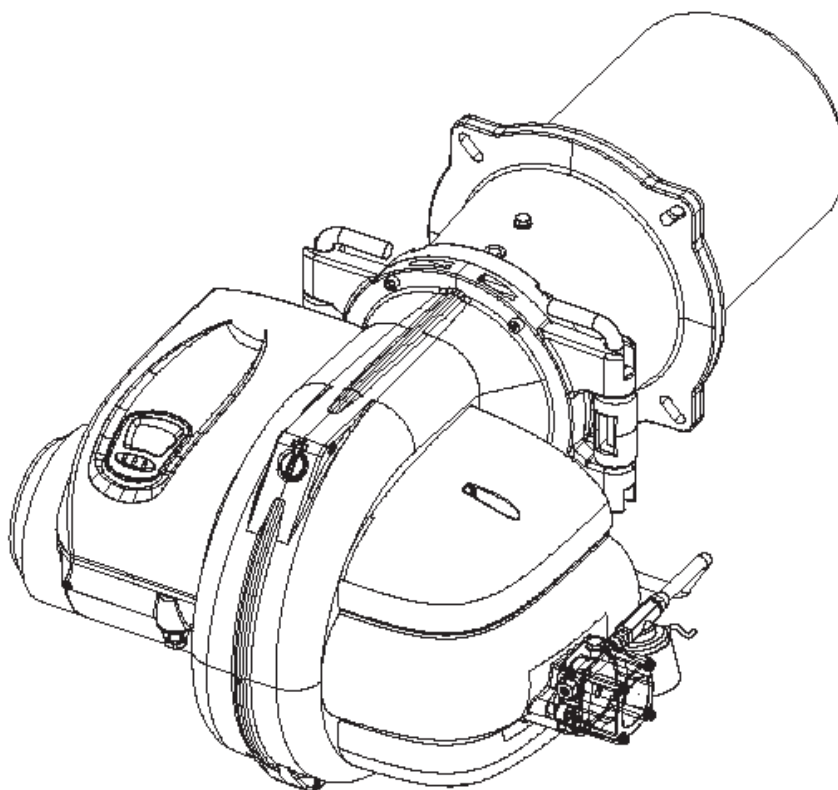




**Lamborghini**  
CALORECLIMA

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UNI EN ISO 9001 CERTIFIED COMPANY



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**Two-stage diesel burner**

**LMB LO 700 (2ST)**

**LMB LO 1000 (2ST)**

**LMB LO 1300 (2ST)**

**LMB LO 2000 (2ST)**

CE

GB

Installation, use and maintenance manual



### **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 LAMBORGHINI 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 **LMB** 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 **LMB** burners comply with:

- DIN EN 267
- 89/336/EEC(2004/108/CE) Electromagnetic Compatibility Directive
- 73/23/EEC(2006/95/CE) Low Voltage Directive

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

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**M** Paragraph of interest for the technician

**U** Paragraph of interest for the user

## GENERAL STANDARDS

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.

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.

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

Do not deposit containers of inflammable substances in the room where the burner is situated.

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 dissipations, 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. 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).

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## TECHNICAL DATA

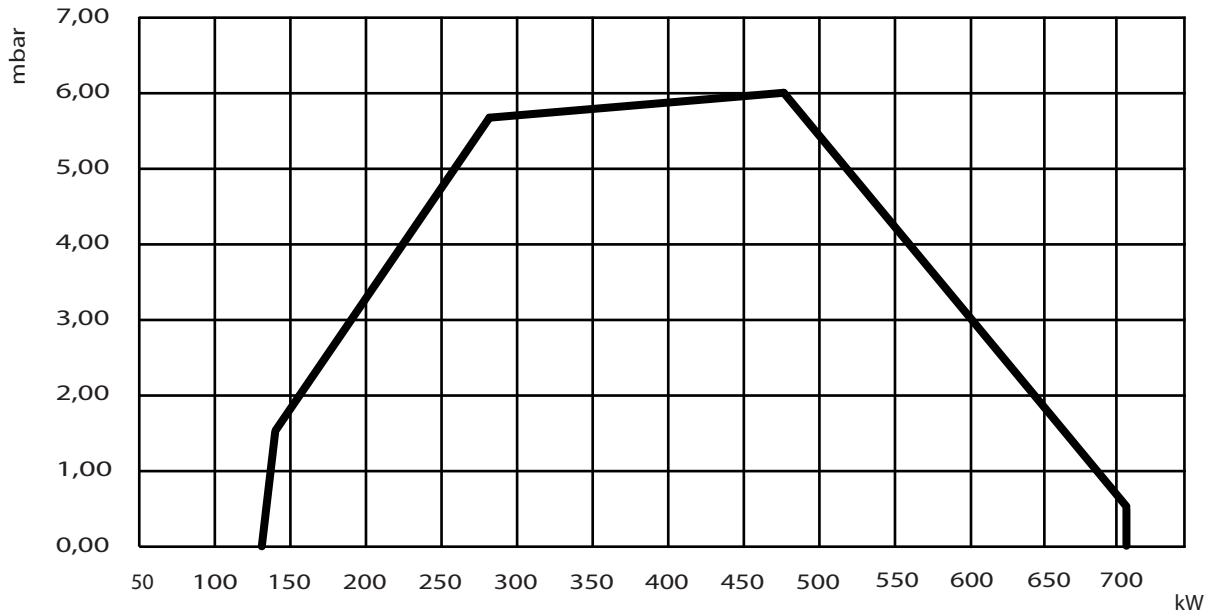


Model		LO 700	LO 1000	LO 1300	LO 2000
Type		Two stages			
Functioning		Intermittent			
Maximum heat output	KW	704	950	1370	1976
Minimum heat output	KW	135	192	201	712
NOx CLASS	-	2			
Maximum flow rate	kg/h	59,4	80	115	166
Minimum flow rate	kg/h	11,4	16,1	41,1	59,8
Electric protection rating	IP	44			
Motor electric power supply (three phase)	V / Hz	400 / 50			
Auxiliary electric power supply (single phase)	V / Hz	230 / 50			
Max. absorbed power	W	750	1100	2200	3000
Transformer (voltage/secondary current)	KV / mA	15 / 48			
Functioning temperature (min/max)	°C	0 / 40			
Weight of the burner body	Kg	32	32,5	40	41

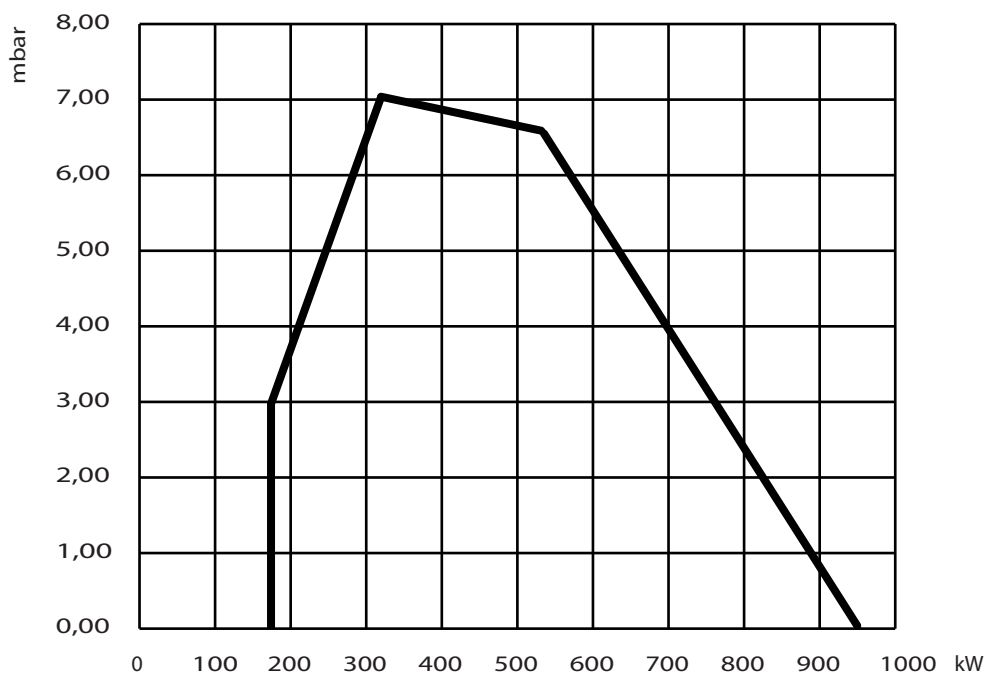
Light oil - Max. viscosity at 20°C: 1.5°E = 6cSt = 41 sec. R1



