

Alpha
HEATING INNOVATION

ARES Tec

**Installation and Servicing
Instructions**

ARES 440 Tec

ARES 550 Tec

ARES 660 Tec

ARES 770 Tec

ARES 900 Tec

Floor standing, high output, modular
condensing boilers

**Leave these instructions with the
Building Manager**

This manual contains instructions for use by Gas Safe registered installers and/or maintenance engineers, in compliance with Gas Safe and current British Standards.

The manufacturer will not be held liable in the case of damage to people, animals or property due to the failure to observe the instructions supplied with the boiler.

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1 GENERAL INFORMATION

1.1 SYMBOLS USED IN THIS MANUAL

When reading through this manual, pay special attention to the parts marked with these symbols:



DANGER!
Serious danger to
safety and life



ATTENTION!
Possibly dangerous situation
for the product and environment



NOTE!
Tips for the user

1.2 COMPLIANT USE OF THE APPLIANCE



The Alpha ARES Tec appliance was built to current standards in place.
Nevertheless, following improper use the safety and life of the user or other people may be exposed to danger, i.e. damage to the appliance or other objects.
The appliance is designed for operation in hot water circulating heating systems.
Any other use is considered unsuitable.
The manufacturer will not be held liable for any damage resulting from improper use.
Any use in accordance with the envisioned purposes includes the strict observance of the instructions in this manual.

1.3 INFORMATION TO BE PROVIDED TO THE USER



The user must be instructed in the use and operation of the heating system, in particular:

- Hand these instructions to the user, as well as the other documents relative to the appliance contained in the packaging in an envelope. **The user must keep this documentation safe so that it is available for future consultation.**
- Inform the user of the importance of ventilation and the flue/condensate system, highlighting how essential they are and how it is strictly forbidden to change them.
- Inform the user on how to control the water pressure in the system as well as the operations required to restore it.
- Inform the user on how to correctly regulate the temperature, control units/thermostats and radiators in order to save energy.
- If the appliance is sold or transferred to another owner or if the owner moves, leaving the appliance behind, always ensure the manual accompanies the appliance so that it may be consulted by the new owner and/or installer.
- It is recommended that servicing is carried out on an annual basis by a Gas Safe registered engineer.

The manufacturer will not be held liable in the case of damage to people, animals or property due to the failure to observe the instructions contained in this manual.

1.4 SAFETY WARNINGS



ATTENTION!

The appliance must not be used by people with reduced physical, mental and sensorial capabilities, without experience and knowledge. These people must be duly instructed and supervised during manoeuvring operations.



ATTENTION!

Installation, adjustment and maintenance of the appliance must be carried out by a Gas Safe registered engineer.



DANGER!

Maintenance or repair work on the boiler must be carried out by a Gas Safe registered engineer, it is advisable to have an annual maintenance contract.

Poor or irregular maintenance can compromise the operational safety of the appliance and cause damage to people, animals and property for which the manufacturer will not be held liable.



Changes to parts connected to the appliance

Do not make changes to the following elements:

- To the boiler.
- To the gas, air, water and power supply lines.
- To the flue pipe, safety valve and condensate pipe.
- To the constructive elements that affect the operational safety of the appliance.



ATTENTION!

To tighten or loosen any threaded fittings, use suitable tools only.

Improper use and/or unsuitable tools can cause damage (i.e. water and gas leaks).



ATTENTION!

Instructions for appliances running on LPG gas

Make sure that the gas tank has been ventilated prior to installing the appliance.

For a thorough ventilation of the tank contact the liquid gas supplier and in any case authorised personnel, in accordance with the law.

Ignition problems can arise if the tank is not thoroughly ventilated.

In this case contact the liquid gas tank supplier.



Smell of gas

In case of the smell of gas observe the following safety instructions:

- Do not smoke or strike matches.
- Do not turn electrical switches on or off.
- Do turn off the gas supply immediately.
- Do extinguish all sources of ignition.
- Do ventilate the room where the gas leak occurred.
- Do contact the National Gas Emergency Service on 0800 111 999.



Explosive and easily flammable substances

Do not use or deposit explosive or easily flammable materials (i.e. petrol, paints, paper, wood) in the room where the appliance is installed.



ATTENTION!

The heating unit must be installed so as to avoid it from freezing and exposing the controls to temperatures below -15°C and over +40°C.

The heating unit must be protected by:

- Insulating the water and condensate pipes.
- Adopting specific anti-freeze products in the water system.

1.5 REGULATIONS FOR INSTALLATION

The **Alpha ARES Tec** boiler is a gas category **II_{2H3P}** heating unit.

The appliance must be installed in accordance with the instructions contained in this manual.

Installation must be carried out by a Gas Safe registered engineer.

Gas Safe Register - 0800 408 5577 - www.gassaferegister.co.uk

It is necessary to observe the standards, regulations and requirements for installation provided below, constituting a rough and non-exhaustive list, in order to follow the changes in regulations. **We would like to underline that updating the list of standards is the responsibility of the engineers authorised to carry out installation.**

Also observe the standards regarding the heating control unit, construction regulations and requirements on combustion heating in the country of installation.

The appliance must be installed, commissioned and subject to maintenance in accordance with all current regulations in force. This also applies to the water system, the flue and condensate disposal systems, the installation room and the electrical system.



Failure to observe the above regulations will void the warranty.

1.6 INSTALLATION

If the ARES Tec boiler is installed on existing systems, make sure that:

- The flue is suitable for condensing appliances, for the temperatures of the combustion products, calculated and built in accordance with regulations in force. That it is as straight as possible, water-tight and insulated and does not have any obstructions or constrictions.
- The flue is equipped with an attachment to remove the condensation.
- The heating control unit is equipped with a pipe for the removal of the condensation produced by the boiler.
- The electrical system is built in accordance with specific regulations and by qualified technical personnel.
- The flow rate, head and direction of flow of the circulation pump must be appropriate for the system.
- The gas supply line and any existing tanks are set up in accordance with regulations in force.
- Ensure expansion vessels are correctly sized for the system to accommodate the expansion of heated water.
- Ensure the system has been thoroughly cleaned and flushed.



ATTENTION!

If the new boiler has been fitted in an old system without it being thoroughly cleaned and flushed, do not clean the system, as any sediments in the system may fill the heat exchanger with residues after replacement. It is advisable to contact a company specialised in water treatment.

If the ARES Tec boiler is being installed on a new system it is still advisable to clean it thoroughly, using products that are suitable for the entire system, and install a Y-strainer with two isolation valves on the return pipe to the boiler, so that it can be cleaned as needed. This filter will protect the boiler from sediments coming from the heating system.

In both cases it is necessary to keep the head losses localised in the primary circuit, for the correct sizing of the pump.

1.7 WATER TREATMENT

Treating the supply water allows you to prevent problems and maintain the functionality and efficiency of the boiler over time.

The purpose of this treatment is to eliminate or significantly reduce problems that can be outlined as:

- build-up
- corrosion
- sediments
- biological growth (mould, fungus, algae, bacteria, etc.).

The chemical analysis of the water provides a lot of information on the state and "health" of the system.

The pH level is a numerical indication of the acidity or alkalinity of a solution.

The pH scale goes from 0 to 14, where 7 corresponds to neutral.

Values below 7 indicate acidity, values above 7 indicate alkalinity.

The ideal pH value in heating systems with aluminium boilers is between 6.5 and 8, with a hardness of 15°F.

Water in a system with a pH value outside of this range considerably accelerates the destruction of the protective oxide layer which forms naturally inside the aluminium bodies, and would not occur naturally: if the pH level is lower than 6 it contains acid, if it is above 8 the water is alkaline, either due to an alkaline treatment (for example phosphates or glycols operating as antifreeze) or in some cases the natural generation of alkalis in the system.

Vice versa, if the pH value is between 6.5 and 8, the aluminium surfaces in the body are passivated and protected from further corrosive attacks.

To minimise corrosion, it is essential to use a corrosion inhibitor. In order for it to work efficiently, however, the metal surfaces must be clean.

When using inhibitors or cleaning agents they must be applied in accordance with their manufacturers instructions. Only products from Fernox and Sentinel are acceptable for use with AresTec boilers. Further information can be obtained from Fernox (Tel: 01799 521133) or Sentinel (Tel: 01928 588330)

The best inhibitors on the market also contain an aluminium protection system that stabilises the pH levels of the filler water, preventing sudden changes (buffer effect).

It is advisable to systematically check (at least twice a year) the pH value of the water in the system. In order to do so a chemical laboratory analysis is not required, but a simple check using a analysis "kit" contained in a carry case, easily available on the market.



THE PRESSURISATION UNIT, EXPANSION VESSELS AND FILLING LOOP MUST BE SET UP ON THE RETURN PIPE TO THE PRIMARY CIRCUIT DOWNSTREAM OF THE PUMP.

Precautions are required to avoid the formation and localisation of oxygen in the water of the system, for example plastic pipes used in the under-floor heating systems must not be permeable to oxygen.

Make sure that any anti-freeze products are compatible with aluminium and any other parts and materials in the system.



ATTENTION!

Any damage caused to the boiler, due to the formation of build-up or corrosive water, will not be covered by the warranty.



ATTENTION!

These appliances are designed and developed to transfer heat to a heat carrying fluid possessing the characteristics described here, they are not suitable to directly heat water intended for human consumption.

GENERAL INFORMATION

1.8 GENERAL WARNINGS

The instruction manual is an integral and essential part of the product and must be kept safe by the individual in charge of the system.

Read the warnings contained in the manual carefully, as they provide important instructions regarding installation, user and maintenance safety.

Keep the manual safe for future use.

The appliance must be installed and maintained in accordance with current regulations in force, adhering to the instructions of the manufacturer, and by Gas Safe registered engineers, in accordance to regulations in force.

Incorrect installation or poor maintenance can cause injury to persons and animals and damage to property, for which the manufacturer is not liable.

Before carrying out any servicing or maintenance operations on the boiler, isolate it's electrical supply and close the appliance gas valve.

Do not obstruct the ventilation openings, flue terminal or condensate pipe outlet.

In case of breakdown and/or poor operation of the appliance, switch it off, and do not attempt in any way to repair it or intervene directly. Only contact personnel that has been authorised in accordance with the law.

Any repairs to the products must be carried out by authorised Alpha personnel only, using original spare parts only. Failure to observe the above can jeopardise the safety of the appliance and will void the warranty.

To guarantee the efficiency of the appliance and its correct operation it is essential for authorised personnel to carry out annual maintenance.

If the appliance is put out of use for downtime, any part that is susceptible to posing a potential source of danger must be made safe.

Before re-commissioning an appliance that has been put out of use, flush the domestic hot water system ensuring that the water has been completely changed.

If the appliance is sold or transferred to another owner or if the owner moves, leaving the appliance behind, always ensure the manual accompanies the appliance so that it may be consulted by the new owner and/or installer.

All appliances with options or kits (including electric) must only use original spare parts.

The appliance must only be employed for its expressly foreseen use. Any other use must be considered improper and therefore dangerous.

2 TECHNICAL DATA AND DIMENSIONS

2.1 TECHNICAL DATA

- A condensing boiler comprised of heating modules designed to operate on their own or in a set.
- Can be installed inside or outside (IP X5D).
- Low water content.
- Quick response time to load changes.
- Single pipe flue that can be positioned on 3 sides.
- Reversible single gas supply pipe.
- Comprised of 4 or more heating modules (between 4 and 8), aluminium/silicon/magnesium casting.
- Including low NOx premix modulating burners.
- None of the heating modules have hydraulic cut-off devices.
- Modulated output between 22 to 108 kW/module.

TEMPERATURE CONTROL DEVICES:

- Temperature sensor (each heating module).
- Limit Thermostat (each heating module).
- Flow temperature sensor (manifold).
- Return temperature sensor (manifold).
- Approved safety thermostat (To be ordered and installed on safety group, see Section 3.8).
- GCI global flow probe.

OTHER SAFETY DEVICES:

- See Section 3.8.

POP-UP control panel comprising:

- On/Off switch (see Section 3.26).
- TGC (boiler thermoregulation/manager).
- GCI (internal cascade management board).
- Protection fuses.
- Any limit thermostats (only models over 350 kW).
- Fan air pressure switch.
- Condensate level sensor.
- Gas pressure switch.
- Flue pressure switch (anti-obstruction).
- Single temperature control sensors for the combined modules on the flow and return manifolds.

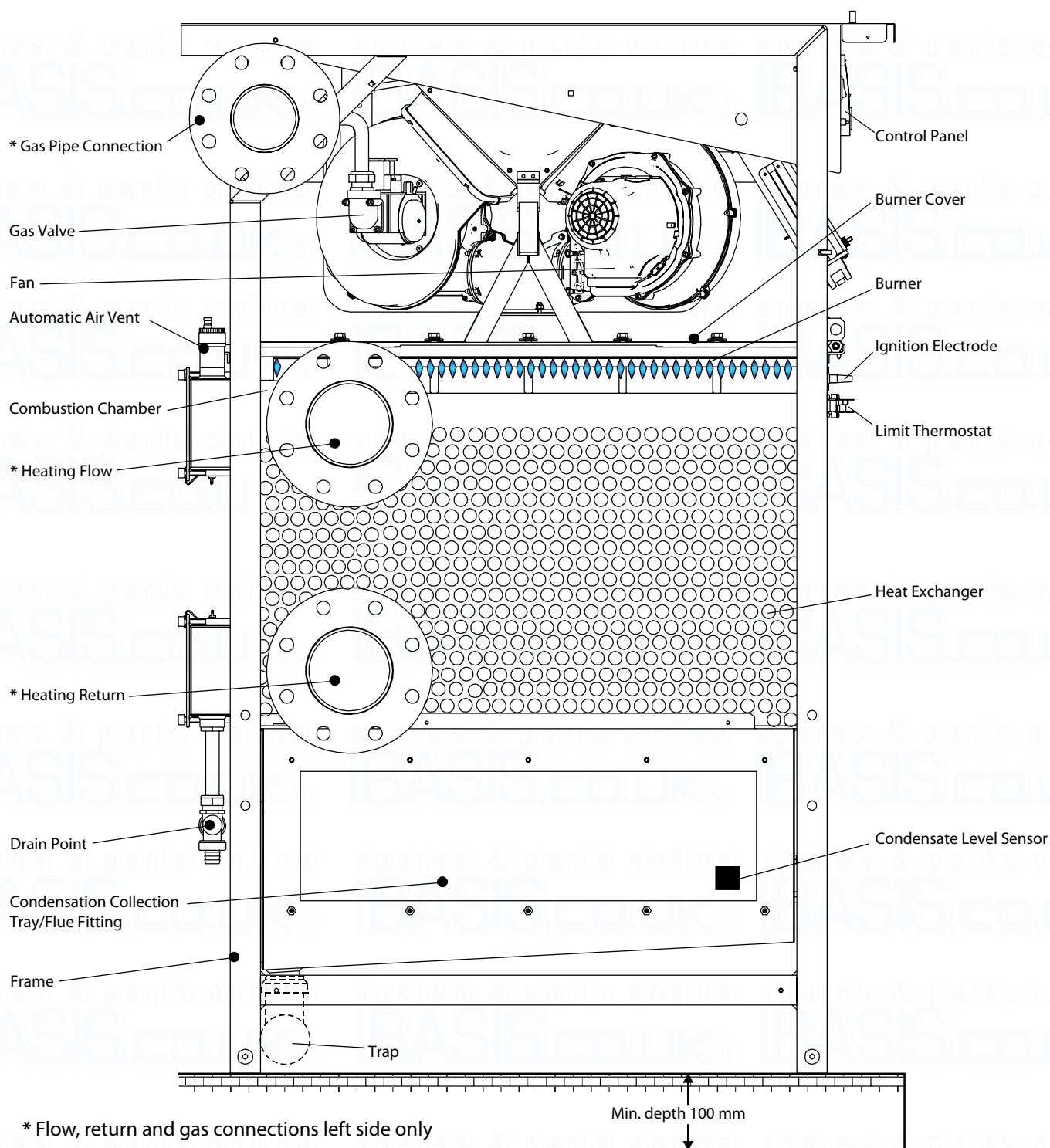
- Integral insulation with non-allergenic synthetic wool.
- Modulating premix burner.
- Sound emissions at maximum output below 49 dBA.
- Operation during heating: determining the required input through a control microprocessor, with preset comparison parameters between requested temperature (or calculated by the outdoor thermoregulation) and overall flow temperature.
- Logic of operation:
 - Possibility of controlling the output of the single heating modules for calibration and/or assistance with reserved access code.
 - DHW production through priority temperature probe, to control the storage tank temperature through a pump or three-way diverter valve through the supplied TGC thermoregulator.
- Possibility of controlling the output of the single heating modules.
- Heat request control: temperature set point and modulation level.
- Monitoring the state of operation and temperatures.
- Alarm notification.
- Parameter setting.
- Control relay to switch on a pump at a fixed speed.
- Analogue 0 to 10 V output to control a modulating pump.
- Emergency operation: this allows you to avoid system down time due to an interruption in communication with the E8 control unit.
- The possibility of selecting the emergency temperature through supplied 'Constant Set point' heating elements: 70°C, maximum of 50% output.
- Alarm management.
- Alarm reset input.
- Alarm notification Relay.
- Easily removable integral panelling comprised of oven-painted steel panels suitable for outdoor installation.
- Condensate collection tray with stainless steel flue trap and flue chamber.
- Incorporated automatic air vent.

The request for heat can be generated by the TGC thermoregulation/manager or alternatively by the GCI (internal cascade management board).

The management logic envisions simultaneous operation of the maximum number of heating modules, so as to always obtain the maximum efficiency. Since it guarantees the maximum exchange area based on the delivered power. The modules are made to operate so as to equally divide the operating time.

The hot water that is produced is circulated by the manifold pump located on the return of the primary circuit to the flow of the hydraulic separator. From here other pumps (see suggested system diagrams in para. 3.21) circulate the flow to the various circuits. The return water enters the hydraulic separator, to start the cycle again.

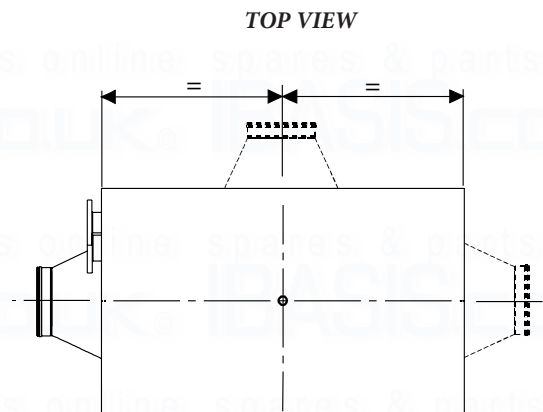
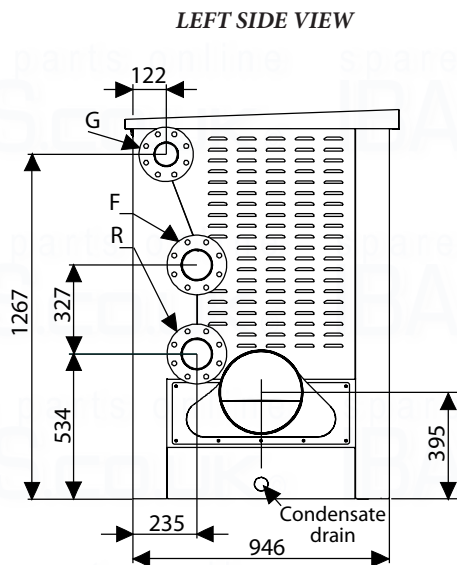
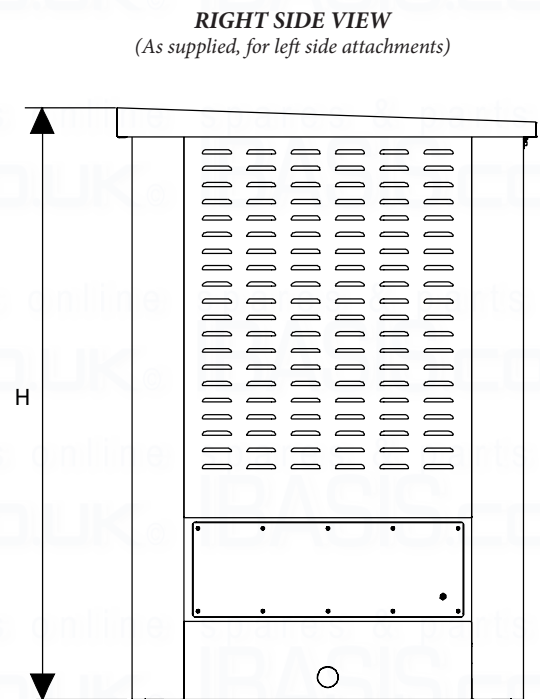
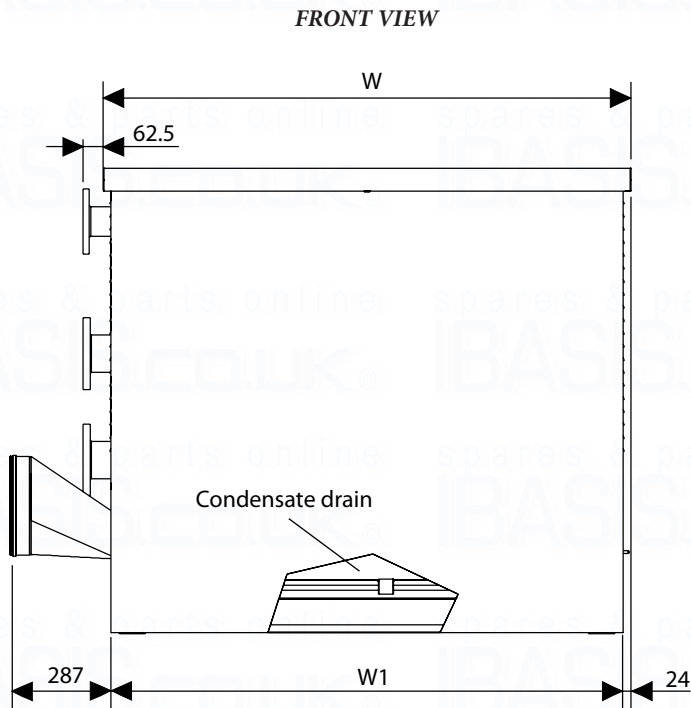
2.2 VIEW OF MAIN COMPONENTS



Flue outlet RIGHT side (as supplied) - LEFT side and REAR side (order rear flue gas outlet kit)
Flow RIGHT side (as supplied) - LEFT side
Return RIGHT side (as supplied) - LEFT side
Gas pipe RIGHT side (as supplied) - LEFT side



To re-position the flue outlet to the **left** side of the boiler, it is necessary to move cover 'A' with relative cabling, level sensor and pressure switch pipe, to the rear side of the boiler.
 The rear cover (previously removed) must be put back on the right side of the boiler.



