

RESERVOIRS

Instructions and warnings **IE**  
Installer  
Maintenance technician



**ARES 440 TEC ERP**  
**ARES 550 TEC ERP**  
**ARES 660 TEC ERP**  
**ARES 770 TEC ERP**  
**ARES 900 TEC ERP**

Modular condensing boiler





Warning this manual contains the exclusive instructions for use for professionally qualified installers and/or maintenance technicians, in compliance with laws in force.

The individual in charge of the system is NOT authorised to work on the boiler.

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 the manuals supplied with the boiler.

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### CE DECLARATION OF CONFORMITY (according to ISO/IEC 17050-1)

The company **IMMERGAS S.p.A.**, with registered office in via Cisa Ligure 95 42041 Brescello (RE) whose design, manufacturing, and after sale assistance processes comply with the requirements of standard **UNI EN ISO 9001:2008**,

#### DECLARES that:

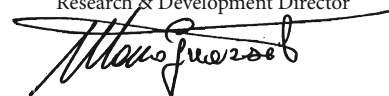
The ARES 440 TEC ERP, ARES 550 TEC ERP, ARES 660 TEC ERP, ARES 770 TEC ERP, ARES 900 TEC ERP model boilers comply with the following European Directives and Delegated European Regulations:

“Eco-design” Directive 2009/125/EC, “Energy labelling” Directive 2010/30/EC, “Gas Appliance” Directive 2009/142/EC, “Electromagnetic Compatibility” Directive 2004/108/EC, “Performance” Directive 92/42/EC and “Low Voltage” Directive 2006/95/EC.

Mauro Guareschi

Research & Development Director

Signature:



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# 1 GENERAL INFORMATION

## 1.1 SYMBOLS USED IN THE MANUAL

When reading 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

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## 1.2 COMPLIANT USE OF THE APPLIANCE



The ARES Tec appliance was built based on the current technical level and recognised technical safety rules. 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 improper.  
Immergas 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.

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## 1.3 INFORMATION TO BE PROVIDED TO THE USER



- The user must be instructed in the use and operation of his/her heating system, in particular:
- Deliver 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 aeration vents and the flue exhaust 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.
  - Remember it is compulsory to carry out regular maintenance on the system once a year and a combustion analysis every two years (as per national legislation).
  - If the appliance is sold or transferred to another owner or if the owner moves, leaving the appliance behind, always ensure the handbook accompanies the appliance so that it may be consulted by the new owner and/or installer.

**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 professionally qualified staff, in compliance with regulations and provisions in force, as incorrect installation can cause damage to people, animals and property, for which the manufacturer will not be held liable.



### DANGER!

Maintenance or repair work on the boiler must be carried out by professionally qualified staff, authorised by Immergas; it is advisable to sign a 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 exhaust pipe
- to the constructive elements that affect the operational safety of the appliance.



### Attention!

To tighten or loosen the screw-attached fittings, use suitable wrenches only.

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



### ATTENTION!

#### Instructions for appliances running on propane gas

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

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

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

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 use electric switches
- do not smoke
- do not use the telephone
- shut off the gas cut-off valve
- aerate the room where the gas leak occurred
- notify the gas supply company or a company specialised in the installation and maintenance of heating systems.



### Explosive and easily flammable substances

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



### ATTENTION!

The heat unit must be installed so as to avoid, under the envisioned operating conditions, the liquid contained in it from freezing and avoid exposing the command and control parts to temperatures below  $-15^{\circ}\text{C}$  and over  $+40^{\circ}\text{C}$ .

The heat unit must be protected from climatic/environmental variations by:

- insulating the hydraulic and condensation exhaust pipes
- adopting specific anti-freeze products in the hydraulic system.

### 1.5 REGULATIONS FOR INSTALLATION

**ARES Tec** is a gas category **II<sub>2H3P</sub>** heat unit.

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

Installation must be carried out by an authorised professional technician, **who is in charge of enforcing observance of all local and/or national laws published in the Official Gazette, as well as all applicable technical regulations.**

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 evolution of the "state of the art". **We would like to underline that updating the list of standards is the responsibility of the technicians 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 the current "state of the art". This also applies to the hydraulic system, the flue exhaust system, the installation room and the electrical system.



**Failure to observe the above regulations will void the warranty.**

### 1.6 INSTALLATION

When the appliance is installed on existing systems, make sure that:

- The flue is suitable for condensation appliances, for the temperatures of the combustion products, calculated and built in accordance with regulations in force. That is it a straight as possible, water-tight and insulated and does not have any obstructions or constrictions.
- The flue is equipped with an attachment to evacuate the condensation.
- The heating control unit is equipped with a pipe for the evacuation of the condensation produced by the boiler.
- The electrical system is built in accordance with specific regulations and qualified technical personnel.
- The flow rate, head and direction of flow of the circulation pumps is appropriate.
- The fuel feed line and any existing tanks are set up in accordance with regulations in force.
- The expansion vessels ensure complete absorption of the dilation of the fluid contained in the system.
- Slurry and build-up have been cleaned out of the system.

#### ***If ARES Tec is being installed on existing Systems:***

If it is possible to schedule the replacement, it is necessary to wash the system preventively, with alkaline dispersants. Washing must be carried out four weeks prior to replacement, with a system operating between 35°C - 40°C.



#### **Attention!**

If the new boiler has been replaced in an old system without having preventively washed it as described above, do not wash the system, as any residues of the product in the circuit may fill the generator with residues after replacement.

It is advisable to contact a company specialised in water treatment.

**Otherwise, if ARES Tec is being installed on a new system** it is advisable to wash it thoroughly in any case, using products that are suitable for the entire system, and install a Y-strainer with two cut-off 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 generator 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.

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 an analysis "kit" contained in a carry cases, easily available on the market.

It will therefore be necessary to set up the devices shown in the figure in the heating system.



**THE COUPLING MUST BE SET UP ON THE RETURN PIPE TO THE PRIMARY CIRCUIT DOWNSTREAM OF THE PUMP.**

All of the precautions required to avoid the formation and localisation of oxygen in the water of the system. For this reason the 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!

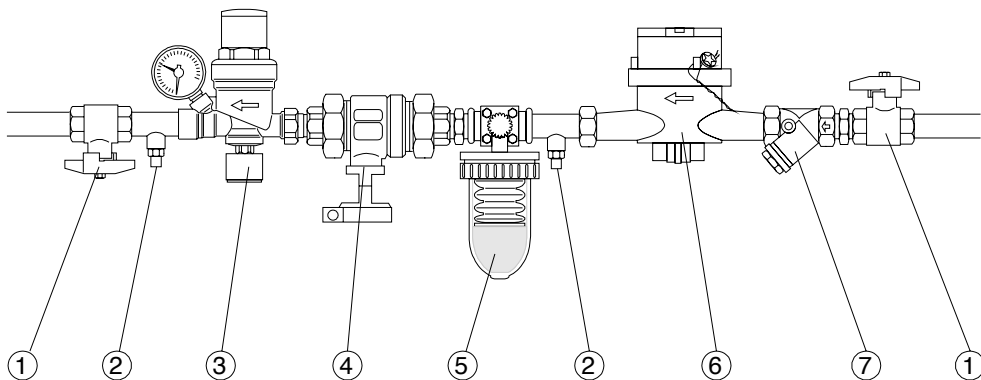
**Any damage caused to the boiler, due to the formation of build-up or corrosive water, will not be covered by the warranty.**



### 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.**

Example of water treatment unit



Key:

- 1 - Ball valve
- 2 - Sample trap
- 3 - Filling unit
- 4 - Cut-off device
- 5 - Water treatment unit
- 6 - Litre meter (recommended)
- 7 - "Y" strainer

### 1.8 GENERAL WARNINGS

The instruction handbook 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 handbook carefully, as they provide important instructions regarding installation, user and maintenance safety.

Keep the handbook safe for future consultation.

**The appliance must be installed and maintained in accordance with regulations in force, pursuant to the instructions of the manufacturer, the state of the art and by authorised and qualified personnel, in accordance with the law.**

**Professionally qualified personnel means staff with specific technical skills in the sector of heating system parts for civil use, hot water production for domestic use and maintenance. This personnel must have the authorisations required by legislation in force.**

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

Before carrying out any cleaning or maintenance operations, cut the appliance off from the power mains by acting on the switch on the system and/or using the cut-off devices.

Do not obstruct the intake/exhaust pipe terminals.

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 Immergas personnel only, using original spare parts only. Failure to observe the above can jeopardise the safety of the appliance and will void the warranty.

The 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, proceed to washing the domestic hot water production system, making water flow through it for the amount of time required to change the water completely.

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

All appliances with optionals 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 CHARACTERISTICS AND DIMENSIONS

## 2.1 TECHNICAL CHARACTERISTICS

- Heat generator, to heat Low Nox condensation gas
- Comprised of a heat module designed to operate on its own or in a set
- Can be set up directly outside (IP X5D)
- Low water content
- High response speed to load changes
- Single flue exhaust that can be positioned on 3 sides
- Unified flow and return hydraulic manifolds
- Comprised of 4 or more heating elements (between 4 and 8), aluminium/silicon/magnesium casting
- Including total irradiation premixing modulating burners
- None of the heating elements have hydraulic cut-off devices
- Single gas supply pipe
- Modulated power between  $22 \div 108$  kW/element.

### TEMPERATURE CONTROL DEVICES:

- ROOM NTC sensor (every heating element)
- Room Limit Thermostat (every heating element)
- Flow NTC sensor (General)
- Return NTC sensor (General)
- Approved safety thermostat (To be ordered and installed on INAIL section in parag. 3.8)
- GCI global flow probe.

### OTHER SAFETY DEVICES according to the R COLLECTION see parag. 3.8

### POP-UP control panel composed of:

- ON-OFF switch see parag. 3.25
- TGC boiler thermoregulation/manager
- GCI (internal cascade management board)
- Protection fuses
- Any limit thermostats
- Fan air pressure switch
- Condensation water level sensor
- Gas pressure switch
- Exhaust pressure switch (anti-obstruction).

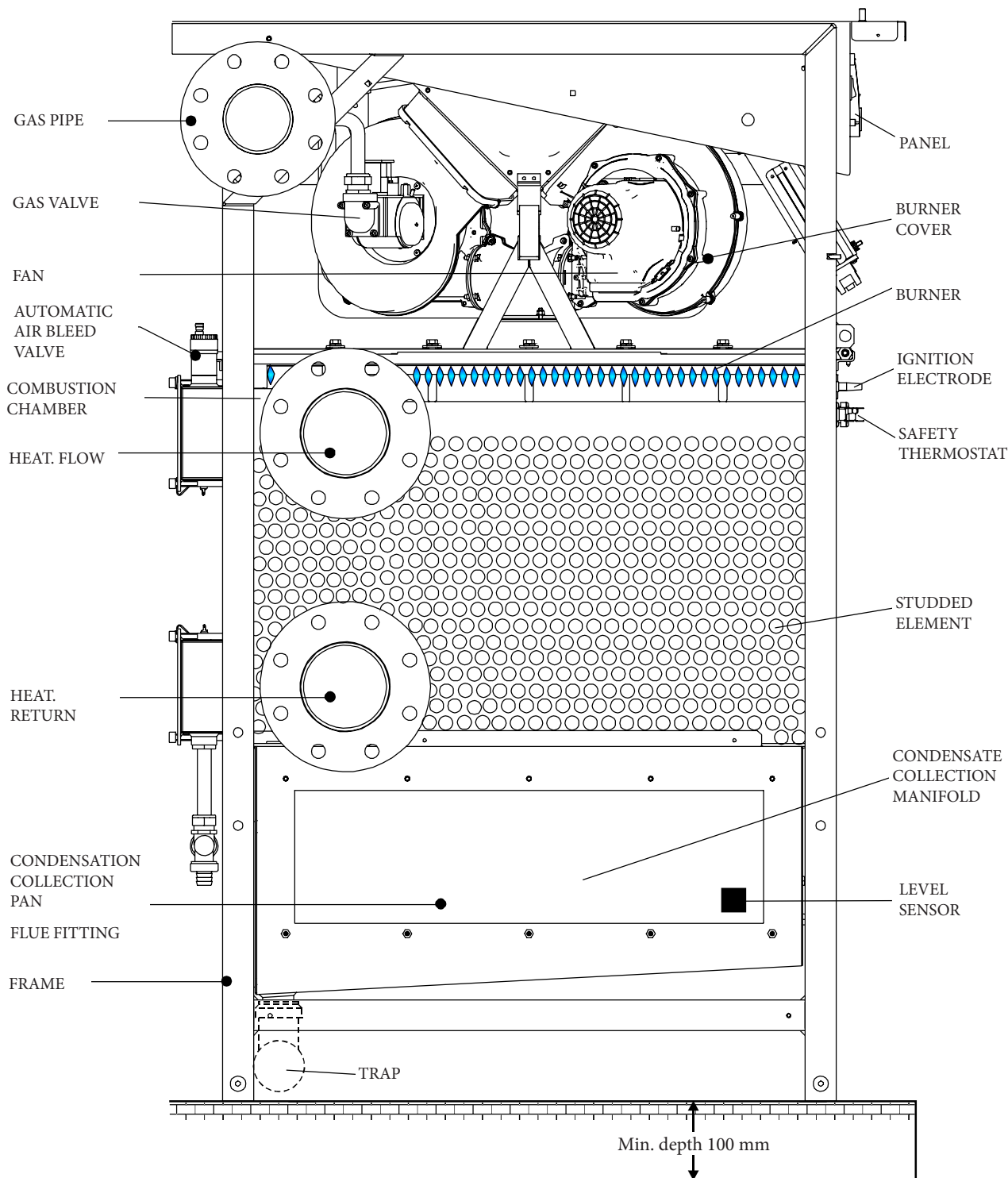
- The entire heating unit is equipped with global temperature control NTC sensors on the flow and return manifolds.
- Integral insulation with non-allergenic synthetic wool.
- Total premix burner, modulating, with "metal foam" radiation combustion chamber. Premixing in the fan. Automatic separating backflow diaphragm from the combustion chamber.
- Sound emissions at maximum power below 49 dBA.
- Operation during heating: determining the instantaneous power through a control microprocessor, with preset comparison parameters between requested temperature (or calculated by the outdoor thermoregulation) and global flow temperature.
- Logic of operation:
  - Possibility of controlling the power of the single heating elements for calibration and/or assistance with reserved access code.
  - D.H.W. production through priority NTC probe, to control the storage tank load through a pump or three-way deviator valve through the supplied TGC thermoregulator.
- Possibility of controlling the power of the single heating elements.
- Heat request control: temperature setpoint 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  $0 \div 10V$  output to control a modulating pump.
- Emergency operation: this allows you to avoid the system from stopping due to an interruption in communication with the adjusting system or possible remote management of the control unit:
- The possibility of selecting the emergency temperature through supplied "Constant Setpoint" heating elements:  $70^{\circ}C$ , maximum power 50%.
- Alarm management.
- Alarm reset input.
- Alarm notification Relay.
- Condensation collection tray with stainless steel exhaust trap.
- Easily removable integral panelling comprised of oven-painted steel panels suitable for outdoor installation.
- Condensation collection tray with stainless steel exhaust trap and flue chamber.
- Incorporated deaerator.

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 heat elements, so as to always obtain the maximum efficiency. Since it guarantees the maximum exchange area based on the delivered power. The elements are made to operate so as to equally divide the operating time.

The hot water that is produced is pushed by the pump located on the return of the primary ring to the flow of the hydraulic separator. From here a second pump (system - see suggested diagrams) will distribute to the various utilities. From the system, return the cooled water is taken in by the pump on the return, through the hydraulic separator, to start the cycle towards the generator again.

## 2.2 VIEW OF MAIN PARTS

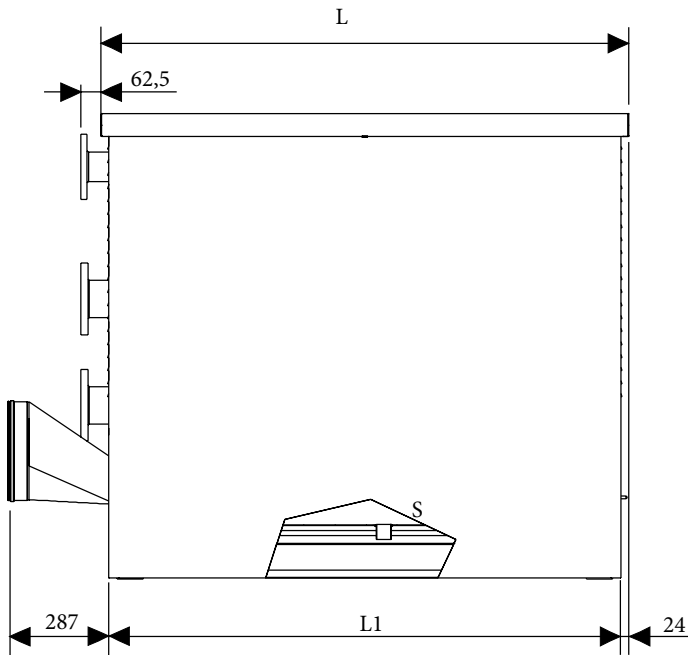


**flue outlet** LEFT, RIGHT, REAR side  
**flow** LEFT side  
**return** LEFT side  
**Gas inlet** LEFT side  
**GCI:** under the front casing

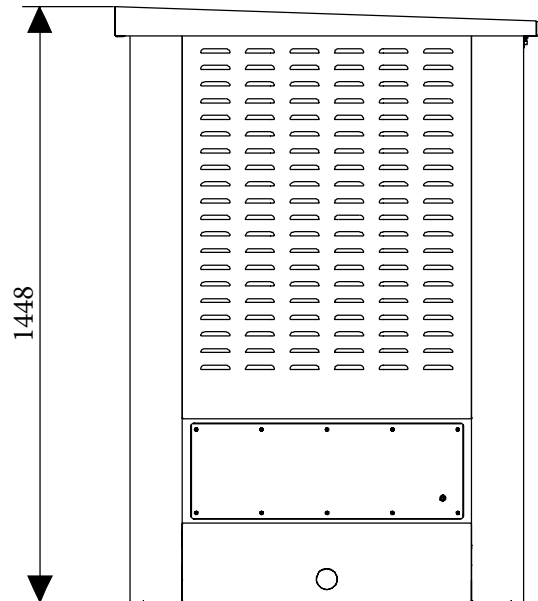


## 2.3 DIMENSIONS

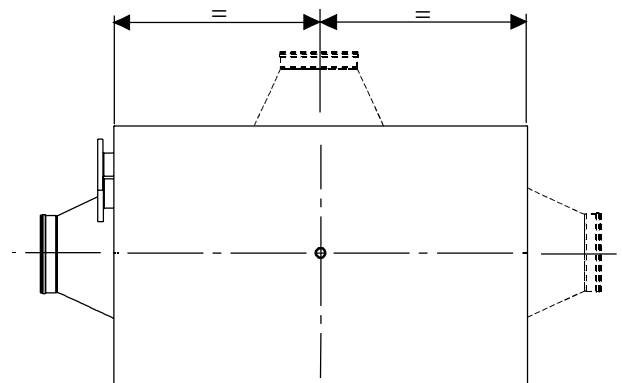
FRONT VIEW



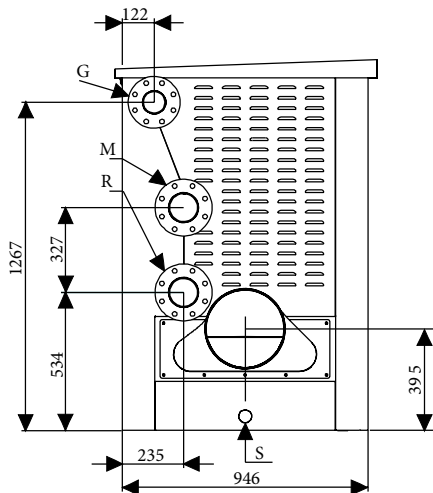
RIGHT SIDE VIEW  
(Supply condition for left side attachments)



TOP VIEW



LEFT SIDE VIEW



### Flue outlets:

Left side (supply condition)

Right side

Rear side

| ARES Tec                |           | 440     | 550     | 660     | 770     | 900     |
|-------------------------|-----------|---------|---------|---------|---------|---------|
| <b>Dimensions</b>       | Unit      |         |         |         |         |         |
| Heating elements        | n°        | 4       | 5       | 6       | 7       | 8       |
| Height                  | mm        | 1448    | 1448    | 1448    | 1448    | 1448    |
| Width "L"               | mm        | 1087    | 1355    | 1355    | 1623    | 1623    |
| Width "L1"              | mm        | 1039    | 1307    | 1307    | 1575    | 1575    |
| Depth                   | mm        | 946     | 946     | 946     | 946     | 946     |
| <b>Attachment sizes</b> |           |         |         |         |         |         |
| G Gas fitting           | mm (inch) | 80 (3)  | 80 (3)  | 80 (3)  | 80 (3)  | 80 (3)  |
| F System flow           | mm (inch) | 100 (4) | 100 (4) | 100 (4) | 100 (4) | 100 (4) |
| R System return         | mm (inch) | 100 (4) | 100 (4) | 100 (4) | 100 (4) | 100 (4) |
| Flue fitting            | mm        | 250     | 250     | 300     | 300     | 300     |
| Condensate drain        | mm        | 40      | 40      | 40      | 40      | 40      |

