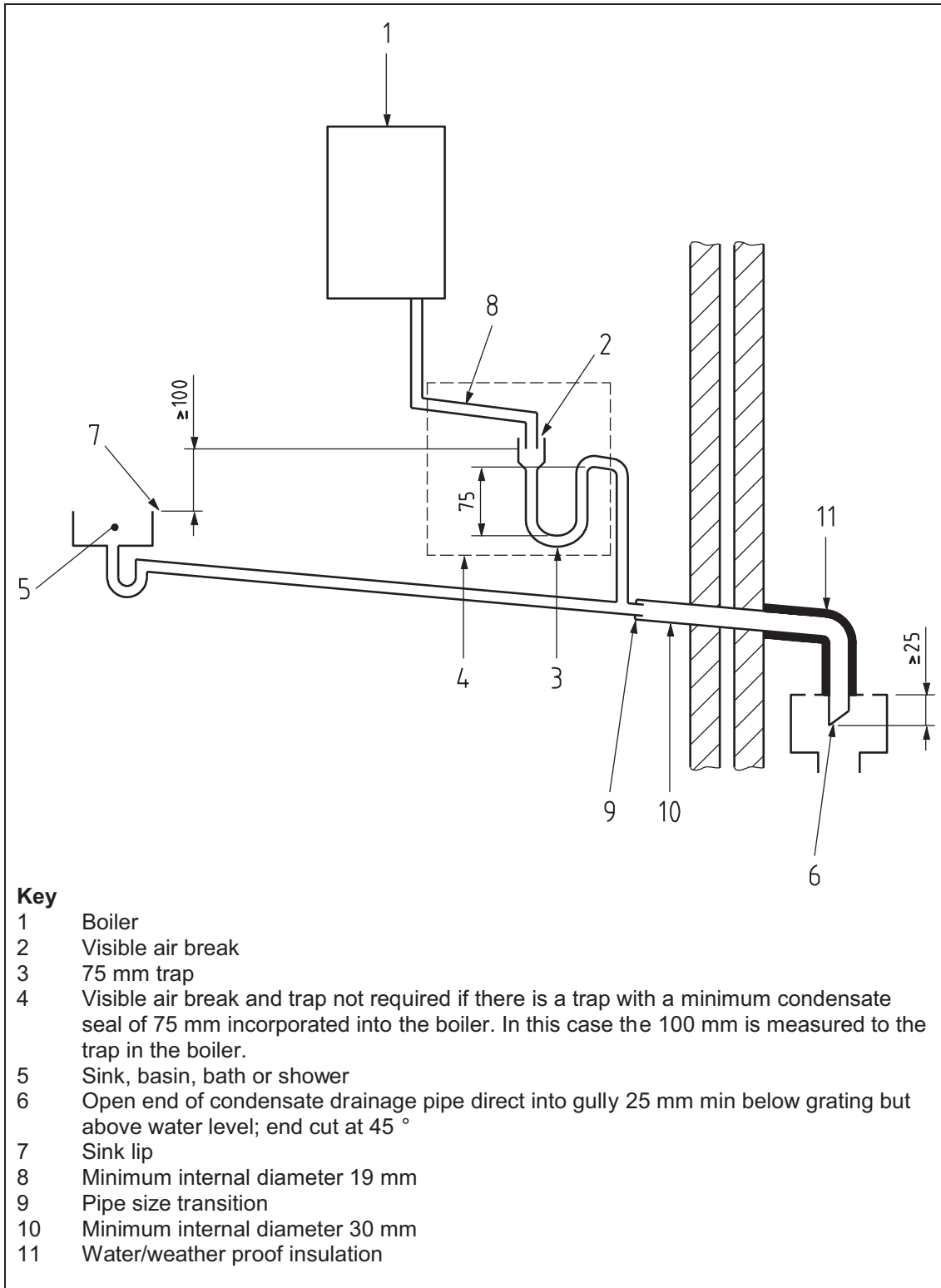
*In some instances (e.g. where an elderly person's heating needs to be reinstated as an emergency measure) condensate drainage pipes may have been cut in order to bypass any blockage and allow re-ignition of the boiler, with condensate being collected in a suitable container as a temporary solution.*