Flue outlets:

Left side (supply condition)

Right side

Rear side

ARES Tec		440	550	660	770	900
Dimensions	Unit					
Heating elements	No. off	4	5	6	7	8
Height 'H'	mm	1448	1448	1448	1448	1448
Width 'W'	mm	1087	1355	1355	1623	1623
Width 'W1'	mm	1039	1307	1307	1575	1575
Depth	mm	946	946	946	946	946
Attachment sizes						
Gas fitting 'G'	mm	80	80	80	80	80
System flow 'F'	mm	100	100	100	100	100
System return 'R'	mm	100	100	100	100	100
Flue fitting	mm	250	250	300	300	300
Condensate drain	mm	40	40	40	40	40

2.4 PERFORMANCE DATA / GENERAL DATA

ARES Tec		440	550	660	770	900
Boiler category		II _{2H3P}	II _{2H3P}	II _{2H3P}	II _{2H3P}	II _{2H3P}
Nominal heat input on L.V.C. Q _n	kW	432	540	648	756	864
Minimum heat input on L.C.V. Q _{min}	kW	22	22	22	22	22
Nominal effective power (Tr 60 / Tf 80°C) P _n	kW	424.35	530.44	636.53	742.62	849.05
Minimum effective power (Tr 60 / Tf 80°C) P _{n min}	kW	20.57	20.57	20.57	20.57	20.57
Nominal effective power (Tr 30 / Tf 50°C) P _{cond}	kW	445.0	557.8	670.1	783.2	900.3
Minimum effective power (Tr 30 / Tf 50°C) P _{cond min}	kW	23.94	23.94	23.94	23.94	23.94
Efficiency at nominal power (Tr 60 / Tf 80°C)	%	98.23	98.23	98.23	98.23	98.27
Efficiency at minimum power (Tr 60 / Tf 80°C)	%	93.5	93.5	93.5	93.5	93.5
Efficiency at nominal power (Tr 30 / Tf 50°C)	%	~ 104	~ 104	~ 104	~ 104	~ 104
Efficiency at minimum power (Tr 30 / Tf 50°C)	%	~ 109	~ 109	~ 109	~ 109	~ 109
Efficiency class according to directive 92/42 EEC	--	4	4	4	4	4
Combustion efficiency at nominal load	%	97.8	97.8	97.8	97.8	97.8
Combustion efficiency at minimum load	%	98.5	98.5	98.5	98.5	98.5
Losses from operating burner casing	%	0.2	0.2	0.2	0.2	0.2
Losses from burner casing when switched off	--	0.1	0.1	0.1	0.1	0.1
Flue losses with burner on	%	2.58	2.53	2.51	2.58	2.58
Flue temperature at net of Tf-Ta (max)	°C	46.7	46.7	46.7	46.7	45.8
Maximum flue flow rate (max)	kg/h	693	866	1040	1213	1386
Air excess	%	24.25	24.25	24.25	24.25	24.25
(**) CO ₂ (min/max)	%	-	-	-	-	-
NO _x (weighted value according to EN 15420)	mg/kWh	49	49	49	49	49
NO _x class	--	5	5	5	5	5
Water flow rate at nominal power (ΔT 20°C)	l/h	18247	22809	27371	31933	36509
Minimum pressure of heating circuit	bar	0.5	0.5	0.5	0.5	0.5
Maximum pressure of heating circuit	bar	6	6	6	6	6
Water content	l	67	80	94	108	122
NG consumption G20 (supp.press. 20 mbar) at Q _n	m ³ /h	45.68	57.10	68.52	79.94	91.36
NG gas consumption G20 (supp.press. 20 mbar) at Q _{min}	m ³ /h	2.33	2.33	2.33	2.33	2.33
LPG consumption (supp.press. 37 to 50 mbar) at Q _n	kg/h	33.53	41.92	50.30	58.68	67.07
LPG consumption (supp.press. 37 to 50 mbar) at Q _{min}	kg/h	1.71	1.71	1.71	1.71	1.71
Maximum pressure available at flue base	Pa	100	100	100	100	100
Max condensate production	kg/h	73.4	91.7	110	128.4	146.7
Emissions						
CO with 0% of O ₂ in the exhaust	ppm	<95	<95	<95	<95	<95
NO _x with 0% of O ₂ in the exhaust	ppm	<30	<30	<30	<30	<30
Sound	dBA	<49	<49	<49	<49	<49
Electrical data						
Power supply voltage / Frequency	V/Hz	230/50	230/50	230/50	230/50	230/50
Supply fuse	A (F)	4	4	4	4	4
Maximum power	W	626	783	940	1096	1252
(***) Degree of protection	IP	X5D	X5D	X5D	X5D	X5D
Consumption in stand-by	W	20	20	20	20	20



(*) Room Temperature = 20°C

(**) See 'NOZZLES - PRESSURES' table, Section 3.24.

(***) The IP X5D degree of protection is obtained with the lid lowered.

3 INSTRUCTIONS FOR INSTALLATION

3.1 GENERAL RECOMMENDATIONS



ATTENTION!

This boiler must only be employed for its intended use. Any other use must be considered improper and therefore dangerous.

This boiler is used to heat water to below boiling temperature at atmospheric pressure.



ATTENTION!

These appliances are designed exclusively for installation inside suitable boiler rooms.



Before connecting the boiler, have professionally qualified personnel:

- a) **Flush and clean all of the pipes in the system to remove any residues or sediment that could stop the boiler from running efficiently.**
- b) Make sure the boiler is set up to operate with the correct type of fuel. The type of fuel is stated on the packaging and technical data plate.
- c) Make sure that the flue has been designed correctly to completely remove the products of combustion.
- d) Ensure that the flue has an adequate draught, that it is not blocked, and that there are no flues from other appliances connected to it.

Only once these checks have been carried out can the boiler be connected to the flue.



ATTENTION!

In atmospheres with aggressive vapour or dust, the appliance must operate independently of the air in the room in which it is installed!



ATTENTION!

The appliance must be installed by Gas Safe Registered engineers.



ATTENTION!

Ensure there is adequate clearance to install the appliance and provide sufficient clearance for maintenance.



The boiler must be connected to a heating system compatible with its specifications and output.

INSTRUCTIONS FOR THE INSTALLER

3.2 PACKAGING

The ARES Tec boiler is supplied assembled in a box on a pallet.

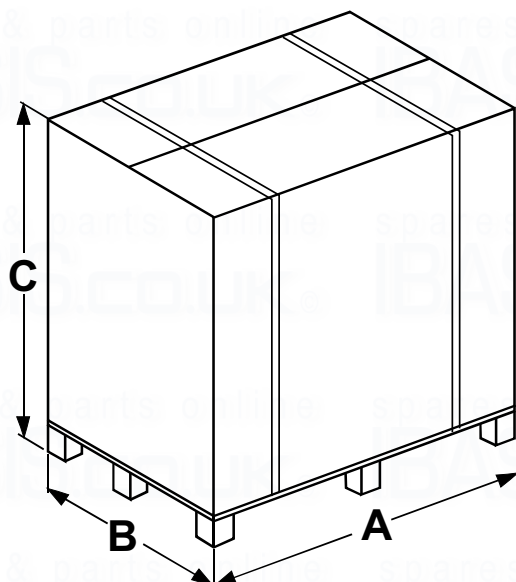


Once the two straps have been removed, lift the box off from the top and make sure the contents are intact.



Packaging materials (cardboard box, straps, plastic bags, etc.) **constitute a potential hazard and must be kept out of the reach of children.**

Alpha will not be held liable in case of damage caused to people, animals or property due to failure to observe the above.



Model	A (mm)	B (mm)	C (mm)	Gross Weight (kg)
440	1263	1120	1515	585
550	1531	1120	1515	643
660	1531	1120	1515	707
770	1799	1120	1515	806
900	1799	1120	1515	858

Contents of pack.

On the left side of the boiler:

- The flue exhaust manifold.
- A cardboard box containing:
 - Gasket between pan and terminal.
 - Collar gasket (Ø 250) Ø 300.
 - Two bends + 1 x tee + plastic cap for condensate drain.
 - Screws required to secure the flue terminal.
- Sensors: external, flow, storage tank.
- Flue inspection cap.
- Kit of resistances.
- Plate and cable clamp for power output.
- A cardboard box containing:
 - Flanges.

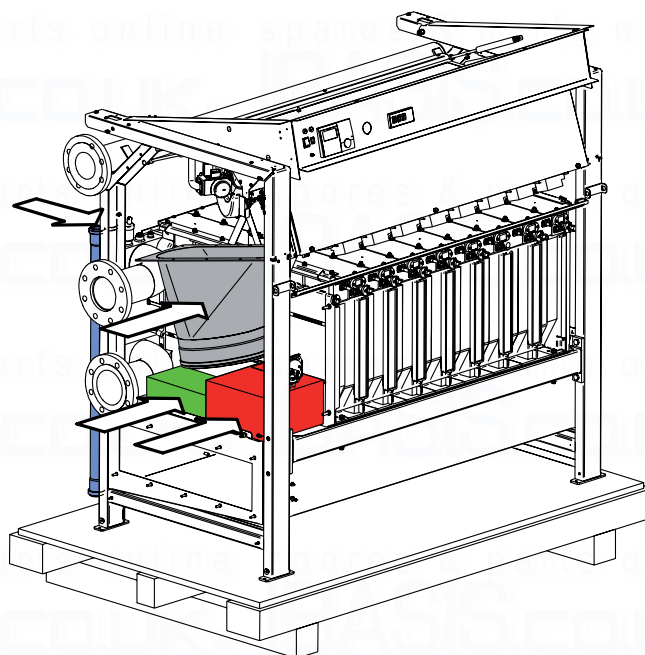
Inside the rear side of the casing:

- Condensate drain trap pipes (1 m).

Above the boiler cover:

- A plastic bag containing:
 - Installation and servicing instructions.
 - System manager instructions handbook.
 - TGC control unit user handbook.
 - Warranty certificate.
 - Hydraulic test certificate.
 - Control unit handbook.
 - Spare parts list.
 - Support pins (for burner service mode).

Position of contents



3.3 UNLOAD THE BOILER AND REMOVE THE PACKAGING



ATTENTION!

Handle using forklift or hoist and sling.

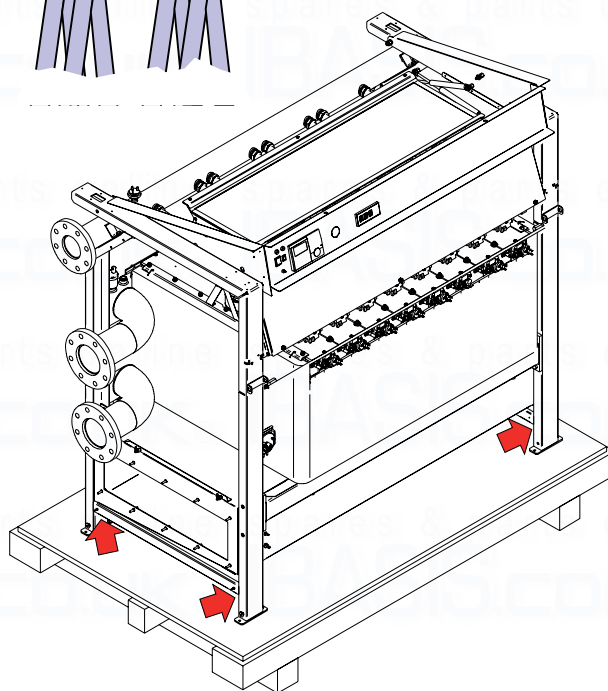
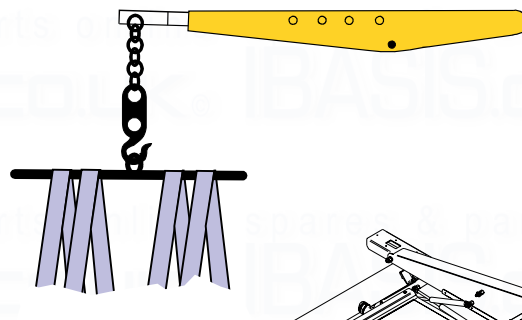
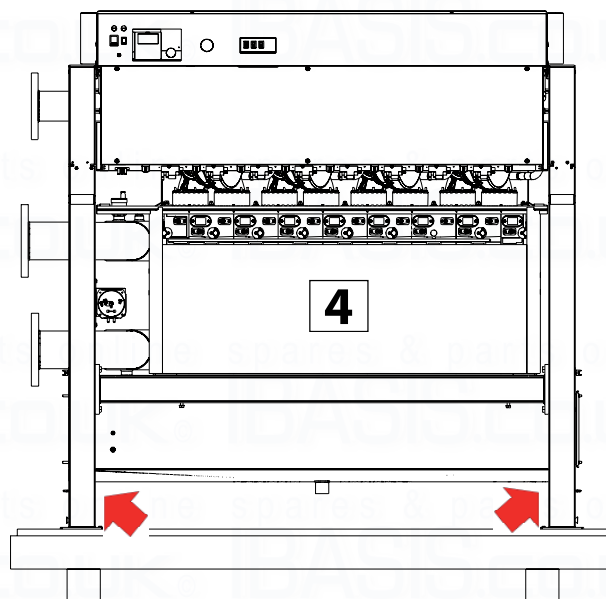
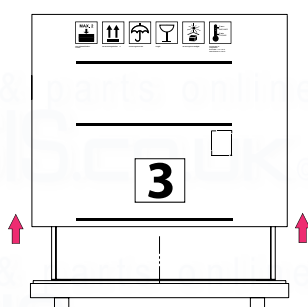
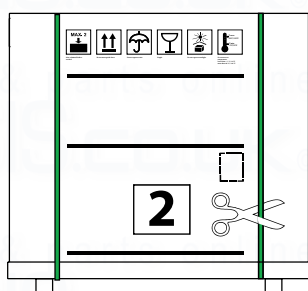
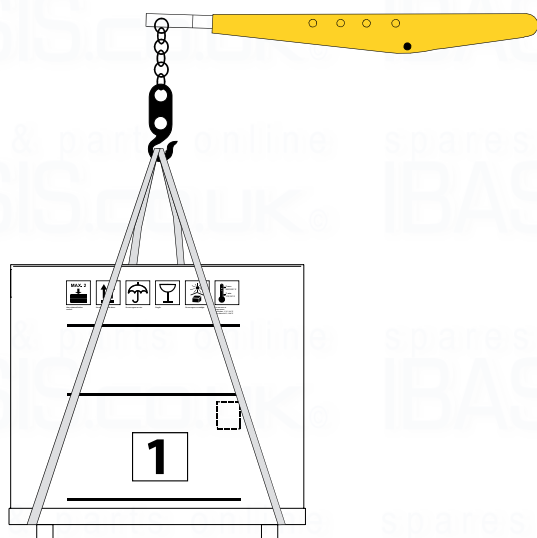


ATTENTION!

Sling slotting points for lifting. The slings must be assembled on the load bearing crossbeams.

To remove the boiler from the pallet it is necessary to use a hoist or crane, to avoid damaging it.

- Remove the casings and harness it using slings, being careful to pass the slings through the load bearing crossbeams of the frame as shown in the following diagrams and photographs.
- Tie the slings to the jib. Perform these operations with caution.



INSTRUCTIONS FOR THE INSTALLER

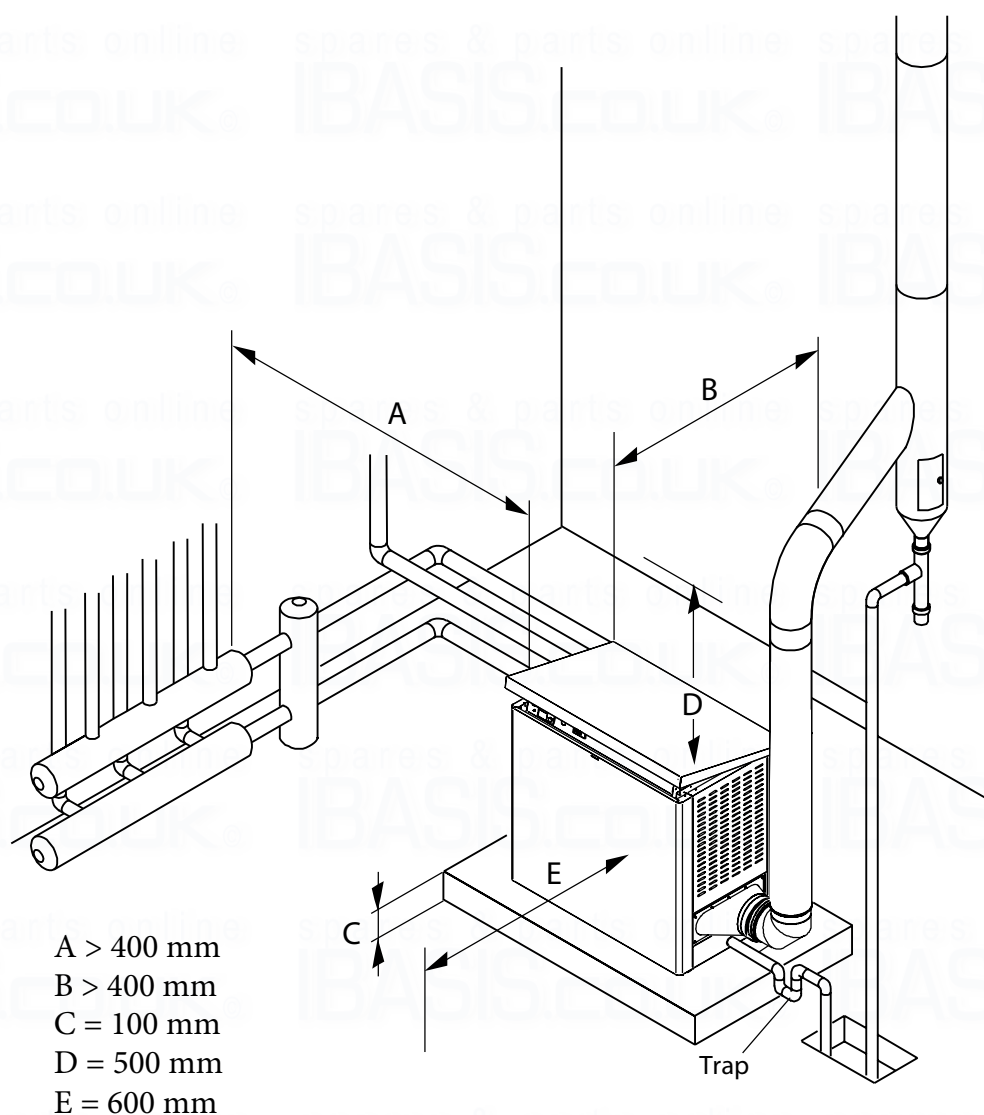
3.4 POSITIONING THE BOILER

Special attention must be paid to British Standards and Gas Safety Regulations regarding commercial boilers, minimum clearances listed below **must be** observed.

The installation must comply with the requirements contained in the most recent standards regarding heating system installation and hot water production, i.e. gas fired hot water boilers of rated input between 70 kW and 1.8 MW, referring to BS 6644 and IGE/UP/10.

The boiler can be placed on a suitable sturdy flat platform no smaller than the boiler measurements and with a minimum height of at least 100 mm so that the trap for condensate drainage can be installed. Alternatively, a sump can be built next to the boiler, at a depth of 100 mm so that the trap can be placed in it (Section. 3.14).

When installation is complete the boiler should be perfectly horizontal firm and stable (to reduce vibrations and noise).



Observe the minimum clearances required to perform normal maintenance and cleaning operations.

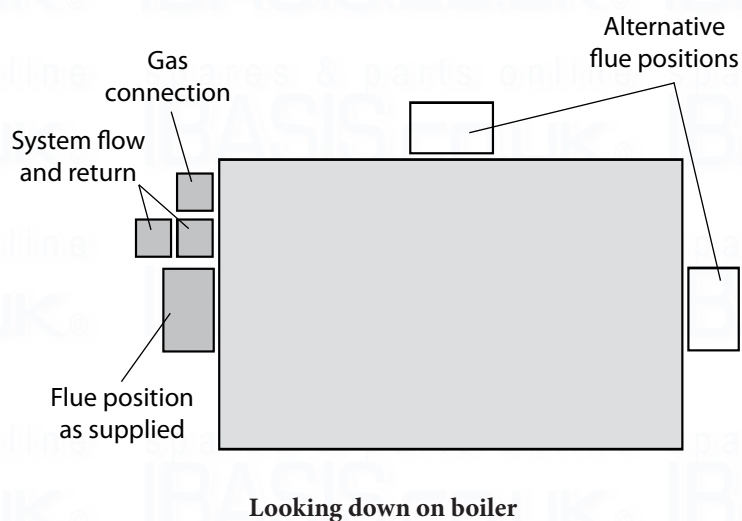
3.5 CONNECTING THE BOILER



The ARES Tec boiler is despatched with the flow and return manifolds, gas and flue connections positioned on the left hand side of the boiler.

To attach the flue manifold use the screws and gaskets supplied in the accessory kit box and a 10 mm socket.

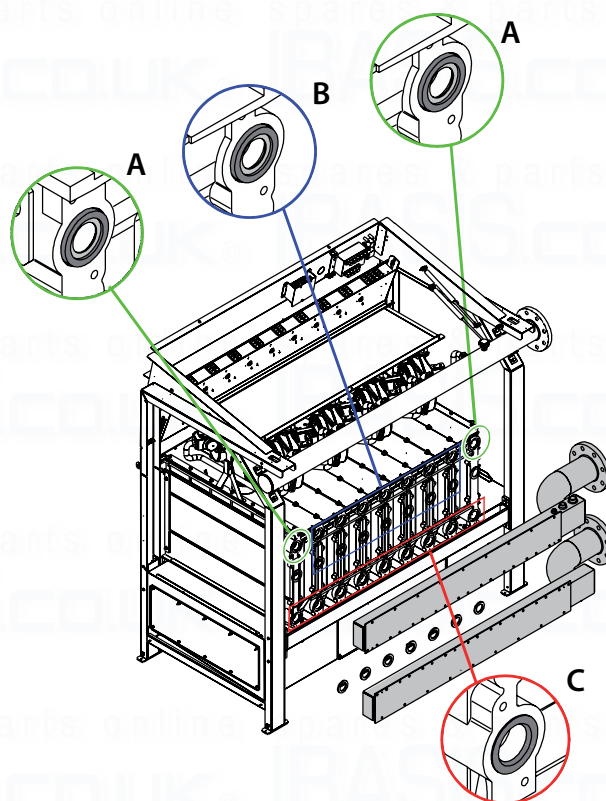
The flue manifold is set up on the LEFT SIDE. It is also possible to move the outlet to the RIGHT or REAR SIDE.



'O' rings and gaskets.

'O' rings - Fitted in the first and last element of the flow manifold 18 mm internal dia. (A), 27 mm internal dia. (B).

Gaskets - Fitted on all of the other elements (C).



INSTRUCTIONS FOR THE INSTALLER

3.6 GAS CONNECTION

The gas supply pipe must be connected to the boiler using a 3" flange as indicated in Section 2.3.

The supply pipe must have a section equal to or larger than the one used in the boiler and must provide the correct gas pressure.

It is advisable to adhere to the standard specifications and requirements in force, installing a gas supply isolation valve, gas filter, anti-vibration joint, etc.

The gas supply pipe to the boiler must be tested for tightness and purged referring to IGE/UP/1 and 1A.



DANGER!

The gas connection must be installed and commissioned by an authorised Gas Safe registered engineer who must observe and adhere to the Gas Safety (Installation and Use) regulations 1998 and the local requirements of the gas supply company, as incorrect installation can cause damage to people, animals and property, for which the manufacturer will not be held liable.



Before installation it is advisable to clean the inside of the gas supply pipe thoroughly, in order to remove any residues that could stop the boiler from operating smoothly.



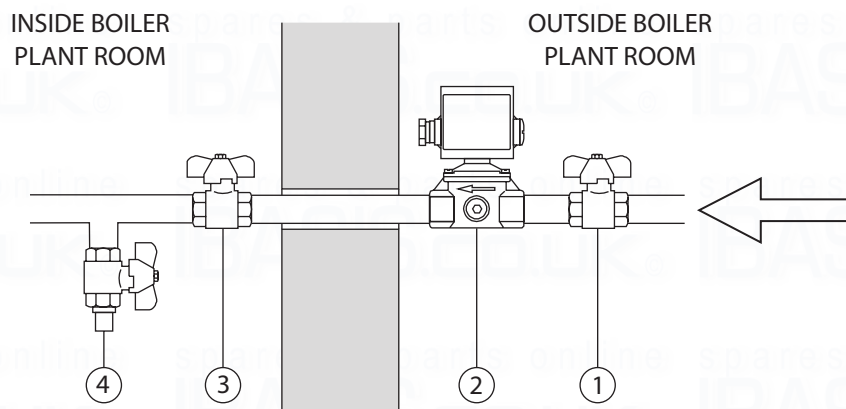
If you notice the smell of gas:

- Close the gas valves.
- Do not operate electrical switches, the telephone or any other object that can generate sparks.
- Immediately open doors and windows to create an air current that purifies the room.
- Seek the assistance of professionally qualified personnel.



In order to detect any gas leaks it is advisable to install a surveillance and protection system composed of a gas leak detector combined with a cut-off safety shut-off on the gas supply pipe.

EXAMPLE OF GAS SUPPLY SYSTEM



- 1 - Isolation valve
- 2 - Gas solenoid valve
- 3 - Appliance isolation valve
- 4 - Test and purge point

3.7 SYSTEM FLOW AND RETURN PIPE CONNECTION

The heating flow and return must be connected to the boiler by the 4" flow (F) and return (R) connections as indicated in Section. 2.3 and shown in the diagram below.

For heating circuit pipe sizing it is necessary to take into account the head losses induced by the components of the system and its configuration.

The layout of the pipes must be set up taking every necessary precaution to avoid air pockets and to facilitate continuous removal of air from the system.



ATTENTION!

Before connecting the boiler to the system thoroughly clean the pipes terminating at the boiler with a suitable product, in compliance with standards, in order to eliminate metal residues from machining and welding, any oil and grease that could affect its operation.

Do not use solvents to wash the system, as they might damage the system and/or its components.

Failure to observe the instructions in this manual can cause damage to people, animals and property, for which the manufacturer will not be held liable.