**LO 700 2ST**

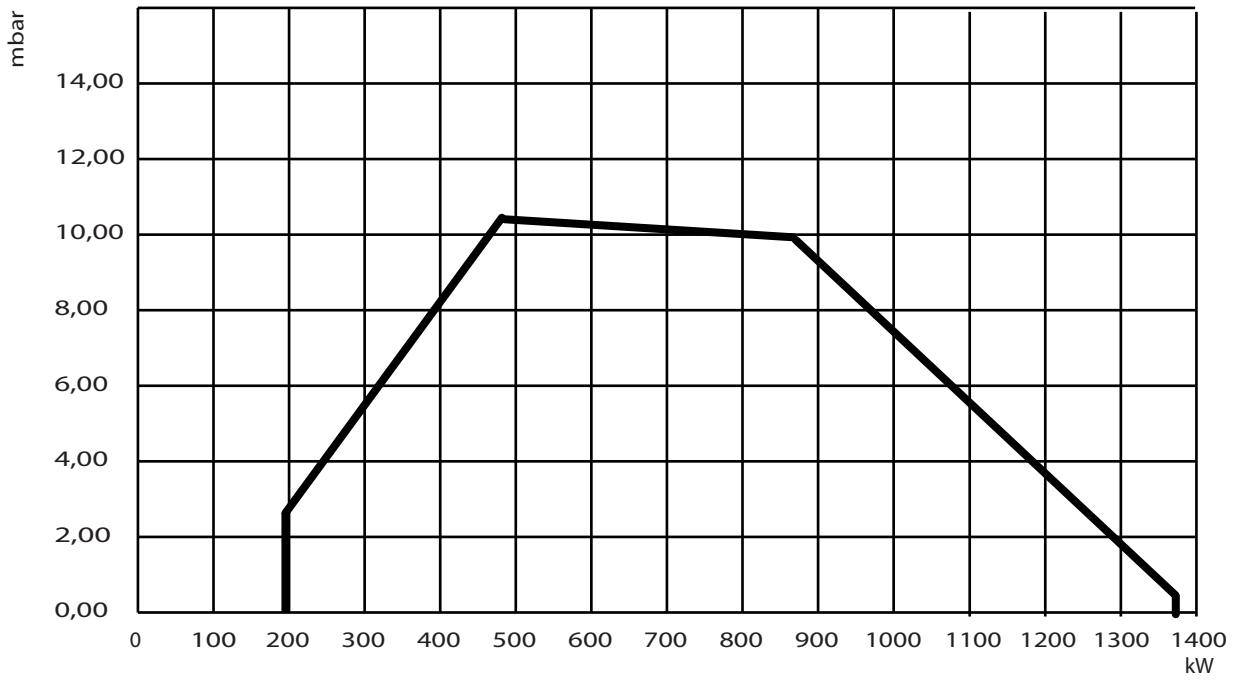


**LO 1000 2ST**

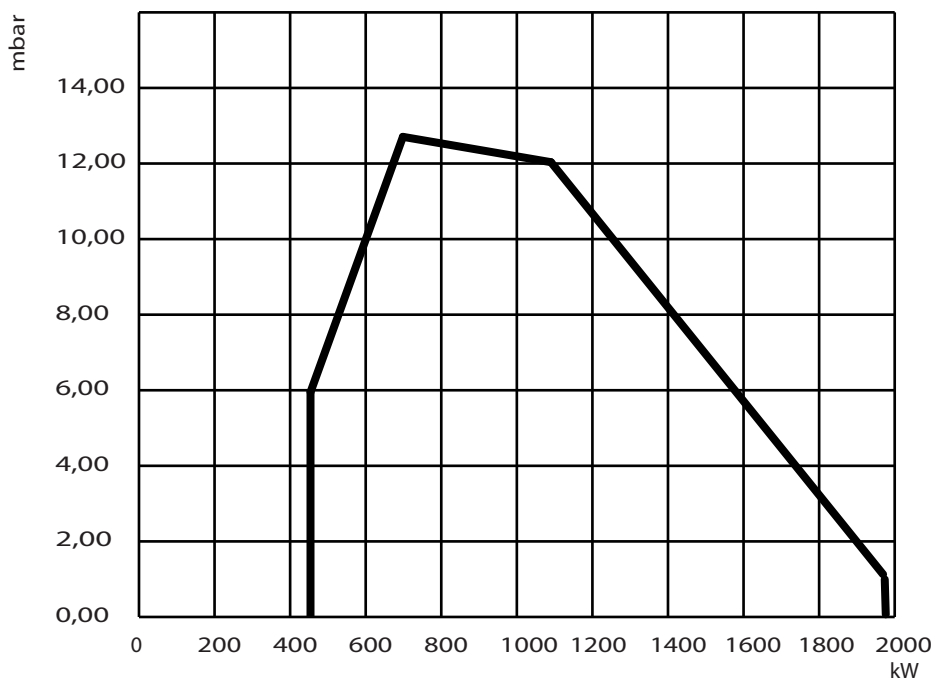




### LO 1300 2ST



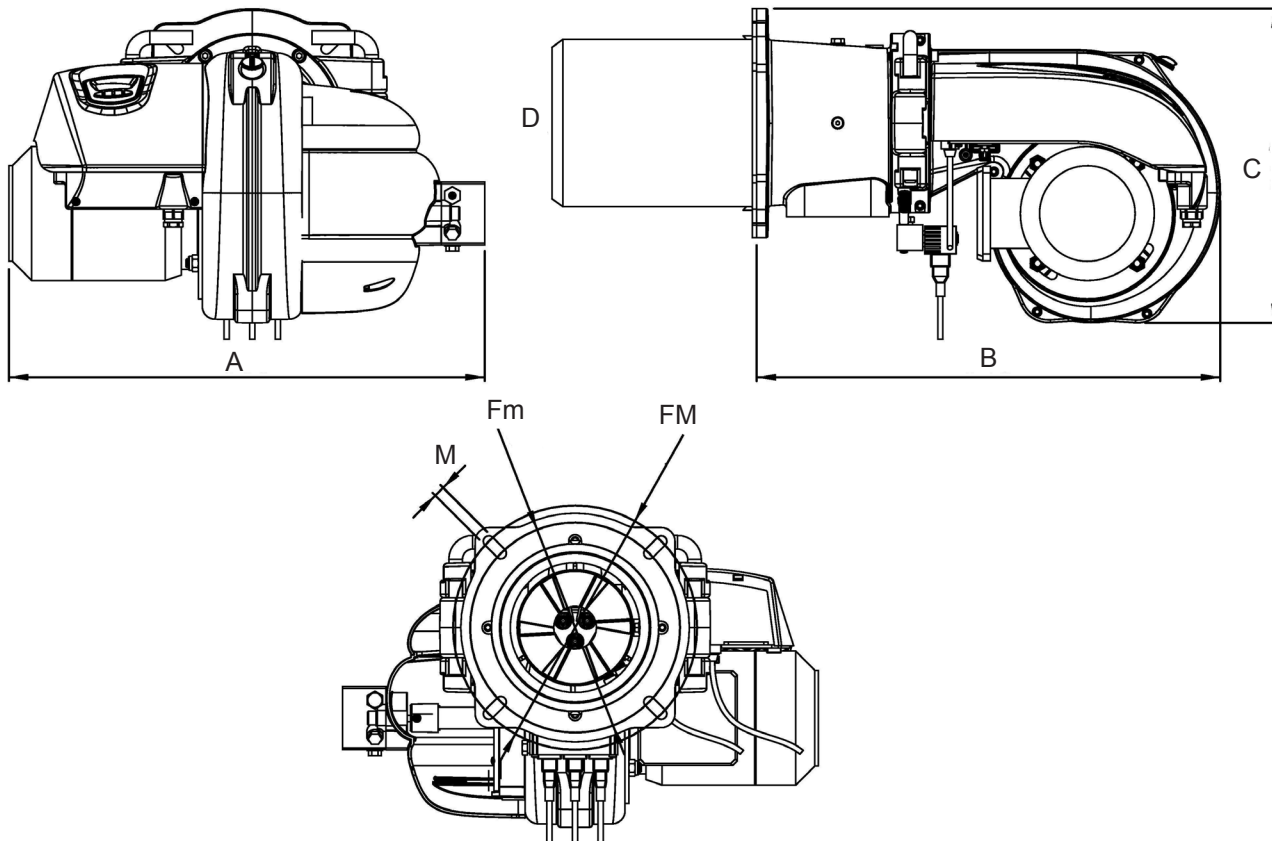
### LO 2000 2ST





**DIMENSIONS**

**M U**



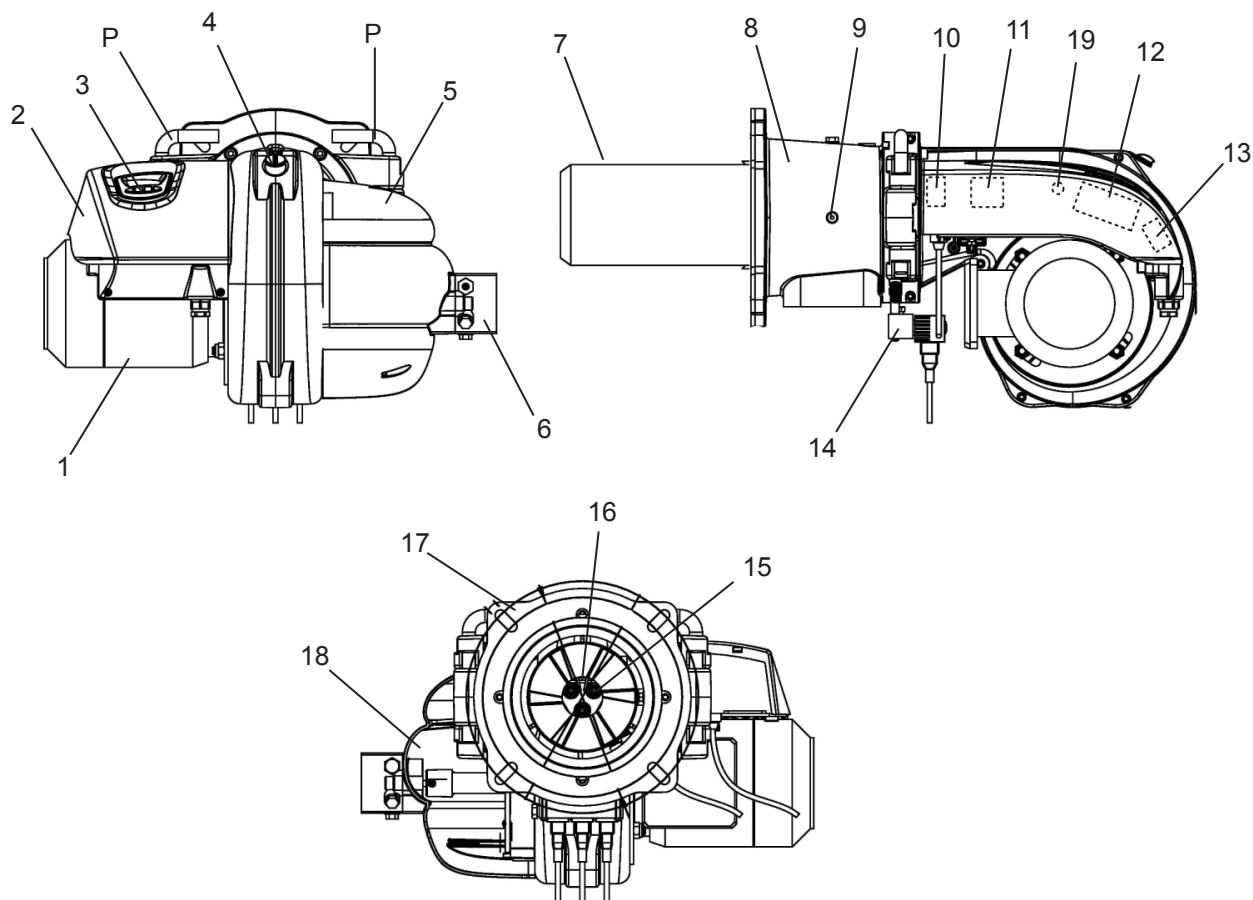
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>FM</b>	<b>Fm</b>	<b>M</b>
	mm	mm	mm	mm	mm	mm	M SCREW
<b>LO 700</b>	560	540	370	166	286	246	M12
<b>LO 1000</b>	560	540	370	196	286	246	M12
<b>LO 1300</b>	650	620	440	244	334	294	M12
<b>LO 2000</b>	650	620	440	244	334	294	M12





## MAIN COMPONENTS

**M**



### KEY

- 1 Motor
- 2 Control panel
- 3 Display
- 4 inspection hole

- 5 Air vent lid
- 6 Diesel pump
- 7 Flow nozzle
- 8 Burner flange
- 9 Ring regulation
- 10 Transformer

- 11 Air servo-motor
- 12 Control unit
- 13 Contactor-motor relay
- 14 Solenoid valves
- 15 Nozzles
- 16 Ignition electrode

- 17 Flange insulation
- 18 Air vent
- 19 Photoresistance
- P Hinge pins

## 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 is 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.

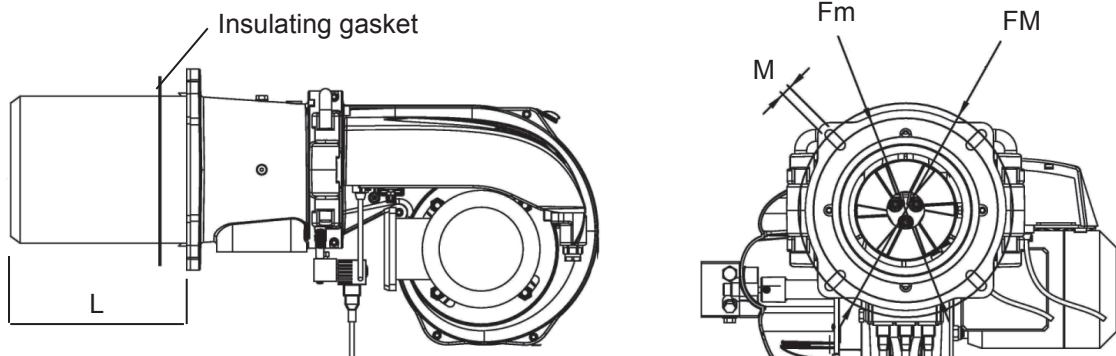
### NOTES FOR REPLACEMENT OF THE APPLIANCE

- 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.

## 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.



L = Useful entrance length flow nozzle  
 L (BC) = flame tube short  
 L (BL) = flame tube long

	D	L (BC)	L (BL)	FM	Fm	M
	mm	mm	mm	mm	mm	M VITE
<b>LO 700</b>	166	235	325	286	246	M12
<b>LO 1000</b>	196	230	320	286	246	M12
<b>LO 1300</b>	244	340		334	294	M12
<b>LO 2000</b>	244	340		334	294	M12

## ELECTRIC CONNECTIONS

**M**

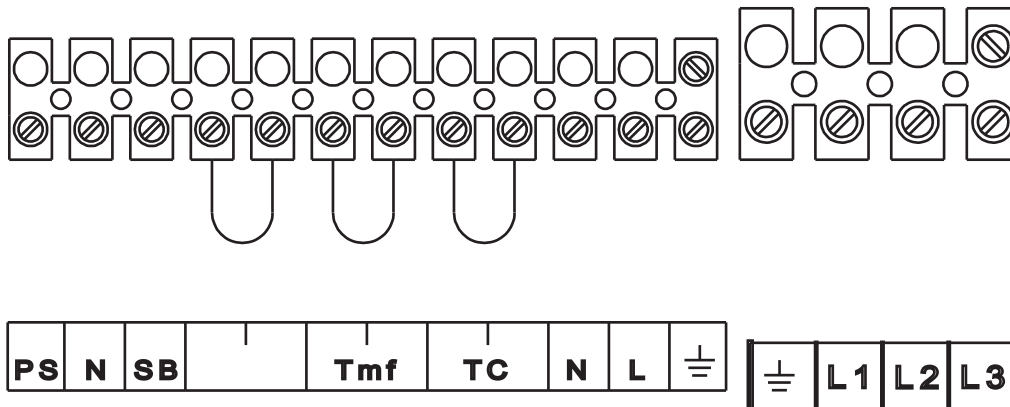
### READ THE GENERAL STANDARDS ON PAGE 3 CAREFULLY

- 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.

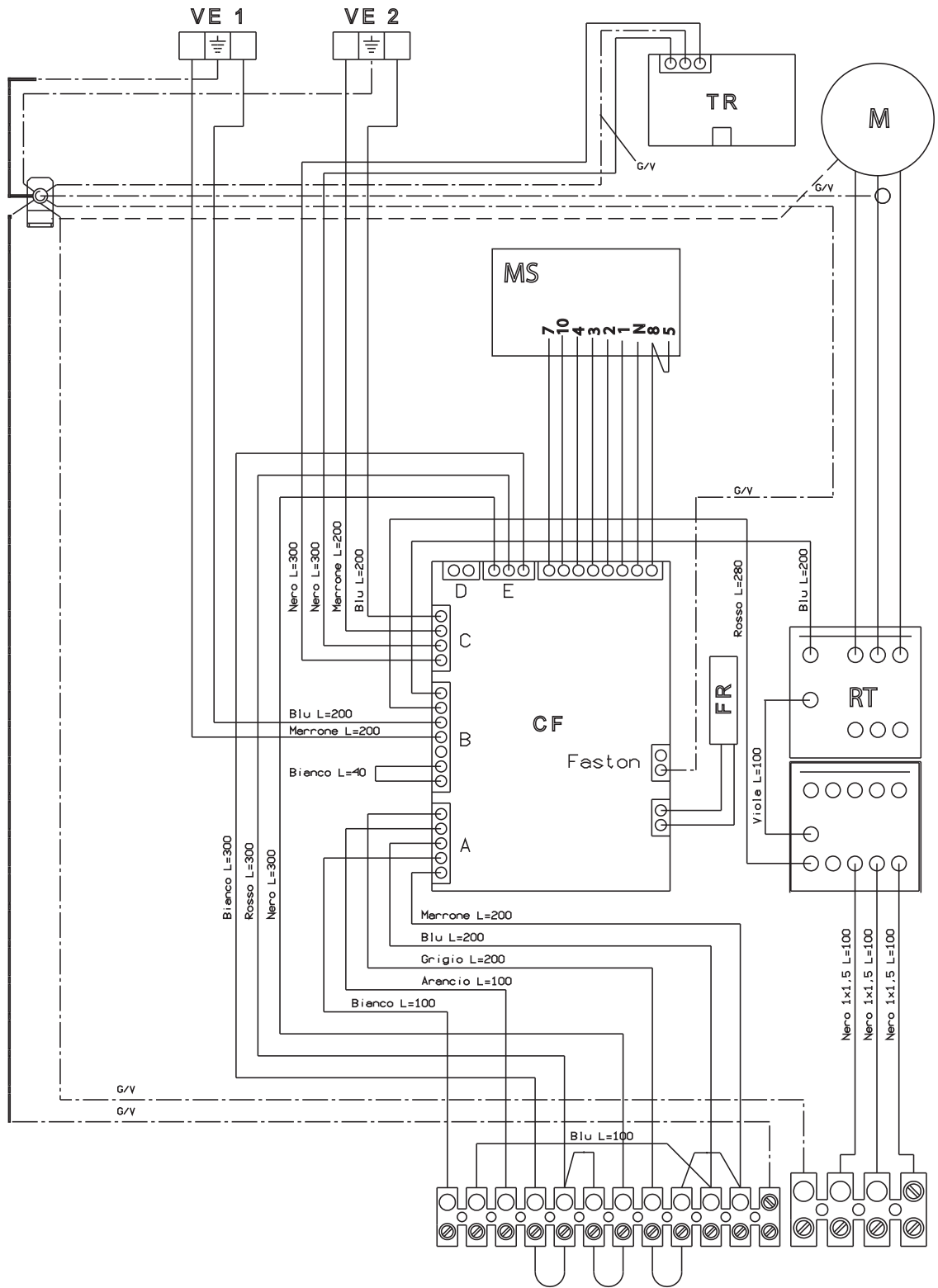
- PHASE-PHASE: in the case of PHASE-PHASE mains power supply, it is necessary to use an insulation transformer. Connect a terminal of the insulation transformer secondary to the appliance EARTH and NEUTRAL.