*While not unsafe, this is not recommended practice and if such action has been taken then the condensate drainage pipe must be reinstated as soon as possible, using the above guidance to reduce risk of freezing in future.*

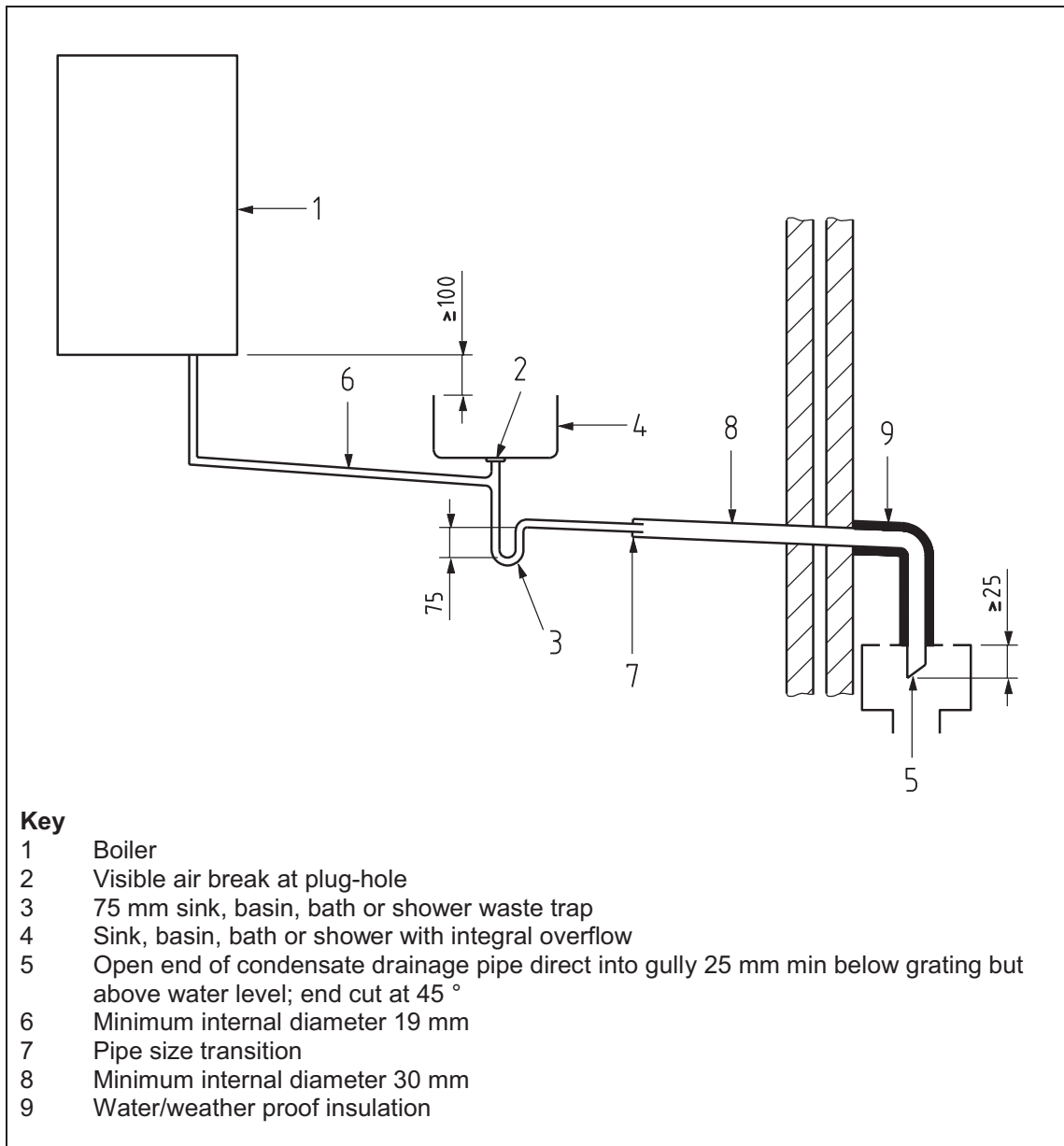
**Figure 1 – Connection of condensate drainage pipe to internal soil and vent stack**



