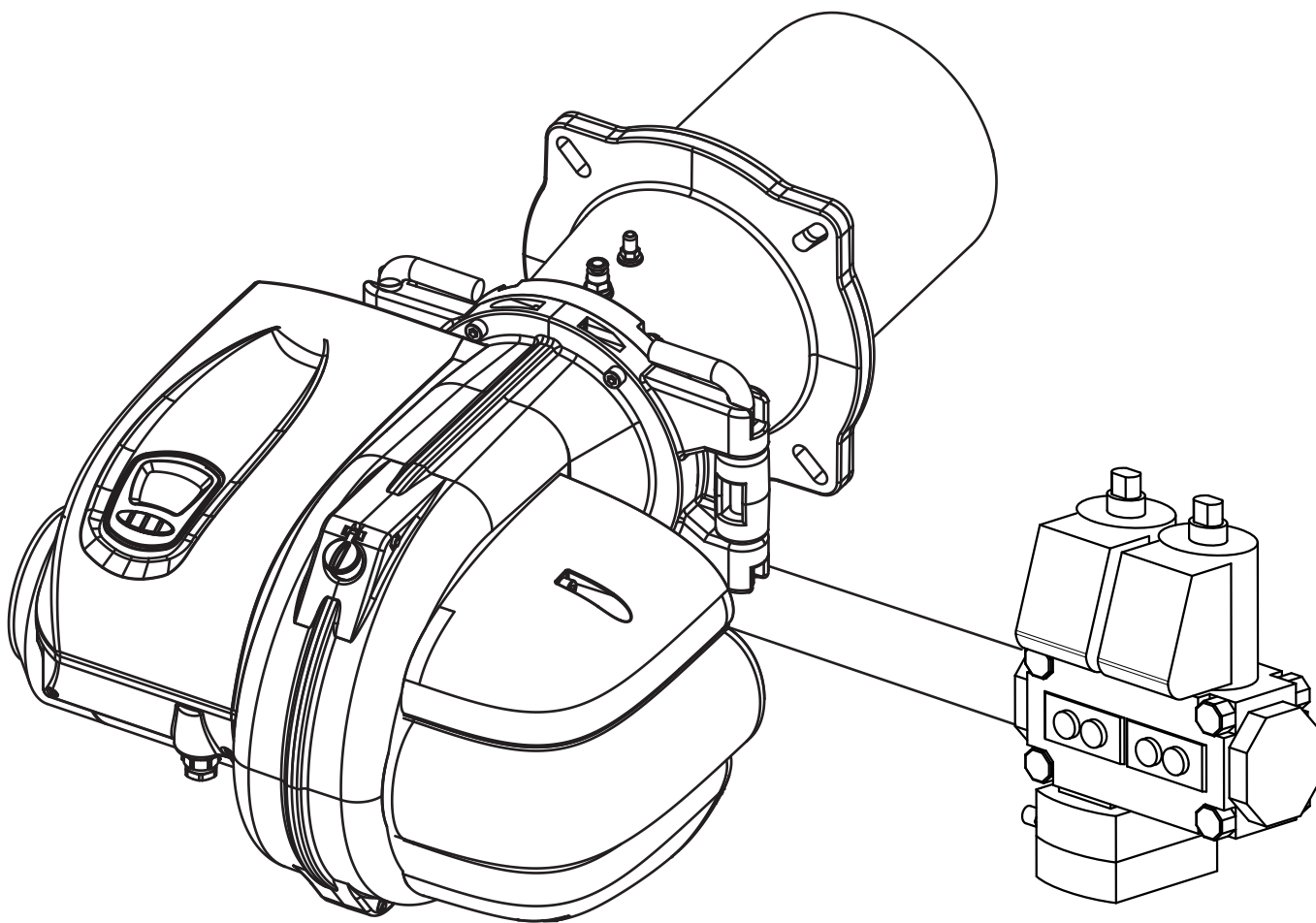




**Lamborghini**  
**CALORECLIMA**

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**UNI EN ISO 9001 CERTIFIED COMPANY**



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**Two-stage progressive/modulating mode gas burner**



**LMB G 700**  
**LMB G 1000**

**Installation, use and maintenance manual**

**GB**



### **Congratulations on your excellent choice**

Thank you for your preference towards our products. LAMBORGHINI CALORECLIMA is a Company that has daily involvement in the research for innovative technical solutions, able to satisfy all needs. The constant presence of our products on the Italian and international market is guaranteed by a capillary network of Agents and Authorised dealers. These are flanked by the, "LAMBORGHINI SERVICE" After-sales Services, which ensure qualified assistance and maintenance of the appliance.

Read this manual well as it supplies important indications regarding safety, installation, use and maintenance of the product. Keep it carefully for future reference. Installation must be carried out by qualified staff in compliance with Technical Standards, national and local legislation in force and the indications given in the instruction manual supplied with the appliance.

**IMPORTANT** - burner installation must scrupulously follow the Standards in force, use and purchase standard components or on request from authorized sales and after-sales centres. The non-fulfilment of the same and the failure to comply with that stated, exonerates the manufacturer from any liability.

## **WARRANTY**

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The burners have a SPECIFIC WARRANTY starting from the date of validity by the After-sales Service in your area. Please contact them as soon as possible

## **CONFORMITY**

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The burners comply with:

- 2016/426/EC (Gas Appliances Regulation - GAR)
- 2006/42/EC (Machinery Directive)
- 2014/30/EU (Electromagnetic Compatibility - EMC)
- 2014/35/EU (Low Voltage Directive - LVD)

For the serial number, refer to the technical plate on the burner.

## **INDEX**

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## GENERAL STANDARDS

**M U**

This manual is an integral and essential part of the product and must be given to the installer. Read the warnings given in this manual as they supply important indications regarding installation, use and maintenance safety.

Keep this manual carefully for future reference. The burner must be installed in compliance with the Standards in force, according to the manufacturer's instructions and by qualified staff. Incorrect installation can cause injury/damage to persons, animals or objects, for which the manufacturer cannot be held responsible.

This appliance must only be destined for the use for which it was expressly declared. Any other use must be considered improper and therefore dangerous. The manufacturer is not liable for any damage caused by improper, incorrect or unreasonable use.

Before carrying out any cleaning or maintenance, disconnect the appliance from the mains power supply by acting on the system switch or via the relevant shut-off elements.

In the case of breakdown and/or bad functioning of the appliance, deactivate it and do not attempt repairs or direct interventions.

Only contact qualified professional staff.

Any product repairs must only be performed by an after-sales centre authorised by the manufacturer, using original spare parts.

Failure to comply with the above can compromise appliance safety.

In order to guarantee the efficiency of the appliance and its correct functioning, it is indispensable to follow the manufacturer's indications. Have qualified professional staff perform periodic maintenance of the appliance.

Whenever the appliance is no longer to be used, the parts that may become a potential source of danger must be made harmless.

The transformation from one family of gas (natural gas or liquid gas) to another family of gas must only be performed by qualified staff.

Before commissioning the burner, have qualified staff check:

- a) that the plate data are those requested by the gas electricity mains supplies;
- b) that burner calibration is compatible with boiler power;
- c) that the flow of combustion agent air and the evacuation of flue gases take place correctly according to Standards in force;
- d) that aeration and normal maintenance of the burner are guaranteed.

Every time the gas cock is opened, wait a few minutes before re-igniting the burner.

Before performing any intervention that envisions disassembly of the burner or opening of the inspection access points, disconnect the electric current and close the gas cocks.

Do not deposit containers of inflammable substances in the room where the burner is situated. If you smell gas, do not activate electric switches. Open doors and windows. Close the gas cocks. Call qualified staff.

The burner room must have openings towards the outside in compliance with local Standards in force. If in doubt relative to the circulation of air, first of all we recommend that the CO<sub>2</sub> value is measured, with the burner functioning at maximum flow rate and the room ventilated, only via the apertures destined to feed air to the burner and then by measuring the CO<sub>2</sub> value again, with the door open.

The value of CO<sub>2</sub> measured in both cases must not change in a significant manner.

If there are more than one burner and fan in the same room, this test must be performed with all appliances functioning simultaneously. Never obstruct the air apertures of the burner room, the burner fan intake apertures and



any air duct or ventilation grid and external dissipation, with the purpose of preventing: - the formation of toxic/explosive gas mixtures in the air of the burner room; - combustion with insufficient air, from which dangerous, costly and polluting functioning occurs.

The burner must always be protected from rain, snow and freezing.

The burner room must always be kept clean and free from volatile substances, which could be sucked inside the fan and block the interior pipes of the burner and the combustion head. Dust is extremely dangerous, especially if this can deposit on the fan blades, where it will reduce ventilation and produce pollution during combustion. The dust can also accumulate on the rear part of the flame stability disc in the combustion head and cause a poor air/fuel mixture.

The burner must be fed with the type of fuel for which it has been set-up as indicated on the data plate and in the technical features supplied in this manual. The fuel line that feeds the burner must be perfectly sealed, realised in a rigid manner with the positioning of a metal expansion joint with flange connection or threaded fitting. Moreover, it must be supplied with all control and safety devices requested by local regulations in force. Pay great care that no external material enters the line during installation.

Make sure that the electric power supply used for the connection is in compliance with the features indicated on the data plate and in this manual. Make an electric plant with an effective connection to an earth plant, in compliance with Standards in force. The earth cable must be a couple of cm. longer than the phase and neutral wire. If in doubt regarding efficiency, it must be checked and controlled by qualified staff.

Never exchange the neutral and phase cables.

The burner can be connected to the mains electricity with a plug-socket connection only if this is equipped in a way that the coupling configuration prevents the inversion of phase and neutral. Install an omnipolar switch with opening between contacts of at least 3mm upstream from the appliance as requested by the existing legislation.

The entire electric system and in particular all cable sections, must be suitable for the maximum absorbed power value indicated on the appliance data plate and in this manual.

If the burner power supply cable is faulty, it must only be replaced by qualified staff.

Never touch the burner with wet body parts or without wearing shoes.

Never stretch (force) power supply cables and keep them away from heat sources.

The length of the cables used must allow the burner and any boiler door to be opened.

The electric connections must be made exclusively by qualified staff and the regulations in force on the subject of electricity must be respected.

After all packaging material has been removed, control the contents and ensure that these have not been damaged in any way during transport. If in doubt, do not use the burner and contact the supplier.

The packaging materials (wooden cages, cardboard, plastic bags, expanded materials, staples, etc...) represent a form of pollution and potential risk if left everywhere. Collect them and dispose of them in a suitable manner (in a suitable place).

The entire electric system and in particular all cable sections, must be suitable for the maximum absorbed power value indicated on the appliance data plate and in this manual.

If the burner power supply cable is faulty, it must only be replaced by qualified staff. Never touch the burner with wet body parts or without wearing shoes.

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## **DESCRIPTION**

**M U**

They are gas burners with gas/air mixture at the combustion head, with reduced flow rate start-up. The conformation of the carburisation head allows the use of all natural, mixed and liquid gases (consult the technical after-sales staff for specific information); the gas/air mixture allows to obtain combustion with low excess air, for high combustion yields and low emissions of CO and NOx for protection of the environment.

They are suitable for pressurised and low pressure areas, according to the relative work curves. The gas ramp can be installed on the left or on the right. Inspection can be performed easily and completely through the hinged opening envisioned between body and burner head, without removing the connection to the gas line.

Automatic functioning with ionisation probe flame control. The burners are envisioned with different sized valves, to be selected in relation to the gas flow rate requested and the gas pressure (and boiler) available



## TECHNICAL DATA

**M U**

Model		G 700	G 1000
Type		Two-stage progressive or modulating	
Functioning		Intermittent	
Regulation		Air/gas proportional valve	
Maximum heat output	KW	748	979
Minimum heat output	KW	135	152
NOx class	-	2	2
Gas category	-	G20 / G30-G31	
Maximum gas flow rate (15°C - 1013.5 mbar)-natural gas	m <sup>3</sup> /h	79	103
Minimum gas flow rate (15°C - 1013.5 mbar)-natural gas	m <sup>3</sup> /h	14	16
Electric protection rating	IP	20	20
Motor electric power supply (three phase)	V / Hz	400 / 50-60 *	400 / 50-60 *
Auxiliary electric power supply (single phase)	V / Hz	230 / 50	230 / 50
Max. absorbed power	W	740	1100
Transformer (voltage/secondary current)	KV / mA	15 / 48	15 / 48
Functioning temperature (min/max)	°C	0 / 40	0 / 40
Noise	dbA	80	81
Weight of the burner body (without ramp)	Kg	30	31

\* It is possible the 60 Hz power supply only with suitable electric motor.

## WORK CURVES

**M U**

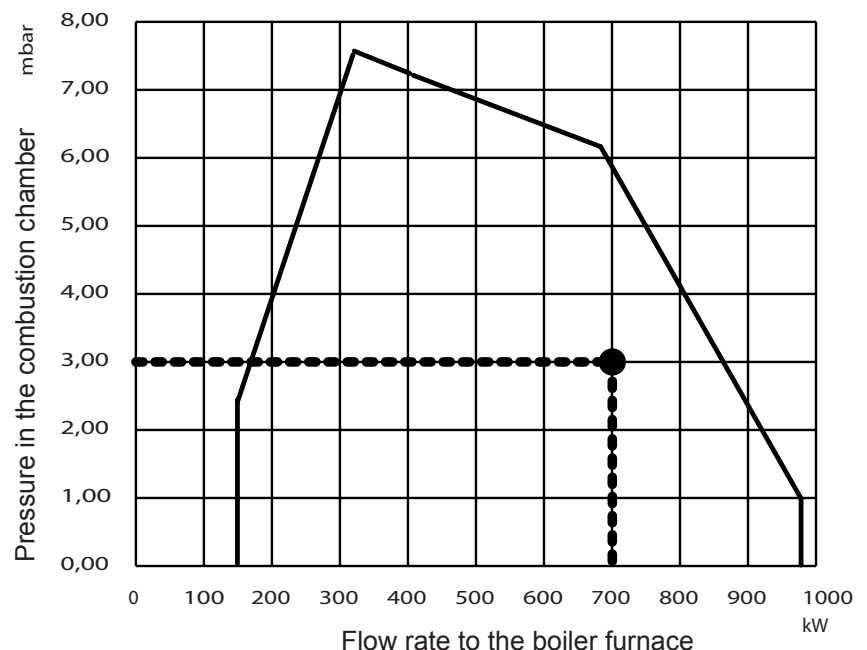
### Reference parameters for choosing blown air gas burners.

Blown air gas burners can be installed on both pressurised and vacuum boilers. It is essential to always refer to the flow-pressure working curve as burner flow (expressed in kW) remains strongly linked to the pressure present in the combustion chamber.

#### Example:

Boiler: power to hearth = 700 kW and pressure in combustion chamber = 3.0 mbar.

The meeting point between the straight lines of combustion chamber pressure and power to the hearth must fall within the operating range of the boiler (see example image).



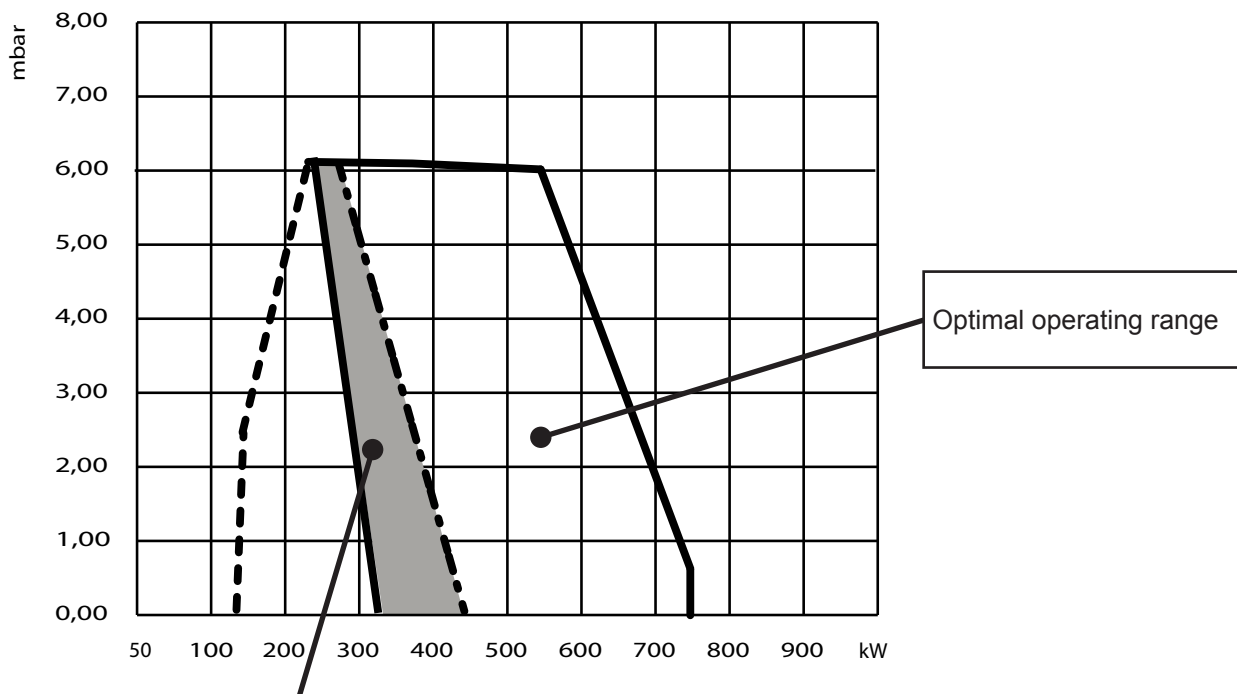


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### Work curves

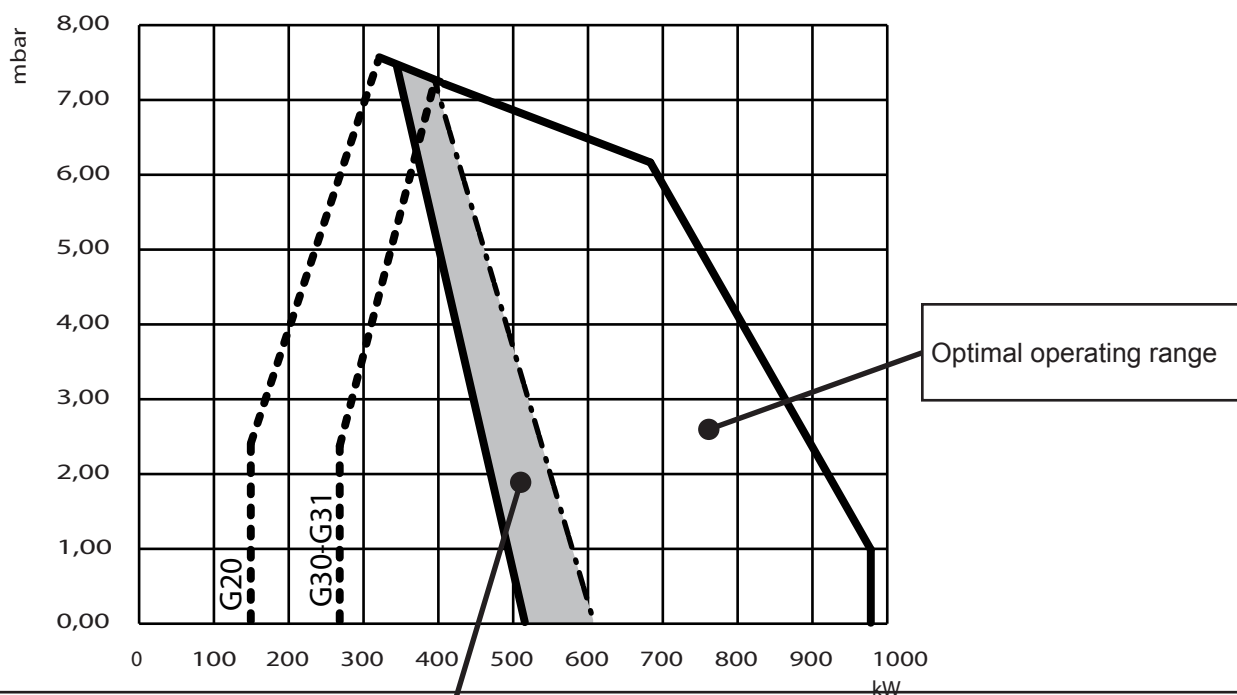
The work range was obtained at an ambient temperature of 15°0, at an atmospheric pressure of 1013.5 mbar (at 0 metres above sea-level) and with the adjustments recommended in this instruction.

#### G 700



If the operating point falls within the shaded area, you must insert the gas diaphragm and lock the right air damper (SEE "ADJUSTMENTS" PARAGRAPH).

#### G 1000

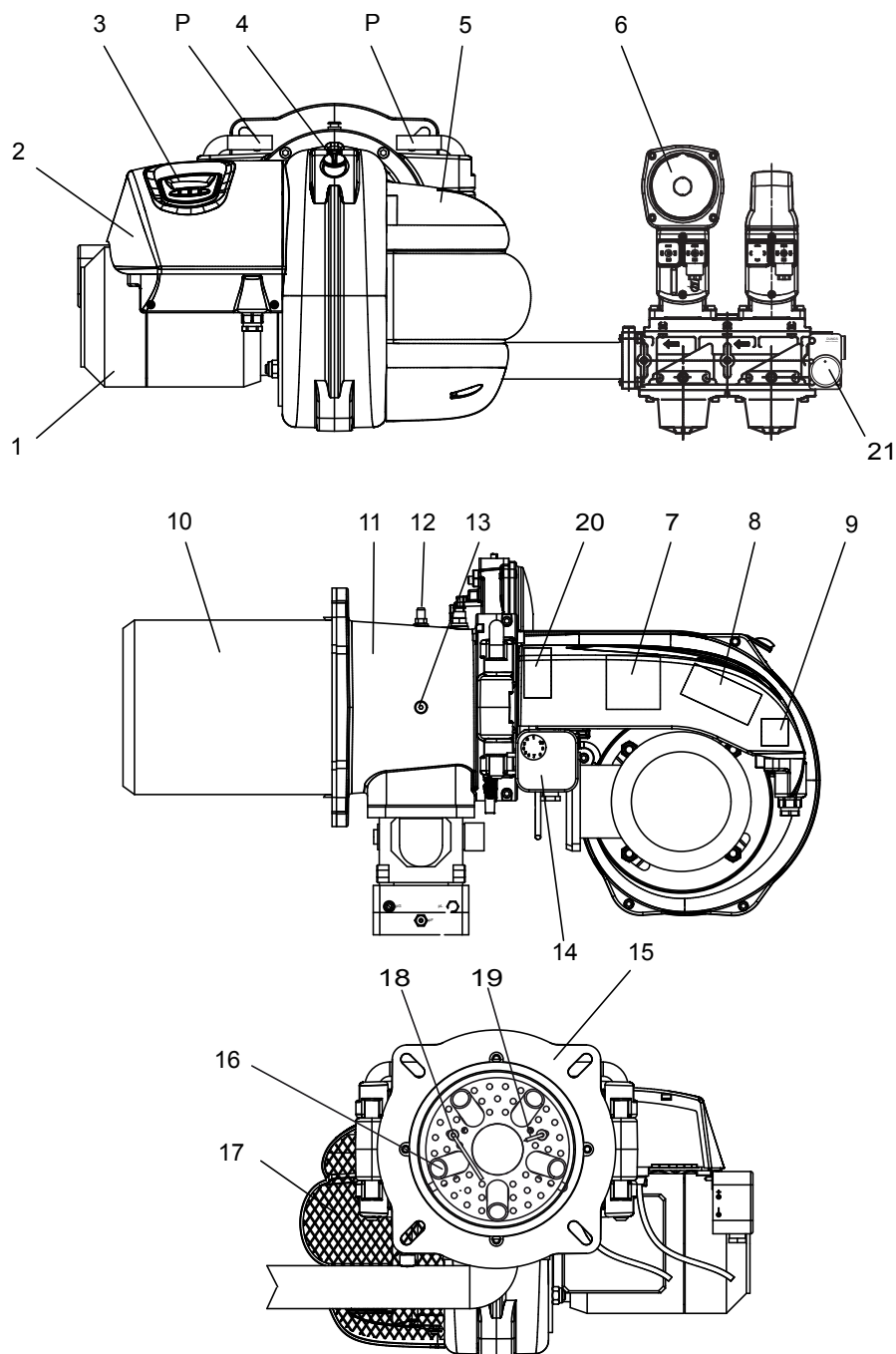


If the operating point falls within the shaded area, you must insert the gas diaphragm and lock the right air damper (SEE "ADJUSTMENTS" PARAGRAPH).  
No gearbox is provided for the LPG (B/P) version.