**2.4 OPERATING DATA / GENERAL CHARACTERISTICS**

| <b>ARES Tec</b>   |                   | <b>440</b>         | <b>550</b>         | <b>660</b>         | <b>770</b>         | <b>900</b>         |
|---|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Boiler category   |                   | II <sub>2H3P</sub> | II <sub>2H3P</sub> | II <sub>2H3P</sub> | II <sub>2H3P</sub> | II <sub>2H3P</sub> |
| Nominal heat input on L.V.C. Q <sub>n</sub>                           | kW                | 432                | 540                | 648                | 756                | 864                |
| Minimum heat input on L.C.V. Q <sub>min</sub>                         | kW                | 22                 | 22                 | 22                 | 22                 | 22                 |
| Nominal effective power (Tr 60 / Tf 80°C) P <sub>n</sub>              | kW                | 424,27             | 530,33             | 636,40             | 742,47             | 848,53             |
| Minimum effective power (Tr 60 / Tf 80°C) P <sub>n</sub> min          | kW                | 20,57              | 20,57              | 20,57              | 20,57              | 20,57              |
| Nominal effective power (Tr 30 / Tf 50°C) P <sub>cond</sub>           | kW                | 445,39             | 557,82             | 670,03             | 783,22             | 900,29             |
| Minimum effective power (Tr 30 / Tf 50°C) P <sub>cond</sub> min       | kW                | 23,94              | 23,94              | 23,94              | 23,94              | 23,94              |
| Efficiency at nominal power (Tr 60 / Tf 80°C)                         | %                 | 98,21              | 98,21              | 98,21              | 98,21              | 98,21              |
| 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)                         | %                 | 103,1              | 103,3              | 103,4              | 103,6              | 104,2              |
| Efficiency at minimum power (Tr 30 / Tf 50°C)                         | %                 | 108,8              | 108,8              | 108,8              | 108,8              | 108,8              |
| Efficiency class according to directive 92/42 EEC                     | --                | 4                  | 4                  | 4                  | 4                  | 4                  |
| Combustion efficiency at nominal load                                 | %                 | 98,28              | 98,28              | 998,28             | 98,28              | 98,30              |
| Combustion efficiency at minimum load                                 | %                 | 98,45              | 98,45              | 98,45              | 98,45              | 98,45              |
| Losses from operating burner casing                                   | %                 | 0,1                | 0,1                | 0,1                | 0,1                | 0,1                |
| Losses from burner casing when switched off                           | --                | 0,1                | 0,1                | 0,1                | 0,1                | 0,1                |
| Chimney losses with burner on   | %                 | 1,55               | 1,55               | 1,55               | 1,55               | 1,55               |
| Flue temperature at net of Tf-Ta (max)                                | °C                | 45,4               | 45,5               | 45,5               | 45,5               | 45,3               |
| Maximum flue flow rate (max)  | kg/h              | 706,0              | 882,5              | 1059,1             | 1235,6             | 1412,1             |
| Air excess  | %                 | 25,5               | 25,5               | 25,5               | 25,5               | 25,5               |
| (**) CO <sub>2</sub> (min/max)  | %                 | -                  | -                  | -                  | -                  | -                  |
| NO <sub>x</sub> (weighted value according to EN 15420)                | mg/kWh            | 47                 | 47                 | 47                 | 47                 | 47                 |
| NO <sub>x</sub> class   | --                | 5                  | 5                  | 5                  | 5                  | 5                  |
| Water flow rate at nominal power (ΔT 20°C)                            | l/h               | 18243,5            | 22804,4            | 27365,2            | 31926,1            | 36487,0            |
| Minimum pressure of heating circuit                                   | bar               | 0,5                | 0,5                | 0,5                | 0,5                | 0,5                |
| Maximum pressure of heating circuit                                   | bar               | 6,0                | 6,0                | 6,0                | 6,0                | 6,0                |
| Water content   | l                 | 73                 | 88                 | 103                | 118                | 133                |
| Methane gas consumption G20 (supp.press. 20 mbar) at Q <sub>n</sub>   | m <sup>3</sup> /h | 45,68              | 57,10              | 68,52              | 79,94              | 91,36              |
| Methane gas consumption G20 (supp.press. 20 mbar) at Q <sub>min</sub> | m <sup>3</sup> /h | 2,33               | 2,33               | 2,33               | 2,33               | 2,33               |
| Gas consumption G25 (supp.press. 20/25 mbar) at Q <sub>n</sub>        | m <sup>3</sup> /h | 53,13              | 66,41              | 79,69              | 92,97              | 106,25             |
| Gas consumption G25 (supp.press. 20/25 mbar) at Q <sub>min</sub>      | m <sup>3</sup> /h | 2,71               | 2,71               | 2,71               | 2,71               | 2,71               |
| Propane gas consumption (supp.press. 37/50 mbar) at Q <sub>n</sub>    | kg/h              | 33,53              | 41,92              | 50,30              | 58,68              | 67,07              |
| Propane gas consumption (supp.press. 37/50 mbar) at Q <sub>min</sub>  | 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              | 69,5               | 86,9               | 104,3              | 121,7              | 139,1              |
| <b>Emissions</b>  |                   |                    |                    |                    |                    |                    |
| CO with 0% of O <sub>2</sub> in the exhaust                           | ppm               | <95                | <95                | <95                | <95                | <95                |
| NO <sub>x</sub> with 0% of O <sub>2</sub> in the exhaust              | ppm               | <30                | <30                | <30                | <30                | <30                |
| Sound   | dBA               | <49                | <49                | <49                | <49                | <49                |
| <b>Electrical data</b>  |                   |                    |                    |                    |                    |                    |
| 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

(\*\*\*) 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 explicitly intended use. Any other use must be considered improper and therefore dangerous.

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



### ATTENTION!

These appliances are designed exclusively for installation inside suitable technical compartments.



Before connecting the boiler, have professionally qualified personnel:

- a) **Accurately washing all of the pipes in the system to remove any residues or sediments could stop the boiler from running efficiently, even in terms of health and hygiene.**
- b) Making sure the boiler is set up to operate with the available type of fuel. The type of fuel is stated on the packaging and technical characteristics plate.
- c) Make sure that the chimney/flue has an adequate draught, that it is not choked, and that there are no other exhausts for other appliances, unless the flue is designed for multiple utilities, in accordance with standard specifications and requirements in force. Only once this check has been carried out can the fitting between boiler and chimney/flue be set up.



### ATTENTION!

In rooms with aggressive vapour or dust, the appliance must operate independently of the air in the room of installation!



### ATTENTION!

The appliance must be installed by a qualified technician possessing professional-technical qualifications in accordance with the law, who, under his/her own responsibility, enforces the observance of regulations according to the rules of good practice.



### ATTENTION!

Assemble the appliance in observance of the minimum required distances for installation and maintenance.



The boiler must be connected to a heating system compatibly with its specifications and power.

## 3.2 PACKAGING

The ARES Tec boiler is supplied assembled in a sturdy cardboard box.



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

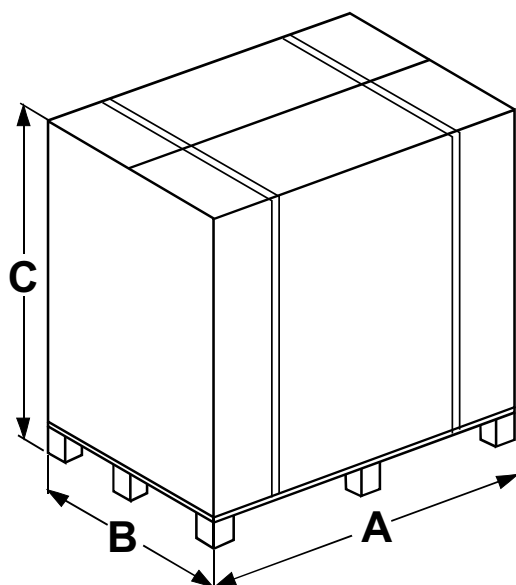


Packaging materials (cardboard box, straps, plastic bags, etc.) **constitute a potential hazard and must be kept out of the reach of children.**

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

To take the boiler off of the pallet it is necessary to use a jib crane, to avoid damaging it.

- Remove the casings and harness it using slings "A" fig. 3 being careful to pass the slings through the load bearing crossbeams of the frame
- Tie the slings to the jib "B". Perform these operations with caution.



| 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               |

Composition of packaging:

**on the left side of the boiler:**

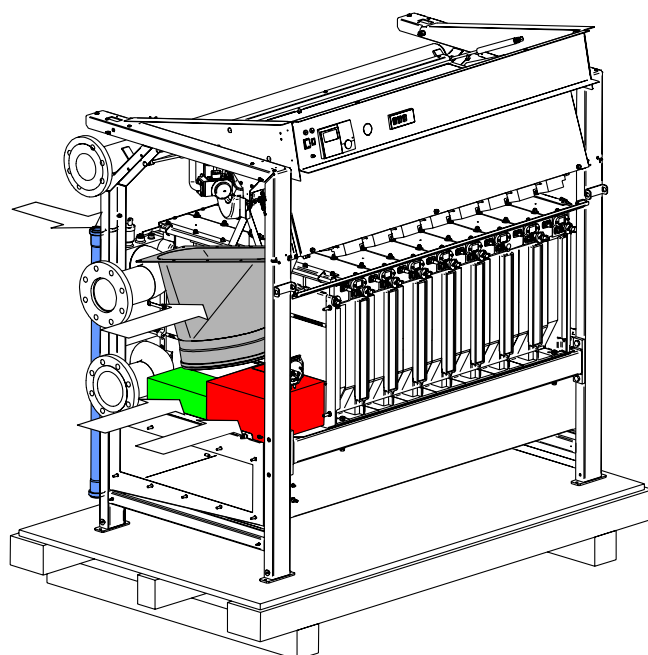
- The flue exhaust manifold.
- A cardboard box containing:
  - Gasket between pan and terminal
  - Collar gasket (Ø 250) Ø 300
  - Two bends + one T + plastic cap for condensate drain
  - Screws required to secure the flue terminal
- The probes: external, flow, storage tank.
- Flue inspection cap.
- Kit of resistances.
- Plate and fairlead 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:
  - Installer and maintenance technician instructions handbook
  - System manager instructions handbook
  - TGC control unit user handbook
  - Warranty certificate
  - Hydraulic test certificate
  - Control unit handbook
  - Spare parts stub



### 3.3 OPERATION TO UNLOAD AND REMOVE THE PACKAGING



**ATTENTION!**

Handle using forklift or hoist and sling.

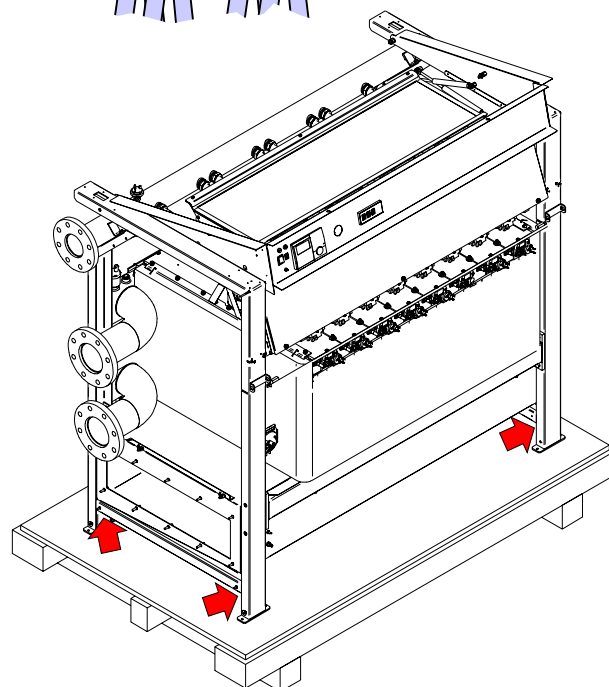
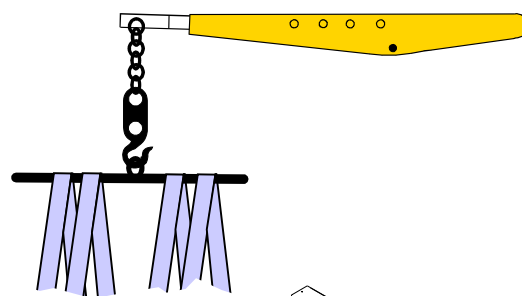
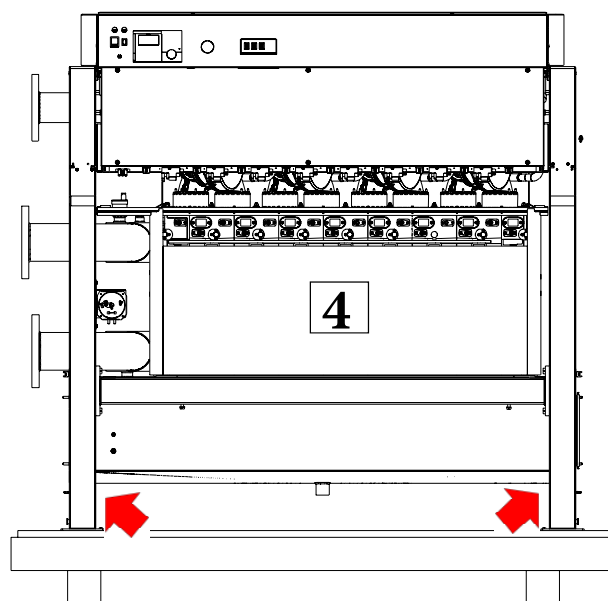
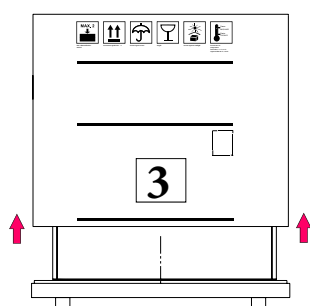
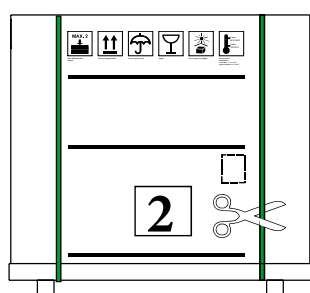
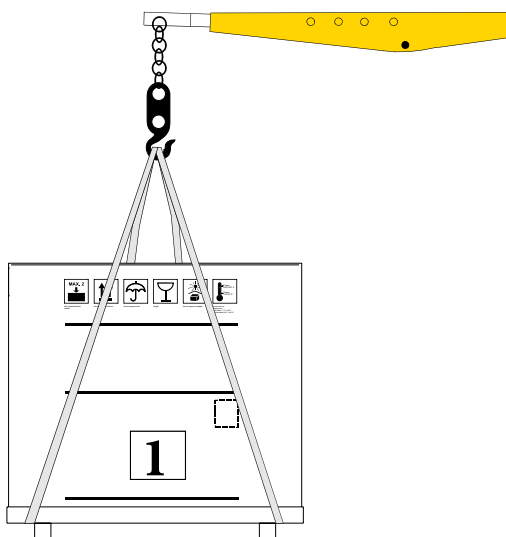


**ATTENTION!**

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

To take the boiler off of the pallet it is necessary to use a jib 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.
- Tie the slings to the jib. Perform these operations with caution.



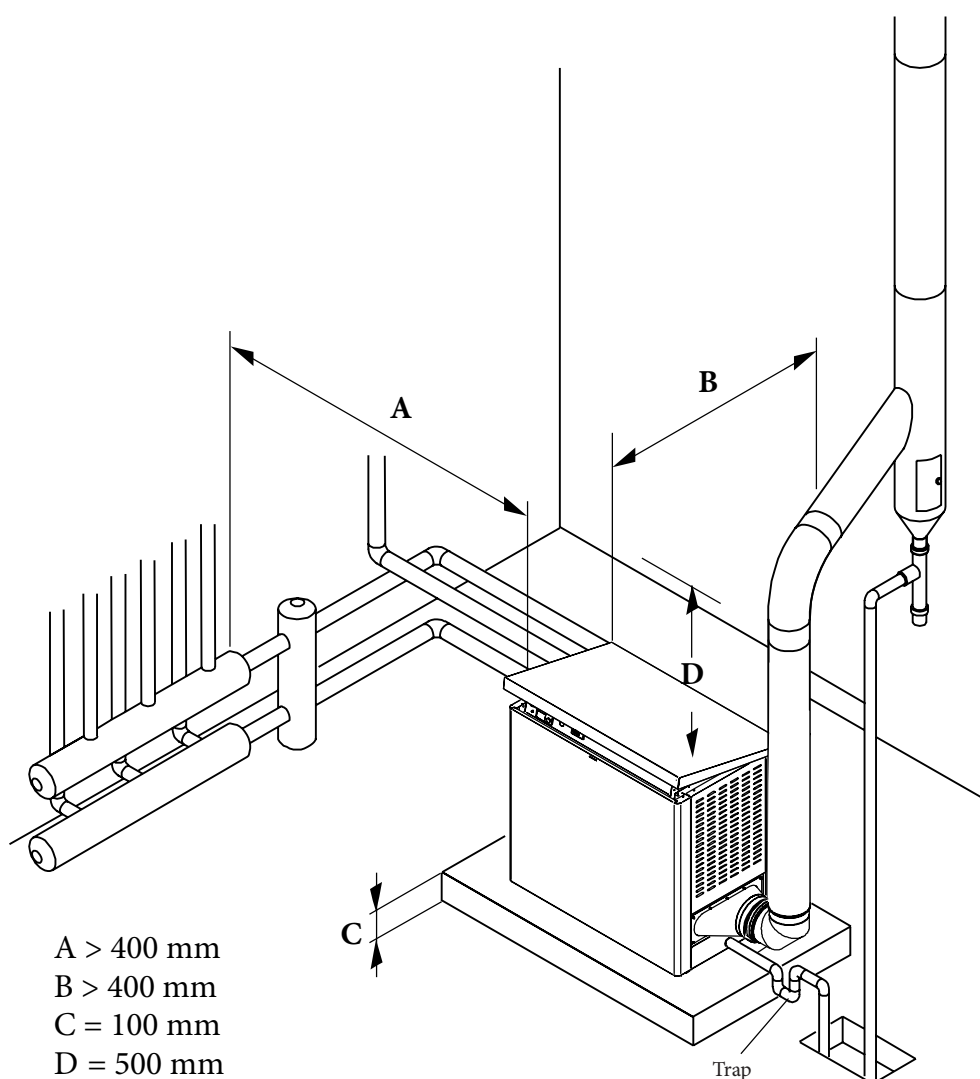
### 3.4 POSITIONING THE HEATING CONTROL UNIT

Special attention must be paid to local standards and regulations regarding heating control units, especially the minimum distances that must be observed.

Installation must comply with the requirements contained in the most recent standards and legislation regarding heating control units, heating system installation and hot water production, ventilation, flues suitable for condensation boiler combustion product exhaust, and any other applicable regulation.

The boiler can be placed on a flat platform that is sufficiently sturdy in size, in plan, 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 trap can be built from this platform, next to the boiler, at a depth of 100 mm so that the trap can be placed in it (Parag. 3.16).

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



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



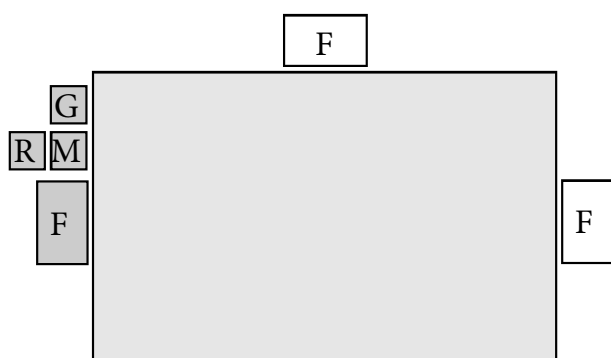
## 3.5 CONNECTING THE BOILER



The ARES Tec boiler leaves the factory set up for the hydraulic (flow and return) and gas connections located on the left side of the boiler.

To fasten the flue exhaust manifold use the screws and gaskets contained in the accessory kit box and a 10 mm socket key.

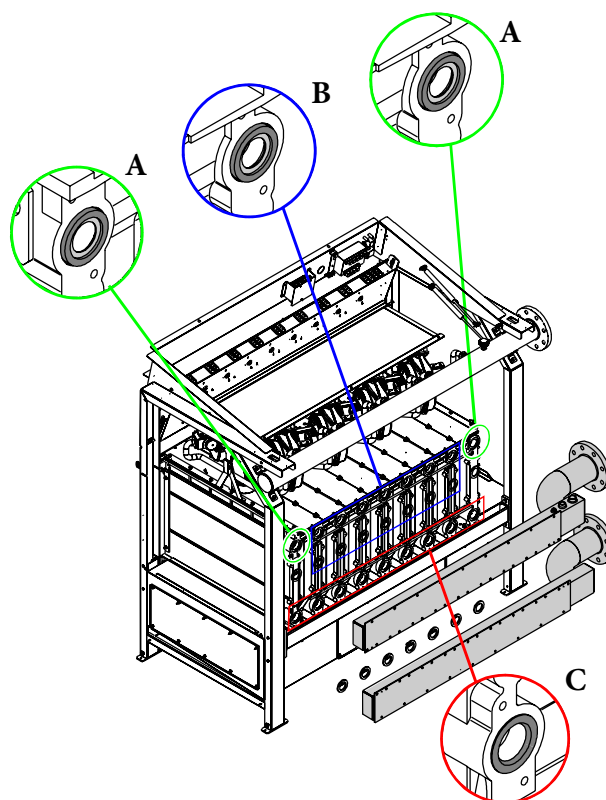
The flue exhaust manifold is set up on the LEFT SIDE. It is also possible to set up the outlet on the RIGHT and REAR SIDE.



**Diaphragms and gaskets.**

**Diaphragm** installed on the first and last element of the flow manifold Ø 18 (A), internal Ø 27 (B).

**Gaskets** installed on all of the other elements (C).



### 3.6 GAS CONNECTION

The gas intake pipe must be connected to the boiler using the respective G 3/8" fitting as indicated in parag. 2.3.

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

It is nevertheless advisable to adhere to the standard specifications and requirements in force, setting up a cut-off valve, gas filter, anti-vibration joint, etc.

Before commissioning an internal gas distribution system and therefore, before connecting it to the meter, it is necessary to thoroughly check the seal.

If any part of the system is not in view, the sealing test must be carried out before covering the pipe.



**Danger!**

The gas connection must be set up by an authorised installation technician who must observe and apply the contents of the legislation in force 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 fuel intake pipe thoroughly, in order to remove any residues that could stop the boiler from operating smoothly.

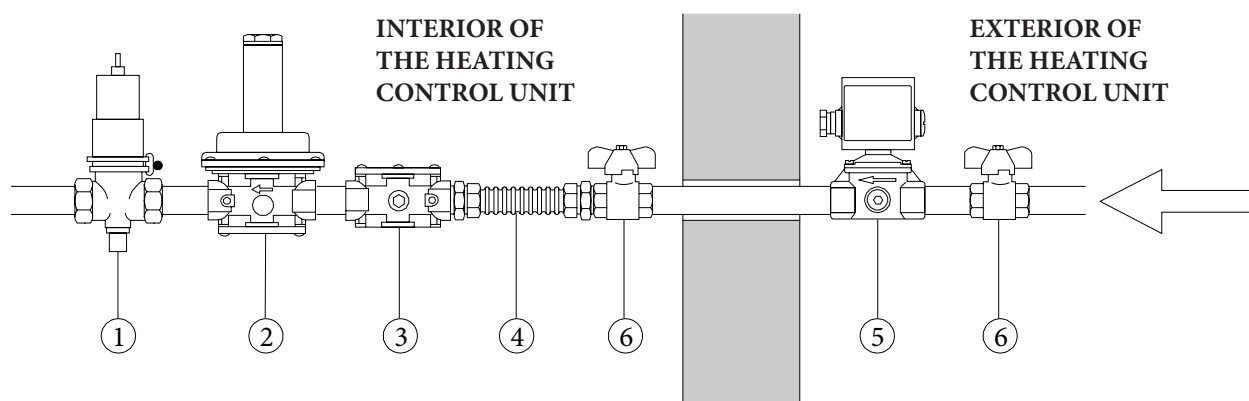
If you notice the smell of gas:

- Do not work the 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;
- Close the gas valves;
- Seek the assistance of professionally qualified personnel.



