

**Installation
Instructions
Type C Boilers**
G.C.N: 47-116-16

**LEAVE THESE INSTRUCTIONS
WITH THE END-USER**



*The code of practice for the installation,
commissioning & servicing of central heating systems*

micro Combi



 **ARISTON**

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7. TECHNICAL INFORMATION

1. GENERAL INFORMATION

This manual is an integral and essential part of the product. It should be kept with the appliance so that it can be consulted by the user and our authorised personnel.

Please carefully read the instructions and notices about the unit contained in this manual, as they provide important information regarding the safe installation, use and maintenance of the product.

For operating instructions please consult the separate Users Manual.



1.1 GENERAL INSTRUCTIONS

Read the instructions and recommendations in these Installation Instructions carefully to ensure proper installation, use and maintenance of the appliance.

Keep this manual in a safe place. You may need it for your own reference while our Servicing Centre technicians or your installer may need to consult it in the future.

This is a combined appliance for the production of central heating (C.H.) and domestic hot water (D.H.W.).

This appliance **must be used only** for the purpose for which it is designed. The manufacturer declines all liability for damage caused by improper or negligent use.

No asbestos or other hazardous materials have been used in the fabrication of this product.

Before connecting the appliance, check that the information shown on the data plate and the table in section 7 comply with the electric, water and gas mains of the property. You will find the data plate on the reverse of the control panel. The gas with which this appliance operates is also shown on the label at the bottom of the boiler.

Do not install this appliance in a damp environment or close to equipment which spray water or other liquids.

Do not place objects on the appliance.

Do not allow children or inexperienced persons to use the appliance without supervision.

If you smell gas in the room, **do not turn on** light switches, use the telephone or any other object which might cause sparks.

Open doors and windows immediately to ventilate the room.

Shut the gas mains tap (at or adjacent to the gas meter) or the valve of the gas cylinder and call your Gas Supplier immediately.

If you are going away for a long period of time, remember to shut the mains gas tap or the gas cylinder valve.

Always disconnect the appliance either by unplugging it from the mains or turning off the mains switch before cleaning the appliance or carrying out maintenance.

In the case of faults or failure, switch off the appliance and turn off the gas tap. Do not tamper with the appliance.

For repairs, call your local Authorised Servicing Centre and request the use of original spare parts. For in-guarantee repairs contact MTS (GB) Limited.

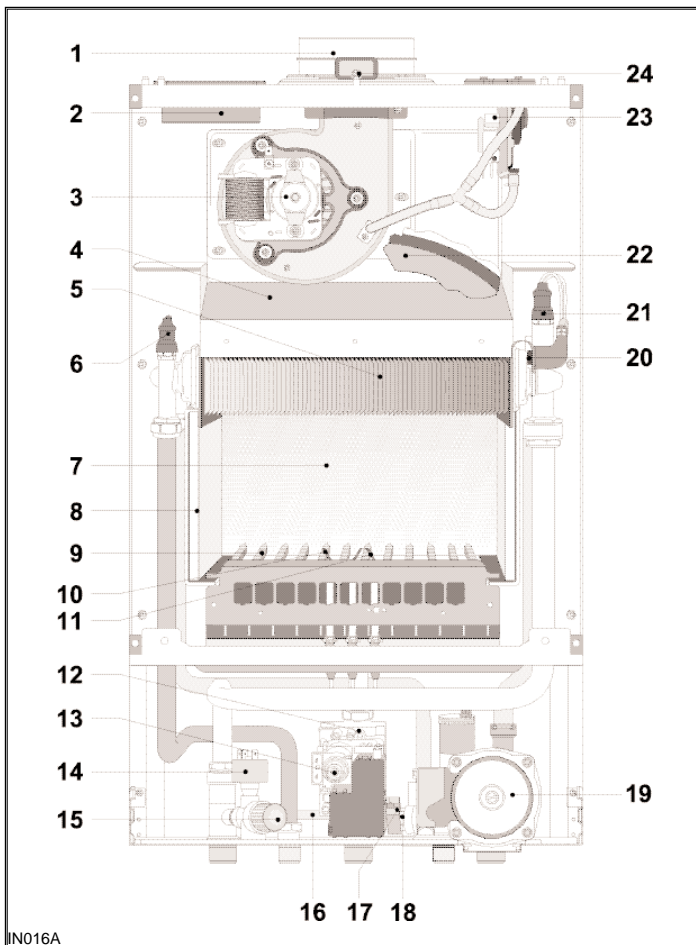
Check the following at least once a year:

- 1 - Check the seals for the water connections; replace any faulty seals.
- 2 - Check the gas seals; replace any faulty gas seals.
- 3 - Visual check of the entire unit.
- 4 - Visual check of the combustion process or analysis of combustion by-products (see section 3.6) and cleaning of the burner if needed.

- 5 - If called for by point. 3, dismantling and cleaning of the combustion chamber.
- 6 - If called for by point. 4, dismantling and cleaning of the burner jets.
- 7 - Visual check of the primary heat exchanger:
 - check for overheating in the blade assembly;
 - clean the exhaust fan if needed.
- 8 - Adjustment of the flow rate of the gas: flow rate for lighting, partial load and full load.
- 9 - Check of the heating safety systems:
 - safety device for maximum temperature (overheat thermostat);
 - safety device for maximum pressure (safety valve).
- 10- Check of the gas safety systems:
 - safety device for lack of gas or flame ionisation (detection electrode);
 - safety device for gas cock.
- 11- Check of the electrical connection (make sure it complies with the instructions in the manual).
- 12- Check of domestic hot water production efficiency (flow rate and temperature)
- 13- General check of the combustion by-products of the discharge/ventilation system.
- 14- Check of the general performance of the unit.

1.2 OVERALL VIEW

FIG. 1.0



LEGEND:

1. Flue connector
2. Air intake for twin pipe flue systems
3. Fan
4. Combustion chamber hood
5. "Twin-pass" heat exchanger
6. Domestic hot water temperature probe
7. Combustion chamber
8. Combustion chamber insulation panel
9. Burner
10. Detection electrode
11. Ignition electrodes
12. Gas valve
13. Spark generator
14. Pump pressure switch
15. Safety valve (3 bar)
16. Automatic By-pass
17. D.H.W. Flow switch
18. Domestic hot water inlet filter
19. Circulation pump with automatic air release valve
20. Safety thermostat
21. Main circuit temperature probe
22. Expansion vessel
23. Air pressure switch
24. Combustion analysis points

2. INSTALLATION

The technical information and instructions provided herein below are intended for the installer so that the unit may be installed correctly and safely.

2.1 REFERENCE STANDARDS

The installation and initial start up of the boiler must be by a CORGI Registered Installer in compliance with the installation standards currently in effect, as well as with any and all local health and safety standards i.e.. CORGI .

This appliance must be installed by a competent installer in accordance with current Gas Safety (installation & use) Regulations.

The installation of this appliance must be in accordance with the relevant requirements of the current Gas Safety (installation & use) Regulations, the Local Building Regulations, the current I.E.E. Wiring Regulations, the byelaws of the local water authority, and in Scotland, in accordance with the Building Standards (Scotland) Regulation and Health and Safety document No. 635 "Electricity at work regulations 1989".

Installation should also comply with the following British Standard Codes of Practice:

BS 7593:1992	Treatment of water in domestic hot water central heating systems
BS 5546:1990	Installation of hot water supplies for domestic purposes
BS 5440-1:1990	Flues
BS 5440-2:1989	Air supply
BS 5449:1990	Forced circulation hot water systems
BS 6789:1987	Installation of gas fired hot water boilers of rated input not exceeding 60kW
BS 6891:1989	Installation of low pressure gas pipe up to 28mm
BS 7671:1992	IEE wiring regulations
BS 4814:1990	Specification for expansion vessels
BS 5482:1994	Installation of LPG

2.2 SITING THE APPLIANCE

The appliance may be installed in any room or indoor area, although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations, and in Scotland, the electrical provisions of the Building Regulations applicable in Scotland, with respect to the installation of the combined appliance in a room containing a bath or shower.

Where a room-sealed appliance is installed in a room containing a bath or shower the appliance and any electrical switch or appliance control, utilising mains electricity should be situated so that it cannot be touched by a person using the bath or shower.

The location must permit adequate space for servicing and air circulation around the appliance as indicated in paragraph 2.4.

The location must permit the provision of an adequate flue and termination.

For unusual locations special procedures may be necessary.