Now connect the other terminal of the transformer secondary to the appliance LINE.



### KEY

- L Line
- N Neutral
- L1 Three phase line
- L2 Three phase line
- L3 Three phase line
- Tmf Flame thermostat mod.
- SB Block indicator (at a distance)
- PS Release button (at a distance)



**KEY**

- L Line
- N Neutral
- L1 Three phase line
- L2 Three phase line
- L3 Three phase line
- M Burner motor
- SL Circuit breaker switch
- TR Ignition transformer
- MS Servo-motor
- VE1 Stage 1 solenoid valve
- VE2 Stage 2 solenoid valve

- CF Control unit
- FR Photoresistance
- RT Circuit breaker relay
- Tmf Flame thermostat mod.
- SB Block indicator (at a distance)
- PS Release button (at a distance)



## 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 voltage power supply;
- protection in case of high power supply voltage;
- non-volatile block;- intermittent functioning: regulation and self-diagnosis stop every 24h;
- air damper control for functioning at several stages or modulating;
- independent control outputs for 3 fuel valves;
- remote reset;
- built-in button or two-colour LED for indicating functioning status and anomalies;
- flame detection via photoresistance;

### Table of times

Pre-ventilation time	15s (*)
Pre-ignition time	15s (*)
Post-ignition time	3s
Safety time	5s (**)
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	$0.2s \leq \&\& \leq 4s$
Pump engagement duration timing	30s
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

### 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).

#### 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.

#### Pump engagement

If the appliance is in block status, it is possible to force a pump engagement status.

By continuous pressing of the key for a time exceeding 6s and successive release of the same, there is a fast green/yellow/red flashing phase with duration of 3 s. If the key is pressed and released within this timed period, the motor and pump are activated for duration of 30s.

The procedure must be repeated in order to deactivate the function before the timing expires. It is possible to activate and deactivate 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.

#### **Functioning in manual mode for burner calibration** (*delegated to authorised staff*).

If the appliance is not in the block state, it is possible to force the MANUAL functioning mode by acting on the button on the board or on the remote release button.

In fact, by pressing the button 3 times (on the board or remote reset) access the green fast flashing display; another press causes the activation of the MANUAL functioning mode. In this phase, the appliance initiates the start-up cycle or remains functioning independently from the status of the heat request thermostat and the functioning regulator.

If the appliance is not in the block state, it is possible to force the MANUAL functioning mode by acting on the button on the board or on the remote release button.

In fact, by pressing the button 3 times (on the board or remote reset) access the green fast flashing display; another press causes the activation of the MANUAL functioning mode. In this phase, the appliance initiates the start-up cycle independently from the status of the heat request thermostat and the functioning regulator.

Once the functioning position has been reached, it is possible to pass from one functioning stage to the next by just acting on the button.

At every press and release of the button, pass to the next intermediate stage until reaching the third stage (three-stage burner). Press again to return to the previous until reaching the first stage position.

(If the two-stage burner passes from the first stage position to the second stage position and vice versa).

(If the modulating burner passes from the minimum modulation position to the maximum modulation position and vice versa).

During the MANUAL functioning phase, the number of yellow flashings indicate the current functioning status (1 flash = first stage or minimum modulation, 2 flashes = second stage or maximum modulation, 3 flashes = third stage).

If the signal becomes flashing red during MANUAL functioning, check the position of the servo-motor cam (cam position anomaly signal); the burner will however remain in functioning mode.

The procedure must be repeated to deactivate the manual functioning mode. It is also possible to deactivate the manual functioning mode by not acting on the button until the relative timeout has expired (see table of times). The function in question can only be activated by accessing the INSTALLER MENU.

#### **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).

#### **Monitoring of functioning**

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

**MOTOR** If 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 VALVES** If 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. 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.

## FUNCTIONING CYCLE

**M**

### Ignition

On closure of the heat request contact, the fan motor and ignition transformer are inserted and total opening of the air damper is commanded.

On reaching total opening the pre-ventilation (and pre-ignition) 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 start of the safety time, during which the first stage solenoid valve is inserted.

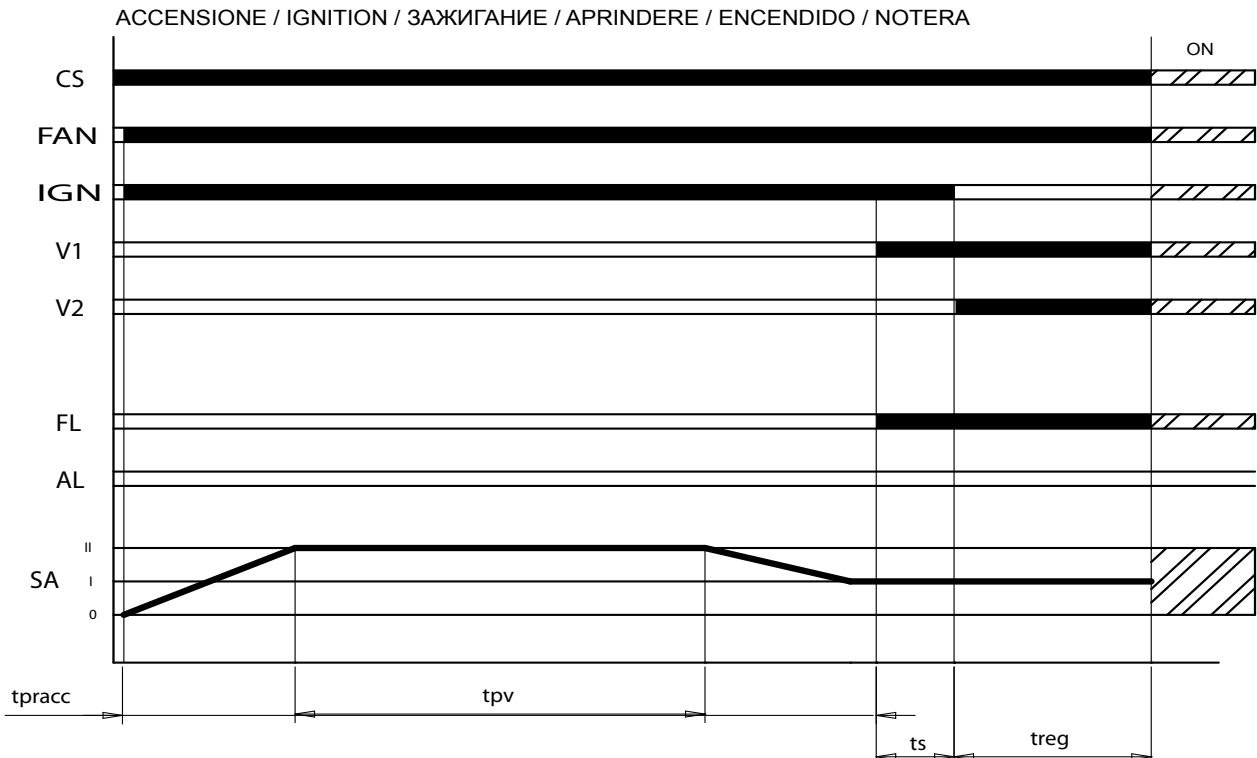
With flame signal presence, the ignition transformer is kept inserted until the end of the post-ignition time and however, no longer than 3s after the end of the safety time.

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

The external regulator, both 2-stage and 3-stage burners or modulating burners, act to satisfy the proportion of heat requested.

The opening of the request contact determines the closure of the solenoid valve, burner switch off and, if envisioned, execution of the post-ventilation phase with total opening of the air damper. When the fan is switched off the air damper then closes completely.

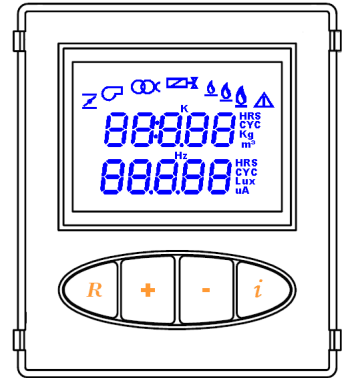


CS Functioning request consents  
 FAN Fan motor  
 IGN Ignition transformer  
 V1 First stage valve  
 V2 Second stage valve  
 FL Flame signal  
 AL Block signal

SA Air damper  
 tpv Pre-ventilation time  
 tpracc Pre-ignition time  
 ts Safety time  
 treg Functioning regulator management delay

## USER INTERFACE

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		
	First stage solenoid valve		
	TWO-STAGE BURNER	THREE-STAGE BURNER	MODULATING BURNER
	First stage flame signal	First stage flame signal	Flame signal presence
	Second stage flame signal	Second stage flame signal	Not used
	Not used	Third stage flame signal	Not used
	Anomaly signal		
<b>K</b>	Not used		
<b>HRS</b>	Hours		
<b>CYC</b>	Cycles		
<b>Kg</b>	Kilograms		
<b>m<sup>3</sup></b>	Not used		
<b>Lux</b>	Lux		
<b>uA</b>	Not used		
<b>Hz</b>	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.

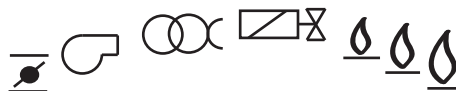
Press key **i** to save the modified value.

To exit the parameter modification mode without saving, wait 10s without pressing any buttons or press the **R** key.

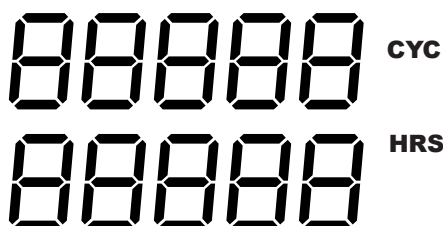
## Normal display mode

By connecting the GB2 board to the mains power supply, the CP45 interface 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.



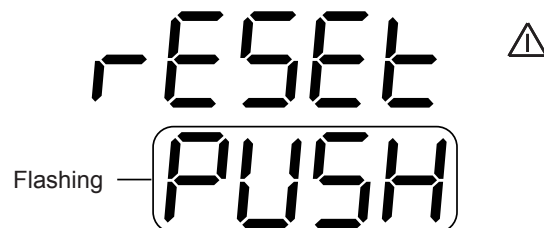
However, if anomalies are present, the anomaly code (see table 1) and the type of anomaly (volatile or non-volatile) will be displayed at the same time.



ANOMALY CODE	MEANING
<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
<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.



*Lamborghini*  
CALORECLIMA

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

Manual functioning mode:

 Flashing

A ADV

Pump engagement:

PUMP-

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 “ *i* ” .

By prolonged pressing for 5 seconds of key “ *i* ” 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 — 

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 or three-stage, the INFO MENU is organised as per table.

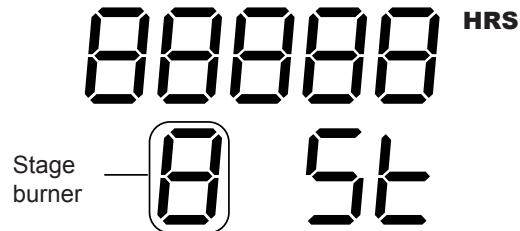
MENU	REPRESENTATION	INFORMATIO
MENU INFO	1st stage burner functioning hours	TIMER
	2nd stage burner functioning hours	
	3rd stage burner total functioning hours(three-stage only)	
	Burner total functioning hours	
	Timer reset	
	Burner functioning cycles (1st stage)	CYCLES-COUNTER
	2nd stage burner functioning cycles	
	3rd stage burner total functioning cycles(three-stage only)	
	Burner no ignition cycles	
	Cycle-counter reset	
	1st stage fuel consumption	FUEL CONSUMPTION
	2nd stage fuel consumption	
	3rd stage fuel consumption (three-stage only)	
	Total fuel consumption	
	Consumption reset	
	Flame signal intensity	FLAME SIGNALS
	Air damper servo-motor current position	AIR DAMPER SERVO-MOTOR
	Air damper servo-motor total opening cycles	
	Servo-motor cycles reset	
	Electrical frequency	ELCTRICAL FREQUENCY
Firmware ID	FIRMWARE ID	



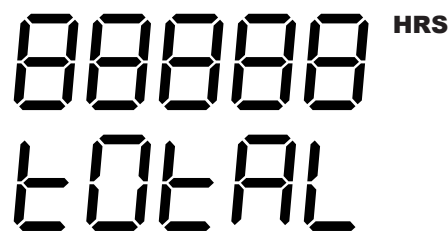
**Lamborghini**  
CALORECLIMA

## Timer

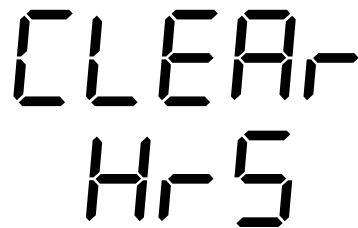
The function hours of the burner are displayed respectively in first and second stage (if two-stage burner).