## MAIN COMPONENTS

**M**



### KEY

- 1 Motor
- 2 Control panel
- 3 Display
- 4 Inspection hole
- 5 Air vent lid

- 6 Gas valve
- 7 Air servo-motor
- 8 Control unit
- 9 Contactor-motor relay
- 10 Flow nozzle
- 11 Burner flange
- 12 Sampling point air
- 13 Ring regulation
- 14 Air pressure switch
- 15 Flange insulation
- 16 Combustion head
- 17 Air vent
- 18 Ionisation electrode
- 19 Ignition electrode

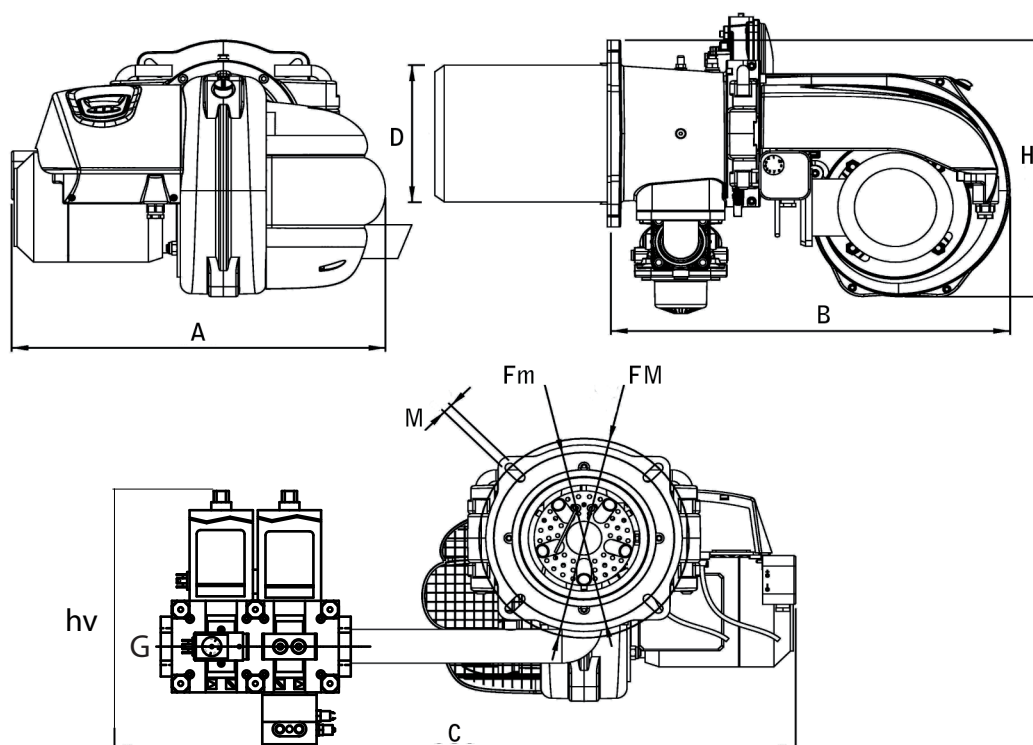
- 20 Ignition transformer
- 21 Minimum gas pressure switch
- P Hinge pins



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## DIMENSIONS

**M U**



	<b>A</b>	<b>B</b>	<b>D</b>	<b>H</b>	<b>FM</b>	<b>Fm</b>	<b>M</b>
	mm	mm	mm	mm	mm	mm	M VITE
<b>G 700</b>	510	540	166	370	286	246	M12
<b>G 1000</b>	510	540	196	370	286	246	M12

<b>G 700</b>	VCV-L125 mm	VCV-L240 mm
<b>C</b>	750	950
<b>hV</b>	237	340
<b>G</b>	1"	1"1/2

<b>G 1000</b>	VCV-L240 mm	VCV-L350 mm	VGD20 mm
<b>C</b>	950	990	930
<b>hV</b>	340	375	470
<b>G</b>	1"1/2	2"	1"1/2

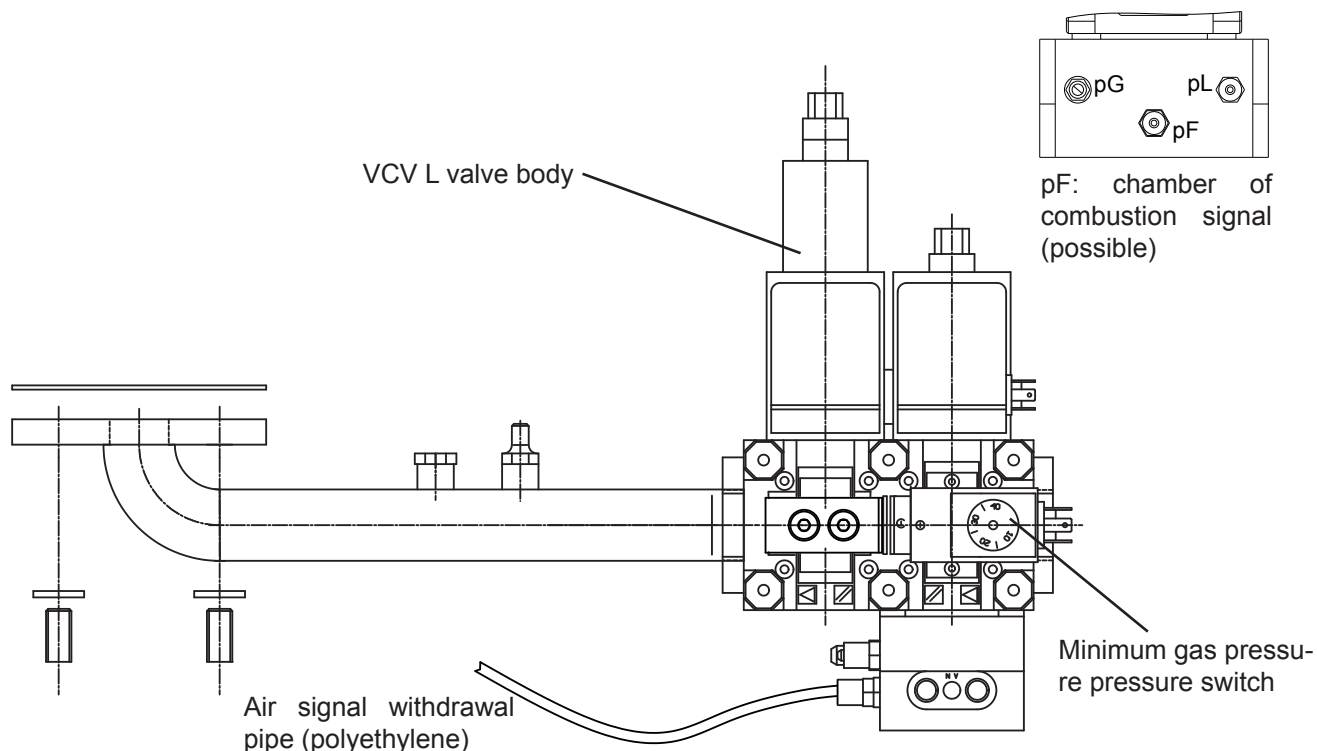


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## VALVES UNIT

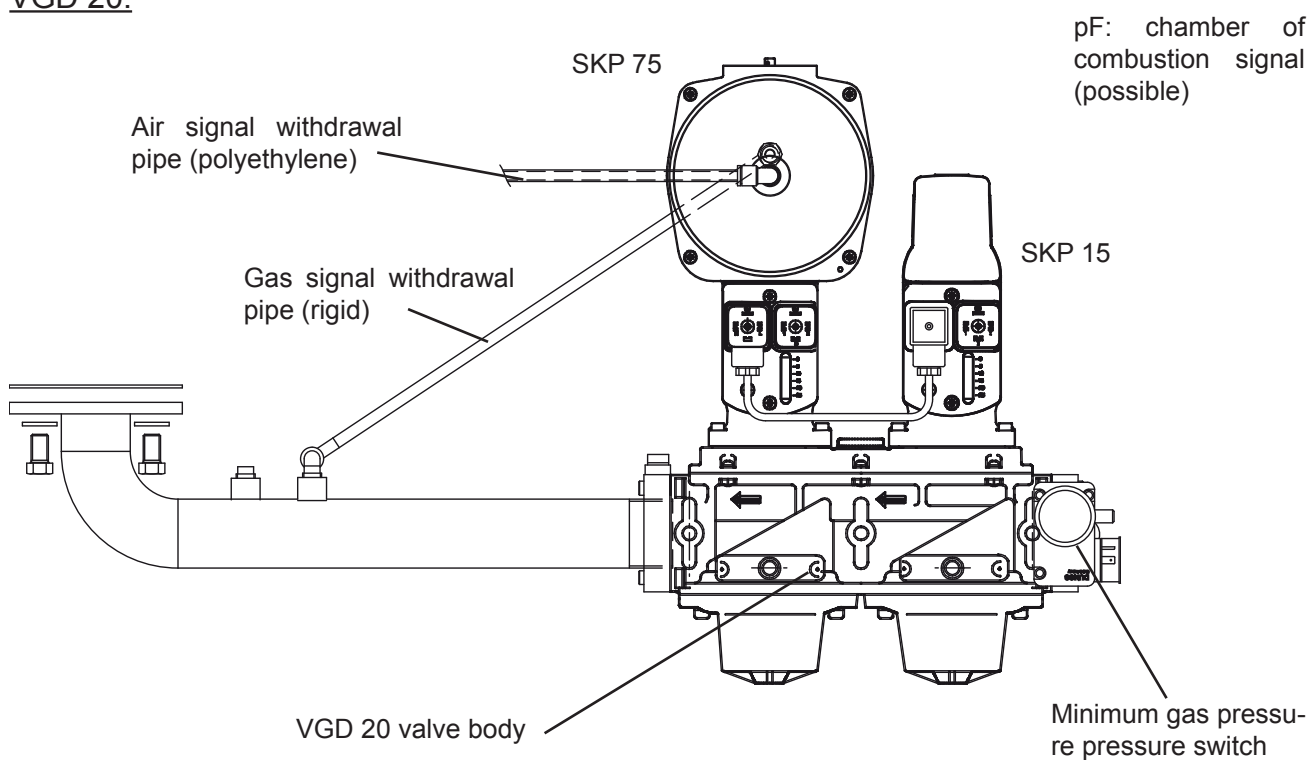
M

VCV L (slow opening)



(1) Note: installation of the combustion chamber compensation tube is recommended in order to optimise operation of the valve.

VGD 20.



(1) Note: installation of the combustion chamber compensation tube is recommended in order to optimise operation of the valve.



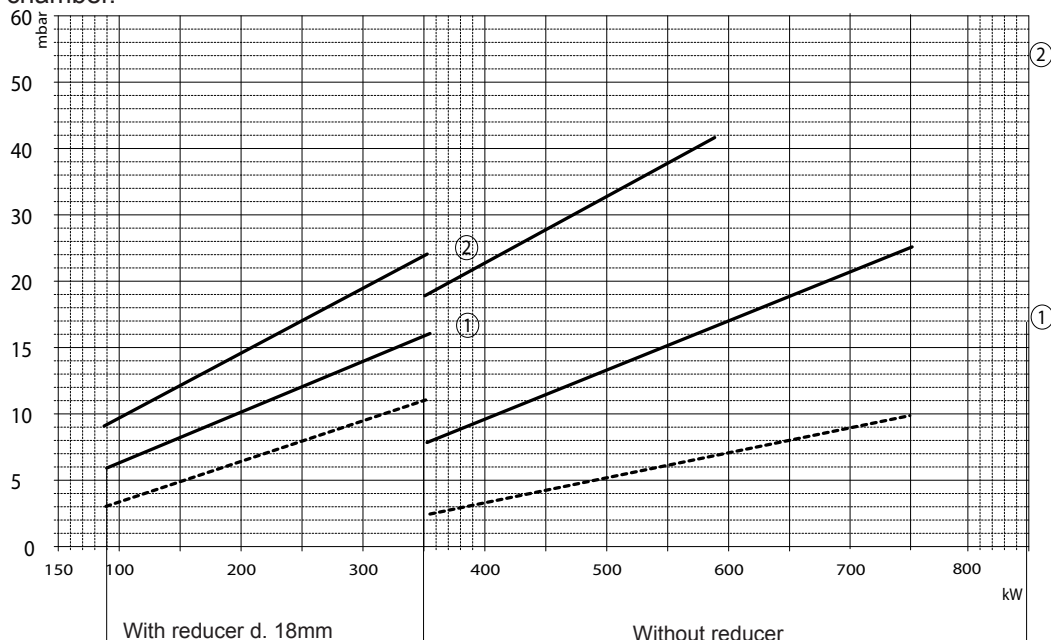


## PRESSURE/FLOW RATE CURVES G 700

**M**

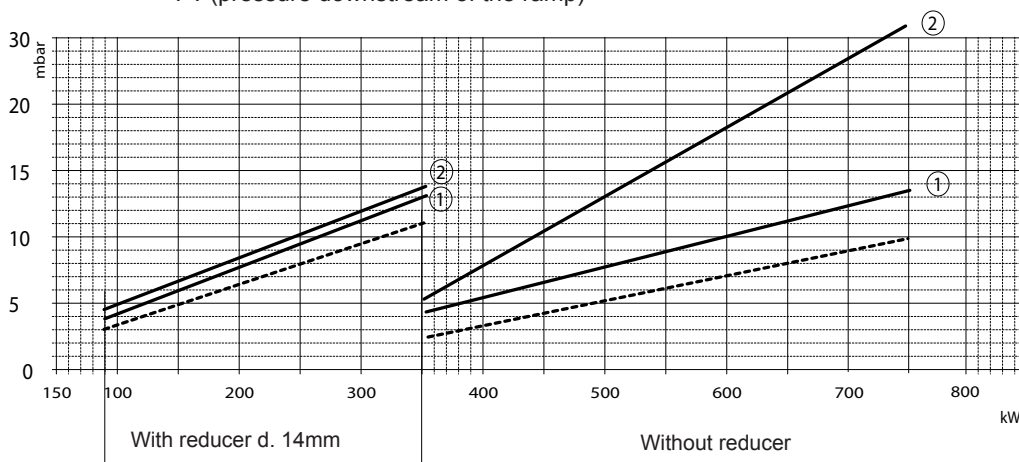
They indicate the gas pressure in mbar, (in the various points of the gas ramp) necessary to obtain a determined flow rate in m<sup>3</sup>/h. The pressures are measured with the burner functioning and are intended with combustion chamber at 0 mbar. If the chamber is pressurised, the gas pressure necessary will be that of the diagram plus the value of that of the chamber.

NATURAL GAS



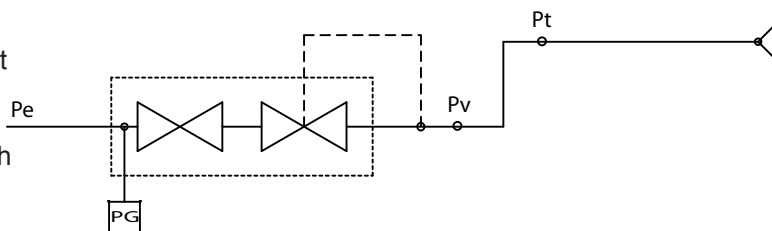
- 1 — VCV 240 (inlet pressure)
- 2 — VCV 125 (inlet pressure) (natural gas, max 590 kW)
- Pv (pressure downstream of the ramp)

LPG



NOTE: For reducer positioning (gas diaphragm) see "GAS DIAPHRAGM POSITIONING" paragraph.

Pe = Pressure upstream from the valves unit  
 Pt = Pressure at the combustion head  
 Pv = Pressure downstream of the ramp  
 PG = Minimum gas pressure pressure switch



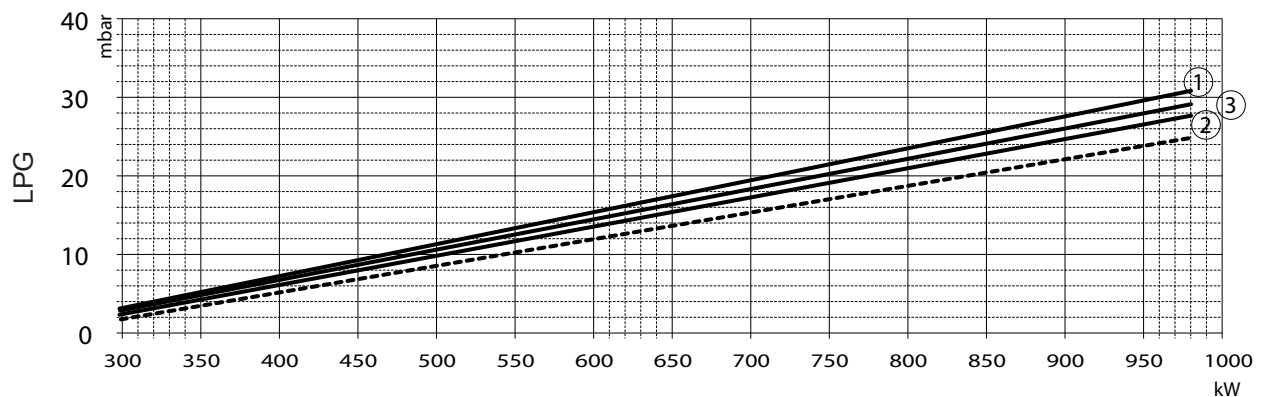
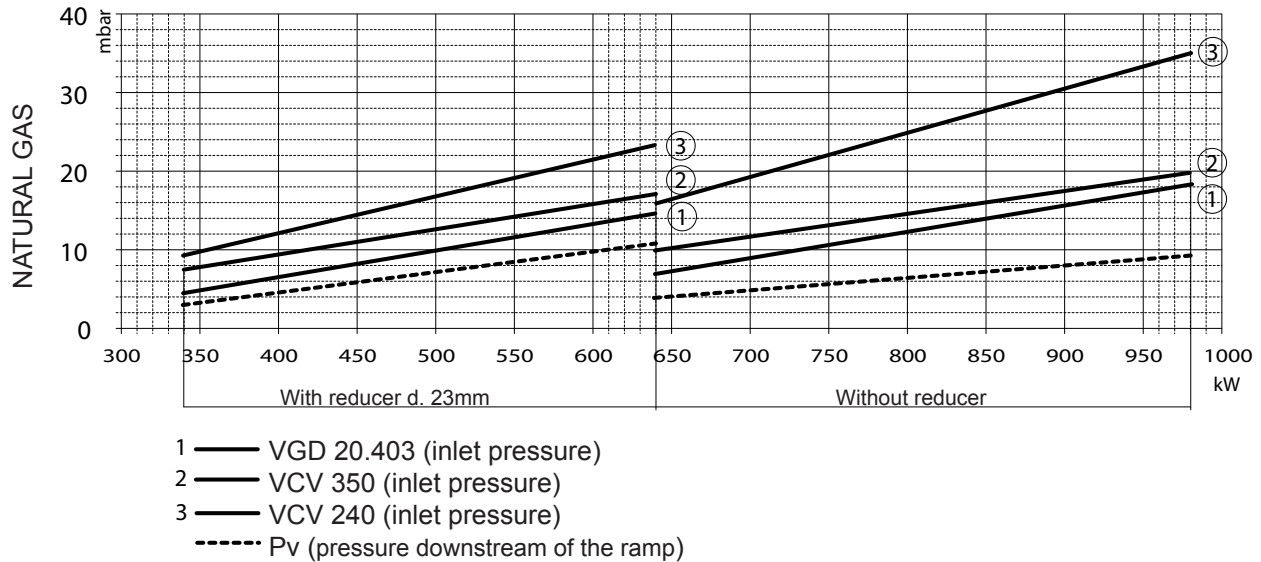
**ATTENTION: the Pt-Pv gas pressure outlets have a screw closing pin. Ensure that the Pt - Pv gas outlets are closed during normal operation.**



## CURVE DI PRESSIONE / PORTATA G 1000

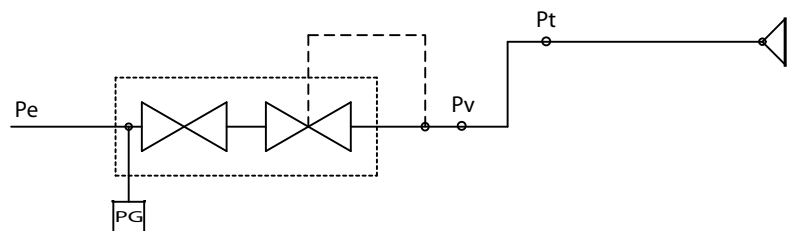
**M**

They indicate the gas pressure in mbar, (in the various points of the gas ramp) necessary to obtain a determined flow rate in m<sup>3</sup>/h. The pressures are measured with the burner functioning and are intended with combustion chamber at 0 mbar. If the chamber is pressurised, the gas pressure necessary will be that of the diagram plus the value of that of the chamber.



NOTE: For reducer positioning (gas diaphragm) see "GAS DIAPHRAGM POSITIONING" paragraph.

Pe = Pressure upstream from the valves unit  
 Pt = Pressure at the combustion head  
 Pv = Pressure downstream of the ramp  
 PG = Minimum gas pressure pressure switch



**ATTENTION: the Pt-Pv gas pressure outlets have a screw closing pin. Ensure that the Pt - Pv gas outlets are closed during normal operation.**



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## RECEIVING THE PRODUCT

**M U**

The burner is supplied protected by cardboard or cardboard/wood packaging.

### WARNING

The instruction manuals are an integral part of the appliance and therefore must be read before installing and starting the burner and must be kept with care.

The documents envelope, positioned inside the packaging, contains the following material:

- Installation and maintenance book
- Warranty certificate
- Spare parts exploded diagram

### HANDLING RECOMMENDATIONS

- Handling must be performed by qualified staff;
- Use suitable accident-prevention equipment;
- It is prohibited to disperse of packaging material in the environment or leave it within the reach of children as it can be a potential source of danger. It must therefore be disposed of in compliance with that established by the law in force;
- The place of installation must be without dusts, objects or inflammable materials or corrosive gases.