In order to prevent any gas leaks it is advisable to install a surveillance and protection system composed of a gas leak detector combined with a cut-off electrovalve on the fuel supply line.

EXAMPLE OF GAS INTAKE SYSTEM



**Key:**

- Fuel shut-off valve
- Double membrane regulator
- Gas filter
- Anti-vibration joint
- Gas electrovalve
- Cut-off valve

## 3.7 SYSTEM FLOW AND RETURN PIPE CONNECTION

The heating flow and return must be connected to the boiler by the respective 4" fittings F and R as indicated in parag. 2.3.

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 degassing of the system.



### ATTENTION!

**Before connecting the boiler to the system proceed by thoroughly washing 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.**

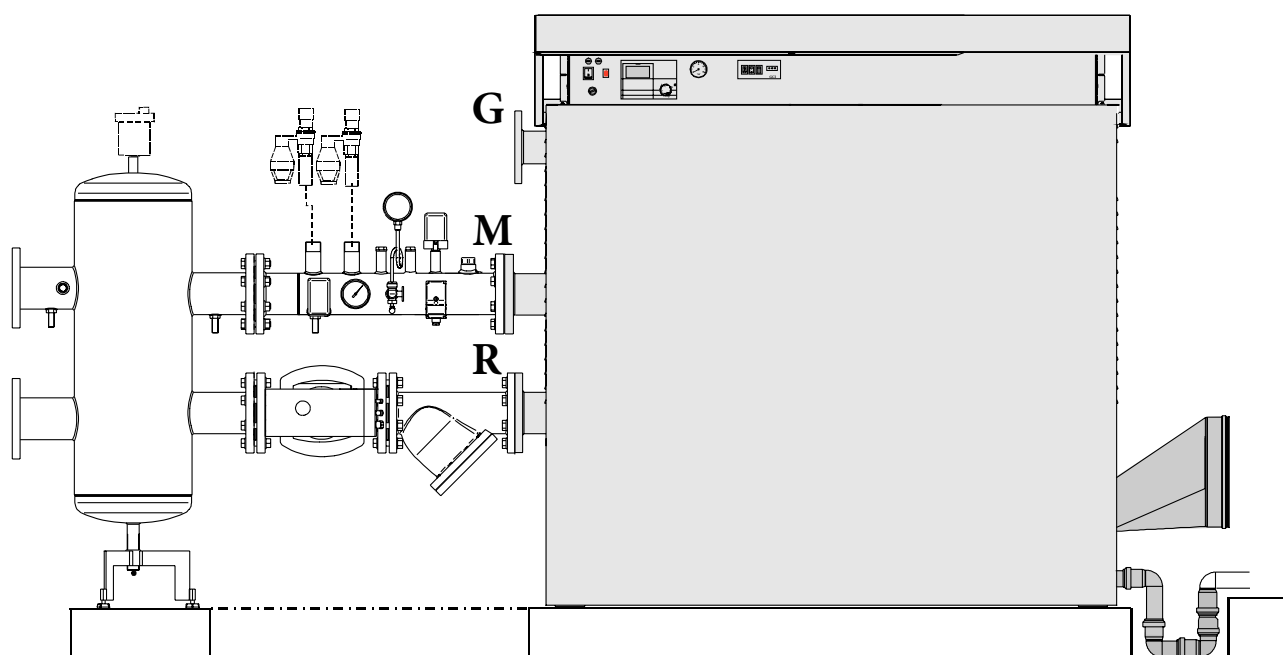


Make sure the pipes in the system are not used as earthing connections for the electrical or telephone system. They are absolutely not suitable for this purpose. Serious damage to pipes, boiler and radiators could occur in a short amount of time.



### ATTENTION!

**IT IS ABSOLUTELY FORBIDDEN TO SET UP CUT-OFF DEVICES ON THE GENERATOR BEFORE THE SAFETY DEVICES.**



### 3.8 ADDITIONAL SAFETY, PROTECTION AND CONTROL DEVICES

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

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

The boiler is not equipped with an expansion vessel on 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 dimensions of the expansion vessel depend on the data for the central heating system. Install a vessel with a capacity, determined by an authorised designer, that responds to the requisites of the standards in force.

#### 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 generator output (flow pipe) at a distance of < 500 mm, and must not have a cut-off device installed on it. **Not supplied by Immergas.**
- 2 **Safety valve:** this has the function of unloading the fluid contained in the generator into the atmosphere when it reaches the maximum operating temperature for any reason. **Not supplied by Immergas.**

#### 2a Visible draining funnel. Not supplied by Immergas.

Set up 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!

Remember it is forbidden to set up any type of cut-off device between the boiler and the safety valve, and it is also advisable to use valves for operation that does not exceed the maximum allowed operating pressure.

#### Attention!

Set up a runoff pipe with funnel and trap on the heating safety valve, that lead to a suitable drain. The drain must be visually controlled.

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.

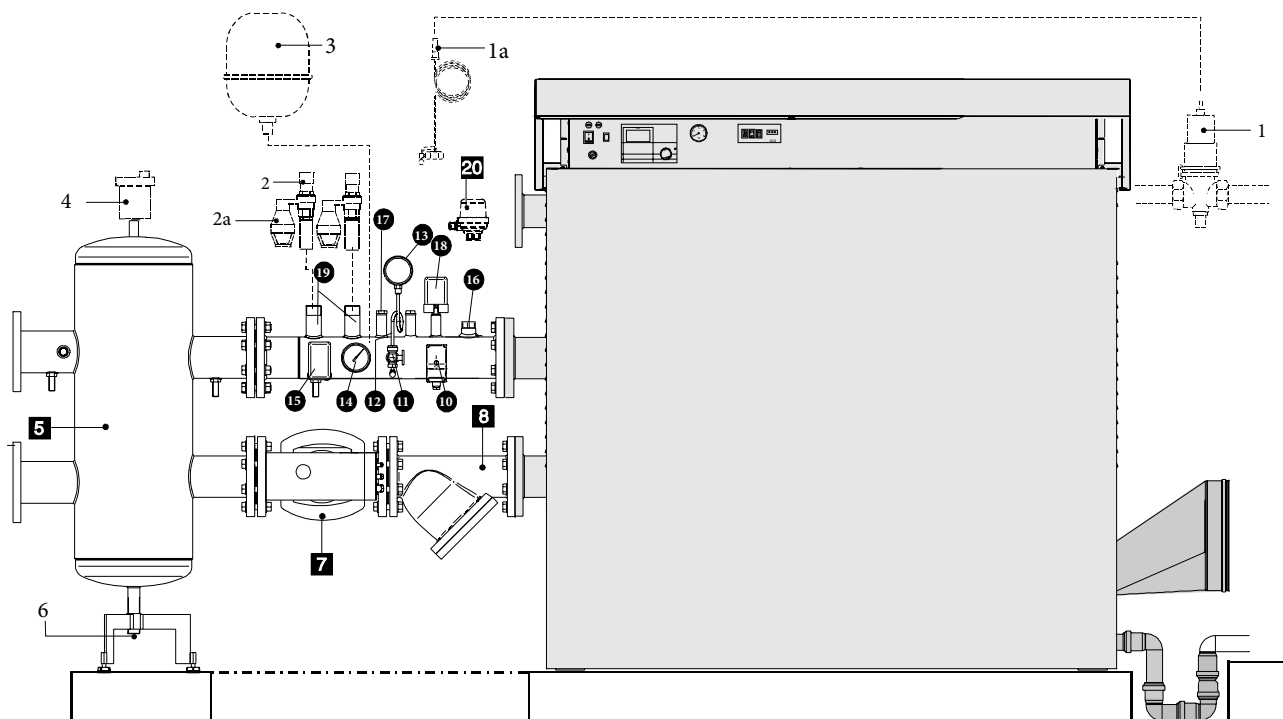
#### Protection devices.

- 10 **Safety thermostat:** this is designed to stop the generator 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 stop the generator if the minimum operating pressure drops (can be calibrated between 0.5 ÷ 1.7 bar). It must be manually re-armed.
- 16 **Extra sleeve G1".**
- 18 **Safety pressure switch:** this is designed to stop the generator if the maximum operating pressure is reached (can be calibrated between 1 ÷ 5 bar).

#### Control devices.

- 13 **(Pressure indicator - not supplied by Immergas) with (12) damper pipe and (11) pressure gauge valve:** it indicates the existing effective pressure in the generator, 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 effective temperature of the water contained in the generator, it must be graduated in centigrade with a full scale of no more than 120°C.
- 17 **Inspection traps:** approved for the inclusion of control devices.
- 19 **G1 ¼" stub pipes:** for the inclusion of safety valves.
- 20 **Flow switch:** this is designed to stop the generator in case of poor water circulation inside the primary ring.
- 3 **Approved expansion vessel:** this absorbs the increase in volume of water in the system following an increase in temperature. **Not supplied by Immergas.**
- 8 **Y strainer.**
- 7 **Modulation pump (Not included in the kit).**
- 5 **Hydraulic separator (Not included in the kit).**
- 4 **Bleeder valve. Not supplied by Immergas.**
- 6 **Draining valve. Not supplied by Immergas.**

## 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 deaeration
- hydraulic decoupling between the two hydraulic circulation rings
- balancing the circuits

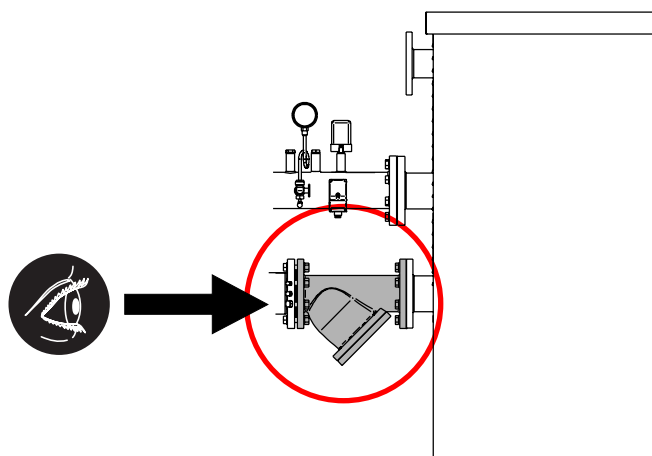
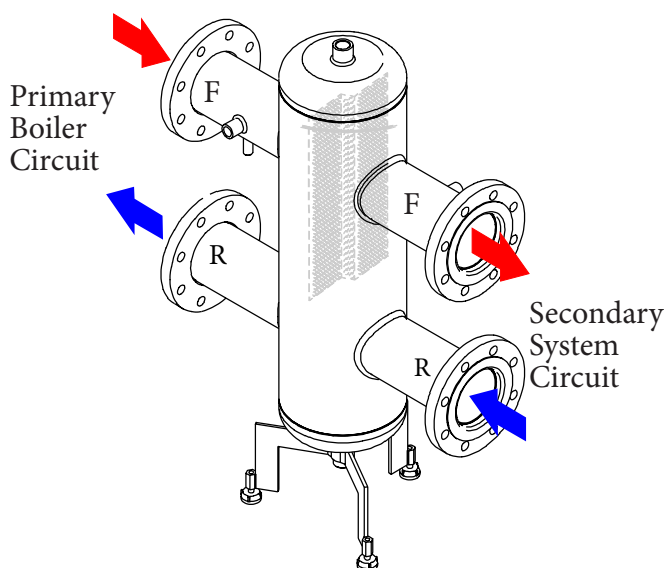
### 3.10 HYDRAULIC SYSTEM FILTER



mod.  
ARES Tec 440 ÷ 900 kW

It is advisable to install a Y strainer in the boiler return pipe.  
This filter will protect the boiler from sediments coming from the heating system.

Ø  
DN 100



**Hydraulic separator 440 ÷ 900 kW**

F = DN 100 - (G 4")

R = DN 100 - (G 4")

## INSTRUCTIONS FOR THE INSTALLER

### 3.11 DETERMINING THE PRIMARY CIRCUIT PUMP OR BOILER PUMP

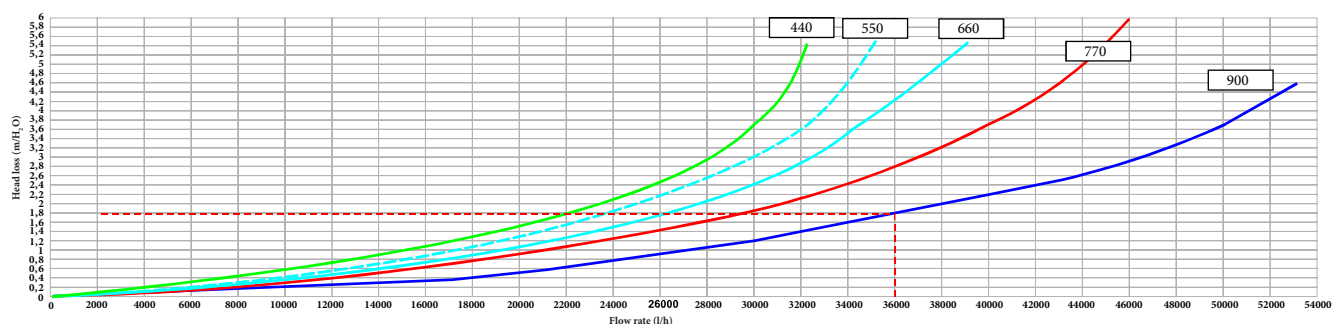
Immergas provides a series of primary rings complete with an accurately sized pump, if alternative solutions are being used, the boiler pump must have a head that is capable of ensuring the flow rates represented in the "Water side head losses" graph.

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



The pumps must be determined 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  $\Delta T$  20K, of an ARES 900 Tec 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/H<sub>2</sub>O.

**NOTE:** It is always advisable to set up a hydraulic compensator between the boiler circuit and the system circuit. It becomes **ESSENTIAL** if the system requires greater flow rates than the maximum allowed by the boiler, i.e.  $\Delta t$  below 15K.

### 3.12 BALL VALVES

It is advisable to install cut-off ball valves on the flow and return pipes of the system.

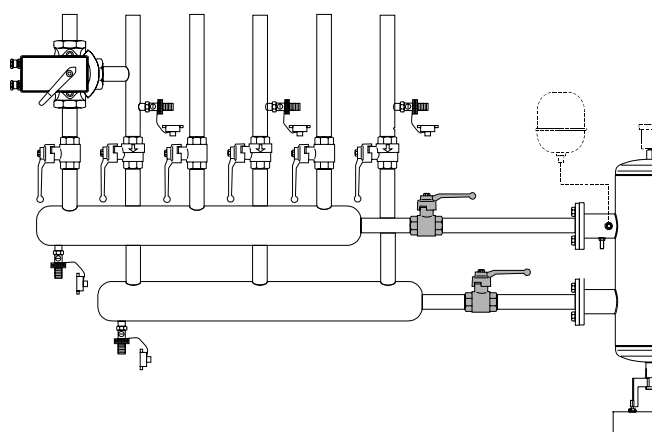


#### ATTENTION!

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

In this way the boiler, during scheduled/unscheduled maintenance, can be disconnected or emptied without emptying the entire system.

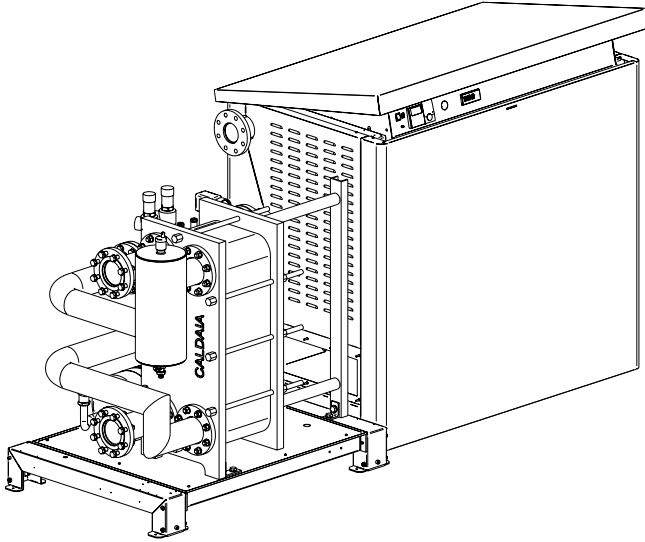
Secondary circuit



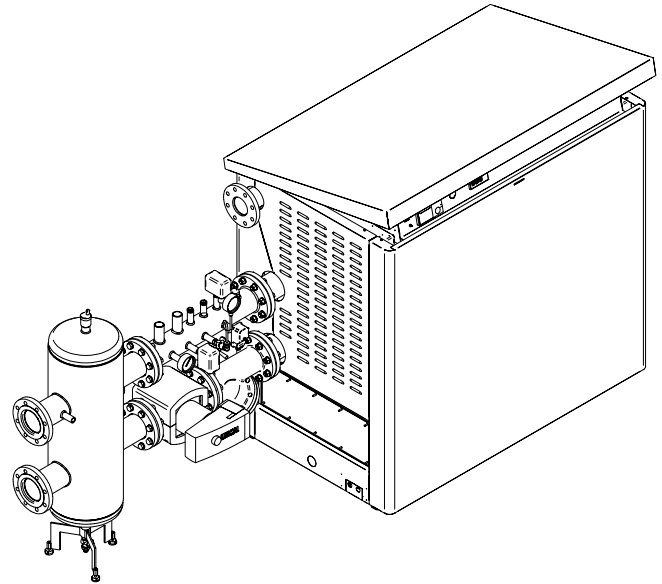


### 3.13 COMPLETE OPTIONAL KITS

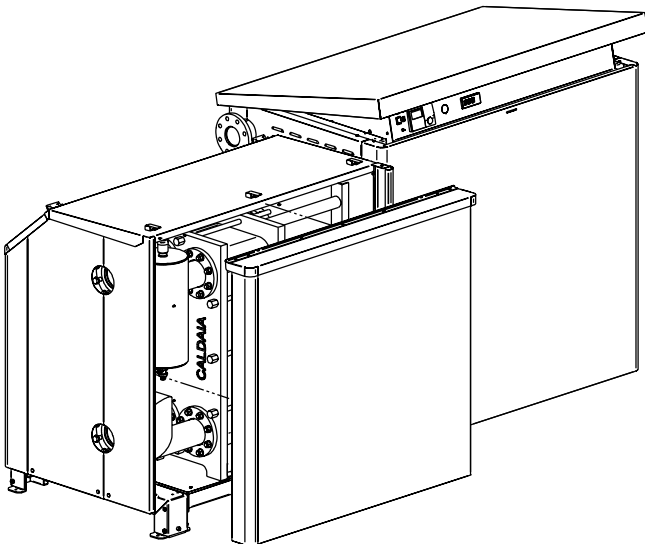
Safety kits including pump and plate exchanger.



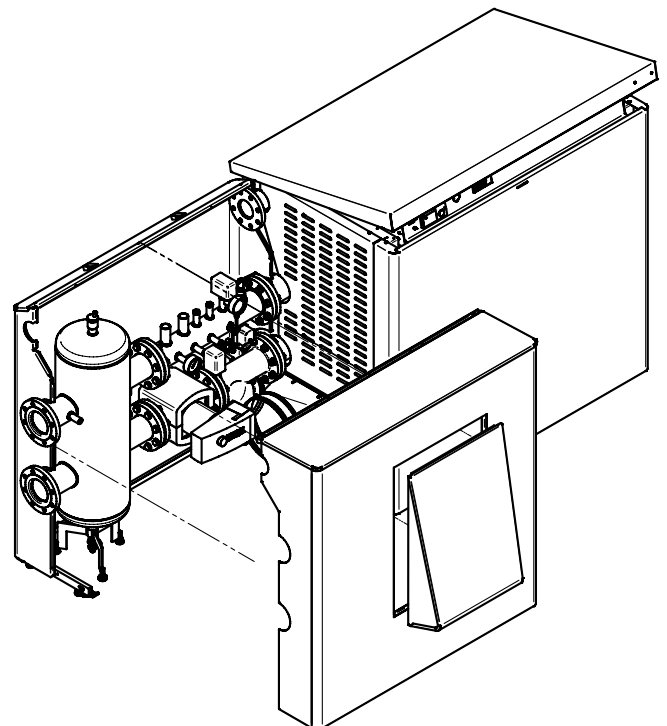
Safety kits including pump and hydraulic separator.



External covering kit for plate exchanger kit.



External covering kit for hydraulic separator.



### 3.14 CONDENSATE DRAIN

The condensate drain into the sewer must be:

- built to avoid gaseous combustion products from leaking out into the environment or the sewer (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 evacuation 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 evacuation 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 figure.

It is forbidden to drain the condensate towards rain pipes, given the risk of ice and degradation of materials normally used to build the rain pipes themselves.

The drain fitting must be visible.

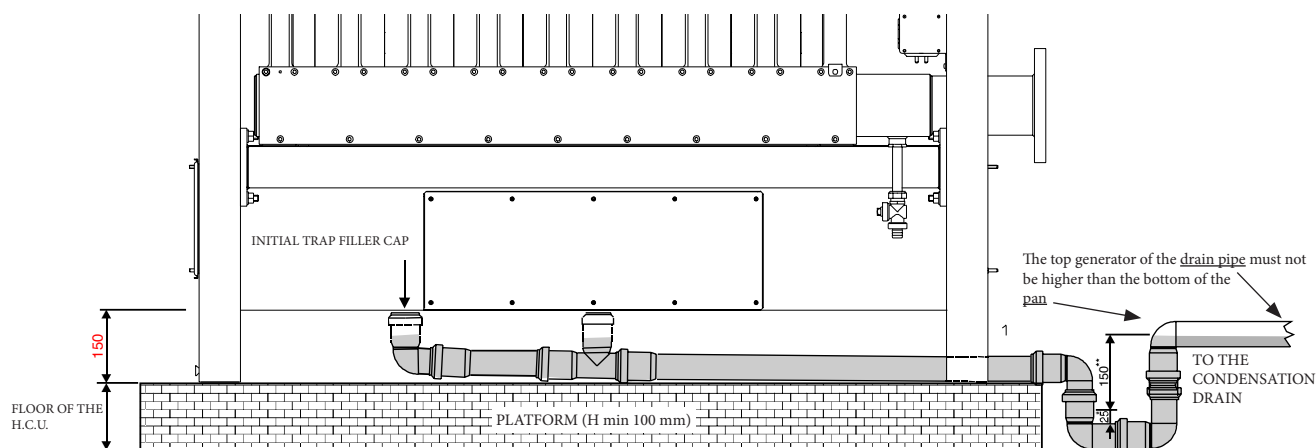
Given the degree of acidity of the condensate (pH between 3 and 5) suitable plastic materials must be used to build the drain pipes.

The condensate drain pipe outlet is set up towards the connection side of the flue box manifold, removing the pre-sectioned part on the cover panel.