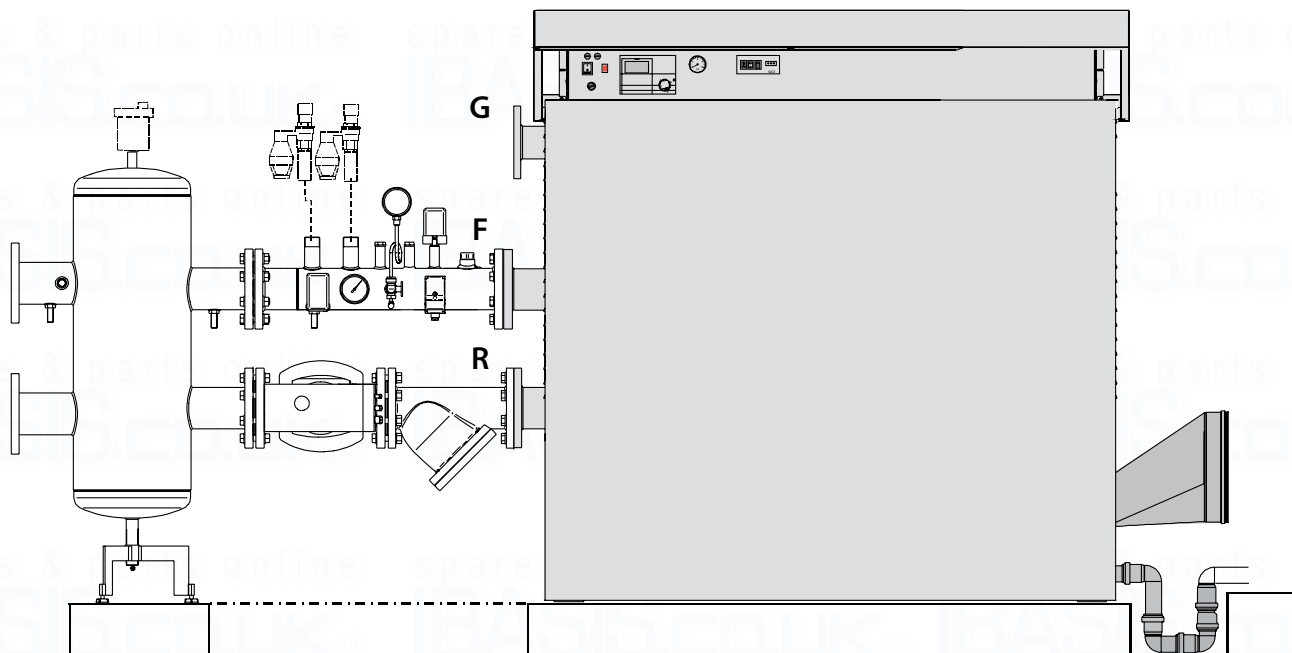


Make sure the pipes in the system are not used as earthing connections for the electrical or telephone system. They are not suitable for this purpose. Serious damage to pipes, boiler and radiators could occur in a short amount of time.



ATTENTION!

DO NOT INSTALL ISOLATION VALVES BETWEEN THE BOILER AND THE SAFETY DEVICES.



3.8 ADDITIONAL SAFETY, PROTECTION AND CONTROL DEVICES

Regulations regarding additional safety devices: closely consult the legislative regulations and safety provisions in force in the country of installation of the appliance.

Use the gas safety and cut-off valves suitable for application and compliant with provisions in force.

The boiler is not supplied with an expansion vessel for the system. It is mandatory to install a closed expansion vessel to guarantee correct boiler operation. The expansion vessel must be compliant with standard requirements in force. The size of the expansion vessel depends on the data for the central heating system. Install a vessel with a capacity, determined by an authorised designer.

Safety devices.

- 1 **Gas cut-off valve:** this has the function of directly cutting-off the gas supply if the limit value of the water temperature is reached. The detection element must be installed as close as possible to the boiler flow pipe at a distance of < 500 mm, and must not have an isolation valve installed between it and the boiler. **Not supplied by Alpha.**
- 2 **Safety valve:** this has the function of releasing the fluid contained in the boiler into the atmosphere when it reaches the maximum operating temperature for any reason. **Not supplied by Alpha.**

2a Visible tundish. Not supplied by Alpha.

Install a discharge pipe from the safety valve via a tundish, to a drain that can be visually controlled. The pipe material must be of copper or steel and be at least the same diameter of the safety valve throughout its length.

Install a safety valve, on the flow pipe, sized for boiler capacity, within 0.5 m of the boiler, and in compliance with regulations in force.



ATTENTION!

Do not install any type of isolation device between the boiler and the safety valve.

Attention!

The manufacturer will not be held liable in the case of failure to observe this precaution, where any work on the safety valve may cause damage to people, animals and property.

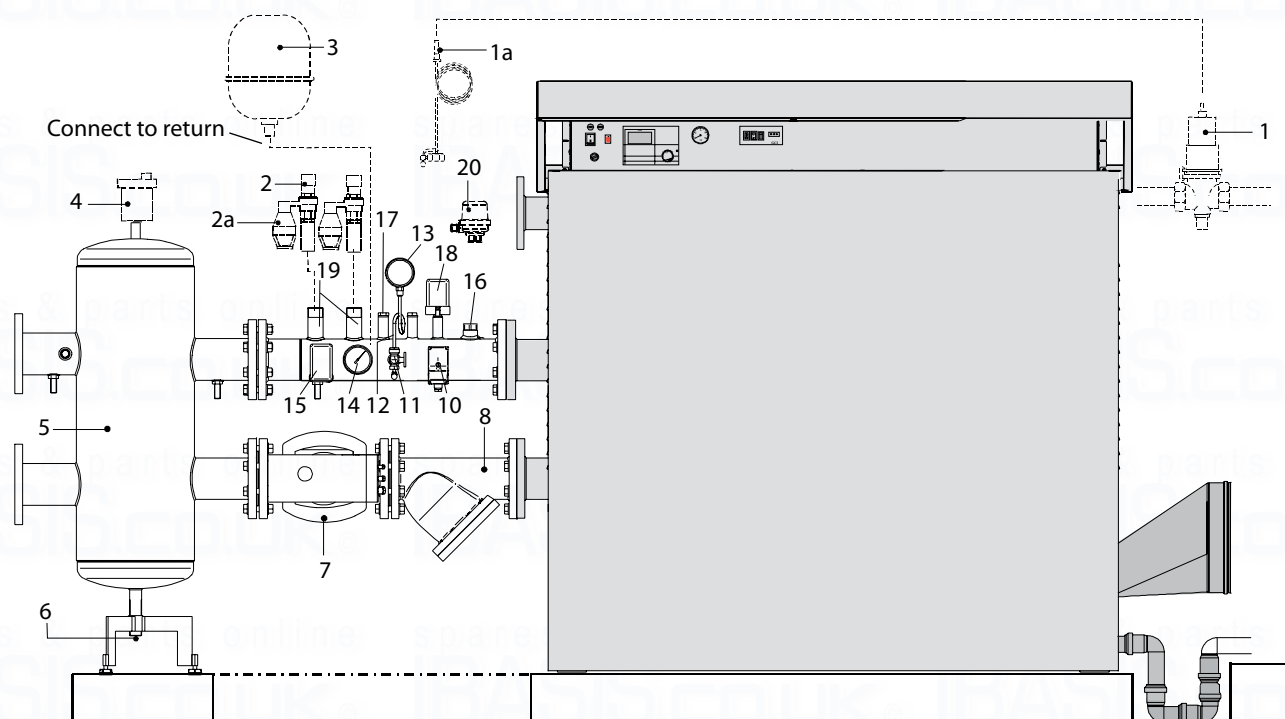
Protection devices.

- 10 **Safety thermostat:** this is designed to shut down the boiler if the safety thermostat installed on the boiler fails to operate correctly. It must have an IMMOVABLE calibration of < 100°C.
- 15 **Minimum pressure switch:** this is designed to shut down the boiler if the minimum operating pressure drops (can be calibrated between 0.5 - 1.7 bar). It must be manually reset.
- 16 **Extra socket 1".**
- 18 **Safety pressure switch:** this is designed to shut down the boiler if the maximum operating pressure is reached (can be calibrated between 1 - 5 bar).

Control devices.

- 13 **(Pressure gauge - not supplied by Alpha) with (12) damper pipe and (11) pressure gauge valve:** it indicates the current pressure in the boiler, it must be graduated in 'bar', its full scale must match the maximum operating pressure and be equipped with a three-way valve with an attachment for the control pressure gauge.
- 14 **Thermometer:** this indicates the current temperature of the water contained in the boiler, it must be graduated in centigrade with a full scale of no more than 120°C.
- 17 **Spare socket:** approved for the inclusion of control devices.
- 19 **1 1/4" stub pipes:** for the inclusion of safety valves (Not supplied).
- 20 **Flow switch:** this is designed to shut down the boiler in case of low flow inside the primary circuit.
- 3 **Approved expansion vessel:** this absorbs the increase in volume of water in the system following an increase in temperature. **Not supplied by Alpha.**
- 8 **Y strainer.**
- 7 **Modulating pump (Not included in the kit).**
- 5 **Hydraulic separator (Not included in the kit).**
- 4 **Automatic air vent. Not supplied by Alpha.**
- 6 **Drain cock. Not supplied by Alpha.**

Recommended installation.



3.9 HYDRAULIC SEPARATOR

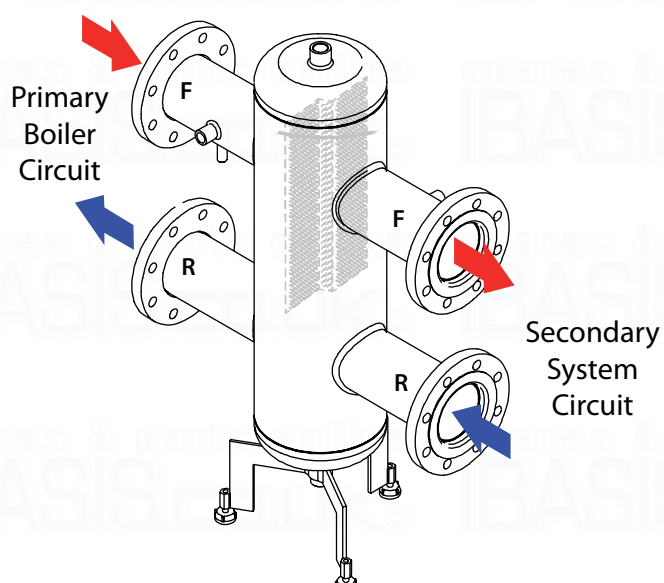
To ensure good operation it is necessary to use a hydraulic separator that guarantees:

- Separation and collection of impurities in the circuits.
- Optimal removal of air from the system.
- Hydraulic decoupling between the two hydraulic circulation rings.
- Balancing the circuits.

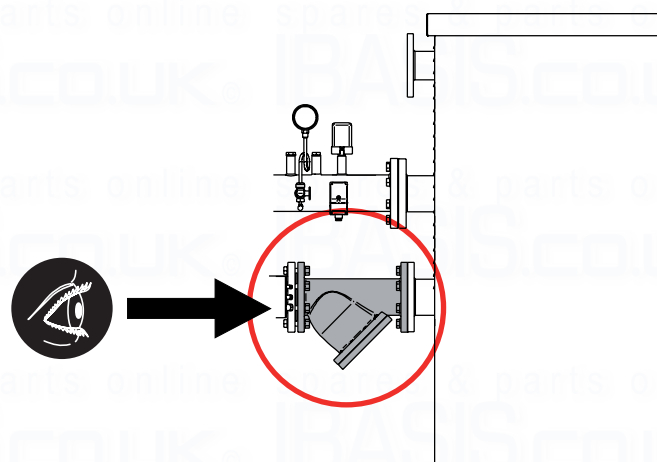


It is advisable to install a Y type strainer in the boiler return pipe.

This filter will protect the boiler from sediments coming from the heating system.



F = 100 mm (4") nominal diameter
R = 100 mm (4") nominal diameter



Hydraulic system filter
100 mm (4") nominal diameter

INSTRUCTIONS FOR THE INSTALLER

3.11 DETERMINING THE PRIMARY CIRCUIT PUMP OR BOILER PUMP

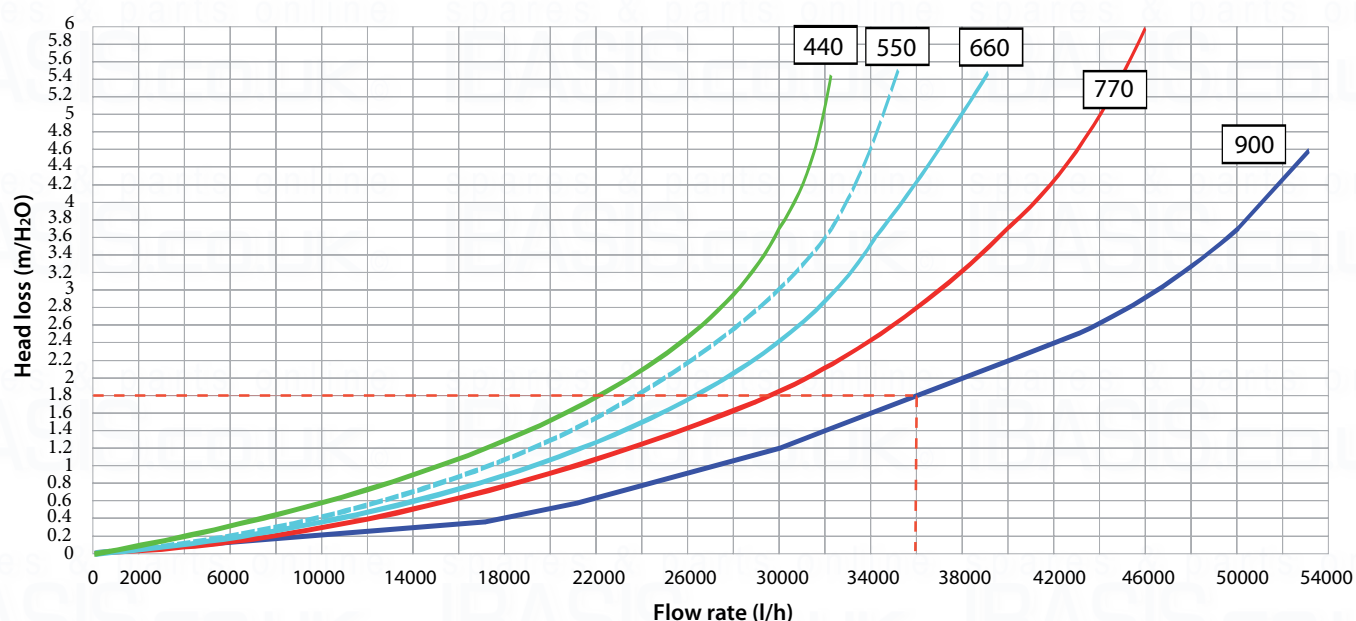
Alpha provides a series of primary rings complete with an accurately sized pump, if alternative solutions are being used, the boiler pump must have a head that is capable of ensuring the flow rates represented in the 'Water side head losses' graph.

The table below roughly indicates the flow rates of the pump based on the ΔT of the primary circuit if the installation is equipped with a hydraulic separator.



The pumps must be sized by the installer or designer based on the data for the boiler and system. The resistance curve on the water side of the boiler is represented in the table provided below. The pump is not an integral part of the boiler. It is advisable to choose a pump with a flow rate and head of approximately 2/3 of its typical curve.

Power in kW	440	550	660	770	900
Maximum flow rate in l/h ($\Delta t = 15$ K)	24326	30404	36487	42570	48647
Nominal requested flow rate in l/h ($\Delta t = 20$ K)	18243	22804	27365	31926	36487



EXAMPLE:

For a ΔT 20 K, of an ARES Tec 900 the maximum required flow rate is 36 289 l/h. From the head loss graph it is possible to deduce that the pump must ensure a head of at least 1.8 m/H₂O.

NOTE: It is advisable to always use the hydraulic separator between the boiler circuit and the system. It becomes **ESSENTIAL** if the system requires greater flow rates than the maximum allowed by the boiler, i.e. ΔT below 15 K.

3.12 VALVES

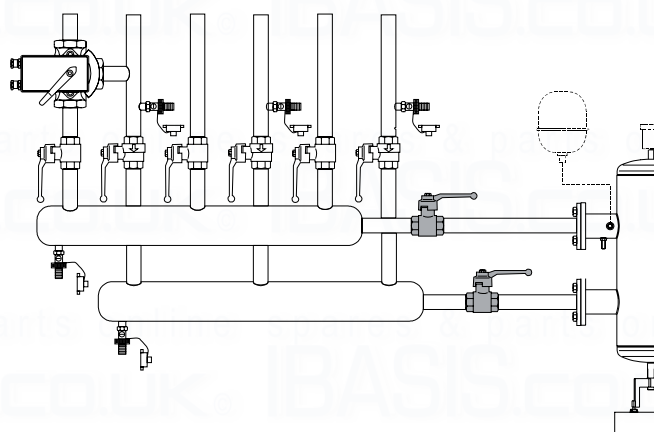
It is advisable to install isolation valves on the flow and return pipes of the system to allow the boiler to be disconnect or drained without draining the entire system.



ATTENTION!

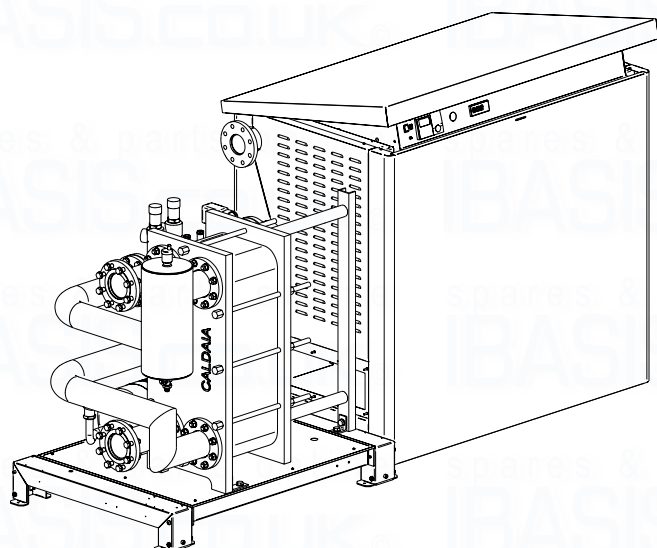
NEVER CUT OFF SAFETY DEVICES FROM THE BOILER, such as the safety valve and expansion vessel.

Secondary circuits

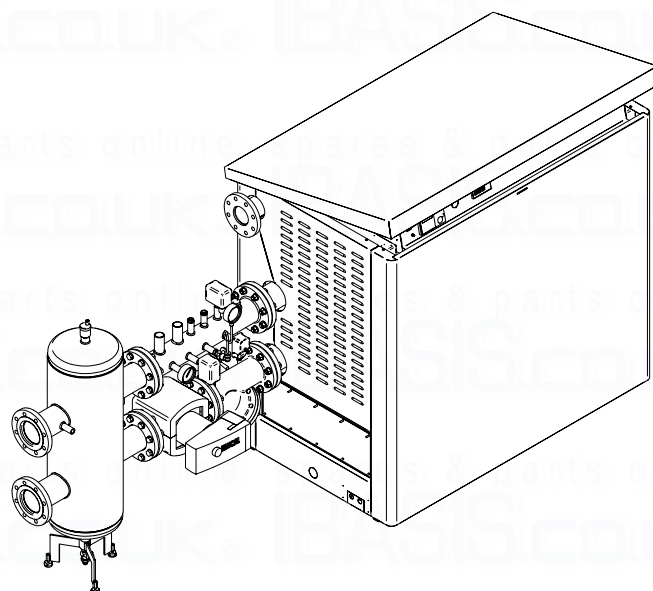


3.13 COMPLETE OPTIONAL KITS

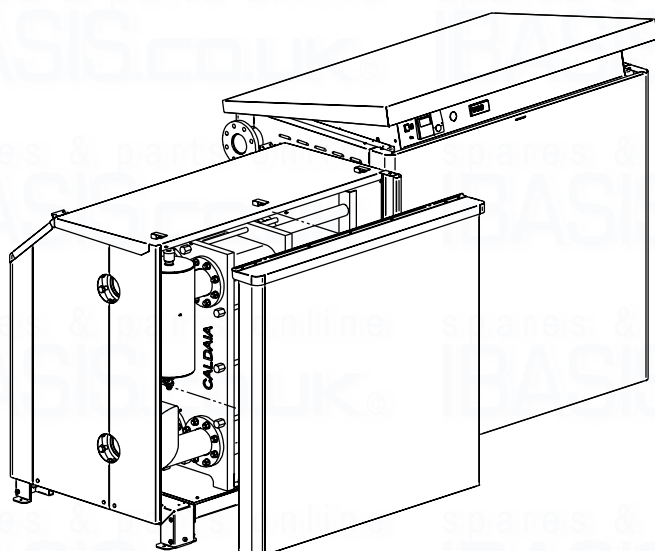
Safety kits including pump and plate exchanger.



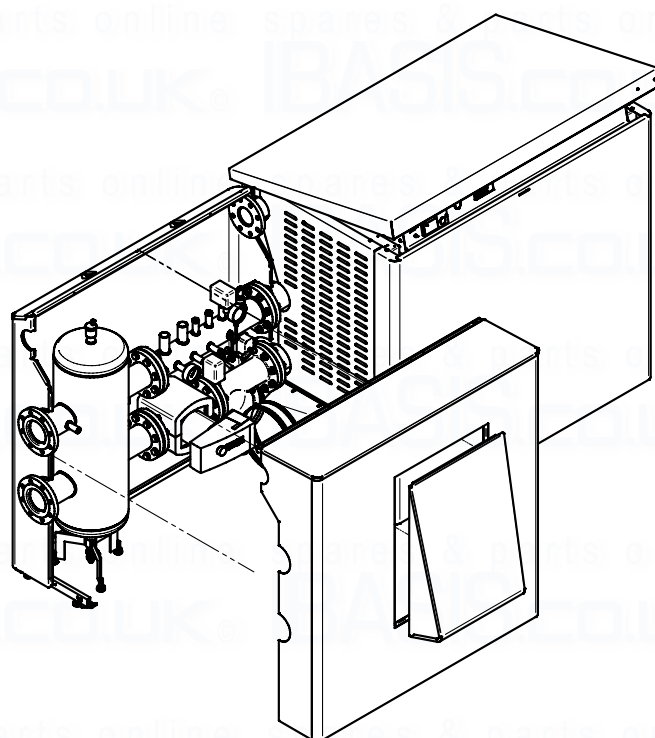
Safety kits including pump and hydraulic separator.



External covering kit for plate exchanger kit.



External covering kit for hydraulic separator.



INSTRUCTIONS FOR THE INSTALLER

3.14 CONDENSATE DRAIN

The condensate drain pipe must be:

- Built to avoid gaseous combustion products from leaking out into the environment or the drain, by the use of a trap.
- Sized and built to allow liquid discharge to runoff correctly, preventing any leaks (gradient of 3%).
- Installed to avoid the liquid contained in it from freezing, under the envisioned operating conditions.
- Can be easily inspected from the relative trap.
- Mixed with household wastewater, for example, (washing machine and dish washer drains etc.) with a mainly alkaline pH so as to form a buffer solution to send it into the sewers.

The condensate must not be left to stagnate in the combustion product drainage system (for this very reason the drain pipe must be set up at an inclination of at least 30 mm/m, running towards the drain) except for any liquid head, in the drain trap of the combustion product drain system (which must be filled after installation and at a minimum height with all of the fans operating at maximum speed of at least 25 mm) - see diagram below.

The condensate must not be allowed to drain into rain water gutters, given the risk of ice and degradation of materials normally used to build the rain pipes themselves.

The drain fitting must be visible.

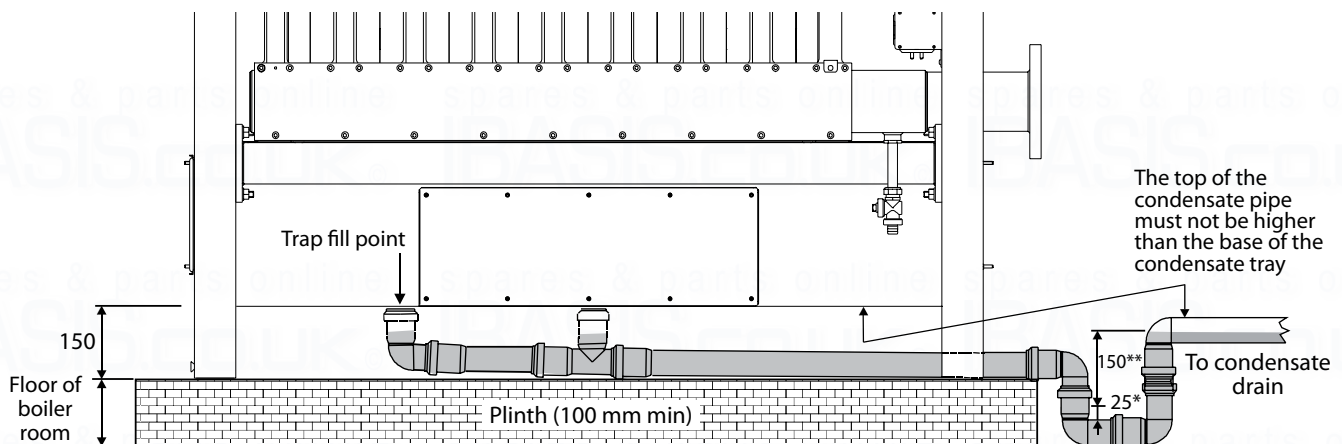
Given the degree of acidity of the condensate (pH between 3 and 5) suitable plastic materials must be used.

The recommended material for use must be PE (polyethylene) or PP (polypropylene).