### RECOMMENDATIONS FOR USE

To prevent injury/damage to persons and the environment in which the appliance is used, the following notes must be complied with!

- Do not open, tamper with or modify the appliance
- Before making any modifications to the connections of the appliance, completely isolate the unit from the mains power supply.
- Suitably protect the appliance terminals in order to prevent any contact with them.
- Make sure that the appliance is connected correctly (see CONNECTION LAYOUT). Incorrect connection can damage the appliance and the place of use.
- Falls and mechanical stress can damage some safety functions. In this case, do not install the appliance even if there is no visible damage.

### RECOMMENDATIONS FOR INSTALLATION

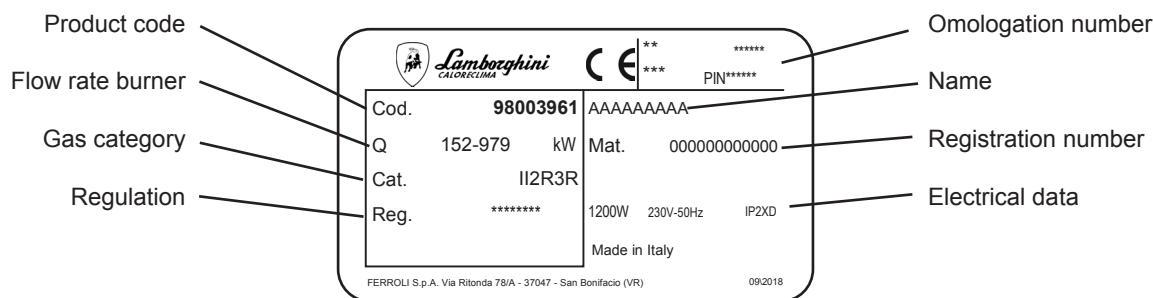
- Installation must be carried out by specialised staff. The Standards in force must be respected.
- The place of installation must be without dusts, objects or inflammable materials or corrosive gases.
- Keep the ignition cable separate from the other connection cables of the appliance.
- The protection fuse must respect that indicated in the technical data. If this does not take place, serious damage can be caused to the appliance and room by a short circuit.
- When checking the components (motor, solenoid valves, etc...) outside the control appliance, the latter must not be connected.
- Check that the maximum load supported by the output terminals is not exceeded.

### NOTES FOR REPLACEMENT OF THE APPLIANCE

- Every time the appliance is replaced, check connections and safety functions
- The appliance is made up from electric and electronic components; therefore it must be disposed of in compliance with local Directives in force.

### NOTES FOR READING THE DATA PLATE

- The data plate is placed on the instrument panel of the burner.





## BOILER ASSEMBLY

**M**

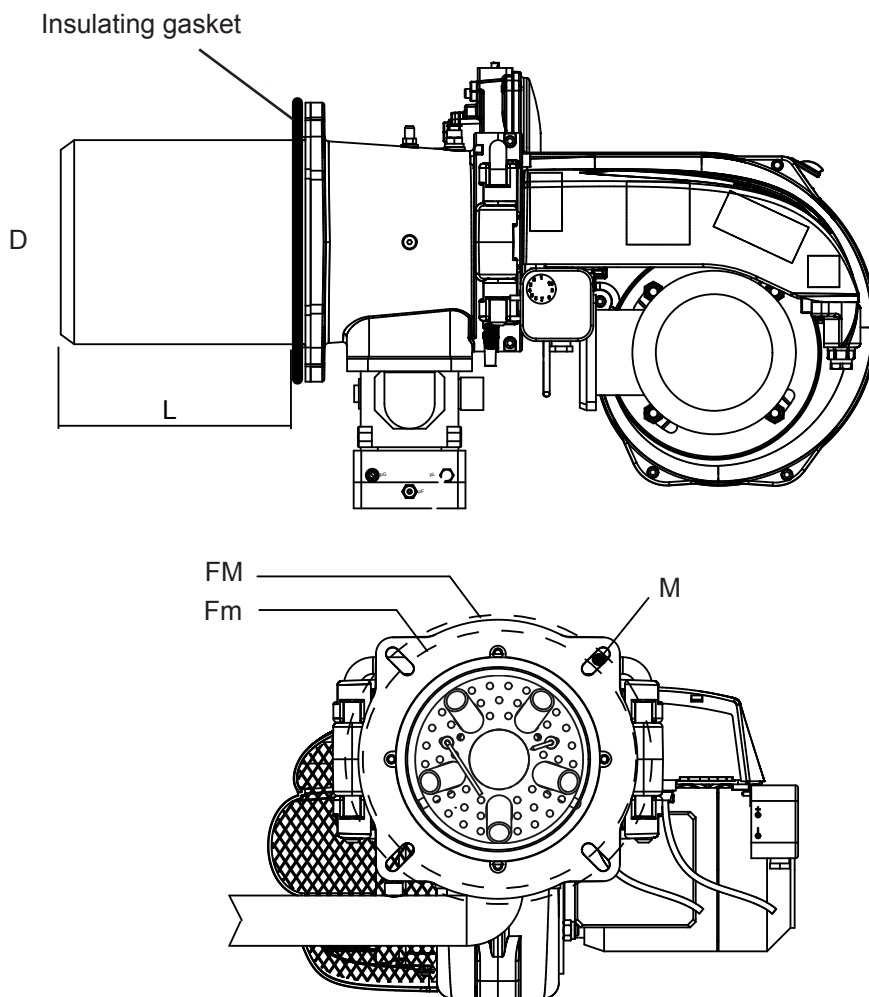
The burner is fixed by the flange, placing the supplied insulated gasket between the plate and the boiler. For drilling of the boiler and positioning of the fastening screws, refer to the diagram.

	D	L (BC)	L (BL)	FM	Fm	M
	mm	mm	mm	mm	mm	M SCREW
<b>G 700</b>	166	235	325	286	246	M12
<b>G 1000</b>	196	230	310	286	246	M12

L = Useful entrance lenght flow nozzle

L (BC) = flame tube short

L (BL) = flame tube long



## GAS CONNECTION

**M**

The system must be complete with the accessories prescribed by the Standards: do not exert mechanical stress on the components.

Also, keep the spaces requested for maintenance of the burner and boiler in mind.

On request, it is possible to order the ACCESSORIES UNIT KIT, composed of the anti-vibration joint and gas ball cock.

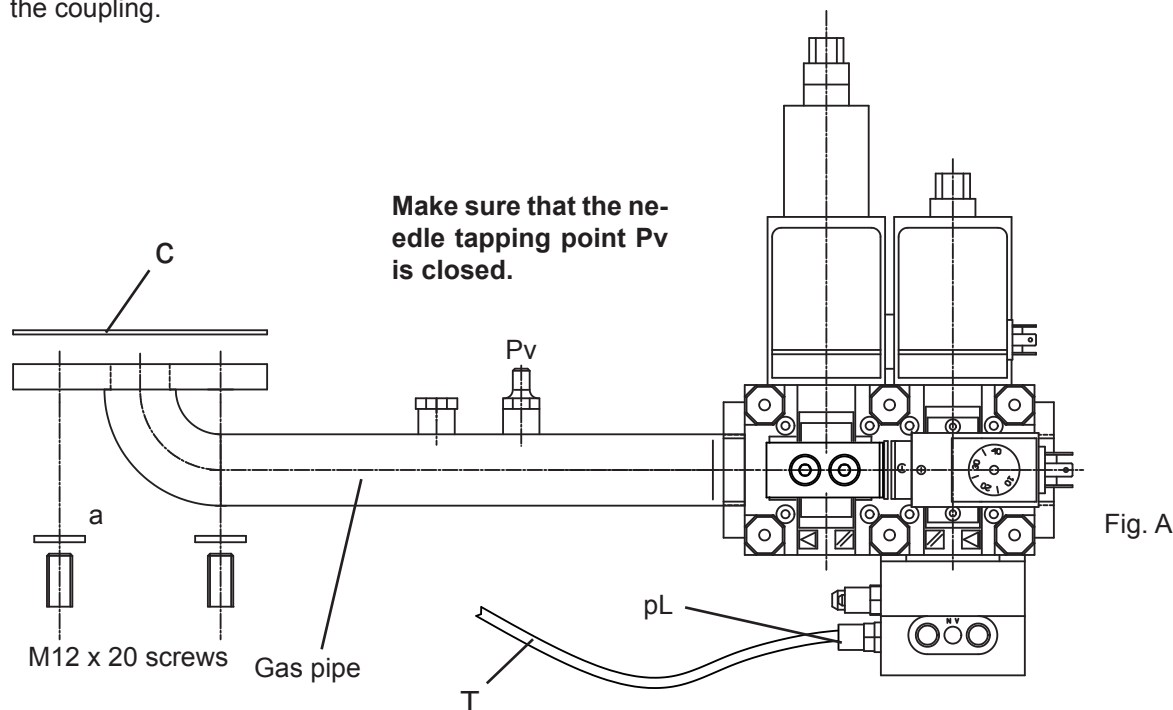


## VALVES UNIT ASSEMBLY

**M**

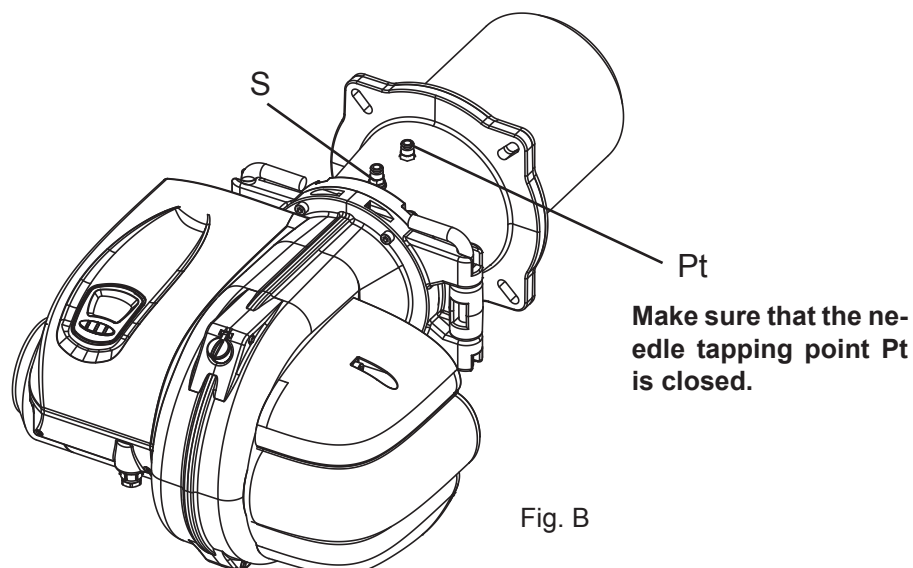
### VCV L (slow opening)

To fix the valves unit (fig. A) to the burner, use the 4 washers (a) and the 4 M12 x 20 screws supplied with the valves unit, paying attention that the cork/rubber gasket (c) is positioned correctly and there are no gas leaks in the coupling.



Connect the supplied air withdrawal polyethylene pipe (T) to the connection pL on the VCV valve and on the quick coupling (S) of the burner (fig.B)

The valves unit can also be positioned on the left of the burner..

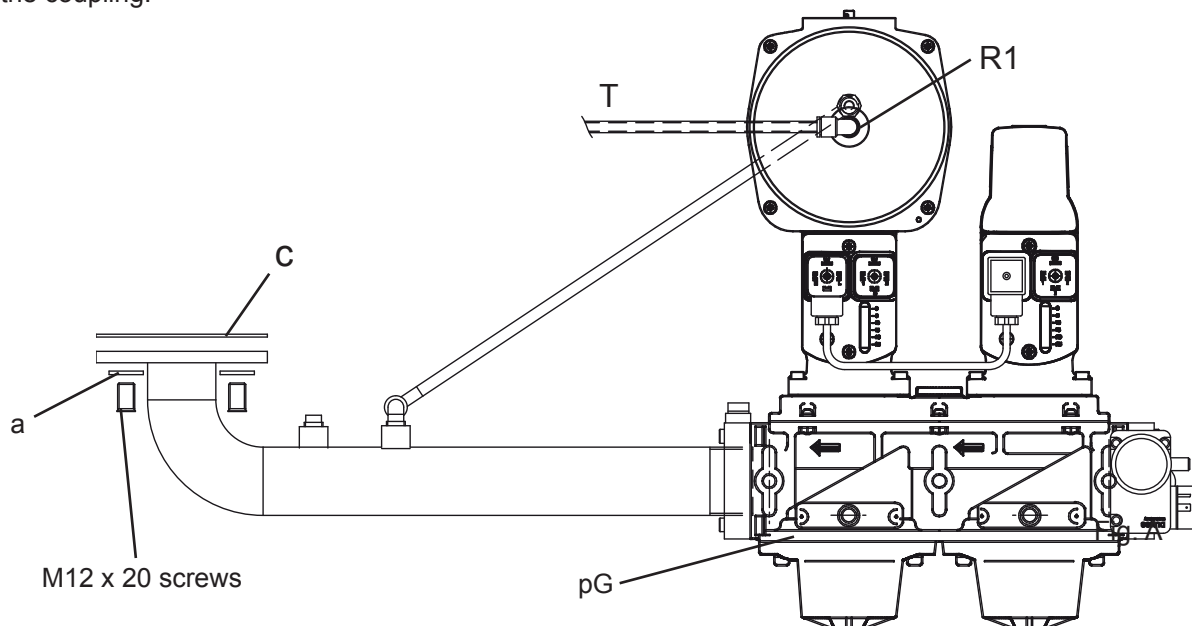




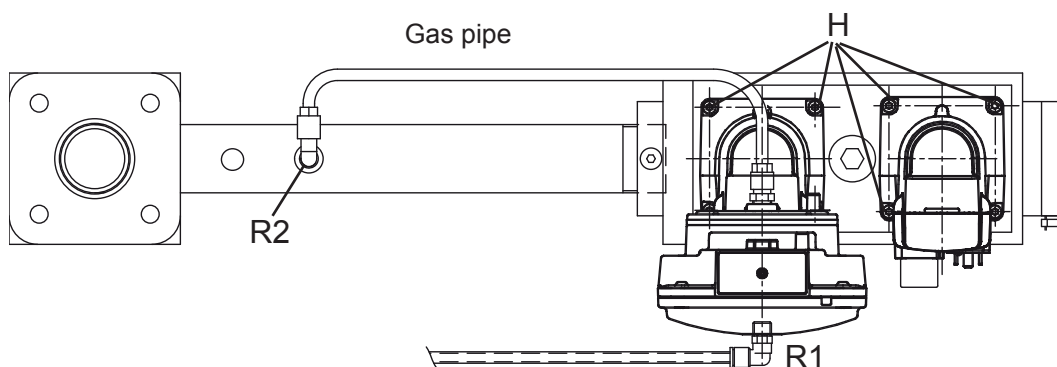
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### VGD 20....

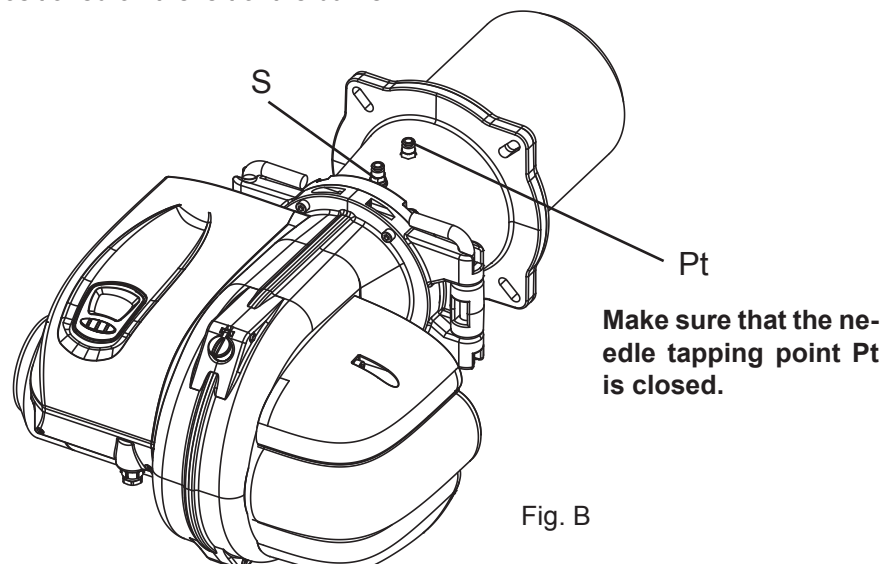
To fix the valves unit (fig. A) to the burner, use the 4 washers (a) and the 4 M12 x 20 screws supplied with the valves unit, paying attention that the cork/rubber gasket (c) is positioned correctly and there are no gas leaks in the coupling.



Connect the supplied air withdrawal polyethylene pipe (T) to the connection R1 on the SKP75 valve and on the quick coupling (S) of the burner (fig.B)



The valves unit can also be positioned on the left of the burner..







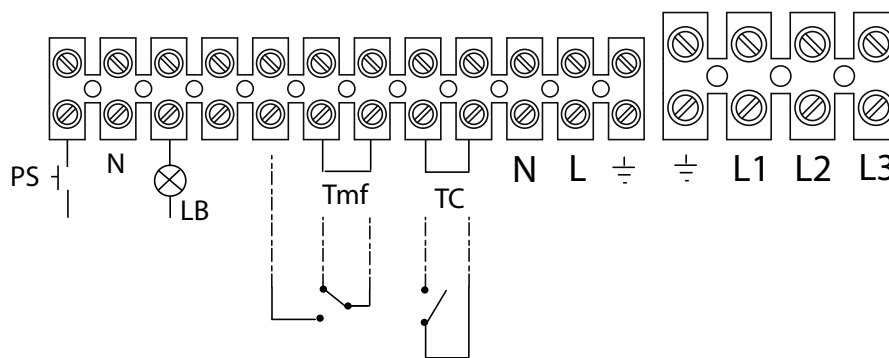
## ELECTRIC CONNECTIONS

**M**

### READ THE GENERAL STANDARDS ON PAGE 3 CAREFULLY

- NEUTRAL TO EARTH: in the case of power supply mains with NEUTRAL CONNECTED TO EARTH connect the mains power supply NEUTRAL to the appliance NEUTRAL.
- INSULATED NEUTRAL: in the case of mains power supply with INSULATED NEUTRAL it is necessary to use an insulation transformer. Connect a terminal of the insulation transformer secondary to the appliance EARTH and NEUTRAL. Now connect the other terminal of the transformer secondary to the appliance LINE.
- PHASE-PHASE: in the case of PHASE-PHASE mains power supply, it is necessary to use an insulation transformer. Connect a terminal of the insulation transformer secondary to the appliance EARTH and NEUTRAL. Now connect the other terminal of the transformer secondary to the appliance LINE.
- The cable to be used for the 230/400V power supply must be **H05W-F** type with cross-section of 1.5 mm<sup>2</sup>

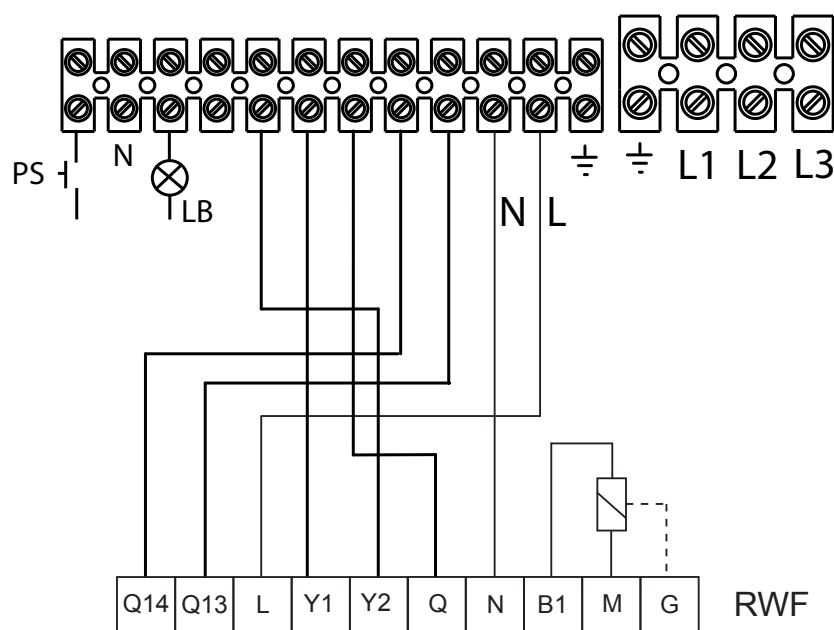
### TERMINAL BOARD CONNECTION

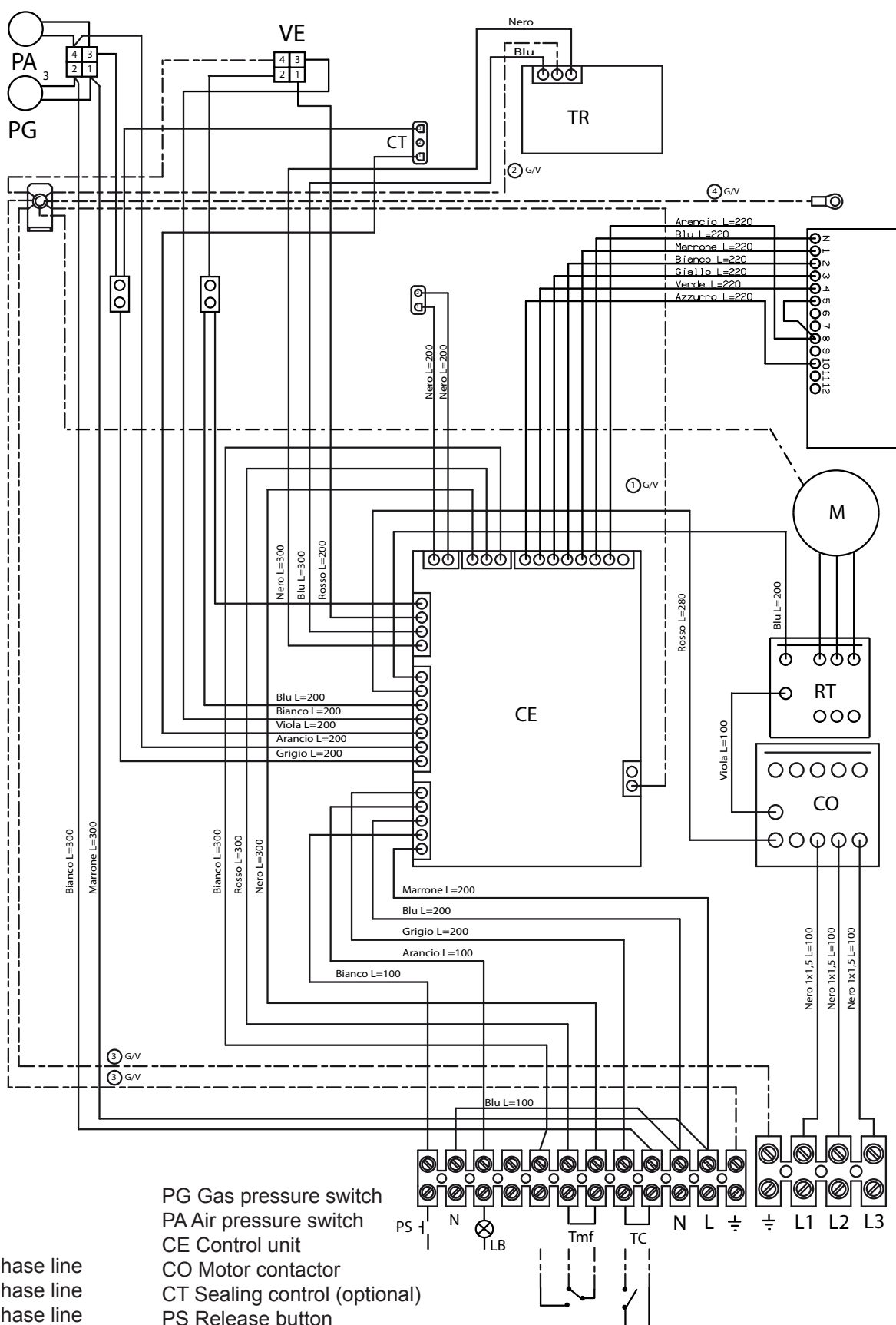


#### KEY

- L Line
- N Neutral
- L1 Three phase line
- L2 Three phase line
- L3 Three phase line
- PS Release button
- LB Lock out lamp
- TC Boiler thermostat
- Tmf Modulating thermostat flame

### RWF CONNECTION





## KEY

L Line  
N Neutral  
L1 Three phase line  
L2 Three phase line  
L3 Three phase line  
M Burner motor  
RT Circuit breaker switch  
TR Ignition transformer  
MS Servo-motor

PG Gas pressure switch  
PA Air pressure switch  
CE Control unit  
CO Motor contactor  
CT Sealing control (optional)  
PS Release button  
LB Lock out lamp  
TC Boiler thermostat  
Tmf Modulating thermostat flame



## APPLIANCE



### Main features

- EMC filter on the board. Protection fuse on the board.
- Stable timers not affected by the voltage and/or temperature changes (system management by microprocessor).
- Protection in case of low/high voltage power supply.
- Monitoring of air pressure switch functioning. Non-volatile block. remote reset;
- Intermittent functioning: regulation and self-diagnosis stop every 24h. As a rule at least once every 24 hours to allow the electrical equipment to check its efficiency at start-up. Normally burner shutdown is ensured by the boiler remote control. Otherwise it is necessary to install a time switch in series that provides for burner shutdown at least once every 24 hours.
- Air damper control for functioning at several stages or modulating.
- Built-in button or two-colour LED for indicating functioning status and anomalies;
- Safety valve sealing control function.