The total functioning hours of the burner are also displayed.



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



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



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 5t

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.

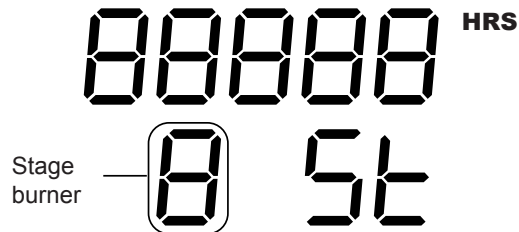
CLEAR  
flashing PUSH

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

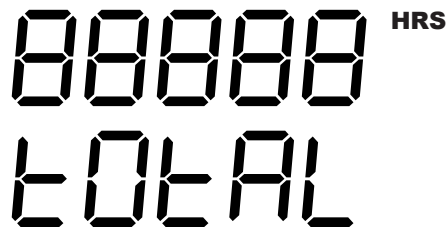
## Fuel consumption

Using the INSTALLER MENU it is possible to set the hourly fuel consumption respectively of the first and second stages. (Unit of measurement: Kg/h).

When this has been performed, it is possible to determine the total fuel consumption relative to the individual functioning stages of the burner.



The total consumption relative to the burner is also displayed.



To reset all counters relative to fuel consumption, press the key *i* during the following display:



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



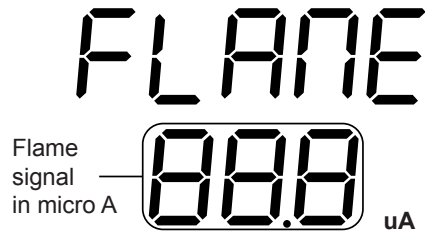
Pressing the key again during this display determines the reset of all meters relative to fuel consumption and the return to first stage fuel consumption display.





### Flame signal

The flame signal value is displayed in uA.

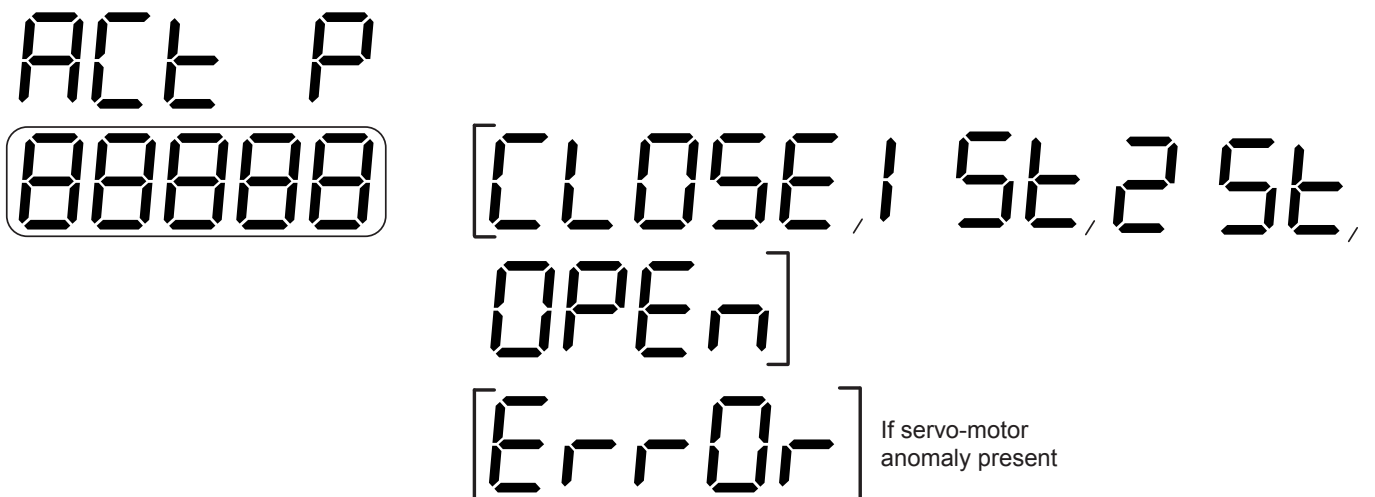


If the flame signal read should exceed the flame signal detection threshold value by 10 times, the display is:



### Air damper servo-motor

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



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

888888 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 8.8 Firmware version



## ANOMALIES LOG MENU

MENU  
HI SE

The HIST MENU is organised as per table 3.

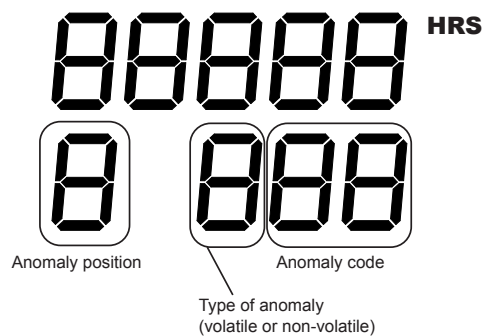
MENU	REPRESENTATION	INFORMATION
MENU HIST	Anomalies log per functioning hours (Posizione 1/8)	ANOMALIES LOG (DISPLAY BY HOURS)
	Anomalies log per functioning hours (Posizione 2/8)	
	Anomalies log per functioning hours (Posizione 3/8)	
	Anomalies log per functioning hours (Posizione 4/8)	
	Anomalies log per functioning hours (Posizione 5/8)	
	Anomalies log per functioning hours (Posizione 6/8)	
	Anomalies log per functioning hours (Posizione 7/8)	
	Anomalies log per functioning hours (Posizione 8/8)	
	Anomalies log per functioning cycles (Posizione 1/8)	ANOMALIES LOG (DISPLAY BY CYCLES)
	Anomalies log per functioning cycles (Posizione 2/8)	
	Anomalies log per functioning cycles o (Posizione 3/8)	
	Anomalies log per functioning cycles (Posizione 4/8)	
	Anomalies log per functioning cycles (Posizione 5/8)	
	Anomalies log per functioning cycles (Posizione 6/8)	
	Anomalies log per functioning cycles (Posizione 7/8)	
	Anomalies log per functioning cycles (Posizione 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.

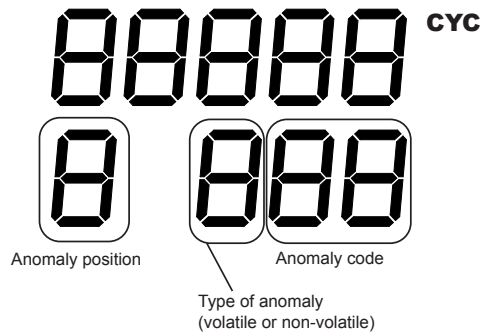


An example is given below.  
(In position 1 no ignition block occurring after 99 burner functioning hours).

99<sup>HRS</sup>  
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.



An example is given below.  
(In position 1 parasite flame signal presence after 1000 burner functioning cycles).

1000<sup>CYC</sup>  
1 A12

**ANOMALIES LOG RESET**

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

CLEAR  
HI ST



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.

PARAM MENU (PARAMETERS)

MENU  
PARAM

The PARM MENU is organised as per table

MENU	REPRESENTATION	SETTABLE VALUES	SET VALUES
MENU PARAM	Burner type	2stages/3stages /modulating	2stages
	Flame sensor type	not managed	not managed
	Pre-heater management	ON / OFF	OFF
	Post-ventilation time	0 - 255 s	0
	First stage solenoid valve advance opening	0 - 80	30
	Second stage solenoid valve advance opening	0 - 80	30
	Third stage solenoid valve advance opening	0 - 80	0

BURNER TYPE

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

burner  
000000 → [2STAG, 3STAG, 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.

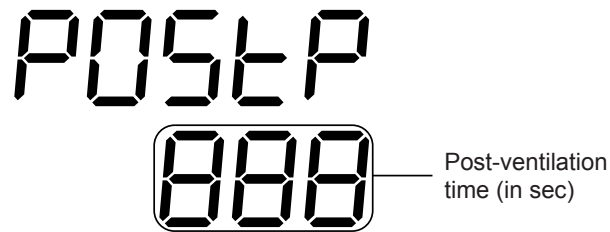
Press key i to memorise the current value displayed. To exit this mode without memorising the value, press key R or wait 10s without pressing the keys.

FLAME SENSOR TYPE

- parameter not managed -

#### 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.



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..



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 first stage position (or minimum modulation) but in a 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.

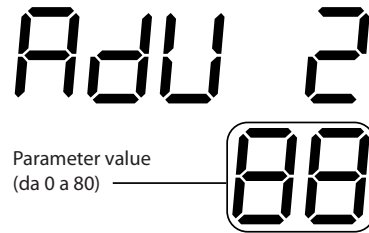
**SECOND STAGE SOLENOID VALVE ADVANCED ACTIVATION (Not managed if MODULATING BURNER)** It is possible to introduce an advance on the second stage solenoid valve activation.

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).

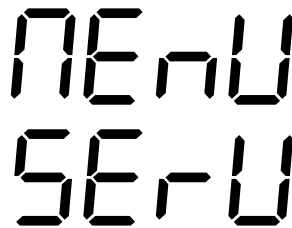
The second stage solenoid valve activation point coincides with the deactivation point at the time when passing from second to first stage. Press key i to access the PARAMETER VALUE MODIFICATION mode, during which the value of the parameter displayed flashes.

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)



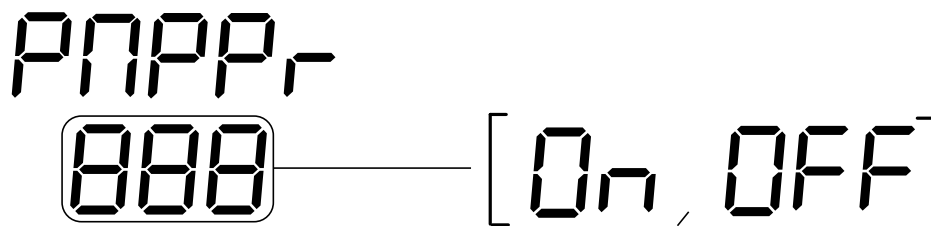
If the burner is two-stage, the SERV MENU is organised as per table.

Two-stage burner:

MENU	REPRESENTATION	SETTABLE VALUES	SET VALUES
MENU SERV	Manual functioning mode	1St - 2St - 3St - OFF	OFF
	Pump engagement	ON / OFF	OFF
	Temporary shutdown	ON / OFF	OFF
	First stage consumption setting [kg/h]	0 -255	0
	Second stage consumption setting [kg/h]	0 - 255	0
	Third stage consumption setting [kg/h]	0 - 255	0

### MANUAL FUNCTIONING MODE

This parameter allows to activate the MANUAL FUNCTIONING FOR BURNER CALIBRATION phase



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.

Once the functioning position of the burner has been reached in first stage (or minimum modulation) it is possible to set and reach the second stage position (or maximum modulation).

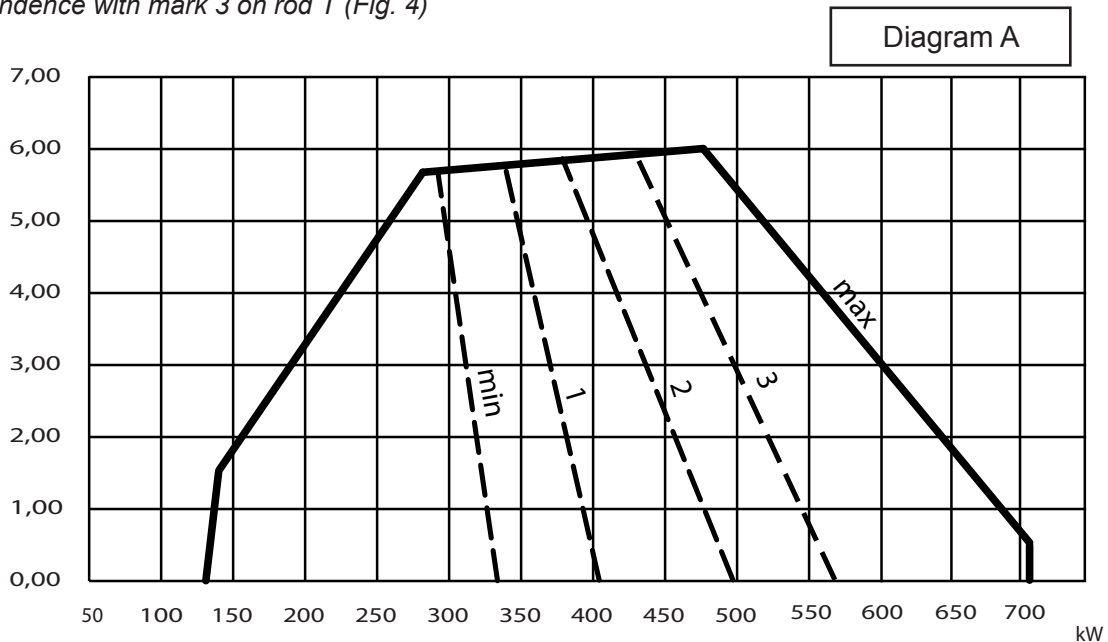
### ARRESTO TEMPORANEO

Questo parametro permette di attivare la funzione ARRESTO TEMPORANEO.