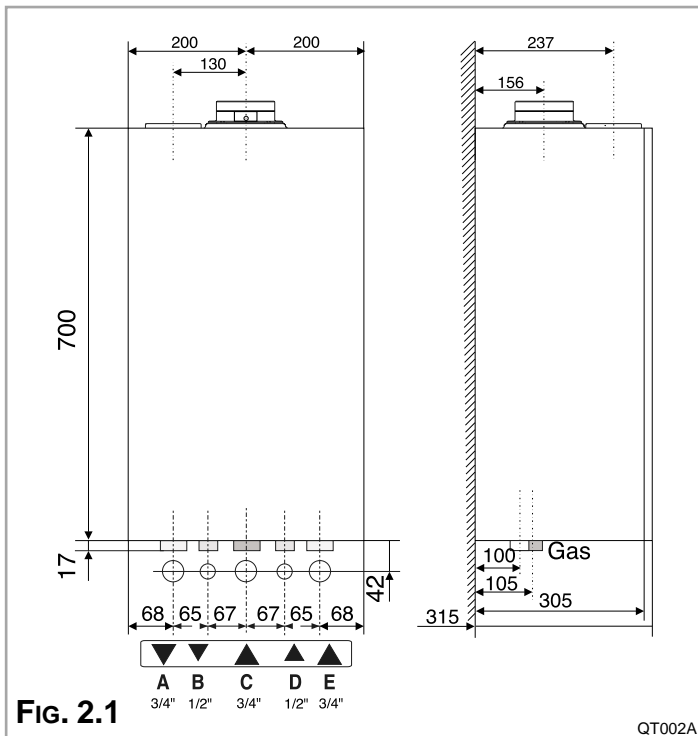
BS 6798-1987 gives detailed guidance on this aspect.

A compartment used to enclose the appliance must be designed specifically for this purpose. No specific ventilation requirements are needed for the installation within a cupboard.

This appliance is not suitable for outdoor installation.

The type C appliances (in which the combustion circuit, air vent intake and combustion chamber are air-tight with respect to the room in which the appliance is installed) can be installed in any type of room.

Secondary ventilation is not required with this boiler. The boiler must be installed on a solid, permanent wall to prevent access from the rear.



2.3 OVERALL DIMENSIONS

LEGEND:

- A = Central Heating Flow (3/4")
- B = Domestic Hot Water Outlet (1/2")
- C = Gas Inlet (3/4")
- D = Domestic Cold Water Inlet (1/2")
- E = Central Heating Return (3/4")

2.4 CLEARANCES

In order to allow for access to the interior of the boiler for maintenance purposes, the boiler must be installed in compliance with the minimum clearances indicated in Fig. 2.2

2.5 MOUNTING THE APPLIANCE

Fasten the boiler in place using the template and anchors supplied with the unit. It is highly recommended that a spirit level be used to position the boiler so that it is perfectly level.

For additional information, please consult the instructions contained in the connection kit and the flue kit.

2.6 ELECTRICAL CONNECTION

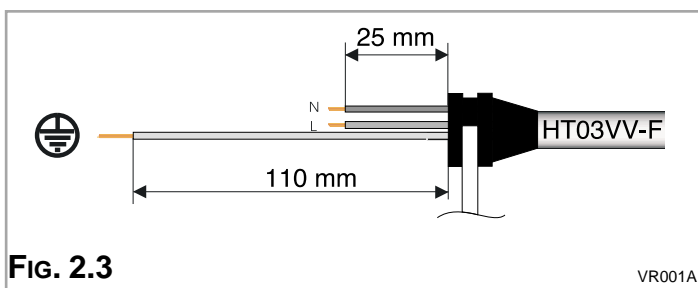
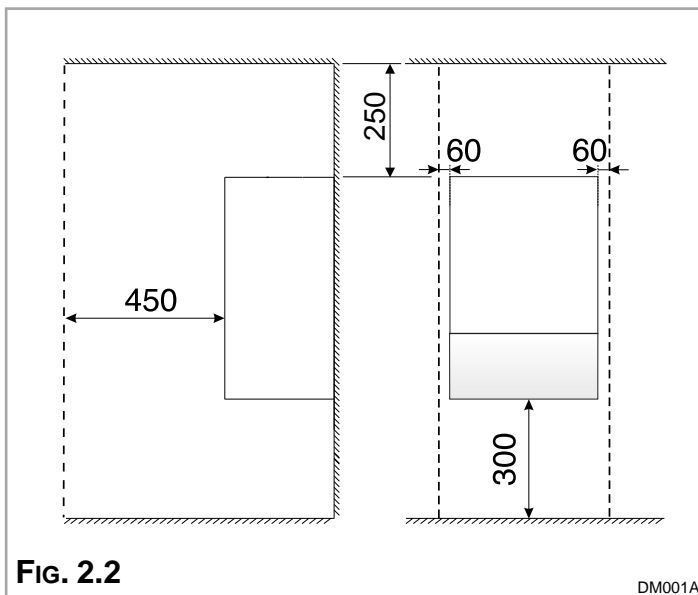
For safety purposes, have a competent person carefully check the electrical system in the property, as the manufacturer will not be held liable for damage caused by the failure to earth the appliance properly or by anomalies in the supply of power. Make sure that the residential electrical system is adequate for the maximum power absorbed by the unit, which is indicated on the rating plate. In addition, check that the section of cabling is appropriate for the power absorbed by the boiler.

The boiler operates with alternating current, as indicated in the technical information table in section 6, where the maximum absorbed power is also indicated. Make sure that the connections for the neutral and live wires correspond to the indications in the diagram. The appliance electrical connections are situated on the reverse of the control panel (see the servicing manual for further information)

IMPORTANT!

In the event that the power supply cord must be changed, replace it with one with the same specifications. Make the connections to the terminal board located within the control panel, as follows:

- The yellow-green wire should be connected to the terminal marked with the "⊕" symbol; make sure to re-use the grommet mounted on the other supply cord;
- The blue wire should be connected to the terminal marked "N";
- The brown wire should be connected to the terminal marked "L".



Note: The diagrams for the electrical system are indicated in section 2.11.

Warning, this appliance must be earthed.

External wiring to the appliance must be carried out by a competent person and be in accordance with the current I.E.E. Regulations and applicable local regulations. The *microCombi* is supplied for connection to a 230 V-50 Hz supply.

The supply must be fused at 3 A.

The method of connection to the electricity supply must facilitate complete electrical isolation of the appliance, by the use of a fused double pole isolator having a contact separation of at least 3 mm in all poles or alternatively, by means of a 3 A fused three pin plug and unswitched shuttered socket outlet both complying with BS 1363.

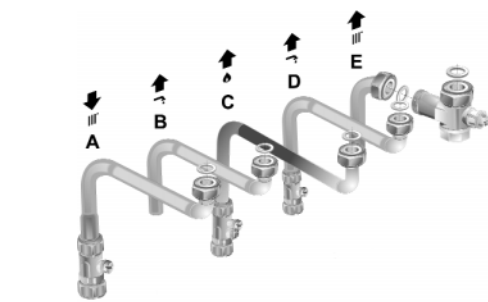
The point of connection to the Electricity supply must be readily accessible and adjacent to the appliance unless the appliance is installed in a bathroom when this must be sited outside the bathroom (see section 2.2).

2.7 GAS CONNECTION

The local gas region contractor connects the gas meter to the service pipe. If the gas supply for the boiler serves other appliances ensure that an adequate supply is available both to the boiler and the other appliances when they are in use at the same time.

Pipe work must be of an adequate size. Pipes of a smaller size than the boiler inlet connection should not be used.

2.8 WATER CONNECTIONS



KT003A

Fig. 2.5

VIEW OF THE BOILER CONNECTIONS

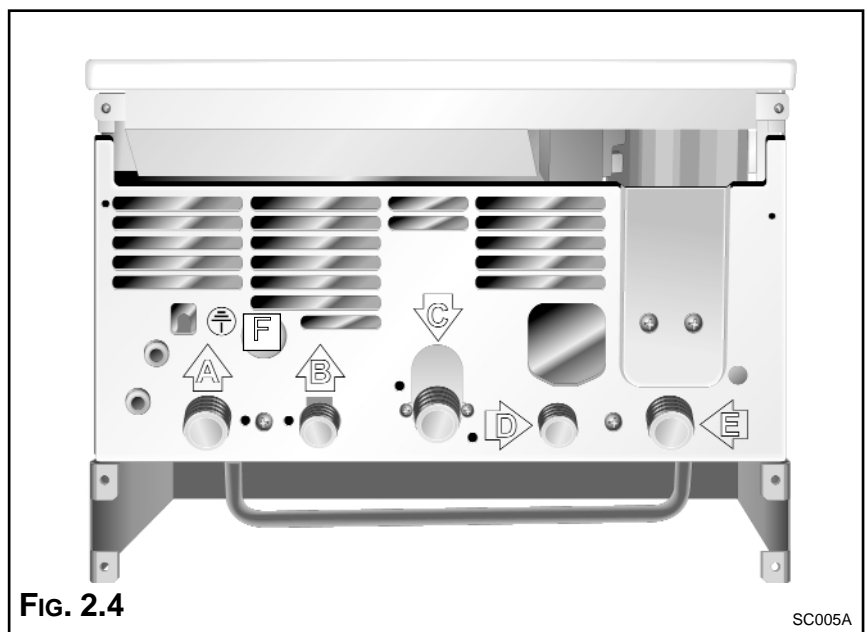


Fig. 2.4

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LEGEND:

- A = Central Heating Flow
- B = Domestic Hot Water Outlet
- C = Gas Inlet
- D = Domestic Cold Water Inlet
- E = Central Heating Return
- F = Safety Valve

CENTRAL HEATING

Detailed recommendations are given in BS 6798:1987 and BS 5449-1:1990, the following notes are given for general guidance.