The condensate drain outlet connection is below the flue box manifold, accessed by removing the pre-cut section in the cover panel.



Before starting the boiler for the first time, fill the trap through the fill point shown in the diagram below.



* Minimum safety trap enforced by regulation.

** Minimum head with boiler operating at maximum output.

If you do not want to or are able to create a plinth, it is possible to install the boiler on the floor and set up the trap at a depth of 100 mm.

3.15 CONNECTING THE FLUE

Condensing boilers produce flue products at very low temperatures, generally below 84°C (approx). It is therefore necessary that the flue is impervious to the condensate produced and built with suitable corrosion-resistant materials.

The connecting joints must be sealed and equipped with suitable gaskets to stop condensation from leaking out and air from getting in.

In terms of flue section and height, it is necessary to refer to national and local regulations in force.

Refer to regulations in force for sizing.

In order to avoid the formation of ice during operation, the temperature of the inside wall at every point in the flue system, for its entire length, must not drop below 0°C.

The flue system must comply with local and national regulations.

The flue system must be built using materials that are resistant to the combustion products, typically 316 certified stainless steel or plastic materials, such as PVDF (polyvinylidene difluoride) or PPS (simple translucent polypropylene) or aluminium or other materials with the same features, in observance of regulation in force.



The supplier is excluded from any contractual and extra-contractual liability for damage caused by errors in installation and use due to failure to observe the instructions provided by the manufacturer.

Model	Modules	Flue spigot diameter
440	4	250
550	5	250
660	6	300
770	7	300
900	8	300

3.16 FLUE MANIFOLD CONNECTION

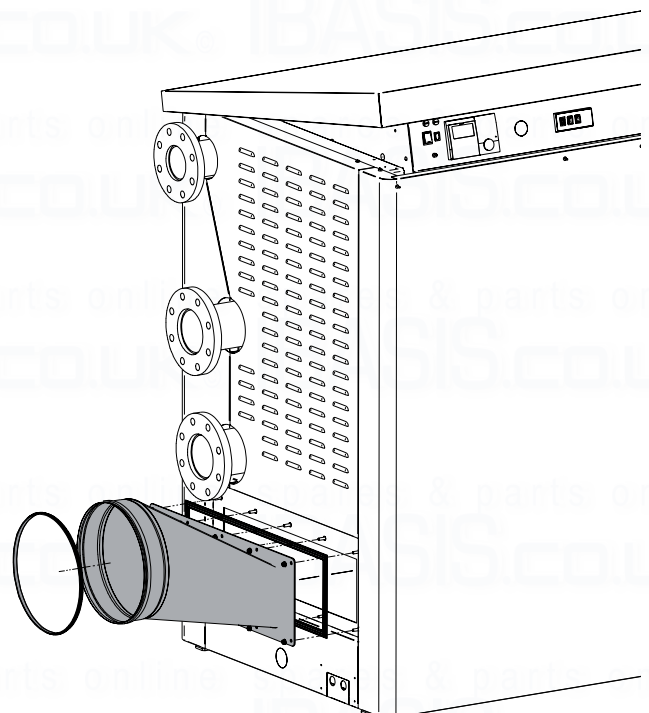
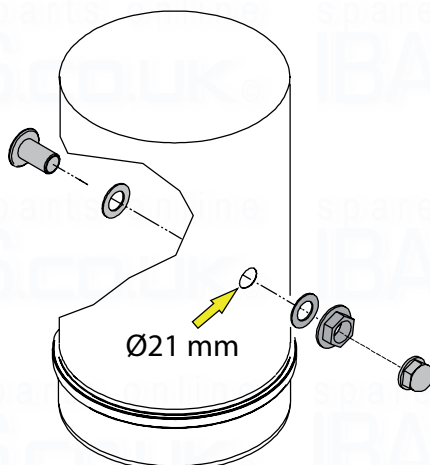


To secure the flue exhaust manifold use the 6 nuts and washers contained in the bag.



A flue test point must be positioned on the first straight section, within 1 metre of the boiler.

To install the test point (supplied), drill a 21 mm hole in the flue pipe, and fit the test point following the sequence shown below.



INSTRUCTIONS FOR THE INSTALLER

FLUE SIZING ACCORDING TO DIN 4705

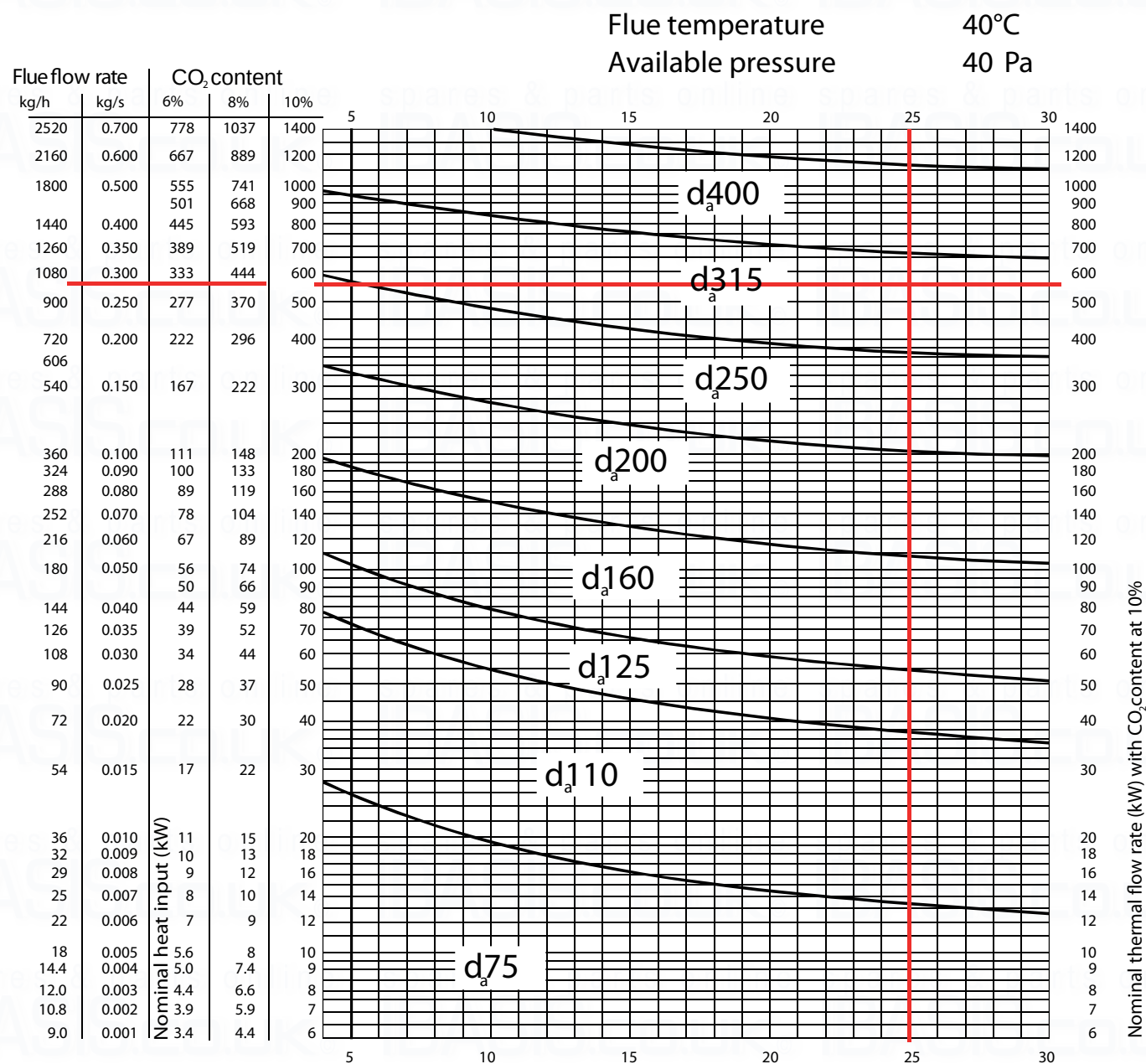


Table of max flue flow rate	
Model	Max flue flow rate (kg/h)
440	693
550	866
660	1040
770	1213
900	1386

Example:

ARES Tec 600

Maximum flue flow rate = 1040 Kg/h

Height of flue = 25 m

Diameter = 315 mm



NOTE:

The diagram above provides rough values only. The flue must be designed by a qualified professional in compliance with legislation and technical standard in force.

3.17 ELECTRICAL CONNECTIONS

General recommendations

Electrical safety of the appliance is only ensured when it is correctly connected to an efficient earthing system as specified by current safety standards. Gas, water and heating system pipes are not suitable in any way whatsoever as earthing connections.

It is necessary to check this fundamental safety requirement. In case of doubt, have an accurate inspection of the electrical system carried out by professionally qualified personnel, as the manufacturer is not responsible for any damage caused by the lack of a earthing connection in the system.

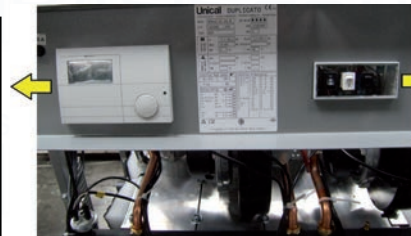
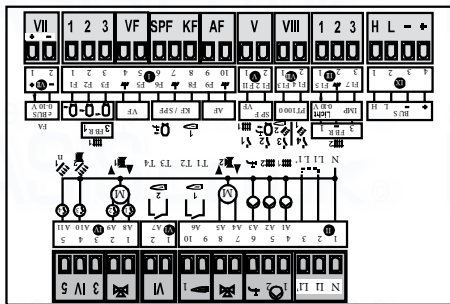
Have professionally qualified personnel make sure the electrical system is suitable for the maximum power used by the appliance, as stated on the data plate, making sure in particular that the section of the system wiring is suitable for the power used by the appliance.

For the main power supply to the appliance, never use adapters, multiple sockets and/or extension leads.

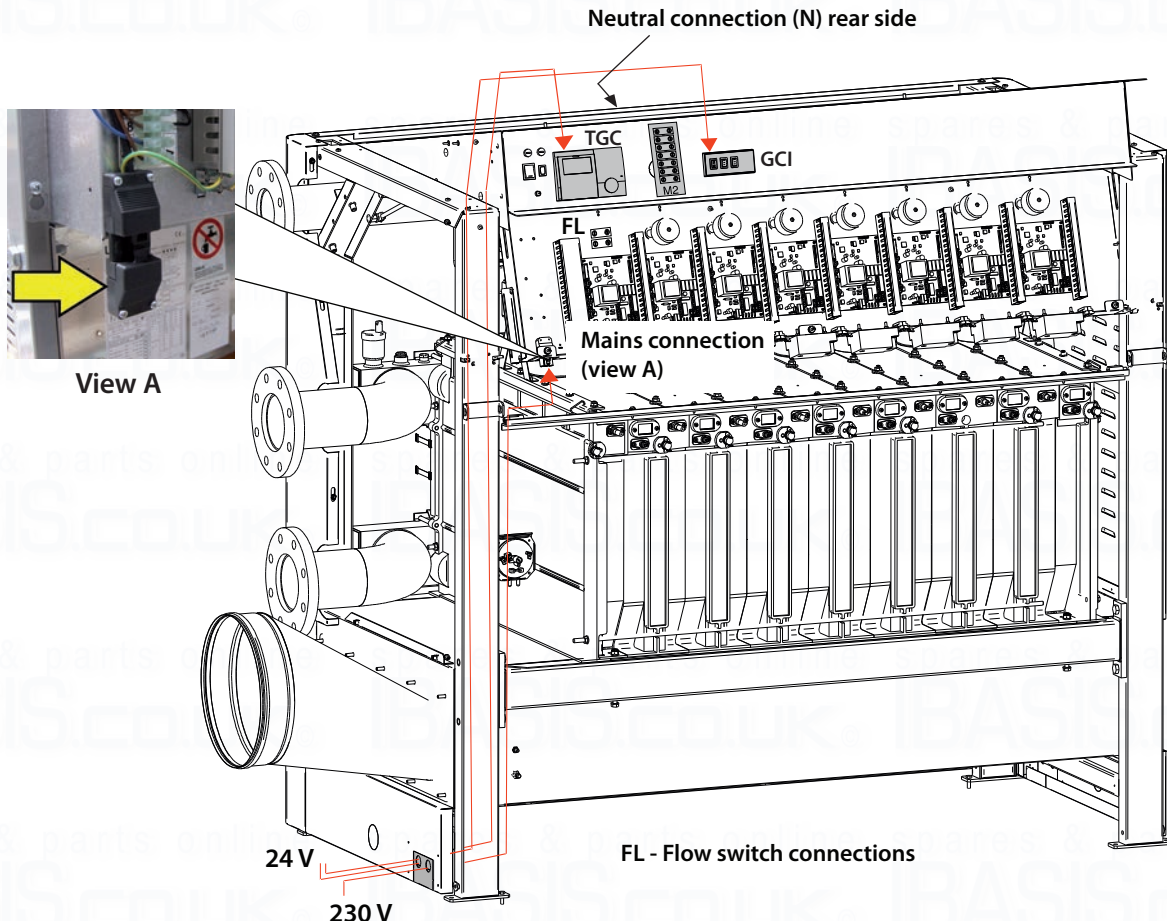
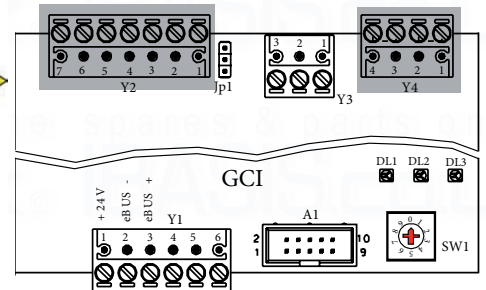
Components involving the use of electrical power require some fundamental rules to be observed such as:

- Do not touch the appliance with wet and/or moist parts of the body and/or barefoot.
- Do not pull the electric cables.
- The appliance may not be used by children or unskilled individuals.

TGC Terminal board (rear view)



GCI Terminal board (rear view)



INSTRUCTIONS FOR THE INSTALLER

230/240 V ELECTRICAL SUPPLY CONNECTION

The electrical connections are illustrated in the wiring diagram in Section 3.19.

The installation of the boiler requires an electrical connection to a 230/240 V ~ 50 Hz supply. This connection must be installed in accordance with the current IEE wiring regulations in force (BS 7671).



ATTENTION!

Also bear in mind that, upstream of the supply, it will be necessary to set up a service relay (NOT SUPPLIED) that, when the electrical safety devices are triggered, cuts off the electrical supply to the gas cut-off valve installed on the gas supply line, but not to the electrical supply the boiler, so as to ensure pump operation and therefore boiler cooling.



DANGER!

Electrical installation must only be carried out by an authorised technician.

Before setting up the connections or any operation on the electrical parts, always disconnect the electrical supply and make sure it cannot be accidentally re-connected.

Remember that it is necessary to install a double pole switch on the electrical supply to the boiler with a maximum distance between the contacts of 3 mm, easy to access, so that maintenance operations can be carried out quickly and safely.

The electrical supply to the boiler (230/240 V ~ 50 Hz single phase) must be connected to the mains connector shown in view A in the diagram in Section 3.17, via an H05VV-F (LIVE - NEUTRAL - EARTH) three core cable with a section between 0.75 mm² and 1.5 mm².

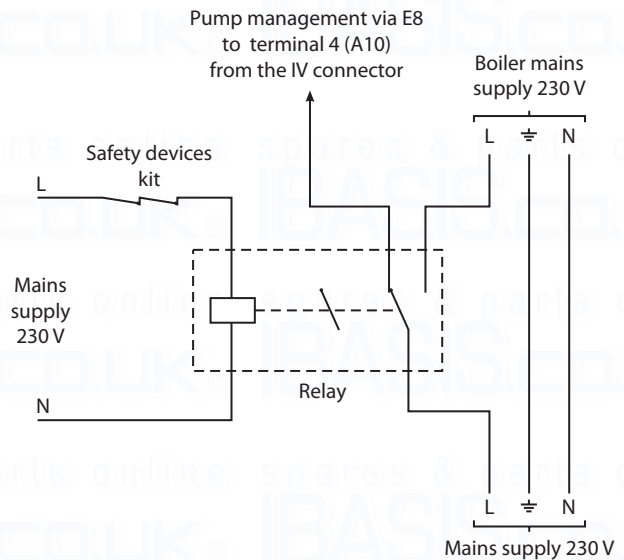


ATTENTION:

Cables carrying a voltage of 230/240 V must be routed separately from cables carrying a voltage of 24 V.

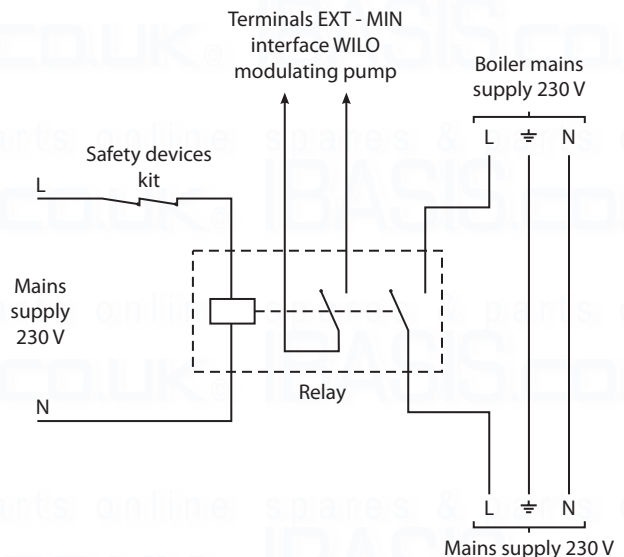
3.18 WIRING DIAGRAMS FOR ADDITIONAL SAFETY DEVICES

ON - OFF PUMP



If the safety devices operate, the pump ON/OFF function continues to work in order to decrease the high temperature.

MODULATING PUMP



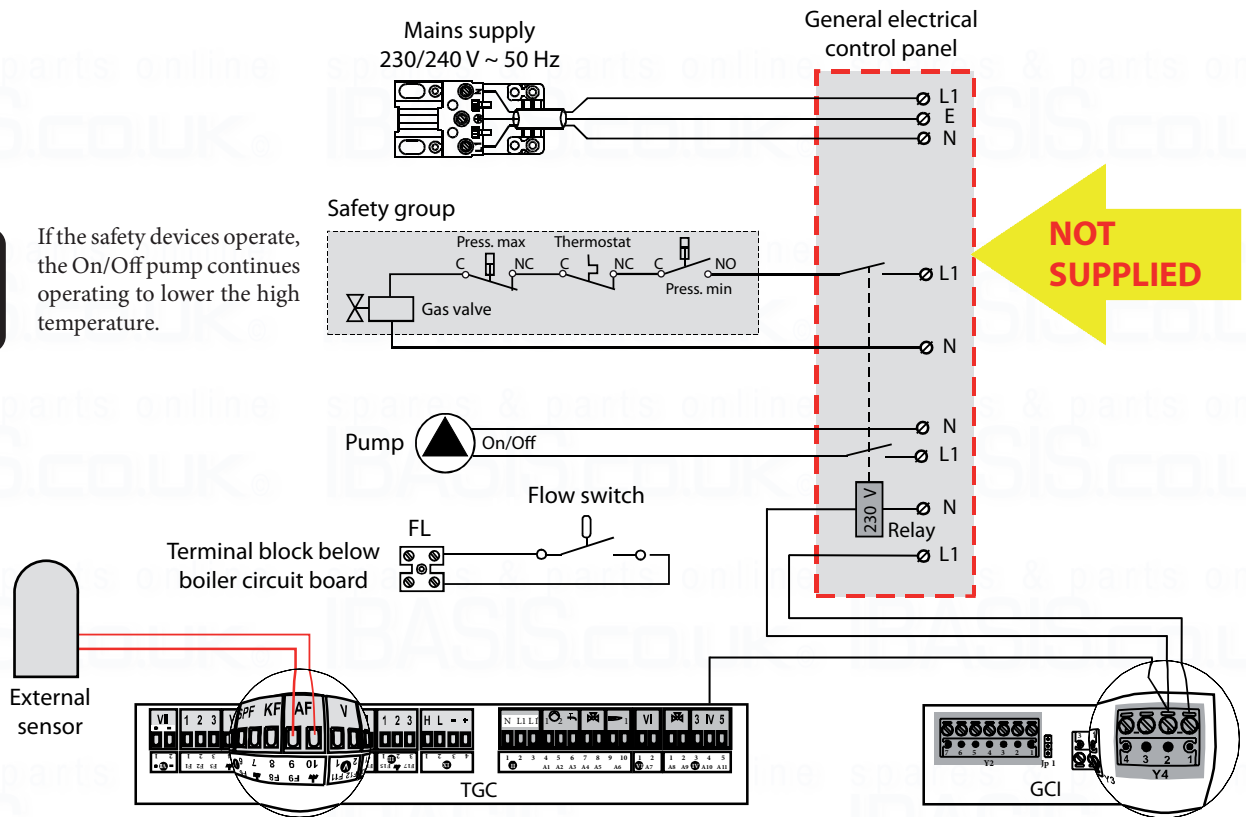
If the safety devices operate, the modulating pump continues to operate at the minimum speed in order to decrease the high temperature.

3.19 EXTERNAL CONNECTION DIAGRAM

Power supply, gas shut off valve, safety group, On/Off pump, external sensor and flow switch.



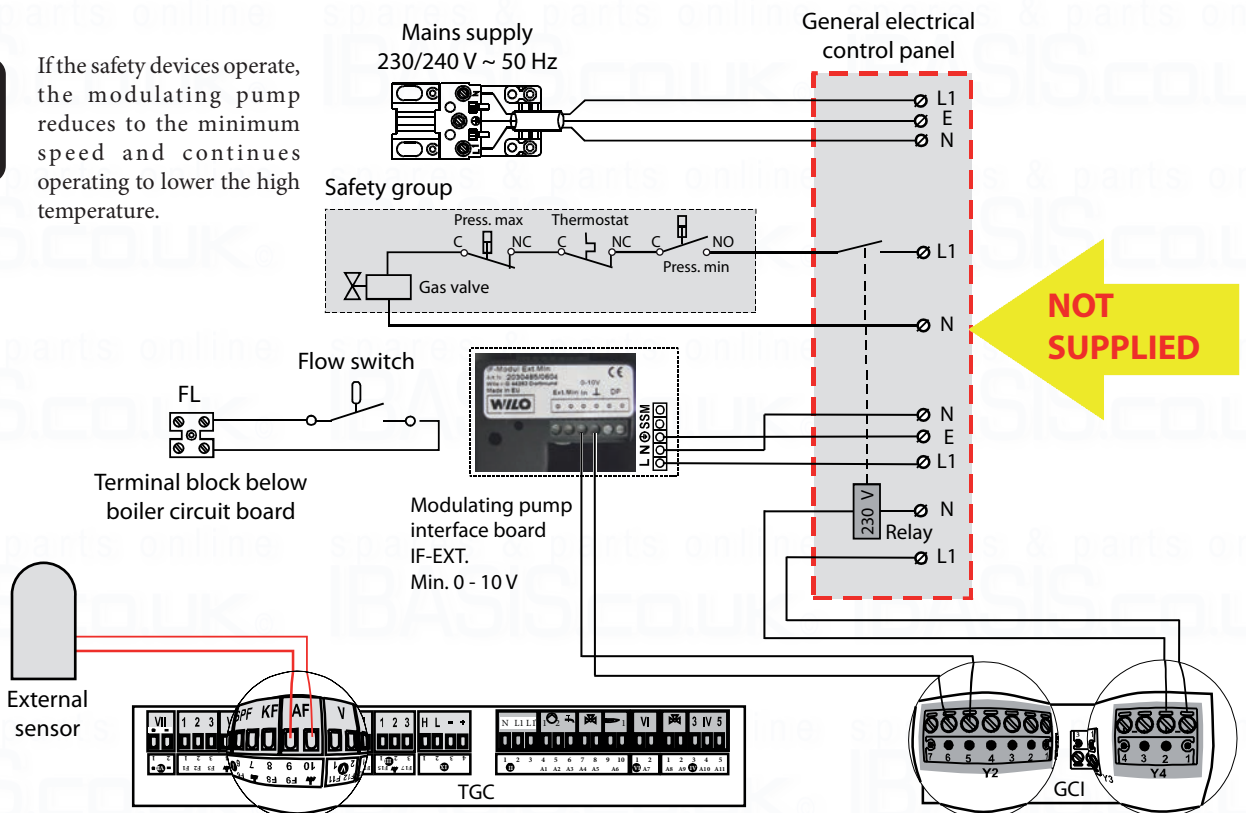
If the safety devices operate, the On/Off pump continues operating to lower the high temperature.



Power supply, gas shut off valve, safety group, modulating pump, external sensor, and flow switch.

