

UK

ENSURE THAT THESE INSTRUCTIONS ARE LEFT
FOR THE USER AFTER COMPLETION OF THE
BENCHMARK SECTION



WRAS
APPROVED
PRODUCT

FORMAT DGT HE

*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/Benchmark 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 Benchmark 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.

Code Of Practice

For the installation, commissioning and servicing
of domestic heating and hot water products

Benchmark places responsibilities on both manufacturers and installers.* The purpose is to ensure that customers** are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. Installers are required to carry out work in accordance with the following:

Standards of Work

- Be competent and qualified to undertake the work required.
- Install, commission, service and use products in accordance with the manufacturer's instructions provided.
- Ensure that where there is responsibility for design work, the installation is correctly sized and fit for purpose.
- Meet the requirements of the appropriate Building Regulations. Where this involves notifiable work be a member of a Competent Persons Scheme or confirm that the customer has notified Local Authority Building Control (LABC), prior to work commencing.
- Complete all relevant sections of the Benchmark Checklist/Service Record when carrying out commissioning or servicing of a product or system.
- Ensure that the product or system is left in a safe condition and, whenever possible, in good working order.
- Highlight to the customer any remedial or improvement work identified during the course of commissioning or servicing work.
- Refer to the manufacturer's helpline where assistance is needed.
- Report product faults and concerns to the manufacturer in a timely manner.

Customer Service

- Show the customer any identity card that is relevant to the work being carried out prior to commencement or on request.
- Give a full and clear explanation/demonstration of the product or system and its operation to the customer.
- Hand over the manufacturer's instructions, including the Benchmark Checklist, to the customer on completion of an installation.
- Obtain the customer's signature, on the Benchmark Checklist, to confirm satisfactory demonstration and receipt of manufacturer's instructions.
- Advise the customer that regular product servicing is needed, in line with manufacturers' recommendations, to ensure that safety and efficiency is maintained.
- Respond promptly to calls from a customer following completion of work, providing advice and assistance by phone and, if necessary, visiting the customer.
- Rectify any installation problems at no cost to the customer during the installer's guarantee period.



*The use of the word "installer" is not limited to installation itself and covers those carrying out installation, commissioning and/or servicing of heating and hot water products, or the use of supporting products (such as water treatment or test equipment).

**Customer includes householders, landlords and tenants.

The Benchmark Scheme

Sime Ltd is a licensed member of the Benchmark Scheme which aims to improve the standards of installation and commissioning of domestic heating and hot water systems in the UK and to encourage regular servicing to optimise safety, efficiency and performance.

Benchmark is managed and promoted by the Heating and Hotwater Industry Council.
For more information visit www.centralheating.co.uk



Format DGT HE 20 System: Gas Council number 41-283-18

Format DGT HE 25: Gas Council number 47-283-24

Format DGT HE 30: Gas Council number 47-283-25

Format DGT HE 35: Gas Council number 47-283-26

These appliances comply with the S.E.D.B.U.K. scheme, band "A"

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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

SIME COMBINATION BOILERS Installer checklist

Please remember to carry out the following checks after installation. This will achieve complete customer satisfaction, and avoid unnecessary service calls. A charge will be made for a service visit where the fault is not due to a manufacturing defect.

- Has a correct by-pass been fitted and adjusted?
- Has the system and boiler been flushed?
- Is the system and boiler full of water, and the correct pressure showing on the pressure gauge?
- Is the Auto Air Vent open?
- **Has the pump been rotated manually?**
- Is the gas supply working pressure correct?
- Is the boiler wired correctly? (See installation manual).
- **Has the D.H.W. flow rate been set to the customer requirements?**
- Has the customer been fully advised on the correct use of the boiler, system and controls?
- Has the Benchmark Checklist in the use and maintenance section of this manual, been completed ?

1 DESCRIPTION OF THE BOILER

1.1 INTRODUCTION

FORMAT DGT HE - FORMAT DGT HE SYSTEM are premixed gas condensation thermal modules that employ a microprocessor-based technology to control and

manage all the functions. All modules are compliant with European 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.

The products manufactured and sold by Sime do not contain any banned materials or substances (ie they comply with ISO9000:2000).

1.2 DIMENSIONS (fig. 1)

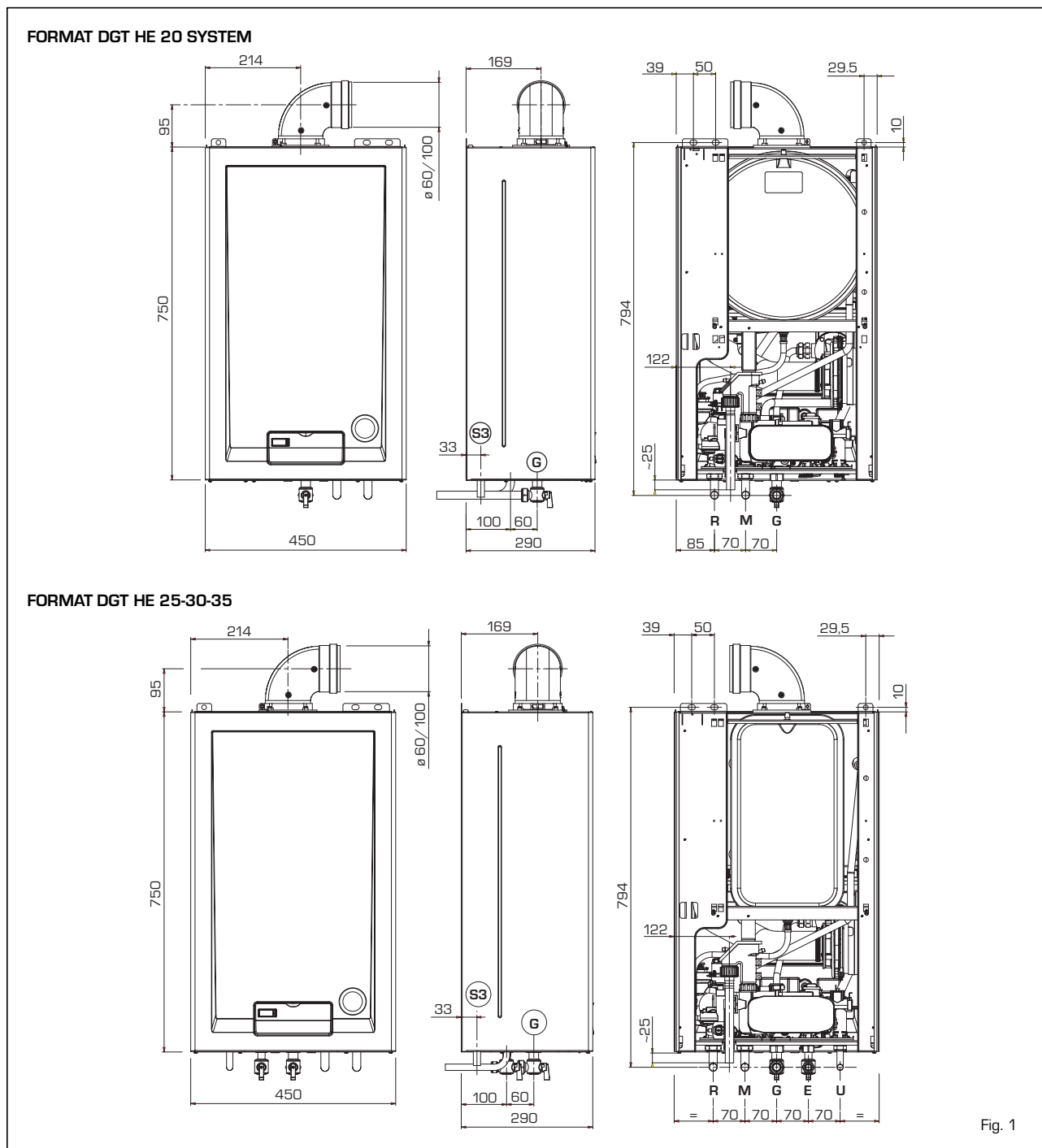


TABLE 1 - Connections

R	C.H. return	22 mm	Compression
M	C.H. flow	22 mm	Compression
G	Gas connection	15 mm	Compression
E	D.H.W. inlet	15 mm	Compression
U	D.H.W. outlet	15 mm	Compression
S3	Condensation outlet \varnothing 20		

TABLE 2 - Minimum clearances

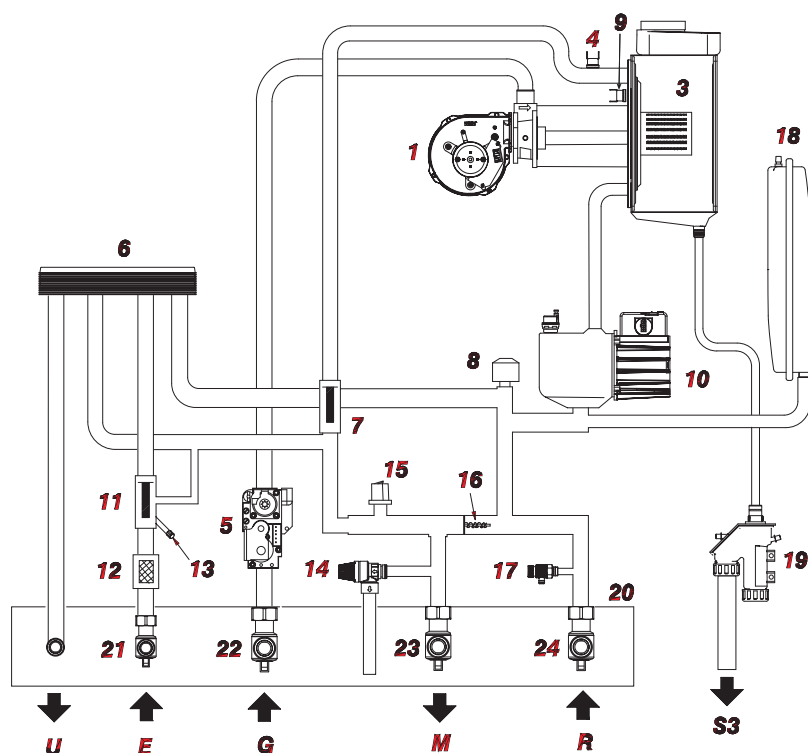
	For servicing
ABOVE THE APPLIANCE CASING	300 mm
AT THE R.H.S.	15 mm
AT THE L.H.S.	15 mm
BELOW THE APPLIANCE CASING	200 mm
IN FRONT OF THE APPLIANCE	500 mm

1.3 TECHNICAL FEATURES

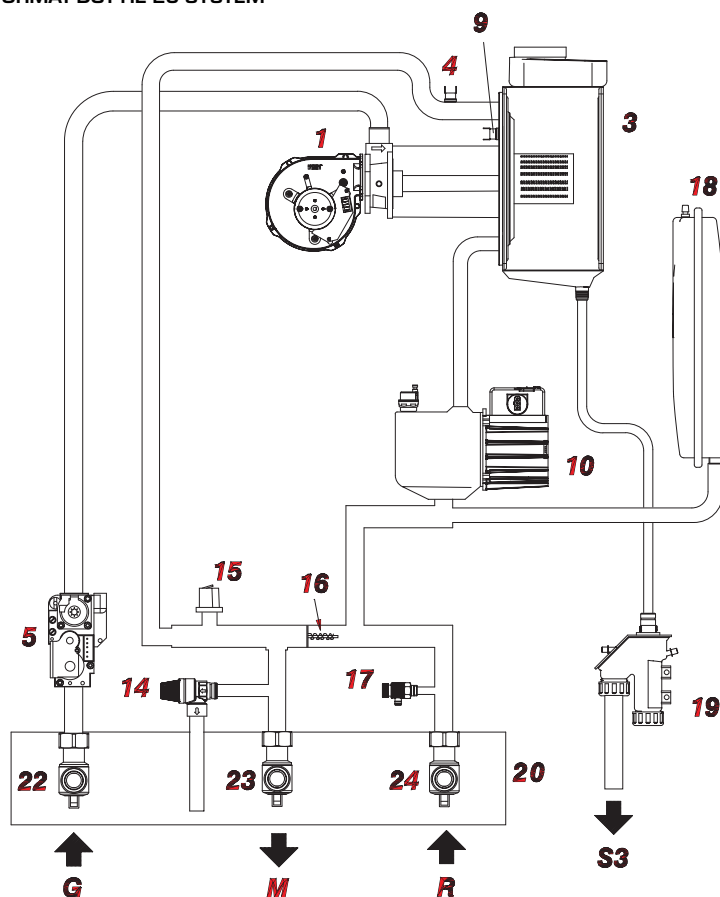
Models		25	30	35	20 System
Heat output					
Nominal (80-60°C)	kW	19.5	24.6	29.4	19.5
Nominal (50-30°C)	kW	20.7	26.3	31.2	20.7
Reduced G20 (80-60°C)	kW	5.7	7.2	8.0	5.7
Reduced G20 (50-30°C)	kW	6.3	8.0	8.9	6.3
Reduced G31 (80-60°C)	kW	6.6	7.2	8.0	6.6
Reduced G31 (50-30°C)	kW	7.3	8.0	8.9	7.3
Heat input nominal C.H./D.H.W.	kW	20/24	25/30	30/35	20
Heat input reduced G20/G31	kW	6.0/7.0	7.5	8.2/9.0	6.0/7.0
Max/min useful yield (80-60°C)	%	95.2/97.5	96.1/98.2	97.8/98.2	95.2/97.5
Max/min useful yield (50-30°C)	%	105.2/103.7	106.2/105.2	108.2/104.3	105.2/103.7
Useful yield at 30% of the load (40-30°C)	%	107.5	107.9	108.5	107.5
Thermal efficiency (CEE 92/42 directive)		★★★★	★★★★	★★★★	★★★★
Losses after shutdown to 50°C (EN 483)	W	100	106	106	100
Supply voltage	V-Hz	230-50	230-50	230-50	230-50
Absorbed power consumption	W	125	125	130	125
Electrical protection grade	IP	X5D	X5D	X5D	X5D
C.H. setting range	°C	20/80	20/80	20/80	20/80
Water content boiler	l	4.3	5.1	5.3	4.4
Maximum water head	bar	2.5	2.5	2.5	2.5
Maximum temperature	°C	85	85	85	85
Capacity of the heating expansion vessel	l	6	6	6	6
Pressure of the heating expansion vessel	bar	1.2	1.2	1.2	1.2
D.H.W. setting range	°C	10/60	10/60	10/60	-
D.H.W. flow rate (EN 625)	l/min	10.5	13.4	15.2	-
Continuous D.H.W. flow rate Δt 30°C	l/min	11.3	14.1	16.0	-
Minimum D.H.W. flow rate	l/min	2.2	2.2	2.2	-
D.H.W. pressure min/max	bar	0.5/6.0	0.5/6.0	0.5/6.0	-
Exhaust fumes temper. at max flow rate (80-60°C)	°C	75	68	69	68
Exhaust fumes temper. at min. flow rate (80-60°C)	°C	56	57	50	57
Exhaust fumes temper. at max flow rate (50-30°C)	°C	57	52	52	57
Exhaust fumes temper. at min. flow rate (50-30°C)	°C	39	36	33	43
Smokes flow min/max	kg/h	10/35	13/44	14/52	5/20
CO₂ at max/min flow rate G20	%	9.0/9.0	9.0/9.0	9.0/9.0	9.0/9.0
CO₂ at max/min flow rate G31	%	10.0/10.0	10.0/10.0	10.0/10.0	10.0/10.0
CE certification	n°	1312BT5266			
Category		II2H3P			
Type		B23P-53P/C13-33-43-53-83			
NO_x emission class		5 (< 30 mg/kWh)			
Weight when empty	kg	38	41	42	33
Main burner nozzle					
Quantity nozzles	n°	1	1	1	1
G20/G31 nozzle diameter	ø	7.0/5.0	7.5/6.0	8.5/5.2	7.0/5.0
Consumption at maximum/minimum flow rate					
G20	m³/h	2.54/0.63	3.17/0.79	3.68/0.87	1.21/0.31
G31	kg/h	1.86/0.54	2.33/0.58	2.70/0.70	0.89/0.31
Gas supply pressure					
G20/G31	mbar	20/37	20/37	20/37	20/37

1.4 FUNCTIONAL DIAGRAM (fig. 2)

FORMAT DGT HE 25-30-35



FORMAT DGT HE 20 SYSTEM



KEY

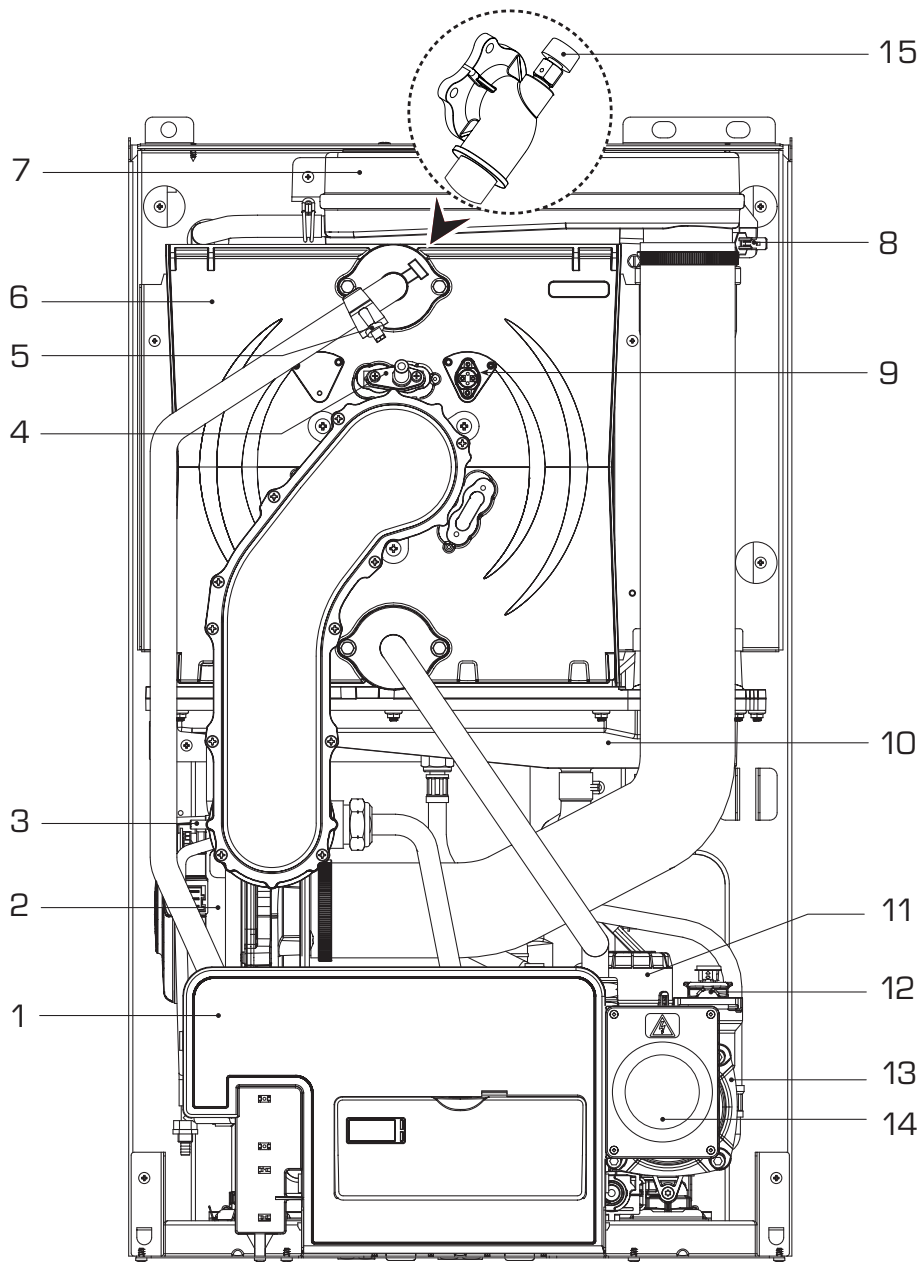
- 1 Fan
- 3 Primary exchanger
- 4 C.H. sensor (SM)
- 5 Gas valve
- 6 D.H.W. exchanger
- 7 Heating water filter
- 8 Diverter valve
- 9 Safety thermostat
- 10 Pump with air release vent
- 11 D.H.W. flow meter
- 12 Water inlet filter
- 13 —
- 14 2.5 BAR safety valve
- 15 Water pressure valve
- 16 Automatic bypass
- 17 Pressure release valve
- 18 Expansion vessel
- 19 Condensate drain trap
- 20 —
- 21 D.H.W. isolation valve
- 22 Gas isolation valve
- 23 C.H. flow isolation valve
- 24 C.H. return isolation valve

CONNECTIONS

- R C.H. return
- M C.H. flow
- G Gas connection
- E D.H.W. inlet
- U D.H.W. outlet
- S3 Condensation outlet

Fig. 2

1.5 MAIN COMPONENTS (fig. 3)



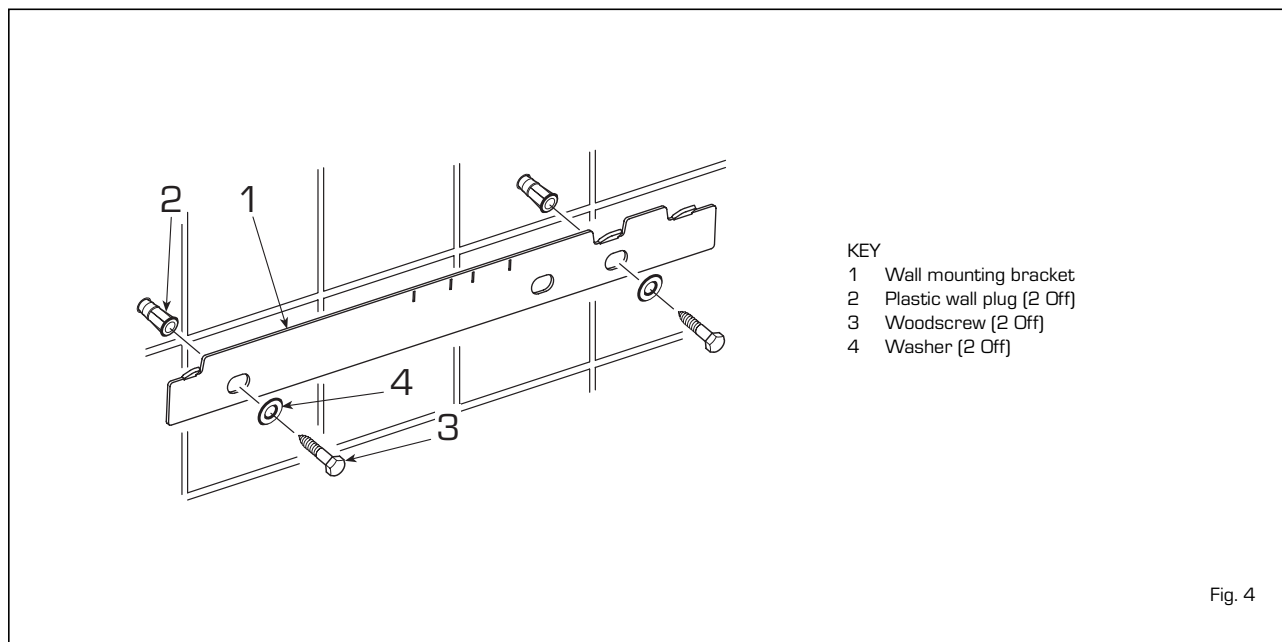
KEY

- 1 Control panel
- 2 Fan
- 3 Mixer
- 4 Ignition electrode
- 5 C.H. sensor (SM)
- 6 Primary exchanger
- 7 Smoke chamber
- 8 Fumes sensor
- 9 Safety thermostat
- 10 Condensate collection tray
- 11 Diverter valve
- 12 Automatic air vent
- 13 Pump
- 14 See programming clock
(optional part number 8092242 - standard for code 8108130, 8108132 and 8108134)
- 15 Manual air vent

NOTE: Analogue pressure gauge see fig. 22/a.