PIPE WORK:

Copper tubing to BS EN 1057:1996 is recommended for water pipes. Jointing should be either with capillary soldered or compression fittings. Where possible pipes should have a gradient to ensure air is carried naturally to air release points and water flows naturally to drain taps.

The appliance has a built-in automatic air release valve, however it should be ensured as far as possible that the appliance heat exchanger is not a natural collecting point for air.

Except where providing useful heat, pipes should be insulated to prevent heat loss and avoid freezing.

Particular attention should be paid to pipes passing through ventilated spaces in roofs and under floors.

BY-PASS:

The appliance includes an automatic by-pass valve, which protects the main heat exchanger in case of reduced or interrupted water circulation through the heating system, due to the closing of thermostatic valves or radiators.

SYSTEM DESIGN:

This boiler is suitable only for sealed systems.

DRAIN COCKS:

These must be located in accessible positions to permit the draining of the whole system and should be fitted at all low points. The taps must be at least 15mm nominal size and manufactured in accordance with BS 2870:1980.

SAFETY VALVE DISCHARGE:

The discharge should terminate facing downward on the exterior of the building in a position where discharging (possibly boiling water & steam) will not create danger or nuisance, but in an easily visible position, and not cause damage to electrical components and wiring.

The discharge must not be over an entrance or a window or any other type of public access.

AIR RELEASE POINTS:

These must be fitted at all high points where air naturally collects and must be sited to facilitate complete filling of the system.

The appliance has an integral sealed expansion vessel to accommodate the increase of water volume when the system is heated.

It can accept up to 6 litres (1.3 gal) of expansion water. If the heating circuit has an unusually high water content, calculate the total expansion and add an additional sealed expansion vessel with adequate capacity. This should be located on the return pipe work as close as possible to the pump inlet.

MAINS WATER FEED - CENTRAL HEATING:

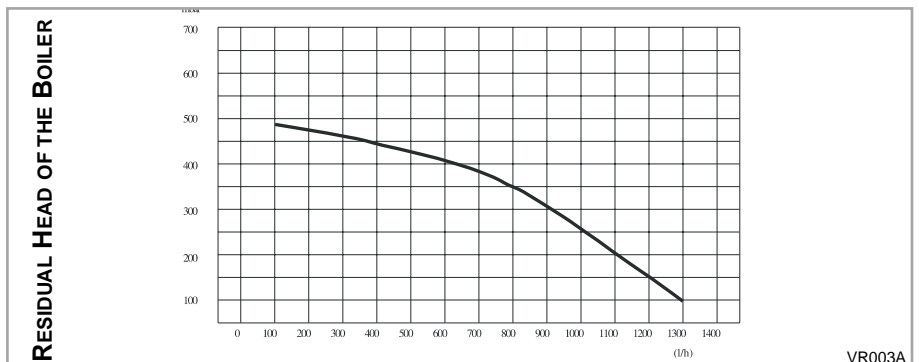
There must be no direct connection to the mains water supply even through a non-return valve, without the approval of the Local Water Authority.

FILLING:

A temporary method for initially filling the system and replacing lost water during servicing in accordance with current Water Regulations and Byelaws must be provided.

DOMESTIC WATER

The domestic water must be in accordance with the relevant recommendation of BS 5546:1990. Copper tubing to BS EN 1057:1996 is recommended for water carrying pipe work and must be used for pipe work carrying drinking water.



VR003A

2.9 FLUE CONNECTIONS

FLUE SYSTEM

The provision for satisfactory flue termination must be made in accordance with BS 5440-1.

The appliance must be installed so that the flue terminal is exposed to outside air. The terminal must not discharge into another room or space such as an outhouse or lean-to.

It is important that the position of the terminal allows a free passage of air across it at all times.

The terminal should be located with due regard for the damage or discolouration that might occur on buildings in the vicinity.

In cold or humid weather water vapour may condense on leaving the flue terminal.

The effect of such "pluming" must be considered.

If the terminal is less than 2 metres above a balcony, above ground or above a flat roof to which people have access, then a suitable terminal guard must be fitted. When ordering a terminal guard, quote the appliance model number.

A suitable terminal guard is available from:

TOWER FLUE COMPONENTS

Morley Road

Tonbridge

Kent TN9 1RA

The minimum acceptable spacing from the terminal to obstructions and ventilation openings are specified in **Fig. 2.6**.

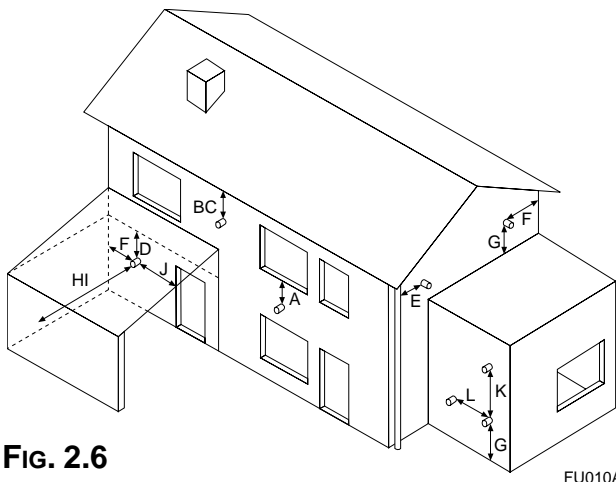


FIG. 2.6

FU010A

TERMINAL POSITION

TERMINAL POSITION	mm
A - Directly below an openable window or other opening	300
B - Below gutters, solid pipes or drain pipes	75
C - Below eaves	200
D - Below balconies or car-port roof	200
E - From vertical drain pipes and soil pipes	75
F - From internal or external corners	300
G - Above ground or balcony level	300
H - From a surface facing a terminal	600
I - From a terminal facing a terminal	1200
J - From an opening in the car port (e.g. door, window) into dwelling	1200
K - Vertically from a terminal in the same wall	1500
L - Horizontally from a terminal in the same wall	300

The boiler is designed to be connected to a coaxial flue discharge system.

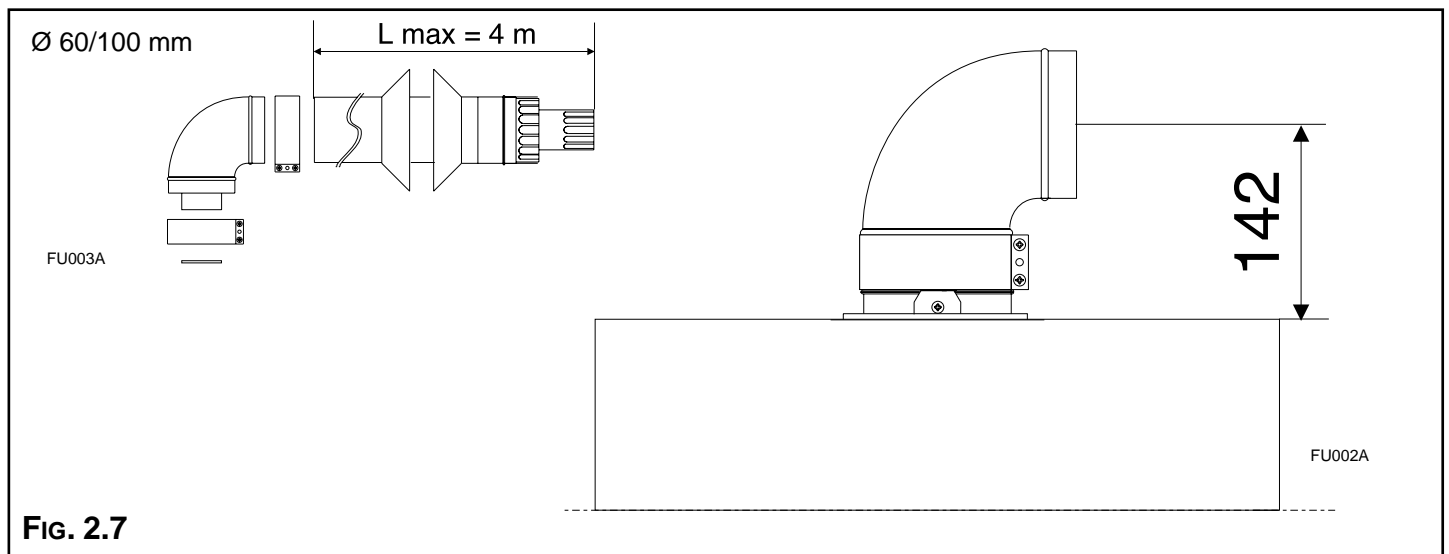


FIG. 2.7

In addition, it is also possible to use a split (twin pipe) system by fitting a special adaptor to the flue connector and using the aperture for the air vent intake located on the top part of the combustion chamber.