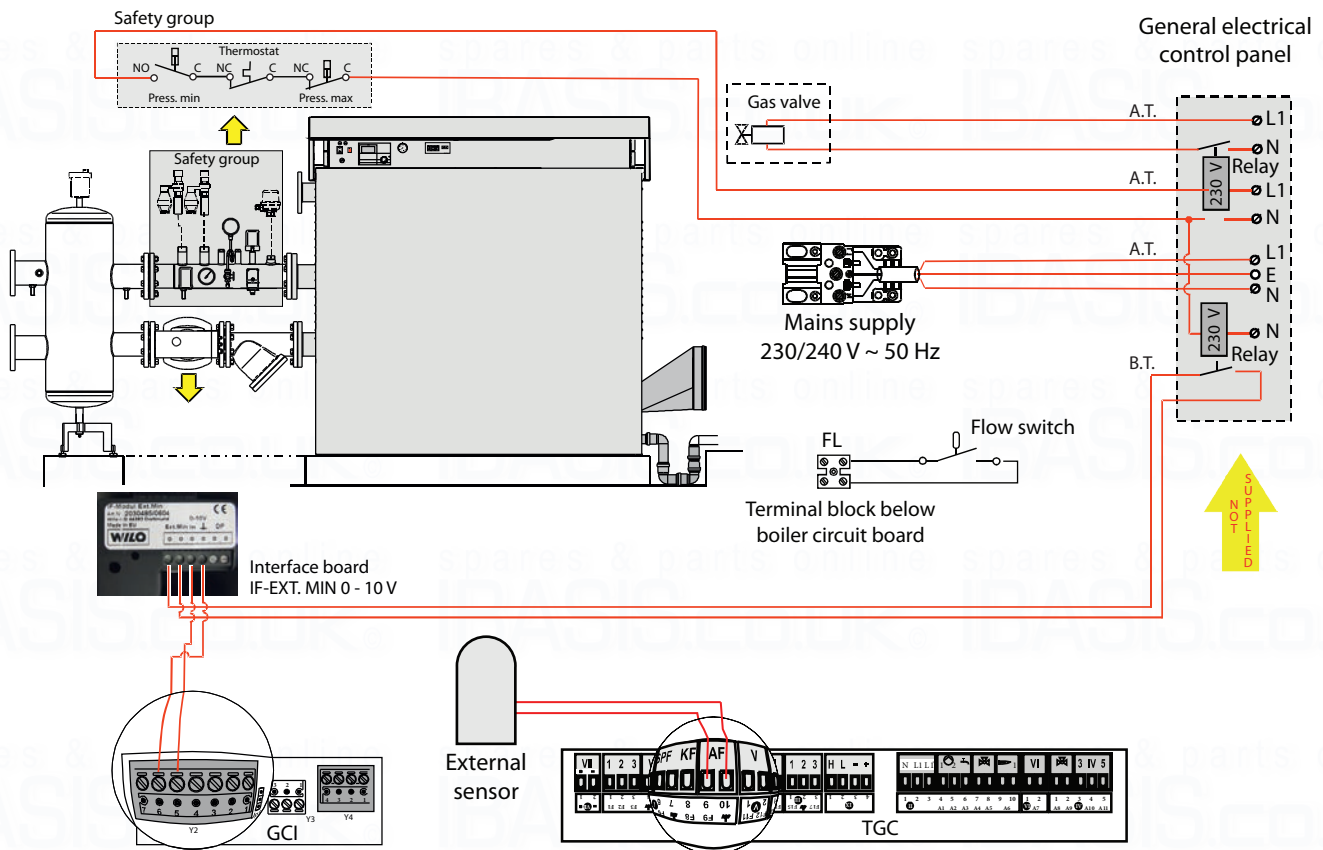


If the safety devices operate, the modulating pump reduces to the minimum speed and continues operating to lower the high temperature.

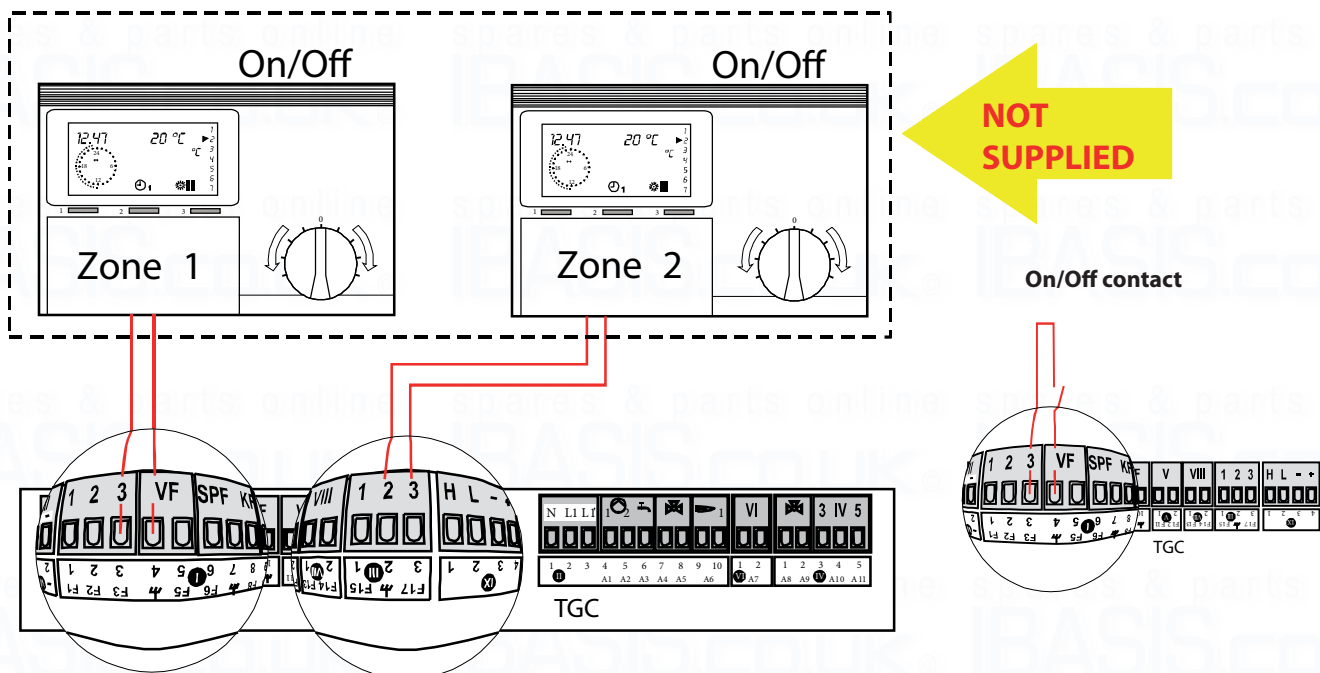


INSTRUCTIONS FOR THE INSTALLER

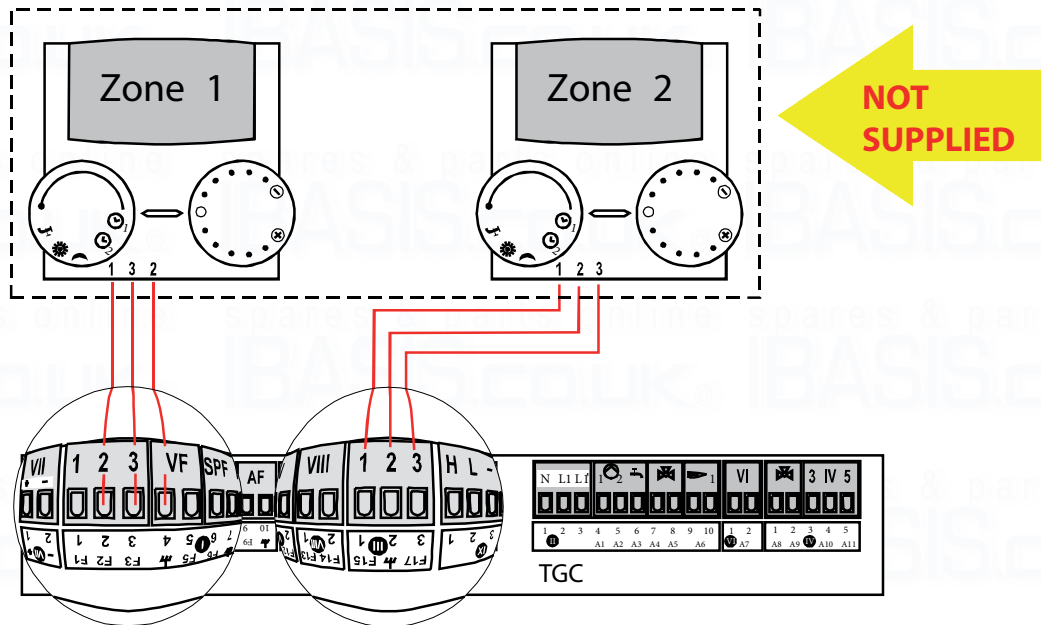
Safety group connection (supplied with modulating pump).



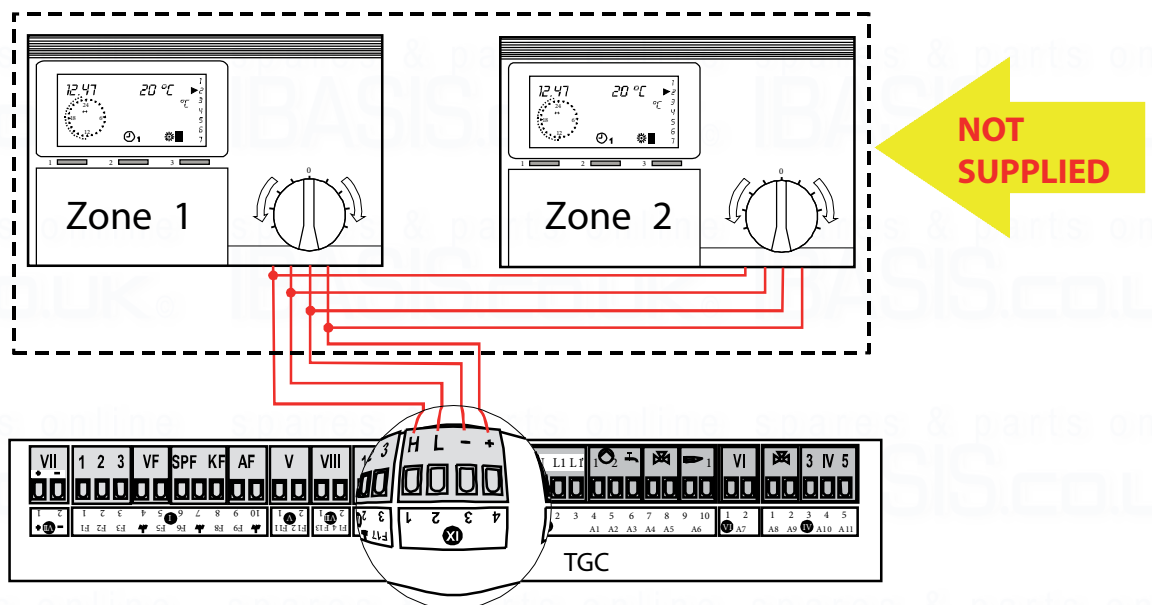
On/Off thermostat connection.



Modulating room thermostats connection.

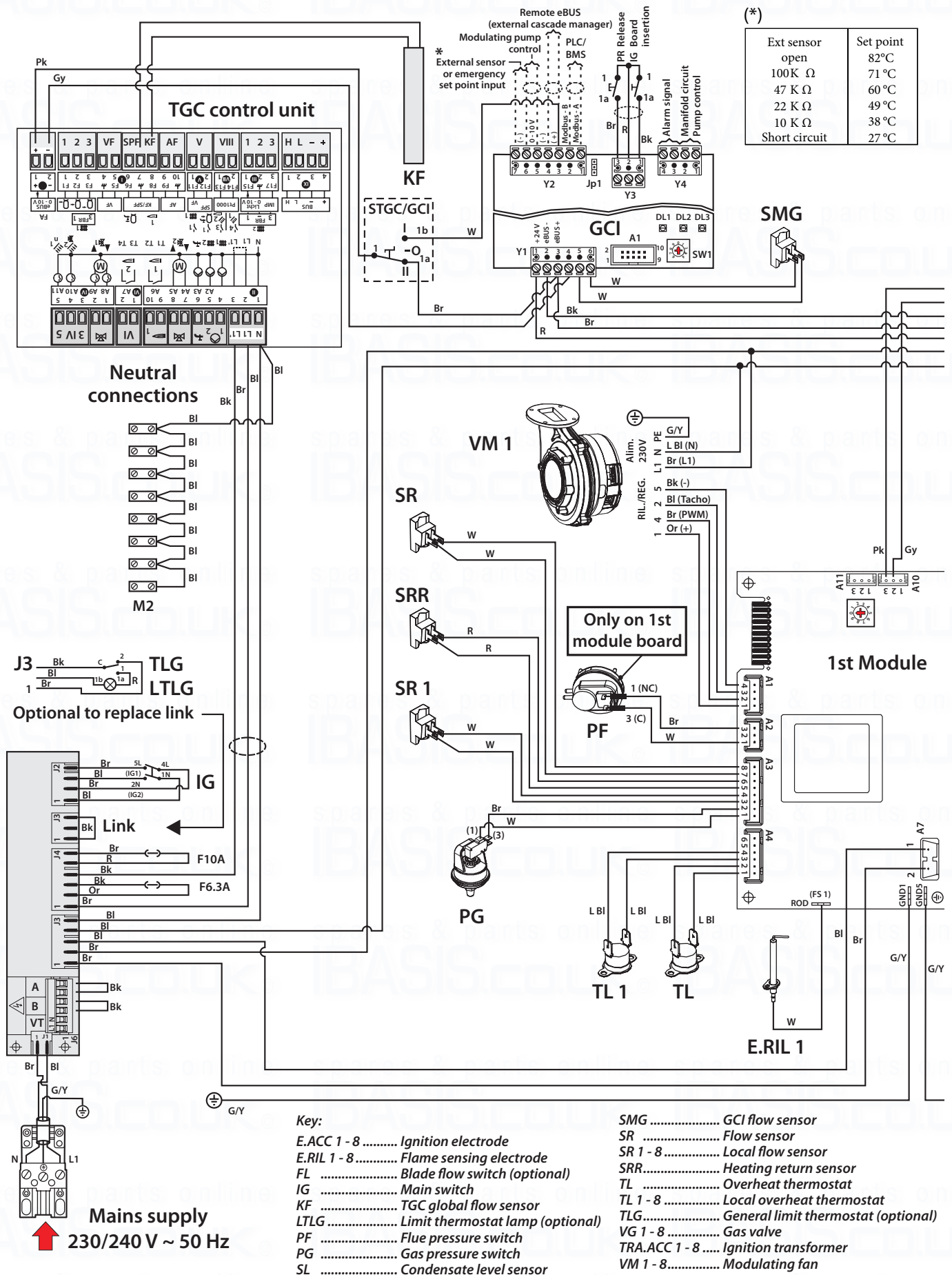


Modulating zone manager connection.



INSTRUCTIONS FOR THE INSTALLER

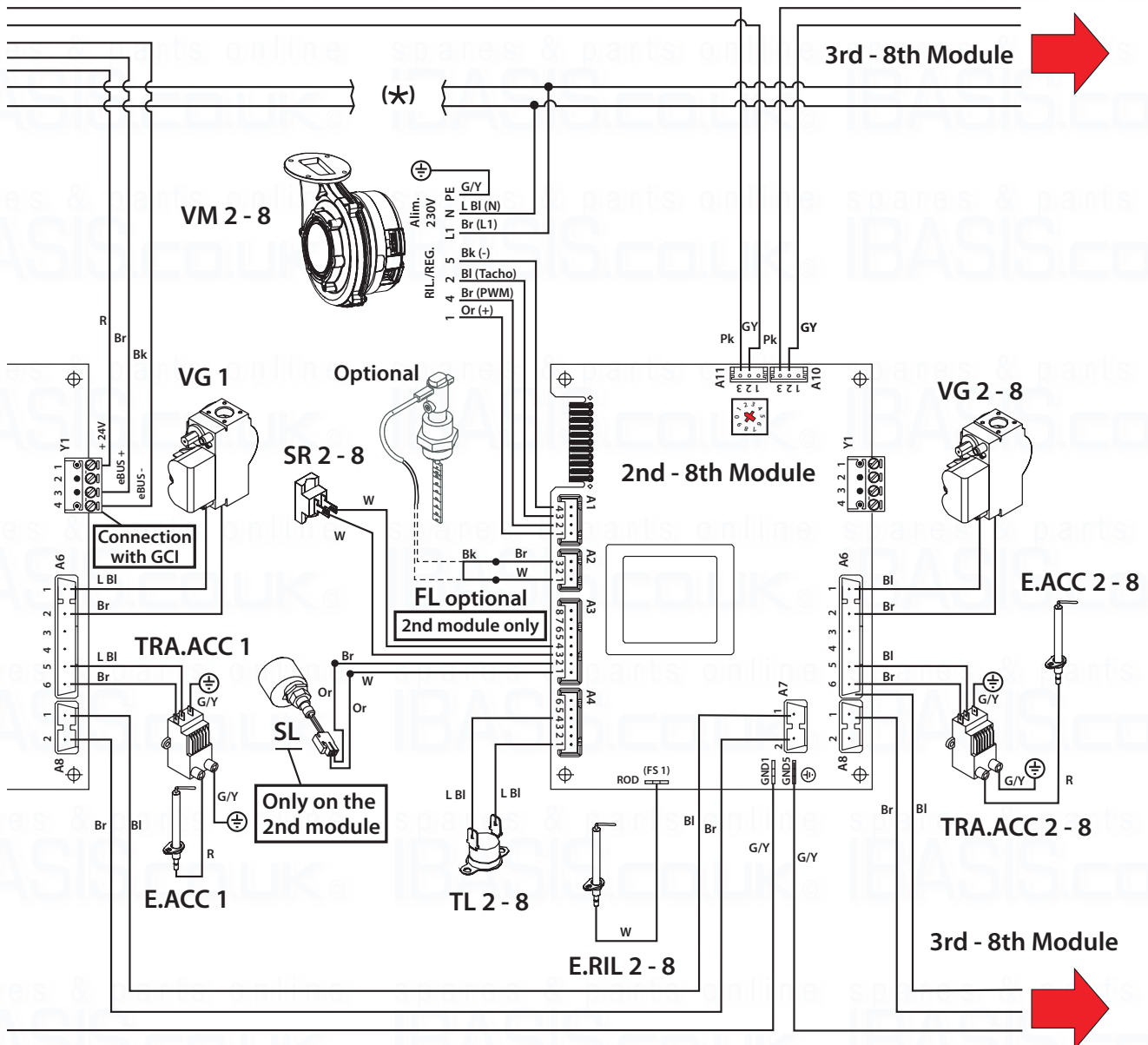
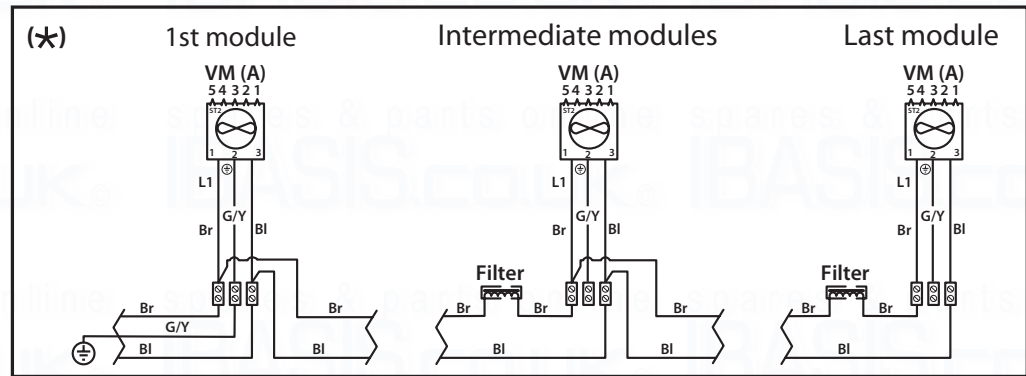
3.20 WIRING DIAGRAM



Colour Code

Br..... Brown
 Bl..... Blue
 Bk..... Black
 Gy Grey
 G/Y..... Green/Yellow
 L Bl..... Light Blue
 Or..... Orange
 Pk..... Pink
 R..... Red
 W..... White

Fan speed filter detail

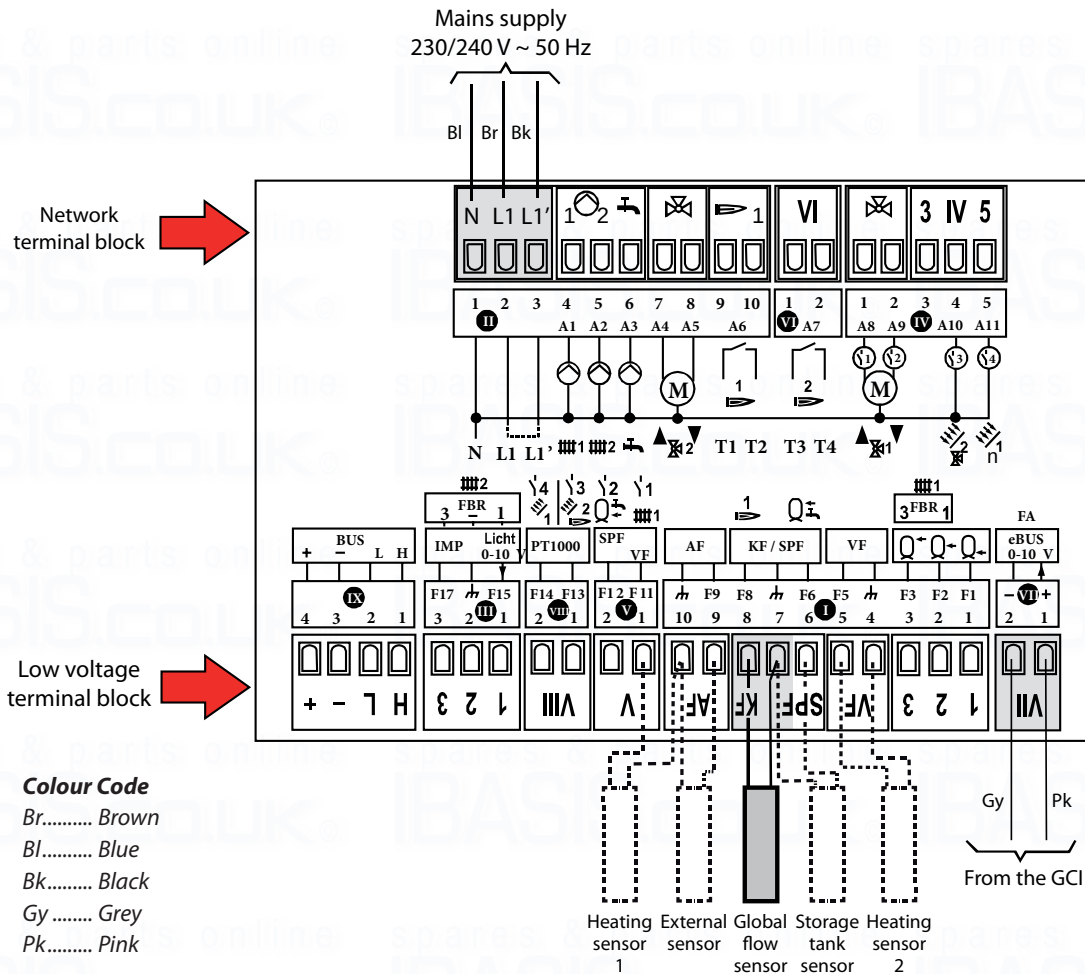


PCB module address selector setting on each module	Module 1 (setting 0)	Module 2 (setting 1)	Module 3 (setting 2)	Module 4 (setting 3)	Module 5 (setting 4)	Module 6 (setting 5)	Module 7 (setting 6)	Module 8 (setting 7)

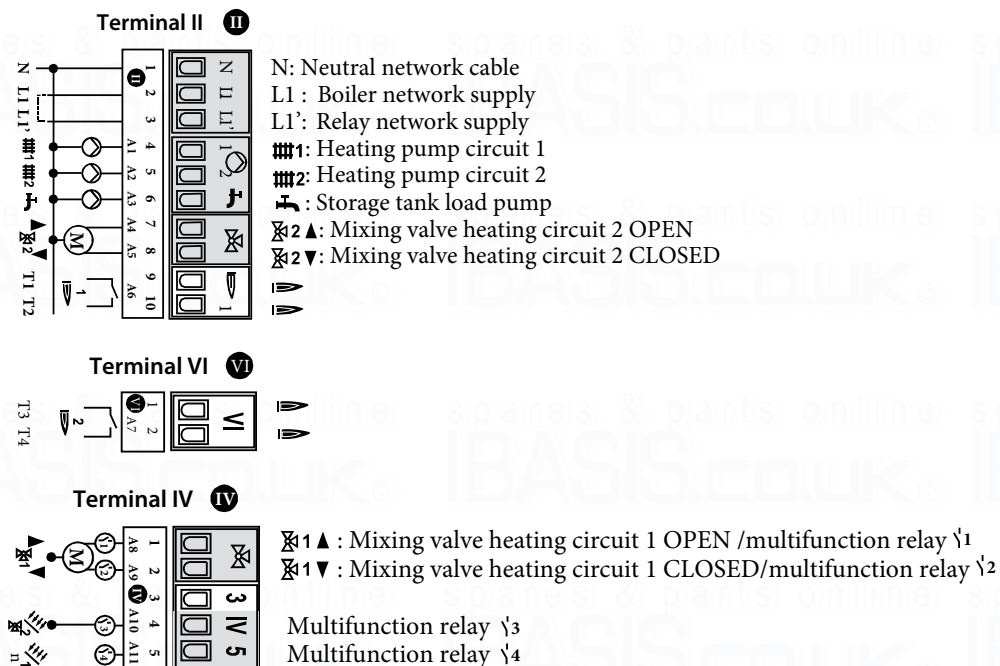
INSTRUCTIONS FOR THE INSTALLER

3.21 CONNECTIONS AND MANAGEMENT DIAGRAM

On the rear of the control panel, there are two terminal blocks: one for the network connections, the other for the low voltage connections. The main controls required for boiler management and some parts of the heating control unit must be connected to the terminal blocks.