It is **necessary** to position the air ring (Diagram A) 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. 4).

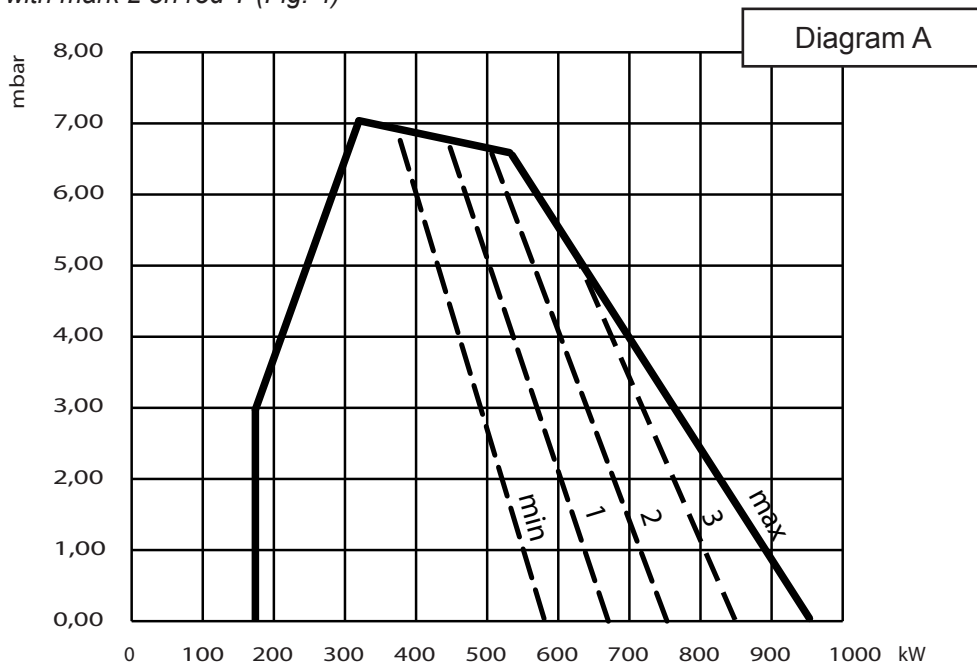
### Combustion head shutter regulation LO 700

Ex. If the burner should operate at 500kW with a counterpressure of 3 mbar, the air ring must be positioned in correspondence with mark 3 on rod T (Fig. 4)



### Combustion head shutter regulation LO 1000

Ex. If the burner should operate at 600kW with a counterpressure of 4 mbar, the air ring must be positioned in correspondence with mark 2 on rod T (Fig. 4)



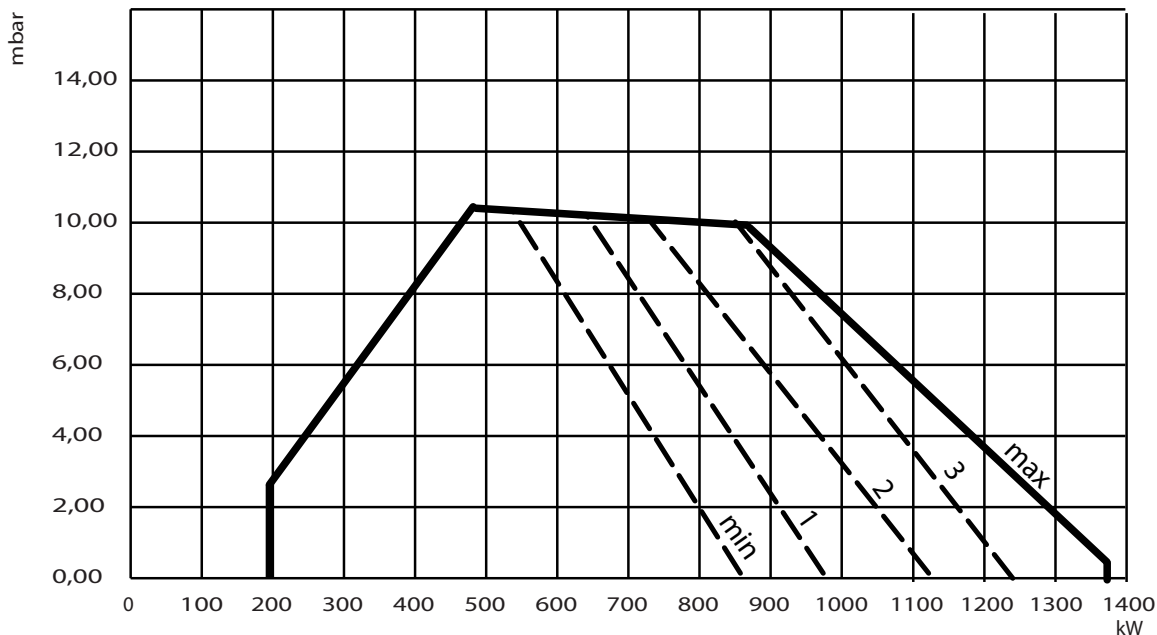




### Combustion head shutter regulation LO 1300

Ex. If the burner should operate at 1100kW with a counterpressure of 4 mbar, the air ring must be positioned in correspondence with mark 3 on rod T (Fig. 4)

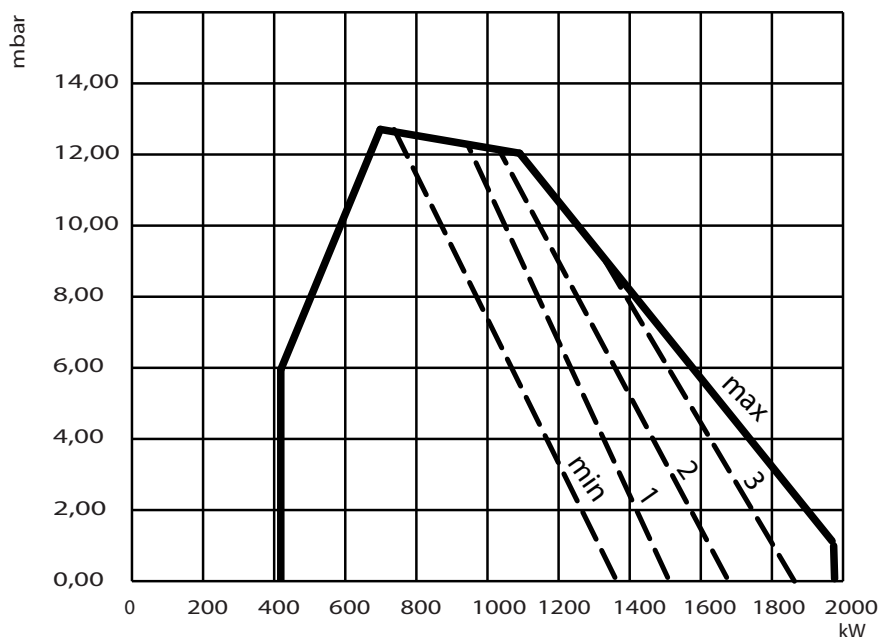
Diagram A



### Combustion head shutter regulation LO 2000

Ex. If the burner should operate at 1600kW with a counterpressure of 4 mbar, the air ring must be positioned in correspondence with mark 3 on rod T (Fig. 4)

Diagram A



**Combustion head shutter placement**

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.

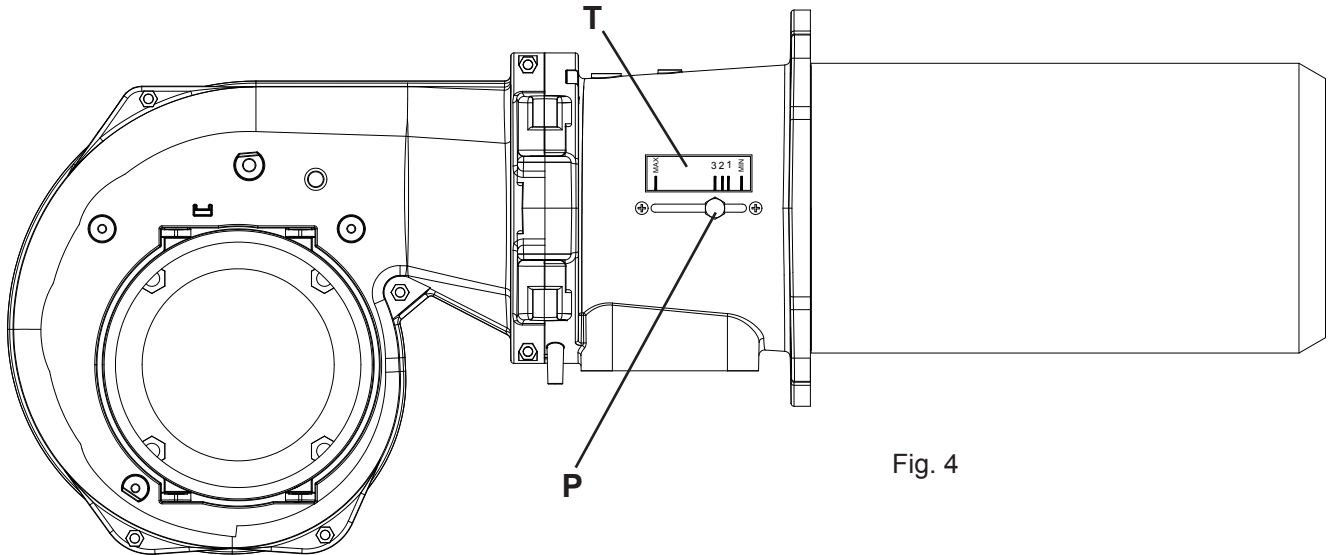
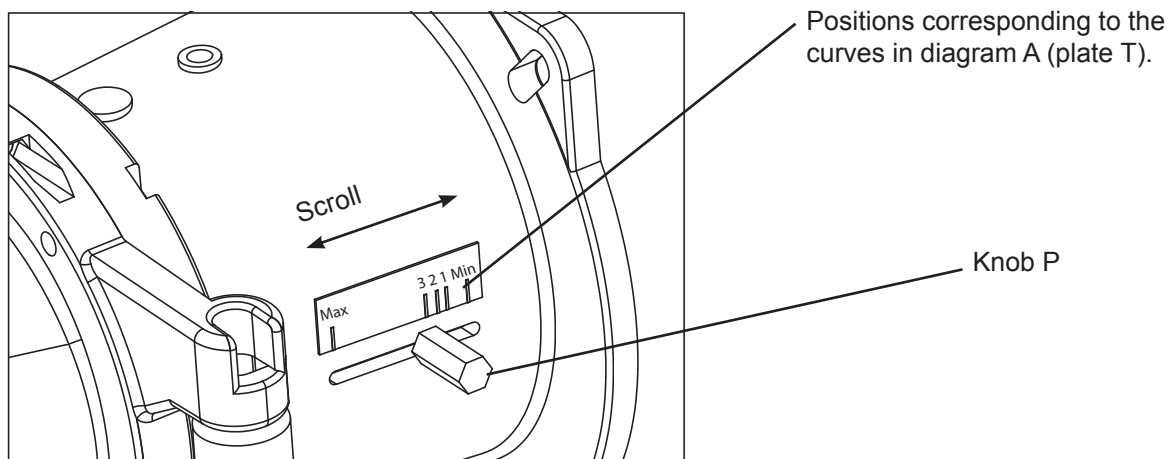


Fig. 4

**Detail of shutter adjustment**

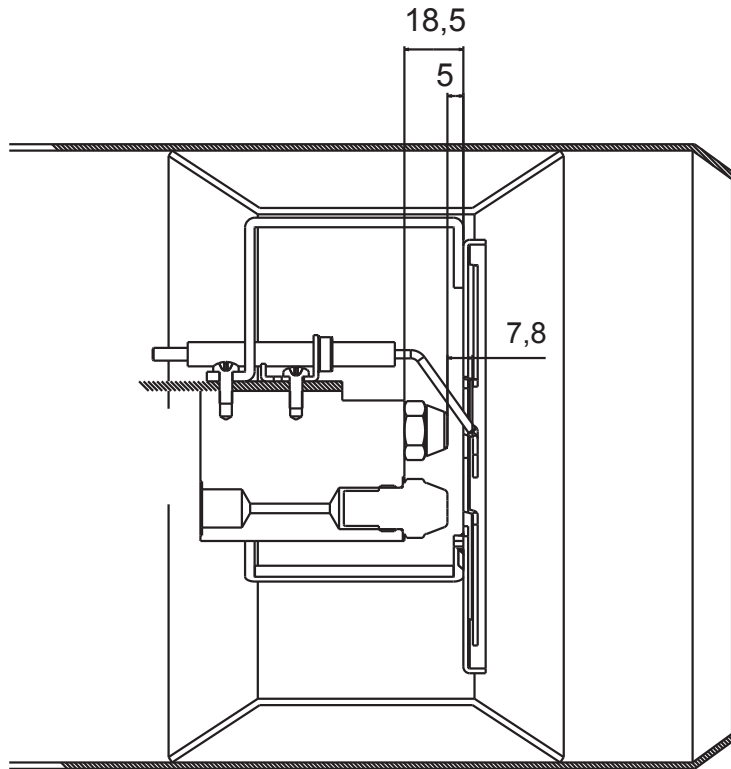




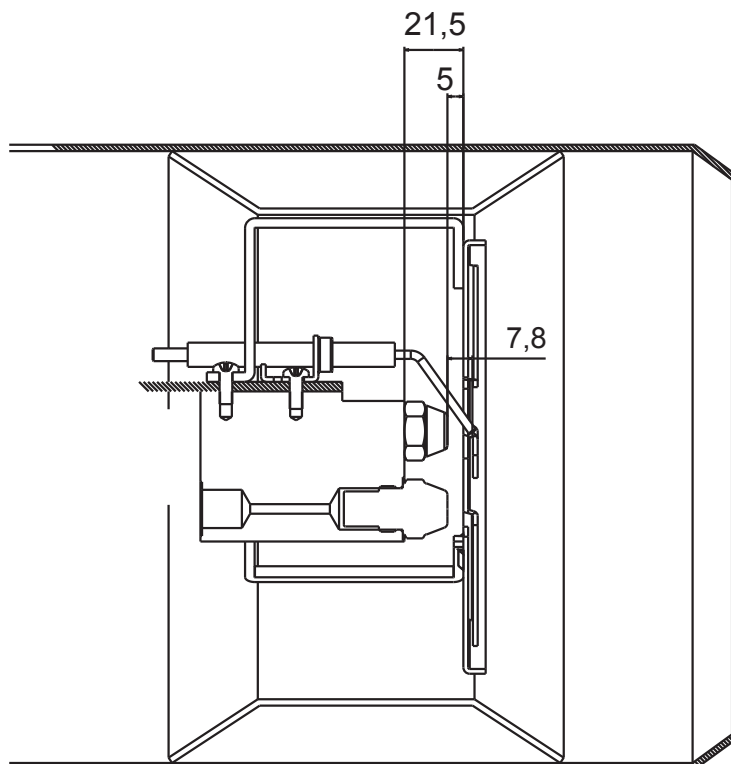
## Electrodes positioning

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.