To utilise the air intake it is necessary to:

1. Remove the bottom of the air intake by cutting it with a suitable knife (see **FIG. 2.8**);
2. Insert the elbow into the air intake until it reaches the lower end. (There is no need to use gaskets or sealing compounds).

The components marked * in **FIG 2.9** are present or absent depending on the type of flue system used by the installer.

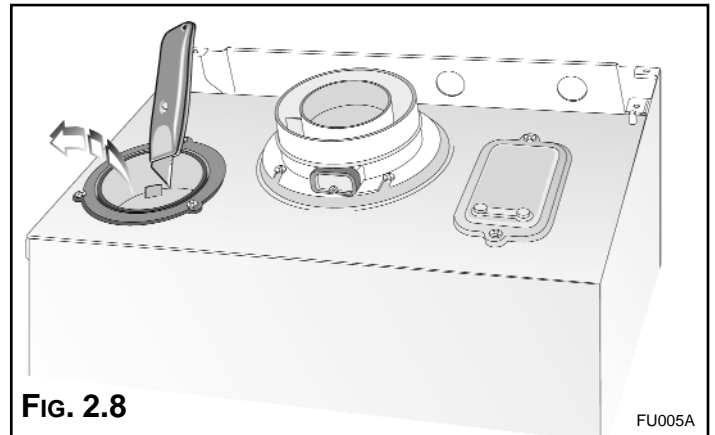


FIG. 2.8

FU005A

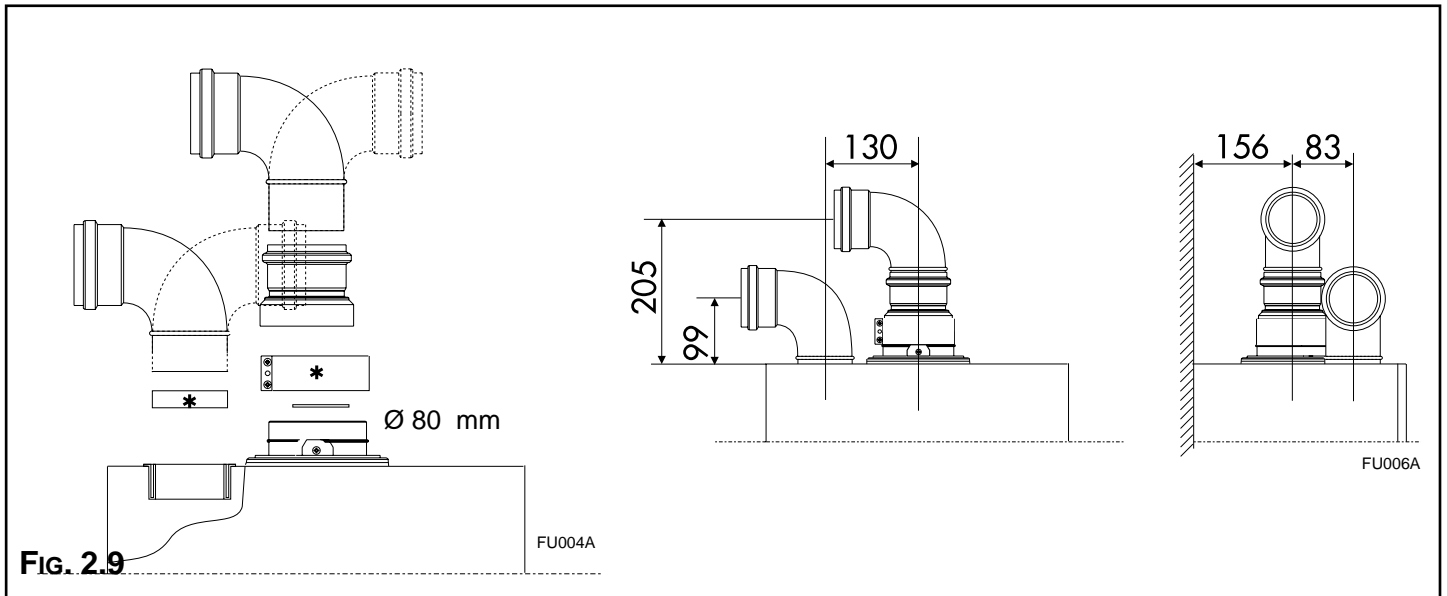


FIG. 2.9

FU004A

FU006A

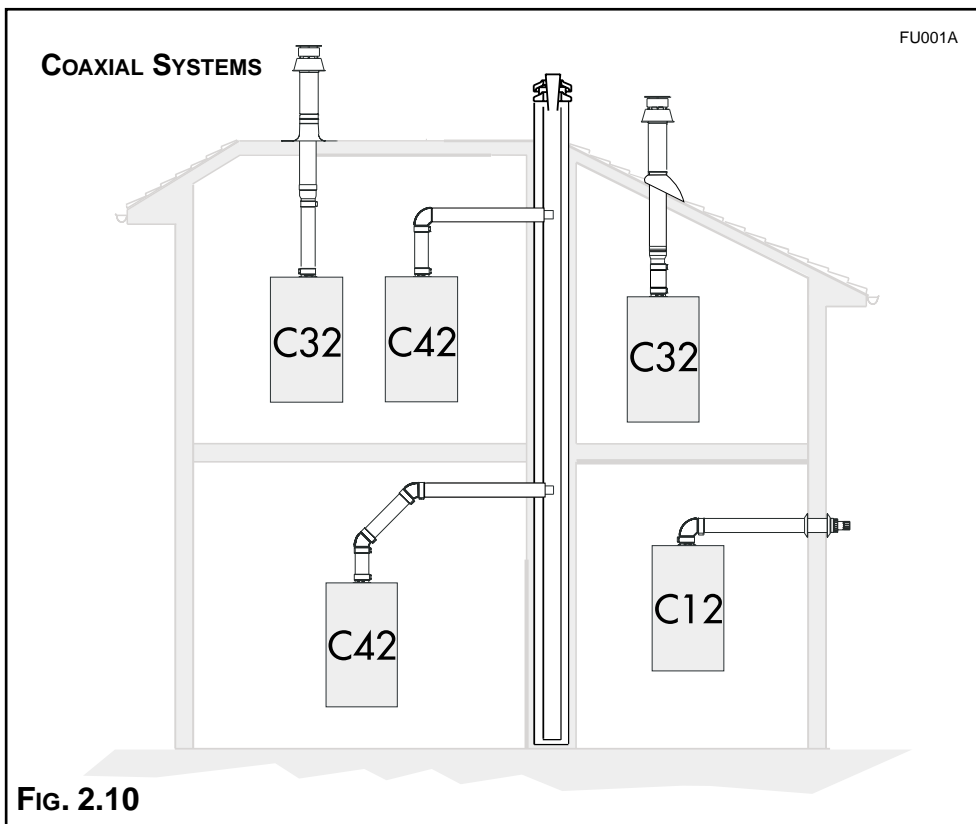


FIG. 2.10

FU001A

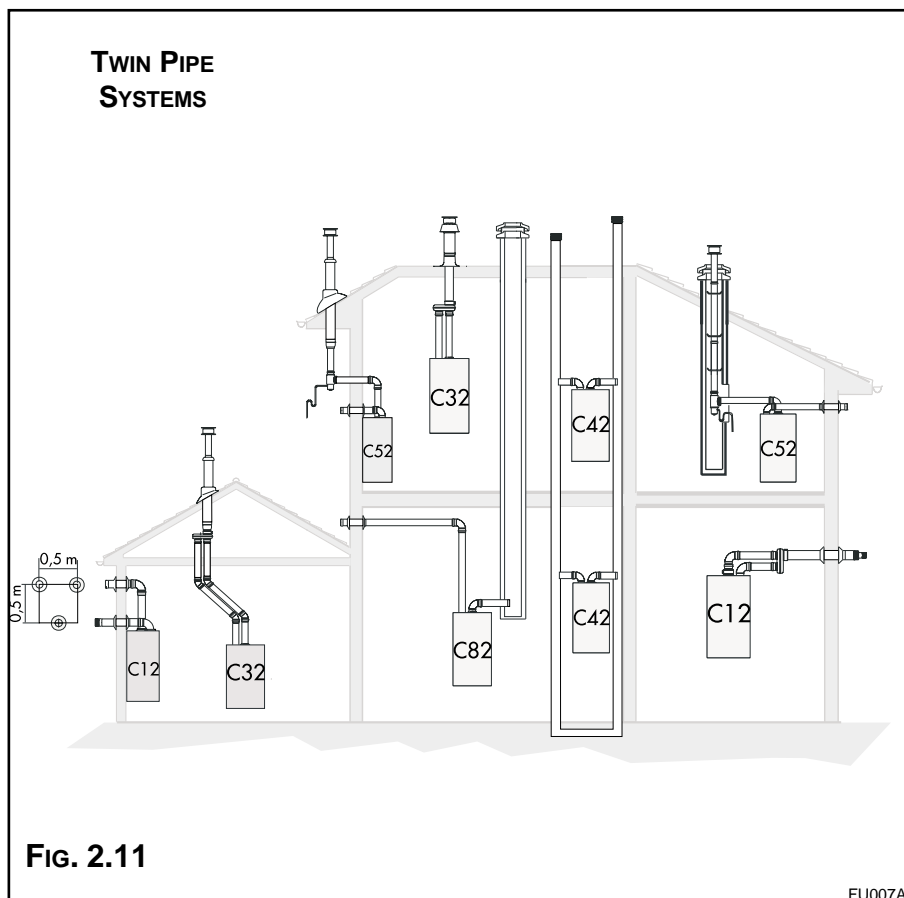
IMPORTANT!