Fig. 3

2 INSTALLATION



It is important that the boiler is initially filled and started for the first time using the method shown in 2.3.3 section e). This procedure should also be used when refilling after draining a boiler.

The boiler must be installed in a fixed location and only by specialized and qualified person in compliance with all instructions contained in this manual.

The installation of this boiler must be in accordance with the relevant requirements of the current Gas Safety (installation and use), the local building regulations, and and I.E.E. wiring regulations. Detailed recommendations for air supply are given in BS5440:2. The following notes are for general guidance: it is not necessary to have a purpose provided air vent in the room or compartment in which the appliance is installed.

2.1 ANTI-FREEZE FUNCTION

The boilers are equipped with anti-freeze function which activates the pump and the burner when the temperature of the water contained inside the appliance drops to below value PAR 10.

The anti-freeze function can only operate if:

- the boiler is correctly connected to the gas and electricity supply circuits;
- the boiler is switched on;
- the boiler ignition is not locked out;
- the essential components of the boiler are all in working order.

In these conditions the boiler is protected against frost down to an environmental temperature of -5°C.

ATTENTION:

In the case of installation in a place where the temperature drops below 0°C, the connection pipes must be protected.

2.2 FIXING THE WALL MOUNTING BRACKET (fig. 4)

- Mark the position of the two wall mounting bracket fixing holes and the flue/air duct hole on the appropriate wall(s).
- Drill a top two fixing holes using a 10 mm masonry drill and fit the plastic plugs provided.
- Accurately measure the wall thickness, and note this dimension for later use.
- Secure the wall mounting bracket in position using the screws provided. Ensure that it is the correct way up, as indicated in fig. 4.

2.3 CONNECTING UP SYSTEM

Before connecting the boiler it is recommended that the system be flushed in accordance to BS 7593, to eliminate any foreign bodies that may be detrimental to the operating efficiency of the appliance. When connecting up the boiler the clearances in fig 1 should be respected.

The boiler is supplied with a valve pack part number 5184817A. The boiler can be filled and pressure tested prior to any electrical supply being connected with the use of the analogue pressure gauge. see fig 22/a

A safety valve set at 3 bar is fitted to the appliance, the discharge pipe provided should be extended to terminate safely away from the appliance and where a discharge would not cause damage to persons or property but would be detected.

The pipe should be a minimum of 15 mm Ø and should be able to withstand boiling water; any should avoid sharp corners or upward pipe runs where water may be retained.

Gas Connection

The gas connection must be made using

seamless steel or copper pipe.

Where the piping has to pass through walls, a suitable insulating sleeve must be provided. When sizing gas piping, from the meter to the boiler, take into account both the volume flow rates (consumption) in m³/h and the relative density of the gas in question. 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).

An adhesive data badge is sited 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 condensate water trap

To ensure safe disposal of the condensate produced by the flue gases, reference 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 advised method of connection to the condensate trap is by using 20mm overflow pipe with a socket attached to cover the condensate trap connection.

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 32mm 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 soakaway.

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 Dealing with condensate

To drain the system, turn off the boiler; isolate the flow and return, and use the boiler drain vent.

2.3.3 Requirements for sealed water systems FORMAT DGT HE (fig. 5/a)

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

- a) The available pump head is given in fig. 14.
- b) The burner starts when the C.H. flow reaches 400÷450 l/h. This safety condition is ensured by the flow switch.
- c) The appliance is equipped with an internal by-pass that operates with system heads (H) greater than 3 m. The maximum flow through the by-pass is about 300 l/h. If thermostatic radiator valves are to be installed, at least one radiator should be

without a thermostatic valve (usually the bathroom radiator or the radiator in the room containing the room thermostat).

- d) A sealed system must only be filled by a competent person using one of the approved methods shown in fig. 5/a. The system design should incorporate the connections appropriate to one of these methods.
- e) It is most important that the boiler is not allowed to ignite until it and the heating system is filled. Ensure that the electrical supply to the boiler is turned off. Open the auto air vent, D fig 15. Fill the system to approximately 1.5 bar. Use the manual air vent located on the uppermost connection to the primary heat exchanger (item 15 fig. 3) to release any air retained, and ensure that all the radiators are vented. Top up the system pressure to 1.5 bar. Turn on the power supply to the boiler and put the boiler in the Summer mode. While in the Summer mode, adjust the heating flow temperature to its minimum 20 degrees. Put the boiler into the Winter mode and allow it to ignite. Run the boiler in this mode for approximately 30 minutes, regularly checking that trapped any air is released. and gradually increasing the flow tempera-

ture to 60 degrees. When inhibitor is added repeat this procedure with the initial flow temperature at 20 degrees. The flow temperature should then be set to the desired value.

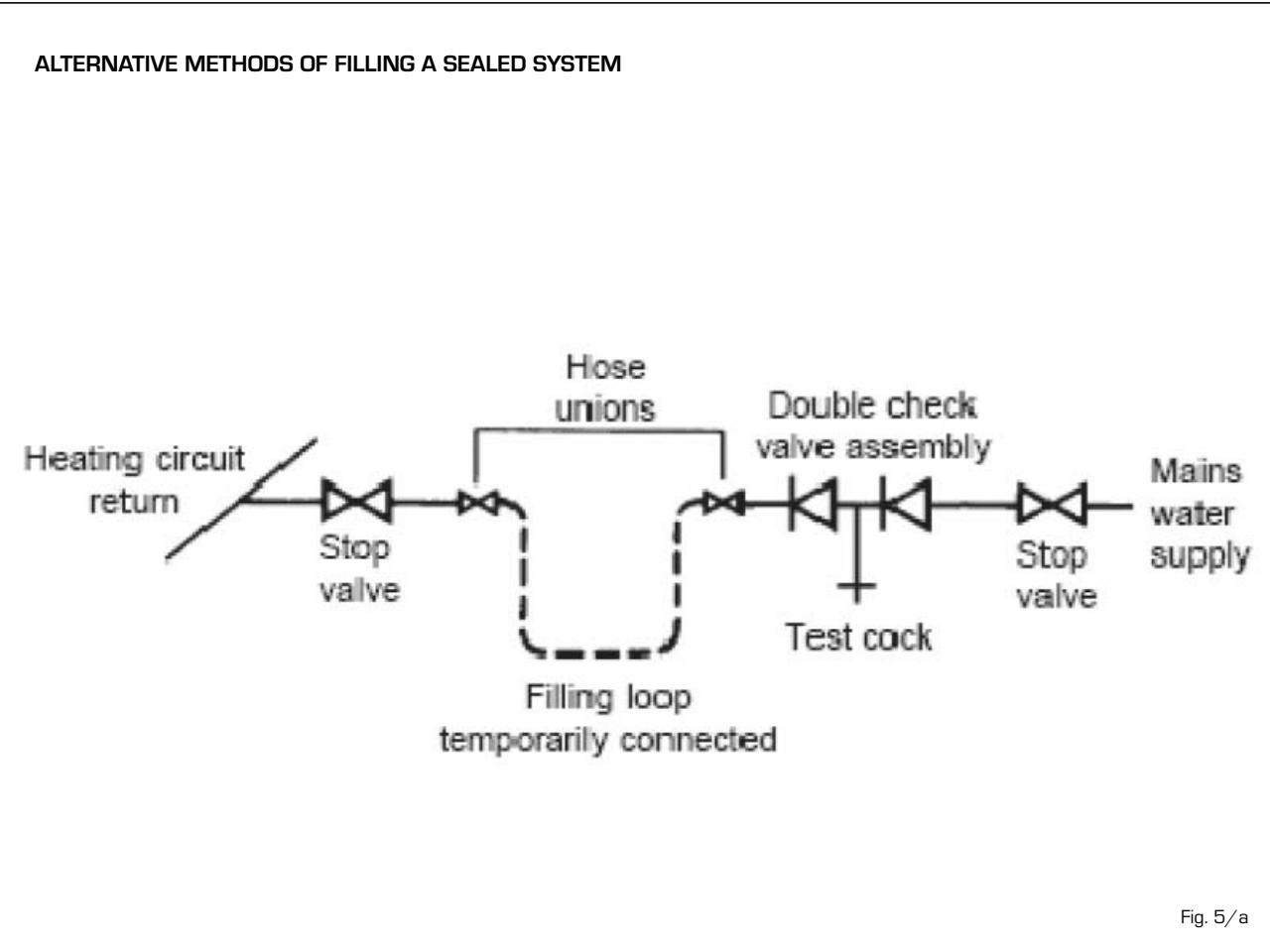
2.3.4 Requirements for sealed water systems FORMAT DGT HE SYSTEM

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

- a) The available pump head is given in fig. 14.
- b) The appliance is equipped with an internal by-pass that operates with system heads (H) greater than 3 m. The maximum flow through the by-pass is about 300 l/h. If thermostatic radiator valves are to be installed, at least one radiator should be without a thermostatic valve (usually the bathroom radiator or the radiator in the room containing the room thermostat).

2.4 CHARACTERISTICS OF FEEDWATER

- All recirculatory systems will be subject to corrosion unless an appropriate water treatment is applied.



This means that the efficiency of the system will deteriorate as corrosion sludge accumulates within the system, risking damage to pump and valves, boiler noise and circulation problems.

- For optimum performance after installation this boiler and its associated central heating system must be flushed in accordance with the guidelines given in BS 7593 "Treatment of water in domestic hot water central heating systems".
- Sime Ltd recommend only 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.

Failure to flush and add inhibitor to the system may invalidate the appliance warranty. For the correct operation of the aluminum heat exchanger make sure that the chemical/physics characteristics of the system water have a PH value within 6,5 and 8.

- It is important to check the inhibitor concentration after installation, system modification and at every service in accordance with the manufacturer's instructions (Test kits are available from inhibitor stockists).
- At every service the Aquaguard Filter

(4.5.2) should be checked and cleaned.

2.5 INSTALLATION OF COAXIAL DUCT ø 60/100 - ø 80/125 (fig. 6)

The coaxial suction and discharge pipes are supplied in a special kit (that can be purchased separately) along with assembly instructions.

The diagrams of fig. 6 illustrate some examples of different types of fluing options allowed and the maximum lengths that can be reached.

IMPORTANT:

- The insertion of each additional 90° bend with a diameter of 60/100 [code 8095850] reduces the available section by 1.5 meters.
- The insertion of each additional 90° bend with a diameter of 80/125 [code 8095870] reduces the available section by 2 meters.
- Each additional 45° curve installed a diameter of 60/100 [code 8095550] reduces the available length by 1.0 metres.
- Each additional 45° curve installed a diameter of 80/125 [code 8095970] reduces the available length by 1.0 metres.

HORIZONTAL FLUES MUST BE LEVEL

NOTE: Before connecting accessories, it is always advisable to lubricate the internal part of the gaskets with silicon products. Avoid using oils and greases.

Model	Length of pipe ø 60/100			Length of pipe ø 80/125		
	H	V		H	V	
		Min	Max		Min	Max
20 SYSTEM	6 m	1.3 m	8 m	12 m	1.2 m	15 m
25	6 m	1.3 m	8 m	12 m	1.2 m	15 m
30	5 m	1.3 m	7 m	10 m	1.2 m	13 m
35	4 m	1.3 m	6 m	10 m	1.2 m	13 m

LIST OF ø 60/100 ACCESSORIES

- Coaxial duct kit L. 790 code 8096250
- a Extension L. 1000 code 8096150
- b Extension L. 500 code 8096151
- Vertical extension L. 140 with coupling code 8086950
- Tile for joint code 8091300
- Terminal for roof exit L. 1285 code 8091212 (includes 8086950)

LIST OF ø 80/125 ACCESSORIES

- Coaxial duct kit L. 785 code 8096253
- a Extension L. 1000 code 8096171
- b Extension L. 500 code 8096170
- Adapter for ø 80/125 code 8093150
- Tile for joint code 8091300
- Terminal for roof exit code 8091212A (includes 8093150)

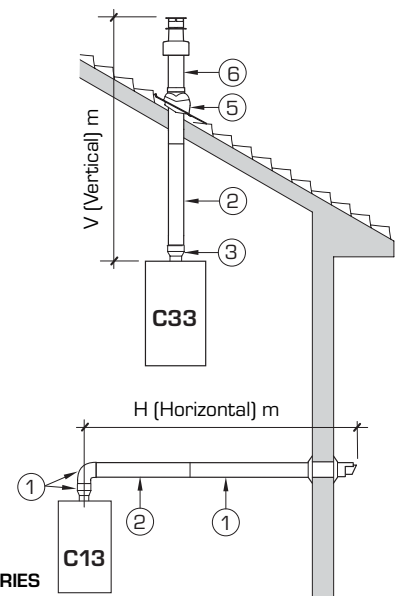


Fig. 6

TABLE 3 - ACCESSORIES ø 80

Accessories ø 80	Total head loss (mm H ₂ O)							
	20		25		30		35	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Air/smoke divider	-	-	-	-	-	-	-	-
90° elbow MF	0.15	0.20	0.20	0.25	0.25	0.30	0.30	0.40
45° elbow MF	0.10	0.10	0.15	0.15	0.20	0.20	0.25	0.25
Extension L. 1000 (horizontal)	0.10	0.10	0.15	0.15	0.20	0.20	0.25	0.25
Extension L. 1000 (vertical)	0.10	0.10	0.15	0.15	0.20	0.20	0.25	0.25
Wall terminal	0.05	0.20	0.10	0.25	0.10	0.35	0.15	0.50
Wall coaxial exhaust *								
Roof outlet terminal *	0.50	0.05	0.80	0.10	1.10	0.15	1.50	0.20

* This loss includes the loss of the adaptor 8091401

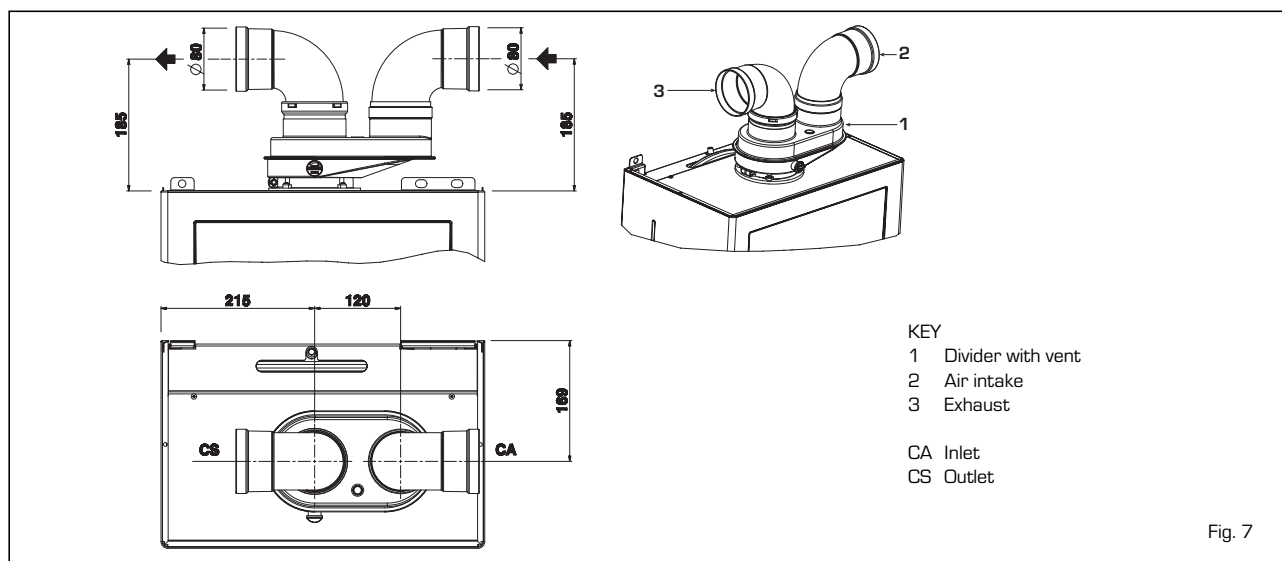


Fig. 7

2.6 INSTALLATION OF SEPARATE DUCTS ø 80 (fig. 7 - fig. 7/a)

The kit with dedicated pipes enables to separate the exhaust fumes pipes from the air suction pipes (fig. 7):

– for ø 80 pipes, divider code 8093050 is provided upon request.

The maximum overall length, resulting from the sum of all the suction and discharge pipes, is determined by the load losses of the single connected accessories and should not exceed 13 mm H₂O (version 20 System) - 15 mm H₂O (version 25-30-35) (**ATTENTION: the total length of each pipe should not exceed 50 m, even if the total loss is below the maximum applicable loss.**)

See Table 3 for information on the load losses of single accessories and the example of Fig. 7/a for information on how to calculate load losses.

Example of allowable installation “25” calculation in that the sum of the head losses of the single fittings is less than 15.0 mm H₂O:

	Inlet	Outlet
9 m horiz. pipe ø 80 x 0.15	1.35	-
9 m horiz. pipe ø 80 x 0.15	-	1.35
n° 2 90° elbows ø 80 x 0.20	0.40	-
n° 2 90° elbows ø 80 x 0.25	-	0.50
n° 1 terminal ø 80	0.10	0.25
Total head loss	1.85	2.10
	= 3.95 mm H ₂ O	

Fig. 7/a

ses of single accessories and the example of Fig. 7/a for information on how to calculate load losses.

2.6.1 Separate ducts kit (fig. 8)

The diagrams of Figure 8 show a couple of examples of the permitted exhausts configurations.

2.7 POSITIONING THE OUTLET TERMINALS (fig. 9)

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 4 gives the minimum distances to be observed, with reference to the type of building shown in fig. 9.

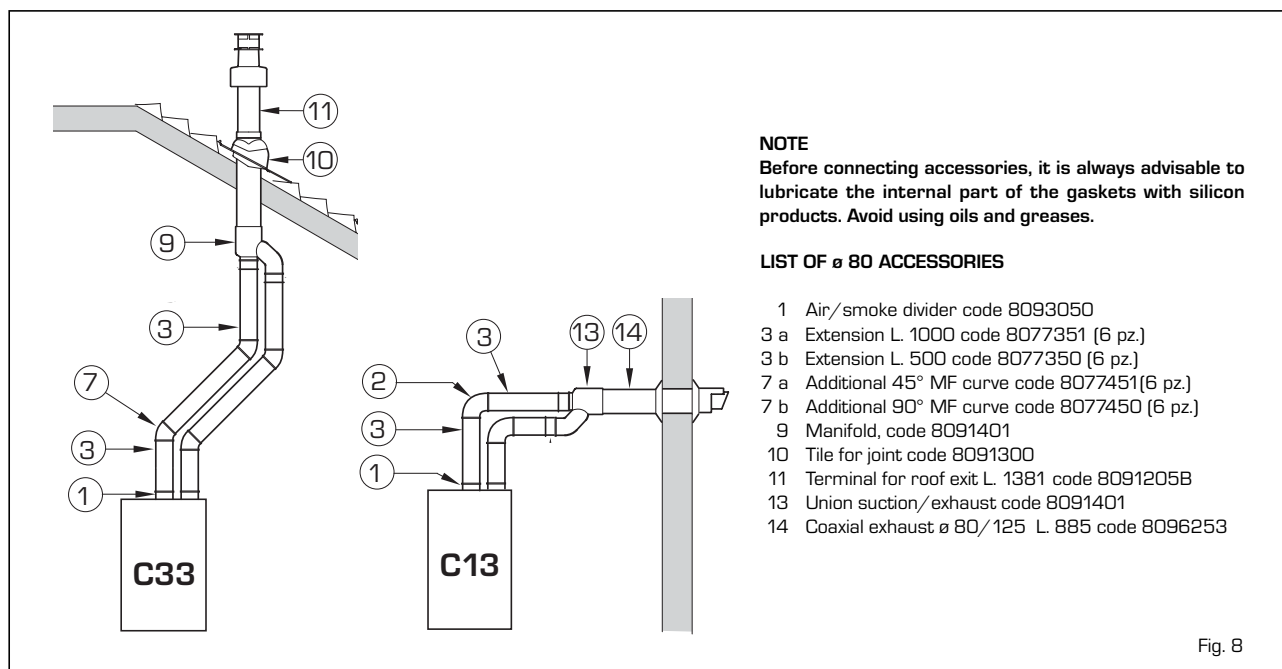


Fig. 8

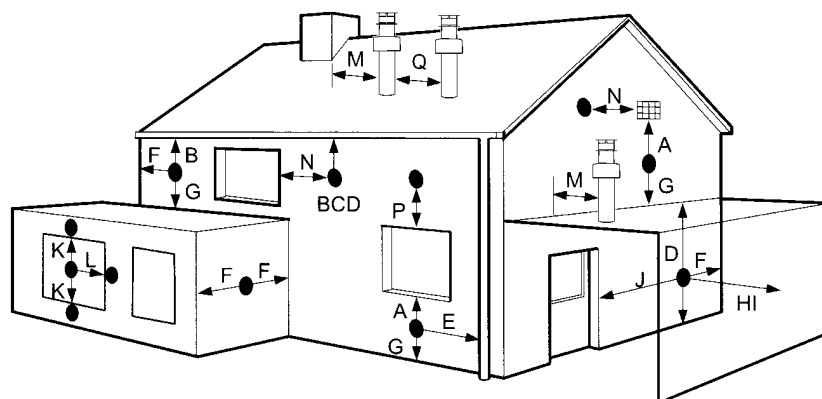


TABLE 4

Terminal position	Minimum spacing
A Directly below an openable window, air vent or any other ventilation opening	300 mm 12 in
B Below guttering, drain pipes or soil pipes (*)	75 mm 3 in
C/D Below eaves, balconies or carport roof	200 mm 8 in
E From vertical drain pipes or soil pipes	75 mm 3 in
F From internal or external corners	300 mm 12 in
G Above adjacent ground, roof or balcony level	300 mm 12 in
H From a boundary or surface facing the boiler	600 mm 24 in
I From a terminal facing the terminal	1,200 mm 48 in
J From an opening in the carport (eg door; window into dwelling)	1,200 mm 48 in
K Vertically from a terminal on the same wall	1,500 mm 60 in
L Horizontally from a terminal on the same wall	300 mm 12 in
M Horizontally from a vertical terminal to a wall	300 mm 12 in
N Horizontally from an openable window or other opening	300 mm 12 in
P Above an openable window or other opening	300 mm 12 in
Q From an adjacent vertical terminal	600 mm 24 in

(*) For condensing boilers this distance can be reduced to 25 mm without effecting boiler performance, but it will be necessary to protect the surfaces from the effects of condensate

- If the terminal discharges into a pathway or passageway check that combustion products will not cause nuisance and that the terminal will not obstruct the passageway.
- Where the lowest part of the terminal is fitted less than 2 m (78 in) above ground, above a balcony or above a flat roof to which people have access, the terminal MUST be protected by a purpose designed guard.
- Where the terminal is fitted within 850 mm (34 in) of a plastic or painted gutter, or 450 mm (18 in) of painted eaves, an aluminium shield at least 1,500 mm (59 in) long must be fitted to the underside of the painted surface.
- The air inlet/outlet flue duct MUST NOT be closer than 25 mm (1 in) to combustible material.
- In certain weather conditions the terminal may emit a plume of steam. This is normal but positions where this would cause a nuisance should be avoided.