LO 700  
LO 1000  
LO 1300



LO 2000

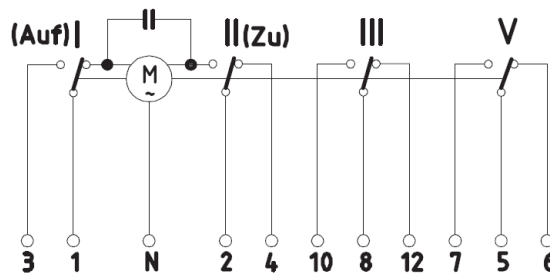


## Air servo-motor regulation

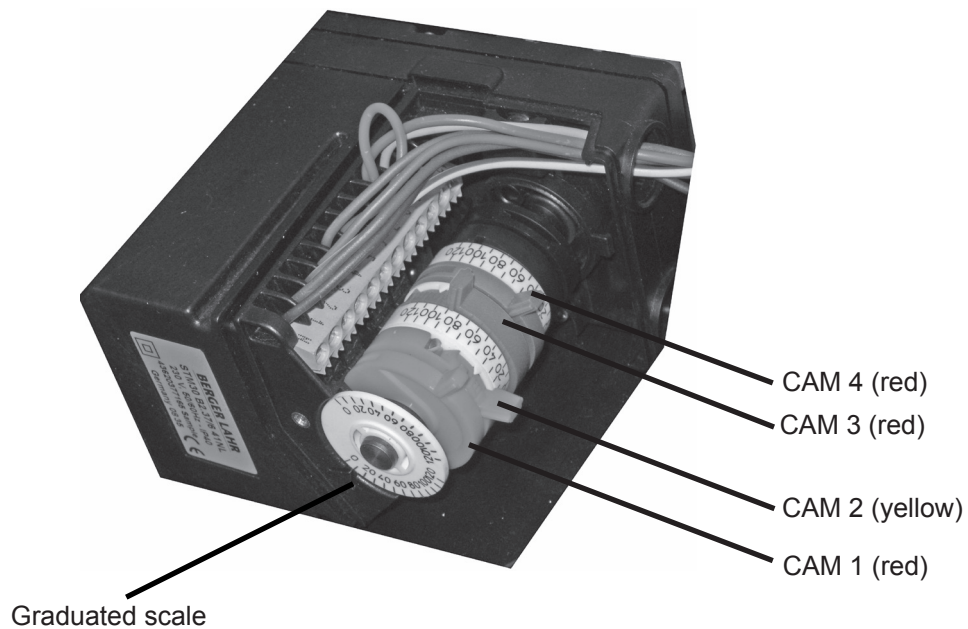
The air damper is activated by an electric servo-control. The positions of the damper are determined via the cams, with reference to the scale on the relevant disc.

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 (red) 2nd stage opening regulation
- CAM 2 (yellow) Closure position regulation (value 0)
- CAM 3 (red) 1st stage opening regulation
- CAM 4 (red) value 0

## Flame detection

- Flame detection takes place via photoresistance with the following features:

<i>Lighting levels:</i>	<i>Lux</i>	<i>Volt</i>
<i>DCFlame detection threshold:</i>	>3.5	<1,5
<i>Flame switch-off threshold:</i>	<2.5	>1,8
<i>Parasite flame threshold:</i>	>1.5	<2,3
<i>Maximum length of flame detection cable: 1.5 m</i>		

*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.

## Monitoring of functioning

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

### MOTOR

If 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 VALVES

If 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.

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.

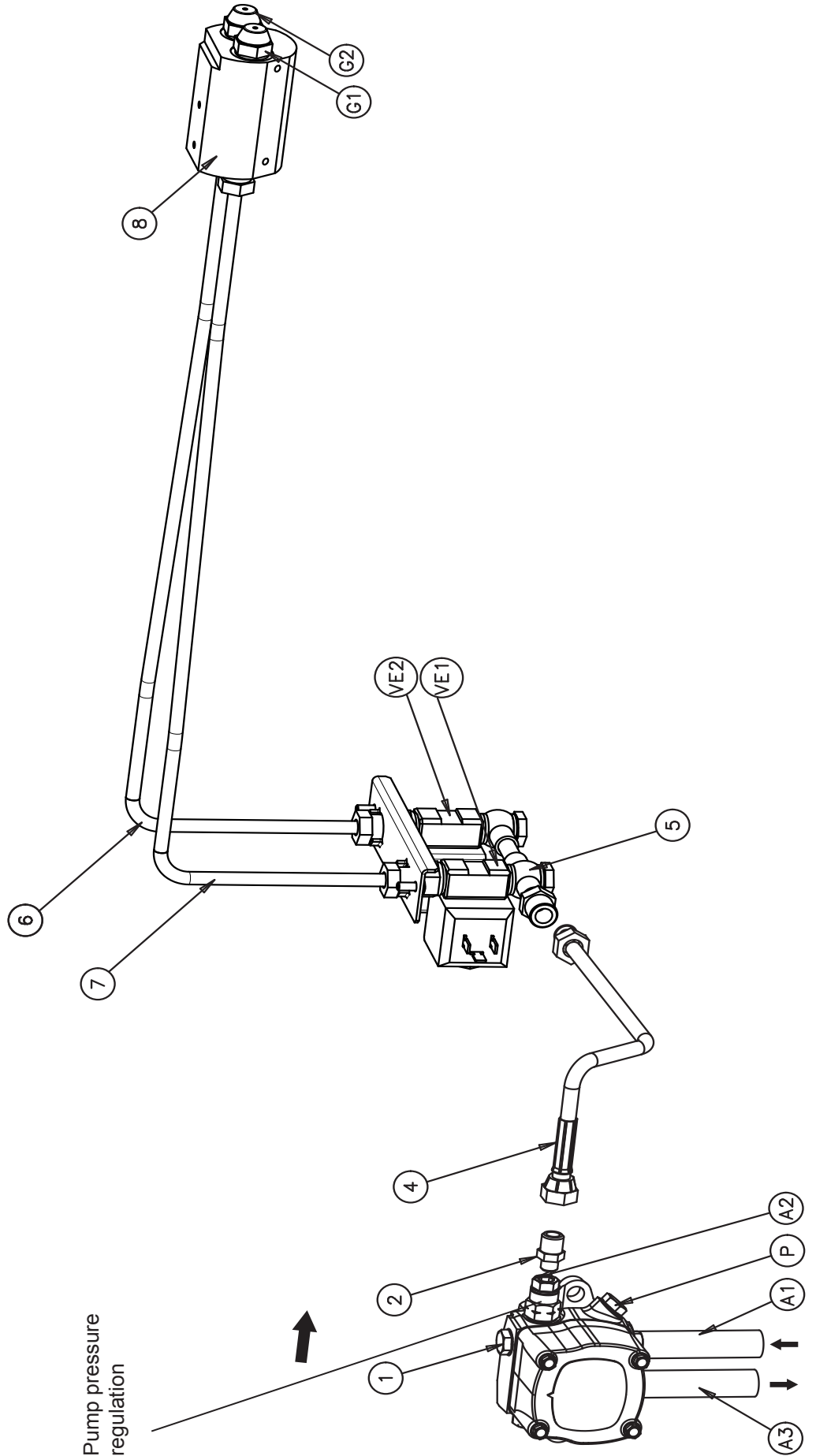


Hydraulic circuit

G1 1st stage nozzle  
G2 2nd stage nozzle

7 Central diesel pipe  
8 Nozzle-holder block  
A1 Diesel intake  
A2 Diesel flow  
A3 Diesel return  
P Manometer connection  
Ve1 1st stage valve  
Ve2 2nd stage valve

KEY  
1 Pump  
2 Nipple  
3 Nipple  
4 Diesel flow hose  
5 Solenoid valve manifold  
6 Lateral diesel pipes





## Nozzles selection

Inside every PUMP/NOZZLE PRESSURE box there are two values. The flow rate in kg/h is expressed at the top, in kW at the bottom.