For all flue systems, a restrictor may be inserted into the boilers flue connector; the restrictor must be Ø 43 in diameter depending on the length of piping indicated in TABLE 2.1.

FIG 2.10 and FIG 2.11 illustrate some of the various designs for coaxial or twin pipe flue systems. For further information on discharge/ventilation accessories, see the **FLUE PIPE ACCESSORIES MANUAL**.

	Exhaust Type	Restrictor ø 43 mm	NO Restrictor	Maximum Extension Exhaust/Air	Risk of Condensation Forming			
					Piping not insulated ø 43 restrictor NO		Piping insulated ø 43 restrictor NO	
Coaxial Systems ø 60/100	C12 (xx)	L min = 0.5 m L max = 2 m	L min = 2 m L max = 4 m	L = 4 m	NONE	NONE	NONE	NONE
	C32 (xx)							
	C42 (xx)							
	Exhaust Type	Restrictor ø 43 mm	NO Restrictor	Maximum Extension Exhaust/Air	Risk of Condensation Forming			
					Piping not insulated ø 43 restrictor NO		Piping insulated ø 43 restrictor NO	
Twin Pipe Systems ø 80/80	C12 (xy)	L max = 11.5 m	L min = 11.5 m	43 m	4.3 m	6.9 m	NONE	NONE
	C32 (xy)			43 m				
	C42 (xy)			43 m				
	C52 (xy)	L max = 11.4 m	L min = 11.4 m	40 m	4.3 m	6.9 m	5.7 m	21.7 m
	C82 (xy)		L max = 40 m					

L = Sum of the total length of exhaust + air intake piping.



In calculating the lengths of the pipes, the maximum length “L” must also take into consideration the values for the exhaust/air intake end terminals, as well as 90° elbows for coaxial systems.

The C52 types must comply with the following requirements:

- 1 - The exhaust/air intake pipes must have the same diameter of ø 80 mm.
- 2 - If elbows are to be inserted into the air intake and/or exhaust system, the calculation of the overall length must take into consideration the values for each elbow, see the **FLUE PIPE ACCESSORIES MANUAL**.
- 3 - The exhaust pipe must protrude by at least 0.5 m above the top of the roof in the event that it is located on the opposite side of the building to the side with the air intake (this condition is not obligatory when the air intake and exhaust are located on the same side of the building).

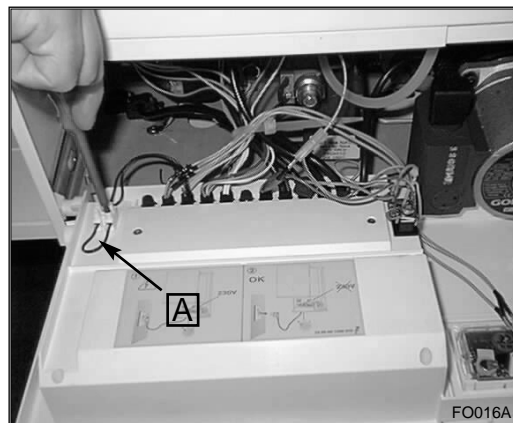
2.10 ROOM THERMOSTAT CONNECTION

To connect a room thermostat, it is necessary to:

1. - Open the control panel as indicated in section 3.3.
- 2.- Remove the link "A" from the terminal block on the reverse of the control panel.
3. - Insert the thermostat cable through the cable grommet and fasten it by means of the cable-clamp provided.
4. - Then connect the thermostat wires to the terminal block.
- 5.- If a remote time clock is to be fitted, disconnect the integral time clock from the P.C.B.
6. - Using a volt-free switching time clock, connect the switching wires from the time clock following points 1-4 above.
7. - If using an external time clock and room thermostat, these must be connected in series as points 1-7 above.

Note: Only a two-wire type room thermostat can be used.

An anti-frost device is built-in to the appliances electronic regulation system.



2.11 ELECTRICAL/SYSTEM DIAGRAMS

LEGEND:

A = Central Heating Temperature Adjustment	A01 = Circulation Pump
B = Domestic Hot Water Temperature Adjustment	A02 = Fan
C = Soft-light Adjustment	A03 = Spark Generator/Gas Valve Supply
D = Maximum Heating Adjustment	A04 = Flame Detection Circuit
E = Time Clock Connector	A05 = Detection Electrode
F = On/Off Switch	A06 = Main Circuit Temperature Probe
G = Fume Sensor L.E.D.	A07 = Domestic Hot Water Temperature Probe
H = Central Heating Selector	A08 = D.H.W. Flow switch
I = Ignition Failure (Lockout) L.E.D.	A09 = Pump Pressure Switch
J = On/Off L.E.D.	A10 = Modulator
K = Reset Button	A11 = Air Pressure Switch
L = Central Heating L.E.D.	A12 = Safety Thermostat
M = Transformer	A13 = External (Room) Thermostat
N = Circulation Pump Relay	
O = Fan Relay	
P = Gas Valve Relay	
Q = Spark Generator I.C.	
	Colours:
	Gry = Grey
	Wh = White
	Pnk = Pink
	Brn = Brown
	Bl = Blue
	Blk = Black
	Rd/Blk = Red/Black