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



**Before igniting the generator, fill the trap through the relative cap.**



\* Minimum safety trap enforced by regulation

\*\* Minimum head with boiler operating at maximum power.

If you do not want to or are able to create a platform, 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

Exhaust is discharged at very low temperatures (Max 84°C approx) in condensation boilers. It is therefore necessary for the flue to be perfectly impermeable to combustion product condensate and built with suitable corrosion-resistant materials.

The various slip on joints must be well-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 combustion product evacuation system, for its entire length, must not drop below 0°C.

For condensation operating conditions of the appliance at project outdoor temperatures, it will be necessary to build a confluent condensate drainage system, based on the installation conditions, either to the boiler collection tank or separate from it.

**The flue exhaust pipe must comply with local and national regulations.**

**The evacuation pipe must be built using materials that are resistant to the combustion products, typically class W1 certified stainless steel or plastic materials.**

Such as PVDF (polyvinylidimethylfluoride) 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 and nevertheless due to failure to observe the instructions provided by the manufacturer.**

| Model | Modules | Ø Attachment |
|-------|---------|--------------|
| 440   | 4       | 250          |
| 550   | 5       | 250          |
| 660   | 6       | 300          |
| 770   | 7       | 300          |
| 900   | 8       | 300          |

## 3.16 FLUE EXHAUST MANIFOLD CONNECTION

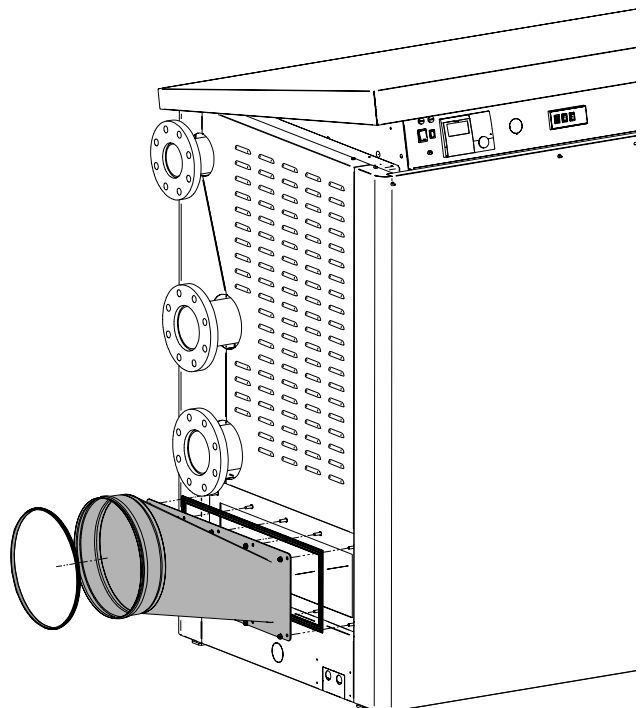
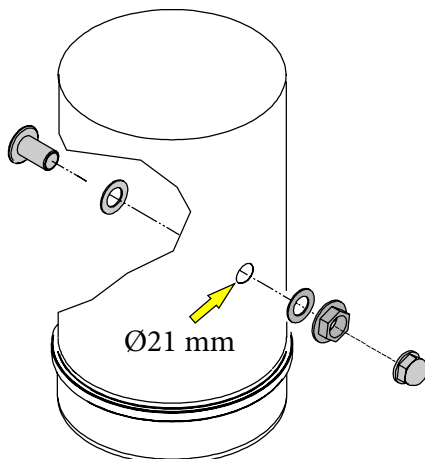


To secure the flue exhaust manifold use the 10 nuts + CH 10 washers contained in the bag.



**The flue point must be positioned on the first straight section, within 1 meter of the boiler.**

To set up the flue inspection point, cut a Ø 21 mm hole in the flue exhaust pipe, and install the inspection point following the sequence provided.

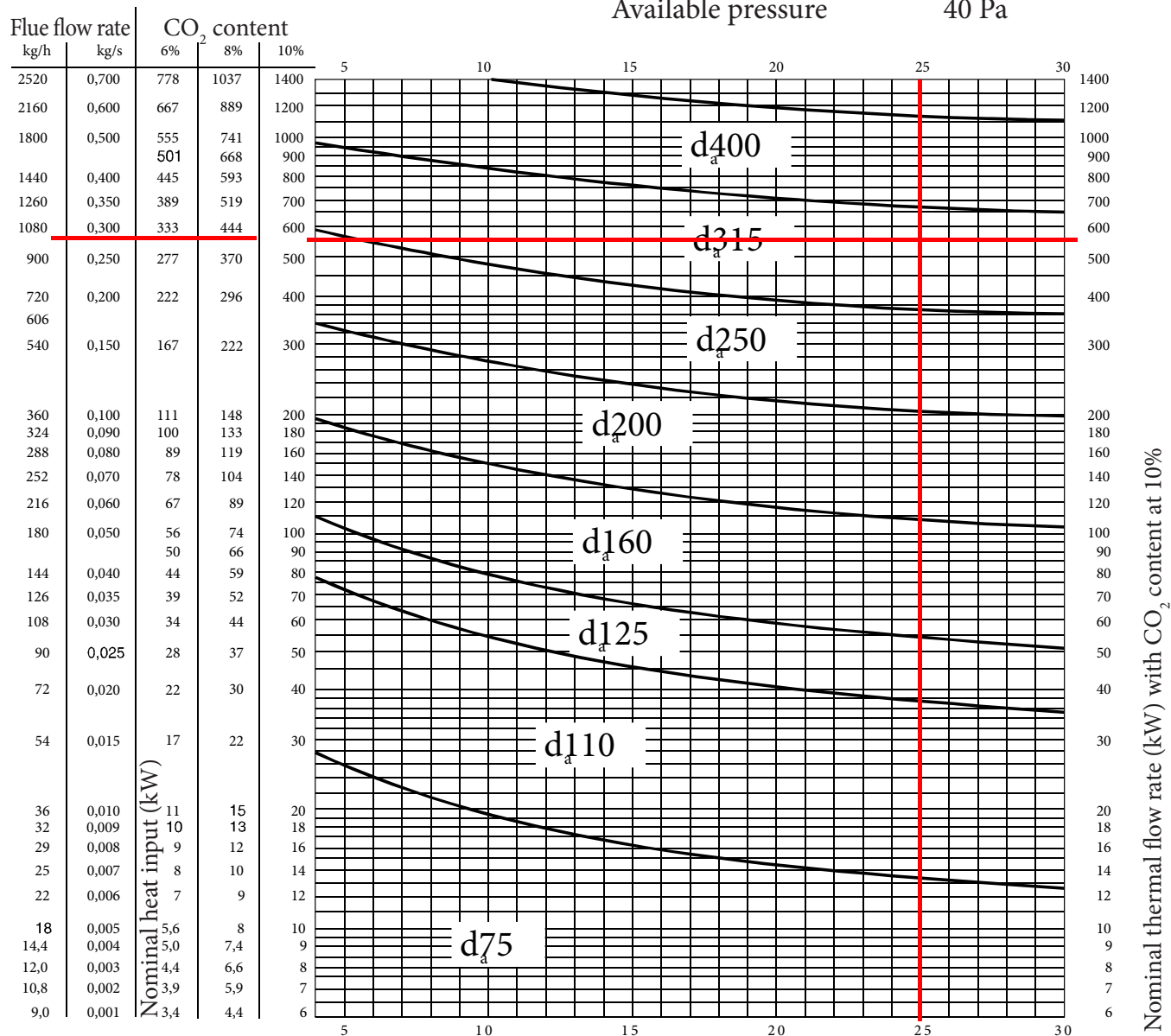


# ERRATA CORRIGE

## INSTRUCTIONS FOR THE INSTALLER

Flue sizing  
according to DIN 4705

Flue temperature 40°C  
Available pressure 40 Pa



| Table of max flue flow rate |                                 |
|-----------------------------|---------------------------------|
| ARES Tec                    | Max flue flow rate (max) kg / h |
| 440                         | 706,0                           |
| 550                         | 882,5                           |
| 660                         | 1059,1                          |
| 770                         | 1235,6                          |
| 900                         | 1412,1                          |

Example:

ARES 660 Tec  
Maximum flue flow rate = 1040 Kg/h  
Height of flue = 25 m  
Diameter = 315 mm



NOTE:

The diagram provides rough values: in any case, 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.

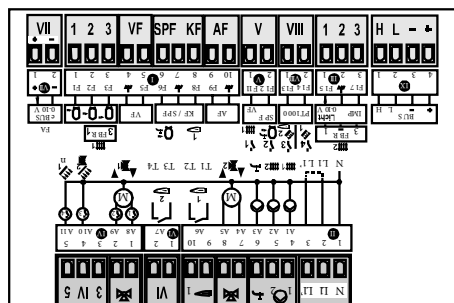
Have professionally qualified personnel make sure the electrical system is suitable for the maximum power absorbed by the appliance, as stated on the plate, making sure in particular that the section of the system's cables is suitable for the power absorbed by the appliance.

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

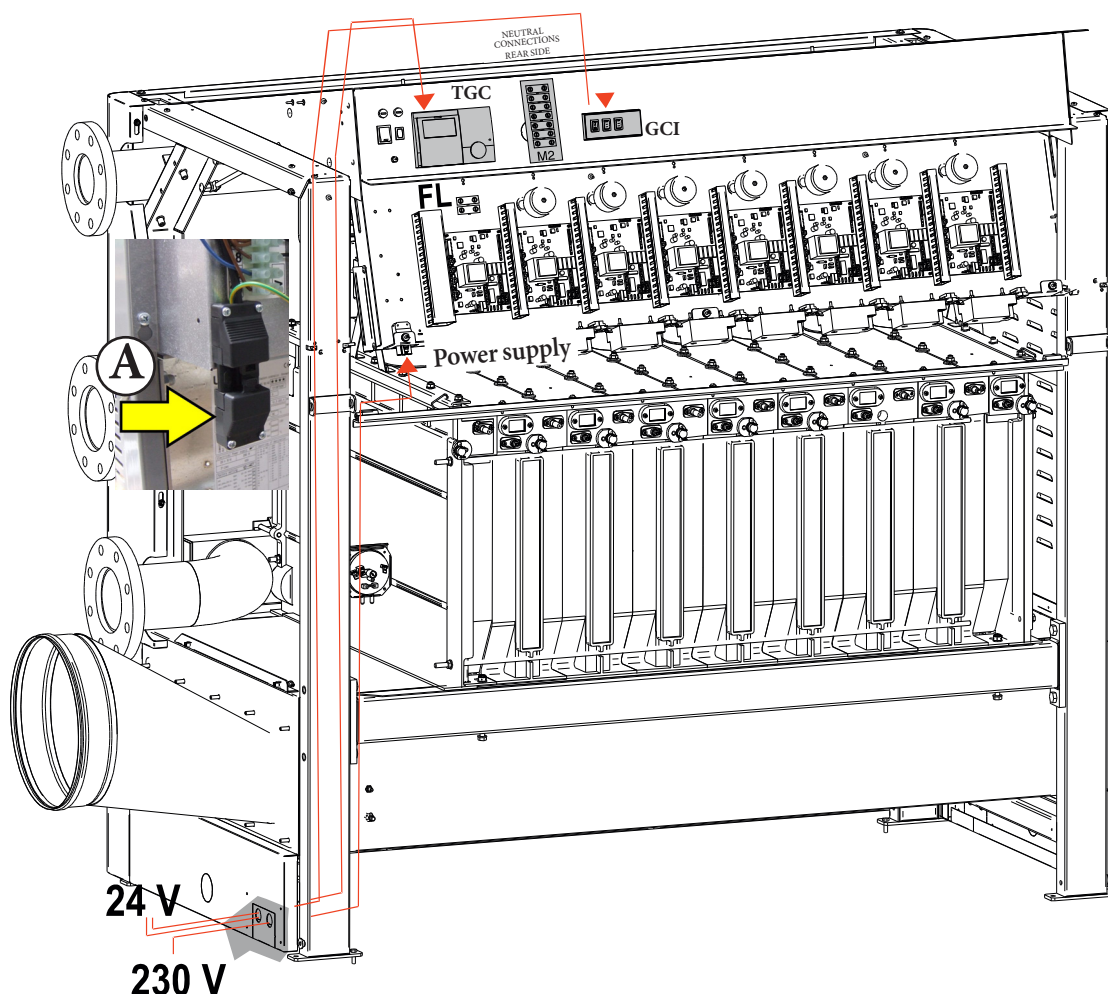
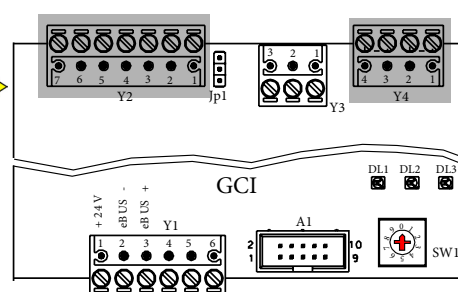
The use of components involving use of electrical power requires some fundamental rules to be observed such as:

- 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 side)



GCI Terminal board (rear side)



## INSTRUCTIONS FOR THE INSTALLER

### 230V ELECTRICAL SUPPLY CONNECTION

The electrical connections are illustrated in section "PRACTICAL CONNECTION DIAGRAM".

The installation of the boiler requires an electrical connection to a 230 V - 50 Hz network: This connection must be set up by state of the art, as envisioned by IEC regulations in force.



#### 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 fuel cut-off valve installed on the gas supply circuit, but not to 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 cut-off the electrical supply and make sure it cannot be accidentally re-connected.

Remember that it is necessary to install a bipolar switch on the electrical supply to the boiler with a max 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 V - 50 Hz single phase, must be carried out on point A, included, with a H05VV-F (PHASE - NEUTRAL - GROUND) three-pole cable with a section between 0.75 mm and 1.5 mm.



#### ATTENTION:

Cables carrying a voltage of 230 V must travel separately from cables carrying a voltage of 24 V.



FL = Flow switch Connection

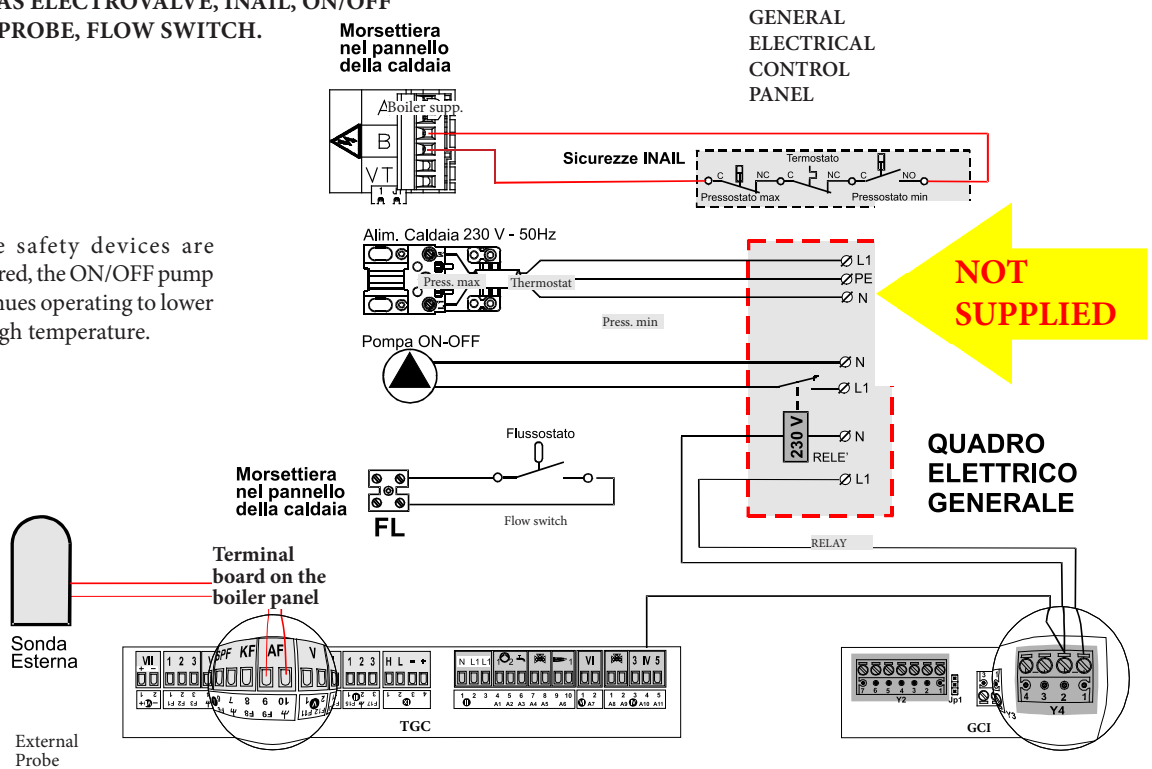


### 3.18 CONNECTION DIAGRAM

POWER SUPPLY, GAS ELECTROVALVE, INAIL, ON/OFF PUMP, EXTERNAL PROBE, FLOW SWITCH.



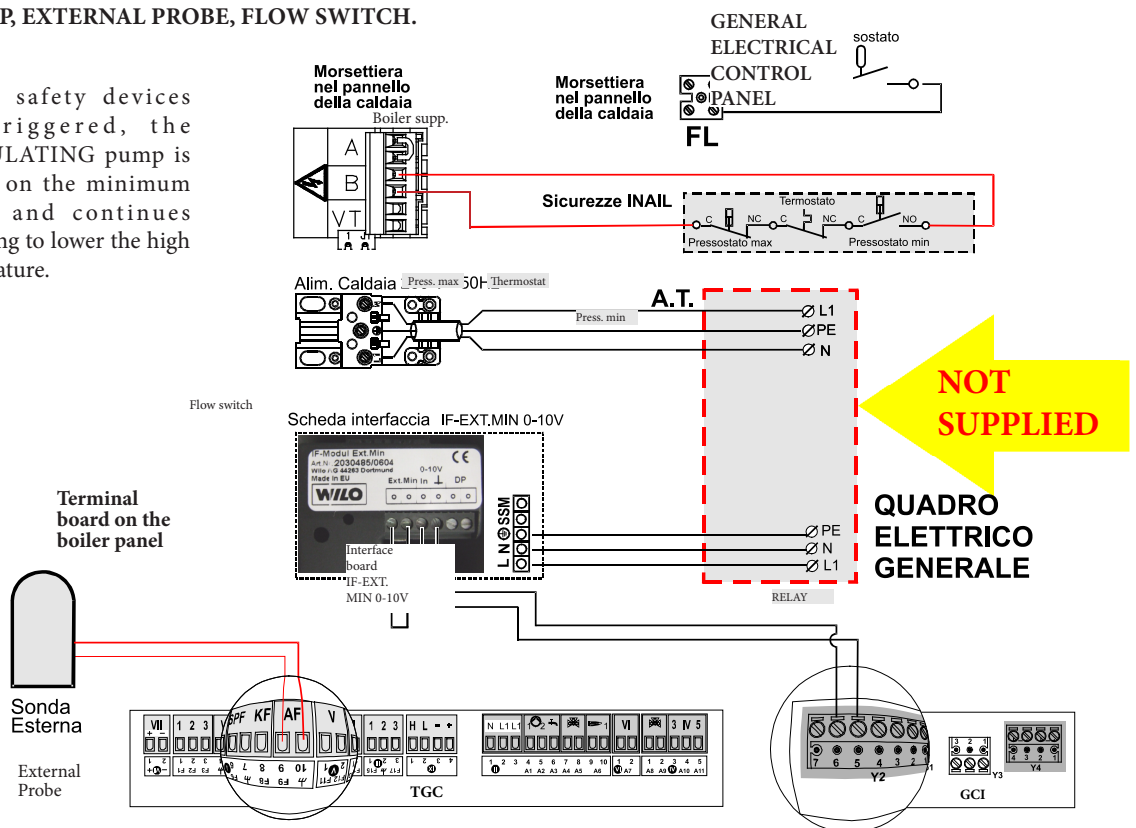
If the safety devices are triggered, the ON/OFF pump continues operating to lower the high temperature.



POWER SUPPLY, GAS ELECTROVALVE, INAIL, MODULATING PUMP, EXTERNAL PROBE, FLOW SWITCH.

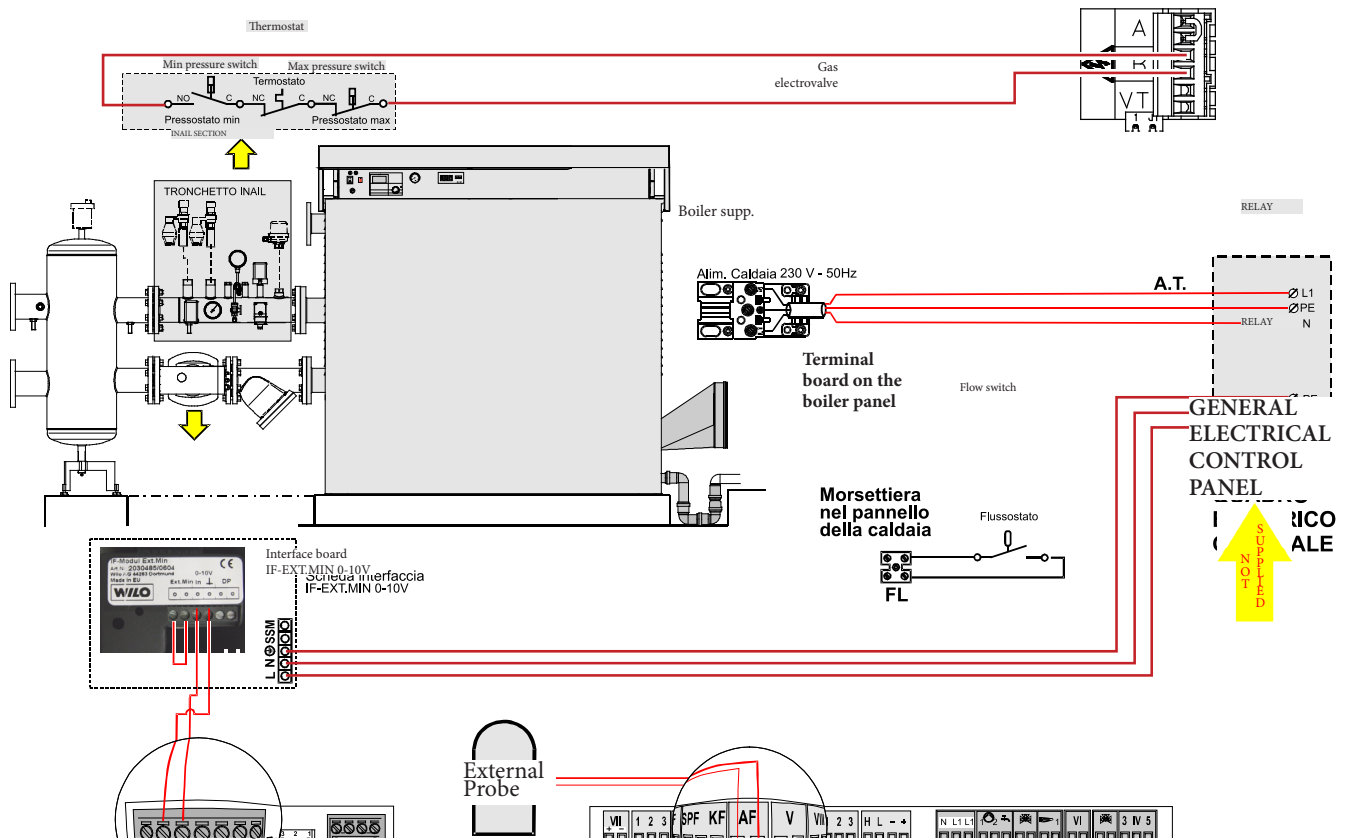


If the safety devices are triggered, the MODULATING pump is placed on the minimum speed and continues operating to lower the high temperature.