Fig. 9

2.8 INSTRUCTIONS FOR ASSEMBLY OPTIONAL CLOCK PART NUMBER 8092242

(fig. 23/a - 23/b - 23/c)

1) Isolate the power supply to the boiler.

2) Remove the boiler cover.

3) Remove the time clock box cover unscrewing the 4 screws (fig. 23/a).

IMPORTANT! RETAIN THE 4 SCREWS AS THESE ARE USED TO FIX TIME CLOCK!

4) Inside the time clock box are 4 wires:

- 2 reds
- 1 brown
- 1 blue;

Remove the faston protections and connect as shown on fig. 23/b.

5) Fix the Time clock with the 4 screws removed before (as shown on fig. 23/c).

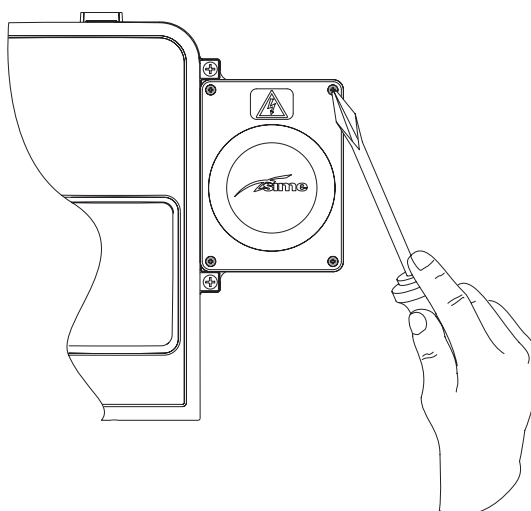
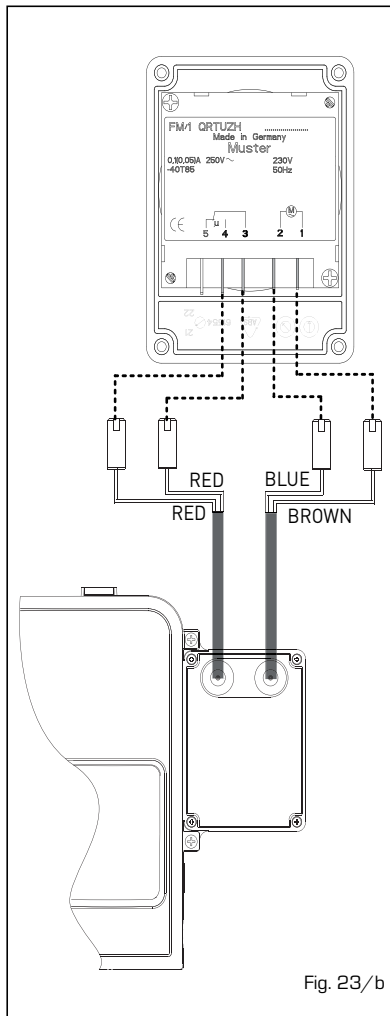
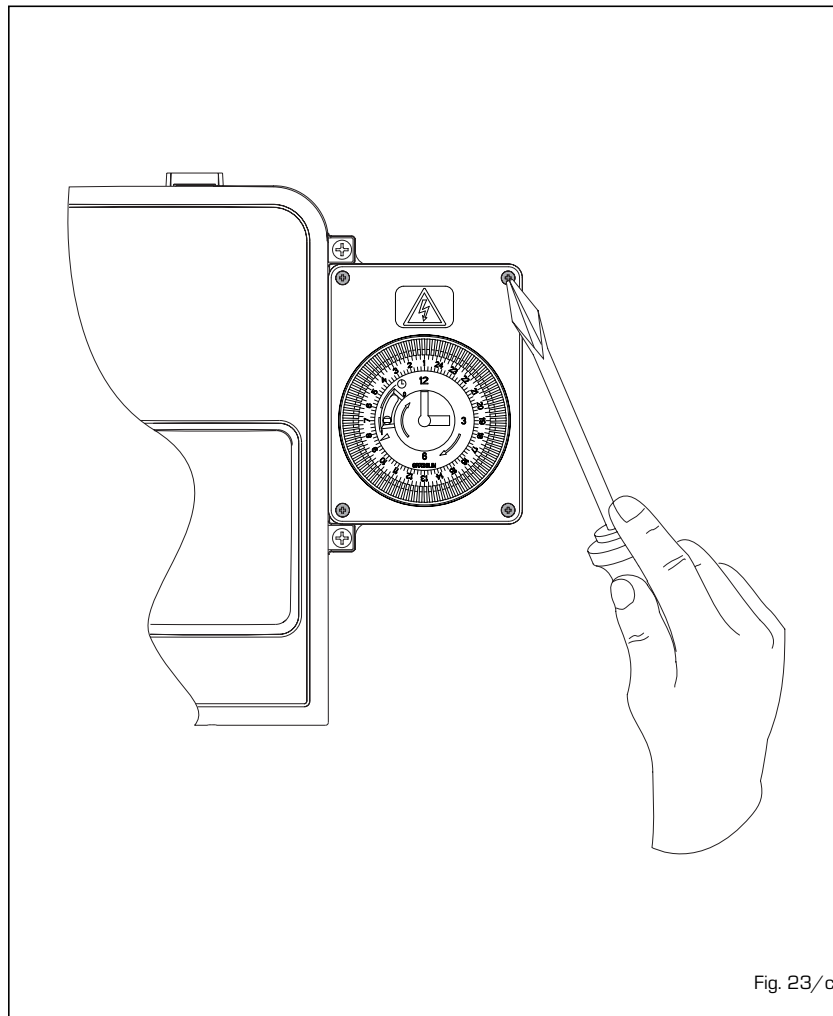


Fig. 23/a



2.9 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 through a 3 amp fused main switch, with at least 3 mm spacing between contacts.

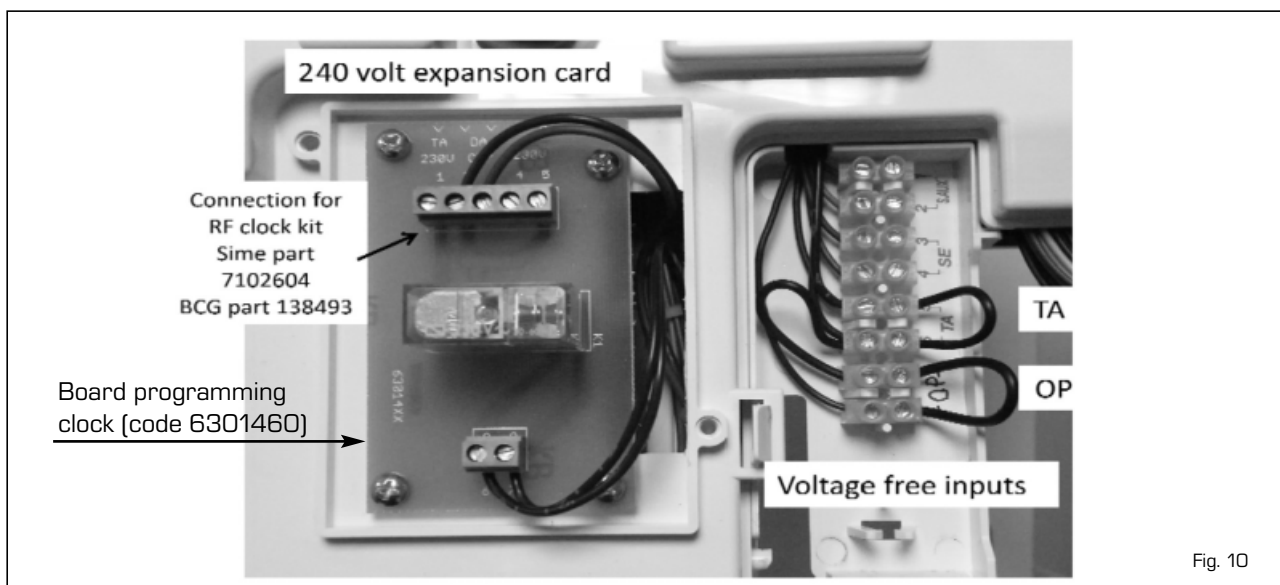


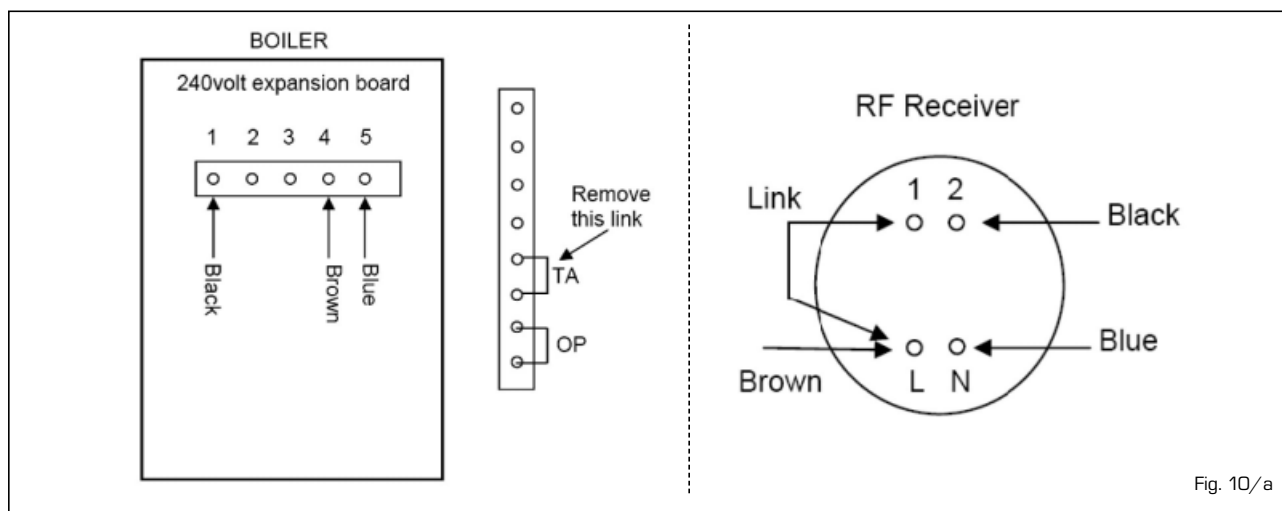
Respect the L and N polarities and the earth connection.

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, or incorrect connection of external controls. Any fault or component failure due to incorrect connection of external controls is not covered in the warranty.

2.9.1 External controls (fig. 10)

Including connection of the RF clock kit Sime part number 7102604 (BCG part 38493). The heating demand on **Format DGT** boilers can be controlled externally by either a voltage free or 240 volt demand. In either case the boiler **MUST** have a permanent power supply.





Voltage free option

A voltage free control, room thermostat or programmable room thermostat, can be connected after removal of the wire link, to the TA connections on the voltage free input connector.

If required a combination of voltage free room thermostat and a separate voltage free time clock can be connected. The room thermostat to the TA connection, and the time clock to the OP connection, after removing the links.

240 volt option

The heating demand can be controlled by a 240 volt switched demand-such as a room thermostat, time clock or the demand from a Y or S plan.

Connect the switched demand to terminal 1 on the 240 volt expansion board, and remove the link in the TA connection on the voltage free inputs (if the TA link is not removed the boiler will work in the heating mode without a demand).

2.9.2 Connection of RF Clock kit Sime part number 7102604 (BCG part 138493) (fig. 10/a)

Ensure that the boiler is isolated from the power

supply. To enable ease of fitting a 1 meter cable is supplied within the boiler.

Mount the receiver close to the boiler at least 1.5 metres above the floor. Avoid any location that would cause receptions problems. Connect the boiler to the receiver as shown. Remove the wire link in the TA connection at the boiler and do not forget to link the "L" and "1" terminals at the RF Receiver (fig. 10/a).

2.9.3 Climatic control option

The boiler is designed for connection to an external temperature sensor; supplied on request (code 8094101) in conjunction with remote control (code 8092226), which can automatically regulate the temperature value of the boiler output according to the external temperature.

For installation, follow the instruction in the package. Expansion control kit 8092240 will also be required.

2.9.4 Use with different electronic systems

Some examples are given below of boiler

systems combined with different electronic systems.

Where necessary, the parameters to be set in the boiler are given.

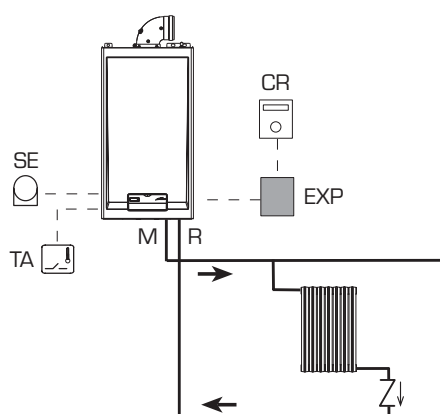
The electrical connections to the boiler refer to the wording on the diagrams (fig. 11 - fig. 11/a). Zone valve control is activated with every heating request from remote control.

Description of the letters indicating the components shown on the system diagrams 1 to 6:

M	C.H. flow
R	C.H. return
CR	Remote control CR 63
SE	External temperature sensor
TA 1-2	Zone room thermostat
VZ 1-2	Zone valve
RL 1-2	Zone relay
SI	Hydraulic separator
P 1-2	Zone pump
IP	Floor system
EXP	Expansion card (code 8092240)
VM	Three-way mixer valve
TSB	Safety thermostat low temperature

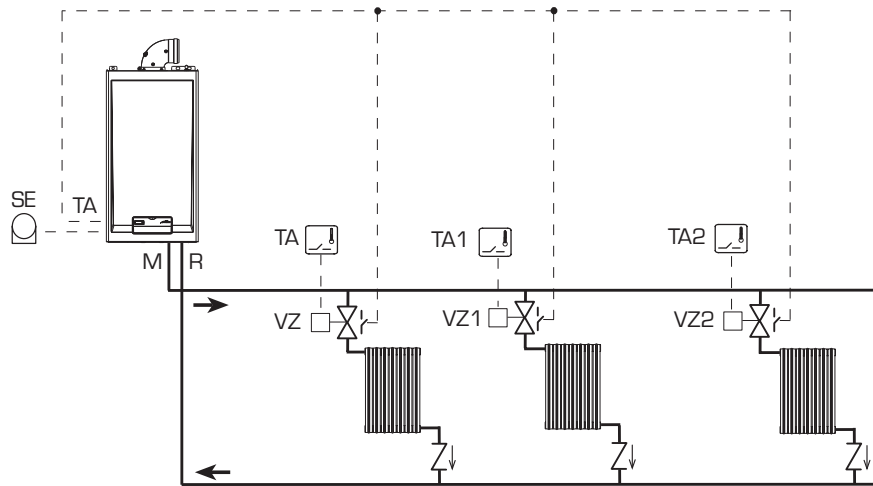
1 BASIC SYSTEM

SYSTEM WITH A DIRECT ZONE AND ROOM THERMOSTAT, OR WITH A REMOTE CONTROL (Code 8092219), KIT EXPANSION REMOTE CONTROL (Code 8092240) AND EXTERNAL SENSOR (Code 8094101)



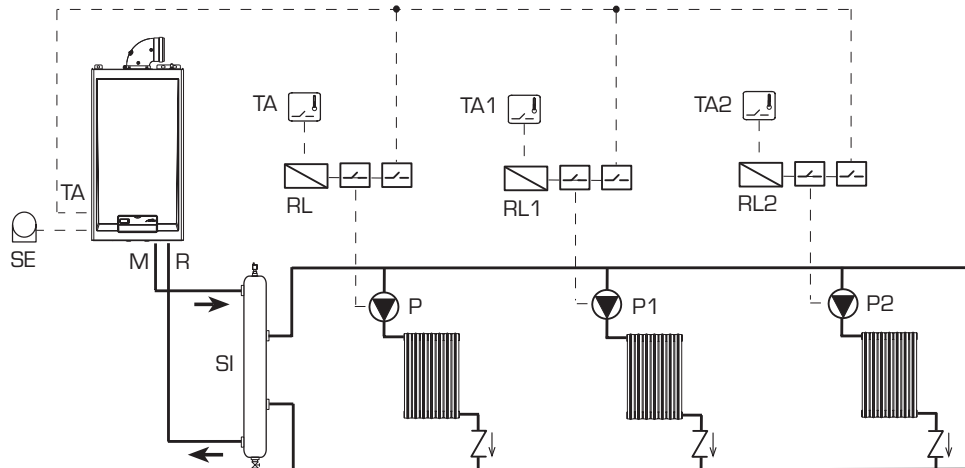
2 BASIC SYSTEM

MULTI-ZONE SYSTEM WITH VALVE, ROOM THERMOSTAT AND EXTERNAL SENSOR (Code 8094101)



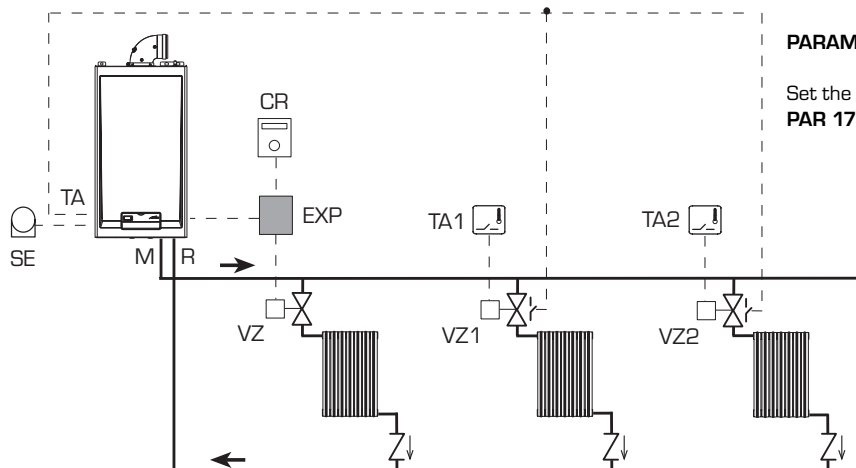
3 BASIC SYSTEM

MULTI-ZONE SYSTEM WITH PUMP, ROOM THERMOSTATS AND EXTERNAL SENSOR (Code 8094101)



4 BASIC SYSTEM

MULTI-ZONE SYSTEM WITH VALVE, ROOM THERMOSTATS, REMOTE CONTROL (Code 8092219), KIT EXPANSION REMOTE CONTROL (Code 8092240) AND EXTERNAL SENSOR (Code 8094101)

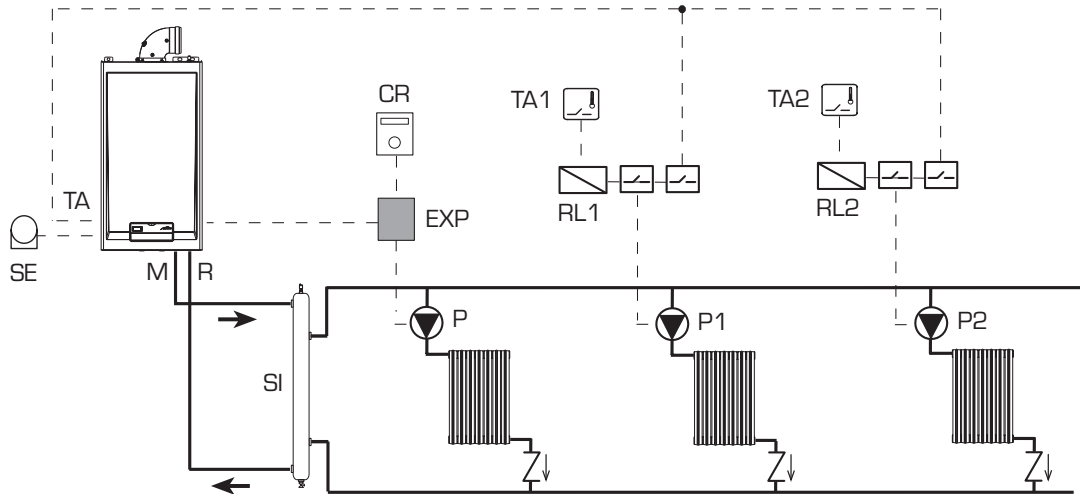


PARAMETERS SETTINGS

Set the opening time of the VZ zone valve:
PAR 17 = SYSTEM PUMP ACTIVATION DELAY

5 BASIC SYSTEM

MULTI-ZONE SYSTEM WITH PUMPS, ROOM THERMOSTATS, REMOTE CONTROL (Code 8092219), KIT EXPANSION
REMOTE CONTROL (Code 8092240) AND EXTERNAL SENSOR (Code 8094101)

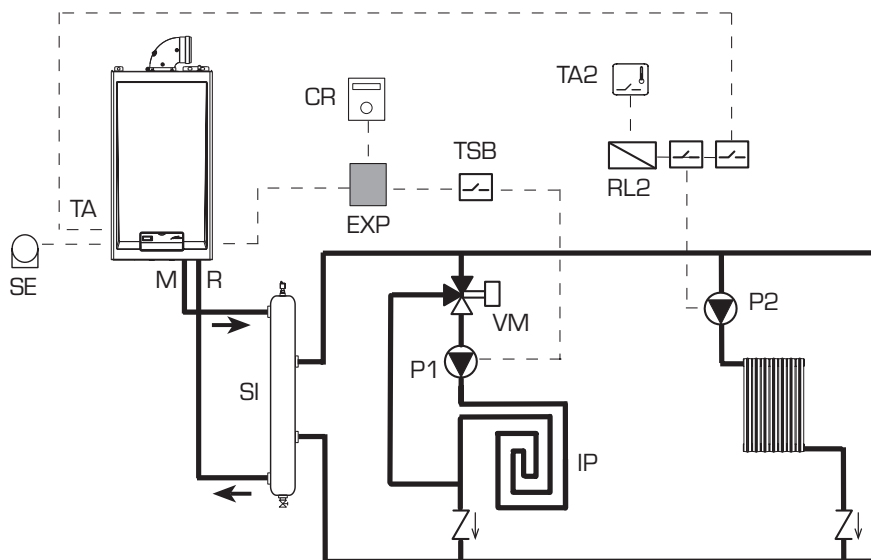


NOTE:

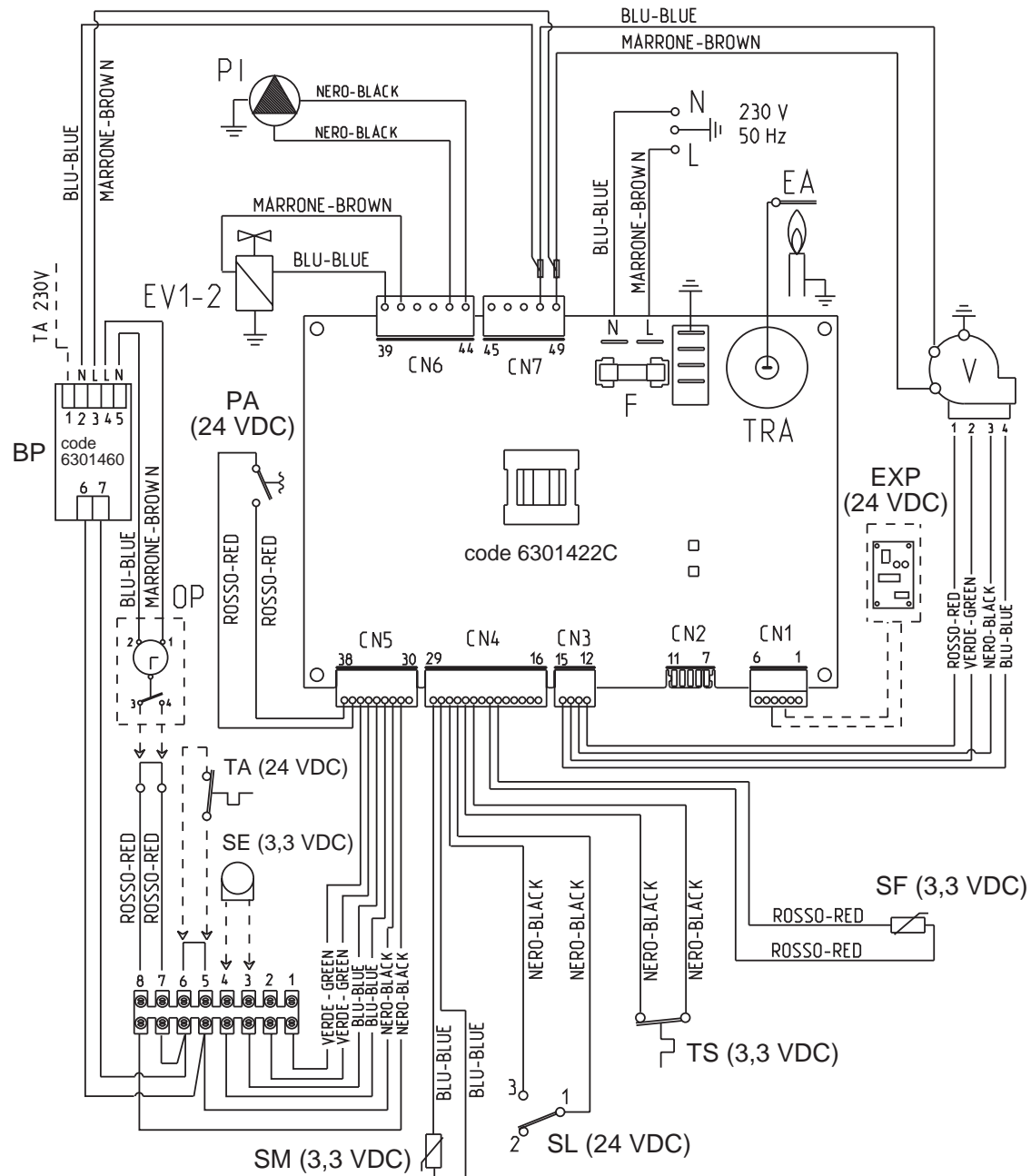
The heating is set from the remote control for the first zone and from the boiler panel for the other zones.
If there is a request for heat at the same time, the boiler is activated at the highest temperature setting.

6 MIXER VALVE SYSTEM

SYSTEM WITH ONE DIRECTED ZONE, AND ONE MIXER ZONE



2.10 BOILER ELECTRICAL "FORMAT DGT HE 20 SYSTEM" (fig. 11)



KEY	
F	Fuse (1.6 AT)
TRA	Ignition transformer
PI	Pump
V	Fan
EA	Ignition/ionisation electrode
EV1-2	Gas valve coil
SL	Condensate level sensor
SM	Heating sensor
TS	Safety thermostat
SF	Fumes sensor
PA	Water pressure switch
TA	Environment thermostat
SE	External sensor (optional)
EXP	Expansion card remote control (optional)
OP	Programming clock (optional part number 8092242)
BP	Board programming clock

NOTE (See section 2.8.1):

- If "TA" is used in low voltage [24 VDC] connect to clamps 5-6 of the terminal board in the panel, after having removed the jumper.
- If "TA" (230 V) is used connect to clamp 1 of the board.
- If a "OP" is used connect the contact to clamps 7-8 after having removed the jumper.
- Any power supply of a "OP" at 230 V can be withdrawn from clamps 4-5 of the board programming clock "BP".

CONNECTOR SPARE PART CODES:

CN3	code 6316268
CN4	code 6316275
CN5	code 6316253
CN6	code 6316266
CN7	code 6319115

Fig. 11

2.11 BOILER ELECTRICAL "FORMAT DGT HE 25-30-35" (fig. 11/a)

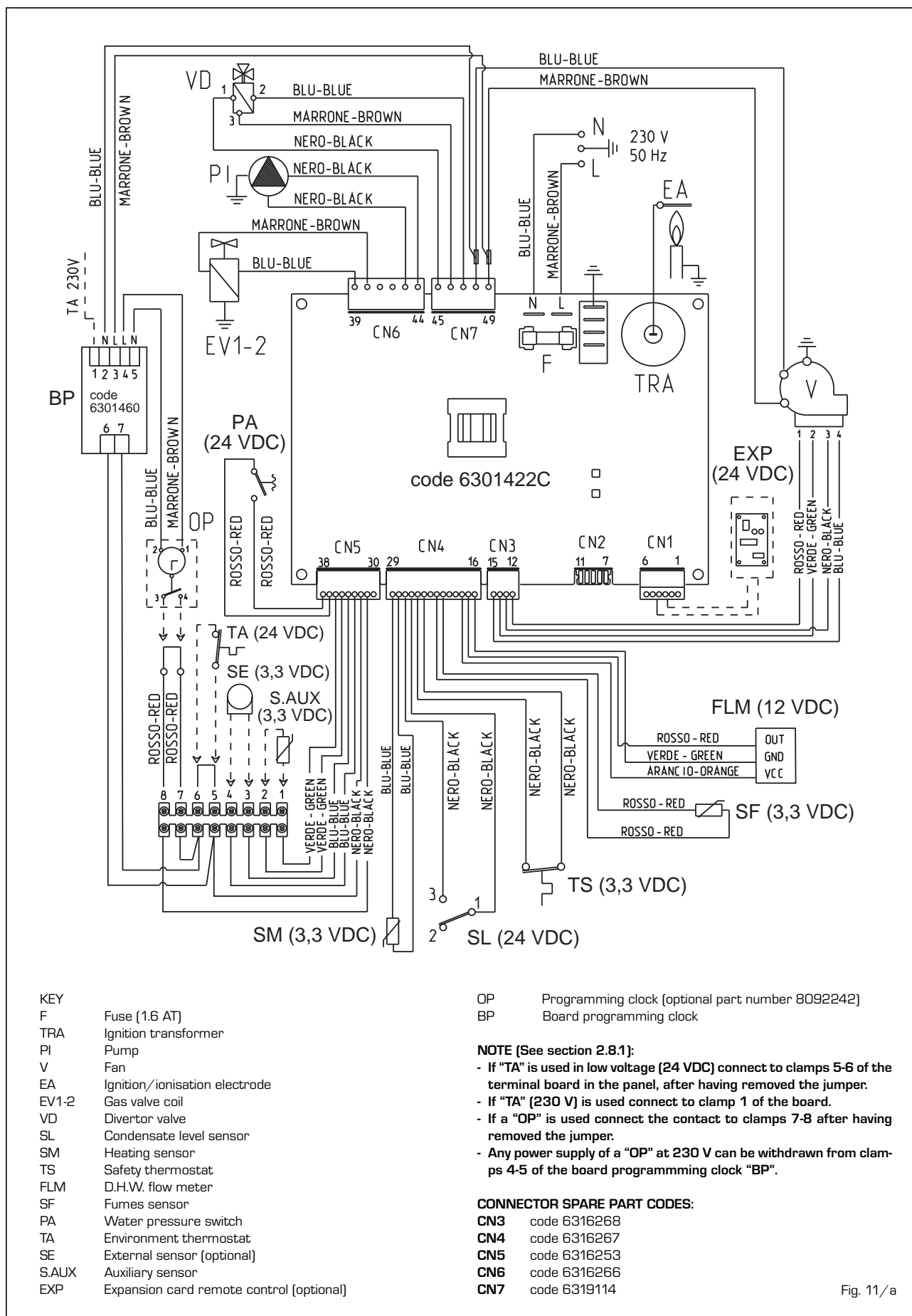
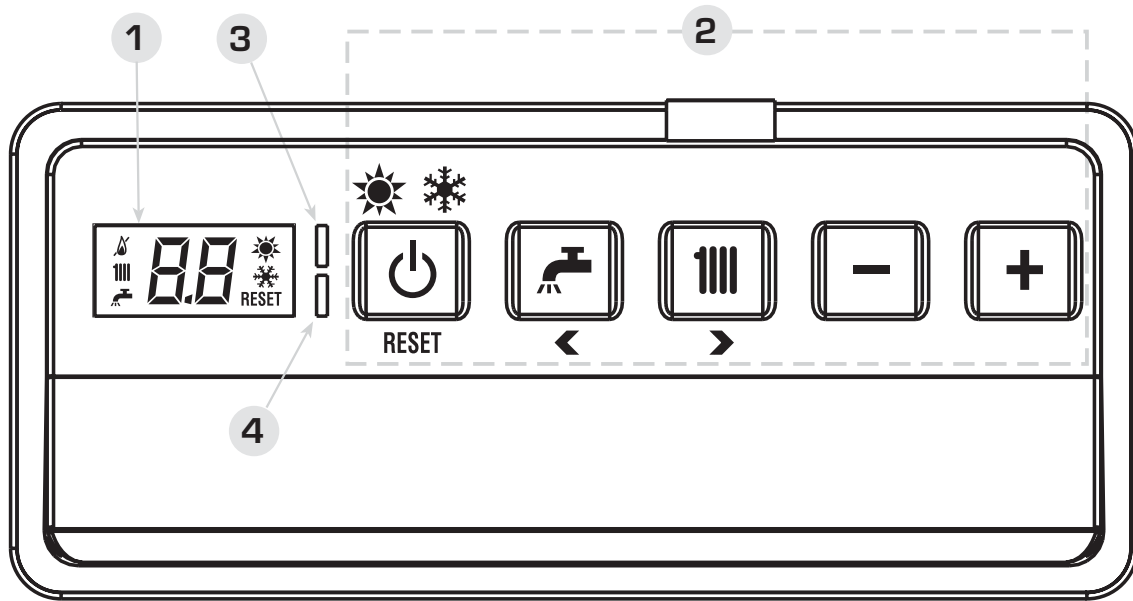


Fig. 11/a

3 CHARACTERISTICS

3.1 CONTROL PANEL (fig. 12)



1 - DESCRIPTION OF DISPLAY ICONS



SUMMER MODE ICON



WINTER MODE ICON



D.H.W. MODE ICON



HEATING MODE ICON



BURNER LIT ICON



LOCKOUT DUE TO NO
IGNITION/FLAME DETECTION



RESET REQUIRED



MAIN DIGITS

2 - DESCRIPTION OF CONTROLS



OPERATING MODE/RESET

By pressing the key in succession, pass to the summer and winter function (stand-by function if permanent on the key more than two second).
RESET is only available if a resettable anomaly is signalled



D.H.W. SET

Press the key to display the D.H.W. temperature value set



HEATING SET

Press the key to display the heating temperature value set (value not relative to the remote control)



DECREASE

Pressing this key decreases the value set



INCREASE

Pressing this key increases the value set

3 - LED GREEN



ON = Indicates the presence of electrical voltage.
It switches of momentarily every time the keys are pressed.
It can be disabled by setting **PAR 3 = 0**.

4 - LED RED

OFF = Normal operation
ON = Boiler anomaly signalled
Flashing when the control panel buttons are pressed inside the
PARAMETERS SECTION.



Fig. 12

3.2 ACCESS TO INSTALLER'S PARAMETERS

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

The red LED flashes and the display shows :





The parameters can be scrolled with  or .


To enter the parameter press **-** or **+**.

The value set **flashes**, the display shows :



Proceed as follows to change the set value:

- set the new value using **-** or **+**.
- confirm the set value using  or .

Press  to exit the parameters section. The display is shown automatically after 5 minutes. The parameters section contains the alarms log, info and meters (display only).

3.2.1 Replacing the board or RESETING parameters

If the electronic board is replaced or reset or the type of gas used is changed, it is necessary to configure PAR 01 and PAR 02 by associating the following values to each type of boiler to be able to restart the boiler:

GAS	MODELS	PAR 1
METHANE (G20)	20 System - 25	02
	30	03
	35	04
PROPANE (G31)	20 System - 25	06
	30	07
	35	08
-	-	-
		20

BOILER	PAR 2
25-30-35	01
25-30-35 combined with sun-panel system	02
with storage tank	03
20 System	04

NOTE: the boiler panel has a label with the values that have to be set for PAR 01 and PAR 02 (fig. 19).

PARAMETERS INSTALLER

FAST CONFIGURATION

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
01	Combustion configuration	- = ND 1 ... 20	=	=	"."
02	Hydraulic configuration	- = ND 1 ... 14	=	=	"."
03	Disabling of the green LED	0 = Disabled 1 = Enabled	=	=	01
04	Correction of external probe values	-5 ... 05	°C	1	00
05	Default time for keypad locking	- = Disabled 1 ... 99	Min.	1	15
09	Fan rpm Step ignition	00 ... 81	rpm x 100	01 from 0,1 to 19,9 1 from 20 to 81	00

D.H.W. - HEATING

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
10	Frost protection temperature	0 ... 10	°C	1	03
11	External sensor antifreeze	- = Disabled -9 ... 05	°C	1	-2
12	Climatic curve setting	03 ... 40	=	1	20
13	Minimum heating temperature	20 ... PAR 14	°C	1	20
14	Maximum heating temperature	PAR 13 ... 80	°C	1	80
15	Maximum heating power	30 ... 99	%	1	99
16	Post-circulation time	0 ... 99	10 sec.	1	03
17	Pump heating activation delay	0 ... 99	10 sec.	1	01
18	Re-ignition delay	0 ... 10	Min.	1	03
19	Flow meter modulation saturation band	0 ... 99	%	1	30
29	Anti-legionella (only D.H.W. tank)	0 = Disabled 1 = Enabled	=	=	0

PARAMETERS RE-SET

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
49 *	Reset default parameters (PAR 01 - PAR 02 equal "-")	- , 1	=	=	=

* To reset the circuit board to the default settings, set PAR49 to 1. PAR1 and PAR2 will need to be set as shown in 3.2.1.

ALARMS (visualization)

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
A0	Code of last error	=	=	=	=
A1	Code of last error - 1	=	=	=	=
A2	Code of last error - 2	=	=	=	=
A3	Code of last error - 3	=	=	=	=
A4	Code of last error - 4	=	=	=	=
A5	Code of last error - 5	=	=	=	=
A6	Code of last error - 6	=	=	=	=
A7	Code of last error - 7	=	=	=	=
A8	Code of last error - 8	=	=	=	=
A9	Code of last error - 9	=	=	=	=

INFO (Display)

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
i0	External sensor temperature	-9 ... 99	°C	1	=
i1	C.H. 1 sensor temperature	-9 ... 99	°C	1	=
i2	C.H. 2 sensor temperature	-9 ... 99	°C	1	=
i3	Fumes sensor temperature	-9 ... 99	°C	1	=
i4	Auxiliary sensor AUX temperature	-9 ... 99	°C	1	=
i5	Set of effective heating temperature	PAR 13 ... PAR 14	°C	1	=
i6	Level ionization flame	00 ... 99	%	1	=
i7	Fan speed	00 ... 99	100 rpm	1	=
i8	Flow rate D.H.W. flow meter	00 ... 99	l/min	1	=

COUNTERS (Display)

PAR	DESCRIPTION	RANGE	UNIT OF MEASUREMENT	INC/DEC UNIT	DEFAULT SETTING
c0	Number hours of operation of the burner	00 ... 99	h x 100	01 from 0,0 to 9,9 1 from 10 to 99	00
c1	Number of ignitions of the burner	00 ... 99	x 1000	01 from 0,0 to 9,9 1 from 10 to 99	00
c2	Total number of errors	00 ... 99	x 1	1	00
c3	Number accesses of Installer parameters	00 ... 99	x 1	1	00
c4	Number of accesses of OEM parameters	00 ... 99	x 1	1	00

3.3 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 3.2 (parameters PAR 13 and PAR 14).

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. 14 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 circuits.
- Ignition and flame detection system.
- Control panel setting for the power and the gas for boiler functioning.
- Anti-jammed for the pump which is fed for a few seconds (10") after 48 hours of inactivity.
- Chimney sweep function which can be activated from the control panel.
- Temperature which can be shifted with the external sensor connected.
- 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: remote control CR 73 combined with expansion card kit code 8092240.

3.6 TEMPERATURE DETECTION SENSOR

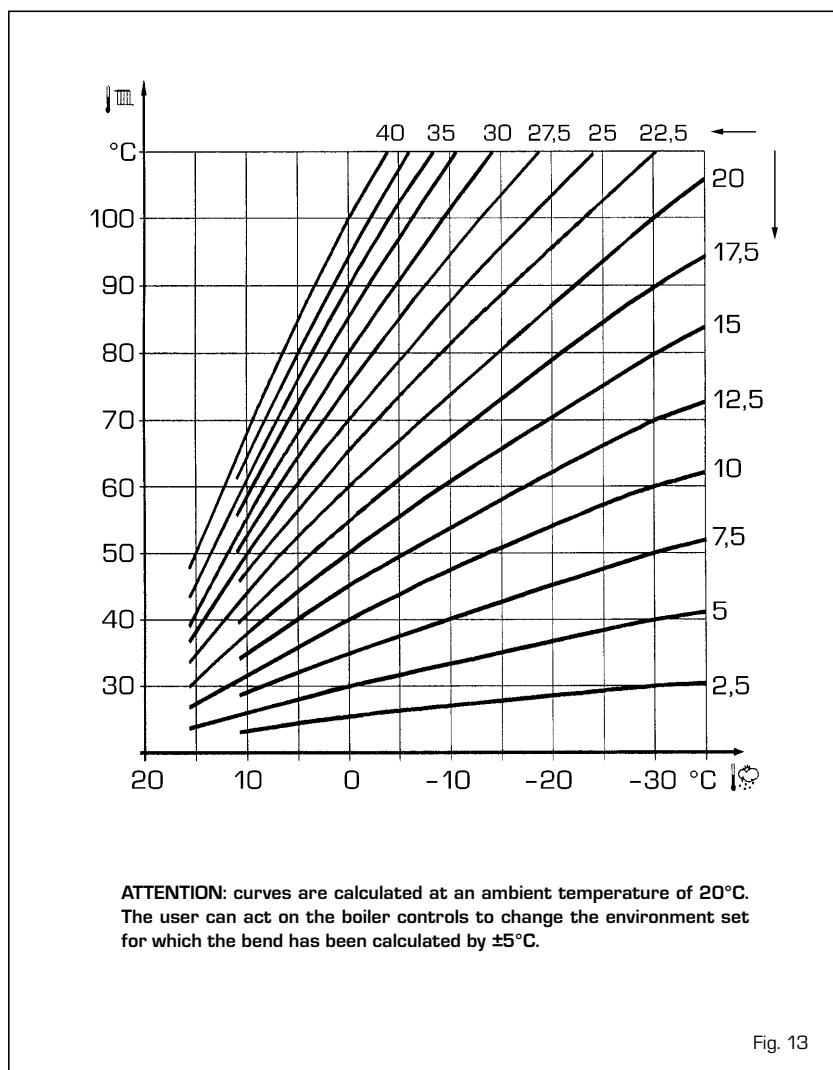
Table 4 shows the resistance values of the heating, D.H.W. and fumes sensor.

If the heating sensor (SM) and fumes sensor (SF) is faulty or open circuit, the boiler will not function on either heating or D.H.W.

If the D.H.W. sensor (SB) is faulty or open circuit, the boiler set in winter mode will only work with heating function; if set in summer mode, D.H.W. function will be enabled only.

TABLE 4 (SM - SF - SB sensors)

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



3.6 ELECTRONIC IGNITION

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

3.6.1 Functioning cycle

Burner ignition should occur within 10 seconds of the opening of the gas valve. If after three attempts the ignition is not detected the boiler will lockout (ALL 06):

- Lack of gas

The ignition electrode will discharge for a maximum of 10 seconds. If after three attempts the ignition is not detected the boiler will lockout (ALL 06). This can happen the first time a boiler is switched on, or after long periods of inactivity. It can also be caused by a closed gas cock or a gas valve not operating.

- No ionisation

The boiler will spark for 10 seconds, if after 3 attempts the ionisation is not detected, the boiler will lockout (ALL 06). This could be due to a poor connection or break in the ionisation cable. Check also

that the cable is not shorted, badly worn or distorted.

In the case of a sudden loss of voltage, the burner will immediately switch off. When the voltage is restored, the boiler will automatically start up again.

3.7 HEAD AVAILABLE TO SYSTEM (fig. 14 - fig. 15)

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

To obtain the maximum head available to the system, turn off the by-pass by turning the union to the vertical position (fig. 15).

3.8 WATER PRESSURE SWITCH (fig. 15)

The water pressure switch (C fig. 15) intervenes, blocking burner functioning, if it detects that there is insufficient pressure in the boiler (< 0,6 bar).

To restore the boiler operation, increase the system pressure to 1 - 1,2 bar.