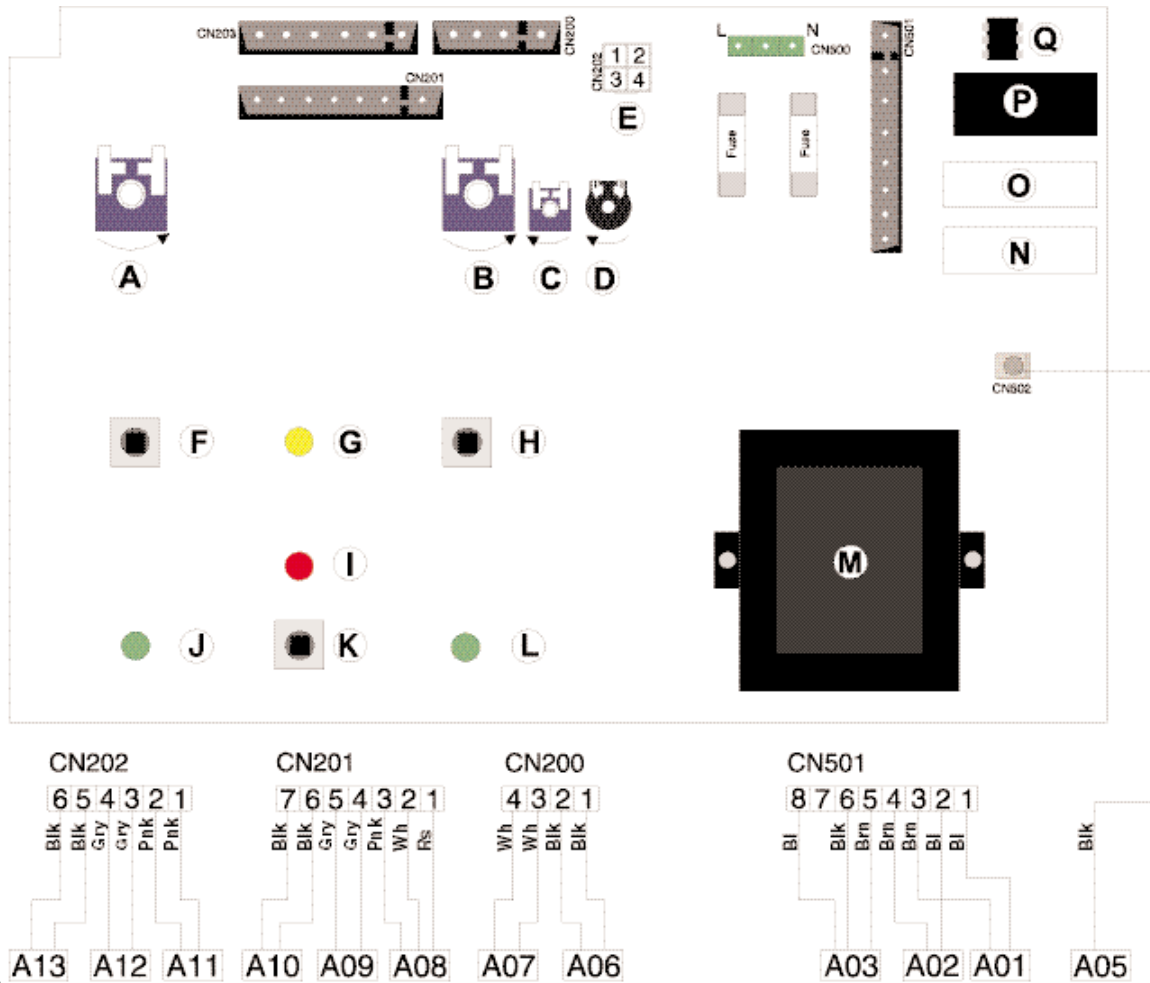
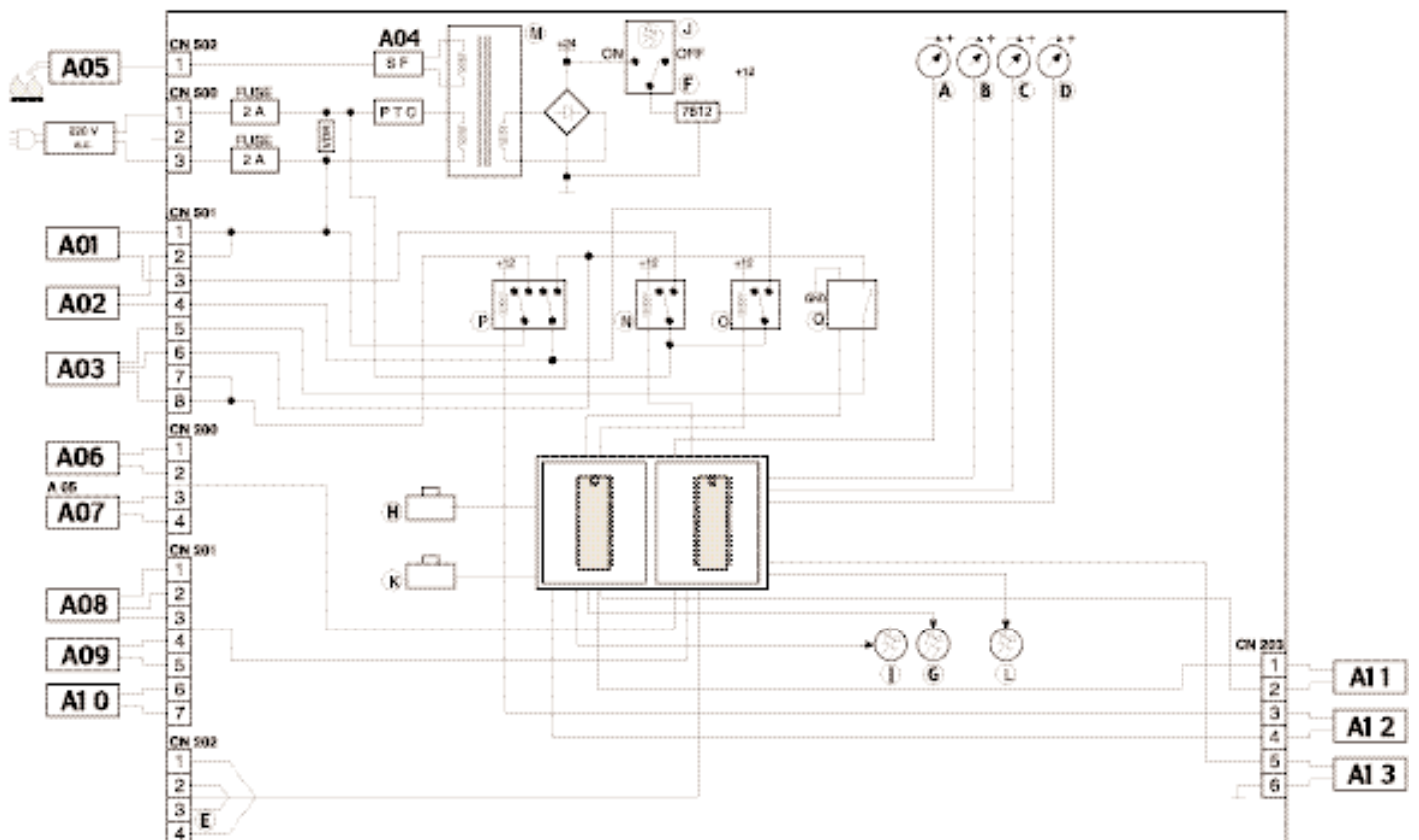


FIG. 2.12

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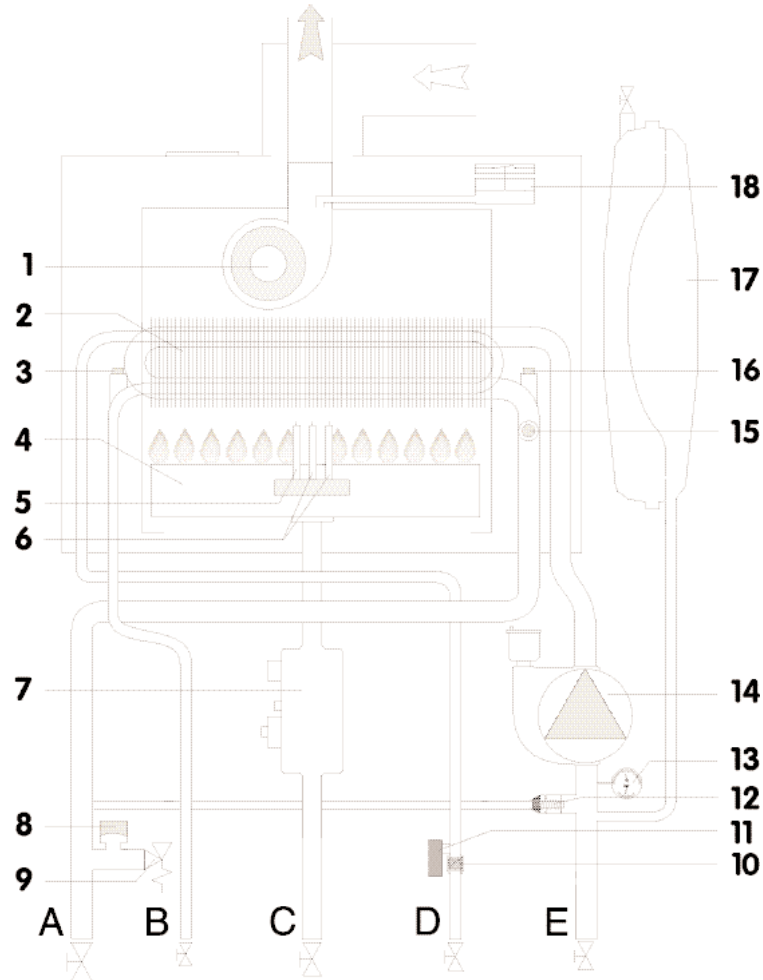
FIG. 2.13



SF013A

2.12 WATER CIRCUIT DIAGRAM

FIG. 2.14



SI016A

LEGEND:

1. Fan
 2. "Twin-pass" Heat Exchanger
 3. Domestic Hot Water Temperature Probe
 4. Burner
 5. Detection Electrode
 6. Ignition Electrodes
 7. Gas Valve
 8. Pump pressure switch
 9. Safety Valve
 10. D.H.W. inlet filter
 11. D.H.W. Flow Switch
 12. Automatic By-pass
 13. Pressure Gauge
 14. Circulation Pump with Automatic Air Release Valve
 15. Overheat Thermostat
 16. Main Circuit Temperature Probe
 17. Expansion Vessel
 18. Air Pressure Switch
-
- A. Central Heating Flow
 - B. Domestic Hot Water Outlet
 - C. Gas Inlet
 - D. Domestic Cold Water Inlet
 - E. Central Heating Return

3. COMMISSIONING

3.1 INITIAL PREPARATION

MTS (GB) Limited support the *benchmark* initiative. Within the information pack you will find a copy of the *benchmark* logbook. It is important that this is completed in the presence of your customer, they are shown how to use it, and it is signed by them. Please instruct your customer that they must have their *benchmark* logbook with them whenever they contact a service engineer or us.

Preliminary electrical system checks to ensure electrical safety must be carried out by a competent person i.e. polarity, earth continuity, resistance to earth and short circuit.

FILLING THE HEATING SYSTEM:

Lower the control panel and remove the case panels (see section 3.3 for further information).

Open the central heating flow and return cocks supplied with the connection kit (there are two isolation points on the return connection).

Unscrew the cap on the automatic air release valve one full turn and leave open permanently.

Close all air release valves on the central heating system.

Gradually open valve(s) at the filling point (filling-loop) connection to the central heating system until water is heard to flow, do not open fully.

Open each air release tap starting with the lowest point and close them only when clear water, free of air, is visible.

Purge the air from the pump by unscrewing anticlockwise and removing the pump plug and also manually rotate the pump shaft in the direction indicated by the pump label to ensure the pump is free.

Refit the pump plug.

Continue filling the system until at least 1.5 bar registers on the pressure gauge.

Inspect the system for water soundness and remedy any leaks discovered.

FILLING OF THE D.H.W. SYSTEM:

Close all hot water draw-off taps.

Open the cold water inlet cock supplied with the connection kit.