GPH	Bar													
	8	9	10	11	12	13	14	15	16	17	18	19	20	21
0,40	1,36	1,44	1,52	1,59	1,67	1,73	1,80	1,86	1,92	1,98	2,04	2,10	2,15	2,20
	<b>16,1</b>	<b>17,1</b>	<b>18,0</b>	<b>18,9</b>	<b>19,8</b>	<b>20,5</b>	<b>21,3</b>	<b>22,1</b>	<b>22,8</b>	<b>23,5</b>	<b>24,2</b>	<b>24,9</b>	<b>25,5</b>	<b>26,1</b>
0,50	1,70	1,80	1,90	1,99	2,08	2,17	2,25	2,33	2,40	2,48	2,55	2,62	2,69	2,75
	<b>20,2</b>	<b>21,3</b>	<b>22,5</b>	<b>23,6</b>	<b>24,7</b>	<b>25,7</b>	<b>26,7</b>	<b>27,6</b>	<b>28,5</b>	<b>29,4</b>	<b>30,2</b>	<b>31,1</b>	<b>31,9</b>	<b>32,6</b>
0,60	2,04	2,16	2,28	2,39	2,50	2,60	2,70	2,79	2,88	2,97	3,06	3,14	3,22	3,30
	<b>24,2</b>	<b>25,6</b>	<b>27,0</b>	<b>28,3</b>	<b>29,7</b>	<b>30,8</b>	<b>32,0</b>	<b>33,1</b>	<b>34,2</b>	<b>35,2</b>	<b>36,3</b>	<b>37,2</b>	<b>38,2</b>	<b>39,1</b>
0,65	2,21	2,34	2,47	2,59	2,71	2,82	2,92	3,03	3,12	3,22	3,31	3,41	3,49	3,58
	<b>26,2</b>	<b>27,8</b>	<b>29,3</b>	<b>30,7</b>	<b>32,1</b>	<b>33,4</b>	<b>34,6</b>	<b>35,9</b>	<b>37,0</b>	<b>38,2</b>	<b>39,3</b>	<b>40,4</b>	<b>41,4</b>	<b>42,5</b>
0,75	2,55	2,70	2,85	2,99	3,12	3,25	3,37	3,49	3,61	3,72	3,82	3,93	4,03	4,13
	<b>30,2</b>	<b>32,0</b>	<b>33,8</b>	<b>35,5</b>	<b>37,0</b>	<b>38,5</b>	<b>40,0</b>	<b>41,4</b>	<b>42,8</b>	<b>44,1</b>	<b>45,3</b>	<b>46,6</b>	<b>47,8</b>	<b>49,0</b>
0,85	2,89	3,06	3,23	3,39	3,54	3,68	3,82	3,96	4,09	4,21	4,33	4,45	4,57	4,68
	<b>34,3</b>	<b>36,3</b>	<b>38,3</b>	<b>40,2</b>	<b>42,0</b>	<b>43,6</b>	<b>45,3</b>	<b>47,0</b>	<b>48,5</b>	<b>49,9</b>	<b>51,4</b>	<b>52,8</b>	<b>54,2</b>	<b>55,5</b>
1,00	3,40	3,61	3,80	3,99	4,16	4,33	4,50	4,65	4,81	4,96	5,10	5,24	5,37	5,51
	<b>40,3</b>	<b>42,8</b>	<b>45,1</b>	<b>47,3</b>	<b>49,3</b>	<b>51,4</b>	<b>53,4</b>	<b>55,2</b>	<b>57,0</b>	<b>58,8</b>	<b>60,5</b>	<b>62,1</b>	<b>63,7</b>	<b>65,4</b>
1,10	3,74	3,97	4,18	4,38	4,58	4,77	4,95	5,12	5,29	5,45	5,61	5,76	5,91	6,06
	<b>44,4</b>	<b>47,1</b>	<b>49,6</b>	<b>51,9</b>	<b>54,3</b>	<b>56,6</b>	<b>58,7</b>	<b>60,7</b>	<b>62,7</b>	<b>64,6</b>	<b>66,5</b>	<b>68,3</b>	<b>70,1</b>	<b>71,9</b>
1,20	4,08	4,33	4,56	4,78	5,00	5,20	5,40	5,59	5,77	5,95	6,12	6,29	6,45	6,61
	<b>48,4</b>	<b>51,4</b>	<b>54,1</b>	<b>56,7</b>	<b>59,3</b>	<b>61,7</b>	<b>64,0</b>	<b>66,3</b>	<b>68,4</b>	<b>70,6</b>	<b>72,6</b>	<b>74,6</b>	<b>76,5</b>	<b>78,4</b>
1,25	4,25	4,50	4,75	5,00	5,20	5,40	5,60	5,80	6,00	6,20	6,35	6,55	6,70	6,85
	<b>50,4</b>	<b>53,4</b>	<b>56,3</b>	<b>59,3</b>	<b>61,7</b>	<b>64,0</b>	<b>66,4</b>	<b>68,8</b>	<b>71,2</b>	<b>73,5</b>	<b>75,3</b>	<b>77,7</b>	<b>79,5</b>	<b>81,2</b>
1,35	4,59	4,87	5,13	5,38	5,62	5,85	6,07	6,28	6,49	6,69	6,88	7,07	7,26	7,44
	<b>54,4</b>	<b>57,8</b>	<b>60,8</b>	<b>63,8</b>	<b>66,7</b>	<b>69,4</b>	<b>72,0</b>	<b>74,5</b>	<b>77,0</b>	<b>79,3</b>	<b>81,6</b>	<b>83,9</b>	<b>86,1</b>	<b>88,2</b>
1,50	5,10	5,41	5,70	5,90	6,24	6,50	6,75	6,98	7,21	7,43	7,65	7,86	8,06	8,26
	<b>60,5</b>	<b>64,2</b>	<b>67,6</b>	<b>70,0</b>	<b>74,0</b>	<b>77,1</b>	<b>80,1</b>	<b>82,8</b>	<b>85,5</b>	<b>88,1</b>	<b>90,7</b>	<b>93,2</b>	<b>95,6</b>	<b>98,0</b>
1,65	5,61	5,95	6,27	6,58	6,87	7,15	7,42	7,68	7,93	8,18	8,41	8,64	8,87	9,09
	<b>66,5</b>	<b>70,6</b>	<b>74,4</b>	<b>78,0</b>	<b>81,5</b>	<b>84,8</b>	<b>88,0</b>	<b>91,1</b>	<b>94,1</b>	<b>97,0</b>	<b>99,7</b>	<b>102,5</b>	<b>105,2</b>	<b>107,8</b>
1,75	5,95	6,31	6,65	6,98	7,29	7,58	7,87	8,15	8,41	8,67	8,92	9,17	9,41	9,64
	<b>70,6</b>	<b>74,8</b>	<b>78,9</b>	<b>82,8</b>	<b>86,5</b>	<b>89,9</b>	<b>93,3</b>	<b>96,7</b>	<b>99,7</b>	<b>102,8</b>	<b>105,8</b>	<b>108,8</b>	<b>111,6</b>	<b>114,3</b>
2,00	6,80	7,21	7,60	7,97	8,33	8,67	8,99	9,31	9,61	9,91	10,20	10,48	10,75	11,01
	<b>80,7</b>	<b>85,5</b>	<b>90,1</b>	<b>94,5</b>	<b>98,8</b>	<b>102,8</b>	<b>106,6</b>	<b>110,4</b>	<b>114,0</b>	<b>117,5</b>	<b>121,0</b>	<b>124,3</b>	<b>127,5</b>	<b>130,6</b>
2,25	7,65	8,15	8,55	8,97	9,37	9,75	10,12	10,47	10,85	11,15	11,47	11,79	12,09	12,39
	<b>90,7</b>	<b>96,7</b>	<b>101,4</b>	<b>106,4</b>	<b>111,1</b>	<b>115,6</b>	<b>120,0</b>	<b>124,2</b>	<b>128,7</b>	<b>132,2</b>	<b>136,0</b>	<b>139,8</b>	<b>143,4</b>	<b>147,0</b>
2,50	8,50	9,01	9,50	9,97	10,41	10,83	11,24	11,64	12,02	12,39	12,75	13,10	13,44	13,77
	<b>100,8</b>	<b>106,9</b>	<b>112,7</b>	<b>118,2</b>	<b>123,5</b>	<b>128,4</b>	<b>133,3</b>	<b>138,1</b>	<b>142,6</b>	<b>147,0</b>	<b>151,2</b>	<b>155,4</b>	<b>159,4</b>	<b>163,3</b>
3,00	10,20	10,82	11,40	11,96	12,49	13,00	13,49	13,96	14,42	14,87	15,30	15,72	16,12	16,52
	<b>121,0</b>	<b>128,3</b>	<b>135,2</b>	<b>141,9</b>	<b>148,1</b>	<b>154,2</b>	<b>160,0</b>	<b>165,6</b>	<b>171,0</b>	<b>176,4</b>	<b>181,5</b>	<b>186,4</b>	<b>191,2</b>	<b>195,9</b>
3,50	11,90	12,62	13,30	13,95	14,57	15,17	15,74	16,29	16,83	17,34	17,85	18,34	18,81	19,28
	<b>141,1</b>	<b>149,7</b>	<b>157,7</b>	<b>165,5</b>	<b>172,8</b>	<b>179,9</b>	<b>186,7</b>	<b>193,2</b>	<b>199,6</b>	<b>205,7</b>	<b>211,7</b>	<b>217,5</b>	<b>223,1</b>	<b>228,7</b>
4,00	13,60	14,42	15,20	15,94	16,65	17,33	17,99	18,62	19,23	19,82	20,40	20,95	21,50	22,03
	<b>161,3</b>	<b>171,0</b>	<b>180,3</b>	<b>189,1</b>	<b>197,5</b>	<b>205,5</b>	<b>213,4</b>	<b>220,8</b>	<b>228,1</b>	<b>235,1</b>	<b>242,0</b>	<b>248,5</b>	<b>255,0</b>	<b>261,3</b>
4,50	15,30	16,22	17,10	17,94	18,73	19,50	20,24	20,95	21,63	22,30	22,95	23,57	24,19	24,78
	<b>181,5</b>	<b>192,4</b>	<b>202,8</b>	<b>212,8</b>	<b>222,1</b>	<b>231,3</b>	<b>240,1</b>	<b>248,5</b>	<b>256,5</b>	<b>264,5</b>	<b>272,2</b>	<b>279,6</b>	<b>286,9</b>	<b>293,9</b>
5,00	17,00	18,03	19,00	19,93	20,82	21,67	22,48	23,27	24,04	24,78	25,49	26,19	26,87	27,54
	<b>201,6</b>	<b>213,8</b>	<b>225,3</b>	<b>236,4</b>	<b>246,9</b>	<b>257,0</b>	<b>266,6</b>	<b>276,0</b>	<b>285,1</b>	<b>293,9</b>	<b>302,3</b>	<b>310,6</b>	<b>318,7</b>	<b>326,6</b>

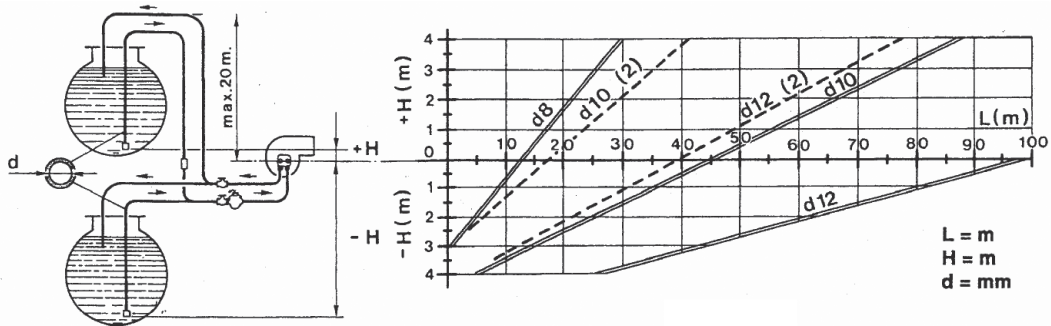
GPH	Bar													
	8	9	10	11	12	13	14	15	16	17	18	19	20	21
5,50	18,70	19,83	20,90	21,92	22,90	23,83	24,73	25,60	26,44	27,25	28,04	28,81	29,56	30,29
	<b>221,8</b>	<b>235,2</b>	<b>247,9</b>	<b>260,0</b>	<b>271,6</b>	<b>282,6</b>	<b>293,3</b>	<b>303,6</b>	<b>313,6</b>	<b>323,2</b>	<b>332,6</b>	<b>341,7</b>	<b>350,6</b>	<b>359,3</b>
6,00	20,40	21,63	22,80	23,92	24,98	26,00	26,98	27,93	28,84	29,73	30,59	31,43	32,25	33,04
	<b>242,0</b>	<b>256,5</b>	<b>270,4</b>	<b>283,7</b>	<b>296,3</b>	<b>308,4</b>	<b>320,0</b>	<b>331,3</b>	<b>342,1</b>	<b>352,6</b>	<b>362,8</b>	<b>372,8</b>	<b>382,5</b>	<b>391,9</b>
6,50	22,10	23,44	23,70	25,91	27,06	28,17	29,23	30,26	31,25	32,21	33,14	34,05	34,98	35,80
	<b>262,1</b>	<b>278,0</b>	<b>281,1</b>	<b>307,3</b>	<b>320,9</b>	<b>334,1</b>	<b>346,7</b>	<b>358,9</b>	<b>370,6</b>	<b>382,0</b>	<b>393,1</b>	<b>403,8</b>	<b>414,9</b>	<b>424,6</b>
7,00	23,79	25,24	26,60	27,90	29,14	30,33	31,48	32,58	33,65	34,69	35,69	36,67	37,62	38,55
	<b>282,2</b>	<b>299,4</b>	<b>315,5</b>	<b>330,9</b>	<b>345,6</b>	<b>359,7</b>	<b>373,4</b>	<b>386,4</b>	<b>399,1</b>	<b>411,4</b>	<b>423,3</b>	<b>434,9</b>	<b>446,2</b>	<b>457,2</b>
7,50	25,49	27,04	28,50	29,90	31,22	32,50	33,73	34,91	36,05	37,16	38,24	39,29	40,31	41,31
	<b>302,3</b>	<b>320,7</b>	<b>338,0</b>	<b>354,6</b>	<b>370,3</b>	<b>385,5</b>	<b>400,1</b>	<b>414,0</b>	<b>427,6</b>	<b>440,7</b>	<b>453,5</b>	<b>466,0</b>	<b>478,1</b>	<b>490,0</b>
8,30	28,21	29,93	31,54	33,08	34,55	35,97	37,32	38,63	39,90	41,13	42,32	43,48	44,61	45,71
	<b>334,6</b>	<b>355,0</b>	<b>374,1</b>	<b>392,3</b>	<b>409,8</b>	<b>426,6</b>	<b>442,6</b>	<b>458,2</b>	<b>473,2</b>	<b>487,8</b>	<b>501,9</b>	<b>515,7</b>	<b>529,1</b>	<b>542,1</b>
9,50	32,29	34,25	36,10	37,87	39,55	41,17	42,72	44,22	45,67	47,07	48,44	49,77	51,06	52,32
	<b>383,0</b>	<b>406,2</b>	<b>428,2</b>	<b>449,2</b>	<b>469,1</b>	<b>488,3</b>	<b>506,7</b>	<b>524,5</b>	<b>541,7</b>	<b>558,3</b>	<b>574,5</b>	<b>590,3</b>	<b>605,6</b>	<b>620,5</b>
10,50	35,69	37,86	40,06	41,73	43,74	45,41	47,20	48,90	50,50	52,00	53,50	55,00	56,40	57,80
	<b>423,3</b>	<b>449,0</b>	<b>475,1</b>	<b>494,9</b>	<b>518,8</b>	<b>538,6</b>	<b>559,8</b>	<b>580,0</b>	<b>599,0</b>	<b>616,7</b>	<b>634,5</b>	<b>652,3</b>	<b>668,9</b>	<b>685,5</b>
12,00	40,80	43,30	45,60	47,80	50,00	52,00	54,00	55,90	57,70	59,50	61,20	62,90	64,50	66,10
	<b>483,9</b>	<b>513,6</b>	<b>540,8</b>	<b>566,9</b>	<b>593,0</b>	<b>616,7</b>	<b>640,5</b>	<b>663,0</b>	<b>684,3</b>	<b>705,7</b>	<b>725,9</b>	<b>746,0</b>	<b>765,0</b>	<b>784,0</b>
13,80	46,90	49,80	52,40	55,00	57,50	59,80	62,10	64,20	66,30	68,40	70,40	72,30	74,30	76,00
	<b>556,3</b>	<b>590,7</b>	<b>621,5</b>	<b>652,3</b>	<b>682,0</b>	<b>709,3</b>	<b>736,5</b>	<b>761,4</b>	<b>786,3</b>	<b>811,3</b>	<b>835,0</b>	<b>857,5</b>	<b>881,2</b>	<b>901,4</b>
15,30	52,00	55,20	58,10	61,00	63,70	66,30	68,80	71,10	73,60	75,80	78,00	80,20	82,20	84,30
	<b>616,7</b>	<b>654,7</b>	<b>689,1</b>	<b>723,5</b>	<b>755,5</b>	<b>786,3</b>	<b>816,0</b>	<b>843,3</b>	<b>872,9</b>	<b>899,0</b>	<b>925,1</b>	<b>951,2</b>	<b>974,9</b>	<b>999,8</b>
17,50	59,50	63,10	66,50	69,80	72,90	75,80	78,70	81,50	84,10	86,70	89,20	91,70	94,10	96,40
	<b>705,7</b>	<b>748,4</b>	<b>788,7</b>	<b>827,9</b>	<b>864,6</b>	<b>899,0</b>	<b>933,4</b>	<b>966,6</b>	<b>997,5</b>	<b>1028,3</b>	<b>1058,0</b>	<b>1087,6</b>	<b>1116,1</b>	<b>1143,3</b>
19,50	66,30	70,30	74,10	77,70	81,20	84,50	87,70	90,80	93,70	96,60	99,40	102,2	104,8	107,4
	<b>786,3</b>	<b>833,8</b>	<b>878,9</b>	<b>921,6</b>	<b>963,1</b>	<b>1002,2</b>	<b>1040,2</b>	<b>1076,9</b>	<b>1111,3</b>	<b>1145,7</b>	<b>1178,9</b>	<b>1212,1</b>	<b>1243,0</b>	<b>1273,8</b>
21,50	73,1	77,5	81,7	85,7	89,5	93,2	96,7	100,1	103,4	106,5	109,6	112,6	115,6	118,4
	<b>867,0</b>	<b>919,2</b>	<b>969,0</b>	<b>1016,4</b>	<b>1061,5</b>	<b>1105,4</b>	<b>1146,9</b>	<b>1187,2</b>	<b>1226,4</b>	<b>1263,1</b>	<b>1299,9</b>	<b>1335,5</b>	<b>1371,1</b>	<b>1404,3</b>
24,00	81,6	86,5	91,2	95,7	99,9	104,0	107,9	111,7	115,4	118,9	122,4	125,7	129,0	132,2
	<b>967,8</b>	<b>1025,9</b>	<b>1081,7</b>	<b>1135,0</b>	<b>1184,9</b>	<b>1233,5</b>	<b>1279,7</b>	<b>1324,8</b>	<b>1368,7</b>	<b>1410,2</b>	<b>1451,7</b>	<b>1490,9</b>	<b>1530,0</b>	<b>1568,0</b>
28,00	95,2	101,0	106,4	111,6	116,6	121,3	125,9	130,3	134,6	138,7	142,8	146,7	150,5	154,2
	<b>1129,1</b>	<b>1197,9</b>	<b>1262,0</b>	<b>1323,6</b>	<b>1382,9</b>	<b>1438,7</b>	<b>1493,2</b>	<b>1545,4</b>	<b>1596,4</b>	<b>1645,0</b>	<b>1693,7</b>	<b>1739,9</b>	<b>1785,0</b>	<b>1828,9</b>
30,00	102,0	108,2	114,0	119,6	124,9	130,0	134,9	139,6	144,2	148,7	153,0	157,2	161,2	165,2
	<b>1209,8</b>	<b>1283,3</b>	<b>1352,1</b>	<b>1418,5</b>	<b>1481,4</b>	<b>1541,9</b>	<b>1600,0</b>	<b>1655,7</b>	<b>1710,3</b>	<b>1763,7</b>	<b>1814,7</b>	<b>1864,5</b>	<b>1911,9</b>	<b>1959,3</b>