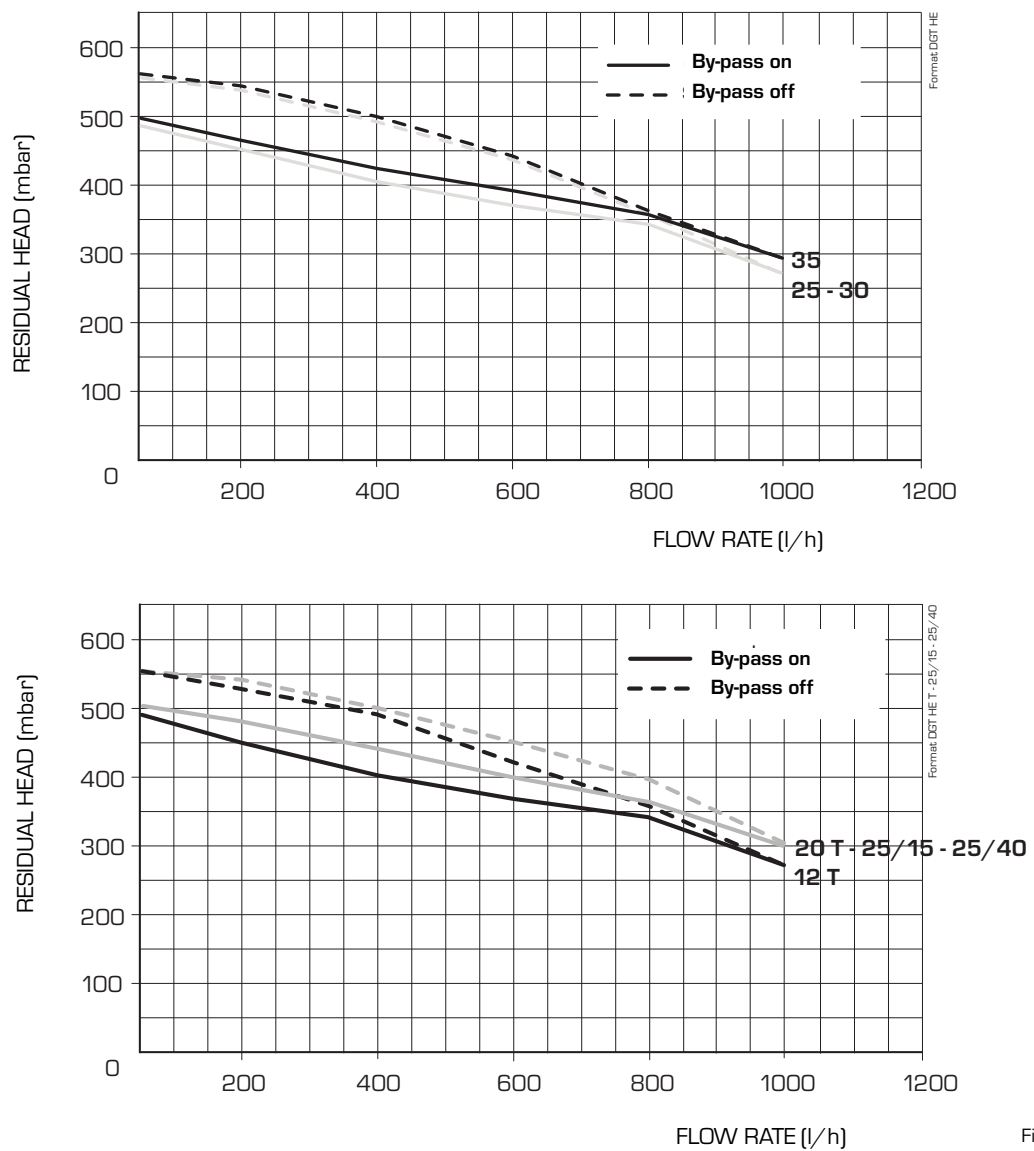


Fig. 14

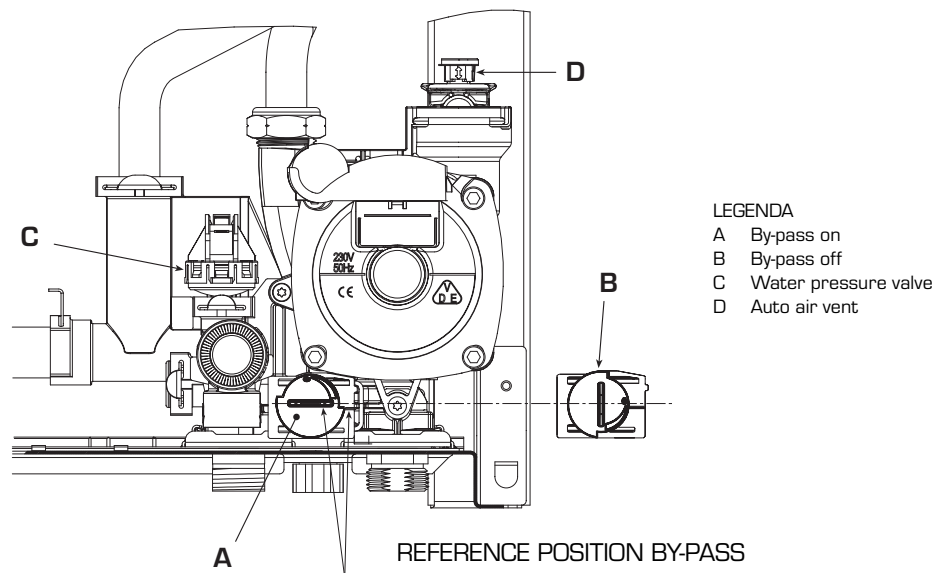


Fig. 15

4 USE, MAINTENANCE (including BENCHMARK) AND COMMISSIONING

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

- The integrity of the flue system and the flue seals
- The integrity of the boiler combustion circuit and relevant seals.
- The operational working gas pressure as described in section 4.7.1
- The combustion performance as described in section 4.8.1

4.1 GAS VALVE (fig. 16)

The boiler is supplied as standard with a gas valve, model SIT 848 SIGMA (Fig. 16).

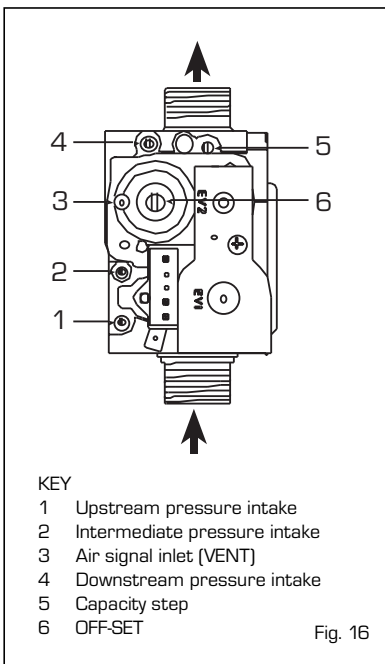


Fig. 16

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 (1) and the gasket (2) using those supplied in the conversion kit.
- Test all the gas connection using leak detection fluid. Do not use open flames.
- Apply the nameplate with the new gas flow layout.
- See section 4.2.2 to measure the CO₂ and adjustment of the gas valve if required.

4.2.1 New fuel configuration

Access the parameters section by pressing the control panel keys (and) at

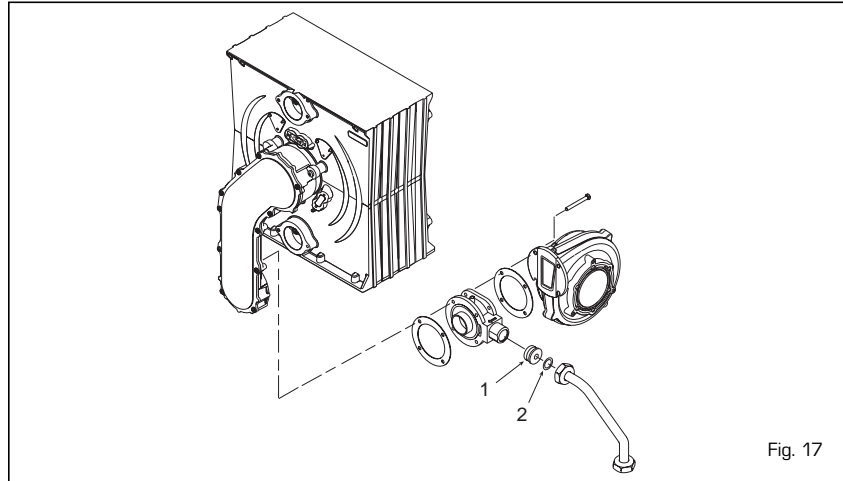


Fig. 17

the same time for 5 seconds.

The red LED flashes and the display shows :



Scroll the parameters using or .

To enter the fuel configuration parameter PAR 01, use or .

The set value **flashes** and if the boiler in question is a **20 System** with methane, the display shows :



For the **20 System** boiler to function with LPG, press until **06** appears.

Confirm this value using or .

Exit the parameters section by pressing .

The table below gives the values to set when the supply gas is changed:

GAS	MODELS	PAR 1
METHANE (G20)	20 System - 25	02
	30	03
	35	04
PROPANE (G31)	20 System - 25	06
	30	07
	35	08
-	-	-
-	-	-
-	-	20

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 combu-

stion 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 buttons and at the same time for 5 seconds. Chimney sweep mode, see 4.5.1 (Lo) will appear on the display and the boiler will work at minimum power:

2) Press button to raise the boiler to maximum power (Hi).

3) Determine the CO₂ values at max power stated below, if required adjust using the capacity step (5 fig. 16):

Boiler model	MAX power	
	CO ₂ (Methane)	CO ₂ (Propane)
20-25-30-35	9,0 ±0,3	10,0 ±0,3

4) Press button to bring the boiler to minimum power (Lo).

5) Determine the CO₂ values at min power stated below, if required adjust using the OFF-SET adjustment screw (6 fig. 16):

Boiler model	MIN power	
	CO ₂ (Methane)	CO ₂ (Propane)
20-25-30-35	9,0 ±0,3	10,0 ±0,3

6) Press buttons and several times to verify the pressures; if necessary, make the appropriate corrections.

7) Press button to exit the function.

4.3 CO / CO₂ RATIO

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

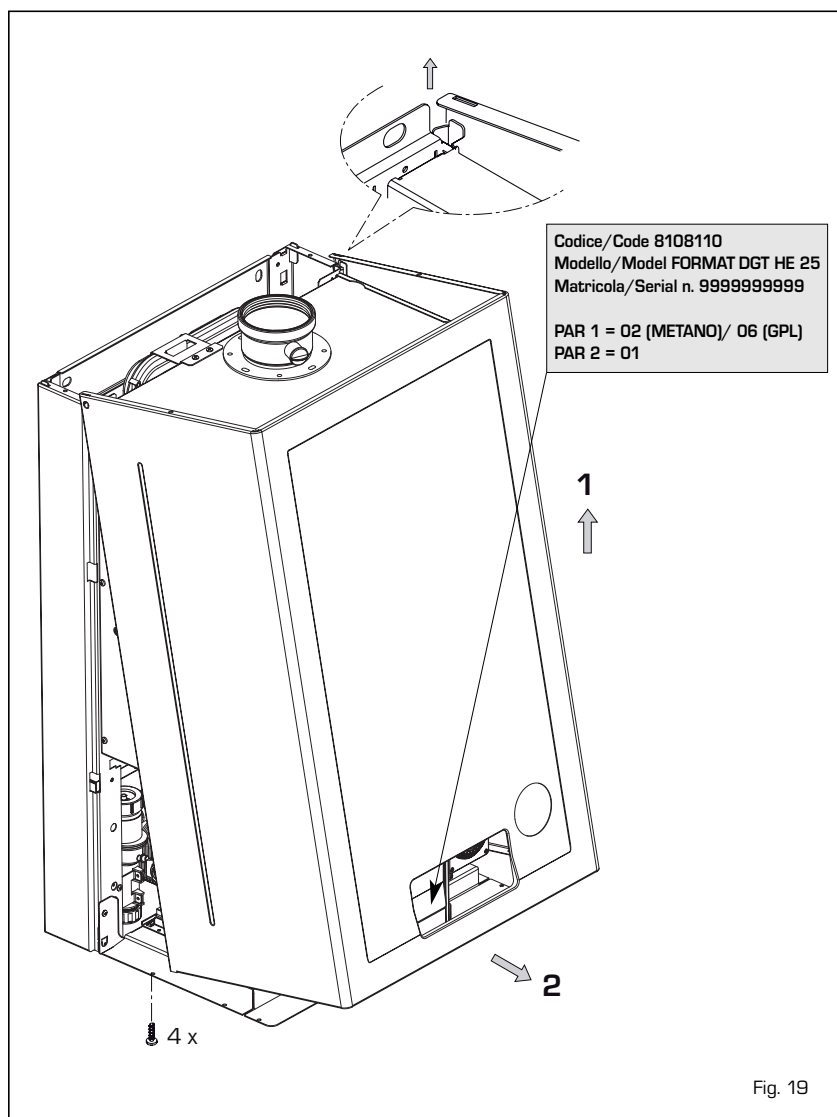


Fig. 19

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 (fig. 20)

To guarantee the operation and efficiency of the appliance and to conform to any extended warranty, it must be serviced regularly, dependant on usage, but at least annually by a qualified Gas Safe Registered engineer. **During maintenance operations, it is important to verify that the condensate trap contains water (this check is particularly important if the generator has not been used for extended periods of time). If necessary, the condensate trap can be filled using the filling point provided (fig. 20).** Instead, to clean the exchanger and the burner, do in the following way (fig. 20):

- Empty the condensation-collecting tray.
- Remove the sleeve.
- Spray the water jet inside of the burner and the exchanger in order to remove dust and combustion residue.
DO NOT USE CHEMICAL AGENTS OR STEEL BUSHES.
- Remove the condensation-collecting tray. Clean it and put it back tightening the fixing nuts with a torque wrench.
- Having re-assembled the tray, check its sealing with a leak detector.

4.5.1 Chimney sweep function

To check boiler combustion, press at the

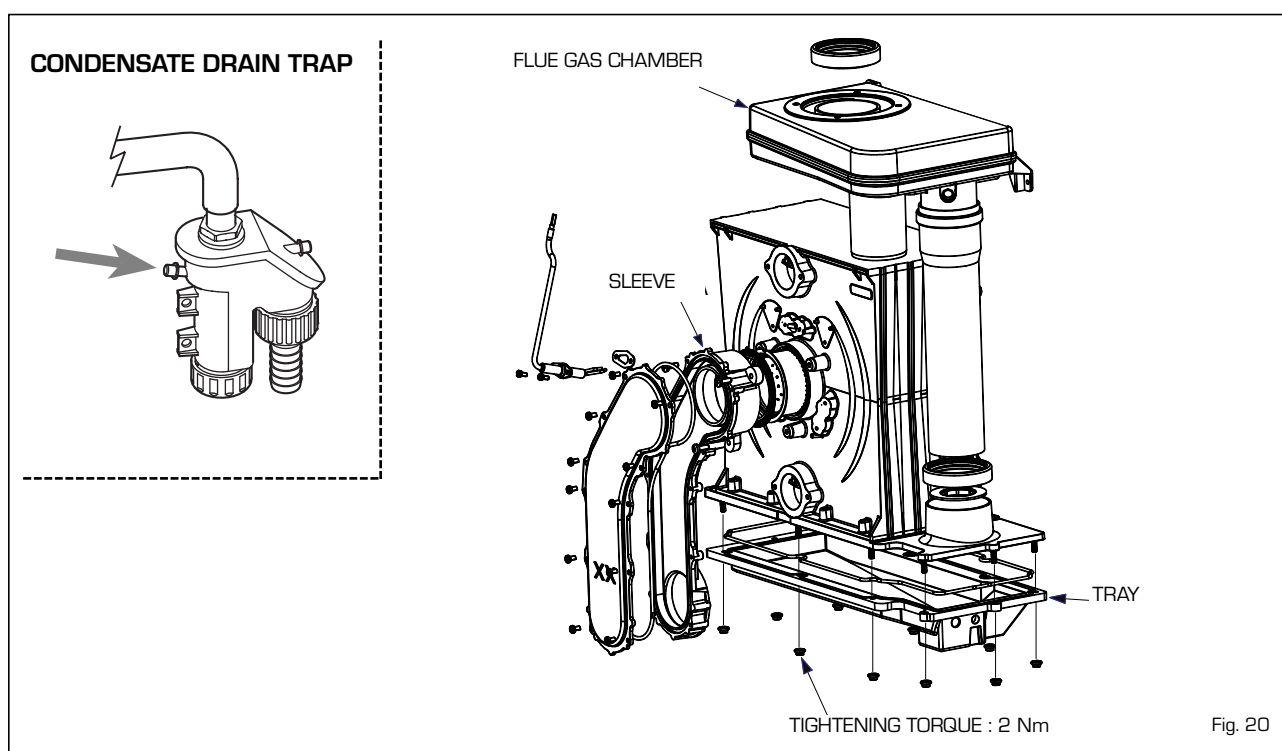



Fig. 20

same time the installer's key (- e +) for a few seconds. The chimney sweep function will switch on and will continue for 15 minutes. During the 15 minutes functioning of chimney sweep function, pressing the keys (- and +) take the boiler respective at maximum (Hi) and at minimum (Lo) power. From that moment, the boiler will start working in heating mode at maximum power, with cut off at 80°C and re-ignition at 70°C.

Before activating the chimney sweep function make sure that the radiator valves or zone valves are open.

The test can also be carried out with the boiler working in D.H.W. mode.

For this, after activating the chimney sweep function, open one or more hot water taps. Under these conditions, the boiler will function at maximum power with the D.H.W. kept at between 60°C and 50°C. During the test, the hot water taps must remain open. For exit to the chimney sweep function press the key  of the control panel.

The chimney sweep function will automatically switch off after 15 minutes from the activation.

4.5.2 Clean heating water filter (fig. 21)

To clean the filter, turn off the system flow/return valves, turn control board power off, remove the casing and empty the boiler through the relevant drain. Place a collecting vessel under the filter. Use pliers to remove the filter clean it removing impurities and lime scale deposits.

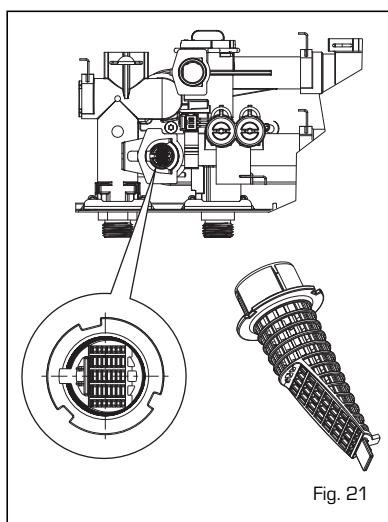


Fig. 21

4.6 FUNCTIONING ERRORS

When there is a functioning error, an alarm appears on the display **and switch on the red led.** Descriptions of the errors with relative alarms and solutions are given below (if a error persists contact a authorised service engineer):


- **FUMES DISCHARGE ERROR ALARM 01**
The fumes thermostat has intervened. If

the condition causing the problem persists for two minutes, the boiler stops for an enforced period of thirty minutes. At the end of this period, the boiler re-attempts ignition.

- **LOW WATER PRESSURE ERROR ALARM 02 (fig. 22/a)**

If the pressure detected by the water pressure valve is lower than 0.5 bar, the boiler stops and the display shows the alarm "AL 02". Increase the system pressure to between 1.0 and 1.2 bar (use pressure gauge, fig 22/a) using the external filling loop. The boiler will automatically resume operating.

- **HEATING SENSOR ERROR ALARM 05**
When C.H. sensor (SM) is open or short circuited, the boiler will not function and the display will show the alarm "AL 05".

- **LOCKOUT ALARM 06 (fig. 22/b)**
If the flame control has not detected the presence of the flame 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 "AL 06". Press the key  of the controls to start up the boiler again.

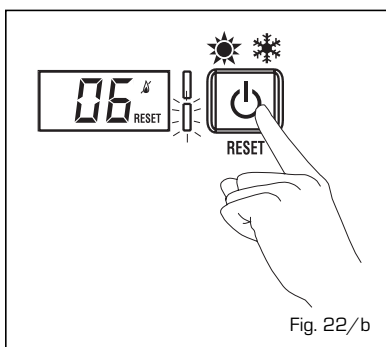


Fig. 22/b

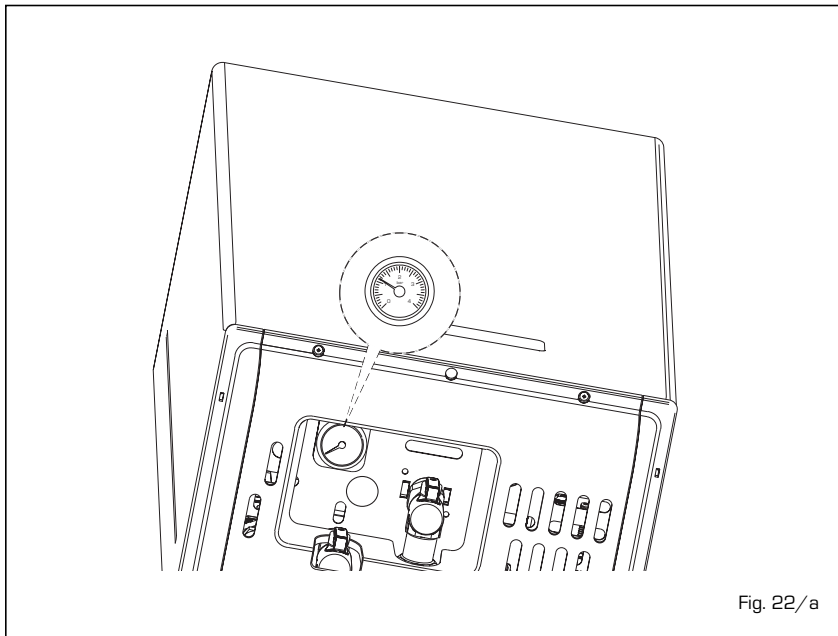



Fig. 22/a

- **SAFETY THERMOSTAT ERROR ALARM 07 (fig. 22/c)**

Opening of the safety thermostat will turn off the burner; the display will show AL07. If the problem persists for more than one minute, the boiler will stop and the red LED will turn on. Press the key  of the controls to start up the boiler again.

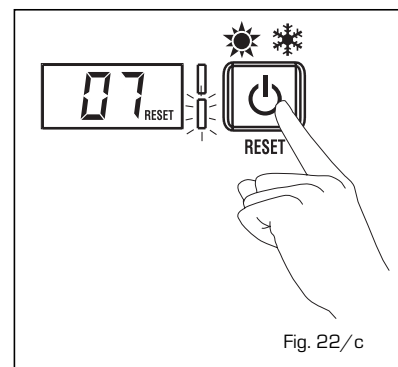



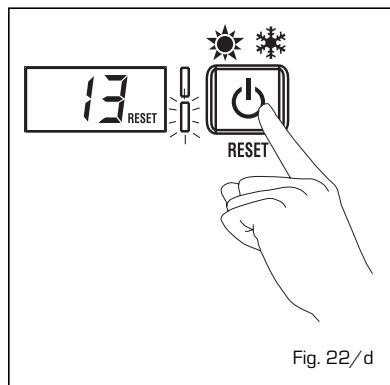
Fig. 22/c

- **FLAME DETECTION ERROR ALARM 08**
If a flame is detected when one should not be present, the boiler will stop and the display will show "AL 08"

- **AUXILIARY SENSOR ERROR ALARM 10 ONLY FOR BOILER WITH SOLAR PLANT COUPLING (PAR 2 = 2):**
D.H.W. inlet probe anomaly. When the probe is open or short circuited the boiler loses the solar function and the display shows anomaly AL 10.