Open slowly each draw-off tap and close them only when clear water, free of bubbles, is visible.

GAS SUPPLY:

Inspect the entire installation including the gas meter, test for soundness and purge the supply as described in BS 6891:1988.

Open the gas cock (supplied with the connection kit) to the appliance and check the gas connections on the appliance for leaks.

When the installation and filling are completed turn on the central heating system (section 3.4) and run it until the temperature has reached the boiler operating temperature. The system must then be immediately flushed through.

The flushing procedure must be in line with BS 7593:1992 code of practice for treatment of water in domestic hot water central heating systems.

During this operation, we highly recommend the use of a central heating flushing detergent (Fernox Superfloc or equivalent), whose function is to dissolve any foreign matter that may be in the system.

Substances different from these could create serious problems to the pump or other components.

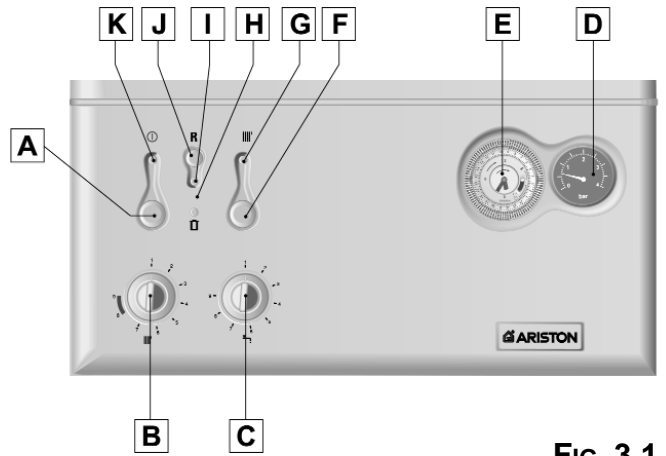
The use of an inhibitor in the system such as Fernox MB-1 or equivalent is strongly recommended to prevent corrosion (*sludge*) damaging the boiler and system.

Failure to carry out this procedure may invalidate the appliance warranty.

3.2 CONTROL PANEL

LEGEND:

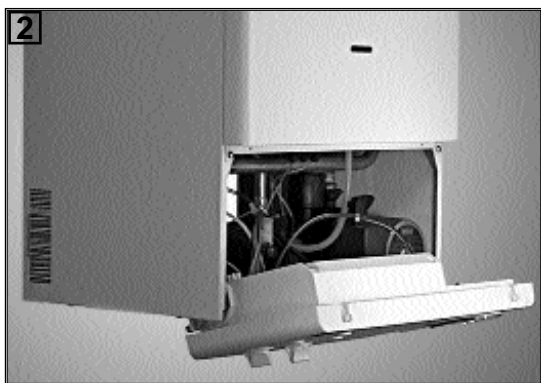
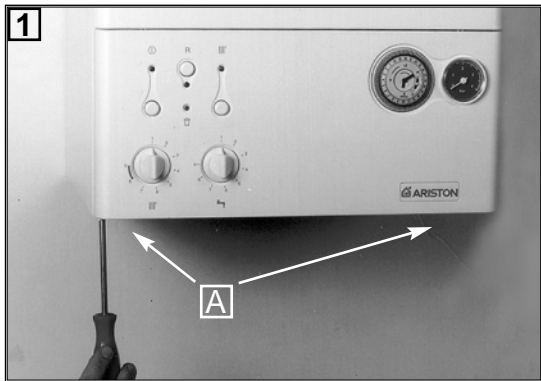
- A - On/Off button
- B - Central heating temperature adjustment
- C - Domestic hot water temperature adjustment
- D - Heating system pressure gauge
- E - Time clock
- F - Central heating selector
- G - Central heating L.E.D. (green)
- H - Fume sensor L.E.D. (yellow)
- I - Overheat and/or ignition failure (lockout) L.E.D. (red)
- J - Ignition failure (lockout) and/or overheat reset button
- K- ON/OFF L.E.D. (green)



FR019A

FIG. 3.1

3.3 REMOVING THE FRONT PANEL

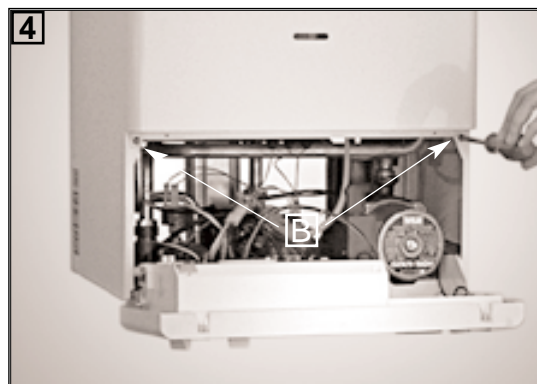


In order to access the inside of the boiler, it is necessary to unscrew the fastening screws "A" of the control panel located on the lower part of the panel itself.

The control panel moves downward and when pulled forward rotates on two lateral hinges.

The panel stays in a semi-horizontal position, which allows access to the inner parts of the boiler.

In order to increase the manoeuvring space, it is possible to raise the control panel and rotate it to a fully horizontal position.



To dismantle the front casing panel it is necessary to:

- 1 - Remove the two screws "B";
- 2 - Move the front casing panel up and lift forward.

3.4. INITIAL START-UP

THE CHECKS TO BE RUN BEFORE INITIAL START-UP ARE AS FOLLOWS:

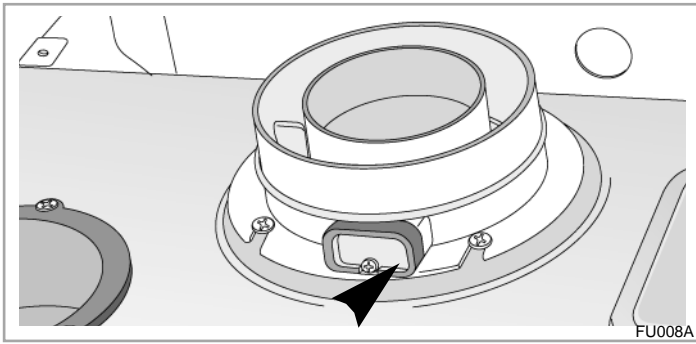
1. Make sure that:
 - the screw on the automatic air valve has been loosened when the system is full;
 - If the water pressure in the system is below 1.5 bar, bring it up to the appropriate level;
 - Ensure that the gas cock is closed;
 - Make sure that the electrical connection has been made properly and that the earth wire is connected to an efficient earthing system;
 - Supply power to the boiler by pushing the On/Off button “A” (see Fig. 3.1) - the L.E.D. “K” will illuminate. Then push the button “F” in for central heating - the L.E.D. “G” will illuminate. This will start the circulation pump. After 7 seconds, the boiler will signal a shutdown due to ignition failure. Leave the boiler as it is until all of the air has been bled from the system.
 - Loosen the cap on the head of the pump to eliminate any air pockets;
 - Repeat the procedure for bleeding the radiators of air;
 - Open the taps for a brief period;
 - Check the system pressure and, if it has dropped, open the filling loop again to bring the pressure back up to 1.5 bar.
2. Make sure that all gate valves are open;
3. Turn on the gas cock and check the seals on the connections with an approved soap solution and eliminate any leaks.
4. Press the reset button “J” for the lighting system; the spark will light the main burner. If the burner does not light the first time, repeat the procedure.
5. Check the minimum and maximum pressure values for the gas going to the burner; adjust it if needed using the values indicated in the table in section 4 (See the relative section for burner pressure adjustment within the servicing manual).

3.5 OPERATIONAL ADJUSTMENTS

To access the areas in which adjustments are made, it is necessary to open the control panel, as indicated in section 3.3, then remove the rear inspection cover by unscrewing the two screws. Access is thereby provided to the P.C.B. and to the following components:

1. the power supply cable connector;
2. the fuses;
3. the soft-light potentiometer, the setting for which, can range from the minimum thermal power to the maximum;
4. the maximum thermal heating power potentiometer adjustable by the minimum to maximum power (already calibrated in the factory to 70% of the maximum thermal power);
5. the time clock connector.

3.6 COMBUSTION ANALYSIS

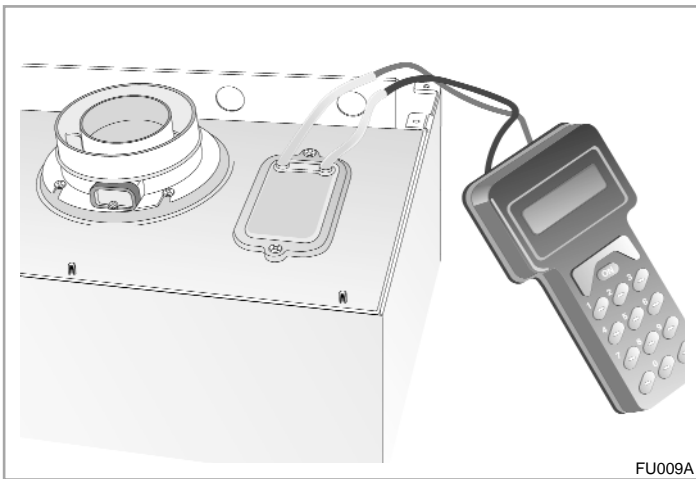


The flue connector has two apertures, readings can be taken for the temperature of the combustion by-products and of the combustion air, as well as of the concentrations of O₂ and CO₂, etc.