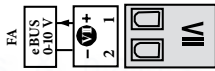


Identification of terminal block for network connections.



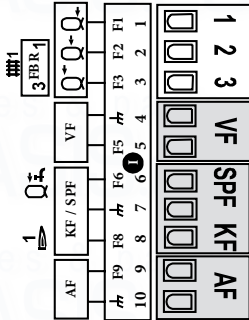
Identification of terminal block for low voltage connections.

Terminal VII To be connected to the GCI



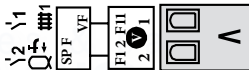
Pin 1: eBUS (F A) or 0 - 10 V output
Pin 2: (earth BUS / 0 - 10 V)

Terminal I



Pin 1: Buffer under sensor
Pin 2: Sensor centre buffer / Remote sensor heating circuit 1 (room sensor)
Pin 3: Buffer over sensor / Remote sensor heating circuit 1 (nom. value)
Pin 4: Flow sensor ground heating circuit 2 / remote ground circuit 1
Pin 5: Flow sensor heating circuit 2
Pin 6: Storage tank sensor
Pin 7: Global flow sensor ground
Pin 8: Global flow sensor
Pin 9: External sensor
Pin 10: External sensor ground / flow sensor ground heating circuit 1

Terminal V



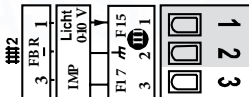
Pin 1: Flow sensor heating circuit 1 / multifunction sensor 1
Pin 2: Storage tank sensor (lower) / multifunction sensor 2

Terminal VIII PT 1000 sensor



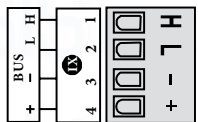
Pin 1: CM2 sensor / solar sensor 2 / multifunction relay sensor 3
Pin 2: Solar sensor 1 / multifunction relay sensor 4

Terminal III



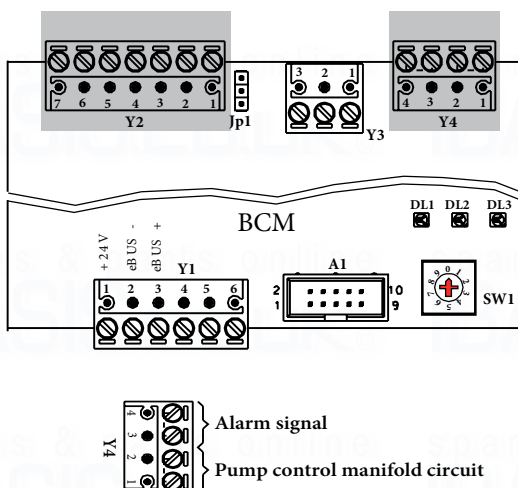
Pin 1: 0 - 10 V input (to be enabled)
Pin 2: Earth

Terminal IX To be connected to remote control devices



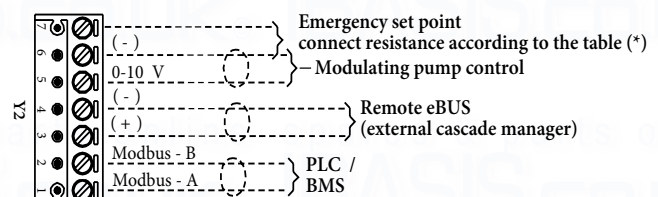
Pin 1 = H (data)
Pin 2 = L (data)
Pin 3 = - (Earth)
Pin 4 = + (12 V power supply)

GCI terminal board description.



(*)

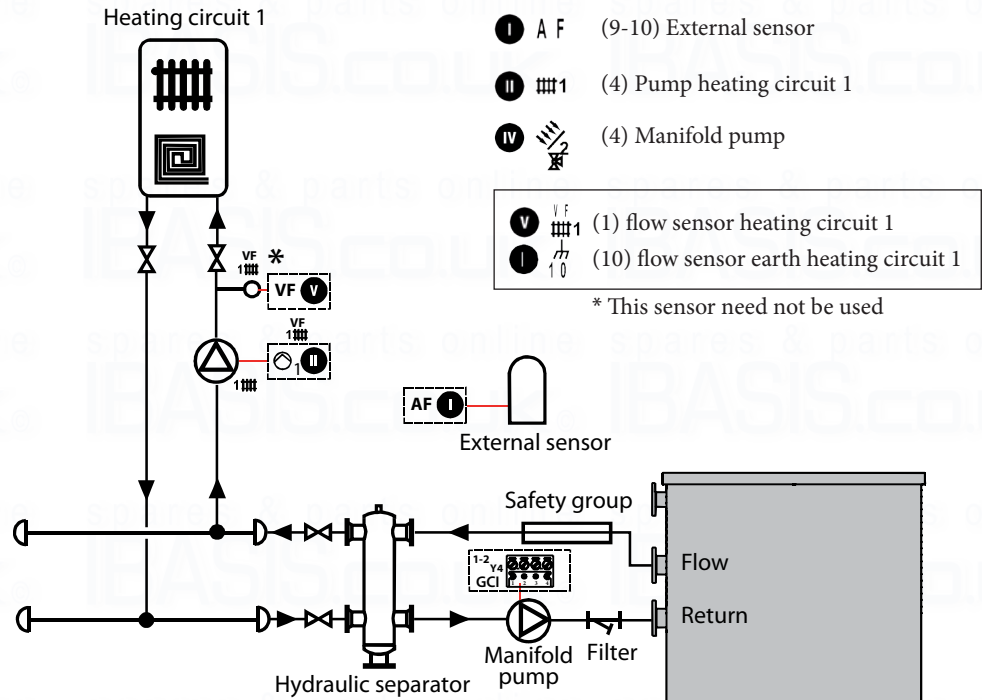
Ext sensor	Set point
open	82°C
100K Ω	71°C
47 K Ω	60°C
22 K Ω	49°C
10 K Ω	38°C
Short circuit	27°C



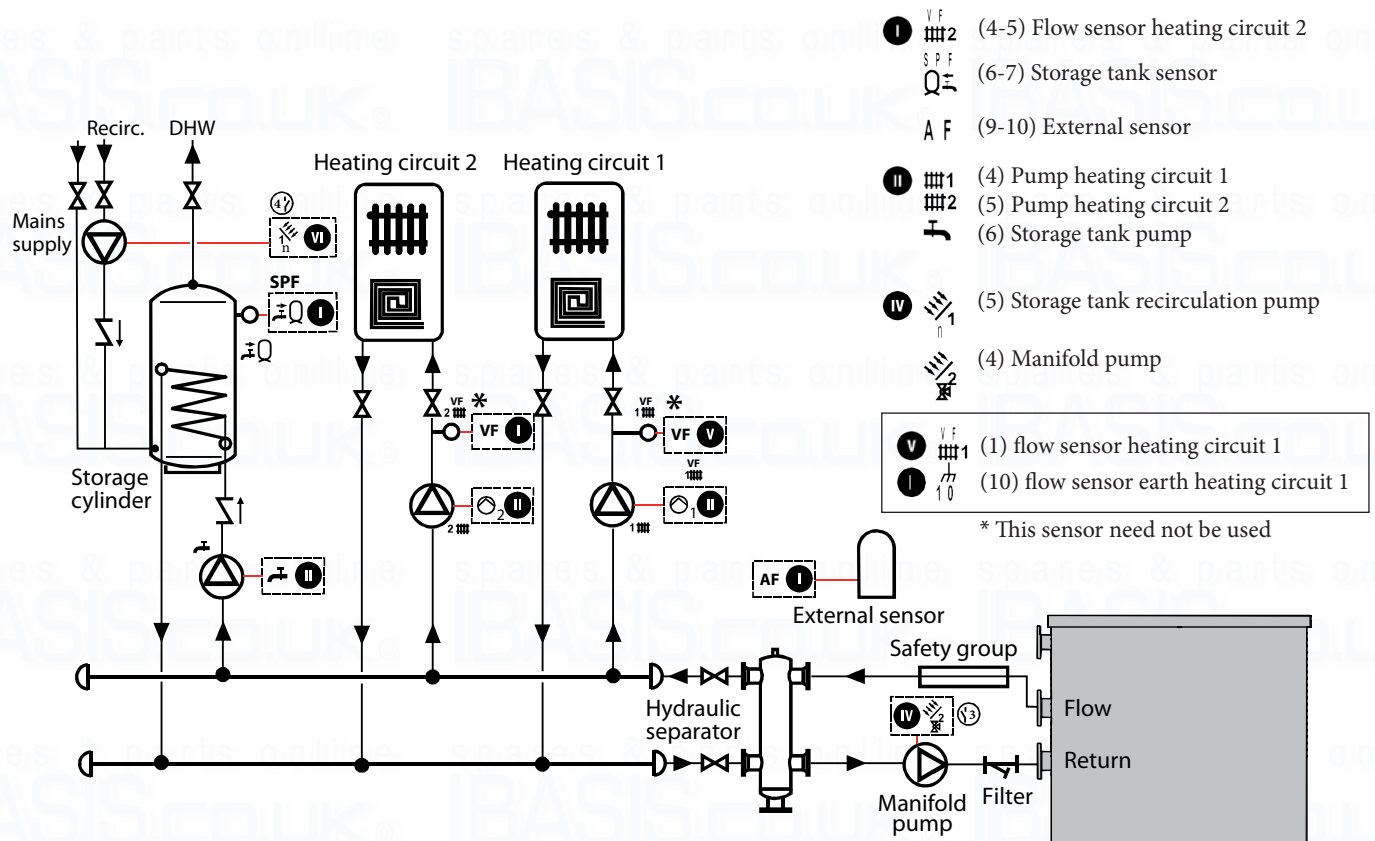
3.22 EXAMPLES OF INSTALLATION

(Functional diagram and description of connections)

Boiler connected to a direct zone.



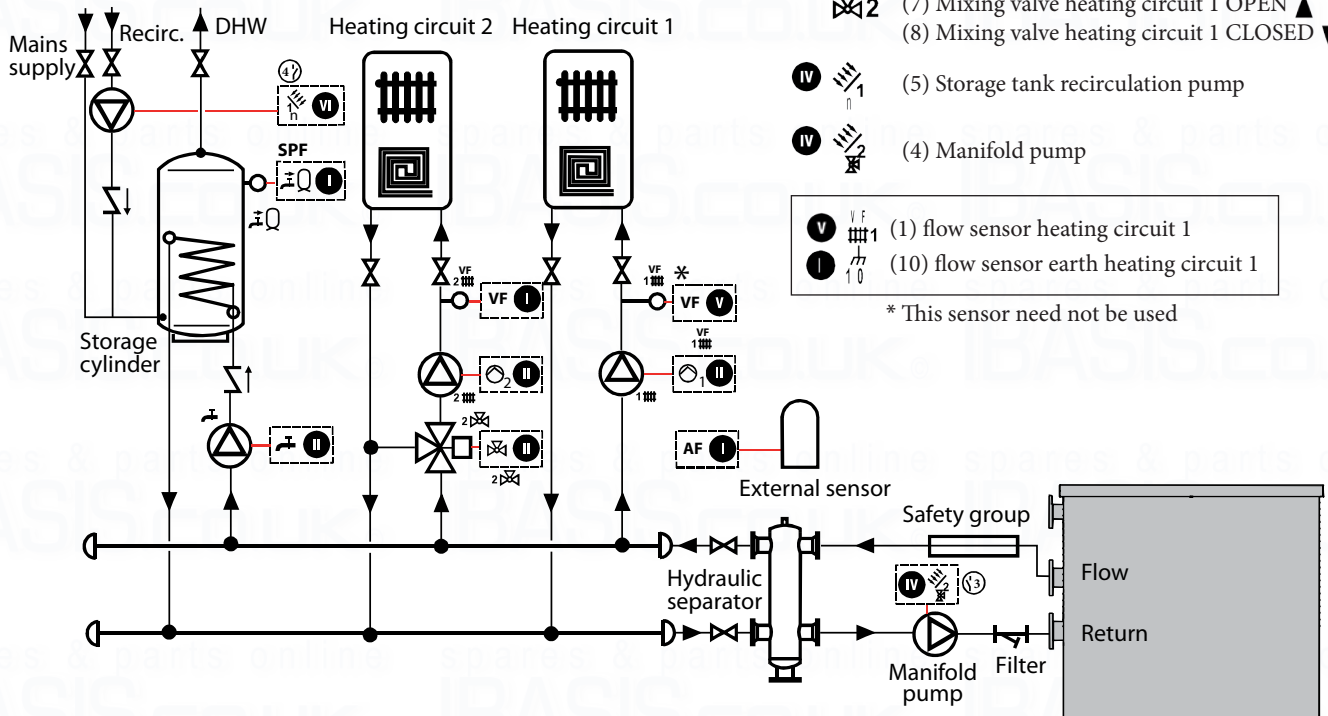
Boiler connected to two direct zones + supply of domestic hot water.



Boiler connected to one mixed zone and one direct zone + supply of domestic hot water.

- I** $\frac{VF}{10}$ (4-5) Flow sensor heating circuit 2
- $\frac{SPF}{Q}$ (6-7) Storage tank sensor
- A F** (9-10) External sensor

- II** $\frac{VF}{10}$ (4) Pump heating circuit 1
- $\frac{VF}{10}$ (5) Pump heating circuit 2
- $\frac{VF}{10}$ (6) Storage tank pump
- $\frac{VF}{10}$ (7) Mixing valve heating circuit 1 OPEN ▲
- $\frac{VF}{10}$ (8) Mixing valve heating circuit 1 CLOSED ▼
- IV** $\frac{VF}{10}$ (5) Storage tank recirculation pump
- IV** $\frac{VF}{10}$ (4) Manifold pump

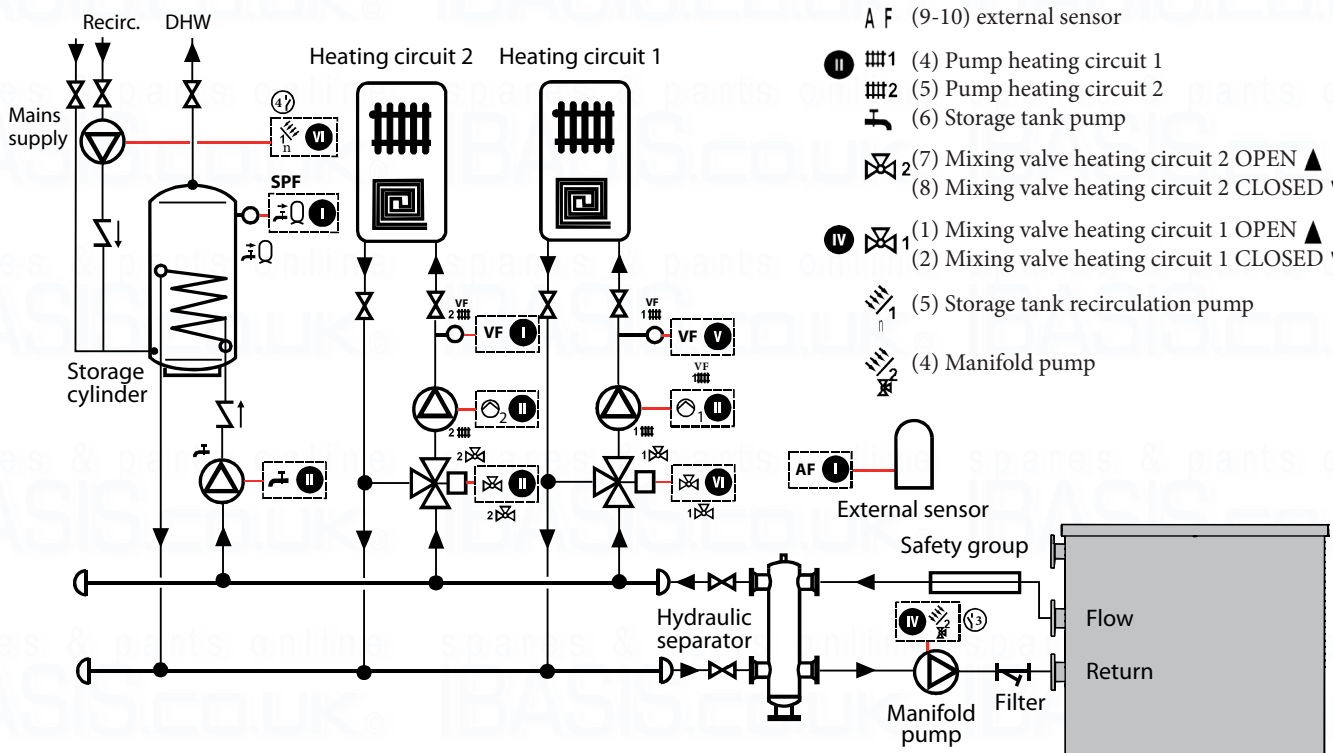


* This sensor need not be used

Boiler connected to two mixed zones + supply of domestic hot water.

- V** $\frac{VF}{10}$ (1) flow sensor heating circuit 1
- I** $\frac{VF}{10}$ (10) flow sensor earth heating circuit 1

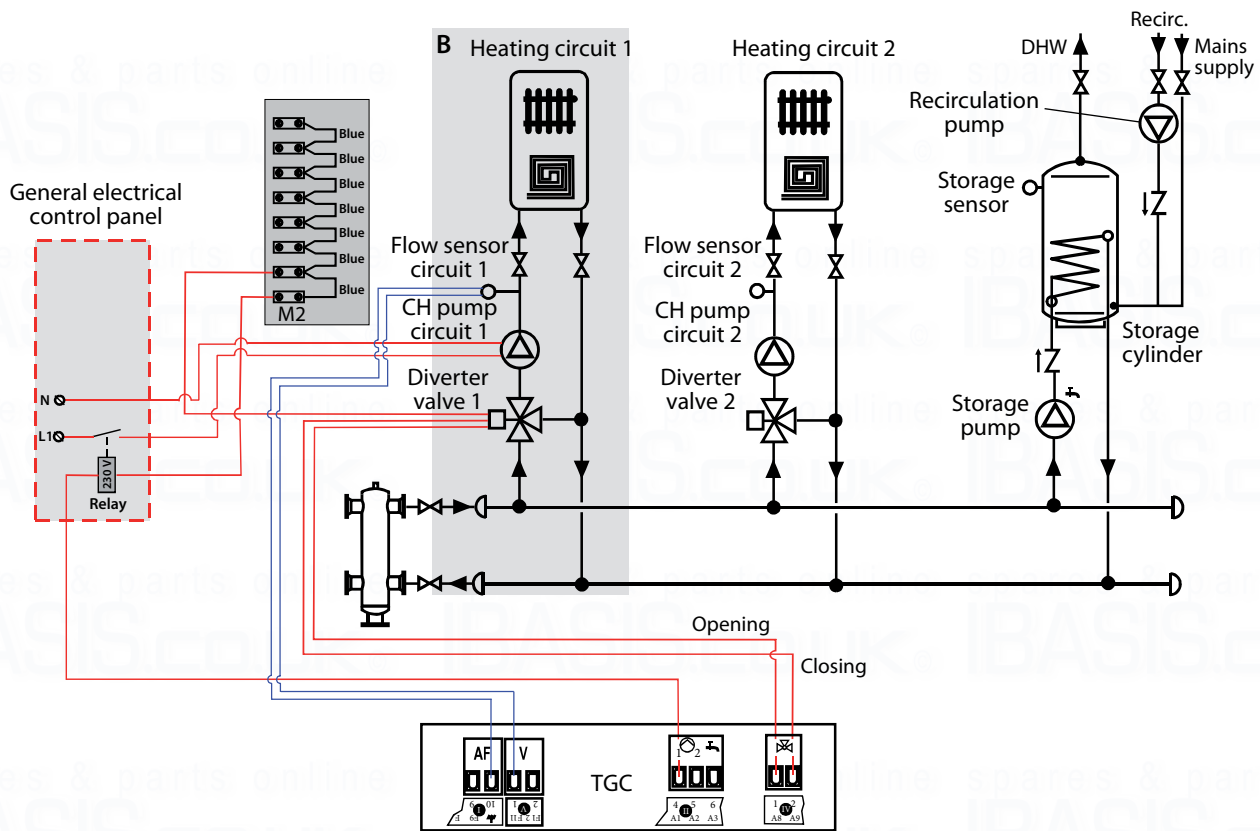
- I** $\frac{VF}{10}$ (4-5) flow sensor heating circuit 2
- $\frac{SPF}{Q}$ (6-7) storage tank sensor
- A F** (9-10) external sensor
- II** $\frac{VF}{10}$ (4) Pump heating circuit 1
- $\frac{VF}{10}$ (5) Pump heating circuit 2
- $\frac{VF}{10}$ (6) Storage tank pump
- $\frac{VF}{10}$ (7) Mixing valve heating circuit 2 OPEN ▲
- $\frac{VF}{10}$ (8) Mixing valve heating circuit 2 CLOSED ▼
- IV** $\frac{VF}{10}$ (1) Mixing valve heating circuit 1 OPEN ▲
- $\frac{VF}{10}$ (2) Mixing valve heating circuit 1 CLOSED ▼
- $\frac{VF}{10}$ (5) Storage tank recirculation pump
- $\frac{VF}{10}$ (4) Manifold pump



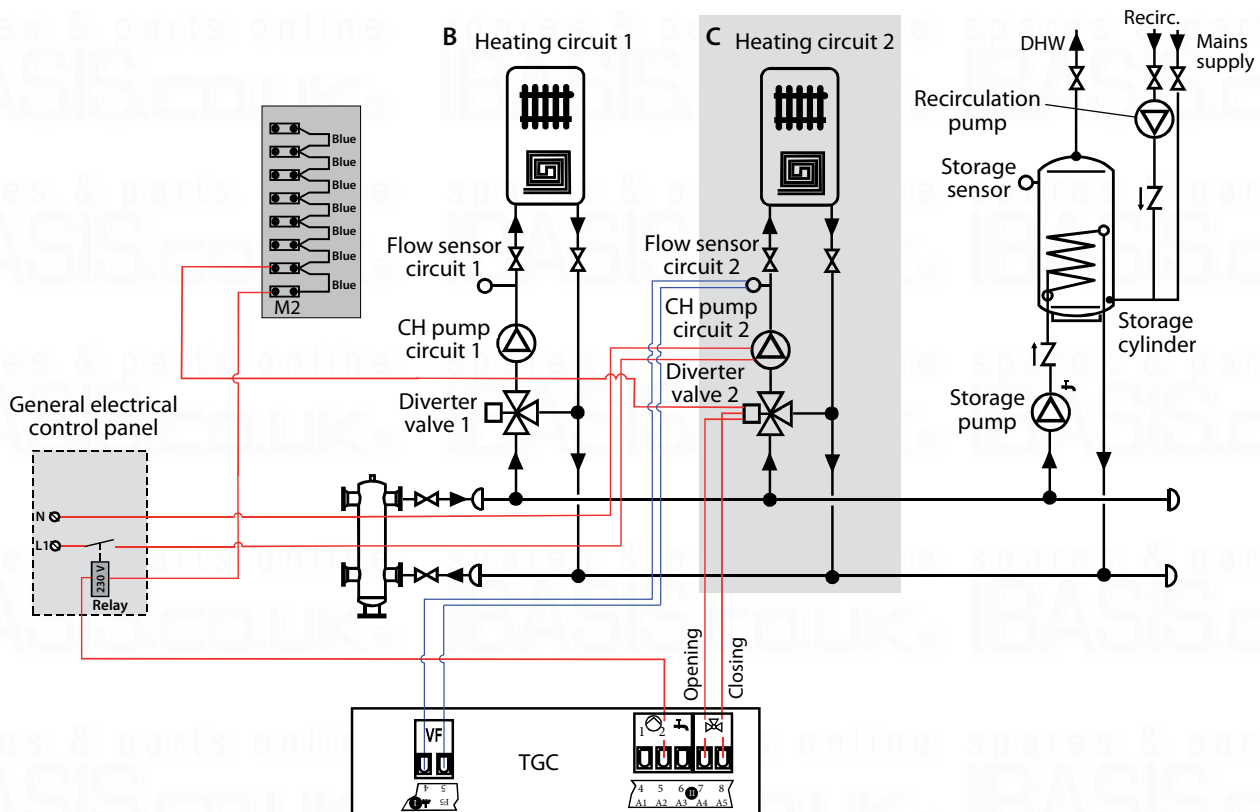
INSTRUCTIONS FOR THE INSTALLER

Secondary system connection.