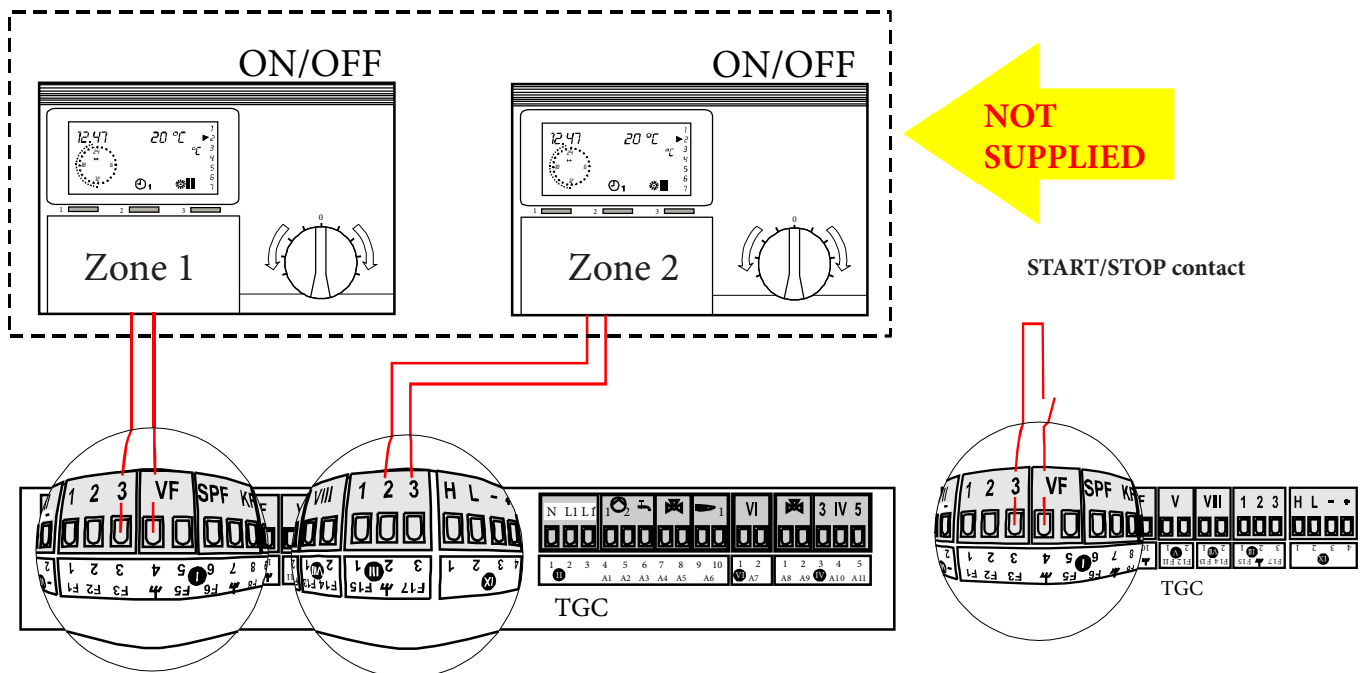


## INSTRUCTIONS FOR THE INSTALLER

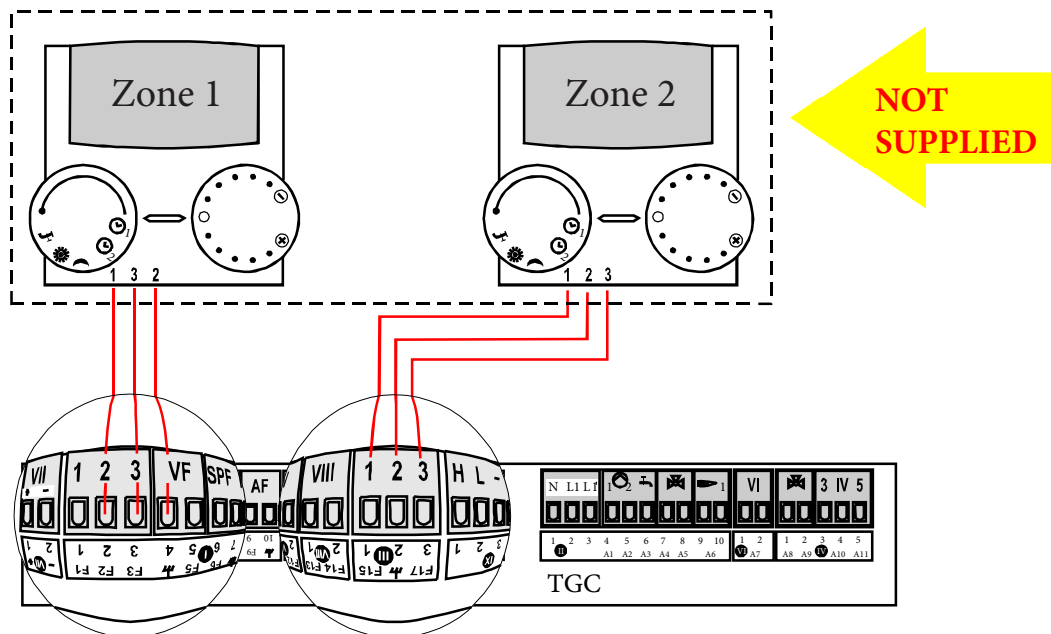
### INAIL SAFETY CONNECTION (SUPPLIED WITH MODULATING PUMP).



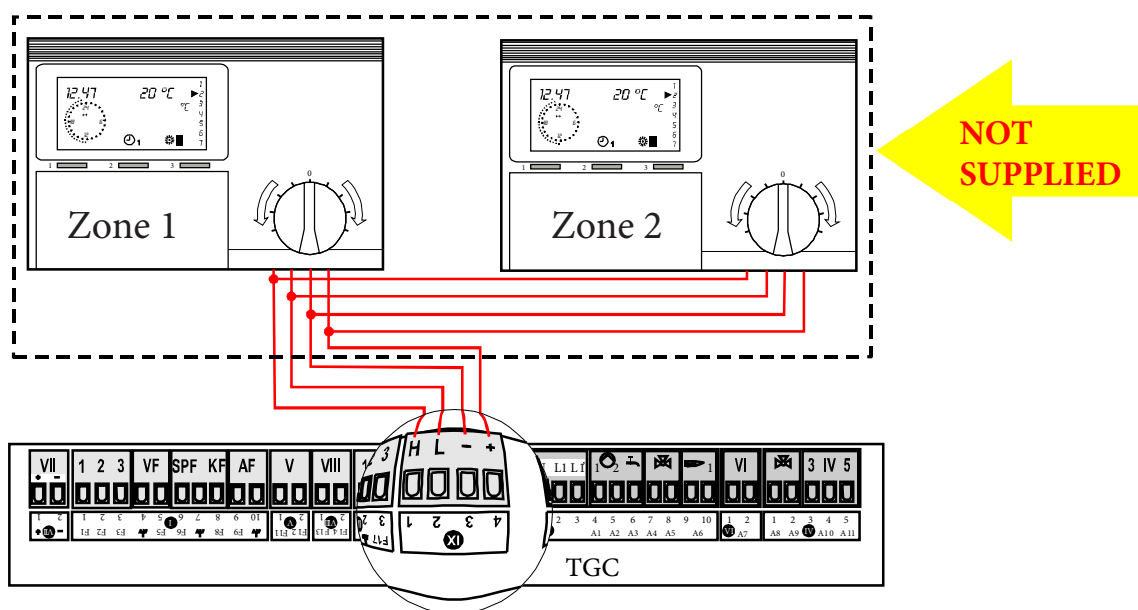
### ON/OFF THERMOSTAT CONNECTION.



MODULATING ROOM THERMOSTATS CONNECTION.

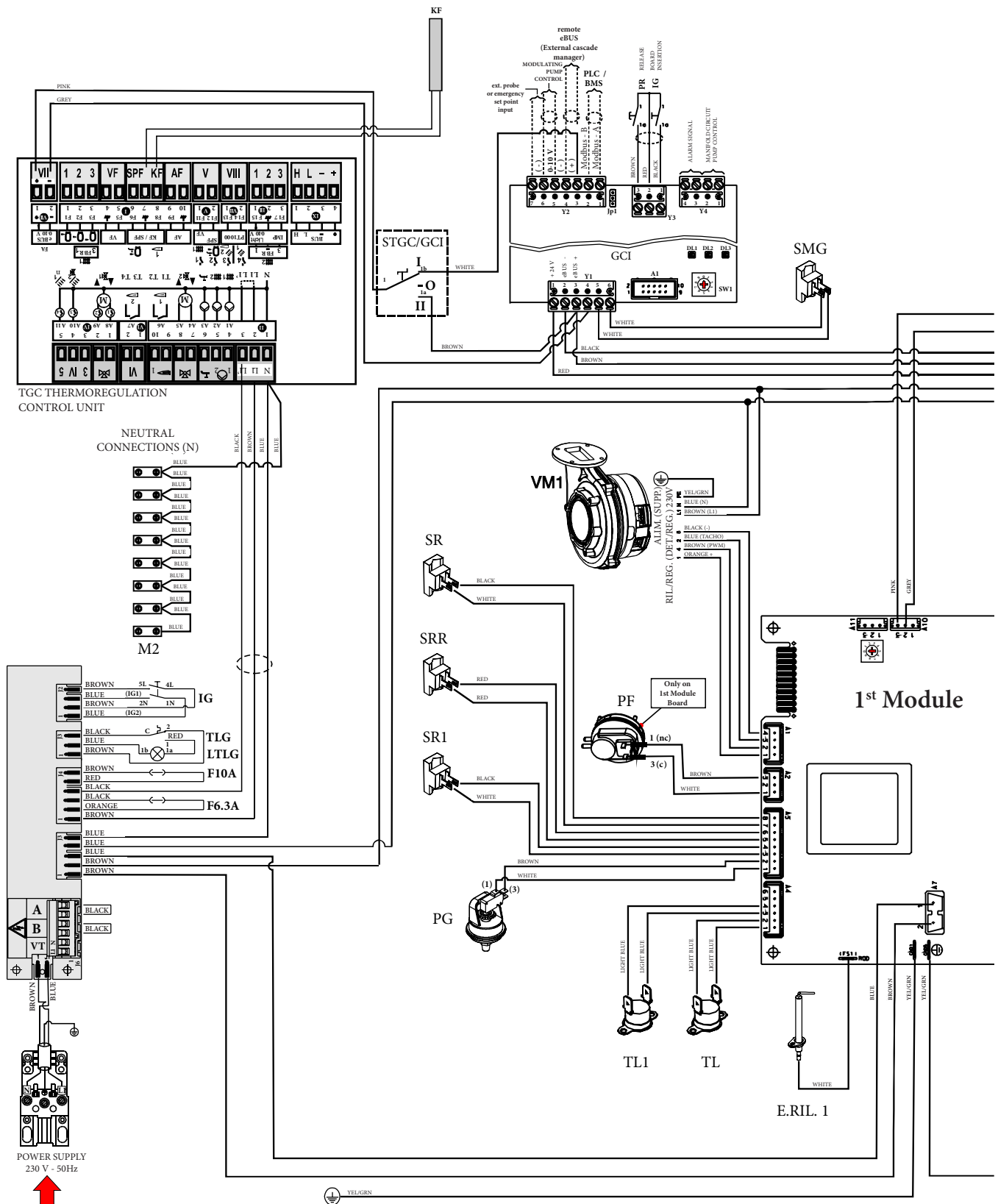


MODULATING ZONE MANAGER CONNECTION.



## INSTRUCTIONS FOR THE INSTALLER

### 3.19 PRACTICAL CONNECTION DIAGRAM

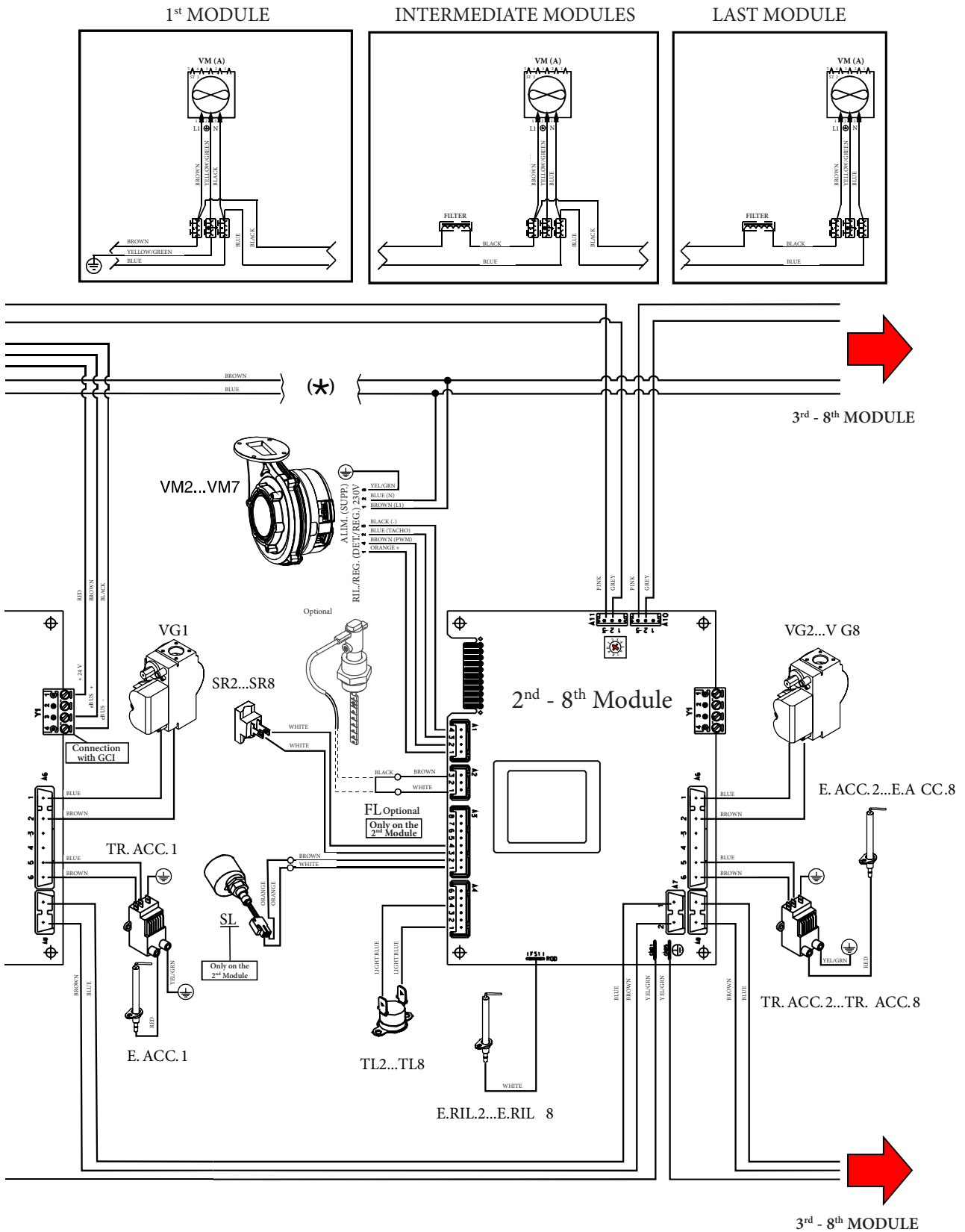


#### Key:

- E.ACC 1...8 - Ignition electrode
- E.RIL 1...8 - Detection electrode
- FL - Blade flow switch (optional)
- IG - Main switch
- KF - TGC global flow probe
- LTGL - Limit thermostat lamp

- PF - Flue pressure switch
- PG - Gas pressure switch
- PV1...8 - Fan pressure switch
- SL - Condensate level sensor
- SMG - GCI global flow probe
- SR - Flow sensor
- SR 1...8 - Local flow sensor

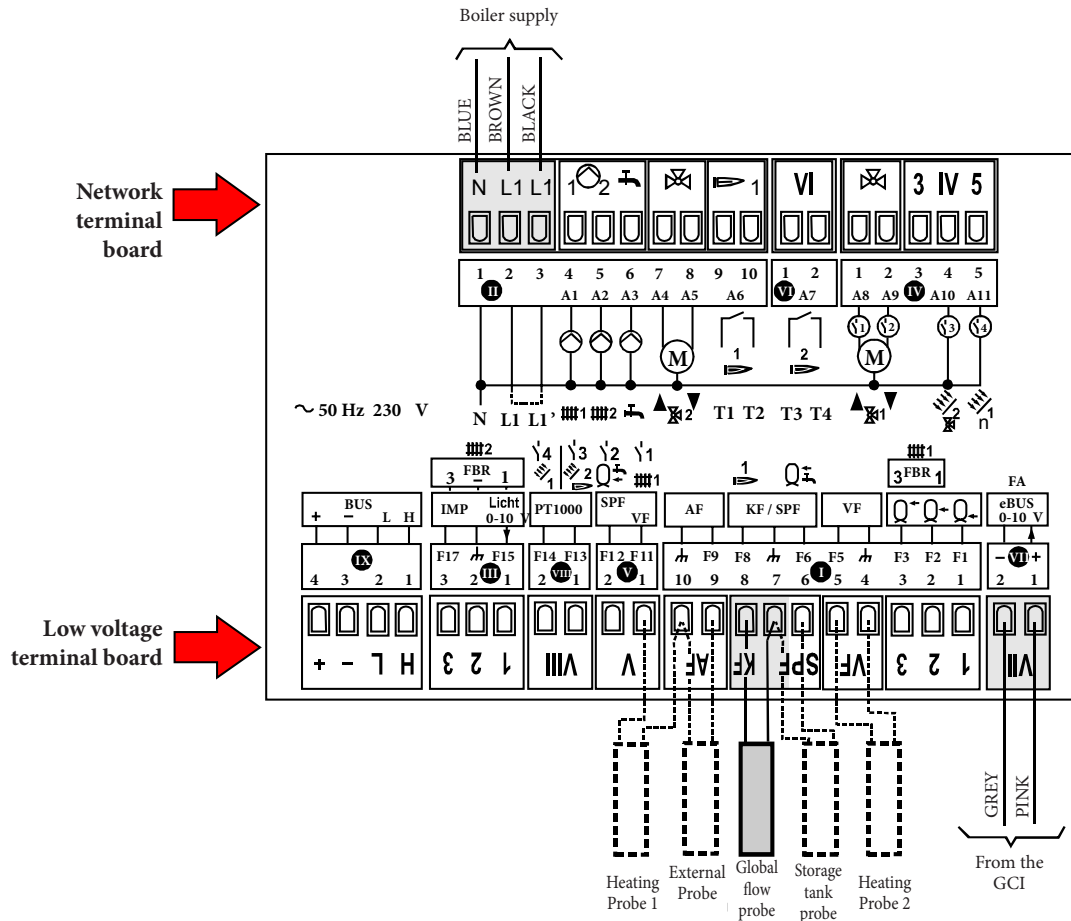
- SRR - Heating return sensor
- TL - Safety thermostat
- TL 1...8 - Local safety thermostat
- TLG - General limit thermostat
- VG 1...8 - Gas valve
- TRA.ACC 1...8 - Ignition transformer
- VM 1...8 - Modulating fan



| Board / module selector positioning | Module 1<br>(Pos 0) | Module 2<br>(Pos 1) | Module 3<br>(Pos 2) | Module 4<br>(Pos 3) | Module 5<br>(Pos 4) | Module 6<br>(Pos 5) | Module 7<br>(Pos 6) | Module 8<br>(Pos 7) |
|-------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                     |                     |                     |                     |                     |                     |                     |                     |                     |

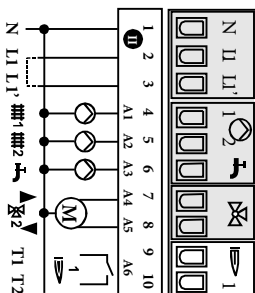
## 3.20 CONNECTIONS AND MANAGEMENT DIAGRAM

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



Description of terminal board for network connections.