To access these intakes it is necessary to unscrew the front screw and remove the metal plate with sealing gasket.

To achieve the best test conditions, turn the central heating adjustment knob "G" to the "max" position and remove the electrical connection to the heating sensor (see section 5). This will allow the appliance to operate at the maximum heating power. Do not allow this test to continue for longer than necessary. Replace the connection on completion.

3.7 FUME DISCHARGE MONITORING



In the boiler, it is possible to monitor the correct operation of the flue exhaust/air intake, checking for a loss of general pressure in the system. Through the use of a differential manometer connected to the test points of the combustion chamber, it is possible to detect the ΔP of operation of the air pressure switch.

The value detected should not be less than 0.55 mbar under conditions of maximum thermal power in order for the boiler to function properly and without interruption.

3.8 BOILER SAFETY SYSTEMS

The boiler is fitted with the following devices (see section 3.2 for references).

1 - *IGNITION FAILURE:*

This indicates ignition failure when a flame is not detected within 7 seconds of starting an ignition sequence. The L.E.D. "I" will illuminate to signal the shutdown status.

The system can be reset by pressing and releasing the button "J" after checking to make sure that the gas cock is open.

2 - *INSUFFICIENT SYSTEM PRESSURE:*

In the event of insufficient water pressure in the heating system, a safety device will shutdown the boiler. Check the system pressure on the pressure gauge "D" and if it is less than 0.4 bar refill the system to 1.5 bar. Once the system pressure is at the correct level the boiler will reset automatically.

3 - *OVERHEATING:*

This control shuts off the boiler in the case where the primary circuit reaches a temperature in excess of 105°C.

The red L.E.D. "I" will illuminate to signal this shutdown status.

The system can be reset by waiting a few minutes for the primary exchanger to cool down and then by pressing and releasing the "J" button.

4. *ANTI-FROST DEVICE:*

The boiler is equipped with a device that, in the event of the water temperature going below 3°C, the burner ignites at the minimum power until the boiler water reaches a temperature of 33°C.

This device operates only if the boiler is functioning perfectly and:

- the system pressure is sufficient;
- the boiler is powered electrically - L.E.D. "K" illuminated;

- the gas is turned on.

6 - EXHAUST DISCHARGE ANOMALY SHUTDOWN:

The boiler is fitted with safety devices, which in the event of defective discharge of exhaust fumes, automatically interrupts the gas supply, thereby shutting off the boiler.

The shutdown of the boiler is temporary and is indicated by the illumination of the yellow L.E.D. "H" for a period of about 15 minutes.

Once this time period has passed and the discharge state of exhaust fumes has returned to normal, the boiler automatically turns back on.

3.9 DRAINING THE SYSTEM

DRAINING THE HEATING SYSTEM

The heating system must be emptied as follows:

- Turn off the boiler;
- Attach a hose pipe and open the drain valve;
- Empty the system at the lowest points (where present). When the heating system is unused for an extended period of time, it is recommended that you add antifreeze with an ethylene glycol base to the water in the heating pipe work and radiators if the ambient temperature drops below 0°C during the winter.

This makes repeated draining of the entire system unnecessary.

DRAINING THE DOMESTIC HOT WATER SYSTEM

Whenever there is the danger of the temperature dropping below the freezing point, the domestic hot water system must be drained as follows:

- Turn off the general water valve for the household plumbing system;
- Turn on all the hot and cold water taps;
- Empty the remaining water from the lowest points in the system (where present).

4. GAS ADJUSTMENTS

CATEGORY I12H3+		Methane Gas G20	Liquid Butane Gas G30	Liquid Propane Gas G31
Lower Wobbe Index (15°C;1013mbar)	MJ/m ³ h	45.67	80.58	80.58
Nominal Delivery Pressure	mbar	20	29	37
Minimum Delivery Pressure	mbar	17	20	25
23 MFFI				
Main Burner: n. 12 jets (∅)	mm	1.30	0.77	0.77
Consumption (15°C; 1013mbar)	m ³ /h	2.78	----	----
Consumption (15°C; 1013mbar)	Kg/h	----	2.02	2.00
Gas Burner Pressure max - min	mbar	11.0 - 2.0	27.7 - 6.0	35.5 - 7.3

[1 mbar = 10,197 mmc.a.]

The outlet pressure of the gas cock is obtained by completely loosening the screw on the solenoid. The maximum pressure of the gas to the burner will be equal to the nominal delivery pressure minus the head loss within the gas valve.

4.1 CHANGING THE TYPE OF GAS

The boiler can be converted to use either methane (natural) gas (G20) or LPG (G30 - G31) by an Authorised Service Centre.

The operations that must be performed are the following:

1. Replace the jets on the main burner (see table in section 4);
2. Adjust the maximum and minimum thermal capacity values for the boiler (see table in section 4);
3. Replace the gas rating plate;
4. Adjust the maximum thermal power setting;
5. Adjust the soft-light feature;
6. Adjust the ignition delay feature for the heating system (can be set from 0 to 2 mins.).

CATEGORY I12H3+	Methane Gas G20	Liquid Butane Gas G30	Liquid Propane Gas G31
Recommended Soft-light Pressure (mbar)	8.0	16.0	16.0

5. MAINTENANCE

It is recommended that the following inspections be carried out on the boiler at least once a year:

- 1 - Check the seals for the water connections; replace any faulty seals.
- 2 - Check the gas seals; replace any faulty gas seals.
- 3 - Visual check of the entire unit.
- 4 - Visual check of the combustion process or analysis of combustion by-products (see section 3.6) and cleaning of the burner if needed.
- 5 - If called for by point. 3, dismantling and cleaning of the combustion chamber.
- 6 - If called for by point. 4, dismantling and cleaning of the burner jets.
- 7 - Visual check of the primary heat exchanger:
 - check for overheating in the blade assembly;
 - clean the exhaust fan if needed.
- 8 - Adjustment of the flow rate of the gas: flow rate for lighting, partial load and full load.
- 9 - Check of the heating safety systems:
 - safety device for maximum temperature (overheat thermostat);
 - safety device for maximum pressure (safety valve).
- 10- Check of the gas safety systems:
 - safety device for lack of gas or flame ionisation (detection electrode);
 - safety device for gas cock.
- 11- Check of the electrical connection (make sure it complies with the instructions in the manual).
- 12- Check of domestic hot water production efficiency (flow rate and temperature)
- 13- General check of the combustion by-products of the discharge/ventilation system.
- 14- Check of the general performance of the unit.

7. TECHNICAL INFORMATION

		mtc Combi 23 MFFI
CE Certification		63AU4547
Heat Input	max/min kW	25.6/11.0
Heat Output	max/min kW	23.7/9.6
Efficiency of Nominal Heat Input	%	92.5
Efficiency at 30% of Nominal Heat Input	%	90.5
Heat Loss to the Casing ($\Delta T=50^{\circ}\text{C}$)	%	1.0
Flue Heat Loss with Burner Operating	%	6.5
Flue Heat Loss with Burner Off	%	0.4
Maximum Discharge of Fumes (G20)	Kg/h	51
Residual Discharge Head	mbar	0.96
Consumption at Nominal Capacity(G20)	m ³ /h	2.72
Gas Consumption after 10 Minutes* (15°C, 1013 mbar) (G30-G31)	m ³ Kg/h	0.32 2.02/2.00
Temp. of exhaust fumes at nominal capacity	°C	126
CO ₂ Content	%	7.0
O ₂ Content	%	8.0
CO Content	ppm	38
Minimum Ambient Temperature	°C	+5
Head Loss on Water Side (max) ($\Delta T=20^{\circ}\text{C}$)	mbar	200
Residual Head of System	bar	0.25
Heating Temperature	max/min °C	82/42
Domestic Hot Water Temperature	max/min °C	54/36
D.H.W. Flow Rate $\Delta T=35^{\circ}\text{C}$	l/min	9.7
D.H.W. Flow Rate $\Delta T=35^{\circ}\text{C}$	gal/min	2.2
D.H.W. Minimum Flow Rate	l/min	2.5
Pressure of Domestic Hot Water	max/min bar	8/0.2
Expansion Vessel Capacity	l	6
Expansion Vessel Pre-load Pressure	bar	1
Maximum Water Content of System	l	130
Maximum Heating Pressure	bar	3
Nominal Pressure	Natural Gas (G20) mbar LPG (G30-G31) mbar	20 30-37
Electrical Supply	V/Hz	230 / 50
Power Consumption	W	135
Protection Grade of Electrical System	IP	X4D
Internal Fuse Rating		FAST 2 AT
Weight	Kg	39
G.C. Number		47-116-16

*Calculated at 70% maximum output

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