### Table of times

Pre-ventilation time	20s (*)
Pre-ignition time	0.5s (*)
Safety time	3s (**)
Air pressure switch consent max. delay before block	10s (***)
Functioning regulator management delay	10s
Intervention time to switch-off	< 1s
Parasite flame signal duration maximum timing before block	10s
Post-ventilation time	from 0 to 255 s
Key pressing limit timing for release	$0.2s \leq \&\& \leq 4s$
Continuous key pressing timing for temporary shutdown	> 5s
Manual mode functioning timeout	4 minutes
Timeout communication with display	60s
Maximum duration of access to menus	120s

(\*) Minimum timing guaranteed

(\*\*) Maximum timing guaranteed

(\*\*\*) Time not set up in starter. Switch air signal attended entire time of opening time.

### Special functions

#### Network frequency self-learning

The board can automatically optimise the functioning times in relation to the network frequency measured (50 or 60 Hz).

#### Network frequency self-learning

The board can automatically optimise the functioning times in relation to the network frequency measured (50 or 60 Hz). Temporary shutdown With ignition request in progress or burner functioning, it is possible to temporarily force a stop by continuous pressing of the key for longer than 5s (yellow fast flashing). A new start-up cycle is allowed only when the key is released. It is possible to activate the function in question also with the external release button. The function in question can only be activated by accessing the INSTALLER MENU.

#### Protection in case of low voltage power supply

The power supply voltage must be at least 180Vac in order to allow a starting cycle to be performed. If the network voltage falls below 156Vac, the appliance stops and signals the anomaly. The starting cycle can only be carried out again if the power supply voltage exceeds 180Vac.

**Protection in case of high power supply voltage**

The power supply voltage must be at below 275Vac in order to allow a starting cycle to be performed. If the network voltage exceeds 280Vac, the appliance stops and signals the anomaly. The starting cycle can only be carried out again if the power supply voltage falls below 275Vac.

**Servo-motor self-learning**

The board can automatically acquire the times relative to the damper control servo-motor, it is therefore not necessary to perform any calibration. It is however necessary to use servo-motors with 0-90° run times no less than 2s and not exceeding 120s.

**Feedback verification and sequence control**

If there is no feedback signal relative to reaching a determined position by the air damper, the system performs a block shutdown and signals the anomaly (block due to servo-motor anomaly). Also present is a control of the arrival sequence of the feedback signals to the appliance. If an incorrect arrival sequence of the appliance damper position signals occurs, the appliance will perform a block shutdown (block due to servo-motor anomaly).

**Sealing control function**

If requested, using a gas pressure switch with switch-over contact, in the start-up phase it is possible to program the SEALING CONTROL of the gas ramp safety valves. The gas pressure switch must be calibrated at a pressure value equal to the half of the gas inlet pressure.

The SEALING CONTROL function is carried out with the following sequence:

- heat request;
- first stage valve opening for 2s and relative closure;
- checking sealing of the safety valve for a time of 10s;
- safety valve opening for 2 s and relative closure;
- checking of the burner side valve sealing for a time of 10s;
- end sealing control. With positive result, the appliance proceeds with the normal start-up program. In the case of an anomaly, the appliance performs a block shutdown with coded signals for the identification of the unsuitable valve. If interface CP45 is present, it is possible to enable or disable the function in question by accessing the PARAMETERS MENU.

**Air pressure switch monitoring**

The board provides continuous monitoring of the air pressure switch contact. More precisely, the status of the air pressure contact must reflect the functioning status of the fan, i.e.: - no air flow: open contact; - air flow presence: closed contact. If the air pressure contact does not close following activation of the fan, the board waits for contact switch-over until the total opening of the air damper position is reached; at this point no switch-over causes a block shutdown. If, however, the air pressure switch opens with burner functioning, the board performs immediate shutdown with consequent block status if the contact is not closed within 10s. In the case of closed contact with fan off, the board waits for the contact to open for a maximum time of 10s. If the contact has not opened within this period of time, the board blocks the next start-up.



## FUNCTIONING CYCLE



### Burner control

#### Ignition

On closure of the heat request contact and when the correct status of the air pressure contact has been verified, the fan motor is inserted and the air damper total opening is controlled. On reaching total opening of the damper and switch-over of the air pressure switch contact has been verified, the pre-ventilation time starts during which the flame amplifier test is performed along with components associated to safety functions. An amplifier fault that corresponds to a flame present condition or the breakdown of a component that ensures a safety function prevents the start of the ignition sequence.

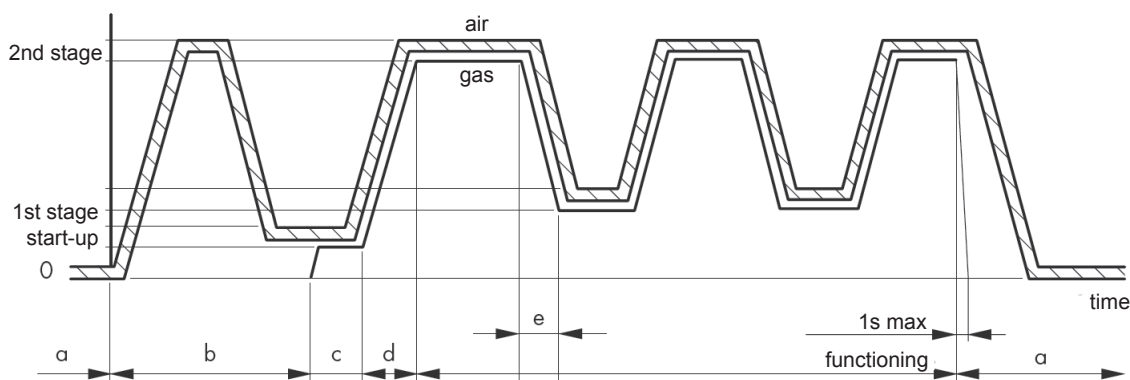
At the end of the pre-ventilation time, the air damper is positioned in the first stage ignition position with consequent activation of the ignition transformer (pre-ignition phase). On expiry of the latter, safety time timing starts, during which the first stage solenoid valve is inserted.

On detection of flame signal presence, the ignition transformer remains inserted until the end of the safety time and, after appropriate timing, functioning regulation is enabled, following the commands supplied by the external regulator. If there is no ignition during the safety time, the appliance is blocked and the voltage is definitively removed to the first stage solenoid valve and the ignition transformer. Post-ventilation is performed with the damper totally open, at the end of which the air damper is closed completely.

#### Functioning principle

According to the device to which the air damper activation servo-control is interlocked, there are two types of burner working: two-stage progressive if the control element is the all-or-nothing- type (ON/OFF), continuous flame modulation if the device is the modulating type

#### Two-stage progressive functioning



It is that obtained with a normal open-close (ON/OFF) boiler thermostat (or pressure switch), for which the servo-control makes the air damper assume two possible positions: the minimum (1st stage) and maximum opening (2nd stage). It is called two-stage progressive functioning because the passage from one to the other takes place gradually and linearly without jumps. The following characteristic phases can be noted in the representative diagram:

- a) Stop sequence: with the burner off, the air damper is in the closure position in order to prevent that air from entering and cooling the combustion chamber of the boiler and flue.
- b) Pre-ventilation sequence: the air damper goes to maximum opening with successive return to partial closure



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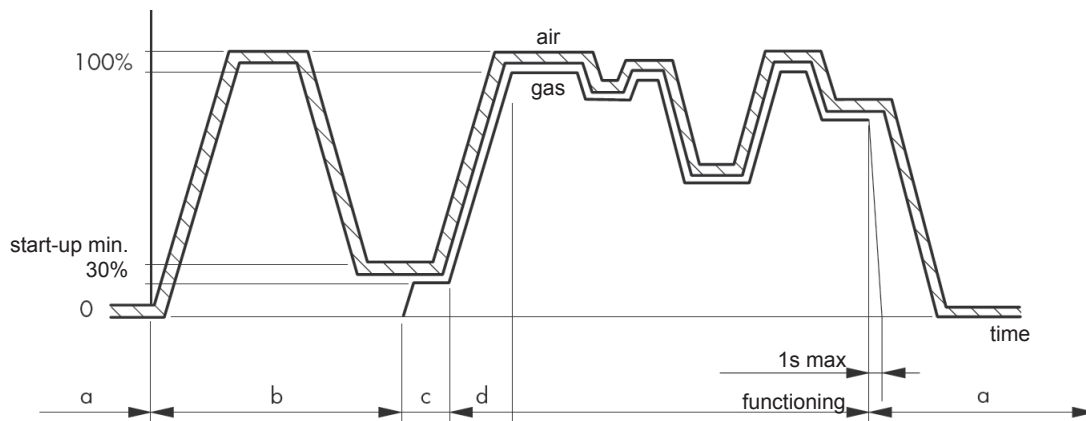
corresponding to start-up flow rate (with gas flow always closed).

c) Formation sequence of the start-up flame: the coils relative to the gas solenoid valves are excited and the gas regulator is partially open in relation to the start-up air pressure.

d) Passage sequence to the main flame or second stage: the servo-control activates the opening of the air (up to maximum flow rate calibration) whose increase in pressure causes the gradual increase of the gas flow rate.

e) Passage sequence from maximum flow rate to first stage: on command of the boiler thermostat/pressure switch (regulator), the servo-control determines the closure of the air. The consequent pressure decrease at the burner head leads to progressive partialisation of the gas until reaching minimum flow rate. The burner repeats the passage from the first to the second stage, from the second to the first or stops completely always in relation to the command given by the boiler regulator to the servo-control.

### Continuous modulation functioning



It is the functioning that is obtained by sending an appropriate signal to the air damper servo-control, therefore the power issued by the burner can assume any intermediate value between a pre-fixed minimum and maximum. The continuous modulation is requested when the boiler water temperature or steam pressure variation must be contained within the narrow range. From the diagram it can be seen that the shutdown, pre-ventilation, flame formation and passage maximum power stages are the same described in the previous paragraph. The effective flame modulation is obtained by giving the system the following equipment, supplied in kits on request:

- LANDIS boiler probe for temperature or pressure;
- regulator, LANDIS RWF 40 with casing for bracket-mounting;
- regulator field adapter, controlled by the boiler probe and with calibration suitable for the scale of the same probe.

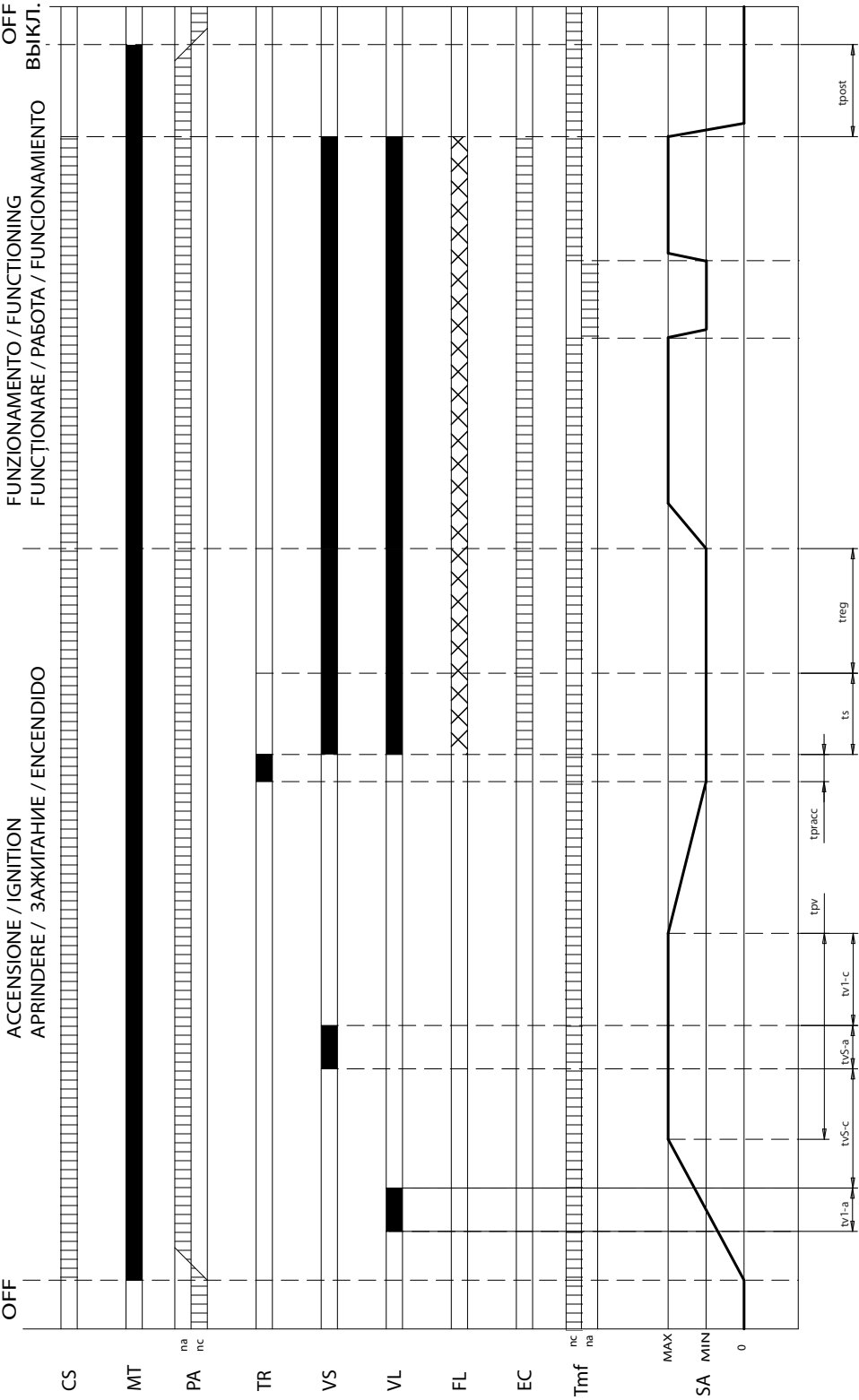




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# Two-stage progressive functioning diagram

With Tmf thermostat with high/low flame

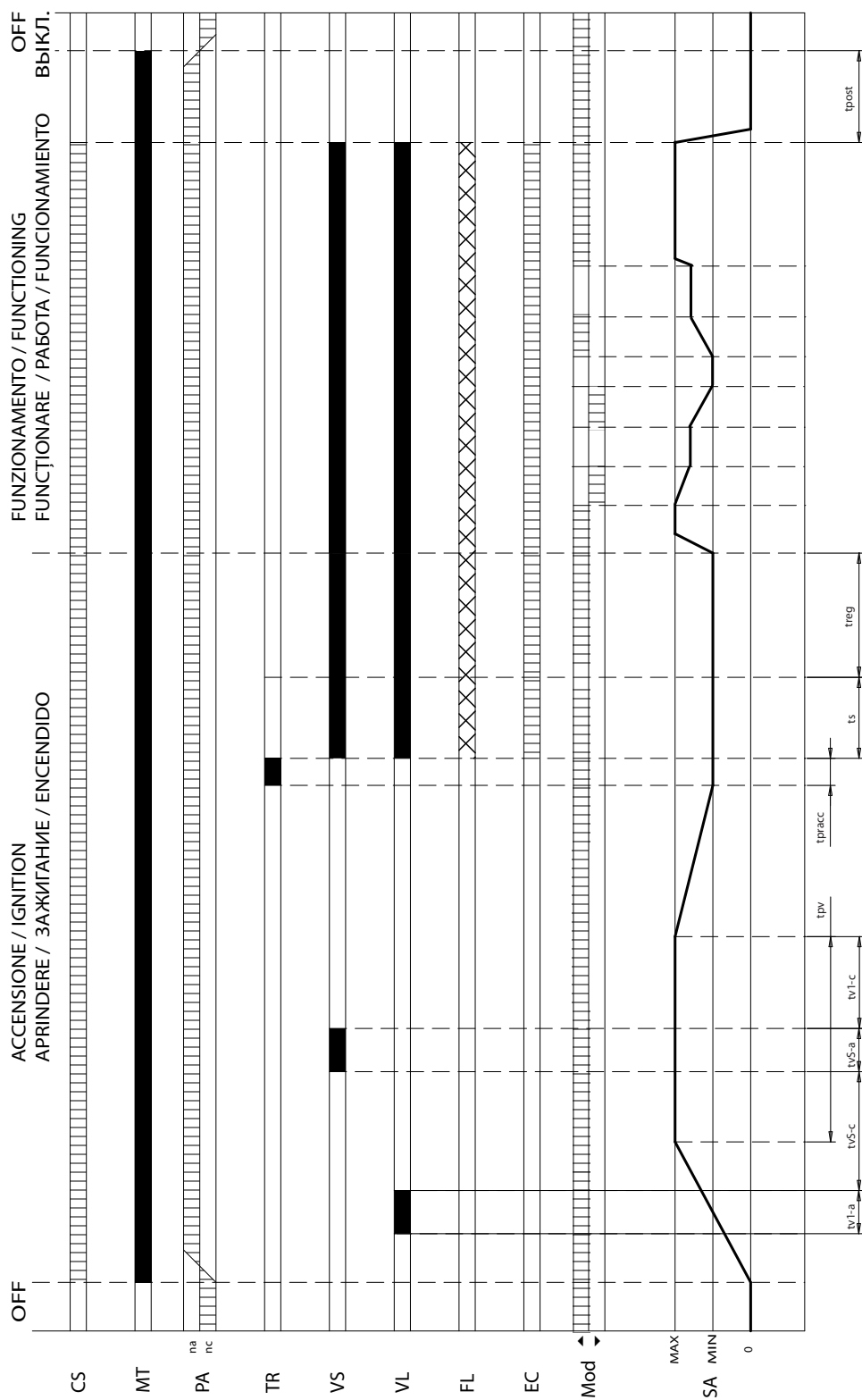


CSCS Functioning request consents  
FAN Fan motor  
GN Ignition transformer  
VS Safety valve  
V1 First stage valve  
V2 Second stage valve  
FL Flame signal  
AL Block signalSA Air damper

tpv Pre-ventilation time  
cc Pre-ignition time  
treg Functioning regulator management delay  
tv1-a First stage valve opening time  
tv5-c Safety valve sealing check time  
tv5-a Safety valve opening time  
tv1-c Work valve sealing check time



## Diagram of functioning with continuous modulation



CS Functioning request consents  
FAN Fan motor  
GN Ignition transformer  
VS Safety valve  
V1 First stage valve  
V2 Second stage valve  
FL Flame signal  
AL Block signal  
SA Air damper

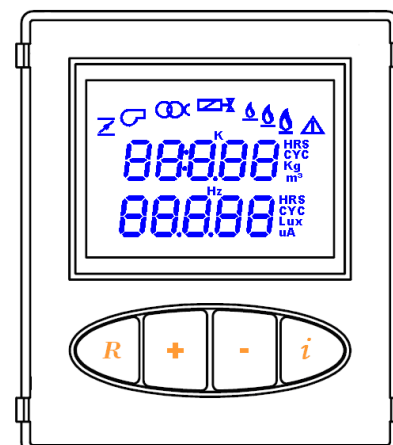
tpv Pre-ventilation time  
tpacc Pre-ignition time  
treg Functioning regulator management delay  
tv1-a First stage valve opening time  
tv2-a Safety valve opening time  
tv2-c Safety valve sealing check time  
tv1-c Work valve opening time  
tv1-c Work valve sealing check time



## USER INTERFACE

**M U**

The control and command panel can be used to monitor the status of the burner, access the diagnostic and configuration menus of the system and release the appliance. The control and command panel is composed of an LCD with back-lit display area and 4 function keys



### Icon meaning

ICON	MEANING	
	Air damper servo-motor	
	Fan motor	
	Ignition transformer	
	Gas ramp solenoid valves	
	TWO-STAGE BURNER	MODULATING BURNER
	First stage flame signal	Flame signal
	TWO-STAGE BURNER	MODULATING BURNER
	SECOND STAGE FLAME SIGNAL	Not used
	Anomaly signal	
K	Not used	
HRS	Hours	
CYC	Cycles	
Kg	Not used	
m <sup>3</sup>	Metres cubed	
Lux	Not used	
uA	Microampere	
Hz	Hertz	

### Key functions

KEY	DISPLAY	MEANING
<b>R</b>	NORMAL	Release appliance if in block conditions
	MENU	Go back to previous level menu
	MODIFY PARAMETER	Exit the display mode without memorising
<b>+</b>	NORMAL	Not used
	MENU	Successive parameter or data
	MODIFY PARAMETER	Increase parameter value
<b>-</b>	NORMAL	Not used
	MENU	Previous parameter or data
	MODIFY PARAMETER	Decrease parameter value
<b>i</b>	NORMAL	Menu display mode
	MENU	Display next level menu
	MODIFY PARAMETER	Confirm parameter modification

## Display

The control and command panel makes 3 display methods available:

### NORMAL:

in this mode, icons appear on the display that are relative to the burner functioning state. If there are no anomalies present, the display shows the number of ignition cycles performed by the burner and the total number of functioning hours. If an anomaly occurs, the display shows the relative code and signals the type of anomaly, (volatile or non-volatile).