**Figure 2(a) – Connection of a condensate drainage pipe downstream of a sink, basin, bath or shower waste trap**



**Figure 2(b) – Connection of a condensate drainage pipe upstream of a sink, basin, bath or shower waste trap**



**Figure 3 – Connection of a condensate pump - typical method (NB manufacturer’s detailed instructions should be followed).**

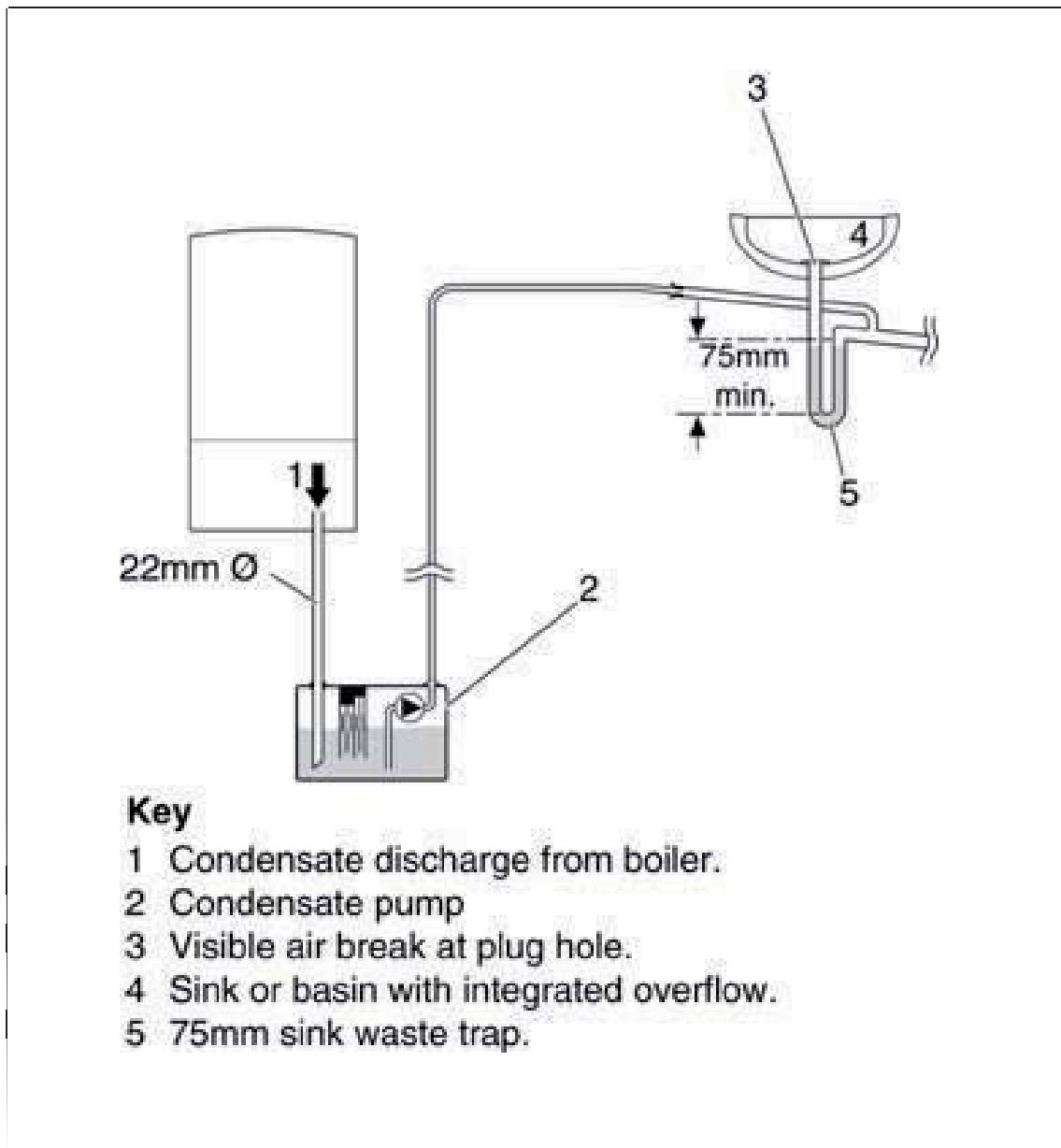


Figure 4 – Connection of condensate drainage pipe to external soil and vent stack