### Terminal II

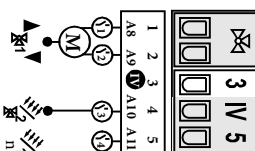


- N: Neutral network cable
- L1: Appliance network supply
- L1': Relay network supply
- 1: Heating circuit pump Heat. Circ. 1
- 2: Heating circuit pump Heat. Circ. 2
- 3: Storage tank load pump
- 4: Mixing valve Heat. circ. 2 OPEN
- 5: Mixing valve Heat. circ. 2 CLOSED
- 6: Multifunction relay '1
- 7: Multifunction relay '2
- 8: Multifunction relay '3
- 9: Multifunction relay '4
- 10: Multifunction relay '5
- A1: Heating circuit pump Heat. Circ. 1
- A2: Heating circuit pump Heat. Circ. 2
- A3: Storage tank load pump
- A4: Mixing valve Heat. circ. 2 OPEN
- A5: Mixing valve Heat. circ. 2 CLOSED
- A6: Multifunction relay '1

### Terminal VI



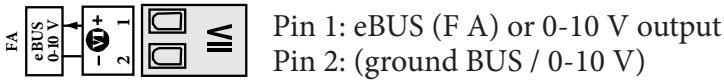
### Terminal IV



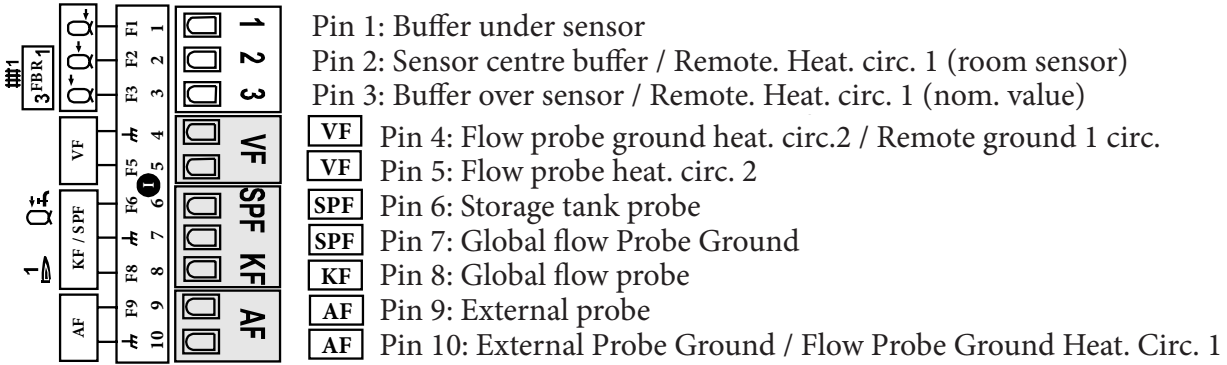
- 1: Mix. Valv. Heat. Circ. 1 OPEN / multifunction relay '1
- 2: Mix. Valv. Heat. Circ. 1 CLOSED / multifunction relay '2
- 3: multifunction relay '3
- 4: multifunction relay '4

## Description of terminal board for low voltage connections.

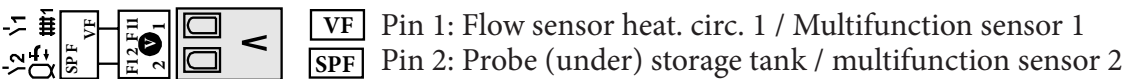
**Terminal VII**  To be connected to the GCI



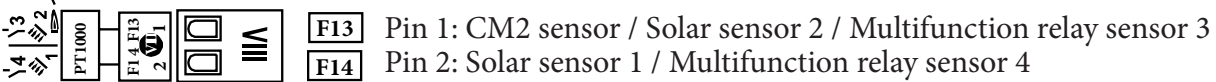
**Terminal I** 



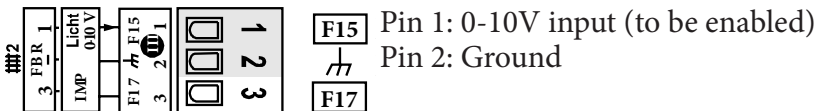
**Terminal V** 



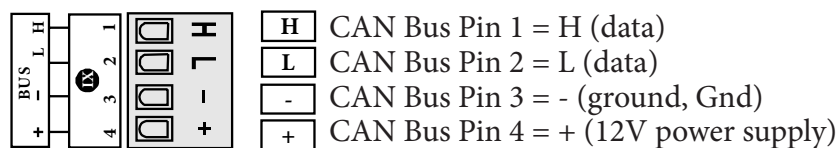
**Terminal VIII**  PT 1000 sensor



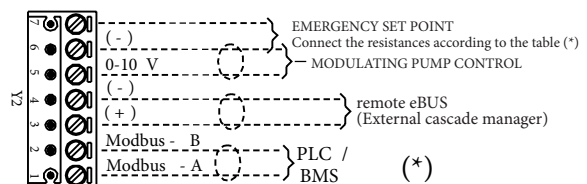
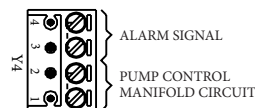
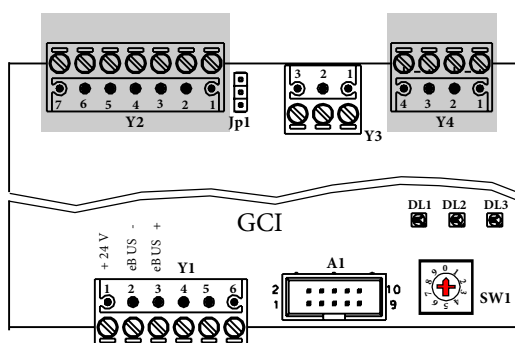
**Terminal III** 



**Terminal IX**  To be connected to remote control devices



## GCI terminal board description



(\*)

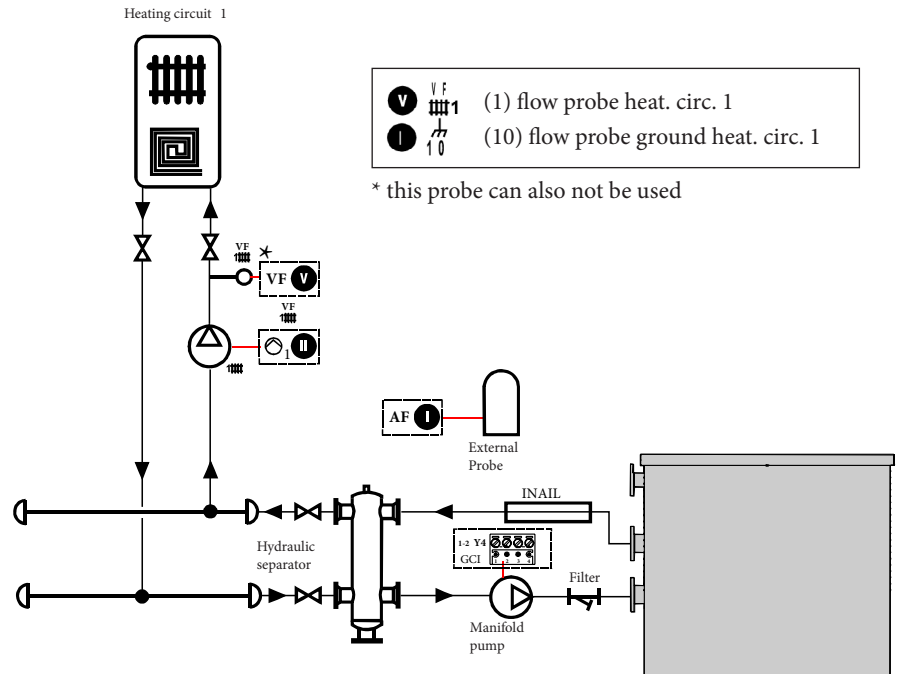
| Ext sens      | Set point |
|---------------|-----------|
| open          | 82°C      |
| 100 KΩ        | 71°C      |
| 47 KΩ         | 60°C      |
| 22 KΩ         | 49°C      |
| 10 KΩ         | 38°C      |
| Short circuit | 27°C      |



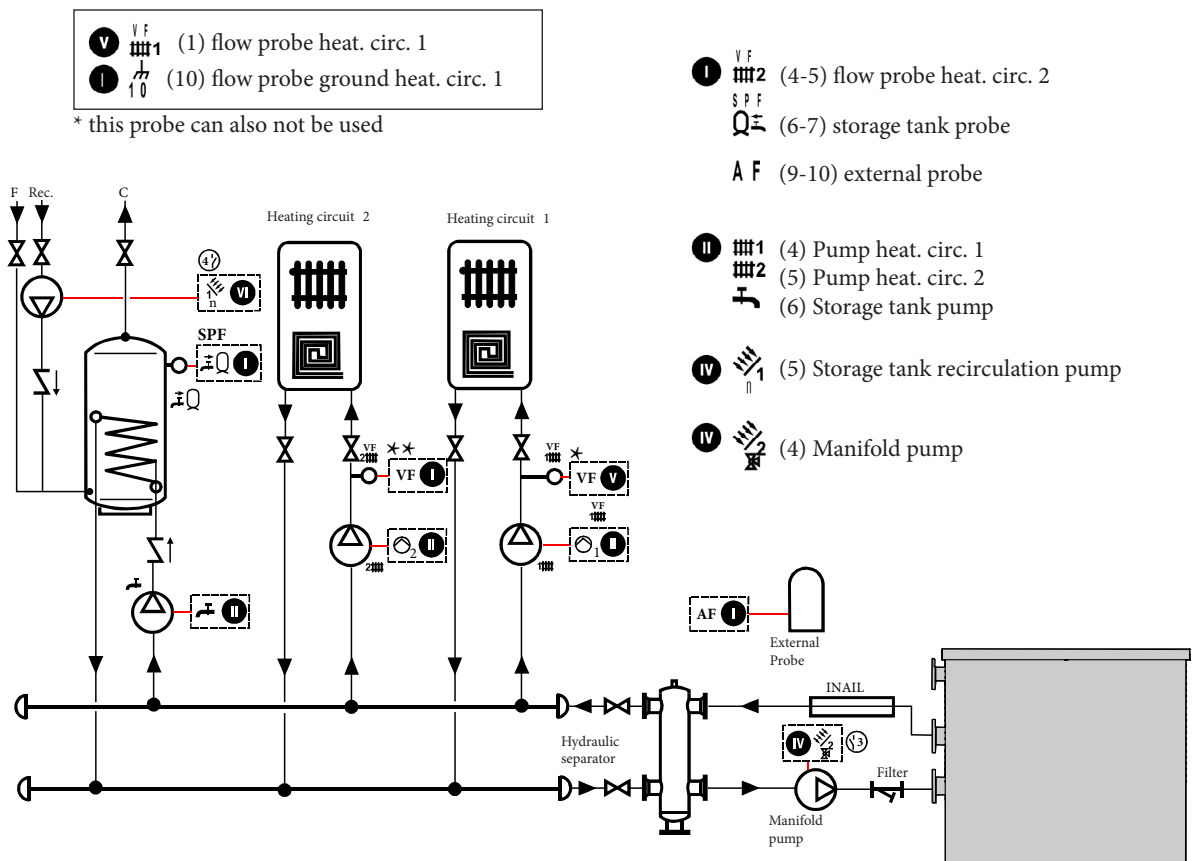
## 3.21 EXAMPLES OF INSTALLATION (FUNCTIONAL DIAGRAM AND DESCRIPTION OF CONNECTIONS)

Assembly of a boiler with connection  
to a direct zone.

- I A F (9-10) external probe
- II #1 (4) Pump heat. circ. 1
- IV #2 (4) Manifold pump



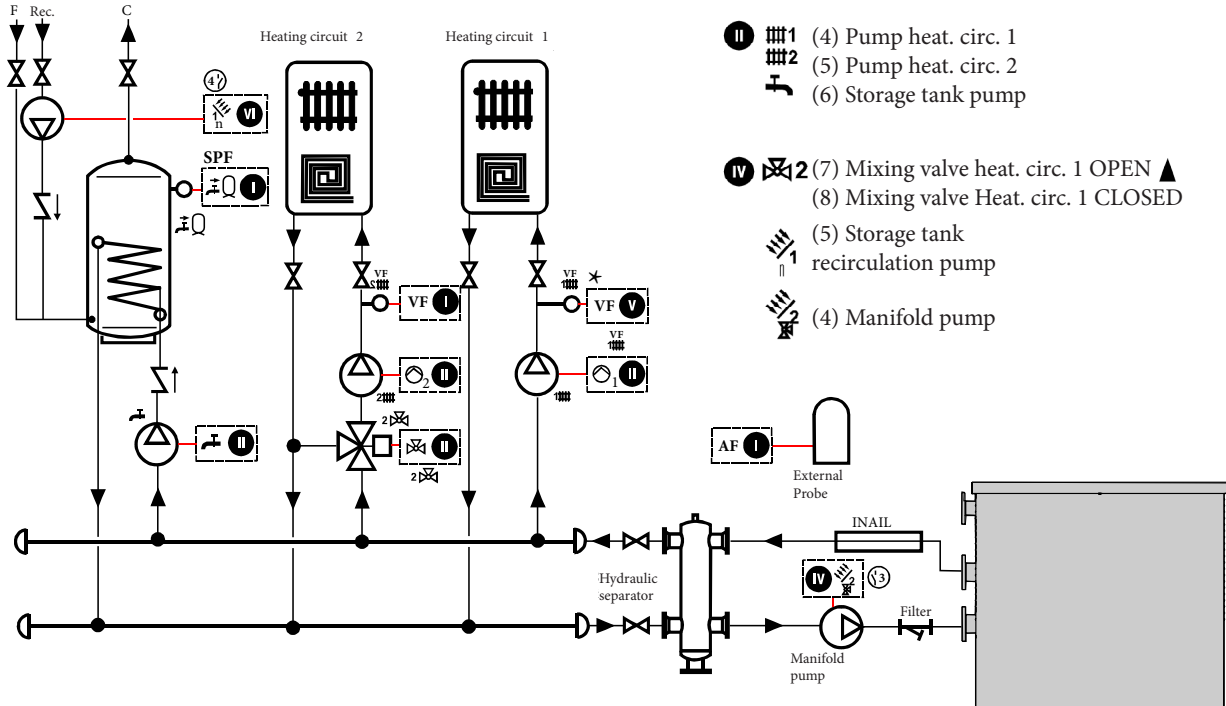
Assembly of a boiler with connection to two direct zones + dhw  
production.



## Assembly of a boiler with connection to one mixed zone and one direct zone + dhw production.

- VF 1 (1) flow probe heat. circ. 1
- 10 (10) heat. circ. flow probe ground 1

\* this probe can also not be used



I VF 2 (4-5) flow probe heat. circ. 2

S P F Q (6-7) storage tank probe

A F (9-10) external probe

II VF 1 (4) Pump heat. circ. 1  
VF 2 (5) Pump heat. circ. 2  
T (6) Storage tank pump

IV 2 (7) Mixing valve heat. circ. 1 OPEN ▲  
(8) Mixing valve Heat. circ. 1 CLOSED

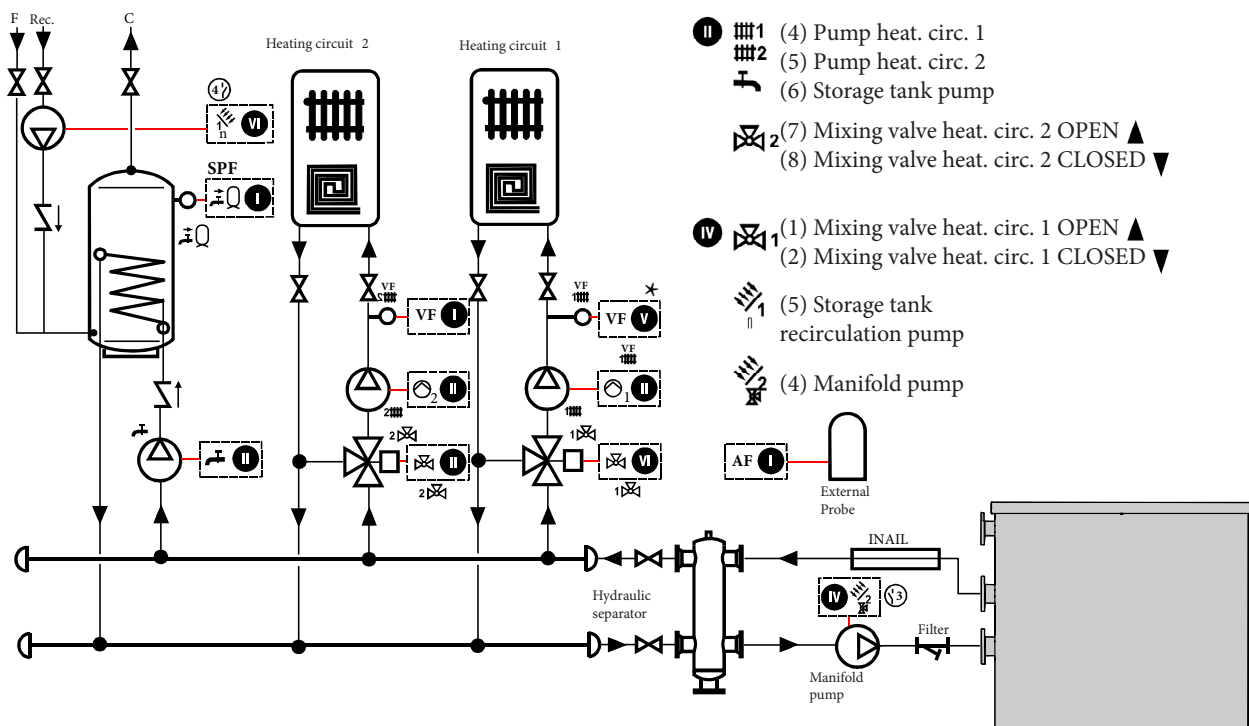
VF 1 (5) Storage tank recirculation pump

VF 2 (4) Manifold pump

## Assembly of a boiler with connection to two mixed zones + dhw production.

- VF 1 (1) flow probe heat. circ. 1
- 10 (10) heat. circ. flow probe ground 1

\* this probe can also not be used



I VF 2 (4-5) flow probe heat. circ. 2

S P F Q (6-7) storage tank probe

A F (9-10) external probe

II VF 1 (4) Pump heat. circ. 1  
VF 2 (5) Pump heat. circ. 2  
T (6) Storage tank pump

2 (7) Mixing valve heat. circ. 2 OPEN ▲  
(8) Mixing valve heat. circ. 2 CLOSED ▼

IV 1 (1) Mixing valve heat. circ. 1 OPEN ▲  
(2) Mixing valve heat. circ. 1 CLOSED ▼

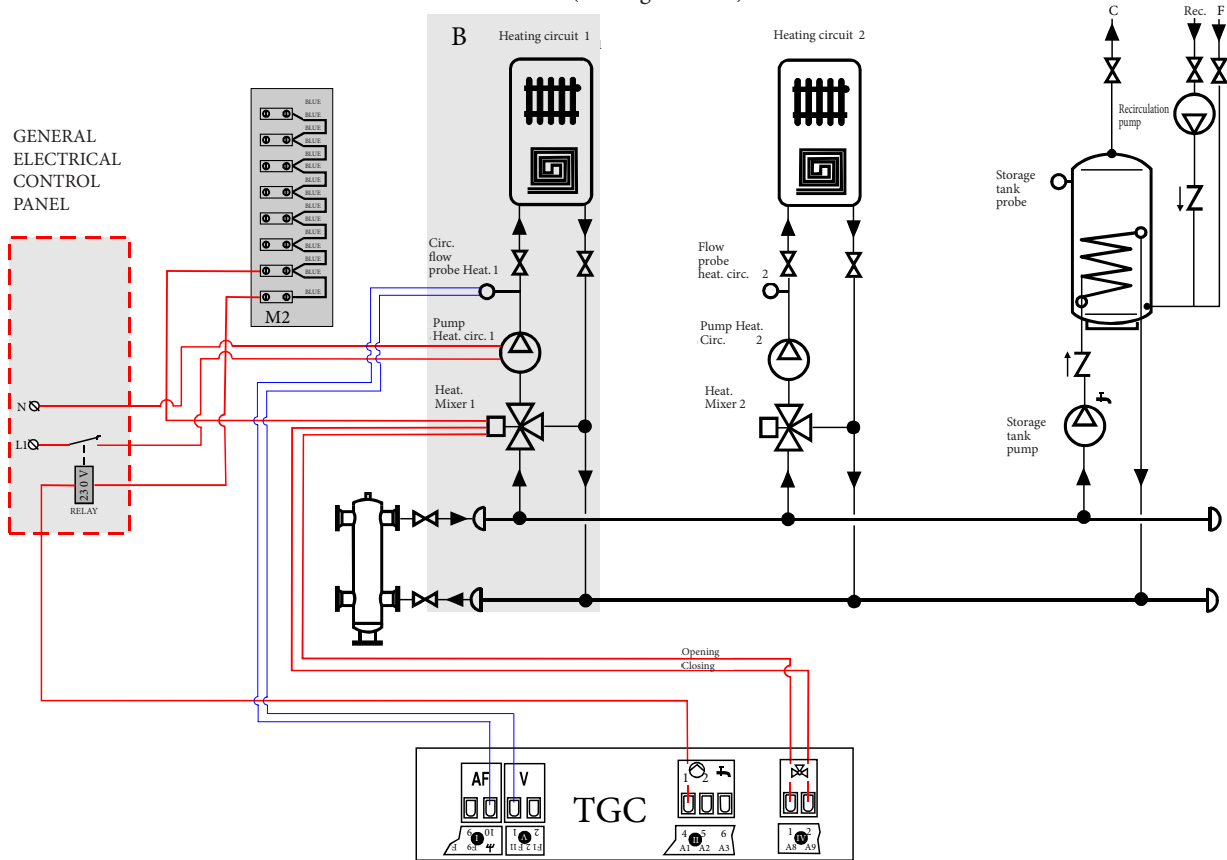
VF 1 (5) Storage tank recirculation pump