Additional information regarding the burner status is also displayed (e.g. valves sealing control procedure) and any execution of special functions for enabled staff.

### MENU:

by pressing key **i** during the normal display mode, access the list of menus:

- INFO (Information)
- HIST (Anomalies log)
- PARAM (Parameters)
- SERV (Installer)

Use the **+** and **-** keys to scroll the list.

Press key **i** again to access one of the menus.

To exit the menu or the list of menus, press **R** or wait 60 s without pressing any buttons to go back to the normal display.

### MODIFY PARAMETER:

The values of the parameters linked to burner functioning can be modified and memorised.

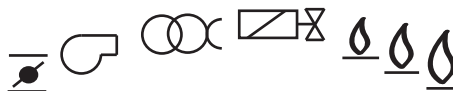
During the display of the parameter of interest, it is possible to access the value modification by pressing key **i**.

In this phase the current parameter value starts to flash and by pressing the **+** and **-** keys it is possible to modify the value.

Press key **i** to save the modified value. To exit the parameter modification mode without saving, wait 10s without pressing any buttons or press the **R** key.

## Normal display mode

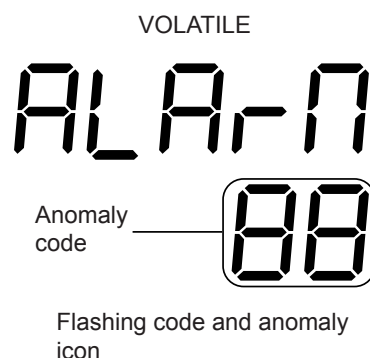
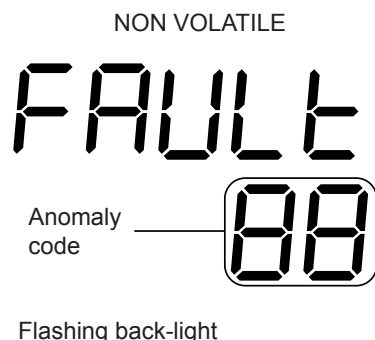
By connecting the burner to the mains power supply, the control equipment is automatically powered, which for a few seconds switches on all icons and segments of the display in order to check correct functioning. When this has been carried out, automatic access is given to the NORMAL DISPLAY mode, during which, in absence of anomalies, the icons are switched on and off in relation to the functioning of the various burner components.



Also with no anomalies present, the total number of ignition cycles performed is displayed along with the total functioning hours of the burner



However, if anomalies are present, the anomaly code (see table 1) and the type of anomaly (volatile or non-volatile) will be displayed at the same time.

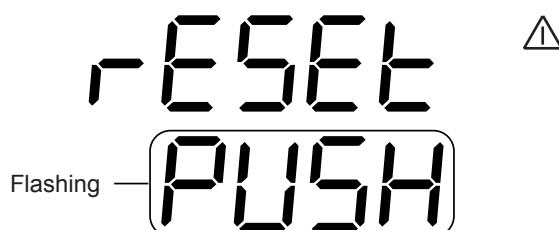


CODICE ANOMALIA	SIGNIFICATO
<b>NON VOLATILE</b>	
01	No ignition block
02	Parasite flame block
03	Block due to maximum number of switch-offs
04	Block due to servo-motor anomaly
05	Block due to air pressure switch anomaly
06	Block due to safety valve sealing anomaly
07	Block due to work valve sealing anomaly
<b>VOLATILE</b>	
12	Parasite flame signal
13	Undervoltage
14	Overvoltage

Table 1

If a non-volatile type block occurs, the appliance can be released.

During the display of non-volatile block, press key R to access the release request confirmation display, with duration of 5s.



Pressing key R again causes the release of the appliance and the return to normal display mode.

During the normal display mode, further information is also supplied that is linked to the functioning status of the burner and the setting of some parameters. In fact, in the case of enabling the valves sealing control procedure from the parameters menu (valve proving system), any execution is signalled.

UPS

If special functions are activated, the function in progress is displayed.

Manual functioning mode:

 Flashing

A ADV

Temporary shutdown:

SHEDN  
TEST


## **ACCESS TO THE MENUS**

### **MENU ACCESS ENABLING PROCEDURE**

In order to enable the display and consequent management of the menus stated previously, during the normal display phase it is necessary to follow the procedure given:

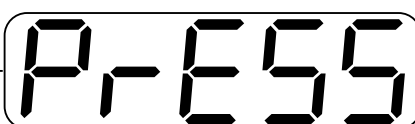

a) PROLONGED PRESSING OF KEY “”.

By prolonged pressing for 5 seconds of key “” the following display is accessed:

Flashing — 

b) PROLONGED PRESSING OF KEY “**R**”.

During phase a) (maximum duration 10s) and by pressing key “**R**” for 5 seconds, access the following displays:

Flashing —   
 Flashing — 





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c) PRESSING KEY “*i*” .

During phase b) (maximum duration 10s) pressing key “*i*” once enables the display and management of the INFO, HIST, PARAM and SERV menus.

The menu management enabling is confirmed by the following display:

ENTER  
MENU

The enabling on display and management of the menus has duration of 120s, after which the return to normal display mode takes place.

To access the menus again, repeat the procedure just described.

## INFO MENU

MENU  
INFO

If the burner is two-stage, the INFO MENU is organised as per table 2.

If the burner is modulating the INFO MENU is organised as per table 2b.





## Modulating burner

MENU	REPRESENTATION	INFORMATION
MENU INFO	-	TIMER
	-	
	Burner total functioning hours	
	Timer reset	
	Burner functioning cycles	CYCLES-COUNTER
	-	
	Burner no ignition cycles	
	Cycle-counter reset	
	-	FUEL CONSUMPTION
	-	
	-	
	-	
	Flame signal intensity	FLAME SIGNALS
	Air damper servo-motor current position	
	Air damper servo-motor total opening cycles	AIR DAMPER SERVO-MOTOR
	Servo-motor cycles reset	
	Electrical frequency	ELECTRICAL FREQUENCY
	Firmware ID	FIRMWARE ID

## Timer

The function hours of the burner are displayed respectively in first and second stage (if two-stage burner).


  
 Stage burner — 

The total functioning hours of the burner are also displayed.


  
 TOTAL

To reset all counters relative to the hours of functioning of the burner, press the key i during the following display:

CLEAR-  
 Hrs

By doing this, access the reset consent confirmation display with duration of 5s.

CLEAR-  
 flashing PUSH

Pressing the key again during this display determines the reset of all meters relative to the functioning hours and the return to first stage functioning hours display.

### Cycles-counter

The burner functioning cycles are displayed respectively in first and second stage (total functioning cycles of the burner are equal to the first stage cycles). (In the case of modulating burner, only the total functioning cycles of the burner are displayed).

888888 CYC  
 burner

Total functioning cycles

888888 CYC  
 Stage burner — 8 St

Functioning cycles in second stage

Also displayed are the total no burner ignition cycles.

888888 CYC  
 FAULT

To reset all counters relative to burner cycles, press the key i during the following display:

CLEAR-  
 CYC

By doing this, access the reset consent confirmation display with duration of 5s.

CLEAR-  
 flashing PUSH

## Flame signal

The flame signal value is displayed in uA.

FLAME  
 Flame signal — 888 uA  
 in micro A

If the flame signal read should exceed the flame signal detection threshold value by 10 times, the display is:

FLAME  
 Flame signal — 888 uA  
 in micro A

## Air damper servo-motor

The current position of the air damper servo-motor is displayed (closure total, first stage, total opening or second stage).

### TWO-STAGE BURNER

ACT P  
 888888 [CLOSE, 1 St, OPEN]  
 [Error] If servo-motor anomaly present

### MODULATING BURNER

ACT P  
 888888 [CLOSE, 01 %, 100%]  
 [Error] If servo-motor anomaly present

If modulating burner is selected, the percentage opening of the damper with respect to the minimum position is also indicated.



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The total opening cycles performed by the servo-motor are also displayed.

000000 CYC  
ACT

To reset the servo-motor opening cycles-counter, press the key i during the following display:

CLEAR  
flashing PUSH

By doing this, access the reset request confirmation display with duration of 5s.

CLEAR CYC  
ACT

Pressing the key again determines the reset of the servo-motor cycle meter and the return to the servo-motor opening cycles display.

### Firmware ID

The firmware version is displayed.

SOFT  
U 00 Firmware version



## ANOMALIES LOG MENU

Menu  
HI SE

The **HIST MENU** is organised as per table 3.

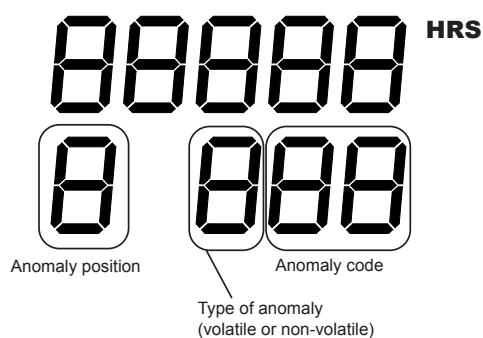
MENU	RAPPRESENTAZIONE	INFORMAZIONI
MENU HIST	Anomalies log per functioning hours (Position 1/8)	ANOMALIES LOG (DISPLAY BY HOURS)
	Anomalies log per functioning hours (Position 2/8)	
	Anomalies log per functioning hours (Position 3/8)	
	Anomalies log per functioning hours (Position 4/8)	
	Anomalies log per functioning hours (Position 5/8)	
	Anomalies log per functioning hours (Position 6/8)	
	Anomalies log per functioning hours (Position 7/8)	
	Anomalies log per functioning hours (Position 8/8)	
	Anomalies log per functioning cycles (Position 1/8)	ANOMALIES LOG (DISPLAY BY CYCLES)
	Anomalies log per functioning cycles (Position 2/8)	
	Anomalies log per functioning cycles (Position 3/8)	
	Anomalies log per functioning cycles (Position 4/8)	
	Anomalies log per functioning cycles (Position 5/8)	
	Anomalies log per functioning cycles (Position 6/8)	
	Anomalies log per functioning cycles (Position 7/8)	
	Anomalies log per functioning cycles (Position 8/8)	
	Anomalies log reset	ANOMALIES LOG RESET

### ANOMALIES LOG (DISPLAY BY HOURS)

It is possible to display a log relative to the last anomalies occurring.

The log keeps trace of the last 8 anomalies (anomaly code and type) and of the respective burner functioning hours.

The most recent anomaly is memorised in position 1 until reaching the least recent in position 8.





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An example is given below.

(In position 1 no ignition block occurring after 99 burner functioning hours).

99 HRS  
1 F01

### ANOMALIES LOG (DISPLAY BY CYCLES)

It is possible to display a log relative to the last anomalies occurring.

The log keeps trace of the last 8 anomalies (anomaly code and type) and of the respective burner functioning cycles.

The most recent anomaly is memorised in position 1 until reaching the least recent in position 8

888888 CYC  
8 888  
Anomaly position      Anomaly code  
Type of anomaly  
(volatile or non-volatile)

An example is given below.

(In position 1 parasite flame signal presence after 1000 burner functioning cycles).

1000 CYC  
1 A12

### ANOMALIES LOG RESET

To reset the anomalies log, press the key i during the following display:

CLEAR  
HI SE

By doing this, access the reset request confirmation display with duration of 5s.

CLEAR  
 flashing PUSH

Pressing the key again determines the reset of the anomalies log and the return to the position 1 log display for functioning hours.

### PARAMETERS MENU

MENU  
 PARAM

The **PARAM MENU** is organised as per table 4.

MENU	RAPPRESENTATION	SETTABLE VALUES
MENU PARAM	Burner type	2 stages / modulating
	Flame sensor type	not managed
	Sealing control	ON / OFF
	Post-ventilation time	0 - 255 s
	First stage solenoid valve advance opening	0 - 80
	Second stage solenoid valve advance opening (Not managed if MODULATING BURNER)	0 - 80

#### BURNER TYPE

This parameter allows to set the type of burner and manage (two-stage or modulating burner).

burnr  
000000 → [2STAG, MODUL]

Press key **i** to access the **PARAMETER VALUE MODIFICATION** mode, during which the value of the parameter displayed flashes. In **MODIFY PARAMETER VALUE** mode, use the **+** and **-** keys to modify the value.

Press key **i** to memorise the current value displayed. To exit this mode without memorising the value, press key **R** or wait 10s without pressing the keys.

#### FLAME SENSOR TYPE

- parameter not managed -

#### SEALING CONTROL

It is possible to enable or disable the sealing control procedure of the gas ramp safety valves.



UP5  
 888 → [On, OFF]

Press key i to access the PARAMETER VALUE MODIFICATION mode, during which the value of the parameter displayed flashes.

In MODIFY PARAMETER VALUE mode, use the + and – keys to modify the value. Press key i to memorise the current value displayed. To exit this mode without memorising the value, press key R or wait 10s without pressing the keys.

#### POST-VENTILATION TIME

It is possible to set the post-ventilation time from a minimum of 0s (post-ventilation disabled) to a maximum of 255s.

POSTP  
 888 — Post-ventilation  
 time (in sec)

Press key i to access the PARAMETER VALUE MODIFICATION mode, during which the value of the parameter displayed flashes.

In MODIFY PARAMETER VALUE mode, use the + and – keys to modify the value.

Press key i to memorise the current value displayed.

To exit this mode without memorising the value, press key R or wait 10s without pressing the keys.

#### FIRST STAGE SOLENOID VALVE ADVANCED ACTIVATION

It is possible to introduce an advance on the first stage solenoid valve activation (or minimum modulation) in the burner ignition phase.

Adv 1  
 Parameter value  
 (da 0 a 30) — 88

This advance can be set from 0 to 30% of the first stage air flow rate (or minimum modulation).

More precisely, at the end of the pre-ventilation phase, the air damper run is not stopped in the first stage position (or minimum modulation) but in the position that is slightly lower on the basis of the parameter setting in question. When this has been carried out, the first stage solenoid valve is activated (or minimum modulation).

By doing this, burner ignition is made easier (less excess air on ignition).

Once the flame signal presence has been detected, the damper is immediately taken into the first stage position (or minimum modulating). The air damper positioning sequence just described is only performed in the burner ignition phase and not in the regulation phase during functioning.

If you do not wish to make use of the function just described, just set the parameter in question at 0.

Press key i to access the PARAMETER VALUE MODIFICATION mode, during which the value of the parameter

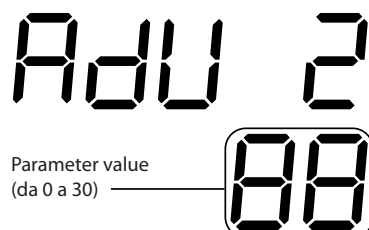
displayed flashes.

In MODIFY PARAMETER VALUE mode, use the + and – keys to modify the value.

Press key i to memorise the current value displayed. To exit this mode without memorising the value, press key R or wait 10s without pressing the keys.

#### SECOND STAGE SOLENOID VALVE ADVANCED ACTIVATION (Not managed if MODULATING BURNER)

It is possible to introduce an advance on the second stage solenoid valve activation.



This delay can be set from 0 to 30% of the second stage air flow rate with respect to the first.

Advance = 0: second stage solenoid valve opening in pre-defined position (second stage cam).

Advance=30: second stage solenoid valve opening in advance with respect to the pre-defined position (maximum value settable).

The second stage solenoid valve activation point coincides with the deactivation point at the time when passing from second to first stage.

Press key i to access the PARAMETER VALUE MODIFICATION mode, during which the value of the parameter displayed flashes.

In MODIFY PARAMETER VALUE mode, use the + and – keys to modify the value. Press key i to memorise the current value displayed.

To exit this mode without memorising the value, press key R or wait 10s without pressing the keys.

#### Serv menu (installer)



If the burner is two-stage, the SERV MENU is organised as per table 5.

If the burner is modulating the SERV MENU is organised as per table 5b.

Two-stage burner:

MENU	RAPPRESENTATION	SETTABLE VALUES
MENU SERV	Manual functioning mode	1St - 2St - OFF
	Temporary shutdown	ON / OFF
	Setting first stage consumption [m3/h]	0 -255
	Second stage consumption setting [m3/h]	0 - 255

Modulating burner:

MENU	RAPPRESENTATION	SETTABLE VALUES
MENU SERV	Manual functioning mode	MIN - MAX - OFF
	Temporary shutdown	ON / OFF



## ADJUSTEMENT

**M**

Check some adjustments before switching on the burner.

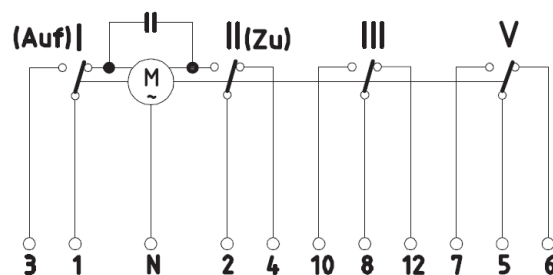
- 1)  The air actuator has been factory pre-calibrated. The high flame cam must be adjusted between 80 and 90° and the low flame cam to about 30°.

### Air servo-motor regulation (G 700 - G 1000)

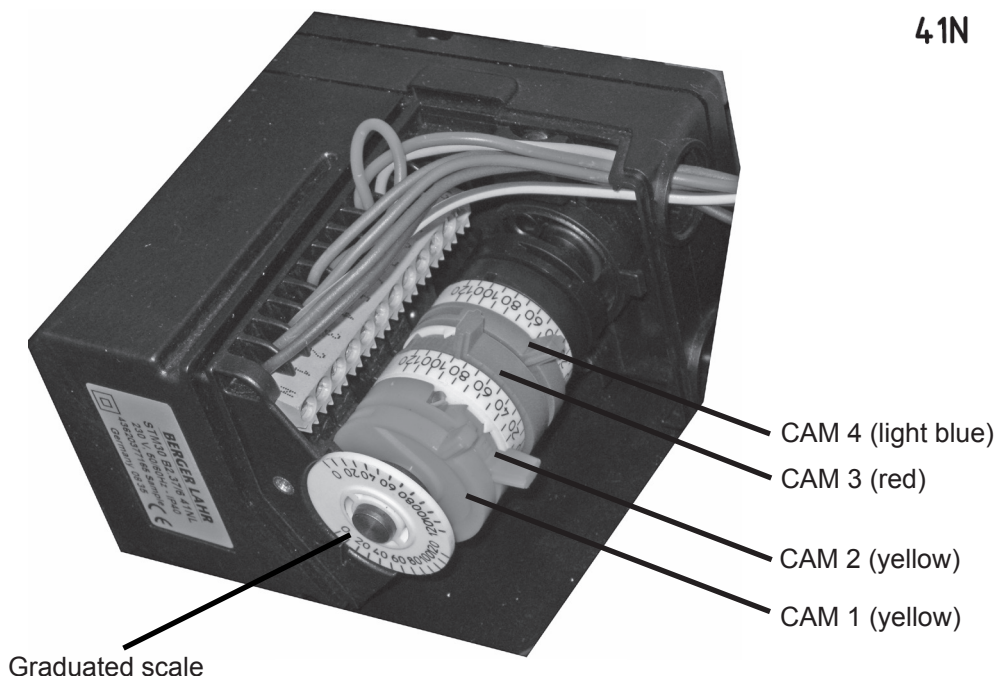
The air damper is activated by an electric servo-control. The positions of the damper are determined via the cams, with reference to the scale on the relevant disc.

The cams are manoeuvred by means of the supplied spanner: they are clutched and self-locked.

The air damper servo-motor must be of the type indicated below. ( Servo-motor in the figure in total closure status)



41N



CAM 1 (yellow) Not used

CAM 2 (yellow) Closure position regulation (value 0)

CAM 3 (red) Maximum flame regulation (burner maximum flow rate)

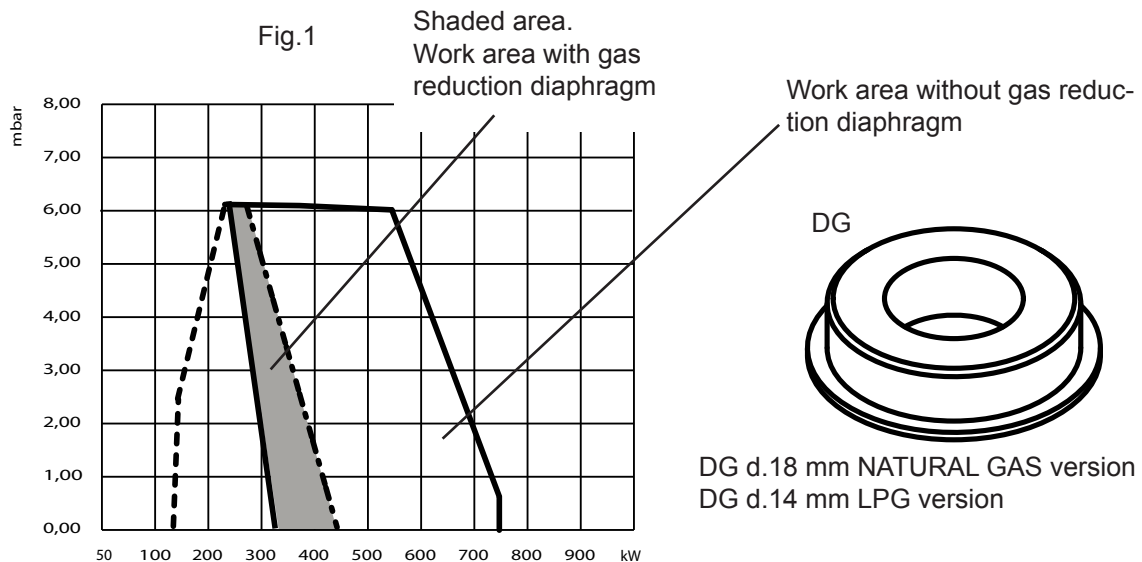
CAM 4 (light blue) Minimum flame regulation (burner minimum flow rate)



- 2) ● → If the burner is to operate inside the operating range where a gas diaphragm is present, you must install it.

## **Gas reduction diaphragm - (G 700)**

When the maximum power of the burner is selected inside the shaded area (see Fig. 1), to increase the gas pressure signal in order to maintain the gas signal and air signal ratio within the operational limits of the valve, insert the gas reduction diaphragm (DG) provided with the burner.