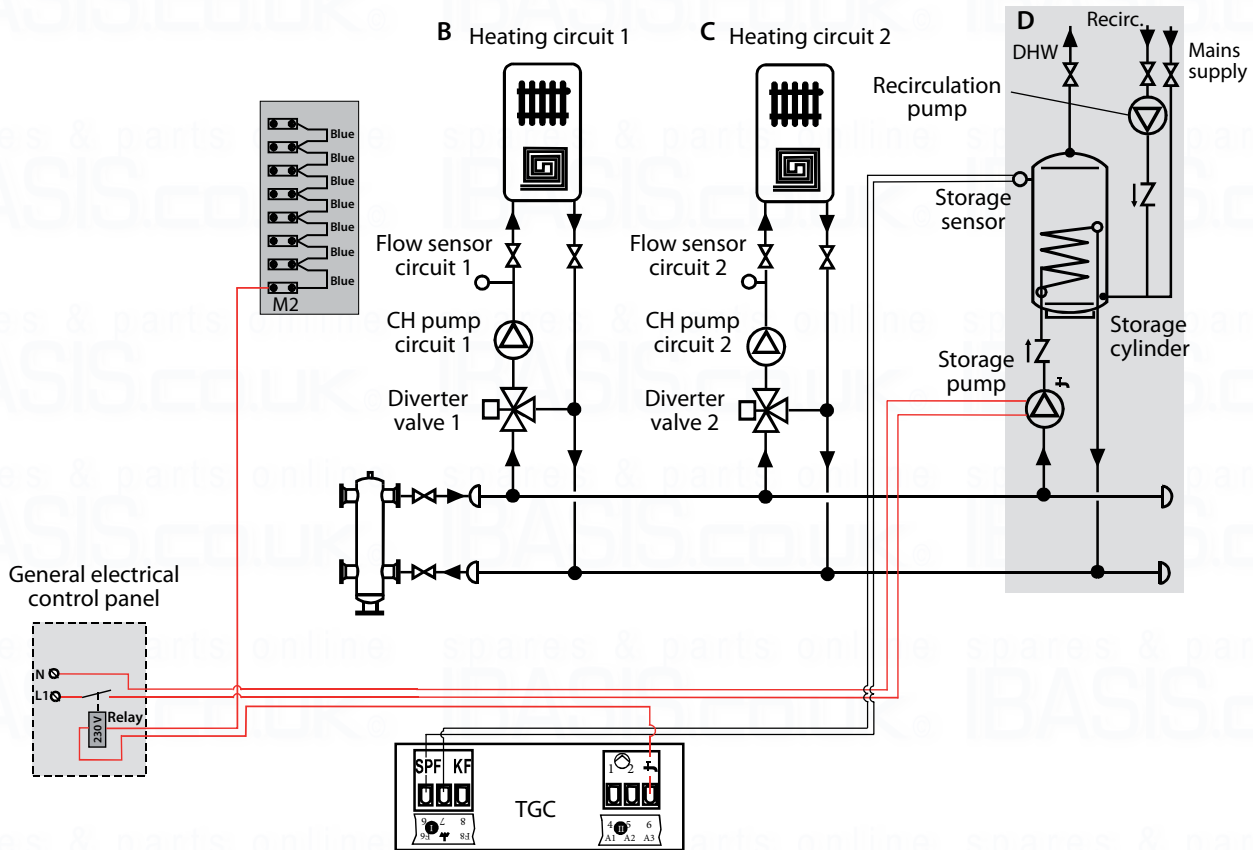
Connection section B (heating circuit 1)



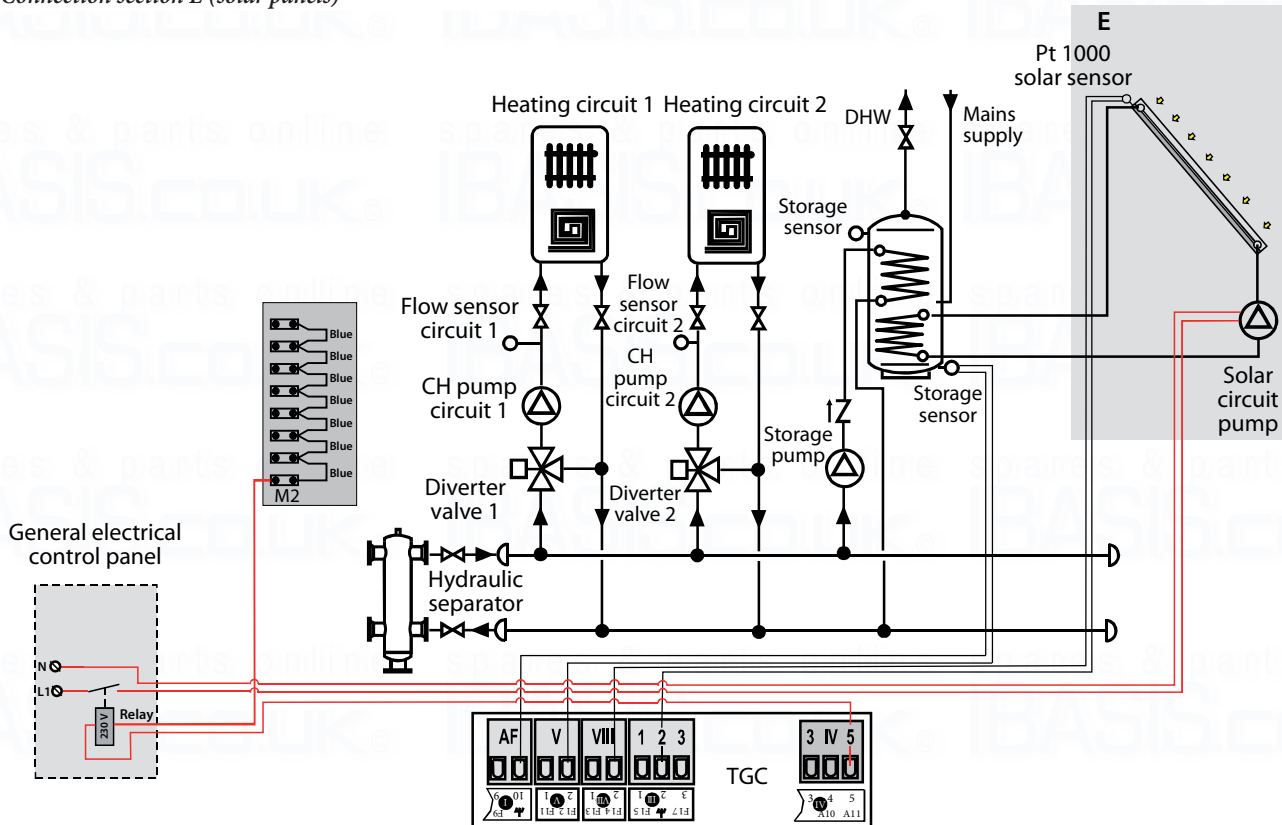
Connection section C (heating circuit 2)



Connection section D (domestic hot water circuit)



Connection section E (solar panels)

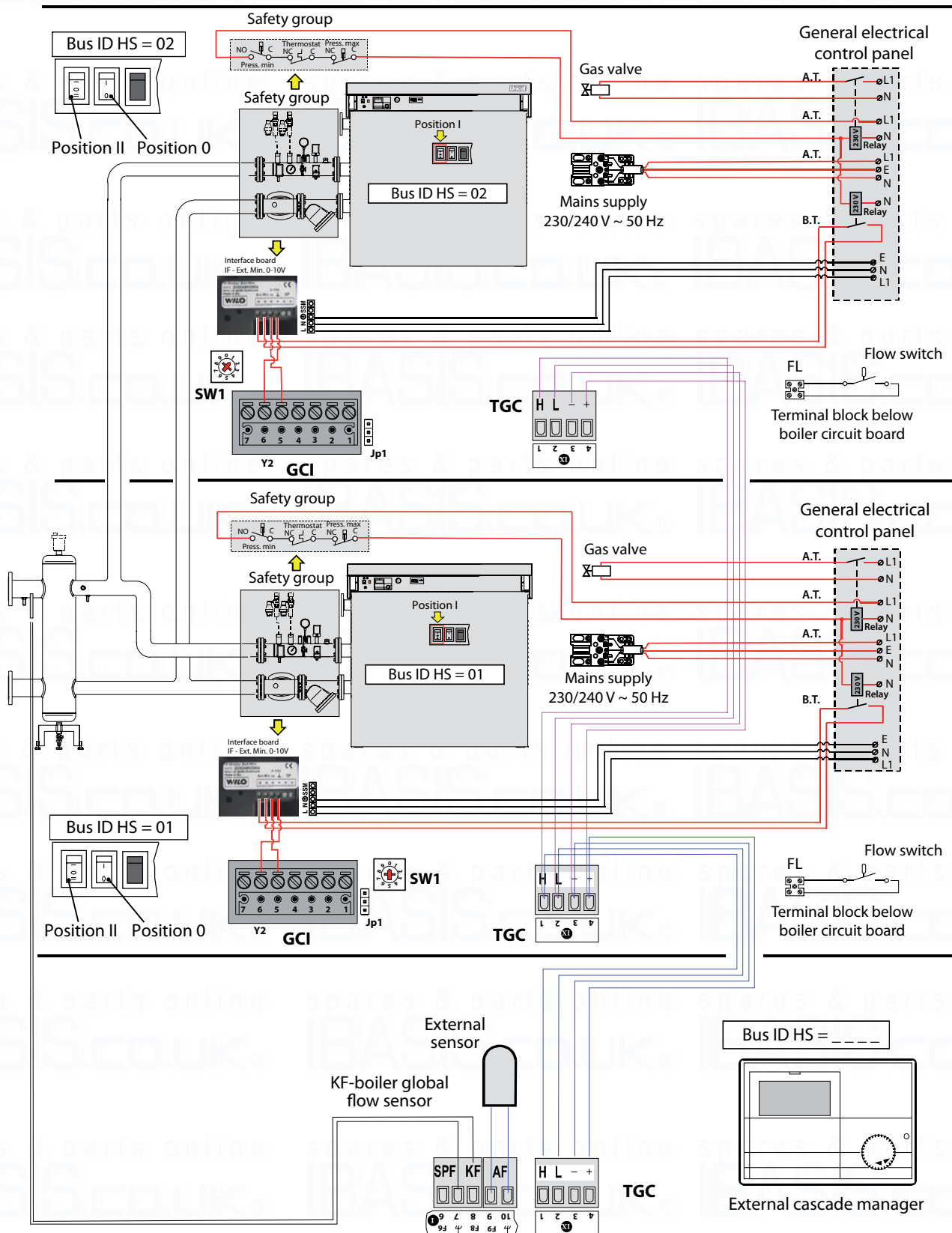


Connections to solar systems require changing a number of setting parameters.

Refer to the TGC controller manual - Expert field → Level SOLAR / MF → MF 4 FUNCTION = "23"

INSTRUCTIONS FOR THE INSTALLER

Two ARES Tec connected in a set, managed by an external TGC cascade regulator.



* Consult the TGC controller manual supplied.



For any other system applications not included in these instructions, contact the Alpha Helpline 0844 871 8764.

3.23 SYSTEM FILLING AND DRAINING

**ATTENTION!**

Do not mix the heating water with antifreeze or anti-corrosion substances at incorrect concentrations! This may damage gaskets and cause noise to develop during operation.

Alpha will not be held liable in case of damage caused to people, animals or property due to failure to observe the above.

Once all of the system connections have been made, it is possible to fill the circuit.

To fill the system install a filling loop and pressurisation unit to the system return pipe, in conjunction with a correctly sized expansion vessel/s. Never use a pressurisation unit to fill the system.

The boiler is fitted with a drain point, as shown in Section 2.2. This must **never** be used to drain the complete system, as dirt contained in the system may accumulate in the boiler, preventing smooth operation. Accordingly, the system must be equipped with its own drain point/s.

3.24 BOILER FROST PROTECTION

If the flow temperature (measured at the global flow sensor) should fall below 7°C the system pump starts operating.

If the temperature drops any further (under 3°C), all modules ignite and run at the minimum output until the return temperature reaches 10°C.

This device protects the boiler only. In order to protect the system as well, it is necessary to add a suitable anti-freeze.

Note: The anti-freeze must be compatible with materials present in the entire system and suitable for use with aluminium alloys.

3.25 CHECK AND ADJUST THE CO₂ VALUES



ATTENTION!

The instructions below are provided for the exclusive use of **Gas Safe registered** personnel.

All boilers leave the factory calibrated and approved, nevertheless, if the calibration conditions need to be changed it is necessary to re-calibrate the gas valve.



ATTENTION!

Remove cap 2, attach the red cap 3 to the flue test point 1. Place the CO₂ analysis probe 4 in the hole on the cap.

Once the measurement has been made, take the cap out and use the relative cap 2 to seal the flue test point.

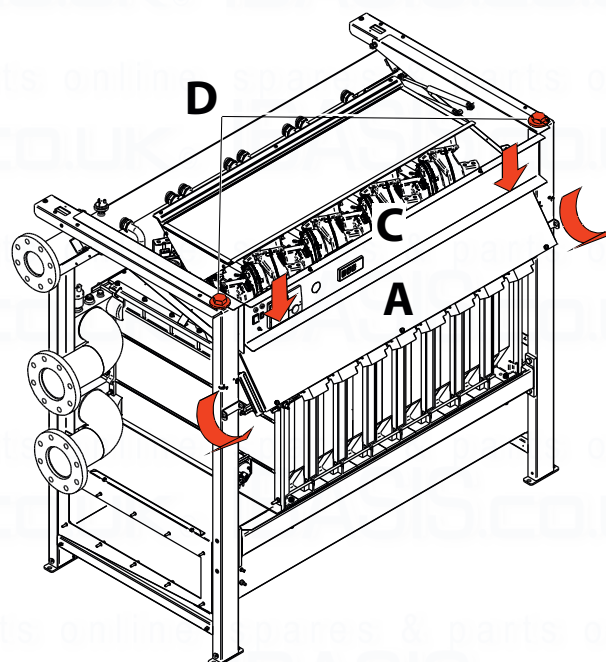
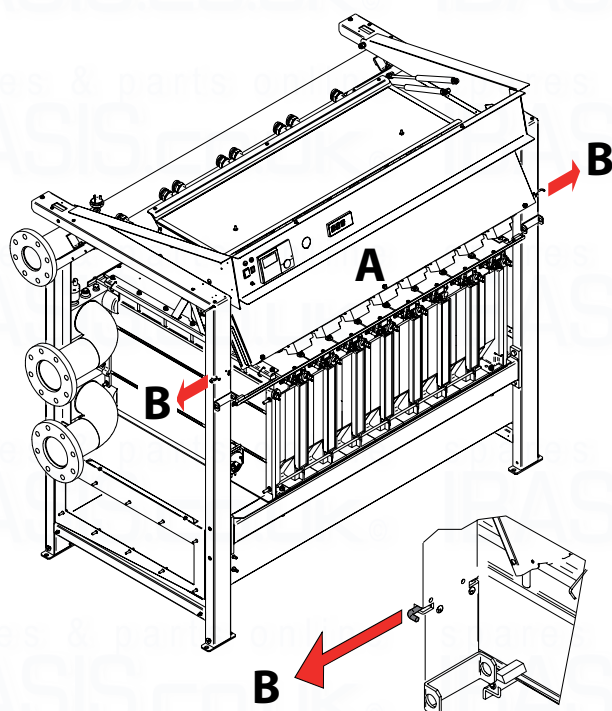
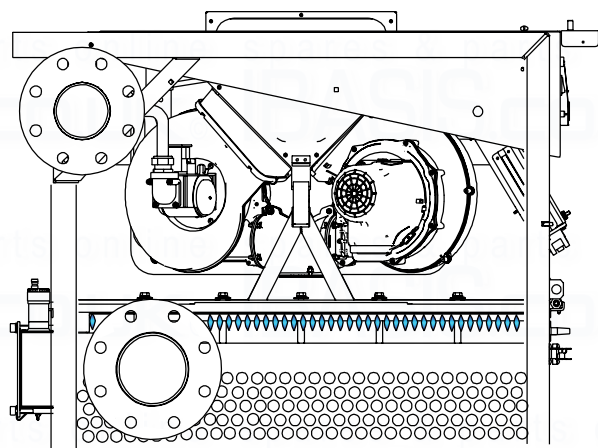
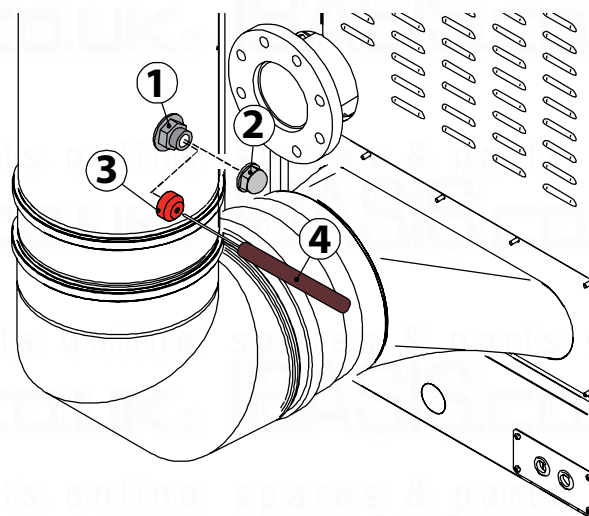


ATTENTION!

For easier access to the gas valves, unhook the control panel 'A' by pulling the spring loaded catches 'B' out (left and right).

Hinge out the control panel 'A' slightly and lower the assembly 'C'.

Temporarily secure the assembly 'C' in place using two M4 screws and washers 'D' (supplied in the documentation bag).



INSTRUCTIONS FOR THE INSTALLER

A) Adjustment at maximum output.

- Remove the sealing cap for flue test point.
- Place the analyser probe inside the flue test point.
- Make burner 1 operate at maximum output, following the procedure described at the end of this Section in 'Chimney sweep function' (100% CASC MANUAL).
- Make sure that the CO₂ level falls within the values indicated in the 'NOZZLE - PRESSURES' table.
- It is possible to correct the value by turning adjusting screw 'A' using a suitable screwdriver.

CLOCKWISE to decrease it and ANTI-CLOCKWISE to increase it.

B) Adjustment at minimum output.

- Make burner 1 operate at minimum output, following the procedure described at the end of this Section in 'Chimney sweep function' (10% CASC MANUAL).
- Make sure that the CO₂ level falls within the values indicated in the 'CO₂ levels' table on the following page.
- It is possible to correct the value by turning adjusting screw 'B' using a 2 mm hex key.

CLOCKWISE to increase it and ANTI-CLOCKWISE to decrease it.



Follow this procedure to adjust the other modules as well.

If the stated CO₂ levels are incorrect, ensure that the flue and gas pipes are not obstructed and that the burner and/or heat exchanger are not dirty or blocked

C) Completing basic calibration.

- Check CO₂ values at the minimum and maximum flow rate.
- Adjust if necessary.

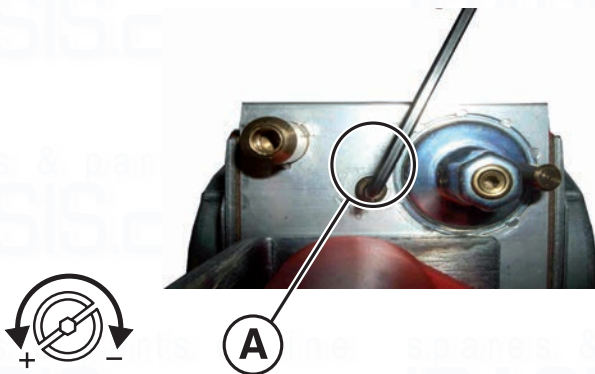


For smooth operation, calibrate the CO₂ values taking care to observe the values in the table.

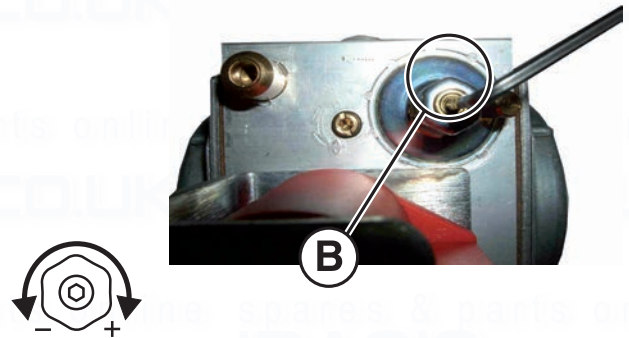
- Replace the flue test point cap.



NOTE: Take care not to force the adjusting screws.



Gas valve maximum output adjusting screw (2 mm hex key)



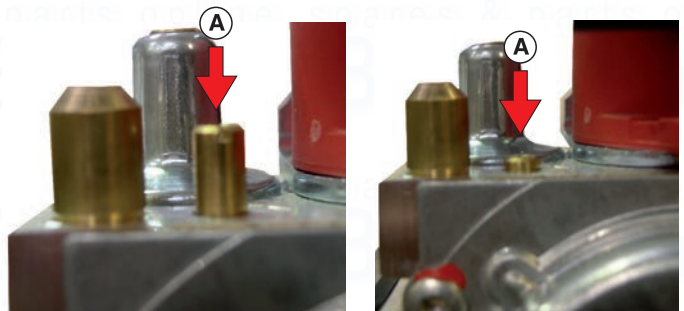
Gas valve minimum output adjusting screw (2 mm hex key)

When replacing the gas valve or having difficulty with ignition:

Carefully screw in (clockwise) the gas valve adjusting screw 'A' until it stops, then unscrew it 9 full turns.

Check boiler ignition. If it does not start, unscrew screw 'A' by one more turn, then try to start it again. If the boiler still fails to light, repeat the operations again until it does light.

At this point adjust the burner pressures as previously described.



NOZZLES - PRESSURES.

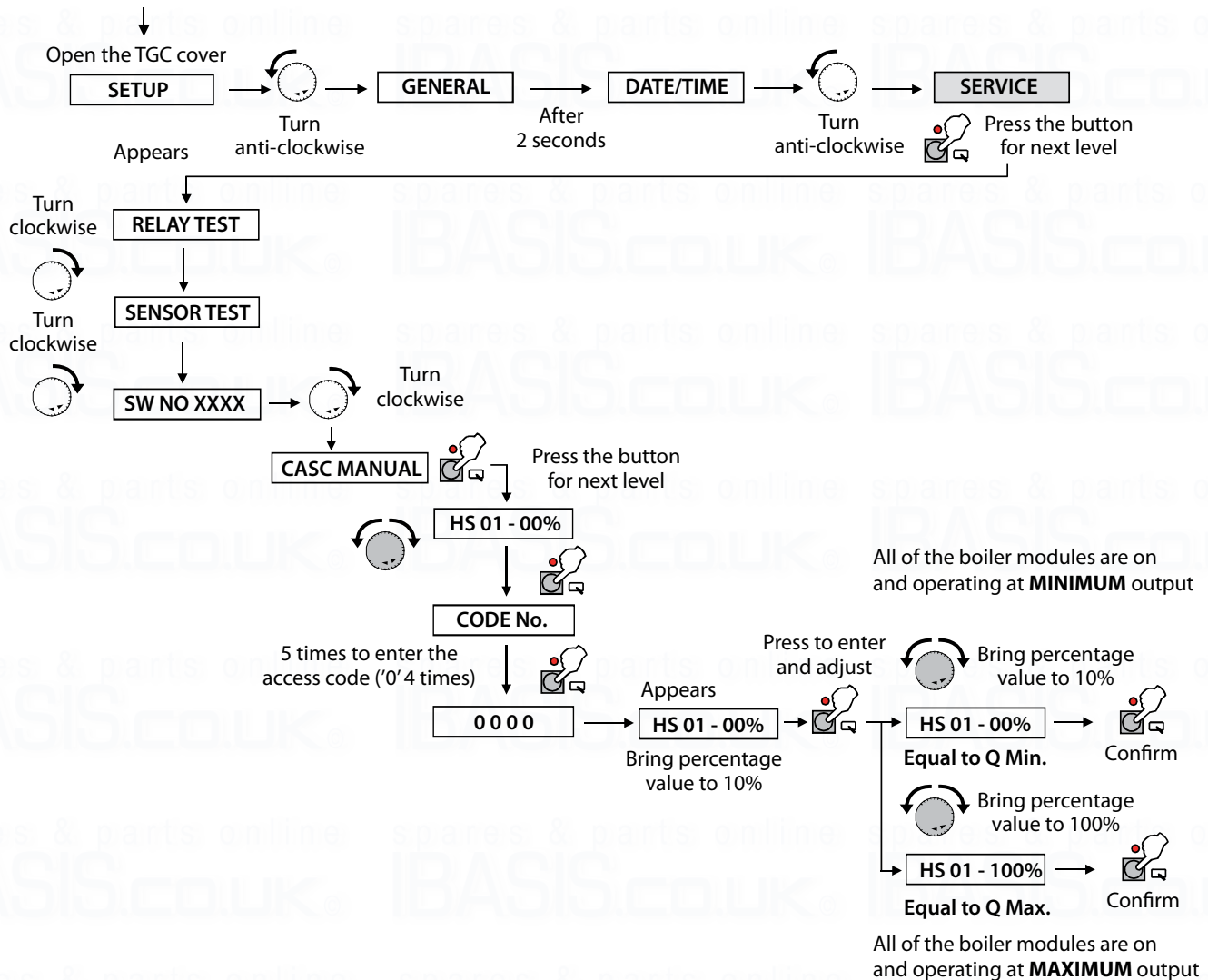
Frequently check the CO₂ levels, especially at low flow rates.