- **ACTIVATION OF THE EXHAUST FUMES SENSOR ERROR "AL 13" (fig. 22/d)**
The activation of the exhaust fumes sensor causes the boiler to stop and the display will show AL 13. Press the key  of the controls to start

up the boiler again.



- EXHAUST FUMES SENSOR ERROR "AL 14"

When the exhaust fumes sensor is opened or short-circuited, the boiler stops and the display shows anomaly AL 14.

- FAN ERROR "AL 15"

If the fan speed is not within the rated speed range, the display will show "AL 15". If the problem persists for more than two minutes the boiler will stop for thirty minutes and then attempt to resume working.

- CONDENSATE LEVEL ERROR "AL 18"

Should the condensate level sensor indicate a backup of condensate, the boiler will stop for 10 minutes and show AL 18. After this period the boiler will attempt to resume.

4.7 COMMISSIONING AND ROUTINE SERVICE

Commissioning and servicing can only be done by a qualified engineer.

4.7.1 Commissioning

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:

- That the boiler has been installed in accordance with these instructions.
- The integrity of the flue system and the flue seals.
- The integrity of the boiler combustion circuit and all the relevant seals.

The following procedure should be done after installation a gas purge and tightness/drop test have been made.

Ensure that the auto air vent (fig. 3) is opened, turn the electrical supply on.

With the boiler on standby fill the system and pressurise to 1.5 bar.

Ensure that the pump has been manually

rotated.

Open the gas cock, press the "❄ mode key" (fig. 12).

Check the operational (working) gas inlet pressure.

Set up the boiler 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 test point (see fig 16 item 1) is 21 mb +/- 2 mb.

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

The boiler will attempt to light.

Press "❄ mode key" (fig. 12).

The burner will extinguish.

Turn on a DHW tap fully (preferably the bath tap).

Set the controls to the required values as shown in the user guide.

Complete the Benchmark sheet enclosed in this manual.

Explain controls and operation to the user.

Leave all documentation with the user.

4.8 ROUTINE SERVICE

To comply with the conditions of any extended warranty offered and to ensure continued safe and efficient operation, the boiler must be serviced at regular intervals, at least once a year. This service must be recorded in the Benchmark section of this manual.

It is the law that a competent person such as a Gas Safe Register registered engineer, must carry out any service work.

4.8.1 Combustion Check (fig. 23)

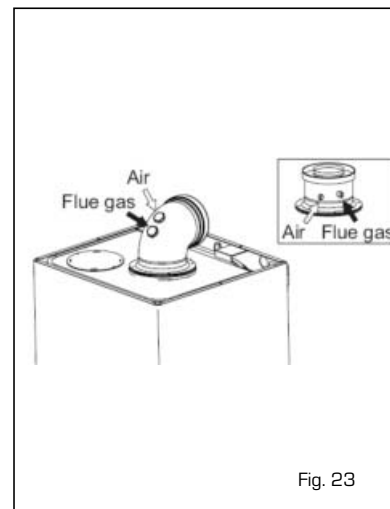
Competence to carry out the check of combustion performance.

PLEASE NOTE: BS 6798: 2009 Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70 kw net advises that:

- * 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 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 combustion gas analysers in accordance with BS7967, parts 1 to 4.

Connect the flue gas analyser to the flue gas sampling point as shown in the diagram and check combustion as described

in 4.2.2 and 4.3 (fig. 23).



4.8.2 Burner inspection

- Isolate from mains
- Remove case cover
- Isolate gas
- Drop down control case
- Remove ignition lead
- Disconnect gas pipe from gas valve to burner mixing arm,
- Disconnect air sensing tube
- Remove air inlet to fan
- Remove 3 times screws holding arm to main heat exchanger body
- Remove arm with fan attached
- Check seals and replace if necessary
- Draw out main burner
- Replace in reverse order

Test for gas tightness

4.8.3 Combustion Chamber

Remove any loose debris from the combustion chamber using a soft brush and a vacuum cleaner.

Take care not to damage the rear insulation panel.

4.8.4 Condensate Trap

The condensate trap would not normally require removal during service, but can be checked whilst the burner assembly is removed.

Carefully pour water into the heat exchanger and check that it flows freely to the drain.

Should it require removal, firstly remove the two wire clips securing the condensate drain rubber pipe to the heat exchanger and the condensate trap.

Remove the pipe.

Remove the 1/2" nut securing the condensate trap to the combustion compartment.

Disconnect the drain pipe from the trap.

Clean the trap and refit in reverse order.

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: _____

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 Ω (ohm) x 1 scale and adjust zero if necessary. Tests 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 Ω (ohm). If the resistance is greater than 1 Ω (ohm) check all earth wires for continuity and all contacts are clean and tight. If the resistance to earth is still greater than 1 Ω (ohm) then this should be investigated further.

5.2 SHORT CIRCUIT CHECK

Switches turned FULL ON - meter set on Ω (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 Ω (ohm) x 100 scale. Repeat it with leads from L to E. If meter reads less than infinity (∞) 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/arcing 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 Ω (ohm) x 100 scale.

All switches including thermostat on test leads from L to E - if meter reads other than infinity (∞) 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

6.1 REMOVAL OF BURNER ASSEMBLY

- Isolate from mains
- Remove case cover
- Isolate gas
- Drop down control case
- Remove ignition lead
- Disconnect gas pipe from gas valve to burner mixing arm,
- Disconnect air sensing tube
- Remove air inlet to fan
- Remove 3 times screws holding arm to main heat exchanger body
- Remove arm with fan attached
- Check seals and replace if necessary
- Draw out main burner
- Replace in reverse order
- Test for gas tightness

6.2 REMOVAL OF FAN UNIT

- Isolate from mains
- Remove case cover
- Isolate gas supply
- Drop down control cover
- Remove ignition lead
- Disconnect gas pipe from gas valve and burner mixing arm
- Disconnect air sensing tube
- Remove air inlet to fan

- Unplug 2 x cables from fan
- Remove 3 times screws to main heat exchanger body
- Remove arm with fan attached
- Check seals and replace if necessary
- Loosen 2 x 8mm bolts from fan and remove 2
- Remove fan
- Remove restrictor plate and fit to new fan
- Refit in reverse order
- Re commission boiler
- Test for gas tightness

6.3 HEATING THERMISTOR (SM SENSOR)

- Remove case cover
- Unclip thermistor from flow pipe
- Disconnect cable
- Refit in reverse order
- Ensuring cables are vertical

6.5 SAFETY STAT

- Isolate from mains
- Remove case cover
- Pull clip forwards slide stat upwards
- Remove 2 black wires connected
- Apply heat sink compound to new stat

- Replace in reverse order

6.6 FLUE STAT

- Isolate from mains
- Remove case cover
- Loosen clip holding air intake tube to flue hood and remove
- Unplug cable from stat
- Loosen stat using 15mm spanner and remove
- Refit in reverse order

6.7 IGNITION ELECTRODE

- Isolate from mains
- Remove case cover
- Remove grommet from rear of PCB board cover and unplug ignition lead
- Remove 2 x screws
- Pull electrode forward
- Replace in reverse order
- Ensure correct gap set


6.8 EXPANSION VESSEL

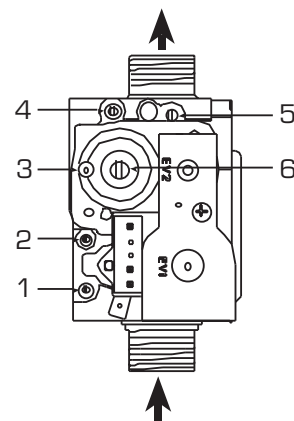
- Isolate from mains
- Remove case cover
- Isolate flow and return valves

- Drain boiler using fitted drain vent
- Disconnect expansion pipe
- Remove expansion securing nut
- Remove vessel
- Check new vessel for correct pressure 1-1.25 bar
- Refit in reverse order

6.9 GAS VALVE (fig. 24)

- Isolate from mains
- Remove cover
- Isolate gas supply
- Disconnect leads from gas valve
- Disconnect sensing tube
- Remove gas valve
- Refit in reverse order ensuring seals are replaced as required
- Setting the gas valve procedure for **FORMAT DGT HE**:

1. Remove the heating sensor from the flow pipe.
2. Open the downstream test point (4 fig. 24) and connect a digital manometer set on the mmH₂O scale. Ensure the meter is zeroed.
3. Simultaneously press the - and + buttons for 5 seconds to enter "chimney sweep". "Lo" will appear on the display and the boiler runs at minimum power.
4. Press the + button and the boiler will go to maximum power "Hi" will be displayed.
5. Fully open the SHUTTER (5 fig. 24) - turn anti clockwise.
6. With the shutter fully open, adjust the OFF-SET (6 fig. 24) to obtain the first pressure value shown in Table 1 - OFF-SET column, ensure that the value is correct for the gas being used. If these figures are not obtainable, confirm that the working inlet gas pressure is correct.
7. Close the SHUTTER (5 fig. 24) to obtain the second pressure reading indicated in Table 1 - SHUTTER column.
8. Once these adjustments have been obtained, a flue gas analysis must be done. See section 4.2.2.
9. Press the - button to return the boiler to minimum output "Lo" will be displayed.
10. Check the analyzer CO₂/Ratio and compare to values reported in Table 1. Make any final adjustments by small adjustments to the OFF-SET screw.
11. Press the + button and verify that the CO₂/Ratio has remained stable.
12. Press the Standby  key to exit.
13. Refit the heating sensor to the flow pipe.
14. Remove the manometer, close the test point, and check for



KEY

- 1 Upstream pressure intake
- 2 Intermediate pressure intake
- 3 Air signal inlet (VENT)
- 4 Downstream pressure intake
- 5 Capacity step
- 6 OFF-SET

TABLE 1

Gas	Model	SHUTTER fully open	OFF-SET adjusted	CO ₂ % + / - 0.3	Ratio Less than
		Adjust OFF-SET mmH ₂ O	Adjust SHUTTER mmH ₂ O		
Methane	20/25HE	120.5	103.5	9.0	0.004
	30HE	102.7	98.3	9.0	0.004
	35HE	130.6	112.8	9.0	0.004
LPG	20/25HE	122.5	105.7	10.0	0.004
	30HE	104.6	89.6	10.0	0.004
	35HE	133.8	128.5	10.0	0.004

Fig. 24

tightness.

- Refit in reverse order
- Check all seals
- Check gas joints for tightness

6.10 MAIN HEAT EXCHANGER

- Isolate from mains
- Remove cover
- Isolate flow and return
- Isolate gas
- Drop down control case
- Remove ignition lead
- Disconnect gas pipe from gas valve to burner mixing arm,
- Disconnect air sensing tube
- Remove air inlet to fan
- Remove 3 screws holding arm to main heat exchanger body
- Remove arm with fan attached
- Check seals and replace if necessary
- Draw out main burner
- Drain boiler using fitted drain vent
- Remove condense sensor lead
- Remove flue stat lead
- Remove overheat lead and SM sensor lead
- Remove flow pipe clip and remove pipe from main heat exchanger and technil assembly
- Remove return pipe from heat exchanger and pump housing
- Remove condense pipe from condense collector
- Remove 4 screws from right hand and left hand side of main heat exchanger
- Drop down heat exchanger and draw forwards

6.11 PUMP HEAD

- Isolate boiler
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vent
- Remove electrical lead from pump
- Remove 4 x fixing screws from pump housing catching any excess water
- Pull pump forward
- Refit in reverse order

6.12 DOMESTIC HEAT EXCHANGER

- Isolate boiler
- Remove cover
- Isolate flow and return
- Turn on D.H.W tap
- Close cold water supply isolation valve
- Drain boiler using drain vent
- Remove 2 screws securing plate heat exchanger
- Remove plate heat exchanger catching any excess water
- Ensure that the four O rings are removed from the technil assembly
- Fit new O rings supplied with new heat exchanger to the heat exchanger
- Refit in reverse order

6.13 SAFETY VALVE

- Isolate from mains
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vent
- Disconnect pipe from safety valve
- Remove safety valve securing clip
- Remove safety valve
- Refit in reverse order

6.14 DIVERTER VALVE MOTOR HEAD

- Isolate mains
- Remove cover
- Remove pin from valve head body
- Disconnect lead
- Lift motor upwards
- Refit in reverse order

6.16 AUTO AIR VENT

- Isolate boiler
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vents
- Pull clip forwards and lift auto air vent upwards
- Refit in reverse order

6.17 DIVERTER CARTRIDGE

- Isolate boiler
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vent
- Remove air inlet duct
- Disconnect return pipe from pump housing
- Disconnect water gauge pipe from pump housing
- Unplug pump removing top cover
- Remove 2 x screws holding pump and pull forwards catching any excess water
- Remove motor head as 6.14
- Remove pin lift cartridge housing upwards catching any excess water
- Refit in reverse order ensure cartridge is locked in position

6.18 WATER PRESSURE TRANSDUCER

- Isolate boiler
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vent
- Remove clip below flow switch
- Disconnect lead from sensor
- Lift switch upwards
- Refit in reverse order

6.19 DHW FLOW SENSOR

- Isolate boiler

- Remove cover
- Remove cable from flow sensor and pull forward
- Lift flow sensor blue clip pull forward
- Refit in reverse order

6.20 CONDENSE SENSOR

- Isolate boiler
- Remove cover
- Remove air inlet duct
- Remove 2 red wires to flue sensor remove flue above boiler
- Remove 2 screws holding flue hood
- Remove 2 screws holding top plate
- Remove condense tube left hand side
- Lift top plate upwards
- Remove exhaust pipe upwards
- Remove flue restrictor
- Cover pump housing to catch excess condense
- Unscrew sensor removing plug lift through exhaust outlet
- Refit in reverse order ensuring all seals and flue restrictor is fitted

6.21 CONDENSE TRAP

- Isolate boiler
- Remove cover
- Remove air inlet duct
- Remove 2 condense pipes from condense trap
- Remove locking nut holding trap to bracket
- Pull trap downwards and forwards
- Refit in reverse order

6.22 FLUE HOOD

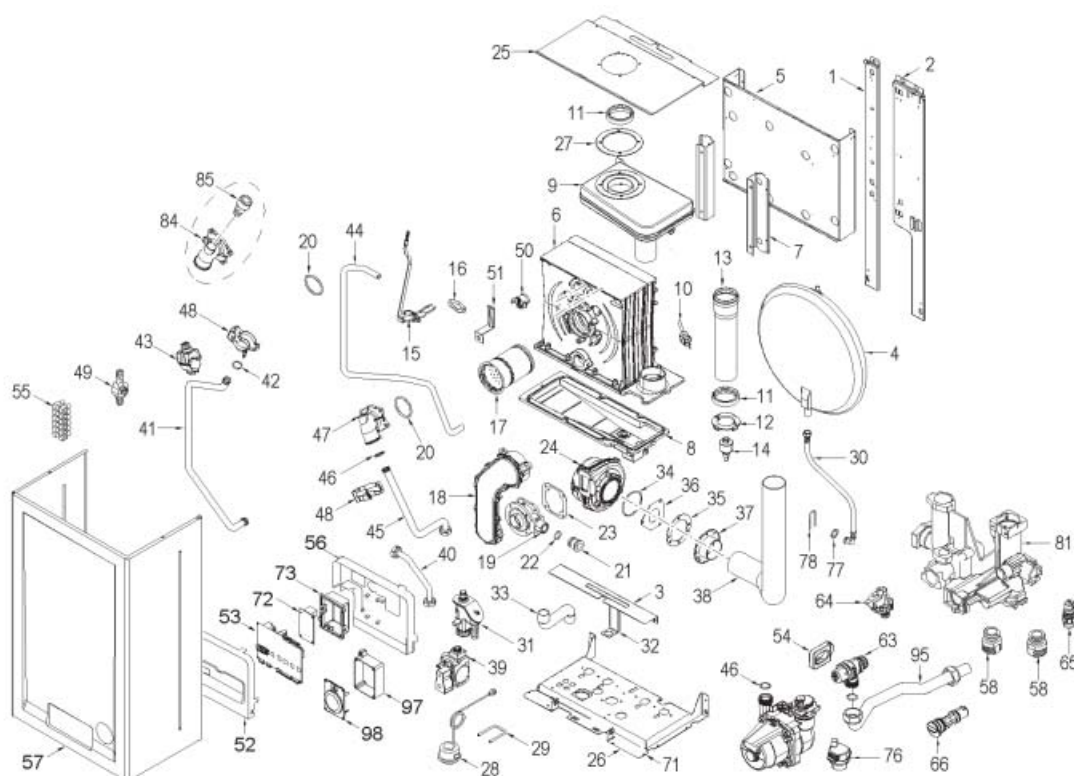
- Isolate boiler
- Remove cover
- Remove air inlet duct
- Remove flue
- Remove condense pipe left hand side of duct
- Remove 2 screws rear of flue duct
- Remove 2 screws top of boiler case
- Lift out flue duct
- Refit in reverse order
- Checking seals

6.23 MANUAL BY-PASS

- Isolate boiler
- Remove cover
- Isolate flow and return valves
- Drain boiler using drain vent
- Remove clip
- Pull bypass valve forward
- Refit in reverse order
- Checking seals

7 EXPLODED VIEWS

8108118 FORMAT DGT HE 20 SYST.



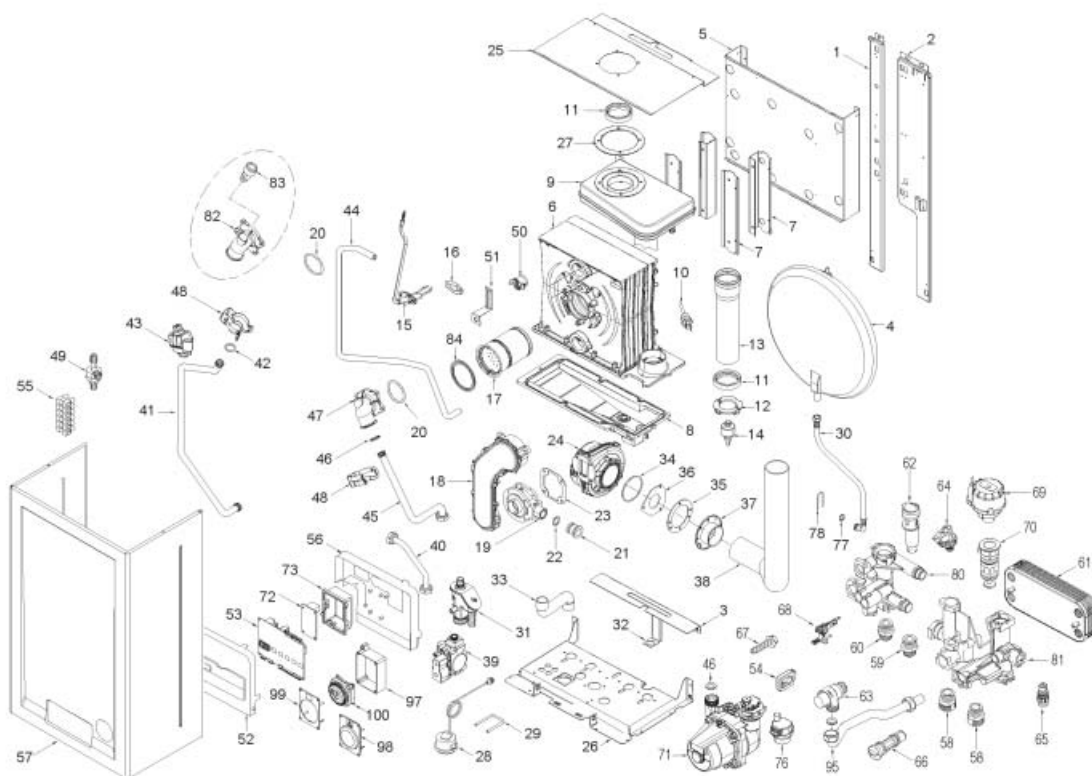
Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel I.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006A	6319201	Main exchanger body
007A	6010843	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015A	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017A	6278312	Burner
018	6278855	Air-gas hose kit
019A	6274306	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021A	6274124	Burner nozzle ø 7,00
021C	6274123	Main burner nozzle Ø 5,00
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024	6261408	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe

20 SYSTEM

20 MET

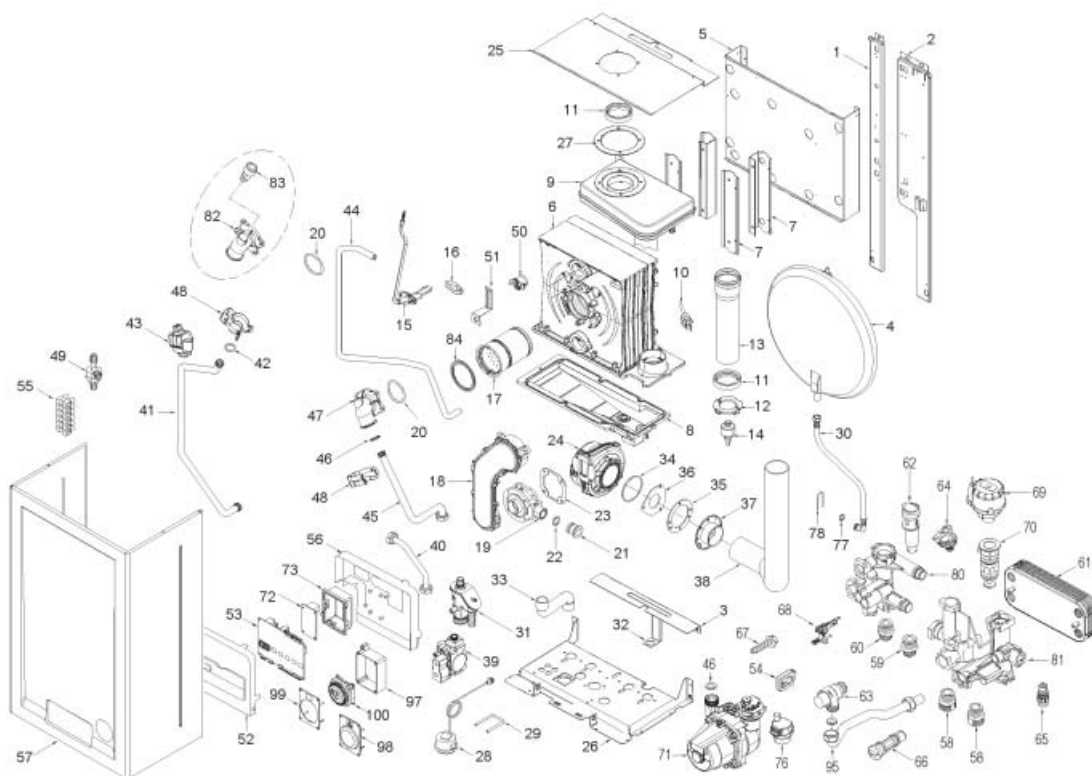
20 GPL

034	6226410	O-Ring Ø 63 x 3
035	6028703	Gasket for duct flange
036	6028646	Air diaphragm
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246505	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050A	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vessel fixing spring
081	6319696	C.H. Technyl manifold group
084	6026415	Exch. elbow flange 1/8" flow
085	6017213	Manual air vent 1/8"
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
098	6155422	Time programmer cover
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
730	6316275	14 pole cable connector
738	5185131	Conversion kit LPG
740	6319115	5 pole cable connector CN7
741	6319695	Murelle-Format-.....o-ring kit
742	5198890	Technyl hydraulic group
743	8076110	Expas.major vessel ZILMET
744	6211793	Hydr.group Bitron caps kit exp
746	5199366	Complete control panel