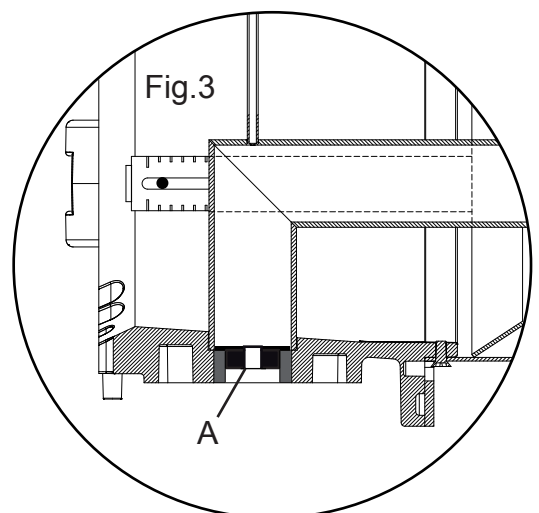
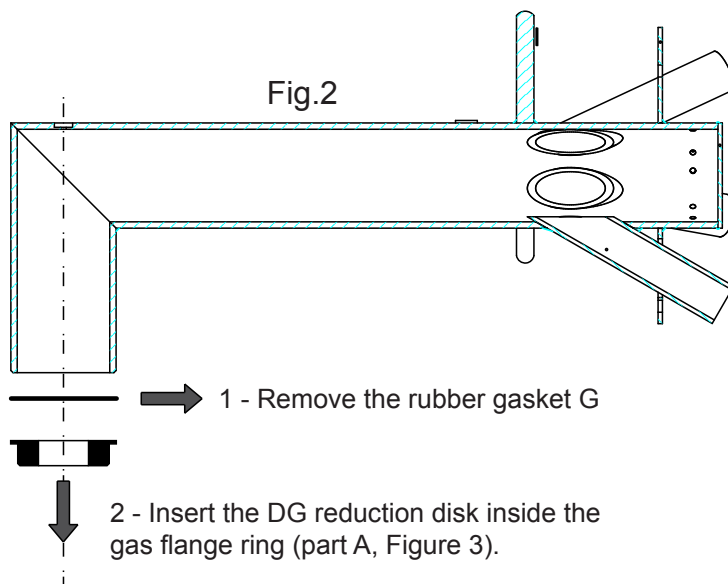


## **Assembly of the gas reduction diaphragm**

To insert the gas reduction diaphragm disassemble the combustion head as indicated in the "MAINTENANCE" chapter, section "Burner opening and access to the combustion head"

- 1 - Remove the rubber gasket (G) (Fig. 2)
- 2 - Insert the DG reduction disk inside the gas flange ring (part A, Figure 3).

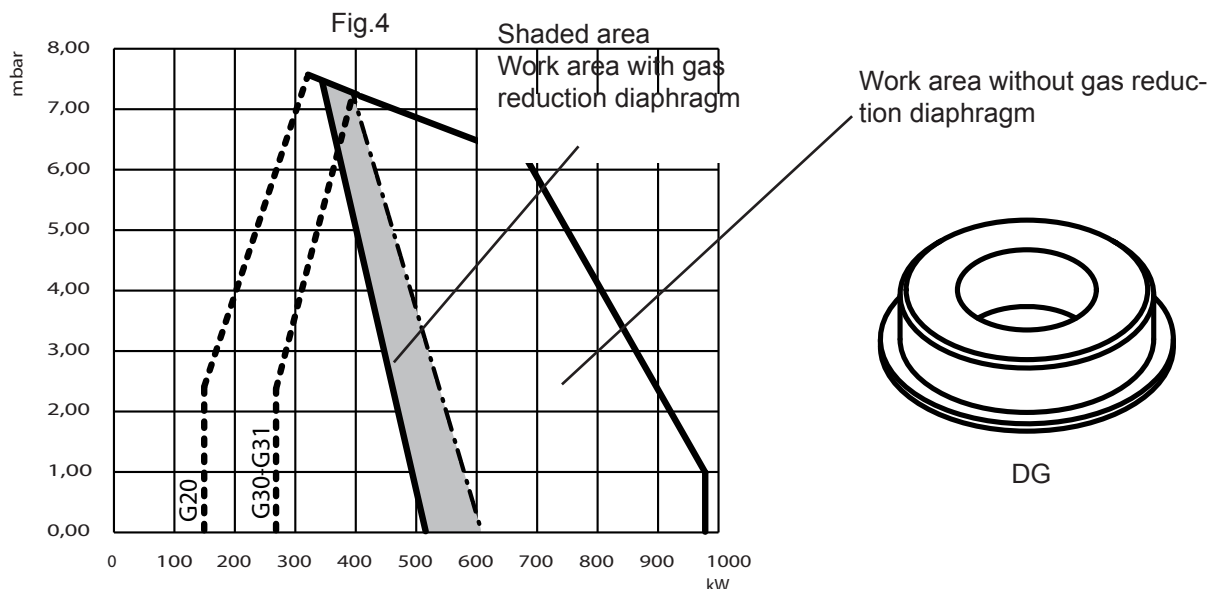
**At the end of the operation the DG reduction disk must be installed as in Figure 3.**





## Gas reduction diaphragm (only natural gas) - (G 1000)

When the maximum power of the burner is selected inside the shaded area (see Fig. 4), to increase the gas pressure signal in order to maintain the gas signal and air signal ratio within the operational limits of the valve, insert the gas reduction diaphragm (DG) provided with the burner.



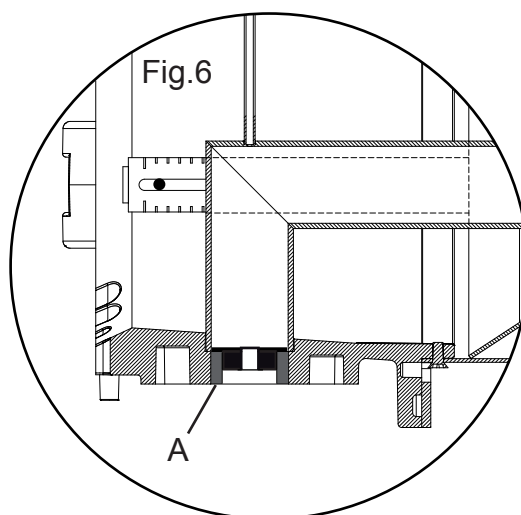
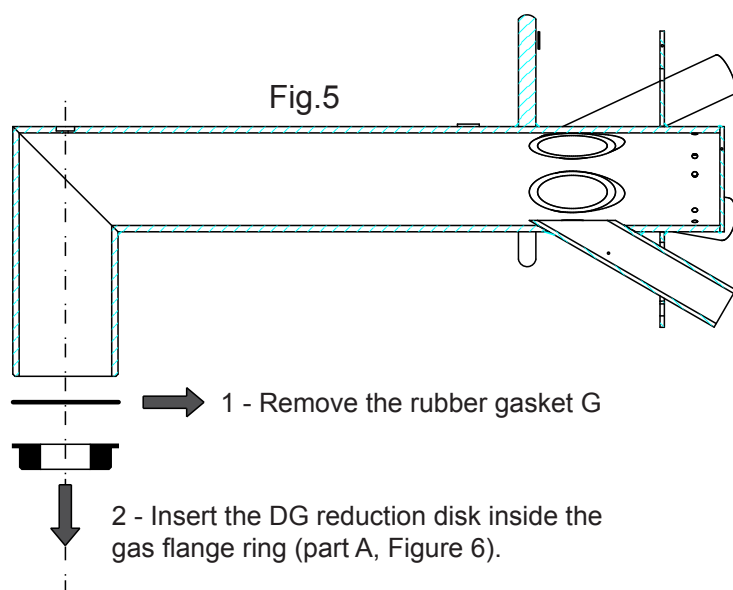
## Assembly of the gas reduction diaphragm (only natural gas)

To insert the gas reduction diaphragm disassemble the combustion head as indicated in the "MAINTENANCE" chapter, section "Burner opening and access to the combustion head"

1 - Remove the rubber gasket (G) (Fig. 5)

2 - Insert the DG reduction disk inside the gas flange ring (part A, Figure 6).

**At the end of the operation the DG reduction disk must be installed as in Figure 6.**





- 3) ● → Adjust the air shutter in the position shown in the diagram, based on foreseen flow control valve operation on the burner.

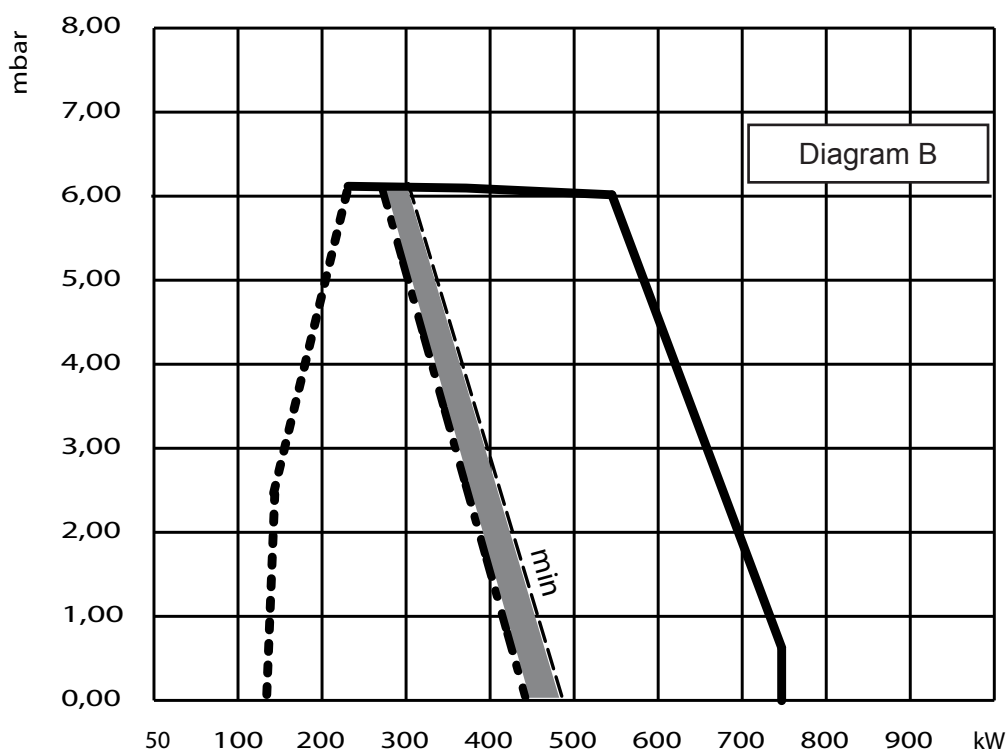
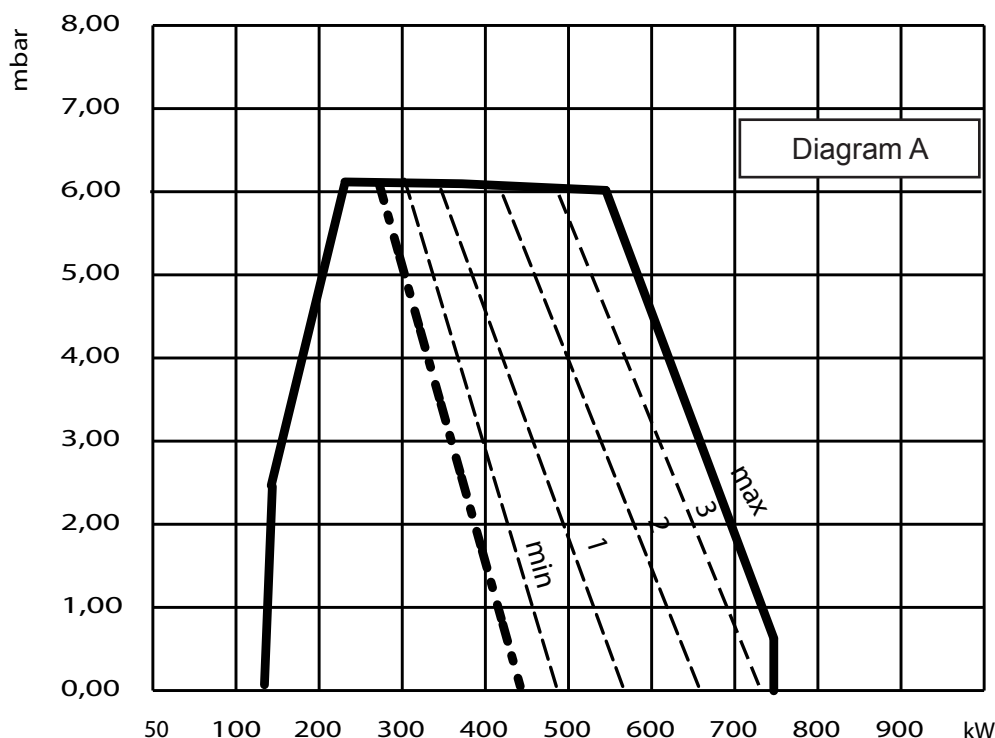
## Gas reduction combustion head regulation - (G 700)

**It is necessary** to position the air ring (Fig. 5) in the desired working point referring to diagram A. Based on the working point of the burner (supplied power / pressure in combustion chamber) a position is indicated (min - 1 - 2 - 3 - max) for the air adjustment ring which corresponds with the marks on rod T (Fig. 7).

Ex. If the burner should operate at 600kW with a counter-pressure of 3 mbar, the air ring must be positioned in correspondence with mark 3 on rod T (Fig. 7)

In the event that the burner must operate in the shaded sector of the work range (therefore with a gas reduction inserted), reference must be made to diagram B for the position of the air adjustment ring. The indicated values (min - 1) refer to the marks on rod T (Fig. 7).

In the event of operation in the shaded sector, for optimisation of the air flow capacity, the right damper must be blocked (see "Blocking right damper" section).





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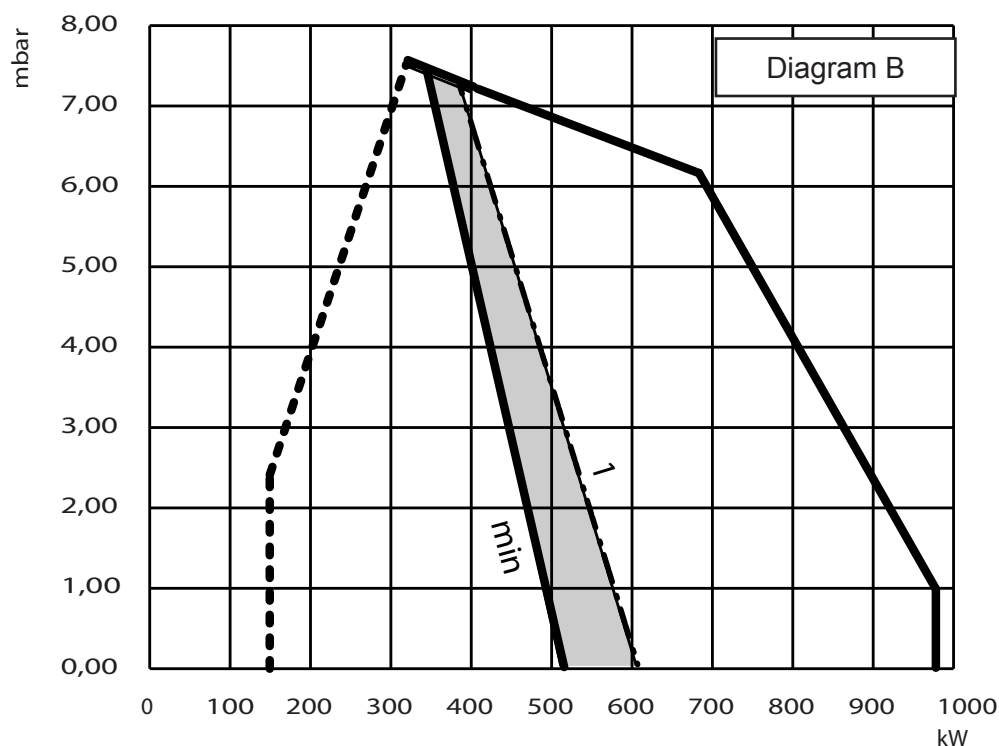
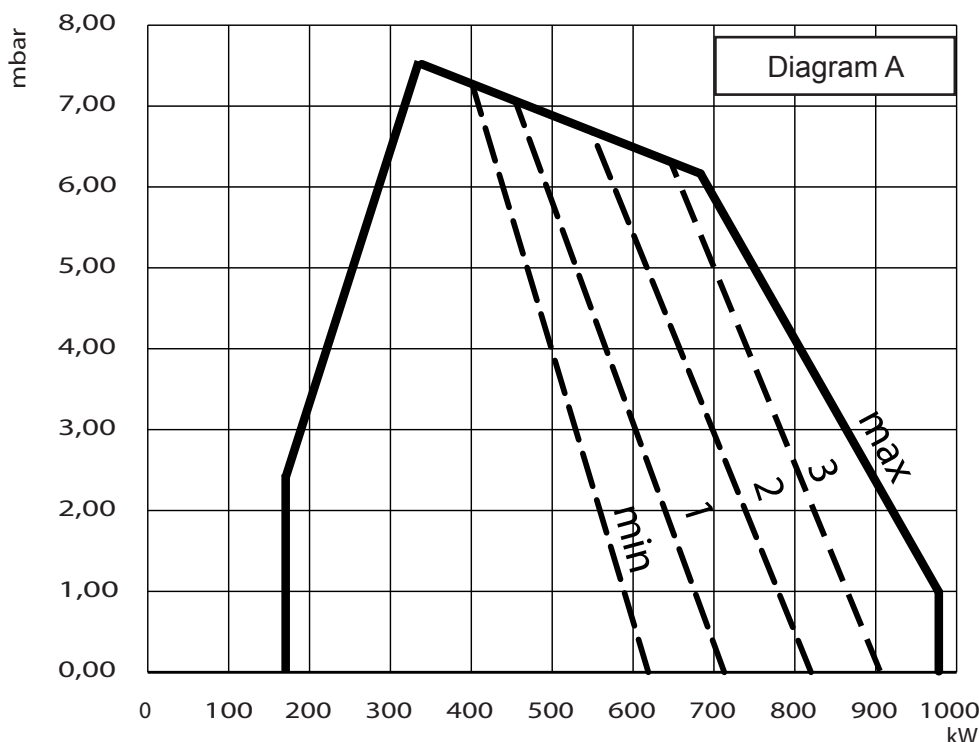
## Gas reduction combustion head regulation - (G 1000)

**It is necessary** to position the air ring (Fig. 5) in the desired working point referring to diagram A. Based on the working point of the burner (supplied power / pressure in combustion chamber) a position is indicated (min - 1 - 2 - 3 - max) for the air adjustment ring which corresponds with the marks on rod T (Fig. 7).

Ex. If the burner should operate at 700kW with a counter-pressure of 3 mbar, the air ring must be positioned in correspondence with mark 2 on rod T (Fig. 7)

In the event that the burner must operate in the shaded sector of the work range (therefore with a gas reduction inserted), reference must be made to diagram B for the position of the air adjustment ring. The indicated values (min - 1) refer to the marks on rod T (Fig. 7).

In the event of operation in the shaded sector, for optimisation of the air flow capacity, the right damper must be blocked (see "Blocking right damper" section).







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### Combustion head shutter placement (G700 – G1000)

To adjust air shutter position, unscrew knob P and move the shutter in correspondence with the desired value, reading plate T. Tighten the knob after adjustment has been completed.

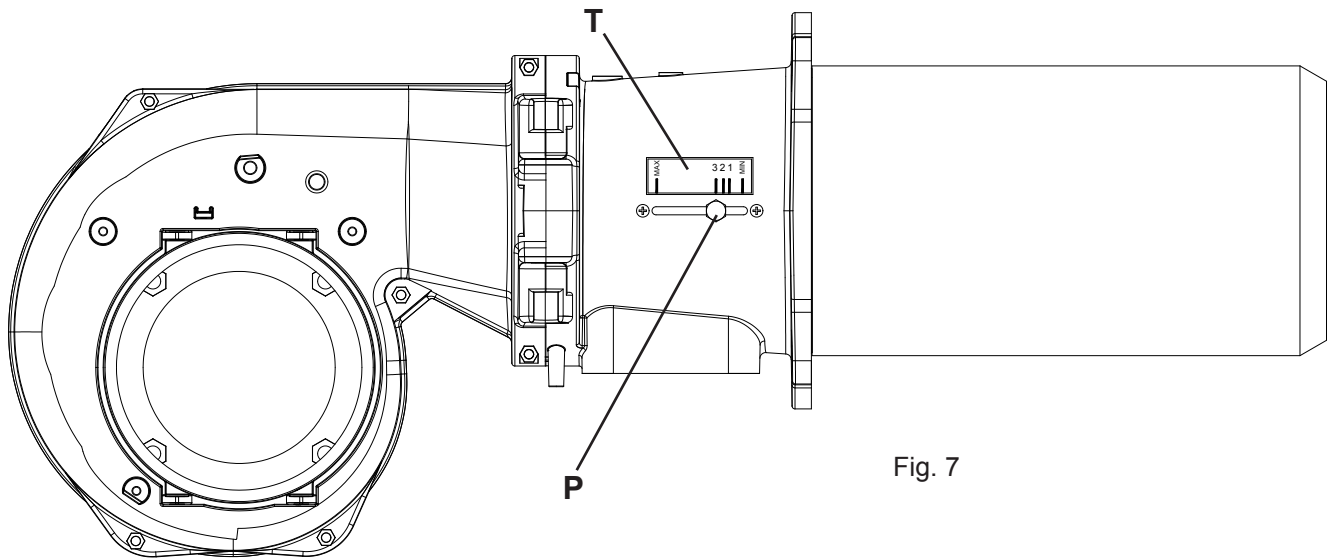
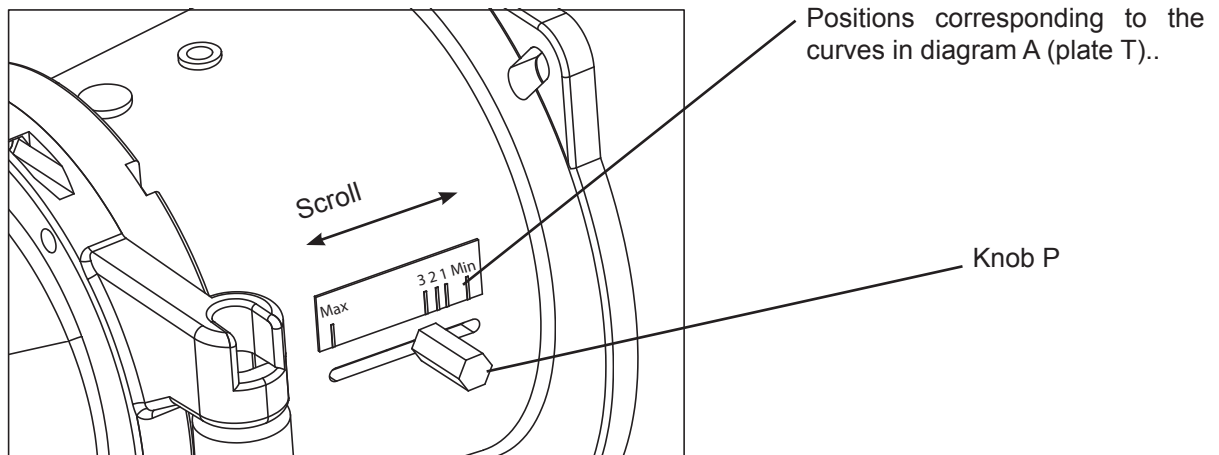


Fig. 7

### Detail of shutter adjustment

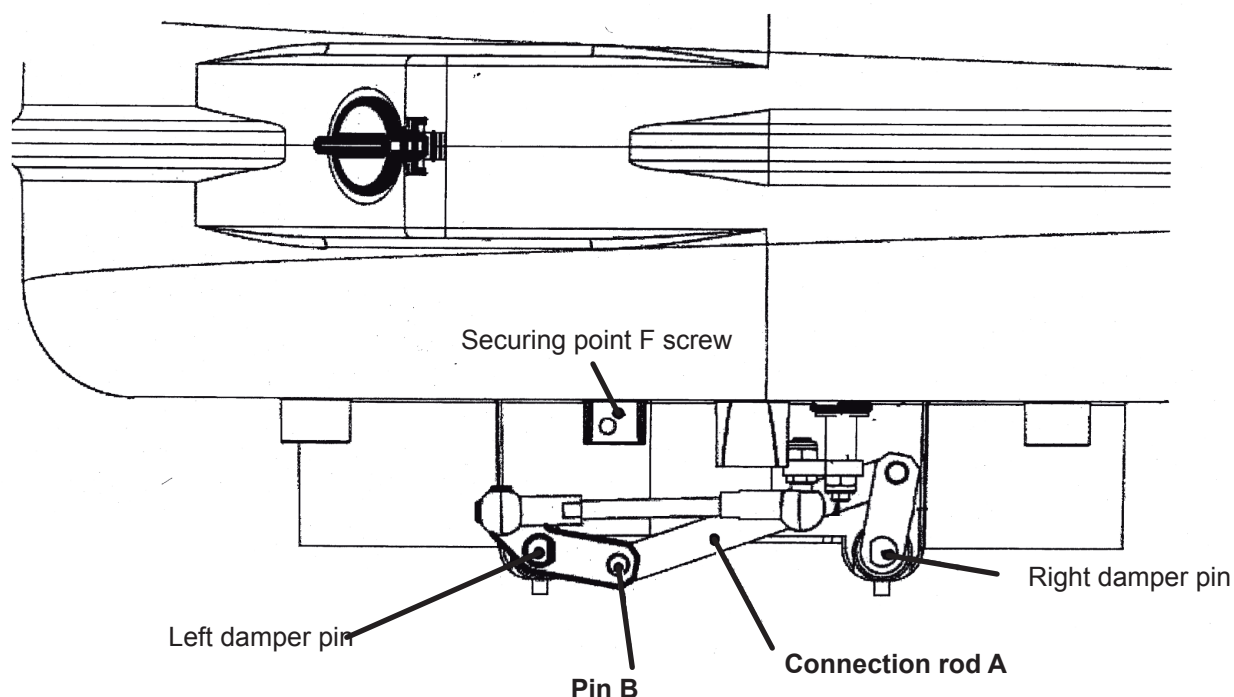






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### Right air flap blocking (G 700 - G 1000)



When necessary, to block the right damper proceed as follows.