ARES Tec 440 - 900	Type of Gas	Supply pressure (mbar)	Nozzle size (mm)	Diaphragm	Fan speed (rpm)		CO ₂ levels (%)		Output at ignition IG (%)
					Min.	Max.	Min.	Max.	
	Nat. gas (G20)	20	9	-	1760	6000	9.1	9.3	50
	Propane (G31)	37	9	-	1760	6000	10.2	10.4	50

INSTRUCTIONS FOR THE INSTALLER

Chimney sweep function.

Before opening the TGC cover
turn the navigation knob clockwise
to the chimney sweep symbol 



ATTENTION!

The functions stays on for 30 min., after which amount of time the set parameters are restored.

- 1 To adjust every single module it is necessary to set switch 'C' (see Fig. 1) to position I.

All of the modules will then turn off except for the first one.

- 2 Change entry 'HS 01' to a value of 100% to calibrate the maximum and then to 10% to calibrate the minimum.
- 3 To move onto the next modules repeat sequence 0 - 1 of the 'C' switch, see Fig. 2.

Once the last module has been calibrated:

- 4 Set switch 'C' to position 0.
- 5 Bring entry 'HS 01' to 00% to turn off the last module that has stayed on.
- 6 Bring entry 'HS 01' to 100% for the definitive combustion analysis, to be noted down in the control unit handbook.

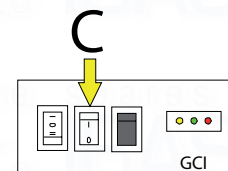


Fig. 1

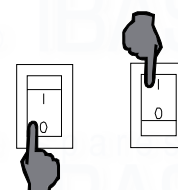
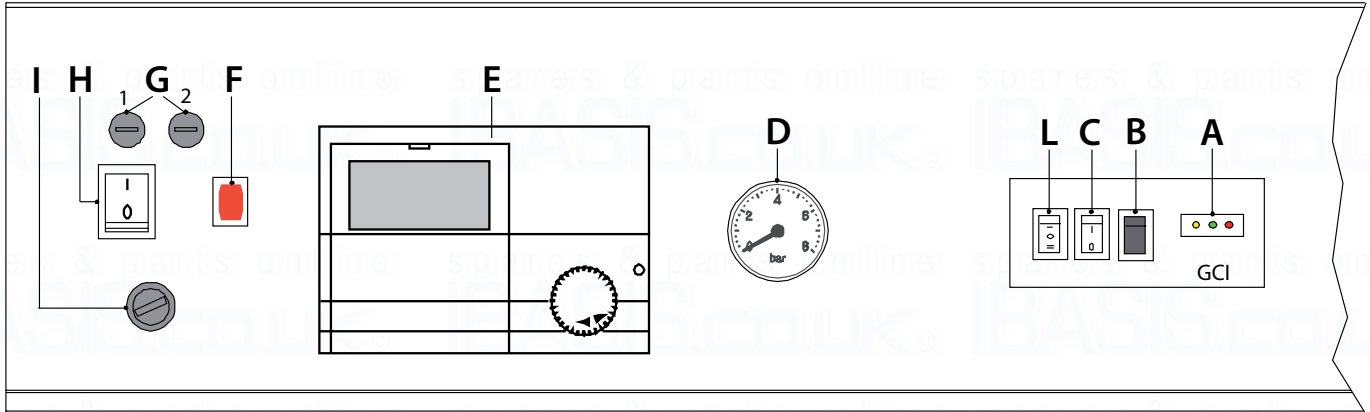


Fig. 2

3.26 EMERGENCY AND SAFETY OPERATIONS



GCI

The GCI board allows the boiler to continue operation if the management system has malfunctioned.

- A YELLOW LED = flashing (communication between module PCB and GCI) ok
GREEN LED = on (Pump On)
RED LED = on (Error Code detected)
- B This allows you to reset the burners anytime they do not respond to controls
- C In position I the control unit operates on request at 'CONSTANT SETPOINT' : 70°C. 50% of maximum output
- D System pressure gauge (optional)
- E TGC control panel
- F Light indicating the general limit thermostat TLG has operated
- G Fuses:
1 = 6.3 A
2 = 10 A
- H On/Off switch
- I When TLG general limit thermostat operates it cuts off electrical supply to the boiler and light F comes on. To reset it, take off the cap and press
- L Parallel series selector:
0 = Emergency on or control managed by PLC or BMS
I = Do not use
II = Parallel (service position for extensive diagnosis)

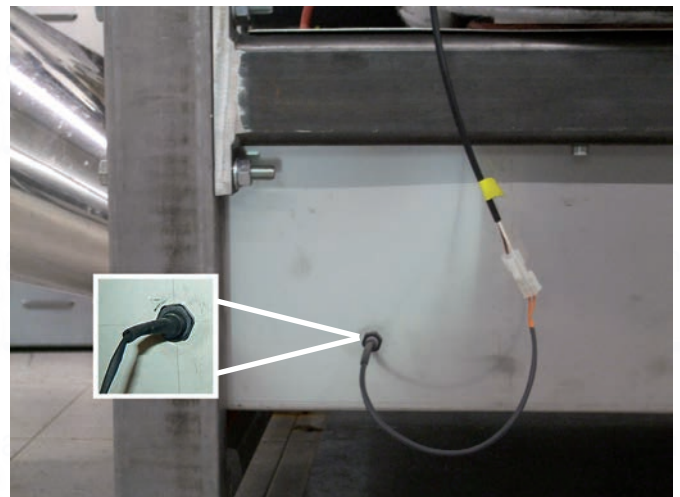


NOTE: The above devices are positioned on the control panel under the casing.



NOTE: The emergency function only switches the burners on in the boiler at 50% output and 70°C flow temperature. All system loads, including the manifold pump, must be controlled manually.

Condensate level sensor position (condensate collection pan at the front of the boiler). See Section 2.2.



3.27 FIRST IGNITION

Preliminary checks.



First ignition must be carried out by a Gas Safe registered engineer. Alpha will not be held liable in case of damage caused to people, animals or property due to failure to observe the above.



DANGER!

Prior to commissioning the appliance fill the condensate trap through the filler hole and make sure the condensate is draining correctly.

If the appliance is used with an empty condensate trap the danger of poisoning could exist.

Prior to commissioning the boiler it is advisable to make sure that:

- Installation fulfils the standard specifications and requirements in force for both the gas and electrical part.
- The supply of combustion air and the evacuation of flue gases are carried out correctly in accordance with standard specifications and requirements in force.
- The gas supply is sized for the boiler flow rate and is equipped with all of the safety and control devices required by regulations in force.
- The electrical supply for the boiler is 230/240 V ~ 50 Hz.
- The system has been filled with water (pressure gauge 1.0 bar with the pump off).
- Any cut-off dampers in the system are open.
- The required gas corresponds to the one used for boiler calibration.
- The gas supply valve is open.
- There are no gas leaks.
- The external electrical supply is switched on.
- The system safety valve on the boiler responds to operation and discharges to a safe visible place.
- The condensate trap is filled with water.
- There are no water leaks.
- Sufficient air supply for the boiler - Refer to BS 6644.
- Minimum distances to carry out any maintenance operations are fulfilled - Refer to Section 3.4.

Switching the boiler on and off.

To turn the boiler on and off read the manual for the TGC regulator.

Information for the Building manager.

The individual in charge of the system must be instructed in the use and operation of the heating system, in particular:

- Supply the Building manager with the 'THE BUILDING INSTRUCTIONS FOR USE', as well as all other documents attached the appliance contained in the envelope in the packaging. **The Building manager must keep this documentation safe so that it is available for future consultation.**
- Inform the Building manager of the importance of ventilation and the flue system, highlighting how essential they are and how it is strictly forbidden to change them.
- Inform the Building manager of the requirement to check the system water pressure, as well as operations to restore it.
- Inform the Building manager on how to correctly regulate the temperature, control units/thermostats and radiators in order to save energy.
- Remember that it is compulsory to carry out regular maintenance on the system and measure combustion output (as per national law).
- If the appliance is sold or transferred to another owner or if the owner moves, leaving the appliance behind, always ensure the instructions supplied accompany the appliance so that it may be consulted by the new owner and/or installer.

4 INSPECTIONS AND MAINTENANCE



Inspection and maintenance carried out at regular intervals, as well as the exclusive use of original spare parts, are of primary importance for smooth operation and to guarantee long boiler life. Annual maintenance of the appliance is compulsory, in accordance with Legislation in force.



Failure to carry out Inspection and Maintenance can cause material and personal damage.

For this reason we recommend a maintenance contract.

Inspection is required to determine the actual state of an appliance and compare it with the optimal state. This is carried out through measuring, checking, observing.

Maintenance is required to eliminate any deviation of the effective state from the optimal state. This is usually carried out through cleaning, setting and possibly replacing single parts that are subject to wear.

These maintenance intervals are set forth by a specialist based on the certified state of the appliance at the time of inspection.

Instructions for inspection and maintenance.



Only original Alpha spare parts must be used to ensure a long life for all of the functions of your appliance, and to avoid changing the conditions of the approved standard product.

Before proceeding with maintenance operations, always carry out the procedures described below:

- Turn off the mains switch.
- Disconnect the appliance from the electrical supply using a separation device, with a contact opening of at least 3 mm (e.g. safety devices or power switches), and make sure it cannot be accidentally re-connected.
- Close the gas service valve upstream of the boiler.
- If necessary, and based on the work that needs to be carried out, close any valves on the heating flow and return.

Once the maintenance work has been finished, always carry out the operations listed below:

- If necessary, open the heating flow and return valves
- Relieve and, if necessary, restore the pressure in the heating system.
- Open the gas service valve.
- Re-connect the appliance to the electrical supply and turn on the mains supply.
- Check the appliance for gas tightness and that there are no water leaks.

Table of resistance values based on the heating sensor (SR) and the heating return probe (SRR) temperature.

T°C	0	1	2	3	4	5	6	7	8	9
0	32755	31137	29607	28161	26795	25502	24278	23121	22025	20987
10	20003	19072	18189	17351	16557	15803	15088	14410	13765	13153
20	12571	12019	11493	10994	10519	10067	9636	9227	8837	8466
30	8112	7775	7454	7147	6855	6577	6311	6057	5815	5584
40	5363	5152	4951	4758	4574	4398	4230	4069	3915	3768
50	3627	3491	3362	3238	3119	3006	2897	2792	2692	2596
60	2504	2415	2330	2249	2171	2096	2023	1954	1888	1824
70	1762	1703	1646	1592	1539	1488	1440	1393	1348	1304
80	1263	1222	1183	1146	1110	1075	1042	1010	979	949
90	920	892	865	839	814	790	766	744	722	701

Relation between the temperature (°C) and nominal resistance (Ohm) of the heating sensor SR and the heating return sensor SRR.

Example: At 25°C, the nominal resistance is 10067 Ohm

At 90°C, the nominal resistance is 920 Ohm

INSPECTIONS AND MAINTENANCE



Only Gas Safe registered engineers should undertake service and maintenance checks.

Since dust is extracted from the boiler room, the resistance on the flue side, through the boiler, will increase, leading to a decrease in the heat load (and, consequentially, in the output).

Prior to cleaning, check the heat load (see Section 3.24) and the percentage of CO₂ (see Section 3.24). If the measured load (with a correct CO₂ level) is within 5% of the value indicated in Section 3.24, the boiler does not need to be cleaned.

The operation must therefore be limited to cleaning the trap.

ATTENTION!



A drop in the heat output can be caused by an obstruction in the flue system or air intake pipe. First of all make sure that this is not the cause.

If there is a drop in the heat load greater than 5%, check how clean the burner condensate collection pan is. Also clean the trap.

First phase – Dissmantling.

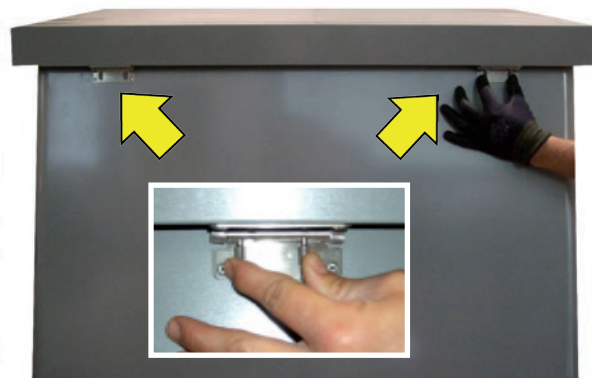
- Shut off the electrical and gas supplies **making sure the gas service valve is firmly shut**.
- Remove all the casing panels.



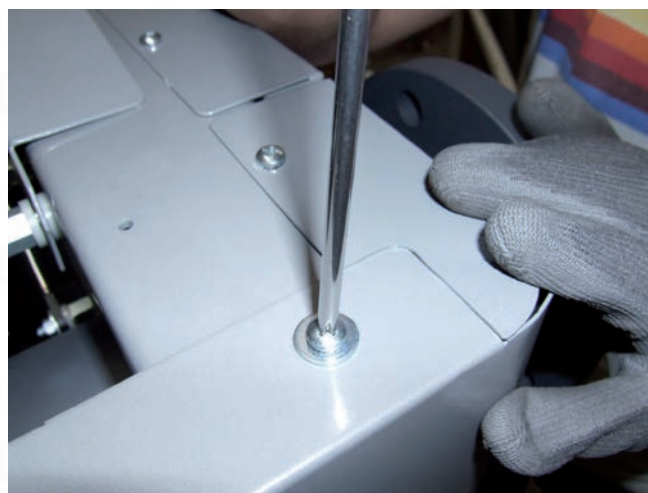
- Turn the required screw to lift the cover.



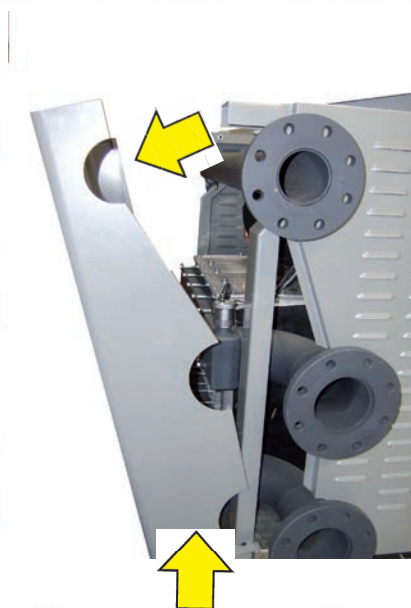
- Remove the two cover fixing screws.



- Squeeze together the pins on the two hinges to take off the top cover.



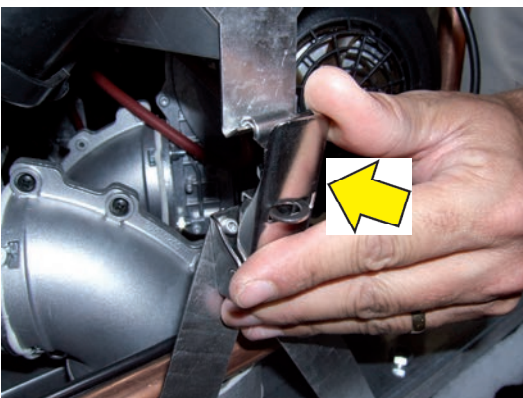
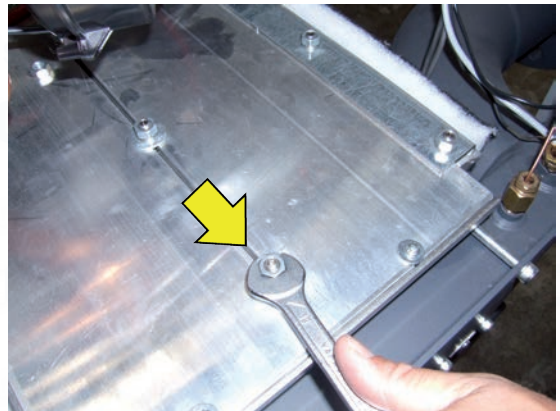
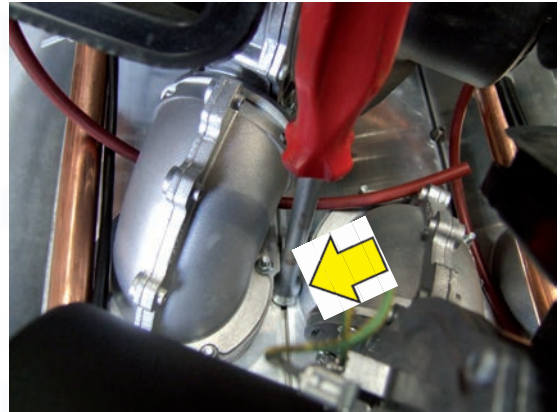
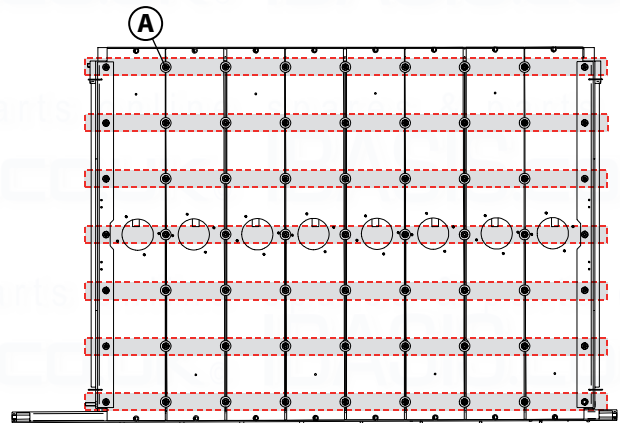
- Remove the rear, front and side fixing screws.



- Remove the panel.

INSPECTIONS AND MAINTENANCE

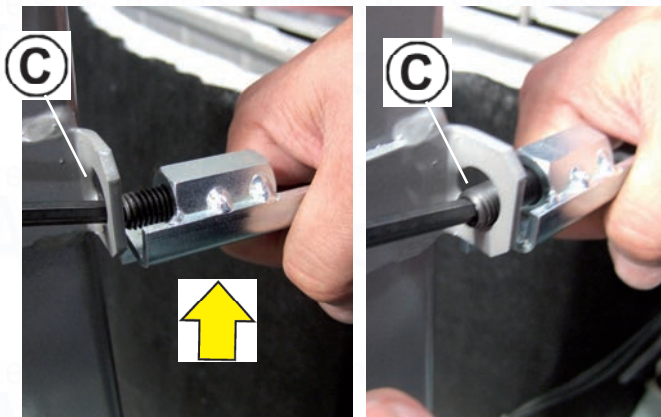
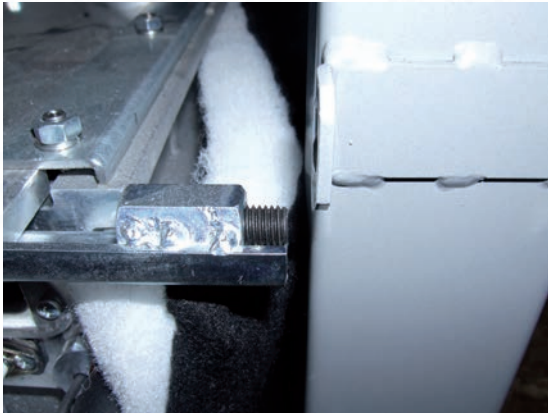
Element fixings 'A'



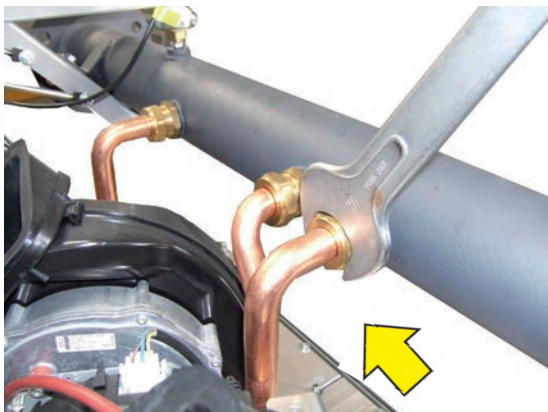
- Remove the nuts 'A' from each element (13 mm socket and ring spanner as shown above).

- Unhook the fan chamber clamping spring (right/left side).
- Disconnect the red silicone tubes.
- Remove the fan chamber.

INSPECTIONS AND MAINTENANCE



- Lift the burner block slightly and unscrew the two screws (one each side) using a 5 mm hex key, until you reach holes 'C', to hinge the burner block.



- Disconnect the gas fittings from the gas manifold using a 36 mm spanner.

Second phase – Cleaning.

- Take out the gaskets and burners.
- Dry clean the burners using compressed air working on the 'flame side'.
- Visually check the state of the welding on the frame and burner mesh.



The burner gaskets must be replaced every time cleaning operations are carried out.

- Wash the combustion chamber with water being careful not to get the electrical cables wet.
- During this operation is necessary to make sure that the condensate pipe is always unobstructed so that the water does not leak out of the inspection opening.
- Blow the combustion chamber with compressed air to remove any dirt that is still attached to the studs.
- When the elements have been washed make sure that the condensate trap is unobstructed: clean if necessary.
- Inspect the flue outlet pipe and the flue.



Third phase - Reassembly.

- Once the body and/or burners have been cleaned, replace the burners back in position.
- Put the **new graphite gaskets in place.**

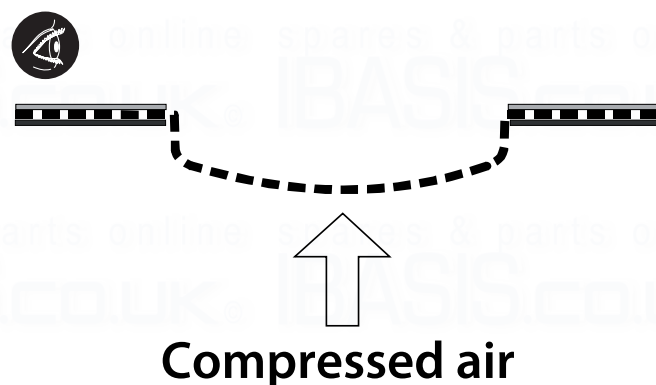
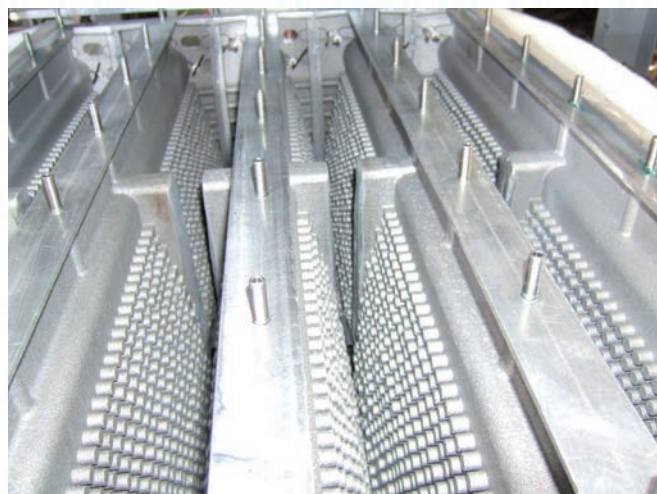


Re-assemble in the reverse order, being careful to tighten the fixings that clamp the mixer unit/fans to the body, to a torque of 13 Nm.



**ATTENTION!
IT IS NECESSARY TO CHANGE THE SEALING GASKETS ON EACH BURNER AT EVERY MAINTENANCE OPERATION.**

- Prior to ignition, make sure the condensate trap is full of water.
- Before opening the gas service valve make sure that the previously loosened gas fitting is firmly tightened, test for leaks.
- As a burner is being lit, immediately check the seal between each single gas valve and relative premixing chamber.
- Perform a combustion analysis and check the parameters.
- Ensure that all of the previously opened gas pressure points are closed.



During the service life of the product, performance is affected by external factors, e.g. the hardness of the DHW, atmospheric agents, deposits in the system and so on. The declared data refers to new products that are correctly installed and used in accordance with applicable regulations.

Note: Correct periodic maintenance is highly recommended.

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