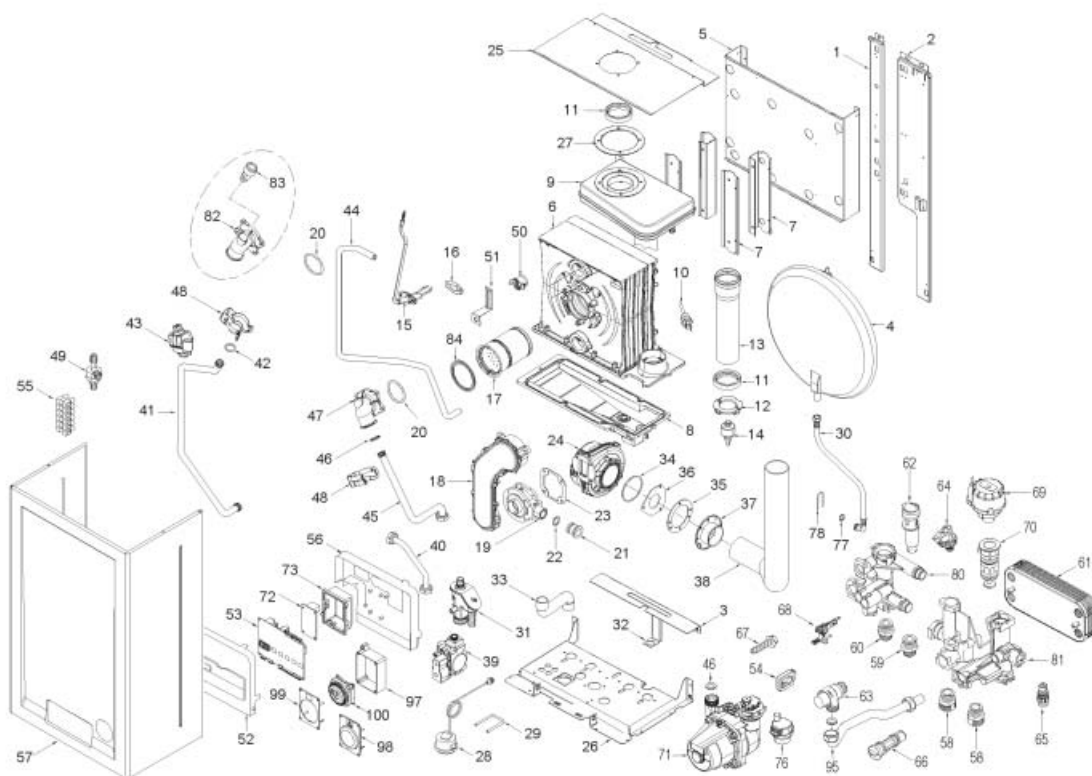
Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006	6319201	Main exchanger body
007	6010843	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017	6278312	Burner
018	6278855	Air-gas hose kit
019	6274306	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021	6274124	Burner nozzle ø 7,00
		25 MET
021C	6274123	Main burner nozzle Ø 5,00
		25 GPL
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024	6261408	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe

034	6226410	O-Ring Ø 63 x 3
035	6028703	Gasket for duct flange
036	6028646	Air diaphragm
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061	6319690	kit 14 plate heat exchanger + o
062	6319630	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vassel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
098	6155422	Time programmer cover
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
712	5185131	Conversion kit LPG
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
724	5199345	Complete control panel



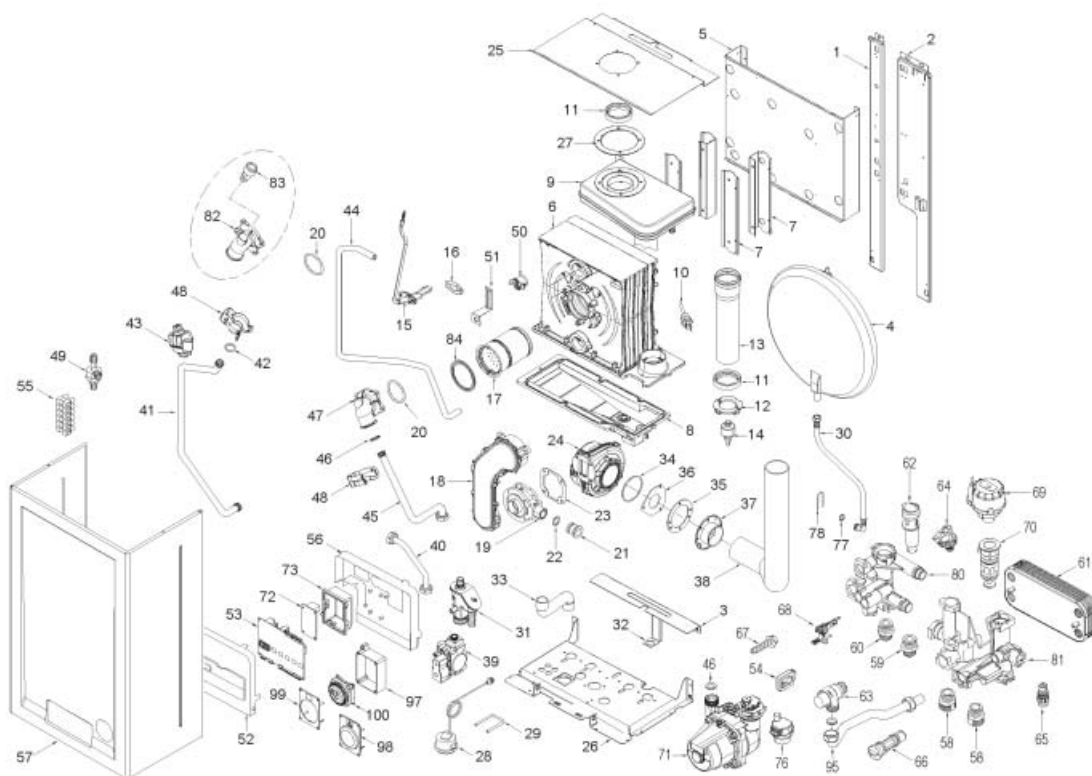
Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006A	6319202	Main exchanger body
007A	6010841	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017A	6278313	Premix
018A	6278856	Air-gas hose kit
019A	6274307	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021A	6274122	Main burner nozzle 750
021D	6274121	Burner nozzle ø 6,00
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024	6261408	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe

035	6028703	Gasket for duct flange
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061	6319690	kit 14 plate heat exchanger + o
062A	6319631	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vassel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
098	6155422	Time programmer cover
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
714	5185136	LPG conversion kit
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
725	5199346	Complete control panel



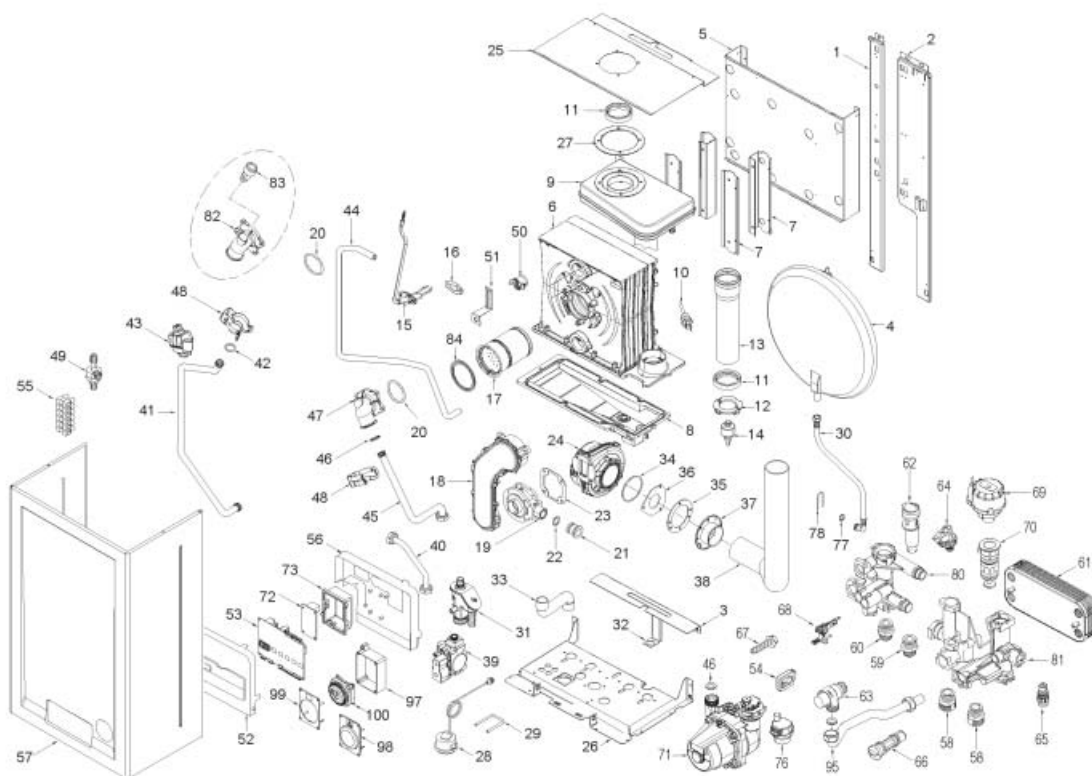
Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006A	6319202	Main exchanger body
007A	6010841	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017A	6278313	Premix
018A	6278856	Air-gas hose kit
019A	6274307	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021B	6274125	Burner nozzle ø 8,50
021E	6274127	Main burner nozzle Ø 5,20
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024A	6261405	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe

035	6028703	Gasket for duct flange
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061A	6319692	Kit 18 plate heat exchanger + o
062B	6319632	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vessel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
098	6155422	Time programmer cover
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
717	5185134	Conversion kit to LPG
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
726	5199347	Complete control panel



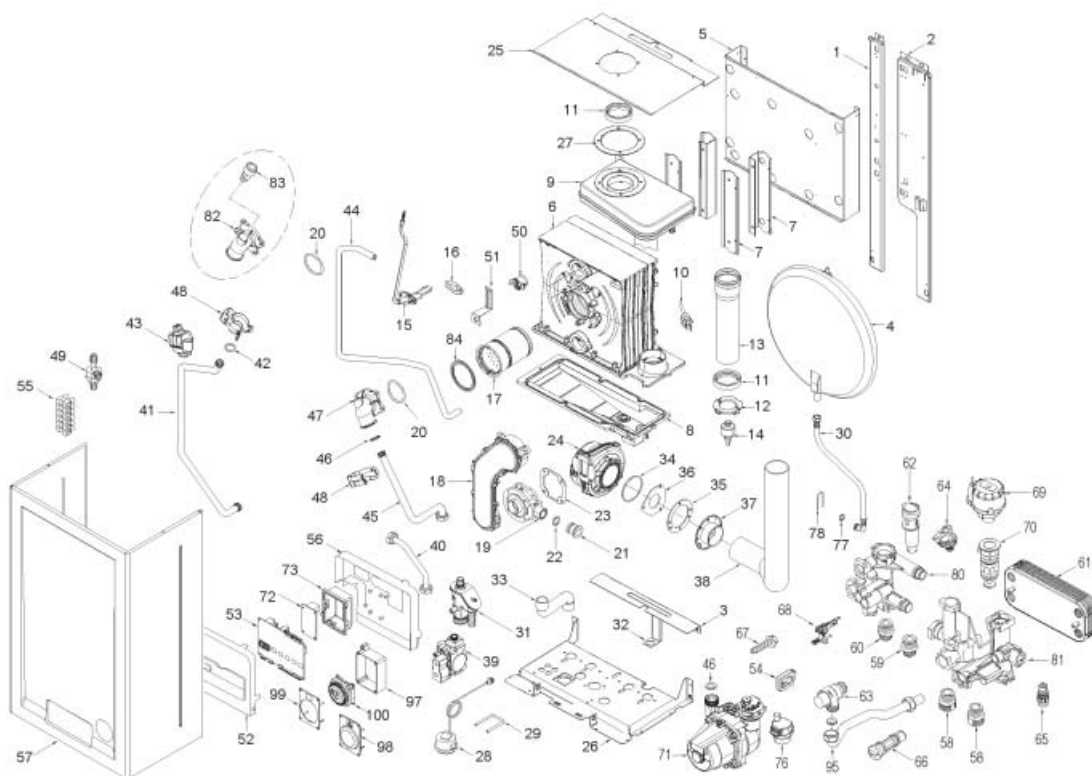
Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006	6319201	Main exchanger body
007	6010843	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017	6278312	Burner
018	6278855	Air-gas hose kit
019	6274306	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021	6274124	Burner nozzle ø 7,00
		25 MET
021A	6274122	Main burner nozzle 750
		30 MET
021C	6274123	Main burner nozzle Ø 5,00
		25 GPL
021D	6274121	Burner nozzle ø 6,00
		30 GPL
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024	6261408	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap

032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe
034	6226410	O-Ring Ø 63 x 3
035	6028703	Gasket for duct flange
036	6028646	Air diaphragm
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061	6319690	kit 14 plate heat exchanger + o
062	6319630	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vassel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
099	6155421	Time programmer cover
100	6197719	Time programmer
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
712	5185131	Conversion kit LPG
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
727	5199348	Complete control panel



Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006A	6319202	Main exchanger body
007A	6010841	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017A	6278313	Premix
018A	6278856	Air-gas hose kit
019A	6274307	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024	6261408	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe
035	6028703	Gasket for duct flange
037	6083055	Duct flange 60

038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061	6319690	kit 14 plate heat exchanger + o
062A	6319631	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vassel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
099	6155421	Time programmer cover
100	6197719	Time programmer
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
714	5185136	LPG conversion kit
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
728	5199349	Complete control panel



Posiz.	Codice	Descrizione
001	6318350	Left hand side frame part
002	6318300	Right hand side frame part
003	6140006	Bracket for expansion vessel
004	5139121	Expansion vessel 1.6 - 3/8" M
005	6010840	Exchanger fixing bracket
006A	6319202	Main exchanger body
007A	6010841	Main exchanger fixing bracket
008	6319490	Condensate recovery basin kit
009	6278702	Smoke chamber
010	6277131	Probe NTC D.4X47
011	6248855	P.C. inlet/outlet smokes gasket
012	6028661	Smoke exhaust diaphragm
013	6034310	Plastic pipe 60x271
014	6319500	Magnetic sensor
015	6221637	Ignition-ionisation electrode
016	6174809	Gasket for ignition electrode
017A	6278313	Premix
018A	6278856	Air-gas hose kit
019A	6274307	Air/gas mixer
020	6226463	Flue kit elbow ORing 47,87x3,5
021B	6274125	Burner nozzle ø 8,50
021E	6274127	Main burner nozzle Ø 5,20
022	6226414	O-ring 117 Ø 13,1x2,62
023	6174816	Gasket for fan flange
024A	6261405	Fan
025	6010842	Upper protection shield
026	6318015	Frame assembly lower side
027	6028711	Rubber gasket diam.100x125x2
028	6146111	Hydrometer
029	6226628	Hydrometer Fixing spring
030	6017313	Flexible pipe 90° L=400
031	6277205	Water trap
032	6010844	Trap fixing bracket
033	6034160	Condensate drainage rubber pipe

035	6028703	Gasket for duct flange
037	6083055	Duct flange 60
038	6001150	Air intake pipe 60
039	6243823	Gas valve type
040	6277416	Pipe connecting gas valve-mixer
041	6246504	C.H. flow pipe
042	6226412	O-ring 3068
043	6231360	Temperature sensor
044	1010215	Rubber pipe dia. 15x2,5
045	6227431	C.H. return pipe
046	6226457	O-ring 12bis diam. 16x1,90
047	6026410	Exchanger elbow flange return
048	6226619	Spring for heat exchanger conne
049	6280590	Three way fitting + cap kit
050	6146724	H.L. stat 95°C
051	6272506	Safety stat fixing spring
052	6304790	Panel kit
053	6301422	Main P.C.B.
054	6275910	Pressure relief valve operation
055	2211010	Terminal strip
056	6305050	Control panel cover
057	6317852	Casing
058	6120533	C.H Nipple
059	6120532	D.H.W. Nipple
060	6120534	D.H.W. Nipple exit
061A	6319692	Kit 18 plate heat exchanger + o
062B	6319632	Flowmeter
063	6040211	Pressure relief valve 3 bar
064	6037504	Water pressure switch
065	6319603	Discharger cock
066	6319640	By-pass
067	6319618	Primary filter component
068	6319601	Sensor hall complete
069	6319620	Divertor valve motor
070	6319625	Diverting valve body
071	6272310	Circulating pump
072	6301460	Programmer clock expansion boar
073	6305060	Expansion board cover
076	6013182	Automatic air vent
077	6226464	O-ring 115 diam. 11,91x2,62
078	6226627	Expansion vassel fixing spring
080	6319682	D.H.W. Technyl manifold group
081	6319681	C.H. Technyl manifold group
082	6026415	Exch. elbow flange 1/8" flow
083	6017213	Manual air vent 1/8"
084	6174823	Gasket for burner flange
095	6157648	Pressure relief valve drain pip
097	6155420	Time programmer box
099	6155421	Time programmer cover
100	6197719	Time programmer
701	6127214	Main cable L=1500
702	6293560	2 pole cable connector
703	6316253	9 pole Stocko connector
704	6316266	6 pole cable connector CN6
705	6316267	14 pole cable connector CN4
706	6316268	4 pole cable connect
708	6319699	Split pin kit for hydraulic gro
709	6319698	O-ring kit for hydraulic group
711	6281534	Gaskets kit
717	5185134	Conversion kit to LPG
719	6319114	5 pole cable connector CN7
720	6319695	Murelle-Format-.....o-ring kit
721	5198696	Technyl hydraulic group
723	6211793	Hydr.group Bitron caps kit exp
726	5199347	Complete control panel

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 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

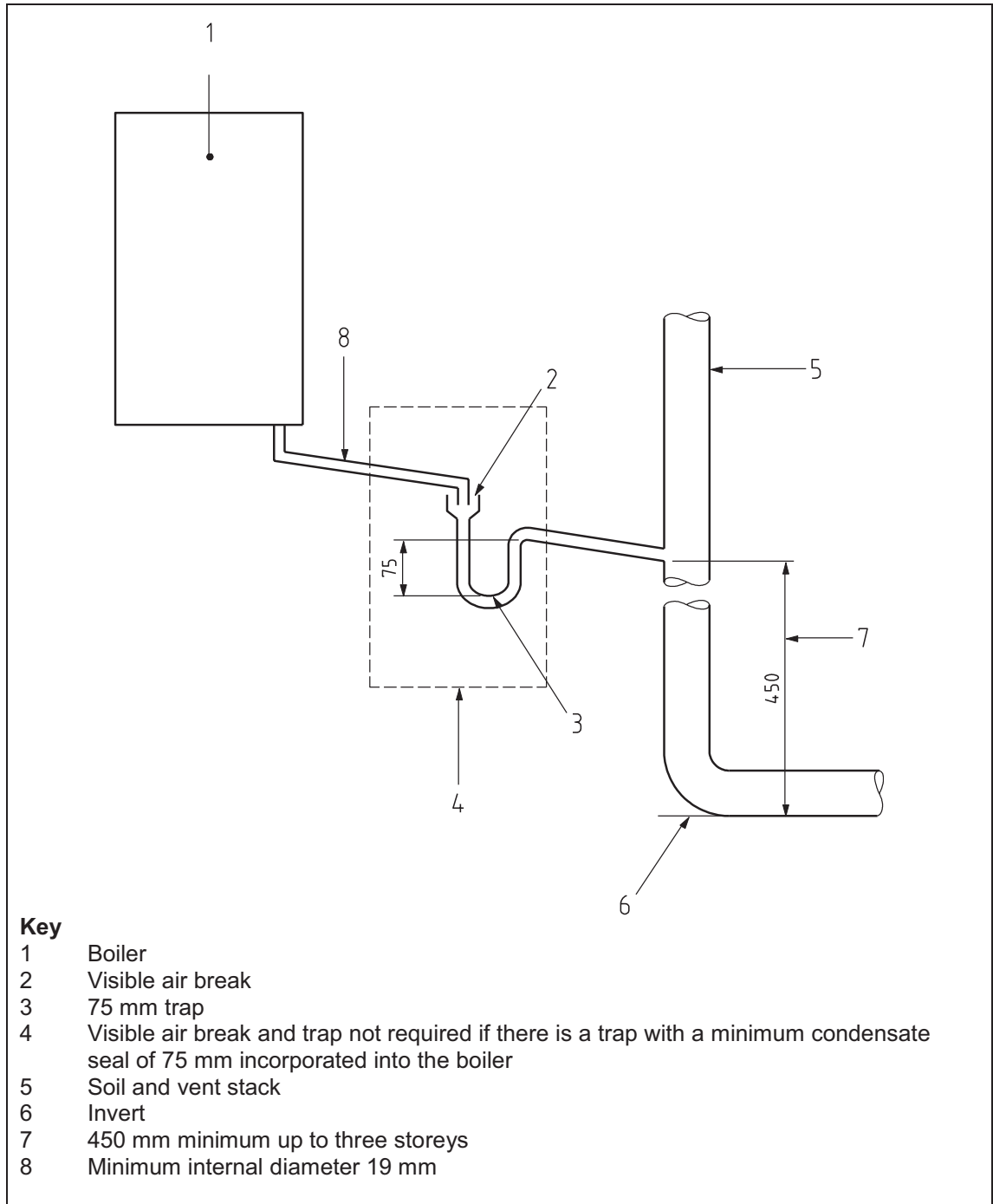


Figure 2(a) – Connection of a condensate drainage pipe downstream of a sink, basin, bath or shower waste trap