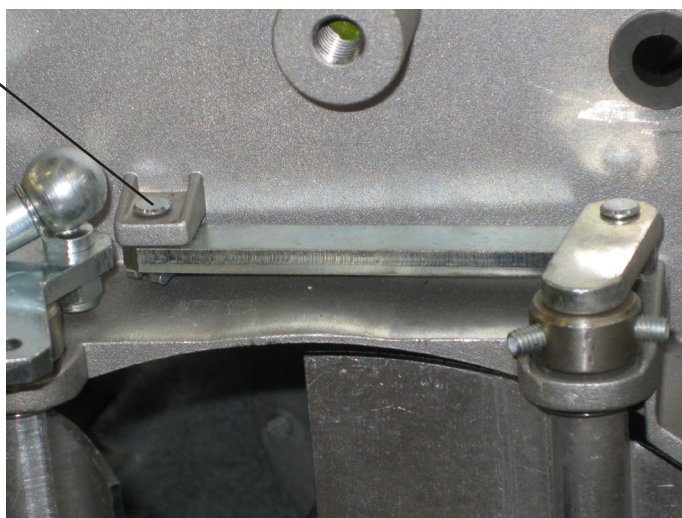
extract the securing pin seeger ring from its housing (B) and remove the pin.

bring the connection rod (A) to the securing point (F) on the semi-Archimedean screw.

bring the pin (B) to the connection rod (A) on the securing point (F).

re-insert the seeger ring in the pin housing (B).

F View of the blocked right damper

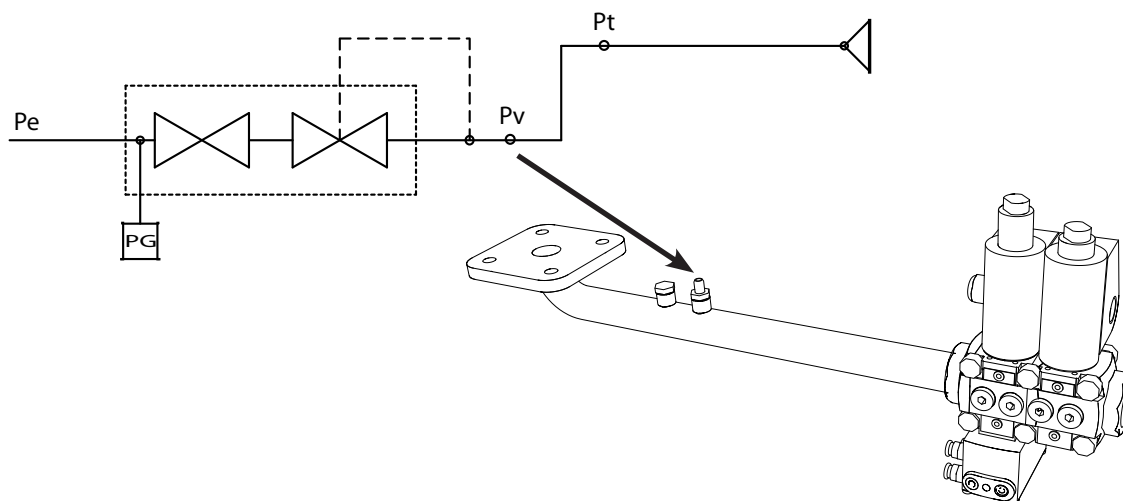




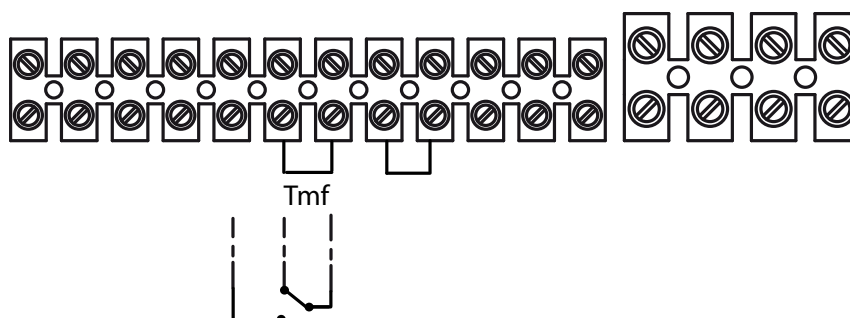
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- 4) ● → Connect the instrument for combustion analysis, the pressure gauge for gas pressure to the combustion head and the low/high flame switch.

Connect the gas pressure gauge to the inlet PV in order to measure gas pressure downstream from the ramp (see pressure/flow curves).



After having electrically connected the burner as per the ELECTRICAL CONNECTIONS paragraph, connect the low/high flame switch Tmf to the terminal block so that you can use it to get the high and low flame burner levels. You must be able to have a high or low flame available during adjustment.



Connection diagram for temporary high/low switch, to be used during adjustment (remove after adjustments and connect a flame modulation thermostat if necessary or reconnect the bridge).



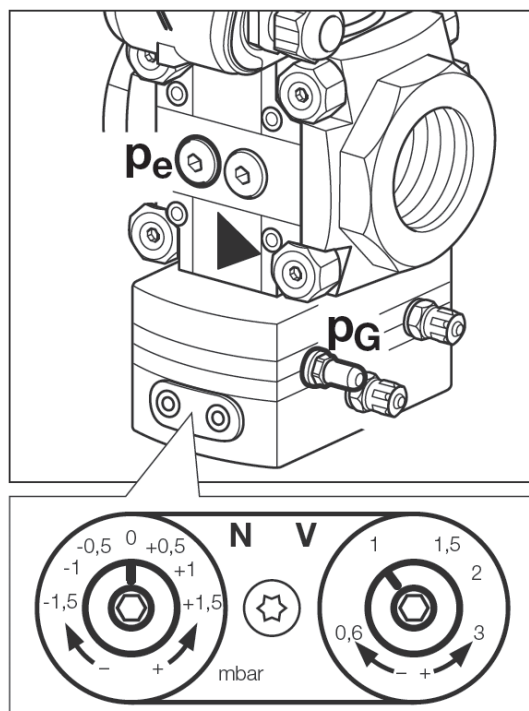
5) ● → Start-up and valve adjustment procedure

### Low flame VCV gas valve start-up

N = low flame adjustment  
V = high flame adjustment

Start up the burner. If the burner does not start up, turn the N slightly in + position and repeat start-up.

The burner starts..

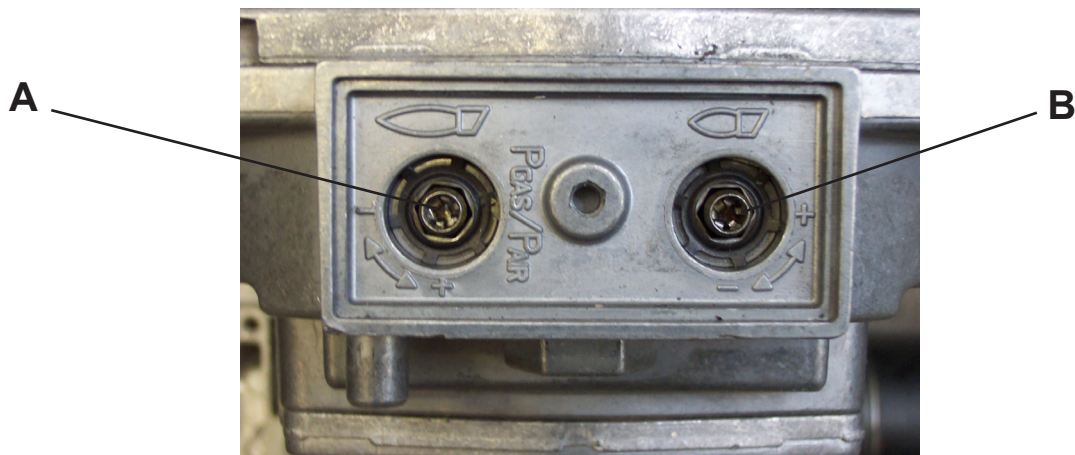


### Low flame SKP gas valve start-up

B = low flame adjustment  
A = high flame adjustment

Start up the burner. If the burner does not start up, turn the B slightly in + position and repeat start-up.

The burner starts..



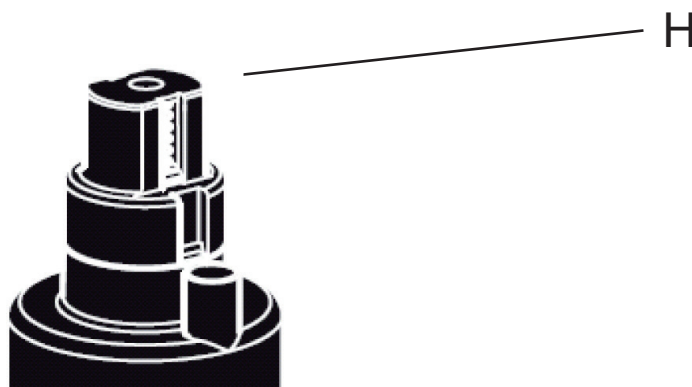


6) ● → Combustion adjustment, burner flow, high and low flame gas valve

**Combustion adjustment, burner flow, high and low flame gas valve (VCV and SKP).**

- Using the Tmf switch, bring the air actuator to the middle position between minimum and maximum (approximately at 45° of the air actuator scale).
- Adjust combustion using screws N (VCV) or B (SKP).
- Using the Tmf switch, bring the air actuator to maximum position (all open). Bring to combustion using screws V (VCV) or A (SKP) and check gas flow.
- If flow is lower than desired, open the air shutter (See Combustion head shutter placement).
- If the flow is higher than desired, close the air shutter.
- When gas flow is correct, use the Tmf switch to bring the air actuator to minimum position. Check combustion and turn screws N (VCV) or B (SKP) as necessary.
- When performing minimum adjustment, re-check high flame combustion using the described procedure.

PLEASE NOTE: the gas flow regulation handle of the VCV-L valve (item "H") must be set at "maximum" and not used to adjust the flow.





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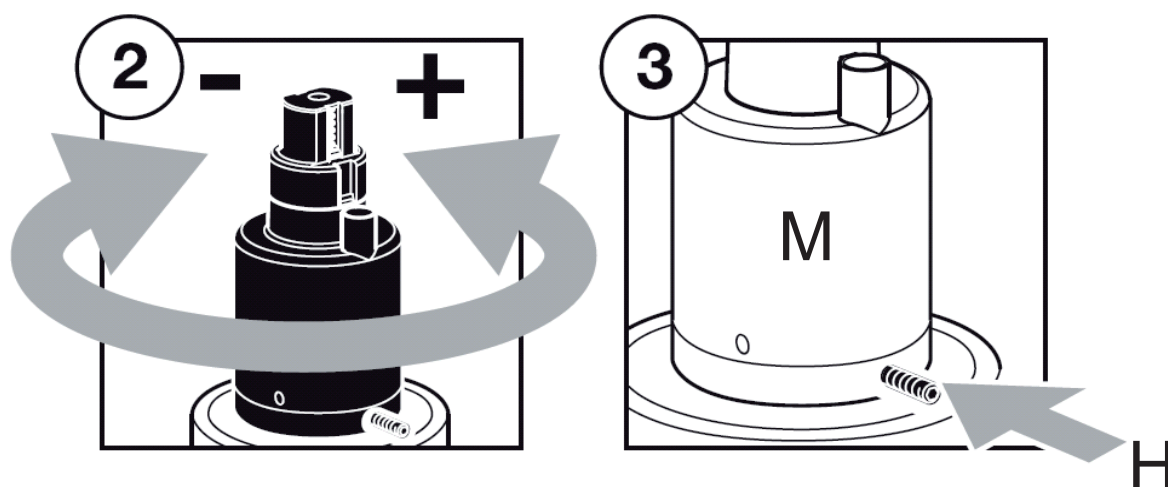
7) ● → Further adjustments (VCV L valve)

**Initial gas quantity adjustment (slow start-up)**

If burner start-up is too fast, you can intervene with slow start-up adjustment.

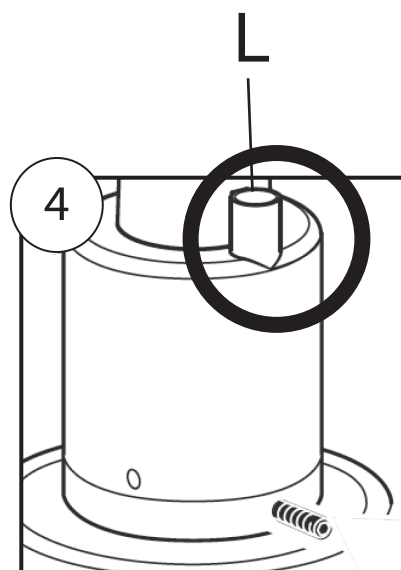
Unscrew screw H and turn knob M (fig. 2-3).

Lock screw H.



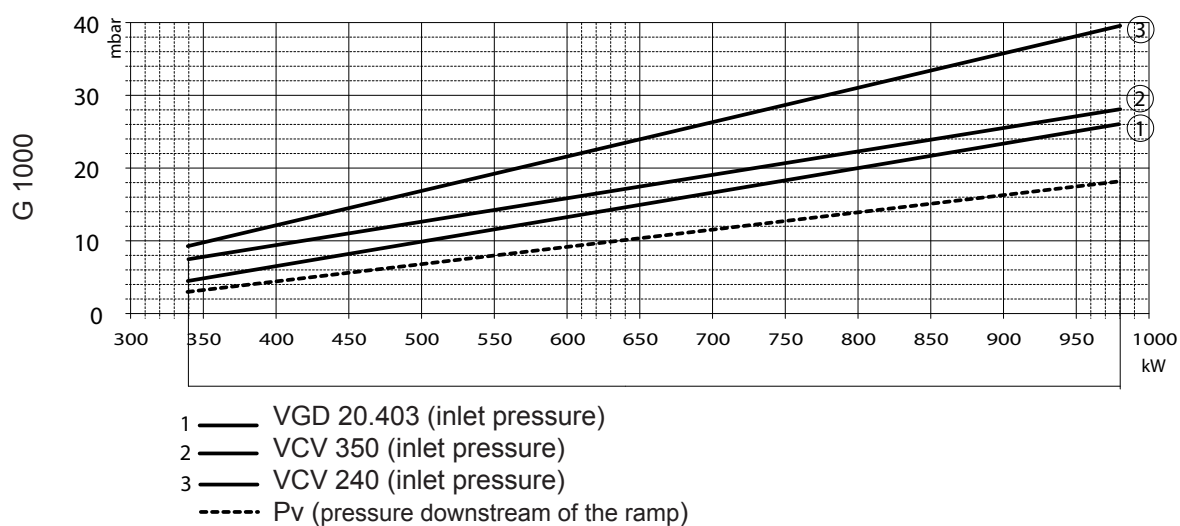
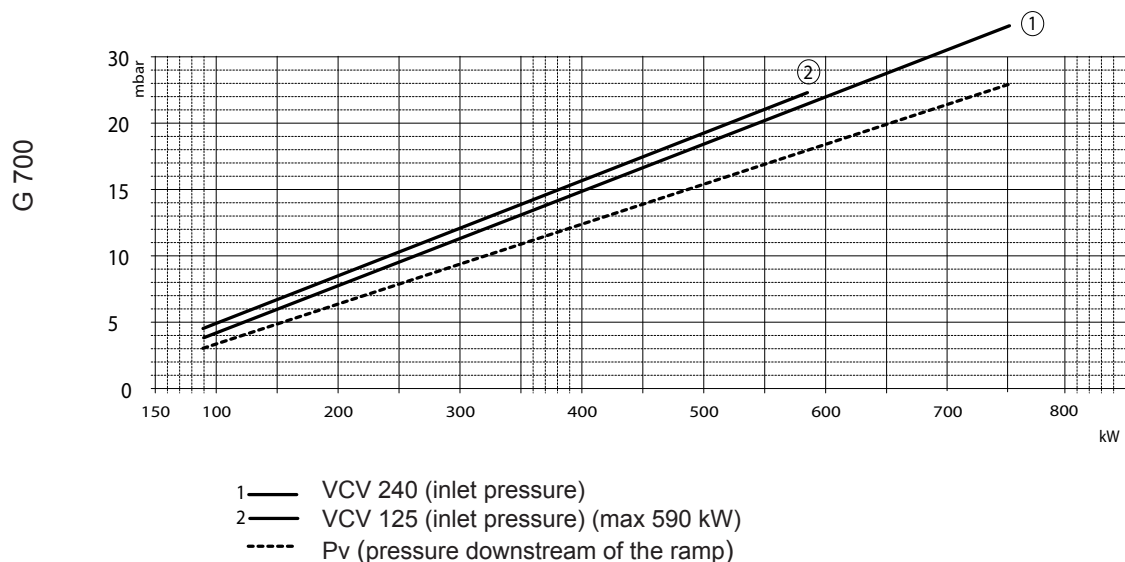
**Adjusting the opening brake**

Further optimisation of slow start-up can be obtained by regulating the opening brake, turning adjustment screw L 1/4" around toward the marking "-" (fig.4).



### Gas diaphragm (natural gas only)

For proper burner operation in the event of particular boiler-burner-chimney couplings, or with low back pressure in the combustion chamber, you may want to install the gas diaphragm anyway inside the entire burner operating range. Refer to the pressure/flow curves indicated below





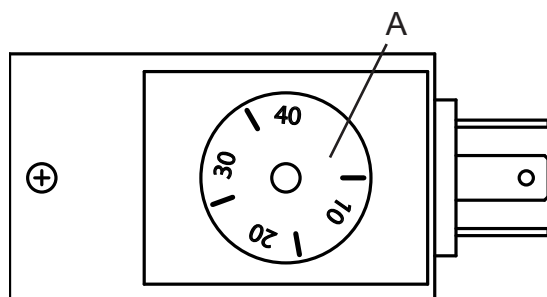
8) ● → Gas and air pressure switch adjustment

### Minimum gas pressure pressure switch

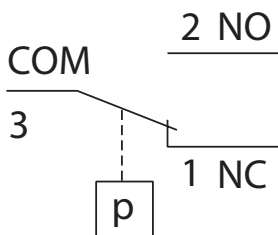
The gas minimum pressure pressure switch prevents burner start-up or stops it if it is functioning. If the gas pressure is not the minimum envisioned, it must be calibrated at 40% lower than the value of the gas pressure, which functions with maximum flow rate.

DG40VC type

Range of calibration 5-40 mbar

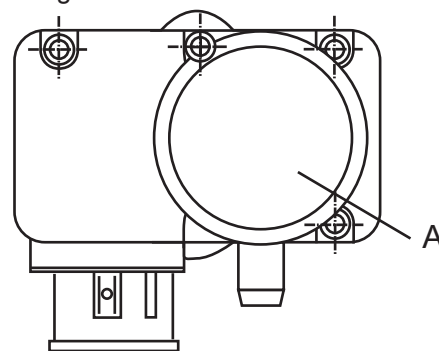


Remove the transparent lid and act on the regulation disc (A)



GW50A5 type

Range of calibration 5-50 mbar



Remove the transparent lid and act on the regulation disc (A)

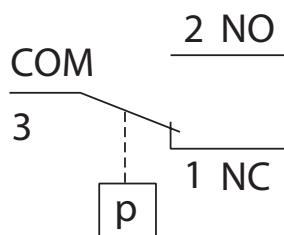
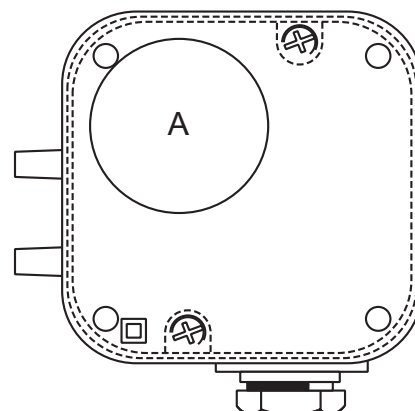
### Air pressure switch regulation

The air pressure switch has the task of putting the burner into safety or block conditions if the combustion air pressure is missing. This will be calibrated lower than the air pressure value at the burner when this is at nominal flow rate with 1st flame functioning, verifying that the value of CO does not exceed the value of 10.000 p.p.m.