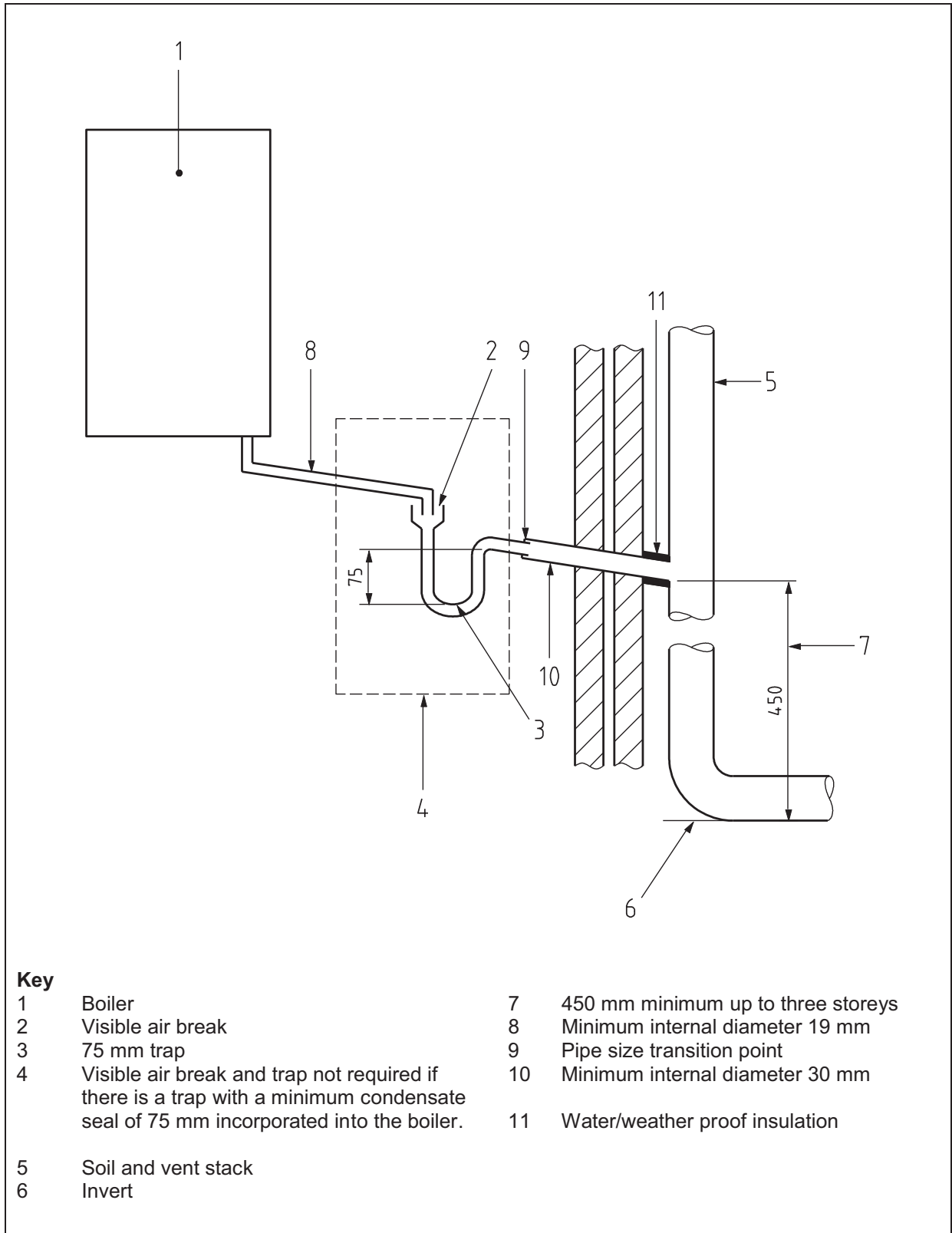


Figure 5 – External termination to rainwater downpipe (NB only combined foul/rainwater drain)