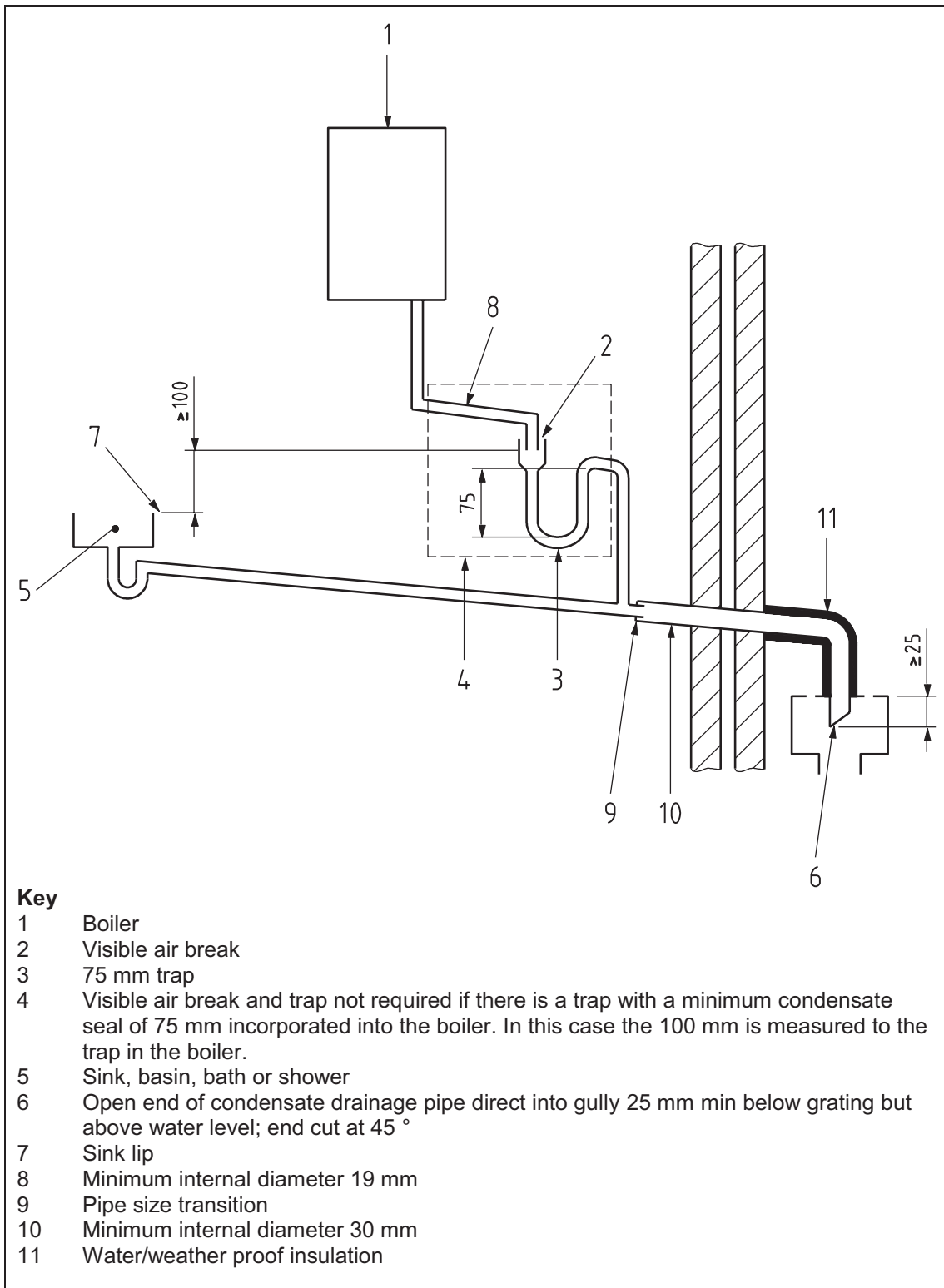


Figure 2(b) – Connection of a condensate drainage pipe upstream of a sink, basin, bath or shower waste trap

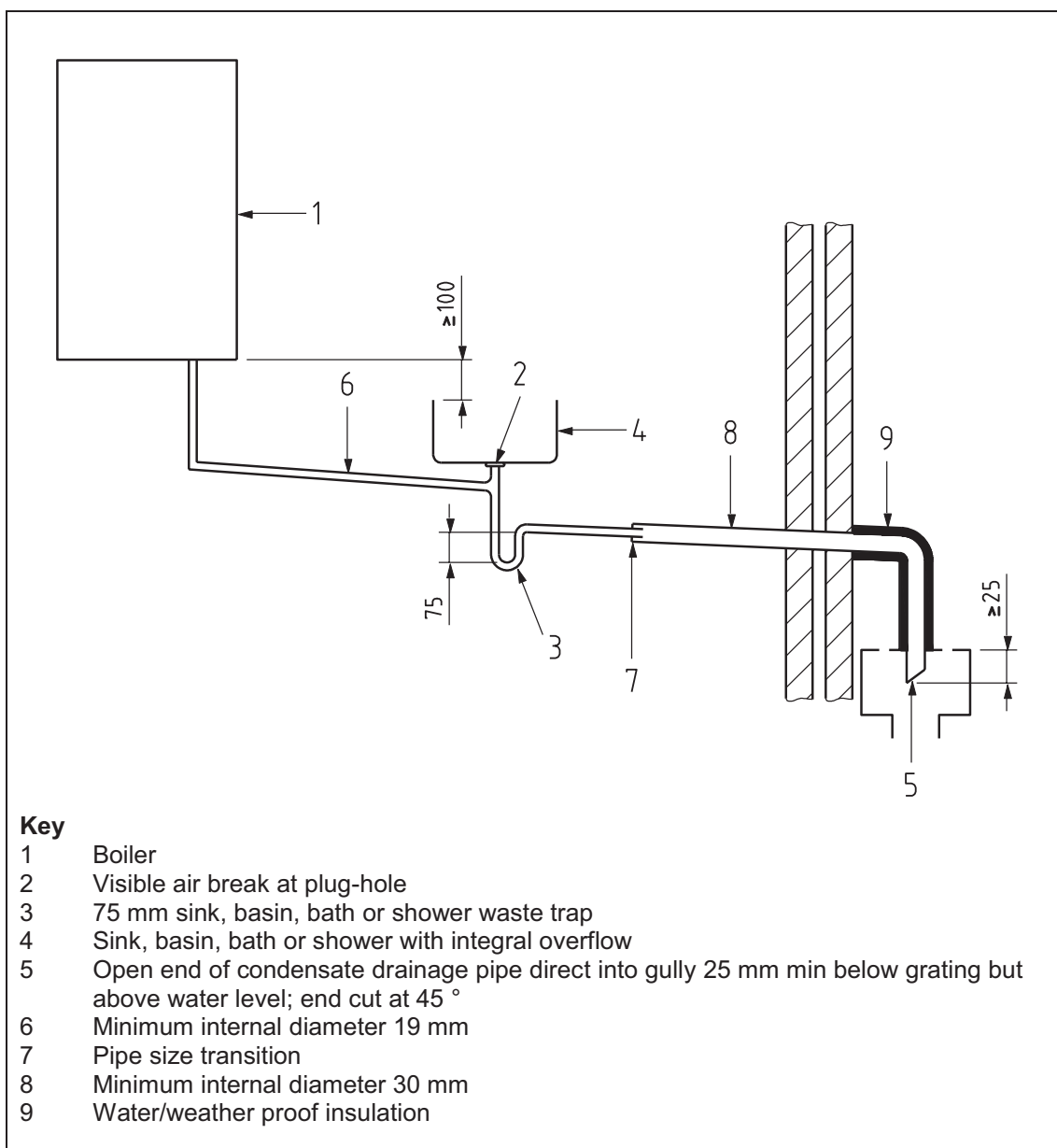
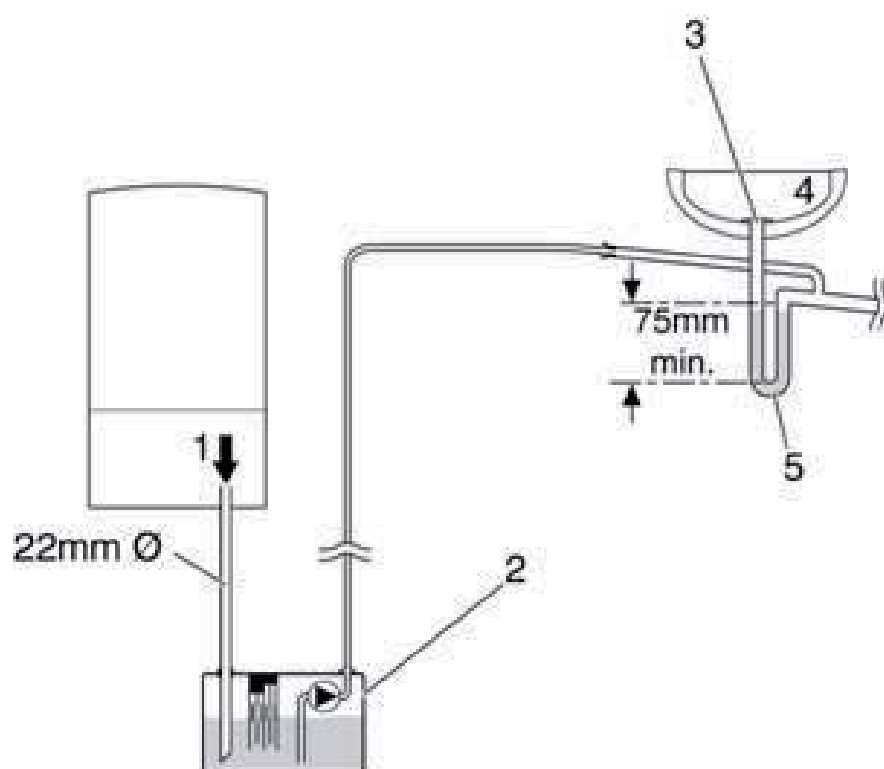


Figure 3 – Connection of a condensate pump - typical method (NB manufacturer's detailed instructions should be followed).



Key

- 1 Condensate discharge from boiler.
- 2 Condensate pump
- 3 Visible air break at plug hole.
- 4 Sink or basin with integrated overflow.
- 5 75mm sink waste trap.

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

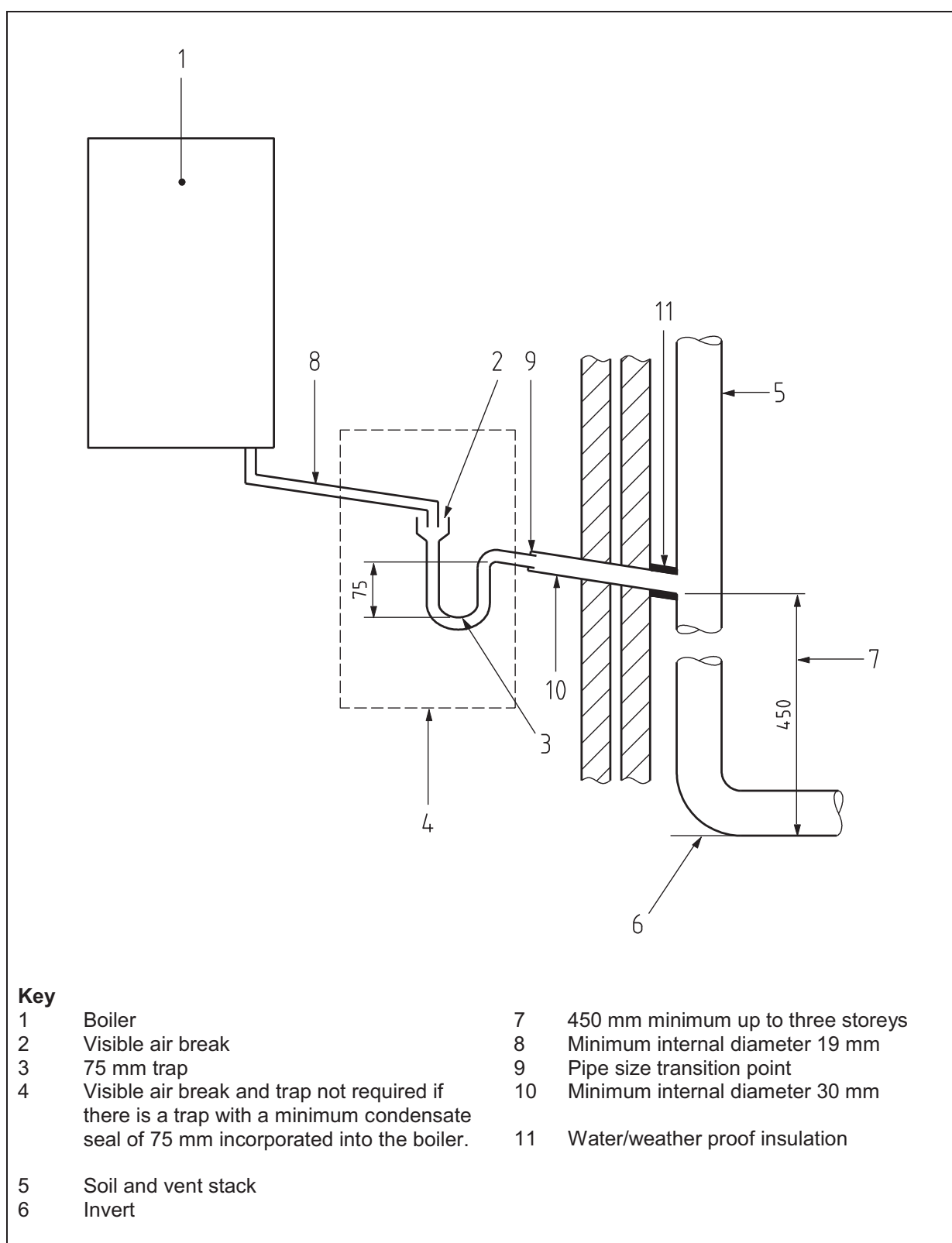


Figure 5 – External termination to rainwater downpipe (NB only combined foul/rainwater drain)

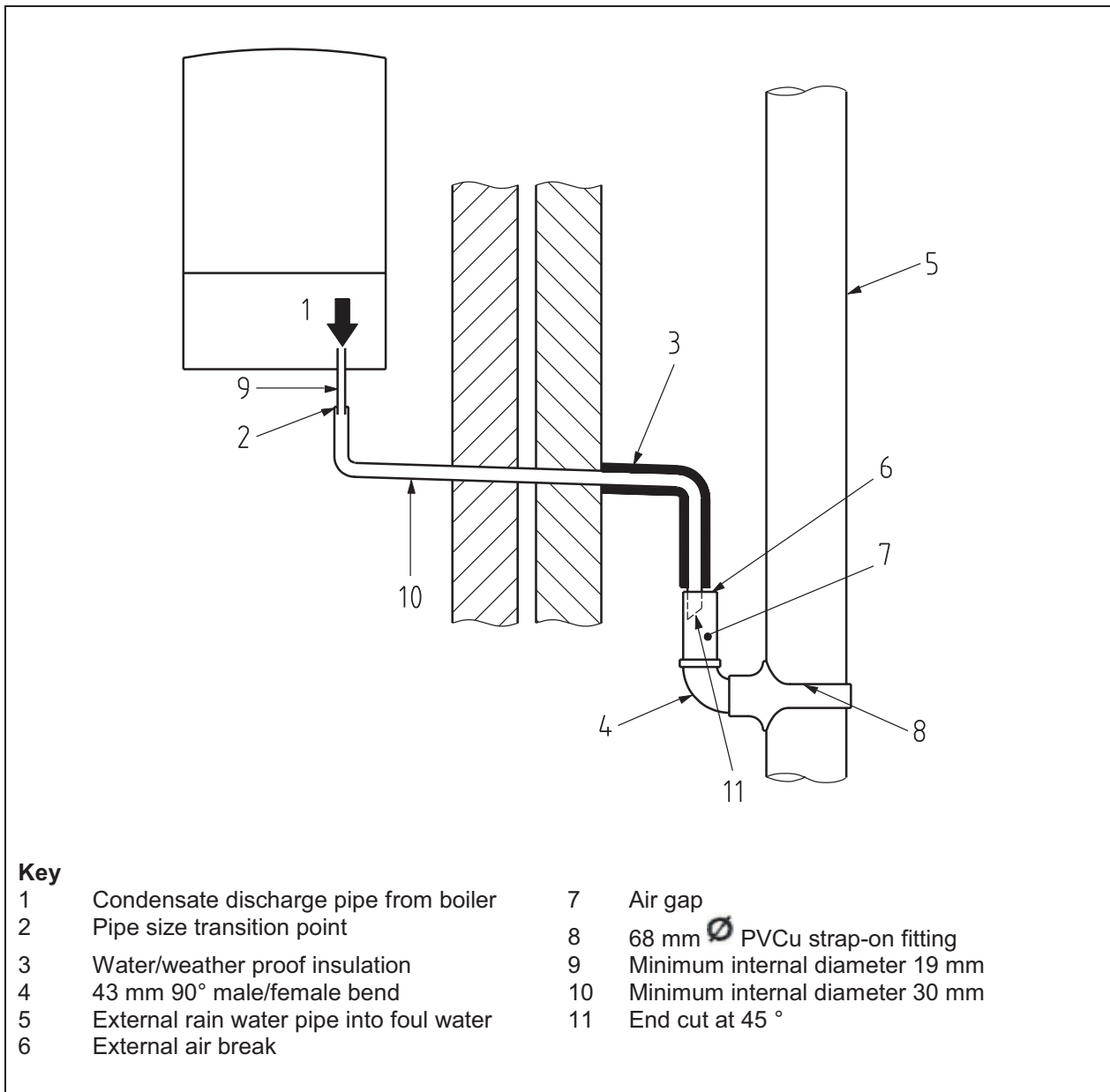


Figure 6 – External drain, gully or rainwater hopper

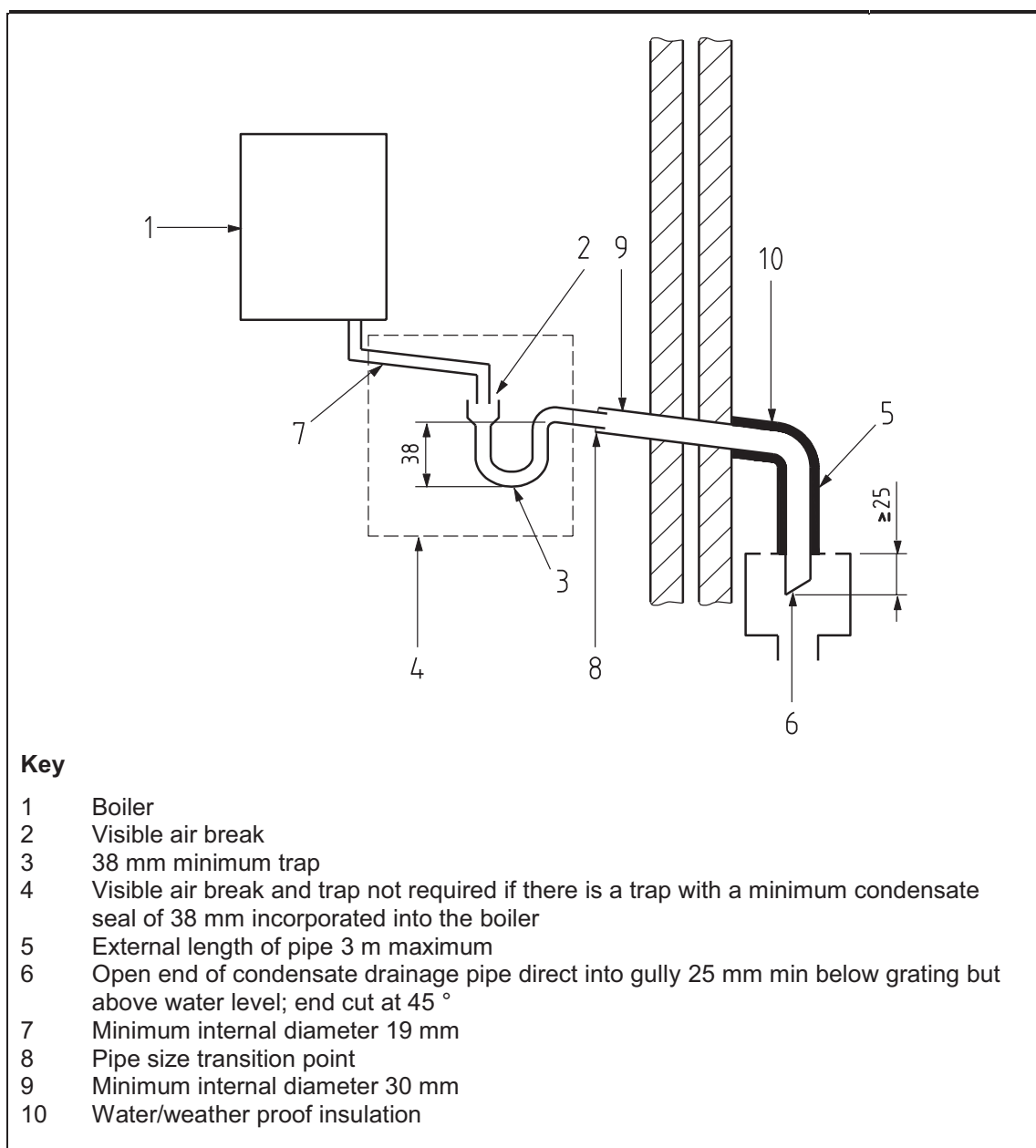
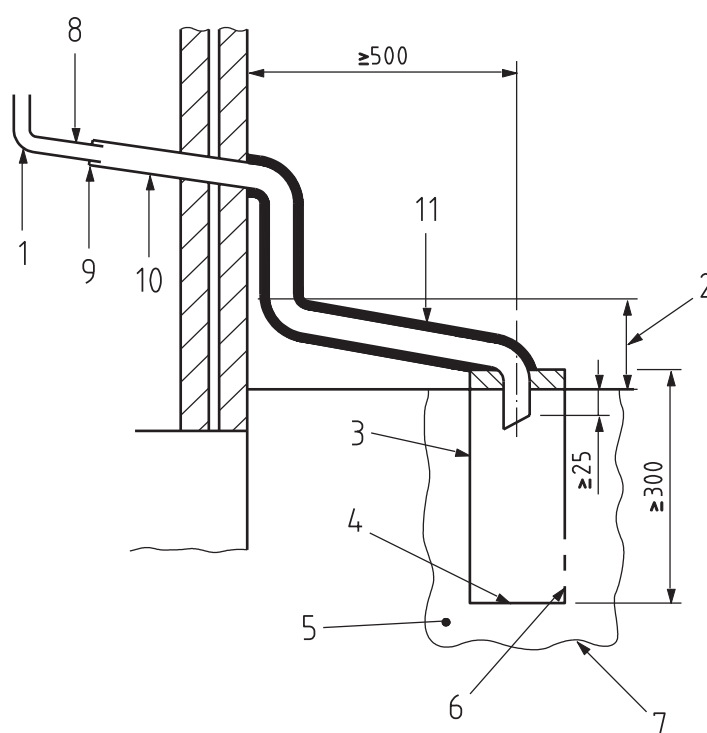


Figure 7 – Example of a purpose-made soakaway



Key

- 1 Condensate discharge pipe from boiler
- 2 Ground (this section of the condensate drainage pipe may be run either above or below ground level); End cut at 45 °
- 3 Diameter 100 mm minimum plastic tube
- 4 Bottom of tube sealed
- 5 Limestone chippings
- 6 Two rows of three 12 mm holes at 25 mm centres, 50 mm from bottom of tube and facing away from house
- 7 Hole depth 400 mm minimum by 300 mm diameter
- 8 Minimum internal diameter 19 mm
- 9 Pipe size transition point
- 10 Minimum internal diameter 30 mm
- 11 Water/weather proof insulation



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