GW 150 A5 type

Range of calibration 5-150 mbar

Remove the transparent lid and act on the regulation disc (A)



Electric circuit function

with pressure rising: 1 NC open, 2 NO close  
with pressure dropping: 1 NC close, 2 NO open

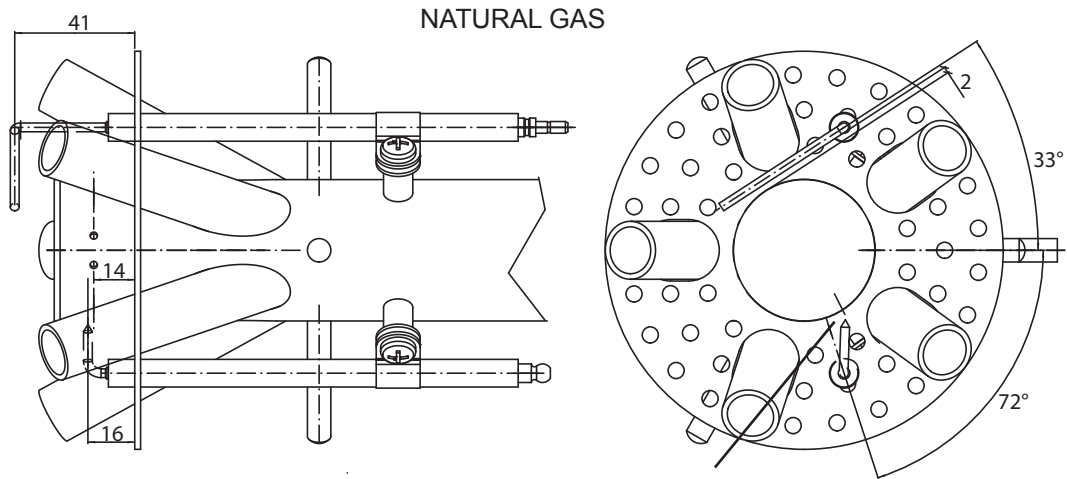




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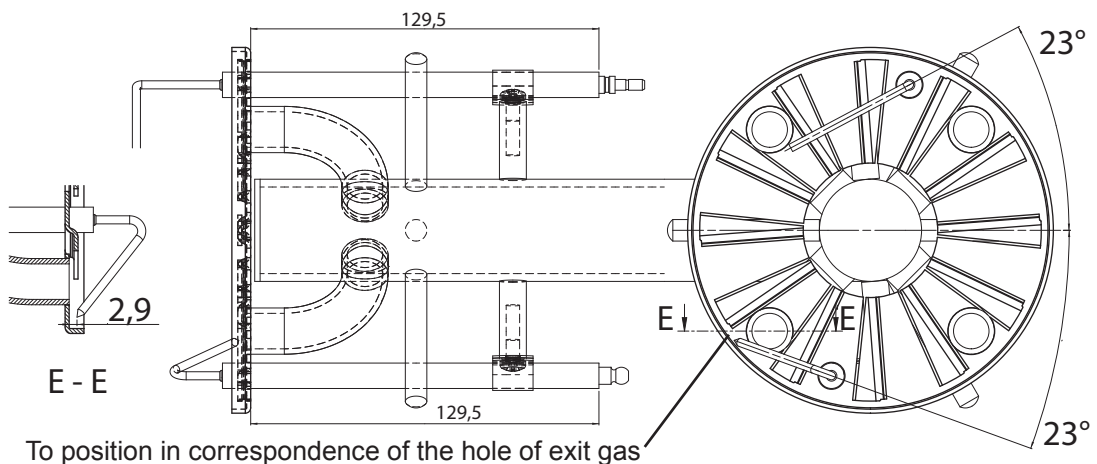
## Electrodes positioning (G 700 - G 1000)

Two electrodes are envisioned for ignition and one for flame control: these must not touch the deflector or other metal parts for any reason as they would lose their function, compromising burner functioning. It is good practice to check the correct position after every intervention on the head.



To position in correspondence of the hole of exit gas

GPL



To position in correspondence of the hole of exit gas



## FUNCTIONING CONTROLS

**M**

### Combustion control

In order to obtain the best combustion yield and with respect to the environment, it is recommended to use suitable instruments to control and regulate combustion.

Fundamental values to consider are:

- CO<sub>2</sub>. It indicates with which air excess combustion takes place; if the air increases, the % value of CO<sub>2</sub> decreases, and if the combustion air decreases the CO<sub>2</sub> increases. Acceptable values are 8.5-10% NATURAL GAS and 11-12% B/P.
- CO. It indicates the presence of unburned gas. The CO lowers combustion yield and represents a serious poisoning hazard. It is an index of imperfect combustion and normally forms when air is missing. Max value accepted, CO = 0.1% volume.
- Flue gas temperature. It is a value that represents the dispersion of heat through the flue; the higher the temperature the greater the dispersion and the lower the combustion yield. If the temperature is too high, the amount of gas burned must be decreased. Good temperature values are those between 160 °C and 220 °C.

N.B. When the burner is started, check that there are no leaks along the gas circuit.

N.B. Provisions in force in some countries can request different regulations from those stated and require the respect of other parameters.

### Monitoring of functioning

The board provides the continuous monitoring of the functioning status of the motor and solenoid valves.

MOTORIf there is no monitor signal or incorrect signal presence, at least 3 attempts are made to perform the start-up cycle. If this anomaly persists, the board will carry out a block shutdown (burner control anomaly).

SOLENOID VALVESIf there is no monitor signal, at least 3 attempts are made to perform the start-up cycle. If this anomaly persists, the board will carry out a block shutdown (burner control anomaly).

If there is an incorrect monitor signal, the board performs an immediate block shutdown (burner control anomaly).

### Block shutdown and rearm

The button allows the reset of the appliance if it is in the block state.

The appliance is released when the button is pressed and then released (button on board or external release button).

The appliance can be released by the button on the board or the external release button also if the CP45 interface is connected.

For the appliance to be released, the button must be pressed for a period of time exceeding 0.2s but less than 4s. In the case of block shutdown with manual rearm, 5 consecutive rearm operations are possible.

After which rearm is possible again:

- after 1 h ( n° 1 additional rearm is allowed every hour).
- removing the mains power supply.

The rearm operation is only possible if the appliance is supplied with mains voltage.

### Intermittent service

The board performs a regulation shutdown with self-diagnosis at least every minimum 18h - maximum 24h

### Preventive checks

a) Carry out a functioning cycle with the detection electrode disconnected from the appliance: check the execution of a block shutdown at the end of the safety time!

b) Carry out a functioning cycle with detection electrode connected directly to an earth clamp: check the execution of a block shutdown at the end of the safety time!

- c) Carry out a functioning cycle and, when burner ignition has been checked, close the gas supply in order to obtain flame switch-off: check the repetition of a cycle and consequent block shutdown caused by no ignition at the end of the safety time!
- d) Carry out a functioning cycle and, when burner ignition has been verified, open the contact relative to the air pressure switch: verify the immediate switch off of the solenoid valve and consequent block shutdown caused by air pressure switch anomaly after 10s!
- e) Close the air pressure switch contact and then make a functioning request: verify the non-activation of the motor and consequent block shutdown caused by air pressure switch anomaly after 10s!

### **Prolonged switch-off**

If the burner must remain inactive for a long period, close the gas cock and remove the current to the appliance.

### **Ionisation current control**

When calibration has been performed and after having carried out the combustion tests, it is good practice to check the control electrode is correctly positioned: this is carried out by measuring the ionisation current.

Use a micro ammeter with high full scale of 100  $\mu$ A, to be inserted into the electrode seat. The minimum value of the current must be 30  $\mu$ A and be quite stable.

Normally the flame surveillance circuit is insensitive to the negative effect of the ignition spark on the ionisation current. If the disturbing effects of the ignition spark on the ionising current are excessive, the polarity of the electric connections of the ignition transformer primary must be inverted and/or check the location of the ignition electrode in relation to the ionisation electrode.

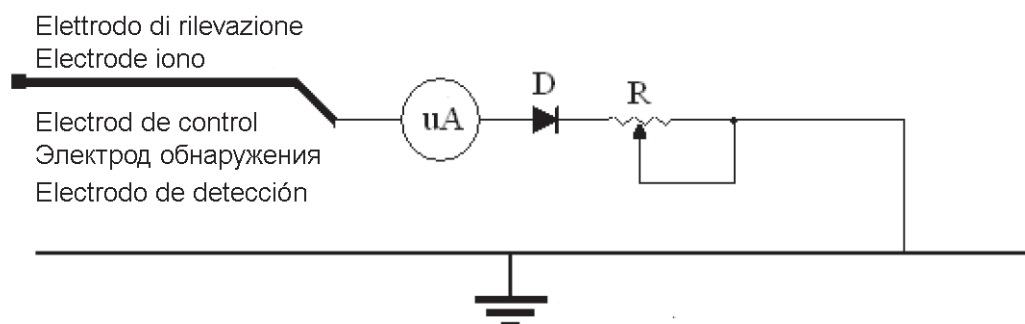
### **Flame signal detection threshold:**

	PARASITE FLAME	FLAME PRESENCE	FLAME SWITCH-OFF
IONISATION CURRENT ( $\mu$ A DC)	> 0.8 +/- 15%	> 1.5 +/- 15%	< 1.2 +/- 15%
FLAME RESISTANCE (M $\Omega$ m)	< 95 +/- 15%	< 50 +/- 15%	> 70 +/- 15%

Flame control takes place via the detection electrode, making use of the ionisation phenomenon.

The flame amplified circuit is sensitive to the variations of the continuous component (DC) of the flame signal current.

#### TEST CIRCUIT



Maximum length of flame detection cable: 1mAny short circuit between the detection electrode and earth does not allow the flame signal to be read. The appliance will perform a lock shutdown at the end of the safety time.

#### *Repetition of the cycle in case the flame switches off in normal working position:*

If the flame goes out in normal working position, the appliance repeats the start-up cycle (max 3 cycle repetitions); the fourth consecutive time the flame goes out in normal working position causes a block shutdown. Every 510 seconds an additional flame is allowed to go out, always up to a maximum of 4 consecutive.

#### *Start-up prevented in presence of parasite flame:*

If the system detects the presence of a parasite flame signal it signals the anomaly and if this anomaly lasts for more than 10s the block shutdown occurs.

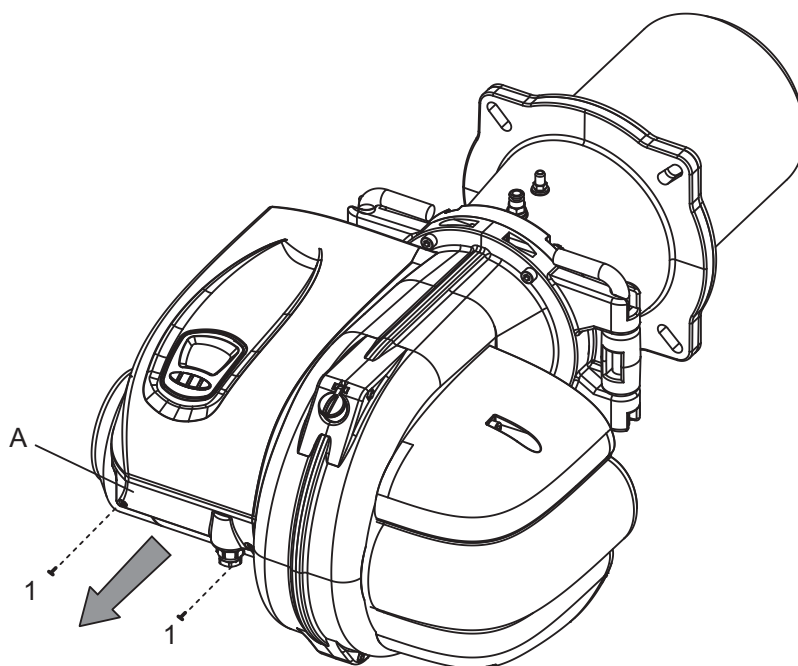
#### *No flame signal detection at the end of the safety time:*

If the appliance does not detect flame signals at the end of the safety time, a block shutdown is carried out

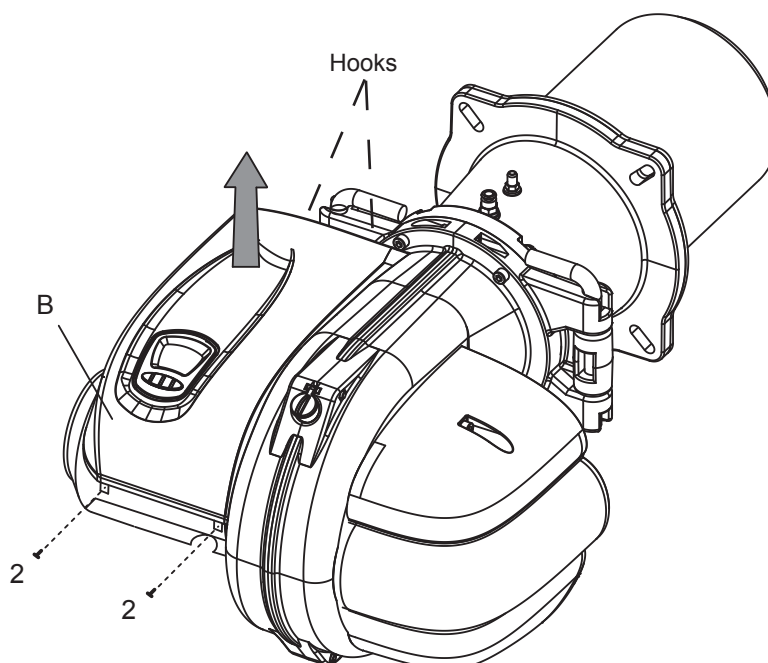


**Electric control board**

To access the electric control board, loosen the screws (1) that hold the terminal board cover (A). Remove the clamp covers (A). ATTENTION: these parts may be live during functioning.



It is now possible to access the screws (2) that block the electric control board lid (B). Loosen the screws (2) and lift the lid (B) paying attention to the lid blocking hooks positioned on the rear of the electric control board.

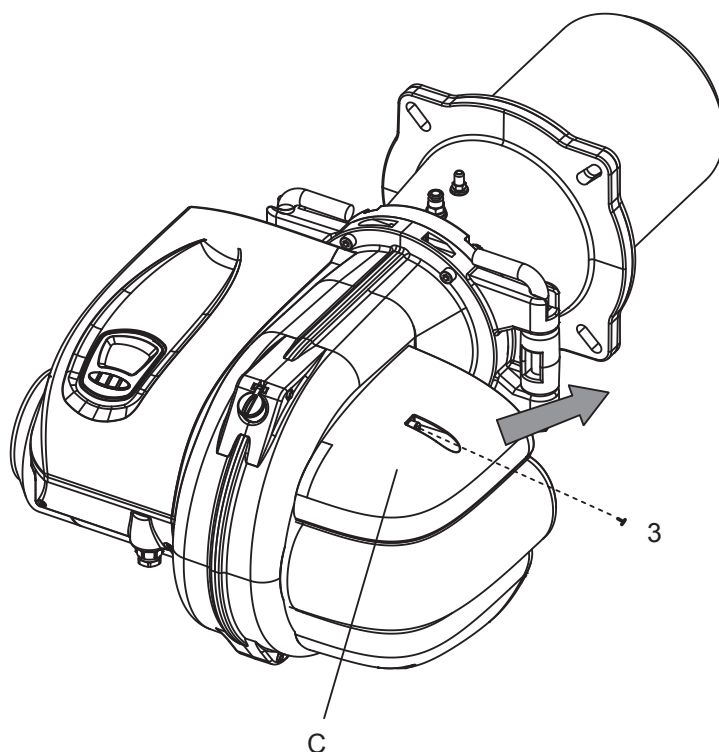




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### **Air vent - air flap maintenance**

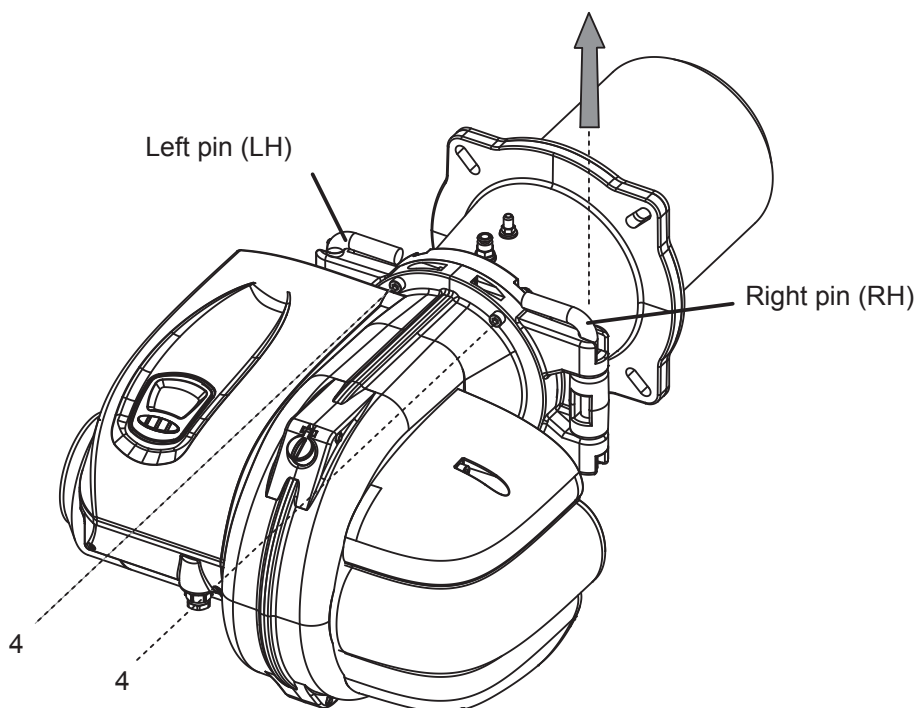
To access the air flap and the air closure system, loosen the screw (3) that blocks the air vent lid (C). ATTENTION: these parts may be moving during functioning



### **Burner opening and access to the combustion head and regulation of the air ring**

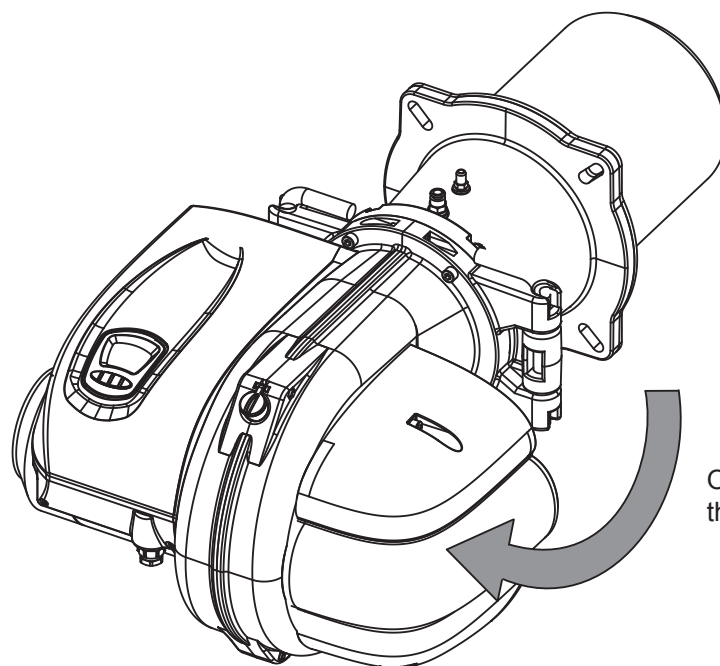
To access the combustion head and to regulate the air ring, loosen the two screws (4). Slide out the right (RH) or left (LH) pin according to necessity and the position of the valves unit (RH pin in the example). At this point it is possible open the burner by turning the pin remaining in the seat.

ATTENTION: manoeuvre to perform with burner off and without electric power supply.



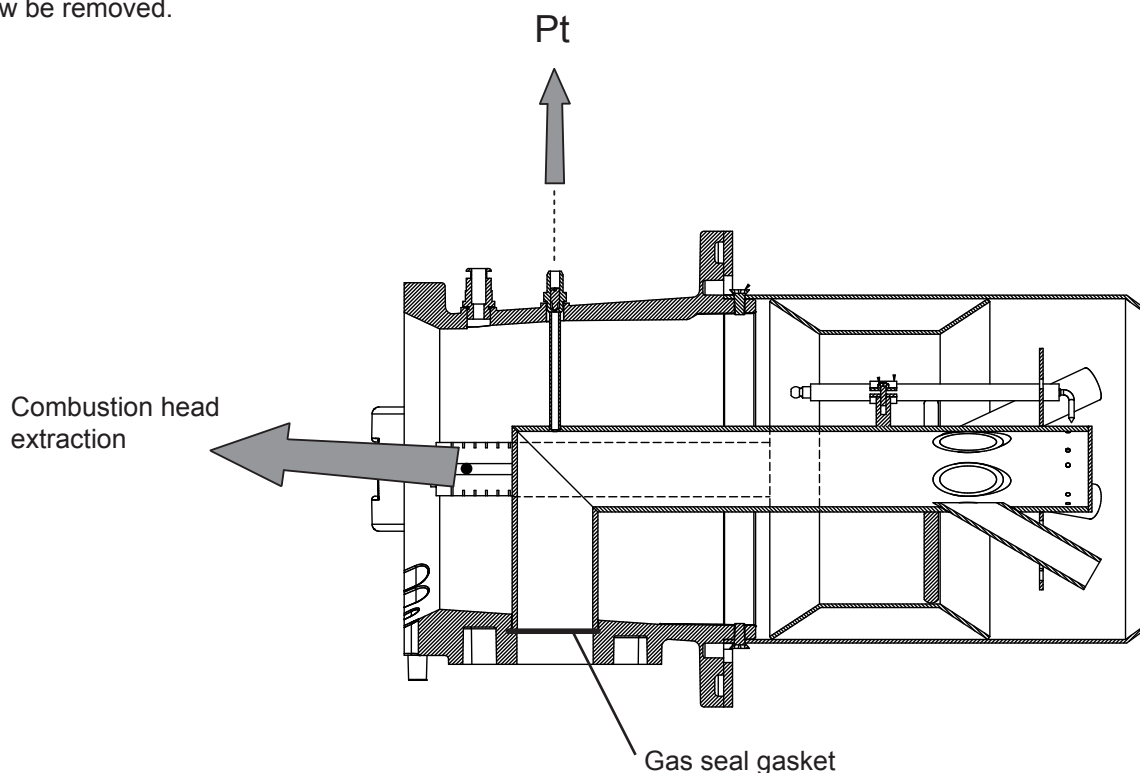


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Opening due to rotation on the LH pin

When the burner is open, loosen the gas tapping point fitting Pt and extract it from the seat. The combustion head can now be removed.



ATTENTION. During the assembly phase of the combustion head in its seat, control that the gas sealing gasket, highlighted in the figure, is well positioned

## **GAS CONVERSION**

**M**

To transform from the operation of a gas burner to another, replace the burner head with special "KIT COMBUSTION HEAD". It should proceed in the dismantling of the combustion head as in "MAINTENANCE". Then proceed with the installation kit.

## Functioning irregularity

DEFECT	CAUSE	REMEDY
The burner does not start-up	No electrical power	Control the power supply line fuses. Control the thermostats and gas pressure switch lines
	Gas does not reach the burner	Check the opening of the shut-off devices positioned along the supply piping.
The burner starts, the flame does not form and it therefore blocks	The gas valves do not open	Check valves functioning
	There is no discharge between the points of the electrodes	Check ignition transformer functioning and the positioning of the electrode points
	No air pressure switch consent	Check calibration and functioning of the air pressure switch
The burner starts, the flame forms and it therefore blocks	No or insufficient flame detection by the control electrode	Check the positioning of the control electrode. Control the value of the ionisation current

The illustrations and data given are indicative and not binding. Lamborghini Caloreclima reserves the right to make all modifications it deems appropriate for improvement of the product without forewarning.



The unit and its accessories must be appropriately disposed of in compliance with current regulations.

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