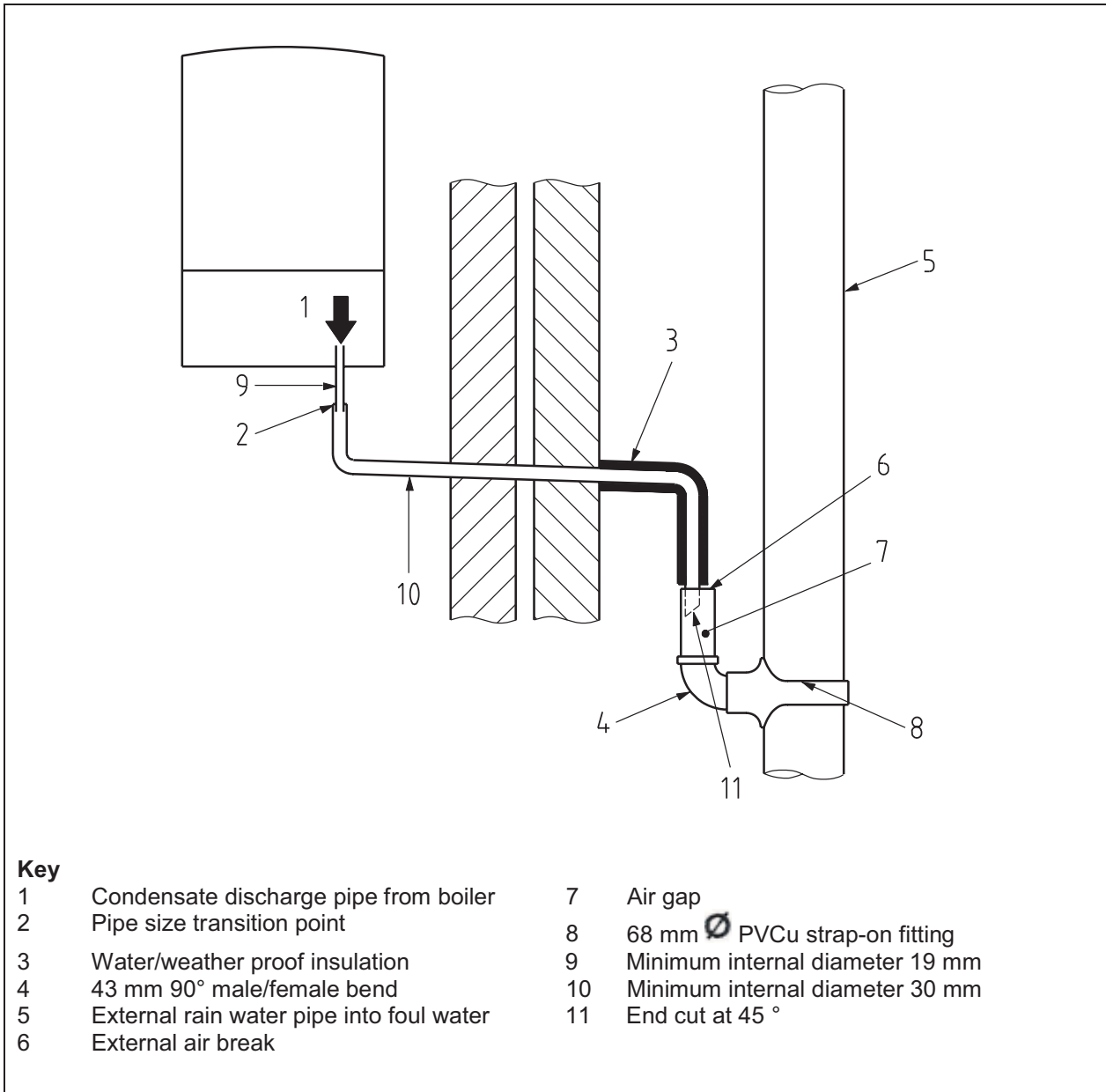


Figure 6 – External drain, gully or rainwater hopper