VF 2 (4) Manifold pump

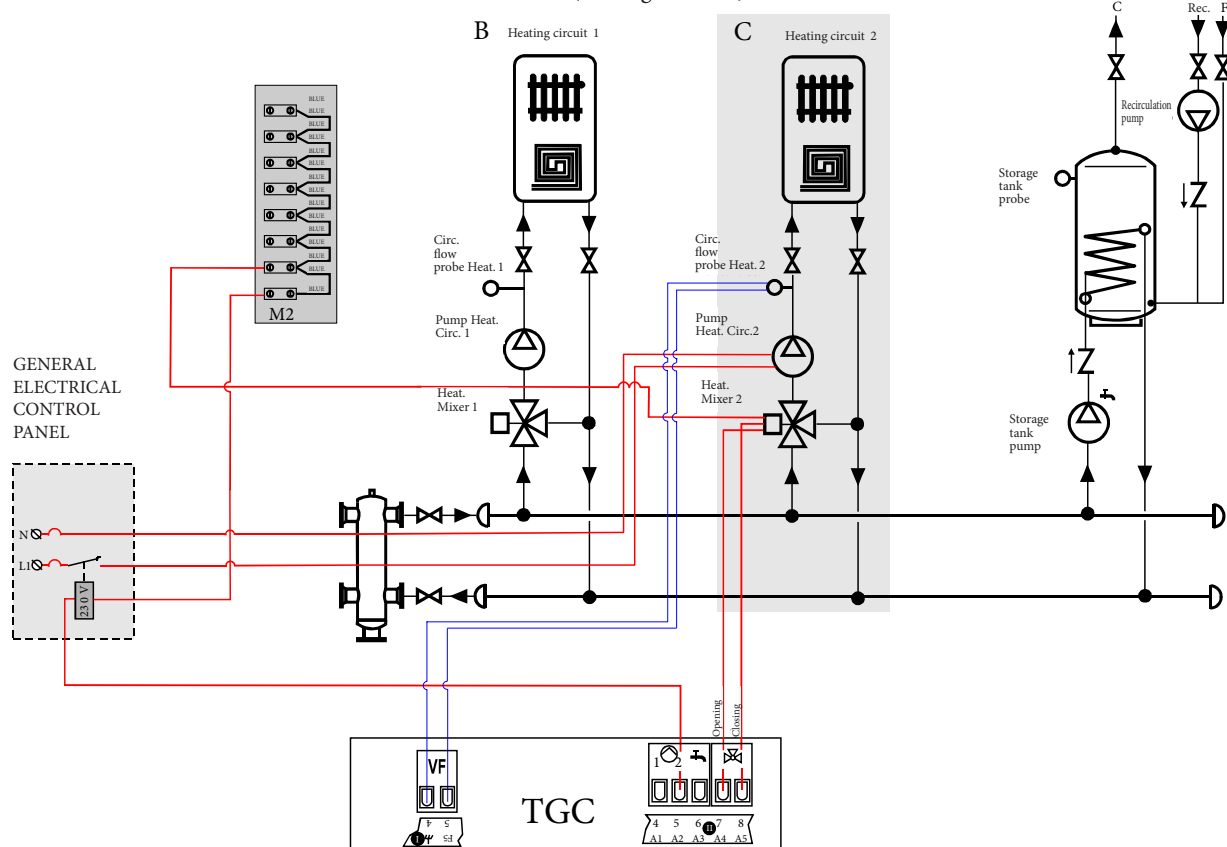
## INSTRUCTIONS FOR THE INSTALLER

### Secondary system connection.

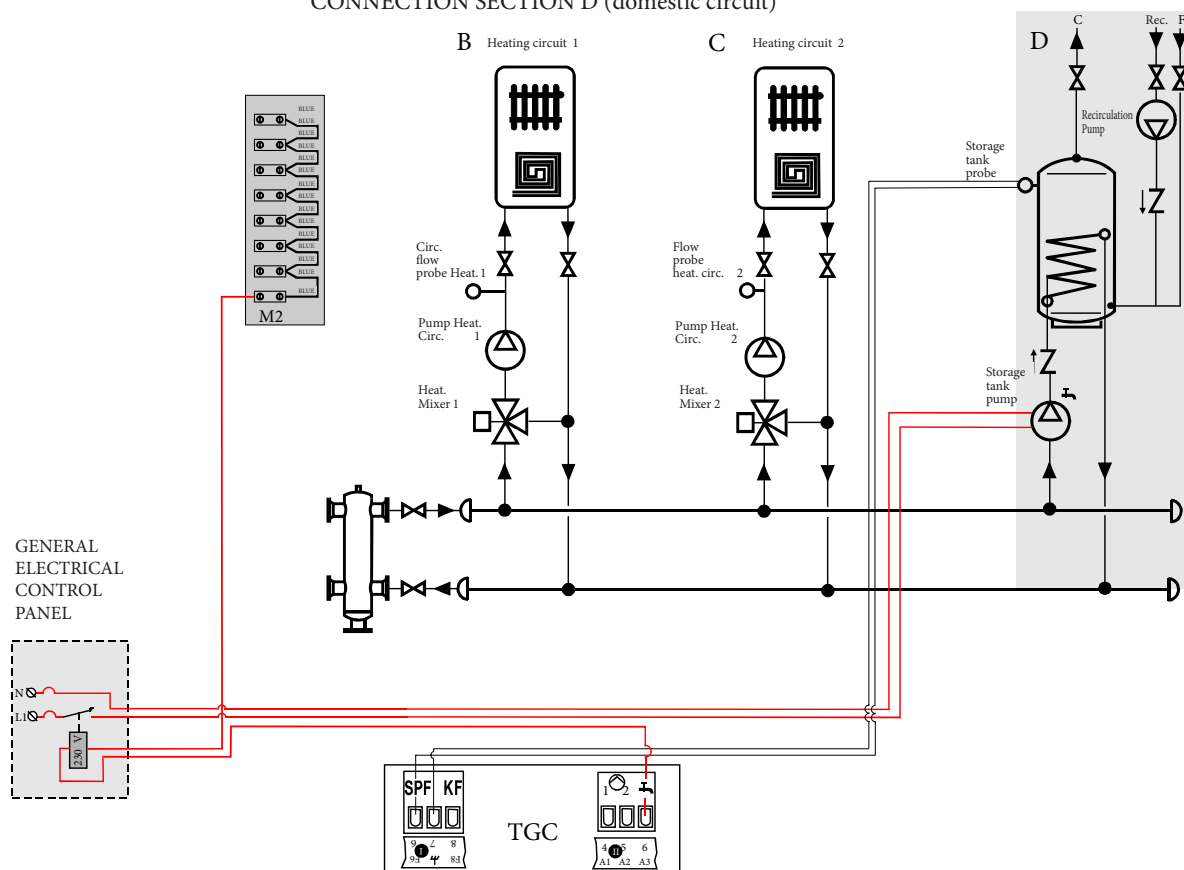
CONNECTION SECTION B (heating circuit 1)



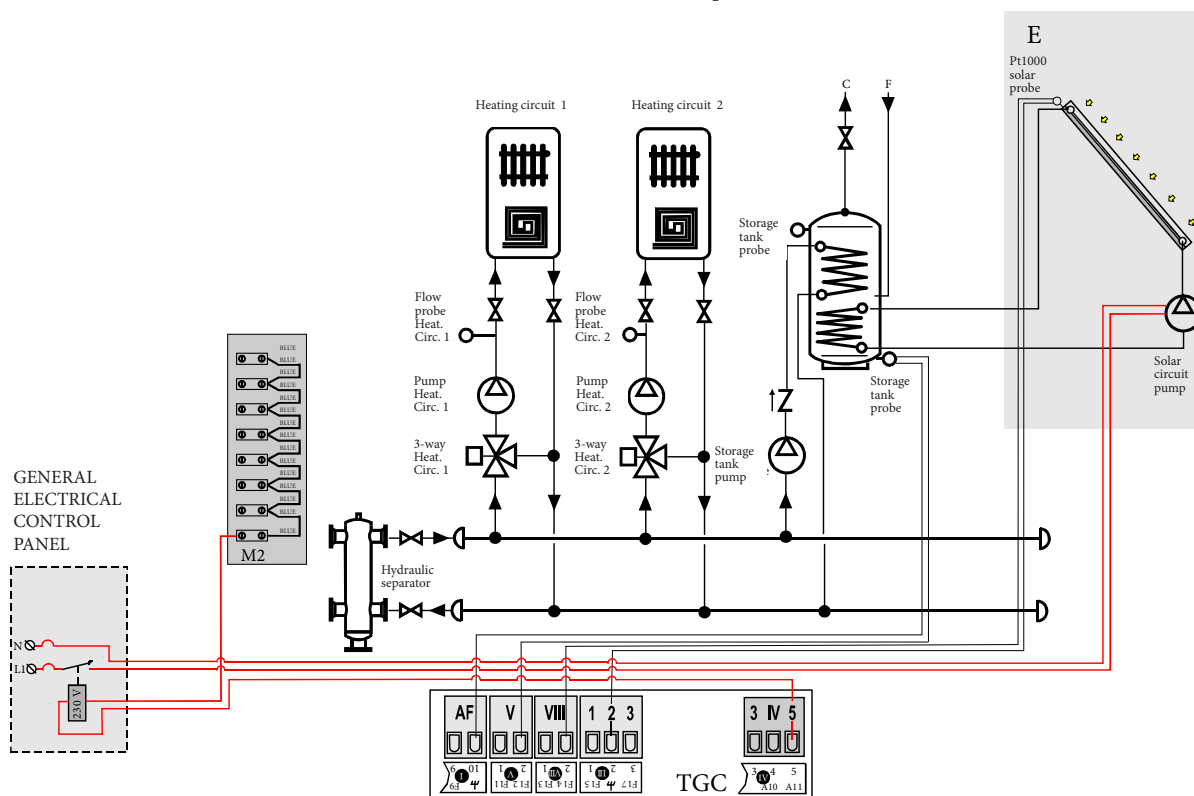
CONNECTION SECTION C (heating circuit 2)



## CONNECTION SECTION D (domestic circuit)



## CONNECTION SECTION E (solar panels)

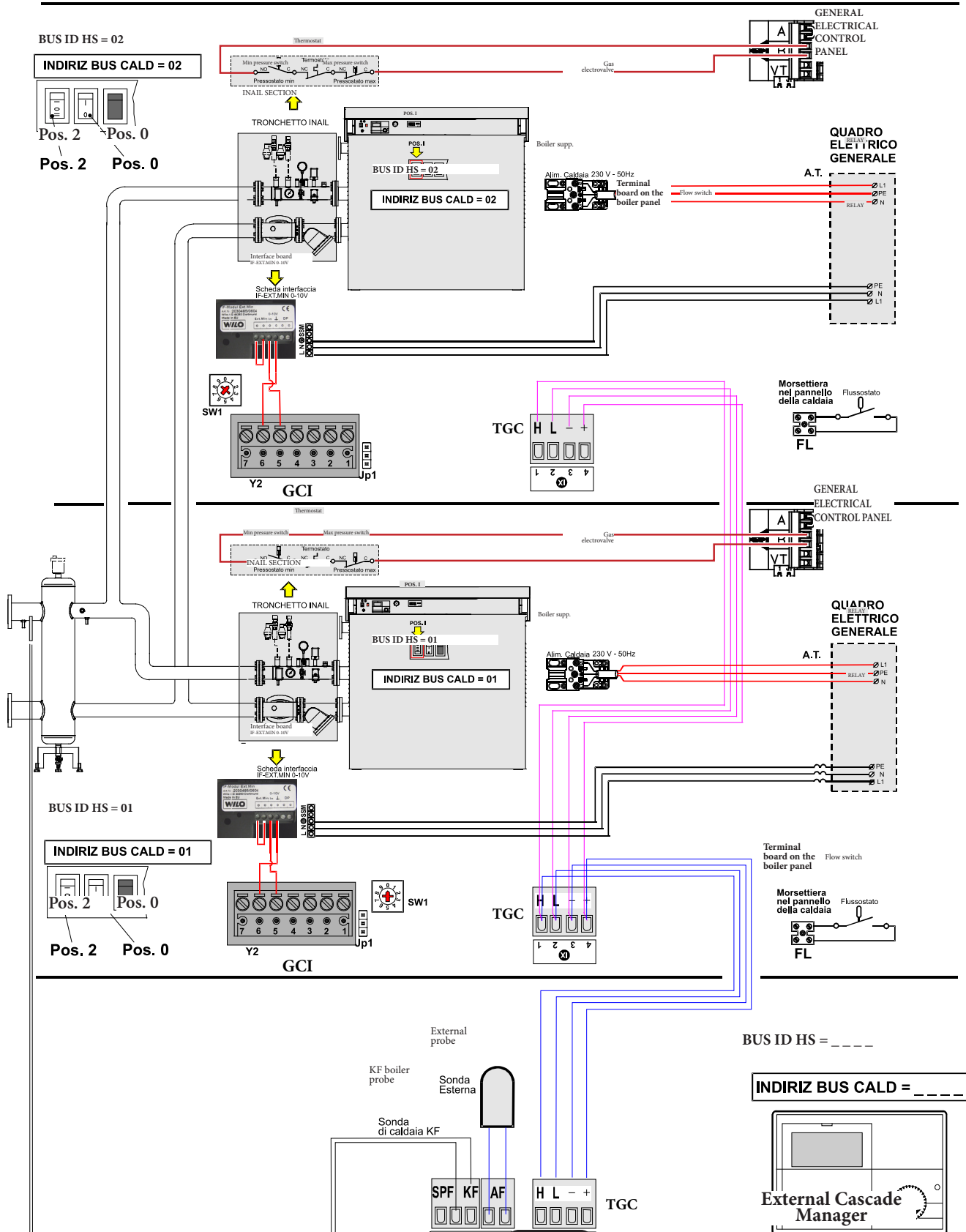


Connections to solar systems require changing a number of setting parameters see Table:

Expert field → Level SOLAR / MF → MF 4 FUNCTION = "23"

## INSTRUCTIONS FOR THE INSTALLER

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



\* Consult the TGC manual included.

For any other system applications not included in the instructions handbook, contact the Immergas after-sales service.

## 3.22 SYSTEM FILLING AND EMPTYING



### Attention!

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

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

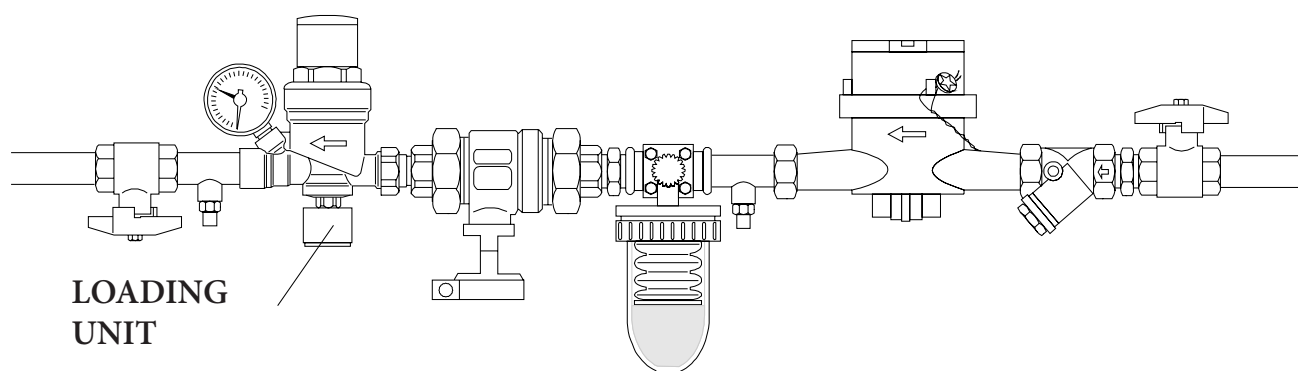
Once all of the connections for the system have been set up, it is possible to fill the circuit.

To fill the system it is possible to set up a loading valve on the system's return pipe.

It can also be filled through the drain valve installed on the boiler return manifold.

The boiler is equipped with an emptying valve, positioned as indicated in the figure of parag. 2.2. This valve must **never** be used to empty the system, since all of the dirt contained in the system may accumulate in the boiler, jeopardising smooth operation. Accordingly, the system must be equipped with its own emptying valve, of a suitable size for the flow rate of the system.

EXAMPLE OF SYSTEM LOADING UNIT



## 3.23 BOILER FROST PROTECTION

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

If the temperature drops any further (under 3°C), all modules are commissioned at the minimum power until the return temperature does not reach 10°C. This device protects the boiler only. In order to protect the system as well, it is necessary to add antifreeze liquid.

**NB: The antifreeze liquid must be compatible with materials present in the entire system and tolerable for aluminium alloys.**

### 3.24 CHECK THE ADJUSTMENT OF THE PRESSURE TO THE BURNER



#### ATTENTION!

All of the instructions below are provided for the exclusive use of **authorised assistance** 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 point 1. Place the CO<sub>2</sub> 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 close the flue exhaust point back up.

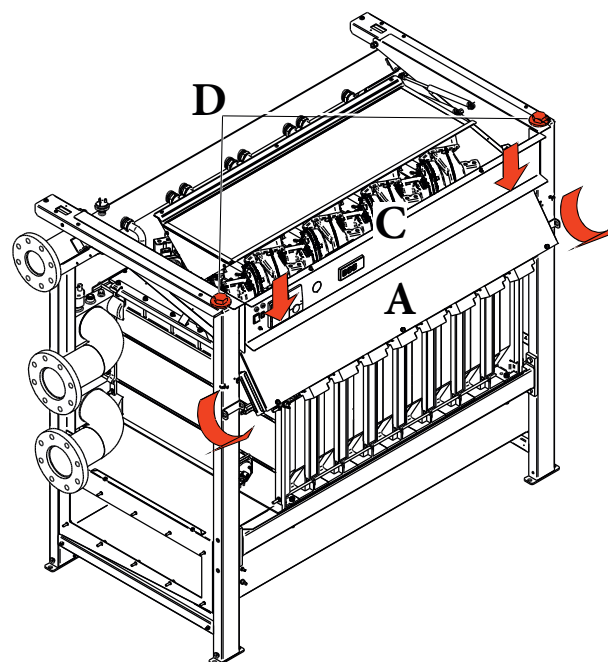
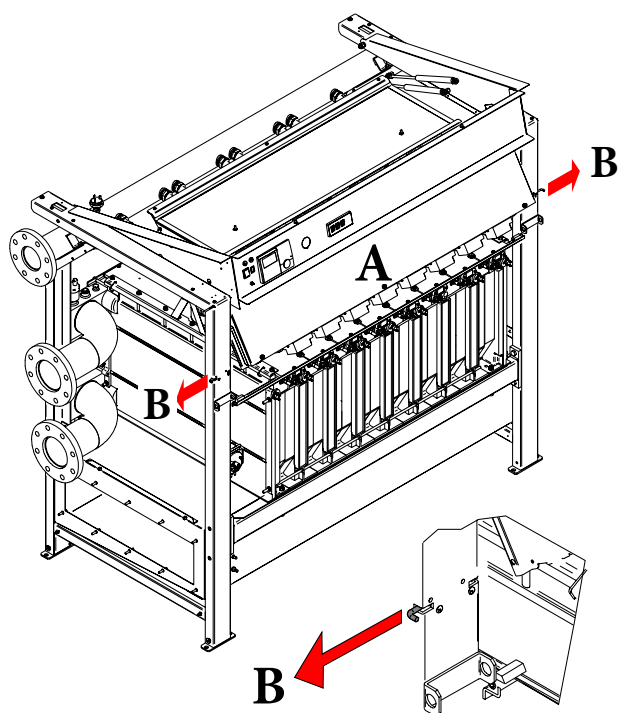
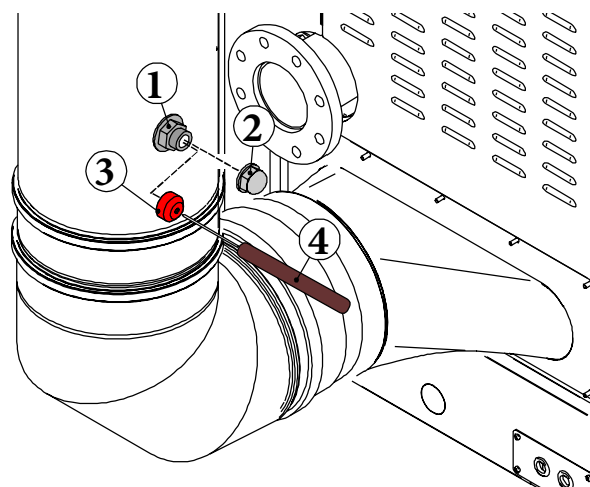
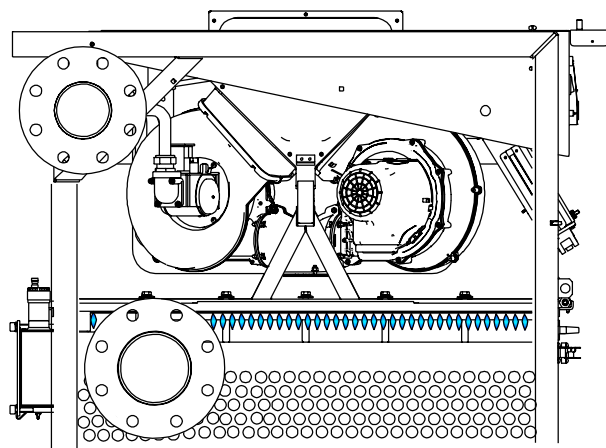


#### ATTENTION!

To access the gas valves more easily, unhook electric panel "A" by acting on spring "B" (right and left).

Turn electrical panel "A" slightly and lower tilting panel "C"

For the amount of time required for the adjusting operation, fix tilting panel "C" in place using 2 M4 screws + "D" washers (contained in the documentation bag).





### A) Adjustment at maximum power.

- Unscrew the closing cap for flue exhaust analysis point.
- Place the analyser probe inside the flue analysis point.
- Make burner 1 operate at max power, following the procedure illustrated below in "chimney sweep function " (100 % CASC MANUAL).
- Make sure that the CO<sub>2</sub> level falls within the values indicated in the "Nozzle pressure" table.
- Possibly correct the value by turning adjusting screw "A" CLOCKWISE to decrease it and COUNTER-CLOCKWISE to increase it.

### B) Adjustment at minimum power.

- Make burner 1 operate at min power, following the procedure illustrated below in "chimney sweep function " (10 % CASC MANUAL).
- Make sure that the CO<sub>2</sub> level falls within the values indicated in the "Nozzle pressure" table.
- Possibly correct the value by turning adjusting screw "B" CLOCKWISE to increase it and COUNTER-CLOCKWISE to decrease it.



Follow this procedure to adjust the other modules as well.

If the measured flow rate is too low, make sure the supply and draining systems (the supply and draining pipes) are not obstructed. If they are not obstructed, make sure the burner and/or exchanger are not dirty.

### C) Completing basic calibration.

- Check CO<sub>2</sub> values at the minimum and maximum flow rate.
- Touch up if necessary.

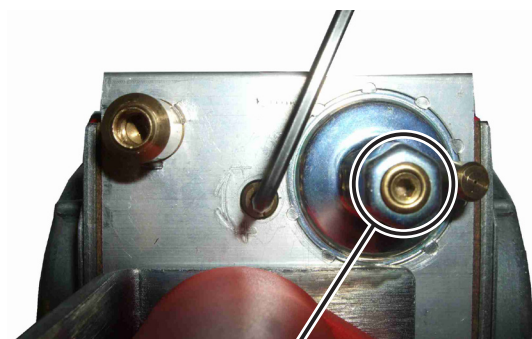


For smooth operation, calibrate the CO<sub>2</sub> values taking care to observe the values in the table.

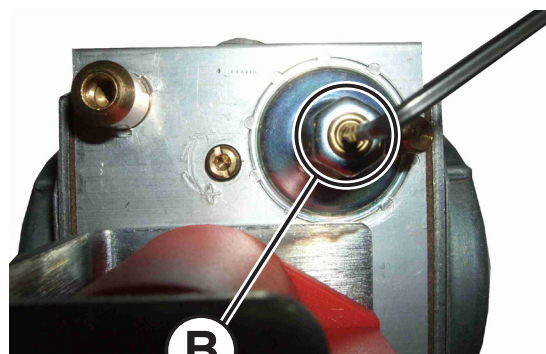
- Close the cap for the flue inspection point back up.