Example: the boiler to which the burner must be coupled has a power at the firebox of 340 kW.  
 The burner functions at 12 bar and has two-stage functioning, therefore two nozzles. The flow rate must be fractionated with the following nozzles:  
 1 nozzle with 2,0 GPH on the second flame that at 12 bar develops 98,8 kW  
 1 nozzle with 5,0 GPH on the first flame that at 12 bar develops 246,9 kW  
 Total of the three nozzles: 345,7 kW, as requested by the boiler.  
 If the best nozzle is not available, by acting on the regulation it is possible to vary the pump pressure in order within the limits of 11 - 14 bar, to obtain the desired flow rate.





## Dual-pipe supply



N. B.: If the piping length exceeds 60m, a supply pump is recommended - d10 (2), d12 (2): for two flame burners..

## Combustion control

In order to obtain the best combustion yield, and with respect for the environment, it is recommended to perform control and regulation of combustion with suitable tools. 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 11-12 %.

- Smoke number (Bacharach). This indicates that solid unburned particles are present in the combustion gas.

If n°2 on the BH scale is passed, check that the nozzle is not faulty and that it is suitable for the burner and boiler (brand, type, spray angle). In general the BH n° tends to decrease by raising the pressure in the pump. In this case it is necessary to pay attention to the fuel flow rate that increases and therefore, if required, reduce the capacity at the nozzle.

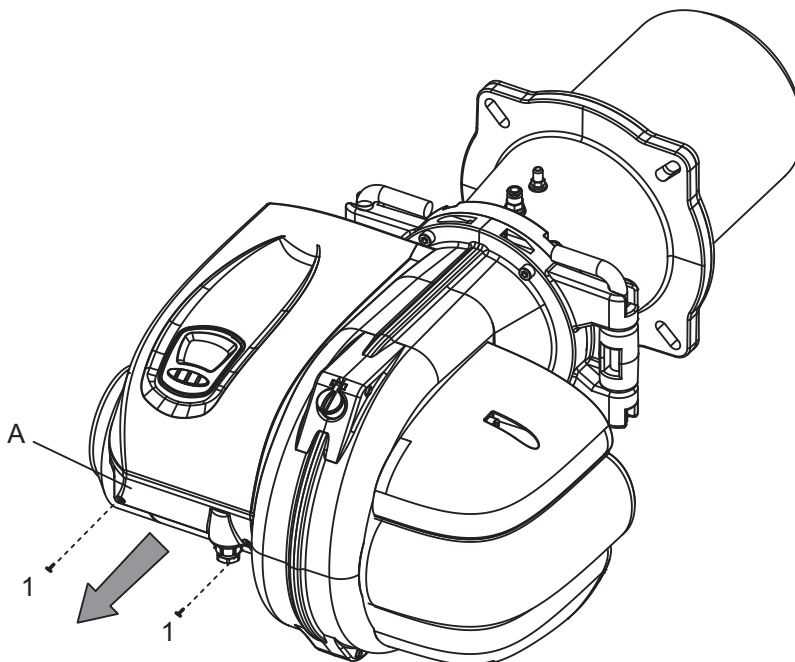
- Flue gas temperature. It is a value that represents the dispersion of heat through the flue; the higher the temperature the greater the dispersion and the lower the combustion yield.

## MAINTENANCE

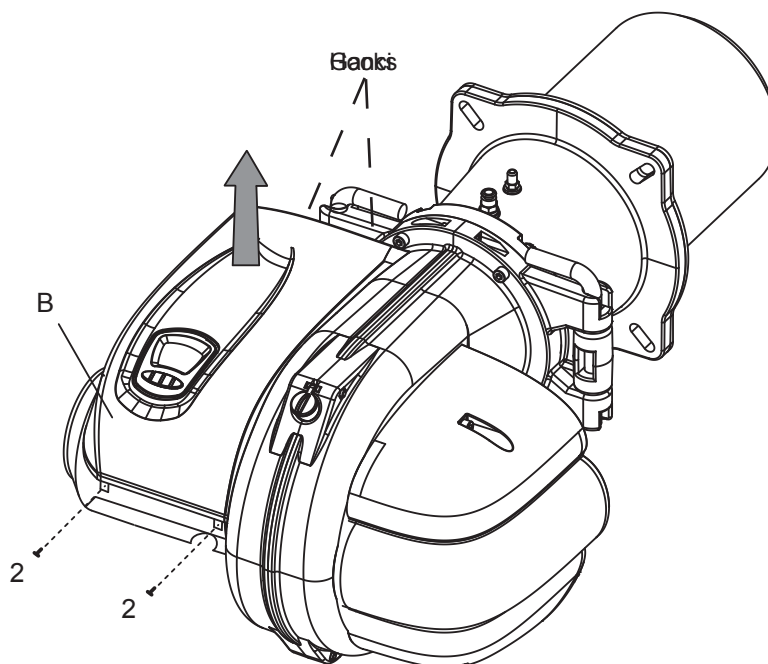


### Electric control board

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.



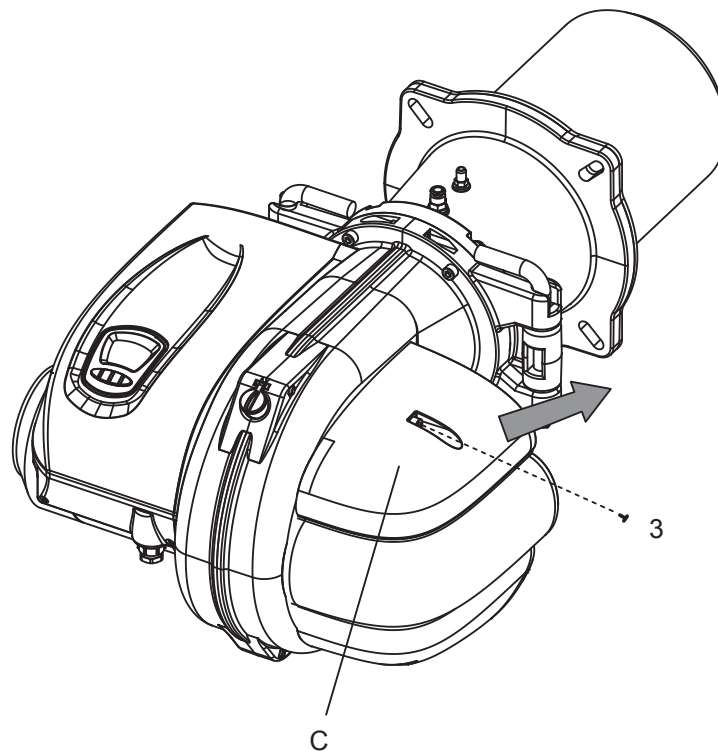
It is now possible to access the screws (2) that block the electric control board lid (B). Loosen the screws (2) and lift the lid (B) paying attention to the lid blocking hooks positioned on the rear of the electric control board



#### **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.

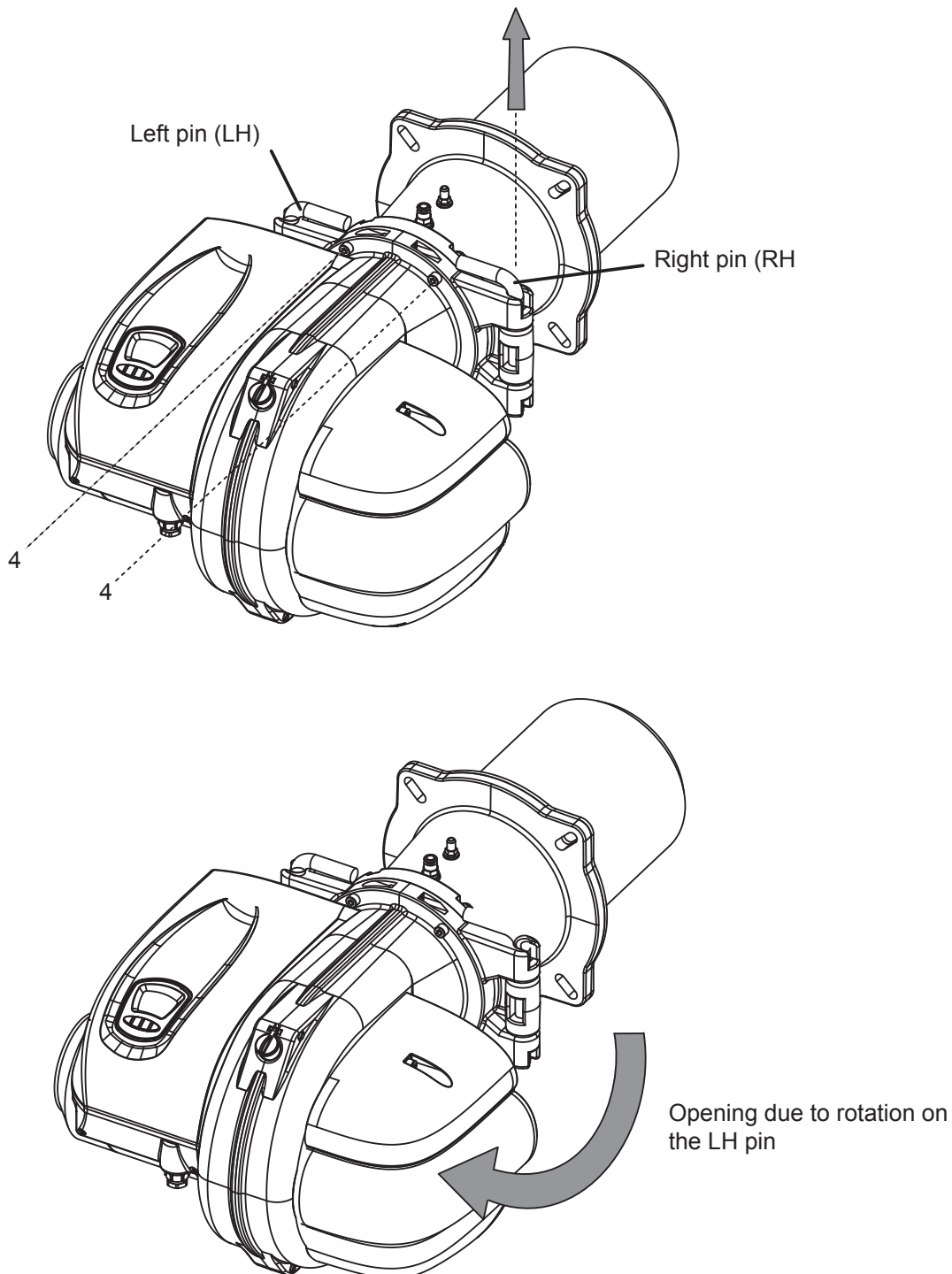




### **Burner opening and access to the combustion head and regulation of the air ring**

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.



For regulation of the air ring, see the REGULATIONS paragraph

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.

## **LAMBORGHINI CALORECLIMA**

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