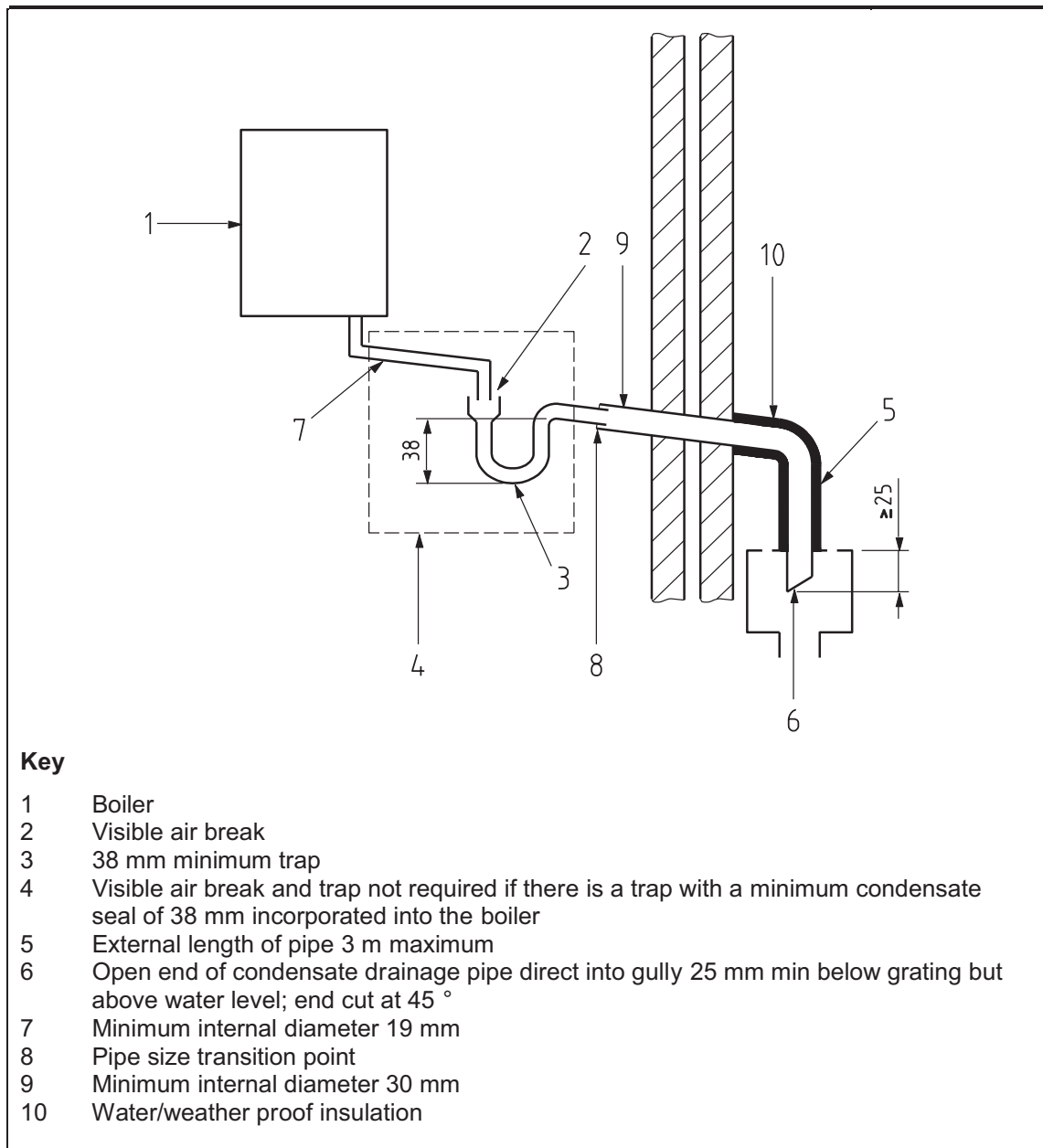
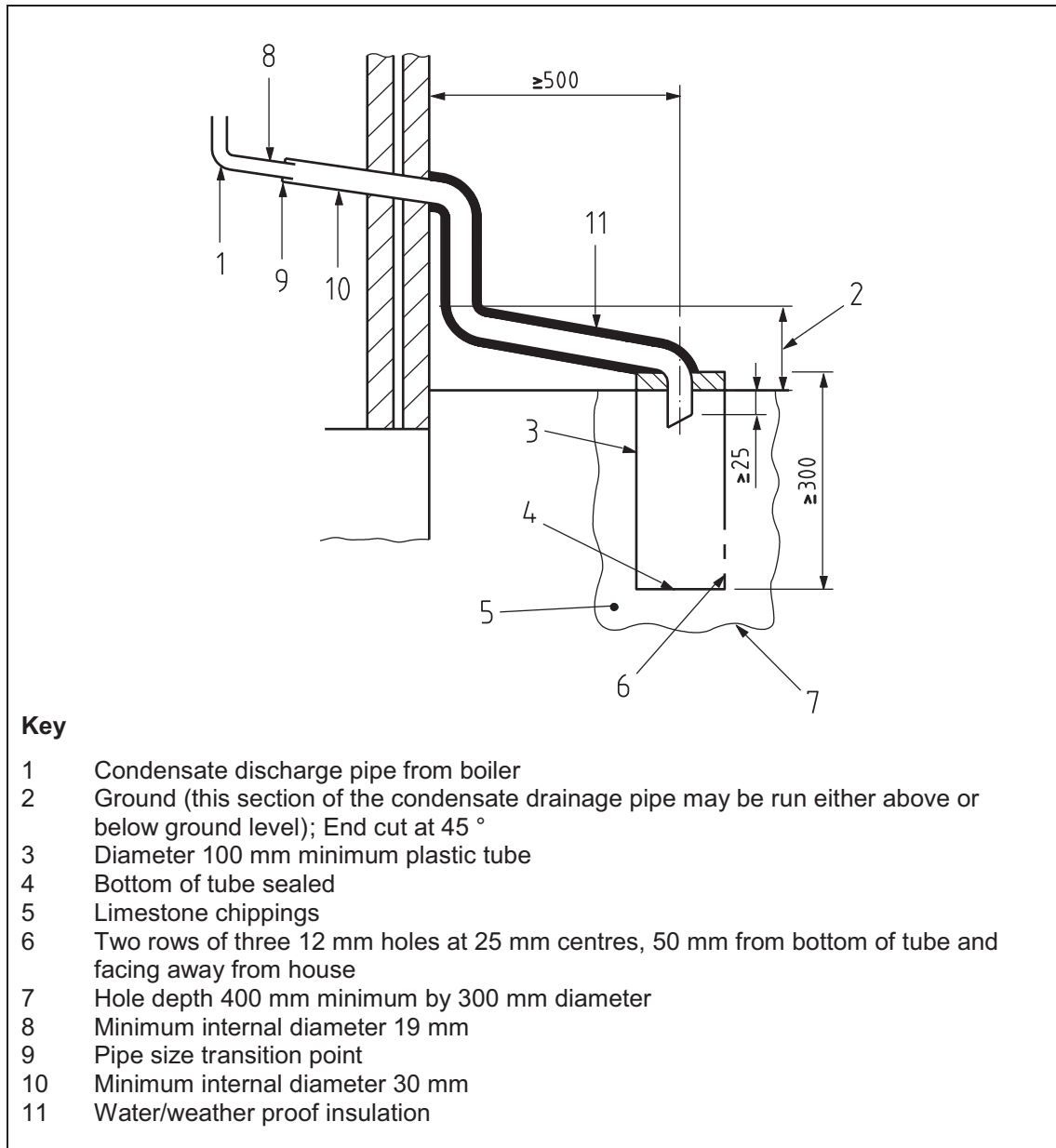




Figure 7 – Example of a purpose-made soakaway









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