**NOTE: do not force the adjusting screw limit switch limits.**



**A**



**B**



ADJUSTING SCREW  
MAXIMUM POWER



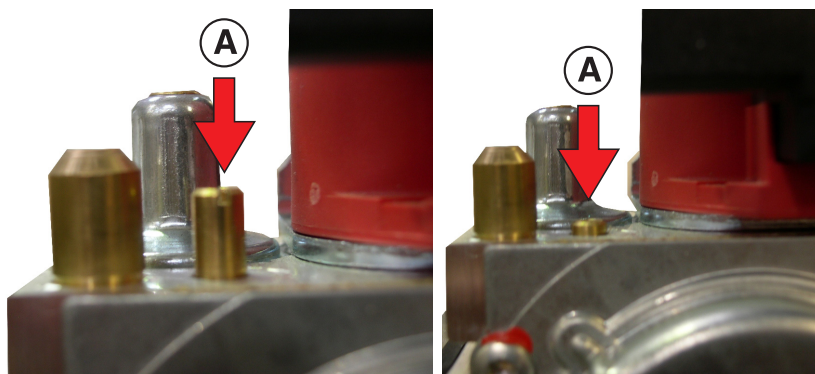
ADJUSTING SCREW  
MINIMUM POWER

## ERRATA CORRIGE

### INSTRUCTIONS FOR THE INSTALLER

#### When replacing the gas valve or having difficulty with ignition:

Screw general adjusting screw "A" on clockwise until it stops, then unscrew by 9 revolutions (methane). Check boiler ignition. If it does not start up unscrew screw "A" by one more revolution, then try to start it up again. If the boiler does not start up again, follow the operations described above until the boiler does start up again.  
At this point adjust the burner as previously illustrated.




#### NOZZLES - PRESSURES.

Frequently check the CO<sub>2</sub> levels, especially at low flow rates.

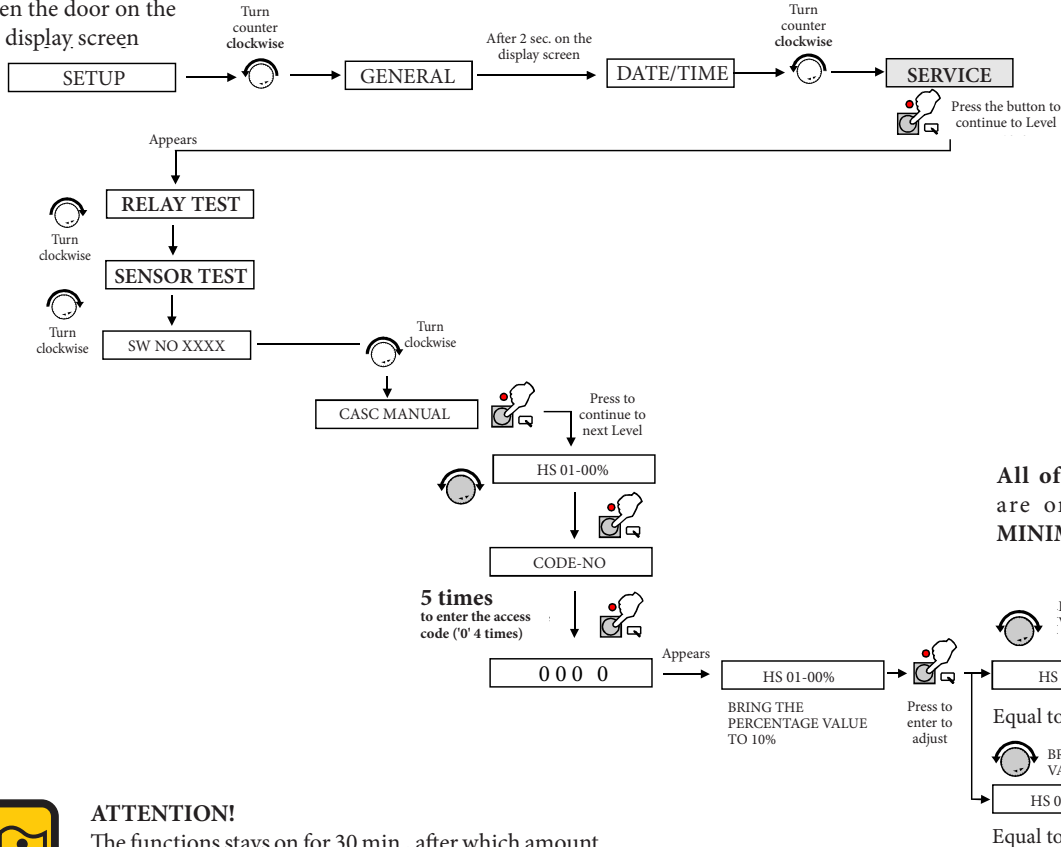
|                    | Type of Gas    | Supply pressure (mbar) | Ø Nozzles (mm) | Diaphragm | Fan speed (rpm) |      | CO <sub>2</sub> levels (%) |      | Power at ignition IG (%) |
|--------------------|----------------|------------------------|----------------|-----------|-----------------|------|----------------------------|------|--------------------------|
|                    |                |                        |                |           | Min.            | Max. | Min.                       | Max. |                          |
| ARES 440 - 900 Tec | Nat. gas (G20) | 20                     | 9              | -         | 1700            | 5540 | 9,1                        | 9,1  | 50                       |
|                    | Nat. gas (G25) | 25                     | 9              | -         | 1700            | 5540 | 9,1                        | 9,1  | 50                       |
|                    | Propane (G31)  | 37                     | 9              | -         | 1700            | 5290 | 10,2                       | 10,4 | 50                       |

## Chimney sweep function.

Before opening the door turn clockwise to the  symbol



Open the door on the display screen



**All of the boiler modules are on and operating at MINIMUM power**

**All of the boiler modules are on and operating at MAXIMUM power**



### 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 bring switch "C" (see fig. 1) to position I.

Accordingly, all of the modules will switch 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 Bring key 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.

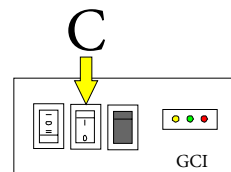


Fig. 1

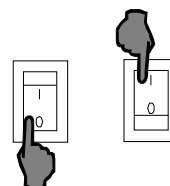
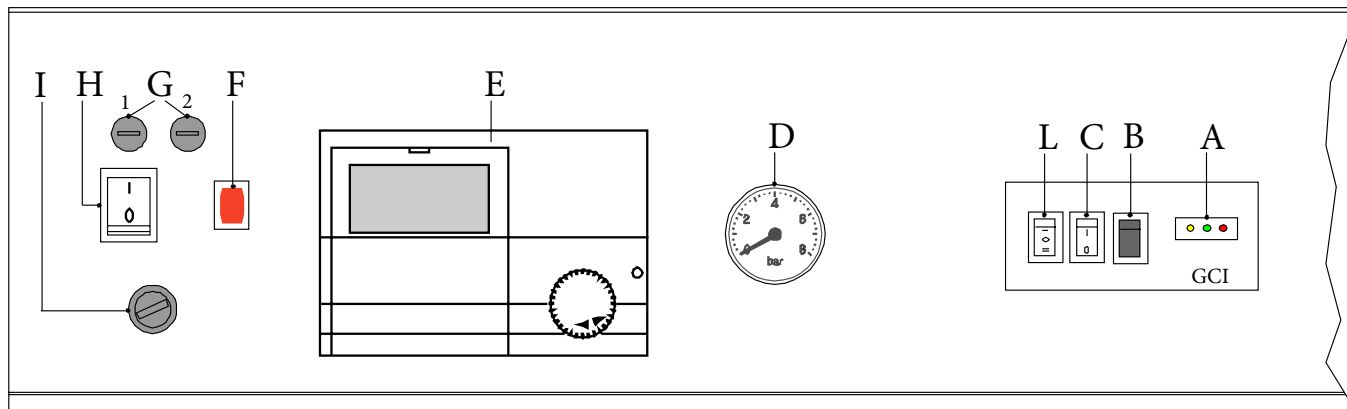


Fig. 2

### 3.25 EMERGENCY AND SAFETY OPERATIONS



#### GCI

The GCI board allows you to avoid stopping the system if the main management system of the control unit is out of order.

- A YELLOW LED = flashing (communication between SDE and GCI) ok  
GREEN LED = on (Pump On)  
RED LED = on (Error Code detected)
- B This allows you to re-arm the burners anytime they do not respond to controls
- C In position I the control unit operates on request at "SETPOINT COSTANTE" ("CONSTANT SETPOINT"): 70°C. maximum power 50%
- D Water pressure gauge (optional)
- E TGC Control panel
- F TLG General Limit Thermostat trigger light
- G Fuses:
  - 1 = 6.3 A
  - 2 = 10 A
- H Main Switch
- I When TLG General Limit Thermostat comes on it cuts off power to the boiler and light F comes on. To re-arm 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).

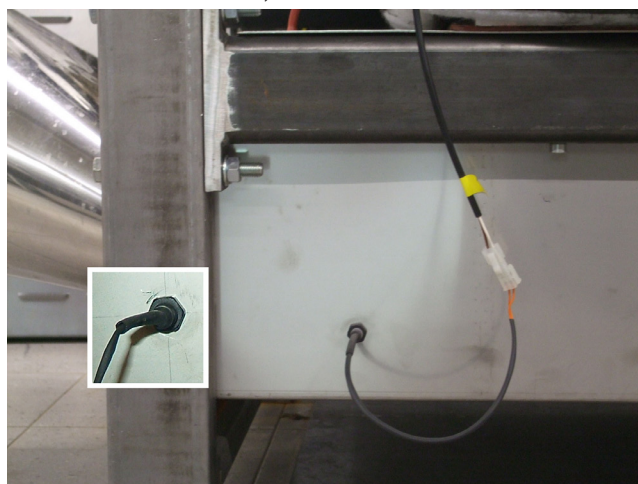


NOTE: the devices are positioned under the casing next to the control unit.



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

**Condensate level sensor position (condensate collection pan at the front of the boiler).**



### 3.26 FIRST IGNITION

#### Preliminary checks.



**First ignition must be carried out by professionally qualified staff. Immergas 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 trap through the filler hole and make sure the condensate is draining correctly.**

**If the appliance is used with an empty condensate drain trap the danger of poisoning subsists following a flue gas leak.**

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 exhaust are carried out correctly in accordance with standard specifications and requirements in force;
- the fuel supply system is sized for the boiler's flow rate and is equipped with all of the safety and control devices required by regulations in force;
- the power supply for the boiler is 230V - 50Hz;
- the system has been filled with water;
- any cut-off dampers on the system are open;
- the required gas corresponds to the one used for boiler calibration: otherwise have the boiler converted for use with the available gas (see section: "ADAPTATION FOR USE WITH OTHER GASES"); this operation must be carried out by qualified technical staff in accordance with regulations in force;
- the gas supply valve is open;
- there are no gas leaks;
- the external main switch is engaged;
- the system safety valve on the boiler responds to operation and is connected to the sewer drain;
- the condensate drain trap is filled with water;
- there are no water leaks;
- the conditions for aeration and minimum distances to carry out any maintenance operations are fulfilled.

#### Switching the boiler on and off.

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

#### Information for the system manager

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

- Supply the system manager with the "THE SYSTEM MANAGER'S INSTRUCTIONS FOR USE", as well as all other documents attached to the appliance contained in the envelope in the packaging. **The system manager must keep this documentation safe so that it is available for future consultation.**
- Inform the system manager of the importance of aeration vents and the flue exhaust system, highlighting how essential they are and how it is strictly forbidden to change them.
- Inform the system manager of the requirement to check the system's water pressure, as well as operations to restore it.
- Inform the system 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 handbook accompanies the appliance so that it may be consulted by the new owner and/or installer.

# 4 INSPECTIONS AND MAINTENANCE



Inspections and maintenance carried out to state of the art and 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 Inspections and Maintenance can cause material and personal damage.**

For this reason we recommend stipulating an inspection or maintenance contract.

Inspection is required to determine the effective 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 Immergas 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.
- Separate the appliance from the electrical network using a separation device, with a contact opening of at least 3 mm (for ex. safety devices or power switches), and make sure it cannot be accidentally re-connected.
- Shut the gas cut-off valve upstream of the boiler.
- If necessary, and based on the work that needs to be carried out, close any cut-off 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.
- Relieve and, if necessary, restore the pressure in the heating system.
- Open the gas cut-off valve.
- Re-connect the appliance to the electrical network and engage the mains switch.
- Make sure the appliance is water-tight, on the gas side and the water side.

**Table of resistance values based on the heating probe (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 nom. resistance (Ohm) of the heating probe SR and the heating return probe SRR.

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

At 90°C, the nominal resistance is 920 Ohm





We urge you to have qualified technical staff fulfil requirements regarding periodic maintenance checks.

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

Prior to cleaning, check the heat load (see parag. 3.24) and the percentage of CO<sub>2</sub> (see parag. 3.24). If the measured load (with a correct CO<sub>2</sub> level) is within 5% of the value indicated in parag. 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 load can be caused by an obstruction in the exhaust channel 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 – Disassembly.

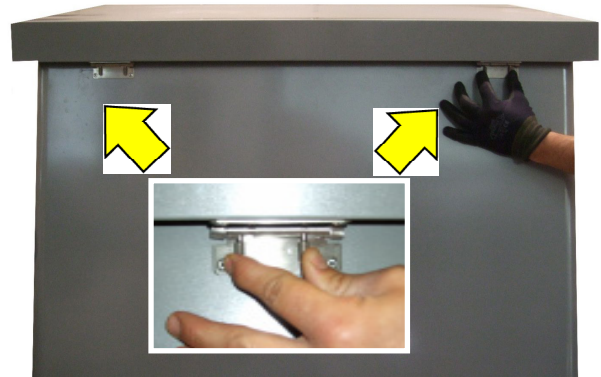
- Shut off the electrical and gas supplies **making sure the valve is firmly shut.**
- Take out: all of the casings.



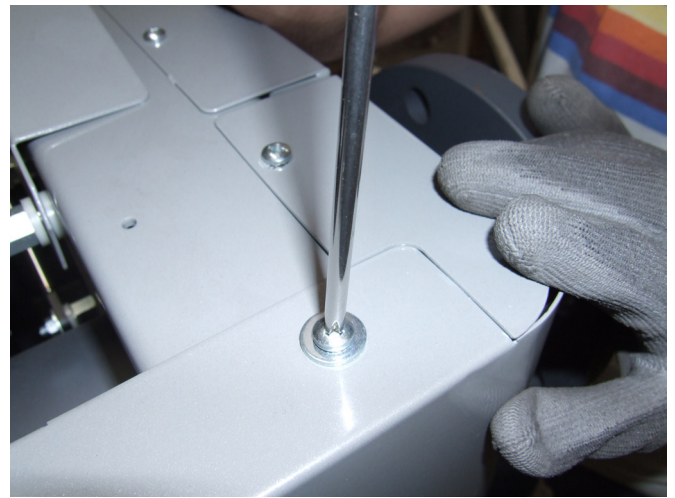
- Turn the required screw to lift the cover.



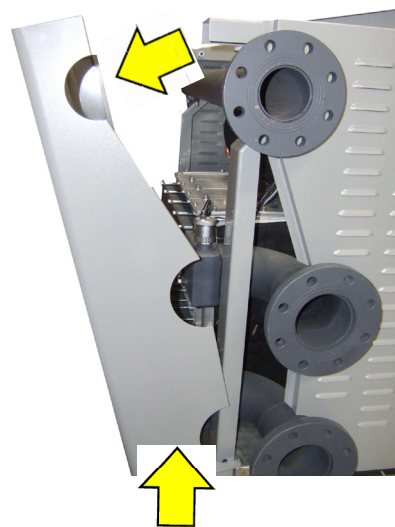
- Take out the two cover clamping screws.



- Act on the two rear closing hinges to take out the cover.



- Take out the rear, front and side casing clamping screws.

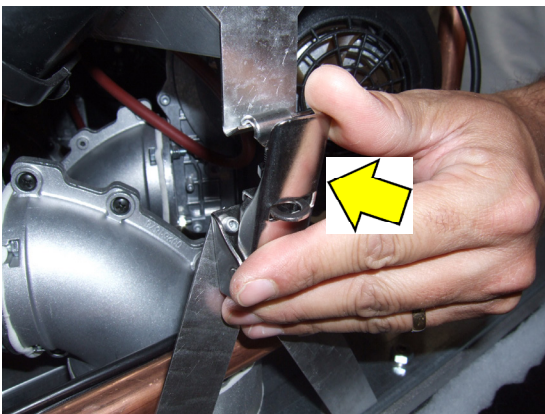
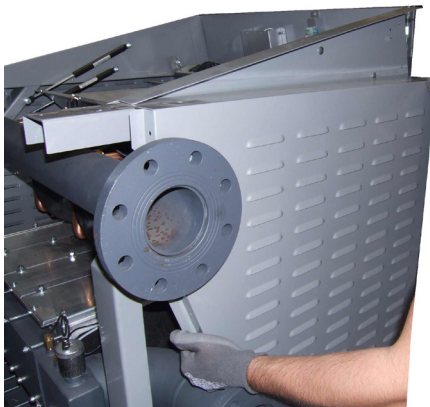
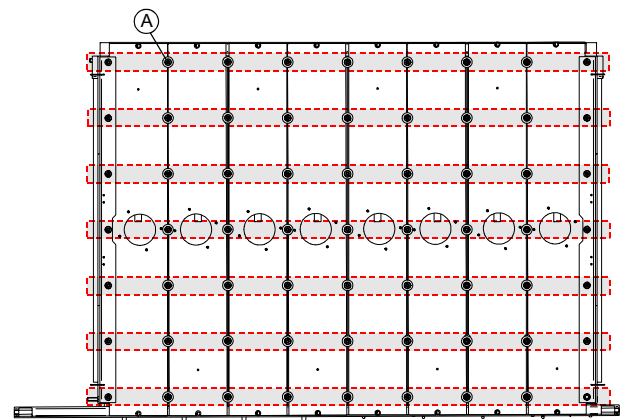




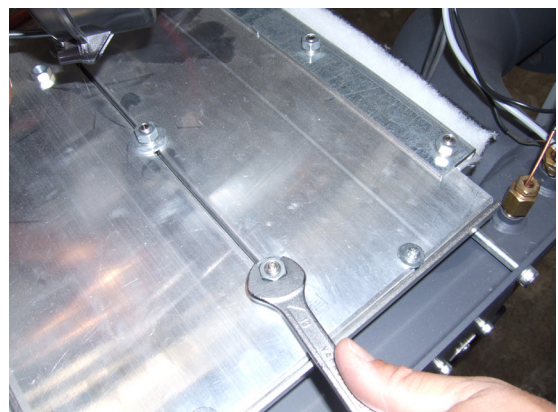


- Take out the red silicone pipes and then the fan chamber.

Element screws.

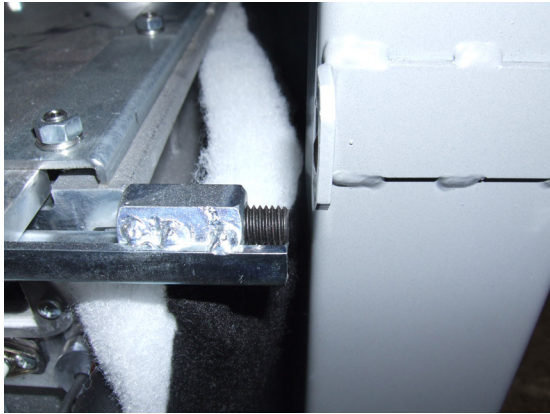


-- Unhook the fan chamber clamping spring (right/left side).

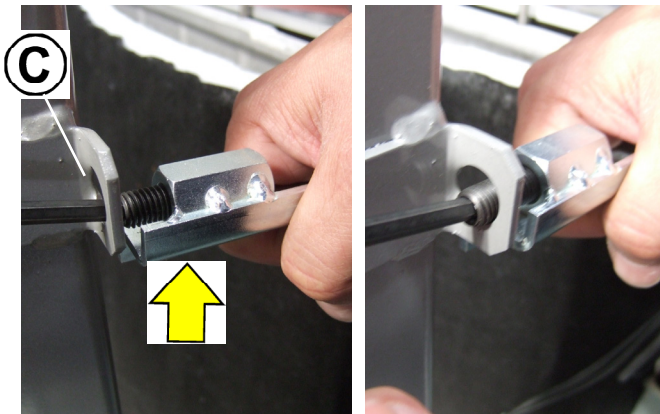


- Take out screws "A" from each element (with 13mm socket and flat key).





- Lift the burner block (front part).



- Lift the rear burner block slightly and take out 2 pins with a 5 mm hex key, until you reach holes "C" (left and right side).



- Take out the gas fittings from the gas manifold with a 36 mm flat key.



## INSPECTIONS AND MAINTENANCE

### Second phase – Cleaning.

- Take out the gaskets and burners.
- Dry clean the burners using compressed air and operating from the "flame side".
- Visually check the state of the welding on the angulars 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 exhaust pipe is always unobstructed so that the wash water does not leak out from 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 drain trap is unobstructed: clean if necessary.
- Inspect the exhaust evacuation pipe and the flue.



### Third phase - Reassembly.

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

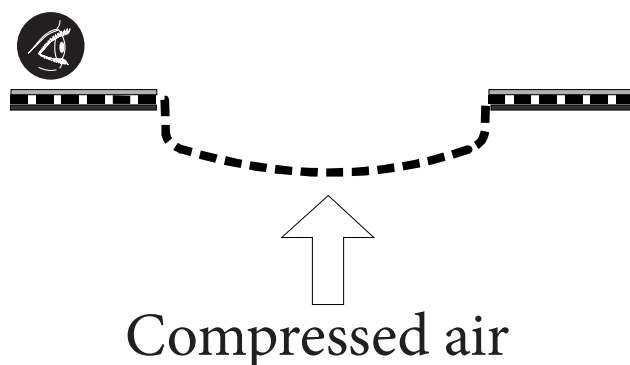
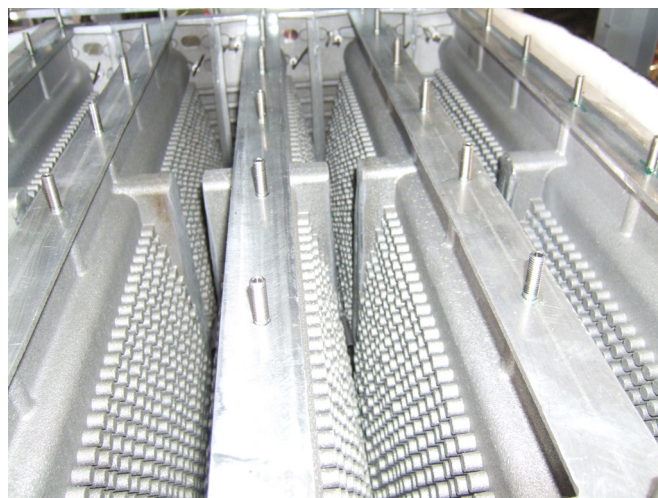


**Proceed in the reverse order for reassembly, being careful to tighten the screws that clamp the mixer unit/fans to the body, at a torque of 13 Nm.**



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

- Prior to ignition, make sure the condensate drain trap is full of water.
- Before opening the gas supply valve make sure that the previously loosened gas fitting is firmly tightened. In order to do so open the valve and check the seal using soapy water.
- As a burner is being ignited, immediately check the seal between each single gas valve and relative premixing chamber.
- Perform a combustion analysis and check the parameters.
- Make sure that all of the previously opened gas pressure points are closed.











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